



Bayanihan Linux Thin Client Manager

Arjyl V. Betan

Advanced Science and Technology Institute
Department of Science and Technology



Thin Client 101

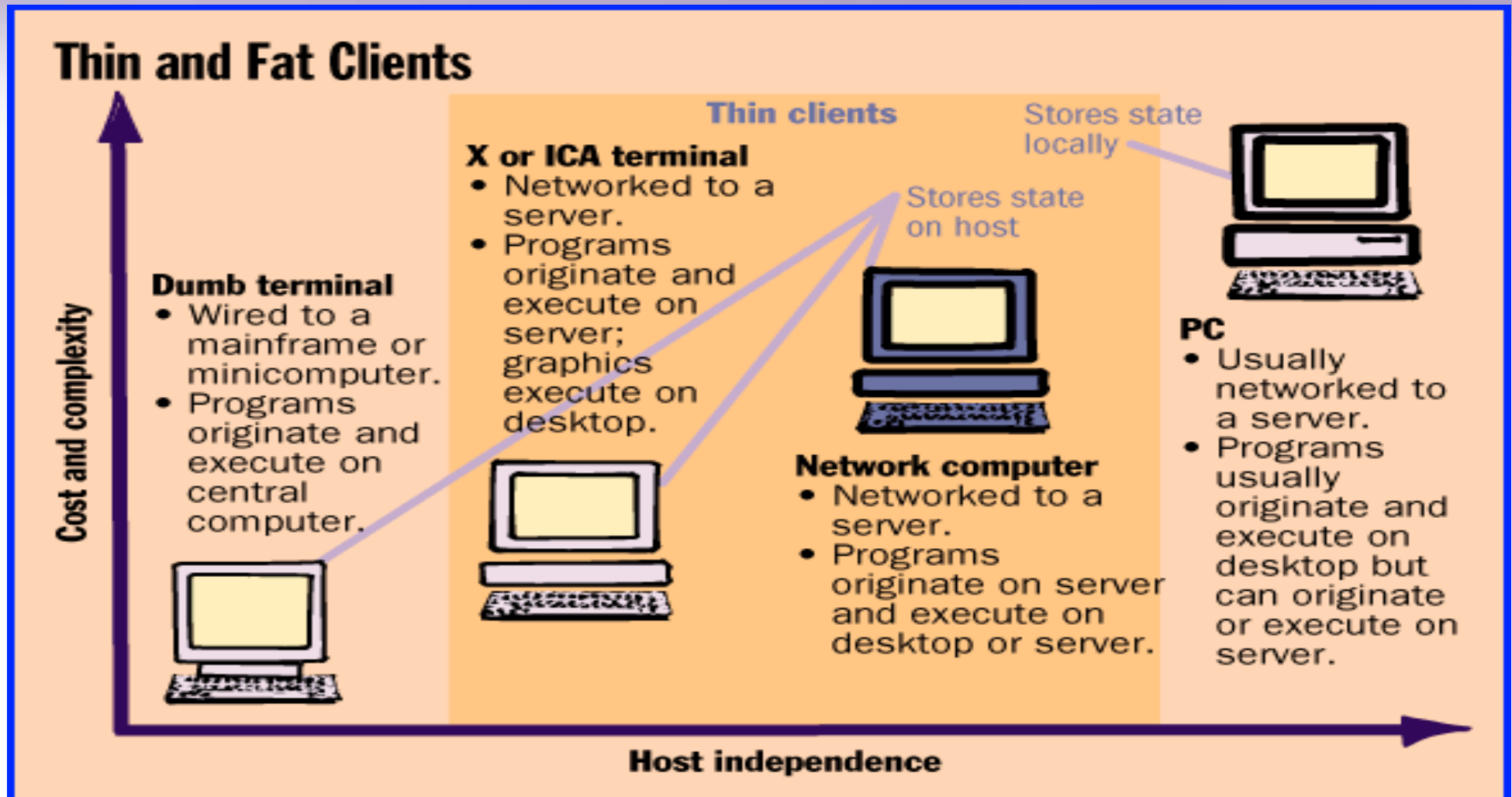
- Thin Client began in the 1970 as X windows
- It is a Unix dumb terminal with a graphical interface
- Started the X11 protocol where the client can communicate to the server



What are the difference between Thin Client and Fat Client?



