Cisco Network Assurance Engine

Transforming Day 2 Operations from Reactive to Proactive

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Cisco DC Switching Marketing

Agenda

- Business Update
- Product Positioning (NAE Differentiation)
- Feature Demo
- Ordering Simplification
- Product Roadmap

Customer Traction Update

2,700+	**Leaf Assured**	**Fabrics Assured**	**150+**
135,000+	**Ports Assured**	**Active Customers**	**170+**

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Benefits of Cisco ACI and Cisco NAE

Cisco ACI

AUTOMATION & AGILITY

Cisco Network Assurance Engine

DAY 2 OPERATIONS
REACTIVE TO PROACTIVE

Delivering Intent Based Networking in the Data Center

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Intent Assurance

The confidence that the infrastructure is doing what you intended it to do

Intent Encompasses Data Center Operations

Configs, Changes, Routing, VMs, Security, … Compliance, Audits

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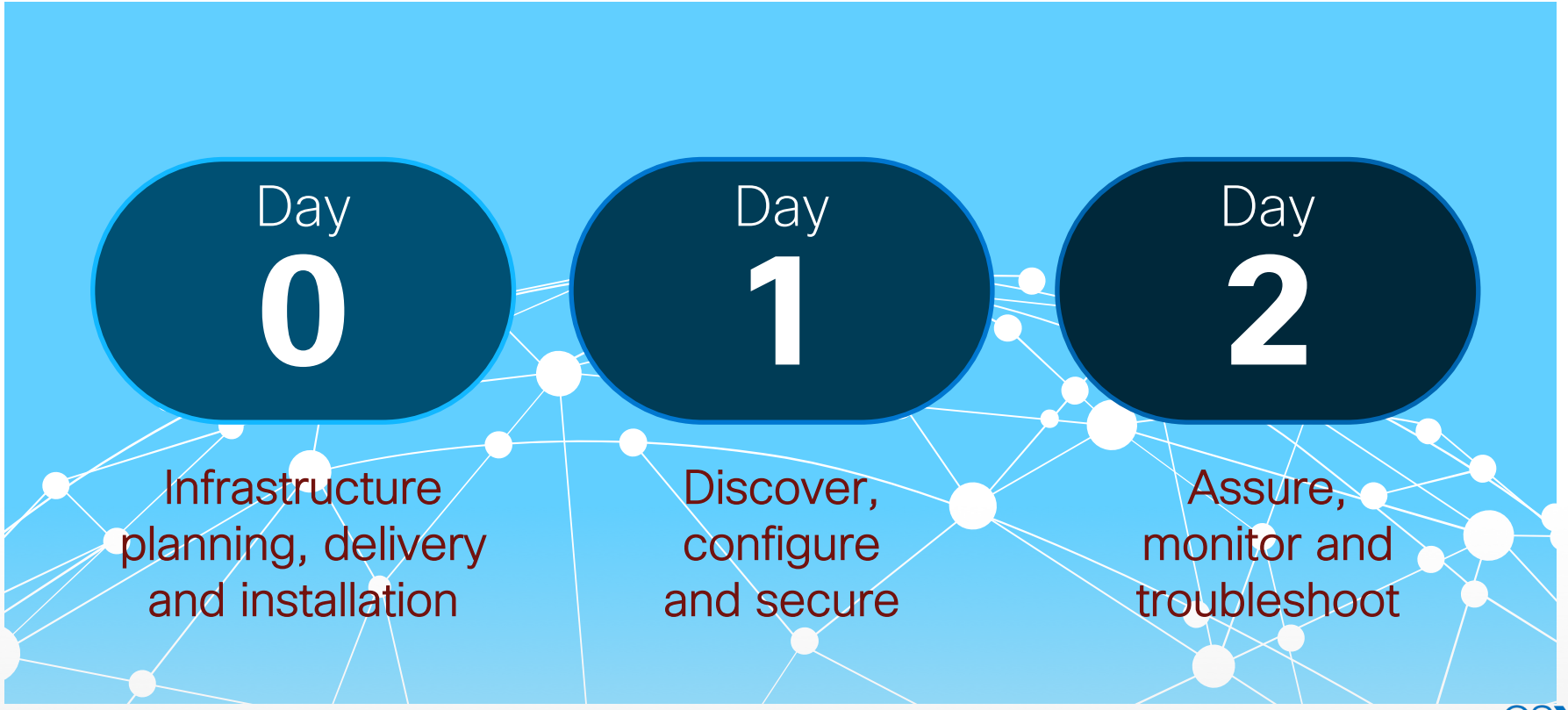
Managing the **Complete Lifecycle**



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GSX

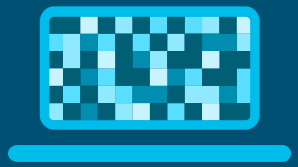
Top Consumer of IT Time: 43% Troubleshooting

4x

Network operators spend more time collecting data than analyzing while troubleshooting

Replication challenge

Troubleshooting an issue can be impossible if IT can't replicate the issue or see the issue as is it happening real time



Slow resolution

Downtime is expense; unplanned downtime cost Fortune 1000 $1.25-2.5B annually

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. [1] McKinsey Study of Network Operations for Cisco – 2016

Problem: DC Paradigms Are Fundamentally Reactive

Intent Frequently Breaks …		We Always React …
Operational	→	Troubleshoot
Security	→	Scramble to fix it
Compliance	→	Fail audits
Change	→	Undo change

An Inability to Assure Intent Proactively.

We are always in a reactive break-fixed mode!

