

AI driven Automation and Assurance

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Principal solutions Engineer

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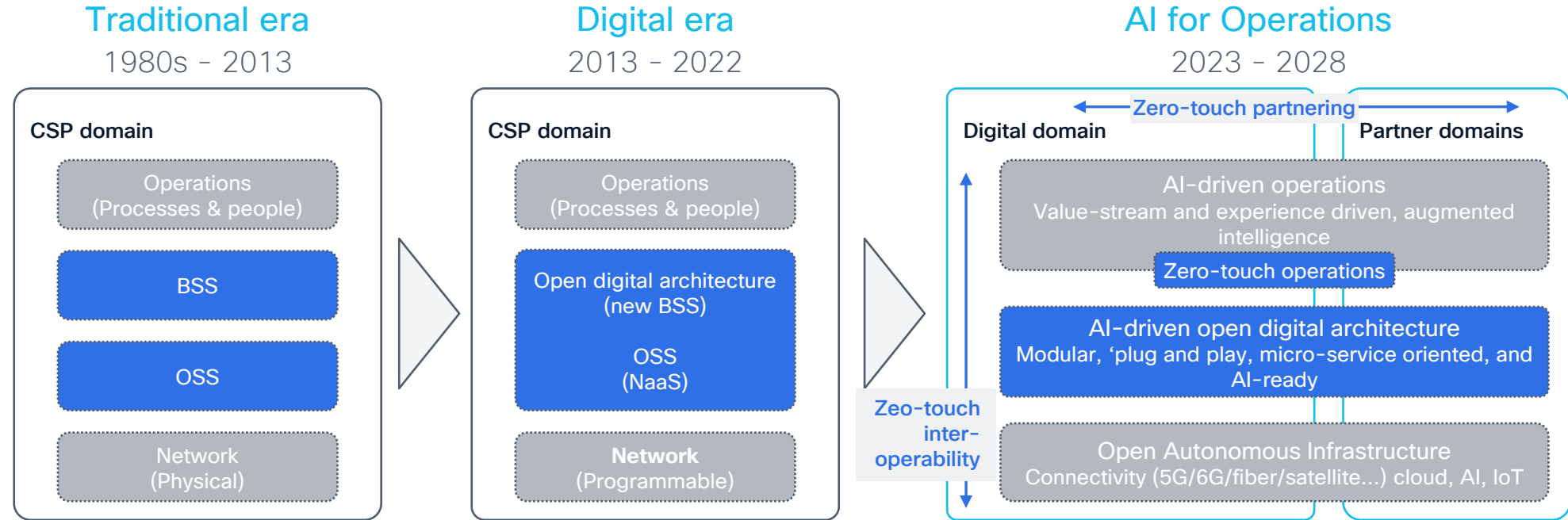
Agenda

- 01 AI and Agentic systems for Autonomous Networking
- 02 AI Enabled operations
- 03 Summary

AI and Agentic systems for Autonomous Networking

Networks towards “AI-for-Operations”

Culture, Integrations and regulations are main barriers



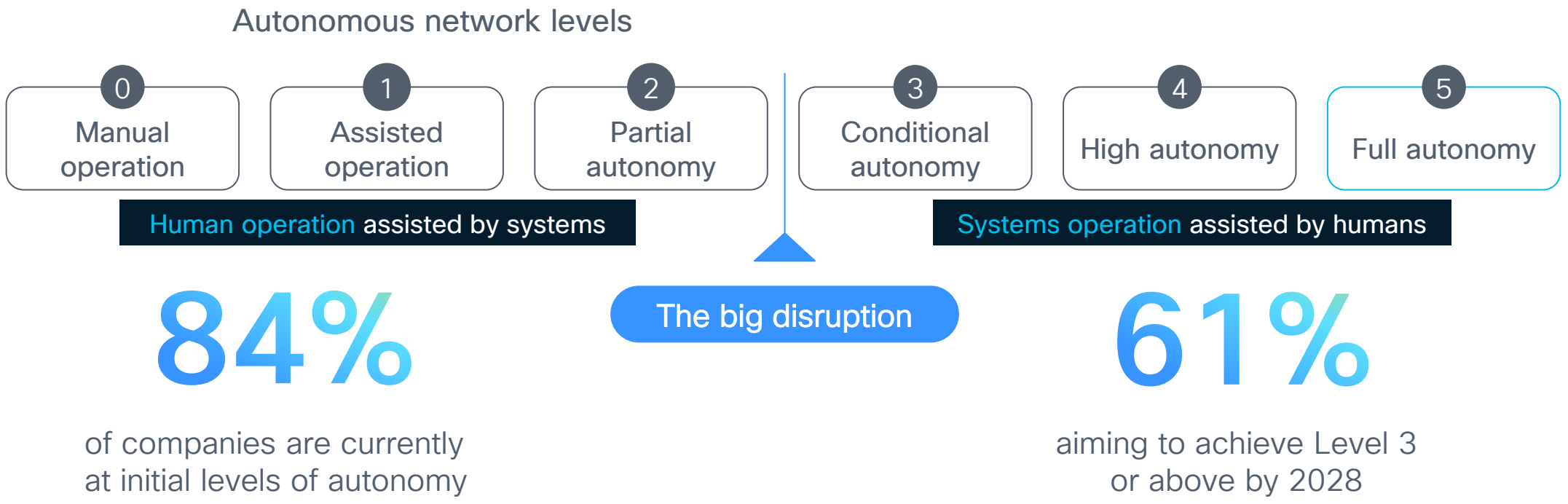
[Source: - TMF Open Digital Architecture [LINK](#)]

51% found Culture as the main barrier for adoption

48% found Integrations as the main barrier for adoption

[Source: CapGemini Research Jan 2024, 123 Telco surveyed - Transport Domain - [LINK](#)]

Journey and drivers for autonomous networking



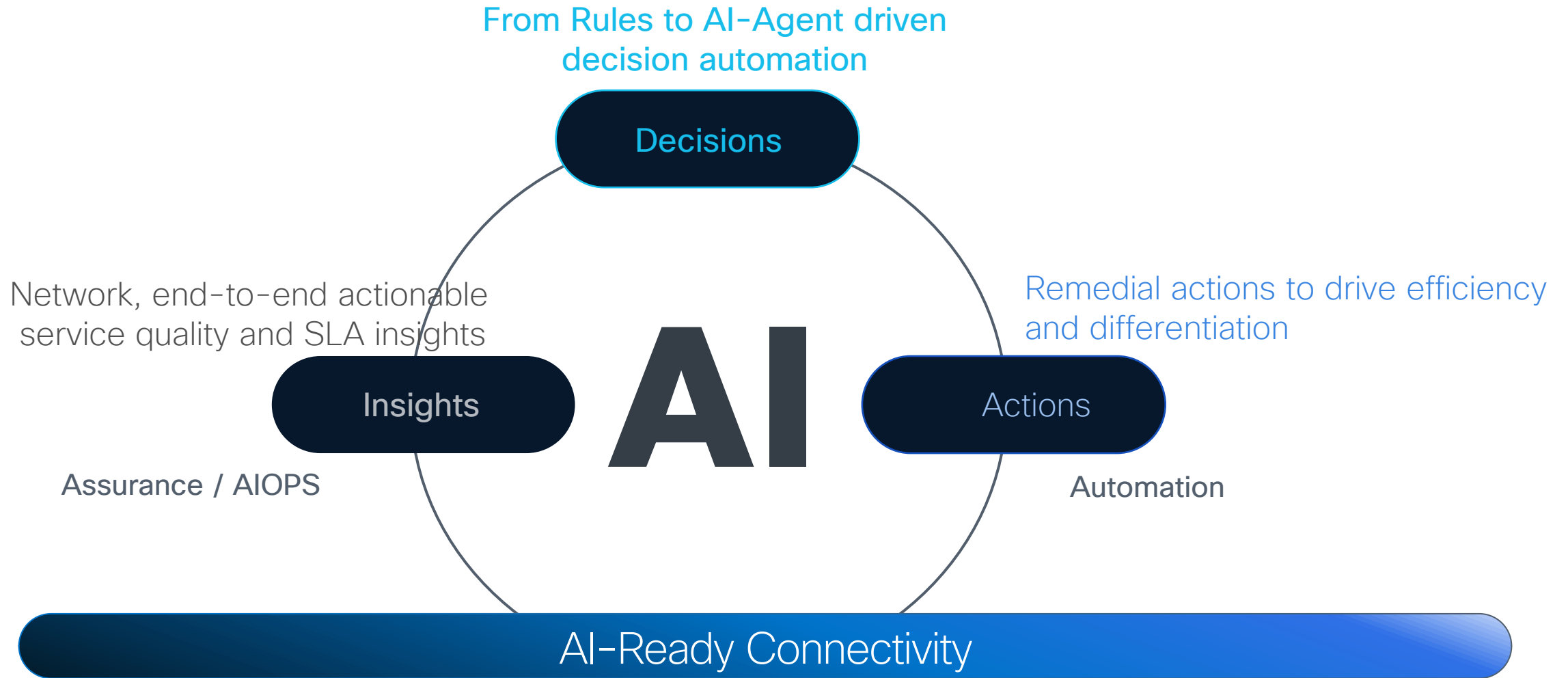
- \$ Network Monetization
- Operational efficiency
- Resource efficiency and energy savings
- Experience excellence

Evolving from reactive to preventative to prescriptive

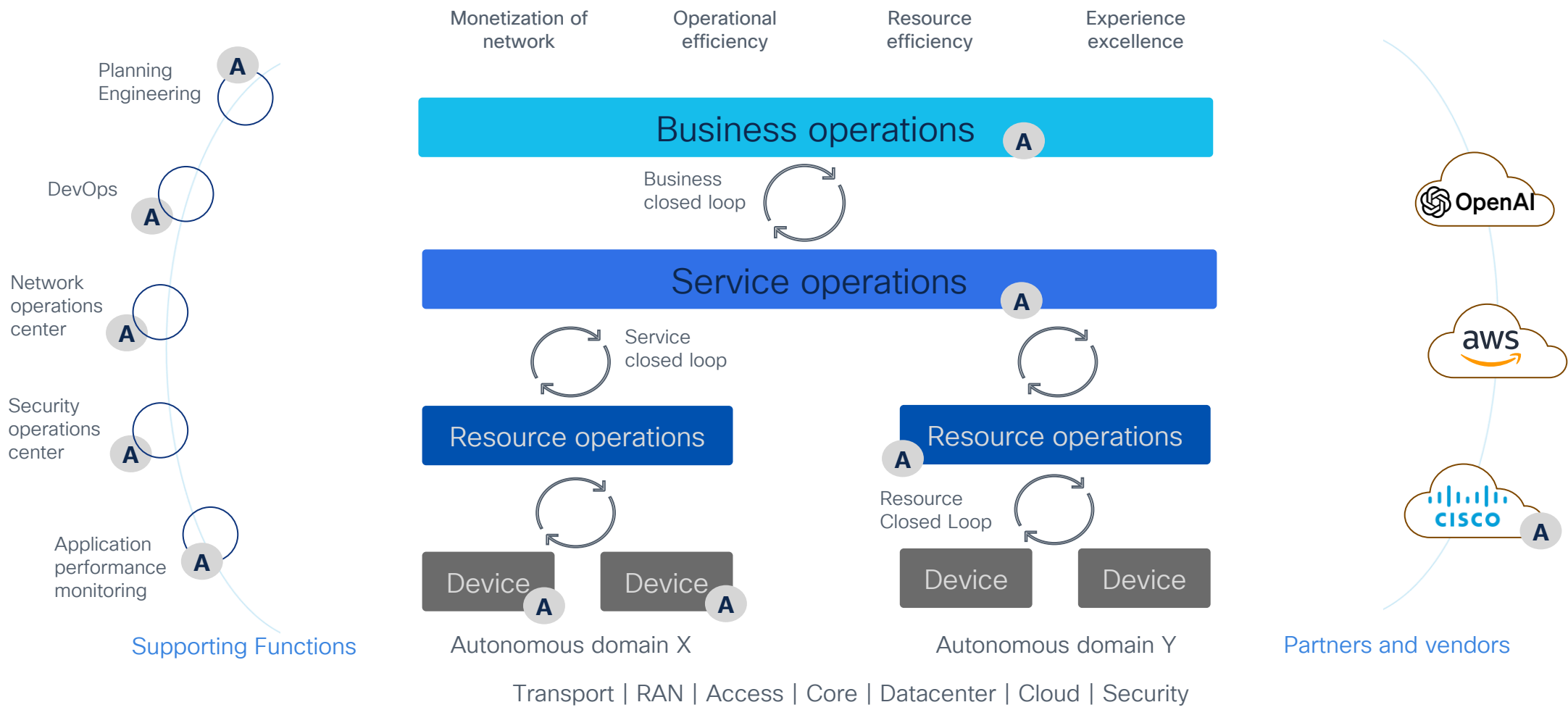
To succeed we need more intelligent systems



