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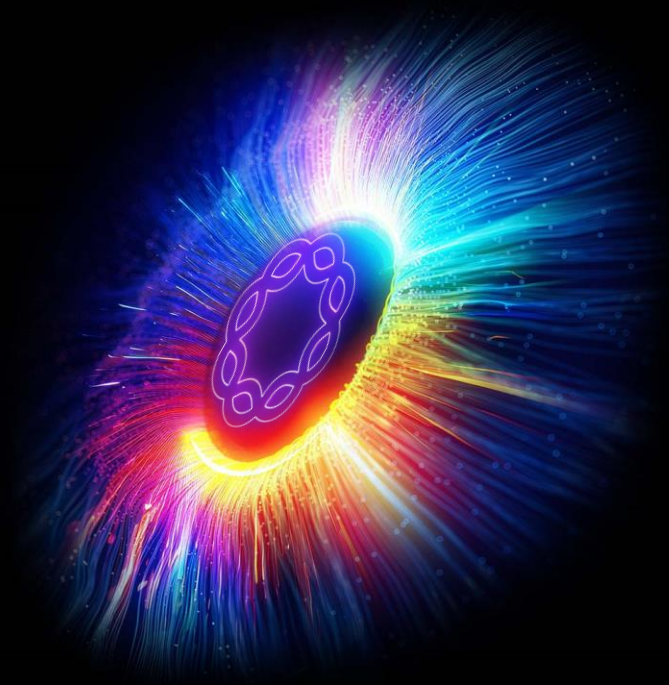


Monetizing the Middle Mile
Broadband Design for the Future

Jack Breeding
Ribbon IP Optical

Terry Chevalier
Sunstone Associates

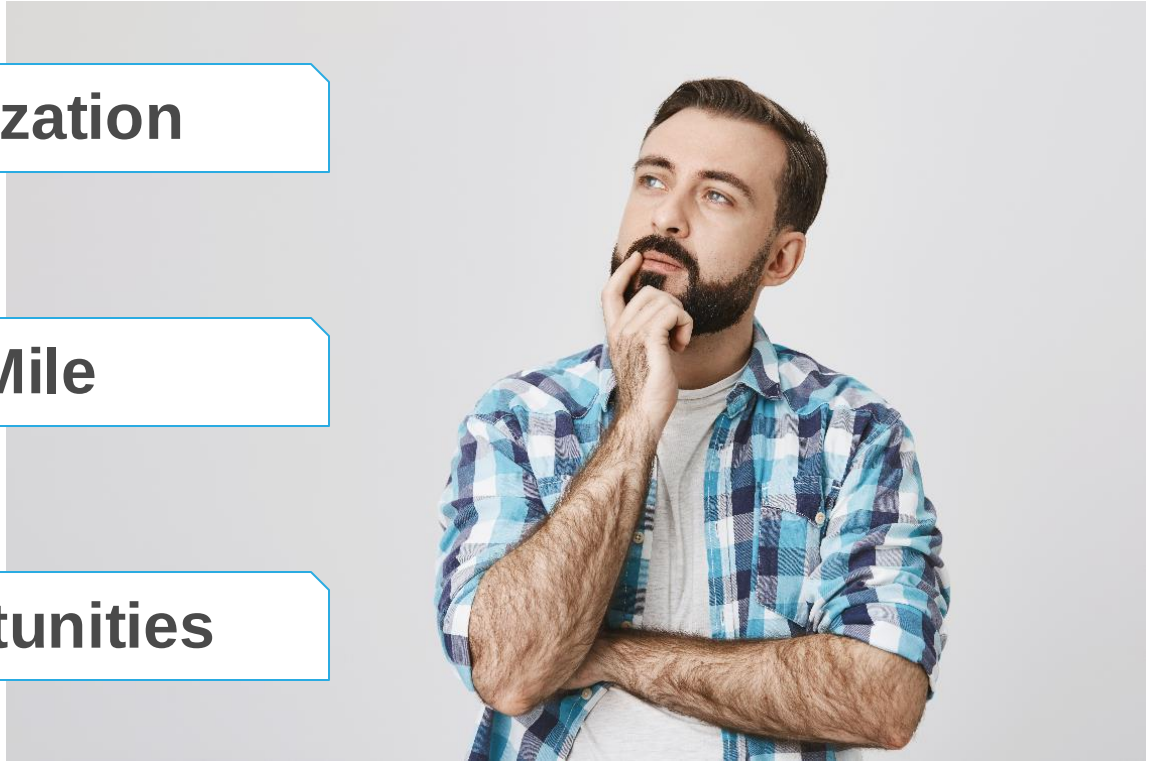
ribbon INSIGHTS

Why this topic?

