



Virtuozzo 7

PXE Installation Guide

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CHAPTER 1

Introduction

This guide explains how to install Virtuozzo over network using a Linux-based preboot execution environment (PXE).

You can install Virtuozzo over network in one of the two modes:

- **Attended.** This mode is very much the same as installing Virtuozzo from a DVD. The key difference is that the distribution files are delivered over network. In this mode, you will need to configure installation options manually. The attended mode can be used to install Virtuozzo on a small number of servers.
- **Unattended.** In this mode, Virtuozzo installer uses a kickstart file with instructions on how to configure the server and install Virtuozzo and requires no interaction on your part. The unattended mode can be recommended to automate Virtuozzo installation on a large number of servers.

In a nutshell, the PXE network installation procedure involves these steps:

1. Make the Virtuozzo distribution available over network by configuring the HTTP, TFTP, and DHCP servers.
2. Create a kickstart file if unattended installation is planned.
3. Boot the client server from network and install Virtuozzo in one of the two modes.

All of these steps are described in the following chapters.

CHAPTER 2

Preparing for PXE Installation of Virtuozzo

You will need the following servers to install Virtuozzo over network using PXE:

- TFTP server that will provide an environment for network boot.
- HTTP or FTP server that will provide the Virtuozzo distribution files.
- DHCP server that will provide network configuration for other servers.
- Client server(s) where Virtuozzo will be installed. The client server(s) must meet the requirements described in the chapter **Preparing for Installation** of the *Virtuozzo 7 Installation Guide*. In addition, they must have network cards with PXE support.

Note: Unless they already exist in your infrastructure, the TFTP, HTTP (FTP), and DHCP servers can share the same physical machine.

This chapter describes how to configure each of the required servers for PXE installation of Virtuozzo (on the example of a RHEL-like OS, e.g., CentOS 6).

2.1 Configuring TFTP Server

2.1.1 Configuring TFTP Server for Installation on BIOS-based Client Servers

Note: If you get the “Permission denied” error when trying to connect to the TFTP server from the client server, try running `# restorecon -Rv /tftpboot/` on the TFTP server.

To configure the TFTP server for installation on BIOS-based client servers, do the following:

1. Make sure the TFTP server, Xinetd, and SYSLINUX bootloader are installed:

```
# yum install tftp-server syslinux xinetd
```

2. Edit the `/etc/xinetd.d/tftp` file to have the following:

```
service tftp
{
  disable          = no
  socket_type      = dgram
  protocol         = udp
  wait            = yes
  user             = root
  server           = /usr/sbin/in.tftpd
  server_args      = -v -s /tftpboot
  per_source       = 11
  cps              = 100 2
  flags            = IPv4
}
```

3. Copy the following files to the `/tftpboot` directory (if this directory does not exist, create it under the root `/` directory):

- `/images/pxeboot/vmlinuz` and `/images/pxeboot/initrd.img` from the Virtuoizzo distribution,
- `menu.c32` and `pxelinux.0` from the syslinux directory (usually `/usr/share/syslinux` or `/usr/lib/syslinux`).

4. In the `/tftpboot` directory, create the `/pxelinux.cfg` directory. In it, create the file `default`.

5. Add the following lines to `/tftpboot/pxelinux.cfg/default`:

```
default menu.c32
prompt 0
timeout 60
```

```
onetimeout VZ
menu title Virtuozzo Boot Menu
label 1
    menu label Install Virtuozzo 7 with GUI management
    kernel vmlinuz
    append initrd=initrd.img ui ip=dhcp inst.repo=http://<HTTP_server_IP_address>/vz
label 2
    menu label Install Virtuozzo 7 with CLI management
    kernel vmlinuz
    append initrd=initrd.img ip=dhcp inst.repo=http://<HTTP_server_IP_address>/vz
```

Note: For more details on the parameters you can specify in `/tftboot/pxelinux.cfg/default`, see the documentation for `syslinux`.

