Run Levels

What is a run level?

- *Run level* is simply a number that Linux uses to distinguish different types of high-level configurations that the machine should be booted into. These run level numbers are on the whole "well-known," in the sense that most of them have very clearly defined meanings.

Init Runlevels

- **The following 7 runlevels are defined in Linux:**

  - 0 - halt (Do NOT set initdefault to this)
  - 1 - Single user mode
  - 2 - Multiuser, without Network (The same as 3, if
    - you do not have networking)
  - 3 – Multiuser with Network
  - 4 - unused
  - 5 – Graphical Mode/ X11
  - 6 - reboot (Do NOT set initdefault to this)

Init Runlevels

- The default runlevel for a system to boot to is configured in **/etc/inittab.**

   id:3:initdefault:

- **In GUI: Applications → System Settings → Server Settings→ Services**

- **Generally, Linux operates in runlevel 3 or 5.**

How to see the run level?

- You can display your previous and current run level using the runlevel command.

- # runlevel

   N 5

- #who –r

  run-level 5 2016-03-03 14:50   last=S

Switching or Changing between different runlevels:-

- **Method-1**: Changing run level temporarily without reboot.
- We can use init command to change rune levels without rebooting the system.
- Ex:-if we are currently in run level 3 and want to go to run level 1, just we need to execute
- # init 1
- Or if you want to shutdown a machine you can take help of run level '0' .Just you need to execute
- #init 0

Remember this change is not permanent and on next reboot you will get your default runlevel.

Method-2

- **Method-2: Changing run level permanently**
- If you want to change your default run level then
- Open the file /etc/inittab and edit entry initdefault:
- # vi /etc/inittab
- Let's set initdefault to 5, so that you can boot to X next time when Linux comes up:

   #**id:5:initdefault:**

Method-3

- **Method-3:-Change run level at boot time**
- You can also change the run level at boot time. If your system uses LILO as the boot manager, you can append the run level to the boot command:
- LILO: linux 3 or
  LILO: linux 5
- If your system uses GRUB, you can change the boot runlevel by pressing the `e' key to edit the boot configuration. Append the run level(in our case 5) to the end of the boot command as shown:
- kernel /vmlinuz-2.6.18-164.el5 ro root=LABEL=/ rhgb quiet 5

Linux Services

There are 113 deamons, Out of them, the following are most widely used:

- **apmd** : Power Management

- **autofs** : Automount services

- **crond** : Periodic Command Scheduler

- **cups** : Common Unix Printing System

- **dhcpd** : The DHCP server

- **dovecot** : IMAP (Internet Message Access Protocol) and POP3 (Post Office Protocol) server

- **gpm** : Mouse

- **httpd** : Apache Web server

Linux Services

- **iptables** : Kernel based Packet Filtering firewall
- **kudzu:** Finds new Hardware
- **mysqld** : MySQL server
- **named** : BIND server
- **nfs** : Network File Share
- **nfslock** : NFS file locking
- **ntpd** : NTP (Network Time Protocol) server
- **portmap** : RPC (Remote Procedure Call) support

Linux Services

- **sendmail** : Sendmail Mail Server

- **smb** : Samba Network Services

- **snmpd** : Simple Network Management Protocol

- **squid** : Squid Proxy Server

- **sshd** : Open SSH and SFTP server

- **syslog** : System Logging

- **xinetd** : Provides support for telnet, ftp, talk, tftp etc.

