



# Open Networking USER GROUP

**ONUG Fall 2015 | Nov. 3-5, 2015**  
*co-hosted by*



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# Service Lifecycle Management Automation Framework



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Neal Secher, BNY Mellon

Aryo Kresnadi, FedEx

Brian Hedstrom, Datavision

Jonathon Lundstrom, Nuage Networks

Maxime Bugat, Deloitte LLP

Ted Turner, Intuit

Jeff Gray, Glue Networks

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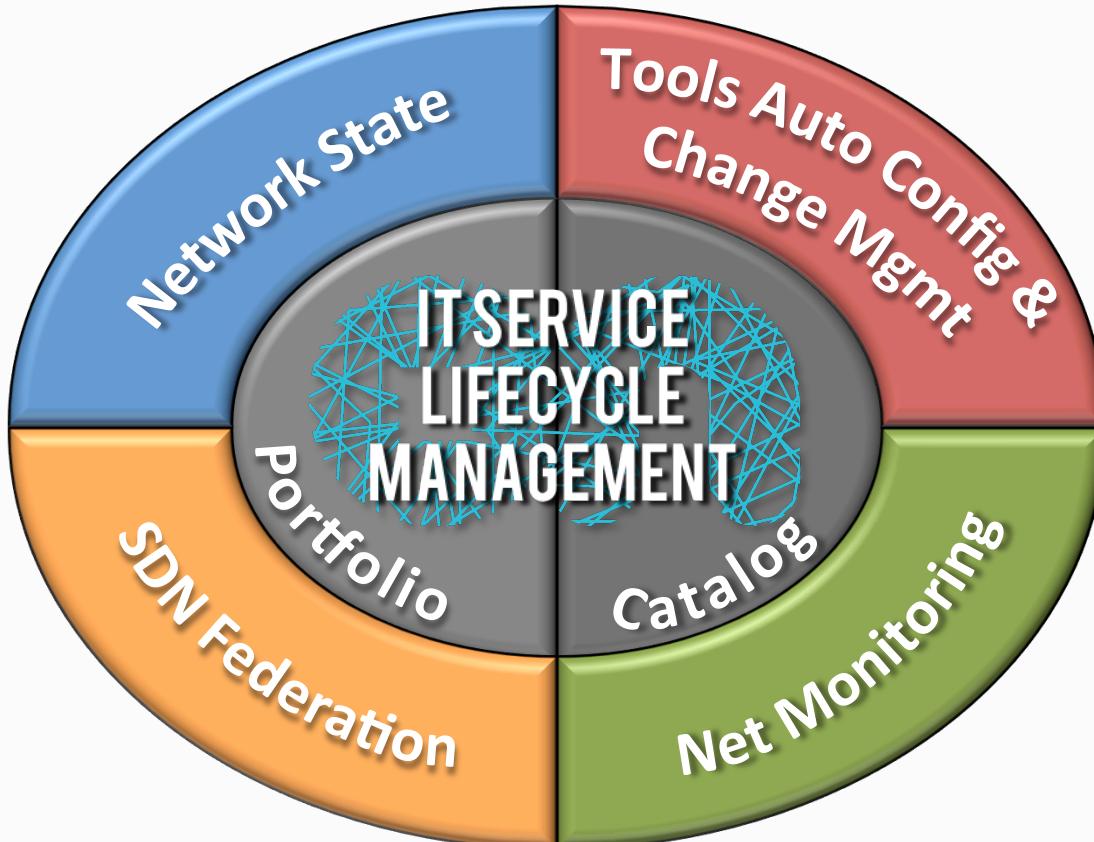
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# Agenda

1:45pm-3:15pm	ONUG Management Working Group Update
1:45-2:00	Service Lifecycle Management Automation Framework Overview
2:00-2:15	Common Tools for Automated Configuration & Change Management
2:15-2:35	SDN Federation/Operability Orchestration
2:35-2:45	Network State Collection, Correlation and Analytics
2:45-2:55	Traffic Monitoring/Visibility
2:55-3:15	Voting & Discussion



# ONUG Service Lifecycle Management Automation Framework



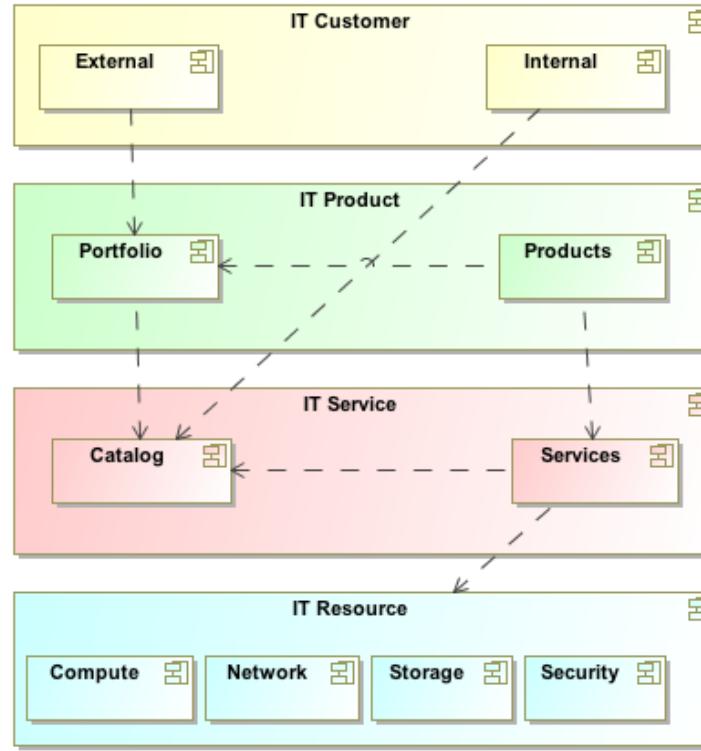
# Problem Statement

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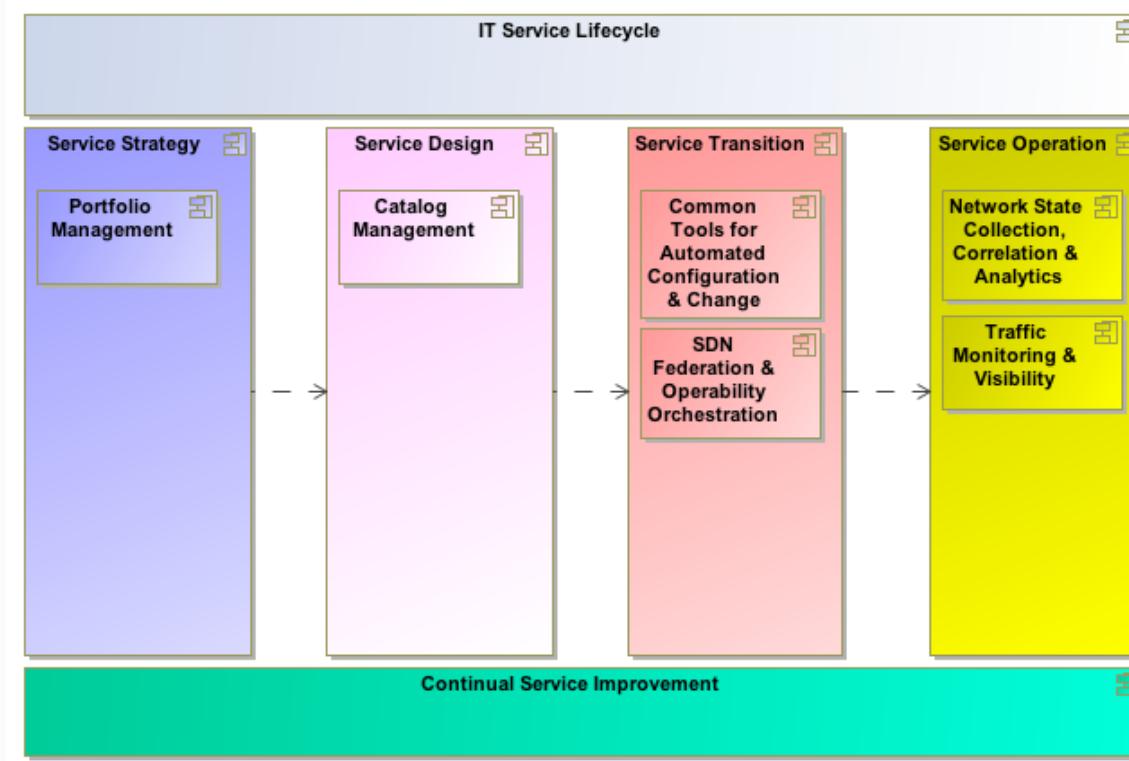
- Lack of focus on IT Service Delivery
  - Service-oriented IT based on Product Portfolio & Service Catalog
- Provisioning products/services takes days, weeks and sometimes months
  - Lack of a dynamic & agile approach to IT Service Delivery
- Quotes from multiple vendors do not necessarily compare apples to apples
  - Lack of a common IT process map & application mapping
- Migrating compute loads to the cloud is hard to compare to existing data center based workloads
- Requesting services on demand (SaaS) is hard to compare to existing data center based workloads