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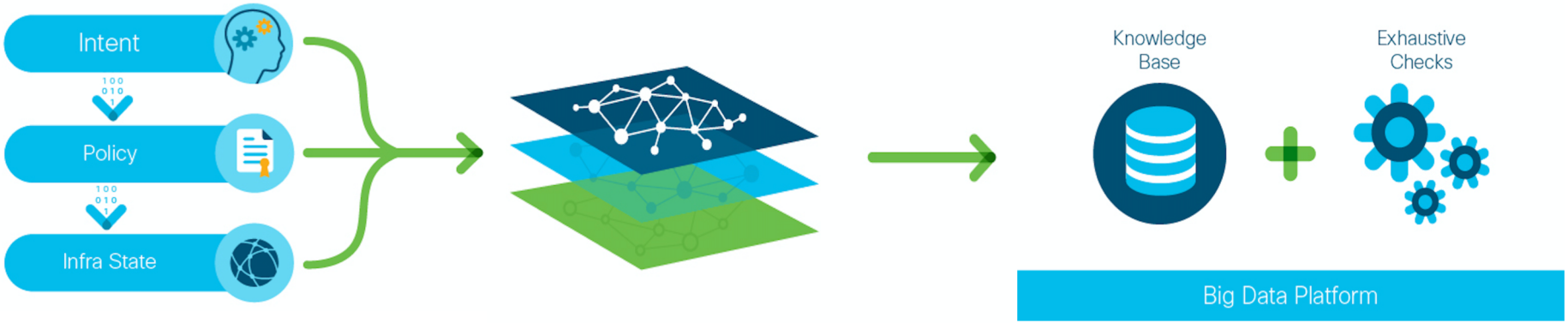
Network Assurance Engine: How it Works



Data Collection

Capture DC Wide Intent, Policy, Control/State across Forwarding & Security

Formal Modeling of Network

Precise Formal Models that codify Cisco's 30+ Years of Networking and Cross Customer Domain Knowledge

Continuous Analysis

Models verify that **Network operates per Intent** and accurately tell what is wrong, where, why, impact and how to fix

ACI Expert in the NOC watching the state of fabric 24 hours a day x 365 days a year!

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Verification Results Delivered via Smart Events

What ?

Severity	Event Category	Event Name
	Filter	Filter
⚠	TENANT_FORWARDING	OVERLAPPING_SUBNETS_ACROSS_BDS_IN_VRF
⚠	CHANGE_ANALYSIS	PERMIT_POLICY_SHADOWED_BY_DENY_POLICY

Who and Where ?

Impacted Bd Subnet	Subnet's Owner BD
[5.1.32.101/24]	testbddup3

Why ?

Failing Condition

Subnets defined under the BDs/EPGs are not unique.

How to fix ?

Suggested Next Steps

- For all the BDs/EPGs listed, determine the correct BD/EPG subnet.
- Configure unique subnets across BDs/EPGs in a VRF.

Reduce Mean Time to Repair with Precise Analysis and Remediation

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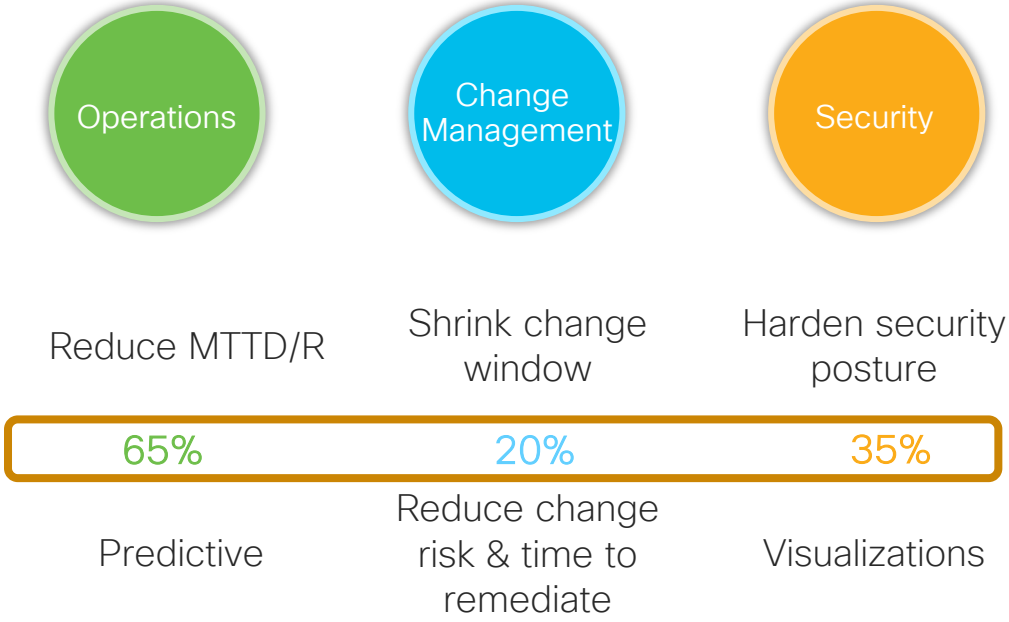
NAE – Cisco IT Business Benefits



Cisco IT Testimonial : http://cs.co/nae-Cisco-IT

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NAE Operational Benefits

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Continuous Assurance Workflows

Is my network compliant with Governance Rules ?

Compliance analysis

Did something change in my network ?

Epoch Delta analysis

Can A talk to B ?

Connectivity Analysis

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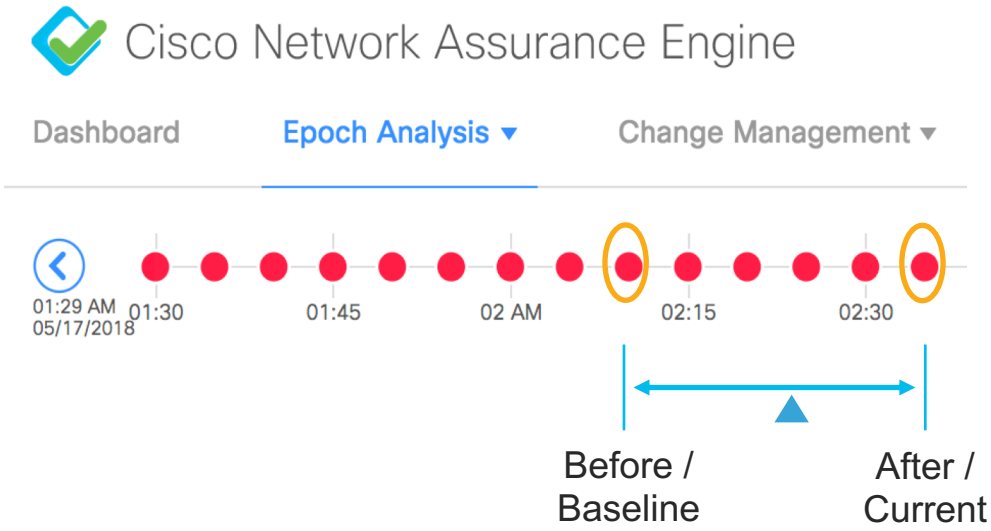
Epoch Delta Analysis

Correlated Ad hoc Analysis Workflow



4 Qs, correlated answers…

- What changed?
- Who was impacted?
- Was it due to config changes?
- What happened as a result?

