

SOI Asia Server

Document

SOI Asia Global-E-Workshop 2008

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 main 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 and MTM.

IPv6 Internet service

SOI Asia network is an IPv6 operation network. SOI Asia server runs some services to support the IPv6 operation and support the interoperability with the IPv4 Internet. These services are DNS + Totd , Web Cache and DHCP.

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

- 1 Hardware/Software Preparation
- 2 SOI Asia Server System Installation
 - Fedora Core 6 Installation
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 - System and Network Configuration
- 3 SOI Asia Archive Lecture Service Installation
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- 4 SOI Asia Internet Service Installation
 - DNS and Totd installation
 - Web Cache Proxy installation
 - DHCP installation
- 5 SOI Asia Network Monitoring Tools Installation
 - Dbeacon and Ssmping 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 6 compliant 80GB or larger HDD 512MB 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	Source
Fedora Core6 Disk #1	http://www.soi.wide.ad.jp/soi-asia/staff/download/soiserver/fc6/FC-6-i386-disc1.iso
Fedora Core6 Disk #2	http://www.soi.wide.ad.jp/soi-asia/staff/download/soiserver/fc6/FC-6-i386-disc2.iso
Fedora Core6 Disk #3	http://www.soi.wide.ad.jp/soi-asia/staff/download/soiserver/fc6/FC-6-i386-disc3.iso
Fedora Core6 Disk #4	http://www.soi.wide.ad.jp/soi-asia/staff/download/soiserver/fc6/FC-6-i386-disc4.iso
Fedora Core6 Disk #5	http://www.soi.wide.ad.jp/soi-asia/staff/download/soiserver/fc6/FC-6-i386-disc5.iso
SOI server	http://www.soi.wide.ad.jp/soi-asia/staff/download/soiserver/sw/ISO/soi-fc6-sw.iso

Notation in this document

1. Command and filename that operator have to type or edit will be presented with courier bold font like below. (# is sign of command prompt)

Command example: `# mkdir /usr/local/bk`

File name example: `/etc/sysconfig/network`

2. Configuration file content will be presented with courier font like below. The labeled part needs to be changed according to partner's network configuration. (!! DO NOT COPY LABELED PART !!)

`IPV6_AUTOCONF=no`

`IPV6_DEFAULTGW="2001:d30:10a::1"`

2. SOI Asia Server System Installation

(STEP 1) Connecting Devices

- Connect the SOI Asia server's power cable to the UPS source.
- Connect SOI Asia server's Ethernet port to the switch using straight cable.

(STEP 2) Fedora Core 6 installation

- Insert the Fedora Core 6 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 6 installation
- Follow the instructions below for SOI Asia server default Fedora Core 6 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, skip network configuration.
 - 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 2,3,4 and 5 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

*** For SOI Asia workshop 2008, please check the network topology and configurations of your SOI server in the **PAGE4 “Network Topology for SOI Asia Server Lab (3 April 2008)”** in the document **“Information for lab exercise”**. ***

- Become root user to have privileges to change system configurations and set path.

```
# sudo su
# PATH=$PATH:/sbin:/usr/local/sbin:/usr/sbin
# export PATH
```

- Edit `/etc/sysconfig/network` to contain the following lines, save and exit. Replace values of `HOSTNAME`, `IPV6_DEFAULTGW` with your SOI server's network information.

```
NETWORKING=yes
HOSTNAME=sfc-soi.ai3.net
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`, `IPV6ADDR` with your SOI server's network information.

```
DEVICE=eth0
BOOTPROTO=static
ONBOOT=yes
IPADDR=10.100.11.2
NETMASK=255.255.255.0
IPV6INIT=yes
IPV6ADDR=2001:d30:10a::2/64
```

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

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

```
eth0      Link encap:Ethernet  HWaddr 00:0E:0C:A8:29:90
          inet addr:10.100.11.2  Bcast:10.100.11.255  Mask:255.255.255.0
          inet6 addr: fe80::20e:cff:fea8:2990/64 Scope:Link
          inet6 addr: 2001:d30:10a::1/64 Scope:Global
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:29125 errors:0 dropped:0 overruns:0 frame:0
          TX packets:3822 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:3543564 (3.3 MiB)  TX bytes:427253 (417.2 KiB)
          Base address:0x4000 Memory:d8000000-d8020000
```

- Test IPv6 connectivity. If one of the following tests fails, fix your IPv6 network setting before proceeding to next step.

- Ping6 to RR, replace “2001:d30:10a::1” with your RR IPv6 Address.

