

Handout 1



The term broadband commonly refers to high-speed Internet access that is always on and faster than the traditional dial-up access. Broadband includes several high-speed transmission technologies.

The broadband technology Arkansans choose depends on a number of factors. These may include whether they are located in an urban or rural area, how broadband Internet access is packaged with other services (such as voice telephone and home entertainment), price, and availability.

Internet Protocol (IP)

- IP networks change constantly, automatically re-routing traffic based on network load conditions
 - All IP networking software is identical throughout the world; that's why a computer in China can communicate with a computer in Canada.
 - IP is universal. No matter what kind of computer or networking hardware you're using, the IP processes work the same.
 - XXXX:XXXX:XXXX:XXXX:XXXX:XXXX:XXXX:XXXX



Every machine on the Internet has a unique identifying number, called an **IP Address**.

All devices on the in the world on the Internet, however different they might be, speak the 'same language' and can integrate into the whole framework. IP is the most common protocol over the Internet. It is the set of rules governing how packets are transmitted over the Internet.

The IP protocol standardizes the way machines over the Internet or any IP network forward or route their packets based on their IP addresses.

Routers

- Routers perform the "traffic directing" functions on the Internet.
 - Its like a radio dispatcher to find the fastest way to get to a location.



Routing consists of forwarding IP data packets from source to destination machines over a network, based on their IP addresses.

Internet Gateways

- A gateway is a network point that acts as an entrance to another network. On the Internet,
 - a touch point to another network
 - or an end-point
- Internet service providers (ISP) are gateway nodes.



A system made of several levels, it looks at the destination of data packets. It is the crossroad of every kind of traffic, no matter what the source of the technology.

Gateways are where Satellite, Cable TV, Telephone, Wireless and other provider networks touch so that your data moves to and from its destination.

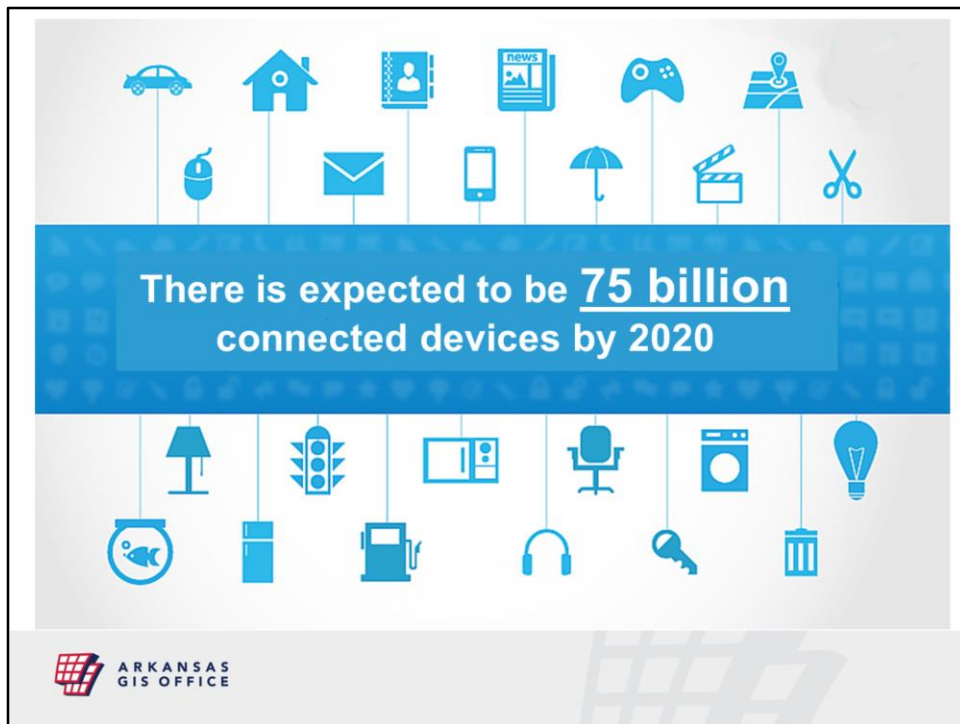
Broadband Does Not Flow Like Water or Electricity

- Broadband traffic is directed. You cannot find and tap the biggest pipe.
- IP infrastructure is like the Postal Service of the Internet



A consumer in rural Arkansas living along a state highway has trouble understanding why they cannot access high speed broadband when they see a sign near their home that says, “Warning Buried Fiber Optic Cable.”







Unlike electricity or water, broadband does not flow. Switch, router and gateway infrastructures are required to access broadband.