Our Vision for Operational Excellence



Autonomous networks requires a system view



Source: "Autonomous Networks Business Requirements & Architecture", TM Forum

The Journey from Automation to Autonomy

Use case Frequency

AUTOMATION

Limited in scope
Based on predefined rules
Does not adapt

+

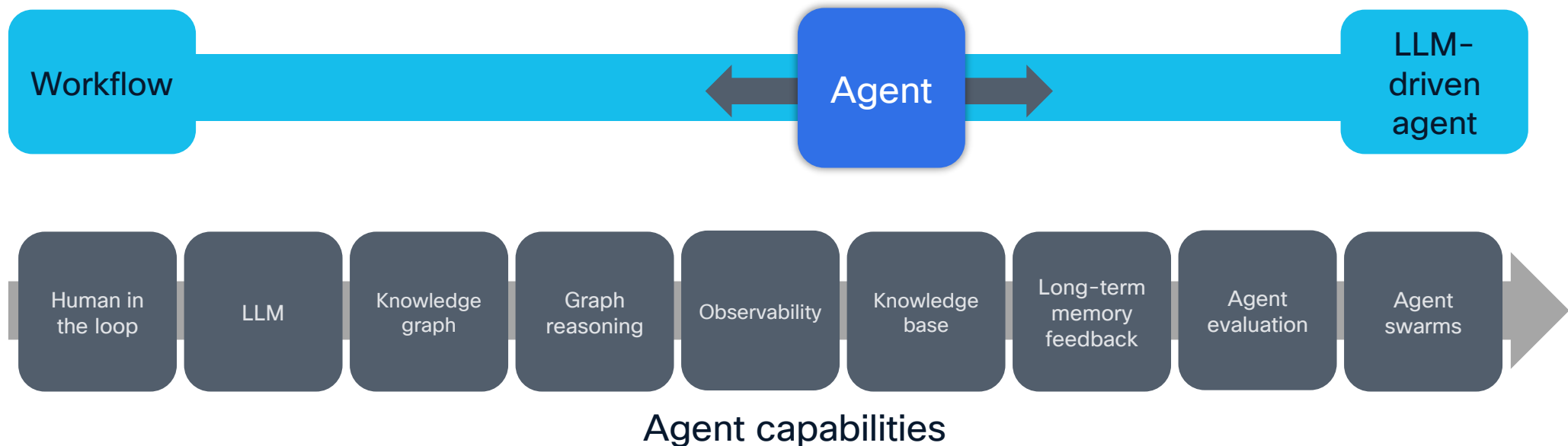
AUTONOMY

Unlocks long tail of use cases
Observes
Understands
Adapts
Not rule dependent

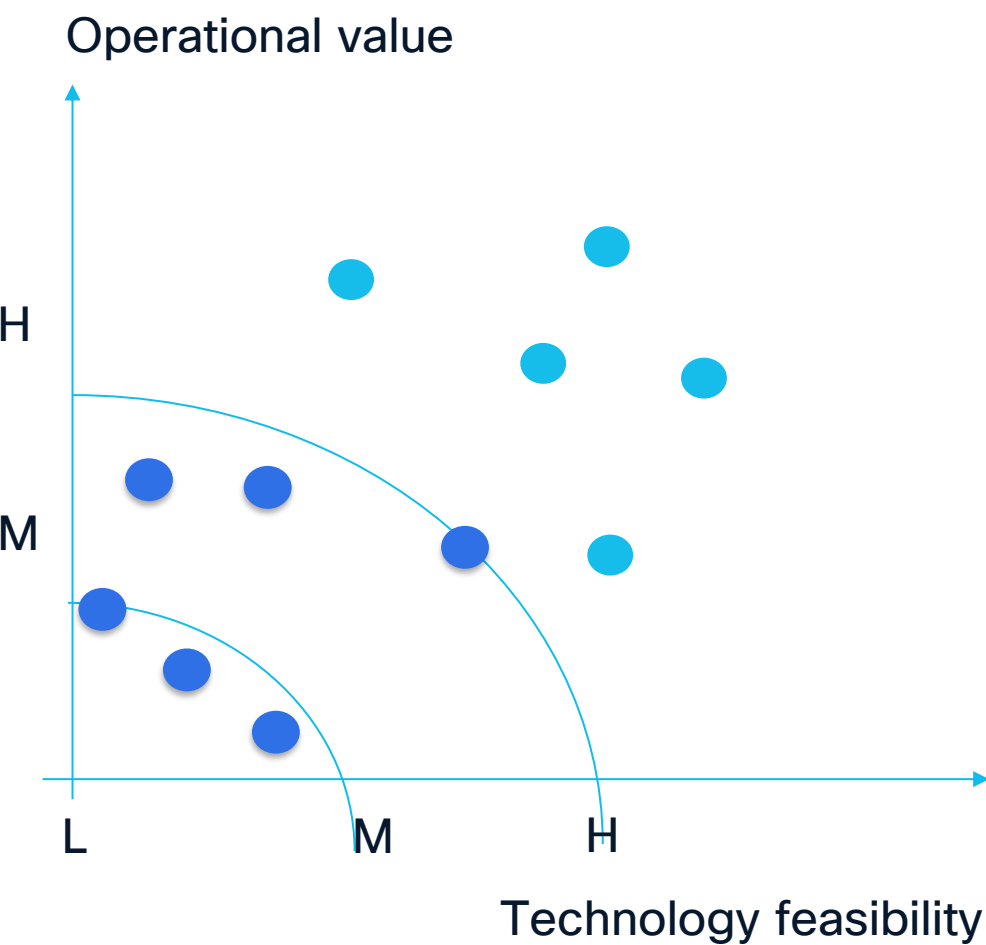
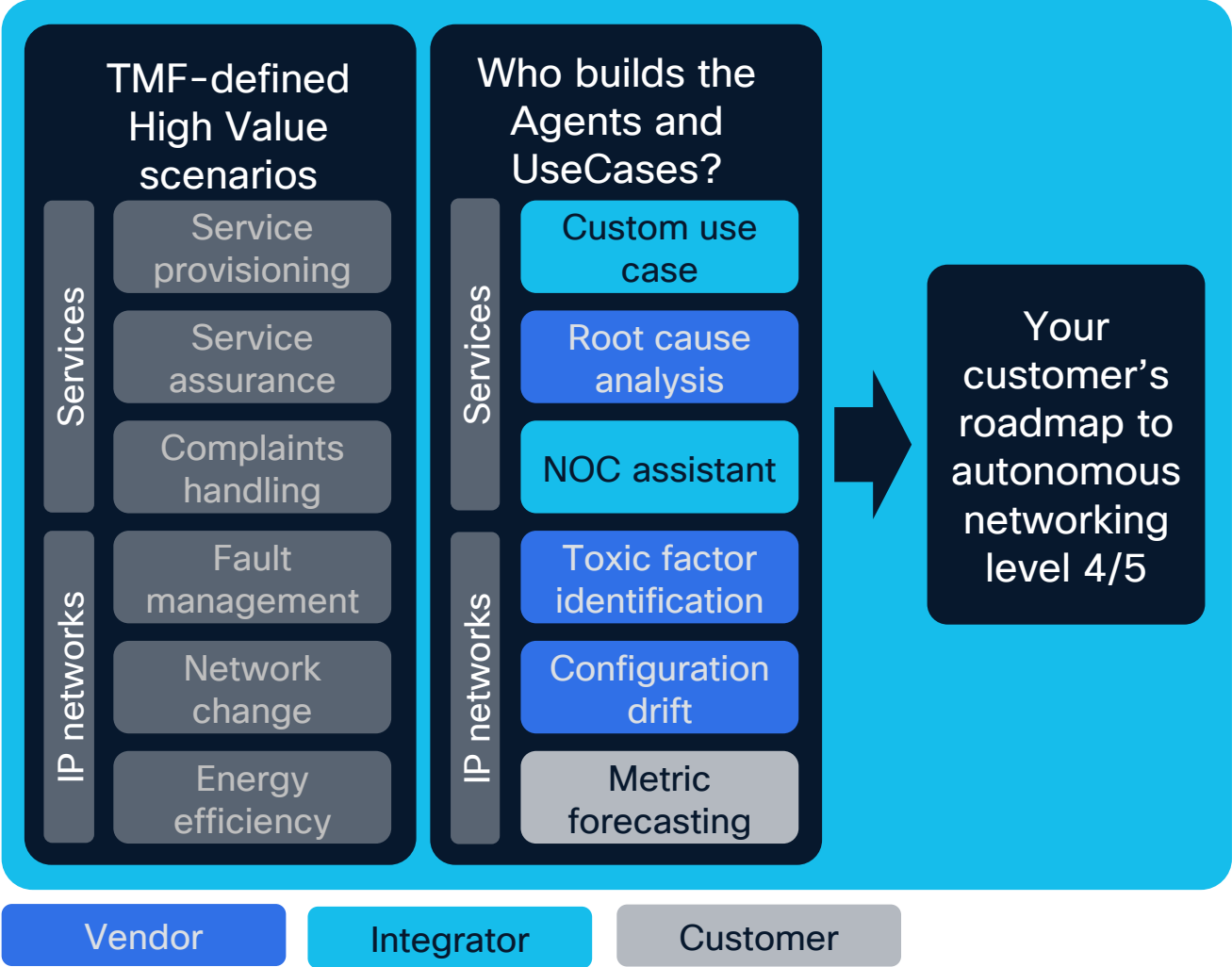
long tail of use cases

AI Agents are ...

“It is a partially or totally LLM-orchestrated workflow.”

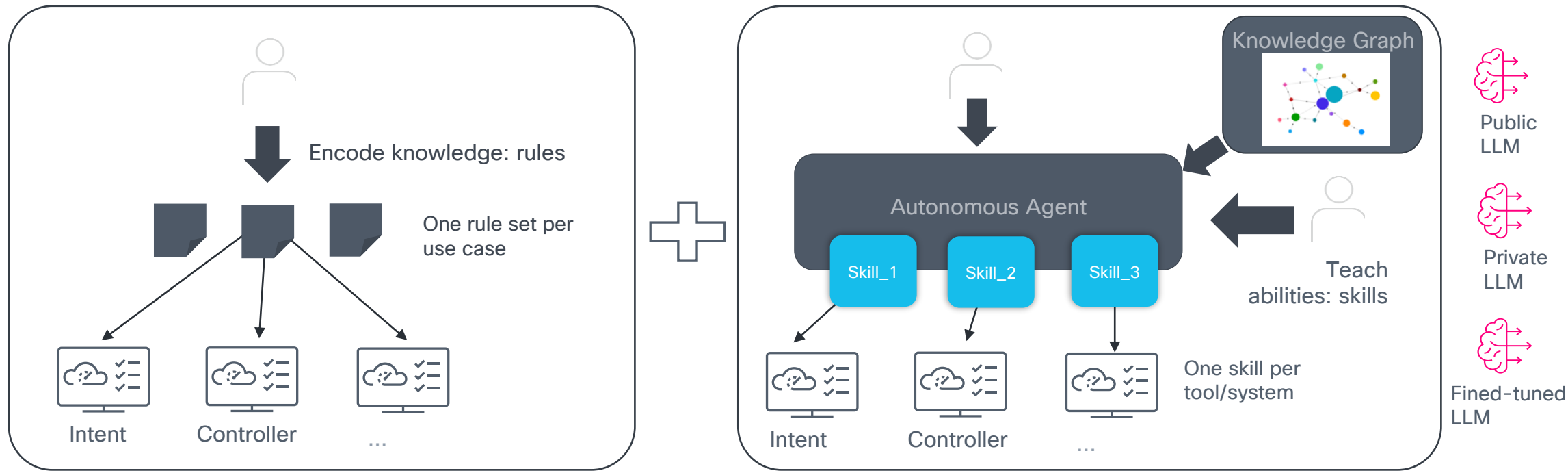


What are the high value scenarios?



The future of Automation at Scale

“Give a man a fish, and you feed him for a day, teach a man to fish, and you feed him for a lifetime.”



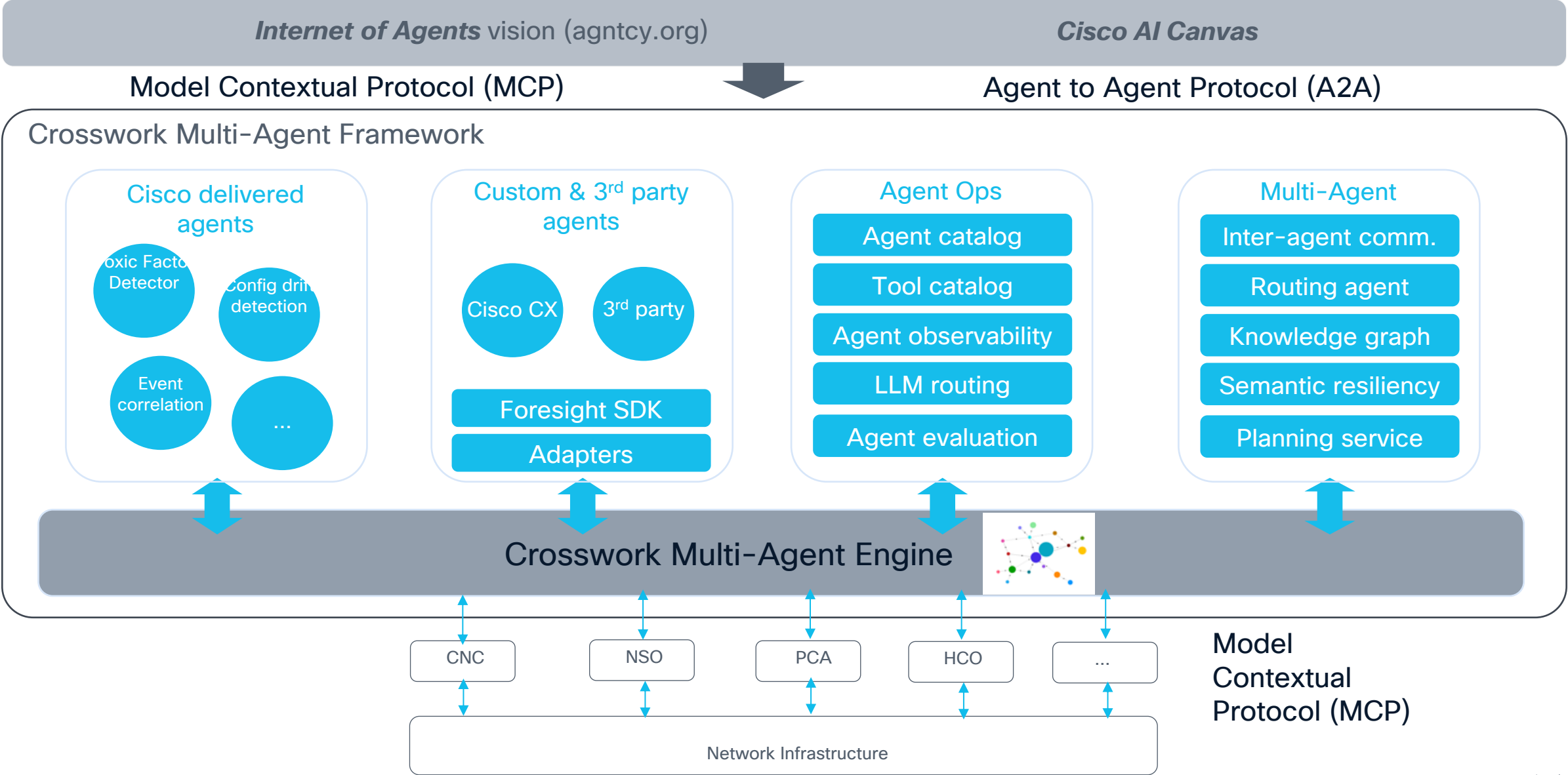
- | | | | |
|---|--|--|--|
| <ul style="list-style-type: none">• Low scale: 1s/10s of closed loop use cases• Knowledge encoded in rules -> invest in rules | <ul style="list-style-type: none">• Each rule-set associated with one use case• Static, limited• L2/L3 – Autonomous Network Levels | <ul style="list-style-type: none">• Large scale: 100s/1000s of closed-loop use cases• Knowledge compiled in LLM.• Context tailors LLM responses. | <ul style="list-style-type: none">• Skills enable Agent to interact -> invest in skills• Dynamic, autonomous, extensible• L4/L5 – Autonomous Network Levels |
|---|--|--|--|

