

GETTING UP TO SPEED:

Understanding and Sustaining Your Broadband



BROADBANDUSA
CONNECTING AMERICA'S COMMUNITIES

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Amigos Library Services



WALLWISHER

wallwisher built by TSLACLD on January 4, 2012 11 posts so far



TSLAC Library Development & Networking Wallwisher Wall
To add your message: double-click on the wall, type in the box, and then click Ok.

TSLACLD says
Does your library have enough bandwidth? If not, how do you know? (Please reply below this box.)
3 days ago

<http://www.wallwisher.com/wall/tslaclcd>

SERIES SUMMARY

- Do your patrons complain about sluggish internet service?!
- Does slow service impact your ability to meet the community's needs and expectations?!

If you know that your library needs to upgrade, but you do not know where to start or do not understand your options, this is the series for you!

SESSION SUMMARY

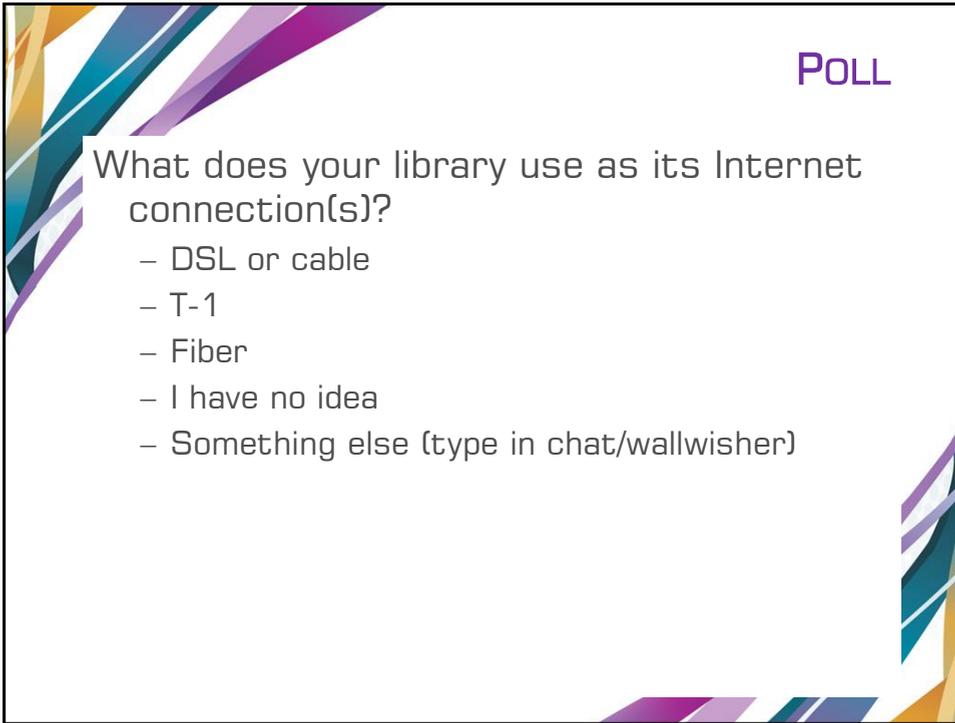
This introductory webinar will define broadband and outline the current connectivity options available to libraries (T-1, DSL, cable, fiber, etc.). Attendees will also learn about the National Broadband Plan and how it affects libraries in a few specific areas.

AGENDA

- Basic telecommunications
- Broadband options
- National Broadband Plan

WHAT IS YOUR BANDWIDTH?

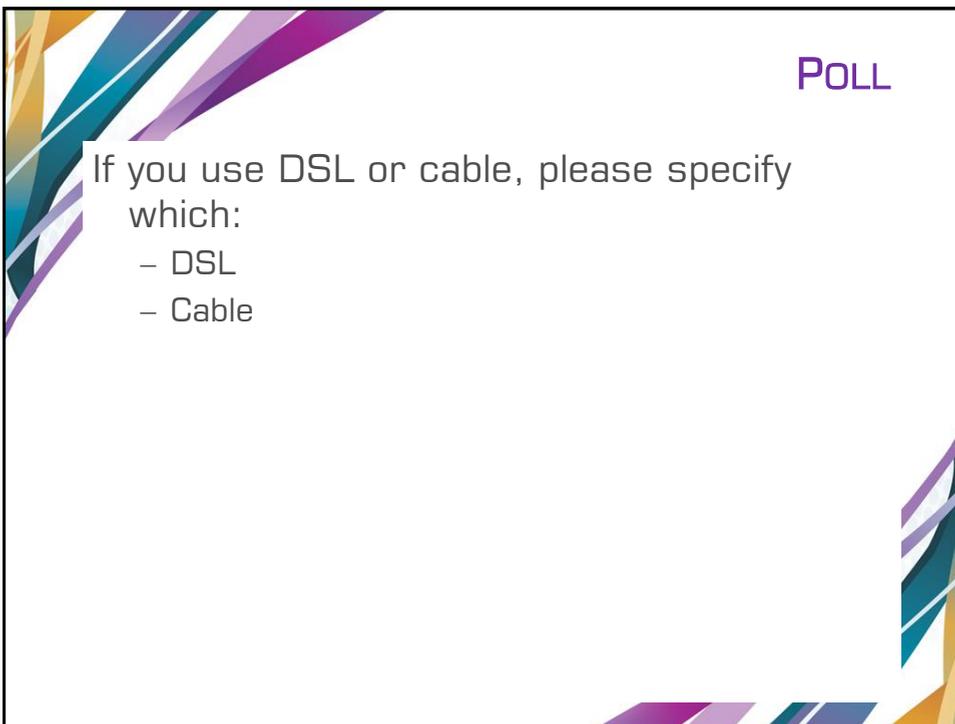
A photograph showing a person's hand holding a green Ethernet cable and plugging it into a white network switch. The switch has several ports, and the cable is being inserted into one of them. The background is dark, and there is a soft glow around the cable head.