Difference between Thin and Fat Client





What are the advantages and disadvantages of Thin Client?



Advantages

- Centralize management of virus protection
- Increase data protection
- Reduce end-user support and system maintenance
- Remote access
- Reduce total cost of ownership



Disadvantages

- Hardware compatibility
- Familiarity of users to applications running on a linux platform a compared to already familiar proprietary software
- Cost of initial setup especially in acquiring a server



Part 1: The Hardware



The Client

- Pentium 100
- 16MB Ram
- 8MB Video Card
- 100Mbps LAN Card
- Bootrom or Boot Disk





The Server

- Pentium4 2Ghz
- 1Gig Ram (for 10 clients)
- 7200RPM Hard Disks
- 100Mbps LAN Card



The Network

- 100Mbps switch
- Cat 5 UTP Cable with RJ45 connector



Why switch not hub?

- More intelligent in traffic network management
- Faster transfer rate
- Same price more quality



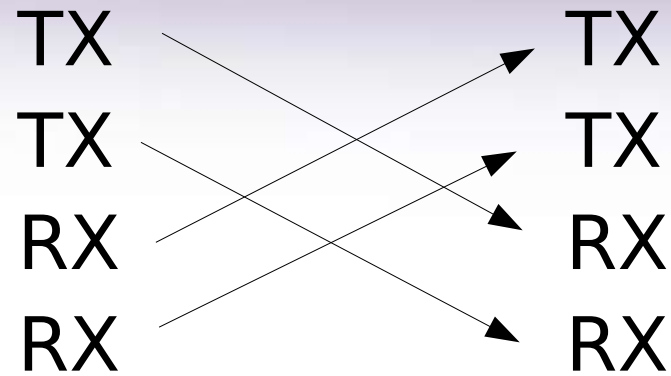
Crimping anyone?

- RJ45
- Crimping Tool
- Cat 5 UTP Cable
- Straight Cable
- Cross Cable



Straight or Cross?

TX ----- RX
TX ----- RX
RX ----- TX
RX ----- TX





Straight

White Green ----- White Green
Green ----- Green
White Orange ----- White Orange
Blue ----- Blue
White Blue ----- White Blue
Orange ----- Orange
White Brown ----- White Brown
Brown ----- Brown



Cross

White Green ----- White Orange
Green ----- Orange
White Orange ----- White Green
Blue ----- Blue
White Blue ----- White Blue
Orange ----- Green
White Brown ----- White Brown
Brown ----- Brown



End of Part 1



Part 2: The Software



What is the Linux Terminal Server Project?



Linux Terminal Server Project

or LTSP, is an add-on package for Linux that allows you to connect lots of low-powered thin client terminals to a Linux server. Applications typically run on the server, and accept input and display their output on the thin client display (from www.ltsp.org).



What BLTCM?

- Bayanihan Linux Thin Client Manager
- It uses the based technology of Bayanihan Linux (3.1) and the Linux Terminal Server Project
- It is a complete and cost effective solution with server-based management features for simpler installation and administration

