aries
Small Office Connectivity

An Introduction to Aries-based Network
Including setup, Internet access, share printer and files and more.

white paper
Why do you need an Aries-Based Network?
A peer “server” refers to a PC that is dedicated to supporting files and printers on a given peer-to-peer network. In your business, you may not have a dedicated PC but rather have a workstation or workstations that people on your peer network use to share files or a printer.

Peer networks offer a reasonable solution at a low cost for businesses that have fewer than five PCs and that want to share files and a printer. However, as the business grows, issues such as performance, stability, security, and backup can begin to take a toll on business productivity.

Client/server operating systems such as Aries Server Appliance eliminate many of the issues of peer networks in addition to offering features such as local and Internet e-mail; shared Internet connectivity; intranet, web hosting, shared customer lists and calendars; and the ability to centrally manage users, security, and backups.

To migrate from a peer-to-peer network to an Aries-based client/server network is very easy and cost effective. Once you have connected all the necessary cables to the Aries, you just need to run web browser on a PC connected to the network to add new users, set file folders, disk quota, security and etc.

Requirements for migrating from a peer network:
- Your peer network must be running an Ethernet network with a network hub.
- Client machines must meet the following system requirements.

Windows-based computers - The computers that you want to connect to the network should have Windows 95 or Windows 98/SE or Windows ME or NT 4 or Windows 2000 installed. If you are using PC with Windows 3.1 or Windows for Workgroup, we recommend that you should upgrade to Windows 98.

Macintosh computer - The Macs that you want to connect to the network should be running System 7.5.5 or Mac OS 7.6 or later.

Access Internet, share printer and files on Macintosh and Win-based computers
Aries makes it possible for Windows-based and Apple Macintosh clients to share files and printers and all services provided on Aries either via Ethernet cable or AirPort. For example, suppose you created a document in Microsoft Word for Windows. A coworker can access that document, use Word for the Macintosh to modify it, and then place it back on the server so you can see those revisions using Word for Windows. This feature is supported by the Aries because Aries functions as an AppleTalk router. Macintosh clients need only the Macintosh operating system software to function as workstations-no additional software is required. You also have the option to set up the Wireless LAN for your Macintosh PowerBook or PowerPC by installing the AirPort card on each of your Mac computers. Additionally, Macintosh clients can also be set up to send and receive e-mail and to connect to the Internet through the shared connection provided by Aries.

Aries is wireless LAN Ready (IEEE 802.11b and Apple AirPort Compatible)
A Wireless Local Area Network is a flexible data communications system that can either replace or extend a wired LAN to provide added functionality. Using Radio Frequency (RF) technology, LANs transmit and receive data over the air, through walls, ceilings and even cement structures, without wired cabling. A WLAN provides all the features and benefits of traditional LAN technologies like Ethernet and Token Ring, but without the limitations of being tethered to a cable.
Wireless technology provides the maximum user mobility, simple and flexible installation option, a reduced cost of ownership (no cabling costs or maintenance) and excellent scalability in support additional PCs. True 11 Mbps wireless is ideal for use with cable modems, DSL or SOHO applications.

In the typical wireless configuration an Aries (installed with Lucent Orinoco 802.11b Wireless LAN PC card) connects to a wired network or broadband modem. The Aries supports up to 25 users with a maximum range of 550 feet. Users access the LAN via the wireless PC card or AirPort adapters in their notebooks or desktops.

IEEE 802.11b Wireless Standard
The IEEE 802.11 standard has emerged as the realm of Wireless LANs. The 802.11 standard allows for two types of transmissions: Frequency Hopping Spread Spectrum (FHSS) and Direct Sequence Spread Spectrum (DSSS). The Spread Spectrum was initially developed by the U.S. military. With FHSS, the signal hops from one frequency to another at a predetermined rate known only to the transmitter and receiver. With DSSS, a redundant “chipping code” is sent with each signal burst, and only the transmitter and receiver knows the chipping sequence. Both forms of spread spectrum consume more bandwidth than a typical narrowband transmission, but this enables a louder signal that is easier for the receiver to detect than a narrowband signal.

The recent evaluation of the High Rate wireless standard, 802.11b provides for a full Ethernet-like date rate of 11Mbps over DSSS and has become the predominant Wireless LAN standard.

