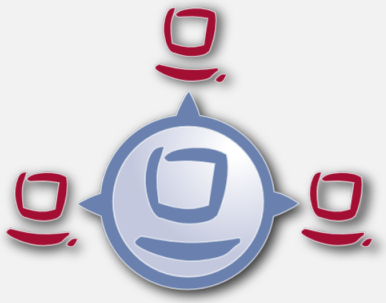


opsi manual opsi version 4.0.7

uib gmbh
Bonifaziusplatz 1b
55118 Mainz
Tel.:+49 6131 275610
www.uib.de
info@uib.de

Stand: 19.10.2017

Contents

1 Copyright

2 Introduction

2.1 Who should read this manual?

This manual is written for all who want to gain a deeper insight into the mechanisms and the tools of the client management system opsi ("open pc server integration").

It presents a complete HOWTO for the use of opsi while emphasizing the understanding of the technical background. The decision maker who decides on using opsi as well as the system administrator who works with it will get a solid foundation for their tasks.

2.2 Notations

Angle brackets < > mark abstract names. In a concrete context any marked *<abstract name>* must be replaced by some real name. Example: The file share, where opsi places the software packets, may abstractly be noted as *<opsi-depot-share>*. If the real fileshare is `/var/lib/opsi/depot`, then you have to replace the abstract name by exactly this string. The location of the packet `<opsi-depot-share>/ooffice` becomes `/var/lib/opsi/depot/ooffice`.

Example snippets from program code or configuration files use a Courier font, with a background color:

```
depoturl=smb://smbhost/sharename/path
```

3 Overview of opsi

Tools for automated software distribution and operating system installation are important and necessary tools for standardization, maintainability and cost saving of larger PC networks. Normally the application of such tools comes along with substantial royalties, whereas opsi as an open source tool affords explicit economics. Expenses thereby arise only from performed services like consulting, training and maintenance, and perhaps from low cofunding rates if you like to use some of the non free modules.

Although the software itself and the handbooks are free of charge, the process of introducing any software distribution tool is still an investment. To get the benefit without throwbacks and without a long learning curve consulting and education of the system administrators by a professional partner is recommended. uib offers all these services around opsi.

The opsi system as developed by uib depends on Linux-servers. They are used for remote installation and maintenance of the client OS and the client software packets ("PC-Server-Integration"). It is based as far as possible on free available tools (GNUtools, SAMBA etc.). The complete system all together is named opsi (Open PC-Server-Integration) and with its configurability is a very interesting solution for the administration challenges of a large computer park.

3.1 Experience

opsi is derived from a system, which is in use since the middle of the 90's with more than 2000 Client-PCs in different locations of a state authority. Since that time it has continuously been adapted to the changing Microsoft operating system world. As a product opsi is now accessible for a broad range of interested users.

You can find an geographical overview of the registered opsi-installations at: opsi-map

3.2 opsi features

The core features of opsi are:

- automatic software distribution
- automatic operating system installation
- hard- and software inventory
- comfortable control via the opsi management interface
- support of multiple depot-servers

3.3 opsi Extensions

- Management of licenses
- MySQL-Backend
- Nagios Connector
- Installation ab Shutdown
- Local Image Backup (Rapid client restore of student computers. For public authorities (e.g. schools) only)
- Linux Agent
- WAN Extension (Support for clients behind slow connections)
- User Profile Management (manipulation Profiles even with Roamin Profiles)
- OTRS::ITSM Connection - via KIX4OTRS by cape IT gmbh

3.4 Structure

The configuration of opsi requires some data management. All non-server components are using a web service for data exchange with the opsi server. They exchange data via the *opsiconfd*, and the *opsiconfd* forwards the data to the backend manager which passes the data into the selected backend.

opsi supports different backends: Backends:

- File based
- MySQL based

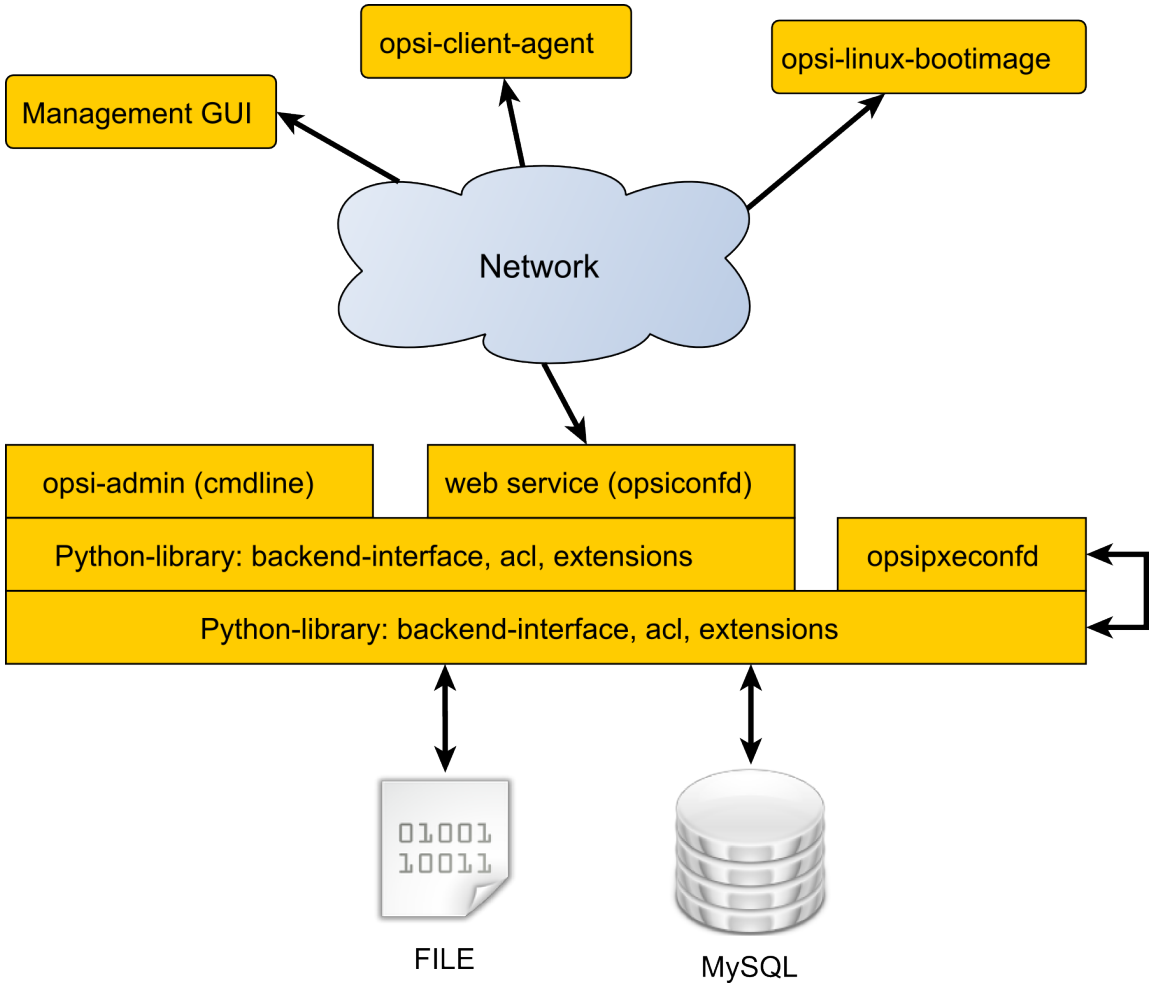


Figure 1: Scheme: opsi with File / MySQL backend

More details you will find at Section 5.6.

The backend configuratin will be found at the files in ther directories `/etc/opsi/backendManager` and `/etc/opsi/backends`.

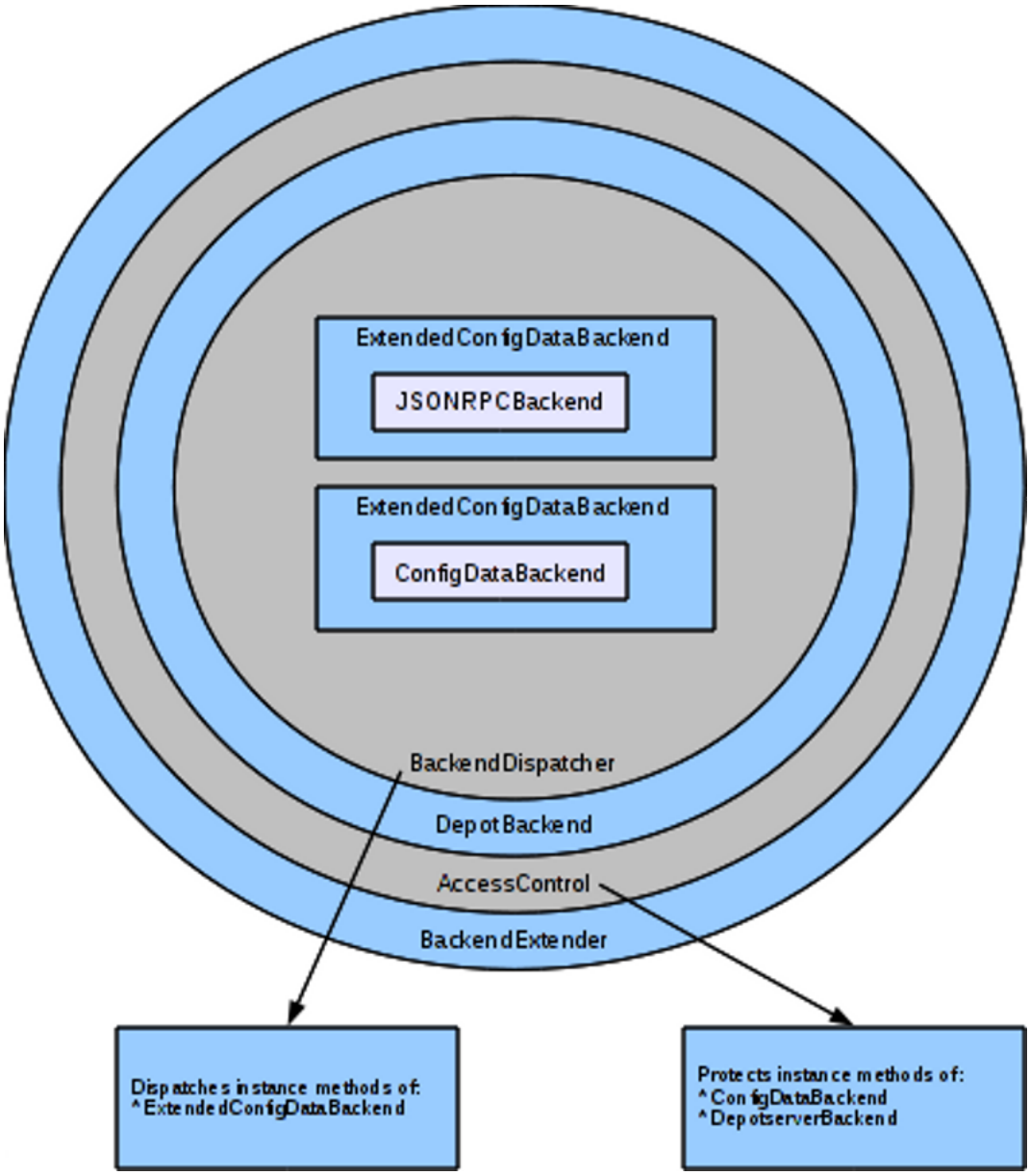


Figure 2: Scheme: backend layers and access control

The configuration files in `/etc/opsi/backends` define the backends.

Which backend is used for which data, is configured in the file `/etc/opsi/backendManager/dispatch.conf`.

The file `/etc/opsi/backendManager/acl.conf` defines who has access to which methods.

Below the directory `/etc/opsi/backendManager/extend.d` there could be files which defines extended opsi methods. So you will find here for example the files which define the action based (*legacy*) methods by mapping them to the object based methods (`/etc/opsi/backendManager/extend.d/20_legacy.conf`).

A more detailed reference of these configuration files you will find at

Section 5.7.1.

4 opsi-Management GUI: *opsi-configed*

4.1 Requirements and operation

Important
Since version 4.0.7.5.22, the *opsi-configed* requires at least Java 1.8 It works with the data from a running `opsiconfd` at least of version 4.0.6.

You find the current version of the *opsi-configed* as an opsi-package for local installation on download.uib.de. In non-opsi systems the *opsi-configed* can be simply installed by copying the required jar archive files as contained e.g. in the opsi-package. In order to automate this, the setup program opsi-configed-setup.exe can be used (from http://download.uib.de/opsi4.0/helper/)

The current stable version of the *opsi-configed* is as well contained in the opsi-server installation, and is maintained by means of the Linux distribution methods. This version of the program has the identical code with the corresponding local version, but is primarily used as a Java Webstart application. It may be executed

- via the webstart link on the start page https://<servername>:4447
- via the URL https://<servername>:4447/configed
- or by directly calling https://<servername>:4447/configed.jnlp

Without using a browser you can execute (e.g. in a start menu link)

javaws https://<servername>:4447/configed.jnlp

If the server has a graphical desktop, the *opsi-configed* can be started as well directly on the server via a desktop menu entry or in a shell by `/usr/bin/opsi-configed`.

With non-gui servers there exist only the special non-gui start options

- *--version*
- *--help* bzw. *-h*
- *--querysavedsearch [SAVEDSEARCH_NAME]* bzw. *-qs [SAVEDSEARCH_NAME]*
- *--swaudit-pdf FILE_WITH_CLIENT_IDS_EACH_IN_A_LINE [OUTPUT_PATH]*

If the additional required jar archives exist in the path the *opsi-configed* can be started simply by `java -jar configed.jar`.

With `java -jar configed.jar --help` you'll get a list of the command line options .

```
-l LOC                 --locale LOC                   Set locale LOC (format: <language>_<country>)-h HOST          \
             --host HOST                    Configuration server HOST to connect to
-u NAME                --user NAME                    User for authentication
-p PASSWORD     --password PASSWORD             password for authentication
-c CLIENT              --client CLIENT         CLIENT to preselect
-g CLIENTGROUP  --group CLIENTGROUP     CLIENTGROUP to preselect
-t INDEX                        --tab INDEX                  Start with tab number INDEX, index counting starts with \
    0, works only if a CLIENT is preselected
-d PATH                --logdirectory PATH       Directory for the log files
-r REFRESHMINUTES                       --refreshminutes REFRESHMINUTES                Refresh data every \
    REFRESHMINUTES  (where this feature is implemented, 0 = never)
-qs [SAVEDSEARCH_NAME]          --querysavedsearch [SAVEDSEARCH_NAME]   On command line: tell saved host searches list \
    resp. the search result for [SAVEDSEARCH_NAME])
--gzip [y/n]                                                    Activate gzip transmission of data from opsi server yes\
    /no
```

```
--sslversion PREFERRED_SSL_VERSION      Try to use this SSL/ TLS version
--ssh-key SSHKEY                                        full path with filename from sshkey used for \
    authentication on ssh server
--ssh-passphrase PASSPHRASE                    passphrase for given sshkey used for authentication on ssh server
--version                                                 Tell configed version
--collect_queries_until_no N                          Collect the first N queries; N = -1 (default, no collect), 0 = \
    infinite
--help                                                  Give this help
--loglevel L                                            Set logging level L, L is a number >= 0, <= 5
--halt                                                  Use  first occurring debug halt point that may be in \
    the code
--sqlgetrows                                            Force use sql statements by getRawData
--nosqlrawdata                                       Avoid getRawData
--localizationfile EXTRA_LOCALIZATION_FILENAME                                                    Use \
    EXTRA_LOCALIZATION_FILENAME as localization file, the file name format has to be: configed_LOCALENAME.properties
--localizationstrings                                                                                          \
     Show internal labels together the strings of selected localization
--swaudit-pdf FILE_WITH_CLIENT_IDS_EACH_IN_A_LINE [OUTPUT_PATH]         export pdf swaudit reports for given clients (\
    if no OUTPUT_PATH given, use home directory)
```

4.1.1 Logging of the *opsi-configed*

By default, the *opsi-configed* uses its log level 3 "Info". The level can be raised to 4 "Check" or 5 "Debug".

To change the log level the command line option --loglevel [LEVEL] can be used. It is not recommended to set level 5 as long as not the start process needs to be inspected. For, with level 5, the produced log file is very large; it is difficult to get loaded and viewed. When the *opsi-configed* is running and a potential error situation is expected the log level can be raised via the menu entry Help/ConfigEditor log level.

Level 4 can be helpful since with it, the service calls are logged. With luck, level 5 offers a detailled view of actions.

Since version 4.0.7.6.12 the logfiles are deposed by default in the user home directory. In Windows the folder

c:\Users\[User name]\AppData\Roaming\opsi.org\log

In Linux the default logfiles folder is the (hidden) subfolder ".configed" in the user home directory.

The current logfile is named configed.log, the up to 3 preceding versions are configed_0.log, configed_1.log, configed_2.log.

The logging directory can be changed via the command line option "-d".

The current logfile path is displayed at the Help menu, entry "Current logfile". The filename can there be retrieved in order to use it in an open file dialog of a viewer program or can be directly opened by the default application for .log files.

4.1.2 Choosing the language

The *opsi-configed* tries to use the language following the OS defined locale. If the matching translation file is missing English is used as default language. If terms in translations file are missing the expressions of the Englisch translation are used as default.

When calling the *opsi-configed* you can set a locale via the command line option

-l resp. --locale

On principle, the locale has the format language_region, each component with two characters, eg. en_US of de_DE. It suffices to give the two character language code since there no region specific variants prepared.

In a running *opsi-configed* the language can be switched via the menu item File/International. A change triggers a re-initialization of the program with a (nearly complete) rebuilding of the visual components in the new language.

Finally the call parameter

--localizationfile

can be used for directly prescribing a localiziation file. The additional parameter

--localizationstrings

has the effect that the display of the localized expressions is combined with displaying the terms for which expressions should be given. This can be used for producing and testing a localization file.

4.1.3 Custom start values with Java Web Start

When starting via Java Web Start you can apply the same parameters as if the configed is started as a local application but with a slightly different syntax. It has the form:

```
javaws "https://<servername>:4447/configed.jnlp?optionname1=value1&optionname2=value2&..."
```

E.g„ to pass the user name *Roger* the following call must be applied:

```
javaws "https://<servername>:4447/configed.jnlp?user=Roger"
```

It's a standard http parameter syntax where the option names are used omitting the dashes.

4.2 Login

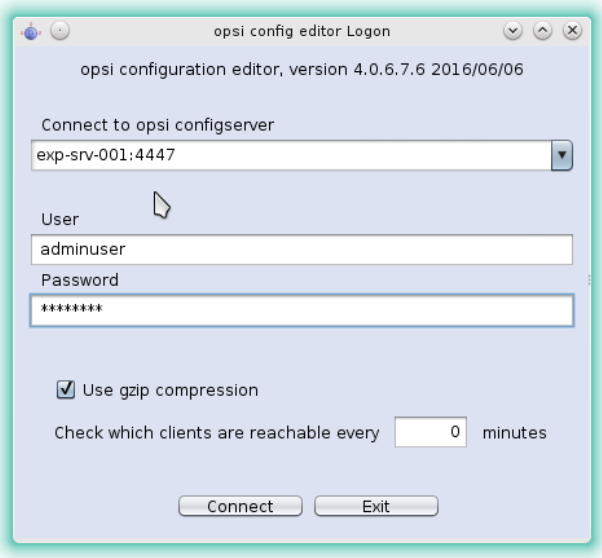


Figure 3: *opsi-configed*: login mask

The *opsi-configed* tries to connect to the opsi server via https. The login is done with the given parameters *opsi server[:Port]* (default port 4447 – opsiconfd) and the user/password pair of the *opsi-config-server* account. For a successful login the provided user has to be a member of the unix group *opsiadmin*.

In the local user profile, the *opsi-configed* saves certain session info in order to rebuild the essential working context after a restart, in particular a selected client group. Since version 4.0.7 the session data is used to produce a selection list of opsi servers to which you were connected (e.g. a productive one and a second one for experimental purposes). The last server used gets the highest place, and can be directly used again.

The gzip compression in HTTP protocol reduces the amount of data being transferred at the expense of an extended processing time, this is due to the fact that the data must be compressed and uncompressed. It has been observed that the reaction times tend to be shorter without compression in the local network, as the effects normally surpass

the prolonged processing time. For transmissions over the WAN, it tends to be the opposite. In the practice, little difference is noticed on LAN connections, but relevant differences are noticed on WAN connections, so the Gzip option is enabled by default.

The feature *check which clients are reachable* runs in the background and shows the results in the client table. It can be enabled from the login screen mask or via command line parameter. The default refresh interval is 0 min (= deactivated). It should be observed though that a too short refresh interval produces a lot of network waiting states which can slow down the opsi server.

4.3 Copy & Paste, Drag & Drop

You may copy the selected entries from nearly every section of the *opsi-configed* to the clipboard using the standard key combinations (*Ctrl-Insert*, *Ctrl-C*). This may be used to transfer interesting data to other programs.

For most of the tables you may also use *Drag & Drop* to copy the data e.g. to *Excel* or a

4.4 opsi-configed modes Client configuration / server configuration / license management

To switch between the different usage modes of the *opsi-configed*, use the buttons in the upper right corner of the *opsi-configed* frame. Since version 4.0.4, there are six buttons.

Figure 4: opsi-configed: Usage modes

The first three buttons allow you to change the editing target of the main window: client configuration, server configuration. On the other hand, each of the buttons *group actions*, *product actions* and *license management* starts a special window to manage the specific objects or actions.

These windows can as well be opened via the main menu item *windows* (since *opsi-configed* version 4.0.7).

4.5 Depot selection

All opsi-depotservers that are integrated with your server, are listed in the upper left corner of the *opsi-configed*. By default the depot on your *opsi-config-server* is selected and the clients belonging to this *opsi-depot* are shown.

You can select multiple Depots at the same time and edit their clients together. However, only the selected depots are synchronized with each other. Trying to edit clients from asynchronous depots together will be rejected with an appropriate warning and the corresponding error message.

As of version 4.0.5, there is no need to carry out a complete data-reload when switching to a different depot-server, that means, when you select a depot its data is loaded immediately. In addition, there are the following buttons:

- (=+) : Marks all depots with identical product stocks.
- (++) : Marks all depots (you can also use *Ctrl-a*)

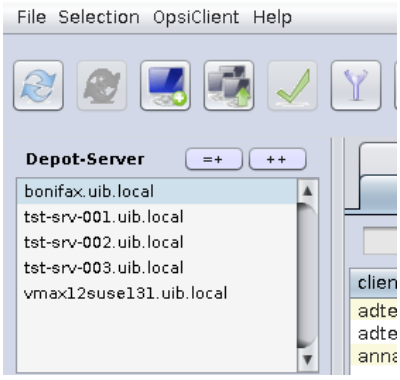


Figure 5: *opsi-configed*: depot selection

4.6 Cient selection

After a successful login, the main window pops up and shows the tab *Client selection*. This tab shows a list of known clients from the selected *opsi-depot* resp. the clients which are selected using the *tree view control* on the left side of the *opsi-configed*.

Since version 4.0.4, the *opsi-configed* saves on the local machine, for the current user, the current depot server and group selection. If the *opsi-configed* is restarted, you can continue working at the point where you were.

Please note, that group selection is preserved when changing depot selection. In order to see all clients in the other depot the group selection has to be changed appropriately.

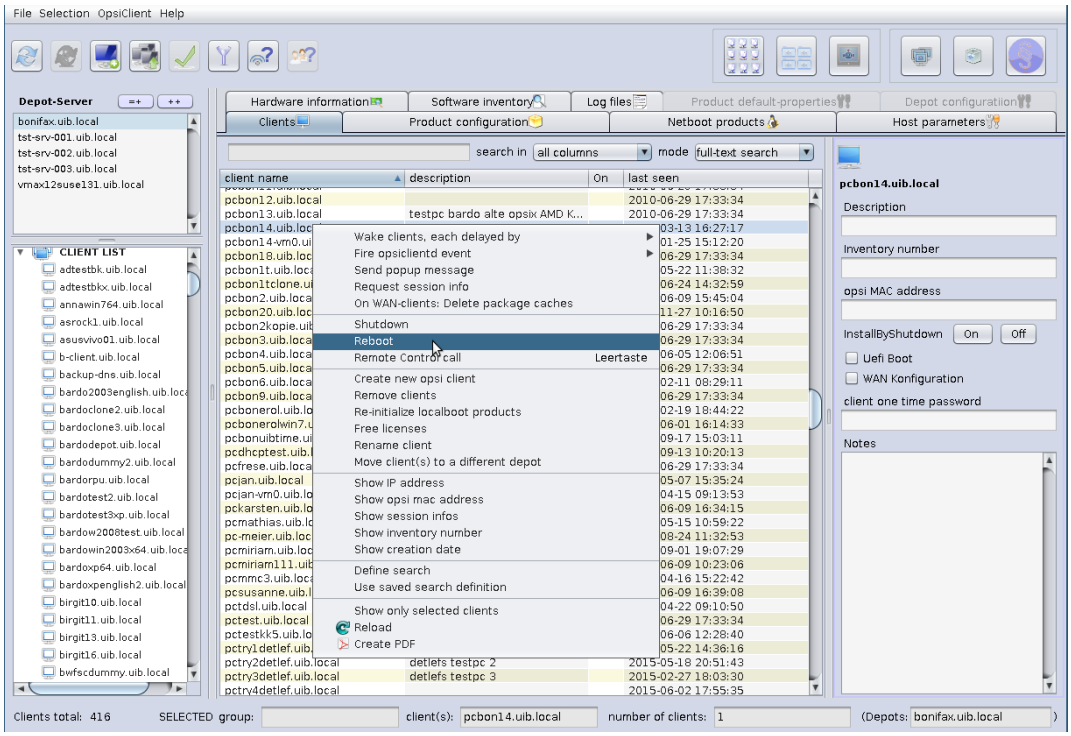


Figure 6: *opsi-configed*: client selection mask

You may select a line of the list not only by manual scrolling and selecting but also by a String search. This requires that you enter a String into the search field at the top of the list

How the search works is determined by the selected elements in two drop down lists:

Via field selection you can choose if

- all fields (more precisely, all fields that are for this temporary configuration represented as columns) are searched (default), or
- only one field (and which one) is searched.

Concerning the method of search you may select between the options (since 4.0.7):

- Full-text: the search string is used in a similar way to a web search on a certain search engine for example in the standard manner; i. e., if the input contains several keywords (delimited by blanks) then the word elements will be a match if any of the input parts are fully contained in some of the columns.
- Full-text (complete string): the search string is used like using a web search on a search engine the search string embraced by citation marks;

  a. e. a table line will match if the complete input string is part of one of the columns content.

- Start-text search: a table line will be a match if the column text starts with the search string.
- Regular expression: the search string is interpreted as a so called regular expression; i.e., a line will be a match if the input string produces a match according to the rules of regular expressions (as described in the java doc for java.util.regex.Pattern).

The enter key produces the next search hit. If there is no match it advances the mark to next line.

More selection functions based on String search are shown in the context menu of the search field.

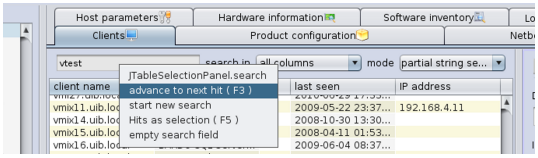


Figure 7: *opsi-configed*: Search function in the client selection list

Examples of Search Patterns
All PCs which have a name or a description containing the character sequence *Miller* with capital *M* or with *m* are found by using the pattern
*.*iller.**
The dot in " .* " means "arbitrary character", the asterisk " * " means "arbitrary number of occurrences (of the beforehand designated element)". That is
*.*iller.**
it matches, if anything (any number of any characters) come before *iller* and anything after *iller*. Since "any number" may be zero
Home of Miller
matches where no character follows after *iller*.
But to ensure that we do not mark *Tiller* as correct a more precise pattern would be
.[Mm]iller.**
Several characters enclosed in brackets are interpreted as the searched value must contain *one of the enumerated characters*. With this more precise pattern, every string is recognized which contains either *Miller* oder *miller* but no other string.
Here is yet another example, a pattern search for products:
*0.-opsi.*standard*
matches for all products which have a name beginning with "0", followed by an *arbitrary character*, followed by *-opsi*, followed by *arbitrary characters* (in *arbitrary number*); finished by *standard*.
To ensure that the second character is a number symbol, i. e. one of the characters "0", "1", "2", "3", "4", "5" , "6", "7", "8", "9", one can write
*0[0123456789]-opsi.*standard*
As short hand for *[0123456789]* one can use, since it is a complete partial sequence of the sequence of all characters, *[0-9]*. Therefore the search pattern reduces to
*0[0-9]-opsi.*standard*
Matching products e.g.
03-opsi-abo-standard
or
05_opsi-linux_standard
More informations on the topic can be found in the java api doc, key word "java.util.regex.Pattern".

4.6.1 The clients list

The clients list has per default the columns *client name*, *description*, *on*, *IP address* and *last seen*.

- *client name* is the *full qualified hostname* which is the client name including the domain name
- *description* is a free selectable description which you can edit in the top right hand side of the window
- *On* shows after clicking the button *Check which clients are connected* the result of this query. This feature runs in the background and shows the results in the client table. It can be enabled from the login screen mask or via command line parameter. The default refresh interval is 0 min (= deactivated).

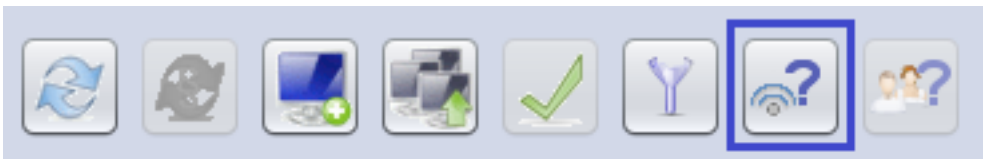


Figure 8: *opsi-configed*: Button *Check which clients are connected*

Figure 9: *opsi-configed*: Client reachable

Figure 10: *opsi-configed*: Client unreachable

- *IP address* shows the IP number to which the opsi server resolves the client name.
- *last seen* shows the date and a time of the last client connect to the opsiconfd web service

Some columns are deactivated by default:

- *session infos* (data is retrieved from the operating system running on the specific client)
- *Inventory No* (displaying some optionally entered data)
- *created* (date and time of client creation)
- *opsi mac address* (hardware address of the client as used by opsi)

You may activate these columns using the context menu. The configuration of the columns being displayed may be changed using the entry *configed.host_displayfields* in the server configuration.

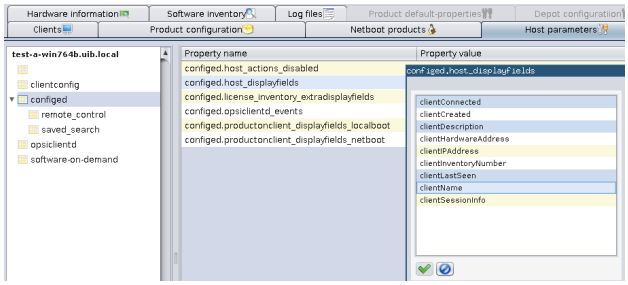


Figure 11: *opsi-configed*: change the default for visible columns in the clients list

Adding the column *session infos* enables the button "request session infos from all clients" in the button panel.

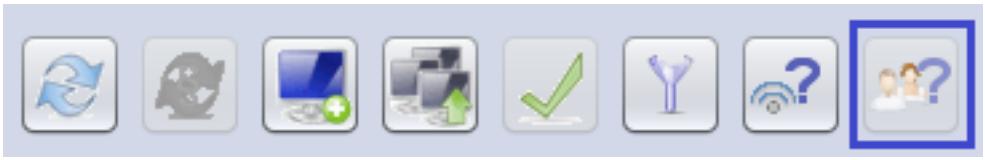


Figure 12: *opsi-configed*: Button *Sessioninfo*

When this button is clicked the *opsiconfd* tries to connect to all clients and to retrieve data of the active user sessions. From the result, the account names are shown in the column *session infos*. Instead of using the button you may start the request only for the selected clients via the context menu or the main menu entry *OpsiClient*. By doing this, network timeouts are avoided.

Since the search function for the client list works (if not configured otherwise) on all displayed columns you may now find out which is the client belonging to a logged in user (with known account name).

To sort the clients by a certain column click on the top header of that column.

4.6.2 Selecting clients

You can select one or multiple clients to work with. The client view can be restricted to the selected clients by clicking the funnel icon or from the menu by *Grouping / Show only selected clients*.

A selected client group can be saved with the icon *Save grouping* or from the menu by *Grouping / save group* with a free selectable name.

You can use the mouse to add the selected clients to an existing group (by dragging them to an existing group which is displayed in the tree view).

In the client selection dialog (as called via menu *Selection / Define search*) clients can be selected using a variety of criteria based on their configurations.

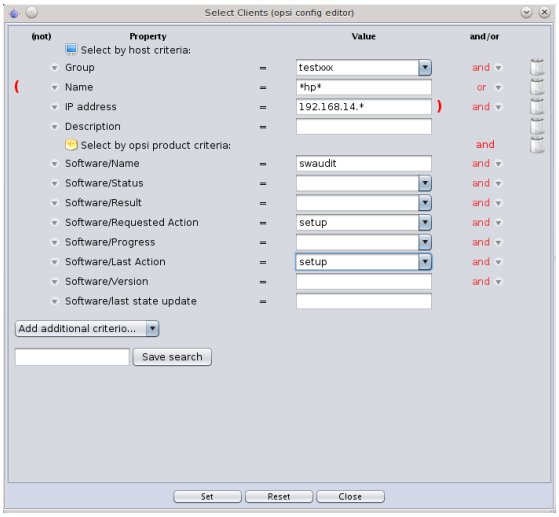


Figure 13: *opsi-configed*: Selection dialog

E.g., it is possible to search for opsi installed products as well as software found by the opsi software audit. You may as well search for PCs satisfying certain hardware conditions. Criteria may be combined by logical *AND* or *OR* operations and may be negated by a *NOT* (which is produced by a click on the Not-Field before the property field). Search strings can be given as fixed strings combined with asterisks * as wildcard symbols.

Search definitions can be saved and then again used via the menu item *Selection/Use saved search definition*.

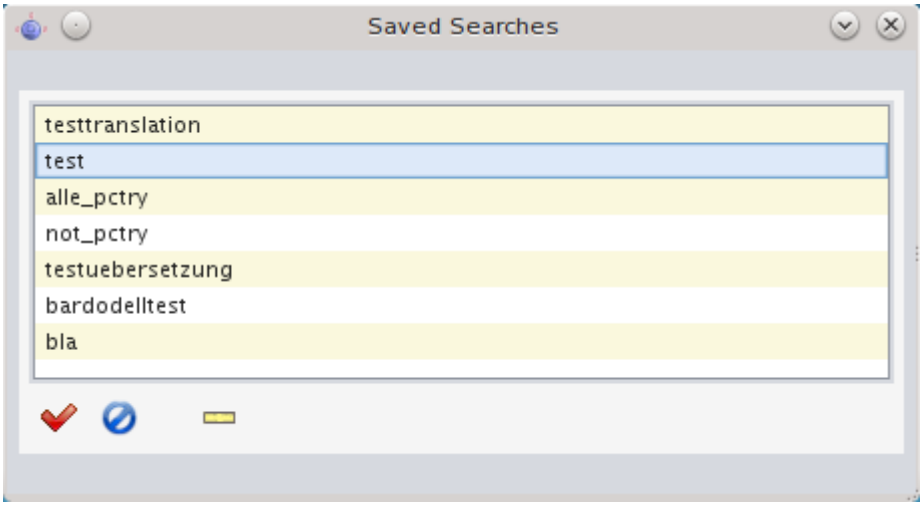


Figure 14: *opsi-configed*: Saved Search

It is also possible to run a saved search from the command line when the opsi-configed editor is started. By including the flag "-qs" and the name of the saved search, the configuration editor will start with the saved search results. If the name is omitted, then a list of available searches will be displayed.

To detect failed installations, the menu item *Selection* offers *Failures with product* and *Failures occurred* (today, since yesterday, ...), since version 4.0.5 .
Choose the first setting to get a list of all products. If you select a single product, all clients will be shown, where the installation of this product failed.
When choosing for instance *Failures occured - today*, all the clients will be marked, where an product installation failed today.

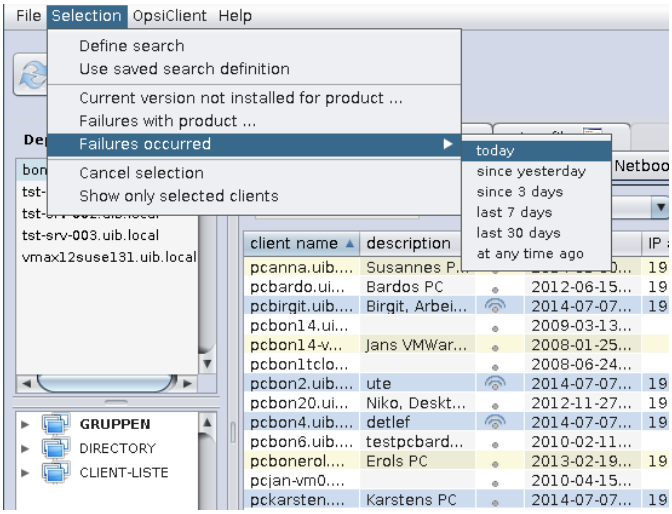


Figure 15: *opsi-configed*: Failed Actions

4.7 Client selection and hierarchical groups using the tree view

Clients can be grouped in a convenient way by using the tree view control placed on the left side of *opsi-configed* frame.

4.7.1 Basic concepts

The tree view control has three base nodes *groups*, *directory* and *client list*. Alls clients of the selected depots are displayed in the group *client list*.

The nodes *groups* and *directory* are different in so far as each client can have any number of locations in the *groups* subtree but has a unique location in the *directory* subtree; as long as there was no other assignment to subgroup of *directory* a client is automatically placed into the group *NOT_ASSIGNED*.

If you select a client, all groups to which the client belongs will get color marked icons.

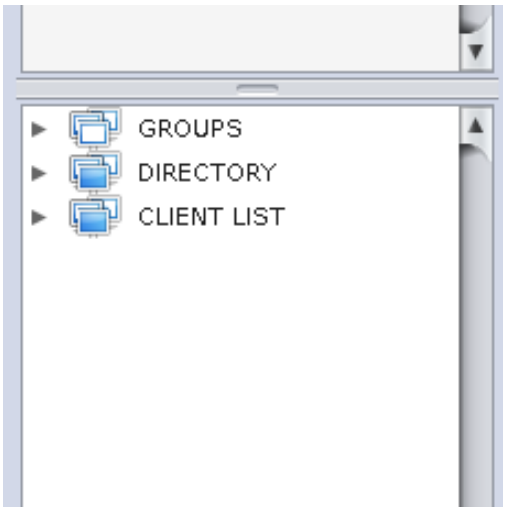


Figure 16: *opsi-configed*: Tree view with clients and groups

4.7.2 How to ...

By a click one a node (or a group) all clients beyond this node will be shown in the *Clients* tab, but none of these clients is selected for processing.

By a click one a client, this client will be shown in the *Clients* tab and selected for processing. You may also use this way to change the selected client while you are in a other tab like product configuration without coming back to the clients tab.

You may use Ctrl-click and Shift-click to select multiple clients. This tree view control show the groups which are created according the chapter

You may also create groups by using the context menu above *ALL* or any existing group.

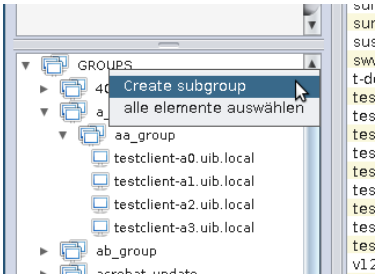


Figure 17: *opsi-configed*: Using the context menu to create a new subgroup

You will be asked for the new groups name.

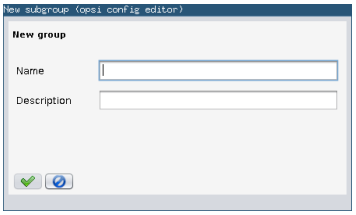


Figure 18: *opsi-configed*: Dialog: Group name

A group can be populated with clients using Drag&Drop by

- copying clients from the *Clients* tab to the group in the tree view (left mouse button)
- copying clients from the tree view control below the node *ALL* to group in the tree view (left mouse button)
- moving clients from a group in the tree view control to a other group in the tree view (left mouse button)
- copying clients from a group in the tree view control to a other group in the tree view (Ctrl-left mouse button)

A group can

- be moved to a different location via drag & drop.

The context menu of a group item can be used

- to create a subgroup;
- to edit the group properties;
- to delete the group together with its subgroups and all client assignments of them;
- to remove all client assignments while keeping the group and its subgroups;
- to display the the contained clients and select them in one step.

4.8 Client processing / Client actions

Using the menu *OpsiClient* or the context menu in the *Clients* tab you may choose from a lot of client specific operations

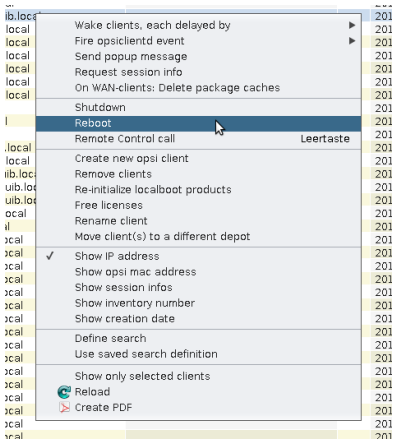


Figure 19: *opsi-configed*: : context menu *Clients* Tab

4.8.1 Install By Shutdown, Uefi Boot and WAN Configuration

Several client standard configurations can be applied directly in the client information panel which is located on the right side of the clients page. Please observe that UEFI support and WAN configuration both are currently based on non free extension modules. If these modules are not active the corresponding buttons are disabled.

- Install By Shutdown:
  In Section 9.17 , the method do switch to Install by Shutdown installation is described en detail. You can automatically trigger this configuration by pushing the On-Button for InstallByShutdown. Observe that this requires a opsi-client-agent reinstall or reconfigure. Alas, the state of the configuration can currently only be seen in the product property `on_shutdown_install`of the opsi-client-agent product.

- Uefi Boot:
  The state of checkbox Uefi Boot indicates, if a client is configured for UEFI boot. It is activated the value of the client host parameter `clientconfig.dhcpd.filename` is changed to `linux/pxelinux.cfg/elilo.efi` geändert. (For more infos cf Section 9.6)

- WAN-Konfiguration:
  Der opsi-configed prüft, ob die Standard-WAN-Konfiguration für den Client vorliegt oder nicht. Entsprechend ist der Haken für WAN-Konfiguration gesetzt oder nicht. Und wenn man den Haken manuell setzt, wird die Standard-Konfiguration eingerichtet.

Diese Konfiguration ist seit Version 4.0.7.6.5 nicht mehr hart kodiert , sondern wird aus den Server-Hostparametern configed.meta_config.wan_mode_off* ausgelesen bzw. als deren Verneinung interpretiert. Wenn man die automatisch eingerichteten Meta_Config.wan_mode*-Parameter beibehalten hat, kommt die in Section 9.10.5 beschriebene, von der uib GmbH empfohlene Standard-WAN-Konfiguration zum Zuge.

Tip
Ob der Client als WAN-Client konfiguriert ist oder einen UEFI-Boot macht, kann in der Client-Tabelle auch in passenden Spalten dargestellt werden. Für die laufende Session werden sie im Menüpunkt *OpsiClient* oder im Kontextmenü aktiviert, dauerhaft über den Eintrag configed.host_displayfields bei den Server-Hostparametern. Dann ist direkt in der Übersicht erkennbar, für welche Clients die Eigenschaft gesetzt ist, und es kann auch danach gesucht und sortiert werden.

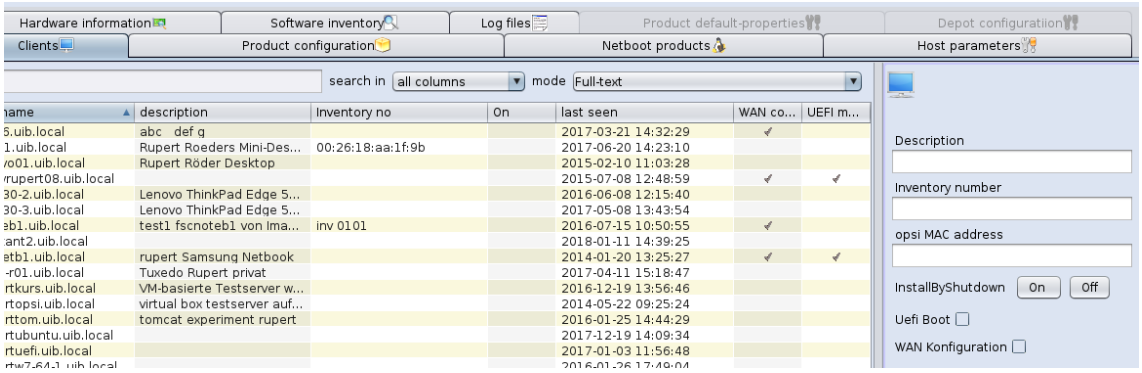


Figure 20: *opsi-configed*: Erweiterte Spaltensicht für opsi-Clients

4.8.2 WakeOnLan (*Wake selected clients*)

Choosing this menu entry, you will send the selected clients a WakeOnLan signal.

Since version 4.0.7 you can choose

- if the network signal is meant to be sent to the selected clients at once
- which delay should be between the waking of two clients
- when the process shall start (via a scheduler).

If a client is assigned to a depot server which is not the configserver then the Wake On Lan signal is not directly sent to the client, but the *opsi-configed* tries to establish a HTTPS connection to the *opsiconfd* of the depot server which in turn sends the Wake On Lan package to the client inside its network segment.

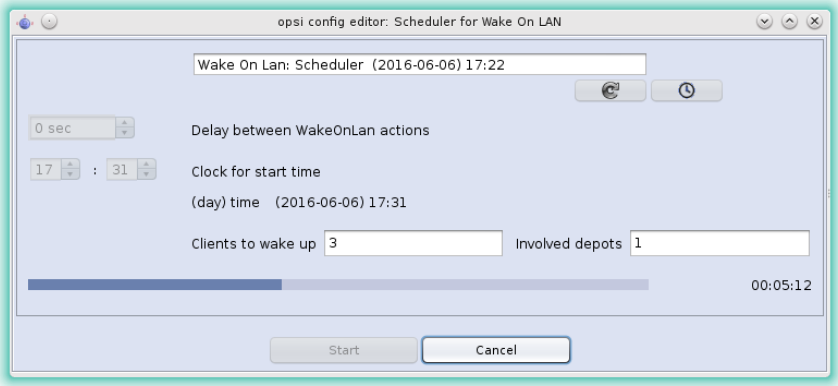


Figure 21: *opsi-configed*: Scheduler for Wake On Lan

It should be observed that it is the *opsi-configed* which triggers the actions, therefore the program must not be shut down in the meantime.

4.8.3 Fire opsiclientd event (Push Installation)

This menu entry is used to send to the *opsi-client-agent* on the selected clients a command to fire the event which is selected in the submenu. The standard event is "on demand" which means the demanded action is started at once. Be aware that this may have the effect that the client is rebooting without any warning.

To incorporate additional events (which should be configured in the opsiclientd.conf) into the submenu you have to edit the config configed.opsiclientd_events via the tab (server) host parameters.

All messages will be shown on the active desktop. If the client isn't reachable, you will get a message.

What happens exactly if you fire the event *on_demand* can be configured in the event *on_demand* configuration.

4.8.4 Sending messages (*Show popup message*)

Choosing the menu entry *Show popup message* you will get a small edit window where you can type in your message.

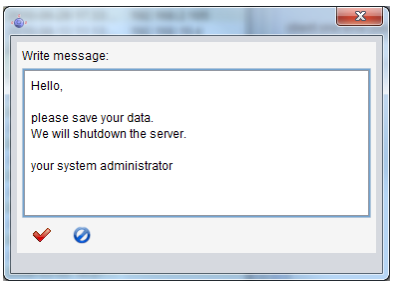


Figure 22: *opsi-configed*: opsi message edit mask

By clicking on the red tick you will send the message to the selected clients.

At the selected clients a message window will appear.

Figure 23: *opsi-configed*: opsi message display dialog

4.8.5 Session info for selected clients

The selected clients get the signal to communicte their session information. The data is shown in the session info column (if visible).

4.8.6 For WAN-Clients: Delete package cache

On WAN clients there are occasional problems with the package cache synchronization. This function resets the cache.

4.8.7 Call external remote control tools for selected clients

The option *Remote Control Software call* in the client context menu as well as the client main menu (since *opsi-configed* version 4.0.1.11) is very powerful. It can be used to use any command that the operating system offers, parametrized e.g. by the client name.

As an example there are configurations automatically generated which can be used to send a `ping` to the selected client: one `ping` command that works in Windows environment and one command that requires a Linux X environment. Please observe: *opsi-configed* calls obviously the command in its environment, i.e., we need the Linux command when the *opsi-configed* is running in Linux.

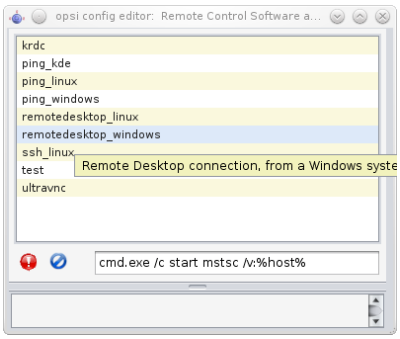


Figure 24: *opsi-configed*: Choice of Remote Control call

The selection window has three parts. The upper part lists the names of the existing commands. It follows a line, which shows the selected command and offers the chance to edit it (if this is allowed). Additionally, the line contains the buttons to execute or abandon the action. The third text area of the window captures any messages that are returned by the operating system when calling the command.

These calls offer a quasi infinite range of opportunities. For example, a command can be configured to open a Remote Desktop connection to the selected client (if it allows such connections). On a Windows system, such a command is

```
cmd.exe /c start mstsc /v:%host%
```

In a Linux environment the following command can be used:

```
rdesktop -a 16 %host%
```

In these examples serves `%host%` as a variable, which *opsi-configed* automatically replaces by the value for the selected host. Other variables that can be analogously used in the commands are:

- `%ipaddress%`
- `%hardwareaddress%`
- `%opsihostkey%`
- `%inventorynumber%`
- `%depotid%`
- `%configserverid%`

If the command is marked by the additional server configuration entry *editable* as `true`, then the command line allows ad hoc editing. For example, you may supply a requested password or vary the command as needed.

Caution
If there is some command declared as *editable* then in fact *any* program addressed at the client computer can be called by changing the editable command.

If more than one client is selected the command will be executed in a own thread for each client.

The list of remote control commands is editable via server configuration entries (cf. Section 4.16).

To define a command `example`, at minimum an entry `configed.remote_control.example` (or `configed.remote_control.example.command`) must be generated. The value of property has to be the command (in which the variables `%host%`, `%ipaddress%` etc. can be used). Additionally, an entry `configed.remote_control.example.description` can be defined. The value of this entry will be shown as tooltip (if not existing, the command itself will serve as tooltip content). Furthermore, a Boolean entry `configed.remote_control.example.editable` can be added. If its value is set to `false` the command cannot be edited in the selection window.

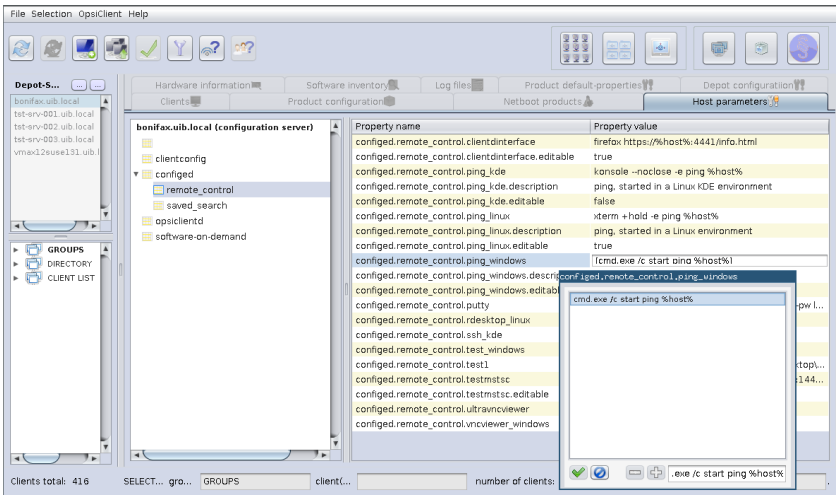


Figure 25: *opsi-configed*: Editing of remote control commands in the server properties editor

4.8.8 Shutdown / reboot of selected clients

You may send the selected clients a shutdown or reboot signal. You have to confirm this command at the opsi-configed.

Caution
If the client received the signal, it will going down with out any more questions.

4.8.9 Delete, create, rename and move clients

You may delete the selected clients from the *opsi-server*.

If you choose to create a client, an input mask opens. There you enter or confirm the required data – client name without domain specification, domain name, depot server name. You may add a textual description for this client and notes on this client.

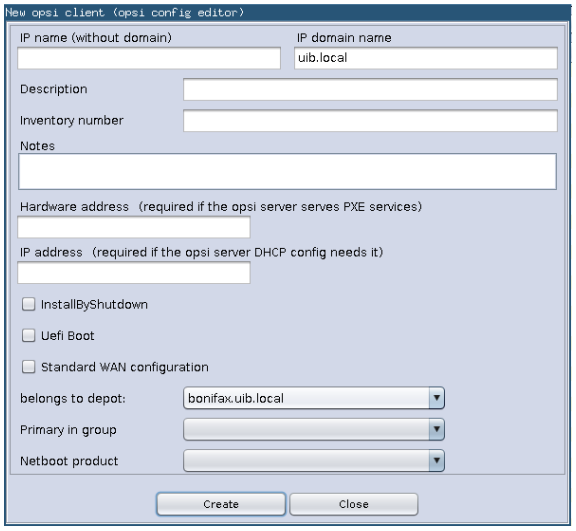


Figure 26: *opsi-configed*: creating a client

The mask also contains fields for an optional declaration of the IP-number and the ethernet (MAC) address of a client. If the backend is activated for the configuration of a local dhcp-server (which is not the default setting), this information will be used to make the new client known to the dhcp-server. Otherwise the MAC address will be saved in the backend and the IP-number will be discarded.

When creating clients you can directly for the new client specify to which group it should belong, as well as which netboot product should be directly set on setup. In addition, you can activate directly the Install by shutdown, UEFI Boot and the (standard) WAN configuration from the beginning. These settings can easily be made in the Hosts-List. These configurations are only available since the version 4.0.5.8.1 .

Since opsi 4.0.4 it is possible to disable the options for creation and deletion of an opsi client. This is used if the client creation should be managed by a different service, eg. the UCS service.

For the configuration of these options, a host parameter (config) is provided. It is named `configed.host_actions_disabled` and offers the list values

- `add client`
- `remove client`

(multiple selection allowed). The default is the empty selection meaning that no option is disabled.

The default setting can be changed so that adding and removing clients from the *opsi-configed* is disabled:

```
opsi-admin -d method config_createUnicode "configed.host_actions_disabled" "Disable host actions" ["add client","remove\
     client"] ["add client","remove client"] false true
```

You may rename a selected client, you will be asked for the new name.

Moving a client to a different depot-server. If clicked the following windows appears with a list of existing depot-servers

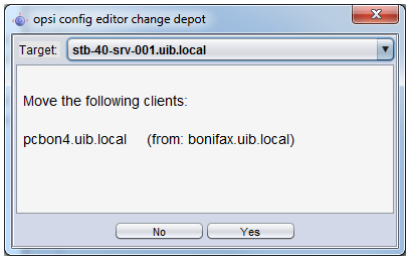


Figure 27: *opsi-configed*: change the depot of a client

4.9 Product configuration

Switching to the tab *Product configuration* you get a list of available software packages with its installation status and action status for the selected clients.

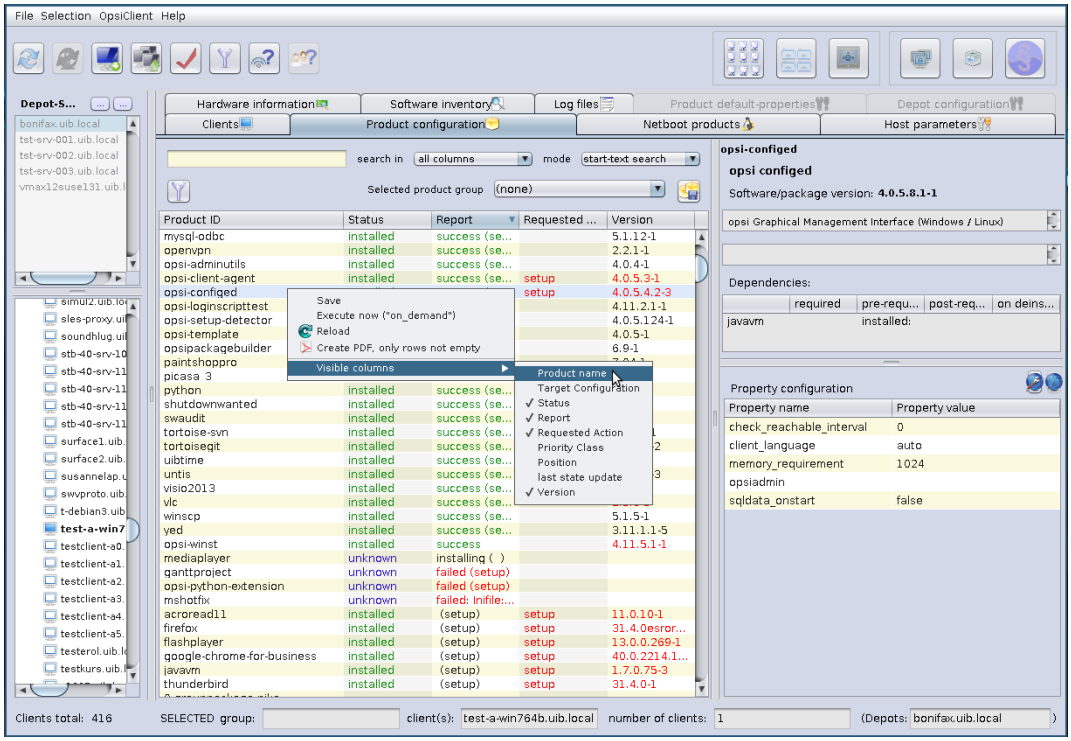


Figure 28: *opsi-configed*: product configuration mask

Since opsi 4.0.4 a search function is added.

With the search function, products can be searched by product names and (if desired) in combination with special values in the fields of the product table (like searching the client table). Therefore a search string can be entered. The

search starts immediately and the first matching line is marked . If there is no match to be found (or characters are removed from the search string), the first line of the table is marked.

The context menu offers some more options.

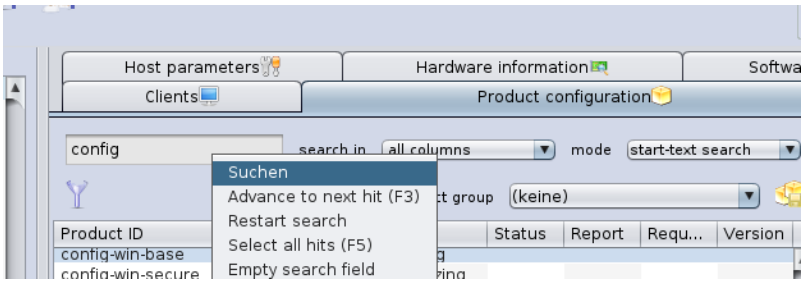


Figure 29: *opsi-configed*: Product search with context menu

To get a better overview, activating the filter function reduces the product view to the selected products only. The selections stays active until the filter is disabled by clicking the filter button again.

If there is a different status for the selected clients this will be marked grey (*undefined*). The list of the selected clients is shown at right on top.

You can also sort the product list by clicking at the column header.

This are the columns:

- *Status* is the last announced state of the product and can hold the values *installed*, *not_installed*, *unknown*. The table shows an empty cell if the value is *not_installed* to improve the usability of the view. The cell becomes grey if a multitude of selected clients is selected and does not share a common value (grey coloring represents the pseudo value *mixed*).
- *Report* informs about the progress or the result of the last action using the pattern <action result> (<last action>). During an installation process there may be indicated *installing*, afterward e. g. *failed(setup)* or *success (uninstall)*.
- The column *Requested action* holds the information which action is to be executed. Possible values are *none* (shown by an empty cell) and the action types for which scripts are defined in the product package (possible values are *setup*, *uninstall*, *update*, *once*, *always*, *custom*).
- The field *Version* displays the software version number combined with the opsi package number of the software package installed on the client.

There are two more columns which can be activated via the context menu:

- *Priority class* displays a priority value that is assigned to the product (highest priority +100, lowest priority -100). It influences the product order when products are installed (by virtue of the product_sort_algorithm)
- The *position* column displays the product ordering forecast for installation sequences.

Choose a software product to get more product information in the right part of the window like:

- *Complete product name*: full product name of that software package.
- *Software/package version*: *software version-version of the opsi package* of the software package (specified in the opsi installation package).
- *Product description*: free text to describe the software.
- *Hints*: free text with advices and caveats for handling the package.

- *Requirements*: A list of other products which the selected product (say *A*) depends on combined with the type of dependency: *required* means that A requires the other product (*B*), but it doesn't matter whether B is installed before or after A. *pre-required* means B has to be installed before A. *post-required* means B needs to be installed A. *on deinstall* means this action should take place if A be de-installed.
- *Configuration for client*: It is possible to define additional properties for a product. Their values can be evaluated in a setup script to configure the product per client. Because of the intrinsic complexity of a property definition there is a specific GUI element for displaying and editing the table of properties:

4.10 Property tables with list editor windows

A property table is a two-column table. In each row, the first column contains a property name, the second column displays the assigned property value(s).

It may be configured that a tool tip is displayed showing some information on the meaning of the property and the default value.

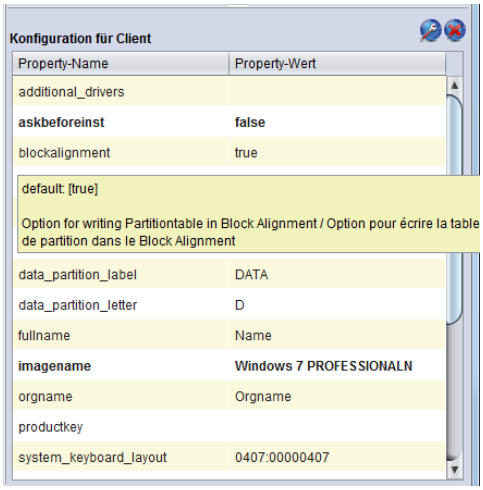


Figure 30: *opsi-configed*: property table with tooltip

If you click at a value a window pops up: the *list editor* for this property. It shows a value resp. a list of preconfigured values with the current value (resp. a combination of values) as selected.

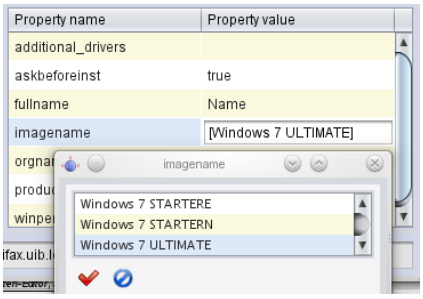


Figure 31: *opsi-configed*: list editor, selection list

Clicking a new value changes the selection.

If the property value list is editable (new values may be added to the existing list resp. existing values changed) the window comes up with an edit field for the new or modified values.

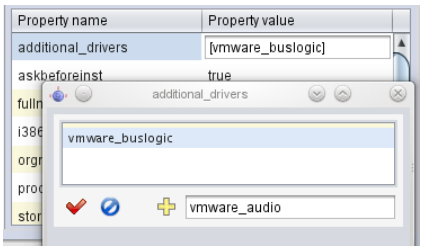


Figure 32: *opsi-configed*: list editor, edit field

The most comfortable way to get a new value that is a variant of an existing one is double clicking the existing value in the list. This copies it into the edit field where it can be modified.

As soon as the edit field contains a new value – not yet occurring in the value list – the plus button will be activated with it the new value can be added to the list of values.

If multiple values are allowed – as it should be e.g. for the property *additional drivers* – a value may be added to the set of selected values by Ctrl-Click . The very same action removes a selected value from the set. The minus button empties the selection set completely.

When the list has been edited the green check mark turns to red as usual in the opsi-configed. Clicking it takes the new selection as new property value (and finishes editing). Clicking the blue cancel button stops editing and resets the original value.

4.10.1 Hidden Password Property Values

A property value that is a password should not be directly displayed.

Until this feature will be constructed as a special value type in some coming release the hack is used that a property value will only be displayed if the user explicitly requests it in cases (since version 4.0.7):

- the property key text contains the string *password*
- the property key text starts with the string *secret*

E.g., the value of the property *root_password* in the Linux netboot products is displayed as a sequence of stars (until the user does the edit click and explicitly confirms to showing the password).

4.11 Netboot products

The products on tab *Netboot products* are mainly used to install the client OS (operating system) and are listed and configured like the products on tab *Product configuration*.

If for the selected client(s) a netboot product is set to *setup*, the correspondent bootimage will be loaded and executed at the next client reboot.

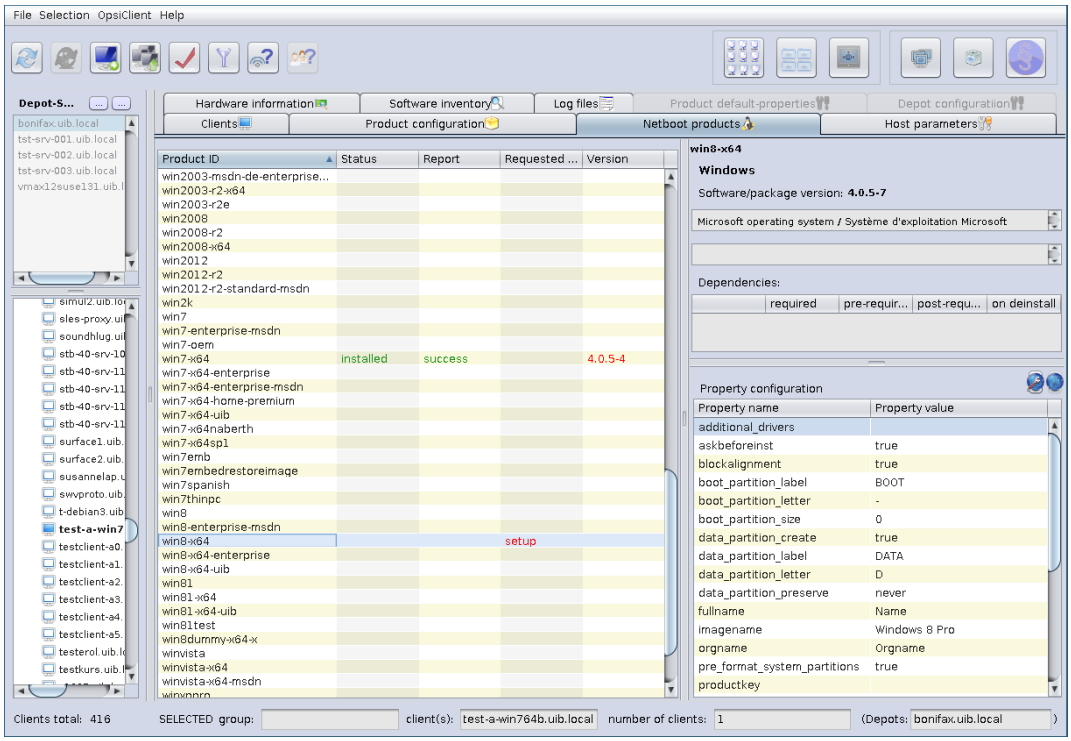


Figure 33: *opsi-configed*: mask to start the bootimage

This is usually done to initiate an OS installation or any other bootimage task (like a memory test etc.)

4.12 Hardware information

With this tab you get the last detected hardware information for this client (only available if a single client is selected).

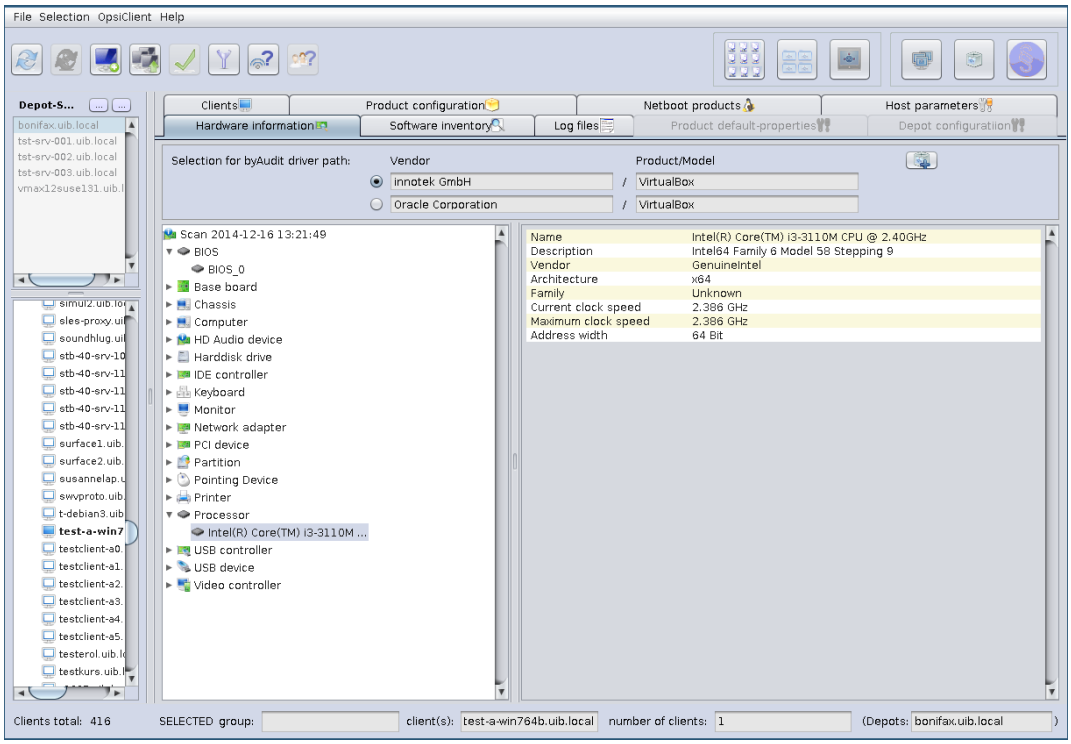


Figure 34: *opsi-configed*: Hardware information for the selected client

4.12.1 Automatic driver upload

The two offered byAudit driver paths are composed of the manufacturer and the product or the model, which are respectively read from the computer and the mainboard. By clicking the right button to upload a driver, a new window will be displayed to add more settings.

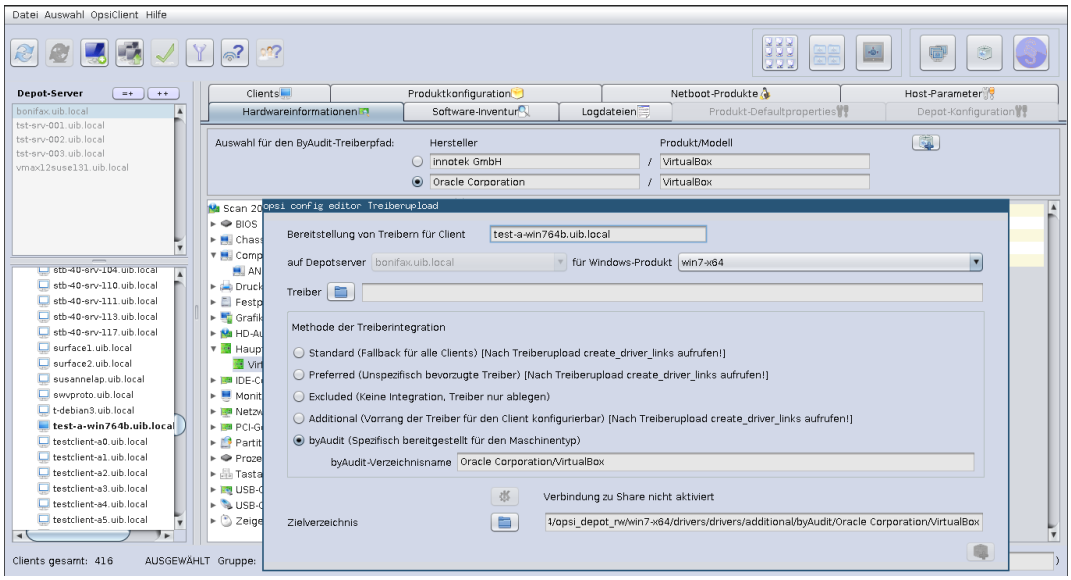


Figure 35: *opsi-configed*: Hardware information - driver upload

If you open the *opsi-configed* on a Linux system, it is not directly possible to carry out a driver upload because the

connection is carried out via a Share. This needs to be made manually. However, the methods or directory structures are an essential aspect of the drivers integration for linux users as well as for windows users.

Without further settings, the driver upload of a Windows computer, works only if the connection to the Share is enabled.

Among other things, information must be given in a new window, like to which Windows product should the driver be prepared, which drivers are to be uploaded and with which method or the directory in which the driver integration takes place. The target directory is accordingly changed with the selection of another method. The previously selected byAudit driver path can be found again by default in the selected method *byAudit*, that specifically integrates the selected driver for the type of machine.

Following methods and directories are possible:

- *standard*: For the drivers which are found in `./drivers/drivers/`, the driver will be matched to the corresponding hardware using the PCI IDs (i.e. USB- or HD_Audio-ID) in the description file, and then integrated into the Windows setup as needed. It may be the case that the drivers found by opsi in this location do not necessarily work with your hardware. For the drivers which are found in `./drivers/drivers/`, the driver will be matched to the corresponding hardware using the PCI IDs (i.e. USB- or HD_Audio-ID) in the description file, and then integrated into the Windows setup as needed. This is the fall back directory for all clients.
- *preferred*: In the case that you have to support special hardware, and you can find the additional drivers from the manufacturers, then use the following procedure to include them in the installation. Place the additional drivers in their own directory under: `./drivers/drivers/preferred` (the naming and depth of the directory structure is not important). Drivers that are found in the directory `./drivers/drivers/preferred` will be integrated into the Windows setup, assuming that opsi finds a suitable match to the drive hardware based off of the PCI IDs (i.e. USB or HD_Audo-ID) in the description file. Problems can occur when the same PCI ID of the drivers is found in `preferred`. In this case, a direct mapping of the drivers to the devices is needed.
- *excluded*: It could happen that the manufacturers include different drivers for different operating systems (i.e. Vista vs. Win7) or different configurations (ie. SATA vs. SATA RAID). The `create_driver_links.py` cannot make this distinction. If you think the wrong driver has been installed, then move the driver to the *drivers/exclude* directory and then call `create_driver_links.py` again. Drivers in the directory *drivers/exclude* are not used during the integration.
- *additional*: When installing additional drivers based on the PCI-IDs or USB-IDs, they should be installed under the directory `./drivers/drivers/additional` (where name and depth of the directory structure is not important). You can map one or more drivers to a client using the Product-Property *additional_drivers* and a list of driver directories under `./drivers/drivers/additional`. The directories specified by *additional_drivers* are searched recursively until all drivers are found. This method can be used to make a specific directory based on the client type (i.e. dell-optiplex-815).
- *byAudit*: The previously described mechanisms that directly map drivers to devices is automated since the 4.0.2 Release 2 of opsi. Opsi will search the directory `./drivers/drivers/additional/byAudit` for a director name that matches the field *Vendor* that was given in the Hardware Inventory. This *Vendor* directory will be search for a *Model* directory that corresponds to what is seen in Hardware Inventory. If this directory is found, then it will be manually assigned to the product property *additional_drivers*. The directory name *byAudit* is case sensitive. The directory names for *Vendor* and *Model* are not case sensitive (*Dell* and *dELL* are treated the same way).

Some manufacturers use model names that are very delicate to this method, since some special characters such as / are not allowed to be used in files or directory names. An example for a model name could be: "5000/6000/7000". A directory with this name is not allowed because of the special characters. Since the third Service Release from opsi 4.0.3 the following special characters: < > ? " : | \ / * were replaced internally with an underscore "_" character. With this change can the above example be replaced with: "5000_6000_7000" the directory will automatically be shown, even though the directory structure information in the hardware inventory is not visually the same.

Important
After the driver upload please execute `create_driver_links` in the *opsi-depot-server*.

4.13 Software inventory

With this tab you get the last known software information for this client (only available if a single client is selected).

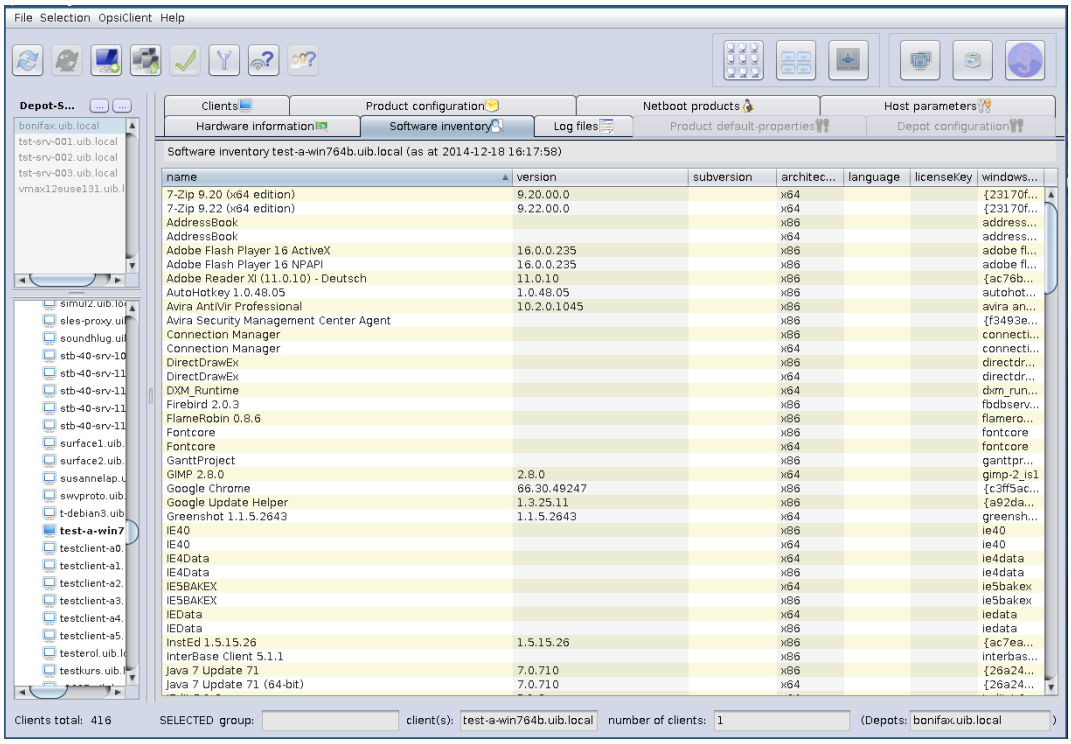


Figure 36: *opsi-configed*: Software information for the selected client

4.14 Logfiles: Logs from client and server

The client specific log files are stored on the server and visible with the opsi-configed via the Tab *log files*.

The level up to which the log lines are seen can be chosen by a slider (wheel mouse enabled), so that errors can be easily found.

It's also possible to search in the log file (to continue the search press *F3* or *Ctrl-L* = last search repeated).

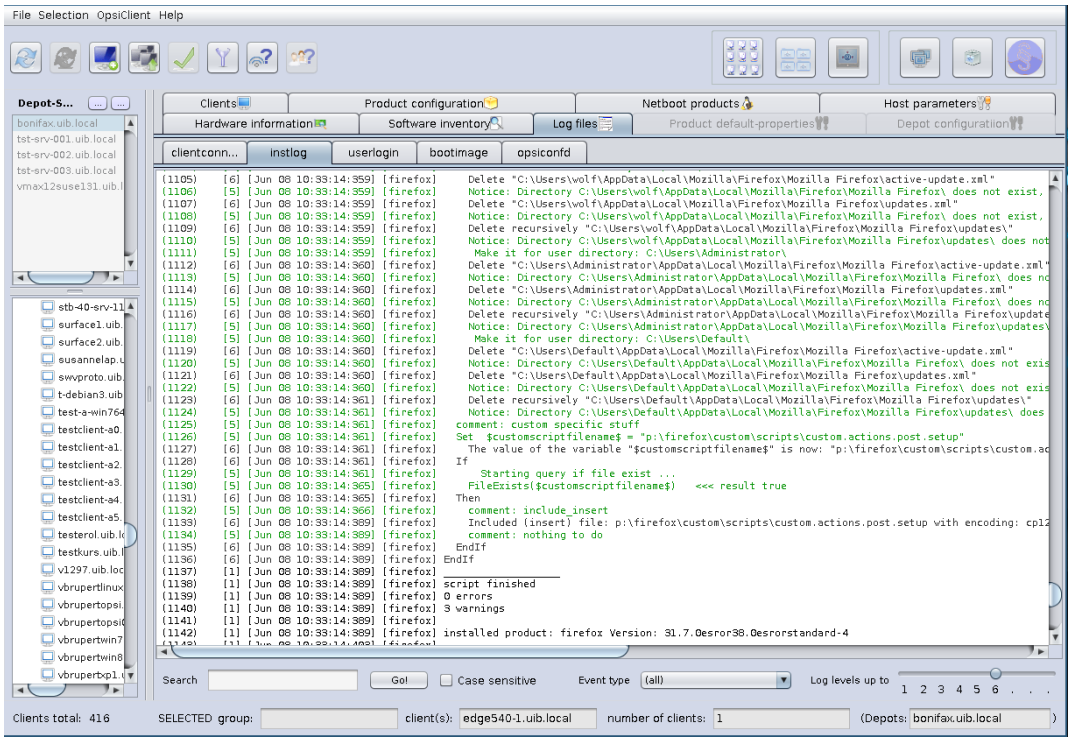


Figure 37: *opsi-configed*: Display of the log file in the opsi-configed

4.15 Product default properties

To change the default values of the products for one or more opsi-depots, there is a tab, called *Product default-properties*. This is only available if you select *Properties of depots* (which is the second button at the top right hand side).
In the main table, all products are listed with the product version as well as the package version.

If a product is selected, at the top of the right side (as is customary for the client product configuration) general information about the product packages is shown. Below is the list of all depots, that have installed the selected product. The table below with the property keys and values is also known from the client product configuration.

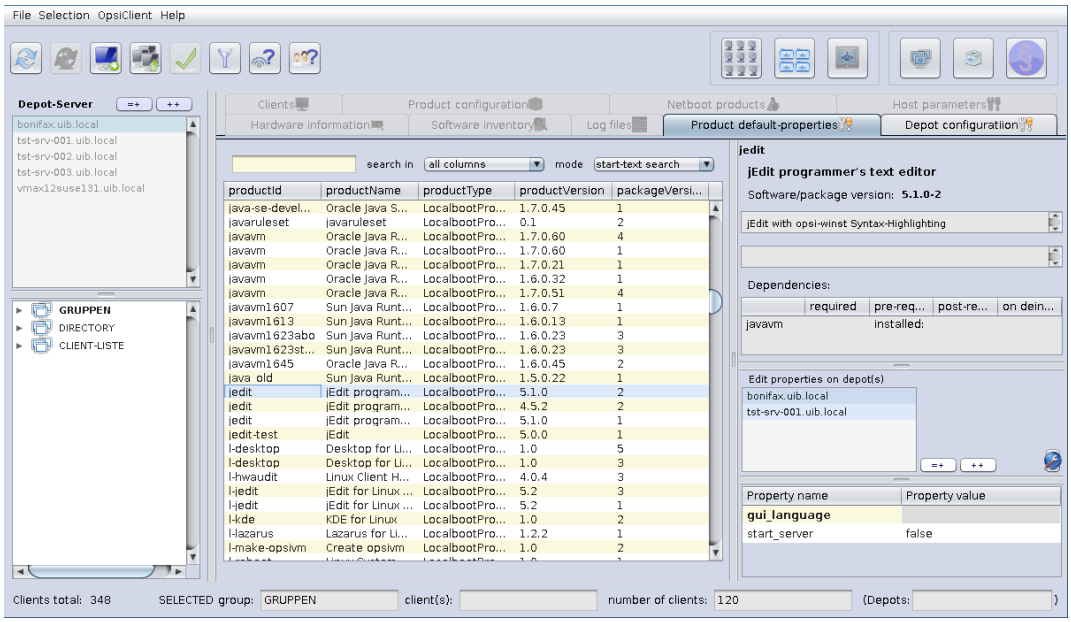


Figure 38: *opsi-configed*: product default properties

You can select a single depot or multiple depots to change the default values (which are also called the depot values) of the product. As the default, all available depots are preselected. With the usual shortcuts (*Ctrl-a*, *Ctrl-Click* or *Shift-Click*) multiple or all clients can be selected.
If the property value is shown grayed (see Figure 38 - "gui_language"), the values for that property differ on the selected depots. On the right side of the depots are three buttons:

- (=+): Mark all depots that have identical values
  All depots, that have the same default values, are marked.
- (++): All depots are marked.
- (globe): set the package default values
  The original package default values of the products will be set for the selected depot(s).

4.16 Host parameters in client and server configuration

There are many configuration options for the opsi server and the opsi clients that may be set or changed via the tab *Host parameters*. Server defaults are set in the mode *server configuration*, client specific values in the mode *client configuration* plus manual selection of the *Host parameters* tab (see also Section 4.4).

On principle, these configuration entries (*config objects* of the *opsi-server*) are conceived as lists of values. Therefore they are edited via the list editor component (cf. Section 4.10).

Depending on the specific type of a configuration object,

- the elements of the list can be of type text (`Unicode`) or of type `Boolean` (i.e. `true`/`false`);
- the set of all values from which elements can be selected may be fixed or extensible.
- the object has a defaultValues-entry, which comprises in the singleValue case exactly one list element, in the multiValue case some partial list selected from the list of all possible values.

New configuration objects can be created via the context menu of the server host parameters. At this place it is also possible to remove existing entries.

The relationship of server and client entries is a little bit complicated.

- Server entries hold the defaults for client entries (this is the defaultValues entry in the server configuration object)
- Consequentliy, if a client entry is needed a server configuration object must be created beforehand.
- And, when a server entry (a config object) is deleted, the depending client entries (called config states) are (automatically) deleted as well.
- If the client related value is shown as identical with its (server based) default value this may be be because there does not exist a client specific data base entry or because the client value is identical with the server default value. In the first case the client value changes when the server default value gets new contents, in the second case the client remains unchanged.
- In order to work comfortable with this situation since opsi-configed version 4.0.7.6.5 the context menus of the client host properties offer the options (1) to remove the specific client values, so that from now on only the current server values are decisive, (2) to fix the specific client values to the current server values.
- if the currently presented client value iis not identical with the server default value it is given in a bold font.
- There are configurations objects for which client values can be created and edited but in fact only the server objects are used. In most cases, the current configed does not show them any more in the client parameters view.

To get more structure the configurations objects are categorized in some (predefined) groups. The groups are listed in a tree-like manner on the left part of the panel. The entry name/value pairs belonging to the selected group are shown in the right part of the panel. Wheel mouse scrolling is enabled as well on the left as on the right side.

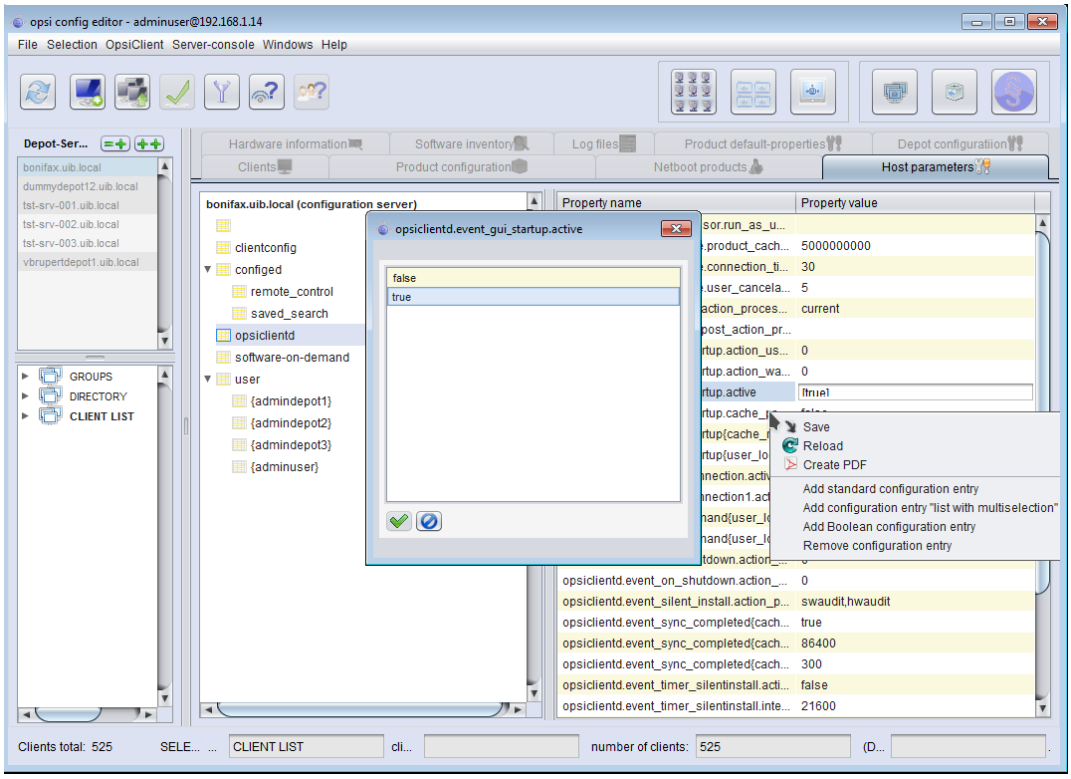


Figure 39: *opsi-configed*: Tab Host parameters (as server configuration)

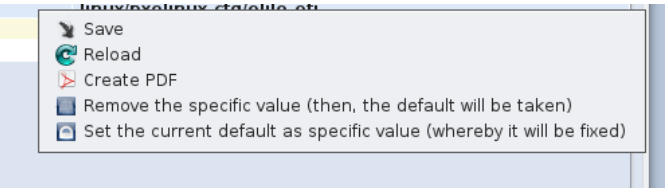


Figure 40: *opsi-configed*: Tab Host parameters (context menü of a client entry)

4.16.1 Management of user rights and roles

Starting with version 4.0.7.5 the *opsi-configed* includes the user roles function.

Caution
In order to use this feature the module *user roles* must be activated in the modules_-file.

In the interface, in the overview of the server host parameters, the category *user* shows the availability of the function (not necessarily active). The *user* branch of the properties tree starts with a boolean entry

```
user.{}.register
```

with default value *false*.

The other entries at this location represent the default values for the user-specific configurations of the server console (cf. Section 4.20).

To activate the user role extension you need to:

1. Set the value of *user. {}.register* to *true*.
2. Load a modules file that has the *userroles* extension temporarily or permanently activated.

When the user-role extension is activated, an entry is created in the properties tree for the logged-in user. The default settings used for the administration of rights are like the "classic" requirements for an administrator, that means, that this user has no restriction whatsoever. E.g., for a user named *admindepot1* the following entries are generated:

```
user.{admindepot1}.privilege.host.all.registered_readonly       [false]
user.{admindepot1}.privilege.host.depotaccess.configured        [false]
user.{admindepot1}.privilege.host.depotaccess.depots            []
user.{admindepot1}.privilege.host.opsiserver.write              [true]
```

These four items mean:

- *admindepot1* is *not* restricted to read-only access to the server (a pure read-only access might be appropriate for a help desk staff member);
- depot restrictions do not exist or are not taken into account;
- consequently, the list of depots available to the user can stay empty (and if some depots are entered, this has no effect);
- the user is allowed to edit config server settings of all kinds.

In the case that the access of *admindepot1* is to be restricted to the computers in the depot server *depot1*, the following should be set:

- *host.depotaccess.configured* is to be set to *true*;
- the value "depot1" is to be put into the list *host.depotaccess.depots*.

After a complete data reload, clients from other depots are not more visible to *admindepot1* (and also only the depot settings for *depot1* are accessible).

Caution
admindepot1 him/herself can change this settings as long as she/he owns the privilege *host.opsiserver.write*

In order to complete the restriction, it therefore is required to set

- *host.opsiserver.write* to *false*.

Caution
The privileges which are set in this way restrict only the functionality of the *opsi-configed*. Until further notice, they have no effect if the JSON-RPC interface of the opsi-server is accessed by other means.

4.17 Depot configuration

In the mode *Properties of depots* you will see the tab *Depots*. There is a drop down menu to select the depot. After selecting the depot you may change the properties of the *opsi-depot*.

see also:

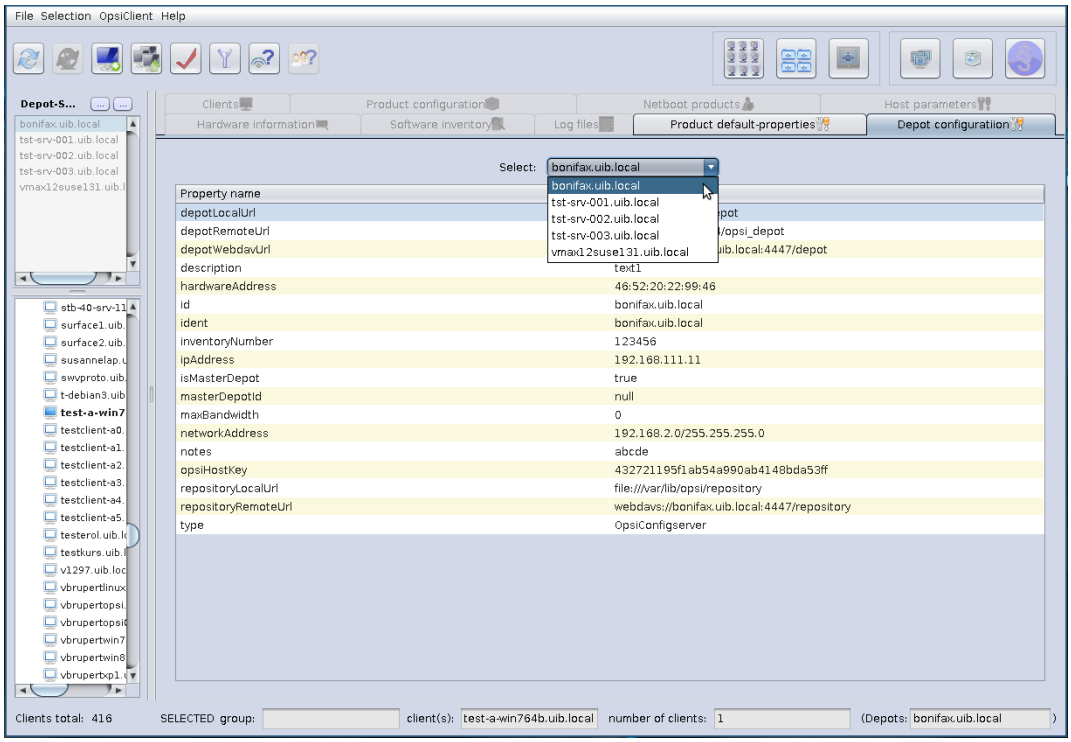


Figure 41: *opsi-configed*: Tab Depot configuration

4.18 Group actions

The button "group actions" in the main button bar (cf. Section 4.4) opens a window for group related functions.

At the moment, it provides only one function which is relevant for the opsi-localimage module.

- to search for an operating system, that had been installed on all of the clients of the selected group and therefore can be offered for all of the clients of that group.

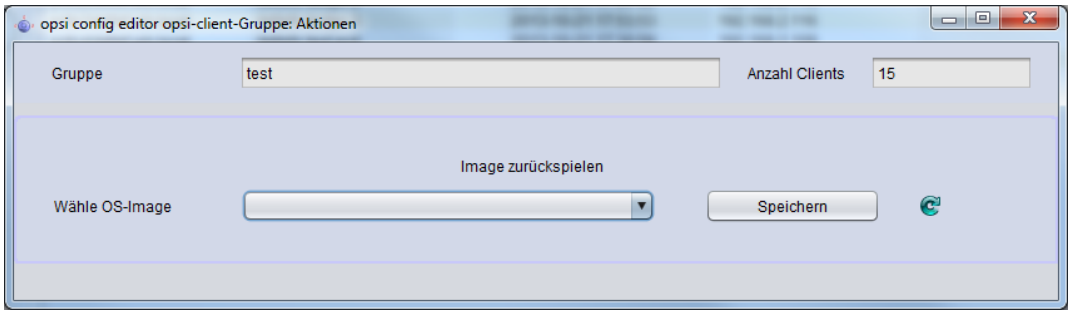


Figure 42: *opsi-configed*: Group actions (for opsi-local-image)

4.19 Product actions

The button "product actions" in the main button bar (cf. Section 4.4) opens a window for functions related to products resp. packages.

Currently it offers two options:

- An .opsi file (opsi package) can be selected or entered and can be uploaded to the opsi server; the default upload directory on the server is the network (samba) share named opsi_workbench. The button click starts installing the package on the server, like invoking the opsi-package-manager.
- The WinPE files and install files for an Windows product (Windows Vista and above) can be uploaded to the server product directory (share opsi_depot), so that windows products do not have to be managed from the server side.

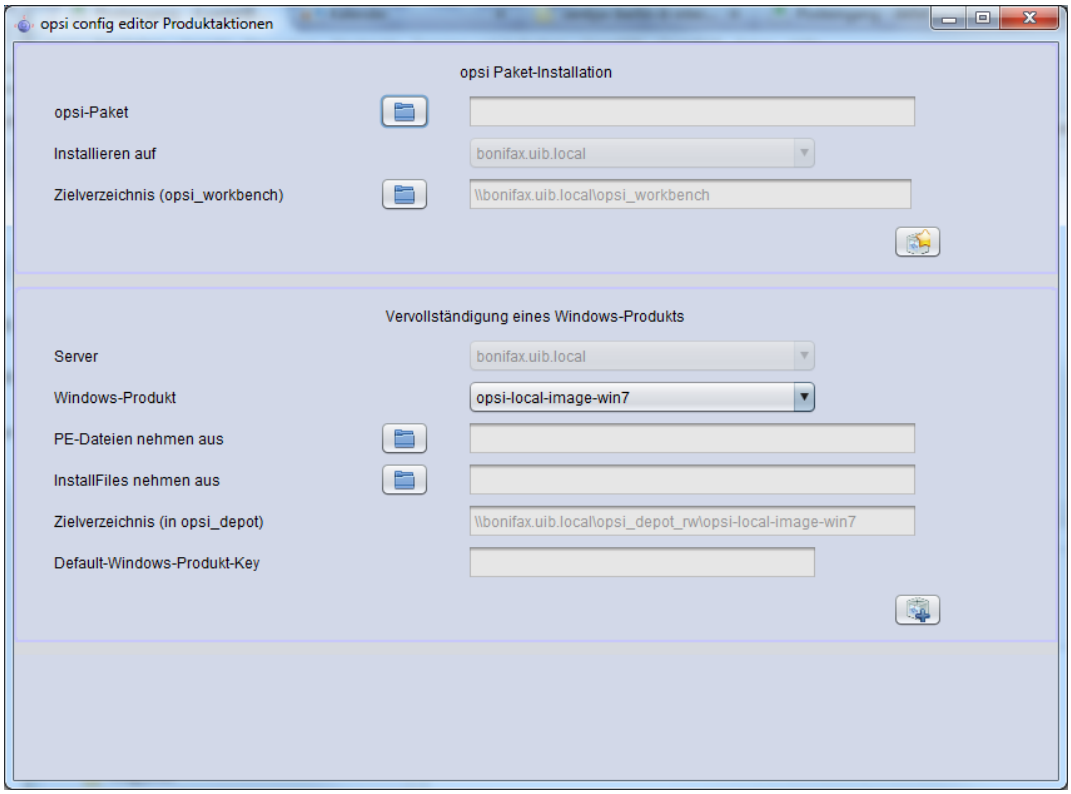


Figure 43: *opsi-configed*: package and product actions

4.20 Server-Console

Caution
Some of the following features require at least python-opsi version 4.0.7.38, in particular defining you own commands as described in Section 4.21 and using them via configed.

With version 4.0.7.5, the configed is extended with a new main menu entry, the "Server Console". At this place some options are bundled to access the opsi-server via a SSH-Connection. It is as well possible to start a terminal as well as menu items are offered of some predefined commands on the opsi-server.

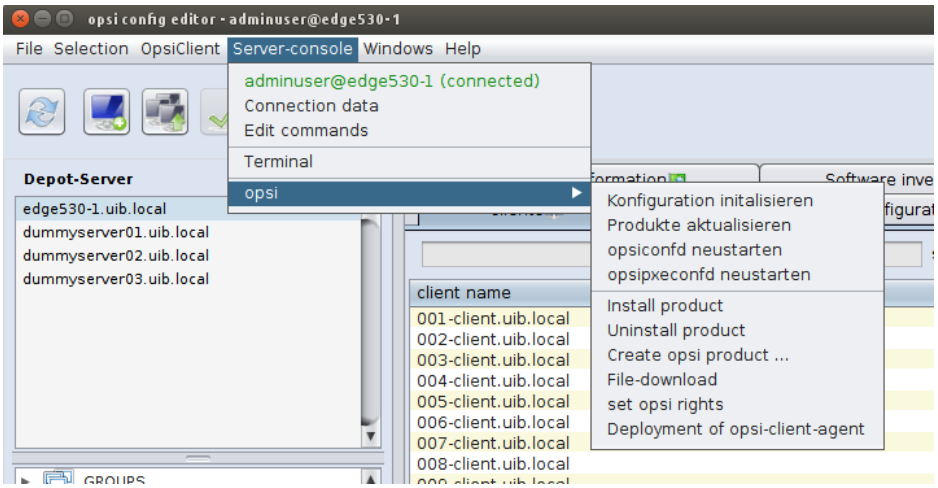


Figure 44: *opsi-configed*: Menu: Server Console

4.20.1 Connection data and permissions

If not otherwise configured, it is tried to build a SSH connection with the same user/server pair for which to configed login was done.

Should this not be the case the connection can be also started via a SSH key (possibly with a password) when the configed starts. In this case, the following start parameters can be used:

- --ssh-key PATH: e.g. --ssh-key /home/user/.ssh/id_rsa
- --ssh-passphrase PASSPHRASE: e.g. --ssh-passphrase Password

The settings can be changed or adjust under the menu entry "Connection Information".

The visibility of menu items in the server console menu is controlled by a series of server host parameters in the user section. If the user roles feature is used (cf. Section 4.16.1) the configs are specifically set for each user (the default values for a newly created user entry are taken from the top user level).

In order to be able to use different functions, the appropriate server settings must be activated.

- user.{}.ssh.serverconfiguration.active:
  Activates the ssh connection settings menu. (Default: false)
- user.{}.ssh.commandmanagement.active:
  Activates the editing of commands and their menu entries. (Default: false)
- user.{}.ssh.menu_serverconsole.active:
  Deactivate the "Server Console" menu in principal. (Default: true)
- user.{}.ssh.terminal.active:
  Allows the usage of the ssh shell. (Default: true)
- user.{}.ssh.commands.active:
  Allows to execute all menu items displaying stored commands. (Default: true)

4.20.2 SSH-Terminal

With the Terminal, Linux commands can be run from the connected SSH-Server.
In addition to the possibility to replace the input with asterisks (*), which is strongly recommended for the input of passwords, a process can also be canceled by clicking the "End process / connection" button or by pressing "Ctrl + C".
Just like in the Terminal, the "TAB" can be used to complete commands. Warning: Paths will not be completed - only Linux system commands.
Besides it is also possible to specify data sources, that before the execution can be replaced by concrete data. More about this functionality: Section 4.21 - Item: Datasources)

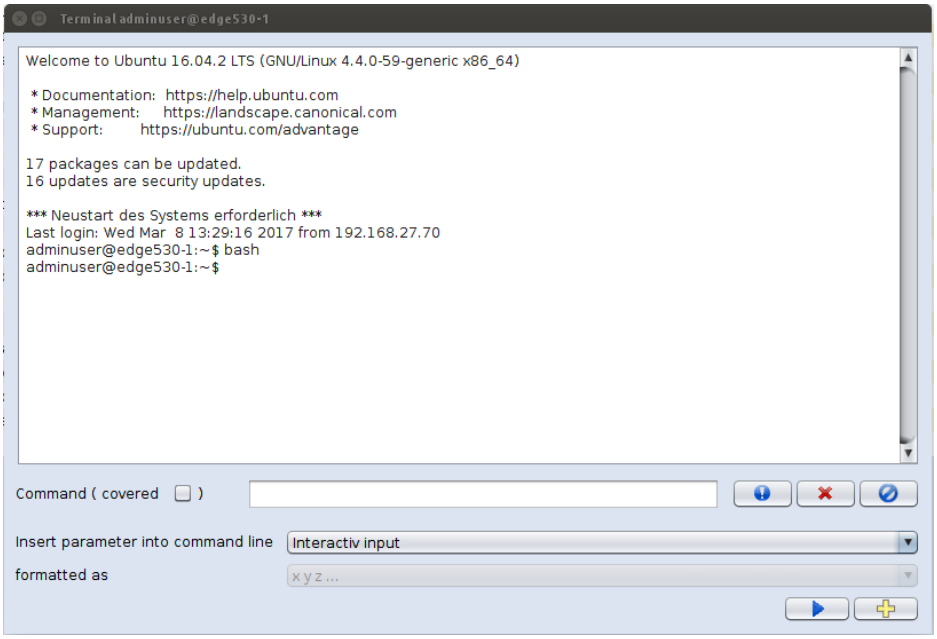


Figure 45: *opsi-configed*: SSH-Terminal

4.20.3 Predefined commands with input masks

Under the menu group "opsi" a few commands are available independently of the self-defined commands with their own input interface. These simplify the handling of various scripts.

- Download from data ...
  Any data file which can be downloaded from the Internet can also be downloaded by the "wget"-command and stored in a certain path on the Server. This could be used for example to download opsi-packages from download.uib.de
- Create opsi product file ...
  Prerequisite for this command is an opsi-utils package with version >= 4.0.7.7. Using this menu item, an opsi package can be created, specifying the directory upon which must be stored. In addition, can the found versions (package and product version) be displayed and overwritten with a button. And also, a md5sum and/or a zsync file can be created.
- Set opsi-rights ...
  This menu item maps the opsi command opsi-set-rights. After entering a specific (optional) path in which the script is to be executed, the root password is prompted and the script is executed in a separate window.
- Package-Installation ...
  With this command, opsi packages can be installed on all depots or in one depot using "opsi-package-manager". You can also specify the server path to the package where the opsi package is located.

By selecting a package from the Internet, the functionality of "File download ..." command is taken up and then the downloaded package is installed on the depot. Additionally, the parameters "--update" and "--setup" of the opsi-package-manager are implemented. If the zsync and md5 files of an opsi package are to be downloaded, the switch "zsync and md5 include" can be activated. Then the url of the packages is added accordingly and the additional files are also obtained.

You can find more about opsi-package-manager under Section 5.3.2

- Package-Deinstallation ...
  From a list of installed packages one can be selected and uninstalled.
  Please check Section 5.3.2

- Deployment opsi-client-agent ...
  If you want to add existing computers to opsi, the opsi-client-agent must be installed on the target computer. If you select the clients in the configed and execute this command, the client names are copied into the corresponding field. If the command is to be executed on several clients in a single call, the login data must be the same on all the participating computers.
  Attention: The location of the script have to be: "/var/lib/opsi/depot/opsi-client-agent/opsi-deploy-client-agent"
  Detailed information can be found in the *opsi-getting-started* manual on the *First steps* chapter.

TIP: Some user interfaces include a selection component for paths in the directory structure. If the button "Find Subdirectories" is activated, all directories or files that are contained in the specified path will be listed. To visualize further sections, you can press the button several times. This functionality is, among others, in the "Set Opsi rights" or the "Package installation" interface.

4.21 Define commands

In addition to the predefined server console commands, you can create or remove your own commands, which can be accessed via menu items. It should be noted that different Linux systems may not be able to execute the same commands. Thus, the administrator must be sure that the commands can be executed on the addressed Linux system.

