The bridge to possible

Multi Layer, Multi Vendor Automation with Cisco's Hierarchical Controller!

Cisco Knowledge Network

April 13, 2022

Today’s Presenters

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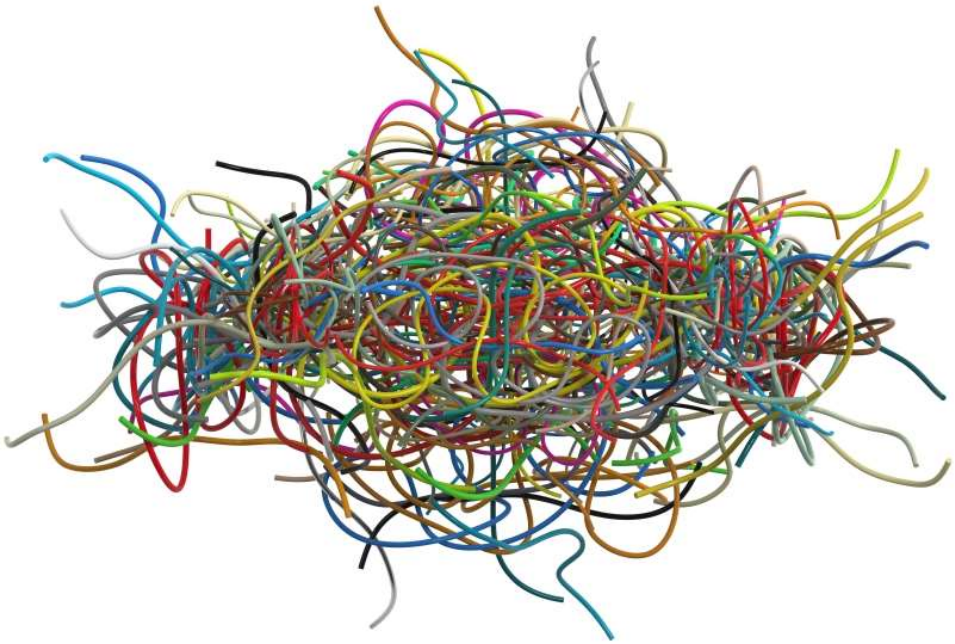
Agenda

- Introduction
- Why do we need a Hierarchical Controller?
- Introducing the Crosswork HCO!
- How does this fit with the industry?
- Differentiation
- Conclusion

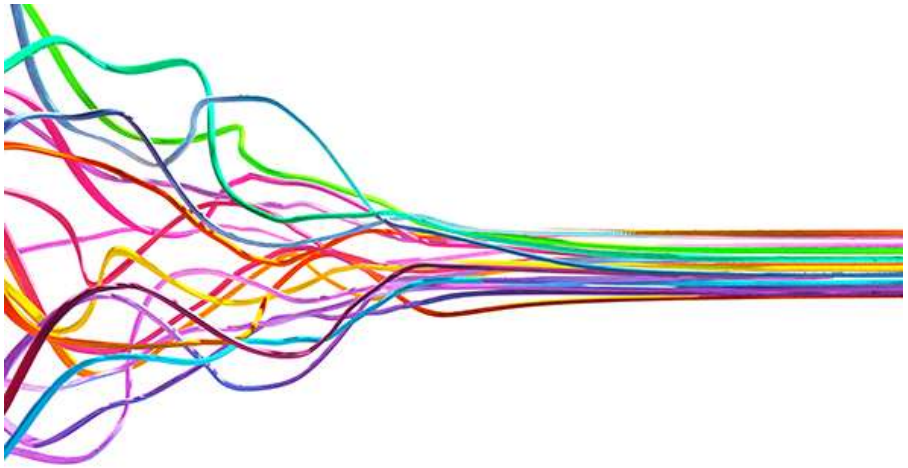
Why the need for hierarchical control?

- All service providers networks are complex
  - Multi Layer
  - Multi Domain
  - Multi Vendor
- Demands on the network are ever increasing
  - 5G services
  - On-demand expectations
  - Rapid data growth
  - Architecture shifts



