

SOI Asia Server

Document

SOI Asia Server Lab Works Session

This document is intended to be a compliment for the textbook during the workshop in Day 4 for SOI Asia server.

Section 1: STEP 1 – STEP 9

For this section please follow the instruction steps from the textbook page 3 – 8

To ease the configuration tasks, please check the following configuration templates or references that has been installed in your VM(virtual machines)

STEP 1: skipped

STEP 2: skipped

STEP 3: Reference configuration files for Network configuration are in the following location of your VM:

```
/usr/local/src/config/network
```

```
/usr/local/src/config/ifcfg-eth0
```

!!! Please Check !!!

You need to refer to “**Information for lab exercise**” document in the section of **Network Topology for SOI Asia Server Lab** for information of IP Address an so on.

After editing the above files with correct files, then you need to copy it to correct destination:

```
# cp /usr/local/src/config/network /etc/sysconfig/network
```

```
# cp /usr/local/src/config/ifcfg-eth0 /etc/sysconfig/network-  
scripts/ifcfg-eth0
```

STEP 4: Please follow the instruction in the textbook at page 6

STEP 5: Reference Yum configuration files are in the following location of your VM:

```
/usr/local/src/config/fedora.repo
```

```
/usr/local/src/config/fedora-updates.repo
```

Then you have to copy to correct destination

```
# cp /usr/local/src/config/fedora.repo /etc/yum.repos.d/
```

```
# cp /usr/local/src/config/fedora-updates.repo /etc/yum.repos.d
```

STEP 6: Please follow the instruction in the textbook at page 7

STEP 7: Please follow the instruction in the textbook at page 7

STEP 8: Please follow the instruction in the textbook at page 7

STEP 9: Please follow the instruction in the textbook at page 8

Section 2: STEP 1 – STEP 3

For this section please follow the instruction steps from the textbook page 9 - 14

STEP 1: Please follow the instruction in the textbook at page 9 – 10

Verifying the web server service using below unix command from your VM:

```
links http://You_IPv4_address/
```

```
links http://[Your_IPv6_address]/
```

STEP 2: Please follow the instruction in the textbook at page 11 – 13

We skip verifying of rmsserver step

STEP 3: Please follow the instruction in the textbook at page 14

Section 3: STEP 1 – STEP 3

For this section please follow the instruction steps from the textbook page 19 – 23

STEP 1: Please follow the instruction in the textbook at page 19

STEP 2: Please check Squid configuration reference template in the following location of your VM:

```
/usr/local/src/config/squid.conf
```

After editing several parameter like `cache_mgr` and `visible_hostname` then you need to copy to correct squid directory:

```
cp /usr/local/src/config/squid.conf /etc/squid/
```

STEP 3: Please follow the instruction in the textbook at page 9 – 10

- We skip verifying dhcp

SOI Asia Global e-Workshop 2006

SOI Asia Server Setup

SOI Asia server is the main server providing important services to each partner site. These services can be classified into two categories.

Archive lecture and file distribution service

This is the server's major service that stores and displays SOI Asia archive courses to students locally. In addition, this server is a part of file distribution service to receive lecture materials/files to conduct SOI Asia class at local site. Required running services are WWW, Real Streaming, MTM.

Internet service

Internet service is a set of fundamental Internet services which support users on each network to be able to effectively access Internet services. These services are DNS, Web Cache, DHCP and SMTP.

This document will guide SOI Asia operator to install and configure SOI Asia Server and is organized as follows.

1. Hardware/Software Preparation
2. SOI Asia Server System Installation
 - Fedora Core 4 Installation
 - Fedora Core 4 Upgrade
 - System and Network Configuration
3. SOI Asia archive lecture server Installation
 - Web Server Installation
 - Real Streaming Server Installation
 - MTM installation
4. SOI Asia Internet Service Installation
 - DNS installation
 - Web Cache Proxy installation
 - DHCP installation

1. Hardware/Software Preparation

Hardware and software needed for installing SOI Asia Server are listed in table 1 and 2 respectively. Software is available as ISO images at the specified sources, they should be downloaded and burned to CD-ROMs before start installation.

Table 1. Hardware for SOI Asia Server

Hardware	Amount	Specification
PC <SOI Server>	1	PC/AT compatible PC Fedora Core 4 compliant 80GB or larger HDD 256MB RAM or more 1GHz CPU or faster One Ethernet interface <reliable chipsets, e.g. Intel, preferred>
Straight Ethernet Cable	1	100BASE-TX straight cable

Table 2. Software for SOI Asia Server

CD#	Software	Source
CD-5	Fedora Core4 Disk #1	http://www.soi.wide.ad.jp/soi-asia/staff/download/soiserver/fc4/fc4-i386-disc1.iso
CD-6	Fedora Core4 Disk #2	http://www.soi.wide.ad.jp/soi-asia/staff/download/soiserver/fc4/fc4-i386-disc2.iso
CD-7	Fedora Core4 Disk #3	http://www.soi.wide.ad.jp/soi-asia/staff/download/soiserver/fc4/fc4-i386-disc3.iso
CD-8	Fedora Core4 Disk #4	http://www.soi.wide.ad.jp/soi-asia/staff/download/soiserver/fc4/fc4-i386-disc4.iso
CD-10	SOI server	http://www.soi.wide.ad.jp/soi-asia/staff/download/soi-fc4-sw.iso

2. SOI Asia Server System Installation

During system/service installation process, network information of SOI Asia server is needed for configuration. Please prepare the following network information of your SOI Asia server. Information presented below is an example to be used in this chapter. Therefore, when you follow the installation instruction, carefully configure with your actual network information.

Please do not copy the example directly!!!

Example IPv4 Information for this document.

IPv4 Network Address: 202.249.26.0

IPv4 Netmask: 255.255.255.248

RR IPv4 address: 202.249.26.1

SOI Server IPv4 address: 202.249.26.2

Example IPv6 Information for this document.

IPv6 Network Address: 2001:d30:10a::

IPv6 Prefix length: 64

RR IPv6 address: 2001:d30:10a::1

SOI Server IPv6 address: 2001:d30:10a::2

(STEP 1) Connecting Devices

- Put the SOI Asia server's power cable to the UPS instead of going directly to power line.
- Connect SOI Asia server's Ethernet port to the switch using straight cable.

(STEP 2) Fedora Core 4 installation

- Insert the Fedora Core 4 CD Disk #1 to SOI Asia server machine
- Change the boot sequence in the BIOS configuration to first boot from CD-ROM and turn on the machine. System will boot with Fedora Core 4 installation
- Follow the instructions below for SOI Asia server default Fedora Core 1 installation.
 - At the first installation page, press enter to install with graphical mode <please connect a mouse to the machine>
 - Press "*skip*" to skip media test.
 - At the graphical welcome menu, click next
 - Follow installation instructions on the left pane to install language, keyboard and mouse
 - Choose "*Install Fedora core*"
 - At installation type, select "*custom*"
 - At Disk Partitioning Setup, select "*automatic partition*", then select to "*remove all partition on this system*" on the system and select drive for installation
 - At Disk Setup, click next to use default.
 - At boot loader configuration, click next to use default
 - At network configuration
 - At network devices section, click "*Edit*". Deselect "*configure using DHCP*", Select "*Activate on boot*" and put in SOI Asia server's IP address/netmask. <refer to table 1.4 in chapter 1 which gives an example of how to assign IP to machines>
 - At hostname section, select "manually" and put in SOI Asia server host name.
 - At Miscellaneous settings, put in gateway address as RR's IP address and put the primary DNS as 202.249.24.33.
 - At Firewall configuration page, choose "*No firewall*" and at the SELinux setting, choose "Disabled".
 - Follow Fedora instruction to install language support, timezone, root password
 - At package group selections, select and install only the following components.

Development Tools

- System ask for confirmation and start installation, disk 2,3 and 4 will be required during this step.
- System ask for boot disk creation, you may create one for future use.
- Installation completed, remove CD from drive and click *“Reboot”*.
- After system startup, login as root.

