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Transport SDN

Bandwidth and Management Solution

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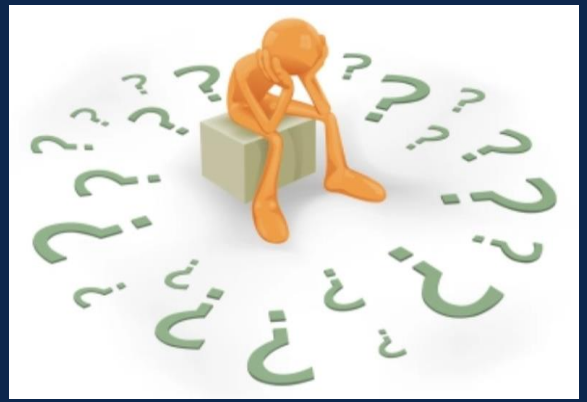
BRKSPG-2246

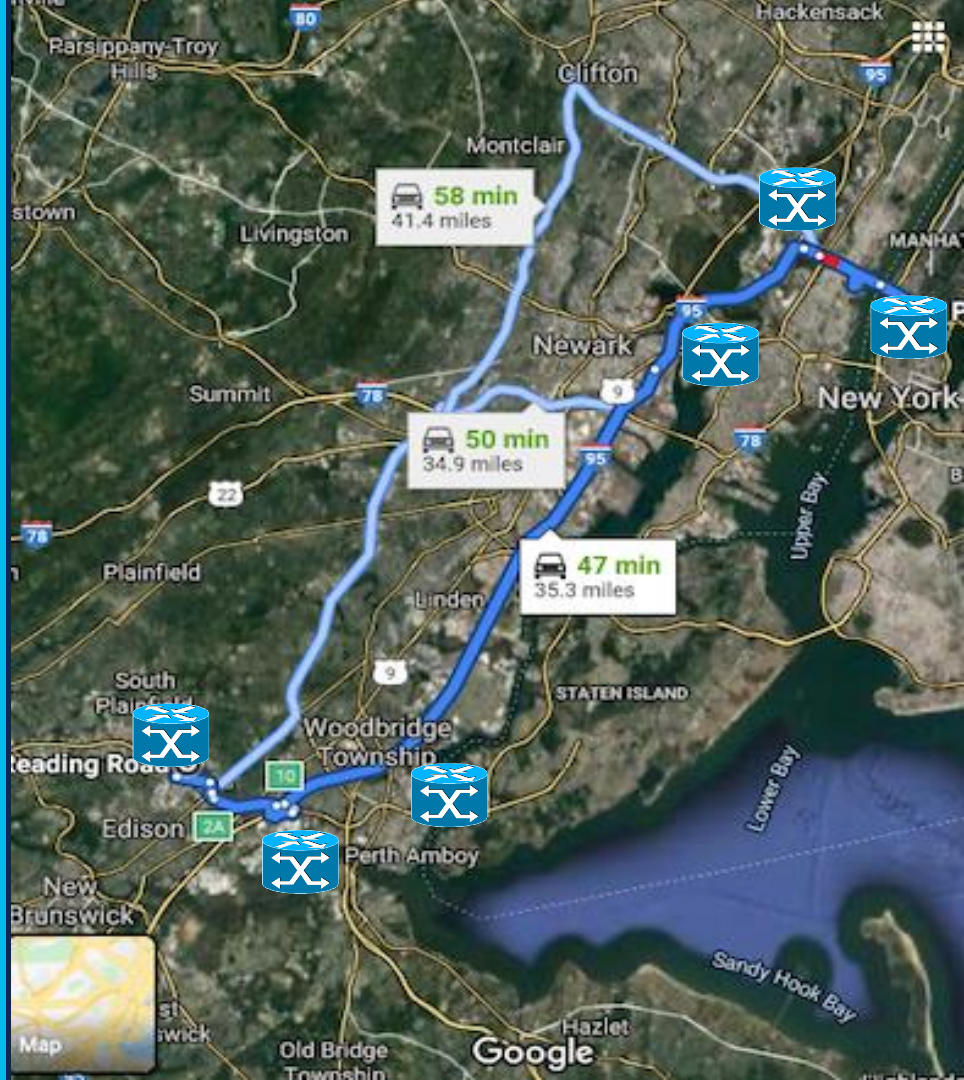
Go to the Airport ASAP

- What is the Path?
- Is it the Best Path?
- How is Situation along the Path?
- What if the Path is Blocked?
- How about Tomorrow…..?



What if?

- Visualization
- Simplification
- Analysis
- Optimization
- On-Demand



Agenda

- Customer Requirements
- Solution & Architecture
- Use Cases
- Demo
- Conclusion

Customer Requirements

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An intent-based Solution for Transport-SDN

Scalable, flexible, and programmable

Onboard customers faster

- Provision new transport networks 78% faster
- Differentiate in the sales cycle by meeting demand more responsively
- Win more enterprise business with immediate gratification
- Optimize network bandwidth

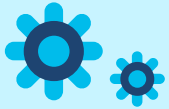
Meet service level agreements

- Maintain a healthier network with 91% faster maintenance procedures
- Monitor network health in real time
- Automatically change network configurations 81% faster
- Identify and resolve issues 70% faster to meet MTTR terms in the SLA

Reduce cost of network operations

- Eliminate repetition
- Respond quickly
- Reduce complexity
- Orchestrate end to end
- Maximize productivity

Challenges



New services adding complexity to an already cost-challenged infrastructure

Operational challenges in quickly turning on new services with legacy IT systems

Imperative to migrate to an agile business infrastructure

Focus on service enablement and delivery

How this benefits?

Transform your business to be more agile and be able to quickly discover and respond to new service opportunities

Increase your operational efficiency by enabling faster fault resolution and a lower cost of maintenance

Automating your network operations can lower your OpEx as well as your CapEx by reducing the complexity of your network

Automate manual provisioning processes
to reduce human errors
and lower your operating expenses

