

Building Gentoo on z/VM

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Building gentoo on z/VM

- Agenda
 - What is Gentoo?
 - Where to get the installation files
 - Setting up the z/VM environment
 - Installing Gentoo
 - Configuring Gentoo
 - Booting

What is Gentoo?

Gentoo is a:

- Lightweight
- High performance
- Customizable
- Installed from source

Linux *meta*-distribution. You install and configure it to meet your needs. It is *not* a standard Linux distribution

What is Gentoo?

Gentoo is also:

- A long-tailed penguin *Pygoscelis papua*
- The fastest penguin underwater
- Named by the Falkland Islanders
- Looks like this:



Where to get the installation files

Get the four starter installation files to your workstation

- `gentoo` (the kernel)
- `gentoo.igz` (the initrd)
- `gentoo.parmfile` (parm line)
- `gentoo.exec` (Rexx start exec)

from here: <http://dev.gentoo.org/~armin76/s390/files/>

Get the `gentoo` and `gentoo.igz` files in binary mode and the `gentoo.exec` and `gentoo.pamfile` in ascii. I rename the `gentoo` kernel file to `gentoo.kernel`

Setting up the z/VM environment

Create a user ID:

```
USER GENT00 VMRULES 1024M 2048M GE
  IPL CMS PARM AUTOOCR
  MACHINE XA
  CONSOLE 0009 3215 T DAVE
  NICDEF 0600 TYPE QDIO LAN SYSTEM VSWSYS
  SPOOL 000C 2540 READER *
  SPOOL 000D 2540 PUNCH A
  SPOOL 000E 1403 A
  LINK MAINT 0190 0190 RR
  LINK MAINT 019D 019D RR
  LINK MAINT 019E 019E RR
  LINK MAINT 019F 019F RR
  MDISK 0150 3390 20031 7500 USR012
  MDISK 0191 3390 878 60 USR001
```

Setting up the z/VM environment

Do the following:

- Bring the GENTOO user id online
- Grant permission for GENTOO to connect to the vswitch
- Log on to the GENTOO user

Setting up the z/VM environment

Do the following:

- CMS format the 191
- Upload the four starter files to the 191
 - `gentoo.kernel` and `gentoo.igz` as binary, fixed 80
 - `gentoo.parmfile` and `gentoo.exec` as ascii, fixed 80 as well.

Setting up the z/VM environment

```
type gentoo parmfiler
```

```
root=/dev/ram0 console=ttyS0 dasd=0150
```

```
listfile
```

```
GENT00 EXEC A1
```

```
GENT00 IGZ A1
```

```
GENT00 KERNEL A1
```

```
GENT00 NETLOG A0
```

```
GENT00 PARMFILER A1
```

Setting up the z/VM environment

```
type gentoo exec

/* REXX EXEC TO IPL DEBIAN GNU/LINUX */
/* FOR S/390 FROM THE VM READER. */

'CP CLOSE RDR'

'PURGE RDR ALL'

'SPOOL PUNCH * RDR'

'PUNCH GENTOO KERNEL * (NOHEADER'
'PUNCH GENTOO PARMFILE * (NOHEADER'
'PUNCH GENTOO IGZ * (NOHEADER'

'CHANGE RDR ALL KEEP NOHOLD'

'CP IPL 000C CLEAR'
```

Installing Gentoo

Boot the busybox installer

```
gentoo
```

```
0000003 FILES PURGED
```

```
RDR FILE 0056 SENT FROM GENTOO PUN WAS 0056 RECS 075K CPY 001 A NOHOLD NOKEE
```

```
RDR FILE 0057 SENT FROM GENTOO PUN WAS 0057 RECS 0001 CPY 001 A NOHOLD NOKEEP
```

```
RDR FILE 0058 SENT FROM GENTOO PUN WAS 0058 RECS 092K CPY 001 A NOHOLD NOKEEP
```

```
0000003 FILES CHANGED
```

```
0000003 FILES CHANGED
```

```
Linux version 3.5.7-gentoo (root@lgentoo2) (gcc version 4.5.4 (Gentoo 4.5.4 p1.1  
, pie-0.4.7) ) #1 SMP Sat Mar 2 16:44:41 UTC 2013
```

```
setup: Linux is running as a z/VM guest operating system in 64-bit mode
```

```
Zone ranges:
```

```
DMA      Ýmem 0x00000000-0x7fffffffš
```

