



XenServer

Unattended Installation

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July 19th, 2013



Disclaimer

- This slide deck has been created as part of a project implementation
- It does not guarantee completeness of content
- The information provided here is no official Citrix support recommendation.
- Content can be used at own risk.

Why unattended installation?

- Avoid manual CD handling
- Create reproducible XenServer installations
- Datacenters sometimes have limited physical access
- Speed-up installation/upgrade process
- Disaster recovery
- ...or just to be a lazy administrator

Installation using file share

Installation using file share

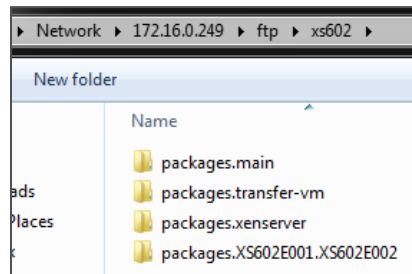
- XenServer can retrieve installation files from
 - CD
 - NFS
 - HTTP
 - FTP
- Installation can be invoked by CD or PXE boot media
- File share installation typically is used for full unattended installation
- File share can be specified interactively during installation or by unattend file

Installation repository on file share

- Simple file share for hosting the installation files
- Access to share can be provided by FTP, HTTP or NFS
- Copy full CD content to file share

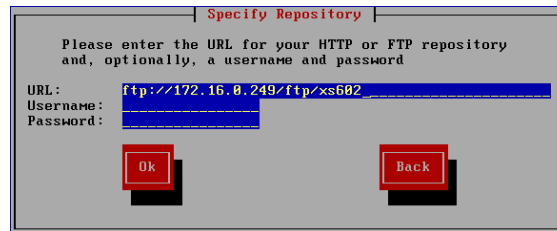
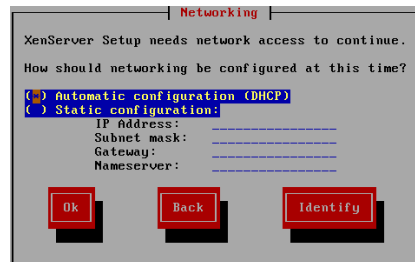
Installation repository structure

- packages.main
 - Base installation files
- packages.xenserver
 - Repository information
- packages.transfer-vm
 - Transfer-VM installation package
- Only for XenServer 6.0.2
 - packages.XS...
- Full CD copy required to installation share (incl. XS-REPOSITORY-LIST)!!



Sample installation with file share source

- Boot from CD and select network installation source
- Select if DHCP or fixed IP should be used for the installation process
 - This does not configure IP settings for XenServer after installation!
- Specify installation directory where packages.x folders are stored
- Provide optional credentials



