Establish the foundation for the converged SDN transport network

Cisco Knowledge Network Webinar

October 26, 2021

Today's Presenters

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Appledore RESEARCH

Moty Cohen

Engineering Product Manager, Crosswork Hierarchical Controller

cisco

Agenda list

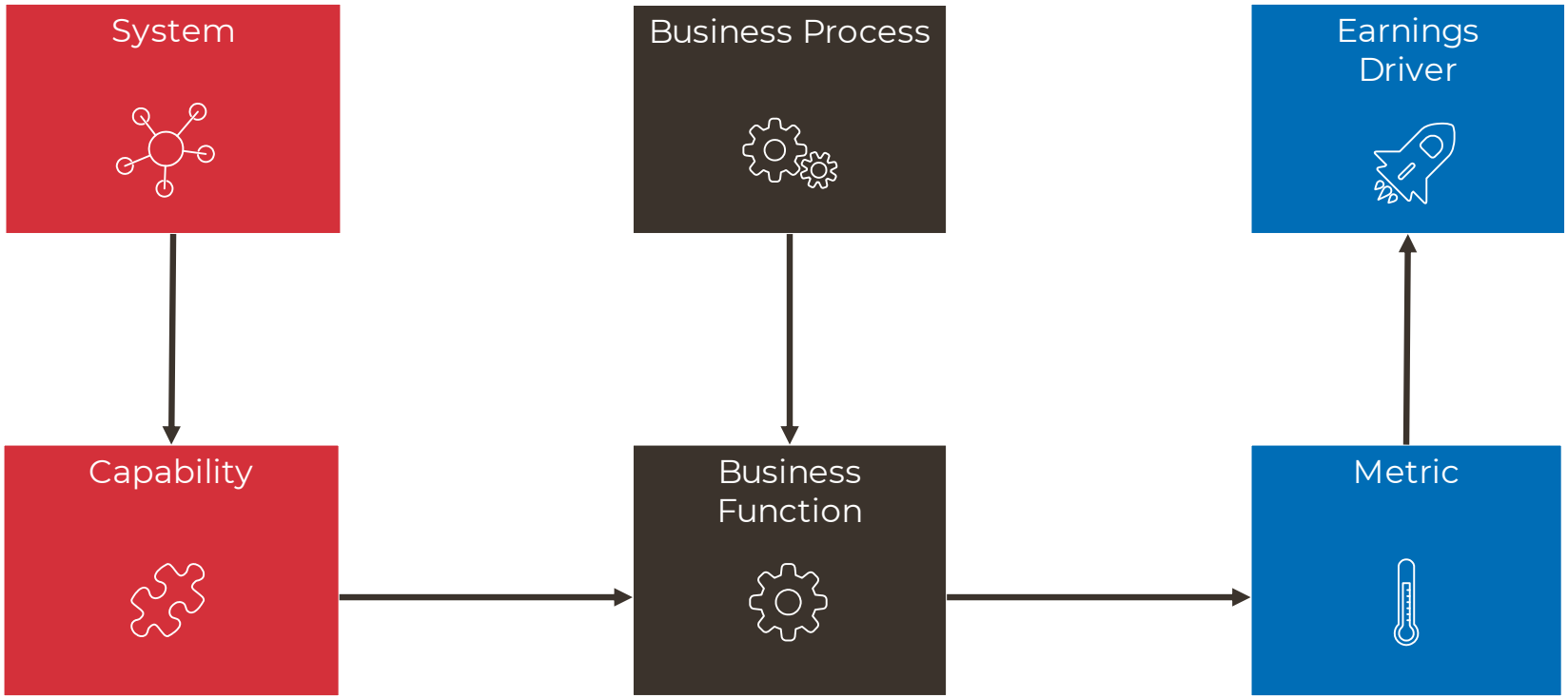
1. Key market developments are reshaping service provider priorities
2. Need for automation and orchestration in converged SDN transport networks
3. Crosswork Hierarchical Controller benefits analysis
4. Cisco’s network automation solution for Converged SDN Transport and RON
5. Questions

Appledore RESEARCH

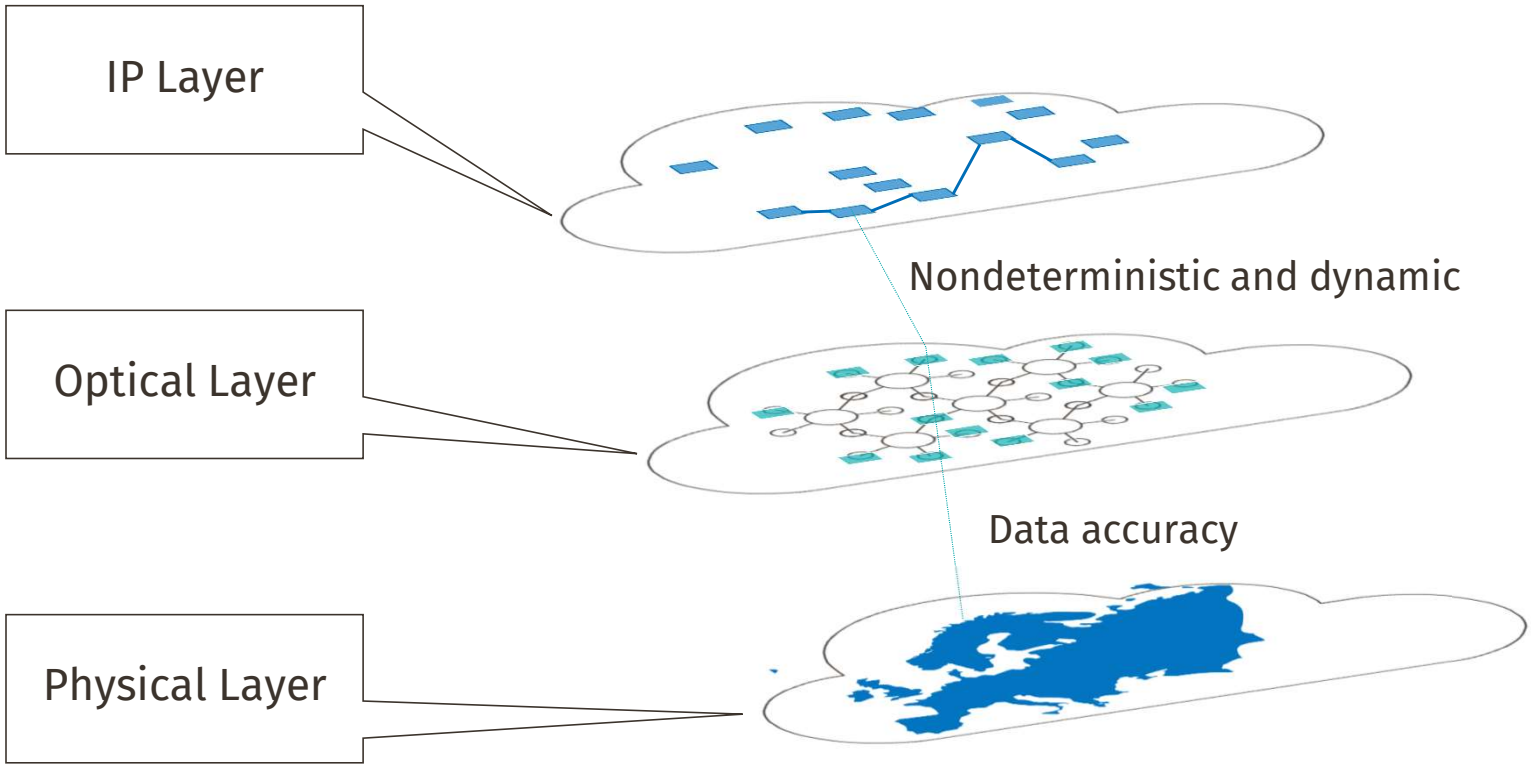
Cisco Crosswork Hierarchical Controller Benefits analysis

