

LINUX Administrator's Quick Reference Card

Jialong He

Jialong_he@bigfoot.com
http://www.bigfoot.com/~jialong_he

User Management

Files

<code>/etc/group</code> <code>/etc/passwd</code> <code>/etc/shadow</code>	User account information.
<code>/etc/bashrc</code> <code>/etc/profile</code> <code>\$HOME/.bashrc</code> <code>\$HOME/.bash_profile</code>	BASH system wide and per user init files.
<code>/etc/csh.cshrc</code> <code>/etc/csh.login</code> <code>\$HOME/.cshrc</code> <code>\$HOME/.tcshrc</code> <code>\$HOME/.login</code>	TCSH system wide and per user init files.
<code>/etc/skel</code>	template files for new users.
<code>/etc/default</code>	default for certain commands.
<code>/etc/redhat-release</code> <code>/etc/slackware-version</code>	Redhat and Slackware version info (Linux kernel version with "uname -a")

Commands

<code>adduser</code>	script to create a new user interactively (slackware) or link to useradd (Redhat).
<code>useradd</code> , <code>userdel</code> , <code>usermod</code>	create, delete, modify a new user or update default new user information..
<code>newusers</code>	update and create new users (batch mode).
<code>groupadd</code> , <code>groupdel</code> , <code>groupmod</code>	add, delete or modify group.
<code>chage</code> , <code>chfn</code> , <code>chsh</code>	modify account policy (password length, expire data etc.) or finger information (full name, phone number etc.) change default login shell.
<code>linux init=/bin/sh rw</code>	gain root access during boot prompt without password, can be used to fix some problems.
<code>mount -w -n -o remount /</code>	
<code>makebootdisk</code>	make a bootable floppy disk

Network Configuration

Files

<code>/etc/rc.d/rc.inet1</code> (Slackware) <code>/etc/sysconfig/network- scripts/ifcfg-eth0</code> (Redhat)	IP address, Network mask, Default gateway are in these files. May edit manually to modify network parameters.
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`/etc/rc.d/rc.netdevice`
`/etc/modules.conf`

`/etc/HOSTNAME`
`/etc/NETWORKING`
(Slackware)

`/etc/sysconfig/network`
(Redhat)

`etc/resolv.conf`

`/etc/hosts`

`/etc/host.conf`

`/etc/nsswitch.conf`

`/etc/networks`
`/etc/protocols`
`/etc/services`

`/etc/rpc`

Commands

<code>netconfig</code>	menu driven Ethernet setup program.
<code>pppsetup</code>	setup PPP connection (Slackware). setup Ethernet during boot, for example <code>/sbin/ifconfig eth0 \${IPADDR} broadcast \${BROADCAST} netmask \${NETMASK}</code>
<code>ifconfig</code>	<code>/sbin/route add -net \${NETWORK} netmask \${NETMASK} eth0</code> <code>/sbin/route add default gw \${GATEWAY} netmask 0.0.0.0 metric 1</code>
<code>host</code>	lookup host name or IP (similar to nslookup).
<code>dnsdomainname</code>	show DNS domain name.
<code>arping</code> ; <code>arp</code>	find out Ethernet address by first arping then arp.
<code>ipchains</code>	firewall and NAT (<code>/etc/sysconfig/ipchains</code> on Redhat)
<code>iptables</code>	firewall and NAT (<code>/etc/sysconfig/iptables</code> on Redhat)
<code>ntsysv</code>	menu driven SYSV service configuration (Redhat)
<code>chkconfig</code>	command line SYSV service configuration (Redhat)

Redhat files in /etc/sysconfig

Configuration Files

`keyboard` keyboard map, e.g.,
`KEYBOARD="/usr/lib/kdb/keytables/us.map"`

Put network card driver (e.g., e100) in
"rc.netdevice"
`/sbin/modprobe e100`
Or in "modules.conf"
`alias eth0 e100`

hostname is set by "/bin/hostname" during
boot and the name is read from these files.
May change manually.

specify name server, DNS domain and
search order. For Example:
`search la.asu.edu`
`nameserver 129.219.17.200`

host name to IP mapping file.

host name information look up order.
Example:
`order hosts, bind`
`multi on`

new way to specify information source.