Unattended installation

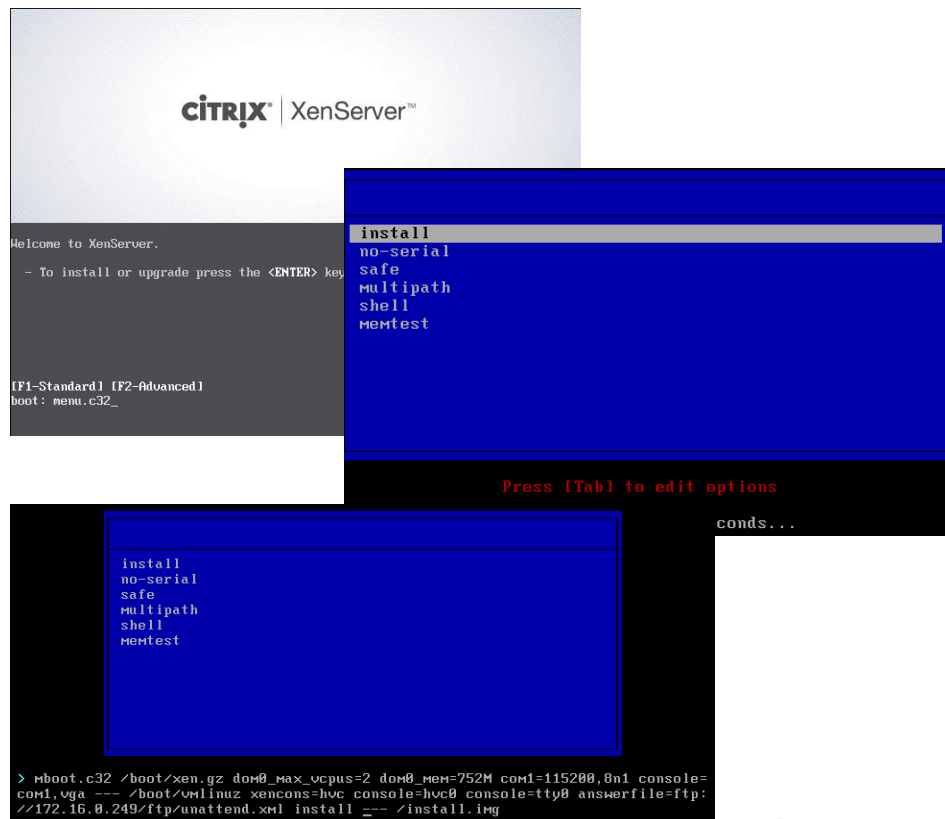
Installation Types

- XenServer installation can be invoked by
 - CD media
 - PXE boot environment
- For both mentioned installation types an unattended installation can be used complementary

Starting unattended installation by CD

Starting unattended installation by CD

- Boot XenServer CD
- Type menu.c32 in first prompt (be fast)
- Push „tab“ key
- Add line for unattended file and push „enter“
 - answerfile=ftp://172.16.0.249/ftp/unattend.xml
 - install



Answerfile options

- kernel parameter „answerfile=„ is used to specify unattend.xml file
- FTP/HTTP
 - answerfile=http://<share + file>
 - e.g. answerfile=http://192.168.0.1/xs60/xenserver01.xml
 - Optionally include authentication credentials
 - e.g. ftp://user:passwd@host...
- NFS
 - answerfile=nfs://<server>:/<nfs path + file>
 - e.g. answerfile=nfs://192.168.0.1:/xs60/xenserver01.xml

PXE based installation

PXE boot environment - requirements





- DHCP server
 - provide IP addresses
 - provide boot options like TFTP server and boot loader file name
- TFTP Server to provide boot loader
- PXE enabled server

DHCP vs PXE vs Proxy DHCP?

- PXE Server = Proxy DHCP
- Architecture 1
 - DHCP provides IP addresses and boot options
- Architecture 2
 - DHCP provides IP addresses
 - PXE / Proxy DHCP provides boot options
 - Both services run on **different** servers
- Architecture 3
 - DHCP provides IP addresses
 - PXE / Proxy DHCP provides boot options
 - Both services run on the **same** server

Standalone DHCP (Architecture 1)

- Configure DHCP server to provide IP addresses
- Add options to DHCP server
 - 66 = TFTP server IP
 - 67 = boot file name (pxelinux.0)
- Usually used
 - when only 1 network based installation is available in datacenter
 - full access to DHCP server is granted

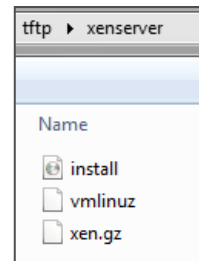
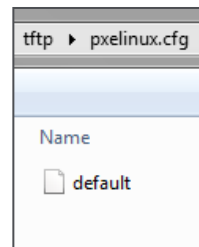
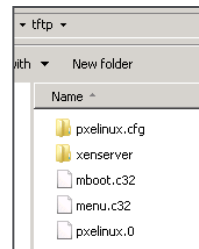
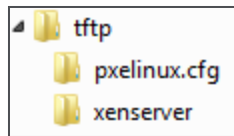
Option Name	Vendor	Value	Class
 066 Boot Server Host Name	Standard	192.168.0.1	None
 067 Bootfile Name	Standard	pxelinux.0	None
 006 DNS Servers	Standard	10.10.11.101, 10.10.11.102	None
 015 DNS Domain Name	Standard	workgroup	None

