

SOI Asia Server Installation

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 SOI Asia Global e-Workshop 2008

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Outline

- SOI Asia Learning Methodologies
- SOI Asia server purpose
- SOI Asia server installation
 - System/Network configuration
- Archive Lecture Service
 - Web/Real streaming/MTM
- IPv6 Internet support service
 - DNS Totd/ Proxy/DHCP
- Network monitoring tool
 - Dbeacon/SSMPing

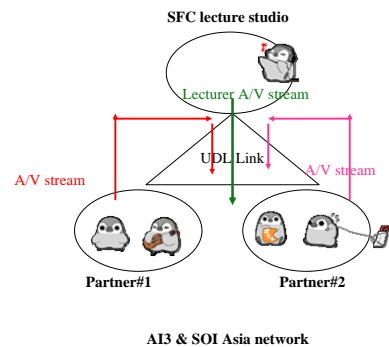
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SOI Asia Learning Method

- 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

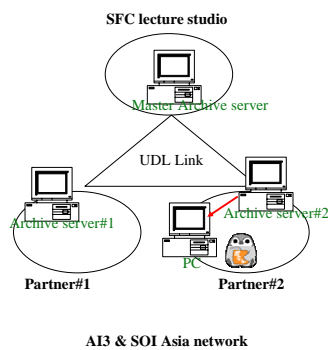
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Realtime Learning Method



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On-demand Learning Method



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SOI Asia Learning Method

- Realtime System
 - Tomorrow
- Archive System
 - Today
 - Configure SOI Asia server
 - Archive server
 - IPv6 Internet services support

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Outline

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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>
- IPv6 Internet Services
 - DNS + Totd, Web cache, DHCP
 - Other services may be needed by partners

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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>

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SOI Asia Content

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

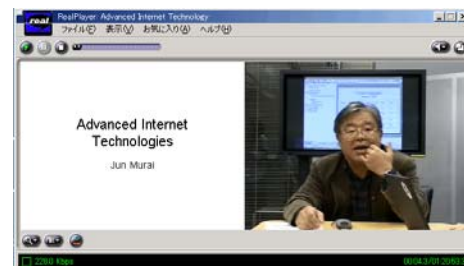
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SOI Asia Archive Content(1)



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SOI Asia Archive Content(2)

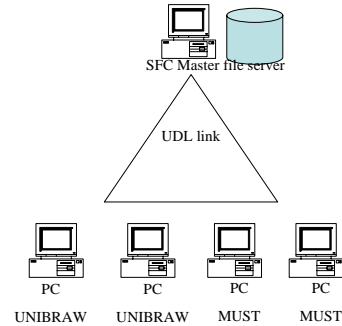


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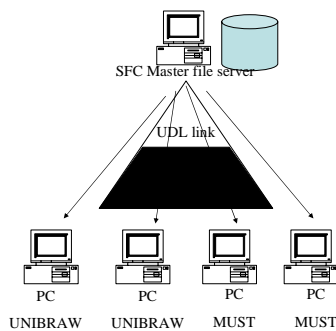
Archive Lecture and File distribution

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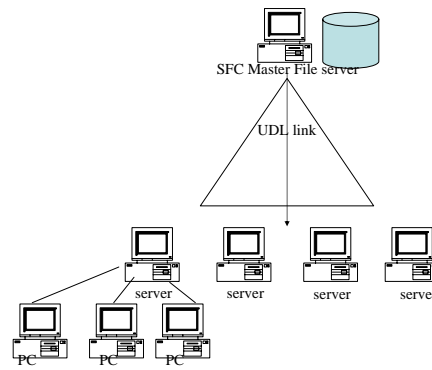
Ordinary File Transfer (1)



Ordinary File Transfer (2)



