



# Virtuozzo 7 Installation Guide

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# Chapter 1. Preparing for Installation

This chapter lists the hardware, software, and network requirements for Virtuozzo 7 and explains how to prepare for installing Virtuozzo 7 from a USB flash drive.

## 1.1. Hardware Compatibility

The system requirements depend on whether you are deploying Virtuozzo 7

- as a standalone installation (see [Section 1.1.1, “Requirements for Standalone Installations”](#) on page 4) or
- as part of a Virtuozzo Storage cluster (see [Section 1.1.2, “Requirements for Servers in a Virtuozzo Storage Cluster”](#) on page 4). Virtuozzo Storage is a commercial feature and is not available in OpenVZ installations.

### 1.1.1. Requirements for Standalone Installations

The recommended hardware requirements for running Virtuozzo 7 as a standalone installation are as follows:

- x86-64 platform with hardware virtualization support: Intel VT-x (with "unrestricted guest") or AMD-V,

**Note:** To check if the Intel processor supports the "unrestricted guest" feature: 1) Download `vmxcap.py` from <https://github.com/qemu/qemu/blob/master/scripts/kvm/vmxcap>, 2) Run `python vmxcap.py | grep -i unrest`. The result must be `yes`.

- CPU: at least 4 cores, a 64-bit processor is required for running 64-bit guest operating systems,
- RAM: 4 GB or more,
- HDD: 64 GB or more,
- SSD (optional): at least 30 GB (at least 32 GB with `/boot`)
- Network: an Ethernet network adapter and a valid IP address.

The actual number of virtual machines and containers you can run on a physical server and their performance depend on resources they will consume.

### 1.1.2. Requirements for Servers in a Virtuozzo Storage Cluster

If you plan to deploy a Virtuozzo Storage cluster, make sure your servers meet the requirements below.

**Note:** This is a commercial feature. For information on how to purchase a Virtuozzo license and enable commercial features, please visit <https://virtuozzo.com/>.

### 1.1.2.1. Metadata Servers

- Software: Virtuozzo 7
- RAM: 1 GB per each 100 TB of storage
- Disk space: 10 GB or more
- Network: one or more Ethernet adapters (1 Gbps or faster), a static IP address for each Ethernet adapter

### 1.1.2.2. Chunk Servers

- Software: Virtuozzo 7
- RAM: 1 GB or more
- HDD: at least 100 GB
- Network: one or more Ethernet adapters (1 Gbps or faster)

### 1.1.2.3. Clients

- Software: Virtuozzo 7
- Network: one or more Ethernet adapters (1 Gbps or faster)

There are no special requirements to the amount of RAM and disk space that must be available on a client, except for the general recommendations for running Virtuozzo Storage.

## 1.1.3. System Limits

The table below lists the current hardware limits for Virtuozzo 7 servers:

Hardware	Theoretical	Certified
RAM	64 TB	256 GB
HDD	16 TB	16 TB

## 1.2. Network Requirements

To connect to a physical server with Virtuozzo, you need to establish a network connection between this server and the remote computer. So, you must have a valid IP address for the physical server as well as know the default gateway, network mask, and DNS configuration.

## 1.3. Preparing for Installation from USB Storage Drives

To install Virtuozzo from a USB storage drive, you will need a 2 GB or higher-capacity USB drive and the Virtuozzo 7 distribution ISO image.

Make a bootable USB drive by transferring the distribution image to it with `dd`.

**Important!** Be careful to specify the correct drive to transfer the image to.

For example, on Linux:

```
# dd if=vz-iso-7.0.0-3391.iso of=/dev/sdb
```

And on Windows (with [dd for Windows](#)):

```
C:\>dd if=vz-iso-7.0.0-3391.iso of=\\.\Device\Harddisk1\Partition0
```

# Chapter 2. Installing Virtuozzo

This chapter explains how to install Virtuozzo.

