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 Whiterspace 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

<table>
<thead>
<tr>
<th>Plan</th>
<th>Price</th>
<th>Downloads</th>
<th>Uploads</th>
<th>Data</th>
<th>Throttling</th>
<th>Fees</th>
<th>Contract</th>
</tr>
</thead>
<tbody>
<tr>
<td>Premium</td>
<td>$39*</td>
<td>4 Mbps</td>
<td>1 Mbps</td>
<td>Unlimited</td>
<td>No</td>
<td>No</td>
<td>No long term contract</td>
</tr>
<tr>
<td>Plus</td>
<td>$59*</td>
<td>10 Mbps</td>
<td>2 Mbps</td>
<td>Unlimited</td>
<td>No</td>
<td>No</td>
<td>No long term contract</td>
</tr>
<tr>
<td>Magnum</td>
<td>$89*</td>
<td>25 Mbps</td>
<td>Unlimited</td>
<td>Unlimited</td>
<td>No</td>
<td>No</td>
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<tr>
<td>Jumbo</td>
<td>$129</td>
<td>100 Mbps</td>
<td>Unlimited</td>
<td>Unlimited</td>
<td>No</td>
<td>No</td>
<td>No long term contract</td>
</tr>
</tbody>
</table>

*Best for limited streaming, best for small families, best for streaming services, best for multiple streaming users.*

[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 1/10\textsuperscript{th} cost of fiber
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 were density supports it
  – Fixed Wireless were 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 competition
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
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

To learn more about Advantenon please contact us at:

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