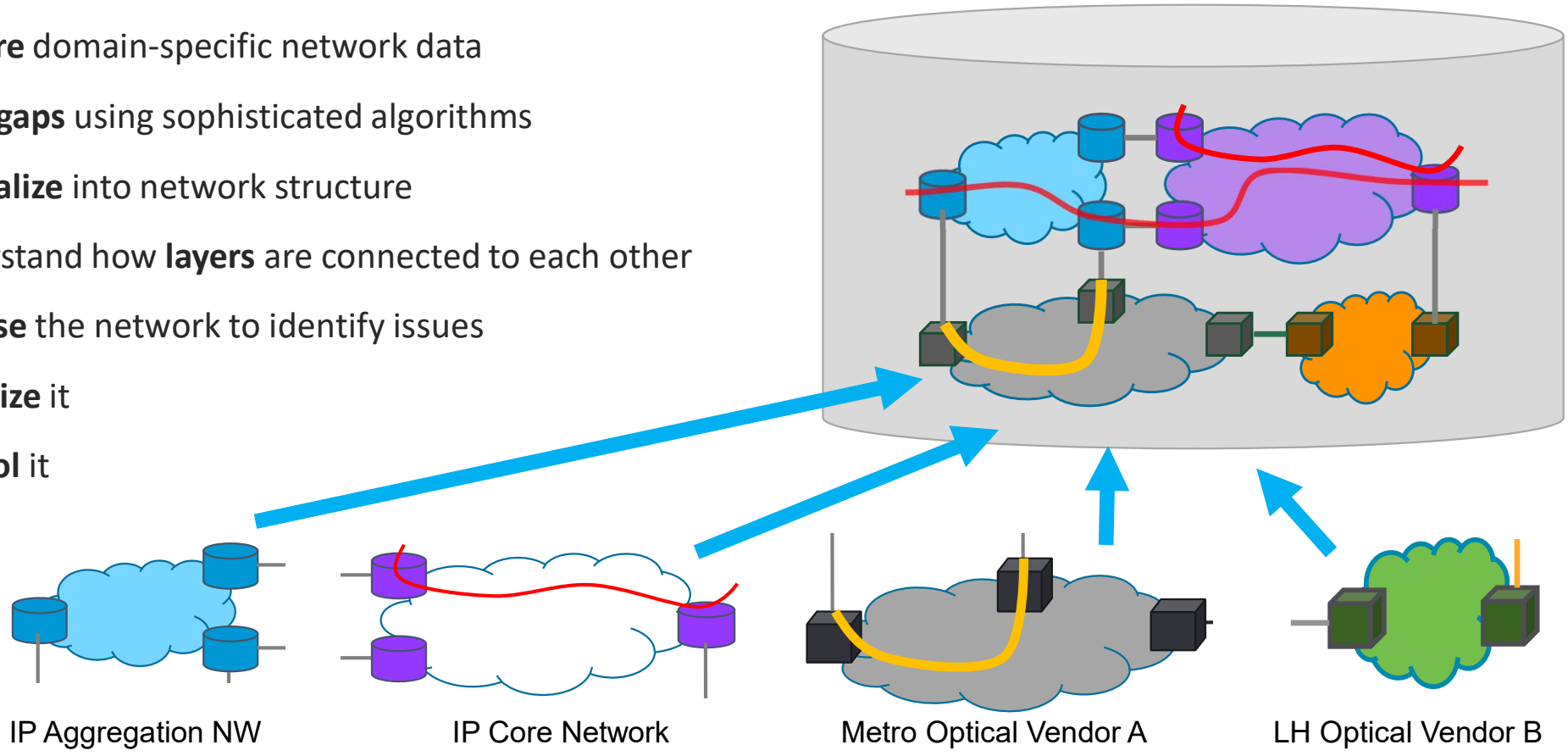
Bring order out of chaos!

- Abstracting the complexity accelerates!
  - Innovation
  - Time to market
  - Mean Time to Repair
- Simplifying control of a network makes sense!
  - Segment domains for expertise
  - Abstract when bringing it together
  - Allow for flattening the architecture
  - Routed Optical Networking

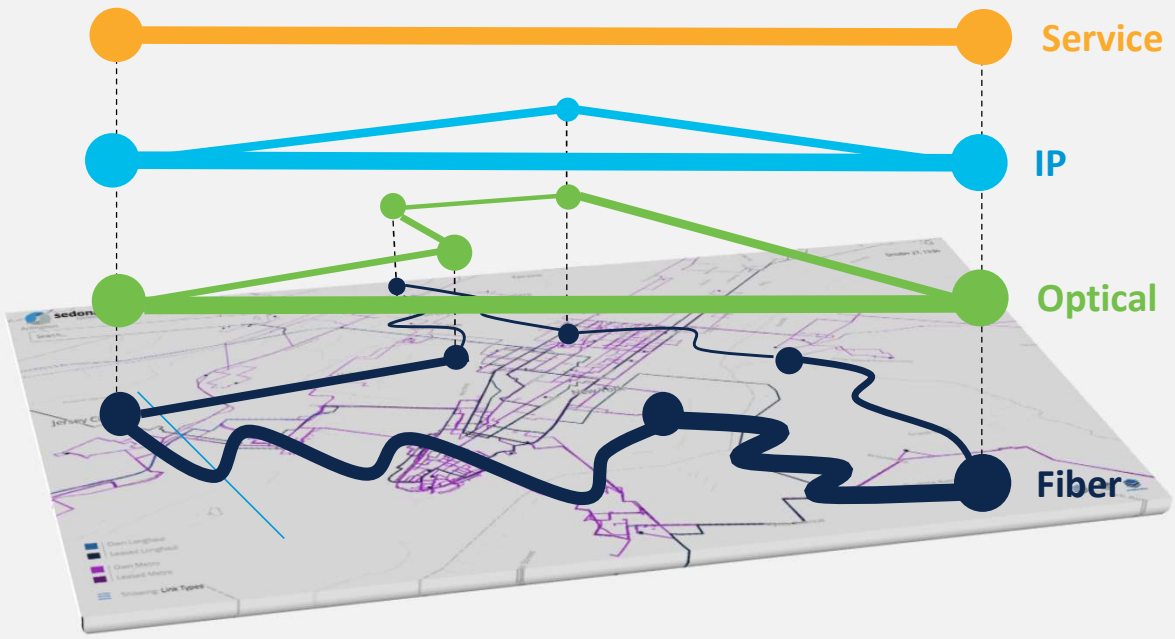


We Put the Network Puzzle Together

- **Acquire** domain-specific network data
- **Fill in gaps** using sophisticated algorithms
- **Normalize** into network structure
- Understand how **layers** are connected to each other
- **Analyse** the network to identify issues
- **Visualize** it
- **Control** it