TCP/IP services and ports mapping.

RPC service name to their program numbers
mapping.

`mouse`

Mouse type, e.g.,
`MOUSETYPE=Microsoft`
`XEMU3=yes`

`network`

network settings, contains
`NETWORKING=yes`
`HOSTNAME=hostname.domain.com`

NFS File Sharing

Files

<code>/etc/fstab</code>	file systems mounted during boot.
<code>/etc/exports</code>	NFS server export list.
<code>/etc/auto.master</code>	auto mount master file.

Commands

<code>mount</code>	mount a file system or all entries in fstab.
<code>exportfs</code>	export file system listed in exports
<code>showmount -e hostname</code>	show file systems exported

Printer Configuration

Files

<code>/etc/printcap</code> <code>/etc/printcap.local</code>	Printer capabilities data base.
<code>/etc/lpd.conf</code>	LPRng configuration file.
<code>/etc/lpd.perms</code>	permissions control file for the LPRng line printer spooler
<code>/etc/hosts.lpd</code>	Access control (BSD lpd).
<code>/etc/hosts.equiv</code>	trusted hosts.
<code>PRINTER</code>	Environment variable of default printer.
<code>/dev/lp0</code>	parallel port.

Commands

<code>lpc</code> , <code>lpq</code> , <code>lprm</code>	line printer control program, print queue maintain
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Sendmail

Files

<code>sendmail.cf</code> <code>sendmail.mc</code>	"sendmail.cf" is the configuration file. "sendmail.mc" is a macro file which can be used to generate "sendmail.cf" by: <code>m4 sendmail.mc > sendmail.cf</code>
<code>aliases</code>	mail aliases, must run "newaliases" after change. use : <code>include:</code> to include external list in a file.
<code>.forward</code>	per user aliases, use \yourname to prevent further expand and keeps a copy in mailbox.
<code>access</code>	mail access control, <code>FEATURE(access_db)</code> should be set in <code>sendmail.mc</code> . For example, in <code>/etc/mail/access</code> <code>cyberpromo.com REJECT</code> <code>mydomain.com RELAY</code>

spam@somewhere.com DISCARD

makemap hash /etc/mail/access </etc/mail/access

/etc/mail/relay-domains list all host/domain accepted for relaying.

Commands

newaliases rebuild the data base for the mail aliases file.

makemap build access database, e.g.,
makemap hash access.db<access

Useful Configuration Files

Files

httpd.conf Apache web server configuration file.
lilo.conf LILO boot loader configuration file.
syslog.conf System log daemon (syslogd) configuration.
ssh_config
sshd_config SSH client and server configuration files.
ld.so.conf default dynamic library search path (run ldconfig).
mtools.conf mtool configuration file (access DOS file).
named.conf DNS name server (BIND).
sysctl.conf kernel parameters by sysctl (Redhat).
ntp.conf net time server.
inetd.conf Internet super server.
Xinetd.conf, Xinetd directory Extended inetd configuration.
proftpd.conf proftpd FTP server.
amanda.conf network backup server.
/etc/pine.conf
/etc/pine.conf.fixed PINE mail client system wide settings.

Rebuild Kernel

Configure Kernel Parameters

make config Unpack the tarball in /usr/src directory
bzip2 -dc linux-2.4.0.tar.bz2 | tar xvf -

make menuconfig
make xconfig Configuring the kernel with interactive, menu or X window interface.

Compile Kernel Source

Building and installing a new kernel.

make dep
make zImage *cp arch/i386/boot/bzImage /boot/bzImage-KERNEL_VERSION*

make zdisk
make zlilo *cp System.map /boot/System.map-KERNEL_VERSION*
make bzImage

ln -s /boot/System.map-KERNEL_VERSION

/boot/System.map

Compile Modules

make modules
make modules_install Building and installing modules.

