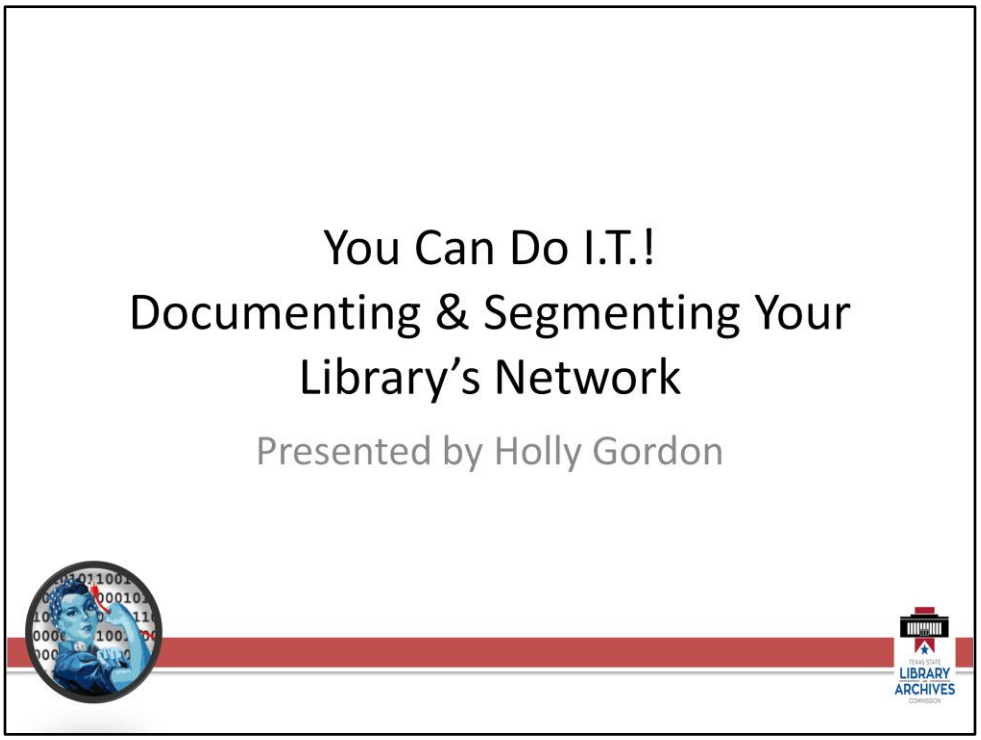


Welcome to the You Can Do I.T.! Webinar on Documenting and Segmenting Your Library's Network.

I'm Holly Gordon, Library Technology Consultant at Texas State Library and Archives Commission.

During the first part of this presentation I'm going to introduce you to the basics of a simple network, such as you might have in a small library or even at your home. At the end of this first section you should know the parts of your network, how to talk about them to your IT support, and how to start fully documenting your network.

In the second half of this presentation I will discuss the importance of segmenting or separating your **staff** network from the library's **public** network. I will also introduce three ways you can segment your networks.

We have a small group on this webinar, so please raise your hand or type in chat if you have a question and I will take those as we go. Also, make sure you have some paper and a pen because we are going to make a rough diagram of your network during this webinar.

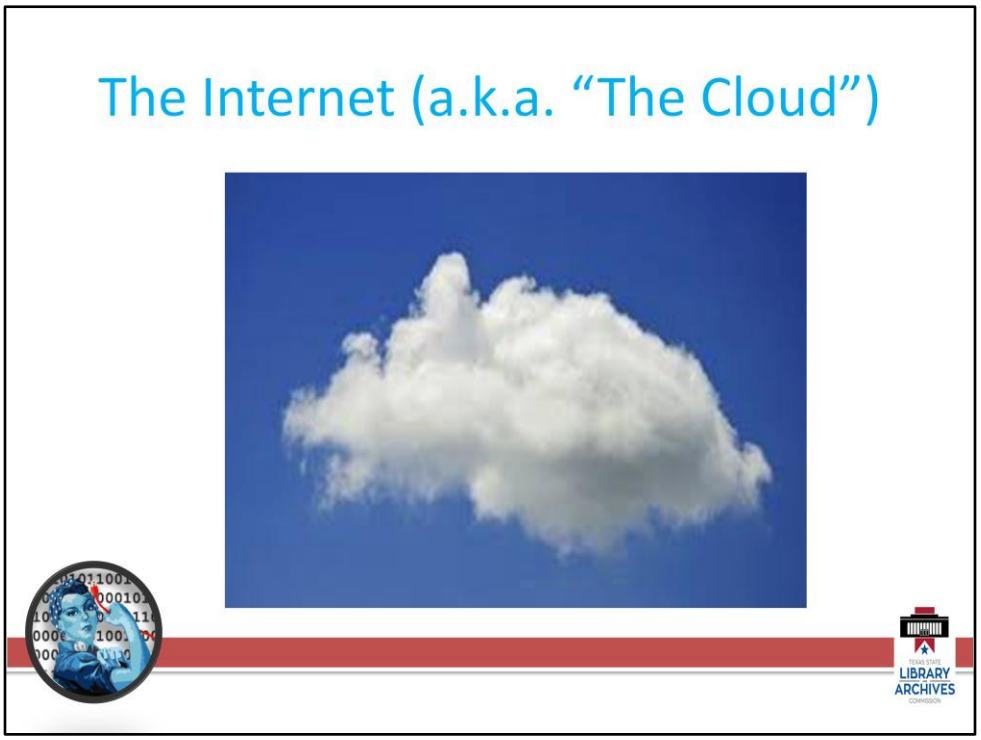
A diagram of your network is essential for you and others to see something that is mostly invisible to the naked eye – the route your data travels.

Many networks share similarities, but few are exactly the same.

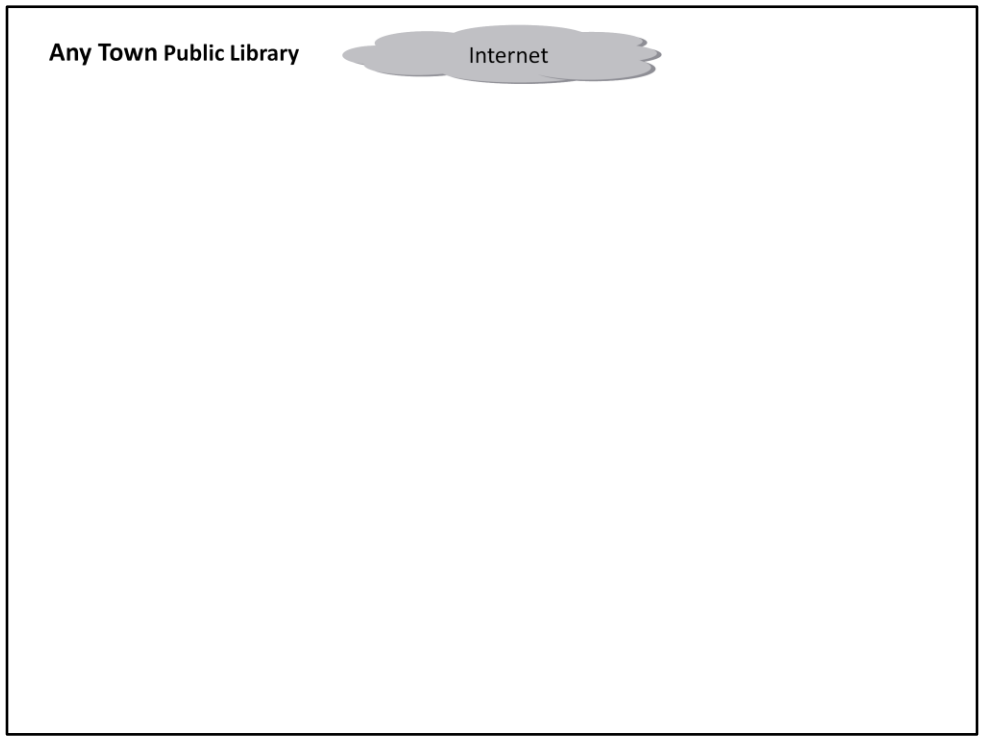
Let's draw a network together as we go….