The foundation for the converged SDN transport network

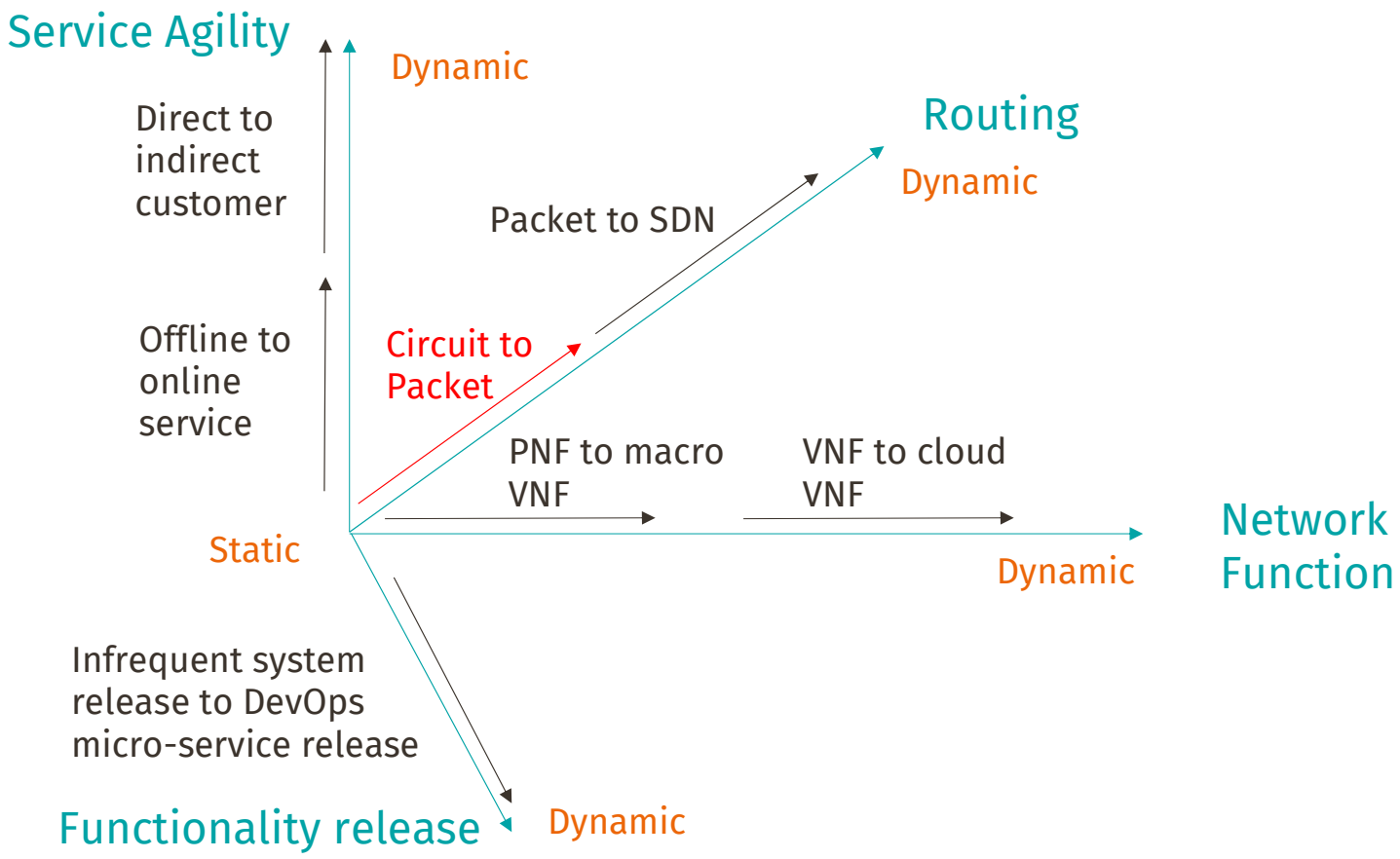
Appledore 3D ROI methodology



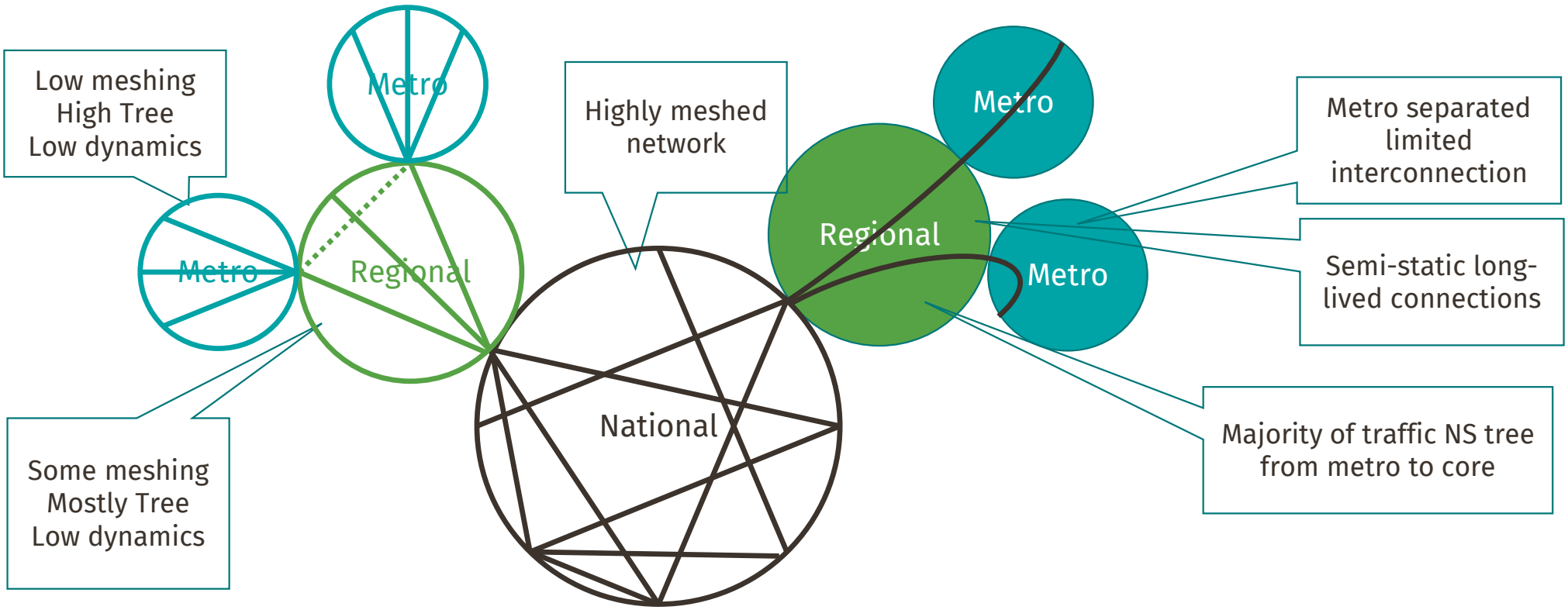
The multi layer transport challenge
Visualization and Management across network layers



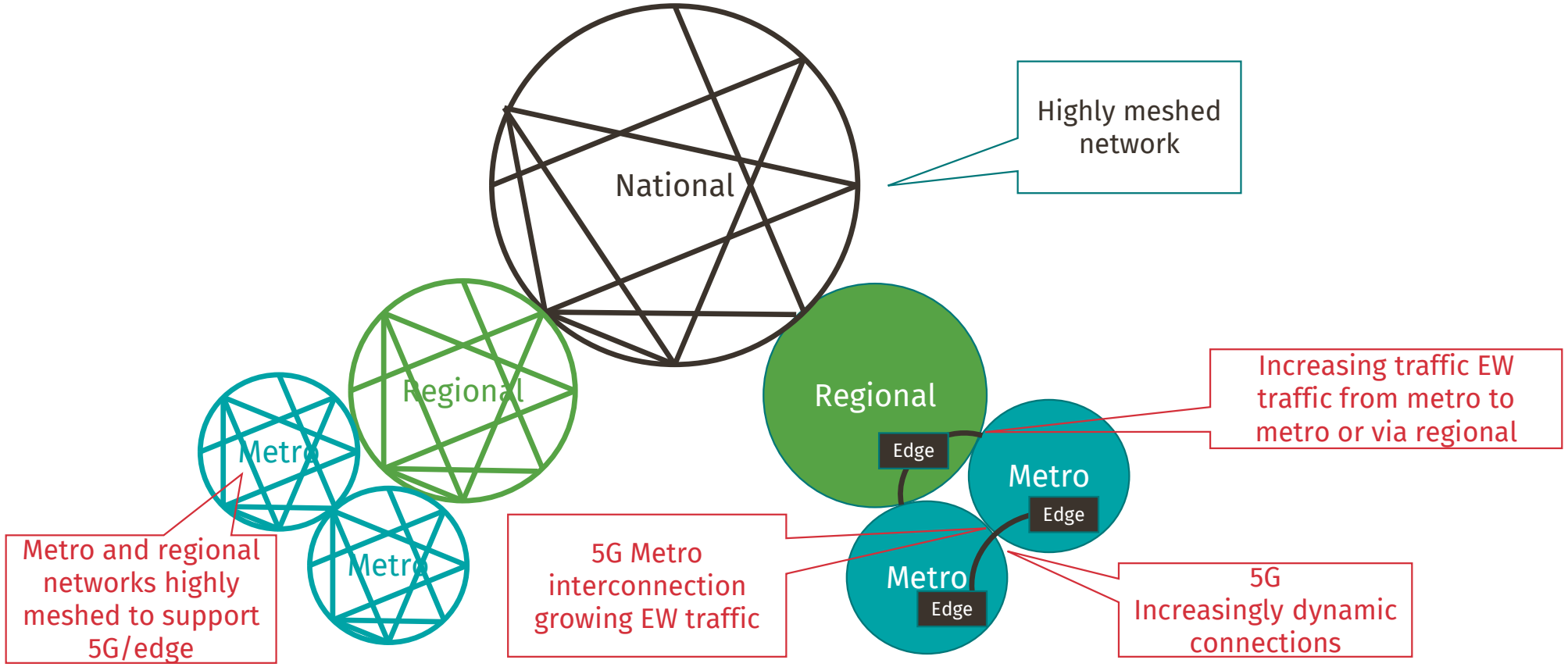
Next generation Networks are dynamic



Today's Transport Network



Tomorrow's 5G/Edge Transport Network



Crosswork Hierarchical Controller Benefit Drivers

- Automation
- Inventory accuracy
- Proactive management of network
- Vendor Independence
- Customer viewpoint
- Warranty

Benefits Modelling

Customers

- Numbers, Growth and Data Growth
- Mobile, Fixed BB, SME and large enterprise

A simplified three tier transport network:

- Metro, Regional, National

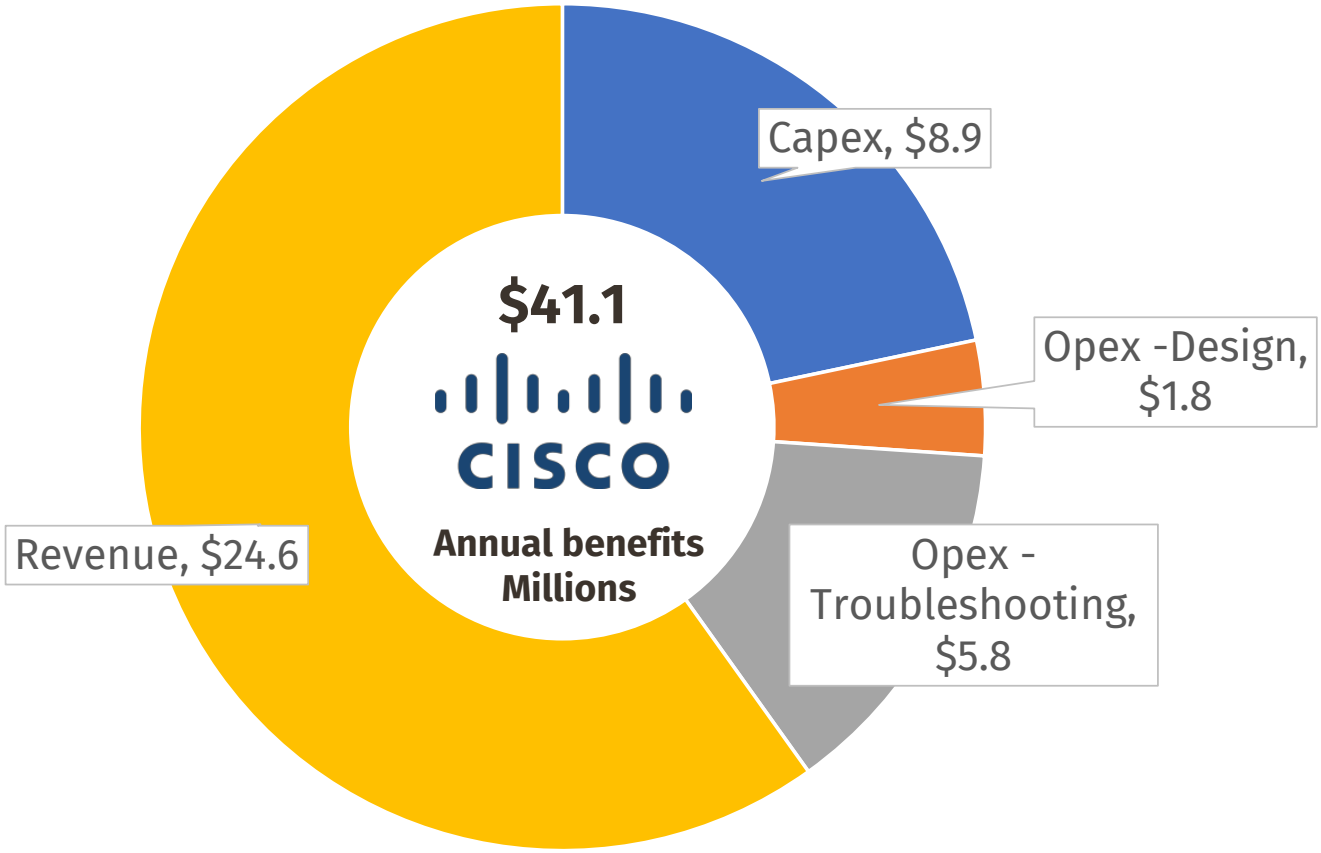
Labor and field activity costs

Port Costs

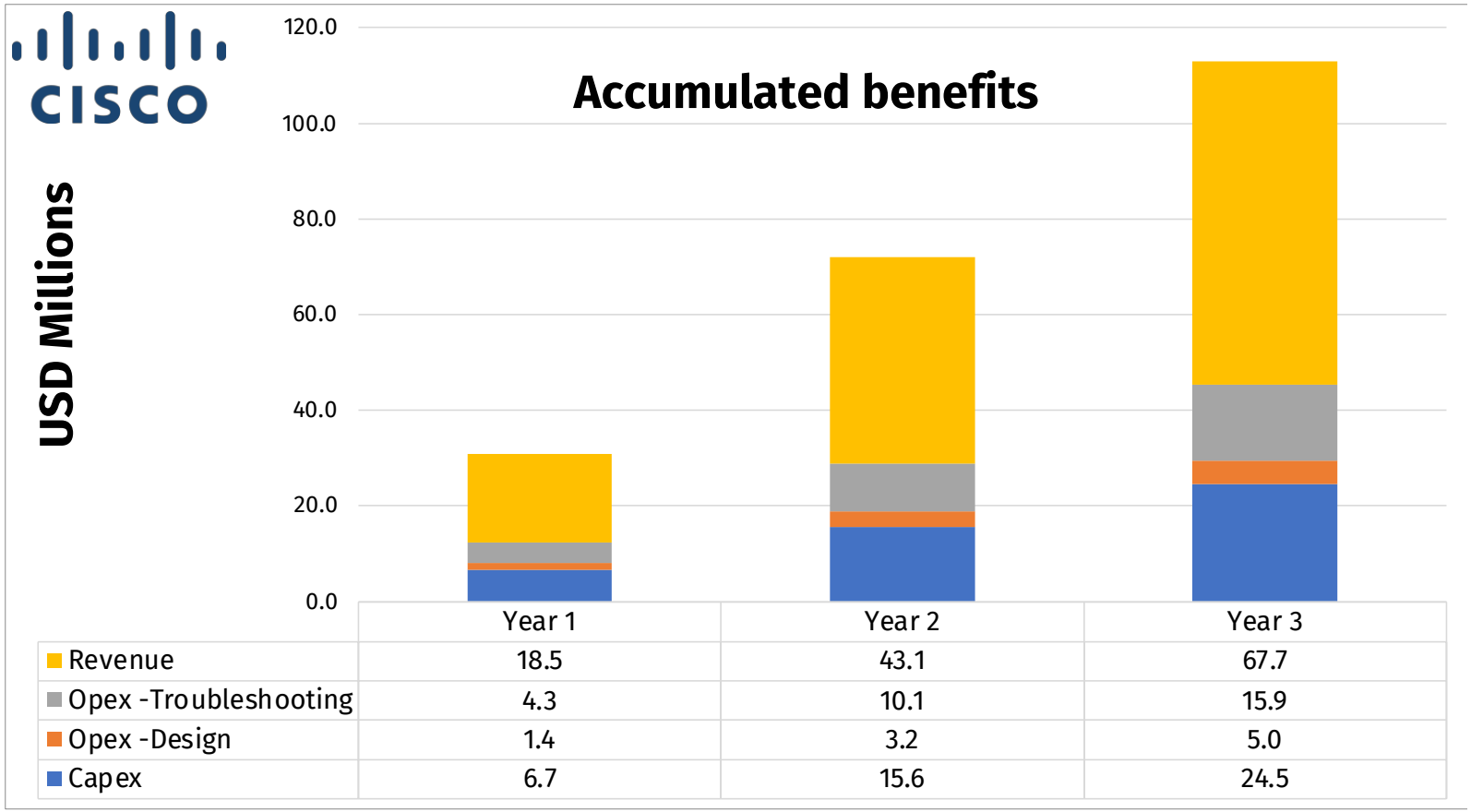
- IP tributary and Optical uplink

Typical operator based on Vodafone UK and UK regulator public figures.

Annual benefits



Accumulated benefits over three years

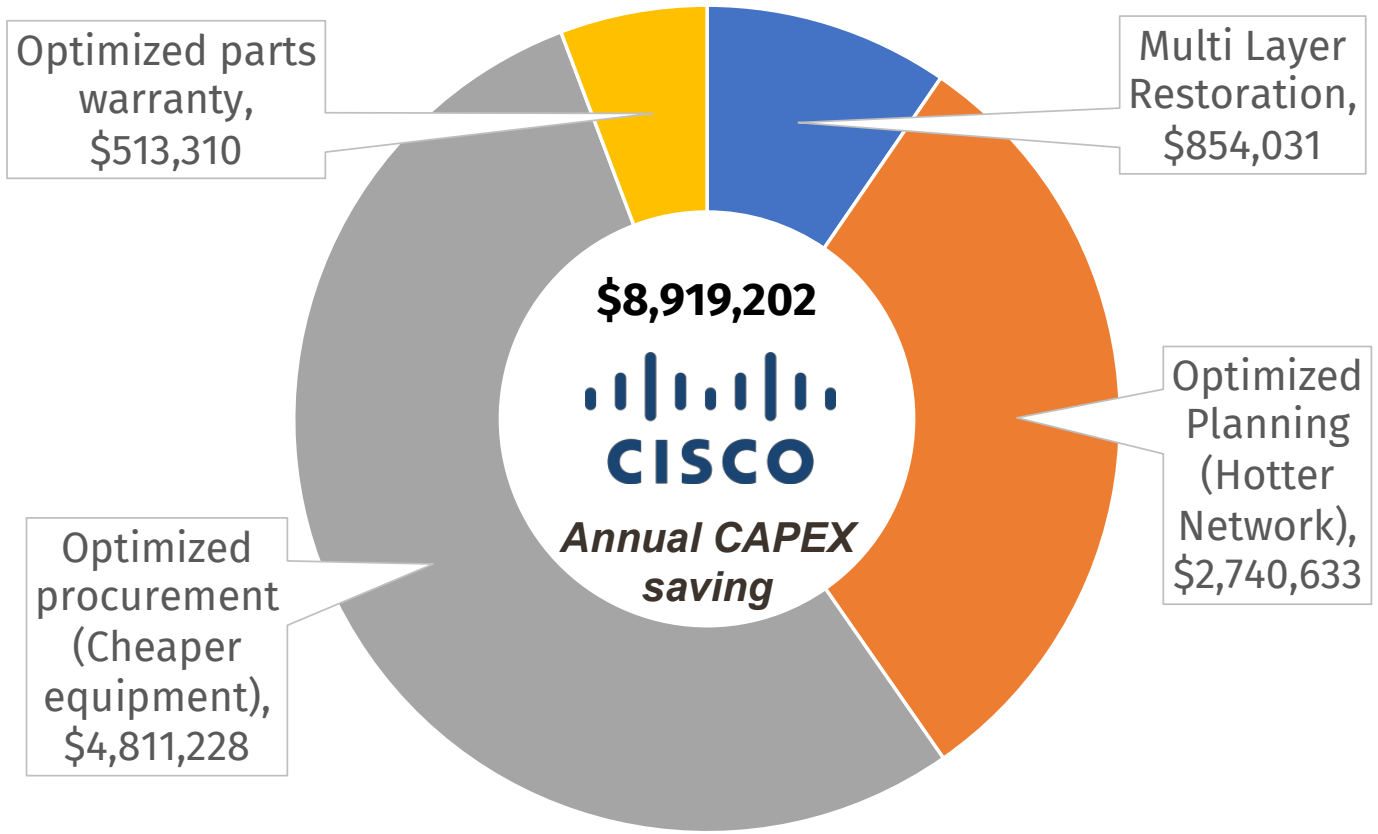


	Year 1	Year 2	Year 3
Revenue	18.5	43.1	67.7
Opex -Troubleshooting	4.3	10.1	15.9
Opex -Design	1.4	3.2	5.0
Capex	6.7	15.6	24.5

