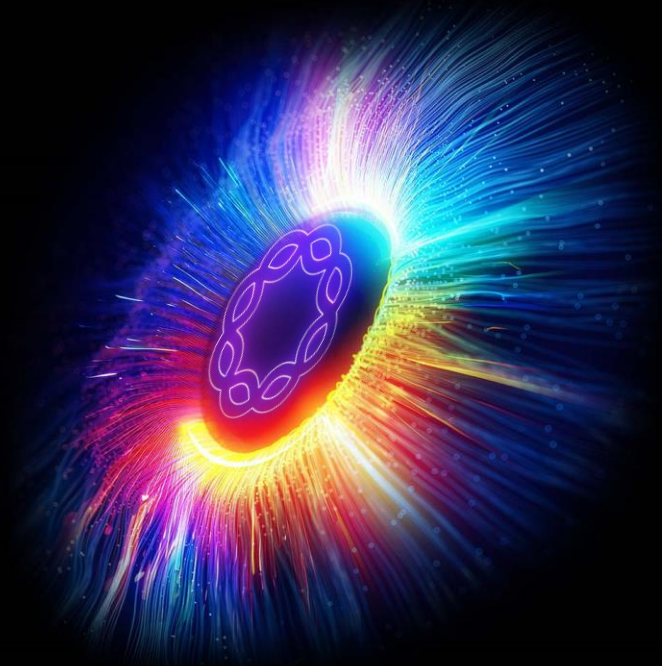


ribbon<sup>®</sup>  
**INSIGHTS**



# Network Modernization for Critical Infrastructure

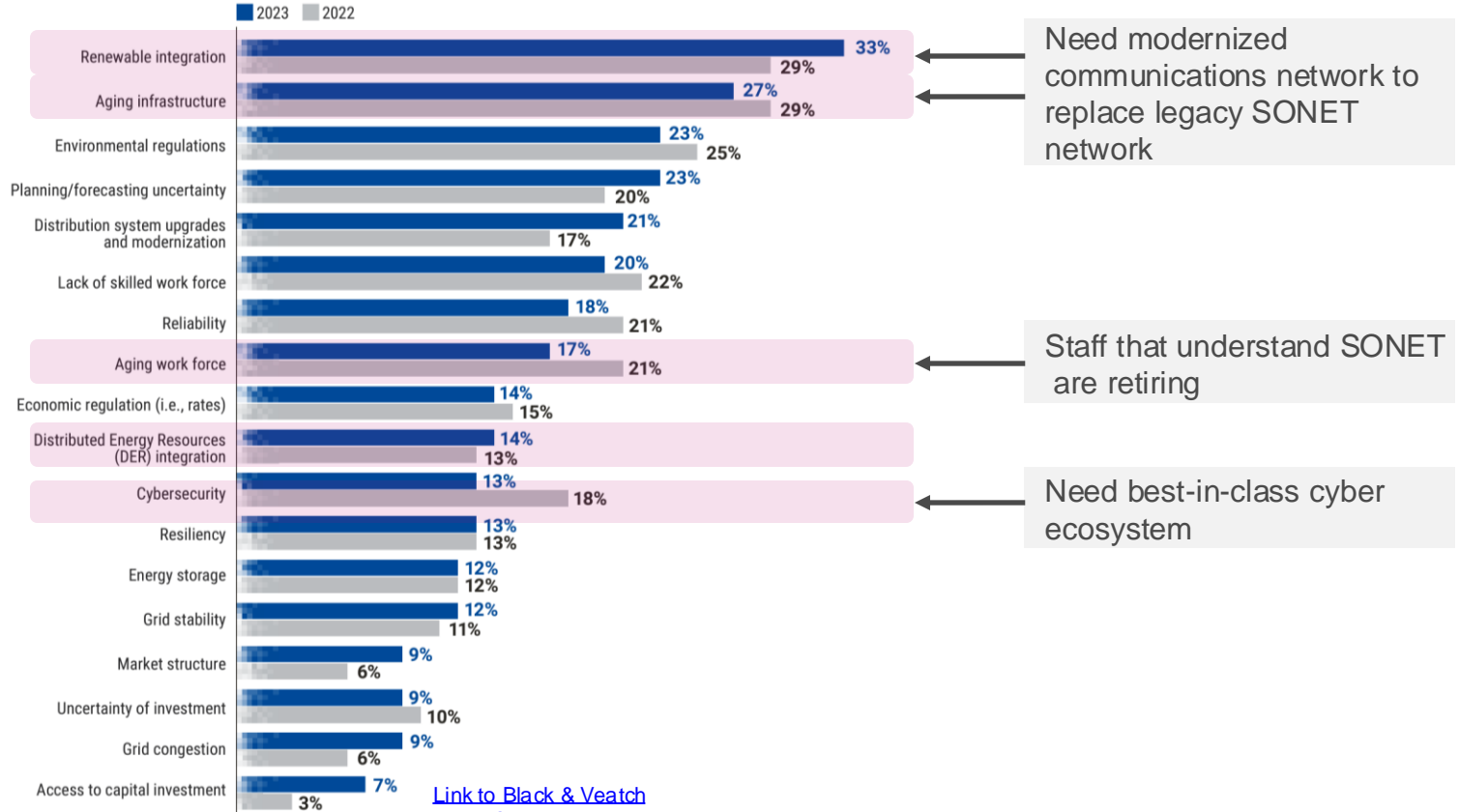