L4 Autonomy blueprint

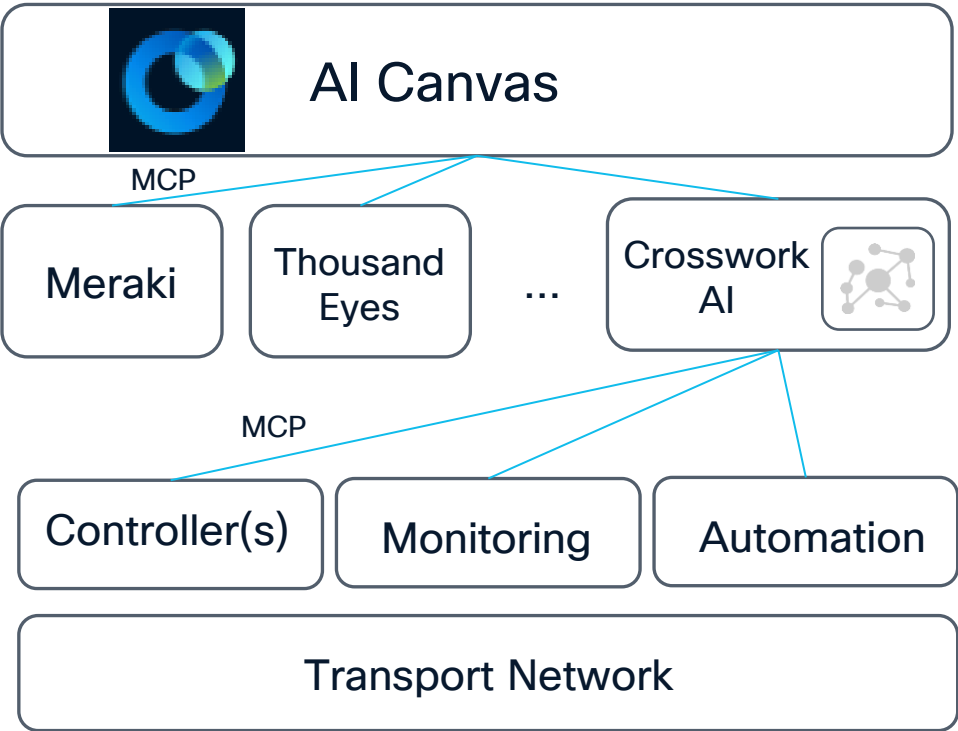
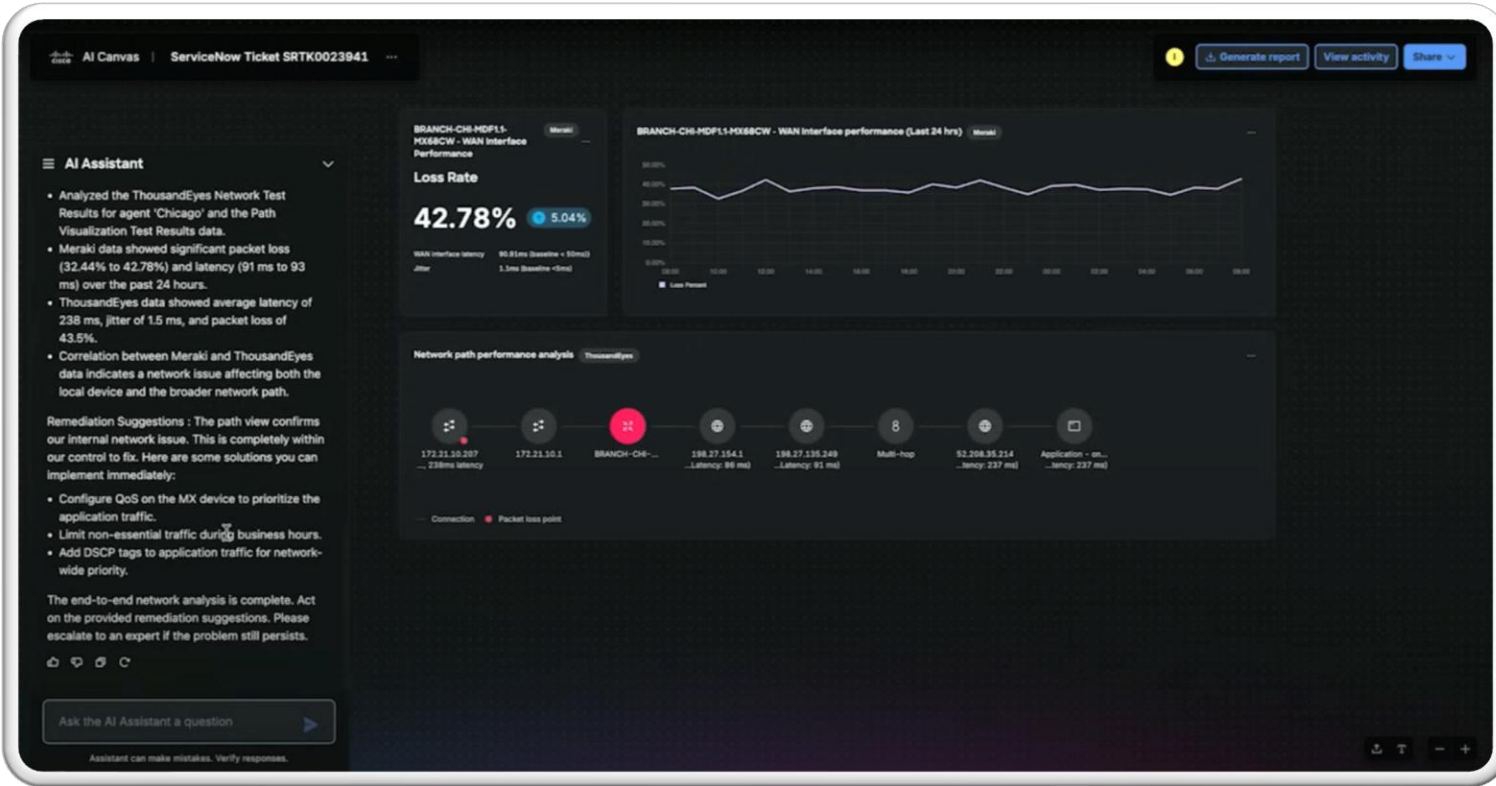
Phase 1 (2025-2027)
Autonomous Agent driven closed loop

Phase 2 (2028-2030)
Multi-agent collaboration for complex and multi-domain closed loop

Making Agents Production Ready for Network Automation



Cisco AI Canvas



PEOPLE + AI AGENTS + DATA

AI Agent Use Cases

Use case	Description	Expected outcome
Toxic Factor Detection	The goal of this use case is to analyze past network events in order to surface patterns that may be influencing negatively the network performance. It uses ML pattern detection algorithms.	Prevent future failures. Increase Mean Time Between Failures (MTBF)
Configuration Drift Detection	Enable a vendor agnostic and template free detection of configuration anomalies by using ML techniques (Configuration Language Models) that learn automatically how a configuration is supposed to be in the customer network	Prevent failures triggered by configuration changes.
Zero-Day Event Correlation	Enable high-quality network event correlation and noise reduction using new techniques such that there is no requirement to implement correlation rules (hence, enabling zero-day correlation even for unseen events)	Operational noise reduction. Improve Mean Time to Detect (MTTD) and Mean Time to Repair/Resolve (MTTR).
AI Automation Developer Agent	Lower the entry barrier for automation artifacts development (yang models, scripts, templates, workflows) by using Agents that can automate the process and automatically generate the required artifacts without requiring the user to have the skills to do this manually	Ease automation adoption (NSO, WFE, CNC). Improve time to value
Network Queries & Reports	AI-Agent focused on replying to complex network queries and reports	Improve MTTD and MTTR
Network Troubleshooting & Root Cause Analysis	Accelerate troubleshooting processes by implementing AI Agents that evaluate different troubleshooting trajectories and autonomously identify the root cause.	Improve MTTR.

AI Agent Use Cases (cont)

Use case		
Brownfield Discovery	Simplify the integration of brownfield infrastructure (devices, configuration, services) by automating the discovery of key entities using AI Agents in a vendor agnostic approach.	Accelerate automation and integration over brownfield.
Compliance & Reporting	Use AI Agents to automate the evaluation of network state against compliance rules. Leverage the flexible nature of Agent based reasoning to accommodate a wide range of compliance and state verification use cases	Improve MTBF and accelerate change management.
Coordinated Maintenance	Use AI to automate and improve the process of large scale maintenance processes such as software upgrades by including verification of impact (what-if) and optimization of scheduling (operational research algorithms for constrained programming)	Prevent maintenance related failures. Increase MTBF
Sustainability Optimization	Use AI mechanisms to identify power consumption hot-spots and provide recommendations on how to improve it by: network design, configuration change, etc.	OPEX optimization
Failure Prediction	Use AI mechanisms to help predict certain type of failures. First candidates are optical transceivers, fiber optics.	Prevent failure impact. Increase MTBF.
Design / Operational / Configuration Recommendations	Using data collected across customers and our Cisco internal knowledge base, automatically generate recommendations that will help customers in design / operational and configuration decisions.	Accelerate decisions and improve decision quality. Prevent network failures by aligning with best practices learned from data.

use case

Toxic Factor Identification

description

Detection risk factors that may be influencing negatively the performance of the network

from automation

Manually analyze the impact of specific factors such as a certain software release or hardware in network event

to autonomy

AI Frequent Pattern detection algorithms are used to autonomously identify any combination of factors that have a negative impact in the occurrence of network failures

outcomes & benefits

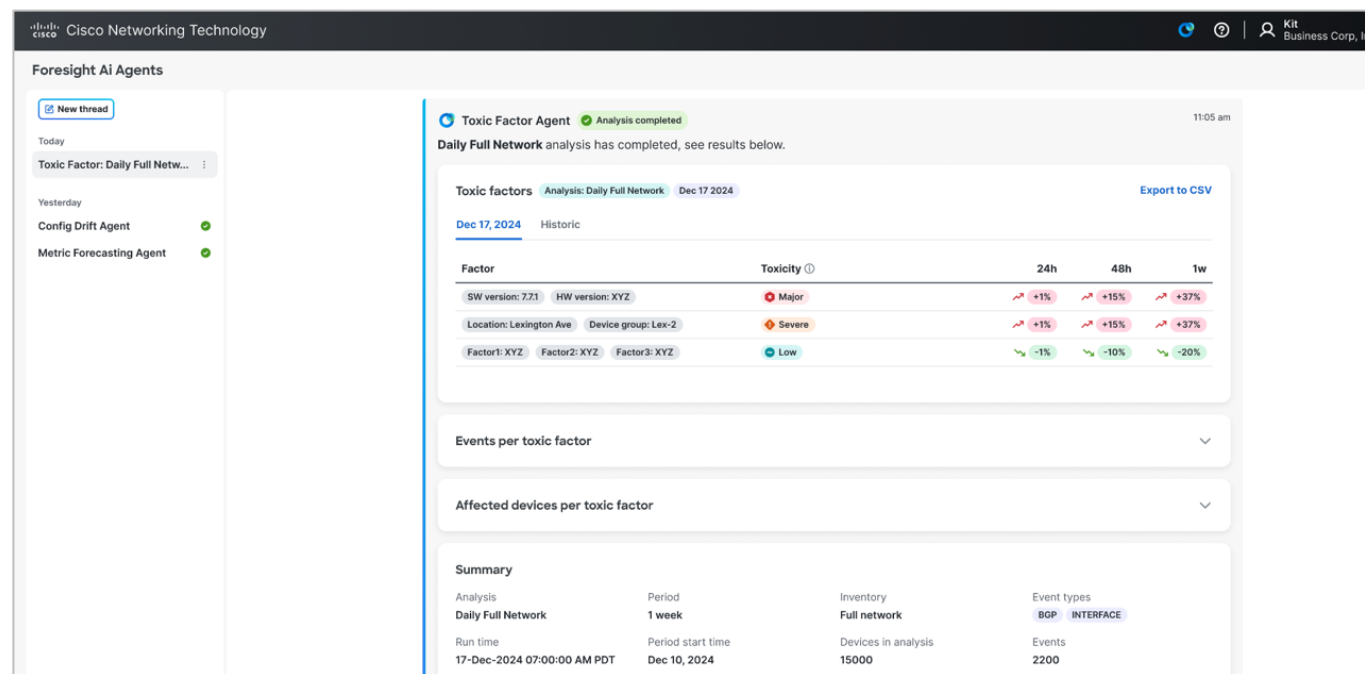
- No need for manual analysis for each factor.
- Multivendor by architecture.
- Prevention of network failures due to identification of risk factors associated.
- Identification of unknown unknowns.
- Improved MTBF.

availability

Q4 CY25

compatibility

- Crosswork Multi-Agent Platform
- Crosswork Network Controller 7.2



Two tmforum Catalyst use cases



Game X: Elevating Customer Experience via Self-Governed Converged Networks



1

**Industry blueprint
and application**

4

Network domains

5

Open APIs

11

**High value
use cases**

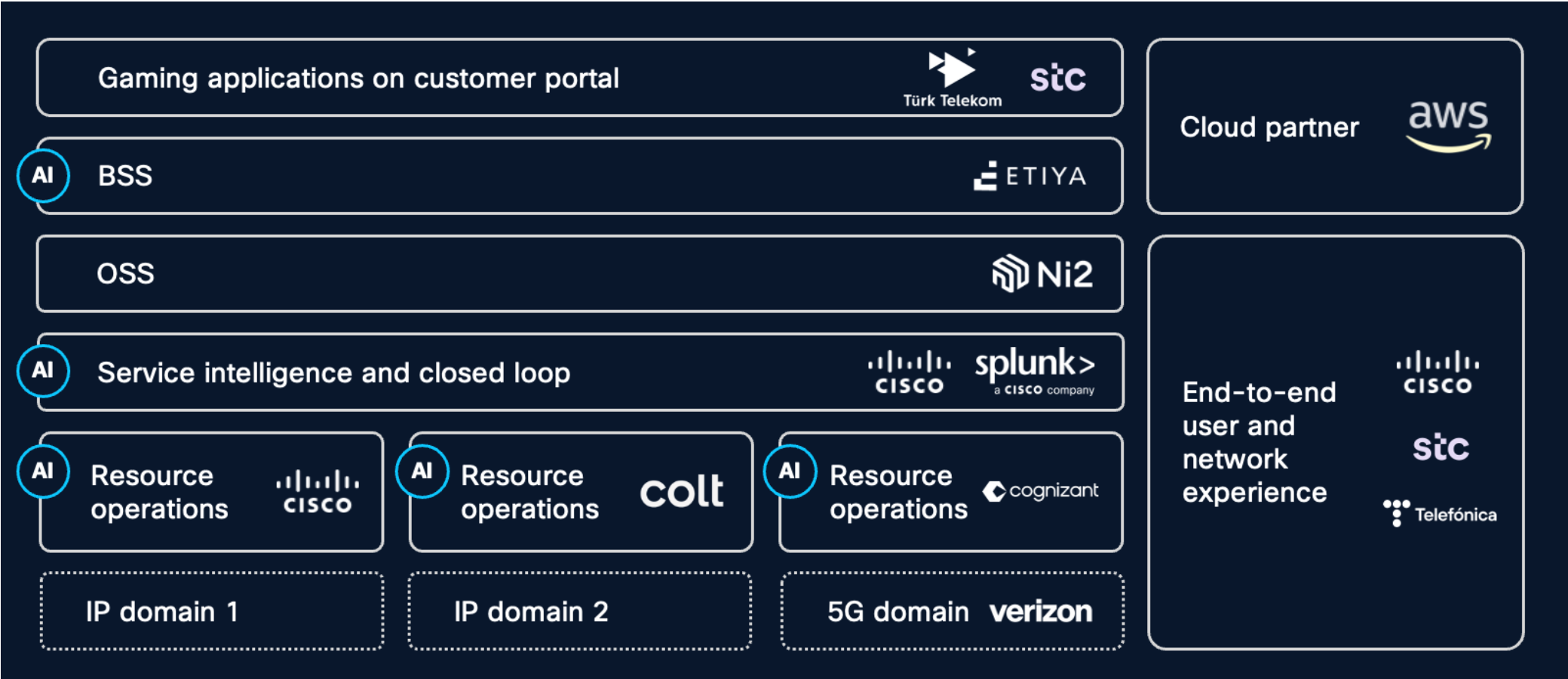
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AI agents