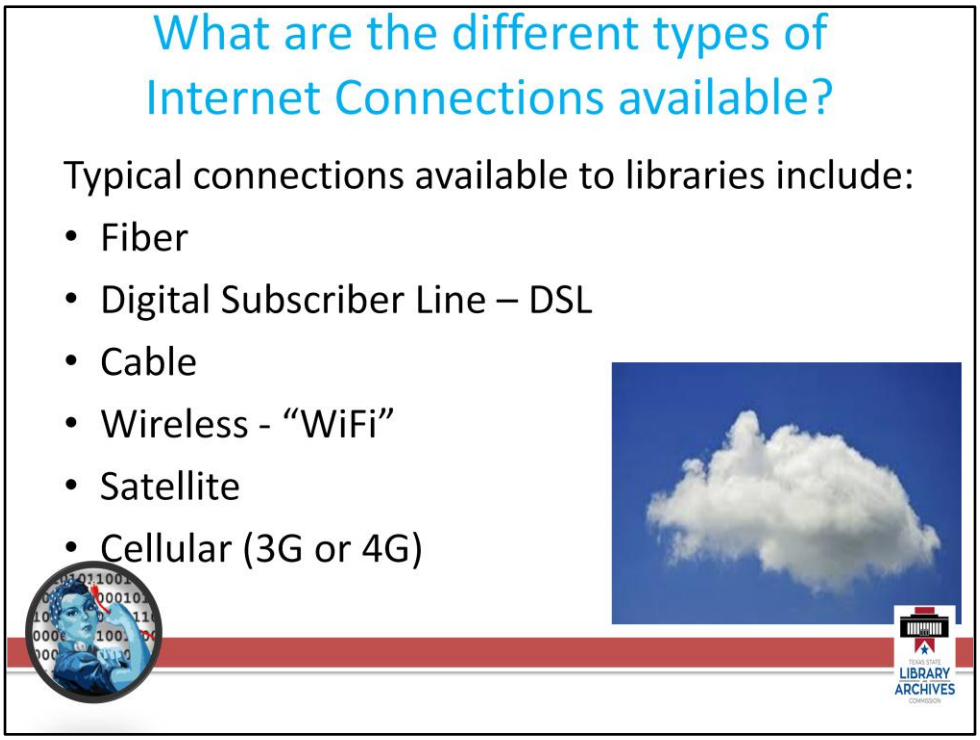
Why diagram your network? This is important documentation so that you know how data travels in you network, where bottlenecks are that may slow down connections to the internet, and where security problems might be. This documentation helps you get fast service from IT support and helps you to explain needs to funding sources. It also is very important to the staff that replaces you, or covers for you while you are out of the library.

While we go through this section keep in mind that every network is different – yours will not look exactly like what I am drawing!



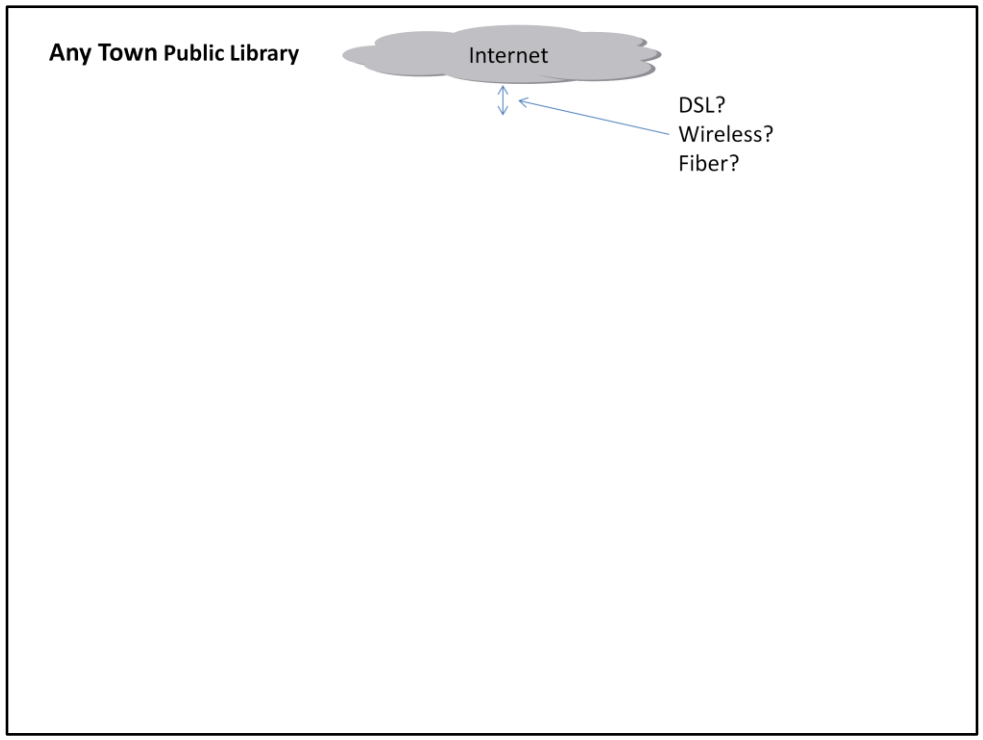
Grab a piece of paper, and at the top of your paper, draw a cloud and label it “Internet”.

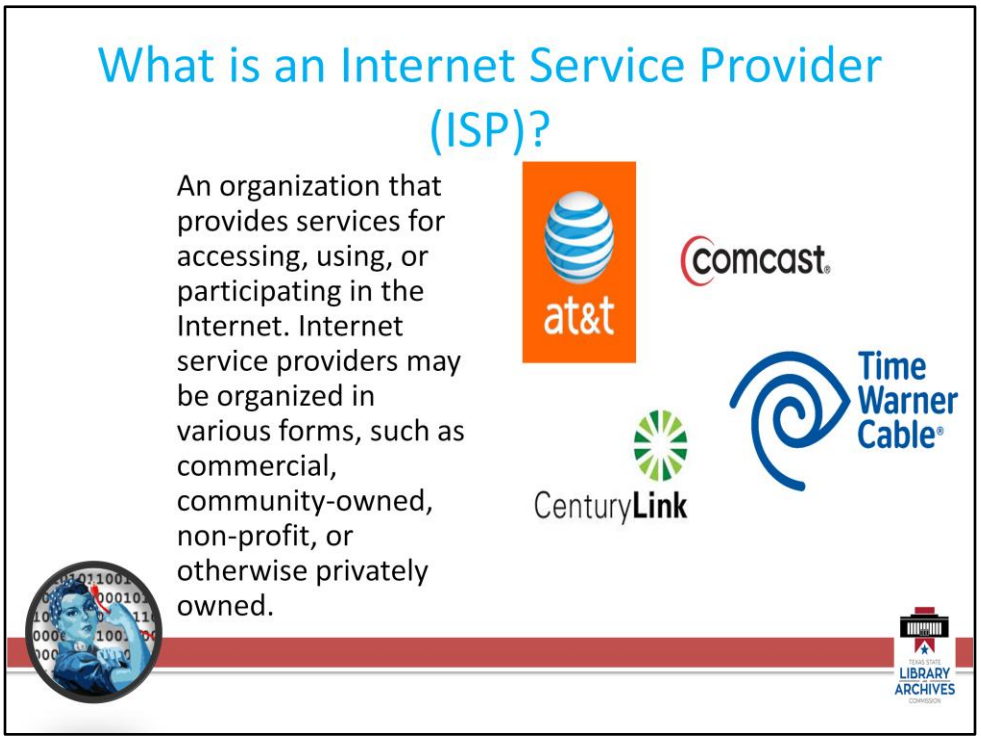

Any Town Public Library
Internet



From the cloud, draw a short line down and label that line with the type of connection you have.