# IT Operationalization Layered View



# IT Service Lifecycle



# Business Value

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- Operationalizing IT based on IT Service Lifecycle
- Scalability
- Accelerated deployment timelines
- Ability to automate provisioning
- Enable interoperation of vendor hardware
- Enable interoperation of vendor services (virtualized services/SaaS)



# Portfolio & Service Catalog

- Mapping various frameworks to useful SDN / SDx paradigm
- ITIL
- TMF eTOM



AWS	Service Now																									
<a href="https://aws.amazon.com/servicecatalog/details/">https://aws.amazon.com/servicecatalog/details/</a>	<a href="http://www.servicenow.com/lphp/service-catalog.html">http://www.servicenow.com/lphp/service-catalog.html</a>																									
<b>Products Portfolios Versioning Granular Access Control Constraints Stack</b>	<p>The diagram illustrates a granular access control matrix. At the top, four grey arrows labeled "Business Unit A", "Business Unit B", "Business Unit C", and "Business Unit D" point to the right. Below them, four rows of boxes represent "IT Service 1", "IT Service 2", "IT Service 3", and "IT Service 4". Each box contains either a white square with an 'X' or a red square with an 'X'. To the right of the matrix is a legend titled "Service Requests" with the following items:<ul style="list-style-type: none"><li>Reset password</li><li>Update details</li><li>Create account</li><li>Delete account</li></ul></p> <table border="1"><thead><tr><th></th><th>Business Unit A</th><th>Business Unit B</th><th>Business Unit C</th><th>Business Unit D</th></tr></thead><tbody><tr><td>IT Service 1</td><td>X</td><td>X</td><td>X</td><td>X</td></tr><tr><td>IT Service 2</td><td>X</td><td>X</td><td></td><td></td></tr><tr><td>IT Service 3</td><td></td><td>X</td><td>X</td><td>X</td></tr><tr><td>IT Service 4</td><td></td><td>X</td><td>X</td><td></td></tr></tbody></table>		Business Unit A	Business Unit B	Business Unit C	Business Unit D	IT Service 1	X	X	X	X	IT Service 2	X	X			IT Service 3		X	X	X	IT Service 4		X	X	
	Business Unit A	Business Unit B	Business Unit C	Business Unit D																						
IT Service 1	X	X	X	X																						
IT Service 2	X	X																								
IT Service 3		X	X	X																						
IT Service 4		X	X																							

For instance AWS and Service Now have their own frameworks



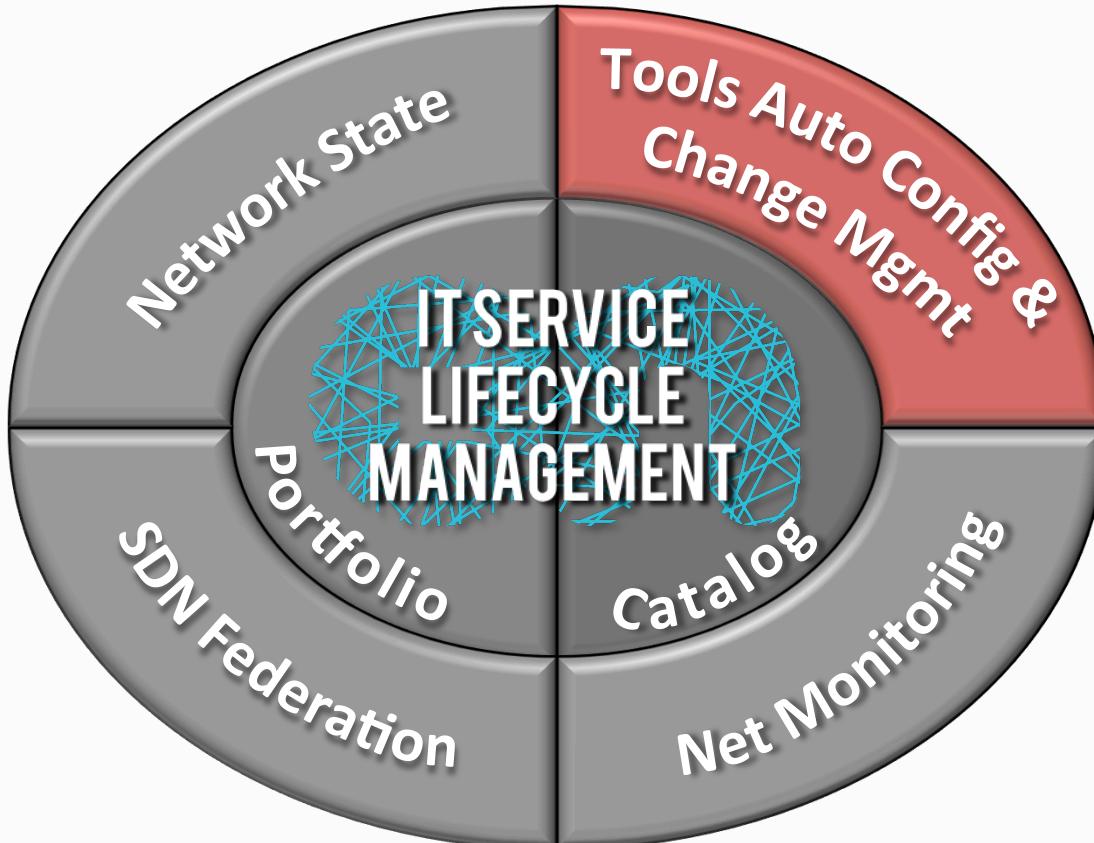
# Vendor Integration with a Corporate Service Catalog

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- The final outcome is to define products & services that can be quickly integrated into any corporate service catalog
- Vendors will benefit from the ability to have products/services added into an organization quickly
- Corporations/consumers will benefit from a well defined structure, to which a vendor can provide services “on demand”
- When appropriate, multiple management domains can be defined for portions of the service catalog
  - Segmentation of management domains enables higher service levels & customer satisfaction, by allowing both staff & vendors to collaborate in defined processes
- Compare/Contrast
  - AWS – service catalog
  - Service Now – service catalog



# ONUG Service Lifecycle Management Automation Framework



# Common Tools for Automated Configuration & Change Management Working Group Panel

Ted Turner, Intuit



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# Identified Administrative Domains for Automation

