

^zVirtuozzo

Virtuozzo 7

Upgrade Guide

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CHAPTER 1

Introduction

This guide describes how to upgrade

- Virtuozzo 6 to Virtuozzo 7 in both local storage and Virtuozzo Storage scenarios,
- OpenVZ 7 to Virtuozzo 7.

When upgrading Virtuozzo 6, you can

1. upgrade Virtuozzo 6 servers by using temporary spare Virtuozzo 6 servers,
2. migrate VMs and containers from Virtuozzo 6 servers to new Virtuozzo 7 servers,
3. upgrade Virtuozzo 6 servers in-place if certain requirements are met.

The exact steps to perform differ depending on scenario and are described further in the guide.

Note:

1. This guide refers to other Virtuozzo documentation that you will need to complete the upgrade: *Virtuozzo 6 User's Guide*, *Virtuozzo 6 Upgrade Guide*, *Virtuozzo 7 Installation Guide*.
2. You can upgrade to Virtuozzo 7 from Virtuozzo 6 and OpenVZ 7 only. If your servers run older virtualization products, you will first need to upgrade them to Virtuozzo 6 or OpenVZ 7, respectively. For instructions, see the *Virtuozzo 6 Upgrade Guide* or OpenVZ documentation.

CHAPTER 2

Upgrading to Virtuozzo 7 with CLI Management

This chapter describes how to upgrade the following:

- Virtuozzo 6 servers with local storage to Virtuozzo 7 with local storage,
- Virtuozzo Storage clusters based on Virtuozzo 6 to Virtuozzo Storage clusters with CLI management based on Virtuozzo 7.

2.1 Upgrading Virtuozzo 6 with Local Storage

This section describes how to upgrade your Virtuozzo 6 servers with local storage to Virtuozzo 7. You can do this by using spare servers or in-place or migrate VMs and containers to new Virtuozzo 7 servers. Apply either method to each server in your Virtuozzo 6 infrastructure.

Note: You will need to install a new Virtuozzo 7 license on each upgraded node.

2.1.1 Upgrading with Spare Virtuozzo 6 Servers

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

1. Update both the Virtuozzo 6 server to be upgraded and the spare server to the latest version. You can do this by running `yum update` on each server.

2.1. Upgrading Virtuozzo 6 with Local Storage

Note: The oldest Virtuozzo 6 build eligible for upgrade is 6.0.11-3466.

2. Back up all VMs and containers on the Virtuozzo 6 server to be upgraded. You can do this with the `pbackup` tool as described in the *Virtuozzo 6 User's Guide* and use both Virtuozzo 6 and 7 hosts as backup servers.
3. Temporarily migrate VMs and containers from the Virtuozzo 6 server to be upgraded to the spare Virtuozzo 6 server. You can do this with the `pmigrate` tool as described in the *Virtuozzo 6 User's Guide*.
4. Perform a fresh install of Virtuozzo 7 on the Virtuozzo 6 server to be upgraded. For instructions, see the *Virtuozzo 7 Installation Guide*.
5. Migrate VMs and containers back to the upgraded server from the spare server. For more details, see *Migrating VMs and Containers from Virtuozzo 6 to Virtuozzo 7* on page 16.
6. If you store VM and container backups on a Virtuozzo 6 server, move them to a Virtuozzo 7 server as described in *Restoring Virtuozzo 6 Backups to Virtuozzo 7 Servers* on page 20.

2.1.2 Upgrading by Migrating to New Servers

To upgrade by migrating to a new Virtuozzo 7 server, do the following:

1. Update the selected Virtuozzo 6 server (from which you will migrate VMs and containers) to the latest version. You can do this by running `yum update`.

Note: The oldest Virtuozzo 6 build eligible for upgrade is 6.0.11-3466.

2. Back up all VMs and containers on the selected Virtuozzo 6 server. You can do this with the `pbackup` tool and use both Virtuozzo 6 and 7 hosts as backup servers.
3. Perform a fresh install of Virtuozzo 7 on a different (new) server. For instructions, see the *Virtuozzo 7 Installation Guide*.
4. Migrate VMs and containers to it from the selected Virtuozzo 6 server. For more details, see *Migrating VMs and Containers from Virtuozzo 6 to Virtuozzo 7* on page 16.
5. If you store VM and container backups on a Virtuozzo 6 server, move them to a Virtuozzo 7 server as described in *Restoring Virtuozzo 6 Backups to Virtuozzo 7 Servers* on page 20.

2.1.3 Upgrading In-Place with Local Storage

Warning: Make sure to backup the data on the hardware node before upgrading. If the upgrade fails, you may have to install Virtuozzo on said hardware node from scratch.

Hardware nodes that host only containers and no virtual machines can be upgraded to Virtuozzo 7 in-place. To be eligible for in-place upgrade, the hardware node must meet the following requirements:

1. Updated to the latest version of Virtuozzo 6.

Note: The oldest Virtuozzo 6 build eligible for upgrade is 6.0.11-3466.