Use Cases

- Change Management
- Root-cause analysis
- Migration
- Maintenance Upgrades
- Capacity Management

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Health Delta - Summary
Change in the health of the Fabric

Delta Analysis 1

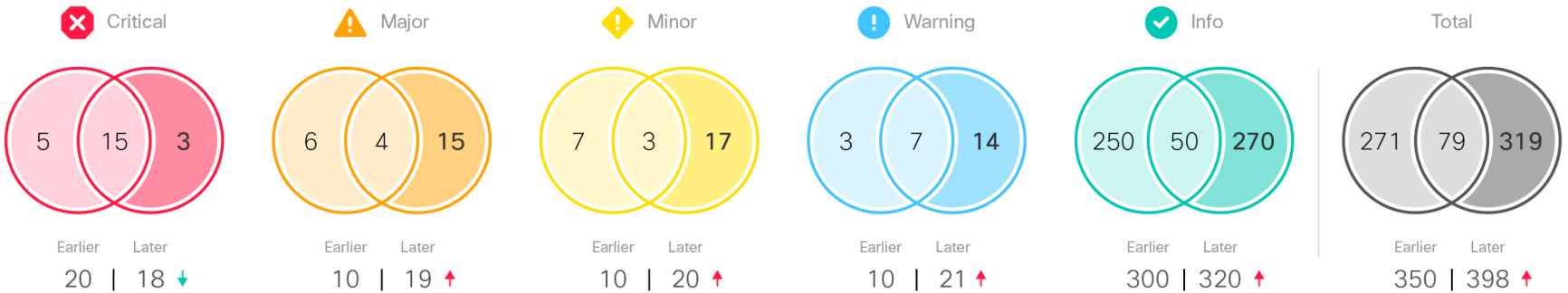
Earlier Epoch : 04/04/2018 1:46:30 PM PDT

Later Epoch : 04/05/2018 5:56:30 PM PDT

Time Range : 1 day 4:10:00

Health Delta | Policy Delta

Smart Event Count



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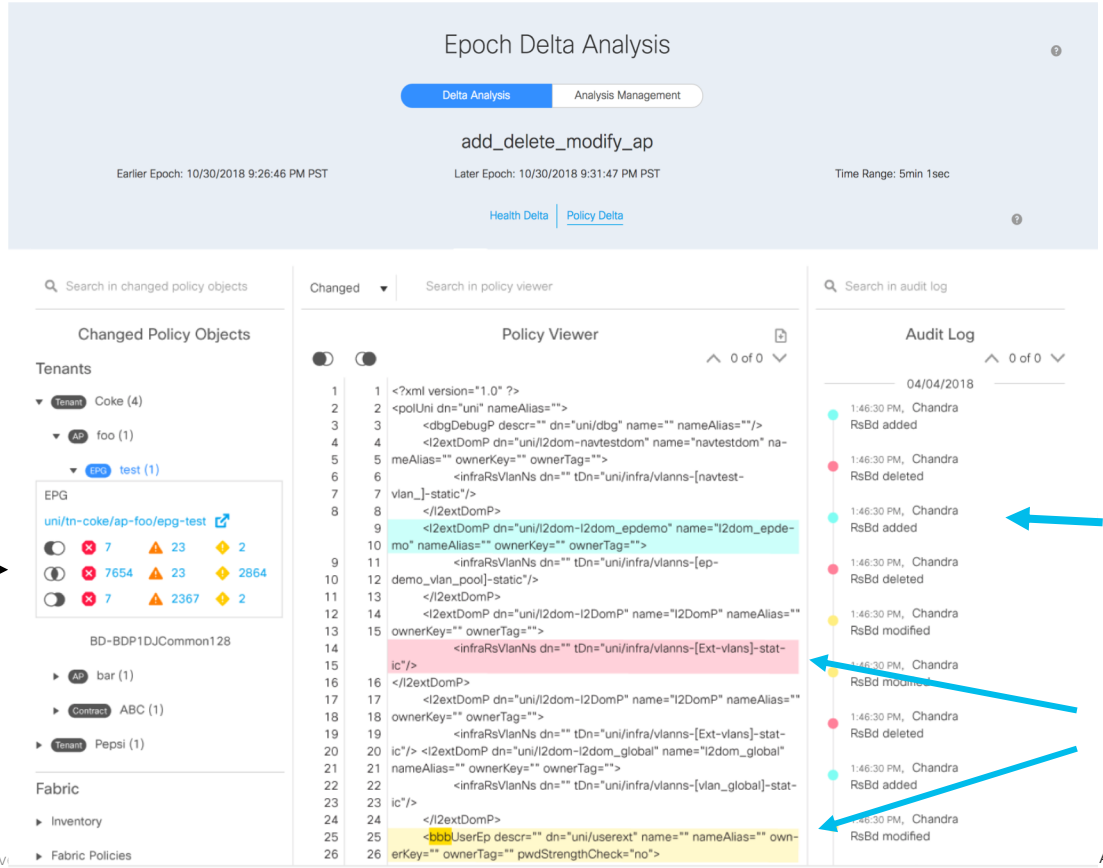
Epoch Delta Workflow – Policy Delta

Impact, Change, Operator



What got impacted ?