DHCP + PXE on different hosts (Architecture 2)

- Configure DHCP server to provide IP addresses
- Configure PXE (Proxy DHCP) on different host to provide boot options
 - next server
 - TFTP server IP
 - boot file
 - pxelinux.0
 - <path>/pxelinux.0 (in case pxelinux.0 is not in the root path of the tftp server)
- Usually used
 - When DHCP server cannot be modified
 - More PXE based installation technologies are available in the datacenter (PXE could be separated by VLAN)

Setup TFTP server

- Use any available TFTP server
- Copy to TFTP root
 - mboot.c32, menu.c32 & pxelinux.0 from <CD>/boot/pxelinux
- Create /xenserver dir in TFTP root
- Copy to /xenserver
 - install.img from <CD>/
 - vmlinuz & xen.gz from <CD>/boot
- Create /pxelinux.cfg dir in TFTP root
 - Create default file in /pxelinux.cfg directory
- For details refer to installation guide
 - <http://support.citrix.com/article/CTX130421>



Example „default“ file

```
default xenserver
label xenserver
kernel mboot.c32
append xenserver/xen.gz dom0_max_vcpus=2 dom0_mem=752M com1=115200,8n1 console=com1,vga ---
xenserver/vmlinuz xencons=hvc console=hvc0 console=tty0 answerfile=ftp://172.16.0.249/ftp/unattend.xml
install --- xenserver/install.img
```

„default“ file with menu structure

```
default menu.c32
prompt 0
menu title PXE Boot Menu
```

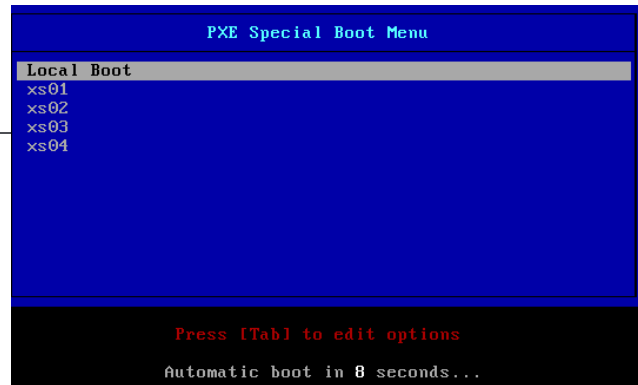
```
label bootlocal
menu label Local Boot
menu default
localboot 0
timeout 100
```

```
label xs01
kernel mboot.c32
append xenserver/xen.gz dom0_max_vcpus=2 dom0_mem=752M com1=115200,8n1 console=com1,vga --- xenserver/vmlinuz xencons=hvc console=hvc0 console=tty0
answerfile_device=eth1 answerfile=nfs://10.10.11.100:/vol/vol_xs_inst/xs60/unattend.files/xs01.xml install --- xenserver/install.img
```

```
label xs02
kernel mboot.c32
append xenserver/xen.gz dom0_max_vcpus=2 dom0_mem=752M com1=115200,8n1 console=com1,vga --- xenserver/vmlinuz xencons=hvc console=hvc0 console=tty0
answerfile_device=eth1 answerfile=nfs://10.10.11.100:/vol/vol_xs_inst/xs60/unattend.files/xs02.xml install --- xenserver/install.img
```