## 2.1. Starting Installation

Virtuozzo can be installed from

- DVD discs
- USB drives (see [Section 1.3, “Preparing for Installation from USB Storage Drives”](#) on page 5)
- PXE servers (see the *Installation via PXE Server* guide for information on installing Virtuozzo over the network)

**Note:** Time synchronization via NTP is enabled by default.

To start the installation, do the following:

1. Configure the server to boot from a DVD or USB drive.
2. Boot the server from the chosen media and wait for the welcome screen:

### 2.1.1. Choosing Installation Type

You can install Virtuozzo 7 in one of the following modes:

- graphics (default, recommended), see [Section 2.2, “Installing Virtuozzo in Graphics Mode”](#) on page 8,
- basic graphics (in case of issues with video card drivers), see [Section 2.3, “Installing Virtuozzo in Basic Graphics Mode”](#) on page 15,
- graphics via VNC, [Section 2.4, “Installing Virtuozzo via VNC”](#) on page 15,
- text (Virtuozzo Storage cannot be installed in this mode), [Section 2.5, “Installing Virtuozzo in Text Mode”](#) on page 15.

Your further installation steps will differ depending on the chosen mode.

### 2.1.2. Enabling Forced Detection of SSDs

Certain solid-state drives (SSDs) may not be autodetectable by the installer. This may result in issues when you create or join Virtuozzo Storage clusters. To avoid this problem, you can force the installer to identify the required drives as SSDs by doing the following:

1. Select the required installation option (e.g., **Install Virtuozzo 7**) and press **E** to start editing it.
2. Add `ssd_hack=sd<N>[ ,...]` at the end of the line starting with `linux /images/pxeboot/vmlinuz`. For example:

```
linux /images/pxeboot/vmlinuz inst.stage2=hd:LABEL=vz-iso-7.0.0-3589.iso quiet ip=dhcp s
```

3. Press **CTRL-X** to start booting the chosen installation option.

The installer should identify the specified drives as SSDs.

## 2.2. Installing Virtuozzo in Graphics Mode

To install Virtuozzo in the graphics mode, choose the **Install Virtuozzo 7** option on the welcome screen. After the installation program loads, you will see the **Installation Summary** screen. On this screen, you need to specify a number of parameters required to install Virtuozzo.

### 2.2.1. Setting Date and Time

If you need to set the date and time for your Virtuozzo installation, open the **DATE & TIME** screen and make the necessary changes.

### 2.2.2. Selecting the Keyboard Layout

The selected keyboard layout can be used during installation and, once the installation is complete, in the console (e.g., for entering localized descriptions, configuration file comments, and such).

If you need to change the default English (US) keyboard layout, open the **KEYBOARD** screen, click the plus sign to add a layout, and click **Options** to choose a key combination for switching layouts.

### 2.2.3. Configuring Network

Usually network is configured automatically by the installation program. If you need to modify network settings, you can do so on the **NETWORK & HOST NAME** screen.

To install Virtuozzo, you will need to have at least one network card configured and you will also need to provide a hostname: either a fully qualified domain name (`<hostname>.<domainname>`) or a short name (`<hostname>`).

### 2.2.4. Choosing the Storage Type

To choose the storage type, open the **SELECT STORAGE TYPE** screen:

Virtuozzo can be installed two types of storage:

- Basic storage, to install Virtuozzo 7 on local hard drive(s). This option is chosen by default and requires no configuration.



- VirtuoZZo Storage, to install VirtuoZZo 7 on a new or existing VirtuoZZo Storage cluster. If you choose this option, you will need to set additional options described in [Section 2.2.5, “Setting VirtuoZZo Storage Installation Options”](#) on page 9.

**Notes:**

1. VirtuoZZo Storage is a solution that transforms local hard drives into a highly protected enterprise-level storage (like SAN or NAS) with data replication, high-availability, and self-healing features. Using VirtuoZZo Storage, you can safely store and run virtual machines and containers, migrate them with zero downtime, provide high availability for your VirtuoZZo installations, and much more. For more information on VirtuoZZo Storage, see the *VirtuoZZo Storage Administrator’s Guide*.
2. This is a commercial feature. For information on how to purchase a VirtuoZZo license and enable commercial features, please visit <https://virtuozzo.com/>.

