



A Manager's Guide to Understanding Technology

Breaking Down Communications Barriers

By Brian Shrift
President of Precision Business Solutions

720 Rowena Drive
Suite 301
Ebensburg, PA 15931

814.471.0206
www.PrecisionBS.com

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Preface

This book was written to assist Managers and Business Owners in understanding the basics of technology, and will allow them to better understand and communicate their wants and needs to an IT Professional. While there are some technical references, this is not meant to be a technical book, but more of an informal “technology explained in plain English” book.

Over the past years, I have worn the hats of a student, teacher, technician, small business owner, and consultant. I am not a seasoned author, so please forgive the grammatical error or two that you may find. Currently, I am an IT Consultant and Small Business Owner, and one of my areas of expertise is working with managers and business owners to educate them in technology. I work with these individuals on a daily basis, helping them to implement technological solutions to make their company more productive, reduce costs, or even start technology based businesses.

Please note the date this book was last revised, *August 17th 2007*, as technology changes daily.

Disclaimer: While I’ve done my best to ensure the information contained in this book is accurate, as you know technology changes daily. Please verify any information you’ve read in the book with your IT Professional, before making any major company/financial decisions.

Computers and Operating Systems

There are many different types of computers and operating systems on the market today. Picking the right one for your business can be tricky and costly, especially if you pick the wrong one.

While I love the commercials, I will not be covering Apple/Macintosh, because they are still struggling to make it back into the business marketplace. I hope that in a later version of this book, there will be a chapter dedicated to Apple. In the meantime, Microsoft Windows it is.

Windows XP

Windows XP Professional is the best operating system for the majority of businesses today. Some of the key features to be highlighted are:

- **Windows Update** – An updating service from Microsoft that will install critical security patches and updates, automatically, during the off hours of the night. This is vital to ensure your computer's security flaws are patched.
- **Remote Desktop** – By far, my favorite. Remote Desktop allows you to connect to your computer from a remote computer, as if you were sitting right in front of it. Therefore, you could be at a colleague's computer, and pull up your computer's screen. Better yet, you could work as if you were at your computer, from home or a remote location.
- **Compatibility and Reliability** – Since Windows XP has been around for quite some time now, most of the bugs have been worked out. Software development companies have written almost every application you can think of and even some older DOS and Windows 98 programs continue to run on Windows XP. Windows XP is as stable as you're going to get!

Vista on the other hand, is brand new.

Microsoft Vista

Since Microsoft Vista's release, I have not recommended it to a single client. I have even recommended paying more to downgrade to Windows XP. Some of the major problems I have with Vista are:

- Speed – Vista requires a lot more horsepower to run. You will need a bigger processor and more memory. If you are upgrading, be prepared for some much slower response times. It is better to purchase a new computer if you want Vista.
- Cost – Since Vista requires more horsepower, you will need to purchase a better computer if you want to stay fast. Also, if you are upgrading, make sure all of your current hardware is compatible, or else you will be replacing it with “Vista Compatible” hardware.
- Hardware Compatibility – Not all of your old stuff will work with Vista. My personal HP LaserJet and Label printer are not compatible, so if I upgrade to Vista, I will have to buy new ones.
- Software Compatibility – If you are planning an upgrade to Vista, check all of your software to make sure it is compatible. WebEx, a major player in the remote online support and online meetings is still not compatible. Do not assume you will be able to reinstall your three-year-old financial package without problems.

Overall, I think it is just going to take some time before businesses are ready for Vista, if ever. Microsoft has already started talking about their next version of Windows coming out in the next year or two, so I'm wondering if Vista is going to be classified like Windows Millennium....a mistake.

What If I have Vista? Can I downgrade to XP?

Well....it depends on what version you have. If you have Vista Business, then you are able to downgrade Vista to Windows XP, without license issues. If you have Vista Home, unfortunately you must purchase an XP Home license.

Computers

There are many different computer brands available. HP, Dell, eMachine, and Acer are just a few examples. Some people swear by Dell, and others swear at Dell. One movie quote sticks out at the moment. In Armageddon, when they are trying to leave the asteroid and the shuttle won't start, Lev comments “American components, Russian components...all made in Taiwan”! The important thing to remember is that no matter

what brand you select, computers are considered disposable. If they last more than three or four years, consider yourself lucky.

Computers are pretty much all the same now-a-days, but there is still one golden rule: You pay for what you get. A \$1,000 computer is going to be better than a \$500 computer, and a \$2,500 computer will be better than them all. The trick is figuring out which one you need, since you do not want to buy the \$2,500 computer when the \$500 computer will do.

The standard computers I recommend to most of my clients contain the following hardware. This is my “standard computer”:

- Intel Celeron or AMD Sempron Processor
- 1GB Memory
- 80GB Hard Drive (or whatever comes standard)
- CD-Burner/DVD Drive (or whatever comes standard)
- 17” Flat Panel Monitor
- Windows XP Pro
- Office 2003 Basic (assuming a word processing suite is required)

If you purchased the above computer, you would be able to sit it down at most people’s desk and would have provided them with the necessary resources to do their job. But, each company is different, and with the ability to customize your computer during purchase, you can get the perfect computer. There are just a few main questions that will help determine the type of computer you need, and they are not all technical questions...many are personal preferences!

- **What will the computer be used for?** If you are an engineer, you will most likely be using CAD software, which means you will want a better video card, bigger processor and monitor. If you are a lawyer, you will most likely need word processing, email, and a time/billing package, which means an average computer will do.
- **Are there any big applications or graphics programs that will require a better processor and more memory?** QuickBooks and AutoCAD are examples of programs that require bigger processors and more memory to run efficiently. The more programs you run, *especially simultaneously*, the more memory you will need. If you are in a word processing program and email all day, the minimal will do.
- **Do you need to copy/make/burn DVDs or CDs?** CD burners are pretty much standard, and DVD burners are not far behind. If you think you may want to burn CDs/DVDs, make sure your computer has a burner.

