

The background features a vibrant, abstract design. On the left, there are horizontal, wavy bands of color in shades of red, orange, yellow, and green. On the right, a bright white light source emits a series of colorful rays in shades of blue, cyan, and yellow, creating a sunburst effect.

cisco *Live!*

Let's go

#CiscoLiveAPJC



The bridge to possible

Modernize Your Network with Cisco's Crosswork Automation Suite

Vishakha Mysore, Product Manager
Sujay Murthy, Technical Marketing Engineer Technical Leader

BRKSPG-1543

CISCO *Live!*

#CiscoLiveAPJC

Cisco Webex App

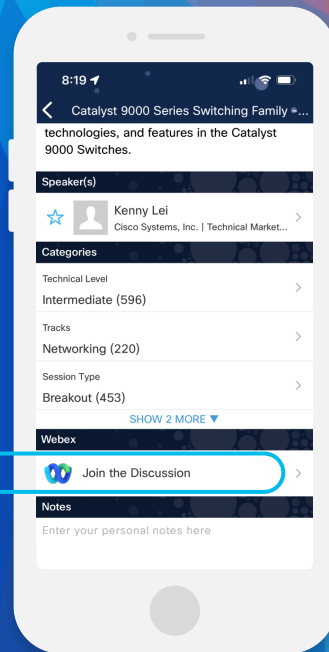
Questions?

Use Cisco Webex App to chat with the speaker after the session

How

- 1 Find this session in the Cisco Live Mobile App
- 2 Click “Join the Discussion”
- 3 Install the Webex App or go directly to the Webex space
- 4 Enter messages/questions in the Webex space

Webex spaces will be moderated by the speaker until December 22, 2023.



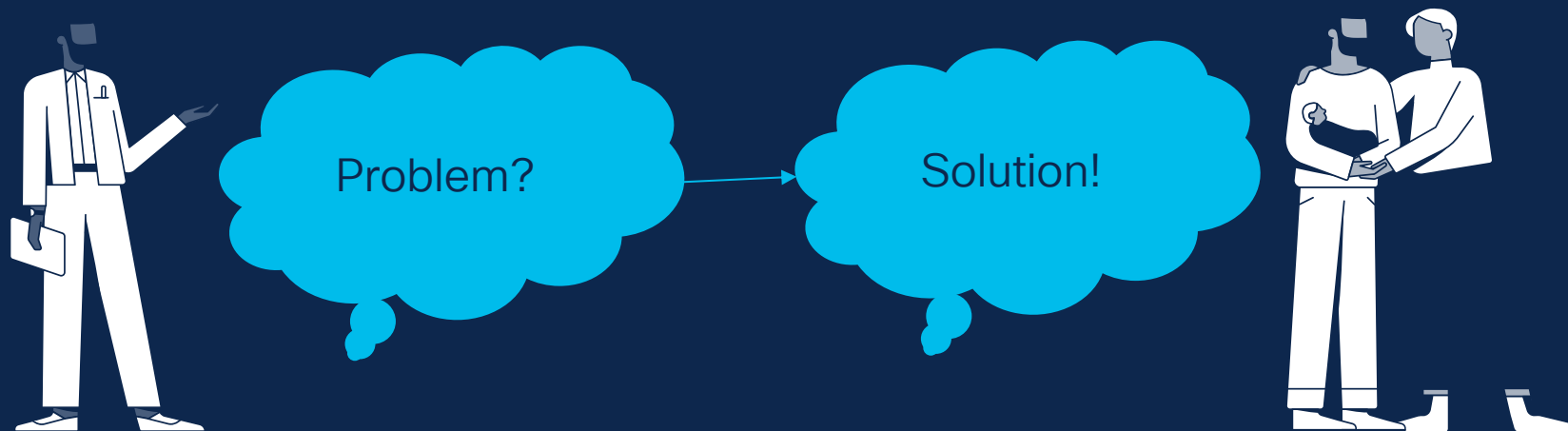
<https://ciscolive.ciscoevents.com/ciscolivebot/#BRKSPG-1543>

Agenda

- Introduction
 - Why you should care about this session
 - What this session covers
 - Why are we presenting this session?
- Crosswork Overview
- Demo
- Conclusion

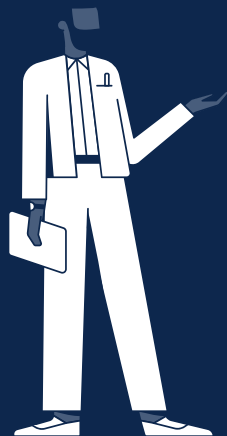
Introduction

Why should you care about this session?



Introduction

What's the problem?



Problems?



Increasing Infrastructure Complexity



Cloud adoption changing nature of managed services



Security Concerns – rise in ransomware attacks



Decreasing supply of skilled workforce

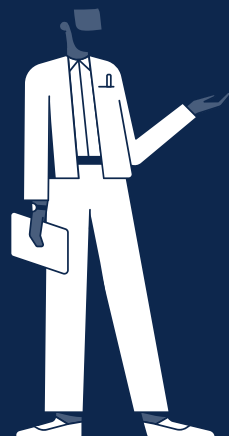


Multiple tools, fragmented observability

<https://www.forbes.com/sites/forbesbusinesscouncil/2023/02/13/what-are-the-modern-challenges-of-managed-service-providers/?sh=40bea6994204>

Introduction

What's the problem?



Problems?



Increasing Infrastructure Complexity



Cloud adoption changing nature of managed services



Decreasing supply of skilled workforce



Multiple tools, fragmented observability

Introduction

Do we have a solution? What would you need in a solution?

Solution!

Cisco's Crosswork Network Automation Suite



Introduction

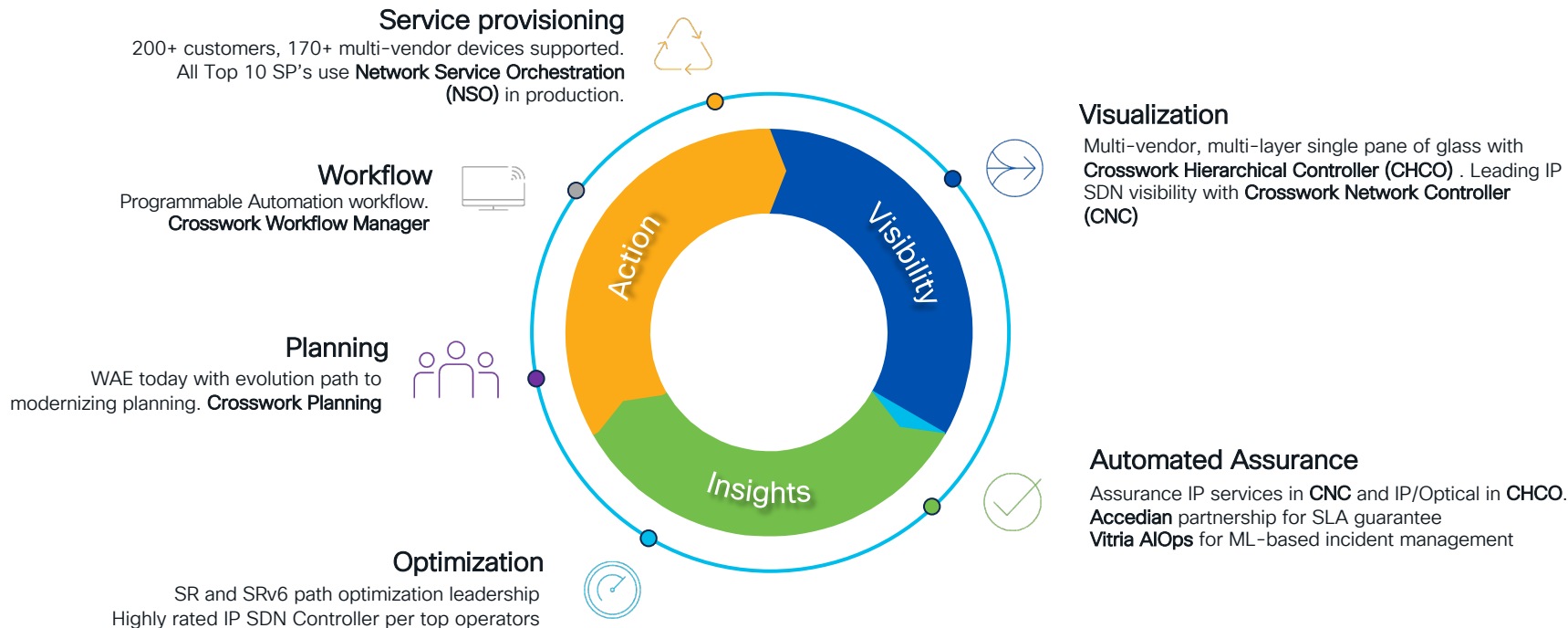
What are you going to get out of this session?

- What actually is Crosswork Network Automation?
- How Crosswork could be the answer to your problems
- Which offers actually make sense for your business?
- What does it take to deploy?
- How do I buy it? (*change to adopt?*)

Crosswork Network Automation Overview

Operationalizing Mass-Infrastructure Networks

Foundation for closed-loop automation and zero-touch networks



Automation On-Premise

Broad Applications to address Operational Lifecycle



Network Controller

Remove siloed tools that provision and operate your mass scale network



Evolved Programmable Network Mgr

Manage a multi-layer, multi-service environment



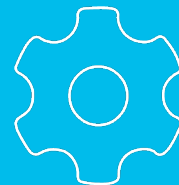
Network Services Orchestrator

Orchestrate multi-vendor, multi-domain service delivery



WAE

Planning tool for capacity planning and what if analyses for different network situations