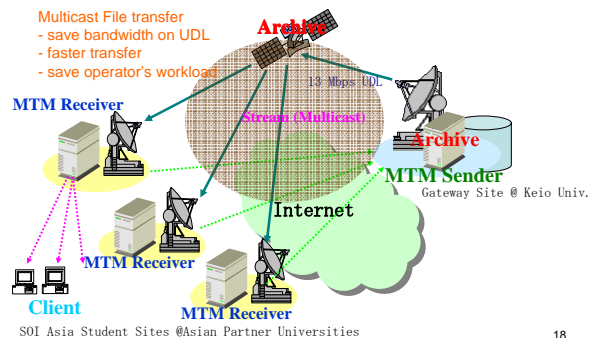
SOI Asia File Transfer

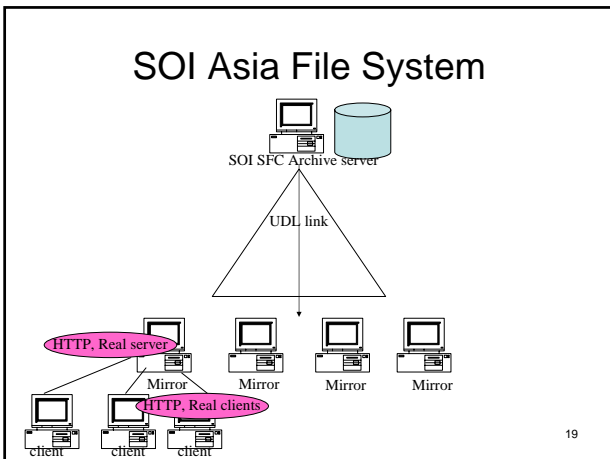


Archive Lecture and File distribution

- 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>

SOI Asia Distribution File System



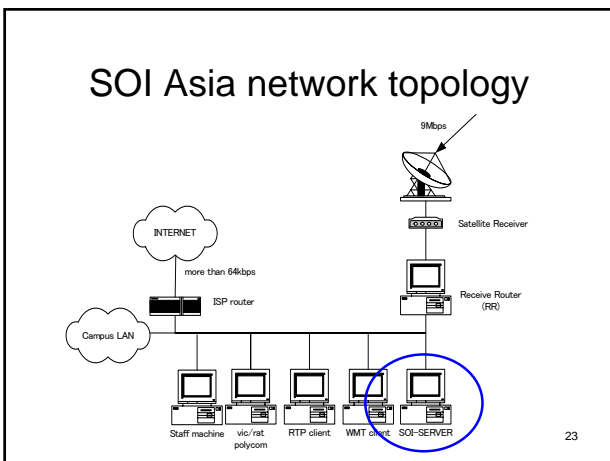


- ### Outline
- SOI Asia Learning Methodologies
 - SOI Asia server purpose
 - **SOI Asia server installation**
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Section 1 SOI Asia System Overview

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- ### SOI server system
- OS
 - Fedora Core 6 , <http://fedora.redhat.com/>
 - HW
 - 80GB or larger HDD
 - 512MB RAM or more
 - 1GHz CPU or faster
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- ### IP Assignment in your site
- IPv6 (Global)
 - Global Internet connectivity
 - Example, 2001:d30:3EE:1b::/64
 - RR = first IP number <2001:d30:3EE:1b::1 >
 - **SOI server = second IP number <2001:d30:3EE:1b::2>**
 - Realtime lecture machines = other remaining IPs
 - IPv4 (Private)
 - Purpose: Local LAN communication
 - Example, 10.200.11.0/255.255.255.0
 - RR = first IP number <10.200.11.1 >
 - **SOI server = second IP number <10.200.11.2>**
 - Realtime lecture machines = other remaining IPs
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Hostname

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

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Section 2 SOI Asia Server System Installation

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Section2

- Fedora Core 6 Installation
- Network Configuration
- Disable unused service
- System Update
- Remote login & permission

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STEP 1,2

Section 2 SOI Asia Server System Installation

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STEP 1,2

- Fedora Core6 Installation

–SKIP

- On the textbook page #4

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By NOW

- Make sure you have
 - TEXTBOOK DAY4
 - LABEL PART NEEDED to be replaced
- ```
IPV6_AUTOCONF=no
IPV6_DEFAULTGW="2001:d30:10a::1"
```
- LAB INFORMATION SHEET
    - REFER to DAY4 SOI SERVER
  - OPEN LIVETTY

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## STEP 3

### Section 2 SOI Asia Server System Installation

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## Network configuration

- 3 configuration files [FORGET about FREEBSD]
  - /etc/sysconfig/network
    - Hostname, Default Gateway
  - /etc/sysconfig/network-scripts/ifcfg-eth0
    - IPv4/IPv6 Address, Netmask
  - /etc/resolv.conf
    - DNS server

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## STEP3

### /etc/sysconfig/network

```
#Replace the xxx notation with the your lab
network settings
NETWORKING=yes
HOSTNAME=ow2008-soi-77.ai3.net
NETWORKING_IPV6=yes
IPV6_AUTOCONF=no
IPV6_DEFAULTGW="2001:d30:3EE:1b::1"
```

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## STEP3

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

```
DEVICE=eth0
BOOTPROTO=static
ONBOOT=yes
IPADDR=10.200.11.77
NETMASK=255.255.255.0
IPV6INIT=yes
IPV6ADDR=2001:d30:3EE:1b::77/64
```

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## STEP3

### /etc/resolv.conf

```
search ai3.net
nameserver ::1
nameserver 2001:d30:101:1::11
```

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## STEP3

### Restart network config

```
service network restart
Shutting down interface eth0: [OK]
Shutting down interface eth4: [OK]
Shutting down loopback interface: [OK]
Bringing up loopback interface: [OK]
Bringing up interface eth0: [OK]
Bringing up interface eth4: [OK]
```

**SHORT session loss,  
don't disconnect**

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## Verification

```
ifconfig eth0
eth0 Link encap:Ethernet HWaddr 00:0E:0C:AA:EF:C0
 inet addr:10.200.11.77 Bcast:10.200.11.255
 Mask:255.255.255.0
 inet6 addr: 2001:d30:3ee:1b::77/64 Scope:Global
 inet6 addr: fe80::20e:cff:feaa:efc0/64 Scope:Link
 UP BROADCAST RUNNING MULTICAST MTU:1500 Metric:1
 RX packets:34869 errors:0 dropped:0 overruns:0 frame:0
 TX packets:788 errors:0 dropped:0 overruns:0 carrier:0
 collisions:0 txqueuelen:1000
 RX bytes:4862037 (4.6 MiB) TX bytes:74998 (73.2 KiB)
 Base address:0x4000 Memory:d8000000-d8020000
```