Details of impact, if any

Who made the changes ?

What has changed ?

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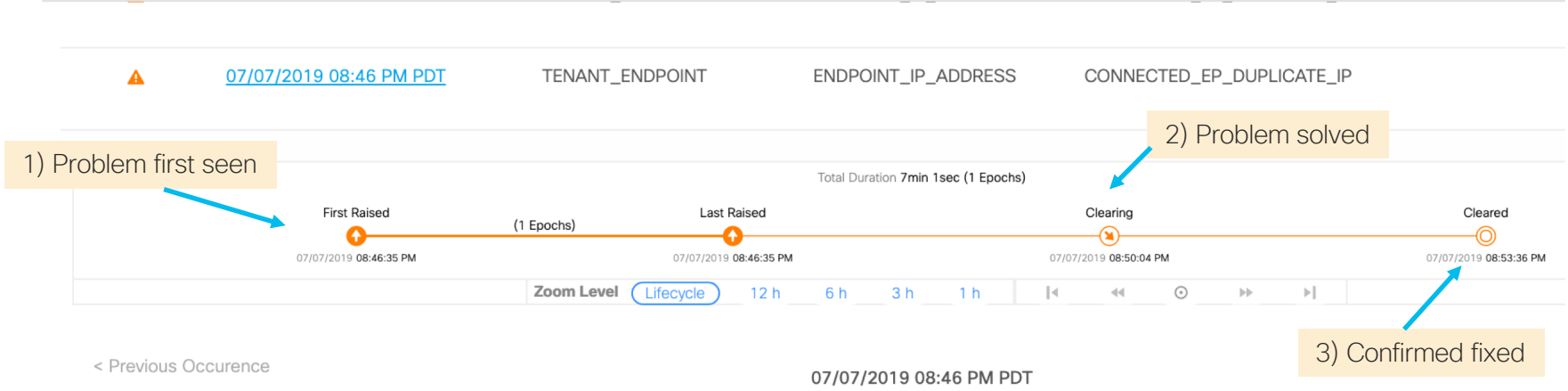
Available: August 2019

Global Search Across Epoch and Event Life Cycle



Description	IP addresses are in use by Multiple MAC addresses within the same VRF.
Impact	Multiple MACs sharing a single IP address will cause intermittent connectivity issues.

Affected Objects Details

EP Type	Mac Address	IP Addresses	BD	BD's VRF	EPGs	EPG's Tenants
Connected_Internal	**AA:CC:B7:0A:DC:55** *	10.52.3.145	**kube-pod-bd** *	k8s *	unknownepg *	-

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Smart Events & Compliance Score for Compliance

COMPLIANCE VIOLATED SMART EVENT

- Identify non compliant policy
- Identify requirements violated
- Identify non-compliant EPGs

COMPLIANCE SATISFIED SMART EVENT

- Identify compliant policy
- Identify requirements satisfied
- Identify compliant EPGs

COMPLIANCE SCORE

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Compliance Analysis
Continuous Compliance Verification

NAE COMMUNICATION COMPLIANCE REQ

Entity A *must not talk to* Entity B ← **Segmentation Compliance**

Entity A *must talk to* Entity B *on* Y ← **SLA Compliance**

Entity A *must not talk* to Entity B on Z ← **Traffic Restriction**

Entity A *may talk to* Entity B only on Z ← **Traffic Restriction**

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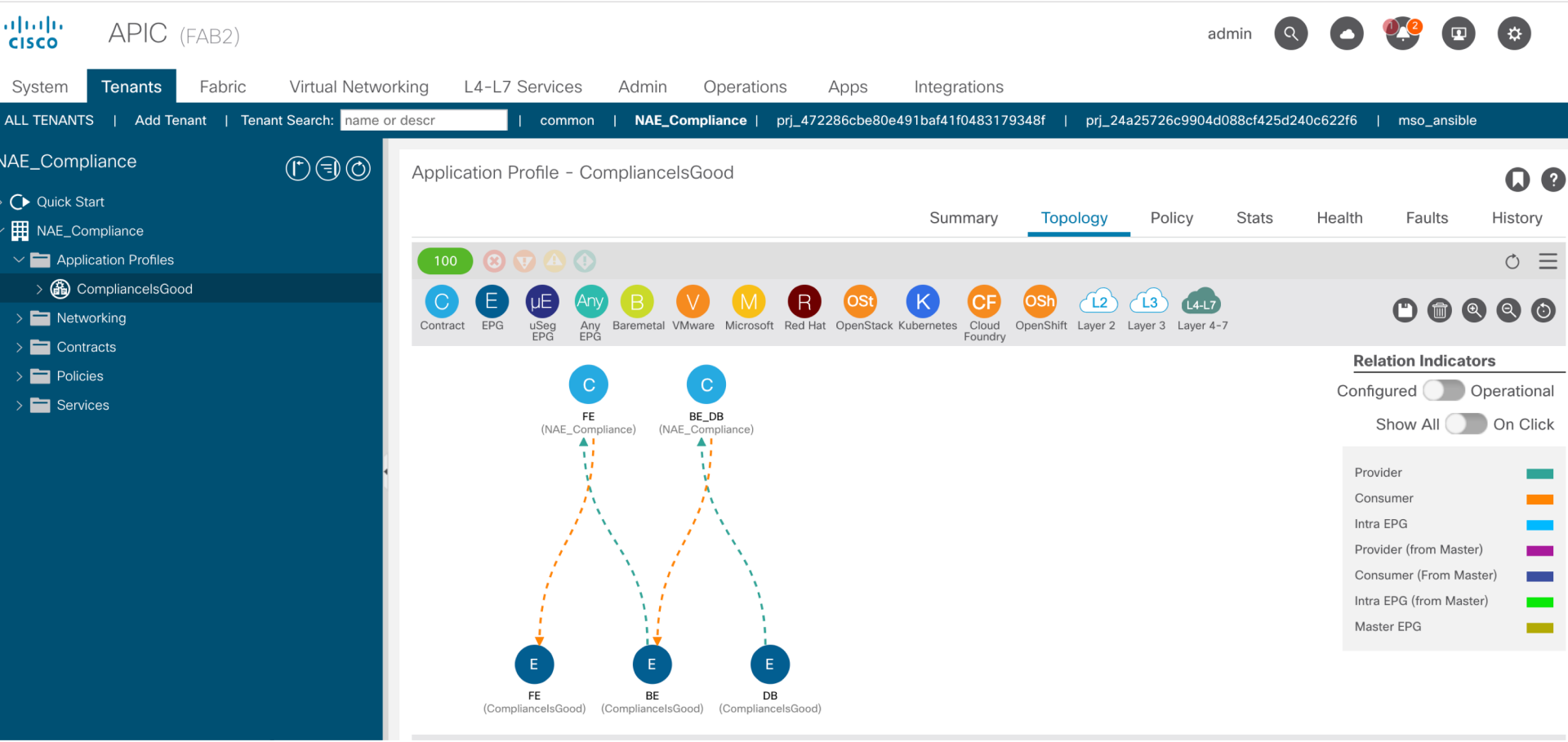
APIC – Compliance Policy