2. No virtual machines.
3. No containers that use VZFS.
4. No templates for guest operating systems unsupported by Virtuozzo 7.

For the upgrade, you will need the following:

1. Contents of the Virtuozzo 7 distribution, either on a disc mounted to a local directory or available over network via HTTP.
2. A Virtuozzo 7 license (optional). The existing Virtuozzo 6 license is not transferred during the upgrade. You can install a new Virtuozzo 7 license during the upgrade or skip this step and install one manually after the upgrade with the `vzlicload` tool.

Note:

1. If any containers on the Virtuozzo 6 node are set to be started automatically on reboot, they will do the same once you boot to Virtuozzo 7 after the upgrade.
2. In the end of the upgrade, `yum update` is launched by default to update to the latest Virtuozzo 7 version from the configured repositories. You can skip this step if required.
3. Upgrade logs can be found in the `/var/log/vzupgrade.log` and `/var/log/redhat*log` files.

To perform an in-place upgrade of a Virtuozzo 6 node to Virtuozzo 7, do the following:

1. Install the `vzupgrade` package:

2.1. Upgrading Virtuozzo 6 with Local Storage

```
# yum install vzupgrade
```

2. Check for conditions blocking the upgrade (listed earlier):

```
# vzupgrade check --blocker
```

Note: The list of upgrade blockers is also displayed by `vzupgrade list`.

3. If no blockers exist, run the `vzupgrade install` command. For example:

```
# vzupgrade install --network <ISO_URL> --boot /dev/sda --reboot\  
--license <license_key> --add-repo vz7=http://repo.virtuozzo.com/vz/releases/7.0/x86_64/os/  
vzlinux7=http://repo.virtuozzo.com/vzlinux/7/x86_64/os/
```

Note: For details on each option, see *Virtuozzo Upgrade Tool Reference* on page 5.

The installer will run a pre-upgrade check and generate upgrade scripts (if required, you can perform this step manually before upgrading with `vzupgrade check`).

4. Having collected the required information, the installer will display a list of things to be aware of. Read the list, and, if you agree to proceed, press **Y** and **Enter**.
5. If `--reboot` is omitted, reboot the hardware node when asked by the installer. Make sure to boot from the hard drive and choose the system upgrade option in the upgrade bootloader. From this moment, the actual upgrade will start and no further interaction on your part will be required.

Note: Packages downloaded during update will be stored in `/var/lib/upgrade_pkgs`.

When the upgrade completes, the node will automatically reboot to Virtuozzo 7.

2.1.3.1 Virtuozzo Upgrade Tool Reference

```
vzupgrade install {--device <mount_point> | --network <ISO_URL>}  
--license <key> | --skip-license-upgrade}  
--add-repo <name>=<repository_URL> [--boot <bootloader_destination>]  
[--reboot] [--skip-post-update] [--clean-cache] [-h,--help]
```

Option	Description
<code>--device <mount_point></code>	Mutually excludes <code>--network</code> . The mount point of the device with Virtuozzo 7 distribution contents (e.g., a USB flash drive).

Option	Description
<code>--network <ISO_URL></code>	Mutually excludes <code>--device</code> . The path to the Virtuozzo 7 installation ISO image (full or netinstall).
<code>--license <key></code>	Specifies the Virtuozzo 7 license key.
<code>--skip-license-upgrade</code>	Skips license installation during upgrade. You can install a Virtuozzo 7 license after the upgrade with the <code>vzlicload</code> tool.
<code>--add-repo <name>=<repository_URL></code>	Specifies remote Virtuozzo 7 and Virtuozzo Linux 7 repositories (space-separated). <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>Note: Starting from Virtuozzo 7.0.5 (Update 5), this option is mandatory.</p> </div>
<code>--boot <bootloader_destination></code>	Specifies destination to install Virtuozzo 7 bootloader to. If omitted, the Virtuozzo 7 bootloader will not be installed and the existing Virtuozzo 6 bootloader will be modified to boot Virtuozzo 7. <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>Note: Third-party bootloaders need to be updated manually if the Virtuozzo 7 bootloader is not installed.</p> </div>
<code>--reboot</code>	Automatically reboots the node to the upgrade bootloader.
<code>--skip-post-update</code>	Skips the launch of <code>yum update</code> in the end of the upgrade.
<code>--clean-cache</code>	Cleans up packages from <code>/var/lib/upgrade_pkgs</code> on start so they are downloaded anew during installation. If this option is omitted (default), packages already stored in <code>/var/lib/upgrade_pkgs</code> are checked against those in the repository, updated if necessary, and used.
<code>-h, --help</code>	Shows usage information.