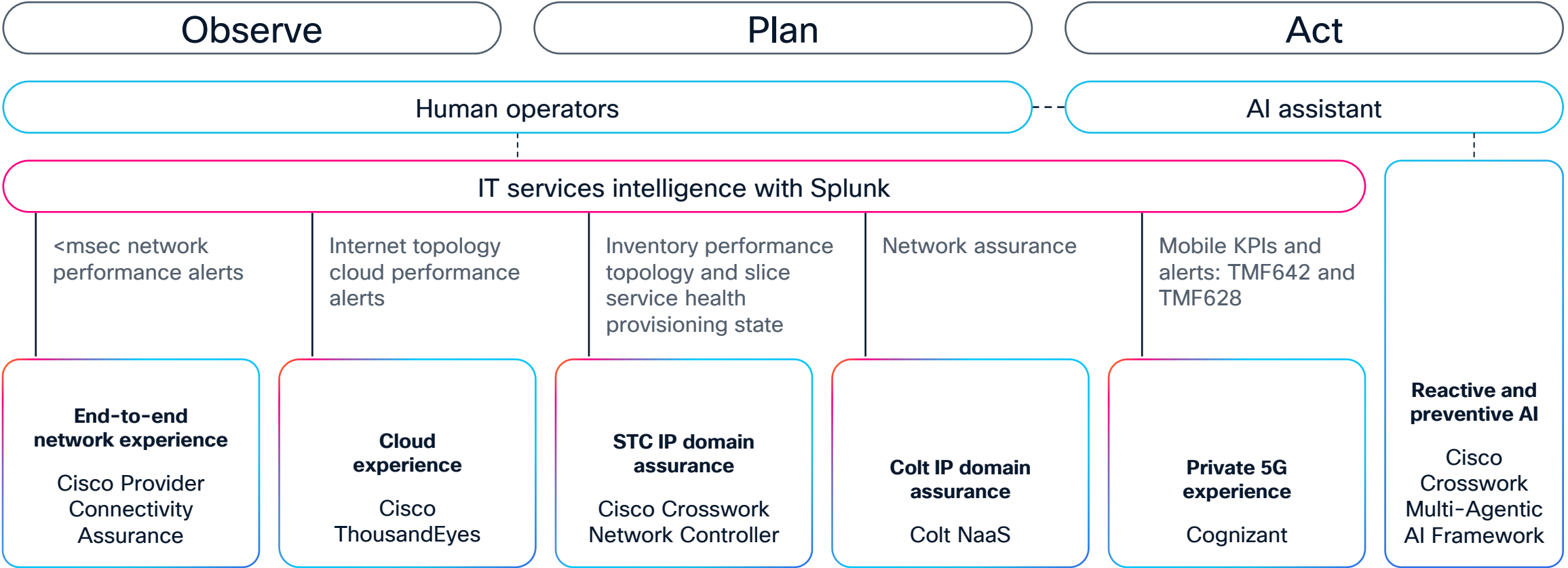
32

People collaborating

TM Forum Catalyst ecosystem and collaboration to enable autonomous networking Level 4



One Cisco story in action

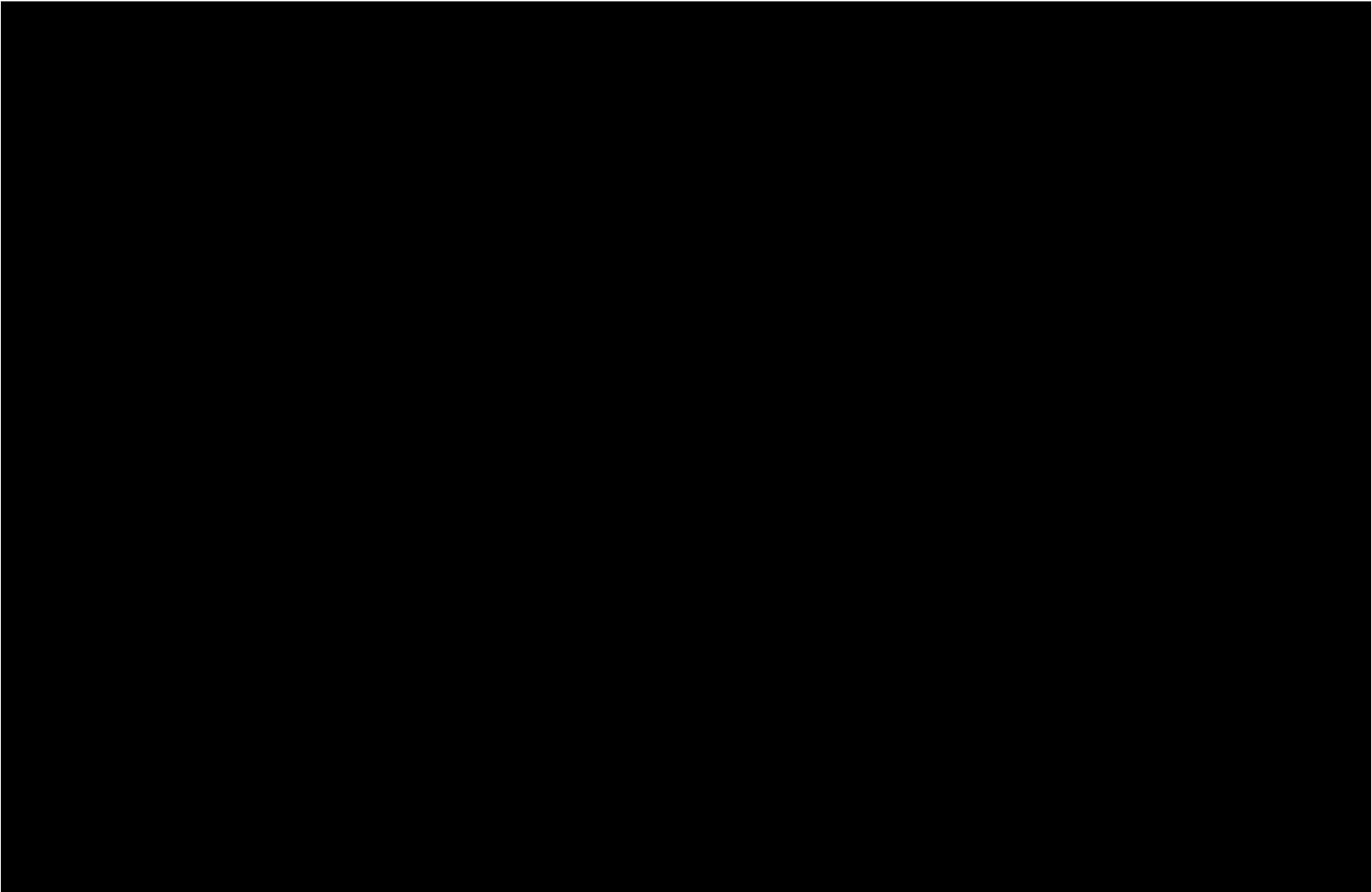


Demo in a real network



AI Enabled operations

Cisco Automation and Assurance Update



Home

Ports

0

Connections

0

Activity

0

Saved requests

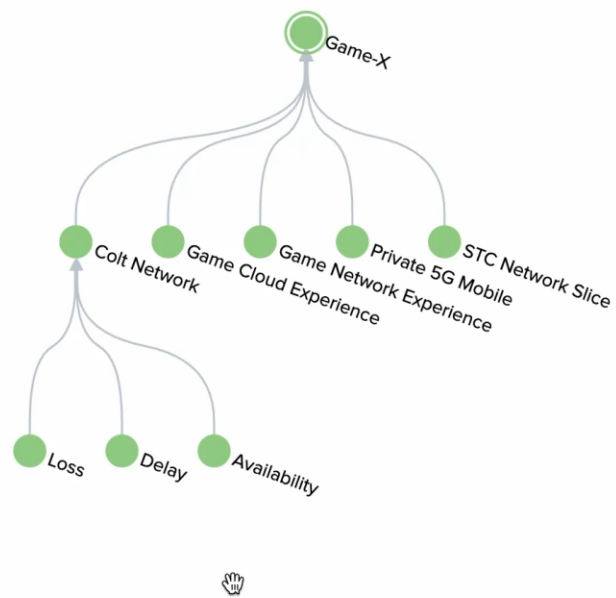
0

Game-X

Auto Refresh: 1 minute Last 4 hours Save as... Save

Filter services Game-X X Filter by tags Select tags to monitor Created By: All Minimum Severity: None Maximum Depth: All KPI Value: Aggregate

Go to service



Game-X 100

KPIs & Episodes Service impact analysis

0 KPIs Open all in Deep Dive

No KPIs found.

0 Critical and High Episodes View All

Waiting for data...

splunk>enterpriseApps

Administrator2 MessagesSettingsActivityHelpFind

GameX ObserverGame-X Overview: Experiences Deep DiveControlAnalyticsSearchDatasetsReportsAlertsDashboards

Global Time RangeLast 60 minutes103%ActionsEdit

TM Forum Moonshot Catalyst M25.0.824 Game X

Combining standardized network APIs and AI orchestration to enable fixed-wireless convergence for ultra-low-latency cloud gaming and immersive applications.

Experience

Provisioning State

Services State

AI Agent Operations

Fault	Frequency	Days	Total	Impacted Systems
AAA BADSERVERTYPEERROR	5	30	90	81%
IP DUPADDR	2	2	4	25%
OSPF FLOOD WAR	90	180	3000	41%
INVALIDKEY OSPF	20	40	300	62%
NACM_INIT	4	7	40	36%

TACACS COMMUNICATION

Tacacs Communication:
Connected to the server.

ENGAGE MODEL

includes the correct device IP address and command s[18/1115\$
remediation.

00:01:330.0000

The interface TenGigE 0/0/0/2 is currently administratively down, significantly impacting critical customer services, specifically the Game-X service connected through this interface. To enable the interface, use the following commands:
````\nconfigure terminal\ninterface TenGigE0/0/0/2\nno shutdown\n````\n

[You]>  
[You]>  
[You]>  
[You]>  
[You]>  
[You]>

[ed-208] 0: [tmux]\*"ed-208-app-764c779794" 10:02 13-Jun-25

Customize

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CISCO

Chrome File Edit View History Bookmarks Profiles Tab Window Help

GameX Agent C Episode Deep Di Game-X Provider Experien Views - Colt On Control Search

Not Secure [https://10.58.239.211/en-US/app/tmf\\_cisco\\_gamex\\_observer\\_app/gamex\\_observer?form.global\\_time.earliest=-60m%40m&form.global\\_time.latest=now](https://10.58.239.211/en-US/app/tmf_cisco_gamex_observer_app/gamex_observer?form.global_time.earliest=-60m%40m&form.global_time.latest=now)

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Last 60 minutes

Experience

Provisioning State

Services State

AI Agent Operations

created by hgehrts@cisco.com

# Cisco Details ‘Salt Typhoon’ Network Hopping Credential Theft Tactics

Cisco Talos observed Chinese hackers pivoting from a compromised device operated by one telecom to target a device in another telecom.

...

The research team also noted the extensive use of LOTL techniques, piggybacking on built-in networking features rather than deploying traditional malware. The attackers modified router configurations, altered authentication settings, and used guest shell environments on Cisco Nexus devices to execute commands stealthily.

...



Source; <https://www.securityweek.com/cisco-details-salt-typhoon-network-hopping-credential-theft-tactics/>

# Before the attack...

## router configuration

```
81 feature tacacs+ vrf management
82 tacacs-server login host 10.15.1.10 vrf management seq-num 1 key 7 0x960c890aa72610d6aca0 port 1623
83 tacacs-server login host 10.15.1.15 vrf management seq-num 2 key 7 0x960c890a272610d6aca0 port 1623
84 aaa local authentication unlock-timeout 1
85 aaa authentication login default vrf management group tacacs+ local
86 snmp-server enable snmp vrf management
87 snmp-server view all .1 included vrf management
88 snmp-server community test group network-operator vrf management
89 snmp-server host 10.15.1.12 traps version 2c test udp-port 162 vrf management
90 snmp-server host 10.15.1.13 traps version 2c test udp-port 162 vrf management
91 feature ntp vrf management
92 ntp enable vrf management
93 ntp server 10.15.1.14 vrf management
94 username admin role network-admin password encrypted $1hde642ysfh5eyw3
95 no username ios
96 feature rsyslog vrf management
97 logging server 10.15.1.15 5 facility local0 vrf management
98 !
```

All authentication configuration settings are defined as expected

# After the attack...

## router configuration

```
77 no errdisable cause stp-bpdu-guard
78 errdisable link-flap-setting max-flaps 5 time 60
79 no feature telnet vrf management
80 feature ssh vrf management
81 feature tacacs+ vrf management
82 tacacs-server login host 10.15.1.10 vrf management seq-num 1 key 7 0x960c890aa72610d6aca0 port 1623
83 tacacs-server login host 10.15.1.11 vrf management seq-num 2 key 7 0x960c890a272610d6aca0 port 1623
84 aaa local authentication unlock-timeout 1
85 aaa authentication login default vrf management group tacacs+ local
86 snmp-server enable snmp vrf management
87 snmp-server view all .1 included vrf management
88 snmp-server community test group network-operator vrf management
89 snmp-server host 10.15.1.12 traps version 2c test udp-port 162 vrf management
90 snmp-server host 10.15.1.13 traps version 2c test udp-port 162 vrf management
91 feature ntp vrf management
92 ntp enable vrf management
93 ntp server 10.15.1.14 vrf management
94 username admin role network-admin password encrypted $1hde642ysfh5eyw3
95 username admin2 role network-admin password encrypted $1hdsgsdfhfdghw4
96 no username ios
97 feature rsyslog vrf management
98 logging server 10.15.1.15 5 facility local0 vrf management
99 !
```

Authentication configuration was 'silently' changed. A new user is configured.

Access compromised, attackers can potentially jump across devices.

If the change goes 'unnoticed' it may stay for days, weeks or months.

# With configuration drift detection AI Agent, integrated with Cisco AI Assistant

