Light Up Every MDU Subscriber
Gigabit Broadband without Rewiring

- **First Thing** – Want to know how to provide your brownfield Multi-Dwelling / Tennent Unit(MDU/MTU) customers super-high-speed broadband, **without the rewiring**?
    - If "Yes", then you are in the right place today

- We applaud you all for getting as much bandwidth as you can **TO** the MDU/MTU
    - Any way you can, and of course ….
    - Fiber is your best choice

- **BUT –** we understand the difficulty of extending that bandwidth **THROUGH** the MDU/MTU to its subscribers
    - Because of what's typically found inside → or

- The Positron GAM extends the power of your fiber into the Brownfield MDU/MTU without the extra cost, time & mess of rewiring

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Positron G.hn Access Multiplexor (GAM) Presentation

- Who is Positron

- The Innovative G.hn Technology used by the GAM

- The GAM - Why to use it and Where

- The GAM Solution Family

- GAM Application Examples

- GAM Software, Integration & Technology Partners

- Summary & Questions

Who is Positron?

Positron develops and manufactures, in Montreal Canada, carrier grade telecommunications Metro Ethernet Forum (MEF) and CE 2.0 compliant equipment used by thousands of customers since 1970.

Positron Access Solutions Receives the BTR 4 Diamond Rating in 2022. Market-leading GAM recognized as one of the top products for the cable industry by the BTR Diamond Technology Review.

Pierre Trudeau, President and CTO of Positron Access, was selected on the 2021 list of "**Top 50 Broadband Influencers, Innovators and Disrupters who are Connecting the World**" (Informa Tech)

Positron Access was recently selected as a **Finalist** in the category of '**Fixed Network Evolution**' for a **2021 Glotel** (Global Telecoms) Award for the GAM

GAM

G.hn Technology & Benefits

What is the Technology We've Chosen and Why?

- **G.hn** stands for **Gigabit Home Networking**, developed under the ITU-T Standardization Sector (G.9660 family)

  - March 2016 ITU-T extended specification to include signaling over telephone wire and coax to provide data rates of up to 2 Gbps (Wave 2)

- **G.hn** supports Dynamic Transmit Allocation (cDTA / iDTA) and provides unparalleled real-time US/DS Gigabit performance per network speed tests

- **G.hn** enables Gigabit services over existing telephone wire or COAX with installation & activation in hours - not weeks!

- Wave 3 **G.hn** chipsets planned for 2024-2025 – support 5 Gbps on copper twisted pair, 10 Gbps on Coaxial facilities.

- Positron has invested significant resources into improving the standard **G.hn** chipset, solution value and capabilities:

  - Improved **G.hn** VectorBoost capabilities for copper pair applications

  - Built in a non-blocking Ethernet Switch to ensure performance

 - *OMCI Integration underway with major PON manufacturers*

G.hn Throughput vs. Distance - G.hn SISO, G.hn MIMO
CAT3 Telephone Wiring (24 AWG / 0.51 mm)
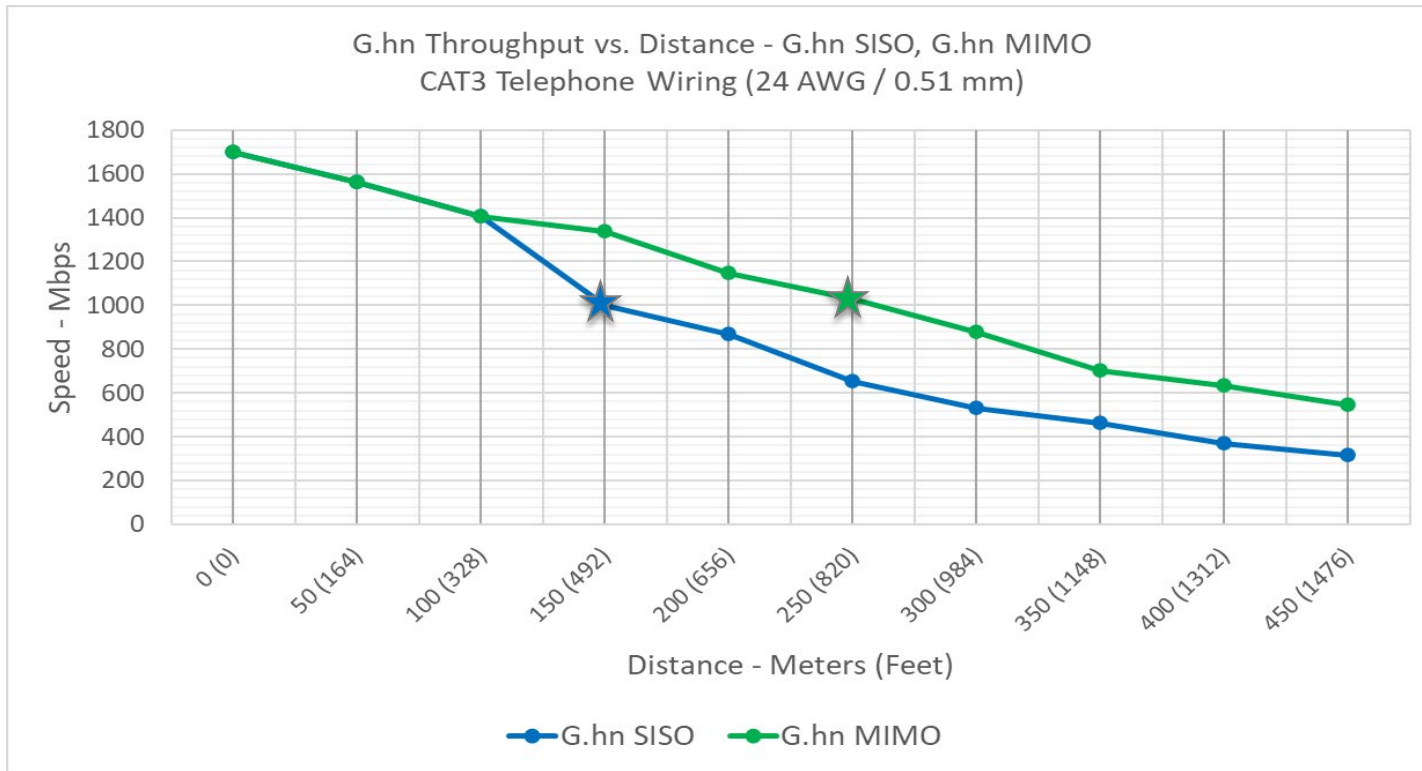