Solution

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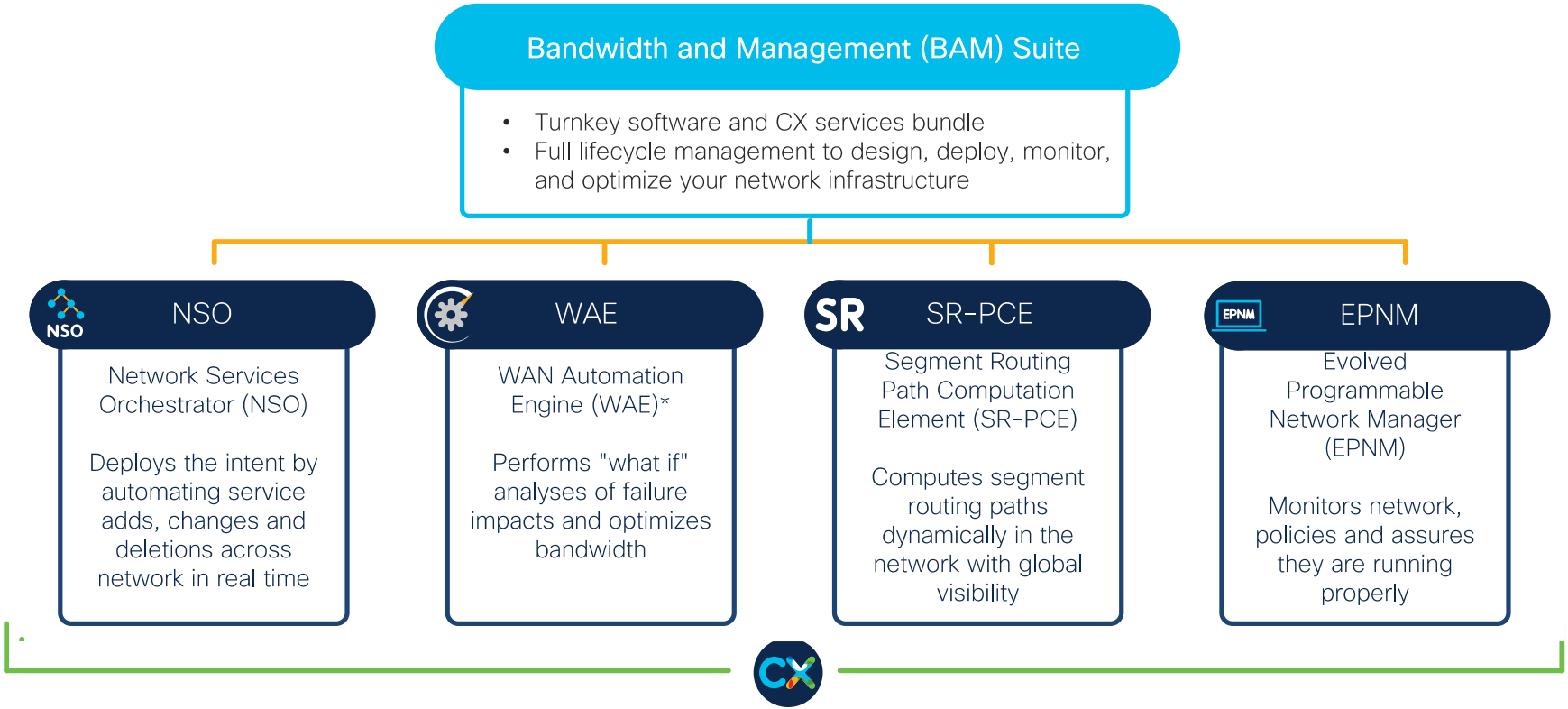
Satellite View

A Suite of Solutions for SDN Transport



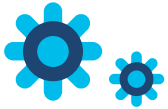
Deployment and Management

Implement the intent using model-based configuration

Optimize multilayer network

Manage a multilayer, multiservice environment

NSO
Network Services Orchestrator



WAE
WAN Automation Engine (+SR-PCE)

EPN-M
Evolved Programmable Network Manager

Customer experience deployment, configuration, and support

Install | Configuration | Knowledge transfer | Upgrades and updates

Complete bandwidth management lifecycle for SDN transport

Who is this for?

Greenfield customers

New deployments

Existing customers of one or more of the suite components can purchase a la carte for components they haven’t already purchased*

Architecture

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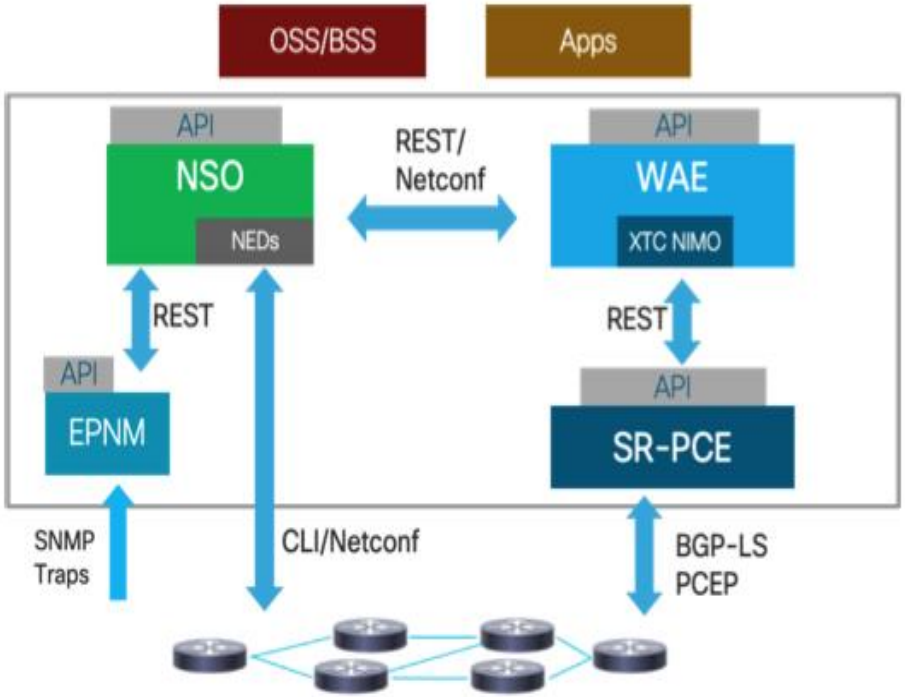
Solution Architecture



Overview

- Ansible deployment
- Out of the Box Integration
- Easy to use API’s
- CLI Support
- Built in KPI’s

Use Cases

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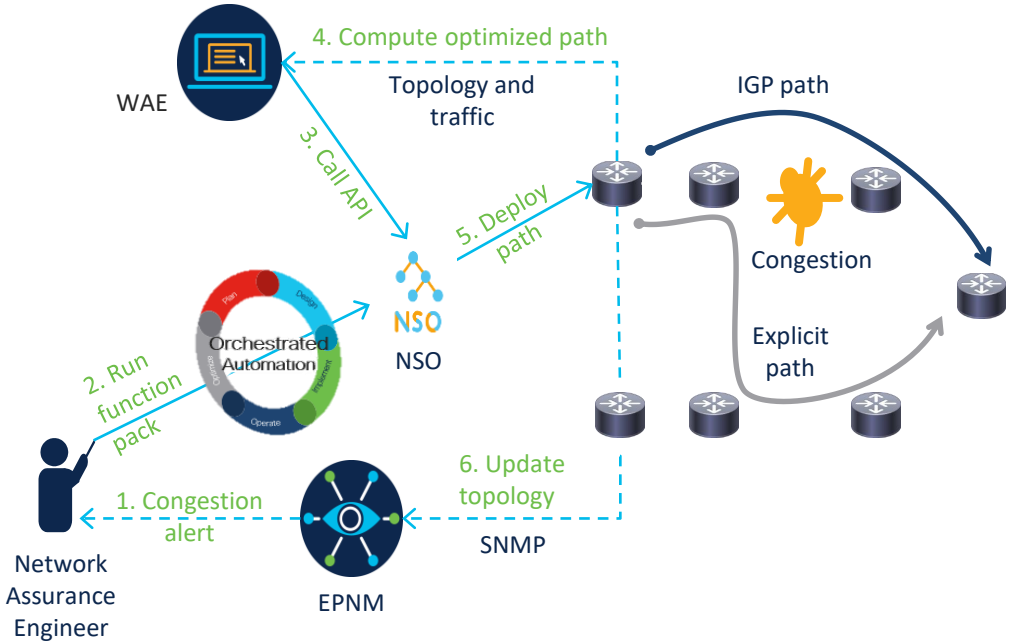
Use Cases Overview