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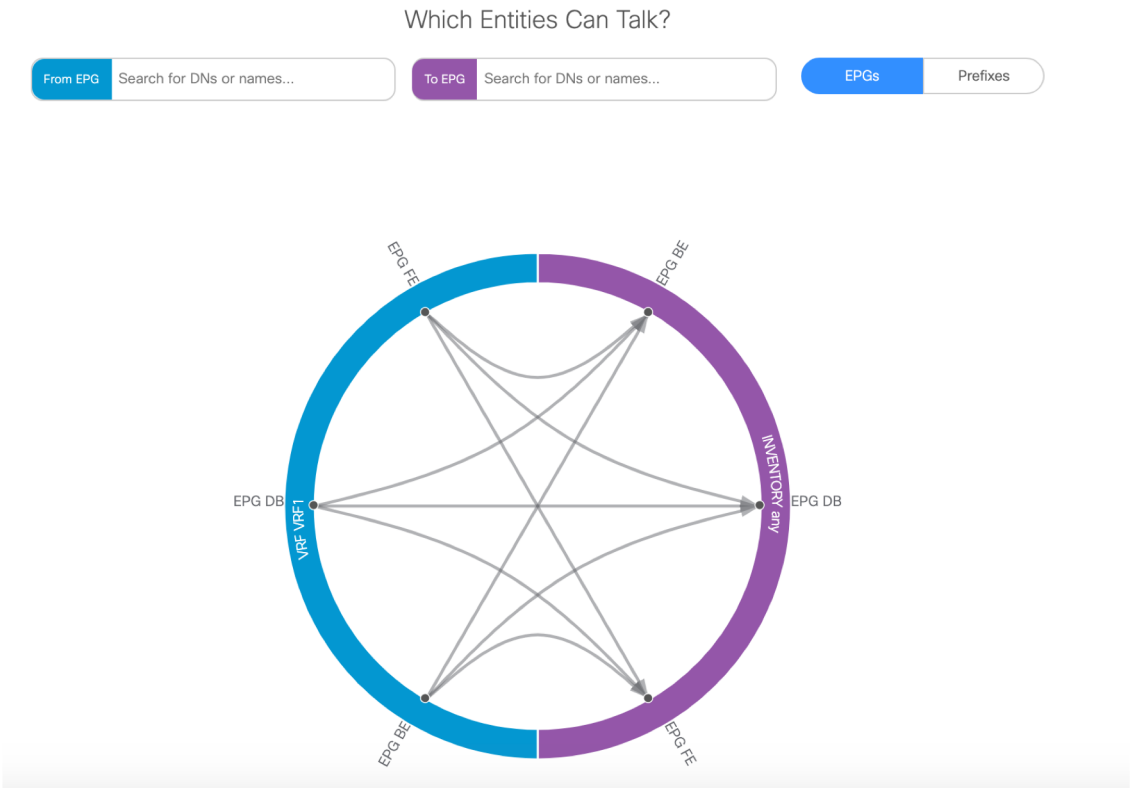
Policy Explorer – Connectivity Analysis



Use Cases

- Forwarding Communication Issues across entire fabric
- Visibility into Route Leakage
- Visibility into Fabric Communication with External Network
- Policy and Forwarding Inconsistencies

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Policy Explorer – Connectivity Analysis

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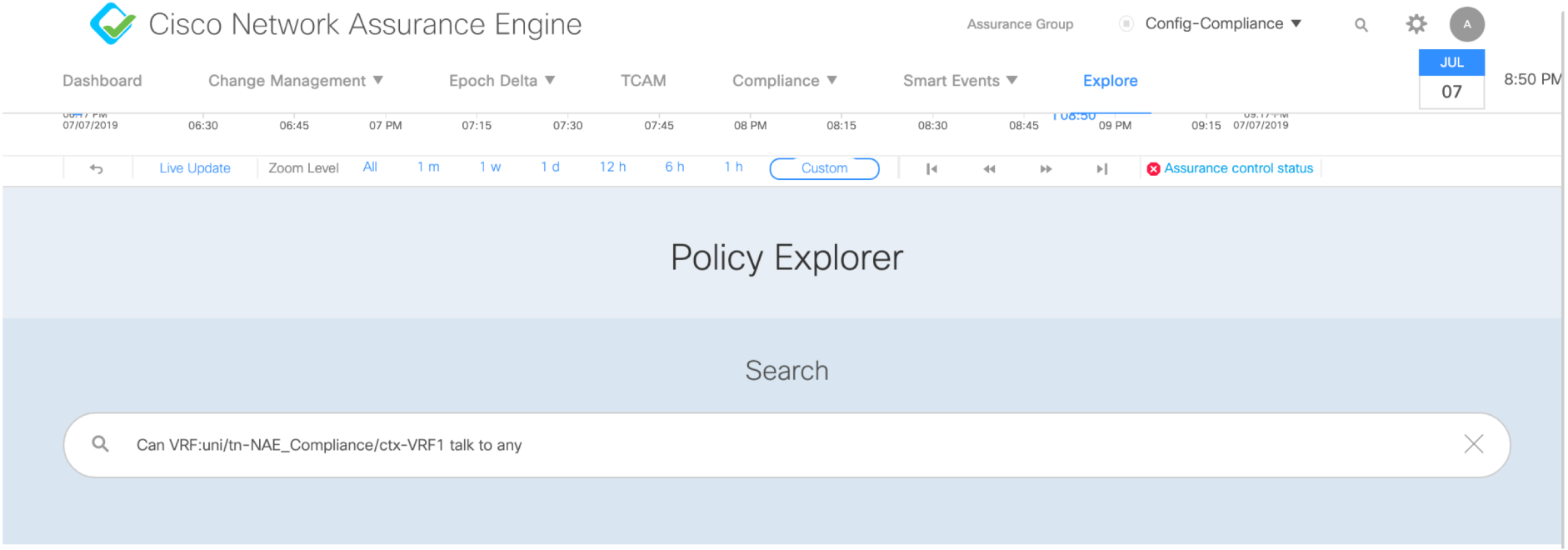