- **Do you need to be mobile?** Laptops are gaining popularity due to the decrease in price and the usefulness of being able to take your computer anywhere. My only words of caution on laptops are to make sure you purchase the warranty. Laptops are moved, banged around, dropped, hit, etc., more than a desktop computer, so they're more likely to break. Dell has a Complete Care warranty that covers accidental damage. Not only would this be good for a college student, but a coffee-spilling prone executive. A coffee in the keyboard will be covered, and your laptop replaced in no time. Also, many laptops come with the ability to purchase a dock, so when you're in the office, you can "dock" your laptop and work on a full sized keyboard, mouse and monitor.
- **I have seen people with two monitors....does that mean they have two computers?** Maybe, but probably not. You can get dual-monitor setups that will allow you to place two monitors side by side, which will work just as if you had one really big monitor. I have had dual-monitors for years now, because I can get so much more work done by having my programs running on two different screens and being able to look at both simultaneously. I have the main application I am working in on the left side and my email on the right. I can quickly bounce back and forth, making life much easier and more productive.
- **What brand should I get?** To be completely honest, I am biased towards Dell. The only computers I recommend are Dells. I have selected Dell because they are the number one manufacturer of computers, which means there are better odds that the components inside a Dell computer have been tested and are very compatible. Dell's support website is also top notch (I am not referring to telephone support). I can login to support.dell.com, check my warranty and download the most recent software for my Dell. This may not mean much to you, but it will save your computer technician time in maintaining and supporting your computer(s), in turn, saving you money.
- **Should I get the warranty?** If you are purchasing a laptop, definitely, and if a desktop, it is up to you. One way to look at it is, if you purchase a three year warranty, you're guaranteed a working machine for the next three years. For the cheap \$500 computers, I would never purchase the warranty (even on laptops). If you needed (or purchased) one of the more powerful \$2,500 computers, it may be worth it (especially if you upgraded to the 24" widescreen flat panel)!

- **What about all these other things? Sound cards, USB drives, software packages, printers, wireless keyboard and mouse, etc? Do I need them?** That one is your call. You know if you need a printer or a scanner. If you like the price, buy it. If you do not, shop around. After the core items: Operating System, Processor, and Memory, everything else is optional. You see the price difference between a 17” flat panel and a 24” widescreen flat panel and you know if you want to pay it. You know if you need a \$125 dollar laptop bag or a wireless keyboard and mouse. After the core three, the rest are personal preference. Please do remember that some items can lead to increased productivity, such as a faster processor or dual-monitors. This is where your technician can assist in helping you choose what you need.

Please see Appendix A for real-world examples and prices of computer configurations for various office examples.

Computer Maintenance

I am a huge believer in proactive computer maintenance. There is that old saying about a tree falling in the woods, and if nobody heard it, did it fall? My rendition to that is if your computer had a problem, but your technician fixed it before it affected your work, did you ever really have a problem? That is especially important in servers, which we will discuss a bit later.

While I would recommend a qualified technician perform maintenance on your computer every three to six months, there are some simple maintenance tasks you and your staff can complete to keep your computers running as efficiently as possible.

- **Disk Defrag** – Think of your computer’s hard drive as a filing cabinet. When you create a document and hit save, your computer puts that file in the first available spot on the hard drive. That would be like opening a random file cabinet drawer and putting your document in the first place you see. That is called File Fragmentation. What the Disk Defrag does is takes all your files, and puts them in order so your operating system or program can quickly find them when you go to open it again. Instead of searching all the drawers for the “Golf Schedule” file, you would simply go to the G’s.
- **Disk Cleanup** – A Disk Cleanup will search your hard drive, and show you a list of items that are most likely junk and can be deleted. Two of the items it cleans are the Recycle Bin (where all your files go when they are deleted) and Internet Explorer temp files. It is important to clear your Internet Explorer temp files (Temporary Internet Files), because that is a common place for spyware to hide, and can easily cause some Internet Explorer errors when loading web pages. The Recycle Bin and Temp files are two areas of your computer that are always accumulating junk, which can safely be deleted.

- Windows Update – While the Windows Update is automatic, there are sometimes optional updates and critical updates that require you to accept a license agreement (I Agree box). These require you to manually install the updates (little yellow shield in the bottom right hand corner of the screen).
- Anti-Virus – While most current anti-virus programs do this automatically, check your anti-virus program to ensure its virus definitions (list of viruses your anti-virus program knows about) are up to date. If your anti-virus program is not kept up to date, it will not know what viruses to look for and you could end up infected. Most anti-virus programs update weekly, if not daily.

I have created some How-To Guides on the above maintenance tasks and they can be found on www.PrecisionBS.com > Services > Client Support Area.

Some of the other maintenance tasks a qualified technician would be able to do are:

- Check Event Logs – Your computer logs many events, some alerting technicians to problems that exist. One example would be a System Log Error under the category Disk. If you receive one of those, chances are your hard drive is failing and may need to be replaced. By replacing the drive before it fails, you will save time and money in technician costs, because you will be able to plan the replacement, instead of having it be a rush or emergency job. This is especially important on servers.
- Spyware/Virus Detection and Removal – Spyware is worse than viruses anymore. Spyware and viruses can dig themselves so far into your system you will have to re-install your computer from scratch. But, technicians do have tools available to clean out most spyware and viruses, without having to reinstall the entire system.
- Hardware Recommendations – Based on talking to the individual about their computer, a good technician should be able to determine if the current computer is slowing the individual down. It could be something as simple as a \$50 memory upgrade to make the computer fast again, or if it is time for a replacement. If you can squeeze an additional **fifteen minutes a day in productivity** out of your employee that approximates sixty hours¹ of additional work per year! If you have ten employees, that is an additional fifteen full weeks of work.

¹ 52 Weeks – 4 Weeks (vacation/sick/holiday) = 48 Weeks * 5 Days/Week = 240 Days * 15Min/Day = 3600 Minutes = 60 Hours

Networks

Everyone knows of at least one network...the Internet. Networking is simply the ability to link multiple computers together to share resources, such as files and printers, as well as communicate, such as sending email. I am going to touch base on a few different Network related items, to help you better understand your choices and options.