Use case	User persona	Need	WAE	NSO	EPN-M	SR-PCE
Orchestrated Network Optimization	Network assurance engineer	Maintain service level agreements when congestion threatens bandwidth	✓	✓	✓	
Closed-Loop Network Optimization	Network planner	React to rapid network changes	✓			✓
Bandwidth on Demand	Network planner	Launch new services with new revenue opportunities	✓	✓		✓

Use Case 1: Orchestrated Network Optimization

Improve Network Assurance with Automated Orchestration of Segment Routing

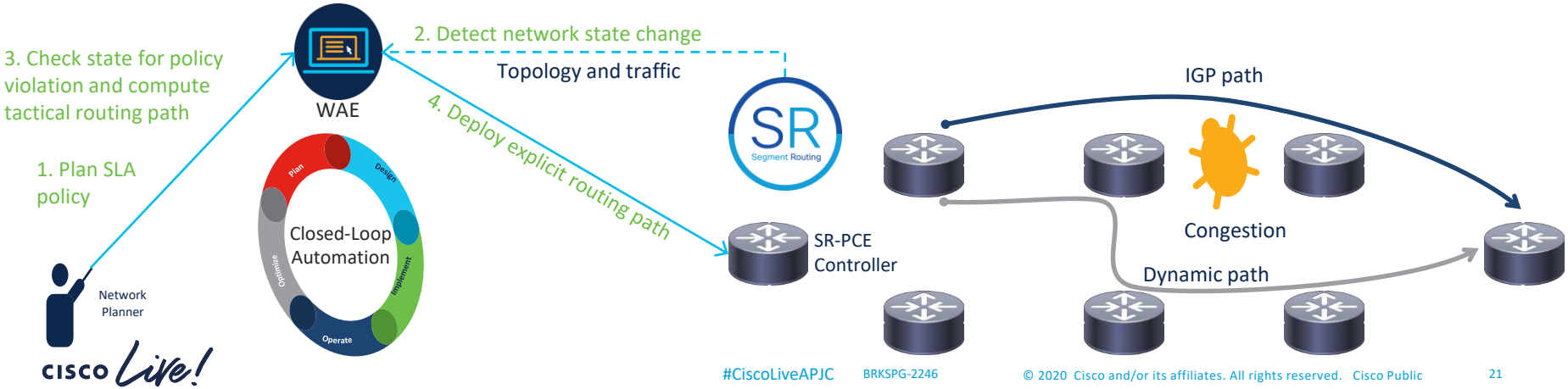
- The problem: As a network assurance engineer, I need to make sure our network meets service level agreements for bandwidth and latency. When network use increases, congestion can reduce bandwidth and increase latency, giving our users a poor customer experience.
- The solution: As a network assurance engineer with Cisco's Bandwidth and Management Suite, I can improve bandwidth and reduce latency with explicit network paths that avoid congestion.
- The value: More network capacity with existing infrastructure, better customer satisfaction on faster network, less time and operational expense to optimize routing.



Use Case 2: Continuous Network Optimization

Continuous Tracking of Network State and Automatic Bandwidth Optimization

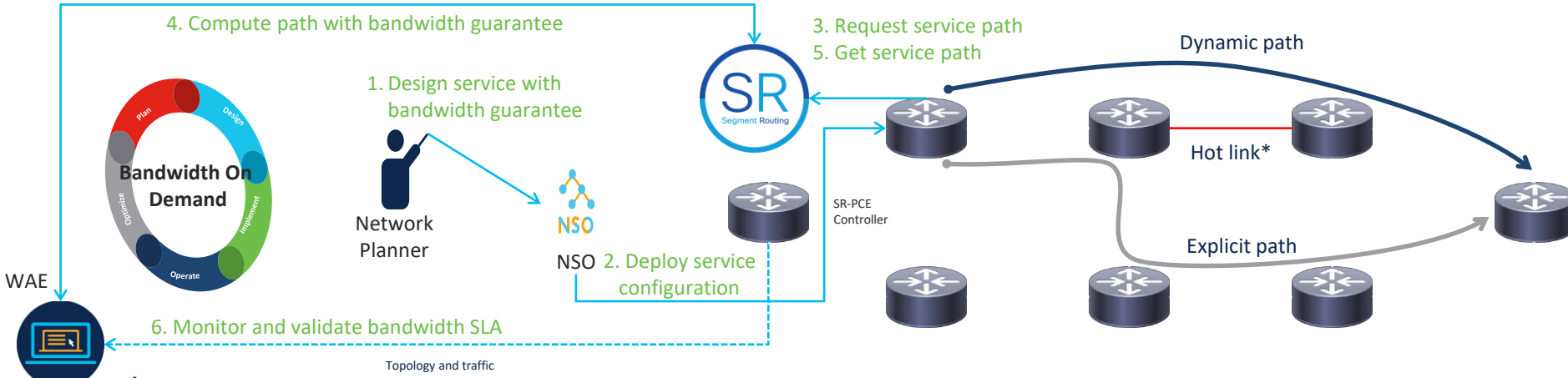
- The problem: As a network assurance engineer, the network state changes continuously and so quickly that I cannot track and react to network problems fast enough to avoid congestion.
- The solution: As a network planner with WAE and SR-PCE, I can configure a policy that continuously tracks network changes and automatically reacts to optimize the network.
- The value: Real-time optimization that enables the network to continuously run optimally.



Use Case 3: Bandwidth on Demand

Offer New Services that Guarantee Bandwidth on Demand

- The problem: As an offer manager, I want to offer a new service that guarantees bandwidth on demand for enterprise customers.
- The solution: As a network planner, I use the Bandwidth on Demand function pack in NSO to provision the service for an enterprise customer.
- The value: Provider can offer a value-added service to existing services that could be monetized.