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## Verification

- [root@server-X soj]# ping6 2001:d30:3EE:1b::1
- PING 2001:d30:3EE:1b::1(2001:d30:3ee:1b::1) 56 data bytes
- 64 bytes from 2001:d30:3ee:1b::1: icmp\_seq=1 ttl=64 time=1.10 ms
- 64 bytes from 2001:d30:3ee:1b::1: icmp\_seq=2 ttl=64 time=0.202 ms
- --- 2001:d30:3EE:1b::1 ping statistics ---
- 2 packets transmitted, 2 received, 0% packet loss, time 999ms
- rtt min/avg/max/mdev = 0.202/0.655/1.109/0.454 ms
- [root@server-X soj]# ping6 www.kame.net
- PING www.kame.net(orange.kame.net) 56 data bytes
- 64 bytes from orange.kame.net: icmp\_seq=1 ttl=58 time=14.7 ms
- 64 bytes from orange.kame.net: icmp\_seq=2 ttl=58 time=14.9 ms

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## Lab Work

- **Follow the instruction of Step 3**
- **PAGE 5-6 on TEXTBOOK**

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## STEP 4-5

### Section 2 SOI Asia Server System Installation

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## Installed Services and Packages

- SOI server : clean install
  - Many services running
    - # ps -ax | more
  - Some services open network connection
    - # netstat -anp | more
    - tcp 0 0 127.0.0.1:25 0.0.0.0:\*
   
LISTEN 2569/sendmail: acce
  - 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
- For running services
  - Limit access to only known clients
- Update packages (Regularly)
  - Lower security risk

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## Security : services/packages

- [STEP 4] Disable unused services.
  - # **service sendmail stop**
  - # **chkconfig sendmail off**
  - # .....
  - # .....
- Verify by
  - # **netstat -anp|more**

