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BROADBAND WIRELESS INTERNET

Mille Lacs County Community Outreach

Agenda

Goal – Education on Internet service offerings

- Rural Challenge
- Wired Internet
- Wireless Internet
- Wireless Solution
- Wireless Service Plans
- Personal / Community Benefits / Business
- Internet safety
- Speed testing
- Domain names and IP addressing
- Basic troubleshooting
- Survey / Interest

Rural Challenge

- Provide affordable wireless high speed Internet to rural communities
  - Fiber-Optic cable does not cover a majority of the state to date
  - Concentrated in metropolitan areas
- Common approach of putting fiber-optic cable to every residence is cost prohibitive
  - Minnesota counties are typically receiving bids of $35-50 million to do fiber-optic to a majority of the county
- Major carriers not interested due to small payback/low subscribers
- State aid has been low and restrictive in dollars
- Time to build out fiber-optic 2-3 years for county

Wired Internet

- Common Technologies include Fiber Optic, Cable, DSL
  - Fast downloads, latest technology, gaming, large file transfer, business applications
- Location
  - Urban based in larger towns
  - High density areas due to shorter financial payback
- Features
  - Unlimited Data
  - Fixed Monthly Fee
  - No Data Throttling
  - No Overage Fees
  - Long Term Contract
- Pricing
  - Priced by Download speed Mbps
  - Typically combined with phone and TV services

Fiber Internet

Fiber Optics characteristics

- Pushing light over glass
- Nearly unlimited capacity
- Does not degrade, will maintain functionality for a very long time (25-30 years)
- Supports other Internet delivery technologies as a backhaul medium
- Expensive - $10,000 or more to install to the house

Wired (Copper) Internet

Telephone line (DSL) characteristics

- Internet delivered over telephone lines
- Typically Fiber backhauls to aggregation points are utilized
- Very distance sensitive, 2-3 miles is limit of effective range
  - Within ½ mile, speeds to 25 Mbps are possible
  - At 2 miles only 10 Mbps are possible, and speeds reduce from there
- Many telephone providers accepted Connect America Fund grant money to expand to 10 Mbps within 6 years

Wired (Copper) Internet

Cable line characteristics

- Internet delivered over coaxial cable
- Typically Fiber backhauls to aggregation points are utilized
- Higher capacity than telephone lines
- Primarily only available in high population density areas

Wireless Internet

Wireless Internet technologies:

- Satellite Internet
- Mobile phone based wireless Internet (Cellular)
- Wi-Fi wireless Internet
- Fixed wireless

Wireless Internet - Satellite

Satellite Internet

- Reasonable speeds – up to 15 Mbps
- Very high latency/delay challenges. This limits applications like VOIP, gaming, video, etc.
- Data caps are very limiting and expensive
- Same technology as satellite television, can be affected by weather
- No geography limitations, available across North America

Wireless Internet - Cellular

Cellular Internet

- Good speeds – up to 15 Mbps, and higher
- Data caps are very limiting and expensive
- Same coverage as mobile phones, typically very good
- Most households are paying $100 and over per month

Wireless Internet – WiFi

WiFi Internet

- Speed is determined by backhaul connection, but can be quite good, >100 Mbps
- Typically municipal and small footprint projects
- Built on same technology as the in-house WiFi routers
- Quick to deploy
- Significant signal coverage limitations
  - Lots of access points are needed
- Only an option for in city coverage

Wireless Internet – Fixed

Fixed Wireless Internet

- Different than Cellular as subscribers are not intended to be mobile
  - This allows for optimization of connection between tower and subscriber
- Mostly a line of site technology, but some frequencies are more tolerant than others
- Different standards (LTE, MIMO, Wi-Fi)
- Licensed spectrum (not prone to interference)
  - 3.65 Ghz
  - 11 Ghz
- Unlicensed spectrum (very prone to interference)
  - 900 Mhz
  - 2.4 Ghz
  - 5 Ghz
- The future of wireless Internet

Why Fixed Wireless?