Installing Gentoo

Normal empty

Movable zone start for each node

Early memory node ranges

node 0: Ymem 0x00000000-0x3fffffffš

PERCPU: Embedded 10 pages/cpu @0000000001124000 s10496 r8192 d22272 u40960

Built 1 zonelists in Zone order, mobility grouping on. Total pages: 258560

Kernel command line: root=/dev/ram0 console=ttyS0 dasd=0150

PID hash table entries: 4096 (order: 3, 32768 bytes)

Dentry cache hash table entries: 131072 (order: 8, 1048576 bytes)

Inode-cache hash table entries: 65536 (order: 7, 524288 bytes)

Memory: 1016360k/1048576k available (3807k kernel code, 0k reserved, 1820k data,
220k init)

Installing Gentoo

(more busybox boot messages, and finally....)

```
BusyBox v1.20.2 (2013-06-11 11:21:19 UTC) built-in shell (ash)
```

```
Enter 'help' for a list of built-in commands.
```

```
/bin/ash: can't access tty; job control turned off
```

Load the qeth device driver....

```
/ # modprobe qeth_l3
```

```
qdio, ccwgroup, qeth: loading core functions
```

```
qeth, qeth: register layer 3 discipline
```

```
qeth: There is no IPv6 support for the layer 3 discipline
```

```
qeth_l3 loaded.
```

Installing Gentoo

Bring the qeth device driver online....

```
/ # echo 0.0.0600,0.0.0601,0.0.0602 > /sys/bus/ccwgroup/drivers/qeth/group
/ # echo 0 > /sys/bus/ccwgroup/drivers/qeth/0.0.0600/layer2
/ # echo 1 > /sys/bus/ccwgroup/drivers/qeth/0.0.0600/online
qdio: 0.0.0602 OSA on SC 3 using AI:1 QEBSM:0 PCI:1 TDD:1 SIGA:RW A
qeth 0.0.0600: Device is a Guest LAN QDIO card (level: V613)
with link type GuestLAN QDIO (portname: )
qeth 0.0.0600: Hardware IP fragmentation not supported on eth0
qeth 0.0.0600: Inbound source MAC-address not supported on eth0
qeth 0.0.0600: VLAN enabled
qeth 0.0.0600: Multicast enabled
qeth 0.0.0600: Broadcast enabled
qeth 0.0.0600: Outbound TSO not supported on eth0
```

Installing Gentoo

Configure networking....

```
/ # /bin/net-setup 192.168.128.100 192.168.128.1

* Network interface eth0 has been started:

*   IP Address: 192.168.128.100

*   Gateway:    192.168.128.1

* An sshd server is available on port 22.  Please set a root
* password via "passwd" before using.

/ # passwd

Changing password for root

New password: rootpass

Bad password: similar to username

Retype password: rootpass

Password for root changed by root
```

Installing Gentoo

Format and partition 150...

```
/ # dasdfmt -b 4096 -f /dev/dasda -label=gentoo
```

```
.....
```

```
Finished formatting the device.
```

```
dasda:VOL1/ GENTOO:
```

```
Rereading the partition table... ok
```

```
/ # fdasd -a /dev/dasda -a -l gentoo
```

```
.....
```

```
writing volume label...
```

```
writing VTOC...
```

```
rereading partition table...
```

```
dasda:VOL1/ GENTOO: dasda1
```


Installing Gentoo

Make an ext4 file system on /dev/dasda1...

```
/ # mkfs.ext4 /dev/dasda1
```

And mount it

```
/ # mount /dev/dasda1 /mnt/gentoo
```

```
/ # cd /mnt/gentoo
```

Get the latest stage3 tarball and portage snapshot files...

```
/mnt/gentoo # wget http://distfiles.gentoo.org/releases/s390/current-stage3/stage3-s390-20130113.tar.bz2
```

```
/mnt/gentoo # wget http://distfiles.gentoo.org/releases/snapshots/current/portage-latest.tar.bz2
```