- G.hn Wave-2 significantly outperforms G.fast

- Gbps speeds to 150 meters / 450+ feet on CAT3 single pair (SISO)

- Gbps Speeds to 250 meters / 750+ feet on CAT3 2-pair (MIMO)

Performance Using Coaxial Facilities

G.hn Throughput vs. Distance - RG-59, RG-11 & RG-6
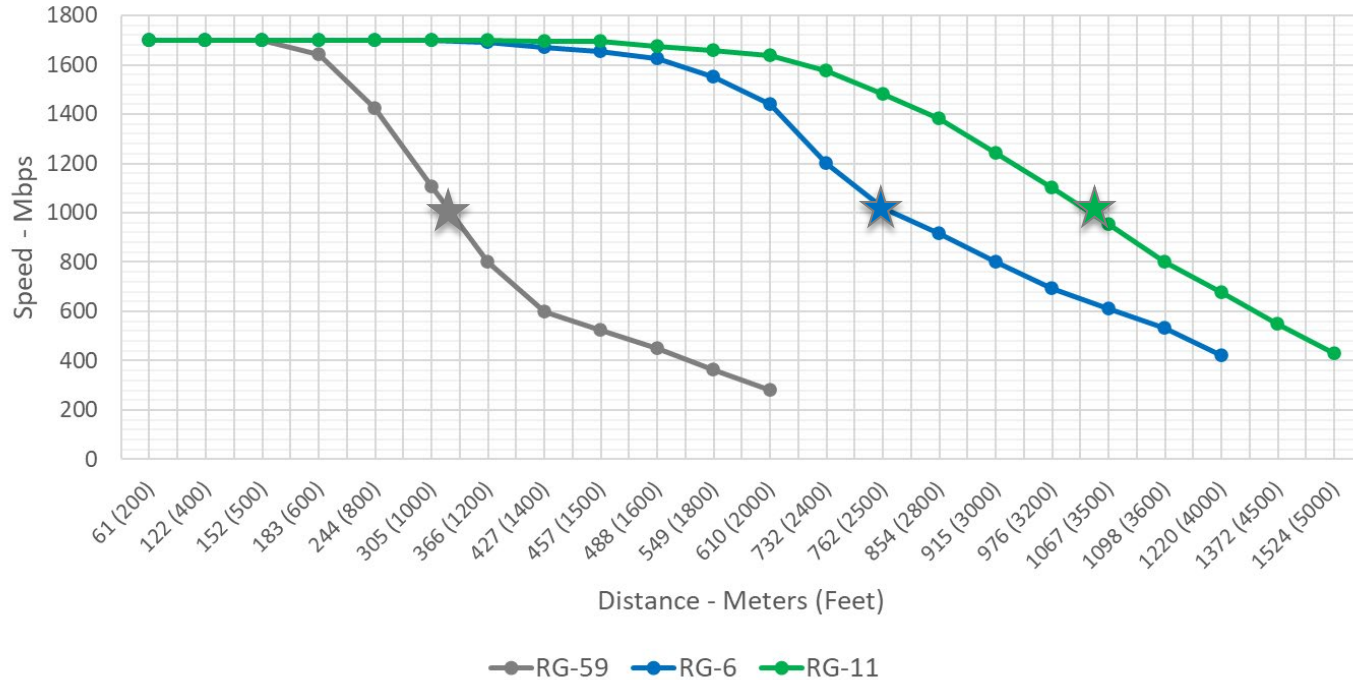
- G.hn takes advantage of Coaxial cable properties (Supports Splitters)

