<h1 align="center">Networking Basics and Benefits</h1>

Every small business is different, but a few things are the same. You work hard. You dream big. You see no limits. That's why every small business needs a network. A network from PCS will help your company work smarter, live larger, and save big all along the way.
Networking pays. We can prove it.

Are you ready for a network?
Do you have five or more computers?
Do more than three of your employees share one printer or fax machine?
Does your company have, or plan to have, e-mail or internet access?
Do your employees frequently need access to customer records, inventory, or financial information?
Do your employees work regularly with large or graphic-intensive files?

Even one yes means you're ready for a network.

Get big business benefits. Big savings, too.

According to a recent industry study, a network can make your small business as much as 40% more productive in just a few short years. This number is based on three primary factors.

First, you'll see an increase in personal productivity. When your office is connected, your people are too. So everyone has quicker, more convenient access to the resources they need. With office-wide links to the Internet, employees can conduct research and exchange information with each other and with key customers throughout the world. Being connected means there's no more running around trading floppy disks, waiting to print at a designated printer, or having to use someone else's computer to access a database.

Second, a network trims your communications budget. Exchanging information electronically can reduce paper, postage and overnight delivery fees. You can also lower phone bills with automatic faxing during off-peak hours. If you're linked to the internet, your whole office can share a single Internet connection instead of paying for monthly individual accounts.

And third, networking saves you money by letting you defer expensive equipment purchases. You won't have to buy that extra printer or additional fax machine when it's so easy to share what you've already got.

See for yourself

This guide will take you through the basics and benefits of networking. We can show you how to turn this technology into a practical solution that will help you accomplish your business goals.

Network

Simply put, a network is computers, printers, faxes, and other electronic devices linked with cables so all the pieces can "talk" and work together. When your network is connected, your employees and your customers are too.

Internet

The internet is the world's largest network. Invaluable as a research tool, it also enables you to send and receive e-mail to your co-workers and customers, as well as access the world wide web. All capabilities that allow small businesses to act like big ones.

Calculating networking benefits

Add up the savings
+ Increased employee productivity
+ Reduced communication costs
+ Reduced office equipment costs

Deduct expenses
- Network components, installation, and maintenance costs

Results = Substantial business benefits

Which network is right for you?

You have two types of network configurations to choose from - peer-to-peer and client-server. Your choice depends on the number of nodes (PCs, printers, and other devices) you want to connect and the types of software applications you work with. Either solution can be upgraded as your networking needs changes.

Peer-to-peer network

If you have five or less nodes to connect, you'll probably want a peer-to-peer network. In this configuration, a single string of computers are connected together. A central controlling device called a hub is a recommended option. Each computer is an equal or a "peer" of the others, and can share files and peripherals connected to the network. While a peer-to-peer network is a low-cost easy-to-install solution, it is not as efficient for sharing large and complex files, such as databases or graphics

Client-server network

If you have six or more nodes to connect, and work with large files like databases or information that is updated frequently, your best choice is a client-server network. The presence of a central computer, or server, in this configuration gives you several advantages. Because files are stored in a single location, they're easier to update, back up, and archive with dependable results. The server itself is typically a high-performance computer that ensures speedy data access and delivery, and gives your business the platform to add capabilities such as centralized accounting and inventory management software.

Node

A computer, printer, server, modem, fax machine, auxiliary hard drive or any other device connected to a network.

True story
Accounting office connects to the internet, shares resources, and saves big Without a network,

information was isolated on individual desktops in this four-person accounting firm. Client files were stored on one computer, the printer was connected to another, and no one had access to the Internet. Employees walked between printers and PC's, frequently stood around waiting to access or print the documents they needed, and had to use traditional mail or overnight services to deliver timely information. With just five nodes to connect (four computers and a printer), the company installed a low-cost peer-to-peer network with Internet access. Now all employees can access files, initiate printing directly from their desktops, and communicate via e-mail. As a result, the company deferred the purchase of a second printer (approximately the same cost as the network components) and saved hours of wasted time.

Network benefits:
• Reduced office equipment costs
• Increased employee productivity

Laying the foundation: cabling

Cabling ties everything in your network together and is a critical component. We can help you decide which type of cable you need.

Cabling comes in several varieties, including coax, twisted pair and fiber

The most common types of cabling for smaller network are coax and twisted pair. Coax resembles cable TV wire. It has the benefit of not requiring a hub and can be used to connect large numbers of computers together in a single "string". Coax was the first standard cabling type; however, it is less flexible than newer twisted-pair cabling and doesn't support high-speed technologies. If you have coax cabling installed and want to upgrade to a twisted-pair solution, look for networking products that support both technologies simultaneously. Twisted-pair cabling resembles the wire that connects your telephone to the wall jack. Its low cost, ability to make easy additions and changes to the network, and built-in path to high-speed technologies such as Fast Ethernet gives you more advantages.

Networking technologies include Ethernet, Fast Ethernet, Token Ring, FDDI, and ATM. The two most popular choices for networks are:

Ethernet

Transfers information at 10 megabits per second (Mbps) in small bursts of data called "packets" to ensure accurate, efficient operations.

Fast Ethernet

Also known as 100BASE-TX; it is 10 times faster than Ethernet, transferring information at 100 megabits per second. Fast Ethernet is ideal for sending large, complex files such as databases and graphics.

Network software requirements

A network operating system is required for every network. It allows computers and other connected devices to send and receive information. Network operating system software can range from simple to more robust. Peer-to-peer networking features are built into Windows 95, Artisoft LANtastic, and the

Macintosh OS. Client-server configurations require more sophisticated network operating systems like Novell NetWare or Windows NT Server.