Creating the ultimate network data source: Fiber-to-service visibility



Complete

Multilayer, multivendor, and multidomain topology, traffic, and services (SDN and legacy)

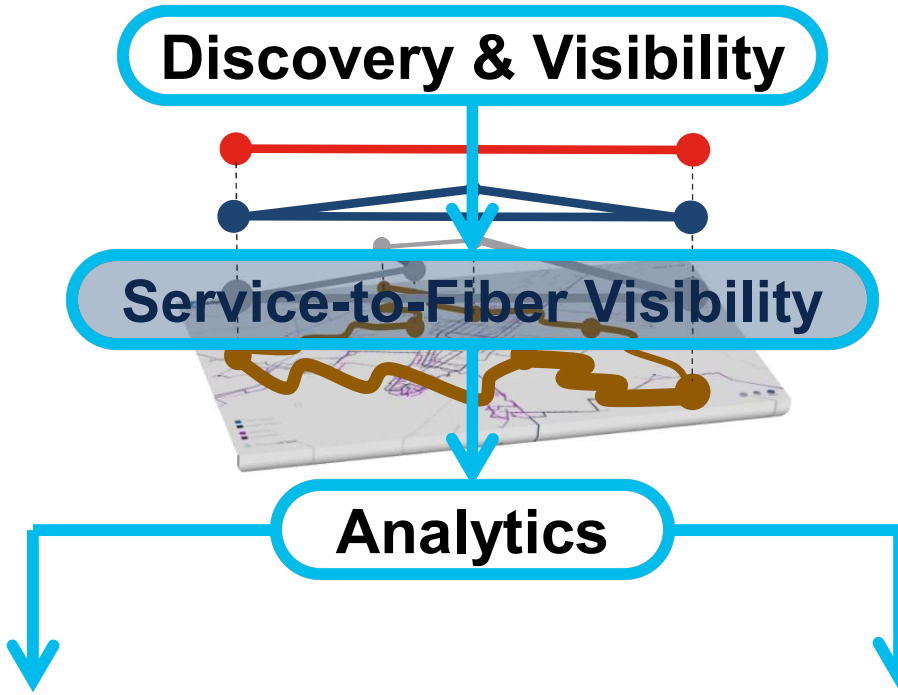
Current

automatically and ongoingly discovered – directly from the network

Correlated

dynamically deducing cross-domain connectivity