6. Start the `xinetd` service:

```
# systemctl start xinetd.service
```

Or restart it if already running:

```
# systemctl restart xinetd.service
```

7. If necessary, allow incoming connections to the TFTP service in the firewall:

```
# firewall-cmd --add-service=tftp --permanent
# systemctl restart firewalld.service
```

2.1.2 Configuring TFTP Server for Installation on EFI-based Client Servers

Note: If you get the “Permission denied” error when trying to connect to the TFTP server from the client server, try running `# restorecon -Rv /tftboot/` on the TFTP server.

To configure the TFTP server for installation on EFI-based client servers, do the following:

1. Make sure the TFTP server and `Xinetd` are installed:

```
# yum install tftp-server xinetd
```

2. Edit the `/etc/xinetd.d/tftp` file to have the following:

```
service tftp
{
    disable          = no
```

2.1. Configuring TFTP Server

```
socket_type    = dgram
protocol       = udp
wait           = yes
user           = root
server         = /usr/sbin/in.tftpd
server_args    = -v -s /tftpboot
per_source     = 11
cps            = 100 2
flags          = IPv4
}
```

3. Copy the following files from the Virtuoizzo distribution to the `/tftpboot` directory (if this directory does not exist, create it under the root (`/`) directory):

- `/images/pxeboot/vmlinuz`,
- `/images/pxeboot/initrd.img`,
- `/EFI/BOOT/grubx64.efi`.

4. In the `/tftpboot` directory, create the `grub.cfg` file.

5. Add the following lines to `/tftpboot/grub.cfg`:

```
set timeout=60
menuentry 'Virtuoizzo 7 with GUI management' {
    linuxefi vmlinuz ui ip=dhcp inst.repo=http://<HTTP_server_IP_address>/vz
    initrdefi initrd.img
}
menuentry 'Virtuoizzo 7 with CLI management' {
    linuxefi vmlinuz ip=dhcp inst.repo=http://<HTTP_server_IP_address>/vz
    initrdefi initrd.img
}
```

6. Start the `xinetd` service:

```
# systemctl start xinetd.service
```

Or restart it if already running:

```
# systemctl restart xinetd.service
```

7. If necessary, allow incoming connections to the TFTP service in the firewall:

```
# firewall-cmd --add-service=tftp --permanent
# systemctl restart firewalld.service
```

2.2 Configuring HTTP Server

To configure the HTTP server to deliver Virtuozzo distribution files over network, do the following:

1. Make sure the HTTP server package is installed and the service is running. For example:

```
# yum install httpd
# systemctl start httpd.service
```

2. Copy the contents of your Virtuozzo installation DVD or ISO image to a directory on the HTTP server (e.g., /var/www/html/vz). The directory must have the r-x access permissions so that client server(s) can boot from this location (e.g., <HTTP_server_IP_address>/vz) over network. To set access permissions to the /var/www/html/vz directory, run:

```
# chmod 755 /var/www/html/vz
```

2.3 Configuring DHCP Server

To configure the DHCP server, do the following:

1. Make sure the DHCP server package is installed:

```
# yum install dhcp
```

2. Add the following lines to the file /etc/dhcp/dhcpd.conf (or /etc/dhcpd.conf):

- For installation on BIOS-based client servers:

```
next-server <TFTP_server_IP_address>;
filename "/pxelinux.0";
```

- For installation on EFI-based client servers:

```
next-server <TFTP_server_IP_address>;
filename "/grubx64.efi";
```

3. Start the DHCP server if you installed it in step 1:

```
# systemctl start dhcpd.service
```

Or restart the existing DHCP server:

```
# systemctl restart dhcpd.service
```

2.4 Configuring Client Servers

The only configuration step required for each client server where Virtuozzo will be installed is to enable network boot in BIOS or EFI setup.

CHAPTER 3

Preparing a Kickstart File

To install Virtuozone in the unattended mode, you will need a kickstart file. A kickstart file is a text file containing options that instruct the installer how to configure the target physical server and install Virtuozone. Kickstart files used in Virtuozone installations are similar to those used to install RHEL-like distributions.