2.2 Upgrading Virtuozzo 6 with Virtuozzo Storage

This section describes how to upgrade your Virtuozzo Storage cluster based on Virtuozzo 6 to a Virtuozzo Storage cluster with CLI management based on Virtuozzo 7. You can do this by using spare Virtuozzo 6

2.2. Upgrading Virtuozzo 6 with Virtuozzo Storage

servers or in-place or migrate VMs and containers to a new Virtuozzo Storage cluster.

2.2.1 Upgrading with Spare Virtuozzo 6 Servers

1. Update all servers in the cluster based on Virtuozzo 6 to the latest version. You can do this by running `yum update` on each server.

Note: The oldest Virtuozzo 6 build eligible for upgrade is 6.0.11-3466.

2. Choose a server to upgrade in the cluster and migrate VMs and containers from it to other Virtuozzo 6 servers in the cluster.
3. Remove chunk servers from the server:
 - 3.1. Find out which chunk servers are stored on the server by running `pstorage -c <cluster_name> top` on any cluster server.
 - 3.2. Initiate removal of chunk servers from the server by running `pstorage -c <cluster_name> rm-cs --wait <CS_ID>` for each chunk server on the server.
4. Wait until the required chunk servers are removed and Virtuozzo Storage rebuilds. To monitor this process, run `pstorage -c <cluster_name> top` on any cluster server. The status of the chunk servers being removed will become `releasing` and the number of replicas on them will start dwindling. When the number of replicas on a CS reaches zero, the CS will be removed both from the server and the `pstorage top` output. Make sure that no chunk servers are left on the server to be upgraded.
5. Perform a fresh install of Virtuozzo 7 on the server. During installation, choose to create a new Virtuozzo Storage cluster. For instructions, see the *Virtuozzo 7 Installation Guide*.
6. Choose another Virtuozzo 6 server in the old cluster and migrate VMs and containers from it to the new Virtuozzo Storage cluster based on Virtuozzo 7. For details, see *Migrating VMs and Containers from Virtuozzo 6 to Virtuozzo 7* on page 16.
7. If you have iSCSI targets on your Virtuozzo Storage cluster based on Virtuozzo 6, move them to the new Virtuozzo Storage cluster based on Virtuozzo 7. For details, see *Moving iSCSI Targets between Virtuozzo Storage Clusters* on page 18.
8. Perform a fresh install of Virtuozzo 7 on the second server. During installation, choose to join the new Virtuozzo Storage cluster based on Virtuozzo 7. For instructions, see the *Virtuozzo 7 Installation Guide*.

- Repeat steps 6-8 for the remaining servers in the old cluster until all Virtuozzo 6 servers are upgraded to Virtuozzo 7.
- If you store VM and container backups on a Virtuozzo 6 server, move them to a Virtuozzo 7 server as described in *Restoring Virtuozzo 6 Backups to Virtuozzo 7 Servers* on page 20.

2.2.2 Upgrading by Migrating to a New Virtuozzo Storage Cluster

To upgrade by migrating VMs and containers from an old Virtuozzo Storage cluster based on Virtuozzo 6 to a new Virtuozzo Storage cluster based on Virtuozzo 7, do the following:

- Update all servers in the cluster based on Virtuozzo 6 to the latest version. You can do this by running `yum update` on each server.

Note: The oldest Virtuozzo 6 build eligible for upgrade is 6.0.11-3466.

- On a different set of servers, create a new Virtuozzo Storage cluster based on Virtuozzo 7. For instructions, see the *Virtuozzo 7 Installation Guide*.
- Migrate VMs and containers from the old cluster to the new cluster. For more details, see *Migrating VMs and Containers from Virtuozzo 6 to Virtuozzo 7* on page 16.
- If you have iSCSI targets on your Virtuozzo Storage cluster based on Virtuozzo 6, move them to the new Virtuozzo Storage cluster based on Virtuozzo 7. For details, see *Moving iSCSI Targets between Virtuozzo Storage Clusters* on page 18.
- If you store VM and container backups on a Virtuozzo 6 server, move them to a Virtuozzo 7 server as described in *Restoring Virtuozzo 6 Backups to Virtuozzo 7 Servers* on page 20.

2.2.3 Upgrading In-Place with Virtuozzo Storage

Virtuozzo 6 hardware nodes in a Virtuozzo Storage cluster can be upgraded in-place to Virtuozzo 7 as follows:

- Update all servers in the cluster to the latest version of Virtuozzo 6. You can check versions on all cluster nodes with `pstorage -c <cluster_name> stat`.

Note: The oldest Virtuozzo 6 build eligible for upgrade is 6.0.11-3466.

- Add at least two spare Virtuozzo 7 servers to the cluster to ensure high availability of virtual

2.2. Upgrading Virtuozzo 6 with Virtuozzo Storage

environments that will be hosted on the upgraded Virtuozzo 7 servers. To do this, perform a fresh install of Virtuozzo 7 on two or more servers. During installation, choose to join your Virtuozzo Storage cluster and tick the checkbox for the **Client Server Role** that will automatically enable HA for virtual machines and containers registered on the server (for more details, see the [Virtuozzo 7 Installation Guide](#)).