## 2.2.5. Setting VirtuoZZo Storage Installation Options

If you choose to install on VirtuoZZo Storage, you need to choose one of these options:

- join the server to an existing VirtuoZZo Storage cluster, see , or
- create a new VirtuoZZo Storage cluster (see [Section 2.2.5.1, “Creating a New VirtuoZZo Storage Cluster”](#) on page 9).

**Note:** For detailed information on working with VirtuoZZo Storage clusters, consult the *VirtuoZZo Storage Administrator’s Guide*.

### 2.2.5.1. Creating a New VirtuoZZo Storage Cluster

If you choose to create a new VirtuoZZo Storage cluster, you will need to provide the cluster name and password and select one or more roles for your server.

First, in the **Name** field, specify a name for the cluster that will uniquely identify it among other clusters in your network. A cluster name must consist of the characters a-z, A-Z, 0-9, minus (-), underscore (\_), and must not be longer than 63 characters long.

Next, click **Configure security** next to the **Name** field and specify a password for your cluster. The password must be at least 8 characters long. It is encrypted and saved to the file `/etc/vstorage/clusters/<cluster_name>/auth_digest.key` on the server.

**Note:** A server needs to be authenticated only once. After that, you can configure it as a metadata server, chunk server, or a client. If later you decide to configure the server where you are setting the first MDS as a chunk server, no additional authentication will be required.

Next, choose the cluster role(s) for your server. Each server can have one, some, or all of the following roles.

- **Metadata Server Role.** MDS servers are an essential part of any Virtuoizzo Storage cluster. They store metadata about chunk servers and control how files keeping the contents of virtual machines and containers are split into chunks and where these chunks are located.

When you create a new Virtuoizzo Storage cluster, the **Metadata Server Role** option is selected by default. As a static IP address is required for an MDS server, the IP address detected by the installation program is specified in the corresponding field by default. If multiple IP addresses are available, you need to choose one to assign to the MDS server. In some cases, you may need to enter a valid IP address manually.

**Note:** MDS servers require static IP addresses. If you are using DHCP, map an IP address to the MAC address of the MDS server.

- **Chunk Server Role.** Chunk servers (CS) store the contents of virtual machines and containers in the form of fixed-size chunks and provide access to these chunks. All data chunks are replicated and the replicas are kept on different chunk servers for high data availability. If one of the chunk servers goes down, other chunk servers continue providing the replicas of data chunks that were stored on the failed server.

**Warning:** Virtuoizzo Storage has redundancy built in, so you should avoid running Virtuoizzo 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 Virtuoizzo 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 *Virtuoizzo Storage Administrator's Guide*.

By default, the installer does the following:

- If your server has several disk drives, the installer will automatically configure each disk drive except system to act as a separate chunk server.
- If one or more SSD drives are available on the server, they will be set up to store chunk server write journals (one journal per chunk server). By using SSD drives for write journaling, you can boost the performance of write operations in the cluster by up to two or more times. For more information on using SSD drives, consult the *Virtuoizzo Storage Administrator's Guide*. If you need to disable this setting, click **Configure** under the chunk server role checkbox and clear the checkbox **Enable the use of SSD drives for the CS journal**.

**Note:** If one or more SSDs are not detected automatically, find out their device names (for example, invoke the console by pressing **Ctrl+Alt+F2** and run `lsblk -d -o name,rota`, zeroes in the **ROTA** column will indicate non-rotational drives, i.e. SSDs), reboot to the installer welcome screen, and follow instructions in [Section 2.1.2, “Enabling Forced Detection of SSDs”](#) on page 7.

- **Client Server Role.** Clients are computers with Virtuoazzo 7 from where you run virtual machines and containers stored in your Virtuoazzo Storage cluster.

By default, the installer does the following:

- Enables high availability support for the client and for all virtual machines and containers you will create on it. With high availability enabled, if the client fails, all virtual machines and containers hosted on it will be automatically moved to a healthy server. For detailed information on high availability, consult the *Virtuoazzo 7 User's Guide*.
- If one or more SSD drives are available on the server, configures them to store a local cache of frequently accessed data. By having a local cache on an SSD drive, you can increase the overall cluster performance by up to 10 and more times. For more information on using SSD drives, consult the *Virtuoazzo Storage Administrator's Guide*.