**Mitch Simcoe**

IP Optical Solution Marketing

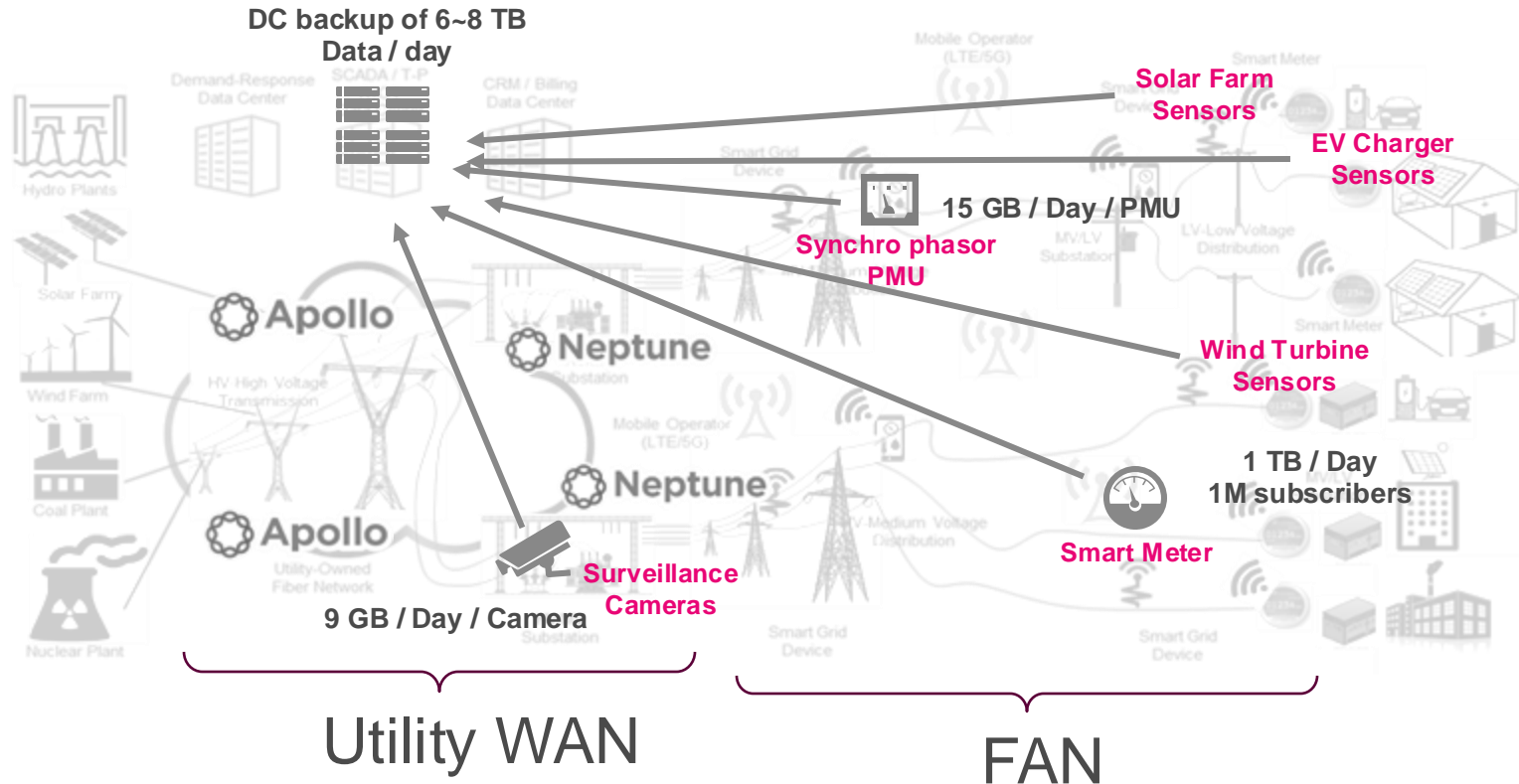
ribbon  
**INSIGHTS**

# Issues Facing Utilities – Ribbon’s Utility