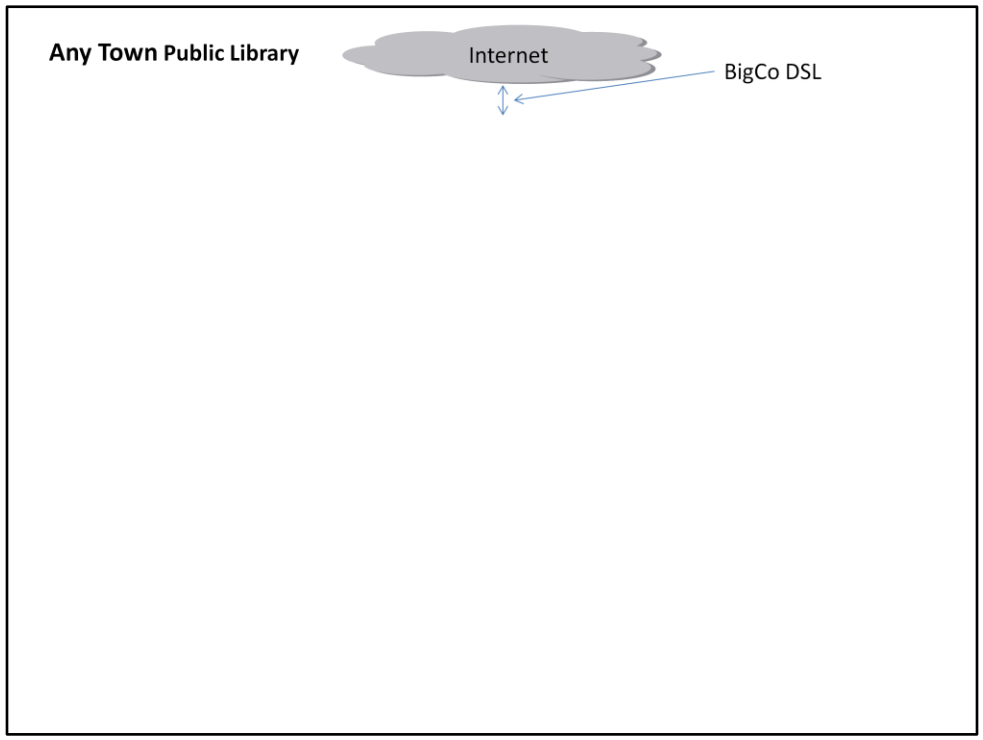
That line represents how your library attaches to the internet. There are different types of connection:
--3G or 4G (cellular)
--DSL (regular phone line)
--Satellite
--Cable
--Fiber
Which kind of connection does your library have? Type this in chat if you'd like


Any Town Public Library
Internet
DSL?
Wireless?
Fiber?



You get that connection from your "Internet Service Provider" or ISP. Write the name of your ISP near where you wrote the type of connection you have. In other words, you should have something like "Cable – Time Warner Cable"

Who is your ISP? Type this in chat if you'd like


Any Town Public Library
Internet
BigCo DSL

ISP Documentation

Later come back to this Network Diagram and write information like

- How your ISP gets paid (Monthly? Erate funds? City pays?)
- How do you contact them when there is a problem, and
- Indicate where any documentation from the ISP is filed.

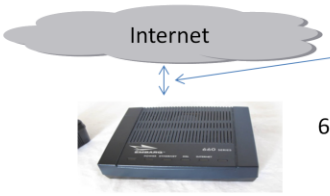
Now draw a little square to represent how your network actually connects to the ISP. Somewhere in your library there is usually a device that belongs to the ISP that connects your network to your ISP.

Often it is a little box, such as a modem, a fiber board, or a wireless gateway. What kind of device this is will depend on the type of connection you have to the internet (DSL, Cable, Fiber, etc.) Ask your ISP…

For now let's just label is "Modem?".

*****note how Carson has done this, separating outside from inside…**

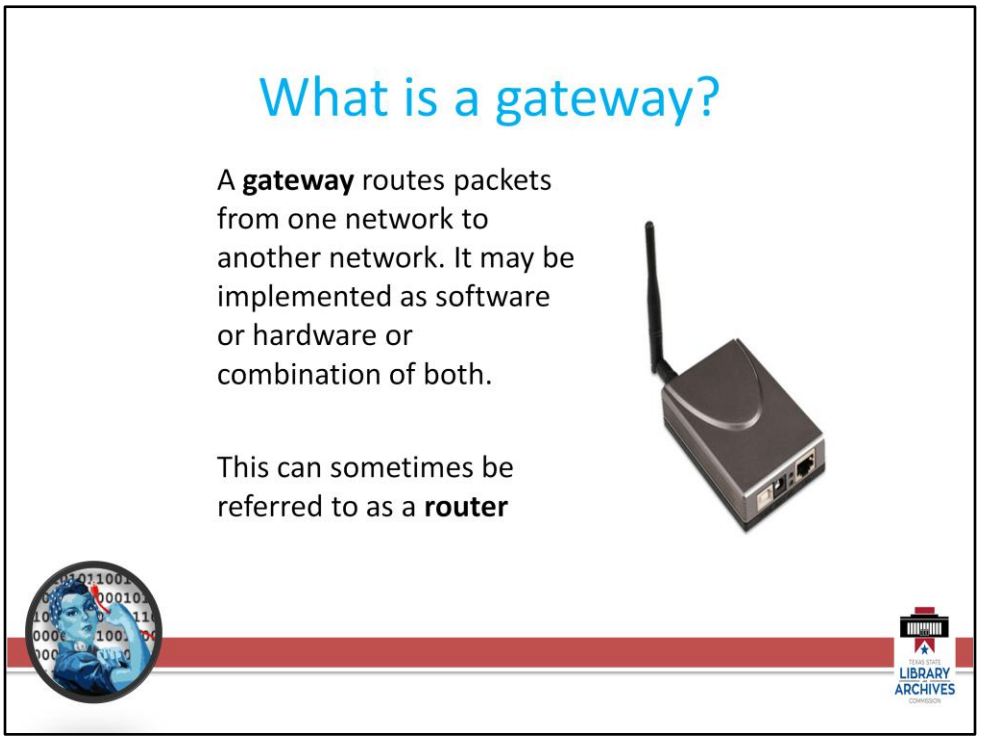
Any Town Public Library



Modem Documentation

Later you can come back to this network diagram and list this information next to that little box:

- Where is the box physically located in the library, or how do you connect to your Internet service provider (ISP)?
- If it is a physical box, note the kind of equipment it is, brand, model, etc.
- How do you reboot the connection to your ISP?



Now draw a line from the modem to another small box. Label this second small box "gateway/router" – there are differences between the two devices, but for this simple diagram we will use both terms interchangeably.