```
# 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=1.44 ms
64 bytes from 2001:d30:10a::1: icmp_seq=1 ttl=64 time=1.26 ms
```

- Ping6 to an IPv6 host

```
# ping6 www.kame.net
```

```
PING www.kame.net(orange.kame.net) 56 data bytes
64 bytes from orange.kame.net: icmp_seq=0 ttl=55 time=267 ms
64 bytes from orange.kame.net: icmp_seq=1 ttl=55 time=267 ms
```

(STEP 4) Disable unused services.

```
# service iptables stop
# service atd stop
# service sendmail stop
# service netfs stop
# service autofs stop
# service cups stop
# service portmap stop
# service bluetooth stop

# chkconfig iptables off
# chkconfig atd off
# chkconfig nfs off
# chkconfig portmap off
# chkconfig nfslock off
# chkconfig gpm off
# chkconfig sendmail off
# chkconfig netfs off
# chkconfig acpid off
# chkconfig autofs off
# chkconfig cups off
```

- Check that the opening network connections are only the required services
`#netstat -anp|more`

(STEP 5) Fedora Core 6 packages upgrade

- Edit `/etc/yum.conf` and add the two lines below, save and exit.

```
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
```

(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 set to allow only your organization and WIDE project.

****** BE CAREFUL TO EDIT THE TWO FILES BELOW AS MISCONFIGURATION WILL PREVENT YOU FROM ACCESSING THE SOI SERVER ******

- Edit `/etc/hosts.allow` to contain following entries, replace "10.100.11.0" with your site's network information.

```
# Allow access from AI3 and SFC
ALL: [2001:d30::]/32
ALL: [2001:200::]/48
#Allow access inside SOI Local network
ALL: 10.100.11.0/255.255.255.0
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 settings by

- **DO NOT LOGOUT** your current session on SOI server because if the configuration is wrong, you will not be able to login this server again.
- Open a new SSH connection to STARBED-GATE and make sure you can login to your SOI server.

(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 using command “date” following by time in MMDDhhmmYY format. The following example set system’s date to 04 August 2005, 18.53. Use command “date” with no argument to check if system time is set correctly.

```
# date 0804185305
# date
Thu Aug 4 18:53:36 JST 2005
```

3. SOI Asia archive server Installation

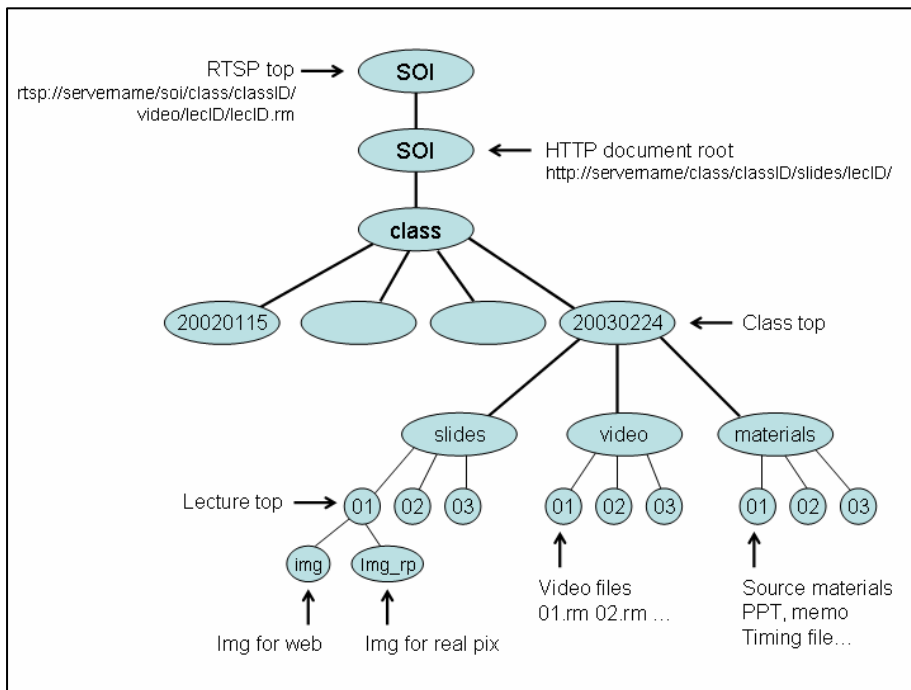


Figure 1 SOI Asia's directory structure

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

- Create a Web root directory. In SOI Asia environment, `/soi/soi` is the Web root directory.