What networking hardware do you need?
All networks need basic hardware components including, cable, network interface cards and hubs. More complex networks require additional components including routers and switches. The following is a listing of these components and the factors that need to be considered in their selection.

Network Interface cards
Every computer needs a Network Interface Card (NIC) to connect to the network. Ethernet NIC’s come in two transmission speeds: 10Mbps Ethernet and 100Mbps Fast Ethernet. You can also purchase dual speed NIC’s which can operate at both 10Mbps and 100Mbps. An advantage of installing dual speed NIC’s is that you won't need to replace them when you upgrade your network to Fast Ethernet. If you choose Fast Ethernet, all network components must be rated for this higher speed including your cabling, hubs, and switches.

A Network Interface Card plugs into an empty slot on your computer’s motherboard. You must determine your existing “Slot” or “Bus” type. Most new computers have PCI (Peripheral Connect Interface) and ISA (Industry Standard Architecture) slots. PCI cards should be chosen over ISA because they can transfer data faster and can support the higher transmission speeds of Fast Ethernet. Older computers may have ISA, EISA or MCA slots. For older computers, make sure you have an ISA slot available because most manufactures no longer support the other bus types. Laptop computers require a credit card size device called a PC Card to connect them to the network.

If you are connecting the Macintosh to your network, make sure that there is an Internal Ethernet adapter in your Mac. If you don’t have one, you have to make sure the type of internal expansions slot that you Mac has. You need an adapter that fits the kind of slot present in your Mac. Various Mac models use different kinds of expansion slots. Please refer to your Macintosh User Manual. If you Mac has PCI slots, get a PCI card that is made for Macs or for Macs and PCs.
10/100BaseT vs. 100BaseT adapters
A straight 10BaseT and 100BaseT adapter are older design and are not common these days. If you opt for a standard 100Mbps Ethernet network, every computer (both PC and Mac) must have a 10BaseT or 10/100BaseT port. If you opt for a fast 100Mbps Ethernet network, every computer must have a 10/100BaseT port.

802.11b Wireless LAN PC Card/AirPort PC card for your notebooks or desktops (PC or Mac)
The 802.11b Wireless PC Card is a Type II PCMCIA card that works in both Macintosh PowerBooks and PC notebooks. It offers users connectivity to LAN network resources for access to email, the Internet, file servers, printers and more without wires.

User access LAN via the Apple AirPort or any 802.11b wireless LAN card installed in the notebooks or desktops.

802.11b Wireless LAN PC Card for Aries
By installing the Orinoco wireless PC card into one of the PCMCIA slots in the Aries, it allows users to access the resources and services provided on the server without cable. (Currently, Aries only support Lucent wireless PC card on the server) It supports up to 128 users with maximum range of 550 feet in semi-open environment.

Network Hub
Hubs are the central connection point for all devices on your network. The following factors should be considered when selecting a hub.

- **Speed**: Hubs come in two transmission speeds: 10Mbps Ethernet and 100Mbps Fast Ethernet. You can also purchase dual speed 10/100Mbps “auto-sensing” hubs, which sense what types of network interface cards, are attached to them. In addition, there are “switched” hubs that have one or more 100Mbps uplink ports (usually connected to file servers) with the remaining 10Mbps ports dedicated to desktop PC’s.
- **Shared versus switched**: A shared 10Mbps Ethernet hub repeats information to all computers on the network. In a shared 10Mbps Ethernet environment, each computer on the network competes for the same 10Mbps bandwidth. Switched 10Mbps Ethernet hubs have one or more 100Mbps uplink ports that are attached to file servers. In a switched 10Mbps Ethernet environment, each computer receives a dedicated 10Mbps bandwidth. The maximum available bandwidth in this switched environment is 100Mbps. Switched hubs increase the performance of your network by reducing network traffic and providing dedicated bandwidth to computers on your network.
- **Quantity of ports**: Hubs typically come in 4, 8, 12, 16, 24 and 48 port models. To determine the number of ports you need, consider the number of desktop PC’s and servers you currently have and allow for at least three years of growth. Also consider other devices, which may be directly connected to the hub such as printers and routers.
- **Port partitioning**: Hubs providing this feature can partition-off (shut down) a specific port when errors are detected on this port. This prevents a malfunctioning network interface card or other device from affecting the entire network.
- **Diagnostics**: All hubs should come with diagnostic LED’s to simplify troubleshooting of network faults (i.e. active connection, transmit, receive, collision and fault). Some hubs also come with network utilization meters, which provide a simple way to monitor the amount of traffic on your network.
- **Stackable Hubs**: A stackable hub has a dedicated high-speed interface allowing it to be connected in series to other stackable hubs. This allows you to add hubs to your existing network to accommodate additional users.
The speed rating of the hub you intend to use must match with the speed rating of your computers' Ethernet connectors and Interface cards. The following table summarize the options.