Demo

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Use Case 1

Orchestrated Network Optimization

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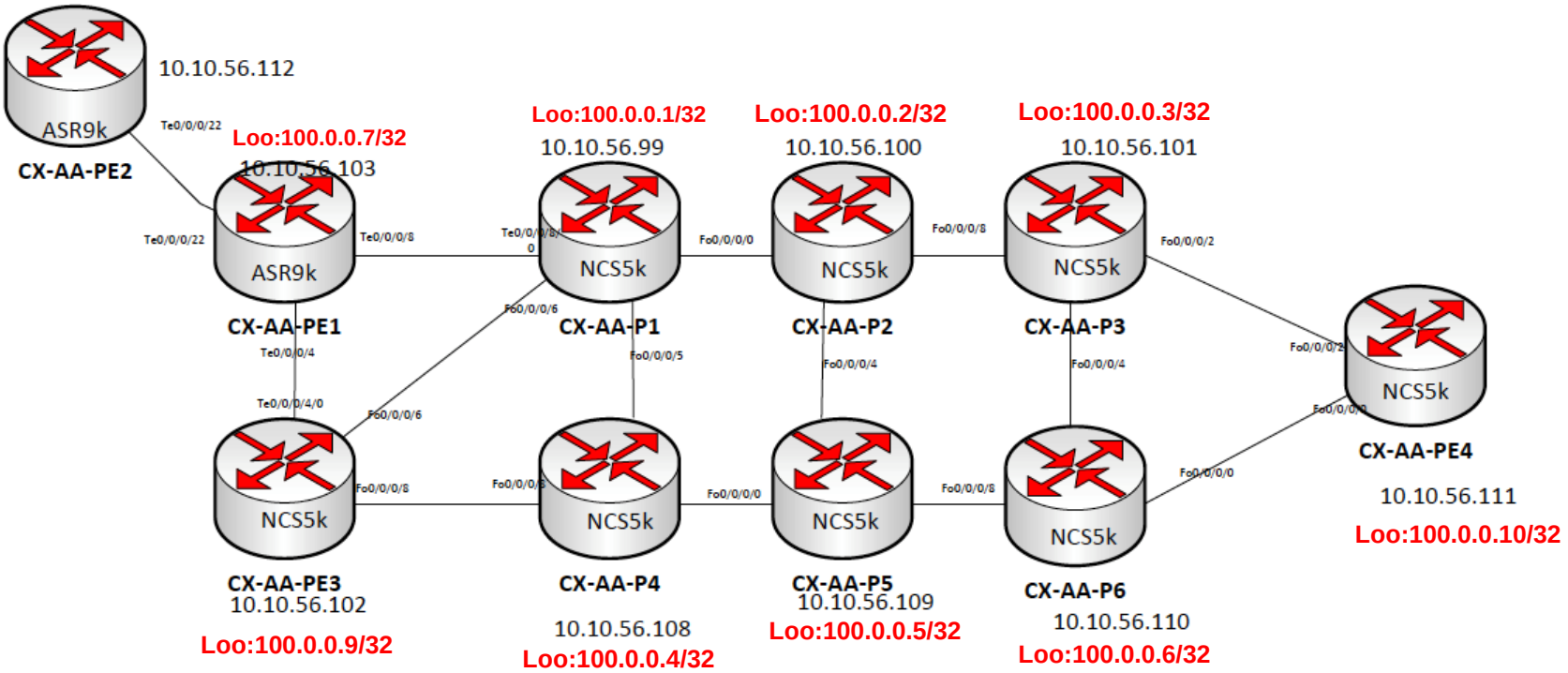
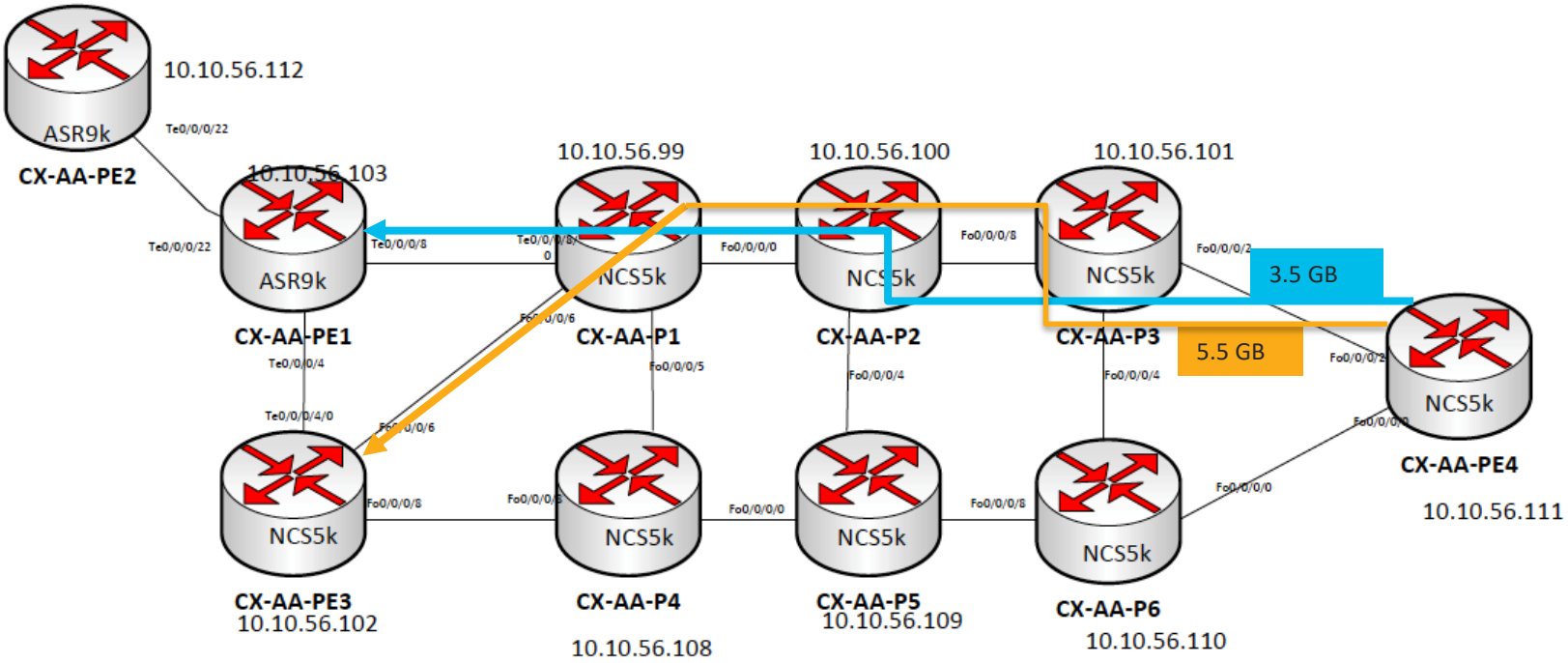
Lab Topology