The Case for Monetization

The Role of Middle Mile

Monetization Opportunities



The Case for Monetization

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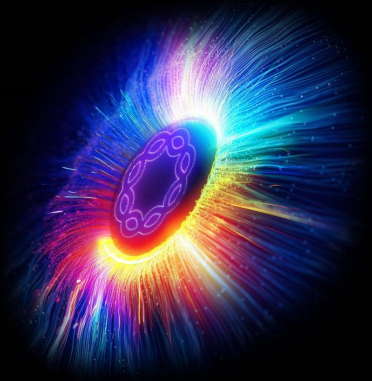
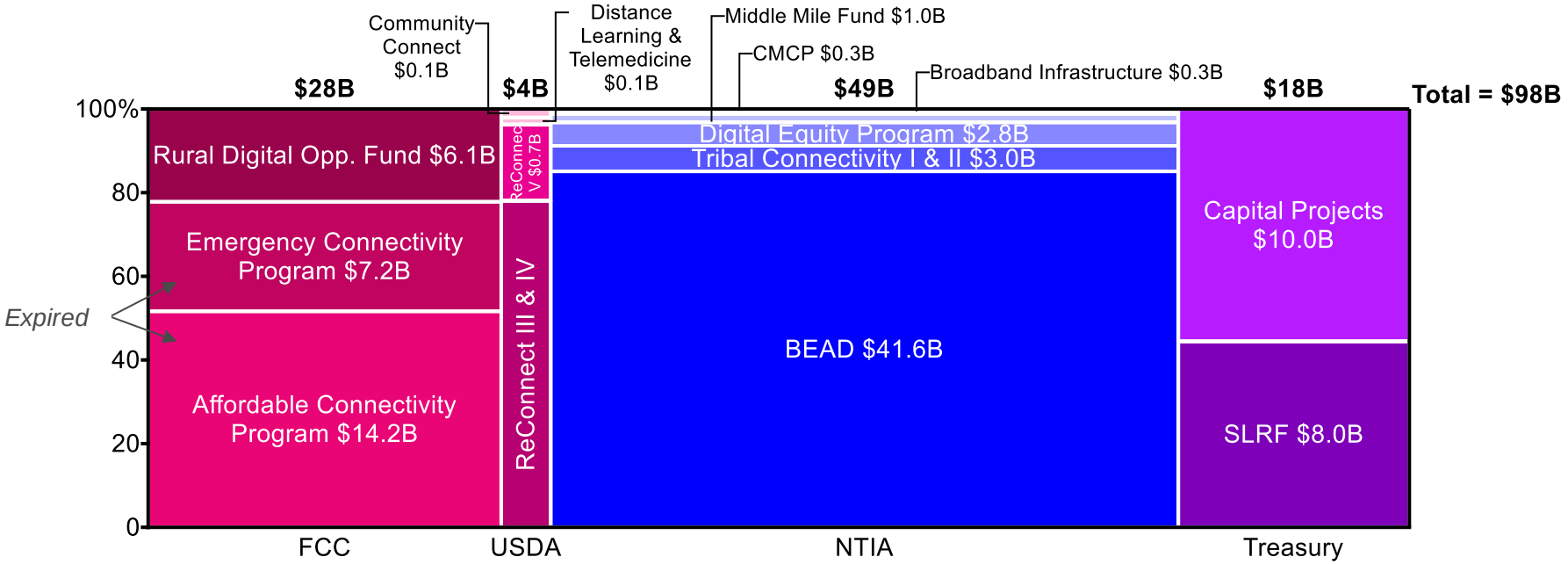


Nearly $100B in grant funding … and nearly all of it is CapEx

"New" Broadband Funding Programs to Close the Digital Divide



Nearly two-thirds of this "new" funding does not provide operating expense support

BEAD is a Land Grab Moment

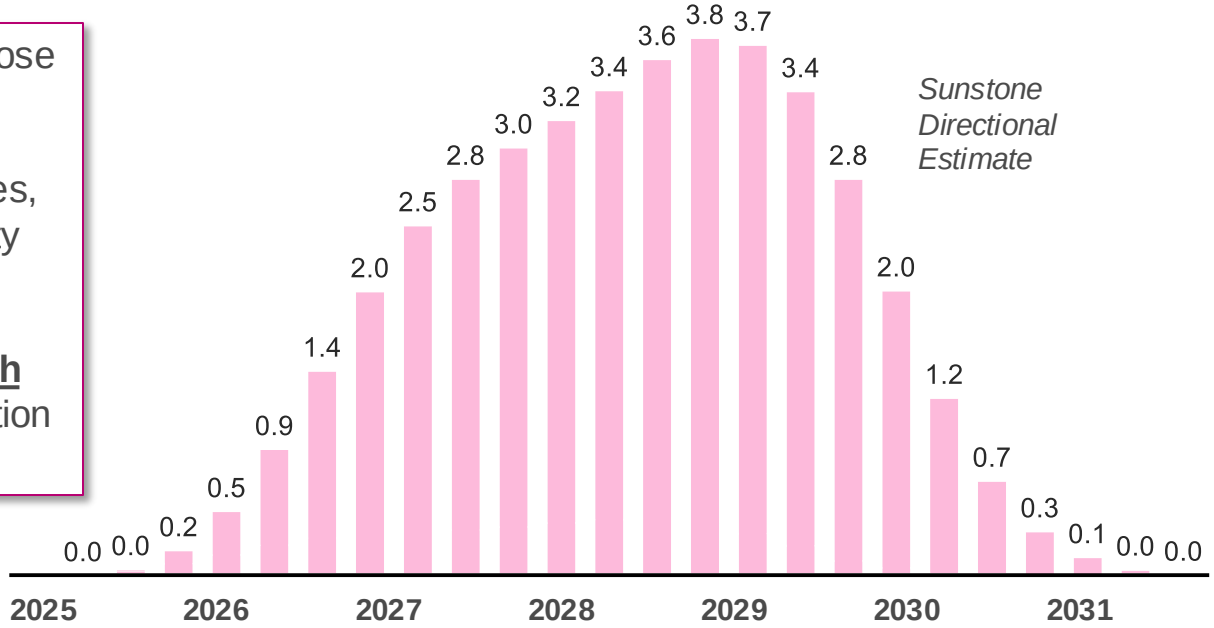
Goal is to dramatically close the Digital Divide

State approval processes, resources, and capacity extends timelines

Once complete, **growth likely capped** to population growth

Quarterly estimated spending forecast from BEAD dollars ($B)