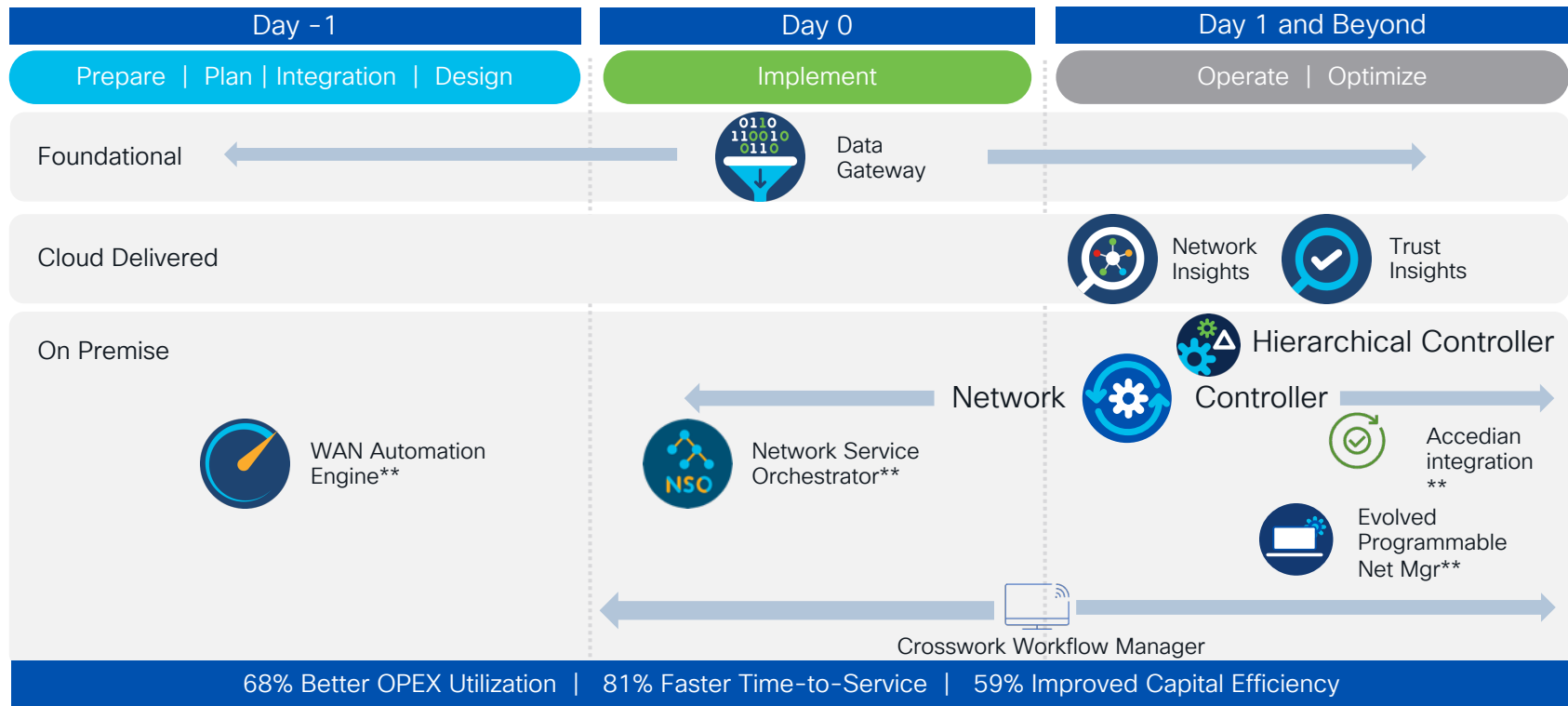


HCO

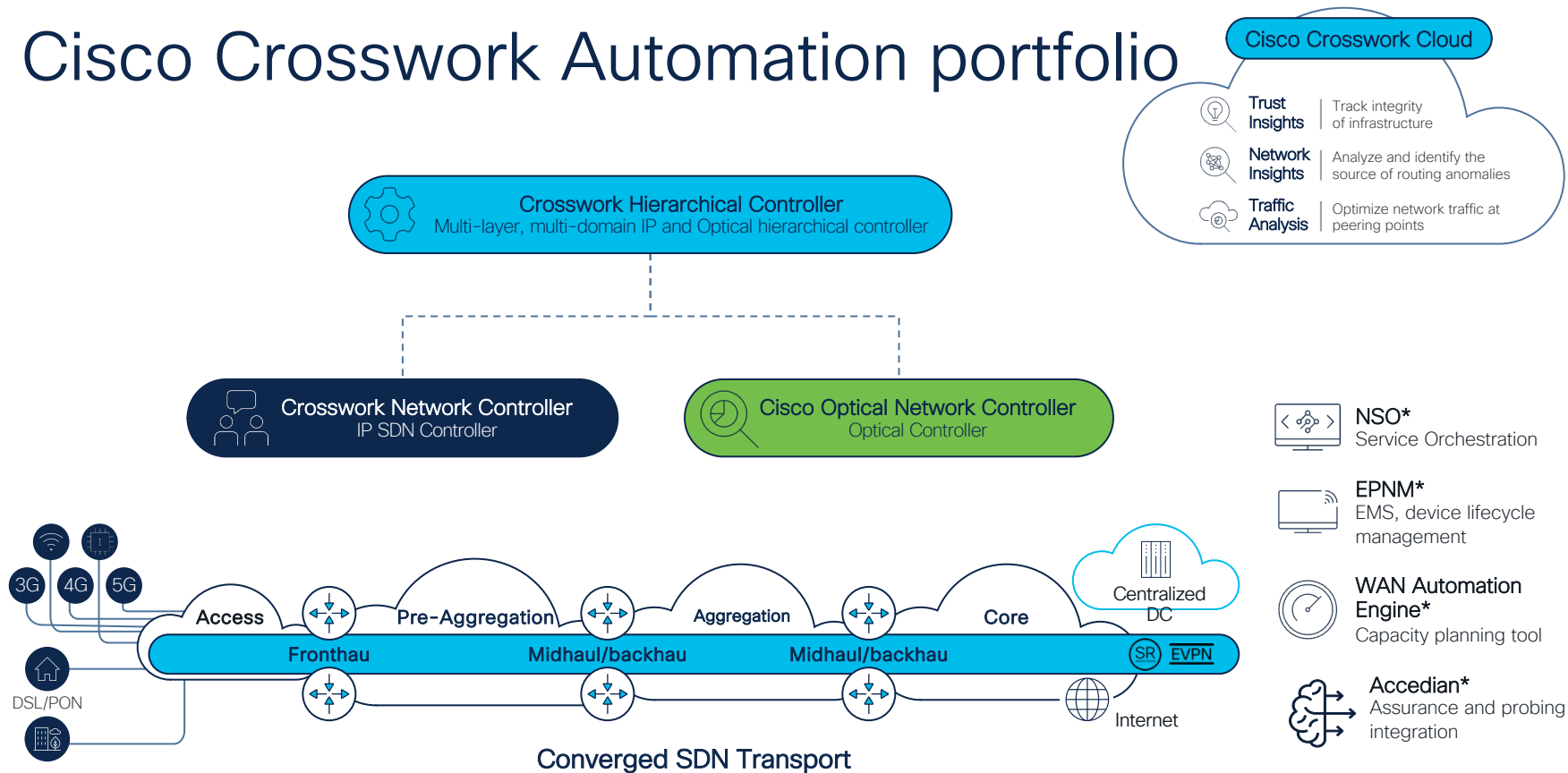
Multi-layer, multi-vendor IP + Optical Controller

Cisco Crosswork Automation Portfolio

Automation across the SP Operations Lifecycle



Cisco Crosswork Automation portfolio



*Not included under Crosswork Branding

Crosswork Network Controller (CNC)

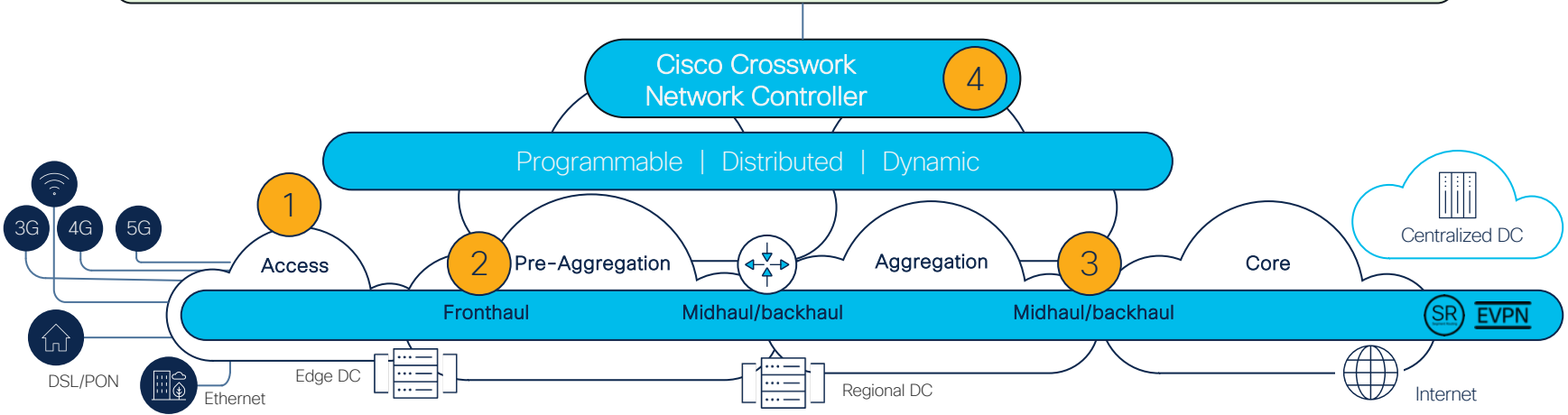
Simplify operational lifecycle - Converged SDN transport automation

Challenges

- 1 Time-consuming service provisioning
- 2 BW swings, over capacity
- 3 Congestions and service impacting conditions
- 4 Siloed, ineffective tools (high OpEx)

Outcomes

- + Intent-based automated provisioning
- + Dynamic BW management
- + Closed loop automation
- + Turnkey solution - Across lifecycle



Crosswork Network Controller (CNC)

OSS/BSS and/or Hierarchical Controller

↕ REST/RESTCONF Model-based



Crosswork Network Controller



End-to-end Service Orchestration



- Yang Service Models
- 170+multivendor devices supported in addition to Netconf

- Deployed by Top 20 SP's
- Fully Programmable to support new services and devices



Visualization

- Service Topology
- End-to-end Dynamic Path and Policy View

- Logical and Physical Network Topology
- Mapping of the Service to L1/L2/L3 Network and Device Views

Path Optimization

- Real-time Network Path Computation
- Bandwidth Optimization
- Bandwidth Reservation SR-CS

Element Management



- Inventory
- Fault
- Performance*
- ZTP
- Config Compliance*
- Software Image Mng

Service Assurance



- Intent-based
- Root Cause Analysis
- Top-down approach

Network Embedded Probes

External Probes

Closed-loop Automation

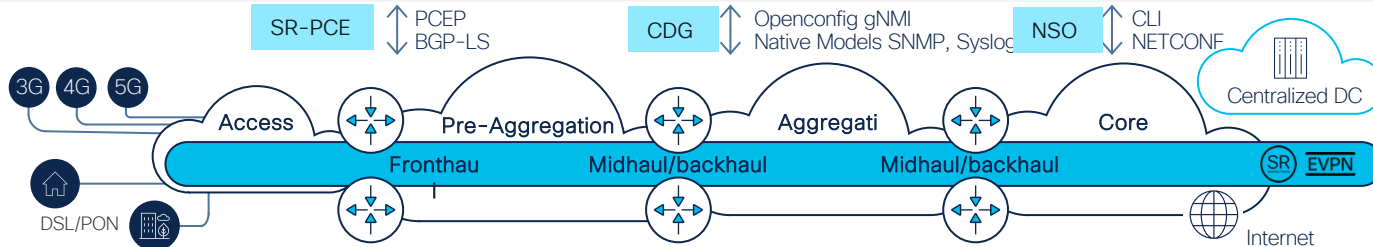


- Playbooks
- Performance monitoring for TCA
- Remediation Action

Massive-Scale

Geo Redundant HA

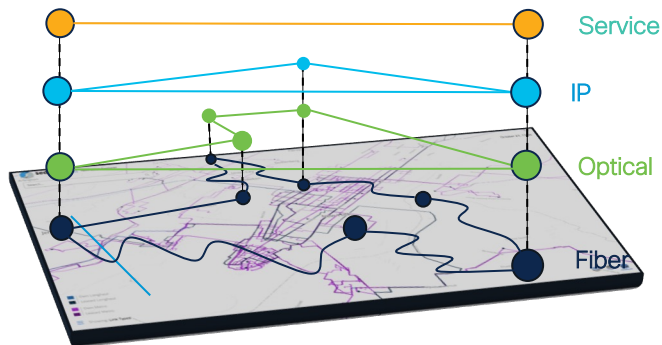
Cloud-Native on Private and Public Clouds



