



Governor's Task Force on Broadband August, 2017

Agenda

- Advantenon background
- Advantenon service plans and speeds
- Advantenon coverage areas
- Future of Fixed Wireless
- Internet of Things and Fixed Wireless
- Wireline and Fixed Wireless
- Fixed Wireless and Cybersecurity
- TV Whitespace and Microsoft's initiative
- Policy recommendations supporting Internet availability to all of Minnesota

Advantenon Background

- Founded by individuals born in rural Minnesota
- Long history (since 1986) in Technology, specifically computer networking
- Many friends and relatives suffering from insufficient Internet options
- Paired passion for technology with unmet need in rural Minnesota
- Driven by “midwestern main street” values
- Goal is to put rural residents on equal footing with suburban/metro residents

Service Plans and Speeds

Residential Plans

Premium	Plus	Magnum	Jumbo
\$39* /Month	\$59* /Month	\$89* /Month	\$129 /Month
4 Mbps download	10 Mbps download	25 Mbps download	100 Mbps download
1 Mbps upload	2 Mbps upload	3 Mbps upload	100 Mbps upload
Unlimited data	Unlimited data	Unlimited data	Unlimited data
No data throttling	No data throttling	No data throttling	No data throttling
No overage fees	No overage fees	No overage fees	No overage fees
No long term contract	No long term contract	No long term contract	No long term contract
<i>Best for limited streaming</i>	<i>Best for small families</i>	<i>Best for Streaming services</i>	<i>Best for multiple Streaming users</i>
SIGN UP	SIGN UP	SIGN UP	SIGN UP

Service Plan Features

- Residential & Business Plans
- Unlimited Data
- Fixed Monthly Fee
- No Data Throttling
- No Overage Fees
- No Long Term Contract

Coverage Areas

Main coverage areas

- Eastern half of Lyon County
- Western half of Redwood County
- All of Traverse County
- Where we have coverage, we cover 100% of residents between towers
 - Most signal strength challenges can be met with cable runs beyond trees, or by adding height to the antenna.
 - Reflector dishes increase ability to penetrate trees, etc.
- All service plan speeds are available in all areas
 - Point to Point links required for 100 Mbps in Lyon/Redwood County

Fixed Wireless Future

Significant growth expected due to:

- Large demand for Unserved customers as evidenced by Border to Border initiative
- Wide interest by many different players
 - WISPs
 - Big 4 Cell phone companies
 - Municipalities and other private network needs
 - Large demand in underdeveloped countries
 - Non ISP based large companies such as Microsoft and Google
- Large expense of fiber to the home
 - Fixed wireless at 100 Mbps costs less than 1/10th cost of fiber

Fixed Wireless Future, cont.

Technology improvements:

- Innovation pace on hardware at high levels
 - Comparable to PCs in 90's where speeds double and prices halved every 2-3 years
- Cellular industry improvements and Fixed Wireless improvements on parallel path
 - Technology is very similar
 - Deployment is very similar
- Fiber to the tower is a great compliment to low cost Fixed Wireless deployments

Fixed Wireless Future, cont.

Challenges:

- Unlicensed space (900 MHz, 2.4 GHz, 5 GHz) are getting very crowded
 - Operators expanding channel width to get more throughput furthers this issue
- Most promising (CBRS) licensed space is under attack
 - T-Mobile and CTIA petitioning to squeeze out smaller operators
- Speeds offered to customers traditionally underwhelming
 - This is changing rapidly
- CAF II and support of large telco DSL
 - In 20 years they have developed very poor reputation amongst customers and show little to no interest in rural areas
 - Speeds are under performant, 10/1 in most areas

Fixed Wireless and IoT

- Internet connection ubiquitous to IoT
 - Devices can tolerate any internet connection
 - Until IPv6 rolled out widespread, most IoT devices NAT'd with no knowledge of Internet connection
- Fixed wireless presents some easier connection options for remote devices, but cost of antenna equipment can be prohibitive
- Most common use case for IoT for residential devices
 - Main Internet connection into house, many devices behind firewall. Security cameras, grain bin dryers, security systems, etc are most common in rural areas
- Business have more varied use cases
 - Similar to residential use cases in that can be connected on public IP addresses or private IP addresses

Consumer Trends

Trends affecting use of Internet Services:

- Over the Top (OTT) services for television
 - Sony Playstation Vue
 - Sling TV
 - DirectvNow
- Subscription Streaming Services
 - Netflix
 - Amazon Video
 - Hulu
 - YouTube
- Streaming plugins
 - Facebook, etc.

Wireline and Fixed Wireless

- Very complimentary technologies
- Expectation is that most future ISPs will create hybrid systems
 - Fiber connections to towers and customers in dense areas
 - Fixed wireless to less dense areas
- Fiber and Fixed Wireless replacing DSL, Cable and other traditional wireline technologies
 - Fiber where density supports it
 - Fixed Wireless where trenching Fiber isn't feasible

Why Fixed Wireless?

- Last mile is built only as required, reducing costs
- Re-uses tower infrastructure in place
- Fixed characteristic provides good distance options
- Licensed spectrum is very stable
- Speeds are very good, up to 100 Mbps or more
- Utilizes Fiber backhaul, most of which is in place

Fixed Wireless & Cybersecurity

- Fixed Wireless has all the same challenges as wireline technologies
 - Operators must secure their infrastructure properly
 - Signals can be captured during transmission on wireline and Fixed Wireless connections
 - Encryption is the key. All sensitive data must be encrypted
- Most Cybersecurity issues are related to lack of education on proper Internet activities
 - Majority of incidents still result from email attachments or downloaded infected files from web pages
- Investigation and resolution of incidents the same as for wireline providers

TV White Space

Summarized Characteristics

- Re-use of UHF and VHF channels (600 MHz)
- Dynamic Spectrum Access is required for best utilization
 - May be similar to proposed Spectrum management of Citizen's Broadband Radio Service (CBRS in 3.5 GHz)
- Lower frequency allows for 4 time distance coverage than 2.4 GHz WIFI at same power
- Early indications are that Microsoft's proposal supports competition
 - Auctioning licenses typically benefits only a few large operators reducing consumer choice
- Throughput (bandwidth) is undetermined as yet

TV White Space

Advantages

- Many bands available, can be managed with a database for dynamic access
- Lower frequency means better reach and signal penetration

TV White Space

Disadvantages

- Opposition from broadcasters, the largest of whom have significant lobbying wherewithal
- Lower frequency typically means lower throughput
 - Need wider channels to compensate
- Devices for towers and Customer Premise Equipment (CPE) not readily available
- Needs FCC rulemaking effort
 - Given the pressure of current T-Mobile and CTIA lobbying against CBRS, there will be pressure to auction licenses, reducing competitino

Policy Decisions

Two main areas:

- MN policy
 - Programs like Border to Border Grant favor wireline providers
 - Remove requirement for pre-application communication
 - Focus Grant applications purely on speed and cost/subscriber
 - Competition is the key to better service and lower prices
- Federal policy
 - Separate telephone and Internet in funding programs
 - CAF II giving large amounts for mediocre to poor speeds
 - Causing challenges with programs like MN's Border to Border
 - Customers have separated, or would like to separate those services anyway
 - Roughly half our customers no longer provide home phone numbers

Policy Decisions, cont.

Spectrum is key to Fixed Wireless:

- Support current CBRS rules already adopted
 - Proposed changes by T-Mobile/CTIA will have negative effect on rural MN deployments
- Support TV White Space frequency development

Advantenon

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