Dollars spent by providers over a 4-year build



Source: Sunstone Analysis and Estimates based on "baseline" award timelines and estimated level of readiness by State using CPF awards, 5 Year Plan Submissions, Initial Proposal Vols I and II status, and other assumptions on award velocity and build profile

Finding a Return on Investment is Challenging

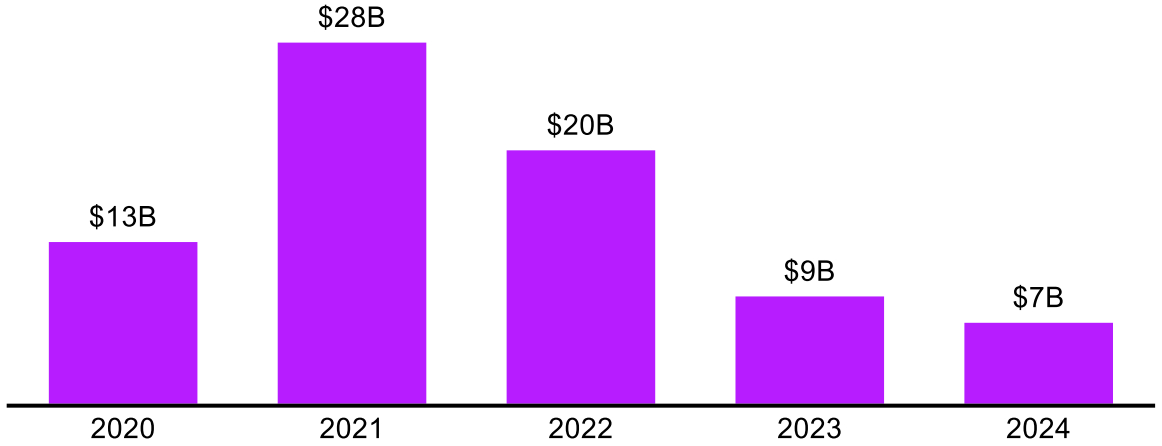
COVID and interest rate impact on deal activity

Median hold time for buyout-backed exits at a high of 6.1 years

Historical growth for private equity driven by revenue growth or multiple expansion, **not margin expansion**

PE/VC-backed investments in telecommunications services

2019-2023



	2020	2021	2022	2023	2024
No. of Deals	97	127	95	72	39
Avg. Transaction Value	$132M	$223M	$210M	$120M	$168M

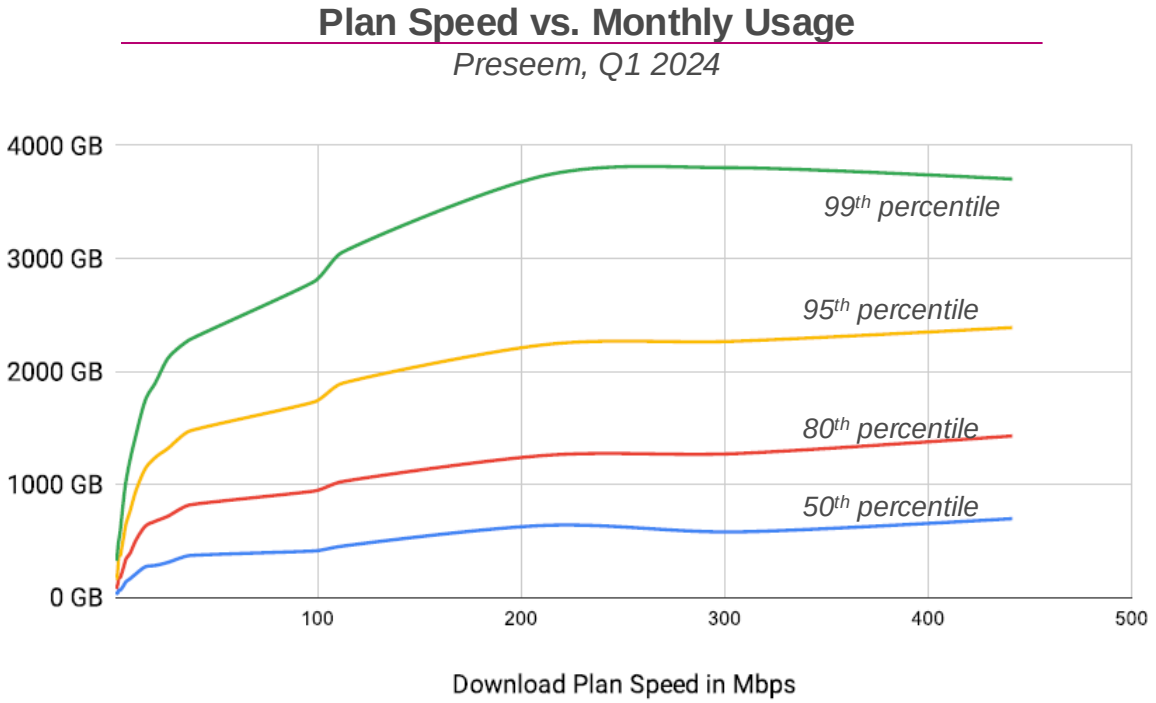
Source: S&P Global Market Intelligence; 2024 thru August 8, 2024; Bain Global M&A and Private Equity Reports

Customer Usage Still Catching up to Investments

Increasing use of Multi-Gig Offers to drive ARPU

Some data suggests customers are not using all of their connection capacity

Suggests speed alone **may not be a long-term sustainable form of differentiation**