Switches, Routers and Speeds

When you have a network, all of the computers are connected via a network cable, which resembles a fat telephone line (unless you are wireless, which is a page or two away). Those cables are plugged into a central location, called a switch. The switch's job is to direct traffic from one connection to the next, making sure the information gets to the right place.

Routers connect different networks together. The most common instance is connecting your office to the Internet. By installing a router and an Internet connection, you are connecting your network, to the Internet (which is a network). Routers also act as firewalls, only allowing in the data you permit or request (such as downloading email or surfing the Internet).

Most office configurations look something like:

Computers -> Switch -> Router -> Internet

The Computers are all plugged into the Switch, which is plugged into the Router, which connects you to the Internet.

There are many different brands of switches and routers. I have been using Linksys switches and routers for the past three years, and have had no complaints. Dell switches are also not too bad. A few of the brands for small business I have had success with are: Linksys, Dell, Netgear, D-Link, 3Com and US Robotics. I would consider these the main manufactures of small business class networking equipment. What you do have to consider is the speed of your network, which is determined by your switch and the network card you have in your computer.

Network speeds vary, and typically range from 10Mbps to 1,000Mbps, depending on the type of technology used. Standard wired networking is 100Mbps (100 megabits per second). Most servers and some new computers come with Gigabit (Gb) (1,000 megabits per second) network cards. Faster is always better, so if you can afford having everything on a Gb network, go for it! My office network has servers running Gb and all the computers/laptops running 100Mbps...a standard network environment.

A recommended standard small business network should have a server with a gigabit network adapter, plugged into a switch that has standard 100Mbps network ports and at least one Gb port. The server would be plugged into the Gb port, and the computers would be plugged into the 100Mbps ports.

This is important for speed because if we have 10 computers and a server all plugged into a standard 100Mbps switch and each are communicating with the server at the same time, they would max out at 10Mbps each ($100/10=10\text{Mbps}$). But, if the server was plugged into the Gb port, each would get their full 100Mbps max ($1,000/10=100\text{Mbps}$).

Wireless Networking

Wireless networks, often found in laptops, are used to connect computers to networks without having to worry about a cable. Some offices are switching to all wireless networks because computers can be easily moved around the office, without having to worry about rewiring. While wireless sounds great, and it is, there are some downfalls to take into consideration:

- Speed – Wireless speeds typically range from 1Mbps – 54Mbps, depending on the type of wireless technology you are using, and the signal quality. Wired networks are 100Mbps or 1,000Mbps, and distance is usually not a problem. The further away you are from the wireless router (antenna), the weaker the signal and slower the speed.
- Security – If your wireless network is not properly secured, outsiders can gain access to your network, and potentially have access to data they should not have.

Wireless is normally used to compliment an existing wired network. Say we have a server, ten computers, and two laptops. The recommended network configuration would be to have the computers hard wired into a switch with the server, and the laptops can be both wired or roam wirelessly. Also, say a printer would be a great addition in the corner office, but it is next to impossible to get a network cable run to that location. They make wireless network cards for printers (wireless print server).

When I setup a new network at a small business, I install a Wireless Router, even if my client does not have laptops or a need for wireless at the present time (wireless can be disabled). A wired router is \$50, and a wireless router \$60, so it just makes sense to go with the wireless and plan for the future. At present, there is only one main type of wireless technology to use, 802.11g (which is compatible with 802.11b).

There are currently three types of wireless network (although N is in the process of being released)

802.11a – 5.xGHz – 54Mbps max speed

802.11b – 2.4GHz – 11Mbps max speed

802.11g – 2.4GHz – 54Mbps max speed

802.11n (coming soon) – 2.4 and/or 5.xGHz – 600Mbps max speed

The GHz is noted because other wireless devices, such as cordless phones, can cause interference since they operate on the same frequency. A qualified technician should install your wireless network, to ensure the frequencies are not overlapping and to ensure it is properly secured. If the frequencies overlap, that could cause interference, which will degrade the quality and speed of your wireless connection. Security is also a factor, because you do not want outsiders being able to gain access to your network. The main types of security that a qualified technician can enable are:

- Encryption – There are different types of encryption methods for securing wireless networks. Every wireless network should at least have minimal encryption, but better and more secure encryption may be necessary.
- Disable SSID – A SSID is the identifier (name) of your wireless network. When you setup a wireless network, you give it a name, and then your laptop will detect that wireless network and you are able to connect to it. By default, your wireless router broadcasts that SSID so your computer can detect and connect to it. After your laptops and other wireless devices are connected, you can disable that broadcast so outsiders can not find it as easily.
- MAC Filtering – Each network device is assigned a unique 16 character identifier, called a MAC address. Most wireless routers allow you to limit which MAC's it will communicate with, allowing you to preprogram the wireless router with the machines you have in your office. While this is an effective security measure, it can be troublesome to manage and efficiently maintain if you have many or often changing wireless devices.
- Broadcast Signal Strength – Most wireless routers have the ability to control signal strength. For example, if a wireless routers signal went 80 ft. @ 100%, you could turn the signal down to 75% and cut its range to 60 ft. Why would you do this? If your wireless device is in the center of your office, and your office is only 60 ft wide, the additional 20 ft is outside of your control (eg. parking lot, open area, etc.). That allows a potential intruder the ability to try to hack into your network. By removing that 20 ft., you are limiting your exposure.

If you implemented three of the above security measures (skipping the signal strength), an intruder would need to:

1. Determine your SSID
2. Break/discover your encryption method and key
3. Figure out a MAC address and spoof your wireless router

Please talk to your technician to determine which security measures and safeguards are adequate for your office.

Internet Connections

Almost every business needs Internet access, even if it is only for email. Most will either go with DSL or Cable, depending on availability, since they are the cheapest and available in most places. Wireless is generally selected due to the lack of DSL/Cable availability, or because good wireless companies can offer special services and increased speeds that are needed.

