Getting started with OpenVZ live CD

This article is written for OpenVZ LiveCD and assumes that the reader only starts using OpenVZ. ([Download live CD](http://openvz.org/Download_live_CD))

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**[**[**edit**](http://openvz.org/w/index.php?title=Getting_started_with_OpenVZ_live_CD&action=edit&section=1)**] Introduction**

So, as you probably know, OpenVZ allows the user to create [VEs](http://openvz.org/VE), or Virtual Environments, which seem very much like real computers. Real computer can run various distributions: Debian, Gentoo, Red Hat and Novell products, etc. In the same way, a VE can be based on various [OS (Operating System) templates](http://openvz.org/OS_template). On the LiveCD only few minimal OS templates are installed because of disk space limit. Each VE is identified by its number -- a **VEID**.

**[**[**edit**](http://openvz.org/w/index.php?title=Getting_started_with_OpenVZ_live_CD&action=edit&section=2)**] VE creation**

So, how to create a VE with VEID of 101 based on Debian template? Very easy. Just type the following commands in your terminal (you must be root):

# vzctl create 101 --ostemplate debian-3.1-i386-minimal

Creating VE private area (debian-3.1-i386-minimal)

Performing postcreate actions

VE private area was created

**vzctl** is the tool that manages VEs. Look in /vz/template/cache/ (CentOS LiveCD) or in /var/lib/vz/template/cache/ (KNOPPIX LiveCD) directories for other OS templates available on LiveCD:

# ls -1 /var/lib/vz/template/cache/

centos-4-i386-minimal.tar.gz

debian-3.1-i386-minimal.tar.gz

fedora-core-5-i386-minimal.tar.gz

**[**[**edit**](http://openvz.org/w/index.php?title=Getting_started_with_OpenVZ_live_CD&action=edit&section=3)**] List of VEs**

You can get the list of all created VEs on **HN** (Hardware Node) using **vzlist** command:

# vzlist -a

VEID NPROC STATUS IP\_ADDR HOSTNAME

101 - stopped - -

As you see, VE 101 is in stopped state now.

**[**[**edit**](http://openvz.org/w/index.php?title=Getting_started_with_OpenVZ_live_CD&action=edit&section=4)**] Starting VE**

Let's start it:

# vzctl start 101

Starting VE ...

VE is mounted

Setting CPU units: 1000

VE start in progress...

# vzlist -a

VEID NPROC STATUS IP\_ADDR HOSTNAME

101 5 running -

**[**[**edit**](http://openvz.org/w/index.php?title=Getting_started_with_OpenVZ_live_CD&action=edit&section=5)**] Executing commands in VE**

From the "vzlist" command you see that 5 processes are running inside VE 101. (The "NPROC" field indicates the number of Processes, or PIDs, that are active in the VE -- not the number of Processors, or CPUs.) Being on usual [hardware node](http://openvz.org/Hardware_node) you can use ps command to identify those, and the same command can be used here. The only difference is that this command should be called inside VE.

In order to perform any command inside VE `vzctl exec` is used:

# vzctl exec 101 ps

PID TTY TIME CMD

1 ? 00:00:00 init

7672 ? 00:00:00 rc

7674 ? 00:00:00 S10sysklogd

7677 ? 00:00:00 syslogd

7678 ? 00:00:00 syslogd

7683 ? 00:00:00 ps

**[**[**edit**](http://openvz.org/w/index.php?title=Getting_started_with_OpenVZ_live_CD&action=edit&section=6)**] Entering VE**

Any self-respected OS provides a shell for the user. This is how you can get the VE's shell:

# vzctl enter 101

entered into VE 101

#

In this shell you can do almost all you can do on the real HN. For example create a new user:

# useradd new-user

# passwd new-user

Enter new UNIX password:

Retype new UNIX password:

passwd: password updated successfully

# mkdir /home/new-user

# chown new-user /home/new-user/

# su new-user

$ cd ~

$ pwd

/home/new-user

exit

#

In order to exit from VEs shell, just type exit:

# exit

logout

exited from VE 101

#

**[**[**edit**](http://openvz.org/w/index.php?title=Getting_started_with_OpenVZ_live_CD&action=edit&section=7)**] Setting up VE networking**

Let's set up networking in VE.

# echo 1 > /proc/sys/net/ipv4/ip\_forward

# ifconfig venet0 up

# vzctl set 101 --ipadd 10.1.1.1 --save

Adding IP address(es): 10.1.1.1

Saved parameters for VE 1

# vzlist -a

VEID NPROC STATUS IP\_ADDR HOSTNAME

101 4 running 10.1.1.1 -

Now your [Hardware Node](http://openvz.org/Hardware_Node) can ping VE and VE can ping HN:

# ping 10.1.1.1

PING 10.1.1.1 (10.1.1.1) 56(84) bytes of data.

