UCS Thin Client Services

Manual for administrators

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Contents

1 Introduction

UCS Thin Client Services (UCS TCS) allows the centrally administrable operation of thin client environments based on Univention Corporate Server. The administration is performed using the UCS management system from Univention Corporate Server and integrates seamlessly in the administration of existing domain resources.

In addition to Linux-based terminal services based on Univention Corporate Server, external solutions such as Windows Terminal Services, VMware View and Citrix XenApp are also supported. UCS TCS thus allows the manufacturer-independent deployment of thin clients in heterogeneous environments.

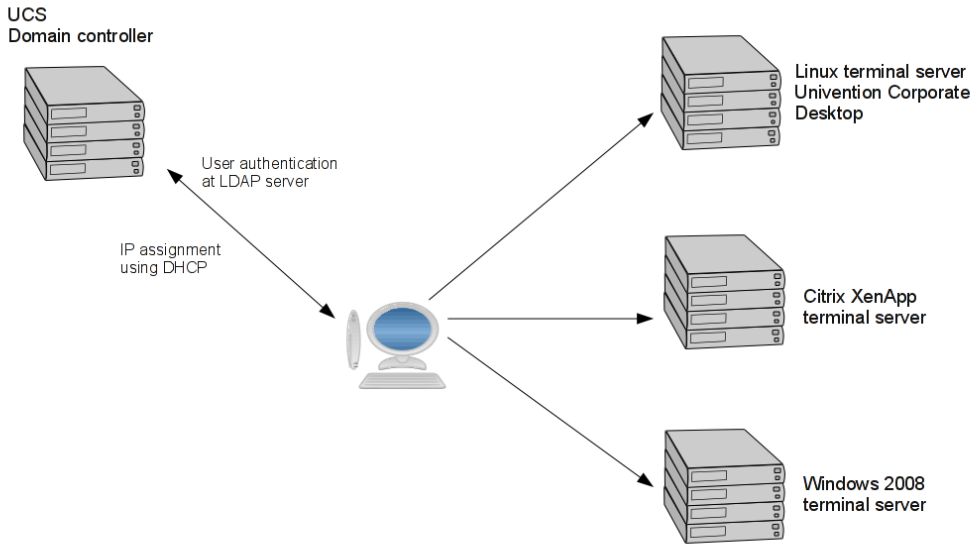

Figure 1.1: Schematic overview

The thin clients are created and configured in the UCS management system. This allows, for example, the assignment of the thin client's IP adress via DHCP from the UCS management system and makes it possibly to specify the screen resolution centrally.

The terminal services used by the users can be configured in two different ways. One the one hand, they can be configured ***user-related***; the configuration is then performed via the user administration of the Univention Directory Manager and the user can use another terminal service manually during the thin client log on - insofar as the user is authorised to do so.

On the other hand, it is also possible to assign a terminal service ***system-related***. In this mode, the thin client starts and runs a client program for the terminal service via an autostart function. The session parameters such as logon name and password can then be configured in this client by the user. The diagram 1.1 shows this graphically.

The ***thin client environment*** is a self-contained software installation in a subdirectory on each UCS terminal server. It represents the Linux system operated on the thin client and contains amongst other things a self-contained kernel, init scripts, programs and libraries. It supports a great number of commercially available thin clients models and can be flexibly adapted and expanded. Hardware parameters such as the specified screen resolution or the access to hardware connected to the thin client can be centrally specified via policies. Maintenance can be performed centrally, including via SSH access to the individual thin clients.

When a thin client boots, it mounts the thin client environment as its system directory (root partition) either via NFS or from the local CompactFlash or USB memory stick and starts the configured work environment.

The components of the thin client environment are modular in construction and can be combined flexibly.

UCS TCS is based on Univention Corporate Server. This document assumes prior knowledge of the administration of a UCS environment (in particular together with the Univention Directory Manager).

2 Installation and update

UCS TCS 3.1 requires UCS 2.4. For new installations, the thin client environment from UCS 2.4 should not be installed in advance if possible; this avoids subsequent updating of the environment. For existing installations, an update is completely supported.

UCS TCS can be installed on master domain controller, backup domain controller and slave domain controller systems.

The installation can be performed via the Univention Management Console or by entering commands on the command line.

2.1 Installing using Univention Management Console

The installation is performed via the UMC module **Online updates**. UCS TCS can be integrated here via **Add a new component**. ***tcs*** must be entered in the **Name** field and the **Enabled** tick activated.

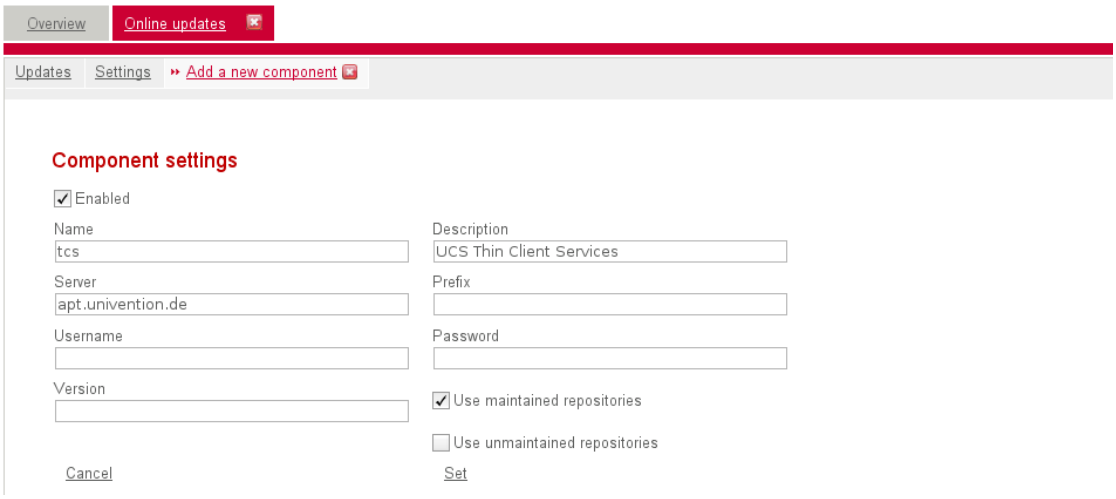

Figure 2.1: Selecting the component TCS

Attention:
On master/backup domain controller systems one must now install the schema package. This is not needed on other system roles.