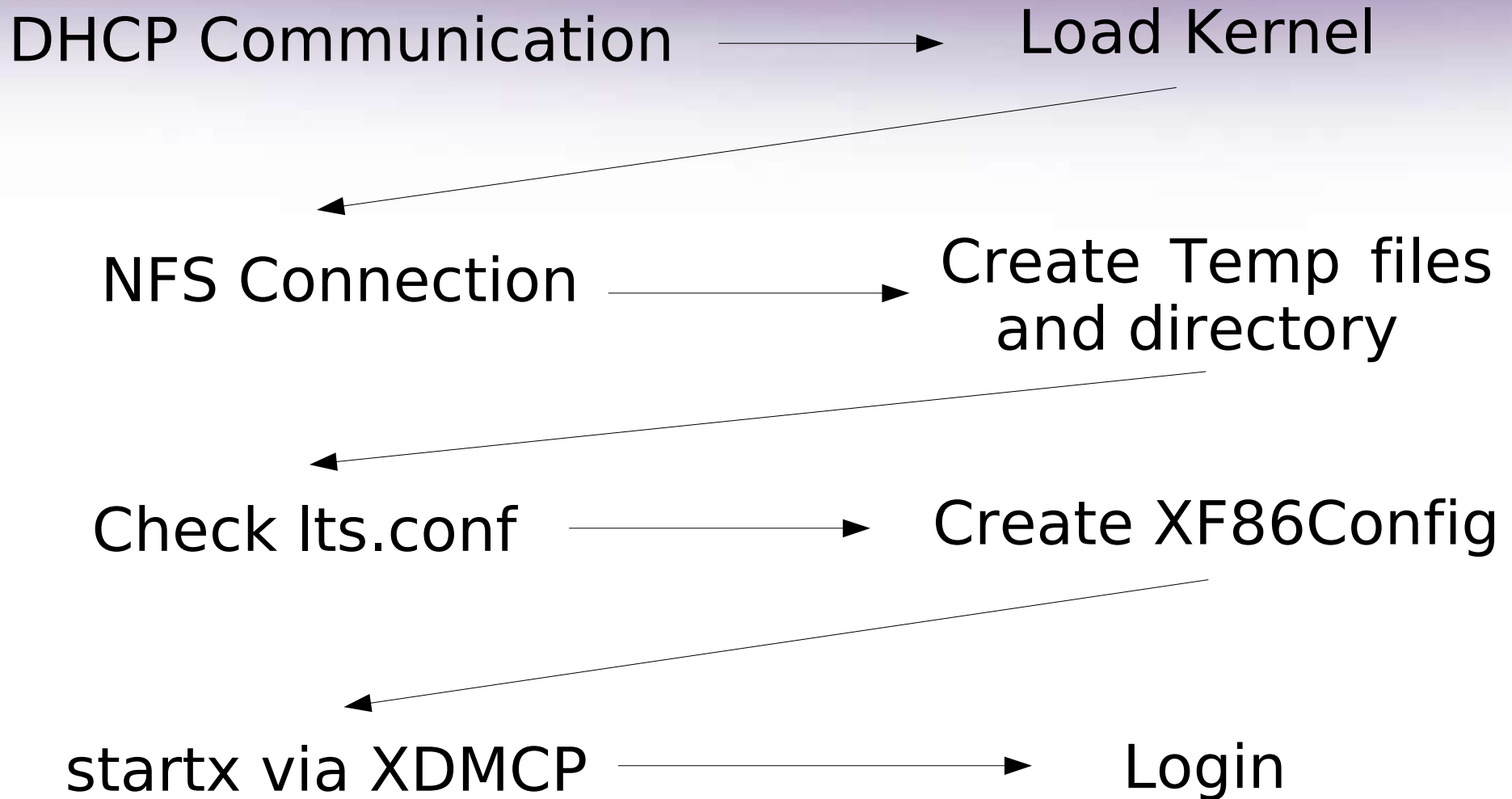


Thin Client Modes

- X Windows – Graphical Interface
- Telnet – Character based terminals
- Shell – Bash console



Thin Client Boot Flow





Protocol BLTCM

- DHCPD
- TFTP
- NFS
- XDMCP



DHCPD

- Dynamic Host Configuration Protocol
- Is a method in which a computer can obtain a valid IP address from a server
- This is generally accomplished by having the MAC Address of the computer registered on the DHCP server



TFTP

- Trivial File Transfer Protocol
- Simplified version of FTP that allows files to be transferred from one computer to another over a network
- It is used to transfer the kernel of the clients
- Unsecured network protocol



NFS

- Network File System
- A protocol developed by Sun Microsystems
- This is both a method and protocol for accessing files and data contained on separate machines connected over a network by logically mounting a remote computer's file systems on a local machine



BLTCM files?