We Apply the Data to Transform Network Operation



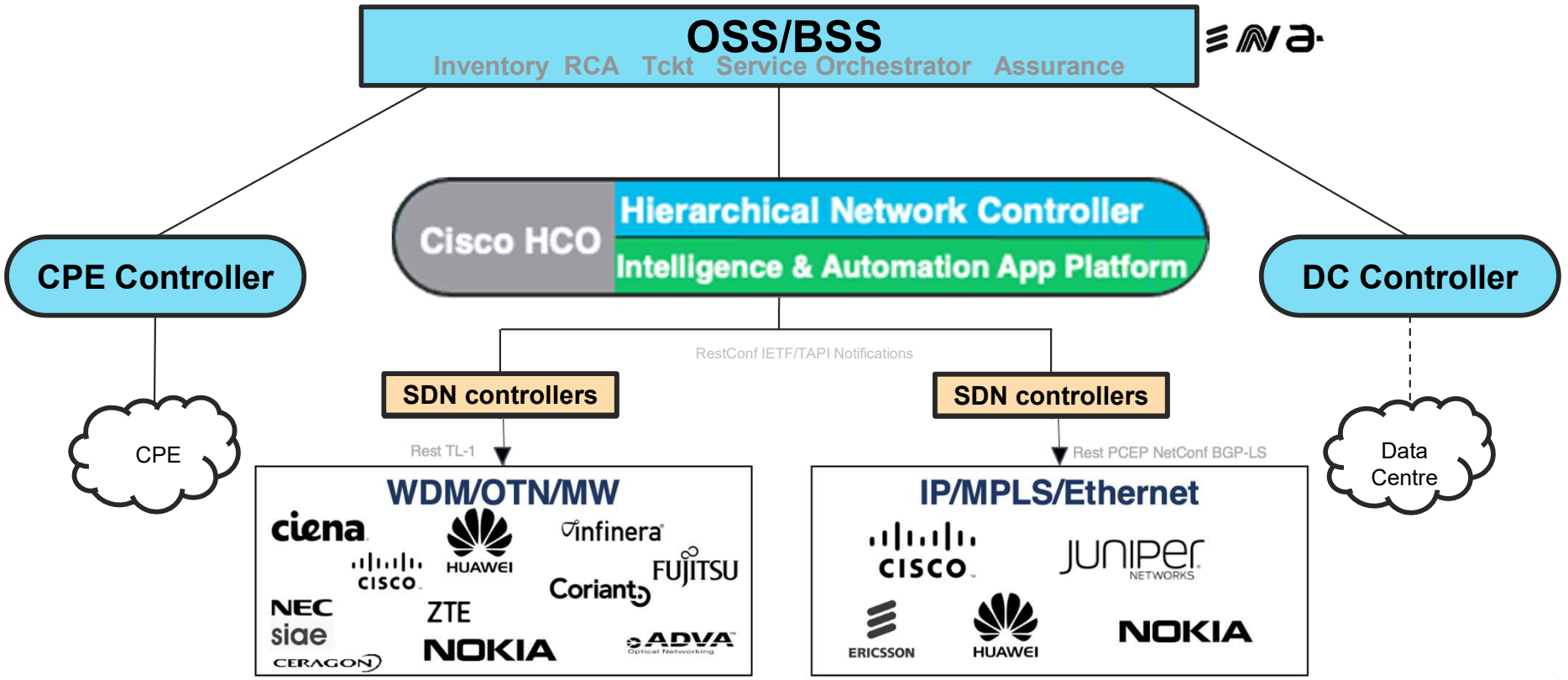
Insights

Inventory validation
Diversity assurance
Live auditing
Network anomalies
Policy compliance

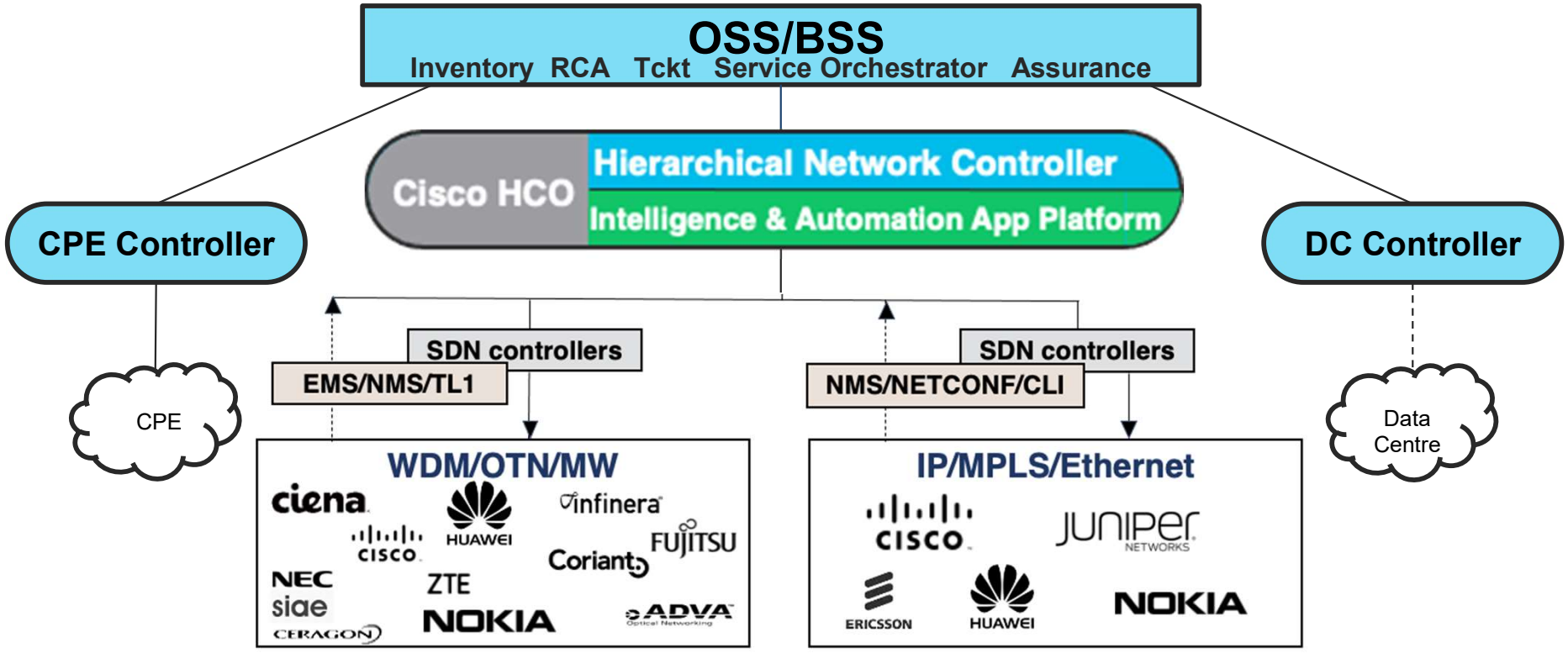
Action

Multi-layer provisioning
Bandwidth on demand
SRLG sharing
Multi-layer restoration
Disaster recovery

