



# Emerging Trends in Broadband Architecture

**Jack Breeding**

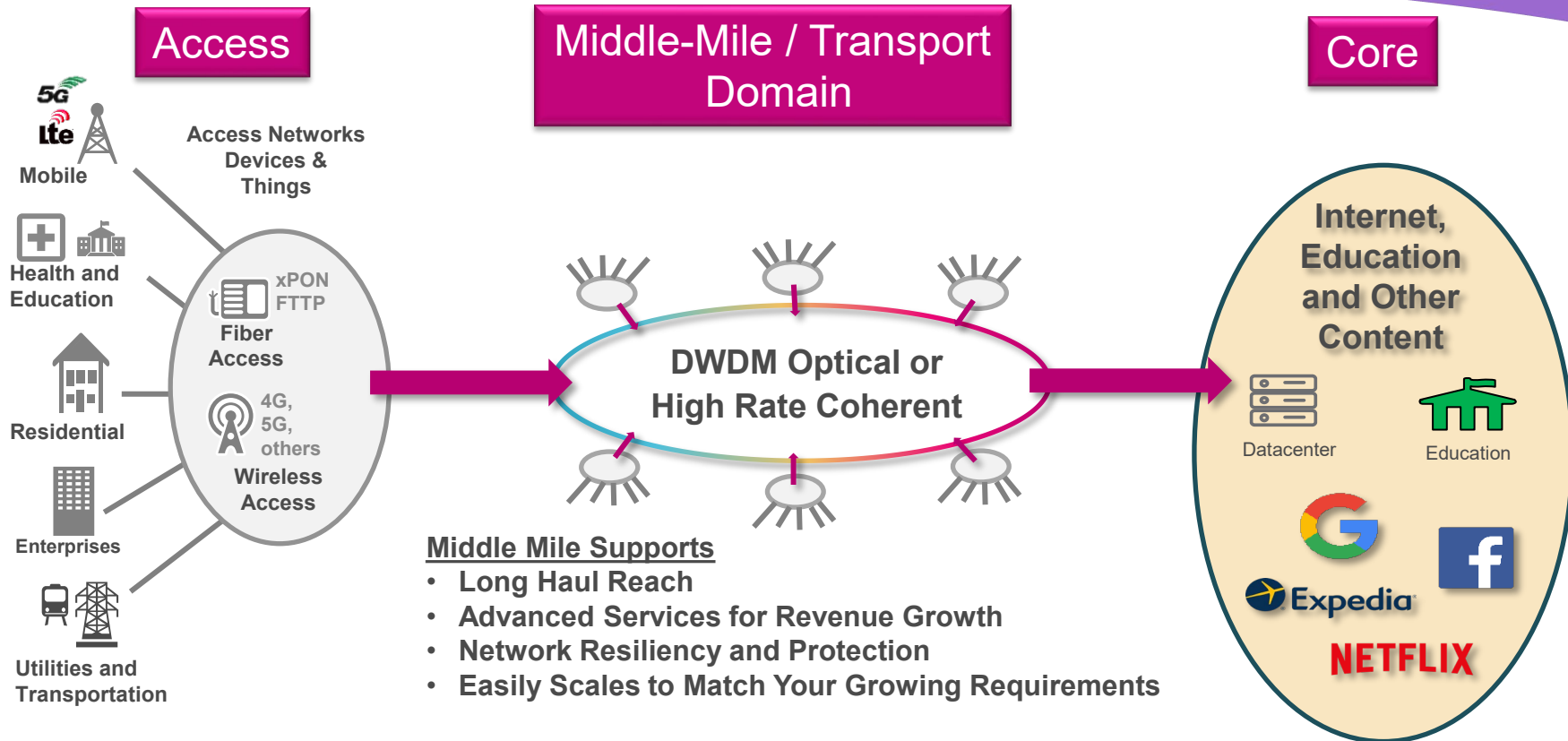
Business Unit Leader, US Rural and Tribal Nations

# Networks Today and Tomorrow

- Today's Broadband Will Demand Adaptable, Scalable Networks
- Simple, Access-Based Networks Impose Limits on Growth
- Recent Developments in Hardware and Software Technology Provide Opportunities for Cost Savings and Increased Revenue Growth

