



# Parallels Cloud Server 6.0

Readme

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# About This Document

This document provides the first-priority information about Parallels Cloud Server 6.0 and supplements the included documentation.

## About Parallels Cloud Server 6.0

Parallels Cloud Server 6.0 is a virtualization solution that allows you to simultaneously run Parallels 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 Parallels Cloud Server 6.0 as a stand-alone installation or as part of a Parallels Cloud Storage cluster.

### Requirements for Standalone Installations

The hardware and software requirements for running Parallels Cloud Server 6.0 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 ext3.
  - *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. Parallels Cloud Server 6.0 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 Parallels Cloud Storage Clusters

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

### Metadata Servers

A metadata server must meet the following requirements:

- **Software:** Parallels Cloud Server 6.0.
- **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:** Parallels Cloud Server 6.0.
- **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:** Parallels Cloud Server 6.0.
- **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 Parallels Cloud Server. 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 Parallels Cloud Storage requirements, see the *Parallels Cloud 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 Parallels Cloud Server 6.0.

### Virtual Machines

#### Windows

- 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 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 7.0 (x86, x64)
- Debian 6.0 (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 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 8.0 (x86, x64)
- Debian 7.0 (x86, x64)
- Debian 6.0 (x86, x64)
- Ubuntu 15.04 (x86, x64)
- Ubuntu 14.10 (x86, x64)
- Ubuntu 14.04 (x86, x64)
- Ubuntu 10.04.4 (x86, x64)

## Installing Parallels Cloud Server 6.0

To install Parallels Cloud Server 6.0, 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 Parallels Cloud Server.

For the complete installation instructions, see the *Parallels Cloud Server 6.0 Installation Guide* and the *Installation via PXE Server* guide.

# Starting to Work with Parallels Cloud Server 6.0

After you have successfully installed the product and restarted the physical server, you can use one of the following ways to start working with Parallels Cloud Server 6.0:

- using the command-line utilities,
- using Parallels Virtual Automation.

## Managing Parallels Cloud Server with the Command-line Utilities

Parallels Cloud Server 6.0 provides a set of command-line utilities for managing Parallels virtual machines and containers both locally and remotely.

- To manage virtual machines and Containers locally—that is, from the same server on which Parallels Cloud Server 6.0 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 Parallels Cloud Server 6.0 (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 Parallels 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 Parallels Cloud 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 Parallels Cloud Server with Parallels Virtual Automation

Parallels Virtual Automation is a Web interface you can use to remotely manage Parallels Cloud Server 6.0. Parallels Virtual Automation is automatically set up during Parallels Cloud Server installation if you select the **Install PVA Agent for Parallels Server** and **Install PVA Management Node** check boxes in the Parallels Cloud Server installer.

To connect to a server using Parallels Virtual Automation, do the following:

- 1 On any computer that can access Parallels Cloud Server 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 Parallels Cloud Server with Parallels Virtual Automation, consult the *Parallels Virtual Automation Administrator's Guide*.

# Changelog

## Parallels Cloud Server 6.0

### What's New

- **Parallels Cloud Storage.** Parallels Cloud Server 6.0 introduces Parallels Cloud 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.

Parallels Cloud Storage is optimized for storing large amounts of data and provides replication, high-availability, and self-healing features for your data. Using Parallels Cloud Storage, you can safely store and run Parallels virtual machines and Containers, migrate them with zero downtime, provide high availability for your Parallels Cloud Server installations, and much more.

- **Container-in-an-image-file layout.** In Parallels Cloud Server 6.0, 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.** Parallels Cloud Server 6.0 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 Parallels server, and reduce the starting times of multiple similar Containers.
- **Rebootless updates.** Parallels Cloud Server 6.0 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.** Parallels Cloud Server 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.** Parallels Cloud Server 6.0, 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 Parallels Cloud Server 6.0, 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 Parallels Cloud Server 6.0, 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.** Parallels Cloud Server 6.0 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 Parallels Cloud Server 6.0, 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 Parallels Cloud Server 6.0, 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.

## Parallels Cloud Server 6.0 Update 1

### What's New

- Tier support in Parallels Cloud 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 Parallels Cloud Server 6.0 could fail (#PSBM-16945).
- The man pages for Parallels Cloud 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).