- **ypbind** : NIS Server
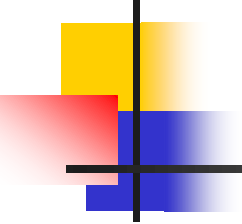
- **postgresql** : The Postgresql Database Engine

Linux services & Port No

- **The configuration file set for services**

  #/etc/services

- **20 – FTP Data** (For transferring FTP data)
- **21 – FTP Control** (For starting FTP connection)
- **22 – SSH**(For secure remote administration which uses SSL to encrypt the transmission)
- **23 – Telnet** (For insecure remote administration
- **25 – SMTP**(Mail Transfer Agent for e-mail server such as SEND mail)
- **53 – DNS**(Special service which uses both TCP and UDP)
- **67 – Bootp**
- **68 – DHCP**
- **80 – HTTP**/WWW(apache)
- **88 – Kerberos**
- **110 – POP3**(Mail delivery Agent)
- **123 – NTP**(Network time protocol used for time syncing uses UDP protocol)
- **137 – NetBIOS**(nmbd)
- **139 – SMB-Samba**(smbd)

- **143 – IMAP**
- **161 – SNMP(For network monitoring)**
- **389 – LDAP(For centralized administration)**
- **69 – TFTP(Trivial file transfer protocol uses udp protocol for connection less transmission of data)**
- **443 – HTTPS(HTTP+SSL for secure web access)**
- **514 – Syslogd(udp port)**
- **636 – ldaps(both tcp and udp)**
- **873 – rsync**
- **993 – IMAPS**
- **1194 – openVPN**
- **1812 – RADIUS**
- **995 – POP3s**
- **2049 – NFS(nfsd, rpc.nfsd, rpc, portmap)**
- **2401 – CVS server**
- **3306 – MySql**
- **3690 – SVN**
- **6000-6063-X11**

Service Configuration

▷ Start   ✖ Stop   ⟳ Restart | 💾 Save   💾 Revert

Currently Running in Runlevel: 5   Editing Runlevel: 5

Services	Description
☐ FreeWnn	apmd is used for monitoring battery status and logging it via syslog(8). It can also be used for shutting down the machine when the battery is low.
☐ NetworkManager	
☑ acpid	
☐ amanda	
☐ amandaidx	
☐ amd	
☐ amidxtape	
☐ anacron	
☑ apmd	
☐ arptables_jf	
☐ arpwatch	
☐ atalk	
☐ atd	
☐ auth	
☐ autofs	
☐ bgpd	
☐ bluetooth	
☐ bootparamd	
☐ canna	
☐ chargen	
☐ chargen-udp	
☐ comsat	
☑ cpuspeed	
☑ crond	

Status

```
[root@testlinux ~]# service vsftpd status
vsftpd is stopped
[root@testlinux ~]# service vsftpd start
Starting vsftpd for vsftpd:                          [  OK  ]
[root@testlinux ~]#
[root@testlinux ~]#
[root@testlinux ~]# service vsftpd status
vsftpd (pid 3591) is running...
[root@testlinux ~]#
[root@testlinux ~]#
[root@testlinux ~]#
[root@testlinux ~]# service vsftpd stop
Shutting down vsftpd:                                 [  OK  ]
[root@testlinux ~]#
[root@testlinux ~]#
[root@testlinux ~]#
[root@testlinux ~]# service vsftps status
vsftps: unrecognized service
[root@testlinux ~]# service vsftpd status
vsftpd is stopped
[root@testlinux ~]#
```

root@testlinux:~

How to enable service at boot time ?

#Chkconfig –list vsftpd
(To check)

#chkconfig vsftpd on
(To make it enable at boot time)

```
[root@testlinux ~]# service vsftpd status
vsftpd is stopped
[root@testlinux ~]# chkconfig --list vsftpd
vsftpd          0:off   1:off   2:off   3:off   4:off   5:off   6:off
[root@testlinux ~]#
[root@testlinux ~]#
[root@testlinux ~]# chkconfig vfstpd on
error reading information on service vfstpd: No such file or directory
[root@testlinux ~]# service vsftpd status
vsftpd is stopped
[root@testlinux ~]# service vsftpd start
Starting vsftpd for vsftpd:                                [  OK  ]
[root@testlinux ~]# chkconfig vsftpd on
[root@testlinux ~]# chkconfig --list vsftpd
vsftpd          0:off   1:off   2:on    3:on    4:on    5:on    6:off
[root@testlinux ~]# reboot

Broadcast message from root (pts/1) (Thu Mar  3 15:34:33 2016):

The system is going down for reboot NOW!
[root@testlinux ~]#
login as: root
root@192.168.0.10's password:
Last login: Thu Mar  3 15:28:43 2016 from 192.168.0.5
[root@testlinux ~]# bash
[root@testlinux ~]#
[root@testlinux ~]# service vsftpd status
vsftpd (pid 3018) is running...
[root@testlinux ~]# runlevel
N 5
[root@testlinux ~]# chkconfig --list vsftpd
vsftpd          0:off   1:off   2:on    3:on    4:on    5:on    6:off
[root@testlinux ~]#
```