Use Case #1a – Crosswork HCO's Role in the SDN Architecture



Use Case #1b - Transition from Legacy to SDN

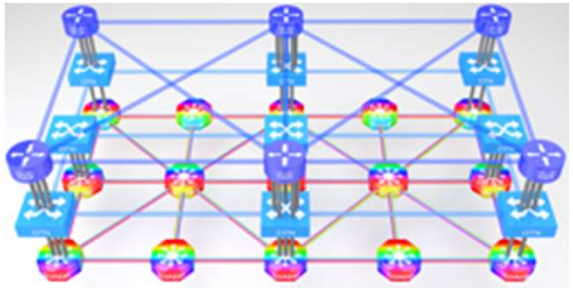


Use case - #2 – Routed Optical Networking

Today's Architecture

Complex Operations
Siloed Layers

IP NMS | Optical NMS

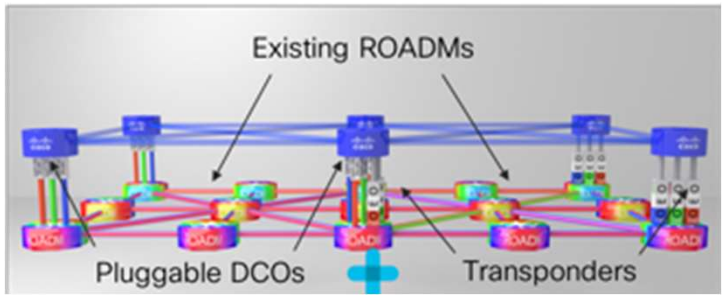


3 Control Planes
IP/MPLS+ GMPLS + WSON/SSON

Transitional Architecture: ZR-Enabled Network

Crosswork HCO
Single Pane of Glass

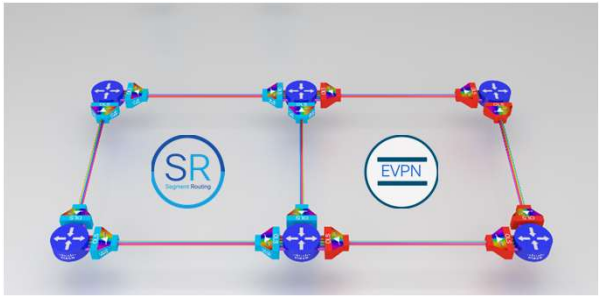
IP SDN Controller (CNC) | Optical Controller (ONC/ Existing)



Routed Optical Networking Architecture

Crosswork HCO
Single Pane of Glass

IP SDN Controller (CNC) | Optical Controller (ONC/ Existing)