<table>
<thead>
<tr>
<th>Connectors/Interface card in The network</th>
<th>10BaseT and 10/100BaseT</th>
<th>100BaseT only</th>
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<tbody>
<tr>
<td>10BaseT</td>
<td>ok</td>
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<tr>
<td>10BaseT and 10/100BaseT</td>
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<td>10/100BaseT only</td>
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<td>100BaseT only</td>
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<td>10BaseT, 10/100BaseT and 100BaseT</td>
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**Network Cable**

Network Interface Cards can support three types of cable connections: Unshielded Twisted Pair (UTP) referred to as 10BaseT, Coax referred to as 10Base2, or Fiber-Optic referred to as 10BaseFL. The majority of new networks are installed with 4-pair UTP (10BaseT and 100BaseT) cabling which uses a rectangular 8-pin modular connector.

On the outside, 10BaseT and 100BaseT Ethernet cables look like phone cable, but are a bit larger. UTP connectors are officially called RJ-45 connectors. The maximum allowable cable length between the hub and the computer is 100 meters.

**Routers**

Routers are intelligent devices that use both hardware and software to connect two networks together. There are four common applications for routers.

- **Internet connection:** Routers are used to connect your network to the Internet so that all users can send and receive email and browse the web over a single Internet connection.
- **WAN connection:** Routers are used to connect your network to another network (branch office or main office) over a wide area network (WAN) link.
- **Segment large networks:** Routers are used to segment (subnet) larger networks. Segmenting breaks a network into smaller segments for better performance, manageability and security.
- **Connect dissimilar networks:** Routers can perform media translation when connecting two different types of networks together (i.e. Ethernet to Token Ring).

Factors to consider when purchasing a router: Some routers integrate several networking components into one device including network hubs, ISDN adapters (Integrated Services Digital Network), CSU/DSU’s (Channel Service Unit/Data Service Unit), etc. Some key features to look for in a router are quantity and type of LAN/WAN interfaces, security, built-in firewall, protocol support, management capability, and capacity (in packets-per-second).

**Switches**

Unlike a hub that repeats data to all devices attached to it, a switch only repeats data to devices that the data is intended for. Switches increase network performance by segmenting larger networks into smaller networks while still maintaining a connection between them. Switches also increase network performance by providing dedicated bandwidth to each device connected to it.
Factors to consider when purchasing a switch: Switches should be used in both new and existing networks to accommodate a large number of users. Switches can be installed in existing networks without having to change any existing equipment such as cabling, network interface cards, hubs, routers, etc. You should look for the same features in switches as are found in hubs. Some specific features to look for are capacity and support for virtual LANs (vLANs allow you to segment your network using software).

**Share An Internet Connection using Aries**

**Configuring the TCP/IP for Aries-based Network**

TCP/IP is a standard protocol for mixed networks that include Macs, Windows PCs, and other computers. Every computer that uses TCP/IP has a unique IP address. IP address is numerical identifier for a computer or device on a TCP/IP network. The IP address format is a string of four numbers, each from 0 to 255, separated by periods. On some network, every computer is assigned an IP address automatically, but on some network it assign IP address manually.

Aries has DHCP server service running, which automatically assigns IP address to each of the computers on your local network. You must set up each computer on your network to automatically request its IP address from Aries. A PC will make this request each time you start it up, and a Mac will request the first time you use an application that requires the TCP/IP protocol.

Aries uses a range of IP address from 192.168.1.1 to 192.168.1.254. By default, 192.168.1.1 is assigned to Aries server.