The two groups of options you can use in Virtuozone kickstart files are:

- the standard options suitable for all RHEL-like distributions, and
- options specific to Virtuozone (including those for Virtuozone Storage with GUI and CLI management).

Note: The Virtuozone EULA is accepted automatically during kickstart installations.

The following sections describe both groups in detail, explain how to create your own kickstart file, and make it accessible over network.

3.1 Standard Kickstart Options

Your kickstart file may include any of the standard Linux options used in kickstart files for installing Linux operating systems. For the full list of these options and their explanations, consult the respective Linux documentation (e.g., the *Red Hat Enterprise Linux Installation Guide*).

Listed below are the mandatory options and commands that you must include in each kickstart file:

Option	Description
auth	Specifies authentication options for the Virtuozone physical server.
bootloader	Specifies the way of installing the bootloader.

3.2. Virtuoizzo Kickstart Options

Option	Description
install	Tells the system to install Virtuoizzo either from nfs or ur1 (for FTP and HTTP installations, respectively). Specify this option to perform a clean installation of Virtuoizzo.
cmdline	Do not start the X Window System and do not show the installer GUI.
keyboard	Sets the system keyboard type.
lang	Sets the language to use during installation and the default language to use on the installed system.
part	Creates partitions on the server.
rootpw	Sets the root user's password.
timezone	Sets the system time zone.
clearpart	Erases partitions on specified (or all) disk drives.
autopart	Automatically creates partitions required to install Virtuoizzo and Virtuoizzo Storage (if being installed). Note: This option must follow clearpart.
zerombr	Initializes unused partitions on all disk drives reachable by the installer. Note: This option must follow clearpart.
ignoredisk	Optional. Ignores the specified drives or all drives except the one specified. Used with one of the following arguments: • <code>--drives=<drive>[, ...]</code>, a comma-separated list of drives to ignore. If a server has drives other than those specified in this option, the installer will ask what to do with them. • <code>--only-use=<drive></code>, ignore every drive except the specified.

3.2 Virtuoizzo Kickstart Options

In addition to standard Linux kickstart options, Virtuoizzo provides a number of own options that you need to add to your kickstart file.

3.2.1 General Options

key (mandatory)

```
key <key>
```

Installs the Virtuozzo product key on the server.

%packages (mandatory)

Specifies the package groups to install on the server:

- @base, @core, mandatory, core Virtuozzo packages.
- @vz, mandatory, Virtuozzo OS virtualization packages.
- @ps, mandatory, Virtuozzo hardware virtualization packages.
- @qemu, mandatory, QEMU-related packages.
- @clustering, optional, packages required for creating clusters from Virtuozzo nodes.
- @templates, optional, Virtuozzo EZ OS templates. To install only specific templates, use the %eztemplates option.
- @vstorage, optional, packages required for setting up Virtuozzo Storage clusters.
- @optional, optional, additional packages not installed by default.

cep (optional)

```
cep [--agree|----agree-node|--disagree]
```

Sets participation in the Customer Experience Program.

Option	Description
--agree	Join the program with physical server and virtual environments. In this case, Virtuozzo will periodically collect information about the configuration of your physical server and virtual machines and containers and use it to improve the product to better fit your needs. Note: No private information like your name, e-mail address, phone number, or keyboard input will be collected.

3.2. Virtuozone Kickstart Options

Option	Description
<code>--agree-node</code>	Join the program with physical server only. In this case, Virtuozone will periodically collect information only about the configuration of your physical server and use it to improve the product to better fit your needs. Note: No private information like your name, e-mail address, phone number, or keyboard input will be collected.
<code>--disagree</code>	Do not join the program.

up2date (optional)

Does the following:

1. Configure the repositories with updates for Virtuozone software and templates.
2. Check the repositories for available updates.
3. Download and install the updated packages, if any, on the server.

