LPI 101.3 - Change runlevel boot targets and shutdown or reboot system

Curs 2021 - 2022

ASIX M01-ISO Install a boot Manager

Change runlevel boot targets and shutdown or reboot system

Description

Key concepts:

- ❏ Set the default runlevel or boot target.
- ❏ Change between runlevels / boot targets including single user mode.
- ❏ Shutdown and reboot from the command line.
- ❏ Alert users before switching runlevels / boot targets or other major system events.
- ❏ Properly terminate processes.
- ❏ Awareness of acpid.

Commands and files:

- ❏ /etc/inittab
- ❏ shutdown
- ❏ init
- ❏ /etc/init.d/
- ❏ telinit
- ❏ systemd
- ❏ systemctl
- ❏ /etc/systemd/
- ❏ /usr/lib/systemd/
- ❏ wall

Runlevels or targets

Linux uses the concept of different runlevels to define what services or processes will be running.

0 poweroff.target
: Halt or shut off the system

1 rescue.target
: Single-user mode for administrative tasks

2 multi-user.target
: Multi-user mode without configured network interfaces or network service

3 multi-user.target
Normal startup of the system

4 multi-user.target
User-definable

5 graphical.target
Start the system normally with a graphical display manager

6 reboot.target
Restart the system

Default target

SysVinit init

- /etc/inittab
- id:5:initdefault:
- /etc/init/rc-sysinit.conf (ubuntu)

systemd

- /etc/systemd/system/default.target
- ln -s target link_name
- systemctl get-default
- systemctl set-default

Viewing current level

- runlevel
- who -r

- systemctl get-defaut
- systemctl is-active multi-user.target
- systemctl is-active graphical.target
- systemctl is-active rescue.target

Changing runlevels and targets

- systemd.unit=DESIRED.TARGET
- tellinit nº
- init nº
- systemctl isolate DESIRED.TARGET

- halt
- poweroff
- shutdown
- shutdown now “message”

- wall
- wall file

Managing system services

init

- /etc/rc.d/init.d
- /etc/rc.d/init.d/httpd
- /etc/rc.d/init.d/httpd start | stop | restart | reload | status | condrestart | configtest
- service httpd start | stop | restart | reload | status | condrestart | configtest

- directories:
    - rc0.d
    - rc1.d
    - rc2.d
    - rc3.d
    - rc4.d
    - rc5.d
    - rc6.d

- S start files
    - To have a service started in a runlevel, a symbolic link to the init script in the /etc/rc.d/init.d directory can be created in the appropriate runlevel directory. This link name must start with the letter S, followed by a number from one to ninety-nine, and the name of the init script that it is linked to.
    - /etc/rc.d/rc5.d/S85httpd

- K kill files
    - o have the web server stopped at runlevel 5, create a symbolic link in the /etc/rc.d/rc5.d directory that would start with the letter K, followed by a number from one to ninety-nine, and the name of the init script that it is linked to
    - /etc/rc.d/rc5.d/K15httpd

- The reason that both start and stop links have a number after the letter S or K is to ensure that services are started or stopped in the correct sequence. The scripts are started (or stopped) in order, so K15httpd would be executed before K35vncserver.

```
#1
# ls -l /etc/rc.d/rc5.d/S85httpd
lrwxrwxrwx 1 root root 19 Jun 27 16:53 /etc/rc.d/rc5.d/S85httpd ->
../init.d/httpd

# ls -l /etc/rc.d/rc5.d/K15httpd
lrwxrwxrwx 1 root root 19 Jun 27 16:53 /etc/rc.d/rc5.d/K15httpd -> ../init.d/httpd

# grep chkconfig /etc/init.d/httpd
# chkconfig: - 85 15
```

chkconfig

- chkconfig
- chkconfig --list
- chkconfig --list service
- chkconfig service on | off
- chkconfig --level 35 atd on | off
- chkconfig --del service
- chkconfig --add service

```
# chkconfig --list
auditd          0:off   1:off   2:on    3:on    4:on    5:on    6:off
crond           0:off   1:off   2:on    3:on    4:on    5:on    6:off
httpd           0:off   1:off   2:off   3:off   4:off   5:off   6:off
iptables        0:off   1:off   2:on    3:on    4:on    5:on    6:off
netconsole      0:off   1:off   2:off   3:off   4:off   5:off   6:off
netfs           0:off   1:off   2:off   3:on    4:on    5:on    6:off
network         0:off   1:off   2:on    3:on    4:on    5:on    6:off
quota_nld       0:off   1:off   2:off   3:off   4:off   5:off   6:off
rdisc           0:off   1:off   2:off   3:off   4:off   5:off   6:off
restorecond     0:off   1:off   2:off   3:off   4:off   5:off   6:off
rsyslog         0:off   1:off   2:on    3:on    4:on    5:on    6:off
saslauthd       0:off   1:off   2:off   3:off   4:off   5:off   6:off
sendmail        0:off   1:off   2:on    3:on    4:on    5:on    6:off
sshd            0:off   1:off   2:on    3:on    4:on    5:on    6:off
udev-post       0:off   1:on    2:on    3:on    4:on    5:on    6:off
```

Systemctl and targets

- /lib/systemd/system
- /run/systemd/system (+)
- /etc/systemd/system (++)