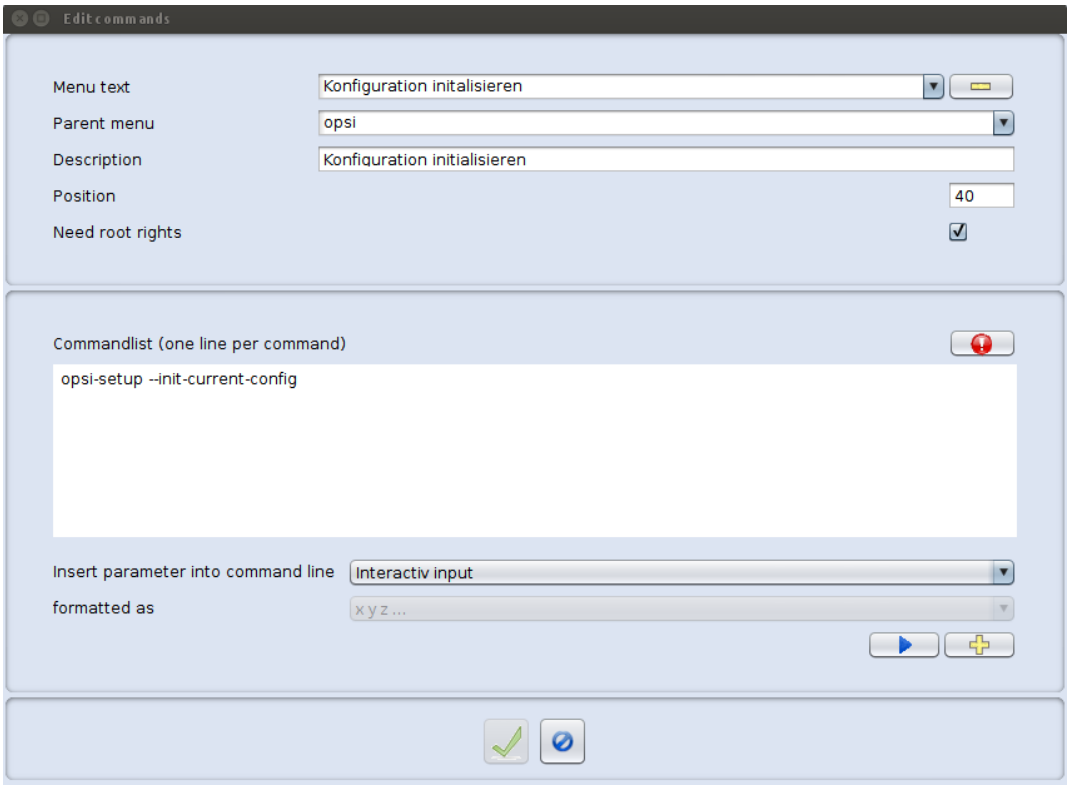


Figure 46: *opsi-configed*: Define commands

Following data must be or rather could be (marked with a "*") for a command:

- Menu-Text:
  When creating a new command you *must* make sure that the menu text has not been used already for another command. If a menu text is to be changed, the command must be first deleted with the minus button, and then the new command can be entered.
- Description*:
  If a more detailed description is stored, then it appears as a tool tip text on the command.
- Superior menu*:
  Determines in which menu the new command should appear as a menu item. In the case that field is empty, then the menu entry will be directly assigned to the "Server console" menu.
- Position *:
  The position determines the order (small numbers comes first) of the menu points in total, and thus within each respective menu. If alphabetical order should be displayed, all items must be set identically (e.g., all 0). Should the the field remain empty, then the position 0 is assigned by default.
- "Sudo" rights *:
  If one of the commands in the command list requires administrative rights, a check mark must be set on "Required root privileges" afterwards the commands in the list are automatically executed with the keyword "sudo".
- Command list:
  For the command list, the Linux commands must be entered line by line, so that they can be executed sequentially. Caution: Command can be tested or executed on the SSH server by means of a button without creating an extra menu point.
- Data sources* (on the command list):
  Additionally methods can be stored as a data source. Before the command can be executed, the parameters are overwritten with the result of the applied method. The following parameters are possible:

- Interactive input:
  It is possible to specify parameters for the commands or to identify them for an interactive output. This is done with the following format "<<< This text will be displayed to the user and replaced by the user input >>>" , it is recommended though to write a sample input for the parameter for the user text.
- Selected client names / Selected client IP addresses
- Selected depot names / Selected depot IP addresses
- configserver name
- Connected SSH servername
  Note: Except for "Interactive Input", the return of the methods can also be formatted, for example, into a comma separated list. In the interface, the data source can be tested, and also insert it into the location marked in the field of the command list.

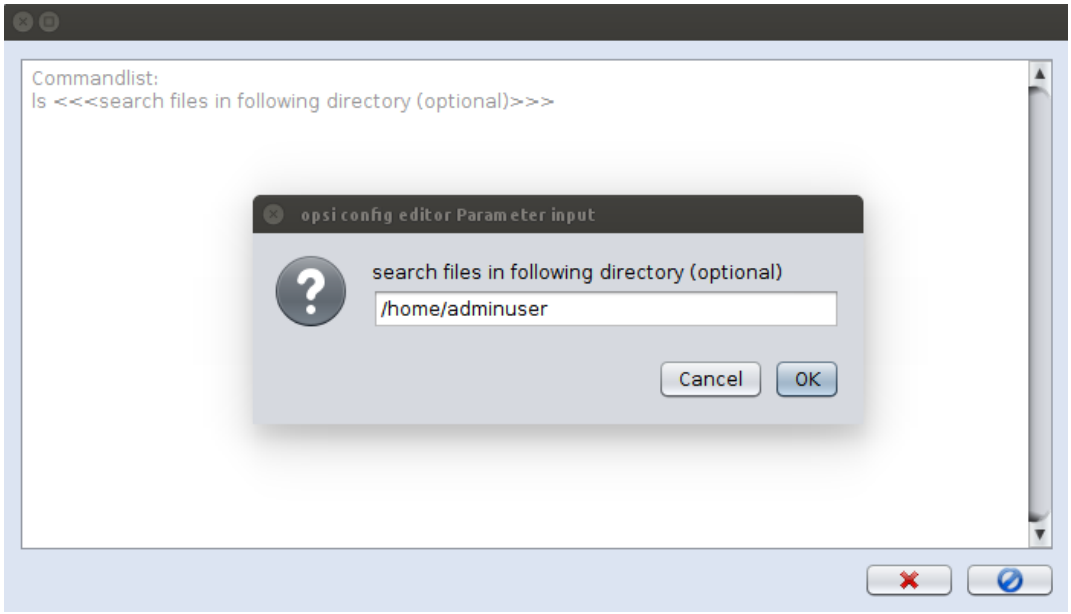


Figure 47: *opsi-configed*: Execute command - Parameter query

Tip
- On Linux, commands can be combined using two commercial ANDs ("&&"). However, it must be ensured that the second command, if needed, is executed with administrative rights, since this is not done automatically. Example: Requires root privileges: "activated", command list: "apt-get update --yes && sudo apt-get upgrade --yes". +
- During the execution, no user input can be made. It is necessary to control all the inputs via the command \ parameters (example: "--yes" option for "apt-get upgrade")

5 opsi-server

5.1 Overview

The functionality of a *opsi-server* may be installed on many different kind of linux distributions.

There are two different roles which a opsi-server can play:

- *opsi-config-server*
  The *opsi-config-server* has the central data storage and provides the access to this data via the *opsi web service*. A *opsi-config-server* normally has additiona the role *opsi-depot-server*.

- *opsi-depot-server*
  The *opsi-depot-server* has no configuration data storage. The *opsi-depot-server* hold the installation files at a share and provides the PXE/tftpboot services for the netboot products.

The hardware requirements are low. The opsi-server can also run as a virtual instance, e.g. vmware® (www.vmware.com).

5.1.1 Installation and initial operation

Installation and start-up of the opsi-server is described in the opsi *getting started* manual.

5.1.2 Samba Configuration

The opsi depot server provides network shares holding the configuration information and the software packets. These shares can be mounted by the clients. For Windows Clients the shares are provided by SAMBA (version 3.x).

To configure your samba according to the needs of opsi (or to repair) call:

```
opsi-setup --auto-configure-samba
```

After every change of the samba configuration, you have to reload your samba (`service samba reload`).

5.1.3 The daemon opsiconfd

The *opsiconfd* is the central opsi daemon (service). It provides an interface for clients to create, manipulate and read data in the backends.

The configuration of *opsiconfd* is done in `/etc/opsi/opsiconfd.conf`. The options are commented in the file. You will find some additional notes here.

- `[global] max log size`:
  This option limits the size of logfiles created through the *opsiconfd*.
  Due to an historic reasons this is limited to 5MB per logfile.
  Since opsi 4.0.6 the size can be configured.
  To disable any size limits the value can be set to 0.

In addition you can use the tool *logrotate* to rotate and compress logfiles.
Please refer to the corresponding manual for configuration possibilities.

With the knowledge that a logfile for a client does not grow beyond a given size it is possible to calculate how much space opsi logs will require. There are five different client-specific logtypes that opsiconfd writes:
bootimage, *clientconnect*, *instlog*, *opsiconfd* and *userlogin*. There are also some client-independent logs: *opsiconfd.log*, *opsipxeconfd.log*,
opsi-backup.log, *opsi-product-updater.log* and *package.log*.

If we now assume a configuration of opsiconfd and logrotate that limits those
files to 5MB except for package.log that is allowed 10MB we end up with the following calculation:

```
(number of clients * 5 * 5MB) + 5MB + 5MB + 5MB + 5MB + 10MB
```

For 100 Clients we then should reserve 2530MB for the logs of opsi. Because *logrotate* will usually only shorten logs on a specified schedule we recommend to rounding this number up. It would also give you some space for adding new clients.

5.1.4 Required administrative user accounts and groups

- User *opsiconfd*
  The daemon *opsiconfd* runs as this user.
- User *pcpatch*
  This user is be used by the *opsi-client-agent* to mount the *depotshare*. You may set the password for this user by `opsi-admin -d task setPcpatchPassword`.
- Group *pcpatch*
  The group *pcpatch* has write permission on many files and youll need to be in this group in order to build and install *opsi products*.
- Group *opsiadmin*
  Members of the group *opsiadmin* are permitted to connect the opsi-webservice and can use for instance the *opsi-configed* configuration editor. Therefor all opsi administrators should be members of the group *pcpatch*.

  A user can join group *opsiadmin* by: *addgroup <user> opsiadmin*.

5.1.5 needed shares

- *Depotshare* with installation files (*opsi_depot*)
  The depot share provides all the software-packets which are installable by the client task *opsi-winst*. The default directory for the software packets is the directory `/var/lib/opsi/depot`. In this directory each software packet has its own sub directory named as the software packet. These sub directories contain the packet-specific installation scripts and files.

  Note
  In older versions that share was located at `/opt/pcbin` and was named *opt_pcbin*.

- The directory to build pacages (*opsi_workbench*)
  At `/home/opsiproducts` you will find the area to create new packages and from where you should install packages with the opsi-package-manager.

  Caution
  On distributions from the SUSE family the directory is located at `/var/lib/opsi/workbench`.

- Share with the configuration files of the file backend (opsi_config)
  At `/var/lib/opsi/config` you will find the file backend configuration files.

5.1.6 opsi PAM Authentication

opsi uses some `PAM`-modules to authenticate the user. With this new release, opsi uses different modules for certain distributions. The following list will give you a small overview about which modules are used:

Default: `common-auth`
openSUSE / SLES: `sshd`
CentOS and RedHat: `system-auth`
RedHat 6: `password-auth`

You can see in the list above, which different `PAM`-modules are used. However, it could be the case that a different `PAM`-module is required, depending on the local configuration. The source code can be modified to account for these changes. To provide more flexibility without changing the sourcecode, it is possible with this release to create a file

named: `opsi-auth` in the directory `/etc/pam.d/`. If this file exists, opsi will use this configuration automatically instead of the modules listed above.

The following example will show you the new feature: If you run a debian/ubuntu-System and you get a `PAM`-authentication-error, even though you can connect with the same credentials over ssh on the server, then you can create the file: `/etc/pam.d/opsi-auth` with following content:

```
@include sshd
```

After restarting opsiconfd, opsi will use automatically the `sshd-PAM`-module for authentication of users.

Note
Please be aware that for application of ACL a case-sensitive interface is used but authentication through PAM can be case-insensitive. This can lead to the case where ACL are denying access despite an successful authentication.

5.1.7 problem management

If you have incidents by using opsi, you should check the following list or rather execute the following commands. Experience has shown that the combination of the commands in this chapter fix the most incidents.

- Check accessibility and load of *opsi-webservice*:
  Call URL: https://<server-ip>:4447/info with your browser. If you can not connect, continue with next step. If you can connect: check the load of *opsi-webservice* and check the freespace on disk (scroll down in the info-page). For the generation of load images you need *rrdtool* with Python-bindings. Please install them if needed.

- Check that the daemons are running and restart them:

```
ps -ef | grep opsiconfd
ps -ef | grep opsipxeconfd
service opsiconfd restart
service opsipxeconfd restart
```

- Initialize the configuration

```
opsi-setup --init-current-config
```

- Set the rights for opsi-relevant files and directories:

```
opsi-setup --set-rights
```

- Cleanup backend

```
opsi-setup --cleanup-backend
```

- Check that samba is running:

```
ps -ef | grep mbd
```

  At least one `nmbd` and one `smbd` process should be running.
  To restart samba:

```
service samba restart
```

  or

```
service nmbd restart
service smbd restart
```

- Set the pcpatch-password:

```
opsi-admin -d task setPcpatchPassword
```

5.2 Remarks to Samba 4

With the stable state of Samba4, the development and maintenance for the Samba3 branch has been discontinued. Therefore most of the common Linux distributions (client and server) now contain Samba4 instead of Samba3. Samba shares are a basic component for the opsi system and there are some opsi relevant differences between Samba3 and Samba4, that are discussed in this chapter.

At first it has to be distinguished, in which operational mode Samba is executed. A special feature of Samba4 is the ability to run a fully-fledged Active Directory compatible domain controller. In this operational mode (which will be called `PDC mode` in the following chapters) there are some restrictions, that had to be adopted from Active Directory for compatibility reasons. Most of the current distributions are equipped with Samba4 in the common share mode, that does not provide the operation of a fully-fledged Active Directory domain. With the exception of the Univention Corporate Server, that has PDC-Mode integrated into their standard packages.

5.2.1 The /etc/opsi/opsi.conf: pcpatch and opsifileadmins

Tip
the restrictions discussed in this chapter concern the PDC mode of Samba4 only.

The classic installation, with the user: *pcpatch* in the group: *pcpatch*, does not work with Samba 4. Samba 4 has defined fundamental restrictions for the Active Directory, such as groups with the same name as a user (which is common in Unix/Linux) are no longer allowed. For this reason, a new configuration file has been introduced: `/etc/opsi/opsi.conf`, that configures the groups for Samba access. To be more specific, for Samba 4 installations the group name *pcpatch* is renamed as *opsifileadmins*. So the user *pcpatch*, who was member of the group *pcpatch* under Samba 3, must now be a member of the group *opsifileadmins*. So, to have access rights for opsi-packages under Samba 3, a user cannot be a member of the group *pcpatch* anymore, but must be a member of the group *opsifileadmins*.

Furthermore, the user *pcpatch* has to be created as a fully-fledged domain user and not as a system user anymore.

These migration steps are performed automatically during opsi installation on a Univention Corporate Server, if the installation process detects Samba4 running in PDC mode.

Besides the UCS installations, currently there are no other default Active Directory configurations. So these steps have to be done manually for any other Samba4 Active Directory domain contoller installation. During future updates, the opsi system checks for the required user configuration and does not try to create users, that do already exist.

For any questions please contact opsi support. In case you do not have an opsi support contract, please contact info(at)uib.de.

5.2.2 Share Configuration

Tip
The changes discussed in this chapter ar relevant for all operational modes of Samba4.

With Samba 3 the default setting was, that every file or directory was executable on the share for the Samba clients. This behaviour changed with Samba 4. Now all files, that shall be executable from the share, must also have the executable bit set on the Unix side.

This results in a basic problem with running opsi. It is not possible to handle this behaviour from the opsi rights management, for it would require fundamental changes of the rights management of opsi, that can't be done with opsi 4.

So for handling this problem with opsi 4.0 there are two ways:

Option 1: for the affected shares this behaviour can be supressed by elevating the share privileges of each member of the pcpatch group from the share configuration by setting the following option:
admin users = @pcpatch

This fix elevates the privileges of the Samba processes and has already been used by opsi for some time for UCS >= 3 with Samba 4.

opsi installs per default for Samba 4 distributions with opsi-setup --auto-configure-samba this option for the opsi_depot share. This share is mounted read only, so the safety and security risk can be estimated as low.

Caution
For all other shares, that are mounted as read/write, it has to be considered, that with this fix the samba process runs with elevated rights. This can be a potential risk. Although there are currently no known exploits for this vulnerability, there might be some in the future.

Caution
The Linux smb daemon has a bug. On an existing opsi_depot share it is configured with oplocks. These options have to be removed in the share configuration within the smb.conf. On a new opsi installation and therefore share creation these options are not present anymore.

Option 2: the following global option can be set in the smb.conf:
acl allow execute always = True

With this option all shares behave like Samba 3 shares.

To restore the old Samba 3 behaviour for all shares, the setting of this option can be done for every share manually, or alternalively the option can be set globally in the smb.conf. This changes the behaviour for all shares, not only for the opsi shares.

The global setting does not work with Univention Corporate Server, for its Samba 4 installation is configured in a very special way.

5.2.3 Access to the shares: clientconfig.depot.user

When using Samba 4 it might be necessary to configure the specific domain and user combination to be used for mounting the depot share.
The default configuration is just the user `pcpatch` and nothing as domain. If this fails because the mount defaults to the wrong domain, you should configure the correct domain (in most cases: the hostname of the opsi-server). The config parameter is named: `clientconfig.depot.user`. The value of this config has the syntax: `<domain name>\<user name>` An example config:
`clientconfig.depot.user = opsiserver\pcpatch`
specifies, that the opsi depot share is mounted as domain `opsiserver` and user `pcpatch`. You may create such a configuration using the opsi-configed: Server configuration / clientconfig / right mouse button: add standard configuration entry.
You may also use the command line to create this configuration (replace *pcpatch* by the string you need e.g. *opsiserver\pcpatch*:

```
opsi-admin -d method config_createUnicode clientconfig.depot.user "clientconfig.depot.user" pcpatch
```

This system wide configuration may be changed client specific (e.g with the opsi-configed)

5.3 opsi command line tools and processes

5.3.1 Tool: opsi-setup

This program is something like the *swiss army knife* of the opsi configuration. It is used by the opsi installation scripts and can be also called separately for maintenance and repair purposes.

The tasks of opsi-setup are:

- register a opsi-server as depot server
- correct file access rights
- initialize data storage backends
- upgrade backend (from 3.4 to 4.0)
- setup of the MySQL-backend
- edit the default configurations
- cleanup the current backend(s)
- configure the essential samba shares
- configure the essential dhcp entries

The command `opsi-setup --help` shows the program options:

```
opsi-setup --help

Usage: opsi-setup [options]

Options:
   -h, --help  show this help
   -l          log-level 0..9

   --log-file <path>          path to log file
   --ip-address <ip>          force to this ip address (do not lookup by name)
   --register-depot           register depot at config server
   --set-rights [path]        set default rights on opsi files (in [path] only)
   --init-current-config      init current backend configuration
   --update-mysql             update mysql backend
   --update-ldap              update ldap backend
   --update-file              update file backend
   --configure-mysql          configure mysql backend
   --edit-config-defaults     edit global config defaults
   --cleanup-backend          cleanup backend
   --auto-configure-samba     patch smb.conf
   --auto-configure-dhcpd     patch dhcpd.conf
```

The functions and options in detail:

- `--ip-address <ip>`
  Sets the ip-address for *opsi-server* and do not resolve by name.
- `--register-depot`
  This option is used to register a *opsi-server* as depot server to a other *opsi-server* (*opsi-config-server*). For details see
- `--set-rights [path]`
  Sets the file access rights in all opsi directories:
  - `/tftpboot/linux`
  - `/home/opsiproducts`
  - `/var/log/opsi`
  - `/var/lib/opsi`
  - `/var/lib/opsi/depot`
  - `/etc/opsi`

    You may give a directory name as argument to set only the access rights below this directory.
    e.g.
    `opsi-setup --set-rights /var/lib/opsi/depot/winxppro/drivers`

- `--init-current-config`
  initialize the configured backend. Should always be invoked after changing the file `/etc/opsi/backendManager/dispatch.conf`

- The commands:
  `--update-mysql`
  `--update-file`
  are used to upgrade the backends from one opsi release to the next one.
  For details see the *releasenotes-upgrade-manual*.

- `--configure-mysql`
  does the first time database setup.

- `--edit-config-defaults`
  To edit the default values of some configuration data like in the *server configuration* of the *opsi-configed*.

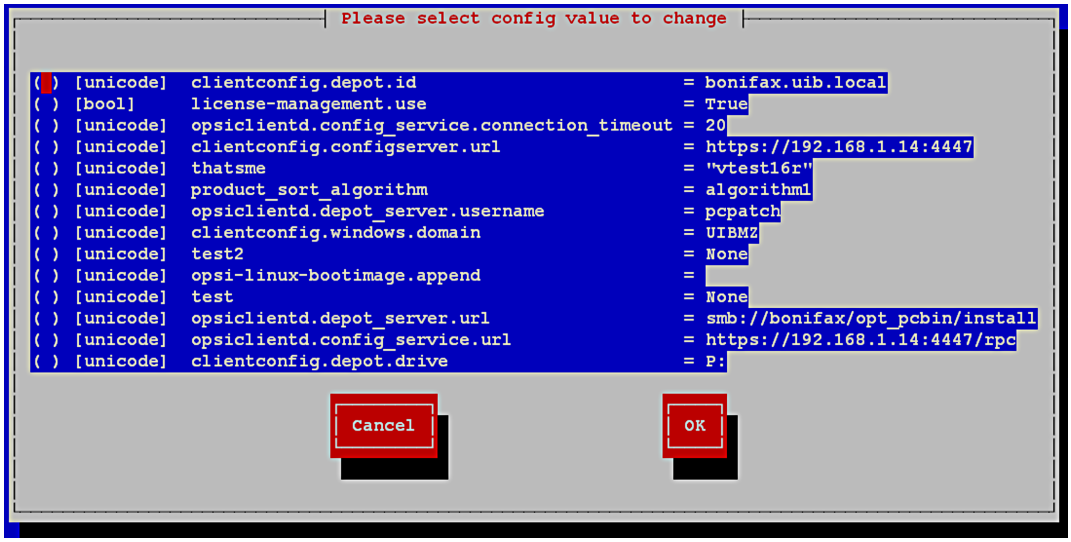


Figure 48: Dialog: `opsi-setup --edit-config-defaults`

e.g.:

clientconfig.depot.id
The name of the default depot server.

clientconfig.depot.drive
The drive letter used for mounting the share with the installation data. You can either select a drive letter or **dynamic**. With **dynamic** the client will try to automatically select an drive letter from those not in use.

license-management.use
Defines if netboot products should get license keys from license management or from product properties.

product_sort_algorithm
Defines the algorithm which is used to calculate the product installation sequence.

- `--cleanup-backend`
  Checks the current backends for integrity and removes obsolete or unreferenced entries.
  Examples for entries that may be removed are products without reference (not installed on depot / client), host-groups without a parent and configstates without corresponding config.

Note
It is common good practice to create a backup through *opsi-backup* before cleaning the backend.

- `--auto-configure-samba`
  Creates the opsi share entries in the `/etc/samba/smb.conf` configuration file
- `--auto-configure-dhcpd`
  Creates the by opsi needed entries in the `/etc/dhcp3/dhcpd.conf`.
  Don't use this if you not plan to use the dhcpd on the opsi server.
  More details in the *opsi-getting-started* manual

5.3.2 Tool: opsi-package-manager: (de-)installs opsi-packages

The `opsi-package-manager` is used for (de-)installing opsi-product-packages on an opsi-server.

In order to install a opsi-product-package, this opsi-product-package must be readable for the opsi system user opsiconfd. Therefore it is strongly recommended to install those packages from the directory /home/opsiproducts (or a sub directory).

The log file of the *opsi-package-managers* you will find at */var/log/opsi/package.log*.

Install a package (asking no questions):

```
opsi-package-manager -i softprod_1.0-5.opsi'
```

Install a package (asking questions):

```
opsi-package-manager -p ask -i softprod_1.0-5.opsi
```

Install a package (and switch required action to setup where installed):

```
opsi-package-manager -S -i softprod_1.0-5.opsi
```

Uninstall a package (asking no questions):

```
opsi-package-manager -r softprod
```

Extract and rename a package:

```
opsi-package-manager -x opsi-template_<version>.opsi --new-product-id myprod
```

It is possible to install a package with a different *product id*. This is helpful if a custom Windows netboot product was derived from an existing package and that package was updated in the meantime.

```
opsi-package-manager --install win7-x64_1.2.3.opsi --new-product-id win7-x64-custom
```

Note
Please note that products installed that way will not be automatically updated by `opsi-product-updater`.

Calling `opsi-package-manager` with option `--help` gives a listing of possible options.

Please note:

- The option `-d` or `--depots` are reserved for the use in a multi-depot-server environment.
- Using option `-d` the opsi-package will be copied to the `/var/lib/opsi/repository` directory of the target server before installing. Please make sure that there is enough free space on this file system.

- If installing new packages fails because there is not enough free space available in your temporary folder you can specify a different temporary folder with the `--temp-dir` option.

see also:

```
# opsi-package-manager --help

Usage: opsi-package-manager [options] <command>

Manage opsi packages

Commands:
  -i, --install      <opsi-package> ...      install opsi packages
  -u, --upload       <opsi-package> ...      upload opsi packages to repositories
  -l, --list         <regex>                 list opsi packages matching regex
  -D, --differences  <regex>                 show depot differences of opsi packages matching regex
  -r, --remove       <opsi-product-id> ...   uninstall opsi packages
  -x, --extract      <opsi-package> ...      extract opsi packages to local directory
  -V, --version                              show program's version info and exit
  -h, --help                                 show this help message and exit

Options:
  -v, --verbose                          increase verbosity (can be used multiple times)
  -q, --quiet                            do not display any messages
  --log-file         <log-file>          path to debug log file
  --log-file-level   <log-file-level>    log file level (default 4)
  -d, --depots       <depots>            comma separated list of depot ids to process
                     all = all known depots
  -p, --properties   <mode>              mode for default product property values
                                 ask     = display dialog
                                 package = use defaults from package
                                 keep    = keep depot defaults (default)
  --purge-client-properties              remove product property states of the installed product(s)
  -f, --force                            force install/uninstall (use with extreme caution)
  -U, --update                           set action "update" on hosts where installation status is "installed"
  -S, --setup                            set action "setup" on hosts where installation status is "installed"
  -o, --overwrite                        overwrite existing package on upload even if size matches
  -n, --no-delta                         full package transfers on uploads (do not use librsync)
  -k, --keep-files                       do not delete client data dir on uninstall
  -t, --temp-dir     <path>              tempory directory for package install
  --max-transfers    <num>               maximum number of simultaneous uploads
                                            0 = unlimited (default)
  --max-bandwidth    <kbps>              maximum transfer rate for each transfer (in kilobytes per second)
                                            0 = unlimited (default)
  --new-product-id   <product-id>        Set a new product id when extracting opsi package or
                                         set a specific product ID during installation.
```

5.3.3 Tool: `opsi-product-updater`

The command line utility `opsi-product-updater` is designed to download and install comfortable opsi packages from a repository or a other opsi server. Using the opsi-product-updater make it easy to keep the opsi server up to date. It may be also used in a cronjob to keep depot server in sync with the config server.

```
# opsi-product-updater --help

Usage: opsi-product-updater [options]
Options:
    -h    Show this help text
    -v    Increase verbosity (can be used multiple times)
    -V    Show version information and exit
    -c    Location of config file
    -i    Install all downloadable packages from configured repositories (ignores excludes)
    -p    List of productIds that will be processed: opsi-winst,opsi-client-agent
```

The main features are:

- configurable repositories
- configurable actions

All configuration will be done at the configuration file `/etc/opsi/opsi-product-updater.conf`.

configurable repositories

Repositories are the sources which will be used by the opsi-product-update to fetch new opsi packages

There are two kinds of repositories:

Internet Repositories

Example: download.uib.de
This are repositories which are configured by:

- baseURL (z.B. http://download.uib.de)
- dirs (A list of directories e.g.. opsi4.0/produkte/essential)
- and if needed username and password for password protected repositories (e.g. for the opsi patch management subscriptions)

You may also configure a proxy here.

opsi-server

This is (using a *opsi-depot-server*) the central *opsi-config-server* will be used to fetch the opsi-packages.

The central configuration item is here:

- *opsiDepotId*

This is in most cases on a *opsi-depot-server* the central *opsi-config-server*. So on any call of the *opsi-product-updater* the *opsi-product-packages* will be fetched from the *opsi-config-server*. This can be done for example by a cronjob.

configurable actions

For each repository you have to configure which actions to run:

- *autoupdate*: Newer versions of installed packages will be downloaded and installed
- *autoinstall*: Also packages which are not installed yet, will be downloaded and installed
- *autoinstall*: For all new installed packages and all clients on which these packages are installed the action request will be set to setup.
- *onlyDownload*: New packages are only downloaded and no further actions are done. A common use case is to use this option together with notifications so that after the download of new packages a mail informs an administrator about the new packages and the administrator will manually install the new packages at a later time.

In addition it is possible to send all these clients a Wake-On-LAN signal to install the new software to the clients. Using the opsi-product *shutdownwanted* you can make sure that the clients will be powered off after the installation.

- time window for autosetup: You can give time window which may be used to that client action requests to setup.
- Automatic WakeOnLan with shutdown: If there is new software Clients could be waked up and shutdown after installation automatically

5.3.4 Tools: opsi-admin / *opsi config interface*

Overview

opsi V3 introduced an opsi owned python library which provides an API for opsi configuration. The *opsiconfd* provides this API as a web service, whereas *opsi-admin* is the command line interface for this API.

Calling https://<opsi-server>:4447/interface in your browser gives you graphical interface to the *opsi web service*. You have to login as a member of the unix group *opsiadmin*.

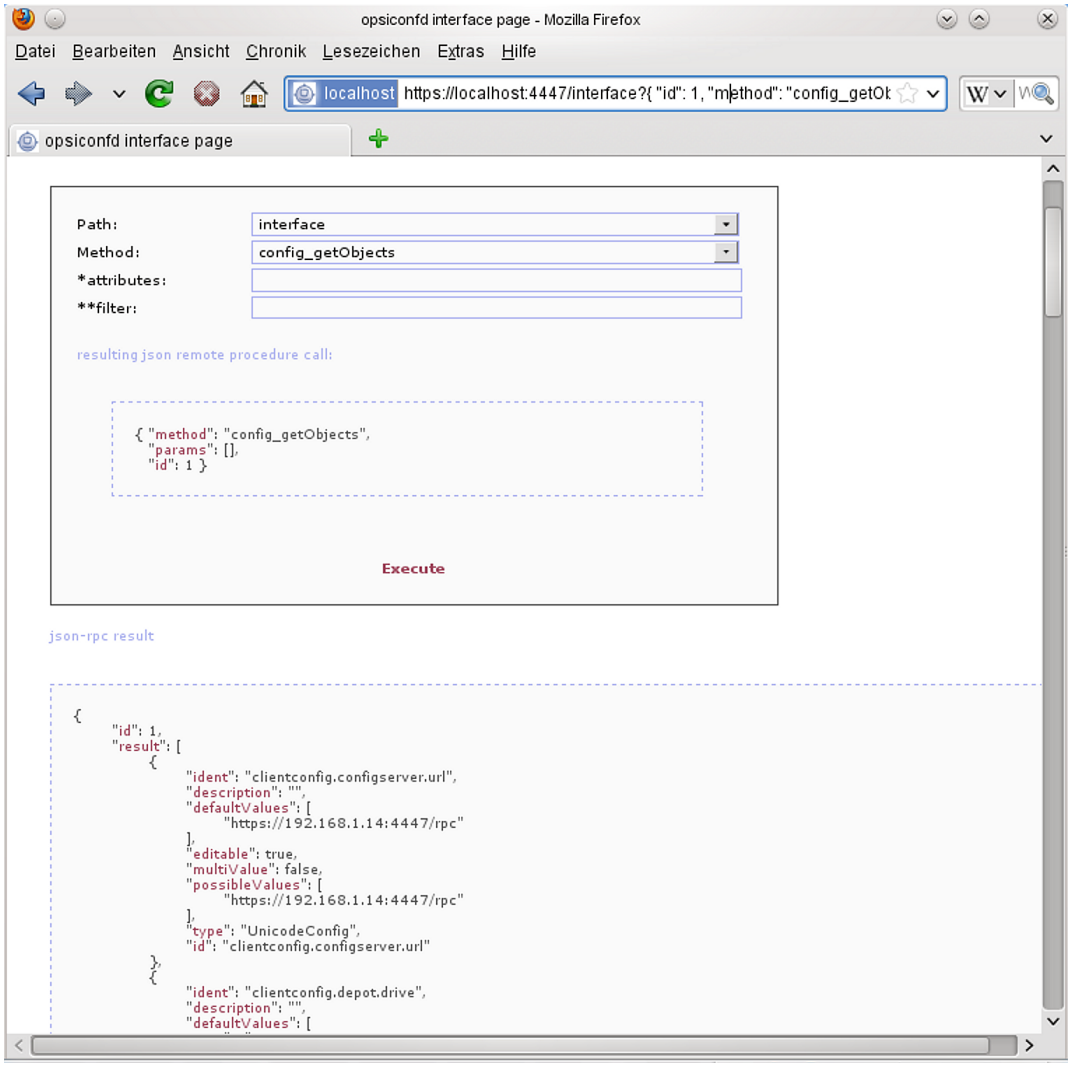


Figure 49: opsi config interface: Access to the web service via browser

At the command line *opsi-admin* provides an interface to the opsi-API. There is a interactive mode and a non interactive mode for batch processing from within scripts.

The help option `opsi-admin --help` shows a list of available command line options:

```
# opsi-admin --help

Application: opsi-admin [options] [command] [args...]
Options:
  -h, --help           Show this help text
  -V, --version        Show version number and exit
  -u, --username       Username (standard: temporary User)
```

```
  -p, --password       Password (standard: Password interactive prompt)
  -a, --address        URL from the opsconfd (standard: https://localhost:4447/rpc)
  -d, --direct         opsiconfd avoid
      --no-depot       Don't use a Depotserver-Backend
  -l, --loglevel       Log-Level (standard: 3)
                       0=nothing, 1=essential, 2=critic, 3=Errors, 4=Warnings
                       5=Tips, 6=Informations, 7=debug, 8=debug2, 9=confidential
  -f, --log-file       Path to Log-file
  -i, --interactive    Start in interactive modus
  -c, --colorize       Colorize output
  -S, --simple-output  Simple output (only for scalar and listen)
  -s, --shell-output   Shell-output
  -r, --raw-output     Raw-output
```

opsi-admin can use the opsi web service or directly operate on the data backend. To work with the web service you have to provide the URL and also an *username* and *password*. Due to security reasons you probably wouldn't like to do this from within a script. In that case you'd prefer direct access to the data base using the `-d` option: `opsi-admin -d`.

In interactive mode (start with `opsi-admin -d` or `opsi-admin -d -i -c` or short `opsi-admin -dic`) you get input support with the TAB-key. After some input, with the TAB-button you get a list or details of the data type of the next expected input.

The option `-s` or `-S` generates an output format which can be easily parsed by scripts.

There are some methods which are directly based on API-requests, and there are some *tasks*, which are a collection of function calls to do a more complex special job.

Typical use cases

Set a product to setup for all clients which have this product installed

```
opsi-admin -d task setupWhereInstalled "softprod"
```

List of all clients

```
opsi-admin -d method host_getIdents
```

Client delete

```
opsi-admin -d method host_delete <clientname>
```

e.g.:

```
opsi-admin -d method host_delete "pxevm.uib.local"
```

Create client

```
opsi-admin -d method host_createOpsiClient <full qualified clientname>
```

e.g.:

```
opsi-admin -d method host_createOpsiClient "pxevm.uib.local"
```

Set action request

```
opsi-admin -d method setProductActionRequest <productId> <clientId> <actionRequest>
```

e.g.:

```
opsi-admin -d method setProductActionRequest win7 pxevm.uib.local setup
```

Attach client description

```
opsi-admin -d method setHostDescription "dpvm02.uib.local" "Client unter VMware"
```

Listing the IDs of all clients

This uses the option `-S` so that every client is on it's own line. Through filtering for the type `OpsiClient` we avoid displaying the IDs of servers.

The output can easily be used in other programs or calls.

```
opsi-admin -dS method host_getIdents '' '{"type": "OpsiClient"}'
```

Listing the products installed on clients

```
opsi-admin -d method productOnClient_getObjects '["productVersion", "packageVersion", "installationStatus"]' '{"\
    installationStatus": "installed"}'
```

set pcpatch password

```
opsi-admin -d task setPcpatchPassword
```

Set the password of user pcpatch for Unix, samba and opsi.

5.3.5 Server processes: opsiconfd and opsipxeconfd

The *opsipxeconfd* provides the *named pipes* in the `tftpboot` directories. which are used to control the PXE boot process.

The configuration file is `/etc/opsi/opsipxeconfd.conf`

The log file is `/var/log/opsi/opsipxeconfd.log`.

The *opsiconfd* provides the opsi API as JSON web service and have a lot of other important tasks. Therefore the *opsiconfd* is the central opsi service and does all the communication to the clients.

Regarding this central rule, a tool to monitor this process gives a lot of information about load and possible problems. This tool is the *opsiconfd* info page.

opsiconfd monitoring: opsiconfd info

Using the web address https://<opsi-server>:4447/info you will get a graphical chart of *opsiconfd* load and cpu/memory usage in the last hour/day/month/year. This information is completed by tabulary information to the actual tasks and sessions.

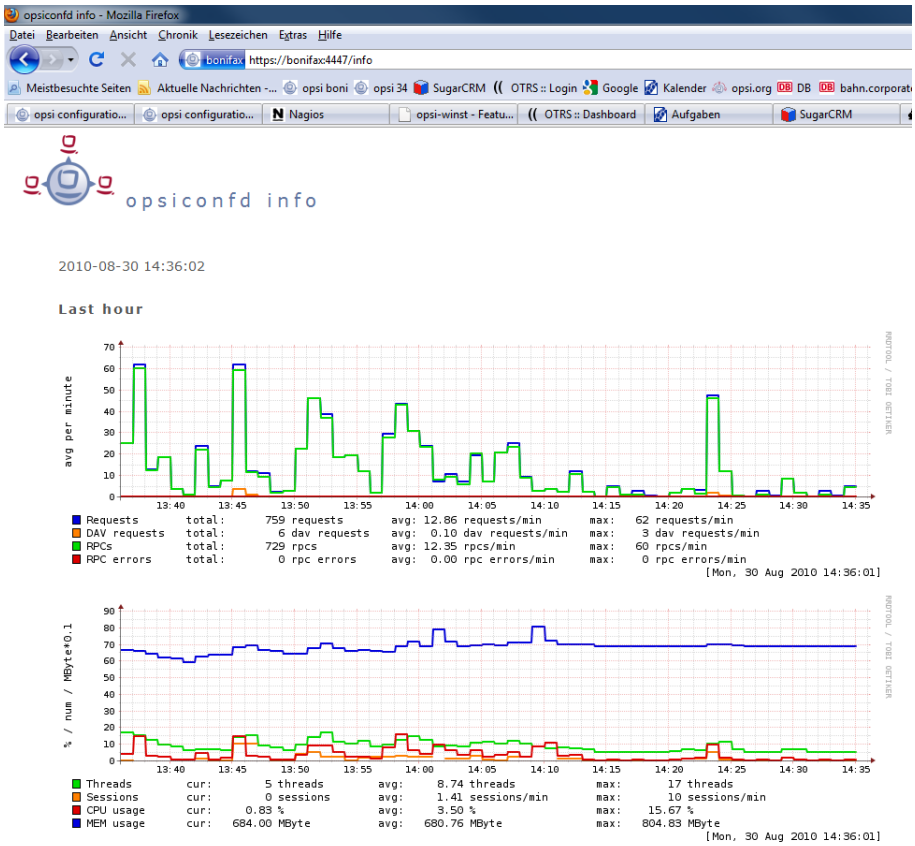


Figure 50: opsiconfd info: opsiconfd values from the last hour

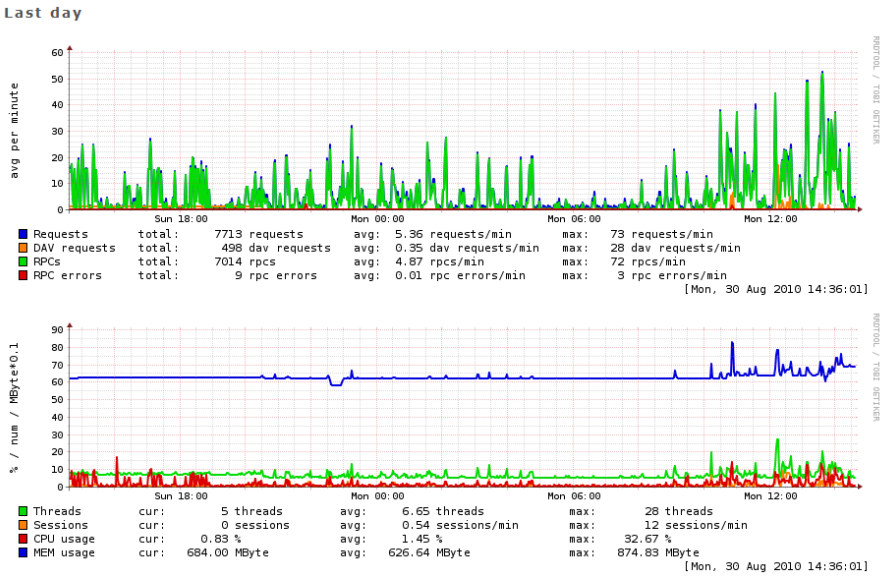


Figure 51: opsiconfd info: opsiconfd values from the last day

5.3.6 Server process: opsi-atftpd

The opsi-atftpd is based on the standard atftpd with the additional feature to handle *named pipes*.

By default the opsi-atftd is configured to not run as daemon but to be started by t the `inetd` process.

To change this configuration in order to run the opsi-atftpd as daemon, the following changes must be done:

- In the file `/etc/inetd.conf` the line for the *tftp* protocol has to be removed or commented out. After you changed this configuration file, you have to reload the `inetd` process. The command to do this differs by the used Linux Distribution:
  - Ubuntu / Debian: `service openbsd-inetd reload`
  - openSUSE / SLES / RedHat / CentOS: `service xinetd reload`
- In the file `/etc/default/atfpd` the line `USE_INETD=true` has to be changed to `USE_INETD=false`. Then you have to restart the opsi-atftpd as daemon with the command: `service opsi-atftpd restart`

5.4 Web service / API methods

5.4.1 object oriented methods

Since opsi 4 we have to different kinds of API methods:

- *object oriented* methods
- *action oriented* methods

Overview

At the *object oriented* methods a Object has some properties.

As a example let us have a look at the object *product*. A object of the type *product* which describes the product *javavm* may look like this:

```
"ident": "javavm;1.6.0.20;2"
"id": "javavm"
"description": "Java 1.6"
"changelog": ""
"advice": ""
"userLoginScript": ""
"name": "SunJavaRuntimeEnvironment"
"priority": 0
"packageVersion": "2"
"productVersion": "1.6.0.20"
"windowsSoftwareIds": None
"productClassIds": None
"type": "LocalbootProduct"
"licenseRequired": False
"setupScript": "javavm.ins"
"updateScript": ""
"uninstallScript": "deljvm.ins"
"alwaysScript": ""
"onceScript": ""
"customScript": ""
```

Every object has a set of operators which can be used to work with this object. Most time these operators are:

- *getObjects* (returns the objects)
- *getHashes* (We recommend to use *getObjects*)
- *create* (create one object comfortable)
- *createObjects* (create one or more objects, existing objects will be updatet)

- *delete* (delete one object)
- *deleteObjects* (delete one or more objects)
- *getIdents* (returns the object id's)
- *insertObject* (create a new object, if the obect exists, it will be updatet)
- *updateObject* (update a single object, if the object doesn't exists **no object will be created**. We recommend to use *insertObject* instead.)
- *updateObjects* (update a bundle of objects, if the objects doesn't exists **they will not be created**. We recommend to use *createObjects* instead.)

The method names are concatenated:

<object name>_<operation>

According to this naming rule, these new methods are easily to difference from the old *legacy* opsi 3 methods, which almost start with *get*, *set* or *create*.

The *getObjects* methods have two optional parameters:

- *attributes*
- *filter*

The *attributes* parameter is used query only for some properties of an object. If you are using attributes the returned object has all attribute keys, but only values the attribute you asked for and for all attributes which are used to identify this object. All other attributes have the value *none*.

For Example you will get by calling the method *product_getObjects* with *attributes:["name"]* for the product *javavm*:

```
"onceScript": None,
"ident": "javavm;1.6.0.20;2",
"windowsSoftwareIds": None,
"description": None,
"setupScript": None,
"changelog": None,
"customScript": None,
"advice": None,
"uninstallScript": None,
"userLoginScript": None,
"name": "Sun Java Runtime Environment",
"priority": None,
"packageVersion": "2",
"productVersion": "1.6.0.20",
"updateScript": None,
"productClassIds": None,
"alwaysScript": None,
"type": "LocalbootProduct",
"id": "javavm",
"licenseRequired": None
```

If you don't want to ask for attributes but instead you need to use the second parameter *filter* you have to pass the attribute parameter as *[]*.

The parameter filter is used to define which objects you want to get. For example if you are using the filter *{ "id":"javavm" }* on the method *product_getObjects* you will get only the object(s) which describe the product *javavm*.

If you are using methods which expect one ore more objects, these objects have to be given as JSON objects or as an array of JSON objects.

The most important objects are:

- *auditHardwareOnHost* (client specific hardware information)

- *auditHardware* (client independent hardware information)
- *auditSoftwareOnClient* (client specific software information)
- *auditSoftware* (client independent software information)
- *auditSoftwareToLicensePool* (license management)
- *configState* (administration of client host parameters)
- *config* (administration of host parameter defaults)
- *group* (group administration)
- *host* (server and clients)
- *licenseContract* (license management)
- *licenseOnClient* (license management)
- *licensePool* (license management)
- *objectToGroup* (group administration)
- *productDependency* (product dependencies)
- *productOnClient* (client specific information to a product e.g. installation state)
- *productOnDepot* (depot specific information to a product)
- *productPropertyState* (depot or client specific product property settings)
- *productProperty* (definition of product properties)
- *product* (product meta data)
- *softwareLicenseToLicensePool* (license management)
- *softwareLicense* (license management)

In addition to the described objects and methods there are some more for special operations.
This design:

- is created to transfer information about clients (severals) faster
- filter data with a unified syntax
- allows to check all input for correct syntax

With this we got an increased stability and higher performance.

host (server and clients)

Example for a OpsiClient:

```
 method host_getObjects [] {"id":"xpclient.vmnat.local"}
[
          {
          "ident" : "xpclient.vmnat.local",
          "description" : "",
          "created" : "2012-03-22 12:13:52",
          "inventoryNumber" : "",
          "ipAddress" : "172.16.166.101",
          "notes" : "Created by opsi-deploy-client-agent at Wed, 24 Aug 2011 10:24:36",
          "oneTimePassword" : "",
```

```
          "lastSeen" : "2012-03-30 16:20:04",
          "hardwareAddress" : "00:0c:29:35:70:a7",
          "opsiHostKey" : "1234567890abcef1234567890abcdef",
          "type" : "OpsiClient",
          "id" : "xpclient.vmnat.local"
          }
]
```

Most of this data is displayed on the *clients* tab of the opsi-configed.

Possible types are:

- *OpsiClient*
- *OpsiConfigserver* (which means implicit this is also a *OpsiDepotserver*)
- *OpsiDepotserver*

The server type have different and additional data.

Example for a server:

```
 method host_getObjects [] {"id":"sepiolina.vmnat.local"}
[
          {
          "masterDepotId" : null,
          "ident" : "sepiolina.vmnat.local",
          "networkAddress" : "172.16.166.0/255.255.255.128",
          "description" : "",
          "inventoryNumber" : "",
          "ipAddress" : "172.16.166.1",
          "repositoryRemoteUrl" : "webdavs://sepiolina.vmnat.local:4447/repository",
          "depotLocalUrl" : "file:///var/lib/opsi/depot",
          "isMasterDepot" : true,
          "notes" : "",
          "hardwareAddress" : null,
          "maxBandwidth" : 0,
          "repositoryLocalUrl" : "file:///var/lib/opsi/repository",
          "opsiHostKey" : "1234567890abcef1234567890abcdef",
          "type" : "OpsiConfigserver",
          "id" : "sepiolina.vmnat.local",
          "depotWebdavUrl" : "webdavs://sepiolina:4447/depot",
          "depotRemoteUrl" : "smb://sepiolina/opsi_depot"
          }
]
```

Most of this data is displayed on the *depot configuration* of the opsi-configed.

group (group administration)

Describes groups and their hierarchical structure.

Example for a group object:

```
 method group_getObjects
 [
       {
          "ident" : "sub2",
          "description" : "sub2",
          "notes" : "",
          "parentGroupId" : null,
          "type" : "HostGroup",
          "id" : "sub2"
          },
          {
          "ident" : "subsub",
```

```
          "description" : "subsub",
          "notes" : "",
          "parentGroupId" : "sub2",
          "type" : "HostGroup",
          "id" : "subsub"
          }
]
```

objectToGroup (group administration)

Describes the membership of an object in a group.

There are *Hostgroups* and *Productgroups*

Example for a objectToGroup objects:

```
 method objectToGroup_getObjects
[
         {
          "groupType" : "HostGroup",
          "ident" : "HostGroup;sub2;win7.vmnat.local",
          "type" : "ObjectToGroup",
          "groupId" : "sub2",
          "objectId" : "win7.vmnat.local"
          },
          {
          "groupType" : "HostGroup",
          "ident" : "HostGroup;subsub;win7x64.vmnat.local",
          "type" : "ObjectToGroup",
          "groupId" : "subsub",
          "objectId" : "win7x64.vmnat.local"
          },
        {
          "groupType" : "ProductGroup",
          "ident" : "ProductGroup;opsiessentials;opsi-client-agent",
          "type" : "ObjectToGroup",
          "groupId" : "opsiessentials",
          "objectId" : "opsi-client-agent"
          },
          {
          "groupType" : "ProductGroup",
          "ident" : "ProductGroup;opsiessentials;opsi-winst",
          "type" : "ObjectToGroup",
          "groupId" : "opsiessentials",
          "objectId" : "opsi-winst"
          }
]
```

product (product meta data)

Describes the meta data of a product which are defined while creating the package.

Example for a product object:

```
 method product_getObjects [] {"id":"jedit","productVersion":"4.5"}
[
          {
          "onceScript" : "",
          "ident" : "jedit;4.5;3",
          "windowsSoftwareIds" :
                    [

                    ],
          "description" : "jEdit with opsi-winst Syntax-Highlighting",
          "setupScript" : "setup.ins",
```

```
          "changelog" : "",
          "customScript" : "",
          "advice" : "",
          "uninstallScript" : "uninstall.ins",
          "userLoginScript" : "",
          "name" : "jEdit programmer's text editor",
          "priority" : 0,
          "packageVersion" : "3",
          "productVersion" : "4.5",
          "updateScript" : "update.ins",
          "productClassIds" :
                    [

                    ],
          "alwaysScript" : "",
          "type" : "LocalbootProduct",
          "id" : "jedit",
          "licenseRequired" : false
          }
]
```

Note
If you have multiple depot servers, you may have different versions of one product.

The entries *productClassIds* and *windowsSoftwareIds* are not used right now.

productProperty (definition of product properties)

Describes the properties of a product which are defined while creating the package.

Example for a productProperty object:

```
 method productProperty_getObjects [] {"productId":"jedit","productVersion":"4.5"}
[
          {
          "ident" : "jedit;4.5;3;start_server",
          "description" : "Should the jedit server be started at every startup ?",
          "editable" : false,
          "defaultValues" :
                    [
                    false
                    ],
          "multiValue" : false,
          "productVersion" : "4.5",
          "possibleValues" :
                    [
                    false,
                    true
                    ],
          "packageVersion" : "3",
          "type" : "BoolProductProperty",
          "propertyId" : "start_server",
          "productId" : "jedit"
          }
]
```

Note
The real default values are stored in the context of the depot in a productPropertyState object.

productPropertyState (depot or client specific product property settings)

Describes:

- the default value of a product property on a given depot properties of a product which are defined while creating the package.
- the client specific settings of product properties.

Example for a productPropertyState objects:

```
 method productPropertyState_getObjects [] {"productId":"jedit"}
[
          {
          "ident" : "jedit;start_server;sepiolina.vmnat.local",
          "objectId" : "sepiolina.vmnat.local",
          "values" :
                    [
                    false
                    ],
          "type" : "ProductPropertyState",
          "propertyId" : "start_server",
          "productId" : "jedit"
          },
         {
          "ident" : "jedit;start_server;xpclient.vmnat.local",
          "objectId" : "xpclient.vmnat.local",
          "values" :
                    [
                    true
                    ],
          "type" : "ProductPropertyState",
          "propertyId" : "start_server",
          "productId" : "jedit"
          }

]
```

productDependency (product dependencies)

Describes the dependencies of a product to another product as it is defined while creating the package.

Example for a productDependency object:

```
method productDependency_getObjects [] {"productId":"jedit","productVersion":"4.5"}
[
          {
          "ident" : "jedit;4.5;3;setup;javavm",
          "productAction" : "setup",
          "requiredPackageVersion" : null,
          "requirementType" : "before",
          "requiredInstallationStatus" : "installed",
          "productVersion" : "4.5",
          "requiredProductId" : "javavm",
          "requiredAction" : null,
          "requiredProductVersion" : null,
          "type" : "ProductDependency",
          "packageVersion" : "3",
          "productId" : "jedit"
          }
]
```

productOnClient (client specific information to a product e.g. installation state)

Describes which products in which versions are installed on which client..

Example for a productOnClient object:

```
 method productOnClient_getObjects [] {"productId":"jedit","clientId":"xpclient.vmnat.local"}
[
          {
          "ident" : "jedit;LocalbootProduct;xpclient.vmnat.local",
          "actionProgress" : "",
          "actionResult" : "successful",
          "clientId" : "xpclient.vmnat.local",
          "modificationTime" : "2012-03-30 15:49:04",
          "actionRequest" : "none",
          "targetConfiguration" : "installed",
          "productVersion" : "4.5",
          "productType" : "LocalbootProduct",
          "lastAction" : "setup",
          "packageVersion" : "3",
          "actionSequence" : -1,
          "type" : "ProductOnClient",
          "installationStatus" : "installed",
          "productId" : "jedit"
          }
]
```

productOnDepot (depot specific information to a product)

Describes which product is installed in which version on a given depot..

Example for a productOnDepot objects:

```
 method productOnDepot_getObjects [] {"productId":"jedit"}
[
          {
          "ident" : "jedit;LocalbootProduct;4.4.1;2;depotserver.vmnat.local",
          "locked" : false,
          "productVersion" : "4.4.1",
          "productType" : "LocalbootProduct",
          "depotId" : "depotserver.vmnat.local",
          "type" : "ProductOnDepot",
          "packageVersion" : "2",
          "productId" : "jedit"
          },
          {
          "ident" : "jedit;LocalbootProduct;4.5;3;sepiolina.vmnat.local",
          "locked" : false,
          "productVersion" : "4.5",
          "productType" : "LocalbootProduct",
          "depotId" : "sepiolina.vmnat.local",
          "type" : "ProductOnDepot",
          "packageVersion" : "3",
          "productId" : "jedit"
          }
]
```

Note
If you have multiple depot server, you may have different versions of one product.

config (administration of host parameter defaults)

Describes the *Hostparameter* of the opsi-configeds *Server configuration*.

Example for a config object:

```
 method config_getObjects [] {"id":"opsiclientd.event_gui_startup.active"}
[
          {
          "ident" : "opsiclientd.event_gui_startup.active",
          "description" : "gui_startup active",
          "defaultValues" :
                    [
                    true
                    ],
          "editable" : false,
          "multiValue" : false,
          "possibleValues" :
                    [
                    false,
                    true
                    ],
          "type" : "BoolConfig",
          "id" : "opsiclientd.event_gui_startup.active"
          }
]
```

configState (administration of client host parameters)

Describes the *Hostparameter* of the opsi-configeds *client configuration*.

Example for a configState object:

```
 method configState_getObjects [] {"configId":"opsiclientd.event_gui_startup.active"}
[
          {
          "configId" : "opsiclientd.event_gui_startup.active",
          "ident" : "opsiclientd.event_gui_startup.active;wanclient.vmnat.local",
          "values" :
                    [
                    false
                    ],
          "objectId" : "wanclient.vmnat.local",
          "type" : "ConfigState"
          }
]
```

Note
A *configState* object can't be created without an existing *config* object to refer to.

auditHardwareOnHost (client specific hardware information)

Describes the detected hardware types (including the client specific values). The idea is that you can see here the client specific data and in `auditHardware` only one entry for a network card which is used in all your computers. Unfortunately in reality this doesn't work as you might expect.

The attribute *state* describes if this is current (value = *1*) or historic (value = *0*) data.

Example for a auditHardwareOnHost object:

```
 method auditHardwareOnHost_getObjects [] {"hostId":"xpclient.vmnat.local","hardwareClass":"NETWORK_CONTROLLER","\
    ipAddress":"172.16.166.101"}
[
          {
          "vendorId" : "1022",
          "macAddress" : "00:0C:29:35:70:A7",
          "hardwareClass" : "NETWORK_CONTROLLER",
          "state" : 1,
          "deviceType" : "PCI",
          "subsystemVendorId" : "2000",
          "ipEnabled" : "True",
          "type" : "AuditHardwareOnHost",
          "firstseen" : "2012-03-30 15:48:15",
          "revision" : "10",
          "hostId" : "xpclient.vmnat.local",
          "vendor" : "Advanced Micro Devices (AMD)",
          "description" : "Ethernetadapter der AMD-PCNET-Familie",
          "subsystemDeviceId" : "1022",
          "deviceId" : "2000",
          "autoSense" : null,
          "netConnectionStatus" : "Connected",
          "maxSpeed" : null,
          "name" : "Ethernetadapter der AMD-PCNET-Familie",
          "serialNumber" : null,
          "lastseen" : "2012-03-30 15:48:15",
          "model" : null,
          "ipAddress" : "172.16.166.101",
          "adapterType" : "Ethernet 802.3"
          },
          {
          "vendorId" : "1022",
          "macAddress" : "00:0C:29:35:70:A7",
          "hardwareClass" : "NETWORK_CONTROLLER",
          "state" : 0,
          "deviceType" : "PCI",
          "subsystemVendorId" : "2000",
          "ipEnabled" : "True",
          "type" : "AuditHardwareOnHost",
          "firstseen" : "2012-03-08 14:26:14",
          "revision" : "10",
          "hostId" : "xpclient.vmnat.local",
          "vendor" : "VMware, Inc.",
          "description" : "VMware Accelerated AMD PCNet Adapter",
          "subsystemDeviceId" : "1022",
          "deviceId" : "2000",
          "autoSense" : null,
          "netConnectionStatus" : "Connected",
          "maxSpeed" : null,
          "name" : "VMware Accelerated AMD PCNet Adapter",
          "serialNumber" : null,
          "lastseen" : "2012-03-10 14:47:15",
          "model" : null,
          "ipAddress" : "172.16.166.101",
          "adapterType" : "Ethernet 802.3"
          },
  {
          "vendorId" : "1022",
          "macAddress" : "00:0c:29:35:70:a7",
          "hardwareClass" : "NETWORK_CONTROLLER",
          "state" : 0,
          "deviceType" : null,
          "subsystemVendorId" : "1022",
          "ipEnabled" : null,
          "type" : "AuditHardwareOnHost",
          "firstseen" : "2012-02-29 15:43:21",
          "revision" : "10",
          "hostId" : "xpclient.vmnat.local",
```

```
          "vendor" : "Advanced Micro Devices [AMD]",
          "description" : "Ethernet interface",
          "subsystemDeviceId" : "2000",
          "deviceId" : "2000",
          "autoSense" : "",
          "netConnectionStatus" : "yes",
          "maxSpeed" : null,
          "name" : "79c970 [PCnet32 LANCE]",
          "serialNumber" : "00:0c:29:35:70:a7",
          "lastseen" : "2012-03-30 14:58:30",
          "model" : "79c970 [PCnet32 LANCE]",
          "ipAddress" : "172.16.166.101",
          "adapterType" : ""
          }
]
```


auditHardware (client independent hardware information)

Describes the detected hardware types (independent from client specific values). The idea in this object is to see client specific data and in `AuditHardware` only the generic. That way, for example, you can see here only one entry for a network card, which is used in all your computers.
Unfortunately in reality this idea doesn't work as you might expect.

Example for a auditHardware object:


```
 method auditHardware_getObjects [] {"hardwareClass":"NETWORK_CONTROLLER","vendorId":"1022"}
[
          {
          "vendorId" : "1022",
          "deviceId" : "2000",
          "maxSpeed" : null,
          "vendor" : "Advanced Micro Devices [AMD]",
          "name" : "79c970 [PCnet32 LANCE]",
          "subsystemDeviceId" : "2000",
          "deviceType" : null,
          "subsystemVendorId" : "1022",
          "autoSense" : "",
          "model" : "79c970 [PCnet32 LANCE]",
          "revision" : "10",
          "type" : "AuditHardware",
          "hardwareClass" : "NETWORK_CONTROLLER",
          "adapterType" : "",
          "description" : "Ethernet interface"
          },
          {
          "vendorId" : "1022",
          "deviceId" : "2000",
          "maxSpeed" : null,
          "vendor" : "VMware, Inc.",
          "name" : "VMware Accelerated AMD PCNet Adapter",
          "subsystemDeviceId" : "1022",
          "deviceType" : "PCI",
          "subsystemVendorId" : "2000",
          "autoSense" : null,
          "model" : null,
          "revision" : "10",
          "type" : "AuditHardware",
          "hardwareClass" : "NETWORK_CONTROLLER",
          "adapterType" : "Ethernet 802.3",
          "description" : "VMware Accelerated AMD PCNet Adapter"
          },
          {
          "vendorId" : "1022",
          "deviceId" : "2000",
          "maxSpeed" : null,
          "vendor" : "Advanced Micro Devices (AMD)",
```

```
          "name" : "Ethernetadapter der AMD-PCNET-Familie",
          "subsystemDeviceId" : "1022",
          "deviceType" : "PCI",
          "subsystemVendorId" : "2000",
          "autoSense" : null,
          "model" : null,
          "revision" : "10",
          "type" : "AuditHardware",
          "hardwareClass" : "NETWORK_CONTROLLER",
          "adapterType" : "Ethernet 802.3",
          "description" : "Ethernetadapter der AMD-PCNET-Familie"
          },
  {
          "vendorId" : "1022",
          "deviceId" : "2000",
          "maxSpeed" : null,
          "vendor" : "Advanced Micro Devices (AMD)",
          "name" : "Ethernetadapter der AMD-PCNET-Familie",
          "subsystemDeviceId" : "1022",
          "deviceType" : "PCI",
          "subsystemVendorId" : "2000",
          "autoSense" : null,
          "model" : null,
          "revision" : "10",
          "type" : "AuditHardware",
          "hardwareClass" : "NETWORK_CONTROLLER",
          "adapterType" : "Ethernet 802.3",
          "description" : "Ethernetadapter der AMD-PCNET-Familie"
          },
          {
          "vendorId" : "1022",
          "deviceId" : "2000",
          "maxSpeed" : null,
          "vendor" : "Advanced Micro Devices (AMD)",
          "name" : null,
          "subsystemDeviceId" : "2000",
          "deviceType" : "PCI",
          "subsystemVendorId" : "1022",
          "autoSense" : null,
          "model" : "",
          "revision" : null,
          "type" : "AuditHardware",
          "hardwareClass" : "NETWORK_CONTROLLER",
          "adapterType" : null,
          "description" : "Ethernetadapter der AMD-PCNET-Familie"
          },
(....)
[
```


auditSoftwareOnClient (client specific software information)

Describes the detected software types (including the client specific values). The idea is that you will see here the client specific data and in `auditSoftware` only one entry for a office software which is used in all your computers.

Example for a auditSoftwareOnClient object:


```
 method auditSoftwareOnClient_getObjects  [] {"name":"jEdit 4.5.0","clientId":"xpclient.vmnat.local"}
[
          {
          "ident" : "jEdit 4.5.0;4.5.0;;;x86;xpclient.vmnat.local",
          "licenseKey" : "",
          "name" : "jEdit 4.5.0",
          "uninstallString" : "\\\"C:\\\\Programme\\\\jEdit\\\\unins000.exe\\\"",
          "usageFrequency" : -1,
          "clientId" : "xpclient.vmnat.local",
          "lastUsed" : "0000-00-00 00:00:00",
```

```
          "subVersion" : "",
          "language" : "",
          "state" : 1,
          "version" : "4.5.0",
          "lastseen" : "2012-03-30 16:19:55",
          "binaryName" : "",
          "type" : "AuditSoftwareOnClient",
          "firstseen" : "2012-03-30 16:19:55",
          "architecture" : "x86"
          }
]
```

auditSoftware (client independent software information)

Describes the detected software types (independent from the client specific values). The idea is that you will see here only one entry for a office software which is used in all your computers.

Example for a auditSoftware object:

```
 method auditSoftware_getObjects  [] {"name":"jEdit 4.5.0"}
[
          {
          "windowsDisplayVersion" : "4.5.0",
          "ident" : "jEdit 4.5.0;4.5.0;;;x64",
          "name" : "jEdit 4.5.0",
          "windowsSoftwareId" : "jedit_is1",
          "windowsDisplayName" : "jEdit 4.5.0",
          "installSize" : -1,
          "subVersion" : "",
          "language" : "",
          "version" : "4.5.0",
          "architecture" : "x64",
          "type" : "AuditSoftware"
          },
          {
          "windowsDisplayVersion" : "4.5.0",
          "ident" : "jEdit 4.5.0;4.5.0;;;x86",
          "name" : "jEdit 4.5.0",
          "windowsSoftwareId" : "jedit_is1",
          "windowsDisplayName" : "jEdit 4.5.0",
          "installSize" : -1,
          "subVersion" : "",
          "language" : "",
          "version" : "4.5.0",
          "architecture" : "x86",
          "type" : "AuditSoftware"
          }
]
```

auditSoftwareToLicensePool (license management)

Describes which license pools are assingned to which *auditSoftware* patterns.

Example for a auditSoftwareToLicensePool object:

```
 method auditSoftwareToLicensePool_getObjects [] {"licensePoolId":"win7-msdn-prof"}
[
          {
          "ident" : "Windows 7 Professional N;6.1;00376-165;de-DE;x64;win7-msdn-prof",
          "name" : "Windows 7 Professional N",
          "language" : "de-DE",
          "subVersion" : "00376-165",
          "licensePoolId" : "win7-msdn-prof",
          "version" : "6.1",
```

```
          "architecture" : "x64",
          "type" : "AuditSoftwareToLicensePool"
          },
          {
          "ident" : "Windows 7 Professional N;6.1;00376-165;de-DE;x86;win7-msdn-prof",
          "name" : "Windows 7 Professional N",
          "language" : "de-DE",
          "subVersion" : "00376-165",
          "licensePoolId" : "win7-msdn-prof",
          "version" : "6.1",
          "architecture" : "x86",
          "type" : "AuditSoftwareToLicensePool"
          }
]
```

softwareLicenseToLicensePool (license management)

Describes which *softwareLicenseId* is assingned to which *licensePoolId*.

Example for a softwareLicenseToLicensePool object:

```
method softwareLicenseToLicensePool_getObjects [] {"licensePoolId":"win7-msdn-prof"}
[
          {
          "licensePoolId" : "win7-msdn-prof",
          "softwareLicenseId" : "uib-msdn-win7-vol",
          "ident" : "uib-msdn-win7-vol;win7-msdn-prof",
          "licenseKey" : "12345-12345-12345-12345-3dbv6",
          "type" : "SoftwareLicenseToLicensePool"
          }
]
```

softwareLicense (license management)

Describes the existing software licenses and their meta data.

Example for a softwareLicense object:

```
 method softwareLicense_getObjects [] {"id":"uib-msdn-win7-vol"}
[
          {
          "ident" : "uib-msdn-win7-vol;msdn-uib",
          "maxInstallations" : 0,
          "boundToHost" : null,
          "expirationDate" : "0000-00-00 00:00:00",
          "licenseContractId" : "msdn-uib",
          "type" : "VolumeSoftwareLicense",
          "id" : "uib-msdn-win7-vol"
          }
]
```

licenseContract (license management)

Describes the existing licenses contracts and their meta data.

Example for a licenseContract object:

```
 method licenseContract_getObjects [] {"id":"msdn-uib"}
[
          {
          "ident" : "msdn-uib",
          "description" : "",
          "conclusionDate" : "2011-04-22 00:00:00",
```

```
          "notificationDate" : "0000-00-00 00:00:00",
          "notes" : "",
          "expirationDate" : "0000-00-00 00:00:00",
          "partner" : "Microsoft",
          "type" : "LicenseContract",
          "id" : "msdn-uib"
          }
]
```

licenseOnClient (license management)

Describes which license is used by which client.

Example for a licenseOnClient object:

```
 method licenseOnClient_getObjects  [] {"clientId":"win7client.vmnat.local"}
[
          {
          "softwareLicenseId" : "uib-msdn-win7-vol",
          "ident" : "uib-msdn-win7-vol;win7-msdn-prof;win7client.vmnat.local",
          "licenseKey" : "12345-12345-12345-12345-3dbv6",
          "notes" : "",
          "clientId" : "win7client.vmnat.local",
          "licensePoolId" : "win7-msdn-prof",
          "type" : "LicenseOnClient"
          }
]
```

licensePool (license management)

Describes the license pool and to which opsi product the license pool is assigned.

Example for a license Pool object:

```
 method licensePool_getObjects [] {"id":"win7-msdn-prof"}
[
          {
          "ident" : "win7-msdn-prof",
          "type" : "LicensePool",
          "description" : "MSDN Keys",
          "productIds" :
                    [
                    "win7",
                    "win7-x64"
                    ],
          "id" : "win7-msdn-prof"
          }
]
```

====== Special methods

Opsi has some special methods. This chapter will introduce some of the more important ones.

====== *configState_getClientToDepotserver* This is in fact also a storage object, but it's a little aside of the standard. It tells us to which depot a client is currently assigned.

The syntax is

```
 method configState_getClientToDepotserver *depotIds *clientIds
*masterOnly *productIds
```

Example:

```
method configState_getClientToDepotserver [] "pcbon4.uib.local"
[
          {
          "depotId" : "bonifax.uib.local",
          "alternativeDepotIds" :
                    [

                    ],
          "clientId" : "pcbon4.uib.local"
          }
]
```

Communication with hosts

The *hostControl* methods are used to communicate and control the clients. Since opsi 4.0.3 we strongly recommend to use the *hostControlSafe* methods. All *hostControlSafe* or *hostControl* Methods have as last parameter the `hostIds`. The `hostIds` are the list of clients this method should work on. In all *hostControlSafe* methods this parameter is not optional, if you want to send a method to all clients you have to give a `"*"`. In the older *hostControl* methods it is allowed to omit this parameter, which means *send to all*. This has caused some trouble to people which tried this with methods like *hostControl_reboot*. So with opsi 4.0.3 we broke the backward compatibility and now an empty `hostIds` is not any more allowed for the *hostControl_reboot* and *hostControl_shutdown* methods.

- `hostControlSafe_execute`
  Excute a command on the client.
  Connect to the opsiclientd of the given `hostIds` and tell them to start `command`.
  Parameters: `command hostIds`

- `hostControlSafe_fireEvent`
  Starts a opsiclientd event on the client.
  Connect the opsiclientd of the given `hostIds` and tell them to start the `event`.
  Parameters: `event hostIds`

- `hostControlSafe_getActiveSessions`
  Get information of the logged on users on the client.
  Connect the opsiclientd of the given `hostIds` and ask for the active sessions.
  Parameters: `hostIds`

- `hostControlSafe_opsiclientdRpc`
  Run the web service `method` of the opsiclientd.
  Connect the opsiclientd of the given `hostIds` and tell them to run the web service `method` using the given `parameters`. This is the most generic *hostControlSafe* method, because you may start any possible method. The best way to find out what is possible, is to have a look at control interface https://<clientId>:4441
  Parameters: `method *params hostIds`

- `hostControlSafe_reachable`
  Checks if the opsiclientd is reachable.
  Connect the opsiclientd of the given `hostIds` but do not login.
  Parameters: `hostIds`

- `hostControlSafe_reboot`
  Reboot the clients.
  Connect the opsiclientd of the given `hostIds` and starts a reboot.
  Parameters: `hostIds`

- `hostControlSafe_showPopup`
  Shows a pop up message on the clients.
  Connect the opsiclientd of the given `hostIds` and starts a pop up windows with the `message`.
  Parameters: `message hostIds`

- `hostControlSafe_shutdown`
  Shutdown the clients.
  Connect the opsiclientd of the given `hostIds` and starts a shutdown.
  Parameters: `hostIds`

- `hostControlSafe_start`
  Sends a *wakeOnLan* signal the clients.
  This is the only *hostControlSafe* method that is not use by the opsiclientd from a client.
  Parameters: `hostIds`

- `hostControlSafe_uptime`
  Asks for the clients uptime.
  Connect the opsiclientd of the given `hostIds` and get the clients uptime in seconds.
  Parameters: `hostIds`

log_read / log_write

- `log_read`
  Reads a opsi log file from the server.
  Parameters: `logType *objectId *maxSize`
  Possible logTypes are *instlog* (opsi-winst), *clientconnect* (opsiclientd), *userlogin*, *bootimage*, *opsiconfd*. The *objectId* is normally the *clientId* to which the log belongs.

- `log_write`
  Writes a opsi log file to the server.
  Parameters: `logType data *objectId *append`
  Logtypes and objectId see above, `append` (true/false) (Default = false) should the log be appended to an existing log.

====== Tutorial: Working with groups

The following tutorial will show how to use the opsi interface from the commandline and work with groups of hosts in opsi.

We want to work with group objects and therefore need to work with those functions whose names start with *group*. Opsi does distinguish between groups of the type *ProductGroup* and *HostGroup*. The first is used for product groupings and the last is used for grouping hosts.

Creating a group of hosts is possible through the method **group_createHostGroup**. The parameters of the method are *id*, a *description*, *notes* and the *parentGroupId* (ID of the parent group). Only the ID is required - everything else is optional. The ID is also the name of the group.

Important
In opsi 4.0 groups are identified by their ID. This ID must be unique throughout the opsi groups.

To create a first group from the commandline we can now issue the following command:

```
opsi-admin -d method group_createHostGroup rechner_wenselowski "Nikos computer"
```

To check if our group was created we use **group_getObjects**.

```
opsi-admin -d method group_getObjects '' '{"id": "rechner_*", "type": "HostGroup"}'
```

To create some hierarchy we need to also specify the ID of the parent group.

```
opsi-admin -d method group_createHostGroup "rechner_wenselowski2" "Undergroup" "" "rechner_wenselowski"
```

We can use the call to **group_getObjects** from earlier to see that our group was indeed created.

Opsi has a default group that behaves like a directory service - i.e. OpenLDAP - that means, that a client can only be member of one group. There is a root group with the ID **clientdirectory** that assumes that exact behavior for any group / client inside. Any client not in a subgroup of **clientdirectory** will be moved to another special group with the ID **NOT_ASSIGNED**. Anyone working with that groups is responsible that clients are not member of multiple subgroups of **clientdirectory**.

Working with the clients is easy now. You probably have noticed that our earlier query to opsi did not show us any signs of clients. That is because the assignment from a client to a group is taken care of another type of object: **objectToGroup**.

To have a client at hand we will first create one:

```
opsi-admin -d method host_createOpsiClient "wenselowski-test.uib.local"
```

This client we now want to add to the group we created previously.

```
opsi-admin -d method objectToGroup_create "HostGroup" "rechner_wenselowski2" "wenselowski-test.uib.local"
```

Noticed the **HostGroup** as the first parameter? That is again our group type. To check if the creation was successful we can execute the following command:

```
opsi-admin -d method objectToGroup_getObjects '' '{"groupType": "HostGroup", "groupId": "rechner_wenselowski2"}'
```

If for some reason we want to remove a client we can do this as well. Just execute the following:

```
opsi-admin -d method objectToGroup_delete "HostGroup" "rechner_wenselowski2" "wenselowski-test.uib.local"
```

Finally you may want to clean up the groups we created earlier. The following statements will do this for you:

```
opsi-admin -d method group_delete "rechner_wenselowski"
```

5.4.2 Action oriented methods

The action oriented methods where introduced in opsi 3. These methods are still available and will still be maintained. Technically methods are mapped to the *object oriented* methods internally.

Here comes a short list of some methods with a short description. This is meant mainly for orientation and not as a complete reference. The short description does not necessarily provide all information you need to use this method.

```
method authenticated
```

Check whether the authentication on the server was successful or not.

```
method createClient clientName domain description=None notes=None
```

Creates a new client.

```
method createGroup groupId members = [] description = ""
```

Creates a group of clients (as used by the opsi-Configed).

```
method createLicenseKey productId licenseKey
```

Assigns an (additional) license key to the product *productId*.

```
method createLocalBootProduct productId name productVersion packageVersion licenseRequired=0 setupScript="" \
    uninstallScript="" updateScript="" alwaysScript="" onceScript="" priority=10 description="" advice="" \
    productClassNames=('localBoot')
```

Creates a new localBoot product (opsi-winst product).

```
method createNetBootProduct productId name productVersion packageVersion licenseRequired=0 setupScript="" \
    uninstallScript="" updateScript="" alwaysScript="" onceScript="" priority=10 description="" advice="" \
    productClassNames=('netboot')
```

Creates a new netBoot (boot image) product.

```
method createProduct productType productId name productVersion packageVersion licenseRequired=0,setupScript="" \
    uninstallScript="" updateScript="" alwaysScript="" onceScript="" priority=10 description="" advice="" \
    productClassNames=""
```

Creates a new product.

```
method createProductDependency productId action requiredProductId="" requiredProductClassId="" requiredAction="" \
    requiredInstallationStatus="" requirementType=""
```

Creates product dependencies.

```
method createProductPropertyDefinition productId name description=None defaultValue=None possibleValues=[]
```

Creates product properties.

```
method deleteClient clientId
```

Deletes a client.

```
method deleteGeneralConfig objectId
```

Deletes a client configuration or domain configuration.

```
method deleteGroup groupId
```

Deletes a client group.

```
method deleteHardwareInformation hostId
```

Deletes all hardware information for the computer <hostid>.

```
method deleteLicenseKey productId, licenseKey
```

Deletes a license key for product <productId>.

```
method deleteProduct productId
```

Deletes a product from the data base.

```
method deleteProductDependency productId action requiredProductId="" requiredProductClassId="" requirementType=""
```

Deletes product dependencies.

```
method deleteProductProperties productId *objectId
```

Deletes all properties of a product.

```
method deleteProductProperty productId property *objectId
```

Deletes a single product property.

```
method deleteProductPropertyDefinition productId name
method deleteProductPropertyDefinitions productId
```

Deletes a single property or all properties from the product <productId>.

```
method deleteServer serverId
```

Deletes a server configuration

```
method exit
```

Quit *opsi-admin*.

```
method getBackendInfos_listOfHashes
```

Supplies information about the available backends of the opsi depot server and which of them are activated.

```
method getClientIds_list
```

Supplies a list of clients which meet the assigned criteria.

```
method getClients_listOfHashes
```

Supplies an extended list of clients which meet the assigned criteria (with description, notes and *last seen* for each client).

```
method getDomain hostId
```

Supplies the computer domain.

```
method getGeneralConfig_hash objectId
```

Supplies the general configuration of a client or a domain.

```
method getGroupIds_list
```

Supplies the list of saved client groups.

```
method auditHardwareOnHost_getObjects '[]' '{"hostId":"<hostId>"}'
```

Supplies the hardware information of the specified computer.

```
method getHostId hostname
```

Supplies the hostid of the specified host name.

```
method getHost_hash hostId
```

List of properties of the specified computer.

```
method getHostname hostId
```

Supplies the host name of the specified host id.

```
method getInstallableLocalBootProductIds_list clientId
```

Supplies a list of all localBoot products that could be installed on the client.

```
method getInstallableNetBootProductIds_list clientId
```

Supplies a list of all netBoot products that could be installed on the client.

```
method getInstallableProductIds_list clientId
```

Supplies a list of all products that could be installed on the client.

```
method getInstalledLocalBootProductIds_list hostId
```

Supplies a list of all localBoot products that are installed on the client.

```
method getInstalledNetBootProductIds_list hostId
```

Supplies a list of the installed netBoot products of a client or server.

```
method getInstalledProductIds_list hostId
```

Supplies a list of the installed products for a client or server.

```
method getIpAddress hostId
```

Supplies the IP address of a host.

```
method getLicenseKey productId clientId
```

Supplies an available license key of the specified product or the product license key which is assigned to the client.

```
method getLicenseKeys_listOfHashes productId
```

Supplies a list of all license keys for the specified product.

```
method getLocalBootProductIds_list
```

Supplies a list of all known localBoot products.

```
method getLocalBootProductStates_hash clientIds = []
```

Supplies for all clients the installation status and action request of all localBoot products.

```
method getMacAddresses_list hostId
```

Supplies the MAC address of the specified computer.

```
method getNetBootProductIds_list
```

Supplies a list of all NetBoot products.

```
method getNetBootProductStates_hash clientIds = []
```

Supplies for all clients the installation status and action request of all netBoot products.

```
method getNetworkConfig_hash objectId
```

Supplies the network specific configurations of a client or a domain.

```
method getOpsiHostKey hostId
```

Supplies the pckey of the specified hostid.

```
method getPcpatchPassword hostId
```

Supplies the password of *pcpatch* (encrypted with the *pckey* of *hostId*).

```
method getPossibleMethods_listOfHashes
```

Supplies the list of callable methods (approximately like in this chapter).

```
method getPossibleProductActionRequests_list
```

Lists the available action requests of opsi.

```
method getPossibleProductActions_hash
```

Supplies the available actions for each product (*setup*, *uninstall* , ...).

```
method getPossibleProductActions_list productId=softprod
```

Supplies the list of all actions (*setup*, *uninstall*,....).

```
method getPossibleProductInstallationStatus_list
```

Supplies the list of all installation states (*installed*, *not_installed*,...)

```
method getPossibleRequirementTypes_list
```

Supplies the list of types of product requirement (*before*, *after*, ...)

```
method getProductActionRequests_listOfHashes clientId
```

Supplies the list of upcoming actions of the specified client.

```
method getProductDependencies_listOfHashes productId = None
```

Supplies the list of product dependencies of all or the specified product.

```
method getProductIds_list
```

Supplies a list of products which meet the specified criteria.

```
method getProductInstallationStatus_hash productId hostId
```

Supplies the installation status for the specified client and product.

```
method getProductInstallationStatus_listOfHashes hostId
```

Supplies the installation status of the specified client.

```
method getProductProperties_hash productId
```

Supplies the product properties of the specified product and client.

```
method getProductPropertyDefinitions_hash
```

Supplies all known product properties with description, allowed values,...

```
method getProductPropertyDefinitions_listOfHashes productId
```

Supplies the product properties of the specified product with description, allowed values,... .

```
method getProductStates_hash clientIds = []
```

Supplies installation status and action requests of all products (for the specified clients).

```
method getProduct_hash productId
```

Supplies the meta data (description, version, ...) of the product

```
method getProvidedLocalBootProductIds_list serverId
```

Supplies a list of available localBoot products on the specified server.

```
method getProvidedNetBootProductIds_list serverId
```

Supplies a list of available netBoot products on the specified server.

```
method getServerId clientId
```

Supplies the opsi-config-server in charge of the specified client.

```
method getServerIds_list
```

Supplies a list of the known opsi-config-server.

```
method getServerProductIds_list
```

Supplies a list of the server products.

```
method getUninstalledProductIds_list hostId
```

Supplies the products which are uninstalled.

```
method powerOnHost mac
```

Send a WakeOnLan signal to the specified MAC address.

```
method setGeneralConfig config
```

Set for client or domain the generalConfig

```
method setHostDescription hostId description
```

Set a description for a client.

```
method setHostLastSeen hostId timestamp
```

Set the *last seen* time stamp of a client.

```
method setHostNotes hostId notes
```

Set the notes for a client.

```
method setMacAddresses hostId macs
```

Set the client MAC address in the data base.

```
method setOpsiHostKey hostId opsiHostKey
```

Set the *pckey* for a computer.

```
method setPcpatchPassword hostId password
```

Set the encrypted (!) *password* for *hostId*

```
method setProductActionRequest productId clientId actionRequest
```

Set an action request for the specified client and product.

```
method setProductInstallationStatus productId hostId installationStatus policyId="" licenseKey=""
```

Set an installation status for the specified client and product.

```
method setProductProperties productId properties objectId = None
```

Set the product properties for the specified product (and the specified client).

```
method unsetProductActionRequest productId clientId
```

Set the action request to *none*.

5.4.3 Backend extensions

In opsi 4 we have the possibility to extend the basic opsi 4 methods with own additional methods which use the opsi 4 base methods. This is done for example to implement the opsi 3 legacy methods or to create methods which fit better to the needs of the opsi-configed.

These extensions has to be written as Python code in the */etc/opsi/backendManager/extend.d* directory.

Extensions are loaded "on to" an BackendManager-instance and can reference it with **self**.

5.4.4 Accessing the API

The API uses JSON-RPC 1.0 over HTTP for communication. We use basic authentication.

To use this interface *POST* your calls to the path `rpc` of your opsi server, i.e. `https://opsiserver.domain.local:4447/rpc`.

Caution
Communicating with an opsi 4.0 webservice leads to a HTTP header *content-type* that does not match the real content encoding. Since release of opsi 4.0.6 it is possible to activate a RFC 2616 compatible behavior by creating the file `/etc/opsi/opsi.header.fix.enable` and restarting opsiconfd. This makes it easier to communicate with the server through third party applications. Because this changed behavior may lead to communication failures with clients expecting the old behavior this is disabled by default. The client components provided with opsi 4.0.6 have been updated so that they can work with both.

5.5 opsi-backup

5.5.1 Introduction

Your opsi-server should be backed up (like any other important system). This chapter shows what to backup and how.

And of course - how to restore it.

5.5.2 Preconditions for a backup

You should run the `opsi-backup` command as *root*.

You have to install the *mysqldump* program before you can use the `opsi-backup` in connection with the *mysql backend*. Usually this program is part of the mysql client packages.

5.5.3 Quick Start

Create a backup:

```
opsi-backup create opsi_backup.tar.bz2
```

Creates a backup of the used backends and all configuration data at the current directory with the name `opsi_backup.tar.bz2`.

Restore a backup:

```
opsi-backup restore --backends=all --configuration opsi_backup.tar.bz2
```

Restores the data from the backup file `opsi_backup.tar.bz2`, which is searched for in the current directory.

5.5.4 Basic parts of opsi

opsi may be divided in five different parts which may be backed up or not. The location where to find this part may vary (by Linux distribution, version and configuration).

Opsi configuration

The most important part of opsi is the configuration. You will find it at `/etc/opsi`.

This part will be backed up by `opsi-backup`.

Opsi backends

The data about the managed clients and the products might be stored in different backends. The most important backends are:

Table 1: opsi backends

Backend	Description
file-Backend	File based backend (default backend)
mysql-Backend	MySQL based backend (since opsi 4 for all configuration data)
dhcp	Special backend which is used in combination with a dhcpd at the *opsi-server*

Different backends may be used for different purposes at the same time. So you should have a look at the `/etc/opsi/backendManager/dispatch.conf` to see which backends you are using.

This part will be backed up by `opsi-backup`.

opsi depot share

At the *opsi depot share* you will find the installation files of the software to be installed on the clients by opsi. The directories which contain these files (Local boot products and netboot products) are located at `/var/lib/opsi/depot`.

Older versions of opsi used the directory `/opt/pcbin/install` for this. If it's still present it may be symlinked towards the new location.

Depending on how many operating systems, drivers, software, etc is located here, this part may have a huge extent.

This part will **not** be backed up by `opsi-backup`.

So if you like to backup this part, you may use *rsnapshot* or other backup utilities.

opsi work bench

The *opsi work bench* is the location which is used to create own packages. It is usually located at `/home/opsiproducts` (`/var/lib/opsi/workbench` on openSUSE and SLES) and exported as the samba share *opsi_workbench*. Because this directory holds your own work, it should be backed up.

This part will **not** be backed up by `opsi-backup`.

So if you like to backup this part, you may use *rsnapshot* or other backup utilities.

opsi repository

The directory `/var/lib/opsi/repository` is used to store opsi packages, which are downloaded by the `opsi-product-updater` or which are installed by the `opsi-package-manager` when using the `-d` option.

This part will **not** be backed up by `opsi-backup`.

So if you like to backup this part, you may use *rsnapshot* or other backup utilities.

TFTP directory

The TFTP directory contains configuration files for booting via PXE. This directory can be found under `/tftpboot/` on most systems. On openSUSE and SLES this is `/var/lib/tftpboot/opsi/`. Files that may have been changed are i.e. `linux/pxelinux.cfg/default.menu` or `linux/pxelinux.cfg/default.nomenu`. During the installation of opsi-linux-bootimage these files are filled with default values. They are not required in case of a disaster recovery.

This part will **not** be backed up by `opsi-backup`.

5.5.5 The program `opsi-backup`

`opsi-backup` is a command line program which makes it easy to create and restore opsi data backups.

The basic commands are `create`, `restore` and `verify`.
The option `--help` displays information about the accepted command line options. Use also `<command> --help` (e.g. `opsi-backup create --help`) to get information about command options.

```
opsi-backup --help
```

The `opsi-backup` utility stores the configuration and backend data in nearly the same format as they were found at the server. **So you may not restore these data to a server which uses other backends, has other opsi versions or is in any other way different regarding the opsi data structures.**

`opsi-backup` creates always a full backup. There is no support for incremental or differencial backups.

Caution
Please notice that `opsi-backup` creates **no** backup of:
* opsi depot share * opsi work bench * opsi repository

`opsi-backup` creates a backup file, which is a compressed tar file. So you may access the data using other standard tools.

Caution
A backup file created by `opsi-backup` may contain passwords, hot-keys and other security-related data. So be sure to store the backup files at a secure place.

Create a backup

To create a backup call `opsi-backup create`.
This command (without any additional options) will create a backup of all configuration data and all used backends.
The backup file will be stored at the current directory with an automatically generated name.
To get information about the possible options of `create` call
`opsi-backup create --help`

```
opsi-backup create
opsi-backup create --help
usage: opsi-backup create [-h] [--flush-logs]
                          [--backends {file,mysql,dhcp,auto,all}]
                          [--no-configuration] [-c [{gz,bz2,none}]]
                          [destination]

positional arguments:
  destination           Destination of the generated output file. (optional)

optional arguments:
  -h, --help            show this help message and exit
  --flush-logs          Causes mysql to flush table logs to disk before the
                        backup. (recommended)
  --backends {file,mysql,dhcp,auto,all}
                        Select a backend to backup or 'all' for all backends.
                        Can be given multiple times. (Default: auto)
  --no-configuration    Backup opsi configuration.
  -c [{gz,bz2,none}], --compression [{gz,bz2,none}]
                        Sets the compression format for the archive (Default:
                        bz2)
```

You may give the target directory or the full path to the backup file as option to `opsi-backup create`. If the given option is a filename, the backup will be created in this file - existing files will be overwritten. If the given option is a directory, the backup file will be crated in this directory with a generated filename using the pattern: `<hostname>_<opsi-version>_<date>_<time>`

```
opsi-backup create /mnt/backup/opsi_backup.tar.bz2
opsi-backup create /mnt/backup/
```

Other `create` options are:

- `--backends {file,mysql,dhcp,all,auto}`
  is used to select the backends which shall be included to the backup. You may give this option multiple times.
  The option `--backends=all` includes all supported backends.
  The default is `--backends=auto`, which means that `opsi-backup` reads the configuration file `/etc/opsi/backendManager/dispatch.conf` and backups all supported backends used in this configuration. The supported backends are: `mysql`, `file`, `dhcp`

  ```
  opsi-backup create --backends=file --backends=mysql
  opsi-backup create --backends=all
  ```

  Tip
  If you are using a not supported backend (like *ldap*), you may use `opsi-convert` to convert your data to a backend, which is supported by backup.

- `--no-configuration`
  Excludes the opsi configuration files from the backup.

  ```
  opsi-backup create --no-configuration
  ```

- `-c [{gz,bz2,none}], --compression [{gz,bz2,none}]`
  Specify the compression method. `none` means *no compression*.
  The default is `bz2`.

  ```
  opsi-backup create -c bz2
  ```

- `--flush-logs`
  The backup of the mysql backend uses the *mysqldump* command. This means that all data known by the database are backed up, no matter if they are on disk or only in the memory yet. This means, that your backup may be more topical than your database files (which is really not a problem).
  If you want to make sure, that the database stores all data to the disk before starting the backup, you may use the `--flush-logs` option. But before you may do this, you have to grant the required RELOAD-privileges to the opsi database user, or your backup will fail. Check: RELOAD.
  So use this option only if you really know what you are doing.

```
opsi-backup create --backends=mysql --flush-logs
```

Example

```
opsi-backup create --no-configuration --backends=all opsi_backup.tar.bz2
```

Archive your backup files

`opsi-backup` has no features to archive the created backup files. So you have to do it by yourself (e.g. using a file backup tool).
If you call `opsi-backup` with a target directory as option, please keep in mind that every call creates a new full backup file and no older files will be deleted.

Verify a backup

The command `opsi-backup verify` is used to test the internal integrity of the created backup file. Special help for the `opsi-backup verify` command is available by the command option `--help`.

Example

```
opsi-backup verify opsi_backup.tar.bz2
opsi-backup verify --help
usage: opsi-backup verify [-h] file [file ...]

required arguments:
  file        The backup archive to verify.

optional arguments:
  -h, --help  shows this help message and then exits
```

Tip
If you are calling `opsi-backup verify` at the console, it may be useful to activate messages at standard out using `-v`: `opsi-backup -v verify opsi_backup.tar.bz2`

Restore from a backup file

To restore data from a backup file, use the command `opsi-backup restore`.

You have to give the path to the backup file as parameter.

The command `opsi-backup restore --help` gives information about the options for the command `restore`.

```
opsi-backup restore --help
usage: opsi-backup restore [-h] [--backends {file,mysql,dhcp,auto,all}]
                           [--configuration] [-f]
                           file

required arguments:
```

```
  file                  The backup archive to restore data from.

optional arguments:
  -h, --help            show this help message and exit
  --backends {file,mysql,dhcp,auto,all}
                        Select a backend to restore or 'all' for all backends.
                        Can be given multiple times.
  --configuration       Restore opsi configuration.
  -f, --force           Ignore sanity checks and try to apply anyway. Use
                        with caution! (Default: false)
```

`opsi-backup restore` has the following options:

- `--backends {file,mysql,dhcp,auto,all}`
  Specifies the backend to restore. This option may be used multiple times.
  The option `--backends=all` specifies that the data from all backends which are found in the backup file shall be restored.
  The default is `--backends=auto`. This restores the data from the backup file to the system using the actual configuration data from `/etc/opsi/backendManager/dispatch.conf`.

```
opsi-backup restore --backends=file --backends=mysql opsi_backup.tar.bz2
opsi-backup restore --backends=all opsi_backup.tar.bz2
```

Caution
If you changed your backend configuration since you have created the backup, no or not all data will be restored. In this case you have to use the `--backends=all` option and then to convert the restored data to the now used backend using `opsi-convert`.

- `--configuration`
  Specifies that the opsi configuration has to be restored.
  This option is not default at `restore` command.

```
opsi-backup restore --configuration opsi_backup.tar.bz2
```

- `-f, --force`
  To avoid data damage `opsi-backup` makes a system compatibility check (opsi Version, OS-Version, Host- and Domain Name) before restoring data and aborts if the actual system differs from the system the backup file was created on. Using this option you may override this check.

```
opsi-backup restore -f opsi_backup.tar.bz2
```

Example

```
opsi-backup restore --configuration --backends=all opsi_backup.tar.bz2
```

5.6 opsi data storage (backends)

5.6.1 file backend

With the backend type *{file backend}* the configuration information is kept in text files (ini file syntax) on the server.
Important details of the backend *file* :

- It is the default backend
- You will find the files of this backend at `/var/lib/opsi`.
- Is implemented with the assumption that the FQDN of the server running this backend is the FQDN of the :configserver: in opsi.

More details on the files and their structure can be found at Section 5.7.4.

5.6.2 mysql backend

mysql backend for inventory data

Inventory data at the *file backend* is stored in structured text files by default. This type of storage is not very useful if you wish to form free queries on these data. In order to allow free queries and reports, a mysql based backend for the inventory data has been introduced.

The main features of this backend are: * only for inventory data free (for other data it's part of a co funding project until now) * optional (not the default backend) * a very fine granulated data structure with an additional table to make queries easier. * a history function which tracks changes in the inventory.

Regarding the very different structure of the components in the inventory the resulting data structure is complex.

The table *hosts* comprises all known hosts. For every device type we use two tables: The *HARDWARE_DEVICE_* .table describes the model without individual aspects like the serial number. The *HARDWARE_CONFIG* table stores these individual and configuration data.

These both tables are connected via the field hardware_id. This is the resulting list of tables:

```
HARDWARE_CONFIG_1394_CONTROLLER
HARDWARE_CONFIG_AUDIO_CONTROLLER
HARDWARE_CONFIG_BASE_BOARD
HARDWARE_CONFIG_BIOS
HARDWARE_CONFIG_CACHE_MEMORY
HARDWARE_CONFIG_COMPUTER_SYSTEM
HARDWARE_CONFIG_DISK_PARTITION
HARDWARE_CONFIG_FLOPPY_CONTROLLER
HARDWARE_CONFIG_FLOPPY_DRIVE
HARDWARE_CONFIG_HARDDISK_DRIVE
HARDWARE_CONFIG_IDE_CONTROLLER
HARDWARE_CONFIG_KEYBOARD
HARDWARE_CONFIG_MEMORY_BANK
HARDWARE_CONFIG_MEMORY_MODULE
HARDWARE_CONFIG_MONITOR
HARDWARE_CONFIG_NETWORK_CONTROLLER
HARDWARE_CONFIG_OPTICAL_DRIVE
HARDWARE_CONFIG_PCI_DEVICE
HARDWARE_CONFIG_PCMCIA_CONTROLLER
HARDWARE_CONFIG_POINTING_DEVICE
HARDWARE_CONFIG_PORT_CONNECTOR
HARDWARE_CONFIG_PRINTER
HARDWARE_CONFIG_PROCESSOR
HARDWARE_CONFIG_SCSI_CONTROLLER
HARDWARE_CONFIG_SYSTEM_SLOT
HARDWARE_CONFIG_TAPE_DRIVE
HARDWARE_CONFIG_USB_CONTROLLER
HARDWARE_CONFIG_VIDEO_CONTROLLER
HARDWARE_DEVICE_1394_CONTROLLER
HARDWARE_DEVICE_AUDIO_CONTROLLER
HARDWARE_DEVICE_BASE_BOARD
HARDWARE_DEVICE_BIOS
HARDWARE_DEVICE_CACHE_MEMORY
HARDWARE_DEVICE_COMPUTER_SYSTEM
HARDWARE_DEVICE_DISK_PARTITION
HARDWARE_DEVICE_FLOPPY_CONTROLLER
HARDWARE_DEVICE_FLOPPY_DRIVE
HARDWARE_DEVICE_HARDDISK_DRIVE
HARDWARE_DEVICE_IDE_CONTROLLER
HARDWARE_DEVICE_KEYBOARD
HARDWARE_DEVICE_MEMORY_BANK
HARDWARE_DEVICE_MEMORY_MODULE
HARDWARE_DEVICE_MONITOR
HARDWARE_DEVICE_NETWORK_CONTROLLER
HARDWARE_DEVICE_OPTICAL_DRIVE
HARDWARE_DEVICE_PCI_DEVICE
HARDWARE_DEVICE_PCMCIA_CONTROLLER
```

```
HARDWARE_DEVICE_POINTING_DEVICE
HARDWARE_DEVICE_PORT_CONNECTOR
HARDWARE_DEVICE_PRINTER
HARDWARE_DEVICE_PROCESSOR
HARDWARE_DEVICE_SCSI_CONTROLLER
HARDWARE_DEVICE_SYSTEM_SLOT
HARDWARE_DEVICE_TAPE_DRIVE
HARDWARE_DEVICE_USB_CONTROLLER
HARDWARE_DEVICE_VIDEO_CONTROLLER
HOST
SOFTWARE
SOFTWARE_CONFIG
```

Which field name in the database is corresponding to which reported and localized name in the opsi management interface is defined in a configuration file. Example (`/etc/opsi/hwaudit/locales/en_US`):

```
DEVICE_ID.deviceType = Device type
DEVICE_ID.vendorId = Vendor ID
DEVICE_ID.deviceId = Device ID
DEVICE_ID.subsystemVendorId = Subsystem vendor ID
DEVICE_ID.subsystemDeviceId = Subsystem device ID
DEVICE_ID.revision= Revision
BASIC_INFO.name = Name
BASIC_INFO.description = Description
HARDWARE_DEVICE.vendor = Vendor
HARDWARE_DEVICE.model = Model
HARDWARE_DEVICE.serialNumber = Serial number
COMPUTER_SYSTEM = Computer
COMPUTER_SYSTEM.systemType = Type
COMPUTER_SYSTEM.totalPhysicalMemory = Physical Memory
CHASSIS = Chassis
CHASSIS.name = Name
CHASSIS.chassisType = Chassis type
CHASSIS.installDate = Installation date
CHASSIS.serialNumber = Serial number
BASE_BOARD = Base board
BASE_BOARD.product = Product
BIOS = BIOS
BIOS.version = Version
SYSTEM_SLOT = System slot
SYSTEM_SLOT.currentUsage = Current usage
SYSTEM_SLOT.status = Status
SYSTEM_SLOT.maxDataWidth = Maximum data width
PORT_CONNECTOR = Port
PORT_CONNECTOR.connectorType = Attributes
PORT_CONNECTOR.internalDesignator = Internal designator
PORT_CONNECTOR.internalConnectorType = Internal type
PORT_CONNECTOR.externalDesignator = External designator
PORT_CONNECTOR.externalConnectorType = External type
PROCESSOR = Processor
PROCESSOR.architecture = Architecture
PROCESSOR.family = Family
PROCESSOR.currentClockSpeed = Current clock speed
PROCESSOR.maxClockSpeed = Maximum clock speed
PROCESSOR.extClock = External clock
PROCESSOR.processorId = Processor-ID
PROCESSOR.addressWidth = Address width
PROCESSOR.socketDesignation = Socket designation
PROCESSOR.voltage = Voltage
MEMORY_BANK = Memory bank
MEMORY_BANK.location = Location
MEMORY_BANK.maxCapacity = Maximum capacity
MEMORY_BANK.slots = Number of slots
MEMORY_MODULE = Memory module
MEMORY_MODULE.deviceLocator = Device locator
MEMORY_MODULE.capacity = Capacity
MEMORY_MODULE.formFactor = Form factor
MEMORY_MODULE.speed = Speed
```

```
MEMORY_MODULE.memoryType = Memory type
MEMORY_MODULE.dataWidth = Data width
MEMORY_MODULE.tag = Tag
CACHE_MEMORY = Cache memory
CACHE_MEMORY.installedSize = Installed size
CACHE_MEMORY.maxSize = Maximum size
CACHE_MEMORY.location = Location
CACHE_MEMORY.level = Level
PCI_DEVICE = PCI device
PCI_DEVICE.busId = Bus id
NETWORK_CONTROLLER = Network adapter
NETWORK_CONTROLLER.adapterType = Adapter type
NETWORK_CONTROLLER.maxSpeed = Maximum speed
NETWORK_CONTROLLER.macAddress = MAC address
NETWORK_CONTROLLER.netConnectionStatus = Net connection status
NETWORK_CONTROLLER.autoSense = auto-sense
NETWORK_CONTROLLER.ipEnabled = IP protocoll enabled
NETWORK_CONTROLLER.ipAddress = IP address
AUDIO_CONTROLLER = Audio controller
HDAUDIO_DEVICE = HD Audio device
HDAUDIO_DEVICE.address = Addresse
IDE_CONTROLLER = IDE controller
SCSI_CONTROLLER = SCSI controller
FLOPPY_CONTROLLER = Floppy controller
USB_CONTROLLER = USB controller
1394_CONTROLLER = 1394 controller
PCMCIA_CONTROLLER = PCMCIA controller
VIDEO_CONTROLLER = Video controller
VIDEO_CONTROLLER.videoProcessor = Video processor
VIDEO_CONTROLLER.adapterRAM = Adapter RAM
DRIVE.size = Size
FLOPPY_DRIVE = Floppy drive
TAPE_DRIVE = Tape drive
HARDDISK_DRIVE = Harddisk drive
HARDDISK_DRIVE.cylinders = Cylinders
HARDDISK_DRIVE.heads = Heads
HARDDISK_DRIVE.sectors = Sectors
HARDDISK_DRIVE.partitions = Partitions
DISK_PARTITION = Partition
DISK_PARTITION.size = Size
DISK_PARTITION.startingOffset = Starting offset
DISK_PARTITION.index = Index
DISK_PARTITION.filesystem = Filesystem
DISK_PARTITION.freeSpace = Free space
DISK_PARTITION.driveLetter = Drive letter
OPTICAL_DRIVE = Optical drive
OPTICAL_DRIVE.driveLetter = Drive letter
USB_DEVICE = USB device
USB_DEVICE.vendorId = Vendor ID
USB_DEVICE.deviceId = Device ID
USB_DEVICE.usbRelease = USB release
USB_DEVICE.maxPower = Maximum power
USB_DEVICE.interfaceClass = Interface class
USB_DEVICE.interfaceSubClass = Interface sub class
USB_DEVICE.interfaceProtocol = Interface protocol
USB_DEVICE.status = Status
MONITOR = Monitor
MONITOR.screenHeight = Screen height
MONITOR.screenWidth = Screen width
KEYBOARD = Keyboard
KEYBOARD.numberOfFunctionKeys = Number of function keys
POINTING_DEVICE = Pointing Device
POINTING_DEVICE.numberOfButtons = Number of buttons
PRINTER = Printer
PRINTER.horizontalResolution = Horizontal resolution
PRINTER.verticalResolution = Vertical resolution
PRINTER.capabilities = Capabilities
PRINTER.paperSizesSupported = Supported paper sizes
```

```
PRINTER.driverName = Driver name
PRINTER.port = Port
```

Examples for queries: Listing of all hard drives:

```
SELECT * FROM HARDWARE_DEVICE_HARDDISK_DRIVE D
LEFT OUTER JOIN HARDWARE_CONFIG_HARDDISK_DRIVE H ON D.hardware_id=H.hardware_id ;
```

The software inventory uses as primary keys the following entries:

- Name
  This is the *windowsDisplayName* or, if this entry isn't found at the registry, it is the *windowsSoftwareId*. Both values come from the registry:
  HKLM\SOFTWARE\Microsoft\Windows\CurrentVersion\Uninstall
  HKLM\SOFTWARE\Microsoft\Windows\CurrentVersion\Uninstall\<id> DisplayName
- Version
  HKLM\SOFTWARE\Microsoft\Windows\CurrentVersion\Uninstall\<id> DisplayVersion
- SubVersion
- Language
- Architecture (32 Bit / 64 Bit)

At the table *Software_config* these primary keys are integrated to one key: *config_id*.

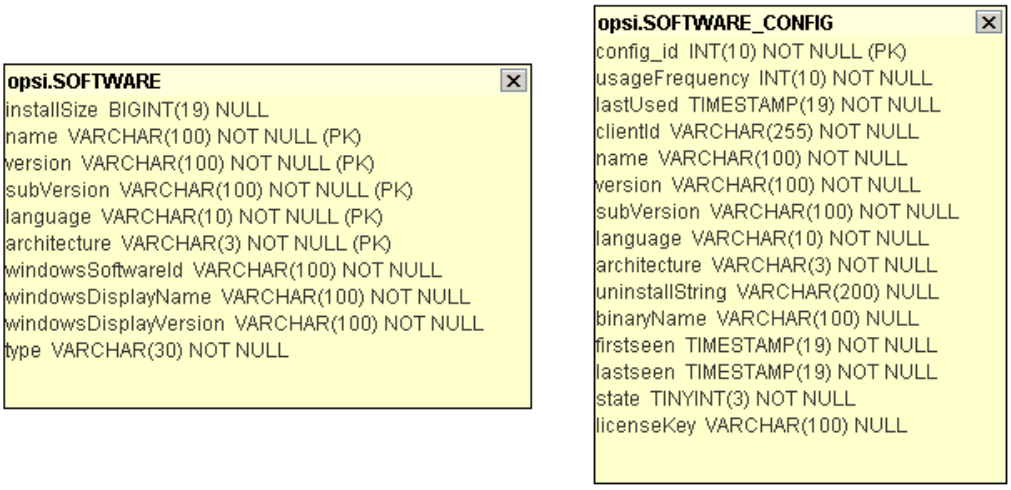


Figure 52: data base schema: software inventory

mysql backend for configuration data

The *mysql backend* for configuration data is available since opsi 4.0.

This opsi extension is currently in the cofunding process and not free. For more details see Section 9.1.

The *mysql backend* has a high performance which is important for large installations.

Here a data structure overview:

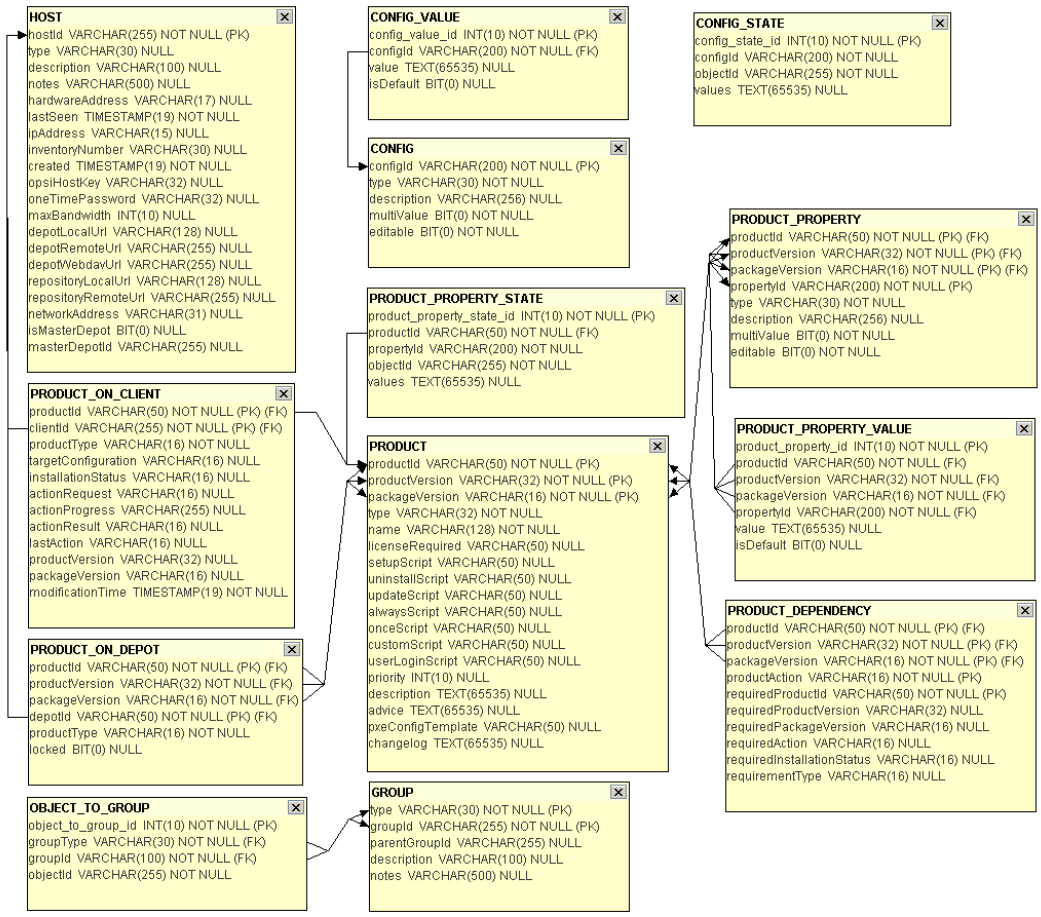


Figure 53: data base schema: configuration data

Initializing the MySQL-Backend

First, the mysql-server has to be installed (if not done yet):

```
apt-get install mysql-server
```

In the next step the administrative password for the mysql-server has to been set:

```
mysqladmin --user=root password linux123
```

Caution
Since MySQL server version 5.7 the *strict mode* is enabled by default. This mode prevents the command *opsi-setup --configure-mysql* to finish properly, with the correct configurations. To disable the strict mode please edit the file `/etc/mysql/mysql.conf.d/mysqld.cnf`.
In the `[mysqld]` section add the following line underneath the section name:
`sql_mode=NO_ENGINE_SUBSTITUTION`

Now the service `mysql` has to be restarted: `service mysql restart`

The command

```
opsi-setup --configure-mysql
```

will now initialize the mysql backend.