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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/
```

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## Security : services/packages

### [STEP 5] FC6 Packages upgrade

- Edit /etc/yum.conf and add the two lines below.
    - proxy=http://sfc-cache.ai3.net:8080
    - http\_caching=none
  - Install SOI Asia packages
    - # **rpm -ivh ftp://sfc-ftp.ai3.net/soiasia/fedora/6/i386/soiasia-release-1-3.noarch.rpm**
    - # **yum clean all**
  - Update Fedora Core packages and turn on the daily update service.
    - # **yum -y update**
    - # **yum install yum-updatesd**
    - # **chkconfig yum-updatesd on**
    - # **service yum-updatesd start**
- (In case of kernel upgrade during yum update, you need to reboot machine)

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## Lab Work

- Follow the instruction of Step 4 - 5

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## STEP 6-9

### Section 2 SOI Asia Server System Installation

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## 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 control

- 2 Files to put access restrictions
  - /etc/hosts.allow
    - Who do you allow?
  - /etc/hosts.deny
    - ALL
- **{BE CAREFUL, MISCONFIGURATION will PREVENT YOURSELF FROM LOGIN}**
- **After config two files, DONOT logout from your ssh.**
- **Try to login to starbed-xx by another putty session to verify you can login**

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## Hosts.allow

**{BE CAREFUL, MISCONFIGURATION will PREVENT YOU FROM LOGIN}**

- # Allow access from AI3 and SFC
- ALL: [2001:d30::]/32
- ALL: [2001:200::]/48
- #Allow access inside SOI Local network
- ALL: 10.200.11.0/255.255.255.0
- ALL: 127.0.0.0/255.0.0.0
- ALL: [::1]/128
- ALL: [fe80::]/10

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## Hosts.deny

- ALL:ALL

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## Lab Work

- Follow STEP 6-9 in text book Page 8-10
- [STEP 9] is to set default system path to bash shell and set system date

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## Section 3 SOI Asia archive server Installation

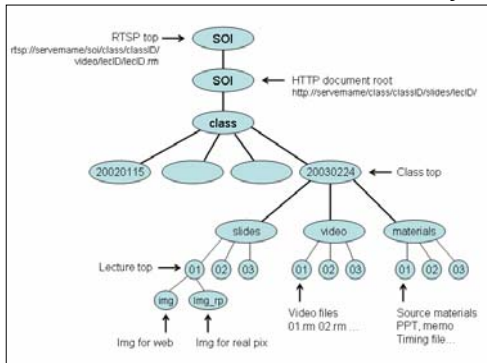
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## Section3

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

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## SOI Asia Archive Directory



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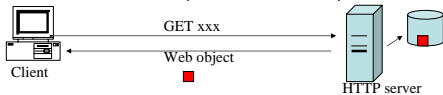
## STEP 1-2

### Section 3 SOI Asia archive server Installation

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## HTTP Service

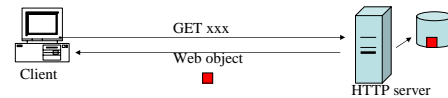
- HTTP server
  - Store Web contents, HTML files, images, etc.
  - Want to show web contents
- HTTP client
  - Want to see web content
  - Web browser (IE, Firefox, etc.)



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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 specified as shared directory through HTTP
- 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](http://server_ip/hello.html)
2. File : /soi/soi/class/20030014/lecture.html  
[http://server\\_ip/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 test HTML file in root directory
  - Verify that you access /soi/soi/test.html file by URL http://[soi\_server\_ipv6]/test.html
- Follow [STEP 1] instructions on the textbook page#11-12

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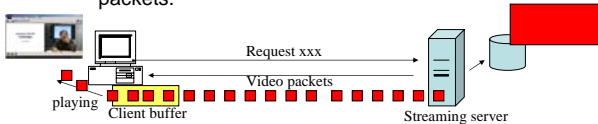
### Video/Audio Streaming service

- 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 Installation (STEP 2)

- Install Real streaming server
- Create directory “soi” under real server’s content root to point to /soi/soi
- Start service
- Verification
  - Ask your TA or lecturer to test your real server working or not.

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### STEP 3

#### Section 3 SOI Asia archive server Installation

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### 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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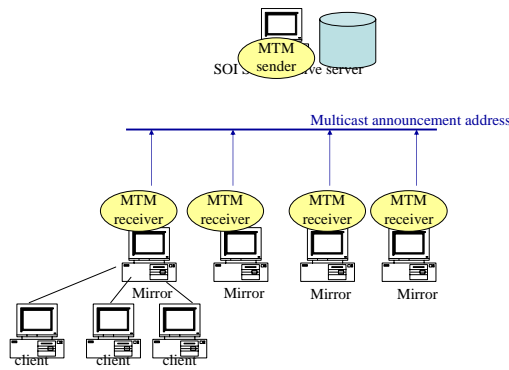
### MTM (1)

- 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

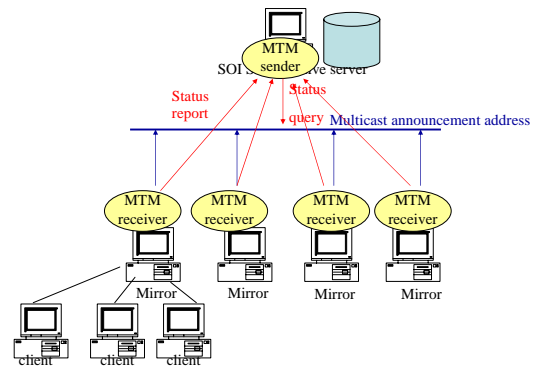
### MTM (2)

- 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

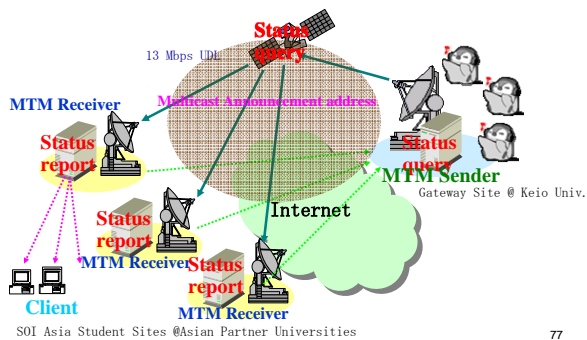
### MTM Architecture



### MTM Architecture



### MTM Architecture



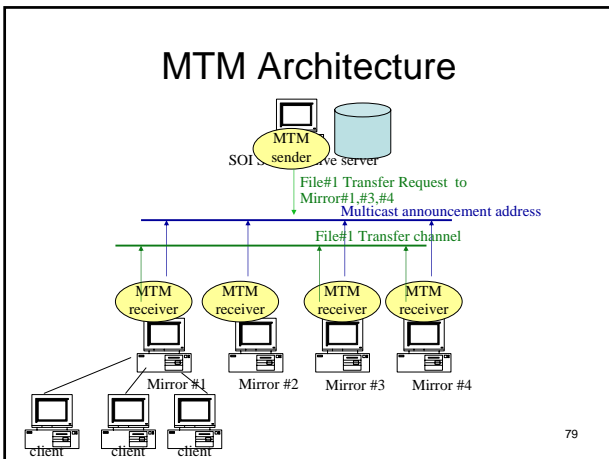
### MTM Receiver Status

- [http://sfc-mtm.ai3.net/soiasia\\_mirror/](http://sfc-mtm.ai3.net/soiasia_mirror/)

SOI ASIA Project

Mirror System

| Site            | Site                           | IP | Status             | Duration (D:Age:R:U:V) |
|-----------------|--------------------------------|----|--------------------|------------------------|
| + Recvite Sites |                                |    |                    |                        |
| + Mirror        |                                |    | DOWN               |                        |
| + Site          |                                |    | [IP:4 Loss = 100%] |                        |
| +AIT            |                                |    | UP                 | 0day(0:0:5)            |
| +BUET           | 2001.450.118.2                 |    | UP                 | 0day(0:0:9)            |
| +CHULA          | 2001.450.115.2                 |    | UP                 | 0day(0:0:9)            |
| +ITB            | 2001.450.103.3000.202448566cbe |    | UP                 | 0day(0:0:6)            |