Traffic Flows



BW-Path OPM API

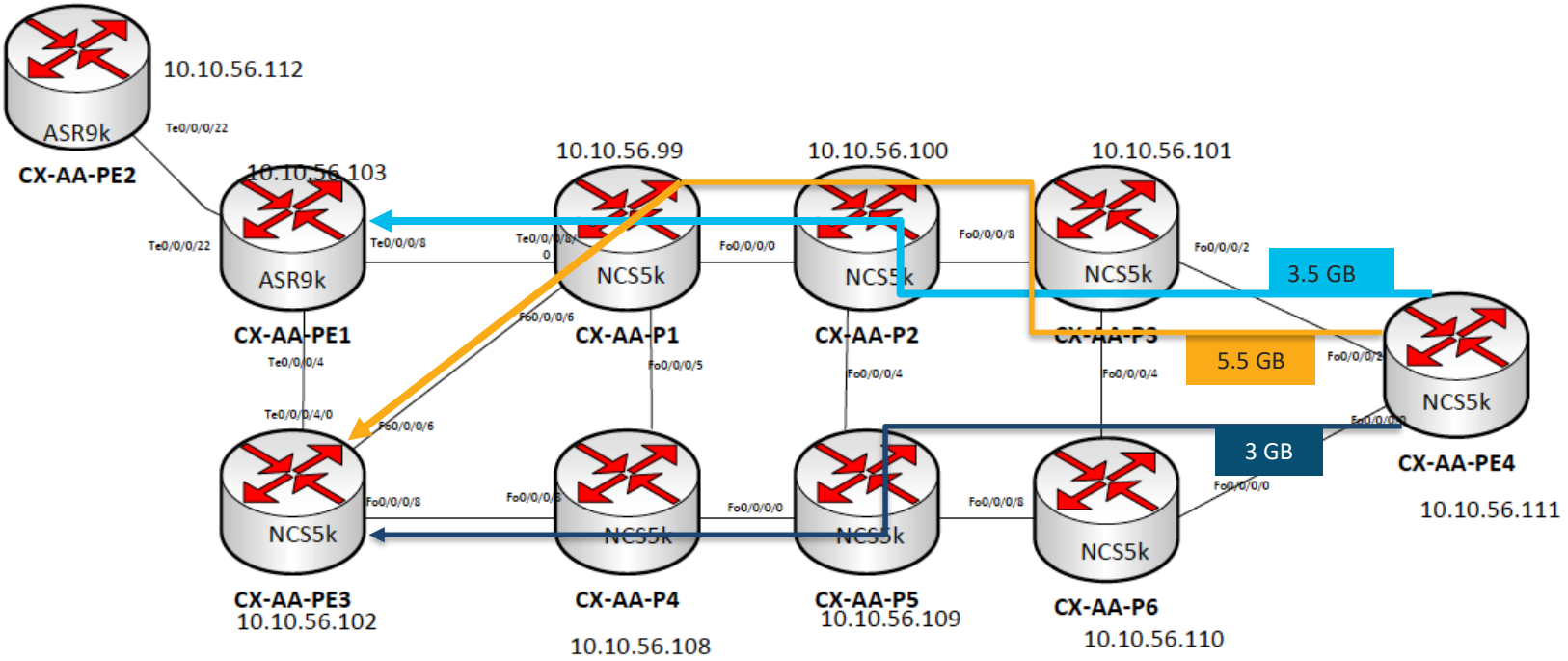
- {
  "input":{
  "source-node":"CX-AA-PE4",
  "destination-node":"CX-AA-PE3",
  "te-type":"segment_routing",
  "bandwidth":3000,
  "service-class":"Default",
  "max-util-percent":50
  }
}

- curl -X POST -v -T /root/api_calls/bw_opt_call.json -H'Content-Type: application/yang-data+json' -u admin:<password> "http://10.8.8.197:8080/restconf/data/networks/network=<wae_network>/opm/bw-path/run"

BW-Path API Response


```
{
  "cisco-wae-opm-bw-path:output": {
    "status": true,
    "constraint-status": "Met",
    "message": "New tunnel required",
    "segment_list": ["80001", "16014", "16003"]
  }
}
```