Some ISP's provide modem-gateway combinations, so you might have one box that serves both functions. Often a router has both physical ports and wireless capabilities. You can connect computers and printers and other devices either using wires to these ports or wirelessly if the devices have that ability.

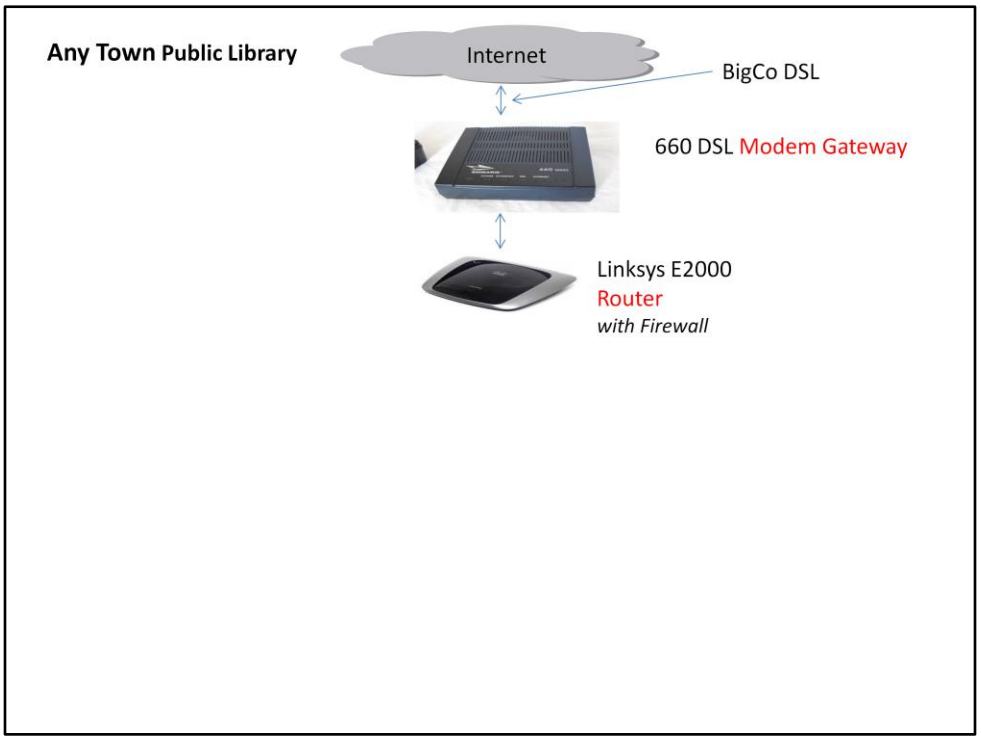
Image:
http://www.globalsensortech.com/media/catalog/product/cache/1/image/9df78eab33525d08d6e5fb8d27136e95/b/s/bs903_2.jpg

Router Documentation

This is information you want to collect about your router:

- Where is the router physically located?
- How do you access it to make changes (password, manual)?
- How do you reboot and reset?

Manuals are available online by model number, etc. – as are default passwords.



Any questions?

What is a Switch?

A network **switch** is a computer networking device that connects devices together on a computer network, by using packet switching to receive, process and forward data to the destination device.

Also called switching hub; bridging hub; MAC bridge

Switches can be dumb or managed – find out which you have

LIBRARY ARCHIVES

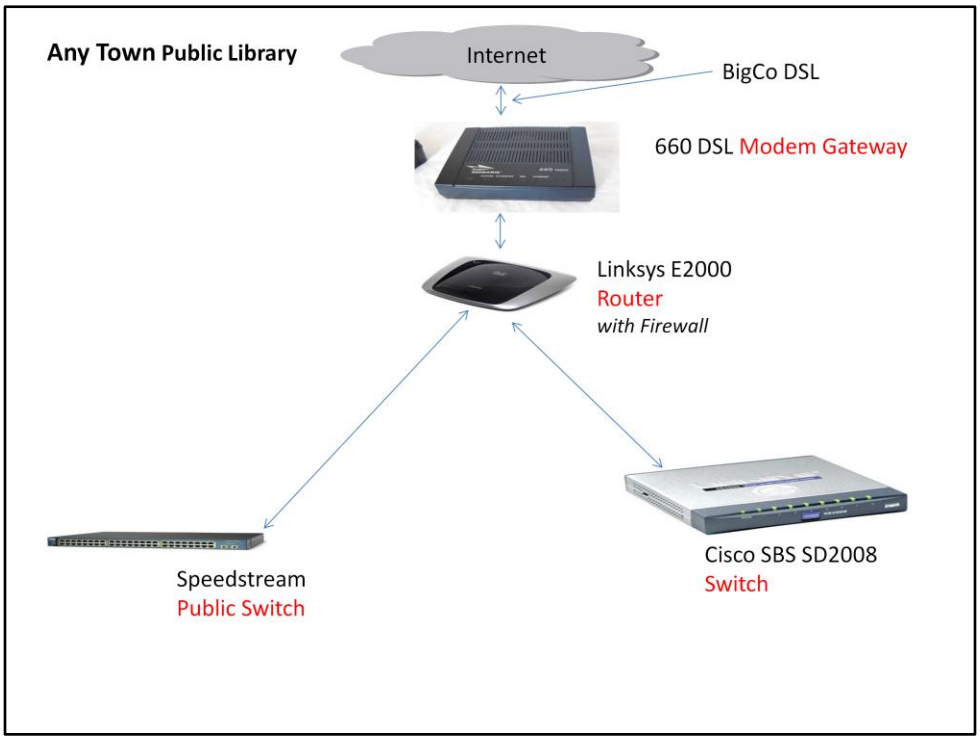
Switches are sort of like power strips. You can typically plug 4 devices into a router, and connect many others wirelessly.

However, usually you find that switches are attached to your router, and then computers and printers are attached to the switches.

Switches can be dumb or managed – find out which you have. *Explain difference….*

Collect documentation on your switches just as you did for your other devices.

Image: https://www.tigerdirect.ca/applications/SearchTools/item-details.asp?EdpNo=206349

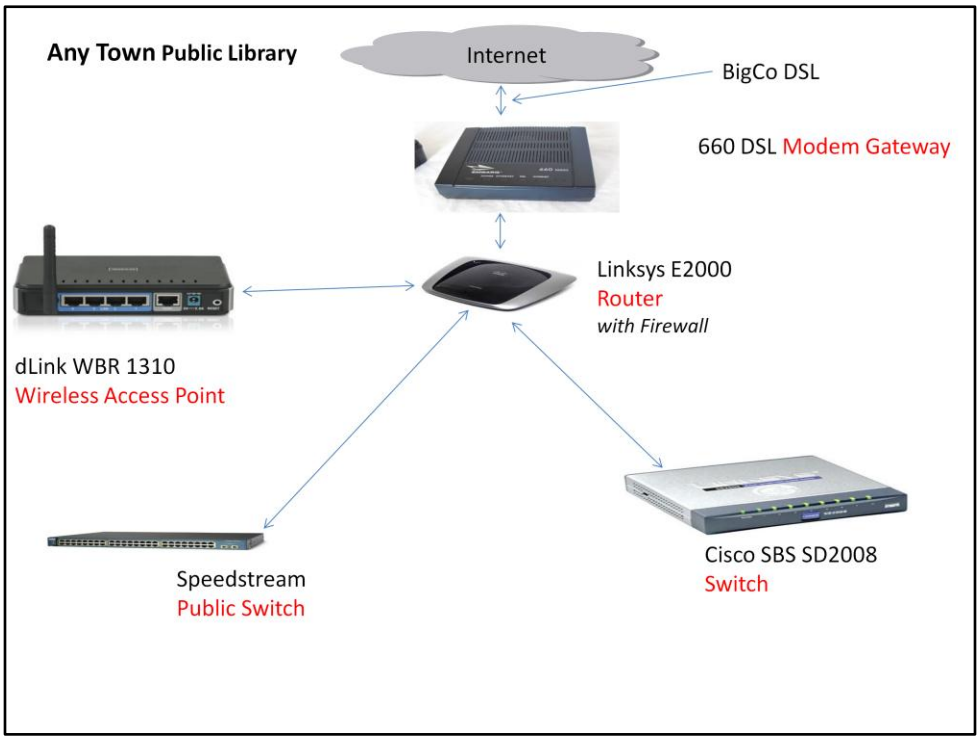

Any Town Public Library
Internet
BigCo DSL
660 DSL Modem Gateway
Linksys E2000
Router
with Firewall
Speedstream
Public Switch
Cisco SBS SD2008
Switch

