



Virtuozzo 6

Upgrade Guide

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CHAPTER 1

About This Document

This document familiarizes you with the way to upgrade the following products to Virtuozzo 6:

- Server Bare Metal 5.0
- Server Bare Metal 4
- Virtuozzo Containers 4.7 for Linux
- Virtuozzo Containers 4.6 for Linux
- Virtuozzo Containers 4.0 for Linux
- OpenVZ

You will learn what upgrade scenarios exist, how to prepare for the upgrade, which actions to take to upgrade a particular product, and how to verify that the upgrade was successful.

Upgrade Scenarios

Before beginning the upgrade process, it is important to choose the proper upgrade scenario. You can choose one of the following:

- **Installation on a spare server.** If you have a spare server, you can install Virtuozzo 6 on this server and then move Containers and virtual machines there. Detailed information on this scenario is given in **Upgrading With a Spare Server** (p. 8).
- **In-place upgrade.** If you want to upgrade to Virtuozzo 6 but do not have a spare server, you can upgrade your existing system. Detailed information on this scenario is given in **Performing an In-Place Upgrade** (p. 9).

Whatever scenario you choose, you first need to complete a number of preliminary steps explained in **Preparing for the Upgrade** (p. 6).

Preparing for the Upgrade

Before you start upgrading your system to Virtuozzo 6, you need to perform a number of preliminary operations. This includes:

- 1 Installing updates for your system (p. 6).
- 2 Backing up all Containers and virtual machines on your server (p. 6).
- 3 Obtaining a Virtuozzo license (p. 7).

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Installing Updates

First of all, you need to install all updates available for your system. This includes installing the latest updates for

- the product you plan to upgrade to Virtuozzo 6 (e.g., for Virtuozzo Containers 4.7), and
- Virtuozzo Automator, if you use this application to manage your system

For detailed information on updating your software, consult the documentation for the respective product.

Note: For information on how to update Hardware Nodes in a Virtuozzo Storage cluster, see the *Virtuozzo 6 User's Guide*.

Creating Backups

Next, you need to back up all Containers and virtual machines hosted on your server. You can use standard Virtuozzo utilities (`vzbackup`, `vzabackup`, or `pbackup`) to create backups.

You are also recommended to perform a full backup of the entire server with third-party software.

Obtaining a License

Depending on the type of license you use, you may need to obtain a new license for Virtuozzo 6:

- If a permanent license is installed on your server, you need to get a new license to start using Virtuozzo. You will be asked to enter the license when upgrading your system. You can, however, skip the step of installing a new license and install it later.
- If a lease license is installed on your server, the license will be automatically upgraded to support Virtuozzo. However, you will need to additionally enable some new features, like "rebootless updates" and "Virtuozzo Storage", on the Key Administrator (KA) server if you want to use them.

Upgrading with a Spare Server

If you have a spare server, you can install Virtuozzo 6 on this server and then move Containers and virtual machines to the server. This upgrade scenario is supported for the following products:

- Server Bare Metal 5.0
- Server Bare Metal 4
- Virtuozzo Containers 4.7 for Linux
- Virtuozzo Containers 4.6 for Linux
- Virtuozzo Containers 4.0 for Linux
- OpenVZ

To upgrade to Virtuozzo 6 using a spare server, do the following:

- 1** Prepare for the upgrade using the instructions in **Preparing for the Upgrade** (p. 6).
- 2** Install Virtuozzo 6 on the spare server. For detailed information, consult the *Virtuozzo 6 Installation Guide*.
- 3** Migrate all Containers and virtual machines from the source server to the spare server. For details on migrating Containers and virtual machines, consult the *Virtuozzo 6 User's Guide*.

Note: You can convert VZFS-based Containers to the new Container-in-an-image-file (ploop) layout while you migrate them to the host running Virtuozzo 6. To do this, use the `pmigrate --convert-vzfs --online` command.

- 4** If you store the backups of Containers and virtual machines on the source server, copy them to the spare server.

