

# **Virtuozzo**

## **Virtuozzo 6**

Readme

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# CHAPTER 1

## In This Chapter

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## About This Document

This document provides the first-priority information about Virtuozzo 6 and supplements the included documentation.

## About Virtuozzo 6

Virtuozzo 6 is a virtualization solution that allows you to simultaneously run virtual machines and containers on the same physical server, thereby making more efficient use of your server's hardware resources.

## System Requirements

The system requirements slightly change depending on whether you will deploy Virtuozzo 6 as a stand-alone installation or as part of a Virtuozzo Storage cluster.

### Requirements for Standalone Installations

The hardware and software requirements for running Virtuozzo 6 as a standalone installation are as follows:

- **Platform:** x86 or x86-64 platform with Intel VT-x or AMD-V hardware virtualization support.
- **CPU:** 1.5 GHz or faster (a 64-bit processor is required for launching 64-bit guest operating systems).
- **Memory:** 2 GB of RAM (4 GB or more recommended).
- **Hard disk:**

- *root (/)*: 10-12 GB.
- */vz*: 30 GB or more (usually all the remaining free disk space), must be formatted to ext4.
- *swap*: based on RAM, as per table below:

RAM	swap
up to 4 GB	2 GB
4-16 GB	4 GB
16-64 GB	8 GB
64-256 GB	16 GB
256-512 GB	32 GB

- **Network**: 1 or more Ethernet cards (1 Gbps or faster).
- **Other hardware**: DVD-ROM drive.
- **Operating system**: None. Virtuozzo 6 is installed directly on the server hardware.

Both the actual number of virtual machines and Containers you can run on a physical server and their performance depend on required resources. In general, the more resources your physical server has, the more virtual machines and Containers you can run and the higher their performance will be.

## Requirements for Servers in Virtuozzo Storage Clusters

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

### Metadata Servers

A metadata server must meet the following requirements:

- **Software**: Virtuozzo 6.
- **RAM**: 1 GB per each 100 TB of storage.
- **Disk space**: 20 GB or more.
- **Network**: 1 or more Ethernet adapters (1 Gbps or faster); a static IP address for each Ethernet adapter.

### Chunk Servers

A chunk server must meet the following requirements:

- **Software**: Virtuozzo 6.
- **RAM**: 1 GB or more.
- **Disk space**: 100 GB or more.
- **Network**: 1 or more Ethernet adapters (1 Gbps or faster).

### Clients

A chunk server must meet the following requirements:

- **Software:** Virtuozzo 6.
- **Network:** 1 or more Ethernet adapters (1 Gbps or faster).

There are no special requirements to the CPU, RAM, and disk space that must be available on a client, except for the general recommendations for running Virtuozzo. However, at least 16 GB of RAM are recommended.

## Network

Your network must:

- operate at 1 Gbps or faster,
- have non-blocking Ethernet switches.

**Note:** For more information on Virtuozzo Storage requirements, see the *Virtuozzo Storage Administrator's Guide*.

# Supported Guest Operating Systems

Listed below are the operating systems that have been tested in virtual machines and Containers and are officially supported in Virtuozzo 6.

## Virtual Machines

### Windows

- Windows Server 2016
- Windows Server 2012 R2
- Windows Server 2008 R2 with Service Pack 1
- Windows Server 2003 R2 with Service Pack 2 (x86, x64)

### Linux

- Red Hat Enterprise Linux 7.x (x64)
- Red Hat Enterprise Linux 6.x (x86, x64)
- Red Hat Enterprise Linux 5.x (x86, x64)
- Fedora 23 (x64)
- Fedora 22 (x64)
- Fedora 21 (x64)
- Fedora 20 (x86, x64)
- CentOS 7.x (x64)

- CentOS 6.x (x86, x64)
- CentOS 5.x (x86, x64)
- SUSE Linux Enterprise Server 11 with Service Pack 2 or Service Pack 3 (x86, x64)
- openSUSE 13.2 (x64)
- openSUSE 13.1 (x86, x64)
- Debian 8.x (x86, x64)
- Debian 7.x (x86, x64)
- Debian 6.x (x86, x64)
- Ubuntu 16.04 (x86, x64)
- Ubuntu 15.10 (x86, x64)
- Ubuntu 14.10 (x86, x64)
- Ubuntu 14.04 (x86, x64)
- Ubuntu 10.04.4 (x86, x64)

#### **FreeBSD**

- FreeBSD 10 (x86, x64)
- FreeBSD 9 (x86, x64)

#### **Containers**

- Red Hat Enterprise Linux 7.x (x64)
- Red Hat Enterprise Linux 6.x (x86, x64)
- Red Hat Enterprise Linux 5.x (x86, x64)
- Fedora 23 (x64)
- Fedora 22 (x64)
- Fedora 21 (x64)
- Fedora 20 (x86, x64)
- CentOS 7.x (x64)
- CentOS 6.x (x86, x64)
- CentOS 5.x (x86, x64)
- SUSE Linux Enterprise Server 11 with Service Pack 2 or Service Pack 3 (x86, x64)
- SUSE Linux Enterprise Server 12 with Service Pack 1 (x64)
- openSUSE 13.2 (x64)
- openSUSE 13.1 (x86, x64)
- Debian 8.x (x86, x64)
- Debian 7.x (x86, x64)

- Debian 6.x (x86, x64)
- Ubuntu 16.10 (x86, x64)
- Ubuntu 16.04 (x86, x64)
- Ubuntu 15.10 (x86, x64)
- Ubuntu 15.04 (x86, x64)
- Ubuntu 14.10 (x86, x64)
- Ubuntu 14.04 (x86, x64)
- Ubuntu 10.04.4 (x86, x64)

## Installing Virtuozzo 6

To install Virtuozzo 6, follow these steps:

- 1** Depending on your installation type, configure the server to boot from the DVD-ROM, USB driver, or over the network.
- 2** Boot the server.
- 3** Follow the on-screen instructions to install Virtuozzo.

For the complete installation instructions, see the *Virtuozzo 6 Installation Guide* and the *Installation via PXE Server* guide.

## Starting to Work with Virtuozzo 6

After you have successfully installed the product and restarted the physical server, you can use one of the following ways to start working with Virtuozzo 6:

- using the command-line utilities,
- using Virtuozzo Automator.

### Managing Virtuozzo with the Command-line Utilities

Virtuozzo 6 provides a set of command-line utilities for managing virtual machines and containers both locally and remotely.

- To manage virtual machines and Containers locally—that is, from the same server on which Virtuozzo 6 is installed—log in to the server as root using the password you have provided during installation.
- To manage virtual machines and Containers remotely, connect to Virtuozzo 6 (e.g., via SSH) using the IP address indicated on the server's welcome screen. Log in to the server as root using the password you have provided during installation.

After logging in to the server, you can start managing virtual machines and Containers with the following command-line utilities:

- `prlctl`: use this utility to perform day-to-day operations and migrate virtual machines and Containers.
- `pstorage`: use this utility to create, manage, and monitor Virtuozzo Storage clusters.
- `pstat`: use this utility to collect statistics on your virtual machines and containers.

For more information on these and other utilities, see their respective man pages.

## Managing Virtuozzo with Virtuozzo Automator

Virtuozzo Automator is a Web interface you can use to remotely manage Virtuozzo 6. Virtuozzo Automator is automatically set up during Virtuozzo installation if you select the **Install Virtuozzo Automator Agent for Virtuozzo** and **Install Virtuozzo Automator Management Node** check boxes in the Virtuozzo installer.

To connect to a server using Virtuozzo Automator, do the following:

- 1 On any computer that can access Virtuozzo over network, launch a supported Web browser.
- 2 Visit the IP address or hostname of the Container acting as the Master Server (configured during installation).
- 3 Log in to the Master Server as root using the password you have provided during installation.

For more information on managing Virtuozzo with Virtuozzo Automator, consult the *Virtuozzo Automator Administrator's Guide*.

# Changelog

## Virtuozzo 6

### What's New

- **Virtuozzo Storage.** Virtuozzo 6 introduces Virtuozzo Storage, a solution allowing you to quickly and easily transform low-cost commodity storage hardware and network equipment into a protected enterprise-level storage, like SAN and NAS.

Virtuozzo Storage is optimized for storing large amounts of data and provides replication, high-availability, and self-healing features for your data. 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.

- **Container-in-an-image-file layout.** In Virtuozzo 6, the Container layout has been redesigned to store all files in a single image (similar to a virtual machine's hard disk). Such standalone nature:

- Enables easier migrations and backups due to a faster sequential I/O access to Container images than to separate Container files.
- Removes the need for OS and application templates once a Container is created.
- Allows the use of native Linux disk quotas that are journaled and does not require quota recalculation after disasters like server crashes.
- **Memory and IOPS deduplication.** Virtuozzo 6 introduces support for memory and IOPS deduplication. Identical files in multiple Containers are efficiently cached to help eliminate memory and I/O bottlenecks, increase the number of running Containers per server, and reduce the starting times of multiple similar Containers.
- **Rebootless updates.** Virtuozzo 6 supports rebootless updates. During a rebootless update, all running virtual machines and Containers are suspended and resumed rather than shut down and started. This greatly reduces their downtime and virtually eliminates the service outage or interruption for end users.
- **Console access to Containers.** Virtuozzo provides you with the possibility to get access to the Container console. Using the console, you can log in to a Container if it is running or view the progress of the startup and shutdown processes.
- **Updates with yum.** Virtuozzo 6, the `vzup2date` utility has been replaced with the standard `yum` utility, greatly simplifying the procedure of updating all components of your system.
- **Containers with preinstalled application templates.** In Virtuozzo 6, you can preinstall application templates to OS EZ template caches to speed up creating multiple Containers based on the same set of OS and application templates.
- **Virtual machines with 32 CPU cores, 128 GB of RAM, and 5 TB of disk space.** In Virtuozzo 6, you can create virtual machines with up to 32 CPU cores, 128 GB of RAM, and 5 TB of virtual disk space.
- **Support for Open vSwitches.** Virtuozzo 6 comes with support for Open vSwitches, multi-layer software network switches that are well suited to function as virtual switches in virtualized environments, providing virtual machines and containers with network connectivity.
- **CPU identification masks for virtual machines.** In Virtuozzo 6, you can control the CPU features available to virtual machines, allowing their migration between servers with different CPU feature sets.
- **Virtual machine configuration samples.** In Virtuozzo 6, you can quickly and easily change the configuration of a virtual machine by applying a new configuration sample file to it, without the need to manually change all its settings.