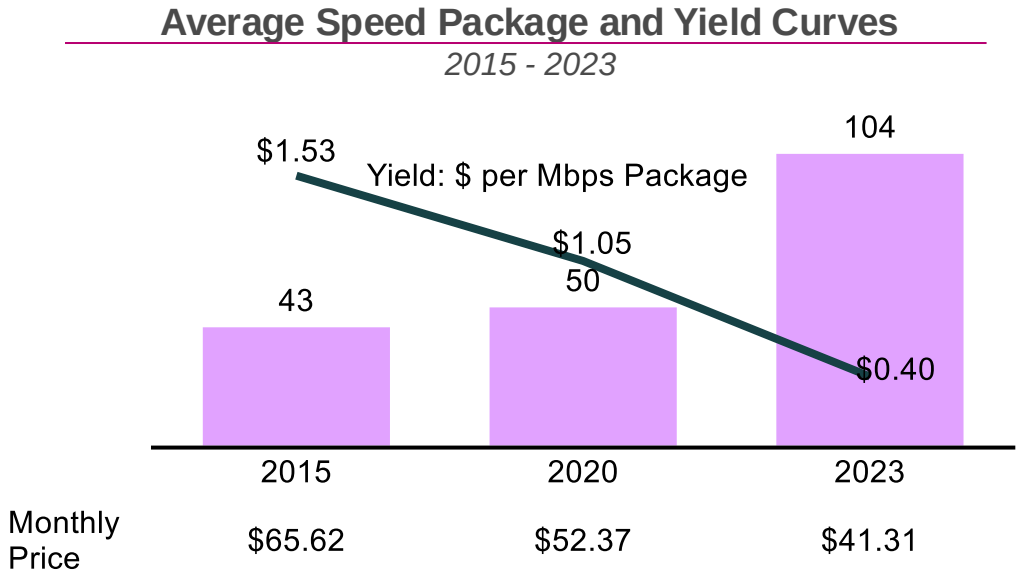
Source: Preseem Fixed Wireless Network Report, 2024 Q1

The Speed Race to the Bottom

Historically customers have migrated speed packages at a moderate rate

Yield ($/ Mbps) has declined steadily as industry creates more capacity

Acceleration of high capacity, multi-gigabit offers is **accelerating yield declines**



Source: U.S. Bureau of Labor Statistics; U.S. Telecom Pricing Report 2023; Packages for US Telecom "Consumer Choice" as part of Broadband Pricing Index study

Better monetization is essential to improve yields while lowering costs at sufficient rate to preserve economic profits

The Role of the Middle Mile

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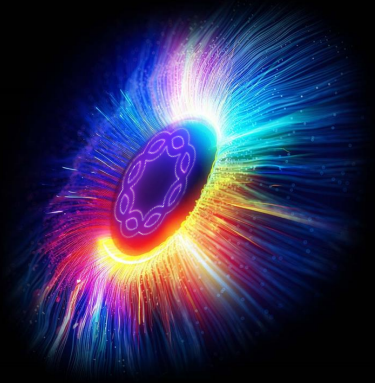