- Re-uses tower infrastructure in place – no need for new
- Fixed characteristic provides good distance options
- Licensed spectrum is very stable
- Speeds are very good, up to 100 Mbps or above
- Utilizes Fiber backhaul, most of which is in place
- Last mile is built only as required, reducing costs
- Subscriber equipment can be expensive
- Geography and foliage impact signal strength, some more than others

Wireless Service Plan Features

- Residential & Business Plans
- Unlimited Data
  - Customer expectations – required for todays technologies
  - System updates can consume 2 GB monthly, or more
- Fixed Monthly Fee
  - Budget friendly
  - No unexpected $$ bills
- No Data Throttling
  - Speeds are never changed affecting your ability for education or business
- No Overage Fees
  - No unexpected $$ bills
- No Long Term Contract
  - Month to month with no bundling of services

Wireless Service $ Plans

Residential Plans

Premium	Plus	Magnum
$39* /Month	$59* /Month	$89* /Month
4 Mbps download	10 Mbps download	25 Mbps download
1 Mbps upload	2 Mbps upload	3 Mbps upload
Unlimited data	Unlimited data	Unlimited data
No data throttling	No data throttling	No data throttling
No overage fees	No overage fees	No overage fees
No long term contract	No long term contract	No long term contract
Best for limited streaming	*Best for small families*	*Best for Streaming services*
SIGN UP	SIGN UP	SIGN UP

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Personal Benefits

Quality of life improvements for all residents

- Online banking and shopping
- Health/Medical
  - Monitoring – physician patient interaction
  - Insurance – coverage, processing
- Social Media
  - Nextdoor – local community activities
  - Pinterest – provides business opportunities
- TV, Movies, Entertainment
  - Netflix
  - Streaming TV
  - Gaming

Personal Benefits

Quality of life improvements for all residents

- Video Communicating / Monitoring
  - Family Communication
    - Young adults at college
    - Seniors for safety and telehealth
  - Security
    - Home
    - Business
- Internet of Things
  - Connected Devices

Community Benefits

Educational Advantages for Students

- Broadband-enabled educational tools facilitate more interactive personalized instruction
- Real-time tutoring by connecting students to a live tutor through a video and audio feed
- By offering courses and programs of study over the Internet, students are provided greater choice and flexibility
- Advanced learners are no longer limited by the courses offered in their schools and can obtain the coursework they need through online opportunities

Community Benefits

Educational Advantages for Teachers

- Personalized instruction that allow students to learn in the way they are best wired to process information, in the style that conforms to them, and at a pace that matches their own
- Resource sharing, Virtual field trips & video conferencing
- Teachers and administrators are also using broadband for administrative tasks, lesson planning, student assessment, communication with other educators, posting course information online for students, and reaching out to parents

Community Benefits

Attract and retain younger workforce

- Access to adequate broadband capacity in our schools is not a luxury it is a necessity for our next generation to be able to compete
- Today and into the future, knowledge, jobs, and capital are going to migrate to places where workers have digital age skills, especially those in science, technology, engineering, and math
- Remote work force is growing as companies search for ways to retain top talent, these people need high speed connectivity

Community Benefits

- Connected residence allow municipalities to delivery services electronically:
  - About - Community, Chamber of Commerce, City Government, Licensing, building permits, Public Utilities, Parks, Schools, Contact information
  - What's New – Calendar of Events, City Newsletter
  - Departments – City Council, Administrative Services, Public Safety, etc..
  - Services – Property Info, Recreation, Recycling etc…
  - Facilities – Fire Stations, Ice Centers, Community Centers, etc….

Broadband helps seniors stay in their homes longer

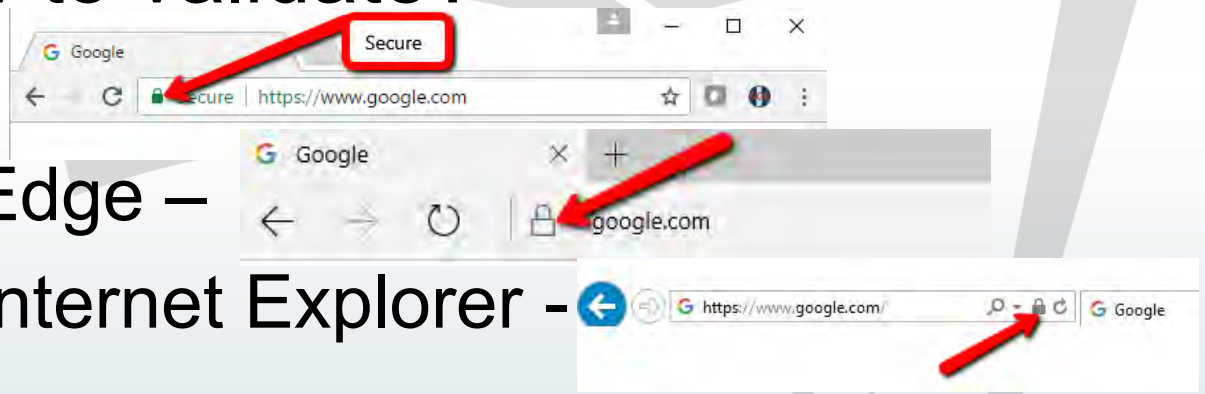
- Almost 13 % of Americans are 65 years or older, 19% by 2030
- Nearly 4 percent more rural seniors are in nursing homes than their urban counterparts
- According to the National Rural Health Association, only 10 percent of physicians practice in rural America despite the fact that nearly one-fourth of the population lives in these areas
- Telemedicine can be further defined
  - Remote monitoring, doctors remotely check a patient's vital signs and caregivers are alerted to falls or wandering
  - Interactive services, these involve concurrent interactions between patient and doctor

