

**Fundamentals of UNIX**  
**Lab 16.4.4 – Networking Commands**  
***(Estimated time: 45 min.)***

**Objectives:**

- Develop an understanding of UNIX and TCP/IP networking commands
- Ping another TCP/IP host
- Telnet to another host
- Remote login to another host
- Terminate a local process from a remote host
- Use `rlogin` and `pkill` to recover from a "hung" CDE session
- Retrieve a file from another host with `ftp`
- Use `traceroute` to check internet path (optional)

**Background:**

In this lab, you will work with UNIX and Transmission Control Protocol / Internet Protocol (TCP/IP) Networking Commands. TCP/IP provides network connectivity support for the UNIX operating system and many other network operating systems. All hosts attached to the Internet run the TCP/IP protocols. Several network commands are available to test connectivity and to connect to remote host machines for administration and troubleshooting. In this lab, you will work with the TCP/IP `ping` troubleshooting utility, telnet remote access utility, the FTP File transfer protocol, the UNIX `rlogin` remote access command and the `traceroute` command.

**Tools / Preparation:**

- a) Before starting this lab, review Chapter 16, Section 4 – Network Commands.
- b) You will need the following:
  1. A login user ID (e.g. user2) and password assigned by your instructor.
  2. A computer running the UNIX operating system
  3. Networked computers in classroom with class file system installed

**Notes:**

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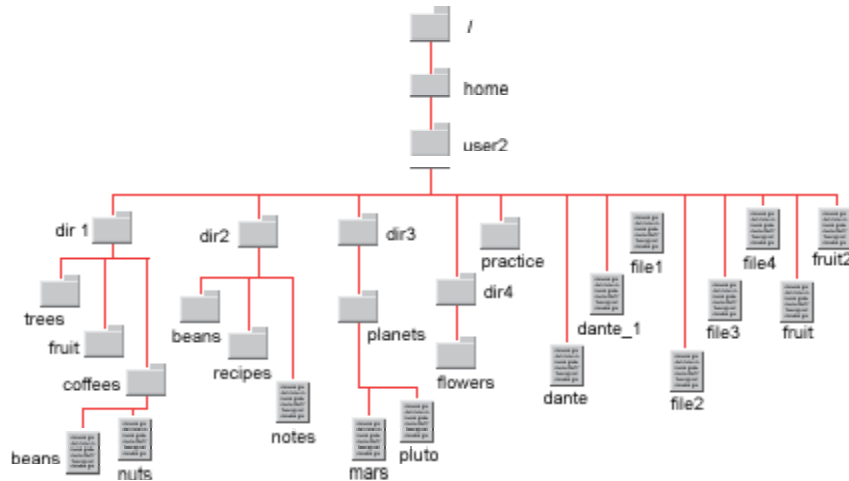
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# Worksheet

**Use the diagram of the sample Class File System directory tree to assist with this lab.**

## Class File Tree Structure



## Step 1. Log in to CDE

Login with the user name and password assigned to you by your instructor in the CDE entry box.

## Step 2. Access the Command Line

Right click on the **workspace** backdrop and click on **Tools**. Select **Terminal** from the menu to open a terminal window.

### Step 3. Ping another TCP/IP Host

**Ping** (Packet Internet Groper) is a very useful utility that is part of the basic TCP/IP protocols package and is standard with every UNIX system. A computer that is running the TCP/IP protocol stack can make use of the **ping** command.

Ping is a good low-level troubleshooting tool, testing layers 1 through 3 of the OSI model. The **ping** command tests basic connectivity between TCP/IP hosts by sending an ICMP (Internet Control Message Protocol) echo request to another computer or "host" on a TCP/IP network. If there is a reply from the destination host, then there is a good connection between them. If you are unable to run an application on a remote host, you can **ping** it as a basic connectivity test. If you do not get a response, the problem may not be with the application, but instead, the host may be down or the network link may be down. **Note:** In order to use the **ping** command in Solaris, you may need to specify the full pathname of:

```
/usr/sbin/ping
```

Any network operating system that is running the TCP/IP protocol can send and respond to **ping**. You can **ping** the name of a host computer if you have a naming service running such as Domain Name Service (DNS) or if you have entered the host name and IP address in your **/etc/inet/hosts** file. If not, you can directly **ping** the IP address of the host, which is preferred since it is a more basic test of connectivity. IP Addresses use a **dotted decimal** format such as 172.16.238.15. It is a 32-bit address divided into four parts known as **octets**. Each octet is made up of 8 bits. Instead of showing the 8 binary bit values (0 or 1), which would be difficult to remember, they are converted to decimal for readability. Each octet can have a value of from 0 to 255 decimal or 256 possible combinations (2 to the 8<sup>th</sup> power).