(STEP 3) Network configuration

- Edit `/etc/sysconfig/network` to contain the following lines, save and exit. Replace values of `HOSTNAME`, `GATEWAY`, `IPV6_DEFAULTGW` with your setting.

```
NETWORKING=yes
HOSTNAME=sfc-soi.ai3.net
GATEWAY=202.249.26.1
NETWORKING_IPV6=yes
IPV6_AUTOCONF=no
IPV6_DEFAULTGW="2001:d30:10a::1"
```

- Edit `/etc/sysconfig/network-scripts/ifcfg-eth0` to contain the following lines, save and exit. Replace values of `IPADDR`, `NETMASK`, `IPV6ADDR` with your setting.

```
DEVICE=eth0
BOOTPROTO=static
ONBOOT=yes
IPADDR=202.249.26.2
NETMASK=255.255.255.248
IPV6INIT=yes
IPV6ADDR=2001:d30:10a::2/64
```

- Edit `/etc/resolv.conf` to contain the following lines, save and exit.

```
search ai3.net
nameserver 202.249.24.33
nameserver 202.249.25.11
```

- Restart network configuration and verify interface setting, you should see the configured IPv4 and IPv6 address shown in eth0 entry.

service network restart

```
Shutting down interface eth0: [ OK ]
Shutting down loopback interface: [ OK ]
Setting network parameters: [ OK ]
Bringing up loopback interface: [ OK ]
Bringing up interface eth0: [ OK ]
```

ifconfig

```
eth0      Link encap:Ethernet  HWaddr 00:E0:18:A8:D3:3F
          inet addr:202.249.26.2  Bcast:202.249.26.7  Mask:255.255.255.248
          inet6 addr: 2001:d30:10a::2/64  Scope:Global
          inet6 addr: fe80::2e0:18ff:fea8:d33f/64  Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:139 errors:0 dropped:0 overruns:0 frame:0
          TX packets:157 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:25163 (24.5 KiB)  TX bytes:13636 (13.3 KiB)
```

- Test IPv4 and IPv6 network connectivity. Connect SOI Asia server's Ethernet port to the hub using a straight cable. Ping RR and you should see successful ping result.

ping 202.249.26.1

```
PING 202.249.26.1 (202.249.26.1): 56(84) bytes of data.
64 bytes from 202.249.26.1: icmp_seq=1 ttl=59 time=256 ms
64 bytes from 202.249.26.1: icmp_seq=2 ttl=59 time=255 ms
```

ping6 2001:d30:10a::1

```
PING 2001:d30:10a::1 (2001:d30:10a::1) 56 data bytes
64 bytes from 2001:d30:10a::1: icmp_seq=0 ttl=64 time=1.18 ms
64 bytes from 2001:d30:10a::1: icmp_seq=1 ttl=64 time=0.561 ms
```

(STEP 4) Disable unused services and set path.

```
# chkconfig iptables off
# chkconfig apmd off
# chkconfig atd off
# chkconfig nfs off
# chkconfig pcmcia off
# chkconfig portmap off
# chkconfig nfslock off
# chkconfig rhnsd off
# chkconfig gpm off
# chkconfig sendmail off
# chkconfig isdn off
# chkconfig netfs off
# chkconfig acpid off
# chkconfig autofs off
# chkconfig cups off
```

(STEP 5) Fedora Core 4 packages updates

Fedora Core has been equipped with an easy updates/upgrades software packages using **yum**. The software itself basically based on the configuration located in **/etc/yum.repos.d/**

/etc/yum.repos.d/fedora.repo

example contents:

```
[base]
name=Fedora Core $releasever - $basearch - Base
baseurl=ftp://sfc-ftp.ai3.net/pub/linux/fedora/core/$releasever/$basearch/os
http://sfc-ftp.ai3.net/pub/linux/fedora/core/$releasever/$basearch/os
http://ftp.jaist.ac.jp/pub/Linux/Fedora/core/$releasever/$basearch/os/
http://download.fedora.redhat.com/pub/fedora/linux/core/$releasever/$basearch/os/
```

/etc/yum.repos.d/fedora-updates.repo

example contents:

```
[updates-released]
name=Fedora Core $releasever - $basearch - Released Updates
baseurl=ftp://sfc-ftp.ai3.net/pub/linux/fedora/core/updates/$releasever/$basearch
http://sfc-ftp.ai3.net/pub/linux/fedora/core/updates/$releasever/$basearch
http://ftp.jaist.ac.jp/pub/Linux/Fedora/core/updates/$releasever/$basearch
http://download.fedora.redhat.com/pub/fedora/linux/core/updates/$releasever/$basear
ch
```

```
# yum update
# chkconfig yum on
# service yum start
```

If it is noticed in the update list that there is a kernel upgrade, you should reboot the server for new kernel being affected.

```
# reboot
```

(STEP 6) Adding a user account

- Use command below to create a username and set password for user, replace “username” in following steps with username you want to create.

```
# adduser username
# passwd username
```

(STEP 7) SSH configuration

- Edit `/etc/ssh/sshd_config` and add the following lines and save the file

```
PermitRootLogin no
```

- Restart sshd daemon to re-read configuration file

```
# service sshd restart
```

(STEP 8) Grant access permission to other hosts.

- The system default setting doesn't prevent outsider to access SOI server, for security reason, SOI server access will be limited only for local organization and WIDE project.
- Edit `/etc/hosts.allow` to contain following entries, replace **202.249.26.0/255.255.255.248** and **[2001:d30:10a::]/48** with your own network setting. **203.178.136.0** and **202.249.25.10** entries are WIDE network address and do not have to be changed.

```
# Allow access from WIDE Project
ALL: 203.178.136.0/255.255.248.0
ALL: 202.249.25.10
ALL: 2001:d30:101::10
#Allow access inside SOI Local network
ALL: [2001:d30:10a::]/48
ALL: 202.249.26.0/255.255.255.248
ALL: 127.0.0.0/255.0.0.0
ALL: [::1]/128
```

- Edit `/etc/hosts.deny` file to contain following entry.

```
ALL:ALL
```

- Verify the setting by make a ssh login from a PC with SOI Asia IP. Operator should be able to make a connection and logging in. If possible, make a ssh login from a machine outside of SOI Asia network, the connection shouldn't be established.

(STEP 9) Miscellaneous configurations

- Edit `/etc/bashrc` and add following two lines at the end of file, save and exit

```
PATH=$PATH:/sbin:/usr/local/sbin:/usr/sbin
export PATH
```

- Set system date in MMDDhhmmYY format. The following example set system's date to 2 August 2006, 11:00.

```
# date 08261100
```

3. SOI Asia archive server Installation

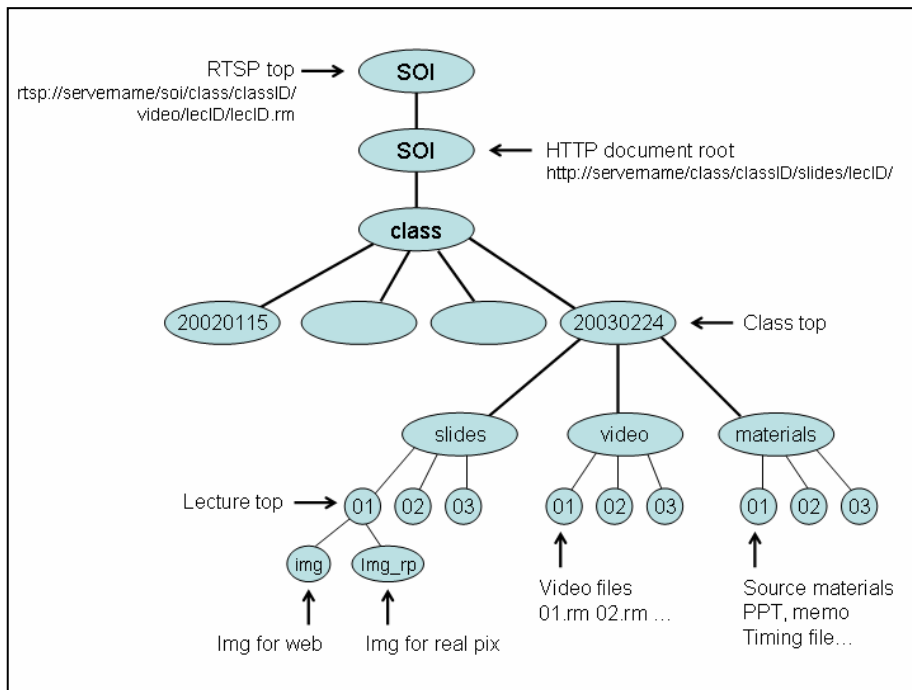


Figure 1. SOI Asia's directory structure

For archive purpose, the directory structure of SOI Asia has been designed as shown in figure 1. “/soi” is the root directory for the whole SOI Asia archive content. Under the “class” directory, there are many subdirectories named by class ID. Under each class ID directory, there are directories to keep slide files (html, images), video files and class materials (ppt, docs). Each of them is separated into lecture ID subdirectories.

(STEP 1) Web server installation

- Create a Web root directory. In SOI Asia environment, `/soi/soi` is the Web root directory. (Each directory under DocumentRoot should have read permission to others. 755 is recommended.)

```
# mkdir /soi
# mkdir /soi/soi
# chmod -R 755 /soi
```

- Install httpd

```
# yum install httpd
```

- Edit `/etc/httpd/conf/httpd.conf` and modify the following parameters. Please be noted that the line number may differ a little bit.

1. DocumentRoot parameter

Change from : `DocumentRoot "/var/www/html"`

To : `DocumentRoot "/soi/soi"`

2. Directory setting

Change from : `<Directory "/var/www/html">`

To : `<Directory "/soi/soi">`

3. Change AddHandler parameter

Change from : `#AddHandler cgi-script .cgi`

To : `AddHandler cgi-script .cgi`

4. ScriptAlias parameter

Change from : `ScriptAlias /cgi-bin/ "/var/www/cgi-bin/"`

To : `Alias /cgi-bin/ "/soi/soi/cgi-bin/"`

5. Directory setting parameter

Change from : `<Directory "/var/www/cgi-bin">`

To : `<Directory "/soi/soi/cgi-bin">`

And change from: `Options None`

To : `Options ExecCGI`

- Enable Web server and make it runs at system startup

```
# chkconfig httpd on
# service httpd start
```

```
Starting httpd: [ OK ]
```

- Web server Verification

- Create `/soi/soi/index.html` to contain the following line.

```
<html><head>hello</head></html>
```

- Use a browser to access `http://your-soi-server-ip/` (In our sample case, `http://202.249.26.2/`), you must see a plain html page written **“hello”**.