POLL

What does your library use as its Internet connection(s)?

- DSL or cable
- T-1
- Fiber
- I have no idea
- Something else (type in chat/wallwisher)



POLL

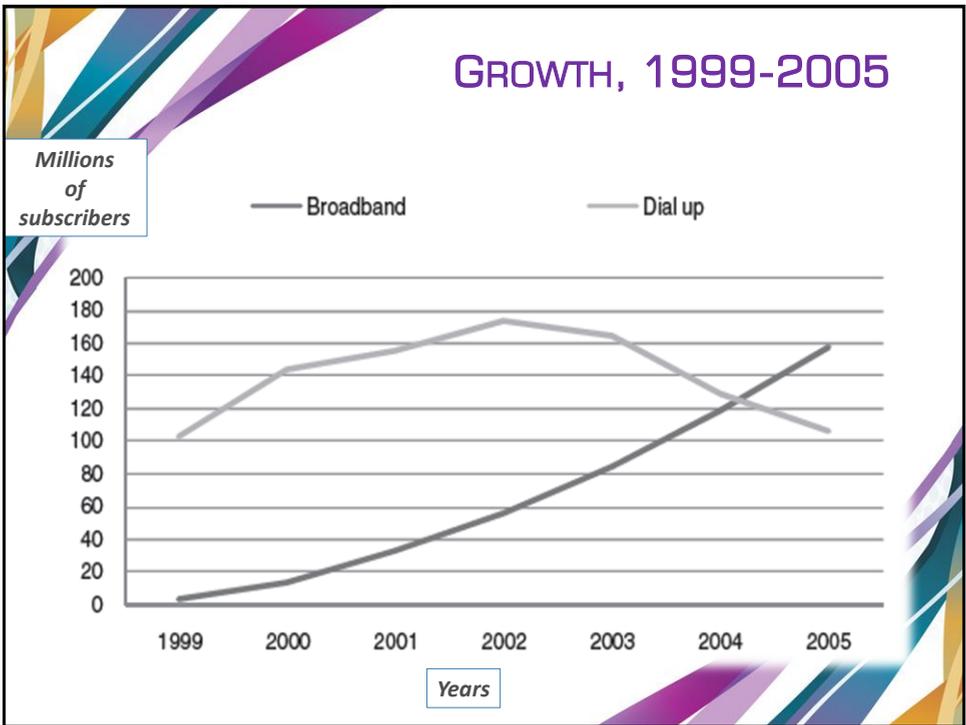
If you use DSL or cable, please specify which:

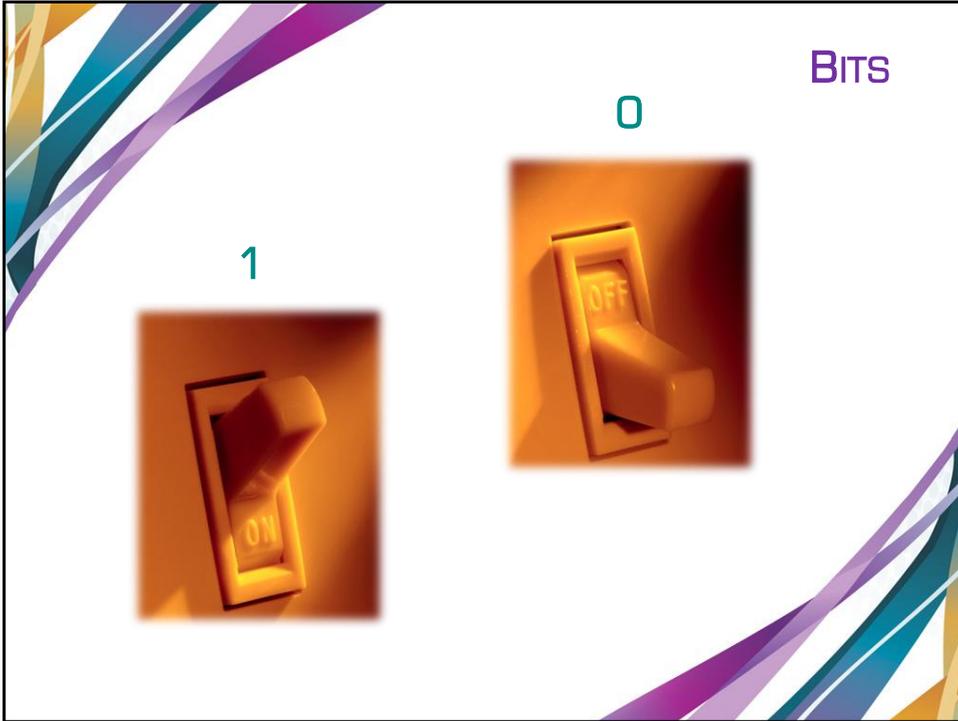
- DSL
- Cable

POLL

What is the downstream speed of your Internet connection(s)?

- Under 1mb/s
- 1mb/s – 10mb/s
- Over 10mb/s
- I have no idea





The image is titled "BYTES" in purple text in the top right corner. It contains a list of facts and a question. In the bottom right corner, there is a graphic of a perspective view of a road made of green binary code (0s and 1s) receding into the distance.

- "8 bits in a byte"
- 00000000
- 8 bits = 1 byte
- 1 bit = .125 byte (1/8)

Which is smaller?

Bits or Bytes?

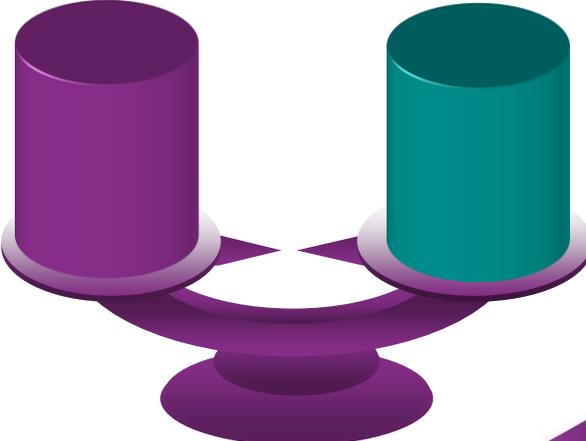
Megabyte	Megabit
Million	Million
Mbyte	Mbit
MB	Mb



The image contains two columns of text. The left column lists 'Megabyte', 'Million', 'Mbyte', and 'MB'. The right column lists 'Megabit', 'Million', 'Mbit', and 'Mb'. Below the text are two illustrations: on the left, a large black and white dog stands next to a much smaller grey dog; on the right, a brown bird is shown in motion, wearing blue and white sneakers.

WHICH IS FASTER?

100 MB/s	100 Mb/s
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The image shows a balance scale with two pans. The left pan is purple and is higher, labeled '100 MB/s'. The right pan is teal and is lower, labeled '100 Mb/s'. The scale is purple and teal.

POLL

Which is faster?

- 100 MB/s
- 100 Mb/s

Fast	Faster	Fastest	Ultimate
Download speed 768 kbps to 1 Mbps	Download speed 1.5 to 3 Mbps	Download speed 4 to 7 Mbps	Download speed 10 to 15 Mbps
<p>Road Runner Turbo 15.0 Mbps with PowerBoost®</p> <p>Our fastest Road Runner ever - giving you the speed you need for a super fast web experience. PowerBoost® gives you an extra burst of speed when downloading big files, so videos, music and files go even faster than before. Road Runner Turbo with PowerBoost® can provide a burst of download</p>			
FASTEST HIGH SPEED INTERNET	FASTER HIGH SPEED INTERNET	FAST HIGH SPEED INTERNET	HIGH SPEED INTERNET
UP TO 6.0 MBPS	UP TO 3.0 MBPS	UP TO 1.5 MBPS	UP TO 768 KBPS



Performance

Offer details:

- Download speeds up to 15 Mbps with PowerBoost®
- Surf the net, download music, upload photos and chat with friends at speeds way faster than DSL
- Norton™ Security Suite (a \$160 value) included at no additional charge
- SmartZone™ Communications Center with 7 e-mail accounts, each with 10 GB of storage
- More than 3,500 live games on xfinity.com/espn3