This is performed via the **Package management** module. ***univention-thin-client-schema*** is entered as the **Pattern**, the package can then be installed by clicking on the package name and **Install**.

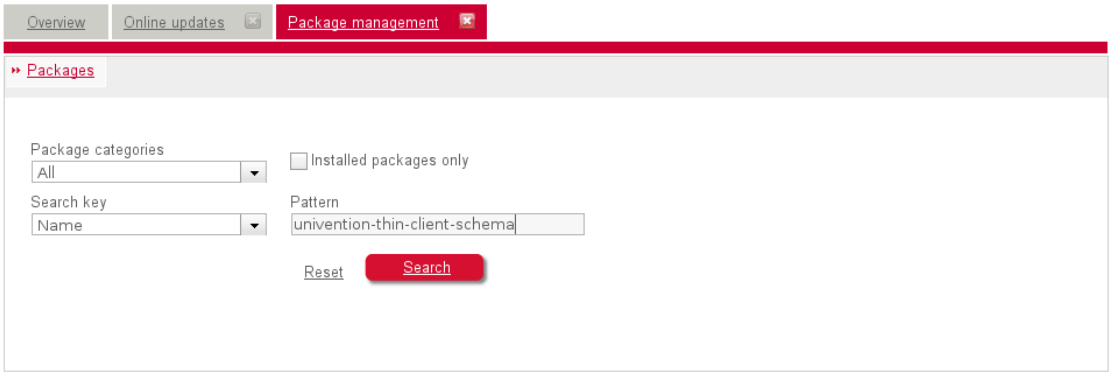

Figure 2.2: Installing the univention-thin-client-schema package

The TCS components can then be installed in the **Online updates** module; clicking on **Check for package updates** opens a list of packages to be installed or updated, which should be confirmed with **Continue**.

If there have not yet been any thin client components installed on the server, they need to be installed now: This is performed via the **Package management** UMC module again. ***univention-thin-client*** is entered as the **Pattern**, the package can then be installed by clicking on the package name and **Install**.

The installation is now complete.

2.2 Installing on the command line

The installation can also be performed via the command line without Univention Management Console:

Firstly, the TCS components must be integrated into the repository:

```
univention-config-registry set repository/online/component/tcs=yes
```

Then UCS TCS can be installed with the following commands:

```
univention-install univention-thin-client-schema
univention-actualise --dist-upgrade
univention-install univention-thin-client
```

univention-thin-client-schema only needs to be installed on the master/backup domain controller .

3 Configuration and management of thin clients

3.1 Creating a thin client in Univention Directory Manager

Thin clients are registered and managed in the Univention Directory Manager. To create a thin client, a new **Thin client** computer object must be created in the **Computer** wizard via **Add**. The location in the LDAP is specified in the **Select container** field. The default setting can be retained for small to medium-sized installations. Recommendations on the structuring of the LDAP for large environments can be found in the Univention Directory Manager chapter of the UCS manual.

The following settings must be configured for every thin client as a minimum:

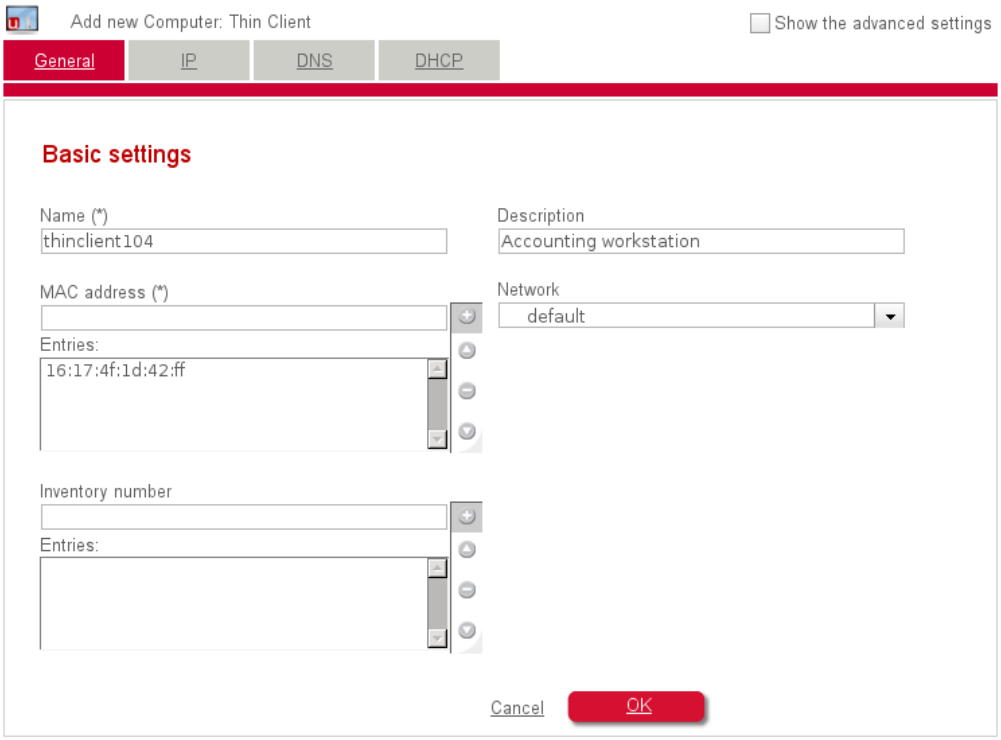

Figure 3.1: Creating a thin client

- The **Hostname** of the thin client (composed of lowercase and uppercase letter, numbers, hyphens and underscores).
- The **MAC address** of the thin clients in the notation XX:XX:XX:XX:XX:XX