Manage Modules

insmod, lsmod, modinfo, modprobe, rmmod, depmod Manage loadable modules.

Miscellaneous

Files

/etc/shells allowed login shells
/etc/ftpusers user names NOT allowed to use ftp.
/etc/hosts.allow
/etc/hosts.deny TCP wrapper access control files.
/etc/sysconfig (redhat) contains system configuration files.
/dev/fd0 floppy drive A
/etc/inittab
/etc/init.d system run level control file.

Commands

fromdos, todos (Slackware)
dos2unix, unix2dos (Redhat) convert text file from/to linux format.
pwck, grpck verify integrity of password and group files.
pwconv, pwunconv, grpconv, grpuncov convert to and from shadow passwords and groups.
shadowconfig toggle shadow passwords on and off.
quota, edquota, quotacheck, quotaon, quotaoff, repquota, Manage disk quota.
lilo -D dos set LILO default OS (default=dos in lilo.conf)
ldd find out shared library dependencies.
lsuf list opened files.
fuser filename show processes that using the file.
ifdown
ifup bring up/down a network interface (Redhat)
sysctl configure kernel parameters (Redhat).
socklist list opened socked.
shutdown [-r|h]
now reboot / halt computer

nmap scan a host for opened ports.
crontab show or edit cron jobs.
sys-unconfig unconfigure system
chkconfig --list list services started at different run level.
unset TMOU disable BASH auto-logout feature
unset autologout disable TCSH auto-logout feature
kudzu probe for new hardware (Redhat).

Rpm

rpm -i INSTALL a package
rpm -e UNINSTALL a package
rpm -q QUERY a package
rpm -U UPDATE a package
save a man page as a text file and remove control characters.

man cmd | col -b >cmd.txt

ntop -w 3000

Run **ntop** and listen on web port 3000. View traffic with browser to <http://hostname:3000>

Configure Apache 2.0 with SSL

mod_ssl

- (1) when compile apache, specify `--enable-ssl` for configure script. By default, ssl is not enabled. After compiling, use `"httpd -l"` to list the modules. "mod_ssl" should be in them.
openssl genrsa -out server.key 1024
- (2) generate private key with command:
openssl req -new -key server.key -out server.csr
- (3) generate certificate request
openssl req -new -key server.key -out server.csr
- (4) generate self-signed certificate
openssl x509 -req -days 60 -in server.csr -signkey server.key -out server.crt
- (5) modify "ssl.conf" which is included in "httpd.conf". To start web server with SSL support , use "httpd -DSSL" or "apachectl startssl", otherwise, commented out `<IfDefine SSL>` in ssl.conf.

(*) Trouble shoot SSI connection with command
openssl s_client -connect yourhost.yourdomain.com:443

Syslog.conf

Each line consists of a selector and an action. A selector has two parts: facilities and priorities, separated by a period (.). You may precede every priority with an equation sign ("=") to specify only this single priority and not any of the above. You may also (both is valid, too) precede the priority with an exclamation mark ("!") to ignore all that priorities, either exact this one or this and any higher priority.

Example:

```
mail.notice /var/log/mail # log to a file
*.emerg @myhost.mydomain.org # log to remote host
```

Note: separator between first column and second column (log file name) must be TAB, not spaces.

Facilities auth, auth-priv, cron, daemon, kern, lpr, mail, mark, news, syslog, user, uucp, local0 – local7.

Priorities debug, info, notice, warning, err, crit, alert, emerg.

Action **Regular File:** File with full pathname beginning with “/”.

Terminal and Console: Specify a tty, same with /dev/console.