Performing an In-Place Upgrade

If you do not have a spare server, you can upgrade your system to Virtuozzo 6 by performing an in-place upgrade. The following sections describe the upgrade procedure for particular products:

- For upgrading systems running Server Bare Metal 5.0 or Server Bare Metal 4, see **Upgrading Server Bare Metal** (p. 9).
- For upgrading systems running Virtuozzo Containers 4.7, Virtuozzo Containers 4.6 for Linux, or Virtuozzo Containers 4.0 for Linux, see **Upgrading Virtuozzo Containers** (p. 13).
- For upgrading systems running OpenVZ, see **Upgrading OpenVZ** (p. 17).

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Upgrading Server Bare Metal

This section describes the process of performing an in-place upgrade of a system running Server Bare Metal 5.0 or Server Bare Metal 4. You learn how to upgrade

- with an ISO image (p. 9)
- via a PXE server (p. 10)
- a system with the `/vz` partition on a network share (p. 10)

In conclusion, the section shows an example of upgrading a system to Virtuozzo 6 in the default graphical mode (p. 10).

Upgrading with an ISO Image

To upgrade to Virtuozzo 6 using an ISO image, do the following:

- 1 Download the ISO image containing the Virtuozzo installation files from the official website.
- 2 Burn the downloaded image to a DVD or create a bootable USB drive.
- 3 Install Virtuozzo from the DVD or USB drive. For detailed installation instructions, consult the *Virtuozzo 6 Installation Guide*.

Upgrading via a PXE Server

To upgrade your existing system over a network using a PXE (Preboot Execution Environment) server, complete the following steps:

- 1 Prepare for installation from a PXE server.
- 2 Create a kickstart file. This step is only required if you plan to automate the procedure of deploying Virtuozzo on your servers.
- 3 Upgrade Virtuozzo.

For detailed information on these steps, consult the *Installation via PXE Server* guide.

Upgrading with /vz on a Network Share

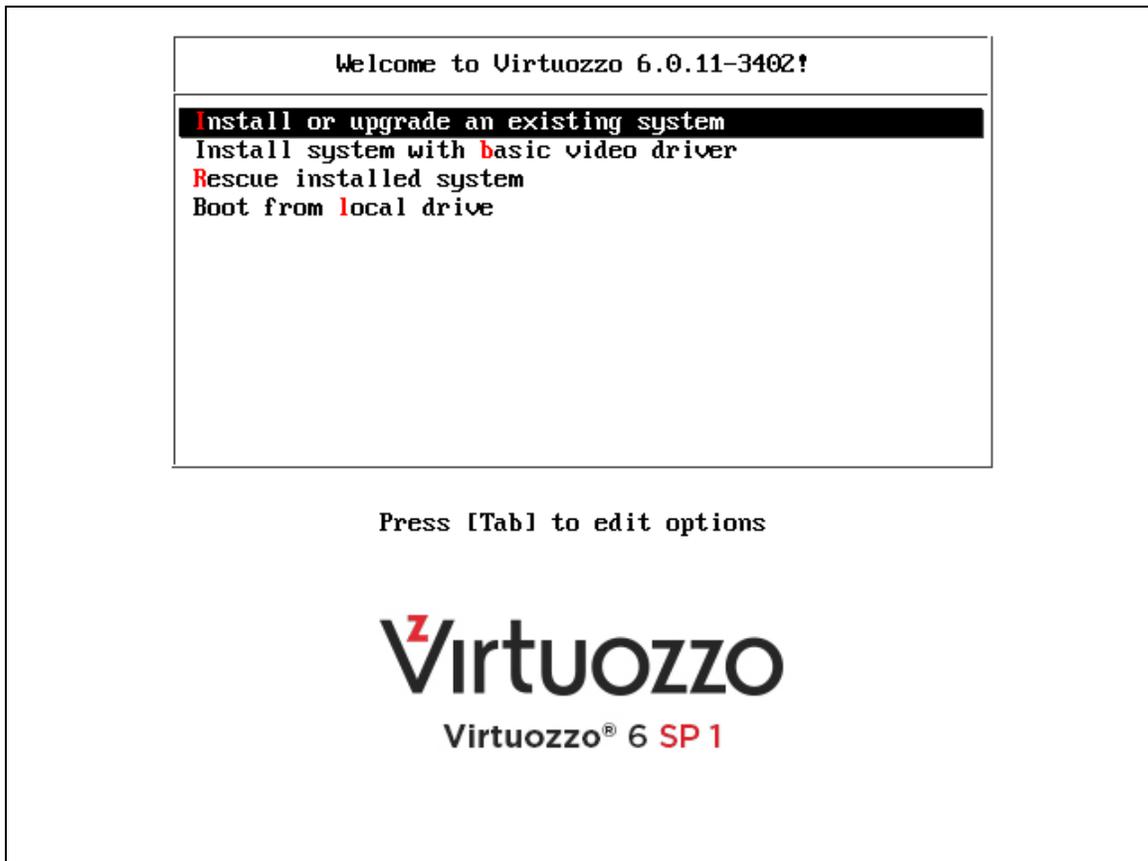
If your /vz partition is located on a network share, do the following to upgrade your system:

- 1 Open the `/etc/fstab` file on your server and write down the entry containing the information about the /vz partition.
- 2 Install Virtuozzo on the server. Use one of the ways described above (that is, an ISO image or a PXE server).
- 3 Add the entry from Step 1 to the `/etc/fstab` file.

Example: Upgrading Server Bare Metal

The following example describes the process of upgrading a system with Server Bare Metal to Virtuozzo 6 using a DVD:

- 1 Configure your server to boot from the DVD-ROM drive.
- 2 Insert the DVD with the Virtuozzo distribution into the server's DVD-ROM drive and restart the server.
- 3 After the server boots, press Enter to choose the default graphical installation mode.



- 4 Read and accept the end user license agreement. To do this, click **Next**, and in the displayed window, click **Agree**.
- 5 Review the hostname and network settings of your server, and configure them, if necessary. Click **Next**.
- 6 Make sure that the **Upgrade an Existing Installation** option is selected, and click **Next**. If you have more than one installation of Server Bare Metal on your physical server, choose the necessary installation from the drop-down menu.



- 7 Once you click **Next**, a pop-up window appears informing you of the new features in Virtuozzo 6 and the ways to start using them on your server. Click **Continue**.
- 8 On the next screen, do the following:
 - If the Virtuozzo Automator components (Agent and Management Node) are installed on the server, click **Next**. The installer will update both components once you restart the server after upgrade.
 - If one or both Virtuozzo Automator components are not installed, you can choose to install them by selecting the respective check boxes and providing the necessary information. Click **Next**.
- 9 Configure your boot loader:
 - **Update boot loader configuration** (recommended). Select this option to have the installer automatically update the boot loader to use with the upgraded system.
 - **Skip boot loader updating**. Select this option to skip the step of upgrading the boot loader. In this case, you will need to upgrade it once the installation is complete.
 - **Create new boot loader configuration**. Select this option to remove the existing boot loader configuration and install GRUB.



10 Once you click **Next**, the installer starts upgrading your system.

Upgrading Virtuozzo Containers

The following table lists the types of "Host OS" + "Virtuozzo Containers" upgrades supported in Virtuozzo 6:

Version of Virtuozzo Containers	Host OS
Virtuozzo Containers 4.7	CentOS 6 CentOS 5
Virtuozzo Containers 4.6	CentOS 5
Virtuozzo Containers 4.0	CentOS 5

To upgrade a system:

- 1 Prepare for the upgrade using the instructions in **Preparing for the Upgrade** (p. 6).
- 2 Install Virtuozzo 6. For an example, see **Example: Upgrading Virtuozzo Containers** (p. 14).

- 3 If necessary, configure Containers to use the VSwap memory parameters. To do this, apply one of the available VSwap configuration files to the Container. For example, to configure Container 101 to use the `ve-vswap.1024MB.conf-sample` configuration file, you can run the following command:

```
# prlctl set 101 --applyconfig vswap.1024MB
```

All VSwap configuration files are stored in the `/etc/vz/conf` directory on the server; so you can explore this directory to find the right configuration file for your Container. For detailed information about VSwap parameters, consult the *Virtuozzo 6 User's Guide*.