64 bytes from 10.1.1.1: icmp\_seq=1 ttl=64 time=3.80 ms

--- 10.1.1.1 ping statistics ---

1 packets transmitted, 1 received, 0% packet loss, time 0ms

rtt min/avg/max/mdev = 3.804/3.804/3.804/0.000 ms

#

# vzctl exec 101 ping 192.168.0.244

PING 192.168.0.244 (192.168.0.244) 56(84) bytes of data.

64 bytes from 192.168.0.244: icmp\_seq=1 ttl=64 time=0.508 ms

#

However, it is not possible to ping other computers in the network: for it we need to set up NAT (Network Address Translation) and set the nameserver.

Assume that you've set up network on HN (for example via DHCP) and the IP address of your node is 192.168.0.244 and nameserver IP address is 192.168.1.1.

# iptables -t nat -A POSTROUTING -s 10.1.1.1 -o eth0 -j SNAT --to 192.168.0.244

# vzctl set 101 --nameserver 192.168.1.1 --save

File resolv.conf was modified

Saved parameters for VE 101

# vzctl exec 101 ping google.com

PING google.com (64.233.167.99) 56(84) bytes of data.

64 bytes from py-in-f99.google.com (64.233.167.99): icmp\_seq=1 ttl=241 time=23.0 ms

**[**[**edit**](http://openvz.org/w/index.php?title=Getting_started_with_OpenVZ_live_CD&action=edit&section=8)**] Installing software inside VE**

I guess you've noted that there is not so many packages in VE. It is because minimal template was used. But of course, you can install any software in VE by yourself. For example, in Debian usual apt-get tool can be used.

Now, for example, we can install gcc inside VE 101 for developing purposes:

# vzctl enter 101

entered into VE 101

#

# apt-get install gcc

Reading Package Lists... Done

Building Dependency Tree... Done

The following extra packages will be installed:

binutils cpp cpp-3.3 gcc-3.3

Suggested packages:

binutils-doc cpp-doc make manpages-dev autoconf automake libtool flex bison gdb gcc-doc gcc-3.3-doc

Recommended packages:

libc-dev libc6-dev

The following NEW packages will be installed:

binutils cpp cpp-3.3 gcc gcc-3.3

0 upgraded, 5 newly installed, 0 to remove and 0 not upgraded.

Need to get 5220kB of archives.

After unpacking 13.6MB of additional disk space will be used.

Do you want to continue? [Y/n] y

Get:1 http://ftp.freenet.de stable/main binutils 2.15-6 [2221kB]

Get:2 http://ftp.freenet.de stable/main cpp-3.3 1:3.3.5-13 [1393kB]

Get:3 http://ftp.freenet.de stable/main cpp 4:3.3.5-3 [29.6kB]

Get:4 http://ftp.freenet.de stable/main gcc-3.3 1:3.3.5-13 [1570kB]

Get:5 http://ftp.freenet.de stable/main gcc 4:3.3.5-3 [4906B]

Fetched 5220kB in 10s (507kB/s)

Selecting previously deselected package binutils.

(Reading database ... 7436 files and directories currently installed.)

Unpacking binutils (from .../binutils\_2.15-6\_i386.deb) ...

Selecting previously deselected package cpp-3.3.

Unpacking cpp-3.3 (from .../cpp-3.3\_1%3a3.3.5-13\_i386.deb) ...

Selecting previously deselected package cpp.

Unpacking cpp (from .../cpp\_4%3a3.3.5-3\_i386.deb) ...

Selecting previously deselected package gcc-3.3.

Unpacking gcc-3.3 (from .../gcc-3.3\_1%3a3.3.5-13\_i386.deb) ...

Selecting previously deselected package gcc.

Unpacking gcc (from .../gcc\_4%3a3.3.5-3\_i386.deb) ...

Setting up binutils (2.15-6) ...

Setting up cpp-3.3 (3.3.5-13) ...

Setting up cpp (3.3.5-3) ...

Setting up gcc-3.3 (3.3.5-13) ...

Setting up gcc (3.3.5-3) ...