(STEP2)Real Streaming Server Installation : Helix DNA Server Plus 11

- Insert SOI server SW CD to CDROM drive and follow commands below.

```
# cd /usr/local/src
# mount /dev/cdrom
# cp /media/cdrom/* ./
# umount /dev/cdrom
# ./servinst_plus_linux-2.6-glibc23-i686.bin
```

- You will see the installation screen, press enter to continue.

```
Extracting files for Helix installation.....
Welcome to the Helix DNA Server Plus (CVS HEAD) (11.0.99.1878) Setup for
UNIX
Setup will help you get Helix DNA Server Plus running on your computer.
Press [Enter] to continue...
```

- System asks for installation directory, input **/usr/local/rmserver**

```
Enter the complete path to the directory where you want
Helix DNA Server to be installed. You must specify the full
pathname of the directory and have write privileges to
the chosen directory.
Directory: [/usr/local/src]: /usr/local/rmserver
```

- System asks for username and password to administer the Helix Server. Please set username as "soi" and password as "soi-asia-secret".

```
Please enter a username and password that you will use
to access the web-based Helix DNA Server Administrator and monitor.
Username []: soi
Password []:
Confirm Password []:
```

- PNA port selection, press enter to use default port number 7070.

```
Please enter a port on which Helix Server will listen for
PNA connections. These connections have URLs that begin with "pnm://"
Port [7070]:
```

- RTSP port selection, press enter to use default port number 554.

Please enter a port on which Helix Server will listen for RTSP connections. These connections have URLs that begin with "rtsp://"

Port [554]:

- HTTP port selection, input "8080"

Please enter a port on which Helix Server will listen for HTTP connections. These connections have URLs that begin with "http://"

Port [80]: **8080**

- Web-based configuration port selection, input "12345"

Helix Server will listen for Administrator requests on the port shown. This port has been initialized to a random value for security. Please verify now that this pre-assigned port will not interfere with ports already in use on your system; you can change it if necessary.

Port [21188]: 12345

- System displays all configuration made, press enter to confirm the configuration

You have selected the following Helix DNA Server configuration:

Admin User/Password: soi/****

Monitor Password: ****

RTSP Port: 554

HTTP Port: 8080

PNA Port: 7070

Admin Port: 12345

Destination: /usr/local/rmsserver

Enter [F]inish to begin copying files, or [P]revious to go back to the previous prompts: [F]:

- Helix Universal server installation is done.

Copying Helix DNA Server files...

Helix DNA Server installation is complete.

Cleaning up installation files...

Done.

- Set streaming server's content root , add a plugin.

```
# cd /usr/local/rmserver/Content/  
# ln -s /soi/soi soi  
# cp /usr/local/src/real9video.rm ./  
# cp /usr/local/src/imgfformat.so /usr/local/rmserver/Plugins/  
# cp /usr/local/src/rmserver.hlx /etc/rc.d/init.d/rmserver  
# chmod 755 /etc/rc.d/init.d/rmserver
```

- Edit `/etc/rc.d/init.d/rmserver` and change 202.249.26.2 to your SOI server 's IP address at line 23.

- Enable the streaming server

```
#service rmserver start  
#chkconfig rmserver on
```

- Streaming server Verification. Connect a Windows PC to the SOI LAN and use SOI Asia's IP address.

- If no Realplayer installed on the PC, please download from

<http://www.real.com/realplayer.html>

- Open a real player. On menu, choose File -> Open and put the following URL

`rtsp://your-soi-server-ip/real9video.rm`

- You must be able to view the sample real stream.

(STEP 3) MTM installation

- Edit `/etc/sysctl.conf` and add following lines at end of file.

```
# Force MLD version to 1 , XORP compatible
net.ipv6.conf.all.force_mld_version = 1
```

- Restart network setting

```
# service network restart
```

- Download and install MTM

```
# cd /usr/local/src
# wget --http-user=satellite --http-passwd=JCSAT
http://www.soi.wide.ad.jp/soi-asia/staff/download/soiserver/mtmrd-1.1.tar.gz
# tar -zxvf mtmrd-1.1.tar.gz
# cd mtmrd-1.1
# make
# make install
```

- Edit `/usr/local/mtm6/mtm.conf` and set value of `RECEIVER_ID` to abbreviation of your organization name(Please use UPPER case, i.e. AIT, CRMA, UNIBRAW...), save and exit.

```
MTM_MULTICAST_ADDRESS=FF38:0:2001:d30:101:1:1:1
MTM_MULTICAST_PORT=49998
RECEIVER_ID=SFC
CMD_RUN_PASSWORD=SOI-seCRET
RUN_DIR=/usr/local/mtm6/run/
LOG_DIR=/usr/local/mtm6/log/
HTML_DIR=/usr/local/mtm6/html/
TMP_DIR=/tmp/mtm
```

- Enable MTM daemon and make it runs at system startup

```
# service mtmrd6 start
# chkconfig mtmrd6 on
```

- Check if the process is running

```
# ps -ax|grep mtmrd6
```

```
18866 p0 D+ 0:00.00 /usr/local/mtm6/bin/mtmrd6
```

- Master server in SFC will check status of MTM processes running on all partners' SOI servers and output to http://sfc-mtm.ai3.net/soiasia_mirror/. Please check if your SOI server is listed in the page or not.
- After finish installation, please send a report of your **receiver_id**, ipv4 and ipv6 of your soi server to operator mailing list. SOI Asia team will register your server to SOI Asia web-based MTM system.

SOI Asia procedure to receive class materials and archive lectures

1. Operator installs HTTP , Real and MTM service on SOI Asia server. Operator informs IPv4/IPv6 of SOI Asia server and RECEIVER_ID setting in mtm.conf to operator mailing list.
2. SOI Asia staff registers partner to MTM system with reported information.
3. On each of SOI Asia course, SOI ASIA team will make an announcement through the operator mailing list to ask for partners' interests in receiving archive lectures. The announcement includes following information
 - Course Information
 - Estimated size of content
4. A participating partner verifies technical readiness of SOI server according to the following checklist.
 - Available disk space of `/soi` is more than estimated size

```
# df /soi
```

```
Filesystem          1K-blocks      Used Available Use% Mounted on
/dev/hda2            28921052    7002364  20449544  26% /
```

- Available disk space of `TMP_DIR` specified in `/usr/local/mtm/mtm.conf` is at least 500M.

```
# df /tmp/mtm
```

```
Filesystem          1K-blocks      Used Available Use% Mounted on
/dev/hda2            28921052    7002364  20449544  26% /
```

- MTM daemon is running and it automatically starts on system boot up.

```
# ps -ax|grep mtmrd6
```

```
24970 pts/2    S          0:00 /usr/local/mtm/bin/mtmrd
```

```
# chkconfig --list|grep mtmrd6
```

```
mtmrd        0:off  1:off  2:on   3:on   4:on   5:on   6:off
```

- HTTP daemon is running and it automatically starts on system boot up.

```
# ps -ax|grep httpd
```

```
24973 pts/2    S          0:00 httpd
```

```
# chkconfig --list|grep httpd
```

```
httpd        0:off  1:off  2:on   3:on   4:on   5:on   6:off
```

- Real server daemon is running and it automatically starts on system boot up.

```
# ps -ax|grep rmserver
24960 pts/2    S          0:00 rmserver
# chkconfig --list|grep rmserver
rmserver      0:off    1:off    2:on     3:on     4:on     5:on
6:off
```

- Firewall is turned off.

```
# chkconfig --list|grep iptables
iptables      0:off    1:off    2:off    3:off    4:off    5:off
6:off
```

- SOI server's hostname setting can be resolved to correct SOI server's IP address
 - check hostname in `/etc/sysconfig/network`. If it is not correct, modify the setting and reboot the machine.

```
# more /etc/sysconfig/network
NETWORKING=yes
HOSTNAME=sfc-soi.ai3.net
GATEWAY=202.249.26.1
```

- ping the configured hostname. Check correct IP and successful ping result.

```
# ping sfc-soi.ai3.net
PING sfc-soi.ai3.net (202.249.26.2) 56(84) bytes of data.
64 bytes from sfc-soi.ai3.net: icmp_seq=0 ttl=64 time=0.129
```

5. Partner registers receiving choice at http://sfc-mtm.ai3.net/soiasia_mirror/. Login password is small case characters of your **RECEIVER_ID** setting.
6. On each file transfer transaction<a class material, a lecture, a test>, system will send a mail with the following information to operator mailing list .

An MTM file transfer has been started with the following details.

```
File Type   : Lecture material
Course      : [20060070] MTM Test Course
Lecture No. : 01
Lecture Date : 4 August 2005
Job ID      : 5
```

Directory : /soi/soi/class/20060070/materials/01
SOI Servers : SFC_RO1_1,CRMA,
[DOWN servers]: SFC_RO1_1
URL Local : http://YOUR_SOI_SERVER_IP/
URL Staff Page: http://sfc-mtm.ai3.net/mtm/mtm6/rs.html

MTM system

7. Operator check job status at http://sfc-mtm.ai3.net/soiasia_mirror/. If job status is marked as “FINISH”, operator access and download local content at <http://your-soi-server-ip/>.