WIRE DATA SPEED CONSTANT



670,000,000mph

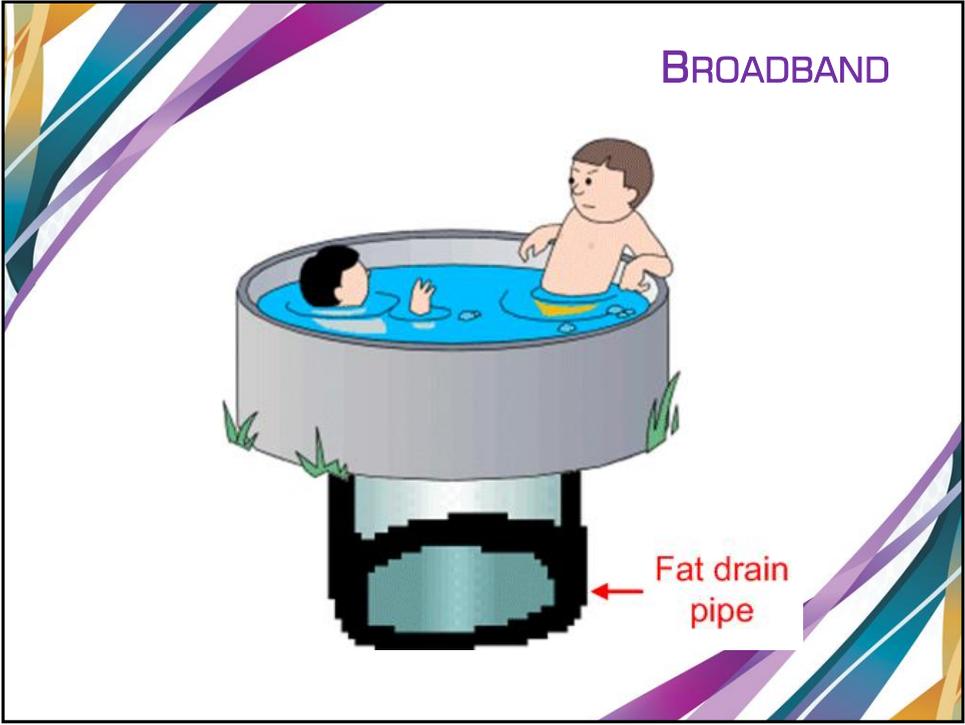
The image features a central graphic of a blue globe with a large, three-dimensional blue arrow that loops around the globe, pointing towards the right. The background is a dark blue space filled with white stars. The text 'WIRE DATA SPEED CONSTANT' is written in purple at the top. Below the graphic, the speed '670,000,000mph' is listed. A 'dreamstime.com' watermark is visible at the bottom right of the graphic.

NARROWBAND



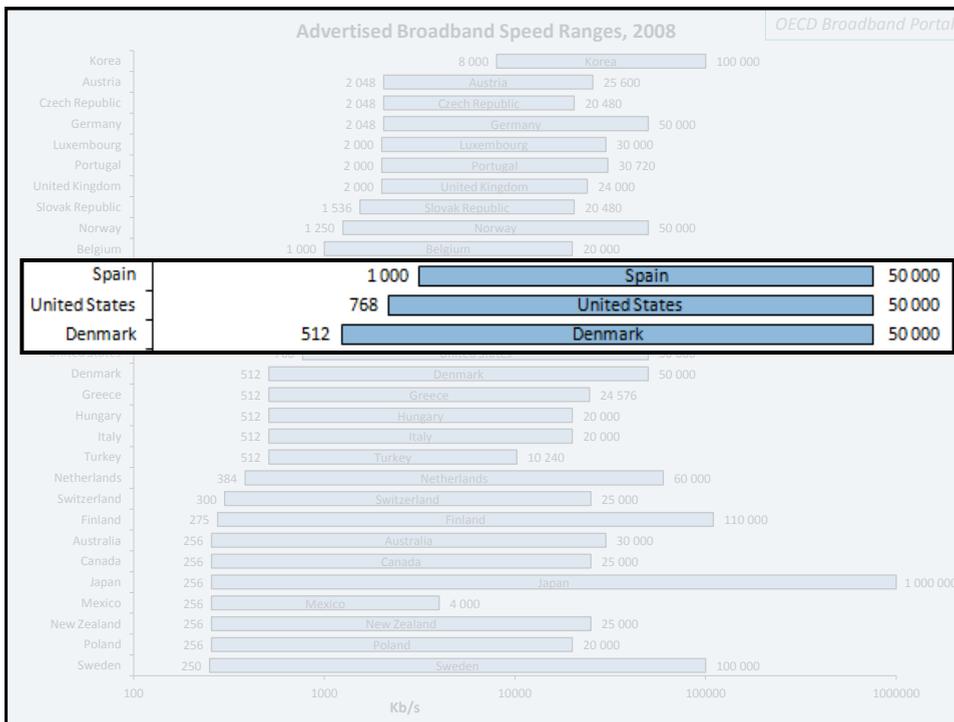
← Skinny drain pipe

The illustration shows a grey bathtub with blue water inside. Two children are in the tub: one is partially submerged on the left, and another is sitting on the right. A very thin, vertical drain pipe extends from the bottom center of the tub. A red arrow points to this pipe with the label 'Skinny drain pipe'.