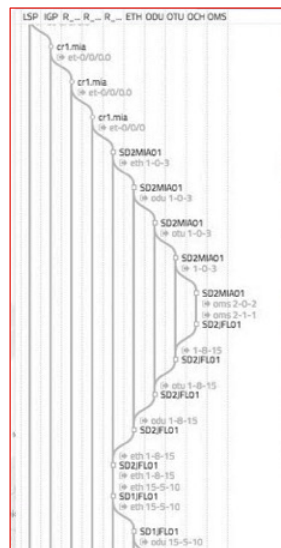
Crosswork Hierarchical Controller (HCO)

Service-to-fiber visibility

The Crosswork Hierarchical Controller
Network Model – from service to fiber



Layered service view in
Crosswork Hierarchical
Controller UI



Visualization of a protected private
line service – zoom-out
and zoom-in views



HCO Use Cases

Multi-layer

- Visualization of IP to optical topologies
- Multi-layer RCA, simulations to find SRLGs, failure impact
- ML PCE as API

RON

- Visualization of ZR+ links across IP and OLS domains + ZR-OLS link validation
- ZR link assurance based on IP traffic and optical span monitoring + TCAs
- Provision new ZR link over OLS + new PLE over IP and OTN gears

Multi-domain optical

- Visualization of all optical layers across multiple domains/vendors
- Service assurance based on multi-layer root-cause + optical perf monitoring
- Provision new E-Line and OTN line across domains (over MPLS-TP, OTN)

Multi-domain IP

- Visualization of TE tunnels/policies over IP topologies and domains
- Assurance based on RCA + traffic and OAM PM and prediction + simulations
- Provision new VPNs across domains using NSO engine

WAE Overview

Visualization

- Topology view (sites, nodes, links)
- Link utilization
- Traffic path, LSP paths, SRLGs, Demands,

Simulation

- Demand deduction
- Traffic and route simulations
- QOS
- Failure analysis including (site, node, SRLGS) and Worst-Case Failures

Capacity Planning

- Traffic matrix
- Traffic trending and forecasting
- Model network changes

Traffic Engineering and Optimization

- IGP
- LSP
- RSVP
- SRTE

Abstracted Optical Model

- Nodes
- Circuits
- Links

Element Management Use-cases

Device Inventory Management

Device Onboarding/Operations
Zero Touch Provisioning
Inventory Visualization
Inventory Configuration
Multi-vendor Devices



Image & Config Management

Automated Image Upgrade
Pre-Post checks
Configuration Backup & Restore



Fault & Performance Management

Realtime Fault Monitoring
KPI Threshold Alerting
Realtime & Historical KPI Trends



Compliance Management

Software Compliance
Configuration Compliance
License and EoX Compliance
Audits and Alerts

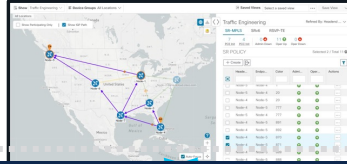


Element Management Functions

Crosswork Preview

Example Use Cases

Use Cases Example 1 : Onboard a node using CWM



Cisco Crosswork Network Automation

Define configurations for CSR node

Design



WAE to plan what if scenarios

Plan



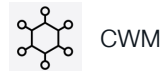
AWS template to define pre-configurations and post-configurations

Prepare



Use CWM to deploy the node using AWS templates

Operate and Optimize

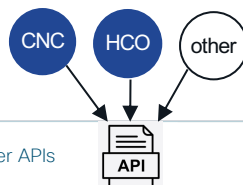


Use Webex chat to monitor the status of the node



WebEx
And
Accedian

Crosswork Workflow Manager & Router Automation



Crosswork Workflow Manager Operations UI

Job name	Run ID	Status	Completed activities	Start date	End date	Duration	Actions
Job 1	123	Running	2	7/7/2022 9:35:35 AM	In progress	-	Cancel
Job 2	13	Terminated	3	7/7/2022 9:35:35 AM	7/7/2022 9:35:35 AM	Sh 13m 5s	Cancel
Job 3	456789	Failed	24	7/7/2022 9:35:35 AM	7/7/2022 9:35:35 AM	Sh 13m 5s	Cancel
Job 4	789099	Timed out	3	7/7/2022 9:35:35 AM	7/7/2022 9:35:35 AM	Sh 13m 5s	Cancel
Job 5	1234	Completed	88	7/7/2022 9:35:35 AM	7/7/2022 9:35:35 AM	Sh 13m 5s	Cancel
Job 6	98777	Completed	66	7/7/2022 9:35:35 AM	7/7/2022 9:35:35 AM	Sh 13m 5s	Cancel
Job 7	99999999999999999999	Completed	9	7/7/2022 9:35:35 AM	7/7/2022 9:35:35 AM	Sh 13m 5s	Cancel
Job 8	8505056	Cancelled	2	7/7/2022 9:35:35 AM	7/7/2022 9:35:35 AM	Sh 13m 5s	Cancel
Job 9	32222	Running	3	7/7/2022 9:35:35 AM	In progress	-	Cancel
Job 10	1	Completed	1234	7/7/2022 9:35:35 AM	7/7/2022 9:35:35 AM	Sh 13m 5s	Cancel

Swagger APIs

Workflow Catalog

Router Automation Kit

Device Onboarding

Fleet Upgrades

Golden Config

CX Offers

Closed Loop (WIP)

Custom Workflows

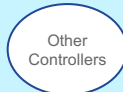
Adapter Catalog



NSO Adapter



REST Adapter
(demo for Netbox,
Webex, &
CNC onboarding)



AWS Adapter
(Used only for
demo)



SDK for building
custom adapters

Execution Engine & Platform

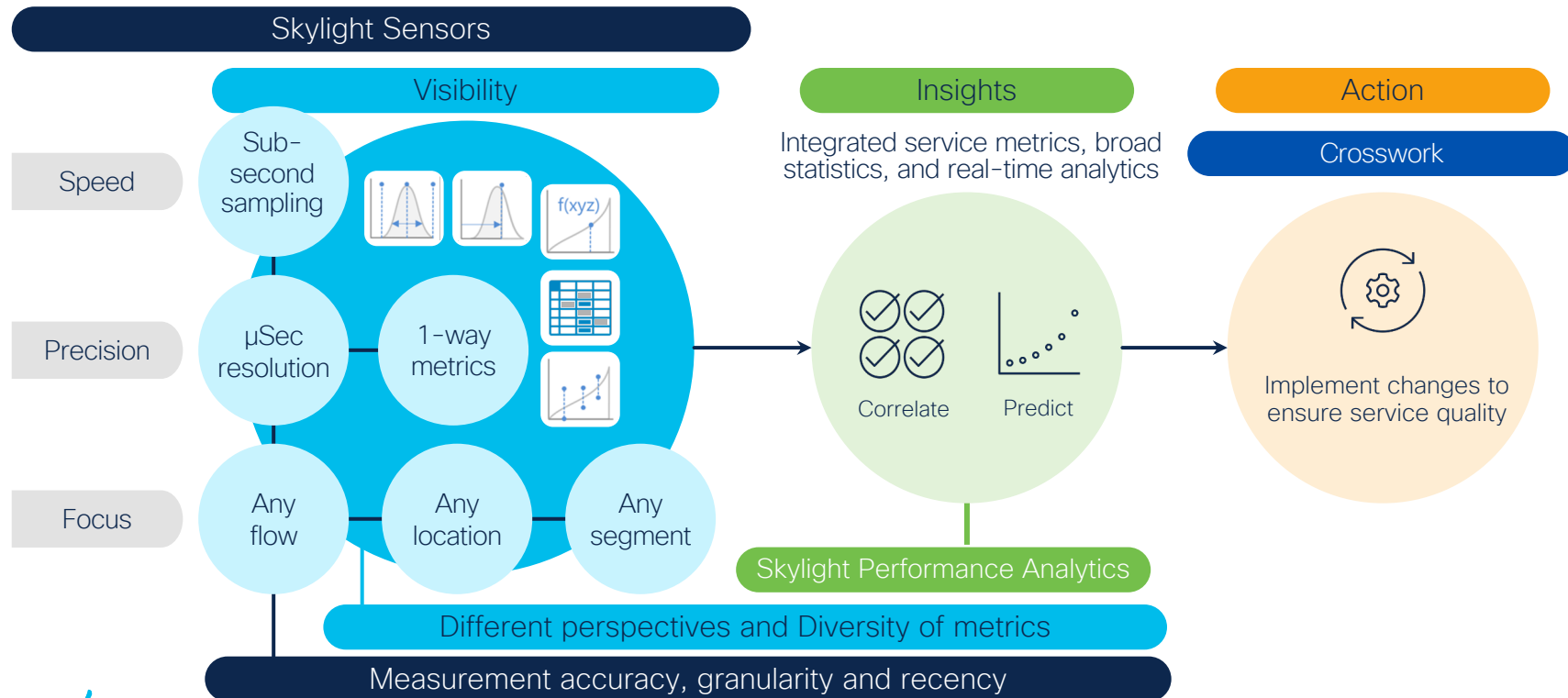


NxF (HCO& ONC infra)

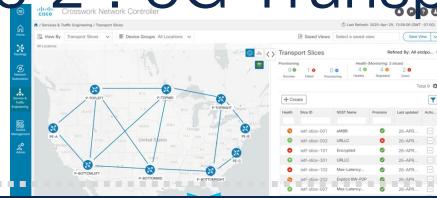
Customer Network

Skylight Sensors and Performance Analytics in Action

High resolution monitoring provides robust foundation for exceptional insights and closed-loop assurance automation



Use Cases Example 2 : 5G Transport Network Slicing



Cisco Crosswork Network Automation

Develop marketable new network services to meet industry needs to build Catalog done by Network Architect

Identify SLO-SLE Templates for different type of services

Provision Slice Service based SLO-SLE Templates on PE Nodes

Slice Optimization to meet SLA requirements

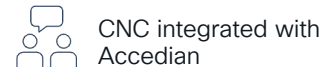
End to End Monitoring of Network Service with reporting

Design

Plan

Prepare

Operate and Optimize



5G Transport Network Slicing Automation

Transport Slice SLA Assurance

- Proactive SLA monitoring per Slice
- SLA breach notification/ reporting
- Service Centric approach to monitoring
- Slice intent to infra telemetry tie
- Active probing with infrastructure monitoring correlation

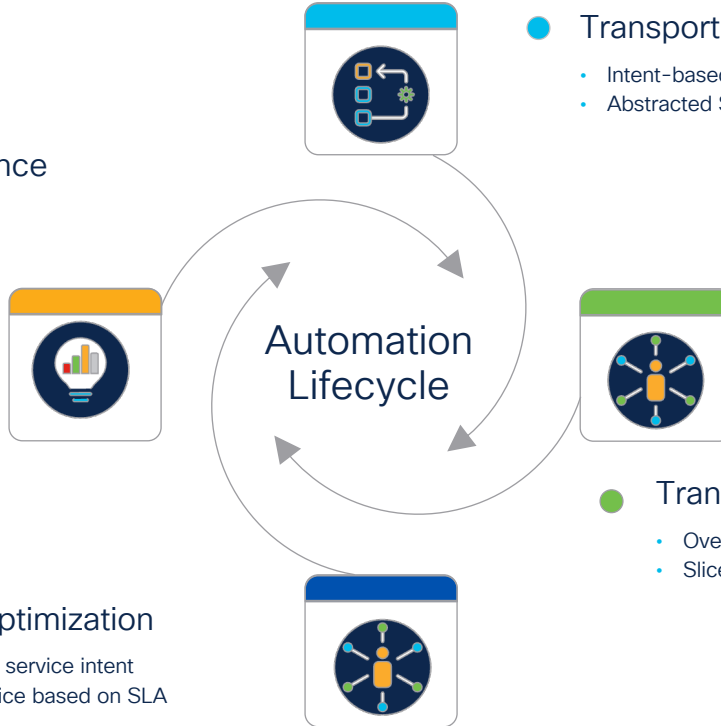


Transport Slice Optimization

- Optimize slice based on service intent
- Path computation per slice based on SLA

