實驗十六

Linux路由器:建構、測試與追蹤

教師：

助教：

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Outline

- Linux kernel debug–KDB
- kernel boot up
- root file system
- software we need
- build Linux router
- benchmark

Linux kernel debug–KDB

- patch Linux Kernel
  - download a patch match your kernel version
  - check it out
  - patch your kernel
- trace kernel flow
  - bp:set break point
  - ss:Single Step
  - bt: Stack Traceback

Linux boot up

- Load the kernel
- Probe & setup the hardware
- Create system process
- System initialization
- getty
- login process

root file system

/dev	Devices, required to perform I/O
/proc	Directory stub required by the proc filesystem
/etc	System configuration files
/sbin	Critical system binaries
/bin	Basic binaries considered part of the system
/lib	Shared libraries to provide run-time support
/mnt	A mount point for maintenance on other disks
/usr	Additional utilities and applications

package

- binary executable file(s) put into /bin、/sbin、/usr/bin or /usr/sbin
- configuration file(s) put into /etc
  - package
  - control
- additional shared libraries put into /lib
  - check it by ldd, prints the shared libraries required
  - can be omitted by static link compiled
- log file and/or manual if you need it

RAM disk

- need to config kernel to support it
- benefit
  - faster
  - reduce capacity with compressed image
- Linux kernel support
  - automatically copy the contents of a root file system to a ramdisk, and then switch the root drive to be the ramdisk
  - bad feature:assume you are using floppy disk
- something similar
  - kernel initrd feature

software we need

- kernel
  - support NIC、routing functionality、ramdisk、ext2 and something else you like it
- utilities and scripts are in need of boot up
  - like /sbin/init、/bin/mount、/bin/login，etc
  - /etc/inittab、/etc/fstab，
  - system initial script，/etc/rc
- network utilities
  - /sbin/route、/sbin/ifconfig
  - config script(s) which is invoked by system initial script to setup up NIC(s) and routing
- routing daemon
  - routed or gated

build Linux router

- top-down
  - step by step remove what you don't need
  - remove redundant package. rpm –e XXX
- bottom-up
  - customize it by systematic script
  - Yard written by perl

Yard

- written by Tom Fawcett(writer of The Linux Bootdisk HOWTO 3.5 July 1999)
- exploits the compressed ramdisk feature of kernel
- You can specify the set of files you want
- check library, symbolic link
- with or without lilo
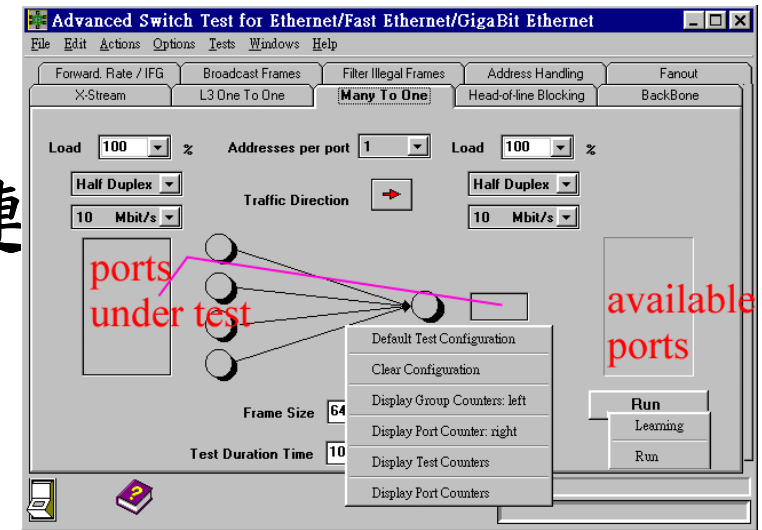
Yard(cont.)

- Config.pl
  - device
  - lilo?
  - one or two floppy
  - kernel
  - strip?
- Bootdisk_contents
  - Specifies what your bootdisk will contain

Yard(cont.)

- make_root_fs–Constructs an initial, uncompressed root filesystem
  - Reading /etc/yard/Bootdisk_Contents
  - Picking up extra files from links
  - Checking library dependencies
  - Recording hard links
- check_root_fs–checks the root filesystem for errors and omissions
  - inittab, fstab, passwd, pam.conf
  - scripts for missing interpreters, missing files, etc
  - checks configuration of PAM and NSS
- write_rescue_disk–takes your kernel and the (compressed) root filesystem and produces a rescue disk from it
  - If you've selected the disk_set=DOUBLE option, the program will write the kernel onto the first disk, then prompt you to change disks, after which it will write the root disk.

benchmark

- 設定**AST**與**SmartBits**的連
- 啟動**SmartBits**與**AST**
- 連接**SmartBits**與待測物
- 使用**AST**測試套件依不同項目個別測試
  - 設定測試埠連結
  - 參數設定:
  - 執行測試及結果收集、統計

reference

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