Making successful connections: network interface cards

Network interface cards work with software to send and receive messages on the network. Every desktop or notebook computer on your network needs a network interface card. Ethernet network interface cards are available in 10 Mbps, 10/100 Mbps, and 100 Mbps configurations. They are available for notebook and desktop computers. Dual function 10/100 Mbps network interface cards let you keep your options open if you're planning an upgrade to Fast Ethernet in the future.

The center for network performance and growth: hubs

Also called a "repeater", the hub is the central point of connection in your network that makes resource sharing possible.

Ethernet and Fast Ethernet hubs are available in several port configurations. The most common options for small business are 4, 8, and 16 ports. You can easily connect hubs together to get more ports and functionality as your business grows, adding just what you need when you need it. No additional software or configuration is required, just plug in what you want and you're ready to go.

A window on the network

A managed hub gives you many useful capabilities by letting you see who's using the network and how they're using it. Hubs can also be managed remotely. By attaching a modem to the hub, we can remotely monitor and manage your network and alert you to potential problems before they impact performance.

Increasing functionality of your network

Once you have a local area network (or LAN) installed, your options are just beginning. You can add more devices such as switches, remote access devices, and resource servers to increase your advantages.

High performance for power users: switches

Graphic designers, engineers, database users - anyone who works with large, complex applications can seriously slow down your network performance. That's when you may want to consider a type of hub called a switch, which lets you pinpoint data delivery to your power users. You also may want a switch if your operations are growing, because it can divide a large network into smaller, more manageable segments.

Ports

Generally speaking, the point at which a device connects to the network so that data can pass through. The simplest example of a port is the point where you plug your telephone into the wall.

True Story
Switching and internet access bring welcome relief to design agency

The challenge for a fifteen-person graphics studio was making sure that everyone in the office was linked to the Internet, while the design department got speedy access to networked resources they needed, like graphics programs, the color printer, and the company's library of photographs.

With a client-server network already in place, the company was able to meet the challenge. It installed a switch between the designers' computers and clipped on an ISDN router to provide access to the Internet for the entire staff. Now bulky graphics files are sent directly to the people who need them and everyone is able to send proofs directly to clients without mail or delivery hassles. Because the Remote ISDN router and switch work with the agency's existing network, installation was a snap, with no complex reconfiguration necessary.

Network benefits:
• Increased employee productivity
• Reduced communication costs

Shared and switched connections

On most networks, everyone shares the capacity of that network. If you have a 10 Mbps network, the capacity remains 10 Mbps even as you add more users and introduce more complex applications such as graphics or images. This can create bottlenecks and slow down performance. Switching allocates data for delivery to a specific user or group of users. For example, if you have two employees on your network who are regularly sending or receiving large image files, they could be using substantial amounts of the network's capacity by themselves. Installing a switch would allow you to deliver additional capacity directly to these power users without impacting performance for the rest of the network. The switch provides the necessary link between Ethernet and Fast Ethernet devices and allocates data delivery to specific users. It is ideal if you have a small number of employees requiring high throughput.

Far-reaching benefits

A key advantage of a network is its ability to connect yo with the world at large. You can access resources on the Internet or at your company's branch offices. Set up a website to promote your company and sell products online. You can give employees who are traveling or working offsite access to company information. You can also exchange timely information with customers and vendors, without postage, overnight deliveries, or long-distance phone charges.

Making the Internet connection: modems and routers

When you design your network, you can build in the capability for Internet and remote access by including wide area network (WAN) devices like modems, remote access routers and servers, and Internet gateways.

A modem (either analog or ISDN) is an easy, cost-effective way to provide Internet and remote access for a single person. Modems send data over a standard analog telephone line at speeds typically ranging from 14.4 Kbps to 56 Kbps or as fast as 128 Kbps with ISDN.

If you need to connect more than one person to the Internet simultaneously, a remote access router is an affordable alternative. Routers link your network to other networks or modems and route information that comes along the network to the right location. A router can also save you money by

providing shared Internet access for all your employees, eliminating the need for expensive individual accounts. Routers can use either built-in modems or ISDN to transmit data.

ISDN

Integrated Services Digital Network provides fast Internet access with ISDN phone lines that can process information up to 10 times faster than conventional modems. ISDN also lets you handle two tasks at once, allowing you to download information while you talk or send a fax.

Internet gateway

A device that lets a network connect and communicate with the Internet without specialized software residing on each individual computer. It can reduce the cost of paying for multiple Internet accounts.

Solutions for resource sharing

Print, fax and CD-ROM servers can bring added productivity to your network by allowing you to share these expensive peripherals. By installing a print server you can attach less costly devices, such as ink-jet printers, directly to your network, eliminating the need to buy a network-ready printer. The server can even prioritize jobs and print them in the order you want.

A fax server can let employees send and receive faxes directly from their desktops, increasing productivity and eliminating the need for additional fax machines, as well as additional telephone lines. A CD-ROM server provides network-direct connections for up to seven attached CD-ROM drives, allowing employees from different areas to access these drives simultaneously.

True Story
Efficient Internet Access hits the bottom line
A small , ten-person marketing company that relies heavily on information gathered over the Internet found it was spending a lot of money to make money. The company's ten project managers were connected through separate online accounts, each with a monthly fee of over $20, over separate phone lines. Each project manager's PC was equipped with a 28.8 Kbps modem, a painfully slow and expensive way to download large documents. The company added an ISDN router to the network's 16-port hub and set up an ISDN online account with their Internet Service Provider. Now all Internet access is consolidated through the router's single ISDN connection. High-speed links make downloads a snap. The cost-saving advantage: ten Internet accounts and phone lines have been reduced to one.

Network benefits:
• Reduced communication costs
• Increased employee productivity

Take the big step

Now that you've seen how a network can benefit you with increased productivity, reduced communication costs, and reduced equipment purchases, contact Prime Computer Systems and help your small business live large.