**Note:** If one or more SSDs are not detected automatically, find out their drive letters (for example, invoke the console by pressing **Ctrl+Alt+F2** and run `lsblk -d -o name,rota`, zeroes in the **ROTA** column will indicate non-rotational drives, i.e. SSDs), reboot to the installer welcome screen, and follow instructions in [Section 2.1.2, “Enabling Forced Detection of SSDs”](#) on page 7.

To change either of these settings, click **Configure** under the client role checkbox and set the corresponding checkboxes in the client settings window.

### 2.2.5.2. Joining an Existing Virtuoazzo Storage Cluster

If you choose to join an existing Virtuoazzo Storage cluster, you will need to provide the cluster name and password and select one or more roles for your server.

First, in the **Name** field, specify a name of the cluster to join.

Next, click **Configure security** next to the **Name** field and specify a password for your cluster.

Next, choose the cluster role(s) for your server. Each server can have one, some, or all of the following roles.

- **Metadata Server Role.** MDS servers are an essential part of any Virtuoazzo Storage cluster. They store metadata about chunk servers and control how files keeping the contents of virtual machines and containers are split into chunks and where these chunks are located.

As a static IP address is required for an MDS server, the IP address detected by the installation program is specified in the corresponding field by default. If multiple IP addresses are available, you need to choose one to assign to the MDS server. In some cases, you may need to enter a valid IP address manually.

**Note:** MDS servers require static IP addresses. If you are using DHCP, map an IP address to the MAC address of the MDS server.

- **Chunk Server Role.** Chunk servers (CS) store the contents of virtual machines and containers in the form of fixed-size chunks and provide access to these chunks. All data chunks are replicated and the replicas are kept on different chunk servers for high data availability. If one of the chunk servers goes down, other chunk servers continue providing the replicas of data chunks that were stored on the failed server.

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By default, the installer does the following:

- If your server has several disk drives, the installer will automatically configure each disk drive except system to act as a separate chunk server.
- If one or more SSD drives are available on the server, they will be set up to store chunk server write journals (one journal per chunk server). By using SSD drives for write journaling, you can boost the performance of write operations in the cluster by up to two or more times. For more information on using SSD drives, consult the *Virtuoizzo Storage Administrator's Guide*. If you need to disable this setting, click **Configure** under the chunk server role checkbox and clear the checkbox **Enable the use of SSD drives for the CS journal**.

**Note:** If one or more SSDs are not detected automatically, find out their device names (for example, invoke the console by pressing **Ctrl+Alt+F2** and run `lsblk -d -o name,rota`, zeroes in the **ROTA** column will indicate non-rotational drives, i.e. SSDs), reboot to the installer welcome screen, and follow instructions in [Section 2.1.2, “Enabling Forced Detection of SSDs”](#) on page 7.

- **Client Server Role.** Clients are computers with Virtuoizzo 7 from where you run virtual machines and containers stored in your Virtuoizzo Storage cluster.

By default, the installer does the following:

- Enables high availability support for the client and for all virtual machines and containers you will create on it. With high availability enabled, if the client fails, all virtual machines and containers hosted on it will be automatically moved to a healthy server. For detailed information on high availability, consult the *Virtuozzo 7 User's Guide*.
- If one or more SSD drives are available on the server, configures them to store a local cache of frequently accessed data. By having a local cache on an SSD drive, you can increase the overall cluster performance by up to 10 and more times. For more information on using SSD drives, consult the *Virtuozzo Storage Administrator's Guide*.

**Note:** If one or more SSDs are not detected automatically, find out their drive letters (for example, invoke the console by pressing **Ctrl+Alt+F2** and run `lsblk -d -o name,rota`, zeroes in the **ROTA** column will indicate non-rotational drives, i.e. SSDs), reboot to the installer welcome screen, and follow instructions in [Section 2.1.2, “Enabling Forced Detection of SSDs”](#) on page 7.