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1. Corporate Sites
  - LAN/VLAN provisioning
  - Wireless provisioning
  - MPLS/Direct Internet Connection provisioning
2. Data Centers
  - LAN/VLAN provisioning
  - WAN/MPLS/Direct Internet Connection provisioning
3. Cloud Provisioning
4. SaaS Providers



# Suggested Use Cases

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## 1. Simple addition of a printer to a network

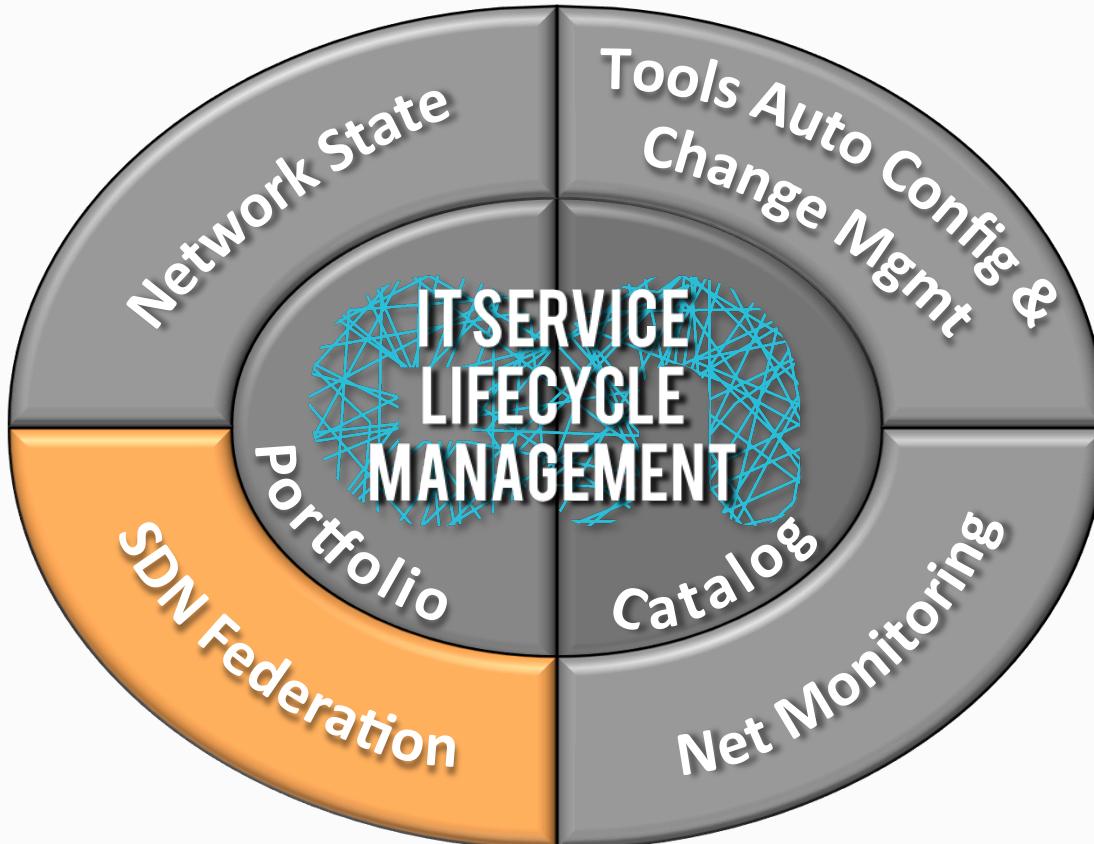
- End user/staff member acquires off-the-shelf printer from retail establishment
- End user is able to simply plug the printer into the network and provide print services for all staff in the office space
- Engagement of IT staff should not be necessary
- This use case is simplistic, but leads to automation of end points (IoT), end user, DC servers and services, cloud services

## 2. Provisioning of services (2 servers/services)

- SERVER 1 - Front end (i.e., web server)
- SERVER 2 - Application (i.e., oauth 2.x)
- This use case is simplistic, but leads to automation of services in corporate, DC, cloud and SaaS provisioning



# ONUG Service Lifecycle Management Automation Framework



# SDN Federation/Operability Orchestration Working Group Panel

Maxime Bugat, Deloitte LLP

Jeff Gray, Glue Networks

Brian Hedstrom, Datavision



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# SDN Federation/Operability Orchestration

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## Chairman:

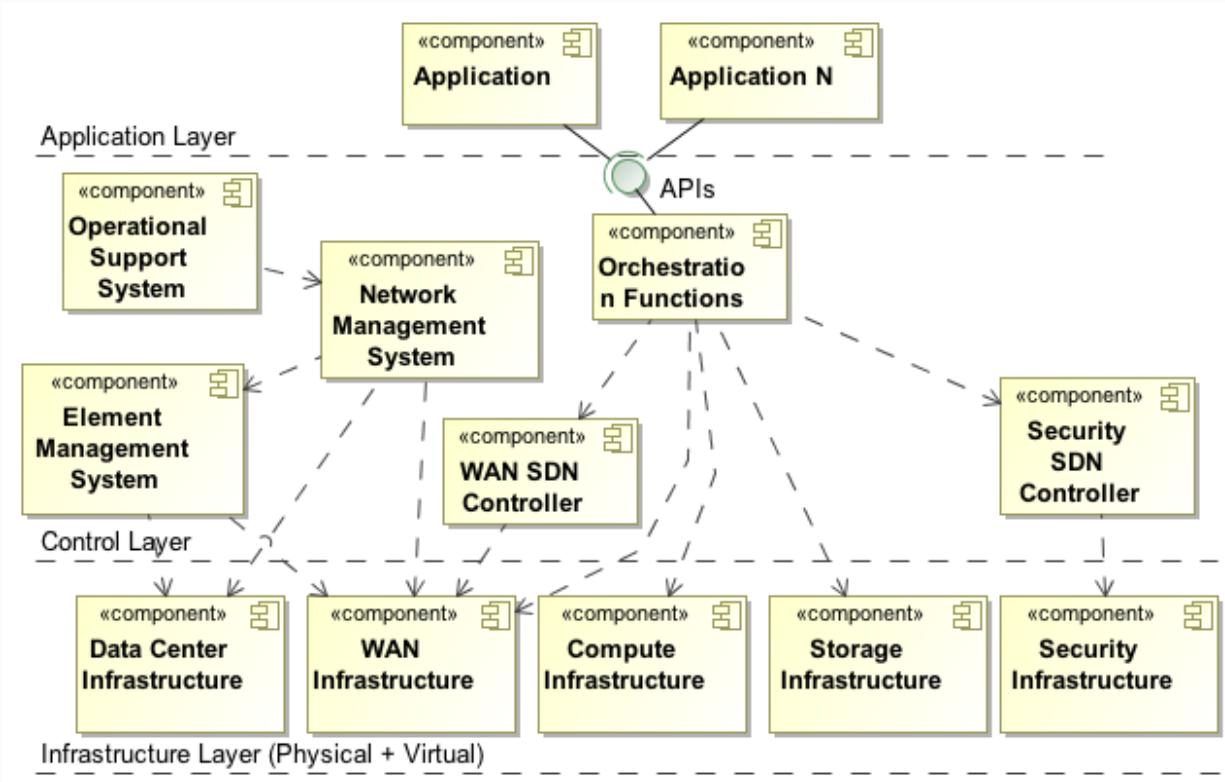
- Maxime Bugat, Chair (Deloitte LLP)

## Working Group Members:

- Brian Hedstrom (Datavision)
- Jeff Gray (Glue Networks)
- Stefan Dietrich (Glue Networks)
- Nick Lippis (ONUG)
- Rashad Mahmood Khan (APECON)
- Matthew Clark (F.Hoffman-LaRoche)
- David White (Institute of Technology Tallaght Dublin)