Remote Machine: @myhost.mydomain.org

Printing with CUPS

Introduction

Common Unix Printing System (CUPS) is the default printing system on many Linux distros and Mac OSX. The latest version can be downloaded from <http://www.cups.org>. You have to download CUPS package and optionally ESP Ghostscript package if you don't have a Postscript printer.

You compile and install both packages with commands
configure; (see *configure --help*)
make;
make install

The printing daemon “/usr/sbin/cupsd” is controlled by a configuration file “/etc/cups/cupsd.conf”. The syntax of this file is similar to Apache’s httpd.conf. You can edit this file with a text editor, but normally the default settings work fine. After change any configuration, you restart “cupsd” to let it read new settings (for example: rc.cups start).

Another important configuration file is “Printers.conf”. This file defines each local or network (socket or IPP) printer. You can edit this file with a text editor and then restart “cupsd” to have it read the new settings. Another way to change printer settings is to use command line program “lpadmin”. CUPS has a web-based administration tool. You point a web browser to <http://localhost:631>. Each Linux distribution also has its own GUI printer administration tool.

```
lpadmin -p myprint -E -v parallel:/dev/lp0 -m laserjet.ppd
lpadmin -p myprint -E -v socket://11.22.33.44 -m myprint.ppd
lpadmin -p myprint -E -v lpd://11.22.33.44/ -m myprint.ppd
lpadmin -p myprint -E -v ipp://11.22.33.44/ -m myprint.ppd
lpadmin -p myprint -E -v ipp://user:passwd@11.22.33.44/ -m myprint.ppd
```

The about commands add a printer connected to (1) local parallel port, (2) JetDirect printer, and (3) LPD printer. –m option specifying a Postscript Printing Definition (PPD) files. CUPS has a few PPD files preinstalled. In order to use full features of your printer, you may need to find a proper PPD file and put it in “/usr/share/cups/model” directory.

kcmshell printmgr KDE printer manager

```
http://localhost:631 CUPS web administration interface
lpadm -d myprint -d option set default printer
lpadm -x myprint -x option delete a installed printer.
enable/disable Control printing queue
accept/reject
lpadmin -p myprint -P another.PPD Change PPD file
lpoptions -p myprint -l Display associate PPD
lpinfo -v List supported printing protocols
lp -d myprint filename Print a file
lpr -P myprint filename
cancel id remove a print job from queue
lprm id
/etc/cups/printers.conf CUPS related configuration files
/etc/cups/classes.conf
/etc/cups/cupsd.conf
/etc/cups CUPS related directories
/usr/lib/cups
/usr/share/cups
```

Samba File and Printer Sharing

Introduction

Samba provides file and printer sharing with MS Windows computers. It makes UNIX speaks SMB/ICFS file and printer sharing protocol. The latest version of samba can be downloaded from <http://www.samba.org>.

Samba is controlled by a configuration file “smb.conf”. On Redhat Linux, one can use “**redhat-config-samba**” to modify the configuration file. On other systems, SWAT is a web based GUI interface. SWAT is run from “inetd” and listen to port 901. You just need point your browser to <http://localhost:901> after starting swat.

Commands

To test if the syntax of “smb.conf” is correct, use
testparm smb.conf
List shares on a Samba or Windows server
smbclient -L machinename -U username
Connect to a Samba or Windows server and get/put files using FTP like commands:
smbclient //machinename/sharename -U username

Security Mode in “smb.conf”

security = user

In this (default) security mode, samba maintain its own user login database which is usually in /etc/samba/smbpasswd. This file is created with command /usr/sbin/smbpasswd. Note, the user login file and command have the same name but in different directories. Following settings are used:

```
encrypt passwords = yes
smb passwd file = /etc/samba/smbpasswd
```

security = domain

In this security mode, samba server must join to an NT domain (using net command) and authenticate users by a domain controller. A user must have both valid UNIX and NT account in order to access files.

security = server

Use another computer (NT or W2k) to authenticate users. No need to join a domain. Need to specify a login server:
password server = *mywin.domain.com*

security = share

Give each share a password, no user name needed.

