

**Berg Kaprow Lewis**

Network servers

Most businesses with three or more computers will benefit from having a computer network.

The network server is the computer that manages the network. It is also where all your shared files are stored.

Buying a network server is more complicated than buying normal PCs. The server will be used more heavily than any other computer in your business and you cannot afford to have it fail.

This briefing covers:

- What a server is used for.
- How to specify a server.
- How to protect your server against failure.
- The types of software network servers use.

1 Using a server

If you only have two or three computers you may not need a server.

You can link most desktop computers together without a network server, using a simple technique called peer-to-peer networking (see **Networks and communications**). But this option is not viable for most businesses.

1.1 Use a general-purpose server to:

- Store and share your files on the server's hard disk.
- Centralise printing, so that the server manages the print queue and lets you share resources such as printers.
- Run networked software applications such as groupware or a database.

Some businesses may need to use several servers in order to spread the load.

1.2 Use a dedicated server to run any software applications that would dramatically slow the rest of your network.

These applications may include:

- Large shared databases.
- Internal mail systems.

The systems administrator needs to establish which applications take up most network time before deciding whether they should be moved to a dedicated network server.

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2 Compatibility

Most network servers are high-performance PCs. Apple Macintosh network servers, Alpha servers, and traditional minicomputers share the rest of the market between them.

2.1 There are clear reasons for the dominance of **PC** network servers in the business market.

- You can purchase your machines, components and add-ons from many different suppliers.
You can exchange parts sourced from different suppliers.
- These servers can run the most popular network software (see **4**).
- Most business software is written for PCs.

2.2 Businesses which only use **Apple Macintoshes** may find it simpler to use a Macintosh network server.

But this does have limitations.

- It may be more difficult to connect and support PC-compatible computers and other devices.
- Macintosh computers can be more expensive to upgrade.

2.3 A business that needs fast and scalable computers (eg to run demanding CAD applications) may consider an **Alpha** server.

- These servers are mostly used to run Unix.

2.4 Large companies, or specialist businesses that need large amounts of computing power, often use **minicomputer** systems such as IBM's AS/400.

3 Choosing network hardware

You will be using your network server all day, every day. This means that the hardware needs to be more robust and better built than an ordinary desktop computer.

3.1 Ensure that you have enough **RAM** (random access memory) available.

You will be able to access files faster with more RAM.

- The suppliers of your chosen operating system will provide guidance as to your minimum RAM requirements.
Do not buy a server with less than 256Mb of RAM. Increasingly, new server software requires 512Mb of RAM.

- You will need more RAM if you run a database or any applications on your network server.

3.2 Choose a network server with a **central processor** you can easily upgrade.

- Replacing the processor with a faster processor may increase the speed at which some applications run on the server.
- Check that you can add an additional processor at a later date.
Multi-processors enable the server to manage greater loads but are not necessarily the cheapest way of getting this improved performance.

3.3 The **hard disk** is the part of your server that is most likely to fail.

You need to minimise the risk of this happening.

- SCSI hard disks are more expensive but faster and more robust than standard IDE disk drives.
The faster the drive, the less time it takes for a user to access a file.
- Ensure that the hard disk drive is large enough to handle your needs.
This figure is largely determined by the number of users who connect to the server, the kind of files you share, and any applications, including databases, you run on the network server.
- Consider buying two hard drives to make sure you can continue working even if one of the drives fails.
This approach is known as mirroring.
- Consider having several hard disk drives if you need extra-large capacity.
You will probably want to invest in a RAID system, which is designed to tolerate a drive failure and keep on working.

3.4 Every computer on a network needs a **network adaptor card** to enable it to exchange information with the other computers. The kind of card you need will depend on how your network is configured (see **Networks and communications**).

- Install the card in the fastest expansion slot you have available, the PCI slot.
- Check that the adaptor is supplied with the relevant drivers.
Drivers are software enabling the network card adaptor to communicate with your operating system. Different operating systems require different drivers.

“We did everything by the book, but did not plan for how loud the server turned out to be. SCSI drives are fast, but also quite unpleasant to listen to. In the end, we moved the server to a different part of the office and decided to administer it from another computer.”
Tom McLaughlin, JLA

3.5 You will need to attach a **monitor** to the network server to enable you to configure and manage the computer.

- It is not worth spending money on a large monitor, as you will rarely use it. In practice, many network servers are administered from a separate desktop computer.

4 Network software

A typical network server may have several different kinds of software installed.

