Parallels Virtuozzo Containers 4.7 for Linux

Reference Guide

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CHAPTER 1

Preface

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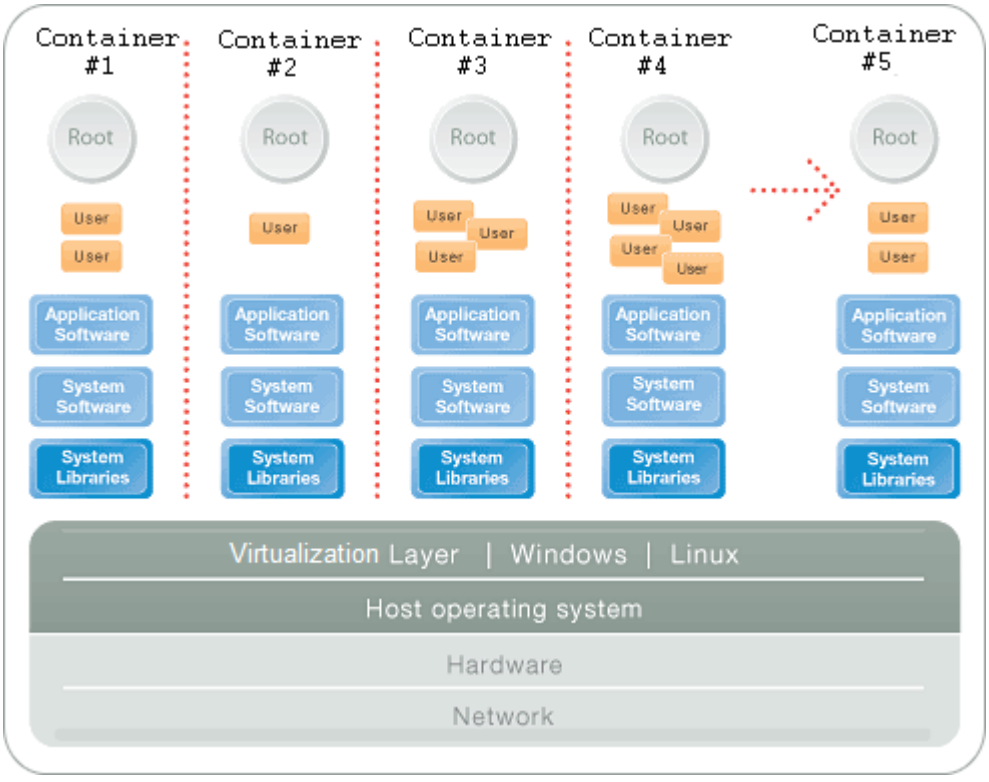
About Parallels Virtuozzo Containers

Parallels Virtuozzo Containers is a patented OS virtualization solution. It creates isolated partitions or Containers on a single physical server and OS instance to utilize hardware, software, data center and management effort with maximum efficiency. The basic Parallels Virtuozzo Containers capabilities are:

- **Intelligent Partitioning—**Division of a server into as many as hundreds of Containers with full server functionality.
- **Complete Isolation—**Containers are secure and have full functional, fault and performance isolation.
- **Dynamic Resource Allocation—**CPU, memory, network, disk and I/O can be changed without rebooting.
- **Mass Management—**Suite of tools and templates for automated, multi-Container and multi-server administration.

The diagram below represents a typical model of the Parallels Virtuozzo Containers system structure:



The Parallels Virtuozzo Containers OS virtualization model is streamlined for the best performance, management, and efficiency. At the base resides a standard Host operating system which can be either Windows or Linux. Next is the virtualization layer with a proprietary file system and a kernel service abstraction layer that ensure the isolation and security of resources between different Containers. The virtualization layer makes each Container appear as a standalone server. Finally, the Container itself houses the application or workload.

The Parallels Virtuozzo Containers OS virtualization solution has the highest efficiency and manageability making it the best solution for organizations concerned with containing the IT infrastructure and maximizing the resource utilization. The Parallels Virtuozzo Containers complete set of management tools and unique architecture makes it the perfect solution for easily maintaining, monitoring, and managing virtualized server resources for consolidation and business continuity configurations.

About This Guide

This guide is a complete reference on all Parallels Virtuozzo Containers configuration files and Hardware Node command-line utilities. It familiarizes you with the way to configure Parallels Virtuozzo Containers to meet your requirements and to perform various tasks by using the corresponding Parallels command line utilities.

The primary audience for this guide is anyone who is looking for an explanation of a particular configuration option, does not understand a Parallels file format, needs help for a particular command, or is seeking for a command to perform a certain task.

Organization of This Guide

Chapter 2, Configuring Parallels Virtuozzo Containers 4.7, explains how to configure Parallels Virtuozzo Containers configuration files to make your Containers function more effectively.

Chapter 3, Parallels Virtuozzo Containers Command Line Interface, describes all available Hardware Node command-line utilities together with the options and switches that can be passed to them.

Documentation Conventions

Before you start using this guide, it is important to understand the documentation conventions used in it.

The table below presents the existing formatting conventions.

Formatting convention	Type of Information	Example
Special Bold	Items you must select, such as menu options, command buttons, or items in a list.	Go to the **Resources** tab.
	Titles of chapters, sections, and subsections.	Read the **Basic Administration** chapter.
Italics	Used to emphasize the importance of a point, to introduce a term or to designate a command-line placeholder, which is to be replaced with a real name or value.	These are the so-called *EZ templates*. To destroy a Container, type `vzctl destroy` *`ctid`*.
`Monospace`	The names of commands, files, and directories.	Use `vzctl start` to start a Container.
`Preformatted`	On-screen computer output in your command-line sessions; source code in XML, C++, or other programming languages.	`Saved parameters for Container 101`
`Monospace Bold`	What you type, as contrasted with on-screen computer output.	**`# rpm –V virtuozzo-release`**
Key+Key	Key combinations for which the user must press and hold down one key and then press another.	Ctrl+P, Alt+F4

Besides the formatting conventions, you should also know about the document organization convention applied to Parallels documents: chapters in all guides are divided into sections, which, in their turn, are subdivided into subsections. For example, **About This Guide** is a section, and **Documentation Conventions** is a subsection.

Getting Help

In addition to this guide, there are a number of other resources available for Parallels Virtuozzo Containers 4.7 which can help you use the product more effectively. These resources include:

- Manuals:
  - **Parallels Virtuozzo Containers 4.7 Evaluation Guide**. This guide is destined to introduce you to the main features of Parallels Virtuozzo Containers 4.7 and to its underlying technology, to help you set up an environment for evaluating the Parallels Virtuozzo Containers major features, and to suggest the relevant procedures for this evaluation.
  - **Getting Started With Parallels Virtuozzo Containers 4.7 for Linux.** This guide provides basic information on how to install Parallels Virtuozzo Containers 4.7 on your server, create new Containers, and perform main operations on them.
  - **Parallels Virtuozzo Containers 4.7 for Linux Installation Guide**. This guide provides exhaustive information on the process of installing, configuring, and deploying your Parallels Virtuozzo Containers system. As distinct from the **Getting Started With Parallels Virtuozzo Containers 4.7 for Linux** guide, it contains a more detailed description of all the operations needed to install and set Parallels Virtuozzo Containers 4.7 to work including planning the structure of your network, performing the Parallels Virtuozzo Containers unattended installation, etc. Besides, it does not include the description of any Container-related operations.
  - **Parallels Virtuozzo Containers 4.7 for Linux User's Guide**. This guide provides comprehensive information on Parallels Virtuozzo Containers 4.7 covering the necessary theoretical conceptions as well as all practical aspects of working with Parallels Virtuozzo Containers. However, it does not deal with the process of installing and configuring your system.
  - **Parallels Virtuozzo Containers 4.7 for Linux Templates Management Guide**. This guide is meant to provide complete information on Parallels Virtuozzo Containers templates - an exclusive Parallels technology allowing you to efficiently deploy standard Linux applications inside your Containers and to greatly save the Hardware Node resources (physical memory, disk space, etc.).
- Help systems:
  - **Parallels Management Console Help**. This help system provides detailed information on Parallels Management Console - a graphical user interface tool for managing Hardware Nodes and their Containers.
  - **Parallels Virtual Automation Online Help**. This help system shows you how to work with Parallels Virtual Automation - a tool providing you with the ability to manage Hardware Nodes and their Containers with the help of a standard Web browser on any platform.
  - **Parallels Power Panel Online Help**. This help system deals with Parallels Power Panel - a means for administering individual Containers through a common Web browser on any platform.

Feedback

If you spot a typo in this guide, or if you have an opinion about how to make this guide more helpful, you can share your comments and suggestions with us by completing the Documentation Feedback form on our website (http://www.parallels.com/en/support/usersdoc/).

CHAPTER 2

Configuring Parallels Virtuozzo Containers 4.7

In order to make Parallels Virtuozzo Containers 4.7 successfully accomplish its tasks, you need to understand how to configure the Parallels Virtuozzo Containers software correctly. This chapter explains what configuration parameters Parallels Virtuozzo Containers has and how they affect its behavior.

In This Chapter

Matrix of Parallels Virtuozzo Containers Configuration Files

There are a number of files responsible for the Parallels Virtuozzo Containers system configuration. Most of the files are located in the `/etc` directory on the Node. However, some configuration files are stored in the `/etc` directory inside the Service Container, on the Backup Node, inside a Container, or on a dedicated server. In case a configuration file is located in a place other than the Hardware Node, we point clearly the exact position (the Service Container, etc.) where it can be found.

A list of configuration files is presented in the table below:

`/etc/vz/vz.conf`	The Parallels Virtuozzo Containers global configuration file. This file keeps system-wide settings affecting the Container and template default location, global network settings, and so on.
`/etc/vz/conf/<CT_ID>.conf`	The private configuration file owned by a Container numbered `<CT_ID>`. The file keeps Container specific settings: its resource management parameters, the location of private area, IP addresses, and so on.
`/etc/vz/conf/ve-<name>.conf.sample`	Sample files containing a number of resources settings that can be used as the basis for creating Containers.
`/etc/vz/conf/dists/<distribution_name>.conf`	The configuration files used to determine what scripts are to be run on performing some operations in the Container context (e.g. on adding a new IP address to the Container). These scripts are different from Parallels Virtuozzo Containers action scripts and depend on the Linux version the given Container is running.
`/etc/sysconfig/vzsve`	The configuration file used for the Service Container creation by `vzsveinstall`.
`/etc/sysconfig/vzagent/<file>`	Parallels Agent configuration files.
`/etc/vz/conf/networks_classes`	The definition of network classes, used by traffic shaping and bandwidth management in Parallels Virtuozzo Containers.
`/etc/sysconfig/vzup2date/vzup2date.conf`	This file specifies the default connection parameters for the `vzup2date` utility.
`/<path>/<name>.conf`	This configuration file specifies the default connection parameters for the `vzup2date-mirror` utility. It should be located on the computer where you are planning to run `vzup2date-mirror`.
`/etc/cron.d/vereboot`	The configuration file for the `cron` daemon. Using this file, Parallels Virtuozzo Containers emulates the "`reboot`" command working inside a Container.

`/etc/vzvpn/vzvpn.conf`	The configuration file used to define the parameters for establishing a private secure channel to the Parallels support team server.
`/etc/vzreport.conf`	The configuration file used to define the parameters for sending your problem report to the Parallels support team.
`/etc/sysctl.conf`	Kernel parameters. Parallels Virtuozzo Containers adjusts a number of kernel `sysctl` parameters, and modifies the default `/etc/sysctl.conf` file.
`/etc/vzredirect.d/*.conf`	These files define the offline management modes for controlling Containers by Container administrators.
`/etc/vzlmond.conf`	This configuration file defines the parameters used by the `vzlmond` daemon to collect information on the main Hardware Node resources consumption.
`/etc/vzstat.conf`	The file lists the warning and/or error levels for a number of resource control parameters. If a parameter hits the warning or error value, the `vzstat` utility will display this parameter in yellow or red.
`/etc/vzstatrep.conf`	This configuration file is located on the Monitor Node and used by the `vzstatrep` utility when generating statistic reports and graphics on the Hardware Node resource consumption and sending these reports to the Node administrator.
`/etc/vzbackup.conf`	The global configuration file residing on the Backup Node and determining the global Container backup settings.
`/etc/vz/pkgproxy/rhn.conf`	The Red Hat Network (RHN) Proxy Server configuration file used by the `vzrhnproxy` utility when setting up the RHN Proxy Server. This file can be located on any computer where the `vzrhnproxy` package is installed.
`/etc/vzpkgpoxy/vzpkgproxy.conf`	This configuration file is used by the `vzpkgproxy` utility when creating special caching proxy servers for OS and application EZ templates. The file can be located on any computer where the `vzpkgproxy` package is installed.
`/etc/vztt/vztt.conf`	This configuration file is used by the `vzpkg` utility when managing OS and application EZ templates.

Global Parallels Virtuozzo Containers Configuration File

Parallels Virtuozzo Containers keeps its system wide configuration parameters in the `/etc/vz/vz.conf` configuration file. This file is in shell format. Keep in mind that Parallels Virtuozzo Containers scripts source this file – thus, shell commands in this file will cause system to execute them under root account. Parameters in this file are presented in the form `PARAMETER="value"`. Logically all the parameters belong to the following groups: global parameters, logging, disk quota, template, network traffic, Containers, validation and overcommitment, supplementary parameters, and name-based hosting parameters. Below is the description of all parameters defined in this version of Parallels Virtuozzo Containers.

Global parameters

Parameter	Description	Default value
`VIRTUOZZO`	This can be either “yes” or “no”. Parallels Virtuozzo Containers System V startup script checks this parameter. If set to “no”, then Parallels Virtuozzo Containers modules are not loaded. You might set it to “no” if you want to perform system maintenance and do not want to bring up all Containers on the Node.	`yes`
`HTTP_PROXY`	Specifies either the hostname or the IP address of the HTTP proxy server. After setting this parameter and in case you use an HTTP proxy server for handling all HTTP requests, the Parallels Virtuozzo Containers utilities communicating with the outer world through HTTP (e.g. the `vzreport` utility) will use this server for managing all your HTTP messages (e.g. sending your problem report).	-
`ACTIONLOGDIR`	This is the directory where `vzctl` keeps a log of its actions in the format suitable for Parallels Virtuozzo Containers statistics daemon `hwcoll`.	`/vz/actionlog`
`LOCKDIR`	Actions on a Container should be serialized, since two simultaneous operations on the same Container may break its consistency. Parallels Virtuozzo Containers keeps lock files in this directory in order to serialize access to one Container.	`/vz/lock`
`REMOVEMIGRATED`	Specifies whether the private area and the configuration file of the Container moved to a new Node with the `vzmigrate` command should be destroyed on the Source Node (the value of the parameter is set to `yes`) or renamed to have the `.migrated` suffix (the value of the parameter is set to `no`). You may wish to leave the Container private area and the configuration file to make migration faster. This configuration value can be overridden by the `vzmigrate` command-line options.	`no`

VE0CPUUNITS	CPU weight designated for the Node itself.	1000
OFFLINE_MANAGEMENT	Specifies whether Containers can be managed by the Container administrator by means of the services indicated in the OFFLINE_SERVICE parameter.	yes
OFFLINE_SERVICE	These services correspond to the names of the files in the /etc/vzredirect.d directory, each file defining at what port the service will be accessible and to what Container the requests coming to this port will be redirected. These services will be accessible to those Containers which have the OFFLINE_MANAGEMENT parameter set to "yes".	vzpp-plesk vzpp
BURST_CPU_AVG_USAGE	The CPU usage limit, in percent, set for the Container. This limit is calculated as the ratio of the current Container CPU usage to the CPU limit (i.e to the value of the CPULIMIT parameter) set for the Container in its configuration file. If the limit is not specified, the full CPU power of the Node is considered as the CPU limit. Upon exceeding the BURST_CPU_AVG_USAGE limit, the BURST_CPULIMIT limit is applied to the given Container. This parameter can be redefined by the BURST_CPU_AVG_USAGE parameter set in the Container configuration file.	disabled
BURST_CPULIMIT	The CPU power limit, in per cent, the Container cannot exceed. The limitations set in this parameter are applied to any Container exceeding the limit specified in the BURST_CPU_AVG_USAGE parameter. This parameter can be redefined by the BURST_CPULIMIT parameter set in the Container configuration file.	
VEFORMAT	Determines the VZFS version to be applied to all Containers that will be created on the given Node: • If you wish your Containers to use the benefits of the VZFS v2 technology, the value of this parameter should be set to vz4. • If you wish your Containers to be based on VZFS v1, you should make sure that the value of this parameter is set to vz3.	vz4

VZMOUNTS	Defines the partitions which will be automatically mounted by the /etc/init.d/vz script after the Node boot. This script will check (by calling the fsck utility) and mount all the partitions specified as the value of this parameter, listed in /etc/fstab file on the Node, and having the noauto flag set for them in this file.	/vz
CEP	Enables/disables your participation in the Parallels Customer Experience Program (CEP). The following options are available: • yes enables CEP • no disables CEP	yes

Logging parameters affect the vzctl utility logging behavior.

Parameter	Description	Default value
LOGGING	This parameter defines whether vzctl should log its actions.	yes
LOGFILE	File where vzctl logs its actions.	/var/log/vzctl.log
LOG_LEVEL	There are three levels of logging defined in the current version of Parallels Virtuozzo Containers.	0

The table below describes the possible values of the LOG_LEVEL parameter and their meanings:

Log level	Information to be logged
0	Actions of vzctl on Containers like start, stop, create, destroy, mount, umount.
1	Level 1 logs events, calls to vzctl helper scripts located in /etc/vz/conf (such as vz-start and vz-stop) and situations when the init process of the Container is killed on Container stop after timeout.
2	Level 0 and level 1 logging events, plus template version used for Container creation and calls to mount and quota operations with parameters.

Disk quota parameters allow you to control the disk usage by the Containers:

Parameter	Description	Default value
DISK_QUOTA	Defines whether to turn on disk quota for Containers. If set to “no” then disk space and inodes accounting will be disabled.	yes
VZFASTBOOT	Determines the Container quota reinitialization procedure when the Node is booted after an incorrect shutdown. If set to "no", the disk quota is reinitialized for each Container during the Node startup and only then are the Containers started, which results in a long Node and Containers booting time. When set to "yes", the Container quota reinitialization procedure depends on the Container quota files state: • Those Containers whose quota files (/var/vzquota/quota.<CT_*ID*>) have a "dirty" flag set, meaning that their contents are inconsistent with the real Containers usage, are started without	no

the quota reinitialization. After all the Containers with "dirty" flags are launched, they are restarted one by one to reinitialize their respective quotas.

- Those Containers whose quota files are absent from the Node or corrupted are started only after their quota has been successfully reinitialized.

In general, setting the VZFASTBOOT parameter to "yes" allows you to considerably reduce the Node and Containers downtime after the incorrect Node shutdown.

Network traffic parameters define whether you want to account bandwidth consumed by Containers and whether you want to limit bandwidth available to Containers:

Parameter	Description	Default value
TRAFFIC_SHAPING	Traffic shaping allows you to limit the bandwidth consumed by Containers for outgoing traffic. If it is set to “yes”, then limitations will be turned on.	no
BANDWIDTH	This is the list of network interfaces on which we want to shape the traffic and their speed in the form of “dev:rate”. The rate is measured in Kbits/s. If you want to shape traffic on more than one interface, set this parameter to “dev1:rate1 dev2:rate2”. For example, for two 100 Mbits/s Ethernet cards, set it to “eth0:102400 eth1:102400”.	eth0:102400
TOTALRATE	Size of the bandwidth pool for all Containers. It is the upper limit for the bandwidth available to all your Containers and is specified in the form of “dev:class:rate”. The rate is measured in Kbits/s. Containers can consume bandwidth up to this limit in addition to the limit specified by the RATE parameter. Default value corresponds to 4 Mbits/s limit for the Class 1 Containers.	eth0:1:4096
RATE	Default bandwidth guaranteed to a Container for outgoing traffic if the Container configuration file does not explicitly specify a different value. This value is in the same format as TOTALRATE and its default value is “eth0:1:8”. The rate is measured in Kbits/s. Note that 8 Kbits/s, offered by the default configuration, is the guarantee and the Container cannot consume less than this value and more than the sum of this value and TOTALRATE.	eth0:1:8
IPV6	Enables (yes) or disables (no) the support for using IPv6 addresses with Containers. If enabled, you can assign IPv6 addresses to Containers and manage them in the same way you would manage IPv4 addresses (e.g., set network classes for IPv6 addresses or connect to Containers with Parallels Power Panel using IPv6 addresses).	yes
USE_VENET_MASK	Enables (yes) or disables (no) the possibility of setting network masks for Containers operating in the venet0 networking mode.	no

VZ_TOOLS_BCID	Enables disk I/O limits for `vzabackup, vzarestore, and vzmigrate` operations. Make sure that the value of this parameter does not coincide with the ID assigned to some of your Containers. For example, if you leave the default value 2, ensure that no Container with ID 2 exists on the Node.	no
VZ_TOOLS_IOLIMIT	Sets the disk I/O limit for the backup, restore, and migration operations, in bytes per second.	10485760

Template parameters allow to configure the template area location.

Parameter	Description	Default value
TEMPLATE	This is the directory where to find templates. It is not recommended to redefine this option since all the templates built by Parallels use the default directory.	/vz/template

Container default parameters either affect new Container creation or represent Container parameters that can be overridden in the Container configuration file:

Parameter	Description	Default value
VE_ROOT	This is a path to the Container root directory where the private area is mounted.	/vz/root/*CT_ID*
VE_PRIVATE	This is a path to the Container private area, where VZFS keeps its private data. VZFS implementation requires `VE_PRIVATE` reside within a single physical partition.	/vz/private/*CT_ID*
CONFIGFILE	The default configuration file sample to be used for the Container creation; it may be overridden with the `--config` option of the `vzctl create` command.	basic
DEF_OSTEMPLATE	The default OS template to be used for the Container creation; it may be overridden with the `--pkgset` command-line option for `vzctl create`.	.centos-5-x86
IPTABLES	Only those `iptables` modules will be loaded to the Containers hosted on the Node which are indicated as the value of this parameter and only if they are loaded on the Node itself as well.	ip_tables ipt_REJECT ipt_tos ipt_limit ipt_multiport iptable_filter iptable_mangle ipt_TCPMSS ipt_tcpmss ipt_ttl ipt_length
VE_ENVIRONMENT	Additional environment variables to be passed to the Container `init` process. Should be provided as any number of *`name=value`* pairs separated by spaces.	

Container validation and overcommitment parameters define whether the Container configuration should be validated and the Node overcommitment checked on a Container startup:

Parameter	Description	Default value
VE_VALIDATE_ACTION	Defines whether the Container configuration	none

	should be validated when a Container is started. If this parameter is set to “warning”, a warning is displayed in case of misconfiguration. If set to “error”, the Container is not started in case of misconfiguration. If set to “fix”, the configuration is automatically corrected.	
OVERCOMMITMENT_ACTION	Defines whether the Node should be checked for the overcommitment of resources when a Container is started. If this parameter is set to “warning”, a warning is displayed in case of overcommitment. If set to “error”, the Container that would cause overcommitment is not started. When checking for overcommitment, the following five parameters are checked.	none
OVERCOMMITMENT_LEVEL_LOWMEM	The percentage of committed memory residing at lower addresses and directly accessed by the kernel.	120
OVERCOMMITMENT_LEVEL_MEMSWAP	The percentage of committed memory available for applications including both RAM and swap space.	90
OVERCOMMITMENT_LEVEL_ALLOCMEM	The allocation memory commitment level is the ratio of the memory size guaranteed to be available for allocation to the capacity of the system.	100
OVERCOMMITMENT_LEVEL_ALLOCMEM_TOT	The number shows how much memory the	1000

	applications are allowed to allocate in comparison with the capacity of the system.	
OVERCOMMITMENT_LEVEL_ALLOCMEM_MAX	This allocation memory commitment level is the ratio of the maximal (among all running Containers) amount of allocated memory to the capacity of the system.	60

Supplementary parameters define other Parallels Virtuozzo Containers settings:

Parameter	Description	Default value
VZWDOG	Defines whether the `vzwdog` module is loaded on Parallels Virtuozzo Containers startup. This module is responsible for catching messages from the kernel. It is needed if you configure the serial Monitor Node for Parallels Virtuozzo Containers.	`no`
VZPRIVRANGE	Defines the ID range for the Containers that are allowed to access the <servere> ID stored in the `/proc/vz/hwid` file.	`1 100`
DUMPDIR	The directory where the Container dump file created by means of the `vzctl suspend` command is to be stored.	`/vz/private/CT_`*`ID`*`/dump`

Container Configuration File

Each Container has its own configuration file, which is stored in the `/etc/vz/conf` directory and has a name like *`CT_ID`*`.conf`. This file has the same format as the global configuration file. The settings specified in this file can be subdivided into the following categories: miscellaneous, networking, backup, resource management parameters, and name-based hosting parameters.

Note: In Parallels Virtuozzo Containers, you can also configure a number of settings for the Node itself by editing the `/etc/vz/conf/0.conf` file. Currently, these settings include the `VERSION` and `ONBOOT` parameters, as well as all parameters listed in the table under the *System parameters* group.

Miscellaneous parameters:

`ONBOOT`

Specifies whether the Container should be started automatically on system startup. Parallels Virtuozzo Containers automatically starts all Containers that have this parameter set to “yes” upon startup.

Note: If "yes" is specified as the value of this parameter in the `0.conf` file, all Node system management parameters are set on the Node boot to the values indicated in this file.

`OFFLINE_MANAGEMENT`

Overrides the `OFFLINE_MANAGEMENT` parameter from the global configuration file.

`OFFLINE_SERVICE`

Overrides the `OFFLINE_SERVICE` parameter from the global configuration file.

`ALLOWREBOOT`

Specifies whether the Container may be restarted with the “reboot” command inside. If omitted or set to “yes”, reboot is allowed.

Note: To make reboot working, you should uncomment the corresponding line in the `/etc/cron.d/vereboot` file.

`CAPABILITY`

Specifies capabilities inside of the Container. Setting of following capabilities is allowed: `CHOWN`, `AC_OVERRIDE`, `AC_READ_SEARCH`, `FOWNER`, `FSETID`, `KILL`, `SETGID`, `SETUID`, `SETPCAP`, `LINUX_IMMUTABLE`, `NET_BIND_SERVICE`, `NET_BROADCAST`, `NET_ADMIN`, `NET_RAW`, `IPC_LOCK`, `IPC_OWNER`, `SYS_MODULE`, `SYS_RAWIO`, `SYS_CHROOT`, `SYS_PTRACE`, `SYS_PACCT`, `SYS_ADMIN`, `SYS_BOOT`, `SYS_NICE`, `SYS_RESOURCE`, `SYS_TIME`, `SYS_TTY_CONFIG`, `MKNOD`, `LEASE`.

`OSTEMPLATE`

The name of the OS template that was used for creating the Container. You do not have to change this parameter; `vzctl` will set it for you upon calling the `vzctl create` command (or using the defaults from the global configuration file). The `.` symbol before the OS template name, if specified, indicates that this is an EZ OS template.

`TEMPLATES`

When used in the Container sample configuration file, this parameter defines a list of application templates that should be automatically added to the Container being created on the basis of this sample. So, if the corresponding templates are installed on the Node, and the `vzctl create` command uses a configuration file with this parameter defined, the templates will be added to the Container immediately upon its creation.

When used in the configuration file of an existing Container, this parameter provides a list of templates that have been installed inside the Container by means of either the `vzctl create`, `vzpkgadd`, or `vzpkg install` commands. In this case you should not modify this parameter since it is used by template management utilities to track the history of the installed templates. This parameter is omitted if no templates have been applied to the Container.

`VE_ROOT`

Overrides the `VE_ROOT` parameter from the global configuration file.

`VE_PRIVATE`

Overrides the `VE_PRIVATE` parameter from the global configuration file.

`VE_ENVIRONMENT`

Overrides the `VE_ENVIRONMENT` parameter from the global configuration file.

`TECHNOLOGIES`

Determines a set of technologies which should be provided by the Parallels Virtuozzo Containers kernel for the Container operability. Currently, this parameter can contain the information about the following technologies:

- The system architecture of the Container (`x86`, `x86_64`, or `i64`).
- Whether the Container is based on the OS template supporting the Native POSIX Thread Library (NPTL). In this case, the `nptl` entry is specified as the value of this parameter.
- Whether the OS EZ template the Container is based on requires the `sysfs` filesystem support (e.g. the OS EZ template for SUSE Linux Enterprise 10).

`DISABLED`

If set to `yes`, disables the Container making it impossible to start the Container once it was stopped. You can start the disabled Container by setting the value of this parameter to `no` or using the `--force` option with the `vzctl set` command.

`DESCRIPTION`

Sets the description for the Container.

Note: You are allowed to use only symbols in the 'A -z' and '0-9' ranges in your descriptions.

`NAME`

The name assigned to the Container. You can use this name, along with the Container ID, to refer to the Container while performing this or that Container-related operation on the Node. Follow the following rules while setting the Container name:

- The name should contain the `A-Z`, `a-z`, `0-9`, `\`, `-`, and `_` symbols only.
- If the name consists of two or more words, it should be quoted (e.g. "My Container 101").

ORIGIN_SAMPLE	The configuration sample the Container was based on when created.
CONFIG_CUSTOMIZED	Indicates whether any of the Container configuration parameters have been modified as regards its original configuration sample. If this parameter is omitted, its value is considered as "no".
UUID	The Container unique identifier. This identifier is used by certain Parallels Virtuozzo Containers utilities during their execution.
VEFORMAT	Displays the VZFS version applied to the Container during its creation: • vz4 denotes that the Container is based on VZFS v2. • vz3 denotes that the Container is based on VZFS v1. This parameter is meant for your information only and cannot be changed.

All resource management parameters can be subdivided into the CPU, disk, system, and VSwap categories for your convenience. Any parameter can be set with the `vzctl set` command and the corresponding option name (in the lower case, e.g. `--kmemsize` for `KMEMSIZE`, etc.). See the **Parallels Virtuozzo Containers Command Line Interface** chapter for more details. The **Typical value** column, if present, specifies a range of reasonable parameter values for different applications, from light to huge heavy loaded Containers (consuming 1/8 of Node with 2 GB memory). If barrier and limit fields are in use, ranges for both thresholds are given.

CPU parameters:

Parameter	Description	Typical value
CPUUNITS	Guaranteed CPU power. This is a positive integer number, which determines the minimal guaranteed share of the CPU the Container receives. The total CPU power in `CPUUNITS` is its Bogomips number multiplied by 25. Parallels Virtuozzo Containers reporting tools consider one 1 GHz Intel processor to be approximately equivalent to 50,000 CPU units.	250…1000
CPULIMIT	Allowed CPU power. This is a positive number indicating the share of the CPU time, in per cent, the Container may never exceed. You can estimate this share as (allowed Container CPUUNITS/CPU power)*100%.	
CPUS	The number of CPUs set to handle all the processes inside the given Container. By default, any Container is allowed to consume the CPU time of all processors on the Node.	
CPUMASK	The CPU affinity mask defining which CPUs on the Node can be used to handle the processes running in the Container. The CPU mask can be specified as both separate CPU index numbers (1,2,3) and CPU ranges (2-4,5-7).	

NODEMASK	The NUMA node mask defining a NUMA node to bind the Container to. Once you set the mask, the processes running in the Container will be executed only on the CPUs that belong to the specified NUMA node.	
BURST_CPU_AVG_USAGE	The CPU usage limit, in percent, set for the Container. This limit is calculated as the ratio of the current Container CPU usage to the CPU limit (i.e to the value of the CPULIMIT parameter) set for the Container in its configuration file. If the limit is not specified, the full CPU power of the Node is considered as the CPU limit. Upon exceeding the BURST_CPU_AVG_USAGE limit, the BURST_CPULIMIT limit is applied to the Container. This parameter redefines the BURST_CPU_AVG_USAGE parameter set in the Parallels Virtuozzo Containers configuration file.	disabled
BURST_CPULIMIT	The CPU power limit, in per cent, the Container cannot exceed. The limitations set in this parameter are applied to the Container when it exceeds the limit specified in the BURST_CPU_AVG_USAGE parameter. This parameter redefines the BURST_CPULIMIT parameter specified in the Parallels Virtuozzo Containers configuration file.	