4. SOI Asia Internet Service Installation

(STEP 1) DNS installation

The default DNS setting in SOI Asia environment is caching only name server. Server resolves domain name queries from clients and cache answers for future queries. But it does not host or manage a domain name by itself.

- Enable DNS service and make it runs at system startup

```
# yum install bind-chroot
# mv /var/named/chroot/etc/named.conf /var/named/chroot/etc/named.conf.bk
```

- Edit `/var/named/chroot/etc/named.conf` and add the following lines. Replace “202.249.26.0” with your IPv4 subnet number and replace “2001:d30:10a::” with your IPv6 subnet number.

```
options {
directory "/var/named";
dump-file "/var/named/data/cache_dump.db";
statistics-file "/var/named/data/named_stats.txt";
allow-query { 202.249.26.0/29; localhost; 2001:d30:10a::/48; ::1/128; fe80::/10;};
allow-recursion { 202.249.26.0/29; localhost; 2001:d30:10a::/48; ::1/128; fe80::/10;};
allow-transfer { none;};
listen-on-v6 { any; };
};
```

- Enable DNS server

```
#service named start
Starting named: [ OK ]
#chkconfig named on
```

- Edit `/etc/resolv.conf` to contain following entry

```
search ai3.net
nameserver ::1
nameserver 202.249.24.33
```

- DNS verification. Use nslookup command and check if it can resolve the IP address of the queried domain or not.

```
# nslookup www.soi.wide.ad.jp ::1
```

```
Server:          127.0.0.1
Address:         127.0.0.1#53
```

Non-authoritative answer:

```
www.soi.wide.ad.jp      canonical name = asari.soi.wide.ad.jp.
Name:   asari.soi.wide.ad.jp
Address: 203.178.138.99
```

** In case you want to host a domain name, please consult an IPv6 document at

http://www.soi.wide.ad.jp/soi-asia/ow/2004-summer/textbook/doc/ipv6_multicast_final.pdf

(STEP 2) Web Cache Proxy installation

Web Cache Proxy is acting as a gateway to access WWW services in the Internet. It accepts client's request for a Web page. It then retrieves the requested web content and transfers to client. Moreover, it caches the web contents for future requests. Clients in SOI Asia network with private IP address gain benefits using this Web Cache Proxy as a relay WWW gateway.

- Install squid

```
# yum install squid
```

- Edit configuration file `/etc/squid/squid.conf` and modify the following parameters

1. `cache_peer` parameter

```
cache_peer sfc-cache.ai3.net      parent      8080 3130
```

2. `cache_dir` parameter

< default configuration define the space of cache directory to 100 M, you may increase this number to the size of space you provide for caching web pages, in this example, we change it to 1.6G >

```
Change from :   #cache_dir  ufs  /var/spool/squid 100 16 256
To           :   cache_dir  ufs  /var/spool/squid 1600 16 256
```

3. `acl` parameter, add the following line. Please replace IP and netmask to your site setting.

```
acl localsite src 202.249.26.0/255.255.255.248
```

4. `http_access` parameter, add the following line before the line `http_access deny all`

```
http_access allow localsite
```

5. `icp_access` parameter

```
Change from:      icp_access allow all
To               :      icp_access deny all
```

6. `cache_mgr` parameter. Please replace `admin@email.address` with email address of person whom be informed when there are something wrongs with proxy server.

```
Change from:      # cache_mgr root
To               :      cache_mgr admin@email.address
```

7. `logfile_rotate` parameter.

```
Change from:      # logfile_rotate 0
To               :      logfile_rotate 10
```

8. `visible_hostname` parameter. Please set this parameter to be corresponding with your server hostname.

```
Change from:      #none
To               :      visible_hostname site_name.ai3.net
```

- Enable Web Cache proxy server and make it runs at system startup

```
# chkconfig squid on
# service squid start
```

- Web Cache Proxy Verification. Connect a Windows PC to the SOI LAN and use SOI Asia's IP address.
 - Open Internet Explorer
 - Open Tools menu and choose Internet Option submenu

- Choose the connection tab and Click LAN Setting button
- Enable the “Proxy server” option, put IP address of SOI server and port 3128
- Click “OK”.
- Use IE to browse Internet pages.

- Install Squid analyzer

```
# cd /usr/local/src
# yum install gd-devel
# yum install perl-GD

# gzip -d squid-graph-3.1.tar.gz
#tar -xvf squid-graph-3.1.tar
# cd squid-graph-3.1
# cd bin
# chmod 755 squid-graph
# mkdir /soi/soi/squid
# cp ../images/logo.png /soi/soi/squid
# ./squid-graph --output-dir=/soi/soi/squid < /var/log/squid/access.log
```

- Generate graph every hour by using command “crontab”.

```
# crontab -e
```

- And add the following lines to file, save and exit.

```
0 0 * * * /usr/sbin/squid -k rotate
1 * * * * /usr/local/src/squid-graph-3.1/bin/squid-graph --output-
dir=/soi/soi/squid < /var/log/squid/access.log
```

- Verify the graph by using window machine to open the following URL.

```
http://your-soi-server-ip/squid/
```

(STEP 3) DHCP installation

- Install DHCP

```
# yum install dhcp
```

- Configure DHCP by edit `/etc/dhcpd.conf` to store the network information for the clients. The sample configuration content is given below, broadcast-address is the highest IP of your network, router is RR, domain-name-servers is the SOI server itself. Finally, the range statement specifies range of IP addresses to be assigned to clients, therefore the IP address of RR, SOI server and broadcast address are excluded.

```
ddns-update-style ad-hoc;
default-lease-time 600;
max-lease-time 7200;
option subnet-mask 255.255.255.248;
option broadcast-address 202.249.26.7;
option routers 202.249.26.1;
option domain-name-servers 202.249.26.2;
option domain-name "ai3.net";

subnet 202.249.26.0 netmask 255.255.255.248 {
    range 202.249.26.3 202.249.26.6;}
```

- Start dhcpd service

```
# service dhcpd start
# chkconfig dhcpd on
```

- DHCP verification. Connect a machine to the SOI Asia LAN and configure it to get IP address from DHCP. Check if the output contains correct network setting or not.

In window machine, using command `ipconfig /renew`.

```
C:\Documents and Settings\soi>ipconfig /renew
```

Windows IP Configuration

Ethernet adapter ???? ?????:

```
Connection-specific DNS Suffix . : ai3.net
IP Address. . . . . : 202.249.26.3
Subnet Mask . . . . . : 255.255.255.248
Default Gateway . . . . . : 202.249.26.1
```

SOI Asia Server Installation

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 abazh@sfc.wide.ad.jp
 SOI Asia Global e-Workshop 2006

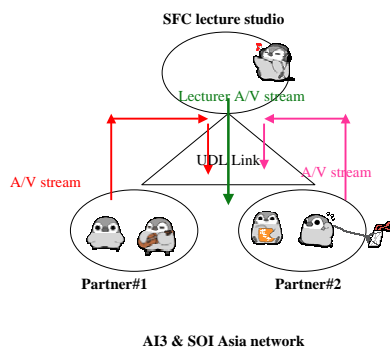
1

SOI Asia Learning Method

- Realtime
 - Interactive session
 - Lecturer and students
 - present at the same time
 - Not at the same place
 - Audio/Video conferencing system
 - over SOI Asia satellite (UDL)
 - Partners's network
- On-demand (Archive)
 - Lecture is recorded in video/audio, material is collected
 - Student learns at anytime

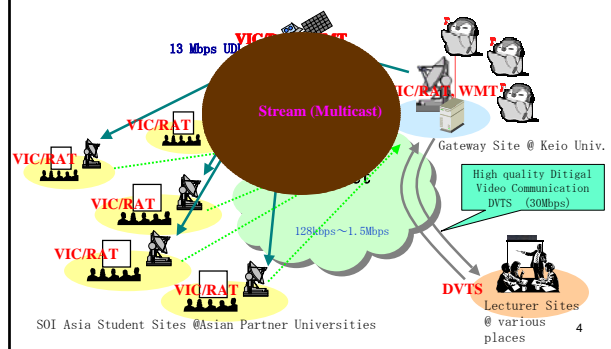
2

Realtime Learning Method



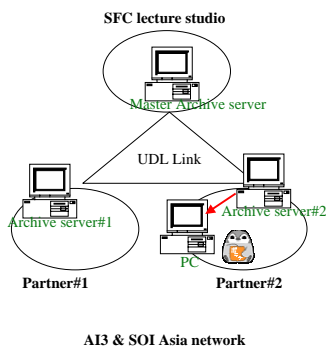
3

Real time class



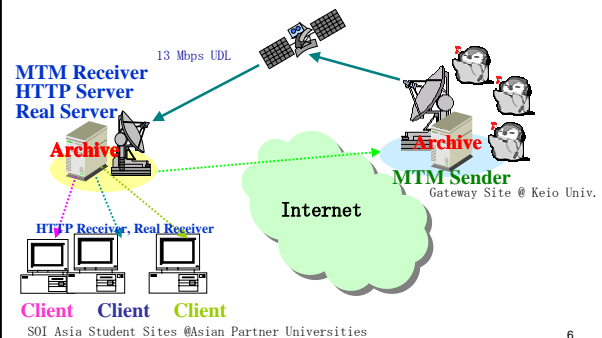
4

On-demand Learning Method



5

On-Demand



6

SOI Asia Learning Method

- Realtime System
 - Tomorrow
- Archive System
 - Today
 - Configure SOI Asia server
 - Archive server
 - Some other Internet services