BLTCM Files

- /etc/dhcpd.conf
- /etc/hosts
- /etc/hosts.allow
- /etc/hosts.deny
- /opt/ltsp/i386/etc/lts.conf



/etc/dhcpd.conf

```
option broadcast-address      192.168.0.255;
option routers                192.168.0.254;
option domain-name-servers   192.168.0.254;
option domain-name           "ltsp";
option root-path              "192.168.0.254:/opt/ltsp/i386";
```

```
host ws001 {
hardware ethernet          00:11:22:33:44:55;
fixed-address              192.168.0.1;
filename                   "lts/2.4.26-ltsp-2/pxelinux.0";
```



/etc/hosts

127.0.0.1	localhost.localdomain	localhost
192.168.0.1	ws001.ltsp	ws001
192.168.0.2	ws002.ltsp	ws002
192.168.0.4	ws004.ltsp	ws004
192.168.0.5	ws005.ltsp	ws005



/etc/hosts.allow

```
Bootpd:      0.0.0.0
in.tftpd:    192.168.0.
portmap:     192.168.0.
```




/opt/ltsp/i386/etc/lts.conf

```
SERVER = 192.168.0.254
XSERVER = auto
X_MOUSE_PROTOCOL = "PS/2"
X_MOUSE_DEVICE = "/dev/psaux"
X_MOUSE_RESOLUTION = 400
X_MOUSE_BUTTONS = 3
USE_XFS = N
SCREEN_01 = startx
X_HORZSYNC = 30-70
X_VERTREFRESH = 50-160
X_MODE_0 = 800x600
RUNLEVEL = 5
```



/opt/ltsp/i386/etc/lts.conf

```
[MAXTERM]
XSERVER                = auto
X_MOUSE_BUTTONS       = 3
USE_XFS                = N
SCREEN_01              = telnet
```

```
[WS001] LIKE = MAXTERM
```



Xserver

- XDM – X Display Manager
- GDM – Gnome Display Manager
- KDM – K Display Manager



KDM

/etc/kde/kdm/kdmrc

[Xdmcp]

Enable=true

/etc/kde/kdm/Xaccess

* #any host can get a login window



libz.so.1

```
cp /usr/lib/libz.so.1 /opt/ltsp/i386/lib
```



Thin Client Installation

- Configure Network Interface of the Server
- FTP to File Server with this set of files:
 - Directory “cdrom”
 - Itsp-utils-0.10-0.noarch.rpm
- Type “rpm -i Itsp-utils-0.10-0.noarch.rpm”
- Go to “cdrom” directory and type “./bltcminstallationwizard”
- After finishing installation, type “Itspcfg”
- Read all the instruction and replace all files



Thin Client Installation

- Setup KDM
- Setup DHCPD
- Type “/etc/init.d/dhcpd restart”
- Start Thin Client



Problems

```
ROM segment 0x0800 length 0x8000 reloc 0x9400  
Etherboot 5.0.2 (GPL) Tagged ELF for [Tulip]  
Probing...[Tulip]No adapter found  
<sleep>  
<abort>
```

Indicates that you don't have the correct image for
your network card
check for the Network Card's PCI ID



Problems

Searching for server (DHCP)...

Physical link problems

Make sure that network cables are good and properly connected

DHCP Server not started

Check if dhcpd is running

```
ps -ax | grep dhcpd
```

Restart dhcpd

```
service dhcpd restart
```

No valid entry for workstation in dhcpd.conf

Check log files

```
tail -f /var/log/messages
```

add dhcpd.conf entries for workstation



Problems

Searching for server (DHCP)...

IP Tables is blocking dhcp requests

`iptables -L -v`

`service iptables stop`

Loading 192.168.0.254:/lts/vmlinuz-2.4.9-ltsp-5 |

Incorrect kernel filename or path

check if filename entry in `dhcpd.conf` can be found in /
tftpboot/lts directory

tftpd is not running

check `/etc/xinetd.d/tftp` to verify if it is enabled



Problems

Kernel panic: No init found. Try passing init= option to kernel.