Single Control Plane
Converged IP + Optical Architecture

Acacia

Transponder → Pluggable

leaba semiconductor

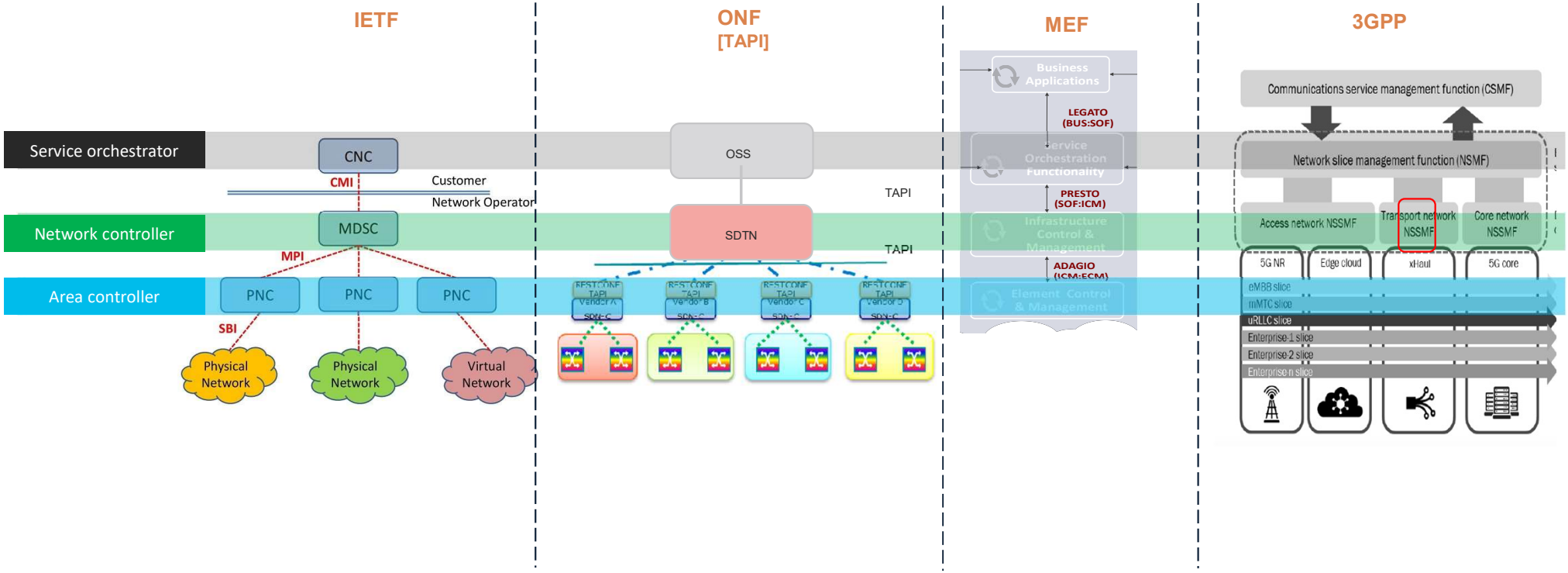
Massive Scalable Silicon

Crosswork Automation

sedona systems

Industry Automation: Standardization

Aligned to standards



…As Well as by Major Telco Groups

- HCO is the interface between the OSS world and the network
- HCO has complete network visibility
- HCO closes the loop for network functions (remediation, optimization)
- HCO abstracts the network towards the OSS

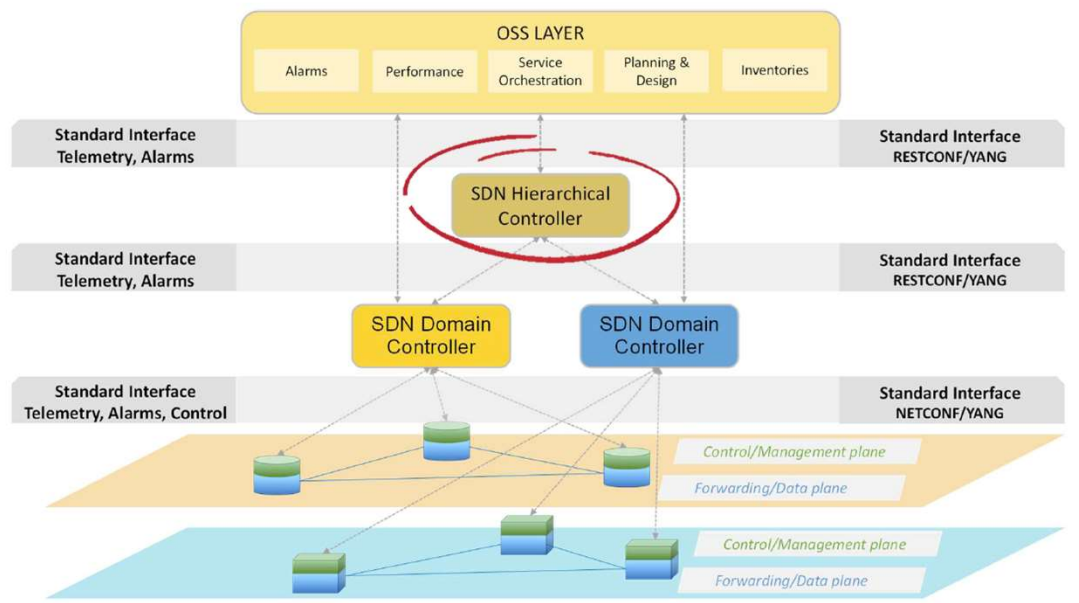
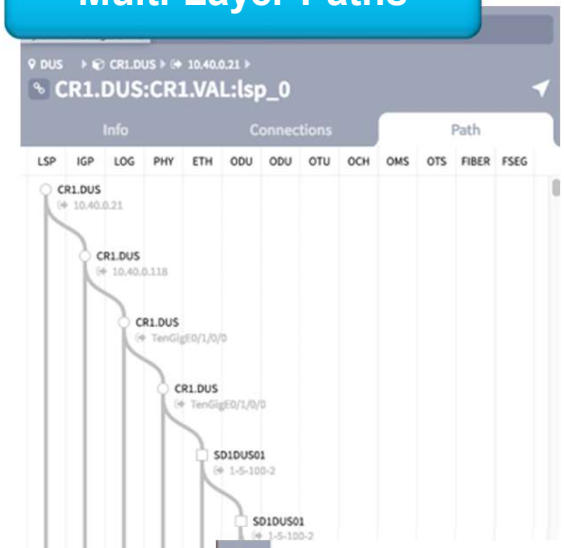


Figure 1: Open Transport SDN Architecture Vision

https://cdn.brandfolder.io/D8DI15S7/at/jh6nnbb6bjvn7w7t5jbgm5n/OpenTransportArchitecture-Whitepaper_TIP_Final.pdf