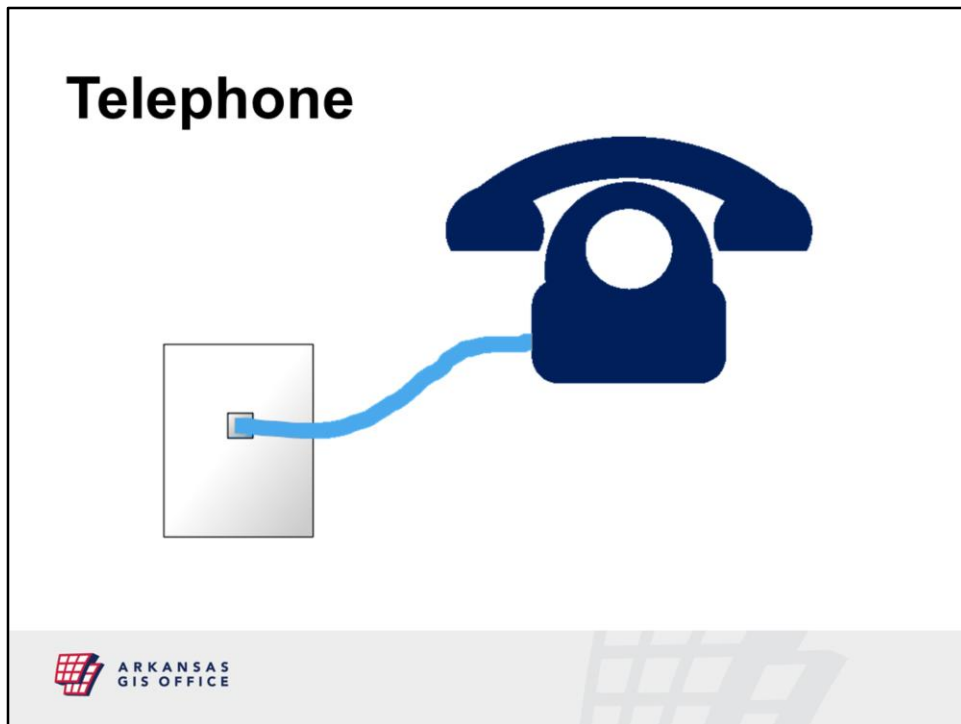
The Internet of Things is a concept for sensors monitoring and tracking all sorts of data; like cloud-based apps translating that data into useful intelligence and transmitting it to machines on the ground, enabling mobile, real-time responses. For example we will have smart bridges, smart cars, smart phones, smart cities, smart tractors, combines, refrigerators, etc. etc.

All these sensors require broadband.

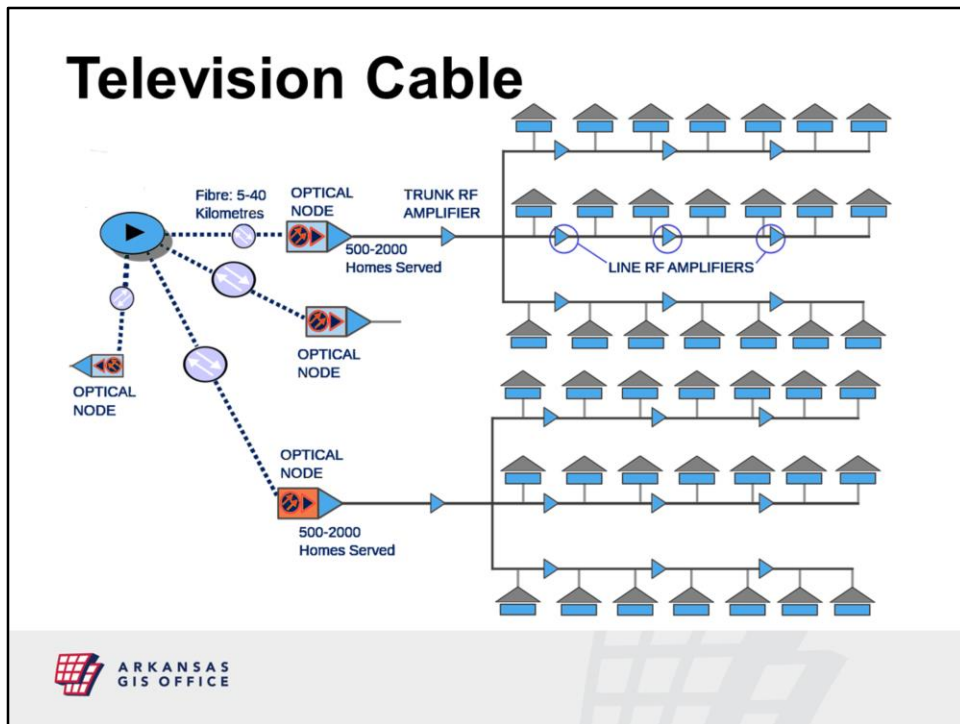
Delivery Methods

Type	Method	Speed
	Telephone Network	Fast
	Television Cable Network	Super Fast
	Fiber to Home	Insanely Fast
	Wireless	Getting Faster
	Satellite	Fast Down Not Up
	Powerlines	Potentially Super Fast

The following slides discuss the various delivery methods.