IPtables (Netfilter)

Command Syntax

```
iptables [-t <table >] <command> <chain > <parameters>
```

Save and Restore rules

```
/sbin/iptables-save > /etc/sysconfig/iptables
/sbin/iptables-restore < /etc/sysconfig/iptables
```

Firewall script sample

http://tiger.la.asu.edu/iptables_examples.htm

Build-in Table

filter This is the default table for handling network packets. Build-in chains are:

1. INPUT — This chain applies to packets received via a network interface.
2. OUTPUT — This chain applies to packets sent out via the same network interface which received the packets.
3. FORWARD — This chain applies to packets received on one network interface and sent out on another.

nat This table used to alter packets that create a new connection. Build-in chains:

1. PREROUTING — This chain alters packets received via a network interface when they arrive.
2. OUTPUT — This chain alters locally-generated packets before they are routed via a network interface.
3. POSTROUTING — This chain alters packets before they are sent out via a network interface.

```
## Masquerade everything out ppp0.
iptables -t nat -A POSTROUTING -o ppp0 -j MASQUERADE
```

```
## Change source addresses to 1.2.3.4.
iptables -t nat -A POSTROUTING -o eth0 -j SNAT --to 1.2.3.4
```

mangle

This table is used for specific types of packet alteration. Build-in chains:

1. *PREROUTING* — This chain alters packets received via a network interface before they are routed.
2. *OUTPUT* — This chain alters locally-generated packets before they are routed via a network interface.

Commands

- flush | -F** Flush (delete) rules in the selected chain.
- policy | -P** Set default policy for a particular chain.
- list | -L** List all rules in filter table, use `[-t tablename]` to specify other tables.
- append | -A** A appends a rule to the end of the specified chain.
- insert | -I** Inserts a rule in a chain at a particular point.

Other commands:

- (1) **--new | -N** (2) **--delete | -D** (3) **--replace | -D** (4) **--zero | -Z**
 (5) **--check | -C** (6) **delete-chain | -X** (7) **rename-chain | -E**

Parameters

- proto | -p [!] *name*** protocol: by number or name, including **tcp**, **udp**, **icmp** or **all**.
- source | -s [!] *addr/mask*** source IP address.
- destination | -d *addr/mask*** destination IP address.
- in-interface | -i** incoming interface name, e.g. eth0 or ppp0.
- out-interface | -o** outgoing interface name.
- jump | -j** jump to a particular target when matching a rule. Standard options: **ACCEPT**, **DROP**, **QUEUE**, **RETURN**, **REJECT**. May jump to a user defined chain.
- fragment | -f** match second or further fragments only.

Options for TCP and UDP protocol

- sport | --source-port** source and/or destination port. Can specify a range like 0:65535, use exclamation character (!) to NOT match ports.
- dport | destination-port**

Options for TCP only

- syn** Match SYN packets.
- tcp-flags** Match TCP packets with specific bits set. For example, `-p tcp --tcp-flags ACK,FIN,SYN` SYN will only match TCP packets that have the SYN flag set and the ACK and FIN flags unset.

Options for ICMP only

- icmp-type [!] *type*** Match specified ICMP type. Valid ICMP type can be

list by
iptables -p icmp -h

Option for state module (-m state --state)

- ESTABLISHED** The matching packet is associated with other packets in an established connection.
- RELATED** The matching packet is starting a new connection related in some way to an existing connection.
- NEW** The matching packet is either creating a new connection or is part of a two-way connection not previously seen.
- INVALID** The matching packet cannot be tied to a known connection.

X Window (XFree86)

Files

To set screen resolution, in "Screen" section and Subsection "Display", specify a mode. For example: Modes "1024x768"

To specify screen refresh rate, in "Monitor" section, specify vertical rate. For example: VertRefresh 70-120

\$HOME/.xinitrc
/etc/X11/xinit/xinitrc
/etc/X11/xinit/xinitrc.d scripts run after X server started
\$HOME/.Xclients
/etc/X11/xinit/Xclients

/etc/sysconfig/desktop decide which desktop (GNORM, KDE) to start (Redhat). (by /etc/X11/prefdm)
/etc/X11/fs/config configuration of X11 font path (font server).

