

# How to install a Linux Terminal Server on Mandrake 9.2 with LTSP (Linux Terminal Server Project)?

<http://www.linux-tip.net>

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## **1. Introduction**

Mandrake Linux 9.2 with LTSP is the ideal solution for users, organizations and offices who need a low-cost, productive and secure desktop computing platform. Old and obsolete computers can be used as diskless workstations thus reducing the cost for buying brand new computers.

Free Office suites and web browsers, such as OpenOffice and Konqueror, are better alternatives from commercial software. Linux's security, from remote attacks and viruses, can greatly reduce the overhead cost for commercial firewalls and anti viruses.

First off all, let's cover what the LTSP is, and what it can do for you. LTSP stands for Linux Terminal Server Project an open source solution for running thin terminals with a Linux server/system. The goal is to take use of low end hardware as workstations, with the better equipped server in the back.

Let's for example set up the following computer network for test purposes. Hardware for the clients should look like this:

- Pentium 133
- 32 MB RAM
- PCI video card
- Network card (Realtek RTL1839B)
- PS/2 mouse and Keyboard
- 17" Monitor

You can find this hardware in second hand computer shops for a very low price. So, save you money and invest it for a powerful server. This hardware should look like this:

- Pentium 4 or AMD Athlon, 3 GHz or better
- 1 GB RAM or more
- 80-120 GB hard disk or RAID system
- 1 network card, or better 2 network cards if you need a Internet connection via DSL or cable modem
- PS/2 mouse and Keyboard
- 17" Monitor

You should get a good solution already for 1500 to 1800 \$. For test purposes it should also work with a small server (P III, 500 MHz, 256 MB RAM, 20 GB HDD etc.)

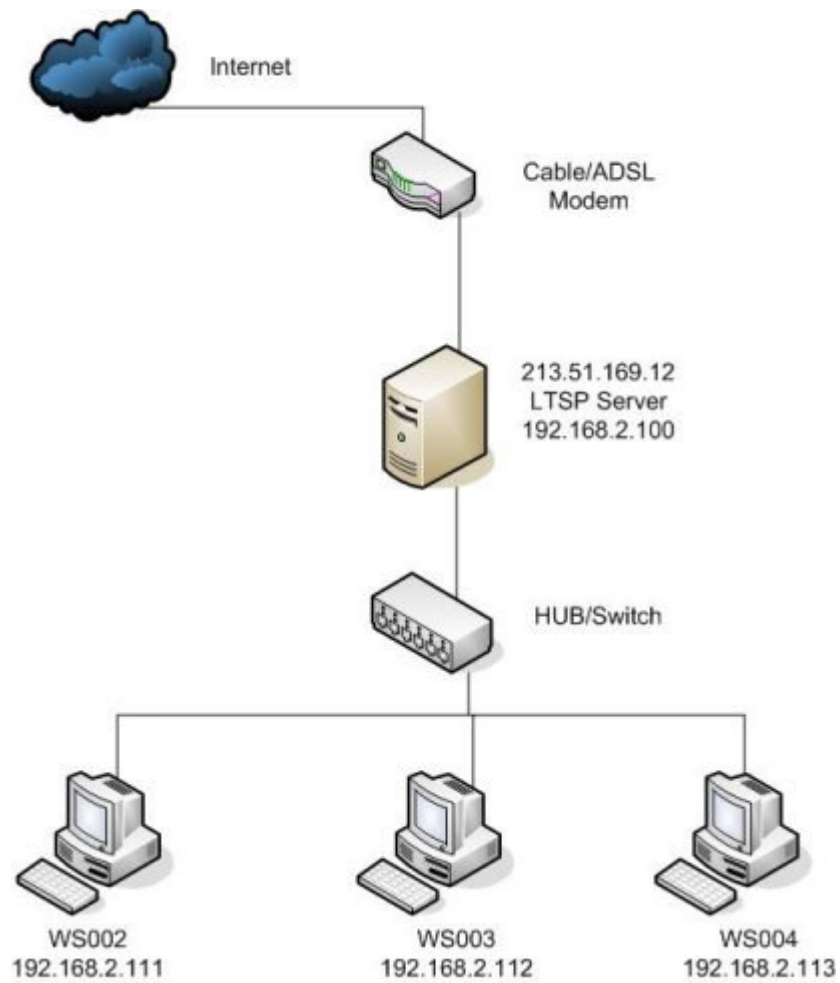


Figure 1

## **2. Mandrake 9.2 installation**

First of all we have to install Mandrake 9.2 on the LTSP server. If you do not have the software yet, download it here:

<http://www.linuxiso.org/>

You should know how to install the software. If you need help, please read this:

<http://doc.mandrakelinux.com/MandrakeLinux/92/en/Starter.html/>

Let's assume that mandrake is running on our new server and the network is configured according to figure 1. Please make sure you have the following software installed on your server:

- tftp (tftp-server) to transfer the LTSP kernel
- dhcpd (dhcp-server) for assigning the IP addresses of the clients
- nfs (nfs-util) accessing the LTSP root file system

Installing LTSP on the server

Please download the LTSP packages from the following website (ltsp.org).

[http://sourceforge.net/project/showfiles.php?group\\_id=17723](http://sourceforge.net/project/showfiles.php?group_id=17723)

I recommend using the RPM packages. We just need the following:

- ltsp\_core-3.0.9-0.i386.rpm
- ltsp\_kernel-3.0.15-0.i386.rpm
- ltsp\_x\_core-3.0.4-0.i386.rpm
- ltsp\_x\_fonts-3.0.0-0.i386.rpm

Oops, if I try to install the ltsp\_core package, the system gives me the following error message:

**“Sorry, but Mandrake version 9.2 not supported”**

Here is the workaround:

**Edit /etc/redhat-release.** Change version “9.2” to “9.1” and install the ltsp\_core package. Do not forget to change it back after the installation.

If you do not have a clue, here are the installation commands:

```
# rpm -ivh ltsp_core-3.0.9-0.i386.rpm
# rpm -ivh ltsp_kernel-3.0.15-0.i386.rpm
# rpm -ivh ltsp_x_core-3.0.4-0.i386.rpm
# rpm -ivh ltsp_x_fonts-3.0.0-0.i386.rpm
```

### 3. Configuring LTSP

After installing the files, it is time to run the `ltsp_initialize` script. Please `cd` to the following directory and run the script:

```
# cd /opt/ltsp/templates
# ./ltsp_initialize
```

Now it's time to configure LTSP and other services using the following files:

1. `/etc/dhcpd.conf`
2. `/etc/hosts`
3. `/opt/ltsp/i386/etc/lts.conf`
4. `/etc/exports`
5. `/etc/xinetd.d/tftp`

To make it easy as possible, we'll use the following setup (see figure 1):

Server IP address: 192.168.2.100

Client IP address: 192.168.2.111 (hostname ws002)

#### `/etc/dhcpd.conf`

Lets start with `/etc/dhcpd.conf`. We will use the example file. Please copy it and create a new config file like this:

```
# cd /etc
# cp dhcpd.conf.example dhcpd.conf
```

Edit the file. Make the following changes. After doing this it should look like this:

```
# Sample configuration file for ISC DHCP
#
# Don't forget to set run_dhcpd=1 in /etc/init.d/dhcpd
# once you adjusted this file and copied it to /etc/dhcpd.conf.
#

ddns-update-style none;
default-lease-time 21600;
max-lease-time 21600;

option subnet-mask 255.255.255.0;
option broadcast-address 192.168.2.255;
option routers 192.168.2.100;
option domain-name-servers 192.168.2.100;
option domain-name "ltsp";
option root-path "192.168.2.100:/opt/ltsp/i386";

option option-128 code 128 = string;
option option-129 code 129 = text;

shared-network WORKSTATIONS {
  subnet 192.168.2.0 netmask 255.255.255.0 {
  }
}
```

```

group {
    use-host-decl-names    on;
    option log-servers     192.168.2.100;

    host ws002 {
        hardware ethernet  00:E0:7D:67:1D:F8;
        fixed-address      192.168.2.111;
        filename           "/its/vmlinuz-2.4.24-ltsp-4";
    }
}

```

Replace the MAC address (hardware Ethernet) (here: **00:E0:7D:67:1D:F8**) with the address from your network card!