Disk parameters:

DISKSPACE	Total size of disk space that can be consumed by the Container, in 1 Kb blocks.	204800…10485760-204800…11534340
DISKINODES	Total number of disk inodes (files, directories, symbolic links) the Container can allocate.	80000…400000-88000…440000
QUOTATIME	The grace period of the disk quota. It is defined in seconds. The Container is allowed to temporarily exceed its quota soft limits for not more than the QUOTATIME period. Specifying -1 as the value of this setting makes the grace period last 'infinitely'.	0…604800
QUOTAUGIDLIMIT	This parameter defines the maximum aggregate number of user IDs and group IDs for which disk quota inside the given Container will be accounted. If set to 0, the UID and GID quota will be disabled. When managing the quotaugidlimit parameter, keep in mind the following: • Enabling per-user and per-group quotas for a Container requires restarting the Container. • If you delete a registered user but some files with their ID continue residing inside your Container, the current number of ugids (user and group identities) inside the Container will not decrease. • If you copy an archive containing files with user and group IDs not registered inside your Container, the number of ugids inside	0…500

	the Container will increase by the number of these new IDs.	
IOPRIO	The Container priority for disk I/O operations. The higher the priority, the more time the Container has for writing to and reading from the disk. The default Container priority is 4.	0-7
IOLIMIT	The bandwidth a Container is allowed to use for its disk input and output (I/O) operations, in bytes per second. In the current version of Parallels Virtuozzo Containers, the maximum I/O bandwidth limit you can set for a Container is 2 GB per second.	unlimited
IOPS	The maximum number of disk input and output operations per second a Container is allowed to perform.	unlimited

System parameters:

NUMPROC	Number of processes and threads allowed. Upon hitting this limit, Container will not be able to start a new process or thread.	40…400
AVNUMPROC	Number of processes expected to run in the Container on average. This is informational parameter used by utilities like `vzcfgvalidate` in order to ensure configuration correctness.	0…NUMPROC
NUMTCPSOCK	Number of TCP sockets (`PF_INET` family, `SOCK_STREAM` type). This parameter limits the number of TCP connections and, thus, the number of clients the server application can handle in parallel.	40…500
NUMOTHERSOCK	Number of sockets other than TCP. Local (UNIX-domain) sockets are used for communications inside the system. UDP sockets are used for Domain Name Service (DNS) queries, as example. UDP and other sockets may also be used in some very special applications (SNMP agents and others).	40…500
VMGUARPAGES	Memory allocation guarantee, in pages. Applications are guaranteed to be able to allocate memory while the amount of memory accounted as `privvmpages` does not exceed the configured barrier of the `vmguarpages` parameter. Above the barrier, memory allocation is not guaranteed and may fail in case of overall memory shortage.	1725…107520
KMEMSIZE	Size of unswappable kernel memory, allocated for internal kernel structures for the processes of a particular Container. Typical amounts of kernel memory is 16…50 Kb per process.	798720…13148160- 851968…14024704
TCPSNDBUF	The total size of send buffers for TCP sockets, i.e. the amount of kernel memory allocated for data sent from applications to TCP sockets, but not acknowledged by the remote side yet.	159744…5365760- 262144…10458760
TCPRCVBUF	Total size of receive buffers for TCP sockets. Amount of kernel memory, received from remote side but not read by local application yet.	159744…5365760- 262144…10458760

OTHERSOCKBUF	Total size of UNIX-domain socket buffers, UDP and other datagram protocols send buffers.	61440…1503232- 163840…4063232
DGRAMRCVBUF	Total size of receive buffers of UDP and other datagram protocols.	32768…262144
OOMGUARPAGES	Out-of-memory guarantee, in pages. Any Container process will not be killed even in case of heavy memory shortage if current memory consumption (including both physical memory and swap) until the `oomguarpages` barrier is not reached.	1725…107520
LOCKEDPAGES	Memory not allowed to be swapped out (locked with the `mlock()` system call), in pages (one page is 4 Kb).	4…4096
SHMPAGES	Total size of shared memory (including IPC, shared anonymous mappings and `tmpfs` objects), allocated by processes of a particular Container, in pages.	512…16384
PRIVVMPAGES	Size of private (or potentially private) memory, allocated by an application. Memory that is always shared among different applications is not included in this resource parameter.	3072…151200- 3450…1612800
NUMFILE	Number of files opened by all Container processes.	512…8192
NUMFLOCK	Number of file locks created by all Container processes.	50…200 – 60…220
NUMPTY	Number of pseudo-terminals. For example, the `ssh` session, `screen`, the `xterm` application consumes pseudo-terminal resources.	4…64
NUMSIGINFO	Number of `siginfo` structures (essentially this parameter limits the size of signal delivery queue).	256…512
DCACHESIZE	Total size of `dentry` and `inode` structures locked in memory. As example, application, first opening the `/etc/passwd` file, locks entries corresponding to `etc` and `passwd` inodes. If a second application opens the `/etc/shadow` file – only entry corresponding to `shadow` is charged, because `etc` is charged already.	184320…3932160- 196608…4194304
NUMIPTENT	The number of IP packet filtering entries.	12…128

VSwap parameters:

PHYSPAGES	Amount of RAM that can be used by the processes of a Container, in 4-KB pages.	
SWAPPAGES	Amount of swap space that can be used by the Container for swapping out memory once the RAM is exceeded, in 4-KB pages.	
VM_OVERCOMMIT	Memory overcommit factor that defines the memory allocation limit for a Container. The limit is calculated as `(PHYSPAGES + SWAPPAGES) * factor`.	1.5

Network-related parameters allow you to set bandwidth management parameters, hostname and IP addresses that a Container can use as well as to indicate those `iptables` modules that can be loaded to the Container:

`HOSTNAME`	If this parameter is specified, then `vzctl` will set the hostname to its value upon the next Container start. This parameter can be omitted. In this case, the Container administrator should configure the hostname manually.
`IP_ADDRESS`	The list of IP addresses that can be used on Container network interfaces. This list is an argument of the Container start call and it is impossible to assign an IP address from inside the Container if the address is not on the list. Any IP address assigned from within the Container will be visible only within the Container.
`EXT_IP_ADDRESS`	The external IP address assigned to the Container. External IP addresses are considered valid IP addresses by the `venet0` adapter, though they are not set as alias addresses inside Containers and are not announced via Address Resolution Protocol (ARP).
`NAMESERVER`	The IP address of the DNS server the Container is supposed to use. More than one server can be specified in the space-separated format.
`SEARCHDOMAIN`	DNS search domains for the Container. More than one domain can be specified.
`NETDEV`	The names of physical network adapters that have been moved from the Node to the given Container.
`IPTABLES`	Overrides the `IPTABLES` parameter from the Parallels Virtuozzo Containers global configuration file.
`NETIF`	Specifies a number of parameters for the virtual network adapters existing inside the Container. These parameters include: • `ifname`: the name of the `veth` virtual Ethernet interface inside the Container. • `mac`: the MAC address assigned to the `veth` virtual Ethernet interface inside the Container. • `host_mac`: the MAC address assigned to the `veth` virtual Ethernet interface on the Node. • `network`: the name of the virtual network where the `veth` virtual network adapter is included. • `ip`: the IP address(es) assigned to the `veth` virtual network adapter.
`RATE`	If traffic shaping is turned on, then this parameter specifies bandwidth guarantee, in Kb/s, for the Container. The parameters should be set in the form of `"eth0:1:8"`.
`RATEBOUND`	If set to "yes", the bandwidth guarantee is also the limit for the Container, and the Container cannot borrow the bandwidth from the `TOTALRATE` bandwidth pool.

Backup-related parameters, if present, allow you to specify the number of backups to store. If absent, these parameters are taken from the global backup configuration file or the backup configuration file for a particular Node.

`BACKUP_CHAIN_LEN`	An incremental backup parameter. After this number of incremental backups, a full backup is performed.	7
`BACKUP_CHAIN_DAY`	An incremental backup parameter. After this	7

S	number of days a full backup is performed.	
BACKUP_KEEP_MAX	The number of backups to store. Only full and plain full backups are accounted. If a regular backup is being performed that exceeds this number, the oldest backup is automatically deleted. This parameter is effective only if the `-p` option is specified with the `vzbackup` utility. If there is no `-p` option, the number of backups to store is not limited whatever the value of this parameter.	3

Linux Distribution Configuration Files

Some Parallels Virtuozzo Containers utilities (e.g. `vzctl`) need to run special scripts inside a Container to perform certain operations on it. However, carrying out one and the same operation inside Containers running different Linux versions may require execution of different actions. This may be caused by the fact that different Linux distributions store files in different locations, use different commands to complete one and the same task, and so on. To distinguish between Containers running different Linux versions and to determine what scripts should be executed while performing the relevant Container-related operations, Parallels Virtuozzo Containers uses special distribution configuration files located in the `/etc/vz/conf/dists` directory on the Node.

There are a number of distribution configuration files shipped with Parallels Virtuozzo Containers by default (`centos.conf`, `fedora-core.conf`, `gentoo.conf`, etc.). To view all configuration files available on your Parallels Virtuozzo Containers, you can go to the `/etc/vz/conf/dists` directory and issue the `ls` command. The distribution configuration files will be displayed in the form of *`Linux_Distribution_Name-version`*`.conf` where *`Linux_Distribution_Name`* and *`version`* denote the name of the Linux distribution and its version, respectively (e.g. `fedora-core-7.conf`).

Any distribution configuration file consists of a number of entries in the form of *`<parameter_name>=<script_name>`* where *`<parameter_name>`* denotes the name of the parameter defining the operation when the script in the right part of the entry is to be executed and *`<script_name>`* is the name of the script to be run on performing the operation defined by the parameter in the left part of the entry. In the current version of Parallels Virtuozzo Containers, the following parameters are used to define what scripts should be executed for the corresponding Linux version a Container is running:

- `ADD_IP`: the script specified as the value of this parameter has the default name of *`<distribution_name>`*`-add_ip.sh` and is used to configure the network settings during the Container startup and the IP address(es) assignment. The script is launched inside the Container on executing the following commands:

```
vzctl start CT_ID
vzctl set CT_ID --ipadd <ip_address>
vzctl set CT_ID --ipadd <ip_address> --ipdel all
```

- `DEL_IP`: the script specified as the value of this parameter has the default name of *`<distribution_name>`*`-del_ip.sh` and is used to delete an existing IP address from the Container. The script is launched inside the Container on executing the following commands:

```
vzctl set CT_ID --ipdel <ip_address>
vzctl set CT_ID --ipdel all
```

- `SET_HOSTNAME`: the script specified as the value of this parameter has the default name of *`<distribution_name>`*`-set_hostname.sh` and is used to configure the hostname of the Container. The script is launched inside the Container on executing the following command:

```
vzctl set CT_ID --hostname <name>
```

- SET_DNS: the script specified as the value of this parameter has the default name of <*distribution_name*>-set_dns.sh and is used to configure DNS parameters in the /etc/resolv.conf file. The script is launched inside the Container on executing the following command:

```
vzctl set CT_ID --searchdomain <domain> --nameserver <ip_address>
```

- SET_USERPASS: the script specified as the value of this parameter has the default name of <*distribution_name*>-set_userpass.sh and is used to add a new user or change the current password. The script is launched inside the Container on executing the following command:

```
vzctl set CT_ID --userpasswd <user:passwd>
```

- SET_UGID_QUOTA: the script specified as the value of this parameter has the default name of <*distribution_name*>-set_ugid_quota.sh and is used to set up second level quota. The script is launched inside the Container on executing the following command:

```
vzctl set CT_ID --quotaugidlimit <num>
```

- POST_CREATE: the script specified as the value of this parameter has the default name of <*distribution_name*>-postcreate.sh and is used to perform certain tasks (e.g. to modify the crontab files) after the Container creation. This script is launched on the Node on executing the following command:

```
vzctl create CT_ID
```

- POST_MIGRATE: the script specified as the value of this parameter has the default name of <*distribution_name*>-post_migrate.sh and is used to perform certain operations on the Container where the physical server has been successfully migrated. This script is launched inside the Container on executing the following command:

```
vzp2v [options] --ctid CT_ID
```

The scripts specified in distribution configuration files are located in the /etc/vz/conf/dists/scripts directory on the Node and executed on performing the aforementioned operations on the Containers. After an operation has been initiated, the vzctl or vzp2v utility turns to the corresponding Container configuration file, looks for the value of the DISTRIBUTION variable or, if the latter is not present, of the OSTEMPLATE variable in this file, and defines on their basis what Linux version the given Container is running. After that, vzctl reads the corresponding configuration file for the determined Linux version from the /etc/vz/conf/dists directory and executes the scripts specified in this file.

Note: If no distribution is specified as the value of the DISTRIBUTION and OSTEMPLATE variables in the Container configuration file or no configuration file for the given Linux version was found in the /etc/vz/conf/dists directory, the default file from this directory is used.

Network Classes Definition File

In Parallels Virtuozzo Containers, both traffic accounting and bandwidth management are based on network classes. The network classes' definition file (`/etc/vz/conf/networks_classes`) describes network classes that Parallels Virtuozzo Containers recognizes. Currently, there can be up to 15 classes defined.

The lines in this file have the following format:

```
<class_id> <ip_address>/<prefix_length>
```

where `<class_id>` defines the network class identifier, `<ip_address>` defines the starting IP address, and `<prefix_length>` defines the subnet mask. In pair `<ip_address>` and `<prefix_length>` define the range of IP addresses for this class. There may be several lines for each class. Classes should be defined after Class 1 and represent exceptions from the "matching-everything" rule of Class 1. Class 0 has a special meaning and defines the IP ranges for which no accounting is done (this Node Container addresses).

The definition of class 1 is required; any class except class 1 can be omitted. However, it is recommended to define class 0 correctly - it will improve performance. For example:

```
# HW node VPS's networks
0 10.10.10.0/24
0 10.10.15.0/24

# all IP("local" traffic)
1 0.0.0.0/0

# class 2 - "foreign" traffic
#2 10.0.0.0/8
#2 11.0.0.0/8

# inside "foreign" network there
# is a hole with "local" traffic
#1 10.10.16.0/24
```

vzup2date Configuration File

The `/etc/sysconfig/vzup2date/vzup2date.conf` file is used by the `vzup2date` utility on the step of connecting to the repository with storing the latest Parallels Virtuozzo Containers updates.

The parameters in this file are presented on separate lines in the following format:

```
<parameter_name>=<parameter_value>
```

The table below describes these parameters:

Parameter	Description	Example
`Server`	The URL used for the connection.	`https://vzup2date.parallels.com`
`User`	The user name for accessing the update server.	`user1`
`Password`	The password for accessing the update server.	`sample`
`HTTP_PROXY`	The proxy server address, if you use this server.	`http://192.168.1.20`
`HTTP_PROXY_USER`	The user name used by the HTTP proxy server for your authentication.	`peter`
`HTTP_PROXY_PASSWORD`	The password of the user specified in the `HTPP_PROXY_USER` parameter and used for your authentication by the HTTP proxy server.	`2wed45r`
`LocalRepositoryDir`	The path to the local directory on the Node where the downloaded Parallels Virtuozzo Containers updates are stored. By default, the `/vz/vzup2date` directory is used.	`/vz/vzup2date`
`LogFile`	The path to the log file on the Node containing the information on Parallels Virtuozzo Containers updates. By default, the `/var/log/vzup2date.log` file is used.	`/var/log/vzup2date.log`

Not all the possible parameters must be necessarily present in this file. In fact, all the parameters are optional, i.e. if they are missing from this file, the `vzup2date` utility will ask for the user input without suggesting its own variant taken from this file.

vzup2date-mirror Configuration File

The `vzup2date-mirror` configuration file is used by the `vzup2date-mirror` utility for determining the connection parameters of the repository with Parallels Virtuozzo Containers system and templates updates and deciding what updates to download to the local mirror. The parameters in this file are presented on separate lines in the following format:

```
<parameter_name>=<parameter_value>
```

The options that can be specified in the `vzup2date.conf` file are described in the table below:

Parameter	Description	Example
`Server`	The URL used for the connection. As a rule, this parameter is set automatically and does not need to be modified.	`https://vzup2date.parallels.com`
`User`	The user name for accessing the update server. As a rule, this parameter is set automatically and does not need to be modified.	`user1`
`Password`	The password for accessing the update server. As a rule, this parameter is set automatically and does not need to be modified.	`sample`
`HTTP_PROXY`	The proxy server address, if you use this server.	`http://192.168.1.20`
`HTTP_PROXY_USER`	The user name used by the HTTP proxy server for your authentication.	`peter`
`HTTP_PROXY_PASSWORD`	The password of the user specified in the `HTTP_PROXY_USER` parameter and used for your authentication by the HTTP proxy server.	`2wed45r`
`LocalRepositoryRoot`	The local directory where the mirror is to be located and all the required packages are to be stored after the execution of `vzup2date-mirror`. This parameter can be overwritten by the `local_repo_path` parameter of the `vzup2date-mirror` utility (to learn more about `local_repo_path`, see the **vzup2date-mirror** subsection).	`/var/www/html`

`Releases`	The list of comma-separated Parallels Virtuozzo Containers releases or OS templates names. The format of this parameter is different for different types of updates: • For system updates, you should set it in the *`arch`*`/Parallels Virtuozzo Containers_`*`release`* format. • For EZ templates updates, you should set it in the *`arch`*`/`*`EZ_template_name`* format. By default, the value of this parameter is set to `all/all` meaning that all available updates for all system architectures will be downloaded from the Parallels Virtuozzo Containers official repository to your local mirror.	`i386/5`
`MirrorName`	The name assigned to the mirror. You must specify this parameter for each mirror if you are planning to have several mirrors with different `LocalRepositoryRoot` parameters operating simultaneously on your server (in one Container). These mirror names will be used by the `apache` application to distinguish among the existing mirrors.	`Mirror1`
`HTTPD_CONFIG_FILE`	The path to the `httpd` configuration file. This file is required for the correct work of the `apache` application. As you can create an HTTP-based mirror only, the `apache` application should be installed on the server and a valid path to `httpd.conf` should be specified. By default, this parameter is set to `/etc/httpd/conf/httpd.conf`. If you have not change the default `httpd.conf` file location, you do not need to change this parameter.	`/etc/httpd/conf/httpd.conf`

The `vzup2date-mirror` configuration file can also include a section defining the updates approval policy for deploying Parallels Virtuozzo Containers system updates to the Nodes in your local network. This section must be opened with the `<ApproveSystemUpdate` *`arch/release`*`>` tag (where *`arch`* denotes the system architecture (e.g. `x86_64`) and *`release`* denotes the Parallels Virtuozzo Containers release (e.g. 5) the specified policy will be applied to) and closed with the `</ApproveSystemUpdate>` tag. This section is optional. If it is absent from the configuration file, all updates downloaded to your local mirror are automatically approved for installation on your Nodes. The parameters that can be specified in this section are described in the table below:

Parameter	Description
CU	The maximum version of Parallels Virtuozzo Containers kernel updates for the specified architecture/release pair. All Parallels Virtuozzo Containers kernel updates having higher versions and downloaded to your local mirror will be invisible for the `vzup2date` utility that you will run on the Nodes in your local network.
TU	The maximum version of Parallels Virtuozzo Containers tools and utilities updates for the specified architecture/release pair. All tools and utilities updates having higher versions and downloaded to your mirror will be invisible for the `vzup2date` utility that you will run on the Nodes in your local network.
MU	Enables (`yes`) or disables (`no`) the `vzup2date` utility to download the next major version update of the Parallels Virtuozzo Containers software.If this parameter or the whole updates approval mechanism section is omitted, major updates are available to the `vzup2date` utility by default.

vzvpn Configuration File

The `/etc/vzvpn/vzvpn.conf` file is used by the Parallels Support Tool to establish a secure connection (a virtual private network) between your Node and the Parallels support server.

The parameters in this file are presented on separate lines in the following format:

```
<parameter_name>=<parameter_value>
```

The table below describes these parameters:

Parameter	Description
`REMOTE_HOST`	Mandatory. The hostname or the IP address of the Parallels support server.
`REMOTE_PORT`	Mandatory. The port number of the Parallels support server to be used for establishing a virtual private network (VPN).
`STARTTMO`	Mandatory. The time, in seconds, during which there will be attempts to start the Parallels Support Tool if it could not be started immediately after its launching.
`INACTIVE`	Mandatory. The time of inactivity, in seconds, after which the connection between your Node and the Parallels support server will be closed.
`PING`	Mandatory. The time, in seconds, at the end of which the port of the Parallels support server will be pinged in case no packets have been received from the support server during the time specified.
`PING_EXIT`	Mandatory. The time, in seconds, after a lapse of which the connection between your Node and the Parallels support server will be closed in case no ping signals or other packets have been received from the support server during this time.
`HTTP_PROXY=hostname[:port]`	Optional. The hostname or the IP address and the port number of the HTTP proxy server through which a VPN between your Node and the Parallels support server is to be established. This parameter overrides the `HTTP_PROXY` parameter set in the `/etc/vz/vz.conf` file on the Node. If the `HTTP_PROXY` parameter is not specified in either of the files, the Parallels Support Tool looks for the `http_proxy` environment variable on the Node and takes its value for establishing a VPN.
`HTTP_PROXY_USER`	Optional. The user name used by the HTTP proxy server for your authentication.
`HTTP_PROXY_PASSWORD`	Optional. The password of the user specified in the `HTTP_PROXY_USER` parameter and used for your authentication by the HTTP proxy server.

Note: You are not recommended to change any of the aforementioned parameters. Modify them only if you are dead certain of your actions (for example, you have received the corresponding information from Parallels).

vzreport Configuration File

The `/etc/vzreport.conf` file is used by the `vzreport` utility to submit a problem report to the Parallels support team.

The parameters in this file are presented on separate lines in the following format:

```
<parameter_name>=<parameter_value>
```

The table below describes these parameters:

Parameter	Description
`SUBMIT_URI`	The Uniform Resource Identifier (URI) of the Parallels support server to be used to receive and gather your problem reports.
`COLLECTOR_SCRIPT`	The path to the file on your Node where the information on your problems reports is collected. This is the same data that is sent to the Parallels support server.
`HTTP_PROXY`	The hostname or the IP address of the HTTP proxy server through which your problem report will be sent to the Parallels support team.
`HTTP_PROXY_USER`	The user name used by the HTTP proxy server for your authentication.
`HTTP_PROXY_PASSWORD`	The password of the user specified in the `HTTP_PROXY_USER` parameter and used for your authentication by the HTTP proxy server.

Not all the possible parameters should be necessarily present in this file. In fact, all the parameters are optional except for the `SUBMIT_URI` parameter which should be specified to tell the `vzreport` utility where to send your problem report.

Kernel Parameters

There is a number of kernel limits that should be set for the Parallels Virtuozzo Containers software to work correctly. Parallels Virtuozzo Containers is shipped with a tuned `/etc/sysctl.conf` file. Understanding what parameters were changed is essential for running the required number of Containers. Below is the contents of the `/etc/sysctl.conf` file as shipped with Parallels Virtuozzo Containers:

```
# On the Node we generally need
# packet forwarding enabled and proxy arp disabled
net.ipv4.ip_forward = 1
net.ipv4.conf.default.proxy_arp = 0
# Enables source route verification
net.ipv4.conf.all.rp_filter = 1
# Enables the magic-sysrq key
kernel.sysrq = 1
# TCP Explict Congestion Notification
#net.ipv4.tcp_ecn = 0
# ARP thresholds. First one is num_ve x 3 + 512
# second one is 2 times first one
net.ipv4.neigh.default.gc_thresh2 = 2048
net.ipv4.neigh.default.gc_thresh3 = 4096
# we do not want all our interfaces to send redirects
net.ipv4.conf.default.send_redirects = 1
net.ipv4.conf.all.send_redirects = 0
```

Notice that some parameters of the kernel configuration depends on the maximum number of Containers you plan to run. In the default configuration file, these numbers were calculated under the assumption the maximum Container number is 512. If you plan to run another number of Containers, it is recommended to recalculate `net.ipv4.neigh.default.gc_thresh2` and `net.ipv4.neigh.default.gc_thresh3` parameters as three per Container plus 128…512. Keep the second parameter twice as great as the first one.

To apply the changes issue the following command:

```
# sysctl -p
```

Besides, it makes sense to set `net.ipv4.tcp_use_sg` to 0, since corresponding "Scatter/gather IO" feature is not supported by the `venet` device, used in Parallels Virtuozzo Containers networking.

It is also worth mentioning that normally you should have forwarding turned on since the Node forwards packets destined to or originated from Containers.

Offline Management Configuration Files

The offline management configuration files located in the `/etc/vzredirect.d` directory define various modes of Container offline management by Container administrators. One configuration file describes one offline management mode. In the current Parallels Virtuozzo Containers version, two files are accessible: `vzpp.conf` and `vzpp-plesk.conf`. The first file defines the Container offline management by means of Parallels Power Panel, and the second one - by means of the same Power Panel with an integrated Plesk control panel.

There are two parameters in each of the files. They are presented on separate lines in the following format:

```
<parameter_name>=<parameter_value>
```

The table below describes these parameters:

Parameter	Description	Example
`PORT`	This port must be entered in the address line of an Internet browser after the Container IP address when managing the Container by means of Parallels Power Panel or the Plesk control panel.	`PORT=8443`
`DST_VEID`	The ID of the Container where the requests coming to the specified port will be redirected.	`DST_VEID=1`

vzlmond Configuration File

The `/etc/vzlmond.conf` file defines the configuration parameters for the `vzlmond` daemon used to periodically check and log the state of your Node. The gathered logs can then used by the `vzstatrep` utility to generate statistic reports and graphics on their basis and to send these reports and graphics to the Node administrator's e-mail address(es). Detailed information on the `vzstatrep` utility is provided in the `vzstatrep` subsection (p. 164).

The parameters in this file are presented on separate lines in the following format:

```
<parameter_name>=<parameter_value>
```

The table below describes these parameters:

Name	Description	Default Value
`STATS_VMSTAT_PERIOD`	The periodicity, in seconds, with which the `vmstat` utility is run on the Node and its output is saved to log files in the directory specified as the value of the `LOGS_DIR` parameter. The `vmstat` output contains information on the Node kernel threads, virtual memory, disks, traps, and CPU activity. For more information on `vmstat`, see its man pages.	480
`STATS_FULLDUMP_PERIOD`	The period, in seconds, at the end of which the complete statistics on the Node resources consumption is gathered and logged to the directory specified as the value of the `LOGS_DIR` parameter. As distinct from the `vmstat` output, this statistics represents a snapshot of the files contents from the `/proc` directory on the Node and contains information on virtually every Node resource: the environment of a certain process, the state and configuration of the CPU(s), the number of I/O ports on the Node and their configuration, etc. Keep in mind that the amount of disk space needed to store this information may be considerable (about 0,5 Kb per Container). However, you are recommended to set the period to no more than 10 minutes to regularly check and log the current Node state and resources consumption.	480
`STATS_NET_PERIOD`	The period, in seconds, after which the Node network statistics is collected and logged to the directory specified as the value of the `LOGS_DIR` parameter. The network statistics is gathered separately for each network interface on the Node (e.g. `eth0`, `eth1`).	480
`LOGS_DIR`	The name of the directory on the Node where the gathered statistics is to be stored.	`/var/log/vzstat`

All the aforementioned parameters are set to their default values during the Parallels Virtuozzo Containers installation; so, you do not have to additionally edit any parameter in the `/etc/vzlmond.conf` file to start gathering your Node statistics.

vzstat Configuration File

This file (`/etc/vzstat.conf`) lists a number of CPU-, memory-, and disk-related parameters used by the `vzstat` utility. The values assigned to these parameters denote either the warning or the error level for the `vzstat` utility to start displaying these parameters either in the yellow color (the warning level has been hit) or in the red color (the error level has been hit). Moreover, if a parameter has hit the error level, the **CRIT** warning is displayed instead of **OK** after the name of the corresponding subsystem (CPU, Memory, Swap, Net, or Disks).

The table below provides information on the name and the description of all these parameters, on whether they denote the warning or the error level, whether the real parameter value has to be higher or lower than this level in order to invoke an alert, and on the parameters default values:

Parameter	Description	Default Value	Alert When	Alert Type
`LOAD_AVG`	Load average.	30	Higher	Warning
`PROC_RUN`	Number of running processes.	20	Higher	Warning
`PROC_UNINT`	Number of uninterruptable processes (in “D” state).	20	Higher	Warning
`CPU_IDLE`	CPU idle time, in percent.	10	Lower	Warning
`CPU_SYS`	CPU system time, in percent.	50	Higher	Warning
`CPU_LAT_MAX_WARN`	Scheduling latency, in milliseconds (maximum over 5 sec period).	750	Higher	Warning
`CPU_LAT_MAX_ERR`	Scheduling latency, in milliseconds (maximum over 5 sec period).	1000	Higher	Error
`CPU_LAT_AVG_WARN`	Scheduling latency, in milliseconds (5 sec average).	500	Higher	Warning
`CPU_LAT_AVG_ERR`	Scheduling latency, in milliseconds (5 sec average).	750	Higher	Error
`MEM_LAT_MAX_WARN`	Memory allocation latency, in milliseconds (maximum over 5 sec period).	300	Higher	Warning
`MEM_LAT_MAX_ERR`	Memory allocation latency, in milliseconds (maximum over 5 sec period).	500	Higher	Error
`MEM_LAT_AVG_WARN`	Memory allocation latency, in milliseconds (5 sec average).	250	Higher	Warning
`MEM_LAT_AVG_ERR`	Memory allocation latency, in milliseconds (5 sec average).	400	Higher	Error
`MEM_ZONE_ACT_INACT_FREE_WARN`	Size of available memory (free + active + inactive pages), in percent.	8	Lower	Warning
`MEM_ZONE_ACT_INACT_FREE_ERR`	Size of available memory (free + active + inactive pages), in percent.	4	Lower	Error

MEM_ZONE_ACT_INACT_FREE_ABS_WARN	Size of available memory (free + active + inactive pages), in MB.	4	Lower	Warning
MEM_ZONE_ACT_INACT_FREE_ABS_ERR	Size of available memory (free + active + inactive pages), in MB.	2	Lower	Error
MEM_ZONE_ORDER_GT_0	Number of pages which are gathered in blocks with order > 0. For example, if current memory distribution looks like: 3*1 1*2 3*4 5*8 .... Then number of pages with order>0 is 1*2 + 3*4 + 5*8 + ...	100	Lower	Warning
SWAP_FREE_WARN	Free swap space, in percent.	75	Lower	Warning
SWAP_FREE_ERR	Free swap space, in percent.	50	Lower	Error
SWAP_IN_WARN	Swap-in activity, in Mb/sec.	0.5	Higher	Warning
SWAP_IN_ERR	Swap-in activity, in Mb/sec.	1	Higher	Error
SWAP_OUT_WARN	Swap-out activity, in Mb/sec.	0.5	Higher	Warning
SWAP_OUT_ERR	Swap-out activity, in Mb/sec.	1	Higher	Error
SWAP_LAT_MAX_WARN	Swap-in latency, in milliseconds (maximum over 5 sec period).	750	Higher	Warning
SWAP_LAT_MAX_ERR	Swap-in latency, in milliseconds (maximum over 5 sec period).	1000	Higher	Error
SWAP_LAT_AVG_WARN	Swap-in latency, in milliseconds (5 sec average).	500	Higher	Warning
SWAP_LAT_AVG_ERR	Swap-in latency, in milliseconds (5 sec average).	750	Higher	Error
DISK_FREE_INODES_WARN	Free inodes on the disk, in percent.	20	Lower	Warning
DISK_FREE_INODES_ERR	Free inodes on the disk, in percent.	5	Lower	Error
DISK_FREE_SPACE_WARN	Free disk space, in percent.	20	Lower	Warning
DISK_FREE_SPACE_ERR	Free disk space, in percent.	5	Lower	Error
CT_FAILCNT_DELTA	Number of failed UBC resource allocations for a particular Container between `vzstat` screen updates (any resource type counts).	1	Higher	Error

vzrmond Configuration File

This file (`/etc/vzrmond.conf`) is the configuration file for the `vzrmond` daemon which is running on the Monitor Node and provides the remote monitoring of Nodes registered in it and the sending of alerts to the specified e-mail addresses. It also allows you to use external applications for sending alerts (e.g. via ICQ or SMS). The file lists a number of parameters some of which have values that should be provided by the user (from `HOSTS` through `CUSTOM_LIST`). These values are included in double quotes and separated by spaces from each other. The remaining parameters have default values that may be altered by the user. They are not included in quotes.

Parameter	Description	Default value
`HOSTS`	The list of hosts to be monitored delimited by spaces. Both hostnames and IP addresses are allowed.	`""`
`EMAIL_ADDRESSES`	E-mail addresses to receive the alerts. Must be separated by spaces.	`""`

`EMAIL_NOTIFICATIONS`	The types of notifications to be sent to the specified e-mail address(es).	`SYSTEM_UP SYSTEM_DOWN`
		`DISK_OK`
		`DISK_BAD`
		`INODES_NORM`
		`INODES_HIGH`
		`HDDBUSY_NORM`
		`HDDBUSY_HIGH`
		`SSH_UP`
		`SSH_DOWN`
		`VZSTAT_OK`
		`VZSTAT_BAD`
		`LOADAVG_NORM`
		`LOADAVG_HIGH`
		`UNINT_NORM UNINT_HIGH`
		`MEMLATM_NORM`
		`MEMLATM_HIGH`
		`MEMLATA_NORM`
		`MEMLATA_HIGH`
		`CPULATM_NORM`
		`CPULATM_HIGH`
		`CPULATA_NORM`
		`CPULATA_HIGH`
		`SWAPIN_NORM`
		`SWAPIN_HIGH`
		`SWAPOUT_NORM`
		`SWAPOUT_HIGH`

`CUSTOM_ACTION`	The program to send alerts of a customized type (e.g. via ICQ or SMS).	`""`

CUSTOM_LIST	Options passed as the command-line parameters of the program specified by CUSTOM_ACTION. Must be separated by spaces.	""
POLL_PERIOD	Periodicity of checking up the registered Nodes, in seconds.	15
CHK_MAX_FAILS	After this number of unsuccessful attempts to reach a Node, the "Node is dead" alert is sent.	4
LOAD_AVG	The average number of processes on the Node. When this value is exceeded, an alert is sent.	30
PROC_UNINT	The number of uninterruptable sleeping processes (in the "D" state). When this value is exceeded, an alert is sent.	20
CPU_LAT_MAX_ERR	The maximal process scheduling latency, in milliseconds. When this value is exceeded, an alert is sent.	1000
CPU_LAT_AVG_ERR	The average process scheduling latency, in milliseconds. When this value is exceeded, an alert is sent.	750
MEM_LAT_MAX_ERR	The maximal memory allocation latency, in milliseconds. When this value is exceeded, an alert is sent.	500
MEM_LAT_AVG_ERR	The average memory allocation latency, in milliseconds. When this value is exceeded, an alert is sent.	400
SWAP_IN_ERR	The swap in activity, in Mb/s. When this value is exceeded, an alert is sent.	1.0
SWAP_OUT_ERR	The swap out activity, in Mb/s. When this value is exceeded, an alert is sent.	1.0
DISK_FREE_INODES_ERR	The percentage of free disk inodes. When the actual value becomes less than this value, an alert is sent.	5
DISK_FREE_SPACE_ERR	The percentage of free disk space. When the actual value becomes less than this value, an alert is sent.	5

To be able to begin monitoring a Node, you should provide the valid values for the HOSTS and EMAIL parameters. If you wish to use an external program for sending alerts about the Node state, you should install in on the Monitor Node and provide its name and options in the CUSTOM_ACTION and CUSTOM_LIST parameters. The alert message text will be sent as the standard input for the specified program.

