# TLAB: The Teaching Lab

*Note:  While this information is correct as of now, it is possible that these machines will be upgraded during the course of the quarter.   If that happens, we will make sure that the software for your course(s) will continue to compile and work in the new environment.*

*The original TLAB was built in September, 2000.  This document describes the current TLAB, which is being built in September, 2003.  If you have an older version of this document, you should throw it out.  A lot has changed.*

The TLAB consists of a dual processor Xeon server and 14 dual-boot Pentium IV hosts connected with a switched Gigabit Ethernet network.  The TLAB is located in room 125 on the first floor of 1890 Maple Avenue.  All CS students, as well as non-CS students taking CS courses, may use the TLAB.  You may use these machines from their consoles or log into them remotely (when they are running Linux).   To use them from their consoles you will need the appropriate keycard to get into the lab.

## Server

The server is a Dell PowerEdge 2650 with the following specifications:
- Two 2.4 GHz Xeon processors with hyperthreading
- 2 GB of Memory
- 240 GB of RAID5 storage spread over a number of SCSI disks
- Dual gigabit Ethernet adaptors
- Red Hat Linux version 9

The server is named TLAB-login.cs.northwestern.edu.

## Server Software

The principle role of the server is to provide authentication and a shared file system to the attached hosts, for both Linux and Windows.  Accounts and passwords are identical to those in the rest of the CS infrastructure, and are the same in both Windows and Linux.  When you log into the server or any host, in either Windows or Linux, you'll see the same home directory.

For most classes, there is no need to log onto the server.  However, some classes may provide special software that is available only there.  For example, CS339 uses Apache, Oracle, and Perl on tlab-login.

## Hosts

The machines are Dell Optiplex GX270s with the following specifications:
- 2.4 GHz Pentium IV processor with hyperthreading
- 1 GB of memory
- 80 GB of IDE storage
- NVIDIA Geforce FX5200 128 MB video card
- Gigabit Ethernet adapter

- SoundBlaster 64V PCI soundcard
- 19" LCD display

The hosts are named TLAB-01.cs.northwestern.edu to TLAB-14.cs.northwestern.edu.

## Host Software

Each host can be booted to Windows or Linux.  The Windows side includes:
- Microsoft Windows XP
- Microsoft Office
- Microsoft Visual Studio
- Sun Java2 Platform
- SSH Secure Shell
- X-Win32
- Matlab
- Mathematica
- Cygwin
- … and many other goodies

The Linux side includes:
- Red Hat Linux 9 "Everything" installation
- SSH 2
- XEmacs 21.4 patch 12
- Latest GCC/GDB/Make
- Perl 5.8.0

## Network

The server and hosts are connected to a 24 port gigabit switch.  Each pair of machines can simultaneously communicate at a peak rate of 1000 Mbps, full duplex, resulting in a peak bisection bandwidth of $n$ Gbps over the 14 hosts.   The hosts are configured at boot time using DHCP.  The DHCP server is configured to always map each host to the same IP address.

The switch is also connected to a firewall, which then connects to the CS Department network.  The firewall permits outgoing traffic, but blocks most incoming traffic. It also prevents certain traffic, such as from CS 340 projects, from leaking off of the TLAB network onto the broader CS network.

## Accounts

The TLAB machines are intended for instructional and research use.  If you take a class that requires their use, you will be given an appropriate account via class mechanisms. That account will be identical to your account on the broader CS infrastructure.   If you are a CS student, you should already have an account.  You can log into both the Linux side and the Windows side using your CS login name and password.  To otherwise acquire an account,  please use the technical support web site at http://www.cs.northwestern.edu/support/.   To get a keycard to the lab, see Caryn.

The home directory of your TLAB account us the same regardless of which machine you log into or whether you're using Windows or Linux. Your space is on the tlab-server and is mounted either via NFS or SMB. Your space is backed up.

Depending on the class, you may also be given access to local scratch space on an individual machine. That space is NOT backed up or guaranteed in any way.

## Logging Into Windows Locally

If you are running Linux, logout and restart the machine from the login screen. **DO NOT SIMPLY POWER CYCLE THE MACHINE**. Select the windows option. Once the Windows login screen appears, log in using your CS account and password. You will notice that there is a mapped network drive that contains your home directory.

## Logging Into Linux Locally

If you are running Windows, logout and restart the machine from the login screen. **DO NOT SIMPLY POWERCYCLE THE MACHINE**. Choose the Linux option. Once the Linux login screen appears, log in as usual. You will notice that you start in your home directory.

## Logging Into Windows Remotely

At this time, Windows Remote Desktop is disabled. This may change.

## Logging Into Linux Remotely

You can log into the TLAB server and hosts from any SSH2 client. For security reasons, the TLAB hosts do not support telnet, rsh, rcmd, rlogin, or unencrypted ssh logins. There are several options. On Unix machines, you will typically find a command-line ssh tool that has the same interface as rsh. On Windows machines, you can use SSH Secure Shell, for which Northwestern has a site license. You can also use the free PUTTY tool. If you want a Unix-like command-line client, you can install Cygwin.

If you cannot log into a specific machine, it may be running Windows. Try several machines before concluding that there is a problem.

If you are logging in from a machine that is running an X Server (a Unix machine, or a Windows machine running Exceed, Xwin32, or similar software), you can greatly improve your work environment by using X remotely. The right way to do this is to enable "X11 tunneling" in your ssh client. This will tunnel all your X traffic through an encrypted session, making X much more secure. It will also automagically set your display variables and whatnot so that you don't have to.

Another option for remote display is VNC. To make it possible to connect from an external machine, you will need to manually set up your own SSH tunnel to get through the firewall.

## Dedicated Machines

In some cases, machines may be dedicated to running a particular operating system or to a particular set of users.  For example, the networking class requires that several machines run Linux at all times.  When a machine is so dedicated, a sign on the machine will make it clear.  DO NOT DISREGARD THESE SIGNS OR ATTEMPT TO "CRACK" THE MACHINES.  DOING SO WILL RESULT IN YOUR LAB PRIVELEGES BEING REVOKED AND POSSIBLY STRONGER ACTION BEING TAKEN.