Using this option, you can ensure that you have the latest Virtuozone software packages and templates right after the installation, without the need to manually check for updates.

readykernel --disable-autoupdate (optional)

Disables the automatic downloading and installation of the latest ReadyKernel patches for the current kernel. With automatic updating enabled by default, ReadyKernel will check for new patches daily at 12:00 server time. If a patch is available, ReadyKernel will download, install, and load it for the current kernel.

nosfxtemplate (optional)

Skips installation of default cached EZ OS templates. Currently these EZ OS templates are installed by default:

- `vzlinux-7-x86_64`
- `centos-7-x86_64`
- `centos-6-x86_64`
- `ubuntu-16.04-x86_64`
- `ubuntu-14.04-x86_64`

- debian-8.0-x86_64
- debian-8.0-x86_64-minimal

%eztemplates (optional)

Installs specific EZ OS templates. All available templates are in the `/Packages` directory of the Virtuoizzo distribution. You can identify them by the ending part `-ez-<version>.vz7.noarch.rpm` (e.g., `vzlinux-7-x86_64-ez-7.0.0-12.vz7.noarch.rpm`). Template names must be specified without the ending part, one per line, for example:

```
%eztemplates
vzlinux-7-x86_64
centos-7-x86_64
%end
```

When using this parameter, keep in mind the following:

- If you specify an empty list, no templates will be installed on the server.
- If you skip this parameter, all templates included in the Virtuoizzo distribution will be installed on the server.
- Specify `--cache` next to an OS template name to cache it after installation. To cache all installed OS templates, specify `--cache` after `%eztemplates`.

Note: To be able to cache OS templates for certain Linux distributions (e.g., Red Hat Enterprise Linux), you may need to first create repositories with the necessary packages for these OS templates.

prlnet (optional)

```
prlnet --name <name> [--ip-scope-start <start_IP_addr> --ip-scope-end <end_IP_addr>]
      [--ip <adapter_IP_addr>[/<mask>]] [--dhcp-ip <DHCP_IP_addr>]
      [--dhcp-server <on|off>] [--dhcp6-server <on|off>]
      [--ip6-scope-start <start_IP_addr> --ip6-scope-end <end_IP_addr>]
      [--ip6 <adapter_IP_addr>[/<mask>]] [--dhcp-ip6 <DHCP_IP_addr>]
```

Defines the range of IP addresses (IPv4 and IPv6) the DHCP server will be able to allocate to virtual machines in the defined host-only network; virtual adapter IP address (IPv4 and IPv6) and subnet mask; DHCP server IP address (IPv4 and IPv6); and enables or disables the virtual DHCP server (DHCPv4 or DHCPv6).

If you omit one or more parameters, the following default values will be used:

- `--ip-scope-start`: 10.37.130.1,

3.2. Virtuoizzo Kickstart Options

- `--ip-scope-end: 10.37.130.254,`
- `--ip: 10.37.130.2/255.255.255.0,`
- `--dhcp-ip: 10.37.130.1,`
- `--dhcp-server: on,`
- `--ip6-scope-start: fdb2:2c26:f4e4::,`
- `--ip-scope-end: fdb2:2c26:f4e4::ffff,`
- `--ip6: fdb2:2c26:f4e4::1/ffff:ffff:ffff:ffff::,`
- `--dhcp-ip6: fdb2:2c26:f4e4::,`
- `--dhcp6-server: on.`

vztturlmap (optional)

Redefines the default locations of repositories with EZ OS and application templates for various operating systems (see `/etc/vztt/ur1.map`). To set a custom repository, specify the OS name followed by `=` and the URL (e.g., `$FC_SERVER=http://myfedorarepo.com` for Fedora). Separate multiple URLs with spaces.

Note: To cache OS templates for certain operating systems (e.g., RHEL and SLES), first create repositories with the necessary packages for these OS templates.