Commands

- startx** start X window system.
- Xconfigurator (Redhat)**
- xfree86setup (Slackware)** setup X server and generate XF86config.
- xf86config**
- XFree86 -configure** XFree86 auto configuration (Plug-n-Play), generate a template named "XF86Config.new"
- Ctrl+Alt+Del** stop X server (on some system Ctrl+Alt+ESC).
- Ctrl+Alt+F1** F1 temporary switch to text mode, F7 switch back to graphic mode.
- Ctrl+Alt+F7**
- SuperProbe** detect graphic hardware.
- xvidtune** adjust X server origin and size.
- xmodmap** modifying key map and mouse button map.
- xhost** server access control program for X.
- xsetroot** root window parameter setting utility for X.
- xlsfonts** server font list displayer for X.
- xset** ser preference utility for X.

XF86Config (xorg.conf)

XFree86 uses a configuration file called **XF86Config** for its initial setup. This file is normally located in "/etc/X11" or "/etc" directory. The XF86Config file is composed of a number of sections which may be present in any order. Each section has the form:

```
Section "SectionName"
SectionEntry
...
EndSection
```

The graphics boards are described in the **Device** sections, and the monitors are described in the **Monitor** sections. They are bound together by a **Screen** section. Keyboard and Mouse are described in **InputDevice** sections, although *Keyboard* and *Pointer* are still recognized. **ServerLayout** section is at the highest level and bind together the InputDevice and Screen sections.

A special keyword called **Option** may be used to provide free-form data to various components of the server. The Option keyword takes either one or two string arguments. The first is the option name, and the optional second argument is the option value. All Option values must be enclosed in quotes.

File Section

FontPath "path"

Font path elements may be either absolute directory paths, or a font server identifier

RGBPath "path"

Sets the path name for the RGB color database.

ModulePath "path"

Allows you to set up multiple directories to use for storing modules loaded by the XFree86 server.

EXAMPLE

```
Section "Files"
RgbPath "/usr/X11R6/lib/X11/rgb"
FontPath "unix:/7100"
EndSection
```

Serverflags Section

Option "DontZap" "boolean"

Disable use **Ctrl+Alt+Backspace** to terminate X server.

Option "DontZoom" "boolean"

Disable use 'Ctrl+Alt+Keypad +' and 'Ctrl+Alt+Keypad -' to switch video mode.

Option "BlankTime" "time"

Sets the inactivity timeout for the blanking phase of the screensaver in minutes. Default 10 min.

Option "StandbyTime" "time"

Sets the inactivity timeout for the "standby" phase of DPMS mode in minutes. Default 20 min.

Option "SuspendTime" "time"

Sets the inactivity timeout for the "suspend" phase of DPMS mode, default 30 min.

Option "OffTime" "time"

Sets the inactivity timeout for the "off" phase of DPMS mode, default 40 min.

Option "DefaultServerLayout" "layout_id"

Specify the default ServerLayout section to use. Default is the first ServerLayout section.

EXAMPLE

```
Section "ServerFlags"
Option "BlankTime" "99999"
Option "StandbyTime" "99999"
Option "SuspendTime" "99999"
Option "OffTime" "99999"
EndSection
```

Module Section

Load "modulename"

Load a module. The module name given should be the module's standard name, not the module file name.

EXAMPLE

```
Section "Module"
Load "extmod"
Load "type1"
EndSection
```

InputDevice Section

There are normally at least two InputDevice sections, one for Keyboard and one for Mouse.

Identifier

Specify an unique name for this input device.

Driver

Specify the name of the driver to use for this input device..

Option "CorePointer"

This input device is installed as the primary pointer device.