## Virtuozzo 6 Update 1

### What's New

- Tier support in Virtuozzo Storage clusters (PSBM-10645).
- Support for EFI BIOS in virtual machines running Windows operating systems (PSBM-11117).
- A way to set passwords for the VNC console securely (PSBM-15494).

- Improved chunk allocation randomization and balancing of reads for better and more scalable performance.

## Bug Fixes

- Under certain conditions, upgrading Parallels Server Bare Metal 5.0 to Virtuozzo 6 could fail (PSBM-16945).
- The man pages for Virtuozzo Storage did not offer information about configuration parameters (PSBM-17005).
- A Container could fail to start due to an error after modifying the `/etc/resolve.conf` file (PSBM-17072).
- The virtual image block devices of different containers could have the same UUIDs under certain conditions (PSBM-17163).
- For ploop-based Containers, the `vzmigrate` utility did not keep the Container's private folder in `<CT_PrivateArea>.migrated` (PSBM-17171).
- A chunk server could not use the repositories specified in the `/etc/pstorage/clusters/<cluster_name>/bs.list` file (PSBM-17369).
- The `max_offline_cs` parameter was replaced with the `max_offline_hosts` parameter for convenience (PSBM-17311).
- Under certain conditions, the `numabalanced` daemon could become non-operational (PSBM-17461).
- The `pstorage-hwflush-check` utility could report errors even if a client was functioning properly (PSBM-17586).
- The `pstorage make-cs` and `pstorage make-mds` commands could fail to operate on existing but empty repositories (PSBM-17587).
- The `pstorage mnt-top` command could fail on reads from request files (PSBM-17618).
- The de-duplication daemon (`pfcache`) could become non-operational under certain conditions (PSBM-17778).
- Under certain conditions, the temporary Container snapshot created during backup could not be merged back after backup (PSBM-17786).
- A number of fixes for minor issues (PSBM-15483, PSBM-16818, PSBM-16822, PSBM-16878, PSBM-16903, PSBM-16994, PSBM-17255, PSBM-17272, PSBM-17473, PSBM-17487).

## Virtuozzo 6 Update 2

### What's New

- Greatly improved Virtuozzo Storage performance in 10GbE clusters (PSBM-17158, PSBM-17709, PSBM-17852).
- Improved Virtuozzo Storage DNS TXT discovery during kickstart installations (PSBM-17573).

- Now a warning is issued if there are not enough chunk servers with unique `host_id` (based on the `max-host-replicas` parameter) (PSBM-17844).
- Fixed Virtuozzo Storage license auto-renewal (PSBM-18269).
- Fixed Virtuozzo Storage replication settings changes blocking writes until replicated if previous `min-replicas` parameter was too low (PSBM-18489).
- Fixed Virtuozzo Storage authentication with a non-default `umask` (PSBM-18819).
- Improved performance of Windows virtual machines in Virtuozzo Storage (PSBM-18983)
- Introduced Virtuozzo Storage performance history in the `stat -F` command.
- Changed the recommended configuration for Virtuozzo Storage to individual hard drives over hardware RAID with or without SSD for the journal/cache.
- Introduced new Virtuozzo Storage performance counters in `top` and `stat` commands (QDepth, RMW, JFull).

## Bug Fixes

- Container migration from Virtuozzo to Parallels Virtuozzo Containers 4.0 could fail (PSBM-17182).
- Listing virtual servers residing in Virtuozzo Storage could take too long (PSBM-17761, PSBM-18035).
- `pfcached` could overflow system log in case of issues with the `pfcache` image (PSBM-17780).
- Compacting virtual machine's disk image could be non-effective under certain conditions (PSBM-17818).
- Incoming traffic to virtual machines could be corrupted (PSBM-17889).
- Two default gateways could be in Debian/Ubuntu-based Containers under certain conditions (PSBM-18000).
- Virtual machines crashed on servers with AMD processors (PSBM-18094, PSBM-18505, PSBM-18515).
- Virtual machines residing in Virtuozzo Storage did not start due to the lack of disk space on the system partition (PSBM-18268).
- Ploop image could become corrupted after Container migration (PSBM-18293).
- Could not create virtual machines from templates located on shared storage but registered on a different Node (PSBM-18471).
- "Unknown" commands inside virtual machine's log file (PSBM-18524).
- Virtual machines failed to resume (PSBM-18532).
- Virtual machines crashed under certain conditions (PSBM-18592).
- ARP entries related to migrated Containers could remain on the source server after migration (PSBM-18674).
- Migration of virtual machines over Virtuozzo Storage could fail (PSBM-18675).

- The Virtuozzo installer could ask for Chunk Server mount point even if the Chunk Server role was not selected (PSBM-19024).

## Virtuozzo 6 Update 3

### What's New

- **High Availability for Virtuozzo Storage clusters** (PSBM-13291). High Availability keeps virtual machines and Containers operational even if the Hardware Node they are hosted on fails. In such cases, the affected virtual environments continue working on other, healthy Hardware Nodes in the cluster. High Availability is ensured by:
  - Replication of metadata servers. For a Virtuozzo Storage cluster to function, not all but just the majority of MDS servers must be up. By setting up multiple MDS servers in the cluster you will make sure that if an MDS server fails, other MDS servers will continue controlling the cluster.
  - Replication of data. All data chunks are replicated and the replicas are kept on different chunk servers. If a chunk server fails, other chunk servers will continue providing the data chunks that were stored on the failed server.
  - Monitoring of Hardware Nodes' health.
- **Basic Dynamic Resource Scheduling** (PSBM-19150). Dynamic Resource Scheduling (DRS) provides load balancing for the High Availability feature in the Virtuozzo Storage cluster and ensures that:
  - Virtual environments, which were moved from a failed Hardware Node to a healthy one, are returned to the original Hardware Node once it is up again.
  - Running virtual environments are spread across Hardware Nodes according to Nodes' license capacity. For example, if there are more virtual environments running on a Hardware Node than its license allows, the 'extra' virtual environments will be moved to the Node which is the least occupied in terms of license capacity.
- **Online conversion of VZFS4-based Containers to the Container-in-an-image-file (ploop) layout** (PSBM-18696). Using the `vzmigrate --convert-vzfs --online` command, you can now convert VZFS4-based Containers to the Container-in-an-image-file (ploop) layout without restarting them. Source servers running the following products are supported:
  - Parallels Virtuozzo Containers for Linux 4.6 (TU-4.6.0-254),
  - Parallels Virtuozzo Containers for Linux 4.7 (TU-4.7.0-310),
  - Parallels Server Bare Metal 5 Update 9,
  - Virtuozzo 6 Update 3.

### Bug Fixes

- Could not migrate a Container online or configure iptables in that Container if the `connlimit` rule was set in the iptables configuration file (PSBM-17553).

- SSD/HDD read balancing was required inside CS (PSBM-17791).
- Resuming a suspended Container could fail on `vz` restart (PSBM-17995).
- Virtuozzo documentation was only available after product installation (PSBM-18949).
- Virtual machines relocated from a failed Hardware Node were reported as running by the `shaman` utility while being, in fact, unregistered (PSBM-19076).
- DNS resolver did not use all available methods to obtain the default domain names (PSBM-19540).
- Two sockets in `/var/run/vzevents` could cause tools to hang (PSBM-19765).
- File leases stuck after MDS master change prevented virtual machines and Containers from being started, migrated, or backed up (PSBM-19814).
- Container registration issues after migration between Hardware Nodes in a Virtuozzo Storage cluster (PSBM-19855).
- P2V migration could fail due to segmentation fault (PSBM-19931).
- Restarting the master MDS could cause virtual machines to stop (PSBM-19978).
- Sporadic replication could go on for hours after CS reboot (PSBM-20007).
- A number of other minor issues (PSBM-16846, PSBM-16880, PSBM-16988, PSBM-18267, PSBM-18511, PSBM-18581, PSBM-18636, PSBM-18695, PSBM-18737, PSBM-18988, PSBM-19103, PSBM-19229, PSBM-19255, PSBM-19280, PSBM-19373, PSBM-19395, PSBM-19399, PSBM-19400, PSBM-19401, PSBM-19423, PSBM-19426, PSBM-19461, PSBM-19463, PSBM-19473, PSBM-19495, PSBM-19505, PSBM-19506, PSBM-19583, PSBM-19620, PSBM-19656, PSBM-19681, PSBM-19767, PSBM-19768, PSBM-19808, PSBM-19813, PSBM-19833, PSBM-19838, PSBM-19864, PSBM-19915, PSBM-19969, PSBM-19973, PSBM-20171, PSBM-20210, PSBM-20248).

## Virtuozzo 6 Update 3 Hotfix 2

### Bug Fixes

- Unnecessary warnings in Virtuozzo Storage logs if the number of CSes was higher than the number of required replicas (PSBM-20472).
- Virtuozzo service could become unresponsive when trying to merge old backup snapshots. Also, if a virtual machine had a disk named `<dir_name>.hdd/<disk_name>.hdd`, backup snapshots remained unmerged after backup (PSBM-20611).
- Graceful shutdown of a node could cause relocation of its resources (PSBM-20698).
- Space overusage due to MDS not recognizing overcommitted chunks (PSBM-20893).
- A local DoS exploit in the latest 2.6.32 kernels (PSBM-20912).

## Virtuozzo 6 Update 3 Hotfix 3

### Bug Fixes

- A virtual machine with a BusLogic SCSI HDD's emulation type could fail to boot (PSBM-20946).
- Under certain circumstances, a memory allocation failure could cause network configuration related activities to hang due to a missing lock release on the particular error path (PSBM-21008).
- Guest tools could not be installed in a virtual machine with the latest CentOS 5 operating system inside (PSBM-21029).

## Virtuozzo 6 Update 3 Hotfix 4

### Bug Fixes

- Filesystem errors after tests (PSBM-21123).
- Dynamic Resource Scheduling not working due to SNMP issues (PSBM-21132).
- Online migration could fail for virtual machines created using Virtuozzo Automator (PSBM-21217).
- Hardware Node could reboot if time on it had been set back (PSBM-21224).
- An unclear error message was shown after attempting to apply settings to a migrated virtual machine (PSBM-21274).

## Virtuozzo 6 Update 3 Hotfix 5

### Bug Fixes

- RTNL messages were in the wrong order on virtual machine start (PSBM-20777).