3. If you have iSCSI targets registered on the Virtuozzo 6 server, stop and unregister them from the server before the upgrade. For example, for the target `iqn.2014-04.com.pstorage:test1` run:

```
# pstorage-iscsi stop -t iqn.2014-04.com.pstorage:test1
# pstorage-iscsi unregister -t iqn.2014-04.com.pstorage:test1
```

4. If you have virtual machines on the Virtuozzo 6 server, migrate them to the newly added Virtuozzo 7 servers as described in [Migrating VMs and Containers from Virtuozzo 6 to Virtuozzo 7](#) on page 16.
5. Upgrade each cluster node, one at a time, to Virtuozzo 7 as described in [Upgrading In-Place with Local Storage](#) on page 4.
6. Re-register the iSCSI targets and restart them on the upgraded Virtuozzo 7 server. For example, for the target `iqn.2014-04.com.pstorage:test1` run:

```
# vstorage-iscsi register -t iqn.2014-04.com.pstorage:test1
# vstorage-iscsi start -t iqn.2014-04.com.pstorage:test1
```

7. When only three Virtuozzo 6 servers are left to upgrade, migrate all virtual environments from them to the upgraded Virtuozzo 7 servers. For more details, see [Migrating VMs and Containers from Virtuozzo 6 to Virtuozzo 7](#) on page 16.
8. Repeat step 5 for the remaining servers until all Virtuozzo 6 servers are upgraded to Virtuozzo 7.

If at some point your cluster happens to be populated with both Virtuozzo 6 and Virtuozzo 7 hardware nodes, it will retain the functionality of Storage for Virtuozzo 6 but not gain the new features of Storage for Virtuozzo 7 like erasure coding. As soon as all of the hardware nodes in such a hybrid cluster are upgraded to Virtuozzo 7, the cluster will begin operating with complete functionality offered by Storage for Virtuozzo 7.

Note: Even though Virtuozzo Storage supports mixed clusters, it is recommended to eventually upgrade all nodes in the cluster to Virtuozzo 7.

CHAPTER 3

Upgrading to Virtuozzo Storage with GUI Management

This chapter describes how to upgrade the following:

- Virtuozzo 6 and 7 servers with local storage to Virtuozzo Storage with GUI management based on Virtuozzo 7,
- Virtuozzo Storage clusters with CLI management based on Virtuozzo 6 and 7 to Virtuozzo Storage clusters with GUI management based on Virtuozzo 7.

3.1 Upgrading Virtuozzo 6 and 7 with Local Storage

This section describes how to upgrade Virtuozzo 6 or 7 servers with local storage to Virtuozzo Storage with GUI management based on Virtuozzo 7. To do this you will need spare servers to deploy a new Virtuozzo Storage cluster with GUI management.

To upgrade your Virtuozzo servers with local storage, follow the steps below:

1. If you are upgrading a Virtuozzo 6 server, update it to the latest version. You can do this by running `yum update`.

Note: The oldest Virtuozzo 6 build eligible for upgrade is [6.0.11-3466](#).

3.1. Upgrading Virtuozzo 6 and 7 with Local Storage

2. On a set of spare servers, create and configure a new Virtuozzo Storage cluster with GUI management based on Virtuozzo 7. For instructions, see the [Virtuozzo 7 Installation Guide](#) and [Virtuozzo Storage Administrator's Guide](#).
3. Create datastores for VMs, containers, and backups as described in the [Virtuozzo Storage Administrator's Guide](#).
4. Log in to Virtuozzo Automator and choose to place VMs, containers, and backups in the created datastores for all servers from the cluster. For instructions, see the [Virtuozzo Automator Administrator's Guide](#).
5. Choose a Virtuozzo server with local storage to upgrade and migrate VMs and containers from it to the new cluster. For more details, see [Migrating VMs and Containers from Virtuozzo 6 to Virtuozzo 7](#) on page 16 and the [Virtuozzo 7 User's Guide](#).
6. If you store VM and container backups on the server with local storage, move them to a server from the new cluster:
 - backups of Virtuozzo 6 VMs or containers can be restored on a Virtuozzo 7 server as described in [Restoring Virtuozzo 6 Backups to Virtuozzo 7 Servers](#) on page 20,
 - backups of Virtuozzo 7 VMs or containers can be placed in a new Virtuozzo Storage datastore by moving their files to `/mnt/vstorage/vols/datastores/<datastore_name>`.
7. Reinstall Virtuozzo 7 on the server to upgrade. During installation, choose to install the [Storage](#) and [Compute](#) components for Virtuozzo Storage and Automator, respectively.
8. In the Virtuozzo Storage management panel, [assign the network roles to the server's network interfaces](#) and [add the server to the cluster](#).
9. In Virtuozzo Automator, choose datastores for the node as you did in step 4.
10. Repeat steps 7-9 for the remaining servers with local storage until all of them are upgraded and joined to Virtuozzo Storage cluster with GUI management based on Virtuozzo 7.