Wireless Access Point (AP)

A device that allows wireless end points to connect to a wired network using Wi-Fi. The AP usually connects to a router (via a wired network) as a standalone device, but it can also be an integral component of the router itself.

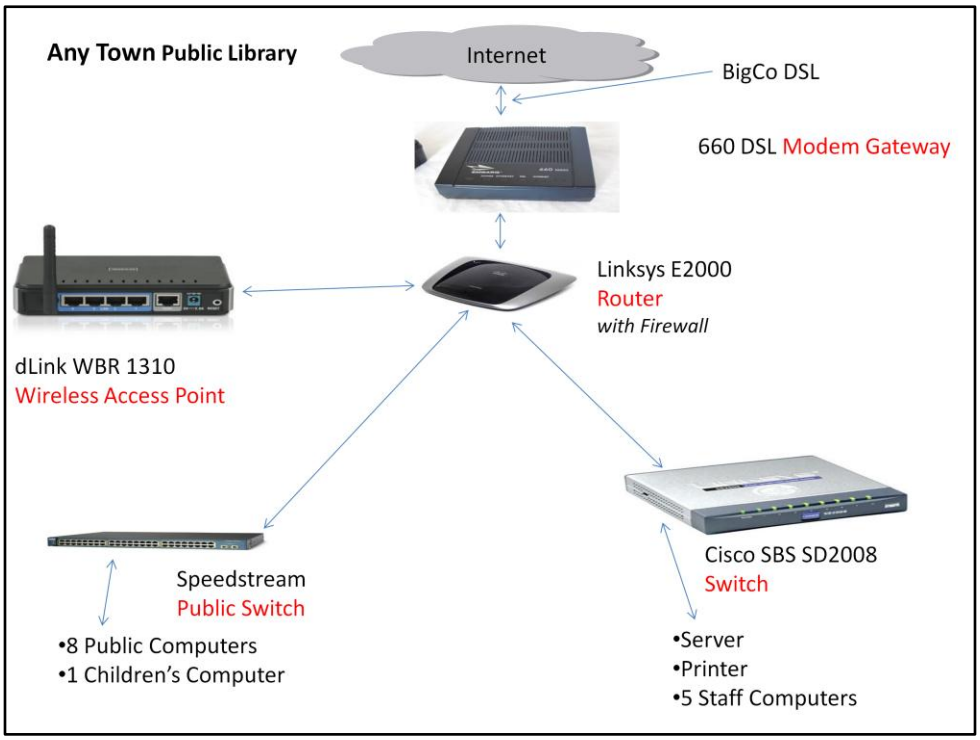
Collect documentation on your Wireless Access Point just as you did for your other devices.

Photo: en.wikipedia.org/wiki/Wireless_access_point


Any Town Public Library
Internet
BigCo DSL
660 DSL Modem Gateway
Linksys E2000
Router
with Firewall
dLink WBR 1310
Wireless Access Point
Speedstream
Public Switch
Cisco SBS SD2008
Switch

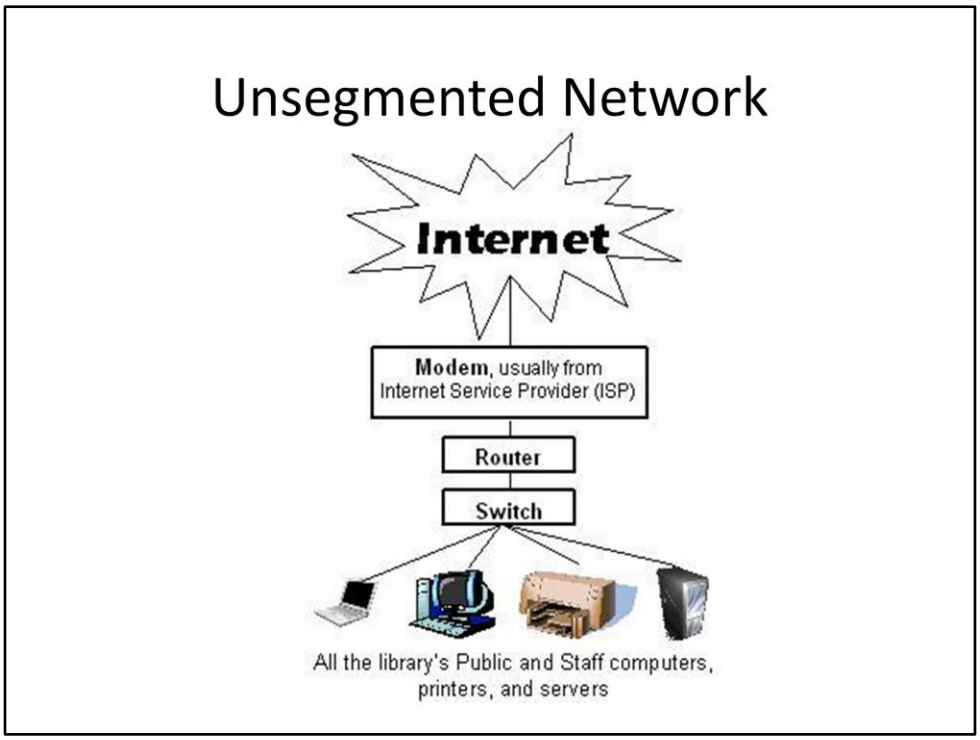
“Endpoint”

Anything attached to the network, such as a desktop computer, laptop, tablet, phone, ipod, etc.


Any Town Public Library
Internet
BigCo DSL
660 DSL Modem Gateway
Linksys E2000
Router
with Firewall
dLink WBR 1310
Wireless Access Point
Speedstream
Public Switch
•8 Public Computers
•1 Children's Computer
Cisco SBS SD2008
Switch
•Server
•Printer
•5 Staff Computers

Questions?

Why is it Important to Segment -- or Separate -- the Public and Staff Networks?



http://www.ctls.net/technology/

This is the layout I often see in small public libraries. Notice that the staff and the public are sharing the same network, and even the same networking equipment! A member of the public can easily snoop the network and remote into a staff computer. For example, these situations have happened:

--a staff member was logged into the software used to write checks while a public user remoted in and obtain enough information to write checks.

--a staff member was working on patron records in the library system, and a public user was able to obtain address and phone number information

--viruses and malware from public computers, even with protection such as Deepfreeze, can move onto the staff computers before they are erased from the public computer during a reboot.

Why Separate Networks??