Type	Speed (download/upload)	Monthly Price	Provider
DSL	3.0Mbps / 512Kbps	\$40	Phone Company
Cable	3.0-6.0Mbps / 768Kbps	\$90-\$120	Cable Company
Wireless	Varies from 1.0Mbps to 10.0Mbps depending on the service and price	Varies, but generally more expensive than DSL/Cable	ISP

Download Speed – Speed when downloading information from the Internet, such as email attachments or music from iTunes.

Upload Speed – Speed when sending information, such as email attachments. Upload speed is more of a factor if you are sending large amounts of data. Big email attachments, online backup services, or VPN links are instances where you will want better upload speed. The upload speed is generally overlooked when reading about Internet speeds.

Dual Internet Connections – Many businesses require Internet access, or they cannot work. Email plays such an important role in business today that if it is offline, you feel lost and unable to get anything done. Dual Internet connections are becoming increasingly popular to prevent this from happening. Dual Internet connections achieve this by providing a second or backup source to the Internet. These are just a few types of companies that rely heavily on Internet and require it to be online:

- Pharmacies and Doctors Offices for Insurance
- Insurance Agencies for Insurance and Claims
- Stock Brokers and Investment Advisors for Financial Information

A dual Internet connection is very simple to get setup. All you need is a dual-connection router (I use one from Linksys) and two Internet connections, such as Cable and DSL. Plug them both in and configure them to:

- Load Balance - use both connections simultaneously for double the speed
- Failover Mode - use primary and if it fails it will automatically switch to the backup connection

VPN + Remote Desktop

VPN is a secure remote connection into a network, from the outside. For example: I am writing this section while sitting on my couch, VPNed into my office and using my computer via Remote Desktop at 9:04pm.

To translate that sentence:

- I am working from a location outside of the office (home).
- I am securely connected to my office network via a Virtual Private Network (VPN) connection. A VPN connection goes thru the Internet to a server at my office, and creates an encrypted connection between the two, allowing my computer to access any network resources (files, printers, etc.). It makes my computer “virtually” connected to the office.
- I am using Remote Desktop (remote connectivity software built-in to Windows XP Pro) to login to my computer at the office and use it, just as if I were sitting at my desk.
- I am physically on my couch, miles away from the office, working as if I were in the office at 9:04pm.

The main use for VPN is the ability to connect to a network from a remote location. Some scenarios would include:

- Working from home when you are not feeling 100% or contagious
- In the event of a snowstorm
- Satellite offices connecting to the main office, where all the resources and files are stored
- On travel, when you are at the hotel or airport
- Permanent VPN connections can be setup to link offices together
- As an employee perk...work from home

Remote Desktop is not a requirement of VPN, but an added bonus. If you take a company laptop home and VPN into the network, all of your network drives, files, printers, etc., will be accessible, as if you were still sitting at your office. The only potential problem is it could be a bit slow, depending on the size of the data you need to transmit across the VPN connection (remember the Upload Speed information a few sections back). If the VPN connection is too slow, talk to your ISP to increase the Upload speed at the office, and your remote location.

Remote Desktop allows you to work on your computer in the office, and the only information sent over the VPN connection is the screen and keyboard/mouse movements (printers, sounds, and other devices can also be enabled thru the Remote Desktop connection). Remote Desktop allows you to use big network applications, such as QuickBooks or your fabrication package, from remote locations without loss in speed. There is also built-in printer redirection, so you can hit Print on your computer at the office, and it will print on your printer at home.

Servers

Your server is the key component to your network. It is where all of your data should be stored, where user accounts are setup, it controls security, enables VPN, provides printing services, faxing services, database storage, or email services. It is the heart of your network.

A server is a powerful computer, with a special operating system, that sits in a corner and appears to do nothing. But, your server provides and facilitates everything you do on your network. It is the guardian/gatekeeper/key master/boss of the network.

Server Services

We will start with different services a server provides, with an explanation of each, and how that service would be used:

- **File Server** – The server provides centralized storage for everyone’s files. Centralized is very important, especially for backup purposes. If you had 15 people saving their files to random locations on their computer, you would need to backup all 15 computers....a technical (and expensive) headache. What the server does is provides each user or group of users an area to save their files and data, so it can be shared, collaborated on, backed up, etc., all from one location.
- **Print Server** – The server provides a centralized area to install printers. If each computer had the printer software installed on it manually, initially, you would have to install and configure that software on all 15 computers. When new software is released, which often happens, you would have to update each of those computers again, and again (increasing your IT bill). By installing the software on the server, the server allows each computer to print to the printer, and you only have to manage one software installation. If you upgrade the software on the server, each workstation is automatically upgraded as well. You can also control who can print to what, and when. For example, you could control which employees can print to the color laser (because color printing is expensive). Or you could prioritize whose jobs were printed first or schedule large documents to print in the evenings.
- **Fax Server** – The server could act as your fax machine. With a modem and the right software, your server could answer your faxes and email, print, and store them on your server or in SharePoint (or do any combination). This is very useful for archiving incoming faxes. If that one important fax disappeared, instead of having to have it re-faxed, you can just open it and print it. Or, you could go paperless, and just have faxes emailed or saved to a network drive. Many offices will continue having the paper fax printed, but also rely on the electronic document for electronic filing.

You can also fax directly from your computer. Save the cost in printing (paper/toner waste), and manually faxing (time waste), by simply clicking Print, selecting the Fax Printer, and addressing the fax. You don’t even have to leave your desk. You will receive a delivery receipt via email confirming a successful or failed fax.