The following is an example of a typical Aries-based network.

![Aries-based Network Diagram](image)

**Aries as an Internet Gateway**

One of the benefits of having a local network connecting all your computers is that you don’t have to provide a modem and a telephone line to each computer to give it access to the Internet. Instead, all the computers on your local network can share one Internet connection. Aries serves as an Internet gateway to your network.

Aries serves as your network’s means of controlling access to the Internet. It receives all outgoing communications from the computers on your network and sends them to sites on the Internet via a single connection. The gateway also receives all incoming communications from the Internet and distributes each communication to the correct computer on your local network. All this rerouting is transparent hidden from users.
Aries offers three places to plug in a modem or an ISDN modem: a serial port and two PC card slots. Aries uses any one of these points for sharing an Internet connection on your local network. Alternatively, you can use broadband services like Cable modem, DSL or ISDN to connect to the Internet via the WAN (Wide Area Network) port on the Aries.

Aries uses this process called NAT (Network Address Translation) to direct traffic between the local network and the Internet by hiding the network's private IP addresses behind the single public IP address provided by your ISP. The Internet gateway translates the private IP addresses to one public IP address for outgoing Internet traffic and routes all information requests from your local network to the Internet using the public IP address. When information is returned from the Internet, the gateway translates and forwards incoming Internet traffic from your public IP address to the appropriate private IP address of the destination computer that requested information. The NAT also called IP masquerading, because all your networked computers masquerade as one computer on the Internet because they share an IP address.

**Internet Security**

Aries serves as a firewall that provides security for your networking by blocking access for unsolicited Internet traffic. A computer on the Internet cannot directly contact your network’s computers because it doesn’t know your computers’ IP addresses. Computers on the Internet can access only the public IP address of your gateway. Aries ignores incoming Internet traffic unless it is sent to your public IP address specifically in response to outgoing traffic generated by one of your network computers.

In addition to blocking unsolicited Internet traffic, Aries can be configured to filter out TCP/IP traffic from specific applications.

**Wireless LAN (Optional)**

Enabling Wireless Networking (802.11b) is as easy as plugging in an optional PCMCIA card into the Aries. Within minutes, users can have their entire network running, and have Internet access with wireless LAN capabilities for the entire office, enabling the freedom to work, whenever one can be most productive. These are the benefits:

**Ease of installation:** Installing a wireless LAN is fast and easy, without having to channel walls/ceilings, laying cables, making up connectors and fixing wall sockets.

**Installation Flexibility:** Wireless LAN makes it much easier to ad or move workstations, and to provide connectivity in areas where it is difficult to lay cable.

**Mobility:** Wireless connectivity provides mobility, from workers who must traverse the warehouse, to sales personnel who need to take their presentation tools with them down the hall. Wireless LAN is a natural extension to an organization’s wired network. It can greatly increase productivity by providing real-time access to e-business applications and valuable networked data.

**Scalability:** Adding new users to the network is as simple as issuing wireless LAN cards. Wireless LAN can be configured as a peer-to-peer network environment suitable for a small number of users to full infrastructure networks of thousands of users that enable roaming over a wide area.
Shares Files with others on Aries-based Network
Aries makes it possible for Windows-based and Apple Macintosh clients to share files either via Ethernet cable or AirPort/802.11b. For example, suppose you created a document in Microsoft Word for Windows. A co-worker can access that document, use Word for the Macintosh to modify it, and then place it back on the server so you can see those revisions using Word for Windows. The Aries supports this feature because Aries functions as an AppleTalk router.

Shares Printer with other on Aries-based Network
Aries makes it very easy to share printer for any computers connected to the local area network via the parallel port. This is a faster connection than a serial connection.

Aries does not require any printer drivers. Aries receives the formatted print job from a client PC/notebook and sends to the printer connected to Aries. Hence the printer driver only needed to be installed on the client PC or notebook.

Currently, it is impossible for Macintosh to use the shared printer on the Aries because Apple does not support Ethernet protocol for printing. However, you can overcome these obstacles by installing either Dave (Thursby System) or PC Maclan (Miramar System) on your Macs.

E-Mail Hosting
Aries supports POP3, IMAP4, SMTP and Multi-drop POP protocol.

