

## **SOI Asia Operator Workshop 2005**

### ***SOI Asia Server Setup***

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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	<a href="http://www.soi.wide.ad.jp/soi-asia/staff/download/soiserver/fc4/fc4-i386-disc1.iso">http://www.soi.wide.ad.jp/soi-asia/staff/download/soiserver/fc4/fc4-i386-disc1.iso</a>
CD-6	Fedora Core4 Disk #2	<a href="http://www.soi.wide.ad.jp/soi-asia/staff/download/soiserver/fc4/fc4-i386-disc2.iso">http://www.soi.wide.ad.jp/soi-asia/staff/download/soiserver/fc4/fc4-i386-disc2.iso</a>
CD-7	Fedora Core4 Disk #3	<a href="http://www.soi.wide.ad.jp/soi-asia/staff/download/soiserver/fc4/fc4-i386-disc3.iso">http://www.soi.wide.ad.jp/soi-asia/staff/download/soiserver/fc4/fc4-i386-disc3.iso</a>
CD-8	Fedora Core4 Disk #4	<a href="http://www.soi.wide.ad.jp/soi-asia/staff/download/soiserver/fc4/fc4-i386-disc4.iso">http://www.soi.wide.ad.jp/soi-asia/staff/download/soiserver/fc4/fc4-i386-disc4.iso</a>
CD-10	SOI server	<a href="http://www.soi.wide.ad.jp/soi-asia/staff/download/soi-fc4-sw.iso">http://www.soi.wide.ad.jp/soi-asia/staff/download/soi-fc4-sw.iso</a>

## 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.

**Do not copy the example.**

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
```

- 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 upgrade

```
# yum update
# yum upgrade
# 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 effective.

```
# 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
#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
```

- 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  
export PATH
```

- Set system date in MMDDhhmmYY format. The following example set system's date to 04 August 2005, 18.53.

```
# date 0804185305
```

### 3. SOI Asia archive server Installation

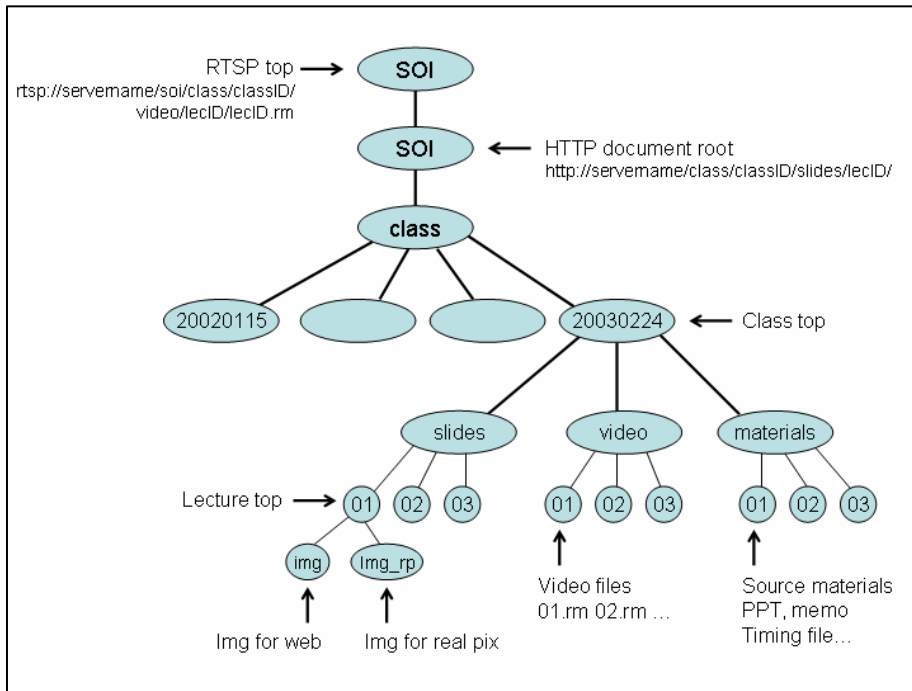


Figure 1. SOI Asia's directory structure

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 : Apache/2.0.54

- 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/rmsserver**

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/rmsserver**

- 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/](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/](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/](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/](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 : BIND 9.3.1

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

#### (STEP 2) Web Cache Proxy installation : squid-2.5.STABLE3-2

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
```

- 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" frame, 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 : dhcp-3.0p12-6

- 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
```