CAPEX benefits drivers

- Multi-layer restoration
- Optimized cross-layer planning
- Optimized procurement
- Optimized parts warranty

Annual CAPEX benefits



Revenue benefits drivers

Increase lead conversion from “Network as a Service”

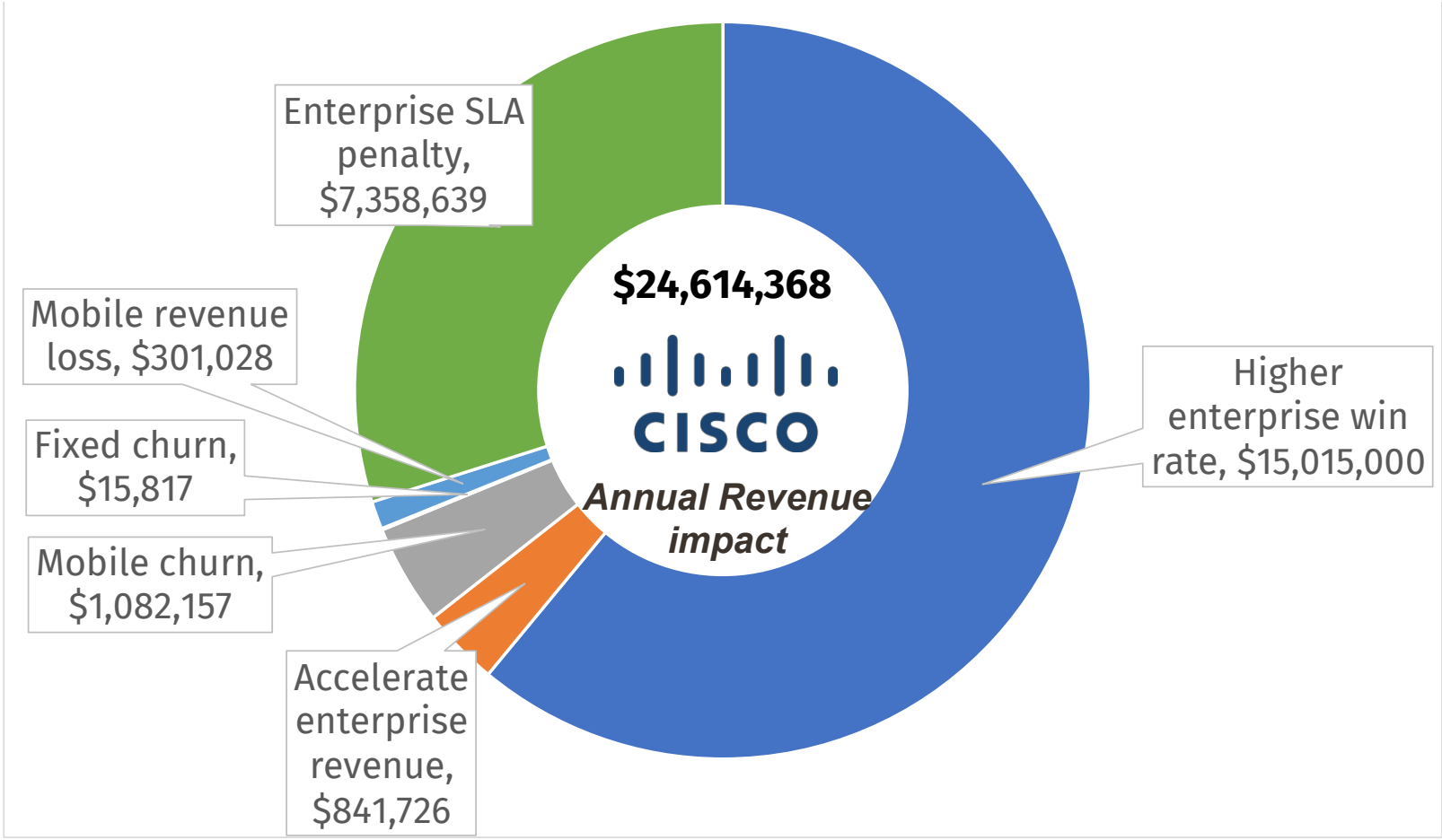
Reduce enterprise SLA penalty payments

Accelerate revenue

Reduced churn from customer tickets

Reduced revenue loss from lower MTTR

Annual Revenue Impact



Opex benefits drivers

Engineering - better design and implementation cost

Engineering - lower field intervention

Troubleshooting – better triage

Troubleshooting – better remedial implementation cost

Troubleshooting - lower field intervention

Cisco’s network automation solution for Converged SDN Transport

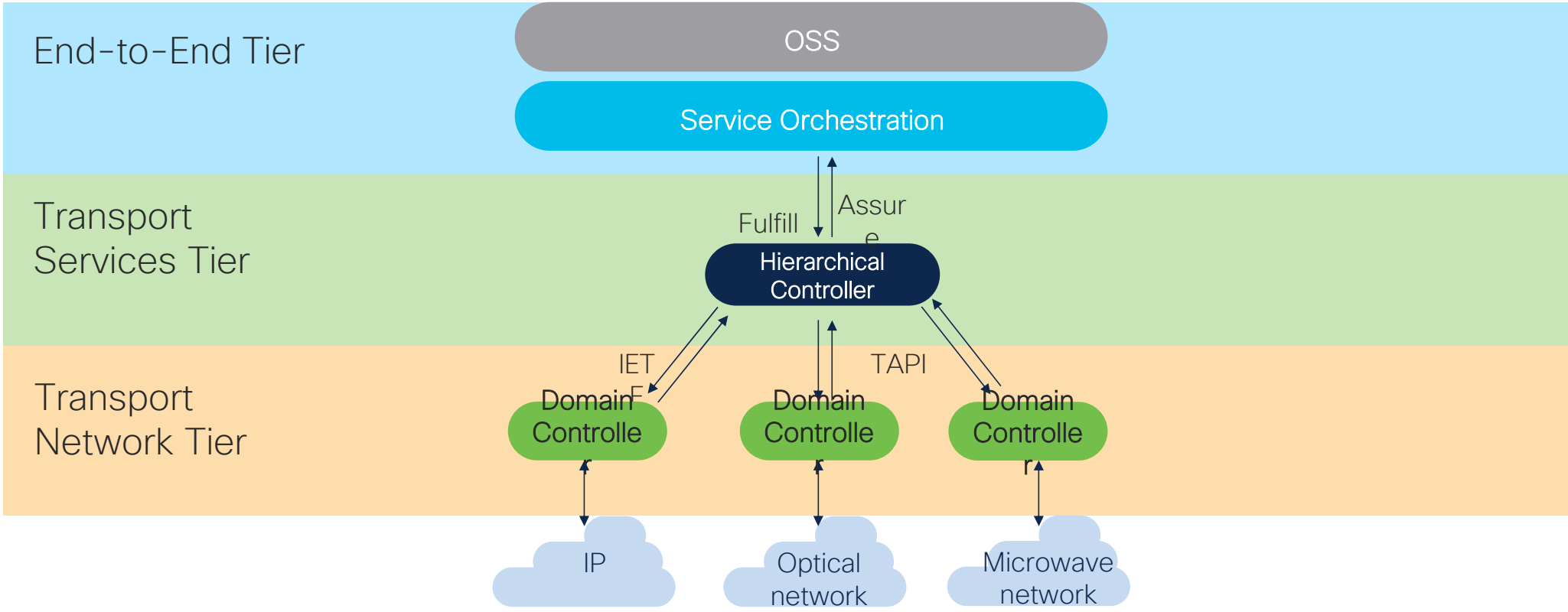
Moty Cohen, Product Management Mass-scale Infrastructure Automation