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

- Install httpd and backup original configuration file.

```
# yum install httpd
# cp /etc/httpd/conf/httpd.conf /etc/httpd/conf/httpd.conf.bkws2008
```

- Edit `/etc/httpd/conf/httpd.conf` and modify the following parameters.

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/test.html` to contain the following line.

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

- Use a web browser(firefox or ie7) on your PC to access

`http://[your-soi-server-ipv6]/test.html` (In our sample case,

`http://[2001:d30:10a::2]/`), you must see a plain html page written "hello test".

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

- Install Real streaming server

```
# cd /usr/local/src
# ./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 directory

```
# 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 IPv4 address at line 23.

- Enable the streaming server

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

- Streaming server Verification.

- Please tell your lecturer/TA in Japan to verify that they can view real streaming from your SOI server or not.

(STEP 3) MTM installation

- Install MTM

```
# yum install mtmrd
```

- 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= FF38:20:2001:d30:101:501:1:1  
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
```

- 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.

4 SOI Asia Internet Service Installation

(STEP 1) DNS and Totd 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.

- Install DNS server and edit configurations.

```
# yum install bind-chroot
```

- Backup original config file

```
# mv /var/named/chroot/etc/named.conf /var/named/chroot/etc/named.conf.bk
```

- Use the prepared template configuration file

```
# cp /usr/local/src/config_samples/named.conf /var/named/chroot/etc/named.conf
```

- Edit `/var/named/chroot/etc/named.conf` and add the following lines. Replace “10.100.11.0” and “2001:d30:10a::” with your 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 { 10.100.11.0/24; 127.0.0.1; 2001:d30:10a::/48; ::1/128; fe80::/10;};
    allow-recursion { 10.100.11.0/24; 127.0.0.1; 2001:d30:10a::/48; ::1/128; fe80::/10;};
    allow-transfer { none;};
    listen-on port 5353 { any; };
    listen-on-v6 { any; };
};
```

- Enable DNS server

```
# service named start
```

```
# chkconfig named on
```

- Install Totd server and use the prepared template configuration file

```
# yum install totd
# cp /usr/local/src/config_samples/totd.conf /etc/totd.conf
cp: overwrite `/etc/totd.conf'? y
```

- Edit `/etc/totd.conf` and make sure it contains the following lines.

```
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::
```

- Enable Totd server

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

- Verify the services by resolving DNS names to IP addresses

```
# nslookup -type=AAAA www.ai3.net ::1
Server:      ::1
Address:     ::1#53
www.ai3.net  has AAAA address 2001:d30:101:624::caf9:1812
```

```
# nslookup www.ai3.net ::1
Server:      ::1
Address:     ::1#53
Name:   www.ai3.net
Address: 202.249.24.18
```

```
# nslookup -type=AAAA www.yahoo.com ::1
Server:      ::1
Address:     ::1#53
```

Non-authoritative answer:

www.yahoo.com canonical name = www.yahoo-ht3.akadns.net.

www.yahoo-ht3.akadns.net has AAAA address 2001:d30:101:624::d183:249e

Authoritative answers can be found from:

akadns.net nameserver = usw2.akadns.net.

```
# nslookup www.yahoo.com ::1
Server:          ::1
Address:         ::1#53
Non-authoritative answer:
www.yahoo.com canonical name = www.yahoo-ht3.akadns.net.
Name:   www.yahoo-ht3.akadns.net
Address: 209.131.36.158
```

(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 and use the prepared template configuration file

```
# yum install squid-v6
# cp /usr/local/src/config_samples/squid.conf /etc/squid/squid.conf
```