- The **IP address** of the thin client (on the **IP** tab)
- A forward and reverse zone for DNS resoluion must be assigned on the **DNS** tab. These zones are created automatically during the installation of the master domain controller. The name and the IP address of the thin client can thus also be resolved in the UCS DNS service.
- A DHCP service must be assigned on the **DHCP** tab. These are also created automatically during the installation of the master domain controller. The thin client is then registered for the DHCP server and the configured IP address is assigned to the DHCP.

UCS offers the possibility of a central management of the IP addresses and DNS/DHCP settings of a network using a ***network object*** in Univention Directory Manager. This can considerably facilitate the creation of thin clients as the network object is selected in the **Network** input field. The next free IP address of the network and the DNS and DHCP settings are adopted automatically.

During the installation of an UCS system, a network object with the name ***default*** is created as standard, which can usually be used in normal cases. If, for example, several locations are to be administrated, further networks can be defined via the **Network** wizards in the Univention Directory Manager.

The DHCP configuration is then also performed via the Univention Directory Manager. The network properties of thin clients can be centrally specified per subnetwork. The settings can be set via the **DHCP** wizards in the Univention Directory Manager. The DHCP container for the current domain must be selected in the **Superordinate** input field. The self-updating selection list then shows the DHCP subnetwork object, which can be opened with a click. The following properties can be specified here amongst others:

- **DNS** allows the assignment of one or more name servers
- **Routing** allows the assignment of a default gateway
- **Lease time** allows the configuration of the assignment period of an IP address.

In the default setting, fixed IP addresses are assigned and only to systems registered in the LDAP.

The DHCP administration also offers numerous, extensive setting possibilities, which are generally, however, not required in thin client operation. They are described in the DHCP section in the Univention Directory Manager chapter of the UCS manual.

A range of further settings can be performed depending on the recommended use of the thin client. These are described in more detail in the following sections.

3.2 Setting Univention Configuration Registry configuration on thin clients

The configuration of UCS system settings is normally performed using Univention Configuration Registry. The settings are not set locally on thin client systems, but rather via Univention Configuration Registry policies via the LDAP.

There are two possible methods for creating policies. The simplest way is to edit them directly via the corresponding tab; policy objects are then created ad hoc. Alternatively, they can be created with the **Policies** wizards in the Univention Directory Manager. Further information can be found in Chapter 13.9 of the UCS manual.

Univention Configuration Registry settings on thin clients can be configured via policies in the directory service. This can be used to adapt some sound card settings or, for example, application programs. The **Univention Configuration Registry** tab is only visible if the **Show the advanced settings** tick is activated.

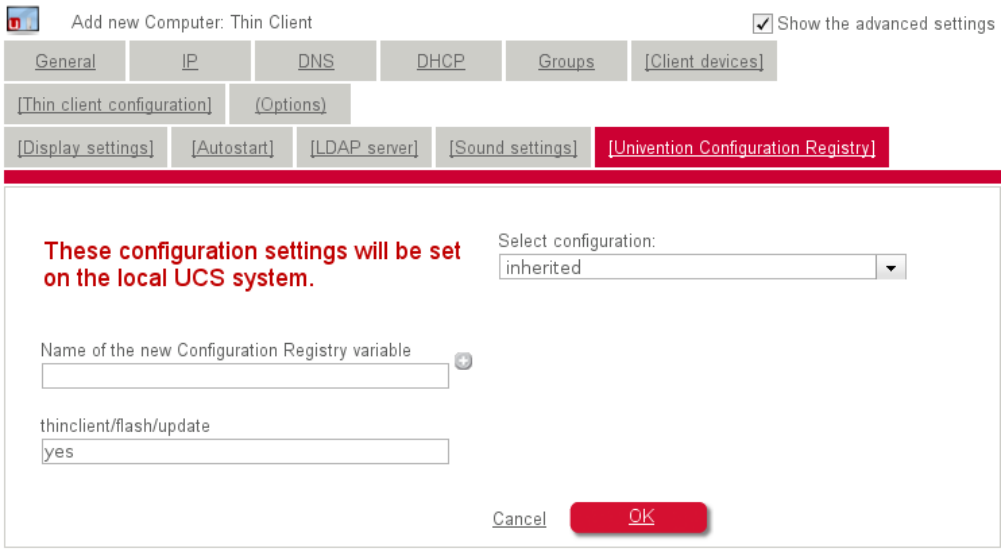

Figure 3.2: Setting a Univention Configuration Registry variable

In addition, at least one Univention Configuration Registry variable must be configured. Firstly, the name of the variable must be entered under **Name of the new Configuration Registry variable**. Clicking the plus sign next to the input field changes the input field to ***Variable: NAME***. The value to be set must now be entered here.

3.3 Configuring the boot mode (PXE or local storage (CompactFlash or USB stick))

In the standard configuration, a thin client starts via the network (PXE) and mounts its system directory (root directory) via the network per NFS from one of the UCS terminal servers. As an alternative, most thin client models also now have an internal CompactFlash card, which can be used to boot a minimal system. This technology is supported by the thin client component ***univention-thin-client-flash***.