Toolset Provides the Solution

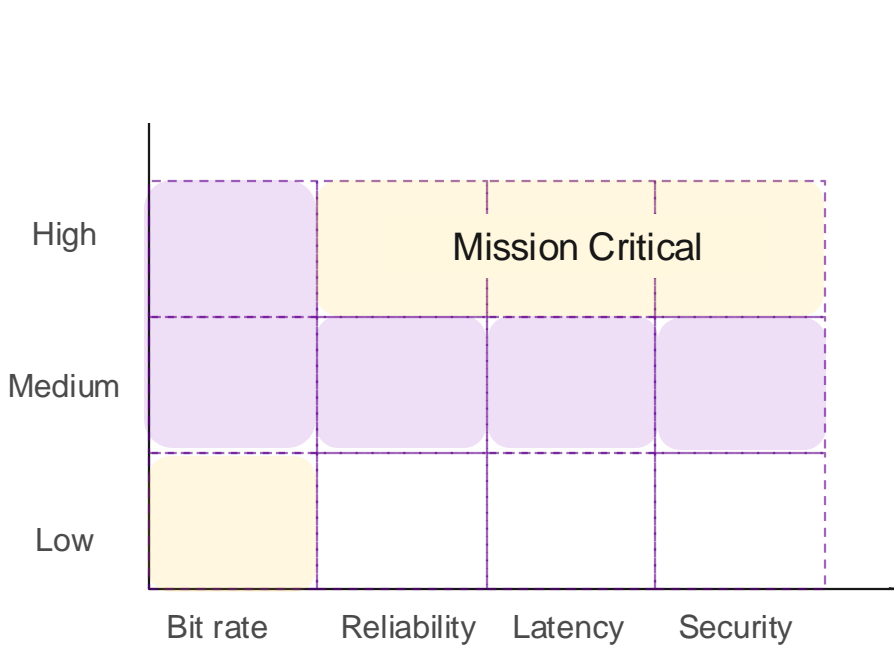
What are the three most challenging issues facing the electric industry in your region today