Post Office Protocol (POP) is a standard protocol for receiving email. POP is a client/server protocol in which email is received and held for you by Aries. When you read your mail, all of it immediately downloaded to your computer and no longer maintained on the Aries. POP3 is built into the Netscape and Microsoft Internet Explorer browsers.

POP can be thought of as a store-and-forward service. Another protocol, Internet Message Access Protocol (IMAP), can be thought of as a remote file server. Internet Message Access Protocol is a standard protocol for accessing email from your local server. IMAP is a client/server protocol in which email is received and help for you by your Internet server. You (or your email client) can view just the heading and the sender of the letter and the decide whether to download the mail from the server. You can also create and manipulate folders or mailboxes on the server, delete messages or search for certain parts or an entire note. IMAP requires continuous access to the server during the time you are working with your mail.

POP and IMAP deal with receiving email from your Aries; Simple Mail Transfer Protocol (SMTP) is a protocol for transferring email between points on the Internet. You send email with SMTP and a mail handler receives it on your recipient’s behalf. This mail is read using POP or IMAP.
Intranet
Intranet is a network that is built using the same tools and protocols that are used by the global Internet but applied to an organization’s internal network. Intranet is the most efficient and effective way to distribute and public private information in a company. The private information is stored in the Aries Server Appliance. Any computers connected to the local area network can access your Intranet. The intranet is accessed via a web browser, such as Netscape Navigator or Microsoft Internet Explorer.

The purpose of the Intranet is to public information and disseminates them. Company commonly uses Intranet for publishing newsletters, company policy directive, or employee handbook. Intranet can also be used for collecting information from employee such as filing expense reports, applying for absence of leave or reporting problems to the help-desk.

Unlimited User Licenses
Unlike other operating system based servers, Aries gives you the ability to add unlimited users to your network without paying for additional licenses.
Appendix A: Glossary

10/100 BaseTX
An Ethernet connection over twisted-pair cables with a throughput of 10 Mb/s or 100 Mb/s.

10BaseT
A 10-Mb/s baseband Ethernet specification using two pairs of twisted-pair cabling (Category 3, 4, or 5): one pair for transmitting data and the other for receiving data. 10BaseT (part of IEEE 802.3 specification has a distance limit of approximately 328 feet per segment.

100BaseTX
The specification for Fast Ethernet using two pairs of Category 5 UTP (Unshielded twisted-pair cable of Type 1 STP (Shielded twisted-pair) cable.

Adapter
A computer add-in board device used to connect end-user nodes to the network: each contains an interface to a specific type of workstation of system bus, e.g. ISA, PCI etc.

Cable Modem
A modem designed to operate over cable TV lines. Because the coaxial cable used by cable TV provides much greater bandwidth than telephone lines, a cable modem can be used to achieve extremely fast access to the Internet.

DSL (digital subscriber line)
Short for Digital Subscriber Line, a new technology that allows more data to be sent over existing copper telephone lines (POTS). A DSL line can carry both data and voice signals and the data part of the line is continuously connected.

Domain name
The location of an organization or other entity on the Internet. For example, the address www.celestix.com locates an Internet address for the domain name “celestix.com” at a particular IP address and a particular host server name “www”.

DHCP (Dynamic Host Configuration Protocol)
A protocol that provides a mechanism for allocating IP addresses dynamically so that an address can be reused when a host no longer needs it.

Ethernet
The most widely used technology for local area networks (LANs). Standard Ethernet runs at 10 Mb/s, 100 Mb/s or 1000 Mb/s. It balances speed, price, ease of installation and availability.

File Sharing
The public or private sharing of computer data or space in at network with various levels of access privileges.

File Transfer Protocol (FTP)
A standard Internet Protocol and a way to exchange files between computers connected to the Internet. FTP is an application protocol that uses TCP/IP protocols. FTP is commonly used to transfer Web page files form the computer that was used to create the files to the computer that acts as the server for these files. It is also used to download programs and other files to your computer form other servers.
Firewall
A system designed to prevent unauthorized access to or from a private network. Firewalls can be implemented in both hardware and software, or a combination of both. Firewalls are frequently used to prevent unauthorized Internet users from accessing private networks that are connected to the Internet.