- Faster speeds over longer distances

- Beats DOCSIS MoCA (rate/reach, symmetry, dynamic b/w usage)

- Much less expensive and easier to manage than CMTS

- Designed for the future: 8k streaming, gaming, IoT

- Cohabitates with any non-DOCSIS broadcast video (video insertion)

8

GAM

Why to use it and Where

MDU/MTU Deployment Challenges

Bringing Fiber to each Door in Brownfield MDUs <u>breaks many Business Cases</u>

- **Regulatory: How will Government MDU Policy Changes Impact your Business?**
  - The US FCC Ruling restricts Exclusive Access Agreements and Sale-and-Leaseback Practices
  - It also rules that the landlord, not the service provider, owns all inside wiring (twisted pair, coax, fiber)

- **Cost/Time/Mess: How do Rewiring complexities impact your Business?**
  - Significant time needed to rewire for Fiber or Ethernet to the Unit
  - Costs and service disruption, even Asbestos, are key issues to address for these projects
  - All inside wiring ultimately becomes the landlord's asset rather than the installer/service provider

- **Profitability & Pay-back Period: What's your minimum required Penetration Rate to be successful?**
  - Rolling trucks repeatedly to hook up new subscribers is not a recommended or profitable option
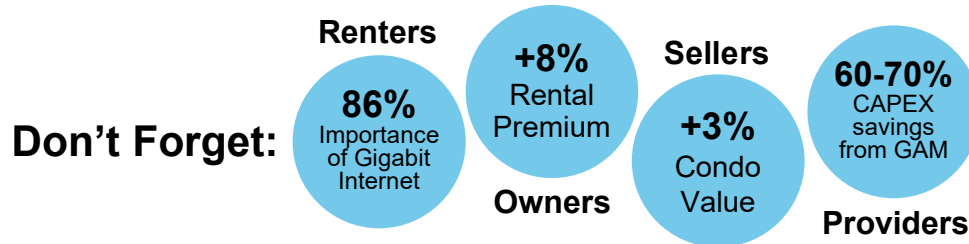 - Rewiring for everyone for less than 100% take rate is not cost effective – the GAM eliminates rewiring

- **The GAM Meets Tenant Broadband Expectations (Symmetric Service)**
  - More UPSTREAM bandwidth now demanded than ever before -
- **The GAM Leverages Existing Brownfield MDU Wiring**
  - Improve Time to Market and ROI: install in hours with no construction
  - Minimize needed take rate for profitability
  - Differentiate Services with scalable solutions and **Reduce Churn**
- **The GAM Increases Real Estate Values for Property Owners**
  - Upgrade a Property's *WiredScore** or *ROVR* Score with better broadband
  - Fiber Capability Extension: 100M, 500M, 1Gbps
- **The GAM Increases IRR, Optimizes TCO, Reduces CAPEX & Maximizes ROI**
  - It's WIN / WIN / WIN for the Property Owner / Operator / Subscriber

*Rollo Gwyn-Jones, global director of marketing for WiredScore, says several issues impact a MDU's broadband quality.
"Digital connectivity is not just about speed. It's about resilience, reliability and price."

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- Consistent Global Growth of MDUs

- MDU % of all living units doubled in the past 7 years – tenants demand high speeds

- Townhouses, garden style, mid-rise and high-rises are reshaping market

- Mixed business/residential usage common

Don't Forget:

Renters
86% Importance of Gigabit Internet

+8% Rental Premium
Owners

Sellers
+3% Condo Value

60-70% CAPEX savings from GAM
Providers

- **Project Waves**
  - Hollins House in Baltimore, Maryland, provides housing for low-income seniors and people with disabilities.
  - Project Waves, one of the only non-profit ISPs in the country, offers free 1 Gbps internet service to Hollins House residents.