# Data is the KING – Power Utilities



# OT / IT Network Convergence



**OT**

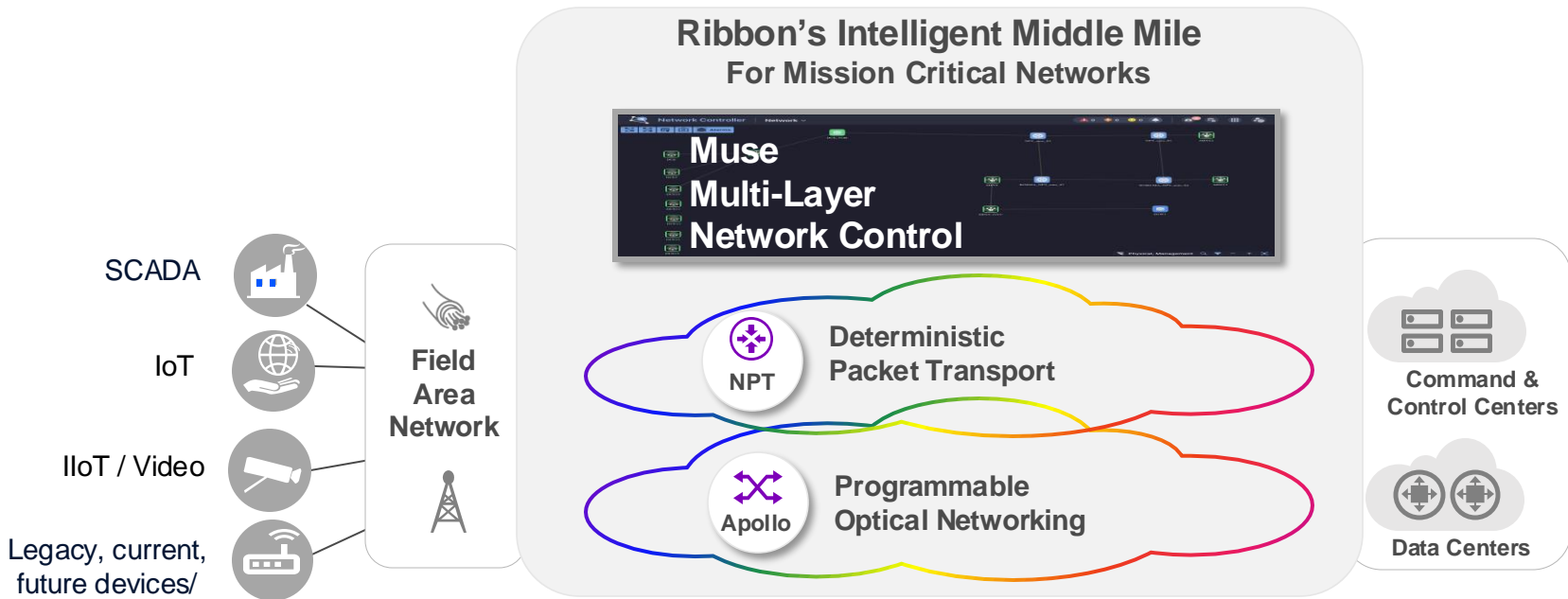
- SCADA
- ▒ Teleprotection
- ⊕ PMU
- ⊗ DER Demand Response

**IT**

- ◆ AMI
- Video
- ▼ Field workforce- data
- ▲ Field workforce-AR
- ★ Data – IT – Corporate
- ✕ Automation Systems

## Challenge To Converge OT And IT Networks

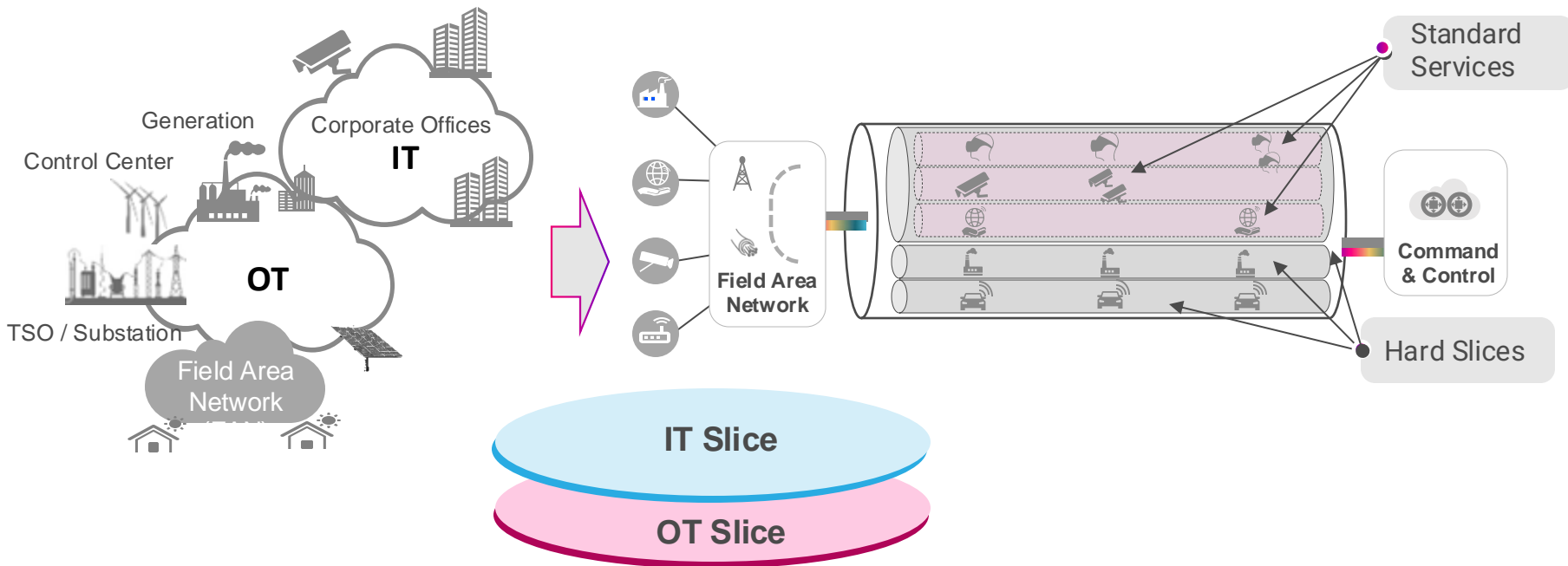
# Comprehensive Solution Optimised For Partners to Offer Utilities