A example session:

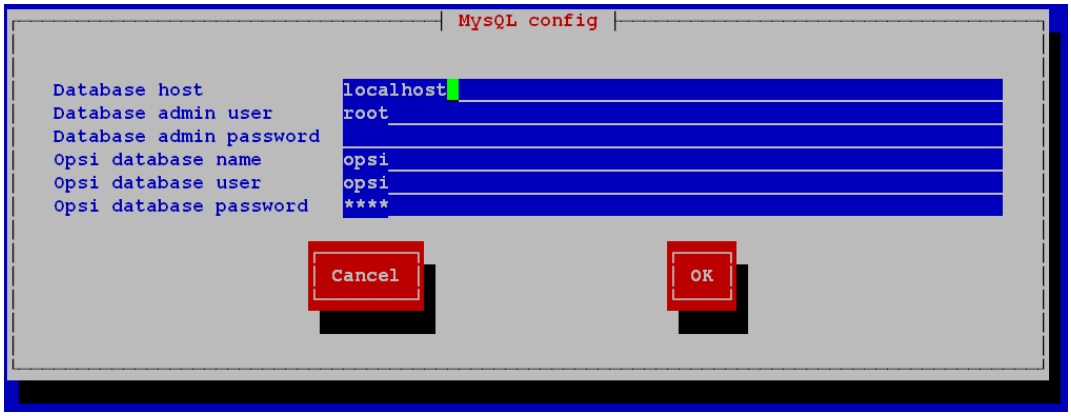


Figure 54: Dialog: opsi-setup --configure-mysql

```
Connecting to host 'localhost' as user 'root'
Successfully connected to host 'localhost' as user 'root'
Creating database 'opsi'
Database 'opsi' created
Creating user 'opsi' and granting all rights on 'opsi'
User 'opsi' created and privileges set
Testing connection to database 'opsi' as user 'opsi'
Successfully connected to host 'localhost' as user 'opsi'
Updating backend config '/etc/opsi/backends/mysql.conf'
Backend config '/etc/opsi/backends/mysql.conf' updated
Initializing mysql backend
```

Figure 55: Output: opsi-setup --configure-mysql

All the queries(except the password) can be taken by default by pressing *ENTER*.

As next step you have to configure how (which methods) opsi should use with the backend. Therefore please edit the file */etc/opsi/backendManager/dispatch.conf*.

You can find a detailed description for this configuration at the *getting started* manual. The configuration file also contains a lot of examples of typical configurations.

A configuration for the use of the *mysql backend* (without internal dhcpd) looks like this:

```
backend_.*          : mysql, opsipxeconfd
host_.*             : mysql, opsipxeconfd
productOnClient_.* : mysql, opsipxeconfd
configState_.*      : mysql, opsipxeconfd
.*                  : mysql
```

Finally you have to activate the changed configuration with the following commands:

```
opsi-setup --init-current-config
opsi-setup --set-rights
service opsiconfd restart
service opsipxeconfd restart
```

Caution
The service *opsiconfd* does not have a dependency to MySQL as default. This is due to the fact that opsi can be run without using MySQL, and because not every init-system does support requirements between services. Please refer to the documentation of your operating system on how to configure this.

Configure the mysql database for access from outside the server

The used database must be configured in a way that allow external access. This usually means that connection from other sources as *localhost* must be accepted.

Please refer to the manual of your used database for further information.

5.6.3 HostControl backend

The HostControl backend does not store any information. It is a special backend to control the opsi clients.

Typical tasks are to send Wake-On-Lan signals and send control signals to the *opsi-client-agent*.

The HostControl backend is configured by the configuration file `/etc/opsi/backends/hostcontrol.conf`. Configuration options are here:

- `opsiclientdPort`:
  Network port to contact the opsi-client-agent.
- `hostRpcTimeout`:
  Timeout (in seconds) connecting a opsi-client-agent.
- `resolveHostAddress`:
  This option controls whether the name resolution of a opsi-client address is primary done by the opsi database or by the name resolution of the operating system of the *opsi-server*. If this option is `True`, the *opsi-server* tries at first to get the IP-Address of a *opsi-client* by the name resolution of the operating system (DNS, /etc/hosts) and if this fails the opsi database is used. To use the opsi database, first you have to set this option to `False`.
- `maxConnections`:
  Maximal number of concurrent connections to *opsi-client-agents*.
- `broadcastAddresses`:
  List of broadcast addresses used to send Wake-On-Lan broadcasts.

5.6.4 HostControlSafe-Backend

The default behavior of opsi4.0 methods called without any parameter is, that it matches all existing objects. For instance the command "host_getObjects" without any parameters results in returning all existing host objects. This could be dangerous when using the HostControl-Backend. Especially with commands like: `hostControl_shutdown` and `hostControl_reboot`. In these cases calling the method without any parameter would shutdown or reboot all the clients.

Therefore with service release opsi 4.0.3 two changes were introduced:

- The methods `hostControl_shutdown` and `hostControl_reboot` don't have the standard behavior anymore and result in an error message when they are called without any parameter.
- A new backend is introduced (**HostControlSafe** backend), that results in an error message for all of the methods, if they are called without any client parameter. To explicitly address all of the clients by a HostControlSafe-Backend method, the wildcard `*` can be used:

```
opsi-admin -d method hostControlSafe_shutdown *
```

So for the reasons mentioned above, we recommend to use the hostControlSafe methods at the console or especially with little experience in using the service methods.

5.6.5 Conversion between different backends

The command `opsi-convert` converts the opsi configuration files from one backend to another. The target or the source can be assigned in different ways:

- backend name:
  A backend on the current server can be addressed with just the backend name. The command `opsi-convert file mysql` converts the data base of the current server from *file backend* to the *mysql backend*.
- Service address
  Providing a fully qualified service address allows access to a remote servers data base (after passing the users password). The service address looks like `https://<username>@<ipadresse>:4447/rpc`. You will be asked for the passwords.
  The conversion command looks like that:

```
opsi-convert -s -l /tmp/log https://uib@192.168.2.162:4447/rpc   https://opsi@192.168.2.42:4447/rpc
```

- Configuration directories
  With the declaration of a configuration directory for the specified backend manager configuration source or target can be described in detail.

```
opsi-convert --help

Usage: opsi-convert [options] <from> <to>
Convert an opsi database into an other.
Options:
    -h        show this help text
    -V        show version information
    -q        do not show progress
    -v        increase verbosity (can be used multiple times)
    -c        clean destination database before writing
    -s        use destination host as new server
    -l <file> log to this file

<from> and <to> can be:
     - the name of a backend as defined in /etc/opsi/backends (file, ldap, ...)
     - the url of a opsi configuration service
       http(s)://<user>@<host>:<port>/rpc
```

5.6.6 Boot files

`/tftpboot/linux` contains the boot files needed for the system start with the PXE boot proms.

5.6.7 Securing the shares with encrypted passwords

The *opsi-client-agent* accesses the shares provided by the *opsi-server* to get the software which have to be installed at the client.

The mount of these shares is done by using the user *pcpatch*. That these shares are not public and have to be mounted using a password is important for: * general system security and data integrity * meet the license agreements of special software packets

To give the client task *opsi-client-agent* access to authentication data, the server creates a specific key (*opsi-host-key*) when creating a client. This key is stored (at the *file backend*) in the file `/etc/opsi/pckeys` and is passed to the PC with the (re)installation request. The *opsi-client-agent* will store this key in the local file `c:\program files\opsi.org\opsi-client-agent\opsiclientd\opsiclientd.conf` during system installation (access rights limited to the administrators). Also, on the server, the file `/etc/pckeys` is only accessible by the user *root*

and members of the group *opsiadmin*. This way every PC has got an unique key only known to the client itself and the *opsi-server*, not accessible by client standard users. The key is used to encrypt the password of the user *pcpatch*. The encrypted password will be transferred to the client at boot time via web service. Hence the servers *pcpatch* password can be changed any time. The new encrypted password will be sent to every client at the next reboot.

5.7 Important files on the depot servers

5.7.1 Configuration files in /etc

/etc/hosts

The hosts file stores all IP addresses and IP names known to the network. The IP addresses and names of all clients have to be entered here. There might be aliases (additional names) and comments (starting with #).

opsi needs *full qualified host name* (including the domain name) and this might come from the `/etc/hosts` as well from the *DNS*.

Example:

```
192.168.2.106  dplaptop.uib.local  dplaptop  # this opsi-server
192.168.2.153  schleppi.uib.local
192.168.2.178  test_pc1.uib.local # Test-PC PXE-bootprom
```

With the following command you may test the name is resolved:

```
getent hosts $(hostname -f)
```

The result should be similar to:

```
192.168.1.1 server.domain.tld server
```

If the result isn't like that and contains for example *127.0.0.1* or *localhost* you should correct your `/etc/hosts` or your DNS before you continue with the installation.

/etc/group

The required opsi groups are *pcpatch* and *opsiadmin*. All users who are administrating opsi packets need to be member of the *pcpatch* group. Membership of the group *opsiadmin* allows users to connect to the *opsi web service* (for instance using the *opsi-configed*).

/etc/opsi/backends/

Configuration files for the used backends.

/etc/opsi/backendManager/

- `acl.conf`
  Configuration of the access control lists to the opsi methods. This allows restricting access to the base methods of the opsi webservice for users and attributes.
- `dispatch.conf`
  Configuration which of the in `/etc/opsi/backends/` configured backends should be used for which method.
- `extend.d/`
  Directory for backend extensions. For example this is be used to implement the old opsi 3 methods which are mapped to the new opsi 4 methods.

/etc/opsi/hwaudit/*

Since opsi V3.2

Here the configuration files for the hardware inventory are to be found. The directory *locales* holds the language specifications. The file *opsihwaudit.conf* specifies the mapping of WMI classes to the opsi data management.

/etc/opsi/opsi.conf

Since Version 4.0.2-2

General opsi configurations.

Example:

```
[groups]
fileadmingroup = pcpatch
```

Background: The classical opsi installation with a user named `pcpatch` and a groeu named `pcpatch` do not works with samba 4 based distributions. The reason is, that with samba 4 we have the rule (from Active Directory) that a user and a group can not have the same name.
So for all samba4 based distributions the file `/etc/opsi/opsi.conf` is be used to defin the name of the group that have read and write permissions to most files of an opsi installations. The name of these group is `opsifileadmins` at the samba4 based distributions.
Everybody who need these access rights (e.g. people who build and install opsi products) should be member of this group.

/etc/opsi/modules

Since opsi 3.4

The opsi activation file.

This is by the uib gmbh signed file which is used to activate not free features of opsi. Any change on this file will invalidate the activation. Without this file (or with a invalid file) you may only use the free feature of opsi.

/etc/opsi/opsiconfd.conf

Since opsi V3

Configuration file for the *opsiconfd* service including configurations like ports, interfaces, logging.

/etc/opsi/opsiconfd.pem

Since opsi version 3.0

Configuration file for the *opsiconfd* holding the ssl certificate.

/etc/opsi/opsipxeconfd.conf

Configuration file for the *opsipxeconfd* in charge for writing the start-up files for the Linux boot image. You can configure directories, defaults and log level here.

/etc/opsi/opsi-product-updater.conf

Configuration file for the opsi-product-updater. See also Section 5.3.3

/etc/opsi/version

Holds the version number of the installed opsi.

/etc/init.d/

Start and stop scripts for: * opsi-atftpd * opsiconfd * opsipxeconfd

5.7.2 Boot files

Boot files in /tftpboot/linux

- `pxelinux.0`
  Boot file which will be loaded first by the PXE boot-prom.
- `install` and `miniroot.gz`
  Installation boot-image which will be loaded by the client (per tftp) during a re-installation.

Boot files in /tftpboot/linux/pxelinux.cfg

- `01-<mac adresse>` or `<IP-NUMMER-in-Hex>`
  Files named by the clients hardware address (prefix 01-) are stored on the *opsi-server* as client-specific boot files. Usually they are named pipes created by the *opsipxeconfd* as to initiate the (re)installation of clients.
- `default`
  The file `default` is loaded if no client-specific file is found. This initiates a local boot.
- `install`
  Information for the boot of the install boot image which will be used by the *opsipxeconfd* to create the named pipe.

5.7.3 Files in /var/lib/opsi

/var/lib/opsi/repository

This is the place where *opsi-product-packages* are saved, which are loaded by the calls of the `opsi-product-updater` to the server.

This is also the place where *opsi-product-packages* are saved, which are installed by the calls of the `opsi-package-manager` if it is called with the option `-d`.

/var/lib/opsi/depot

This directory is exported as read only Samba share *opsi_depot*.

/var/lib/opsi/ntfs-images

This directory holds (per default) the partition image files which are produced by the netboot product *opsi-clonezilla*.

Other directories

The other directories in `/var/lib/opsi` (`config` and `audit`) are directories of the *file backends*, which are described in the following chapters.

5.7.4 Files of the file backend

/etc/opsi/pckeys

In this file the *opsi-host-keys*, specified for each computer, are stored.

Example:

```
schleppi.uib.local:fdc2493ace4b372fd39dbba3fcd62182
laptop.uib.local:c397c280fc2d3db81d39b4a4329b5f65
pcbon13.uib.local:61149ef590469f765a1be6cfbacbf491
```

/etc/opsi/passwd

Here the passwords encrypted with the server key of the server (e.g. for pcpatch) are kept.

Overview /var/lib/opsi

The files of the *file backend* are in `/var/lib/opsi`, which is the home directory of the opsiconfd daemon. The following schema gives an overview of the directory structure.

```
/var/lib/opsi-|
              |-depot                          opsi_depot share
              |-repository                     opsi package repository used by opsi-product-updater opsi-package-\
    manager
              |-audit                          inventory - files
              !-config/-|                              config share
                        |-clientgroups.ini     client groups
                        |-config.ini           Host Parameter (Global Defaults)
                        |-clients/             <pcname.ini> files
                        |-products/            product control files
                        !-depots               depot description files

       +audit/
               global.<Type> (generic hard-, and software information)
               <FQDN>.<Type> (host specific hard-, and software information)

       clientgroups.ini (hold the host groups)

       +clients/
               <FQDN>.ini (client configuration information)
       config.ini (store the 'configs' (host parameter))

       +depots/
               <FQDN>.ini (Information according to the depots)

       +products/
               <ID>_<ProdVer>-<PackVer>.<Type> (Information about the products)

       +templates/
               pcproto.ini (template for new clients)
               <FQDN>.ini (specific templates (not implemented yet))
```

Warning
Editing the files is strongly discouraged!

Configuration files in detail

The following chapters explain the structure of different the file backend files.

./clientgroups.ini

This file holds information on the client groups.

```
[<GroupId>]
<HostId> = 1 #aktiv
<HostId> = 0 #inaktiv
```

./config.ini

This are the global defaults of the *host parameter* as shown in the *server configuration* in the *opsi-configed*.

./clients/<FQDN>.ini

In these files the client specific configuration is set. This information will be combined with the *<depot-id>.ini* values whereas the settings from *<FQDN>.ini* overrides the *<depot-id>.ini* setting.

These files can have the following structure:

The section *info* contains all non product client information:

```
[info]
description = <String>
created = <Date> #format: 'YYYY-MM-DD HH:MM:SS'
lastseen = <Date> #format: 'YYYY-MM-DD HH:MM:SS'
inventorynumber = <String>
notes = <String>
hardwareaddress = <MAC> #format: 'hh:hh:hh:hh:hh:hh'
ipaddress = <IP> #format: 'nnn.nnn.nnn.nnn'
onetimepassword = <String>
```

The following section stores the installation state and the action request of a product. If there is no information here, the default is `not_installed:none`.

```
[<Type>_product_states] #'Local-', bzw. 'NetbootProduct'
<ProductId> = <InstallationStatus>:<ActionRequest>
```

More information on products you will find at the product sections:

```
[<ProductId>-state]
producttype = <Type> #'Local-', bzw. 'NetbootProduct'
actionprogress = <String>
productversion = <ProdVer>
packageversion = <PackVer>
modificationtime = <Date> #format: 'YYYY-MM-DD HH:MM:SS'
lastaction = <ActionRequest>
actionresult = <ActionResult>
targetconfiguration = <InstallationStatus>
```

/var/lib/opsi/config/templates

In this directory are the template files like `pcproto.ini`, which is the standard template for creating a new `<FQDN>.ini` file. It has the same internal structure as the `<FQDN>.ini` file.

/var/lib/opsi/config/depots/

Here are the depot specific data storage which are also stored as `<depot-id>.ini`. Here you find general information about the depot.

```
[depotshare]
remoteurl = smb://<NetBiosName>/<Path>
localurl = file://<Path>

[depotserver]
notes = <String>
network = <IP>
description = <String>
hardwareaddress = <MAC>
ipaddress = <IP>
inventorynumber = <String>

[repository]
remoteurl = webdavs://<FQDN>:<Port>/<Path>
localurl = file://<Path>
maxbandwidth = <Integer> #in Bytes
```

You will find also information which opsi product is installed at the depot in which version and with which property defaults.

Product control files in /var/lib/opsi/config/products/

This directory contains the product meta data, which is the product name, properties, default values and dependencies.

The control files are the kind of control files, that are generated by creating new opsi-products in the directory *<product name>/OPSI/control*.

The control files have the following sections:

- Section [Package]
  Description of the package version and whether this is an incremental package.
- Section [Product]
  Description of the product
- Section(s) [ProductProperty]
  (optional)
  Description of variable product properties
- Section(s) [ProductDependency]
  (optional)
  Description of product dependencies

Example:

```
[Package]
version: 1
depends:
incremental: False

[Product]
type: localboot
id: thunderbird
name: Mozilla Thunderbird
description: Mail client by Mozilla.org
advice:
version: 2.0.0.4
priority: 0
licenseRequired: False
productClasses: Mailclient
setupScript: thunderbird.ins
uninstallScript:
updateScript:
```

```
alwaysScript:
onceScript:

[ProductProperty]
name: enigmail
description: Install encryption plug-in for GnuPG
values: on, off
default: off

[ProductDependency]
action: setup
requiredProduct: mshotfix
requiredStatus: installed
requirementType: before
```

- [Package]-*Version*
  is for different package versions from the same product version. This helps to distinguish packages build from the same product version but with different *opsi-winst* script for instance.
- [Package]-*depends*
  refers to the base package of an incremental package.
- [Package]-*Incremental*
  specifies whether this is an incremental package.
- [Product]-*type*
  marks the product type as localboot or netboot.
- [Product]-*Id*
  is the general name of that product (like *firefox*), independent from the product version.
- [Product]-*name*
  is the full name of the product.
- [Product]-*Description*
  is an additional description for the product as shown in the *opsi-configed* as *Description*.
- [Product]-*Advice*
  is an additional hint for handling the product (caveats etc.) as to be shown in the *opsi-configed* as *Note*.
- [Product]-*version*
  is the version of the original software.
- [Product]-*Priority*
  affects (in combination with the product dependencies) the installation sequence.
- [Product]-*productClasses*
  is for future use.
- [ProductProperty]-*type*
  Type of the property: (unicode/boolean)
- [ProductProperty]-*name*:
  Name of the property.
- [ProductProperty]- *multivalue*
  May this property contain a list of values (True/False)
- [ProductProperty]- *editable*
  Is this property free editable or may the user only select on of the values (True/False)
- [ProductProperty]-*description*:
  Description of a property (Tool-tip in the *opsi-configed*).

- [ProductProperty]-*values* :
  List of allowed values.
- [ProductProperty]-*default* :
  Default value of the property.
- [ProductDependency]-*Action* :
  To which product action this dependency entry belongs (setup, uninstall ...).
- [ProductDependency]-*Requiredproduct*:
  Product ID of the product to that a dependency exists.
- [ProductDependency]-*Required action*:
  The required action of the product, which the dependency entry refers to. Actions could be setup, uninstall, update...
- [ProductDependency]-*Required installation status*:
  The required status of the product, which the dependency entry refers to. Typically this is *installed*, which results in setting this dependency product to setup, if it isn't installed on the client yet.
- [ProductDependency]-*Requirement type*:
  this is regarding the installation order. If the product, which the dependency entry refers to, has to be installed before the actual product installation starts, the *Requirement type* must be *before*. If the dependency product has to be (re-)installed after the actual product, the *Requirement type* is set to *after*. If there is no entry, the installation order is of no relevance.

Inventory data /var/lib/opsi/audit

Here you find the inventory data for hardware (**.hw) and software (**.sw).

5.7.5 opsi programs and libraries

Programs in /usr/bin

- opsipxeconfd
  opsi daemon to administrate the files required for the PXE boot of the clients.
- opsi-admin
  Starts the command line interface for the opsi python library
- opsiconfd
  opsi daemon which is the central opsi configuration daemon.
- opsiconfd-guard
  opsi daemon which monitors if the *opsiconfd* is running and restarts the *opsiconfd* if it isn't running.
- opsi-configed
  Command to start the opsi management interface
- opsi-convert
  Script for converting between different backends.
- opsi-makeproductfile
  Script for packing the opsi-package (opsi-product)
- opsi-newprod
  Script for creating the structure and meta data files of a new opsi product
- opsi-package-manager
  Script to unpack, install, remove, list opsi packages on one ore more servers (and a lot more).
- opsi-setup
  opsi configuration utility

5.7.6 opsi log files

The opsi log files have the following format:

```
[Loglevel] Timestamp Message
The log levels are:
0 = nothing      (absolute nothing)
1 = essential    ("we always need to know")
2 = critical     (unexpected errors that my cause a program abort)
3 = error        (Errors that don't will abort the running program)
4 = warning      (you should have a look at this)
5 = notice       (Important statements to the program flow)
6 = info         (Additional Infos)
7 = debug        (important debug messages)
8 = debug2       (a lot more debug information and data)
9 = confidential (passwords and other security relevant data)
```

/var/log/opsi/bootimage

In this directory are the log-files of the *opsi-linux-bootimage*. These log files will be named `log.<IP-number>`.

If the *opsi-linux-bootimage* couldn't connect the web-service, you will find the logs in `/tmp/log` at the bootimage. In such case, there are two possible ways to get the log file:

1. You have a network connection to the client
   You may use scp (winscp) to copy the log file from the running boot-image to your computer (login as root with password linux123).
2. You have no network connection to the client
   You have to use a USB stick.
   - Login as root with the password *linux123*
   - Connect USB stick to the client and wait some seconds
   - use the command `sfdisk -l` to check on which device you will find your stick
   - mount
   - copy
   - umount

A example session:

```
#sfdisk -l
Disk /dev/sda: 30401 cylinders, 255 heads, 63 sectors/track
Units = cylinders of 8225280 bytes, blocks of 1024 bytes, counting from 0

   Device Boot Start     End   #cyls    #blocks   Id  System
/dev/sda1   *      0+  30401-  30402- 244197528+   7  HPFS/NTFS
/dev/sda2          0       -       0          0    0  Empty
/dev/sda3          0       -       0          0    0  Empty
/dev/sda4          0       -       0          0    0  Empty

Disk /dev/sdb: 1017 cylinders, 33 heads, 61 sectors/track
Units = cylinders of 1030656 bytes, blocks of 1024 bytes, counting from 0

   Device Boot Start     End   #cyls    #blocks   Id  System
/dev/sdb1          0+   1016    1017-   1023580    b  W95 FAT32
/dev/sdb2          0       -       0          0    0  Empty
/dev/sdb3          0       -       0          0    0  Empty
/dev/sdb4          0       -       0          0    0  Empty
# mount /dev/sdb1 /mnt
# cp /tmp/log /mnt
#umount /mnt
```

/var/log/opsi/clientconnect

In this directory are the log-files of the *opsi-client-agent* running on the client.
The client log files will be named `<client FQDN>.log`. On the client you will find this file at `C:\opsi.org\log\opsiclientd.log`.

/var/log/opsi/instlog

In this directory are the log-files of the *opsi-winst* running on the client. The client log files will be named `<client FQDN>.log`. On the client you will find this file at `C:\opsi.org\log\opsiscript.log`

/var/log/opsi/opsiconfd

In this directory are the log-files of the *opsiconfd* and the clients.
The client log files will be named `log.<IP-number>` and (if available) a symbolic link named `<IP-Name>.log` to `log.<IP-number>` is created.

/var/log/opsi/opsipxeconfd.log

Log file the *opsipxeconfd*
that administrates the tftp files for the PXE boot of the clients.

/var/log/opsi/package.log

Log file of the `opsi-package-manager`.

/var/log/opsi/opsi-product-updater.log

Log file of the `opsi-product-updater`.

tftp log in /var/log/syslog

The log of the `tftpd` you will find at `/var/log/syslog`.

You should increase the log level to see important information.
At the file `/etc/inetd.conf` in the line starting with *tftpd* set the parameter *verbose* to 7 :

```
tftp    dgram   udp     wait    nobody /usr/sbin/tcpd /usr/sbin/in.tftpd --tftpd-timeout 300 --retry-timeout 5     --\
    mcast-port 1758 --mcast-addr 239.239.239.0-255 --mcast-ttl 1 --maxthread 100 --verbose=7  /tftpboot
```

If this is done execute:

```
killall tftpd
killall -1 inetd
```

c:\opsi.org\log\opsi_loginblocker.log

Log file of the *opsi-login-blocker*

c:\opsi.org\log\opsiclientd.log

Log file of the *opsiclientd*
This file is copied at the end of a event to server at `/var/log/opsi/clientconnect/<pc-ipnummer.log>`.

c:\opsi.org\log\opsi-script.log

Log file of the *opsi-winst*.
This file is copied at the end of a installation to server at `/var/log/opsi/instlog/<pc-ipnummer.log>`.

5.8 Upgrade of a opsi-server

Please refer to the special *releasenotes-upgrade* manuals.

5.9 Notes on file structure on UCS 4.X systems

Compared to Ubuntu or Debian the files of the opsi-linux-bootimage are stored in another directory, namely:

```
/var/lib/univention-client-boot
```

Earlier versions of the opsi-linux-bootimage package had filesn stored in the directory `/tftpboot/linux` and linked the content to `/var/lib/univention-client-boot`. This changed with the release of opsi 4.1. the opsi-linux-bootimage of opsi 4.1 directley installs the files into `/var/lib/univention-client-boot`. After the `opsi-atftpd` received a patch to support files larger than 90MiB the opsi 4.1 opsi-linux-bootimage adapted to opsi 4.0. The file structure looks like this:

```
 ls -l /var/lib/univention-client-boot/
insgesamt 224424
-rw-rw-r-- 1 997 OPSI Depot Servers     12372 Aug 13 13:13 chain.c32
lrwxrwxrwx 1 997 OPSI Depot Servers        15 Aug 13 13:13 install -> vmlinuz-4.17.13
lrwxrwxrwx 1 997 OPSI Depot Servers        11 Aug 13 13:13 install64 -> install-x64
lrwxrwxrwx 1 997 OPSI Depot Servers        19 Aug 13 13:13 install-x64 -> vmlinuz-x64-4.17.13
-rw-rw-r-- 1 997 OPSI Depot Servers     52272 Aug 13 13:13 menu.c32
-rw-rw-r-- 1 997 OPSI Depot Servers 105388996 Aug 13 13:13 miniroot-20180813.bz2
lrwxrwxrwx 1 997 OPSI Depot Servers        21 Aug 13 13:13 miniroot.bz2 -> miniroot-20180813.bz2
-rw-rw-r-- 1 997 OPSI Depot Servers 108394052 Aug 13 13:13 miniroot-x64-20180813.bz2
lrwxrwxrwx 1 997 OPSI Depot Servers        25 Aug 13 13:13 miniroot-x64.bz2 -> miniroot-x64-20180813.bz2
-rw-rw-r-- 1 997 OPSI Depot Servers     15710 Aug 13 13:13 pxelinux.0
drwxrwxr-x 2 997 OPSI Depot Servers      4096 Aug 28 19:19 pxelinux.cfg
-rw-rw-r-- 1 997 OPSI Depot Servers   7763664 Aug 13 13:13 vmlinuz-4.17.13
-rw-rw-r-- 1 997 OPSI Depot Servers   8166656 Aug 13 13:13 vmlinuz-x64-4.17.13
```

If the inetd service is used to control the `opsi-atftpd` the `tftp` line in the file `/etc/inetd.conf` has to look as follows:

```
tftp dgram udp wait nobody /usr/sbin/tcpd /usr/sbin/in.tftpd --tftpd-timeout 300 --retry-timeout 5 --verbose=5 /var/lib\
    /univention-client-boot
```

On the other hand if the inetd service is not used, and the `opsi-atftpd` is used directly the configuration file `/etc/default/atftpd` need to have the following content:

```
USE_INETD=false
OPTIONS="--daemon --port 69 --tftpd-timeout 300 --retry-timeout 5
--mcast-port 1758 --mcast-addr 239.239.239.0-255 --mcast-ttl 1 --maxthread 100 --verbose=5
/var/lib/univention-client-boot"
```

In opsi 4.1 the `opsi-tftpd-hpa` obsoleted `opsi-atftpd` and directly patches the service file to have the correct *TFTPROOT* directory.

In addition UCS 4.X needs a DHCP policy to support a PXE Boot. This policy can be found in the Policies section of the domain settings. Hereby the boot server need to be entered whereby the IP address represents the boot server and the file *pxelinux.0* is the boot filename.

6 opsi-client

6.1 opsi-client-agent

6.1.1 Overview

To make Software distribution manageable for the system administrator, a client computer has to notice that new software-packets or updates are available and install them without user interaction. It is important to make user-interaction completely obsolete as the installation can run unattended this way and a user cannot stop the installation during the installation process.

These requirements are implemented in opsi by the *opsi-client-agent*:

On the client side the service *opsiclientd* examines usually at boot time, before the user logs in, whether an update has to be installed for this client.

If there are software packets to be installed on the client, the script processing program *opsi-winst* is being started to do the installation job. The server provides all the installation scripts and software files on a file share. At this time the user has no chance to interfere with the installation process.

As an additional option the module *loginblocker* can be installed to prevent a user login before the end of the installation process is reached.

Before any software can be installed with the *opsi-winst* program, it has to be prepared as *opsi-product-package*. For details see Chapter *Integration of new software packets into the opsi software deployment* from the *getting started* manual.

6.1.2 Directories of the opsi-client-agent

The *opsi-client-agent* is installed at `%ProgramFiles%\opsi.org\opsi-client-agent`.

This directory contains all programs of the *opsi-client-agent* like e.g. the *opsiclientd*, the *opsiclientd notifier*, the *opsi-winst* and some required libraries. Also we will find here the configuration files and graphical templates (skins) of the mentioned programs.

The directory `%ProgramFiles%\opsi.org\opsi-client-agent` is protected against manipulation by users without administrator privileges.
The directory `%ProgramFiles%\opsi.org\opsi-client-agent\opsiclientd` contains the configuration file of the *opsiclientd* and you need administrator privileges to read it.

There also is the directory `c:\opsi.org`.

This directory is used (at the moment) for caching installation files and data (see WAN-Extension). In future it will have some more functions like containing log files.
You need administrator privileges to read the directory `c:\opsi.org`.

The log files of the *opsi-client-agent* you will find in `c:\opsi.org\log\`.

6.1.3 The service: opsiclientd

The *opsiclientd* is the core of the *opsi-client-agent*. The *opsiclientd* starts at boot time and runs with administrative privileges.

The important features are:

- Event based control:
  The activity of the opsi client agent (opsiclientd) may be triggered by different events in the client system. According to this fact, the start of the installation can be triggered by the system start up event or can be configured to be triggered by some other system event.

- Control via web service:
  This interface is used for *push* installations and for maintenance purposes as well.
- Remote configuration:
  The configuration data for the clients may be changed (globally or client specific) at the server by editing the *Host parameters*.

The *opsi-client-agent* consists of multiple components :

- *opsiclientd*: the main service
- *opsiclientd notifier*: information and communication window
- *opsi-login-blocker*: block the user login until the installation has finished

Installation

In case of automatic OS-Installation with opsi (not image based), the *opsi-client-agent* will be installed automatically.

You may set the action request *uninstall* to uninstall the *opsi-client-agent*.

For a subsequent installation on an existing Windows system or for repair purposes see the *getting started* manual. See also: Section 6.1.6. See also Chapter *opsi Software On Demand (Kiosk-Mode)*: Section 9.15

opsiclientd

Core component of the *opsi-client-agent* is the service *opsiclientd*. This service starts at the boot time.

The *opsiclientd* has the following tasks:

- while the system is booting and the *opsiclientd* is waiting for the GUI to come up, the *block_login_notifier* is started and shows a padlock at the right upper corner of the screen.
- Getting in action if the configuration event takes place. In case of action the *opsiclientd* contacts the opsi server via web service (JSON-RPC) and asks for the configuration data and required actions.
  The default event is *gui_startup* which will fire at boot time before user login.
- Creates a named pipe which is used by the *opsi-login-blocker* to ask via JSON-RPC the *opsiclientd* when to unblock the login.
- Starting the *opsiclientd notifier* as a thread for information and interaction with the user.
- If needed, it connects to the *opsi-depot* to update the local installation of the *opsi-winst* and then starts it to process the *action requests* (software packet installations).

opsiclientd notifier

The *opsiclientd notifier* implements the interaction with the user. It displays status messages and may give the possibility to interact with the process.

There are different situations where the *opsiclientd notifier* will become active in different ways:

blocking notifier
: Indicates that the *opsi-login-blocker* is blocking

Figure 56: opsiclientd blocklogin notifier

event notifier
Shows information about the current event.

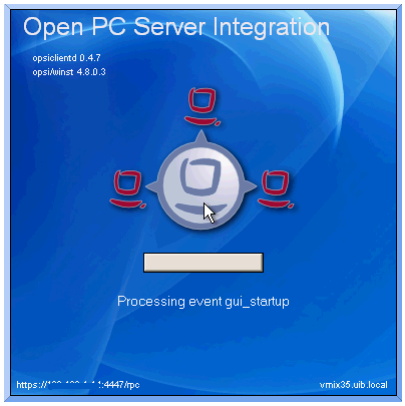


Figure 57: opsiclientd event notifier

action notifier
Shows state of the event processing

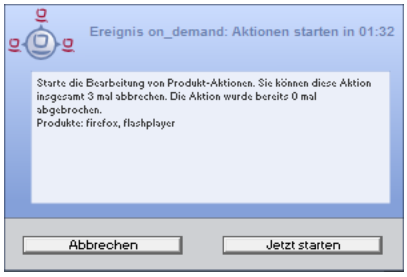


Figure 58: opsiclientd action notifier

shutdown notifier
Gives information about a requested reboot / shutdown (if `shutdown_warning_time` > 0)

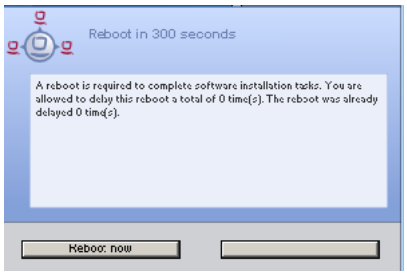


Figure 59: opsiclientd shutdown notifier

Caution
Names and functionality of the notifier have changed from opsi 4.0 to opsi 4.0.1.
The opsi 4.0 event notifier doesn't exist anymore.
The opsi 4.0.1 event notifier equals the opsi 4.0 action notifier.
The opsi 4.0.1 action notifier has almost the same functionality as the opsi 4.0 event notifier, but it will only be activated if there is a *action request*.

opsi-login-blocker

The *opsi-login-blocker* for NT5 (Win2K/WinXP) is implemented as a *GINA* (*opsigina.dll*). This *GINA* waits until the opsiclientd reports, that all *product actions* are finished or, if the opsiclientd is not reachable, until the connection timeout to the opsiclientd is reached (normally 120 seconds). Then the complete control is forwarded to the next *GINA*, which is normally the `msgina.dll`.

The *opsi-login-blocker* for NT6 (Vista/Win7) is implemented as a *credential provider filter* (*OpsiLoginBlocker.dll*). This *credential provider filter* blocks all *credential providers* until the opsiclientd reports, that all *product actions* are finished or, if the opsiclientd is not reachable, until the connection timeout to the opsiclientd is reached (normally 120 seconds).

Processing sequence

How the opsiclientd works may be configured in many details. To understand these configuration options, it is necessary to understand the processing sequence. Here comes an overview of the work flow of a *standard event* like the *event_gui_startup*.

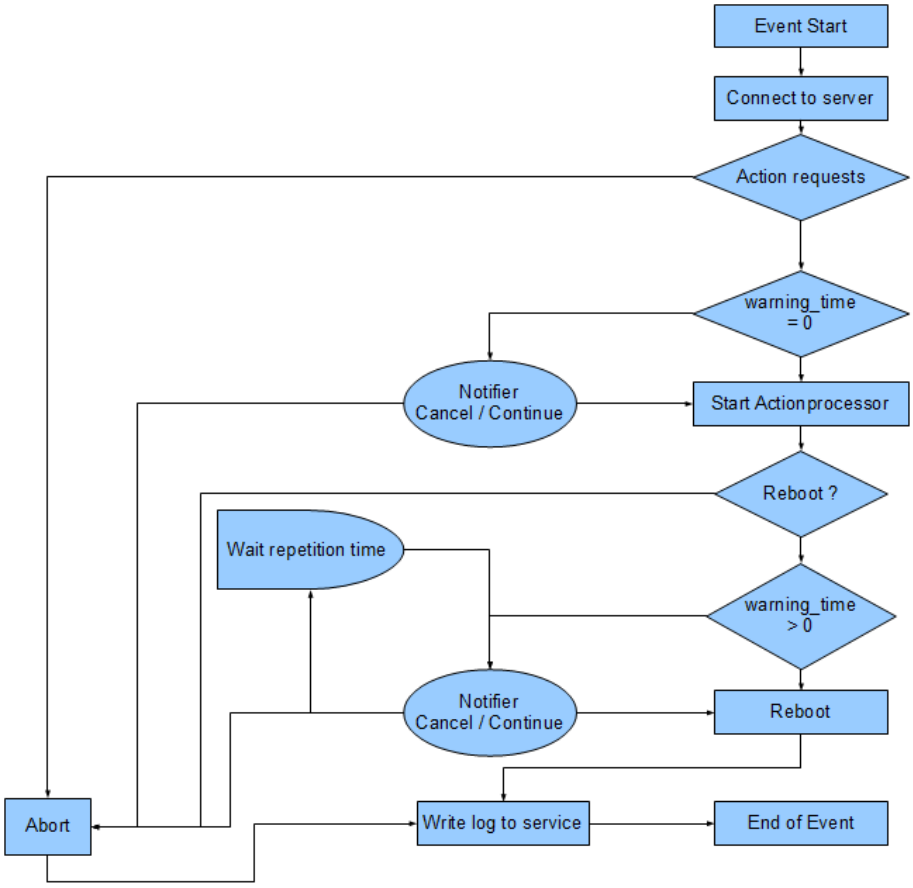


Figure 60: simplified work flow of a *standard event*

The most important parameters have the following relations:

Tip
If there is an error while connecting to the *opsi-config-server*, the log of this problem cannot be sent to the server. But you may find the log in the local log file `opsiclientd.log` in the log directory (`c:\opsi.org\log\opsiclientd.log`) at the client.

1. If an event fires, the `event_notifier_command` will be started.
   Now the opsiclientd tries to reach the *opsi-config-server* using the url address.
   If after `user_cancelable_after` seconds there is still no connection established, so the *opsiclientd notifier* will enable an *Abort* button. If no connection could be established in `connection_timeout` seconds, the *opsiclientd* connection process will be aborted and the event ends with an error message. To avoid a user from aborting, set `user_cancelable_after` = `connection_timeout` .

2. After a successful connection to the *opsi-config-server*, the *opsiclientd* checks if there are *action requests* for this client. If there are *action requests* and the `action_warning_time` > 0, the `action_notifier_command` will be executed.
   This is normally the *opsiclientd notifier*, which shows now the list of *action requests* for this client for

`action_warning_time` seconds.
Is the `action_warning_time` = 0 (default) the `action_notifier_command` will not be executed.
You may allow the user to suspend the process at this time by setting `action_user_cancelable` >= 0. The user may suspend the actions up to `action_user_cancelable` times. After `action_user_cancelable` aborts in sequence or if `action_user_cancelable` = 0 the user gets no possibility to suspend the actions.
In every case there will be a button which allows the user to start the installations immediately without waiting for the count down of `action_warning_time` seconds. The messages displayed by the *opsiclientd notifier* may be configured with the options `action_message` or `action_message[lang]` . This messages may contain the placeholders `%action_user_cancelable%` (total number of allowed suspensions) and `%action_cancel_counter%` (number of suspensions already used by the user).
If the actions are not suspended by the user, the `action_cancel_counter` will reset and the *opsi-winst* will be executed to process the *action requests*.

3. If the *opsi-winst* terminates with a reboot or shutdown request, the `shutdown_notifier_command` will be executed if `shutdown_warning_time` > 0.
   The now starting `shutdown_notifier_command` shows for `shutdown_warning_time` seconds a message saying that the client will be rebooted. If `shutdown_user_cancelable` > 0 the user may suspend the reboot up to `shutdown_user_cancelable` times in sequence. If the user suspends the reboot, the `shutdown_notifier_command` will be restarted after `shutdown_warning_repetition_time`. The `shutdown_notifier_command` shows a message which may be configured by `shutdown_warning_message` or `shutdown_warning_message[lang]`. This message may contain the placeholders `%shutdown_user_cancelable%` (maximum number of allowed suspensions) and `%shutdown_cancel_counter%` number of suspensions already done by the user).
   If the client is rebooted (by the user or the *opsi-client-agent*) the `%shutdown_cancel_counter%` will be reset.

Tip
The sequence of event processing and user actions is visualized as a timeline graphic at the info page of the *opsiclientd*.

(Section 6.1.3).

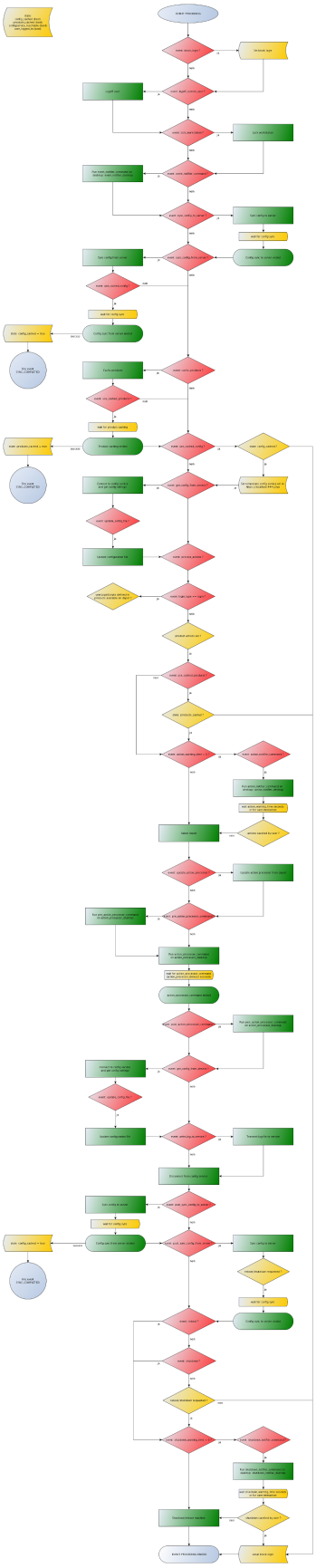


Figure 61: Complete work flow of an event

Configuration

The following chapters shows how to configure the opsi-client-agent.

Configuration of different events

To meet the requirements of the various different situations in which the *opsi-client-agent* will become active, a slightly complex configuration is needed. To reduce the complexity, the configuration file uses something like inheritance.
In the *opsiclientd* configuration section headers like `[event_<config-id>]` introduce a new event configuration section.
An event configuration may be disabled by setting the section option `active = false`.

There are different types of event configurations (`type`).

- There are *event configuration templates* (type = template).
  Event configurations may inherit configurations from another event. In this case the option `super` points to the other event to inherit all parameters from (excluding the parameter `active`). These inherited parameters may be overridden by local parameters in the current event section. So an event section needs only those parameters which are different from the `super` event.
  Setting an event to `active = false` does not change anything in the inheritance process.
- The other event types are:
  - `gui startup`
    A `gui startup` event starts while booting the client and loading the *graphical user interface* (GUI). It is the most used event and set to active in the default configuration.
  - `custom`
    Event configurations of the type `custom` are fired by a `wql` event. A `wql` event is defined by the corresponding `wql` statement in the event configuration. If the `wql` statement is empty, the event will never be fired, but can be executed from the interactive web interface.
  - `user login`
    will be fired at the login of a user
  - `timer`
    will be fired all `interval` seconds
  - `sync completed`
    will be fired if the synchronization of configurations (`sync_config_from_server`) or products (`cache_products`) is completed.
  - `sw on demand`
    will be fired by the user choosing *Start actions now* in the *software-on-demand* web page of the opsiclientd. It will never be fired if *software-on-Demand* is not used.
- There are *Preconditions*
  Preconditions define special system states (e.g. a user is logged on). In the *opsiclientd* configuration a section header of the form `[precondition_<precondition-id>]` starts the declaration of a *Precondition*. A *Precondition* is true, if all declared options are true. An option not declared (but possible) is assumed as true.
  Possible options for *Preconditions* are:
  - `user_logged_in`: is true if currently a user is logged on.
  - `config_cached`: is true if the caching of configuration data is completed (see: `sync_config_from_server`).
  - `products_cached`: is true if the caching of product files is completed (see: `cache_products`).
- A *Precondition* can be assigned to an event configuration.
  If there is a *Precondition* in an event configuration header, there also must be a configuration for this event without any *precondition*. The event configuration with the precondition inherits all the parameters from the event configuration without *precondition*.
  If the event is fired, first it will be checked which *preconditions* are true. If there is no *precondition* true, the

configuration without *precondition* is used. Is one *precondition* true, the configuration is used, which is bound to this *precondition*. If more than one of the *preconditions* are true, the most specific event configuration is used (which is the configuration with the most matching options).

A small example for a better understanding:
While installing software it may be necessary to reboot the computer. Is there currently a user logged on, you should warn about the pending reboot. This warning should have a timeout and it may make sense to ask the user, if the reboot should be canceled (at the moment).
Is there no user logged on, it makes no sense to ask and wait for an answer. So in this case the reboot should take place immediately.
To handle these different situations, we configure the `event_on_demand` in the following way:

- We define a *Precondition* `user_logged_in` which comes true if a user is logged on to the system (`user_logged_in = true`).
- In the default configuration for the event `event_on_demand` (without any *Precondition*) we set `shutdown_warning_time = 0` (immediate reboot without warning).
- At the configuration `event_on_demand{user_logged_in}` we set `shutdown_warning_time = 300` (warning with 300 seconds timeout).

Proxysupport-Configuration

In the global section of opsiclientd.conf you have the option to define a proxyserver that will be used by the opsi-client-agent. If a proxyserver is defined in config, all HTTP- and HTTPS-Connection of the opsiclientd will be redirected to this proxyserver.

```
# Use a proxy for connecting configservice
# proxy_mode:
#   'system' will try to check the system setting,
#   'static' to use proxyurl from configfile/hostparameter
# proxy_url usage: http://<user>:<password>@<proxy-url>:<proxy-port>
# Example: http://proxyuser:proxypass123@proxy.domain.local:8080
proxy_mode = static
proxy_url =
```

This proxy settings allows also to use a proxyserver, that require authentication. In that case you must define the credentials as shown in the configuration snippet.

Warning
The option proxy_mode is reserved for the value *system* to use on the system proxy settings. This feature is not implemented yet. Therefore the only option that works at the moment is the *static* mode.

Event configuration to control which products will be processed

With this new feature it's possible over the configuration to control the list of products, that will be processed in Events with product groups:

There are (basically) two ways to use this control:

Blacklisting (excluding):

The option `exclude_product_group_ids` allows to configure a comma separated list of product Groups. The members of these groups will be excluded from the actual Event. Also if action request is set for this products. This products will be ignored in this event, but the action requests will not be changed.

White listing (including):

The option `include_product_group_ids` allows to also configure a comma separated list of products Groups. The members of this groups are the only products, that will be processed from the actual event if they have set action requests.

You can use these options globally from the default-Event. From that point this settings will be used in every event. You can also set these options in a special event. If you use the option on event_on_demand, you can control which products will not be installed in push installations, although they have an action request. On normal restart of the client, the products will be installed from gui_startup (default event) at startup. CAUTION: For Clients that work in WAN/VPN-mode you must set this options in sync-event and also in the cacheservice-section, because the cache service have no access to the configuration of main sync-event.

Warning
Product dependencies will not be observed by this feature. That means that you have to observe the process in order to prevent dependency issues.

Configuration via configuration file

On a 64bit Windows the configuration file is `c:\program files (x86)\opsi.org\opsi-client-agent\opsiclientd\opsic`

On a 32bit Windows the configuration file is `c:\program files\opsi.org\opsi-client-agent\opsiclientd\opsiclientd`

Caution
This configuration file is UTF-8 encoded.
Any changes using editors which do not support this encoding (e.g. notepad.exe) may destroy any umlaut in this file.

The configuration written in this file may be changed by different configuration data, which come via web service after a successful connection to the *opsi-server*.

A sample `opsiclientd.conf`:

```
; = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = =
; =     configuration file for opsiclientd                              =
; = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = =


; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
; -     global settings                                                 -
; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
[global]

# Location of the log file.
log_file = c:\\opsi.org\\log\\opsiclientd.log

# Set the log (verbosity) level
# (0 <= log level <= 9)
# 0: nothing, 1: essential, 2: critical, 3: errors, 4: warnings, 5: notices
# 6: infos, 7: debug messages, 8: more debug messages, 9: passwords
log_level = 4

# Client id.
host_id =

# Opsi host key.
opsi_host_key =

# Verify opsi server certs
verify_server_cert = false
```

```
# Verify opsi server certs by ca
verify_server_cert_by_ca = false

# On every daemon startup the user login gets blocked
# If the gui starts up and no events are being processed the login gets unblocked
# If no gui startup is noticed after <wait_for_gui_timeout> the login gets unblocked
# Set to 0 to wait forever
wait_for_gui_timeout = 120

# Application to run while blocking login
block_login_notifier = %global.base_dir%\\notifier.exe -s notifier\\block_login.ini

# Use a proxy for connecting configservice
# proxy_mode:
#   'system' will try to check the system setting,
#   'static' to use proxyurl from configfile/hostparameter
# proxy_url usage: http://<user>:<password>@<proxy-url>:<proxy-port>
# Example: http://proxyuser:proxypass123@proxy.domain.local:8080
proxy_mode = static
proxy_url =

; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
; -     config service settings                                         -
; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
[config_service]
# Service url.
# http(s)://<opsi config server address>:<port>/rpc
url = https://opsi.uib.local:4447/rpc

# Conection timeout.
connection_timeout = 30

# The time in seconds after which the user can cancel the connection establishment
user_cancelable_after = 30

# If this option is set, the local system time will be synced with time from service
sync_time_from_service = false

; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
; -     depot server settings                                           -
; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
[depot_server]

# Depot server id
depot_id =

# Depot url.
# smb://<depot address>/<share name>/<path to products>
url =

# Local depot drive
drive =

# Username that is used for network connection [domain\]<username>
username = pcpatch

; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
; -     cache service settings                                          -
; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
[cache_service]
# Maximum product cache size in bytes
product_cache_max_size = 5000000000
# Members of this ProductGroups will be excluded from processing
exclude_product_group_ids =
# Only members of this ProductGroups will be excluded from processing
include_product_group_ids =

; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
```

```
; -     control server settings                                  -
; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
[control_server]

# The network interfaces to bind to.
# This must be the IP address of an network interface.
# Use 0.0.0.0 to listen to all interfaces
interface = 0.0.0.0

# The port where opsiclientd will listen for HTTPS rpc requests.
port = 4441

# The location of the server certificate.
ssl_server_cert_file = %global.base_dir%\\opsiclientd\\opsiclientd.pem

# The location of the server private key
ssl_server_key_file = %global.base_dir%\\opsiclientd\\opsiclientd.pem

# The location of the static files
static_dir = %global.base_dir%\\opsiclientd\\static_html

# The maximum number of authentication failures before a client ip
# is blocked for an amount of time.
max_authentication_failures = 5

; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
; -     notification server settings                             -
; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
[notification_server]

# The network interfaces to bind to.
# This must be the IP address of an network interface.
# Use 0.0.0.0 to listen to all interfaces
interface = 127.0.0.1

# The first port where opsiclientd will listen for notification clients.
start_port = 44000

# Port for popup notification server
popup_port = 45000

; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
; -     opsiclientd notifier settings                            -
; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
[opsiclientd_notifier]

# Notifier application command
command = %global.base_dir%\\notifier.exe -p %port% -i %id%

; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
; -     opsiclientd rpc tool settings                            -
; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
[opsiclientd_rpc]

# RPC tool command
command = %global.base_dir%\\opsiclientd_rpc.exe "%global.host_id%" "%global.opsi_host_key%" "%control_server.port%"

; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
; -     action processor settings                                -
; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
[action_processor]
# Locations of action processor
local_dir = %global.base_dir%\\opsi-winst
remote_dir = opsi-winst\\files\\opsi-winst
filename = winst32.exe

# Action processor command
command = "%action_processor.local_dir%\\%action_processor.filename%" /opsiservice "%service_url%" /clientid %global.\
```

```
    host_id% /username %global.host_id% /password %global.opsi_host_key%

# Load profile / environment of %run_as_user%
create_environment = false

; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
; -     events                                                          -
; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
[event_default]
; === Event configuration
# Type of the event (string)
type = template
# Interval for timer events in seconds (int)
interval = -1
# Maximum number of event repetitions after which the event will be deactivated (int, -1 = forever)
max_repetitions = -1
# Time in seconds to wait before event becomes active (int, 0 to disable delay)
activation_delay = 0
# Time in seconds to wait before an event will be fired (int, 0 to disable delay)
notification_delay = 0
# Event notifier command (string)
event_notifier_command = %opsiclientd_notifier.command% -s notifier\\event.ini
# The desktop on which the event notifier will be shown on (current/default/winlogon)
event_notifier_desktop = current
# Block login while event is been executed (bool)
block_login = false
# Lock workstation on event occurrence (bool)
lock_workstation = false
# Logoff the current logged in user on event occurrence (bool)
logoff_current_user = false
# Get config settings from service (bool)
get_config_from_service = true
# Store config settings in config file (bool)
update_config_file = true
# Transmit log file to opsi service after the event processing has finished (bool)
write_log_to_service = true
# Shutdown machine after action processing has finished (bool)
shutdown = false
# Reboot machine after action processing has finished (bool)
reboot = false
# Members of this ProductGroups will be excluded from processing
exclude_product_group_ids =
# Only members of this ProductGroups will be excluded from processing
include_product_group_ids =

; === Sync/cache settings
# Sync configuration from local config cache to server (bool)
sync_config_to_server = false
# Sync configuration from server to local config cache (bool)
sync_config_from_server = false
# Sync configuration from local config cache to server after action processing (bool)
post_sync_config_to_server = false
# Sync configuration from server to local config cache after action processing (bool)
post_sync_config_from_server = false
# Work on local config cache
use_cached_config = false
# Cache products for which actions should be executed in local depot cache (bool)
cache_products = false
# Maximum transfer rate when caching products in byte/s (int, 0 = no limit)
cache_max_bandwidth = 0
# Dynamically adapt bandwidth to other network traffic (bool)
cache_dynamic_bandwidth = false
# Work on local depot cache
use_cached_products = false

; === Action notification (if product actions should be processed)
# Time in seconds for how long the action notification is shown (int, 0 to disable)
action_warning_time = 0
```

```
# Action notifier command (string)
action_notifier_command = %opsiclientd_notifier.command% -s notifier\\action.ini
# The desktop on which the action notifier will be shown on (current/default/winlogon)
action_notifier_desktop = current
# Message shown in the action notifier window (string)
action_message = Starting to process product actions. You are allowed to cancel this event a total of %\
    action_user_cancelable% time(s). The event was already canceled %state.action_processing_cancel_counter% time(s).
# German translation (string)
action_message[de] = Starte die Bearbeitung von Produkt-Aktionen. Sie können diese Aktion insgesamt %\
    action_user_cancelable% mal abbrechen. Die Aktion wurde bereits %state.action_processing_cancel_counter% mal \
    abgebrochen.
# French translation (string)
action_message[fr] = Traitement des actions du produit. Vous êtes autorisé à annuler cet événement un total de %\
    action_user_cancelable% fois. L'événement a été déjà annulée %state.action_processing_cancel_counter% fois.
# Number of times the user is allowed to cancel the execution of actions (int)
action_user_cancelable = 0

; === Action processing
# Should action be processed by action processor (bool)
process_actions = true
# Type of action processing (default/login)
action_type = default
# Update the action processor from server before starting it (bool)
update_action_processor = true
# Command which should be executed before start of action processor
pre_action_processor_command =
# Action processor command (string)
action_processor_command = %action_processor.command%
# The desktop on which the action processor command will be started on (current/default/winlogon)
action_processor_desktop = current
# Action processor timout in seconds (int)
action_processor_timeout = 10800
# Command which should be executed before after action processor has ended
post_action_processor_command =

; === Shutdown notification (if machine should be shut down or rebooted)
# Process shutdown requests from action processor
process_shutdown_requests = true
# Time in seconds for how long the shutdown notification is shown (int, 0 to disable)
shutdown_warning_time = 0
# Shutdown notifier command (string)
shutdown_notifier_command = %opsiclientd_notifier.command% -s notifier\\shutdown.ini
# The desktop on which the action notifier will be shown on (current/default/winlogon)
shutdown_notifier_desktop = current
# Message shown in the shutdown notifier window (string)
shutdown_warning_message = A reboot is required to complete software installation tasks. You are allowed to delay this \
    reboot a total of %shutdown_user_cancelable% time(s). The reboot was already delayed %state.\
    shutdown_cancel_counter% time(s).
# German translation (string)
shutdown_warning_message[de] = Ein Neustart wird benötigt um die Software-Installationen abzuschliessen. Sie können \
    diesen Neustart insgesamt %shutdown_user_cancelable% mal verschieben. Der Neustart wurde bereits %state.\
    shutdown_cancel_counter% mal verschoben.
# French translation (string)
shutdown_warning_message[fr] = Un redémarrage est nécessaire pour terminer l'installation du logiciel. Vous êtes \
    autorisé à retarder le redémarrage un total de %shutdown_user_cancelable% fois. Le redémarrage a été déjà retardé \
    %state.shutdown_cancel_counter% fois.
# Number of times the user is allowed to cancel the shutdown (int)
shutdown_user_cancelable = 0
# Time in seconds after the shutdown notification will be shown again after the user has canceled the shutdown (int)
shutdown_warning_repetition_time = 3600

[event_gui_startup]
super = default
type = gui startup
name = gui_startup
block_login = true

[event_gui_startup{user_logged_in}]
```

```
name = gui_startup
shutdown_warning_time = 300
block_login = false

[event_gui_startup{cache_ready}]
use_cached_config = true
use_cached_products = true
action_user_cancelable = 3
action_warning_time = 60

[event_gui_startup{installation_pending}]
name = gui_startup
active = true

[event_on_demand]
super = default
type = custom
name = on_demand

[event_on_demand{user_logged_in}]
name = on_demand
shutdown_warning_time = 300

[event_software_on_demand]
super = default
type = sw on demand

[event_sync]
super = default
type = template
process_actions = false
event_notifier_command =
sync_config_to_server = true
sync_config_from_server = true
cache_products = true
cache_dynamic_bandwidth = true

[event_timer]
super = sync
type = timer
active = false
interval = 3600

[event_net_connection]
super = sync
type = custom
active = false
wql = SELECT * FROM __InstanceModificationEvent WITHIN 2 WHERE TargetInstance ISA 'Win32_NetworkAdapter' AND \
     TargetInstance.NetConnectionStatus = 2

[event_sync_completed]
super = default
type = sync completed
event_notifier_command =
process_actions = false
get_config_from_service = false
write_log_to_service = false

[event_sync_completed{cache_ready_user_logged_in}]
reboot = true
shutdown_user_cancelable = 10
shutdown_warning_time = 300

[event_sync_completed{cache_ready}]
reboot = true

[event_user_login]
super = default
```

```
type = user login
action_type = login
active = false
action_message = Starting to process user login actions.
action_message[de] = Beginne mit der Verarbeitung der Benutzer-Anmeldungs-Aktionen.
action_message[fr] = Traitement des actions à la connexion de l'utilisateur.
block_login = false
process_shutdown_requests = false
get_config_from_service = false
update_config_file = false
write_log_to_service = false
update_action_processor = true
event_notifier_command = %opsiclientd_notifier.command% -s notifier\\userlogin.ini
event_notifier_desktop = default
action_processor_command = %action_processor.command% /sessionid %service_session% /alllogінscripts /silent
action_processor_desktop = default
action_processor_timeout = 300

[event_on_shutdown]
super = default
type = custom
name = on_shutdown
active = False

[event_on_shutdown{installation_pending}]
name = on_shutdown
active = False

[event_silent_install]
super = default
type = custom
name = silent_install
event_notifier_command =
process_shutdown_requests = false
action_processor_productIds = swaudit,hwaudit
action_processor_command = %action_processor.command% /productlist %action_processor_productIds% /silent
action_processor_desktop = winlogon
action_processor_timeout = 300

[event_timer_silentinstall]
super = silent_install
type = timer
active = false
interval = 21600

[precondition_user_logged_in]
user_logged_in = true

[precondition_cache_ready]
config_cached = true
products_cached = true

[precondition_cache_ready_user_logged_in]
user_logged_in = true
config_cached = true
products_cached = true

[precondition_installation_pending]
installation_pending = true
```

Configuration via web service (Host Parameter)

The opsiclientd configuration can be changed by the *host parameter* tab at the opsi management interface.

The entries in the *host parameter* have to be according to the following patterns:

`opsiclientd.<name of the section>.<name of the key>`

Example:
`opsiclientd.event_gui_startup.action_warning_time = 20`
set in the configuration file `opsiclientd.conf` in the section `[event_gui_startup]` the value of `action_warning_time` to the value 20.

The following figure shows how to change the serverwide general configure via *opsi-configed*

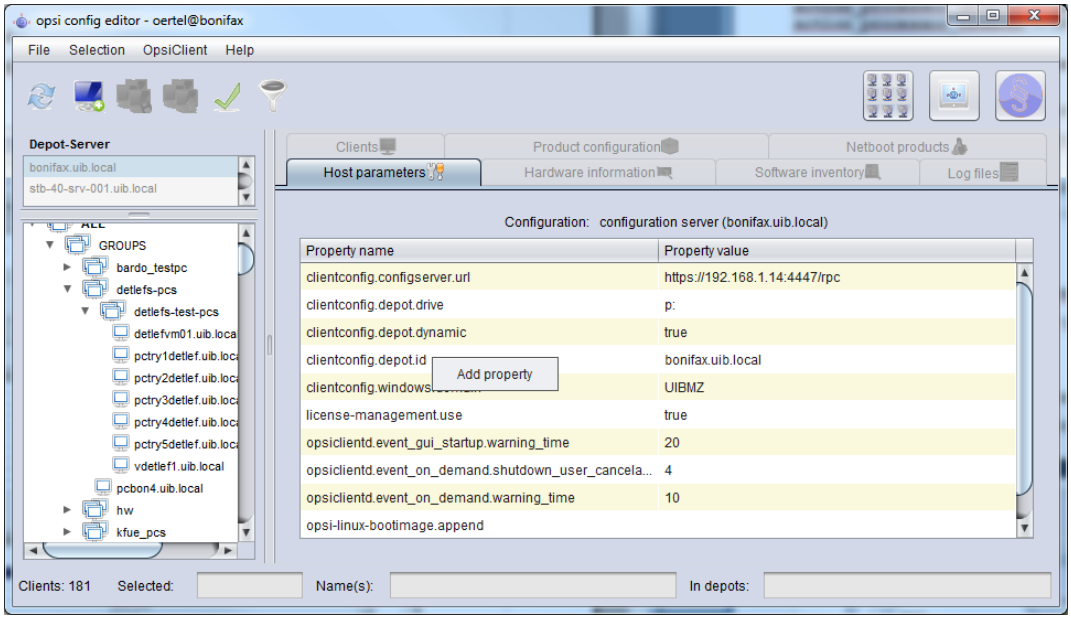


Figure 62: Setting the server default opsiclientd configuration

Using the context menu you may choose *add property* to set a new key/value pair.

To delete a server default, please use the *opsi-admin* tool:

Example:

```
opsi-admin -d method config_delete "opsiclientd.event_gui_startup.action_warning_time"
```

It is also possible to manipulate these entries client specific via *opsi-configed*.

To delete a client specific entry, please use the *opsi-admin* tool:

Example:

```
@opsi-admin> method configState_delete "opsiclientd.event_gui_startup.action_warning_time" "myclient.uib.local"
```

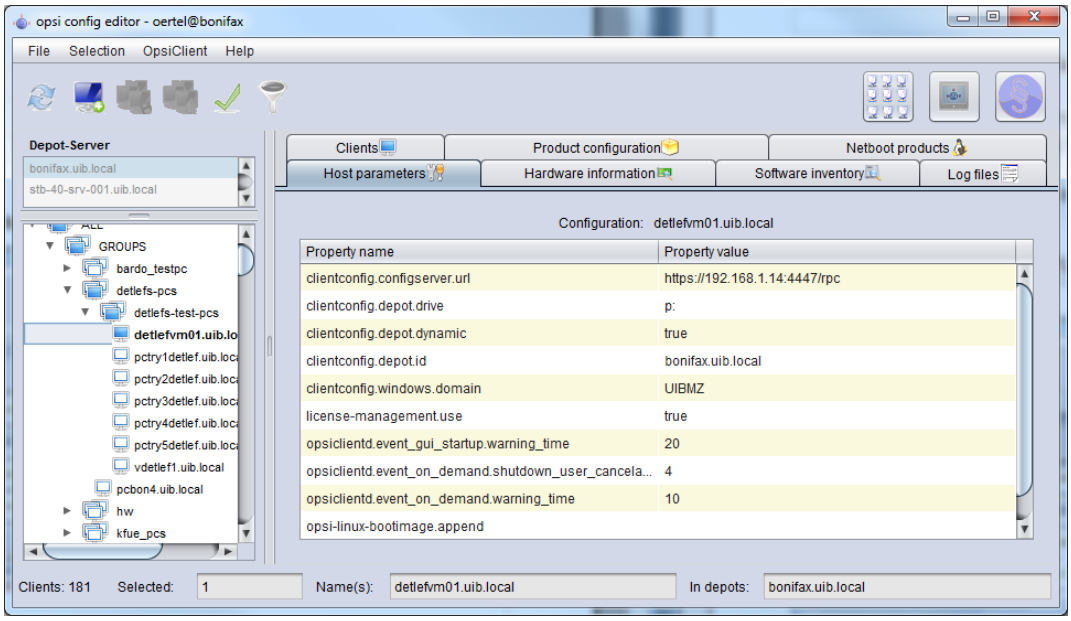


Figure 63: client specific opsiclientd configuration via opsi-configed

Logging

The *opsiclientd* logs to:
`C:\opsi.org\log\opsiclientd.log`.

All log information will be transferred to the *opsi-config-server* via web service. At the server you find these log infos at `/var/log/opsi/clientconnect/<ip-or-name-of-the-client>.log`. They are presented in the opsi configed at the tab *logfiles / client connect*.

Every line at the log has the pattern:
`[<log level>] [<time stamp>] [message source] message`.

There are the following log levels:

```
# Set the log (verbosity) level
# (0 <= log level <= 9)
# 0: nothing, 1: essential, 2: critical, 3: errors, 4: warnings, 5: notices
# 6: infos, 7: debug messages, 8: more debug messages, 9: passwords
```

Example:

```
(...)
[5] [Mar 22 10:17:46] [ event processing gui_startup  ] Event config 'sync_completed{cache_ready}' added to event \
    generator 'sync_completed'   (Events.pyo|1107)
[5] [Mar 22 10:17:46] [ event processing gui_startup  ] Event config 'gui_startup' added to event generator '\
    gui_startup'   (Events.pyo|1107)
[5] [Mar 22 10:17:46] [ event processing gui_startup  ] Event config 'gui_startup{cache_ready}' added to event \
    generator 'gui_startup'   (Events.pyo|1107)
[5] [Mar 22 10:17:46] [ event processing gui_startup  ] Event config 'on_demand' added to event generator 'on_demand'  \
     (Events.pyo|1107)
[5] [Mar 22 10:17:46] [ event processing gui_startup  ] Event config 'sync_completed{cache_ready_user_logged_in}' added\
     to event generator 'sync_completed'   (Events.pyo|1107)
[5] [Mar 22 10:17:46] [ event processing gui_startup  ] Event config 'gui_startup{user_logged_in}' added to event \
    generator 'gui_startup'   (Events.pyo|1107)
[5] [Mar 22 10:17:46] [ event processing gui_startup  ] Event config 'sync_completed' added to event generator '\
    sync_completed'   (Events.pyo|1107)
[5] [Mar 22 10:17:46] [ event processing gui_startup  ] Event config 'software_on_demand' added to event generator '\
    software_on_demand'   (Events.pyo|1107)
```

```
[5] [Mar 22 10:17:46] [ event processing gui_startup  ] Event config 'on_demand{user_logged_in}' added to event \
    generator 'on_demand'   (Events.pyo|1107)
[5] [Mar 22 10:17:46] [ event processing gui_startup  ] Updating config file: 'C:\Program Files (x86)\opsi.org\opsi-\
    client-agent\opsiclientd\opsiclientd.conf'   (Config.pyo|287)
[5] [Mar 22 10:17:46] [ event processing gui_startup  ] No need to write config file 'C:\Program Files (x86)\opsi.org\\
    opsi-client-agent\opsiclientd\opsiclientd.conf', config file is up to date   (Config.pyo|318)
[5] [Mar 22 10:17:46] [ event processing gui_startup  ] No product action requests set   (EventProcessing.pyo|591)
[5] [Mar 22 10:17:49] [ event processing gui_startup  ] Writing log to service   (EventProcessing.pyo|247)
[6] [Mar 22 10:17:49] [ opsiclientd                   ] shutdownRequested: 0   (Windows.pyo|340)
[6] [Mar 22 10:17:49] [ opsiclientd                   ] rebootRequested: 0   (Windows.pyo|326)
[5] [Mar 22 10:17:49] [ opsiclientd                   ] Block login now set to 'False'   (Opsiclientd.pyo|111)
[6] [Mar 22 10:17:49] [ opsiclientd                   ] Terminating block login notifier app (pid 1620)   (Opsiclientd.\
    pyo|148)
[6] [Mar 22 10:17:49] [ event processing gui_startup  ] Stopping notification server   (EventProcessing.pyo|225)
[6] [Mar 22 10:17:51] [ control server                ] client connection lost   (Message.pyo|464)
[6] [Mar 22 10:17:52] [ event processing gui_startup  ] Notification server stopped   (Message.pyo|651)
[5] [Mar 22 10:17:52] [ event processing gui_startup  ] ============= EventProcessingThread for event 'gui_startup' \
    ended =============   (EventProcessing.pyo|1172)
[5] [Mar 22 10:17:52] [ opsiclientd                   ] Done processing event '<ocdlib.Events.GUIStartupEvent object at\
     0x023CE330>'   (Opsiclientd.pyo|405)
[5] [Mar 22 10:19:41] [ opsiclientd                   ] Session 'HSzMB1wtOiBS6vHl7mh3ro5r6s3TanFu' from ip '127.0.0.1',\
     application 'opsi jsonrpc module version 4.0.1' expired after 120 seconds   (Session.pyo|184)
[6] [Mar 22 10:19:41] [ opsiclientd                   ] Session timer <_Timer(Thread-20, started daemon 2636)> canceled\
       (Session.pyo|120)
[5] [Mar 22 10:19:41] [ opsiclientd                   ] Session 'HSzMB1wtOiBS6vHl7mh3ro5r6s3TanFu' from ip '127.0.0.1',\
     application 'opsi jsonrpc module version 4.0.1' deleted   (Session.pyo|207)
[6] [Mar 22 10:27:55] [ control pipe                  ] Creating pipe \\.\pipe\opsiclientd   (ControlPipe.pyo|253)
[5] [Mar 22 10:27:55] [ event generator wait_for_gui  ] -----> Executing: getBlockLogin()   (JsonRpc.pyo|123)
[5] [Mar 22 10:27:55] [ opsiclientd                   ] rpc getBlockLogin: blockLogin is 'False'   (ControlPipe.pyo\
    |428)
[6] [Mar 22 10:27:55] [ event generator wait_for_gui  ] Got result   (JsonRpc.pyo|131)
'
```

The *opsi-login-blocker* logging to the log file: `C:\opsi.org\log\opsi_loginblocker.log`.

opsiclientd infopage

According to the fact that there are a lot of subcomponents of the *opsiclientd* which work and log at the same time, the log file of the *opsiclientd* becomes complex.

In order to make it easier to understand how the different subcomponents work together, the *opsiclientd* has an own *info page* which visualizes the running tasks on a timeline.
You may view this *info page* at the browser calling the url:
https://<address-of-the-client>:4441/info.html

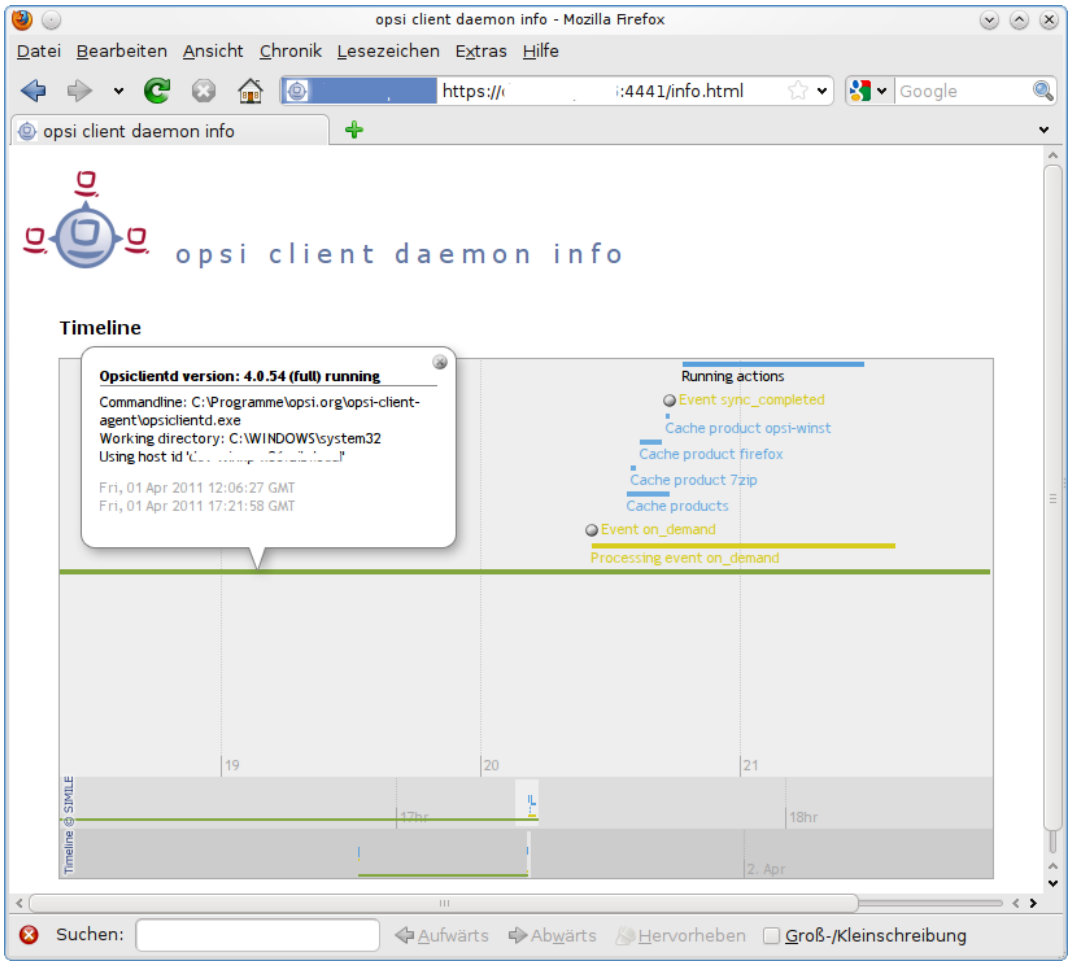


Figure 64: Info page of the opsiclientd after push installation with activated product caching

opsi-client-agent remote control

The *opsiclientd* has its own web service interface which can be used to transmit commands to the *opsiclientd*. The possible commands can be divided in the following categories:

- send Messages (Popup)
- *Push* installation (start the event *on_demand*)
- other maintenance tasks

This can be done on the command line using the tool *opsi-admin* by calling one of the `hostControlSafe_*` methods. Calling one of these methods takes the parameter `*hostid` which:

- can be `["*"]` to send the command to all clients
- can be the name of a client (e.g.. "pcbon4.uib.local")
- can be a list of client names according to the pattern [<client1>, <client2>]
  e.g.. ["pcbon1.uib.local", "pcbon2.uib.local"]
- may contain wildcards like *
  e.g.. "pcbon4.*" or "pcbon*"

If a client isn't reachable (e.g. powerd off) you will get a message.

Sending popup messages

Using the *opsi-configed* you may send messages to the clients. Section 4.8.4

At the command line you may do this with the tool *opsi-admin*:

```
opsi-admin -d method hostControlSafe_showPopup message *hostid
```

Example:

```
opsi-admin -d method hostControlSafe_showPopup "This is my message" "myclient.uib.local"
```

Push installations: start the event *on demand*

The *opsi-server* may send a command to the client that the client should process the configured action requests immediately. This is done by activating the event *on_demand* at the client.

This is possible using the *opsi-configed* and is described in chapter: *Push* installationen: start the event *on demand*

From the *opsi-server* the client can be instructed to execute the *product actions*.

Executing Events can also be done from the *opsi-configed*. Section 4.8.3

On the command line you may use *opsi-admin* to fire an event:

```
opsi-admin -d method hostControlSafe_fireEvent event *hostIds
```

Example:

```
opsi-admin -d method hostControlSafe_fireEvent "on_demand" "myclient.uib.local"
```

Additional maintenance tasks (shutdown, reboot,. . . . .)

Using the control server port you may remote control the *opsiclientd*. In order to do this you have to authenticate yourself at the web service. This could be done either with the local administrator account (with a not empty password) or with the *opsi-host-Id* (FQDN, client name and DNS Domain name) as user name and the opsi-hostkey as password.

Using the *opsi-configed* you may choose the menu *opsiClient* or the context menu in the *Clients* Tab.

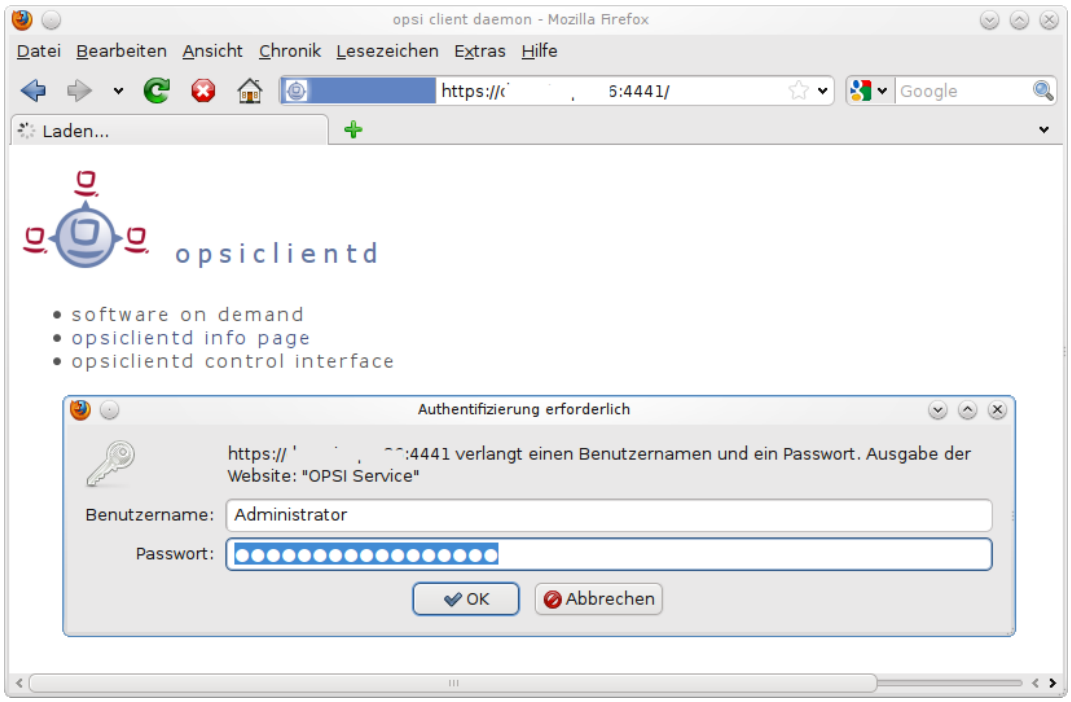


Figure 65: Web service of the opsiclientd

At the command line you also can initiate a client:

shutdown:

```
opsi-admin -d method hostControlSafe_shutdown *hostIds
```

reboot:

```
opsi-admin -d method hostControlSafe_reboot *hostIds
```

6.1.4 Adapting the opsi-client-agent to your Corporate Identity (CI)

Adapting the *opsi-client-agent* to your Corporate Identity can be important for the user acceptance when rolling out opsi. By adding your corporate logo to the opsi background image, the users feel more familiar with the opsi installation instead of being puzzled by something unknown.

Since opsi-client-agent version 4.0.7.16 all graphic components of the opsi-client-agent (notifier, opsi-script, kiosk-client) are base on the same graphic libraries and may be customized in the same way.
Colors can be configured in three different ways: as symbolic name (`clRed`), as hexadecimal value (`$FF00FF`) and as rgb value (`(255,0,0)`). There is a helper program set allows you simple to choose your colors and get the correct way to write the colors to the configuration file. The program is opsi color chooser.

As background graphic formats you may use a large number of different formats like: .bmp, .png, jpeg and so on. But all these formats are include a number of subformats. So for example is one png file displayed without any problem while an other, different png-file may not displayed in a correct way.
There may also be a difference between the operating system platforms (e.g between Windows and Linux).
There is a helper program set allows you simply to check if a given bitmap file will be displayed correct or not: opsi bitmap viewer.

Elements to be patched: opsi-winst

The files to be configured for opsi-winst are to be found in the directory `/var/lib/opsi/depot/opsi-client-agent/files/opsi/opsi-winst/winstskin`:

- `bg.png`
  This is the *opsi-winst* background image, where during installation text messages and product logos are shown.
- `skin.ini`
  This is the configuration file to specify the position, font and color of text messages during installation.

Elements to be configured: opsiclientd

In the directory `/var/lib/opsi/depot/opsi-client-agent/files/opsi/dist/notifier` are the files to configure the look of the notifiers. Each notifier has an image and a configuration file:

- `block_login.bmp`
  background image of the login blocker notifier.
- `block_login.ini`
  configuration file of the login blocker notifier.
- `event.bmp`
  background image of the server connection event notifier.
- `event.ini`
  configuration file of the server connection event notifier.
- `action.bmp`
  background image of the action notifier (software installation).
- `action.ini`
  configuration file of the action notifier.
- `shutdown.bmp`
  background image of the shutdown/reboot action notifier.
- `shutdown.ini`
  configuration file of the shutdown/reboot action notifier.
- `popup.bmp`
  background image of the popup message notifier.
- `popup.ini`
  configuration file of the popup message notifier.
- `userlogin.bmp`
  background image of the user login event notifier.
- `userlogin.ini`
  configuration file of the user login event notifier.

Elements to be configured: kioskclient

For description of the kiosk client see also: Section 9.15

The Headers list from the Main window (1) is customizable to the desire of the client. To that, there are two files which play a roll:

- `opsiclientkiosk.png`
- `opsiclientkiosk.ini`

The `opsiclientkiosk.png` holds the picture which will be loaded in this area.

The `opsiclientkiosk.ini` defines the text and its representation which will be shown in this area.

Example:

```
[TitleLabel]
Text= Opsi Client Kiosk
FontName = Arial
FontSize = 15
FontColor = clWhite
FontBold = false
FontItalic = false
FontUnderline = false

[Tile]
Width = 220
Height = 200
Color =  clCream
FontName = Arial
FontSize = 12
FontColor = clBlack
FontBold = false
FontItalic = false
FontUnderline = false

[TileRadio]
Fontsize = 10
None_color = clBlack
Uninstall_color = clRed
Setup_color = clGreen
```

You will find templates for these files under `/var/lib/opsi/depot/opsi-client-agent/files/opsi/opsiclientkiosk/opsiclientkioskskin` or `C:\Program Files(x86)\opsi.org\opsi-client-agent\opsi`

Protect your CI changes from updates: the custom directory

(available since opsi-client-agent version 4.0.2.3)

The custom directory can be used to protect your configuration changes during opsi-client-agent updates: (`/var/lib/opsi/depot/opsi-client-agent/files/opsi/custom`). During server updates of opsi-client-agent the whole custom directory will be saved and restored after the update, so that your custom changes will persist.

- `custom/config.ini`
  Values from this config file override values from the default `cfg/config.ini`. Except of the values for `pckey` and `bootmode`, which never are picked from that file. Add to your custom config file **only** those values, that are different from the default settings.
- `custom/winstskin/*.*`
  All the files from this directory will be copied to the clients `C:\Program Files (x86)\opsi.org\opsi-client-agent\custom\winstskin` directory during installation of the opsi-client-agent on the client. This `winstskin` directory, if it exists, since opsi-winst Version 4.11.3.4. is the preferred one. It must contain all required winstskin files and configurations, for the content of the default directory is ignored.
- `custom/notifier/*.*`
  All the files from this directory will be copied to the clients `C:\Program Files (x86)\opsi.org\opsi-client-agent\notifier` directory during installation of the opsi-client-agent and overwrite the files from the server side `files/opsi/dist/notifier/` directory.

- `custom/opsiclientd.conf`
  If it exists, the `custom/opsiclientd.conf` will be copied to the clients `C:\Program Files (x86)\opsi.org\opsi-client-agent\opsiclientd` directory during installation of the opsi-client-agent and overwrites the default opsiclientd.conf from the server side `files/opsi/dist/opsiclientd/` directory. So the custom opsiclientd.conf must contain **all** the required configuration entries.
  Attention:
  Using a custom `opsiclientd.conf` is not recommended. To customize your client configuration, use the host parameter configuration for single features as described in the opsi-client-agent chapter. Using a custom `opsiclientd.conf` is applicable for very complex configurations only. By using a custom `opsiclientd.conf`, after each update of opsi-client-agent it is required to check the server default file `files/opsi/dist/opsiclientd/opsiclientd.conf` for changes to be patched to your custom `opsiclientd.conf`.
  So: hands off this feature, unless you really know what you are doing!

- `custom/opsiclientkioskskin/*.*`
  All the files in these directory will be copied, by the installation of an opsi-client-agent to C:\Program Files(x86)\opsi.org\opsi-client-agent\custom\opsiclientkioskskin. If available, this directory (opsiclientkioskskin) will have the preference over others.

To avoid errors by the change of rights, the following helps:

```
opsi-setup --set-rights /var/lib/opsi/depot/opsi-client-agent
```

6.1.5 Blocking the user login with the opsi-Loginblocker

To prevent a user login before all installations are completed, opsi provides the optional *opsi-login-blocker*.

opsi loginblocker at Windows 2000 to XP (NT 5)

The *opsi-login-blocker* is implemented as the *Gina* `opsigina.dll`. *Gina* means *Graphical Identification and Authentication* and is the official Microsoft hook to manipulate the login process.

If you already have a special *Gina-DLL* installed, which is different from the original Microsoft *msgina.dll* (e.g. Novell *nwgina.dll*), you should not install the *opsi-login-blocker* without consulting uib or https://forum.opsi.org. It is possible to chain different gina.dll's, but therefore the installation has to be customized. Proper chaining of Gina DLLs is a quite critical task and might result in a locked up computer if done improperly.

Whether the *opsi-login-blocker* is installed or not is configured by the switch *LoginBlockerStart=on/off* in section [opsi-client-agent-install] of the client configuration.

opsi loginblocker at NT 6 (Win 7 & Co)

The *opsi-login-blocker* at Vista is implemented as a *credential provider filter*. It blocks all *credential providers* until the release by the *opsiclientd* or timeout.

6.1.6 Subsequent installation of the opsi-client-agents

The information about the *Subsequent installation of the opsi-client-agent* you will find in the *opsi-getting-started* manual (Chapter *First Steps*).

Installation of the opsi-client-agent from a master image or as exe

In order to install the opsi-client-agent from a prepared (sysprep) masterimage, the opsi-client-agent has to be (re)installed while the clone awakes and get a new personality.

To do this use the following steps:

- Copy from the share `opsi_depot` the complete content of the directory `opsi-client-agent` in a temporary directory on the master.
- Edit there the file `files\opsi\cfg\config.ini` :
  - In section `[installation]` set for `service_user=` the login name of a user that is member of the opsiadmin group..
  - NOT RECOMMENDED: In section `[installation]` set for `service_password=` the uncoded password of this user. Better:
  - In section `[installation]` set for `service_hidden_password=` the base64 encoded password of this user. For encoding of the pawword you may use the opsi-winst function `base64EncodeStr(<string>)` or a online service like http://www.base64encode.org/
    If `service_hidden_password=` has any value the key `service_password=` will be ignored.
  - In section `[opsiclientd]` set for `config_service.url =` the web service address of your opsi-config-server (e.g. `https://192.168.1.10:4447/rpc`)
- Make sure that the script `silent_setup.cmd` from the temporary directory is called after the clone has its new personality.
- After the call of `silent_setup.cmd` is finished, the temporary directory should be deleted.

If you like you may pack the temporary directory to a self extracting exe with final program start using a tool like filzip.

6.1.7 The Systray Program of the opsi-client-agent

The systray program of the *opsi-client-agent* focuses on the following targets:

- Notifying the user in regular (and configurable) Intervals on pending Installations. (Optional)
- Notifying the user on pending Installations on demand by using the context menu.
- Possibility for the user to start the installations.

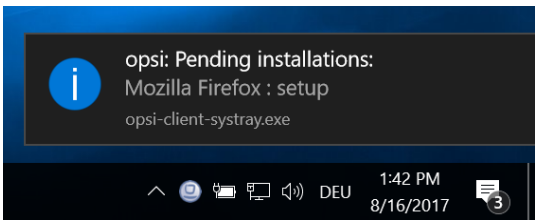


Figure 66: Message window of the opsi-systray program

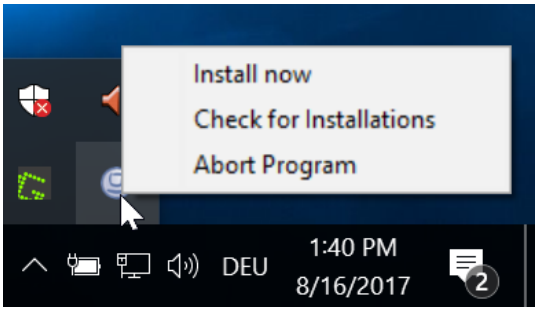


Figure 67: Context menu (right mouse click) of the opsi-systray program

Controlling the opsi systray program via the *opsi-client-agent* product properties:

- `systray_install`
  (`true` / `false`) Install the opsi systray program ?
  Default = `false`
- `systray_check_interval`
  Interval in minutes to check for pending action requests.
  Default=`180` (Small values here give heavy load to the server)
  The value `0` means: no checks at all..
- `systray_request_notify_format`
  Format of action request notification.
  Possible Values:
  "productid : request", "productname : request", "productname productversion : request"
  default: "productname : request"

Logs of the opsi systray program:

The program logs to `%Appdata%\opsi.org\log`. That is the `opsi.org\log` directory in the Appdata directory of the loggedin user.
For Example:
`C:\Users\<username>\AppData\Roaming\opsi.org\log\`

See also Chapter *opsi Software On Demand (Kiosk-Mode)*: Section 9.15

6.2 Registry Entries

6.2.1 Registry entries for the opsiclientd

opsi.org/general

- `bootmode= <bkstd | reins>`
  Stores the information whether the client is new installed or not.

opsi.org/shareinfo

- `depoturl`
  <URL for installation packets>
  depoturl pattern: <protocol:\\server\share\dir>

  Example:
  smb:\\opsi-server\opsi_depot
- `depotdrive`
  drive letter the depoturl will be mounted to

  Example: `P:` (including the colon)

6.2.2 Registry entries of the opsi-winst

opsi.org/winst

This registry entries are controlled by opsi-winst and should not be edited.

```
"LastLogFilename"="C:\\TMP\\syslogin.log"
"ContinueLogFile"=dword:00000000
"RebootRequested"=dword:00000000
"SendLogToService"=dword:00000001
"NumberOfErrors"=dword:00000000
"ShutdownRequested"=dword:00000000
```

7 Security

7.1 Introduction

Opsi is a powerful tool for the administration of many clients.

According to that fact, the *opsi-server* has to be in the focus of security considerations.

If you control the *opsi-server*, you are in control of all the clients, that are connecting to that *opsi-server*.

How much time and money you should spend for hardening your *opsi-server*, depends on your needs regarding security and the operational environment for using opsi. So for example an *opsi-server* in the *cloud* is more endangered than an *opsi-server* in a secured network.

In the following chapter we have collected the most important issues and problems.

At this point we say *thank you* to all customers and users which informed us about security problems and helped us to improve the security of the opsi system. If you find any security problem, please inform us (info@uib.de) before disclosing the security vulnerability in public.

7.2 Stay tuned

Information about security relevant updates and tasks are published at
the news area at the opsi forum:
https://forum.opsi.org/viewforum.php?f=10

7.3 General server security

The opsi software cannot be more secure than the underlying operating system. So please make sure to update your server with the security updates of your Linux distribution. This has to be done not only for the *opsi-config-server*, but also for all the *opsi-depot-server*.

It may help you to install programs which inform you by email if there are new updates available.

Debian, Ubuntu
: apticron

RHEL, CentOS
: yum-updatesd

There are a lot of possibilities to enhance the security of your Linux server. But this is not the task of this manual.

We would be happy to help you with this task as part of a support contract.

7.4 Client authentication at the server

The client authenticates itself using the FQDN as username and the *opsi-host-key* as password.

The *opsi-host-key* is stored at the client in the file:
`%programfiles%\opsi.org\opsi-client-agent\opsiclientd\opsiclientd.conf`
which is readable with administrative privileges only.
The *opsi-host-key* is stored at the server in the used backend (e.g at `/etc/opsi/pckeys`).

In addition to this authentication, you may tell the *opsiconfd* to check if the client IP address matches the given FQDN. To activate this check, set at the `/etc/opsi/opsiconfd.conf`:

```
verify ip = yes
```

and reload the *opsiconfd*:

```
service opsiconfd reload
```

Caution
Do not use this feature if you are not really sure, that your name resolution works properly in both directions for all clients.

7.5 Server authentication at the client

Since opsi 4.0.1 there are different possibilities to check the trustworthiness of the contacted server.

Caution
Do not use them in combination. Choose only one way or you will be locked out from your client.

7.5.1 Variant 1: verify_server_cert

At the first contact to a opsi-server, the client will accept the given SSL certificate and store it at `C:\opsi.org\opsiclientd\server-certs`.
On any subsequent contact, the client creates a random string and uses the *public key* of the stored certificate to encrypt this string (and the own access parameters). These encrypted data will be sent to the server.
The server uses the *private key* of its own SSL certificate to decrypt the data and sends the decrypted random string back to the client.
Now the client checks if the correct string was sent back. If not, the communication to the server will be aborted.

You can prevent this way that somebody directs your clients to a wrong server, e.g. by manipulating the DNS. If you setup a new server, you may migrate the SSL certificate from the old to the new server without problems. And you must not deploy any certification authority (CA).

The disadvantage of this method is, that a *man-in-the-middle* attack is still possible.

This security method checks the communication between client and *opsi-config-server*.

Using the opsi WAN extension and as `clientconfig.depot.protocol webdav`, also the communication to the *opsi-depot-server* is checked.

Section 9.10.3

To activate this check, set at the `opsiclientd.conf` in the section *[global]* the option:

```
verify_server_cert = true
```

Run the following command at your *opsi-config-server* to create this configuration entry for all clients:

```
opsi-admin -d method config_createBool opsiclientd.global.verify_server_cert "verify_server_cert" false
```

Now you can activate this using the *opsi-configed* at the *Server configuration* or at the *Host parameter* of seleted clients by chaning the value from *false* to *true*.

Caution
Be very careful with activating "verify_server_cert", for in case of improper configuration your clients will refuse the connection!

7.5.2 Variant 2: verify_server_cert_by_ca

This variant works just like SSL certificates are checked in your browser.
The given SSL certificate will be accepted, if it is issued for the exact FQDN (*commonName*) of the server (or if the DNS verifies that this is the FQDN matching the IP address of the server) **and** the certificate is issued and signed by the *uib gmbh*.

Is one of these conditions not true, the communication to the server will be aborted.

This method is more secure than the first one. But you will have to buy the certificates from *uib gmbh*. For prizes and conditions have a look at the prize list of *uib gmbh*:
http://uib.de/en/opsi_support/index.html

Any profits from selling these certificates will be invested in the maintenance of the opsi security.

To activate this security method, set at the `opsiclientd.conf` in the section *[global]* the option:

```
verify_server_cert_by_ca = true
```

Run the following command at your *opsi-config-server* to create this configuration entry for all clients:

```
opsi-admin -d method config_createBool opsiclientd.global.verify_server_cert_by_ca "verify_server_cert_by_ca" false
```

Now you can activate this using the *opsi-configed* at the *Server configuration* or at the *Host parameter* of seleted clients by chaning the value from *false* to *true*.

Caution
Be very careful with activating "verify_server_cert_by_ca", for in case of improper configuration your clients will refuse the connection!

7.6 Authentication at the control server of the client

The *opsiclientd* provides a web service interface, which allows remote control of the *opsiclientd* and thus remote control of the client.

(Section 6.1.3).

In order to access this interface authentication is required. You may authenticate as a local administrator with a not empty password, or with an empty user name and the *opsi-host-key* as password.

7.7 Admin network configuration

The idea of an *admin network* is to ban any administrative access from the standard production network and allow these accesses only from a special *admin network*.

With opsi all *opsi-clients* need restricted access to the *opsi web service*, which allows them to read and change their own data. Administrative access with further privileges is granted to members of the unix group *opsiadmin* only.

If you configure an *admin networks* parameter, all administrative accesses are restricted to these network(s).

Setting the option `[global] admin networks` at the `/etc/opsi/opsiconfd.conf` will restrict the administrative access to the *opsiconfd* to connections coming from the specified network address(es).
You may give multiple addresses separated by comma.
Non administrative access may also come from other networks.

The default is:

```
admin networks = 0.0.0.0/0
```

and allows administrative access from all networks.

A configuration like e.g.

```
admin networks = 127.0.0.1/32, 10.1.1.0/24
```

restricts administrative access to the server itself and to the network *10.1.1.0/24*.

7.8 The user pcpatch

With opsi 4 the user *pcpatch* is used just by the *opsi-client-agent* to mount the *depot share* (`opsi_depot`).

Excepions are the products:

- `opsi-wim-capture` and `opsi-local-image-capture` which use *pcpatch* to mount the share `opsi_depot_rw`
- `opsi-clonezilla` wich use *pcpatch* to mount the share `opsi_images`

The password of the user *pcpatch* is usually stored and transmitted encrypted. Under special circumstances it might be possible to catch the clear password. To reduce risks arising from that, you should do the following:

Deny for the user pcpatch the access to all other shares than the *opsi_depot* share. You should do this by adding the following entry to all share definitions (besides the *opsi_depot*) at the `/etc/samba/smb.conf`:

```
invalid users = root pcpatch
```

Alternative
At the `/etc/samba/smb.conf` restrict privileges for the user *pcpatch* to global read only by setting in the [global] section:

```
read list = pcpatch
```

Warning
For the products `opsi-wim-capture` and `opsi-local-image-capture` the share `opsi_depot_rw` must have write permission for *pcpatch*. For the product `opsi-clonezilla` the share `opsi_images` must have write permission for *pcpatch*

As an additional task you should frequently change the password of the user *pcpatch*. You may set the password to a random string which no one knows (besides opsi). You may do this by calling the following command e.g by a cronjob:

```
opsi-admin -d task setPcpatchPassword $(< /dev/urandom tr -dc _A-Z-a-z-0-9 | head -c16)
```

If you are not using netboot products that require the possibility to login as user *pcpatch* you can disable the login for that user. To do so please change the shell of the user *pcpatch* to `/bin/false` in the file `/etc/passwd`. Netboot products that may require such a login are i.e. *ntfs-write-image* and *ntfs-restore-image* respectively.

7.9 Webservice access limitations

The file `/etc/opsi/backendManager/acl.conf` can be used to limit the access to specified methods and attributes of the returned values.

The limitation affects the base methods of the webservice. For those a restriction of users or groups and allowed attributes can be established.

The access should be limited to the used methods. If it is not clear what methods are being used one can refer to the output of opsiconfd about the accessed methods. This is logged to `/var/log/opsi/opsiconfd/opsiconfd.log` in case of a stop or restart.

More information about the webservice can be found at Section 5.4.1.

7.10 Change the bootimage root password

The root password of the opsi linux bootimage is *linux123* by default. You may like to change this for security reasons. How to do this is desribed here: Section 8.2.1

8 opsi products

8.1 Localboot products: automatic software distribution with opsi

A *localboot product* is a opsi product which will be installed by the *opsi-client-agent* after the client started it's default OS from the local hard disk. This diskriminate them form the *netboot products* which will be described later

8.1.1 opsi standard products

The following products are basic products which come with the *opsi-server* installation.

opsi-client-agent

The *opsi-client-agent* packet contains the installation and update mechanism of the *opsi-client-agent*.

opsi-winst

The *opsi-winst* packet is a special case. It includes the actual *opsi-winst* `winst32.exe`, which is updated by the *opsi-client-agent* packet itself. The *opsi-client-agent* checks the server for there is a different version of the `winst32.exe` and then copies the new *opsi-winst* (all it's files) to the client.

javavm: Java Runtime Environment

he product *javavm* installs the required Java runtime environment (required for *opsi-configed*) on the clients.

opsi-configed

opsi Graphical Management Interface as application For Windows and Linux. See also chapter Section 4

jedit

Java based editor with syntax highlighting for *opsi-winst* scripts

swaudit + hwaudit: Products for hard- and software-audit

The products hwaudit and swaudit provide the hardware and software inventories. The hardware data are acquired using WMI and written to the hardware inventory via *opsi web service*. The data for the software inventory are taken from the registry (HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Windows\CurrentVersion\Uninstall) and passed to the inventory server via *opsi web service*.

opsi-template

Template for you own opsi scripts.

You may extract this template with:

```
opsi-package-manager -x opsi-template_<version>.opsi
```

it is also possible to rename it at the same time:

```
opsi-package-manager -x opsi-template_<version>.opsi --new-product-id myprod
```

See also opsi-getting-started Manual.

opsi-template-with-admin

Template-Script for Installations in the Context of a Local Administrator

You may extract this template with:

```
opsi-package-manager -x opsi-template-with-admin_<version>.opsi
```

it is also possible to rename it at the same time:

```
opsi-package-manager -x opsi-template-with-admin_<version>.opsi --new-product-id myprod
```

See also opsi-winst-manual / opsi-script-manual
Chapter: *Cookbook / Script for Installations in the Context of a Local Administrator*

shutdownwanted

Requests a shutdown after all is installed.
(more exactly: if there is no more action request).

opsi-script-test

Large collection of opsi-script selftest scripts which can be used as a example collection for running opsi-script code.

opsi-wim-capture

See also chapter Section 9.4

opsi-winpe

Product for comfortable creation of a opsi-winpe See also opsi-getting-started Manual, Chapter *Creating a PE*.

opsi-uefi-netboot

See also chapter Section 9.6

opsi-set-win-uac

Set's the UAC-Level via opsi.

opsi-setup-detector

See also chapter Section 9.19

opsi-logviewer

Text viewer with selection for log levels and events.
For Windows and Linux.

config-win10

Configure various Windows 10 settings like lockscreen, hibernationboot, telemetry sending and update behavior.

- **change_power_plan** Change the machine power plan.
- **config_updates** gives one the possibility to handle the update source. The options are to select Microsoft servers, a local peer-to-peer or a peer-to-peer over the internet as an update source. Die option *disable* moved into an own property, named *disable_updates*.
- **defer_upgrade**: One can defer Updates and Upgrades of Windows 10. Setting this property to *true* defers Updates for four weeks and Upgrades for eight months. However security updates will be installed anyway.
- **disable_advertising_id**: The advertising ID is used to collect data within the browser and show user-specific advertisement. Set this property to *true* to disable this.
- **disable_cortana**: The Cortana assistant in Windows 10 collects data on performed seaches through the search field in the task bar. To change this behaviour use this property.
- **disable_customer_experience** can dis- or enable the data collection on used applications.
- **disable_defender**: Windows 10 has the Windows Defender preinstalled. To deactivate the defender and replace it with an own anti-virus-solution use the property *disable_defender*.
- **disable_font_streaming**: Whenever a document uses a font which is not installed on the system the missing font is streamed to the machine. This can be disabled by setting the peroperty *disable_font_streaming* to *true*.
- **disable_handwrite_sharing**: On modern tablet computers with Windows 10 Microsoft collects data whenever the user uses a pen or anything similar to write something. This handwrite sharing feature is controlled by the property *disable_handwrite_sharing*
- **disable_location_sensors**: Windows 10 logs informations on the current geolocation of the device. This property makes it possible to disable this logging.
- **disable_lock_screen** disable_lock_screen.
- **disable_mac**: Windows 10 also collect data on the currently logged in Microsoft account user. This can be changed with the property *disable_mac*
- **disable_mrt**: Windows 10 has an auto built in *Malware Removal Tool* (MRT). This tool checks the file on the harddrive on a regular basis and compares them with known malware. To disable this feature, set the property to *true*.
- **disable_onedrive_sync** disable the OneDrive file synchronization.
- **disable_sending_feedback** can disable the feedback service. This service send data to Microsoft in crashed applications.

- **disable_smbv1** disable smbv1.
- **disable_telemetry** influences the amount of transfered data to Microsoft. Usually the default level, full, transfers most data. Setting this property to *true* lowers the amount of transfered data. Windows 10 LTSB and Enterprise releases will then only communicate security related information. Any other Windows 10 release will lower the level to *basic*.
- **disable_updates** blocks connections wo Microsoft update sources when set to *true*. Setting the property to *false* enables these connections again.
- **disable_wifi_sense**: *WiFi Sense* service makes it possible to share WiFi SSIDs inclusing password with contacts. The *disable_wifi_sense* property can disable or enable this service.
- **flashplayer_autorun**: The Adobe Flashplayer contains a security vunerability related to its autorun feature. If one has the Flashplayer installed, please use the *flashplayer_autorun* property to disable or enable the autorun feature.
- **online_search**: Whenever one uses the search field within the task bar a search is also performed through the internet. The search result then also contains webpages even if a local file was searched. Setting the property to *true* disables
- **sync_settings**: Windows 10 makes it possible to synchronise made settings with an account and restore these saved settings on another device running Windows 10.

```
[ProductProperty]
type: bool
name: disable_fast_boot
description: Disable Fastboot for proper opsi startup
default: True

[ProductProperty]
type: bool
name: disable_lock_screen
default: True

[ProductProperty]
type: bool
name: disable_telemetry
description: Disable telemetry data transmission
default: True

[ProductProperty]
type: bool
name: disable_cortana
description: Disable Cortana assistant
default: True

[ProductProperty]
type: bool
name: disable_customer_experience
description: Disable customer experience program
default: True

[ProductProperty]
type: bool
name: disable_mrt
description: Disable Malicious Software Removal Tool
default: True

[ProductProperty]
type: unicode
name: config_updates
multivalue: False
editable: False
description: Set Windows-Update behavior
values: ["AllowPeerToPeer", "LocalPeerToPeer", "MicrosoftOnly"]
```

```
default: ["MicrosoftOnly"]

[ProductProperty]
type: bool
name: disable_mac
description: Disable Microsoft Account communication
default: False

[ProductProperty]
type: bool
name: disable_advertising_id
description: Disable Microsoft Advertising ID
default: False

[ProductProperty]
type: bool
name: disable_updates
description: Disable Windows Updates
default: False

[ProductProperty]
type: bool
name: disable_defender
description: Disable Microsoft Windows Defender
default: False

[ProductProperty]
type: bool
name: disable_wifi_sense
description: Disable Wi-Fi Sense
default: False

[ProductProperty]
type: bool
name: disable_sending_feedback
description: Disable sending feedback and diagnostics
default: False

[ProductProperty]
type: bool
name: disable_font_streaming
description: Disable font streaming of not installed fonts
default: False

[ProductProperty]
type: bool
name: defer_upgrade
description: Defer Windows 10 Upgrade
default: True

[ProductProperty]
type: bool
name: flashplayer_autorun
description: Adobe Flashplayer: allow autorun?
default: False

[ProductProperty]
type: bool
name: location_sensors
description: Disable location and sensor detection
default: True

[ProductProperty]
type: bool
name: online_search
description: Disable online search during file or command search
default: True
```

```
[ProductProperty]
type: bool
name: disable_handwrite_sharing
description: Tablet-PC: Disable sharing of handriting information
default: True

[ProductProperty]
type: bool
name: sync_settings
description: Sync settings with AccountID
default: False
```

config-winbase

Package for customizing the GUI and Explorer settings.

8.1.2 Manipulating the installation sequence by product priorities

Since opsi 4.0 the installation sequence will be calculated by regarding product dependencies and product priotities.

- product dependencies
  defines dependencies and needed installation sequence between opsi-packages. A typical example is the dependency between a java program and the java runtime environment (javavm).
- product priorities
  will be used to push some packages to the beginning of the installation sequence and other packages to the end. For example it is useful install service pack and hotfixes at the beginning of a installation sequence and software inventory at the end.
  Product priorities are numbers between 100 and -100 (0 is the default)

There are different possibilities how these two factors are used to calculate the installation sequence. According to this opsi provides two different algorithms.