3.2.2 Options Specific to Virtuoizzo Storage with GUI Management

Important: You can only use one set of options: for either GUI or CLI management.

container (mandatory)

```
container --special=va-mn --ip=<VA_MN_IPv4_addr> [--hostname=<VA_MN_hostname>]
          --rootpw=<VA_MN_passwd>
container --special=vstorage-ui --ip=<vstorage_UI_IPv4_addr> [--hostname=<vstorage_UI_hostname>]
          --rootpw=<vstorage_UI_passwd>
```

Creates containers for Virtuoizzo Automator Management Node and Virtuoizzo Storage management panel. You will need to specify container's IP address and hostname, type of the management panel to install, and root user's password.

Typically, you create containers for both the VA MN and Virtuoizzo Storage management panel on the first node of your infrastructure.

register_vaagent (mandatory)

```
register_vaagent --mn_addr=<VA_MN_IPv4_addr> --rootpw=<VA_MN_passwd>
```

Registers the node in the previously installed VA MN.

register_vstorage_ui (mandatory)

```
register_vstorage_ui --ui_addr=<vstorage_UI_IPv4_addr> [--token=<token>]
```

Registers the node in the previously installed Virtuoizzo Storage management panel. The `--token=<token>` parameter is only required to deploy the second and other nodes in your Virtuoizzo Storage infrastructure. Tokens can be obtained from the Virtuoizzo Storage management panel usually installed on the first node.

3.2.3 Options Specific to Virtuoizzo Storage with CLI Management

Important: You can only use one set of options: for either GUI or CLI management.

vstorage mds_create (mandatory unless mds_join is used)

```
vstorage mds_create <name> --ip=<IP_address>
```

Does the following:

- Creates a Virtuoizzo Storage cluster with the name of `<name>`. A name may contain the characters a-z, A-Z, 0-9 as well as minus (-) and underscore (_) signs.
- Configures the server as a metadata server for the Virtuoizzo Storage cluster and binds the MDS service to the IP address of `<IP_address>`.

Metadata servers are part of any Virtuoizzo Storage cluster. They store metadata about chunk servers, data chunks, and chunk replicas. You must set up at least one metadata server for a cluster to function.

3.2. Virtuozone Kickstart Options

Note:

1. MDS servers must have static IP addresses assigned. If you are using DHCP, you should map an IP address to the MAC address of the MDS server.
2. For detailed information on deploying and managing Virtuozone Storage clusters, consult the *Virtuozone Storage Administrator's Guide*.
3. The current version of Virtuozone Storage supports setting up one cluster per kickstart file. So when specifying several `vstorage` commands, make sure that all commands use the same cluster name.

vstorage mds_join (mandatory unless mds_create is used)

```
vstorage mds_join <name> --ip=<IP_address>
```

Does the following:

- Configures the server as a metadata server for the Virtuozone Storage cluster with the name of `<name>`.
- Sets the IP address of `<IP_address>` to connect to the metadata server.

vstorage clusterpw (mandatory)

```
vstorage clusterpw <passwd>
```

Creates a new or supplies the existing password when creating or joining Virtuozone Storage clusters.

Note: Keeping plain-text passwords in the kickstart file is a security risk if your network is not isolated. In this case, consider installing Virtuozone first and configuring Virtuozone Storage clusters manually later.

vstorage reg_timeout (optional)

```
vstorage reg_timeout <minutes>
```

Sets the number of minutes during which MDS servers, chunk servers, and clients can try to register with the master MDS server and join the cluster. Every minute, one registration attempt is made. The default value is 0, which assumes that the master MDS server is already up and running.

vstorage cs_join (optional)

```
vstorage cs_join <name> [<options>]
```

Configures the server as a chunk server for the Virtuozone Storage cluster with the name of `<name>`. You can use the following options with this command:

Option	Description
<code>--mpoint=<mnt_point></code>	Specify the mount point under which the chunk server is to be mounted on the server.
<code>--ssd=<MNT_POINT>,<SIZE></code>	Specify the mount point under which the SSD drive is to be mounted on the server.
<code>--ssd=no</code>	Specify this option to forbid the use of SSD drives for write journaling.
<code>--tier=<TIER></code>	Specify the tier, from 0 to 3, defining the type of storage to use for storing data chunks. You can use tiers to keep different categories of data on different chunk servers.
<code>--allow-system-disk</code>	Allow creating chunk servers on system disks. Have in mind that doing so may result in cluster performance degradation.