You should increase the value of the POLL_PERIOD parameter together with the increase in the number of monitored Nodes not to create an overload on the Monitor Node. The parameters related to the scheduling latency, memory allocation latency, and swap in/out activity serve to have an alert generated if the system's performance plummets due to the abnormal values of these parameters.

Do not forget to restart the `vzrmond` daemon after you have edited this configuration file.

vzstatrep Configuration File

The `vzstatrep.conf` configuration file located in the `/etc` directory on the Monitor Node is used by the `vzstatrep` utility while trying to generate statistic reports and graphics on the Node resource consumption and to send them to your e-mail address. This file has a number of lines in the following format:

```
<parameter_name>="parameter_value"
```

Below is a list of available parameters:

Name	Description
`NODES`	The IP address or hostname of the Node whose logs are to be analyzed. You can set several Nodes for being processed with the help of the `vzstatrep` utility and separate them by spaces. If no Node is specified, the logs of the local server (i.e. of the Monitor Node itself) are analyzed.
`STATS_EMAIL`	The e-mail address to send the generated statistic reports and graphics to. You can specify several e-mail addresses and separate them by commas or spaces.
`GNUPLOT`	The path to the `gnuplot` utility on the Monitor Node. By default, the utility is located in the `/usr/bin` directory; however, you may specify another directory for its location (e.g. `/etc/mydir/gnuplot`). `gnuplot` is used by the `vzstatrep` utility to present the Node resources consumption in the graphical form. The resources whose graphics are to be generated should be set as the values of the `STATS_PLOT` parameter. For detailed information on the `gnuplot` utility, see its man pages.
`MUTT`	The path to the `mutt` utility on the Monitor Node. By default, the utility is located in the `/usr/bin` directory; however, you may specify another directory for its location (e.g. `/etc/mydir/mutt`). `mutt` is used by the `vzstatrep` utility to send the generated statistic reports and graphics in the form of attached files via e-mail. For detailed information on the `mutt` utility, see its man pages.
`LOGS_DIR`	The path to the directory on the Node where `vzstatrep` will search for the logs generated by the `vzlmond` daemon and containing the information on the Node resources consumption. By default, the `/var/log/vzstat` directory is used. If you have changed the directory where `vzlmond` stores the gathered information, you should specify the full path to this directory as the value of this parameter (e.g. `LOGS_DIR=/my_logs/vzstat`).
`STATS_PLOT`	Specify the resources parameters whose graphics are to be generated by means of the `gnuplot` utility. You can specify several resources and separate them by spaces. Currently, you can create graphics for the following parameters: • `ve_sum`: the information on the CPU usage for all Containers on the Node. • `ve_top`: the information on the CPU usage for 5 Containers with the highest CPU consumption. • `loadavg`: the average number of active processes for the past 1, 5, and 15 minutes. Active processes can be running, i.e. currently executed by the CPU, or runnable, i.e. waiting in the run queue for the CPU. • `io`: the amount of data read from and written to all devices on the

Node, in kilobytes per second.

- `mem`: the total memory consumption on the Node.
- `ints`: the number of interrupts and context switches on the Node per second.
- `cpu`: the information on the CPU load on the Node.
- `net`: the network information for each network interface on the Node.
- `forks`: the number of copies of all processes made on the Node during one second.

By default, all the aforementioned resources except for `ve_sum` are plotted.

To start analyzing the logs, creating the Node statistic reports and graphics, and receiving e-mail messages with these reports and graphics, you should specify the `NODES` and `STATS_EMAIL` parameters in the `/etc/vzstatrep.conf` file. All the other parameters are automatically set during the `vzrmon` package installation on the Monitor Node.

Backup Configuration File

This file (`/etc/vzbackup.conf`) is in the same format as the global Parallels Virtuozzo Containers configuration file and per-Container configuration files. All the parameters define the global backup settings, but some of them may be overridden by the per-Node configuration file, if the latter exists. Still, other parameters may be further overridden in the configuration file of a particular Container.

All-Node parameters:

Parameter	Description	Default value
`BACKUP_DIR`	The backup directory, i.e. the directory where backups are stored.	`/vz/backup`
`BACKUP_TYPE`	The backup type. Among the supported types are "plain full (`F`)", "full (`I`)", and "incremental (`i`)". The default is incremental. If it is impossible to do an "incremental" backup, a "full" backup will be made.	`i`
`BACKUP_NODES`	The hostname of the Node whose Containers are to be backed up. You can specify several hostnames of your Nodes and separate them by spaces. If you wish to back up Containers residing on the Backup Node itself, you should specify its hostname as the value of this parameter.	
`BACKUP_MAX_CHLD`	The maximal number of Nodes to back up in parallel for non-periodic backups.	`1`
`BACKUP_MAX_CHLD_CRON`	The maximal number of Nodes to back up in parallel for periodic backups.	`3`
`BACKUP_NOTIFY_EMAIL`	The e-mail addresses where to send notifications about the backing up.	
`BACKUP_COMPRESS`	Specifies whether the Containers are to be compressed when being backed up, and with what compression algorithm. When backing up Containers residing on Parallels Virtuozzo Containers 4.7 Hardware Nodes, you can set this option to one of the following values: • `C0`: in this case the Container backup is created without any compression. Using this level of compression, you may greatly reduce the backup creation time; however, the size of the resulting backup file may significantly increase as compared to other compression levels. • `C1`: in this case the Container backup is created with a normal level of compression. • `C2`: in this case the Container backup is created with the high level of compression. The size of the resulting	`none`

	backup file is smaller than that of the backup file compressed in the 'normal' and 'none' modes; however, it takes longer to create the backup file. • C3: in this case the Container backup is created with the maximal level of compression. The size of the resulting backup file is the smallest and the time of the backup creation - the longest.	
CRON_BACKUP	Specifies whether the backing up is performed as a cron job. If set to "yes", the values of the BACKUP_KEEP_MAX and BACKUP_LOADAVG_MAX parameters in the given file are taken into consideration. This parameter can be overridden by the -p or -j command line switch of the vzbackup utility.	no

Per-Node parameters:

Parameter	Description	Default value
BACKUP_SSH_OPTS	Options which are passed to ssh when it is used. On Parallels Virtuozzo Containers 4.7 Hardware Nodes, this option is relevant only for the vzbackup and vzrestore utilities when they are run in the compatibility mode.	-c blowfish
BACKUP_VESTOP	Defines whether the Containers are to be stopped before their backing up. If set to –s, the Containers are stopped by default, otherwise, they are not stopped. On Parallels Virtuozzo Containers 4.7 Hardware Nodes, this option is relevant only for the vzbackup and vzrestore utilities when they are run in the compatibility mode.	
BACKUP_EXCL_VES	Defines those Containers that are to be excluded from the backup list. Container IDs must be given here.	
BACKUP_LOADAVG_MAX	The maximal loadavg with which backing up is allowed. This parameter is effective only if the -p option is specified with the vzbackup utility. On Parallels Virtuozzo Containers 4.7 Hardware Nodes, this option is relevant only for the vzbackup and vzrestore utilities when they are run in the compatibility mode.	10
BACKUP_FINISH_TIME	The time when the backing up should be stopped and delayed until the next execution, e.g. when running backup scripts at 4am, one can require the backup to be finished before 7am. The backup will continue from the last Container at the next execution. The format is: "HH:MM". This parameter is effective only if the -L option is specified with the vzbackup utility.	none
BACKUP_LIMIT_TIME	The number of hours after which the backing up should be stopped and delayed until the next	none

	execution. The format is: "HH". This parameter is effective only if the -L option is specified with the vzbackup utility.	

Per-Container parameters

Parameter	Description	Default Value
BACKUP_CHAIN_LEN	An incremental backup parameter. After this number of incremental backups, a full backup is performed. On Parallels Virtuozzo Containers 4.7 Hardware Nodes, this option is relevant only for the vzbackup and vzrestore utilities when they are run in the compatibility mode.	7
BACKUP_CHAIN_DAYS	An incremental backup parameter. After this number of days a full backup is performed. On Parallels Virtuozzo Containers 4.7 Hardware Nodes, this option is relevant only for the vzbackup and vzrestore utilities when they are run in the compatibility mode.	7
BACKUP_KEEP_MAX	The number of backups to store. Only full and plain full backups are accounted. If a regular backup is being performed that exceeds this number, the oldest backup is automatically deleted. This parameter is effective only if the -p option is specified with the vzbackup utility. If there is no -p option, the number of backups to store is not limited whatever the value of this parameter. On Parallels Virtuozzo Containers 4.7 Hardware Nodes, this option is relevant only for the vzbackup and vzrestore utilities when they are run in the compatibility mode.	3

If you want to rewrite the per-Node parameters for a particular Hardware Node, you should create a new configuration file named <*node*>.conf and put it to the backup directory (defined by the BACKUP_DIR parameter in the global backup configuration file.

vzrhnproxy Configuration File

This file (`/etc/vz/pkgproxy/rhn.conf`) is the configuration file for `vzrhnproxy` - a special utility which can be used on any RHEL-based server (e.g. RHEL 4 or 5, Fedora Core 5 or , CentOS 4 or 5) to create RHN (Red Hat Network) Proxy Servers allowing you to effectively manage the RPM packages included in the RHEL 4 and 5 OS EZ templates.

The parameters in this file are presented on separate lines in the following format:

<*parameter_name*>=<*parameter_value*>

The table below describes these parameters:

Parameter Name	Description
`REDHAT_LOGIN`	The user name for logging in to Red Hat Network.
`REDHAT_PASSWORD`	The password of the user specified as the value of the `REDHAT_LOGIN` parameter.
`HTTP_PROXY`	The hostname or the IP address and the port number of the HTTP proxy server, if you use any to connect to the Internet.
`HTTP_PROXY_USER`	The user name used by the HTTP proxy server for your authentication.
`HTTP_PROXY_PASSWORD`	The password of the user specified in the `HTTP_PROXY_USER` parameter and used for your authentication by the HTTP proxy server.
`EMAIL`	The destination of all tracebacks.
`PRE_DOWNLOAD`	The names of the packages to be downloaded when running the `vzrhnproxy update` command. The names of the packages listed as the value of this parameter should correspond to the names of real packages in the RHEL repository in Red Hat Network and can be specified as regular expressions (e.g. `perl.*`).

vzpkgproxy Configuration File

This file (`/etc/vzpkgproxy/vzpkgproxy.conf`) is the configuration file for `vzpkgproxy` - a special utility which can be used to create special caching proxy servers allowing you to efficiently manage your OS and application EZ templates.

The parameters in this file are presented on separate lines in the following format:

<*parameter_name*>=<*parameter_value*>

The table below describes these parameters:

Parameter Name	Description
`REPO_DIR`	The path to the directory on the proxy server where the local repository created on the basis of the cached packages is to be stored. By default, this directory has the path of `/var/www/html/download`.
`CACHE_DISABLE`	The IP addresses of the hosts to be excluded from the caching process. It means that the packages requested by Nodes and received from these hosts will not be cached on the proxy server. By default, the proxy server is configured to cache all packages from all hosts on external networks.

vztt Configuration File

This file (`/etc/vztt/vztt.conf`) is the configuration file used by the `vzpkg` utility when managing OS and application EZ templates.

The parameters in this file are presented on separate lines in the following format:

<*parameter_name*>=<*parameter_value*>

The table below describes these parameters:

Parameter Name	Description
`VZTT_PROXY`	The IP address or hostname of the caching proxy server to be used by the `vzpkg` tool for managing OS and application EZ templates.
`HTTP_PROXY`	The IP address or hostname of the HTPP proxy server address, if you use this server.
`HTTP_PROXY_USER`	The user name used by the HTTP proxy server for your authentication.
`HTTP_PROXY_PASSWORD`	The password of the user specified in the `HTPP_PROXY_USER` parameter and used for your authentication by the HTTP proxy server.
`METADATA_EXPIRE`	Defines the period of time, in seconds, in the course of which the downloaded software packages in the `vzpkg` cache are regarded as 'not obsolete'. During this time, the `vzpkg` utility searches for the EZ template packages in the local cache only (without checking the remote repositories set for EZ templates). By default, this period is set to 86400 seconds (24 hours).
`EXCLUDE`	List of comma-separated packages that are not to be installed or updated during the `vzpkg` execution. The package names should correspond to the name of real packages in the repository and can contain file globs (e.g. * and ?).

Managing Parallels Virtuozzo Containers Scripts

This section provides information on Parallels Virtuozzo Containers scripts used to automate and perform some operations and procedures within your system.

Overview

Along with Parallels Virtuozzo Containers configuration files responsible for the Parallels Virtuozzo Containers system configuration, there are a number of scripts allowing you to customize the Container behavior in different ways. These are the following scripts:

Script Name	Description
`/vz/private/<CT_ID>/scripts/<action>`	Container private action scripts. These scripts allow to run user-defined actions on particular events. The currently defined actions are `start`, `stop`, `mount`, `unmount`.
`/etc/vz/conf/dists/scripts/<script>`	Scripts to be executed on performing certain Container-related operations (e.g. on adding a new IP address to the Container). These operations should be specified in the corresponding Linux distribution configuration file.
`/usr/sbin/vzagent_ctl`	The Parallels Agent start/stop script.
`/etc/rc.d/init.d/srvcontrol`	The Parallels Agent start/stop script; it runs inside the Service Container.
`/etc/rc.d/init.d/vz`	The Parallels Virtuozzo Containers start/stop script. This script is responsible for proper Parallels Virtuozzo Containers startup and shutdown procedures, including Parallels Virtuozzo Containers modules loading and Container start/stop procedures.

Parallels Virtuozzo Containers Action Scripts

There might be situations when you need to do additional actions when a particular Container is started or stopped. For example, if you want to be able to access the Node file system (or part of it) from Container 101, then you can bind mount it inside the Container manually from the Node. However, after you restart the Container, your mount disappears, and you should manually type the `mount` command again.

Parallels Virtuozzo Containers allows you to automate procedures like the above by using `Parallels Virtuozzo Containers` *action scripts*. There are six action scripts defined in the current version of Parallels Virtuozzo Containers:

global `mount`	This script runs immediately after `vzctl` mounts the Container private area. The Container itself is not yet running and the script is running in the Node context.
`mount`	This script runs immediately after the global mount script. The Container is still not running, and the scripts is called in the Node context.
`start`	After `vzctl` has started a Container, it runs the Container `start` script. The script is running already in the Container context.
`stop`	This script runs before the Container is stopped, in the Container context.
`umount`	After the Container has been already stopped, the `umount` script is executed, and the script runs in the Node context.
global `umount`	This script runs when `vzctl` is about to dismount the Container private area. It also runs in the Nodecontext.

It is important to understand how `vzctl` handles exit codes of action scripts. If exit code is non-zero, then `vzctl` will try to undo the action for the `mount` and `start` scripts. In other words, if the `start` script returns an error, then `vzctl` will stop Container, and if one of the `mount` scripts fails, then `vzctl` will dismount the Container private area. Please note that in this case `vzctl` will not execute the `stop` and `umount` scripts at all.

Caution: When executing `vzctl start`, both `mount` and `start` scripts run. However, if the `start` script fails then neither `stop` nor `umount` scripts will run. As a result, `vzctl` might be unable to dismount the Container private area, if you set up additional mounts in the `mount` scripts and dismount them in the `umount` scripts.

The situation with the `umount` and `stop` scripts is similar. If a script returns an error, then the action will not be taken. Be careful since this allows to create Containers that are not stoppable by `vzctl`.

The global scripts are named `vps.mount` and `vps.umount` and located in the `/etc/vz/conf` directory on the Node. These scripts are called when any Container on the Node is started or stopped. So, you should include in these scripts those commands that are common for all Containers and leave Container-specific commands for the scripts belonging to a particular Container. Container-specific action scripts are located in the `/vz/private/`*`CT_ID`*`/scripts` directory and have the `mount`, `start`, `stop`, and `umount` names. For example, the scripts specific for Container 101 will have the following names:

- /vz/private/101/scripts/mount
- /vz/private/101/scripts/start
- /vz/private/101/scripts/stop
- /vz/private/101/scripts/umount

For the mount and umount scripts, the environment passed is the standard environment of the parent (i.e. vzctl) with two additional variables: $VEID and $VE_CONFFILE. The first one holds the ID of the Container being mounted (started, stopped, dismounted), and the second one holds the full path to the Container configuration file. It is probably a bit redundant. Parallels introduced both variables for convenience. You can use the following fragment of the code in bash scripts to get access to additional Container information like $VE_PRIVATE or $VE_ROOT locations:

```
#!/bin/bash
#
# This script sources Container configuration files in the same
# order as vzctl does

# if one of these files does not exist then something is
# really broken
[ -f /etc/sysconfig/vz ] || exit 1
[ -f $VE_CONFFILE ] || exit 1

# source both files. Note the order, it is important
. /etc/vz/vz.conf
. $VE_CONFFILE
```

The start and stop scripts are performed in the Container context. If these scripts call any external commands, these commands are taken from the Container itself. Also note that the start script runs before any Container tasks (including init), thus the /proc file system is not mounted inside the Container at this moment – therefore, applications using an information from /proc may be not functional.

CHAPTER 3

Parallels Virtuozzo Containers Command-Line Interface

Parallels Virtuozzo Containers is shipped with a number of command line tools. This chapter documents the utilities, which are supported in Parallels Virtuozzo Containers. For every utility, all available command-line options and switches are described.

In This Chapter

Matrix of Parallels Virtuozzo Containers Command Line Utilities

The table below contains the full list of Parallels Virtuozzo Containers command-line utilities.

General utilities are intended for performing day-to-day maintenance tasks:

`vzctl`	Utility to control Containers.
`vzlist`	Utility to view a list of Containers existing on the Node with additional information.
`vzquota`	Utility to control Parallels Virtuozzo Containers disk quotas.

Licensing utilities allow you to install a new license, view the license state, generate a license request for a new license:

`vzlicview`	Utility to display the Parallels Virtuozzo Containers license status and parameters.
`vzlicload`	Utility to manage Parallels Virtuozzo Containers licenses on the Node.
`vzlicupdate`	Utility to activate the Parallels Virtuozzo Containers installation, update the Parallels Virtuozzo Containers licenses installed on the Node, or transfer the Parallels Virtuozzo Containers license from the Source Node to the Destination Node.

Container migration tools allow to migrate Containers between Nodes or within one Node:

`vzmigrate`	Utility for migrating Containers from one Node to another.
`vzmlocal`	Utility for the local cloning or moving of the Containers.
`vzp2v`	Utility to migrate a physical server to a Container on the Node.

Container backup utilities allow to back up and restore the Container private areas, configuration files, action scripts, and quota information:

`vzbackup`	Utility to back up Containers.
`vzrestore`	Utility to restore backed up Containers.
`vzabackup`	Utility to back up Nodes and their Containers. As distinct from `vzbackup`, this utility requires the Parallels Agent software for its functioning.
`vzarestore`	Utility to restore backed up Nodes and Containers. As distinct from `vzrestore`, this utility requires the Parallels Agent software for its functioning.

Template management tools allow the template creation, maintenance and installation of applications into a Container:

`vzpkg`	Utility to manage OS and application EZ templates either inside your Containers or on the Hardware Node itself.
`vzmktmpl`	Utility to create OS and application EZ templates.
`vzveconvert`	Utility to convert Containers based on standard templates to EZ template-based Containers.

`vzpkgproxy`	Utility to create caching proxy servers for handling OS and application EZ templates.
`vzrhnproxy`	Utility to create RHN proxy servers for handling the packages included in the RHEL 4 and RHEL 5 OS EZ templates.
`vzpkgls`	Utility to get a list of templates available on the Hardware Node and in Containers.
`vzpkginfo`	Utility to get the information on any template installed on the Hardware Node.
`vzpkgcreat`	Create a new package set from binary RPM or DEB files.
`vzpkgadd`	Utility to add a new template to a Container.
`vzpkglink`	Utility to replace real files inside a Container with symlinks to these very files on the Node.
`vzpkgrm`	Utility to remove a template from a Container.
`vzpkgcache`	Update a set of preinstalled Container archives after new template installation.

Supplementary tools perform a number of miscellaneous tasks in the Hardware Node and Container context:

`vzup2date`	Utility to update your Parallels Virtuozzo Containers software and templates.
`vzup2date-mirror`	Utility to create local mirrors of the Parallels Virtuozzo Containers official repository.
`vzfsutil`	Utility for the VZFS optimization and consistency checking.
`vzcache`	Utility to gain extra disk space by caching the files identical in different Containers.
`vzsveinstall`	Utility to create the Service Container on the Hardware Node.
`vzsveupgrade`	Utility to update the packages inside the Service Container.
`vzps` and `vztop`	Utilities working as the standard `ps` and `top` utilities, with Container-related functionality added.
`vzsetxinetd`	Utility to switch some services between a standalone and `xinetd`-dependent modes.
`vzdqcheck`	Print file space current usage from quota's point of view.
`vzdqdump` and `vzdqload`	Utilities to dump the Container user/group quota limits and grace times from the kernel or the quota file or for loading them to a quota file.
`vznetstat`	Utility that prints network traffic usage statistic by Containers.
`vzcpucheck`	Utility for checking CPU utilization by Containers.
`vzmemcheck`	Utility for checking the Hardware Node and Container current memory parameters.
`vzcalc`	Utility to calculate resource usage by a Container.
`vzcheckovr`	Utility to check the current system overcommitment and safety of the total resource control settings.
`vzstat`	Utility to monitor the Hardware Node and Container resources consumption in real time.
`vzpid`	Utility that prints Container id the process belongs to.
`vzsplit`	Utility to generate Container configuration file sample, "splitting" the Hardware Node into equal parts.

`vzcfgscale`	Utility to scale the Container configuration.
`vzcfgvalidate`	Utility to validate Container configuration file correctness.
`vzstatrep`	Utility to analyze the logs collected by `vzlmond` and to generate statistics reports on the basis of these logs (in the text and graphical form).
`vzreport`	Utility to draw up a problem report and to automatically send it to the Parallels support team.
`vzhwcalc`	Utility to scan the main resources on any Linux server and create a file where this information will be specified.
`vzveconvert`	Utility to convert the Containers based on Parallels standard OS templates to the EZ template-based ones.
`vznetcfg`	Utility to manage network devices on the Hardware Node.
`vzmtemplate`	Utility to migrate the installed OS and application templates from the one Hardware Node to another.

vzctl

`vzctl` is the primary tool for Container management. To use it, you have to log in to the Node as the root user. The syntax of `vzctl` is:

```
vzctl [--quiet | --verbose] command CT_ID
vzctl --version
vzctl --help
```

Where *`command`* can be one of the following:

`create`	Creates a new Container.
`delete`	Deletes a Container.
`destroy`	
`mount`	Mounts the Container private area and executes the Container mount script.
`umount`	Unmounts the Container private area and executes the unmount script.
`start`	Starts a Container.
`stop`	Stops a Container.
`restart`	Restarts a Container.
`status`	Displays the Container status.
`set`	Sets Container parameters: resource control settings, hostname, IP addresses, and so on.
`unset`	Removes Container parameters (resource control settings, IP addresses, and so on) from the configuration file.
`enter`	Logs in to a Container without knowing its root password.
`exec`	Runs arbitrary commands in a Container without logging in to it.
`exec2`	
`recover`	Recovers the original state of the Container system and application files.
`reinstall`	
`quotaon`	Turns the disk quota on for a Container.
`quotaoff`	Turns the disk quota off for a Container.
`quotainit`	Initializes the disk quota for a Container with the parameters taken from the Container configuration file.
`suspend`	Saves the state of a running Container in a dump file.
`resume`	Restores a Container from its dump file.
`convert`	Converts legacy Containers to support the new Parallels Virtuozzo Containers directory layout.
`runscript`	Runs shell scripts in a Container.

Verbosity options can be used with any of the above commands:

`--verbose`	Sets the log level to its maximum possible value.

`--quiet` Disables logging to the screen and to the log file.

You can also pass to `vzctl` one of the following options:

`--version` Displays the `vzctl` package version currently installed on the Node.

`--help` Displays the usage information about `vzctl`.

vzctl create

This command is used to create a new Container. It has the following syntax:

```
vzctl create <CT_ID> {--pkgset name [--pkgver ver] | [--ostemplate name]}
                     [options]
```

With this command, you can create regular Containers. A unique Container ID is required for this command.

Note: Container IDs from 1 to 100 are reserved for internal Parallels Virtuozzo Containers needs. Do not use IDs from 1 to 100 for Containers.

Command options are as follows:

`--ostemplate` *name*	OS EZ template to use for creating the Container. If omitted, this value is taken from the `DEF_OSTEMPLATE` parameter in the global Parallels Virtuozzo Containers configuration file.
`--config` *name*	Container sample configuration file to use for creating the Container. Sample configuration files are located in `/etc/vz/conf` and have names in the format `ve-<`*name*`>.conf-sample`. The sample configuration files usually have a number of resource control limits for the Container and some application templates to be added to the Container immediately upon its creation. If you skip this option and the default configuration file name is not specified in the global Parallels Virtuozzo Containers configuration file, you will have to set resource control parameters for the Container using the `vzctl set` command.
`--private` *path*	Path to the Container private area. This option is used to override default path to private area from the `/etc/vz/vz.conf` configuration file (`VE_PRIVATE` variable). The argument can contain `$VEID` string which will be replaced by numeric Container ID value.
`--root` *path*	Path to the mount point of the Container root directory. This option is used to override default path to Container root directory from the `/etc/vz/vz.conf` configuration file (`VE_ROOT` variable). The argument can contain `$VEID` string which will be replaced by numeric Container ID value.
`--ipadd` *addr*`[/`*mask*`]`	IP address and subnet mask to assign to the Container. If you omit this option, you can set an IP address for the Container later using the `vzctl set` command.
`--hostname` *name*	Hostname to assign to the Container. If you omit this option, you can assign a hostname to the Container later using the `vzctl set` command.
`--name` *name*	Name to assign to the Container. Like IDs, names can be used to perform Container-related operations.
`--description` *desc*	Container description. You cat type any text you consider reasonable. If the text contains space characters, enclose in in quotation marks.
`--skip_app_templates`	Do not install the application templates specified in the Container sample configuration file.
`--pkgset` *name*	OS standard template to use for creating the Container. If omitted, this value is taken from the global Parallels Virtuozzo Containers configuration

	file.
`--pkgver` *ver*	Particular version of OS standard template. If omitted, the latest available version is used.

vzctl delete and vzctl destroy

These commands are used to delete a Container, which is no longer needed, from the Node. The syntax of the commands is as follows:

```
vzctl delete <CT_ID>
vzctl destroy <CT_ID>
```

When executed, `vzctl delete`/`vzctl destroy` physically removes all the files located in the Container private area (specified as the `VE_PRIVATE` variable in the Container configuration file) and renames the Container configuration file in `/etc/vz/conf` from `<CT_ID>.conf` to `<CT_ID>.conf.destroyed`. It also renames Container action scripts, if any, in a similar manner.

These commands do not take any additional arguments and requires the Container to be stopped and its private area to be dismounted.

vzctl mount and vzctl umount

These commands take no additional arguments:

```
vzctl mount  <CT_ID>
vzctl umount <CT_ID>
```

The first command mounts the Container private area to the Container root directory (`/vz/root/<CT_ID>` on the Node) without starting it. Normally, you do not have to use this command as the `vzctl start` command mounts the Container private area automatically.

The `vzctl umount` command unmounts the Container private area. Usually, there is no need in using this command either because `vzctl stop` unmounts the Container private area automatically.

vzctl start, vzctl stop, vzctl restart, and vzctl status

These four commands have the same syntax and take no obligatory arguments:

```
vzctl start   <CT_ID|name> [--wait]
vzctl stop    <CT_ID|name> [--fast]
vzctl restart <CT_ID|name>
vzctl status  <CT_ID|name>
```

The first command is used to start a Container. It will set up all network interfaces inside the Container, initialize the Container quota, if needed, start the `init` process inside the Container, and exit. You can also make the `vzctl start` command wait for all the necessary startup processes to complete and the Container to boot into the default runlevel by passing the `--wait` option to this command.

When starting a Container, `vzctl` executes a number of helper scripts located in the `/vz/private/<CT_ID>/scripts` (the first and last scripts in the table) and `/etc/vz/conf` (all the other scripts in the table) directories, namely (in the order of execution):

`mount`	Optional Container mount script. If it exists, then it is executed immediately after mounting the Container private area. If it exits with a non-zero status, then `vzctl` dismounts the Container private area and returns the error.
`vz-start`	This script sets up IP traffic accounting for the Container.
`vz-net_add`	This script creates the necessary ARP entries and sets up the necessary routing entries for Container IP addresses.
`ve-alias_add`	This script configures the network interfaces inside the Container.
`ve-veconfig`	This script is called by `vzctl` to set a hostname and DNS search domains inside the Container.
`ve-quota`	If the second-level (per user/group) quota is turned on, then `vzctl` calls this script to form the correct `/etc/mtab` file inside the Container.
`start`	Optional Container start script. If it exists, then it is executed in the context of a just started Container.

`vzctl stop` shuts the Container down. If the Container is not down after a two-minute timeout due to an error in an application, for example, `vzctl` will forcibly kill all the processes inside the Container. To avoid waiting for two minutes in case of a corrupted Container, you may use the `--fast` option with this command. The normal shutdown sequence of `vzctl stop` is described below in the order of execution:

`stop`	Optional Container stop script. If it exists, then it is executed in the context of the Container prior to any other actions. If it exits with non-zero status, then `vzctl` does not stop the Container.
`umount`	Optional Container unmount script. If it exists, then it is executed after stopping the Container but before dismounting its private area.
`vz-stop`	This script deletes routing and IP traffic accounting for the Container.

You should use action scripts (`mount`/`umount` and `start`/`stop`) if you would like to carry out some actions upon the Container startup/shutdown. However, there might be situations when you have to modify other scripts documented above. In this case it is strongly suggested that you create a separate script containing all your modifications and add an invocation of this script to shipped scripts. This will facilitate upgrades to future Parallels Virtuozzo Containers versions.

The `vzctl restart <CT_ID>` command consecutively performs the stopping and starting of the corresponding Container.

The `vzctl status` command shows the current Container state. It outputs the following information: whether the Container private area exists, whether it is mounted and whether the Container is running as in the example below:

```
# vzctl status 101
VEID 101 exist mounted running
```

vzctl set

This command is used for setting Container parameters. It has the following syntax:

```
vzctl set <CT_ID> <option> <value> [--save]
```

An optional `--save` switch, if specified, tells `vzctl` to save changes into the Container configuration file `/etc/vz/conf/<CT_ID>.conf`. Practically all Container settings can be changed dynamically without the necessity to reboot the Container. The exceptions are `--onboot`, `--quotaugidnum`, `--capability`, `--private`, and `--root`.

The options specified in this file can be subdivided into the following categories: miscellaneous, networking, and resource management parameters.

Note: In Parallels Virtuozzo Containers, you can also use the `vzctl set` command to specify a number of parameters for the Node itself. Currently, these parameters include: `--cpuunits`, `--numproc`, `--numtcpsock`, `--numothersock`, `--vmguarpages`, `--kmemsize`, `--tcpsndbuf`, `--tcprcvbuf`,`--othersockbuf`, `--dgramrcvbuf`, `--oomguarpages`, `--lockedpages`, `--shmpages`, `--privvmpages`, `--numfile`, `--numflock`, `--numpty`, `--numsiginfo`, and `--dcachesize`. Any of these parameters can be set by indicating 0 as the value of `<CT_ID>`.

Miscellaneous options:

`--onboot yes|no`

This setting requires the `--save` switch. If you set it to "yes" than Parallels Virtuozzo Containers will automatically start this Container on next system startup.

Note: If "yes" is specified as the value of this parameter in the `0.conf` file, all Node system management parameters are set on the Node boot to the values indicated in this file.

`--offline_management yes|no`

Enabling/disabling the direct managing of the Container through a common Internet browser by means of Parallels Power Panels and the Plesk control panel (as defined by the `OFFLINE_SERVICE` parameter in the global or Container configuration file).

`--offline_service service_name`

Defines whether the Container can be managed by means of Parallels Power Panel or Plesk or both. Valid only if the `OFFLINE_MANAGEMENT` parameter is set to "yes". The names of the available services can be taken from the file names (excluding the `.conf` extension) in the `/etc/vzredirect.d` directory on the Node.

`--userpasswd user:password`

This setting creates a new user with the specified password in the Container, or changes the password of an already existing user. This command modifies not the Container configuration file, but the `/etc/passwd` and `/etc/shadow` files inside the Container. In case the Container root is not mounted, it is automatically mounted to apply the changes and then unmounted.

`--noatime yes|no`

Sets the `noatime` flag (do not update inode access times) on the Container file system. The default is `yes` for a Class 1 Container, and `no` otherwise.

`--devnodes device:r|w|rw|none`

Lets the Container access the specified devices in the specified mode - read-only, write-only, or read-write - or denies any access.

For example: `--devnodes hda1:rw`

The device must be present in the Container `/dev` directory, otherwise, a new device is automatically created.

`--netdev_add` *`name`*

Moves the specified network device from the Node to the Container.

For example: `--netdev_add eth0`

`--netdev_del` *`name`*

Moves the specified network device from the given Container to the Node.

`--capability` *`name`*`:on|off`

Specifies capabilities inside the Container. Setting the following capabilities is allowed: `AC_OVERRIDE`, `AC_READ_SEARCH`, `CHOWN`, `FOWNER`, `FSETID`, `IPC_LOCK`, `IPC_OWNER`, `KILL`, `LEASE`, `LINUX_IMMUTABLE`, `MKNOD`, `NET_ADMIN`, `NET_BIND_SERVICE`, `NET_BROADCAST`, `NET_RAW`, `SETGID`, `SETPCAP`, `SETUID`, `SYS_ADMIN`, `SYS_BOOT`, `SYS_CHROOT`, `SYS_MODULE`, `SYS_NICE`, `SYS_PACCT`, `SYS_PTRACE`, `SYS_RAWIO`, `SYS_RESOURCE`, `SYS_TIME`, `SYS_TTY_CONFIG`.