You may switch between these algorithms:

- using the opsi-configed, in the *Host parameter* Tab of the *server configuration*

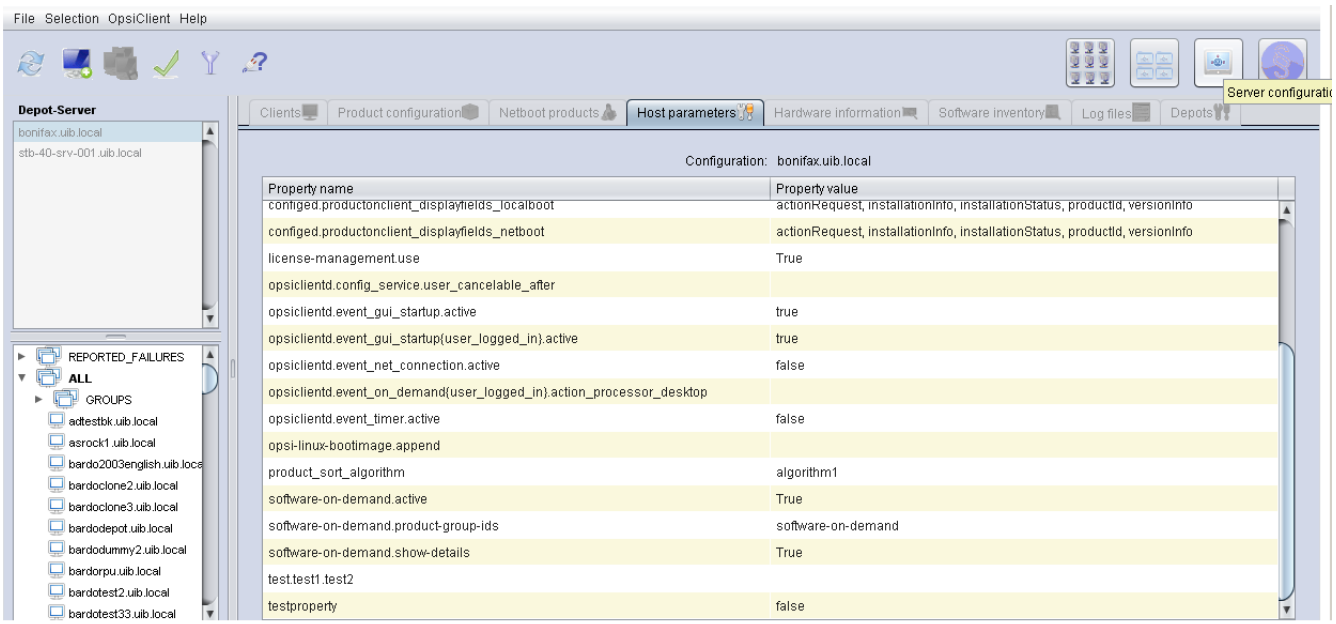


Figure 68: *opsi-configed*: server configuration

or you can do this on the commend line:

```
opsi-setup --edit-config-defaults
```

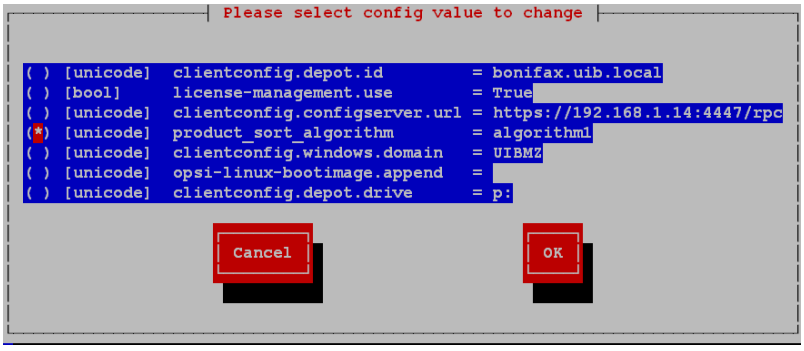


Figure 69: Choose the sort algorithm: Part 1

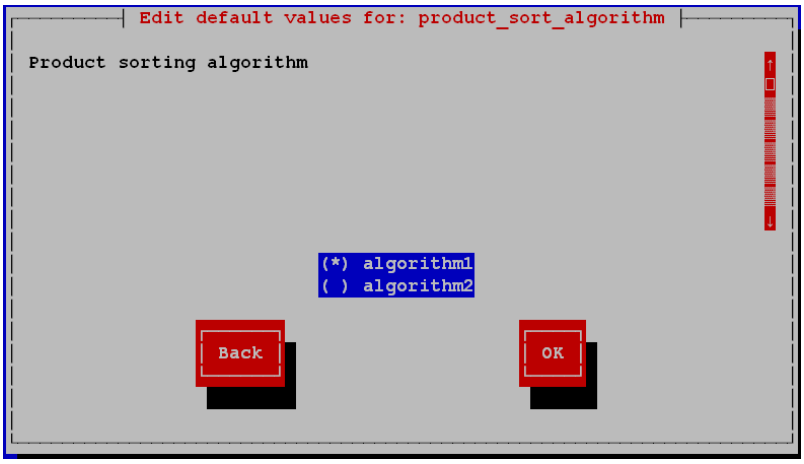


Figure 70: Choose the sort algorithm: Part 2

Algorithm1: product dependency above priority (default)

Using this algorithm, the product installation sequence at first will be calculated by the product priorities. In a second step it will be resorted to met the product dependencies. This algorithm may push products with low priority before products with higher priority to met the needs of product dependencies. But therefore you will not see installation problems as result of not resolved product dependencies.
The installation sequence of products with action requests is exactly the sequence you see in the configed if sort the products by the products by the column *position* and its order even if the scripts have partly been executed. Especially, if the execution of a script is stopped by an "ExitWindows /ImmediateReboot" command, then it is guaranteed that the suspended product installation is directly continued after reboot.

Algorithm2: product priority above dependency

The base philosophy of this algorithm is, that in practice there are three needed priority classes:

- Products which have to be installed at the beginning of a sequence, like OS-Patches. These products need a high priority (e.g. 100)
- "normal" products to install applications (default priority = 0)
- Products which have to be installed at the end of a installation sequence, like software inventory. These products need a low priority (e.g. -100)

Product dependicies will only resolved inside of priority class. This guarantees that products with a high priority will be installed very early. But is in your reponsibility that there are non product dependencies which go cross priority class borders.

Defining product priorities and dependencies

Product priorities and dependencies belong to the meta data of a product. You will be asked for these meta data creating a new product using the command `opsi-newprod`.

These meta data will be stored in the product control file and may be edited there. After changing the control file you have create and install the package again.

For more details see at *getting started* manual in the chapter creating a opsi-package.

8.1.3 Integration of new software packets into the opsi software deployment.

The information about the *Integration of new software packets into the opsi software deployment.* you will find in the *opsi-getting-started* manual.

8.2 Netboot products

8.2.1 Parameteters for the opsi linux boot image

The opsi-linux-bootimage has some parameters which may be used to change the behaviour of the bootimage. You will try this if the opsi-linux-bootimages doesn't run properly with the standard parameters on your hardware (e.g. black screen).
You may change these standard parameters by the *opsi-configed* choosing the Tab *Hostparameter* and use there the entry *opsi-linux-bootimage.append*.

Typical values are (may be combined):

- `acpi=off`
- `noapic`
- `irqpoll`
- `reboot=bios`

An other important default is the password of the root user within the opsi-linux-bootimage. This password is *linux123* by default and you should change this for security reasons.

To do this change the *opsi-linux-bootimage.append* entry at the *server-configuration*.

The option you have to change is *pwh* (password hash). As the value to this option you have to give a new password as a hash, which will be loaded to the `/etc/shadow` during the boot process.

The best way to get the correct password hash is to login via ssh to your bootimage:

```
ssh root@<client.domain.tld>
```

The old password is *linux123*.

Now set a new password for root:

```
passwd
```

Get the new hash

```
grep root /etc/shadow
```

The output should look like this:

```
root:$6$344YXKIT$D4RPZfHMmv8e1/i5nNkOFaRN2oYNobCEjCHnkehiEFA7NdkDW9KF496OHBmyHHq0kD2FBLHZoTdr5YoDlIoWz\
    /:14803:0:99999:7:::
```

Now copy from after the first colon until to the second colon and use this as value for *pwh*.

So the option for *opsi-linux-bootimage.append* may be:

```
pwh=$6$344YXKIT$D4RPZfHMmv8e1/i5nNkOFaRN2oYNobCEjCHnkehiEFA7NdkDW9KF496OHBmyHHq0kD2FBLHZoTdr5YoDlIoWz/
```

One can execute a pythin script before the execution of the desired netboot product. Therefore the bootimage append supports two parameter:

- `pre-execute`

- `pre-script`

In addition these parameter require an address with the script. This can be a *http://* or *tftp://* address. Please refer to the following example:

- `tftp://172.16.166/linux/test.py`

When using tftp please keep in mind that the default port 69 is used.

8.2.2 Unattended automated OS installation

Overview

Steps of a re-installation:

- Using PXE-Boot:
  - Choose the client which has to be installed with the utility opsi-configed or opsi-admin.
- At the next reboot, the client detects (via PXE-Bootprom) the re-installation request and loads the boot image from the opsi-server.

Using CD-Boot: * The client boots the boot image from the *opsi-client-boot-cd*. *The boot image starts and asks for confirmation to proceed with the re-installation. This is the only interactive question. After confirming this, the installation proceeds without any further request for interaction. * The bootimage formats and partitions the hard disk. * The bootimage copies the required installation files and configuration information from the *opsi-server* to the client and initiates a reboot. * Windows Installation: After the reboot the client installs the OS according to the provided configuration information without any interaction. * Linux Installation: By default the Linux Netboot products initiate a *kexec* command from within the bootimage and directly jumpt to the distribution installaer. * Next the *opsi-client-agent* is installed as the opsi installer for automated software distribution. * The automated software distribution then installs all the software packages as defined in the client's configuration.

Preconditions

The client PC has to be equipped with a bootable network controller. Most recent network controllers provide this functionality (PXE boot). Also recent network controllers which are integrated on the PC's main board. The PXE software, which is stored in the *bootprom* of the network controller, controls the boot process via network according to the BIOS boot device sequence. Usually the boot sequence has to be set in the BIOS, *network-boot* has to be the first boot device. If there is no possibility to use PXE you may boot from the opsi-client-bootcd.

The opsi installation package for the OS to be installed needs to be provided on the depot server. In the following we assume Windows 10 to be the OS to install.

PC-client boots via the network

The PXE firmware gets activated at startup of the PC. Part of the PXE implementation is a DHCP client.

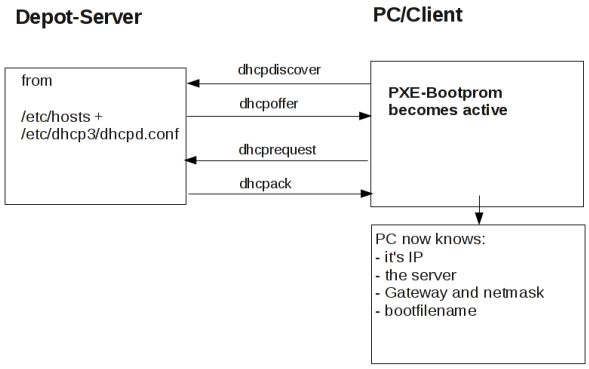


Figure 71: Step 1 during PXE-Boot

At first the PC only knows its hardware Ethernet address (MAC), consisting of six two-digit HEX characters.

The firmware initiates a *DHCPDISCOVER* broadcast: "I need an IP address, who is my DHCP-Server?"

The DHCP-Server offers an address (*DHCPOFFER*).

DHCPREQUEST is the response of the client to the server if the IP address is accepted. (This is not an obsolete step as there could be more than one server in the network.)

The server sends a *DHCPACK* to acknowledge the request. The information is sent to the client again.

You can watch this process on the display, for the PXE-BOOTPROM displays some firmware information and its *CLIENT MAC ADDR*. The rotating pipe-symbol is displayed during the request. When an offer was made it is replaced by an \ and you get the transmitted information (CLIENT IP, MASK, DHCP IP, GATEWAY IP). A short while later you should get a response like this: *My IP ADDRESS SEEMS TO BE .....*

This process makes the PC a regular, fully configured member of the network. The next step is to load the boot file (bootimage) given in the configuration information.

Loading pxelinux

The bootimage is loaded via trivial file transfer protocol (tftp). The displayed message is „LOADING". tftp is a rather old and simple protocol to transfer files without authentication. In fact, all data available via tftp is available to everyone in the network. Therefore the tftp access is limited to one directory, which is usually */tftpboot*. This directory is specified in x/inetd (internet daemon, /etc/inetd.conf), which will start the tftp daemon *tftpd* if requested. The start command as noted in inetd.conf is something like

```
tftpd -p -u tftp -s /tftpboot
```

The PXE boot-process is a multi-stage process:

Stage 1 is to load and start the file submitted as part of the address discovery process (usually /tftpboot/linux/pxelinux.0).

The program *pxelinux.0* then looks for configuration and boot information in */tftpboot/linux/pxelinux.cfg*. It first looks for a PC specific file with a name based on the hardware ethernet address (MAC) of the network controller with a leading 01. The filename for the controller with the hardware ethernet address 00:0C:29:11:6B:D2 would be 01-00-0c-29-11-6b-d2. If the file is not found, *pxelinux.0* will start to shorten the filename (starting at the end) to obtain a match. If this process ends without result, the file *default* will be loaded. This file only contains the instruction to

boot from the local hard disk. In this case the PC won't install anything and will just start the current OS from hard disk.

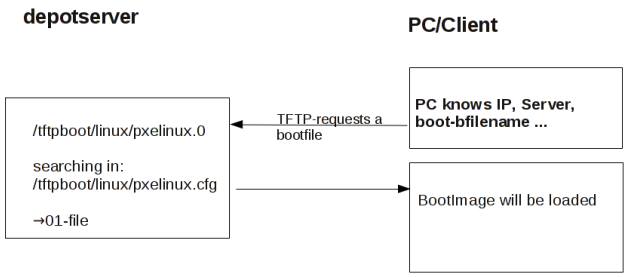


Figure 72: Step 2 PXE-Boot

To initiate the re-installation of a certain PC, a loadable file is prepared for the program *pxelinux.0*. In order to do so, the opsipxeconfd creates a PC custom file in */tftpboot/linux/pxelinux.cfg*. Part of this file is the command to load the installation boot image. Also this file contains the client key to decrypt the pcpatch password. This file is created as a *named pipe* and therefore disappears after being read once. More details about this in the chapter on security of file shares.

Based on the information the *pxelinux.0* got from the *named pipe*, the actual bootimage is loaded from the opsi depot server via tftp. The bootimage is based on a linux kernel (/tftpboot/linux/install) within an appropriate initrd file system (/tftpboot/linux/miniroot.bz2).

Boot from CD

Similar to the tftp boot via PXE-bootprom, the installation boot image can be booted from the opsi bootcd.

This might be recommended under the following conditions:

- the client has no PXE bootprom;
- there is no dhcp;
- there is a dhcp but it isn't allowed to configure any client data and the hardware addresses of the clients are unknown;
- there is a dhcp but it isn't configured for this demand.

According to different situations, several information has to be provided for the CD boot image by interactive input. The most simple case is to provide no further information. Eventually the clients hostname can be passed by *hn=<hostname>*. Using the option *ASK_CONF=1* several parameters can be queried. Pressing *F1* at the CD prompt shows the syntax.

Please read the chapter *Create a new client using the opsi-client-bootcd* at the opsi-getting-started manual.

The linux bootimage prepares for reinstallation

The bootimage again performs a dhcp request and configures the network interface according to the perceived information. Afterwards the configuration data for the client will be loaded via *opsi web service*.

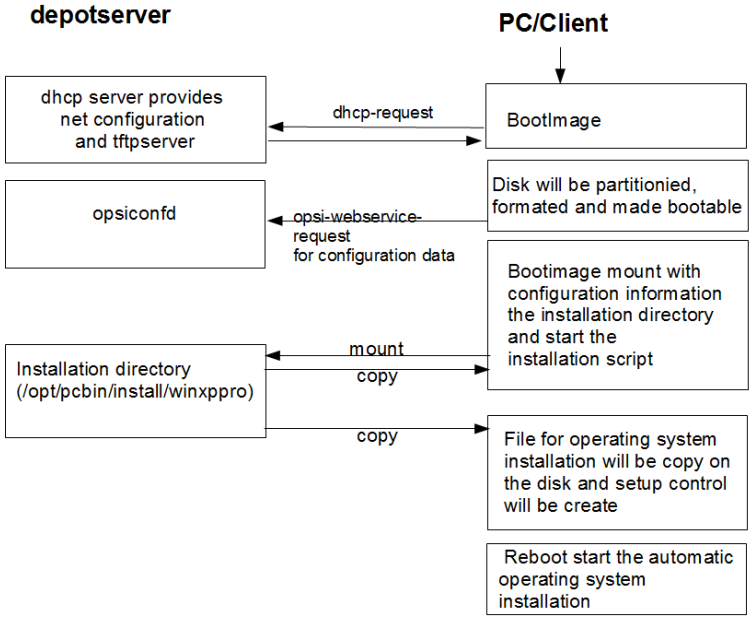


Figure 73: PXE-Boot loaded with bootimage preparing hard disk for operating system installation

It also holds the information on how to partition the hard disk, what file system to use and which operating system to install. Also it provides the encrypted password to connect the file share.

These information will be combined with some information taken from the dhcp response and then be passed to the installation script for further processing.

Then the password for the user *pcpatch* will be decrypted with the transferred key to mount the installation share and then call the installation script from the mounted share to start the installation of the operating system. What specific operations the script performs depends on the operating system which is to be installed. Below the steps of a Windows 10 installation will be described.

Prepare the disc: On the hard disk the bootimage creates a new partition (size of 4 GB), formats it and installs a bootable ntloader kernel.

Copy the installation file: The files required for OS installation and the setup files for the opsi-client-agent (which is the opsi software distribution pack) will be copied from the server file share (e.g. `/var/lib/opsi/depot/win10/installfiles`) to the local hard disk.

Maintain the configuration informations: Some of the configuration and control files contain replacement characters, which will be patched before starting the actual installation. With a specified script (patcha-script) the placeholders will be replaced with parameters taken from the information packet. This is built from configuration files and the dhcp-response. For example the file *unattend.xml*, which is the control file for unattended OS Installation, will be patched with specific information like host IP, client IP, client name, workgroup, default gateway etc..

Prepare Reboot: Bootrecords will be installed which will start the Windows setup program at the next reboot. The patched *unattend.xml* is passed to the setup as the control file for unattended installation.

Reboot: During the previous boot, the named pipe (which is indicating a request for installation) has been removed by reading it once. So the next PXE boot will load the default netboot response, which executes the command *localboot 0*. The local boot loader will be started and the setup for operating system installation starts.

These steps are controlled by an OS specific python script.

Installation of OS and opsi-client-agent

The OS installation bases on the Microsoft unattended setup. Part of this is the standard hardware detection. In addition to the possibilities given during an installation from non-OEM or slipstreamed installation media, drivers and patches (i.e. service packs) can be installed during the initial installation, making the separate installation of drivers obsolete.

One feature of the unattended installation is the possibility to initiate additional installations after the main installation is finished. This mechanism is used to install the opsi-client-agent, which implements the automatized software distribution system. An entry in the registry marks the machine as being still in the *reinstallation-mode*.

The final reboot leads to starting the opsi-client-agent service for software distribution prior to the first user login. Based on the value of the aforementioned registry key the opsi-client-agent switches into *reinstallation-mode*. Therefore, regarding the configuration status of each software packet, each packet which is marked as action status "setup" or installation status "installed" within the configuration of that client will be installed. After all the designated client software has been installed, the reinstallation process is finished and the internal status is switched back from *reinstallation-mode* to *standard-mode*. In *standard-mode* only software packages that are marked as action status "setup" will be installed.

How the patcha program works

As mentioned above the information collected from dhcp and opsi-webservice will be used to patch some configuration files as e.g. *unattend.xml*. The program used for patching is the script */user/local/bin/patcha*.

This script replaces patterns like *@flagname()* *in a file with values taken as* flagname=value *from the specified properties in the Windows 10 product. In the files that have to be patched, the search and replace pattern must start with @, might have an optional* after the flagname and must have one or more trailing .

So by calling *patcha -f <patchValues> <filename>* the file *<filename>* will be patched with information from the set product properties, stored in the file *<patchValues>*. The file *<patchValues>* is generated before the installation from the product properties.

```
Usage: patcha [-h|-v] [-f <params file>] <patch file>

Fill placeholders in file <patch file>
Options:
-v Show version information and exit
-h Show this help
-f <params file> File containig key value pairs
If option not given key value pairs from kernel cmdline are used
```

`patcha` patches one tag per line

Caveat: patch a patches only the first pattern of each line.

Each pattern will be expanded (or reduced) to the length of the value to be replaced with and then replaced. Trailing chars will not be affected.

Examples:

With the input file *try.in*

```
cat try.in
tag1=hallohallohallo1 tag2=t2
```

and the file *patch.me* to be patched:

```
cat patch.me
<#@tag1##########################>
<#@tag2##########################>
<#@tag1#>
<#@tag2#>
<#@tag1*#########################>
<#@tag2*#########################>
```

```
<#@tag1*#>
<#@tag2*#>
<#@tag1#><#@tag1#####>
<#@tag2*#######><#@tag1#>
```

the result will be:

```
./patcha -f try.in patch.me
cat patch.me
<hallohallohallo1>
<t2>
<hallohallohallo1>
<t2>
<hallohallohallo1>
<t2>
<hallohallohallo1>
<t2>
<hallohallohallo1><#@tag1#####>
<t2><#@tag1#>
```

Structure of the unattended installation products

The information about the *Structure of the unattended installation products* is found in the opsi-getting-started manual.

Simplified driver integration with symlinks

The information about the *Simplified driver integration with symlinks* is found in the opsi-getting-started manual.

8.2.3 Some hints to the NT6 netboot products (Win7 to Win 10)

Preconditions All netboot products with the version >= *4.1.0.0* require an opsi-winst >= *4.12.0.13* installed on the opsi server.
The netboot products with the version *4.1.0.0* also run on opsi 4.0.7.

Multidisk mode Windows OS installations on systems with more than one hard disk are now supported with the new multidiskmode property. The multidiskmode property allows to select the target disk for the Windows installation by selecting the disk number. It is also possible to select the first SSD by using `prefer_ssd` or to select the first rotational (*classic*) disk by `prefer_rotational`
In order to work with the multidisk mode, the property **`winpenetworkmode` has to be `true`**.

Important
By using the multidiskmode on a computer with **MBR BIOS** you have to make sure, that the by multidiskmode selected disk is also the first disk in the BIOS boot sequence.
On **UEFI BIOS** systems no further actions are necessary, due to the fact that the boot sequence it's controlled by the installation software.

Actions while running inside the Windows PE The preparation of a Windows installation starts with the opsi-linux bootimage, which select and prepares the hard disk. It also copies a Windows PE to a partition of the hard disk. This Windows PE is booted in order to start the Windows setup.
Starting with the 4.1.0.0 netboot products we use an opsi-script inside the Windows PE. This has the following advantages:

- Easier and clearer scripts
- The creation of a log file of the actions inside the PE

- Sending of this log file to the opsi server

The netboot products for the installation of the operating systems of the NT6 familiy, contain several properties which will be described below.

Property-Name	Property-Wert
additional_drivers	
administrator_password	*****
askbeforeinst	false
boot_partition_label	BOOT
boot_partition_letter	-
boot_partition_size	0
data_partition_create	true
data_partition_label	DATA
data_partition_letter	D
data_partition_preserve	never
fullname	Name
imagename	Windows 10 Pro N
installto	disk
multi_disk_mode	0
orgname	Orgname
pre_format_system_partitions	true
preserve_winpe_partition	false
productkey	
setup_after_install	
system_keyboard_layout	0407:00000407
system_language	de-DE
system_timezone	W. Europe Standard Time
use_raid1	false
windows_partition_label	WINDOWS
windows_partition_size	100%
winpe_dir	auto
winpe_inputlocale	0407:00000407
winpe_partition_size	4000M
winpe_uilanguage	de-DE
winpe_uilanguage_fallback	de-DE
winpenetworkmode	true

Figure 74: NT6 product properties

additional_drivers
One or more directories below `<productid>\drivers\drivers\additional`. All driver directories below the given directories will be integrated. If there is here a driver for a found device, no other driver will be integrated by the automatic driver integration.

administrator_password
At this property you set the password for the local Administrator.
Default = *nt123*

askbeforeinst
Should there be a confirmation dialog before start installing

boot_partition_label
Label of the *boot_partition* (Bitlocker partion)

boot_partition_letter
Drive letter of the *boot_partition* (Bitlocker Partion)

boot_partition_size
Size of the *boot_partition* (Bitlocker Partion). 0 = create no partition

data_partition_label
Label of the data partion (if created)

data_partition_letter
Drive letter of the data partion (if created)

data_partition_preserve
Preserve data partition on reinstallation

fullname
Full name of the license holder, which is given to the setup program

imagename
Name of the operating system variant

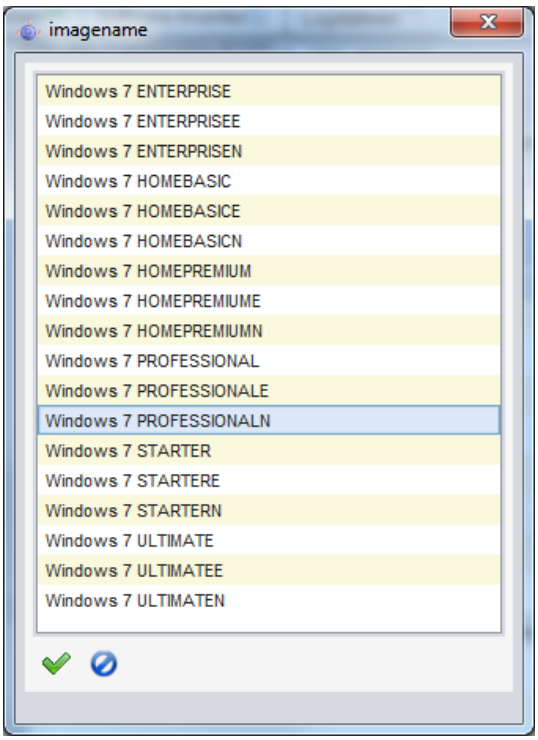


Figure 75: NT6 image names

installto
This property should never be changed. It ist not editable. It is used internally to difference between standard (disk) installations, opsi-local-image (oli) and opsi-vhd (vhd).
Please do not try to change it.

multi_disk_mode
This property is used to select the target disk of the Windows installation.
Possible values are: "0","1","2","3","prefer_ssd","prefer_rotational"
The values "0","1","2","3" are the index of the hard disks ("0"= 1. harddisk)
The value "prefer_ssd" selects the first SSD.
The value "prefer_rotational" selects the first rotational (*classic*) disk.
This property is ignored on systems with only one disk.
Default = "0"

orgname
Name of the company or organisation of license holder, which is given to the setup program

pre_format_system_partitions
Should we format the windows and boot partition before installation starts to remove any traces of former installations ? (takes time !)

preserve_winpe_partition
By default (False) the winpe partition will be deleted after the installation and the space is used by the system partition. True meens only to hide the winpe partition.

productkey
License key for the installation. Is only used if the *host parameter* `license-management.use` is set to *false*. If it set to *True* the license key will be get from the license management module.

setup_after_install
Which opsi product(s) should we switch to setup after OS installation is done ?

system_keyboard_layout
Select keyboard language. (see: http://msdn.microsoft.com/en-us/goglobal/bb895996)

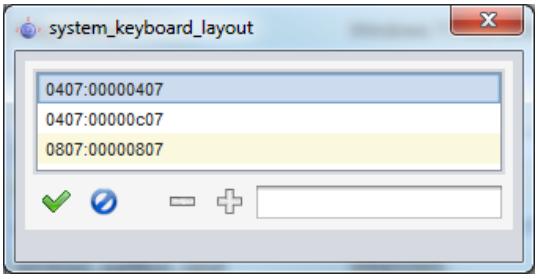


Figure 76: Select keyboard language

system_language
Select system language

system_timezone
Select time zone

winpe_dir
This property only is used for debuging
The value "auto" detects the matching standard winpe directory. These are *winpe* or *winpe_uefi*
Any other value must point to an existing directory inside the product directory on the opsi depot share.
Default = *auto*

winpe_inputlocale
Microsoft-Windows-International-Core-WinPE InputLocale

winpe_partition_size
Size of the winpe_partition

winpe_uilanguage
Microsoft-Windows-International-Core-WinPE

winpe_uilanguage_fallback
Microsoft-Windows-International-Core-WinPE

windows_partition_label
Label of the system partion (c:)

windows_partition_size
Size of the system partion (c:). The size may be given as percent of the harddisk size or as absolut size (G=Gigabyte). If you choose a other value the *100%*, the rest will be used as *data_partition*.

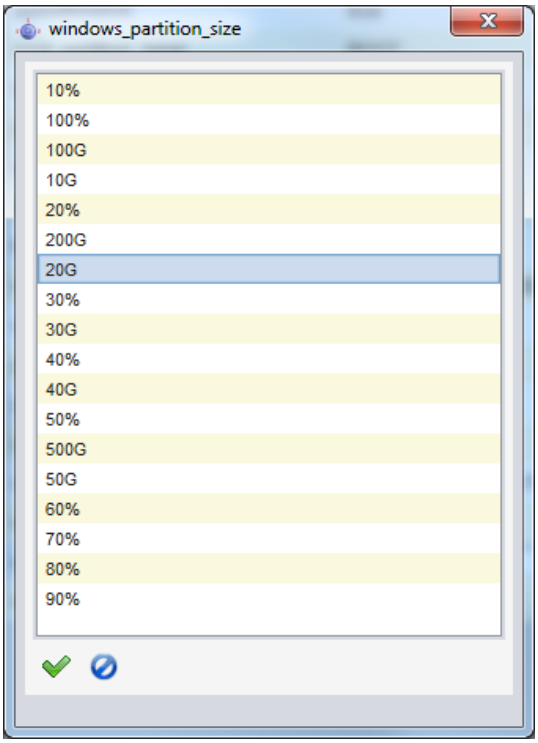


Figure 77: Size of the system partion

winpenetworkmode
If *true* the PE tries to mount the depot share and start the operating system setup from the share (faster). If *false* all installation files will be copied to the hard disk and the installation starts from the local disk (slower).

8.2.4 memtest

The product *memtest* is a utility to perform a memory test on a client.

8.2.5 hwinvent

This product does a hardware inventory of the client.

8.2.6 wipedisk

The product *wipedisk* overwrites the complete hard disk (partion=0) or several partitions with different patterns. The number of consecutive write operations to perform is specified as the {product-property *iterations* (1-25).

8.3 Inventory

The inventory can be ordered with the Localboot products `hwaudit` and `swaudit` or with the Netboot product `hwinvent`.

8.3.1 Hardware Inventory

The hardware inventory is controlled by an opsi configuration file. This means that the information about the data that will be compiled is not hardwired into the corresponding products `hwaudit` and `hwinvent`. In fact, the products will be controlled by a configuration file. The configuration file will be called and interpreted with every dispatch of the Web service. Simultaneously, the configuration file controls the structure of the database, so that a change of this configuration file changes the database schema.

The configuration file is `/etc/opsi/hwaudit/opsihwaudit.conf`.
All the objects on the inventory are defined and described in this file, like how these objects and their data are instantiated (under Linux and Windows). This file will also define the associated data structure. To be more specific, this configuration file contains the object-oriented inheritance definitions. The reason for this is the fact that a lot of objects contain identical data fields (i.e. like `Name` and `Vendor`). The general information will be defined in *virtual* Hardware base classes. The actual inventory objects are then *structural* Hardware classes, where many properties could possibly be inherited from overridden *virtual* base classes.

The following example may be instructive:
At first, the configuration file defines a *virtual Class* called *"BASIC_INFO"*. This defines the properties (*Values*):

- "name"
- "description"

Next comes the *virtual Class* called *"HARDWARE_DEVICE"*, which inherits all the additional parameters from *"BASIC_INFO"*, and includes the following:

- "vendor"
- "model"
- "serialNumber"

Next follows the first object that is found in the inventory, which is the first *structural Class* called *"COMPUTER_SYSTEM"*, which inherits of all the additional parameters from *"HARDWARE_DEVICE"*, it is defined (and overwrites properties) as:

- "name"
- "systemType"
- "totalPhysicalMemory"

The class definition will include a description of various parameters and their *Values*:

- Class definition:

  – "Type"
  is "STRUCTURAL" or "VIRTUAL"
  – "Super"
  this class which it will be inheriting.
  – "Opsi"
  gives the name of the class, which will be used later in opsi as a display name.

Further more, the class definition can define how the data will be compiled. This information can also be found in the definition of the *Values*.

- For the inventory under Linux:

  - "Linux": "[<command>]<parameter>"
    Executes the command <command> on the command line, with the argument <parameter>.
  - "Python": "<python code with place holder>"
    Executes the given Python code whose output will be placed in the place holder which is between the "#" signs (see example below).

- For the Inventory under Windows:

  - "WMI": "<wmi select statement>"
    executes WMI when called
  - "Cmd": "<Python text object with place holder>"
    In this case, this is the relative path to the Python executable program, whose output will be placed in the place holder.
  - "Registry": "[<registry key>] <value name>"
    The value of <value name> will be read from the registry, and given the key name <registry key>.
    The registry must be read in an architecture-specific manner. This means, that the 64 bit sector will be read on a 64 bit system.

- Value Definition:

  - "Type": "<MySQL database type>"
    <MySQL Database type> gives the MySQL database type that will be applied to this value (i.e. a Python string will be a "<MySQL Datenbase type>"="varchar(200)").
  - "Scope": "<scope>"
    The field <scope> will be used in the following way:
    "g" means: This attribute is the same in every link of these types.
    "i" means: This attribute can have different types of values with these links.
  - "Opsi": "<id>"
    "<id>" is an internal name of the fields. This can be found in the file located at `/etc/opsi/hwaudit/locales` .
  - "WMI": "<id or command>"
    <id or command> is either the name of a WMI command that prints the value or a single WMI command. If the WMI command is given in the Class definition (i.e. "select * from Win32_ComputerSystem") , then the results are assigned to the "WMI" variables in the "Values" class definition. If there is no WMI command, then the "WMI" variables in the "Values" section are WMI commands (see example below).
  - "Linux": "<id>"
    This is part of the class definition, <id> is the name of the displayed value when the Linux command is given.
  - "Condition": "<condition>"
    <condition> is a condition which must be fulfilled, with which the *Value* will be determined. So for example if the <condition> is defined as"vendor=[dD]ell*", then the values of "vendor" must contain either *Dell* or *dell*.

Here is an example of the class "COMPUTER_SYSTEM":

```
{
   "Class": {
      "Type":   "STRUCTURAL",
      "Super":  [ "HARDWARE_DEVICE" ],
      "Opsi":   "COMPUTER_SYSTEM",
      "WMI":    "select * from Win32_ComputerSystem",
      "Linux":  "[lshw]system"
   },
   "Values": [
      {
         "Type":   "varchar(100)",
         "Scope":  "i",
         "Opsi":   "name",
         "WMI":    "Name",
         "Linux":  "id"
      },
```

```
      {
         "Type":   "varchar(50)",
         "Scope":  "i",
         "Opsi":   "systemType",
         "WMI":    "SystemType",
         "Linux":  "configuration/chassis"
      },
      {
         "Type":   "bigint",
         "Scope":  "i",
         "Opsi":   "totalPhysicalMemory",
         "WMI":    "TotalPhysicalMemory",
         "Linux":  "core/memory/size",
         "Unit":   "Byte"
      },
      {
         "Type":   "varchar(50)",
         "Scope":  "i",
         "Opsi":   "dellexpresscode",
         "Condition": "vendor=[dD]ell*",
         "Cmd": "#dellexpresscode\dellexpresscode.exe#.split('=')[1]",
         "Python":  "str(int(#{'COMPUTER_SYSTEM':'serialNumber','CHASSIS':'serialNumber'}#,36))"
      }
   ]
},
```

Regarding the "WMI" commands, the class definition contains "select * from Win32_ComputerSystem". This command is run by WMI, which has output columns of "Name", "SystemType", and "TotalPhysicalMemory". These values are then assigned to the opsi values of "name", "systemType", and "totalPhysicalMemory".

Especially interesting is here the last value "dellexpresscode":
This is really useful when it queries a Dell-computer, about its condition.
The command line program `dellexpresscode.exe` was designed for Windows, and tells `hwaudit.exe` that the dellexpresscode is provided in the directory `dellexpresscode\`. Items in between # are place holders for output. So the statement at "dellexpresscode\dellexpresscode.exe" runs `dellexpresscode.exe`, and produces output in the form : *dellexpresscode=123456789*. The value that will be used is the one after the split on the place holder =, which is done in Python using the split() method as such `.split('=')[1]` . Under Linux, there will be found a value for *serialNumber* for the elements (*COMPUTER_SYSTEM* or *CHASSIS*), that is then used to assign the Dell Express codes. The call *int(,36)* converts the output integer to base-36.

The OPSI names of the values will be translated using the files found in `/etc/opsi/hwaudit/locales/*`. The file `/etc/opsi/hwaudit/locales/en_US` may contain translations such as:

```
COMPUTER_SYSTEM = Computer
COMPUTER_SYSTEM.systemType = Type
```

The class name COMPUTER_SYSTEM will be translated into "Computer". The Opsi attribute "systemType" of the class COMPUTER_SYSTEM will be translated into "Type" for English. If one were to look in the file `/etc/opsi/hwaudit/locales/de_DE`, you could see that the attribute of "COMPUTER_SYSTEM.systemType" will be translated into "Typ" for German. Finally another suggestion: When a new field is created, it should be placed in these files, even if one does not translate the term explicitly. This avoids any "*Warning*" messages.

After any change on the configuration file you should call:

```
opsi-setup --init-current-config
```

Also you should make a complete data reload in your *opsi-configed* by calling the menu: *File/Reload all data*.

The source code for this package can be found at GitHub: opsi-org/hwaudit

8.3.2 Software Inventory

The software inventory is done with the Localboot product `swaudit`. In this case, information will be inherited from the uninstall of the Registry, and additional information will be obtained from the Hotfixes and License keys.

The source code for this package can be found at GitHub: opsi-org/swaudit

8.4 opsi subscriptions

8.4.1 Initial Deployment of opsi subscriptons

Add the abo repositories to the */etc/opsi/opsi-product-updater.conf*

```
[repository_abo_mshotfix]
baseUrl = http://download.uib.de
dirs = abo/mshotfix/opsi4/glb
active = false
username = <user>
password = <pass>
autoInstall = false
autoUpdate = true
autoSetup = false
onlyDownload = false

[repository_abo_standard]
baseUrl = http://download.uib.de
dirs = abo/standard/opsi4
active = false
username = <user>
password = <pass>
autoInstall = false
autoUpdate = true
autoSetup = false
onlyDownload = false

[repository_abo_msoffice]
baseUrl = http://download.uib.de
dirs = abo/msoffice/opsi4
active = false
username = <user>
password = <pass>
autoInstall = false
autoUpdate = true
autoSetup = false
onlyDownload = false
```

Caution
If needed you can add a proxy to each section!

```
; Set Proxy handler like: http://10.10.10.1:8080
proxy =
```

Since opsi Version 4.0.5 one can choose specific packages for example:

```
opsi-product-updater -p "mshotfix,mshotfix-win7-x86-glb,mshotfix-win7-win2008r2-x64-glb"
```

for the mshotfix-packages for Windows 7.

Prior to opsi 4.0.5 one could download the opsi-packages and install them via `opsi-package-manager -p ask -i <packagename>.opsi` and set the default properties for the *opsi-config-server*. (Without the option `-p ask` the package defaults would be the depot defaults)-

Since opsi 4.0.5 it's possible to set the product-property defaults per depot with the management interface *opsi-configed*

An equivalent approach ist the usage of for example an `/etc/opsi/opsi-product-updater.conf.abo.standard` which can encalled via `opsi-product-updater -c /etc/opsi/psi-product-updater.conf.abo.standard`

8.4.2 Subscription *MS-Hotfixes*

Regular updates for the product MS-Hotfix (OS hotfixes for Windows 7 / 2008R2 /8.1 /2012 / 10 /2016).

Caution
Windows 10 1507 "non"-ltsb, 1511 und 1607 "non"-ltsb beside Education and Enterprise will get Status "failed"

The updates will be provided within 3 working days after Microsoft publication of important and critical patches.

This opsi-packages are delivered via download area (restricted access).

http://technet.microsoft.com/en-us/security/gg309177.aspx

```
Rating  Definition
Critical

A vulnerability whose exploitation could allow code execution without user interaction. These scenarios include self-\
     propagating Malware (e.g. network worms), or unavoidable common use scenarios where code execution occurs without \
     warnings or prompts. This could mean browsing to a web page or opening an email.

Microsoft recommends that customers apply Critical updates immediately.

Important

A vulnerability whose exploitation could result in compromise of the confidentiality, integrity, or availability of \
     user data, or of the integrity or availability of processing resources. These scenarios include common use \
     scenarios where client is compromised with warnings or prompts regardless of the provenance, quality, or usability\
     . Sequences of user actions that do not generate prompts or warnings are also covered.

Microsoft recommends that customers apply Important updates at the earliest opportunity.

Moderate

Impact of the vulnerability is mitigated to a significant degree by factors such as authentication requirements or \
     applicability only to non-default configurations.

Microsoft recommends that customers consider applying the security update.
Low     Impact of the vulnerability is comprehensively mitigated by the characteristics of the affected component. \
     Microsoft recommends that customers evaluate whether to apply the security update to the affected systems.
```

The opsi-mshotfix package uses (like WSUS Offline Update http://forums.wsusoffline.net/viewtopic.php?f=7&t=172 Coverage of WSUS Offline Update) Microsoft's wsusscn2.cab. wsusscn2.cab delivers all „critical“ and „important“ updates, but not all "optional" updates.

The base-package „mshotfix“ contains the master-script for installing the patches contained in the other mshotfix-packages.

Caution
Wan/VPN-extension: mshotfix packages for Windows 8.1 / Windows 2012 R2 requires opsi-winst >= opsi-winst_4.11.3.11-1.opsi and opsi-client-agent >= 4.0.4.4-1.opsi

Caution
Wan/VPN-extension: mshotfix packages for Windows 10 / Windows 2016 requires opsi-client-agent >= 4.0.7.9-2

Table 2: mshotfix Client-Requirements

OS	
Windows 7 / Windows 2008 R2	Servicepack 1
Windows Windows 2012	Windows 8.1 / Windows 2012 R2
	Windows 10 / Windows 2016

Structure of the download area:

```
mshotfix
  !-opsi4/
     !-glb/     Base-package mshotfix  and global packages
                mshotfix-win7-x86-glb,
                mshotfix-win7-win2008r2-x64-glb
                mshotfix-win8-win2012-x64-glb
                mshotfix-win81-x86-glb
                mshotfix-win81-win2012r2-x64-glb
                mshotfix-win10-win2016-x64-glb
                mshotfix-win10-x86-glb
     !-misc/
                dotnetfx,
                dotnetfx-hotfix,
                mshotfix-uninstall,
                ms-ie11,
                ms-optional-fixes,
                silverlight
```

Table 3: mshotfix Client-OS

OS	Arch. Language	Patch-package
Windows 7	32Bit	mshotfix-win7-x86-glb
Windows 7	64Bit	mshotfix-win7-win2008r2-x64-glb
Windows 2012	64Bit	mshotfix-win8-win2012-x64-glb
Windows 8.1	32Bit	mshotfix-win81-x86-glb
Windows 8.1	64Bit	mshotfix-win81-win2012r2-x64-glb
Windows 2008 Server R2	64Bit	mshotfix-win7-win2008r2-x64-glb
Windows 2012 R2	64Bit	mshotfix-win81-win2012r2-x64-glb
Windows 10	32Bit	mshotfix-win10-x86-glb
Windows 10	64Bit	mshotfix-win10-win2016-x64-glb
Windows 2016	64Bit	mshotfix-win10-win2016-x64-glb

Since mshotfix 201304-1 a list of installed patches is saved in file `C:\opsi.org\mshotfix\deployed.txt`.

Caution
Since mshotfix 201808-3 installs at first the ServingStack with an immediate reboot

noreboot
noreboot=on: Don't Reboot if possible Warning will be logged if a reboot is required. Will be ignored for Servicing stacks values: ["off", "on"] default: ["off"]

force
force=on: All Hotfixes will be forced installed values: ["off", "on"] default: ["off"]

excludes
Comma separated list with kb-numbers or ms-no, that will be excluded (Only Number without beginning kb and no spaces. Example: 123456,789011,2222) Browser Choice update? (KB976002)

severity
choose the severity that will be installed. Possible Entries are Critical, Important, Moderate, all values: ["Critical", "Important", "Moderate", "all"] default: ["Critical", "Important"]

excludelist-superseded.txt
Use File ExcludeList-superseded.txt values: ["", "ExcludeList-superseded.txt"] default: [""]

monthly-updates
Handle windows-7-and-windows-8-1 : security Only Quality Update vs Monthly Quality Rollup (see Further simplifying servicing models for Windows 7 and Windows 8.1, More on Windows 7 and Windows 8.1 servicing changes, .NET Framework Monthly Rollups Explained) values: ["all", "monthly_quality_rollup", "security_only_quality_update"] default: ["security_only_quality_update"]

misc mshotfix-uninstall

mshotfix-uninstall	201512-1	MS Hotfix BasePackage

Removes removable patches via `wusa /uninstall ...` if possible

excludes
Commaseparated list with kb-numbers or ms-no, that will be excluded (Only Number without beginning kb and no spaces. Example: 2553154,ms14-082)

noreboot
noreboot=on: Don't Reboot. Warning will be logged if a reboot is required. values: ["off", "on"] default: ["off"]

removefromdeployed.txt
Remove from deployed.txt default: False

removekb
Remove KBXXXXX, (Only Number without beginning kb and no spaces f.e. 3097877) multivalue: True default: [""]

misc dotnetfx

dotnetfx	4.7.2-3	.NET Framework

Installation of dotnet framework 4.5 and above especially for windows 7 /2008 R2 / 8.1 / 2012 R2 On Windows installations (> Windows 7) you can also install Dotnet 3.5.

"The Microsoft .NET Framework 4.7.1 is a highly compatible in-place update to the Microsoft .NET Framework 4, 4.5, 4.5.1, 4.5.2, 4.6, 4.6.1, 4.6.2, and 4.7. "

(see https://support.microsoft.com/en-us/help/3151802/the-.net-framework-4.6.2-web-installer-for-windows)

As a consequence

a) One cant install the 4.x-versions side by side b) Third-party setups might not recognize this issue and insist for example on version 4.5.1

After a successful dotnetfx-Installation on a windows client dotnetfx-hotfix - if available on your opsi-server - will be set to setup.

version
["3.5", "4.0", "4.5", "4.5.1", "4.5.2", "4.6", "4.6.1", "4.6.2", "4.7", "4.7.1", "4.7.2", "latest", "latestAnd3.5"] values: ["3.5", "4.0", "4.5", "4.5.1", "4.5.2", "4.6", "4.6.1", "4.6.2", "4.7", "4.7.1", "4.7.2", "latest", "latestAnd3.5"] default: ["latest"]

rerundotnethotfix::rerun dotnetfx-hotfix after installation if possible values: ["false", "true"] default: ["true"]

install_language_languagepack
install_language_languagepack values: ["auto", "de", "en", "fr"] default: ["auto"]

os-package
Here you can switch from which OS-Version to be install Dotnet3.5, auto=win10 or opsi-local-image-win10 (default); other ProductID for netboot-product values: ["auto",] default: ["auto"]

misc dotnetfx-hotfix

dotnetfx-hotfix	201808-1	dotnetfx-hotfix

at the moment our update subscription *MS-Hotfixes* contains patches for *Microsoft .NET Framework* if the version belongs to the installed operating system.

For instance comes "Microsoft .NET Framework 3.5.1" with Windows 7 .

This provides patches from Microsoft for

- Microsoft .NET Framework 4 and above for OS Windows 7

(The monthly rollups are contained in the mshotfix-packages)

The dotnetfx-hotfix patches - if available - versions 4.x

We tested the package thoroughly under Windows 7.

Please have a look at https://support.microsoft.com/en-us/lifecycle?p1=14380

"Support for .NET Framework 4, 4.5, and 4.5.1 ended on January 12, 2016" (https://support.microsoft.com/en-us/-lifecycle?p1=14380)

respectivly

https://support.microsoft.com/en-us/lifecycle#gp/Framework_FAQ

noreboot
noreboot=on: Don't Reboot. Warning will be logged if a reboot is required. values: ["off", "on"] default: ["off"]

force
force=on: All Hotfixes will be installed forced values: ["off", "on"] default: ["off"]

severity
choose the severity that will be installed.Possible Entries:Critical, Important, Moderate, all values: ["Critical", "Important", "Moderate", "all"] default: ["all"]

misc ms-ie11

ms-ie11	11.0-11	Internet Explorer 11

Win7 Internet Explorer 11

rerunmshotfix
rerun mshotfix after installation values: ["false", "true"] default: ["true"]

client_language
values: ["auto", "de", "en", "fr"] default: ["auto"]

misc ms-optional-fixes

ms-optional-fixes	201808-1	MS optional fixes

supplement to mshotfix and based on mshotfix

Contains:

kb2999226 win7-win8.1

message_language
Language for messages while installing values: ["auto", "de", "en", "fr"] default: ["auto"]

noreboot
noreboot=on: Don't Reboot if possible Warning will be logged if a reboot is required. Will be ignored for Servicing stacks values: ["off", "on"] default: ["off"]

excludes
Commaseparated list with kb-numbers or ms-no, that will be excluded (Only Number without beginning kb and no spaces. Example: 123456,789011,2222) 49 Browser Choice update? (KB976002) 50 values: [] 51 default: []

rerunmshotfix
rerun mshotfix after installation values: ["false", "true"] default: ["true"]

client_language
values: ["auto", "de", "en", "fr"] default: ["auto"]

misc silverlight

silverlight	5.1.50907.0-1	Microsoft Silverlight

8.4.3 Update subscription for *MS-Office Hotfixes*

Regular updates for the product:

```
Ms-Office 2010 (32 Bit International)
```

The updates will be provided within 3 working days after Microsoft's publication of important and critical patches.

Updates for MS Office 2010 32-bit international: office_2010_hotfix

office_2010_hotfix	201808-1	Microsoft Office 2010 Hotfixes

Contains global Office 2010 patches (inclusive Visio and Project 2010) . Requires Service pack 2.

Since office_2010_hotfix 201305-2 a list of installed patches is saved in file

`C:\opsi.org\mshotfix\office_2010_hotfix_deployed`

Since office_2010_hotfix 201503-1:

excludes
Comma separated list with kb-numbers or ms-no, that will be excluded (Only Number without beginning kb and no spaces. Example: 2553154,ms14-082)

Updates for MS Office 2013 32-bit international: office_2013_hotfix

```
office_2013_hotfix                201808-1                Microsoft Office 2013 Hotfixes
```

Contains global Office 2013 patches (includes Visio 2013). Requires Service pack 1

A list of installed patches is saved in the file

`C:\opsi.org\mshotfix\office_2013_hotfix_deployed`

Since office_2013_hotfix 201503-1:

excludes
Comma separated list with kb-numbers or ms-no, that will be excluded (Only Number without beginning kb and no spaces. Example: 2553154,ms14-082)

Updates for MS Office 2016 32-bit international: office_2016_hotfix

```
office_2016_hotfix                201808-1                Microsoft Office 2016 Hotfixes
```

Contains global Office 2016 patches.

A list of installed patches is saved in the file

`C:\opsi.org\mshotfix\office_2016_hotfix_deployed`

excludes
Comma separated list with kb-numbers or ms-no, that will be excluded (Only Number without beginning kb and no spaces. Example: 2553154,ms14-082)

CAUTION
For usage of MS Office 2016 32-bit and 64-Bit or 64-Bit only

Adopt your repo uib_abo_msoffice u: x3264 / x64

8.4.4 Update subscription for the opsi standard packages

```
Adobe Reader DC Classic / Continuous (international / 32 Bit)
Adobe Flashplayer (international / 32 Bit / 64 Bit)
Apache OpenOffice.org (german / 32 Bit)
Google Chromium for business (international 32 Bit /64 Bit)
LibreOffice (international / 32 Bit)
Mozilla Firefox (dutch, german, english and french / 32 Bit) respectivle 32/64 Bit sin
Mozilla Thunderbird (german, english and french / 32 Bit)
Oracle Java VM (international / 32 Bit / 64 Bit)
```

```
Depending on your contracts we offer the subscriptions with:
```

```
Adobe Acrobat Reader XI (in addition danish, dutch, italian and spanish / 32 Bit)
Mozilla Firefox (in addition czech, danish, italian, norwegian or spanish / 32 Bit)
Mozilla Thunderbird (in addition italian / 32 Bit)
```

```
further languages can be obtained upon request.
```

```
The updates will be provided within 2 working weeks after manufacturers release. For c
```

Customizing with central configuration files

For the opsi-packages

```
adobe.reader.dc.classic
adobe.reader.dc.continuous
firefox
flashplayer
javavm
thunderbird
```

one can provide configuration files and populate them via product-properties (for details see the relevant chapters)

Customizing with preinst/postinst-scripts

For the opsi-packages

```
adobe.reader.dc.classic
firefox          (since 17.0.6esrorstandard-1)
flashplayer      (since 13.0.0.182or11.7.700.275-1)
google-chrome-for-business
javavm           (since 1.7.0.51-4 )
libreoffice      (since 4.3.5or4.4.0-2)
ooffice          (since 4.1.1-2)
thunderbird      (since 17.0.6esrorstandard-1)
```

one can use custom-scripts in directory `custom\scripts`

Simple templates can be found in directory `opsi\scripts`

```
custom.actions.post.setup
custom.actions.post.uninstall
custom.actions.pre.setup
custom.actions.pre.uninstall
custom.declarations
custom.sections

custom scripts will be included at
- setup-script
- uninstall-script

custom pre-scripts will be included in
- setup-script
- uninstall-script

custom post-scripts will be included in
- in setup-script
- uninstall-script

custom.declarations
; intended for declaration of custom Variables and Stringlist Variables
; will be included with "include_insert" at top of [actions]
; but after GetProductProperties

custom.sections
; intended for declaration of custom secondary sections
; will be included with "include_append" at top of [actions]
; but after GetProductProperties

custom.actions.pre.setup  (or custom.actions.pre.uninstall)
; will be included with "include_insert" at at top of [actions]
; (but after GetProductProperties)
```

```
custom.actions.post.setup (or custom.actions.post.uninstall)
; will be included with "include_insert" in case of successful installation before "endof_"actions"
; in setup-script ( or uninstall-script)
```

Adobe Acrobat Document Cloud Classic : adobe.reader.dc.classic

```
adobe.reader.dc.classic 20151500630394or20171701130070-1
Adobe Acrobat Reader dc
```

The adobe.reader.dc.classic-Package contains Adobe Acrobat Document Cloud Classic (MUI-Version)

Adaptation in the transform file *.mst

```
cat transform.txt
Changes vs default the transform file *.mst

Personalization Options
Suppress Eula

Installation Options
acivated - Make Reader the default PDF viewer
IF REBOOT REQUIRED - suppress reboot


Shortcuts
deactivated - Destination Computer/Desktop/Adobe Reader XI (Icon)


Online and Acrobat.com Features
Online Features
activated - Disable product updates
Enable & Ask before Installing - Load trusted root certificates from Adobe

Online Services and Features
disable product updates
Load trusted root certificates from Adobe disable
DISABLE all Services
```

adobereader.mst
The Adobe Reader package uses a default transform build with the Adobe Customization Wizard. Own mst-files can be placed in the share `opsi_depot` in `/var/lib/opsi/depot/adobe.reader.dc.classic/custom` During the installation via `opsi-package-manager -i <adobe.reader.dc.classic>` the directory custom will preserved by the preinst/postinst-scripts and the names of any mst-file in the custom-directory will be appear as a possible property entry.

Caution
opsi WAN/VPN extension: The synchronization process is based on the file `<product-id>.files`. So any change in the `custom` share requires new installation of the package via `opsi-package-manager`.

---

client_language
The adobe.reader.dc.classic-package contains Adobe Acrobat Document Cloud Classic (MUI-Version) "auto" tries to install the correct language. values: ["auto", "de", "en", "fr"] default: ["auto"]

classicversion
description: https://helpx.adobe.com/acrobat/release-note/release-notes-acrobat-reader.html Classic Track (2015 Release) or (2017 Release) values: ["2015", "2017"] default: ["2015"]

noreboot
description: noreboot=true: Don't Reboot. Warning will be logged if a reboot is required. values: ["false", "true"] default: ["false"]

Adobe Acrobat Document Cloud Continuous : adobe.reader.dc.continuous

adobe.reader.dc.continuous	2015.023.20056-1	Adobe Acrobat Reader dc

The adobe.reader.dc.classic-Package contains Adobe Acrobat Document Cloud Continuous (MUI-Version)

Adaptation in the transform file *.mst

```
cat transform.txt
Changes vs default the transform file *.mst

Personalization Options
Suppress Eula

Installation Options
acivated - Make Reader the default PDF viewer
IF REBOOT REQUIRED - suppress reboot


Shortcuts
deactivated - Destination Computer/Desktop/Adobe Reader (Icon)


Online and Acrobat.com Features
Online Features
activated - Disable product updates
Enable & Ask before Installing - Load trusted root certificates from Adobe

Online Services and Features
disable product updates
Load trusted root certificates from Adobe disable
DISABLE all Services
```

adobereader.mst

The Adobe Reader package uses a default transform build with the Adobe Customization Wizard. Own mst-files can be placed in the share `opsi_depot` in `/var/lib/opsi/depot/adobe.reader.dc.continuous/custom` During the installation via `opsi-package-manager -i <adobe.reader.dc.continuous>` the directory custom will preserved by the preinst/postinst-scripts and the names of any mst-file in the custom-directory will be appear as a possible property entry.

Caution

opsi WAN/VPN extension: The synchronization process is based on the file `<product-id>.files`. So any change in the `custom` share requires new installation of the package via `opsi-package-manager`.

client_language

The adobe.reader.dc.classic-package contains Adobe Acrobat Document Cloud Classic (MUI-Version) "auto" tries to install the correct language. values: ["auto", "de", "en", "fr"] default: ["auto"]

noreboot

description: noreboot=true: Don't Reboot. Warning will be logged if a reboot is required. values: ["false", "true"] default: ["false"]

Adobe Flashplayer : flashplayer

flashplayer	24.0.0.194-1	Adobe Flashplayer

The flashplayer-package contains Adobe Flashplayer standard or the Extended Support Release

flashplayer-version
Flashplayer standard as default; Version esr (Extended Support Release http://blogs.adobe.com/flashplayer/-2014/03/upcoming-changes-to-flash-players-extended-support-release.html)

values: esr, standard default: standard

mms.cfg
The configuration file mms.cfg

will be created during "setup" and patched according the properties below.

Since Version 13.0.0.250-2 one can use custom `mms.cfg` files in the share `opsi_depot` in `/var/lib/opsi/depot/flashplayer/custom`

During the installation via `opsi-package-manager -i <flashplayer>` the directory custom will be preserved by the preinst/postinst-scripts and the names of any mms.cfg-file in the custom-directory will be appear as a possible property entry.

Caution
opsi WAN/VPN extension: The synchronization process is based on the file `<product-id>.files`. So any change in the `custom` share requires new installation of the package via `opsi-package-manager`.

mms.cfg
`/var/lib/opsi/depot/flashplayer/custom` custom mms.cfg-files.

Only the property autoupdatedisable will be populated if custom `mms.cfg` are used

Adobe Flashplayer Admin Guide:

```
flash_player_11_1_admin_guide.pdf (flash_player_admin_guide.pdf)

####################################
Chapter 4: Administration

You can create and place files on the end user's machine to manage
features related to security, privacy, use of disk
space, etc.

Privacy and security settings (mms.cfg)

As a network administrator, you can install Flash Player across the
environment while enforcing some common global
security and privacy settings (supported with installation-time
configuration choices). To do this, you need install a file
named mms.cfg on each client machine.

The mms.cfg file is a text file. When Flash Player starts, it reads its
settings from this file, and uses them to manage
functionality as described in the following sections.

mms.cfg file location

Assuming a default Windows installation, Flash Player looks for the
mms.cfg file in the following system directories:

32-bit Windows - %WINDIR%\System32\Macromed\Flash

64-bit Windows - %WINDIR%\SysWow64\Macromed\Flash

Note: The %WINDIR% location represents the Windows system directory,
such as C:\WINDOWS.
```

assetcachesize
description: hard limit, in MB, on the amount of local storage that Flash Player uses for the storage of common Flash components values: ["20"] default: ["20"]

autoupdatedisable
description: Lets you prevent Flash Player from automatically checking for and installing updated versions. values: ["0", "1"] default: ["1"]

autoupdateinterval
description: (without meaning if AutoUpdateDisable=1) how often to check for an updated version of Flash Player

avhardwaredisable
description: Lets you prevent SWF files from accessing webcams or microphones values: ["0", "1"] default: ["1"]

disabledevicefontenumeration
description: Lets you prevent information on installed fonts from being displayed. values: ["0", "1"] default: ["1"]

fullscreendisable
description: Lets you disable SWF files playing via a browser plug-in from being displayed in full-screen mode values: ["0", "1"] default: ["1"]

localfilereaddisable
description: Lets you prevent local SWF files from having read access to files on local hard drives values: ["0", "1"] default: ["0"]

filedownloaddisable
description: Lets you prevent the ActionScript FileReference API from performing file downloads values: ["0", "1"] default: ["0"]

fileuploaddisable
description: Lets you prevent the ActionScript FileReference API from performing file uploads values: ["0", "1"] default: ["0"]

disableproductdownload
description: Lets you prevent native code applications that are digitally signed and delivered by Adobe from being downloaded values: ["0", "1"] default: ["1"]

disablesockets
description: enable or disable the use of the Socket.connect() and XMLSocket.connect() methods values: ["0", "1"] default: ["1"]

enablesocketsto
description: Lets you create a whitelist of servers to which socket connections are allowed

enforcelocalsecurityinactivexhostapp
description: Lets you enforce local security rules for a specified application.

legacydomainmatching
description: Lets you specify whether SWF files produced for Flash Player 6 and earlier can execute an operation that has been restricted in a newer version of Flash Player values: ["0", "1"] default: ["0"]

localfilelegacyaction
description: Lets you specify how Flash Player determines whether to execute certain local SWF files that were originally produced for Flash Player 7 and earlier values: ["0", "1"] default: ["0"]

allowuserlocaltrust
description: Lets you prevent users from designating any files on local file systems values: ["0", "1"] default: ["0"]

localstoragelimit
description: Lets you specify a hard limit on the amount of local storage that Flash Player uses (per domain) for persistent shared objects. values: ["3"] default: ["3"]

overridegpuvalidation
description: Overrides validation of the requirements needed to implement GPU compositing values: ["0", "1"] default: ["0"]

rtmfpp2pdisable
description: Specifies how the NetStream constructor connects to a server when a value is specified for peerID, the second parameter passed to the constructor values: ["0", "1"] default: ["1"]

disablenetworkandfilesysteminhostapp
description: 1 (Acrobat.exe,Acroread.exe,WINWORD.EXE,EXCEL.EXE,POWERPNT.EXE,PPTVIEW.EXE,OUTLO
values: ["0", "1"] default: ["1"]

- **Known problems:**
  - Installation "On Demand" may fail cause running browsers.

Google Chromium for Business

```
google-chrome-for-business 56.0.2924.76-1
```

Uses the msi-installer (see Chrome for Business FAQ https://support.google.com/chrome/a/answer/188447?hl=en)

remarks:

Installing and uninstalling google-chrome.msi seems sometimes to hang.

There are several approaches working around this issue.

One customer reported a quote of 100% successful Installations on 40 installations with the following property setting:

- `install_architecture`: 32
- `reboot_on_retry`: True
- `reboot_after_uninstall`: True
- `timeout`: 240

In our internal tests we work with: * `install_architecture`: system specific * `reboot_on_retry`: True * `reboot_after_uninstall`: True * `timeout`: notimeout

autoupdate
!!! Will not work anymore!!!

https://support.google.com/chrome/a/answer/187207

ADM= use Policy based on Googles Template, 0=UpdatesDisabled, 1=UpdatesEnabled, 2=ManualUpdatesOnly, 3=AutomaticUpdatesOnly, values: ["0", "1", "2", "3", "ADM"] default: ["0"]

removeupdatehelper
default: ["true"]

install_architecture
description: which architecture (32/64 bit) has to be installed values: ["32", "64", "system specific"] default: ["system specific"]

reboot_on_retry
description: If installation fails and (timeout > 0) then reboot before retry default: False

reboot_after_uninstall
description: reboot after uninstall old version default: False

timeout
description: TimeOutSeconds msi installs values: ["240", "300", "600", "notimeout"] default: ["notimeout"]

Apache OpenOffice : ooffice

ooffice	4.1.3-1	Apache OpenOffice

The ooffice-package contains Apache OpenOffice in german.

handle_excel_xls , handle_powerpoint_ppt , handle_word_doc , remove_ooo2
remove OpenOffice.org 2 true = OpenOffice.org 2 will be removed

LibreOffice The Document Foundation : libreoffice

libreoffice	5.1.6 or 5.2.5-1	libreoffice

LibreOffice 5 international.

client_language
client_language - only for messages important, because libre office is international values: ["auto", "de", "en", "fr"]

msoregister
Open Microsoft Office documents with LibreOffice (true) values: ["false", "true"] default: ["false"]

libreoffice-version
description: *Stable* - is an Extended Support Release from LibreOffice for the conservative user - default version (5.1.6); *Experimental* is a version for the experimental user from LibreOffice (5.2.5) values: ["experimental", "stable"] default: ["stable"]

hide_component
description: Hide component base by removing desktoplink and exe file values: ["base", "none"] default: ["none"]

ui_languages
description: which UI languages should be installed (comma separated), For example UI_LANGS=en_US,de,fr,hu will install English (US), German, French, and Hungarian. default: ["auto"]

install_architecture
which architecture (32/64 bit) has to be installed values: ["32", "64", "system specific"] default: ["32"]

Mozilla Firefox : firefox

firefox	60.2.2esror62.0.3-2	

The firefox-package contains Mozilla Firefox german, englisch, french and dutch.

One can place customized configuration files a) `mozilla.cfg` (see http://kb.mozillazine.org/Locking_preferences) b) XOR `policies.json` (see https://github.com/mozilla/policy-templates/blob/master/README.md)

```
/var/lib/opsi/depot/firefox/custom/
```

The entries for the property "mozillacfg" will be populated via preinst-/postinst-scripts when installing the opsi-package

- example

```
cat /var/lib/opsi/depot/firefox/custom/mozilla.cfg
//
lockPref("browser.startup.homepage", "http://www.uib.de");
lockPref("network.proxy.type", 1);
lockPref("network.proxy.http", "router.uib.local");
lockPref("network.proxy.http_port", 3128);
```

Instead of a `mozilla.cfg` one can provide an autoconfig.zip build with the CCK2 and populate via Property "mozillacfg".

Caution
opsi WAN/VPN extension: The synchronization process is based on the file `<product-id>.files`. So any change in the `custom` share requires new installation of the package via `opsi-package-manager`.

client_language
values: ["auto", "de", "en", "fr", "nl"] default: ["auto"]

firefox-version
Firefox *esr* - is the Extended Support Release from Mozilla.org (60.2.2esr); (62.0.3) is the Mozilla.org standard version values: ["esr", "esr", "standard"] default: ["esr"]

pref_file
(user/prefs)= use user.js or prefs.js. values: ["prefs", "user"] default: ["prefs"]

noautoupdate
(on/off): disable auto update. default=on

setproxy
(off/direct/manual/file) proxy settings

- off= do nothing
- direct = direct
- manual = use proxy settings via property proxysetting (<ip-numme>:<port>) and property noproxy_hosts (host1,host2)
- file = use proxy settings via property proxysetting (<path_to_proxyconf.pac>) and property noproxy_hosts (host1,host2)
- system
- default=off

proxysetting
string for proxy setting (see: setproxy)

noproxy_hosts
comma separated list of hosts

mozillacfg
description: filename for mozilla.cfg in `%scriptpath%\custom`-directory, http://kb.mozillazine.org/-Locking_preferences

profilemigrator
enable or disable Profilemigrator on first run values: ["off", "on"] default: ["off"]

- **Known problems:**
  - Installation "On Demand" may fail cause running browsers.

Mozilla Thunderbird : thunderbird

```
thunderbird                    45.7.0-1
```

The thunderbird-package contains Mozilla Thunderbird in german, englisch and french.

Customized configurations (see http://kb.mozillazine.org/Locking_preferences) can provided analogous the firefox-Package and property "mozillacfg"

client_language
values: ["auto", "de", "en", "fr"] default: ["auto"]

thunderbird-version
45.7.0 - actual Thunderbird version values: ["45.x"] default: ["45.x"]

addonsactivation
description: Enable/Disable AddOns (default = enable) values: ["off", "on"] default: ["on"]

https://developer.mozilla.org/en/Addons/Add-on_Manager/AddonManager

http://mike.kaply.com/2012/02/09/integrating-add-ons-into-firefox/

https://developer.mozilla.org/en/Thunderbird/Deploying_Thunderbird_in_the_Enterprise/-Thunderbird_Preferences_Relevant_to_Enterprises

```
Set_Netscape_User_Pref ("extensions.autoDisableScopes", 11)
Set_Netscape_User_Pref ("extensions.shownSelectionUI", true)
```

enigmail
description: Install GnuPG-Plugin values: ["off", "on"] default: ["off"]

```
Thunderbird 17.0. Enigmail 1.5.1
```

mozillacfg
description: filename for mozilla.cfg in `%scriptpath%\custom`-directory, http://kb.mozillazine.org/-Locking_preferences

noautoupdate
description: disable automatic updates values: ["off", "on"] default: ["on"]

lightning
description: Install calender plugin lightning values: ["off", "on"] default: ["off"]

```
Thunderbird 17.0.  Lightning 1.9.1
```

- **Known problems:**
  - Installation "On Demand" may fail if thunderbird is running.

Oracle Jre : javavm

javavm	1.8.0.121-1	Oracle Java Run

The javavm-package contains Oracle Jre version 8.x (cpu and psu, if available) (see http://www.oracle.com/technetwork/java/javase/downloads/cpu-psu-explained-2331472.html)

(Oracle announced "End Of Public Updates Februar 2013" http://www.oracle.com/technetwork/java/eol-135779.html)

http://www.oracle.com/technetwork/java/javase/jre-install-137694.html

Existing "Patch-in-place" Jre-versions 1.6.x, 7.x and 8.x will be uninstalled. - Existing Oracle JRE with "Static configuration" will not be uninstalled - Earlier Oracle JRE (version 1.6.0 - version 1.6.7) will be uninstalledby default. One can change this behavior using the property "keepversion".

Starting with 8u20 the jre8 will be installed in static mode

Customized configurations deployment.properties (see http://docs.oracle.com/javase/6/docs/technotes/guides/deployment/deployment-guide/properties.html http://docs.oracle.com/javase/7/docs/technotes/guides/deployment/deployment-guide/properties.html) can be edited in

```
/var/lib/opsi/depot/javavm/custom/
```

The entries for the property "deployment.properties" will be populated via preinst-/postinst-scripts when installing the opsi-package - example

```
cat /var/lib/opsi/depot/javavm/custom/deployment.properties
//
#deployment.properties
#Tue Dec 18 12:36:01 CET 2012
deployment.javaws.autodownload=NEVER
deployment.javaws.autodownload.locked=
deployment.security.validation.ocsp=true
deployment.security.validation.ocsp.locked=
deployment.security.validation.crl=true
deployment.security.validation.crl.locked=
```

Caution
opsi WAN/VPN extension: The synchronization process is based on the file `<product-id>.files`. So any change in the `custom` share requires new installation of the package via `opsi-package-manager`.

install_architecture
description: which architecture (32/64 bit) has to be installed values: ["32 only", "64 only", "both", "system specific"] default: ["both"]

javaversion
description: which version has to be installed (JRE 8 = 1.8.x); jre8 1.8.0_121-b13 (CPU); jre8psu 1.8.0_12-b13 (CPU) values: ["jre8", "jre8psu"] default: ["jre8"]

keepversion
description: Don't uninstall jre version values: ["1.6.0_0", "1.6.0_1", "1.6.0_2", "1.6.0_3", "1.6.0_4", "1.6.0_5", " 1.6.0_6", "1.6.0_7", "none"] default: ["none"]

webjava
description: TESTING: http://java.com/en/download/help/silent_install.xml WEB_JAVA=0, if used, disables any Java application from running in the browser values: ["0", "1", "none"] default: ["none"]
CAUTION: Setting WEB_JAVA=0 results in misleading browsermessages ("missing plugin")

uninstalljava16
description: Uninstall Java 1.6 "Patch in Place" Installations default: True

uninstalljava17
description: Uninstall Java 1.7 "Patch in Place" Installations default: True

deployment.properties
description: filename for deployment.properties in %scriptpath%\custom-directory, http://docs.oracle.com/javase/7/docs/technotes/guides/deployment/deployment-guide/properties.html saved by pre- postinstscript

startmenuentry
Create Entry for java in common startmenu aboutJava,CheckForUpdates,ConfigureJava,GetHelp,VisitJava.com default: False

timeout
TimeOutSeconds msi installs values: ["180", "240", "300", "notimeout"] default: ["300"]

copy.java.exe.to.system32
Copy java.exe,javaw.exe, javaws.exe to system32 default: False

environment_set_java_home
Set the environment variable JAVA_HOME default: False

- **Known problems:**
  - Installation "On Demand" may fail due to running browsers.

9 opsi Extensions

9.1 Activation of non free modules

opsi is open source, nevertheless there are some components which are at the moment not free but in their cofunding periods. That is they are developped and maintained in a project which has to come up for its costs.

At this time (December 2016), this refers to the the following components :

- the MySQL backend for configuration data (see Section 5.6.2)
- UEFI Support (see Section 9.6)
- the opsi license management module (see Section 9.9)
- support for clients accessed in a WAN/VPN connection (see Section 9.10)
- opsi WIM Capture (see Section 9.4)
- opsi Local Image (see Section 9.7) and opsi-vhd-reset (see Section 9.8)
- opsi Linux Agent (see Section 9.5)
- opsi Nagios Connector (see Section 9.11)
- the user roles functionality (see Section 4.16.1)
- the scalability1 extension to increase performance for very large installations

For additional information please have a look at our website: opsi cofunding projects

As long as the components are in their cofunding state they are only allowed to be used for evaluation purposes or based on paying the cofunding fee.

To verify the use of these components as long as they are not free the opsi files include an activation file `/etc/opsi/modules`. It is just a plain text file with the data which module is activated for how many clients, protected via a digital signature. MIssing entries in the file are supplemented with the default values If the activation file doesn't exist at all only the *free* parts of opsi will work.

If you need a temporary valid activation file to evaluate extensions please contact info@uib.de. If you become a co-funder, you will get an activation file for permanent and regular use.

When you got an activation file, put it with *root* privileges into the directory `/etc/opsi` (and rename it to `modules` if yet necessary). If this is done, execute:

```
opsi-setup --set-rights /etc/opsi
```

and restart the *opsiconfd*.

You may then check your activation state with one of the following methods:

Using the *opsi-configed* choose the menu entry *Help/opsi-Module* which shows a window with the activation state.

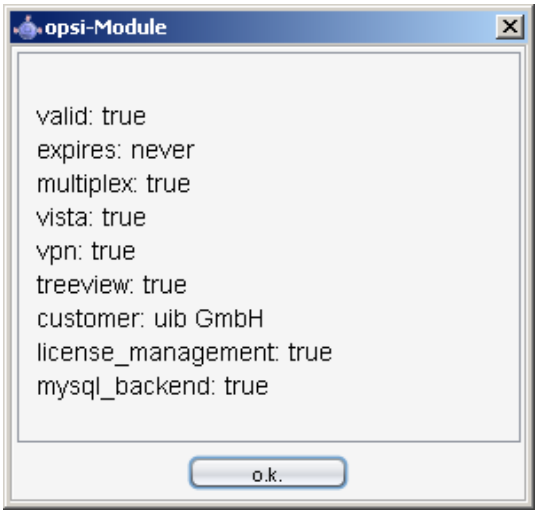


Figure 78: Display of activation state in opsi-configed

At the command line you may use the command *opsi-admin* with the method `backend_info`. (Remark: Never give your activation file or the output of this command to third people without removing its signature entry).

```
opsi-admin -d method backend_info
{
"opsiVersion" : "3.99.0.0",
"modules" :
{
"customer" : "uib GmbH",
"vista" : true,
"vpn" : true,
"license_management" : true,
"expires" : "never",
"valid" : true,
"multiplex" : true,
"signature" : "THIS-IS-NO-VALID-SIGNATURE",
"treeview" : true,
"mysql_backend" : true
}
}
```

9.2 User roles (via opsi-configed)

The feature *user roles* must be activated in the *modules* file. The functioning is explained in Section 4.16.1

9.3 *opsi directory connector*

9.3.1 Introduction

The opsi directory connector is a tool to transfer data from a directory service to an opsi installation. This avoids the need of maintaining data in two separate systems.

9.3.2 Prerequisites for the opsi extension *opsi directory connector*

This module is currently a co-funded opsi extension.
Some preconditions are required, in order to use this module. That means that you need a suitable modules file to unlock this extension. You can get this file by purchasing the extension module. For evaluation purposes you can get a temporary modules file without charge. (→ mail us at info@uib.de).

General Requirements

The source directory service must implement the LDAP protocol. Samba 4 or Active Directory are examples for directory services that support the LDAP protocol.

The target opsi server should run at least opsi 4.0.7. Prior versions may work but have not been tested.

The machine running the connector must have access to the ones running the directory and opsi over the network.

It is possible to have everything running on the same server but this manual will assume that different machines are used.

Hardware Requirements

These requirements are intended for a basic use in a small-sized environment with up to 500 clients. The requirements may change running the connector in larger environments so please be aware that adjustments may be necessary.

- 256 MB of free RAM
- Network connection

Software Requirements

The installation and operation is only supported on Linux. Support for Windows is not planned.

The connector uses Python 3 which has to be available in at least version 3.2.

The connector uses standardized protocols and therefore does not require any further opsi- or directory-components to be installed.

9.3.3 Installation

To install the connector please add the opsi repository as described in the *Getting Started* document.

Then use your operating system's package manager to install the package `opsi-directory-connector`.

On an Debian-based machine installation can be done like this:

```
apt-get install opsi-directory-connector
```

Note
CentOS and RedHat version 6 and 7 do not have Python 3 as part of their core repositories. Therefore we currently can not support installation on these operating systems.

9.3.4 Configuration

The connector features a variety of settings to fit into different environments.

The configuration is made in a JSON-formatted file and must contain valid JSON! To specify any boolean value please use `true` or `false`. Text has to be entered in double quotes like `"this is text"`.

An example configuration will be provided at `/etc/opsi/opsidirectoryconnector.example.conf`. This file can be used as a template for your own configurations.

```
cp /etc/opsi/opsidirectoryconnector.example.conf /etc/opsi/opsidirectoryconnector-custom.conf
```

Directory settings

These are the settings required to access the directory and limit the search scopes to specific areas and entries.

```
{
    "directory": {
        "address": "ldap://192.168.12.34",
        "user": "DOMAIN\\opsiconnector",
        "password": "insertpasswordhere",
        "passwordFile": "",
        "search_base": "dc=testcompy,dc=local",
        "search_query_computers": "(objectClass=computer) ",
        "search_query_groups": "(objectClass=organizationalUnit)",
        "connection_options": {
            "start_tls": true,
            "paged_search_limit": 768
        }
    },
    ...
}
```

Under `address` you specify the directory-server. `user` and `password` are required for authentication at the directory. If `passwordFile` is set the value will be interpreted as path to a file that contains the password. The content of the file will be used as password. This allows for not having the password written in plaintext in the file. This will override the value set for `password` if the file can be read.

Tip
We recommend using a dedicated user account.

Note
Depending on the used directory software and it's configuration the format for the username can be different.
Besides *Down-Level Logon Name* in the format of `DOMAIN\\username` it is possible that the format uses *User Principal Name* with the format of `user@domain` or a *Distinguished Name* (DN) like `uid=opsiconnect,cn=users,dc=test,dc=intranet`.

With `search_base` you specify the location from where on the connector looks for matching entries. Through `search_query_computers` and `search_query_groups` the conditions for finding entries can be configured. Either `search_query_computers` or `search_query_groups` or both need to be configured. To disable one of these set them to `""`. The search for groups will be implemented in a future version. Until then the setting has no effect.

The parameter `connection_options` contains additional options to configure the connection. With `start_tls` it is possible the control if a secure connection should be used.

Note
Additional connection options will be implemented on demand.

If the optional parameter `paged_search_limit` is present and it's value is an integer multiple queries are made to the directory in order to read it's elements. How many elements a response contains is limited through the given value. This is supported since version 20.

Through the optional parameter `identifying_attribute` it is possible to set the attribute used for the unique identification of an client. This is possible since version 23. The default is the usage of `dn`.

Since version 14 it is possible to test the connection to the directory through the paramter `--check-directory` without connecting to the opsi server.

Configure connnection for UCS

For a connection to Univention Corporate Server a full *Distinguished Name* hast do be used as username. This has the form `uid=<username>,cn=users,dc=company,dc=mydomain`.

On UCS LDAP is reachable through ports 7389 (unsecured) resp. 7636 (secured via SSL). If Samba is installed on the Server and used as AD-compatible domain controller then it is listening on ports 389 (unsecured) resp. 636 (secured via SSL). To make use of the secured ports set the connection option `start_tls` to `true`.

The different connections also change the DN used for authentication. LDAP uses `uid=...` where are Samba works with `dn=...`.

Usually clients are found in the container `computers`. The following command shows a matching value for `search_base`:

```
echo "cn=computers,$(ucr get ldap/base)"
```

To search for Windows clients you can set `search_query_computers` to `(objectClass=univentionWindows)`.

How you can create a user with read only access is described in the Univetion wiki: Cool Solution - LDAP search user

Behaviour settings

These settings defines the behaviour of the connector.

```
{
    ...
    "behaviour": {
        "write_changes_to_opsi": true,
        "root_dir_in_opsi": "clientdirectory",
        "update_existing_clients": true,
        "prefer_location_from_directory": true
    },
    ...
}
```

If `write_changes_to_opsi` is set to `false` no data will be written to opsi. This can be used to check settings before applying them.

Via `root_dir_in_opsi` you define what group should be used as the root in opsi. You need to make sure that this group exists.

Note
The group *clientdirectory* is shown as *DIRECTORY* in configed. If clients or groups are to appear directly below *DIRECTORY* the value for `root_dir_in_opsi` has to be `clientdirectory`.

If `update_existing_clients` is set to `false` clients already existing in opsi will not be altered. If this is set to `true` clients may have any manually set data overridden with the values from the directory.

If `prefer_location_from_directory` is set to `true` clients will be moved in opsi to the same location they have in the directory. If you want to disable this set it to `false`.

Attribute-Mappings

With a system as flexible as a directory service the connector must be given information about what attributes in the directory match these of the corresponding opsi objects.

```
{
    ...
    "mapping": {
        "client": {
            "id": "name",
            "description": "description",
            "notes": "",
            "hardwareAddress": "",
            "ipAddress": "",
            "inventoryNumber": "",
            "oneTimePassword": ""
        },
        "group": {
            "id": "name",
            "description": "description",
            "notes": ""
        }
    },
    ...
}
```

There is a mapping for clients and one for groups.

The key of each mapping is the attribute in opsi and the value is the attribute from the directory. If the value (in the mapping) is empty no mapping will be done.

Note
If the value read from the directory for the client ID does not seem to be an FQDN an FQDN will be created. The domain part for this will be created from the DC of the read element.

Tip
On UCS the value for `hardwareAddress` can be set to `macAddress` if the connection is made through LDAP (ports 7389 or 7636).

Manual assignment of group names

Group names are usually used without any major adjustments. But this may lead to cases where names should be used that are invalid in opsi.

For this special cases a manual assignment of group names can be helpful.

To configure this an entry `group_name` has to be created in `mapping`. This holds the mapping from the directory to opsi. Names that are not present in this mapping aren't changed. The group names are always processed in lowercase. This can be configured since version 23.

The following example handles the group `_server` originating from the directory as `server` in opsi.

```
{
    ...
    "mapping": {
        ...
        "group": {
        ...
        },
    "group_name" {
        "_server": "server"
    }
    },
    ...
}
```

Warning
Please be careful with this feature as it may introduce undesired side effects. It should only be used for special cases!

opsi connection settings

This specifies how the connector accesses opsi.

```
{
    ...
    "opsi": {
        "address": "https://localhost:4447",
        "username": "syncuser",
        "password": "secret",
        "exit_on_error": false
        "passwordFile": "",
        "connection_options": {
            "verify_certificate": true
        }
    }
}
```

Set `address` to the address of your opsi server. Please include the port.

Note
To use a proxy for the connection use the environment variable *HTTPS_PROXY*.

`username` and `password` should be set accordingly to authenticate at the opsi server. If `passwordFile` is set the value will be interpreted as path to a file that contains the password. The content of the file will be used as password. This allows for not having the password written in plaintext in the file. This will override the value set for `password` if the file can be read.

Tip
We recommended setting up a dedicated user for this task. Refer to the document *Getting Started* on how to do this.

If the parameter `exit_on_error` is `true` then any problem that appears when updating data in opsi opsi - this could be triggered by submitting values that are invalid in opsi - results in a break. If this is `false` then problems will be logged but the run will not be stopped.

With `connection_options` the options for connecting to opsi can be set. `verify_certificate` configures the verification of the server certificate. For selfsigned certificates this can be set to `false`.

Since version 14 it is possible to test the connection to the opsi server through the paramter `--check-opsi` without connecting to the directory.

9.3.5 Running the connector

After installation a binary called `opsidirectoryconnector` will be present on the system.

It is required to pass an argument `--config` together with the path to the configuration.

```
opsidirectoryconnector --config /etc/opsi/opsidirectoryconnector-custom.conf
```

Note
The user running the binary does not require any access to opsi as this is all specified in the configuration.

Example: recurring runs with systemd

The connector currently does one synchronisation run when executed but the chances are good that you want to have a constant synchronisation of data.

It is easy to automate the execution of the connector to have recurring runs.

We will use systemd for this. In contrast to cronjobs systemd will avoid overlapping runs and is therefore a good choice.

The following example will set up the connector so that it is run five minutes after the machine was booted and from then on every hour.

In the directory `/etc/systemd/system/`, this is the directory for user-defined units, you need to place the two following files. One for the timer that makes the job recurring and one for the job itself.

Please put this inside `opsi-directory-connector.timer`:

```
[Unit]
Description=Start the opsi-directory-connector in regular intervals

[Timer]
OnBootSec=5min
OnUnitActiveSec=1hour

[Install]
WantedBy=timers.target
```

And this is the content of `opsi-directory-connector.service`:

```
[Unit]
Description=Sync clients from AD to opsi.
Wants=network.target

[Service]
Type=oneshot
ExecStart=/usr/bin/opsidirectoryconnector --config /etc/opsi/opsidirectoryconnector-custom.conf
```

To enable the timer and start it right away use the following commands:

```
systemctl enable opsi-directory-connector.timer
systemctl start opsi-directory-connector.timer
```

If the timer does not get started it will be first run after the next reboot of the machine.

Example: recurring runs as cronjob

It is easy to automate recurring runs through a cronjob.

Please be aware that overlapping runs may happen with cron and therefore the interval should be higher. To avoid this problem it is recommended to use **systemd** instead of **cron**

The cronjob file can usually be edited through `crontab -e`. For an synchronisation that happens every hour there can be used the following:

```
0 * * * * /usr/bin/opsidirectoryconnector --config /etc/opsi/opsidirectoryconnector-custom.conf
```

9.4 *opsi WIM Capture*

9.4.1 Prerequisites for the opsi extension *opsi wim capture*

This module is currently a co-funded opsi extension.
Some preconditions are required, in order to use this module. That means that you need a suitable modules file to unlock this extension. You can get this file by purchasing the extension module. For evaluation purposes you can get a temporary modules file without charge. (→ mail us at info@uib.de).

Technical requirements are opsi 4.0.6 with package versions:

Table 4: required packages

opsi-package	version
opsi-linux-bootimage	>= 20160111
opsi-client-agent	>= 4.0.6.3-8
Windows Netboot >=7	>= 4.0.6.1-3
opsi-clonezilla	

Caution
For the product `opsi-wim-capture` the share `opsi_depot_rw` must have read/write permission for the *pcpatch*. Check your Samba configuration.

- Since opsi-wim-capture Version 4.1.x there is a full uefi support
- install.esd (instead of install.wim) as target format is supported since opsi-wim-capture Version 4.1.x.

9.4.2 Quick Info

For the people who are looking for a quick guide, this is the place to start. More detailed information follows below.

Pre-requirements

- Set boot priority of PXE-Boot / LAN-Boot on Computer BIOS to first priority
- Computer must be configure with the following specifications on the properties of the Netboot-Products:
  boot_partition_size=0
  preserve_winpe_partion = true
  windows_partition_label = WINDOWS
  windows_partition_size=100%

- Target product completion:
  The target product used is usually one of the provided capture products, e.g.: *win7-x64-capture*
  Winpe and Drivers directory can be created as symbolic links from the standard product.
  The install files folder must be copied because the *install.wim* must be adapted.
  In addition, Files from the `custom` directory are copied or linked, e.g.: *unattend.xml*
- The property opsi-clonezilla *imageshare = auto* (is the default, deprecated //<servername>/opsi_images)
  imagefile and *runcommand* will be replaced automatically *opsi-wim-capture*
- All software, which should be integrated in the image, must be install on the computer.
- Start of the product *opsi-wim-capture*:*
- Completion from the following properties is required:
  image_description = <Image description>
  imagename = <image name>
  target_product = win7-x64-captured
- Set *opsi-wim-capture* on *setup*

Install the computer with the new image:

- Target product (e.g. *win7-x64-captured*) adjusting the following to setup:
  Imagename= (Apply the same name from the property *opsi-wim-capture*)

9.4.3 Introduction

With NT6 (i.e. from Vista), Microsoft has introduced a new Image Format/ Container for OS Installation. Its called **Windows Imaging Format (WIM)**. A WIM Image is not exactly an image of a disk or partition, but rather an archive of files and Metadata. A WIM file can contain several images. The default installation of an NT6 operating system works like this: setup.exe unzips an image from an install.wim file, configures it, and adds some additional drivers.

This way, an installation is quicker than with NT5. But then installation of Hotfixes with NT6 takes significantly longer, so that the basic install of Windows 7 will take 30 minutes, but adding all required Hotfixes may take several hours.

With this opsi extension, it is possible to read an installed Windows OS, including installed software, Hotfixes and configurations, and save it as a WIM image. This WIM file can then be used as a source for a fresh Windows Installation.

Our product opsi-wim-capture is made exactly for this purpose. Roughly, we boot off a PE partition, so that the PE can read the system partition and save it into a WIM file.

9.4.4 Overview of the Sequence

Capturing an installed Windows image works like this:

Preparation:

- opsi - installation of a Windows OS with set property:
  preserve_winpe_partition=true
  boot_partition_size=0
  windows_partition_size=100%

run the product `opsi-wim-capture`.
All the following steps will be controlled by the product `opsi-wim-capture`:

1. via opsi-clonezilla, makes a backup of the disk (OS and winpe partition)

2. backup of the opsi metadata
3. make winpe partition bootable, create winpe script (work.cmd)
4. sysprep of the installed systems (depersonalization)
5. boot winpe, capture of OS disk, write to destination product
6. restore of the original disk (OS and winpe partition) via opsi-clonezilla

9.4.5 Sequence Details

Preparation

Installation of a Windows OS must have the property set to *true* like this *preserve_winpe_partition=true*, because the winpe partition will be needed later.

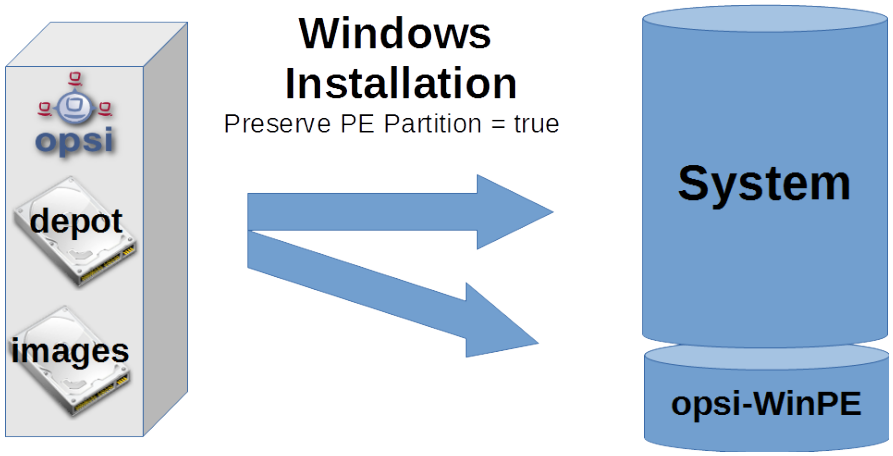


Figure 79: Schema: Deployment of Windows OS

After the Windows OS installation you can install additional Software and Hotfixes, configure the system manually or via opsi.

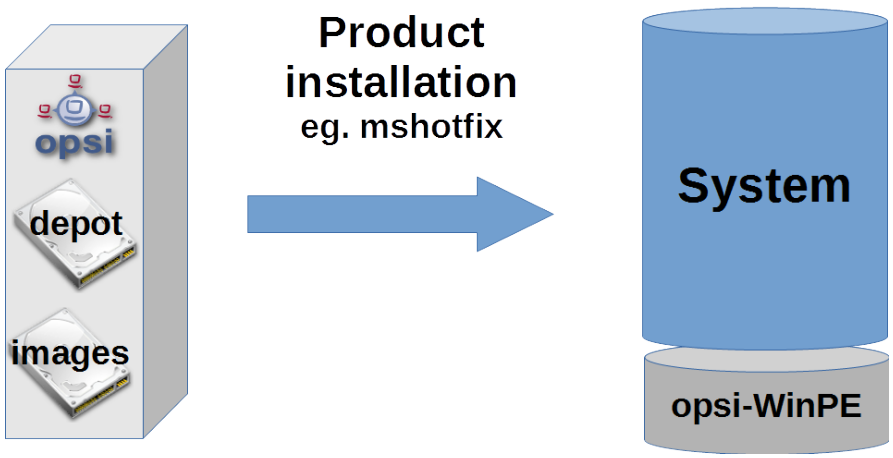


Figure 80: Schema: Installation of opsi products

opsi-wim-capture

The whole sequence will need time, at least an hour. It will work unattended, though.

In case the property `disabled` is set to *true* (default=false), the process will be canceled immediately. This switch is for development only.

The setting of the property *always_backup_before_sysprep* will be checked. If yes, it'll make a backup of the system via opsi-clonezilla.

Note

In opsi-clonezilla, the runcommand is `ocs-sr -q2 --batch -j2 -rm-win-swap-hib -i 2000 -p true savedisk imagefile sda` . Within this command, `imagefile` will be set according to the value of the property *clonezilla_imagefile* . In case its set to *auto* (default), we'll configure the value for *imagefile* automatically. This will be done with the help of property values and the client name according to the following pattern:
`<FQDN of client>_<target_product>_<imagename>`
If the value is not *auto*, the value contained will be used as *imagefile*. Furthermore, we'll set the product opsi-clonezilla to setup. In order to initiate opsi-clonezilla, reboot.
In order to avoid a never ending loop, we write a reboot flag, so that after writing the backup, we can see that this step has already been done.
Technical note: We do not want to reboot again after restoring the backup, though (but the reboot flag is contained in the backup). Thats why the reboot flag is being set as a time stamp. In case the time stamp is older than 0.1 days (i.e. 2.4 hrs), it will be ignored.

The system will reboot now, leaving the product *opsi-wim-capture* set to *setup*. opsi-clonezilla will start up and do the backup.

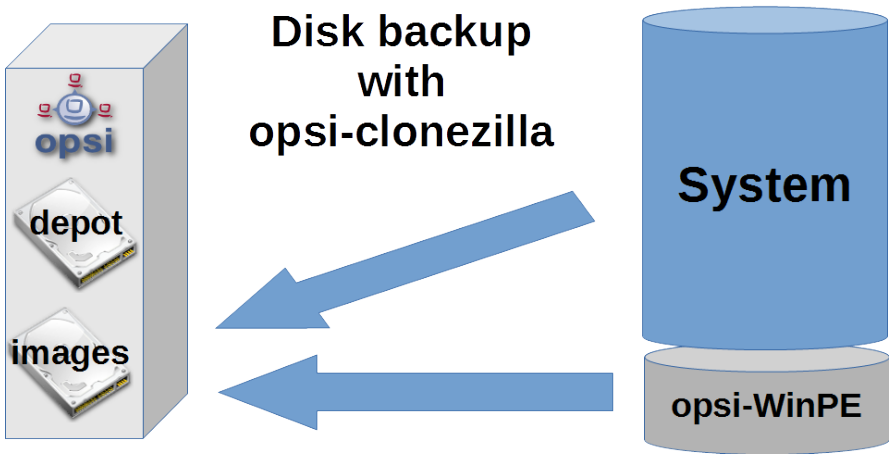


Figure 81: Schema: Backing up the disk via opsi-clonezilla

Tip

Why backup via opsi-clonezilla ?
The sysprep action to follow will leave the OS partition unusable.
An OS, that is set up from a captured WIM Image, will contain information about the sysprep run. Thus, it cannot be used for further capturing via opsi-wim-capture.
Only perform repeat capturing using a previously restored opsi-clonezilla image.

The product opsi-clonezilla is now being configured in a way that it will perform a restore on next run.

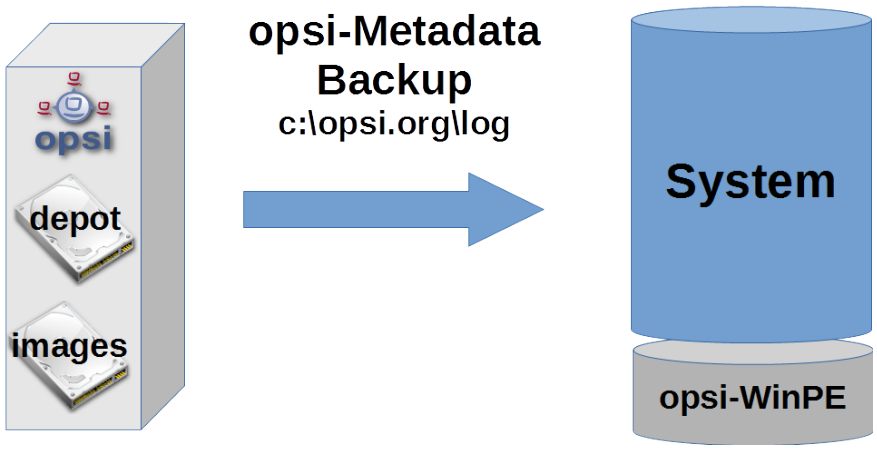


Figure 82: Schema: Saving opsi-meta-data to c:\opsi.org\tmp

Now information about the installed opsi-products (and versions) will be stored on the client.

Note
The productOnClient objects of all Localboot Products are being written to `c:\opsi.org\tmp\productonclients.json` .

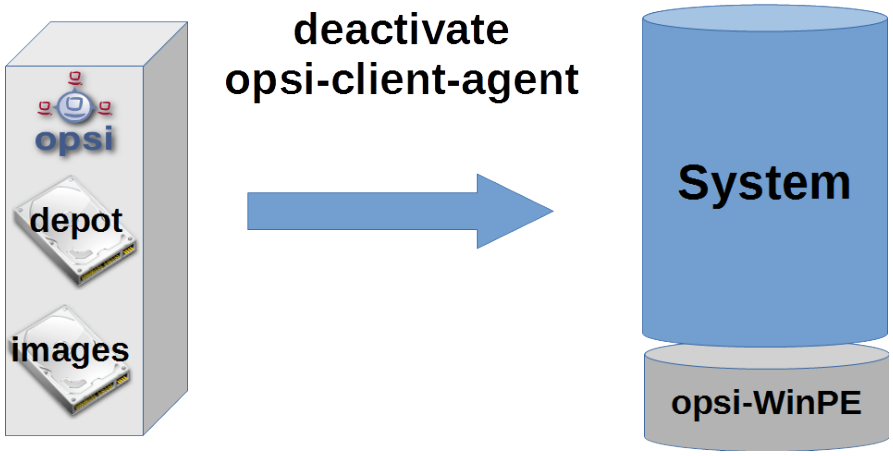


Figure 83: Schema: Deactivating the opsi-client-agent

The machine's opsi-client-agent is now being deactivated, so that it cannot run after deployment based on this image.

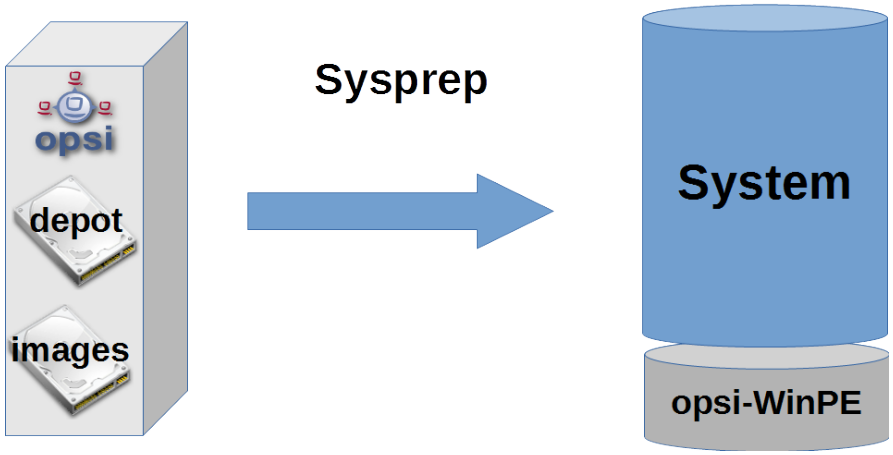


Figure 84: Schema: Depersonalization of the OS partition via *sysprep*

In order to be able to deploy the captured image like a default Windows Setup to any machine, it needs to be depersonalized. This will be done via `sysprep`.

Tip
This does not mean *all* of the software will be depersonalized. It's , that installed software *holds data* regarding on which computer it was originally installed. A config of that kind will be likely to cause problems, specially if you deploy the image to different machines. It might be a good idea not to capture all the software on the computer.

If the property `startcapture` is set to *false* (default=true), will stop working after the sysprep, and shut down the machine. This makes sense only if you plan to take an image of the machine using a different tool.

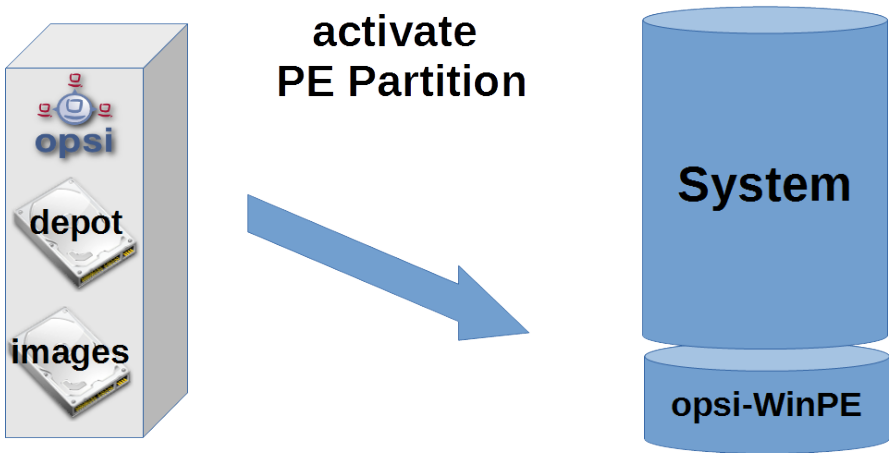


Figure 85: Schema: Activating and boot-enable the PE partition

In order to read the OS partition and writing it into the WIM file, we have to use a Windows OS, which cannot be the Windows OS we want to read (for obvious reasons). Therefore, we use the Windows PE we created and preserved at the initial installation. And afterwards:

- Activation of the WinPE as bootable partition, creation of the required boot record, (if necessary) deactivation of drive letters of other partitions

- Reading opsi metadata concerning installed products on the client, saving the data to a temporary folder on the client
- some cleaning on the system we want to capture

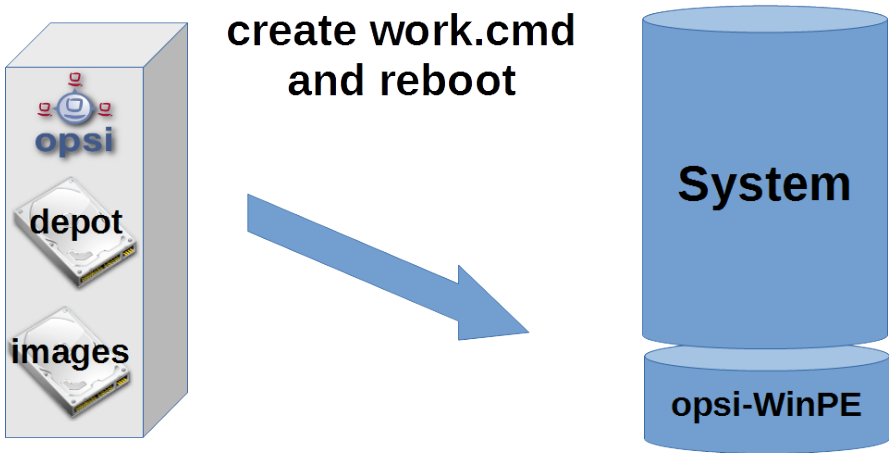


Figure 86: Schema: Creating work.cmd inside the PE

- Writing a command file, which will initiate the capturing at next WinPE boot.
- Provisioning of further data for the WinPE run, like list of products from the property `start_after_capture`
- Reboot the client

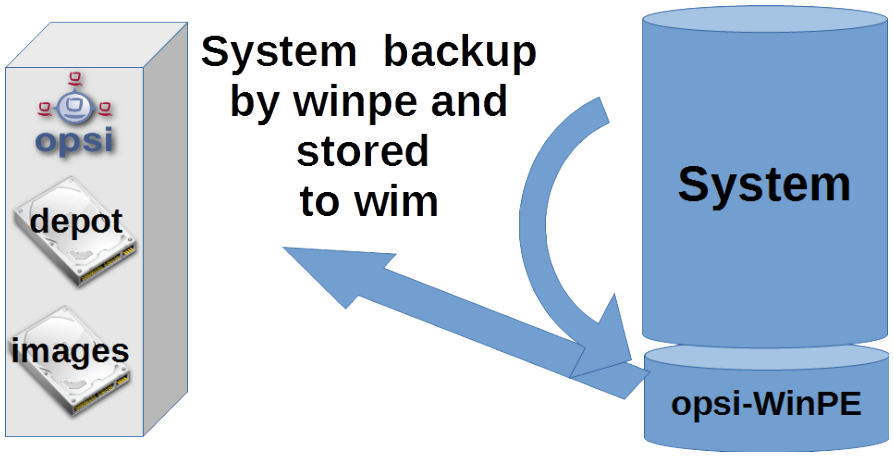


Figure 87: Schema: Capturing the OS partition when on PE

Now the WinPE starts and will do the actual capturing. Here are the details:

- Mounting the *opsi_depot_rw* share, so that we can write to it.
- Checking the architecture of the WinPE (32/64 Bit); start of the corresponding opsi-script interpreter.
- Establishing a connection to the opsi-webservice
- Re-activation of the drive letters

- If the property `check_disk_before_capture` contains the value *true* (default=false), we perform `chkdsk` on the Windows OS partition. That will take time.
- Checking for existence of the target product stated in the property `target_product` on our *opsi_depot_rw* share, and whether it contains an `install.wim` file in the right place.
- Checking and creating a lock file within the `target_product` folder. If this file exists already, we cancel the process in order to prevent several capturing processes writing to the same WIM file.
- If the property `force_imagex` is set to *true* (default=true), then we use the `imagex` command of our product *opsi-wim-capture* for capturing, even if the Windows PE has a `dism` command. Otherwise `dism` will be used, if available. `Dism` is faster, but might produce images that cannot be used for successful deployment.
- If the property `capture_mode` is set to `append`: Check, if there is an image of that name contained in the `install.wim`, and delete it.
  The value `always_create` will only be accepted, if `dism` is being used. In this case, a new `install.wim` file will be created.
- Start of the capture process. The previously mentioned tool (`imagex` vs `dism`) and the `capture_mode` chosen will be used. The name of the image is set by the property `imagename`. The property `image_description` will determine the description of the image.
  This can take a long time to be completed.

Caution
Keep in mind the name of the Image! The name of the image created can't be automatically added to the list of installable images at the current time. You have to keep the name in mind and state the image name when deploying!

- Deleting of the lock file in the `target_product` folder.
- Merging the resulting log files.
- Request action *setup* for products contained in the property `setup_after_capture`.
  At this time, also product dependencies will be resolved.
  The property is a list and can contain several product IDs.

Tip
leave settings so that opsi-clonezilla will be set to setup!
The machine will be depersonalized after the capture run, and thus remain unusable. Our product opsi-clonezilla is prepared, so that the backup taken earlier will be restored automatically.

- Deactivation of the WinPE partition, and re-activation of the OS partition (Windows).
- Transfer of the logfile to the server. It will be appended to the existing logfile of the opsi-wim-capture run.
- Reboot

If the product `opsi-clonezilla` has been set to *setup*, a restore of the disk is being performed automatically.