7

Outline

- Server Purpose
- System Overview
- Installation

8

Server Purposes

- Archive Lecture and File distribution Service
 - Receive lecture video/materials/files from master server
 - Store/Display archive course content
 - HTTP server , Real Server, MTM<Multicast Tree Mirroring>
- Basic Internet Services
 - Other services may be needed by partners
 - DNS, Web cache, DHCP

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Archive Lecture and File distribution

- **Content in SOI Asia system**
- Why do we have to put in local server?
- How these services serve the purposes?
 - WWW , Real Server, MTM<Multicast Tree Mirroring>

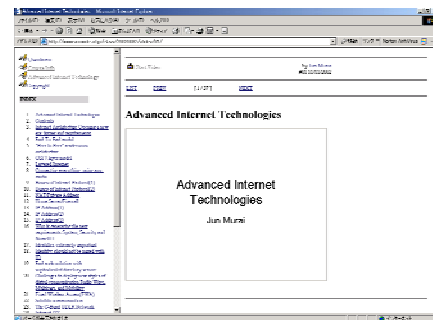
10

SOI Asia Content

- Lecture Material/Handouts
 - PPT, PDF, MSWord, Video files
- SOI Asia Archive Content
 - HTML, Video , Image files

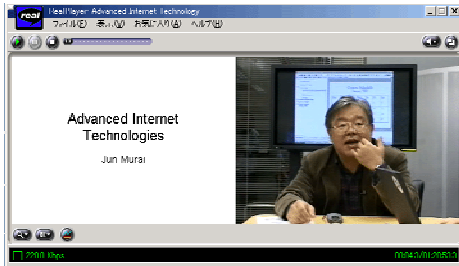
11

SOI Asia Archive Content(1)



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SOI Asia Archive Content(2)



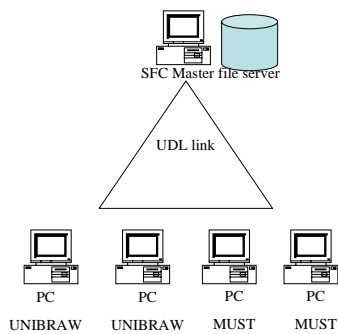
13

Archive Lecture and File distribution

- Content in SOI Asia system
- Why do we have to put in local server?
- How these services serve the purposes?
 - WWW , Real Server, MTM<Multicast Tree Mirroring>

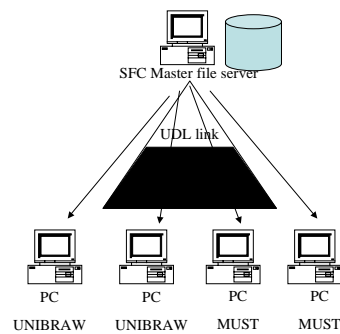
14

Ordinary File Transfer (1)



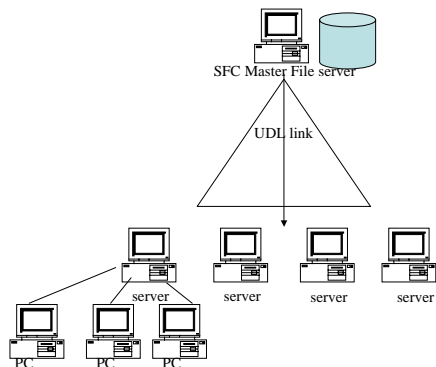
15

Ordinary File Transfer (2)



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SOI Asia File Transfer

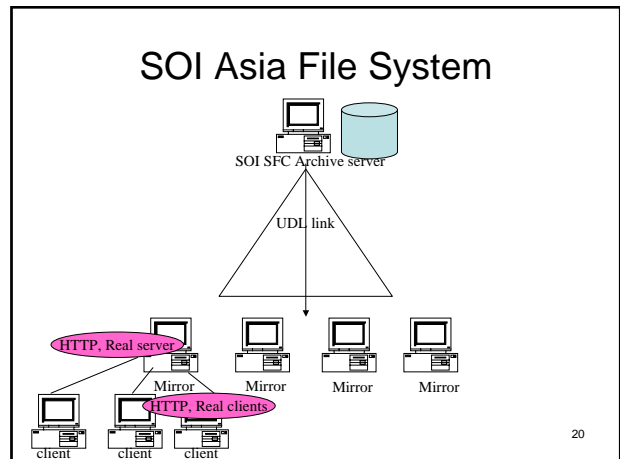
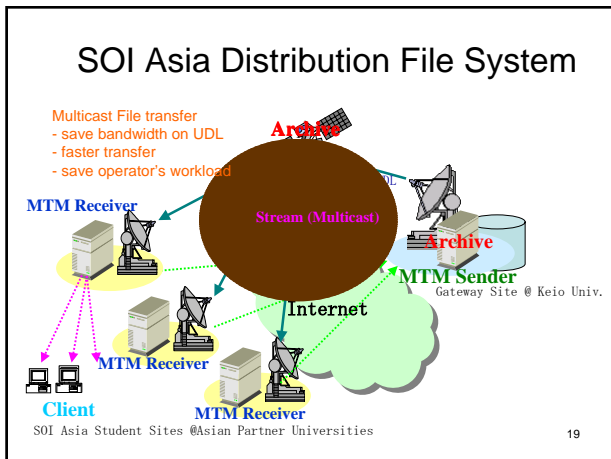


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Archive Lecture and File distribution

- Content in SOI Asia system
- Why do we have to put in local server?
- How these services serve the purposes?
 - HTTP server , Real Server, MTM<Multicast Tree Mirroring>

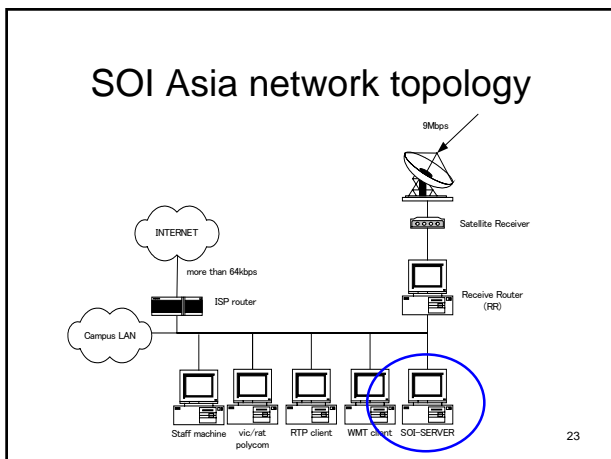
18



Section 1 SOI Asia System Overview

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- ### SOI server system
- OS
 - Fedora Core 4 , <http://fedora.redhat.com/>
 - HW
 - 80GB or larger HDD
 - 256MB RAM or more
 - 1GHz CPU or faster
- 22



- ### IP Assignment
- IPv4
 - Example, 202.249.26.0/255.255.255.248
 - RR = first IP number <202.249.26.1>
 - **SOI server = second IP number <202.249.26.2>**
 - Realtime lecture machines = other remaining IPs
 - IPv6
 - Example, 2001:d30:10a::/64
 - RR = first IP number <2001:d30:10a::1 >
 - **SOI server = second IP number <2001:d30:10a::2>**
 - Realtime lecture machines = other remaining IPs
- 24

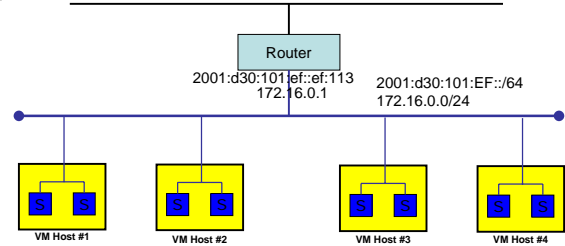
Hostname

- Hostname
<siteName>-soi.ai3.net
– example, sfc-soi.ai3.net, crma-soi.ai3.net

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Virtual SOI Asia Server Network Topology

For IPv4: 172.16.0.y/24
For IPv6: 2001:d30:101:EF::y/64
y= Server #



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Network Configuration

- Check your Lab Sheets

VM Host	Server #	IPv4 host address / prefix	IPv4 Gateway	IPv6 host address/prefix	IPv6 Gateway
2	21	172.16.0.21/24	172.16.0.1	2001:d30:101:ef::21/64	2001:d30:101:ef::ef:113
	22	172.16.0.22/24	172.16.0.1	2001:d30:101:ef::22/64	2001:d30:101:ef::ef:113
	23	172.16.0.23/24	172.16.0.1	2001:d30:101:ef::23/64	2001:d30:101:ef::ef:113
	24	172.16.0.24/24	172.16.0.1	2001:d30:101:ef::24/64	2001:d30:101:ef::ef:113
	25	172.16.0.25/24	172.16.0.1	2001:d30:101:ef::25/64	2001:d30:101:ef::ef:113
	26	172.16.0.26/24	172.16.0.1	2001:d30:101:ef::26/64	2001:d30:101:ef::ef:113

