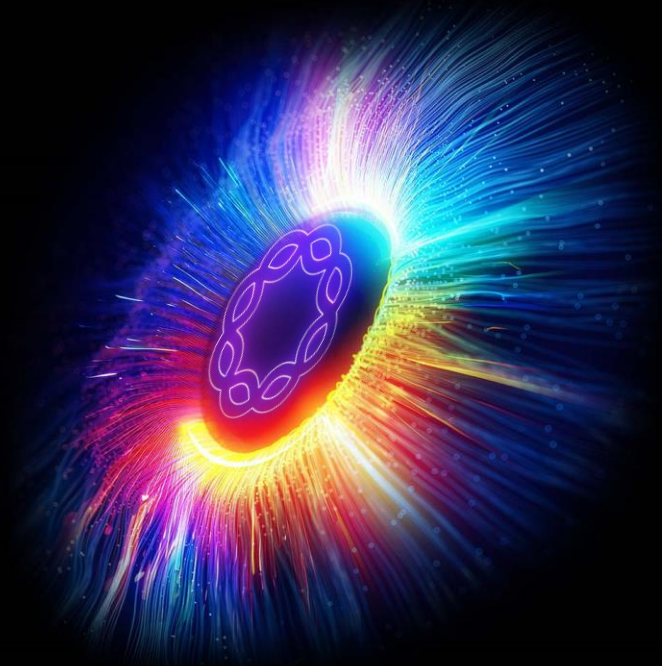


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**INSIGHTS**



# Broadband Aggregation

## The Intelligent Middle Mile

**Jack Breeding**

Dallas Insights 2024

ribbon  
**INSIGHTS**

# Broadband Architecture – Market Trends



## Traffic Growth

- Internet
- Mobile
- VOD
- Gaming/Immersive Apps



## Capacity

- IP Links Growth from 10G to 100G, 200G with Trend to 400G and Beyond



## Topology

- Transition from P2P Lines & Rings to Partial and Virtual Mesh Topologies



## Advanced Applications

- Telehealth/Medicine
- Low and Ultra-Low Latency
- Remote Learning



## Open & Unlocked

- Standardized Interfaces
- Decoupling Software from Hardware

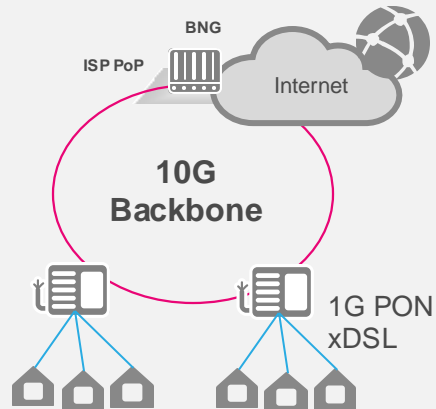


## Network Convergence

- TCO Savings
- Extended ROI
- Additional Revenue from Service Diversity

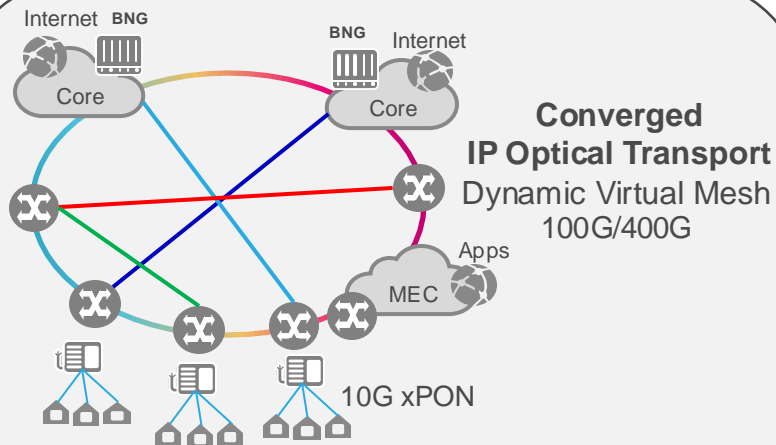
# Fiber Topologies Adapt to New User Demands