- Allows you to use a Natural Query Language
- Quick and easy way to navigate to the issue

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Demo

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NAE Orderability Simplification

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Requires: NAE Leaf + Appliance License

ACI Premier License

- If a customer buys ACI Premier License then
  - They have already purchased Leaf for NAE (Entitled them for NIA/NIR)
- Then buy the Appliance license (below) depending on Leaf count for the fabric

CNAEL-ACI-SPARES (Below provide 3yrs or 5yrs subscription)		
Small Appliance form factor - Supports assurance of up to 50 Leafs per Fabric.	Medium Appliance form factor - Supports assurance of up to 100 Leafs per Fabric.	Large Appliance form factor - Supports assurance of up to 400 Leafs per Fabric.
CNAEL-VAL9-3Y-S	CNAEL-VAL9-3Y-M	CNAEL-VAL9-3Y-L
CNAEL-VAL9-5Y-S	CNAEL-VAL9-5Y-M	CNAEL-VAL9-5Y-L

NAE Appliance also available via: APIC-L2, APIC-L3, APIC-M2/M3 or APIC Clusters

ACI Essentials or ACI Advantage License

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Small Appliance form factor - Supports assurance of up to 50 Leafs per Fabric.	Medium Appliance form factor - Supports assurance of up to 100 Leafs per Fabric.	Large Appliance form factor - Supports assurance of up to 400 Leafs per Fabric.
CNAEL-VAL9-3Y-S	CNAEL-VAL9-3Y-M	CNAEL-VAL9-3Y-L
CNAEL-VAL9-5Y-S	CNAEL-VAL9-5Y-M	CNAEL-VAL9-5Y-L
CNAEL-LEAF-3Y-SD		
CNAEL-LEAF-5Y-SD		