And untar them....

```
/mnt/gentoo # tar -xjpf stage3-s390-20130113.tar.bz2 -C /mnt/gentoo
```

```
/mnt/gentoo # tar -xjpf portage-latest.tar.bz2 -C /mnt/gentoo/usr
```

Installing Gentoo

Log onto GENTOO as root using ssh from Linux or Putty from Win

```
ssh root@192.168.128.100
```

Go to the /mnt/gentoo mount point

```
# cd /mnt/gentoo
```

Chrooting to /mnt/gentoo

```
# cp -L /etc/resolv.conf /mnt/gentoo/etc/
```

```
# mount -t proc none /mnt/gentoo/proc
```

```
# mount --rbind /sys /mnt/gentoo/sys
```

```
# mount --rbind /dev /mnt/gentoo/dev
```

```
# chroot /mnt/gentoo /bin/bash
```

```
# source /etc/profile
```

```
# export PS1="(chroot) $PS1"
```

Configuring Gentoo

Read the latest news items....

```
s390x ~ # eselect news list
```

News items:

- [1] N 2010-08-01 (2010-08-01-as-needed-default - removed?)
- [2] N 2012-03-16 udev-181 unmasking
- [3] N 2012-05-21 Portage config-protect-if-modified default
- [4] N 2012-09-09 make.conf and make.profile move
- [5] N 2012-11-06 PYTHON_TARGETS deployment
- [6] N 2013-01-23 Upgrading udev from 171 (or older) to 197 (or newer)
- [7] N 2013-02-10 New 13.0 profiles and deprecation of 10.0 profiles

```
s390x ~ # eselect news read
```

Configuring Gentoo

Choose the correct profile...

```
s390x ~ # eselect profile list
```

Available profile symlink targets:

```
[1] default/linux/s390/13.0
```

```
[2] default/linux/s390/13.0/s390x
```

```
s390x ~ # eselect profile set 2
```

Set the time zone...

```
s390x ~ # ls /usr/share/zoneinfo
```

```
s390x ~ # cp /usr/share/zoneinfo/America/Chicago /etc/localtime
```

```
s390x ~ # echo "America/Chicago" > /etc/timezone
```

Configuring Gentoo

Get the kernel source...

```
s390x ~ # emerge gentoo-sources
```

Configure the kernel....

```
s390x ~ # cd /usr/src/linux
```

```
s390x ~ # make menuconfig
```

Set the options to meet your needs. I use....

```
CONFIG_MARCH_Z196=y
```

```
CONFIG_ARCH_ENABLE_MEMORY_HOTPLUG=y
```

```
CONFIG_ARCH_ENABLE_MEMORY_HOTREMOVE=y
```

```
CONFIG_SHARED_KERNEL=y
```

```
CONFIG_BLK_DEV_XPRAM=y
```

```
CONFIG_DCSSBLK=y
```

Configuring Gentoo

Set the options to meet your needs. I use (cont.)

```
CONFIG_NETIUCV=y
```

```
CONFIG_SMSGIUCV=y
```

```
CONFIG_QETH=y
```

```
CONFIG_QETH_L2=y
```

```
CONFIG_QETH_L3=y
```

```
CONFIG_QETH_IPV6=y
```

```
CONFIG_CCWGROUP=y
```

I turn off support for JUMP_LABEL and BLK_DEV_INITRD. These work for me, your needs may be different....

Configuring Gentoo

Build the kernel...

```
s390x ~ # make
```

```
s390x ~ # make modules_install
```

```
s390x ~ # cp /usr/src/linux/arch/s390/boot/image /boot
```

Update the /etc/fstab file...

```
s390x ~ # nano -w /etc/fstab
```

```
# NOTE: If your BOOT partition is ReiserFS, add the notail option to opts.
```

```
#/dev/BOOT          /boot              ext2              noauto,noatime 1 2
```

```
/dev/dasda1         /                  ext4              noatime          0 1
```

```
#/dev/SWAP          none              swap              sw               0 0
```

```
#/dev/cdrom         /mnt/cdrom        auto              noauto,ro       0 0
```

```
#/dev/fd0          /mnt/floppy       auto              noauto          0 0
```

Configuring Gentoo

Set host and domain names...

```
s390x ~ # nano -w /etc/conf.d/hostname
```

```
# Set to the hostname of this machine
```

```
hostname="s390x"
```

```
s390x ~ # nano -w /etc/conf.d/net
```

```
# Set the dns_domain variable to your domain name
```

```
dns_domain_lo="vsoft-software.com"
```