# exit

logout

exited from VE 101

#

|  |  |
| --- | --- |
| [Yellowpin.svg](http://openvz.org/File:Yellowpin.svg) | **Note**: In the LiveCD environment, you may have to increase **shmpages** resource limit/barrier for the VE (read the next section) or you will run out of "disk space" when trying to install software |

**[**[**edit**](http://openvz.org/w/index.php?title=Getting_started_with_OpenVZ_live_CD&action=edit&section=9)**] Resource limiting**

The very important feature of VE is that you can limit it by resources: CPU, memory, disk space. It is also performed via vzctl. For example to set **shmpages** (shared memory pages) barrier:limit you should give this command:

vzctl set 101 --shmpages 16384:16384 --save

This will give VE 101 64MB of **shmpages** (one page equals 4Kb on i386: 4Kb \* 16384 = 64Mb)

Current usage values and limits of memory-related resources can be viewed through /proc/bc/VEID/resources file:

# cat /proc/bc/101/resources # or /proc/user\_beancounters on 2.6.9 kernels

kmemsize 628209 976969 2752512 2936012 0

lockedpages 0 0 32 32 0

privvmpages 5238 6885 49152 53575 0

shmpages 5012 5014 8192 8192 0

numproc 3 11 65 65 0

physpages 5084 6020 0 2147483647 0

vmguarpages 0 0 6144 2147483647 0

oomguarpages 5084 6020 6144 2147483647 0

numtcpsock 0 2 80 80 0

numflock 1 5 100 110 0

numpty 0 1 16 16 0

numsiginfo 0 6 256 256 0

tcpsndbuf 0 4440 319488 524288 0

tcprcvbuf 0 42180 319488 524288 0

othersockbuf 2220 6660 132096 336896 0

dgramrcvbuf 0 2220 132096 132096 0

numothersock 1 6 80 80 0

dcachesize 0 0 1048576 1097728 0

numfile 106 339 2048 2048 0

numiptent 10 10 128 128 0

#

First column is resource name, second is current usage, third is peak usage, forth and fifth are barrier and limit, and last column is fail counter.

Note that if you have nonzero values in the last column, it means that this VE experienced a resource shortage. This is very common reason why some application fail to work in a VE. In this case you should increase limits/barriers accordingly; see [resource shortage](http://openvz.org/Resource_shortage) for more info.

**[**[**edit**](http://openvz.org/w/index.php?title=Getting_started_with_OpenVZ_live_CD&action=edit&section=10)**] Stopping/removing VE**

Well, let's stop VE and destroy it:

# vzctl stop 101

Stopping VE ...

VE was stopped

VE is unmounted

# vzctl destroy 101

Destroying VE private area: /var/lib/vz/private/101

VE private area was destroyed

#

**[**[**edit**](http://openvz.org/w/index.php?title=Getting_started_with_OpenVZ_live_CD&action=edit&section=11)**] Links**

That's all you need to start playing with OpenVZ. Additional information can be found in man page on vzctl and at <http://wiki.openvz.org/> .

If you experience some difficulties, contact us via <http://forum.openvz.org/> . Templates and other tools are available from <http://download.openvz.org/>

## Burning

After downloading the image, you have to burn it to the actual media, i.e. a CD-R or CD-RW disk. The process depends on the actual OS and CD burning software that you have, and the exact details are out of scope of this article.

If you don't know how to burn the ISO image to CD-R, try [this document](http://www.knoppix.net/wiki/Downloading_FAQ#Q:_I_have_downloaded_the_ISO_file._How_do_I_burn_the_ISO.3F_How_is_the_ISO_supposed_to_be_burned.3F).

## [[edit](http://openvz.org/w/index.php?title=Download/live_CD&action=edit&section=6)] Booting

Just insert the fresh CD into your CD-ROM and reboot. In some cases you have to modify your BIOS settings in order to enable booting from a CD. If you use CentOS-based CD you'll be able to choose the kernel to boot: ovz9rh, ovz18, ovz18rh, ovz20 or linux (original CentOS kernel).

## [[edit](http://openvz.org/w/index.php?title=Download/live_CD&action=edit&section=7)] Using

With the Owl CD, brief instructions (not OpenVZ specific yet) will be printed to the console, right before dropping you to a shell prompt. Then you will need to proceed with [instructions for getting started with OpenVZ on Owl, as found on the Openwall wiki](http://openwall.info/wiki/Owl/usage-examples/OpenVZ/getting-started).

With the Knoppix (and CentOS?) CDs, upon successful boot, a browser window with some helpful hints will appear to help you start using OpenVZ. The latest version of that document is also available on this wiki: [Getting started with OpenVZ live CD](http://openvz.org/Getting_started_with_OpenVZ_live_CD).

## [[edit](http://openvz.org/w/index.php?title=Download/live_CD&action=edit&section=8)] Limitations

Since these are live CDs, everything is created in RAM, i.e. is not persistent. If you will create a number of VEs, they will not be available after the reboot.