Upgrading /vz on Network Shares

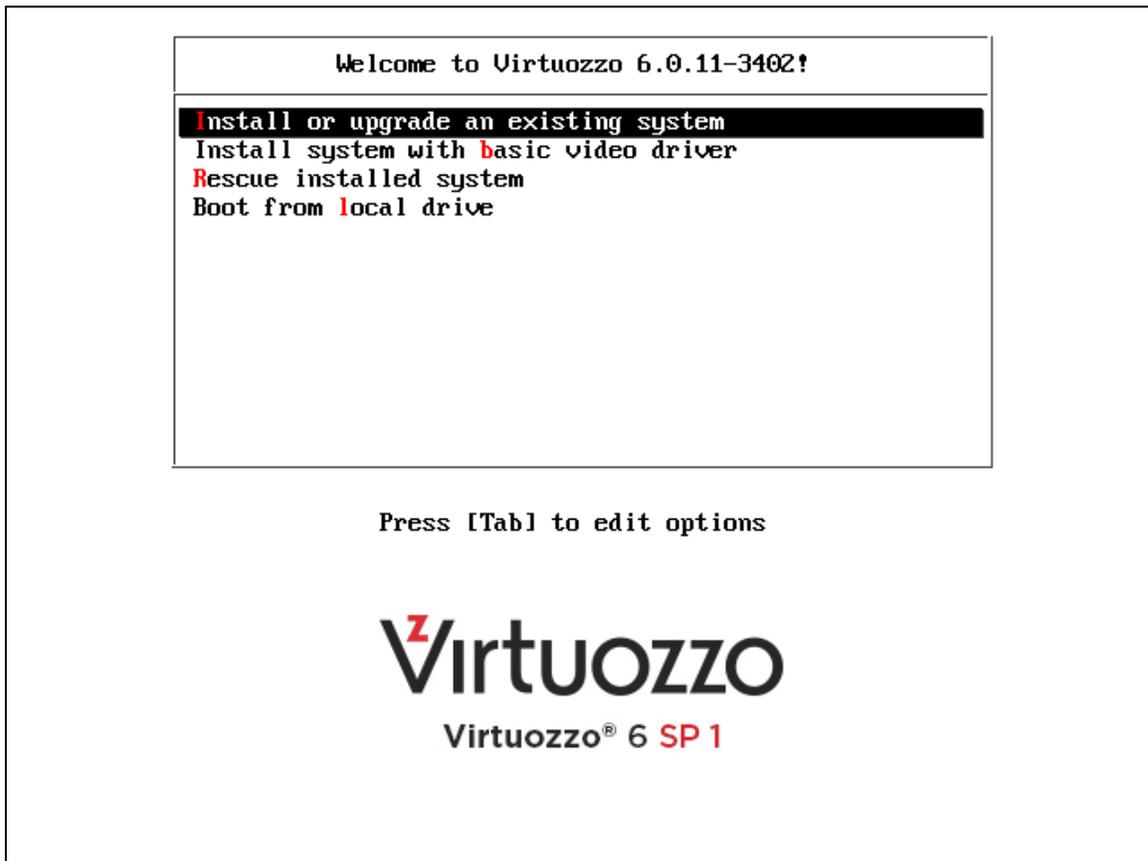
If your `/vz` partition is located on a network share, do the following to upgrade your system:

- 1 Open the `/etc/fstab` file on your server and write down the entry containing the information about the `/vz` partition.
- 2 Follow steps 1 and 2 in **Upgrading Virtuozzo Containers** (p. 13) to install Virtuozzo 6.
- 3 Add the entry from Step 1 to the `/etc/fstab` file.
- 4 Follow steps 3-4 in **Upgrading Virtuozzo Containers** (p. 13) to configure Containers after the upgrade.