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Using CNAEL-PID-SPARES

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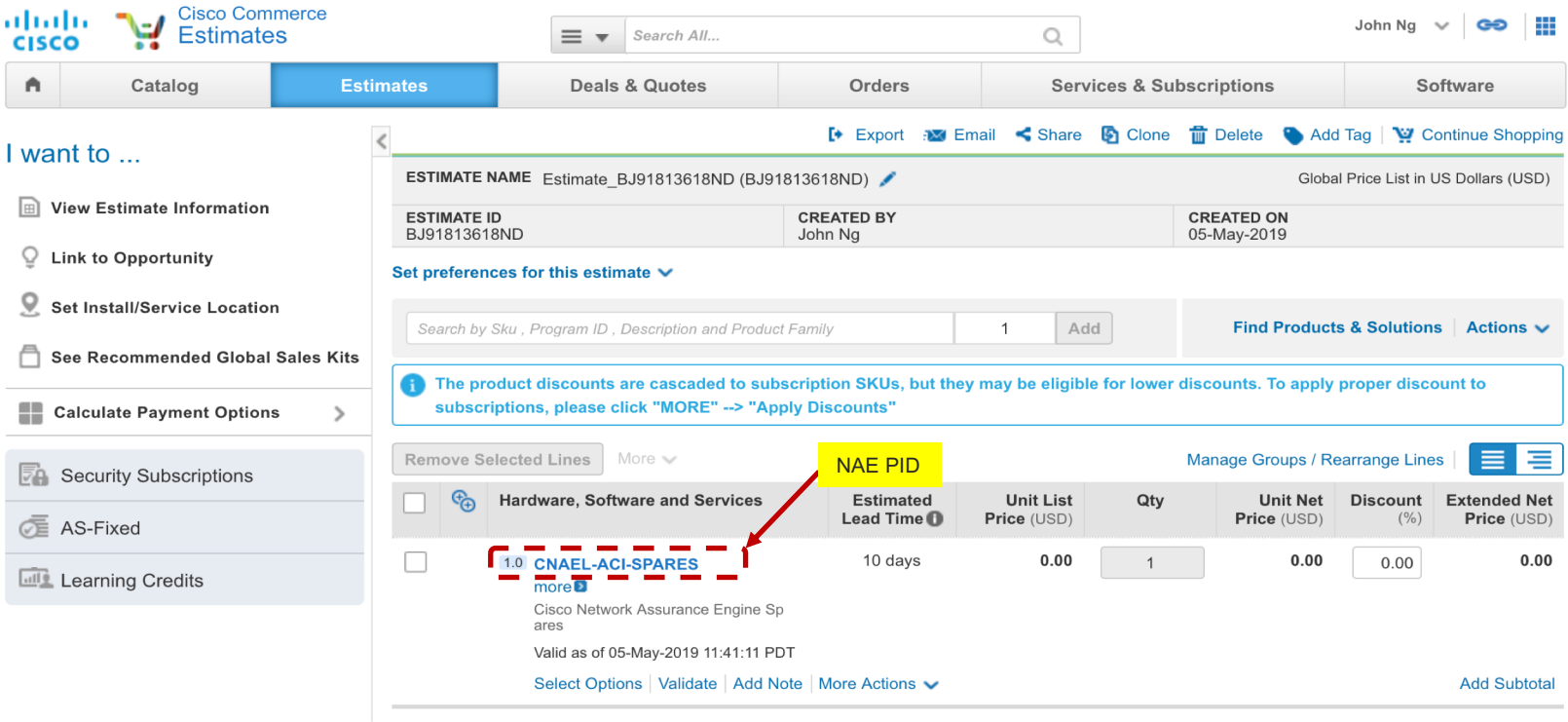
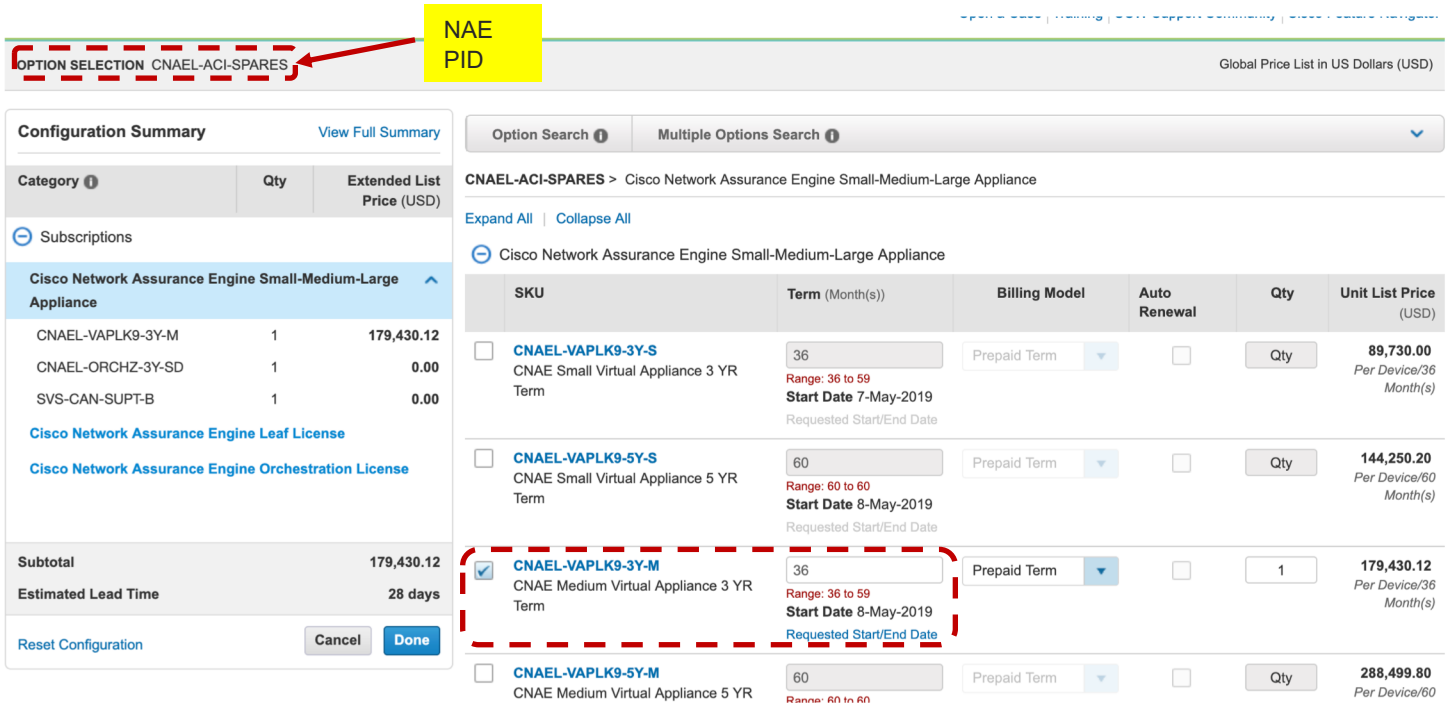
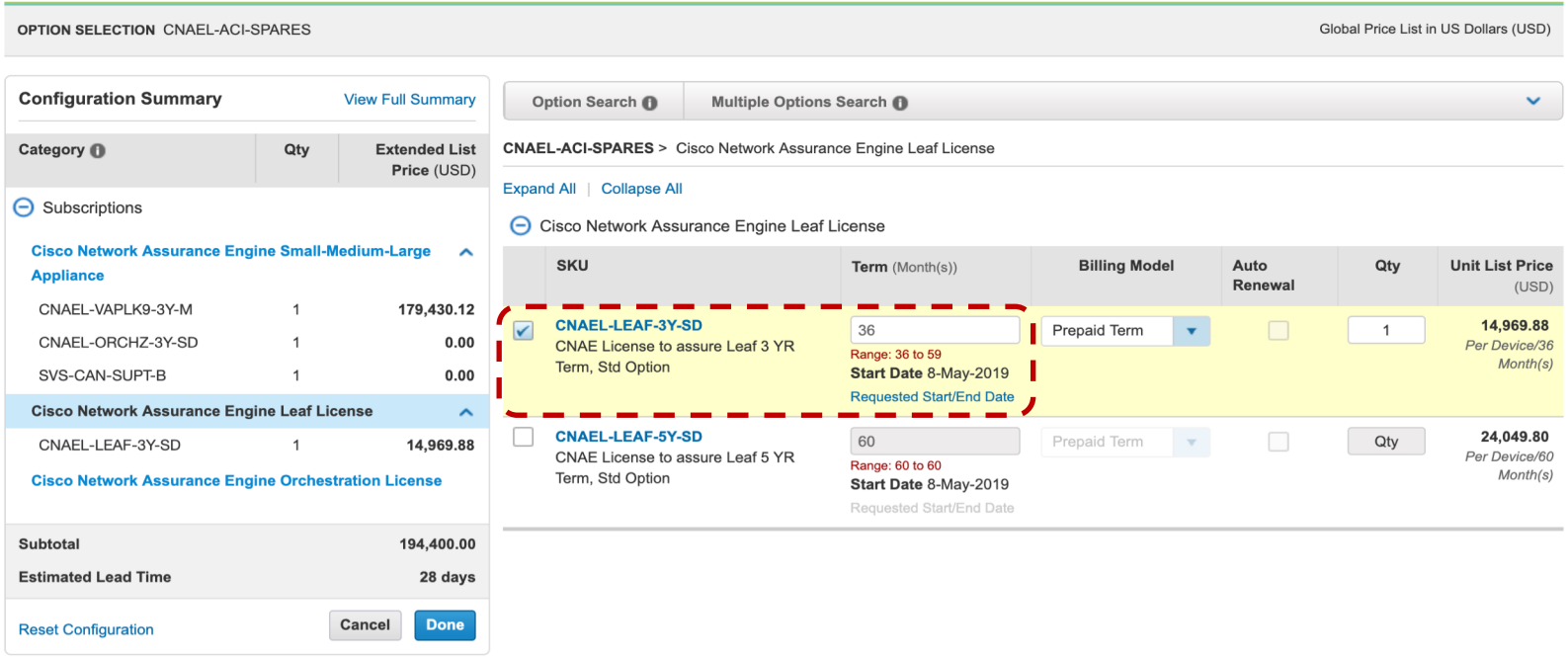
Ordering using PID: CNAEL-ACI-SPARES