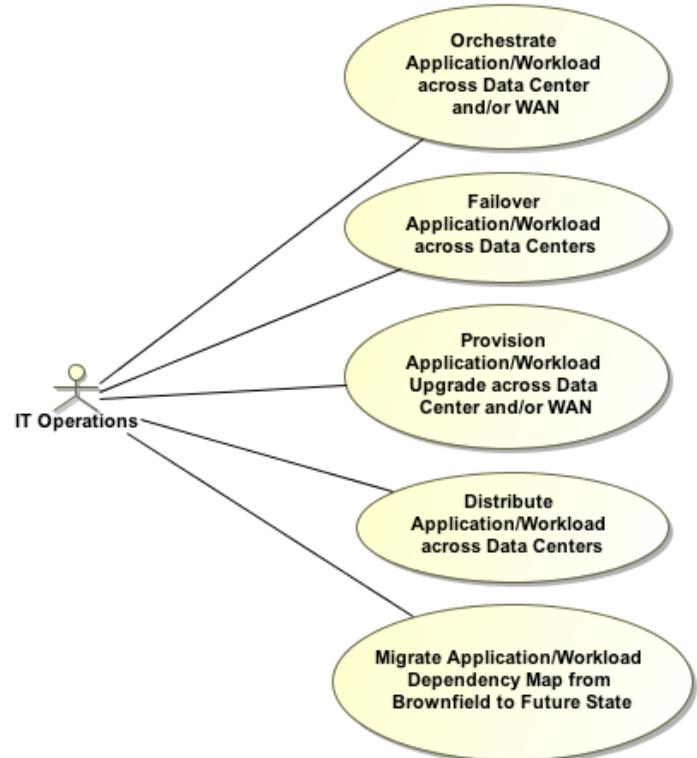


# Present Day Landscape

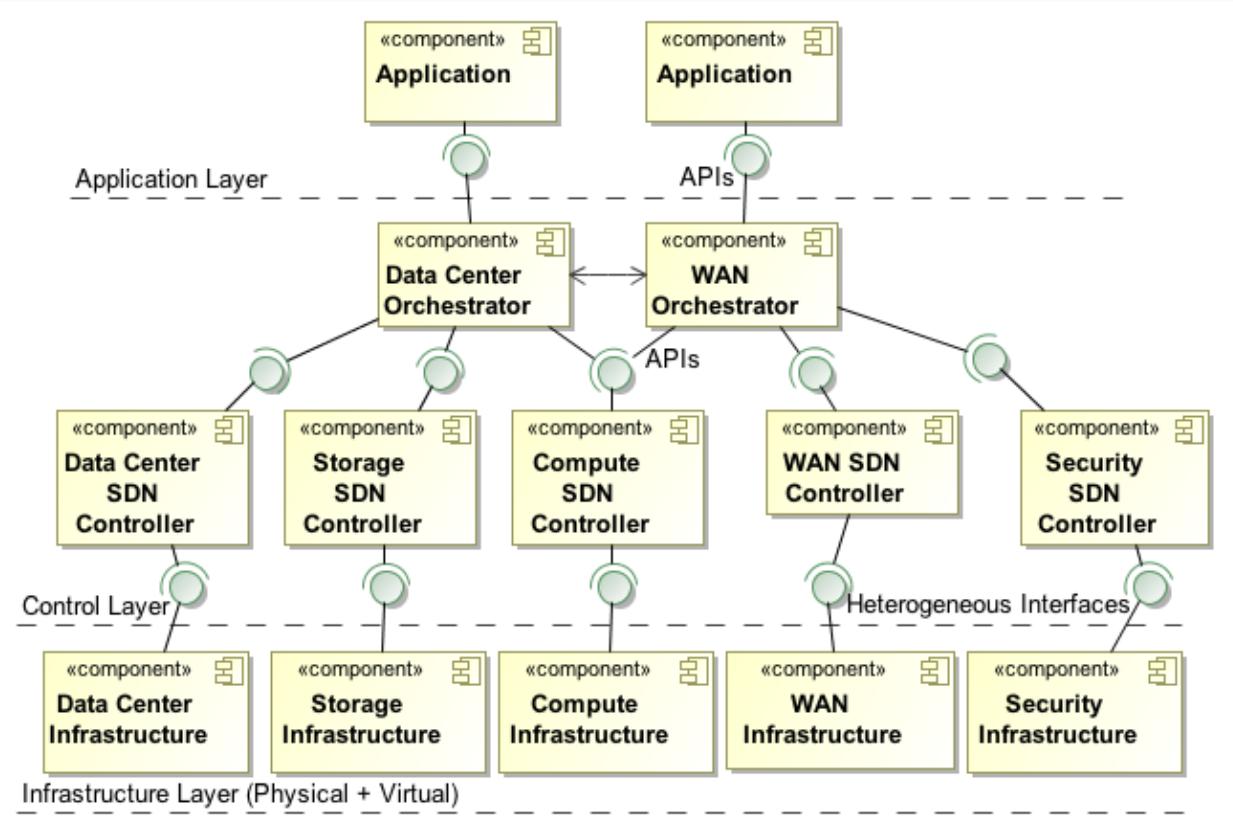


# Top 5 Uses

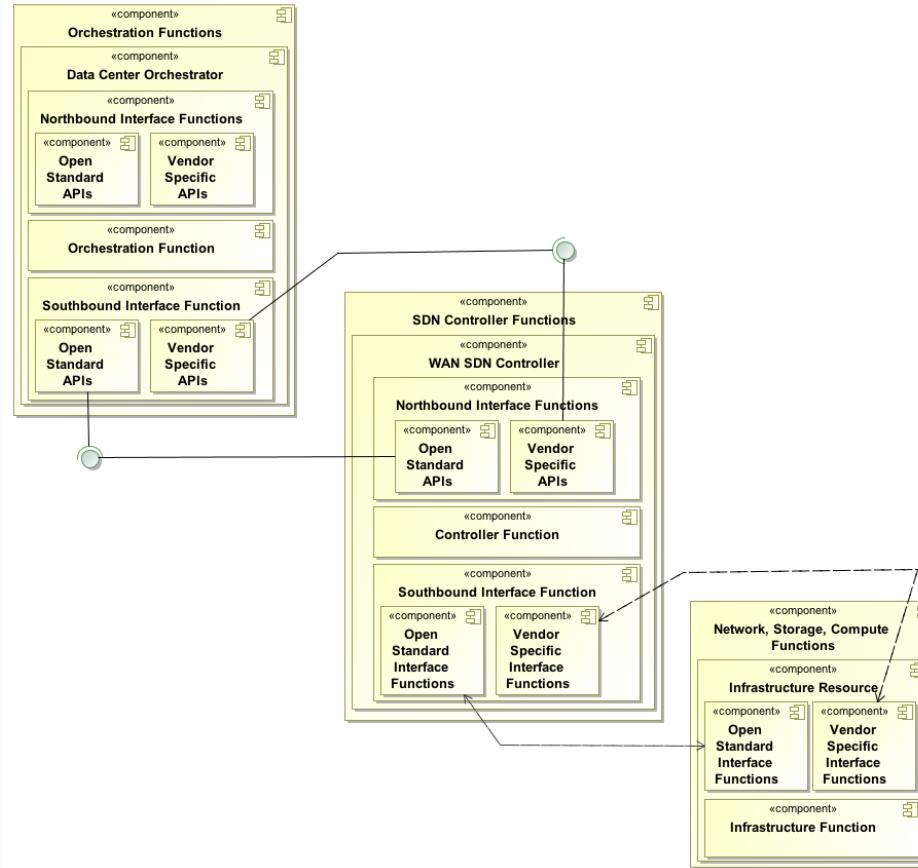
1. Orchestrate Application/Workload across Data Center and/or WAN
2. Failover Application/Workload across Data Centers
3. Provision Application/Workload Upgrade across Data Center and/or WAN
4. Distribute Application/Workload across Data Centers
5. Migrate Workload Dependency Map from Brownfield to Future State
  - a. Dependency map defines resource requirements for workload



# Architectural Framework



# Architectural Detailed View



# Top 10 Requirements

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1. Controller functions must provide northbound interfaces to orchestration functions.
2. Orchestration functions must provide east-west interfaces between different orchestrators.
3. Controller must support southbound heterogeneous (open & proprietary) interfaces.
4. The framework must support multiple administrative domains.
5. A controller can get configuration demands or request from multiple orchestrators.
6. The orchestration function provides northbound interfaces to the service catalogues.
7. All APIs must be opened & published such as REST.
8. The controller must provide a discovery function.
9. Common APIs for most standard functions.
10. Must scale to "n" number orchestrators & controllers.