| +CRMA           |                                |    | DOWN               |                        |
| +ITC            |                                |    | [IP:4 Loss = 100%] |                        |
| +JIB            |                                |    | [IP:4 Loss = 100%] |                        |
| +MUST           |                                |    | DOWN               |                        |
| +NUOL           |                                |    | [IP:4 Loss = 100%] |                        |
| +NUOL           |                                |    | [IP:4 Loss = 100%] |                        |
| +PRIM           | 2001.450.1215.2                |    | UP                 | 0day(0:0:9)            |
| +PRIM           |                                |    | DOWN               |                        |
| +PSU            |                                |    | [IP:4 Loss = 0%]   |                        |
| +PSU            |                                |    | [IP:4 Loss = 100%] |                        |
|                 |                                |    | DOWN               |                        |



### 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
  - Edit configuration
    - RECEIVER\_ID set as **soixx**
  - Start service
  - Verification
    - Check if your RECEIVER\_ID is listed on [http://sfc-mtm.ai3.net/soiasia\\_mirror/](http://sfc-mtm.ai3.net/soiasia_mirror/)
  - Follow [STEP 3] instructions on the textbook page#15-16
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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 IPv6
    - RECEIVER\_ID setting in mtm.conf
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## procedure

- SOI Asia staff registers partner to MTM system

| SOI ASIA Project |                              |                                              |                         |  |
|------------------|------------------------------|----------------------------------------------|-------------------------|--|
| Mirror System    |                              |                                              |                         |  |
| Site             | IP                           | Status                                       | Duration (D days H.M.S) |  |
| CRMA             | 2001.430.115.020461E607959a  | UP                                           | 04days(0:0:5)           |  |
| SFC_RO1_1        | 2001.430.10a.2               | UP                                           | 04days(4:46:8)          |  |
| SFC_RO2_1        | 2001.430.10b-10b-2           | UP                                           | 04days(4:46:8)          |  |
| UNIBRAW          | 2001.430.111.220c76E9e27c163 | UP                                           | 04days(0:41:33)         |  |
| UNSRAT           | -                            | DOWN<br>[IPv4 Loss = 0%]<br>[IPv6 Loss = 0%] | -                       |  |

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## procedure

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

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## procedure

- Operator registers receiving choice at [http://sfc-mtm.ai3.net/soiasia\\_mirror/](http://sfc-mtm.ai3.net/soiasia_mirror/).

\*\* Affect from the day you register

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## procedure

- 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

- Operator check job status at [http://sfc-mtm.ai3.net/soiasia\\_mirror/](http://sfc-mtm.ai3.net/soiasia_mirror/) .  
 - download local content at [http://YOUR\\_SOI\\_SERVER\\_IP/](http://YOUR_SOI_SERVER_IP/) .

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## Section 4 SOI Asia Internet service Installation

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## IPv6 Internet Services

- DNS + Totd
- Web cache
- DHCP

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## STEP 1

### Section 4. SOI Asia Internet Service Installation

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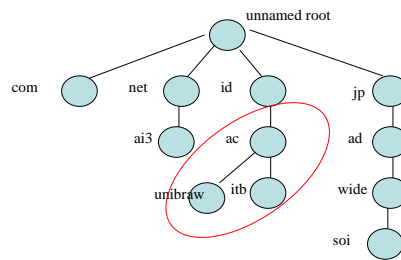
## DNS

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)

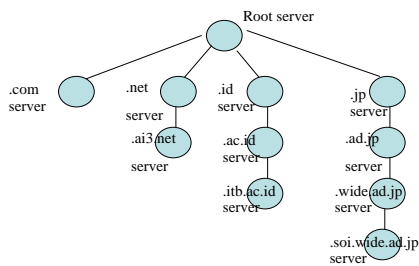
93

## Domain name structure



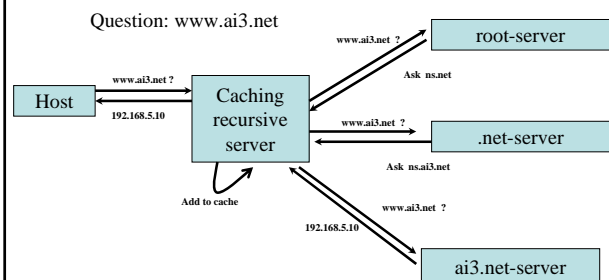
94

## DNS Authoritative Servers



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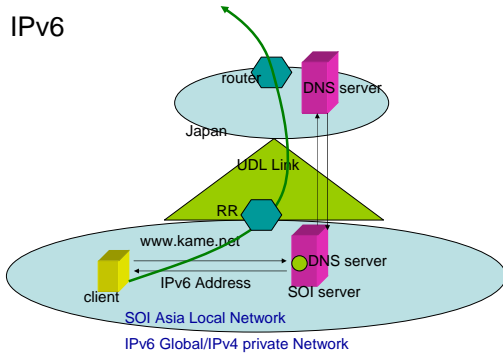
## Resolving process



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### Scenario in IPv6 Only network

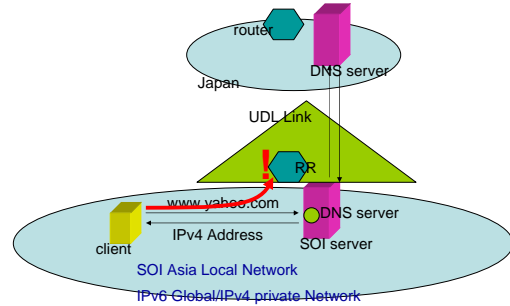
- IPv6



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### Scenario in IPv6 Only network

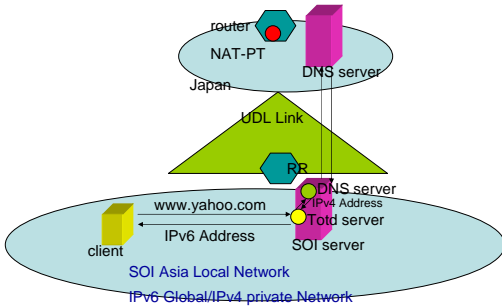
- IPv4



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### Scenario in IPv6 Only network

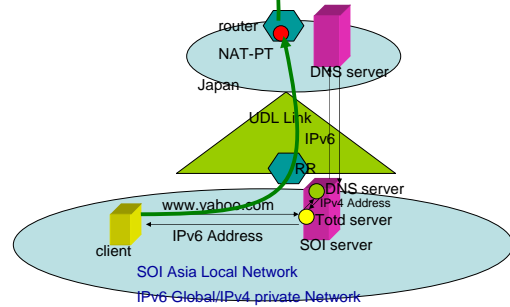
- IPv4 & Solution



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### Scenario in IPv6 Only network

- IPv4 & Solution



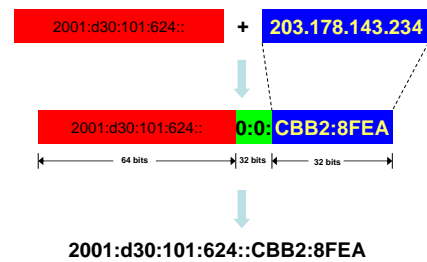
100

### Totd (Trick and Treat Daemon)

- Totd is a small DNS proxy server which maps IPv4 addresses into the specifies IPv6 prefix.
- Totd server need to be configured as dual stack machine if the upstream DNS server is IPv4 only.
- If there is a IPv6 reachable upstream DNS server, then Totd server can be configured to be IPv6 only server.
  - For example: SOI Asia DNS server

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### Totd (Trick and Treat Daemon)



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## DNS server config

/var/named/chroot/etc/named.conf