3.3.1 Creating an image

To allow a thin client to boot from an internal CompactFlash card, an image must first be installed which contains the minimal operating system. This is created from the thin client environment (see Chapter 5) on a UCS terminal server. In this way, a thin client which boots over a flash card has the same functions as the thin clients which boot from the terminal server on which the image was created.

For the updating of thin clients with CompactFlash, the ***univention-thin-client-flash*** package must be installed on the UCS boot server.

The boot order must be configured in the BIOS of the thin client. If a thin client is furnished with a flash image and should nevertheless be started via PXE, the boot order in the BIOS of the thin client must be changed.

The `univention-thin-client-flash` tool is provided for the creation of the flash images. It can be run in the basic setting without parameters and creates an image from the thin client environment on the UCS terminal server. Each image has a version number (starting with 1), which is incremented every time it is updated.

3.3.2 Configuring CompactFlash updates for a thin client

In the basic setting, the CompactFlash memory of thin clients is not updated.

To activate a thin client for a CompactFlash update, Univention Configuration Registry variable `thinclient/flash/update` must be set to ***yes*** (see Chapter 3.2).

3.3.3 Installation of the image during thin client boot

If the setting described above has been performed, the thin client checks next time it is started (irrespective of whether booted via PXE or from CompactFlash/USB), whether there is an updated version of the image available. If this is the case, the image is installed on the CompactFlash/USB memory and a restart initiated after the update.

The image is downloaded via HTTP, as standard from `http://<server>/univention-thin-client-flash/` on the UCS server. Alternatively, the Univention Configuration Registry variable `thinclient/flash/update/url` can be used to specify a different URL. The name of the image does **not** need to be specified.

The target partition is determined automatically during the installation on CompactFlash.

As an alternative to a local system start from CompactFlash, many thin clients offer the possibility of starting from USB mass storage; usually a USB stick. The update process is performed in the same way as CompactFlash memory is updated, however the USB device to be written on must be configured with the Univention Configuration Registry variable `thinclient/flash/update/disk`. The value is entered in the internal notation of the Linux kernel, e.g., ***/dev/sda***.

3.3.4 Updating the image

To create a new generation of the images - for example after an update or when new software is installed (see Chapter 5.1) - `univention-thin-client-flash` must be run again. The version number of the image is then increased and all the thin clients marked for updates are updated the next time the system is started.

3.3.5 Using multiple images

If thin clients with different abilities and configurations are to be applied in one environment, there is the possibility of creating more than one image. These images can for example include additional software packages or be based on different UCS versions.

As standard, the image created is called ***root.img***. The name can be entered when creating the image. A personal version number is maintained for each image, so that changes to an image do not affect thin clients with other images.

The name of the image file can be specified relative to the configured download URL via the Univention Configuration Registry variable `thinclient/flash/update/image`.

3.4 Configuring the Kerberos authentication server

The authentication during thin client login is performed via Kerberos, a protocol for distributed authentication on networks. Each UCS domain controller provides Kerberos services. Further information on Kerberos can be found in Chapter 9.8 of the UCS manual.

The server to be used by the thin client for the login can be assigned via a **Thin client configuration** policy in the Univention Directory Manager. If no entry is set there, attempts will be made to determine the Kerberos server via an enquiry in DNS service records. The service records of a UCS domain are created automatically during the installation of the domain controller master and can also be modified subsequently (see Chapter 4.5.9.4 in the UCS manual).

3.5 Configuring the fileserver for the home directory

A home directory can be mounted from a server for each user, in which the last used session type is saved (e.g., UCD or Citrix XenApp). If the session is specified via the Univention Directory Manager, the mounting of a home directory can avoided. This can be achieved by setting the Univention Configuration Registry variable `thinclient/mount/homedir` to ***no***.

If the mounting of the home directory fails, the login can still be continued.

A file server can be specified per thin client in the **File servers** field of the **Thin client configuration** policy, on which the home directory share should be specified. All the registered servers with home directory shares are available for selection.

3.6 Configuring the screen resolution

The configuration of the graphic resolution and monitor parameters can be performed via a **Display settings** policy in the Univention Directory Manager.

It is recommended to activate the **Automatic detection** of the graphics card and the monitor. When this is done, the best available driver for the graphics card is selected automatically and the monitor resolution set to the highest value supported by the monitor.

Alternatively, the individual parameters can also be configured manually. This is also necessary if dual monitor operation is to be used. The following provides a selection of the important settings:

- **Graphic adapter driver** selects the responsible Xorg driver.
- The screen resolution of the main monitor should be entered under **Resolution of primary display**. The values for width and height should be separated by an 'x', e.g., ***1024x768***.
- **Resolution of secondary display** defines the screen resolution of a second monitor, if present. This combines with the primary monitor to display a shared screen area.
- The **Position of secondary display** menu specifies the relative position of the secondary monitor with respect to the primary monitor.
- The **Color depth** should be entered in bits per pixel. Admissable values are 1, 2, 4, 8, 16 and 24. (24-bit is true color color depth).
- **Keyboard layout** is used to activate the normal national keyboard layout for the thin client.

3.7 Accessing USB drives on thin clients

The ***univention-thin-client-ltsp*** package installed as standard allows the access to the USB-CD/DVD drives, hard drives and sticks connected to the thin client. These are made available in UCD, Windows terminal server and XenApp terminal server sessions if the **Activate access to client devices** tick is activated on the **Client devices** tab/policy in the computer administration of the Univention Directory Manager.

If a thin client is booted from the CompactFlash memory integrated in the thin client, this setting means that the flash memory is also visible in the session. Setting the Univention Configuration Registry variable `thinclient/usbdevice/usbonly` to ***yes*** means that only USB devices are taken into account.