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Section 2 SOI Asia Server System Installation

28

Section2

- Fedora Core 4 Installation
- Network Configuration
- System Update
- Disable unused service
- Remote login permission

29

STEP 1,2

Section 2 SOI Asia Server System Installation

30

STEP 1,2

- Fedora Core4 Installation
 - SKIP
 - On the textbook page #3

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STEP 3

Section 2
SOI Asia Server System Installation
On the textbook page#4

32

Network Configuration

- /etc/sysconfig/network

```
NETWORKING=yes
HOSTNAME=sfc-soi.ai3.net
GATEWAY=202.249.26.1
NETWORKING_IPV6=yes
IPV6_AUTOCONF=no
IPV6_DEFAULTGW="2001:d30:10a::1"
```

- for current workshop class
 - Naming of hostname
 - hostname=server-Y.ai3.net
 - *Y = refer to your server id number
 - IPv4 and IPv6 gateway, please refer to lab sheets

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Network Configuration

- /etc/sysconfig/network-scripts/ifcfg-eth0

```
DEVICE=eth0
BOOTPROTO=static
ONBOOT=yes
IPADDR=202.249.26.2
NETMASK=255.255.255.248
IPV6INIT=yes
IPV6ADDR=2001:d30:10a::2/64
```

- for current workshop class
 - IPv4 and IPv6 address allocation, please refer to lab sheets

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Network Configuration

- /etc/resolv.conf

```
search ai3.net
nameserver 202.249.24.33
nameserver 202.249.25.11
```

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Network Configuration

- Commands
 - # service network restart
 - # ifconfig
 - # ping
 - # ping6

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Network Configuration

- Verification
 - Interface configuration is correct
 - IPv4 and IPv6 reachability to RR

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STEP 4-5

Section 2 SOI Asia Server System Installation

38

Installed Services and Packages

- SOI server : clean install
 - Many services running
 - # ps -ax | more
 - Some services open network connection
 - # netstat -an | more
 - Many packages on system
 - # yum list installed

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Security : services/packages

- Turn off unused services
 - Especially those open network connections
 - You should know all the opening ports
- Update packages (Regularly)
 - Lower security risk
- For running services
 - Limit access to only known clients

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Security : services/packages

- [STEP 4] Turn off unused services
 - # chkconfig servicename on/off
 - #
 - #
 - # reboot
 - # ps -ax
 - # netstat -an or netstat -lnp

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Security : services/packages

- Update packages (Manually)
 - How many packages you have to check? Regularly?
 - # yum list installed
 - How do you know what packages has an updates?
 - Big job for administrator

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Automatic Install/Upgrade

- Repository Server (In INTERNET)
 - Keeps up-to-date packages
 - Commonly used packages
- Fedora Machine
 - Download new packages from the server to install or upgrade
 - Program name: yum , apt-get
 - Configured which repository server you want to use

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Automatic Install/Upgrade

- Convenient to install/upgrade packages
- Auto Periodical upgrade
- Risk on update problems

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YUM Command

```
# yum install <package(s)>
# yum remove <package(s)>
# yum update
# man yum
Yum configuration files:
/etc/yum.repos.d/fedora.repo
/etc/yum.repos.d/fedora-updates.repo
/etc/yum.repos.d/fedora-extras.repo
```

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Yum Configuration

- /etc/yum.repos.d/fedora.repo


```
[base]
name=Fedora Core $releasever - $basearch - Base
baseurl=ftp://sfc-ftp.ai3.net/pub/linux/fedora/core/$releasever/$basearch/os
http://sfc-ftp.ai3.net/pub/linux/fedora/core/$releasever/$basearch/os
http://ftp.jaist.ac.jp/pub/Linux/Fedora/core/$releasever/$basearch/os/
http://download.fedora.redhat.com/pub/fedora/linux/core/$releasever/$basearch/os/
```

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Yum Configuration

- /etc/yum.repos.d/fedora-updates.repo


```
[updates-released]
name=Fedora Core $releasever - $basearch - Released Updates
baseurl=ftp://sfc-ftp.ai3.net/pub/linux/fedora/core/updates/$releasever/$basearch
http://sfc-ftp.ai3.net/pub/linux/fedora/core/updates/$releasever/$basearch
http://ftp.jaist.ac.jp/pub/Linux/Fedora/core/updates/$releasever/$basearch
http://download.fedora.redhat.com/pub/fedora/linux/core/updates/$releasever/$basearch
```

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Fedora Core 4 packages upgrade

```
# yum update
# chkconfig yum on
# service yum start
# reboot ← can be skipped
(In case of kernel upgrade, then need to do)
– Check for the yum log file at /var/log/yum.log
# tail -f /var/log/yum.log
```

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Lab Work

- Follow the instruction of Step 4 - 5 on the textbook page#6

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STEP 6-9

Section 2 SOI Asia Server System Installation

50

Security for Remote Login

- TELNET <default disable>
 - Plain text password, unencrypted session
 - Do not use
- SSH <default enable>
 - Encrypted session

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SSH Operation

1. Always upgrade Openssh/Openssl packages on your server to the most up-to-date version.
2. Configuration
 - No Root Login
 - No Empty password <default>
3. Access Control
 - Allow known networks to connect

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User

```
# adduser username  
# passwd username
```

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SSH configuration

- /etc/ssh/sshd_config

```
PermitRootLogin no
```

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Access Permission

- `/etc/hosts.allow`

```
# Allow access from WIDE Project
ALL: 203.178.136.0/255.255.248.0
ALL: 202.249.25.10
#Allow access inside SOI Local network
ALL: [2001:d30:10a::]/48
ALL: 202.249.26.0/255.255.255.248
```
- `/etc/hosts.deny`

```
ALL: ALL
```

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Lab Work

- Follow STEP 6-9 in text book
- on page#7 - 8

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Section 3 SOI Asia archive server Installation

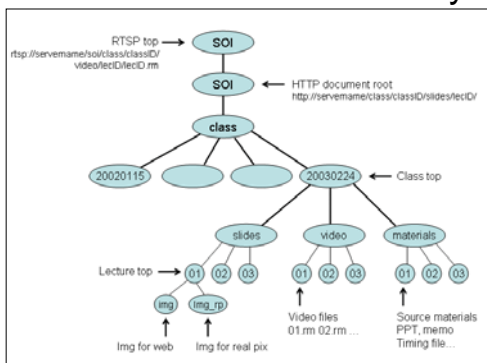
57

Section3

- SOI Asia directory structure
- HTTP Installation
- Real server Installation
- MTM Installation

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SOI Asia Archive Directory



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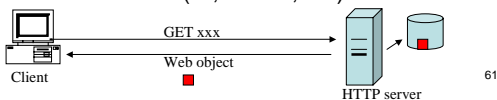
STEP 1-2

Section 3 SOI Asia archive server Installation

60

HTTP Service

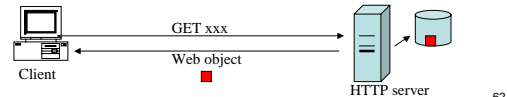
- HTTP server
 - Store Web contents, HTML files, images, etc.
 - Want to show web contents
- HTTP client
 - Want to see web content
 - Web browser (IE, Firefox, etc.)



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HTTP Procedure

1. HTTP server waits at port 80
2. HTTP client connect to port 80
3. HTTP client sends a request to get a Web content using HTTP protocol
4. HTTP server sends requested web content back.
5. Web content displayed on browser



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HTTP Content Directory

- A particular directory that contains html files
- Not showing whole system directory because of information security
 - /etc – system information, user information
- HTTP server will show content starting from that directory

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HTTP content directory

Example. Content directory : /soi/soi

1. File : /soi/soi/hello.html
http://server_ip/hello.html
2. File : /soi/soi/class/20030014/lecture.html
http://server_ip/class/20030014/lecture.html
3. File : /home/yoo/test.html
CANNOT BE ACCESSED
It is not under HTTP content directory

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HTTP Installation (STEP 1)

- Create web content directory /soi/soi
- Install HTTPD
- Configure HTTPD to know that its content directory is /soi/soi (DocumentRoot parameter)
- Start service
- Verification
 - Create small HTML file in root directory
 - Notice that you access /soi/soi/index.html file by URL http://soi_server_ip/index.html
 - Use 2 Windows machines at back of classroom to access your server
- Follow [STEP 1] instructions on the textbook page#9 - 10

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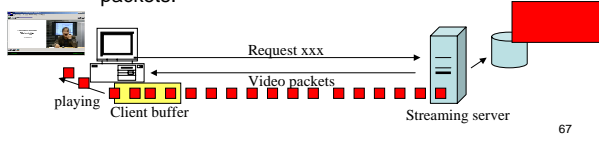
Video/Audio Streaming service

- Streaming server
 - Store video/audio file
 - Want to display video/audio file
- player
 - Want to play audio/video
 - Window media player, Realplayer

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Streaming Concept

- Video/Audio file is divided into small packets and deliver from streaming server to player
- Player has a buffer to store video/audio packets
- Player start playing video/audio from buffer without waiting for a whole file to be downloaded.
- At the playing time, buffer is filled with coming packets.