3.2 Upgrading Virtuozzo 6 and 7 with Virtuozzo Storage

This section describes how to upgrade Virtuozzo Storage with CLI management based on Virtuozzo 6 or 7 to Virtuozzo Storage with GUI management based on Virtuozzo 7. The procedure consists of two major parts: upgrading the first cluster node and upgrading the second and other cluster nodes.

To upgrade the first node in your cluster, do the following:

1. Install all available updates on Virtuozzo Storage nodes by running `yum update` on each.

Note: The oldest Virtuozzo 6 build eligible for upgrade is [6.0.11-3466](#).

2. Choose a Virtuozzo Storage node to upgrade. Migrate VMs and containers from this node to other Virtuozzo Storage nodes. If you also keep backups on this node, move their files to a temporary location. If you have iSCSI targets registered on this node, stop the iSCSI targets if they are up and unregister them from the node (for instructions, refer to [Moving iSCSI Targets between Virtuozzo Storage Clusters](#) on page 18).

If you use Virtuozzo Automator, you can migrate VMs and containers with it. If you do not, you may need to consult the following, depending on your migration scenario: [Virtuozzo 6 User's Guide](#), [Virtuozzo 7 User's Guide](#), or [Migrating VMs and Containers from Virtuozzo 6 to Virtuozzo 7](#) on page 16.

3. Remove chunk and metadata servers from the chosen node:

- 3.1. Find out which chunk and metadata servers are located on the node by running `pstorage -c <cluster_name> top` (Virtuozzo 6) or `vstorage -c <cluster_name> top` (Virtuozzo 7) on any node in the cluster.
- 3.2. Remove metadata servers from the node by running `pstorage -c <cluster_name> rm-mds <MDS_ID>` (Virtuozzo 6) or `vstorage -c <cluster_name> rm-mds <MDS_ID>` (Virtuozzo 7) for each MDS on the node.
- 3.3. Initiate removal of chunk servers from the node by running `pstorage -c <cluster_name> rm-cs --wait <CS_ID>` (Virtuozzo 6) or `vstorage -c <cluster_name> rm-cs --wait <CS_ID>` (Virtuozzo 7) for each CS on the node.
- 3.4. Wait until the chunk servers are removed from the node and Virtuozzo Storage rebuilds.

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To monitor this process, run `pstorage -c <cluster_name> top` (Virtuozzo 6) or `vstorage -c <cluster_name> top` (Virtuozzo 7) on any node in the cluster. The status of the chunk servers being removed will change to `releasing` and the number of replicas on them will start to decrease. When the number of replicas on a CS reaches zero, the CS will be removed both from the node and `pstorage top` (`vstorage top`) output. Make sure that no chunk servers are left on the node to be upgraded.

4. Perform a fresh install of Virtuozzo 7 on the node. It will be the first node in your new Virtuozzo Storage infrastructure.

During installation, choose to install the [Virtuozzo Storage management panel](#) and [Virtuozzo Automator management panel](#).

Note: If you already have Virtuozzo Automator set up, you can use it instead. To easily switch to the Virtuozzo Storage management panel, you can install Virtuozzo Storage management plugin for your Virtuozzo Automator as described [here](#).

After installation, the node will show up as a storage node in the newly installed Virtuozzo Storage management panel.

5. Manually enable backward compatibility to allow managing the cluster from the upgraded node and the new Virtuozzo Storage management panel.

To do this, log in to the upgraded node and set the `Environment` parameter to `PCS_FORCE_CLNT_ID=1` in the `/usr/lib/systemd/system/vstorage-ui-agent.service` file. For example:

```
<...>
Environment=PCS_FORCE_CLNT_ID=1 AGENT_CONFIG<...>
<...>
```

Then restart the `vstorage-ui-agent` service:

```
# systemctl daemon-reload
# systemctl restart vstorage-ui-agent
```

6. Log in to the Virtuozzo Storage management panel and assign the network role **Storage** to the node's network interface. For instructions, see the [Virtuozzo Storage Administrator's Guide](#).
7. Authenticate the node in the existing Virtuozzo 6 cluster by running the following command on it:

```
# vstorage -c <cluster_name> auth-node
```

Specify the cluster password when prompted.

8. Register the cluster in the Virtuozzo Storage management panel and add the already upgraded node to

the cluster.

To do this:

- 8.1. In the management panel, click **ADD NODE** and save the shown token.
- 8.2. On the upgraded node, run the `/usr/libexec/vstorage-ui-agent/bin/register-storage-node.sh` script, specifying the IP address of the container with the management panel and the token you obtained earlier. For example:

```
# /usr/libexec/vstorage-ui-agent/bin/register-storage-node.sh \  
-m <management_panel_IP> -t <token> -r -P
```

Specify cluster password when prompted.