October 26, 2021

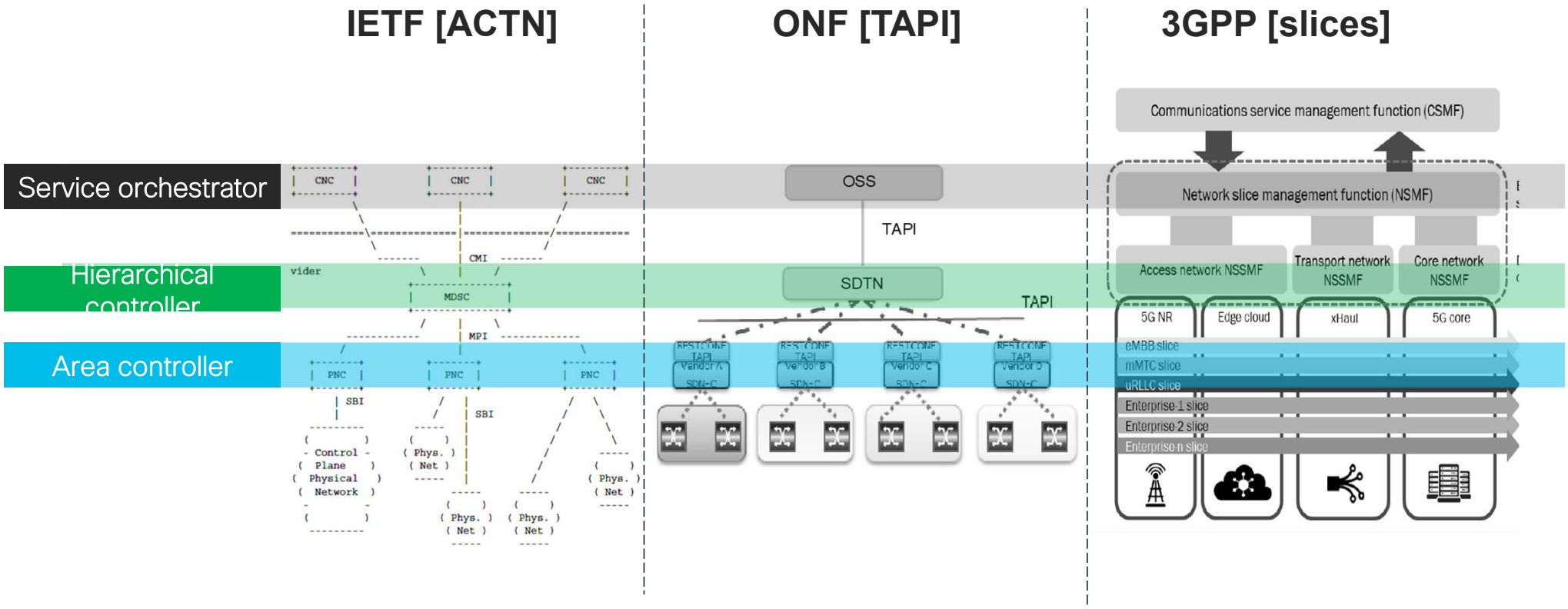
Cisco strategy

1. Cisco leads Internet for the Future with silicon, routing, optical and automation
2. Cisco Routed Optical Networking (RON) converges IP and optical networks with pluggable coherent optics and automation
3. Simplified RON networks operate at mass-scale with 46% less cost
4. Crosswork Hierarchical Controller complements Cisco Crosswork Network Controller to help customers operate the Cisco Routed Optical Networking solution

Hierarchical Architecture



Hierarchical Controller Architecture Endorsed by Standard Bodies



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…As Well as by Major CSP Groups

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

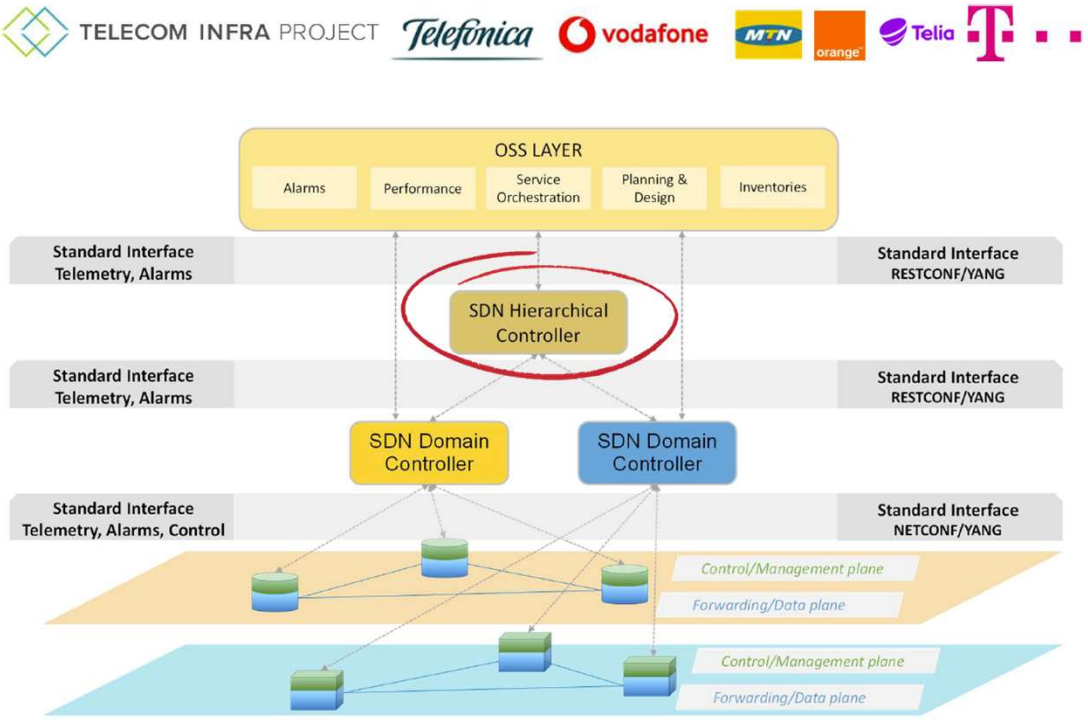

Figure 1: Open Transport SDN Architecture Vision

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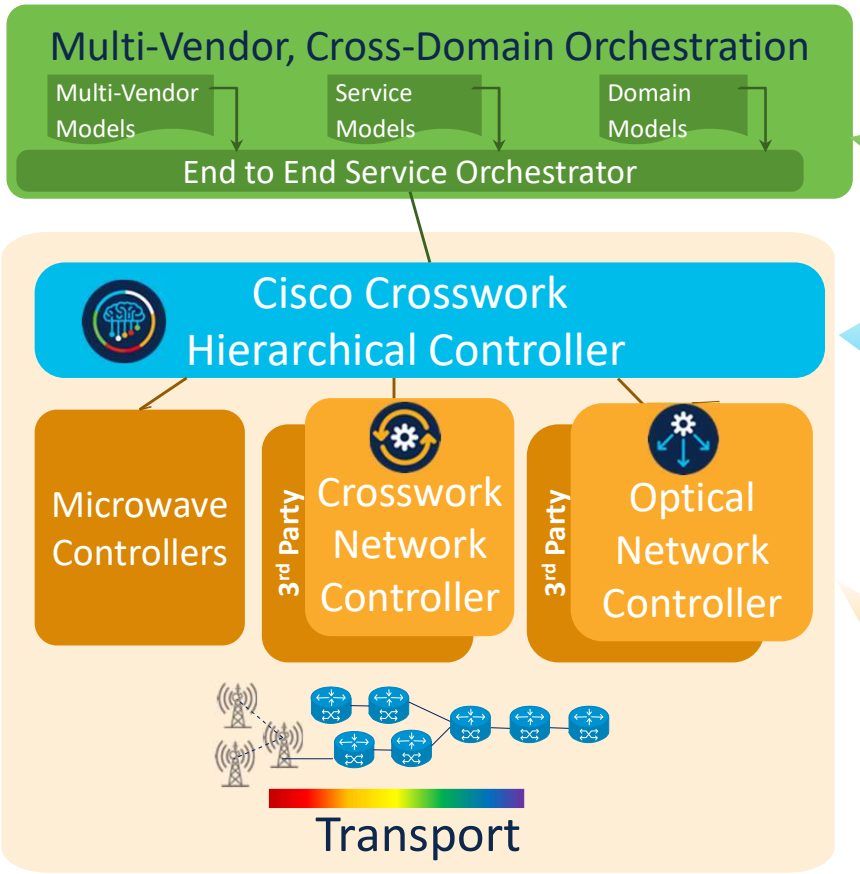
Transport Domain Functional Layers



- E2E service lifecycle management (Transport, Radio, DC)
- Resource management (storage, compute, network)

- Unified view of all layers and domains.
- Hierarchical PCE
- Decomposes service and SLA per domain
- Manages network resources centrally.
- Northbound network abstraction (NBI).

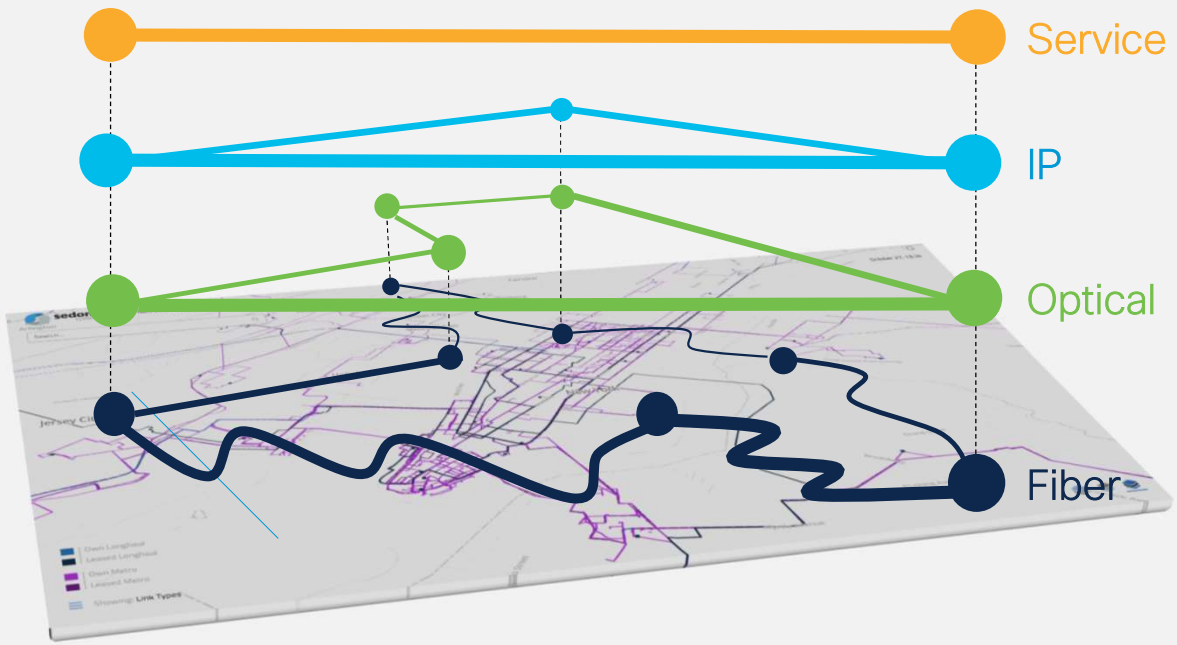
- PCE inside domain
- IP/MPLS/SR layer; Single multi-vendor-domain
- Disaggregated optical networks split the line system and transponder domains
- Microwave in early stages