## Virtuozzo 6 Update 4

### What's New

- **Support for 16TB virtual hard disks in Containers and virtual machines** (PSBM-15670). Introduced in this update, the ploop v2 format removes the 2-terabyte disk space limitation and allows creating up to 16-terabyte ploop images for Containers and virtual machines. Newly created Containers use the ploop v2 format by default.
- **Support for NFSv4.\* mounts in Containers** (PSBM-17793). You can enable NFSv4 support on a Hardware Node by running the `sysctl -w fs.nfs.nfs4_ct_enable=1` command. To make sure the NFSv4 support remains enabled after Node reboot, add the `fs.nfs.nfs4_ct_enable=1` line to `/etc/sysctl.conf`.

Next time a resource is mounted, Virtuozzo will automatically choose the latest NFS version supported by both the server and client.

- **Support for failure domains in Virtuozzo Storage** (PSBM-20618). A failure domain is a set of services which can fail in a correlated manner. Due to correlated failures it is very critical to scatter data replicas across different failure domains for data availability.

Every Virtuozzo Storage service component now has topology information assigned to it. Topology paths define a logical tree of components—physical locations consisting of 5 identifiers which are referred to as `room.row.rack.host.CS`. The first 3 topology path components (`room.row.rack`) can be configured by user via `/etc/pstorage/location` configuration files. The last 2 components (`host.cs`) are auto-generated and should not be modified by user. The unique host identifier is randomly generated during installation and located at `/etc/pstorage/host_id`. CS is a unique service identifier generated upon CS creation.

- **Support of HDD hot plugging and unplugging to easily add new or replace failed HDDs** (PSBM-20760). Introduced in this update is `pstorage-hotplug`, a set of scripts which use `udev` and enable you to automatically create and start a CS on an HDD hot plug event and stop a CS on an HDD hot unplug event (stopped CSes need to be deleted manually). The HDDs in question must be detected by the operating system and not work via a RAID controller.

**Note:** Special considerations apply to sharing SSD write cache between running CSes. This functionality is not implemented yet, so CSes with SSD journals will not be started automatically on disk hotplug.

## Bug Fixes

- Offline migration of ploop Containers resulted in much longer downtime compared to VZFS Containers (PSBM-19407).
- Unfinished operations prevented virtual machines from booting for much too long (PSBM-20157).
- `prl_convert` could fail with the `RESIZER_REPAIR_FS_VOLUME_ERROR` error (PSBM-20300).
- Could not backup virtual machines with attached physical HDDs (PSBM-20366).
- Backing up a virtual machine could fail if its virtual hard disk was being compacted (PSBM-20607).
- Online migration failures were reported in Virtuozzo Automator only after 24 hours if the source and destination nodes had no swaps configured (PSBM-20622).
- Online migration could fail for virtual machines created in Virtuozzo Automator (PSBM-20687).
- Impossible to have EID unchanged during Container migration (PSBM-20717).
- Dispatcher could hang after backup failure (PSBM-21919).
- A number of other minor issues (PSBM-18017, PSBM-18267, PSBM-18902, PSBM-19176, PSBM-19512, PSBM-19805, PSBM-19885, PSBM-19999, PSBM-20006, PSBM-20022, PSBM-20079, PSBM-20353, PSBM-20374, PSBM-20564, PSBM-20613, PSBM-20640, PSBM-20678, PSBM-20685, PSBM-20714, PSBM-20756, PSBM-20799, PSBM-20885, PSBM-20906, PSBM-20913, PSBM-21014, PSBM-21205, PSBM-21358, PSBM-21397, PSBM-21516, PSBM-22083).

## Virtuozzo 6 Update 4 Hotfix 2

### Bug Fixes

- Online Container migration could freeze (PSBM-22372).
- MDS could hang during license update (PSBM-22373).
- MDS could be running in the `unavail` state (PSBM-22379).
- Added Microsoft-signed drivers to Virtuozzo 6 (PSBM-22388).
- MDS server could fail to start after update to Update 4 (PSBM-22422).
- The `/vz` partition could freeze after backup (PSBM-22710).
- Update could fail due to `initramfs` image corruption (PSBM-22715).
- MDS could exit due to a bug (PSBM-22774).
- Incorrect `df` output from `pstorage` after update to Update 4 (PSBM-22803).

## Virtuozzo 6 Update 4 Hotfix 3

### Bug Fixes

- Ploops did not work on HDDs with 4096-byte sectors (PSBM-21987).
- Dispatcher could crash on restart (PSBM-22175).
- The elapsed time of new processes was shown incorrectly after `vzreboot` (PSBM-22925).
- Incorrect calculation in `ploop_iooff_to_sec` for ploops over 2TB (PSBM-23054).

## Virtuozzo 6 Update 5 (SP1)

### What's New

- **16 TB virtual hard disks** (PSBM-15670). The maximum size of virtual hard disks supported by Containers and virtual machines has increased to 16 TB.
- **The new global memory consumption limit** (PSBM-17887). The new limit makes sure that no backup, restore, or migration operation will occupy too much of the Node's memory, potentially leading to an out-of-memory situation. You can set it via the `VZ_TOOLS_MEMLIMIT` parameter of the global configuration file `/etc/vz/vz.conf`.
- **The new user-friendly list of chunk and metadata server paths** (PSBM-20877). Using the `pstorage list-services` command, you can now easily locate CS and MDS servers on storage devices attached to your Virtuozzo Storage cluster.
- **The new DRS relocation mode for High Availability clusters** (PSBM-21305). In the new resource relocation mode, virtual machines and Containers which were running on a failed Hardware Node are relocated to healthy Nodes based on available RAM and license capacity.

## Bug Fixes

- Required libraries were missing in the Parallels Transporter installer for Virtuozzo Containers (PSBM-20968).
- The `vzpkg update` command could fail to install new packages added to an EZ template (PSBM-21459).
- The `prlctl exec` command could hang in POA installations (PSBM-22075).
- `dd oflag=dsync` worked slowly in ploop Containers if the ploop grew (PSBM-22381).
- Shared migration could fail because a Container with the same ID or root path could exist at destination (PSBM-22889).
- Unable to fill a pre-allocated image above 2TB (PSBM-22961).
- A non-sparse ploop image could become sparse during migration (PSBM-22993).
- `vzreboot` could cause soft lockups (PSBM-23189).
- Virtuozzo Automator could show incorrect placement of relocated resources (PSBM-23202).
- Container replication issues on hard disk failure (PSBM-23325).
- No callback from parallels-server to PACI IM after migration or backup (PSBM-23338).
- Virtual machine restoration could be slowed by processing of devices listed in `/proc/devices` (PSBM-23489).
- A number of minor issues (PSBM-15095, PSBM-20022, PSBM-20250, PSBM-20614, PSBM-20905, PSBM-21109, PSBM-21111, PSBM-21309, PSBM-21891, PSBM-21894, PSBM-21937, PSBM-22083, PSBM-22215, PSBM-22240, PSBM-22374, PSBM-22376, PSBM-22392, PSBM-22492, PSBM-22707, PSBM-22778, PSBM-22780, PSBM-22828, PSBM-22879, PSBM-23037, PSBM-23097, PSBM-23229, PSBM-23505, PSBM-23523, PSBM-23532).

## Virtuozzo 6 Update 5 (SP1) Hotfix 1

### Bug Fixes

- Unable to mount ploop images (PSBM-24092).
- Unable to add new MDS to Virtuozzo Storage clusters (PSBM-24093).
- Virtuozzo Storage mount points not recovered after network breakdown (PSBM-24109).
- `pdrs` incorrectly handled combined licenses (PSBM-24116).
- Could not migrate Containers with conversion (PSBM-24125).
- Shared Folders not mounted automatically in CentOS 6 guests (PSBM-24148).
- `pdrs` produced empty core dumps (PSBM-24154).
- Incorrect memory overcommit factor in Containers (PSBM-24164).
- netfilter did not allow connections to MDS by default (PSBM-24167).

- No network functionality in Containers (PSBM-24170).
- Could not update the `qt` package with `yum` (PSBM-24177).
- Virtuozzo Storage could hang on concurrent creation or deletion of filesystem objects (PSBM-24275).
- Dropped e1000 tx packets could cause mail delivery issues on mail servers set up in virtual machines (PSBM-23390).
- A number of minor issues (PSBM-21123, PSBM-23535, PSBM-23793, PSBM-23985, PSBM-24004, PSBM-24015, PSBM-24043, PSBM-24054, PSBM-24101, PSBM-24104, PSBM-24110, PSBM-24139, PSBM-24149).

## Virtuozzo 6 Update 5 (SP1) Hotfix 2

### What's New

- **New EZ templates.** Ability to create Containers with Fedora 20 and openSUSE 13.1 distributions inside.

**Note:** To be able to use such Containers, reboot to the updated kernel (2.6.32-042stab084.17 or newer).

### Bug Fixes

- Setting non-fully qualified domain names to virtual machines could lead to domain resolution issues (PSBM-24243).

## Virtuozzo 6 Update 5 (SP1) Hotfix 3

### Bug Fixes

- Downsizing of ploop-based Containers worked incorrectly (PSBM-23217).
- Offline migration with ploop conversion and enabled `QUOTAUGIDLIMIT` could fail with error code 65 if Container was based on a legacy (std) template (PSBM-24058).
- Live migration of Containers did not work under certain conditions (PSBM-24351).
- Reverting to a snapshot after cloning a Container changed clone's UUID and name to the parent's (PSBM-24387).
- `vzctl` could crash while reverting to a snapshot (PSBM-24388).
- Attempting to migrate a Container back to the cluster from a non-cluster node could result in Container filesystem corruption (PSBM-24407).
- `vzctl convert` of running VZFS Containers did not work with Plesk installed (PSBM-24516).
- Disk space calculated was incorrectly during migration with ploop conversion of cPanel VZFS Containers (PSBM-24525).

- A number of minor issues (PSBM-23963, PSBM-24154, PSBM-24267, PSBM-24284, PSBM-24390, PSBM-24456, PSBM-24493, PSBM-24504, PSBM-24517).

## Virtuozzo 6 Update 5 (SP1) Hotfix 5

### Bug Fixes

- Wrong traffic reported for newly created Containers (PSBM-24674, PSBM-24702).
- Offline conversion of VZFS Containers to the ploop layout was broken (PSBM-24737).
- Migration with the `--convert-vzfs` option could fail if a file existed under a bind mount (PSBM-24648).
- Ploop could get damaged if the Hardware Node was short on disk space (PSBM-24758).