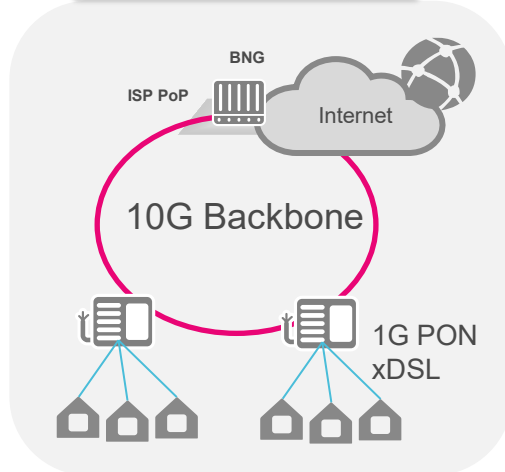


# Broadband Architecture Overview



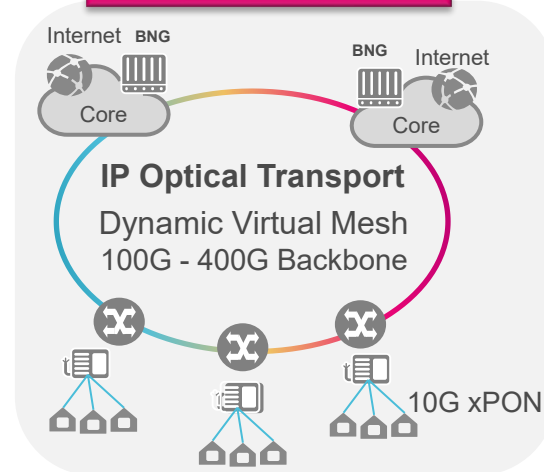
# The Migration to More Complex Architectures

## Access Only



- Mix of xDSL and 1G PON
- Access Unable to Cope with Advanced Services
- Undersized Ring, Difficult and Expensive to Upgrade

## Integrated Middle Mile



- XGS-PON
- Mesh (Dynamic)
- Higher Capacity 100G, 200G, 400G
- Transport Backbone Scales Easily To Terabits

# Traffic Engineering is Critical to Revenue

## Streaming Entertainment

- **High Bandwidth**, “Best Effort”
- Latency: ok
- Minor Packet Loss: ok

## Business Connectivity

- **Reliability** is Essential

## Education

- **Security**, Walled Garden

## Telehealth

- **Encryption**, Privacy are Paramount

‘Oversubscribing’  
is **Essential**

‘Oversubscribing’  
is a **Disaster**

Open Access  
is a **Problem**

Stolen Bits are  
a **Disaster**



# Bypassing 200G, the Move is on to 400G

Services Traffic

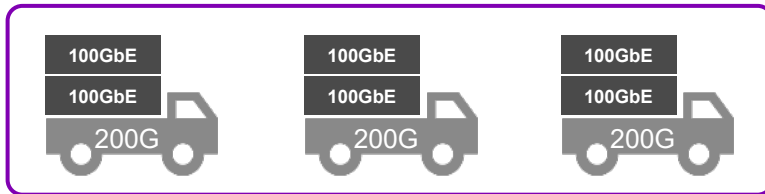
Optical Network

Yesterday

100 GbE



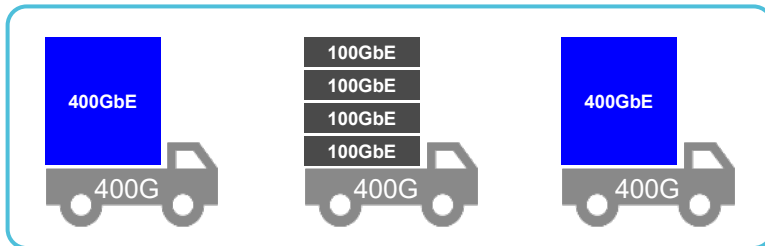
100G Lanes



200G Lanes

Today

400 GbE

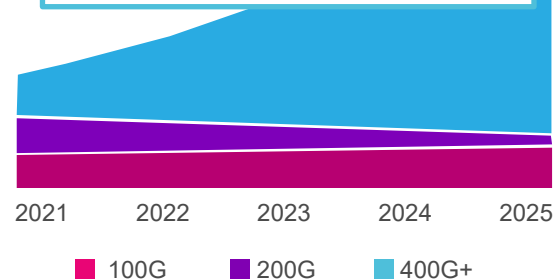


400G+ Lanes

## Market Forecast

400G+ Ports Shipments Forecast  
(Source: Ciena AI)

Coherent 400G Optics  
Are Approaching  
*Price Parity* with 100G!



# Summary

- “Access-Only” Networks Can Limit Growth, Service Offerings and Revenue
- New 400G Optics May Allow Faster Backbone Speeds at Lower Cost
- Consider Integrated Middle-Mile Options for
  - Long Haul Geographic Reach
  - Cost-Effective Bandwidth Scalability
  - Enhanced Service Offerings to Grow Revenue



# Thank You



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