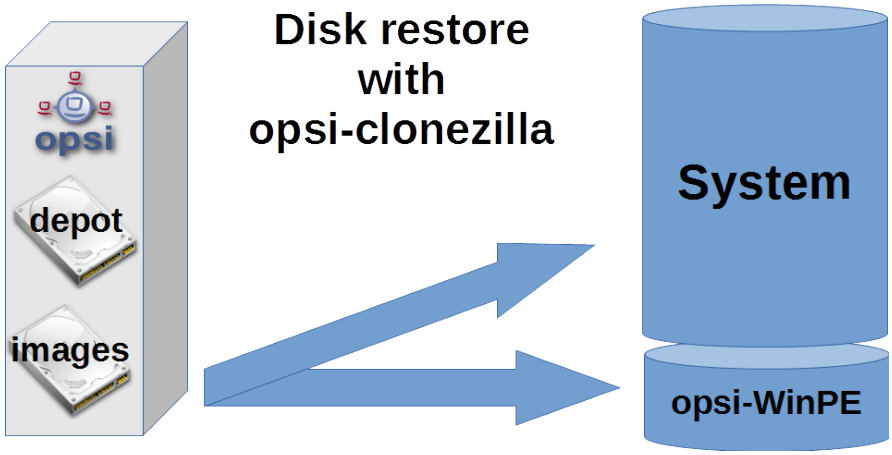


Figure 88: Schema: Restore using opsi-clonezilla

9.4.6 Products

Main Product opsi-wim-capture

The product opsi-wim-capture contains the following product properties:

- `always_backup_before_sysprep`:
  (true/false), Default=true,
  Always make an opsi-clonezilla backup before sysprep.
- `startcapture`:
  (true/false), Default=true,
  Sets the product `opsi-local-image-capture` to *setup*, and reboots the machine
- `disabled`:
  (true/false), Default=false,
  If set to true, nothing will happen. Its only there for debugging.
- `target_product`:
  Name of the target product: (Default = ")

Important
This property is not *intelligent*, i.e. we do not check, if the image being copied matches the target product. You could easily write a win7-32Bit Image into a Win81-64Bit product without errors. But you shoud not do that! Furthermore, we recommend separated products for capturing, that are only target products in the capture process. (for instance `win7-x64-captured`).

The target product has to be prepared for deployment like any other Windows OS product. The target file within the target product will be the `install.wim` file (`installfiles/sources/install.wim`), which also contains the images provided by Microsoft. Our new OS image will either be created as a new `install.wim` , or be appended to the existing file. This is being controlled by the property :

- `capture_mode`:
  (append/always_create) Default=*append*:

`append` will append the newly created image to the existing install.wim .

Important
If the install.wim contains an image that's named like the new one, it will be deleted **without warning**.
`always_create` will always create a new install.wim .
`always_create` will not work with a WinPE based on Windows < 8 .

An Install.wim file is a container, that can contain several images. All of them have a name and a description, which can be controlled by the following properties:

- `imagename`:
  Default = ”
- `image_description`:
  Default = ”
- The property `start_after_capture`
  this is a list of products that will be set to *setup* after completion of the capture process. Could be good to use for instance opsi-clonezilla, which will restore the backup taken before sysprep.
- `force_imagex`:
  true/false (default=true) This will use the `imagex` tool, even if `dism` is available.
- `opsi_depot_rw_host`:
  Normally `auto` (default) or leave empty.
  If not `auto` or empty: the host from which we mount the opsi_depot_rw share.
  If the host is given, it must be a hostname, a FQDN or a IP Number
  This property is only for situations where the `opsi_depot_rw` share is **not** reachable at the opsi depot where the client is assigned to.
- `checkdisk_before_capture`:
  Should we make a file system check on the system partition before we capture.
  Default = false.
- `verify_clonezilla_images`:
  Should Clonezilla check the images `after_save`, `before_restore`, `never`, `always`
  A verify check takes nearly the same time as the save or restore process.
  Default = `never`

Target Products

The target products shall host the captured images.

Why target products ?

The target products do not differ from default opsi Windows netboot products. Technically, a standard `win7-x64` they can be used as a target product.
We recommend the usage of dedicated target products, so that it is easy to differentiate a modified installation (opsi-wim-capture) from an unmodified installation (original Microsoft DVD).
Furthermore, it might be wise to keep a fall back product you can switch to in case the captured `install.wim` becomes unusable for some reason. This decision is for you to make.

We provide the following target products:

- `win7-x64-captured`
- `win81-x64-captured`
- `win10-x64-captured`

These products have to be equipped with required files from the OS DVDs like any other Windows netboot product (see our opsi-getting-started document).

Still, folders like `winpe` or `drivers/drivers/additional/byAudit` can be symbolic links to a directory in a suitable non-target product. Watch out: the Subfolder `installfiles` needs to be physically there (copy from Windows DVD).

9.4.7 Windows Installation via Target Product

(Deployment from a captured Image)

Restore of the opsi metadata from installed Products

The Problem:

If you reinstall a Windows with opsi, e.g. `win7-x64`, then during the installation of the opsi-client-agent all the local Boot products, which in this computer were previously marked as` installed`, will automatically be set to setup and thus reinstalled later.
This can not be completely carried out exactly in the rolling of a *captured* Image.
In the image is the backup from the opsi data that was stored during the capture process. This will be discovered when you install the opsi-client-agent and re-imported into the depot server. With it the products that were installed in the *captured* Image, now are on the newly installed computer mark as `installed`. Should now all the products that are mark as `installed` set to` setup`, this would imply that all products installed already in the image will be re-installed. This is not desirable.

By the restoring from the opsi metadata of installed products there are two alternatives available now with opsi 4.0.7:

- Alternative 1:
  Restoring the metadata and retention of *setup* -Action Requests.
  Products that are mark as *installed* will **not** be set to *setup*.
  This is the default, and the behavior before opsi 4.0.7
- Alternative 2:
  Restoring the metadata. Products that are mark as *installed* will be set to *setup* except those which were contained in the restore metadata.

Alternative 1
By the deploy from a *captured* image, after the install, only the products which were already from the beginning of the OS-install set to *setup* will be automatically installed. These can be done through your intervention, or through the property *setup_after_install*. Therefore only the products which stood at `setup` before installing the operating system will be installed in this case.
This is the default, and the behavior before opsi 4.0.7

Alternative 2
Variant 2 behaves similar to what would be the case of an installation without a captured Image:
* Restore of the metadata.
* Products that are mark as *installed* are then set to *setup* except those which were contained in the restore metadata.
This behavior is only available since opsi 4.0.7 and is not the default. Option 2 is made possible by enhancements to the opsi script and is part of the opsi-client-agent of 4.0.7.
In order to be able to apply this behavior a *config* must be set on (*Host parameters*) :
The Boolean configuration entry: `clientconfig.capture.switch_installed_products_to_setup`. If the entry for this client has the value *true* then variant 2 is applied, otherwise variant 1

host parameter can have specific client events activated or deactivated. The *host parameter* can be applied using the *opsi-configed* or the *opsi-admin*.

To create the *host parameter* over the *opsi-admin* the following commands are to be executed on the'opsi-config-server':

```
opsi-admin -d method config_createBool clientconfig.capture.switch_installed_products_to_setup "capture.\
    switch_installed_products_to_setup" true
```

With that you set for **all** computers *Alternative 2*.

To create the *host parameter* over the *opsi-server* select there *Server Configuration* / *ClientConfig* / And on the right side with the right mouse button: `Add Boolean configuration entry`.

9.4.8 Helper product opsi-wim-info

The product `opsi-wim-info` is useful to gather information about the images that are stored inside a install.wim. These information is written to the logfile. Properties:

- `target_produkt`
  ProductId of the product where the install.wim file is searched.

9.4.9 Known Restrictions and Problems

The following restrictions are known as of today (13.7.2018):

- none

9.5 opsi Linux Support

9.5.1 Supported as opsi-client: Linux

(Stand / as of 26.09.2018)

Table 5: Supported Linux OS as Client in opsi 4.1 and 4.0.7 /
Unterstützte Linux-OS als Client in opsi 4.1 und 4.0.7

Distribution	OS-Installation	netboot products	client-agent	opsiclientd
Debian 9 *Stretch*	✔	debian, debian9	✔	✔
Debian 8 *Jessie*	✔	debian, debian8	✔	✔
Debian 7 *Wheezy*	⚠	debian, debian7	⚠	⚠
Debian 6 *Squeeze*	⚠			
Ubuntu Bionic 18.04 LTS	✔	ubuntu, ubuntu18-04	✔	✔
Ubuntu Xenial 16.04 LTS	✔	ubuntu, ubuntu16-04	✔	✔
Ubuntu Wily 15.10	⚠	ubuntu,ubunt15-10	⚠	✖
Ubuntu Vivid 15.04	⚠	ubuntu, ubunt15-04	⚠	✖
Ubuntu Utopic 14.10	⚠	ubuntu	⚠	✖
Ubuntu Trusty 14.04 LTS	✔	ubuntu, ubunt14-04	✔	✔
Ubuntu Precise 12.04 LTS	⚠	ubuntu	✔	✔
Ubuntu Lucid 10.04 LTS	⚠			
RHEL 7	✔	rhel70	✔	🏃
RHEL 6	⚠			
CentOS 7	✔	centos70	✔	🏃
CentOS 6	⚠			
SLES 15	🏃		🏃	🏃
SLES 12.3	🏃		🏃	🏃
SLES 12.2	✔	sles12sp2	✔	🏃

Table 5: (continued)

SLES 12.1	✔	sles12sp1	✔	✔
SLES 12	✔	sles12	✔	✔
SLES 11SP4	✔	sles11sp4	✔	🚧
SLES 11SP3	⚠	sles11sp3	⚠	✖
openSuse Leap 15.0	🚧	opensusel15	🚧	🚧
openSuse Leap 42.3	✔	opensusel42-3	✔	🚧
openSuse Leap 42.2	⚠	opensusel42-2	⚠	⚠
openSuse Leap 42.1	⚠	opensusel42-1	⚠	⚠
openSuse 13.2	⚠	opensuse13-2	⚠	⚠
openSuse 13.1 RC2	⚠			
openSUSE 12.3	⚠			
openSuse Tumbleweed	✖		✖	✖
UCS 4.3	✔	ucs43	✔	✔
UCS 4.2	✔	ucs42	🚧	🚧
UCS 4.1	⚠	ucs41	⚠	⚠
UCS 4.0	🚧		⚠	⚠
UCS 3.2	✖		✖	✖
UCS 3.0	✖		✖	✖

✔: Supported ✖: Unsupported 🚧: Under Development ⚠: Discontinued

Table 6: Linux netboot products and the used installer type in opsi 4.1 and 4.0.7 / Linux Netboot-Produkte nach Installer-Typ in opsi 4.1 und 4.0.7

Netbootproduct	Installer	State	Remark
debian	opsi	✔	squeeze - stretch
debian9	distribution	✔	
debian8	distribution	✔	
debian8	distribution	✔	
debian7	distribution	⚠	
ubuntu	opsi	✔	trusty - artful
ubuntu18-04	distribution	✔	
ubuntu16-04	distribution	✔	
ubuntu15-10	distribution	⚠	
ubuntu15-04	distribution	⚠	
ubuntu14-04	distribution	✔	

Table 6: (continued)

centos70	distribution	✔	
redhat70	distribution	✔	
sles15	distribution		
sles12sp2	distribution	✔	
sles12sp1	distribution	✔	
sles12	distribution	✔	
sles11sp4	distribution	✔	
sles11sp3	opsi	⚠	
opensusel15	distribution		
opensusel42-3	distribution	✔	
opensusel42-2	distribution	⚠	
opensusel42-1	distribution	⚠	
opensuse13-2	distribution	⚠	
opensuse13-1	opsi	⚠	
ucs43	distribution	✔	
ucs42	distribution	✔	
ucs41	distribution	⚠	

9.5.2 Preconditions for using the opsi Linux Support

Technical precondition is opsi 4.0.5 with following packet versions:

Table 7: Required packets

opsi packet	version
opsi-linux-bootimage	>= 20140805-1

The opsi support for Linux is based on a free Open Source component (the netboot products) and a co-funded component (the client-agent).

The opsi-linux-client-agent is a co-funded opsi extension module.
In order to use the opsi Linux extension module, an activation file is required, this file can be acquired by buying the extension module. To obtain a temporary activation file for evaluation, please email us at info@uib.de.
For further details on handling extension modules please refer to the opsi manual.

9.5.3 opsi-linux-client-agent: 15 Free starts

The opsi-linux-client-agent includes 15 Free starts by which the agent can be used without any activation

In detail: After the initial Install from the opsi-linux-client-agent the opsi-script can be started 15 times in service context without the need of activation.

This gives you the possibility to set a Linux computer with the corresponding opsi-products for the configuration needed. For example, after the installation of the system you could use the product `l-opsi-server` to make of the newly installed computer an opsi-server.

For a long lasting maintenance of the installed Linux computers after the 15 free starts, it is recommended the activation of the feature, in order to continue taking advantage of its benefits.

9.5.4 Deployment of the products

The Linux related Localboot and Netboot products can be loaded over the opsi-product-updater.
To that end, you have to make sure that in the `/etc/opsi/opsi-product-updater.conf` the corresponding directories are listed. The easiest way is, when you find the following section in your configurations file:

```
[repository_uib_linux]
active = true
baseUrl = http://download.uib.de
dirs = opsi4.0/products/opsi-linux
autoInstall = false
autoUpdate = true
autoSetup = false
; Set Proxy handler like: http://10.10.10.1:8080
proxy =
```

Then you can with the following command, invoke the opsi-linux products and deploy them:

```
opsi-product-updater -i -vv
```

9.5.5 Introduction

A single management tool for Windows and Linux

The objective of the opsi Linux extension module is to provide an homogenous management system for heterogenous environments. The focus is on integrating both worlds into the same management processes and tools

This means, that a Linux installation is triggered the same way as a Windows installation. The Linux opsi-client-agent is based on the same source code as the Windows client and provides (when applicable) the same opsiscript instruction sets.

Independent from Linux distribution

The opsi Linux Support is designed to be independent from any special Linux distribution.
The following distributions are supported:

- Debian
- Ubuntu
- OpenSuse / SLES (Suse Linux Enterprise Server)
- RHEL (RedHat Enterprise Linux)
- CentOS
- UCS

9.5.6 Linux netboot products v406 based on the distibution installer

With opsi v405 the installation of Linux targets has been controlled by the netboot product. The opsi v406 Linux netboot products are based on installer of the respective distribution.

This is a fundamental change of the structure and behavior of these products.
Overview of the changes:

- Like with the unattended Windows installation, the Linux installer is equipped with an answer file to configure the unattended installation.
- The installer of a distribution is not like with Windows an executable program, but is a combination of the distribution kernel and initrd implementation.
- The system installation including partitioning, LVM, and all the basic software, are performed by the installers and not by the bootimage anymore.
- For the Suse and RedHat like distributions, the installation sources have to be provided by you by introducing the DVD as an ISO-file on the depot share. This is comparable to the Windows installation, with the difference that the Windows installation files are stored in a different place and stored as the content of the DVD and not as an ISO file.
- For the Debian like distributions, the installation sources are taken from the internet. Just the netboot versions of the distribution kernel with the associated initrd are placed on the depot share. These files are small, so they are included in the opsi package.
  Since opsi 4.0.7 it is also possible to provide for some netboot products a local http repository.
- For further maintenance of the installation the opsi-linux-client-agent can be installed with the basic installation.

Description of the automated installation process:

1. The opsi-linux-bootimage boots, deletes the partition table and creates a small temporary partition.
2. The opsi-linux-bootimage fetches the initrd for the distribution and unpacks it on the temporary partition.
3. The opsi-linux-bootimage fetches the generic answer file, patches it (personalisation) and moves it to the initrd directory.
4. The opsi-linux-bootimage creates some helper scripts and configuration files (e.g. for installing the opsi-linux-client-agent) and moves them to the initrd directory.
5. The opsi-linux-bootimage packs the patched initrd directory
6. The opsi-linux-bootimage boots the distribution kernel with the patched initrd per kexec.
7. The distribution kernel with the patched initrd performs the unattended installation of the target system and finally installs the opsi-linux-client-agent.

Advantages:

- The installation is done as specified by the distributor, which is of special importance for providing support in the business context.
- The opsi integration of new releases is easier and faster available.
- For Suse and RedHat like distributions, the installation is done from the sources on the opsi-server, and therefore is faster and more stable than installing from the internet repositories.

Disadvantages:

- Currently there is no UEFI support available. The information about UEFI gets lost during kexec boot. We hope to fix this with a future bootimage.

Providing the installation media on the server

For Suse and RedHat like distributions, the installation media is provided by an additional nfs-share: `opsi_nfs_share`.

To configure this share, there must be a NFS server installed and configured on the opsi-server:

Since opsi v4.0.6 stable this is done by the special package `opsi-linux-support`. This package is not installed by default and must be installed manually once, e.g.

```
apt-get install opsi-linux-support
```

If a firewall is running on your system you need to configure it to accept TCP connections at port 80. Please consult the appropriate manual on how to do this.

The `opsi-linux-support` package performs the following tasks:

- Installation of the applicable nfs-server package on the opsi-server. For Debian, Ubuntu, Suse this is the package: nfs-kernel-server. For Centos, Redhat it is the package nfs-utils.
- The share `opsi_nfs_share` is created and exported:
  - Create directory:
    `mkdir -p /var/lib/opsi/depot/opsi_nfs_share`
  - Add the share entry to /etc/exports:
    `/var/lib/opsi/depot/opsi_nfs_share *(ro,no_root_squash,insecure,async,subtree_check)`
  - Activate the export:
    `exportfs -r`
  - Check the successful export:
    `showmount -e localhost`
    The output should be:
    `Export list for localhost:  + /var/lib/opsi/depot/opsi_nfs_share *`
- The share `opsi_nfs_share` has the following directory structure:
  `opsi_nfs_share/<productId>/<arch>/<dvd>.iso`
  example:
  `opsi_nfs_share/opensuse13-2/64/openSUSE-13.2-DVD-x86_64.iso`
  The installation file must have an extension `.iso`, the name of the file does not matter. If there are several `.iso` files in the same directory, it is not specified which one to use.
- Copy the installation DVD to the `opsi_nfs_share` and execute:
  `opsi-set-rights /var/lib/opsi/depot/opsi_nfs_share`
  IMPORTANT: use the standard installation DVDs of the distribution. Modified installation DVDs might have a different structure and therefore cannot be used in this context.
- If for any reasons the directory `/var/lib/opsi/depot/opsi_nfs_share` cannot be exported by the opsi-server per NFS (for instance because the depot share is already a NAS NFS share), so the NFS share to be used can be specified by a server config. Like `clientconfig.opsi_nfs_share=172.16.166.1:/var/lib/opsi/depot/opsi_nfs_share`

The opsi v406 netboot products for Debian and Ubuntu do not get their installation files from an ISO file. They are provided by opsi with the standard netboot kernel and initrd. All further packages are taken from the internet. To relieve the network connection, using an apt-cache might be useful.
See chapter Section 9.5.14

See chapter Section 9.5.6

Start order of involved services for SLES 11
It may occur that the showmount command exits with an error message like the following:

```
# showmount -e localhost
clnt_create: RPC: Program not registered
```

Please make sure that after installing the NFS-server a reboot has been done. Then the services *rpcbind* and *nfsserver* need to be started in that exact order.
The services can be restarted by the following commands:

```
# service rpcbind restart
# service nfsserver restart
```

Then showmount works as expected:

```
# showmount -e localhost
Export list for localhost:
/var/lib/opsi/depot/opsi_nfs_share *
```

Common properties of the opsi v406 Linux netboot products

The following properties are available with all v406 netboot products to configure the Linux installation:

- `askbeforeinst`:
  Starting an installation has to be confirmed from the client console? (Default=*true*)
- `architecture`:
  architecture selection, which affects the selection of bootimages and the installation architecture. (Default=*64bit*)
- `language` or `locale`:
  Which language / locale is to be installed. (Default=distribution dependent / *de*)
- `console_keymap`:
  keyboard layout to be installed. (Default=distribution dependent / *de*)
- `timezone`:
  Timezone to be installed?. (Default=*Europe/Berlin*)
- `root_password`:
  root password. (Default=*linux123*)
- `user_password`:
  user password. (Default=*linux123*)
- `proxy`:
  Proxystring (if required) as: `http://<ip>:<port>`. (Default=")
- `install_opsi-client-agent`:
  Install the Linux opsi-client-agent (co-funded project: a module file is required for activation. (Default=*true*)
- ‘setup_after_install`:
  Which opsi products should be installed after the installation of the operating system (opsi products set to setup). (Default=")

The products debian7, debian8 and ubuntu14-04, ubuntu16-04

The basic OS installation files are taken from the internet.

This product has the productive state.

This product has the following additional properties:

- `online_repository`:
  distribution repository for the installation. (only for the Debian/Ubuntu family) (Default=distribution dependent)
- `encrypt_password`:
  Password for disk encryption (only if encrypt_logical_volumes=true)
  Example: `linux123` Default: `linux123`
- `partition_disk`:
  Disk to use.: `first` or complete device path Examples: "first", "/dev/sda", "/dev/sdb"
  Default: `first`
- `partition_method`:
  The method use for partitioning of the disk:
  `regular`: use the usual partition types for your architecture / `lvm`: use LVM to partition the disk / `crypto`: use LVM within an encrypted partition Possible: "regular", "lvm", "crypto"
  Default: `lvm`
- `partition_recipe`:
  The kind of partitions that will be used:
  `atomic`: all files in one partition / `home`: separate /home partition / `multi`: separate /home, /usr, /var, and /tmp partitions Possible: "atomic", "home", "multi"
  Default: `atomic`
- `desktop_package`:
  Desktop package to install (standard = no desktop) Possible: "standard", "ubuntu-desktop", "kubuntu-desktop", "lubuntu-desktop", "xubuntu-desktop", "ubuntu-gnome-desktop"
  Default: `standard`
- `language_packs`:
  Possible: "ar", "bg", "by", "cf", "de", "dk", "en", "es", "et", "fa", "fi", "fr", "gr", "il", "it", "kg", "kk", "lt", "mk", "nl", "no", "pl", "ro", "ru", "sg","sr", "ua", "uk", "us", "wo"
  Default: `de`

Videos (time lapse)

- http://download.uib.de/press-infos/videos/opsi-linux/debian7_406_1fps.mp4
- http://download.uib.de/press-infos/videos/opsi-linux/debian8_406_1fps.mp4
- http://download.uib.de/press-infos/videos/opsi-linux/ubuntu14-04_406_1fps.mp4

The product ucs41 and ucs42

The basic OS installation files are taken from the the official UCS repositories.

This product has a productive state. With this product one can install a master, slave, backup and even a memberserver. It is recommended to use the l-opsi-server localboot product to make an opsi server out of the UCS machine. Memberserver are supported when an opsi server is installed through l-opsi-server. This localboot products makes special adjustments to the server, so it can deploy clients like other UCS roles.

This product has the same properties as described above for `debianX` or `ubuntuX` and the following additional ucs specific properties:

- `dns_domain`:
  The DNS domain name: Example: `example.com` Default: `ucs.test`
- `ldap_base`:
  The ldap base. Example: `dc=example,dc=com` Default: `dc=ucs,dc=test`

- `ucs_code_name`:
  The code name of the ucs version that is provided in the repository.
  Example: `ucs414` Default: `ucs414`
- `organisation`:
  The name of the organisation that will be used for the ucs installation.
  Example: `uib gmbh` Default: `uib gmbh`
- `windomain`:
  The name of the Samba/Windows domain.
  Example: `MYDOMAIN` Default: `MYDOMAIN`
- `external_nameserver`:
  Which nameserver is included to the ucs installation ?
  Example: `10.11.12.13` Default: `auto` = the name server given by dhcp
- `ucs_master_ip`:
  What is the IP Number of the UCS Domain Controller (needed for other roles to join) ?
  Example: `10.10.10.10` Default: `10.10.10.10`
- `ucs_master_admin_password`:
  What is the password of the user Administrator of the UCS Domain Controller (needed for other roles to join) ?
  Example: `linux123` Default: `linux123`
- `ucs_role`:
  Which UCS role should be installed ?
  Possible: "domaincontroller_master", "domaincontroller_backup", "domaincontroller_slave", "memberserver", "base"
  Default: `domaincontroller_master`

Setting up a local deb http repository

With debian8, ubuntu 16-04 and ucs41 package it is now possible to install from a local Apache2 repository.
To do that on Product as property " you must introduce the Address based on this example `http://<opsi-server>/opsi/<productId>` e.G `http://opsiserver/opsi/debian8`
Furthermore, the local repository must be of course created.
To do this please make sure that the product `opsi-linux-support` is installed on your opsi-server. This package installs the required packages for each Distribution(apache2) and also creates the necessary folders. These must be then completed with the corresponding Distribution repository.
To that end there are two possibilities:

1. Simple: You download a built and tested Repository from us and unpack it
2. Elaborate: You build it yourself

Simple:
Execute the following command as *root*.
Note that the path to the Apache2 `DocumentRoot` has different defaults which are dependent to each distribution.
Therefore, you may need to use the second line of the script !

debian8

```
#! /bin/bash
DOCUMENTROOT=/var/www/html
URL=http://download.uib.de/opsi4.0/products/opsi-linux
FILE=debian8.tgz
mkdir -p ${DOCUMENTROOT}/opsi
cd ${DOCUMENTROOT}/opsi
wget ${URL}/${FILE}
tar xzf ${FILE}
opsi-set-rights .
```

ubuntu16-04

```
#! /bin/bash
DOCUMENTROOT=/var/www/html
URL=http://download.uib.de/opsi4.0/products/opsi-linux
FILE=ubuntu16-04.tgz
mkdir -p ${DOCUMENTROOT}/opsi
cd ${DOCUMENTROOT}/opsi
wget ${URL}/${FILE}
tar xzf ${FILE}
opsi-set-rights .
```

ucs41

```
#! /bin/bash
DOCUMENTROOT=/var/www/html
URL=http://download.uib.de/opsi4.0/products/opsi-linux/univention-repository/
FILE=univention-repository-4.1.tgz
mkdir -p ${DOCUMENTROOT}/opsi
cd ${DOCUMENTROOT}/opsi
wget ${URL}/${FILE}
tar xzf ${FILE}
opsi-set-rights .
```

ucs42

```
#! /bin/bash
DOCUMENTROOT=/var/www/html
URL=http://download.uib.de/opsi4.0/products/opsi-linux/univention-repository/
FILE=univention-repository-4.2.tgz
mkdir -p ${DOCUMENTROOT}/opsi
cd ${DOCUMENTROOT}/opsi
wget ${URL}/${FILE}
tar xzf ${FILE}
opsi-set-rights .
```

Please take notice of the folllowing file:
http://download.uib.de/opsi4.0/products/opsi-linux/univention-repository/opsi-ucs-repository-readme.txt

Alternatively one can create an own repository from an UCS DVD.

Caution
An own repository created from an UCS 4.2-0 DVD leads to an uninstalable state. The package `depootstrap` on this DVD is not able to install the system without interaction. However our provided repository is not affected by this.

```
#! /bin/bash
set -x
BASE_DIR=/var/www/opsi
DVD_PATH=UCSISOMOUNTPOINT
UCS_VERSION=4.1
UCS_SUBVERSION=4
UCS_REPODIR=univention-repository/mirror
UCS_REPODIR2=${UCS_VERSION}/maintained/${UCS_VERSION}-${UCS_SUBVERSION}
UCS_RELEASE_PATH=dists/ucs414/main/binary-amd64/Release

cd ${BASE_DIR}
mkdir -p ${UCS_REPODIR}
cd ${UCS_REPODIR}
```

```
pwd
ln -s . univention-repository
mkdir -p ${UCS_REPODIR2}
cd ${UCS_REPODIR2}
pwd
cp -r ${DVD_PATH}/all .
cp -r ${DVD_PATH}/amd64 .
cp -r ${DVD_PATH}/dists .
mkdir -p i386
cd all
dpkg-scanpackages . /dev/null | gzip -9c > Packages.gz
dpkg-scanpackages . /dev/null > Packages.gz
cd ..
cd amd64
dpkg-scanpackages . /dev/null | gzip -9c > Packages.gz
dpkg-scanpackages . /dev/null > Packages.gz
cd ..
cd i386
dpkg-scanpackages . /dev/null | gzip -9c > Packages.gz
dpkg-scanpackages . /dev/null > Packages.gz
cd ..
echo "Archive: stable" > ${UCS_RELEASE_PATH}
echo "Origin: Univention" >> ${UCS_RELEASE_PATH}
echo "Label: Univention" >> ${UCS_RELEASE_PATH}
echo "Version: ${UCS_VERSION}.${UCS_SUBVERSION}" >> ${UCS_RELEASE_PATH}
echo "Component: main" >> ${UCS_RELEASE_PATH}
echo "Architecture: amd64" >> ${UCS_RELEASE_PATH}
cat  ${UCS_RELEASE_PATH}
cd ${BASE_DIR}
chown -R www-data:www-data univention-repository
echo "all done"
```

The products sles11sp4, sles12, sles12sp1

This product has the following additional properties:

```
name: productkey
multivalue: False
editable: True
description: email:regcode-sles for suse_register. Is only used if the
host parameter ‘license-management.use‘ is set to false . If it set to True
the license key will be get from the license management module. / La clé de licence pour l
values: ["", "myemail@example.com:xxxxxxxxxxxxx"]
default: [""]

name: suse_register
description: set to false, if you don't want to register your system online, if you set th
default: True

name: local_repositories
multivalue: True
editable: True
description: list of local repositories to use. Syntax: "repository description", example
values: [""]
default: [""]

name: install_unattended
description: If false then do interactive installation
default: True
```

Source of installation To download the installation DVD you need an account on SUSE. Installation DVD should have the name (we've made tests with files with these names): sles11sp4: SLES-11-SP4-DVD-x86_64-GM-DVD1.iso sles12: SLE-12-Server-DVD-x86_64-GM-DVD1.iso sles12sp1: SLE-12-SP1-Server-DVD-x86_64-GM-DVD1.iso Copy the ISO-File to `/var/lib/opsi/depot/opsi_nfs_share/opensusel42-1/64/` Please don't forget to execute `opsi-set-rights`.

Videos (time lapse) The following video shows an installation.
It is made with one frame per second and because of that, the installation that you see it is much more faster than a normal installation.

- http://download.uib.de/press-infos/videos/opsi-linux/sles12_406_1fps.mp4

The products redhat70 and centos70

This product has the following additional properties:

```
name: install_unattended
description: If false then do interactive installation
default: True

name: selinux_mode
multivalue: False
editable: False
description: In which mode should SELinux run ?
values: ["enforcing", "permissive", "disabled"]
default: ["permissive"]

name: partition_method
multivalue: False
editable: False
description: plain: Regular partitions with no LVM or Btrfs. / lvm: The LVM partitioning sc
values: ["plain", "lvm", "btrfs", "thinp"]
default: ["lvm"]

name: productkey
multivalue: False
editable: True
description: email:regcode for subscription_register. Is only used if the
host parameter 'license-management.use' is set to false . If it set to True
the license key will be get from the license management module. / La clé de licence pour l
values: ["", "myemail@example.com:xxxxxxxxxxxxx"]
default: [""]

name: subscription_register
description: set to false, if you don't want to register your system online, you need to s
default: True
```

Source of installation CentOS Download the installation DVD here: e.G.: http://isoredirect.centos.org/centos/7/isos/x86_64/CentOS-7-x86_64-DVD-1511.iso Copy the ISO-File to `/var/lib/opsi/depot/opsi_nfs_share/centos70/64/` Please don't forget to execute `opsi-set-rights`.

Source of installation RedHat To download the installation DVD you need an account on RedHat. Installation DVD should be named we've made tests with a file with these name:
rhel-server-7.0-x86_64-dvd.iso Copy the ISO-File to `/var/lib/opsi/depot/opsi_nfs_share/redhat70/64/` Please don't forget to execute `opsi-set-rights`.

Videos (time lapse) The following video shows an installation.
It is made with one frame per second and because of that, the installation that you see it is much more faster than a normal installation.

- http://download.uib.de/press-infos/videos/opsi-linux/centos70_406_1fps.mp4
- http://download.uib.de/press-infos/videos/opsi-linux/redhat70_406_1fps.mp4

9.5.7 Linux v405 netboot products without distribution installer

Basic OS installation per netboot

To install Linux on a client, at the beginning the standard opsi-linux-bootimage boots per netboot. It is the same image as the one used for the Windows installation.
The bootimage automatically performs the partitioning and formatting of the hard disc (/ and swap). Next the installation of the basic Linux Operating System is performed (including network and ssh, but without X11). The installation process itself is quite different for the individual distributions, but has in common, that the installation is performed directly from the original distribution packages.

The basic Linux installation can be extended with optional opsi packages, for instance to turn the system into an opsi-Server (a new depotserver for instance).
Also the opsi-client-agent for Linux can be installed, which enables the automated installation and configuration of further software packages.

The opsi-client-agent for Linux is available as a co-funded opsi extension module, the required opsi netboot products for Linux installation are available as free Open Source modules.

Because the base installation is done from the Standard opsi-linux-bootimage, there are some distribution dependent differences, that have to be installed and configured after the first reboot of the installed system. This is for example the SELinux installation of the *RedHat like* or the keyboard configuration of the *Debian like* systems. These after boot installations and patches are done by the standard localboot product `l-os-postinst`.

Common properties of the v405 Linux netboot products

The following properties for controlling the Linux installation are available with all netboot products:

- `askbeforeinst`:
  confirm start of the new installation on the client? (default=*true*)
- `architecture`:
  architecture selection - affects the selection of the bootimage and the installation architecture. (default=*64bit*)
- `system_partition_size`:
  size of the system partition - the size may be given as percent of the hard disk size or as absolute size (G=Gigabyte). If you choose another value than 100%, the remaining rest will be used as data_partition. (default=*100%*)
- `swap_partition_size`: +size of the swap partition. (default=*2000M*)
- `data_partition_create`:
  create a data partition if there is some space left. (true/false) (default=*true*)
- `data_partition_preserve`:
  preserve an existing data partition?
  always = cancel the installation in case the preservation of an existing partition with the label *data* is not possible with the given partition data.
  if_possible = an existing partition with the label *data* is preserved if possible according to the given partitioning parameters. Otherwise it will be deleted.
  never = a new partition table will be created. (default=*never*)
- `language`:
  language / locale to be installed (default=*de*)
- `console_keymap`:
  keyboard layout to be used (default = distribution dependent / *de*)

- `timezone`:
  time zone to be configured (default=*Europe/Berlin*)
- `root_password`:
  root password (default=*linux123*)
- `user_password`:
  user password (default=*linux123*)
- `install_opsi_server`:
  install opsi server packages (default=*false*)
- `online_repository`:
  repository to use for installation - repository of the Linux distribution to be used for installation (not for SLES) (default = distribution dependent)
- `opsi_online_repository`:
  repository for opsi-server installation - repository for the opsi-server packets (default = distribution dependent)
- `proxy`:
  proxystring (if required) as: `http://<ip>:<port>` (default=")
- `additional_packages`:
  additional packages to install. Packages names separated by blanks. (default=")
- `wget_and_execute`:
  fetch a file via wget and execute it - URL (http) of a file to be executed at the end of installation. (default=")
- `install_opsi-client-agent`:
  install the Linux opsi-client-agent (cofunding project: has to be activated by the /etc/opsi/modules) (default=*false*)
- `release`:
  (Debian and Ubuntu only)
  which release of the distribution is to be installed? (default = distribution dependent)
- `setup_after_install`:
  opsi product(s) to be installed after the OS installation is done (opsi products to be set to *setup*) (default=*l-os-postinst*)

Netboot products for Linux distributions

====== ubuntu

The basic installation is performed per debootstrap directly from the network.

This product has the status *productive*.

It is UEFI/GPT compatible (tested for release=trusty).

For this product applicable opsi-server packets are available, that can be installed by setting *install_opsi_server=true*.

====== debian

The basic installation is performed per debootstrap directly from the network.

This product has the status *productive*.

It is UEFI/GPT compatible (tested for release=wheezy).

For this product applicable opsi-server packets are available, that can be installed by setting *install_opsi_server=true*.

9.5.8 opsi-linux-client-agent

The opsi-client-agent for Linux is part of the cofunding project *Linux Agent*, which is liable to pay costs.

The opsi-client-agent for Windows is based on two components:

1. the service `opsiclientd`
2. the action processor `opsi-script / opsi-script-nogui`

The opsi-client-agent for Linux is based on the Linux port of the Windows client agent.

The `opsiclientd` is not ported to all supported Linux distributions. If no `opsiclientd` is available, it is substituted by a direct `opsiscriptstarter` call.
A Linux `opsiclientd` is available for:

- Debian 7 / 8
- Ubuntu 12.04 / 14.04 / 16.04
- openSuse 13.2 / 42.1
- SLES 12 / 12SP1
- UCS 4.0 / 4.1

If there is no `opsiclientd`, so it is replaced by the `opsiscriptstarter`, which performs the following `opsiclientd` tasks at system start:

- connect to the opsi-server: check whether actions are to be performed
- mount the depot share
- start the action processor
- unmount the depot share
- transfer the logfile to the server

The Linux action processor is named opsi-script and is built from the same sources as the Windows opsi-winst. So on Linux the same scripting syntax is available as on Windows. All common features, that are not Windows specific, are available, as there are e.g.:

- file handling
- string and stringlist functions
- executing external scripts and programs
- communication with the opsi-Server
- patching config files

Of course Windows specific features (like patching the Windows registry) are not available on Linux, but there are some additional Linux specific functions like e.g.:

- getLinuxDistroType
- getLinuxVersionMap

Logging of the opsi-script ist available (like with the opsi-winst on Windows).

Linux opsi-script is available as a graphical version for working with X-Windows and a noGUI version for systems without graphical user interface.

opsi-linux-client-agent: Installation: service_setup.sh

This method is the first choice for installations on a single computer. service_setup.sh can also be used for maintenance or repair of a client. For mass roll-out, see the chapter below.

1. login to the Linux client with root privileges
2. mount the shared directory on the opsi server at \\<opsiserver>\opsi_depot to any mount point
3. change to directory `opsi-linux-client-agent` at the mountpoint
4. start as this place the script `./service_setup.sh`

Caution
After the installation, the client will be restarted

opsi-linux-client-agent: Installation: opsi-deploy-client-agent

The `opsi-deploy-client-agent` script installs the opsi-client-agent directly from the opsi-server to the clients.

Requirements for the opsi-server:

- The Python 2 package **paramiko** has to be installed. It is available as `python-paramiko` on most distributions and can be installed through the corresponding package manager.

Requirements for the clients are:

- ssh access as root or as a user that has the possibility to run sudo without entering the password

The script creates the client on the server, then copies the installation files and the configuration information including the pckey to the client. After copying the necessary information, `opsi-deploy-client-agent` starts the installation on the client.

With the `opsi-deploy-client-agent` script a whole list of clients can be processed. These can include any number of clients that can be passed as the last parameter, or with the option *-f* by which the clients can be read from a file. When using a file, on each line a client must be present.

The script can work with IP addresses, host names and FQDNs. It will automatically try to recognize what kind of Address was passed.

The script can be found at */var/lib/opsi/depot/opsi-linux-client-agent*
Run the script with root privileges.
It could happen that you must first make the script executable with:
`Chmod u + x /var/lib/opsi/depot/opsi-linux-client-agent/opsi-deploy-client-agent`

```
bonifax:/var/lib/opsi/depot/opsi-linux-client-agent# ./opsi-deploy-client-agent --help
usage: opsi-deploy-client-agent [-h] [--version] [--verbose]
                                [--debug-file DEBUGFILE] [--username USERNAME]
                                [--password PASSWORD]
                                [--use-fqdn | --use-hostname | --use-ip-address]
                                [--ignore-failed-ping]
                                [--reboot | --shutdown | --start-opsiclientd]
                                [--hosts-from-file HOSTFILE]
                                [--skip-existing-clients]
                                [--threads MAXTHREADS]
                                [--keep-client-on-failure | --remove-client-on-failure]
                                [host [host ...]]

Deploy opsi client agent to the specified clients. The clients must be
```

```
accessible via SSH. The user must be allowed to use sudo non-interactive.

positional arguments:
  host                  The hosts to deploy the opsi-client-agent to.

optional arguments:
  -h, --help            show this help message and exit
  --version, -V         show program's version number and exit
  --verbose, -v         increase verbosity (can be used multiple times)
  --debug-file DEBUGFILE
                        Write debug output to given file.
  --username USERNAME, -u USERNAME
                        username for authentication (default: root). Example
                        for a domain account: -u "<DOMAIN>\\<username>"
  --password PASSWORD, -p PASSWORD
                        password for authentication
  --use-fqdn, -c        Use FQDN to connect to client.
  --use-hostname        Use hostname to connect to client.
  --use-ip-address      Use IP address to connect to client.
  --ignore-failed-ping, -x
                        try installation even if ping fails
  --reboot, -r          reboot computer after installation
  --shutdown, -s        shutdown computer after installation
  --start-opsiclientd, -o
                        start opsiclientd service after installation
  --hosts-from-file HOSTFILE, -f HOSTFILE
                        File containing list of clients (one hostname per
                        line). If there is a space followed by text after the
                        hostname this will be used as client description for
                        new clients.
  --skip-existing-clients, -S
                        skip known opsi clients
  --threads MAXTHREADS, -t MAXTHREADS
                        number of concurrent deployment threads
  --keep-client-on-failure
                        If the client was created in opsi through this script
                        it will not be removed in case of failure. (DEFAULT)
  --remove-client-on-failure
                        If the client was created in opsi through this script
                        it will be removed in case of failure.
```

opsi-linux-client-agent: Installation: Via opsi netboot product

If you install a Linux via opsi netboot product, you only have to switch the property `install_opsi-client-agent` to *true* (which is the default) in order to install the opsi-linux-client-agent.

opsi-linux-client-agent: opsiclientd configuration

The `opsiclientd` for Linux is a port of the `opsiclientd` for Windows. So it works withe similar configuration file which is located at: `/etc/opsi-client-agent/opsiclientd.conf`.

A detailed description of this file you will find at the chapter for the opsi-client-agent for Windows: Section 6.1.3

At the moment there are not all of the features and events available on Linux.
Available are:

- Start at boot time (or via explicit start of the service `opsiclientd`). At Linux is the name of this event `opsiclientd_start` (not `gui_startup`)
- `event_on_demand`
- The `event_timer` but only with the configuration: `super = default`

Not available are:

- Everything that is related to local caching (*WAN-Extension*).
- Modification of events via `preconditions`.
- The `opsiclientd notifier`
- The `event_net_connection`
- The `event_on_shutdown`
- The `event_silent_install`

opsi-linux-client-agent: installation paths

As usual on Linux, the linux-opsi-client-agent is spread to several directories:

The binaries:

`/usr/bin/opsi-script` (X11)

`/usr/bin/opsi-script-nogui` (without X11)

`/usr/bin/opsiscriptstarter` (preliminary opsiclientd replacement)

`/usr/bin/opsiclientd`

Auxiliary files:

Skin files:
`/usr/share/opsi-client-agent/opsi-script/skin` (depricated)
Since `opsi-script 4.12.0.31` / `opsi-linux-client-agent (4.1.0.9-1)`:
default : `/usr/share/opsi-script/skin`
custom : `/usr/share/opsi-script/customskin`

opsi-script Library:
`/usr/share/opsi-script/lib`

Translation files: `/usr/share/locale/<LANG>/LC_MESSAGES/opsi-script.po`

Config files:

`/etc/opsi-client-agent/opsiclientd.conf` (configuration of the opsiscriptstarter/opsiclientd)

`/etc/opsi-client-agent/opsi-script.conf` (depricated)
Since `opsi-script 4.12.0.31` / `opsi-linux-client-agent (4.1.0.9-1)`:
`/etc/opsi-script/opsi-script.conf`

Logfiles / temporary files:

`/var/log/opsi-client-agent`

`/var/log/opsi-client-agent/opsiclientd`

`/var/log/opsi-client-agent/opsi-script` (depricated)
Since `opsi-script 4.12.0.31` / `opsi-linux-client-agent (4.1.0.9-1)`:
`/var/log/opsi-script/`

9.5.9 opsi-linux-client-agent: Known Bugs

Copy a bundle of files via Files section from a smb share may fail according to the Samba version This problem was reported from some samba3 Versions but seems to be vanished in samba4.

Workaround: Instead of:

```
[Files_copy_netboot]
copy -s "%scriptPath%/installfiles/*" "$target$/installfiles/"
```

you may use:

```
[ShellInAnIcon_opsi_copy_netboot]
set -x
export PATH=/usr/local/bin:/usr/bin:/bin:/usr/local/sbin:/usr/sbin:/sbin
cd "%scriptPath%"
tar cf - installfiles | ( cd "$target$/installfiles/" ; tar xf - )
```

Script examples

For software deployment on Windows clients there can be said: the installation of software itself is as important as the subsequent configuring of the software.
On Linux most packets are available from the distribution repositories. So the installation part is less, but the configuration part stays the same. Also there are applications, that are not available from the standard repositories. In this case special repositories or installation sources have to be added to the system. The important feature is, that all installation and configuration settings can be managed and logged on the opsi-server.

Here are some example snippets for an opsi-linux-client-agent opsi-script:

- exit in case the script detects a non Linux system
- detecting the distribution type (to use `apt-get`, `zypper` or `yum`)
- detecting the Linux version
- installing a packet
- adding a repository

Example: exit in case the script detects a non Linux system:

```
[Actions]
requiredWinstVersion >= "4.11.4.1"
ScriptErrorMessages=off

DefVar $OS$

set $OS$ = GetOS

if not($OS$ = "Linux")
        LogError "Wrong OS: Product: " + $ProductId$ + "is only for Linux"
        isFatalError "Wrong OS"
endif
```

Example: detecting the distribution type:

```
[Actions]
requiredWinstVersion >= "4.11.4.1"
ScriptErrorMessages=off

DefVar $distrotype$

set $distrotype$ = getLinuxDistroType

if $distrotype$ = 'debian'
        Message "Try to get Package Lock..."
        if waitForPackageLock("60","false")
                comment "we got the package lock."
```

```
        else
                LogError "could not get Package Lock"
                isFatalError "package lock failed"
        endif
        ShellInAnIcon_Upgrade_deb
else
        LogError "Wrong Distro: This Product is for Debian/Ubuntu only"
        isFatalError "Wrong distro"
endif

if not("0" = getLastExitCode)
        Message "failed ShellInAnIcon_Upgrade"
        LogError "failed ShellInAnIcon_Upgrade"
        isFatalError "failed Upgrade"
endif


[ShellInAnIcon_Upgrade_deb]
set -x
export DEBIAN_FRONTEND=noninteractive
apt-get --yes install aptitude
apt-get update
apt-get --yes dist-upgrade
exit $?
```

Example: detecting the Linux version and installing a packet:

```
[Actions]
requiredWinstVersion >= "4.11.4.1"
ScriptErrorMessages=off

DefVar $distCodeName$
DefVar $distroName$
DefVar $distRelease$
DefVar $desktop$

DefStringList $linuxInfo$

set $linuxInfo$ = getLinuxVersionMap
set $distCodeName$ = getValue("Codename", $linuxInfo$)
set $distRelease$ = getValue("Release", $linuxInfo$)
set $distroName$  = getValue("Distributor ID", $linuxInfo$)

set $desktop$ = GetProductProperty("desktop", "kde")


if $distrotype$ = 'suse'
        if $desktop$ = "unity"
                Message " No Unity on SUSE - fallback to KDE ..."
                set $desktop$ = "kde"
        endif ; unity

        Message "Try to get Package Lock..."
        if waitForPackageLock("60","false")
                comment "we got the package lock."
        else
                LogError "could not get Package Lock"
```

```
                isFatalError "package lock failed"
        endif

        if $desktop$ = "kde"
                if ($distroName$ = 'openSUSE project')
                        ShellInAnIcon_kde_suse
                endif
                if ("SUSE LINUX" = $distroName$) and ($distRelease$ = "11")
                        ShellInAnIcon_kde_sles11
                endif
                if not("0" = getLastExitCode)
                        LogError "failed ShellInAnIcon"
                        Message "failed kde"
                        isFatalError "failed kde"
                endif
        endif ; kde
endif; suse type

[ShellInAnIcon_kde_suse]
set -x
zypper --no-gpg-checks --non-interactive install patterns-openSUSE-kde4 patterns-openSUSE-
    kde4_basis
zypper --no-gpg-checks --non-interactive install splashy-branding-openSUSE
exit $?

[ShellInAnIcon_kde_sles11]
set -x
zypper --no-gpg-checks --non-interactive install --auto-agree-with-licenses -t pattern kde
exit $?
```

Example: adding a repository:

```
[Actions]
requiredWinstVersion >= "4.11.4.1"
ScriptErrorMessages=off

DefVar $distCodeName$
DefVar $distroName$
DefVar $distRelease$
DefVar $desktop$

DefStringList $linuxInfo$

set $linuxInfo$ = getLinuxVersionMap
set $distCodeName$ = getValue("Codename", $linuxInfo$)
set $distRelease$ = getValue("Release", $linuxInfo$)
set $distroName$  = getValue("Distributor ID", $linuxInfo$)

set $desktop$ = GetProductProperty("desktop", "kde")


if $distroName$ = 'Ubuntu'

        if $desktop$ = "cinnamon"
                set $desktopPackage$ = $desktop$
                Message "Try to get Package Lock..."
                if waitForPackageLock("60","false")
```

```
                        comment "we got the package lock."
                else
                        LogError "could not get Package Lock"
                        isFatalError "package lock failed"
                endif
                ShellInAnIcon_ubuntu_cinnamon
                if not("0" = getLastExitCode)
                        Message "failed ShellInAnIcon_ubuntu_cinnamon"
                        LogError "failed ShellInAnIcon_ubuntu_cinnamon"
                        isFatalError "failed cinnamon"
                endif
        endif ; cinnamon
endif; ubuntu

[ShellInAnIcon_ubuntu_cinnamon]
set -x
export DEBIAN_FRONTEND=noninteractive
# we need to get the add-apt-repository command
apt-get --yes --force-yes install python-software-properties
# the cinnamon repository
add-apt-repository ppa:gwendal-lebihan-dev/cinnamon-stable
apt-get update
apt-get --yes install ubuntu-desktop
exit $?
```

9.5.10 Linux localboot products

Here some localboot products that are part of the standard opsi Linux support.

The product l-opsi-server

The product *l-opsi-server* serves to install on a Linux computer an opsi-server via opsi-linux-client-agent in an automated way. This can serve to install quickly a new opsi-depot-server or e.G. an opsi Test system.

Caution
Currently for a opsi-config server an other maschine can't be a opsi-linux-client and a opsi-depot-server at the same time.
To work around this limitation, you have two possibilities:
1. Using one opsi-config-server: After the installation of opsi via *l-opsi-server* and before you register this maschine as opsi-depot-server, you have to delete it as client in the configed.
2. Using two opsi-config-servers: Setup a second independent opsi-config-server, which is only used to administrate (install and mantain) your opsi-servers. So this second opsi-config-server knows the other opsi-servers only as linux-clients. Your other (first) opsi-config-server know theses other opsi-servers as depots.
In a UCS environment method 2 is recommended and the second opsi-config server must not be a UCS Server.

The product *l-opsi-server* has the following Properties:

- `opsi_online_repository`:
  (Base-) Repository for opsi-server installation.
  (Default="http://download.opensuse.org/repositories/home:/uibmz:/opsi:/opsi40")
  see also *repo_kind*

- `opsi_noproxy_online_repository`:
  (Base-) Repository for opsi-server installation (without any cache proxy).
  (Default="http://download.opensuse.org/repositories/home:/uibmz:/opsi:/opsi40")
  Should you require on `opsi_online_repository` to introduce a Proxy or deb-cacher (e.G. 'http://mydeb-cacher:9999/download.opensuse.org/repositories/home:/uibmz:/opsi:/opsi40"), than introduce the URL without Proxy. Otherwise introduce the same as `opsi_noproxy_online_repository`.

- `repo_kind`:
  Which kind of repository ["experimental", "stable", "testing"] should be installed ?. (Default=*stable*)
  With the Client OS, *opsi_online_repository* and *repo_kind* the URL will be built and the client will be added to an opsi repository.

- `backend`:
  Which backend should be installed ? (mysql needs a valid activation file). (Default=*file*)
  A modules file with the require Activations can be stored in the custom directory of the product. If a modules file is found there, then will this one used.

- `opsi_admin_user_name`:
  The name of the opsi_admin_user to create (empty= nothing created). (Default=*adminuser*)
  If a user is introduced here, it will applied, also it will be added to the group *opsiadmin*, *pcpatch*/*opsifileadmin* and become as unix and samba password the value `opsi_admin_user_password`

- `opsi_admin_user_password`:
  What is the password of the opsi_admin_user to create (empty= not allowed). (Default=*linux123*)
  see `opsi_admin_user_name`

- `setup_after_install`:
  Which opsi product(s) should we switch to setup after l-opsi-server installation is done ?. (Default="")

- `allow_reboot`:
  May the server reboot if script is finished ?. (Default=*true*)

- `install_and_configure_dhcp`:
  Should we run the dhcp server on this machine ?. (Default=*False*)
  If this property is *false* then the following properties: *netmask*, *network*, *dnsdomain*,*nameserver* and *gateway* are meaningless because they are only used for dhcp configuration.

- `myipname`:
  Set a different IP name (FQDN) (*auto*= use standard) (Default=*auto*)
  Meaningless if *install_and_configure_dhcp=false*

- `myipnumber`:
  Set a different IP number (*auto*= use standard) (Default=*auto*)
  Meaningless if *install_and_configure_dhcp=false*

- `netmask`:
  Netmask (for dhcp). (Default="255.255.0.0")
  Meaningless if *install_and_configure_dhcp=false*

- `network`:
  network address (for dhcp). (Default="192.168.0.0")
  Meaningless if *install_and_configure_dhcp=false*

- `dnsdomain`:
  DNS domain (for dhcp). (Default="uib.local")
  Meaningless if *install_and_configure_dhcp=false*

- `nameserver`:
  Primary nameserver (for dhcp). (Default="192.168.1.245")
  Meaningless if *install_and_configure_dhcp=false*

- `gateway`:
  gateway (option routers for dhcp). (Default="192.168.1.245")
  Meaningless if *install_and_configure_dhcp=false*
- `ucs_master_admin_password`:
  Only needed for opsi installation on UCS Server with other Roles than Role *Master*. (Default=*linux123*)
- `update_test`:
  Do not use: Internal Debugging. (Default=*False*)
- `ucs_master_admin_password`:
  On a UCS machine the roles Slave, Backup and Member have to be joined correctly with the Mas ter. This property takes the password to perform the join.

The product has *setup required before* dependency to the product *l-system-update*. That means when you set *l-opsi-server* on *setup* it will also automatically set *l-system-update* also on setup and installed before.

In the directory `custom` of the product `l-opsi-server` the activated file (`modules`) is stored, which is used in the Installation of the product `l-opsi-server` and will be preserved in the case of a new version of the product.

l-os-postinst

This product installs and configures those parts of the base installation, that cannot be done from the bootimage in a proper way.

This is for the different distributions:

- CentOS:
  - installation of SELinux

This product has a dependency to the product *l-system-update* which is executed before running *l-os-postinst*.
This product has a high priority, so it is executed before common products.

l-desktop

The product l-desktop installs a desktop packet on the computer.

The property `desktop` selects the desktop to be installed. Not all of the desktops are available for every distribution. For instance *Unity* is available for Ubuntu only. If the selected desktop is not available, the distribution specific default desktop will be installed. Furthermore the scope of the desktop packets differs according to the distribution and the selected desktop. It can be just the actual desktop software, or might also contain some base products like libreoffice, firefox, PDF Reader etc.

The property `desktop` can have the following values:

- Gnome
  Default for Debian, CentOS, RHEL.
  Available for all distributions.
- KDE
  Default für SLES, OpenSuse. Available for all distributions.
- Unity
  Available for Ubuntu only.
- Cinnamon
  Available for Ubuntu only.
- xfce4
  Available for Ubuntu, Debian.
- lxde
  Available for Ubuntu, Debian.

l-system-update

This product updates the system.

l-swaudit

Software inventory, based on the packet manager

l-hwaudit

Hardware inventory.
The hardware inventory currently is based on the Python implemented method as also used by the bootimage. Therefore the packet `python-opsi` from the opsi-repository of the distribution must be installed. So if there is no opsi-repository available for this distribution, the hardware inventory fails.

l-jedit

Java based editor with syntax highlighting for opsi-script. If Java is missing on the system, it will be installed automatically.

9.5.11 Inventory

To create an inventory, the data are collected on the client and sent to the server. The hardware inventory is based on the methods implemented in the bootimage.

The software inventory is based on the data from the packet management of the deployed Linux distribution.

9.5.12 UEFI / GPT support

Some of the opsi 4.0.5 Linux netboot products are UEFI/GPT compatible.

The 4.0.6 Linux netboot products are not UEFI/GPT compatible. At the moment they loose their information about the uefi environment at the kexec boot of the distribution kernel. We hope to fix this at a later point.

For details refer to the list of netboot products above or see at the UEFI chapter of the opsi-manual.

9.5.13 Roadmap

Linux support is a brand new opsi feature. Therefore not all of the planned features have been implemented yet with the first release.
Planned features to follow are:

- configurable partitioning
- logical volume management
- patching XML files
- patching hierarchical configuration files like dhcpd.conf

9.5.14 Proxy for *.deb*-packages

Instructions for installation and use of servers for local caching of debian packages:

- Ubuntu help: Apt-Cacher-Server
- How to set up Apt caching server on Ubuntu or Debian

9.6 opsi with UEFI / GPT

9.6.1 Netboot products with uefi support

(Stand / as of 25.08.2018)

Table 8: opsi-clonezilla

Netboot product	Opsi 4.0.7 / 4.1	Remark
opsi-clonezilla	✔	

Table 9: Standard Windows

Netboot product	Opsi 4.0.7 / 4.1	Remark
Server 2016	✔	
win10 64 Bit	✔	
win10 32 Bit	🚶	
Server 2012 R12	✔	
win8.1 64 Bit	✔	
win8.1 32 Bit	✖	
Server 2012	✔	
win7 64 Bit	✔	
win7 32 Bit	✖	
Server 2008 R2	✔	
winvista 32 Bit	✖	
winvista 64 Bit	⚠	
Server 2008 64 Bit	⚠	
winxp	✖	

✔: Supported ✖: Unsupported 🚶: Under Development ⚠: Discontinued

Table 10: Linux

Netboot product	Opsi 4.0.7 / 4.1	Remark
ubuntu	✔	
ubuntu18-04	✔	
ubuntu16-04	✔	since ubuntu16-04_4.0.7.2-1
ubuntu14-04	✖	
debian	✔	

Table 10: (continued)

debian9	✔	
debian8	✔	since debian8_4.0.7.2-1
debian7	🚧	
centos70	🚧	
centos65	⚠	
redhat70	🚧	
opensusel15	🚧	
opensusel42-3	✔	
opensusel42-2	⚠	
opensusel42-1	⚠	
opensuse13-2	⚠	
opensuse13-1	⚠	
sles15	🚧	
sles12sp1	🚧	
sles12	🚧	
sles11sp4	🚧	
sles11sp3	⚠	

✔: Supported ✖: Unsupported 🚧: Under Development ⚠: Discontinued

Table 11: opsi-local-image

Netboot product	Opsi 4.0.7 / 4.1	Remark
opsi-local-image-prepare	✔	
opsi-local-image-backup	✔	
opsi-local-image-restore	✔	
opsi-local-image-wim-capture	✔	
opsi-local-image-win*	✔	
opsi-local-image-ubuntu	✔	
opsi-local-image-opensuse13-2	⚠	
opsi-local-image-opensusel42-2	🚧	
opsi-vhd-win10-x64	✔	

✔: Supported ✖: Unsupported 🚧: Under Development ⚠: Discontinued

9.6.2 Preconditions for working with UEFI / GPT

This module currently is a co-funded opsi extension.
Some preconditions are required to work with that module, which is to get a suitable modules file to unlock the

feature. You can get this unlock file by purchasing the extension module. For evaluation you can get a time limited modules unlock file without charge. (→ mail to info@uib.de).

Technical requirements are opsi 4.0.5 with package versions:

Table 12: required packages

opsi package	version
Netboot products	>=4.0.5
opsi server packages	>=4.0.5

9.6.3 Furher remarks regarding the pxe-installation with the opsi-Moduls UEFI / GPT

- opsi 4.0.6 supports only 64-Bit UEFI-Installations
- PXE-boot installs require a winpe that is capable of booting in UEFI mode. Often, an existing winpe will be capable of doing so, check by verifying there is a folder named `EFI`, as well as a file named `bootmgr.efi` inside your winpe folder. If that is not the case, create a recent winpe as explained in our opsi-getting-started Manual, Chapter "Creating a PE". A winpe, that is UEFI capable, needs to reside in the winpe_uefi folder of the opsi netboot product. Provided your winpe is already capable of booting UEFI and MBR modes, you could simply place a softlink `winpe_uefi` > `winpe` .
- you have to configure your external DHCP server with the bootfile `linux/pxelinux.cfg/elilo.efi`
- Activate in the opsi-configed the checkbox "Uefi-Boot" for uefi-clients (since version 4.0.5.8.1) or set hostparameter `clientconfig.dhcpd.filename=linux/pxelinux.cfg/elilo.efi`
- BIOS settings:
  Since the BIOS menus are very different and use different terminology, you need to consider here what is the best fit for your BIOS.
  - Secureboot disabled
    This entry is usually in the *Boot* or *Startup* but it can also be found in the *Security* area.
  - Turn the BIOS on in the UEFI-Mode. If you have the choice between *UEFI only*,*Legacy only*, or *Both*, then you should select *UEFI only*. If the selected option is *Both* this is not the best practice but it can eventually work. If the *Legacy Support* it is present, it should be disable. *CSM Support* in conjunction with *UEFI only* can remain enabled. Otherwise just disable it. *UEFI Network Boot* must be enabled. It could happened that the entry is also named *Network Stack* and also can be found under the *UEFI* category. If there are two categories for *IPv4* and *IPv6* here the right choice is *IPv4*.

9.6.4 Introduction

Recent PCs, tablets and server often are equpped with an UEFI BIOS. Often there is a legacy mode available to support the old features including PXE boot. But more and more devices come with an UEFI only BIOS (especially tablets). So they cannot be managed with the previous opsi environment.

To integrate these devices into opsi and to be able to use the advantages of UEFI, the uib gmbh developed the opsi extension for UEFI support.

9.6.5 What is UEFI and what is different about it?

UEFI is the abbreviation of *Unified Extensible Firmware Interface* and is the follow-up to the classic PC-BIOS (MBR-BIOS).

For detailled information on UEFI there are some links listed below.

UEFI has much more features than the old BIOS. Basically UEFI is a small operating system by itself. But in this place, we just consider some features, that are of special interes to the system administrator:

- The recent (by January 2014) implementations of UEFI by the hardware manufacturers have not developed any clear standards yet. As soon as the system is to be booted from any other device but the hard disc, you face the utter chaos. Often UEFI and classic BIOS are implemented both, sometimes they can be deactivated individually, or sometimes not. UEFI can be implemented with the Compatibility Support Module (CSM), or without. Netboot might work, or might not.
  Especially the availability of netboot is essential for structurd client management.
- With the classic PC-BIOS the BIOS and its configuration usually are separated from the operating system. So BIOS configurations like the boot sequence cannot be changed by the operating system.
  This is different with UEFI. The operating system can change the boot sequence (and usually it does). This has consequences for a client management that relies on netboot.
- The UEFI Bios comes with its own boot manager, which not only can be used by the operating systems to change the boot sequence, but also contains the start entries for the operating systems themselves. This is to support the parallel installation of different operating systems, so that there is no conflict with the different boot loaders.
- The UEFI BIOS can be implemented for 32 or 64 bit, which also presets a 32 or 64 bit operating system. So there cannot be installed a 32 bit OS on a 64 bit UEFI system.
- Secureboot (not supported yet by opsi)
- partitioning with GPT and additional partitions for the bootloader:
  - 1. partition: EFI system partition (ESP) 100 - 260 MByte ; VFAT
  - 2. partition: Microsoft reserved (MSR) 32 - 128 MB; NTFS
  - following the actual OS partitions

Links :

http://de.wikipedia.org/wiki/Unified_Extensible_Firmware_Interface

9.6.6 What is different about GPT

GPT (GUID Partition Table) id the follow-up for the previous MBR partition tables. GPT is part of the UEFI specification.

The main features for the sysadmin are

- overriding the 2 Terabyte limit (now it is 8 Zebibyte)
- almost unlimited number of primary partitions
- changed partition types / GUIDs
- new: partition GUIDs
- new: partition attributes (hidden, read only, ...)
- different tools: gdisk

Basically GPT can be used without UEFI. But UEFI depends on GPT. With UEFI there are up to two additional partitions:

1. the EFI system partition (ESP) with the bootloaders
2. Microsoft reserved (MSR)

Links :

http://de.wikipedia.org/wiki/GUID_Partition_Table

9.6.7 UEFI Boot

In contrary to the old BIOS the boot sequence not only can be defined for devices, but also can be set for different bootloaders on the EFI system partition. Furthermore the sequence can be changed by a running operating system. So if you set netboot as the first boot priority, this setting will not survive the first OS installation.

9.6.8 UEFI Netboot

Unfortunately early UEFI implementations do not support netboot at all, but netboot support is increasing.

Meanwhile there are a lot of UEFI bootloader (like grub2 or elilo), but mostly without netboot support.

With the UEFI support extension module uib gmbh has developed a succesfull UEFI netboot support for integrating UEFI clients into opsi. Because the UEFI standard is still under development and changing, in future the opsi UEFI module will continue to adapt to the technical changes, which might require structural redesigns of the module.

9.6.9 opsi support for UEFI netboot

The opsi support for UEFI is based on several components:

- adaption of the netboot UEFI bootloader ELILO to the opsi / client-management requirements.
- new opsipxeconfd, which also supports config files for the opsi-ELILO (in addition to the PXE config).
- new (64 bit) opsi-linux-bootimage with the tools for UEFI- and GPT management
- redesigned netboot products for OS installation (Windows/Linux) with additional support of UEFI/GPT (of course only for OS that support UEFI).
- client setting on the opsi-server whether to be treated as UEFI client or not. (clientconfig.dhcpd.filename=linux/pxelinux.cfg/elilo.efi)
- support of a software triggered switch to UEFI netboot.
  The label of the UEFI netboot entry of the Bios can be saved on the opsi-server (clientconfig.uefinetbootlabel), as far as the BIOS supports it (so there is an activatable netboot entry in the Bios). This allows opsi-product to enbale netboot selective for the next reboot. This technique is implemented in several opsi products. An important example is the product `opsi-uefi-netboot`:
  This product tries to configure the Bios for netboot and then triggers a reboot. If there is no `uefinetbootlabel` or it is a non UEFI client, just a reboot is triggered.
  This product is available for Windows and for Linux.

9.6.10 Installation

All packages required are installed automatically with opsi version 4.0.5.

9.6.11 Configuration of the DHCP server

Configuration example of a Linux isc-dhcp-server:

```
filename "linux/pxelinux.0";

# this is the UEFI detection:
if substring (option vendor-class-identifier , 19,1 ) = "0" {
        log (info, "pxe client");
        filename "linux/pxelinux.0";
}
else if substring (option vendor-class-identifier , 19,1 ) = "6" {
        log (info, "efi32 client");
        filename "linux/pxelinux.cfg/elilo-x86.efi";
}
else if substring (option vendor-class-identifier , 19,1 ) = "7" {
        log (info, "efi64 client");
        filename "linux/pxelinux.cfg/elilo.efi";
}
else {
        log (info, concat ( "Unhandled vendor class Arch: ", substring (option
        vendor-class-identifier , 19,1 )));
}
```

See also: Fedora: PXE Boot Configuration

Example for the configuration of a Windows DHCP server 2012 R2

- As standard for this variant the PXE boot file for x64 Uefi installations is entered as default. DHCP options 66 and 67 are adjusted as it follows:
  066 Host name of the start server: <IP of the opsi server>
  067 Name of the start file: linux/pxelinux.cfg/elilo.efi
- To distinguish the Bios clients, a manufacturer class identifier (PXEClient:Arch:00000:UNDI:002001) must be defined on the DHCP server:

```
Define manufacturer class
Add new manufacturer class
Edit class
  Display name: Legacy BIOS
  Asci: PXEClient:Arch:00000:UNDI:002001
```

- The predefine options must be order under the manufacturer class:

```
Set predefined options
Options
  Option class: Legacy BIOS
  Add
Adjust the option type
  Name: Legacy BIOS
  Data Type: String
  Code: 60
  Description: PXEClient Class Legacy BIOS
Predefined options and values
  String: PXEClient
```

- Define the DHCP policy that is assigned to the boot file for the PXE boot (BIOS) of the manufacturer class:

```
New policy
  Policy Name: PXE BootFile Legacy BIOS
  continue
Add conditions
  Criteria: Manufacturer class
  Operator: equals
  Value: Legacy BIOS
  add
Would you like to configure an IP address range for the following policy: No
Manufacturer class: DHCP Standard Options
  067 Name of the start file
  file input
    String value: linux/pxelinux.0
```

- In the range options, there are two entries for the start file, which is linked to a policy in case a bios client is detected:

```
067 Name of the Start file: linux/pxelinux.cfg/elilo.efi          Policy: None
067 Name of the Start file: linux/pxelinux.0        Policy: PXE BootFile Legacy BIOS
```

Reference: http://www.pix.net/software/pxeboot/archive/pxespec.pdf

9.6.12 opsipxeconfd configuration

Since opsipxeconfd 4.0.7.7 it is possible to configure the path of the files used as templates for UEFI netboot in the configuration file `opsipxeconfd.conf`.

This is possible through the options `uefi netboot config template x86` and `uefi netboot config template x64`.

9.6.13 Alternative elilo.uefi

The `elilo.efi` distributed by default is configured to wait indefinite time for information to perform a netboot. In most scenarios this is not a problem because after an succesful installation the boot order will be automatically changed to boot from harddisk. However the UEFI of some devices is unable to follow the UEFI specification in this regard and this is impossible.

There is an alternative `elilo.efi` that only waits a short time before attempting to boot from a local disk. Unfortunately this does not work with all devices, especially when using NVME disks, and therefore is not the default.

If you want to use this alternative you can find this altarnative `elilo.efi` at https://download.uib.de/-opsi4.1/misc/uefi/elilo_with_timeout/ and then can place it at your tftpboot directory (usually `/tftpboot/linux/pxelinux.cfg/elilo.efi`) replacing the original.

9.6.14 Criteria for a *good* BIOS

Whether an UEFI BIOS meets the requirements of a client management system like opsi depends on several criteria. These criteria do not estimate the qualitiy of the device, but only whether it can be managed by using netboot. This requires BIOS functions for UEFI netboot. Hier an example comparison:

Table 13: Example for UEFI BIOS differences

	Lenovo Twist	**MS-Surface**	**Dell Venue 11**
UEFI pure	√	√	√
UEFI + CSM	√	x	√
Legacy	√	x	√
Both	√	x	x
UEFI Netboot	√	√	√
activatable entry	√	x	√
netboot without interaction	√	x	√

In this case *activatable entry* means, that for the next reboot a netboot can be activated by standard software. *netboot without interaction* means, that an activated netboot will be executed at the next reboot without any require4d interaction (like pressing any key combinations, F12 key, ...). If these preconditions are met, special opsi products can trigger a netboot. This feature is very important for automated processing. A product using this feature is for instance the localboot product for Windows and Linux `opsi-uefi-netboot`.

9.6.15 Technical details

The following sub chapters provide some information for scripted or manual handling of UEFI / GPT. For understanding how opsi works with UEFI/GPT, knowing these details is not required.

Technichal details about UEFI

UEFI Bootloader entries can be managed on Linux with the program `efibootmgr`.
List of boot entries:

```
efibootmgr -v
BootCurrent: 000D
Timeout: 0 seconds
BootOrder: 0012,0011,000D,0010,000B,0009,0007,0008,000A,000C
Boot0000  Setup
Boot0001  Boot Menu
(..)
Boot0007* USB CD        030a2400d23878bc820f604d8316c068ee79d25b86701296aa5a7848b66cd49dd3ba6a55
Boot0008* USB FDD       030a2400d23878bc820f604d8316c068ee79d25b6ff015a28830b543a8b8641009461e49
Boot0009* ATA HDD0      030a2500d23878bc820f604d8316c068ee79d25b91af625956449f41a7b91f4f892ab0f600
Boot000D* PCI LAN       030a2400d23878bc820f604d8316c068ee79d25b78a84aaf2b2afc4ea79cf5cc8f3d3803
Boot0010* ubuntu        HD(1,800,31801,faffb7b9-bdf9-4767-b475-0b8aee68d3ac)File(\EFI\ubuntu\grubx64.efi)
Boot0011* opsitempwinpe HD(4,3c72800,7cf801,dc1cea68-a296-4fb8-a97a-263227ed86f4)File(\EFI\boot\bootx64.efi)
Boot0012* Windows Boot Manager  HD(1,800,31801,5e4ffde2-3e25-42dd-b0f7-fcb7ee5d2b20)File(\EFI\Microsoft\Boot\bootmgfw.\
    efi)WINDOWS.........x...B.C.D.O.B.J.E.C.T.=.{.9.d.e.a.8.6.2.c.-.5.c.d.d.-.4.e.7.0.-.a.c.c.1.-.f.3.2.b.3.4.4.d\
    .4.7.9.5.}...a.............-...
```

On Windows UEFI boot loader entries can be managed with the program `bcdedit`.
List of boot entries:

```
bcdedit /enum firmware

Start-Manager für Firmware
- - - - - - - - - - - - - - -
Bezeichner              {fwbootmgr}
displayorder            {bootmgr}
                        {99a9f9be-9a98-11e3-b22f-806e6f6e6963}
                        {11a8b97e-99df-11e3-ae5c-b888e3e3cbb4}
                        {11a8b986-99df-11e3-ae5c-b888e3e3cbb4}
Windows-Start-Manager
```

```
- - - - - - - - - - - - - - -
Bezeichner              {bootmgr}
device                  partition=\Device\HarddiskVolume1
path                    \EFI\Microsoft\Boot\bootmgfw.efi
Firmwareanwendung (101fffff)
- - - - - - - - - - - - - - -
Bezeichner              {11a8b971-99df-11e3-ae5c-b888e3e3cbb4}
description             Setup
Firmwareanwendung (101fffff)
- - - - - - - - - - - - - - -
Bezeichner              {11a8b972-99df-11e3-ae5c-b888e3e3cbb4}
description             Boot Menu
(...)
Firmwareanwendung (101fffff)
- - - - - - - - - - - - - - -
Bezeichner              {11a8b978-99df-11e3-ae5c-b888e3e3cbb4}
description             USB CD
Firmwareanwendung (101fffff)
- - - - - - - - - - - - - - -
Bezeichner              {11a8b979-99df-11e3-ae5c-b888e3e3cbb4}
description             USB FDD
Firmwareanwendung (101fffff)
- - - - - - - - - - - - - - -
Bezeichner              {11a8b97a-99df-11e3-ae5c-b888e3e3cbb4}
description             ATA HDD0
Firmwareanwendung (101fffff)
- - - - - - - - - - - - - - -
Bezeichner              {11a8b97e-99df-11e3-ae5c-b888e3e3cbb4}
description             PCI LAN
Firmwareanwendung (101fffff)
- - - - - - - - - - - - - - -
Bezeichner              {99a9f9be-9a98-11e3-b22f-806e6f6e6963}
device                  partition=X:
path                    \EFI\boot\bootx64.efi
description             opsitempwinpe
```

Both programs can be used to create or delete entries, setting *netxtboot* or change the boot order.

Example: Setting the entry for the next boot:

- Linux:

```
efibootmgr /bootnext <hexId>
```

- Windows:

```
bcdedit /set {fwbootmgr} bootsequence <GUID>
```

Technichal details about GPT

GPT partitions know some *new* partition types. These are derived from the standard types. So the partition type for NTFS 07 becomes GPT 0700. The Linux partition types 82 and 83 become 8200 and 8300.

The list of known partition types can be shown:

```
# sgdisk -L
0700 Microsoft basic data  0c01 Microsoft reserved    2700 Windows RE
4100 PowerPC PReP boot     4200 Windows LDM data      4201 Windows LDM metadata
7501 IBM GPFS              7f00 ChromeOS kernel       7f01 ChromeOS root
7f02 ChromeOS reserved     8200 Linux swap            8300 Linux filesystem
```

```
8301 Linux reserved         8302 Linux /home            8400 Intel Rapid Start
8e00 Linux LVM              a500 FreeBSD disklabel      a501 FreeBSD boot
a502 FreeBSD swap           a503 FreeBSD UFS            a504 FreeBSD ZFS
a505 FreeBSD Vinum/RAID     a580 Midnight BSD data      a581 Midnight BSD boot
a582 Midnight BSD swap      a583 Midnight BSD UFS       a584 Midnight BSD ZFS
a585 Midnight BSD Vinum     a800 Apple UFS              a901 NetBSD swap
a902 NetBSD FFS             a903 NetBSD LFS             a904 NetBSD concatenated
a905 NetBSD encrypted       a906 NetBSD RAID            ab00 Apple boot
af00 Apple HFS/HFS+         af01 Apple RAID             af02 Apple RAID offline
af03 Apple label            af04 AppleTV recovery       af05 Apple Core Storage
be00 Solaris boot           bf00 Solaris root           bf01 Solaris /usr & Mac Z
bf02 Solaris swap           bf03 Solaris backup         bf04 Solaris /var
bf05 Solaris /home          bf06 Solaris alternate se   bf07 Solaris Reserved 1
bf08 Solaris Reserved 2     bf09 Solaris Reserved 3     bf0a Solaris Reserved 4
bf0b Solaris Reserved 5     c001 HP-UX data             c002 HP-UX service
ea00 Freedesktop $BOOT      eb00 Haiku BFS              ed00 Sony system partitio
ef00 EFI System             ef01 MBR partition scheme   ef02 BIOS boot partition
fb00 VMWare VMFS            fb01 VMWare reserved        fc00 VMWare kcore crash p
fd00 Linux RAID
```

Actually the partition types shown in this list are just short forms for the actual GUIDs that are used. The partition schema is named after that.

So: `0700` stands for `Microsoft basic data` and for the GUID `EBD0A0A2-B9E5-4433-87C0-68B6B72699C7`

A list of GUIDs can be found at Wikipedia:

https://de.wikipedia.org/wiki/GUID_Partition_Table#Partitionstyp-GUIDs

https://en.wikipedia.org/wiki/GUID_Partition_Table#Partition_type_GUIDs

Furtheron the tool gdisk (and sgdisk, ...) has an internal substitution table for unknown partition types. For the *old* partion type for vfat32 `0b` there is no corresponding `0b00`. By passing the type `0b00` to sgdisk, it will be translated to `0700` without any message. Perhaps because of the consideration: vfat32 - this must be some Microsoft data partition ...

GPT partitionen can have attributes.

List of the currently known attributes

Value	Description	Attribute value (sgdisk --info / diskpart gpt attribute)
nix	nix	0000000000000000
0	system partition	0000000000000001
1	partition hidden from EFI	0000000000000002
2	legacy boot flag (legacy BIOS bootable)	0000000000000004
60	read-only	1000000000000000
62	hidden	4000000000000000
63	do not automount	8000000000000000

On Linux the attributes can be set with sgdisk by the option `-A, --attributes` and using the short form. On Windows they can be set with diskpart by the command `gpt attributes` and using the long form.

Examples:

```
select disk 0
select partition 1
gpt attributes=0x0000000000000000
```

```
sgdisk -t 1:0700 --attributes 1:clear:63 --attributes 1:set:62 -p /dev/sda
```

show the partition table with `-p , --print`:

```
sgdisk -p /dev/sda
```

show detailled infos for a partition (1) with `--info=`:

```
sgdisk --info=1 /dev/sda
```

opsi UEFI/GPT Roadmap

- UEFI 32 Bit support
- other netboot capable UEFI boot loader (grub2)
- Secureboot

9.7 *opsi local image*

9.7.1 Preconditions for the opsi extension *opsi local image*

This module currently is a cofunding project.
Some preconditions have to be met to use this module. So it requires a special modules file to unlock this feature. This module file can be obtained by buying the extension module. For evaluation we also provide a temporary modules file without charge (→ mail to info@uib.de).

Further details on extension modules can be found in Section 9.1.

If get the right to use `opsi-local-image` you als get the right to use the opsi extension `opsi-vhd-reset` (see Section 9.8)

As a technical precondition opsi 4.0.3 is required with the packet versions:

Table 14: Required packets

opsi packet	version
opsi-linux-bootimage	>= 20130207-1

Caution
For the product `opsi-local-image-capture` the share `opsi_depot_rw` must have write permission for *pcpatch*. Check your Samba configuration.

9.7.2 Introduction

Opsi offers a good basis for the automated installation and maintenance of Windows clients - especially when there is heterogeneous hardware to be managed. But the opsi standard installation technique based on installation packages is not fast enough to restore class room workstations in a short time, during breaks between two classes, for example. So this module is introducing a new concept, by saving the result of the package based installation as an image on a second partition. From this partition a recovery can be performed in a small amount of time.

1. Initial installation concluding with a local image backup
2. Fast recovery based on different techniques

3. System maintenance also concluding with a local image backup
4. Integration of captured installations to WIM
5. Integration of Linux clients into the Backup/Restore procedure.

9.7.3 Concept

The requirements of computer networks for education / trainings / class rooms differ from those of other networks. An important requirement, which will be discussed in the following, is the fast recovery of workstations to regain a clean and well known installation status, which has been spoiled by temporary use. This is required for workstations in class rooms, but also for computer pools at universities or any networks for commercial trainings.

The restore must be completed within a brief amount of time (about 15 minutes) and should also be able to switch the workstations to a different base installation (like Win XP / Win 7 / Linux). Also the continuous system maintenance by installing security updates must be included.

The standard approaches for the system maintenance have different advantages and disadvantages:

Table 15: Advantages and disadvantages from Unattended and Image based solutions

Feature	**Unattend**	**Image**
Performance	(-) slow	(+) fast
Sensitivity to heterogenous Hardware	(+) low	(-) high
Network load	(-) high	(-) high

The concept of opsi-local-image tries to combine the advantages of the different approaches:

Table 16: opsi-local-image

Feature	**Unattend**
Performance	(+) fast
Sensitivity to heterogeneous Hardware	(+) low
Network load	(+) low

The main features of this combined concept are:

- Initial Windows installation per PXE boot, based on packages with individual driver integration by using the opsi-Linux-Bootimage
- Storing the result of the initial installation as a backup image on another partition on the local disc by using the opsi-Linux-Bootimage
- Fast recovery of the installation by using the opsi-Linux-Bootimage
- Maintenance of the local installation (security updates) by using the opsi system and storing the updated system to the local backup-image by using the opsi-Linux-Bootimage

9.7.4 Technical Concept

The workstation is being used with a static partition table of three or four partitions.:

- Partition 1 (System)
  holds the currently installed operating system (Windows / Linux).
  The size of this partition is set during partitioning by the product `opsi-local-image-prepare` according to the particular property state.
- Optional: Partition 2 (sysdata)
  These are user data that are to sustain during the restore. The format is NTFS.
  The size of this partition is set during partitioning by the product `opsi-local-image-prepare` according to the particular property state.
- Partition 3 (winpe / swap)
  The size of this partition is static and set to 4GB.
  With Windows XP this partition is not used.
  With NT6 (Windows 7) this partition is used during installation for the winpe (which is required for installation) and will not be visible during the operating state of the workstation.
  With Linux this partition is used as swap.
- Partition 4 (backup)
  This partition is used to hold the backup images and their meta data.
  The size of this partition is whatever is left by the other partitions.

The netboot products for the operating system installation use the first two or three partitions (XP the first one only) and do not interact with the last partition. So the backup images on the partition four are still available after the install of a new operating system.

9.7.5 Process steps

Initial Installation

The product `opsi-local-image-prepare` first generates the required static partitioning.

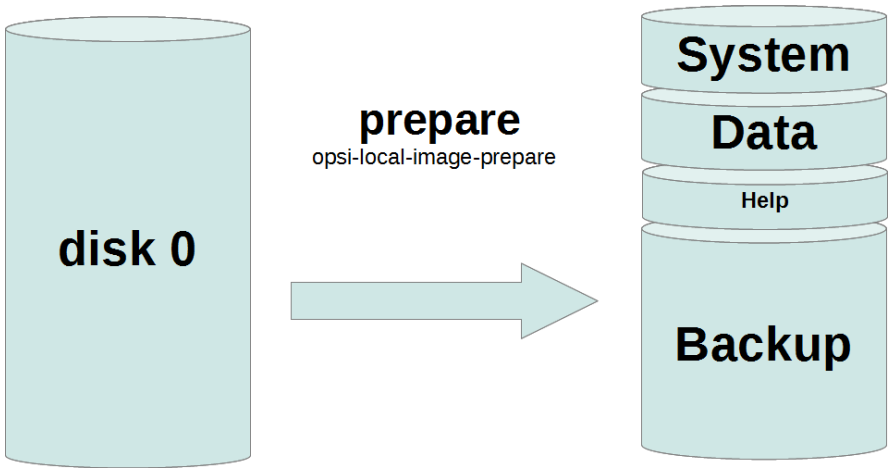


Figure 89: schema: static partitioning with opsi-local-image-prepare

Then the products `opsi-local-image-win*` or others can install several operating systems with different client configuration and different application software.

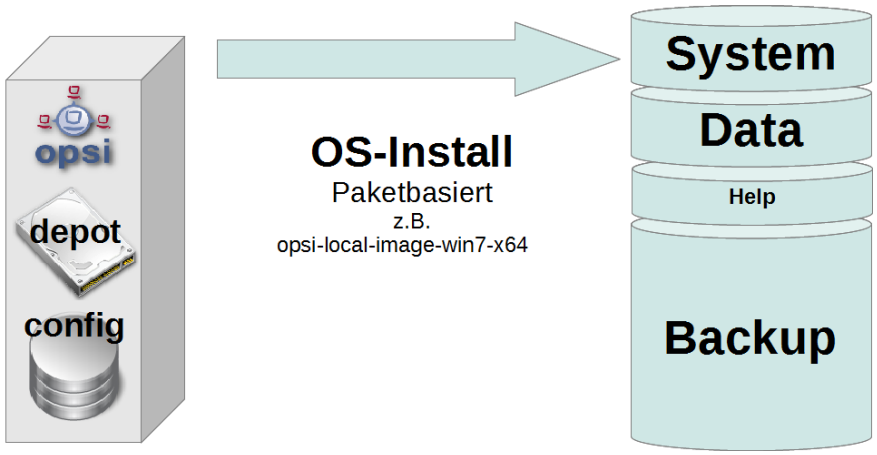


Figure 90: schema: OS installation with opsi-local-image-win*

Per default after the installation they will be backuped as image.

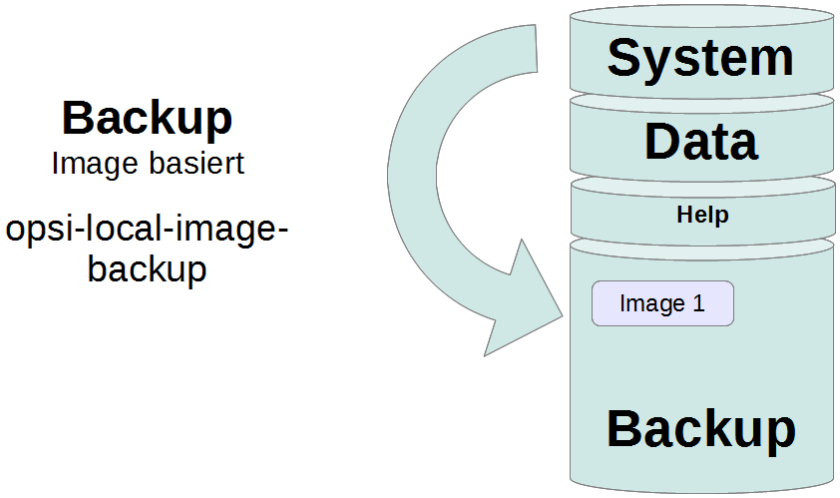


Figure 91: schema: image backup with opsi-local-image-backup

Restoring an image

Executing the product `opsi-local-image-restore` per default restores the image that has been generated recently. In case a different image is to be restored, the name of the image has to be specified on the property `imagefile`.

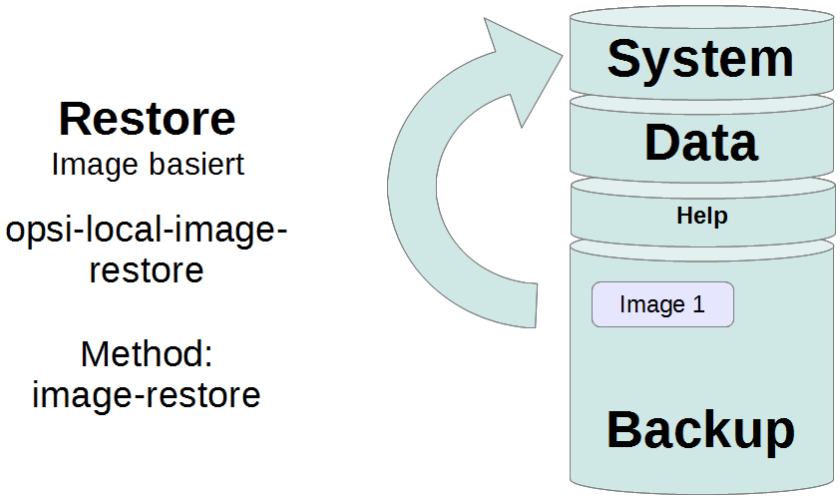


Figure 92: schema: image restore with opsi-local-image-restore

Deleting an image

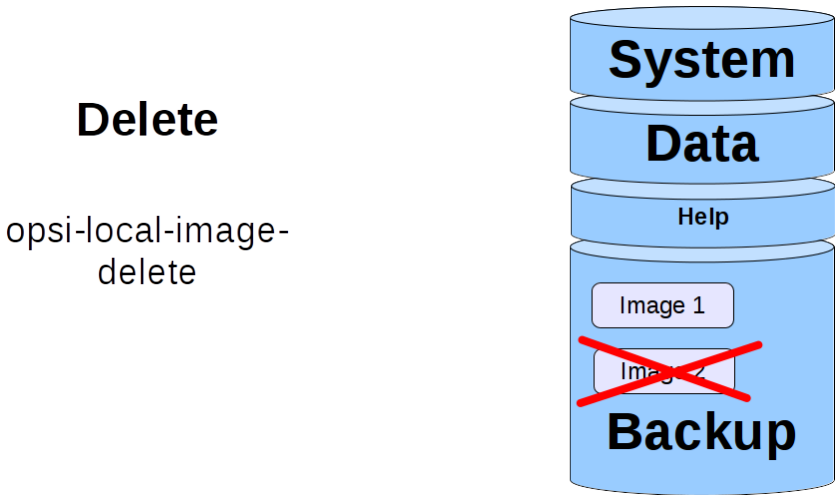


Figure 93: Schema: Deleting an Image

By executing the product `opsi-local-image-delete` the image that is specified by the property `imagefile` will be deleted.

Updating an image: automatic work flow

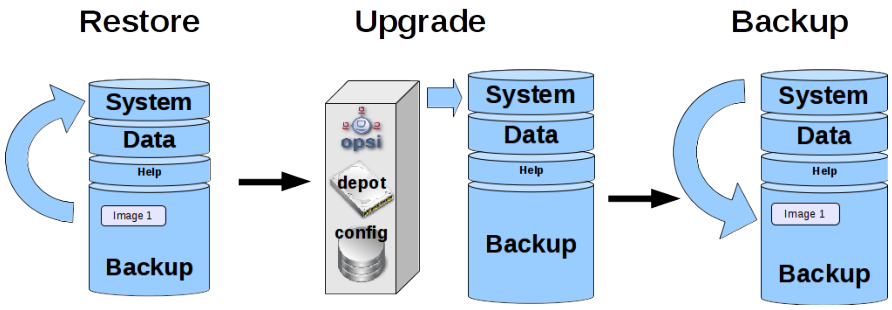


Figure 94: Schema: Steps of automatic image upgrade work flow

By executing the product `opsi-local-image-restore` with the property setting `update_and_backup` = *true* the following will happend:

1. the given Image (inclusive its opsi Meta-Data) will be restored,
2. on the basis of the restored Meta-Data it will be determined which product can be updated via opsi
3. the updates will also be deploy
4. from the updated system partition a new Image will be created through the *backup*.

9.7.6 The opsi-local-image products

The opsi-local-image products with version 4.1 and up are supporting systems with more than one harddisks. For more information to this topic please see here: Section 8.2.3

The packet *opsi-local-image* consists of several products:

The netboot product used for partitioning

- `opsi-local-image-prepare`

The netboot products fr OS installation:

- `opsi-local-image-winxp`
- `opsi-local-image-win7`
- `opsi-local-image-win7-x64`
- `opsi-local-image-win81`
- `opsi-local-image-win81-x64`
- `opsi-local-image-win10`
- `opsi-local-image-win10-x64`
- `opsi-local-image-ubuntu`

The netboot products for the local image handling: * `opsi-local-image-backup` * `opsi-local-image-restore` * `opsi-local-image-delete`

The local boot product for the process control:

- `opsi-local-image-backup-starter`

To install those products please set the attribute **active** of the repository **uib_local_image** in the file `/etc/opsi/opsi-product-updater.conf` to *True*. Executing `opsi-product-updater -i -vv` will then install the new products.

UEFI Compatibility

The opsi-local-image Products are UEFI enabled with some exceptions.

Not UEFI enabled are the following opsi-local-image products:

netboot product for partitioning

- `opsi-local-image-prepare`
  To create the static partitioning of the hard disc for all other products.
  Properties:

  ask_before_inst
  Should we ask to the client before we start. (Default=*true*)

  system_partition_size
  The size of partition 1 (system). (Default = 30G)

  data_partition_size
  The size of partition 2 (data). If set to *0G*, no partition will be created for data (default = 0G).

  start_os_installation
  selects a product for installing an operating system and to be started after the partitioning automatically. When installing this product, the product properties *imagefile* and *imagefiles_list* of the product `opsi-local-image-restore` are deleted, for they have become invalid after the repartitioning.

  delay_for_reboot
  Seconds between the end of the work and the reboot to give the opsi-server time to create the netboot pipes.

  minimal_backup_partition_size
  This property is used for a plausibility check of the other partion size entries.
  The size of the backup partition is given by:
  Harddisk size - (`system_partition_size` + `data_partition_size` + `winpe_partition_size`).
  Normally opsi-local-image is used to have the posibility to make local backup. Therefor we need a backup partition which is at least a littl bit larger than the system partition. If the resulting backup partition size is smaller than the value of `minimal_backup_partition_size` the process stops with an error.
  (Default=55%)

  winpe_partition_size
  Size of the winpe partition (Default=4G)

  multi_disk_mode
  This property is used to select the target disk of the Windows installation.
  Possible values are: "0","1","2","3","prefer_ssd","prefer_rotational"
  The values "0","1","2","3" are the index of the hard disks ("0"= 1. harddisk)
  The value "prefer_ssd" selects the first SSD.
  The value "prefer_rotational" selects the first rotational (*classic*) disk.
  This property is ignored on systems with only one disk.
  Default = "0"

  backup_partition_on_same_disk
  true : create the backup partition on the system disk. false : create the backup partition on the first disk that is not the system disk.
  This property is ignored on systems with only one disk.
  Default = "true"

Important
Use this product only for the initial preparation of the disc for it deletes all existing images.

netboot products for the installation of Windows

The special netboot products for the installation of Windows are derived from the opsi standard products for windows installation. Therefore the structure and the driver integration are the same as with the standard. For details please refer to the *opsi-getting-started* manual.

The properties of the opsi-local-image Windows NT6 products are a subset of the properties of the standard opsi NT6 products. So you should have a look to the description of these products in chapter: Section 8.2.3. You will find the missing properties for disk and partition information at the product `opsi-local-image-prepare`. These properties will used by the other products to get informations about the disk and partition configuration.

ATTENTION
Do not change the property values of opsi-local-image-prepare after you preparded the disk, because the subsequent products will access these properties.

- `opsi-local-image-winxp`
  Installation of Windows XP. Uses the first partition only. Administrator password is empty.
- `opsi-local-image-win7`
  Installation of Windows7 32 Bit.
- `opsi-local-image-win7-x64`
  Installation of Windows 7 64 Bit.
- `opsi-local-image-win81`
  Installation von Windows 8.1 32 Bit.
- `opsi-local-image-win81-x64`
  Installation von Windows 8.1 64 Bit.
- `opsi-local-image-win10`
  Installation von Windows 10 32 Bit.
- `opsi-local-image-win10-x64`
  Installation von Windows 10 64 Bit.

The following products have special properties for *opsi-local-image*:

- *backup_after_install* with default value *true*. In this case this means, that after the OS installation at first the application software is being installed and then an image backup of the installation is generated. Furthermore the value of `imageFile` of the product `opsi-local-image-restore` will be deleted. So the generated backup will be named like the current netboot product (e.g. `opsi-local-image-win7`).
- *setup_after_install*
  Here one or more products can be listed, that after the OS installation shall be set to *setup*. This includes the dependencies of these products.

Netboot products for installing Linux

- `opsi-local-image-ubuntu`
  Installation of Ubuntu Linux 12.04/14.04 32Bit/64Bit.
  The installed system has 2 users: `root` and `user`. The password for *root* will be set according to the product property `root_password` (default: `linux123`). For *user* the password will be set according to `user_password` (default: `linux123`). Details of the installation can be configured with some product properties. The main product properties are:

- `askbeforeinst`:
  Has the start of the installation to be confirmed at the client? (default=*true*)
- `architecture`:
  architecture selection, affects the selection of the bootimage and the installation architecture (default=*64bit*)
- `additional_packages`:
  list of additional packets to be installed, separated by blanks (default = ")
- `language`:
  language / locale to be installed (default=*de*)
- `console_keymap`
  keyboard layout to be installed (default=*de-latin1-nodeadkeys*)
- `timezone`:
  timezone to be set (default=*Europe/Berlin*)
- `online_repository`
  the online repository to get the install packets from. Default is *http://de.archive.ubuntu.com/ubuntu*
- `proxy`:
  Proxystring (if required) with following syntax: `http://<ip>:<port>` (default = ")
- `backup_after_install`
  (*true/false*) default = *true*. If true, after the installation an image backup will be generated.
- `setup_after_install`
  Here one or more products can be listed, that are to be set to *setup* and so will be installed after the OS installation. This also includes the dependencies of these products.
- `wget_and_execute`:
  Url (http) of a file to be fetched and executed at the end of the installation (default = ")
- `release`:
  Ubuntu release to be installed (default="trusty")
- `install_opsi-client-agent`:
  The Linux opsi-client-agent is to be installed if *true* (this is a cofunding project and requires activation by /etc/opsi/modules) (default=*false*)

Netboot product for backup and restore

- `opsi-local-image-backup`
  This product saves the OS which is installed on partition 1 as an image on partition 3. The image name will be set according to the property `imageFile`. If this is empty, the name of the opsi netboot product will be used, that currently is set to *installed* (e.g. `opsi-local-image-winxp`). This name also is set as the product property *imagefile* of the product `opsi-local-image-restore`, so that a following call of `opsi-local-image-restore` is going to restore this image. This name also will be added to the product property *imagefiles_list* of the product `opsi-local-image-restore`. So this property holds the list of all available images. Furthermore (for Windows products) the current opsi product settings will be saved together with the image, so they also can be restored.
  The backup tool in use is partclone.
  Properties:

  - `askbeforeinst`:
    Has the start of the installation to be confirmed at the client? (default=*false*)
  - `free_on_backup`:
    This is a read-only property which shows you the some infos about the backup partition: device, size, used, remaining, use in %, mount point
  - `imagefile`
    name of the image file to be generated (default = empty = the name of the installed opsi-local-image operating system product will be used). The name may include spaces, but no umlauts (like ä, ö, ü). (In case of spaces they will internally be treated as underscore. So *my image* = *my_image*.

  - `setup_after_install`
    Here one or more products can be listed, that are to be set to *setup* and so will be installed after tis product is finished. This also includes the dependencies of these products.

- `opsi-local-image-restore`
  This product restores the image defined by the product property *imagefile* to partition 1 and makes it bootable. Furthermore (for Windows products) the product settings connected with this image will be restored.
  Properties:

  - `askbeforeinst`:
    Has the start of the installation to be confirmed at the client? (default=*true*)
  - `architecture`:
    architecture selection, affects the selection of the bootimage and the installation architecture (default=*64bit*)
  - `imagefile`
    Name of the image to be restored. The value of this property has been set automatically by the last backup. The list of available images is to be found in the property `imagefiles_list`.
  - `imagefiles_list`
    List of all available images. This list is managed automatically by the backup product.
  - `update_and_backup`
    (*true*/*false*) default = *false*. If set to *true*, after the restore all localboot products, that have a different version on the server, will be set to `setup` and the product `opsi-local-image-backup-starter` will be set to `once`. This results in installing all available updates of the products and then automatically generating a backup.
  - `setup_after_restore`
    can be set to one or multiple opsi products, that after the restore are to be set to *setup*, so that after the reboot they will execute automatically. The default is set to the product *windomain* to add the restored client to the Windows domain again.

- `opsi-local-image-delete`
  This product deletes the image given by the product property *imagefile* from the backup partition

  - `imagefile`
    Name of the image to be deleted (default = empty, results in an error when executing)

Localboot product for process control

- `opsi-local-image-backup-starter`
  This localboot product sets the Netboot product `opsi-local-image-backup` to *setup* and reboots the client. This product has a very low priority of -98. This means, that all usual localboot products will be installed first. This feature can be used as follows:
  For a client the following products are set to `setup`:

- The product `opsi-local-image-restore`
- all localboot products that are outdated
- The product `opsi-local-image-backup-starter`

This results in the following process order:

1. restore of the image
2. update of the restored operating system (all outdated products are updated)
3. backup of the updated operating system

9.7.7 Extended opsi service methods

With this extension the clients of a training classroom can be listed as a opsi-client group. The following extensions have been implemented to provide comfortable collective action management for all clients of a classroom:

- `setProductActionRequestForHostGroup`
  Parameter: `hostGroupId, productId, actionRequest`
  allows to start a defined action (like image restore) for all members of a group (e.g. clients of a training classroom).
- `setProductPropertyForHostGroup`
  Parameter: `productId propertyId propertyValue hostGroupId`
  allows to set a given product property (like which image is to be restored) for all members of a group (e.g. clients of a training classroom).
- `getPossibleImagefileValuesForHostGroup`
  Parameter: `groupId`
  gets the list of present imagefile names that have been generated by `opsi-local-image-backup` on all members of the group. If a special image (like `opsi-local-image-winxp`) is not available on one or more of the clients, it will not be on the returned list.

These methods will be integrated into the opsi standard packets at a later date. Until then these extensions are available by executing the file `40_groupActions.conf`, which is part of this release. Please copy it with *root* rights to `/etc/opsi/backendManager/extend.d` and execute: `opsi-setup --set-rights /etc/opsi`.

9.7.8 Backup partition

The backup partion is (with MBR BIOS without data partition and on one disk systems) the third partition of the system disk.
On systems with more than one disk the system disk may be configured by the opsi-local-image-prepare property: multi_disk_mode.
On systems with more than one disk the backup partiton may according to the property backup_partition_on_same_disk the first partition of the first non system disk.

It contains:

- The file `master.log` with information about all image operations performed. This logfile is transfered to the bootimage logs.
- The image files
  The image directories have the same name as the image and hold the image and the meta files of the image.
  To give an idea about file sizes, here as an example the sizes of different image files with OS and standard software (Libreoffice, Adobereader, firefox, thunderbird, javavm, flashplayer):
- `opsi-local-image-ubuntu`: 3.6G
- `opsi-local-image-winxp`: 6.4G
- `opsi-local-image-win7`: 9.4G
- `opsi-local-image-win7-x64`: 13G

9.7.9 Capture Images (WIM) generating and distribution

Capture Images (WIM) Introduction

Starting with NT6 (Vista) Microsoft has introduced the new image format **Windows Imaging Format (WIM)** for installation. A WIM image is not a disc or partition image anymore, but a file and meta archive. A WIM file can hold several images. The standard installation of a NT6 client is based on a setup.exe extracting an installation image from the file install.wim which is then to be configured and equipped with additional drivers.

From an existing client the Windows operating system including the installed software and configuration can be extracted and saved in form of a WIM. Then such a WIM can be the starting point for a new installation.

Capture Images (WIM) Components

In order to create a captured WIM image you need with product version 4.1 and up only the product:

- `opsi-local-image-wim-capture`

The older products:

- `opsi-local-image-capture`
- `opsi-local-image-sysprep`

are obsolete and should be removed.

In addition there are the *target products* which should be used to hold the captured images:

- `opsi-local-image-win7-capture`
- `opsi-local-image-win7-x64-capture`
- `opsi-local-image-win81-capture`
- `opsi-local-image-win81-x64-capture`
- `opsi-local-image-win10-capture`
- `opsi-local-image-win10-x64-capture`

Capture Images (WIM) Processing

The configuration and process sequence of the product `opsi-local-image-wim-capture` is very similar to the product `opsi-wim-capture` which is described over here: Section 9.4. A detailed description of the properies of the product `opsi-wim-capture` is placed here: Section 9.4.6.

The main difference between these both products is the way how the backup and restore of the target partition is done: `opsi-local-image-wim-capture` use the products. `opsi-local-image-backup`/`opsi-local-image-restore`. For the same purpose `opsi-wim-capture` use the product `opsi-clonezilla`.

TIPP::`opsi-local-image-wim-capture` will fail if you setup your system with a data partition. Install your master system with the opsi-local-image-prepare property data_partition_size=0.

9.7.10 Restore from opsi metadata from Images

Restore of the opsi metadata from installed Products

The Problem:

If you reinstall a Windows with opsi, e.g. `win7-x64`, then during the installation of the opsi-client-agent all the local Boot products, which in this computer were previously marked as` installed`, will automatically be set to setup and thus reinstalled later.
This can not be completely carried out exactly in the rolling of a *captured* Image.
In the image is the backup from the opsi data that was stored during the capture process. This will be discovered when you install the opsi-client-agent and re-imported into the depot server. With it the products that were installed in the *captured* Image, now are on the newly installed computer mark as `installed`. Should now all the products that are mark as `installed` set to` setup`, this would imply that all products installed already in the image will be re-installed. This is not desirable.

By the restoration of the opsi metadata of installed products there are two alternatives available now with opsi 4.0.7:

- Alternative 1:
  Restoring the metadata and retention of *setup* -Action Requests.
  Products that are mark as *installed* will **not** be set to *setup*.
  This is the default, and the behavior before opsi 4.0.7

- Alternative 2:
  Restoring the metadata. Products that are mark as *installed* will be set to *setup* except those which were contained in the restore metadata.

Alternative 1
By the deploy from a *captured* image, after the install, only the products which were already from the beginning of the OS-install set to *setup* will be automatically installed. These can be done through your intervention, or through the property *setup_after_install*. Therefore only the products which stood at `setup` before installing the operating system will be installed in this case.
This is the default, and the behavior before opsi 4.0.7

Alternative 2
Variant 2 behaves similar to what would be the case of an installation without a captured Image:
* Restore of the metadata.
* Products that are mark as *installed* are then set to *setup* except those which were contained in the restore metadata.
This behavior is only available since opsi 4.0.7 and is not the default. Option 2 is made possible by enhancements to the opsi script and is part of the opsi-client-agent of 4.0.7.
In order to be able to apply this behavior a *config* must be set on (*Host parameters*) :
The Boolean configuration entry: `clientconfig.capture.switch_installed_products_to_setup`. If the entry for this client has the value *true* then variant 2 is applied, otherwise variant 1

About this *host parameter* can then specific client events activated or deactivated. The *host parameter* can be applied using the *opsi-configed* or *opsi-admin*.

To create the *host parameter* over the *opsi-admin* the following commands are to be executed on the'opsi-config-server':

```
opsi-admin -d method config_createBool clientconfig.capture.switch_installed_products_to_setup "capture.\
    switch_installed_products_to_setup" true
```

With that you set for **all** computers *Alternative 2*.

To create the *host parameter* over the *opsi-server* select there *Server Configuration* / *ClientConfig* / And on the right side with the right mouse button: `Add Boolean configuration entry`.

9.7.11 Helper product opsi-wim-info

The product `opsi-wim-info` is useful to gather information about the images that are stored inside a install.wim. These information is written to the logfile. Properties:

- `target_produkt`
  ProductId of the product where the install.wim file is searched.

9.7.12 Creating an own Ubuntu *proxy*

For a helpful manual for creating an own Ubuntu proxy refer to:

http://wiki.ubuntuusers.de/Lokale_Paketquellen/Apt-Cacher-ng

http://www.gambaru.de/blog/2011/10/26/apt-cacher-ng-ein-proxy-server-fur-debian-und-ubuntu/

9.8 opsi vhd reset

9.8.1 Preconditions for the opsi extension 'opsi vhd reset

This module currently is a cofunding project.
Some preconditions have to be met to use this module. So it requires a special modules file to activate this feature. This module file can be obtained by buying the extension module. For evaluation purposes we also provide a temporary modules file free of charge (→ mail to info@uib.de).
This extension is bundled with the extension *opsi-local-image*, which means that in order to use it, you need an activation for *opsi-local-image*. If you have one, you may use it without any additional costs.

As a technical precondition opsi >= 4.0.7 is required with the package versions:

Table 17: Required packages

opsi package	version
opsi-winst	>= 4.12.0.13

9.8.2 Introduction

The requirements of computer networks for education / trainings / class rooms differ from those of other networks. An important requirement, is the fast recovery of workstations to regain a clean and well known installation status, which has been altered by temporary use.
opsi has with the extension *opsi-local-image* the solution for this problem.
With the extension *opsi-vhd-reset* there is another solution which have a different technical approach.
So both solutions have their specific advantages and disadvantages.

The technical approach here is: * Installation of a windows 10 into a vhd container * Snapshot of the original installation by creating a child vhd, which records any future changes. * Fast recovery by replacing the old child vhd with a new empty one. * Upgrade of the initial installation by merging updates from the child VHD to the parent VHD * In a nutshell we use the well known snapshot features found in virtualization engines just without virtualization.

9.8.3 Process steps

Initial Installation

By running the netboot product `opsi-vhd-win10-x64` a Windows 10 will be installed directly into a VHD file.