To change either of these settings, click **Configure** under the client role checkbox and set the corresponding checkboxes in the client settings window.

## 2.2.6. Partitioning the Hard Drives

Having chosen the storage type, you need to choose partitioning options on the **INSTALLATION DESTINATION** screen.

Firstly, you will need to choose which of the disks are marked as **System**, **Datastore**, and **Cache**:

- Use the **System** radio button to select a disk where the root partition with Virtuozzo system files (mounted to `/`) will be kept.
- Use **Datastore** checkboxes to mark disks where virtual machines and containers will be kept. All such disks will be organized into a single volume group and mounted to the `/vz` mount point. At least one disk need to be marked as a data store. If Virtuozzo Storage chunk server role is selected, a chunk server will be created on each disk marked as a data store (in this case, the system disk cannot be marked as a data store).
- Use **Cache** checkboxes to mark SSD drives where journals and cache will be kept. This option is only applicable for SSD drives to be used in Virtuozzo Storage clusters.

Secondly, in the bottom of the screen, you will need to choose:

- **Automatically configure partitioning** and click **Done** to have the installation program create the default layout on the server.
- **I will configure partitioning** and click **Done** to manually partition your disk(s).

When partitioning the disks, keep in mind that Virtuozzo requires these partitions:

- Boot: mount point `/boot`, 1 GB, boot partition with Virtuozzo boot files, created on each HDD,
- Root: mount point `/`, 12-24 GB, root partition with Virtuozzo files, created on the HDD marked **System**,
- Swap: paging partition with the `swap` file system, created on the HDD marked **System**. The size depends on RAM:
  - if RAM is below 2 GB, swap size should be twice the RAM,
  - if RAM is 2-8 GB, swap size should be equal to RAM,
  - if RAM is 8-64 GB, swap size should be half the RAM,
  - otherwise swap size should be 32 GB
- Data storage, depends on the chosen storage type:
  - Local: mount point `/vz`, at least 30 GB, storage for virtual machines, containers, and OS and application templates, an LVM volume group that spans all HDDs marked **Datastore**.
  - Virtuozzo Storage chunk server: mount point `<cluster_name>-cs<N>`, at least 100 GB, only required if the chunk server role is chosen.
- In addition, either a 1 MB partition with the BIOS boot file system or a 200 MB partition with the EFI boot file system is required depending on your server configuration.

A typical partition layout for Virtuozzo on basic storage may look like this:

A typical partition layout for Virtuozzo on Virtuozzo Storage may look like this:

## 2.2.7. Finishing Installation

Having configured everything necessary on the **INSTALLATION SUMMARY** screen, click **Begin Installation**.

While Virtuozzo is installing, create a password for the root account. Installation will not finish until the password is created.

Once the installation is complete, click **Reboot** to restart the server and boot into Virtuozzo.

**Note:** If you are installing Virtuozzo from a USB drive, remove said drive before restarting the server.

After you restart your Virtuoazzo server, you will see the login prompt as well as the server IP address and hostname that you can use to connect to the server remotely.

To manage virtual machines and containers on the Virtuoazzo server, you will need to log in as the root user. After you do so, you will see a shell prompt and can start creating and managing your virtual machines and containers. For quick-start instructions, run `man afterboot`. More detailed information is provided in the *Virtuoazzo User's Guide*.

## 2.3. Installing Virtuoazzo in Basic Graphics Mode

If the installer cannot load the correct driver for your video card, you can try to install Virtuoazzo in the basic graphics mode. To select this mode, on the welcome screen, choose **Troubleshooting-**→, then **Install Virtuoazzo 7 in basic graphics mode**. The installation process itself is the same as that in the default graphics mode (see [Section 2.2, “Installing Virtuoazzo in Graphics Mode”](#) on page 8).