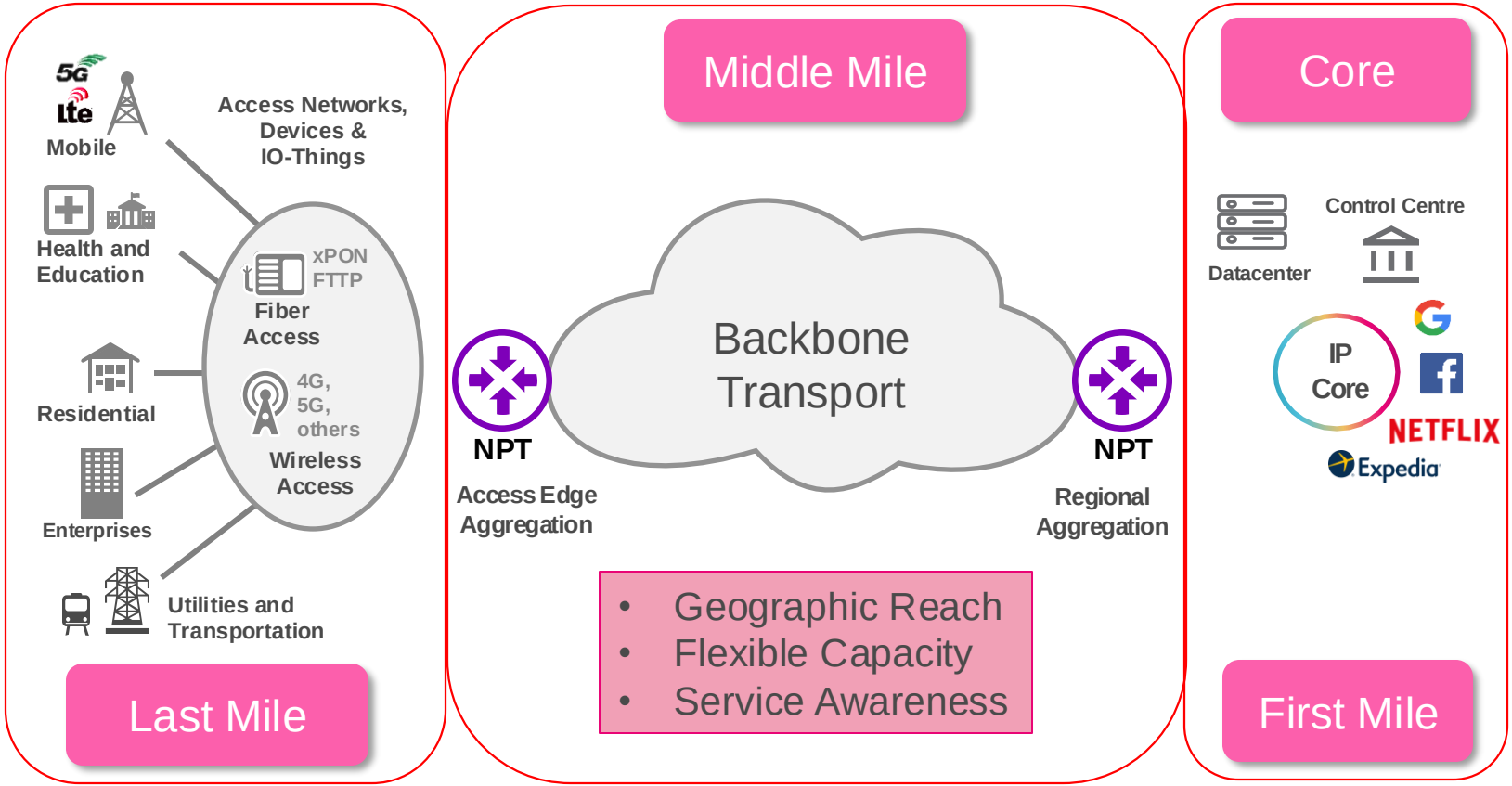
Public Investment Reminders

- Historic Levels of Public Funding
  - RDOF, BEAD, ReConnect, MMG, RUS
  - Little to No Opex Funding Available
  - Unlikely to Repeat

- Cost-Effective Includes…
  - Initial Investment
  - Return on Investment
  - Improved Time to Revenue
  - Total Cost of Ownership
  - Extending the Life of Your Network

RDOF.COM

What is the ‘Middle-Mile’ ?



NPT for All Middle Mile Networks

Service Providers

- Service Aggregation and Broadband Backhaul
- Converged Multi-service Access
- Mobile – 4G/5G xHaul
- TDM to IP migration

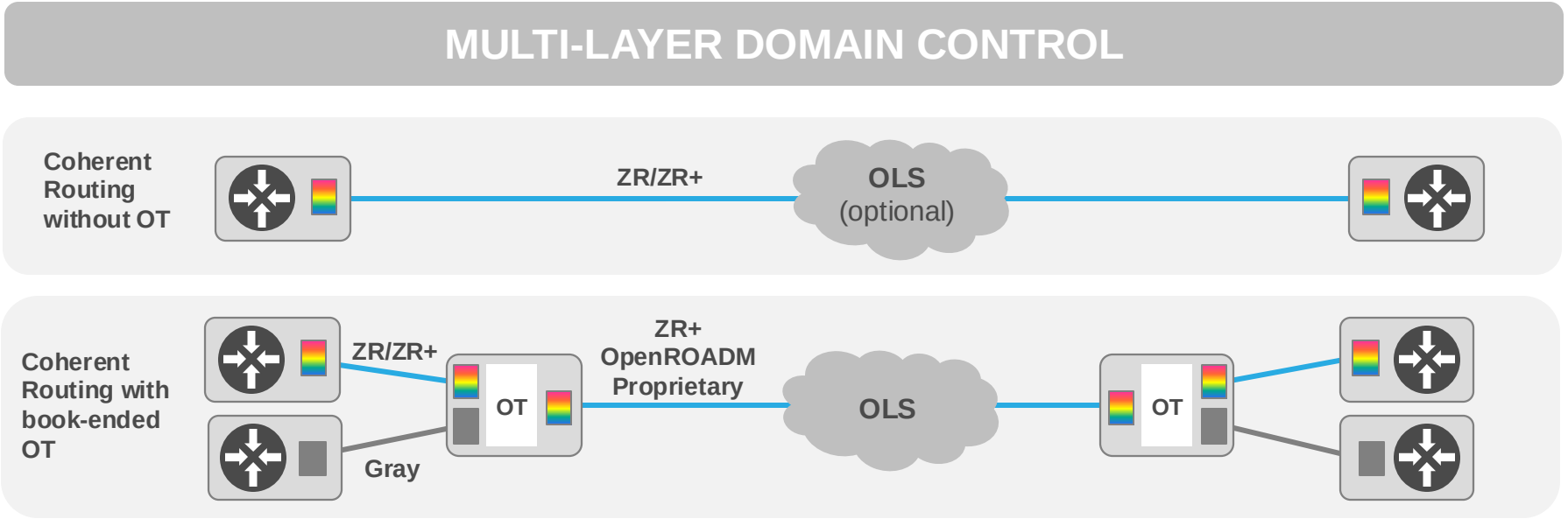
Critical Infrastructure

- Utilities and U-Telco (Power, Railway, Oil & Gas)
- Transportation (Rail, Road, Ports)
- Smart City
- Defense