- **Montgomery County**
  - Main Street Connect is a new apartment complex in Montgomery County, Maryland
  - Offering symmetrical 50-500 Mbps internet services and digital training for low-income and special-needs residents via a partnership with the county government's Department of Technology Services.

- Provide high bandwidth solutions as per MEF CE 2.0 (E-LINE / E-LAN)

- No need to trench fiber to each business unit, through parking lots, etc…

- Rapidly accelerate business service delivery (instant on via existing copper twisted pairs or coaxial facilities)

- Fiber into the telecom room, copper or coax from there to every floor

- Gigabit Service to every building on campus without new fiber

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- Hotels and resorts have plenty of inside wiring (Coax, and CAT3)

- Running fiber or CAT6 to every room requires an expensive remodel

- The Positron GAM and POE endpoints are ideal solutions for this application
  - Native support for Wi-Fi devices
  - Personal Area Network Features

- Leverage existing facilities to provide premium broadband to all guests

GAM

Solutions Family

- Copper Twisted Pairs or Coax
- Every G.hn port is 1.7 Gb
- Every Subscriber may have symmetric Gb profile
- Transport / Backhaul Agnostic
- Built-in Non-Blocking Ethernet Switch
- Small, Medium and Large Applications
- Indoor Rack Mount or Outdoor Hardened, Multiple Power Options

Introducing the Positron Access GAM Portfolio

Indoor GAM

GAM-12-M

GAM-24-M

GAM-12-C

GAM-24-C
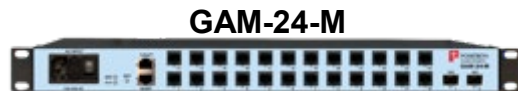
Outdoor GAM

GAM-4-MX   GAM-4-CX
GAM-4-MRX   GAM-4-CRX

GAM-8-MX   GAM-8-MVX
GAM-8-MRX   GAM-8-MDVX

G1000's

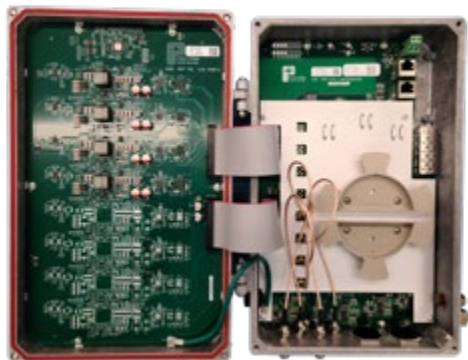G1001-M
G1001-MP
G1001-MR
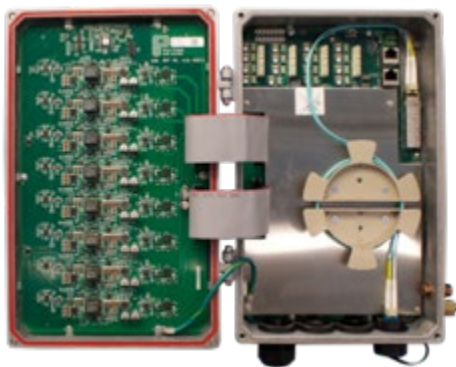G1002-M
G1002-M+
G2002-M+

G1001-C
G1001-CR
G1002-C
G1002-C+

M indicates MIMO support (Copper)   **R** indicates Reverse Power Feed
C indicates Coaxial support   **X** indicates Outdoor (IP68) Enclosure
D indicates DM Mode for +/- 190- VDC   **V** indicates support for +/- 190V Feed