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Real Streaming Server

- Install Real streaming server
- Create directory "soi" under real server's content root to point to /soi/soi
- Start service
- Verification
 - Use real player to play an example video with URL `rtsp://(your SOI server's IP)/real9video.rm`
- Follow [STEP 2] instructions in the textbook page#11 - 13

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STEP 3

Section 3 SOI Asia archive server Installation

69

Multicast Tree Mirroring(MTM)

- Developed by SOI Asia project
- Distribution of a directory tree or a file
- SOI master server - > partner's servers
- Reliable Multicast Transport Protocol<RMUS from AIT>
- IPv4/IPv6

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MTM (1)

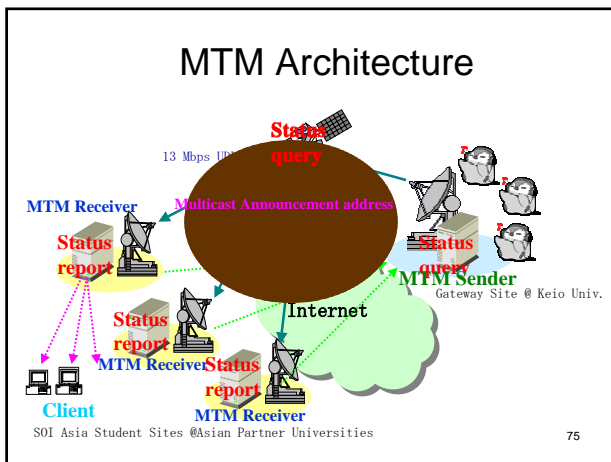
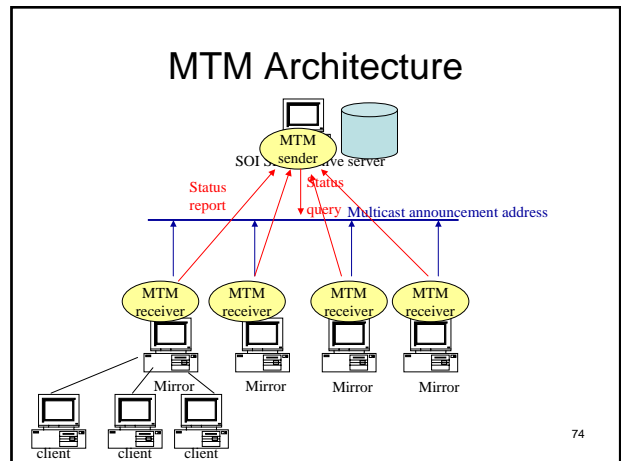
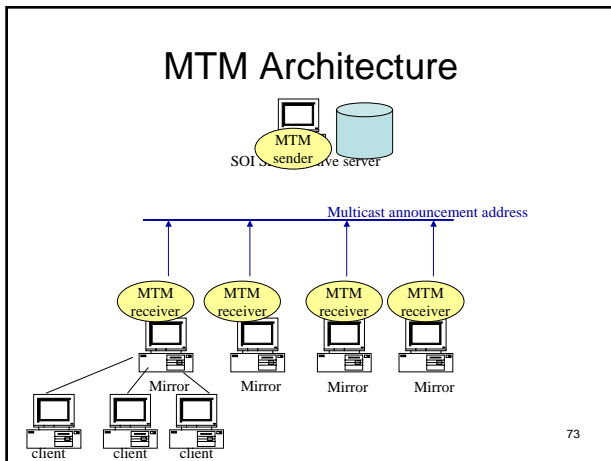
- Multicast is bandwidth saving
 - Send a 1-Mbytes file to 21 partners in same UDL link
 - Unicast : send 21 times, use UDL to transfer 21 Mbytes
 - Multicast : send 1 time, use UDL to transfer 1 Mbytes
- Multicast is not reliable
 - Packets loss
 - Packets out of order
- MTM – develop Reliable Multicast Protocol for a transfer session

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MTM (2)

- If some targeted servers have problem
 - Network down
 - Server down
 - Normal case in SOI Asia environment
- Ordinary transfer
 - Has small timeout < 1 min
 - Transmission failed, not continued
 - Operator has to manually try to transfer later
- MTM keeps retransmit to targeted servers (no timeout) – except cancelled manually

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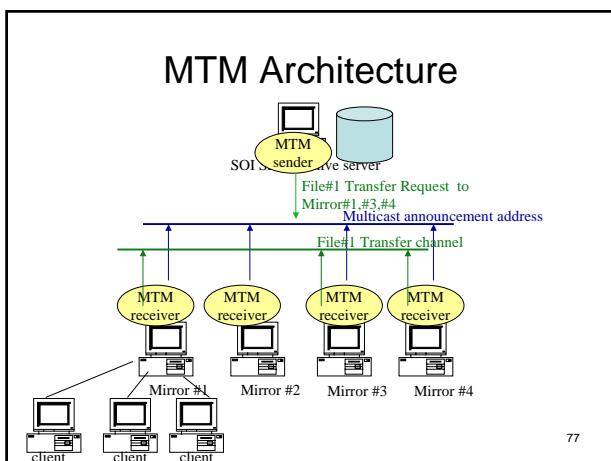


MTM Receiver Status

• http://sfc-mtm.ai3.net/soiasia_mirror/

SOI ASIA Project				
Mirror System				
Menu	Site	IP	Status	Duration (Days H:M:S)
+	AVT	-	DOWN [IP=4 Loss = 100%]	-
+	BUET	2001.430.118.2	UP	0day(0:0:5)
+	CHULA	2001.430.104.2	UP	0day(0:0:9)
+	CEMA	2001.430.115.2	UP	0day(0:0:9)
+	ITB	2001.430.193.3000.202.4485696.thc	UP	0day(0:0:6)
+	CMMA	-	DOWN [IP=4 Loss = 100%]	-
+	ITC	-	DOWN [IP=4 Loss = 100%]	-
+	MUST	-	DOWN [IP=4 Loss = 100%]	-
+	ITC	-	DOWN [IP=4 Loss = 100%]	-
+	MUST	-	DOWN [IP=4 Loss = 100%]	-
+	NVOL	-	DOWN [IP=4 Loss = 100%]	-
+	PRIM	2001.430.1215.2	UP	0day(0:0:9)
+	PRM	-	DOWN [IP=4 Loss = 9%]	-
+	PSU	-	DOWN [IP=6 Loss = 100%]	-

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MTM Distribution Status

• http://sfc-mtm.ai3.net/soiasia_mirror/

JobID	Time (JST)	Directory	Course	Status
1	02August2005-17:55:59	/sco/sco/class/20060070/materials/01	MTM Test Course	FINISH
2	05August2005-17:51:07	/sco/sco/class/20060070/materials/01/h2M	MTM Test Course	FINISH
3	05August2005-17:51:46	/sco/sco/class/20060070/materials/01/h2m	MTM Test Course	FINISH
4	05August2005-17:52:33	/sco/sco/class/20060070/materials/01/h2mM	MTM Test Course	FINISH
5	05August2005-18:03:16	/sco/sco/class/20060070/materials/01/h3G	MTM Test Course	FINISH
6	07August2005-11:17:57	/sco/sco/class/20060070/materials/01/h3G	MTM Test Course	FINISH
7	07August2005-11:19:15	/sco/sco/class/20060070/materials/01/h2M	MTM Test Course	FINISH
8	07August2005-11:19:39	/sco/sco/class/20060070/materials/01/h2mM	MTM Test Course	FINISH
9	07August2005-11:20:06	/sco/sco/class/20060070/materials/01/h2mM	MTM Test Course	FINISH
10	07August2005-12:12:02	/sco/sco/class/20060070/materials/01/h3G	MTM Test Course	FINISH
11	07August2005-12:12:33	/sco/sco/class/20060070/materials/01/h2M	MTM Test Course	FINISH

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MTM Configuration

- /usr/local/mtm6/mtm.conf
- MTM_MULTICAST_ADDRESS=FF05::1151
- MTM_MULTICAST_PORT=49998

RECEIVER_ID=**SFC**

CMD_RUN_PASSWORD=SOI-seCREt
 RUN_DIR=/usr/local/mtm6/run/
 LOG_DIR=/usr/local/mtm6/log/
 HTML_DIR=/usr/local/mtm6/html/
 TMP_DIR=/tmp/mtm

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MTM

- Install MTM receiver
- RECEIVER_ID set as **soiX-ow2006**
- Start service
- Verification
 - Check if your RECEIVER_ID is listed on http://sfc-mtm.ai3.net/soiasia_mirror/
- Follow [STEP 3] instructions on the textbook page#14 - 15
- Note: X = your server id number
 - e.g: **soi23-ow2006**

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SOI Asia mirror system

- Sender side
 - Manage File Transfer for SOI Asia courses
 - Issue a Transfer
 - Monitor Transfer status
 - Report receiver status
- Receiver side
 - Register to receive course content
 - Material
 - Archive
 - Both
 - Check transfer history and receiver status

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SOI Asia procedure to receive class materials and archive lectures

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procedure

1. Install HTTP,Real,MTM service on SOI server. After done, report following information to operator mailing list.
 SOI server's IPv4
 SOI server's IPv6
 RECEIVER_ID setting in mtm.conf

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procedure

2. SOI Asia staff registers partner to MTM system

SOI ASIA Project				
Mirror System				
Receiver Status	Site	IP	Status	Duration (D days H:M:S)
+	CRMA	2001:430:115:0:204:61E6:07:959a	UP	0days(0:0:5)
+	SFC_RO1_1	2001:430:10a:2	UP	0days(4:46:8)
+	SFC_RO2_1	2001:430:10b:106:2	UP	0days(4:46:8)
+	UNDBRAW	2001:430:111:2:20c:76ff:627:c163	UP	0days(0:41:33)
+	UNSRAT	-	DOWN	-
			[IPv4 Loss = 0%]	
			[IPv6 Loss = 0%]	

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procedure

3. For each SOI Asia course, there is an announcement asking partner's interest to receive content.
4. Operator checks technical readiness of SOI Asia server

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procedure

5. Operator registers receiving choice at http://sfc-mtm.ai3.net/soiasia_mirror/.
- ** Affect from the day you register

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procedure

6. Notification mail for each transfer

An MTM file transfer has been started with the following details.