Strengths and Weaknesses

- 👍 Removes integration/development burden from service provider
- 👍 Allows vendors to innovate
- 👍 Friendly migration path from legacy to next generation platforms
- 👍 Unifies network topologies into a single pane of glass
- 👍 Aligns with new standards and creates modular architecture
- 👎 Introduces a new software layer
- 👎 Many controllers are not fully mature yet
- 👎 Requires close collaboration between service providers and vendors

Crosswork Hierarchical Controller

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



Complete

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

Current

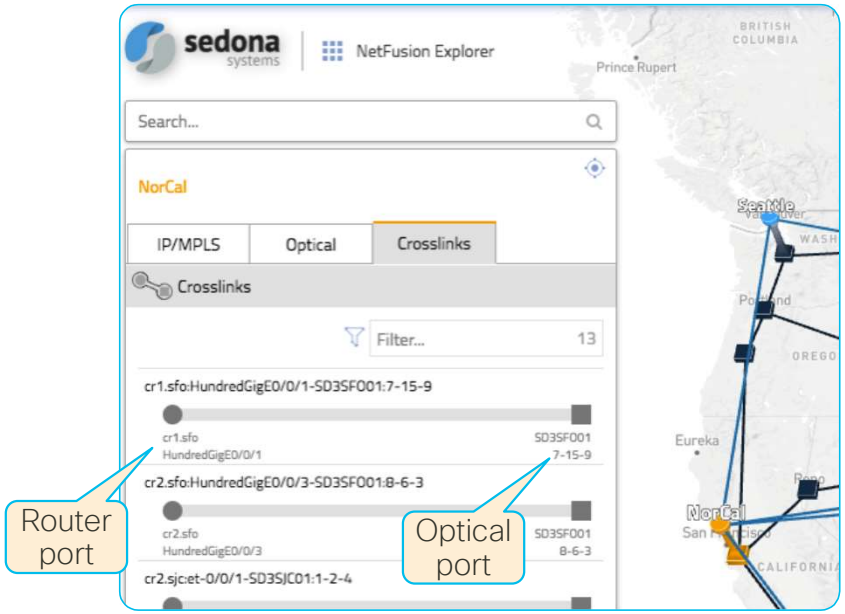
automatically and ongoingly discovered – directly from the network

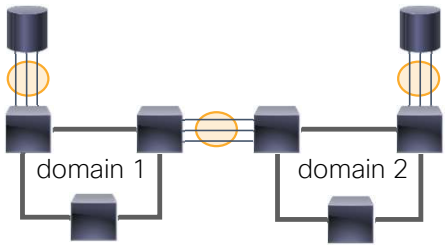
Correlated

dynamically deducing cross-domain connectivity

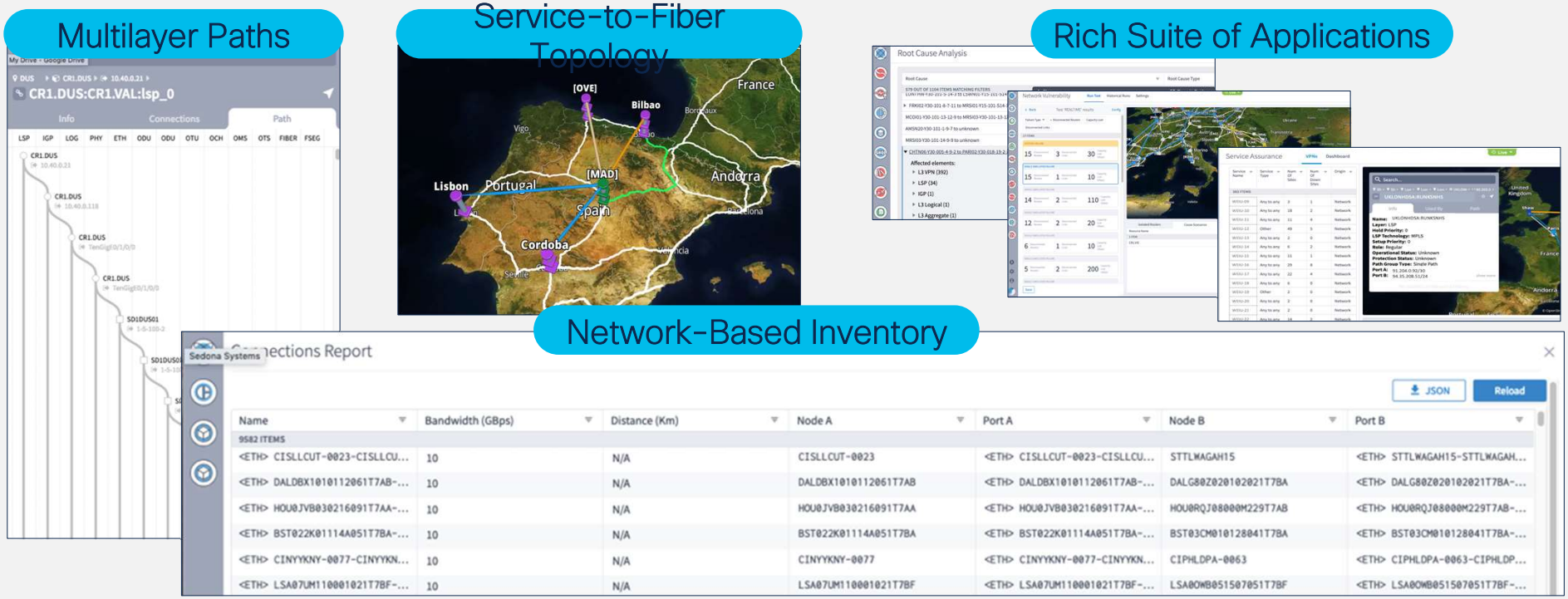
Cross-layer/ domain mapping

- Patented process based on complex analysis of topology, performance data, and transient behaviours
- Mandatory before any autonomous action
- Full mapping impossible using current standards
  - Partial solution for Ethernet via LLDP
  - Partial solution for OTN via TTI
  - Not working on most legacy gear



