Unit 17
Networking overview
Unit objectives

After completing this unit, you should be able to:
• Define the basic TCP/IP terminology
• Configure TCP/IP for an Ethernet or Token-Ring connection
• Use some of the standard TCP/IP facilities to:
  – Log in to another system
  – Transfer files
  – Run commands
What is TCP/IP?

• Transmission Control Protocol/Internet Protocol

• Software to enable different systems to exchange data over a variety of types of network

• The way in which systems are connected and how data is passed between them is transparent to the user

• TCP/IP is vendor-independent; development is overseen by the Internet Architecture Board
An Internet

- A TCP/IP network is often called an *Internet*.

- Individual machines are called *hosts*
- Hosts may vary in size and functionality but have equal standing as far as TCP/IP is concerned
- Hosts which link two or more physical network segments to each other are called *gateways*
Names and addresses

- Each system in a TCP/IP network is given a name:
  - For example: `sys3`

- When contacting another system you only need to know the name:
  - For example: `$ telnet sys3`

- When contacting another user you need to know the system and user name:
  - For example: `$ mail fred@sys3`

- Each system has one or more TCP/IP addresses:
  - For example: `10.0.0.3`

- If you know the address, but not the name, you can use some TCP/IP facilities with the address
Standard TCP/IP facilities include: mail, file transfer, remote login, remote execution, and remote printing.

A number of AIX applications use TCP/IP:
- Network File System (NFS)
- Network Information Services (NIS)
- Domain Name Service (DNS)
- Dynamic Host Configuration Protocol (DHCP)
- Network Computing System (NCS)
- Distributed Computing Environment (DCE)
- X Windows and AIXWindows
- Tivoli Netview for AIX
Information needed to configure TCP/IP

• Address:
  – Each adapter is given a unique TCP/IP address and often a subnet mask
  – These are usually assigned by your network administrator

• Name:
  – Each machine has a unique hostname
  – Each machine must have access to a table of name to address translations, which can be either:
    • /etc/hosts file
    • Domain Name Server - You must know:
      – Domain Name
      – Address of the Name Server

• Routes:
  – In order to communicate with systems in other networks, you may need to find the address of the default gateway
Configuring TCP/IP

# smit mktcpip

Minimum Configuration & Startup

To Delete existing configuration data, please use Further Configuration menus

Type or select values in entry fields.
Press Enter AFTER making all desired changes.

[Entry Fields]
* HOSTNAME [sys1]
* Internet ADDRESS (dotted decimal) [10.0.0.1]
  Network MASK (dotted decimal) [255.255.255.0]
* Network INTERFACE en0
  NAMESERVER
    Internet ADDRESS (dotted decimal) []
    DOMAIN Name []
Default Gateway
  Address (dotted decimal or symbolic name) [10.0.0.192]
  Cost [0] #
  Do Active Dead Gateway Detection? no +
Your CABLE Type N/A +
START TCP/IP daemons Now no +

F1=Help      F2=Refresh      F3=Cancel     F4=List
Esc+5=Reset  Esc+6=Command   Esc+7=Edit    Esc+8=Image
Esc+9=Shell  Esc+0=Exit     Enter=Do
Flat name resolution

# more /etc/hosts

# The format of this file is:
# Internet Address     Hostname     # Comments
# Items are separated by any number of blanks and/or tabs. A '#' #
# indicates the beginning of a comment; characters up to the end #
# of the line are not interpreted by routines which search this #
# file. Blank lines are allowed.

<table>
<thead>
<tr>
<th>Internet Address</th>
<th>Hostname</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>127.0.0.1</td>
<td>loopback</td>
<td>localhost</td>
</tr>
<tr>
<td>10.0.0.1</td>
<td>sys1</td>
<td>timeserver</td>
</tr>
<tr>
<td>10.0.0.2</td>
<td>sys2</td>
<td></td>
</tr>
<tr>
<td>10.0.0.3</td>
<td>sys3</td>
<td></td>
</tr>
<tr>
<td>10.0.0.4</td>
<td>sys4</td>
<td></td>
</tr>
</tbody>
</table>
Identifying the hostname

• **hostname** command:
  - Example:

```bash
# hostname
sys3
```

• **host** command:
  - Examples:

```bash
# host  sys3
sys3 is 10.0.0.3, Aliases: sys3.washington.ibm.com

# host  10.0.0.3
sys3 is 10.0.0.3, Aliases: sys3.washington.ibm.com
```
Basic TCP/IP user functions

• The following commands work with any TCP/IP system (not just UNIX/AIX):

  – Test connectivity: ping
  – Remote execution: rexec
  – File transfer: ftp
  – Remote login: telnet
1. What are the following commands used for?
   • `ftp` ______________________________________
   • `rexec` ______________________________________
   • `telnet` ______________________________________
   • What is the difference (if any) between a **host** and a **gateway**?
     ______________________________________________
     ______________________________________________
     ______________________________________________

3. True or false? Each machine in a TCP/IP network must have a unique hostname and TCP/IP address.
   • Which file holds the name and the TCP/IP address of each host in a flat network? __________________________
1. What are the following commands used for?
   - `ftp` transfers files from one machine to another
   - `rexec` executes a command on a remote system
   - `telnet` logins to another system

2. What is the difference (if any) between a host and a gateway?
   
   A host is an individual machine connected to a network, whereas a gateway is a special kind of host which links two or more physical networks together.

3. True or false? Each machine in a TCP/IP network must have a unique hostname and TCP/IP address.

4. Which file holds the name and the TCP/IP address of each host in a flat network? `/etc/hosts`
Exercise 19: Networking

- Deconfigure TCP/IP
- Configure TCP/IP
- Testing the configuration
- Using telnet
- Using ftp
Unit summary

• TCP/IP is a networking architecture which defines a set of rules. These rules describe how computers can communicate with one another over a network.

• A flat TCP/IP network can be configured through SMIT by supplying the following information: addresses, subnet mask and hostnames.

• There are many useful utilities which are provided by TCP/IP, such as telnet to login to another system, ftp to transfer files and reexec to execute a command on a remote system.

• Use the ping command to check for connectivity to remote hosts.