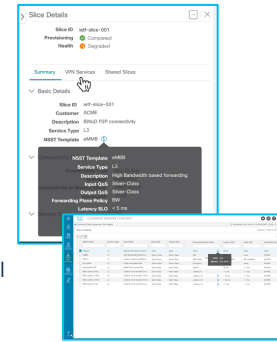


Automation Lifecycle



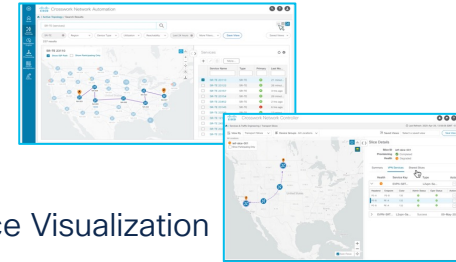
Transport Slice Orchestration

- Intent-based slice definition
- Abstracted Slice model based on IETF model



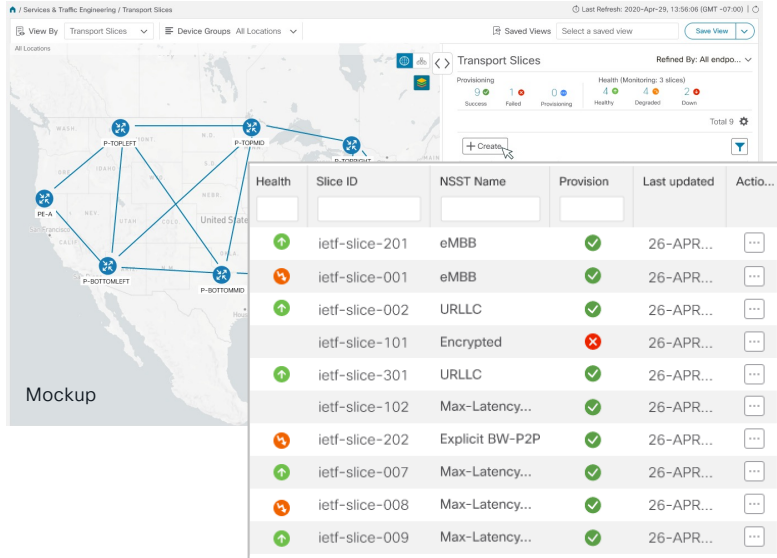
Transport Slice Visualization

- Overlay maps
- Slice details: Type, Template, VPNs, Transport



5G Network Slicing Automation

Simplify Network Slice Lifecycle Management



Challenges:

- Automation of slice lifecycle functions
- Ensure delivery of distinct SLA/SLO requirements

Solution:

- Utilize existing CNC capabilities: Provisioning, Monitoring, Traffic engineering and closed loop optimization
 - L2VPN/L3VPN, SR TE, SRv6, FlexAlgo
- Leverage Circuit-Style Capabilities for bandwidth reservations (Target CNC 5.0)
- Augment solution with BWoD and SLA monitoring with QoS and End-to-End network measurements*

Outcome:

- Simplified deployment of 5G services with designated SLA
- New revenue stream can be enabled via Differentiated service offering

*Roadmap

Transport Slicing in CNC: Visualization

Service & Traffic Engineering / VPN Services

- View By: Transport Slices
- Device Groups: All Locations
- All Locations
- L2VPN-44378
- Show Participating Only

Transport Slices

Service & Traffic Engineering

- VPN Services
- Traffic Engineering
- Bandwidth On Demand
- Bandwidth Optimization
- Local Congestion Mitigation
- Path Query
- Provisioning (NSO)

Service & Traffic Engineering / Transport Slices

View By: Transport Slices | Device Groups: All Locations

All Locations

Transport Slices

Provisioning: 9 Success, 1 Failed, 0 Provisioning

Health (Monitoring: 3 slices): 4 Healthy, 4 Degraded, 2 Down

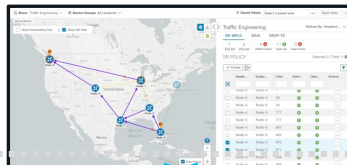
Total 9

Health	Slice ID	NSST Name	Provision	Last updated	Action
🔴	ietf-slice-001	eMBB	🔴	26-APR...	...
🟢	ietf-slice-002	URLLC	🔴	26-APR...	...
🔴	ietf-slice-101	Encrypted	🟢	26-APR...	...
🟢	ietf-slice-301	URLLC	🟢	26-APR...	...
🟢	ietf-slice-102	Max-Latency...	🟢	26-APR...	...
🔴	ietf-slice-202	Explicit BW-P2P	🟢	26-APR...	...
🟢	ietf-slice-007	Max-Latency...	🟢	26-APR...	...
🔴	ietf-slice-008	Max-Latency...	🟢	26-APR...	...
🟢	ietf-slice-009	Max-Latency...	🟢	26-APR...	...

Slice list including type and provisioning state

New menu for Transport Slice and Catalog

Use Cases Example 3 : Migration to SRv6 from MPLS underlay



Cisco Crosswork Networ Automation

Design
SRv6
network
topology
with
WAE/CP

Introduce
a new
SRv6 RR

- Enable IPv6 Routing
- SRv6 on first set of PEs
- SRv6 on the rest of the PEs

Remove
MPLS from
the network
via NSO and
CNC

Post
migration
network
checks

Design and Plan

Prepare

Operate and Optimize



Use Cases Example 3 : Migration to SRv6 from MPLS underlay

Phase 1

Existing IPv4 Network

MPLS underlay/BGP services

- Step 1: Enable IPv6 routing
- Step 2: Introduce new RR for SRv6

Today's CNC demo

Phase 2

SRv6 on first set of PEs

- SRv6 PEs advertise VPN services to both RRs (dual connected PEs)
- Use BGP best-path selection to prefer SRv6 or MPLS

Phase 3

SRv6 on remaining PEs

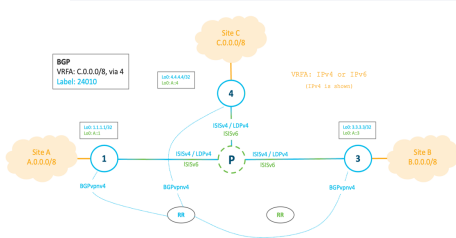
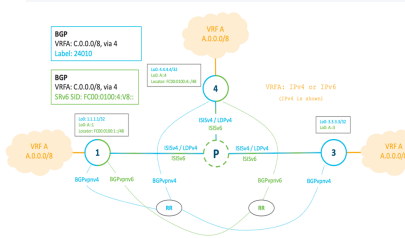
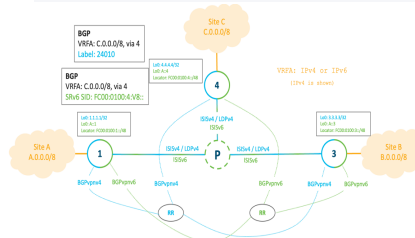
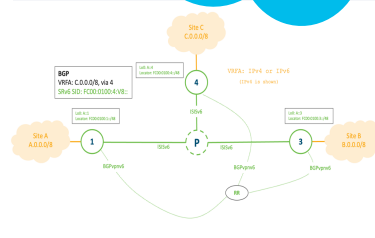
- All PEs advertise VPN services to both RRs (dual connected PEs)
- Use BGP best-path selection to prefer SRv6 or MPLS

Phase 4

Remove MPLS

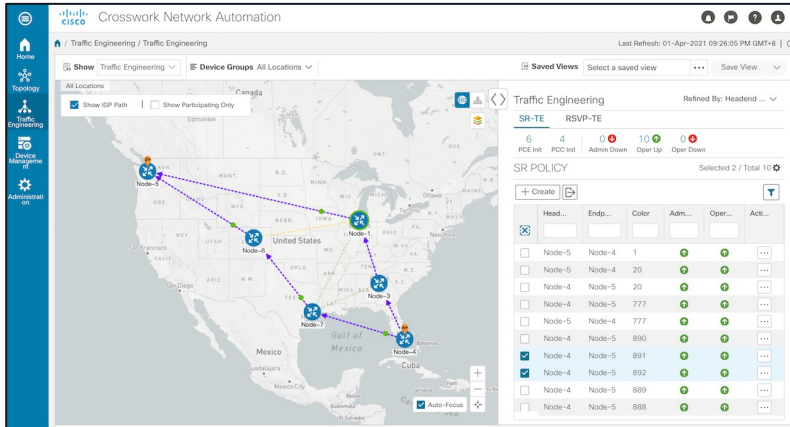
- Left with IPv6 (or SRv6) underlay and SRv6 BGP service

Check out Jakub Horn's session (SRv6 Fundamentals BRKMPL-2203) for a full demo on brownfield migration





Migration to SR/SRv6 Service & Transport Provisioning



SR Policy SLA Objectives and Constraints

Objective: Latency/IGP/TE Metric Minimization

Constraints: Affinities, Disjoint Paths, Bandwidth



Rapid Time-To-Value

Challenges:

- Cumbersome and time-consuming service provisioning
- Missing transport and service context linkage and visibility, satisfy service specific performance objectives, such low latency

Solution:

- Intent-based automated provisioning
- Customizable service intent with explicit SLA definitions
- Service Topology Visualization with actionable operational context (Health, Path changes, etc)

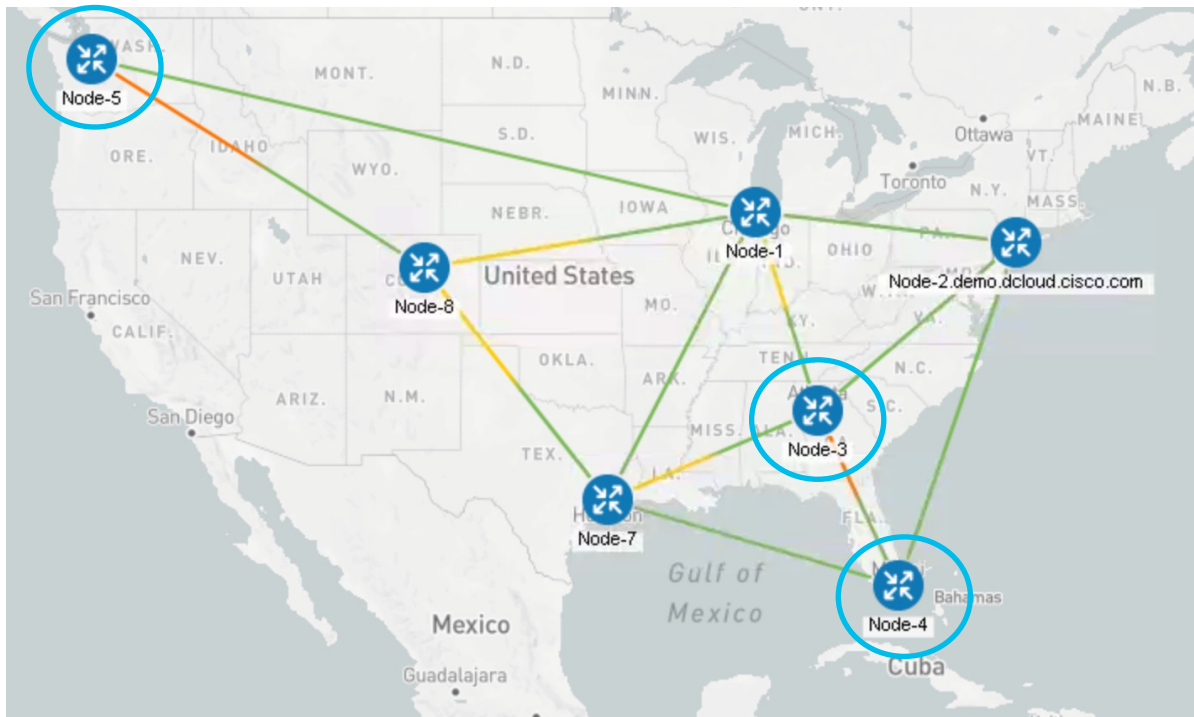
Outcome:

- Rapid Time to Value with **provisioning reduced from weeks to minutes**

DEMO

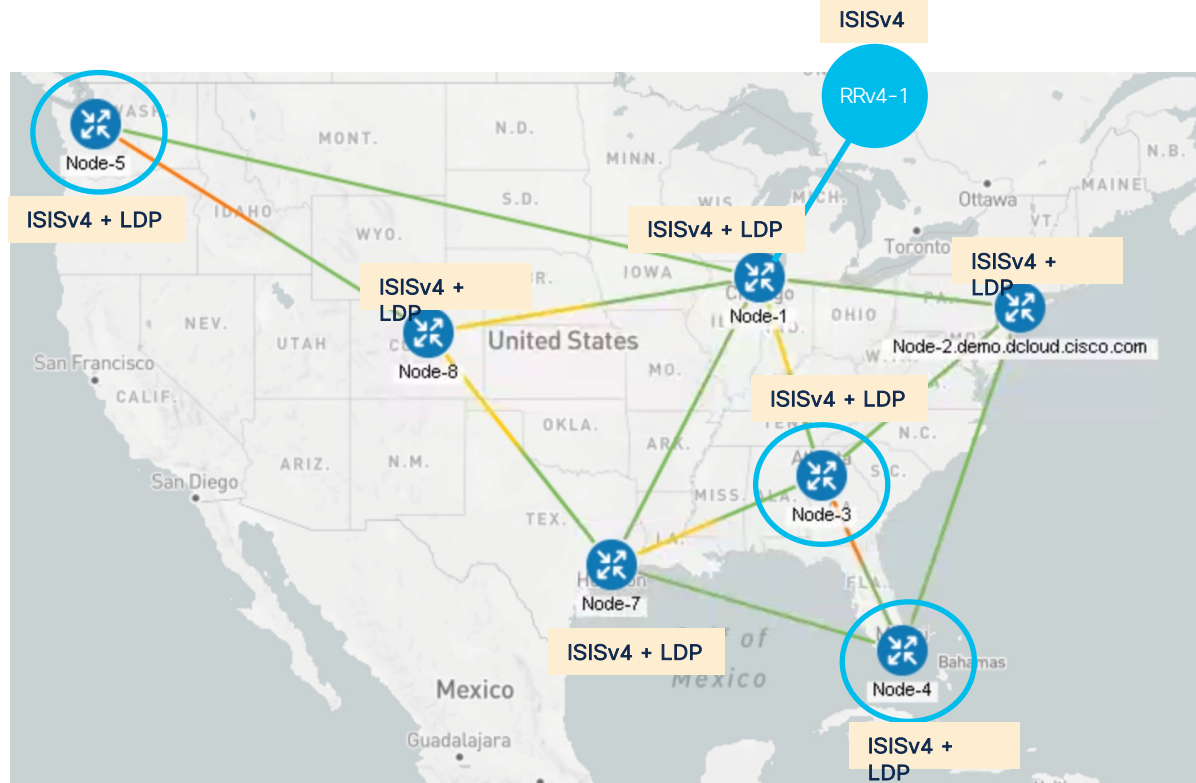


Topology:



L3VPN – MPLS LDP to SRv6 Migration

VRF:VPN-201
MPLS VRF



ISISv4

ISISv4

ISISv4



ISISv4

ISISv4

L3VPN – MPLS LDP to SRv6 Migration – CNC Device Details

Step1: Enable ISISv6



Device Details

[Details](#) [Links](#) [Alarms](#) [Inventory](#)

Summary

Host Name	Node-5
Alarms	✖ 1 ⚠ 3
Reachability	✓ Reachable
IP Address	198.19.1.5
Geo Location	Latitude 47.603832, Longitude -122.330062
Device Type	🔌 Router
Device Group	Location > All Locations > Unassigned Devices
Product Type	Cisco IOS XRv 9000 Router
Connect To Device	🔌 SSH IPV4
Last Update	26-May-2023 03:49:19 PM PDT

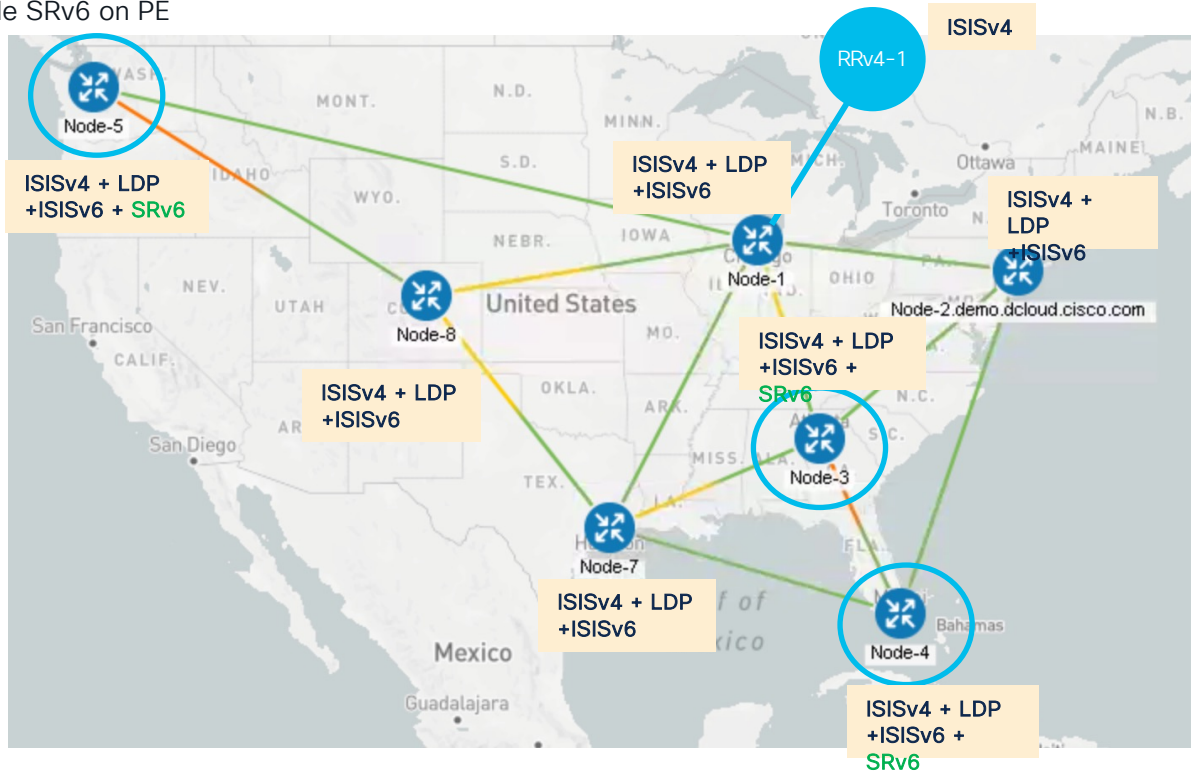
Routing

TE Router ID	198.19.1.5
IPV6 Router ID	fcdd:dd00:305::1
ISIS System ID	0010.0100.0005 Level-2
ASN	65000

L3VPN – MPLS LDP to SRv6 Migration

Step2: Enable SRv6 on PE

```
VRF:VPN-201
MPLS VRF
```



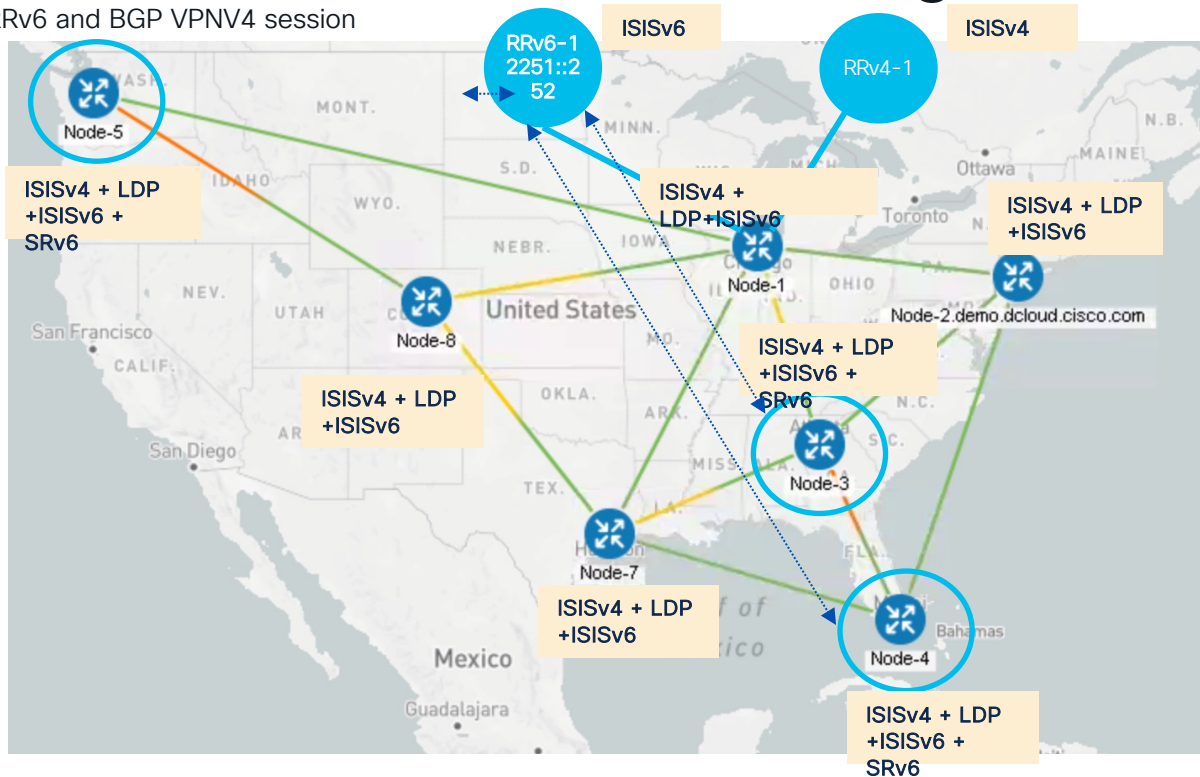
Node5

```
router isis 1
address-family ipv6 unicast
segment-routing srv6
locator loc_be
exit
exit
exit
segment-routing
srv6
encapsulation
source-address fcdd:dd00:305::1
!
locators
locator loc_be
micro-segment behavior
unode psp-usd
prefix fcdd:dd00:305::/48
!
!
!
!
!
```

L3VPN – MPLS LDP to SRv6 Migration

Step3: Add RRv6 and BGP VPNV4 session

VRF:VPN-201
MPLS VRF



Node5

```
router bgp 65000
neighbor 2251::252
remote-as 65000
update-source Loopback0
address-family vpnv4 unicast
route-policy vpn-transport out
encapsulation-type srv6
exit
exit
exit
```