## Access Only



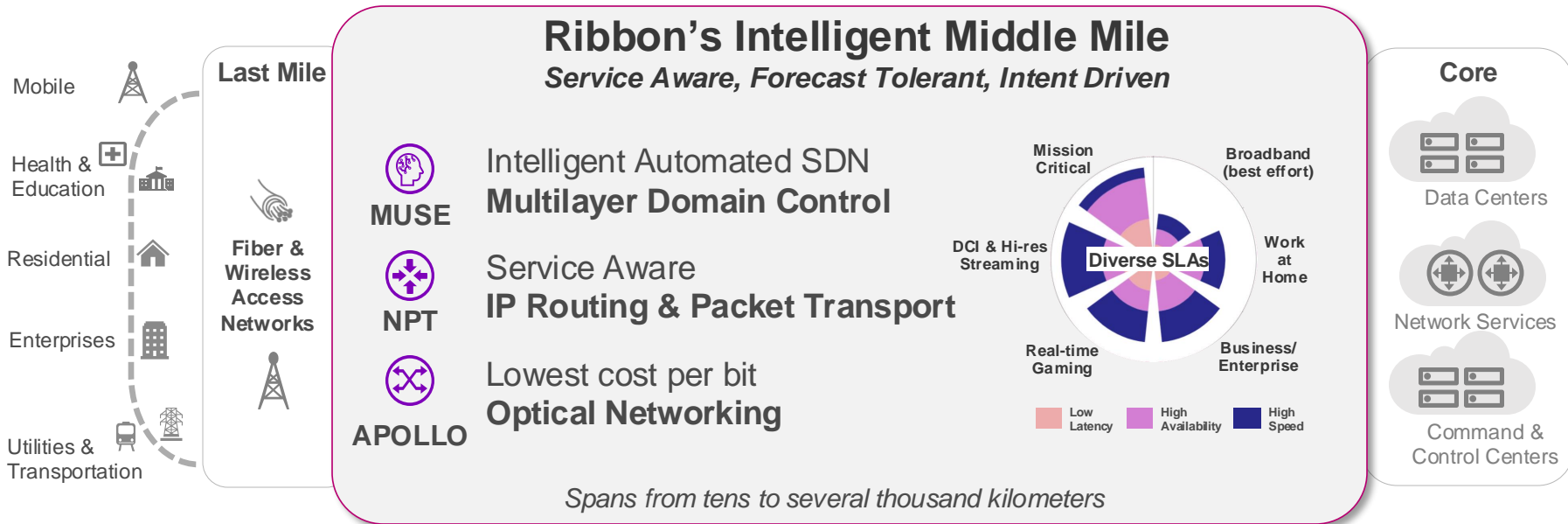
- G-PON and Other Legacy
- Access Devices Not Built for Advanced Applications
- Fixed Ring Capacity, Difficult and Expensive to Upgrade

## Access + Middle Mile



- XGS-PON, 10G/25G+
- Lower Latency
- Intelligent Transport Supports New Revenue
- Middle Mile Scales Easily to Terabits

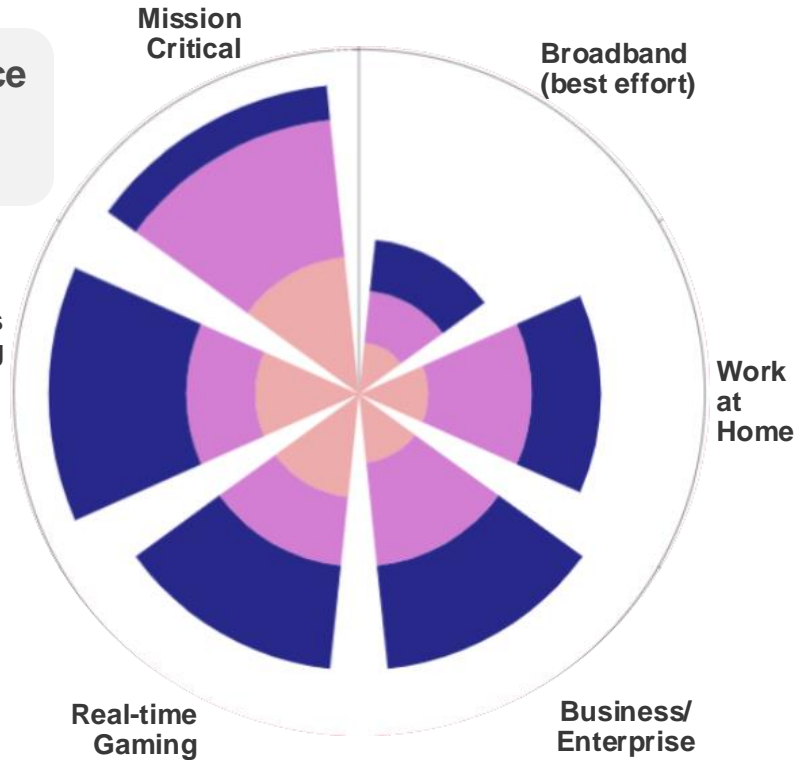
# Definition: Ribbon's Intelligent Middle Mile