`--features` *`name`*`:on|off`

Enables/disables the support for the following functionality inside the Container:

- `nfs`: mounting NFS shares
- `ipip`: creating IPIP tunnels
- `sit`: using the Simple Internet Transition (SIT) mechanisms
- `ppp`: using the PPP protocol
- `ipgre`: creating IP-GRE tunnels
- `bridge`: using bridges to connect virtual Ethernet devices
- `nfsd`: running an NFS-kernel-space server

`--root` *`path`*

This setting does NOT move the root mount point of your Container to a new path. It simply overrides the `VE_ROOT` parameter in the Container configuration file.

`--private` *`path`*

This setting does NOT move the private area of your Container to a new path. It simply overrides the `VE_PRIVATE` parameter in the Container configuration file. You should use this option only if you have manually moved the Container private area to a new place and want to update the Container configuration file.

`--setmode restart|ignore`

This option tells the utility either to restart or not restart the Container after applying any parameters requiring that the Container be rebooted for them to take effect.

`--disabled yes|no`

If set to `yes`, disables the Container making it impossible to start the Container once it was stopped. The disabled Container can be started by passing the `--force` option to `vzctl set`.

`--name`

An arbitrary name assigned to the Container. This name can be used, along with the Container ID, to refer to the Container while performing certain Container-related operations on the Node. Follow the following rules while specifying the Container name:

- The name should contain the `A-Z`, `a-z`, `0-9`, `\`, `-`, and _ symbols only.
- If the name consists of two or more words, it should be quoted (e.g. "My Container 101").

`--description`

This option allows you to set the description for the Container.

Note: You are allowed to use only symbols in the 'A -z' and '0-9' ranges in your descriptions.

`--bindmount_add [src:]dst[,nosuid,noexec,nodev]`

Mounts a source directory (*src*) located on the Node to a destination directory (*dst*) inside the Container. If the source directory is not specified, mounts the directory to the `/vz/root/`*`CT_ID`* directory.

Additional options that can be used with `--bindmount_add` are the following:

- `noexec`. Do not allow execution of any binaries on the mounted directory.
- `nodev`. Do not interpret character or block special devices on the mounted directory.
- `nosuid`. Do not allow set-user-identifier or set-group-identifier bits to take effect.

`--bindmount_del dst|all`

Removes the mount point created by using the `--bindmount_add` option from the Container.

Resource management settings control the amount of resources a Container can consume. If the setting has `bar:lim` after it than this setting requires specifying both barrier and limit values separated by colons.

`--applyconfig name`

This option lets you set the resource parameters for the Container not one by one, but by reading them from the Container sample configuration file. All Container sample configuration files are located in the `/etc/vz/conf` directory and are named according to the following pattern: `ve-<name>.conf-sample`, so you should specify only the `<name>` part of the corresponding sample name after the `--applyconfig` option. Note that the names of

	sample configuration files cannot contain spaces. The `--applyconfig` option applies all the parameters from the specified sample file to the given Container, except for the `OSTEMPLATE`, `TEMPLATES`, `VE_ROOT`, `VE_PRIVATE`, `HOSTNAME`, `IP_ADDRESS`, `TEMPLATE`, `NETIF` parameters (if they exist in the configuration sample file).
`-p, --numproc` *bar*`:`*lim*	Number of processes and threads allowed. Upon hitting this limit, the Container will not be able to start new process or thread. In this version of Parallels Virtuozzo Containers, the limit shall be set to the same value as the barrier.
`--numtcpsock` *bar*`:`*lim*	Number of TCP sockets (`PF_INET` family, `SOCK_STREAM` type). This parameter limits the number of TCP connections and, thus, the number of clients the server application can handle in parallel. In this version of Parallels Virtuozzo Containers, the limit shall be set to the same value as the barrier.
`--numothersock` *bar*`:`*lim*	Number of socket other than TCP. Local (UNIX-domain) sockets are used for communications inside the system. UDP sockets are used for Domain Name Service (DNS) queries, for example. In this version of Parallels Virtuozzo Containers, the limit shall be set to the same value as the barrier.
`-e, --numiptent` *bar*`:`*lim*	Number of IP packet filtering entries.
`--vmguarpages` *bar*`:`*lim*	Memory allocation guarantee, in pages (one page is 4 Kb). Applications are guaranteed to be able to allocate memory while the amount of memory accounted as `privvmpages` does not exceed the configured barrier of the `vmguarpages` parameter. Above the barrier, memory allocation may fail in case of overall memory shortage. In this version of Parallels Virtuozzo Containers, the limit shall be set to the same value as the barrier.
`-k, --kmemsize` *bar*`:`*lim*	Size of unswappable kernel memory (in bytes), allocated for internal kernel structures of the processes of a particular Container. Typical amounts of kernel memory are 16…50 Kb per process.
`--tcpsndbuf` *bar*`:`*lim*	Total size (in bytes) of send buffers for TCP sockets – amount of kernel memory allocated for data sent from an application to a TCP socket, but not acknowledged by the remote side yet.
`-b, --tcprcvbuf` *bar*`:`*lim*	Total size (in bytes) of receive buffers for TCP sockets. Amount of kernel memory received from the remote side but not read by the local application yet.
`--othersockbuf` *bar*`:`*lim*	Total size in bytes of UNIX-domain socket buffers, UDP and other datagram protocol send buffers.
`--dgramrcvbuf` *bar*`:`*lim*	Total size in bytes of receive buffers of UDP and other datagram protocols.
`--oomguarpages` *bar*`:`*lim*	Out-of-memory guarantee, in 4 Kb pages. Any Container process will not be killed even in case of heavy memory shortage if the current memory consumption (including both physical memory and swap) does not reach the `oomguarpages` barrier. In this version of Parallels Virtuozzo Containers, the limit shall be set to the same value as the

	barrier.
`-l, --lockedpages` *bar*`:`*lim*	Memory not allowed to be swapped out (locked with the `mlock()` system call), in 4-Kb pages.
`--shmpages` *bar*`:`*lim*	Total size of shared memory (including IPC, shared anonymous mappings and `tmpfs` objects), allocated by processes of a particular Container, in 4 Kb pages.
`--privvmpages` *bar*`:`*lim*	Size in 4 Kb pages of private (or potentially private) memory, allocated by Container applications. Memory that is always shared among different applications is not included in this resource parameter.
`-n, --numfile` *bar*`:`*lim*	Number of files opened by all Container processes. In this version of Parallels Virtuozzo Containers, the limit shall be set to the same value as the barrier.
`-f, --numflock` *bar*`:`*lim*	Number of file locks created by all Container processes.
`-t, --numpty` *bar*`:`*lim*	Number of pseudo-terminals. For example, `ssh` session, `screen`, `xterm` application consumes pseudo-terminal resource. In this version of Parallels Virtuozzo Containers, the limit shall be set to the same value as the barrier.
`-i, --numsiginfo` *bar*`:`*lim*	Number of `siginfo` structures (essentially this parameter limits size of signal delivery queue). In this version of Parallels Virtuozzo Containers, the limit shall be set to the same value as the barrier.
`-x, --dcachesize` *bar*`:`*lim*	Total size in bytes of `dentry` and `inode` structures locked in memory. Exists as a separate parameter to impose a limit causing file operations to sense memory shortage and return an error to applications, protecting from excessive consumption of memory due to intensive file system operations.
`--cpuunits` *units*	CPU weight. This is a positive integer number that defines how much CPU time the Container can get as compared to the other Containers running on the server. The larger the number, the more CPU time the Container can receive. Possible values range from 8 to 500000. If this parameter is not set, the default value of 1000 is used.
`--cpulimit` *percent*`|`*megahertz*	CPU limit, in percent or megahertz (MHz), the Container is not allowed to exceed. By default, the limit is set in percent. To set the limit in MHz, specify "m" after the value. **Note**: If the server has 2 processors, the total CPU time equals 200%.
`--cpus` *num*	If the Node has more than one CPU installed, this option allows you to set the number of virtual CPUs to be available to the Container.
`--cpumask` *num*`|all`	CPU affinity mask. This mask defines the CPUs on the server that can be used to handle the processes running in the Container. The CPU mask can be specified as both separate CPU index numbers (1,2,3) and CPU ranges (2-4,5-7).

`--nodemask` *num*|`all`

The NUMA node mask defining a NUMA node to bind the Container to. Once you set the mask, the processes running in the Container will be executed only on the CPUs that belong to the specified NUMA node.

`--diskspace` *bar*:*lim*

Total size of disk space consumed by the Container, in 1 Kb blocks. When the space used by a Container hits the barrier, the Container can allocate additional disk space up to the limit during grace period specified by the `--quotatime` setting.

`--diskinodes` *bar*:*lim*

Total number of disk inodes (files, directories, symbolic links) a Container can allocate. When the number of inodes used by a Container hits the barrier, the Container can create additional file entries up to the limit during grace period specified by the `--quotatime` setting.

`--quotatime` *seconds*

The grace period of the disk quota. It is defined in seconds. A Container is allowed to temporary exceed barrier values for disk space and disk inodes limits for not more than the period specified with this setting.

Specifying `-1` as the value of this setting makes the grace period last 'infinitely'.

`--quotaugidlimit` *num*

This parameter defines the maximum aggregate number of user IDs and group IDs for which disk quota inside the given Container will be accounted. If set to `0`, the UID and GID quota will be disabled.

When managing the quotaugidlimit parameter, keep in mind the following:

- Enabling per-user and per-group quotas for a Container requires restarting the Container.
- If you delete a registered user but some files with their ID continue residing inside your Container, the current number of ugids (user and group identities) inside the Container will not decrease.
- If you copy an archive containing files with user and group IDs not registered inside your Container, the number of ugids inside the Container will increase by the number of these new IDs.

`--ioprio` *num*

The Container priority for disk I/O operations. The allowed range of values is 0-7. The greater the priority, the more time the Container has for writing to and reading from the disk. The default Container priority is 4.

`--iolimit` *num*

The bandwidth a Container is allowed to use for its disk input and output (I/O) operations. By default, the limit is set in megabytes per second. However, you can use the following suffixes to use other measurement units:

- `G`: sets the limit in gigabytes per second.
- `K`: sets the limit in kilobytes per second.

- `B`: sets the limit in bytes per second.

In the current version of Parallels Virtuozzo Containers, the maximum I/O bandwidth limit you can set for a Container is 2 GB per second.

`--iopslimit` *num*

The maximum number of disk input and output operations per second a Container is allowed to perform.

`--rate` *dev*`:`*class*`:Kbits`

If traffic shaping is turned on, then this parameter specifies bandwidth guarantee for the Container. The format is `dev:class:Kbits` where `dev` is the network device to count traffic on, `class` is the network class (group of IP addresses) and the last parameter is traffic bandwidth.

`--ratebound yes|no`

If set to "yes", the bandwidth guarantee is also the limit for the Container and the Container cannot borrow the bandwidth from the `TOTALRATE` bandwidth pool.

`--physpages`

The amount of RAM that can be used by the processes of a Container, in 4-KB pages. You can use the following suffixes to set RAM in other measurement units:

- `G` in gigabytes
- `M`in megabytes
- `K` in kilobytes
- `B` in bytes

`--ram`

The amount of RAM that can be used by the processes of a Container, in bytes. You can use the following suffixes to set RAM in other measurement units:

- `G` in gigabytes
- `M` in megabytes
- `K` in kilobytes
- `B` in bytes

`--swappages`

The amount of swap space that can be used by the Container for swapping out memory once the RAM is exceeded, in 4-KB pages. You can use the following suffixes to set swap in other measurement units:

- `G` in gigabytes
- `M` megabytes
- `K` in kilobytes
- `B` in bytes

`--swap`

The amount of swap space that can be used by the Container for swapping out memory once the RAM is exceeded, in bytes. You can use the following suffixes to set swap in other measurement units:

- `G` in gigabytes
- `M` megabytes

- K in kilobytes
- B in bytes

`--vm_overcommit` — Memory overcommit factor that defines the memory allocation limit for a Container. The limit is calculated as

`(RAM + SWAP) * factor`

`--reset_ub` — Resets the current values of all system parameters of the Node to the ones set in the `0.conf` file.

Network related settings allow you to set the hostname, the domain to search when a not fully qualified domain name is used, the DNS server address and the IP addresses that Container can use as well as to indicate those `iptables` modules that can be loaded to the Container:

`--hostname name` — Sets the hostname to the specified name.

`--ipadd addr` — Adds an IP address to a list of IP addresses the Container can use and brings up the network interface with this address inside the Container.

If used with the `--ifname` option, adds an IP address to the specified Container virtual network adapter.

`--ipadd addr/net_mask` — Assigns the IP address and network mask to the Container.

Note: You can assign network masks to Containers operating in the `venet0` networking mode only if the `USE_VENET_MASK` parameter in the Parallels Virtuozzo Containers configuration file is set to `yes`.

`--ipdel addr|all` — Allows you to revoke IP address from the Container. If “all” is used instead of IP address than all IP addresses will be revoked.

If used with the `--ifname` option, deletes an IP address from the specified Container virtual network adapter.

`--ext_ipadd addr` — Assigns the external IP address to the Container. External IP addresses are considered valid IP addresses by the `venet0` adapter, though they are not set as alias addresses inside Containers and are not announced via Address Resolution Protocol (ARP). You can assign the same external IP address to several Containers, irrespective of whether they reside on the same or different Hardware Nodes.

`--ext_ipdel addr|all` — Removes the external IP address from the Container. To delete all external IP addresses assigned to the Container, specify `--ext_ipdel all`.

`--nameserver addr` — The DNS server IP address for the Container.

If used with the `--ifname` option, sets the DNS server for the specified Container virtual network adapter.

`--searchdomain domain` — The DNS search domain for the Container. More than one domain may be specified.

`--iptables module` — Only those `iptables` modules will be loaded to the given

	Container which are indicated. The list of `iptables` modules are loaded to a Container is determined by the list of `iptables` modules loaded on the Node at the moment of the Container startup.
`--netif_add` *`name`* `[,`*`mac`*`,`*`host_mac`*`]`	Creates a new `veth` virtual network adapter and assigns the name of *`name`* to the Ethernet interface inside the Container. Along with the Ethernet interface name inside the Container, you can set the following parameters when creating the `veth` adapter: • *`mac`*: the MAC address to be assigned to the `veth` Ethernet interface inside the Container. • *`host_mac`*: the MAC address to be assigned to the `veth` Ethernet interface on the Node. Only the Ethernet interface name (*`name`*) is mandatory; all the other parameters, if not specified, are automatically generated by Parallels Virtuozzo Containers during the `veth` adapter creation.
`--netif_del` *`name`*	Removes the `veth` virtual network adapter with the specified name from the Container.
`--ifname` *`name`*	Specifies the name of the `veth` virtual network adapter whose settings are to be configured. This option can be used along with one of the following options: `--ipadd`, `--ipdel`, `--nameserver`, `--gw`, `--network`, `--dhcp`, `--mac`, `--host_mac`.
`--mac` *`MAC_Address`*	The MAC address to be assigned to the `veth` virtual Ethernet interface inside the Container. Should be used along with the `--ifname` option.
`--host_mac` *`MAC_Address`*	The MAC address to be assigned to the `veth` virtual Ethernet interface on the Node. Should be used along with the `--ifname` option.
`--host_ifname` *`name`*	The name to be assigned to the `veth` virtual Ethernet interface on the Node. Should be used along with the `--ifname` option.
`--network` *`network_ID`*	Connects the `veth` virtual network adapter to the bridge associated with the specified network ID. Should be used along with the `--ifname` option. You can also use this option to disconnect the `veth` virtual network adapter from the bridge. To this effect, you should specify `""` after the option.
`--dhcp yes|no`	Defines the IP assignment type for the `veth` virtual network adapter: • `yes` enables the dynamic IP address allocation for the Container. • `no` turns off the dynamic IP address allocation for the Container. Should be used along with the `--ifname` option.

`--gw` *addr*	Set the default gateway for the `veth` virtual network adapter. Should be used along with the `--ifname` option.

vzctl unset

This command is used to remove Container parameters from its configuration file (`/etc/vz/conf/<CT_ID>.conf`). It has the following syntax:

```
vzctl unset <CT_ID> <setting_name> --save
```

Depending on the parameter for which the command is executed, `vzctl unset` can:

- Either delete the information on the specified parameter from the Container configuration file without making any changes to the Container configuration (e.g. if executed with the `--root` or `--private` parameter).
- Or delete the information on the specified parameter from the Container configuration file and make the corresponding changes to the Container configuration (e.g. disable the offline management if executed with the `--offline_management` parameter or forbid the Container to start on the Node boot if executed with the `--onboot` parameter).

This command can be used with the same parameters as `vzctl set`. You can view detailed information on all the parameters in the previous subsection.

vzctl exec, vzctl exec2, and vzctl enter

These commands are used to run arbitrary commands in a Container being authenticated as root on the Node. The syntax of these commands is as follows:

```
vzctl { exec|exec2 } <CT_ID|name> <command>
vzctl enter <CT_ID|name>
```

where `command` is a string to be executed in the Container. If `command` is specified as "`-`" then the commands for execution will be read from the standard input until the end of file or "exit" is encountered.

The difference between `exec` and `exec2` is the exit code. `vzctl exec` returns 0 in case `vzctl` has been able to launch the command and does not take into account the exit code of the command itself. `vzctl exec2` returns the exit code of the command executed in the Container.

When using `exec` or `exec2`, you should remember that the shell parses the command-line and, if your command has shell meta-characters in it, you should escape or quote them.

`vzctl enter` is similar to `vzctl exec /bin/bash`. The difference between the two is that `vzctl enter` makes the shell interpreter believe that it is connected to a terminal. As such, you receive a shell prompt and are able to execute multiple commands as if you were logged in to the Container.

vzctl recover and vzctl reinstall

These commands are used to restore the original state of Container system and application files (to be more precise, of VZFS symlinks in the Container private area to system and application templates) if the Container gets broken for some reason. These are restored to the state as they were at the time when the Container was created and/or when other applications were added to the Container afterwards.

The difference between these two commands lies in the way the symlinks are restored. Whereas the `vzctl recover` command simply rewrites the original symlinks to the Container private area (leaving the user files intact), the `vzctl reinstall` command creates a new private area for the Container and re-writes the Container from scratch using its configuration files (thus retaining the Container IP address, hostname, resource control parameters, and all the other settings). The contents of the Container old private area are then copied to the `/old` directory in the new private area, to retain the user files.

The syntax of these commands is as follows:

```
vzctl recover <CT_ID> [options]
vzctl reinstall <CT_ID> [options]
```

The available options are listed below:

Option	Description
`--resetpwdb`	Removes the Container user database and creates a clean database as for any new installation.
`--skipbackup`	Does not save the contents of the old private area to the `/old` directory. Can be used with the `vzctl reinstall` command only.
`--scripts` *`script1 script2 ...`*	Indicates the scripts to be executed during the Container reinstallation. These scripts are used to customize your application templates inside the new Container and bring them to the same state they were inside the old Container. By default, all available scripts are executed.
`--listscripts`	Lists the scripts that will be executed during the Container reinstallation to customize your application templates inside the new Container.
`--desc`	Displays the description of the scripts that will be executed during the Container reinstallation. Should be used together with the `--listscripts` option.

Note: If any of the Container application templates cannot be added to the Container in a normal way, the reinstallation process will fail. This may happen, for example, if an application template was added to the Container using the `--force` option of the `vzpkgadd` command.

vzctl quotaon, vzctl quotaoff, and vzctl quotainit

These commands turn the quota on or off for the particular Container; the `vzctl quotainit` command forces the quota to be initialized for the Container, i.e. its disk space and inodes recalculated. The Container ID must be specified after these commands with no additional options:

```
vzctl quotaon <CT_ID>
vzctl quotaoff <CT_ID>
vzctl quotainit <CT_ID>
```

When the quota is turned on or initialized for the specified Container, the quota settings are taken from the Container configuration file. If you wish to change these settings, you should use the `vzctl set` command.

vzctl suspend and vzctl resume

The `vzctl suspend` command is used to save the state of a running Container. It has the following syntax:

```
vzctl suspend <CT_ID>
```

During the `vzctl suspend` execution, the current Container state is saved to a special dump file and the Container itself is stopped. The created dump file is saved to the `Dump` file in the `/vz/private/CT_ID/dump` directory on the Node (or in the directory specified as the value of the `DUMPDIR` parameter in the Parallels Virtuozzo Containers global file).

The `vzctl resume` command is used to restore the Container from its dump file created with the `vzctl suspend` command. It has the following syntax:

```
vzctl resume <CT_ID>
```

When executed, `vzctl resume` searches for the `Dump` file in the `/vz/private/CT_ID/dump` directory on the Node and restores the Container from this file.You can restore the Container dump file on the Source Node, i.e. on the Node where this Container was running before its dumping, or transfer the dump file to another Node and restore it there.

Note: Before restoring a Container from its dump file, make sure that the file system on the Destination Node is identical to that at the moment of the Container dumping. Otherwise, the Container restoration may fail.

vzctl convert

The `vzctl convert` command is used to convert legacy Containers to the new Parallels Virtuozzo Containers directory layout. It has the following syntax:

```
vzctl convert <CT_ID|name>
```

To execute the command, you should specify only the ID of the Container you wish to convert. Keep in mind that this Container should be stopped.

In the old layout, the Container-related files are dispersed over the whole Node file system. In the new layout, the Container-related files are stored in the `/vz/private/CT_ID` directory. When executed, `vzctl convert` collects all the Container-related files dispersed over the Hardware Node file system into the `/vz/private/CT_ID` directory.

vzctl runscript

The `vzctl runscript` command is used to run shell scripts in Containers. For example, you can add this command to scripts you use to perform customization or configuration tasks in the Container context. The syntax of `vzctl runscript` is as follows:

```
vzctl runscript <CT_ID> <script_path>
```

The command requires the following input parameters:

- The ID of the Container where you want to run the script.
- The full path to the script on the Node.

If you execute the command for a running Container, it just jumps into the Container and runs the specified script there. If, however, you run the command for a stopped Container, the sequence of operations is slightly different: Once `vzctl` enters the Container, it mounts the root (`/`) filesystem, and then executes the script. Notice that in this case only the following instances are running in the Container:

- a process for the `vzctl` session
- the script
- processes initiated by the script

vzlist

The `vzlist` utility is used to list the Containers existing on the given Node together with additional information about these Containers. The output and sorting of this information can be customized as needed. The utility has the following syntax:

```
vzlist [-a] [-S] [-o parameter[.specifier] \
[,parameter[.specifier]...]] [-s [-]parameter[.specifier]] \
[-H] [-h hostname_pattern] [CT_ID ...] [-n] [-N name_pattern] \
[CT_ID [CT_ID ...]|-1]
vzlist -L
```

Here follows the description of available options:

Option	Description
`-a, --all`	Lists all the Containers existing on the Node. By default, only running Containers are shown.
`-S, --stopped`	Lists only stopped Containers.
`-o parameter[.specifier]`	This option is used to display only particular information about the Containers. The parameters and their specifiers that can be used after the `-o` option are listed in the following subsection. To display a number of parameters in a single output, they should be separated with commas, as is shown in the synopsis above.
`-s, --sort [-]parameter[.specifier]`	Sorts the Containers in the list by the specified parameter. If "`-`" is given before the name of the parameter, the sorting order is reversed.
`-h, --hosthame hostname_pattern`	Displays only those Containers that correspond to the specified hostname pattern. The following wildcards can be used: `*`,`?`, and `[]`. **Note:** The last wildcard should be escaped to avoid shell interpretation.
`-H, --no-header`	Do not display column headers.
`CT_ID`	Displays only the Container with the specified ID. Several Container IDs separated with a space can be specified. If `-1` is given as the Container ID, the utility lists only IDs of the Containers existing on the Node, with no additional information.
`-n, --name`	If used without any parameters, displays information on all the Containers on the Node together with their names. If you indicate the Container ID after this option, displays information including the Container name on the specified Container only.
`-N, --name_filter name_pattern`	Displays only the Container that corresponds to the specified name pattern.
`-i, --netif <interface_name>`	Displays the Container whose `veth` virtual Ethernet interface name on the Node corresponds to the specified name pattern.
`-d, --description desc_pattern`	Displays only the Container whose description corresponds to the specified pattern.

`-L, --list`	Lists all the parameters available to be used with the `-o` option.

vzlist Output Parameters and Their Specifiers

Almost any parameter that can be used after the `-o` and `-s` switches of the `vzlist` utility can be specified by the "dot+letter" combination following the parameter and denoting one of the following things:

Specifier	Description
`.m`	The maximal registered usage of the corresponding resource by the given Container.
`.b`	The barrier on using the corresponding resource set for the given Container.
`.l`	The limit on using the corresponding resource set for the given Container.
`.f`	The number of times the system has failed to allocate the corresponding resource for the given Container.
`.s`	The soft limit on using the corresponding resource set for the given Container.
`.h`	The hard limit on using the corresponding resource set for the given Container.

The following parameters are available for using with the utility:

Parameter	Possible Specifiers	Output Column	Description
`ctid`	none	`CTID`	The Container ID.
`hostname`	none	`HOSTNAME`	The Container hostname.
`ip`	none	`IP_ADDR`	The Container IP address.
`status`	none	`STATUS`	Specifies whether the Container is running or stopped.
`tm`	none	`TM`	Specifies the type of the OS template your Container is based on: • `ST` indicates that the Container is based on a standard OS template. • `EZ` indicates that the Container is based on an EZ OS template.
`ostemplate`	none	`OSTEMPLATE`	Specifies the name of the OS template your Container is based on (e.g. `redhat-el5-x86`).
`kmemsize`	`.m, .b, .l, .f`	`KMEMSIZE`	The size of unswappable kernel memory (in bytes), allocated for internal kernel structures of the processes of a particular Container. Typical amounts of kernel memory are 16…50 Kb per process.
`lockedpages`	`.m, .b, .l, .f`	`LOCKEDP`	The amount of memory not allowed to be swapped out (locked with the `mlock()` system call), in 4-Kb pages.
`privvmpages`	`.m, .b, .l, .f`	`PRIVVMP`	The size in 4 Kb pages of private (or potentially private) memory, allocated by Container applications. Memory that is always shared among different applications is not included in

			this resource parameter.
shmpages	.m, .b, .l, .f	SHMP	The total size of shared memory (including IPC, shared anonymous mappings and tmpfs objects), allocated by processes of a particular Container, in 4 Kb pages.
numproc	.m, .b, .l, .f	NPROC	The number of processes and threads allowed.
physpages	.m, .b, .l, .f	PHYSP	The total size of RAM used by processes. This is accounting-only parameter currently. It shows the usage of RAM by the Container. For memory pages used by several different Containers (mappings of shared libraries, for example), only a fraction of a page is charged to each Container. The sum of the physpages usage for all Containers corresponds to the total number of pages used in the system by all accounted users.
vmguarpages	.m, .b, .l, .f	VMGUARP	The memory allocation guarantee, in pages (one page is 4 Kb). Applications are guaranteed to be able to allocate memory while the amount of memory accounted as privvmpages does not exceed the configured barrier of the vmguarpages parameter. Above the barrier, memory allocation may fail in case of overall memory shortage.
oomguarpages	.m, .b, .l, .f	OOMGUARP	The out-of-memory guarantee, in 4 Kb pages. Any Container process will not be killed even in case of heavy memory shortage if the current memory consumption (including both physical memory and swap) does not reach the oomguarpages barrier.
numtcpsock	.m, .b, .l, .f	NTCPSOCK	The number of TCP sockets (PF_INET family, SOCK_STREAM type). This parameter limits the number of TCP connections and, thus, the number of clients the server application can handle in parallel.
numflock	.m, .b, .l, .f	NFLOCK	The number of file locks created by all Container processes.
numpty	.m, .b, .l, .f	NPTY	The number of pseudo-terminals. For example, ssh session, screen, xterm application consumes pseudo-terminal resource.
numsiginfo	.m, .b, .l, .f	NSIGINFO	The number of siginfo structures (essentially this parameter limits size of signal delivery queue).
tcpsndbuf	.m, .b, .l, .f	TCPSNDB	The total size (in bytes) of send buffers for TCP sockets – amount of kernel memory allocated for data sent from an application to a TCP socket, but not acknowledged by the remote side yet.
tcprcvbuf	.m, .b,	TCPRCVB	The total size (in bytes) of receive buffers for TCP sockets. Amount of kernel memory

	.l, .f		received from the remote side but not read by the local application yet.
othersockb	.m, .b, .l, .f	OTHSOCKB	The total size in bytes of UNIX-domain socket buffers, UDP and other datagram protocol send buffers.
dgramrcvbuf	.m, .b, .l, .f	DGRAMRCVB	The total size in bytes of receive buffers of UDP and other datagram protocols.
nothersock	.m, .b, .l, .f	NOTHSOCK	The number of socket other than TCP. Local (UNIX-domain) sockets are used for communications inside the system. UDP sockets are used for Domain Name Service (DNS) queries, for example.
dcachesize	.m, .b, .l, .f	DCACHESIZE	The total size in bytes of `dentry` and `inode` structures locked in memory. Exists as a separate parameter to impose a limit causing file operations to sense memory shortage and return an error to applications, protecting from excessive consumption of memory due to intensive file system operations.
numfile	.m, .b, .l, .f	NFILE	The number of files opened by all Container processes.
numiptent	.m, .b, .l, .f	NIPTENT	The number of IP packet filtering entries.
diskspace	.s, .h	DQBLOCKS	The total size of disk space consumed by the Container, in 1 Kb blocks. When the space used by a Container hits the barrier, the Container can allocate additional disk space up to the limit during grace period.
diskinodes	.s, .h	DQINODES	The total number of disk inodes (files, directories, symbolic links) a Container can allocate. When the number of inodes used by a Container hits the barrier, the Container can create additional file entries up to the limit during grace period.
laverage	none	LAVERAGE	The average number of processes ready to run during the last 1, 5 and 15 minutes.
cpulimit	none	CPULIM	This is a positive number indicating the CPU time in per cent the corresponding Container is not allowed to exceed.
cpuunits	none	CPUUNI	Allowed CPU power. This is a positive integer number, which determines the minimal guaranteed share of the CPU the Container will receive. You may estimate this share as ((Container CPUUNITS)/(Sum of CPU UNITS across all busy Containers))*100%. The total CPU power depends on CPU, and Parallels Virtuozzo Containers reporting tools consider one 1 GHz PIII Intel processor to be equivalent to 50,000 CPU units.

`cpumask`	none	`CPUMASK`	The CPU affinity mask defining which CPUs on the Node can be used to handle the processes running in the Container. The CPU mask can be specified as both separate CPU index numbers (1,2,3) and CPU ranges (2-4,5-7).
`nodemask`	none	`NODEMASK`	The NUMA node mask defining a NUMA node to bind the Container to. Once you set the mask, the processes running in the Container will be executed only on the CPUs that belong to the specified NUMA node.
`ioprio`	none	`IOPRIO`	The disk input/output priority level set for the Container. The higher the Container I/O priority level, the more time the Container will get for its disk I/O activities as compared to the other Containers on the server. The default I/O priority level is set to 4. Possible values are from o to 7.
`iolimit`	none	`IOLIMIT`	The bandwidth a Container is allowed to use for its disk input and output (I/O) operation, in bytes per second.
`iopslimit`	none	`IOPSLIMIT`	The maximum number of disk input and output operations per second a Container is allowed to perform.

If a parameter that can be used with a specifier is used without any specifier in the command-line, the current usage of the corresponding resource is shown by default.

vzquota

This command is used to configure and see disk quota statistics for Containers. `vzquota` is also used to turn on the possibility of using per-user/group quotas inside the Container. It allows you to configure per-user or per-group quota inside the Container as well. `vzctl` uses `vzquota` internally to configure quotas and you usually do not have to use `vzquota` except for checking the current quota statistics. The syntax of `vzquota` command is as follows:

```
vzquota [options] command <CT_ID> [command-options]
```

General options available to all `vzquota` commands are:

`-v` Verbose mode. Causes `vzquota` to print debugging messages about its progress. You can give up to two `-v` switches to increase verbosity.

`-q` Quiet mode. Causes all warning and diagnostic messages to be suppressed. Only fatal errors are displayed.

Parallels Virtuozzo Containers quota works on a file system sub-tree or area. If this area has additional file systems mounted to its subdirectories, the quota will not follow these mount points. When you initialize quota, you specify the file system sub-tree starting point for the quota. Quota keeps its current usage and settings for a Container in the `/var/vzquota/quota.<CT_ID>` file.

Any quota file has a special flag, which indicates whether the file is “dirty”. The file is dirty when its content can be inconsistent with that of real quota usage. On the Container startup, quota will be re-initialized if the Node was incorrectly brought down (for example power switch was hit). This operation may noticeably increase the Container startup time.

For both the disk and inodes usage, Parallels Virtuozzo Containers allows you to set soft and hard limits as well as an expiration time. Upon reaching a soft limit, Parallels Virtuozzo Containers starts the expiration time counter. When the time is expired, the quota will block the subsequent disk space or inode allocation requests. The hard limit cannot be exceeded.

`vzquota` understands the following commands:

`init` Before you can use quota, the current disk space and inode usage should be counted. For the `init` command, you must specify all the limits as well as the file tree where you want to initialize the quota.

`drop` Removes the quota file.

`on` Turns on quota accounting on the specified quota ID.

`off` Turns off quota accounting on the specified quota ID.

`setlimit` Allows you to change quota limits for the running quota.

`setlimit2` Set the second-level quota parameters.

`stat` Shows quota statistics for the running quota.