## 2.4. Installing Virtuoazzo via VNC

To install Virtuoazzo via VNC, boot to the welcome screen and do the following

1. Select the required installation option (e.g., **Install Virtuoazzo 7**) and press **E** to start editing it.
2. Add `text` at the end of the line starting with `linux /images/pxeboot/vmlinuz`. For example:

```
linux /images/pxeboot/vmlinuz inst.stage2=hd:LABEL=vz-iso-7.0.0-3589.iso quiet ip=dhcp t
```

3. Press **CTRL-X** to start booting the chosen installation option.
4. When presented with a choice of starting VNC or proceeding to the text mode, choose **1** for VNC.
5. When offered, enter a VNC password.
6. In the output that follows look up the hostname or IP address and VNC port to connect to, e.g.,  
192.168.0.10:1.
7. Connect to said address in a VNC client. You will see the usual **Installation Summary** screen.

The installation process itself is the same as that in the default graphics mode (see [Section 2.2, “Installing Virtuoazzo in Graphics Mode”](#) on page 8).

## 2.5. Installing Virtuoazzo in Text Mode

To install Virtuoazzo in the text mode, boot to the welcome screen and do the following

1. Select the main installation option **Install Virtuoazzo 7** and press **E** to start editing it.
2. Add `text` at the end of the line starting with `linux /images/pxeboot/vmlinuz`. For example:

```
linux /images/pxeboot/vmlinuz inst.stage2=hd:LABEL=vz-iso-7.0.0-3589.iso quiet ip=dhcp t
```



3. Press **CTRL-X** to start booting the chosen installation option.
4. When presented with a choice of starting VNC or proceeding to the text mode, choose **2** for text mode.
5. In the installation menu that is shown, at least set or confirm the following: installation source (press **3**), installation destination (press **5**), root password (press **8**). Also set other options if necessary.
6. Press **b** to begin installation.
7. When installation ends, press **Enter** to reboot.

## 2.6. Configuring Server Ports for Virtuozzo

This section lists the ports that need to be opened for your server to operate properly. The set of ports differs depending on your system configuration:

- If the server does not participate in a Virtuozzo Storage cluster, see [Section 2.6.1, “Configuring Ports on Standalone Servers”](#) on page 16 for information on ports used by Virtuozzo.
- If the server is part of a Virtuozzo Storage cluster, see [Section 2.6.2, “Configuring Ports on Servers in Virtuozzo Storage Clusters”](#) on page 17 for information on ports used by the cluster.

### 2.6.1. Configuring Ports on Standalone Servers

The table below lists the ports for servers that do not participate in Virtuozzo Storage clusters. **I** in the **Description** column signals that the port should be opened for incoming traffic and **O**, for outgoing traffic.

Port	Description
22	(IO) Used for secure logins via SSH.
80	(IO) Used for HTTP connections, e.g., to download Virtuozzo updates and EZ templates from remote repositories.
21	(O) Used to connect to the Debian repository to cache Debian EZ templates.
443	(O) Used to send problem reports to the support team.
5224	(O) Used to connect to the Key Administrator server to update Virtuozzo lease licenses.
64000	(IO) Used for remote connections to the dispatcher via Odin Automation for Cloud Infrastructure.
1621, 1622	(O) Used to migrate containers to virtual machines on servers that run Virtuozzo hypervisor-based solutions.
67	Used to support host-only adapters in virtual machines. Virtuozzo does not use port 67 for any external connections.
<RPC ports>	Used by various RPC services (e.g., to support NFS shares). Port numbers may differ from system to system. To learn what RPC services are registered on your server and what ports they are using, run this command:  <pre># rpcinfo -p localhost</pre>



Port	Description
647, 847	Reserved by the Linux <code>portreserve</code> program for the DHCP server, if you use one.