Example: Upgrading Virtuozzo Containers

The following example describes the process of upgrading a system with Virtuozzo Containers for Linux 4.7 to Virtuozzo 6 using a DVD:

- 1 Configure your server to boot from the DVD-ROM drive.
- 2 Insert the DVD with the Virtuozzo distribution into the server's DVD-ROM drive and restart the server.
- 3 After the server boots, press Enter to choose the default graphical installation mode.



- 4 Read and accept the end user license agreement. To do this, click **Next**, and in the displayed window, click **Agree**.
- 5 Review the hostname and network settings of your server, and configure them, if necessary. Click **Next**.
- 6 Make sure that the **Upgrade with Reinstalling your System** option is selected, and click **Next**. If you have more than one installation of Virtuozzo Containers on your physical server, choose the necessary installation from the drop-down menu.



- 7 Once you click **Next**, a pop-up window appears informing you of the new features in Virtuozzo 6 and the ways to start using them on your server. Click **Continue**.
- 8 Specify your time zone settings, and click **Next**.
- 9 Specify a password for the root account to log in to the server.
- 10 Choose the way of partitioning your server:
 - **Reinstall existing system** (recommended). Choose this radio button to have the installer automatically re-partition your server drives for use with Virtuozzo 6. The installer will remove all existing partitions, except for the /vz partition, and create them anew.
 - **Create Custom Layout**. Choose this radio button to manually partition the drives.



11 Once you click **Next**, the installer starts upgrading your system.

Upgrading OpenVZ

Upgrade to Virtuozzo 6 is only supported for systems running CentOS 6 and the latest version of OpenVZ. A system may host both ploop-based and SimFS-based Containers.

OpenVZ Containers are not compatible with Virtuozzo 6, so during the upgrade, the installer offers you to convert them. If you agree:

- SimFS-based Containers are converted into VZFS-based ones.
- OpenVZ ploop-based Containers are converted into ploop-based ones compatible with Virtuozzo 6.

If you decide not to convert, you will need to manually upgrade OpenVZ Containers to run them under Virtuozzo 6 once the upgrade is complete. To do this, go to the `/usr/sbin` directory and execute the `ovzconvert` script. The script automatically performs all operations necessary to upgrade the Containers on your server.

Note: When you upgrade your OpenVZ system in unattended mode, the installer automatically converts OpenVZ Containers into the ones compatible with Virtuozzo 6.

To perform an in-place upgrade of an OpenVZ system, do the following:

- 1 Prepare for the upgrade using the instructions in **Preparing for the Upgrade** (p. 6).
- 2 Follow the steps in **Upgrading Virtuozzo Containers** (p. 13) to install Virtuozzo 6.

Configuring the Upgraded System

Virtuozzo 6 comes with two major new features:

- *Virtuozzo Storage*. Virtuozzo Storage transforms low-cost commodity storage hardware and network equipment into a protected enterprise-level storage, like SAN and NAS. It is optimized for storing virtual machines and Containers, providing replication, high-availability, and self-healing features for your data.

Warning: Virtuozzo Storage has redundancy built in, so you should avoid running Virtuozzo Storage on redundant types of RAID like 1, 5, or 6 over local storage. In this case, a single write operation may affect a significant number of HDDs resulting in very poor performance. For example, for 3 Virtuozzo Storage replicas and RAID5 on servers with 5 HDDs each, a single write operation may result in 15 I/O operations. For recommendations on optimal local storage configurations, consult the *Virtuozzo Storage Administrator's Guide*.

- *New Container-in-an-image-file layout*. The new Container-in-an-image-file layout is a replacement for the obsolete VZFS layout. The new layout has been redesigned to store all files in a single image, enabling easy Container migrations and backups and improving server performance.

During the upgrade, the installer does not upgrade your system to be compatible with these new features. You need to manually configure the system to start using them:

- To learn how to set up a Virtuozzo Storage cluster and move your Containers and virtual machines to it, consult the *Virtuozzo Storage User's Guide*.
- For detailed information on how to upgrade your Containers to use the new layout, see **Creating Containers with the New Layout** (p. 20).