NAE Appliance: CNAEL-VAPLK9-3Y-M



NAE Leaf: CNAEL-LEAF-3Y-SD



Service PID: ASF-DCV1-G-CA-IB

NAE 3 Month Service Deliverables

Deliverables
• AS deployed NAE Instance will provide assurance for upwards of **1 assurance group (1 ACI Fabric) per ASF**.
• Post installation of NAE Appliance. There will be half-day training session focusing on product features and how to operate the appliance.
• Fabric Event - Identify top 10 Smart events **weekly** and provide interpretation to customer via email. Up to 3 times a week, identification is based on samples collected...Secure File Exchange, Secure Box or Jump host to NAE appliance
• Fabric Analysis Report – Review events collected during the week, generate report to customer on up to 4 events with expert analysis and recommendation. Webex meeting: weekly in M1, bi-weekly in M2 and M3. Weekly touchpoint - Webex based Updates on NAE Assurance - Review critical issues, if any, observed during the week requiring prioritized action
• Ongoing Knowledge Transfer for staff – Product features, Operational use cases
• Operations Knowledge Transfer (Full-day) - Workshop focused on NAE Day 2 operations use cases. Use cases covered will include Change Management, Optimization and Troubleshooting. Help customer update and streamline their operational process to create a new customized playbook.

NAE Roadmap

3.0(1)
CCO: Nov 2018

Assurance
- Forward Conn Analysis/Visuals
- PC/vPC
- Dynamic Path Binding
- ACI 4.0
- 200 Leaf Scale

Workflow
- Compliance: Segmentation
- Policy Delta

Usability
- Event Suppression
- LDAP

3.1(1)
CCO: April 8, 2019

Assurance
- IPv6 Forwarding
- PBR compatibility (False Positive Removal)
- 400 Leaf Support

Workflow
- Compliance: SLA
- Compliance: Traffic Restriction

Usability
- Production Ready APIs

Packaging
- vSphere, vCenter 6.7 support

4.0(1)
Target CCO: August/Sept 2019

Assurance
- ACI 4.1
- Global Search
- Smart Event Lifecycle
- Remote Leaf
- Black list contracts
- ACI GOLF support

Workflow
- Config Compliance

Usability
- UI Simplification
- NAE PE natural lang query
- Multiple Fabric Scheduler
- Offline Analysis Delete

Roadmap
Target: Q4CY'19/1HCY20

Assurance
- Multi-Site
- Ecosystem Assurance VMM/ LB
- ACI Anywhere

Workflow
- Pre-Change Verification
- Compliance: Config naming
- Report Generation for Epoch Delta Analysis and Compliance

Usability
- Import/Export NAE Config
- TACACS+

Packaging
- Smart Licensing
- Service Engine

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Vision : Assurance Everywhere

Cross Platform, Multi-cloud

Available 2019

Cross-platform Network Integration

CITRIX

CISCO Firewall

Virtual Machine Manager

Available Now

Integration with Operations Toolchains

splunk>

servicenow

turbonomic CWOM

ANSIBLE

ACI Data Center Fabric

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Cisco Network Assurance Engine

Deployment Model

Zero Touch

No sensors, No Packet Data

Time to Value

30 mins to deploy

60 mins to value

Form Factors

Software only OVA

Lightweight: 3 VMs

Available Now | **30-Day Free Trial** | **Subscription Licensing**

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NAE Virtual Appliance VM Specs

Requirement	Appliance Model: Small	Appliance Model: Medium	Appliance Model: Large
Model	NAE-V500-S	NAE-V1000-M	NAE-V2000-L
Virtual Machines	3 VMs	3 VMs	3 VMs
CPU (vCores per VM)	8	12	24
Memory (GB per VM)	40	64	96
Disk	1 TB in total per VM	2 TB in total per VM	4 TB in total per VM
Storage	SSD	SSD	SSD
APIC Fabric Size	50 leaf switches for a 3 VM cluster	100 leaf switches for a 3 VM cluster	400 leaf switches for a 3 VM cluster

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For More Information – NAE Summary

- How to reach us:
  - ask-nae-pm@cisco.com
  - nae-pm-team@cisco.com
  - nae-tme-team@cisco.com
- Network Assurance Engine: http://www.cisco.com/go/nae
- Customer Testimonial by Cisco IT: http://cs.co/nae-Cisco-IT
- NAE Packet Pusher Podcast: http://cs.co/nae-packetpusher
- Youtube useful videos:
  - Youtube: search = “Cisco NAE”

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Cisco ACI

AUTOMATION & AGILITY

Cisco Network Assurance Engine

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REACTIVE TO PROACTIVE

Delivering Intent Based Networking in the Data Center

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