Gateway
A network device that acts as an entrance to another networks. A gateway can also be any device that passes packets from one network to another network across the Internet.

HyperText Markup Language (HTML)
A set of “markup” symbols or tags inserted in a text file intended for display on a World Wide Web browser; the markup tags tell the Web browser how to display a Web page’s content, words, and images. HTML is a subset of Standardized Generalized Markup Language (SGML).

Internet Message Access Protocol (IMAP)
Internet Message Access Protocol is a standard protocol for accessing email from your local server. IMAP is a client/server protocol in which email is received and help for you by your Internet server. You (or your email client) can view just the heading and the sender of the letter and the decide whether to download the mail from the server. You can also create and manipulate folders or mailboxes on the server, delete messages or search for certain parts or an entire note. IMAP requires continuous access to the server during the time you are working with your mail.

IMAP can be thought of as a remote file server. Another protocol, Post Office Protocol (POP), can be thought of as a store-and-forward service.

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ISDN (Integrated Services Digital Network)
An all-digital replacement for analog telephone service. ISDN provides two 64-Kbps channels, called B-channels, over a single phone line, which can be used together or independently to carry voice or data. The data signaling channel, or D-channel, carries signaling and limited packed communications at either 16 or 64 Kbps, depending on the service.

Internet Protocol (IP)
A network-layer protocol in the TCP/IP stack offering a connectionless internetwork service. IP provides features for addressing, type-of-service specification, fragmentation and reassembly, and security; IP is defined in RFC 791.

InterNIC
The former organization responsible for registering and maintaining the com, edu, gov, net and org domain names on the World Wide Web. Domain name registration is now performed by Network Solutions, Inc. who will continue to be under U.S government contract for limited time.
**IP address**
A 32-bit address assigned to hosts using Transmission Control Protocol/Internet Protocol (TCP/IP). An IP address belongs to one of five classes (A, B, C, D, or E) and is written as four octets separate by periods (for example, 192.168.10.10), also called the dotted decimal format. Each address consists of a network number, an optional subnetwork number and a host number. The network and subnetwork number together are sued for routing, while the host number is used to address an individual host within the network or information from the IP address. Also called an Internet address.

**Leased IP address**
An IP address assigned by the Dynamic Host Configuration Protocol (DHCP) to an unrecognized computing device. This method involves setting up a leased pool of IP addresses that are allocated dynamically when new devices are booted and recognized on the network.

**Local area network (LAN)**
A high-speed, low-error data network covering a relatively small geographic area (up to a few thousand meters). A LAN connects workstations, peripherals, terminals and other devices in a single building or other geographically limited area. LAN standards specify cabling and signaling at the physical and data link layers of the Open Systems Interconnection (OSI) model. Widely used LAN technologies include Ethernet, fiber distributed date interface (FDDI) and token ring.

**Leased Line**
A permanent telephone connection between two points. Unlike normal dial-up connections, a leased line is always active. The fee for the connection is a fixed monthly rate. The primary factors affecting the monthly fee are distance between end points and the speed of the circuit.

**LCD**
Liquid Crystal Display, a type of display commonly used in digital watches and many portable computers.

**Media access control (MAC) address**
A standardized data-link-layer address that is required for every port or device that connects to a LAN. Other devices in the network use these addresses to locate specific ports in the network, and to create and update routing tables and data structures. MAC addresses are six bytes long and are controlled by the IEEE. Also known as a hardware address, a MAC-layer address and a physical address.

When your computer is connected to the Internet, a correspondence table relates your IP address to your computer’s physical (MAC) address on the network.

**Name server**
A program that constitutes the server half of the DNS client-server mechanism. A name server contains information about a segment of the DNS database and makes it available to a client called a resolver. A resolver is often just a library routine that creates queries and sends them across a network to a name server.

**Network Address Translation (NAT)**
A mechanism for reducing the need for globally unique IP addresses. NAT allows an organization with addresses that are not globally unique to connect to the Internet by translating those addresses into globally routable address space. Also known as Network Address Translator.
Peer-to-Peer
A networking model where a computer is both a client and a server.

POTS (Plain old telephone service)
Standard telephony for placing and receiving calls.