- Connects access networks with core services/applications and provides datacenter interconnect (DCI), meeting service performance requirements on a service-by-service basis
- Ribbon are trusted to deliver middle mile for Broadband Backhaul, 5G xHaul, TDM to IP Migration, Mission Critical Networks and DCI in Service Providers, Utilities, Enterprises and Defense/Government networks

# Service Awareness and Handling

- Quality of Experience
- Meet SLAs
- Increased Revenue



DCI & Hi-res Streaming



# Multilayer Design Approach

## IP/Packet - NPT



### Deterministic

Dynamic, Deterministic Transport



### Transport

400G Transport with Elastic Scalability



### Multiservice Aggregation

Multiservice Access Aggregation

## Optical - Apollo



### Powerful

10G to 2x600G in the same platform



### Intelligent

SDN features and integrated monitoring



### Open

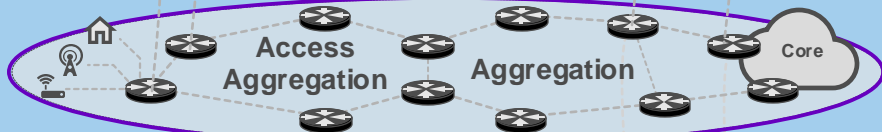
Standardized APIs, Open Optics

## Management - Muse

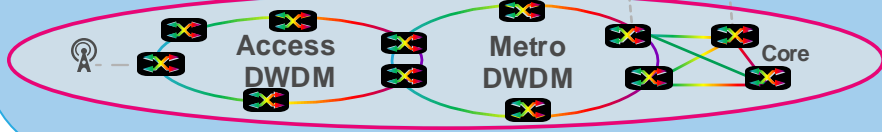


Orchestration, Administration,  
Analytics, Reporting

## IP/Packet - NPT



## Optical - Apollo



*Configurable*

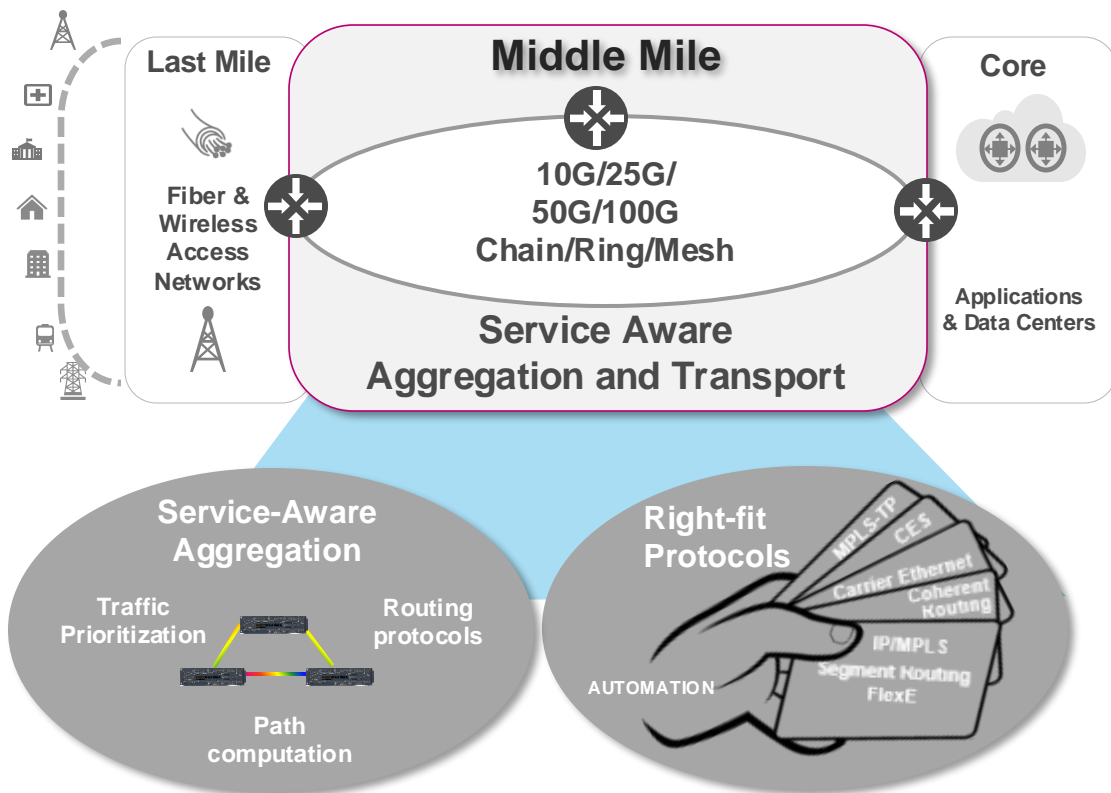
*Automation*

*Streamlined*

*Open Architecture*

# NPT Service Aware Routing: Tailorable To Each Middle Mile

- **Huge Set of Interfaces**  
Supports All Access Networks & Services
- **All Network Topologies**  
To meet Operational and Business Needs
- **Right-fit Form Factors**  
With Multiple Architectures and Capacities
- **IP Optical Integration**  
With IPoDWDM, IPoOLS, IPoOTN
- **Common, Proven NOS**  
Provides Capabilities  
Optimized for Revenue Enhancement