File Type : Lecture material
Course : [20060070] MTM Test Course
Lecture No. : 01
Lecture Date : 4 August 2005
Job ID : 5
Directory : /soi/soi/class/20060070/materials/01
SOI Servers : SFC_RO1_1,CRMA,
[DOWN servers]: SFC_RO1_1
URL Local : http://YOUR_SOI_SERVER_IP/
URL Staff Page: http://sfc-mtm.ai3.net/mtm/mtm6/rs.html

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procedure

7. Operator check job status at http://sfc-mtm.ai3.net/soiasia_mirror/ .
- download local content at http://YOUR_SOI_SERVER_IP/ .

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Basic Internet Services

- DNS
- Web cache
- DHCP

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STEP 1

Section 4. SOI Asia Internet Service Installation

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DNS

DNS - Domain Name System

- A system to translates domain names into IP addresses
- Domain name(Alphabetic) is easier to remember than IPv4(32 bits), IPv6(128 bits)

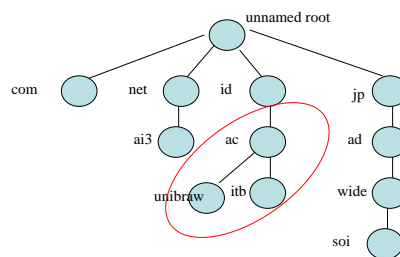
92

Domain name

- mail.ai3.net
mail.ai3.net is under .ai3.net domain
.ai3.net is under .net domain
.net is top-level domain

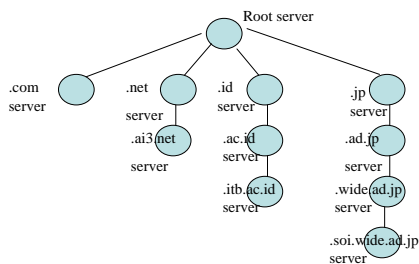
93

Domain name structure



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DNS Authoritative Servers



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Authoritative server role

- Take care of its own domain
 1. Keep records of Name -> IP
 2. Keep links to servers of subdomains

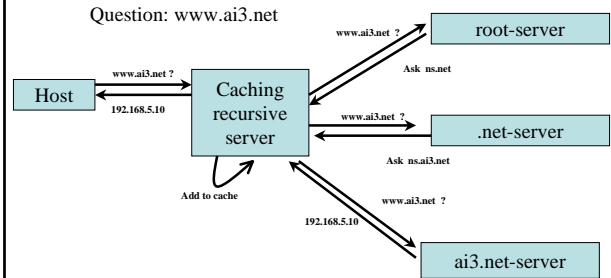
96

DNS Server

- Two main types of DNS server
 - Authoritative server
 - Take care of a domain
 1. Keep records of Name -> IP
 2. Keep links to servers of subdomains
 - (Caching) recursive server
 - Do not have a domain
 - Do the name resolve

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Resolving process



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SOI Asia DNS

- Caching Only Name Server
- Bind 9

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SOI Asia DNS

- `/var/named/chroot/etc/named.conf`

```
options {
    directory "/var/named";
    dump-file "/var/named/data/cache_dump.db";
    statistics-file "/var/named/data/named_stats.txt";
    allow-query { 202.249.26.0/29; localhost;
                2001:d30:10a::/48; ::1/128; fe80::/10; };
    allow-recursion { 202.249.26.0/29; localhost;
                    2001:d30:10a::/48; ::1/128; fe80::/10; };
    allow-transfer { none; };
    listen-on-v6 { any; };
};
```

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Step 1

- Install Bind, follow step 1 on the textbook page#19
- Configuration
- Service start
- Verification command


```
# nslookup www.sqi.wide.ad.jp ::1
```

DNS server you ask



DNS name you want to resolve



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STEP 2

Section 4. SOI Asia Internet Service Installation

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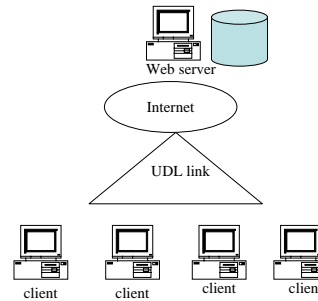
HTTP cache proxy

Concept

- User shares same interests in accessing WWW
- Keeps web objects closer to users
- Reduce bandwidth usage
- Improve access time

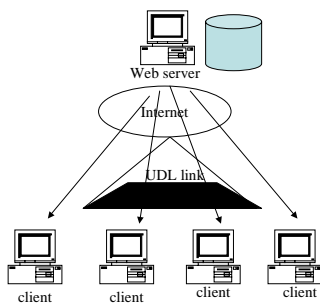
103

HTTP model



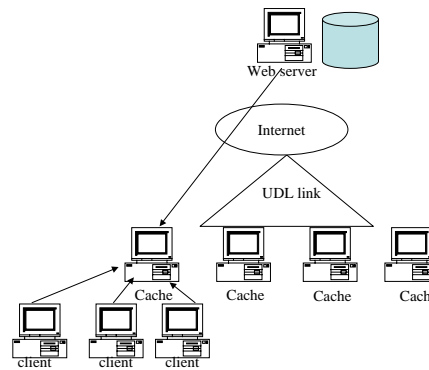
104

HTTP model



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Web caching



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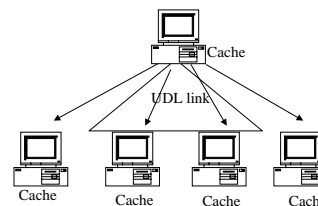
Web cache mechanism

- HTTP client sends HTTP request to a web cache instead of HTTP server
- Web cache checks if the required URL is in local storage or not
- If yes<cache hit>, send this local object to client
- If no<cache miss>, get object on HTTP server and keep it in local disk

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SOI Asia Cache peering

Parent cache: sfc-cache.ai3.net



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SOI Asia Cache Structure

- Partner setups a web cache on SOI server
- Ask all HTTP clients to use web cache
- Together helps reduce bandwidth on UDL

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SOI Asia Web Cache

- Squid
- Additional Configuration

```
visible_hostname server-Y.ai3.net
*Y = refer to your server ID number
```

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Squid logfile analyzer

- Squid-graph script
 - Parsing access.log
 - Web/Image report of usage
 - Run every hour

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Lab Work

- Installing and Configuring Web Cache Proxy
- Follow [STEP 2] on the textbook page#20 - 22

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STEP 3

Section 4. SOI Asia Internet Service Installation

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DHCP

- Dynamic Host Configuration Protocol
 - enable individual computers on an IP network to extract their configurations from a server
IP, netmask, domain, default route
- Motivation
 - to ease the work for administering the network
 - Temporary clients shares limited number of IP addresses

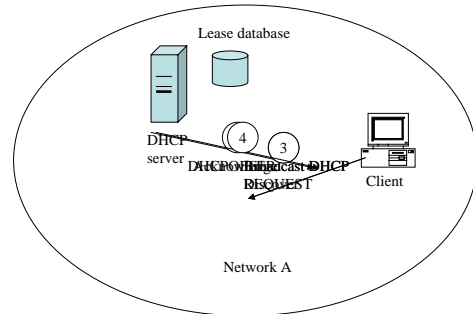
114

DHCP

- DHCP server
 - Keep pool of IP address
 - When requested, lease a network configuration for a specific period <lease time>
 - Keep tracks of currently used IP
 - Network parameters are all set by administrator

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DHCP Lease Mechanism



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DHCP Configuration

default-lease-time : lease time server gives to client
 maximum-lease-time: limitation of client's lease time request
 range : pool of IPs to be dynamically assign
 others: network information

- Follow instructions in [STEP 3] on the textbook page#22 - 23
- Please refer to lab sheets for installation in this workshop
 - We will skip testing or verification of DHCP service.

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SOI Asia Server IPv6 Status

Service	IPv6	Client	IPv6
Linux 2.6.17-1.2142_FC4	OK		
SSHD (openssh-4.2p1, openssl-0.9.7f)	OK	PuTTY 0.58 WINSXP 3.75	OK OK
HTTP (Apache/2.0.54)	OK	IE 6 Firefox	OK OK
Named (BIND 9.3.1)	OK	Window Linux/FreeB SD	NO OK OK
Real Server (Helix DNA Server Plus 11.0.99.1878)	OK	Real Player	NO
SQUID 2.5.STABLE13	NO	IE Firefox	NO

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Thank you

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