DSL is a wireline transmission technology that transmits data faster over traditional copper telephone lines already installed to homes and businesses. DSL-based broadband provides transmission speeds ranging from several hundred Kbps to millions of bits per second (Mbps). The availability and speed of your DSL service may depend on the type of line and distance from your home or business to the closest telephone company facility.

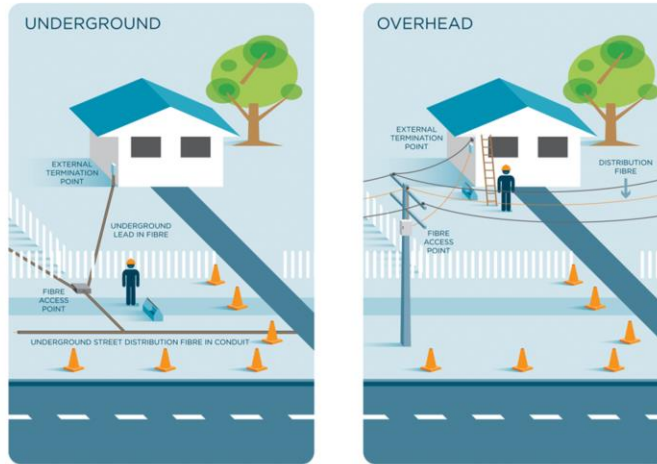


Cable modem service enables cable operators to provide broadband using the same coaxial cables that deliver pictures and sound to your TV set.

Most cable modems are external devices that have two connections: one to the cable wall outlet, the other to a computer.

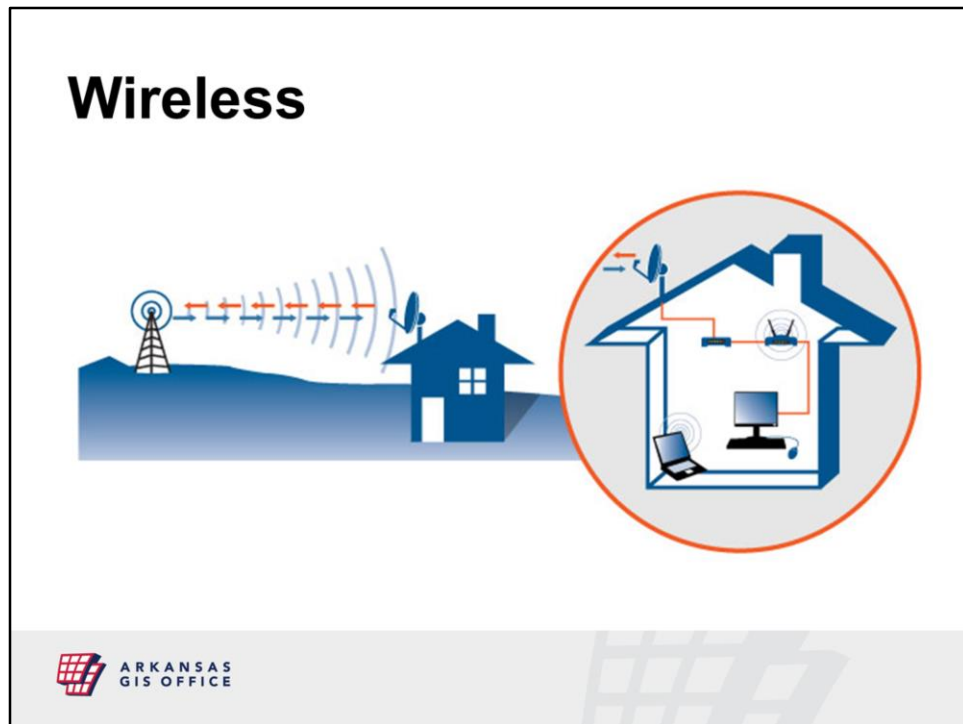
Subscribers can access their cable modem service by simply turning on their computers, without dialing-up an ISP. You can still watch cable TV while using it. Transmission speeds vary depending on the type of cable modem, cable network, and traffic load.