Outdoor GAM

GAM-4-CRX

GAM-8-MRX

Flexible Mounting Bracket

Strand-Mount Option

Dimensions: 8" W x 12" H x 3" D
(200 mm W x 300 mm H x 75 mm D)
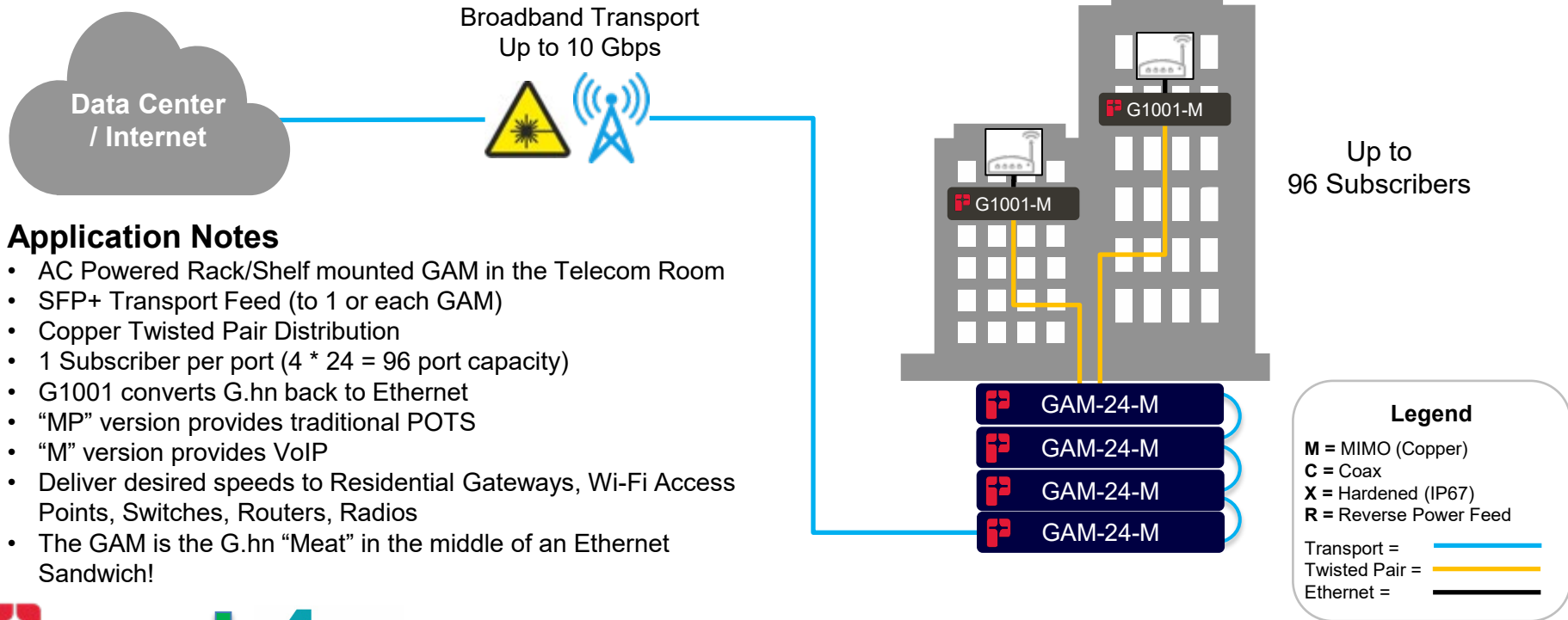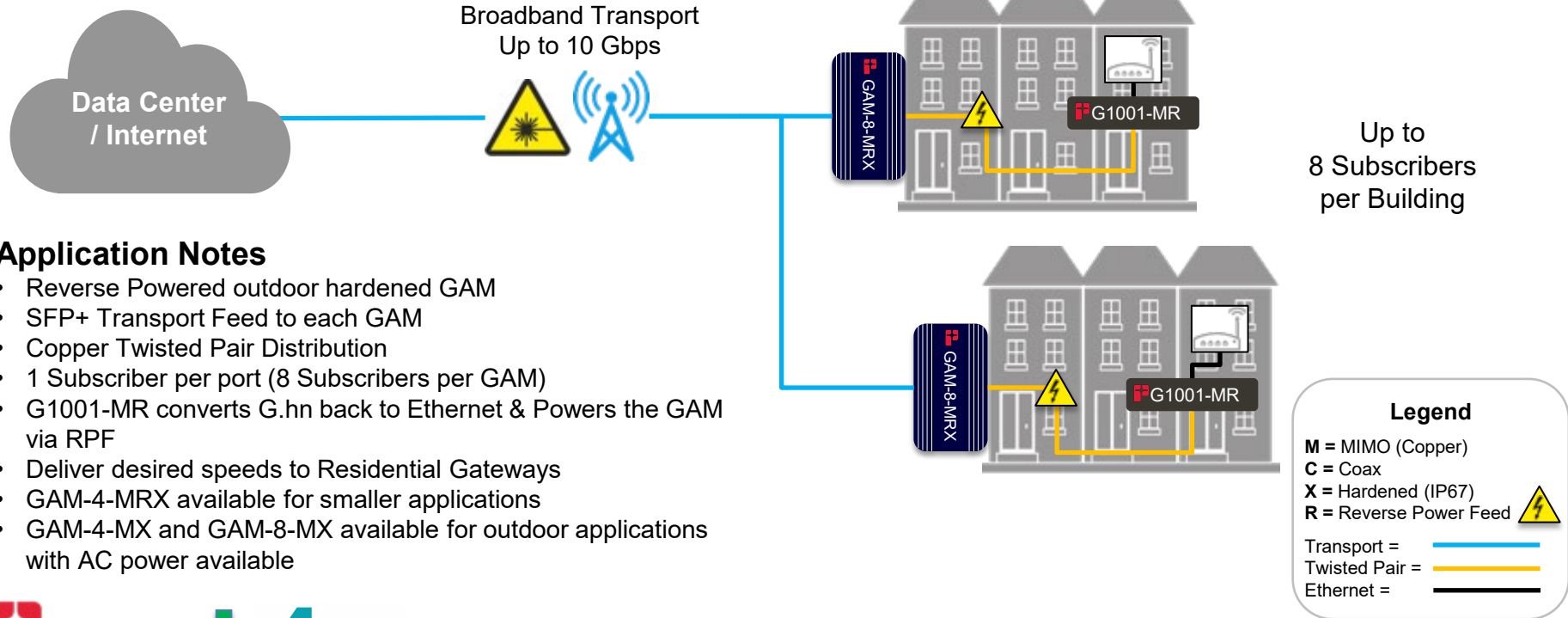
GAM