[/opt/ltsp/i386 directory is empty](#)

Root-NFS: Server returned error -13 while mounting
/opt/ltsp/i386

[indicates that /opt/ltsp/i386/ isn't listed in /etc/exports](#)
[check /var/log/messages for errors](#)



Problems

```
Looking up port of RPC 100003/2 on 192.168.0.254
portmap: server 192.168.0.254 not responding, timed out
Root-NFS: Unable to get nfsd port number from server, using default
Looking up port of RPC 100005/2 on 192.168.0.254
portmap: server 192.168.0.254 not responding, timed out
Root-NFS: Unable to get mountd port number from server, using default
mount: server 192.168.0.254 not responding, timed out
Root-NFS: Server returned error -5 while mounting /opt/ltsp/i386
VFS: unable to mount root fs via NFS, trying floppy.
VFS: Cannot open root device "nfs" or 02:00
Please append a correct "root=" boot option
Kernel panic: VFS: Unable to mount root fs on 02:00
```

[Portmap isn't running](#)

```
ps -ax | grep portmap
```

```
start portmap /etc/init.d/portmap start
```



Problems

NFS and Mount daemons aren't running

```
ps -ax | grep nfs
```

```
ps -ax | grep mountd
```

```
start nfs and mountd /etc/init.d/nfs restart or  
service nfs restart
```

Gray Screen with X cursor

indicates that the Xserver is running but it hasn't been able to make contact with the display manager

Display Manager may not be running

check if xdmcp is running

```
netstat -ap | grep xdmcp
```

check if you have the correct entry in lts.conf

```
SERVER=192.168.0.254
```



Problems

Display manager may be configured to ignore remote requests

Check your KDM setup

Display Manager is unable to map IP Addresses to hostnames, check for entries in /etc/hosts



BLTCM Features

- User friendly configuration of client computers
- Management of users applications
- Control of users menus
- Restriction of user's time of use
- Monitoring of user uptime



BLTCM Features

- Monitoring of user's application usage
- Monitoring of system disk space, memory, and CPU usage
- Generation of system reports
- System administrator guide



Bayanihan Linux Thin Client Manager v1.0

Bayanihan Linux Thin Client Manager

- Settings
- Users
- Groups
- System Monitoring
- Help
- Exit

blts

Group Memberships Create New Group

Time Restrictions Back to System Groups

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APPLICATION RESTRICTIONS

- joan -

All (0 / 0)

Save Cancel

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CREATE NEW GROUP

- new group -

Group Name

Users Preferences

Members	Non-Members
	joan joseph nfsnobody

<< Add Remove >>

Save Cancel

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Bayanihan Linux Thin Client Manager v1.0

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- Settings
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System Groups Create New Gro...

blts	opensource
bluetooth	san_felipe
courseware	sei_titaas
erp	sei_sanbartolome
ltsp	
mis	
old_group	

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Bayanihan Linux Thin Client Manager v1.0

Bayanihan Linux Thin Client Manager

- Settings
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USERS APPLICATION USAGE

- System Users -

< November >							< November >						
Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat
			1	2	3	4	5	6	7	8	9	10	11
12	13	14	15	16	17	18	12	13	14	15	16	17	18
19	20	21	22	23	24	25	19	20	21	22	23	24	25
26	27	28	29	30			26	27	28	29	30		

Application Use

No Users Found.

Bayanihan Linux Thin Client Manager v1.0

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USERS UPTIME

- System Users -

FROM < December >							TO < January >						
Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat
			1	2	3	4	2	3	4	5	6	7	8
5	6	7	8	9	10	11	9	10	11	12	13	14	15
12	13	14	15	16	17	18	16	17	18	19	20	21	22
19	20	21	22	23	24	25	23	24	25	26	27	28	29
26	27	28	29	30	31		30	31					

View Users Uptime

root		
gdm	22.07%	166:31:25
login	0.98%	07:22:44

Back to System Monitoring

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Reference for help

- BLTCM Website

<http://thinclient.bayanihan.gov.ph/>

- LTSP Website

www.ltsp.org

- IRC

Server : [irc.freenode.net](irc://irc.freenode.net)

Channel : [#ltsp](#)

- Mailing List

ltsp-discuss@lists.sourceforge.net



THE END

THANK YOU!