

## IST 251 – Chapter 4 – Network Protocols

**Protocol** – a set of rules and conventions for sending information over a network. XP Uses TCP/IP

**TCP/IP – Transmission control protocol / internet protocol** – maps to a 4 layer conceptual model

1. **Network Interface Layer** – puts frames on the wire and pulls frames off the wire.
2. **Internet Layer** – encapsulates packets into internet datagram's and runs all the necessary routing algorithms.
  - a. **IP** – responsible for addressing and routing packets between hosts
  - b. **ARP** – provides IP address mapping to the MAC sub layer
  - c. **ICMP** – allows hosts to share connection status
  - d. **IGMP** – allows multicasting.
3. **Transport Layer** – provides communication sessions between computers
  - a. **TCP** – Transmission Control Protocol – provides assurance that the data was sent and properly received
  - b. **UDP** – User Datagram Protocol – provides connectionless data transfer, but doesn't guarantee data is received (radio broadcast over the internet)
4. **Application Layer** – allows applications to gain access to the network. Provides 2 interfaces:
  - a. **Winsock** – the standard between socket-based applications and TCP/IP.
  - b. **NetBIOS** – the standard between NetBIOS services and TCP/IP

### Lesson 2 – configuring and troubleshooting TCP/IP

**DHCP – Dynamic Hosts Configuration Protocol** – assigns IP address to computers on the network.

**IP addresses** – logical 32-bit numbers broken down into 4 8-bit fields known as octets. TCP/IP supports classes A, B, and C.

1. Class A – 1.0.0.0 through 126.0.0.0 – 126 networks and 16,777,214 hosts
2. Class B – 128.0.0.0 through 191.255.0.0 – 16,384 networks and 65,534 hosts
3. Class C – 192.0.0.0 through 223.255.255.0 – 2,097,152 networks and 254 hosts

**A Static IP Address** – an IP Address that is manually assigned and is constant.

**Subnet mask** – divide large networks into multiple physical networks with routers.

**Default gateway** – intermediate device on a LAN that stores network IDs (Router)

### Obtain an IP Address Automatically

**Automatic Private IP Address** – an extension of dynamic IP Addresses. Is enabled by default.

**Alternate configurations for TCP/IP** – allows mobile computers to work seamlessly between different networks... i.e. home and office networks.

## Troubleshooting TCP/IP

1. **Ping** – verifies configurations and test connections
2. **ARP** – displays locally resolved IP addresses as physical addresses
3. **ipconfig** – Displays the current TCP/IP configurations
4. **Nbstat** – displays statistics and connection using NetBEUI
5. **Netstat** – displays TCP/IP protocol statistics and connections
6. **Route** – displays or modifies the local routing table
7. **Hostname** – returns the local computers host name for authentication by the remote copy protocol (RCP), remote Shell (RSH), and remote Execution tools (REXEC)
8. **Tracert** – checks the route to a remote system
9. **PathPing** – verifies that the routers on the way to a remote host are operating correctly by detecting packet loss over multiple-hop trips

**Do Exercise 1, 2, 3, 4 on page 145-150.**

## Novell NetWare

**NWLink – IPX/SPX/NetBIOS connections.** – Allows XP computers to connect to other network devices using IPX/SPX. (another routable protocol other than TCP/IP)

**Frame Type** – defines the way the network adapter card formats data (use auto detect)

**Network Number** – a number that is unique for each network segment.

**Internal network Number** – a unique number that identifies a computer on a network for internal routing.

## Troubleshooting NetWare connections

IPXroute config

IPXroute ripout

Network Monitor

## Practice on Page 159-161

## Lesson 4 – Network bindings

Binding – the process of linking network components on different levels to enable communication between those components.

You can specify your binding order... for most computers TCP/IP should be highest.

## Do Practice on Page 165 - 167