New 3GB SR Policy from PE4->PE3



Use Case 2

Continuous Network Optimization

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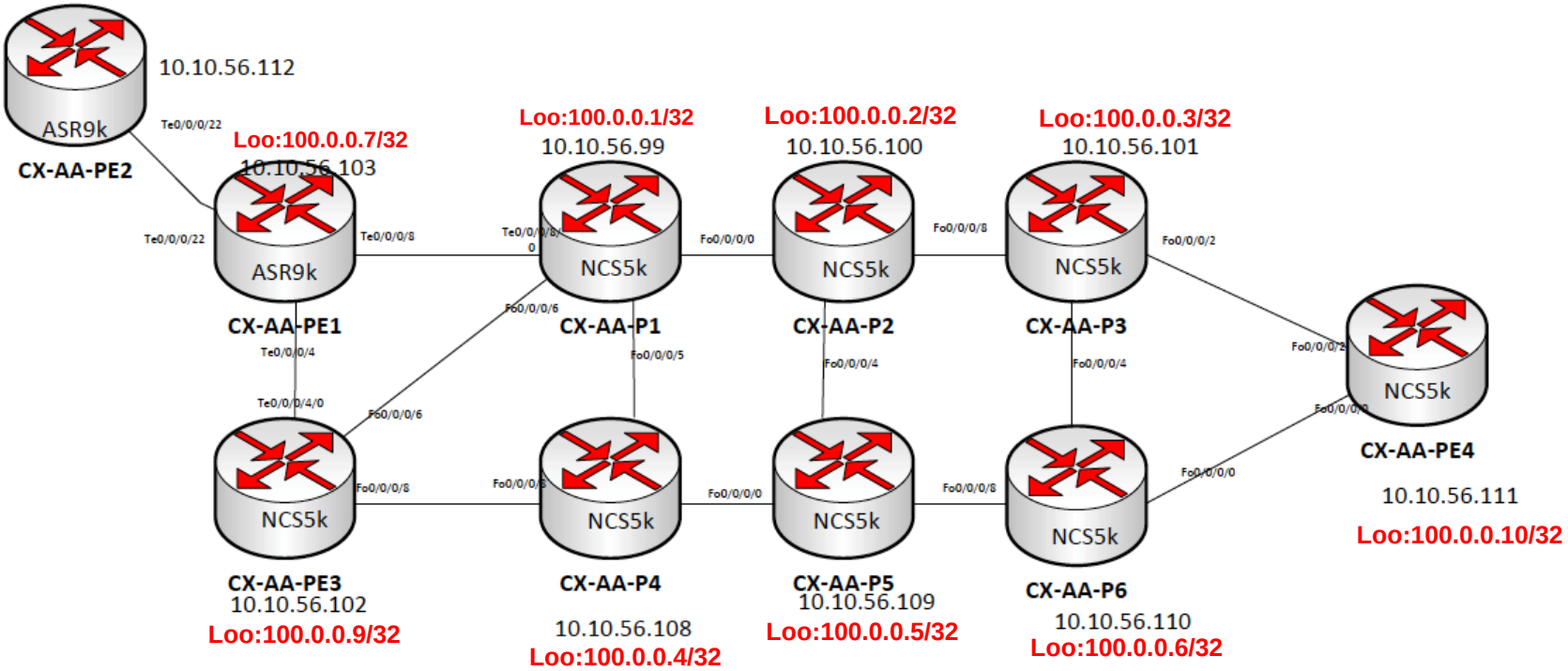
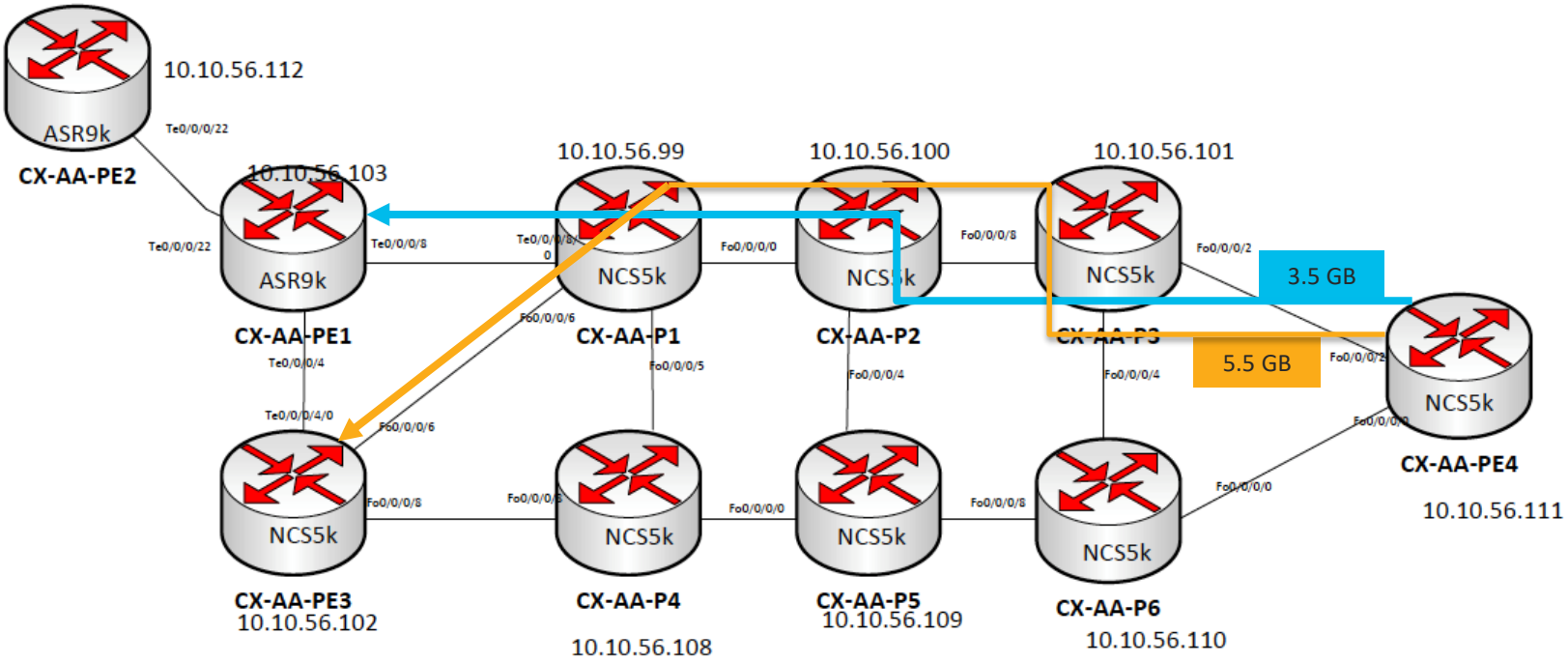
Lab Topology



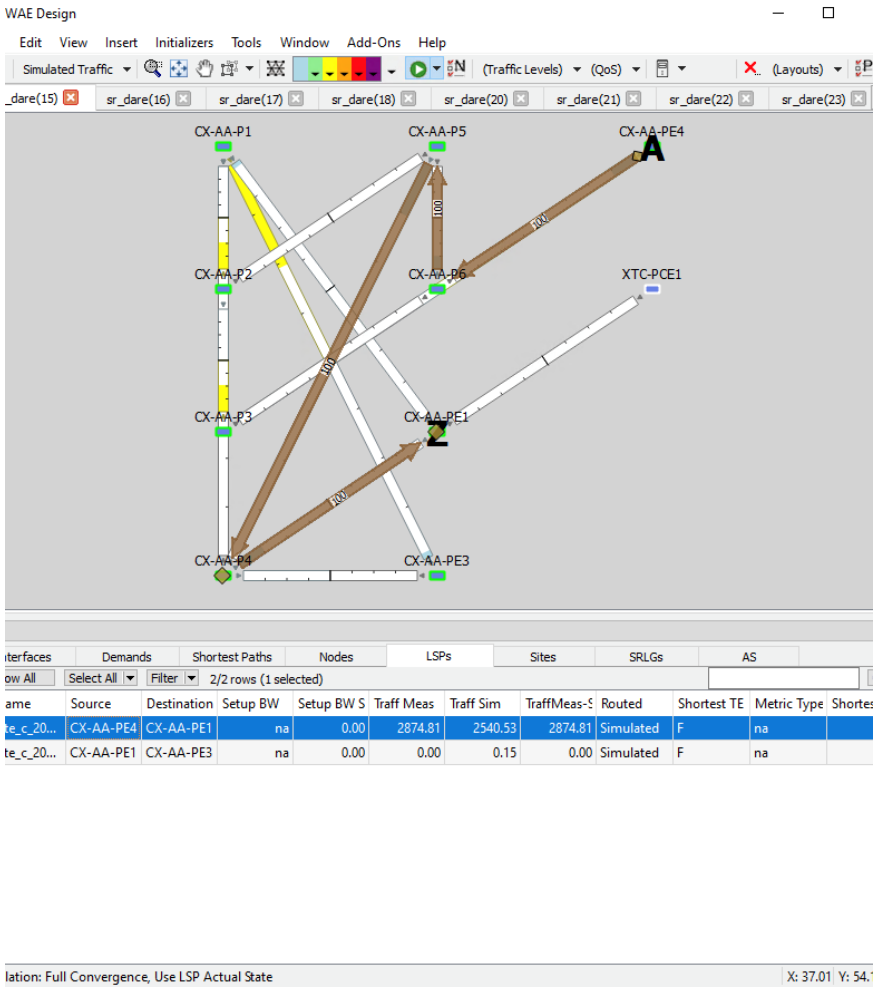
Traffic Flows



WAE - BwOpt Config

```
config {
  xtc-agents      [ xtc1 ];
  enable          false;
  util-threshold  50.0;
  util-hold-margin 3.0;
  color           200;
  del-lsps        true;
  profile-id      1;
  advanced {
    objective                max-avail-bw;
    fix-lsp-duration         120;
    removal-suspension-interval 900;
  }
}
```