- ❖ Deterministic Packet Transport supports OT and IT transport requirements
- ❖ Optimized IP Optical networks with automation delivers lowest TCO

# OT and IT Networks – Coexistence or Convergence?

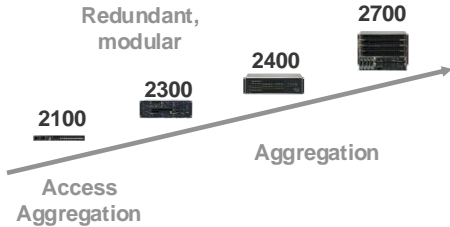
Resiliency & segregation requirements remain



# IP Routing Key Values To Position To Customers

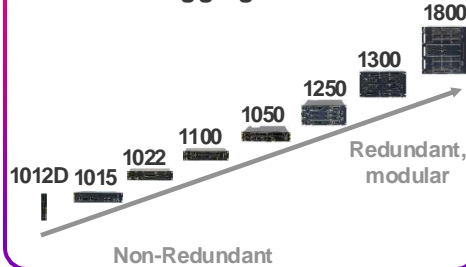
## NPT XDR 2000 Series

Optimized for High Performance



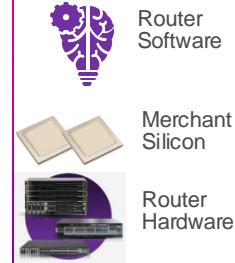
## NPT AR 1000 Series

Optimized for CI & access aggregation

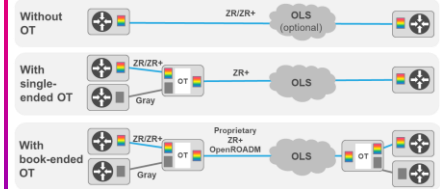


## Proven Software

### IP Router

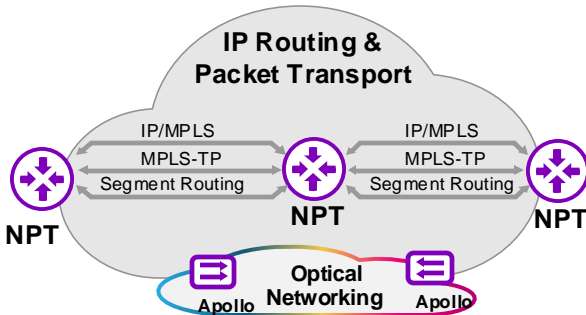


## Coherent Routing

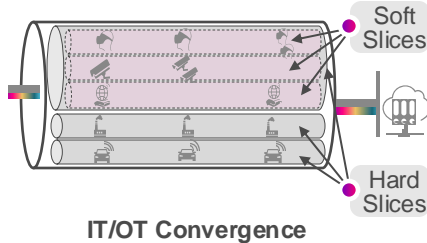


Optimized IP and Optical Integration

## Multi-Stack MPLS



## Network Segregation



## Proven Interoperability

Interoperability: EANTC 2013 - 2023

### Ribbon Participation

Year	Test Area
2013	MPLS-TP / ISBv2
2016	LDP FRR / LZVPN
2017	NETCONF / L3VPN
2018	Segment Routing NETCONF
2019	SR-TE / PCE
2020	FlexE, TSS Class C PTP over MACsec
2021	SR domain & Timing domain
2022	SR-MPLS TE & EVPN
2023	EVPN-VPWS / SR-TE & FlexAlgo