Note: Both using Containers with the new layout and storing them in a Virtuozzo Storage cluster requires that the `/vz` partition be formatted as `ext4`. Notice that remounting the `/vz` partition formatted with another file system (e.g., `ext3`) as `ext4` is not enough, and you need to convert the partition to enable all `ext4` features once the upgrade is complete.

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Creating Containers with the New Layout

To start creating Containers with the Container-in-an-image-file layout after upgrade, you need to complete these tasks:

- Upgrade the `/vz` partition to use the `ext4` file system, if it is formatted with another file system (e.g., with `ext3`).
- Cache the OS templates you plan to base your Containers on.

Converting the `/vz` partition

To upgrade the `/vz` partition to `ext4`, complete the following tasks:

1 Stop the `vz` and `parallels-server` services:

```
# service vz stop
# service parallels-server stop
```

2 Unmount the `/vz` partition:

```
# umount /vz
```

3 Convert the file system:

```
# tune2fs -O extents,uninit_bg,dir_index /dev/DEVICE_NAME
# e2fsck -fDC0 /dev/DEVICE_NAME
```

where `DEVICE_NAME` is the name of the device the `/vz` partition is mounted on. The latter command will display a message that it has found some errors and needs to fix them. Press **Y** to agree and continue with the conversion process.

4 Change the current mount options in `/etc/fstab`:

a Mount the `/vz` partition on the device it was previously mounted on:

```
# mount /dev/DEVICE_NAME /vz
```

b Check the current entry for the `/vz` partition:

```
# grep "/vz" /etc/fstab
/dev/DEVICE_NAME /vz      ext3      defaults,noatime 1 2
```

c Edit the `/etc/fstab` file by replacing `ext3` with `ext4`.

5 Start the `vz` and `parallels-server` services:

```
# service vz start
# service parallels-server start
```

Creating a Container with the new layout

In Virtuozzo 6, an OS template is cached automatically when you create the first Container based on this template. Before creating the Container, however, you need to make sure that

- You have an active Internet connection to access the official repository storing software packages for the OS template the Container will be based on. Or
- You have configured a local repository for the OS template.

After that, you can use the `prlctl create` command to create your first Container. For example, you can execute the following command to create a new Container, assign the name of `ct101` to it, and base it on the Centos 6 OS template:

```
# prlctl create ct101 --ostemplate centos-6-x86 --vmtype ct
```

This command first creates the cache for the `centos-6-x86` OS template and then makes the `ct101` Container on the basis of the cached template.

Converting VZFS Containers to the New Layout

After upgrading your system to Virtuozzo 6, all legacy Containers continue operating on VZFS—the file system used by Containers in previous versions of Server Bare Metal and Virtuozzo Containers.

Note: You can convert VZFS-based Containers to the new Container-in-an-image-file (ploop) layout while you migrate them to the host running Virtuozzo 6. To do this, use the `vzmigrate --convert-vzfs --online` command.

To convert a Container based on VZFS to use the new Container-in-an-image-file layout:

- 1 Make sure that the `/vz` partition is formatted as `ext4`.

Containers with the Container-in-an-image-file layout can be used only on `/vz` partitions formatted as `ext4`. For more information on converting the `/vz` partition to `ext4`, see **Creating Containers with the New Layout** (p. 20).

- 2 Use the `vzctl convert` command to convert the Container. For example, to convert Container 101, you can run this command:

```
# vzctl convert 101 --velayout 5
```

If the `--velayout` option is omitted, the command converts a Container to the layout defined by the `VEFSTYPE` parameter in the global configuration file `/etc/vz/vz.conf`. For the Container-in-an-image-file layout, this parameter must be set to `ext4`.

CHAPTER 7

Verifying the Upgrade

Follow these steps to verify that your system has been successfully upgraded to Virtuozzo 6:

- 1** Check that you can log in to the host using Virtuozzo Automator.
- 2** Check that all Containers on the host can be started and stopped (using Virtuozzo Automator and command-line utilities).
- 3** Check that you can log in to Containers using Power Panel.

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