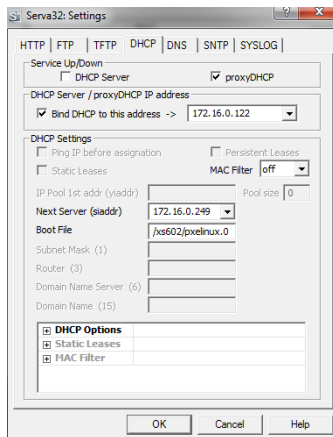
```
label xs03
kernel mboot.c32
append xenserver/xen.gz dom0_max_vcpus=2 dom0_mem=752M com1=115200,8n1 console=com1,vga --- xenserver/vmlinuz xencons=hvc console=hvc0 console=tty0
answerfile_device=eth1 answerfile=nfs://10.10.11.100:/vol/vol_xs_inst/xs60/unattend.files/xs03.xml install --- xenserver/install.img
```

```
label xs04
kernel mboot.c32
append xenserver/xen.gz dom0_max_vcpus=2 dom0_mem=752M com1=115200,8n1 console=com1,vga --- xenserver/vmlinuz xencons=hvc console=hvc0 console=tty0
answerfile_device=eth1 answerfile=nfs://10.10.11.100:/vol/vol_xs_inst/xs60/unattend.files/xs04.xml install --- xenserver/install.img
```



Poor man's PXE server

- Download Serva (32bit/64bit)
 - <http://www.vercot.com/~serva/>
- DHCP, ProxyDHCP and TFTP server for Windows (and much more)
- Example configuration for ProxyDHCP/PXE to use external DHCP for IP addressing



Answerfile

About the answerfile

- Refer to installation guide
 - <http://support.citrix.com/article/CTX130421>
 - Installation guide does not document all options
- Answerfile is in XML format
 - Options almost self-explaining
 - Not anaconda-style
- Answerfile needs to be stored on http/ftp/nfs share

Sample answerfile (basic)

```
<?xml version="1.0"?>
<installation>
  <keymap>de</keymap>
  <primary-disk>sda</primary-disk>
  <guest-disk>sda</guest-disk>
  <root-password>citrix</root-password>
  <source type="url">ftp://172.16.0.249/ftp/xs602</source>
  <admin-interface name="eth0" proto="dhcp" />
  <timezone>Europe/Berlin</timezone>
  <hostname>autoinstttest</hostname>
  <name-server>172.16.10.10</name-server>
  <name-server>172.16.0.254</name-server>
</installation>
```

Sample answerfile (more comprehensive)

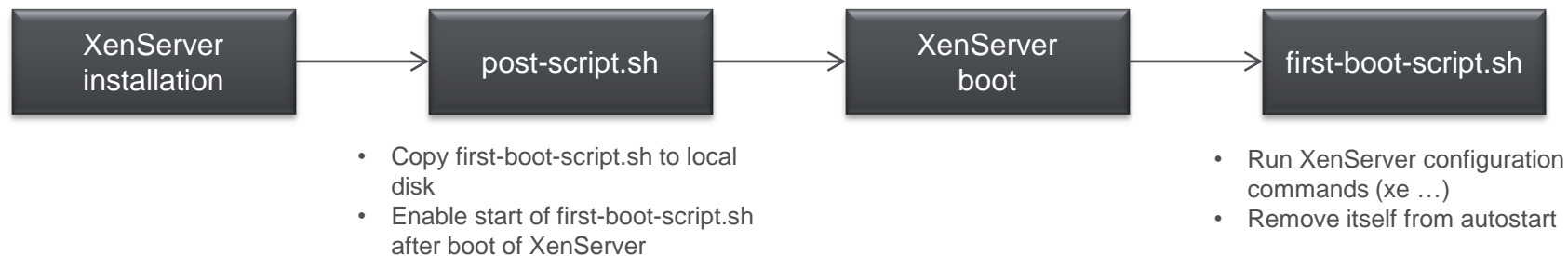
```
<?xml version="1.0"?>
  <installation mode="fresh" srtype="lvm">
    <bootloader>extlinux</bootloader>
    <primary-disk gueststorage="yes">sda</primary-disk>
    <keymap>de</keymap>
    <hostname>xen01</hostname>
    <root-password>citrix</root-password>
    <source type="url">http://172.16.3.20/Xenserver/</source>
    <admin-interface name="eth0" proto="static">
      <ip>172.16.3.254</ip>
      <subnet-mask>255.255.255.0</subnet-mask>
      <gateway>172.16.3.1</gateway>
    </admin-interface>
    <name-server>172.16.3.1</name-server>
    <name-server>172.16.3.10</name-server>
    <timezone>Europe/Berlin</timezone>
    <time-config-method>ntp</time-config-method>
    <ntp-server>0.de.pool.ntp.org</ntp-server>
    <ntp-server>1.de.pool.ntp.org</ntp-server>
    <ntp-server>2.de.pool.ntp.org</ntp-server>
  </installation>
```