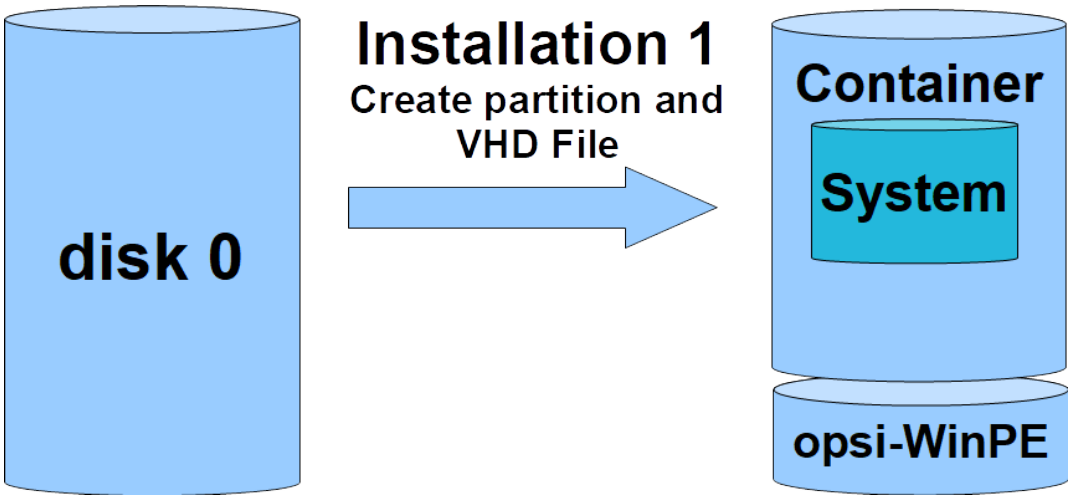


Figure 95: Scheme: Initial Installation 1: Creation of the VHD

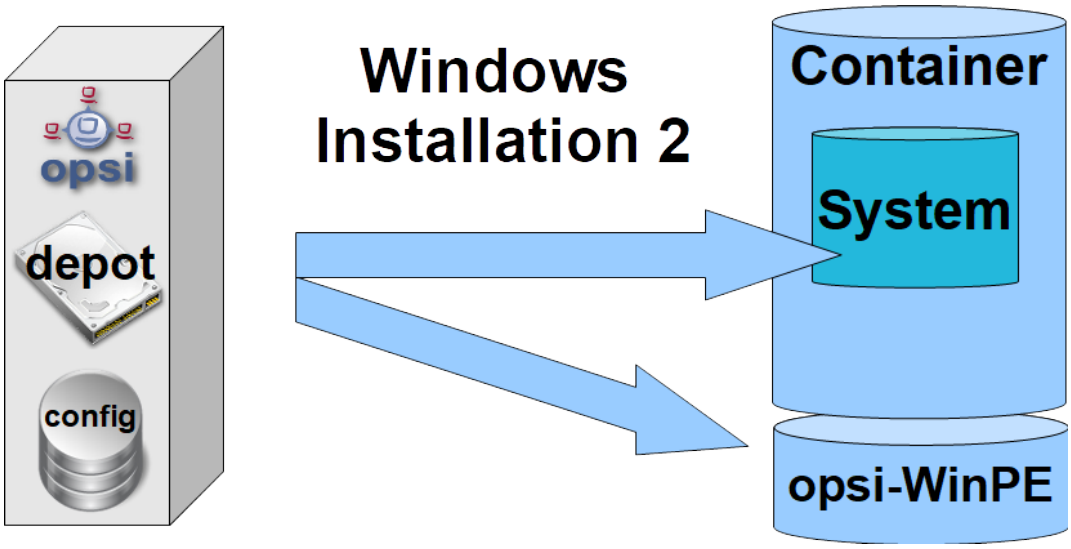


Figure 96: Scheme: Initial Installation 2: Windows Installation

The next step is the installation of the application software.

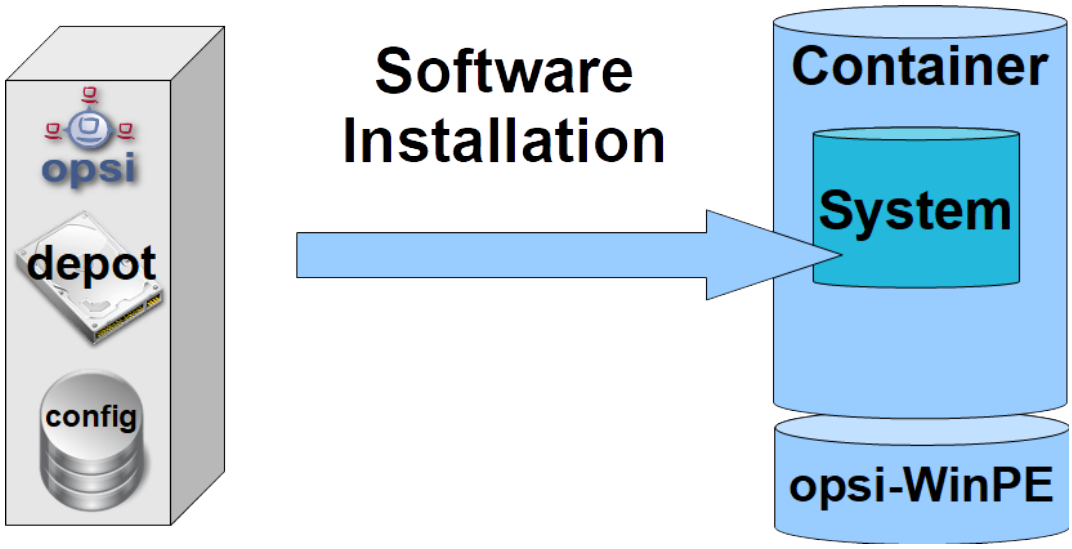


Figure 97: Scheme: Initial Installation 3: Software Installation

By running the localboot product *opsi-vhd-control* the following actions will be done:

- The opsi meta data (which products are installed on which version) will be stored on the client.
- The Windows-PE partition will be activated for the next boot and reboot is triggered.

The product *opsi-vhd-control* has a very low installation sequence priority (-97). Therefore this product will start after all the normal applications software is installed. So it's possible to switch this product to setup together with the applications.

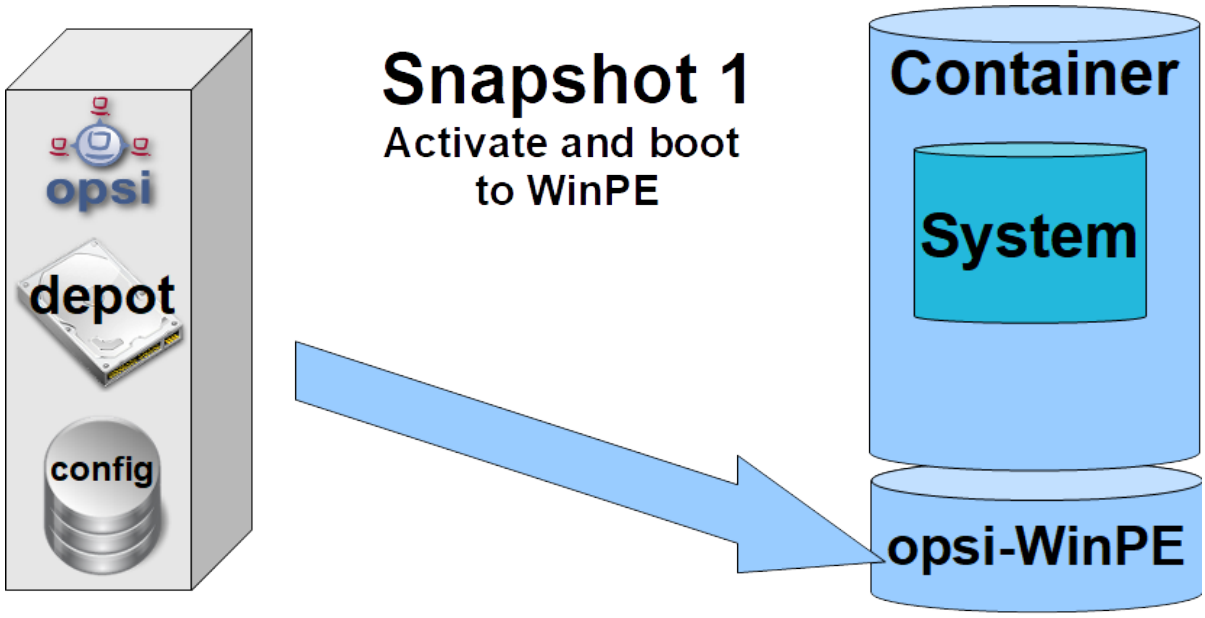


Figure 98: Scheme: Initial Installation 4: Activating the PE partition

After the Windows-PE boots, the second part of *opsi-vhd-control* starts to work and creates a child VHD which seals the initial installation and records all further changes.

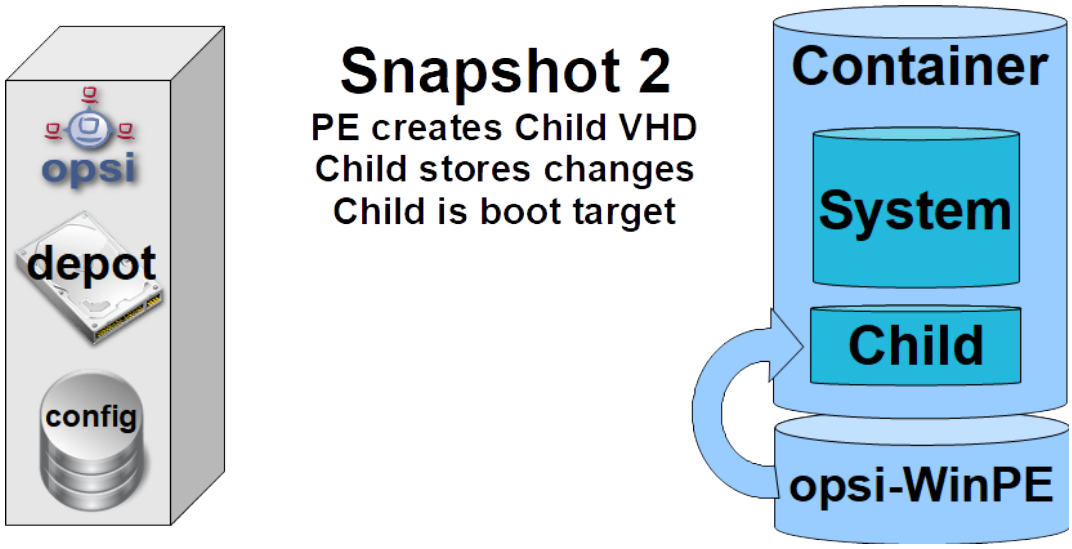


Figure 99: Scheme: opsi-vhd-control: Sealing the initial installation

All changes while working are stored in the child VHD.

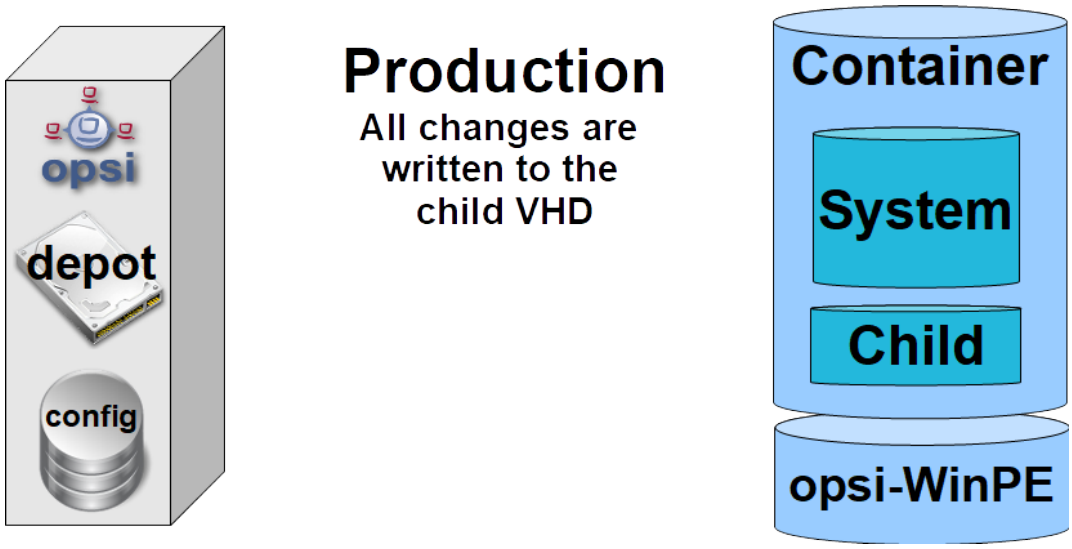


Figure 100: Scheme: Working with the *sealed* system

Fast recovery

In order to recover the sealed installation you have to run *opsi-vhd-control* again. The stored opsi-meta data will be restored to the opsi server and a reboot to the Windows-PE is performed.

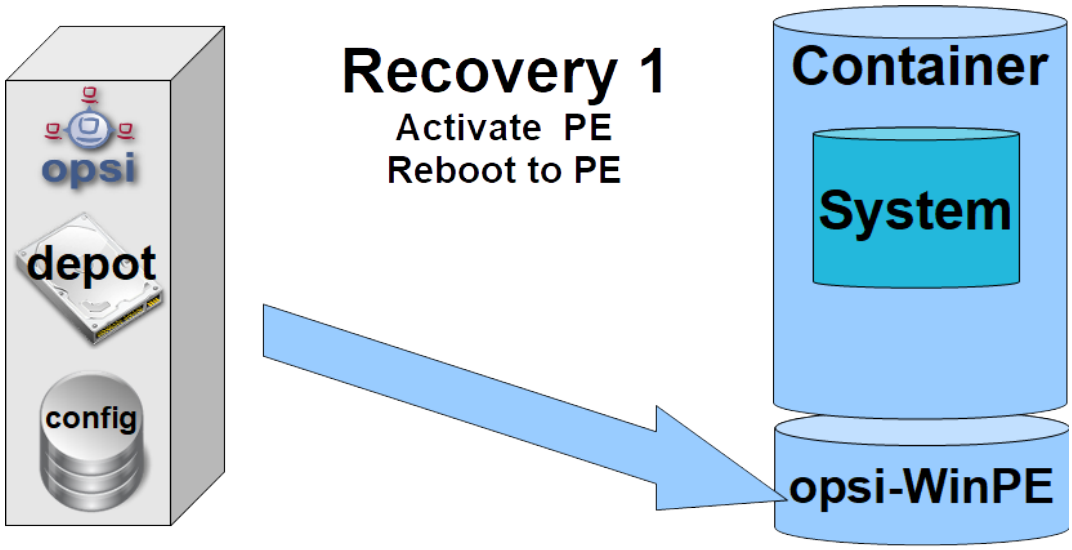


Figure 101: Scheme: opsi-vhd-control: Recovery of the initial installation 1

From the Windows-PE the child VHD is replaced by a new empty one and we can reboot to the cleaned initial installation.

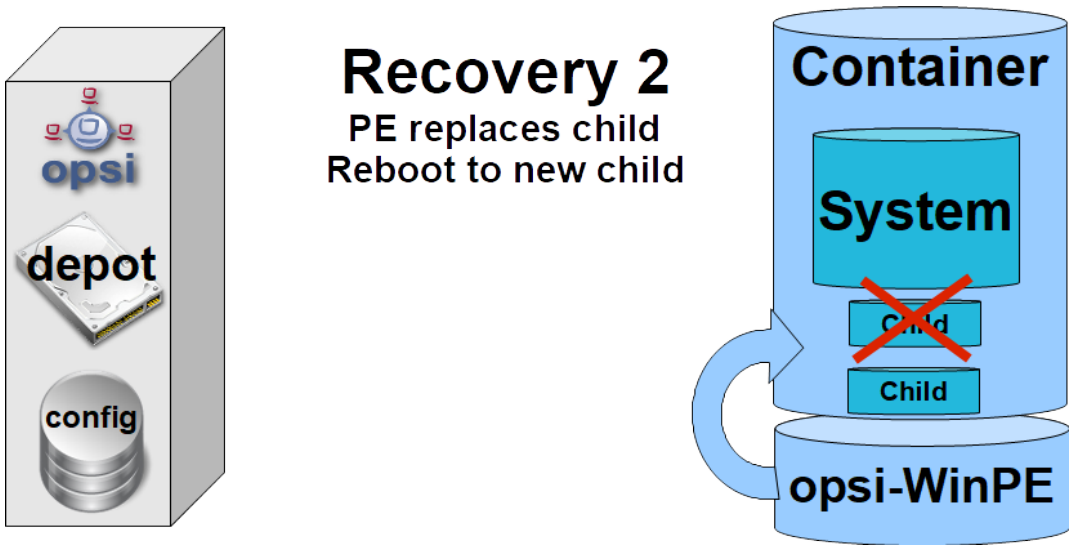


Figure 102: Scheme: opsi-vhd-control: Recovery of the initial installation 2

Updating an image using `opsi-vhd-auto-upgrade`

In order to update the initial installation with patches and software updates you need to start the following workflow:

- Recover the initial installation with opsi-vhd-control
- Install all the updates (They will be stored in the child VHD)
- Integrate the changes in the child to the parent by running *opsi-vhd-control* with the property *upgrade=true*. This will also store the new meta data to the client for the next recovery.

You may run all these processes fully automatically controled by starting the product `opsi-vhd-auto-upgrade`.

9.8.4 The opsi-vhd products

The extension *opsi-vhd-reset* consists of the following products:

The netboot product for the initial installation:

- `opsi-vhd-win10-x64`

The localboot product to control the creation, the exchange and merge of the child VHD's:

- `opsi-vhd-control`

The localboot product to control the full automatic upgrade of the parent VHD.

- `opsi-vhd-auto-upgrade`

UEFI Compatibility

All opsi-vhd-reset products are UEFI compatible.

The opsi netboot product *opsi-vhd-win10-x64* and its properties

This netboot products are very similar to the standard netboot products (4.1.0) for the Windows installation. After installation on the server it has to be filled like it's described for the windows netboot products in the *getting-started* manual.
Also most of the properties are equal.

The following properties are special for opsi-vhd-reset:

- `windows_vhd_size`
  This propery gives the size of the base (parent) VHD in absolute sizes or in percent of the disk size minus the size of the windows PE partition.
  The default value of 100% will be shortened to 80% in order to get space for the child VHD. If you give any other value which lead to a size of above 80% it will be also shortened to 80%.
  This property replaces the standard property `windows_partition_size`
  (Default = 100%)
- `installto`:
  The value is *vhd* and you should not try to change this.

The following standard properties are not existing at *opsi-vhd*:

- `windows_partition_size`, `windows_partition_label`
  see above. The Label of the partition which holds the VHD files is *CONTAINER*.
- `data_partition_size`, `data_partition_letter`, `data_partition_create`, `data_partition_preserve`
  There is no possibility for a data partitions in opsi-vhd-reset currently.
- `boot_partition_size`, `boot_partition_letter`, `boot_partition_label`
  There is no possibility for a boot partitions in opsi-vhd-reset currently.
- `pre_format_system_partitions`, `preserve_winpe_partition`
  The value for this property is always *true* at opsi-vhd-reset.

The opsi localboot product *opsi-vhd-control* and its properties

The product *opsi-vhd-control* has a very low installation sequence priority (-96). Therefore this product will start after all the normal applications software is installed. So it's possible to switch this product to setup together with the applications.

- `disabled`
  This property is for debugging.
  If *true* no actions will be done.
  Default = *false*
- `upgrade`
  If *true*: Merge the changes that are collected in the child VHD to the parent VHD. Afterwards replace the child VHD with an empty one.
  If *false*: Replace the child VHD with an empty one.
  At the end of a successful *upgrade* run this property will switch back to *false*.
  Default = *false*
- `stop_on_no_network_in_pe`
  This property is for debugging.
  If *true*: Abort with an error message if there is no network connection to the server, so it's possible to analyze where the problem is. Default = *false*

The opsi localboot product *opsi-vhd-auto-upgrade* and its properties

The product *opsi-vhd-auto-upgrade* has a very low installation sequence priority (-97). It is lower than *opsi-vhd-control* so *opsi-vhd-control* can be controled by *opsi-vhd-auto-upgrade*

- `disabled`
  This property is for debugging.
  If *true* no actions will be done.
  Default = *false*
- `rebootflag`
  Please do not touch while running. Should be "0" before start.
- `stop_after_step`
  This property is for debugging.
  If not "0" then it is the number of reboots after we need a debugging stop. Default = *0*

Known Problems and Restrictions

- There is also an experimental 32 Bit version. But a bug in the merge command of the windows PE 32 bit diskpart.exe restricts the use of this version. So it stays in experimental (at least for the time being).
- Implementations for Windows 8.1 or Windows 7 Enterprise are possible. We'll build them at request. Windows 7 Professional does not support installations to VHD.
- It's known that the last Windows 10 Release Upgrade (1709) crashes on VHD based installations. So it's possible that this is a principle restriction.
  (https://www.heise.de/newsticker/meldung/VHD-Boot-Windows-Update-demoliert-Aktivierung-3806023.html)

9.9 opsi License Management

9.9.1 Conditions for using the opsi License Management extension

This module currently is a co-funded extension and therefore not free. For more details see Section 9.1.

9.9.2 Overview

Main features

The opsi license management module is designed for managing the software licenses for proprietary software installed on opsi clients.

The main features are:

- Providing the license management functions from within the *opsi-configed* management interface.
- Automated supplying, assignment, and reservation of license keys.
- The following different types of licenses can be managed:
  - standard single license (one installation, possibly identified by a specific license key, on one computer),
  - volume (or campus) licenses (a certain number or an unlimited number of installations for which license keys are provided if required)
  - client bound license (a single license only valid for a specific client, e.g. OEM licenses),
  - concurrent licenses (managed by a license server)
- License keys are released when deinstalling software.
- Licenses can be manually edited, including licenses that were not assigned by an opsi installation.
- Reporting functions that use the software inventory to gather data on licenses installed by opsi and non-opsi software, and then match the opsi and non-opsi data.

Overview database model

In the world of non free software license management ist a complex subject. To represent it, opsi uses a relatively complex data base model.

The involved tables in the opsi database are sketched in the following diagram. The meaning of the different relations should *peu à peu* become clear by the following explanations of the opsi license management concepts and usages.

The blue line in the diagram marks the border of the tables which are automatically generated by the software audit functions and the data which are constructed especially for license management. Only the license pool table has connections to both spheres. This demonstrates the importance of this construct.

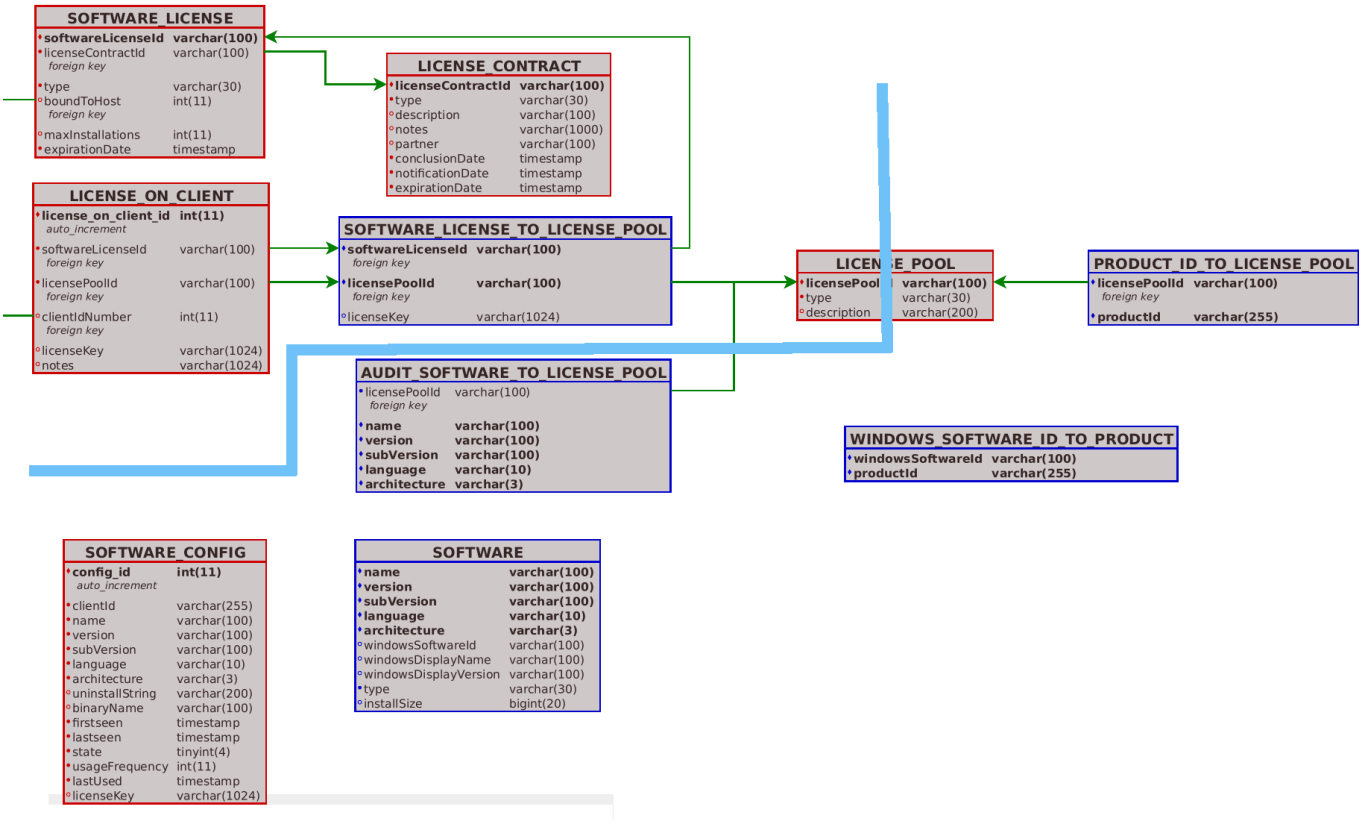


Figure 103: Data base tables relevant for license management

Invoking the license management from the *opsi-configed*

A separate window in the *opsi-configed* management GUI is used for the license management.
It is available by pressing the button "licenses" at the top right corner of the *opsi-configed* management GUI. If the license management module is disabled, # then a note will be displayed.(see the entry for "license management" in the main menu under */Help/Modules*).

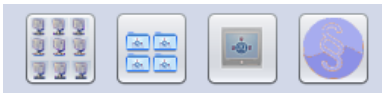


Figure 104: opsi-configed: Menu bar with the button "licenses" (rightmost)

The opsi license management module is a co-financed opsi extension module.

9.9.3 *license pools*

What is a *license pool*?

A *license pool* has to be defined for every type of license. The *license pools* represent the use cases of licenses, and provide the license keys for installing the licensed software on the clients. The *license pool* is the central element of the opsi license management. Therefore, the first tab of the *opsi-configed* license management window is the management *license pools* tab.

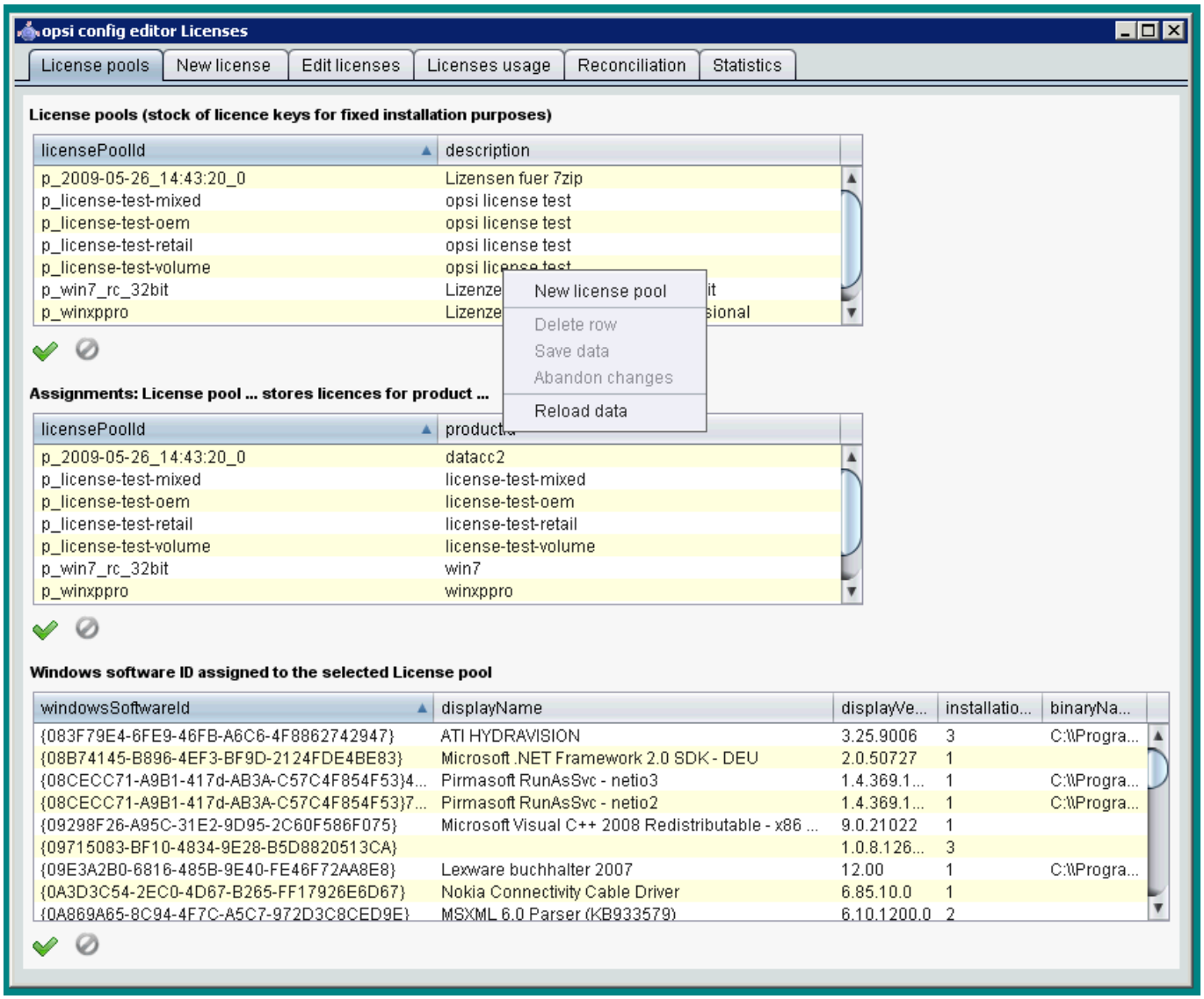


Figure 105: License management: tab "License pools" from the license management window

Administration of *license pools*

At the top of the *license pools* window is a table of available *license pools*.

The input field *description* can be edited.

More editing functions are available from the context menu (right mouse button). The most important is: creating a *{New license-pool}*.

When inserting a new line into the table, a (unique) *licensePoolId* must be entered, e.g. *softprod_pool*. Please do not use special characters. When saving the new entry, any capitals will be converted to lower case.

The new *licensePoolId* cannot be changed after it is saved, because it is used as the master key.

The table at the top of the window contains the available *license pools*. The context menu provides several functions for managing *license pools*, especially to insert a *{New license-pool}*. After any changes to the data in the window, the green check checkmark changes to red and the cancel option is enabled. The changes can be saved by clicking the red checkmark, or changes can be cancelled by clicking the cancel option (also available from the context menu).

license pools and *opsi-products*

The standard method to manage licenses is to include the license, from a single *license pool*, when installing the software (i.e. using the *opsi-product* installation software to install *Acrobat Writer*).

Not unusal is the case that multiple products share the same license pool. This is normal if these products are variants of the same same software. For example: the products *win10-x64* and *opsi-local-image-win10-x64* using the license pool *p_win10-x64*).

A more complicated situation (which you should avoid) might occur while installing software that requires licenses from several *license pools* (i.e. "Designer tools" which installs *Adobe Photoshop* as well as *Acrobat Writer*). + In this case, the *opsi-product* requests licenses from several *license pools*. At the same time, there might be other *opsi-products* requesting licenses from the same *license pools* (e.g. the *Acrobat Writer license pool*). So the relation between *opsi-products* and *license pools* can be ambiguous. This can be avoided by using unambiguous policies when building *opsi-products*.

Tip
Do not integrate more than one license needing software in one opsi product. Assign this product to the license pool which hold the licenses for this product. (Wthout this assignment the license management will not work together with the opsi WAN extenstion. see also chapter Section 9.10)

The second part of the *license pool* tab manages the relationship between *license pools* and productIds (from *opsi-products*).

All tables in the license management module can have their columns sorted by clicking on the column header. Clicking again inverts the order (ascending or descending).

Sorting can be used to display the connections between *opsi-products* and *license pools*. Sorting by *opsi-product* displays all *license pools* connected to a certain *opsi-product*, whereas sorting by *license pool* shows which *opsi-products* are connected to a *license pool*.

The context menu provides an option for inserting a new relationship between *opsi-product* and *license pool*. An empty row is inserted on top of the table. Clicking into the field *licensePoolId* or *productId* displays a dropdown with the available options.

license pools and Windows software IDs

The third section of the *license pools* tab displays the Windows software IDs connected to the currently selected *license pool* (in the first section of the tab).

A Windows software ID is an unique key identifying a software packet as detected by opsi software audit. These software IDs are also used by the opsi software inventory module to identify which software is actually installed on the client.

The assignment of software IDs to the current *license pool* can be changed by setting or removing the selection (ctrl-click or shift-click). From the context menu the display can be toggled between showing all available software IDs detected by the software audit or just showing the software IDs connected to the current *license pool*.

Displaying the relationship between Software IDs and *license pools* is useful for comparing the number of actual software installations (detected by the software audit) with the number of legal installations available from the *license pool* (tab "Statistics", see below).

9.9.4 Setting up licenses

Setting up a license for being provided by a *license pool* requires several steps. The second tab *New license* is for setting up and editing licenses.

On top is the table of available *license pools* to select the *license pool* the new license is to be assigned to. So the first step is to select the *license pool* for the new license.

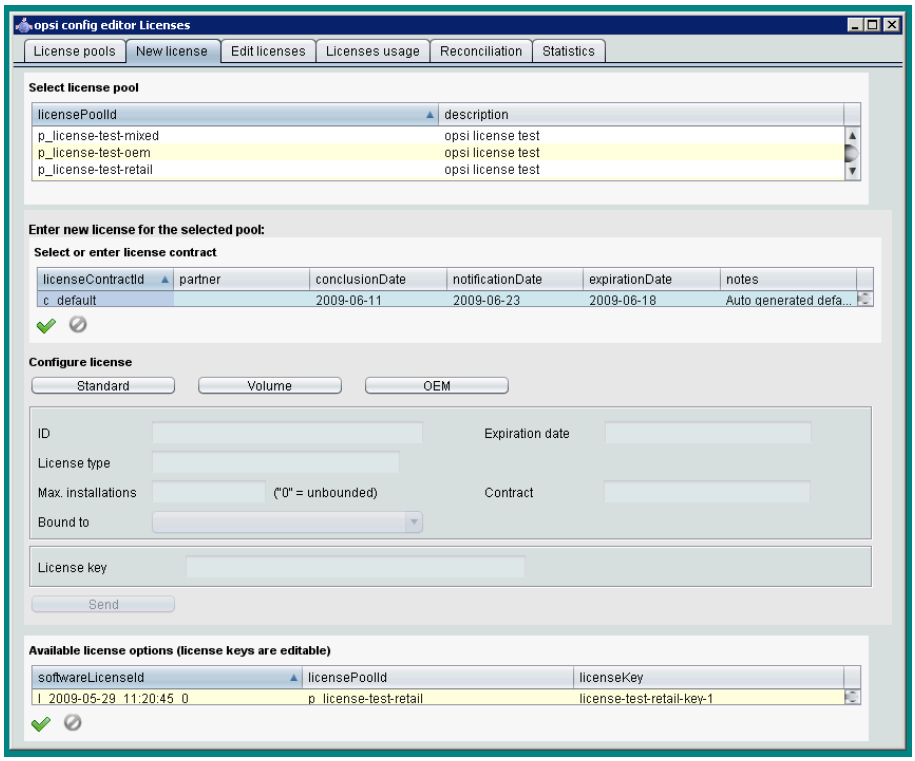


Figure 106: License management: tab "New license" from the license management window

Before continuing with the next steps, some basic concepts and terms of license management have to be introduced:

Some aspects and terms of the license concept

Licensing means the actual deployment of a permission to use a software by installing the software on a client. This might (but doesn't have to) include the use of a special **license key** *(license key)*.

The **software license** is the permission to install and use a software as defined by the license contract. Within the opsi database a *software license* is identified by a *softwareLicenseId*.

There are several types of software licenses (volume license, OEM license, time limited license etc.) which are the different **license models**. A software license is based on a **license contract** *(license contract)*, which is defining and documenting the juristic aspects of the license.

A **license option** defines the option to use a software license for a selected *license pool*. Within opsi the license option is defined by a combination of *softwareLicenseId* and *licensePoolId*. This includes the actual *licenseKey* (if required).

Finally the **license usage** documents the use of a license by assigning the license option to a client. This is the legal and implemented licensing of a software defined by the combination of *softwareLicenseId*, *licensePoolId*, the unique client name *hostId* and (if required) the *licenseKey*.

Registering the license contract

After selecting the *license pool* for the new license option, the next step is to register the license contract the license is based on. The section "Select or enter license contract" (from tab "New license") defaults to a standard contract with ID default. The default setting can be used if the license contract is implied by purchasing the software or the contract is documented some other way. Otherwise the contract can be selected from the table or a new contract can be registered from the context menu. The license contract dataset comes with data fields for partner, conclusion date, notification date and expiration date. The entry field notes can hold some additional notes like the location where the contract document is kept. The unique contract ID (licenseContractId) is for identifiying the license contract in the

license management database. When entering a new license contract, a new unique ID is constructed based on the current date and time stamp. This ID can be changed before saving the new data set. When saving the data, the opsi service checks whether the ID is unique. In case it is not, a new ID is generated and cannot be changed any more.

Configuring the license model

The third part of the Tab "New license" is named "Configure license" and is for registering the license model and license data.

Several types of license models are available:

- Standard license
- Volume license
- OEM license
- Concurrent license

Each Option is represented by a button. Clicking a button, the form is filled with data for that type of license model.

The license model **Standard license** means, that this license is valid for a single installation on an arbitrary client. So the license key (if any) is valid for a single installation only.

A **Volume license** is valid for a certain number n of installations. In this case the optional license key is used for that number of installations. Setting $n = 0$ means, that the number of installations is unlimited within the same network (campus license).

In case of an **OEM license**, the license is valid for a dedicated client only. Clients that come with a vendor pre installed operating system often have this type of license for the pre installed OS and software packets.

The **Concurrent license** means that a certain number of licenses is available for a variable set of clients. Within opsi this situation is handled like an unlimited Volume license. The number of actual installations in use has to be managed by some external license server.

After clicking a button, the automatic generated data include a generated unique ID (derived from date and time stamp). This ID can be changed as desired.

It depends on the type of license model, which of the other fields can or cannot be changed.

The field "Expiration date" defines the expiration date of the license in a technical sense. (This column of the license is for future use).

Saving the data

The "Send" button sends the data to the opsi service to save them permanently to the opsi data base (if they are consistent and no errors occur).

While proceeding this, data records will be generated for the new software license based on the selected software contract and the new license option assigned to that.

The list of available license options at the bottom of the window will be refreshed with the new license option selected. If necessary, the license key can be changed then.

9.9.5 Editing licenses

For ninety percent of the use cases editing the license data with the tabs "License pools" and "New license" will do. But there might be some special cases affording to edit license data more specific and explicit. Therefore the tab "Edit licenses" presents the license data in three tables, representing the internal data structure and allowing to adapt the data for some special cases.

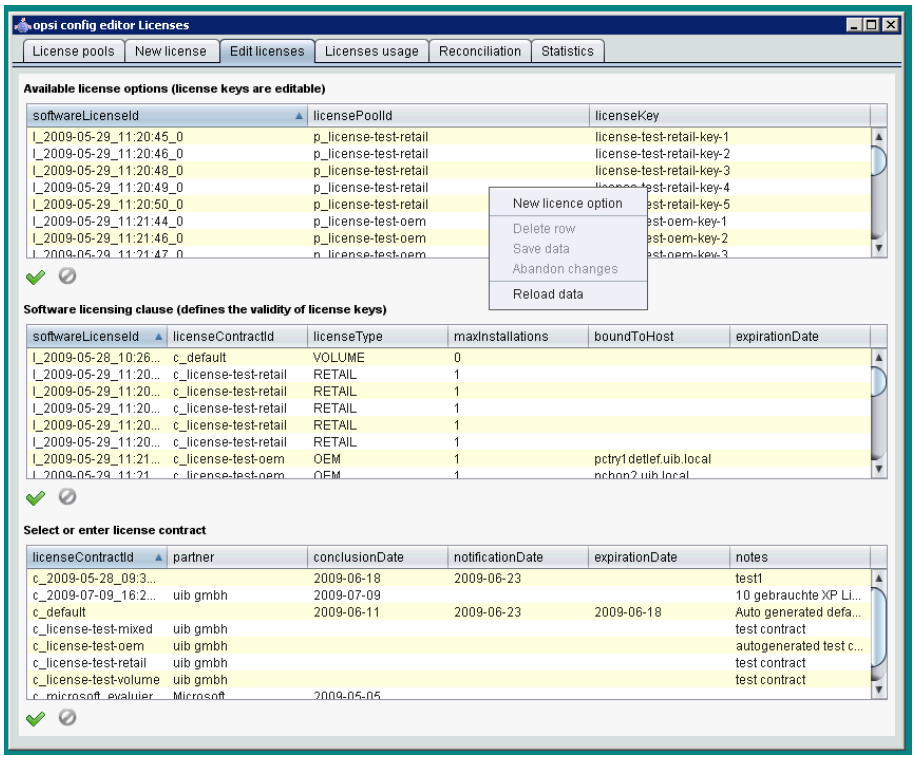


Figure 107: License management: tab "Edit licenses" from the license management window

Based on this direct data access, the following chapter shows how to configure a special license, like the Microsoft Vista or Windows 7 professional downgrade option for installing Windows XP.

Example downgrade option

Downgrade option means, that instead of the software purchased, also the preceding version can be installed. For instance installing Windows XP based on a Windows Vista license. In this case, the license key also can be used for an installation, which it wasn't meant for in the first place.

In the opsi license model this case can be configured like this:

From the tab "New license" the Vista license is to be registered as usual, resulting in a new license option, which is displayed in the list of license options at the bottom of the window. This new license option is based on a new software license identified by *softwareLicenseId*.

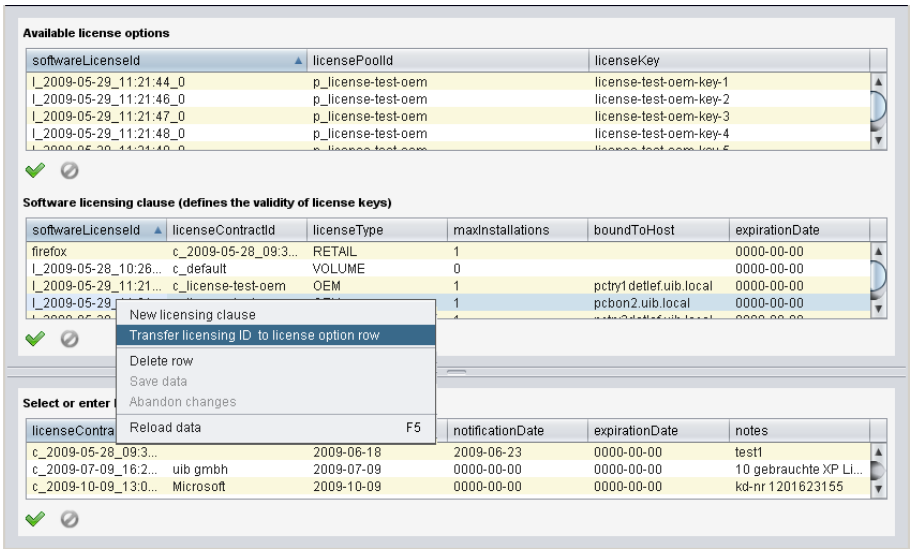


Figure 108: License management: copying the license-ID to the license options from the context menu

This softwareLicenseId is needed for the further configuration steps. You can keep it in mind or copy it with drag&drop. You can as well look for the ID in the "Available license options" list of the "Edit licenses" tab. The context menu supports copying the ID.

The important step now is to connect this softwareLicenseId to an additional *license pool*.

Therefore a new record has to be registered from the "Available license options" table of the "Edit licenses" tab. The fields of the new record have to be filled with the softwareLicenseId and the ID of the additional *license pool* (in this case the pool for Windows XP licenses). For installing Windows XP based on this license, an applicable Windows XP license key already in use by another client has to be added.

After saving the new record, there are two different license options based on the same software license! The opsi service counts the use of either of them as an installation deducting from the maximum installation count. So in case of a downgrade license (with maxInstallations = 1), the opsi service delivers a license key for a Vista installation *or* for a XP installation, but not for both of them.

9.9.6 Assignment and release of licenses

Using a license option by installing the software on a client results in the actual licensing (which is the use of the license option).

In the opsi context installations are done script based and automatically, which is the client running the Winst script invokes some calls to the central opsi service.

The following chapters introduce some of these service calls, which are relevant for the license management. For further information about Winst and opsi commands see the documentation on Winst and opsi.

opsi service calls for requesting and releasing a license

The opsi service call for requesting a license option and retrieving the license key for doing the installation (as transmitted by a Winst script) is `getAndAssignSoftwareLicenseKey`.

The parameters to be passed are the client *hostID* (hostID of the client where the software is to be installed) and the ID of the *license pool* the license is requested from. Instead of the *licensePoolId* also an *opsi-product* ID or a Windows Software ID can be passed, if they are connected to a *license pool* within the opsi license management.

The use of a license option can be released by calling `deleteSoftwareLicenseUsage`.

Again the parameters to be passed are the *hostID* and alternatively the *licensePoolId*, *productID* or Windows Software ID. Calling this method releases the license option and returns it to the pool of available license options.

For the complete documentation of opsi service calls see below.

opsi-winst script calls for requesting and releasing of licenses

The *opsi-winst* provides the client related calls as *opsi-winst* commands.

A *opsi-winst* script can make a call to the function `DemandLicenseKey` to get a license key for installing. The parameters to be passed are:

`DemandLicenseKey (poolId [, productId [, windowsSoftwareId]])`

The return value is the license key (can be empty) as a string:

```
set $mykey$ = DemandLicenseKey ("pool_office2007")
```

The returned license key can be used by other script command for installing the software.

For releasing a license option and license key (as to be used in a *opsi-winst* deinstallation script) the command `FreeLicense` is available with the following syntax:

`FreeLicense (poolId [, productId [, windowsSoftwareId]])`

The boolean function `opsiLicenseManagementEnabled` can be used to check whether the opsi license management is enabled and can be used for scripting:

```
if opsiLicenseManagementEnabled
        set $mykey$ = DemandLicenseKey ("pool_office2007")
else
        set $mykey$ = IniVar("productkey")
```

The service calls can be invoked from the command line tool `opsi-admin`.

Parameters marked with * are optional.

License contracts

```
method createLicenseContract(*licenseContractId, *partner, *conclusionDate, *notificationDate, *expirationDate, *notes)
```

This method registers a new license contract record with the ID *licenseContractId*. If no *licenseContractId* is passed, it will be generated automatically. Using the *licenseContractId* of an existing contract, this contract can be edited.

The parameters partner (co-contractor) and notes are strings and can be filled with any information desired. The parameters *conclusionDate* (date of conclusion of the contract), *notificationDate* (date for a reminder) and *expirationDate* (expiration date of the contract) are passed in the format `YYYY-MM-DD` (e.g. 2009-05-18).

The method returns the *licenseContractId* of the contract.

```
        set $mykey$ = DemandLicenseKey ("pool_office2007")
else
        set $mykey$ = IniVar("productkey")
```

With the string returning functions `getLastServiceErrorClass` and `getLastServiceErrorMessage` error states can be detected and handled, e.g. if there is no license available:

```
if getLastServiceErrorClass = "None"
        comment "no error"
endif
```

The error class `LicenseMissingError` is returned if a license has been demanded but there is no license available. The error class `LicenseConfigurationError` is returned if the current configuration does not allow assignment of a license pool to a software. This could be the case if either no assignment exists or no distinct assignment is possible.

Manual administration of license use

Within the opsi config editor, the licenses registered by the opsi service are listed on the tab "Licenses usage":

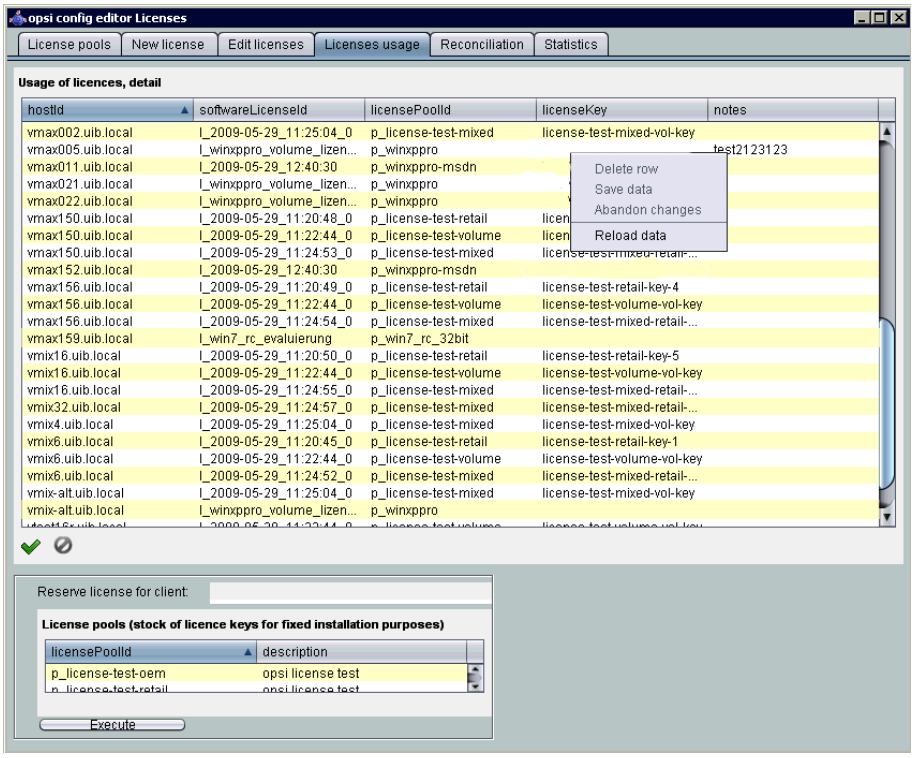


Figure 109: License management: tab "Licenses usage" from the license management window

From this tab, licenses also can be managed manually. This can be useful, if a licensed software is not integrated into the opsi deployment, but installed manually on just a few clients.

These are the functions for manual license management in detail:

- "Delete row" (available from the context menu) releases a license option.
- "Reserve license for client" at the bottom of the window is to create a license reservation for a dedicated client.
- By editing the field "licenseKey" from the "Usage of licenses" table, the license key can be changed.

Preservation and deletion of license usages

If a software packet is reinstalled, the call to the *opsi-winst* function DemandLicenseKey will return the same license option and license key as had been used before.

In case this is not favoured, the former license option has to be released by calling the *opsi-winst* command `FreeLicense`, or by calling the opsi service call `deleteSoftwareLicenseUsage` or deleting the license use manually.

So, if not explicitly deleted, the license usages are preserved when reinstalling a client.

For releasing the licenses, they can be deleted from the tab "Licenses usage" or can be deleted by the service call `deleteAllSoftwareLicenseUsages` passing the client host name to delete the license uses from.

9.9.7 Reconciliation with the software inventory

The tab "Reconciliation" lists for each client and for each *license pool* whether a use of this *license pool* is registered by opsi ("used_by_opsi") and if the software inventory (*swaudit*) on that client reported a software, that requires a license option from that pool (*Swinventory_used*).

To evaluate the results from *swaudit*, the relevant Software IDs (as found in the client registry) have to be associated with the appropriate *license pool* (tab "License pools").

When data matching with the software inventory, the license management counts not more than one license per client and *license pool*. So if the *license pool office2010* is connected with ten different patterns from software inventory, indicating that *office2010* is installed on this client, this is (regarding the licenses usage count) counted as a single installation, although all of the detection patterns might to be found on the client.

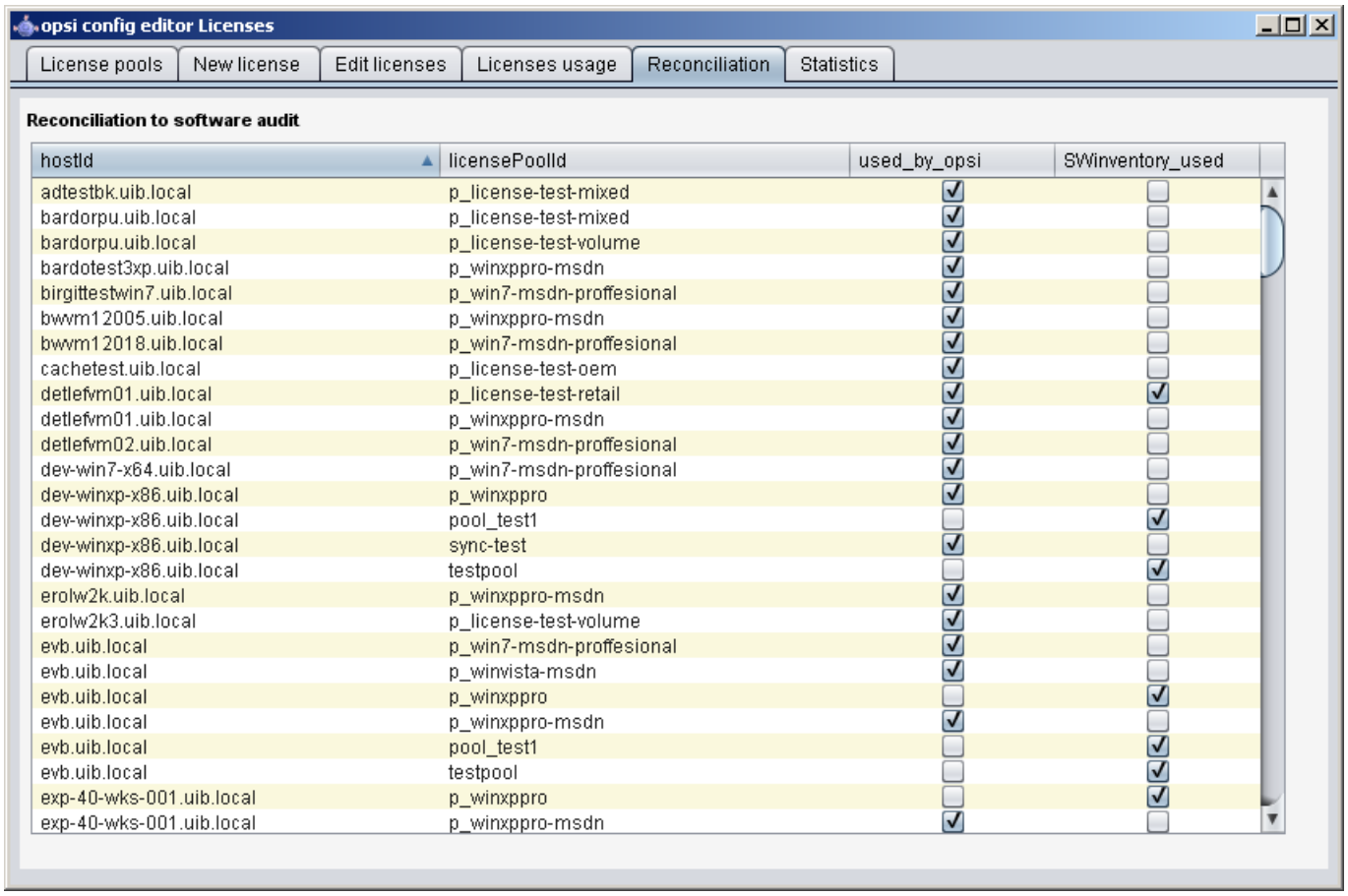


Figure 110: License management: tab "Reconciliation" (data matching) with the inventory

As usual, this table can be copied as *Drag & Drop* and for instance pasted to a spreadsheet program. If the *opsi-configed* process has got the required access rights (running standalone and not from the applet), the table also can be printed from the context menu.

By virtue of the config *configed.license_inventory_extradisplayfields* which can be edited in the host parameter page of the server you may add extra data fields for each client to the table.

9.9.8 Licenses usage overview

The tab "Statistics" displays a summary of the different *license pools*, showing the total number of license options (*license_options*) and how many of them are in use (*used_by_opsi*) or still available (*remaining opsi*).

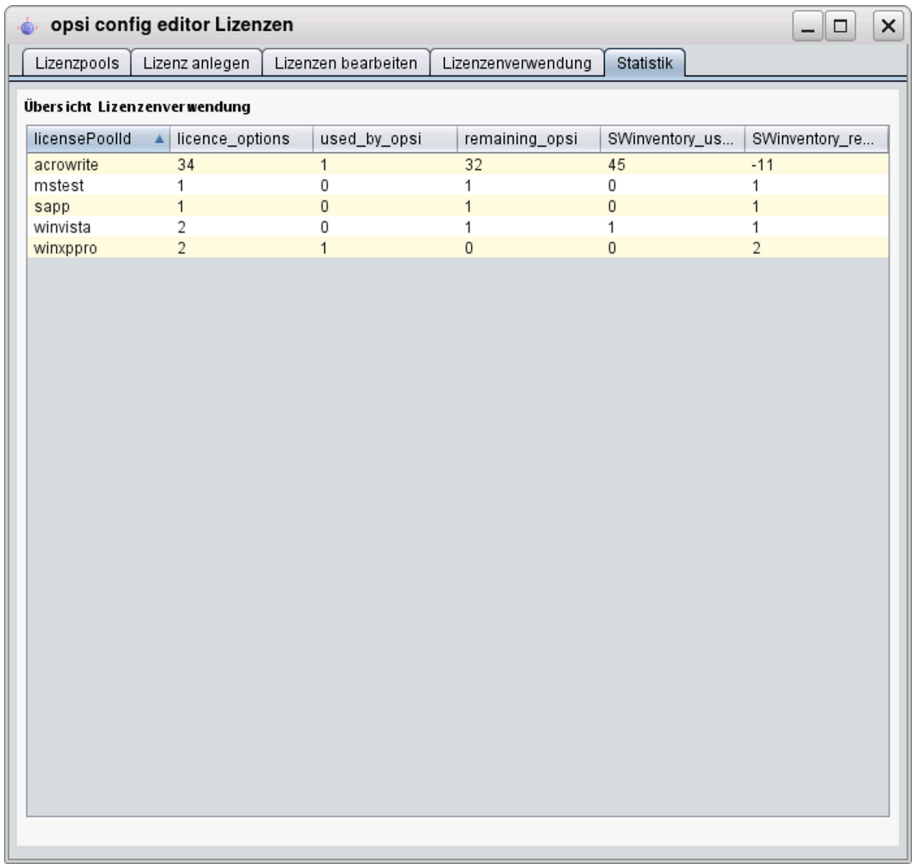


Figure 111: License management: tab "Statistics" from the license management window

In addition to the number of license uses registered by opsi (*used by opsi*) and the currently available licenses (*remaining...*) the ovierview also shows the total number of detected installations, that require a license (*SWinventory_used*).

The data from the column *SWinventory_used* are based on the registry scans from the *opsi-product swaudit* and the assignment of the Windows software IDs (as they are found in the registry) to the *license pools* (as registered with the opsi license management (tab "License pools", see Section 9.9.3).

From the context menu the table can be printed (because of restricted access rights not available from the applet), with drag&drop data can be copied to e.g. a spreadsheet.

In case of downgrade option

If a downgrade option has been configured (see Section 9.9.5), this appears in the overview and statistics like this:

A single downgrade license results in a license option for at least two different *license pools*, but only one of them can be requested for an installation. So using a downgrade license option decreases the number of available license options (*remaining_opsi*) in each of the *license pools* concerned by that downgrade option by *1*. So this looks like a single installation reduces the number of available license options by *2*, which, in this case, actually is the fact.

9.9.9 Service methods for license management

The service methods for license management can be called from the command line tool *opsi-admin*. So they are accessible for scripting, e.g. to read license keys from a file.

Examples can be found in the products *license-test-....opsi* from http://download.uib.de/opsi4.0/products/license-management/. After installing the packets with opsi-package-manager -i *.opsi, in the directory /var/lib/opsi/depot/<product name> the corresponding scripts: create_license-*.sh can be found.

As an example here the script `create_license-mixed.sh` (the current version comes with the download packet).

```
#!/bin/bash
# This is a test and example script
# (c) uib gmbh licensed under GPL

PRODUCT_ID=license-test-mixed
# read the license key from a file
# myretailkeys.txt has one licensekey per line
MYRETAILKEYS=‘cat myretailkeys.txt‘
# myoemkeys.txt has one pair: <licensekey> <hostid.domain.tld> per line
MYOEMKEYS=‘cat myoemkeys.txt‘
# some output
echo "$PRODUCT_ID"

# this is the function to create the oem licenses
##############
createlic ()
{
while [ -n "$1" ]
do
        #echo $1
        AKTKEY=$1
        shift
        #echo $1
        AKTHOST=$1
        shift
        echo "createSoftwareLicense with oem key: ${PRODUCT_ID}-oem-${AKTKEY} for host ${AKTHOST}"
        MYLIC=‘opsi-admin -dS method createSoftwareLicense "" "c_$PRODUCT_ID" "OEM" "1" "${AKTHOST}" ""‘
        opsi-admin -d method addSoftwareLicenseToLicensePool "$MYLIC" "p_$PRODUCT_ID" "${PRODUCT_ID}-oem-${AKTKEY}"
done
}
##############

# here the script starts

# delete the existing license pool and all connected licenses
# ATTENTION: never (!) do this on a productive system
echo "deleteLicensePool p_$PRODUCT_ID"
opsi-admin -d method deleteLicensePool "p_$PRODUCT_ID" true

# delete the existing license contract
echo "deleteLicenseContract c_$PRODUCT_ID"
opsi-admin -d method deleteLicenseContract "c_$PRODUCT_ID"

# create the new license pool
# the used method has the following syntax:
# createLicensePool(*licensePoolId, *description, *productIds, *windowsSoftwareIds)
echo "createLicensePool p_$PRODUCT_ID"
opsi-admin -d method createLicensePool "p_$PRODUCT_ID" "opsi license test" \’["’’$PRODUCT_ID’’"]\’ \’["’’$PRODUCT_ID’"\
    ’]\’

# create the new license contract
# the used method has the following syntax:
# createLicenseContract(*licenseContractId, *partner, *conclusionDate, *notificationDate, *expirationDate, *notes)
echo "createLicenseContract c_$PRODUCT_ID"
opsi-admin -d method createLicenseContract "c_$PRODUCT_ID" "uib gmbh" "" "" "" "test contract"

# create the new license and add the key(s)
# the used methods have the following syntax:
# createSoftwareLicense(*softwareLicenseId, *licenseContractId, *licenseType, *maxInstallations, *boundToHost, *\
    expirationDate)
# addSoftwareLicenseToLicensePool(softwareLicenseId, licensePoolId, *licenseKey)

# create the retail licenses:
for AKTKEY in $MYRETAILKEYS
do
        echo "createSoftwareLicense with retail key: ${PRODUCT_ID}-retail-${AKTKEY}"
```

```
        MYLIC=‘opsi-admin -dS method createSoftwareLicense "" "c_$PRODUCT_ID" "RETAIL" "1" "" ""‘
        opsi-admin -d method addSoftwareLicenseToLicensePool "$MYLIC" "p_$PRODUCT_ID" "${PRODUCT_ID}-retail-${AKTKEY}"
done

# create the oem licenses
createlic $MYOEMKEYS

# create the volume licenses
echo "createSoftwareLicense with volume key: ${PRODUCT_ID}-vol-key"
MYLIC=‘opsi-admin -dS method createSoftwareLicense "" "c_$PRODUCT_ID" "VOLUME" "10" "" ""‘
opsi-admin -d method addSoftwareLicenseToLicensePool "$MYLIC" "p_$PRODUCT_ID" "${PRODUCT_ID}-vol-key"#
```

9.9.10 Example products and templates

In the uib download section at

http://download.uib.de/opsi4.0/products/license-management/

there are four example products available. One for each type of license model, as there are Retail, OEM and Volume license type, as well as a product combining all of them.

These example products use as an example some licenses and release them again. So using them leaves some marks in the software inventory, that might be of influence to reconciliation and statistics.

All of these products contain a shell script to automatically generate *license pools*, license contracts and license options.

The standard template for *opsi-winst* scripts *opsi-template* also contains some examples for using the opsi license management.

9.10 opsi WAN/VPN extension

The WAN/VPN extension module allows to integrate clients, that are connected via low speed connections. This chapter is about configuring and maintaining the opsi WAN/VPN extension.

9.10.1 Preconditions for using the WAN/VPN extension

This opsi extension is currently in the cofunding process and not free. For more details see Section 9.1.

There are some preconditions to use the WAN/VPN extension module. The feature *product groups* is required, which is available with opsi 4.0 and above. Also the packets *opsi-client-agent* and *opsi-configed* are required, which come with version 4.0.1.

At the moment, the simultaneous use of both "WAN extension" and "installation on shutdown extension" is not supportet. On the same opsi server with different clients, these opsi extensions can be used.

Table 18: Required packets

opsi-Packet	version
opsi-client-agent	>=4.0.1-1
opsi-winst	>=4.10.8.12
python-opsi	>=4.0.1-7
opsi-configed	>=4.0.1.6-1

9.10.2 General overview of the WAN/VPN extension

opsi software deployment is mainly doing the following steps:

- The *opsi-login-blocker* at client system startup prevents the users from logging on.
- The *opsiclientd* service running on the client connects the *opsi-config-server*.
- If any *product actions* are set for the client, it mounts a share from the *opsi-depot*.
- The *opsi-winst* is starting and also connects to the *opsi-config-server*.
- The *opsi-winst* executes the *product actions*, using the share from the *opsi-depot*.
- If a reboot is required, it executes and the process starts all over.
- When all the *product actions* are completed, the log files are transferred to the *opsi-config-server* and the user logon is unblocked.

Now we will look at the special circumstances of a client, which is located in a remote branch, connected via *WAN* to the *LAN*, where the *opsi-config-server* and *opsi-depot-server* are:

- During communication with the *opsi-config-server* small amounts of data are transferred, so there is no noticeable slowdown of the software deployment in a WAN.
- But processing the *product actions* might consume a very long time, depending on the packet sizes, bandwidth and latency of the *WAN* connection. There also might occur timeouts during file access.
- Therefore, during the installation is processing, the user has to wait for an unreasonably long time before logon is granted.

As an alternative to providing a dedicated *opsi-depot-server* in the remote branch network, the remote clients can be connected via WAN/VPN extension module. Using the WAN/VPN extension module, the *opsi-client-agent* can be configured this way:

- At system startup, if there are no *opsi-products* cached and ready for installation, the user can logon immediately.
- When there are *product actions* set for the client, the *opsiclientd*, which is running on the client, starts downloading the required installation files from the *opsi-depot* to the local file system. This is done in the background while the user is working. The maximum download bandwidth can be configured and also can be dynamically adapted to the current network traffic status.
- When the synchronization of the *opsi-products* is completed, a reboot request is triggered.
- The logged on user can accept the reboot request, or the client will be rebooted at some time later on.
- At the next system startup, the cache is found to be filled with the *opsi-products* to be installed and the installation starts. In this case, the installation will use the downloaded files from the local file system, which increases the speed of installation even compared to a standard *LAN* installation.

Now we examine the situation of a notebook, which at system startup often cannot connect the *opsi-config-server*:

- Trying to connect the *opsi-config-server* at system startup will result in a timeout.
- Connecting the *opsi-config-server* might be possible when a user logs on and a *VPN* connection to the corporate network is established.
- Without connection the *opsi-config-server* no software deployment is available.

This situation also can be solved by using the WAN/VPN extension module.
The *opsi-client-agent* can be configured the following way:

- At system startup, if there are no *opsi-products* cached and ready for installation, the user can logon immediately.
- Triggered by network activation or a by timer event, the *opsiclientd* running on the client tries to connect the *opsi-config-server*.

- If the *opsi-config-server* is reachable, the *opsiclientd* starts to:
  - synchronize the configurations
  - download the required files from the *opsi-depot* to the local file system.
    In combination with the opsi extension module *Dynamic Depot Selection*, the download is done from the best fitting *opsi-depot*.
- When the synchronization of the *opsi-products* is completed, a reboot request is triggered.
- The logged on user can accept the reboot request or the client will be rebooted at some time later on.
- At the next system startup, the cache is found to be filled with the *opsi-products* to be installed and the installation starts. In this case, the installation will use the downloaded files from the local file system, which increases the speed of installation even compared to a standard *LAN* installation. So the *opsiclientd* takes over the function of both the *opsi-config-server* and the *opsi-depot-server*.
- At the next connect to the *opsi-config-server* the results of the installation process (configuration change, log files ...) will be synchronized.

The download mechanism of product synchronization is multiple interruptible and will continue at the point of interruption. So files that are already downloaded will not have to be downloaded again.

The WAN/VPN extension module allows to connect clients, that are outside of the secure corporate network. Therefore additional security mechanisms are required regarding the communication between client and server.
So the *opsiclientd* now offers the ability to verify the identity of an *opsi-server*. Therefore the key pair of the SSL certificate of the *opsiconfd* is used.
By this mechansim the *opsi-config-server* as well as the *opsi-depot-server* can be verified, assumed the communication is performed via *opsiconfd* and *SSL*. In case of an *opsi-depot* the file access must be done by the *opsiconfd* using *HTTPS/WEBDAVS*. Access done via *CIFS/SMB* will not be checked.

9.10.3 Caching of opsi-products

Caching of *opsi-products* is done by the *ProductCacheService*, which is part of the *opsiclientd*.
The *ProductCacheService* synchronizes the local copy of an *opsi-product* with the current version of the corresponding *opsi-products* on the *opsi-depot*. The location of the local product cache can be configured and defaults to `%SystemDrive%\opsi.org\cache\depot`.

Communication Protocol for accessing an opsi-depot

For transferring the product files, two different protocols are used:

- *CIFS/SMB*
- *HTTP(S)/WEBDAV(S)*

In case of using *CIFS/SMB*, a connection to the *depotRemoteUrl* will be established as configured with the properties of the *opsi-depot*. In case of using *HTTP(S)/WEBDAV(S)*, the *depotWebdavUrl* is connected, which as well is to be configured with the properties of the *opsi-depot*.

Which protocol is to be used, can be configured client specific by the *host parameter* `clientconfig.depot.protocol`. Available values to be set as `clientconfig.depot.protocol` are `cifs` and `webdav`.

Note
Also the *opsi-linux-bootimage* is evaluating this setting and uses the specified protocol.

Using the `.files` file for Synchronization

The synchronization process is based on the file `<product-id>.files`, which is located in the base directory of each *opsi-product* on the *opsi-depot*. This file contains information about the files, directories ans symbolic links used by an *opsi-product*. Each line of that file contains such information. Different types of information are separated by a blank. The first character of a line defines the type of the following entry. Available values are:

- `d` for a directory
- `f` for a file
- `l` for a symbolic link

Separated by a blank follows the relative path, which is single quoted.
The next entry gives the sizes of the file (which is 0 for directories and symbolic links).
The final entry in case of a file is the MD5-sum of the file, in case of a symbolic link it is the target referred to by the symbolic link.

Example excerpt of a *.files* file:

```
d 'utils' 0
f 'utils/patch_config_file.py' 2506 d3007628addf6d9f688eb4c2e219dc18
l 'utils/link_to_patch_config_file.py' 0 '/utils/patch_config_file.py'
```

The *.files* file is generated automatically when installing *opsi-product-packages* (after running the postinst-Script).

Warning
When using the WAN/VPN extension, the files of *opsi-products* on the *opsi-depot* should not be changed manually, otherwise the information contained in the *.files* file would be outdated, causing errors during the synchronization process.

Internal processing of opsi-product caching

The synchronization of a local copy of an *opsi-product* processes as follows:

- The *.files* file of the *opsi-product* is transferred to the local client.
- Then it is checked, whether there is enough local disk space available to cache the *opsi-products*. If there isn't enough disc space available, some old *opsi-products* will be deleted, which haven't been used (synchronized) for a long time.
- The local caching directory will be created if it doesn't exist.
- Referring to the *.files* file, any old files and directories, which aren't in use anymore, will be deleted from the local *opsi-product* cache.
- Then the *.files* file will be processed in the following order.
  - missing directories are created.
  - missing files are transferred.
  - existing files will be checked by size and MD5-sum and be synchronized again if necessary.

The synchronization results in an exact local copy of the *opsi-product* from the *opsi-depot*.

Note
On windows systems, no symbolic links will be created. Instead of links there will be copies of the link target.

When the *opsi-product* has completed successfully,

- the status of `products_cached` will turn to `true` (and stays `true` in case of a system restart, see: Section 6.1.3).
- a `sync completed` event will be triggered.

Configuring the opsi-product caching

The *opsi-product* caching is configured in the section `[cache_service]` of the `opsiclientd.conf`.

- `product_cache_max_size` (integer): The maximum size of the *opsi-product* cache in byte. This is important to limit the disk space to be used by *opsi-product* caching.
- `storage_dir` (string): the path to the directory, in which the base directory `depot` for the *opsi-product* caching is to be created.

Further configurations can be done event specific.
Within an event configuration section `[event_<event-config-id>]` the following options are available:

- `cache_products` (boolean): if the value of this option is `true`, in case of the event the *ProductCacheService* will start to cache *opsi-products*, for which a *product action* is set. If additionally the value of the option `use_cached_products` is set to `true`, the further processing of this section will be suspended until the caching of *opsi-products* is completed.
- `cache_max_bandwidth` (integer): the maximum bandwidth in byte/s to be used for caching. If this value is set to 0 or less, the bandwidth is unlimited.
- `cache_dynamic_bandwidth` (boolean): if the value of this option is set to `true`, the bandwidth will be adapted dynamically. Therefore the network traffic at the network interface to the *opsi-depot* will be monitored. If any traffic is detected, which is not caused by the *opsi-product* caching, the bandwidth for the caching will be sharply reduced, to allow other processes to work at (almost) full speed. If the caching works at reduced bandwidth and no more other network activity but the *opsi-product* caching is detected, the caching process will continue with unlimited bandwidth. The value of `cache_max_bandwidth` will be used to limit the maximum dynamic bandwidth.
- `use_cached_products` (boolean): if the value of this option is set to `true`, the local *opsi-product* cache will be used for processing *product actions*. If caching of the *opsi-products* is not completed, the processing of this event will stop and return an error code.

9.10.4 Caching of configurations

The caching of configurations is done by the *ConfigCacheService*, which is part of the *opsiclientd*.
The *ConfigCacheService* synchronizes a local *client-cache-backend* with the *config backend* of the *opsi-config-server*.
The *opsiclientd* provides per *WebService* an access point to the backend and thereby provides quite the same functionality as the *opsiconfd*.

The local *client-cache-backend*

The local *client-cache-backend* is based on *SQLite* and mainly consists of a local working copy, a snapshot an a modification tracker, which records all changes of the local working copy.
The base directory of the config cache can be configured and defaults to `%SystemDrive%\opsi.org\cache\config`.
The snapshot reflects the configuration status on the *opsi-config-server* at the time of the last synchronization.
At the start of the processing, the local working copy is a copy of the snapshot, but will be modified during processing.

Internal processing of configuration synchronizing

The synchronization of the local changes of the *client-cache-backend* with the *config backend* of the *opsi-config-server* is processed as follows:

- The changes of the local working copy registered by the modification-tracker are transferred to the *opsi-config-server*. Any changes of the configuration on the *opsi-config-server* since the last synchronization will be detected by comparing to the snapshot. If there are any conflicts deteced, the following rules apply:
  - In case of inventory data, the local client data have priority.
  - In case of *action requests*, the value from the *opsi-config-server* has priority.
  - In case of *installation status* and *action result*, the client data have priority.
  - If the opsi licenense management modul is switched on (config: *license-management.use=true*), the config server tries to find a license pool for the product by the assignment pool to productId. I free license of this pool will be reserved and this license will be replicated. Any unused licences, which have been reserved during replication, will be released again.
  - The *opsi-config-server* has priority for the status of *host parameter* and *product properties*.
- The modification tracker will be cleared.
- The logfiles will be transferred.

The *config backend* replication of the *opsi-config-server* to the *client-cache-backend* is processed as follows:

- The replication only takes place, if any *action requests* are set on the *opsi-config-server*. The *product action* `always` does not count in this respect. The replication process will start only if the status of *action requests* is changed since the last replication.
- The modification tracker and the local working copy are cleared.
- The configurations required for local processing will be replicated.
- If *action requests* are set for *opsi-products* which are marked as to require a license, the required software license will be reserved from a *license pool*, which is assigned to that *opsi-product*.
- Additionally required data, as there are the `auditHardwareConfig` and the `modules`, will be transferred.
- The snapshot and the local working copy will be updated, so they have the same content.

A successful replication from server to client results in:

- The status of `config_cached` is set to `true` (and stays `true` in case of a system restart, see: Section 6.1.3).
- An event of type `sync completed` will be triggered.

Configuration of config caching

The configuration of the config caching is mainly done event specific:
Within an event configuration section `[event_<event-config-id>]`, the following options are available:

- `sync_config_to_server` (boolean): if the value of this option is set to `true`, the *ConfigCacheService* in case of that event starts to transfer the changes registered by the modification tracker to the *opsi-config-server*. The process will wait for that task to complete.
- `sync_config_from_server` (boolean): if this value is set to `true`, the *ConfigCacheService* starts with the replication. If additionally the value of the option `use_cached_config` is set to `true`, the processing of this event is suspended until the replication is completed.

- `use_cached_config` (boolean): if the value of this option is set to `true`, the *client-cache-backend* will be used for processing the *product actions*. If the synchronization is not completed, the processing of this event will be stopped and return an error code.
- `post_sync_config_to_server` (boolean): has the same functionality as `sync_config_to_server`, but will be evaluated after the *product actions* have been completed.
- `post_sync_config_from_server` (boolean): has the same functionality as `sync_config_from_server`, but will be evaluated after the *product actions* have been completed.

9.10.5 Recommended configuration when using the WAN/VPN extension module

The *opsi-client-agent*-package comes with a `opsiclientd.conf` prepared for the WAN/VPN extension.
For activating the WAN/VPN extension, just enabling of some events and disabling of some others is required.
The configuration of the *opsi-client-agent* also can be done from the web service (see: Section 6.1.3), so it is recommended to create the following *host parameter*:

- `opsiclientd.event_gui_startup.active` (boolean, default: `true`)
- `opsiclientd.event_gui_startup{user_logged_in}.active` (boolean, default: `true`)
- `opsiclientd.event_net_connection.active` (boolean, default: `false`)
- `opsiclientd.event_timer.active` (boolean, default: `false`)

By these *host parameter*, events can be enabled or disabled client specific. The *host parameter* can be created using the *opsi-configed* or *opsi-admin*.

For creating the *host parameter* by *opsi-admin*, the following commands have to be executed on the *opsi-config-server*:

```
opsi-admin -d method config_createBool opsiclientd.event_gui_startup.active "gui_startup active" true
opsi-admin -d method config_createBool opsiclientd.event_gui_startup{user_logged_in}.active "gui_startup{user_logged_in\
    } active" true
opsi-admin -d method config_createBool opsiclientd.event_net_connection.active "event_net_connection active" false
opsi-admin -d method config_createBool opsiclientd.event_timer.active "event_timer active" false
```

The default values are as they come with the special `opsiclientd.conf`.

Caution
If you do **not** set the defaults like described above and skip directly to the commands below you set **all** your clients into WAN mode !

For a WAN/VPN client, which shall do caching of configurations and *opsi-products*, the *host parameter* have to be configured as follows:

- `opsiclientd.event_gui_startup.active`: `false`
- `opsiclientd.event_gui_startup{user_logged_in}.active`: `false`
- `opsiclientd.event_net_connection.active`: `true`
- `opsiclientd.event_timer.active`: `true`

The client specific *host parameter* can be set by *opsi-configed* or *opsi-admin*.

To set the *host parameter* by *opsi-admin*, the following commands have to be executed on the *opsi-config-server*: (in this example the client has the *opsi-host-Id* `vpnclient.domain.de`):

```
opsi-admin -d method configState_create opsiclientd.event_gui_startup.active vpnclient.domain.de false
opsi-admin -d method configState_create opsiclientd.event_gui_startup{user_logged_in}.active vpnclient.domain.de false
opsi-admin -d method configState_create opsiclientd.event_net_connection.active vpnclient.domain.de true
opsi-admin -d method configState_create opsiclientd.event_timer.active vpnclient.domain.de true
```

This configuration will process as follows:

- At system start of the client there will be no connection established to the *opsi-config-server*.
- When the activation of a network interface is detected, a connection to the *opsi-config-server* will be established (if possible) and the synchronization starts as background task.
- A `timer`-Event will be established, which tries at regular intervals to trigger the synchonization process.

Setting the protocol for caching of *opsi-products*

The caching of *opsi-products* can be done via the protocols *HTTPS/WEBDAVS* or *CIFS/SMB*.

When using *webdav*, access to the *opsi-depot* is performed by the *opsiconfd*.

- advantages:
  - easy firewall configuration, for it requires just port 4447.
  - verify of the SSL-certificate of the *opsi-depot* available.
- disadvantage:
  - the *opsiconfd* generates more traffic on the *opsi-depot*.

By using *cifs*, access to the *opsi-depot* is done via *SAMBA*.

- advantage:
  - the *SAMBA*-server shows a good performance, is resource-conserving and well scaleable.
- disadvantages:
  - the firewall configuration is more complicated, access to the SAMBA ports is required.
  - no verify of the SSL-certificate of the *opsi-depot* is available.

An instruction for configuring the protocols is to be found in the chapter Section 9.10.3.

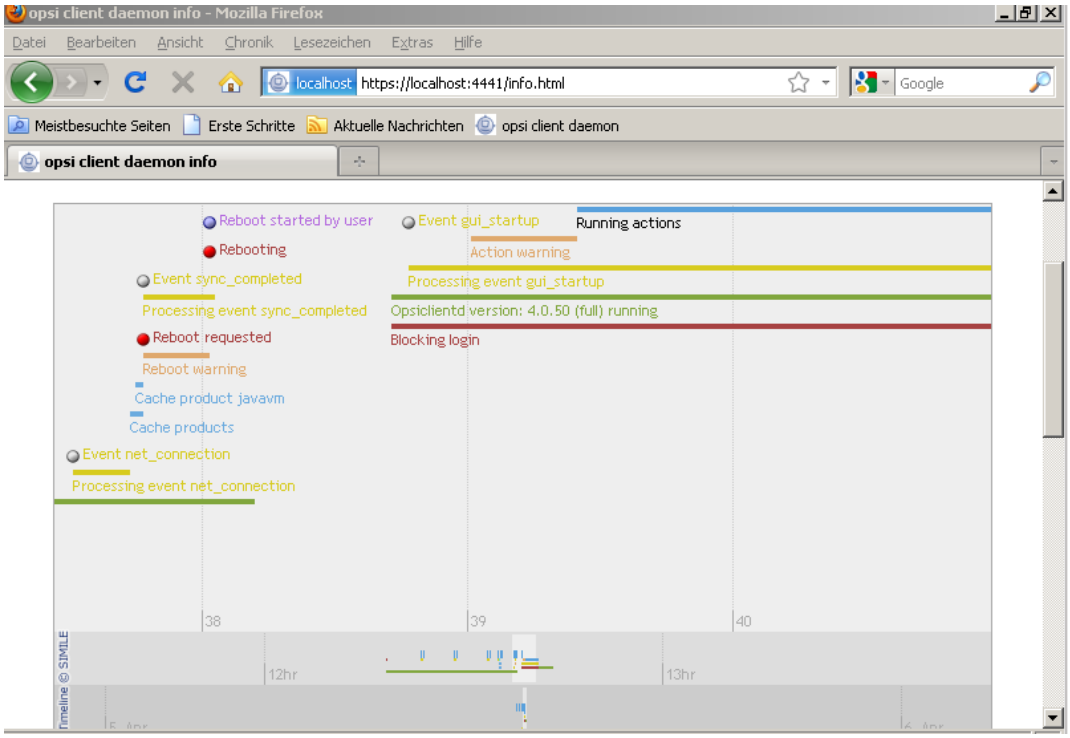


Figure 112: processing of an installation with WAN extension as displayed in the opsiclientd infopage

Verifying the server certificates

To activate the verifying of SSL certificates, in the `opsiclientd.conf` within the section `[global]`, the option `verify_server_cert` is to be set to `true`. This, during connection to an `opsiconfd`, results in verifying the *opsi-server* by using the SSL certificate. The server certificates will be stored in the directory `%SystemDrive%\opsi.org\opsiclientd\server-certs`. The name of the certificate is combined from the server address (IP or name) and the extension `.pem`. If at connection time no stored certificate is to be found, no checking will be done.

Tip
To publish a changed certificate, the old certificate stored on the clients has to be deleted. This can be done by the RPC-method `deleteServerCerts`, which is available from the control interface of the *opsiclientd*.

9.11 opsi-Nagios-Connector

9.11.1 Introduction

Beside client management is monitoring one the central functions in a modern IT service management. With opsi you got a client management tool. For monitoring tasks there are other well known open source solutions. So we build for the monitoring tasks in opsi not an own monitoring tool but an interface to existing solutions. With this opsi extension we provide a connector to Nagios.
In the following chapters the design and configuration of the opsi-Nagios-Connector is explained.

The opsi-Nagios-Connector isn't strictly bound to Nagios. It is developed for the use with Nagios and Icinga. It should also work with other Nagios derivatives but this is whether tested nor supported.

The scope of this manual is the design and configuration of the opsi-Nagios-Connector. It is not a Nagios manual. You will need a running Nagios installation and the knowledge how to run Nagios.

9.11.2 Preconditions

Preconditions at the opsi server and client

This extension is at the moment a cofunding project which means that until the complete development costs are payed by co-funders, they are only allowed to use by the co-funders or for evaluation purposes. If we have earned the development cost we will give these modules for everybody for free.
see also
opsi cofunding projects
opsi cofunding contribution

So as precondition to use this extension you need as first an activation file. For evaluation purpose you will get a temporary activation file if you ask for it in a mail at info@uib.de.
For more details see Section 9.1.

Technical preconditions are opsi 4.0.2 with the following package and product versions:

Table 19: Needed product and package versions

opsi package	Version
opsi-client-agent	>=4.0.2-1
opsiconfd	>=4.0.2.1-1
python-opsi	>=4.0.2.1-1

Preconditions at the Nagios server

As precondition you need a Nagios installation in the version 3.x or a Icinga Installation in the version 1.6 or higher. For graphical output of performance data a pnp4nagios installation is required.

Further information can be found at:

- nagios.org
- icinga.org
- pnp4nagios.org

9.11.3 Concept

The opsi-Nagios-Connector contains of two core components. At first we will discuss these core components.

opsi web service extension

The heart of the opsi-Nagios-Connector are extended features of the opsi web service. These web service extension make it possible to run checks via web service on the opsi server. So the Nagios server calls checks via web service which are executed on the opsi-server and the results come back to the Nagios server via opsi web service. The advantage of this solution is that there is nearly nothing to do on the monitored opsi server.

The focus of the opsi web service extension lies on opsi specific checks like e.g. rollout monitoring. For the *normal* server monitoring you should use still standard check methods.

opsi-client-agent extension

An other part of the opsi-Nagios-Connector is an extension of the opsi-client-agent.
In a opsi environment on every managed client runs a opsi-client-agent. With this extension you may use the opsi-client-agent as Nagios agent as well. But in fact not all features of a standard Nagios agent like `NSClient++` are implemented at the opsi-client-agent. You may use the opsi-client-agent to run command line programs and send back the output.

If you not use all functions like NSCA but rather some standard checks per plugin on the client or a set of own plugins on the clients you can use the opsi-client-agent.

If you need more features for the client monitoring you should rollout a standard agent like `NSClient++` via opsi.

The advantage of using the opsi-client-agent as Nagios agent is, that you don't need an additional agent on the client and that you don't need any access data for the clients at the monitoring server. These data is not needed because all check run via the opsi server. This makes the configuration a lot more easier.

9.11.4 opsi-checks

The following chapter explains the goals and configurations of the opsi-checks.

Some background information about where to run the checks

Monitoring administrators know the difference between active and passive checks.

With the opsi-Nagios-Connector we get a new difference: direct and indirect.

- direct:
  The check which collects information about a client runs on that client, get the information direct from the client and sends the information back.
- indirect:
  The check which collects information about a client runs on the opsi server and get the information from the opsi configuration data which is stored in the opsi backend. So - this information may be different from the actual situation of the client.

A good example for an indirect check is the `check-opsi-client-status`. This check gives you for a given client information about pending action request and reported failures of the opsi software deployment.. So this are information about the client from the opsi servers point of view. Therefore this check runs on the opsi server and is an indirect check. A check which runs on the client is a direct check.

For a correct distribution and configuration of the checks you have to analyze your opsi installation.
According to the flexibility of opsi many various opsi configurations are possible. So here we can only explain some typical situations. Of course we will get help for special situations by our comercial support.

only one opsi server:
The opsi stand alone installation is the situation that you will find at the most opsi environments. At this installation the opsi config server functionality is at the same server like the (one and only) opsi depot server functionality.
This means to you, that you may ignore if a check has to be run on the config server or the depot server.

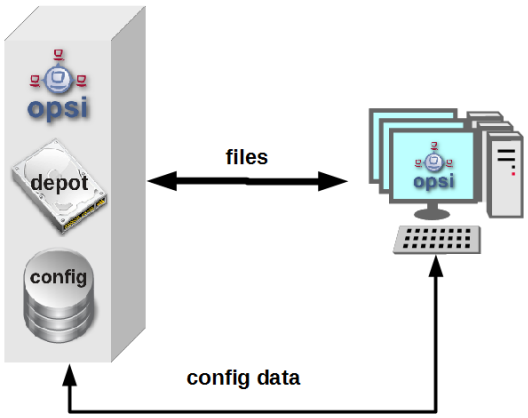


Figure 113: Scheme of a standalone opsi server

opsi with multiple depotservers:
If you have a central management of a multi location opsi environment (one config server, multiple depot servers) the situation is more complicated. So you have to understand the situation:

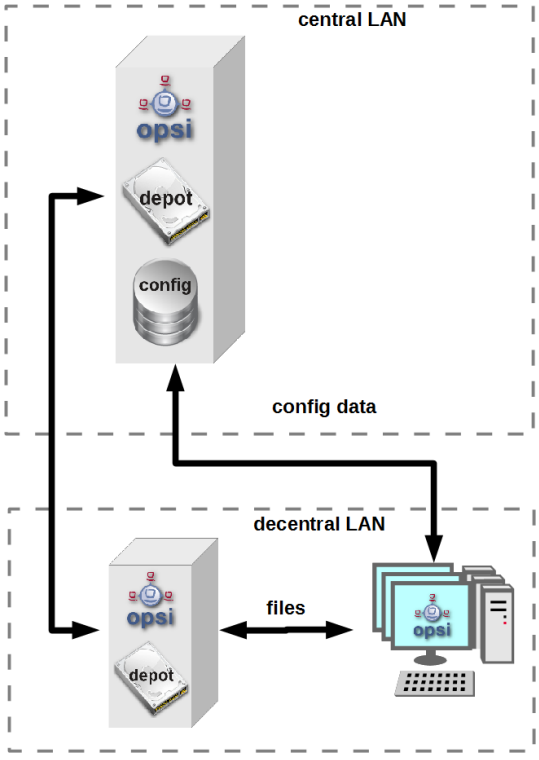


Figure 114: Scheme opsi multi depot environment

As the figure points out there is only one server which have data storage for the configuration data - the data backend. This is the opsi config server. The opsi depot server has no own data storage but a redirected backend. This means that if you ask a depot server for any configuration data, this question will be redirected to the config server. And this leads to the consequence that every check which runs against the opsi data backend will at least run on the config server. So you should address checks that run against the backend always to the config server. Even in the situation if you are collecting information about clients which are assigned to a depot which is different from the config server and the check is logically part of the check of this depot server.

If you running direct checks you normally also address the config server. You may address the depot server if the clients can't be reached by the opsi config server via port 4441. In this case it is a good idea to address the depot server.

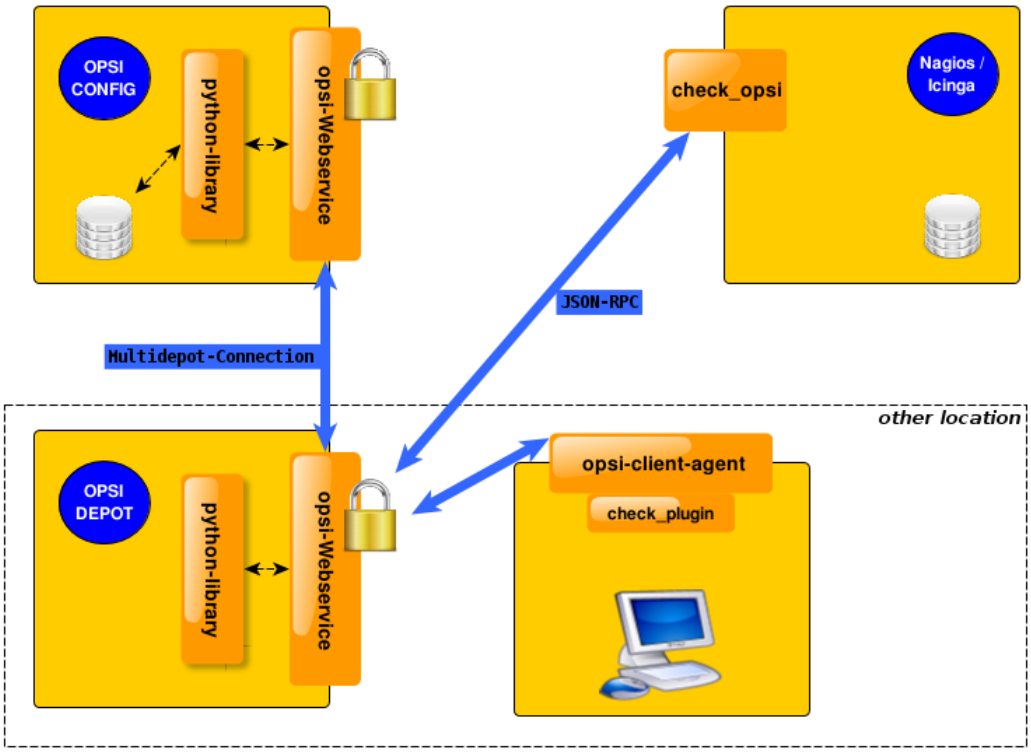


Figure 115: Distributed checks

opsi-check-plugin

At the nagios server there is only one opsi-check-plugin which provides a wide range of different checks. According to the number of features there is also a big number of command line options. So - just list all these options won't help you much. Instead the option will be explained in the context of documentation of the possible checks.
How ever to get a listing of all options you may call `check_opsi` with the parameters `--help` or `-h`.

The following general options are needed for every check:

Table 20: General Options

Option	Description	Example
-H,--host	opsi server which should run the check	configserver.domain.local
-P,--port	opsi webservice port	4447 (Default)
-u,--username	opsi monitoring user	monitoring
-p,--password	opsi monitoring password	monitoring123
-t,--task	opsi check method (case sensitive)	

The following chapter describes how to call the opsi-check-plugin is called on the command line. How you have to configure these calls at your Nagios server is described at the chapter *configuration*.

In order to install the opsi-check-plugin on your Nagios server you should add the opsi repository to your server and

install the package *opsi-nagios-plugins*.
For example at Debian or Ubuntu with the following commands:

```
apt-get install opsi-nagios-plugins
```

On RedHat/Centos Servers please use the follwing command:

```
yum install opsi-nagios-plugins
```

And last but not least for openSUSE/SLES Installations:

```
zypper install opsi-nagios-plugins
```

The plugin it self is written in python and should ran at any distribution.

The package bases on the package *nagios-plugins-basic* respectivly *nagios-plugins* and installs the plugin to `/usr/lib/nagios/plugins`.
According to the flexibility of the check_plugin there is no automatic configuration.

Check: opsi web service

This check monitors the opsi web service process (opsiconfd). This check returns also performance data. You should run this check on every opsi server because every opsi server have a opsiconfd process.

```
check_opsi -H configserver.domain.local -P 4447 -u monitoring -p monitoring123 -t checkOpsiWebservice
```

This check return normally OK.
You will get other return values in the following situations:

- Critical:
  - If the opsiconfd is in trouble and can't reply correctly.
  - If the opsiconfd consumes more than 80% of the cpu.
  - If you have a rate of RPC errors of more than 20%.
- Warning:
  - If the opsiconfd consumes more than 60% (but less than 80%) of the cpu.
  - If you have a rate of RPC errors of more than 10% but less than 20%
- Unknown:
  The opsi web service could not be reached.

NOTICE: The percentage value of the cpu consumption belongs always to one cpu because the opsiconfd only may use one cpu. (This may change with the opsi multi processing extension)

Check: opsi web service pnp4nagios template

For the display of performance data there is a template for pnp4nagios which displays the data in a combined way. Here is not described how to install pnp4nagios. We assume that pnp4nagios is installed and configured correctly. The way you have to use to configure our template may differ from the below described way according to your pnp4nagios installation (which may use different path).

Standard templates display for every performance data an own diagram. To create a combined display you have to go the following steps:

Step 1:
create at `/etc/pnp4nagios/check_commands` a file named `check_opsiwebservice.cfg` and insert the following content:

```
CUSTOM_TEMPLATE = 0
DATATYPE = ABSOLUTE,ABSOLUTE,ABSOLUTE,ABSOLUTE,DERIVE,GAUGE,GAUGE,GAUGE
```

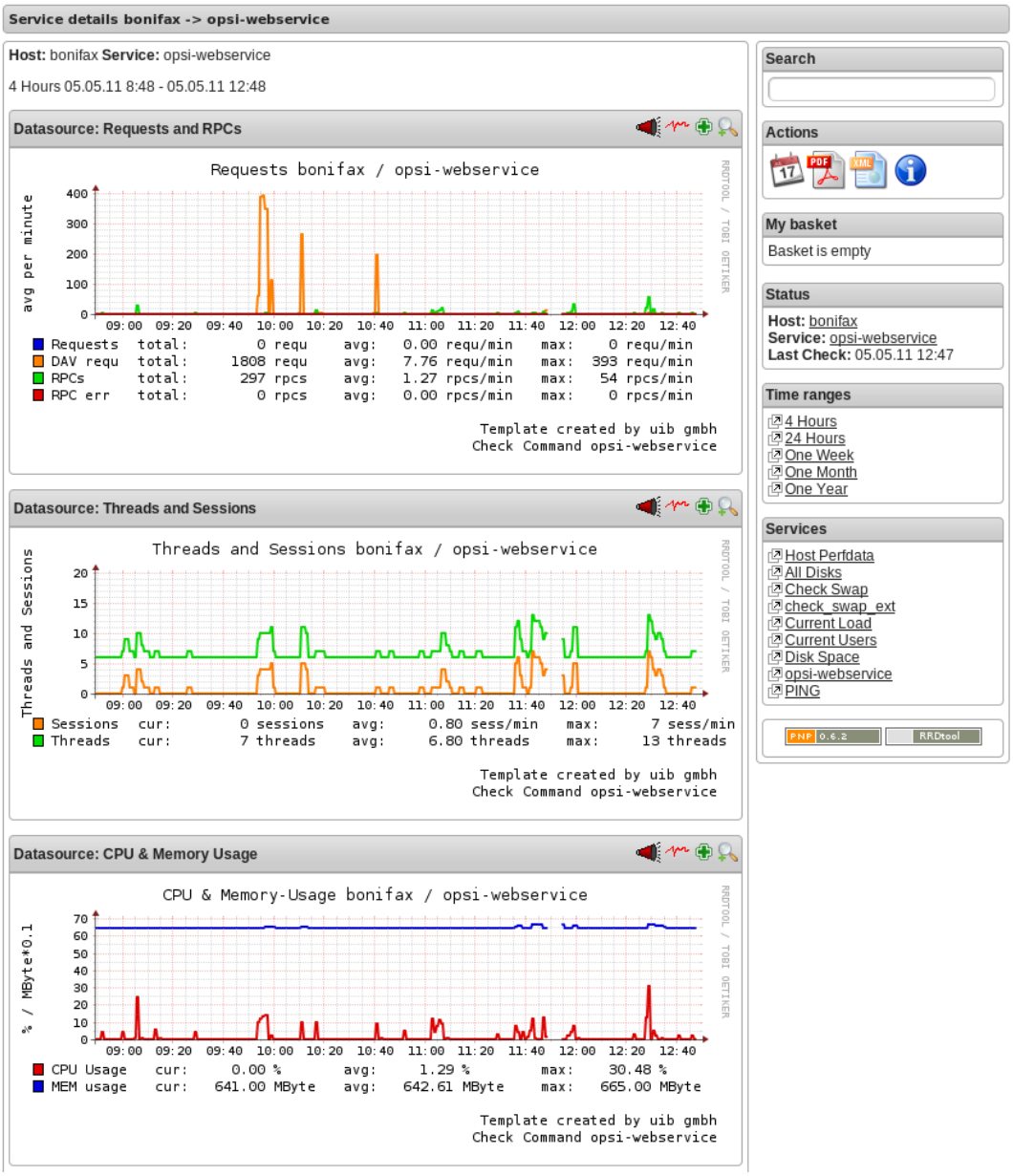
Setp 2:
change to the directory `/usr/share/pnp4nagios/html/templates` and place there a file `check_opsiwebservice.php` which you check out from svn.opsi.org:

```
cd /usr/share/pnp4nagios/html/templates
svn co https://svn.opsi.org/opsi-pnp4nagios-template/trunk/check_opsiwebservice.php
```

Please check that your php file is named exactly like the *command_name* which is defined at the `/etc/nagios3/conf.d/opsi/opsicommands.cfg`. If the names don't match, a standard template will be used instead our combined template.

After installing this template you should delete the RRD data bases which belong to this check (if there any existing). You will find these data bases at `/var/pnp4nagios/perfdata/<host>/` where you should (only) delete the `opsi-webservice.rrd` and `opsi-webservice.xml` files.

If you have configured everything correctly you should now able to see diagrams like the following screenshot.



Check: opsi-check-diskusage

This check monitors the usage of the resources (directories) which are used by opsi. The following table shows the resource names and the corresponding directories:

Table 21: opsi resources

Resource name	Path
/	/usr/share/opsiconfd/static
configed	/usr/lib/configed
depot	/var/lib/opsi/depot
repository	/var/lib/opsi/repository

Please note that this check monitors only opsi relevant data and do replace a general disk usage check for the server.

The following command retrieves all resources at one time:

```
check_opsi -H configserver.domain.local -P 4447 -u monitoring -p monitoring123 -t checkOpsiDiskUsage
```

In addition to this standard variant you may restrict the check to the ressource `repository`:

```
check_opsi -H configserver.domain.local -P 4447 -u monitoring -p monitoring123 -t checkOpsiDiskUsage --resource \
    repository
```

The default result value of this check is *OK* and the free space of the resources. The free space is given in Gigabyte. The default values for the *Warning* and *Critical* results are:

- WARNING: If at least one resource have 5GB or less free space.
- CRITICAL: If at least one resource have 1GB or less free space.

This are the default thresholds. They may changed by giving other values for *Warning* with the -W or --warning options and for *Critical* wit the -C or --critical option. With these options you can give the thresholds as Gigabyte (G) and as percent (%) as well. The produced output uses the same unit which is used to define the thresholds. Finally an example:

```
check_opsi -H configserver.domain.local -P 4447 -u monitoring -p monitoring123 -t checkOpsiDiskUsage --resource \
    repository --warning 10% --critical 5%
```

Check: opsi-client-status

One of the targets of the opsi Nagios connector is the software roll out monitoring by viewing to single clients. This is one of the checks which is designed for this job. More exactly: the *software roll out* and *last seen* situation of a certain client is checked.

The result of the following checks is determined by two different states:

- The roll out state of one or more software products:
  The software roll out state results to:
  - *OK* if the software is installed at the in the same product and package version which is available at the server and no action request is set.
  - *Warning* if the software is installed in version that is different to the servers version or if any action request is set.
  - *Critical* if there is a *failed* reported by the last action.

- The time since *last seen*:
  The time since *last seen* results to:
  - *OK* if the client has bee seen less or equal then 30 days before.
  - *Warning* if the client has bee seen more then 30 days before.

This check may used in different variants, here is the simplest one, which includes all software packages:

```
check_opsi -H configserver.domain.local -P 4447 -u monitoring -p monitoring123 -t checkClientStatus -c opsiclient.\
    domain.local
```

As variant it is possible to exclude products from the check. For example:

```
check_opsi -H configserver.domain.local -P 4447 -u monitoring -p monitoring123 -t checkClientStatus -c opsiclient.\
    domain.local -x firefox
```

In the example above the product *firefox* was excluded from the check. So this check would not switch to critical because the last action on *firefox* reported a failure.

Check: opsi-check-ProductStatus

An other target of the opsi Nagios connector is the software roll out monitoring by viewing to single product or a group of products.

The result of the following checks is determined by the following states:

The software roll out state results to: * *OK* if the software is installed at the in the same product and package version which is available at the server and no action request is set. * *Warning* if the software is installed in version that is different to the servers version or if any action request is set. * *Critical* if there is a *failed* reported by the last action.

This checks has many variants and is so very flexible. The bast way to explain these variants are examples.

The simplest variant check one product on all clients. Here you have to give the product as the opsi `productId`.

```
check_opsi -H configserver.domain.local -P 4447 -u monitoring -p monitoring123 -t checkProductStatus -e firefox
```

In a simple one server opsi environment, this check is all you need to check the state of the product *firefox* on every client.
You will get the information how many clients are in *Warning* and in *Critical* states.

To get the information which clients exactly have the problems, you should call the check in the `verbose mode`:

```
check_opsi -H configserver.domain.local -P 4447 -u monitoring -p monitoring123 -t checkProductStatus -e firefox -v
```

An other variant is, that you may exclude a client from the check.

//// produkt muss angegebn werden ?! ////

```
check_opsi -H configserver.domain.local -P 4447 -u monitoring -p monitoring123 -t checkProductStatus -e firefox -x \
    client.domain.local
```

In a opsi environment with multiple depot servers you have to use additional options to check also the clients that are not assigned to the config servers depot. If you have multiple depots, you may give the depots name as parameter:

```
check_opsi -H configserver.domain.local -P 4447 -u monitoring -p monitoring123 -t checkProductStatus -e firefox -d \
    depotserver.domain.local
```

The reason is that the version of the software packages may differ between your depots. So every client has to be checked against the versions at the depot where they are assigned to. An advantage is that can place the display of the results to the depot server.
You may give instead of the depot servers name the keyword *all* which means all known depot servers. But this

normally make only sense if you have only one or two depots. You may also give a comma separated list of depot servers.

An other way to define the checks is to give the name of a opsi groups. So you may check the software roll out state of all products in a given opsi product group. If you have for example a product group *accounting* you may use the following call:

```
check_opsi -H configserver.domain.local -P 4447 -u monitoring -p monitoring123 -t checkProductStatus -g accounting
```

Now you will check all products that are Members of the opsi product group *accounting* by this single check. Important is to see, that the resolution of the opsi group is done while the check at the opsi server. So you may change the opsi group at the opsi Management interface and so you will change the products that will checked without any changes at the Nagios server.

Note
Sub groups (groups in groups) will not be resolved.

In the same way it is possible to define the clients that should be checked by giving the name of a opsi client group. An example for a client group *productiveclients*:

```
check_opsi -H configserver.domain.local -P 4447 -u monitoring -p monitoring123 -t checkProductStatus -g accounting -G \
    productiveclients
```

This would check all products of the product group *accounting* at all clients of the client group *productiveclients*.

Note
Sub groups (groups in groups) will not be resolved.

Note
You may also give a comma separated list of opsi groups.

Finally opsi-Clients can be excluded:

```
check_opsi -H configserver.domain.local -P 4447 -u monitoring -p monitoring123 -t checkProductStatus -g buchhaltung -G \
    produktivclients -x client.domain.local
```

Check: opsi-check-depotsync

If you are using multiple opsi depots the monitoring of synchronicity is important. Even if your depots are for good reasons not completely synchronize they should be synchrony as much as possible to avoid problems by moving a client from one depot to another.

This check monitors if your depots are synchronize according to product ids, product versions and package versions.

This check returns:

- *OK*
  If all is in sync.
- *Warning*
  If there is any difference

You should run this check always on the config server because all the data come from the backend of the config server.

Here are some examples.

The base variant:

```
check_opsi -H configserver.domain.local -P 4447 -u monitoring -p monitoring123 -t checkOpsiDepotSyncStatus
```

This base variant is equivalent to the following call:

```
check_opsi -H configserver.domain.local -P 4447 -u monitoring -p monitoring123 -t checkOpsiDepotSyncStatus -d all
```

So if you don't give the depots which are have to be checked, all known depots will be checked. If you have a lot of depots the interpretation of the result is complicated, so it is a good idea to define a lot of single checks where the depots are given as comma separated list:

```
check_opsi -H configserver.domain.local -P 4447 -u monitoring -p monitoring123 -t checkOpsiDepotSyncStatus -d \
    configserver.domain.local,depotserver.domain.local
```

With this check you compare all products, that are installed **on both** depots. Any product which is installed only on one of the depot is ignored and will not effect the result.

If you want to include products which are not installed on all checked depots, you have to use the `strictmode` switch:

```
check_opsi -H configserver.domain.local -P 4447 -u monitoring -p monitoring123 -t checkOpsiDepotSyncStatus -d \
    configserver.domain.local,depotserver.domain.local --strictmode
```

Now also differences about missing products will be seen.

If you like to exclude a product from the check (perhaps because this product should be in different versions on different depots) you may do this by using the `-x` option. Here you may also use a comma separated list:

```
check_opsi -H configserver.domain.local -P 4447 -u monitoring -p monitoring123 -t checkOpsiDepotSyncStatus -d \
    configserver.domain.local,depotserver.domain.local --strictmode -x firefox,thunderbird
```

This check will not warn if the products *firefox* or *thunderbird* or not in sync.

Instead of excluding products you may give an explicit list of products that has to been checked:

```
check_opsi -H configserver.domain.local -P 4447 -u monitoring -p monitoring123 -t checkOpsiDepotSyncStatus -d \
    configserver.domain.local,depotserver.domain.local --strictmode -e firefox,thunderbird
```

In this case **only** *firefox* and *thunderbird* will be checked. We recommend to use this check variant with `strictmode` to see if one of the products is missing.

```
check_opsi -H configserver.domain.local -P 4447 -u monitoring -p monitoring123 -t checkOpsiDepotSync
```

Check: nagios client plugin check via opsiclientd

This check gives you an easy possibility to integrate checks that collects the data direct on the client with a minimum of configuration work.