- Exchange Server (email) – Implementing an Exchange server will provide your business with a centralized and efficient way to communicate. By using an Exchange server, your email is centralized, which means it can easily be backed up (very important since much more business is being conducted via email). Also, with Exchange you can share calendars, contacts, email boxes, assign tasks, schedule appointments, take surveys, and much more. It also comes with Outlook Web Access, a web based version of Outlook that will allow you to check your email via any Internet connection. Add-on a Blackberry server and you will be a communications wizard!
- User Administration – User accounts are configured and controlled from the server. You can configure each user’s settings and what resources they have access to (files, printers, emails, etc.). There can also be safeguards in place to prevent someone from attempting to hack into their account.
- Database Server – Many larger applications require databases in order to efficiently store large amounts of information. A server with a database application, such as Microsoft SQL or MySQL, provides that resource. SharePoint, for example, interfaces with a database.
- Web Server – While Windows 2003 server has the capabilities to host your companies public website (e.g. www.Google.com), it is not recommended that you do. A hosting company should be responsible for keeping your website online. The web server included with your server should be used for the Intranet (internal use only) website. Outlook Web Access or SharePoint are two services that will use the web server. Or you may have an outside company write a web based application for internal use, which could be hosted on this server.
- VPN Server – Enabling remote access will allow you and your employees to be able to access the network from out of the office, whether that is for working from home, on the road, at a client’s, a hotel, etc. The VPN server will control who can access the server from the outside, and log all activity.
- SharePoint Server – SharePoint is a newer technology from Microsoft that facilitates collaboration. It can be used for file storage, task lists, calendars, notes, and mainly to allow groups of individuals the ability to work together efficiently. One neat thing about SharePoint is a feature called versioning. If you are storing a document on the SharePoint server and versioning is enabled, every time that document is modified, the original is kept, allowing you to access any past version of the file.

Windows Server 2003

Windows Server 2003 comes in a few different versions. The three main versions most small businesses have are:

Features/Services	2003 Server	2003 Small Business Server	2003 Premium Small Business Server
File	X	X	X
Print	X	X	X
Fax		X	X
Exchange		X	X
User Administration	X	X	X
Database	MySQL	MySQL	MS SQL/MySQL
Web	X	X	X
VPN	X	X	X
SharePoint	X	X	X
Terminal Services	X		

Most small businesses will go with the Small Business Server, for the Exchange and Fax capabilities. Generally Premium is only selected when an add-on application that requires a MS SQL database, such as SharePoint², will be used.

Windows Terminal Server

A Windows Terminal Server is like Remote Desktop on steroids, and they are becoming very popular. A Terminal Server is a Windows 2003 Server with an additional feature installed and enabled, called Terminal Services. Turn back the clock a couple of years to when the computers were big mainframes with dummy terminals attached, and you will get an idea of how a Terminal Server functions.

A computer with Remote Desktop software (pretty much any computer made) can connect to a Terminal Server, where all of the software and applications are loaded. This could be used for various purposes, such as working from home, on the road, or from a client's. It can also be used for reducing maintenance costs by replacing old computers with Thin Clients (will be elaborated upon in the next section).

A Terminal Server also provides a reduced total cost of ownership, due to software licensing³, and support and maintenance costs.

² SharePoint comes with a database that has a max of 2GB. If you plan on exceeding that amount, which can easily be done, you will need to upgrade to Microsoft SQL server (MS SQL)

³ Check with your IT Consultant due to licensing always changing

Thin Clients

A Thin Client is like a dummy terminal. It is a tiny box that you plug a network connection, speakers, keyboard, monitor and mouse into, and it automatically connects to a Terminal Server. No software licensing, no cd-rom, no viruses, no spyware, low power consumption, and very cheap⁴. You would turn on your Thin Client and login to your Terminal Server, where all of your software would be waiting for you.

This is becoming increasingly popular because of the reduction in purchasing computers, supporting computers, and defending networks against viruses and spyware. By everyone working off of the Terminal Server, there is only one device to maintain and support. The only major downside is that if the Terminal Server fails, everyone is offline until it is operational again (but proper maintenance and warranty coverage reduce that risk).

Real World Examples:

- An accounting firm has a Terminal Server loaded with all of their tax packages, so if employees cannot make it in due to some event, especially during tax season, they are able to work from home. This Terminal Server is also used so employees can access their clients' financial/tax information when on-site with a client.
- A manufacturing facility has a Terminal Server for management level employees who travel from location to location. This keeps all the data in a centralized location while allowing quick access to that data, even when they are at a location with poor Internet connectivity.
- A law office has a Terminal Server loaded with its time/billing software and word processing suite, and is starting to phase out the paralegals and secretaries' computers and implement Thin Clients as a cost savings measure.

Sever Maintenance

Proper server maintenance is crucial in ensuring that your server remains online and operating at 100% at all times, and is most likely overlooked by many businesses. Server Maintenance should be completed every month, at a minimum. Some servers should be maintained every 2-3 weeks, depending on the amount of services they are running. It is very important that you sit down with your IT Consultant and review what is currently being done to keep your server operating at maximum capacity. At Precision Business Solutions, we have a checklist that we verify every month. Some of the items on that checklist are:

⁴ I purchased a HP Thin Client w/ 3 Year Warranty for \$299.

- Disk Defrag – Perform a disk defrag on all the drives
- Disk Cleanup – Perform a disk cleanup on all the drives
- Event Logs – Check the event logs for indicators of problems. Many problems can be prevented by catching Warnings before they turn into Errors. Also, instances such as a failing hard drive will be noted as a Warning, before it actually fails.
- Backup – Verify that the backup is functioning properly and everything is being backed up.
- Anti-Virus – Check that the Anti-Virus is enabled and automatically updating.
- Check Disk Space – Verify there are not any unusual spikes in disk usage, and that there is plenty of free space.
- Windows Updates – Verify all Windows Updates have been installed and the Critical updates are being installed automatically.
- Check Service – Verify all the different services and software on the server are working as they should (eg. Exchange, Fax, etc.).
- Update Drivers – Drivers are the software that tells your server how to communicate with the hardware installed in the server. Often there are updated drivers, which help the server remain more reliable or perform better. It is recommended that the most recent drivers be used.
- Inventory Status Verified – We have a management system in use for tracking our clients' hardware. Items we track and verify are the current configuration of the server, hardware, warranty information (very important to know when your warranty is expiring), anti-virus expiration date and other important information. This information should be managed in some fashion, even if it is an Excel worksheet.

Performing the above maintenance regularly will help ensure that your server stays operational and efficient, allowing you and your employees to remain productive.