Application Network Diagrams

GAM-24-M + G1001-M / MP for 96 Subscribers

Broadband Transport
Up to 10 Gbps

Data Center / Internet

G1001-M

G1001-M

Up to 96 Subscribers

GAM-24-M

GAM-24-M

GAM-24-M

GAM-24-M

Application Notes

- AC Powered Rack/Shelf mounted GAM in the Telecom Room
- SFP+ Transport Feed (to 1 or each GAM)
- Copper Twisted Pair Distribution
- 1 Subscriber per port (4 * 24 = 96 port capacity)
- G1001 converts G.hn back to Ethernet
- "MP" version provides traditional POTS
- "M" version provides VoIP
- Deliver desired speeds to Residential Gateways, Wi-Fi Access Points, Switches, Routers, Radios
- The GAM is the G.hn "Meat" in the middle of an Ethernet Sandwich!

Legend

M = MIMO (Copper)
C = Coax
X = Hardened (IP67)
R = Reverse Power Feed

Transport =
Twisted Pair =
Ethernet =

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GAM-8-MRX + G1001-MR for 8 Subscribers per GAM & Reverse Power

Broadband Transport
Up to 10 Gbps

Data Center / Internet

GAM-8-MRX

G1001-MR

Up to
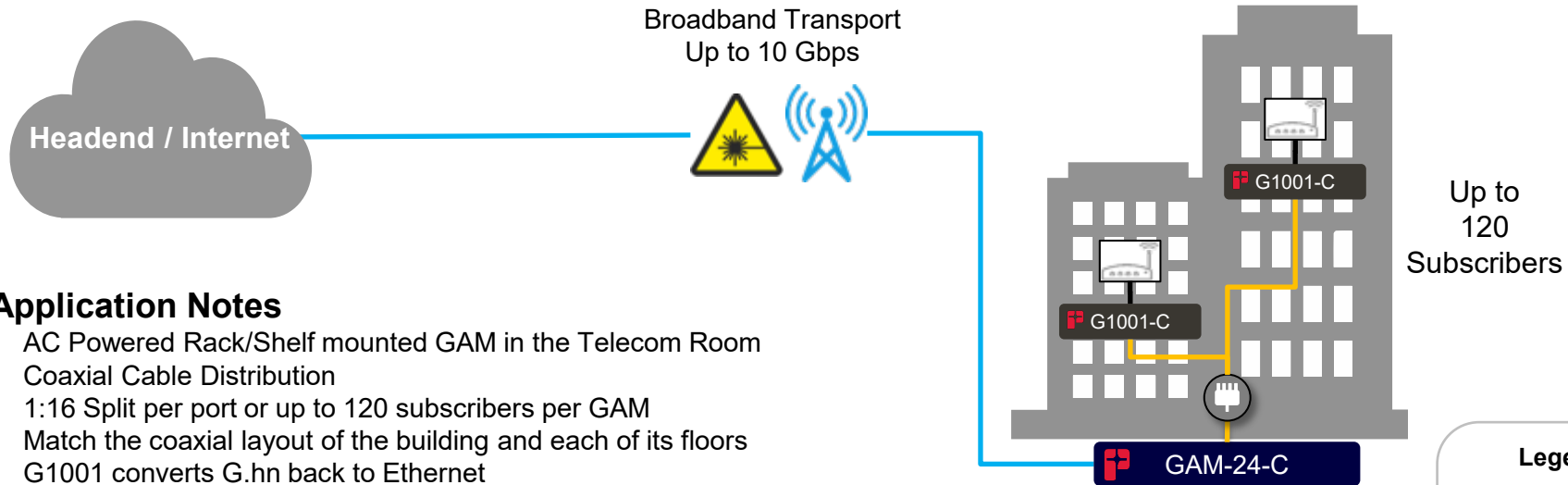8 Subscribers
per Building

GAM-8-MRX

G1001-MR

Application Notes

- Reverse Powered outdoor hardened GAM
- SFP+ Transport Feed to each GAM
- Copper Twisted Pair Distribution
- 1 Subscriber per port (8 Subscribers per GAM)
- G1001-MR converts G.hn back to Ethernet & Powers the GAM via RPF
- Deliver desired speeds to Residential Gateways
- GAM-4-MRX available for smaller applications
- GAM-4-MX and GAM-8-MX available for outdoor applications with AC power available

Legend

M = MIMO (Copper)
C = Coax
X = Hardened (IP67)
R = Reverse Power Feed

Transport =
Twisted Pair =
Ethernet =

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GAM-24-C + G1001-C for 120 Subscribers

Broadband Transport
Up to 10 Gbps

Headend / Internet

G1001-C

G1001-C

GAM-24-C

Up to 120 Subscribers

Application Notes

- AC Powered Rack/Shelf mounted GAM in the Telecom Room
- Coaxial Cable Distribution
- 1:16 Split per port or up to 120 subscribers per GAM
- Match the coaxial layout of the building and each of its floors
- G1001 converts G.hn back to Ethernet
- Deliver desired speeds to Residential Gateways, Wi-Fi Access Points, Switches, Routers, Radios
- The GAM is the G.hn "Meat" in the middle of an Ethernet Sandwich!

Legend

M = MIMO (Copper)
C = Coax
X = Hardened (IP67)
R = Reverse Power Feed

Transport =
Coax =
Ethernet =

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GAM-4-CRX + G1001-CR for 4-64 Subscribers per GAM & Reverse Power

Broadband Transport
Up to 10 Gbps

Data Center / Internet

GAM-4-CRX

G1001-CR

Up to
64 Subscribers
per Building

Application Notes

- Reverse Powered outdoor hardened GAM
- SFP+ Transport Feed to each GAM
- Coaxial Cable Distribution
- 1:16 Split serves up to 64 subscribers for each GAM
- Match the coaxial layout of the building and each of its floors
- G1001-CR converts G.hn back to Ethernet & Powers the GAM via RPF
- Deliver desired speeds to Residential Gateways
- GAM-4-CX available for outdoor applications with AC power available

Legend

M = MIMO (Copper)
C = Coax
X = Hardened (IP67)
R = Reverse Power Feed

Transport =
Coax =
Ethernet =

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This webinar contains only the basics

When you are ready, we can discuss the GAM in much more detail

- The GAM is more than a "box"; it is a complete network solution (ask us about daisy chain configurations for campus and outdoor hospitality apps)

- The GAM supports POE in various ways over Coax and Copper Twisted Pair

- The GAM supports gaming with low latency

- The GAM supports IPTV, Streaming, and cohabitation of satellite & roof-top broadcast video

- Got to get rid of VDSL? Ask us about the GAM's VDSL migration plan

- Use a major vendor's XGSPON? Ask us about the OMCI work we're doing with the GAM

- Also, we have a great GAM Try-&-Buy Program so you can Verify the performance for yourselves without risk