So this check tells the opsiclientd which is running at the opsi client to run a command, fetch the output and send it back.

This extension is not intended to be a complete replacement of a full featured Windows Nagios agent. It is only a light weight alternative.

The plugins which the opsiclientd may call must be compatible to the `Nagios plug-in development guidelines`. (More details at: http://nagiosplug.sourceforge.net/developer-guidelines.html).

In order to run such a plugin on the client, it has to be installed at the client. This problem you will solve by deploying it as an opsi package. The path where the plugin is installed at client doesn't matter because you have to give the complete path at check definition. We recommend to install all plugins in one directory to ease the maintenance of the plugins at the client.

For security reasons you should make sure that non privileged users have no write access to the plugins, because they will be executed from the opsiclientd with *system* privileges.

There are lot of ready to use plugins at the internet. One important address to look is:
http://exchange.nagios.org/

In the following we assume that your plugins are installed at `C:\opsi.org\nagiosplugins\` and we will find ther the plugin `check_win_disk.exe` out of the package *nagioscol* from
http://sourceforge.net/projects/nagiosplugincol/

```
check_opsi -H configserver.domain.local -P 4447 -u monitoring -p monitoring123 -t checkPluginOnClient --plugin "C:\\\
    opsi.org\\nagiosplugincol\\check_win_disk.exe C:" -c client.domain.local
```

This call checks the client `client.domain.local`. At the client the plugin `check_win_disk.exe` is called with the parameter `C:`. This means, that the hard drive with the letter *C* should be checked. The output and the result value of the plugin will be fetched by the opsiclientd and will be given back to the Nagios server (via the opsi server) in a for Nagios correct format.

Another special feature is to hold the last check results, even if the client is not reachable.

This feature was implemented according to the fact that desktop clients not always are running like servers, but the most time in their life are usually switched off. Normally Nagios will show for switched off clients the result *Unknown*. In fact the most problems on the monitored clients will not disappear by just switching them off and on again. So the information that a client had a problem before it was switched off may be an essential information for the system administrator. (You may try to solve this problem by using `Timeperiods` at the Nagios configuration, but we think that this is not flexible enough and leads to a permanent configuration work). So this opsi extension give you the possibility to give back the last real check results if the client is not reachable right now.

In order to use this feature, you have to use the Nagios macros `$SERVICESTATEID$` and `$SERVICEOUTPUT$`. `$SERVICESTATEID$` gives the last result value and should be passed to the `-s` Option. `$SERVICEOUTPUT$` gives the last output line and should be passed to the `-o` Option. So check can give these last values instead of *Unknown* if the client is not reachable.

```
check_opsi -H configserver.domain.local -P 4447 -u monitoring -p monitoring123 -t checkPluginOnClient --plugin "C:\\\
    opsi.org\\nagiosplugincol\\check_win_disk.exe C:" -c client.domain.local -s $SERVICESTATEID$ -o  $SERVICEOUTPUT$
```

9.11.5 opsi monitoring configuration

This chapter focuses on the configuration that have to been made for a working interface between the opsi and the Nagios server. Just see this as a recommendation, there will be a lot of other ways to do the job.

This description uses a Nagios server as monitoring server. On a Icinga server it should work very similar but you have to change some path entries. It should also work on other Nagios derivatives but this is not tested.

Tip
The configurationfiles from these Chapter are in opsi-nagios-connector-utils svn-Repository. To get these example configurationfiles you can connect over a browser to following url:

```
https://svn.opsi.org/listing.php?repname=opsi-nagios-connector-utils
```

or you can make a direct checkout from repository with following command:

```
svn co https://svn.opsi.org/opsi-nagios-connector-utils
```

---

opsi monitoring user

In monitoring environments you will often find that the access is just restricted by IP numbers. Because of the lack of security of this solution we decided to work with a real user / password security in this opsi extension.

Using the opsi standard group `opsiadmin` would give the Nagios more rights than needed. So you have to create an own opsi user for the opsi-Nagios-Connector.

In the following example a user named *monitoring* with the password *monitoring123* is created for opsi:

```
opsi-admin -d method user_setCredentials monitoring monitoring123
```

The created user *monitoring* will be stored with its encrypted password at the `/etc/opsi/passwd` and is not a user which may be used to login at a shell. In fact it is no real Unix user.

You have to create this user only on your config server, even if you have multiple depots.

At your Nagios server you should mask the user and password by making an entry at the `/etc/nagios3/resource.cfg`. This should look for example like this:

```
$USER2$=monitoring
$USER3$=monitoring123
```

The number behind *$USER* may vary. If this configuration was not used before, there should be only `$USER1$` be used. According to what you are using here, you might have to change the other examples in this manual.

opsi-Nagios-Connector configuration directory

To make the maintenance of the Nagios configuration easier, we recommend to put all *opsi nagios connector* related configuration files in one separated place.
So just create below `/etc/nagios3/conf.d` a new directory named `opsi` for these configurations.

The configuration files we will place in this directory are:

- Nagios Template: `opsitemplates.cfg`
- Hostgroups: `opsihostgroups.cfg`
- Server Hosts: `<full name of the server>.cfg`
- Commands: `opsicommands.cfg`
- Contacts: `opsicontacts.cfg`
- Services: `opsiservices.cfg`

All the client configuration files we recommend to put in sub directory of this place. Therefore you create below `/etc/nagios3/conf.d/opsi` another directory named `clients`.

Nagios template: `opsitemplates.cfg`

Using templates is a standard functionality of Nagios which will not explained here. The main advantage is that it makes the single configuration files smaller and easier to read (and write).

Inside of the templates we use some Nagios *custom variables* for often used values. According to the fact, that the most checks have to run on the opsi config server, we will define the name and port of the config server as such a *custom variable*:

```
_configserver           configserver.domain.local
_configserverurl        4447
```

You will find this below in the template definitions.
These *custom variables* may later on be referenced by the Nagios macros: `$_HOSTCONFIGSERVER$` and `$_HOSTCONFIGSERVERPORT$`. (These macros have leading *HOST* in their name, because they are defined inside of a host definition).

For more details on variable and macro take look at your Nagios documentation.

Now the first file we create in `/etc/nagios3/conf.d/opsi` is the template definition file `opsitemplates.cfg`.

This file may hold different templates. Every template is created according to the following patter (which contains comments for better understanding):

```
define host{
        name                    opsihost-tmp    ; The name of this host template
        notifications_enabled           1       ; Host notifications are enabled
        event_handler_enabled           1       ; Host event handler is enabled
        flap_detection_enabled          1       ; Flap detection is enabled
        failure_prediction_enabled      1       ; Failure prediction is enabled
        process_perf_data               0       ; Process performance data
        retain_status_information       1       ; Retain status information across program restarts
        retain_nonstatus_information    1       ; Retain non-status information across program restarts
                max_check_attempts              10
                notification_interval           0
                notification_period             24x7
                notification_options            d,u,r
                contact_groups                  admins
        register                        0       ; DONT REGISTER THIS DEFINITION - ITS NOT A REAL HOST, JUST A TEMPLATE!
        icon_image                      opsi/opsi-client.png
        }
```

NOTE: * The optional option icon_image may put it to an image with relative path below: `/usr/share/nagios3/htdocs/images/logos/`. * Optional you may give an own *contact_group*, which have to be defined as contact object, for example in the file `opsicontacts.cfg`.

Now we recommend to create templates for the following objects

- opsi server
- opsi client
- opsi service
- and 2 templates for pnp4nagios (host-pnp / srv-pnp)

Let's start with the example of the opsi server template:

```
define host{
        name                            opsi-server-tmpl
        notifications_enabled           1
        event_handler_enabled           1
        flap_detection_enabled          1
        failure_prediction_enabled      1
        process_perf_data               1
        retain_status_information       1
        retain_nonstatus_information    1
                check_command                   check-host-alive
                max_check_attempts              10
                notification_interval           0
                notification_period             24x7
                notification_options            d,u,r
                contact_groups                  admins,opsiadmins
        _configserver                   configserver.domain.local
        _configserverport               4447
        register                        0
        icon_image                      opsi/opsi-client.png
        }
```

You just have to change *configserver.domain.local* to your config server name. Also you may change the *contact_groups* to your needs.

The next part of the file `opsitemplates.cfg` is the template for the clients:

```
define host{
        name                            opsi-client-tmpl
        notifications_enabled           1
        event_handler_enabled           1
        flap_detection_enabled          1
```

```
        failure_prediction_enabled      1
        process_perf_data               1
        retain_status_information       1
        retain_nonstatus_information    1
                max_check_attempts              10
                notification_interval           0
                notification_period             24x7
                notification_options            d,u,r
                contact_groups                  admins,opsiadmins
        _configserver                   configserver.domain.local
        _configserverport               4447
        register                        0
        icon_image                      opsi/opsi-client.png
        }
```

The Option "check command check-host-alive" should be not set here because the clients are not always running. In effect the clients will be displayed as *pending* instead of *offline*.

You just have to change *configserver.domain.local* to your config server name. Also you may change the *contact_groups* to your needs.

The next part of the file `opsitemplates.cfg` is the template for the opsi-services:

```
define service{
        name                            opsi-service-tmpl
        active_checks_enabled           1
        passive_checks_enabled          1
        parallelize_check               1
        obsess_over_service             1
        check_freshness                 0
        notifications_enabled           1
        event_handler_enabled           1
        flap_detection_enabled          1
        failure_prediction_enabled      1
        process_perf_data               1
        retain_status_information       1
        retain_nonstatus_information    1
                notification_interval           0
                is_volatile                     0
                check_period                    24x7
                normal_check_interval           5
                retry_check_interval            1
                max_check_attempts              4
                notification_period             24x7
                notification_options            w,u,c,r
                contact_groups                  admins,opsiadmins
        register                        0
        }
```

If you are using pnp4nagios for the graphic display of performance data you will need two other templates in the file `opsitemplates.cfg`:

```
define host {
   name       host-pnp
   action_url /pnp4nagios/index.php/graph?host=$HOSTNAME$&srv=_HOST_
   register   0
}

define service {
   name       srv-pnp
   action_url /pnp4nagios/index.php/graph?host=$HOSTNAME$&srv=$SERVICEDESC$
   register   0
}
```

opsi hostgroup: `opsihostgroups.cfg`

The nest step is to define the hostgroups. This helps to structure the display of the results as well as the service definitions.

So create a file named `opsihostgroups.cfg` wit the following content:

```
define hostgroup {
        hostgroup_name  opsi-clients
        alias           OPSI-Clients
}

define hostgroup {
        hostgroup_name  opsi-server
        alias           OPSI-Server
        members         configserver.domain.local, depotserver.domain.local
}
```

Do not forget to edit the *member* line.

opsi server: `<full name of the server>.cfg`

The next step is to create for every opsi server you are running an own configuration file. This file should be named based on the pattern `<full name of the server>.cfg`. For example `configserver.domain.local.cfg`.
(You may also create one file (e.g. `opsihost.cfg` with all server definitions).
The content should look like this:

```
define host{
        use                             opsi-server-tmpl
        host_name               configserver.domain.local
        hostgroups              opsi-server
        alias                           opsi Configserver
        address                 configserver.domain.local
        }

define host{
        use                             opsi-server-tmpl
        host_name               depotserver.domain.local
        hostgroups              opsi-server
        alias                           opsi Depotserver
        address                 depotserver.domain.local
        }
```

Explanation of the entries: * *use* references to the used template. * *hostgroups* tells us to which hostgroup this server belongs.

opsi Clients: `clients/<full name of the client>.cfg`

The opsi client configurations should be placed in an own sub directory. They should be defined like this:

```
define host{
        use                             opsi-client-tmpl
        host_name               client.domain.local
        hostgroups              opsi-clients
        alias                           opsi client
        address                 client.domain.local
        _depotid                        depotserver.domain.local
        }
```

This client configuration uses again a *custom variable*: `_depotid`. This *custom variable* may be referenced by the macro `$_HOSTDEPOTID$`.
The usage is optional. If a client may be not connected by the opsi configuration server directly, you will here write down from which depot server the client can be contacted.

To make it easier to create the configuration files for your large number of opsi clients, you may run the following script on your opsi configuration server:

```
#!/usr/bin/env python

from OPSI.Backend.BackendManager import *

template = '''
define host {
        use             opsi-client-tmpl
        host_name       %hostId%
        hostgroups      opsi-clients
        alias           %hostId%
        address         %hostId%
        }
'''

backend = BackendManager(
             dispatchConfigFile = u'/etc/opsi/backendManager/dispatch.conf',
             backendConfigDir   = u'/etc/opsi/backends',
             extensionConfigDir = u'/etc/opsi/backendManager/extend.d',
                       )


hosts = backend.host_getObjects(type="OpsiClient")

for host in hosts:
        filename = "%s.cfg" % host.id
        entry = template.replace("%hostId%",host.id)
        f = open(filename, 'w')
        f.write(entry)
        f.close()
```

opsi command configuration: `opsicommands.cfg`

Now we have to define which of the check commands, which are described before, we want to use. You should do this in a file named `opsicommands.cfg`.
This is just an example which you may change to your needs:

First let us explain the structure of the entries:

```
define command{
        command_name    check_opsi_clientstatus
        command_line            $USER1$/check_opsi -H $_HOSTCONFIGSERVER$ -P $_HOSTCONFIGSERVERPORT$ -u $USER2$ -p \
    $USER3$ -t checkClientStatus -c $HOSTADDRESS$
        }
```

The `command_name` will be used by other configuration files. The option `command_line` defines the command and all used arguments.

Based on this pattern we create now the file `opsicommands.cfg`:

```
define command {
        command_name    check_opsiwebservice
        command_line    /usr/lib/nagios/plugins/check_opsi -H $HOSTADDRESS$ -P 4447 -u $USER2$ -p $USER3$ -t \
    checkOpsiWebservice
}
define command {
        command_name    check_opsidiskusage
        command_line    /usr/lib/nagios/plugins/check_opsi -H $HOSTADDRESS$ -P $_HOSTCONFIGSERVERPORT$ -u $USER2$ -p \
    $USER3$ -t checkOpsiDiskUsage
}
define command {
        command_name    check_opsiclientstatus
        command_line    /usr/lib/nagios/plugins/check_opsi -H $_HOSTCONFIGSERVER$ -P $_HOSTCONFIGSERVERPORT$ -u $USER2$\
     -p $USER3$ -t checkClientStatus -c $HOSTADDRESS$
```

```
}
define command {
        command_name    check_opsiproductstatus
        command_line    /usr/lib/nagios/plugins/check_opsi -H $_HOSTCONFIGSERVER$ -P $_HOSTCONFIGSERVERPORT$ -u $USER2$\
      -p $USER3$ -t checkProductStatus -e $ARG1$ -d $HOSTADDRESS$ -v
}
define command {
        command_name    check_opsiproductStatus_withGroups
        command_line    /usr/lib/nagios/plugins/check_opsi -H $_HOSTCONFIGSERVER$ -P $_HOSTCONFIGSERVERPORT$ -u $USER2$\
      -p $USER3$ -t checkProductStatus -g $ARG1$ -G $ARG2$ -d "all"
}
define command {
        command_name    check_opsiproductStatus_withGroups_long
        command_line    /usr/lib/nagios/plugins/check_opsi -H $_HOSTCONFIGSERVER$ -P $_HOSTCONFIGSERVERPORT$ -u $USER2$\
      -p $USER3$ -t checkProductStatus -g $ARG1$ -G $ARG2$ -v -d "all"
}
define command {
        command_name    check_opsidepotsync
        command_line    /usr/lib/nagios/plugins/check_opsi -H $_HOSTCONFIGSERVER$ -P $_HOSTCONFIGSERVERPORT$ -u $USER2$\
      -p $USER3$ -t checkDepotSyncStatus -d $ARG1$
}
define command {
        command_name    check_opsidepotsync_long
        command_line    /usr/lib/nagios/plugins/check_opsi -H $_HOSTCONFIGSERVER$ -P $_HOSTCONFIGSERVERPORT$ -u $USER2$\
      -p $USER3$ -t checkDepotSyncStatus -d $ARG1$ -v
}
define command {
        command_name    check_opsidepotsync_strict
        command_line    /usr/lib/nagios/plugins/check_opsi -H $_HOSTCONFIGSERVER$ -P $_HOSTCONFIGSERVERPORT$ -u $USER2$\
      -p $USER3$ -t checkDepotSyncStatus -d $ARG1$ --strict
}
define command {
        command_name    check_opsidepotsync_strict_long
        command_line    /usr/lib/nagios/plugins/check_opsi -H $_HOSTCONFIGSERVER$ -P $_HOSTCONFIGSERVERPORT$ -u $USER2$\
      -p $USER3$ -t checkDepotSyncStatus -d $ARG1$ --strict -v
}
define command {
        command_name    check_opsipluginon_client
        command_line    /usr/lib/nagios/plugins/check_opsi -H $_HOSTCONFIGSERVER$ -P $_HOSTCONFIGSERVERPORT$ -u $USER2$\
      -p $USER3$ -t checkPluginOnClient -c $HOSTADDRESS$ --plugin $ARG1$
}
define command {
        command_name    check_opsipluginon_client_with_states
        command_line    /usr/lib/nagios/plugins/check_opsi -H $_HOSTCONFIGSERVER$ -P $_HOSTCONFIGSERVERPORT$ -u $USER2$\
      -p $USER3$ -t checkPluginOnClient -c $HOSTADDRESS$ --plugin $ARG1$ -s $SERVICESTATEID$ -o "$SERVICEOUTPUT$"
}
define command {
        command_name    check_opsipluginon_client_from_depot
        command_line    /usr/lib/nagios/plugins/check_opsi -H $_HOSTDEPOTID$ -P $_HOSTCONFIGSERVERPORT$ -u $USER2$ -p \
     $USER3$ -t checkPluginOnClient -c $HOSTADDRESS$ --plugin $ARG1$
}
```

Contacts: `opsicontacts.cfg`

This define the contacts which will get notifications.

```
define contact{
        contact_name                    adminuser
        alias                           Opsi
        service_notification_period     24x7
        host_notification_period        24x7
        service_notification_options    w,u,c,r
        host_notification_options       d,r
        service_notification_commands   notify-service-by-email
        host_notification_commands      notify-host-by-email
        email                           root@localhost
```

```
        }
define contactgroup{
        contactgroup_name       opsiadmins
        alias                   Opsi Administrators
        members                 adminuser
        }
```

You should replace *adminuser* by one or more real users.

Services: `opsiservices.cfg`

Finally we define with the *services* what the Nagios server have to monitor and to display. This definition are using the definition of the other configuration file above like templates, commands and hostgroups or hosts.

As first part we define the services which give us information's about the servers. One of these is the check if the depots are in sync, which is here down against *all* known depots.

```
#OPSI-Services
define service{
        use                             opsi-service-tmpl,srv-pnp
        hostgroup_name                  opsi-server
        service_description             opsi-webservice
        check_command                   check_opsiwebservice
        check_interval                  1
        }
define service{
        use                             opsi-service-tmpl
        hostgroup_name                  opsi-server
        service_description             opsi-diskusage
        check_command                   check_opsidiskusage
        check_interval                  1
        }
define service{
        use                             opsi-service-tmpl
        hostgroup_name                  opsi-server
        service_description             opsi-depotsyncstatus-longoutput
        check_command                   check_opsidepotsync_long!all
        check_interval                  10
        }
define service{
        use                             opsi-service-tmpl
        hostgroup_name                  opsi-server
        service_description             opsi-depotsyncstatus-strict-longoutput
        check_command                   check_opsidepotsync_strict_long!all
        check_interval                  10
        }
```

The next part is the monitoring of the software roll out. In one check a concrete opsi product *opsi-client-agent* is mentioned. In two other check are referenced on a opsi product group *opsiessentials* and opsi client group *productive-clients*.

```
define service{
        use                             opsi-service-tmpl
        hostgroup_name                  opsi-clients
        service_description             opsi-clientstatus
        check_command                   check_opsiclientstatus
        check_interval                  10
        }
define service{
        use                             opsi-service-tmpl
        hostgroup_name                  opsi-server
        service_description             opsi-productstatus-opsiclientagent
        check_command                   check_opsiproductstatus!opsi-client-agent
        check_interval                  10
        }
```

```
define service{
        use                             opsi-service-tmpl
        hostgroup_name                  opsi-server
        service_description             opsi-productstatus-opsiessentials-group
        check_command                   check_opsiproductStatus_withGroups!opsiessentials!productiveclients
        check_interval                  10
        }
define service{
        use                             opsi-service-tmpl
        hostgroup_name                  opsi-server
        service_description             opsi-productstatus-opsiessentials-group-longoutput
        check_command                   check_opsiproductStatus_withGroups_long!opsiessentials!productiveclients
        check_interval                  10
        }
```

In the third and last part of the file, the checks which are should run directly on the clients (*direct checks*) are defined. These checks are (for example) not assigned to hostgroups but to single hosts or lists of hosts (*client.domain.local*,*depotclient.domain.local*).

Some description:

- *opsi-direct-checkpluginonclient*
  runs a normal *direct* check on the client and results to *unknown* if the client is offline.
  At this check the config server try's to reach the client directly.
- *opsi-direct-checkpluginonclient-with-servicestate*
  is equal to *opsi-direct-checkpluginonclient*, but returns the last valid result if the client is offline (instead of *unknown*)
- *opsi-direct-checkpluginonclient-from-depot*
  is equal to *opsi-direct-checkpluginonclient*, but the client will be connected by the server which is given in the host configuration as *__depotid*.

```
define service{
        use                             opsi-service-tmpl
        host_name                       client.domain.local,depotclient.domain.local
        service_description             opsi-direct-checkpluginonclient
        check_command                   check_opsipluginon_client!"C:\\opsi.org\\nagiosplugins\\check_memory.exe"
        check_interval                  10
        }
define service{
        use                             opsi-service-tmpl
        host_name                       client.domain.local
        service_description             opsi-direct-checkpluginonclient-with-servicestate
        check_command                   check_opsipluginon_client_with_states!"C:\\opsi.org\\nagiosplugins\\\
    check_memory.exe"
        check_interval                  10
        }
define service{
        use                             opsi-service-tmpl
        host_name                       depotclient.domain.local
        service_description             opsi-direct-checkpluginonclient-from-depot
        check_command                   check_opsipluginon_client_from_depot!"C:\\opsi.org\\nagiosplugins\\check_memory\
    .exe"
        check_interval                  10
        }
```

9.12 *opsi-clonezilla* (free)

9.12.1 Preconditions for the opsi Extensions *opsi-clonezilla*

Technical preconditions are opsi 4.0.3 with the following package and product versions:

Table 22: Needed product and package versions

opsi-Package	Version
opsi-linux-bootimage	>= 20130207-1

or opsi 4.0.5 with the following package and product versions:

Table 23: Needed product and package versions

opsi packet	version
opsi-linux-bootimage	>= 20140805-1
opsi-clonezilla	>= 4.0.5-1

Caution
For the product `opsi-clonezilla` the share `opsi_images` must have write permission for *pcpatch*. Check your Samba configuration.
For use with UEFI you need at least opsi 4.0.7
Set for the property `imageshare` a share as value. This share should have the format `//server/share`. Please note the use of slashes instead of back slashes. This share should be mountable by the opsi user `pcpatch` with the password as known by the opsi-server. This is normally the share opsi_images from the opsi-server.

9.12.2 Introduction

Besides of the package based (unattended) installation, opsi had in the past just a rudimentary support for image based installations. With the integration technique of the Open Source product clonezilla (http://clonezilla.org/) into opsi, now a comprehensive and flexible solution for handling partition and disc images is available.

9.12.3 Concept

We have combined the clonezilla scripts with the opsi-linux-bootimage to generate the following benefits:

- integration into the opsi process control
- automated mount of the shares for the image repository
- availability of automated processing

9.12.4 Interactive Proceedings

Starting the opsi-clonezilla per default starts in the interactive mode. This interactive mode allows to choose the desired operations and parameters easily. Knowing the commands and their parameters from this makes it easy to create non-interactive run commands from this.

- Set for the property `imageshare` a share as value. This share should have the format `//server/share`. Please note the use of slashes instead of back slashes. This share should be mountable by the opsi user `pcpatch` with the password as known by the opsi-server. This is normally the share opsi_images from the opsi-server.
- Switch the property `runcommand` to `ocs-live` . This is the interactive mode of clonezilla.

- Start the netboot product.
- In the first dialog you will be asked, whether anything should be mounted to `/home/partimg`. Choose `Skip` because the mount has already been done by the opsi bootimage.

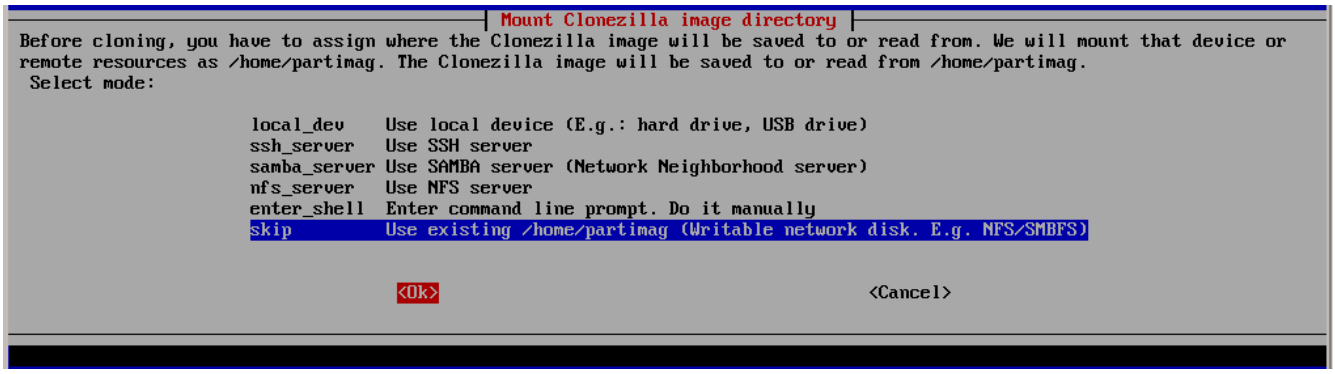


Figure 116: Skip: The share given by the property *imageshare* will be mounted by the bootimage to `/home/partimg`.

The mounted partition will be displayed:

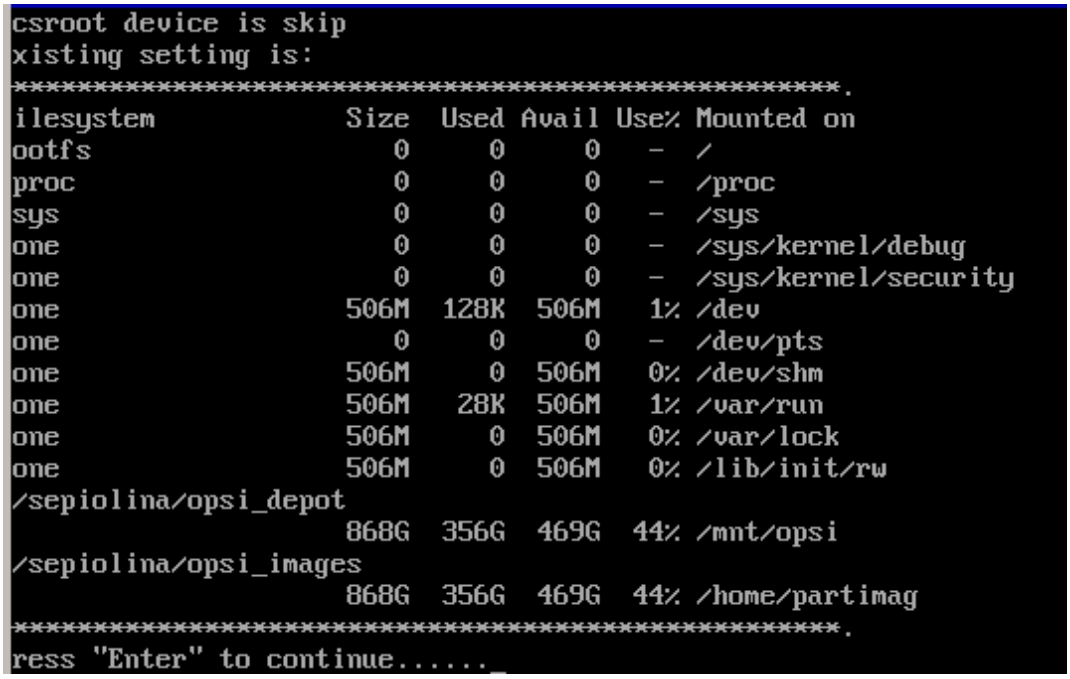


Figure 117: Mounted partitions.

By choosing `Expert` or `Beginner` you decide if you want to use all default parameters or have the possibility to modify them.

Since opsi 4.0.5 you may also choose the `Beginner` mode.

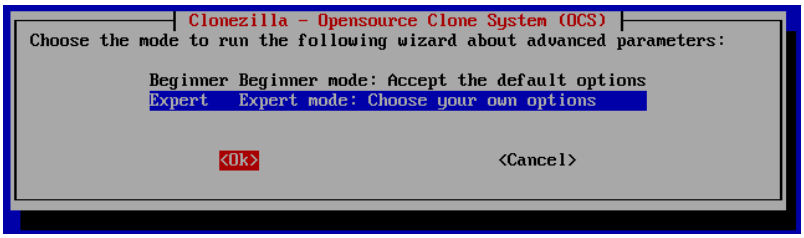


Figure 118: Expert or Beginner ?

Now you have to choose which basic operation you like to run. In this manual we discuss only the following operations:

- save disk
- save partition
- restore disk
- restore partition

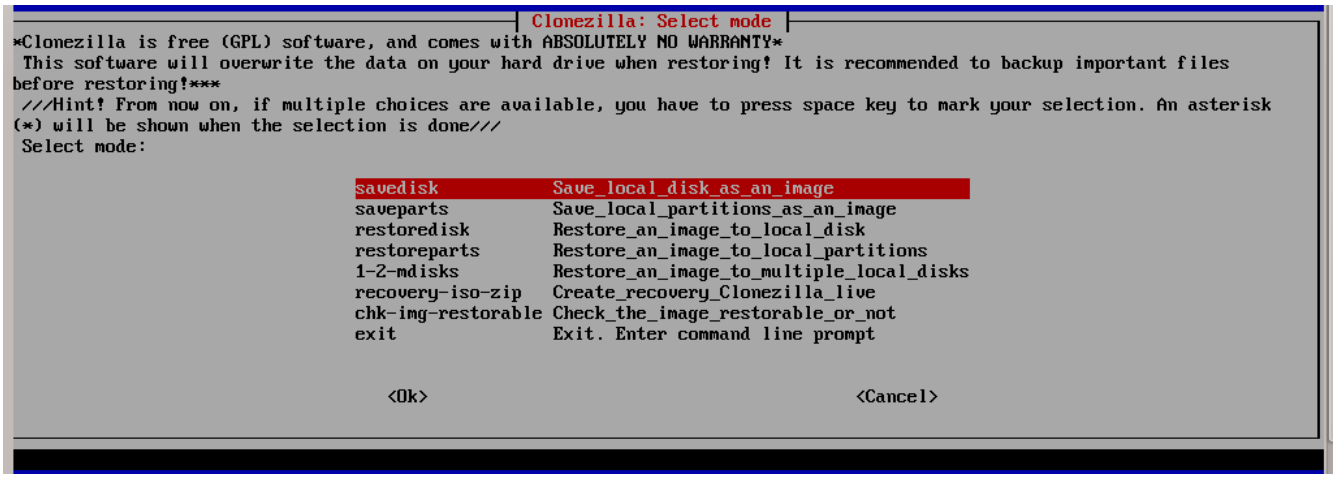


Figure 119: Choose operation.

Interactive save disk in the expert mode

Here will be shown (as an example for similar operations) the additional dialogs you will get in the save disk expert mode.

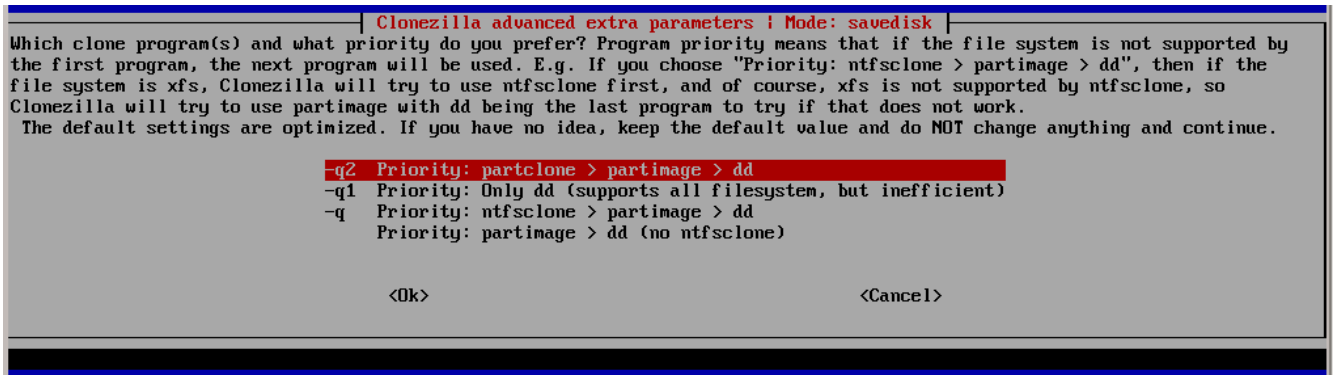


Figure 120: Choose the tools (default value recommended)

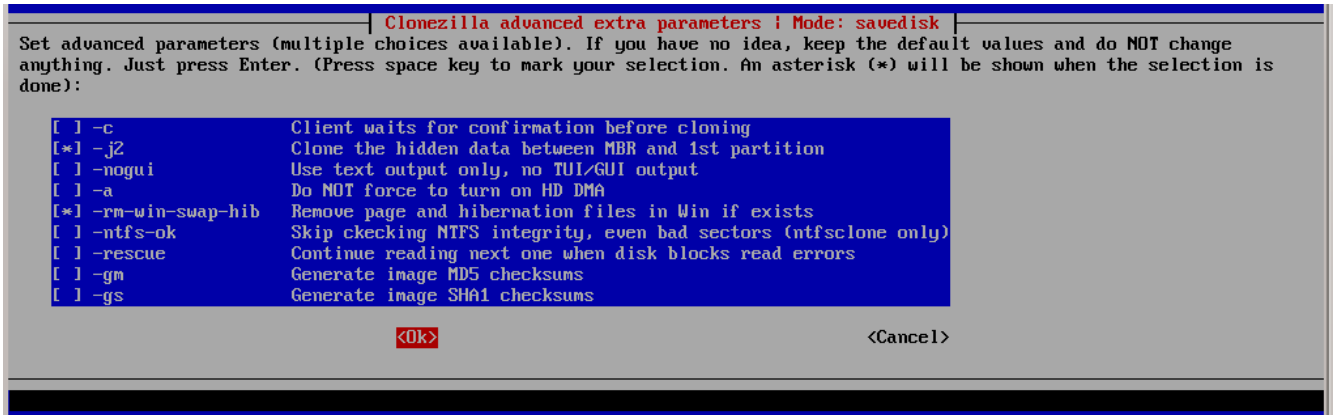


Figure 121: miscellaneous: unset -c here to suppress interactive questions for automation.

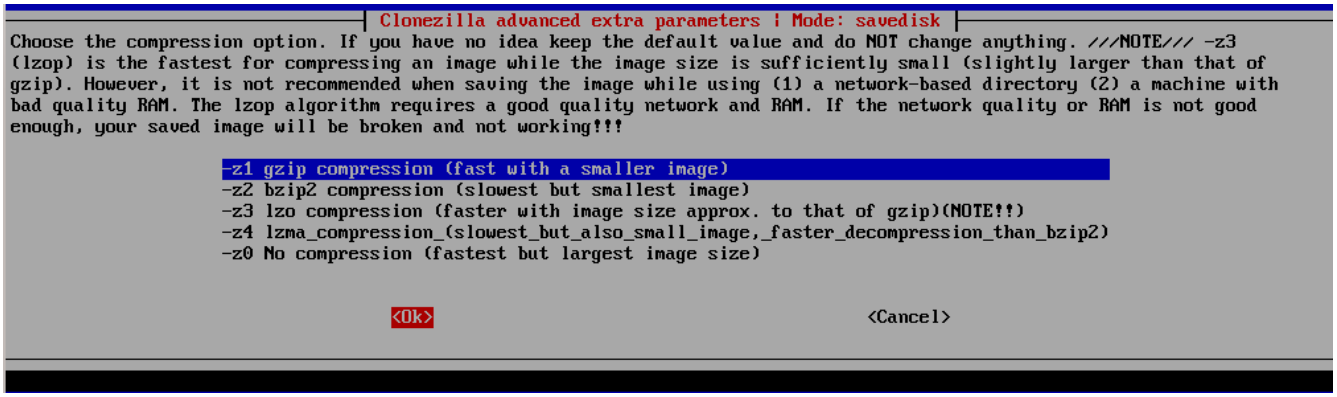


Figure 122: compression method before opsi 4.0.5, which is bootimages ⇐ 20130207 (opsi-clonezilla_2.01-3), select here -z1. With opsi 4.0.5 and above is not required anymore.

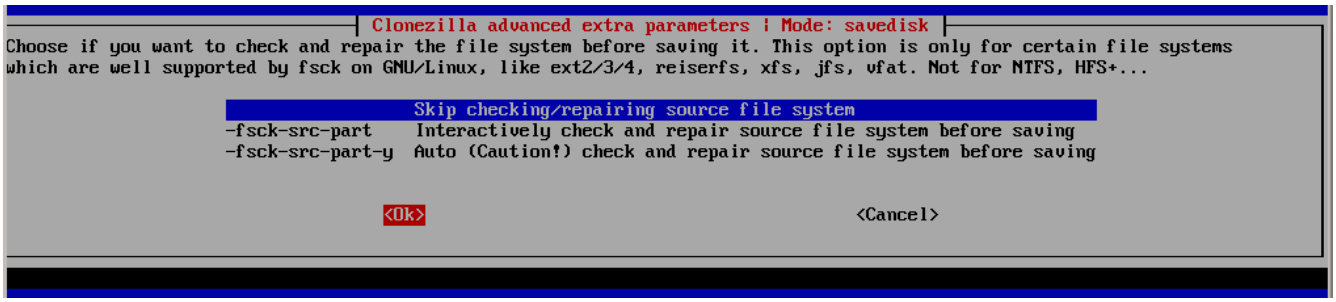


Figure 123: Check filesystem (den default *skip* nutzen)

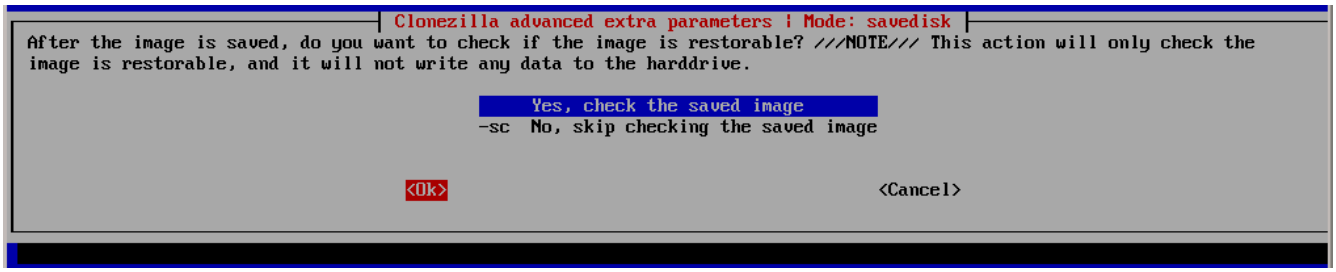


Figure 124: Check the saved image (den default *yes* nutzen)

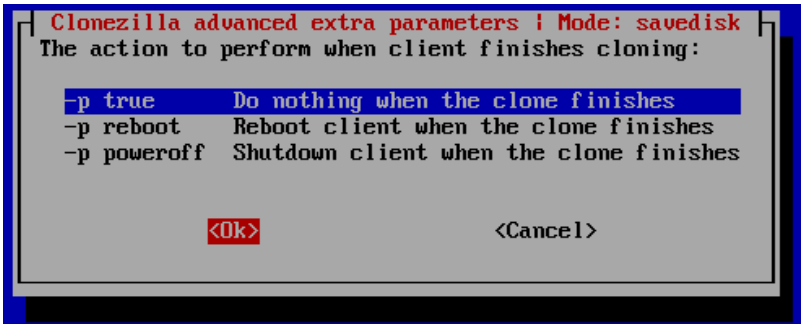


Figure 125: Action after cloning (use the default *-p true*, the reboot is triggered by the opsi bootimage).

Interactive save disk

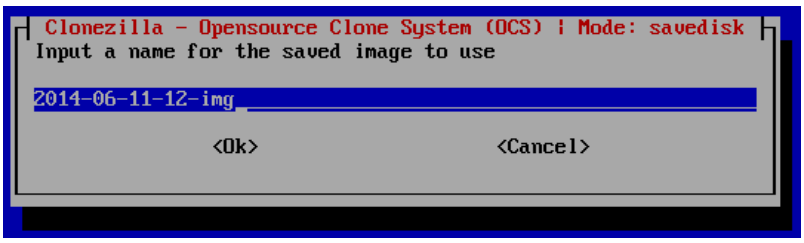


Figure 126: Name for the image to be saved on disc.

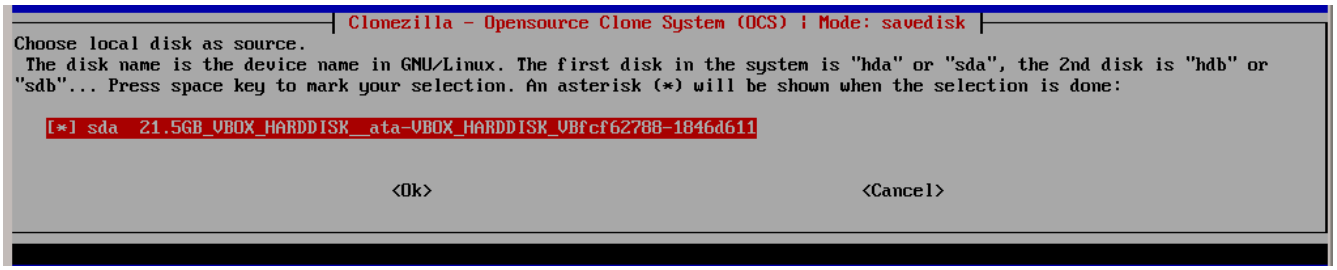


Figure 127: Select the disc to create the image from

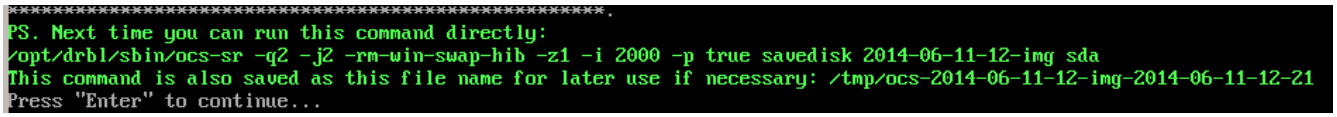


Figure 128: The resulting command. This can be set as product property *runcommand*

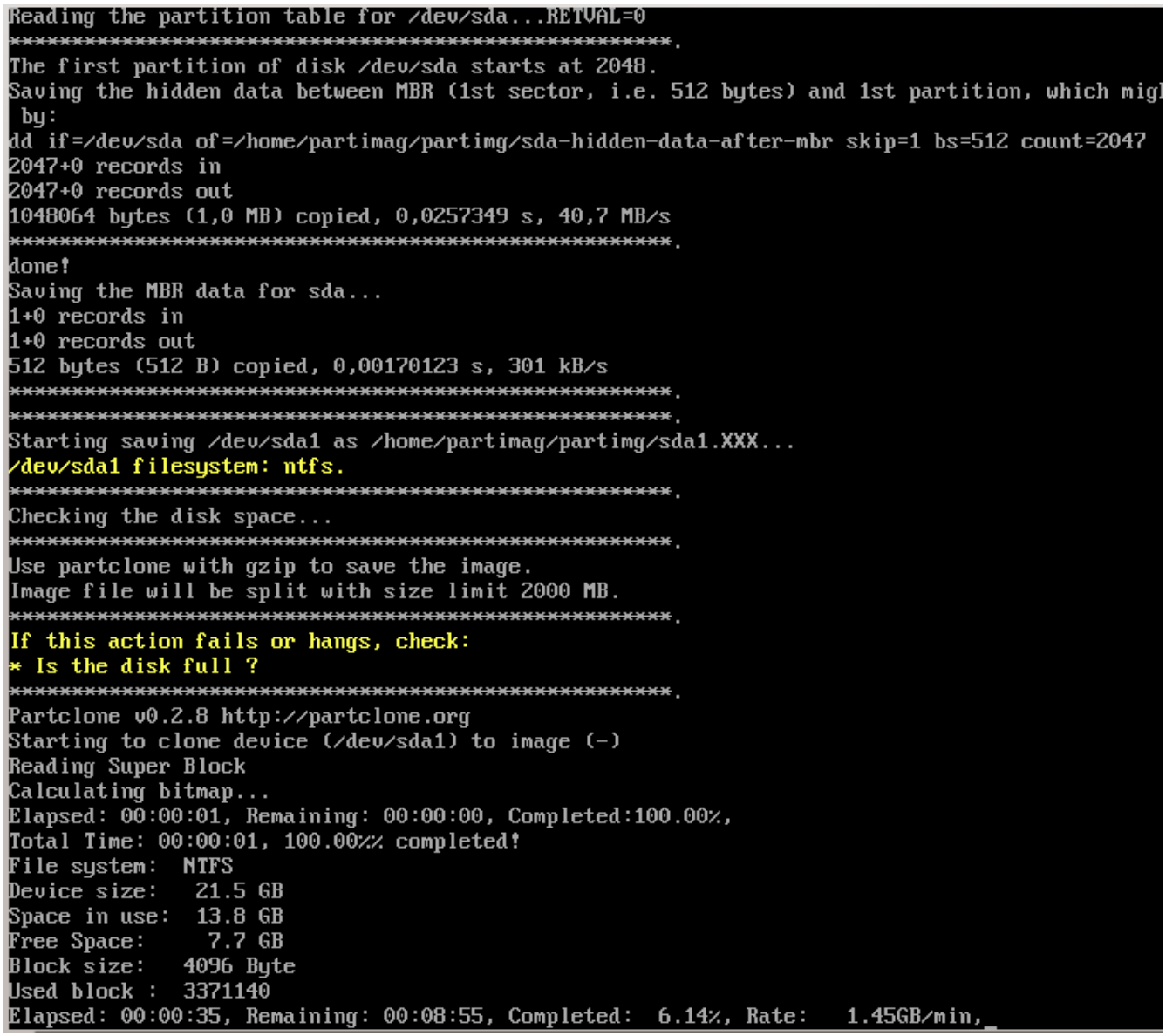


Figure 129: Progress bar

Interactive save part

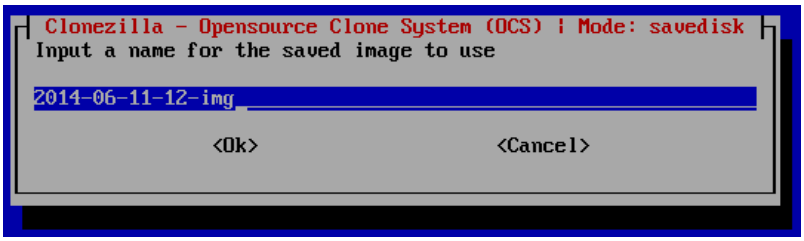


Figure 130: Name for the partition image to be saved as.

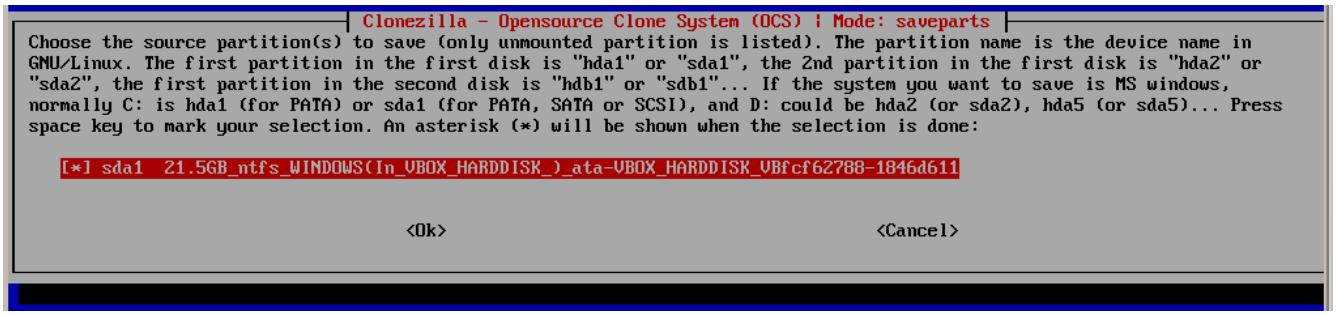


Figure 131: Select the partition to create the image from

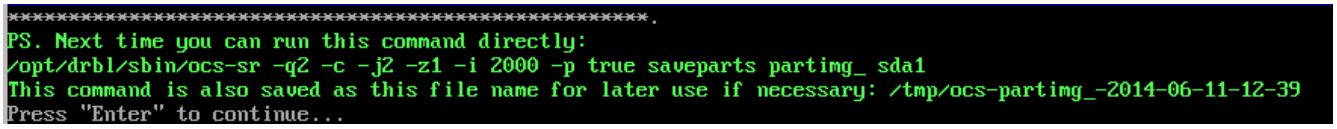


Figure 132: The resulting command. This can be set as product property *runcommand*

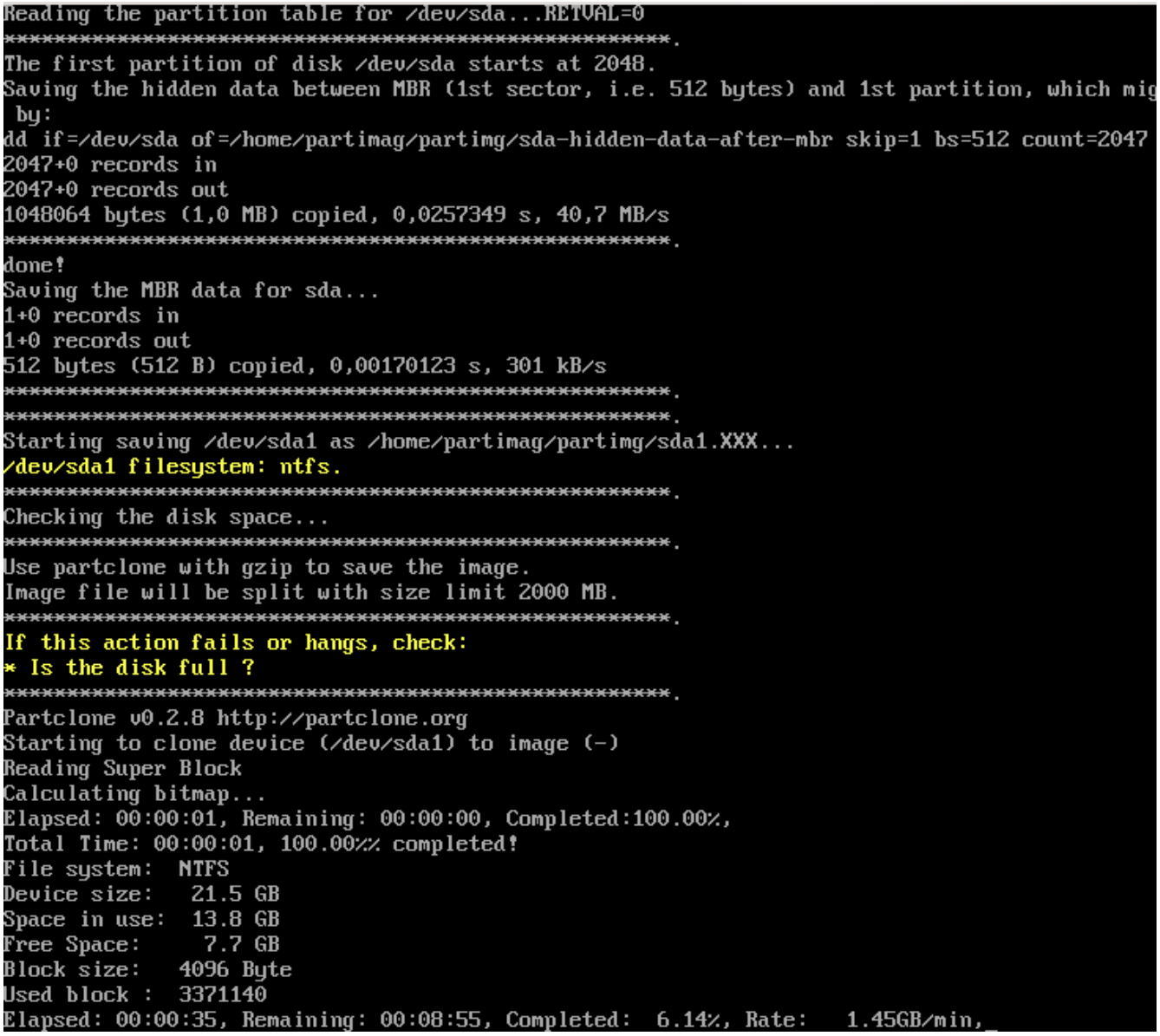


Figure 133: Progress bar

Interactive restore disk

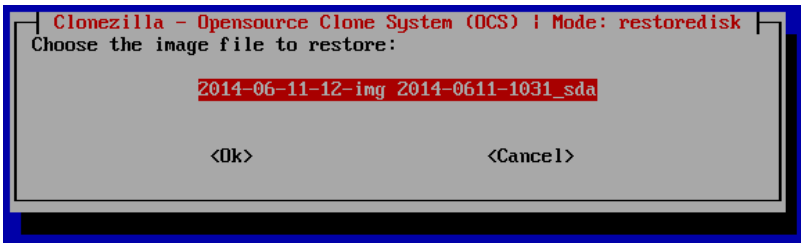


Figure 134: Selct the disc image to be restored

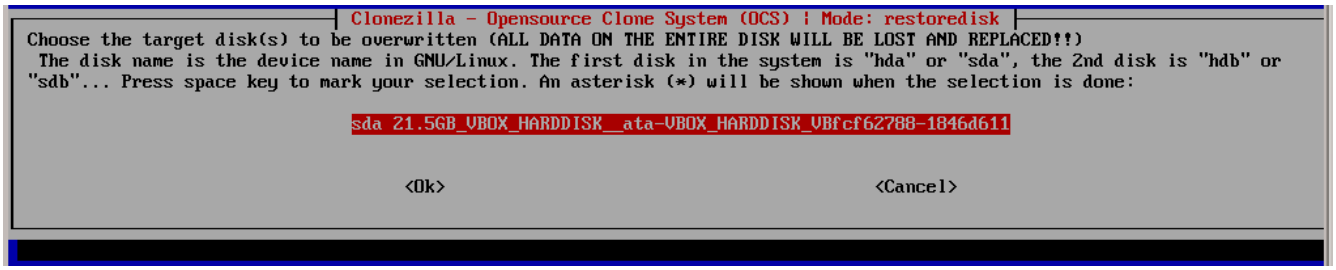


Figure 135: Select the disc where the image is to be restored

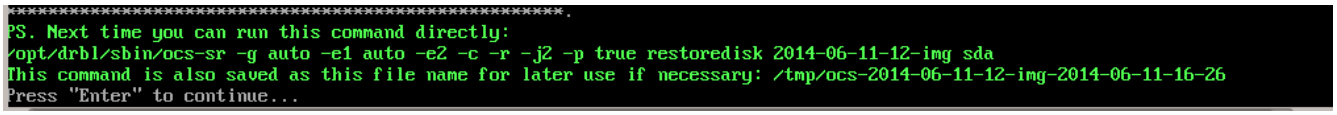


Figure 136: The resulting command. This can be set as product property *runcommand*

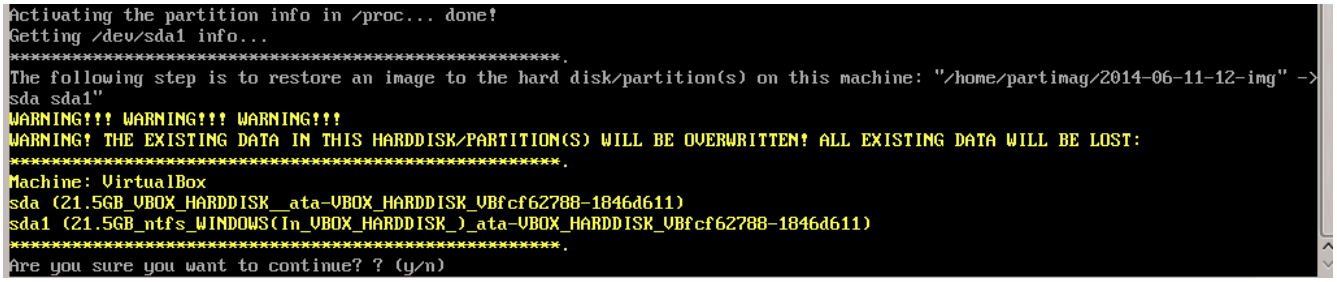


Figure 137: Query before starting to overwrite the disc. Can be suppressed by omitting the option -c from the command.

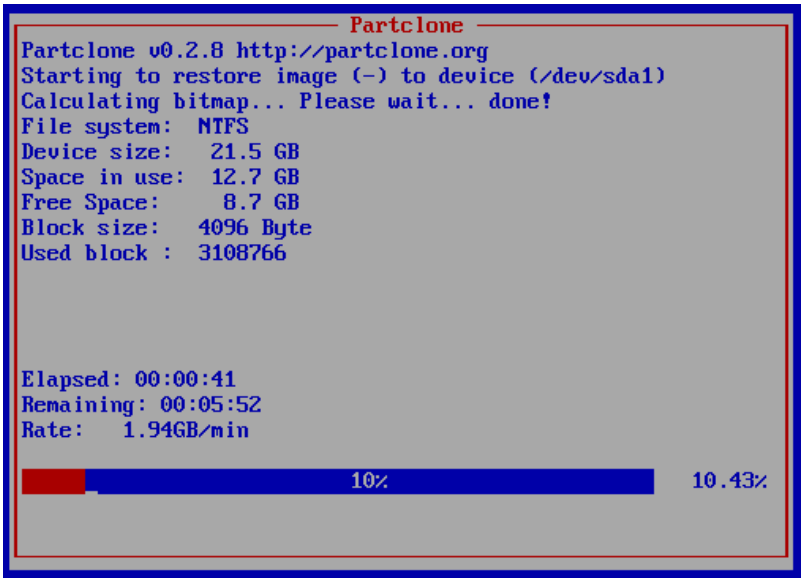


Figure 138: Progress bar

Interactive restore part

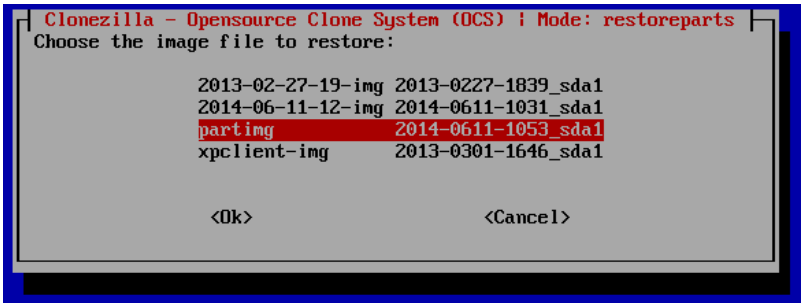


Figure 139: Select the part image to be restored

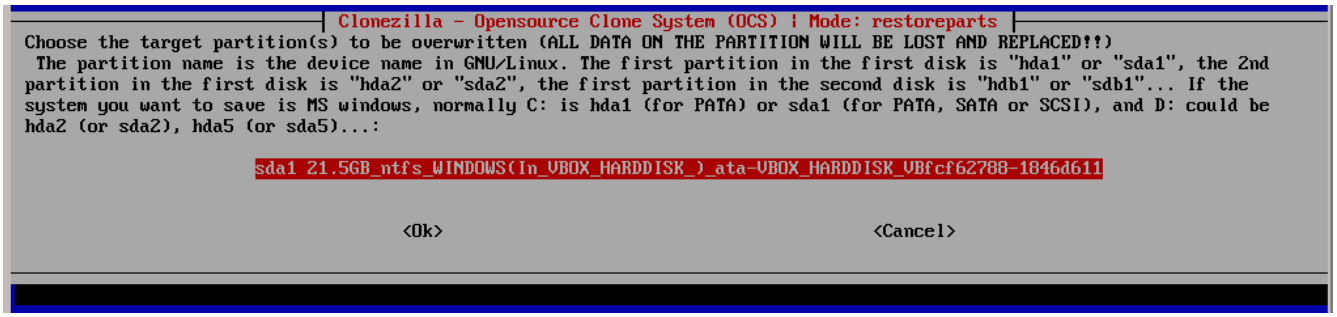


Figure 140: Select the partition where the image is to be restored.

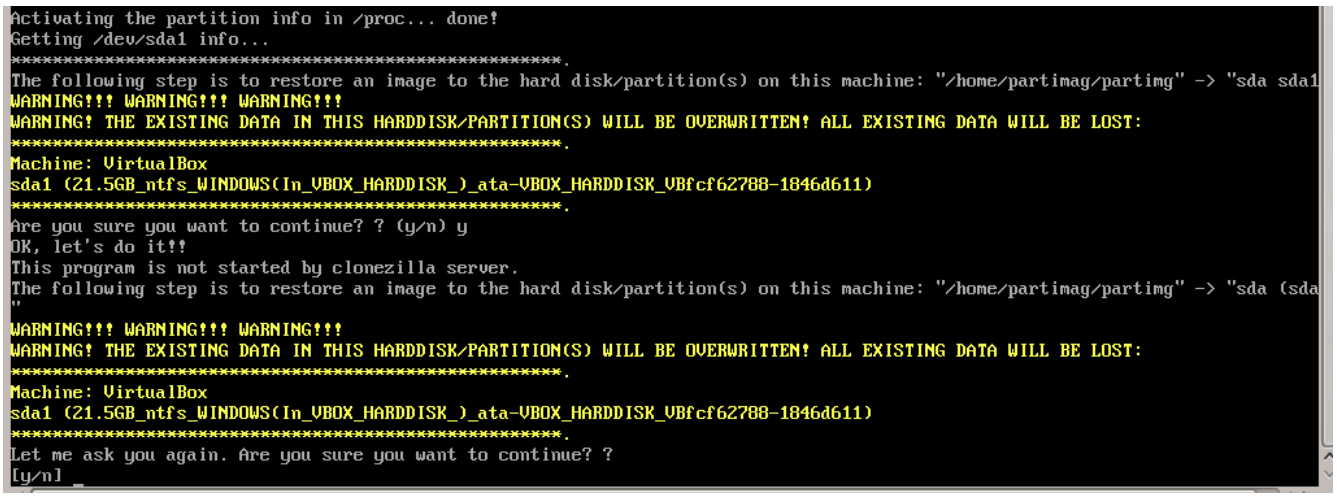


Figure 141: Query before starting to overwrite the disc. Can be suppressed by omitting the option -c from the command.

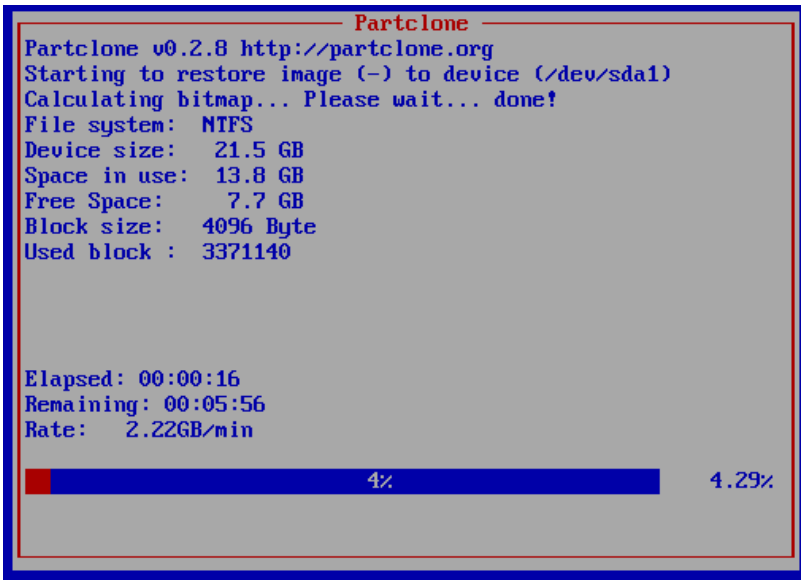


Figure 142: Progress bar

9.12.5 Not interactive processes

By setting the desired command as the product property `runcommand` opsi-clonezilla is switched to the non interactive mode.

- Set the property `imageshare` to a share, that can be mounted by the user `pcpatch` with the password as known by the opsi-server. The format for the share is `//server/share` (attention: use forward slashes, not backward slashes).
- Set the property `runcommand` to the non interactive command. Recommended Parameters:
  - Always: *--batch*
  - At restore: *--skip-check-restorable-r*
  - Always remove: *-c*

Here are some non interactive versions of the examples from above (without -c and with --batch). Since opsi 4.0.5 the parameter `-z1` can be omitted. This accelerates the compression with multi processor kernels:

- `/opt/drbl/sbin/ocs-sr --batch -q2 -j2 -rm-win-swap-hib -z1 -i 2000 -p true save disk 2014-06-11-12-img sda`
- `/opt/drbl/sbin/ocs-sr --batch -q2 -j2 -rm-win-swap-hib -z1 -i 2000 -p true save parts partimg sda1`
- `/opt/drbl/sbin/ocs-sr --batch -g auto -e1 auto -e2 -r -j2 -p true restore disk 2014-06-11-12-img sda`
- `/opt/drbl/sbin/ocs-sr --batch -g auto -e1 auto -e2 -r -j2 -k -p true restore parts partimg sda1`

Furthermore in these examples the image names `2014-06-11-12-img` or `partimg` can be replaced by the string *imagefile*. In this case the string *imagefile* will be substituted by the value of the property `imagefile`.

If you would take the device names `sda` or rather `sda1` for example, and replace them with, the string *diskdevice* or *partdevice*, then the string *disk_number* or *part_number* will be also respectively replaced.
Examples for disk_number=1 and part_number=1:
sda / sda1
cciss/c0d0 / cciss/c0d0p1
As a result you can look at the following examples:

- `ocs-sr -g auto -e1 auto -e2 --skip-check-restorable-r --batch -r -j2 -p true restoredisk imagefile diskdevice`
- `ocs-sr -q2 --batch -j2 -rm-win-swap-hib -i 2000 -p true savedisk imagefile diskdevice`
- `ocs-sr -q2 -c -j2 -z1 -i 2000 -sc -p true saveparts imagefile partdevice`

9.12.6 opsi-clonezilla properties

- `askbeforeinst`
  - description: Should there be a confirmation dialog before start installing ? / Faut-il y avoir une confirmation avant de démarrer l'installation ?
  - default: False
- `mount_image_share`
  - description: Should there be a confirmation dialog before start installing ? / Faut-il y avoir une confirmation avant de démarrer l'installation ?
  - default: True
- `imageshare`
  - editable: True
  - description: normally `auto` or empty: Defaults to the opsi_images share of the depot server; if not `auto` or empty: smb/cifs share in the format //server/share
  - values: ["", "//opsiserver/opsi_images", "auto"]
  - default: ["auto"]
- `runcommand`
  - editable: True
  - description: Clonezilla command to be executed
  - values: ["", "ocs-live", "ocs-sr -g auto -e1 auto -e2 --skip-check-restorable-r --batch -r -j2 -p true restoredisk imagefile diskdevice", "ocs-sr -q2 --skip-check-restorable-s --batch -j2 -rm-win-swap-hib -i 2000 -p true savedisk imagefile diskdevice", "ocs-sr -q2 -c -j2 -z1 -i 2000 -sc -p true saveparts imagefile partdevice"]
  - default: ["ocs-live"]
- `disk_number`

  - editable: True
  - description: Number (first=1) of the disk ; if string *diskdevice* in the runcommand it will be replaced by valid device path (eg sda)
  - values: ["1", "2"]
  - default: ["1"]

- `part_number`

  - editable: True
  - description: Number (first=1) of the partition of *disk_number* ; if string *partdevice* in the runcommand it will be replaced by valid device path (eg sda1)
  - values: ["1", "2", "3", "4", "5"]
  - default: ["1"]

- `imagefile`

  - editable: True
  - description: name of the imagefile ; will replace the string *imagefile* in the runcommand
  - values: ["myimagefile"]
  - default: ["myimagefile"]

- `drbl_ocs_conf`

  - editable: True
  - description: Directory for post run scripts (Entries in /etc/drbl/drbl-ocs.conf)
  - values: ["", "OCS_POSTRUN_DIR=\"/home/partimag/postrun\"", "OCS_PRERUN_DIR=\"/home/partimag/preru

- `rebootflag`

  - editable: False
  - description: Should the Client reboot after running the script
  - values: ["keepalive", "reboot", "shutdown"]
  - default: ["reboot"]

- `setup_after_install`

  - multivalue: True
  - editable: True
  - description: Which opsi product(s) should we switch to setup after clonezilla work is finished ?
  - values: [""]
  - default: [""]

- `architecture`

  - editable: False
  - description: Selection of architecture, influcences the selection of the installation and the installation architecture.
  - values: ["32bit", "64bit"]
  - default: ["32bit"]

9.12.7 opsi-clonezilla known bugs

None

9.12.8 Clonezilla command reference

Save and restore of images

http://clonezilla.org/clonezilla-live-doc.php

```
Clonezilla ocs-sr options
```

```
/usr/sbin/ocs-sr:
Usage:
To save or restore image
ocs-sr [OPTION] {savedisk|saveparts|restoredisk|restoreparts} IMAGE_NAME DEVICE
```

Options for saving:

-enc, --enc-ocs-img
To encrypt the image with passphrase.

-fsck-src-part, --fsck-src-part
Run fsck interactively on the source file system before saving it.

-fsck-src-part-y, --fsck-src-part-y
Run fsck automatically on the source file system before saving it. This option will always attempt to fix any detected filesystem corruption automatically. //NOTE// Use this option in caution.

-gm, --gen-md5sum
Generate the MD5 checksum for the image. Later you can use -cm|--check-md5sum option to check the image when restoring the image. Note! It might take a lot of time to generate if the image size is large.

-gs, --gen-sha1sum
Generate the SHA1 checksum for the image. Later you can use -cs|--check-sha1sum option to check the image when restoring the image. Note! It might take a lot of time to generate if the image size is large.

-gmf, --gen-chksum-for-files-in-dev
Generate the checksum for files in the source device. Later you can use -cmf|--chk-chksum-for-files-in-dev to check the files in the destination device after they are restored. Note! It might take a lot of time to inspect the checksum if there are many files in the destination device.

-i, --image-size SIZE
Set the size in MB to split the partition image file into multiple volumes files. For the FAT32 image repository, the SIZE should not be larger than 4096.

-j2, --clone-hidden-data
Use dd to clone the image of the data between MBR (1st sector, i.e. 512 bytes) and 1st partition, which might be useful for some recovery tool.

-ntfs-ok, --ntfs-ok
Assume the NTFS integrity is OK, do NOT check again (for ntfsclone only)

-rm-win-swap-hib, --rm-win-swap-hib
Try to remove the MS windows swap file in the source partition.

-q, --use-ntfsclone
If the partition to be saved is NTFS, use program ntfsclone instead of partimage (i.e. Priority: ntfsclone > partimage > dd)

-q1, --force-to-use-dd
Force to use dd to save partition(s) (inefficient method, very slow, but works for all the file system).

-q2, --use-partclone
Use partclone to save partition(s) (i.e. partclone > partimage > dd).

-rescue, --rescue
Turn on rescue mode, i.e. try to skip bad sectors.

-sc, -scs, --skip-check-restorable, --skip-check-restorable-s
By default Clonezilla will check the image if restorable after it is created. This option allows you to skip that.

-z0, --no-compress
Don't compress when saving: very fast but very big image file (NOT compatible with multicast restoring!!!)

-z1, --gzip-compress
Compress using gzip when saving: fast and small image file (default)

-z1p, --smp-gzip-compress
Compress using parallel gzip program (pigz) when saving: fast and small image file, good for multi-core or multi-CPU machine

-z2, --bz2-compress
Compress using bzip2 when saving: slow but smallest image file

-z2p, --smp-bzip2-compress
Compress using parallel bzip2 program (lbzip2) when saving: faster and smallest image file, good for multi-core or multi-CPU machine

-z3, --lzo-compress
Compress using lzop when saving: similar to the size by gzip, but faster than gzip.

-z4, --lzma-compress
Compress using lzma when saving: slow but smallest image file, faster decompression than bzip2.

-z5, --xz-compress
Compress using xz when saving: slow but smallest image file, faster decompression than bzip2.

-z5p, --smp-xz-compress
Compress using parallel xz when saving: slow but smallest image file, faster decompression than bzip2.

-z6, --lzip-compress
Compress using lzip when saving: slow but smallest image file, faster decompression than bzip2.

-z6p, --smp-lzip-compress
Compress using parallel lzip when saving: slow but smallest image file, faster decompression than bzip2.

-z7, --lrzip-compress
Compress using lrzip when saving.

-i, --image-size SIZE
Set the split image file volume size SIZE (MB). When ocs-sr is run with -x, the default SIZE is set as 4096, if without -x, we will not split it. Some words are reserved for IMAGE_NAME, "ask_user" is used to let user to input a name when saving an image. "autoname" is used to automatically generate the image name based on network card MAC address and time. "autohostname" is used to automatically generate the image name based on hostname. "autoproductname" is used to automatically generate the image name based on hardware product model gotten from dmidecode. A word is reserved for DEVICE, "ask_user" could be used to let user to select the source device when saving an image.

Options for restoring:

-f, --from-part-in-img PARTITION
Restore the partition from image. This is especially for "restoreparts" to restore the image of partition (only works for one) to different partition, e.g. sda1 of image to sdb6.

-g, --grub-install GRUB_PARTITION
Install grub in the MBR of the disk containing partition GRUB_PARTITION with root grub directory in the same GRUB_PARTITION when restoration finishs, GRUB_PARTITION can be one of "/dev/hda1", "/dev/hda2"... or "auto" ("auto" will let clonezilla detect the grub root partition automatically). If "auto" is assigned, it will work if grub partition and root partition are not in the same partition.

-r, --resize-partition
Resize the partition when restoration finishes, this will resize the file system size to fit the partition size. It is normally used when when a small partition image is restored to a larger partition.

-k, --no-fdisk, --no-create-partition
Do NOT create partition in target harddisk. If this option is set, you must make sure there is an existing partition table in the current restored harddisk. Default is to create the partition table.

-icrc, --icrc
Skip Partclone CRC checking.

-irhr, --irhr
Skip removing the Linux udev hardware records on the restored GNU/Linux.

-irvd, --irvd
Skip removing the NTFS volume dirty flag after the file system is restored.

-ius, --ius
Skip updating syslinux-related files on the restored GNU/Linux.

-icds, --ignore-chk-dsk-size-pt
Skip checking destination disk size before creating the partition table on it. By default it will be checked and if the size is smaller than the source disk, quit.

iefi, --ignore-update-efi-nvram
Skip updating boot entries in EFI NVRAM after restoring.

-k1,
Create partition table in the target disk proportionally.

-k2,
Enter command line prompt to create partition table manually before restoring image.

-scr, --skip-check-restorable-r
By default Clonezilla will check the image if restorable before restoring. This option allows you to skip that.

-t, --no-restore-mbr
Do NOT restore the MBR (Mater Boot Record) when restoring image. If this option is set, you must make sure there is an existing MBR in the current restored harddisk. Default is Yes

-u, --select-img-in-client
Input the image name in clients

-e, --load-geometry
Force to use the saved CHS (cylinders, heads, sectors) when using sfdisk

-e1, --change-geometry NTFS-BOOT-PARTITION
Force to change the CHS (cylinders, heads, sectors) value of NTFS boot partitoin after image is restored. NTFS-BOOT-PARTITION can be one of "/dev/hda1", "/dev/hda2"... or "auto" ("auto" will let clonezilla detect the NTFS boot partition automatically)

-e2, --load-geometry-from-edd
Force to use the CHS (cylinders, heads, sectors) from EDD (Enhanced Disk Device) when creating partition table by sfdisk

-y, -y0, --always-restore, --always-restore-default-local
Let Clonezilla server as restore server, i.e. client will always has restore mode to choose (However default mode in PXE menu is local boot)

-y1, --always-restore-default-clone
Let Clonezilla server as restore server, i.e. client will always has restore mode to choose (The default mode in PXE menu is clone, so if client boots, it will enter clone always, i.e. clone forever)

-j, --create-part-by-sfdisk
Use sfdisk to create partition table instead of using dd to dump the partition table from saved image (This is default)

-j0, --create-part-by-dd
Use dd to dump the partition table from saved image instead of sfdisk. ///Note/// This does NOT work when logical drives exist.

-j1, --dump-mbr-in-the-end
Use dd to dump the MBR (total 512 bytes, i.e. 446 bytes (executable code area) + 64 bytes (table of primary partitions) + 2 bytes (MBR signature; # 0xAA55) = 512 bytes) after disk image was restored. This is an insurance for some hard drive has different numbers of cylinder, head and sector between image was saved and restored.

-j2, --clone-hidden-data
Use dd to clone the image of the data between MBR (1st sector, i.e. 512 bytes) and 1st partition, which might be useful for some recovery tool.

-hn0 PREFIX
Change the hostname of M$ Windows based on the combination of hostname prefix and IP address, i.e. PREFIX-IP

-hn1 PREFIX
Change the hostname of M$ Windows based on the combination of hostname prefix and NIC MAC address, i.e. PREFIX-MAC

--max-time-to-wait TIME
When not enough clients have connected (but at least one), start anyways when TIME seconds since first client connection have pased. This option is used with --clients-to-wait

-cm, --check-md5sum
Check the MD5 checksum for the image. To use this option, you must enable -gm|--gen-md5sum option when the image is saved. Note! It might take a lot of time to check if the image size is large.

-cs, --check-sha1sum
Check the SHA1 checksum for the image. To use this option, you must enable -gs|--gen-sha1sum option when the image is saved. Note! It might take a lot of time to check if the image size is large.

-cmf, --chk-chksum-for-files-in-dev
Check the checksum for the files in the device. To use this option, you must enable -gmf|--gen-chksum-for-files-in-dev when the image is saved. Note! (1) The file system must be supported by Linux kernel so that it can be mounted as read-only to check the files. (2) It might take a lot of time to check if there are many files in the source device.

-srel, --save-restore-error-log
Save the error log file in the image dir. By default the log file won't be saved when error occurs.

--mcast-port NO
Assign the udp port number for multicast restore. This is used by clonezilla server. Normally it's not necessary to manually assign this option. Some words are reserved for IMAGE_NAME, "ask_user" is used to let user to input a name when saving an image. "autoproductname" is used to automatically get the image name based on hardware product model from dmidecode. A word is reserved for DEVICE, "ask_user" could be used to let user to select the source device when saving an image.

General options:

l, --language INDEX
Set the language to be shown by index number: [0|en_US.UTF-8]: English, [1|zh_TW.BIG5]: Traditional Chinese (Big5) - Taiwan, [2|zh_TW.UTF-8]: Traditional Chinese (UTF-8, Unicode) - Taiwan [a|ask]: Prompt to ask the language index

-b, -batch, --batch
(DANGEROUS!) Run program in batch mode, i.e. without any prompt or wait for pressing enter key. //NOTE// You have to use *-batch* instead of *-b* when you want to use it in the boot parameters. Otherwise the program init on system will honor *-b*, too.

-c, --confirm
Wait for confirmation before saving or restoring

-d, --debug-mode
Enter command mode to debug before saving/restoring

--debug=LEVEL
Output the partimage debug log in directory /var/log/ with debug LEVEL (0,1,2... default=0)

-m, --module MODULE
Force to load kernel module MODULE, this is useful when some SCSI device is not detected. NOTE! Use only one module, more than one may cause parsing problem.

-o0, --run-prerun-dir
Run the script in the direcoty /usr/share/drbl/postrun/ocs/ before clone is started. The command will be run before MBR is created or saved.

-o1, -o, --run-postrun-dir
Run the script in the direcoty /usr/share/drbl/postrun/ocs/ when clone is finished. The command will be run before that assigned in -p or --postaction.

-w, --wait-time TIME
Wait for TIME secs before saving/restoring

-nogui, --nogui
Do not show GUI (TUI) of Partclone or Partimage, use text only

-a, --no-force-dma-on
Do not force to turn on HD DMA

-mp, --mount-point MOUNT_POINT
Use NFS to mount MOUNT_POINT as directory ocsroot (ocsroot is assigned in drbl.conf)

-or, --ocsroot DIR
Specify DIR (absolute path) as directory ocsroot (i.e. overwrite the ocsroot assigned in drbl.conf)

-p, --postaction [choose|poweroff|reboot|command|CMD]
When save/restoration finishs, choose action in the client, poweroff, reboot (default), in command prompt or run CMD

-ns, --ntfs-progress-in-image-dir
Save the ntfsclone progress tmp file in the image dir so that if cloning is in DRBL client, the progress can be check in the server (Default in to be put in local /tmp/, which is local tmpfs).

-um, --user-mode [beginner|expert]
Specify the mode to use. If not specified, default mode is for a beginner.

-v, --verbose
Prints verbose information

-d0, --dialog
Use dialog

-d1, --Xdialog
Use Xdialog

-d2, --whiptail
Use whiptail

-d3, --gdialog
Use gdialog

-d4, --kdialog
Use kdialog

-x, --interactive
Interactive mode to save or restore.

Example:

- To save or restore image in client (Only that DRBL client will join, and its local partitions is NOT mounted). NOTE!!! You should run the command in DRBL client or you have to make sure the target device is NOT busy!. To save all the data in local first IDE harddrive *hda* as image *IMAGE1*, use ntfsclone instead of partimage, and lzop compression (NOTE!!! You should run the command in DRBL client or make sure hda is NOT busy/mounted!): ocs-sr --use-ntfsclone -z3 savedisk IMAGE1 hda
- To save the data in first and second partitions in local first IDE harddrive *hda* as image *IMAGE2*, use ntfsclone instead of partimage, and lzop compression (NOTE!!! You should run the command in DRBL client, or make sure hda is NOT busy/mounted!): ocs-sr --use-ntfsclone -z3 saveparts IMAGE2 "hda1 hda2"
- To restore image IMAGE1 to local hda. grub-install will be run after cloning (image IMAGE1 is already in DRBL server. NOTE!!! You should run the command in DRBL client or make sure hda is NOT busy/mounted!): ocs-sr -g auto restoredisk IMAGE1 hda
- To restore image first and second partitions from IMAGE2 to local hda1 and hda2. grub-install will be run after cloning (image IMAGE2 is already in DRBL server. NOTE!!! You should run the command in DRBL client or make sure hda is NOT busy/mounted!): ocs-sr -g auto restoreparts IMAGE2 "hda1 hda2"
- To save disk(s)/partitition(s) as an image or restore an image to disk(s)/partitition(s) interactively, use: ocs-sr -x

disk-to-disk Operation

http://drbl.org/management/techrpt.php?c=ocs-onthefly&t=Clone%20disk%20or%20partition%20on-the-fly

Clone disk or partition on-the-fly

The "ocs-onthefly" is used to do disk to disk or partition to partition copy on-the-fly. This command is different from drbl-ocs (or clonezilla). Clonezilla is used to do massively clone, so it will save the template machine as an image in clonezilla server. On the other hand, ocs-onthefly is used to 1 to 1 copy, so no image will be saved in the server. Just clone disk or partition directly.
There are 2 ways to run ocs-onthefly:

1. Clone locally: Boot the machine as DRBL client, then clone one disk to another disk. This is specially for when you just want to clone disk, and you only have one machine.
2. Clone via network: Boot the source and target machine as DRBL clients, then clone disk from one machine to another machine. This is specially for you have 2 machines, and you want to clone them without dismantling machine.

Usage:
ocs-onthefly [OPTION]
Option:

-e, --resize-partition
resize the target disk in target machine (To solve the small partition image restored to larger partition problem.)

-f, --source DEV
specify the source device as DEV (hda, hda1...)

-g, --grub-install GRUB_PARTITION
install grub in hda with root grub directory in GRUB_PARTITION when restoration finishs, GRUB_PARTITION can be one of "/dev/hda1", "/dev/hda2"... or "auto" ("auto" will clonezilla detects the grub root partition automatically)

-i, --filter PROGRAM
use the PROGRAM (gzip/lzop/bzip2/cat) before sending partition data to netcat (only in network clone mode). The default action is gzip. Use "cat" if you do not want to compress (Good for fast internode network).

-n, --no-sfdisk
skip partition table creation

-m, --no-mbr-clone
do NOT clone MBR

-o, --load-geometry
force to use the saved CHS (cylinders, heads, sectors) when using sfdisk in restoring.

-p, --port PORT
specify the netcat port (Only in network clone mode)

-r, --server
specify the running machine is in network clone server.

-s, --source-IP
IP specify the source IP address (used in target client machine).

-t, --target DEV
specify the target device as DEV (hda, hda1...)

-v, --verbose
prints verbose information

ocs-onthefly [OPTION]

Examples:

1. Clone locally: To clone the 1st harddisk (hda) to 2nd harddisk (hdb), you can boot this machine as DRBL client, then run:
   ocs-onthefly -f hda -t hdb
2. Clone via network: To clone the 1st harddisk (hda) in machine A to the 1st harddisk (hda) in machine B. Then without dismantling machines, you can do it by:
   Boot machine A as DRBL client, and it's IP address is, say, 192.168.100.1, then run:
   ocs-onthefly -r -f hda

Then it will prompt you the command to run in machine B, such as:
ocs-thefly --source-IP 192.168.100.1 -t [TARGET_DEV] (TARGET_DEV is like hda, hdb, hda1, hdb1...)

The "TARGET_DEV" is the target harddisk in machine B, in this case, it hda. Then, boot machine B as DRBL client, and run:
ocs-onthefly --source-IP 192.168.100.1 -t hda

9.13 opsi-server with multiple depots (free)

9.13.1 Concept

Supporting multiple depot shares in opsi aims at the following targets:

- central configuration data storage and configuration management
- providing the software depots on local servers
- automated deployment of software packages from the central server to the local depots

Accordingly, it is implemented:

- All configuration data is stored on the central *opsi-config-server*.
- All clients connect to this *opsi-config-server* in order to request their configuration data. The configuration data comprise the information on method and target of the *opsi-depot-server* connection.
- All installable software is stored on *opsi-depot-servers*.
- The *opsi-depot-servers* have as well an `opsipxeconfd` running by which they provide boot-images to clients via PXE/tftp.
- `opsi-package-manager`
  A program to (de-)install opsi packages on one ore more *opsi-depot-servers*.
- The opsi packages are copied via webdav protocol to the *opsi-depot-servers* and are installed from the opsiconfd via a web service call.
- *opsi-configed* supports the management of multiple depots.
- Clients connected to different depots can be managed in one bundle if the involved depots are synchronized (have all product packages in identical versions).

The following schema gives a more detailed view on the communication between the components of a opsi multi depot share environment.

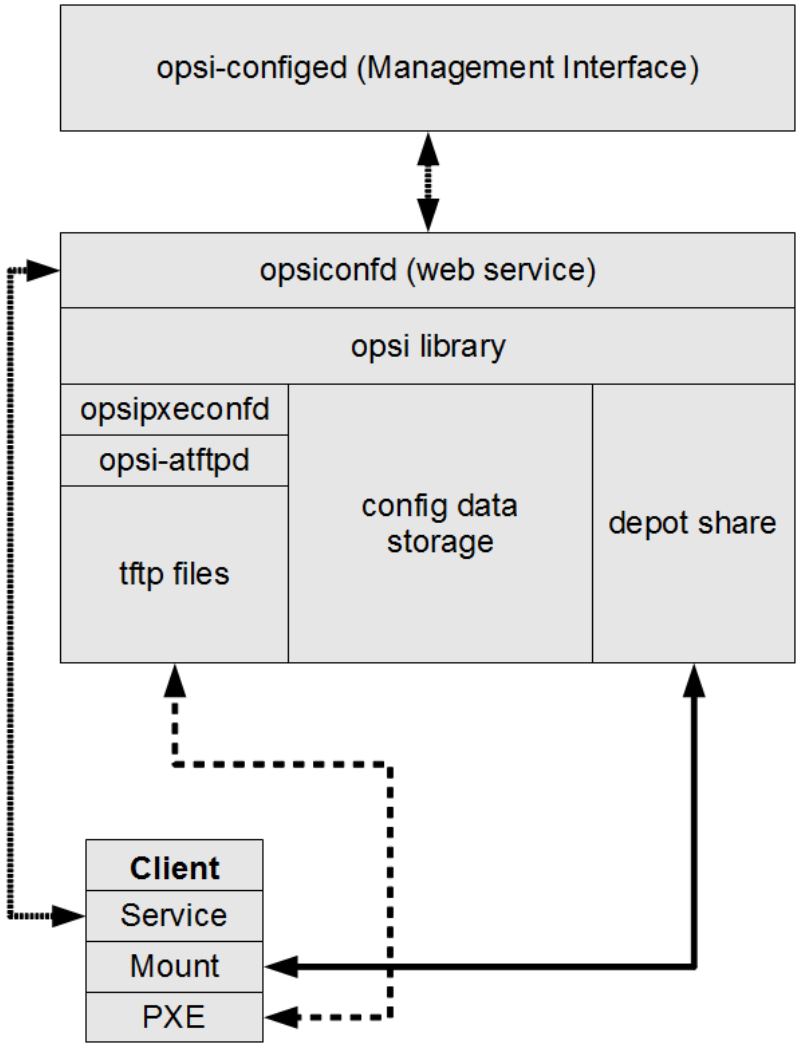


Figure 143: Scheme: opsi config server without attached depot server (single location)

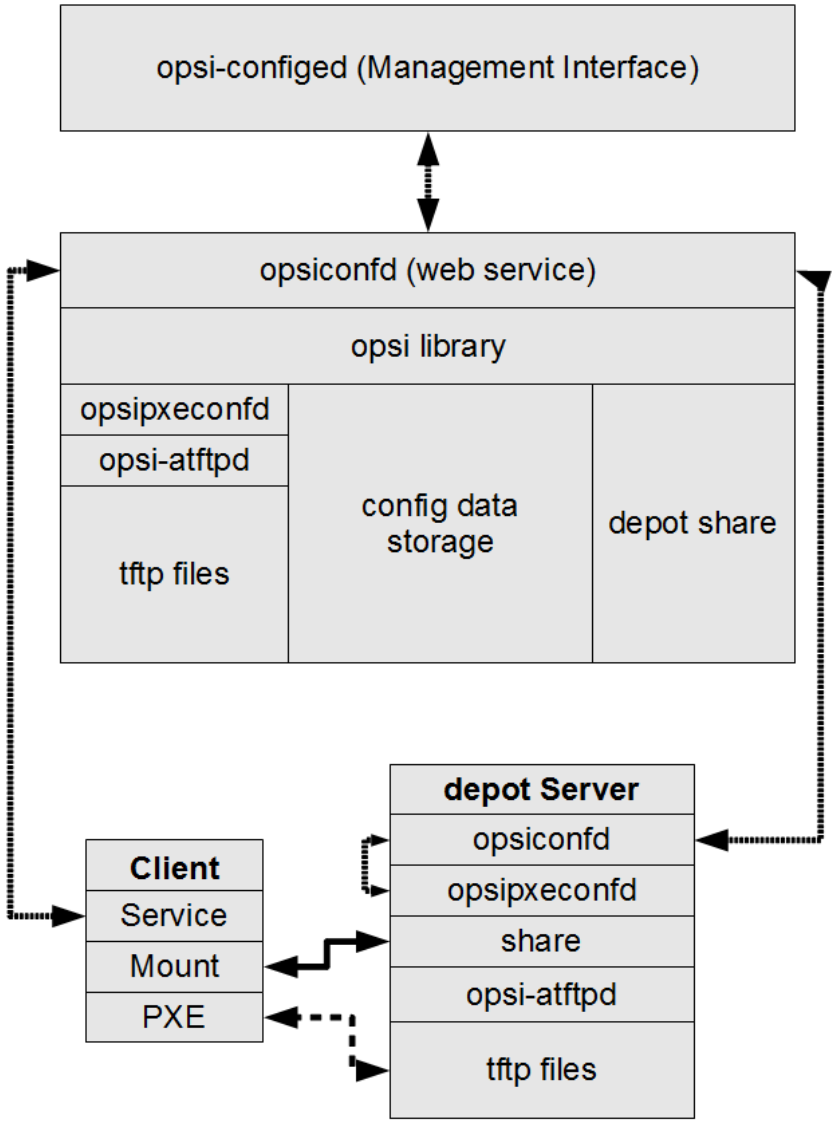


Figure 144: Scheme: opsi config server with attached depot server (multi location)

9.13.2 Creating an depot server

In order to create an *opsi-depot-server* you have to install a standard *opsi-server*. This *opsi-server* can be configured to act as *opsi-depot-server* by calling the script `opsi-setup --register-depot` as user root on the server which should become the *opsi-depot-server*. Because this script does not only reconfigure the local server, but also registers this server as *opsi-depot-server* with the central *opsi-config-server*, username and password of a member of the *opsiadmin* group have to be supplied here.

On Univention Corporate Server the registration of a *opsi-depot-server* happens automatically. The first server with an opsi installation is used as *opsi-config-server* and all following in a UCS domain installed systems will register there as an *opsi-depot-server*.

Example:
svmdepotde.svm.local will be reconfigured as opsi-depot-server and registered at the opsi-config-server

sepiella.svm.local:

```
root@svmdepotde.svm.local:~# opsi-setup --register-depot
```

Now you will be prompted for the opsi-config-server you want to connect to . The registration needs to be authorised by supplying the username and password of a member of the group *opsiadmin* at the opsi-config-server.

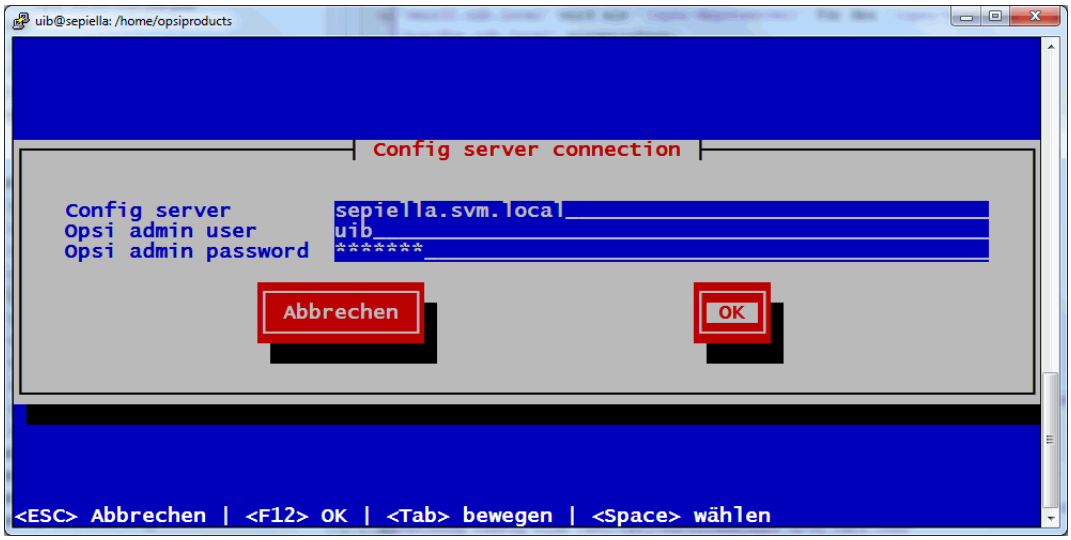


Figure 145: opsi-setup --register-depot : Enter opsiadmin account for the *opsi-config-server*

Now the opsi-depot-server settings are being displayed. In most cases no changes have to be made. Note that the new opsi-depot-server will register as a "Master-Depot", so that you'll be able to assign *opsi-clients* to it.

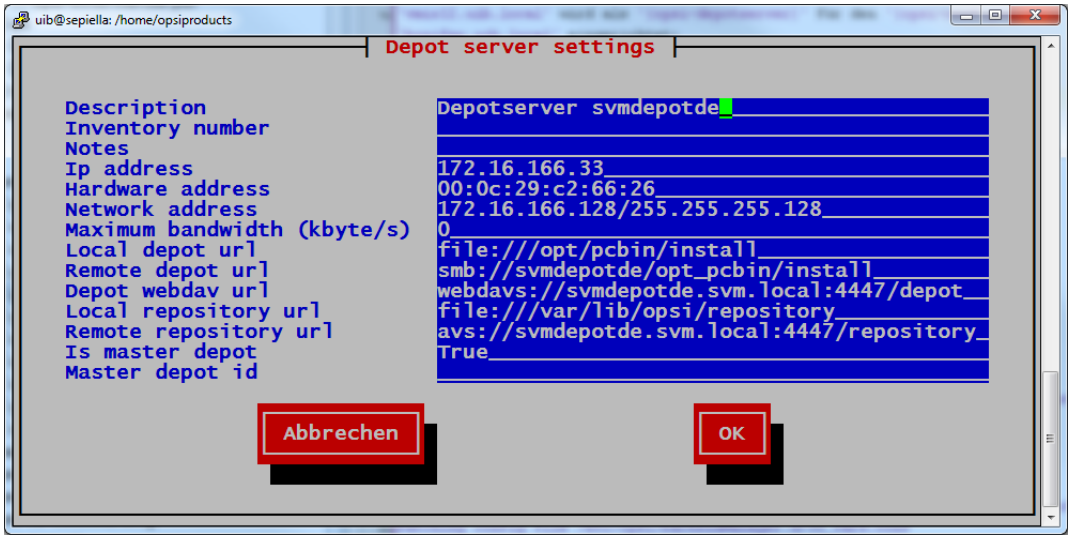


Figure 146: opsi-setup --register-depot : depot settings

After the data input is completed the configuration process will start:

```
[5] [Apr 06 12:32:19] Getting current system config (opsi-setup|70)
[5] [Apr 06 12:32:19] System information: (opsi-setup|117)
[5] [Apr 06 12:32:19]    distributor  : Debian (opsi-setup|118)
[5] [Apr 06 12:32:19]    distribution : Debian GNU/Linux 5.0.8 (lenny) (opsi-setup|119)
```

```
[5] [Apr 06 12:32:19]    ip address   : 172.16.166.33 (opsi-setup|120)
[5] [Apr 06 12:32:19]    netmask      : 255.255.255.0 (opsi-setup|121)
[5] [Apr 06 12:32:19]    subnet       : 172.16.166.0 (opsi-setup|122)
[5] [Apr 06 12:32:19]    broadcast    : 172.16.166.255 (opsi-setup|123)
[5] [Apr 06 12:32:19]    fqdn         : svmdepotde.svm.local (opsi-setup|124)
[5] [Apr 06 12:32:19]    hostname     : svmdepotde (opsi-setup|125)
[5] [Apr 06 12:32:19]    domain       : svm.local (opsi-setup|126)
[5] [Apr 06 12:32:19]    win domain   : OPSI (opsi-setup|127)
[5] [Apr 06 12:46:03] Creating depot 'svmdepotde.svm.local' (opsi-setup|2342)
[5] [Apr 06 12:46:03] Getting depot 'svmdepotde.svm.local' (opsi-setup|2345)
[5] [Apr 06 12:46:03] Testing connection to config server as user 'svmdepotde.svm.local' (opsi-setup|2354)
[5] [Apr 06 12:46:04] Successfully connected to config server as user 'svmdepotde.svm.local' (opsi-setup|2359)
[5] [Apr 06 12:46:04] Updating backend config '/etc/opsi/backends/jsonrpc.conf' (opsi-setup|2361)
[5] [Apr 06 12:46:04] Backend config '/etc/opsi/backends/jsonrpc.conf' updated (opsi-setup|2373)
[5] [Apr 06 12:46:04] Updating dispatch config '/etc/opsi/backendManager/dispatch.conf' (opsi-setup|2375)
[5] [Apr 06 12:46:04] Dispatch config '/etc/opsi/backendManager/dispatch.conf' updated (opsi-setup|2388)
[5] [Apr 06 12:46:04] Setting rights (opsi-setup|410)
[5] [Apr 06 12:46:06] Setting rights on directory '/tftpboot/linux' (opsi-setup|482)
[5] [Apr 06 12:46:06] Setting rights on directory '/home/opsiproducts' (opsi-setup|482)
[5] [Apr 06 12:46:06] Setting rights on directory '/var/log/opsi' (opsi-setup|482)
[5] [Apr 06 12:46:06] Setting rights on directory '/etc/opsi' (opsi-setup|482)
[5] [Apr 06 12:46:06] Setting rights on directory '/var/lib/opsi' (opsi-setup|482)
[5] [Apr 06 12:46:06] Setting rights on directory '/var/lib/opsi/depot' (opsi-setup|482)
[5] [Apr 06 12:46:27] Restarting services (opsi-setup|2392)
[5] [Apr 06 12:46:35] Configuring client user pcpatch (opsi-setup|347)
[5] [Apr 06 12:46:35]    Creating RSA private key for user pcpatch in '/var/lib/opsi/.ssh/id_rsa' (opsi-setup|361)
[5] [Apr 06 12:46:35] Setting rights (opsi-setup|410)
[5] [Apr 06 12:46:38] Setting rights on directory '/var/lib/opsi/.ssh' (opsi-setup|482)
```

Per default it will be necessary to edit the /etc/opsi/opsi-product-updater.conf config - file on the new depot. If the new depot should only update its packages from the main server, something like this should remain the only active repo-section:

```
[repository_master]
active = true
opsiDepotId = bonifax.uib.local
autoInstall = true
autoUpdate = true
autoSetup = false
; Inherit ProductProperty defaults from master repository
inheritProductProperties = false
```

Non-interactive registration of a opsi-depot-server

Since opsi-depotserver 4.0.7.2 it is possible to register a depot without interaction.

To do this the data for the connection to the opsi-config-server has to be passed as JSON object alongside the parameter `--unattended`.

```
opsi-setup --register-depot --unattended '{"address": "config.server.address:4447/rpc", "username": "adminuserinopsi", \
    "password": "pwoftheuser"}'
```

The opsi-depot-server will be created with defaults.

It is possible to set custom attributes for the opsi-depot-server. For this the JSON object needs to get the key `depot` and as a value another JSON object with the custom values.

The following example illustrates how to set a custom description:

```
opsi-setup --register-depot --unattended '{"address": "config.server.address:4447/rpc", "username": "adminuserinopsi", \
    "password": "pwoftheuser", "depot": {"description": "Added with unattended registration."}}'
```

9.13.3 package management with multiple depots

see also:
Section 5.3.2
Section 5.3.3

In or to manage opsi-packages with different *opsi-depot-server* the `opsi-package-manager` got the option `-d` (or `--depot`). With this option you can give the target *opsi-depot-server* for the installation. Using the keyword *ALL* the opsi package will be copied to `/var/lib/opsi/repository` on all known *opsi-depot-servers* and then installed via a web service call.

If you don't give the option `-d`, the opsi package will be only installed on the local server (without upload to `/var/lib/opsi/repository`).

Example:
Install the package `softprod_1.0-5.opsi` on all known *opsi-depot-servers*:

```
opsi-package-manager -d ALL -i softprod_1.0-5.opsi
```

In order to get information's about what are the differences between depots you may call `opsi-package-manager` with the option `-D` (or `--differences`).

Example:
Show the differences between all known depots regarding the product `mshotfix`

```
opsi-package-manager -D -d ALL mshotfix
mshotfix
    vmix12.uib.local :  200804-1
    vmix13.uib.local :  200804-1
    bonifax.uib.local:  200805-2
```

9.14 Dynamic Depot Assignment (free)

9.14.1 Introduction

With the standard opsi multi depot support, the clients are assigned to a designated depot. This is now extended with the option, that for download speed-up, each client can dynamically detect a suitable depot to download software packages from.

For most cases an assignment according to the IP address might be the easiest and suitable solution. For other network topologies, e.g. a star topology VPN network, this might not be sufficient.

Therefore a mechanism is required for the client to detect dynamically, which depot to connect for download of software packages. The specific assignment algorithm and implementation depends on the network topology and other special customer requirements. So it is best to have this adaptable and configurable.

To offer the option, that the client can detect the suitable depot according to the current network conditions, it must be ensured, that the alternative depots are synchronized, which means they offer the same software packages. In practice the depots will not be synchronized at all times. So the list of alternative depots offered to a client is limited to those depots, which are synchronized with the clients master depot. The master depot of a client is the depot, which the client is assigned to. So the master depot defines, which software version is to be installed on the client.

The opsi concept for this is as follows:

The opsi config-server provides a client script, which can be requested and executed by the client. This script determines, which depot is to be used according to the current conditions. The interfaces to the client script are specified as: the interface to get the list of available servers and the current client configuration (IP address, netmask, gateway) and to return the result of the selection procedure. Furthermore there are interfaces for logging and user information about the processing progress.

So the actual implementation within the script can easily be adapted to the requirements of the particular opsi environment.

Regarding to this concept the single steps of a client connect are as follows:

1. The client connects to the opsi opsi-configserver via web service.
2. The opsi-configserver passes to the client the list of software packages to be installed.
3. The opsi-configserver transmits to the client the script for detecting the best depot and the list of available depots.
4. The client executes the script and determines the best depot.
5. The client connects the chosen depot to get the required software packages.
6. The client installation status is reported to the opsi-configserver.

9.14.2 Requirements

This option requires opsi version >= 4.0.

This opsi extension is free now.
It finished the cofunding process in March 2013. For more details see Section 9.1.

The following package versions are required:

Table 24: required packages

opsi package	version
opsi-client-agent	>=4.0-11
opsi-configed	>=4.0.1.5-1
python-opsi	>=4.0.0.18-1

Note
The depot selection is made through the opsi-client-agent. This means that the functionality is not present for netboot products.

9.14.3 Configuration

The script for the dynamic depot assignment is expected on the server as:
`/etc/opsi/backendManager/extend.d/70_dynamic_depot.conf`

To activate the dynamic depot assignment for a client, the following host parameter has to be set:
clientconfig.depot.dynamic = true

This can be done with the opsi-configed from the tab *host parameter*.

Alternatively this can be done at the command line with the opsi-admin (in this case <client-id> is the FQDN, e.g. client1.uib.local):

```
opsi-admin -d method configState_create \
clientconfig.depot.dynamic <client-id> [True]
```

The result can be checked by calling:

```
opsi-admin -d method configState_getObjects \
[] '{"configId":"clientconfig.depot.dynamic","objectId":"<client-id>"}'
```

9.14.4 Editing the depot properties

The properties of a depot are partly queried while registering an opsi-server as a depot by executing the command: `opsi-setup --register-depot` (see Section 9.13.2).

The properties of a depot can be edited. This can be done from the management interface as well as from the command line.

Figure 147: Showing the properties of a depot (2nd button from the left)

The depot properties can be called by the button *Properties of depots* from the management interface (the buttons are in the upper right corner).

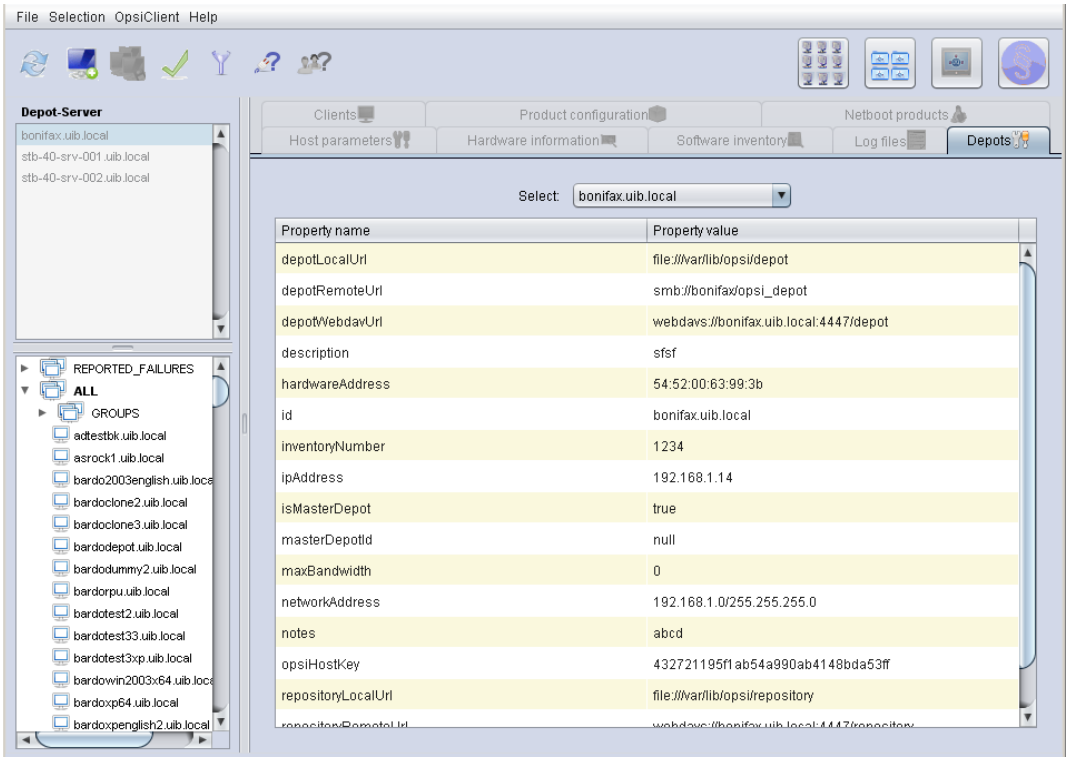


Figure 148: Depot properties from the *opsi-configed*

From the command line the depot properties can be shown by the method `host_getObjects`. Here e.g. for the depot *dep1.uib.local*.

```
opsi-admin -d method host_getObjects [] '{"id":"dep1.uib.local"}'
```

This call results in the following output:

```
[
        {
        "masterDepotId" : "masterdepot.uib.local",
        "ident" : "dep1.uib.local",
```

```
          "networkAddress" : "192.168.101.0/255.255.255.0",
          "description" : "Depot 1 Master Depot",
          "inventoryNumber" : "",
          "ipAddress" : "192.168.105.1",
          "repositoryRemoteUrl" : "webdavs://dep1.uib.local:4447/repository",
          "depotLocalUrl" : "file:///var/lib/opsi/depot",
          "isMasterDepot" : true,
          "notes" : "",
          "hardwareAddress" : "52:54:00:37:c6:8b",
          "maxBandwidth" : 0,
          "repositoryLocalUrl" : "file:///var/lib/opsi/repository",
          "opsiHostKey" : "6a13da751fe76b9298f4ede127280809",
          "type" : "OpsiDepotserver",
          "id" : "dep1.uib.local",
          "depotWebdavUrl" : "webdavs://dep1.uib.local:4447/depot",
          "depotRemoteUrl" : "smb://dep1/opsi_depot"
          }
]
```

To edit the depot properties on the command line, the output can be redirected to a file:

```
opsi-admin -d method host_getObjects [] '{"id":"dep1.uib.local"}' \
> /tmp/depot_config.json
```

The resulting file (`/tmp/depot_config.json`) can now be edited and then written back with the following command:

```
opsi-admin -d method host_createObjects < /tmp/depot_config.json
```

The depot properties, which are relevant for the dynamic depot assignment, are as follows:

- *isMasterDepot*
  Must be `true` for assigning a client to that depot. If this is set to `false` no clients can be assigned but the depot may still be used for dynamic depot selection.
- *networkAddress*
  Network address for that depot. The network address can be specified in two different notations:
  - network/netmask, example: 192.168.101.0/255.255.255.0
  - network/maskbits, example: 192.168.101.0/24

Whether the *networkAddress* is actually evaluated for the depot assignment depends on the script algorithm. The default algorithm, as provided by uib, uses that parameter.