Post installation script

Post installation script

- Start task after successful installation
- Installation script has to be created in UNIX style
 - For Windows use editors like
 - <http://notepad-plus.sourceforge.net/de/download.php>
 - <http://www.grahl-software.com/en/ab-edit/>
 - <http://www.brixoft.net/prodinfo.asp?id=1>
- Script has to be stored
 - On file share (nfs, http, ftp)
 - Locally (file)
- Script is executed during installation, not after boot of server!!

Workflow with post script



Post installation script - invoke

post-script.sh

- Invoke post install script by
 - `<script stage="filesystem-populated" type="url">ftp://172.16.0.249/ftp/post-script.sh</script>`
- Stage options
 - stage="installation-start"
 - stage="file-system-populated"
 - was "post-install-script" in earlier releases
 - Invoked before installation has finished
 - Root disk is still mounted
 - Script will get parameter specifying root mount point (to be used with \$1 in script)
 - stage="installation-complete"
 - was "install-failed-script" in earlier releases
 - Invoked after installation has finished
 - Can run script conditionally e.g. when installation failed
 - Root disk not mounted anymore
 - Script will get parameter showing installation success (to be used with \$1 in script)
 - 0 = success
 - not 0 = failure

Post installation script

- Post installation script is invoked during installation, not after boot of server
- During execution of script, XAPI is not running yet
- Post installation script is primarily used to
 - copy script (which is run on first boot) to server
 - Enable execution of copied script on first server boot
- Script example

```
#!/bin/sh
touch $1/tmp/post-executed
wget ftp://172.16.0.249/ftp/xenserver/scripts/first-boot-script-602-std.sh -O $1/tmp/first-boot-script.sh
chmod 777 $1/tmp/first-boot-script.sh
ln -s /tmp/first-boot-script.sh $1/etc/rc3.d/S99zzpostinstall
```

First boot script

first-boot-script.sh

- Usually stored on file share
- Copy to server invoked by post install script (e.g. wget command)
- Includes all required configuration steps using xapi / xe commands or similar

```
#!/bin/bash
# Wait before start
sleep 60
# Assign License to server
HOSTNAME=$(hostname)echo $HOSTNAME
HOSTUUID=$(xe host-list name-label=$HOSTNAME --minimal)
xe host-apply-edition edition=platinum host-uuid=$HOSTUUID license-server-address=172.16.10.10 license-server-port=27000

# Disable first boot script for subsequent reboots
rm -f /etc/rc3.d/S99zzpostinstall

# Final Reboot
reboot
```


Unattend file including post install script

```
<?xml version="1.0"?>
<installation>
    <keymap>de</keymap>
    <primary-disk>sda</primary-disk>
    <guest-disk>sda</guest-disk>
    <root-password>citrix</root-password>
    <source type="url">ftp://172.16.0.249/ftp/xs60</source>
    <script stage="filesystem-populated" type="url">ftp://172.16.0.249/ftp/xs60/postinstall.scripts/post-script.sh</script>
    <admin-interface name="eth0" proto="dhcp" />
    <timezone>Europe/Berlin</timezone>
    <hostname>autoinsttest</hostname>
    <name-server>172.16.10.10</name-server>
    <name-server>172.16.0.254</name-server>
</installation>
```