Option "CoreKeyboard"

This input device is the primary Keyboard.

EXAMPLE

```
Section "InputDevice"
Identifier "Generic Keyboard"
Driver "keyboard"
Option "AutoRepeat" "500 30"
Option "CoreKeyboard"
EndSection

Section "InputDevice"
Identifier "PS2 Mouse"
Driver "mouse"
Option "CorePointer"
Option "Device" "/dev/mouse"
Option "Protocol" "PS/2"
Option "Emulate3Buttons" "true"
EndSection
```

Device Section

Specifies information about the video card used by the system. You must have at least one Device section in your configuration file. The active device is in ServerLayout->Screen.

Identifier

Specify an unique name for this graphics card.

Driver

Specify the name of the driver to use for this graphics card.

EXAMPLE

```
Section "Device"
Identifier "ATI Mach64"
VendorName "ATI MACH64"
VideoRam 2048
EndSection
```

Monitor Section

Monitor section describes a monitor. There must be at least one monitor section and the active one is used in ServerLayout->Screen.

Identifier

Specify an unique name for this monitor.

HorizSync horizensync-range

Gives the range(s) of horizontal sync frequencies of this monitor in kHz.

VertRefresh vertrefresh-range

Gives the range(s) of vertical sync frequencies of this monitor in Hz.

EXAMPLE

```
Section "Monitor"
Identifier "Generic Monitor "
VendorName "Monitor Vendor"
ModelName "Monitor Model"
HorizSync 31.5-56.6
VertRefresh 40-70
EndSection
```

Screen Section

Screen Section binds Device and Monitor sections. There must be at least one Screen Section. The active one is in ServerLayout section.

Identifier

Specify an unique name for this Screen Section.

Device "device-id"

This specifies the Identifier of **Device section** to be used for this screen.

Monitor "monitor-id"

This specifies the Identifier of **Monitor section** to be used for this screen.

DefaultDepth depth

Default color depth, like 8, 16 or 24.

Option "Accel"

Enables XAA (X Acceleration Architecture), default is ON.

DISPLAY SUBSECTION

Each Screen section must have at least one Display Subsection which matches the depth values in DefaultDepth.

Depth depth

This entry specifies what color depth of this Display Subsection.

Virtual xdim ydim

Specifies the virtual screen resolution to be used.

ViewPort x0 y0

Sets the upper left corner of the initial display.

Modes "mode-name" ...

Specifies the list of video modes to use. Each mode-name specified must be in double quotes. They must correspond to those specified in the appropriate Monitor section (including implicitly referenced built-in ESA standard modes). mode can be switched with Ctrl+Alt+Keypad-Plus or Ctrl+Alt+Keypad-Minus.

EXAMPLE

```
Section "Screen"
Identifier "My Screen"
Device "ATI Mach64"
Monitor "Generic Monitor"
DefaultDepth 16
SubSection "Display"
Depth 16
Modes "1024x768" "800x600" "640x480"
EndSubSection
SubSection "Display"
Depth 24
Modes "1024x768" "800x600" "640x480"
EndSubSection
EndSection
```

ServerLayout Section

ServerLayout section binds a Screen section and one or more InputSection to form a complete configuration. The active ServerLayout section is specified in ServerFlags. If not, the first ServerLayout section is active. If no ServerLayout sections are present, the single active screen and two active (core) input devices are selected as described in the relevant sections.

Identifier

An unique name for this ServerLayout Section.

Screen screen-num "screen-id" position-information

The screen-id field is mandatory, and specifies the Screen section being referenced.

InputDevice "idev-id" "option" ...

Normally at least two are required, one for the core pointer and the other for the primary keyboard devices.

