

Computer Networking for Librarians

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Just a little bit about me

I am not:

A world-famous expert in an incredibly specialized field.

A computer science major.

I am:

Like a lot of other librarians, trying to get by and doing my job the best way I know how.

Why bother knowing about IT?

You need to know something to negotiate with vendors and IT service providers.

You need to know what to do in an emergency - Fire, Flood, Tornado, why do we leave out IT?

Because the one time you need your third-party IT service person, HE OR SHE WON'T BE THERE. --Murphy's Law.

Why know about your computer network?

It's important to know how everything is tied together:

- For documentation purposes and future planning

- So you can describe a network issue over the phone with some detail.

- So you can diagnose an equipment failure.

- So you can, perhaps even save yourself a service call.

A bolt from the blue

February, 2013:

The Pella Public Library took a lightning strike in the middle of the night.

The next morning:

Only about half of the equipment had network access

Multiple equipment failures throughout the building.

Bolt from the blue (cont.)

Network had been documented in advance of disaster.

Triaged good network equipment from bad

Re-routed critical service to undamaged network switches.

Of course, called for help from our contract IT service person.

We were back online (for the most part) in a matter of four hours.

Let's dig right in - Five major components

Internet Service Provider Modem

Router

Firewall

Switch

Ethernet cables to connect it all.

Internet Service Provider Modem

Based on the traditional beep-boop dial-up modem

No dialing involved.

Communicates with ISP.

Generally, one cable in, one cable out.

Transmission methods include: Coax cable, DSL, Fiber.



Router

Serves to “route” data between your network and another network.

Helps create the structure of your network

May be built in to your firewall, or may be a separate device.

Can potentially manage bandwidth

Possibly can do failover from one ISP to another.



Wikimedia Commons / Hystiff

Firewall

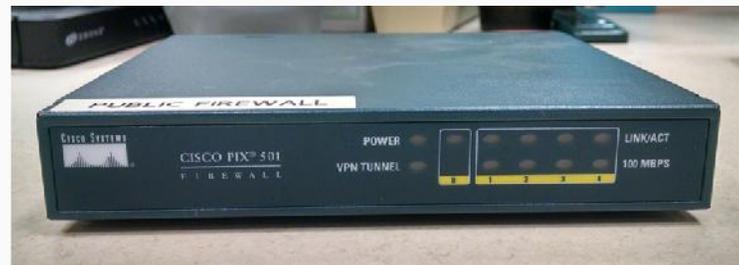
Gatekeeper to your network

Prevents attacks on your network

Denies data from unknown sources

Some models can also filter services
(such as P2P)

Configurations Vary - RTFM



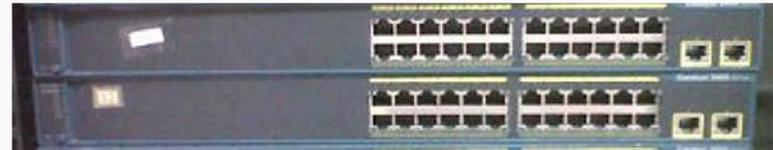
Switch

Not a light switch

Like PO boxes at the post office - the router can sort the mail but only the switch knows physically where it should go.

Memorizes which device is attached to each port to avoid data collisions or unnecessary retransmission.

Multiple switches can be uplinked to make a larger switch.



Wikimedia Commons / Eduardo.rodas.zavala

Ethernet cables

The connectors *look like* phone cables but are wider - the two types are not interchangeable.

Simply plug-and-play; no crimping or rewiring

There are different types of cable; you should be using Cat 5e or Cat 6 for best performance.

Cables plug into a patch panel which is connected to other Ethernet cables which run throughout your building.



Put it all together - the Wireless router

Usually contains a rudimentary firewall to filter incoming data

Contains a router to sort the data from one network to another

Contains a switch to distribute the data to physical ports on the back or to computers connected wirelessly.



Wikimedia Commons / Zuzu

Uninterruptible Power Supply (UPS)

Better than a power strip

Puts network equipment on a battery backup.

Also filters electrical noise and other issues so they do not reach equipment.

Self-testing and will report problems.

In most models, the battery is replaceable.



Wikimedia Commons / AnthDaniel

Other considerations - Network rack

Best way to store several pieces of networking equipment

Contrast with the free-standing stack of equipment that is prone to tipping, etc.

Holds the equipment securely and spaces it for appropriate airflow.

Properly installed, provides for an equipment ground.

Both cabinet and open-frame designs, both large and small.



Wikimedia Commons / Alexander Chupryna

Other considerations - Patch panel

Just a measure of convenience.

Allows you to make connection changes with short “patch” cables instead of long ones.

Front of the board has female connectors

Back of board is hard-wired to Ethernet cables all over the building.

So, is that it? Configure and quit?

Nope! Not unless you want to tempt fate!

Document, document, document, and document some more.