Rural Based Business

- Farming/Agriculture
  - Support business – Seed and Chemical
  - Technology – Computer and GPS
- Manufacturing
  - Suppliers to Medical device companies
- Video Surveillance for business
- Organic Agriculture
- Tourism

Internet Safety

- Great tutorial: http://www.gcflearnfree.org/internetsafety/
- https: - How to validate?
  - – Chrome –
  - – Microsoft Edge –
  - – Microsoft Internet Explorer -



- Mobile Apps
  - – iPhone
    - Check Privacy settings, particularly Location, Contacts, Microphone, Camera
  - – Android
    - Review access requests at app install

Speed Testing

- Speedtest.net is most common
  - Ads can be very annoying and skew results
- Installed apps are available for use
- All devices in home share subscribed bandwidth
  - 2 devices using 5 Mbps uses full 10 Mbps
- Distance from wireless router affects overall speed
  - To be safe, test right next to the router, or used wired connection

Bits and Bytes

- What's the difference between bits and bytes?
  - Both are measurements of data. A byte is 8 times bigger than a bit. Both measurements are small – so in the practical world usually give measurements in Kilobit/byte, Megabit/byte, Gigabit/byte. So how much is that?
  - KB, MB, GB – A kilobyte (KB) is 1,024 bytes. A megabyte (MB) is 1,024 kilobytes. A gigabyte (GB) is 1,024 megabytes. A terabyte (TB) is 1,024 gigabytes.
- Bits are generally used for describing interface speed and bytes for storage.
  - Broadband speed is measured in bits or Megabits per second (Mbps).
  - The size of something we want to upload or download in Megabytes (MB) – a song is roughly 3-4 MB.
- The average household consumes 190 gigabytes (GB) of data per month
  - With a 1 Mbps connection it will take 453 hours to transfer (almost 19 days)
  - With a 1 Gbps connection it will take 27 minutes to transfer

Basic Troubleshooting

- Reboot router
- Ping router
- Ping subscriber module
- Ping www.google.com
- Ipconfig /all

Domain Names & IP Address

- Domain Names
  - Top Level Domains (.com, .net, .edu, .co)
  - All domain names are tied to a specific IP Address using DNS (Domain Name Server)
- IP Addresses
  - Every device on Internet has an IP Address
  - Can be assigned dynamically or statically
  - IPV4 has 4 octets (255.255.255.255)
  - IPV6 will remove total # of IP Addresses limitations
  - Private IP Addresses are not usable on Internet

Take Rate

Help us understand your existing Internet plan speed. Please select from the options below.

____ 2 Mbps ____5 Mbps ____ 10 Mbps ____ 15 Mbps ____ 25 Mbps and greater

Please tell us the price range of your current service, including equipment rental. Please select from the options below.

____ 30-40$____ 40-50$ ____ 50-60$ ____ 60-75$

Please provide existing Internet service company/provider name _____

Do you live in ____ town or out ____ of town please indicate with and X. Outside of town is greater than ¼ mile outside of the city limits.

Please provide your current Internet contract expiration date if in a contract, month/year

_____month, _____year.

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Take Rate

Please select the Internet service plan that you would sign up for if it was available to you:

_____ 4Mbps $39+$7=$46 total	_____10Mbps $59+$10=$69 total	____ 25Mbps $89+$10=$99 total
Unlimited data	Unlimited data	Unlimited data
No data throttling	No data throttling	No data throttling
No overage fees	No overage fees	No overage fees
$7 Antenna rental	$10 Antenna rental	$10 Antenna rental
No long term contract	No long term contract	No long term contract

This survey can also be completed on-line via the below link:

https://www.surveymonkey.com/r/mille_lacs

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To learn more about Rural High Speed Internet Service please contact us at:

David Coudron 612-991-7474

Paul Hess 763-486-6848

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