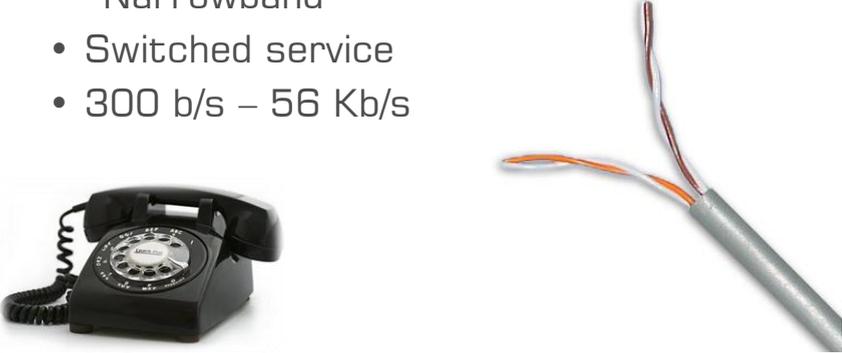
"BROADBAND"

- 2006 OECD:
 - 256 Kb/s both ways
- Until 2010 FCC:
 - 200 Kb/s both ways
- 2010 FCC:
 - 4 Mb/s downstream
 - 1 Mb/s upstream



POTS

- Plain Old Telephone Service
- Analog
- 2 twisted copper wires
- “Narrowband”
- Switched service
- 300 b/s – 56 Kb/s

A black rotary telephone is shown on the left. On the right, a cutaway view of a twisted copper wire is shown, revealing two twisted copper strands inside a grey insulation jacket. The background features colorful diagonal stripes in purple, blue, and yellow.

56K DEDICATED LINES

- Digital
- Single destination
- 8 Kb/s (signaling)
- Were very common

A wooden utility pole with several power lines is shown against a blue sky with light clouds. The pole is weathered and has a cross-arm with insulators. The background features colorful diagonal stripes in purple, blue, and yellow.

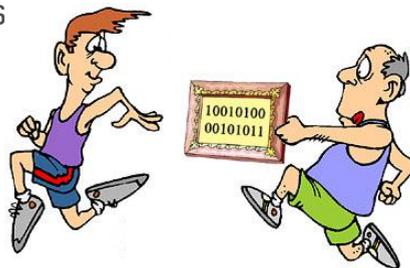
ISDN BRI

- Basic Rate Interface
- Digital over *existing* copper
- 2 B channels
 - 64 kb/s each
 - Bonding
- 1 D channel
 - 16 kb/s
 - Control/signalling

The logo for ISDN (Integrated Services Digital Network) features the letters 'ISDN' in a bold, black, sans-serif font. The letters are set against a background of a grid of small, glowing yellow squares, giving it a digital or network-like appearance.

FRAME RELAY

- Data is sent in “frames”
- No error correction/retransmit
- Bursty
 - Committed Information Rate (CIR)
 - Burst Information Rate (BIR)
- 56Kb/s – ~45Mb/s
- The Cloud



SATELLITE

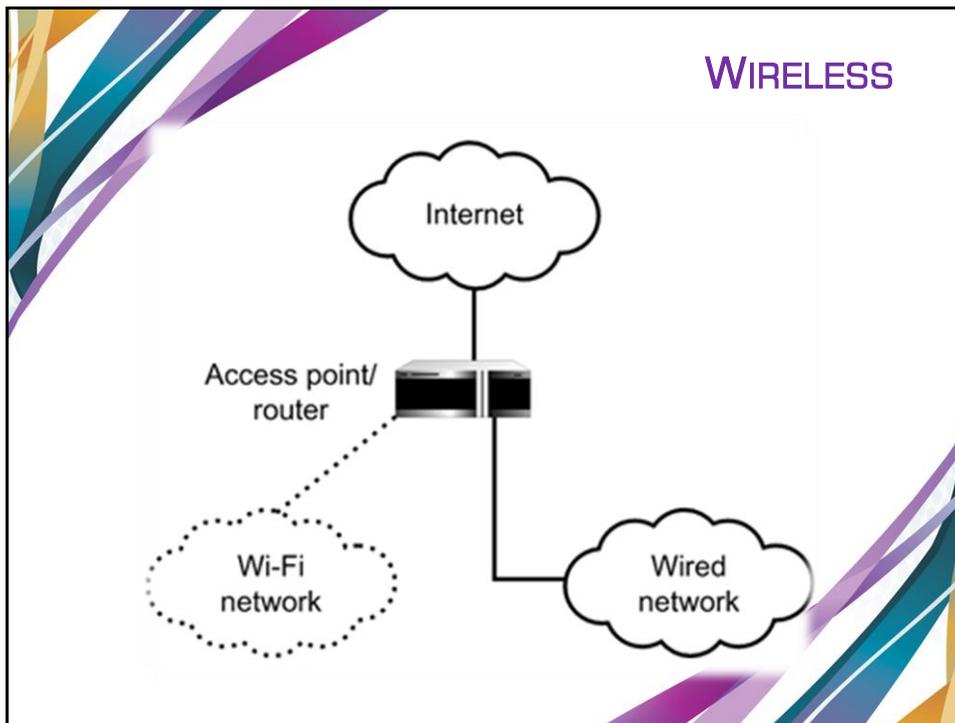
- Low Earth Orbit
- Geostationary
- Line of sight
- Latency
- 1 Mb/s download
- 256 Kb/s upload