## Virtuozzo 6 Update 5 (SP1) Hotfix 9

### Bug Fixes

- The `contrack` module should not be disabled on the Hardware Node if the Node is managed by PACI (PSBM-16884).

## Virtuozzo 6 Update 6

### What's New

- **Automatic loading of kernel modules on Container start or resume** (PSBM-13097). The new `vzctl --netfilter` command allows you to set the state of `iptables` modules for backup/restore or live migration. If some of the `iptables` modules allowed for a Container are not loaded on the Hardware Node where that Container has been restored or migrated, they will be automatically loaded when that Container starts.
- **Highly Available iSCSI targets on Virtuozzo Storage** (PSBM-23763). The `pstorage-iscsi` tools provide a convenient way of accessing Virtuozzo Storage clusters from operating systems and third-party virtualization solutions. With these tools, you can export ploop images stored in Virtuozzo Storage clusters as iSCSI LUNs.
- **Ability to stop relocation of virtual machines and Containers if too many Hardware Nodes fail** (PSBM-18423). The new `RELOCATION_SKIP_THRESHOLD` parameter in the `shaman.conf` configuration file allows you to set how many Hardware Nodes can be down at the same time before `shaman` stops relocating virtual machines and Containers. Relocation resumes as soon as the number of failed Nodes drops below the threshold.
- **Automatic Data Balancing** (PSBM-23871). To maximize I/O performance of storage drives in a cluster, Virtuozzo Storage automatically balances drive load by moving data chunks from drives under high load to those under less load as well as moving the most used ("hot") data chunks to faster drives and least used ("cold") data chunks to slower drives.
- **Improved HDD hotplug support for LSI RAID controllers** (PSBM-24292). The improved support of hot plugging and unplugging of HDDs connected to LSI RAID controllers allows you

to easily add new or replace failed hard disks. Disks connected to LSI RAID controllers must work in the passthrough mode (JBOD) or RAID0.

**Note:** Special considerations apply to sharing SSD write cache between running CSEs. This functionality is not implemented yet, so CSEs with SSD journals will not be started automatically on disk hotplug.

- **Easier identification of CSEs on LSI RAID controllers.** Virtuozzo Storage now provides the `pstorage-hotplugd locate` command to easily identify CSEs on LSI RAID controllers by distinctive LED patterns.
- **New Microsoft Windows Server 2012 R2 guest OS** (PSBM-23872). Microsoft Windows Server 2012 R2 is now supported as a guest OS in virtual machines.
- **IPSec support in Containers** (PSBM-20174). The IPSec protocol is now supported in Containers.
- **Switching to snapshots of running virtual environments without resuming them** (PSBM-24513). The new `--skip-resume` option for the `prctl snapshot-switch` command allows you to skip automatic virtual machine or Container resume when switching to snapshots of running virtual machines or Containers.
- **Ability to delete virtual machine HDDs used in snapshots** (PSBM-24992). The new `--destroy-image-force` option for the `prctl set --device-del` command allows you to delete virtual machine's HDDs even if they are used in that virtual machine's snapshots.
- **Improved cleanup of temporary Container snapshots** (PSBM-24727). New automatically merged 'temporary snapshots' ensure that disk space is not wasted on snapshots left over from failed backups or migrations.
- **Memory usage statistics from guest OS** (PSBM-21913). Memory usage statistics can now be reported to subscribers from guest operating systems.
- **GPT partition support for physical-to-virtual migration** (PSBM-18226). GPT partitions are now supported for migrating Windows-based physical hosts to virtual machines.

## Bug Fixes

- The "Make sure that guest tools are properly installed in the virtual machine" warning is shown during backup of Windows Server 2012 R2 with installed guest tools (PSBM-21377).
- Cannot add new MDS to cluster (PSBM-24093)
- x86\_64 versions of `libstdc++`, `libxml2`, and `glib2` missing from the `centos-6-x86_64` template (PSBM-24115).
- Need to temporarily disable UNIX socket communications due to hang-ups under memory pressure (PSBM-24426).
- Incorrect network restarts by Guest Tools in Debian and Ubuntu (PSBM-24475)
- Newly created Containers may not start, ploop devices may not be mounted, the "invalid argument" is shown (PSBM-24671)
- Overcommitted chunks should be removed even on non-healthy clusters to free disk space (PSBM-24722)

- Custom shaman scripts are not executed (PSBM-24730).
- Cannot configure name server and search domain in running Container with resolvconf installed (PSBM-24918).
- Memory leak in `vzctl2_get_env_status` (PSBM-24926).
- `prlctl` cannot resize disk to more than 4TB (PSBM-25222).
- Online conversion of large Containers to ploop fails (PSBM-25424).
- An MDS could hang in a busy loop on parallel file removal (PSBM-25901).
- A number of other bugs (PSBM-20653, PSBM-21010, PSBM-21649, PSBM-21864, PSBM-22795, PSBM-23503, PSBM-23726, PSBM-24018, PSBM-24397, PSBM-24406, PSBM-24453, PSBM-24501, PSBM-24520, PSBM-24629, PSBM-24952, PSBM-25102, PSBM-25115, PSBM-25118, PSBM-25252, PSBM-25317, PSBM-25445, PSBM-25462, PSBM-25821, PSBM-26058).

## Virtuozzo 6 Update 6 Hotfix 1

### Bug Fixes

- Under certain circumstances, the shaman daemon may fail to start (PSBM-26496).

## Virtuozzo 6 Update 6 Hotfix 3

### Bug Fixes

- Various kernel panics caused by stack overflow could be triggered by high disk I/O activity (PSBM-23683, OVZ# 2846).
- Under certain circumstances, CentOS 6.5 virtual machine could hang (PSBM-25427).
- Checkpointing code was enhanced to support `iptables` rules saving and restoring (PSBM-25872, OVZ# 2916).
- The `numabalanced` service is designed to move Containers between NUMA nodes in order to increase overall system performance. Previously, such migrations resulted in confusingly huge values of `numastat:node_other` and `numastat:numa_miss` parameters (PSBM-26309).
- Network console configured via bonded network interface could cause kernel panic (PSBM-26668).
- Under certain circumstances, reinstallation of ploop Containers from Power Panel could not be possible (PSBM-26738).
- VNC server could not start after a reboot from inside the Container (PSBM-26740).
- Non-shared migration of Containers with custom private areas kept on Virtuozzo Storage (PSBM-26741).

## Virtuozzo 6 Update 6 Hotfix 4

### Bug Fixes

- Under certain conditions, virtual machines may crash. (PSBM-27006)
- The `prlctl create --uuid` command does not work with the `--vmtype <vm>` option. (PSBM-27046)
- An issue in the `futex` subsystem allowed a local user to gain ring 0 control via the `futex` syscall. An unprivileged user could use this flaw to crash the kernel (resulting in denial of service) or for privilege escalation. Using this vulnerability, a local unprivileged user of a Container could potentially crash the Hardware Node or gain host root privileges. (#CVE-2014-3153)

### References

- <https://access.redhat.com/security/cve/CVE-2014-3153>

## Virtuozzo 6 Update 6 Hotfix 5

### Bug Fixes

- An OpenSSL vulnerability could allow for a man-in-the-middle attack against an encrypted connection, so an attacker could intercept an encrypted data stream allowing them to decrypt, view and then manipulate said data. (PSBM-27293, #CVE-2014-0224)
- Other OpenSSL vulnerabilities: #CVE-2010-5298, #CVE-2014-0076, #CVE-2014-0195, #CVE-2014-0198, #CVE-2014-0221, #CVE-2014-3470.

### References

- <https://access.redhat.com/site/articles/904433>
- [https://www.openssl.org/news/secadv\\_20140605.txt](https://www.openssl.org/news/secadv_20140605.txt)

## Virtuozzo 6 Update 6 Hotfix 7

### Bug Fixes

- Failed online Container migration on shared storage results in file system corruption. (PSBM-27479)
- Container snapshot remains after failed online Container migration on shared storage. (PSBM-27456)

## Virtuozzo 6 Update 6 Hotfix 9

### Bug Fixes

- Online migration of an active packet socket could fail with the message "CPT ERR: page without mapping". Checkpointing code has been enhanced to support online migration of packet sockets. (PSBM-24091)
- Online Container migration could fail if files from /proc/\$PID/ were still open after the process with PID \$PID had stopped. (PSBM-25452)
- HP Performance Agent could fail due to the absence of the /proc/sysvipc/msg file. The SYSVIPC procfs interface has been provided, so the /proc/sysvipc/{msg,sem,shm} files are now available. (PSBM-26563)
- Certain netfilter kernel modules (nf\_nat, nf\_contrack\_ipv4, nf\_contrack\_ipv6) could not be loaded automatically if requested from inside Containers. (PSBM-26669)
- The top utility run inside a Container could show confusing equal values of used CPU power for every CPU available inside that Container; even though the total CPU power used inside the Container was shown correctly. (PSBM-26714)
- The iproute2 utility could show netlink warnings in the log. For example, "[2532930.556624] netlink: 20 bytes leftover after parsing attributes". (PSBM-26757)
- A kernel panic could occur due to a race between bridge device deletion and packet forwarding. (PSBM-26931)
- A Hardware Node with hundreds of gigabytes of RAM could suffer from high memory and CPU latencies (as displayed by vzstat or pstat) if the vzstat.ko kernel module was loaded. (PSBM-26984)
- A Container could fail to start if its configuration file contained an empty IPTABLES parameter and the iptable\_raw kernel module was loaded on the Hardware Node. (PSBM-27181)
- Under certain circumstances, a kernel panic could occur in dquot\_initialize() under heavy disk I/O load and with quotas enabled. (PSBM-27506)
- Under certain circumstances, a soft CPU lockup could occur in case of high memory pressure inside a Container and OOM killer activity. (PSBM-27508)
- Online migration of a Container with nested bindmounts could fail with an error during restore. In particular, this issue affected Containers running cPanel as well as Fedora 17 and newer. (PSBM-27525)
- Virtual machines created from shared templates remained in the invalid state after creation. (PSBM-27831)
- Checkpointing mechanism could not handle silly-renamed files if SimFS was used over NFS. (#OVZ-2242)
- An attempt to run a KVM VM could fail due to insufficient permissions while accessing a device. (#OVZ-2915)
- Under certain circumstances, PID allocation code deficiency could lead to a Hardware Node crash. (#OVZ-2983)