```
#Replace the xxx notation with the your lab network settings
options {
 forwarders {2001:d30:101:1::11; 2001:d30:102:1000::1001;};
 forward only;
 directory "/var/named";
 dump-file "/var/named/data/cache_dump.db";
 statistics-file "/var/named/data/named_stats.txt";
 allow-query { 10.200.11.0/24; 127.0.0.1; 2001:d30:3EE::/48;
 ::1/128; fe80::/10;};
 allow-recursion { 10.200.11.0/24; 127.0.0.1; 2001:d30:3EE::/48;
 ::1/128; fe80::/10;};
 allow-transfer { none;};
 listen-on port 5353 { any; };
 listen-on-v6 { any; };
};
```

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## Totd config

```
forwarder ::1 port 5353
forwarder 2001:d30:101:1::11 port 53
forwarder 2001:d30:102:1000::1001 port 53
prefix 2001:d30:101:624::
```

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## Lab Work

- Follow STEP 1 in text book Page 17-19

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## Verification

- `nslookup -type=AAAA www.ai3.net ::1`
- `nslookup www.ai3.net ::1`
- `nslookup -type=AAAA ww.yahoo.com ::1`  
**www.yahoo-ht3.akadns.net has AAAA address 2001:d30:101:624::d183:249e**
- `nslookup www.yahoo.com ::1`

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## STEP 2

### Section 4. SOI Asia Internet Service Installation

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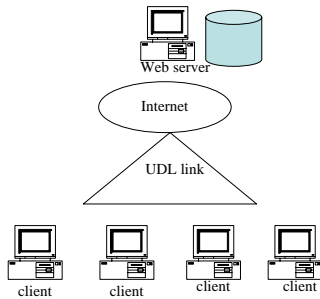
## HTTP cache proxy

### Concept

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

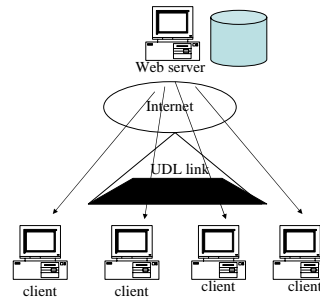
108

### HTTP model



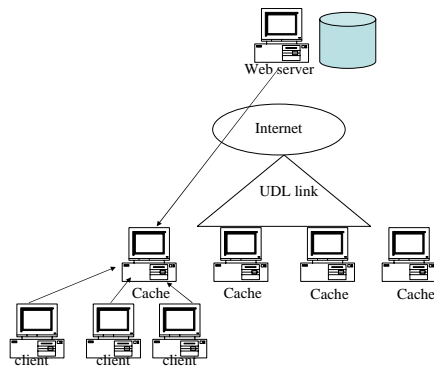
109

### HTTP model



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### Web caching



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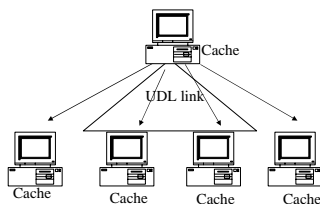
### Web cache mechanism

- 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  
Communication between is IPv6



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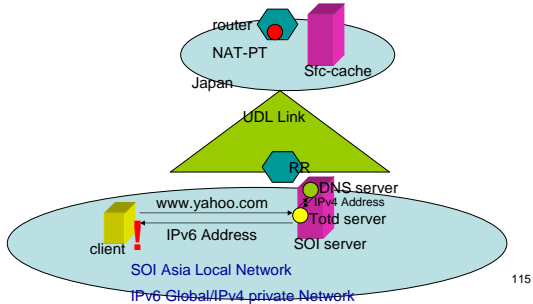
### Web cache as IPv6 Proxy Server

- 1) For IPv4 only application, proxy will help pass the traffic through
- 2) This can reduce some common IPv6 traffic like http and https to flow out through NAT-PT

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### Scenario in IPv6 Only network

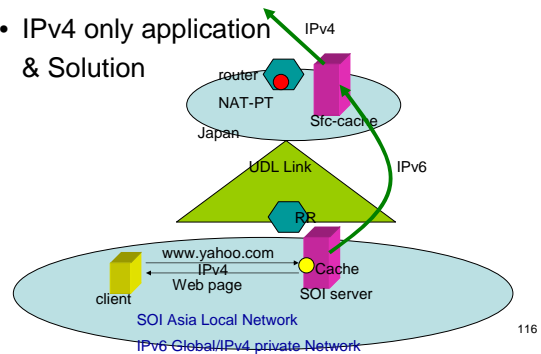
- IPv4 only application



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### Scenario in IPv6 Only network & Solution

- IPv4 only application



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### Squid.conf