BROADBAND OVER POWERLINE

- Data flows over electrical lines
- BPL modem
- Infrastructure available
- Remote areas
- Interference





WIRELESS FREQUENCIES

- IEEE 802.11b
 - Up to 11mb/s
 - 125-460 feet
- IEEE 802.11g
 - 54mb/s
 - 125-460 feet
- IEEE 802.11n
 - 150mb/s
 - 230-820 feet



A small icon of a blue antenna with three curved lines representing signal waves is located in the bottom right corner of the slide.

DSL

- Digital Subscriber Line
- Existing copper wires
- 128 Kb/s upstream
- 1.5 - 51 Mb/s downstream
- Distance sensitive



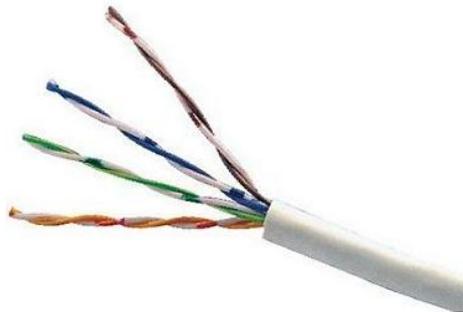
CABLE INTERNET

- Cable television infrastructure
- Usually capped
- 1-6Mb/s downstream
- <1Mb/s upstream



T-1

- Bell System Trunk system
- Dedicated
- 4-pairs copper wire; 2 each way
- 24 channels
 - Each 64 Kb/s
- Total 1.5 Mb/s



ISDN PRI

- Primary Rate Interface
- 23 B channels
 - 64 Kb/s each
 - Bonding
- 1 D channel
 - 64 Kb/s
 - Control/signalling
- Total 1.5 Mb/s

ISDN

T-3

- Dedicated
- Usually fiber
- 28 T-1 lines
 - Each 1.5 mb/s
 - Total 45 mb/s



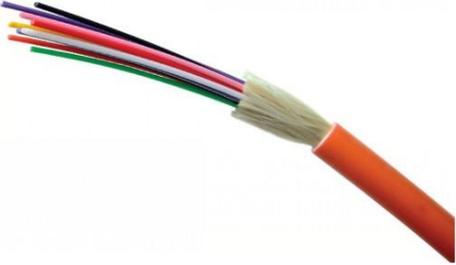
ETHERNET

- Local area networks
- 10 mb/s – 100 mb/s – 1000 mb/s
- Copper wiring
 - Category 5 cable
 - 500 meters between devices
- Gigabit ethernet
 - 1000 mb/s
 - 4 pair Cat 5
 - Category 6 cable
 - Fiber



SONET

- Synchronous Optical Network
- OC levels
 - OC-1: 52 mb/s
 - OC-48: 2.5 gb/s
 - Up to several hundred Gbps
- 2 or 4 fibers
- Few errors



FIBER LONG-TERM STRATEGY?

- Most robust technology
- Unlimited capacity (almost)
- Easier to upgrade in future
- Costs similar to multiple T-1s?
- Easier to adapt to new services