In the standard setting, data is kept for up to a tenth of a second before being written on the USB memory. Setting the Univention Configuration Registry variable `thinclient/usbdevice/syncmount` to ***yes*** writes out all changes directly. This generally leads to considerable performance losses.

3.7.1 UCD

In UCD terminal sessions, a desktop icon is created automatically for a connected USB device, via which the user can access his data. When a client device is removed, the icon is automatically deleted from the desktop.

3.7.2 Citrix XenApp

To make USB storage media available in Citrix XenApp, the Univention Configuration Registry variable `thinclient/usbdevice/local` must be set to ***yes***. Mounted drives are represented in the Citrix session as local system folders.

3.7.3 Windows terminal server

In Windows terminal server sessions, the hardware must be registered via the redirect function of the rdesktop RDP client. This is described in Chapter 4.2.3.

3.8 Configuring audio output

The **Sound settings** policy can be used to activate the audio output on the thin client. Automatic detection of the sound card is generally sufficient, if necessary, the driver can also be selected specifically.

As standard the network sound server ARTS (analog Real time synthesizer) is used.

KDE 4 from UCD 3.x no longer supports ARTS, alternatively, Pulseaudio can be used. To activate it, the Univention Configuration Registry variable `thinclient/sound/daemon` must be set to ***pulseaudio*** (see Chapter 3.2).

The Univention Configuration Registry variable `thinclient/sound/volume` can be used to specify the volume to be set in percent during the boot procedure.

3.9 SSH access to thin clients

As standard, a SSH login is possible on thin clients, which is provided by the ***univention-thin-client-ssh*** package. This offers the possibility of remote diagnosis of thin clients.

The authentication is performed on the thin client against local user accounts from the thin client environment, typically with the ***root*** user. How to set the root password is described in the Chapter 5.2.

When the thin client SSH support is installed, a host key is created which is used as standard for all thin clients which retrieve their file system from the terminal server or boot a flash image which was created on the terminal server. This renders the thin client's booting process considerably quicker, but means that the thin client cannot be clearly identified. The Univention Configuration Registry variable `thinclient/sshd/generate_key` prompts thin clients to create their own host keys during booting. For this, the variable must be set to ***yes***.

3.10 Executing user-defined commands during thin client boot

A Univention Configuration Registry policy can be used to run arbitrary commands during the thin client boot. They are entered in the format:***startup/IDENTIFIER=BEFEHL***. If more than one Univention Configuration Registry variable beginning with ***startup*** is defined, the commands are sorted alphabetically prior execution using the IDENTIFIERS.

For example, if the (fictitious) program `reset-mixer-settings` should be used to reset the volume settings when the system is started, this can be configured as shown in Figure 3.3.

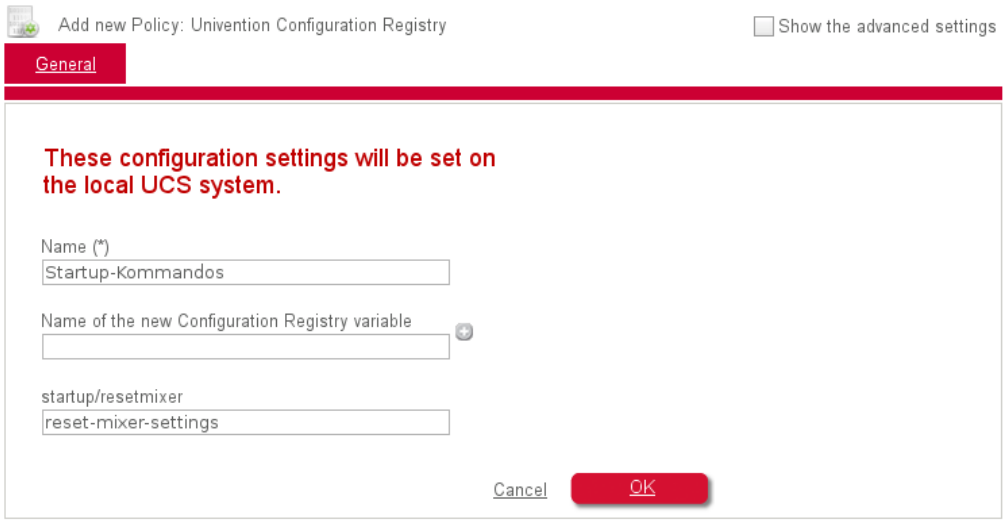

Figure 3.3: Configuring startup commands

4 Configuring the access to terminal services

4.1 Supported access variants

UCS TCS supports two general modes for accessing terminal services:

- When the thin client is started, a login mask is displayed. The terminal service configuration is configured in the Univention Directory Manager individually for each user (***user-related access***). The user can also be given the possibility of choosing between different session types.
- No login mask appears when the thin client is started, instead a client software is automatically started for the access to a terminal service. The user can then freely configure the login and perform it himself. The assignment of the clients to be started is performed per computer via an autostart policy (***system-related access***).

The following user-related terminal services are supported in UCS TCS 3.1:

- Univention Corporate Desktop based on KDE
- Citrix XenApp
- Microsoft Windows terminal server

The following computer-related terminal services are supported in UCS TCS 3.1:

- Citrix XenApp
- NoMachine NX
- VMware View
- Microsoft Windows terminal server

4.2 User-related access to terminal services

Access to terminal services with Univention Corporate Desktop, Windows terminal services and Citrix XenApp can be configured per user in the Univention Directory Manager.

This starts the graphical login manager GDM once the thin client has started. The user is given the possibility of performing a login to a terminal server via the **Session** selection field.

This is also practical if the user should be able to choose freely between a login to a KDE desktop with Univention Corporate Desktop and a login to a Windows terminal server in a heterogeneous environment, for example.