Linux Services

- **Start/Stop boot time services in /etc/rc.d/rc3.d or /etc/rc.d/rc5.d**
- All services startup scripts which start with **S will start at boot time** and all startup scripts which **start with K will not start at boot time**. The number after S or K is the priority.

  K95kudzu

  K96pcmcia

  S56xinetd

  S60vsftpd

- **Use**
- **#service --status-all**

  #service <service name> start/stop/restart

  (to start, stop or restart a service from command line)

  #/etc/init.d/vsftpd status

  #/etc/init.d/vsftpd start/stop

Listing the services

- The **chkconfig** utility is a command-line tool that allows you to specify in which runlevel to start a selected service, as well as to list all available services along with their current setting

  #chkconfig –list

- To display the current settings for a selected service

  #chkconfig --list *service_name*

  # chkconfig --list vsftpd

Enabling service

- To enable a service in runlevels 2, 3, 4, and 5,
  #chkconfig *service_name* on

  #chkconfig vsftpd on

- To enable a service in certain runlevels only
- chkconfig *service_name* on --level *runlevels*

  # chkconfig --list vsftpd
  vsftpd   0:off 1:off 2:off 3:off 4:off 5:off 6:off
  # chkconfig vsftpd on --level 35
  # chkconfig --list vsftpd
  vsftpd   0:off 1:off 2:off 3:on   4:off 5:on   6:off

Disabling service

- To disable a service in runlevels 2, 3, 4, and 5

  #chkconfig *service_name* off

  # chkconfig --list vsftpd

  vsftpd   0:off   1:off   2:on   3:on   4:on   5:on   6:off

  # chkconfig vsftpd off

  # chkconfig --list vsftpd

  vsftpd   0:off   1:off   2:off   3:off   4:off   5:off   6:off

- To disable a service in certain runlevels only, add the --level option followed by numbers from 0 to 6

- chkconfig *service_name* off --level *runlevels*

- *#chkconfig vsftpd off –level 0124*

How to enable service in startup

- As an example, lets enable the Apache web server to start in run levels 2, 3, and 5. This is how it is done.

  We first add the service using chkconfig script. Then turn on the service at the desired run levels.

  # chkconfig httpd --add

  # chkconfig httpd on --level 2,3,5
  This will enable the Apache web server to automatically start in the run levels 2, 3 and 5. You

  # chkconfig --list httpd

Remove Service from Startup List

- # chkconfig httpd off
- # chkconfig httpd –del

Reboot & shutdown

- Any of the following commands will reboot the system from the command line.
- # reboot
- # shutdown -r now
- # init 6

Shutdown

- Either of the following commands will shut down the system from the command line.
- # shutdown -h now
- # init 0

```
[root@testlinux /]# shutdown -r now

Broadcast message from root (pts/1) (Thu Mar  3 15:50:52 2016):

The system is going down for reboot NOW!
[root@testlinux /]#
login as: root
root@192.168.0.10's password:
Last login: Thu Mar  3 15:38:37 2016 from 192.168.0.5
[root@testlinux ~]# bash
[root@testlinux ~]# uptime
 15:53:38 up 2 min,  1 user,  load average: 2.30, 1.14, 0.43
[root@testlinux ~]#
```