## Parallels Cloud Server 6.0 Update 2

### What's New

- Greatly improved Parallels Cloud Storage performance in 10GbE clusters (#PSBM-17158, #PSBM-17709, #PSBM-17852).
- Improved Parallels Cloud 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 Parallels Cloud Storage license auto-renewal (#PSBM-18269).
- Fixed Parallels Cloud Storage replication settings changes blocking writes until replicated if previous `min-replicas` parameter was too low (#PSBM-18489).
- Fixed Parallels Cloud Storage authentication with a non-default `umask` (#PSBM-18819).
- Improved performance of Windows virtual machines in Parallels Cloud Storage (#PSBM-18983).
- Introduced Parallels Cloud Storage performance history in the `stat -F` command.
- Changed the recommended configuration for Parallels Cloud Storage to individual hard drives over hardware RAID with or without SSD for the journal/cache.
- Introduced new Parallels Cloud Storage performance counters in `top` and `stat` commands (`QDepth`, `RMW`, `JFull`).

### Bug Fixes

- Container migration from Parallels Cloud Server to Parallels Virtuozzo Containers 4.0 could fail (#PSBM-17182).
- Listing virtual servers residing in Parallels Cloud 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 Parallels Cloud 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 Parallels Cloud Storage could fail (#PSBM-18675).
- The Parallels Cloud Server installer could ask for Chunk Server mount point even if the Chunk Server role was not selected (#PSBM-19024).

## Parallels Cloud Server 6.0 Update 3

### What's New

- **High Availability for Parallels Cloud 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 Parallels Cloud 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 Parallels Cloud 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 Parallels 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,
  - Parallels Cloud Server 6.0 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).
- Parallels Cloud Server 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 Parallels Cloud 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).

## Parallels Cloud Server 6.0 Update 3 Hotfix 2

### Bug Fixes

- Unnecessary warnings in Parallels Cloud Storage logs if the number of CSeS was higher than the number of required replicas (#PSBM-20472).
- Parallels 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).

## Parallels Cloud Server 6.0 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).
- Parallels Tools could not be installed in a virtual machine with the latest CentOS 5 operating system inside (#PSBM-21029).

## Parallels Cloud Server 6.0 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 Parallels Virtual Automation (#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).

## Parallels Cloud Server 6.0 Update 3 Hotfix 5

### Bug Fixes

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

## Parallels Cloud Server 6.0 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, Parallels Cloud Server will automatically choose the latest NFS version supported by both the server and client.

- **Support for failure domains in Parallels Cloud 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 Parallels Cloud 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 Parallels Virtual Automation 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 Parallels Virtual Automation (#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).

## Parallels Cloud Server 6.0 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 Parallels Cloud Server 6.0 (#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).



## Parallels Cloud Server 6.0 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).

## Parallels Cloud Server 6.0 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 Parallels Cloud 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 Parallels Virtuozzo Containers for Windows (#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).
- Parallels Virtual Automation 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).

## Parallels Cloud Server 6.0 Update 5 (SP1) Hotfix 1

### Bug Fixes

- Unable to mount ploop images (#PSBM-24092).
- Unable to add new MDS to Parallels Cloud Storage clusters (#PSBM-24093).
- Parallels Cloud 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).
- Parallels Cloud 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).

## Parallels Cloud Server 6.0 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).

## Parallels Cloud Server 6.0 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).

## Parallels Cloud Server 6.0 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).

## Parallels Cloud Server 6.0 Update 5 (SP1) Hotfix 9

### Bug Fixes

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

## Parallels Cloud Server 6.0 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 Parallels Cloud Storage** (#PSBM-23763). The `pstorage-iscsi` tools provide a convenient way of accessing Parallels Cloud Storage clusters from operating systems and third-party virtualization solutions. With these tools, you can export ploop images stored in Parallels Cloud 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, Parallels Cloud 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.** Parallels Cloud 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 `prlctl 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 `prlctl 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 Parallels Tools are properly installed in the virtual machine" warning is shown during backup of Windows Server 2012 R2 with installed Parallels 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 `vzctl12_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).

## Parallels Cloud Server 6.0 Update 6 Hotfix 1

### Bug Fixes

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

## Parallels Cloud Server 6.0 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 Parallels Cloud Storage (#PSBM-26741).

## Parallels Cloud Server 6.0 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>

## Parallels Cloud Server 6.0 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)

## Parallels Cloud Server 6.0 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)

## Parallels Cloud Server 6.0 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\_conntrack\_ipv4, nf\_conntrack\_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>

## Parallels Cloud Server 6.0 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 Parallels Cloud 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 Parallels Cloud 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 *Parallels Cloud Server Command Line Reference Guide*.
- **S.M.A.R.T. monitoring of physical disks used by Parallels Cloud Storage** (#PSBM-26433). The S.M.A.R.T. status of physical disks is now monitored by the `smartctl` tool installed along with Parallels Cloud Server. Every 10 minutes, the tool polls all physical disks attached to Hardware Nodes in the cluster, including caching and journalling 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 *Parallels Cloud Storage Administrator's Guide*.
- **Monitoring of lost packets and network latencies for Parallels Cloud Storage services** (#PSBM-27003, #PSBM-26211). Based on these monitoring results, Parallels Cloud 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 Parallels 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).