L3VPN – MPLS LDP to SRv6 Migration

Step4: Enable Dual connected VRF, MPLS preferred on SRv6 PE's

VRF:VPN-201
MPLS VRF
Dual Connected

Configured Data

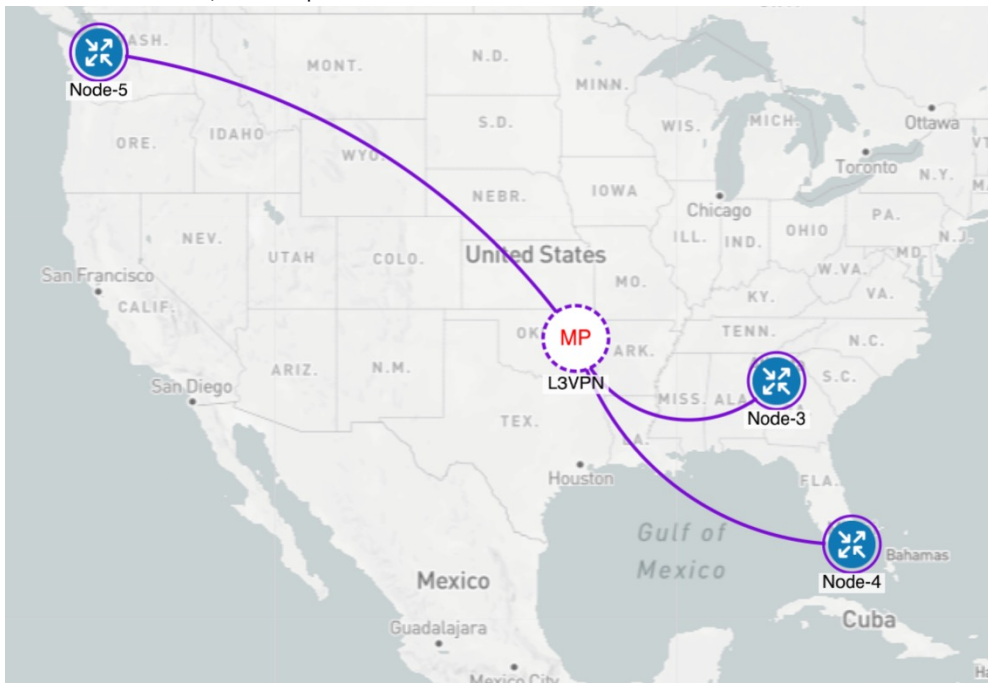
```
object>ietf-l3vpn-ntw:l3vpn-ntw>vpn-services>vpn-service>0>vpn-nodes>vpn-node>0>vpn-  
network-accesses>vpn-network-access>  
▼ object {1}  
  ▼ ietf-l3vpn-ntw:l3vpn-ntw {1}  
    ▼ vpn-services {1}  
      ▼ vpn-service [1]  
        ▼ 0 {6}  
          vpn-id : vpn-201  
          vpn-service-topology : ietf-vpn-common:any-to-any  
          ▼ vpn-instance-profiles {1}  
            ▼ vpn-instance-profile [1]  
              ▼ 0 {2}  
                profile-id : default  
                ▼ cisco-l3vpn-ntw:srv6 {1}  
                  ▼ address-family [1]  
                    ▼ 0 {2}  
                      name : ietf-vpn-common:ipv4  
                      locator-name : loc_be
```

```
▼ vpn-nodes {1}  
  ▼ vpn-node [3]  
    ▼ 0 {4}  
      vpn-node-id : Node-3  
      ▼ active-vpn-instance-profiles {1}  
        ▼ vpn-instance-profile [1]  
          ▼ 0 {2}  
            profile-id : default  
            ► address-family [2]  
          ▼ vpn-network-accesses {1}  
            ► vpn-network-access [1]  
          ▼ cisco-l3vpn-ntw:custom-template [1]  
            ▼ 0 {2}  
              name : CT-BGP-VRF-MPLS-ALLOC  
              ▼ variable [2]  
                ▼ 0 {2}  
                  name : ASN  
                  value : 65000  
                ▼ 1 {2}  
                  name : VRF  
                  value : vpn-201
```

L3VPN – MPLS LDP to SRv6 Migration

Step4: Enable Dual connected VRF, MPLS preferred on SRv6 PE's

VRF:VPN-201
MPLS VRF
Dual Connected



Node

5

```
router bgp 65000
vrf vpn-201
address-family ipv4 unicast
mpls alloc enable
segment-routing srv6
locator loc_be
!
```

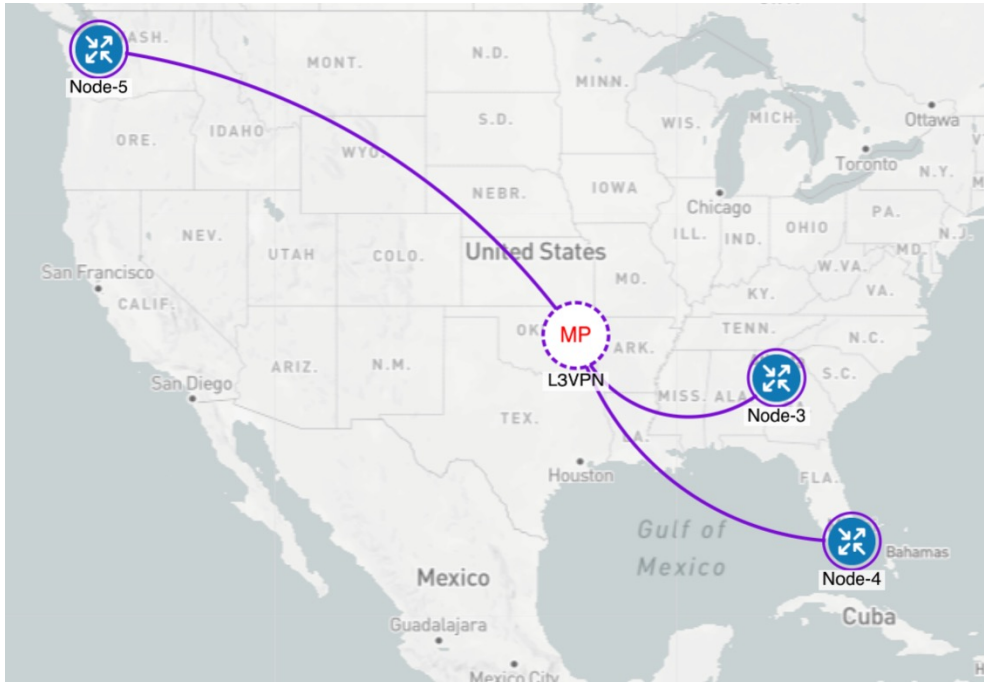
Verification : Prefixes are learned from both RR RR-1 / MPLS is best path

```
1 RP/0/RP0/CPU0:Node-5#sh bgp vpnv4 unicast
2 Thu Jun 1 17:51:44.499 UTC
3 BGP router identifier 198.19.1.5, local AS number 65000
4 BGP generic scan interval 60 secs
5 Non-stop routing is enabled
6 BGP table state: Active
7 Table ID: 0x0
8 BGP main routing table version 46
9 BGP NSR Initial initsync version 1 (Reached)
10 BGP NSR/ISSU Sync-Group versions 0/0
11 BGP scan interval 60 secs
12
13 Status codes: s suppressed, d damped, h history, * valid, > best
14                 i - internal, r RIB-failure, S stale, N Nexthop-discard
15 Origin codes: i - IGP, e - EGP, ? - incomplete
16   Network          Next Hop          Metric LocPrf Weight Path
17 Route Distinguisher: 198.19.1.3:0
18 Route Distinguisher Version: 46
19 *>i30.1.3.0/24      198.19.1.3          0      100      0 ?
20 * i                 fcdd:dd00:303::1    0      100      0 ?
21
22 Route Distinguisher: 198.19.1.4:0
23 Route Distinguisher Version: 45
24 *>i30.1.4.0/24      198.19.1.4          0      100      0 ?
25 * i                 fcdd:dd00:304::1    0      100      0 ?
26
27 Route Distinguisher: 198.19.1.5:0 (default for vrf vpn-201)
28 Route Distinguisher Version: 44
29 *>i30.1.3.0/24      198.19.1.3          0      100      0 ?
30 *>i30.1.4.0/24      198.19.1.4          0      100      0 ?
31 *> 30.1.5.0/24      0.0.0.0             0              32768 ?
32
33 Processed 5 prefixes, 7 paths
```

L3VPN – MPLS LDP to SRv6 Migration

Step 5: Use SRv6 between the Dual Connected PEs

VRF:VPN-201
MPLS VRF
Dual Connected



Node

5

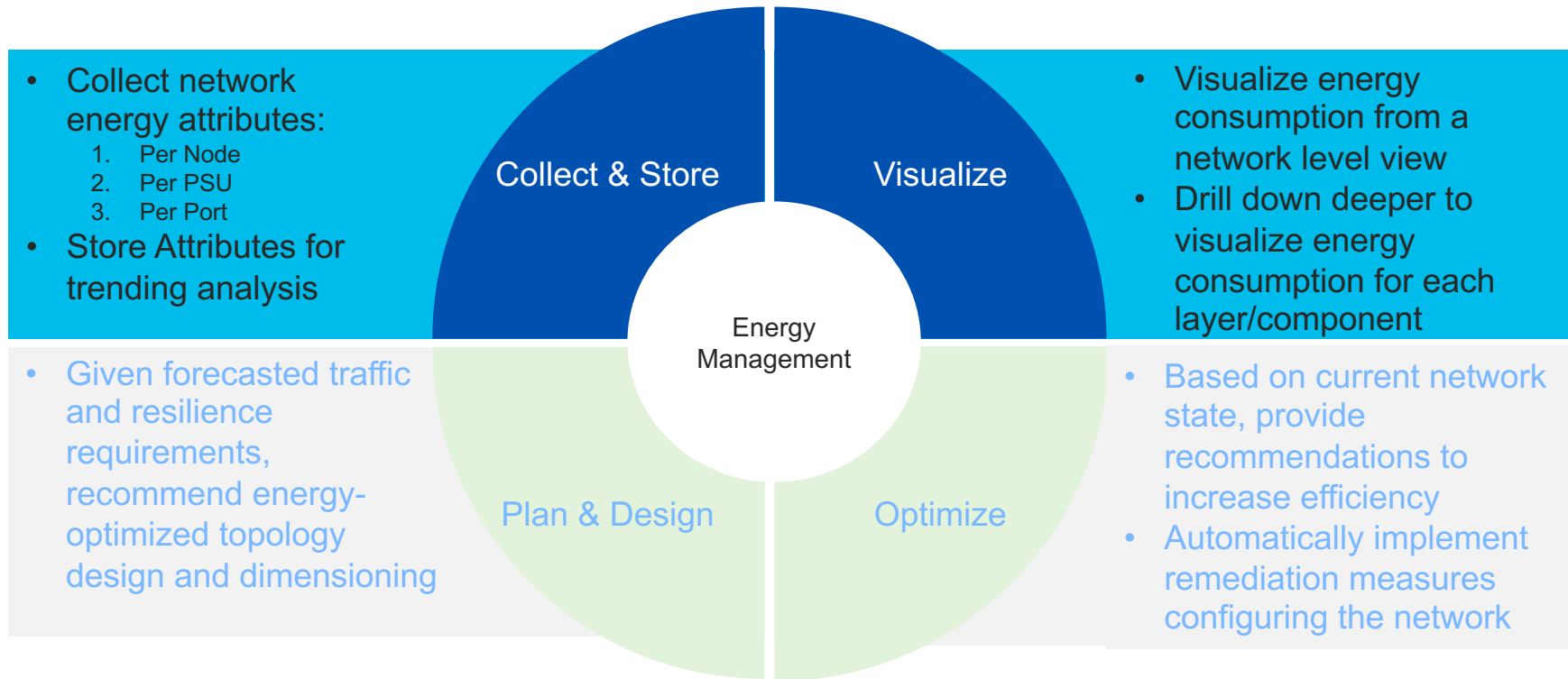
```
route-policy vpn-transport
  apply vpn-201-transport
  pass
end-policy
!
route-policy vpn-201-transport
  if extcommunity rt matches-any
    (201:201) then
      set local-preference 150
    endif
  end-policy
!
```