New BwOpt Service Policies



Use Case 3

Bandwidth On Demand

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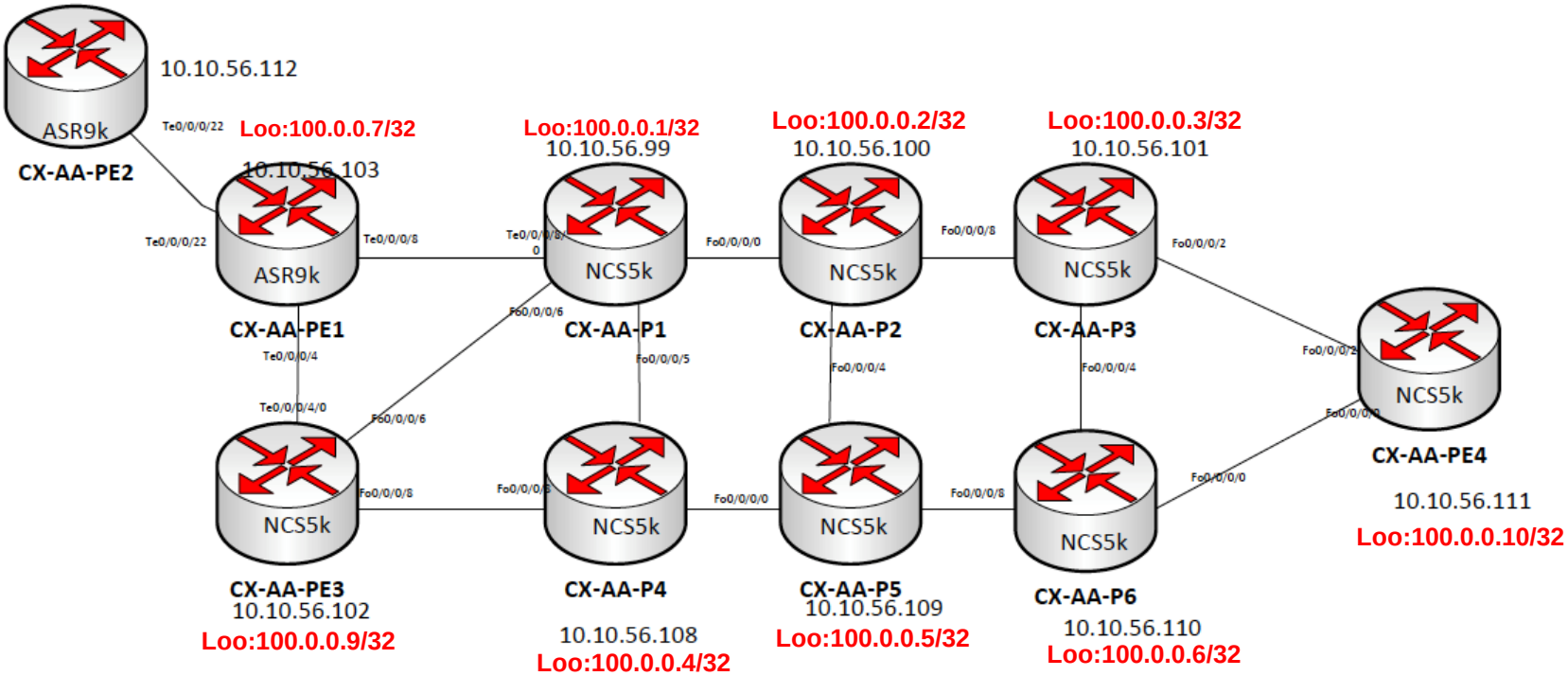
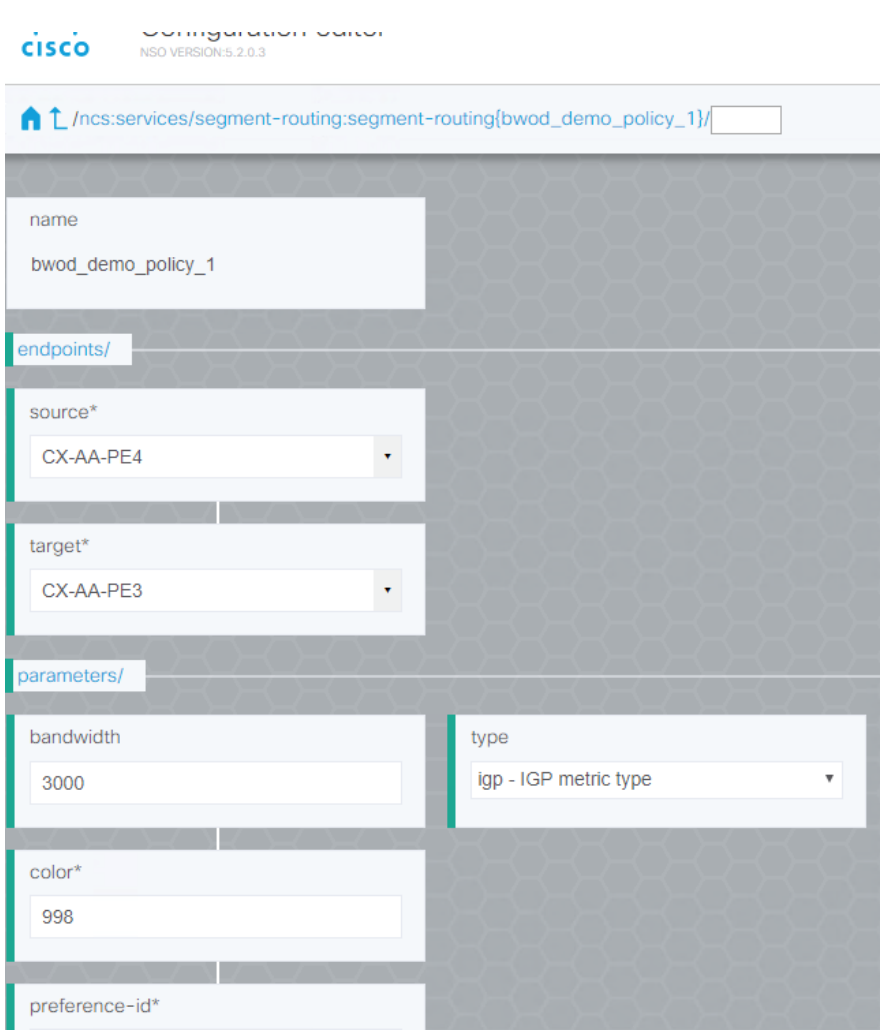
Lab Topology