Peripheral Components Interconnect (PCI)
Peripheral Components Interconnect (PCI) is an interconnection system between a microprocessor and attached devices in which expansion slots are spaced closely for high-speed operation. PCI is designed to be synchronized with the clock speed of the microprocessor, in the range of 20 MHz to 33 MHz.

PCI transmits 32 bits at a time in a 124-pin connection (the extra pins are for power supply and groundings) and 64 bits in a 188-pin connection in an expanded implementation. PCI uses all active paths to transmit both address and data signals, sending the address on one clock cycle and data on the next. Burst data can be sent starting with an address on the first cycle and a sequence of data transmission on a certain number of successive cycles.

Point-to-Point Protocol (PPP)
A protocol for communication between two computers using a serial interface, typically a personal computer connected by telephone line to a server. For example, your Internet server provider may provide you with a PPP connection so that the provider’s server can respond to your requests, pass them on to the Internet and forward your requested Internet responses back to you. PPP uses the Internet protocol (and is designed to handle others).

Point-to-Point Protocol over Ethernet (PPPoE)
A specification for connecting multiple computer users on an Ethernet to a remote site through common customer-premises equipment such as a modem and similar devices. PPPoE can be used to allow an office or building full of users share a common digital subscriber line (DSL), cable modem or wireless connection to the Internet. PPPoE combines the Point-to-Point Protocol (PPP), commonly used in dial-up connections, with the Ethernet protocol, which supports multiple users in a local area network (LAN). PPN information is encapsulated within an Ethernet frame.

Post Office Protocol 3 (POP3)
Post Office Protocol (POP) is a standard protocol for receiving email. POP is a client/server protocol in which email is received and held for you by your Internet server. When you read your mail, all of it immediately downloaded to your computer and no longer maintained on the server. POP3 is built into the Netscape and Microsoft Internet Explorer browsers.

POP can be thought of as a store-and-forward service. Another protocol, Internet Message Access Protocol (IMAP), can be thought of as a remote file server.

POP and IMAP deal with receiving email from your local server; Simple Mail Transfer Protocol (SMTP) is a protocol for transferring email between points on the Internet. You send email with SMTP and a mail handler receives it on your recipient's behalf. This mail is read using POP or IMAP.

A system program that awaits requests from client programs in the same computer or across a network, and services those requested. A server can be dedicated, in which case this is its sole function, or non-dedicated, where the system can be used in other ways as a workstation.
Simple Mail Transfer Protocol (SMTP)
The TCP/IP standard protocol for transferring electronic mail messages between points on the Internet. SMTP specifies how two mail systems interact and the format of control messages they exchange to transfer mail.

SMTP is a protocol for transferring email between points on the Internet; Post Office Protocol (POP) and Internet Message Access Protocol (IMAP) deal with receiving email from your local server. You send email with SMTP and a mail handler receives it on your recipient’s behalf. The mail is then read using POP or IMAP.

Subnet Mask
A number that, in conjunction with an IP address, defines the set of IP addresses that are considered “local.” For example, if you IP address is 192.168.25.77 and your subnet mask is 255.255.255.0, then addresses between 192.168.25.1 and 192.168.25.255 are considered local. Also known as net mask.

T-1
A digital carrier technology used for transmitting data through the telephone system at 1.544 Mbps.

Transmission Control Protocol (TCP)
A connection-oriented transport layer protocol that provides reliable full-duplex data transmission. TCP is part of the TCP/IP protocol stack.

Transmission Control Protocol/Internet Protocol (TCP/IP)
A common name for the suite of protocols developed in the 1970’s to support the construction of worldwide internetworks. TCP and IP are the two best-known protocols in the suite. The TCP/IP protocols enable computers and networks to connect to an intranet or Internet.

VPN
Short for Virtual Private Network, a network that is created using the Internet as the medium for transporting data. These systems use encryption and other security mechanisms to ensure that only authorized users can access the network and that the data cannot be intercepted.

Wide area network (WAN)
A data communication network that serves users across a broad geographic area and often uses transmission devices provided by common carriers. Asynchronous transfer mode (ATM), frame relay, Switched Multimegabit Data Service (SMDS) and X.25 are examples of WANs.