Verification : Prefixes are learned from both RR RR-2 / SRv6 is best path

```
1 RP/0/RP0/CPU0:Node-5#sh bgp vpnv4 unicast
2 Thu Jun 1 17:57:13.246 UTC
3 BGP router identifier 198.19.1.5, local AS number 65000
4 BGP generic scan interval 60 secs
5 Non-stop routing is enabled
6 BGP table state: Active
7 Table ID: 0x0
8 BGP main routing table version 50
9 BGP NSR Initial initsync version 1 (Reached)
10 BGP NSR/ISSU Sync-Group versions 0/0
11 BGP scan interval 60 secs
12
13 Status codes: s suppressed, d damped, h history, * valid, > best
14                i - internal, r RIB-failure, S stale, N Nexthop-discard
15 Origin codes: i - IGP, e - EGP, ? - incomplete
16   Network          Next Hop          Metric LocPrf Weight Path
17 Route Distinguisher: 198.19.1.3:0
18 Route Distinguisher Version: 49
19 * i30.1.3.0/24      198.19.1.3              0    100      0 ?
20 *>i                 fcdd:dd00:303::1
21                                     0    150      0 ?
22 Route Distinguisher: 198.19.1.4:0
23 Route Distinguisher Version: 47
24 * i30.1.4.0/24      198.19.1.4              0    100      0 ?
25 *>i                 fcdd:dd00:304::1
26                                     0    150      0 ?
27 Route Distinguisher: 198.19.1.5:0 (default for vrf vpn-201)
28 Route Distinguisher Version: 50
29 *>i30.1.3.0/24      fcdd:dd00:303::1
30                                     0    150      0 ?
31 *>i30.1.4.0/24      fcdd:dd00:304::1
32                                     0    150      0 ?
33 *> 30.1.5.0/24      0.0.0.0                  0    32768 ?
34
35 Processed 5 prefixes, 7 paths
```

Forward Looking Preview

Energy Management on Crosswork (WAE and CNC)



Some of the features described herein remain in varying stages of development and will be offered on a when-and-if-available basis. This roadmap is subject to change at the sole discretion of Cisco, and Cisco will have no liability for delay in the delivery or failure to deliver any of the products or features set forth in this presentation.

Conclusion

Do we have a solution? What would you need in a solution



Increasing Infrastructure Complexity



Best in Class



Cloud adoption
changing nature of
managed services



Customizable and Agile



Decreasing supply of
skilled workforce



Intelligent and Context
Aware



Multiple tools,
fragmented observability



Single Pane of Glass



Case Study: Automation is Making a Difference



One of the world's largest
telephone operators and
mobile network providers

Challenge: A 3 year planned multipurpose automation project to support 5G.

Solution: Cisco Crosswork, Data Gateway, Health Insights, Situation Manager, Optimization Engine and NSO



Using key performance indicators
with network visibility

- address incidents before they happened
- optimize network traffic flow
- *"collect once, use many"*

“We opted for Cisco because of the outcome driven approach in automation that will have immediate and long-term benefits to transform our infrastructure and deliver the best in class customer experience.”

Joaquin Mata,
CTO, Telefonica Spain

Automation is Making a Difference



Largest Philippines
telecommunications company

Challenge: A network transformation to support 5G, IoT and Smart Cities.

Solution: Cisco Crosswork with NSO, WAE, Optimization Engine



**Transforming to achieve a
self-service operation**

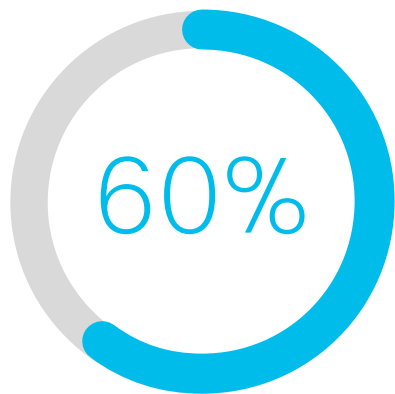
- manage traffic congestion
- minimize network outages
- launch digital services faster

“With a fully automated network, our enterprise customers can expect more tailor-fit digital services that meet their businesses’ specific needs today and in the future.”

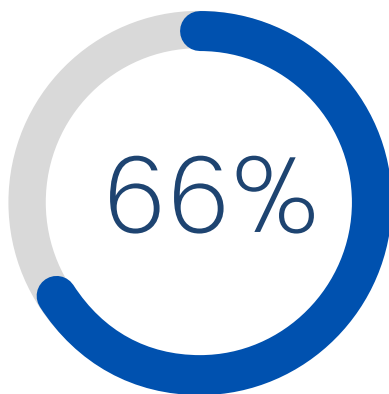
Juan Victor Hernandez,
SVP and Head of Enterprise PLDT

Improved Business Outcomes

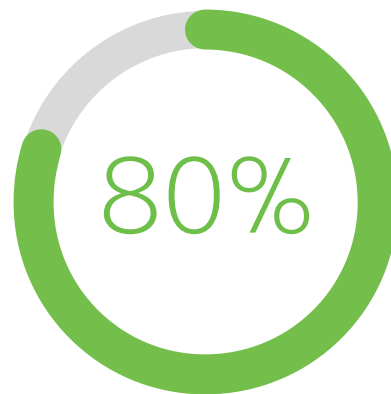
With Cisco Mass Scale Infrastructure and Crosswork Network Automation



CAPEX
Savings



OPEX
Savings



Faster
Time-to-Revenue

For more information
on Cisco's Automation
Portfolio please visit
cisco.com/go/crosswork

CISCO *Live!*

ProductsSupportPartnersMore

Try Cisco Crosswork Network Automation free for 30 days.[Get trial](#)

Products & Services / Cloud and Systems Management /

Cisco Crosswork Network Automation



Transforming mass scale network operations

Plan, design, implement, operate, and optimize your service provider network with Cisco Crosswork Network Automation. Cisco Crosswork is designed to help service providers gain the mass awareness, augmented intelligence, and proactive control for a comprehensive data-driven, intent-based automated network.

[Proactively manage end-to-end networks \(3:10\)](#)

BenefitsProduct FamilyResources

Contact Cisco

Why Cisco Crosswork Automation

Cisco Crosswork Network Automation enables service providers to proactively manage their end-to-end networks, with a suite of machine-learning, intent-based and closed-loop solutions to ensure faster innovation, extraordinary customer experiences, and operational excellence.

On-prem solutions provide actionable insights with automated network orchestration, accelerating mean-time-to-value by monetizing agile new services, as well as minimizing mean-time-to-remediation to avoid network degradation and customer issues. Cisco Crosswork Cloud provides multiple SaaS solutions that provide operational insights and validation of network health and security with the agility and scale of the cloud.

Cisco Crosswork Network Automation is ready for service providers of all sizes with broad or narrow use cases - any device, anytime, anywhere, any format - a truly scalable solution for a 5G world.

60%

Reduction in time to revenue

150,000+

Labor hours saved

70%

Improvement in mean time to repair

99%

Reduction in operational noise

Telefonica automates multi-vendor networks

Learn how leading operator Telefonica is leveraging Cisco NSO and Crosswork Automation to reduce complexity and improve profitability.

[Watch video \(2:28\)](#)



BRKSPG-1543

© 2023 Cisco and/or its affiliates. All rights reserved. Cisco Public

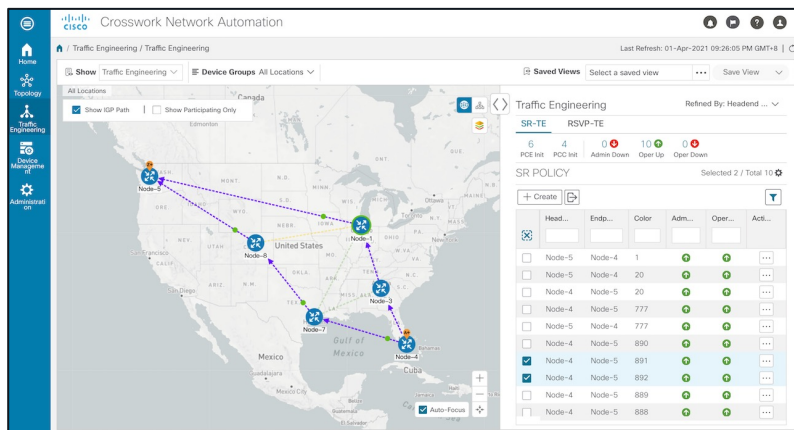
54

Use Cases Example 5G Transport Network Slicing

1. Design: Develop marketable new network services to meet industry needs to build Catalog done by Network Architect
2. Planning : Identify SLO-SLE Templates for different type of services
3. Operate: Provision Slice Service based SLO-SLE Templates on PE Nodes
4. Optimize: Slice Optimization to meet SLA requirements
5. Monitor: End to End Monitoring of Network Service with reporting

Service & Transport Provisioning

Intent-based
Automated Provisioning



SR Policy SLA Objectives and Constraints

Objective Latency/IGP/TE Metric Minimization

Constraints Affinities, Disjoint Paths, Bandwidth



Rapid Time-To-Value

Challenges:

- Cumbersome and time-consuming service provisioning
- Missing transport and service context linkage and visibility, satisfy service specific performance objectives, such as low latency

Solution:

- Intent-based automated provisioning
- Customizable service intent with explicit SLA definitions
- Service Topology Visualization with actionable operational context (Health, Path changes, etc)

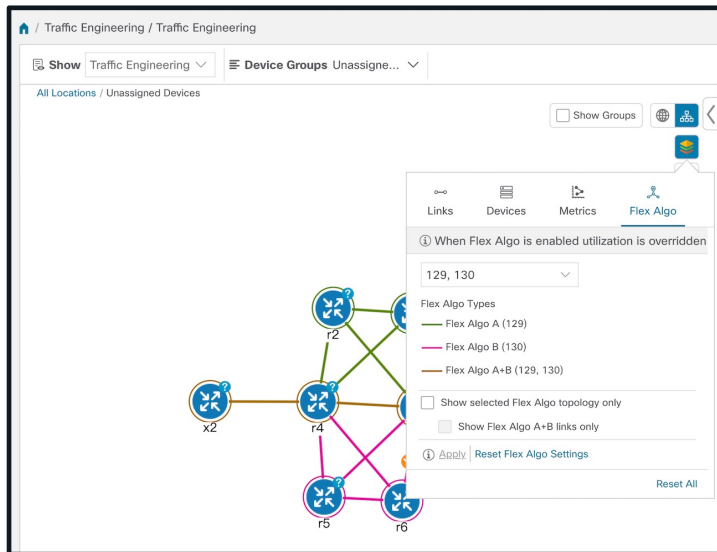
Outcome:

- Rapid Time to Value with provisioning reduced from weeks to minutes

Enhanced Traffic Engineering with FlexAlgo

End-to-end fine grained policy control

Dynamic Traffic Engineering



Flexible Path Control

Challenges:

- Inability to scale with end-to-end, fine-grained control over the myriad 5G services with distinct policy requirements

Solution:

- Customized IGP shortest path computation
- Flexibility to define and assign new SR segments (prefix SIDs)
- Establish Traffic engineered path from anywhere to anywhere automatically computed by the IGP

Outcome:

- Enhanced TE control with SID list customization
- Operational Flexibility and control to meet SLA intent
- Custom fit 5G network slices to specific applications

Crosswork Automated Assurance Use Cases

Know your Customer Personas: Role and Know-How its different

QUESTIONS TO ANSWER

First Level
Service Operation Center



Is the service **degrading**?