Backups

Every time I meet with a new client, I ask what type of backup is in place. A conversation once went something like:

Me: So, what kind of backup do you have in place here?

Client: I have a tape backup that is automatically run every night, then I replace the tape in the morning. I have ten tapes for a two week rotation! (Grinning)

Me: Great! Where do you keep the tapes?

Client: I have them locked right here in my drawer, and only I have access to them. (Still Grinning)

Me: What happens if there is a flood or fire?

Client: Um..... (Grin disappeared)

Don't get me wrong, I was very impressed that the client had a backup, it was able to go back ten days (two week cycle) and that it was done on a nightly basis. But, a backup must meet the following requirements to be a truly good backup:

1. Automated – The server should run the backup on its own, without any user interaction, so there is not the ability to forget to run the backup or “run out of time” at the end of the day.
2. Daily – A backup should be run every day, and you should have at least five backup tapes (one week cycle).
3. Secure – The backup should not be placed in the open for anyone to be able to grab. Backup software that encrypts or password protects is a plus.
4. Offsite – The backup tape needs to leave the premises the following day. Most backups run at night, so the following morning the tape should be taken home, or somewhere out of the office.
5. Alerts – There should be some sort of email alert if something is wrong with the backup. If you have regular server maintenance done every month, but the maintenance is done on the 1st and the backup quits working on the 5th, you will have 25 days of an unreliable or non-functional backup.

Backups are so important; redundant backups are now something many companies should consider. An easy way to implement a redundant backup is to subscribe to an online backup service. An online backup service will provide you with a piece of software that will enable your server to securely copy the data to a server at the online backup company's facility. Research should be done to ensure you are working with a reliable company, so in the event that you needed that data, you could easily get it.

Precision BS offers a secured online backup service for our clients. Our software performs the backup, and then emails us a status report, successful or unsuccessful, so we know what happened, and so we are sure the backup is running successfully.

Some sort of disaster recovery plan should be in place. Whether the plan is officially documented and in writing, or just thought about and discussed, it should be considered. Also, a staged recovery of backup data is also important to test every so often, to ensure the data being recovered is usable and in its entirety.

Purchasing a Server

When you are ready to purchase a server, you should definitely discuss your wants and needs with your IT Consultant, and make an informed and educated decision together. I am only going to discuss two areas on your server purchase; some hardware terms and warranty options you should be familiar with.

Hardware (RAID, RAM, RPM)

The server's hardware is important, and my only recommendation is to make sure you have an IT Consultant that you trust, and who knows and understands your needs. Make sure you discuss your future ambitions for the company, so the server will perform well in the future as well. If you have fifteen employees now, but plan to double over the next year, that may be something to discuss!

Core Components:

- Network Operating System – Without knowing the details of what the requirements are for the server, I cannot make any recommendations, other than Small Business Server is very nice for most small businesses.
- Processor – Without knowing the details of what the server will be running, the only advice I can offer is that it is powerful enough for now and for the next three to five years. Some servers come with the ability to have dual-processors. You could only buy one processor now, and you can add another later if needed.
- Memory – More the better. Make sure whichever server you purchase has plenty of room to grow in that area. If you need 4GB of Memory, and that is the max your server supports, you need a bigger server. Make sure there is room to add more.

- Hard Drive Configuration – This is very important. There are many different hard drive configurations to go with and each does something different (this part gets a little tricky).
 - No RAID – Just like a standard computer. There is a single hard drive or multiple hard drives that everything is loaded on. No RAID is the basic and simplest hard drive configuration that provides no increase in speed or fault tolerance.
 - RAID0 – Striping – Striping uses multiple hard drives (2+) to increase speed. The two drives are combined into one, and the data is broken up and written to both hard drives simultaneously. Example: If you're writing a 100Mb file to your server, on No RAID it could take 30 seconds to write it to the drive. If you're using RAID0 with two drives, it would write 50Mb to each drive simultaneously, cutting the time it take to write that file in half. If you had three drives, it would take a third of the time, and so on. RAID0 increases speed, but provides no fault tolerance. Storage size is calculated by adding all the drives that are in the RAID set together. So if you had three 100GB drives in your RAID0 configuration, you would have 300GB of available storage.
 - RAID1 – Mirroring – Mirroring uses two identical drives and writes the data to both, simultaneously. That 100Mb file you had would be written to both drives. This provides no speed improvement, but provides fault tolerance. If one drive fails, your server remains operational and no data is lost because the other drive is still functional. RAID1 is the minimum hard drive configuration I would recommend for a server and is the configuration all of my servers run.
 - RAID5 – Striping with Parity – RAID5 is the best of both worlds. In RAID5, 3+ drives are used to create a fast fault tolerant drive. If you have three drives, two have data written to them and the third is used to write recovery data (parity), so the drive configuration would be able to rebuild itself if a drive died. To determine how much storage space you would have, add up the total storage of the drives, minus one of them. So, if you had three 100GB hard drives, you would have 200GB of available storage (100 + 100 + 100 – 100) or if you had four 100GB drives, you would have 300GB of available storage. The more drives you add, the faster the set becomes. A very nice server would have 4+ drives configured as RAID5. RAID5 is both fast and redundant. If a drive fails, the server remains operational. Sadly, none of my servers have RAID5.

- Hard Drive Speed – The speed of a hard drive is measured in RPM (rotations per minute). The higher the RPM, the faster the speed of the disk is.
 - 5,400-7,200RPM – Normal Hard Drives
 - 7,200RPM – 15,000RPM – Server Hard Drives
- Network Card – Most servers come with Gigabit network cards, which I recommended.
- Tape Backup – Your backup plan should be discussed and detailed with your IT Consultant prior to purchasing a server. If you are going with a Tape Backup, make sure you get BackupExec and have it configured to email you if there are any errors during the backup.