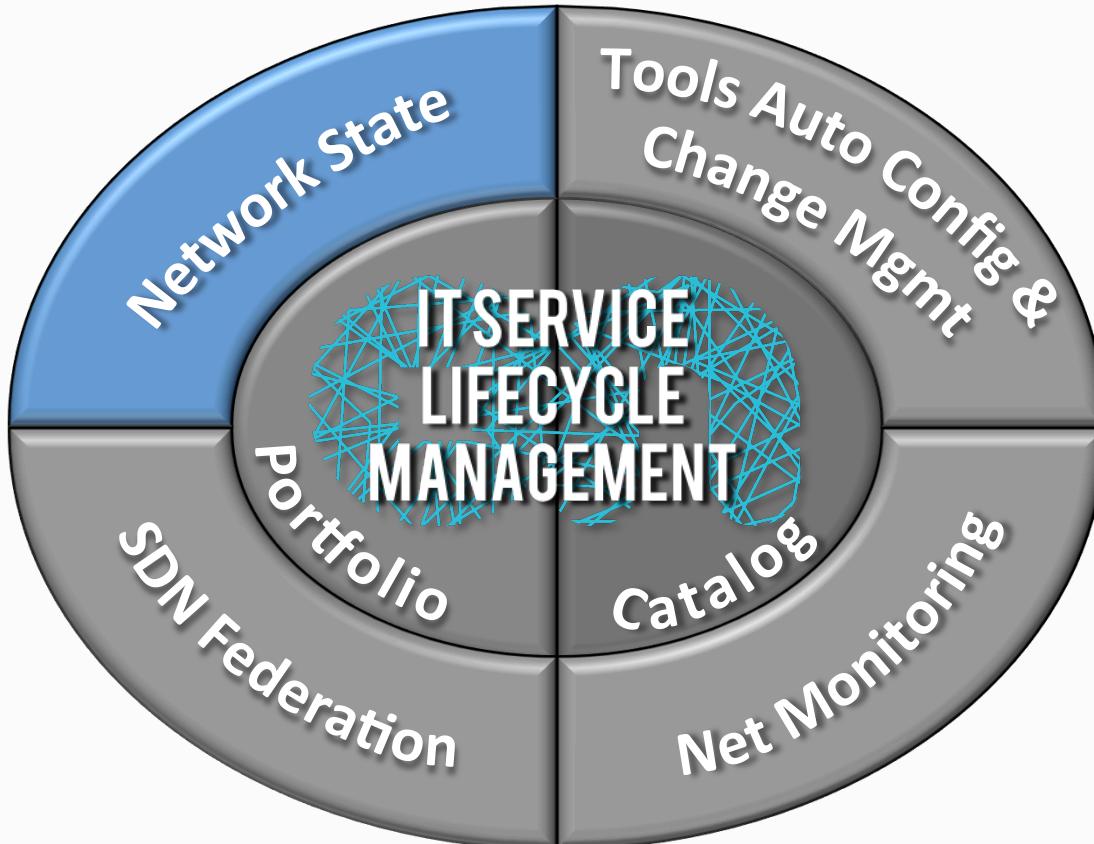
# Demo

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Jeff Gray, Glue Networks



# ONUG Service Lifecycle Management Automation Framework

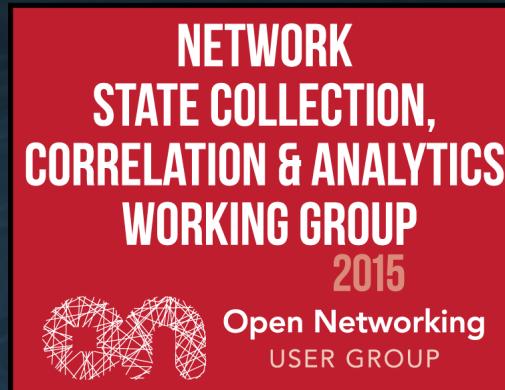


# Network State Collection, Correlation & Analytics Working Group Panel

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Brian Hedstrom, Datavision

Jonathon Lundstrom, Nuage Networks



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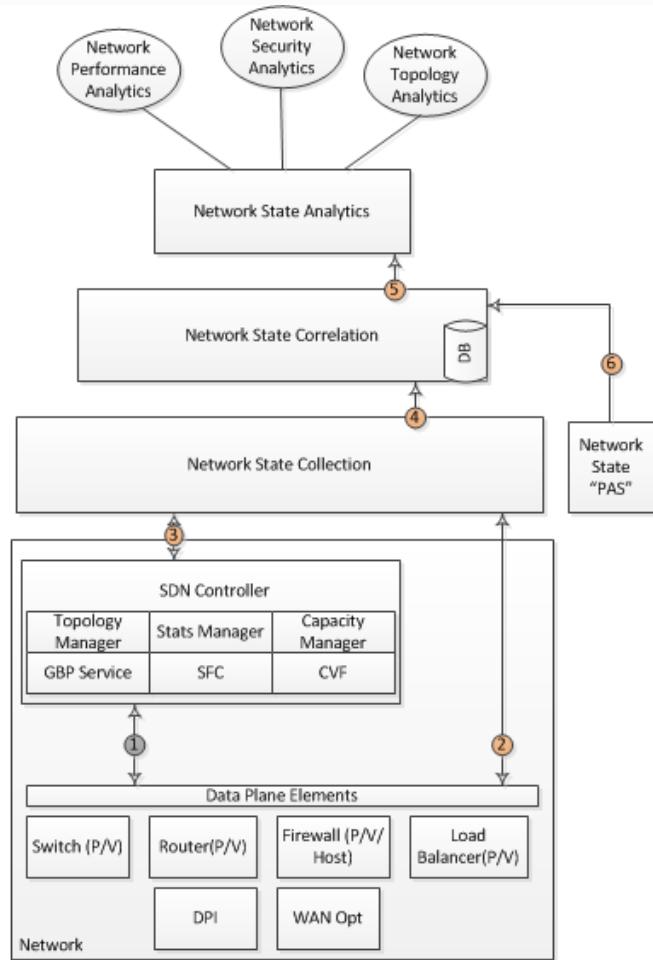