Grab a Dymo™ labeler and go wild!

Post stuff on the walls in the network area.

Keep an emergency binder



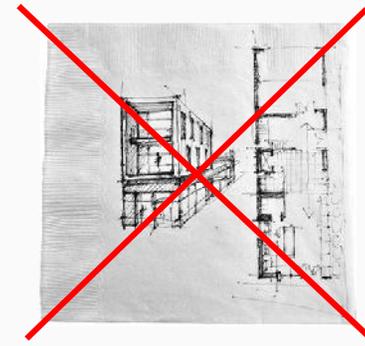
Wikimedia Commons / Fotografeur

Network map

A network map is simply a diagram of all the connections in your network

Lay it out flat then take a picture

Better than a sketch on a cocktail napkin.



Wikimedia Commons / Audrey.m.mckee

Network Notepad

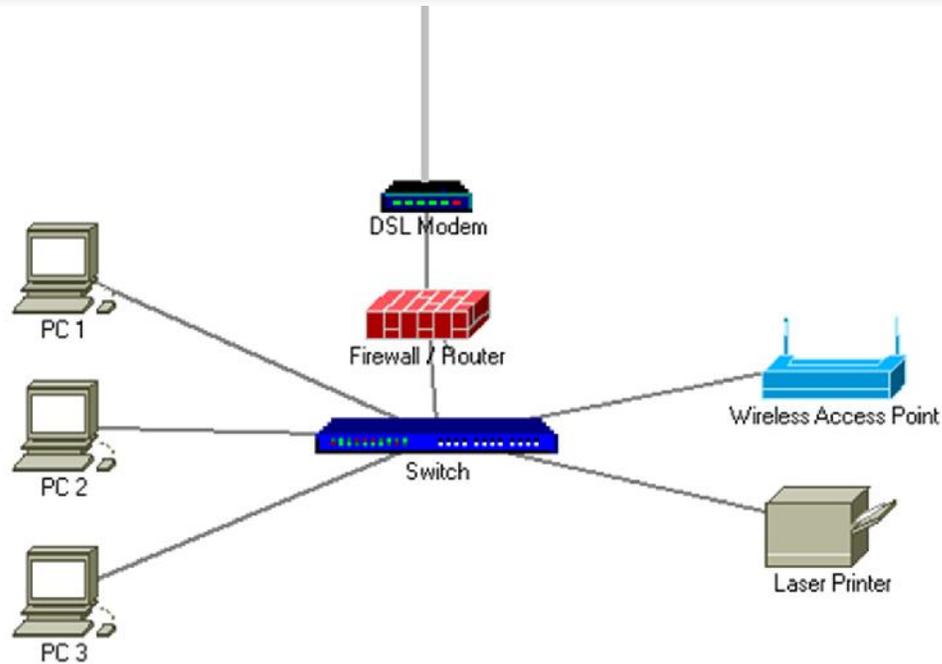
Freeware program

Place network device icons and cables between them

Enter information about each device

www.networknotepad.com

A simple network map



A few other notes on mapping

There is no right way - do what works best for you

You can also add IP addresses and other information

Put one copy in emergency binder

Tape another copy to wall next to networking equipment.

Lights chart

Take a look at your equipment when everything is working.

Document what lights are on, what lights are off.

If lights are on, what are they doing? What color are they? Blinking?

By knowing how it should look, you hopefully can tell if something is wrong.

We aren't all IT gurus who can just read the lights - that's OK!

Lights chart continued

Observations of cable modem

Name of Light	Observation
Power	Steady green
DS	Steady blue
US	Steady blue
Online	Steady blue
Link	Flickering green

Lights chart continued

If my DS light is blinking only once per second, or my Online light is dark, I know something is wrong.

Helpful when you report it to your ISP.

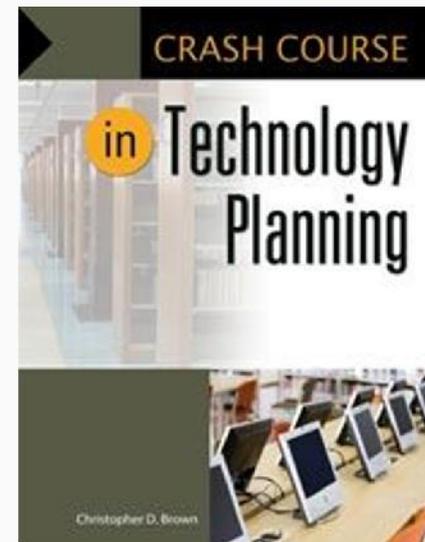
Don't take "No" for an answer once you have this chart in hand.

There's a book for that...

Crash Course in Technology Planning
Libraries Unlimited
ISBN-13: 978-1440850608

Networking, PC repair, planning,
public contact, and more!

Available now!



Contact me!

I love cooperative problem solving!
(I also love trivia!)

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Questions and Open Forum