EXAMPLE

```
Section "ServerLayout"
Identifier "Default Layout"
Screen "My Screen"
InputDevice "Generic Keyboard"
InputDevice "PS/2 Mouse"
EndSection
```

Boot Sequences

Redhat

Usually the Linux kernel file is **/boot/vmlinuz** and is loaded by a boot loader (e.g., LILO). The first process created by the kernel is **/sbin/init**. It uses a configuration file **/etc/inittab**. **init** process runs **/etc/rc.d/rc.sysinit** script first, then runs all scripts in **/etc/rc.d/rcN.d**, where **N** is the default run level defined in **inittab**. The actual scripts are stored in **/etc/rc.d/init.d** and proper links are created in run level directories to point to corresponding scripts in **init.d** directory. The last script to run is **/etc/rc.d/rc.local**.

Run level 1: Single user mode
Run level 3: Multiuser mode
Run level 5: Multiuser model with X11

Slackware

In Slackware, Linux kernel is **/boot/vmlinuz** and the first process started by the kernel is **/sbin/init**. Its configuration file is **/etc/inittab**. **init** first runs script **/etc/rc.d/rc.S**, then runs **/etc/rc.K** for single user mode or **/etc/rc.M** for multiuser mode. The last script to run is **/etc/rc.d/rc.local**.

rc.S calls scripts (**rc.modules**, **rc.pcmcia**, **rc.serial** and **rc.sysvinit**).
rc.M calls scripts (**rc.inet1**, **rc.inet2**, **rc.httpd**, **rc.samba**) and start some network server (lpd, httpd etc.)
rc.inet1 sets IP address, Mask, and default Gateway.

Run level 1: Single user mode
Run level 3: Multiuser mode
Run level 4: Multiuser model with X11

Fix Slackware boot after Ghost

- boot with slackware installation CD
- mount root partition (mount /dev/hda2 /mnt)
- change root (chroot /mnt)
- re-run LILO (cd /mnt/etc; lilo)

GRUB boot loader

Introduction

More Linux distributions are using GRUB as the boot loader instead of LILO. GRUB can be downloaded from <http://www.gnu.org/software/grub/>

The newer version of GRUB (called GRUB2) is totally rewritten and uses somewhat different syntax than Ver 0.xxx (called GRUB Legacy). After unpacking GRUN, compile and install it with following commands:

```
./configure  
make  
make install
```

First test GRUB by creating a bootable floppy disk with command

```
grub-install /dev/fd0
```

Suppose you have Windows installed on the first hard disk and Linux on the second disk, boot with just created floppy, when **grub>** prompt appears, type following commands

```
=== Boot Linux ===  
grub> root (hd1,0)  
grub> kernel /boot/vmlinuz  
(or linux /boot/vmlinuz if using GRUB2)  
grub> boot
```

```
=== Boot Windows ===  
grub>rootnoverify(hd0, 0)  
chainloader +1  
boot
```

Other Useful GRUB commands

ls	Display disks and partitions (GRUB2)
geometry(hd0)	Show hard disk geometry, test if HD exist
configfile (hd1,0)/boot/grub/grub.conf	Display boot menu
cat (hd1, 0)/etc/fstab	Display a file content, can figure out which partition was used as root partition in an unbootable system, then pass root parameter in “kernel” command
help	List available commands

Sample GRUB configuration file

```
#=====  
# GRUB ver 0.xxx  
#=====  
default=0  
timeout=10  
splashimage=(hd1,2)/grub/splash.xpm.gz  
title Linux  
    root (hd1,0)  
    kernel /boot/vmlinuz root=/dev/sdb1  
  
title Windows XP  
    rootnoverify (hd0,0)  
    chainloader +1
```

```
#=====  
# GRUB2  
#=====  
set timeout=10  
set default=0  
  
# Entry 0 - Load Linux kernel  
menuentry "Linux" {  
    set root=(hd1,0)  
    linux /boot/vmlinuz root=/dev/hda2  
    initrd /initrd  
}  
  
# Entry 1 - Chainload another bootloader  
menuentry "Windows" {  
    set root=(hd0,0)  
    chainloader +1  
}
```