```
router configuration
77 no errdisable cause stp-bpdu-guard
78 errdisable link-flap-setting max-flaps 5 time 60
79 no feature telnet vrf management
80 feature ssh vrf management
81 feature tacacs+ vrf management
82 tacacs-server login host 10.15.1.10 vrf management seq-num 1 key 7 0x960c890aa72610d6aca0 port 1623
83 tacacs-server login host 10.15.1.11 vrf management seq-num 2 key 7 0x960c890a272610d6aca0 port 1623
84 aaa local authentication unlock-timeout 1
85 aaa authentication login default vrf management group tacacs+ local
86 snmp-server enable snmp vrf management
87 snmp-server view all .1 included vrf management
88 snmp-server community test group network-operator vrf management
89 snmp-server host 10.15.1.12 traps version 2c test udp-port 162 vrf management
90 snmp-server host 10.15.1.13 traps version 2c test udp-port 162 vrf management
91 feature ntp vrf management
92 ntp enable vrf management
93 ntp server 10.15.1.14 vrf management
94 username admin role network-admin password encrypted $1hde642ysfh5eyw3
95 username admin2 role network-admin password encrypted $1hdsgsdfhfdghw4
96 no username ios
97 feature rsyslog vrf management
98 logging server 10.15.1.15 5 facility local0 vrf management
99 !
```

Config drift  
AI Agent

AI Assistant

Config Drift Agent: On-demand analysis has completed, see result below

Result overview On-demand Download results

235 total anomalies 123 total devices 13 devices with anomalies

Details

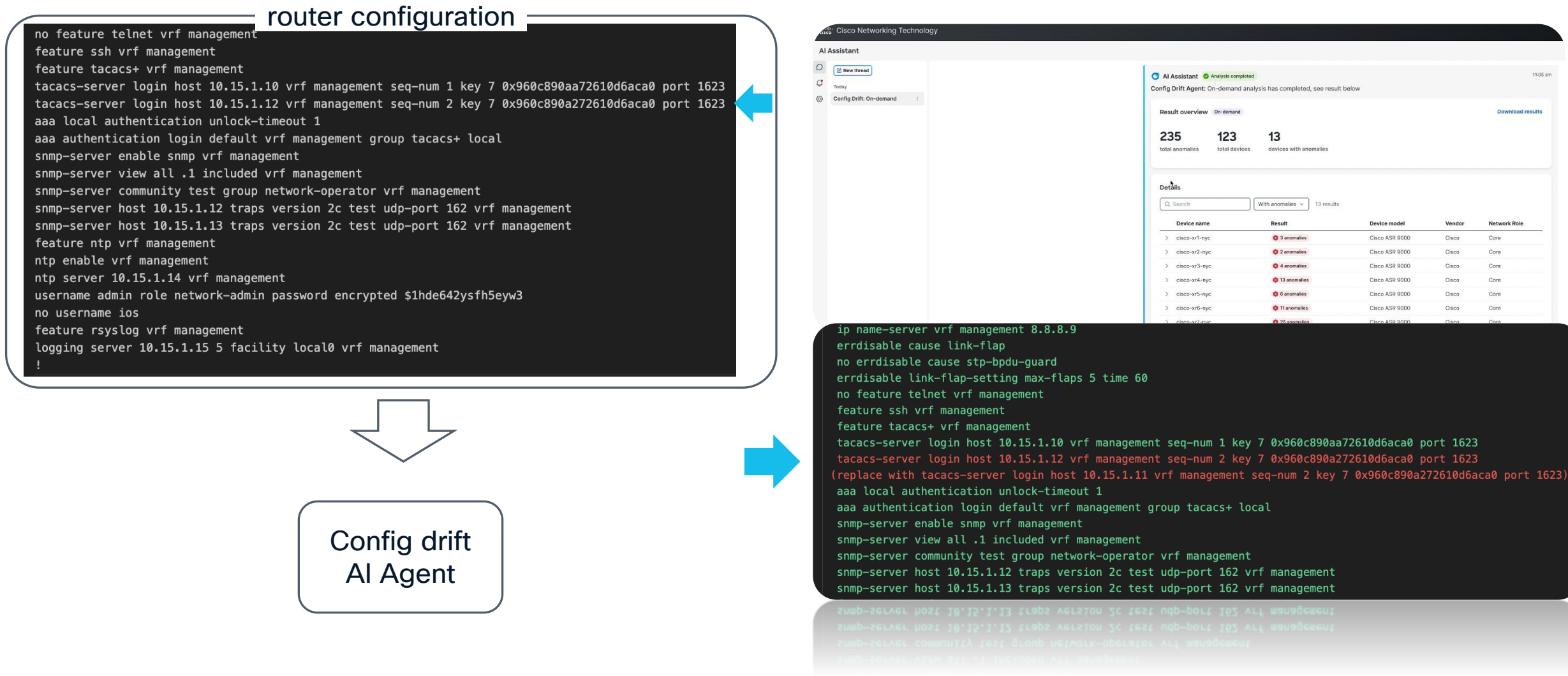
Search With anomalies 13 results

Device name	Result	Device model	Vendor	Network Role
> cisco-xr1-nyc	3 anomalies	Cisco ASR 9000	Cisco	Core
> cisco-xr2-nyc	2 anomalies	Cisco ASR 9000	Cisco	Core
> cisco-xr3-nyc	4 anomalies	Cisco ASR 9000	Cisco	Core
> cisco-xr4-nyc	13 anomalies	Cisco ASR 9000	Cisco	Core