Integrating Drivers

Driver types

- Driver required for installation
 - usually storage driver
- Driver update required after installation
 - all driver types
- Driver required for accessing network to get access to unattend.xml
 - usually NIC driver

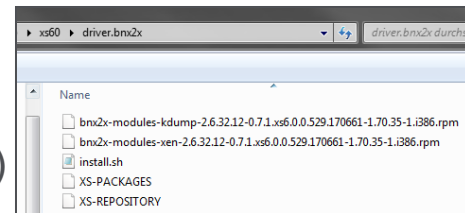
Manual driver installation (compared to unattended)

- Provided as zip download which includes iso file
- Manual installation (2 methods)
 - Select installation of supplemental disk and attach iso/CD during installation
 - install driver after XenServer installation by running install.sh from iso file
- Optionally point to a file share where driver is stored (requires extraction of iso file)



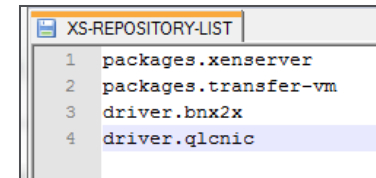
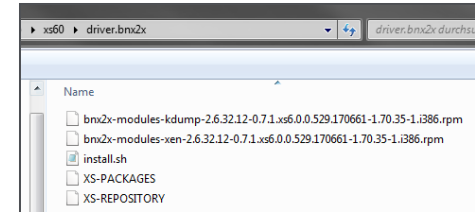
Driver required for installation

- Create driver repository
 - extract content from iso file
 - store it on installation source in sub directory (e.g. driver.<name>)
- Add line to unattend.xml
 - point to driver sub dir on repository
 - `<driver-source type="url">ftp://172.16.0.249/ftp/xs60/driver.qlnic</driver-source>`
- Specified in unattend.xml
 - driver will be used for installation
 - driver will be installed on XenServer
 - no need to install supplement separately or modify XS-REPOSITORY-LIST



Driver update after installation

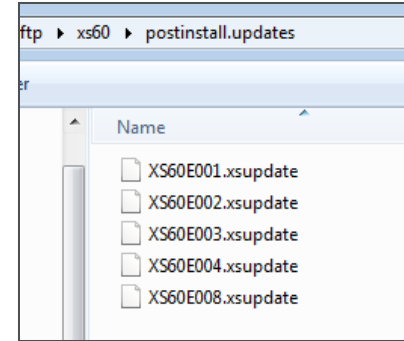
- Drivers will not be considered for installation itself
- Drivers will be installed on XenServer
- No need to add content to unattend.xml
- Unattended installation
 - copy drivers to sub dir on repository (same step as shown on previous slides)
 - Add sub dir(s) to XS-REPOSITORY-LIST file in installation root



Unattended installation of updates

Unattended installation of updates

- Download updates from support.citrix.com
- Store .xsupdate files in sub folder of unattend install dir
- Update script tasks
 - Copy updates to local server
 - Execute update step by step
 - Delete applied update
 - Restart xapi or restart host depending on update type
 - Re-invoke script after reboot
- See example script on next slide
- Include script section to update drivers as part of first boot script