The session type can alternatively also be enforced in the user administration of the Univention Directory Manager. This is performed in the **Force this session for user login** input field in the **Thin client session**

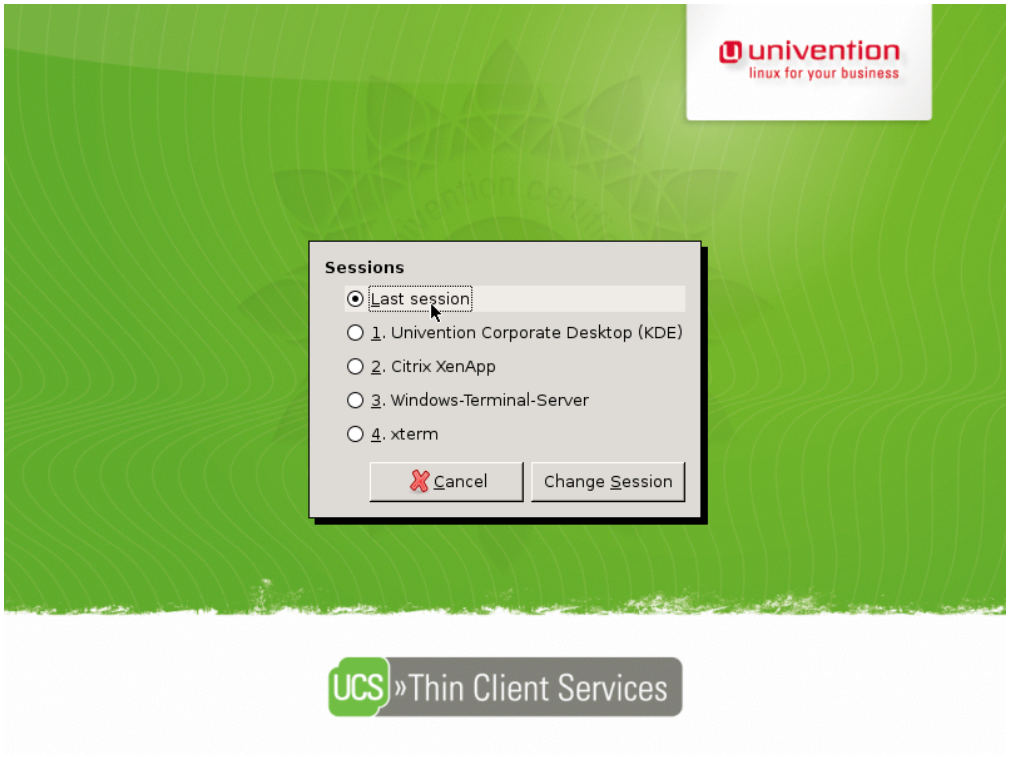

Figure 4.1: Session selection

policy. Independently of the selection of the session script during the user login, the login on the terminal server is always performed with the predefined session.

4.2.1 Univention Corporate Desktop

For the provision of terminal services with Univention Corporate Desktop, the ***univention-application-server*** package must be installed on the UCS system which should also function as the terminal server. Univention Corporate Desktop is based on KDE.

The KDE session used by the user can be preconfigured via desktop profiles and assigned to users via a **Desktop settings** policy. Information on the creation and maintenance of the profiles can be found in the technical document ***Erstellung eigener KDE-Profile***. (http://www.univention.de/download/dokumentation/erweiterte-administration/) (Currently only available in German). The policy can also be used to specify the desktop language or to define logon and logout scripts.

4.2.2 Citrix XenApp

The access to a Citrix XenApp terminal server can be configured user-related. The following packages must be installed:

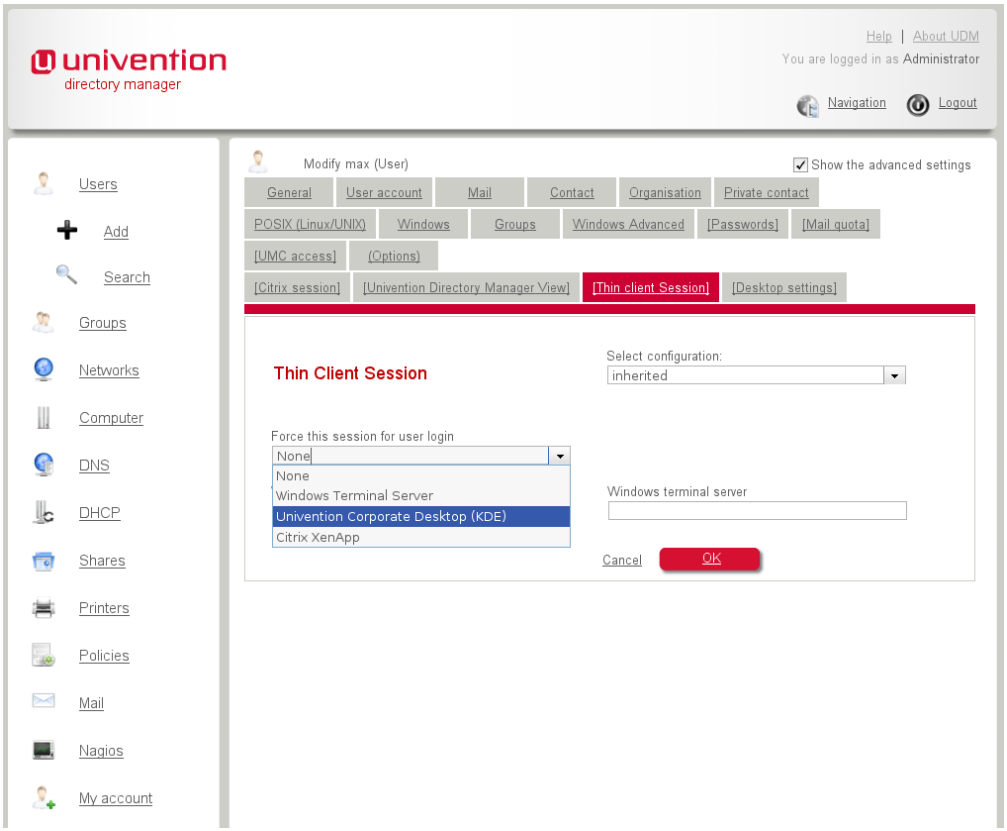

Figure 4.2: Forcing a user session

- ***univention-citrix-session-configuration*** must be installed on the systems on which the Univention Directory Manager is installed.
- ***univention-citrix-session-configuration-schema*** must be installed on master domain controller and backup domain controller systems.
- ***univention-thin-client-session-xenapp*** must be installed on the UCS systems which offer thin client sessions.
- The Citrix Receiver client is not shipped with UCS TCS, but procured from the Citrix website. A guide to its installation can be found at `http://sdb.univention.de/1137`.

Configuration of the Citrix sessions is performed via ICA files, which are assigned in the Univention Directory Manager via the ***Citrix session*** policy. The server against which the logon is performed is defined in this ICA file. The ICA files are read out of the `/var/lib/univention-client-root/usr/share/icafiles/` directory on the terminal server as standard. Alternatively, the ICA file can also be procured from a web server. To do so, a Univention Configuration Registry policy (see Chapter 3.2) must be used to specify a URL as the Univention Configuration Registry variable `thinclient/ica/downloadpath`, e.g., ***http://192.168.0.100/icafiles***.

The ICA file describes the settings of the Citrix server. It is a text file, which can be generated with the Citric ICA File Creator and written by hand. Further information can be found at http://support.citrix.com/article/CTX113472.

In addition, the Windows domain used on the Citrix terminal server must be configured via a ***Thin client session*** policy. The login domain must be specified in the **Windows terminal server** input field.

The user logs on to the GDM after startup. The ***Citrix XenApp*** session should be selected. The password entered is forwarded on to the Citrix server for the logon so that it is not necessary to enter the password again.

4.2.3 Windows terminal services

The access to a Windows terminal server can be configured per user. For this, the ***univention-thin-client-session-rdp*** package must be installed on the thin client server.

The configuration of the RDP sessions is performed in the computer management of the Univention Directory Manager via the **Thin client session** policy.

The Windows terminal server to be used for the log on must be specified under **Windows terminal server**; the domain name in the **Windows domain** field.

The user logs on to the GDM after a start up. The ***Windows terminal server*** session should be selected. The password entered is forwarded on to the Windows terminal server for the logon so that it is not necessary to enter the password again.

`rdesktop` is used for the access to Windows terminal servers. The RDP access can be further configured with the following Univention Configuration Registry variable (no further adaptations should be necessary for the majority of installations):

- If ***rdp/windowmanager/disable*** is set to ***yes***, this prevents the window manager Metacity from being started in the background.
- ***rdp/colour/depth*** can be used to set the colour depth in bits (16 bit as standard).
- If the Windows domain name of the terminal server is not specified via the **Windows domain** field, it can alternatively be specified via ***rdp/domainname***.
- The computer name of the thin client is used as the host name of the accessing thin client as standard. This can be overwritten with ***rdp/client***.
- ***rdp/geometry*** allows the setting of the screen resolution to be used.
- ***rdp/redirect*** can be used to make local hardware available on the thin client in the RDP session. The format is different depending on the hardware and is documented in the rdesktop manpage.
- ***rdp/user*** can be used to specify the user name of the accessing user on the Windows terminal server.
- If the computer name of the terminal server is not specified via the **Windows terminal server** field, it can alternatively be specified via ***rdp/server***.

4.3 System-related access to terminal services

A **Autostart** policy for thin clients in the Univention Directory Manager can be used to specify a software client, which is started directly once the thin client has started completely. The user can perform his login there.

The available logon scripts are divided into individual packages, which need to be installed on the respective UCS thin client servers. As the autostart scripts are registered in the LDAP, `univention-run-join-scripts` should be run once the following packages have been installed on the UCS thin client servers.

4.3.1 VMware View

The ***univention-thin-client-session-vmware-view-open*** package can be used to access a VMware View installation using the VMware View Open client.

4.3.2 Nomachine NX

The installation of the ***univention-thin-client-session-nx*** package allows a login on NX terminal servers. The terminal server to which the connection will be created can be specified per thin client via the **Linux terminal servers** input field in the **Thin client configuration** tab/policy.

As standard, the window manager Metacity is started. This can be suppressed by setting the Univention Configuration Registry variable `nx/windowmanager/disabled` to ***yes***.

4.3.3 Windows Terminal Services

univention-thin-client-session-rdp uses `rdesktop` to realise the access to Windows terminal servers via RDP. The further configuration of the clients via Univention Configuration Registry is described in Chapter 4.2.3.

4.3.4 Citrix XenApp

The ***univention-thin-client-session-xenapp*** package starts the Citrix Receiver client, from which a session can be set up to a XenApp server.

5 Thin client environment

The thin client environment is a self-contained software installation in a subdirectory on each thin client server. It represents the Linux system operated on the thin client and contains amongst other things a self-contained kernel, init scripts and libraries.

When a thin client boots, it mounts the thin client environment as its system directory (root partition) either via NFS or from the local CompactFlash or USB memory stick and starts the configured work environment.

The components of the thin client environment are modular in construction and can be combined flexibly. The ***univention-thin-client*** meta package allows simple installation of the standard components.

The following section describes the main components of the modular base system and the installation of new components.