Is the service meeting SLAs?

Existing OSS/BSS

Services & SLA Dashboard

Proactive service quality analytics
(Accedian Skylight)

AI/ops based Incident and Performance Management
(Vitria VIA AIOps)

Second Level
Network Operation Center



Service is **DEGRADING!**

WHERE is the problem and **WHY?**

I see a congestion in the network,
WHAT is the cause?

Hierarchical Controller

Domain SME



Is the infrastructure **OPERATING** according to planned performance objectives ?

Domain Controller

Domain Controller

Domain Controller

Topology-based correlation and Assurance
(Crosswork Hierarchical Controller)

Cisco Multivendor IP Controller
(Crosswork Network Controller)

Cisco Optical Controller

Any 3rd Party Controller



Probing

Deliver Your Service with Confidence

Accedian Integration

LA in
CNC 6.0

ACCEDIAN Skylight Analytics

Insight



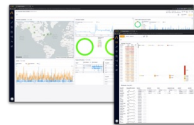
Micro
Detail



Macro
View



ML



Crosswork Network Controller

Action

Insight



Infrastructur
e Health



Transp
ort Health



Session
Results Health



Service Health

Trigger
Notification

ACCEDIAN Skylight Sensors

Visibility



Agent



Control



Modules



SFP Compute

Restconf

gNMI



Domain
in SME



Crosswork Network
Controller

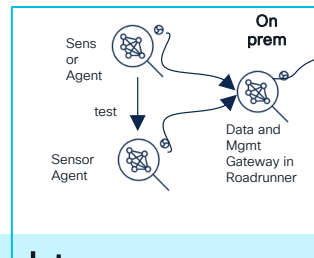
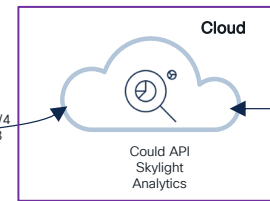
Restconf

gNMI

Trigger
Notification



Service Operation
Center / End Customer



AP I
User

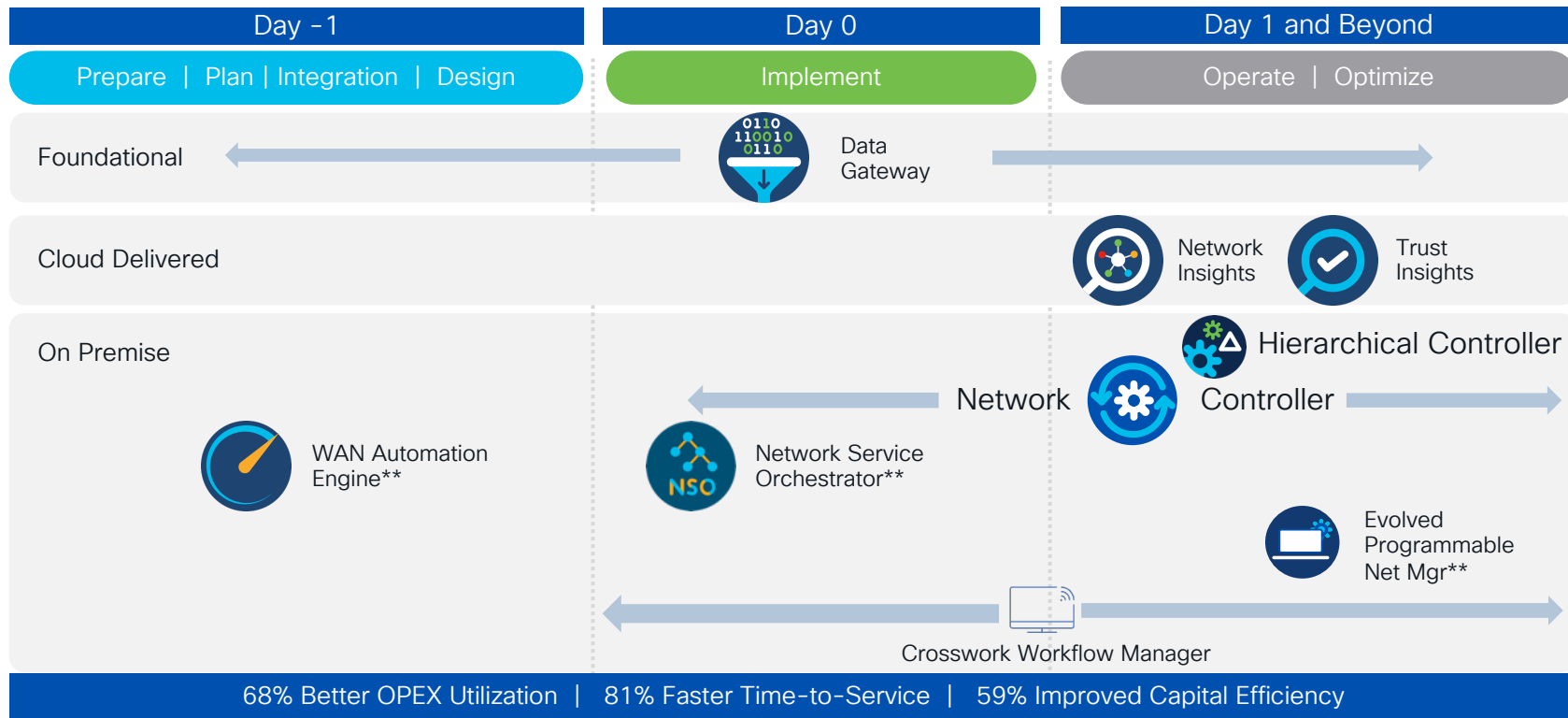
Integration Highlights

- **Zero Touch Assurance:** Extend service definition (INTENT) to include TWAMP sessions with desired topology
- **Model Driven Telemetry:** Subscribe to Accedian gNMI paths path automatically for the session initiated

Cisco Crosswork Automation

Add Accedian

Automation across the SP Operations Lifecycle



Cisco Crosswork Automation Portfolio

Cisco Crosswork Cloud



Trust Insights

Track integrity of infrastructure



Network Insights

Analyze and identify the source of routing anomalies



Traffic Analysis

Optimize network traffic at peering points



Crosswork Hierarchical Controller

Multi-layer, multi-domain IP and Optical hierarchical controller

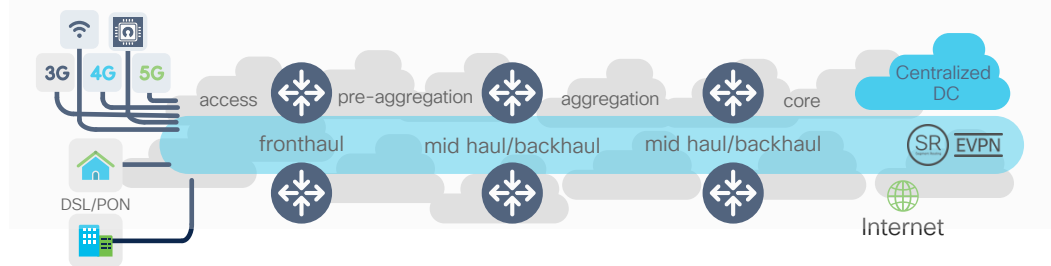
Add Accedian



Crosswork Network Controller
IP SDN Controller



Cisco Optical Network Controller
Optical Controller



Converged SDN Transport



NSO*

Service Orchestration



EPNM*

EMS, device lifecycle management



WAE

Capacity planning tool



Crosswork Workflow

Workflow Management tool

Back to basics: 3 stages of doing anything

- Plan → Design
- Build → Implement
- Manage → Operate/Sustain

Let's talk about the Cisco PPDIOO method

- **Prepare:** Involves establishing the organizational requirements, developing a network strategy, and proposing a high-level conceptual architecture identifying technologies that can best support the architecture. The prepare phase can establish a financial justification for network strategy by assessing the business case for the proposed architecture.
- **Plan:** Involves identifying initial network requirements based on goals, facilities, user needs, and so on. The plan phase involves characterizing sites and assessing any existing networks and performing a gap analysis to determine whether the existing system infrastructure, sites, and the operational environment can support the proposed system. A project plan is useful for helping manage the tasks, responsibilities, critical milestones, and resources required to implement changes to the network. The project plan should align with the scope, cost, and resource parameters established in the original business requirements.
- **Design:** The initial requirements that were derived in the planning phase drive the activities of the network design specialists. The network design specification is a comprehensive detailed design that meets current business and technical requirements, and incorporates specifications to support availability, reliability, security, scalability, and performance. The design specification is the basis for the implementation activities.
- **Implement:** The network is built or additional components are incorporated according to the design specifications, with the goal of integrating devices without disrupting the existing network or creating points of vulnerability.
- **Operate:** Operation is the final test of the appropriateness of the design. The operational phase involves maintaining network health through day-to-day operations, including maintaining high availability and reducing expenses. The fault detection, correction, and performance monitoring that occur in daily operations provide the initial data for the optimization phase.
- **Optimize:** Involves proactive management of the network. The goal of proactive management is to identify and resolve issues before they affect the organization. Reactive fault detection and correction (troubleshooting) is needed when proactive management cannot predict and mitigate failures. In the PPDIOO process, the optimization phase can prompt a network redesign if too many network problems and errors arise, if performance does not meet expectations, or if new applications are identified to support organizational and technical requirements.



Did you know?

You can have a
one-on-one session with
a technical expert!

Visit Meet the Expert in The HUB
to meet, greet, whiteboard & gain
insights about your unique questions
with the best of the best.



Meet the Expert Opening Hours:

Tuesday	3:00pm – 7:00pm
Wednesday	11:15am – 7:00pm
Thursday	9:30am – 4:00pm
Friday	10:30am – 1:30pm

Session Surveys

We would love to know your feedback on this session!

- Complete a minimum of four session surveys and the overall event surveys to claim a Cisco Live T-Shirt



Continue your education



- Visit the Cisco Showcase for related demos
- Book your one-on-one Meet the Expert meeting
- Attend the interactive education with DevNet, Capture the Flag, and Walk-in Labs
- Visit the On-Demand Library for more sessions at www.CiscoLive.com/on-demand



The bridge to possible

Thank you

CISCO *Live!*

#CiscoLiveAPJC

The background features a vibrant, multi-colored abstract design. On the left, there are horizontal, wavy bands of color in shades of red, orange, yellow, and green. On the right, a bright white light source emits a series of colorful rays in shades of blue, green, and yellow, creating a sunburst effect.

cisco *Live!*

Let's go

#CiscoLiveAPJC