Key NPT Middle Mile Applications

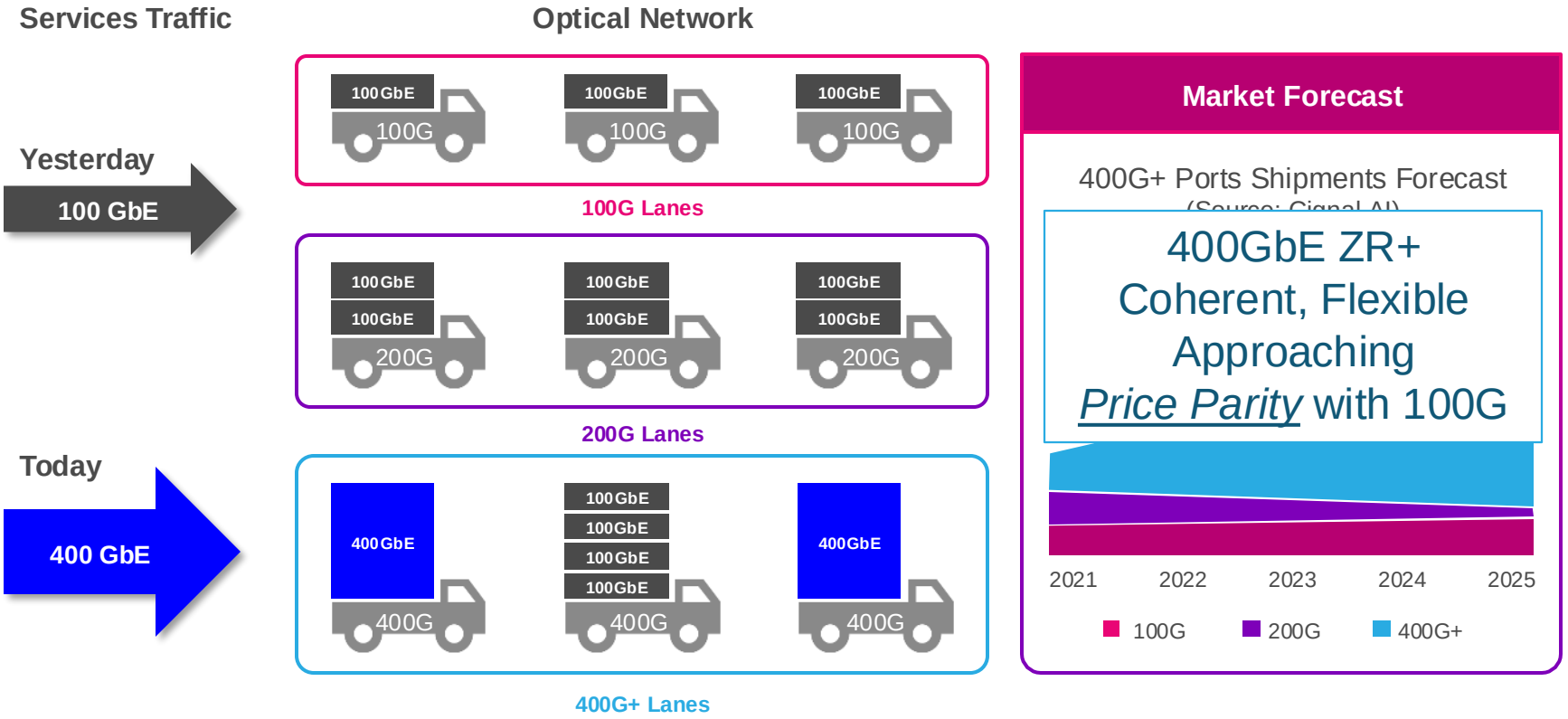
- 5G xHaul
- Distributed Cell Site Gateway (DCSG)
- Rural Broadband Backhaul
- Converged Interconnect Network (CIN)
- TDM to IP Migration
- Disaggregated Routing
- Critical Infrastructures

Coherent Routing Integrated with OT Helps Differentiate Ribbon



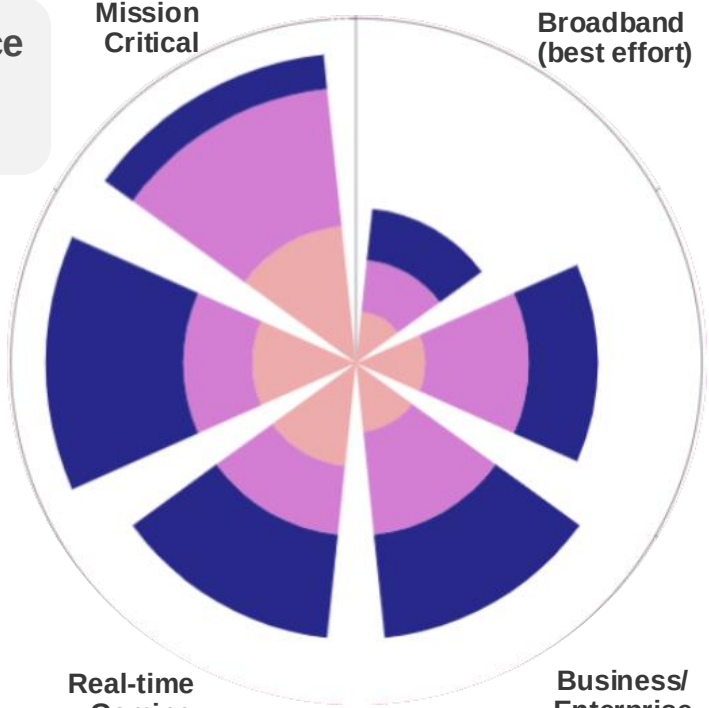
Cost Effective and Flexible Architecture

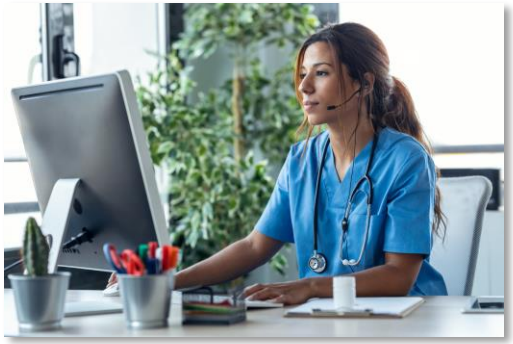
Bypassing 100/200G, the Move is on to 400G+