Example update script (first boot)

```
#!/bin/bash
# Install XenServer Updates
HOSTUUID=$(xe host-list name-label=$HOSTNAME --minimal)
cd /tmp
if [ -a /tmp/secondboot ]
    then
        echo "Secondboot"
    else
        mkdir updates
        cd updates
        echo "Downloading Updates..."
        wget ftp://172.16.0.249/ftp/xs602/postinstall.updates/*.xsupdate
        cd /tmp
        touch /tmp/secondboot
    fi
fi

for updatefile in `ls /tmp/updates`; do
    sleep 60
    echo "Uploading Update $updatefile ..."
    echo "Uploading Update $updatefile ..." >> /var/log/messages
    PATCHUUID=$(xe patch-upload file-name=/tmp/updates/$updatefile)
    sleep 10
    echo "Installing Update $updatefile ..."
    echo "Installing Update $updatefile ..." >> /var/log/messages
    xe patch-apply host-uuid=$HOSTUUID uuid=$PATCHUUID
    rm -f /tmp/updates/$updatefile
    PATCHACTION=$(xe patch-list uuid=$PATCHUUID params=after-apply-guidance --minimal)
    if [ "$PATCHACTION" == "restartXAPI" ]
    then
        /opt/xensource/bin/xe-toolstack-restart
        sleep 60
    elif [ "$PATCHACTION" == "restartHost" ]; then
        reboot;
        sleep 60
    fi
done

# Disable first boot script for subsequent reboots
rm -f /etc/rc3.d/S99zzpostinstall
rm -f /tmp/secondboot

# Final Reboot
reboot
```

Additional information

Installation Debugging

- During installation: Move to TTY 2,3,4 (Strg + Alt + Fx)
- See e.g. DHCP messages
- Installation log file
`/var/log/installer/install-log`
- Tool for collecting all installer logs
`/opt/xenource/installer/report.py`

Undocumented answerfile parameters

Installation / Mode

Element	Description	Required?
<installation>	<p>All nodes should be within a root node named <i>installation</i>.</p> <p>Attributes: You can specify an installation mode attribute with possible values <i>fresh</i>, <i>reinstall</i>, <i>upgrade</i>, <i>oemhdd</i> and <i>oemflash</i>. For example:</p> <pre data-bbox="432 707 873 740"><installation mode="fresh" ></pre> <p>If this attribute is not specified, the default is <i>fresh</i>.</p>	Y

Installation / Srtype

Element	Description	Required?
<installation>	<p>All nodes should be within a root node named <i>installation</i>.</p> <p>Attributes: You can specify the type of your storage repository with the <i>srtype</i> attribute with possible values <i>lvm</i> or <i>ext</i>. For example:</p> <pre data-bbox="432 707 1074 743"><installation mode="fresh" srtype="lvm"></pre> <p>If this attribute is not specified, the default is <i>lvm</i>.</p>	N

Source

Element	Description	Required?
<source>	<p>Specifies where the packages should be installed from.</p> <p>Attributes:</p> <p><i>type: url, nfs, or local</i></p> <p>If local, leave the element empty.</p> <p>Example URLs:</p> <p>http://[user[:passwd]]@host[:port]/path/ https://[user[:passwd]]@host[:port]/path/ ftp://[user[:passwd]]@host[:port]/path/ file:///path/ nfs://server:/path/</p>	Y

Network backend

Element	Description	Required?
<network-backend>	<p>Attributes:</p> <p>You can specify the network-backend to be used. Values can be bridge or openvswitch. Default uses the default of the XenServer version used for installation.</p> <p>Example:</p> <pre><network-backend>openvswitch</network-backend></pre>	N

Root-Password

Element	Description	Required?
<root-password>	<p>The desired root password for the XenServer host.</p> <p>If type is not specified, XenServer will ask for password after installation.</p> <p>Possible values for type: type=plaintext type=hash</p> <p>Example: <root-password type="plaintext hash">passwd</root-password></p> <p>Used password has to be extracted from /etc/passwd file from a running system.</p>	N

Nameserver

Element	Description	Required?
<name-server>	The IP address of a name-server. You should use one of these elements for each name-server you want to use.	N

NTP-Server

Element	Description	Required?
<ntp-server>	The IP address or FQDN of a timeserver. You should use one of these elements for each time server you want to use.	N

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Backup

Answerfile parameters

Pre XenServer 6.0