Warranty

A warranty is very important to get when purchasing a server. Do not worry about the software support though, that is what you have your IT Consultant for. I will use Dell warranties as my example, and they currently have a few to pick from:

- 3 Year Basic Support (comes with all servers) – 5 Days/Week, 10 Hrs/Day Support and Next Business Day repair if hardware needs replaced. Not a bad plan, especially if you can wait until the following day for a resolution.
- 3 Year Basic Enterprise Support - 5 Days/Week, 10 Hrs/Day Support and 4 Hour repair, if it falls within the 10 Hr day.
- 3 Year Silver Enterprise Support – 7 Days/Week, 24 Hrs/Day Support and 4 Hour repair.

If your server cannot be down long, or is vital to operations, I would go with the Silver Enterprise Support (that is what I have on my servers). Although the basic warranty is good, you may want to do the math on what it would cost you to be down until the following business day. The small increase in price for upgrading to a better plan will most likely be worth it.

I have three Dell PowerEdge servers, with one reaching its three year birthday (warranty expiration). This is how I have used my Silver Enterprise Support warranties:

- Server 1 – CPU failed after one week. After some basic troubleshooting with Dell, a technician from Harrisburg drove three hours to install a new CPU. My server was back online within five hours.
- Server 2 – Never used it (but I have a year to go)
- Server 3 – Never used it (but I have a year to go)

Granted, the above shows the reliability of hardware in the Dell servers, which makes you think the basic warranty will be fine. Your server warranty is like your auto-insurance...

- You hate paying for it
- You don't want to use it
- You hope you never have to use it
- But if you do, you're glad you have it

Software

I will not be going too in depth into software because there are so many different applications out there, and every business is unique. So, I will just talk about some ways you may want to use or implement software to help your business.

Open Source

Open Source is a type of license, which basically gives the software away, for free! Remember your golden rule though...you pay for what you get. That holds true, even for open source software. SugarCRM, a leading customer relationship software package, is free, for the base version. That includes the basics and no support. If you have problems or need support, you will need to purchase a support plan, or single incident calls. Also, you can purchase add-on features, such as the ability to sync with Outlook. Do not get me wrong, Open Source is great, but just make sure you know all of the options associated with your open source choice. My biggest warning is to ensure there are paid support options available, especially if you plan on relying on an open source product for an important business function.

Licensing

Please remember that with most software, you are not allowed to install it on multiple computers. So, if you purchase Microsoft Office, you can only install it on one computer. Or, if you purchase a new computer with WordPerfect, you cannot take that CD and install it on other computers.

Employee Monitoring

You may want to implement employee monitoring software to ensure your employees are using their computers for the right reason. I have implemented employee monitoring software both as a preventative measure and to prove misuse of the computers for employee termination. One example was an accountant who just never seemed to be able to get everything done. After implementing monitoring software, we were able to track everything he did, from the twenty-five minutes a day spent surfing espn.com, to the three hours a week doing personal online banking and online poker.

Customer Relationship Management (CRM)

CRM software has become very popular for businesses to track sales leads, and to manage their customer base. There are various programs available, some of the larger ones being SalesForce.com and SugarCRM.com (SugarCRM having a free Open Source version).

Financial Software

I use QuickBooks for managing my books, and Quicken for managing my personal finances. My favorite (time saving) feature is the ability to download my transactions from both my credit card and bank. That makes balancing all of my accounts simple and fast. No more going thru paper statements or remembering to enter every receipt or check....I just let the daily download take care of it. That is one easy way to help your accountant/bookkeeper get more done faster.

OpenOffice.org

OpenOffice is an open source office suite, which is fully compatible with Microsoft Office! Granted, it is not as “pretty” as Microsoft Office, but it has all the main features, without the price.

Document Imaging

Many offices are saving space and becoming more efficient by going paperless. Doctor’s offices, accounting firms, and law offices are just some of the few that are finding efficiencies in going paperless. Simply saving on the cost to store, manage, and maintain the paper could offset the cost of the scanners. That is not even mentioning the efficiencies in accessing those records, or knowing that even in the event of a fire or flood, your documents remain safe.

Other Technologies

There are many technologies out there to help you and your employees remain productive, and new technologies are being developed every day!

PDA

A PDA is generally used as an extension of your computer, as an organizer, to keep your calendar, contacts, tasks, files, etc. with you on the road. Now-a-days, PDA's are integrated into cell phones, and are generally not used as a standalone device. PDAs have a special slimmed down operating system, such as Microsoft PocketPC or Palm OS, allowing them to operate on limited hardware resources.

MicroPC

A MicroPC is made by Sony, and is a cross between a PDA and a Laptop. They are great if you are on the road a lot, because of the size (could easily fit in a purse), and run complete operating systems, such as Windows XP. There is both wireless and cell phone wireless built in, so you can get Internet access wherever you are. It also comes with a dock, so when you are back in the office you can plug in and have your full keyboard/mouse and monitor.

Video Conferencing

Especially with the increased cost of gas, video conferencing provides a cost effective way to have face-to-face meetings, without the travel. An example of this implementation would be a company with multiple offices being able to have meetings, or partner/executive meetings, without the travel expense and wasted time. Also, give full-blown presentations to a potential customer who is a hundred miles away, without hopping on a plane.

BlackBerry

Blackberrys are great communications tools, especially if you do a lot of work via email. Just in case you are not familiar with them, a BlackBerry is a Cell Phone + PDA from Rim, a Canadian company. Basically, a BlackBerry allows you to send/receive email on your cell, but does it very efficiently, and a couple different ways:

Basic Email Account – The BlackBerry will connect to your mail server, and download any new mail. But, it will not remove the mail from the server, which is important. This means that your computer at the office will still download a copy, so you will receive it in two places.

Desktop Redirector – The BlackBerry Desktop Redirector is a very slick program. What it does is monitor your Outlook email, and will relay any new messages automatically (and very fast). You can even set rules/criteria, so only the email you need relayed to your BlackBerry will be relayed (helpful in stopping the Viagra emails from making it through). As if that was not useful enough, when you send email, the email goes back to your Outlook and can be found in your Sent Items. It even marks the email as Replied To, Read, or Forwarded!