### /etc/hosts

This file could look like this:

```

127.0.0.1    localhost
192.168.2.100  svr02
192.168.2.111  ws002

```

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

This file should look like this:

```

#
# Config file for the Linux Terminal Server Project (www.ltsp.org)
#
[Default]
SERVER          = 192.168.2.100
XSERVER         = auto
X_MOUSE_PROTOCOL = "PS/2"
X_MOUSE_DEVICE  = "/dev/psaux"
X_MOUSE_RESOLUTION = 400
X_MOUSE_BUTTONS = 3
USE_XFS         = N
LOCAL_APPS      = N
RUNLEVEL        = 5

#-----
#
[ws002]
XSERVER         = auto
LOCAL_APPS      = N
USE_NFS_SWAP    = N
SWAPFILE_SIZE   = 64m
RUNLEVEL        = 5

```

## /etc/exports

This file should look like this:

```
# The lines between the 'LTS-begin' and the 'LTS-end' were added
# on: Sat Jul 17 13:18:43 UTC 2004 by the ltsp installation script.
# For more information, visit the ltsp homepage
# at http://www.ltsp.org
#
/opt/ltsp/i386          192.168.2.0/255.255.255.0(ro,no_root_squash)
/var/opt/ltsp/swapfiles 192.168.2.0/255.255.255.0(rw,no_root_squash)
/tftpboot             192.168.2.0/255.255.255.0(ro,no_root_squash)

## LTS-end ##
```

## /etc/xinitd.d/tftp

```
# default: off
# description: The tftp server serves files using the trivial file transfer
# protocol. The tftp protocol is often used to boot diskless
# workstations, download configuration files to network-aware printers,
# and to start the installation process for some operating systems.
service tftp
{
    disable          = no
    socket_type      = dgram
    protocol         = udp
    wait             = yes
    user             = root
    server            = /usr/sbin/in.tftpd
    server_args      = -s /tftpboot
    per_source       = 11
    cps              = 100 2
    flags            = IPv4
}
```

That's it. LTSP is configured. It is time to start the necessary services with the following commands:

```
# service nfs restart
# service xinetd start
# service dhcpd restart
```

The server should now be able to accept DHCP clients. The next task is to configure our client machines. We need a way to boot the workstation, and since we don't use hard drives, there are two ways of doing this. You can either use a bootrom on the network card or from a **floppy disk**. For this HOWTO, we will make a boot floppy. Why? It is easy to set up, and you don't need any special equipment to make it work.

## **4. Setting up the (thin) clients**

Let's creating a boot floppy:

1. Go to the following website and download a ROM for your network card's chipset.  
<http://www.etherboot.org/db/>  
Let's say we have a network card with RTL8139B chipset. We downloaded the file **eb-5[1].2.4-rtl8139.zdisk**
2. Insert a formatted floppy on the floppy drive. Then type on a Linux system:  

```
# cat eb-5[1].2.4-rtl8139.zdisk > /dev/fd0
```

On a DOS/Windows system, use the RAWRITE program to write the .zdisk image to a formatted floppy. RAWRITE is available on most GNU/Linux installation CDs or on the web.
3. Boot the client from the floppy and you (hopefully) have a working LTSP system! You can use all applications, data and services from the server as if you are in the server itself.

## **5. Troubleshooting and additional help**

**Oops! X starts up but the cursor just sits in the middle of the screen (you don't get a login screen)!**

Then you almost certainly are not running xdm/kdm/gdm on your server. As root, run one of the three. Install i.e kdm (mdkkdm-9.2-9mdk) with Mandrake Control centre or just using the rpm command. Reboot the workstation and it should get to the login prompt this time.

**If you are running a workstation that is low on RAM** ("less then 16mb) you might want to enable the nfs swap. This is done in the file `/opt/ltsp/i386/etc/lts.conf`. Uncomment the [ws001] that we commented out earlier, and uncomment the "USE\_NFS\_SWAP =Y" line by removing the "#" sign from the front of the line.

**If your X doesn't start**, you might have to specify the X server to use in the file: `/opt/ltsp/i386/etc/lts.conf`. The format is the same as the line

**XSERVER = auto**

Of course you have to change "auto" to the server you want to use. You'll need to study the documentation for XFree86 for more information. This document does not attempt to cover that material.

For additional help visit the LTSP page for docs and news.