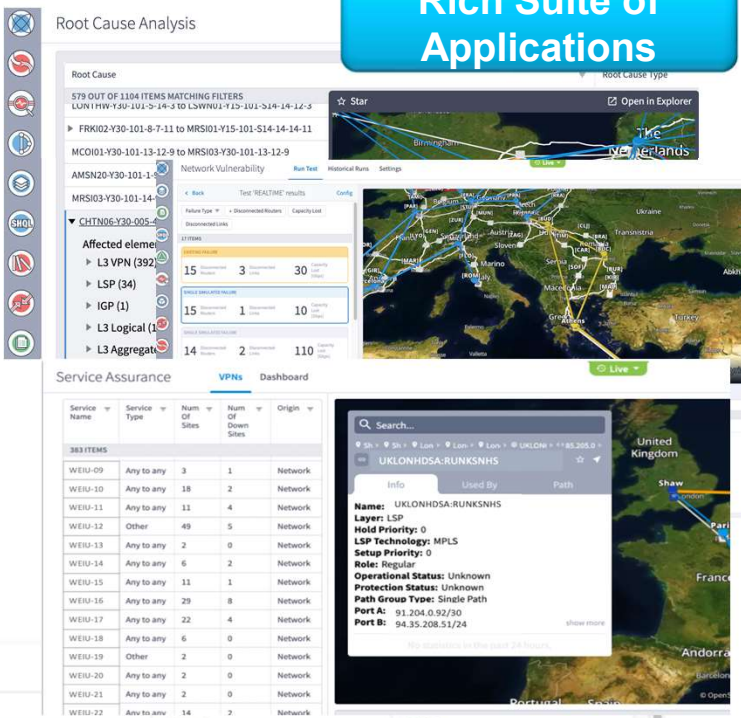
Cisco Hierarchical Controller Core Functions

Multi-Layer Paths

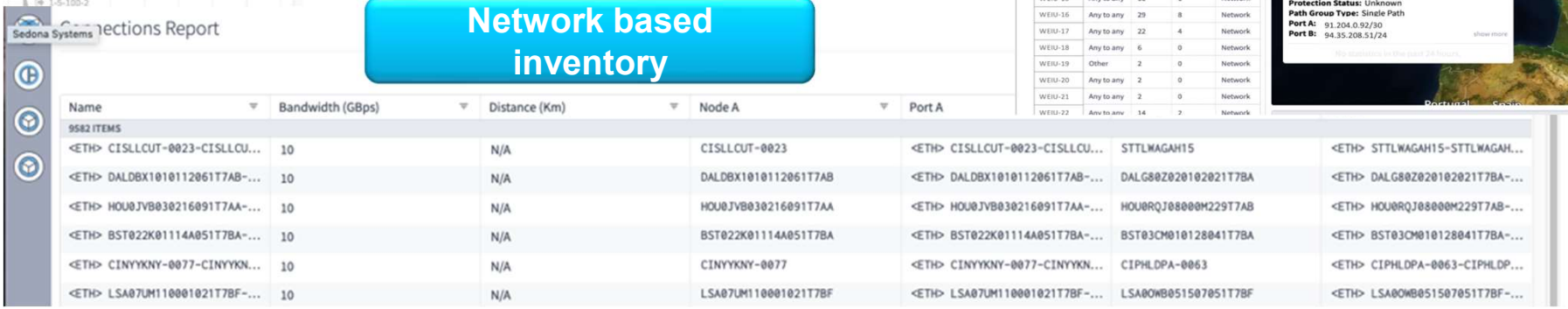


Service to Fiber Topology

Rich Suite of Applications



Network based inventory



Name	Bandwidth (GBps)	Distance (Km)	Node A	Port A		
9582 ITEMS						
<ETH> CISLLCUT-0023-CISLLCU...	10	N/A	CISLLCUT-0023	<ETH> CISLLCUT-0023-CISLLCU...	STTLWAGAH15	<ETH> STTLWAGAH15-STTLWAGAH...
<ETH> DALDBX1010112061T7AB-...	10	N/A	DALDBX1010112061T7AB	<ETH> DALDBX1010112061T7AB-...	DALG80Z020102021T7BA	<ETH> DALG80Z020102021T7BA-...
<ETH> HOU0JVB030216091T7AA-...	10	N/A	HOU0JVB030216091T7AA	<ETH> HOU0JVB030216091T7AA-...	HOU0RQJ08000M229T7AB	<ETH> HOU0RQJ08000M229T7AB-...
<ETH> BST022K01114A051T7BA-...	10	N/A	BST022K01114A051T7BA	<ETH> BST022K01114A051T7BA-...	BST03CM010128041T7BA	<ETH> BST03CM010128041T7BA-...
<ETH> CINYYKNY-0077-CINYYKN...	10	N/A	CINYYKNY-0077	<ETH> CINYYKNY-0077-CINYYKN...	CIPHLDPA-0063	<ETH> CIPHLDPA-0063-CIPHLDP...
<ETH> LSA07UM110001021T7BF-...	10	N/A	LSA07UM110001021T7BF	<ETH> LSA07UM110001021T7BF-...	LSA0OWB051507051T7BF	<ETH> LSA0OWB051507051T7BF-...