```
tacacs-server login host 10.15.1.10 vrf management seq-num 1 key 7 0x960c890aa72610d6aca0 port 1623
tacacs-server login host 10.15.1.11 vrf management seq-num 2 key 7 0x960c890a272610d6aca0 port 1623
aaa local authentication unlock-timeout 1
aaa authentication login default vrf management group tacacs+ local
snmp-server enable snmp vrf management
snmp-server view all .1 included vrf management
snmp-server community test group network-operator vrf management
snmp-server host 10.15.1.12 traps version 2c test udp-port 162 vrf management
snmp-server host 10.15.1.13 traps version 2c test udp-port 162 vrf management
feature ntp vrf management
ntp enable vrf management
ntp server 10.15.1.14 vrf management
username admin role network-admin password encrypted $1hde642ysfh5eyw3
username admin2 role network-admin password encrypted $1hdsgsdfhfdghw4
(remove)
no username ios
feature rsyslog vrf management
logging server 10.15.1.15 5 facility local0 vrf management
!
```



# With configuration drift detection AI Agent, integrated with Cisco AI Assistant



# Demo Configuration Drift

Crosswork Network Controller

Kit Business Corp, Inc

AI Assistant

New thread



How can I help today?

Choose a suggestion or use the text field to ask a question. I have limitations and won't always get it right, but your feedback will help me improve.

I want to check the config for a number of devices

I want to list all scheduled config drift analysis

Ask the AI Assistant a question

Assistant can make mistakes. Verify responses.

# Agentic Playground Workshop/Lab



AI Agent Playground version: 2.1-internal

### AGENT SETTINGS

LLM settings

Select the LLM provider:

Choose the LLM provider

CIRCUIT

Enter the LLM you want to use:

gpt-4.1

Query agent operational settings

Deep Troubleshooting agent operational settings

Click to activate and verify AI agent readiness

Query Agent simulations

Deep Troubleshooting Agent simulations

Agent components

Query Agent

Deep Troubleshooting Agent

Agent observability



## AI AGENT PLAYGROUND

Deep Troubleshooting Agent

### How can I help you?

 The isis adjacency between routers node-6 and node-7 is down. I need to know why

 Evaluating the following hypothesis: There is a mismatch in ISIS authentication configuration between node-6 and node-7 interfaces used for the adjacency, causing the ISIS adjacency to fail.

 Hold on, analyzing your request

 My next step: Query the graph G to identify all interface pairs where one interface belongs to node-6 and the connected peer interface belongs to node-7, using the 'connects\_to\_peer\_interface' relationship.

 My next step: Query the graph G to obtain the management IP address and Netmiko device type for router node-6.

 My next step: Query the graph G to obtain the management IP address and Netmiko device type for router node-7.

 My next step: Connect to node-6 using SSH and collect the ISIS configuration for interface GigabitEthernet0/0/0/7, in order to check the ISIS authentication settings on this interface.

 My next step: Connect to node-6 using SSH, and run the CLI command 'show running-config interface GigabitEthernet0/0/0/7' to retrieve the full interface configuration, which will include any ISIS authentication settings relevant to the interface connecting node-6 and node-7.

 My next step: Connect to node-7 using SSH, and run the CLI command 'show running-config interface GigabitEthernet0/0/0/6' to retrieve the full interface configuration, which will include any ISIS authentication settings relevant to the interface connecting node-7 to node-6.

- Available at:
  - Automation Developer Days
  - Cisco Live
  - Autoconf
- Planned to be release with Agentic Framework
- Regular workshops with customers using Cisco dcloud virtual labs

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BRKATO-2065



# AI Agent Roadmap

2HCY25		1HCY26	2HCY26	2027