## References

- <https://rhn.redhat.com/errata/RHSA-2014-0771.html>
- <https://www.redhat.com/security/data/cve/CVE-2013-6378.html>
- <https://www.redhat.com/security/data/cve/CVE-2014-0203.html>
- <https://www.redhat.com/security/data/cve/CVE-2014-1737.html>
- <https://www.redhat.com/security/data/cve/CVE-2014-1738.html>
- <https://www.redhat.com/security/data/cve/CVE-2014-1874.html>
- <https://www.redhat.com/security/data/cve/CVE-2014-2039.html>

## Virtuozzo 6 Update 7

### New Features

- **Multiple virtual hard disks in Containers** (PSBM-15338). Even though new Containers are created with just one virtual hard disk, you can now add more disks to a Container and keep the corresponding ploop images at locations of your choice, be it directly attached HDDs or SSDs or Virtuozzo Storage. Such functionality allows creating more flexible Containers, in which, for example, the operating system is kept on a fast SSD and user content is stored on a capacious HDD or Virtuozzo Storage.
- **Ability to select which Container disks to compact** (PSBM-26001). The new `--autocompact` parameter for the `prlctl set` command allows you to select which Container disks should be compacted by the `pcompact` tool. For details, see the *Virtuozzo Command Line Reference Guide*.
- **S.M.A.R.T. monitoring of physical disks used by Virtuozzo Storage** (PSBM-26433). The S.M.A.R.T. status of physical disks is now monitored by the `smartctl` tool installed along with Virtuozzo. Every 10 minutes, the tool polls all physical disks attached to Hardware Nodes in the cluster, including caching and journaling SSDs, and reports the results to the MDS server. You can view disk poll results in the output of the `pstorage top` command (press `d` to switch to the disks table).
- **Ability to change iSCSI target's IP address** (PSBM-26416). Now, if you need to change the IP address of an iSCSI target, stop the target, then run the command `pstorage-iscsi set -t <target_name> -a <new_IP_address>`.
- **Ability to increase iSCSI LUN size** (PSBM-26175). Now, if you need to increase the size of an iSCSI LUN, stop the target, then run the command `pstorage-iscsi lun-grow -t <target_name> -l <lun_ID> -s <new_size>`.
- **Chunk server failure flags in pstorage top** (PSBM-24724). The flags in the CS section of `pstorage top` now indicate the reasons for CS failure. For more details, see the *Virtuozzo Storage Administrator's Guide*.
- **Monitoring of lost packets and network latencies for Virtuozzo Storage services** (PSBM-27003, PSBM-26211). Based on these monitoring results, Virtuozzo Storage optimizes

network traffic between its services. The lost packets and network latencies are shown in the RETRANS and LAT\_AVG, LAT\_MAX, LAT\_TOP columns in the CS section of `pstorage top` (press `i`). Lost packets as well as network latency values marked orange and red may indicate network issues.

- **Ability to reset traffic statistics for running Contrainers** (PSBM-21243). The `vztactl reset_ve_stat` command now works for running Containers as well.

## Bug Fixes

- Intel i350 NICs could silently drop the ARP packet generated by `arp send` for VLAN interfaces. (PSBM-22719)
- The guest tools service startup type was switched from `Auto` to `Delayed`. (PSBM-23163)
- Newly created ploop images could not be mounted after resizing. (PSBM-24671)
- Replication performance was optimized in regard to SSD journals (PSBM-25768)
- `prl_backup_client` could crash or hang if it used more than 1024 file descriptors. (PSBM-26171)
- The `ISCSI_ROOT` variable now points to `/pstorage/<cluster_name>/iscsi` by default (PSBM-26178)
- Autocompletion now works for `pstorage-iscsi` commands (PSBM-26196).
- Unlicensed disk capacity is now shown in `pstorage top` (PSBM-26342)
- CloudLinux Server 5 virtual machines could experience 1-2 minute hangs. (PSBM-26394)
- The dispatcher could not start external processes (e.g., `shaman`, `iptables`) if it used more than 1024 file descriptors. (PSBM-26422)
- Listening addresses can now be set for existing chunk servers with the `pstorage configure-cs` command. (PSBM-26436)
- The dispatcher could crash after failure to stop the VNC server. (PSBM-26583)
- Virtual machines with routed networking and enabled offline management could lose network after migration. (PSBM-27454)
- Virtual machines created from shared templates remained in the invalid state after creation. (PSBM-27729, PSBM-27814)
- A number of other bugs (PSBM-22777, PSBM-23917, PSBM-24500, PSBM-24812, PSBM-24876, PSBM-24928, PSBM-25604, PSBM-25670, PSBM-25734, PSBM-25869, PSBM-25922, PSBM-25986, PSBM-26164, PSBM-26294, PSBM-26340, PSBM-26446, PSBM-26570, PSBM-26659, PSBM-26966, PSBM-27296, PSBM-27447, PSBM-27489, PSBM-27507, PSBM-27566, PSBM-27642, PSBM-27899).

## Virtuozzo 6 Update 7 Hotfix 2

### Bug Fixes

- Could not resize virtual machine disks as unprivileged user. (PSBM-28144)

- Could not resize disks of virtual machines with spaces in names. (PSBM-28158)
- Incorrect values reported for virtual machines by CPU usage counters. (PSBM-28181)
- A cache-related issue could cause the Virtuozzo Storage client to crash. (PSBM-28217)
- The `prlctl create` command with the `--uuid` switch failed to work if the `--vmtype vm` and `--ostemplate` options were also specified. (PSBM-28250)
- Zero total allocatable space reported by `pstorage top` and `pstorage stat`. (PSBM-28268)
- Migration of Containers to virtual machines did not work. (PSBM-28276)

## Virtuozzo 6 Update 7 Hotfix 4

### Bug Fixes

- The `prlctl --device-add hdd` command failed to add the image path to Container configuration. (PSBM-28316)
- Information on where to find `prlctl` return codes for Container operations was missing from the `prlctl` man page. (PSBM-28347)
- Could not add the second disk to Container using `prlctl`. (PSBM-28397)
- The Java VNC client did not print the colon character with the Japanese keyboard layout selected. (PSBM-28458)
- Under certain circumstances, Parallels Transporter installation could fail because not all system libraries could be initialized in time. (PSBM-28471)
- Under certain circumstances, a virtual environment could fail to restore from backup. (PSBM-28673)

## Virtuozzo 6 Update 7 Hotfix 6

### Bug Fixes

- Under certain circumstances, Virtuozzo Storage client could crash. (PSBM-28294)
- Under certain circumstances, a memory leak could occur in the MDS daemon. (PSBM-29184)

## Virtuozzo 6 Update 8

### New Features

- **Attaching backups to virtual machines and Containers.** To read the contents of a virtual machine or Container backup, you can attach it to a virtual machine or Container as a virtual hard disk. Currently, only local backups can be attached.
- **Updating Virtuozzo during installation from DVD.** To save time, you can download and install product updates from the official repository during Virtuozzo installation. To do this, click

**Yes** in the alert window that is shown after the installation has started but before any packages are installed.

- **Enabling and disabling the Customer Experience Program in guest tools.** Now enabling or disabling CEP reports on the Hardware Node also enables or disables CEP reports in guest tools installed in virtual machines. To apply changes to virtual machines, restart them after changing CEP settings on the Node.
- **The vzeventd daemon for improved Container restarting.** You can restart Containers from the inside using typical Linux commands, e.g., `reboot` or `shutdown -r`. Restarting is now handled by the `vzeventd` daemon which listens to kernel events and runs the appropriate action scripts.
- **An out-of-space message for Virtuozzo Storage clusters not used for virtualization.** If the cluster is not used for virtualization, you can mount it with the `--fail-on-nospace` option. In this case an `ERR_NO_SPACE` error will be returned if the cluster runs out of free space.
- **Afterboot man page.** An `afterboot` manual page has been added to the Virtuozzo distribution.

## Bug Fixes

- Under certain circumstances, very large Containers with enabled quotas could fail to start. (PSBM-26464)
- Converting a Container from VZFS to ploop could fail due to a huge `diskinodes` value. (PSBM-26570)
- Implemented remote clone operation in SDK. (PSBM-26671)
- Virtual machines with UEFI could fail to start if assigned more than 64256 MB of RAM. (PSBM-26752)
- Virtual machines on a Hardware Node with certain AMD Opteron CPUs could hang. (PSBM-27636)
- Under certain circumstances, backing up a virtual machine with ReiserFS could result in a Hardware Node crash. (PSBM-27869)
- Virtual machine's disk could become split after p2v migration to Virtuozzo Storage. (PSBM-28057)
- Checking integrity of a ploop image in use could corrupt its partition table. (PSBM-28961)
- Under certain circumstances, migration of a virtual machine with disabled High Availability could fail. (PSBM-29317)
- Could not enter the colon character in Java VNC clients in the Japanese locale. (PSBM-29449)
- A number of other bugs (PSBM-7525, PSBM-20387, PSBM-22455, PSBM-24682, PSBM-26347, PSBM-26716, PSBM-26883, PSBM-26954, PSBM-27286, PSBM-27291, PSBM-27366, PSBM-27470, PSBM-27531, PSBM-27565, PSBM-27797, PSBM-27854, PSBM-27864, PSBM-27925, PSBM-27940, PSBM-27946, PSBM-28109, PSBM-28142, PSBM-28308, PSBM-28310, PSBM-28363, PSBM-28370, PSBM-28371, PSBM-28375, PSBM-

28514, PSBM-28552, PSBM-28604, PSBM-28669, PSBM-28826, PSBM-29052, PSBM-29087, PSBM-29187, PSBM-29349, PSBM-29581, PSBM-29866, PSBM-29987).

## Virtuozzo 6 Update 8 Hotfix 1

### Bug Fixes

- A flaw was found in the way the Linux kernel handled GS segment register base switching when recovering from an #SS (stack segment) fault on an erroneous return to user space. A local, unprivileged Container user could use this flaw to crash the Hardware Node or escalate their privileges on the system. (PSBM-30745)

## Virtuozzo 6 Update 8 Hotfix 3

### New Features

- Support for CentOS 7 and Red Hat Enterprise Linux 7 in virtual machines.
- Support for OpenSUSE 13.2 in Containers.