True story #1

Staff member was logged into the software used to write checks while a public user remoted in and obtain enough information to write checks

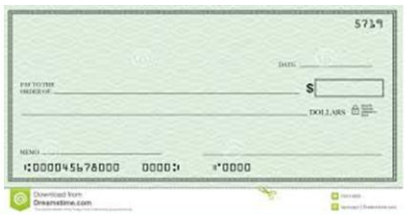


Image: http://www.dreamstime.com/royalty-free-stock-image-blank-check-open-space-your-text-image19414606

Why Separate Networks??

True Story #2

Staff member was working on patron records in the library system, and a public user was able to obtain address and phone number information

Image: http://cliparts.co/phone-book-clip-art

Why Separate Networks??

True Story #3…the most common!!!

Viruses and malware from public computers, even with protection such as Deepfreeze, can move onto the staff computers before they are erased from the public computer during a reboot.

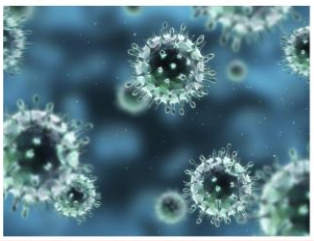


Image: http://www.dxna.com/pathogene-tests/influenza-ab-surveillance

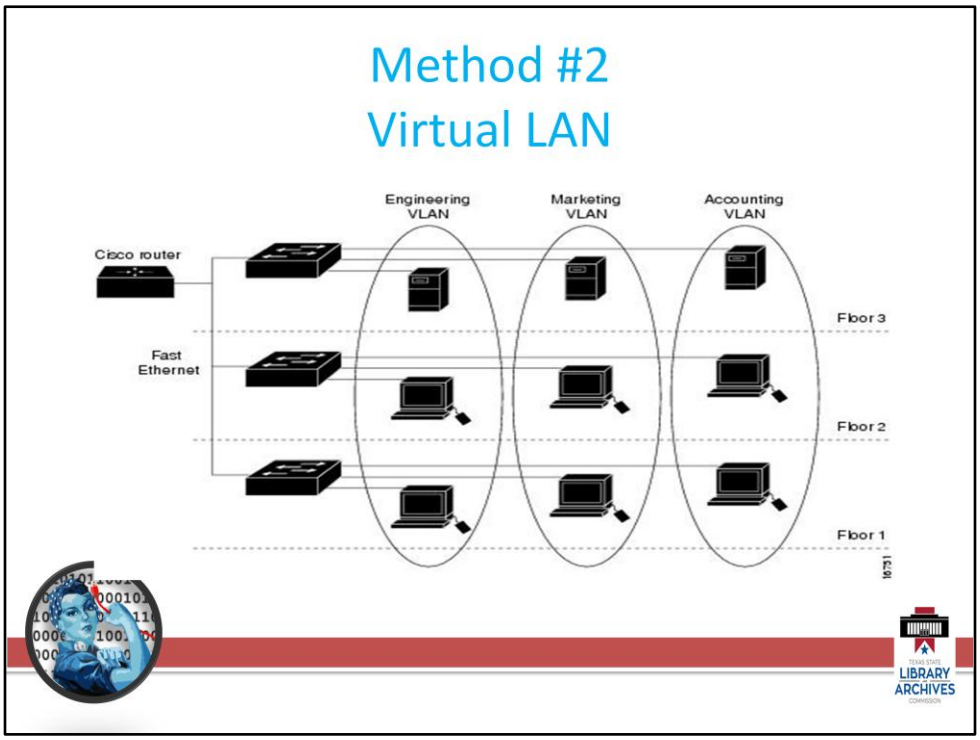
Method #1
Two separate connections to ISP

This is can be an expensive method, or it can be

- A good way to ensure duplication
- No shared bandwidth
- Could use two different ISPs

In other words, your library would have two physical local area networks (LANs)

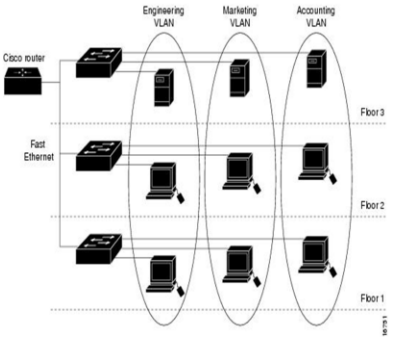
Not common in small libraries, but might be a good possibility for your library.



This is done using smart, managed switches, and is very common in large libraries. However, these price of these devices has gone way down and is viable for small libraries.

What's a "Virtual LAN" (VLAN)?

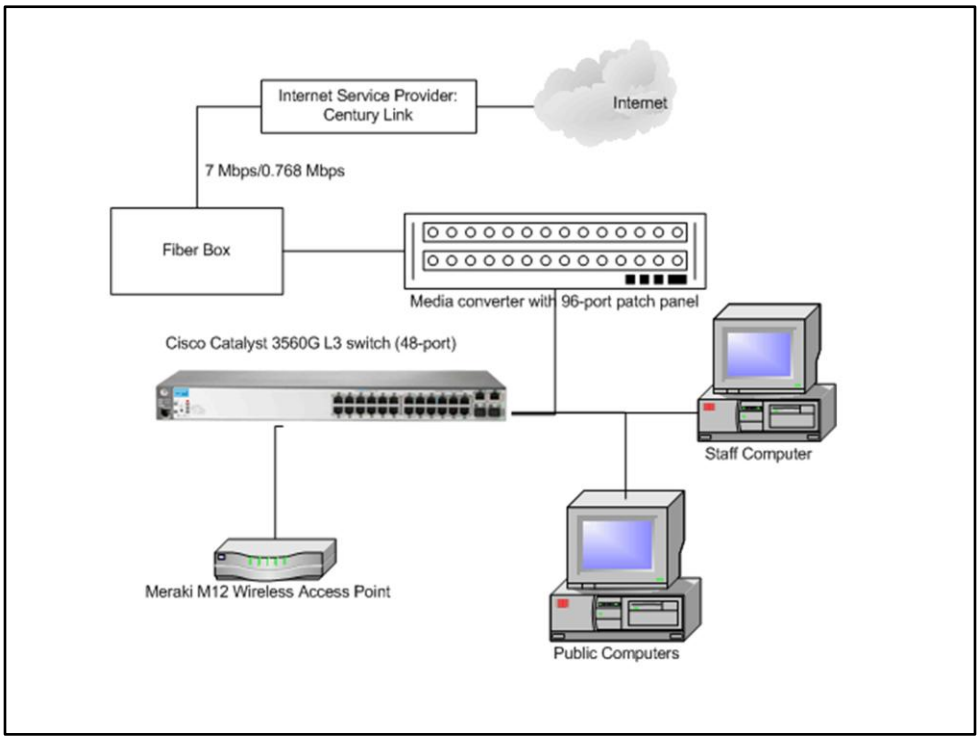
a VLAN has the same attributes as a physical local area network (LAN), but it allows for endpoints to be grouped together more easily even if they are not on the same network switch. VLAN membership can be configured through software instead of physically relocating devices or connections.

