Linux Startup

By : Amir Hossein Payberah

payberah@yahoo.com

Tehran Polytechnic University

دانشگاه صنعتی امیرکبیر
(پلی تکنیک تهران)

Contents

- System startup
- Run levels
- Services
- Controlling boot services

Tehran Polytechnic University

System Startup

- At first BIOS check the basic subsystem of computer.
- If all goes well, the BIOS will then look for a bootable volume.
- Next, the BIOS will look for boot code in the partition boot sector.
  - The first sector
  - 512 bytes (**446 bytes**:boot loader such as LILO or GRUB, **64 bytes**:partition table, **2 bytes**:special code).
  - This area usually contains a boot loader.

Sequence of Events

- /usr/src/linux/init/main.c
- Details about the specific sequence of events or what happens when the Linux kernel is loaded.
  - Recognize, set up and initialize the CPU(s).
  - Set up kernel memory and process handling.
  - Initialize configured system devices.
  - Start memory handling (paging, ...).
  - Set up and mount the file system.
  - Start the init command.
  - ...

Tehran Polytechnic University

init Command

- After the kernel has detected computer's hardware and load the correct device driver, init is started.
  - The last step of kernel booting.
- It s the parent of all processes.
  - PID = 1
- init role:
  - The primary role of init is to create processes from a script stored in /etc/inittab.
  - Running scripts in /etc/rc.d.

/etc/inittab

- This file describes how the init process should setup the system in a certain run level.
- /etc/inittab format:
  - **Id:run-level:action:process**
  - Id: a unique 1-4 character which identifies an entry in inittab.
  - Run-level: run level number.
  - Action: which action should be taken (wait, boot, initdefault, …)
  - Process: the process to be executed.

/etc/rc.d

- rc
  - Performs master control of which scripts to execute.
- rc.sysinit
  - The system initialization script
- rc.local
  - Used for local initialization
- /etc/rc.d/inid.d/
  - A number of scripts used to start and stop services
- /etc/rc.d/rc*.d/ (* : 0–6)
  - Each file is merely a soft link to a script under init.d

rc.sysinit

- This file is interpreted by init once at boot time.
- It contains bash shell script logic to perform some the following:
  - Sets the system hostname
  - Reads in network configuration data
  - Prints welcome banner for login
  - Configures the kernel
  - Sets up the system time
  - Sets the console and keyboard mapping
  - ...

Contents

- System startup
- Run levels
- Services
- Controlling boot services

Tehran Polytechnic University

Run Levels

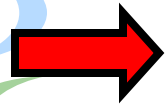
- A run-level is a software configuration of the system which allows only a selected group of processes to exist.

Run Levels (Cont.)

- 0 – halt (/etc/rc.d/rc0.d/)
- 1 – single user mode (/etc/rc.d/rc1.d/)
- 2 – multiuser, without NFS (/etc/rc.d/rc2.d/)
- 3 – full multiuser mode (/etc/rc.d/rc3.d/)
- 4 – unused (/etc/rc.d/rc4.d/)
- 5 – X11 (/etc/rc.d/rc5.d/)
- 6 – reboot (/etc/rc.d/rc6.d/)

Contents

- System startup
- Run levels
- Services
- Controlling boot services



Tehran Polytechnic University

Services

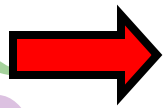
- /etc/rc.d/init.d/
  - A number of scripts used to start and stop services

Run Level and Services

- The scripts (in /etc/rc.d/rc*.d/) are actually symbolic links to system service scripts under the /etc/rc.d/init.d/ directory.
- Some scripts begin with the letter K
- Some other scripts begin with the letter S
- There is a number followed by K/S
- Example:
  - K12mysql
  - S10network

Contents

- System startup
- Run levels
- Services
- Controlling boot services



Tehran Polytechnic University

Controlling Boot Services

- Manually rename Scripts
  - Rename K to S and vice versa
  - Change the number followed by K/S
- Manually start and stop services
  - {start | stop | restart | status}
  - /etc/rc.d/init.d/network start
  - service network start
- Through graphical tool
  - ntsysv

Changing Run Levels

- The telinit command is used to change run-levels on-the-fly on a running Linux system.
  - telinit 5

Question?

Tehran Polytechnic University