Creating Demand with MDU's

Panel Presentations and Discussion
Nashville, Tennessee June 13, 2016
Creating Demand with MDU's

**Agenda and Panel Introduction**

**Topic Introduction and Moderator**
John George, Director, Solutions and Professional Services
OFS

**The Future of Connectivity & Recommended Best Practices**
Chris Smith, Sr. Program Manager, Strategic Partnerships
Google

**Experience the Power of Fiber Optics**
Max R. Kipfer, EVP & Regional Manager
Hotwire Communications

**The Value Of Advanced Broadband To MDUs**
Michael C. Render, President and Co-founder
RVA LLC

Q&A
Opportunities
• 80 Million MDU households in Americas
• High density of potential subscribers
• FTTH Service Differentiation
  • Gigabit is just the beginning!

Challenges
• Competition
• Negotiating agreements with owners
• Cost and Speed of Installation
New Technologies Can Speed, Cost Reduce, and Conceal Optical Fiber Installation

Rugged, Ultra-Bend Insensitive Fiber Solutions

- 4.8 mm
- 3.0 mm
- <=0.01 dB loss per corner at 1625nm

Invisible Surface Mount Solutions

- Riser and Hallway – 12 fibers
- In Living Unit – single fiber

Solutions shown above enabled by EZ-Bend® Fiber with 2.5 mm bend radius
The Future of Connectivity & Recommended Best Practices

June 13th, 2016

Chris Smith
Strategic Partnerships
Google Fiber
Connectivity matters more than ever before
Future-proof your property with tomorrow’s speeds.
3 out of 5 residents say fiber Internet makes a building more desirable
53% of residents say high speed Internet access differentiates a property from those without it

Sample data collection and analysis by Nielsen. This was part of a quantitative online survey carried out Nov - Dec 2014 | 1,107 respondents
For purposes of this research: ultra high speed refers to Internet speeds of 50+ MBPS (n=456) | Low Internet speed refers to Internet speeds of 12 - 49 MBPS (n=651)
Qualifying Criteria US 18+ | Reside in multi-dwelling unit | Internet speed 12+ MBPS | Data weighted to reflect the US general ‘tech savvy’ population | Significance testing is performed at 95% confidence level throughout the report
42% of residents said they would move if they lost high speed Internet access at home

Sample data collection and analysis by Nielsen. This was part of a quantitative online survey carried out Nov - Dec 2014 | 1,107 respondents
For purposes of this research: ultra high speed refers to Internet speeds of 50+ MBPS (n=456) | Low Internet speed refers to Internet speeds of 12 - 49 MBPS (n=651)
Qualifying Criteria US 18+ | Reside in multi-dwelling unit | Internet speed 12+ MBPS | Data weighted to reflect the US general 'tech savvy' population | Significance testing is performed at 95% confidence level throughout the report
Prepare your property

This is where you can really make a difference!
In-unit wiring is key!
Competition is Good for Everyone - In-unit wiring is key!

- **Future-proofing for Multiple Providers:**
  - Leave room for spare conduit and equipment
  - Provide enough power outlets for multiple connected devices at structured panel
  - Perform a WiFi signal test and consider additional outlets for future APs

- **Structured Wiring:**
  - Connect all rooms in one central location
  - Use cables that can carry high-speed data

- **It’s all in the Contract:**
  - Understand proposed language about internal wiring
  - Exclusive wiring conflicts with future proofing; recommend planning for multiple provider access
### What does it mean to Future Proof?

<table>
<thead>
<tr>
<th>Material</th>
<th>Fiber or Copper</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pathway</td>
<td>Cable or Conduit</td>
</tr>
<tr>
<td>Wiring</td>
<td>Types of Ethernet Cables: CAT x</td>
</tr>
<tr>
<td>Space</td>
<td>Cable Management and Devices</td>
</tr>
</tbody>
</table>
Fiber vs Copper

**SPEED**

- **COPPER**
  - 10 Mbps
  - 1 movie in 30 minutes

- **FIBER**
  - 1 Gbps
  - 1 movie in 2 minutes
  - 1 Tbps
  - 1 movie in 0.1 seconds

**SIZE**

- **COPPER**: Standard twisted copper wire pairs (400,000)
- **FIBER**: 1 optical fiber

**SAFETY**

- **COPPER**: Safety concerns
- **FIBER**: Safer

**EFFICIENCY**

- **COPPER**: Less efficient
- **FIBER**: More efficient
Benefits of installing a microduct