A number of [VEs](http://openvz.org/VE) that you can create using this live CD greatly depends on the amount of RAM your machine has, since the system uses RAM instead of a hard disk. On a 1 gigabyte RAM machine you can create about 5 VEs. To work around this, you have to have a disk partition mounted to /vz/private/ for CentOS-based CD and to /var/lib/vz/private for KNOPPIX-based CD.

OpenVZ disk quota does not work on LiveCD at the moment due to [OpenVZ Bug #558](http://bugzilla.openvz.org/show_bug.cgi?id=558), so df in [VE](http://openvz.org/VE) shows ludicrous values if quota is on. Because of it on Owl and CentOS 4.4 LiveCD disk quota is switched off by default.

Checkpointing (and consequently live migration) doesn't work on KNOPPIX LiveCD at the moment due to [OpenVZ Bug #606](http://bugzilla.openvz.org/show_bug.cgi?id=606). You can work around it by mounting some filesystem (ext2, ext3, tmpfs) to /var/lib/vz/private directory. On CentOS-based LiveCD tmpfs is mounted on this directory automatically during the booting.

## [[edit](http://openvz.org/w/index.php?title=Download/live_CD&action=edit&section=9)] CD contents

### [[edit](http://openvz.org/w/index.php?title=Download/live_CD&action=edit&section=10)] Owl CD contents

This CD uses the following OpenVZ components:

* kernel 2.6.18-348.3.1.el5.028stab106.2.owl1 (latest from OpenVZ's RHEL5 branch as of April 8, 2013, with minor changes for Owl)
* vzctl 3.0.23 (with minor enhancements and customizations by ALT Linux and Owl teams)
* vzquota 3.0.12

The live system is a full install of the Owl userland, including networking clients, servers, as well as "development" tools and libraries (C, C++). It also includes installable packages, the installer program, full source code, and the build environment. Unfortunately, it does not include pre-created container templates, but you may either configure networking (with "setup") and download a pre-created template to RAM, or you may use "make vztemplate" to create a new template of the Owl userland right on the CD-booted system.

### [[edit](http://openvz.org/w/index.php?title=Download/live_CD&action=edit&section=11)] CentOS CD contents

This CD is based on CentOS 4.4 Live CD and contains the following OpenVZ packages:

* **kernels**:
  + original CentOS 4.4 kernel without virtualization (2.6.9-42.livecd.c4)
  + 2.6.9-023stab044.4
  + 2.6.18-028stab035
  + 2.6.18-028stab035-rhel5
  + 2.6.20-ovz007.1
* **tools**:
  + vzctl 3.0.18
  + vzquota 3.0.9
* **template tools**:
  + vzyum-2.4.0-11
  + vzrpm44-4.4.1-22.5
  + vzrpm43-4.3.3-7
  + vzpkg-2.7.0-18
* **template metadatas**:
  + vztmpl-centos-4-2.0-2
  + vztmpl-fedora-core-3-2.0-2
  + vztmpl-fedora-core-4-2.0-2
  + vztmpl-fedora-core-5-2.0-2
* **precreated templates**:
  + centos-4-i386-minimal
  + fedora-core-5-i386-minimal
  + debian-3.1-i386-minimal

A number of original CentOS packages were removed (openoffice, gimp, etc.) in order to free disk space for OpenVZ packages and templates.

### [[edit](http://openvz.org/w/index.php?title=Download/live_CD&action=edit&section=12)] Knoppix CD contents

This CD contains the following OpenVZ packages:

* kernel 2.6.18-028stab027
* vzctl 3.0.16
* vzquota 3.0.9

plus a number of precreated templates:

* Debian 3.1 minimal
* CentOS 4 minimal
* Fedora Core 5 minimal

It also contains all the software from the original Knoppix 5.1.1 CD, excluding:

* OpenOffice
* GIMP
* Frozen Bubble

The above packages were taken out to make some room for OpenVZ packages.

## [[edit](http://openvz.org/w/index.php?title=Download/live_CD&action=edit&section=13)] Changelog

* 29 January 2010, added Owl
* 5 July 2007, version based on CentOS 4.4
* 7 May 2007, initial version based on Knoppix 5.1.1

## [[edit](http://openvz.org/w/index.php?title=Download/live_CD&action=edit&section=14)] External links

* [openwall.com](http://www.openwall.com/Owl/), the home of Openwall GNU/\*/Linux (or Owl)
* [centos.org](http://centos.org/), the home of CentOS distribution
* [knoppix.com](http://knoppix.com/), the home of Knoppix distribution