`show` Shows quota usage from the quota file.

vzquota init

This command is used for counting the current usage of disk space and inodes. It has the following syntax:

```
vzquota [options] init <CT_ID> [command-options]
```

The following options are understood by the `vzquota init` command:

`-s, --sub-quotas 1|0`	Optional. If the value used is 1 than per user/group quota is enabled in the Container. By default, user/group quotas are disabled.
`-b, --block-softlimit` *num*	Required. Disk quota block soft limit – amount of 1 Kb blocks allowed for the Container to use. This limit can be exceeded by the Container for the time specified by block expiration time (see below). When expiration time is off, the Container cannot allocate more disk space even if the hard limit is not yet reached.
`-B, --block-hardlimit` *num*	Required. Specifies disk quota block hard limit in 1 Kb blocks. This limit cannot be exceeded by the Container.
`-e, --block-exptime` *time*	Required. Expiration time for excess of the block soft limit. Time can be specified in two formats: • *dd*`:`*hh*`:`*mm*`:`*ss* For example: 30 - 30 seconds; 12:00 - 12 minutes; 20:15:11:00 - 20 days, 15 hours, 11 minutes • `xx`A, where A - h/H(hour); d/D(day); w/W(week); m/M(month); y/Y(year) For instance: 7D - 7 days; 01w - 1 week; 3m – 3 months
`-i, --inode-softlimit` *num*	Required. Inodes soft limit – amount of inodes allowed for the Container to create. This limit can be exceeded by the Container for the time specified by inode expiration time (see below). When expiration time is off the Container cannot create more inodes even if hard limit is not yet reached.
`-I, --inode-hardlimit` *num*	Required. Specifies inodes hard limit. This limit cannot be exceeded by the Container.
`-n, --inode-exptime` *time*	Required. Expiration time for excess of the inode soft limit. Time can be specified in two formats: • *dd*`:`*hh*`:`*mm*`:`*ss* For example: 30 - 30 seconds; 12:00 - 12 minutes; 20:15:11:00 - 20 days, 15 hours, 11 minutes • `xx`A, where A - h/H(hour); d/D(day); w/W(week); m/M(month); y/Y(year) For instance: 7D - 7 days; 01w - 1 week; 3m – 3 months
`-p` *path*	Required. Specifies the path to the Container private area.
`-c` *quota_file*	Optional. Specifies the file to write output of counted disk space and inodes as well as limits. If omitted, the default

`/var/vzquota/quota.<CT_ID>` file is used.

vzquota drop

Removes the quota file. The syntax of this command is:

```
vzquota [options] drop <CT_ID> [-f] [-c quota_file]
```

The command checks whether the quota is running for a given Container and if it is, exits with error. An optional `-f` switch can be given to override this behavior and drop quota even if it is running. You can also override the path to the quota file to be dropped with an optional `-c` switch.

vzquota on and vzquota off

These commands are used to turn quota on and off. Their syntax is as follows:

```
vzquota [options] on <CT_ID> [command-options]
vzquota [options] off <CT_ID> [-f] [-c quota_file]
```

`vzquota off` turns the quota off for the file system tree specified in quota file given with an optional `-c` switch. If this switch is omitted, the default `/var/vzquota/quota.<CT_ID>` file is used. This command exits with error if for some reason quota file cannot be accessed and usage statistics could be lost. You can override this behavior by giving an optional `-f` switch.

`vzquota on` accepts the following options:

`-s, --sub-quotas 1|0`	Optional. If the value used is 1 then per user/group quota is enabled in the Container. By default user/group quotas are disabled.
`-u, --ugid-limit num`	Optional. Specifies the maximum number of user and group IDs for which usage statistics will be counted in this Container. If this value is 0, user/group quota will not be accounted. The default value is 0.
`-p path`	Required. Specifies the path to the Container private area.
`-f`	This option forces recalculation of quota usage even if the quota file does not have dirty flag set on.
`-c quota_file`	Optional. Specifies the file to write output of counted disk space and inodes as well as limits. If omitted, the default `/var/vzquota/quota.<CT_ID>` file is used.

`-b, --block-softlimit num`
`-B, --block-hardlimit num`
`-e, --block-exptime time`
`-i, --inode-softlimit num`
`-I, --inode-hardlimit num`
`-n, --inode-exptime time`
	These options are optional for the `vzquota on` command. They are described in the **vzquota init** subsection.

vzquota setlimit

This command updates limits for the running quota. It requires at least one limit to be specified. It also updates the corresponding quota file with new settings. The syntax of this command is:

```
vzquota [options] setlimit <CT_ID> [command-options]
```

Command options can be:

`-u, --ugid-limit num`	Optional. Specifies the maximum number of user and group IDs for which usage statistics will be counted in this Container. If this value is 0, user/group quota will not be accounted. Default value is 0.

`-b, --block-softlimit num`
`-B, --block-hardlimit num`
`-e, --block-exptime time`
`-i, --inode-softlimit num`
`-I, --inode-hardlimit num`
`-n, --inode-exptime time`
	These options are optional for the `vzquota on` command. However, at least one of these options or `-u, --ugid-limit num` must be specified. These options are described in the **vzquota init** subsection.

`-c quota_file`	Optional. Specifies the file where to write output of the counted disk space and inodes as well as limits. If omitted, the default `/var/vzquota/quota.<CT_ID>` file is used.

vzquota setlimit2

This command updates the second-level quota parameters for the running quota. It updates the corresponding quota file with new settings. The syntax of this command is:

```
vzquota [options] setlimit <CT_ID> [command-options]
```

You can use the following command options with `vzquota setlimit2`:

`-u, --ugid-limit num`	Optional. Specifies the maximum number of user and group IDs for which usage statistics will be counted in this Container. If this value is 0, user/group quota will not be accounted. Default value is 0.

`-b, --block-softlimit num`
`-B, --block-hardlimit num`
`-e, --block-exptime time`
`-i, --inode-softlimit num`
`-I, --inode-hardlimit num`
`-n, --inode-exptime time`
	These options are optional for the `vzquota on` command. These options are described in the **vzquota init** subsection.

`-c quota_file`	Optional. Specifies the file where to write output of the counted disk space and inodes as well as limits. If omitted, the default `/var/vzquota/quota.<CT_ID>` file is used.

vzquota stat and vzquota show

These commands are used for querying quota statistics. The syntax is as below:

```
vzquota [options] show <CT_ID> [-t] [-f] [-c quota_file]
vzquota [options] stat <CT_ID> [-t] [-c quota_file]
```

The difference between the `vzquota stat` and `vzquota show` commands is that the first one reports usage from the kernel while the second one reports usage as written in the quota file. However, by default `vzquota stat` updates the file with the last kernel statistics. If you do not want to update the quota file, add the `-f` switch to the command.

You can specify an alternative location to the quota file with the `-c quota_file` switch. Otherwise, the default `/var/vzquota/quota.<CT_ID>` file will be used.

To add information on user/group quota to the above commands output, use the `-t` command line switch.

A typical output of the `vzquota stat` command is shown below:

```
# vzquota stat 101 -t
   resource          usage       softlimit      hardlimit    grace
  1k-blocks         113856         2097152        2097152
     inodes          42539          200000         220000
User/group quota: on,active
Ugids: loaded 33, total 33, limit 100
Ugid limit was exceeded: no

User/group grace times and flags:
 type block_exp_time inode_exp_time  hex_flags
 user                                       0
group                                       0

User/group objects:
 type    ID  resource     usage   softlimit   hardlimit   grace status
 user     0 1k-blocks    113672           0           0         loaded
 user     0    inodes     42422           0           0         loaded
```

This output is suppressed for the sake of simplicity. As can be seen, Container 101 has the same soft and hard limits for disk space and Container can occupy up to 2 Gb of disk space. The current usage is 113 Mb. There are 42,539 inodes used by the Container, it has soft limit of 200,000 inodes and hard limit is set to 220,000. The empty **grace** column shows that grace period is started neither for inodes nor for disk space.

Per user/group quota is turned on and up to 100 users and groups are counted by the quota. Currently, there are 33 users and groups found in the Container and statistics for root is shown. There are no limits set from within the Container, and the current usage for root is 42,422 inodes and 113 Mb of disk space.

Licensing Utilities

This section describes the utilities you can muse to manage Parallels Virtuozzo Containers licenses.

vzlicload

This utility is used to manage Parallels Virtuozzo Containers licenses on your Node. It has the following syntax:

```
vzlicload [options]
```

The utility accepts the following options:

`-p, --product-key`	Installs the Parallels Virtuozzo Containers license on the Node.
`-f, --license-file <file_path>`	The full path to the license file containing the license to be installed on the Node.
`-r, --remove`	Removes the license with the specified serial number from the Node. You can find out the license serial number using the `vzlicview` utility (see the **vzlicview** subsection (p. 96) for details).
`-i, --stdin`	Makes `vzlicload` use standard input as a license.
`-h, --help`	Prints the usage help and exits.

vzlicupdate

This utility can be used to perform the following license-related operations:

- Activate your Parallels Virtuozzo Containers installation using a special activation code.
- Update the currently installed license on the Node.
- Transfer the license installed on the Source Node with the help of an activation code to the Destination Node.

The `vzlicupdate` utility has the following syntax:

```
vzlicupdate [options]
```

The utility accepts the following options:

`-a, --activate` *`activation_code`*	Activates the Parallels Virtuozzo Containers installation using the specified activation code. To successfully complete this task, your Node must be connected to the Internet.
`-t, --transfer`	Transfers the license activated with the activation code from the Source Node to the Destination Node. Should be run along with the `-a` option on the Destination Node, i.e. on the Node where you are planning to transfer the license.
`-s, --server` *`hostname`*`[:`*`port`*`]`	The hostname of the Parallels Key Authentication (KA) server responsible for updating Parallels Virtuozzo Containers licenses, activating Parallels Virtuozzo Containers installations, and transferring licenses from the Source Node to the Destination Node. If not specified, the `ka.parallels.com` hostname is used.
`-n, --no-check`	Updates the license currently installed on the Node even if it is still valid.
`-v, --verbose`	Sets the log level to its maximum possible value.
`-h, --help`	Prints the utility usage and exits.

When executed without any options, `vzlicupdate` updates the license currently installed on the Node. However, you can use the options listed in the table above to complete other license-related tasks.

vzlicview

This utility displays the license contents along with the license status information. It has the following syntax:

```
vzlicview [options]
```

The following options can be used with this utility:

`-p, --product-key <key_number>`	Displays the license information contained in the specified Parallels Virtuozzo Containers product key.
`-f, --license-file <file>`	Displays the license information from the specified Parallels Virtuozzo Containers license file.
`-i, --stdin`	Makes `vzlicview` use standard input as a license and display its information.
`-h, --help`	Displays the utility usage and exits.

When executed without any options, the utility returns the contents and status of the license currently installed on the Node. The utility can report the following statuses for Parallels Virtuozzo Containers licenses:

`ACTIVE`	The license installed on the Node is valid and active.
`VALID`	The license the utility parses is valid and can be installed on the Node.
`EXPIRED`	The license has expired and, therefore, could not be installed on the Node.
`GRACED`	The license has been successfully installed on the Node, but it has expired and is currently on the grace period (i.e. it is active till the end of the grace period).
`INVALID`	The license is invalid (for example, because of the Node architecture mismatch) or corrupted.

In the compatibility mode (i.e. for Virtuozzo 3.0 and 3.0 SP1 license files), the following statuses can be reported:

`ACTIVE`	The license file is valid and has been successfully loaded into the kernel.
`VALID`	The license file contains a valid license for this Hardware Node; however, no license is loaded into the kernel.
`INVALID`	The license file is invalid (for example, because of the Hardware Node ID mismatch) or corrupted.
`GRACED`	The license file has been successfully loaded into the kernel; however, it has expired and is currently on the grace period (i.e. it is active till the end of the grace period).
`EXPIRED`	The license file matches the Hardware Node ID but has expired and, therefore, could not be loaded into the kernel.
`UNKNOWN`	No Parallels Virtuozzo Containers support has been detected in the running kernel.
`INACTIVE`	The license file the utility parses is valid; however, another license is currently active in the kernel.

Migration Utilities

vzmigrate

This command is used for moving Containers to another system with minimal or zero downtime. It has the following syntax:

```
vzmigrate [options] Destination_Server {Container_list}
```

{CT_list} is a list of *<CT_ID>*[:*<new_CT_ID>*] pairs. A new Container ID parameter is needed in case both the Source Node (the one where you run the `vzmigrate` command) and the Destination Node have a Container with the ID of *<CT_ID>*. You can specify multiple Containers at once for migration.

The following options can be used with `vzmigrate`:

`-s, --nostart`

Do not attempt to start the Container on the Destination Node after its successful migration if the Container was running on the Source Node prior to the migration. This option does not have any effect if the Container was not running on the Source Node.

`-r, --remove-area yes|no`

This option takes precedence of the `REMOVEMIGRATED` setting from the global configuration file. If "yes" is specified, then the Container private area and configuration file will be deleted after successful migration. If "no" is specified, the private area and configuration file will be left on the Source Node and have the `.migrated` suffix appended to them.

`-f, --nodeps [=[all][,cpu_check] [,disk_space] [,technologies] [,license][,rate]]`

During its execution, `vzmigrate` performs a number of checks on the Destination Node (e.g. it verifies that all OS and application templates required for the Container are present on the Destination Node) and if some checks fail, exits with an error. This option allows you to bypass all checks and migrate the Container. If you specify this option for a running Container, the Container will not be automatically started on the Destination Node. You should manually start it after adding the missing templates.

You can additionally use one or several of the following parameters with this option:

- `all`: do not perform any checks on the Destination Node.
- `cpu_check`: do not check the CPU capabilities of the Destination Node.
- `disk_space`: do not check the amount of disk space on the Destination Node.
- `technologies`: do not check a set of technologies provided by the Parallels Virtuozzo Containers kernel on the Destination Node (see the description of the `TECHNOLOGIES` parameter in the **Container Configuration File** (p. 23) subsection for details).

- `license`: do not check the license installed on the Destination Node.
- `rate`: do not check the value of the `RATE` parameter in the Parallels Virtuozzo Containers global file.

`-b, --batch`

Normally, you do not have to specify this option. It is used by Parallels Virtuozzo Containers scripts and changes the screen output to a computer-parsable form.

`--ssh=<ssh_options>`

Additional options to be passed to `ssh` while connecting to the Destination Node.

Note: Do not specify the Destination Node hostname as an option of `--ssh`.

`--keep-dst`

Do not remove the 'synched' Container private area on the Destination Node if some error occurred during the migration. This option allows you to prevent `vzmigrate` from the repeated 'synching' the Container private area if the first migration attempt failed for some reason or other.

`--online`

Migrates the running Container with zero downtime. By default, the 'iterative online migration' type is used. During the migration:

- The main amount of Container memory is transferred to the Destination Node.
- The Container is 'dumped' and saved to an image file.
- The image file is transferred to the Destination Node where it is 'undumped'.

Using this type of online migration allows you to attain the smallest service delay.

To not use the 'iterative online migration' type, supply the `--noiter` option.

`--lazy`

Can be used only together with the `--online` option. Speeds up the zero downtime migration process if your Container is running a number of memory-consuming applications. This option allows you to decrease the size of the image file storing all Container private data and transferred to the Destination Node by leaving the main amount of memory in a locked state on the Source Node and swapping this memory from the Source Node on demand.

While using the `--lazy` option, pay your attention to the following:

- The migration type is set to "lazy" only if you additionally supply the `--noiter` option.
- If the `--noiter` option is not supplied, the migration type is set to 'lazy + iterative'.

`--noiter`

Can be used only together with the `--online` option. Sets the migration type to 'simple'. This option cannot be used together with the `--require-realtime` option.

`--require-realtime`	Can be used only together with the `--online` option. Forces `vzmigrate` to move the Container by using the 'iterative online migration' type. If this migration type cannot be carried out for some reason or another, the command will fail and exit. This option cannot be used together with the `--noiter` option. If the default 'iterative online migration' type cannot be carried out, and this option is omitted , `vzmigrate` will try to move your Container by making use of other types: the 'simple online migration' type or the 'lazy online migration' type (depending on the presence of the `--lazy` option).
`--readonly`	Just copy the specified Container to the Destination Node without making any changes to the Container on the Source Node.
`--dry-run`	Simulate the same operations as `vzmigrate` completes without specifying this option (connects to the Destination Node, verifies that all OS and application templates required for the Container are present on the Node, etc.); however, the Container itself is not moved to the Destination Node.

vzmlocal

Moving/copying a Container within one and the same Node consists in changing/adding the Container ID, private area, and root paths. Thus, you may use the `vzmlocal` utility either to change the ID and/or the private area path and/or the root path of any existing Container or to clone a Container, i.e. to create a complete copy of an existing Container with different ID and paths. It has the following syntax:

```
vzmlocal <source_CT_ID>[:<dest_CT_ID> \
[:<dest_private>[:dest_root]] [...]
vzmlocal -C <source_CT_ID>:<dest_CT_ID> \
[:<dest_private>[:dest_root]] [...]
vzmlocal -h
```

The options are the following:

`-h` Display the utility help.

`-c` Clone the source Container instead of moving it.

You should specify the source Container ID (`<source_CT_ID>`) and the destination Container ID (`<dest_CT_ID>`). Specifying the destination Container private area path (`<dest_private>`) and root path (`<dest_root>`) is optional; it allows you to override the default paths - `/vz/private/<dest_CT_ID>` and `/vz/root/<dest_CT_ID>`, correspondingly.

Notes:

1. You may perform a number of copying/moving operations by a single invocation of the `vzmlocal` utility.

2. You may run the `vzmlocal` utility on both running and stopped Containers.

vzp2v

`vzp2v` is used to migrate a physical server to a Container on your Node. It has the following syntax:

```
vzp2v [user[:password]@]address[:port] [options]
```

The options that can be used with the `vzp2v` utility are listed in the table below:

Name	Description
`--ctid`	Mandatory. The ID of the Container that will be created on the Node and where the physical server will be migrated. You can specify any unoccupied ID on the Node.
`-c`	Mandatory. The full path to the configuration file on the Node that was created on the physical sever by means of the `vzhwcalc` utility. You can specify only the name of the configuration file if you run the `vzp2v` utility from the directory where this file is located.
`-q`, `--quota`	Optional. The partition on your physical server which has any user and/or user groups quotas imposed on it. This partition will be migrated to the Container together with all quotas imposed on it. Moreover, these quotas will be applied to the entire Container after the server migration.
`-z, --eztmpl`	Optional. The EZ OS template to be used to create the Container. You may list all OS templates installed on the Node together with their updates by executing the `vzpkg list` command. In case an OS template is not specified, the `mkvzfs` command is executed during the Container creation which makes an empty private area with the name of `/vz/private/CT_ID` on the Node. This private area is then used to copy all the physical server files to it.
`-t, --ostmpl`	Optional. The OS template to be used to create the Container. You may list all OS templates installed on the Node together with their updates by executing the `vzpkgls` command. In case an OS template is not specified, the `mkvzfs` command is executed during the Container creation which makes an empty private area with the name of `/vz/private/CT_ID` on the Node. This private area is then used to copy all the physical server files to it.
`-d`, `--dist`	Optional. The Linux flavor your physical server is running. The name of the version specified should coincide with the name of the corresponding distribution configuration file located in the `/etc/vz/conf/dist` directory on the Node. For example, if you specify `rhel-5` as the value of this option, the `rhel-5.conf` file should be present in the `/etc/vz/conf/dist` directory on the Node. You should obligatorily set this option, if there is no `DISTRIBUTION` variable specified in the server configuration file. In case the `DISTRIBUTION` variable is set in the configuration file and you have specified the `-d` option, the latter takes precedence.
`--exclude`	Optional. The path to the directories and files which will be excluded from copying to the Container. This option allows you to avoid migrating the data you do not need. To gain more understanding on this option, please consult the man pages for the `rsync` utility from where it was borrowed. **Note**: We strongly recommend that you exclude the directories you were informed of while running the `vzhwcalc`

	utility on the physical server.
`-S, --srvstop`	Optional. The services to be stopped for the time of the physical server migration. We recommend that you stop all the services on the physical server except for the critical ones (e.g. the `sshd` service that is needed to provide communication between the physical server and the Node) before the migration. This will prevent the running services from modifying any files being moved.
`-h, --help`	Prints information on the utility options.
`--usage`	Prints usage information.

Backing-Up Utilities

Any Container is defined by its private area, configuration files, action scripts, and quota information. Backing up these components allows you to restore all the content of a Container on any Parallels Virtuozzo Containers-based system at any time if the Container gets broken.

vzabackup

The `vzabackup` utility can be run on virtually any Parallels server (including the Source and Backup Nodes) having the `vzabackup` package installed. It has the following syntax:

```
vzabackup [BACKUP_OPTIONS] NODE1 ... [CT_OPTIONS]
vzabackup [STORAGE_OPTIONS]
```

The general backup options are the following:

`-F, -I, --Tfull`	Force performing a full backup.
`-i, --Tinc`	Make an incremental backup or, if no full backups are available, a full backup. If this and `--Tdiff` options are omitted, the full backup is created.
`--Tdiff`	Make a differential backup or, if no full backups are available, a full backup. If this and `-i` options are omitted, the full backup is created.
`-D, DESCRIPTION "`*`backup_description`*`"`	The description to be set for the backup archive. The backup description should always be quoted (e.g. "backup for Container 101").
`-o, --rm-old`	Create a new backup and then remove the oldest backup of the specified Container.
`--rm-tag` *`backup_ID`*	Create a backup and then remove the backup with the specified ID. You can learn what ID is assigned to this or that Container backup by running the `vzarestore` utility with the `-l` or `-f` option.
`-Cn, -C0`	Create the Container backup without any compression. This will speed up the backing up time; however, it may significantly increase the size of the resulting backup archive.
`-Cg, -C1`	Compress the resulting backups with the normal level of compression. This is the default level of compression used to back up all Nodes/Containers. The optimal data compression level depends on the type of files to be stored in the backup archive. For example, it is advisable to use the 'normal' and 'none' compression types if most of the files to be backed up are already compressed (e.g. the files with the `.zip` and `.rar` extensions) or can be compressed with a low degree of efficiency (e.g. all executable files with the `.exe` extension or image files with the `.jpg`, `.jpeg`., and `.gif` extensions).
`-C2`	Compress the resulting backups with the high level of compression. The size of the resulting backup file is smaller than that of the backup file compressed with the `-C0` and `C1` options; however, it takes longer to create the backup file.
`-Cb, -C3`	Compress the resulting backups with the maximum level of compression. In this case the backup file size is the smallest; however, it may take much time to create such backups.
`-J`	If several Hardware Nodes are specified, this option tells `vzabackup` to back up the specified Hardware Nodes (and their Containers) simultaneously. If the option is omitted, the Hardware Nodes are backed up sequentially one after another.

`--force`
: Force the process of backing up the Hardware Nodes/Containers. You are recommended to use this option when simultaneously backing up more than one Node/Container.

`--storage` *`BACKUP_SERVER`*
: The IP address or hostname and the credentials of the Backup Node where the created backup will be stored. Should be specified in the following format: `[`*`USER`*`[:`*`PASSW`*`]]@`*`IP_ADDRESS`* where:

  - *`IP_ADDRESS`* is the IP address or hostname of the Backup Node and
  - *`USER`* and *`PASSW`* denote the credentials of the `root` user used to log in to the Backup Node.

  When using this option, keep in mind the following:

  - If you do not indicate the user and/or password to log in to the Backup Node, you will be asked to do so during the `vzabackup` execution.
  - If you are backing up Containers residing on the local Node and this local Node is also used as the Backup Node, you do not need to specify the Node credentials, provided that you are logged in to this Node as `root`.
  - If the `--storage` option is omitted, `vzabackup` puts the created Container backups to the backup directory on the local (Source) Node. By default, this directory is `/vz/backups`.

`Node1...`
: The IP address and the root credentials of the Source Node, i.e. of the Node hosting the Containers to be backed up. Should be specified in the following form: `[`*`USER`*`[:`*`PASSW`*`]]@`*`IP_ADDRESS`* where:

  - *`IP_ADDRESS`* is the IP address or hostname of the Source Node and
  - *`USER`* and *`PASSW`* denote the credentials of the `root` user used to log in to the Source Node.

  When using this option, keep in mind the following:

  - If you do not indicate the user and/or password to log in to the Source Node, you will be asked to do so during the `vzabackup` execution.
  - If you are backing up Containers residing on the Source Node, you do not need to specify the Node credentials, provided that you are logged in to this Source Node as `root`.

`-q, --no-progress`
: Disables logging to the screen during the `vzabackup` operation.

The Container options define the list of Containers to be backed up:

`-e` *`CT1...`*
: The Containers to back up on the Source Node. If this and the `-x` options are omitted, all Containers on the given Node will be backed up. Containers can be specified using both their IDs (e.g. `101` or `102`) and their names (e.g. `server1` or `server2`).

`-x` *`CT1...`*	The Containers that need not to be backed up, i.e. the Containers you wish to exclude from the backup process. If this and the `-e` options are omitted, all Containers on the given Node will be backed up. Containers can be specified using both their IDs (e.g. `101` or `102`) and their names (e.g. `server1` or `server2`).
`--include-files` *`files_list`*	The path to the files and directories inside the Container to be included in the backup.
`--exclude-files` *`files_list`*	The path to the files and directories inside the Container to be excluded from the backup.

The backup storage options are the following:

`--view-folder`	Display the path to the backup storage directory on the local Node. The default is `/vz/backups`.
`--set-folder` *`PATH_TO_STORAGE`*	Set a new directory on the local Node where the created backups are to be stored (if the local Node will be used as the Backup Node).

vzarestore

The `vzarestore` utility is used to manage Container backups: restore a Container or certain Container files/directories from the Container backup archive, list the backups existing on the Backup Node, remove backups, and so on. `vzarestore` can be run on any Hardware Node provided this Node has the `vzabackup` package installed. The utility has the following syntax:

```
vzarestore [CTID[:New_CTID] | -e [<CTID[:New_CTID],...>] [OPTIONS]
           [BACKUP_NODE]
vzarestore -r,--remove <BACKUP_ID ...>
vzarestore -l,--list [LIST_OPTIONS] [BACKUP_NODE]
vzarestore --browse BACKUP_ID [BROWSE_OPTIONS] [BACKUP_NODE]
vzarestore --print-ct-config BACKUP_ID [BACKUP_NODE]
vzarestore --help
```

The restore options are the following:

`-e CTID[:New_CTID],...`
: Comma-separated list of Containers to restore. Containers can be specified using both their IDs (e.g., `101`) and their names (e.g., `computer1`).

  You can restore the backup to a Container with a different ID. To do this, specify a new ID for the Container and separate it from the original ID by a colon (e.g., `-e 101:202`).

`-b BACKUP_ID`
: ID assigned to the Container backup. This ID can be used to restore the Container or any of its files from the backup with the specified ID. If not specified, the last Container backup is used.

  This option is incompatible with the `-e` option.

`--force`
: Do not stop on errors during the `vzarestore` execution. You can use this option when restoring more than one Container at once.

`--skip-ct-config`
: Do not restore the Container configuration file. This option can be used only when restoring a single Container.

  Note: The Container configuration file is not changed when restoring separate Container files.

`--files PATH_TO_FILE`
: Full path to the file/directory in the Container to restore. This option is incompatible with the `-e` option.

`--skip-locked`
: Do not stop on errors even if some of the files to be restored are in the 'locked' state.

`-B`
: Handle the values after the `-e` option as Container backup IDs.

`--storage BACKUP_NODE`
: IP address and the credentials of the Backup Node where the Container backups are stored. Use the following format for this option: `USER[:PASSW]@IP_ADDRESS`. If this option is omitted, the local Node is treated as the Backup Node.

Miscellaneous options for `vzarestore`:

`-r, --remove`
: Remove the Container backup with the specified backup ID. You can specify several backup IDs and separate them by spaces.

`-l, --list`	Do not restore any Containers. Display the information on the existing backups located either on the Backup Node or on the local Node if the former is not specified.
`--browse`	Display the contents of the Container backup with the specified backup ID.
`--print-ct-config`	Display the configuration file contents of the Container with the specified backup ID.

The options that can be used with the `--list` option of `vzarestore`:

`-f, --full`	Display the full information on the specified Container backup.
`--latest`	Display the latest Containers backups.
`-e` *`CT1`*`,...`	Display the information on backups for the specified Containers only.
`-B`	Handle the values after the `-e` option as Container backup IDs.

You can use the following options with the `--browse` option of `vzarestore`:

`-d, --dir` *`directory_path`*	The path to the directory inside the Container backup archive whose contents you want to see.

EZ Template Management Utilities

The following utilities can be used to perform EZ templates-related operations:

- `vzmktmpl`. This utility is used to create OS and application EZ templates.
- `vzpkgproxy`. This utility is used to set up a caching proxy server meant for handling your OS and application EZ templates.
- `vzrhnproxy`. This utility is used to set up a Red Hat Network (RHN) Proxy Server meant for handling the packages included in the RHEL 4 OS EZ template.
- `vzmtemplate`. This utility is used to migrate the installed OS EZ templates from the Source Node to the Destination Node. Detailed information on this utility is provided in the **vzmtemplate** subsection (p. 170).
- `vzpkg`. This utility is used to perform to manage OS and application EZ templates either inside your Containers or on the Node itself. This tool can also be used to manage standard software packages (e.g. the `mysql.rpm` package) inside a Container. The syntax of `vzpkg` is:

```
vzpkg command [options] <CT_ID>
vzpkg --help
```

Where *command* can be one of the following:

`install template`	Used to install OS and application EZ templates on the Node.
`update template`	Used to update OS and application EZ templates installed on the Node.
`remove template`	Used to remove OS and application EZ templates from the Node.
`list`	Used to list EZ templates or software packages either on the Node or inside a particular Container.
`info`	Used to get information on any EZ templates or software packages available on the Node or inside the Container.
`status`	Used to display the updates for the packages installed inside the Container.
`install`	Used to add application EZ templates to or to install software packages inside the Container.
`update`	Used to update application EZ templates and software packages inside the Container.
`link`	Used to replace the real application files inside your Container(s) with the symlinks to the same files on the Node.
`remove`	Used to remove application EZ templates or software packages from the Container.
`create cache`	Used to create a tarball (cache) for the given OS EZ template.
`update cache`	Used to update the existing tarball (cache) for the given OS EZ template.
`remove cache`	Used to remove a tarball (cache) for the given OS EZ template.
`localinstall`	Used to install a software package inside a Container from the corresponding file on the Node.

`localupdate`	Used to update the software packages installed inside your Container(s) by means of the `vzpkg install` or `vzpkg localinstall` commands.
`upgrade`	Used to upgrade an OS EZ template the Container is based on to a newer version.
`fetch`	Used to download packages included in EZ templates to the Node and to store them in the `vzpkg` local cache.
`clean`	Used to remove all locally cached data from the template directories on the Node.
`update metadata`	Used to update the local metadata on the Node.

vzpkg install template

This command is used to install an OS or application EZ template on the Node from the corresponding package. It has the following syntax:

```
vzpkg install template [options] <path_to_package> ...
```

You can use the following options with this command:

Name	Description
`-q, --quiet`	Disables logging to the screen and to the log file.
`-f, --force`	Forces the EZ template installation the Node.

When executed, the `vzpkg install template` command installs an application or OS template on the Node from the specified package (<*package*>). You can install a number of templates at once by specifying the corresponding packages and separating them by spaces.

vzpkg update template

This command is used to update an OS or application EZ template on the Node from the corresponding package. It has the following syntax:

```
vzpkg update template [options] <path_to_package> ...
```

This command can be used with the following options:

Name	Description
`-q, --quiet`	Disables logging to the screen and to the log file.
`-f, --force`	Forces the EZ template update.

When executed, the `vzpkg update template` command updates an application or OS EZ template on the Node from the specified file (<*package*>). You can update a number of templates at once by specifying the corresponding packages and separating them by spaces.

vzpkg remove template

This command is used to remove an OS or application EZ template that you do need any more from the Node. It has the following syntax:

```
vzpkg remove template [options] [-F OS_template] <template_name> ...
```

You can pass the following options to this command:

Name	Description
`-q, --quiet`	Disables logging to the screen and to the log file.
`-f, --force`	Forces the EZ template deletion from the Node.

When executed, the `vzpkg remove template` command removes the specified OS EZ template (*<template_name>*) from the Node. To delete an application EZ template, you should additionally specify the name of the OS EZ template (*OS_template*) under which this application template is to be run.

vzpkg list

The `vzpkg list` command is used to list the EZ templates, software packages, or package groups installed on the Node or already added to a particular Container. It has the following syntax:

```
vzpkg list [options] <CT_ID>|<CT_NAME> [...]
vzpkg list [options] [<OS_template>|<CT_ID>|<CT_NAME> [...]]
vzpkg list --available
```

If you indicate one or more Container IDs or names, the command will list the EZ templates applied to the specified Containers. If you indicate one or more OS EZ templates, `vzpkg list` will display a list of application EZ templates available for these OS EZ templates. Without the *<CT_ID>/<CT_NAME>* and *<OS_template>* arguments, the utility lists all EZ templates available for Containers on the Node.