Do not use the options, except for `--ssd=no`, if you are creating the default partition layout and chunk server configuration using the `autopart` standard option.

Chunk servers store the contents of virtual machines and containers as 64MB data chunks. All data chunks are replicated, and their replicas are stored on different chunk servers. You must set up at least one chunk server for a cluster to function.

vstorage client (optional)

```
vstorage client <name> [--ssd=<MNT_POINT>|--ssd=no]
```

Configures the server as a client for the Virtuozone Storage cluster with the name of `<name>`.

Option	Description
<code>--ssd=<MNT_POINT></code>	Manually specify the mount point under which the SSD drive is to be mounted on the server. Do not use this option if you are creating the default partition layout and chunk server configuration using the <code>autopart</code> standard option.
<code>--ssd=no</code>	Forbid the use of SSD drives for storing the local cache.

Clients are computers with Virtuozone 7 from where you run virtual machines and containers stored on your Virtuozone Storage.

vstorage key (optional)

```
vstorage key <key>
```

3.3. Kickstart File Example

Installs the Virtuozzo Storage product key on the server.

3.3 Kickstart File Example

Below is an example of a kickstart file that you can use to install and configure Virtuozzo in unattended mode. You can use this file as the basis for creating your own kickstart files.

Important:

1. To make sure the disk where you install Virtuozzo is partitioned correctly, you may need to erase existing partitions with `clearpart`. This command is commented out by default to avoid accidental loss of data.
2. Keeping plain-text passwords in the kickstart file is a security risk if your network is not isolated. Consider encrypting your password according to `auth` parameters (e.g., with SHA512 as in this example) and using `rootpw --iscrypted <passwd_hash>`.

```
# Install Virtuozzo.
install
# Skip loading X Window System and the installer GUI.
# cmdline
# Specify the location of the Virtuozzo distribution files.
url --url http://<HTTP_server_IP_address>/vz
# Set the language for the installation and the default system language
# to US English.
lang en_US.UTF-8
# Set the keyboard layout to US English.
keyboard --vckeymap=us --xlayouts='us'
# Erase all partitions from the sda hard drive.
# clearpart --drives=sda --all --initlabel --disklabel=gpt
# Automatically creates required partitions. Requires clearpart.
autopart
# Agree to participate in the Customer Experience Program.
cep --agree
# Obtain network configuration via DHCP.
network --bootproto dhcp
# Download updated packages.
# up2date
# Set the root password for the server.
rootpw <passwd>
# Encrypt user passwords with the SHA-512 algorithm and enable shadow passwords.
auth --enableshadow --passalgo=sha512
# Set the system timezone.
timezone --utc America/New_York --ntpservers=0.pool.ntp.org,1.pool.ntp.org
```

```
# Set sda as the first drive in the BIOS boot order and write the boot record to
# MBR.
bootloader --location=mbr
# Reboot the system after installation.
reboot
# Install a Virtuoizzo license.
key <key>
# Install Virtuoizzo packages.
%packages
@^cloudserver
@base
@core
@ps
@qemu
@templates
@vstorage
@vz
kexec-tools
%end
```

3.3.1 Kickstart File Example for Virtuoizzo Storage with GUI Management

If you need to install Virtuoizzo Automator and Virtuoizzo Storage, you can expand the basic example as follows:

- For the first node in your VA and Virtuoizzo Storage infrastructure, add the following lines to the kickstart file:

```
container --special=va-mn --ip=<VA_MN_IPv4_addr> [--hostname=<VA_MN_hostname>] --rootpw=<VA_MN_
container --special=vstorage-ui --ip=<vstorage_UI_IPv4_addr> [--hostname=<vstorage_UI_hostname>]
register_vaagent --mn_addr=<VA_MN_IPv4_addr> --rootpw=<VA_MN_passwd>
register_vstorage_ui --ui_addr=<vstorage_UI_IPv4_addr>
```

- For the second and other nodes in your VA and Virtuoizzo Storage infrastructure, add the following lines to the kickstart file:

```
register_vaagent --mn_addr=<VA_MN_IPv4_addr> --rootpw=<VA_MN_passwd>
register_vstorage_ui --ui_addr=<vstorage_UI_IPv4_addr> --token=<token>
```

3.3.2 Advanced Partitioning Example

For more control on partitioning, you can replace `autopart` with a set of `part` commands to adjust the size of required partitions. In this case, each partition will have the same size on every system you install Virtuoizzo on. E.g., if you use the lines below, swap will be 4GiB and `/vz` will be 40GiB on every system (whereas if you use `autopart` swap size will depend on RAM size and `/vz` will occupy all available space).

3.4. Making Kickstart File Accessible Over Network

For example, for installation on BIOS-based systems:

```
part /boot --fstype=ext4 --size=1024
part / --fstype=ext4 --size=20096
part /vz --fstype=ext4 --size=40768 --grow
part swap --size=4096
```

For installation on EFI-based systems, also specify

```
part /boot/efi --fstype=efi --grow --maxsize=200 --size=20
```

Note:

1. For details on possible partition sizes, see the [Virtuozzo 7 Installation Guide](#).
2. If you are installing Virtuozzo Storage and need to use `part`, also use `vstorage` options to configure partitions for chunk servers and clients. For details, see [Options Specific to Virtuozzo Storage with CLI Management](#) on page 14.

3.4 Making Kickstart File Accessible Over Network

To use the prepared kickstart file, make it accessible over network as follows:

1. Copy the kickstart file to the same directory on the HTTP server where the Virtuozzo installation files are stored (e.g., `/var/www/html/vz`).
2. Add the option `ks=<HTTP_server_address>/<path_to_kickstart_file>` to the corresponding files on the TFTP server.

Note: The kickstart file contains the location of the Virtuozzo distribution files and overrides the previously added option `inst.repo=http://<HTTP_server_IP_address>/vz` so you can remove it.

- For installation on BIOS-based systems, modify `/tftpboot/pxelinux.cfg/default`. For example, for the HTTP server at 198.123.123.198 and the kickstart file in `/var/www/html/vz/ks.cfg`, the default file may look like the following:

```
default menu.c32
```

```
prompt 0
timeout 60
ontimeout VZ
menu title Virtuozzo Boot Menu
label VZ
    menu label Install Virtuozzo 7
    kernel vmlinuz
    append initrd=initrd.img ip=dhcp ks=http://198.123.123.198/vz/ks.cfg
```

- For installation on EFI-based systems, modify `/tftpboot/grub.cfg`. For example, for the HTTP server at 198.123.123.198 and the kickstart file in `/var/www/html/vz/ks.cfg`, the `grub.cfg` file may look like the following:

```
set timeout=60
menuentry 'Virtuozzo 7' {
    linuxefi vmlinuz ip=dhcp ks=http://198.123.123.198/vz/ks.cfg
    initrdefi initrd.img
}
```

CHAPTER 4

Launching Virtuozzo Installation

Now that you have prepared all the servers, you can start the Virtuozzo installation:

1. Boot the client server from network.
2. Once the PXE boot menu loads, select the entry for Virtuozzo (**Install Virtuozzo** in this example) and press **Enter**.

If you are installing Virtuozzo in the attended mode, you will need to set options in the installer (see the [Virtuozzo 7 Installation Guide](#)). If you are installing Virtuozzo in the unattended mode using a kickstart file, no further interaction will be required from you.