The existing cluster configuration will be detected, the cluster will be added to the management panel, and the node will be added to the cluster.

After the script completes, the complete cluster parameters (physical and logical space, number of CS and MDS, etc.) will be displayed on the **OVERVIEW** screen. However, only the node you have already upgraded will be shown on the **NODES** screen.

9. In Virtuozzo Storage management panel, assign to node disks the same storage roles they had before the upgrade. For example, **Storage** (CS) and **Metadata** (MDS). For instructions, see the [Virtuozzo Storage Administrator's Guide](#).
10. Wait until the cluster rebalances the data between chunk servers and **HEALTHY** is shown on the **OVERVIEW** screen.
11. Create the desired datastores for VMs, containers, and backups as described in the [Virtuozzo Storage Administrator's Guide](#).

Note: If you are upgrading a Virtuozzo Storage cluster based on Virtuozzo 6, use only replication for datastores as erasure coding is not supported by Virtuozzo 6.

12. Log in to Virtuozzo Automator, open the node summary, and choose to place VMs, containers, and backups in the created Virtuozzo Storage datastores. For instructions, see the [Virtuozzo Automator Administrator's Guide](#).
13. Register existing Virtuozzo 6 nodes in Virtuozzo Automator:
 - 13.1. Update the VA Agent on these nodes to the latest version as described [here](#).
 - 13.2. Add Virtuozzo 6 nodes to Virtuozzo Automator one by one by clicking **New... > Hardware Node**

3.2. Upgrading Virtuozzo 6 and 7 with Virtuozzo Storage

and providing the necessary details.

14. From Virtuozzo Automator, migrate VMs and containers back to the upgraded node. They will be placed in the specified datastore(s). In addition, if you previously moved backups to the temporary location, you can place them in a new Virtuozzo Storage datastore by moving their files to `/mnt/vstorage/vols/datastores/<datastore_name>`.
15. To re-register iSCSI targets on this node, refer to *Moving iSCSI Targets between Virtuozzo Storage Clusters* on page 18.

The first node is upgraded. Now you can upgrade the second and other nodes:

1. Choose a node to upgrade. Migrate VMs and containers, move backups, and unregister iSCSI targets from it as you did for the first node.
2. Remove chunk servers from the node as you did for the first node.
3. Perform a fresh install of Virtuozzo 7 on the node. During installation, choose to install the **Storage and Compute** components for Virtuozzo Storage and Automator, respectively.
4. In the Virtuozzo Storage management panel, assign the network roles to node's network interfaces as you did for the first node and [add it to the cluster](#).
5. In Virtuozzo Automator, choose datastores for the node as you did for the first node.
6. Re-register iSCSI targets on this node as you did for the first node.
7. Repeat these steps for the remaining nodes in the cluster until the entire cluster is upgraded to Virtuozzo Storage with GUI management based on Virtuozzo 7.
8. Revert the changes made to the `Environment` parameter in the `/usr/lib/systemd/system/vstorage-ui-agent.service` file on the first node. For example:

```
<...>
Environment=AGENT_CONFIG<...>
<...>
```

Restart `vstorage-ui-agent`:

```
# systemctl daemon-reload
# systemctl restart vstorage-ui-agent
```

CHAPTER 4

Migrating VMs and Containers from Virtuozzo 6 to Virtuozzo 7

You can migrate older Virtuozzo 6 virtual machines (online) and containers (offline only) to Virtuozzo 7 servers. During migration, such VMs and containers will be converted in the Virtuozzo 7 format. In particular, VM devices will be replaced by those supported in Virtuozzo 7 (for a list of VM hardware supported in Virtuozzo 7, see the [Virtuozzo 7 User's Guide](#)).

Warning: Windows VMs without installed Virtuozzo guest tools cannot be migrated from Virtuozzo 6 to Virtuozzo 7.

To migrate a running VM or a stopped or suspended container from Virtuozzo 6 to Virtuozzo 7, run the following command on the Virtuozzo 6 server.

```
# prlctl migrate <VM_or_CT_name> root@<VZ7_server_IP_address_or_hostname>
```

Note: If you need to migrate a container from a Virtuozzo 6 server with local storage to a Virtuozzo Storage cluster based on Virtuozzo 7, use the following command: `prlctl migrate <CT_name> root@<VZ7_server_IP_address_or_hostname>/<CT_UUID>`.

Migration from Virtuozzo 6 to Virtuozzo 7 implies VM and container downtime that depends on network bandwidth, virtual machine RAM size, and server load. To reduce downtime, it is recommended to at least perform migration when the server load is minimal.