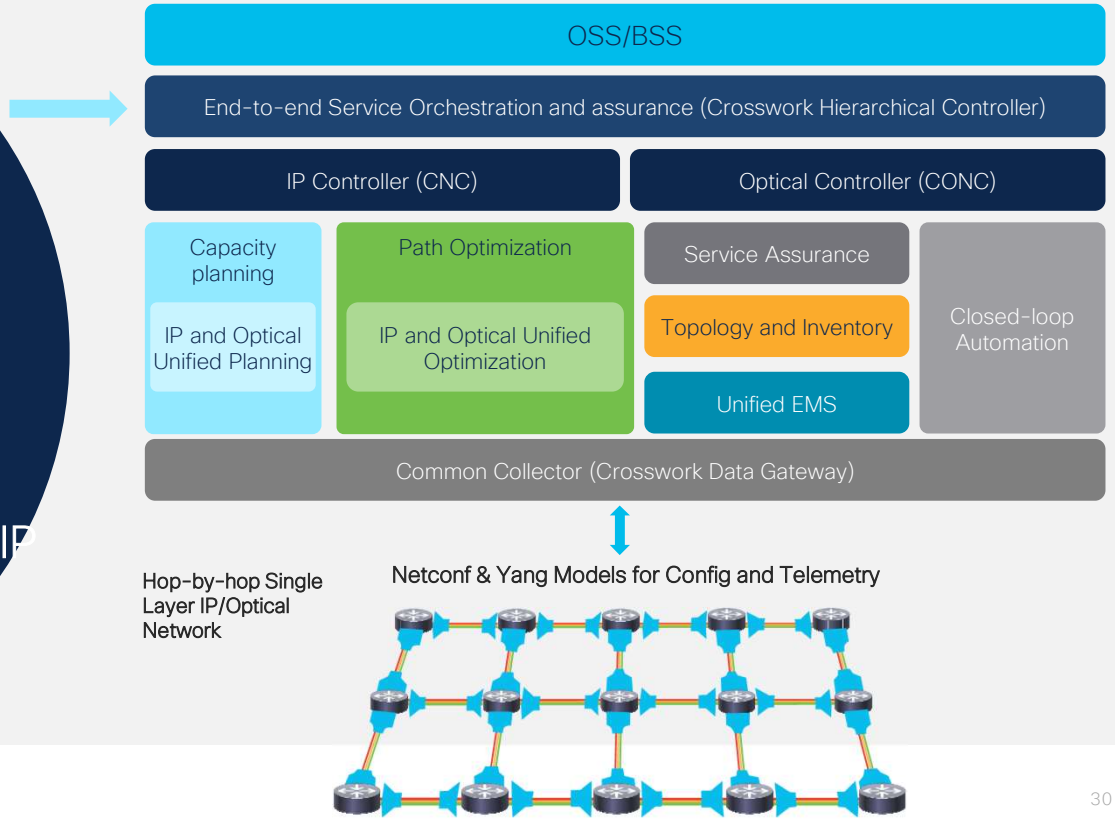


Crosswork Hierarchical Controller core functions



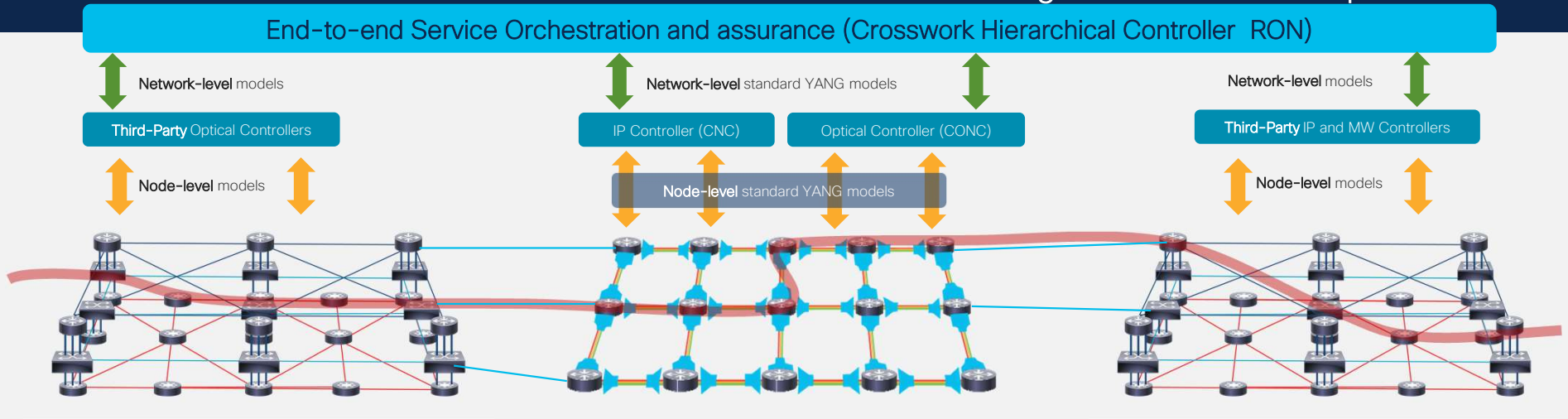
Role of Crosswork Hierarchical Controller in the routed optical network control architecture

- Single pane of glass/API
- NBI to OSS
- Understanding how the layers are connected
- Breaking a multilayer request in the IP part and optical part
- Bridging between RON & non-RON networks across multi-vendor, multi-layer IP and Optical networks.



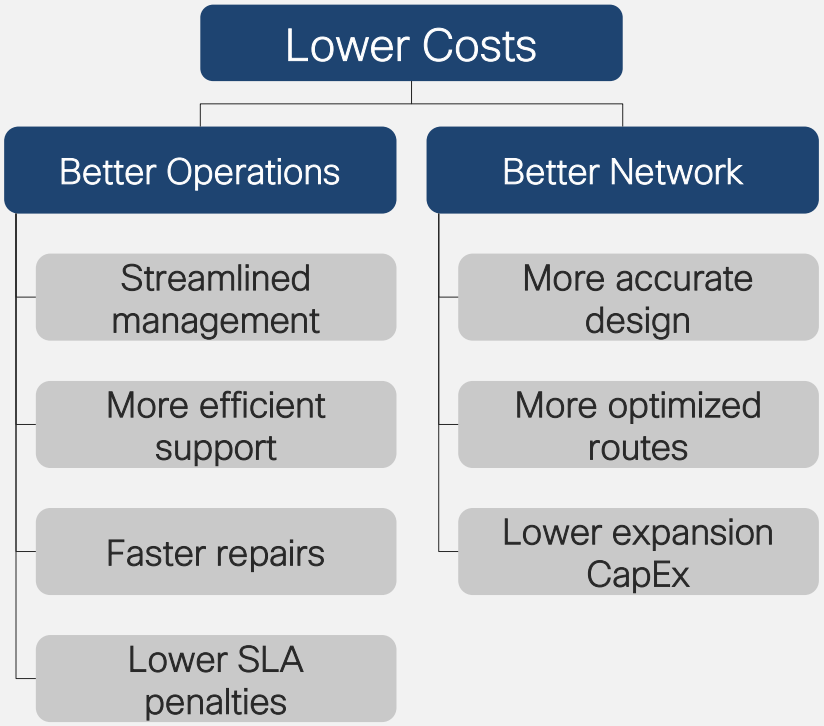
Role of Crosswork Hierarchical Controller in a hybrid RON + legacy network

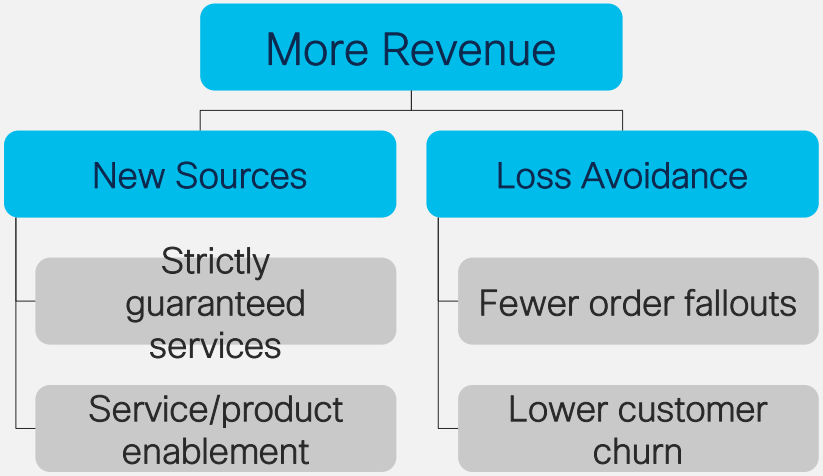
- Deployment scenarios:
  - RON is deployed side by side with other domains
  - RON routers are deployed over legacy WDM systems
- Role of Crosswork Hierarchical Controller RON: control and assure the entire network in a unified easy manner
- Provide smooth introduction for RON into a non-RON network – single look and feel to operations