Set network configuration...

```
s390x boot # cat /etc/conf.d/net
```

```
config_eth0="192.168.128.127"
```

```
routes_eth0="default via 192.168.128.1"
```

```
ccwgroup_eth0="0.0.0600 0.0.0601 0.0.0602"
```

```
ccwgroup_opts_eth0="layer2=0" #"fake_ll=0"
```


Configuring Gentoo

Start network at boot time...

```
s390x boot # cd /etc/init.d
s390x boot # ln -s net.lo net.eth0
s390x boot # rc-update add net.eth0 default
```

Update /etc/hosts file...

```
s390x boot # nano -w /etc/hosts
127.0.0.1 s390x.vsoft-software.com s390x localhost
# add any additional hosts here...
```

Configure locales...

```
s390x boot # nano -w /etc/locale.gen
en_US ISO-8859-1
en_US.UTF-8 UTF-8
s390x boot # locale-gen
```

Configuring Gentoo

Reload shell environment...

```
s390x boot # env-update && source /etc/profile
```

Start sshd server at boot time...

```
s390x boot # rc-update add sshd default
```

Set the root password...

```
s390x boot # passwd
```

Configuring Gentoo

Configure /etc/conf.d/keymaps...

```
s390x boot # nano -w /etc/conf.d/keymaps
```

```
keymap="us"
```

```
windowkeys="NO"
```

```
extended_keymaps=""
```

```
dumpkeys_charset=""
```

```
fix_euro="NO"
```

Configure /etc/inittab

```
s390x boot # nano -w /etc/inittab
```

```
# SERIAL CONSOLES
```

```
s0:12345:respawn:/sbin/agetty 38400 ttyS0 dumb
```

Configuring Gentoo

Configure /etc/zipl.conf...

```
s390x ~ # nano -w /etc/zipl.conf
```

```
[defaultboot]
```

```
defaultmenu = menu
```

```
:menu
```

```
target = /boot
```

```
1 = gentoo-linux
```

```
default = 1
```

```
prompt = 1
```

```
timeout = 15
```

```
[gentoo-linux]
```

```
target = /boot
```

```
image=/boot/image
```

```
parameters="dasd=150 root=/dev/dasda1 LANG=en_US.UTF-8 TERM=dumb vmpoff=LOGOFF"
```

Configuring Gentoo

Make the 150 disk bootable...

```
s390x ~ # zipl -VV
```

Installation of gentoo is now complete!

Booting Gentoo

Shut down the install system...

```
S390x ~ # exit
```

```
# cd
```

```
# umount -l /mnt/gentoo/dev
```

```
# umount -l /mnt/gentoo/proc
```

```
# halt
```

And boot the new one on the 3270 console...

```
#cp ip1 150
```

— or —

```
#cp ip1 150 parm savesys=gentoo
```

Where to from here?

Gentoo provides its users with lots of possibilities, and therefore lots of documented (and less documented) features. A good place to go next is the Gentoo Handbook entitled *Working with Gentoo* which explains how to keep your software up to date, how to install more software, what USE flags are, how the Gentoo init system works, etc. It can be found here:

<http://dev.gentoo.org/~armin76/s390/hb/handbook-s390.xml?part=2>

Another good place to continue would be with the *Gentoo Linux S390 Handbook*, which is here:

<http://dev.gentoo.org/~armin76/s390/hb/handbook-s390.xml>

Acknowledgments

None of this would have been possible without the tireless help and assistance of

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He answered countless annoying and ignorant questions with good grace and humor.

Who am I?

I'm –

Dave Jones

V/Soft Software

Real expertise in virtual technologies

www.vsoft-software.com

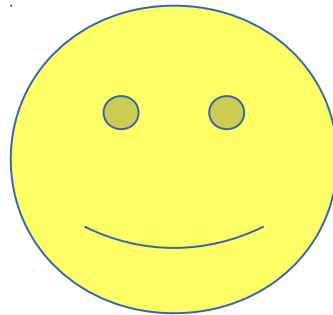
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Thanks!

Thank you for coming today.....



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