# Reference Architecture 2.0

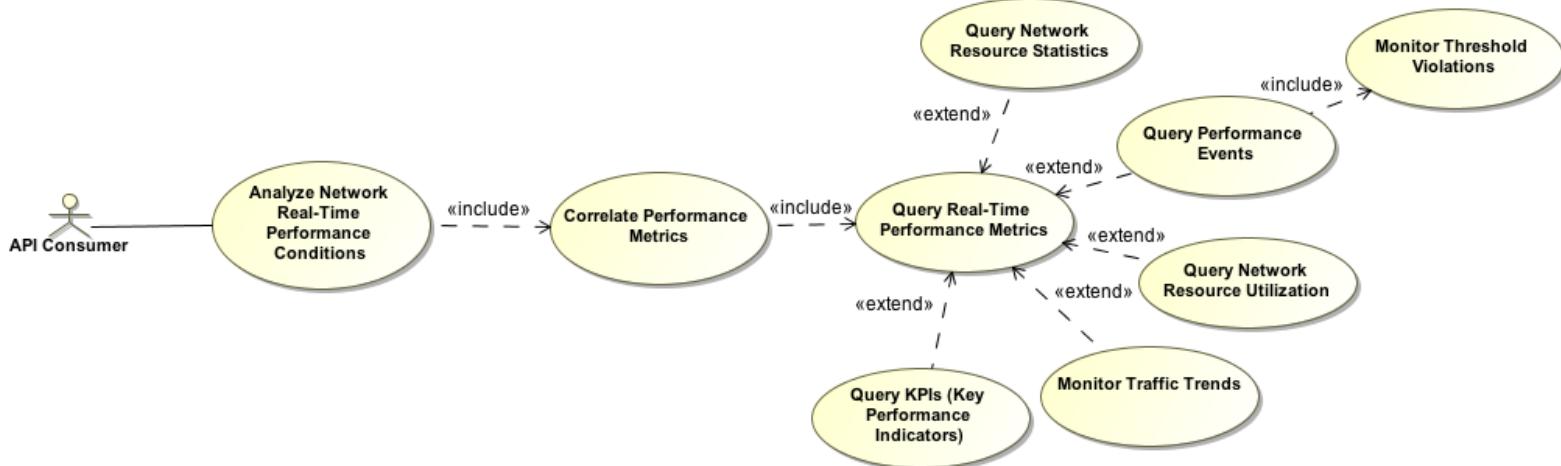
## ONUG FALL WG Review:

- Focus on the top 3 Use Cases prioritized from live voting @ ONUG Spring
- Moved to a more generalized “actor” on analytic information
- Focus on API access into Analytics for a variety of use cases

**Key**  
DPI: Deep Packet Inspection  
GBP: Group Based Policy  
SFC: Service Function Chaining  
CVF: Change Verification Functions  
PAS: Pretty Amazing Stuff

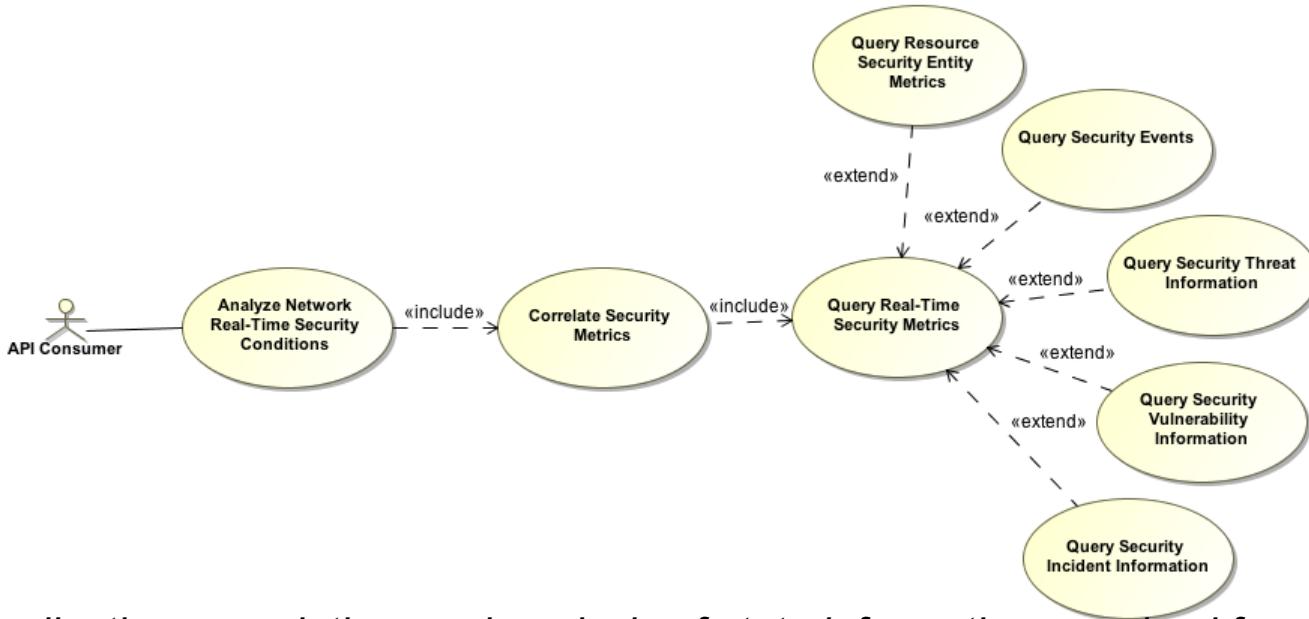


# Real Time Performance Analytics



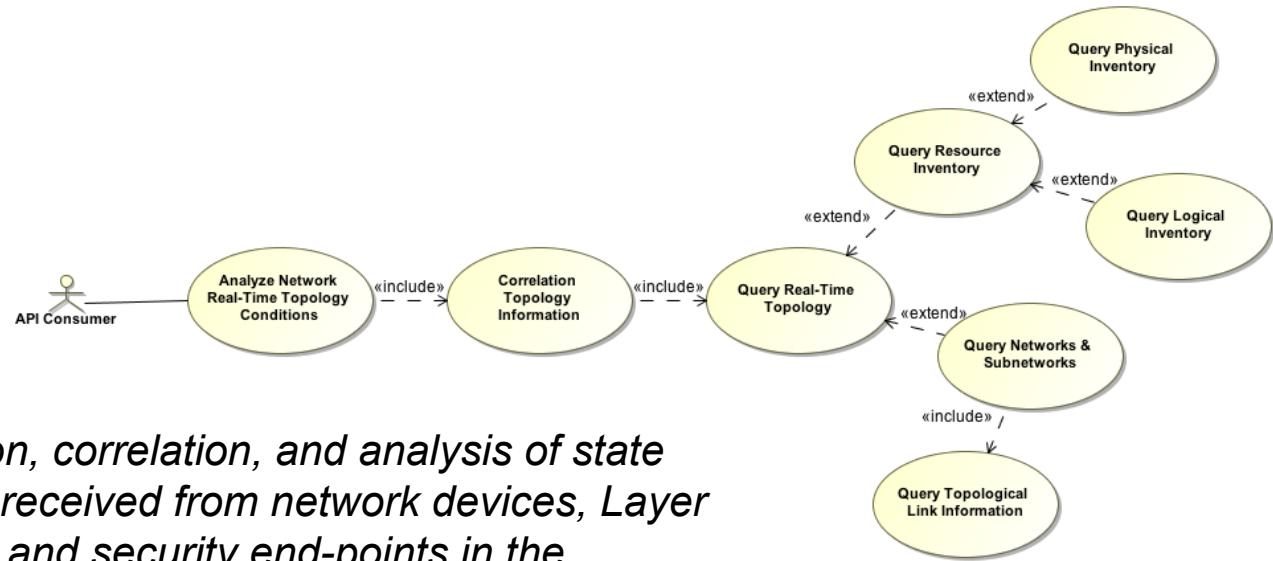
*The collection, correlation, and analysis of state information, received from network devices, Layer 4-7 devices, and security end-points in the network, will provide a view of the overall performance of a network. With the understanding of how the network is performing, we can plan network upgrades, downgrades and determine the optimal placement of network services and workloads.*

# Real Time Security Analytics



*The collection, correlation, and analysis of state information, received from network devices, Layer 4-7 devices, and security end-points in the network, will provide a view of the security posture of a given infrastructure. This informed view of the security state of the network should be able to influence actions to be taken to reduce the security threat.*