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**Worksheet – Cont.**

**Command Syntax:**    *ping host\_ip\_address*

**OR**    *ping host\_name*    (if name resolution is available)

a. If you have a server in the classroom, obtain the IP address from your instructor. Ping the IP address of the server. What command did you use? \_\_\_\_\_ What was the response?  
\_\_\_\_\_

b. Obtain the IP Address of one of your lab partners and use the **ping** command to test connectivity between both machines. What devices did the **ping** packet have to go through to complete its path?  
\_\_\_\_\_

c. Name resolution converts host names to IP address through the use of a name server or a hosts file on your computer. If name resolution is available, **ping** the name of your lab partner's machine by its host name. What command did you use? \_\_\_\_\_ What was the response?  
\_\_\_\_\_

**Step 4. Telnet to another Host**

Telnet is a client-server **terminal emulation** program that allows you to connect to another system. The telnet server simulates a terminal in order to authorize a user or **telnet** client to connect to a remote system and work in that environment. When you **telnet** to another host, you are prompted for a user name and password. Once a session is established from your **telnet** client, you can enter commands as if you were entering them directly on the server console. You can telnet to several different hosts and have multiple telnet sessions opened simultaneously.

Telnet is another good network troubleshooting tool. It is a non-graphical communications utility that can be used to check the upper layers of the OSI model. It runs at layer 7, the Application layer. If you are having trouble executing another, perhaps graphical, client-server application, you can try to telnet to the host or server to verify that the TCP/IP protocol stack is functioning correctly. Remember, not all network operating systems support the telnet server function. For instance, you can telnet from a Windows 9x or NT/2000 workstation to a UNIX server, but you cannot **telnet** to the Windows workstation

You can telnet to the name of a host computer if you have a naming service running such as Domain Name Service (DNS) or if you have entered the host name and IP address in your **/etc/inet/hosts** file. If not, you can **telnet** the IP address of the host. When using telnet, you can:

- **Open a session on a remote machine**
- **Alternate between the remote session and the local session**
- **Access machines that do not run under the UNIX environment**

**Command Syntax:**    *telnet host\_ip\_address (or hostname)*

a. If you have a UNIX server in the classroom, telnet to the IP address of the server. What command did you use? \_\_\_\_\_ What was the response? \_\_\_\_\_  
\_\_\_\_\_

b. The escape character allows you to suspend your session with the remote host and return to your home machine. What is the escape character? \_\_\_\_\_

c. Login to the classroom server or your lab partner's machine using your user ID or a guest account. What is your prompt now that you are a remote terminal attached to the other machine.  
\_\_\_\_\_

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- d. Enter some UNIX commands such as **pwd** command to see what directory you are in on the remote machine. What directory are you in? \_\_\_\_\_
- e. Terminate your telnet session to the remote host by typing **exit** at the command prompt. What was the response? \_\_\_\_\_

**Step 5. Remote Login to Another Host**

Use the **rlogin** command to establish a remote login session on another UNIX host, which can be a server or a workstation. Remotely logging in to another host is helpful under the following circumstances:

- **To access information on another workstation that is not available otherwise.**
- **To access your workstation remotely to read mail.**
- **To kill a process that has caused your workstation to hang.**

You can login as your current login ID if that one is defined on the remote system or you can login to another host under a different Login ID.

Use the **-l** option to specify a different login ID for the remote login session. The system administrator can set up a guest account so users can remotely log on to a server. Before attempting to remotely login to another system as a different user, be sure you have an account on the desired remote machine.

**Command Format: *rlogin hostname -l username***

- a. If you have a UNIX server in the classroom, rlogin to the hostname or IP address of the server. What was the response?  
\_\_\_\_\_
- b. Issue the **id** command. What is the user id shown? \_\_\_\_\_
- c. Issue the **uname -n** command. What was the result? \_\_\_\_\_
- d. Issue the **pwd** command. What was the result? \_\_\_\_\_
- f. Terminate your rlogin session to the remote host by typing **exit** at the command prompt. What was the response? \_\_\_\_\_

**Step 6. Terminate a Local Process From a Remote Host**

When your system is not responding and you do not want to reboot, you may be able to kill a process on your system remotely by logging on to another machine and using the **rlogin** command to access your system. After successfully killing the process that caused your system to not respond, the **exit** command will end your rlogin session.