- systemctl start httpd.service
- systemctl stop httpd.service
- systemctl status httpd.service
- systemctl -a
- systemctl --all

- systemctl enable httpd.service
- systemctl disable httpd.service
- systemctl list-units
- systemctl list-unit-files

- systemctl isolate DESIRED.TARGET
- systemctl hibernate
- systemctl suspend
- systemctl poweroff
- systemctl reboot

- systemctl list-dependencies graphical.target
- systemctl list-dependencies multi-user.target

- systemctl list-dependencies rescue.target
- /etc/systemd/system/default.target

```
# systemctl enable named.service

# ln -s /usr/lib/systemd/system/named.service
/etc/systemd/system/mulit-user.target.wants/
```

```
# locate httpd.service
/usr/lib/systemd/system/httpd.service
/usr/lib/systemd/system/httpd.service.d
/usr/share/man/man8/httpd.service.8.gz

# cat /usr/lib/systemd/system/httpd.service
# See httpd.service(8) for more information on using the httpd service.

# Modifying this file in-place is not recommended, because changes
# will be overwritten during package upgrades.  To customize the
# behaviour, run "systemctl edit httpd" to create an override unit.

# For example, to pass additional options (such as -D definitions) to
# the httpd binary at startup, create an override unit (as is done by
# systemctl edit) and enter the following:

#       [Service]
#       Environment=OPTIONS=-DMY_DEFINE

[Unit]
Description=The Apache HTTP Server
Wants=httpd-init.service
After=network.target remote-fs.target nss-lookup.target httpd-init.service
Documentation=man:httpd.service(8)

[Service]
Type=notify
Environment=LANG=C

ExecStart=/usr/sbin/httpd $OPTIONS -DFOREGROUND
ExecReload=/usr/sbin/httpd $OPTIONS -k graceful
# Send SIGWINCH for graceful stop
KillSignal=SIGWINCH
KillMode=mixed
PrivateTmp=true

[Install]
WantedBy=multi-user.target
```

```
# systemctl  get-default
graphical.target

# ls -l /etc/systemd/system/default.target
lrwxrwxrwx. 1 root root 36 Apr  7  2021 /etc/systemd/system/default.target ->
/lib/systemd/system/graphical.target
```

```
# systemctl  list-dependencies rescue.target
rescue.target
● ├─rescue.service
● ├─systemd-update-utmp-runlevel.service
● └─sysinit.target
●   ├─dev-hugepages.mount
●   ├─dev-mqueue.mount
●   ├─dracut-shutdown.service
●   ├─fedora-import-state.service
```

```
●    ├─iscsi.service
●    ├─kmod-static-nodes.service
●    ├─ldconfig.service
●    ├─lvm2-lvmetad.socket
●    ├─lvm2-lvmpolld.socket
●    ├─lvm2-monitor.service
●    ├─multipathd.service
●    ├─plymouth-read-write.service
●    ├─plymouth-start.service
●    ├─proc-sys-fs-binfmt_misc.automount
●    ├─sys-fs-fuse-connections.mount
●    ├─sys-kernel-config.mount
●    ├─sys-kernel-debug.mount
```

```
# systemctl  list-dependencies graphical.target  | grep .target
graphical.target
● └─multi-user.target
●   ├─basic.target
●   │ ├─paths.target
●   │ ├─slices.target
●   │ ├─sockets.target
●   │ ├─sysinit.target
●   │ │ ├─cryptsetup.target
●   │ │ ├─local-fs.target
●   │ │ └─swap.target
●   │ └─timers.target
●   ├─getty.target
●   ├─nfs-client.target
●   │ └─remote-fs-pre.target
●   └─remote-fs.target
●     └─nfs-client.target
●       └─remote-fs-pre.target
```

```
# cat /lib/systemd/system/multi-user.target
#  SPDX-License-Identifier: LGPL-2.1+
#
#  This file is part of systemd.
#
#  systemd is free software; you can redistribute it and/or modify it
#  under the terms of the GNU Lesser General Public License as published by
#  the Free Software Foundation; either version 2.1 of the License, or
#  (at your option) any later version.

[Unit]
Description=Multi-User System
Documentation=man:systemd.special(7)
Requires=basic.target
Conflicts=rescue.service rescue.target
After=basic.target rescue.service rescue.target
AllowIsolate=yes
```

Example Exercises

1. List all the system units
2. Active the httpd (apache2) service.

3. Show service httpd (apache2) status.
4. reload the service httpd (apache2).
5. Stop the httpd (apache2) service.
6. Enable the httpd (apache2)service on system startup.
7. Disable httpd (apache2) service on system startup.

8. Which is the default target?
9. Is active the multi-user target?
10. And the graphical target?
11. Show the symbolic link configuring the system default target.
12. Show all the dependencies of graphical.target.
13. Show all the target dependencies of graphical.target.

14. Change the runlevel / target to rescue.target.
15. Is active recue.target?
16. ps ax.
17. Change the runlevel to emergency.target.
18. is active multi-user.target? and recue.target?
19. ps ax

20. Change the default target to rescue.target
21. reboot
22. Change the default target to multi-user.target or graphical.target (as you like).

23. Reboot the system in mode init=/bin/bash

24. Realitza els exercicis indicats a: 101.3 Change runlevels / boot targets and shutdown or reboot system
25. Realitza els exercicis del Question-Topics 101.3.