**EANTC**  
EUROPEAN ADVANCED NETWORKING TEST CENTER

**SR-MPLS: VPN services and SR-TE**

- SR-TE Per-Destination traffic steering
- SR-TE FlexAlgo & TI-LFA
- SR-MPLS PCE initiated LSP - interop with PCE (Cisco/Juniper/Nokia)

**EVPN-MPLS**

- EVPN VPWS
- EVPN VPLS
- Multihoming PE
- MAC Mobility



# Apollo Optical Key Values To Position To Customers

## Next Gen High Density

### 9408 Optical Transport

### 9458 OLS



Pay as you grow pluggables



- 5nm-140Gbaud 1.2T
- Ultra-dense metro 400

4-degrees per 4RU

F2B cooling plus Telco NEBS

## Modular 400G+ Everywhere

### Capacity-Reach Optimized

### Metro Power-Cost Optimized

#### TM800\_2 – 140Gbaud λs

#### TM400\_2



5nm-140Gbaud pluggables

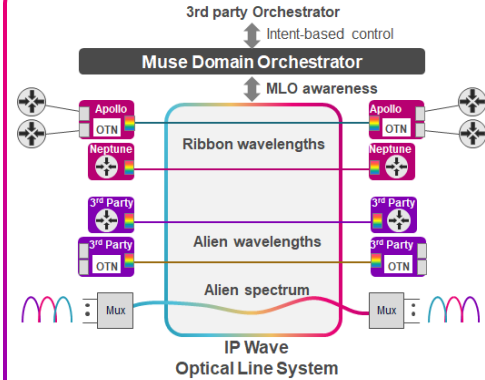


Multisource 400G ZR+ pluggables

- Regional 800G
- Unlimited 400G

- Pay-as-you-grow 400G
- OpenROADM interop

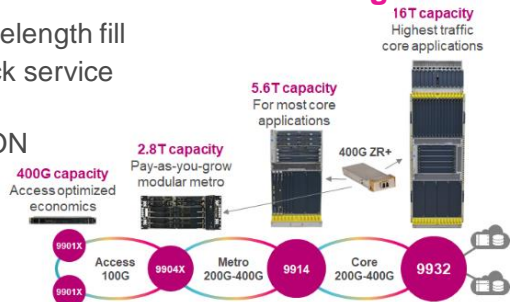
## Super OLS



- Any wavelength
- Shared spectrum
- Dynamic WSON restoration
- Optical and fiber health

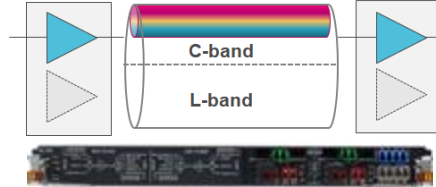
## Access-to-Core OTN Switching

- Optimize wavelength fill
- Point-and-click service provisioning
- Dynamic ASON restoration