- a. Start the **sleep** process on your machine using the **sleep 1000 &** command. Leave your machine and work with a partner to **rlogin** as yourself to your machine from their machine.
- b. Verify that you are in your home directory by issuing the **pwd** command.
- c. Issue the **ps -e | grep sleep** command to locate and display the **sleep** process. Note the **process ID**. What is the process ID for the sleep process? \_\_\_\_\_

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- d. Issue the **kill** command to terminate the process ID for the sleep process. What was the result?

\_\_\_\_\_

- e. Display the processes again to see if the sleep process has been terminated. Is it dead?

\_\_\_\_\_

**Step 7. Retrieve a file from Another Host with ftp**

The **ftp** (File Transfer Protocol) application is part of the TCP/IP protocol suite and is standard with the UNIX operating system. It can be used to transfer files using ASCII or binary mode between systems using similar or dissimilar operating systems. This provides a basic means of transferring files from one file system to another.

Most computers running Servers with web sites set up for downloading files sometimes provide an **anonymous** ftp account so users can pull files off the server. For this kind of an account, at the Name prompt, the word *anonymous* is entered instead of accepting the default displayed. If a password is required for the anonymous account, it will usually be your full email address.

**Command Syntax:**     **ftp host\_ip\_address**

**Or**     **ftp host\_name**     (if name resolution is available)

Once you have successfully used **ftp** to access a remote host, some familiar file and directory access commands like **cd** and **ls** are available.

- a. Use the ftp command to connect to the classroom server or your lab partner's machine using the IP address. You can use the machine name if name resolution is available. What was the response?

\_\_\_\_\_

- a. If you have an account on the machine you are going to ftp to, you will be prompted for a password. If not, you will be prompted for a login name. Enter **anonymous** for the login name and a password if you do not have an account on the ftp machine.
- b. What is your prompt now? \_\_\_\_\_
- c. To view a list of FTP available commands, enter the ? at the **ftp>** prompt. What are some of the ftp command available. **Answers will vary – binary, bye, cd, delete, get, put etc.**
- d. Enter command to determine what your current default directory is. What is you current directory? \_\_\_\_\_
- e. If permissions are set by the site's system administrator for a user to see the contents of a directory the **ls** command will display files in that directory. Enter the **ls** command to get a listing of files. Identify a file to be copied to your machine.
- f. As on your local system, **cd** will change directories on the remote system. If it is necessary for you to change directories on your own system in the middle of the ftp session, the **lcd** (local change directory) command can be used.

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- g. Set your transfer mode type to **binary** (image) using the **bin** ftp command. What was the response? \_\_\_\_\_

Retrieve (copy) a file from the ftp host using the ftp **get filename** command. The file will be placed in your current working directory using the same name unless you specify otherwise. What was the response? \_\_\_\_\_

- h. If you have permissions to copy files to the ftp directory on the remote host, use the ftp **put filename** command to copy a file to the remote host.
- i. End your ftp session, by typing **bye** at the prompt.

**Step 8. Use Traceroute to Check Internet Path (Optional)**

The **traceroute** command can be used to trace the path a packet takes from your host to another Internet host. It checks the routers that the packet passes through along the way which are called hops. The **traceroute** command operates at OSI layer 3, the network layer, and will report back to you what routers your trace encountered en route to the destination. If the packet does not make it to the destination you can determine which router it stopped at. Depending on your firewall setup you may not receive the results of the **traceroute** command. To find out more about **traceroute**, use the man pages.

**Command format:**     **traceroute IP address**

**Or     hostname (e.g. www.sun.com - if name resolution is available)**

- a. Use the **traceroute** command to trace the route to the Sun Microsystems web site **www.sun.com**. What was the result? \_\_\_\_\_

**Step 10 – Remove Files and Directories Created in this Lab**

**Remove all files and directories** created in your home directory during this lab.

**Step 11. Close the Terminal Window and Logout**

Double click on the dash button in the upper left corner of the screen, then click the **EXIT** icon on the front panel.