- **Reusable Pathway**: Provides flexibility during installation.
- **Future proof**: Reduced maintenance. Provides flexibility during installation.
- **Low Cost**: Saves upfront cabling costs and potentially on cut & patch repairs.
Coax & Ethernet Cables

Coax
- <= 10 Mbps
- Chain of devices

Cat 5
- 100 Mbps
- Hub/switch of devices
- Cheaper than Coax
- Obsolete in recent years

Cat 5e
- 1 GB
- “Cat 5 Enhanced”
- Twisted pair cabling
- Ability to traverse distances without being impacted by crosstalk

Cat 6
- 10 GB
- Twisted pair cabling
- Thick plastic casing further reduces crosstalk
- 55m

Today’s Speed

Tomorrow’s Speed
Cable Management and Devices

Source: ctwatchdog, diycentral
Bringing fiber to your property

Key Takeaways for Future Proofing properties:

- Non-binding specifications to prepare your new developments for future
- Flexible agreements
- Microduct pathway, riser space for installations and multiple providers

1. ISP Designs
   Budget and plan for future proofing units with tight specifications. Consider all providers and future managed Wi-Fi.

2. ISP Pathway Construction
   Ensure good construction practices for pathway installations. Perform audits upon completion. Reduce future disruptions to tenants.

3. OSP Drop Construction
   Install extra conduits while trenches are open. Minimal material incremental cost.

4. Service Agreements
   Read your contracts and understand what they mean for your property. Exclusivity can impede your future proofing plans.
Thank you

Chris Smith
chrissm@google.com
Strategic Partnerships

Additional Q/A - from 4:25 to 4:55 - FTTH Hub
Experience the Power of Fiber Optics
Max R. Kipfer, EVP & Regional Manager
Learning Objectives

1. How to market the value of fiber optics to potential tenants
2. The financial benefits of offering bulk services
3. Implementing Fiber-To-The-Unit in ALL of your buildings
Superior Technology
For Tomorrow’s Services

Your Important Task: Education !!

Superior Quality
Fiber optic services have less outages and require less maintenance than coaxial systems.

Exceedingly Faster
Transmits data in the form of light, while copper wire relies on electricity.

Limitless Capacity
Brings more bandwidth than any other technology in the market today.

Extremely Reliable
GPON does not need regeneration or electrical power in order to continue operating, which reduces outages.

Exceptional Security
Does not radiate an electromagnetic field, which makes it impossible to tap into the signal.
You want a ‘Partnership’ with your Service Provider

- Gigabit Speed Internet
- Advanced IPTV Video Technology
- Digital Voice Service
- Smart Home Application Technology
- HD & 4K
- DAS Product
- Public Safety

Stay informed on technology advancements.
RVA Market Research:

- **Internet service**: one of the most vital expected ‘Amenity’ for condominium owners/renters.

- **Definite parallel**: Total resident satisfaction & access to fiber infrastructure.

- **Lower resident churn rates**: Unmatched internet speed options & campus-wide connectivity.
Accelerate Sales
Create Gigabit Community
Future-proof the Community Infrastructure
Upgrade Community Amenities
Provide a Quality Service for YOUR Residents
Financial Benefits

- Buying services in bulk = DISCOUNT $$$
- Accelerate occupancy / reduce churn
- Reduce operating costs

Bulk Packages Are Customizable

- Building automation options
- Enhanced Telecom services
Service Delivery to YOUR Units

GPON/ONT Technology
GPON/ONT Technology

- Power switch
- Digital Voice Telephone Ports
- Ethernet Ports (IPTV/Internet service)
- Power Connector
- USB
- WLAN
- WPS
- Reset

SIZE: 220(w) x 180(d) x 40(h) mm
Max R. Kipfer
Hotwire Communications
EVP & Regional Manager
mkipfer@hotwiremail.com
The Value Of Advanced Broadband To MDUs

Michael Render,
President and Co-founder, RVA LLC
Research Methodology

Over 2,000 MDU Residents

Over 2,000 Single Family Residents – For Comparison
More Need
Online Activity Now Absolutely Foundational To MDU Daily Life

- Each person averages 5.1 hours online at home per day.
- There are 5.5 reported online devices in the home. (Smart appliances now entering)
- Second screens are used 29% of the time when watching TV.
- Those under age 35 get 61% of their video content online.
GoodBroadbandIsNowTheNumberOneApartmentAmenity