Fiber to Home



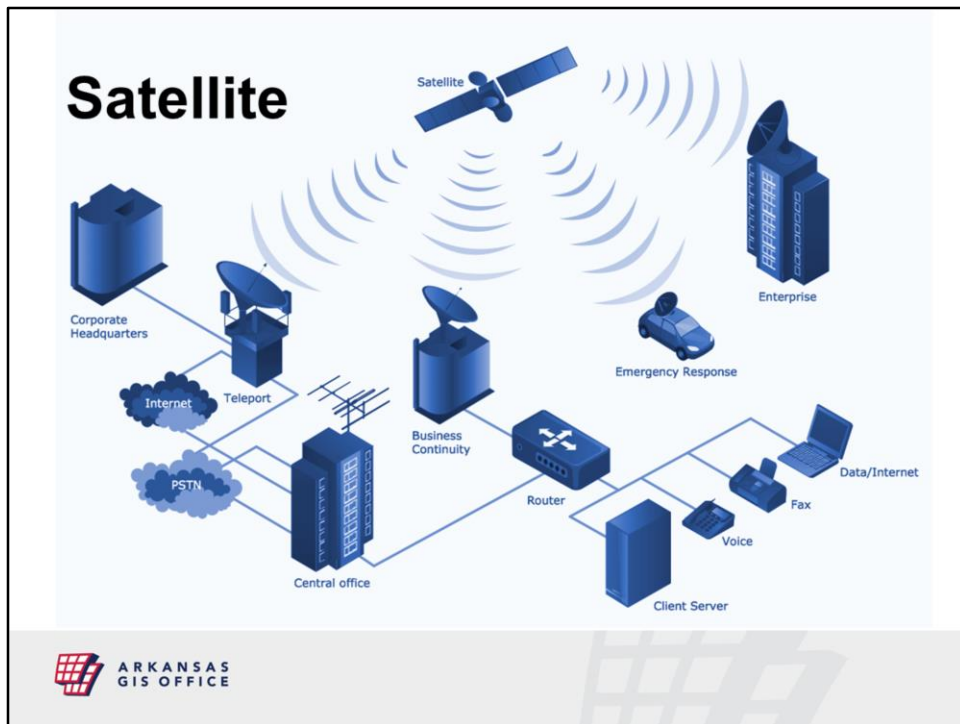
Fiber optic technology converts electrical signals carrying data to light and sends the light through transparent glass fibers about the diameter of a human hair. Fiber transmits data at speeds far exceeding current DSL or cable modem speeds, typically by tens or even hundreds of Mbps.

The same fiber providing your broadband can also simultaneously deliver voice (VoIP) and video services, including video-on-demand.



Wireless broadband connects a home or business to the Internet using a radio link between the customer's location and the service provider's facility. Wireless broadband can be mobile or fixed.

Wireless broadband Internet access services offered over fixed networks allow consumers to access the Internet from a fixed point while stationary and often require a direct line-of-sight between the wireless transmitter and receiver.

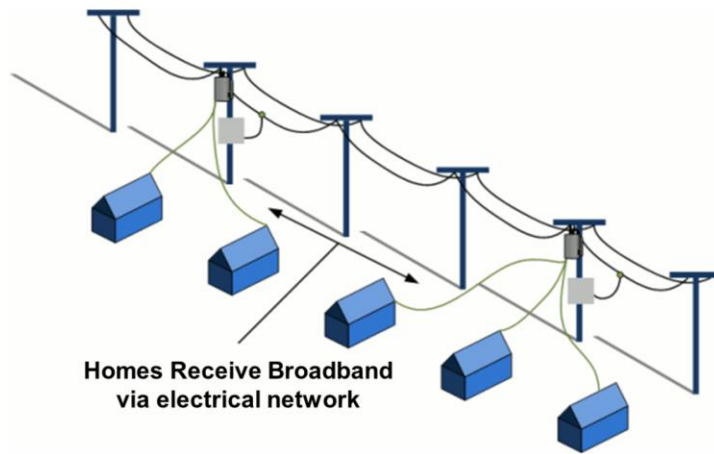


Satellites orbiting the earth can also provide links for broadband. Satellite broadband is another form of wireless broadband, and is also useful for serving remote or sparsely populated areas.

Downstream and upstream speeds for satellite broadband depend on several factors, including the provider and service package purchased, the consumer's line of sight to the orbiting satellite, and the weather.

Service can be disrupted in extreme weather conditions.

Broadband Over Powerline



Broadband over Powerline (BPL) is a delivery of broadband over the existing low- and medium-voltage electric power distribution network. BPL speeds are comparable to DSL and cable modem speeds. BPL can be provided to homes using existing electrical connections and outlets. BPL is an emerging technology that is available in very limited areas. According to the FCC the only state with limited BPL service is Illinois.

BPL has potential because power lines are installed virtually everywhere, alleviating the need to build new broadband facilities for every customer, but it is untapped in Arkansas.

Questions?

- Arkansas GIS Office
- shelby.johnson@arkansas.gov
- 501-682-2767
- gis.arkansas.gov