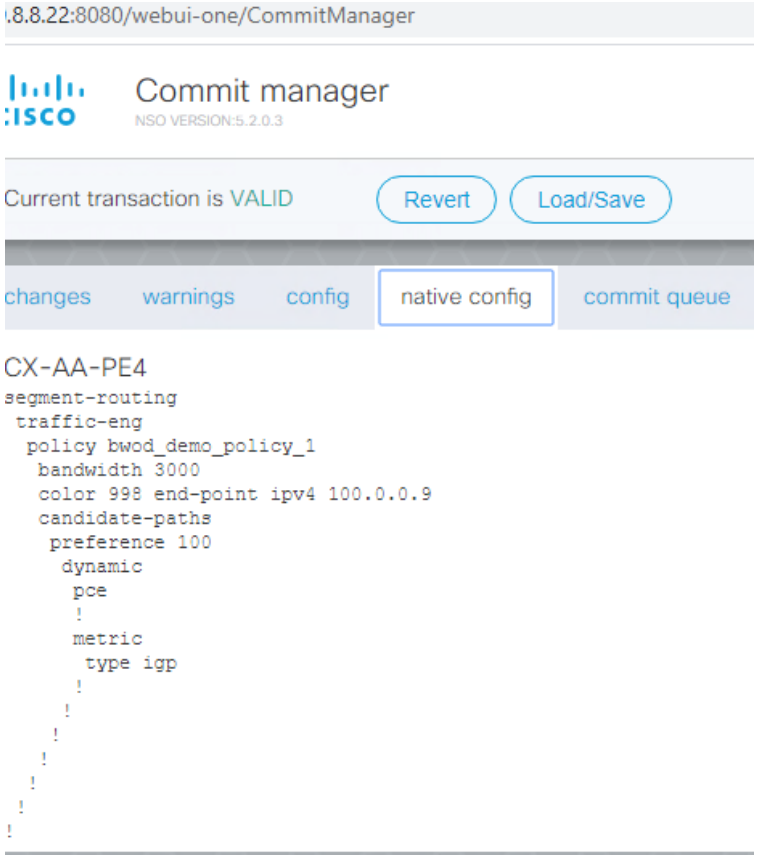
WAE - BwOD Config

```
• config {
    xtc-agents     [ xtc1 ];
    enable         true;
    util-threshold 50.0;
  }
```

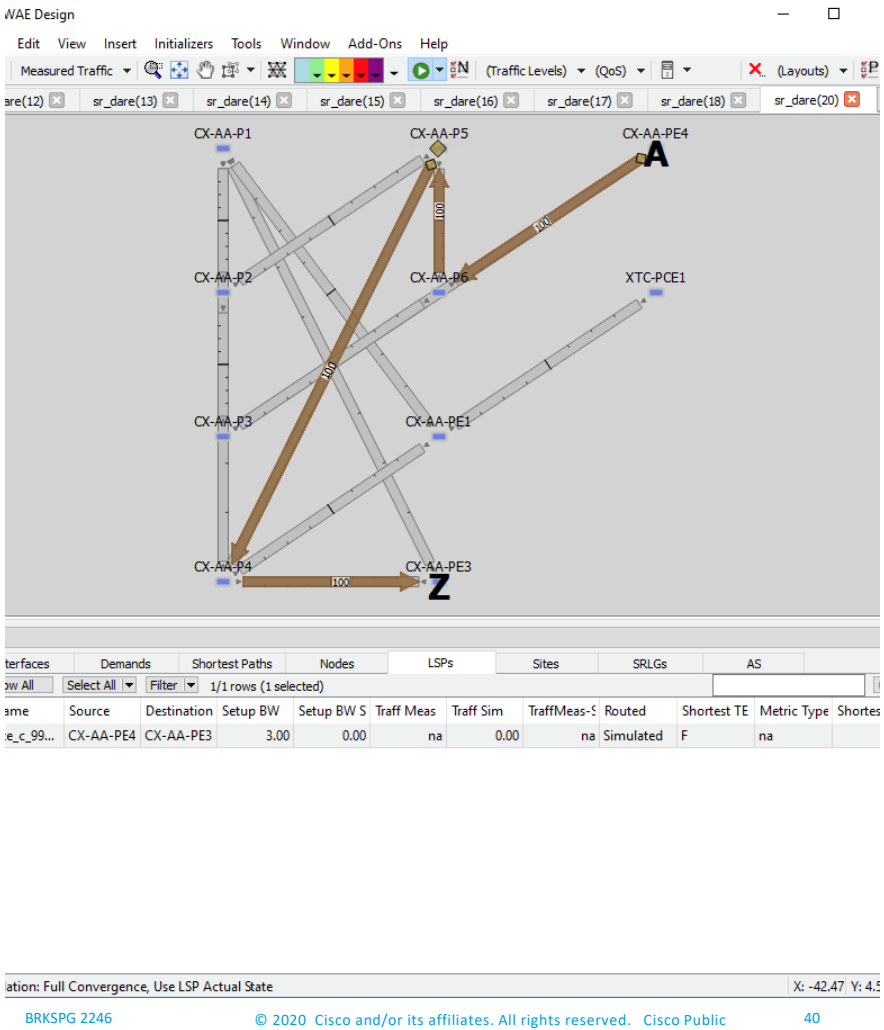
BwOD Service Deployment from NSO



Device SR Policy native config



New BwOD Service Policy



Conclusion

- Brand new intent self monitoring solution which is scalable flexible and easy to manage

Thank you

Backup

Use Case 1 - API Call

```
[root@venu-nso5 ~]# curl -X POST -v -T /root/api_calls/bw_opt_call.json -H'Content-Type: application/yang-data+json' -u admin:Admin143! "http://10.8.8.197:8080/restconf/data/networks/network=sr_demands/opm/bw-path/run"
* About to connect() to 10.8.8.197 port 8080 (#0)
*   Trying 10.8.8.197...
* Connected to 10.8.8.197 (10.8.8.197) port 8080 (#0)
* Server auth using Basic with user 'admin'
> POST /restconf/data/networks/network=sr_demands/opm/bw-path/run HTTP/1.1
> Authorization: Basic YWRtaW46QWRtaW4xNDMh
> User-Agent: curl/7.29.0
> Host: 10.8.8.197:8080
> Accept: */*
> Content-Type: application/yang-data+json
> Content-Length: 188
> Expect: 100-continue
>
< HTTP/1.1 100 Continue
< Allow: GET, POST, OPTIONS, HEAD
< Content-Length: 0
* We are completely uploaded and fine
< HTTP/1.1 200 OK
< Date: Fri, 31 Jan 2020 03:56:54 GMT
< Allow: GET, POST, OPTIONS, HEAD
< Cache-Control: private, no-cache, must-revalidate, proxy-revalidate
< Content-Length: 182
< Content-Type: application/yang-data+json
< Vary: Accept-Encoding
< Pragma: no-cache
<
{
  "cisco-wae-opm-bw-path:output": {
    "status": true,
    "constraint-status": "Met",
    "message": "New tunnel required",
    "segment_list": ["80001", "16014", "16003"]
  }
}
* Connection #0 to host 10.8.8.197 left intact
[root@venu-nso5 ~]# cat /root/api_calls/bw_opt_call.json
{
  "input":{
  "source-node":"CX-AA-PE4",
  "destination-node":"CX-AA-PE3",
  "te-type":"segment_routing",
  "bandwidth":3000,
  "service-class":"Default",
  "max-util-percent":50
  }
}

[root@venu-nso5 ~]#
```

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