- Very high speed/reliable broadband: 81%
- Washer/dryer in unit: 76%
- Balcony or patio: 69%
- Cable television: 67%
- Security monitoring for complex: 65%
- Choice of multiple broadband providers: 60%
- Covered parking: 56%
- Alarm system in unit: 46%
- Outdoor recreation on grounds: 41%
- Workout facilities: 36%
- Pool: 34%
- Fireplace: 17%
Good Broadband Is Tied For First As A Condominium Amenity

<table>
<thead>
<tr>
<th>Feature</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Washer/dryer in unit</td>
<td>82%</td>
</tr>
<tr>
<td>Very high speed/reliable broadband</td>
<td>81%</td>
</tr>
<tr>
<td>Cable television</td>
<td>74%</td>
</tr>
<tr>
<td>Balcony or patio</td>
<td>72%</td>
</tr>
<tr>
<td>Security monitoring for complex</td>
<td>68%</td>
</tr>
<tr>
<td>Covered parking</td>
<td>66%</td>
</tr>
<tr>
<td>Choice of multiple broadband providers</td>
<td>61%</td>
</tr>
<tr>
<td>Outdoor recreation on grounds</td>
<td>48%</td>
</tr>
<tr>
<td>Alarm system in unit</td>
<td>47%</td>
</tr>
<tr>
<td>Pool</td>
<td>38%</td>
</tr>
<tr>
<td>Workout facilities</td>
<td>37%</td>
</tr>
<tr>
<td>Fireplace</td>
<td>21%</td>
</tr>
</tbody>
</table>
More Performance
FTTH Customers Report About Half The Personal Service Time

1.4 FTTH calls annually versus 2.0 for other broadband

1.0 FTTH reboots monthly versus 2.0 for other broadband
MDU FTTH Users Have The Highest Blended Broadband Speed

- Gigabit Fiber: 305.0
- All Fiber: 36.0
- Cable: 16.4
- Wireless: 5.8
- DSL: 4.8
More Value
FTTH Users Are More Likely To Recommend Their Service To Friend

Gigabit Fiber: 89%
All Fiber: 74%
Cable: 60%
DSL: 53%
Wireless: 48%
Those With FTTH Are Less Likely To Have Heard Of Better Broadband

- DSL: 32%
- Wireless: 26%
- Cable: 23%
- All Fiber: 14%
- Gigabit Fiber: 5%
FTTH Users Are More Likely To Be Satisfied With Their MDU Property

- FTTH: 77%
- Other Broadband: 65%
FTTH Adds MDU Home Value

*Discount Needed To Consider A Similar Non FTTH Home*

- **MDU Condo Own** ($8528/ $300,000) 2.8%
- **MDU Rent** ($80/ $1000) 8.0%
- **Home price** ($9,734/ $300,000) 3.2%
### FTTH Adds MDU Business Value

**MDU Rental Example**

<table>
<thead>
<tr>
<th>Financial Data from 2013 Survey</th>
<th>Changes Re FTTH amenity</th>
<th>Financial Data assuming FTTH amenity</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TURNOVER</strong></td>
<td>54%</td>
<td>50%</td>
</tr>
<tr>
<td><strong>REVENUES</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gross Potential rent</td>
<td>$11,278</td>
<td>$11,954</td>
</tr>
<tr>
<td>Rent Revenue collected</td>
<td>$10,224</td>
<td>$10,884</td>
</tr>
<tr>
<td>Other revenue</td>
<td>$827</td>
<td>$827</td>
</tr>
<tr>
<td>Total Revenue</td>
<td>$11,051</td>
<td>$11,711</td>
</tr>
<tr>
<td><strong>OPERATING EXPENSES</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Salaries and Personnel</td>
<td>$1,171</td>
<td>$1,171</td>
</tr>
<tr>
<td>Insurance</td>
<td>$250</td>
<td>$250</td>
</tr>
<tr>
<td>Taxes</td>
<td>$1,137</td>
<td>$1,137</td>
</tr>
<tr>
<td>Utilities</td>
<td>$535</td>
<td>$535</td>
</tr>
<tr>
<td>Management Fees</td>
<td>$352</td>
<td>$352</td>
</tr>
<tr>
<td>Administrative</td>
<td>$259</td>
<td>-$5</td>
</tr>
<tr>
<td>Marketing</td>
<td>$163</td>
<td>-$33</td>
</tr>
<tr>
<td>Contract Services</td>
<td>$266</td>
<td>$266</td>
</tr>
<tr>
<td>Repair and Maintenance</td>
<td>$457</td>
<td>-$9</td>
</tr>
<tr>
<td>Total Operating Expenses</td>
<td>$4,590</td>
<td>$4,543</td>
</tr>
<tr>
<td><strong>Net Operating Income</strong></td>
<td>$6,461</td>
<td>$7,168</td>
</tr>
<tr>
<td><strong>Value of Unit (8 X NOI)</strong></td>
<td>$51,688</td>
<td>$57,344</td>
</tr>
</tbody>
</table>

75% of the value advantages assumed as a rent increase.