5.1 Thin client base system and installation of additional components

The ***univention-thin-client-basesystem*** package of the thin client environment provides a basic system. This allows the booting of thin clients and login on the console.

The components typically used in a UCS TCS installation are installed via the ***univention-thin-client*** meta package.

Further thin client components are installed via the standard package management tools. The components contain meta packages which install the necessary extensions for the respective components in the subdirectory in the thin client environment.

The thin client base package includes ***univention-thin-client-apt***, which makes it possible to install packages (including dependencies) in the subdirectory of the thin client environment. The tool supports all parameters from ***apt-get*** and a few additional, optional, parameters of its own. When they are entered, these must be listed before the ***apt-get*** options. '--' should be entered as a separating sign before the ***apt-get*** options. The following parameters are available:

--help, -h: Displays a short help for using the command.

--prefix, -p: Defines the directory in which the packages should be installed. The preset value is the directory for the thin client environment (`/var/lib/univention-client-root`).

--arch, -a: Specifies the architecture to be used for the packages. The predefined value here is ***i386***, i.e., the thin client environment is also set for i386 systems on amd64 systems as well.

--debug, -d: Sets the log level. Possible values are in the region from 0 (no output) to 4 (detailed information)

With ***univenton-thin-client-apt*** further packages can be installed in the thin client environment which are not included in the existing components. For example, the following command can be executed to install the Emacs editor in the thin client environment.

```
univention-thin-client-apt install emacs23
```

In the following command, the `apt-get` option ***–dry-run*** is given, which only simulates the installation of the package, without actually performing any changes:

```
univention-thin-client-apt install emacs23 --dry-run
```

The APT sources configuration and the cache directory of the thin client server are used for the installation. Necessary dependencies are resolved directly and installed in the thin client environment. A i386 repository is necessary for this on amd64 systems.

5.2 Local logins on thin clients

The local login on a text console (tty1 and tty2, to be reached by pressing e.g., ALT+SHIFT+F1) performs authentication against the user data from the local `/etc/shadow`. By default it is not possible to log on as the ***root*** user. The `univention-thin-client-sync-rootpassword` command can be used to synchronise the password of the thin client server in the thin client environment.

6 Thin Client extensions

In addition to the basic components installed as standard, the service spectrum of UCS TCS can also be expanded with additional packages. The majority of these add-on components can only be used with Univention Corporate Desktop as the terminal service as standard.

6.1 Secured connections using IPSec

To use thin clients as a home office, it is advisable to encrypt the communication with the server. This possibility is offered by the component for IPSec support. Together with the component for CompactFlash cards a thin client can boot locally and then open an IPSec tunnel to encrypt the connection with the corporate network.

The package ***univention-thin-client-ipsec*** must be installed on the terminal server to provide IPSec support for thin clients. The necessary packages are installed in the thin client environment. This installs a service which allows the automatic update of IPSec configurations. If the thin client is started on a local network using CompactFlash, this service checks whether an update for the IPSec configuration is available under a specified URL. If this is the case, the configuration is downloaded and saved on the flash card.

The following Univention Configuration Registry variables can be used to configure IPSec:

thinclient/ipsec/update: This variable must be set to ***yes*** so that the thin client performs an IPSec configuration update when booting.

thinclient/ipsec/update/url: A URL can be given here where the IPSec configuration can be found. If the variable is not set, a search will be performed for the IPSec configuration under the following URL on the terminal server:
`http://<server>/univention-thin-client-ipsec/`.

The IPSec configuration for a thin client must be packed (compressed with gzip) in a tar archive containing the following directories and files.

```
ipsec.d/cacerts/
ipsec.d/certs/
ipsec.d/private/
ipsec.conf
ipsec.secrets
ipsec-setup.sh
```

This archive is unpacked directly in the `/config` directory on the thin client and the corresponding symbolic links created in `/etc`.

Optionally, a script with the name `ipsec-setup.sh` can be contained in the archive, which is run before the initiation of IPSec. This gives the opportunity to adapt to the respective environment, e.g., setting name servers or special routes.

This type of archive must be created for each thin client which is going to use IPSec and stored on the web server. The archive must be named as follows: <MAC address>.tar.gz. The MAC address here is written in hyphen notation (e.g., 00-01-02-03-04-05.tar.gz).

If the archive is saved on the web server and the Univention Configuration Registry variable `thinclient/ipsec/update` set to ***yes***, the thin client will attempt to import a new configuration as described above. Thereafter, whenever it is booted the thin client will open a IPSec tunnel over the flash card before establishing a connection to the LDAP server.

6.2 Scanner support

The ***univention-thin-client-sane*** package is used to provide a component which makes it possible to operate scanners connected to the thin client.

The SANE protocol is used for scanner support; it allows scanners to be used over the network. As soon as a scanner is connected to a thin client and recognised by SANE an icon appears on the UCD desktop of the user who is logged on. This icon can be used to access the scanner. The icon is deleted when the scanner is removed.

Before using a scanner it should be checked whether the model is supported by SANE and to what extent. For some models it is also necessary to make a firmware file available on the thin client. This file must be copied into the subdirectory of the thin client environment.

If support for SANE has been verified, the scanner can be connected to the thin client and accessed directly using the symbol on the user's UCD desktop. As standard the scanner can only be used from one terminal server. If several terminal servers are to be used in the environment or access permitted for other computers, the Univention Configuration Registry variable `thinclient/saned/networks` can be set. This variable can contain a list of networks separated by commas:

```
thinclient/saned/networks=192.168.0.0/24,192.168.1.0/24
```

Bibliography

[1] Univention. Univention Corporate Server - Manual for users and administrators. 2010. http://www.univention.de/fileadmin/download/documentation_english/handbuch_ucs24_en.pdf.