```
#Replace the xxx notation with the your lab
network settings
http_port 3128
cache_peer 2001:d30:101:1::5 parent 8080
3130 default proxy-only
cache_dir ufs /var/spool/squid 1600 16 256
access_log /var/log/squid/access.log squid
```

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### Squid.conf

```
acl all src 0.0.0.0/0 ::/0
acl not_v6 dst 0.0.0.0/0 2001:d30:101:624::/64
acl manager proto cache_object
acl localhost src 127.0.0.1/32 ::1/128
acl localsite src 10.200.11.0/24 2001:D30:3EE::/48
http_access allow localhost
http_access allow localsite
http_access deny all
http_reply_access allow all
icp_access deny all
cache_mgr admin@ow2008-soi-xx.ai3.net
visible_hostname ow2008-soi-xx.ai3.net
```

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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

- Install and Configure Web Cache Proxy
- Follow [STEP 2] on the textbook

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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

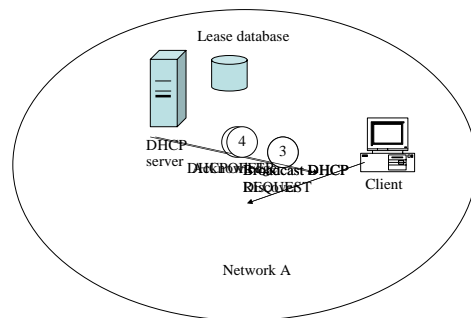
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## DHCP

- DHCP server
  - Keep pool of IPv4 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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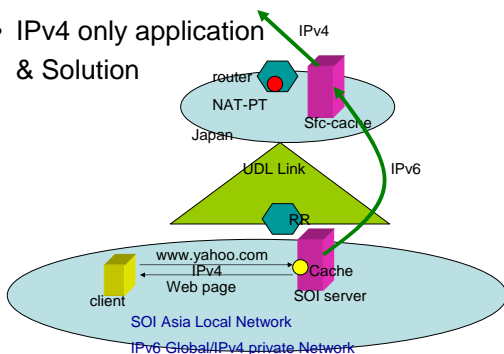
## DHCP Lease Mechanism



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## Why still need IPV4?

- IPv4 only application & Solution



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## Dhcp.conf

```
#Replace the xxx notation with the your lab network settings
ddns-update-style none;
default-lease-time 600;
max-lease-time 7200;
option subnet-mask 255.255.255.0;
option broadcast-address 10.200.11.255;
option routers 10.200.11.1;
option domain-name-servers 10.200.11.77;
option domain-name "ai3.net";