4.1 The two main **network operating systems** are Microsoft's Windows Server and Linux.

Some businesses may want to use Unix. This provides excellent performance, but may need to be configured and run by an expert.

- Both Windows Server and Linux supply the features required on a general-purpose server.
- These products use different methods for sharing files and printers. But you can configure them to work with each other.
- You can also use these products to run dedicated servers (see **1.2**).
- Both products allow you to connect Apple Macintosh desktop computers to your network.
- You can use both products on a wide range of processors and hardware.

Windows Server probably has more application software.

4.2 You may need additional **network management software** to monitor and control everything attached to your network.

- Managing the network becomes more difficult as your network grows. It is best to use network management software from the moment you install your network.
- Proactive network management can significantly reduce the overall lifetime cost of owning a server.
- Make sure any hardware you buy can communicate with the network management software you use.

4.3 Network versions of desktop software make it easier to manage the software.

- You install a single copy of the software on

your server, which then installs it on each user's desktop computer. This makes it easier to be sure everyone is using the latest version of the software.

- Buying multiple-user licences is often cheaper than buying individual copies.

4.4 Large databases and groupware products are often supplied as **client-server applications**.

- This cuts down network traffic. The desktop computer (the client) sends a request to the server. The request is then processed by the server and the client is sent an answer.
- This kind of software consumes a lot of computer time and often needs to be run on a dedicated server (see **2.2**).

4.5 Intranet applications need the network server to run special software to provide support for web pages and email.

Intranets provide all the features of the Internet, but contained within the company.

- This enables users to access internal information using a web browser.

See **Intranets**.

5 Back-up and protection

Your network server may fail at some point. If it does, you need to know that you will be able to start working again within a short time.

There are many actions you can take to minimise the risk of failure or disaster, and to help you restore your system quickly and completely after any incidents.

5.1 Fit your network server with an **uninterruptible power supply (UPS)**.

This is basically a large battery which powers the server during power cuts and eliminates power surges.

- The UPS should be compatible with your network operating system and your network management software. This is so the UPS can shut down the network in an orderly fashion.

5.2 Back up your data from the network server's main hard disk.

- Choose a convenient, high-speed back-up device, such as DAT or DLT tape drives.

“Don't think about adding back-up systems later. It is when you first install the system that you are most likely to need back-up.”
Anthony Fisher,
Traderwebs

- Check that the back-up device can automatically back up at least one day's worth of new data.
- Automate the procedure, using back-up software which is compatible with your server's operating system.
This allows you to do back-ups at pre-set times when the system is not being heavily used.
- Use a cycle of back-up tapes to record new data every day and a full copy of the entire hard disk every week.
- Store a full copy of the system off-site.

5.3 You can protect against data corruption by using **fault-tolerance** methods.

- Use a RAID or mirroring system to protect you against failure of an individual hard disk drive.
With mirroring, the system software keeps two copies of everything and will automatically use the mirrored copy if the first copy fails.
- Install a second network adaptor card to allow you to switch cards if there is a fault.
This can also speed up the rate at which data is transferred.
- Ask if databases use transaction logging and have roll forward capabilities.
This keeps track of all amendments to the main data file and enables them to be applied to the last back-up.

5.4 Use **firewall** hardware or software to prevent unauthorised access from the outside world, such as via the Internet.

You will need firewall protection if you have a permanent connection (for example, broadband or ADSL) to the Internet. (See **Security and the Internet**).

- A firewall checks incoming and outgoing traffic before it reaches or leaves the main network server.

5.5 Use **anti-virus software** specially designed for servers to protect against virus attacks.

- Use the software to check all files stored on your network server.
Regularly check the anti-virus software supplier's website to update the list of recognised viruses held by your system.
If this list is always up to date you will have good protection against virus attack.

See **Maintaining your IT system**.

6 Upgrading

Network servers are expected to see several years' service and are designed to be upgraded.

6.1 You may need to upgrade your **hardware**.

- Adding more RAM will improve the speed at which your network server responds (see **4.1**).
- Adding a second network adaptor card will reduce congestion on your network.
- A faster or larger capacity hard disk drive will improve access speed, as will using several hard disk drives together.
- Adding a second processor will improve the performance of some specialist applications.

6.2 You may need to upgrade your **software**.

Upgrading or changing network software may involve reconfiguring all the computers connected to the server.

- You may occasionally need to update your network operating system.
- You may even want to change network operating systems.

Upgrade your network server at a time when nobody else needs to access the data on it. Make sure that you have a complete back-up of your entire system before making any changes, in case you need to start again.

Expert contributors

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Further help

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