### Bug Fixes

- Could not resize virtual machine disk as unprivileged user. (PSBM-28144)
- With CPU hotplugging enabled and CPU limits set in MHz, CPU speed in `/proc/cpuinfo` could be calculated incorrectly. (PSBM-28832)
- Could not use `/dev/mapper/<alias>` as HDD name. (PSBM-28955)
- Unable to migrate Containers with VZFS to ploop conversion due to the "Error setting up ugid quota" error. (PSBM-29375)
- Virtual machine name could be parsed incorrectly during restore. (PSBM-30187)
- Cloning Containers with Virtuozzo Automator XML RPC could result in some of them getting lost. (PSBM-30319)
- Increasing HDD size with the `prl_disk_tool resize --resize_partition` command could result in deletion of files on the HDD. (PSBM-30362)
- Could not check for EZ template updates with `rpm/yum` via `vzpkg update`. (PSBM-30365)
- Virtuozzo Storage event log got flooded with license update errors occurring if a newer license was not available. (PSBM-30459)
- Containers with names longer than 31 characters could not be compacted. (PSBM-30725)

## Virtuozzo 6 Update 8 Hotfix 6

### Bug Fixes

- A Hardware Node could crash while caching the openSUSE 12.2 OS template due to a bug introduced in `vzpkgenvzypp49-6.0.8-9`. (PSBM-31265, PSBM-31275)

- Updating to `pstorage-6.0.8-38` with hotplugging enabled could result in chunk server loss. (PSBM-31341)

## Virtuozzo 6 Update 9

### New Features

- **Support for Docker inside Containers** (PSBM-29806). You can now create and run Docker containers inside Containers based on supported OS EZ templates.
- **Improved Virtuozzo Storage data balancing and a new space allocation algorithm** (PSBM-29966, PSBM-30229, PSBM-30289). A new space allocation algorithm balances data better in the cluster and helps avoid cluster performance degradation when adding new chunk servers.
- **Improved Virtuozzo Storage I/O latency monitoring** (PSBM-31580, PSBM-31839). The `pstorage mnt-top` command provides new latency monitoring and shows network statistics and disk latencies for CS communications. The command lets users identify Chunk Servers and Nodes with the highest latencies and thus helps eliminate weaknesses in the data chain. The `pstorage mnt-top` command shows average and top latencies as well as unaligned I/O statistics to help users identify files and virtual environments generating unaligned I/O. If a Virtuozzo Storage I/O request is frozen for more than 7 seconds, a message about is added to `/var/log/messages`.

### Bug Fixes

- Invalid unlicensed space in `pstorage stat`. (PSBM-29353)
- The `-i` option was not ignored in `pstorage make-mds -I -i` commands. (PSBM-30139)
- Parsing of listening address for `make-cs` and `configure-cs` commands did not work. (PSBM-30144)
- P2V migration of Ubuntu could fail because of failed GRUB detection. (PSBM-30487)
- Under certain circumstances, use of an e1000 network adapter in a Windows virtual machine could lead to kernel panic. (PSBM-30624)
- Improved error logging on the `pstorage-mount` initialization stage. (PSBM-30831)
- Missing confirmation for the `pstorage rm-cs --force` command. (PSBM-31071)
- Accessing Container's `sysfs` filesystem from both inside the Container and the host (CT #0) could lead to a kernel panic. (PSBM-31275)
- Under certain circumstances, a virtual machine registered in PACI could hang in the stopping state (PSBM-31069)
- The Distributed Replicated Block Device (DRBD) driver kernel module could not be compiled for the OpenVZ kernel. (PSBM-31320, #OVZ 3168)
- The `yum update` command could fail due to incorrect repository configuration (PSBM-31325)

- Multicast packets could be processed incorrectly on hosts with bridged networking, which could lead to sporadic multicast packet storms or kernel panics. (PSBM-31496)
- Under certain circumstances, online migration of a Container could fail with the message `Error: rst_inotify: -17`. (PSBM-31567)
- Checkpointing and restoration of a Container could break symbolic links in `/dev` which could lead to application failures. (PSBM-31593)
- An infinite loop could occur in the monitor script after a service's working directory had been unexpectedly removed.
- Improved format for space and latency values in `pstorage stat` and `pstorage top` output.
- A number of other bugs (PSBM-20496, PSBM-24602, PSBM-26223, PSBM-27443, PSBM-28657, PSBM-28708, PSBM-28768, PSBM-28883, PSBM-28885, PSBM-29036, PSBM-29046, PSBM-29181, PSBM-29287, PSBM-29513, PSBM-30011, PSBM-30027, PSBM-30190, PSBM-30197, PSBM-30366, PSBM-30667, PSBM-30771, PSBM-30804, PSBM-30915, PSBM-30930, PSBM-31110, PSBM-31539).

## Virtuozzo 6 Update 9 Hotfix 2

### Bugfixes

- The total Virtuozzo Storage replication time could increase multifold due to a bug in replication algorithm. (PSBM-32765)
- Under certain circumstances, a massive migration of virtual environments to a cluster running Update 9 could lead to a massive MDS crash. (PSBM-32773)

## Virtuozzo 6 Update 9 Hotfix 3

### New Features

- **CPU Pools for High Availability clusters.** (PSBM-21735) A CPU pool is a set of nodes with equal CPU features, enabling live migration of virtual machines and Containers between nodes of the CPU pool.
- **VirtIO network adapter emulation.** (PSBM-29162) The VirtIO network adapter can now be used in virtual machines. It can be enabled with the `prctl set --adapter-type virtio` command.

### Bug Fixes

- After updating to Virtuozzo 6.0 Update 9, Containers and virtual machines could fail to start if an outdated kernel was in use (version 2.6.32-042stab094.7 or older). (PSBM-32497)
- Disk information disappeared from `pstorage top/stat` output after updating to Virtuozzo 6.0 Update 9. (PSBM-32849)
- `cpupools` threw an error on the Intel Xeon E5-2630 v3 processor. (PSBM-32850)
- Online migration of a running Container with `pmigrate` or `vzmigrate` could leave it in the `invalid` state on the source node after successful migration. (PSBM-32870)

## Virtuozzo 6 Update 9 Hotfix 4

### Bug Fixes

- Network configuration for old SLES-based containers was broken in 042stab105.x kernels. (PSBM-32744)
- `vzlist` did not show the `devnodes` field for containers. (PSBM-32936)
- External syn flood leads to node slowdown and triggers soft lockup messages on host. (#OVZ-3201)
- Creation of `/dev/net/tun` device file inside container could fail, which could affect VPN functionality inside containers. (#OVZ-3209)

**Note:** Access to the `tun` device is mandatory for Docker-ready containers.

## Virtuozzo 6 Update 9 Hotfix 7

### New Features

- **Support for Ubuntu 15.04 and Debian 8.0 in Containers.** You can now create Containers using EZ templates for Ubuntu 15.04 and Debian 8.0.

### Bug Fixes

- Attempting to start VNC could result in dispatcher crash if the previous VNC start had failed for some reason. (PSBM-33188)
- Incorrect I/O framework could be selected for virtual machines working on Virtuozzo Storage. (PSBM-33552)
- The `parallels.log` file could rapidly increase in size due to message floods, potentially leading to disk space shortage. (PSBM-33673)

## Virtuozzo 6 Update 9 Hotfix 9

### New Features

- Support for Fedora 22 in Containers.

### Bug Fixes

- In rare cases, MDS server could crash during zeroconf discovery. (PSBM-32770)
- The `/var/log/messages` file could grow large quickly due to repeating "Cache file already exist" messages, potentially resulting in disk space issues. (PSBM-33858)
- Allocatable space in Virtuozzo Storage could be calculated incorrectly. (PSBM-34063)

## Virtuozzo 6 Update 9 Hotfix 12

**Note:** This update causes service restart.

### New Features

- Improved migration of Windows containers to virtual machines. Improvements include higher migration speed, migration of network settings, CPU, and memory limits. (PSBM-31947)

### Bug Fixes

- VZFS-based container backup could result in / partition overflow. (PSBM-21789)
- The IP address passed with the `--vnc-address` option is ignored and VNC server for the virtual machine listens on address `IPADDR_ANY`. (PSBM-34337)
- In certain circumstances, migrating containers to a heavily loaded hardware node could fail. (PSBM-34548)
- In certain circumstances, virtual machine could fail to resume automatically from suspended state after `vzreboot`. (PSBM-34554)
- Setting the `noauto` option in `fstab` could result in `/vz` partition not being mounted on server start. (PSBM-34800)
- Container might start unexpectedly after stopping if `sysvinit-utils` is outdated (`sysvinit-utils 2.88dsf-59`). (PSBM-34966)

## Virtuozzo 6 Update 10

### New Features

- **Backup/restore API for block devices.** The new API functions allow developing third-party backup solutions for Virtuozzo virtual machines and Containers.
- **Virtual machine CPU limit now takes into account hardware virtualization overhead.** The new `--vm-cpulimit-type` parameter enables Node administrator to apply CPU limit to specific virtual machine threads: both service and activity or just activity.
- **Guest filesystem usage reporting.** The new `guest.fs*` performance counters provide usage statistics of virtual machine and Container filesystems. The data provided includes filesystem's total size, free space, name (as seen from inside the guest), and indices of disks on which the filesystem resides. The data can be obtained with the `prlctl statistics centos7 --filter "guest.fs*" --loop` command.
- **Periodic NTP time synchronization is now enabled by default during Virtuozzo installation.**
- **Linux kernel AIO limit virtualization.** (PSBM-27188) Global kernel variables `aio_nr` and `aio_max_nr` are now virtualized as `fs.aio-nr` and `fs.aio-max-nr`, respectively, for Containers and Hardware Nodes. Container owners can set their own `fs.aio-max-nr` limits

isolated from Node's and other Containers' limits. The `fs.aio-nr` variable shows current AIO usage calculated per Container and Hardware Node.