- Edit configuration file `/etc/squid/squid.conf` and change the “acl localsite src” configuration to your network settings.

```
http_port 3128
cache_peer 2001:d30:101:1::5 parent 8080 3130 default proxy-only
hierarchy_stoplist cgi-bin ?
acl QUERY urlpath_regex cgi-bin ¥?
cache deny QUERY
acl apache rep_header Server ^Apache
broken_vary_encoding allow apache
cache_dir ufs /var/spool/squid 1600 16 256
access_log /var/log/squid/access.log squid
refresh_pattern ^ftp: 1440 20% 10080
refresh_pattern ^gopher: 1440 0% 1440
refresh_pattern . 0 20% 4320
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 10.100.11.0/24 2001:d30:10a::/48
acl to_localhost dst 127.0.0.0/8 ::/126
acl Messenger port 5050 1863 # You can define another Messenger ports
acl SSL_ports port 443
acl Safe_ports port 80 # http
acl Safe_ports port 21 # ftp
acl Safe_ports port 443 # https
acl Safe_ports port 70 # gopher
acl Safe_ports port 210 # wais
acl Safe_ports port 1025-65535 # unregistered ports
acl Safe_ports port 280 # http-mgmt
acl Safe_ports port 488 # gss-http
acl Safe_ports port 591 # filemaker
acl Safe_ports port 777 # multiling http
acl CONNECT method CONNECT
http_access allow manager localhost
http_access deny manager
http_access deny !Safe_ports
http_access deny CONNECT !SSL_ports !Messenger
http_access allow localhost
http_access allow localsite
http_access deny all
http_reply_access allow all
icp_access deny all
never_direct allow all
cache_mgr admin@ow2008-soi-xx.ai3.net
visible_hostname ow2008-soi-xx.ai3.net
logfile_rotate 10
coredump_dir /var/spool/squid

```

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

```

# chkconfig squid on
# service squid start

```

- Web Cache Proxy Verification.

- Install web browser

- ```
yum install lynx
```

- Set http proxy to use local squid

- ```
# export http_proxy=http://127.0.0.1:3128
```

- Browse web page

- ```
lynx www.soi.wide.ad.jp
```

- Install Squid analyzer

```
cd /usr/local/src
```

```
yum install gd-devel perl-GD
```

```
tar -zxvf squid-graph-3.1.tar.gz
```

```
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 viewing the URL below.

```
http://[your-soi-server-ipv6]/squid/
```

### (STEP 3) DHCP installation : dhcp-3.0p12-6

- Install DHCP and use the prepared template configuration file

```
yum install dhcp
```

```
cp /usr/local/src/config_samples/dhcpd.conf /etc/dhcpd.conf
```

- 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 none;
default-lease-time 600;
max-lease-time 7200;
option subnet-mask 255.255.255.0;
option broadcast-address 10.100.11.255;
option routers 10.100.11.1;
option domain-name-servers 10.100.11.2;
option domain-name "ai3.net";

subnet 10.100.11.0 netmask 255.255.255.0 {
 range 10.100.11.3 10.100.11.100;}
```

- 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. : 10.100.11.3
```

```
Subnet Mask : 255.255.255.0
```

```
Default Gateway : 10.100.11.1
```

## 5 SOI Asia Network Monitoring Tools Installation

(STEP 1) Install dbeacon and ssm ping

```
yum -y install dbeacon ssm ping
```

- Edit `/etc/dbeacon/dbeacon.conf` and change values of HOSTNAME, EMAIL and COUNTRY to your site's information. For example,

```
HOSTNAME='sfc-soi.ai3.net'
EMAIL=admin@ai3.net
BEACONADDR=ff18:20:2001:d30::beac
COUNTRY=JP
```

- Start the dbeacon and ssm pingd services.

```
service ssm pingd start
```

```
Starting ssm pingd: [OK]
```

```
service dbeacon start
```

```
Starting dbeacon: [OK]
```

- Verify dbeacon

- Open the website, <http://sfc-monitor.ai3.net/ai3-matrix/> and your SOI server should be reported on the web page.

- Verify ssm ping

- Open the website, <http://mcast.fujisawa.wide.ad.jp/lg/>

- Try ssm ping to your SOI server by putting these parameters and click "submit query"

Tool: ssm ping

Packet cout: 10

IPversion : 6

Destination: **Your SOI server IPv6 Address**

- The output results should show both unicast and multicast replies from your SOI server.

```
/usr/local/bin/ssm ping -6 -c 10 2001:d30:3ee:1b::77
```

```
ssm ping joined (S,G) = (2001:d30:3ee:1b::77,ff3e::4321:1234)
```

```
pinging S from 2001:200:0:1001:230:48ff:fe86:a7d2
```

```
unicast from 2001:d30:3ee:1b::77, seq=1 dist=4 time=14.491 ms
```

```
unicast from 2001:d30:3ee:1b::77, seq=2 dist=4 time=14.576 ms
```

```
multicast from 2001:d30:3ee:1b::77, seq=2 dist=4 time=14.206 ms
```

```
unicast from 2001:d30:3ee:1b::77, seq=3 dist=4 time=14.542 ms
```

```
multicast from 2001:d30:3ee:1b::77, seq=3 dist=4 time=15.026 ms
```