The following options can be used with the `vzpkg list` command:

Name	Description
`-p, --package`	If the *<CT_ID>* or *<CT_NAME>* argument is given, the command lists all software packages installed inside the Container. If the *<OS_template>* argument is given, the command lists all packages included in the OS EZ template. Without the *<CT_ID>/<CT_NAME>* and *<OS_template>* arguments, `vzpkg list` displays all packages available on the Node.
`-g, --groups`	If the *<CT_ID>* or *<CT_NAME>* argument is given, the command lists all package groups installed inside the Container. If the *<OS_template>* argument is given, the command lists all package groups included in the OS EZ template. Without the *<CT_ID>/<CT_NAME>* and *<OS_template>* arguments, `vzpkg list` displays all package groups available on the Node. This option can be used only for Containers that run operating system that support the `yum` package manager.
`-O, --os`	If the *<CT_ID>* or *<CT_NAME>* argument is given, the command displays the OS EZ template the Container is based on. Without the *<CT_ID>*/*<CT_NAME>* argument, `vzpkg list` lists all OS EZ templates installed on the Node.
`-A, --app`	If the *<CT_ID>* or *<CT_NAME>* argument is given, the command displays the application EZ templates installed inside the Container. If the *<OS_template>* is given, the command shows the application EZ templates which can be used with the OS EZ template specified. Without the *<CT_ID>/<CT_NAME>* and *<OS_template>* arguments, `vzpkg list` lists all application EZ templates installed on the Node.
`-C, --cache`	Lists the packages included in the specified EZ template or applied to the specified Container from the local `vzpkg` cache. You can omit this parameter if the elapsed time from the last `vzpkg` cache update does not exceed the value of the `METADATA_EXPIRE` parameter specified in the `/etc/vztt/vztt.conf` file. Should be used along with the `-p` option.
`-r, --remote`	If the elapsed time from the last `vzpkg` cache update does not exceed the value of the `METADATA_EXPIRE` parameter specified in the `/etc/vztt/vztt.conf` file, you should use this option to make `vzpkg list` list the packages included in the specified EZ template or applied to

	the specified Container in the remote repositories. Should be used along with the `-p` option.
`-u, --custom-pkg`	Displays the list of packages that are applied to the specified Container but absent from the repository set to handle the EZ template where these packages are included.
`-i, --pkgid`	Displays the ID assigned to the EZ template instead of its name; these IDs are unique within the given system. If the *<CT_ID>* or *<CT_NAME>* argument is given, the command shows the IDs of the EZ templates available inside the Container. If the *<OS_template>* argument is given, the command displays the IDs of the OS EZ template specified and all its EZ application templates. Without the *<CT_ID>*/*<CT_NAME>* and *<OS_template>* arguments, the IDs of all EZ templates installed on the Node are shown.
`-S, --with-summary`	In addition to listing the EZ templates available either inside the Container (if the *<CT_ID>* or *<CT_NAME>* argument is given) or installed on the Node (if the *<CT_ID>*/*<CT_NAME>* argument is omitted), this option makes `vzpkg list` display the summary information on the corresponding EZ templates/packages.
`-c, --cached`	This option has no effect if the *<CT_ID>* or *<CT_NAME>* argument is given. If used for listing the EZ templates available on the Node, it makes `vzpkg list` omit all application and OS EZ templates for which the cache has not been created (by running the `vzpkg create cache` command). In other words, with this option on, `vzpkg list` will list only the OS EZ templates ready to be used for the Container creation.
`-d, --debug` *<num>*	Sets the debugging level to one of the specified values (from 0 to 10). 10 is the highest debug level and 0 sets the debug level to its minimal value.
`-q, --quiet`	Disables logging to the screen and to the log file.
`--available`	Lists all EZ OS and application templates available in the Parallels repository.

vzpkg info

This command provides information on the EZ templates, software packages, or package groups installed on the Node or applied to the Container. The syntax of the utility is as follows:

```
vzpkg info [-F <OS_template>|<CT_ID>|<CT_NAME>] -q|-d <app_template>
           [<parameters> ...]
vzpkg info -p|-g [-C|-r] [-F <OS_template>|<CT_ID>|<CT_NAME>] -q|-d
           <package_name> [<parameters> ...]
```

The available options are described in the following table:

Name	Description
`-F, --for--os` <*os_name*>|<*CT_ID*>	Displays the information on the application EZ template, the software package, or the package group included in the specified OS EZ template or applied to the indicated the Container.
`-p, --package`	If the <*CT_ID*> or <*CT_NAME*> argument is given, the command lists all software packages installed inside the Container. If the <*OS_template*> argument is given, the command lists all packages included in the OS EZ template.
`-g, --groups`	If the <*CT_ID*> or <*CT_NAME*> argument is given, the command lists all package groups installed inside the Container. If the <*OS_template*> argument is given, the command lists all package groups included in the OS EZ template. This option can be used only for Containers that run operating systems supporting the `yum` package manager.
`-C, --cache`	Displays the information on the specified package from the local `vzpkg` cache. You can omit this parameter if the elapsed time from the last `vzpkg` cache update does not exceed the value of the `METADATA_EXPIRE` parameter specified in the `/etc/vztt/vztt.conf` file.
`-r, --remote`	If the elapsed time from the last `vzpkg` cache update does not exceed the value of the `METADATA_EXPIRE` parameter specified in the `/etc/vztt/vztt.conf` file, you can use this option to make `vzpkg info` get the information on the specified package from the remote repositories set for handling the EZ template where this package is included.
`-d, --debug` <*num*>	Sets the debugging level to one of the specified values (from 0 to 10). 10 is the highest debug level and 0 sets the debug level to its minimal value.
`-q, --quiet`	Disables logging to the screen and to the log file.

When executed, `vzpkg info` parses the subdirectories and files located in the `/vz/template/`<*os_name*>`/`<*os_version*>`/`<*arch*>`/config` directory and containing the EZ template meta data. To run the command, you need to specify either the OS EZ template name or the Container ID. In either case, detailed information on the corresponding OS EZ template is displayed. You can also use the `-F` option to get the necessary information on any application EZ template included into the OS EZ template or applied to the Container.

By default, `vzpkg info` displays all meta data on the specified EZ template, package, or package group. However, you can reduce the amount of the output information by using special parameters (<*parameters*>) listed in the table below:

Name	Description

`name`	The name of the EZ template, package, or package group.
`packages`	The packages included in the EZ template. For EZ templates only.
`repositories`	The repository where the packages comprising the EZ template are stored. For EZ templates only.
`mirrorlist`	The URL to the file containing a list of repositories from where the packages comprising the EZ template are to be downloaded. For EZ templates only.
`distribution`	The Linux distribution on the basis the OS EZ template has been created or under which the application EZ template is to be run. For EZ templates only.
`summary`	Brief information on the EZ template, package, or package group.
`description`	Detailed information on the EZ template, package, or package group. Unlike `summary`, it can contain additional data on the EZ template, package, or package group.
`technologies`	Displays the following information: • The microprocessor architecture where the EZ template is to be used (`x86`, `x86`, `ia64`); • Specifies whether the EZ template can be used only on the Nodes with the Native POSIX Thread Library (NPTL) support. In this case the `nptl` entry is displayed after the `vzpkg info` execution. For EZ templates only.
`version`	The version of the software package.
`release`	The release of the software package.
`arch`	The system architecture where the EZ template, package, or package group is to be used. It can be one of the following: • `x86` if the EZ template, package, or package group is to be used on 32-bit platforms. • `x86_64` if the EZ template, package, or package group is to be used on x86-64-bit platforms. • `ia64` if the EZ template, package, or package group is to be used on IA-64-bit platforms.
`config_path`	Displays the path to the EZ template configuration directory containing the template meta data where the meta data for the base OS EZ template are stored (the default directory path is `/vz/template/<os_name>/<os_version>/<arch>/config/os/default`).
`package_manager_type`	The packaging system used to handle the packages included in the specified EZ template. It can be one of the following: • `rpm` for RPM-based Linux distributions (Fedora, Red Hat Enterprise Linux, etc.) • `dpkg` for Debian-based Linux distributions (e.g., Debian and Ubuntu) For EZ templates only.

`package_manager`

The package manager type used to manage the packages included in the specified EZ template. It can be one of the following:

32-bit Linux distributions:

- `rpm47x86`: Fedora 11 and 12
- `rpm44x86`: Red Hat Enterprise Linux 5 and CentOS 5
- `rpm43x86`: Red Hat Enterprise Linux 4 and CentOS 4
- `rpm41x86`: SUSE Linux Enterprise Server 10 and 11 and SUSE Linux 11.*x*
- `rpm41s9x86`: SUSE Linux Enterprise Server 9
- `dpkg`: Debian and Ubuntu

64-bit Linux distributions for x86-64 processors:

- `rpm47x64`: Fedora 11 and 12
- `rpm44x64`: Red Hat Enterprise Linux 5 and CentOS 5
- `rpm43x64`: Red Hat Enterprise Linux 4 and CentOS 4
- `rpm41x64`: SUSE Linux Enterprise Server 10 and 11 and SUSE Linux 11.*x*
- `rpm41s9x64`: SUSE Linux Enterprise Server 9
- `dpkgx64`: Debian and Ubuntu

vzpkg status

This command is used to check the status of the packages either installed inside a Container or included in an OS EZ template. It has the following syntax:

```
vzpkg status [options] <CT_ID>|<CT_NAME>|<OS_template>
```

You can use the following options with `vzpkg status`:

Option	Description
`-C, --cache`	Makes the `vzpkg status` command look for available updates in the local `vzpkg` cache only. You can omit this parameter if the elapsed time from the last `vzpkg` cache update does not exceed the value of the `METADATA_EXPIRE` parameter specified in the `/etc/vztt/vztt.conf` file.
`-r, --remote`	If the elapsed time from the last `vzpkg` cache update does not exceed the value of the `METADATA_EXPIRE` parameter specified in the `/etc/vztt/vztt.conf` file, you should use this option to make `vzpkg status` look for the package updates in the remote repositories set for handling the corresponding EZ template.
`-d, --debug` *<num>*	Sets the debugging level to one of the specified values (from 0 to 10). 10 is the highest debug level and 0 sets the debug level to its minimal value.
`-q, --quiet`	Disables logging to the screen and to the log file.

When executed, the command performs the following operations:

- Checks all the packages installed inside the specified Container or included in the specified OS EZ template.
- Checks the repository used to install/update packages inside the Container/OS EZ template.
- Compares the packages in the repository with those inside the Container/OS EZ template.
- Lists the found packages updates for the Container/OS EZ template, if any, or informs you that the Container/OS EZ template is up-to-date.

Note: The `vzpkg status` command can be executed for running Containers only.

vzpkg install

This command is used to add an application EZ template to or install software packages inside a Container. It has the following syntax:

```
vzpkg install [options] <CT_ID>|<CT_NAME> <object> [...]
```

The `vzpkg install` command will add an object (<*object*>) which can be an application EZ template, a software package, or a package group to the Container with the ID of <*CT_ID*> or with the name of <*CT_NAME*>. You can specify a number of objects to be applied to your Container.

When executed, `vzpkg install` automatically handles the interdependencies among the packages to be installed inside a Container and ensures that all dependencies are satisfied. If the package dependencies cannot be resolved, the installation process will fail and the corresponding message will be displayed.

Options available to this command are:

Name	Description
`-p, --package`	Tells the `vzpkg install` command to install software packages instead of EZ templates.
`-g, --groups`	Tells the `vzpkg install` command to install package groups instead of EZ templates. This option can be used only for Containers that run operating systems supporting the `yum` package manager.
`-f, --force`	Forces the EZ template/package installation.
`-C, --cache`	Makes the `vzpkg install` command look for the packages included in the EZ template in the local `vzpkg` cache only. If there is a package not available locally, the command will fail. You can omit this parameter if the elapsed time from the last `vzpkg` cache update does not exceed the value of the `METADATA_EXPIRE` parameter specified in the `/etc/vztt/vztt.conf` file.
`-r, --remote`	If the elapsed time from the last `vzpkg` cache update does not exceed the value of the `METADATA_EXPIRE` parameter specified in the `/etc/vztt/vztt.conf` file, you should use this option to make `vzpkg install` look for the packages in the remote repositories set for handling the corresponding EZ template.
`-n, --check-only`	Simulates the same operations as `vzpkg install` completes without specifying this option (downloads the software packages to the Node, handles the package interdependencies, etc.); however, the packages themselves are not installed in the specified the Container.
`-d, --debug` <*num*>	Sets the debugging level to one of the specified values (from 0 to 10). 10 is the highest debug level and 0 sets the debug level to its minimal value.
`-q, --quiet`	Disables logging to the screen and to the log file.

By default, the specified object is treated by `vzpkg install` as an application EZ template. However, you can use the `-p` or `-g` option to explicitly specify that the object should be considered as a software package or a package group, respectively.

Installing packages or package groups by using the `vzpkg install` command has the following main advantages:

- The dependencies for software packages are automatically checked during the installation process; so, you do not have to bother any more on how to resolve possible package dependencies.
- During the package installation, only symlinks to the installed files on the Node are created and added to the Container private area, which allows you to noticeably save disk space inside your Containers.
- You can update the installed packages by running the `vzpkg update` command. For the information on this command, see the next subsection.

Note: A Container has to be running in order to install an application EZ template, package, or package group in it.

vzpkg update

The `vzpkg update` command is used to update

- OS EZ templates Containers are based on
- application EZ templates installed in Containers
- single packages or package groups installed in Containers by means of the `vzpkg install` command

The command has the following syntax:

```
vzpkg update [options] <CT_ID>|<CT_NAME> [<object> [...]]
```

The following options can be used with `vzpkg update`:

Name	Description
`-C, --cache`	Makes the `vzpkg update` command look for the package updates in the local `vzpkg` cache only. You can omit this parameter if the elapsed time from the last `vzpkg` cache update does not exceed the value of the `METADATA_EXPIRE` parameter specified in the `/etc/vztt/vztt.conf` file.
`-r, --remote`	If the elapsed time from the last `vzpkg` cache update does not exceed the value of the `METADATA_EXPIRE` parameter specified in the `/etc/vztt/vztt.conf` file, you should use this option to make `vzpkg update` look for the package updates in the remote repositories set for handling the corresponding EZ templates.
`-p, --package`	Updates the packages installed inside the Container by using the `vzpkg install` command.
`-g, --groups`	Updates all the packages from the specified package group installed inside the Container by using the `vzpkg install` command. This option can be used only for Containers that run operating systems supporting the `yum` package manager.
`-f, --force`	Forces the EZ template/package update procedure.
`-n, --check-only`	Simulates the same operations as `vzpkg update` completes without specifying this option (downloads the updated packages to the Node, handles their interdependencies, etc.); however, the packages themselves are not updated.
`-d, --debug <num>`	Sets the debugging level to one of the specified values (from 0 to 10). 10 is the highest debug level and 0 sets the debug level to its minimal value.
`-q, --quiet`	Disables logging to the screen and to the log file.

Without any option specified, `vzpkg update` updates all EZ templates (including the OS EZ template) inside the Container with the ID of <*CT_ID*> or the name of <*CT_NAME*>. However, you can make the command update a particular EZ template by specifying its name as <*object*>. You can also use the `-p` or `-g` option to make the command update the packages or package groups, respectively, installed inside the Container by using `vzpkg install` instead of EZ templates.

Note: A Container has to be running in order to update an application EZ template, package, or package group in it.

vzpkg remove

This command is used to remove application EZ templates or software packages from a Container. It has the following syntax:

```
vzpkg remove [options] <CT_ID>|<CT_NAME> <object> [...]
```

This command will remove an object (***object***) which can be an application EZ template, a software package, or a package group installed with the `vzpkg install` command from the Container with the ID of ***CT_ID*** or with the name of ***<CT_NAME>***. You can specify a number of objects for removing.

The options available to this command are the following:

Name	Description
`-p, --package`	Removes the specified software package from the Container.
`-g, --groups`	Removes the specified package group from the Container. This option can be used only for Containers that run operating systems supporting the `yum` package manager.
`-w, --with-depends`	Removes also the packages having dependencies with the object specified.
`-f, --force`	Forces the EZ template/package deletion.
`-n, --check-only`	Simulates the same operations as `vzpkg remove` completes without specifying this option (handles interdependencies of the packages to be removed from the Node, etc.), but the packages themselves are not deleted from the Container.
`-d, --debug <num>`	Sets the debugging level to one of the specified values (from 0 to 10). 10 is the highest debug level and 0 sets the debug level to its minimal value.
`-q, --quiet`	Disables logging to the screen and to the log file.

By default, the specified object is treated by `vzpkg remove` as an application EZ template. However, you can use the `-p` or `-g` option to explicitly specify that the object should be considered as a software package or package group, respectively.

Note: A Container has to be running in order to remove an application EZ template, package, or package group from it.

vzpkg link

If an application (or its update) was directly installed inside a Container, whereas a compatible application EZ template is also installed on the Node, the Container can be linked to this template, so the real files inside the Container are replaced with symlinks to these very files on the Node. The `vzpkg link` command has the following syntax:

```
vzpkg link [options] <CT_ID>|<CT_NAME>
```

The options that can be used with this command are the following:

Option	Description
`-s, --slow`	Check all packages inside the Container including the ones installed by using the technology of Parallels Virtuozzo Containers templates and replace the real application files, if any, with symlinks to the files on the Node.
`-C, --cache`	Makes the `vzpkg link` command look for the packages in the local `vzpkg` cache only. If there is a package not available locally, the command will fail. You can omit this parameter if the elapsed time from the last `vzpkg` cache update does not exceed the value of the `METADATA_EXPIRE` parameter specified in the `/etc/vztt/vztt.conf` file; in this case `vzpkg link` will also check the local `vzpkg` cache only.
`-r, --remote`	If the elapsed time from the last `vzpkg` cache update does not exceed the value of the `METADATA_EXPIRE` parameter specified in the`/etc/vztt/vztt.conf` file, you should use this option to make `vzpkg link` look for the packages in the remote repositories set for handling the corresponding EZ templates.
`-d, --debug` *<num>*	Sets the debugging level to one of the specified values (from 0 to 10). 10 is the highest debug level and 0 sets the debug level to its minimal value.
`-q, --quiet`	Disables logging to the screen and to the log file.

vzpkg create cache

This command is used to create tarballs (caches) for OS EZ templates. You should execute this command before you can start using a newly installed OS EZ template for creating Containers. It has the following syntax:

```
vzpkg create cache [options] [<OS_template> [...]]
```

You can use the following options with this command:

Name	Description
`-C, --cache`	Makes the `vzpkg create cache` command check for the packages included in the EZ OS template in the local `vzpkg` cache only and use them for the cache creation. You can omit this parameter if the elapsed time from the last `vzpkg` cache update does not exceed the value of the `METADATA_EXPIRE` parameter specified in the `/etc/vztt/vztt.conf` file. In this case `vzpkg create cache` will also check the local `vzpkg` cache only.
`-r, --remote`	If the elapsed time from the last `vzpkg` cache update does not exceed the value of the `METADATA_EXPIRE` parameter specified in the `/etc/vztt/vztt.conf` file, you should use this option to make `vzpkg create cache` check for the packages included in the EZ OS template in the remote repositories set for its handling.
`-d, --debug` *<num>*	Sets the debugging level to one of the specified values (from 0 to 10). 10 is the highest debug level and 0 sets the debug level to its minimal value.
`-q, --quiet`	Disables logging to the screen and to the log file.
`-f, --force`	Forces the process of the cache creation.

`vzpkg create cache` checks the template area on the Node (by default, the `/vz/template` directory is used) and if it finds an OS EZ template for which no tar archive exists, it creates a gzipped tarball for the corresponding OS EZ template and places it to the `/vz/template/cache` directory. When a Container is being created, `vzctl` just unpacks the tar archive.

By default, `vzpkg create cache` checks the tar archive existence for all OS EZ templates installed on the Node and creates some, if necessary. However, you can explicitly indicate what OS EZ template should be cached by specifying its name as <*OS_template*>. If the cache of the OS template specified already exists on the Node, the command will fail and you will be presented with the corresponding error message.

vzpkg update cache

This command is used to update tarballs (caches) of the OS EZ templates installed on the Node. It has the following syntax:

```
vzpkg update cache [options] [<OS_template> [...]]
```

You can pass the following options to this command:

Name	Description
`-C, --cache`	Makes the `vzpkg update cache` command check for the packages updates in the local `vzpkg` cache only and use them for the cache creation. You can omit this parameter if the elapsed time from the last `vzpkg` cache update does not exceed the value of the `METADATA_EXPIRE` parameter specified in the `/etc/vztt/vztt.conf` file. In this case `vzpkg update cache` will also check the local `vzpkg` cache only.
`-r, --remote`	If the elapsed time from the last `vzpkg` cache update does not exceed the value of the `METADATA_EXPIRE` parameter specified in the `/etc/vztt/vztt.conf` file, you should use this option to make `vzpkg update cache` check for the packages updates in the remote repositories set for handling the given EZ OS template.

`vzpkg update cache` checks the cache directory in the template area (by default, the template area is located in the `/vz/template` directory on the Node) and updates all existing tarballs in this directory. However, you can explicitly indicate what OS EZ template tarball is to be updated by specifying its name as <*OS_template*>. Upon the `vzpkg update cache` execution, the old tarball is renamed by receiving the `-old` suffix (e.g. `redhat-el5-x86.tar.gz-old`).

If the `vzpkg update cache` command does not find a tarball for one or more OS EZ templates installed on the Node, it creates the corresponding tar archive(s) and puts them to the `/vz/template/cache` directory.

vzpkg remove cache

This command removes the cache for the OS EZ templates specified. It has the following syntax:

```
vzpkg remove cache [options] [<OS_template> [...]]
```

You can use the following options with this command:

Name	Description
`-d, --debug` <*num*>	Sets the debugging level to one of the specified values (from 0 to 10). 10 is the highest debug level and 0 sets the debug level to its minimal value.
`-q, --quiet`	Disables logging to the screen and to the log file.

By default, `vzpkg remove cache` deletes all caches located in the `/vz/template/cache` directory on the Node. However, you can explicitly indicate what OS EZ template tar archive is to be removed by specifying its name as <*OS_template*>.

Note: The OS EZ template caches having the `-old` suffix are not removed from the `/vz/template/cache` directory. You should use the `-rm` command to delete these caches from the Node.

vzpkg localinstall

The `vzpkg localinstall` command is used to install a software package inside a Container from the corresponding file on the Node. It has the following syntax:

```
vzpkg localinstall [options] <CT_ID>|<CT_NAME> rpm_file_path [...]
```

Options available to this command are:

Name	Description
`-C, --cache`	When handling the package interdependencies, makes the `vzpkg localinstall` command look for the needed packages in the local `vzpkg` cache only. If there is a package not available locally, the command will fail. You can omit this parameter if the elapsed time from the last `vzpkg` cache update does not exceed the value of the `METADATA_EXPIRE` parameter specified in the `/etc/vztt/vztt.conf` file.
`-r, --remote`	If the elapsed time from the last `vzpkg` local cache update does not exceed the value of the `METADATA_EXPIRE` parameter specified in the `/etc/vztt/vztt.conf` file, you should use this option to make `vzpkg localinstall` look for the packages in the remote repository.
`-n, --check-only`	Simulates the same operations as `vzpkg localinstall` completes without specifying this option (e.g. handles the package interdependencies); however, the package itself is not installed in the specified Container.
`-d, --debug` *<num>*	Sets the debugging level to one of the specified values (from 0 to 10). 10 is the highest debug level and 0 sets the debug level to its minimal value.
`-q, --quiet`	Disables logging to the screen and to the log file.

When executed, the command installs the package, the full path to which is specified as *rpm_file_path*, inside the Container with the ID of *<CT_ID>* or with the name of *<CT_NAME>*. You may specify a number of packages at once to be installed inside the Container.

During its execution, `vzpkg localinstall` automatically handles the interdependencies among the packages to be installed inside a Container and ensures that all dependencies are satisfied. If the package dependencies cannot be resolved, the installation process will fail and the corresponding message will be displayed.

vzpkg localupdate

The `vzpkg localupdate` command is used to update the software packages installed inside your Container(s) by means of the `vzpkg install` or `vzpkg localinstall` commands. It has the following syntax:

```
vzpkg localupdate [options] <CT_ID>|<CT_NAME> rpm_file_path [...]
```

Options available to this command are:

Name	Description
`-C, --cache`	When handling the package interdependencies, makes the `vzpkg localupdate` command look for the needed packages in the local `vzpkg` cache only. If there is a package not available locally, the command will fail. You can omit this parameter if the elapsed time from the last `vzpkg` cache update does not exceed the value of the `METADATA_EXPIRE` parameter specified in the `/etc/vztt/vztt.conf` file.
`-r, --remote`	If the elapsed time from the last `vzpkg` local cache update does not exceed the value of the `METADATA_EXPIRE` parameter specified in the `/etc/vztt/vztt.conf` file, you should use this option to make `vzpkg localupdate` look for the packages in the remote repository.
`-n, --check-only`	Simulates the same operations as `vzpkg localupdate` completes without specifying this option (e.g. handles the package interdependencies); however, the package itself is not installed in the specified Container.
`-d, --debug` *<num>*	Sets the debugging level to one of the specified values (from 0 to 10). 10 is the highest debug level and 0 sets the debug level to its minimal value.
`-q, --quiet`	Disables logging to the screen and to the log file.

When executed, `vzpkg localupdate` compares the file on the Node the full path to which is specified as *`rpm_file_path`* with the corresponding package inside the Container with the ID of *<CT_ID>* or the name of *<CT_NAME>* and updates it, if necessary. You may specify a number of packages at once to be updated inside your Container.

vzpkg upgrade

The `vzpkg upgrade` command is used to upgrade an OS EZ template the Container is based on to a newer version. It has the following syntax:

```
vzpkg upgrade [options] <CT_ID>|<CT_NAME>
```

You can use the following options with this command:

Name	Description
`-C, --cache`	Makes the `vzpkg upgrade` command check for the packages included in the OS EZ template in the local `vzpkg` cache only. If any package is not available locally, the command will fail. You can omit this parameter if the elapsed time from the last `vzpkg` cache update does not exceed the value of the `METADATA_EXPIRE` parameter specified in the `/etc/vztt/vztt.conf` file; in this case `vzpkg upgrade` will also check the local `vzpkg` cache only.
`-r, --remote`	If the elapsed time from the last local `vzpkg` cache update does not exceed the value of the `METADATA_EXPIRE` parameter specified in the `/etc/vztt/vztt.conf` file, you should use this option to make `vzpkg upgrade` check for the packages in the remote repositories set for handling the given EZ OS template.
`-n, --check-only`	Simulates the same operations as `vzpkg upgrade` completes without specifying this option (downloads the packages to the Node, handles their interdependencies, etc.); however, the packages themselves inside the Container are not upgraded.
`-f, --force`	Forces the process of upgrading the OS EZ template.
`-d, --debug` *<num>*	Sets the debugging level to one of the specified values (from 0 to 10). 10 is the highest debug level and 0 sets the debug level to its minimal value.
`-q, --quiet`	Disables logging to the screen and to the log file.

vzpkg fetch

This command is used to download packages included in the corresponding OS EZ template or their updates from the remote repository to the `vzpkg` local cache on the Node and to prepare them for installation. It has the following syntax:

```
vzpkg fetch [options] <OS_template>
```

You can pass the following options to `vzpkg fetch`:

Option	Description
`-O, --os`	Download packages/updates for the specified EZ OS template.
`-A, --app`	Download packages/updates for EZ application templates used with the EZ specified OS template.
`-C, --cache`	Makes the `vzpkg fetch` command look for the metadata in the `vzpkg` local cache only. You can omit this parameter if the elapsed time from the last `vzpkg` cache update does not exceed the value of the `METADATA_EXPIRE` parameter specified in the `/etc/vztt/vztt.conf` file.
`-r, --remote`	If the elapsed time from the last `vzpkg` cache update does not exceed the value of the `METADATA_EXPIRE` parameter specified in the `/etc/vztt/vztt.conf` file, you should use this option to make `vzpkg fetch` look for the OS EZ template metadata in the remote repositories set for handling the corresponding EZ template.
`-f, --force`	Forces the process of downloading packages and/or their updates to the Node.
`-d, --debug` *<num>*	Sets the debugging level to one of the specified values (from 0 to 10). 10 is the highest debug level and 0 sets the debug level to its minimal value.
`-q, --quiet`	Disables logging to the screen and to the log file.

You can make `vzpkg fetch` run as a `cron` job (e.g. nightly) checking for available packages or packages updates for your EZ templates and keeping them in the local cache. Having all the necessary packages in the `vzpkg` local cache can greatly speed up the execution of the `vzpkg install`, `vzpkg update`, or `vzpkg create cache` commands since the packages are available locally and there is no need to check for them in the corresponding remote repositories.

vzpkg clean

This command is used to remove the software packages, their headers, and metadata downloaded to the Node from the repository during the `vzpkg` execution (e.g. while caching an OS EZ template or adding an application EZ template to a Container for the first time). It has the following syntax:

```
vzpkg clean [options] [<OS_template> [...]]
```

You can use the following options with `vzpkg clean`:

Name	Description
`-k, --clean-packages`	Removes the packages, headers, and metadata of the specified EZ OS template from the local `vzpkg` cache. This is also the default behaviour of `vzpkg clean`.
`-t, --clean-template`	Checks the template area for the specified EZ OS template (the template area has the default path of `/vz/template`) and removes all packages that are currently not used by any Container on the Node and not included in the EZ OS template cache.
`-a, --clean-all`	Removes both: • the packages, headers, and metadata of the specified EZ OS template from the `vzpkg` local cache and • the packages that are currently not used by any Container on the Node and not included in the EZ OS template cache.
`-f, --force`	Forces the `vzpkg clean` execution.
`-n, --check-only`	Simulates the same operations as `vzpkg clean` completes without specifying this option; however, the packages and headers are not removed from the Node.
`-d, --debug` *<num>*	Sets the debugging level to one of the specified values (from 0 to 10). 10 is the highest debug level and 0 sets the debug level to its minimal value.
`-q, --quiet`	Disables logging to the screen and to the log file.

vzpkg update metadata

This command is used to update the OS EZ template local metadata on the Node. It has the following syntax:

```
vzpkg update metadata [options] [OS_template ...]
```

The following options can be used with `vzpkg update metadata`:

Name	Description
`-C, --cache`	Makes the `vzpkg update metadata` command look for available metadata updates in the local `vzpkg` cache only. You can omit this parameter if the elapsed time from the last `vzpkg` cache update does not exceed the value of the `METADATA_EXPIRE` parameter specified in the `/etc/vztt/vztt.conf` file.
`-r, --remote`	If the elapsed time from the last `vzpkg` cache update does not exceed the value of the `METADATA_EXPIRE` parameter specified in the `/etc/vztt/vztt.conf` file, you should use this option to make `vzpkg update metadata` look for the updated metadata in the remote repositories set for handling the corresponding OS EZ template.
`-d, --debug` *<num>*	Sets the debugging level to one of the specified values (from 0 to 10). 10 is the highest debug level and 0 sets the debug level to its minimal value.
`-q, --quiet`	Disables logging to the screen and to the log file.

When executed without any options, the command updates the metadata of all OS EZ templates installed on the Node. If you specify one or more OS EZ templates, the command will update the metadata of the indicated OS templates only. You can run this command a cron job at regular intervals to be sure that your OS EZ templates metadata are always up-to-date.

vzpkg upgrade area

The `vzpkg upgrade area` command is used to upgrade EZ OS templates that were initially installed on Hardware Nodes running Virtuozzo 3.0 and later on upgraded to Parallels Virtuozzo Containers 4.7 to support VZFS v2. It has the following syntax:

```
vzpkg upgrade area [options] [<OS_template> [...]]
```

You can pass the following options to this command:

Name	Description
`-d, --debug` *<num>*	Sets the debugging level to one of the specified values (from 0 to 10). 10 is the highest debug level and 0 sets the debug level to its minimal value.
`-q, --quiet`	Disables logging to the screen and to the log file.

By default, `vzpkg upgrade area` upgrades all OS EZ templates installed on the Hardware Node. However, you can explicitly indicate what OS EZ template is to be upgraded by specifying its name as <*OS_template*>.

vzmktmpl

This utility is used to create new EZ templates. It has the following syntax:

```
vzmktmpl [options] metafile
```

The following options can be passed to `vzmktmpl`:

Name	Description
`--pre-cache` *file*	The path to the script which will be executed by the `vzpkg cache` command before installing the packages included in the EZ template on the Node. This script is executed in the Node context and relevant for OS EZ templates only.
`--post-cache` *file*	The path to the script which will be executed by the `vzpkg cache` command after installing the packages included in the EZ template on the Node. This script is executed in the Node context and relevant for OS EZ templates only.
`--pre-install` *file*	The path to the script which will be executed by the `vzpkg install` command before adding the application EZ template to the Container. This script is executed in the Container context and relevant for application EZ templates only.
`--post-install` *file*	The path to the script which will be executed by the `vzpkg install` command after adding the application EZ template to the Container. This script is executed in the Container context and relevant for application EZ templates only.
`--pre-upgrade` *file*	The path to the script which will be executed by the `vzpkg upgrade` command before upgrading the OS EZ template inside the Container. This script is executed in the Container context.
`--post-upgrade` *file*	The path to the script which will be execute by the `vzpkg upgrade` command after upgrading the OS EZ template inside the Container. This script is executed in the Container context.
`--pre-update` *file*	The path to the script which will be executed by the `vzpkg update` command before updating the packages included in the application EZ template inside the Container. This script is executed in the Container context.
`--post-update` *file*	The path to the script which will be executed by the `vzpkg update` command after updating the packages included in the application EZ template inside the Container. This script is executed in the Container context.
`--pre-remove` *file*	The path to the script which will be executed by the `vzpkg remove` command before removing the application EZ template from the Container. This script is executed in the Container context and relevant for application EZ templates only.
`--post-remove` *file*	The path to the script which will be executed by the `vzpkg remove` command after removing the application EZ template from the Container. This script is executed in the Container context and relevant for application EZ templates only.
`--environment` *file*	The path to the file storing a list of environment variables. The variables should be set in the form of *key=value*. The variables specified in this file are used when running the `vzpkg create cache` and `vzpkg update`

	`cache` commands and exported to the Container environment during the EZ template scripts execution.
`-d, --doc` *`file`*	The path to the file containing the information on the EZ template. You can specify several files and separate them by commas.
`-s, --spec-only`	Creates the package specification file only.
`-r, --srpm`	Creates the package source file only.
`-h, --help`	Displays the utility usage and exits.

The utility requires only the metafile to create an EZ template and save it as a software package (see the next subsection for information on EZ template metafiles). However, you can set a number of scripts to be executed on different stages of the EZ template lifecycle (e.g. upon its installing on the Node or after its removing from the Container) or use other options listed in the table above.