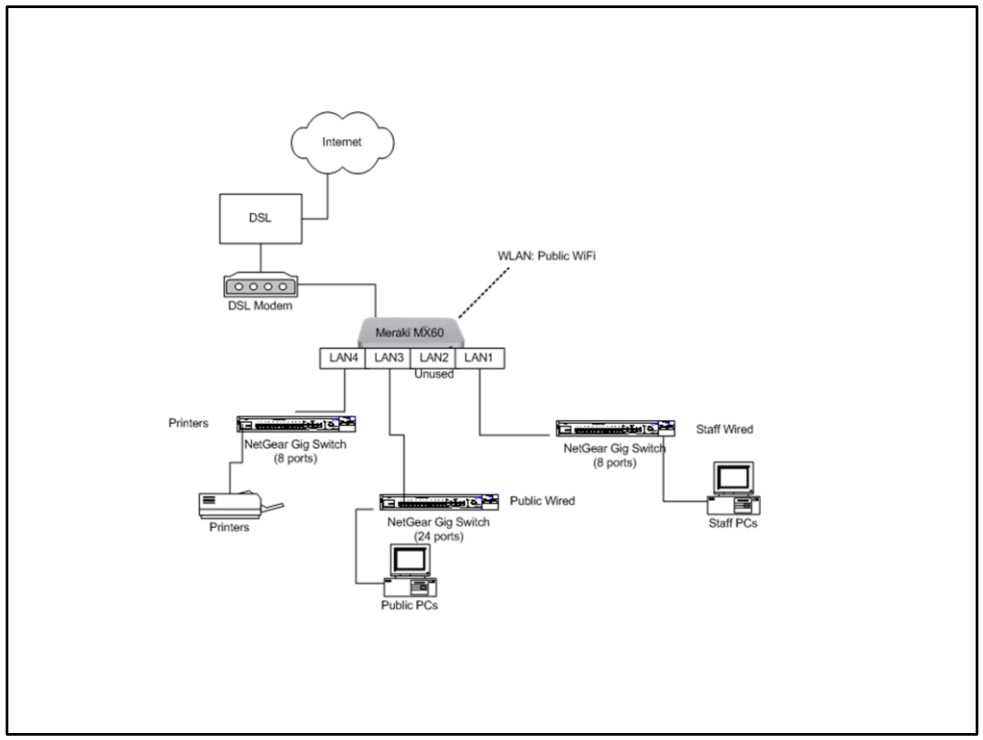


TEXAS STATE LIBRARY ARCHIVES COMMISSION

Poll –
Does anyone currently use VLANs to segment their networks? Common brands for these are Meraki (by Cisco)

Image: http://www.cisco.com/c/en/us/td/docs/switches/lan/catalyst4500/12-2/25ew/configuration/guide/conf/vlans.html


Internet Service Provider:
Century Link
Internet
7 Mbps/0.768 Mbps
Fiber Box
Media converter with 96-port patch panel
Cisco Catalyst 3560G L3 switch (48-port)
Staff Computer
Meraki M12 Wireless Access Point
Public Computers


Internet
DSL
DSL Modem
WLAN: Public WiFi
Meraki MX60
LAN4
LAN3
LAN2
LAN1
Unused
Printers
NetGear Gig Switch
(8 ports)
Printers
NetGear Gig Switch
(8 ports)
Staff Wired
Staff PCs
Public Wired
NetGear Gig Switch
(24 ports)
Public PCs

Method #3
Using DHCP and $1000 equipment

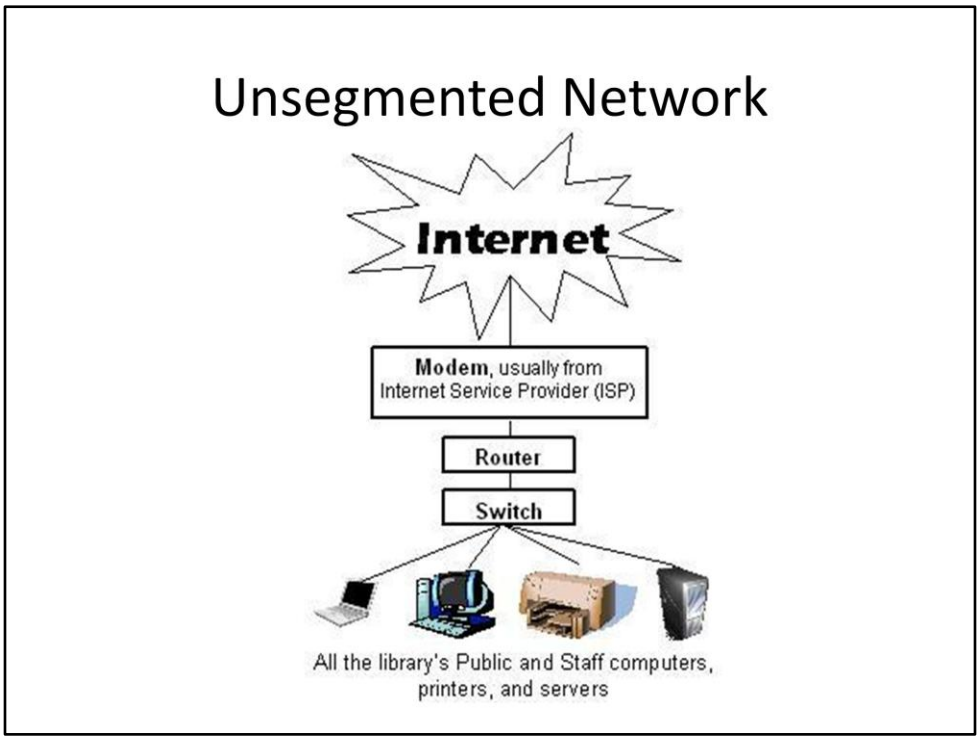
You can isolate the staff network by adding an inexpensive router and a couple of switches, and configuring the routers to specific DHCP ranges

DHCP

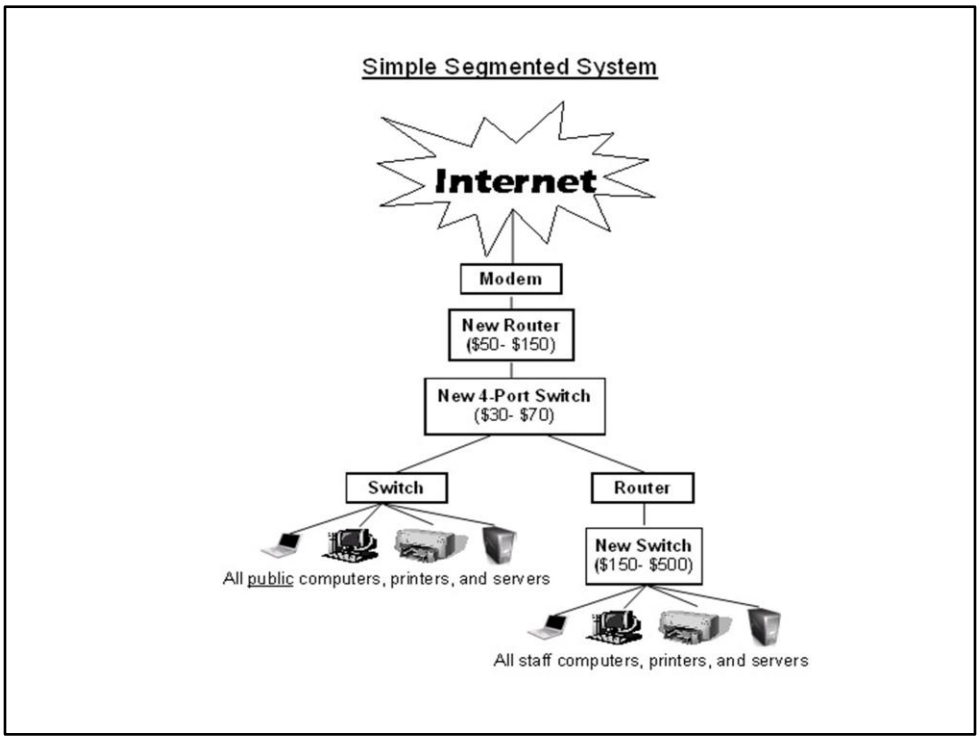
What is DHCP??