Reactive		<ul style="list-style-type: none"><li>Incident co-pilot.</li></ul>	<ul style="list-style-type: none"><li>Network troubleshooting and root cause analysis</li><li>Brownfield discovery.</li></ul>	
Preventive	<ul style="list-style-type: none"><li>Toxic Factor Detector</li><li>Configuration Drift Detection</li></ul>	<ul style="list-style-type: none"><li>Noise reduction (Zero-Day Event Correlation)</li></ul>	<ul style="list-style-type: none"><li>Compliance &amp; reporting (Agent based)</li><li>Coordinated maintenance</li><li>Sustainability optimization</li><li>Brownfield discovery</li></ul>	<ul style="list-style-type: none"><li>Failure prediction</li></ul>
Prescriptive		<ul style="list-style-type: none"><li>Automation adoption (AI Automation developer agent)</li></ul>	<ul style="list-style-type: none"><li>Device migration</li></ul>	<ul style="list-style-type: none"><li>Network Design recommendations</li><li>Configuration recommendations</li><li>Operational recommendations.</li><li>Multi-layer optimization</li></ul>
Framework	<ul style="list-style-type: none"><li>Baseline for first two agents</li></ul>		SDK	



Committed



Planning



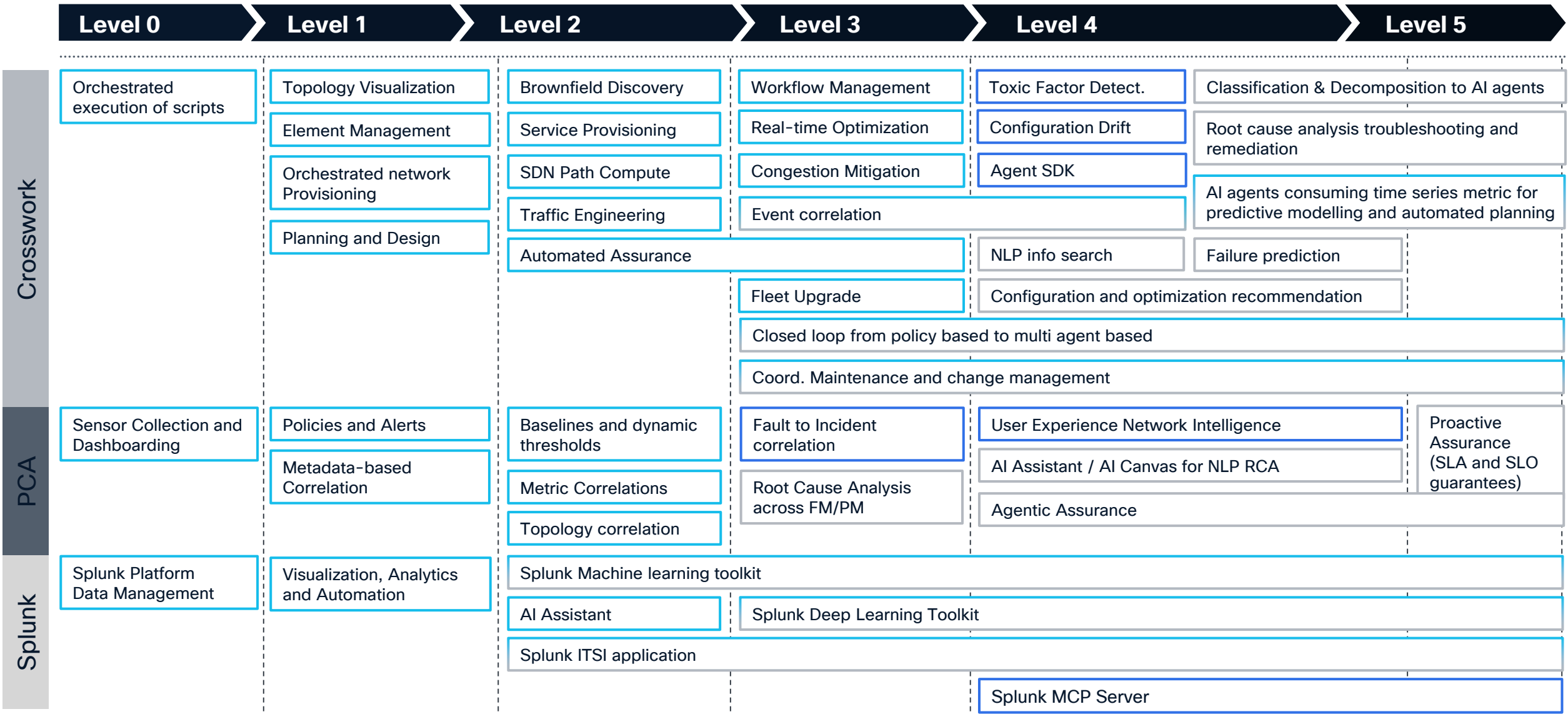
Radar



NSO



CNC



Delivered

Next release

Roadmap

# AI Enabled operations

Cisco Automation and Assurance Update

# Cisco Automation And Assurance



Most Comprehensive Functions



Intent-driven Automation



Modular, Multi-vendor & Extensible



Multi-agentic AI



Low-code/ No-code Experience



Scalable, Resilient & Secure



Deep Visibility & Analytics

Operational Task Automation



Orchestration



Planning



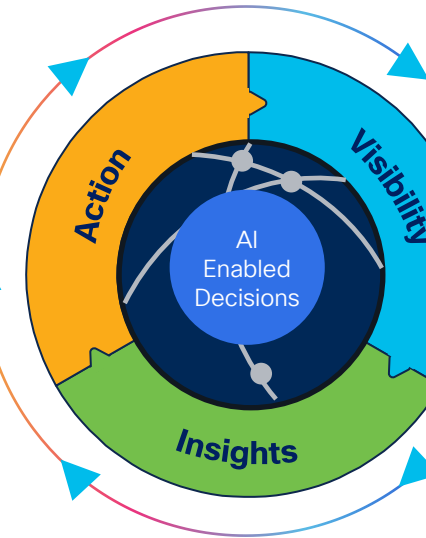
Visualization



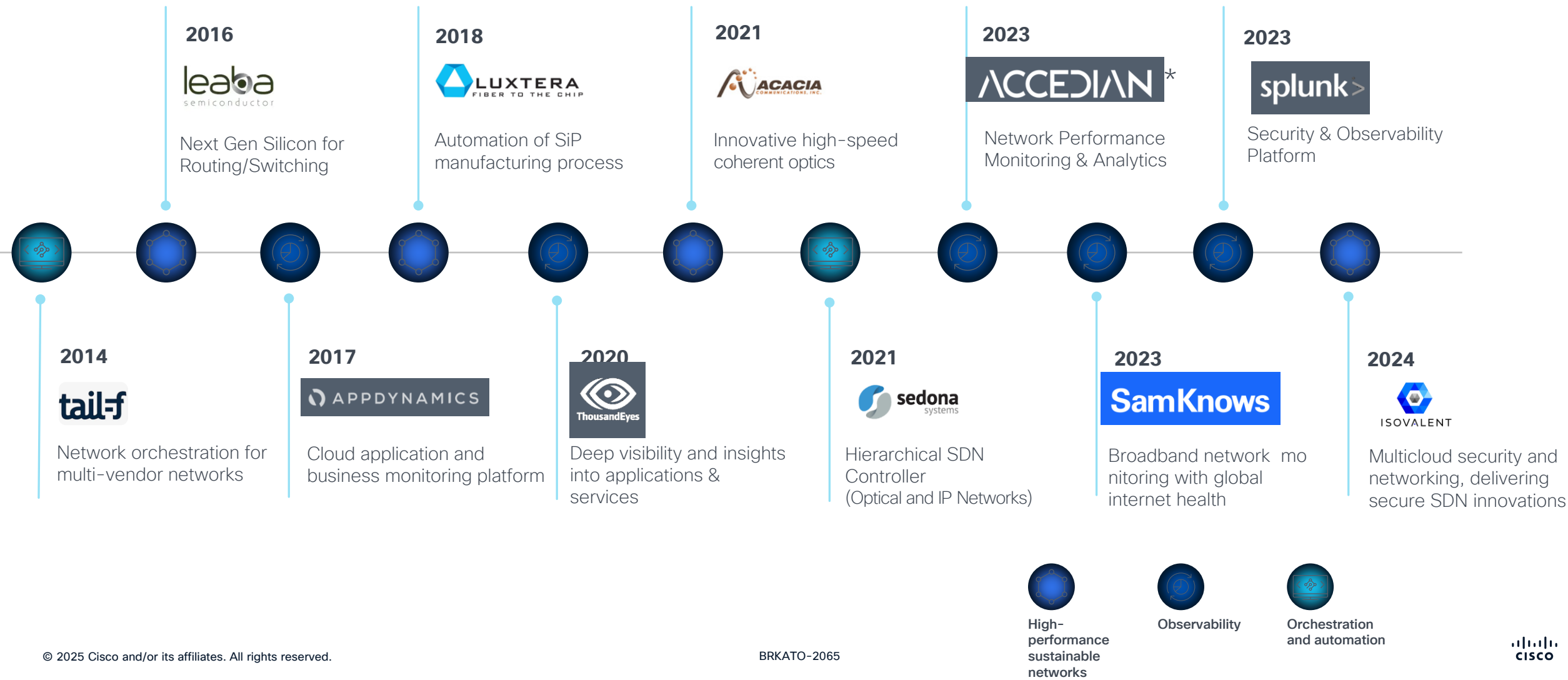
Automated Assurance



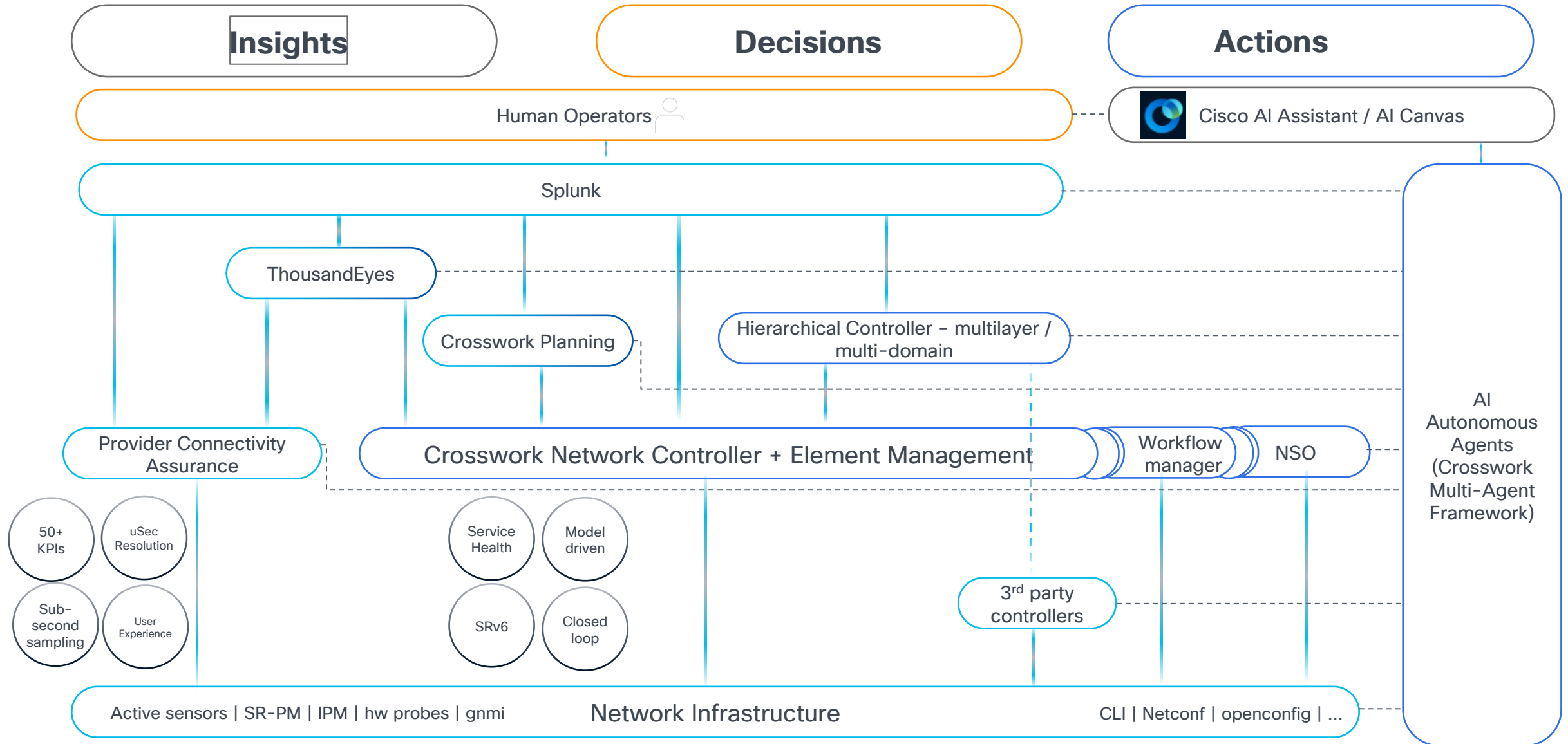
Optimization



# Consistent investment speeding innovation



# Towards AI for Operations



# Introducing Crosswork Planning

## Predictive AI

Predict the impact of network changes, traffic growth, new services, and potential failures

## Capacity Planning

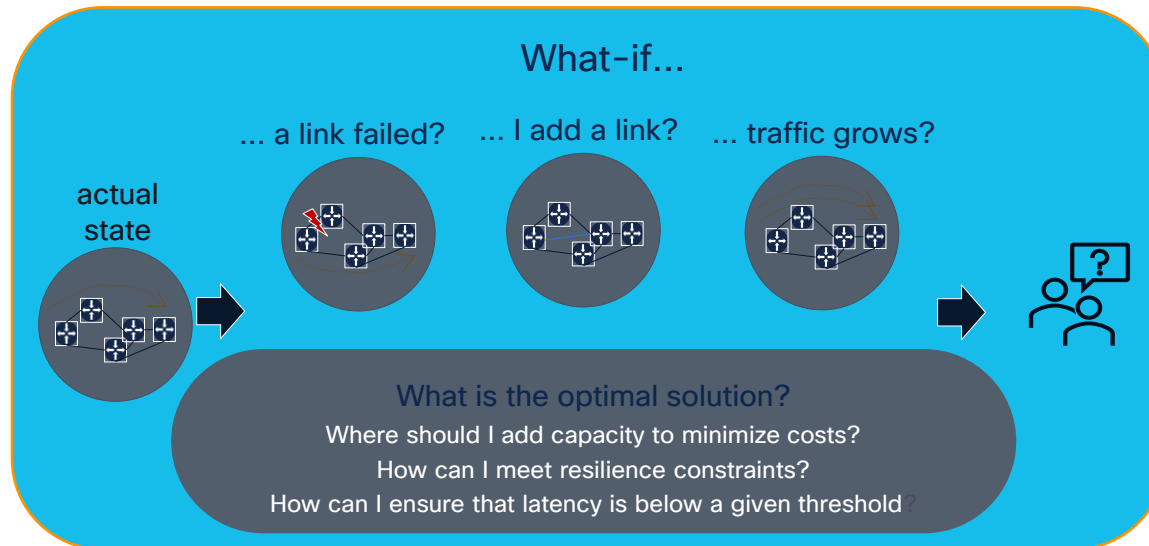
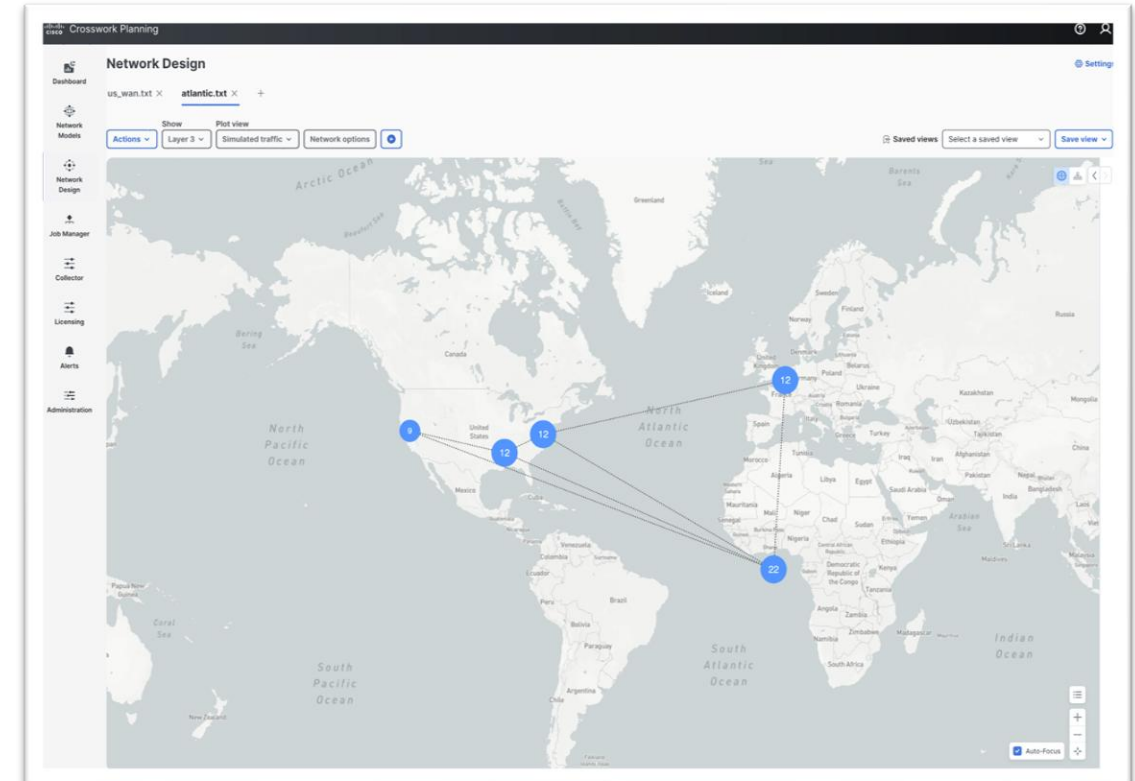
Leverage measured or simulated traffic data for accurate predictions

## Services Optimization

Optimize network design for efficiency and reliability

## Benefits

- Reduced operational costs
- Improved network performance
- Enhanced agility
- Proactive planning
- Simplified Capacity planning



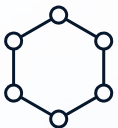
# We're Still Pushing Boundaries



**Optimistic transactions**  
**9X Performance**



**Scalable database**  
**3X Scale**



**Multi-vendor support**  
**across protocols**



**Operational performance**  
**10X Less downtimes**



**Out-of-band service**  
**protection**  
**More use cases, less ups!**

# Where are customers using Cisco NSO – TOP uses

## Wide Area Networks

- MPLS / SR / SRv6 Networks
- All your B2B automation
- Could include CPE
- Mobile Backhaul
- Expand to LAN Area Networks and Datacenter interconnects.
- Expand to SD-WAN
- Expand to Microwaves
- Expand to Optical Services

## AI Datacenters/Cloud

- DC Fabric automation
- Direct device access or via controller
- NaaS solutions with security and load-balancing
- NFV Orchestration (NFVO and CNFO)\*

## Security

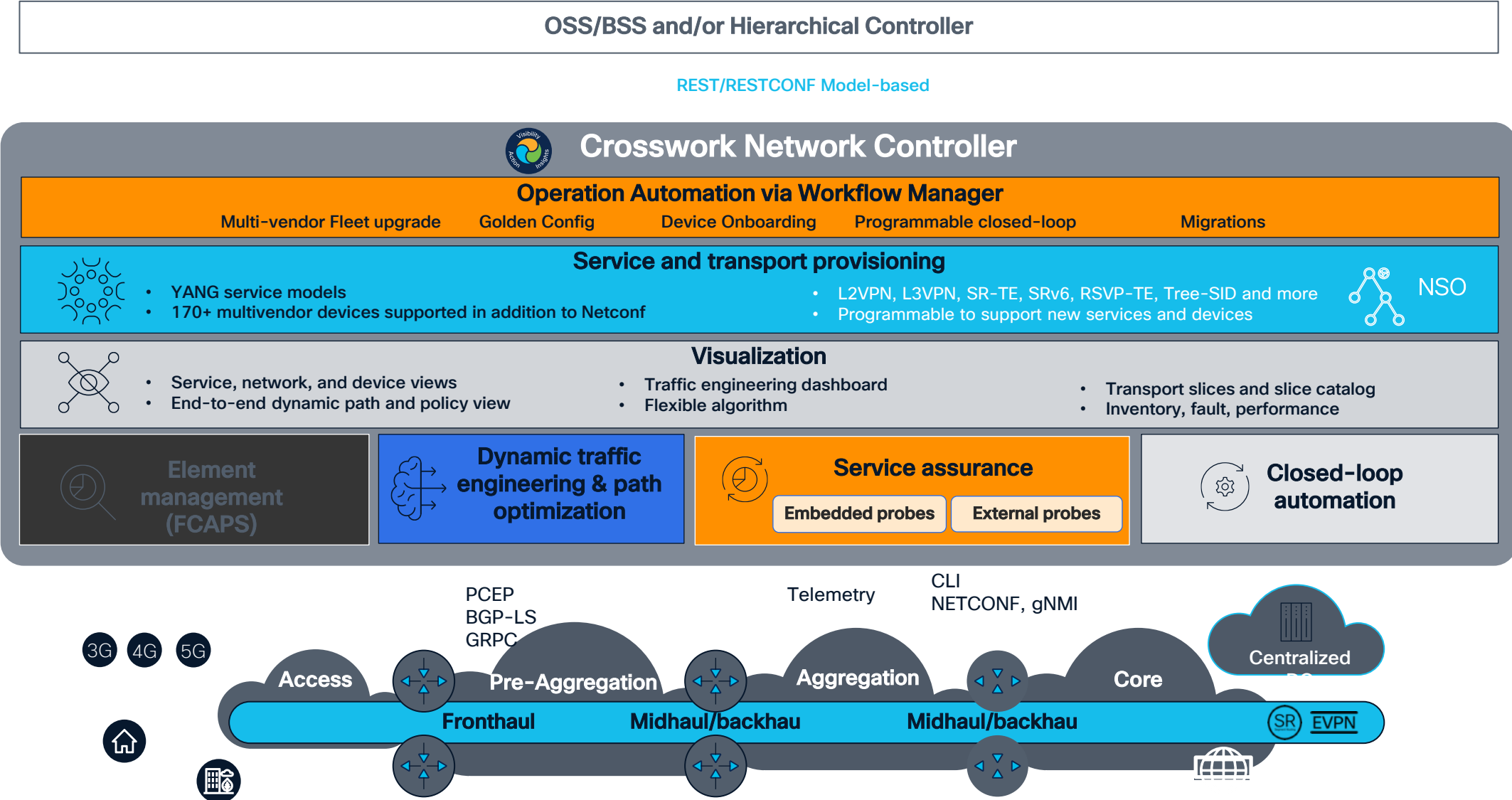
- Compliance reports
- Firewall Management
- ACL, IPS, WebFiltering rules
- Standalone, as part of DC or Mobile GiLAN

# AI-Enabled Functionality (Planned / Roadmap)

- NSO will integrate the Agentic AI-ops backend Crosswork AI that we have developed to enable AI-enabled capabilities that align with NSO's areas of focus
- Details of our initial agents follow
- AI Assisted service creation
- MCP server
- Cisco AI Assistant
  - Leverage Crosswork AI use cases
  - Documentation search, sample code search

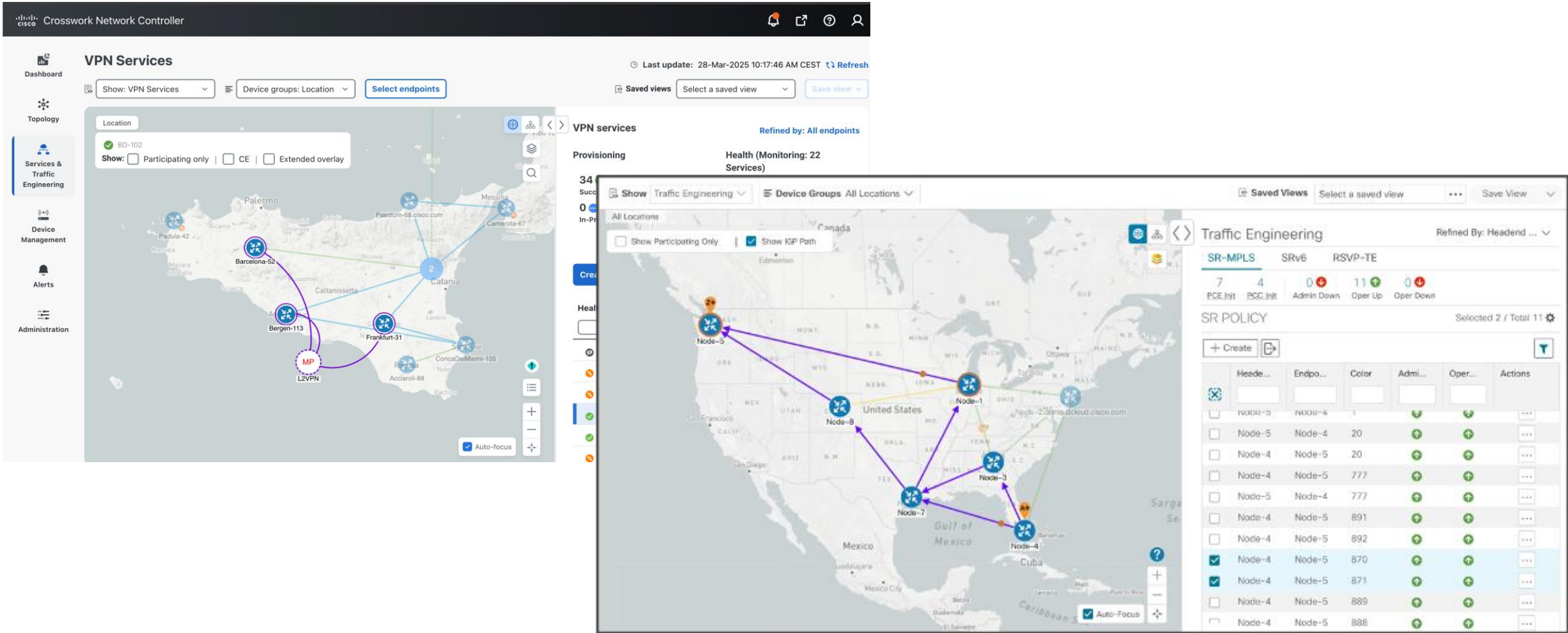
AI Package wizard: <https://www.youtube.com/watch?v=OY8oWcN122E>

# CNC: Service and Device Lifecycle Automation



# CNC: Service Lifecycle Automation

Provisioning, Visualize, Control and Assurance



Not Secure