National Broadband Plan



NATIONAL BROADBAND PLAN
<http://www.broadband.gov/>

BROADBAND.GOV FEDERAL COMMUNICATIONS COMMISSION

HOME THE NATIONAL BROADBAND PLAN CONSUMER RESOURCES GET INFORMED EVENTS BLOG EN ESPAÑOL

NATIONAL BROADBAND PLAN
CONNECTING AMERICA

Investing in America's future in:
Broadband & Education

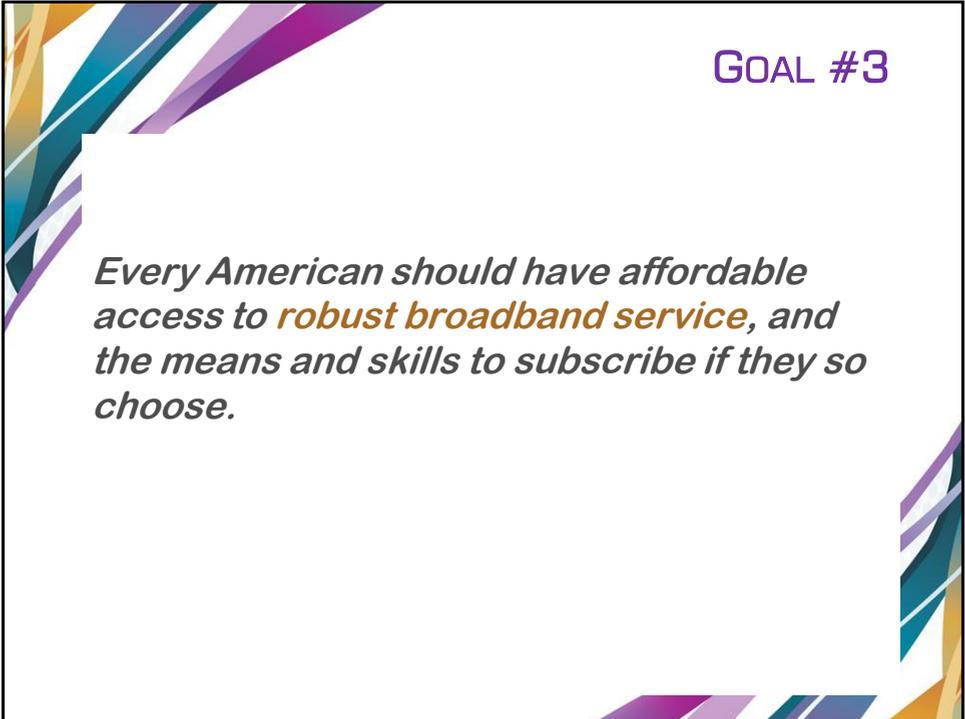
Broadband investment will help America lead the world in educational innovation by supporting 21st century teaching and learning both in the classroom and outside of it.

LEARN MORE

21ST CENTURY CARE ECONOMIC OPPORTUNITY **EDUCATION** HEALTH CARE ENERGY & ENVIRONMENT GOVERNMENT PERFORMANCE CIVIC ENGAGEMENT PUBLIC SAFETY

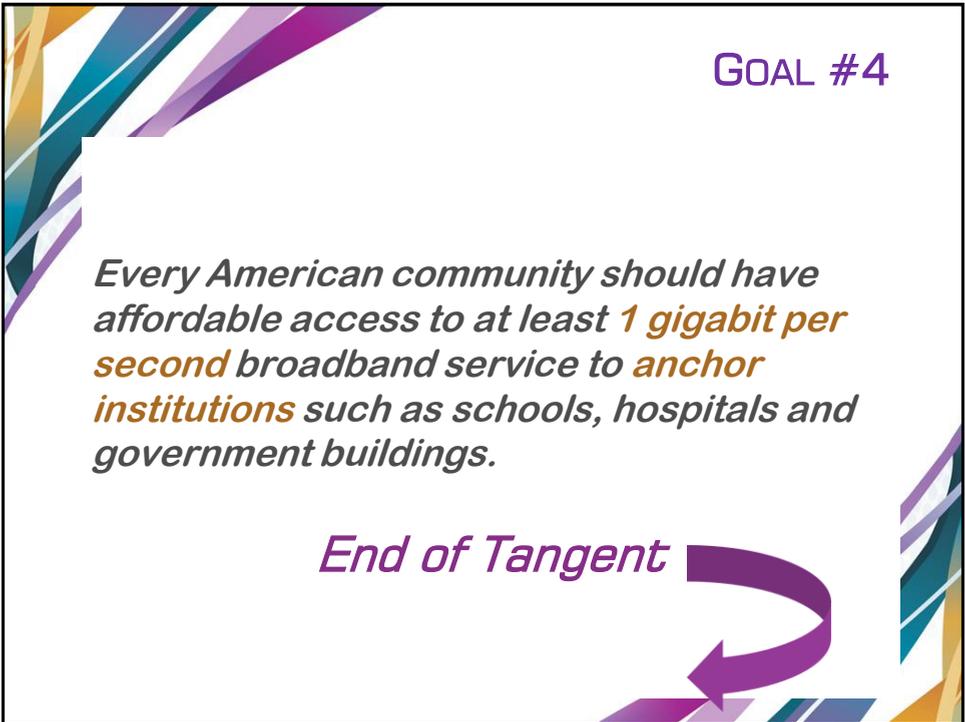
GOAL #1

*At least 100 million U.S. homes should have affordable access to actual download speeds of at least **100 megabits per second** and actual upload speeds of at least **50 megabits per second**.*



GOAL #3

*Every American should have affordable access to **robust broadband service**, and the means and skills to subscribe if they so choose.*