Dynamic Host Configuration Protocol (**DHCP**) is used to assign IP addresses.

With DHCP, end points request IP addresses automatically from a DHCP server…which in this case is a **router**



We are going to change this unsegmented network…



To this segmented network.

Thanks to Robert Williams for this illustration, from his workshop on making your library network more secure for about $1000 by segmenting it into 2 networks.

Now take a very deep breath…

Configuring routers for segmenting

New Router

(connected to Modem, serves both public and staff)

SSID: Sample Public Library

Network number (WAN address): XXX.XXX.XXX.XXX (you get this from you ISP, internet service provider)

Subnet mask: 255.255.255.0

Router IP address (LAN address): 192.168.1.1

DHCP range: 192.168.1.50 – 192.168.1.100

All the Public PC's will get IP addresses that look like this: 192.168.1.X, where X is a number from 50 to 100. Printers and the Staff Router will be assigned static IP addresses that are outside of the DHCP range.

Configuring the Library staff router

Router for Staff

(connected to switch that is connected to a port on New Router, serves only the library STAFF)

SSID: Sample Public Library Staff

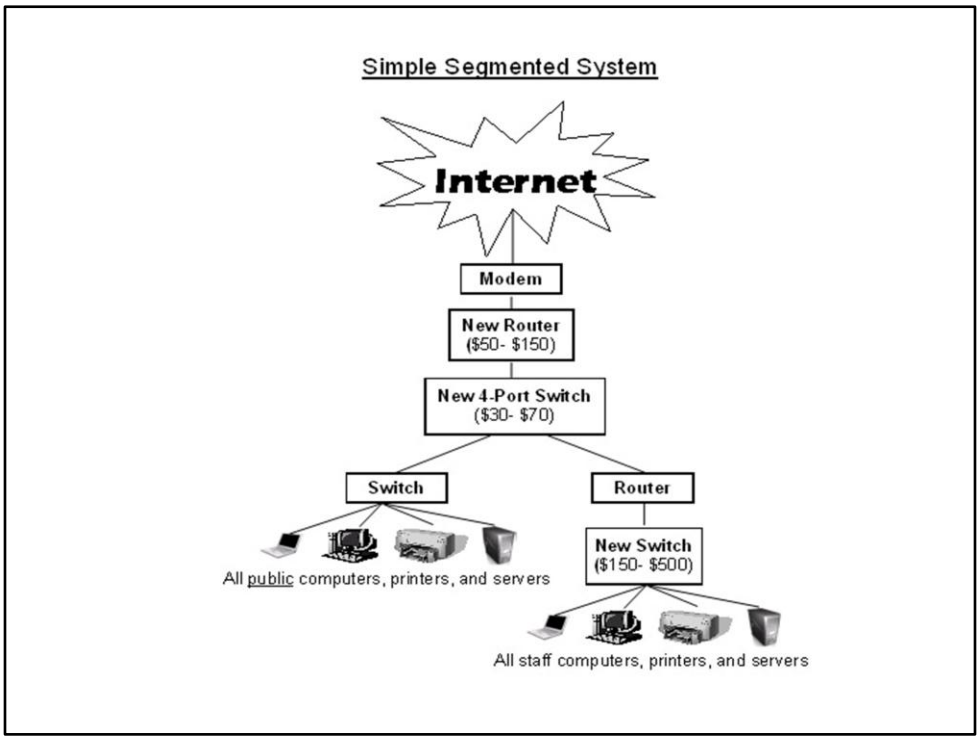
Network number (WAN address): 192.168.1.2 is a static IP address, outside of the DHCP range of Router #1

Subnet Mask: 255.255.255.0

Router IP address (LAN address): 192.168.2.1

DHCP range: 192.168.2.50 – 192.168.2.100

All the Staff PC's will get IP addresses that look like this: 192.168.**2**.X, where X is a number from 50 to 100. Staff printers and servers will be assigned static IP addresses that are outside of the DHCP range.



To this segmented network.

Thanks to Robert Williams for this illustration, from his workshop on making your library network more secure for about $1000 by segmenting it into 2 networks.

Now take a very deep breath…

Workshop

Register for the **You Can Do I.T. Basic Library Network** workshop here:

https://www.tsl.texas.gov/ld/workshops/youcandoit

Here is the blog of the first workshop in Columbus:

https://www.tsl.texas.gov/ld/librarydevelopments/?p=18106

Networking Resources

The blog for the Network chapter of "Technology for Small and One Person Libraries" is:
https://www.tsl.texas.gov/ld/librarydevelopments/?p=17720

The large I.T acronym guide is available here:
http://media.techtarget.com/facebook/downloads/TechTarget-IT-Acronyms.pdf

For more information on E-rate & filtering (aka filtering) contact Henry Stokes, and also
https://www.tsl.texas.gov/ld/consulting/tech/cipa.html

Speed Test is here:
http://www.speakeasy.net/speedtest/

How does encryption work (video)?
https://www.youtube.com/watch?v=3QnD2c4Xovk

To find your IP address, the service ports:
https://www.grc.com, then go to ShieldsUp!

Additional Networking Resources

TechSoup's "Self-Service Internet Access: Setting Up a Wireless Network
https://www.techsoupforlibraries.org/files/CB2_Meal%20Plan%20One.pdf

What is your IP address?
http://www.whatismyip.com

BroadBandUSA NTIA Broadband Adoption Toolkit
http://www2.ntia.doc.gov/files/toolkit_042913.pdf

Calculating how much bandwidth you need:
http://impact.ischool.uw.edu/calc.html and
http://www.techsoupforlibraries.org/blog/broadband-basics-webinar-follow-up

Convertor for data communications units (mbps, gigabits):
http://www.numion.com/Calculators/Units.html

In addition to the National Broadband map, this is interesting (substitute your county for "**tarrant**"):
http://www.connectedtx.org/community_profile/find_your_county/texas/**tarran**t

Where to find equipment?

State contracts for purchasing:

https://www.tsl.texas.gov/ld/funding/statecontracts/index.html

Suggestions from other libraries (non-TSLAC endorsements):

- For a cheap backup hotspot, look for Mobile Beacon on Techsoup.org (many libraries and schools check these out to patrons)
- IT professionals like yourself can receive a free access point when you view a Meraki webinar https://meraki.cisco.com/freeap

Staying in Touch

Subscribe to the You Can Do I.T. technology list:
https://lists.tsl.state.tx.us/mailman/listinfo/youcandoit

Subscribe to the Library Development blog here:
https://www.tsl.texas.gov/ld/librarydevelopments/?page_id=16986

TSLAC Library Development

Technology Planning information is available here:
https://www.tsl.texas.gov/ld/TechnologyPlanning

Small Library Management Program, which includes a Technology course which is available online:
https://www.tsl.texas.gov/ld/workshops/slm/index.html,

Continuing Education and Consulting Division:
https://www.tsl.texas.gov/landing/ce.html
CEC is a team that provides continuing education and consulting for library staff.

TSLAC online training site:
https://onlinetraining.tsl.texas.gov

TSLAC archived webinars:
https://www.tsl.texas.gov/ld/workshops/webinars/archived.html

This workshop is made possible by a grant from the Institute of Museum and Library Services to the Texas State Library and Archives Commission under the provisions of the Library Services and Technology

Thanks!

For more information contact

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Katherine Adelberg at kadelberg@tsl.texas.gov

For more information contact Henry Stokes at hstokes@tsl.texas.gov or Katherine Adelberg at kadelberg@tsl.texas.gov