## C+L Band

### High traffic fiber route



Pay as you grow for extra capacity  
Where you need it – When you need it

## Open Control Interfaces

Open ROADM OPENCONFIG

ONF gNMI telemetry

Optical overlay for SDN applications

# Ribbon Brings Your Customers Field Proven, Risk-free Migration

- **Risk-free transition:**

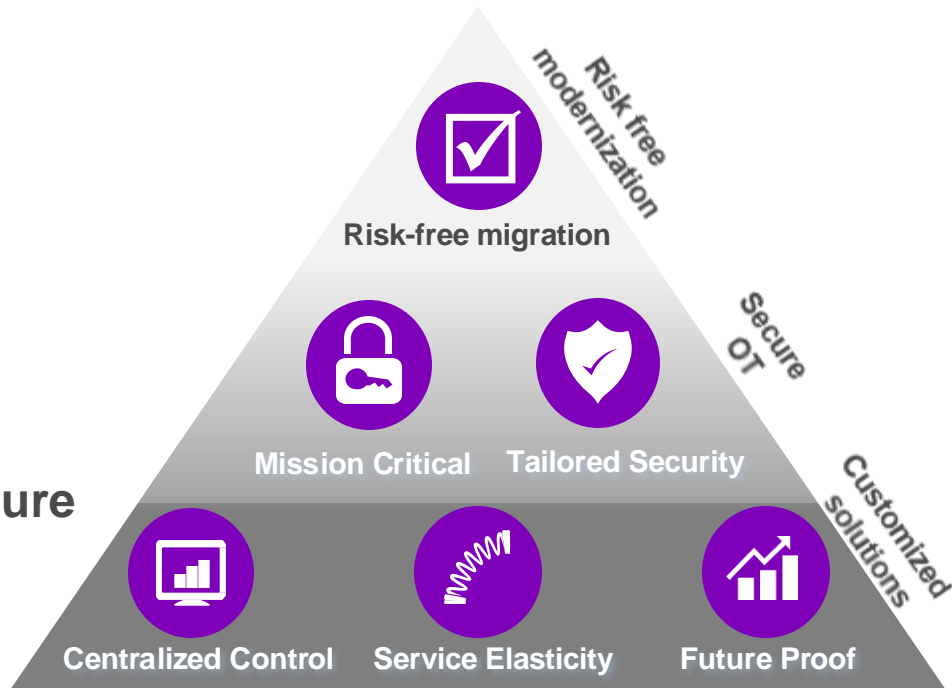
Field proven, tailorable migration

- **Holistic Security:**

Protects Critical infrastructure from attack

- **Optimized for Critical Infrastructure**

Mission critical grade platforms



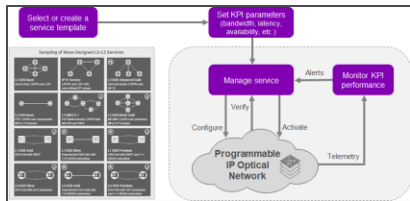
**Proven, Reliable, Secure, Tailored Modernization**

# Muse Is The Secret Sauce That Really Helps You Position

## Network Automation

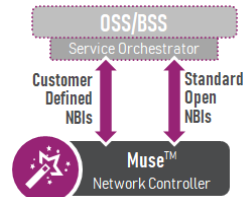


Workflow Engine

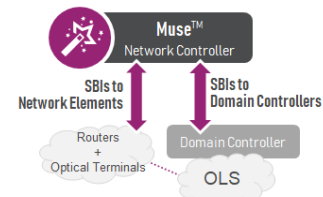


Closed Loop Automation

## Multi-Vendor and OSS Integration

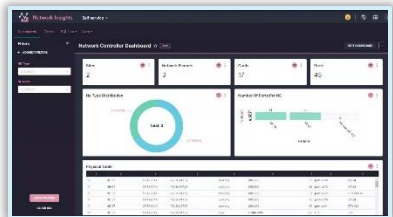


Flexible NBI



Flexible SBI

## Advanced Analytics



Network Insights



Network Health

## Cloud Native Architecture



Microservices Architecture

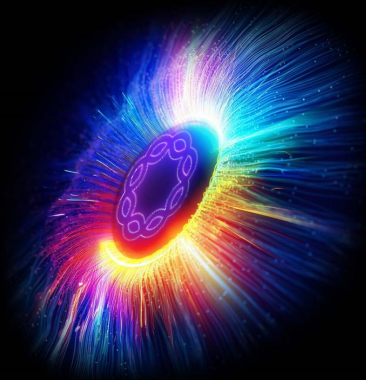


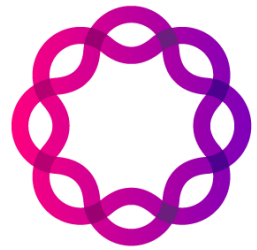
K8S Infrastructure

# How Ribbon Can Help You Win In Utilities

- **Proven, Local** Expertise, Experience and Processes
- Critical Infrastructure is a **key focus** and investment for Ribbon
- Technology architected for **mission-critical** class communications
- **Muse Automation** Removes the pain of making your network work
- Large vendor capability with **startup agility**

ribbon<sup>®</sup>  
**INSIGHTS**





ribbon®