Note:

1. Network settings configured from inside Windows VMs currently cannot be preserved during migration of such VMs.
2. Containers with templates unsupported in Virtuozzo 7 (i.e. not listed [here](#)) cannot be reinstalled with the `prlctl reinstall` command after migration to Virtuozzo 7.

CHAPTER 5

Moving iSCSI Targets between Virtuozzo Storage Clusters

You can move iSCSI targets between your Virtuozzo Storage clusters as follows:

- from a Virtuozzo Storage cluster based on Virtuozzo 6 to a Virtuozzo Storage cluster with CLI management based on Virtuozzo 7,
- from a Virtuozzo Storage cluster based on Virtuozzo 6 to a Virtuozzo Storage cluster with GUI management based on Virtuozzo 7,
- from a Virtuozzo Storage cluster with CLI management based on Virtuozzo 7 to a Virtuozzo Storage cluster with GUI management based on Virtuozzo 7.

To move your iSCSI targets from one cluster to another, do the following:

1. Stop iSCSI targets if they are running and unregister them from the server. For example:

- on a Virtuozzo 6 server, for the iSCSI target `iqn.2014-04.com.pstorage:test1`, run:

```
# pstorage-iscsi stop -t iqn.2014-04.com.pstorage:test1
# pstorage-iscsi unregister -t iqn.2014-04.com.pstorage:test1
```

- on a Virtuozzo 7 server, for the iSCSI target `iqn.2014-04.com.vstorage:test1`, run:

```
# vstorage-iscsi stop -t iqn.2014-04.com.vstorage:test1
# vstorage-iscsi unregister -t iqn.2014-04.com.vstorage:test1
```

2. Configure the Virtuozzo Storage cluster where iSCSI targets will be moved:

- for a cluster with CLI management, follow the instructions given in the [Virtuozzo Storage Administrator's Command Line Guide](#),

-
- for a cluster with GUI management, assign the network role **iSCSI** to the node's network interface in the Virtuzo Storage management panel (see the [Virtuzo Storage Administrator's Guide](#))
3. Copy the directory containing iSCSI targets from the the old Virtuzo Storage cluster to the new cluster. The default locations of iSCSI targets are:
 - in Virtuzo Storage based on Virtuzo 6, `/pstorage/<cluster_name>/iscsi/`,
 - in Virtuzo Storage with CLI management based on Virtuzo 7, `/vstorage/<cluster_name>/iscsi/`,
 - in Virtuzo Storage with GUI management based on Virtuzo 7, `/mnt/vstorage/vols/iscsi/`.
 4. Register and start the copied iSCSI targets on the upgraded Virtuzo 7 server. For example, for the iSCSI target `iqn.2014-04.com.vstorage:test1`, run:

```
# vstorage-iscsi register -t iqn.2014-04.com.vstorage:test1
# vstorage-iscsi start -t iqn.2014-04.com.vstorage:test1
```

CHAPTER 6

Restoring Virtuozzo 6 Backups to Virtuozzo 7 Servers

Virtuozzo 7 supports restoring backups of Virtuozzo 6 VMs and containers to Virtuozzo 7 servers.

The following rules and considerations apply:

- Restore commands are run on the destination server (to which the backups will be restored).
- Only stopped virtual machines and containers can be restored from backup.
- Windows VMs without installed Virtuozzo guest tools cannot be restored from Virtuozzo 6 backups (or backed up to Virtuozzo 7).
- Backups of virtual machines and containers with guests unsupported in Virtuozzo 7 may not be restored correctly.
- VZFS-based containers must be converted to ploop format and backed up again before they can be restored to Virtuozzo 7.

To restore a specific backup of a Virtuozzo 6 VM or container stored on a remote Virtuozzo server, do the following:

1. Find out the backup ID by listing backups stored on the remote server:

```
# prlctl backup-list -s root@<backup_server>
```

2. Specify the found backup ID in the restore command:

```
# prlctl restore -t <backup_ID> -s root@<backup_server>
```

To restore a remotely stored backup of a Virtuozzo 6 VM or container after said VM or container has been

migrated to a Virtuozzo 7 server, run

```
# prlctl restore <VM_or_CT_name_or_UUID> -s root@<backup_server>
```

To copy a Virtuozzo 6 VM or container backup to a Virtuozzo 7 server and restore it there, do the following:

1. Find out the backup ID by listing backups stored on the Virtuozzo server:

```
# prlctl backup-list root@<backup_server>
```

2. Find out the default backup directory on the Virtuozzo 7 server:

```
prlsrvctl info | grep "Backup path"
```

3. Copy backup files to the default backup directory on the Virtuozzo 7 server. For example, if backups are stored in the default directory on a Virtuozzo 6 server, run:

```
# scp -r root@<VZ6_server>:/var/parallels/backups/<VM_UUID> \  
/vz/vmprivate/backups/
```

Or, if you keep backups on network storage, attach said network storage to the default backup directory on the Virtuozzo 7 server. For example, if you store backups on an NFS share, mount this share to `/vz/vmprivate/backups/`.