# NPT For Aggregation

## NPT XDR Family

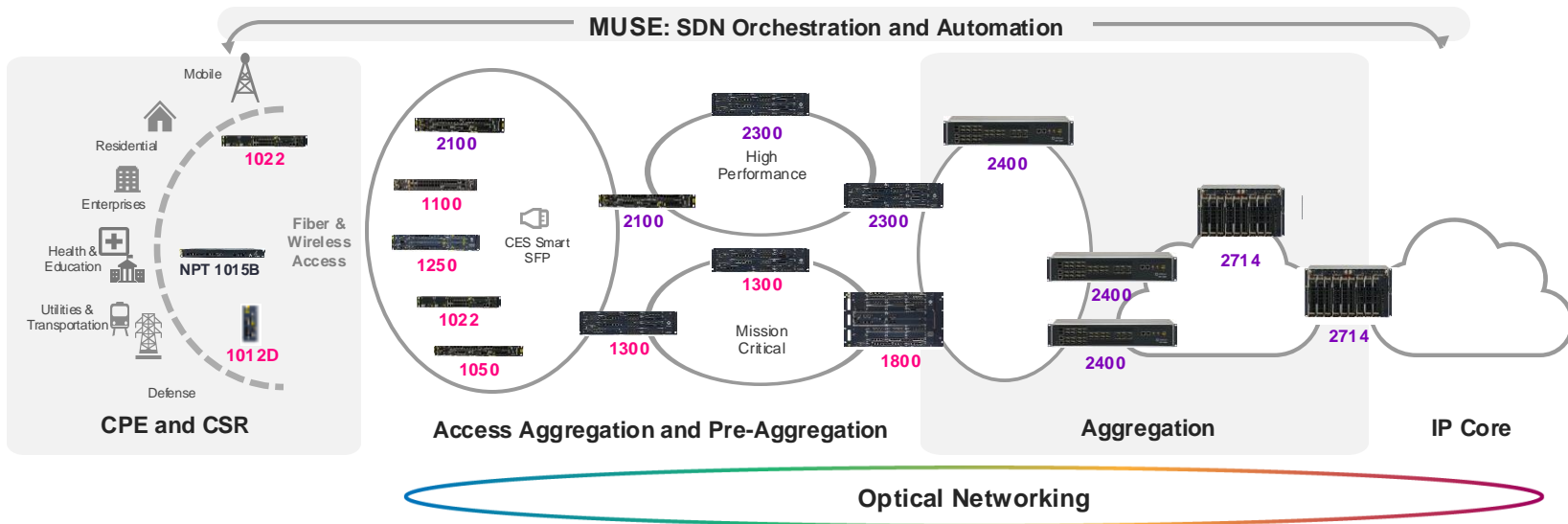
### High Performance Routers

- NPT 2100
- NPT 2300
- NPT 2400
- NPT 2714

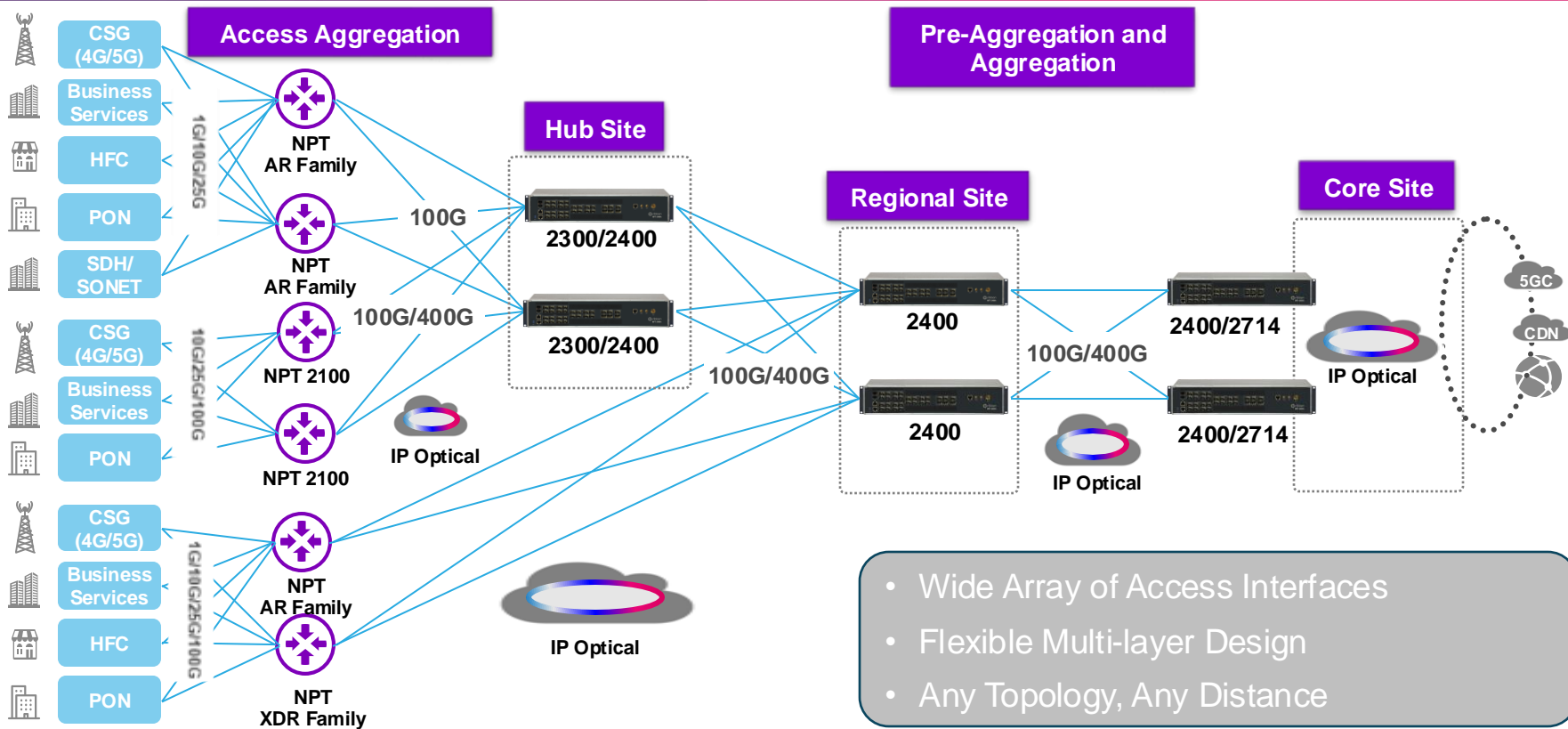
## NPT AR Family

### High Availability Routers

- NPT 1012D
- NPT 1015B
- NPT 1022
- NPT 1050
- NPT 1100
- NPT 1250
- NPT 1300
- NPT 1800

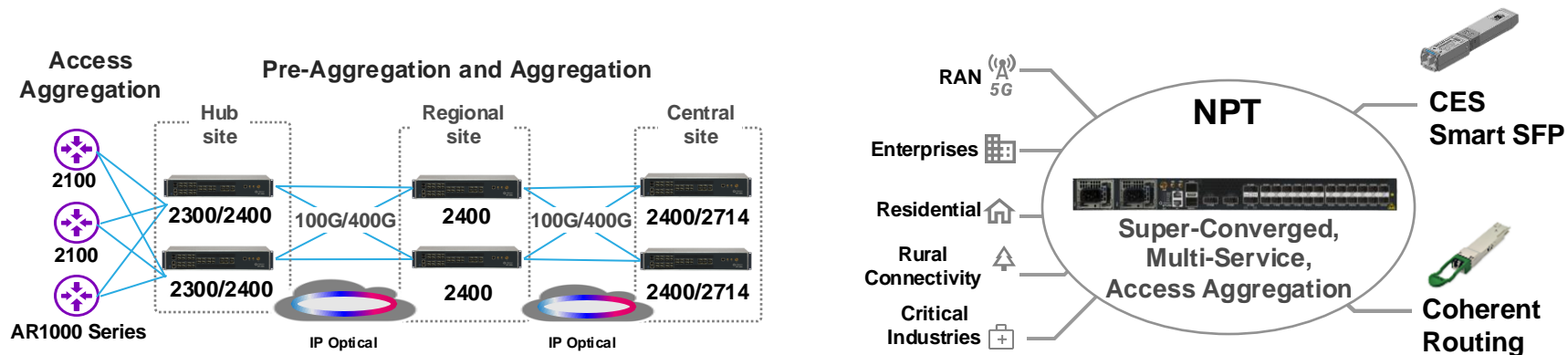


# Aggregation Architecture



- Wide Array of Access Interfaces
- Flexible Multi-layer Design
- Any Topology, Any Distance

# Access Aggregation in the Middle Mile with NPT



- **Network convergence:** Ethernet/IP, MBH, 5G xhaul and TDM migration in a single platform
- **Multiple form factors:** Modular/fixed, redundant/non-redundant, integrated/disaggregated, Airflow: Front to back/ Left to right
- **Deployment flexibility:** Low noise, low power, temperature hardened make NPT suitable for deployment in street cabinet, office or CO environments

# How NPT Helps You Succeed



AR Routers



XDR Routers



## Proven Automated IP

Industry leading practical automation orchestration of proven IP portfolio and routing stack



## Coherent Routing

Full support of coherent pluggables seamlessly supporting IPoDWDM, IPoOLS, IPoOLS



## Optimized for the Middle Mile

Service-aware aggregation providing multiservice access, and performance guaranteed transport



## Open Architecture

Ribbon's carrier-grade IP Wave rNOS spans across the whole portfolio and open, standards compliant, interfaces



## Engineered for need

Right-fit, multilayer integration with IPoDWDM, IPoOLS, Colored/coherent interfaces



## Better Economics

Right-fit form factors; modular, scalable, cost optimized supported by consulting and design tools



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