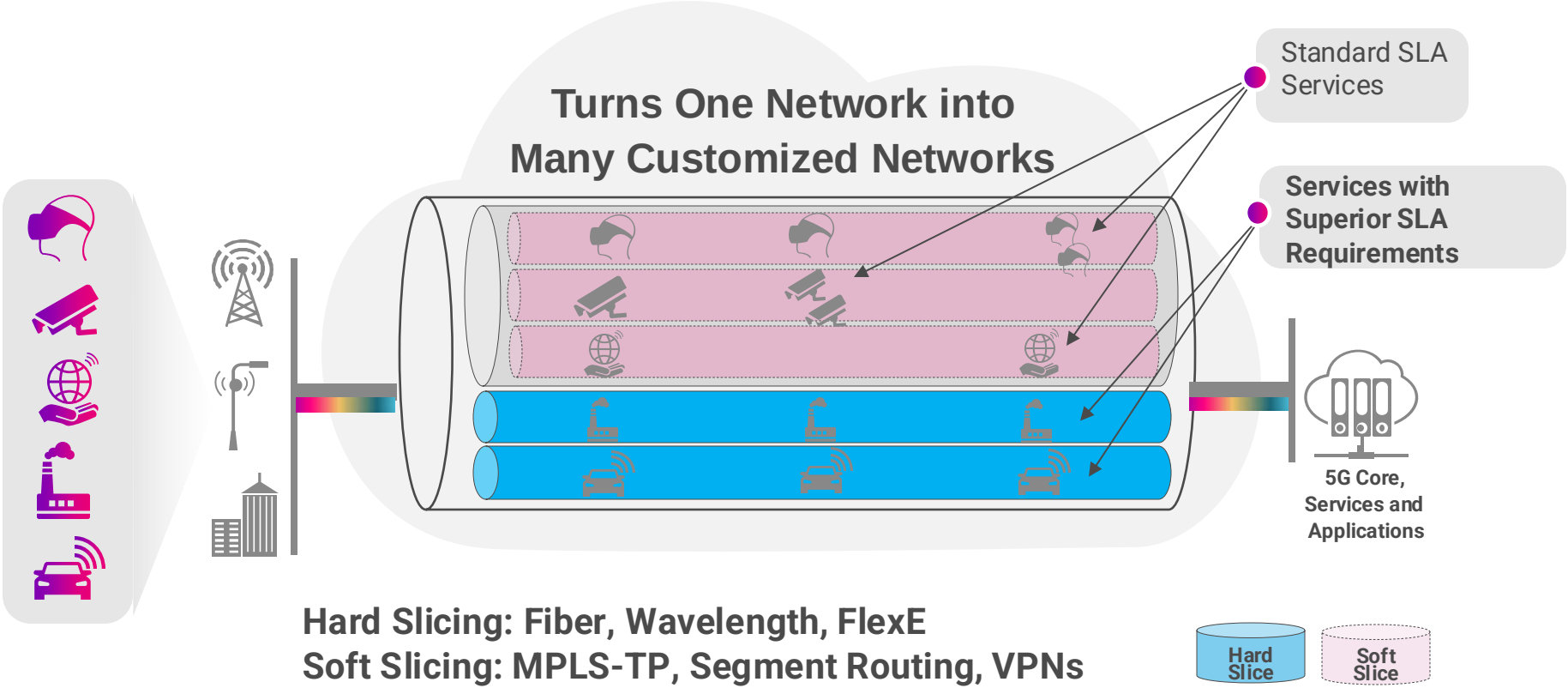
Service Awareness and Handling

- Quality of Experience
- Meet SLAs
- Increased Revenue

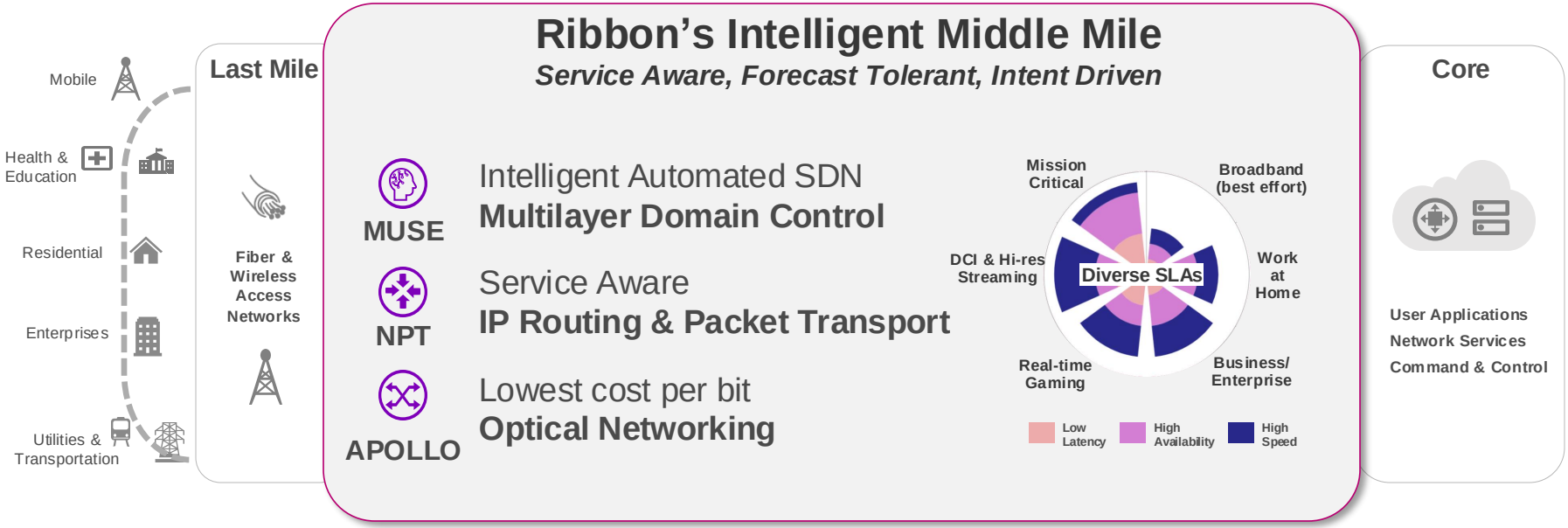




Network Segregation using Transport Network Slicing



Ribbon’s Intelligent Middle Mile Provides Network Modernization



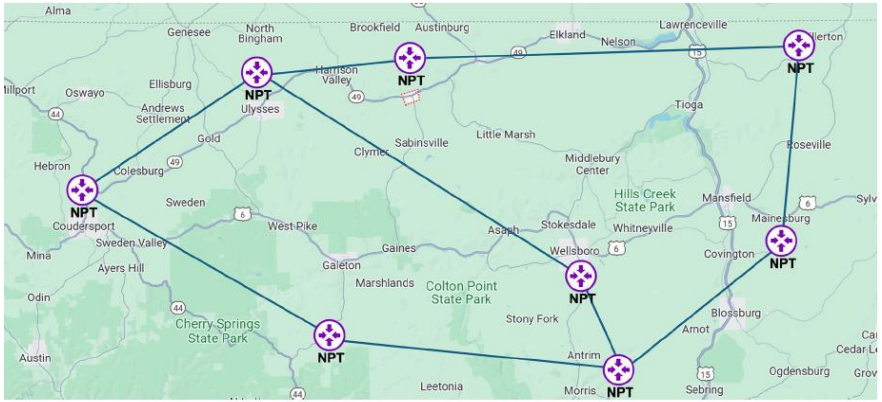
Critical Infrastructure: Tri-Co Connections

TRI-CO CONNECTIONS

Vertical: Utility Broadband Provider
Region: North America
Solution: 100G Broadband Aggregation using Ribbon NPT 1800

- Separate Broadband Subsidiary of Electric Co-op
- 100G IP Optical Aggregation Network Easily Scalable to 400G
- Separate EVPNs for SCADA Traffic, Meter Gateways, and Security Cameras at all Substations

Tri-Co covers 19,500 members in Seven Counties of Pennsylvania



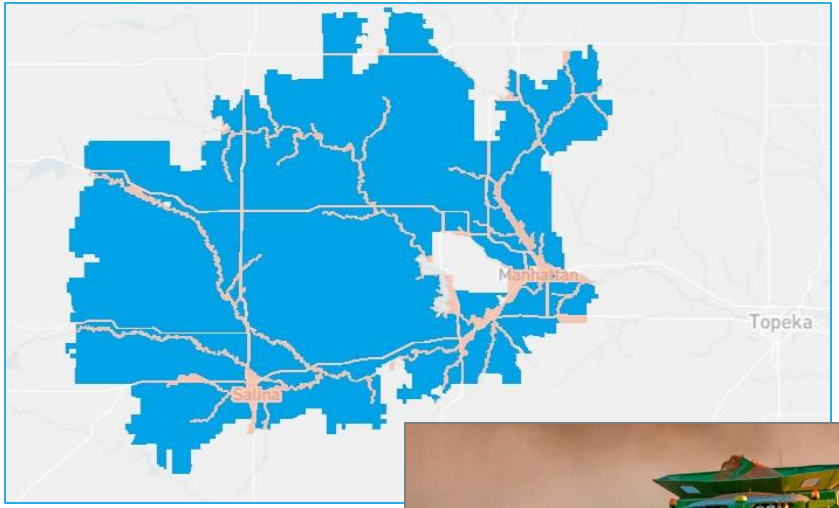
Tri-Co Network Configuration

Rural Broadband: Twin Valley Telephone