# Real Time Topology Analytics



*The collection, correlation, and analysis of state information, received from network devices, Layer 4-7 devices, and security end-points in the network, will provide a view of the network architecture. With the understanding of how network devices are connected to each other, we will have an informed view of the impact of network changes or outages.*



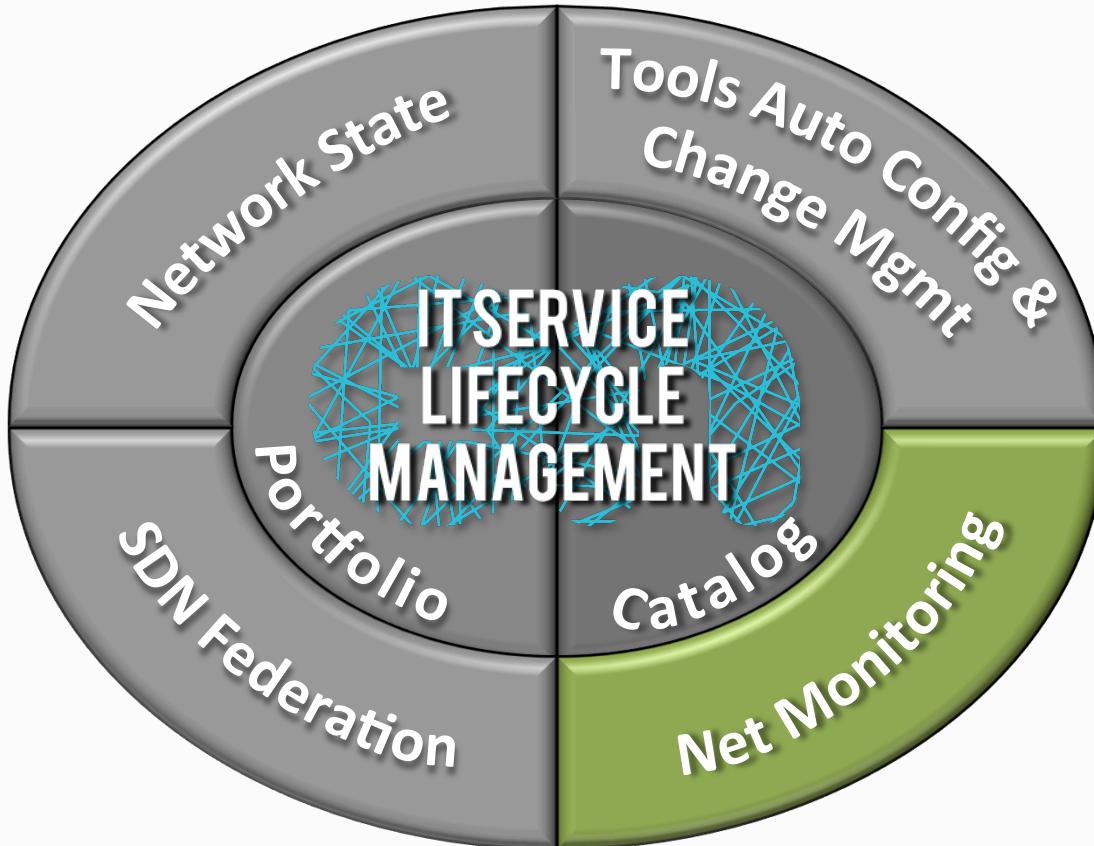
# Network State Topology Analytics Demo

Jonathon Lundstrom, Nuage Networks



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# ONUG Service Lifecycle Management Automation Framework

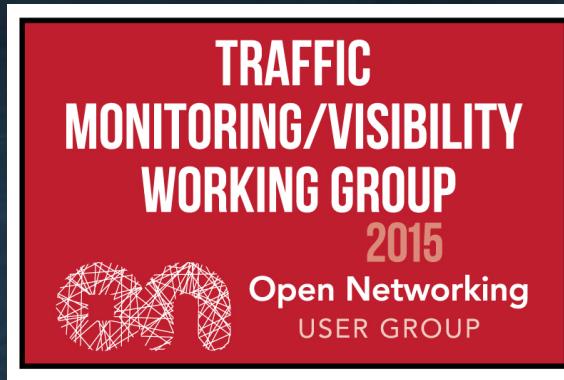


# Traffic Monitoring/Visibility Working Group Panel

Aryo Kresnadi, FedEx

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# Traffic Monitoring/ Visibility (Phase 2 – Feature Verification)

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## Chairman:

- Aryo Kresnadi (FedEx)

## Test Organizer:

- Pierre Lynch (Ixia)

## Working Group Members:

- Howard Wang (Bank of America)
- Traffis Griffin (FedEx)
- David White (Institute of Tech, Tallaght, Dublin)
- Silke Lohser (Independent Consultant)
- Jem Pagan (JNK Securities)
- Bob Natale (MITRE)
- Kenneth Miller (Penn State University)
- Dave Greenfield (STAnalytics)
- Sumanth Bopanna (Thomson Reuters)
- Sean Wang (University of British Columbia)
- Zakir Mohideen (Visa)
- Phil Hattwick (Wellington Management)

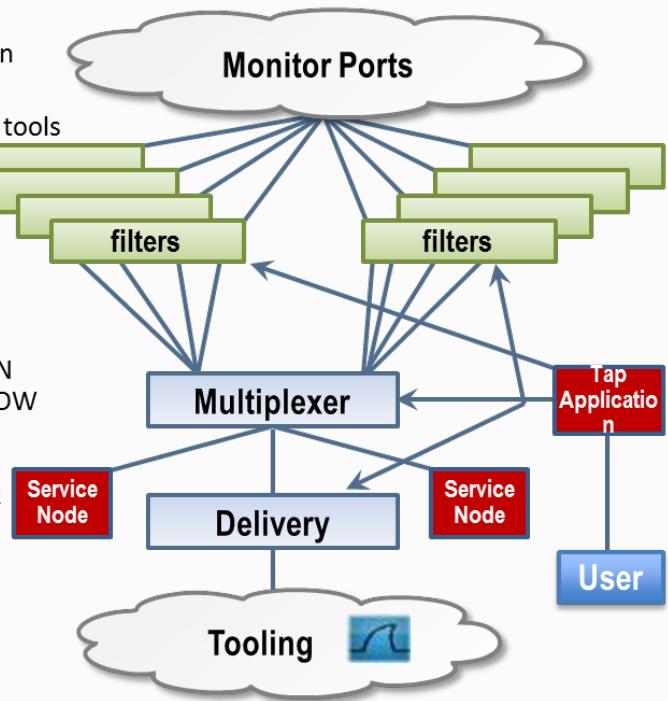
## Working Group Members/Vendors:

- Dominic Cafarelli (Gigamon)
- Shehzad Merchant (Gigamon)
- Sunay Tripathi (Pluribus)
- Marco Pessi (Pluribus)
- Dario David/Cary Wright (Ixia)
- Hansang Bae/Charles Kaplan (Riverbed)
- Matthew Williamson (vArmour)
- Matt Gwyther/Sanch Datta (FatPipe)