You may also need to additionally open ports used to connect to remote yum repositories. Though most of the repositories can be accessed via HTTP, some may require access via HTTPS or FTP. To check what repositories are currently configured for your system and what protocols are used to connect to them, run the following commands and examine their output:

```
# yum repolist -v | egrep -e 'baseurl|mirrors'
# curl http://repo.cloudlinux.com/psbm/mirrorlists/psbm6-os.mirrorlist
```

## 2.6.2. Configuring Ports on Servers in VirtuoZZo Storage Clusters

A VirtuoZZo Storage cluster requires the following ports to be open:

Port	Description
<b>MDS Servers</b>	
2510	(IO) Used for communication between MDS servers.
2511	(IO) Used for communication with chunks servers and clients.
<b>Chunk Servers</b>	
2511	(O) Used for communication with MDS servers.
<code>&lt;random_port&gt;</code>	(I) Used for communication with clients. The chunk server management service automatically binds to any available port. You can also manually assign the service to a specific port.
<b>Clients</b>	
2511	(O) Used for communication with MDS servers.
<code>&lt;random_port&gt;</code>	(O) Used for communication with chunk servers. The client management service automatically binds to any available port. You can also manually assign the service to a specific port.

# Chapter 3. Exploring Additional Installation Options

This chapter describes how to

- boot into rescue mode
- run Virtuozzo in virtual machines

## 3.1. Booting into Rescue Mode

If you experience problems with your system, you can boot into the rescue mode to troubleshoot these problems. Once you are in the rescue mode, your Virtuozzo installation is mounted under `/mnt/sysimage`. You can go to this directory and make the necessary changes to your system.

To enter the rescue mode, do the following:

1. Boot your system from a Virtuozzo DVD or USB drive.
2. On the welcome screen, click **Troubleshooting** →, then **Rescue system**.
3. Once Virtuozzo boots into the emergency mode, press **Ctrl+D** to load the rescue environment.
4. In the rescue environment, you can choose one of the following options:
  - Continue (press **1**): mount the Virtuozzo installation in read and write mode under `/mnt/sysimage`.
  - Read-only mount (press **2**): mount the Virtuozzo installation in read-only mode under `/mnt/sysimage`.
  - Skip to shell (press **3**): load shell, if your file system cannot be mounted; for example, when it is corrupted.
  - Quit (Reboot) (press **4**): reboot the server.
5. Unless you press **4**, a shell prompt will appear. In it, run `chroot /mnt/sysimage` to make the Virtuozzo installation the root environment. Now you can run commands and try to fix the problems you are experiencing.
6. After you fix the problem, run `exit` to exit the chroot environment, then `reboot` to restart the system.

## 3.2. Running Virtuozzo in Virtual Machines

Installing Virtuozzo in virtual machines may prove useful if you want to evaluate Virtuozzo.

To run virtual machines with Virtuozzo, the physical server's processor(s) must support either of these architectures: Intel VT-x (with "unrestricted guest") and EPT, or AMD-V and RVI. The following hypervisors are supported: Parallels Desktop for Mac, VMware Fusion, VMware Workstation, and VMware ESXi. Make sure that nested virtualization support is enabled in your hypervisor.

The following virtual hardware is recommended for virtual machines with Virtuozzo:

- vCPU: 2 or more
- RAM: 2 GB or more
- HDD: 64 GB or more

To install Virtuozzo in a VM, copy the distribution ISO image to a local drive and create a new VM from it according to your virtualization software documentation. Start the VM, boot to the Virtuozzo installer, and follow the instructions in [Section 2.2, “Installing Virtuozzo in Graphics Mode”](#) on page 8.

### 3.2.1. Restrictions and Peculiarities

When using Virtuozzo in a virtualized environment, keep in mind the following restrictions and specifics:

- Running Virtuozzo in a virtual machine is intended for evaluation purposes only, and not for production.
- If you change the configuration of a virtual machine where Virtuozzo is installed, you may need to reactivate Virtuozzo.
- When you start a virtual machine with Virtuozzo, VMware Fusion may warn you that it requires full access to the network traffic. Ignore this message, and proceed with booting the virtual machine.
- To run in a virtualized Virtuozzo environment, a virtual machine must have Virtuozzo guest tools installed.
- To enable full support for virtual machines created inside Virtuozzo, make sure to enable nested virtualization support for the Virtuozzo VM in your virtualization software. Otherwise virtual machines created in Virtuozzo will only support 32-bit operating systems and a single CPU.