GOAL #4

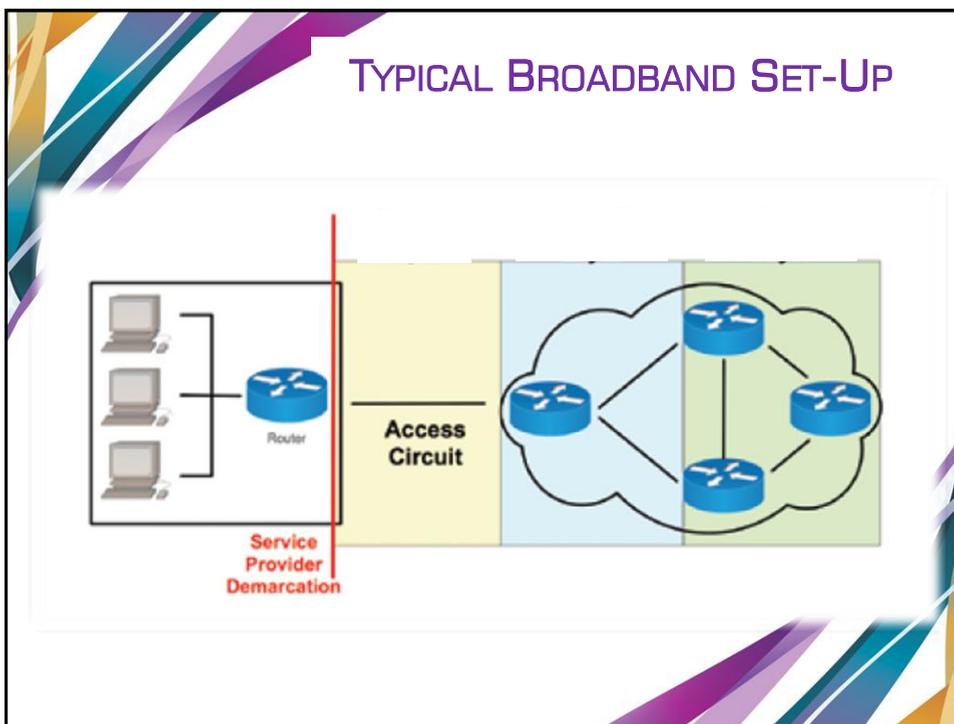
*Every American community should have affordable access to at least **1 gigabit per second** broadband service to **anchor institutions** such as schools, hospitals and government buildings.*

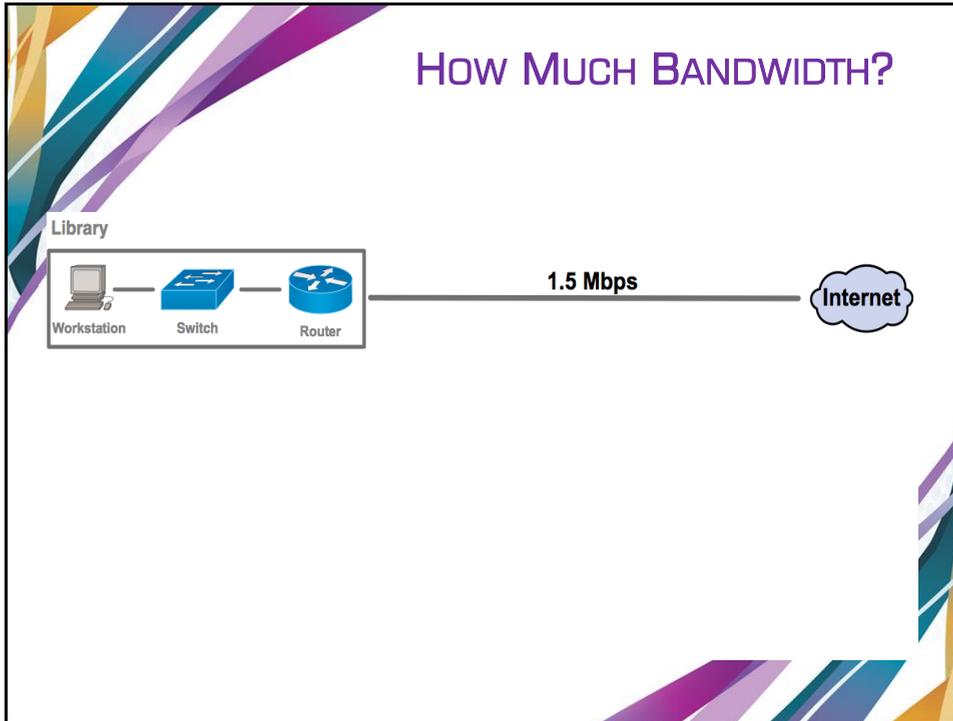
End of Tangent



ATM

- Asynchronous Transfer Mode
- Protocol over fiber
- 53-byte cells
- 155 Mb/s – 10 Gb/s
- Different types of data
- “Bandwidth on Demand”

A blue and silver ATM machine with a screen displaying "Account Balance \$0.00". The word "ATM" is printed in white on the blue top panel.



IDENTIFYING YOUR BANDWIDTH

- Bandwidth Monitor - <http://www.bwmonitor.com/>
- www.broadband.gov
- speedtest.net
- speakeasy.net
- Network software

The screenshot shows a window titled "Bandwidth Monitor" with a sub-header "All Connections". The window displays a line graph with a red line representing network activity. The y-axis is labeled with bandwidth values: 17.5 mbps, 14.7 mbps, 11.9 mbps, 9.13 mbps, 6.35 mbps, and 3.57 mbps. The x-axis shows two time points: 1:43:43 and 1:44:13. At the bottom of the graph, the following statistics are displayed: (Max: 17.7 mbps) Avg Down: 121.8 kbps Avg Up: 41.1 kbps.