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GAM

Software &
Subscriber
Management

UI & EMS
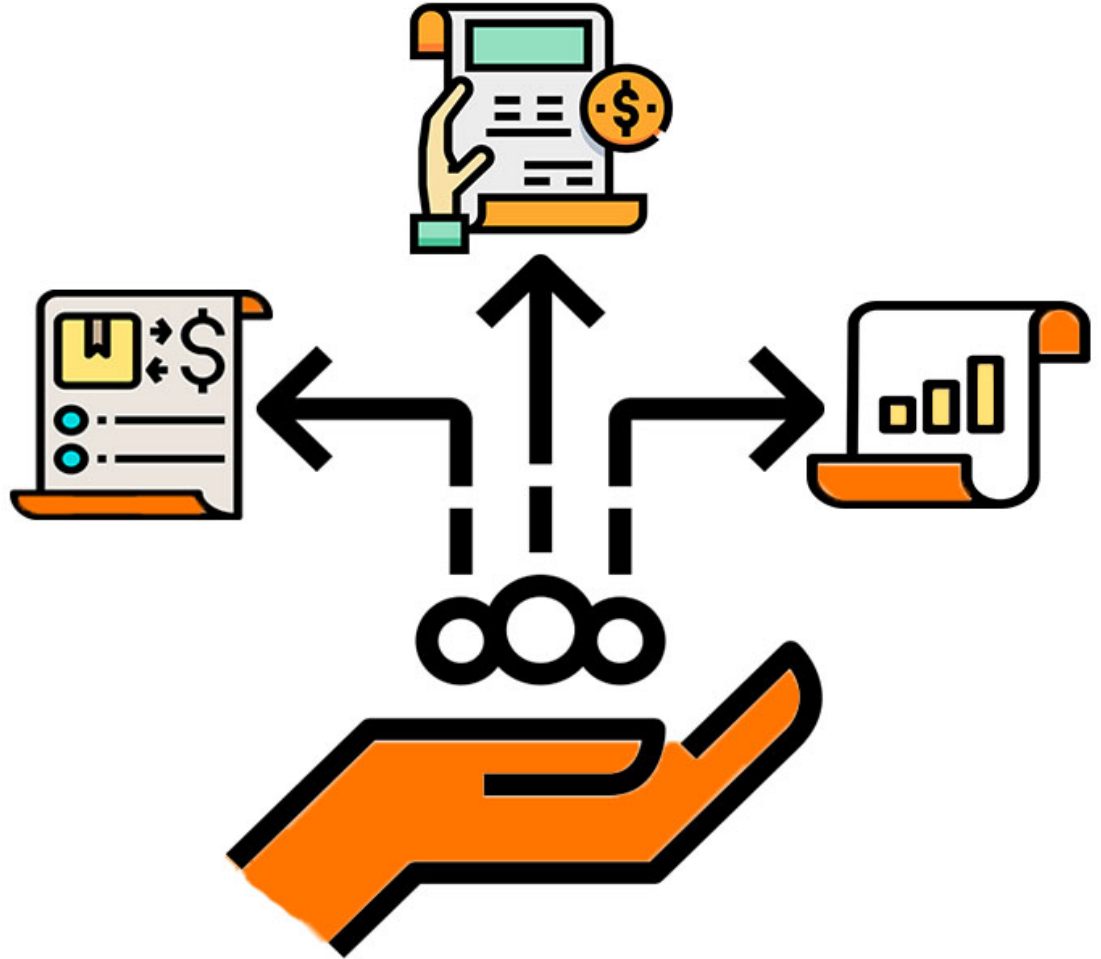
Positron Software Expertise for Every Service Provider

- **GAM** Solutions are enabled through our high-quality G.hn Software:
  - Command Line Craft Interface (Standard Ethernet Router Syntax) – each GAM
  - Web based Graphical User Interface – each GAM
  - VIRTUalized Optimized Services & Operation (VIRTUOSO) – Multi-GAM Element Management System (EMS)

- **Got your own Back Office?**
  - JSON APIs available
  - SNMP APIs available

- **Need a Partner (XGSPON OMCI, Inventory, Billing, Provisioning)?**
  - Calix   NETS   eti   sonar

Web Graphical User Interface (GUI)
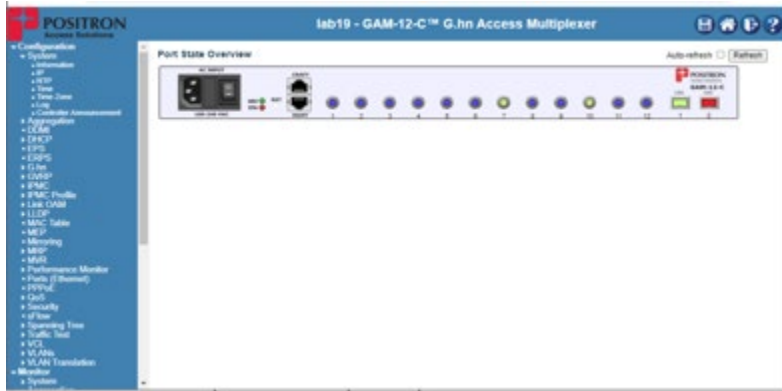
←Access to each GAM

Diagnostics→

← Monitor Service

Configure G.Hn Ports →

Summary

- The Positron **GAM** provides Accelerated Service Delivery combined with Significant Cost Savings:

  - **_Eliminate_** the cost, disruption, and inconvenience of messy rewiring projects & inadequate legacy technologies & by doing so – Eliminate Churn

  - **_Extend_** the reach of your Fixed Wireless and Fiber transport without expensive construction projects, permits, new AC drops, or costly asbestos removal

  - **_Exceed_** the desires of your broadband subscribers in terms of **_Speed_**, **_Simplicity_**, and **_Reliability_**

  - **_Enable_** revenue acceleration with outstanding ROI

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Questions?

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