4. Restore the copied backup:

```
# prlctl restore -t <backup_ID>
```


CHAPTER 7

Upgrading from Other Products to Virtuozzo 7

Currently, you can upgrade physical or virtual servers to Virtuozzo 7 from OpenVZ and CentOS 7.x.

Two methods of upgrading from OpenVZ to Virtuozzo 7 are available:

- Containers created with OpenVZ based on kernels 2.6.18 and 2.6.32 can be migrated to Virtuozzo 7.
- OpenVZ based on kernel 3.10 can be upgraded to Virtuozzo 7.

7.1 Migrating Containers from OpenVZ Based on Kernels 2.6.18 and 2.6.32 to Virtuozzo 7

You can migrate containers from a server running OpenVZ based on kernels 2.6.18 and 2.6.32 to a Virtuozzo 7 server by means of the `ovztransfer.sh` script freely available at <https://src.openvz.org/scm/ovz1/ovztransfer.git>. Do the following:

1. Install the SSH key on the destination server for the root user. To do this, on the source server generate a key with `ssh-keygen -t rsa`, then transfer the key to the destination server with `ssh-copy-id root@<dest_server>`.
2. Clone the repository with the script to the source OpenVZ server with `git clone https://src.openvz.org/scm/ovz1/ovztransfer.git`.
3. Change to the `/ovztransfer` directory and make the script executable with `chmod 755 ovztransfer.sh`.

7.2. Upgrading from OpenVZ Based on Kernel 3.10 to Virtuozzo 7

4. Run the script on the source OpenVZ server as follows:

```
# ./ovztransfer.sh <dest_server> <source_CT1_ID>[:<new_CT1_name>] \  
[ ... <source_CTn_ID>[:<new_CTn_name>]]
```

where `<source_CT_ID>` (the source container ID) and `<new_CT_name>` (the new container name) must both be specified in the old numerical ID format. For example:

```
# ./ovztransfer.sh 192.168.0.10 100:200
```

So, in the example above, `200` will be the name of the resulting ploop-based container on the Virtuozzo 7 server, even though said name looks like an old numerical ID.

7.2 Upgrading from OpenVZ Based on Kernel 3.10 to Virtuozzo 7

Warning: This procedure cannot be reverted.

Note: Upgrading requires an Internet connection to download Virtuozzo 7 packages.

To upgrade a server from OpenVZ based on kernel 3.10 to Virtuozzo 7:

1. Run the upgrade script:

```
# do-upgrade-vz7 --key <VZ7_product_key>
```

In the process, the commercial Virtuozzo 7 packages will be downloaded and installed on your server.

Note: To skip license installation, use `--skip-license` instead of `--key <VZ7_product_key>`. In this case, you will need to install a license later with the `vzlicload` tool.

2. Reboot the server.

7.3 Upgrading from CentOS 7 to Virtuozzo 7

Warning: This procedure cannot be reverted.

Physical or virtual servers running CentOS 7.x can be upgraded to Virtuozzo 7.

The server must:

- have a clean CentOS 7.x installation without third-party drivers or packages,
- have ext4 file system on the root disk,
- meet Virtuozzo 7 system requirements described in the *Virtuozzo 7 Installation Guide*,
- have Internet connection for downloading Virtuozzo Linux and Virtuozzo packages.

To upgrade CentOS 7.x to Virtuozzo 7, do the following:

1. Convert CentOS 7 to Virtuozzo Linux 7. To do this, download and run the upgrade script:

```
# wget http://repo.virtuozzo.com/vzlinux/vzdeploy/vzdeploy
# chmod 755 vzdeploy
# ./vzdeploy
```

The script will replace CentOS repositories and packages with Virtuozzo Linux ones, install a Virtuozzo Linux kernel in addition to the current CentOS one, and activate a trial Virtuozzo Linux license.

2. Reboot to the Virtuozzo Linux kernel.
3. Optionally, you can remove the CentOS kernel to make sure that the server always boots to the Virtuozzo kernel.

```
# yum remove kernel
```

4. Upgrade Virtuozzo Linux 7 to Virtuozzo 7. To do this, run the script `do-upgrade-vzlin-vz7` installed with the `vzlin-release` package on previous steps.

```
# do-upgrade-vzlin-vz7 --key <VZ7_product_key>
```

Note: You can skip license installation by specifying `--skip-license` instead of `--key <VZ7_product_key>`. In this case, you will need to install a license later with the `vzlicload` tool.

The script will add Virtuozzo 7 repositories, install Virtuozzo 7 packages, and perform required

7.3. Upgrading from CentOS 7 to Virtuozzo 7

configuration. No new partitions will be created during installation (e.g., /vz will be a directory on the root disk).

5. Reboot the server to start using Virtuozzo 7.