Not only does the BlackBerry handle your email, but as any good PDA, it will sync your Calendar, Contacts, Tasks and Notes. However, it does not stop with just your defaults as others do, but allows you to select multiples of each. For example, I have three different address books that I have my BlackBerry configured to sync: Personal Contacts, Business Contacts, and School Contacts.

BlackBerry Server

Adding a BlackBerry server to your existing Exchange server allows everything to stay in sync all the time. Normally for your contacts, calendar, notes, or tasks to sync you would have to plug your cable into your computer, then they would sync. That does not seem so hard, so why have an additional server/cost to simply remove the manual sync? So that when you are on the road and appointments change or contacts get updated, you are instantly updated as well. Would it not be nice if your assistant, Betty, updated your afternoon schedule while you were at your morning appointment, and once you left and checked your BlackBerry, your new schedule would be there. Or if you are on the road and you make an appointment, Betty would instantly know about it (assuming you enabled calendar sharing). The BlackBerry server simply keeps things in sync faster and easier, and they are not even that expensive.

Wireless Sync

Wireless Sync is Verizon's stab at BlackBerry, and they did not do too bad of a job! Wireless Sync is similar to the Desktop Redirector + BlackBerry server. The Wireless Sync software loads on your computer, then keeps your email, contacts, calendar, tasks, and notes, in sync at all times (15 minute intervals, or you can force a sync). The first time I set one of these up it was a headache and did not want to work just right, but that was when the service was first released. I have been testing one recently, and it is pretty reliable and very nice. The feature I like the most is that you can set a timeframe for when you want the device to sync, so you do not receive the 2am emails. It also has filters and rules, to allow only certain senders the ability to make it to your cell. This service could definitely give the BlackBerry and BlackBerry server a run for its money!

GoToMyPC

GoToMyPC allows you to remotely access your computer, without any fancy server or VPN. This is ideal for smaller offices, or when you are the only one who needs to work remotely. Very simple to get up and running, it works by installing a small piece of software on your remote (work) computer. You can then login to the website, and open that computer, allowing you to work on it as if you were there (similar to Remote Desktop). Best of all, its free!

iPod

I am listing the iPod (or any other audio player) as a business tool, because I believe it is underutilized as a business tool. Anyone who commutes or travels should have an iPod. Why? Because there are so many great books written that are available on audio book. Instead of jamming to Prince, Vanilla Ice, or MC Hammer, you could be listening to Who Moved My Cheese, The 7 Habits, or another great book. There are many online stores that sell a variety of audio books, so when you or your employees have to make that hour long drive to meet a client, go ahead and get a few chapters in.

Wireless Internet (via Cell Phone Providers)

For some, being connected to the Internet all the time is a must...especially when traveling. While most airports have free Internet, others still do not, or worse, make you pay for access. Even some hotels still do not have free Internet yet! You can ensure Internet access is available by picking up a Data Plan from your cell phone provider. Both AT&T and Verizon have unlimited data plans for around \$60-\$70/month (I mention those two because they are nationwide). What these plans do is provide you with Internet service via the cell phone network. So, if you have cell phone reception, you have Internet. While you can now get laptops with this network card pre-installed, I would recommend the USB adapter. That way, you can pass it around, allowing the ability to get your money's worth out of the service. You could have an "office account", that allowed anyone on travel the ability to take it so they could stay online.

Appendix A – Computer Configuration Pricing Examples

The following are examples of possible computer configurations, along with the price⁵. Please note that these are generic examples, and may not reflect what would be best for your business, but will give you an idea of what goes into picking the right computer for your business.

Position: Example position of an individual in the company

Software Used: Examples of the software needed

Cost: On a scale from 1-5, 5 being the most expensive

Specs: Items that increased the cost of the machine. XP Pro will be selected for each of the examples

Rational: Why I picked what I picked

Price: Cha-ching

Position: Engineer

Software: AutoCAD, Word, Excel, Outlook and Internet Explorer

Cost: 4

Specs: Intel Core 2 Duo E6400 Processor, 256MB Dual-Output nVidia Video Card, 2GB Memory, 22” Flat Panel, Microsoft Office Basic & a 3 Year Warranty

Rational: I have increased the hardware on the computer because AutoCAD is a powerful graphics oriented program, used in engineering, which requires better hardware to remain efficient. I have included the 22” monitor to allow the engineer the ability to see larger drawings without needing to continuously zoom and scroll. The video card was upgraded, to allow the addition of a second monitor in the future, if necessary. Since this is not a cheap computer, the three year warranty was a good deal to ensure it stayed in service for the next three years.

Price: \$2,300

Position: Lawyer

Software: Time/Billing Software, Word, Outlook and Internet Explorer

Cost: 1.5

Specs: Celeron D 347, 1GB Ram, Office Basic and a 19” Flat Panel

Rational: A lawyer will mainly use a computer for preparing documents, researching cases, emailing and entering time/billing. None of these tasks are high-end for a computer, so a basic computer will do.

Price: \$900

Position: Accountant/Bookkeeper

Software: QuickBooks, Word, Excel, Outlook and Internet Explorer

Cost: 3

Specs: Intel Core 2 Duo E4300, 2GB Ram, Office Basic and 19” Flat Panel

⁵ The pricing is based on Dell’s website as of 5/11/07

Rational: QuickBooks is a large application that needs a good processor and plenty of memory to run efficiently. Other than that, a standard computer would be just fine. The larger monitor was added to make working with the numbers and financials easier on the eyes.

Price: \$1,100

Position: Secretary/Office Assistant

Software: Word, Outlook and Internet Explorer

Cost: 1

Specs: Celeron D 347, 1GB Ram, Office Basic and a 17” Flat Panel

Rational: A secretary/office assistant would mainly use a computer to assist an individual with their work. Document preparation and email would be two of the main programs, neither high-end for a computer.

Price: \$800

Position: Our “standard” computer

Software: Office Professional, Internet Explorer and most programs will run perfectly fine on this computer’s hardware.

Cost: 2

Specs: Celeron D 347, 1GB Ram, Office Basic and a 19” Flat Panel

Price: \$900