Hierarchical Controller Values

- Create single point of control for entire transport network
  - Network As A Platform
- Enable new architectures & capabilities –
  - Routed Optical Networking
  - 5G
  - On demand services
- Digital twin of complex multi vendor network
- Rationalize interlayer dependencies

In Action (Demo)

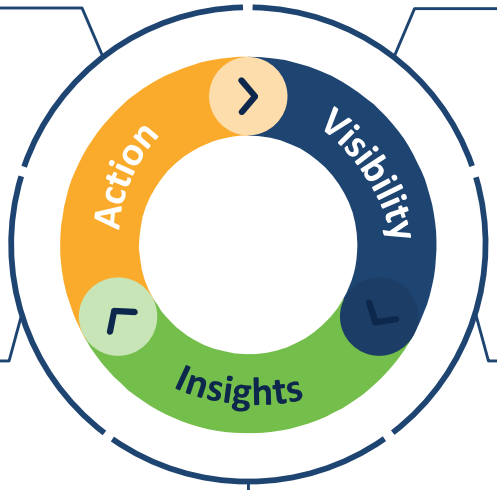
Tenets of Cisco Crosswork Automation

Software defined

API-centric, unlocking of operational data and simpler tool chain integration

Standards-based

Architecture based on standard APIs and protocols giving customers the needed flexibility.



Autonomous

Real-time visibility, assurance, and analytics to support zero-touch operations

Multivendor + multidomain

Robust support for vendors across technologies for the entire service

Scalable + adaptive

Effortlessly adjust to changes in size, volume, and frequency of workflows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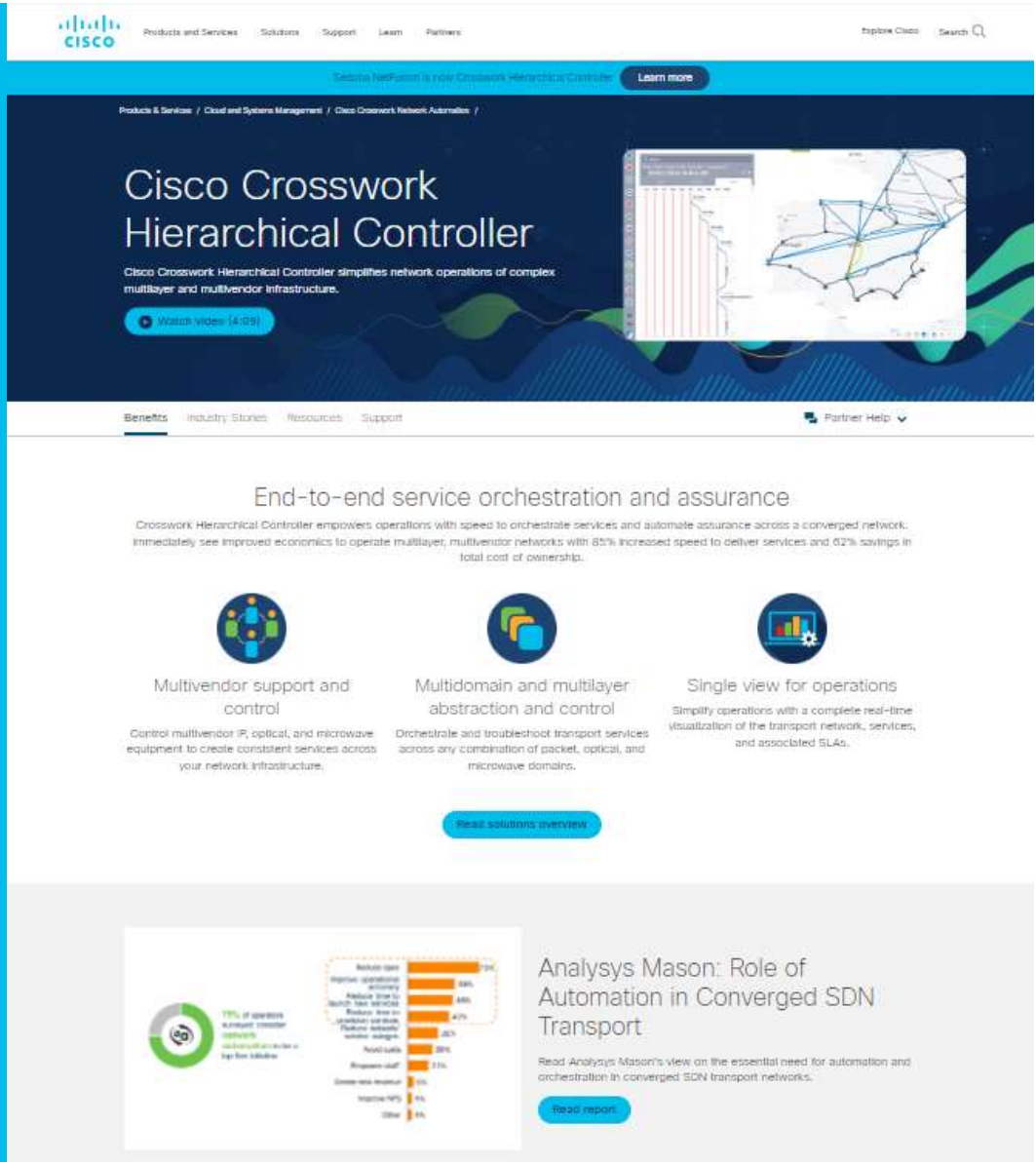
For more information on Cisco's Crosswork Automation portfolio, please visit

cisco.com/go/hco



Questions?

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