Delivering incremental value

Economic benefit drivers





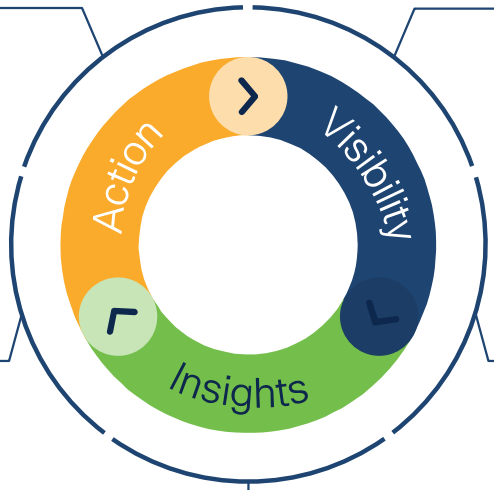
Tenets of Cisco Crosswork Automation

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

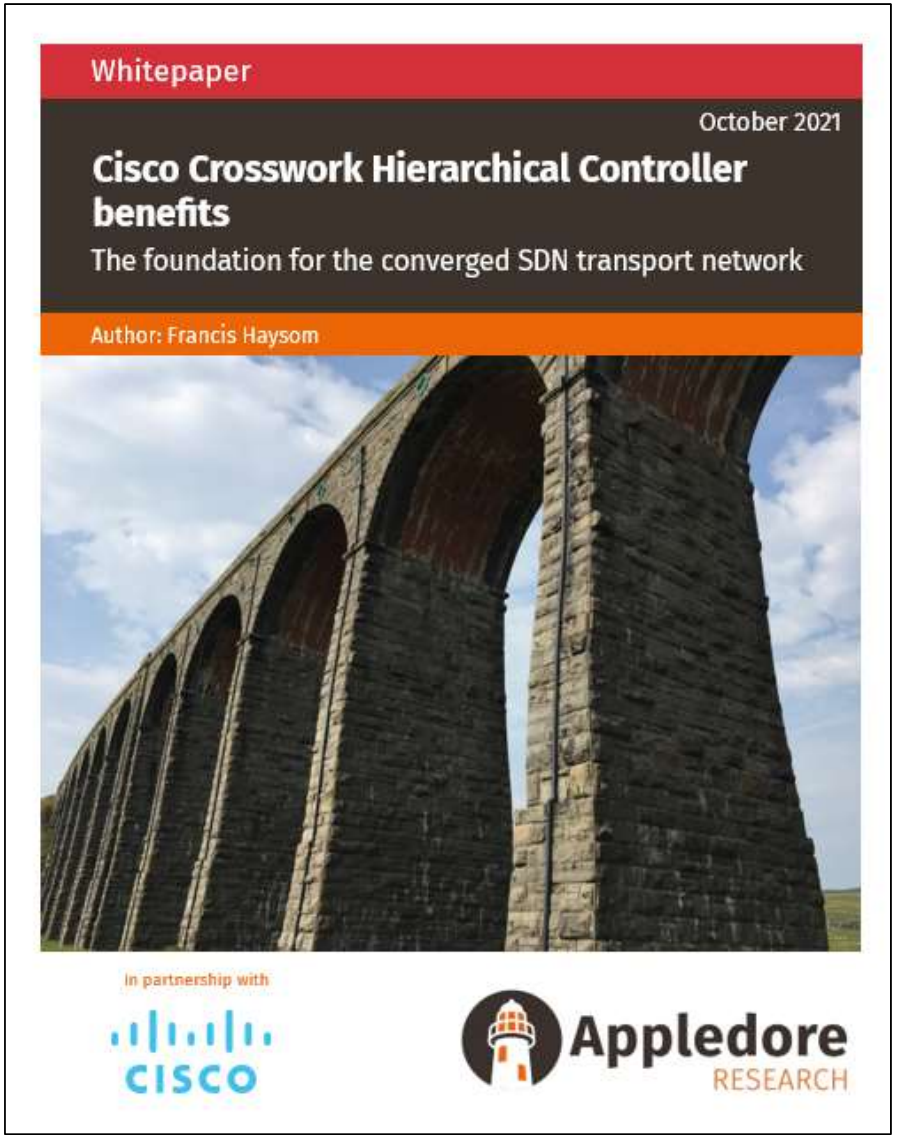
Please download the white paper

Available on

www.appledoreresearch.com

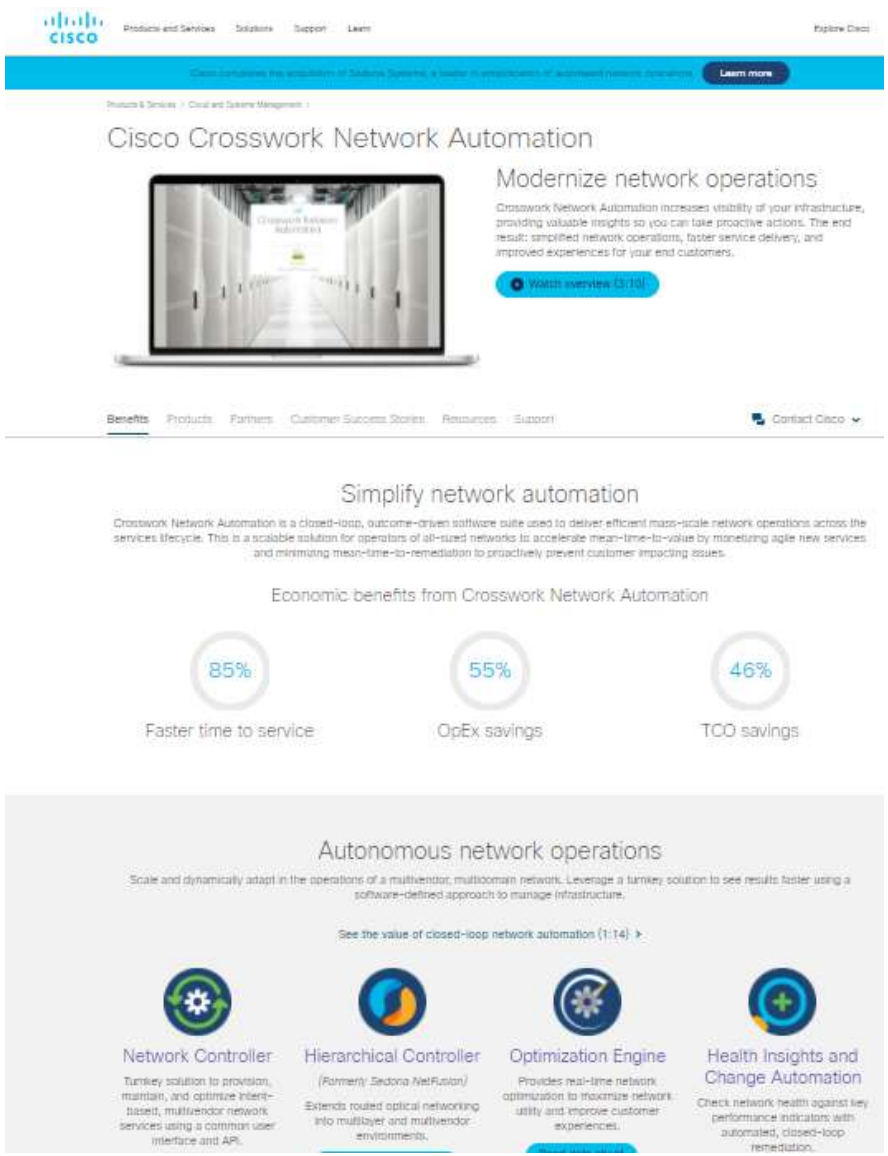
and

www.cisco.com/go/crosswork



For more information on Cisco's Crosswork Automation portfolio, please visit

cisco.com/go/crosswork



Questions?

The bridge to possible

Our Analyst Team

Francis Haysom, Partner & Principal Analyst

Francis has 25+ years of experience in telecoms BSS and OSS software. Francis provides a unique combination of management and technical acumen, combined with 25 years of successful innovation.

Responsible for innovation and strategy in Ericsson Software Solutions and previously Telcordia. Within this role he set, reviewed and presented the strategic direction of both product and customer program delivery. VP - OSS Architecture at Cramer Systems and later Amdocs OSS. As an initial employee of Cramer he was responsible for the development of its professional services organization and its strategic deployment architecture. He has led BSS development teams at BT and Convergys.

Dr. Haysom received his PhD from the University of Bath and a BSc in Engineering Science from the University of Exeter.

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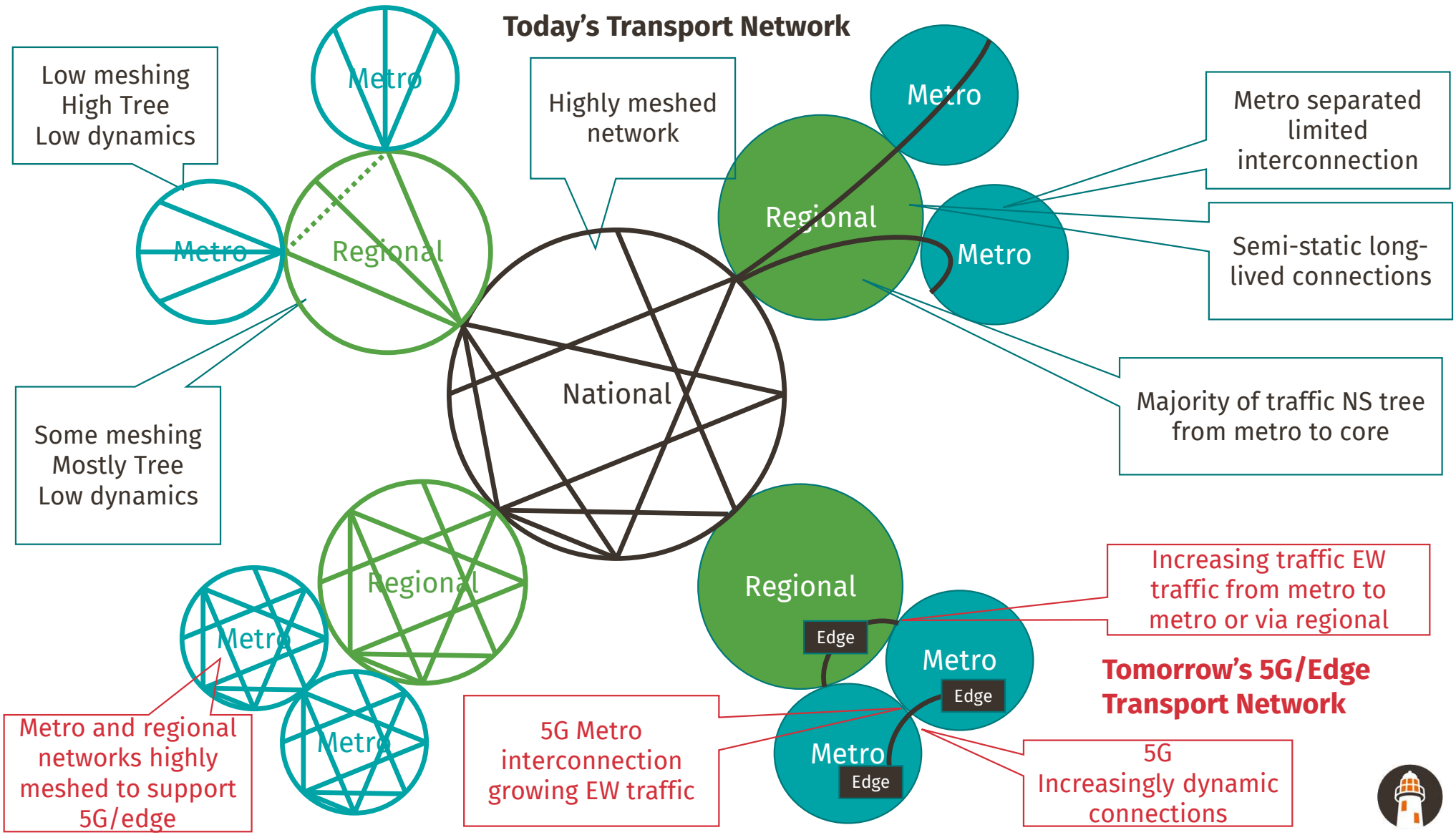
Today's Transport Network
Low meshing
High Tree
Low dynamics
Metro
Metro
Regional
Highly meshed network
Metro
Regional
Metro
Metro separated limited interconnection
Semi-static long-lived connections
Majority of traffic NS tree from metro to core
National
Some meshing
Mostly Tree
Low dynamics
Regional
Metro
Metro
Regional
Edge
Metro
Edge
Metro
Edge
Increasing traffic EW traffic from metro to metro or via regional
Tomorrow's 5G/Edge Transport Network
Metro and regional networks highly meshed to support 5G/edge
5G Metro interconnection growing EW traffic
5G
Increasingly dynamic connections