Note: We recommend that you use the sample scripts located in the `/usr/share/vztt/samples` directory on your Node as the basis for creating your own scripts.

vzpkg.metafile

This file is used by the `vzmktmpl` utility as the basis for the EZ template creation. The parameters in this file are presented on separate lines in the following format:

```
<parameter_name>
<parameter_value>
```

The table below describes these parameters:

Name	Description
`%osname`	Mandatory. The name of the Linux distribution for which you are creating the OS EZ template or under which the application EZ template being created is to be run.
`%osver`	Mandatory. The version of the Linux distribution specified as the value of the `%osname` parameter.
`%osarch`	Mandatory. The microprocessor architecture where the EZ template is to be run. You can set the value of this parameter to one of the following: • `x86`: this value should be specified if your EZ template is to be used on 32-bit platforms. • `x86-64`: this value should be specified if your EZ template is to be used on x86-64-bit platforms (e.g. on servers with the AMD Opteron and Intel Pentium D processors installed). • `ia64`: this value should be specified if your EZ template is to be used on IA-64-bit platforms (i.e. on servers with the Itanium 2 processor installed).
`%appname`	Mandatory, for application EZ templates only. The name of the application EZ template.
`%setname`	Optional. The name of the non-base OS EZ template, if any. This parameter should be specified only while creating non-base OS EZ templates.
`%upgradable_version`	Optional. A list of Linux distribution versions which can be upgraded to the version of the Linux distribution for which you are creating the EZ template. For OS EZ templates only.
`%packages`	Mandatory. A list of software packages to be included in the EZ template. The names of the packages listed as the value of this parameter should correspond to the names of real packages that are stored in the repository used for managing your EZ templates and can be specified in one of the following ways: For RPM-based Linux distributions: • as a package name only (e.g. `wget`) • as a package name with the indication of the system architecture on which the package is to be run (e.g. `wget.i386`, `wget.noarch`) • as a package name with its versions (e.g. `wget-1.9.1`) • as a package name with its versions and release number (e.g.

`wget-1.9.1-12`)

- as a package name with its version, release number, and system architecture (e.g. `wget-1.9.1-12.i386`)
- as a package name with its version, release number, system architecture, and epoch number (e.g. `10:wget-1.9.1-12.i386`)

For Debian-based Linux distributions:

- as a package name only (e.g. `wget`)
- as a package name with its version (e.g. `wget-1.9.1-12`)

`%packages_0`

Mandatory, for Debian-based OS EZ templates only. A list of packages to be used for creating a minimal Debian/Ubuntu `chroot` environment. These packages should correspond to those installed on a standalone server on the first stage of the Ubuntu distribution installation. The packages will be installed on the Node one by one in the specified order during the OS EZ template caching. If you wish several packages to be simultaneously installed on the Node, you should specify the package names on a single line and separate them by spaces.

`%packages_1`

Mandatory, for Debian-based OS EZ templates only. A list of 'base' packages for the Debian/Ubuntu distribution. These packages are needed to install the packages listed as the value of the `%packages` parameter.

`%package_manager`

Mandatory. The short name of the package manager to be used for handling the EZ template. Depending on the Linux distribution for which you are creating the template or under which the template will be used, you should set the following values for the `PKGMAN` parameter:

32-bit Linux distributions:

- `rpm44x86`: Red Hat Enterprise Linux 5, Fedora Core 4, 5, and 6, Fedora 7 and 8
- `rpm43x86`: Red Hat Enterprise Linux 3 and 4 (with the 2.6 kernel and NPTL support) and CentOS 4, 5
- `rpm41x86`: SUSE Linux Enterprise Server 10 and SUSE Linux 10.*x* where *x* denotes the minor number of the SUSE Linux 10 release (e.g. 10.1 or 10.2)
- `rpm41s9x86`: SUSE Linux Enterprise Server 9
- `dpkg`: Debian and Ubuntu

64-bit Linux distributions for x86-64 processors:

- `rpm44x64`: Red Hat Enterprise Linux 5 and Fedora Core 4, 5, and 6, Fedora 7 and 8
- `rpm43x64`: Red Hat Enterprise Linux 3 and 4 (with the 2.6 kernel and NPTL support) and CentOS 4, 5
- `rpm41x64`: SUSE Linux Enterprise Server 10 and SUSE Linux 10.*x* where *x* denotes the minor number of the SUSE Linux 10 release (e.g. 10.1 or 10.2)
- `rpm41s9x64`: SUSE Linux Enterprise Server 9

	• `dpkgx64`: Debian and Ubuntu *64-bit Linux distributions for ia64 processors:* • `rpm44i64`: Red Hat Enterprise Linux 5 • `rpm43i64`: Red Hat Enterprise Linux 3 and 4 (with the 2.6 kernel and NPTL support) and CentOS 4, 5 • `rpm41s9i64`: SUSE Linux Enterprise Server 9 • `rpm41i64`: SUSE Linux Enterprise Server 10 • `dpkgi64`: Debian and Ubuntu This parameter should be obligatorily specified for all base OS EZ templates and can be omitted for application EZ templates and non-base OS EZ templates.
`%repositories`	Mandatory, for RPM-based Linux distributions only. A list of repositories where the packages comprising the EZ template are stored.
`%mirrorlist`	Mandatory. One or several URLs to the file containing a list of repositories from where the packages comprising the EZ template are to be downloaded. This parameter can be omitted if you are creating a metafile for an application EZ template or a non-base OS EZ template.
`%distribution`	Optional. The type of the Linux distribution. Examples of Linux distribution types are `centos`, `debian`, `fedora-core`, `gentoo`, `mandrake`, `redhat`, `rhel-3, rhel-4, rhel-5`, `fedora-core-4`, `fedora-core-5`, `slackware`, `slackware-10.0`, `suse`, `suse-9.3`, etc.
`%description`	Optional. Detailed information on the EZ template package file.
`%version`	Optional. The version of the EZ template package file.
`%release`	Optional. The release of the EZ template package file.
`%license`	Optional. The information about the owner of the EZ template package file.
`%changelog`	Optional. The information about the changes made to the EZ template package file.

vzpkgproxy

The `vzpkgproxy` utility is used to set up a caching proxy server meant for handling OS and application EZ templates. The `vzpkgproxy` package where the `vzpkgproxy` utility is included can be installed by using the `rpm -i` command on any computer meeting the following requirements:

- The Apache `httpd` server, version 2.0.52 and higher, should be installed on the workstation.
- The `createrepo` package, version 0.4.2 and higher, should be installed on the workstation.

During its installation, the utility performs all the tasks necessary to install, configure, and put into operation your caching proxy server. Detailed information on how to set up caching proxy servers is given in the *Parallels Virtuozzo Containers 4.7 Templates Management Guide*.

vzrhnproxy

The `vzrhnproxy` utility is used to set up a Red Hat Network (RHN) Proxy Server meant for handling the packages included in the RHEL 4 and 5 OS EZ templates. It has the following syntax:

```
vzrhnproxy register OS_arch OS_name server_hostname
            server1_IP_Address [server2_IP_Address ...]
vzrhnproxy list
vzrhnproxy update [profile_name ...]
vzrhnproxy help
```

The `vzrhnproxy` utility can be installed with the `rpm -i` command on any 'RHEL 4'-based server (e.g. RHEL 4 and RHEL 5, Fedora 7 and 8, or CentOS 4 and 5). To start using `vzrhnproxy` for creating an RHN Proxy Server, you should specify valid credentials in the `/etc/vz/rhnproxy/rhn.conf` file to log in to RHN and run the `vzrhnproxy register` command on the server where you wish to create the RHN Proxy Server. This command will:

1. Connect to Red Hat Network with the credentials specified in the previous step.
2. Register in RHN and create a system profile for the server with:
   - the hostname of *HN_hostname*
   - the OS name of *OS_name*. In the current version of Parallels Virtuozzo Containers, this name can be set to one of the following:
     * `4AS` for Red Hat Enterprise Linux 4 Advanced Server
     * `4ES` for Red Hat Enterprise Linux 4 Edge Server
     * `4WS` for Red Hat Enterprise Linux 4 Workstation
     * `4Desktop` for Red Hat Enterprise Linux 4 Desktop
     * `5Server` for Red Hat Enterprise Linux 5 Server
     * `5Client` for Red Hat Enterprise Linux 5 Desktop
   - the system architecture of *OS_arch* which can be one of the following: `i386` for 32-bit versions of RHEL 4 and 5, `x86_64` for x86-64-bit versions of RHEL 4 and 5, or `ia64` for IA64-bit versions of RHEL 4 and 5
3. Download the headers of the packages comprising the corresponding RHEL distribution to the RHN Proxy Server.
4. Create a pseudo-repository containing the repodata generated on the basis of the downloaded headers.
5. Grant the Node with the IP address of *server1_IP_Address* access to the RHN Proxy Server. You can specify several IP addresses to allow several Nodes to use this Proxy Server.

The `vzrhnproxy list` command displays a list of all system profiles you have registered with Red Hat Network.

The `vzrhnproxy update` command updates the repodata in the pseudo-repository on the Proxy Server for the specified system profile (*`profile_name`*); you can specify more than one system profile whose repodata are to be updated.

Supplementary Tools

vzup2date

The `vzup2date` utility is used to update your Parallels Virtuozzo Containers software and templates and keep them at the most recent version. It has the following syntax:

```
vzup2date [-s|-t|-z] [-m interactive]
vzup2date [config_options] [-s|-t|-z] -m {batch|messages} \
          <command> [command_options] [filters] [update_IDs]
vzup2date {-?|--help}
```

The `vzup2date` utility can be launched in two modes:

- In the graphical mode: in this case `vzup2date` should be used with the `-s`, `-t`, and `-z` switches only or without any parameters at all. You can also specify the `-m interactive` switch to explicitly indicate that `vzup2date` is to be run in the graphical mode.
- In the command-line mode containing two submodes: the batch submode and the messages submode. To run `vzup2date` in the command-line mode, you should specify either the `-m batch` switch or `-m messages` switch for executing `vzup2date` in the batch or messages submodes, respectively. Both submodes are meant to update Parallels Virtuozzo Containers in the unattended mode and have the identical syntax; however, they are different in their output. The batch submode output is more user friendly than the messages submode one which is mostly suitable for machine processing.

The following options can be passed to `vzup2date` in both modes - graphical and command-line:

Name	Description
`-s, --system`	Used to check and, if necessary, download and install Parallels Virtuozzo Containers system updates, i.e newest versions of the Parallels Virtuozzo Containers core and utilities. If the `-s` is omitted and the `-t` option is not specified either, the `vzup2date` utility looks for the Parallels Virtuozzo Containers system updates.
`-t, --templates`	Used to check and, if necessary, download and install OS and application standard templates. You should explicitly specify this option to make `vzup2date` look for standard template updates.
`-z`	Used to check and, if necessary, download and install OS and application EZ templates. You should explicitly specify this option to make `vzup2date` look for EZ template updates.

Note: The current version of Parallels Virtuozzo Containers does not support using the `-t` option.

Setting Connection Parameters

If you have not set the necessary connection parameters for the repository with Parallels Virtuozzo Containers updates in the `/etc/sysconfig/vzup2date/vzup2date.conf` file on the Node or wish to redefine any of them, you may specify the following options:

Name	Description
`-R, --repository=`*`path`*	The URL used to connect to the repository with Parallels Virtuozzo Containers updates. The *`path`* value should be specified in the form of `[`*`protocol`*`://][`*`user`*`:`*`password`*`@]`*`server`*`[:`*`port`*`][/`*`repository_dir`*`]` where: • *`protocol`* indicates what protocol is to be used while connecting to the update server (e.g. `http` or `https`). • *`user:password`* denotes the user name and password used to access the update server. • *`server`* is the IP address or the domain name where the update repository is located. • *`port`* denotes the port number of the update server used for establishing the connection. • *`repository_dir`* specifies the directory on the update server where the required Parallels Virtuozzo Containers updates are stored.
`--proxy=`*`path`*	The proxy server address, if you use this server. The *`path`* value should be specified in the form of `[`*`protocol`*`://][`*`user`*`:`*`password`*`@]`*`server`*`[:`*`port`*`]` where • *`protocol`* indicates what protocol to use while connecting to the proxy server (e.g. `http` or `https`). • *`user:password`* denotes the user name and password used to log it to the proxy server. • *`server`* is the IP address or the domain name of the proxy server. • *`port`* specifies the port number of the proxy server used for establishing the connection.
`--local-path=`*`path`*	The path to the local directory on the Node where the downloaded Parallels Virtuozzo Containers updates are stored.
`--log-path=`*`path`*	The path to the log file on the Node containing the information on Parallels Virtuozzo Containers updates.
`--save-config`	Use this option to save the specified parameters in the `/etc/sysconfig/vzup2date/vzup2date.conf` file on the Node.

Available Commands

The commands that can be used with `vzup2date` in the command-line mode (i.e. while specifying either the `-m batch` switch or the `-m messages` switch) are given in the table below:

Name	Description
`list`	Lists the updates matching the criteria specified in [*`filters`*] and [*`update_IDs`*]. Detailed information on filters and update IDs is given below. If no filters and update IDs are specified, all updates for the OS and application templates installed on the Node are displayed.
`show`	Displays detailed information on the updates matching the criteria specified in [*`filters`*], and [*`update_IDs`*]. If no filters and update IDs are specified, information on updates for all OS and application templates installed on the Node is shown.
`get`	Checks and downloads Parallels Virtuozzo Containers updates matching the criteria specified in [*`filters`*], and [*`update_IDs`*] from the Parallels update server to the local directory on the Node. The path to the local directory can be set either in the `/etc/sysconfig/vzup2date/vzup2date.conf` file or by specifying the `--local-path` option. If no filters and update IDs are specified, updates for all OS and application templates installed on the Node are downloaded to the local directory.
`install`	Checks and, if necessary, downloads and installs Parallels Virtuozzo Containers updates matching the criteria specified in [*`filters`*], and [*`update_IDs`*]. If no filters and updates IDs are specified, updates for all OS and application templates on the Node are downloaded and installed. In some cases, you may need to update the `vzup2date` utility itself. To do this, pass the `--self-update` option to the `vzup2date install` command.
`showconf`	Shows the contents of the `/etc/sysconfig/vzup2date/vzup2date.conf` file on the Node.
`install-self-update` *`update_ID`*	Installs updates with the specified ID for the `vzup2date` utility. You may need to update `vzup2date` before you are able to get the latest Parallels Virtuozzo Containers updates. To display the latest updates for `vzup2date`, you can use the `vzup2date get` command.

All the aforementioned commands (except for `showconf` and `install-self-update`) can be used with the following options:

Name	Description
`--cache`	If specified, `vzup2date` does not search the update server for the update packages that are already available in the local repository directory on the Node. When used with the `vzup2date install` command, `vzup2date` does not check the integrity of the update files located in the local repository directory.
`--nosignatures`	If specified, `vzup2date` does not validate digital signatures of the downloaded update packages.
`--status-log-file=`*`path`*	The path to the status log file where the messages on Parallels Virtuozzo Containers updates will be stored (e.g. `/vz/vzup2date/my_file.log`). Without specifying this option, the messages are sent to `stdout` only. The option can be used in the messages submode only.

`--status-log-prog=`*`path`*	The path to the status log program. This program should accept log messages sent to `stdout`. The option can be used in the messages submode only.
`--status-log-id=`*`ID`*	The ID assigned to the status log file and unique within the given system. This ID will be used as the name of the log file with the `.log` extension created during the `vzup2date` *`command`* execution. By default, this file is located in the `/vz/vzup2date/ipc` directory on the Node. The option can be used in the messages submode only.

Note: The `vzup2date install` command has a number of additional options described in the **vzup2date install** subsection.

Update Filters and IDs

The `vzup2date` utility allows you to specify what particular Parallels Virtuozzo Containers updates should be searched for on the update server, download the found updates, and install them on the Node. This can be done by using special update filters or by explicitly specifying the update IDs. You can also combine both methods to get the right updates for your Parallels Virtuozzo Containers installation.

The filters that can be used with `vzup2date` can be divided in two groups:

- The filters used to update Parallels Virtuozzo Containers system files. They are presented in the table below:

Name	Description
`--major`	Selects the latest major update for your current Parallels Virtuozzo Containers installation. To see the latest update available, you can use the `vzup2date list` or `vzup2date show` command. If you do not specify an update ID for the major Parallels Virtuozzo Containers update (e.g., `MU-4.7.0`), your Parallels Virtuozzo Containers installation will be automatically updated to the latest version available on the update server. Bear in mind that the major Parallels Virtuozzo Containers release you are updating to might also already have available minor updates (i.e., updates for the Parallels Virtuozzo Containers core and tools). However, they will not be applied during the major Parallels Virtuozzo Containers update. So, in order to install the latest Parallels Virtuozzo Containers version and then to apply minor updates for it, you will need to launch the utility twice.
`--core`	Selects updates available for your current Parallels Virtuozzo Containers core. While working with the Parallels Virtuozzo Containers core updates, keep in mind the following: • Each Parallels Virtuozzo Containers release has its own set of core updates. Therefore, the update to the latest core version is possible only within the given Parallels Virtuozzo Containers release. • Core updates are cumulative, i.e. the updates with higher versions include the functionality of all previous core updates within the given Parallels Virtuozzo Containers release (e.g., the `CU-2.6.32` core update includes all functionality of `CU-2.6.30`, `CU-2.6.28`, etc.). • Only the updates for the core version currently installed in your system are shown. For example, if your system is running the 2.6.*x* core version, all core updates for kernel 2.6 will be shown.
`--tools`	Selects updates available for your current Parallels Virtuozzo Containers utilities. While working with the Parallels Virtuozzo Containers tools updates, keep in mind the following: • Each Parallels Virtuozzo Containers release has its own set of utility updates. Therefore, the update to the latest utility version is possible only within the given Parallels Virtuozzo Containers release.

- Unlike the Parallels Virtuozzo Containers core updates, utility updates are incremental, i.e. they include the new functionality only.

`--products=`*`products-list`*

Specifies the products to update. The following values can be passed to this parameter:

- `virtuozzo`. Look for updated system files of Parallels Virtuozzo Containers.
- `pim`. Look for updated system files of Parallels Virtual Automation.

If no values are specified, `vzup2date` looks for updated system files of both Parallels Virtuozzo Containers and Parallels Virtual Automation.

Note: `vzup2date` can process Parallels Virtual Automation system files only if this application is installed on the Hardware Node.

- The filters used to update Parallels EZ templates. These are the following filters:

Name	Description
`--update-os`	Selects updates for all OS templates installed on the Hardware Node.
`--all-os`	Selects all OS templates available on the update server.
`--update-app-for=`*`OS_List`*	Selects updates for all application templates included in the OS templates specified.
`--update-app`	Selects updates for all application templates on the Hardware Node.
`--all-app-for=`*`OS_List`*	Selects all application templates available on the update server for the OS templates specified.
`--all-app`	Selects all application templates for all OS templates installed on the Hardware Node.
`--update`	Selects updates for all OS and application templates installed on the Hardware Node.

`OS_list` denotes a list of OS templates for which the application templates are to be updated. You can specify several OS templates and separate them by commas.

vzup2date install

The `vzup2date install` command is used to install new OS and application templates on the Node or to update any of the existing OS and application templates already installed on the Node. It has the following syntax:

```
vzup2date  [config_options] [-s|-t|-z] -m {batch|messages} install\
           [options] [filters] [update_IDs]
```

Along with the options which are common for all `vzup2date` commands and described in the previous subsection, you can also use the following options with `vzup2date install`:

Name	Description
`--reboot`	Automatically reboot the Node, if needed, after the Parallels Virtuozzo Containers update completion. For example, the system reboot may be required in the case of updating the Parallels Virtuozzo Containers core or installing major updates on the Node. If the option is omitted, the system will not reboot.
`--loader-autoconfig [=bootloader]`	Automatically recognize and reconfigure the Lilo and GRUB boot loaders after the Parallels Virtuozzo Containers update completion. You can explicitly specify what boot loader is to be reconfigured by specifying either `GRUB` or `Lilo` as the value of *`bootloader`*.
`--self-update`	Automatically update the `vzup2date` utility. If an updated version of `vzup2date` is available, this version is downloaded and installed on the Node at first. After that, the command is re-launched and the Parallels Virtuozzo Containers system update is performed.
`--novzpkgcache`	Do not run the `vzpkg create cache` utility for EZ OS templates. By default, a tarball (cache) is automatically created for every OS template or its update installed on the Node by using the `vzup2date install` command.
`--environment`	Download from the `vzup2date` repository and install on the Node the specified environment. Environments are required for the correct operation of OS templates. Depending on the OS template, the following environments can be specified: *32-bit Linux distributions*: • `vzpkgenv47`: OS templates for Fedora 11 and 12 • `vzpkgenv44`: OS templates for Red Hat Enterprise Linux 5 and CentOS 5 • `vzpkgenv43`: OS templates for Red Hat Enterprise Linux 4 and CentOS 4 • `vzpkgenv41`: OS templates for SUSE Linux Enterprise Server 10 and 11 and SUSE Linux 11.*x* • `vzpkgenv41s9`: OS template for SUSE Linux Enterprise Server 9 • `vzpkgenvdeb`: OS templates for Debian and Ubuntu *64-bit Linux distributions for x86-64 processors*: • `vzpkgenv47x64`: OS templates for Fedora 11 and 12

- `vzpkgenv44x64`: OS templates for Red Hat Enterprise Linux 5 and CentOS 5
- `vzpkgenv43x64`: OS templates for Red Hat Enterprise Linux 4 and CentOS 4
- `vzpkgenv41x64`: OS templates for SUSE Linux Enterprise Server 10 and 11 and SUSE Linux 11.*x*
- `vzpkgenv41s9x64`: OS template for SUSE Linux Enterprise Server 9
- `vzpkgenvdebx64`: OS templates for Debian and Ubuntu

You do not usually have to install environments for your OS templates because they are automatically downloaded to and installed on the server in the following cases:

- You cache an OS template for which no environment is installed. The OS template itself can be either installed or not installed. In the latter case, it will be downloaded and installed along with the necessary environment.
- You install or update an OS template using the `vzpkg install template` and `vzpkg update template` commands, respectively, without specifying the name of the package from which the OS template is to be installed. See **vzpkg install template** and **vzpkg update template** for details.

Note: The `--environment` option can be used only when running the `vzup2date` utility in the batch mode.

vzup2date-mirror

The `vzup2date-mirror` utility is used to create local mirrors of the Parallels official repository storing the latest versions of the Parallels Virtuozzo Containers software and OS and application templates. The `vzup2date-mirror` utility has the following syntax:

```
vzup2date-mirror [options] [local_repo_path]
```

You can pass the following options to `vzup2date-mirror`:

Name	Description
`-s, --system`	Creates a local mirror of the repository storing the latest versions of the Parallels Virtuozzo Containers core and utilities. It also can be used to update your existing local mirror. If this option is not specified and the `-t` and `-z` options are omitted, `vzup2date-mirror` will also make the repository mirror with Parallels Virtuozzo Containers system files.
`-z, --eztemplates`	Creates a local mirror of the repository storing the latest versions of OS and application EZ templates.
`-t, --templates`	Creates a local mirror of the repository storing the latest versions of OS and application standard templates.
`-c, --config`	The full path to the configuration file that will be used by `vzup2date-mirror` on the step of connecting to the Parallels official repository and downloading new updates. If omitted, the utility uses the default `vzup2date-mirror.conf` file which is located in the `/etc/vzup2date-mirror` directory.
`local_repo_path`	The path to the repository mirror. If omitted, the utility uses the repository mirror whose location is defined in the `vzup2date-mirror` configuration file. Detailed information on `vzup2date-mirror.conf` is provided in the **Configuration File for vzup2date-mirror** subsection (p. 35).
`-q, --quiet`	Reports only errors during the `vzup2date-mirror` execution.
`-D, --delete`	Automatically deletes obsolete updates during the `vzup2date-mirror` execution.
`--version`	Prints the utility version and exits.
`-h, --help, -?`	Displays the utility usage and exits.

When executed, the `vzup2date-mirror` utility completes a number of tasks (connects to the Parallels official repository, creates a special directory and downloads the specified Parallels Virtuozzo Containers system or templates updates to this directory, etc.) resulting in building a local mirror of the Parallels official repository or some of its parts.

vzfsutil

This command is used for checking the VZFS consistency, correcting and optimizing the Container private area, upgrade the Container private area from VZFS 1 to VZFS 2. It has the following syntax:

```
vzfsutil [general_options] -t template_path private_path
         <action_options>
```

A Container private area consists of number of VZFS symlinks to templates and when the Container is running, these VZFS symlinks are visible as regular files inside the Container. When the user inside the Container changes one of the VZFS symlink files, a file with a special name and with the changed content is created in the special copy-on-write directory (`$VE_PRIVATE/cow`) of the Container private area. However, when the user creates a file inside the Container, the file is created in the root directory (`$VE_PRIVATE/root`) of the private area (`$VE_PRIVATE`).

This utility optimizes the private area by moving copy-on-write files to their actual location in the root directory of the private area. It also checks the correctness of VZFS symlinks and fixes found inconsistencies.

The required parameters for this utility invocation are:

`-t` *template_path*	Path to the directory where templates are installed. As a rule, it is `/vz/template`.
<action_options>	One or more actions described below.
private_path	Path to the Container private area.

General options

`-v`	Verbose mode. Causes the utility to print debugging messages about its progress. You can give up to two `-v` switches to increase verbosity.
`-q`	Quiet mode. Causes all warning and diagnostic messages to be suppressed. Only fatal errors are displayed.
`-i`	Interactive mode. When this option is given, the utility asks for confirmation before correcting any inconsistency. This option works only with check actions.
`-p, --progress`	Display (at certain intervals) the information on the operations currently performed by `vzfsutil`.
`-V`	Display the utility version.
`--upgrade`	Upgrades the Container private area from VZFS v1 to VZFS v2. You can also use `--ctid` with this option to perform an additional check of the Container private area.
`--ctid=`*CT_ID*	Performs an additional check for the Container with the specified ID.

Action options

Action options can be checking and optimizing. Checking actions have the format of `--`*<option>*`[=`*<action>*`]` where *<action>* is one of the following:

`i, ignore`	Do not repair found inconsistency, only report it. This is the default action if no action is

explicitly specified.

`m, move` Move inconsistent VZFS symlinks into the `$VE_PRIVATE/lost_files` directory.

`r, remove` Remove inconsistent VZFS symlinks.

Options can be one or several of the following:

`--call,--cA` Correct all found errors. This options turn on and set action on all type of corrections. However, you can specify different action on a particular type of correction by adding specific option. For example, you may want to report only all inconsistencies except the orphaned file in copy-on-write area, which you want to remove. In that case you have to issue the command with `--call=i --ccow=r` action options.

`--ccow,--cC` Correct orphaned files in the copy-on-write directory `$VE_PRIVATE/cow`. The file is considered to be orphaned when there is no VZFS symlink in the Container private area referring to the file.

`--cmark,--cM` Correct broken copy-on-write mark on the VZFS symlink. VZFS uses sticky bit on the VZFS symlink when file is being copied as a mark that copy-on-write directory has a new file for the symlink. The mark is considered to be broken when copy-on-write area contains no file for the VZFS symlink. If this option is used with the `remove` action then VZFS symlink is not removed but the mark (sticky bit) is turned off on the VZFS symlink.

`--clink,--cL` Correct broken VZFS symlink. VZFS symlink is considered to be broken when it points to non-existent or non-regular file in the template directory.

Optimization actions have the format of `--<option>[=<action>]` where `<action>` can be one of the following:

`i, ignore` Do not do actual optimization, only report what can be optimized. This is the default action if no action is explicitly specified.

`d, do` Proceed with the optimization.

Options can be one or several of the following:

`--oall,--oA` Do all types of optimizations.

`--oreplace,--oR` Replaces VZFS symlinks in the Container private area with the files found in the copy-on-write directory.

`--oempty,--oE` Compares the content of the file in the copy-on-write directory with the file from the template directory and if they are the same, removes the file from the copy-on-write directory. It also turns off the copy-on-write mark (sticky bit) from the corresponding VZFS symlink.

The example below illustrates the usage of `vzfsutil` for getting rid of files in the copy-on-write directory of Container 101.

```
# ls /vz/private/101/cow
02c38bc341d382c11ecb8140b2811ea3  81294809f6694940b2b8bd321ceda09e
1052304dc986a695b12d34eaf1324976  823500b4147c2d3a30e4478faee48550
2dfb1f92fc775fc85d7898391d72080d  96c61677e816f3433e3f0eeb6e539380
410fb765985f96d07b5e90b875cb325f  a5f1c84a031fcf70743896779758a181
57ec3d1ee07a848f883ca6ba4511e9bc  b46db38473ff5b6082c1803f0cc1f59c
# vzfsutil -t /vz/template --oall=d /vz/private/101
Optimization: 'cow' '57ec3d1ee07a848f883ca6ba4511e9bc' \
different from 'template' 'redhat-el5-x86/initscripts-6.43-1/sbin/ifup'
Optimized: replaced 'magic' 'sbin/ifup' with 'cow' \
```

```
'57ec3d1ee07a848f883ca6ba4511e9bc'
Optimization: non-changed 'cow' '410fb765985f96d7b5e90b875cb325f' \
for 'etc/printcap'
Optimized: removed non-changed 'cow' '410fb765985f96d7b5e90b875cb325f'
 [further output suppressed]
# ls -l /vz/private/101/cow
total 0
```

Caution: Potentially, with incorrect usage (for example, if you specify the `remove` action with non-interactive mode and incorrect template area), this utility may destroy VZFS private area. Use this utility with care. It is highly recommended to run it in the "report-only" mode before making any changes.

vzcache

The `vzcache` utility scans the specified Containers for common files and caches these files in the Node template area (`/vz/template/vc` by default), replacing the real files inside the Containers with symlinks to the template area. In the case of a significant number of identical files, using this utility results in a notable disk space gain. `vzcache` has the following syntax:

```
vzcache [options] CT_ID-list
```

The following command-line options can be used with the `vzcache` utility:

Option	Description
`-h`, `--help`	Print the usage information.
`--version`	Display the utility version.
`-v`, `--verbose`	Verbose mode. Causes `vzcache` to print debugging messages about its progress. Multiple `-v` options increase verbosity; the maximal number is 2.
`-q`, `--quiet`	Quiet mode. Print error messages only.
`-r`, `--cachearea`	Process the Container template area only. During the `vzcache` execution, a separate template area (`/vz/template/vc/`*`CT_UUID`* by default) is created for each specified Container. *`CT_UUID`* denotes the Container unique identifier and can be determined by viewing the *`UUID`* parameter in the Container configuration file. You are recommended to use this option when running `vzcache` for migrated or restored Containers.
`-C`, `--clean`	Clears the Container template area (`/vz/template/vc/`*`CT_UUID`* by default) from those cached files that are not present any more inside the corresponding Container. Only one Container can be cleaned up at a time.
`-s`, `--size-limit` *`N`*	Do not process files smaller than *`N`* bytes. By default, only empty files are not processed.

vzps and vztop

These two utilities can be run on the Node just as the standard Linux `ps` and `top` utilities. For information on the `ps` and `top` utilities, consult **Linux Administrator's Guide** or the corresponding man pages. The `vzps` and `vztop` utilities provide certain additional functionality related to monitoring separate Containers running on the Node.

The `vzps` utility has the following functionality added:

- The `-E` *`CT_ID`* command-line switch can be used to show only the processes running inside the Container with the specified ID.

The `vztop` utility has the following functionality added:

- The `-E` *`CT_ID`* command-line switch can be used to show only the processes running inside the Container with the ID specified. If `-1` is specified as *`CT_ID`*, the processes of all running Containers are displayed.
- The `e` interactive command (the key pressed while `top` is running) can be used to show/hide the `CTID` column, which displays the Container where a particular process is running (`0` stands for the Node itself).
- The `E` interactive command can be used to select another Container the processes of which are to be shown. If `-1` is specified, the processes of all running Containers are displayed.

vzsetxinetd

To switch the service running in a particular Container between an independent and `xinetd`-dependent modes, the `vzsetxinetd` utility is used. It has the following syntax:

```
vzsetxinetd -h
vzsetxinetd -s CT_ID SERVICE ...
vzsetxinetd [-u] [-f] CT_ID SERVICE on|off ...
```

where ***CT_ID*** is the ID of the corresponding Container, and ***SERVICE*** is the corresponding service: `sendmail`, `sshd`, `proftpd`, or `courier-imap`. There may be any number of the ***SERVICE*** or ***SERVICE*** `on|off` strings in a single invocation of the `vzsetxinetd` utility. With "`on`", the service will be based on `xinetd`; if "`off`" is specified, it will be standalone.

Notes:

1. The `courier-imapd`, `courier-imapds`, `courier-pop3d`, and `courier-pop3ds` services are provided by the `courier-imap` service, thus `vzsetxinetd` can manage these services via the `courier-imap` service.

2. The Parallels HSPcomplete application cannot be used for managing Containers having one or more services configured with the `vzsetxinetd` utility.

Here follows the explanation of available options:

`-h`, `--help`	Prints help on the usage of the utility.
`-s`, `--state`	Prints the information on whether the corresponding service is `xinetd`-dependent or standalone.
`-u`, `--userfiles`	This option tells the utility to save the previously saved user files related to the service.
`-f`, `--force`	This option tells the utility to set the service to the specified mode even in case the service is currently in this mode already.

vzdqcheck

This utility counts inodes and disk space used using the same algorithm as Parallels Virtuozzo Containers quota. It has the following syntax:

```
vzdqcheck [options] <path>
```

The command traverses directory tree given as the `path` argument and calculates space occupied by all files and number of inodes. The command does not follow mount points and correctly handles VZFS symlinks unlike the standard `du` command.

Options available to the `vzdqcheck` command are:

`-h` Usage info.

`-V` `vzquota` version info.

`-v` Verbose mode.

`-q` Quiet mode.

vzdqdump and vzdqload

The `vzdqdump` and `vzdqload` utilities are used for dumping the Container user/group quota limits and grace times from the kernel or the quota file or for loading them to a quota file, respectively. `vzdqdump` displays the corresponding values on the console screen, and `vzdqload` gets the information from the standard input.

The syntax of the commands is the following:

```
vzdqdump [general_options] quota_id [-f] [-c quota_file] –G|-U|-T
vzdqload [general_options] quota_id [-c quota_file] –G|-U|-T
```

The general options are described in the table below:

`-h`	Usage info.
`-V`	`vzquota` version info.
`-v`	Verbose mode.
`-q`	Quiet mode.