50% of the cost advantages assumed as a cost decrease.

$707 Dollar or 11% Increase in Net Operating Income
Augment These Advantages
Fiber-to-the-Home Broadband Enhances The Consumer MDU Rental/Purchase Decision

- **Need**: MDU Residents have a tremendous need for better broadband. (Remind them)
- **Awareness**: MDU Residents talk about a property with better broadband. (Help spread word of mouth/social)
- **Rational Interest**: Fiber-to-the-home broadband has quantifiable benefits to MDU Living. (Make more visible to the prospect)
- **Emotional Interest**: Fiber-to-the-home broadband has emotional benefits to MDU living. (Bring this home to the prospect)
- **Value / Purchase**: Fiber broadband has value – to the consumer and the property owner. (Take advantage of it)
Thank you for attending. Please remember to complete the online evaluation of this session in the mobile app by selecting the bar graph icon.
John George
Director, Solutions and Professional Services, OFS
johngeorge@ofsoptics.com 770-314-0778

John George has served with AT&T, Lucent Technologies and OFS in systems engineering, applications engineering, marketing, and manufacturing. He currently directs the Solutions and Professional Services group for OFS’s optical fiber, cable, connectivity, and solutions business. John has published and presented over 30 papers on fiber optics and FTTH. He facilitated the development of numerous standards including 10 Gb/s Ethernet, Ethernet in the First mile, OM-3 optical fiber, and small form factor optical connectivity. John has been an active member of the Fiber to the Home (FTTH) Council in various roles from its founding year of 2001, serving on its board of directors since 2008, and in 2010 received the Council’s Photon Award for his work helping to create the conference educational program. John has Bachelor of Science in Mechanical Engineering from Georgia Tech and a Master of Science in Engineering Administration from Virginia Tech, and 5 patents.
Creating Demand with MDU’s

Panelists

Chris Smith
Sr. Program Manager, Strategic Partnerships, Google

Mr. Smith currently heads the Strategic Partner Management team for Google Fiber as a Sr. Program Manager, and oversees National MxU Strategic Partnerships. Prior to joining Google, Chris spent 18 years in the telecommunications industry and acquired comprehensive, multi-faceted industry experience from network planning, fiber-to-the-home design and construction, and building Internet service provider, long haul, middle-mile, cellular, microwave, and managed wi-fi networks. Throughout his career, Chris has held multiple executive leadership positions ranging from business development, engineering, supply chain, construction, and purchasing, for a leading fiber-to-the-home design/build firm. He also has served as a key contributor on several municipal network deployment engagements from concept to completion, designed fiber for 500,000 passings in the United States, and consulted for major telecommunications clients in more than 12 countries. A lifelong innovator, Chris holds several patents, a BS in Telecommunications Management and served on the FTTH Council Technology & Government Relations Committees.
Max R. Kipfer
Regional Vice President – Mid Atlantic, Southeast, Hotwire Communications

Max R. Kipfer is one of America’s pioneers in the development of Fiber to the Home (FTTH) broadband networks having built several of the nation’s first residential FTTH communities in northern Virginia in 2001. Kipfer has been with Hotwire Communications and a predecessor company for over 10 years. He is a regular speaker at industry events and served for 3 years on the FTTH Council Board of Directors including one year as its Chairman. In his current role Max manages Hotwire’s Mid-Atlantic and Southeast regions including assets in Georgia, Virginia and North & South Carolina. Kipfer earned a BA from Valparaiso University. He and his wife Bridget reside near Raleigh, NC.
Michael Render

Michael Render is president and founder of RVA LLC. RVA is a nationally known market research firm with a 30 year history of diverse market research service to a wide range of firms ranging from well known Fortune 100 corporations to promising start-ups. RVA is North America’s source for the most comprehensive and detailed data on advanced broadband and fiber-to-the-home services, and has followed this market since 2002. Render is frequently quoted in national trade and general interest publications on the subject. He has made numerous presentations about FTTH to companies, industry groups, and government agencies, both in the US and Abroad. For his work in FTTH market research, he received the 2007 Star award from the Fiber to the Home Council.