9.14.5 Synchronizing the depots

The opsi tools for synchronizing the depots are:

- `opsi-package-manager`
- `opsi-productupdater`

The `opsi-package-manager`, when installing an opsi package, can be configured by the parameter `-d ALL` to install the package not only on the current server, but also on all known depots. Example:

```
opsi-package-manager -i opsi-template_1.0-20.opsi -d ALL
```

By using the parameter -D the `opsi-package-manager` can be instructed to list the differences between depots. In this case the option `-d` must specify a list of depots or refer to all known depots by `-d ALL`. Example:

```
opsi-package-manager -D -d ALL
```

The `opsi-package-manager` also is the tool for a *push* synchronization. Whereas the tool `opsi-product-updater` is meant for *pull* synchronization. The `opsi-product-updater` on the depot servers can be configured as a cronjob. Therefore in the configuration file of the `opsi-product-updater` (`/etc/opsi/opsi-product-updater.conf`) set in the section *[repository_uib]* `active = false`, and in the section *[repository_master]* `active = true`. Also, in the same section, set *opsiDepotId* to the depot ID (FQDN) to synchronize with. The `opsi-product-updater` then synchronizes with the specified depot all the packages in the directory `/var/lib/opsi/repository`.

Caution
When a package is installed on an opsi server with the command `opsi-package-manager -i`, the package is not installed to the repository directory. To get the package to the repository directory, the name of the depot can be specified by the -d option. Alternatively the upload of the package to the repository directory can be done by `opsi-package-manager -u <package name>`.

Please refer to the documentation of the tools `opsi-package-manager` and `opsi-product-updater` in the opsi manual.

9.14.6 Processing

If the dynamic depot assignment is activated for a client by the host parameter *clientconfig.depot.dynamic*, the client retrieves the script via web service and executes it.

The script to be used for dynamic assignment is:
`/etc/opsi/backendManager/extend.d/70_dynamic_depot.conf`

Following parameters are passed to the function `selectDepot`, which is defined in the script:

- clientConfig
  Information about the current client configuration (hash).
  The clientConfig hash keys are currently:
  - "clientId": opsi host ID of the client (FQDN)
  - "ipAddress": IP address of the network interface to the *opsi-config-server*
  - "netmask" : netmask of the network interface
  - "defaultGateway": default gateway
- masterDepot
  Information regarding the master depot (*opsi-depot-server*-object). The master depot is the depot which the client is assigned to from the management interface. The attributes of the passed *opsi-depot-server*-object match the attributes as given by `host_getObjects` (see Section 9.14.4).
- alternativeDepots
  Information about the alternative depots (list of *opsi-depot-server*-objects). The list of alternative depots lists the depots, which are, regarding the required software packages, identical to the master depot.

Based on this information, the assignment algorithm can pick a depot from the provided depot list and return the *opsi-depot-server*-object of the chosen depot as the result of the function. If the assignment algorithm does not find a suitable depot from the list (or if the provided list is empty), the return result should be the master depot object.

9.14.7 Template of the assignment script

The template script checks the network addresses of the given depots and picks the depot which is in the same network as the client.

The template script offers example functions for depot detection.
The function `depotSelectionAlgorithmByNetworkAddress` checks the network addresses of the depots and selects the depot which is in the same network as the client.

The function `depotSelectionAlgorithmByLatency` sends ICMP „echo-request“-packages (ping) to the depots and selects the depot with the lowest latency.
The function `depotSelectionAlgorithmByMasterDepotAndLatency` aims for the use in environments with more than one master depots that can have zero-to-many slave depots themselves. It will determine the depot with the lowest latency based on the same check as `depotSelectionAlgorithmByLatency` from a list containing the master depot of the current client and its slave depots. The function `getDepotSelectionAlgorithm` is called by the client and returns the algorithm for depot selection.

The template script uses as default the function `depotSelectionAlgorithmByNetworkAddress`.

```
# -*- coding: utf-8 -*-

global depotSelectionAlgorithmByNetworkAddress
depotSelectionAlgorithmByNetworkAddress = \
'''
def selectDepot(clientConfig, masterDepot, alternativeDepots=[]):
        selectedDepot = masterDepot
        logger.info(u"Choosing depot from list of depots:")
        logger.info(u"   Master depot: %s" % masterDepot)
        for alternativeDepot in alternativeDepots:
                logger.info(u"   Alternative depot: %s" % alternativeDepot)
        if alternativeDepots:
                import socket, struct
                # Calculate bitmask of host's ipaddress
                n = clientConfig['ipAddress'].split('.')
                for i in range(4):
                        n[i] = forceInt(n[i])
                ip = (n[0] << 24) + (n[1] << 16) + (n[2] << 8) + n[3]

                depots = [ masterDepot ]
                depots.extend(alternativeDepots)
                for depot in depots:
                        if not depot.networkAddress:
                                logger.warning(u"Network address of depot '%s' not known" % depot)
                                continue
                        (network, netmask) = depot.networkAddress.split(u'/')
                        while (network.count('.') < 3):
                                network = network + u'.0'
                        if (netmask.find('.') == -1):
                                netmask = forceUnicode(socket.inet_ntoa(struct.pack('>I',0xffffffff ^ (1 << 32 - \
    forceInt(netmask)) - 1)))
                        while (netmask.count('.') < 3):
                                netmask = netmask + u'.0'

                        logger.debug(u"Testing if ip %s is part of network %s/%s" % (clientConfig['ipAddress'], network\
    , netmask))

                        n = network.split('.')
                        for i in range(4):
                                n[i] = int(n[i])
                        network = (n[0] << 24) + (n[1] << 16) + (n[2] << 8) + n[3]
                        n = netmask.split('.')
                        for i in range(4):
                                n[i] = int(n[i])
                        netmask = (n[0] << 24) + (n[1] << 16) + (n[2] << 8) + n[3]

                        wildcard = netmask ^ 0xFFFFFFFFL
                        if (wildcard | ip == wildcard | network):
                                logger.notice(u"Choosing depot with networkAddress %s for ip %s" % (depot.\
    networkAddress, clientConfig['ipAddress']))
                                selectedDepot = depot
                                break
                        else:
                                logger.info(u"IP %s does not match networkAddress %s of depot %s" % (clientConfig['\
    ipAddress'], depot.networkAddress, depot))
        return selectedDepot
'''
```

```
global depotSelectionAlgorithmByLatency
depotSelectionAlgorithmByLatency = \
'''
def selectDepot(clientConfig, masterDepot, alternativeDepots=[]):
        selectedDepot = masterDepot
        logger.info(u"Choosing depot from list of depots:")
        logger.info(u"   Master depot: %s" % masterDepot)
        for alternativeDepot in alternativeDepots:
                logger.info(u"   Alternative depot: %s" % alternativeDepot)
        if alternativeDepots:
                from OPSI.Util.Ping import ping
                from OPSI.Util.HTTP import urlsplit
                depots = [ masterDepot ]
                depots.extend(alternativeDepots)
                latency = {}
                for depot in depots:
                        if not depot.repositoryRemoteUrl:
                                continue
                        try:
                                (scheme, host, port, baseurl, username, password) = urlsplit(depot.repositoryRemoteUrl)
                                latency[depot] = ping(host)
                                logger.info(u"Latency of depot %s: %0.3f ms" % (depot, latency[depot]*1000))
                        except Exception, e:
                                logger.warning(e)
                if latency:
                        minValue = 1000
                        for (depot, value) in latency.items():
                                if (value < minValue):
                                        minValue = value
                                        selectedDepot = depot
                        logger.notice(u"Choosing depot %s with minimum latency %0.3f ms" % (selectedDepot, minValue\
    *1000))
        return selectedDepot
'''

global depotSelectionAlgorithmByMasterDepotAndLatency
depotSelectionAlgorithmByMasterDepotAndLatency = \
'''
def selectDepot(clientConfig, masterDepot, alternativeDepots=[]):
        def getLatencyInformation(depots):
                from OPSI.Util.Ping import ping
                from OPSI.Util.HTTP import urlsplit

                latency = {}
                for depot in depots:
                        if not depot.repositoryRemoteUrl:
                                continue

                        try:
                                (scheme, host, port, baseurl, username, password) = urlsplit(depot.repositoryRemoteUrl)
                                latency[depot] = ping(host)

                                if latency[depot]:
                                        logger.info(u"Latency of depot %s: %0.3f ms" % (depot, latency[depot]*1000))
                                else:
                                        logger.info(u"Latency of depot %s: N/A" % depot)
                        except Exception, e:
                                logger.warning(e)
                return latency

        def getDepotWithLowestLatency(latency):
                selectedDepot = None
                if latency:
                        minValue = 1000
                        for (depot, value) in latency.items():
                                if not value:
                                        continue
```

```
                                if (value < minValue):
                                        minValue = value
                                        selectedDepot = depot
                        logger.notice(u"Choosing depot %s with minimum latency %0.3f ms" % (selectedDepot, minValue\
    *1000))

                return selectedDepot

        logger.info(u"Choosing depot from list of depots:")
        logger.info(u"   Master depot: %s" % masterDepot)
        for alternativeDepot in alternativeDepots:
                logger.info(u"   Alternative depot: %s" % alternativeDepot)

        if alternativeDepots:
                from collections import defaultdict

                # Mapping of depots to its master.
                # key: Master depot
                # value: All slave depots + master
                depotsByMaster = defaultdict(list)

                allDepots = [masterDepot] + alternativeDepots

                for depot in allDepots:
                        if depot.masterDepotId:
                                depotsByMaster[depot.masterDepotId].append(depot)
                        else:
                                depotsByMaster[depot.id].append(depot)

                depotsWithLatency = getLatencyInformation(depotsByMaster[masterDepot.id])
                depotWithLowestLatency = getDepotWithLowestLatency(depotsWithLatency)

                logger.info('Depot with lowest latency: {0}'.format(depotWithLowestLatency))
                if not depotWithLowestLatency:
                        logger.info('No depot with lowest latency. Falling back to master depot.')
                        depotWithLowestLatency = masterDepot

                return depotWithLowestLatency

        return masterDepot
'''

def getDepotSelectionAlgorithm(self):
        #return depotSelectionAlgorithmByMasterDepotAndLatency
        #return depotSelectionAlgorithmByLatency
        return depotSelectionAlgorithmByNetworkAddress
```

9.14.8 Logging

If the dynamic depot assignment is activated, there are some logs from the depot assignment in `opsiclientd.log`. In this shortened example log, the server `bonifax.uib.local` is config server and master depot for the client `pctrydetlef.uib.local`. As a master server the server has the network address `192.168.1.0/255.255.255.0`. As an alternative depot the server `stb-40-srv-001.uib.local` is available with the network address `192.168.2.0/255.255.255.0`. The client `pctry4detlef.uib.local` has the IP address `192.168.2.109`, which is in the network of the alternative depot.

```
(...)
[6] [Dec 02 18:25:27] [ opsiclientd                  ] Connection established to: 192.168.1.14   (HTTP.pyo|421)
[5] [Dec 02 18:25:28] [ event processing gui_startup ]    [ 1] product opsi-client-agent:   setup   (EventProcessing.\
    pyo|446)
[5] [Dec 02 18:25:28] [ event processing gui_startup ] Start processing action requests   (EventProcessing.pyo|453)
[5] [Dec 02 18:25:28] [ event processing gui_startup ] Selecting depot for products [u'opsi-client-agent']   (Config.\
    pyo|314)
[5] [Dec 02 18:25:28] [ event processing gui_startup ] Selecting depot for products [u'opsi-client-agent']   (__init__\
    .pyo|36)
```

```
(...)
[6] [Dec 02 18:25:28] [ event processing gui_startup  ] Dynamic depot selection enabled   (__init__.pyo|78)
(...)
[6] [Dec 02 18:25:28] [ event processing gui_startup  ] Master depot for products [u'opsi-client-agent'] is bonifax.uib\
    .local   (__init__.pyo|106)
[6] [Dec 02 18:25:28] [ event processing gui_startup  ] Got alternative depots for products: [u'opsi-client-agent']   (\
    __init__.pyo|110)
[6] [Dec 02 18:25:28] [ event processing gui_startup  ] 1. alternative depot is stb-40-srv-001.uib.local   (__init__.\
    pyo|112)
(...)
[6] [Dec 02 18:25:28] [ event processing gui_startup  ] Verifying modules file signature   (__init__.pyo|129)
[5] [Dec 02 18:25:28] [ event processing gui_startup  ] Modules file signature verified (customer: uib GmbH)   (\
    __init__.pyo|143)
(...)
[6] [Dec 02 18:25:28] [ event processing gui_startup  ] Choosing depot from list of depots:   (<string>|4)
[6] [Dec 02 18:25:28] [ event processing gui_startup  ]    Master depot: <OpsiConfigserver id 'bonifax.uib.local'>   (<\
    string>|5)
[6] [Dec 02 18:25:28] [ event processing gui_startup  ]    Alternative depot: <OpsiDepotserver id 'stb-40-srv-001.uib.\
    local'>   (<string>|7)
[5] [Dec 02 18:25:28] [ event processing gui_startup  ] Choosing depot with networkAddress 192.168.2.0/255.255.255.0 \
    for ip 192.168.2.109   (<string>|40)
[5] [Dec 02 18:25:28] [ event processing gui_startup  ] Selected depot is: <OpsiDepotserver id 'stb-40-srv-001.uib.\
    local'>   (__init__.pyo|171)
(...)
[5] [Dec 02 18:25:28] [ event processing gui_startup  ] Mounting depot share smb://stb-40-srv-001/opsi_depot   (\
    EventProcessing.pyo|415)
(...)
```

9.15 opsi Software On Demand (Kiosk-Mode) (free)

9.15.1 Introduction

With the module "Software-on-Demand" opsi administrators may give their users access to install a range of software-products. These software products may be selected and installed user-driven without the administrator needing to do anything. This documentation shows how the module "Software-on-Demand" works, describes it's functions and how to configure it.

9.15.2 Prerequisites

There are some preconditions for using the extension. The product-groups are needed, available with opsi 4.0. Furthermore the opsi-client-agent and the opsi-configed at version 4.0.1 are needed.

Table 25: Required Packages

opsi-Package	**Version**
opsi-client-agent	>=4.0.1-3
opsi-winst	>=4.10.8.12
python-opsi	>=4.0.1-7
opsi-depotserver	>=4.0.1-2
opsi-configed	>=4.0.1.6-1

The Software-on-Demand module is tested and declared as stable for the following browsers:

- Internet Explorer 8
- Mozilla Firefox 3.6.15

9.15.3 configuration

The configuration of this extension is based on product-groups and config-variables. The used config-variables are:

- software-on-demand.active
- software-on-demand.product-group-ids
- software-on-demand.show-details

These config-variables are created with installing the opsi-depotserver-package.

Managing product-groups

The most comfortable way to create and manage product-groups is using the `opsi-configed`. There you have to change to the tab `product configuration`.

Tip
Since version 4.0.1.6 of the `opsi-configed` you can change to `product configuration` without choosing a client.

The product-group menu is above the product list.

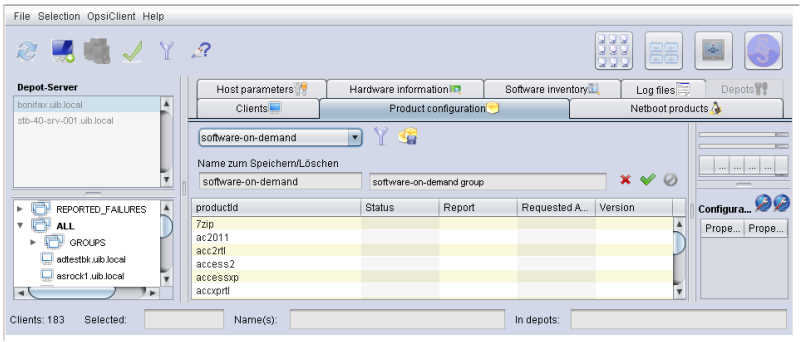


Figure 149: product-group menue

With the drop down menu you can choose a product-group to edit it. If you have chosen a group, the corresponding products will be highlighted.
With a second icon, filter can be activated or deactivated. When a filter was activated, only the products of the activated product-group are seen.
Product-groups can be edited after activating the icon with the yellow packets (show editor / hide editor) next to the icon with the filter. In this view, a new group and it's description can be added. Save the editing by activating the red check icon.
If some more products should be added to a group, select them and press the red check icon. (Press the <ctrl> button and select the products).

configure the module Software-On-Demand

The module can be configured, as mentioned above, with the config-variables described in the following table:

Table 26: overview of the config-variables of the module Software-on-Demand

Configuration	Description	Values
software-on-demand.active	activates or deactivates the modul.	true/false
software-on-demand.product-group-ids	Product-groups with software-products, that can be used for Software-on-Demand.	List of produkt-groups
software-on-demand.show-details	Show further information to the user.	true/false

There are two ways to use these configuration objects. For the whole system or for each client. The following 2 chapters will explain both ways.

Configuration for the whole system

The configuration here is the default system wide for every client. The configuration can be edited in the `opsi-configed`. Push the Button `Server Configuration` and change to the tab `Host Parameter`

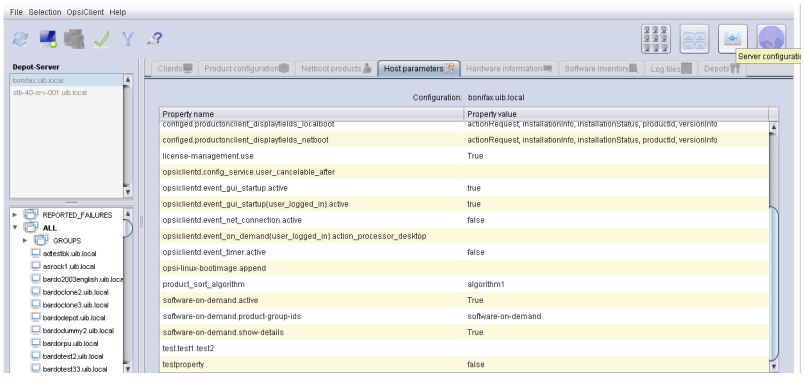


Figure 150: part of the module server configuration in the opsi configuration editor

Another possibility is to change the server-configuration with the following command:

```
opsi-setup --edit-config-defaults
```

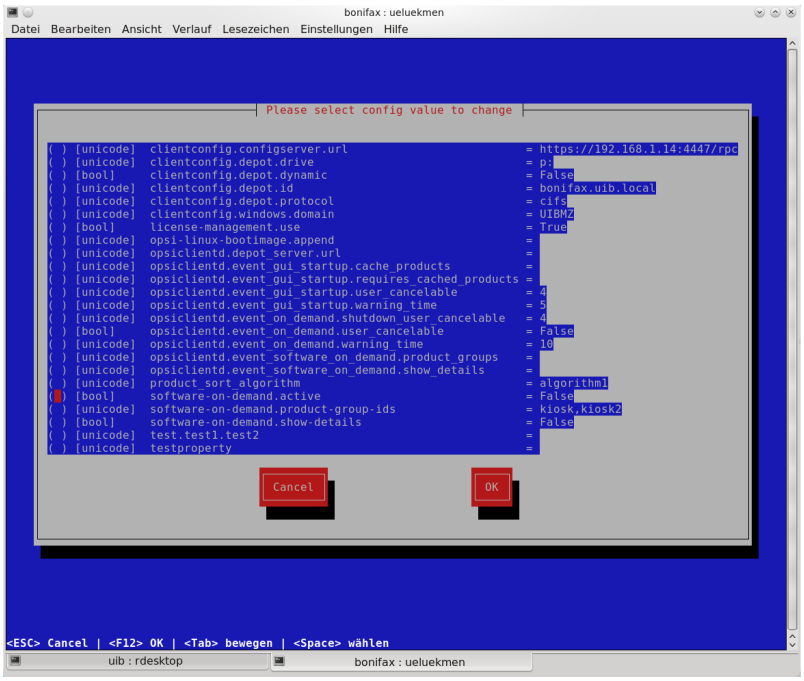


Figure 151: edit-config-defaults with opsi-setup

Tip
Administration is also possible with the opsi-python-API or with *opsi-admin*

Configuration for a single client

The configuration for a single client - or client specific configuration - is useful if, for example, only some of the clients should have access to the Software-on-Demand extension. Or if you want to make several product groups available to some clients.

The configuration of the client specific host parameters can be edited in different ways:

The most comfortable way to edit the configuration is via *opsi-configed*. Choose one or several clients (even all clients of a client group if you want to) and then navigate to the tab "Host parameters".

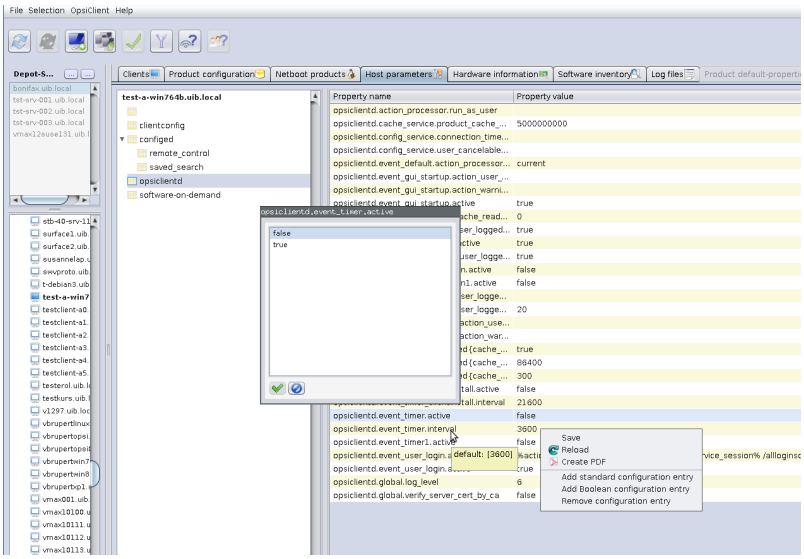


Figure 152: edit hostparameter in the configuration editor

This editing overrides the system wide defaults.

opsiclientd event-configuration

There are two ways for the users to start the software-installation:

- with the next system start
- immediately

If the user chooses "with the next system start", the product state will be set to "setup." If the choice is "immediately", the *opsiclientd* creates an event `software on demand`. This event can be configured in the file `opsiclientd.conf` as any other event.

9.15.4 New opsiclientkiosk application

With opsi 4.0.7 is the prior Web-based solution of the client kiosk is replaced by an application. Background for this change is:

- Elimination of the problem that means to have a self-signed certificate.
- Greater functionality of the new client.

Caution
The old (Web based) Kiosk client no longer works with the new opsi-client-agent/opsiclientd.

Client Kiosk: Installation

If the opsi-client-agent during the installation notes that, the configuration (Host Parameter): *software-on-demand.active* is set to *true*, it will automatically create a Start menu item during the installation on the Client, on which the Kiosk application can be run directly. It can be found under: *Start → Programs → opsi.org → software-on-demand*.

The installation may be controlled by the following *opsi-client-agent* product properties:

- `kiosk_startmenue_entry`
  The Start Menu entry for the Client Kiosk (software on demand).
  Default=`software on demand`; editable

- `kiosk_desktop_icon`
  Create a desktop icon for client kiosk ?
  Default=`false`

The used icon for the start menu / Desktop may be modified by storing a `kiosk.ico` file at `/var/lib/opsi/depot/opsi-client-agent/files/opsi/custom/opsiclientkioskskin/`.

Clientkiosk: Usage

After starting the application, the following main window will be shown:

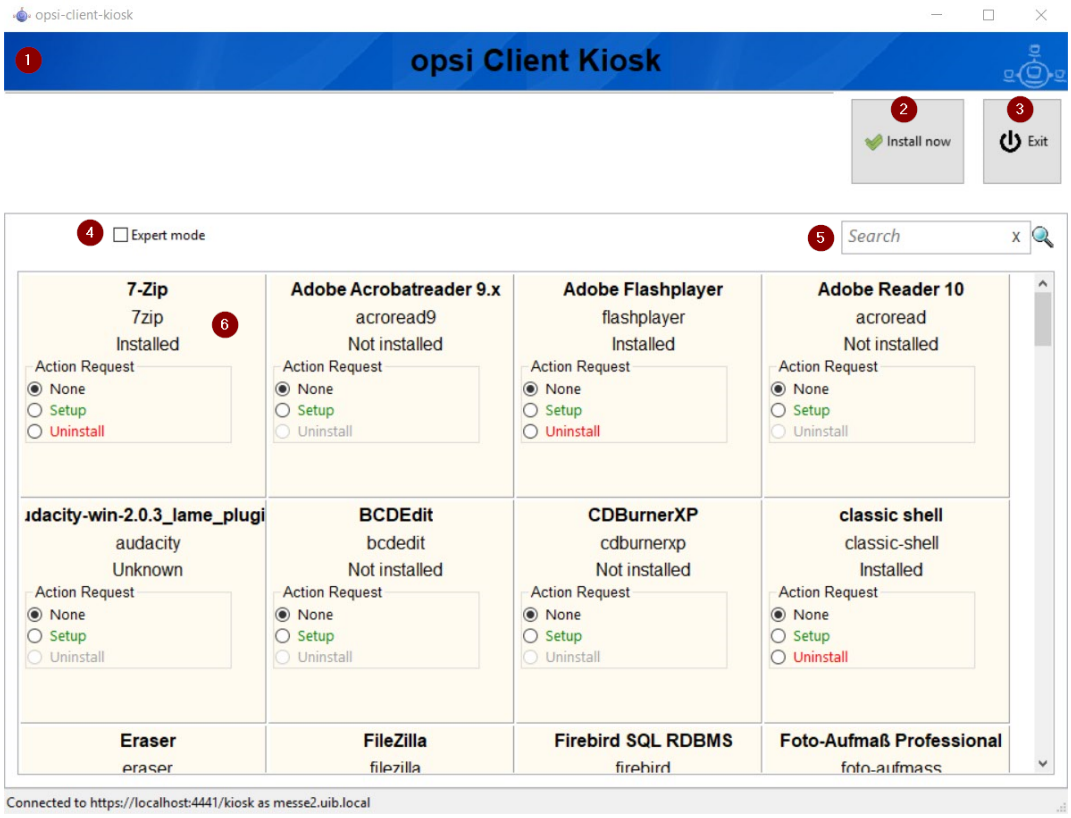


Figure 153: opsi-client-kiosk: Main window with tiles (Default Modus)

Elements:

1. Header panel (Customizable to the specification of the customer)
2. Button to start the requested installations
3. Button to end the program
4. Checkbox to activate the expert mode (per Default not active)
5. Search mask (Filter input field)
6. Tiles for the opsi packages

In this view, the main window displays the released products as tiles and with as few operating elements as possible. In the central area the products are displayed (6). As soon as a product is clicked, detailed information about this one is displayed below. By clicking on the radio buttons in the *Action request* field, requirements can be set or deleted. Using the *Install now* button (2) the set requirements are sent to the server and then the corresponding installation is started directly.
With the search field (5) you can search specific products. The search will be performed in all the fields of the product. By clicking *X* in the search field, the search can be deleted and all products will be displayed again.
Using the checkbox *Expert mode* (4) additional control elements can be displayed.

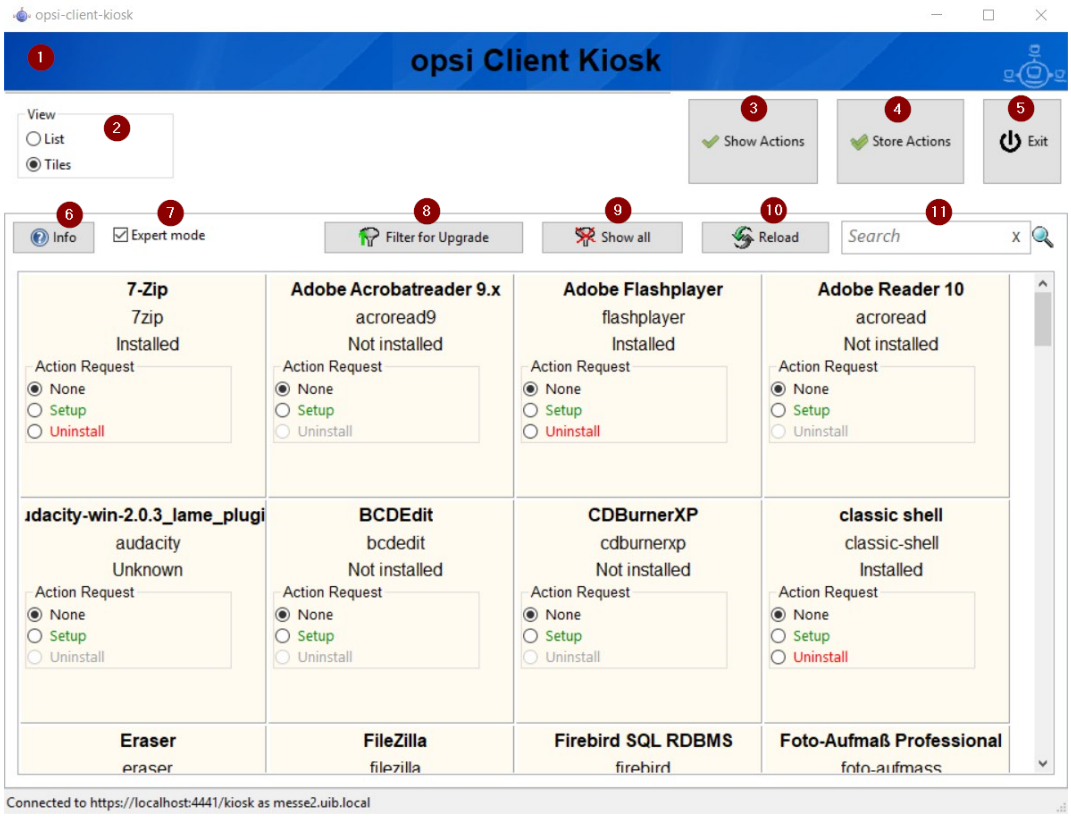


Figure 154: opsi-client-kiosk: Main window with tiles (Expert Mode)

Elements:

1. Header panel (Customizable to the specification of the customer)
2. Radiobutton field to switch between tile view (Default) and list view
3. Button to display the set actions
4. Button to save and view the set actions
5. Button to end the program
6. Info button: version and the loaded language
7. Checkbox to activate the expert mode (not active per default)
8. Filter to check possible product upgrades
9. Delete the previously set filter and display all data
10. Reload the data (e.g., after actions have been)

11. Search mask (filter input field)
12. Tiles for the opsi packages

In this view, the main window displays the released products as tiles and with all the additional control elements (expert mode). The products are displayed in the central area (6). When a product is clicked, detailed information about this product is displayed below. By clicking the radio buttons in the *Action request* field, requirements can be set or cleared. Using the *Show Actions* button (3), the actions known so far for the application are shown, it's important to mention that these actions have not been saved yet. Only the *Save actions* (4) button sends the set actions to the server. This action also checks whether further products have to be set to setup via product dependencies. Finally, the complete list of the upcoming actions is displayed in a separate window. Search for specific products using the search field (11). The search will be performed in all the fields of the product. By clicking the *X* in the search field, the search field will be deleted and all products will be displayed again.
By using the checkbox *Expert mode* (7) additional control elements are displayed here.

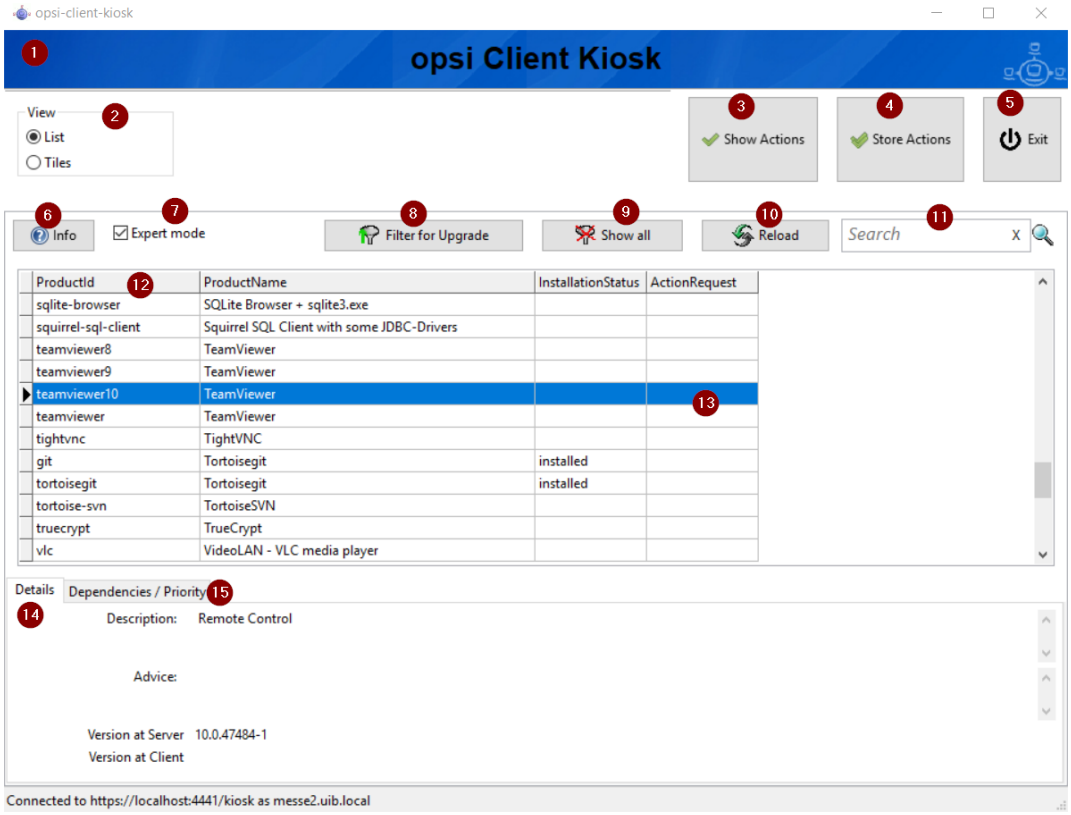


Figure 155: opsi-client-kiosk: Main window with lists (Expert Mode)

Elements:

1. Header panel (Customizable to the specification of the customer)
2. Radiobutton field to switch between tile view (Default) and the list view
3. Button to display the set actions
4. Button to save and display the set actions
5. Button to end the program
6. Info Button: version and loaded language

7. Checkbox to activate the expert mode (per default not active)
8. Filter to check possible product upgrades
9. Delete the set filter and display all data
10. Reload the data (e.g., after actions have been performed)
11. Search mask (filter input field)
12. Product display
13. Column to set the action requirements
14. Tab: Product detail info: Description / Reference / Version
15. Tab: Product detail info: Dependencies / Priorities

The main window displays the shared products as a list in this view. The products are displayed in the central part (12). As soon as a product is clicked, detailed information about this particular product is displayed below (14/15). An action request can be set on the column `ActionRequest` (13).

Using the *Show Actions* button (3), the actions known so far for the application are shown, it's important to mention that these actions have not been saved yet. Only the *Save actions* (4) button sends the set actions to the server. This action also checks whether further products have to be set to setup via product dependencies. Finally, the complete list of the upcoming actions is displayed in a separate window.
Search for specific products using the search field (11). The search will be performed in all the fields of the product. By clicking the *X* in the search field, the search field will be deleted and all products will be displayed again.
By using the checkbox *Expert mode* (7) additional control elements are displayed here.

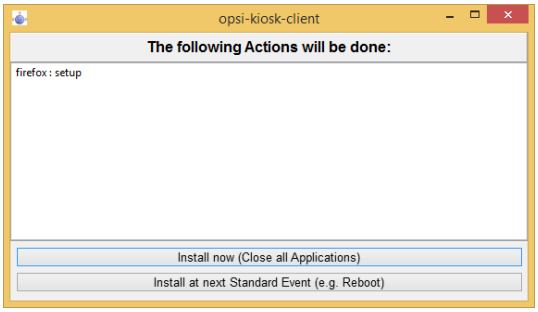


Figure 156: *opsi-client-kiosk*: Confirm action

This window appears only in the *expert mode* after using the *Store Actions* button.
In this window and by using the upper button *Install now* an immediate installation can be triggered. In that case, it is advisable to close all applications (or at least save your data) since the installation can interfere with the running applications.
The button below `Install at next standard event` will end the program at this point. All the stored actions will be executed at a later point.

The config *Software-on-demand.show details* have in the kiosk application no influence prior to 4.0.7 and can be at this point deleted.

Logs of the opsi-client-kiosk program:

The program logs to `%Appdata%\opsi.org\log`. That is the `opsi.org\log` directory in the Appdata directory of the loggedin user.
For Example:
`C:\Users\<username>\AppData\Roaming\opsi.org\log\`

9.15.5 Characteristics

The following apply to the software-on-demand module:

- Dependencies are resolved automatically
  - Software that depends on software from the Demand group, will automatically be set to setup (install), without interaction from the user..
- Software that is already set to setup
  - In this case, the Checkbox: *install*, will be already activated.

Client kiosk: Customizable to Corporate Identity

This Chapter you will find as a part of the Chapter Corporate Identity of the opsi-client-agent: Section 6.1.4

9.16 *User Profile Management* (free)

9.16.1 Preconditions for the extension

This extension was a cofunding project but is released as free since 29 Apr 2015.
see also Section 9.1
and
opsi cofunding projects
opsi cofunding contribution

Technical preconditions are opsi 4.0.1 with the following package and product versions:

Table 27: Needed product and package versions

opsi product	**Version**
opsi-client-agent	>=4.0.1-23
opsi-winst	>=4.11.2.1
python-opsi	>=4.0.1.31-1

Table 28: Needed product and package versions to run it without activation file

opsi product	**Version**
opsi-client-agent	>=4.0.5.4-2
opsi-winst	>=4.11.4.17-1

Caution
This extension does not work together with the WAN extension. On WAN clients we recommend to not use the login event.

9.16.2 Introduction

The *opsi-winst* has some special commands to manipulate profiles. These commands act at the local stored profiles. If you are using *Roaming Profiles* this feature of the *opsi-winst* does not help you because all modifications at the profiles will be overwritten by the server stored profile while login.

The opsi extension for *User Profile Management* gives you the possibility to do the needed profile manipulation after the login of the user, at the correct profile. This is done by starting the *opsi-winst* after the user login again and run some special *userLoginScripts*.

9.16.3 Concept

If you can't do the profile manipulation while installing the software on the machine, you have to separate the *machine part* of the software installation from the *profile part*. This can be done inside of a script and also by putting the *profile part* into a separate script. Many admins still use the second idea by integrating *profile parts* into a domain login script.

According to the method you use the *profile part* of your opsi products are part of the opsi installation scripts for installation and deinstallation or they are separated for example as part of the domain login scripts.
The goal of this opsi extension is to provide the possibility to integrate both variants of scripts easily.

The core concepts of this opsi extension are:

- Executing special *userLoginScripts* scripts at the user login
  At the user login the opsiclientd uses the *event_user_login* to startup the *opsi-winst* in a special login script mode. In this special mode the *opsi-winst* executes only the *userLoginScripts* which are assigned to the opsi products.
- Executing these scripts with administrative privileges inside the context of the logged in user
  Domain login scripts may be used to execute *profile parts*. But they run only with user privileges. opsi *userLoginScripts* run with administrative privileges. They run with these high privileges in the user context, so that is easy to manipulate file and registry parts of the profile using the same commands you may use in a domain login script.
- Executing these scripts inside of the opsi service context
  The opsi *userLoginScripts* run inside the opsi service context, so that they know all details about at which opsi product name, version and package version they are just working. They have the complete access to product properties and other information that can be requested by opsi service calls.

Restrictions:

- The opsi *userLoginScripts* will be always executed online and not from a local cache. Even if your client runs with the opsi WAN extension.

9.16.4 New and extended *opsi-winst* functions

- Command line parameter `/allloginscripts`
  If you are calling *opsi-winst* in the opsi service context with the additional parameter */allloginscripts* this will lead to the following actions:
  - All products which have a *userLoginScript* will be detected. Only for these products will be the *userLoginScripts* executed.
  - The logged in user will be identified. All global constants to user specific directories like `%CurrentAppdataDir%` will be directed to the directories of the logged-in user. Also the registry operations (`Registry` sections and `GetRegistryString`) which going to `HKCU` will be executed in a way that they read or write to the current_user hive of the logged-in user.
- Command line parameter `/silent`
  The command line parameter `/silent` switches off the *opsi-winst* standard window in order to not disturb the user.

- Function `GetScriptMode`
  In order to detect if a script runs as *userLoginScript* or for example as installation script, the function `GetScriptMode` gives you two possible values:
  - *Machine*
    The script is **not** executed as *userLoginScript* (but e.g. as setup or uninstall script).
  - *Login*
    The script is executed as *userLoginScript*.
- New primary section `ProfileActions`
  This section may be used to the place for calling user profile manipulations. Here a syntax may be used, which make it possible to use this section as a part of a installation script and as a *userLoginScript* as well. Therefore this primary section will be interpreted in different ways according to the fact if it is called at *Machine* mode or at *Login* mode (as *userLoginScript*):
  - *Login*
    If a script is running as *userLoginScript* and there is a section `ProfileActions` in the script, the script interpretation will start at the `ProfleActions` section (and not at the `Actions` section, which will be ignored).
  - *Machine*
    If a script is running as normal istallation script, you may call the section `ProfileActions` as a sub section. But in difference to a normal sub section it has some special rules: For every called *Registry* section the modifier */AllNtUserDats* is implicit set. gesetzt. For every called *Files* section the modifier */AllNtUserProfiles* is implicit set.
    Since Version 4.11.3.2 : For every called *Patches* section the modifier */AllNtUserProfiles* is implicit set.
- Registry sections
  - Registry sections which should work on the *HKCU* or *HKEY_CURRENT_USER* hive in the `openkey` command, will be executed in login script mode (*Login*) in a way, that all changes will be made in the registry hive of the logged-in user. The same applies to the functions `GetRegistryStringValue*`.
  - Registry sections which are called at the normal mode (*Machine*) with the modifier */AllNtUserDats*, may now contain *HKCU* resp.. *HKEY_CURRENT_USER* at the `openkey` command. This gives you the possibility to use the same registry sections in both modes.
- Winbatch sections with `/RunAsLoggedOnUser`
  Even if the `opsi-winst` is started by the Login event, it is running in the SYSTEM context and not in the context of the user that just made the login. In order to start a process in the context of the user you should use a winbatch section with the option `/RunAsLoggedOnUser`.
- Avoid unnecessary script execution:
  With the new script command `saveVersionToProfile` you save product name, version and package version to the logged-in users profile. These information can be retrieved by the new string function `readVersionFromProfile`, so that you may see if this script was executed at this profile before. To make the handling easier there is also a new Boolean function `scriptWasExecutedBefore`. This function checks if there is a version stamp in the profile (like you may do with the `readVersionFromProfile` command) and set a new stamp to the profile (like you may do with the `saveVersionToProfile` command). So you may just use this single command in a `if` statement.
  The new string list function `getProductMap` gives you a hash with all information about the installation states and report to the actual product. So you may see if this product is installed or was uninstalled.
- Logging
  The logs of the *userLoginScripts* are written to
  `c:\opsi.org\log\<login user name>_login.log`
  This log file will be transmitted to the server. At the server they will be stored at `/var/log/opsi/userlogin/<clientid>.log`.
  This log file is handled in append mode. This means new logs will appended to a existing log file of this client. To avoid to large log files, the size of the log files are limited by the server to a maximal size of 5 MB.
  You may display these log files at the opsi management interface (opsi-configed) at the tab *Log files* in the sub tab *userlogin*.

9.16.5 Examples of userLoginScripts

We are starting with examples that are build in a way that they also may used in a domain login script.

A very simple generic example:

```
[Actions]
requiredWinstVersion >= "4.11.3.2"
Message "Example Profile Patch ...."

Files_profile_copy
Registry_currentuser_set
Patches_profile_ini "%userprofiledir%\opsi-script-test.ini"

[Files_profile_copy]
copy "%Scriptpath%\profiles\*.*" "%CurrentAppdataDir%\ACME"

[Registry_currentuser_set]
openkey [HKCU\Software\ACME]
set "show_greeting_window" = "no"

[Patches_profile_ini]
add [secdummy] dummy1=add1
```

A example for firefox configuration:

```
[Actions]
Message "Firefox Profile Patch ...."

DefVar $akt_profile_ini$
DefVar $rel_prefs_path$

comment "check for existing profile ..."
Set $akt_profile_ini$ = "%CurrentAppdataDir%\Mozilla\Firefox\profiles.ini"
if FileExists($akt_profile_ini$)
        Set $rel_prefs_path$ = GetValueFromInifile($akt_profile_ini$,"Profile0","Path","")
        if FileExists("%CurrentAppdataDir%\Mozilla\Firefox\\"+$rel_prefs_path$)
                comment "We found the profile and will now patch it ....."
        endif
else
        comment "no firefox profile found for user"
endif
```

At the next example (which simply extends the first example) we show how you may delete things from the profile in the case that this product has been uninstalled. According to what we get from the function `getProductMap` different parts of the script will be executed.

```
[Actions]
requiredWinstVersion >= "4.11.3.2"
Message "Example Profile Patch ...."

if getValue("installationstate", getProductMap) = "installed"
        comment "Product is installed"
        Files_profile_copy
        Registry_currentuser_set
        Patches_profile_ini "%userprofiledir%\opsi-script-test.ini"
endif
```

```
if getValue("lastactionrequest", getProductMap) = "uninstall"
        comment "Product was uninstalled"
        Files_profile_del
        Registry_currentuser_del
endif

[Files_profile_copy]
copy "%Scriptpath%\profiles\*.*" "%CurrentAppdataDir%\ACME"

[Registry_currentuser_set]
openkey [HKCU\Software\ACME]
set "show_greeting_window" = "no"

[Files_profile_del]
del -s -f "%CurrentAppdataDir%\ACME"
del "%userprofiledir%\opsi-script-test.ini"

[Patches_profile_ini]
add [secdummy] dummy1=add1

[Registry_currentuser_del]
deletekey [HKCU\Software\ACME]
```

Now a example which shows how standard installation scripts (setup32.ins and delsub32.ins) may used also as *user-LoginScripts* to avoid unneeded code doubling.

setup32.ins:

```
[Actions]
requiredWinstVersion >= "4.11.3.2"

DefVar $MsiId$
DefVar $UninstallProgram$
DefVar $ProductId$
DefVar $InstallDir$

; ----------------------------------------------------------------
; - Please edit the following values                             -
; ----------------------------------------------------------------
Set $ProductId$       = "ACME"
Set $InstallDir$      = "%ProgramFiles32Dir%\ACME"
; ----------------------------------------------------------------
if GetScriptMode = "Machine"
        comment "Show product picture"
        ShowBitmap "%ScriptPath%\\" + $ProductId$ + ".png" $ProductId$

        if FileExists("%ScriptPath%\delsub32.ins")
                comment "Start uninstall sub section"
                Sub "%ScriptPath%\delsub32.ins"
        endif

        Message "Installing " + $ProductId$ + " ..."

        comment "Start setup program"
        Winbatch_install

        comment "Patch the local Profiles ..."
        Registry_currentuser_set /AllNtUserDats
```

```
        Files_profile_copy /AllNtUserProfiles
        Patches_profile_ini "%userprofiledir%\opsi-script-test.ini" /AllNtUserProfiles
endif

if GetScriptMode = "Login"
        comment "login part"
        Files_profile_copy
        Registry_currentuser_set
        Patches_profile_ini "%userprofiledir%\opsi-script-test.ini"
endif


[Winbatch_install]
"%ScriptPath%\setup.exe" /sp- /silent /norestart

[Files_profile_copy]
copy "%Scriptpath%\profiles\*.*" "%CurrentProfileDir%\Appdata\ACME"

[Registry_currentuser_set]
openkey [HKCU\Software\ACME]
set "show_greeting_window" = "no"

[Patches_profile_ini]
add [secdummy] dummy1=add1
```

delsub32.ins:

```
Message "Uninstalling " + $ProductId$ + " ..."

if GetScriptMode = "Machine"
        comment "The machine part ..."
        Set $UninstallProgram$ = $InstallDir$ + "\uninstall.exe"
        if FileExists($UninstallProgram$)
                comment "Uninstall program found, starting uninstall"
                Winbatch_uninstall
        endif
        ; does also work since 4.11.2.1
        Registry_currentuser_del /AllNtUserDats
        Files_profile_del /AllNtUserProfiles
endif

if GetScriptMode = "Login"
        comment "The profile part ..."
        Files_profile_del
        Registry_currentuser_del
endif

[Winbatch_uninstall]
"$UninstallProgram$" /silent /norestart

[Files_profile_del]
del -s -f "%CurrentAppdataDir%\ACME"
del "%userprofiledir%\opsi-script-test.ini"

[Registry_currentuser_del]
deletekey [HKCU\Software\ACME]
```

Now a variant which is variant of the example before. It makes use of the new primary section `ProfileAction`. This makes the script shorter and it may be still used as installation script and as *userLoginScript* as well.

```
[Actions]
requiredWinstVersion >= "4.11.3.2"

DefVar $ProductId$
DefVar $InstallDir$

Set $ProductId$       = "ACME"
Set $InstallDir$      = "%ProgramFiles32Dir%\ACME"

comment "Show product picture"
ShowBitmap "%ScriptPath%\\" + $ProductId$ + ".png" $ProductId$

Message "Installing " + $ProductId$ + " ..."

comment "Start setup program"
Winbatch_install

comment "Patch the local Profiles ..."
ProfileActions

[ProfileActions]
comment "login part"
Files_profile_copy
Registry_currentuser_set
Patches_profile_ini "%userprofiledir%\opsi-script-test.ini"

[Winbatch_install]
"%ScriptPath%\setup.exe" /sp- /silent /norestart

[Files_profile_copy]
copy "%Scriptpath%\profiles\*.*" "%CurrentProfileDir%\Appdata\ACME"

[Registry_currentuser_set]
openkey [HKCU\Software\ACME]
set "show_greeting_window" = "no"

[Patches_profile_ini]
add [secdummy] dummy1=add1
```

Most of the time, we want to run opsi login-scripts once. Thus, we need to store information on product, version and package version per User. We achieve this by using the following code, which will save opsi product and its versions to a file in the Appdata\opsi.org folder.

```
[Actions]
requiredWinstVersion >= "4.11.3.2"
Message "Example Profile Patch ...."

comment "Did we run this script before ? - and set version stamp in profile"
if not (scriptWasExecutedBefore)
        comment "loginscript was not run yet "
        Files_profile_copy
        Registry_currentuser_set
        Patches_profile_ini "%userprofiledir%\opsi-script-test.ini"
endif
```

```
[Files_profile_copy]
copy "%Scriptpath%\profiles\*.*" "%CurrentAppdataDir%\ACME"

[Registry_currentuser_set]
openkey [HKCU\Software\ACME]
set "show_greeting_window" = "no"

[Patches_profile_ini]
add [secdummy] dummy1=add1
```

9.16.6 Configuration

In order to use the opsi *User Profile Management* extension, you have to activate the *event_user_login* at the opsi-clientd configuration.

If the opsi-client-agent at the client is up to date, the (*opsi-winst*) should be started with the additional parameter */allloginscripts* or */loginscripts*.

- `/allloginscripts` means that at the login event **all** loginscripts that are known by the opsi-server will be executed - no matter if the according product is well known to the client (installed or formally installed) or not.
  This is the default.
- `/loginscripts` means that at the login event only those loginscripts will be executed, where the product is well known by the client, which means it is or was installed. (Technically: there exists a productOnClient object for this product and client). Loginscript from products that were never installed on this client will not be executed.

You may activate the *event_user_login* at the command line with the following command (we set the server-side value to *false*, so that we can test on single clients first. Activate via Client - Hostparameter - opsi-clientd.event_user_login.active > true . Later you might want to activate this feature server-wide):

```
opsi-admin -d method config_createBool opsiclientd.event_user_login.active "user_login active" false
```

As additional action_processor (*opsi-winst*) parameter you may use */silent*, which suppress the display of the *opsi-winst* window.

```
opsi-admin -d method config_createUnicode opsiclientd.event_user_login.action_processor_command "user_login \
    action_processor" "%action_processor.command% /sessionid %service_session% /loginscripts /silent" "%\
    action_processor.command% /sessionid %service_session% /loginscripts /silent"
```

These configurations you will also see (and modify) at the opsi management interface (opsi-configed) at the tab *Host parameters* at the client or server configuration-

9.16.7 Notification

If you have activated the *event_user_login* (as described above), you will see after every login the user_login_notifier:

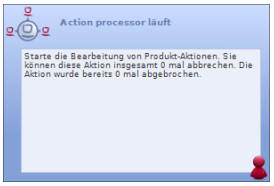


Figure 157: User Login Notifier

9.17 opsi Installation on Shutdown (free)

9.17.1 Introduction

Usually the client installation of opsi software packages starts when the client boots. So the user has to wait for the installation to finish, before the user login is granted. So it might be useful to do most of the software installation when the client is going to shut down.

The opsi module for installation on shutdown provides this feature. Selected clients can be configured to perform the installation on shutdown.

9.17.2 Preconditions for Installation on Shutdown

The opsi module Installation on Shutdown can be used for clients with **Windows XP** or above. The required components are part of the opsi package *opsi-client-agent*.

The package *opsi-client-agent* must be version 4.0.2.3-2 or above with an `opsiclientd` version 4.0.75 or above.

The **cofunding of this project has been finished,** and thus with opsi version 4.0.5.4-2 it has been added to the core of the free opsi system and doesn't require a modules file anymore. Older versions of opsi-client-agent still do require a modules file. For further details on cofunding projects see Section 9.1 and the weblink opsi cofunding projects.

Some technical restrictions and constraints are the following cases:

- WAN extension: the Installation on Shutdown module currently is not available for clients that run also the WAN extension. Running the WAN extension on a client under some conditions requires to use the local configuration files, which interferes with the state handling of the installation on shutdown mechanism.
- Group Policies: part of the mechanism for Installation on Shutdown is based on shutdown scripts per Local Group Policy. Other Group Policies might override these local configurations. In this case, the required configuration for running this shutdown scripts should be included in your Group Policies mechanism. See Section 9.17.4 for the required configurations.
- If the install on shutdown has been triggered by a shutdown or a reboot, the Windows API doesn't allow to convert a shutdown into a reboot (or vice versa). In case of a shutdown, the installation of any product, that require a reboot, will continue at the next startup of the client.
- Windows Home Edition: Windows Home does not provide the required Local Group Policy shutdown script mechanism. Therefore Installation on Shutdown cannot be used for Windows Home Edition.
- Windows 2000: For Windows 2000 clients the maximum timeout for shutdown scripts is 10 minutes. After 10 minutes the installation is aborted by the system. Therefore Installation on Shutdown cannot be used for Windows 2000 clients.

9.17.3 Activating Installation on Shutdown

The required components for Installation on Shutdown are part of the current `opsi-client-agent` package. Since opsi version 4.0.5.4-2 the `modules` file is not required for the install on shutdown.

The Installation on Shutdown can be configured for suitable clients (see Section 9.17.2) simply by setting the `opsi-client-agent` product property `on_shutdown_install=on` and setting the action request for the `opsi-client-agent` to `update` or `setup`.

That is everything. The rest of the configurations are done by the `opsi-client-agent` package during update / setup.

Just in case client group policies are already applied, there might be a conflict with the local opsi client group policy setting. In case of such a conflict, the opsi shutdown script group policy entries of the opsi-client-agent package should be disabled (on_shutdown_install_set_policy = off) and instead be added to your local group policy administration, see Section 9.17.4.

The Installation on Shutdown is done in addition to the Installation at Startup. Usually this is the best way to ensure that the clients always have the current security updates installed, even if the client was off for a long time (when the user was on holiday for instance). If required, the standard Installation on Startup can be disabled, see Section 9.17.4. Installations in progress are continued anyway, triggered by the precondition `installation_pending`.

The Windows system during system shutdown does not distinguish shutdown from reboot. The Installation on Shutdown is started in both cases and it is not possible, to distinguish them during the installation process. Also the Windows API does not allow to transform a system shutdown into a reboot (or vice versa). So in case of a system shutdown, further installations are continued at the next system startup.

9.17.4 Technical Concept

The following explanations are conceived to bring understanding on the technical design and the interactions of the components in case of special configurations or error states. Usually all of the required configurations are done by the `opsi-client-agent` package.

Overview

The Installation on Shutdown module is based on several system components. A major part of it, is the Windows shutdown script mechanism per Local Group Policy. Shutdown scripts allow to run tasks at shutdown when the user is logged off already, but all the system services are still available.

The shutdown script performs an opsi task, which triggers the opsi system service *opsiclientd* to start the installation process and waits for the task to end. So the system waits for the installation process to finish and then shuts down. During the shutdown handling, the Windows system does not distinguish shutdown from reboot, so the installation is triggered in either case.

The opsi client service *opsiclientd* is configured to process the action `on_shutdown`, which starts the installation process. In case of required reboots, the precondition `installation_pending` allows the process control. If during an installation a reboot is required before continuing the installation, the precondition `installation_pending` continues the installation at the next system startup (even if installation at `gui_startup` is disabled). During the state of `installation_pending`, no further Installations on Shutdown are triggered, otherwise there would be no reboot between Installation on Startup and Installation on Shutdown. So until the current installation is completed, the Installation on Shutdown is suppressed by the setting `event_on_shutdown{installation_pending}`.

The following chapter gives some further details on the Installation on Shutdown.

Installing by shutdown script

By special registry entries, the Local Group Policy is configured to perform an opsi shutdown script, which triggers the installation process. The registry entries used by `opsi-client-agent` are the same as the ones done by the Group Policy-Editor `gpedit.msc`.

This is how to configure the shutdown script by using the Group Policy-Editor `gpedit.msc`:

- Local Computer Policy
- Computer Configuration
- Windows Settings
- Scripts (Startup/Shutdown)
- Shutdown
- Scripts - Add - Browse
- C:\Programs Files\opsi.org\opsi-client-agent\on_shutdown\doinstall32.cmd (or doinstall64.cmd for 64Bit systems)

To configure the system to wait for the completion of the installation process, the maximum waittime is set to infinite (0 seconds):

- Administrative Templates
- System - Scripts
- Maximum Waittime for Group Policy scripts
- Setting - Enabled - Seconds: 0

The opsi shutdown script `doinstall32.cmd` / `doinstall64.cmd` changes the working directory and triggers the *on_shutdown* event:

```
echo Start opsi product installation ...
cd "%ProgramFiles%\opsi.org\opsi-client-agent\on_shutdown"
opsiclientd_event_starter.exe --event=on_shutdown
```

For 64Bit systems:

```
echo Start opsi product installation ...
cd "%ProgramFiles(x86)%\opsi.org\opsi-client-agent\on_shutdown"
opsiclientd_event_starter.exe --event=on_shutdown
```

The `opsiclientd_event_starter` triggers the installation and waits for completion, so the system shutdown is delayed while the `opsiclientd_event_starter` task is running.

Registry Entries for executing the shutdown script

These registry entries are set by the `opsi-client-agent` package and start the execution of the shutdown script *doinstall32.cmd* on WinXP / 32Bit clients. For 64Bit-systems the script name is `doinstall64.cmd` (instead of `doinstall32.cmd`).

```
[HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Windows\CurrentVersion\Group Policy\State\Machine\Scripts\Shutdown\0]
"GPO-ID"="LocalGPO"
"SOM-ID"="Local"
"FileSysPath"="C:\\WINDOWS\\System32\\GroupPolicy\\Machine"
"DisplayName"="opsi shutdown install policy"
"GPOName"="opsi shutdown install policy"

[HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Windows\CurrentVersion\Group Policy\State\Machine\Scripts\Shutdown\0\0]
"Script"="C:\\Programme\\opsi.org\\opsi-client-agent\\on_shutdown\\doinstall32.cmd"
"Parameters"=""
"ExecTime"=hex(b):00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00

[HKEY_LOCAL_MACHINE\SOFTWARE\Policies\Microsoft\Windows\System\Scripts\Shutdown\0]
"GPO-ID"="LocalGPO"
"SOM-ID"="Local"
"FileSysPath"="C:\\WINDOWS\\System32\\GroupPolicy\\Machine"
"DisplayName"="opsi shutdown install policy"
"GPOName"="opsi shutdown install policy"

[HKEY_LOCAL_MACHINE\SOFTWARE\Policies\Microsoft\Windows\System\Scripts\Shutdown\0\0]
"Script"="C:\\Programme\\opsi.org\\opsi-client-agent\\on_shutdown\\doinstall32.cmd"
"Parameters"=""
"ExecTime"=hex:00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00

[HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Windows\CurrentVersion\policies\system]
"MaxGPOScriptWait"=dword:00000000
```

These are the registry entries for Win6 64Bit (Vista / Win7 / Win8):

```
[HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Windows\CurrentVersion\Group Policy\State\Machine\Scripts\Shutdown\0]
"GPO-ID"="LocalGPO"
"SOM-ID"="Local"
"FileSysPath"="C:\\WINDOWS\\System32\\GroupPolicy\\Machine"
"DisplayName"="opsi shutdown install policy"
"GPOName"="opsi shutdown install policy"

[HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Windows\CurrentVersion\Group Policy\State\Machine\Scripts\Shutdown\0\0]
"Script"="C:\\Programme\\opsi.org\\opsi-client-agent\\on_shutdown\\doinstall32.cmd"
"Parameters"=""
"ExecTime"=hex(b):00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00

[HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Windows\CurrentVersion\Group Policy\Scripts\Shutdown\0]
"GPO-ID"="LocalGPO"
"SOM-ID"="Local"
"FileSysPath"="C:\\Windows\\System32\\GroupPolicy\\Machine"
"DisplayName"="opsi shutdown install policy"
"GPOName"="opsi shutdown install policy"
"PSScriptOrder"=dword:00000001

[HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Windows\CurrentVersion\Group Policy\Scripts\Shutdown\0\0]
"Script"="C:\\Program Files (x86)\\opsi.org\\opsi-client-agent\\on_shutdown\\doinstall64.cmd"
"Parameters"=""
"IsPowershell"=dword:00000000
"ExecTime"=hex:00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00

[HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Windows\CurrentVersion\policies\system]
"MaxGPOScriptWait"=dword:00000000
```

Configuration of the opsiclientd

To manage the Installation on Shutdown, the opsi client service *opsiclientd* has got entries for the special Event *on_shutdown* in the configuration file *opsiclientd.conf*. These are the relevant entries:

```
[event_gui_startup]
active = True

[event_gui_startup{installation_pending}]
active = True

[event_on_shutdown]
active = False

[event_on_shutdown{installation_pending}]
active = False

[precondition_installation_pending]
installation_pending = true
```

The precondition `installation_pending` is set to *true* by the *opsiclientd* while an installation is in progress and set to *false* when the installation is finished. So an unfinished installation, which needs to proceed the installation after a reboot, can be detected by the precondition `installation_pending` still being *true* at the end of the script processing. When the `event_on_shutdown` section is set to False (which is the default), the Installation on Shutdown is disabled.

This is the configuration for a client with activated Installation on Shutdown:

```
[event_gui_startup]
active = True

[event_gui_startup{installation_pending}]
active = True

[event_on_shutdown]
active = True
```

```
[event_on_shutdown{installation_pending}]
active = False

[precondition_installation_pending]
installation_pending = true
```

So the only difference is the *event_on_shutdown* section being *True*:

```
[event_on_shutdown]
active = True.
```

The setting of the *event_on_shutdown* section is managed by the product switch `on_shutdown_install` of the `opsi-client-agent` package.

The precondition `precondition_installation_pending = true` indicates, that the current installation process has not completed yet. This precondition stays *true*, even after several Reboots, until the current installation has completed. In case of a required Reboot during the installation process, the configuration `[event_gui_startup{installation_pending}] active = True` triggers the installation to continue at the next system startup. This configuration may not be changed, because the current installation has to be completed, before the user is allowed to login.

Also the configuration `[event_on_shutdown{installation_pending}] active = False` must keep its value *False* at all times, because the installation has to continue AFTER the next reboot. Otherwise there wouldn't be a reboot between Installation at Startup and Installation on Shutdown.

As soon as the installation process has completed, the precondition is set to `installation_pending = false`, so the Installation on Shutdown is active again.

Special Configuration of Installation on Shutdown

To activate the Installation on Shutdown, just a current opsi-client-agent package is required, as described in Section 9.17.3. The Shutdown on Install can be activated by setting the product switch `on_shutdown_install` of the clients `opsi-client-agent` package.

As default, the Installation at startup is also active. So it is ensured, that the client always has the current software. Even if it had been offline for a while (when the user returns from holiday, for instance).

The Installation at startup can be turned off, if desired. The configuration of the *opsi-client-agents* can be done by the web service (see: Section 6.1.3), therefore an *host parameter* should be created:

- `opsiclientd.event_gui_startup.active` (boolean, default: `true`)

By this *host parameter* the *gui_startup* event can be configured for a client. The *host parameter* can be created by *opsi-configed* or *opsi-admin*.

For creating the *host parameter* with *opsi-admin*, execute the following command on the *opsi-config-server*:

```
opsi-admin -d method config_createBool opsiclientd.event_gui_startup.active "gui_startup active" true
```

The default value *true* is the default value as it comes with the default `opsiclientd.conf`.

To disable the Installation at Startup for a client, the *host parameter* can be configured like this:

- `opsiclientd.event_gui_startup.active: false`

Be careful with disabling the Installation on startup, for there is a high risk of outdated software. Never change the settings of the sections with the precondition *installation_pending*. The default settings are required to manage the installation process.

To set the *host parameter* with *opsi-admin*, execute the following command on the *opsi-config-server* (in this example for a client with the opsi-host-Id `myclient.domain.de`):

```
opsi-admin -d method configState_create opsiclientd.event_gui_startup.active myclient.domain.de false
```

With the configuration *event_gui_startup=false* there is no connect to the *opsi-config-server* and no software installation at startup. With the exception of installations in progress, which continue at system startup. This is managed by the configuration `event_on_shutdown{installation_pending}`. So do not change the settings for sections with the precondition *installation_pending*, for they are important for products, that require a reboot during installation.

Local Logfile

During Install on Shutdown two logfiles are written:

- `C:\opsi.org\log\doinstall.log`
- `C:\opsi.org\log\opsiclientd_event_starter.log`

with, in case of success, has the following content:

`doinstall.log`:

```
doinstall32.cmd started
Aktuelles Datum: 29.01.2013
```

`opsiclientd_event_starter.log`:

```
[1] [Okt 06 18:49:44:435] opsiclientd_shutdown_starter: version: 4.0.7.0
[5] [Okt 06 18:49:44:435] clientid=pctry4detlef.uib.local
[5] [Okt 06 18:49:44:435] service_url=https://localhost:4441/opsiclientd
[5] [Okt 06 18:49:44:435] service_user=pctry4detlef.uib.local
[5] [Okt 06 18:49:44:450] host_key=***(confidential)***
[5] [Okt 06 18:49:44:450] myevent=on_shutdown
[6] [Okt 06 18:49:44:450] Working with ssl protocol: sslvSSLv23 - auto negotation
[6] [Okt 06 18:49:45:107] JSON Bench for backend_info "params":[],"id":1} Start: 18:49:44:450 Time: 00:00:00:657
[6] [Okt 06 18:49:45:232] opsidata connected
[5] [Okt 06 18:49:45:232] init Connection done
[6] [Okt 06 18:49:45:232] JSON service request https://localhost:4441/opsiclientd isInstallationPending
[6] [Okt 06 18:49:45:529] JSON Bench for isInstallationPending "params":[],"id":1} Start: 18:49:45:232 Time: \
    00:00:00:297
[5] [Okt 06 18:49:45:622] resultstring={"id": 1, "result": false, "error": null}
[5] [Okt 06 18:49:45:622] No installation pending - fine
[6] [Okt 06 18:49:45:622] JSON service request https://localhost:4441/opsiclientd fireEvent
[6] [Okt 06 18:49:45:966] JSON Bench for fireEvent "params":["on_shutdown"],"id":1} Start: 18:49:45:622 Time: \
    00:00:00:344
[5] [Okt 06 18:49:46:091] resultstring={"id": 1, "result": null, "error": null}
[5] [Okt 06 18:49:46:091] Succesfull fired event: on_shutdown
[5] [Okt 06 18:49:51:107] calling: isEventRunning,[on_shutdown]
[6] [Okt 06 18:49:51:107] JSON service request https://localhost:4441/opsiclientd isEventRunning
[6] [Okt 06 18:49:51:357] JSON Bench for isEventRunning "params":["on_shutdown"],"id":1} Start: 18:49:51:107 Time: \
    00:00:00:250
[5] [Okt 06 18:49:51:451] resultstring={"id": 1, "result": true, "error": null}
[5] [Okt 06 18:49:56:467] calling: isEventRunning,[on_shutdown]
[6] [Okt 06 18:49:56:467] JSON service request https://localhost:4441/opsiclientd isEventRunning
[6] [Okt 06 18:49:56:935] JSON Bench for isEventRunning "params":["on_shutdown"],"id":1} Start: 18:49:56:467 Time: \
    00:00:00:468
[5] [Okt 06 18:49:57:060] resultstring={"id": 1, "result": true, "error": null}
[5] [Okt 06 18:50:02:076] calling: isEventRunning,[on_shutdown]
[6] [Okt 06 18:50:02:076] JSON service request https://localhost:4441/opsiclientd isEventRunning
[6] [Okt 06 18:50:02:545] JSON Bench for isEventRunning "params":["on_shutdown"],"id":1} Start: 18:50:02:076 Time: \
    00:00:00:469
[5] [Okt 06 18:50:02:670] resultstring={"id": 1, "result": true, "error": null}
[5] [Okt 06 18:50:07:686] calling: isEventRunning,[on_shutdown]
[6] [Okt 06 18:50:07:686] JSON service request https://localhost:4441/opsiclientd isEventRunning
[6] [Okt 06 18:50:08:186] JSON Bench for isEventRunning "params":["on_shutdown"],"id":1} Start: 18:50:07:686 Time: \
    00:00:00:500
[5] [Okt 06 18:50:08:311] resultstring={"id": 1, "result": true, "error": null}
```

```
[5] [Okt 06 18:50:13:327] calling: isEventRunning,[on_shutdown]
[6] [Okt 06 18:50:13:327] JSON service request https://localhost:4441/opsiclientd isEventRunning
[6] [Okt 06 18:50:13:624] JSON Bench for isEventRunning "params":["on_shutdown"],"id":1} Start: 18:50:13:327 Time: \
    00:00:00:297
[5] [Okt 06 18:50:13:749] resultstring={"id": 1, "result": true, "error": null}
[5] [Okt 06 18:50:18:765] calling: isEventRunning,[on_shutdown]
[6] [Okt 06 18:50:18:765] JSON service request https://localhost:4441/opsiclientd isEventRunning
[6] [Okt 06 18:50:19:030] JSON Bench for isEventRunning "params":["on_shutdown"],"id":1} Start: 18:50:18:765 Time: \
    00:00:00:265
[5] [Okt 06 18:50:19:171] resultstring={"id": 1, "result": false, "error": null}
[5] [Okt 06 18:50:19:171] calling: isEventRunning,[on_shutdown{user_logged_in}]
[6] [Okt 06 18:50:19:171] JSON service request https://localhost:4441/opsiclientd isEventRunning
[6] [Okt 06 18:50:19:452] JSON Bench for isEventRunning "params":["on_shutdown{user_logged_in}"],"id":1} Start: \
    18:50:19:171 Time: 00:00:00:281
[5] [Okt 06 18:50:19:562] resultstring={"id": 1, "result": false, "error": null}
[5] [Okt 06 18:50:19:562] Task completed
```

or

```
[1] [Okt 12 18:07:57:352] opsiclientd_shutdown_starter: version: 4.0.7.0
[5] [Okt 12 18:07:57:352] clientid=pctry4detlef.uib.local
[5] [Okt 12 18:07:57:352] service_url=https://localhost:4441/opsiclientd
[5] [Okt 12 18:07:57:352] service_user=pctry4detlef.uib.local
[5] [Okt 12 18:07:57:352] host_key=***(confidential)***
[5] [Okt 12 18:07:57:352] myevent=on_shutdown
[6] [Okt 12 18:07:57:352] Working with ssl protocol: sslvSSLv23 - auto negotation
[6] [Okt 12 18:07:57:946] JSON Bench for backend_info "params":[],"id":1} Start: 18:07:57:352 Time: 00:00:00:594
[6] [Okt 12 18:07:58:055] opsidata connected
[5] [Okt 12 18:07:58:055] init Connection done
[6] [Okt 12 18:07:58:055] JSON service request https://localhost:4441/opsiclientd isInstallationPending
[6] [Okt 12 18:07:58:290] JSON Bench for isInstallationPending "params":[],"id":1} Start: 18:07:58:055 Time: \
    00:00:00:235
[5] [Okt 12 18:07:58:399] resultstring={"id": 1, "result": true, "error": null}
[2] [Okt 12 18:07:58:399] State installation pending detected, do not starting shutdown event.
[2] [Okt 12 18:07:58:399] Terminate called.
```

This Logfiles are rewritten each time and can be checked in case of a malfunction.

9.18 opsi Feature *SilentInstall* (free)

The opsi feature SilentInstall-provides for administrators the ability to install software on a client without the logged on user being disturbed. This chapter describes the characteristics of this feature and offers a guideline for configuring this new installation method.

9.18.1 Preconditions for the Silent Installation

For using this feature, opsi version 4.0.3. or above is required. Basically the *opsi-client-agent* version 4.0.3.1 or above is required.

9.18.2 Overview of the SilentInstall feature

The SilentInstall method offers the ability to install a pre-defined list of products on a client, without the user having to interrupt his work. Unlike the installation by the onDemand-Event (push Installation), the SilentInstall method does not display anything on the user desktop.

All displays are suppressed and are not to be seen on any desktop. Of course this feature bears some risk. In case of a problem, e.g. a syntax error of the *opsi-winst* script, there is no way to interact with the installation process, for no dialog windows are shown. So this would result in the *opsi-winst* and so the Event processing not coming to an end, and so no more events will be executed. To avoid this "Worst case scenario", the maximum installation time is limited by a timeout configuration. This timeout value might have to be adapted in case of an extended installation. For further information, see the configuration chapter.

Another very important ability of this feature is the predefined list of products to be installed silently. Contact to the service is established, but different from the usual procedure, the ActionRequests given by the service are ignored. The list of software to be installed is defined by an *opsi-client-agent* configuration. The "setup" action will be executed for all the products on this list and they do not have to be set to setup. As usual after processing the setup script, also the update script will be executed, if there is one. `No product dependencies will be resolved.` So either no products containing product dependencies should be installed by the SilentInstall feature, or all the products from the dependency list must be added to the SilentInstall product list. As usual the installation process is completed by sending the installation status and installation logfiles to the service. In summary it is recommended to use the SilentInstall only for products, that meet the following requirements:

- small packets or installations only
- little system load: some software installations, so for instance most of the MSI installations, request during installation most of the clients ressources. This could result in a poor system performance remaining for the user.
- installable within a fixed amount of time: the default timeout for this event is set to 300 seconds. If the installation process has not completed within the timeout, the 'opsi-winst'process will be terminated and so the event can be completed.
- no reboots required: software requesting a reboot should not be installed from the SilentInstall. With the default configuration the event is configured not to process any reboot requests. Without this safety configuration the *opsi-client-agent* could reboot the client without any warning to the user. This could result in loss of data if there is a logged on user. This could result in an inoperable software installed by SilentInstall without reboot.

Within the default configuration swaudit and hwaudit are installed by this method. The inventory products of opsi meet all the requirements above and so are applicable for this method. With the default configuration the opsi hard- and software inventory are generated on demand, without the need to set the setup action request with the *opsi-configed*. With this method the inventory information can be generated in real-time operation. Also applicable would be any configuration products, that perform automatic repairs or restore client patches.

9.18.3 Executing the Silent Installation

This event will not be triggered automatically like other events. So there are two ways to perform this event.

The first way is to trigger the event from the opsi webservice, like e.g.:

```
opsi-admin -d method hostControl_fireEvent silent_install client.domain.local
```

So this command is scriptable and can be used within scripts that can be combined with an *at-job* to plan the execution of the event.

As an alternative the event can be triggered by a timer event after a certain amount of time. The default configuration for this event is 6 hours. This value presumes, that a work station usually is in use for 8 hours. So the event would be executed once a day after six hours of uptime. For mor information on configuring and activating this event see the following configuration chapter.

9.18.4 Configuring the opsi-feature: *SilentInstall*

This chapter is about the default configuration of this feature. The default *opsiclientd.conf* has got a SilentInstall event. This listing just shows the important options:

Standard Event SilentInstall:

```
[event_silent_install]
process_shutdown_requests = false
action_processor_productIds = swaudit,hwaudit
action_processor_command = %action_processor.command% /productlist %action_processor_productIds% /silent
action_processor_desktop = winlogon
action_processor_timeout = 300
```

- action_processor_productIds
  - This option is an important new property for the event control. For all events that perform product actions, this option can define a list of products. The product list must be given as a comma separated list.
- process_shutdown_request = false
  - this configuration suppresses reboot requests from the *opsi-winst*.
- action_processor_command
  - this prepares the call of *opsi-winst*.
- action_processor_desktop
  - This option defines the desktop to display the *opsi-winst* GUI.
- action_processor_timeout
  - This option sets the timeout for terminating the *opsi-winst*-process.

The second event is the Timer Event, which triggers the event after a certain amount of time:

Default Timer Event for SilentInstall

```
[event_timer_silentinstall]
super = silent_install
type = timer
active = false
interval = 21600
```

- super
  - This option defines the event to inherit properties from. As the default configuration the Timer-Event inherits from the event silent_install.
- type
  - This option defines this event configuration to be a Timer-Event.
- active
  - as default this event is not active. To acivate it, set this option to *true*.
- interval
  - This option defines the intertval to fire the event. The default value is set to 6 hours, so after six hours of uptime the event is triggered the first time and then every other six hours. So this interval should (like any timer intervall) not be too short, otherwise the event would be peformed most of the time and thereby block the execution of other actions. On the other hand the interval also should not be too long, for the *opsi-client-agent* must be running all that time until the event is triggered. If the client or the *opsi-client-agent* always is restarted before the interval elapsed, this event never will be triggered.

Also the SilentInstall event could be triggered by another system event detected by an WMI request. Therefore a *wql* option can be specified. How to specify a *wql* option is to be seen in the event_net_connection section. If the *wql* option is used, the event should be set to *active = false* as default, so it can be activated later on when requested.

To trigger the event by a timer, usually it only needs to set a host parameter. Therefore at first a default configuration has to be created. In this case it is sufficient to activate the Timer Event.

To create the standard option the following *host parameter* are to be created by the *opsi-admin*. Also this configuration could be created by the *opsi-configed*:

```
opsi-admin -d method config_createBool opsiclientd.event_timer_silentinstall.active "event_timer_silentinstall active" \
    false
```

So at first this event is disabled for all the clients. Then the event can be enabled for single clients:

```
opsi-admin -d method configState_create opsiclientd.event_timer_silentinstall.active silentclient.domain.de true
```

To define the products to be installed, the following entry must be set. If for instance instead of *swaudit* and *hwaudit* the product firefox shall be installed, the entries should be created as described above:

```
opsi-admin -d method config_createUnicode opsiclientd.event_silent_install.action_processor_productIds "\
    event_silent_install productIds" "swaudit,hwaudit"
```

With this option as the default for all clients the product list for the Silent Install Event is set to swaudit and hwaudit. To change the product list for a single client into *firefox* execute the following command:

```
opsi-admin -d method configState_create opsiclientd.event_silent_install.action_processor_productIds client.domain.de "\
    firefox"
```

As you can see, the product list can be different for each client.

9.19 opsi Setup Detector (free)

9.19.1 Introduction

The basic steps of software packaging and distribution are:

- analyzing the setup and creating the files on the opsi workbench
- packing the opsi package
- installing the opsi package on the opsi server
- installing the software on the clients (roll out)

The opsi setup detector is a tool for supporting the packaging of software to prepare for software rollouts. All the steps can be done from the graphical user interface: selecting and analyzing the setup, creating the files on the opsi workbench, packing and installing the package on the opsi server. For packing and installing, the opsi setup detector invokes the community projekt *opsi Package Builder*. When opening a setup file, the opsi setup detector checks whether it is a well known Installer type and then automatically detects the available parameters from the setup file. Over the time, by feed back from opsi users and increasing experience with different installer types and setup files, the setup detector will improve its ability to detect different setup types.

9.19.2 Preconditions for using the opsi Setup Detector

The *opsi Setup Detector* runs on Windows XP or above.

It is part of the default repositories of opsi. It can be installed with the following command:

```
opsi-product-updater -i -p opsi-setup-detector
```

If also packets shall be packed and installed on the opsi server, the community projekt *opsi Package Builder* is required to be installed on the same Windows client. For further information about the *opsi Package Builder* see the Community Projects section of the opsi Forum: https://forum.opsi.org/viewforum.php?f=22

For creating the files and packets a writable Samba share to the opsi Workbench is required. Further on some software setups (especially for 64 bit software) require for analyzing and integration the matching Windows system. This means, that analyzing and integrating software for 64bit Windows7 might not run on a 32bit Windows XP Client. This must be considered in each individual case.

So this is the list of preconditions:

- Windows clients from Windows XP and above
- opsi package Builder installed and configured
- writable Samba share to the opsi Workbench
- opsi Setup Detector itself with all its helper files

9.19.3 Setting up the opsi Setup Detector

The *opsi Setup Detector* is a Windows program developed with Lazarus. It requires some additional helper files to analyze special Setup types and some templates to generate the files for a new opsi packet from. The *opsi Setup Detector* is available as an opsi package, which includes all its helper files (but not the community project *opsi Packet Builder*). After installing the *opsi Setup Detector*, just the Share to the opsi Workbench has to be configured as *Packet BaseDir* and then a setup file to analyze can be opened with *File - Open Setup File And Analyze*.

Language Support

When starting the *opsi Setup Detector*, the language of the Windows system is detected and, if for language *xx* a suitable language file *languages\opsisetupdetector.xx.po* is detected, it will be used. The *opsi Setup Detector* comes with German and English language files. Additional languages can be supported by generating a suitable language file.

Files of the opsi Setup Detector

The *opsi Setup Detector* package contains the following files:

- opsisetupdetector.exe - the *opsi Setup Detector* itself
- extractMSI.cmd - helper file for analyzing Setups with embedded MSI files
- MSIInfo.js - helper file to analyze MSI files
- innounp.exe - helper file to analyze Inno Setup files
- innounp.htm - help for the innounp.htm helper file
- favicon.ico - opsi Icon
- languages\ - directory for language specific files
- languages\opsisetupdetector.po - default language file (English)
- languages\opsisetupdetector.de.po - German language file
- languages\Help.en.html - English help file
- languages\Help.de.html - German help file

To create new opsi packages on the opsi workbench, several template files are required. These templates will be copied and patched according to the information from the *opsi Setup Detector*:

- files2opsi\OPSI\ - templates for the opsi packaging
- files2opsi\OPSI\control
- files2opsi\OPSI\postinst
- files2opsi\OPSI\preinst
- files2opsi\CLIENT_DATA\ - templates for the opsiscripts

- files2opsi\CLIENT_DATA\setup.opsiscript
- files2opsi\CLIENT_DATA\uninstall.opsiscript
- files2opsi\CLIENT_DATA\delsub.opsiscript
- files2opsi\CLIENT_DATA\check_advanced_exitcode.opsiscript
- files2opsi\CLIENT_DATA\check_inno_exitcode.opsiscript
- files2opsi\CLIENT_DATA\check_installshield_exitcode.opsiscript
- files2opsi\CLIENT_DATA\check_installshieldmsi_exitcode.opsiscript
- files2opsi\CLIENT_DATA\check_inno_exitcode.opsiscript
- files2opsi\CLIENT_DATA\check_msi_exitcode.opsiscript

9.19.4 The Menu of opsi Setup Detektor

The menu on the upper left contains the following options:

- File - (opens a sub menu, see below)
- Help - show help in an *opsi Setup detector* window. The help file *%ProgramFiles-Dir%\opsiSetupDetector\languages\Help.de.html* also can be displayed with a browser.
- About - Show program version

The menu option *File* opens a sub menu with:

- *Open Setup File and Analyze* - select the Setup to be analyzed. This option has the same effect as the *Open Setup File* button on the *Analyze* Tab down at the right side and opens a file selection dialog, which shows all file types. The file selection dialog on the other setup tabs only shows files with the extension *.MSI*(*MSI* Tab) or *.EXE* (on all the other Tabs).
- *Create Logfile* - The current content of the Analyze Tab will be written as logfile. The name of the created logfile is *%TEMP%\opsitmp\opsiSetupDetector.log* and will be shown when generating a logfile. The logfile will be generated when executing this command and only contains information, that is currently shown in the *Analyze* tab.
- Exit - quits the *opsi Setup Detektor*

9.19.5 Automated Analysis of a Setup file

When opening a setup file with *Open Setup File and Analyze*, it will be analyzed automatically and, if it is a well known Installer type, automatically switched to the suitable tab. If the installer type is not detected, the **Analyze** tab keeps the focus. Even when the installer type was detected, you can switch back to the **Analyze** tab any time to check the info details sampled by the analysis.

When analyzing a MSI file, the extension *.MSI* already indicates a MSI setup file. When analyzing an *.EXE* file the extension is not very specific and could be anything. So the EXE file is scanned for special markers to indicate the installer type. If the marker of a well known Installer type is found, the focus switches to the corresponding installer type tab. This might give some clue to what kind of installer it is. If the Setup type cannot be detected, the file will be scanned for a special set of words like (e.g. "Installer" or "Setup") and the corresponding lines will be written to the **Analyze** tab. This also might show some cryptic text passages and error codes, which are contained within the setup file like:

```
o@dejDs@s@t@t@du@u@<v@w@w@lx@Hy@x@x{@X|@|@@@@L@x@@Inno Setup Setup Data
The Setup has detected a serious error and quits
```

This just means, that these strings are found within the setup file and match the search pattern, so they are written to the **Analyze** Tab . In this case the search pattern is "Setup". In case of an unknown setup type this might give some clue about the installer type. All output on the **Analyze** Tab, which is preceded by:

```
Analyzing: F:\<setup.exe>
```

und closed by:

```
default grep finished.
```

derives from the automated analysis. If the setup type is detected, it is written below "default grep finished". In case of a well known installer type, the focus switches to the corresponding Tab.

According to the installer type some more information is to be found in the **Analyze** tab. This will be discussed in each of the installer chapters.

The content of the **Analyze** tab is cleared when starting a new analysis and so only contains information from the current setup analysis.

9.19.6 Setup-EXE with embedded MSI

Before going into the different installer types, just a few general things about setup files with embedded MSI: at the moment the *opsi Setup Detector* automatically detects embedded MSI that are wrapped by by Advanced Installer and Installshield based EXE files. The *opsi Setup Detector* extracts and analyses the MSI and writes the detected information to the **Advanced+MSI** Tab or **InstallShield+MSI** Tab and additionally to the **MSI** Tab. An EXE file with embedded MSI can contain several different MSI packages, e.g. for different Windows platforms 32bit/64bit. Usually a setup like this detects the system to use the matching MSI. In this case, when analyzing a setup, only the MSI will be detected for the system where the *opsi Setup Detector* is running on. Such EXE files often have command line options to get more information about the package and install options. Also there might be several MST-files, which will be used in case of detectable conditions. To make a long story short: you never really know, what a setup might do under different conditions. So in most cases you just need the MSI code to patch the deinstallation script. So you just have to make sure, that you have captured all of the codes to be handled in the deinstallation script. For instance a MSI for 32bit and 64bit usually has got a different code. To get all of the codes, you can run the *opsi Setup Detector* on different platforms to grab the MSI codes. When the *opsi Setup Detector* detects an embedded MSI, it will be analyzed and the information is shown in the MSI tab. It is possible to create the opsi packet based on the **MSI** tab. But usually you would take the EXE file for the packet, for it is easier to adapt it to updates and also the EXE file might do some additional jobs.

During the analysis the MSI and other components of the EXE file will be extracted to the directory `%TEMP%\opsitmp`. Before doing so, the directory will be cleaned, so all files to be found there are from the current setup.

9.19.7 Supported Installer Types

Some of the well known installer types have pretty good standards and are accessible for automated analysis. From a MSI packet or an Inno Setup based Setup a lot of useful information can be detected automatically, whereas other Installer types, like NSIS, don't make any information accessible. So in many cases the automatic analysis gives good results, but in other cases it doesn't work at all or requires to work it over. With increasing experience from user results the detection skill of the *opsi Setup Detector* will surely improve.

MSI packages are the most important and widespread Installer type, so the **MSI** tab is the first one to follow the *Analyze tab, and then the others in alphabetical order.

Installer Type MSI

MSI files are the installer format of the Microsoft Windows Installer. Setups of type MSI can be detected by the file extension .MSI. The internal format of MSI packages is a well known standard, so the *opsi Setup Detector* can read several information from the packet to show on the **Analyze** tab and the **MSI** Tab, where the focus will switch to. When analysing a MSI, the detected information shown in the **Analyze** Tab looks like this:

```
Analyzing MSI: F:\Setups\MSI\7-zip\7-Zip.msi

Microsoft (R) Windows Script Host, Version 5.8
Copyright (C) Microsoft Corporation 1996-2001. All rights reserved.

MSI file: F:\uib\setupdetector\Setups\MSI\7-zip\7-Zip.msi
Manufacturer: Igor Pavlov
ProductName: 7-Zip 4.57
ProductVersion: 4.57.00.0
ProductCode: {23170F69-40C1-2701-0457-000001000000}
UpgradeCode: {23170F69-40C1-2701-0000-000004000000}
MSI file size is: 0,9 MB
Estimated required space is: 5,2 MB

get_MSI_info finished
```

The detected information is extracted from the MSI packet and automatically fills in the **MSI** tab form. It is used to patch the opsiscript installation/deinstallation scripts:

- **MSI file:** Name of the analysed MSI file
- **opsi Product ID:** this is the name of the new opsi packet to be created. It is derived from the product name below, by substituting spaces and other invalid characters with -. The suggested opsi Product ID can be changed.
- **Product Name:** this is the name of the software as detected from the MSI. This name can be changed, but most likely the detected name will fit.
- **Product Version:** the version of the software as detected from the MSI. Usually the detected value can be taken, but it should contain only numbers and points.
- **MSI Product Code:** the MSI product code as detected from the MSI. It will be used to patch the deinstall opsiscript. Caveat: a MSI product for 32bit and 64bit usually has a different product code.
- **Required Space:** this value is not read from the MSI packet, but is assumed as being six times the size of the MSI file. Before installting the software on the client, the setup.opsiscript checks, whether there is enough disc space.
- **MSI File Size:** the size of the MSI file.
- **use MST File:** if there is a MST file (Transform file) to be found in the same directory (where the MSI file is), its name will be filled in this edit field and will be checked to use for installation. By using the *Select* button on the right, another MST file can be selected. By removing the selection mark on the left, the MST file will not be used.
- **Description:** The product name is set to this edit space and can be supplemented with additional information to be shown in the product description of the opsi product.
- **License required:** When this selection mark is checked, the opsiscript will be patched with *license=true* to indicate that a license is required.

In case of analysing an EXE file with embedded MSI, the MSI file will be extracted automatically and the detected information will be shown in the **MSI** tab in addition to the corresponding tab (**Advanced+MSI** or **InstallShied+MSI**).

Installer Type Advanced+MSI

The Advanced Installer is a tool for creating MSI packets that also can be embedded in EXE setup files. When the *opsi Setup Detector* detects an EXE file as an MSI embedded with Advanced Installer, it extracts the MSI file from the EXE file and analyses the information. The result is shown in the **Advanced+MSI** tab and in addition in the **MSI** tab. For further information on the **MSI** tab see chapter Section 9.19.7.

When extracting and analysing an embedded MSI from an Advanced Installer setup the **Analyze** tab will look like this:

```
xxxxxxxxxxxxxxxxxxxxxxxx
Analyzing AdvancedMSI Setup:
F:\Setups\AdvancedMSI\Phase5\phase562install.exe
Analyzing MSI from Setup
F:\Setups\AdvancedMSI\Phase5\phase562install.exe
cmd.exe /C "F:\Setups\AdvancedMSI\Phase5\phase562install.exe" /extract:e:\Temp\opsitmp\
!! PLEASE WAIT !!
!! PLEASE WAIT !! Extracting and analyzing MSI ...
!! PLEASE WAIT !!
e:\Temp\opsitmp\*.msi
Analyzing MSI: e:\Temp\opsitmp\phase5.msi
```

The MSI will be extracted to the directory =%TEMP%\opsitmp= and then analysed. With the result the **Advanced+MSI** tab will be filled in:

- **Setup file:** Name of the analysed setup file
- **opsi Product ID:** this is the name of the new opsi packet to be created. It is derived from the product name below, by substituting spaces and other invalid characters with -. The suggested opsi Product ID can be changed.
- **Product Name:** this is the name of the software as detected from the MSI. This name can be changed, but most likely the detected name will fit.
- **Product Version:** the version of the software as detected from the MSI. Usually the detected value can be taken, but it should contain only numbers and points.
- **MSI Product Code:** the MSI product code as detected from the MSI. It will be used to patch the deinstall opsiscript. Caveat: a MSI product for 32bit and 64bit usually has a different product code and an Advanced Installer packet might contain different MSI files. In this case it depends on the system the analysis is running on, which MSI is extracted and analysed. Usually a 64bit MSI cannot be extracted on a 32bit system. So for packing a 64bit software, a 64 system should be used.
- **Required Space:** this value is not read from the MSI packet, but is assumed as being six times the size of the EXE file. Before installting the software on the client, the setup.opsiscript checks, whether there is enough disc space.
- **Setup File Size:** the size of the EXE file.
- **Description:** The product name is set to this edit space and can be supplemented with additional information to be shown in the product description of the opsi product.
- **License required:** When this selection mark is checked, the opsiscript will be patched with *license=true* to indicate that a license is required.

Signature Advanced+MSI: for detection of an Advanced+MSI setup, the EXE file is scanned for the marker:

```
name="microsoft.windows.advancedinstallersetup
```

Installer Type Inno Setup

Setups created with Inno Setup follow a pretty well known standard and contain a special file named *install_script.iss*, which can be extracted from the EXE file. The information from *install_script.iss* is filled into the edit fields of the **Inno Setup** tab and the focus switches to this tab. Going back to the **Analyze** Tab it looks like this:

```
.........................................
Analyzing: F:\Setups\Inno\openssl\Win32OpenSSL_Light-1_0_0i.exe
stringsgrep started (verbose:false, skipzero:false)
found string "<description>Inno Setup</description>"
```

```
detected Inno Setup
stringsgrep completed (verbose:false, skipzero:false)
.........................................
Analyzing Inno-Setup:
extract install_script.iss from F:\Setups\Inno\openssl\Win32OpenSSL_Light-1_0_0i.exe to
C:\ProgramData\opsi setup detector\INNO\Win32OpenSSL_Light-1_0_0i\install_script.iss
"E:\Program Files (x86)\opsiSetupDetector\innounp.exe" -x -a -y -d"C:\ProgramData\opsi setu
; Version detected: 5402
#66 install_script.iss
C:\ProgramData\opsi setup detector\INNO\Win32OpenSSL_Light-1_0_0i\install_script.iss
........
[Setup]
AppName=OpenSSL Light (32-bit)
AppVerName=OpenSSL 1.0.0i Light (32-bit)
AppPublisher=OpenSSL Win32 Installer Team
AppPublisherURL=http://www.openssl.org
AppSupportURL=http://www.slproweb.com
AppUpdatesURL=http://www.slproweb.com/products/Win32OpenSSL.html
DefaultDirName={sd}\OpenSSL-Win32
DefaultGroupName=OpenSSL
OutputBaseFilename=Win32OpenSSL_Light-1_0_0i
Compression=bzip2
........
Setup file size is: 1,9 MB
Estimated required space is: 11,1 MB
........
get_inno_info finished
Inno Setup detected
```

The information from *install_script.iss* is taken to fill in the edit fields of the **Inno Setup** tabs to patch the opsiscripts:

- **Setup file:** Name of the analysed setup file
- **opsi Product ID:** this is the name of the new opsi packet to be created. It is derived from the product name below, by substituting spaces and other invalid characters with -. The suggested opsi Product ID can be changed.
- **Product Name:** this is the name of the software as detected from *install_script.iss*. This name can be changed, but most likely the detected name will fit.
- **Product Version:** the version of the software as detected from *install_script.iss*. Usually the detected value can be taken, but it should contain only numbers and points.
- **Install Directory:** this is the name of the directory, where the software is supposed to be installed on the client. This is taken to patch the deinstall script. The installation dir is read from *install_script.iss* and usually can be taken as is. But sometimes this entry might contain some Inno Setup specific notations, which are usually enclosed in curly braces. Some of them the *opsi Setup Detector* will translate to opsiscript syntax, like There could be a number of other entries in curly brackets, which opsiscript does not understand. In this case manual translation to opsiscript syntax is required. The entry *UninstallDisplayName* from *install_script.iss* might give some clue to this. A list and description of Inno Setup constants can be found in the Inno Setup help, e.g. http://www.jrsoftware.org/ishelp/index.php
- **Required Space:** this value is not read from *install_script.iss*, but is assumed as being six times the size of the EXE file. Before installting the software on the client, the setup.opsiscript checks, whether there is enough disc space.
- **Setup File Size:** the size of the EXE file.
- **Description:** The product name is set to this edit space and can be supplemented with additional information to be shown in the product description of the opsi product.

- **License required:** When this selection mark is checked, the opsiscript will be patched with *license=true* to indicate that a license is required.

Signature Inno Setup: for detecting a setup as Inno Setup, the EXE file is scanned for the marker:

```
<description>inno setup</description>
```

Installer Type InstallShield

EXE files created with Installshield are not accessible for automated analysis. It just can be detected, that it is a setup of type Installshield. So all the entries to be found in the **InstallShield** tab are derived from the name of the setup file. So if the filename is simply *Setup.exe*, the edit fields will be filled with *Setup*. In addition it depends on the Installshield version, what command line parameters are accepted by the setup and the deinstallation program. So integrating an Installshield setup is mainly manual work. The first test could be to check out available command line parameters of the setup, e.g. with *setup -?*. More and more Installshield packets contain embedded MSI files. So pure Installshield packets without MSI will become less important.

When analysing an Installshield setup, the **Analyze** tab looks like this:

```
.....................................
Analyzing: F:\uib\setupdetector\Setups\InstallShield\viclient\VMware-viclient.exe
stringsgrep started (verbose:false, skipzero:false)
found string "InstallShield"
detected InstallShield Setup
stringsgrep completed (verbose:false, skipzero:false)
.....................................
Analyzing InstallShield-Setup:
Setup file size is: 32,1 MB
Estimated required space is: 192,6 MB
........
get_InstallShield_info finished
InstallShield Setup detected
```

The edit fields of the **InstallShield** tab are:

- **Setup file:** Name of the analysed setup file
- **opsi Product ID:** this is the name of the new opsi packet to be created. It is derived from the product name below, by substituting spaces and other invalid characters with -. The suggested opsi Product ID can be changed.
- **Product Name:** this is the name of the software as detected from the setup filename. Most likely it has to be adapted.
- **Product Version:** the version of the software as detected from from the setup filename. It should contain only numbers and points and most likely has to be adapted .
- **Install Directory:** this is the name of the directory, where the software is supposed to be installed on the client. This is taken to patch the deinstall script and must be set manually
- **Required Space:** this value is assumed as being six times the size of the EXE file. Before installting the software on the client, the setup.opsiscript checks, whether there is enough disc space.
- **Setup File Size:** the size of the EXE file.
- **Description:** The product name is set to this edit space and can be supplemented with additional information to be shown in the product description of the opsi product.
- **License required:** When this selection mark is checked, the opsiscript will be patched with *license=true* to indicate that a license is required.

Signature InstallShield: for detecting an Installshield setup file, the EXE is scanned for the marker:

```
<description>InstallShield.Setup</description>
```

Finding the Installshield signature without detecting the marker for embedded MSI, the setup is assumed to be of type **InstallShield**. If also the marker for an embedded MSI is found, the setup is assumed to be of type **InstallShield+MSI** (see below).

Installer Type InstallShield+MSI

Setups created with InstallShield often contain embedded MSI files. To extract the MSI file from the EXE file, a batch is invoked to start the setup and wait for a MSI file to be extracted. The batch will wait for about 10 seconds for a MSI file to appear and then kill the setup tasks. The extracted MSI will be analysed and the gathered information will be shown in the **InstallShield+MSI** tab and the **MSI** tab. It depends on the EXE file and the system conditions, whether it extracts an MSI file or not. Eventually it does not extract any MSI for the operating system is not suitable or because ther is a GUI question waiting to be answered. If the automated extraction fails, the MSI might be unpacked manually and analysed as MSI. These entries can be transfered to the **InstallShield+MSI** tab.

In case of a successful InstallShield+MSI analysis the **Analyze** tab looks like this:

```
.....................................
Analyzing: F:\Setups\Installshield-MSI\javavm\jre-6u22-windows-x64.exe
stringsgrep started (verbose:false, skipzero:false)
found strings "Installer,MSI,Database" and "InstallShield"
detected InstallShield+MSI Setup (InstallShield with embedded MSI)
found strings "Installer,MSI,Database" and "InstallShield"
detected InstallShield+MSI Setup (InstallShield with embedded MSI)
stringsgrep completed (verbose:false, skipzero:false)
.....................................
Analyzing InstallShield+MSI Setup: F:\Setups\Installshield-MSI\javavm\jre-6u22-windows-x64
Analyzing MSI from InstallShield Setup F:\Setups\Installshield-MSI\javavm\jre-6u22-windows
cmd.exe /C E:\Program Files (x86)\opsiSetupDetector\extractMSI.cmd "F:Setups\Installshield
!! PLEASE WAIT !!
!! PLEASE WAIT !! Extracting and analyzing MSI ...
!! PLEASE WAIT !!
e:\Temp\opsitmp\*.msi
Analyzing MSI: e:\Temp\opsitmp\phase5.msi
cmd.exe /C cscript.exe "E:\Program Files (x86)\opsiSetupDetector\msiinfo.js" "e:\Temp\opsit
........
Microsoft (R) Windows Script Host, Version 5.8
Copyright (C) Microsoft Corporation 1996-2001. Alle Rechte vorbehalten.

MSI file: e:\Temp\opsitmp\phase5.msi
Manufacturer: Systemberatung Schommer
ProductName: Phase 5 HTML-Editor
ProductVersion: 5.6.2.3
ProductCode: {20B1B020-DEAE-48D1-9960-D4C3185D758B}
UpgradeCode: {C63B6E47-6A28-44B6-A2C9-2BF084491FAD}
MSI file size is: 0,3 MB
Estimated required space is: 1,7 MB
........
get_MSI_info finished
Setup file size is: 15,4 MB
Estimated required space is: 92,7 MB
........
get_InstallShield_info finished
InstallShield+MSI Setup detected
```

If the automated extraction of the MSI succeeds, the detected valueswill be written to the **InstallShield+MSI** tab:

- **Setup file:** Name of the analysed setup file
- **opsi Product ID:** this is the name of the new opsi packet to be created. It is derived from the product name below, by substituting spaces and other invalid characters with -. The suggested opsi Product ID can be changed.
- **Product Name:** this is the name of the software as detected from the setup filename. Most likely it has to be adapted.
- **Product Name:** this is the name of the software as detected from the MSI. This name can be changed, but most likely the detected name will fit.
- **Product Version:** the version of the software as detected from the MSI. Usually the detected value can be taken, but it should contain only numbers and points.
- **MSI Product Code:** the MSI product code as detected from the MSI. It will be used to patch the deinstall opsiscript. Caveat: a MSI product for 32bit and 64bit usually has a different product code and an Advanced Installer packet might contain different MSI files. In this case it depends on the system the analysis is running on, which MSI is extracted and analysed. Usually a 64bit MSI cannot be extracted on a 32bit system. So for packing a 64bit software, a 64 system should be used.
- **Required Space:** this value is not read from the MSI packet, but is assumed as being six times the size of the EXE file. Before installting the software on the client, the setup.opsiscript checks, whether there is enough disc space.
- **Setup File Size:** the size of the EXE file.
- **Description:** The product name is set to this edit space and can be supplemented with additional information to be shown in the product description of the opsi product.
- **License required:** When this selection mark is checked, the opsiscript will be patched with *license=true* to indicate that a license is required.

Signature InstallShield+MSI: for the automated detection of an Installshield setup with embedded MSI the EXE file is scanned for the Installshield marker and the marker for an embedded MSI:

```
<description>InstallShield.Setup</description>
...
installer,msi,database
```

If both of them are found, the EXE file is supposed to be InstallShield+MSI.

Installer Type NSIS

NSIS setups are known to be small and fast. But it is not possible to extract further information from the packet, besides from detecting it as a NSIS setup. All further information to be shown is derived from the name of the setup. So the information must be sampled manually (for instance by installing the setup).

The entries in the **Analyze** tab might look like this:

```
.....................................
Analyzing: F:\Setups\NSIS\7z920\7z920.exe
stringsgrep started (verbose:false, skipzero:false)
found string "Nullsoft.NSIS.exehead"
detected NSIS Setup
stringsgrep completed (verbose:false, skipzero:false)
.....................................
Analyzing NSIS-Setup:
Setup file size is: 1,1 MB
```

```
Estimated required space is: 6,4 MB
........
get_nsis_info finished
NSIS (Nullsoft Install System) detected
```

The edit fields of the **NSIS** tab are:

- **Setup file:** Name of the analysed setup file
- **opsi Product ID:** this is the name of the new opsi packet to be created. It is derived from the product name below, by substituting spaces and other invalid characters with -. The suggested opsi Product ID can be changed.
- **Product Name:** this is the name of the software as detected from the setup filename. Most likely it has to be adapted.
- **Product Version:** the version of the software as detected from from the setup filename. It should contain only numbers and points and most likely has to be adapted.
- **Install Directory:** this is the name of the directory, where the software is supposed to be installed on the client. This is taken to patch the deinstall script and must be set manually.
- **Required Space:** this value is assumed as being six times the size of the EXE file. Before installting the software on the client, the setup.opsiscript checks, whether there is enough disc space.
- **Setup File Size:** the size of the EXE file.
- **Description:** The product name is set to this edit space and can be supplemented with additional information to be shown in the product description of the opsi product.
- **License required:** When this selection mark is checked, the opsiscript will be patched with *license=true* to indicate that a license is required.

Signatur NSIS: for detecting a NSIS Setup, the EXE file will be scanned for the marker:

```
Nullsoft.NSIS.exehead
...
Nullsoft Install System
```

9.19.8 Creating a new opsi Packet

After analyzing the setup and the edit fields of the corresponding tab being filled, clicking the button *Create opsi Packet* (on the lower right) generates the files for a new opsi product.

Attention:

- the *Packet BaseDir* must be a writable share to the opsi Workbench.
- for safety reasons a new opsi packet only can be created if it doesn't exist. To rewrite the product, first delete the product directory from the opsi workbench.

Left of the *Create opsi Packet* button are three available options to specify the operation of the button:

- **create opsi packet:** the product directory and the corresponding files will be generated and patched on the opsi workbench. The packet will not be packed nor installed.
- **create opsi packet and start interactive PacketBuilder:** as above the files will be created and patched and then the *opsi Packet Builder* will be started. The product data will be passed to the Packet Builder and the packet can be packed and installed in interactive mode. After completion the *opsi Packet Builder* should be closed to be startable again for the next data transfer.

- **create and auto -build -install -quiet:** as above the directory and the files will be generated and patched and for further actions the *opsi Packet Builder* will be started. The opsi product data will be passed to the packet Builder and the packet will be built and installed, if the corresponding options are checked. If e.g. the packet just should be packed but not installed, the checkmark at **install** can be removed. Additionally the checkmark **quiet** can be set to execute the *opsi Packet Builders* without showing its user interface. After completion the *opsi Packet Builder* should be closed again.

For installation, configuration and instructions for the Community Project *opsi Packet Builder* see https://forum.opsi.org/viewforum.php?f=22

10 opsi localization

10.1 Most opsi parts

The localization of the opsi software is done through *Transifex*:
https://www.transifex.com/

Transifex allows for an easy translation of software projects.

You can find the opsi.org translation project at link: transifex.com/opsi-org/opsiorg/.

Everyone interested in translating opsi can participate!

With this we hope to get not only improved translations but also be able to integrate new languages that you are currently missing!

10.2 opsi configed

It is now possible to translate the opsi Configuration Editor - best know by its short name *Configed* - in Transifex. After logging in you will be able to access the resource configed.properties.

We think that translating Configed poses a bit more of a challenge. For most messages the context in which they appear is important and therefore simple word-by-word translation often does not result in a good translation.

This is why we want to handle things different in this case. In the past there were no reviews involved when we updated translations. But as Configed is such a vital and important part for many users that we will change our way from here on. To ensure the quality of translations for Configed that makes it of good and easy use for all opsi users we only want to publish translations that are reviewed.

To review a translation you need the role of a reviewer in Transifex. If you login as a user with this role you get a button in the translation interface that says *review*. Any reviewed string can not be further translated. If you are a partner, customer or someone very active inside the opsi community and you are interested in doing reviews for opsi please do not hesitate to contact us through mail or at the opsi forum.

10.3 Localization contact

Please send any questions, hints or localization files to: *locales@uib.de*

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