The *`quota_id`* parameter corresponds to the ID of the Container for which you wish to dump/load the quotas. Other options are the following:

`-f`	Dump the user/group quota information from the kernel rather than from the quota file
`-c quota_file`	Specifies a quota file to process other than the default quota file (`var/vzquota/quota.<CT_ID>`)
`-G, --grace`	Dump/load user/group grace times
`-U, --limits`	Dump/load user/group disk limits
`-T, --exptimes`	Dump/load user/group expiration times

Quotas must be turned off when the `vzdqload` utility is working. Mind that only 2nd-level disk quotas are handled by the utilities.

vznetstat

This utility outputs traffic usage statistics for Containers. It has the following syntax:

```
vznetstat [-v <CT_ID>] [-c <class>] [-a] [-r]
```

The utility displays input and output traffic for Containers for each defined network class, in bytes. The network classes are described in the `/etc/vz/conf/networks_classes` file. If no options are specified the network statistics for all running Containers is printed.

The utility accepts the following options:

`-v <CT_ID>`	Display statistics for Container with the ID of `<CT_ID>`. Multiple `-v` options can be given to a single `vznetstat` invocation.
`-c <class>`	Show the network statistics for the `<class>` class only.
`-a`	Display statistics for all classes.
`-r`	Rounds down the statistics results, which is shown in bytes by default. In this case, the statistics is shown in the following units of measurement, depending on the amount of traffic: • `K(b)`—kilobytes • `M(b)`—megabytes • `G(b)`—gigabytes
`--help`	Display the utility usage information.

vzcpucheck

This utility displays the current Node utilization in terms of allocated CPU units as well as total Node CPU units capacity. It has the following syntax:

```
vzcpucheck [-v]
```

Without arguments, the utility prints the sum of CPU units of all running Containers and the total Node capacity. If the `-v` option is given, the utility prints per Container CPU units information.

vzmemcheck

This utility shows the Node memory parameters: low memory utilization, low memory commitment, RAM utilization, memory+swap utilization, memory+swap commitment, allocated memory utilization, allocated memory commitment, allocated memory limit. It has the following syntax:

```
vzmemcheck [-v] [-A]
```

The following options can be specified in the command-line:

`-v` Display information for each Container.

`-A` Display absolute values (in megabytes).

It is possible to use any of the available options, both of them, or to do without any options.

vzcalc

This utility is used to calculate Container resource usage. It has the following syntax:

```
vzcalc [-v] <CT_ID>
```

This utility displays what part of Node resources Container `<CT_ID>` is using. An optional `-v` switch produces verbose output including number of processes, low memory, allocated memory and memory and swap statistics.

For stopped Containers the utility displays promised and maximum values the Container can consume. For running Containers, it also outputs the current values.

The high values of resource usage means that either the Node is overcommitted or Container configuration is invalid.

vzcheckovr

This utility is used to check the current system overcommitment and safety of the total resource control settings. It runs as follows:

```
vzcheckovr [-v]
```

where `-v` is the option for verbose output. This utility computes the commitment levels of a number of resource management parameters (Low Memory, Memory + Swap, Allocated Memory) and compares them with the values chosen by the Parallels Virtuozzo Containers administrator in the `/etc/vz/vz.conf` global configuration file. The utility will produce a warning if these configured values are exceeded. Similarly to `vzmemcheck`, `vzcheckovr` takes into account only those Containers that are currently running and ignores all the others existing on the Node.

pstat

This utility is for real-time monitoring in Parallels Virtuozzo Containers. It displays the status and load of the system pertaining to its disk, network, CPU, and memory (including swap) parameters, updating this status with the preset time interval. It also provides a list of running Containers together with their resources consumption statistics, and can sort this list by a number of parameters. The utility has an interactive interface for setting the mode of displaying the information.

The syntax of the `pstat` utility is the following:

```
pstat [-l] [-d X] [-p CT_ID] [-b|-v] [-t] [-a]
```

Here is the description of the command-line parameters:

`-l` Print information once and exit immediately.

`-d` Specify the delay between screen updates. Can be changed on the fly by the `t` interactive command. Default is 1 sec.

`-p` Monitor only Containers with the specified *CT_IDs*. This flag can be given up to twenty times, in form `-p` *CT_ID*`1 -p` *CT_ID*`2 ....` This option is not available interactively.

`-b` "Brief" mode. Minimal details level. Shows only one summary line about each monitoring subsystem. By default, "standard" details level is in use. Valid levels are "brief", "standard" and "verbose". Can be set on the fly by the `b` interactive command. See also the `-v` command-line option and `s` and `v` interactive commands.

`-v` "Verbose" mode. Provides maximum details about all monitored subsystems. Can be set on the fly by the `v` interactive command. See also the `-b` command-line option and `b` and `s` interactive commands.

`-t` Text mode, provides information once. It is printed in terse form, suitable for parsing by other programs. All output data are not aligned and numbers are not in a human readable format. In the text mode, there are no colors in the output and only the top 10 Containers sorted by their CPU usage are shown.

`-a` Display the current disk input and output (I/O) statistics for Containers.

`-i` Display the IO accounting information for Containers.

`-m` Display disc statistics for all file system types. By default, the statistics is shown for ext2, ext3, ext4, and reiserfs.

`-o` Filter the output by the specified parameters. You can specify multiple parameters and separate them by commas. The list of available parameters is given below.

`-O` Filter the output by the specified parameters. Unlike the `-o` option, the produced output already contains some default columns (for example, Container ID and IP address). The list of available parameters is given below.

`-n` Display network statistics.

`-s` Filter the output by the specified keys. The list of available parameters is given below.

`-c` Display I/O statistics in the specified units of measurement: `B` (bytes), `K` (kilobytes), `M` (megabytes), or `G` (gigabytes).

`pstat` can display the following information:

Type of Information	Description	Example	Toggling by
Uptime	This line displays the time for which the system has been up, and three "load averages" for the system. The load averages are the average number of processes ready to run during the last 1, 5, and 15 minutes. This line is just like the output of uptime(1).	`1:22am, up 1:31, 2 users, load average: 0.00, 0.06, 0.33`	`l`
Containers and processes	Total number of Containers and processes running at the time of the last update. The output is also broken down into the number of tasks which are running, sleeping, uninterruptable, zombie, or stopped.	`CTNum 102, procs 467: running 12, sleeping 455, unint 0, zombie 0, stopped 0`	`p`
CPU states	Shows the percentage of CPU time used by all Containers and by the server (shown as `CT0`), the CPU time spent in the user mode, in the system mode, and being idle, and the maximal/average scheduling latency in ms. The scheduling latency is the time spent by the processes in the system awaiting for scheduling.	`CPU [ OK ]: CTs 43%, CT0 12%, user 41%, sys 13%, idle 45%, lat(ms) 3/2`	`c`
Mem	Statistics on the memory usage, including the total available memory, free memory, and maximal/average memory allocation latency. The free memory is displayed both for the low and high memory. The low memory is the sum of the DMA and Normal zones memory and the high memory is the High zone memory. Memory allocation latency is the time required to allocate memory inside the kernel in ms. An excessive allocation latency can be a sign of Node's overload.	`Mem [ OK ]: total 755MB, free 671MB/0MB (low/high), lat(ms) 10/7.`	`m, M`
Memory zones information	Information on the memory zones state. This information includes: the total size of the memory zone in MB, the size of active and inactive lists, of the free memory and zone limits.	`ZONE1 (Normal): size 752MB, act 29MB, inact 31MB, free 658MB (0/1/2)`	`m, M`
Memory zones fragmentation	Information on the memory zones fragmentation. This information describes how much system memory is fragmented and which is the biggest block size possible to allocate atomically. The first number before * is a number of blocks and the second is a block size in pages.	`fragm 2*1 3*2 15*4 22*8 25*16 12*32 4*64 0*128 1*256 326*512".`	`m, M`
Memory allocation latency	Memory allocation latency is an average time spent in the kernel memory allocator for different memory type requests. Any memory type is coded as XY, where X is A for GFP_ATOMIC, K for GFP_KERNEL and U for GFP_USER, and Y denotes the allocation request order, i.e. Y=0 for order=0 and 1 for order=1.	`Mem lat (ms): A0 0, K0 0, U0 1, K1 3, U1 2`	`m, M`
Slab cache information	Slab cache information includes: the total slab cache size/real cache size divided into the	`Slab pages: 13MB/13MB (ino 8MB, de 1MB, bh`	`m, M`

	inode cache size, dentry cache size, buffer heads cache size and page beancounters cache size. The real cache size is the size to which the cache can be shrunk, i.e. it is always less than the total cache size.	`1MB, pb 0MB)`	
Swap	Statistics on the used swap space, including the total swap space, the available swap space and the speed of swap-in/swap-out activity in MB/s.	`Swap [ OK ]: tot 1004MB, free 1004MB, in 0.000MB/s, out 0.000MB/s`	`w, W`
Swap latency	Swap operations latency. This includes the swap-in count, the swap-in maximal/average latency in ms, the swap-out count, the swap-out maximal/average latency in ms, and the maximal/average CPU time spent for the swap-out.	`Swap lat: si 0, 0/0 ms, so 0, 0/0 ms, 0/0 cpu ms`	`w, W`
Swap cache	Swap cache information includes the number of addition, deletion, and find operations respecting the swap cache.	`Swap cache: add 0, del 0, find 0/0`	`w, W`
Network information	Network statistics summary includes the total incoming traffic speed in MB/s and incoming packets/s, and outgoing traffic speed in MB/s and outgoing packets/s.	`Net [ OK ]: tot in 1.020MB/s 267pkt/s, out 0.001MB/s 1pkt/s`	`n, N`
Network interface information	Provides the network statistics summary for a particular Ethernet interface, including its total incoming traffic speed in MB/s and incoming packets/s, and outgoing traffic speed in MB/s and outgoing packets/s.	`eth0: in 0.000MB/s 3pkt/s, out 0.001MB/s 1pkt/s`	`n, N`
Disks statistics	Disks statistics summary including the writing and reading activity in MB/s.	`Disks [ OK ]: in 0.000MB/s, out 0.000MB/s`	`d, D`
Mounted disks statistics	Information on the mounted disks such as their mount point, free space, and free inodes left on the device.	`root(/) free: 3489MB(46%), 511077ino(52%)`	`d, D`

Disk I/O statistics	Shows disk input and output statistics for Containers. The following statistics is displayed:
	• `IOUSED%`: the percentage of time the disks are used by the Container.
	• `IOWAIT%`: the percentage of time when at least one I/O transaction in the Container is waiting for being served.
	• `IOSPEED`: the current speed of disk I/O operations in the Container and the I/O limit set for this Container, if any. The value can be displayed in bytes, kilobytes, megabytes, or gigabytes per second, depending on the units you used to set the I/O limit.
		`IOUSED%`
		`5.00`
		
		`IOWAIT%`
		`0.00`
		
		`IOSPEED`
		`2/100MB/s`
			`A`

Quite a number of single-key interactive commands can be used while `pstat` is running to change the way the utility displays information. The commands are not available if `pstat` runs with the `-t` or `-l` command-line option. These interactive commands are the following:

Key	Action
`h, ?`	Print a help screen.
`space`	Update display immediately.
`q`	Quit.
`t`	Change the delay between screen updates. You will be prompted to enter new delay time, in seconds. Entering 0 causes continuous updates. See also the `-d` command-line parameter.
`b`	Set the "brief" details level. See also the `-b` command-line parameter.
`s`	Set the "normal" details level.
`v`	Set the "verbose" details level. See also the `-v` command-line parameter.
`a`	"Averaged" mode. Monitoring parameters will be averaged through a minute. This includes: 1. Number of uninterruptable processes; 2. Scheduling max latency; 3. Memory allocation max latency; 4. Size of free/active/inactive memory; 5. Swap-in latency; 6. UBC fail-counters absolute values.
e	Toggle display of Container IP addresses/hostnames.
`i`	Toggle display of idle Containers.
`l`	Toggle display of load average.
`p`	Toggle display of processes statistics.
`c`	Toggle display of CPU usage statistics.
`w`	Toggle display of swap information.
`m, M`	Toggle/expand display of memory information. Each subsystem, including memory, network and disk has a number of verbosity levels. In the minimal level no information is displayed. Corresponding interactive lowercase key decreases verbosity level, the same key in uppercase increases it.
`n, N`	Toggle/expand display of network statistics.
`A`	Toggle display of disk input and output statistics for Containers.
l	Toggle display of input and output accounting for Containers.
`X`	Toggle display of network statistics for Containers.
`d, D`	Toggle/expand display of disk usage and activity information.
`0`	Toggle display of statistics for the server itself.
`o`	Sort key. You can use one of the following sort option keys: `n` Sort by Container ID `c` Sort by CPU usage `f` Sort by UBC failure counters `r` Sort by the number of running processes `p` Sort by the total number of processes t Sort by Container status. Containers which probably are unusable or unstable (increasing UBC failure counters or very high scheduling latency) will be shown first.

s Sort by the number of open sockets

m Sort by memory latency

v Sort by virtual memory usage

k Sort by kernel memory usage

You can use the following parameters with the `-o`, `-O`, and `-s` options to filter the information related to Containers:

Parameter Name	Column Name	Description
`id`	`CTID`	Container ID
`st`	`ST`	Container status.
`vm`	`%VM`	Virtual memory usage, in per cent of the total memory on the Node. It's displayed in the form of "actual usage/barrier". This parameter corresponds to the `PHYSPAGES` VSwap parameter.
`km`	`%KM`	Kernel memory usage, in per cent of the normal zone size. It's displayed in the form of "actual usage/barrier". This parameter corresponds to the `kmemsize` UBC parameter.
`sw`	`%SW`	Swap space usage, in per cent of the total swap space on the Node. It's displayed in the form of "actual usage/barrier". This parameter corresponds to the `SWAPPAGES` VSwap parameter.
`proc`	`PROC`	Process information. It's displayed in the form of "running processes/total processes/barrier".
`cpu`	`CPU`	CPU usage. It's displayed in the form of "actual CPU usage/guaranteed PU usage". If more than one processor is installed on the server, all processors are considered as 100%.
`sock`	`SOCK`	Sockets usage calculated as the sum of UBC `numtcpsock` and `numothersock` parameters. It's displayed in the form of "open sockets/barrier".
`fcnt`	`FCNT`	Fail counters—that is, the number of UBC fail counters for all resources.
`mlat`	`MLAT`	Maximum process scheduling latency, in milliseconds. In this case, the latency means the maximum time a process in a Container is waiting for the CPU.
`iow`	`IOW`	Transfer rate with which data is written to the Container.
`ior`	`IOR`	Transfer rate with which data is read from the Container.
iowt	`IOWT`	Total amount of data that was written to the Container.
`iort`	`IORT`	Total amount of data that was read from the Container.
`ios`	`IOS`	Synchronization rate.
`iod`	`IOD`	Flushing rate of dirty pages (pages that have been changed but are not yet written to the Container disk).
`rx`	`RX`	Incoming traffic rate, in megabytes per second.
`tx`	`TX`	Outgoing traffic, in megabytes per second.
`rxt`	`RXT`	Total amount of incoming traffic, in megabytes.

txt	TXT	Total amount of outgoing traffic, in megabytes.
rxp	RXP	Incoming traffic, in packets per second.
txp	TXPT	Outgoing traffic, in packets per second.
rxpt	RXPT	Total amount of incoming packets.
txpt	TXPT	Total amount of outgoing packets.

vzpid

This utility prints the ID of the Container where the process is running. It has the following syntax:

```
vzpid <pid> [<pid>…]
```

Multiple process IDs can be specified as arguments.

vzsplit

This utility is used to generate a sample Container configuration file with a set of system resource control parameters. The syntax of this command is as follows:

```
vzsplit [-n num] [-f sample_name] [-s swap_size]
```

This utility is used for dividing the Node into equal parts. It generates a full set of Containers system resource control parameters based on the total physical memory of the Node it runs on and the number of Containers the Node shall be able to run even if the given number of Containers consume all allowed resources.

Without any option the utility prompts for the desired number of Containers and outputs the resulting resource control parameters to the screen.

The utility accepts the following options:

`-n num`	Desired number of Containers to be simultaneously run on the Node.
`-f sample_name`	Name of the sample configuration to create.
`-s swap_size`	Size of the swap file on the Node. It is recommended to specify the swap size to be taken into account when the utility generates sample configurations.

The resulting sample configuration will be created in the `/etc/vz/conf` directory. The file name will be `ve-<sample_name>.conf-sample`. Now you can pass `<sample_name>` as an argument to the `--config` option of the `vzctl create` command. If a sample with this name already exists, the utility will output an error message and will not overwrite the existing configuration.

Note: If you create a Container configuration sample by splitting Parallels Virtuozzo Containers resources via Parallels Virtuozzo Containers tools (e.g. Parallels Management Console) rather than using `vzsplit`, this sample is put to the `/var/vzagent/etc/samples` directory after its creation. This sample can then be used for creating new Containers by Parallels Virtuozzo Containers tools only.

vzcfgscale

This utility is used to “scale” Container configuration. It multiplies Container resource control parameters by the number passed as an argument. The syntax of this utility is as follows:

```
vzcfgscale [options] <CT_config_file>
```

Container configuration file shall be always the last parameter and the utility uses it to produce scaled Container configuration. The utility accepts the following options:

`-o <file>`	Output scaled configuration into the `<file>`. By default, utility prints its output to screen. Note that the file specified cannot be the same as `<CT_config_file>`, otherwise you will loose the configuration file content.
`-a <factor>`	Multiply all Container parameters by a `<factor>`.
`-c <factor>`	Multiply CPU parameters by a `<factor>`.
`-d <factor>`	Multiply disk related parameters by a `<factor>`.
`-u <factor>`	Multiply system resource control parameters by a `<factor>`.
`-n <factor>`	Multiply bandwidth parameters by a `<factor>`.
`-r`	Do not output Container-specific parameters like `VE_ROOT`, `VE_PRIVATE`, and so on. This option is useful for producing configuration samples to be used as an argument for the `--config` option of the `vzctl create` command.

At least one multiplying argument is required. It is possible to specify more than one multiplying argument to use different factors for different group of parameters. If both `-a` and a specific group option is used, then the specific option factor takes precedence of the value specified by the `-a` option.

vzcfgvalidate

This utility is used to check the resource management parameters consistency in a Container configuration file. It has the following syntax:

```
vzcfgvalidate <CT_config_file>
```

The utility has a number of constraints according to which it tests the configuration file. If a constraint is not satisfied, the utility prints a message with its severity status. Three severity statuses are defined in Parallels Virtuozzo Containers:

Recommendation	This is a suggestion, which is not critical for Container or Node operations. The configuration is valid in general; however, if the system has enough memory, it is better to increase the settings as advised.
Warning	A constraint is not satisfied and the configuration is invalid. Applications in the Container with such invalid configuration may have suboptimal performance or fail in a not graceful way.
Error	An important constraint is not satisfied and the configuration is invalid. Applications in a Container with such invalid configuration have increased chances to fail unexpectedly, to be terminated or to hang.

It is suggested to use this utility when applications in a Container behave in an unexpected way and there seems to be no resource shortage for the Container.

vzcfgconvert

This utility is used to convert Container configuration files. It has the following syntax:

```
vzcfgconvert <CT_ID>
```

This utility is able to perform two tasks:

1. Convert Virtuozzo 2.0.2 Container configuration files into the Virtuozzo 2.5.x format. After updating a Hardware Node or migrating a Container from a Virtuozzo 2.0.2 Hardware Node to a Virtuozzo 2.5.x Hardware Node, the Container configuration file remains in the old format. Virtuozzo can use old format files to start and run Containers. However, for validation and scaling utilities the file has to be in the Virtuozzo 2.5.x format.
2. Scale configuration files of Containers running on Host OSs with Linux kernel 2.4 to those adjusted for Linux kernel 2.6.

Whatever the task, the utility saves the updated configuration file.

vzstatrep

`vzstatrep` is run on the Monitor Node and used to analyze the logs collected by the `vzlmond` daemon on one or more Nodes to generate statistic reports and graphics on the basis of the gathered logs, and to send these reports and graphics to the Node administrator's e-mail address(es). The `vzstatrep` utility has the following syntax:

```
vzstatrep [options]
```

The following command-line options can be passed to `vzstatrep`:

Name	Description
`--plot`	Generate graphics for the resources parameters specified as the values of the `STATS_PLOT` parameter in the `/etc/vzstatrep.conf` file on the Monitor Node.
`--sendmail`	Send the statistic report and graphics to the e-mail address(es) specified as the value(s) of the `STATS_EMAIL` parameter in the `/etc/vzstatrep.conf` file on the Monitor Node. If the `--sendmailto` option is omitted, you should obligatorily use this option.
`--sendmailto` *`mail`*	Send the statistic report and graphics to the e-mail address specified as the value of this option. You can set several e-mail addresses and separate them by spaces. If the `--sendmail` option is omitted, you should obligatorily use this option.
`--weekly`	Generate statistic reports and graphics on a weekly basis. By default, `vzstatrep` analyzes the logs and produces the Node resources statistics once a day.
`--nodes` *`hostname`*	Analyze the logs from the Node whose IP address or hostname is specified as the value of this option. You can set several Nodes by separating them by spaces and enclosing them in quotes (e.g. `"my_hardware_node1 my_hardware_node2"`). If the option is omitted or its value is not specified, the logs from the Nodes set as the values of the `NODES` parameter in the `/etc/vzstatrep.conf` file on the Monitor Node are analyzed.

The `vzstatrep` utility generates statistic reports and graphics on the basis of the logs gathered by `vzlmond` (by default, the logs are stored in the `/var/log/vzstat` directory on the Node) and containing information on the memory and CPU consumption of the Node, network resources on the Node, etc. You do not need to perform any additional operations to start using `vzstatrep`. All the necessary parameters can be set during the `vzstatrep` execution by using the aforementioned options. However, if you wish to run the `vzstatrep` utility as a `cron` job and/or free yourself from the necessity to manually specify the needed options each time you wish to run `vzstatrep`, you should edit the `/etc/vzstatrep.conf` configuration file on the Monitor Node and set the parameters values contained in this file. Detailed information on the `/etc/vzstatrep.conf` file is provided in the **vzstatrep Configuration File** subsection (p. 49).

vzreport

`vzreport` is used to compile a problem report and to automatically send it to the Parallels support team. It has the following syntax:

```
vzreport [options]
```

The following command-line options can be used with the `vzreport` utility:

Name	Description
`-h, --help`	Print usage information.
`-q, --quiet`	Quiet mode. Print error messages only.
`-p, --progress`	Causes `vzreport` to print additional information on its progress.
`-n, --name` *name*	The name of the person submitting the problem report.
`-c, --company` *company*	The name of the company where the person is working.
`-e, --email` *e-mail_address*	The e-mail address to be used to contact the person generating the problem report.
`-s, --subject` *subject*	The main subject of the problem report.
`-m, --description` *problem_description*	Additional information which, in your opinion, can help solve the problem.

When launched without any options, the `vzreport` utility starts in the full screen mode; however, you can force it to run in the command line mode by specifying an option containing either your contact information (e.g. `-n` denoting your name) or the problem report description (e.g. `-m` used to provide additional information on your problem). Moreover, if you have specified at least one option with your contact information and/or problem description, you should also indicate all the other options.

vzhwcalc

`vzhwcalc` is used to scan information on the resources consumption on a server (this can be a physical server or a Node) and create a special file on its basis. When launched without any options, it makes a snapshot of the resources consumption and writes down this information to a special file - a server configuration file. The collected information can then be used to create a Container on its basis where the physical server will be migrated. You may also use `vzhwcalc` to collect data on your server resources in one place and be aware of their current consumption.

The `vzhwcalc` utility has the following syntax:

```
vzhwcalc [options]
```

The following options can be passed to the `vzhwcalc` utility:

Option Name	Description
`-o, --out`	The name of the configuration file that will be created by the utility and contain information on the server main resources.
`-t, --scan-time`	The time during which the utility is to be run on the server. The time should be given in the `dhms` format (e.g. `1d2h30m40s`).
`-p, --scan-period`	The interval with which the server will be scanned by the utility.
`--mem-scale`	The enlargement factor by which the calculated memory on the server will be increased in the configuration file.
`--disk-scale`	The enlargement factor by which the calculated disk space on the server will be increased in the configuration file.
`-d, --dist-detect`	The path to the file on the server where the `distdetect-common.sh` script is located. You can specify several scripts and separate them by commas.
`-h, --help`	Print usage information.
`-v, --version`	Print the version of the utility.

The configuration file created by the `vzhwcalc` utility is placed to the same directory on the server from where you have run this utility and has the default name of `ve.conf` (i.e. in case the `-o` option was omitted during the utility execution).

vzveconvert

The `vzveconvert` utility is used to convert the Containers based on standard OS templates and having a number of standard application templates applied to them to the EZ template-based Containers. It has the following syntax:

```
vzveconvert [options] <CT_ID>
```

You can pass the following options to the utility:

Name	Description
`-C, --cache`	Makes the `vzveconvert` utility look for the template packages and their updates in the local `vzpkg` cache only. If there are any packages not available locally, the command will fail.
`-t, --test`	Simulates the same operations as `vzveconvert` completes without specifying this option (compares the packages comprising the Container standard template with those in the repository set for the corresponding EZ template, compares the installed packages in the EZ template directory on the Node with those specified in the EZ template meta files, etc.); however, the standard templates themselves applied to the Container are not converted to their EZ counterparts.
`-r, --remote`	This option should be used if: • you wish the `vzveconvert` utility to check for the packages included in the standard OS and application templates in the remote repositories set for handling the corresponding EZ template and • the elapsed time from the last `vzpkg` cache update does not exceed the value of the `METADATA_EXPIRE` parameter specified in the `/etc/vztt/vztt.conf` file.
`-d, --debug` *<num>*	Sets the debugging level to one of the specified values (from 0 to 5). 5 is the highest debug level and 0 sets the debug level to its minimal value.
`-f, --force`	Forces the process of converting the specified Container (e.g. if the corresponding EZ application template is not installed on the Hardware Node).
`-q, --quiet`	Disables logging to the screen and to the log file.
`-a, --avail`	Displays the list of available OS templates conversions. This option can be used to check whether a standard OS template running inside your Container can be updated to an EZ template and, if yes, then to what EZ template. After you execute the command, all standard OS templates that can be converted to the EZ templates are listed in the **Target OS** column of the command output, whereas the resulting EZ templates are shown in the **Destination OS** column.
`-h, --help`	Display the utility usage and exit.

The `vzveconvert` utility requires only the ID of the Container for its execution and automatically performs all the necessary transformation tasks. However, you may specify a number of additional options listed in the table above.

The full list of "standard OS template --> EZ OS template" and "standard application template --> EZ application template" transformations which can be performed in the current version of Parallels Virtuozzo Containers is provided in the `/usr/share/vztt/convert/os_table` and `/usr/share/vztt/convert/app_table` files on the Hardware Node, respectively.

vznetcfg

The `vznetcfg` utility is used to manage the following network devices on the Node:

- physical and VLAN (Virtual Local Area Network) adapters
- Virtual Networks (VNs)

`vznetcfg` has the following syntax:

```
vznetcfg command
```

Where *`command`* can be one of the following:

Name	Description
`net new <VN_name>`	Creates a new Virtual Network with the name of *`<VN_name>`* on the Node.
`net addif <VN_name>|<interface_name>`	Connects a network device with the name of *`<interface_name>`* to the Virtual Network having the name of *`<VN_name>`*. You can join the following network devices to the Virtual Network: • physical network interface cards (NICs) installed on the Node • VLAN adapters bound to NICs on the Node
`net delif <interface_name>`	Disconnects a network device (either a NIC or a VLAN adapter) with the name of *`<interface_name>`* from the corresponding Virtual Network.
`net change <old_VN_name> <new_VN_name>`	Changes the Virtual Network name from *`<old_network_ID>`* to *`<new_VN_name>`*.
`net del <VN_name>`	Removes the Virtual Network with the name of *`<VN_name>`* from the Node.
`vlan add <parent_interface> <index_number>`	Creates a new VLAN adapter, associates it with the VLAN ID of *`<index_number>`* (where *`<index_number>`* can be an arbitrary integer number to be used to uniquely identify the VLAN among other VLANs on the Node), and ties it to the *`<parent_interface>`* physical network adapter on the Node.
`vlan del <vlan_adapter_name>`	Removes the VLAN adapter with the name of *`<vlan_adapter_name>`* from the Node. **Note:** A VLAN adapter name is automatically generated by Parallels Virtuozzo Containers on the basis of the VLAN ID and the name of the physical adapter you specified during the VLAN adapter creation (e.g. `eth0.1`). You can find out the VLAN name using the `vznetcfg if list` command.
`if list`	Lists detailed information on all network devices (NICs, VLAN adapters, etc.) available on the Node.

`net list`	Displays detailed information on the Virtual Networks currently existing on the Node.
`init all`	Initializes all interfaces (e.g. VLANs and bridges) listed in the `/etc/vz/vznet.conf` file on the Node. You may wish to make use of this command when creating startup scripts.
`down all`	Disables all interfaces (e.g. bridges and VLANs) listed in the `/etc/vz/vznet.conf` file on the Node.

vzmtemplate

The `vzmtemplate` utility is used to migrate the installed OS and application standard templates and OS EZ templates from the Source Node to the Destination Node. It has the following syntax:

```
vzmtemplate [-bhz] [--ssh=<ssh_options>]
            <[user_name@]Destination_server_IP_Address> template_name ...
```

The following options can be used with `vzmtemplate`:

Option	Description
`-z, --eztempl`	Migrates the specified OS EZ template(s) installed on the Source Node. Without this option specified, `vzmtemplate` moves standard OS and application templates.
`--ssh=`*`ssh_options`*	Additional `ssh` options to be used while connecting to the Destination Node.
`-b, --batch`	This option should be passed to `vzmtemplate` in scripts if you are going to use these scripts for running the `vzmtemplate` utility and do not wish them to analyze the `vzmtemplate` command output.
`-h, --help`	Displays the utility usage and exits.

To migrate a template, you should execute the `vzmtemplate` command on the Source Node and pass the corresponding options to it. During its execution, the utility will try to connect to the Destination Node with the IP address of *`Destination_server_IP_Address`* and move the specified template(s) to this Node. By default, `vzmtemplate` logs in to the Destination Node as `root` and asks you for the password of this user. However, you can make the utility use other credentials to log in to the Destination Node by appending the corresponding user name with the `@` symbol to the Node IP address (e.g. `user1@192.168.0.123`). Keep in mind that the specified user should have the `root` privileges; otherwise, the command will fail.

Glossary

Application template is a template used to install a set of applications in *Containers*. See also *Template*.

Container (or *regular Container*) is a virtual private server, which is functionally identical to an isolated standalone server, with its own IP addresses, processes, files, its own users database, its own configuration files, its own applications, system libraries, and so on. Containers share one *Hardware Node* and one OS kernel. However, they are isolated from each other. A Container is a kind of 'sandbox' for processes and users.

Container 0 is used to designate a *Hardware Node* where the *Parallels Virtuozzo Containers* software is installed.

EZ template is a template file that points to a repository with the packages that comprise the template. Unlike *standard templates*, EZ templates cannot be updated because the repository stays the same. However, the packages in the repository can be updated.

Hardware Node (or *Node*) is a server where the Parallels Virtuozzo Containers software is installed for hosting *Containers*. Sometimes, it is marked as *Container 0*.

Host Operating System (or *Host OS*) is an operating system installed on the *Hardware Node*.

OS template (or *Operating System template*) is used to create new *Containers* with a preinstalled operating system. See also *Template*.

Package set is a synonym for *Template*.

Parallels Virtual Automation is a tool designed for managing Hardware Nodes and all *Containers* residing on them with the help of a standard Web browser on any platform.

Parallels Management Console (or *Management Console*) is a Parallels Virtuozzo Containers management and monitoring tool with graphical user interface. It is used to control individual *Hardware Nodes* and their *Containers*. *Management Console* is cross-platform and runs on both Microsoft Windows and Linux workstations.

Parallels Power Panel is a means for administering personal Containers with the help of a standard Web browser (Internet Explorer, Mozilla, etc.) on any platform.

Parallels Virtuozzo Containers is a complete server automation and virtualization solution allowing you to create multiple isolated *Containers* on a single physical server to share hardware, licenses, and management effort with maximum efficiency.

Private area is a part of the file system where *Container* files that are not shared with other *Containers* are stored.

Standard template (obsolete) is a template file that has inside itself all the re-usable files of all the packages comprising the template. If newer versions of any of these packages appear, a standard template can be correspondingly updated. Compare *EZ template*.

Template (or *package set*) is a set of original application files (packages) repackaged for mounting over Virtuozzo File System. There are two types of templates. OS Templates are used to create new *Containers* with a preinstalled operating system. Application templates are used to install an application or a set of applications in *Containers*. See also *Standard template* and *EZ template*.

UBC is an abbreviation of *User Beancounter*.

User Beancounter is the subsystem of the *Parallels Virtuozzo Containers* software for managing *Container* memory and some system-related resources.

venet0 is a virtual networking device, a gateway from a *Container* to the external network.

Virtual Environment (or *VE*) is an obsolete designation of a *Container*.

Virtuozzo Control Center (or *VZCC*) is an obsolete designation of *Parallels Virtual Automation*.

Virtuozzo File System (*VZFS*) is a virtual file system for mounting to Container private areas. VZFS symlinks are seen as real files inside *Containers*.

Parallels Virtuozzo Containers license is a special license that you should load to the *Hardware Node* to be able to start using the *Parallels Virtuozzo Containers* software. Every *Hardware Node* shall have its own license.

Virtual Private Server (or *VPS*) is an obsolete designation of a *Container*.

Parallels Agent (or *Parallels Agent Protocol*) is an XML-based protocol used to monitor and manage a *Hardware Node*. The *Parallels Agent* software implements this protocol and is a backend for the *Parallels Management Console*.

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