subnet 10.200.11.0 netmask 255.255.255.0 {
 range 10.200.11.100 10.200.11.120;}
```

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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]

- Please refer to lab sheets for installation in this workshop
- We will skip testing or verification of DHCP service.

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## Section 5 SOI Asia Network monitoring tools Installation

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## STEP 1

### Section 5 SOI Asia Network monitoring tools Installation

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## Network Monitoring tools

- ssm ping
- dbeacon

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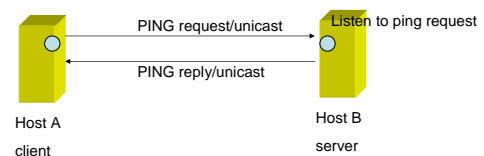
## NetMon tools

- Unicast - Connectivity
  - Ping
  - Ping6
- Multicast ?

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## PING

- Common in every host



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## Multicast PING?

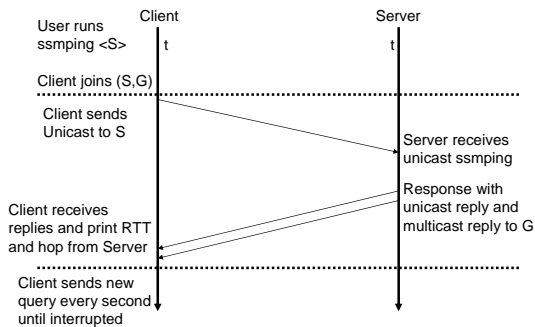
- NOT common
  - Server : SSMPINGD
    - Listen for request
      - send reply to clients in Multicast and Unicast
  - Client : SSMPING (ASMPING)
    - Send request to sender in Unicast
    - Join to Multicast group and wait for multicast reply
    - Wait for unicast reply
- To CHECK
  - Multicast from server can -> Receiver

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## ssmping

- Receiver, send SSM-Ping request (join message) to Sender and waits a reply on (S,G) SSM channel.
- DR multicast along the path will create PIM message and forwards it toward the source, S.
- S, creates reply and sends it to (S,G) SSM channel.
- Packets will propagate along the previous established multicast forwarding path between S to R.

## ssmping: how it works



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## ssmping

```

[abazh@host-]# ssmping -c 4 sfc-soi.ai3.net
ssmping joined (S,G) = (2001:d30:111:2::4,ff3e::4321:1234)
pinging S from 2001:d30:101:1:214:85ff:fe14:f3ca
unicast from 2001:d30:111:2::4, seq=1 dist=3 time=322.098 ms
multicast from 2001:d30:111:2::4, seq=1 dist=3 time=322.130 ms
unicast from 2001:d30:111:2::4, seq=2 dist=3 time=341.902 ms
multicast from 2001:d30:111:2::4, seq=2 dist=3 time=341.936 ms
unicast from 2001:d30:111:2::4, seq=3 dist=3 time=315.358 ms
multicast from 2001:d30:111:2::4, seq=3 dist=3 time=315.493 ms
unicast from 2001:d30:111:2::4, seq=4 dist=3 time=320.869 ms
multicast from 2001:d30:111:2::4, seq=4 dist=3 time=320.906 ms

--- 2001:d30:111:2::4 statistics ---
4 packets transmitted, time 4001 ms
unicast:
4 packets received, 0% packet loss
rtt min/avg/max/std-dev = 315.358/325.056/341.902/10.075 ms
multicast:
4 packets received, 0% packet loss since first mc packet (seq 1) rcvcd
rtt min/avg/max/std-dev = 315.493/325.116/341.936/10.035 ms

```

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## dbeacon – a Multicast beacon

**IPv6 Multicast Beacon**  
 Current server time is Fri Dec 22 13:05:19 2006  
 Current stats for ff18:20::2001:d30:1:beac/10000  
 View [?] (Hide Source Info, Full, ASM and SSM, ASM only): TTL (hop count) LOSS (percentage) Delay (ms) Jitter (ms)

|               | S1 | S2 | S3 |
|---------------|----|----|----|
| SFCMONITOR R1 | 3  | 3  | 3  |
| SFCSOIRO1 R2  | 3  | 2  | 2  |
| UNIBRAW R3    | 3  | 2  | 2  |

Matrix cell colors: Full connectivity (ASM and SSM) X ASM only X SSM only X

|               | Age     | Source Address                   | Admin Contact          | L/M SSM P |
|---------------|---------|----------------------------------|------------------------|-----------|
| SFCMONITOR R1 | 88m 25s | 2001:d30:101:1:20w:cff:fe4e:670c | huani@a13.net          | M         |
| SFCSOIRO1 R2  | 88m 22s | 2001:d30:10a::12                 | abazh@sfc.wide.ad.jp   | -         |
| UNIBRAW R3    | 88m 24s | 2001:d30:111:2::14               | arieff@bravijaya.ac.id | -         |

If you wish to run a beacon in your site check [Running db beacon at db beacon's Wiki](#).

matrix.pl - a tool for dynamic viewing of db beacon information and history, by Hugo Santos, Sebastien Chaumontet and Hoerd Mickael

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## dbeacon (distributed multicast beacon)

- Check Multicast connectivity
  - (Many – to – Many)
- Common group channel
  - receiver and sender on the this channel
  - compute local matrix data
  - Report sent by each beacon to multicast group

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## dbeacon packet format

- common header of 4 bytes.

```

| 0 | 1 | 2 | 3 |

| 0xbeac | 1 | T |

```

- Two types of messages:
  - Probes (0) : to gather statistics about hosts.
  - Reports (1) : report local stats to other beacons, advertise known address – name mappings, etc.

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## Lab Work

- Install and Configure SSMPINGD and Dbeacon
- Verify ssm ping
  - From the <http://mcast.fujisawa.wide.ad.jp/lq/> , can ssm ping to your soi server
- Verify dbeacon
  - From the <http://sfc-monitor.ai3.net/ai3-matrix/>, can see your soi server on.
- Follow [STEP 1] on the textbook

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Thank you

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