- **Added support for more guest operating systems.** The following guests are now available: openSUSE 13.2, Fedora 21, Debian 8, Ubuntu 14.10, Ubuntu 15.04.
- **The pcompact utility can now defragment data blocks.** The feature can be controlled with the `DEFRAG` parameter in the `/etc/vz/pcompact.conf` configuration file.
- **VirtIO is now default network adapter for most Linux guests.**

## Bug Fixes

- Virtual block layer was optimized for speed. (PSBM-19580)
- ploop could get stuck inside `ploop_make_request()` causing Node to hang (PSBM-29066, #OVZ-6293, #OVZ-6392)
- By default `kdump` was configured to store crash dumps on `/` which could be too small. Now the partition with the most free space is automatically chosen for crash dumps. (PSBM-31922)
- Removing a snapshot of a virtual machine with split disks could get that virtual machine stuck in the `del_snapshot` state. (PSBM-32164)
- ext4 filesystem over ploop device could get corrupt due to hard reset. (PSBM-32381)
- Under certain network workload, Container checkpoint/restore operations could result in conntrack duplication which could prevent online migration of said Container. (PSBM-32411)
- Container could not be restarted after attempting to enable quota for it with the `vzctl set quotauidlimit --setmode restart` command. (PSBM-32894)
- Attempt to join a cluster could fail with an error message "A cluster with this name already exists". (PSBM-32970)
- In certain circumstances, virtual machine disk could become corrupt. (PSBM-33127)
- Soft lockup in `cgroup_kernel_close()`. (PSBM-33300)
- Kernel could crash in `attach_task_by_pid()` when tasks exited. (PSBM-33381)
- CPT image compatibility was broken in 042stab108.x kernels. As a result, received but nondelivered TCP packets saved into CPT image could, in certain circumstances, lose TCP flags during restore on 042stab108.x kernels. This resulted in incorrect processing of restored packets and could cause unexpected kernel warnings or lead to issues in userspace applications. (PSBM-33549, #OVZ-3237)
- Fixed the reason of invalid warning "ida\_remove called for id=0 which is not allocated." (PSBM-33789, #OVZ-3117)
- The `VE_PARALLEL` option in `/etc/vz/vz.conf` was ignored on server reboot. (PSBM-34836)
- Dispatcher could stop itself and all virtual machines if `vzmd` failed during migration. (PSBM-34986)
- ploop journal could get stuck in `__block_write_full_page()` causing Node to hang. (PSBM-35095)

- After conversion of a third-party virtual machine to Virtuozzo with Virtuozzo Storage, the resulting virtual machine could have split disk. (PSBM-35286)
- Temporary files remained after `prlctl backup` operation was cancelled. (PSBM-35292)
- The `--backup-timeout` option for `prlsrvctl` was renamed to `--idle-connection-timeout` for clarification. (PSBM-35307)
- In certain circumstances, Hardware Nodes with 108.x kernels could crash. (PSBM-37612)
- Virtual devices state (AHCI, VirtIO) could become corrupt on target node during migration. (PSBM-39003)
- `rsyslogd` was not allowed to dump Container-related kernel messages inside Container. (#OVZ-2693)
- A number of other issues. (PSBM-19258, PSBM-24412, PSBM-25446, PSBM-27264, PSBM-29522, PSBM-29760, PSBM-29763, PSBM-30460, PSBM-30636, PSBM-30732, PSBM-30787, PSBM-31266, PSBM-31452, PSBM-31706, PSBM-31708, PSBM-31727, PSBM-32613, PSBM-32710, PSBM-32791, PSBM-32795, PSBM-32803, PSBM-32826, PSBM-33074, PSBM-33163, PSBM-33333, PSBM-33381, PSBM-33472, PSBM-33651, PSBM-33730, PSBM-33781, PSBM-33804, PSBM-33924, PSBM-33996, PSBM-34041, PSBM-34227, PSBM-34385, PSBM-34560, PSBM-34677, PSBM-34689, PSBM-34697, PSBM-34813, PSBM-34901, PSBM-35308, PSBM-35323, PSBM-35380, PSBM-37910, PSBM-38748, PSBM-39148)

## Virtuozzo 6 Update 10 Hotfix 1

### Bug Fixes

- Migration of a Container between nodes in a Virtuozzo Storage cluster could fail if said Container had symlinks in the path specified as `VE_PRIVATE` in the configuration file.

## Virtuozzo 6 Update 10 Hotfix 2

### Bug Fixes

- Could not start Virtuozzo Storage iSCSI targets due to a missing `arp send` executable. (PSBM-39584)
- Virtual machines could not be cloned from GlusterFS storage after updating to Virtuozzo 6 Update 10. (PSBM-39658)

## Virtuozzo 6 Update 10 Hotfix 3

### New Features

- **Preview of the Bitnami application image catalog for Virtuozzo.** Available as an additional subscription for Virtuozzo, the catalog provides the latest versions of popular applications and development stacks, tested, optimized, and ready to be deployed in containers or virtual machines.

## Bug Fixes

- In certain circumstances, container owner could escape from bindmount. (PSBM-34244)
- Virtual machine log could get flooded by DIO messages and could potentially eat up free disk space on host. (PSBM-39659, PSBM-39747)
- In certain circumstances, dispatcher could crash. (PSBM-39734, PSBM-39736, PSBM-39817, PSBM-39874)
- Migration with `--convert-vzfs` could fail due to an empty path used. (PSBM-39739)

## Virtuozzo 6 Update 10 Hotfix 4

### Bug Fixes

- CPT suspend of a ploop container could lead to a crash in `add_extent_mapping()`. (PSBM-26762)
- In certain circumstances, host node could hang on memory allocation inside `ext4_writepages()`. (PSBM-39335)
- DRM/i915: crash on boot in `intel_cleanup_ring_buffer()`. (PSBM-39657)
- `e2fsprogs-e4defrag2-static` was not installed as a dependency. (PSBM-39959)
- `e4defrag2` could fail with `EMFILE` on `pass3` on a large Container. (PSBM-40019)
- Guest RAM statistics was only counted with guest tools in the state `PTS_INSTALLED`. (PSBM-40139)
- Virtuozzo Storage packages were released with a lower version than the previous update. (PSBM-40285)
- Infinite loop in `fuse_fill_write_pages()`. (PSBM-40379)
- Uninterruptable hang in `sendfile`. (PSBM-40387)
- Crash when attempting to garbage-collect an uninstiated keyring. (PSBM-40458, CVE-2015-7872)
- Use-after-free in `unix_dgram_poll()`. (PSBM-40459)
- Performance degradation when starting systemd-based containers. (#OVZ-6510)
- Crash on mount of corrupted ext4 filesystem. (#OVZ-6541)
- RDS: verify the underlying transport exists before creating a connection. (CVE-2015-6937)
- Minor memory leaks and performance optimizations.
- Non-security issues in RHSA-2015-1272, RHBA-2015-1466, RHSA-2015-1623, RHBA-2015-1827.

### References

- <https://rhn.redhat.com/errata/RHSA-2015-1272.html>

- <https://rhn.redhat.com/errata/RHBA-2015-1466.html>
- <https://rhn.redhat.com/errata/RHSA-2015-1623.html>
- <https://rhn.redhat.com/errata/RHBA-2015-1827.html>

## Virtuozzo 6 Update 10 Hotfix 5

### Bug Fixes

- Ensured forced ARP cache updates on neighbor nodes. (PSBM-40322)

## Virtuozzo 6 Update 10 Hotfix 6

### Bug Fixes

- In very rare cases, CS could permanently show 100% W/A time, reducing cluster performance. (PSBM-39708)
- Deletion of a very large amount of data could result in changing of master MDS. (PSBM-40975)
- A malicious guest administrator could trigger a DoS causing the host to hang indefinitely. (PSBM-41035)

**Note:** After updating, no host reboot or 'parallels-server' restart is necessary. To avoid the vulnerability in the future, each VM on the host should either be restarted or suspended/resumed. Alternatively, VMs on the host can be migrated to an updated host.

## Virtuozzo 6 Update 10 Hotfix 7

### New Features

- **Support for Ubuntu 15.10 guest OS in containers.**
- **Support for Fedora 23 guest OS in containers.**

### Bug Fixes

- Could not restore backups of large virtual machines (100+ GB) due to timeouts. (PSBM-41302)

## Virtuozzo 6 Update 11

### New Features

- **VzLinux replaces CloudLinux as base distribution.** From this update on, Virtuozzo 6 is based on the VzLinux distribution supported by Virtuozzo.
- **Support for the WebSocket protocol over SSL for VNC connections.** Virtuozzo virtual machines or containers can now be managed remotely via HTML5-based VNC consoles.
- **Support for Docker 1.8.3 in Virtuozzo containers (experimental).**

- **Support for OpenShift v1.1.1, Kubernetes v1.2.0, and cAdvisor v0.20.5 in Virtuozzo containers.**
- **Support for Fedora 23 and Ubuntu 15.10 in virtual machines.** Now Virtuozzo 6 supports Fedora 23 (see also <https://kb.virtuozzo.com/en/128128>) and Ubuntu 15.10 guest operating systems in virtual machines in addition to containers (support for which was added in previous updates).

## Bug Fixes

- Default `mtime` granularity could result in chunk servers switching between active/inactive states in Virtuozzo Storage. (PSBM-20411)
- Running `service network restart` could reset configuration set with `vznetcfg`. (PSBM-20547)
- Temporary snapshots left after backup operations could result in snapshot inconsistency and further backup failures. (PSBM-33414)
- Failure of `vzmdest` with a `segfault` during migration could result in stopping of the dispatcher and all VMs on the destination host. (PSBM-34986)
- After restoring a VM with an external HDD from backup, the external HDD could be not reattached to the VM on startup. (PSBM-39010)
- A memory leak in the `vza_conf` process could potentially affect performance of a host running a large amount of containers. (PSBM-39469)
- Backing up VMs with inconsistent configurations could result in dispatcher crash. (PSBM-39939)
- Excessive amount of lookup/stat events generated for subscribers to VE performance statistics could result in excessive load on host. (PSBM-41481)
- Crash in `restore_one_vfsmount()` on restoring shared non-master mounts. (PSBM-42471)
- On RHEL7-based guest operating systems, guest tools could become unusable after a kernel or tools update. (PSBM-42621)
- Hanging of `iptables` during execution could result in hanging of the dispatcher as well. (PSBM-42634)
- Introduced `FADV_DEACTIVATE` flag in `fdadvise()` to be able to move file pages from the active to the inactive list. (PSBM-42664)
- Race between `keyctl_read()` and `keyctl_revoke()` could crash the host. (PSBM-43799, CVE-2015-7550)
- Under certain circumstances, backup/restore via the CBT interface could hang the host. (PSBM-43936)
- Second-level quota in `simfs` containers was broken in `042stab113.x` kernels. (OVZ-6655)
- A number of other bugs (PSBM-21205, PSBM-34381, PSBM-34382, PSBM-38735, PSBM-40083, PSBM-40807, PSBM-41282, PSBM-42665, PSBM-42898).