Large Rural Service Provider, Clay Center, Kansas

Customer Challenges

- **Scale to Provide Robust Middle Mile**
  - Backbone Sized to Accommodate Current and Projected Growth
- **Network Reliability**
  - Automated, Flexible and Optimized Traffic Failover



Solution

- **IP/MPLS 400GbE Backbone**
  - Service Awareness
  - Sub 50ms Service Restoration (TI-LFA)
  - Advanced Traffic Engineering (SR-TE)

TWIN VALLEY

In Summary – The Intelligent Middle Mile

- Public Investment is *CapEx Only*
  So Spend Wisely!
- Smart Transport Backbone
  Key to Revenue Growth
- Traffic Engineering
  Enables Enhanced Service Offerings
- Cost-Improved Technology Advances
  - Advanced Service Handling Routers
  - Coherent Routing with 400G Optics

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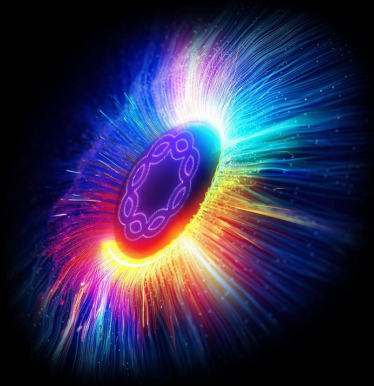
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