https://172.20.163.92:30603/crosswork-home/#/app-dashboard

Crosswork Network Controller

Dashboard

Topology

Services & Traffic Engineering

Workflow Automation

Device Management

Alerts

Administration

Dashboard

General

Traffic\_Utilization\_Dashboard

Services\_Dashboard

+ Add dashboard

0

Total Workflows

Published

0

Workflows WIP

0

3

Adapters

In use

3

Installed

3

Not in use

0

Activities

0

3

Workers

Active

3

Waiting

0

Failed

0

Tasks

Zero touch provisioning

Saved views

Select a saved view

Save view

Last update: 22-May-2025 01:02:50 PM CEST

Refresh

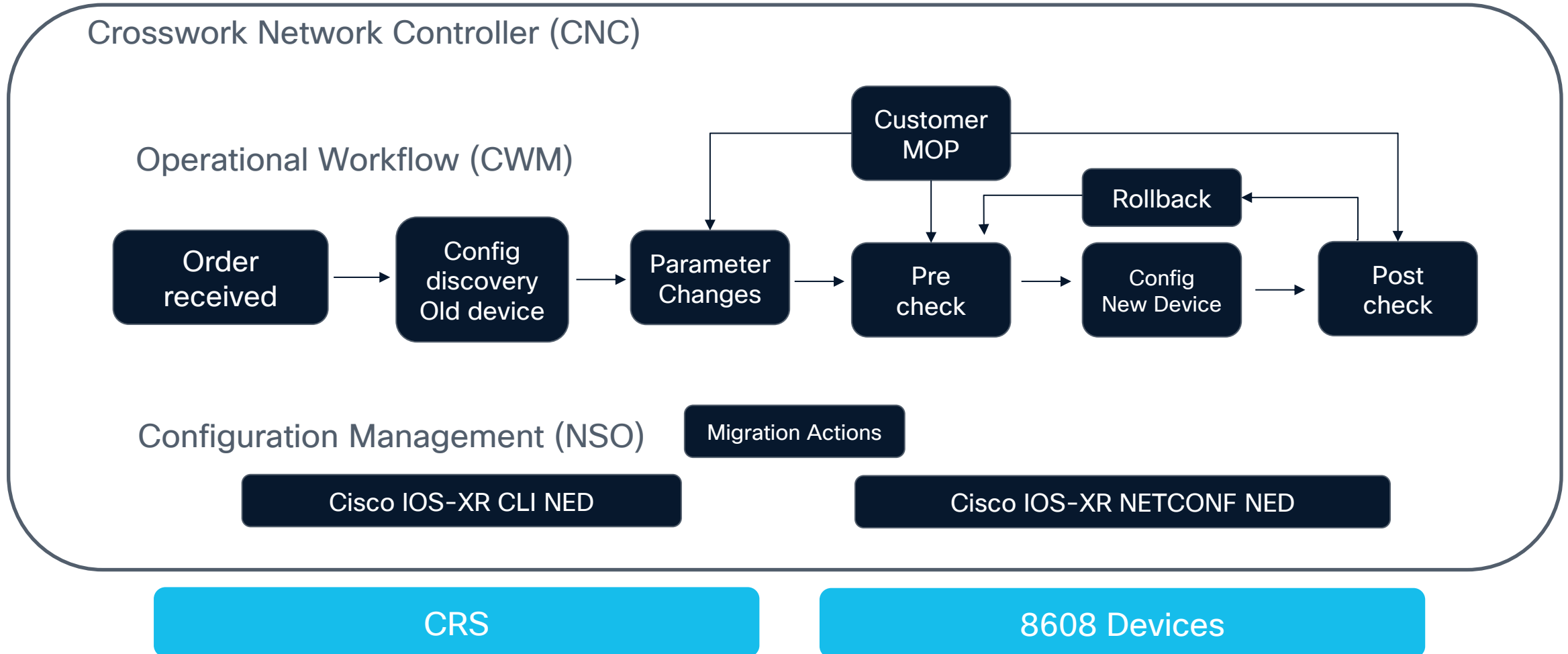
Edit dashboard

Make a copy

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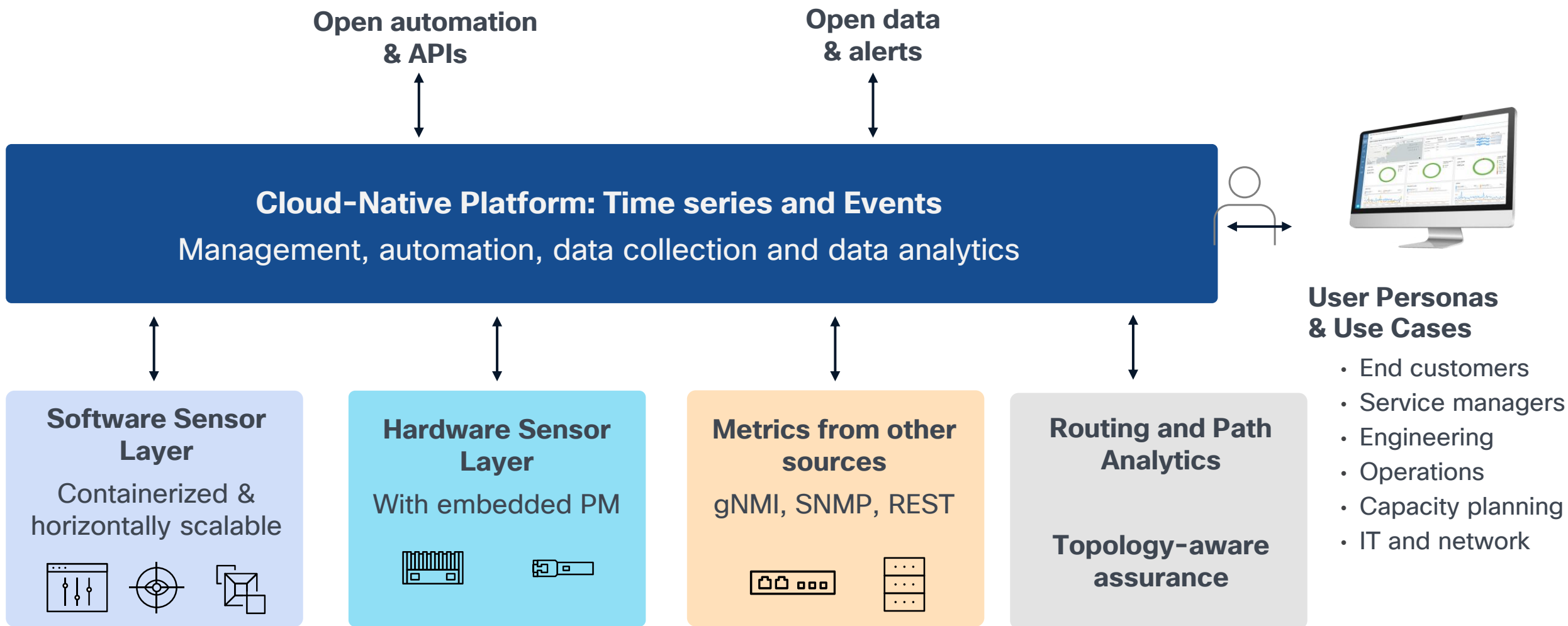
BRKATO-2065

# Migration Process Automation Workflow



# Provider Connectivity Assurance solution overview

High-level view



# Customers References - Colt

**AUTOCON 1**  
THE NETWORK AUTOMATION CONFERENCE

### From Network Automation to DevNetOps

The diagram illustrates a three-stage evolution of network automation:

- Stage 0: Ad-hoc Automation**  
Pre-2020  
Focus: Engineers (Document-based, Focus on devices)
- Stage 1: Task Automation**  
May/20  
Focus: Scripts (Runbook approach, Focus on tasks & resources)
- Stage 2: Process Automation**  
Feb/23  
Focus: Workflows (Workflow approach, Focus on process)

Key milestones and components shown above the timeline:

- Foundation DevOps Framework (between Stage 0 and Stage 1)
- Automated Device Upgrades (above Stage 1)
- Assistive Network Tools (above Stage 2)
- Platform Validation Dev Model Agile Intro. (above Stage 2)

**JOAN ESPIN GARCIA**

Watch the story from the source;

<https://www.youtube.com/watch?v=Jv5xnPG0g5I>

### Enabling NaaS through Intent

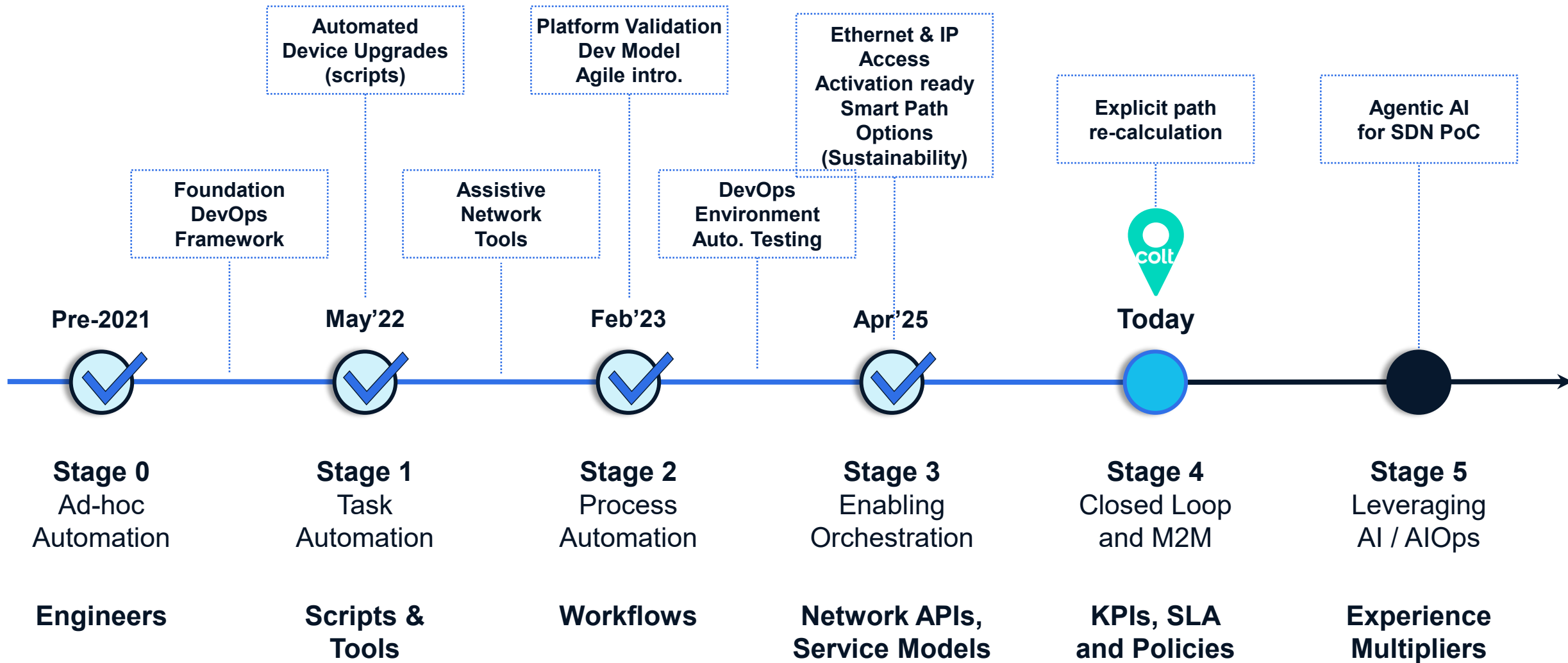
The diagram shows a multi-layered architecture for Network as a Service (NaaS) enabled through intent:

- Top Layer:** Provider Connectivity Assurance, SDN ISN Path Query Service (highlighted with a purple box), SDN API Gateway, SDN Service Manager, Federation Layer, Network Abstraction Layer, and colt iQ.
- Intermediate Layer:** Includes components like PCF Controller, Policy Manager, and various APIs (REST, gRPC, etc.).
- Bottom Layer:** SDP-L3 (Topology, SR-PN) and SDP-L2 (Topology, SR-PN).
- External Interactions:** On the right, it shows an 'On Demand Platform' (COB) and an 'IT stack' (SCM, Inventory, FMPM).

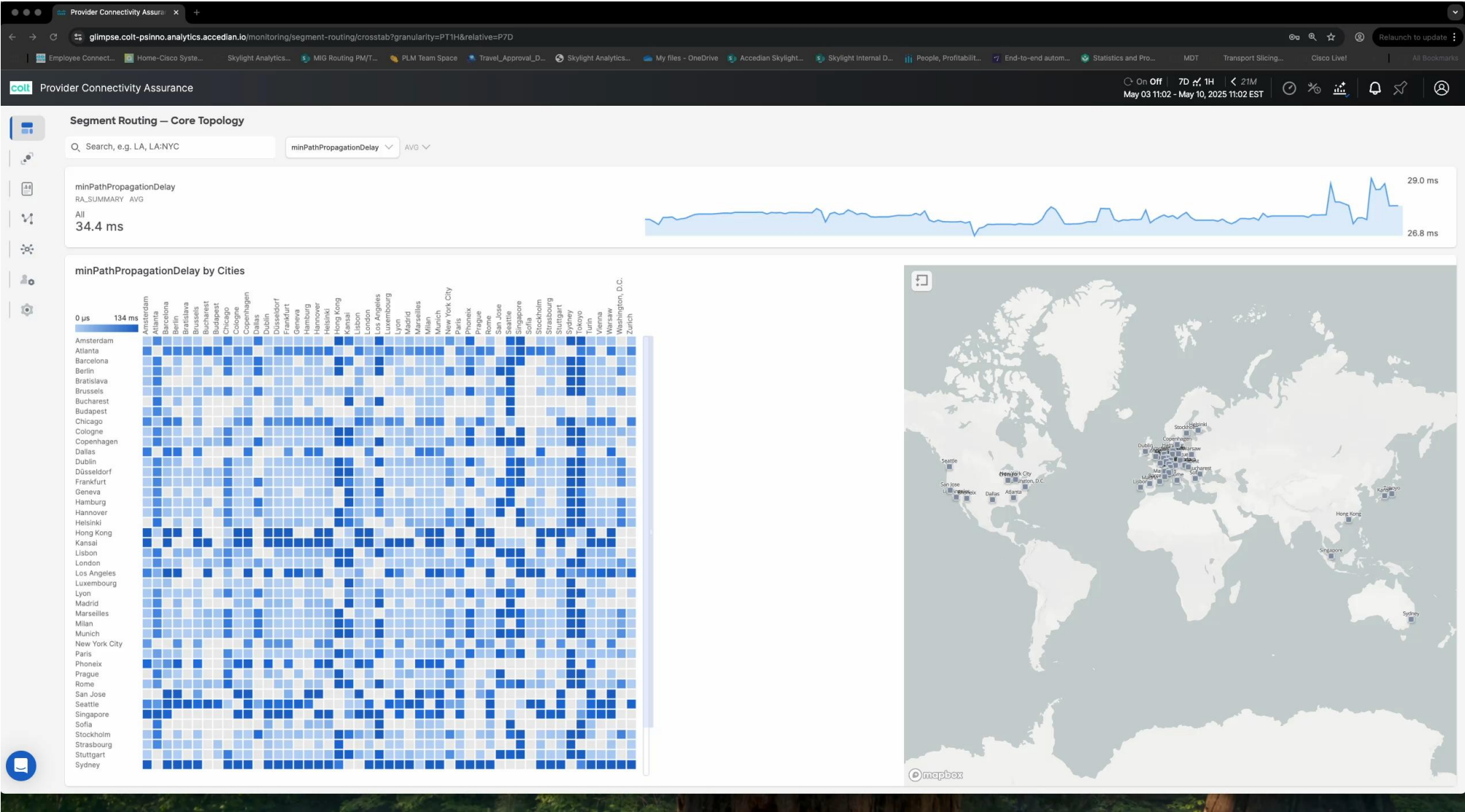
**Automation Developer Days Stockholm May 21, 2025 – Morning**

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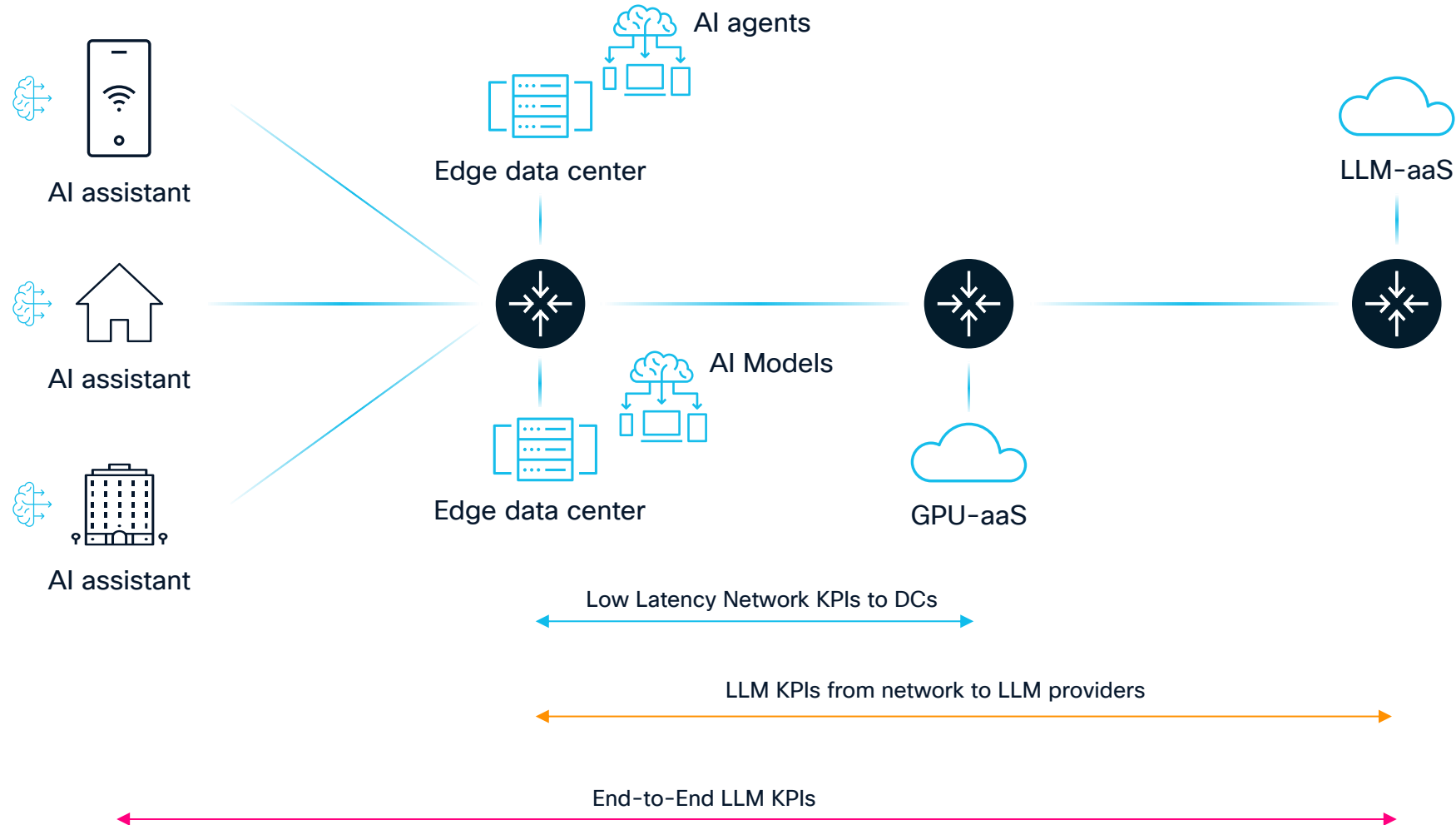
# Colt's automation journey so far



# Colt Example: Path Details and ECMP Compare



# Infrastructure for AI: Measure and optimize AI performance



# LLM + Network Performance Correlation

## Key LLM Performance Metrics

### Request Latency

This is the amount of time each request takes to process by the LLM from start to finish.

### Time To First Token

The amount of time the LLM takes to return the first token in a response to a request.

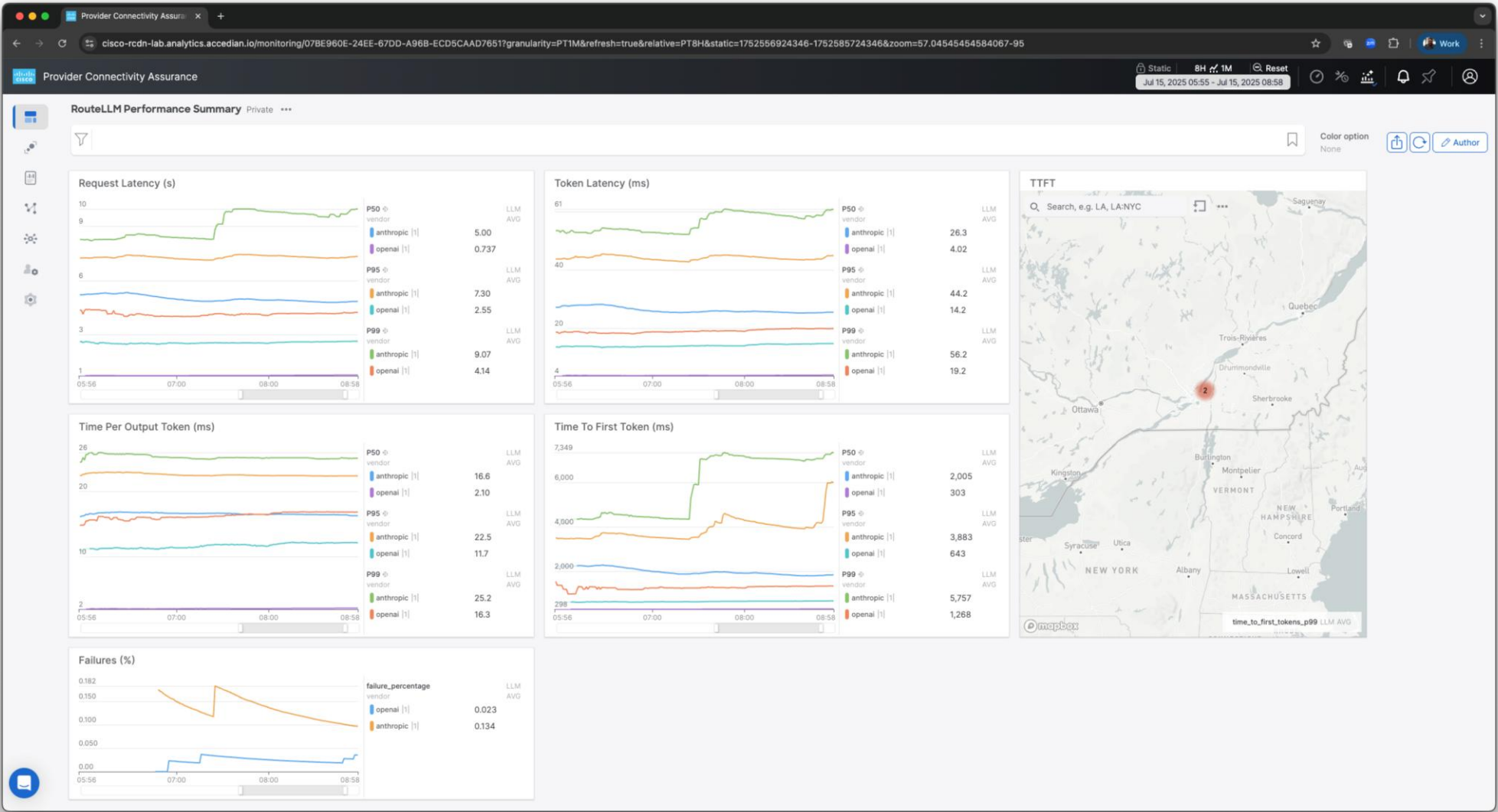
### Time Per Output Token

The amount of time taken to generate each token after the first token (a.k.a. inter-token latency) in a response.

### Token Latency

The amount of time taken to generate each token in the response (request latency / total number of tokens).

# Using Provider Connectivity Assurance for network and LLM Experience



# Summary

- Operators face a Perfect Storm of handling Complexity, Increasing consumer expectations, Knowledge contention & OpEx constraints
- Cisco is investing heavily on multi-vendor network automation and assurance platforms, including additional AI capabilities to address any customer requirement
- We are actively working with our SP customers to explore, define and develop the Automation Use Cases that will accelerate their journey to a Systems-led operating model

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