## Virtuozzo 6 Update 11 Hotfix 1

### Bug Fixes

- Virtuozzo Storage chunk servers with SSD journal and without checksumming could crash after updating to Virtuozzo 6 Update 11. (PSBM-45099)
- Virtuozzo Storage metadata servers could crash after updating to Virtuozzo 6 Update 11. (PSBM-45155)

## Virtuozzo 6 Update 11 Hotfix 3

### New Features

- Virtuozzo Application Catalog.

To meet the popular demand for a service that allows to quickly deploy preconfigured and ready-to-use applications, Virtuozzo has partnered with Bitnami to offer a new subscription service called Virtuozzo Application Catalog. Available as an additional subscription for Virtuozzo, the catalog provides the latest versions of end users' favorite applications and development stacks, tested, optimized, and ready to be deployed in an environment of choice. The catalog offers Wordpress, Redmine, SugarCRM, Alfresco, Drupal, MediaWiki, GitLab, and dozens of other popular applications designed for all types of users and businesses. Every application is precompiled and preconfigured with all the necessary dependencies and works out-of-the-box as a container or virtual machine. Service providers no longer have to waste valuable time fixing and updating their own application catalogs.

For more details, please see Using Virtuozzo Application Catalog in the Virtuozzo User's Guide available at

[http://updates.virtuozzo.com/doc/pcs/en\\_us/virtuozzo/6/current/pdf/Virtuozzo\\_Users\\_Guide.pdf](http://updates.virtuozzo.com/doc/pcs/en_us/virtuozzo/6/current/pdf/Virtuozzo_Users_Guide.pdf).

Virtuozzo Application Catalog is offered as a commercial subscription service for Virtuozzo 6. Please contact our sales team for assistance in purchasing it.

## Virtuozzo 6 Update 11 Hotfix 4

### New Features

- **Support Ubuntu 16.04 guest OS in Containers.** The new Ubuntu 16.04 OS EZ template adds support for this guest OS in Containers.

## Virtuozzo 6 Update 11 Hotfix 7

### New Features

- Added the ability to migrate virtual machines from Virtuozzo 6 to Virtuozzo 7. (PSBM-40857)

## Virtuozzo 6 Update 11 Hotfix 9

### Bug Fixes

- Incremental backup size could grow enormously if a filesystem on one of the backed up VM partitions could not be recognized. (PSBM-44861)
- Dispatcher performance could degrade on highly loaded hosts in OACI environment. (PSBM-46684)

## Virtuozzo 6 Update 12

### New Features

- Support for Windows Server 2016 guest OS in virtual machines. (PSBM-30543)
- Support for Ubuntu 16.04 guest OS in virtual machines. (PSBM-46799)

### Bug Fixes

- Attempting to start a VM created from a legacy template could result in dispatcher crash. (PSBM-20830)
- `prl_backup_client` could remain active for a few more hours, consuming resources, after container restore was aborted by user. (PSBM-39109)
- VMs migrated while being reset could get stuck in the stopping state after migration. (PSBM-42497)
- Incorrect load balancing could result in increased I/O latencies of certain requests. (PSBM-42834)
- Unable to set log rotation policy for `pstorage-mount`. (PSBM-45338)
- Attempting to list network interfaces using ``prlctl`` could result in a crash if some of the virtual environments had multiple network interfaces. (PSBM-47775)
- Removed generation of HWIDs for `vme*` interfaces. (PSBM-48173)
- `vzlicview` could incorrectly detect amount of CPU sockets on host. (PSBM-49020)
- Sockets were missing the last symbol after suspend-resume. (PSBM-51817)
- Unable to start Virtuozzo 6.0 VMs on hosts SMBIOS 3.0. (PSBM-53027)
- Unable to install templates with ``vzpkg install template`` command. (PSBM-54052)
- VM scripts were not copied during VM cloning. (PSBM-54119)
- Fixed a memory leak that caused network slowdown. (OVZ-6838)
- Other fixes. (PSBM-32537, PSBM-39556, PSBM-42410, PSBM-43934, PSBM-44571, PSBM-45214, PSBM-45314, PSBM-45335, PSBM-46660, PSBM-46955, PSBM-47808, PSBM-49297, PSBM-50962, PSBM-51005, PSBM-51125, PSBM-52531, PSBM-53189, PSBM-54238, PSBM-54814, PSBM-55146, PSBM-57080)

## Known Issues and Restrictions

- The `prlctl` utility does not support some of the Container operations supported by `vzctl` in the previous versions of Parallels Server Bare Metal. To perform such operations, use the `vzctl` utility instead of `prlctl`.
- The offline management feature does not work for Containers operating in the bridged networking mode. For details, see the KB article at <http://kb.virtuozzo.com/en/111356>.
- The offline management feature might not work for running virtual machines that operate in the bridged networking mode. The reason for this is that the destination MAC address in incoming offline management packets is changed when the packets are processed on the host. As a result, the processed packets contain a source MAC address different from the destination one in incoming packets and might be dropped by your router.

To solve the problem, reconfigure the router to accept packets with the same IP address but different MAC addresses. As an alternative, you can set the network adapter of a virtual machine to operate in the host-routed mode.

- Cannot establish IPsec connections from Virtuozzo Hardware Node to Containers. For more information, see <http://kb.virtuozzo.com/120008>.
- Containers with multiple virtual hard disks cannot be backed up or restored via Virtuozzo Automator or using the `vzabackup/vzarestore` commands.
- An issue in the E1000 network driver may cause network on Windows Server 2012 R2 Update 1 virtual machines to stop working. For more details, see <http://kb.virtuozzo.com/en/123253>.
- Converting a Hyper-V virtual machine to a virtual machine may fail. To work around the problem, use the `--allow-no-os` option when converting the virtual machine. (PSBM-7201)
- Creating a virtual machine in Virtuozzo 6 set up in a Parallels Desktop for Mac virtual machine may take a long time. (PSBM-8528)
- Use of the WMI console is not supported in Windows virtual machines that you enter with the `prlctl enter` command. For more information on how to work around the problem, see <http://kb.virtuozzo.com/en/114766>. (PSBM-9811)
- A Linux virtual machine with less than 4 GB of RAM may hang on start-up. To work around the problem, use the `iommu=soft` option when booting the virtual machine. For details, see <http://kb.virtuozzo.com/en/114764>. (PSBM-11807)
- Creating snapshots of a Container that has at least one `prlctl enter` or `prlctl exec` session open is not supported. To make a snapshot, close the open sessions first. (PSBM-11871)
- Xen virtual machines cannot be migrated to virtual machines. (PSBM-12122)
- Virtuozzo may freeze a container trying to consume more disk space than you allocated to it. To solve the problem, increase the amount of disk space for the affected Container. (PSBM-12213)
- The Bash `echo` command does not report an error when trying to write to a file located on a Virtuozzo Storage cluster, even if the cluster does not have enough free space. (PSBM-12621)

- Soft lockups in the Linux kernel, up to version 2.6.37, may occur on stopping virtual machines. For more information, see <http://kb.virtuozzo.com/en/114761>. (PSBM-13963)
- Traffic shaping may not work for bridged virtual network adapters on physical servers with Open vSwitch enabled. (PSBM-14260)
- It is impossible to use the iptables functionality on physical servers with Open vSwitch bridges enabled. (PSBM-14334)
- On systems upgraded from Parallels Server 4 Bare Metal to Virtuozzo 6, `prlctl list -a` may not show the IP addresses of container-bridged network adapters. To view such IP addresses, use the `vzlist -o IP` command. (PSBM-14528)
- Running virtual machines with Windows Server 2012 and Windows 8 is supported only on servers that have CPUs with the NX (No-eXecute) feature enabled. For details, see <http://kb.virtuozzo.com/en/114760>. (PSBM-14837)
- Setting encrypted passwords for containers that run Ubuntu 10.04 is not supported. To work around the problem, set the password in plain text. For more details, see <http://kb.virtuozzo.com/en/114759> (PSBM-14886).
- Backing up a virtual machine with large virtual disks stored on an LVM partition may take a long time. (PSBM-14971)
- Running the lometer tool in a virtual machine with Windows and a small amount of RAM may cause the virtual machine to crash. To work around the problem, increase the amount of RAM or swap allocated to the virtual machine. (PSBM-15403)
- The `ebtables` rules are flushed after restarting the `ebtables` service. (PSBM-15641)
- Creating a cache with updates may fail for containers that run Red Hat Enterprise Linux 5. (PSBM-15707)
- Cannot migrate a Container with over 2TB of data to a virtual machine. (PSBM-21613)
- On 32-bit Linux guest operating systems, the maximum size of a virtual hard disk was limited to 17592186040320 bytes (16 TiB - 4 KiB). (PSBM-22193)
- Migration of physical Linux hosts which use EFI and GPT to virtual machines is not supported. (PSBM-24118)
- Cannot resize plain virtual hard disks with the `--resize_partition` option. (PSBM-26377)
- Cannot migrate Parallels Virtuozzo Containers for Windows 4.5 hardware nodes to virtual machines. (PSBM-29576)
- The `vzctl` utility does not recognize backups attached to virtual machines or Containers. (PSBM-29752)
- Virtual machine configurations with both EFI firmware and SCSI BusLogic controllers enabled are not supported. (PSBM-30537)
- Resizing disk of a virtual machine with Fedora 23 guest OS fails with internal error. (PSBM-43054)

## Deprecated Features

Features considered deprecated will be removed in the next major release of Virtuozzo. They will, however, work and remain supported in Virtuozzo 6. The following features are deprecated:

- The Virtuozzo file system (VZFS). For more information, see <http://kb.virtuozzo.com/119015>.
- Migration of physical servers to Containers and migration of Xen virtual machines to virtual machines. For more information, see <http://kb.virtuozzo.com/119016>.
- The `vzbackup`, `vzabackup`, and `pbackup` utilities. For more information, see <http://kb.virtuozzo.com/119017>.
- The global iptables mask configured in `/etc/sysconfig/vz`.
- All UBC resources except `physpages` and `swappages`.
- The `vziptables` parameter configured in the kickstart file used for unattended installations of Virtuozzo.
- Virtuozzo Automator Agent (Virtuozzo Virtualization SDK will be used instead).

## Contact Information

For information on Virtuozzo, visit <http://www.virtuozzo.com>.