## Parallels Cloud Server 6.0 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 Parallels Cloud 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)

## Parallels Cloud Server 6.0 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 `prctl` return codes for Container operations was missing from the `prctl` man page. (#PSBM-28347)
- Could not add the second disk to Container using `prctl`. (#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)

## Parallels Cloud Server 6.0 Update 7 Hotfix 6

### Bug Fixes

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

## Parallels Cloud Server 6.0 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 Parallels Cloud Server during installation from DVD.** To save time, you can download and install product updates from the Parallels official repository during Parallels Cloud Server 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 Parallels Customer Experience Program in Parallels Tools.** Now enabling or disabling CEP reports on the Hardware Node also enables or disables CEP reports in Parallels 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 Parallels Cloud 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 Parallels Cloud Server 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 Parallels Cloud 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).

## Parallels Cloud Server 6.0 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)

## Parallels Cloud Server 6.0 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 Parallels Virtual Automation XML RPC could result in some of them getting lost. (#PSBM-30319)
- Increasing HDD size with the `pvl_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)
- Parallels Cloud 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)

## Parallels Cloud Server 6.0 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)

## Parallels Cloud Server 6.0 Update 9

### New Features

- **Support for Docker inside Parallels Containers** (#PSBM-29806). You can now create and run Docker containers inside Parallels Containers based on supported OS EZ templates.
- **Improved Parallels Cloud 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 Parallels Cloud 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 Parallels Cloud 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).

## Parallels Cloud Server 6.0 Update 9 Hotfix 2

### Bugfixes

- The total Parallels Cloud 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)

## Parallels Cloud Server 6.0 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 Parallels Cloud Server 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 Parallels Cloud Server 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)

## Parallels Cloud Server 6.0 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.

## Parallels Cloud Server 6.0 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 Parallels Cloud Storage. (#PSBM-33552)
- The `parallels.log` file could rapidly increase in size due to message floods, potentially leading to disk space shortage. (#PSBM-33673)

## Parallels Cloud Server 6.0 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 Parallels Cloud Storage could be calculated incorrectly. (#PSBM-34063)

## Parallels Cloud Server 6.0 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)

## Parallels Cloud Server 6.0 Update 10

### New Features

- **Backup/restore API for block devices.** The new API functions allow developing third-party backup solutions for Parallels Cloud Server 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 Parallels Cloud Server 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 `vzmdest` 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 Parallels Cloud Server with Parallels Cloud 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)
- UDP socket reference count bugs in the `pppol2tp` driver. (#OVZ-3117)
- 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)

## 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.odin.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 Parallels server. 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.

- 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.odin.com/en/114759>.
- Cannot establish IPsec connections from Parallels Cloud Server Hardware Node to Containers. For more information, see <http://kb.odin.com/120008>.
- Containers with multiple virtual hard disks cannot be backed up or restored via Parallels Virtual Automation 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.odin.com/en/123253>.
- Converting a Hyper-V virtual machine to a Parallels 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 Parallels Cloud Server 6.0 set up in a Parallels Desktop for Mac virtual machine may take a long time. (#PSBM-8528)
- Using 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.odin.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.odin.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 Parallels virtual machines. (#PSBM-12122)
- Parallels Cloud Server 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 Parallels Cloud 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.odin.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 Parallels Cloud Server 6.0, `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.odin.com/en/114760>. (#PSBM-14837)
- 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)
- Ubuntu 15.04 `systemd` immediately unmounts manually mounted directories (for more details, see <https://bugs.launchpad.net/ubuntu/+source/systemd/+bug/1457398>). As a workaround, you can downgrade the `systemd` package or rebuild it with the available patch. (#PSBM-33492, #PSBM-33498)

## Deprecated Features

Features considered deprecated will be removed in the next major release of Parallels Cloud Server. They will, however, work and remain supported in Parallels Cloud Server 6.0. The following features are deprecated:

- The Virtuozzo file system (VZFS). For more information, see <http://kb.odin.com/119015>.
- Migration of physical servers to Containers and migration of Xen virtual machines to virtual machines. For more information, see <http://kb.odin.com/119016>.
- The `vzbackup`, `vzabackup`, and `pbackup` utilities. For more information, see <http://kb.odin.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 Parallels Cloud Server.
- PVA Agent (Parallels Virtualization SDK will be used instead).

## Contact Information

Product website: <http://www.odin.com>.