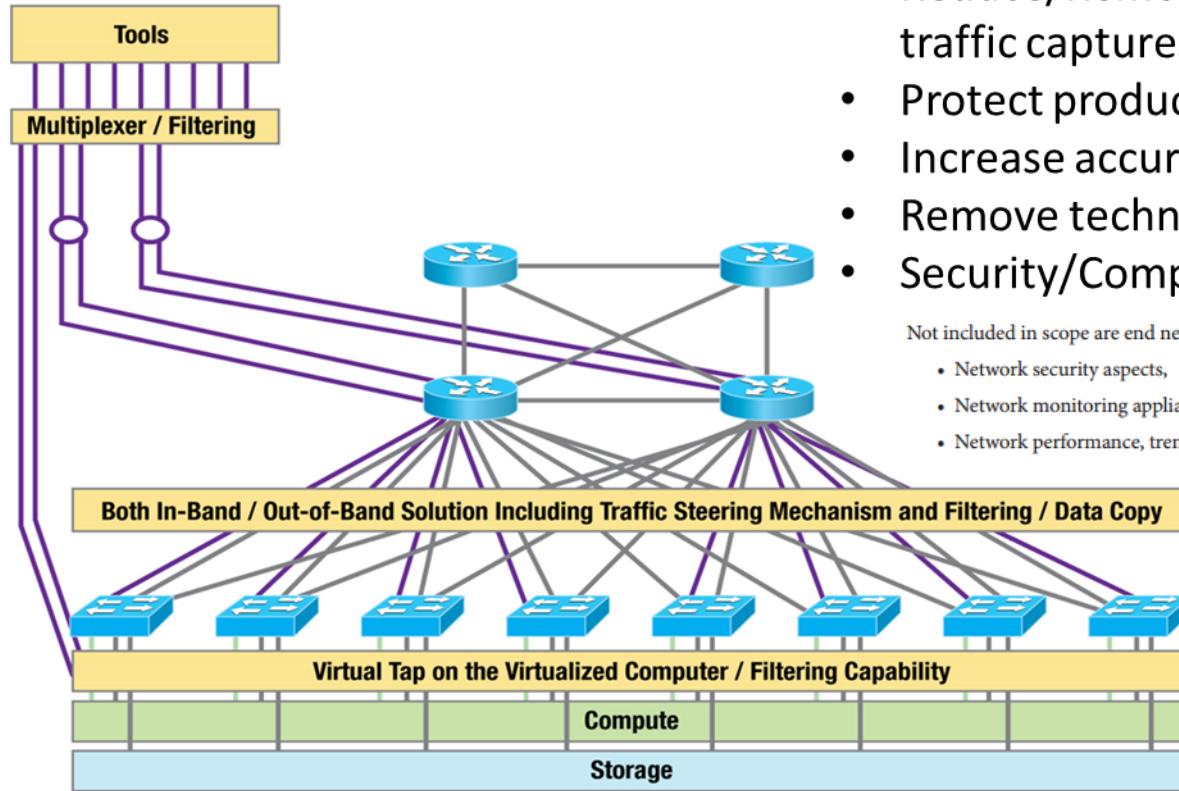


# Refresh Memory -- Traffic Monitoring/Visibility

- **Problem Being Solved:** Over & Underlay Traffic Filtering/Steering
  - Allows for highly customizable data capture and copy based on header and DPI matches
  - Automated/flexible traffic steering capabilities to monitoring tools
  - Limited SPAN/monitor port capacity on network switches
  - Polling schemes don't scale
  - Lack of network traffic/flow visibility usage trends
  - Lack of scale: need visibility into 1,000s of flows
- **Open Networking Components:**
  - Open API and Controllers + SDN Tap application provides SPAN functionality on arbitrarily large number of switch ports + SFLOW
  - White box networks to aggregate SPAN ports
- **Gap:** Shadow network. Can't monitor without big data network analytics, information visibility.
  - Providing all information about network infrastructure plant
- **Benefits:** Over & Underlay Traffic Monitoring, Steering
  - Business unit self service
  - CapEx/OpEx relief
  - Network/traffic/flow visibility



# Desired Architecture



- Reduce/Remove the proliferation of traffic captures tools
- Protect production traffic
- Increase accuracy
- Remove technology limitation
- Security/Compliance

Not included in scope are end network design nor considerations regarding:

- Network security aspects,
- Network monitoring appliances for storing/processing traffic itself, and
- Network performance, trending and analysis.

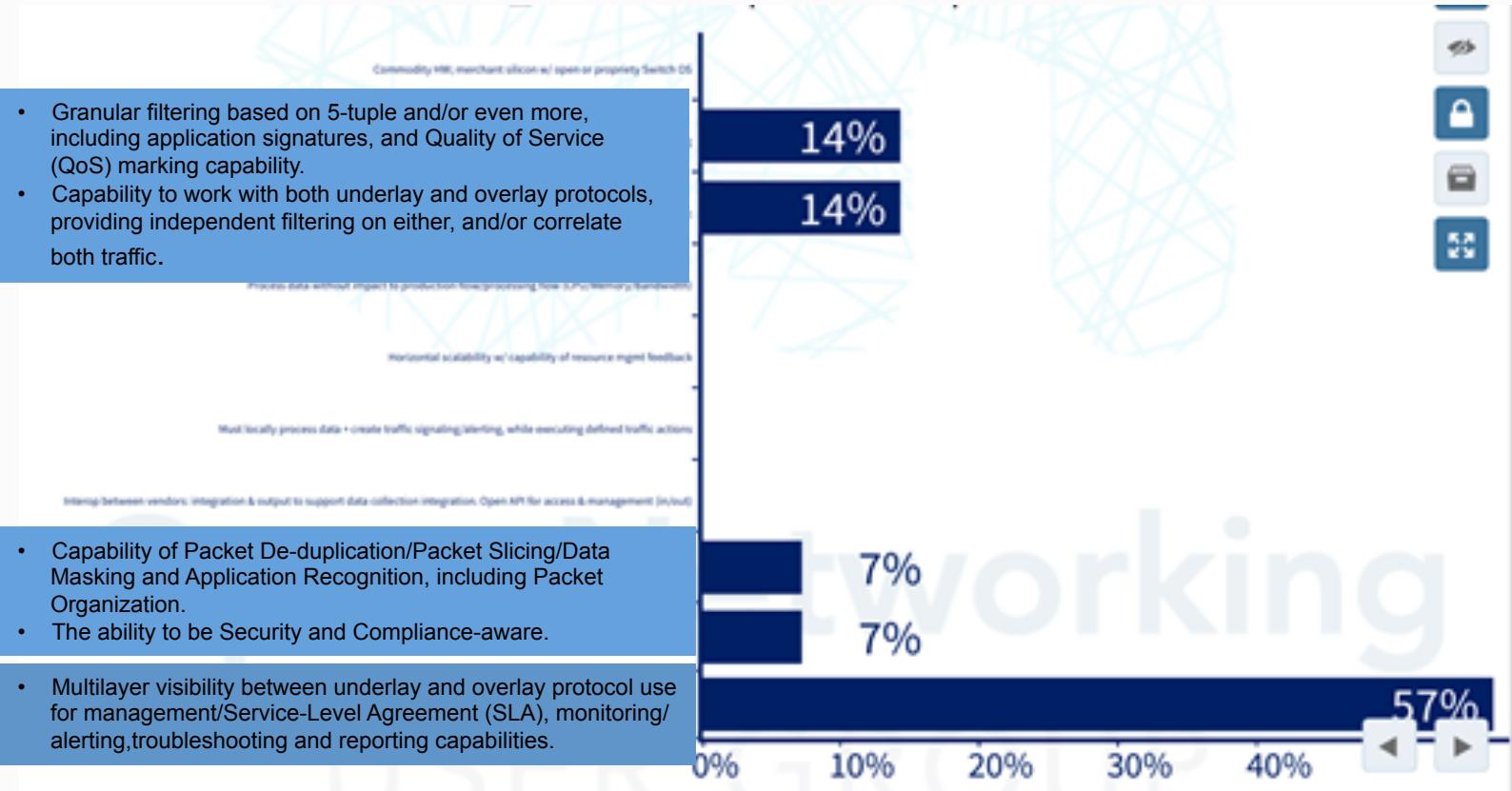
# Top 10 Requirements

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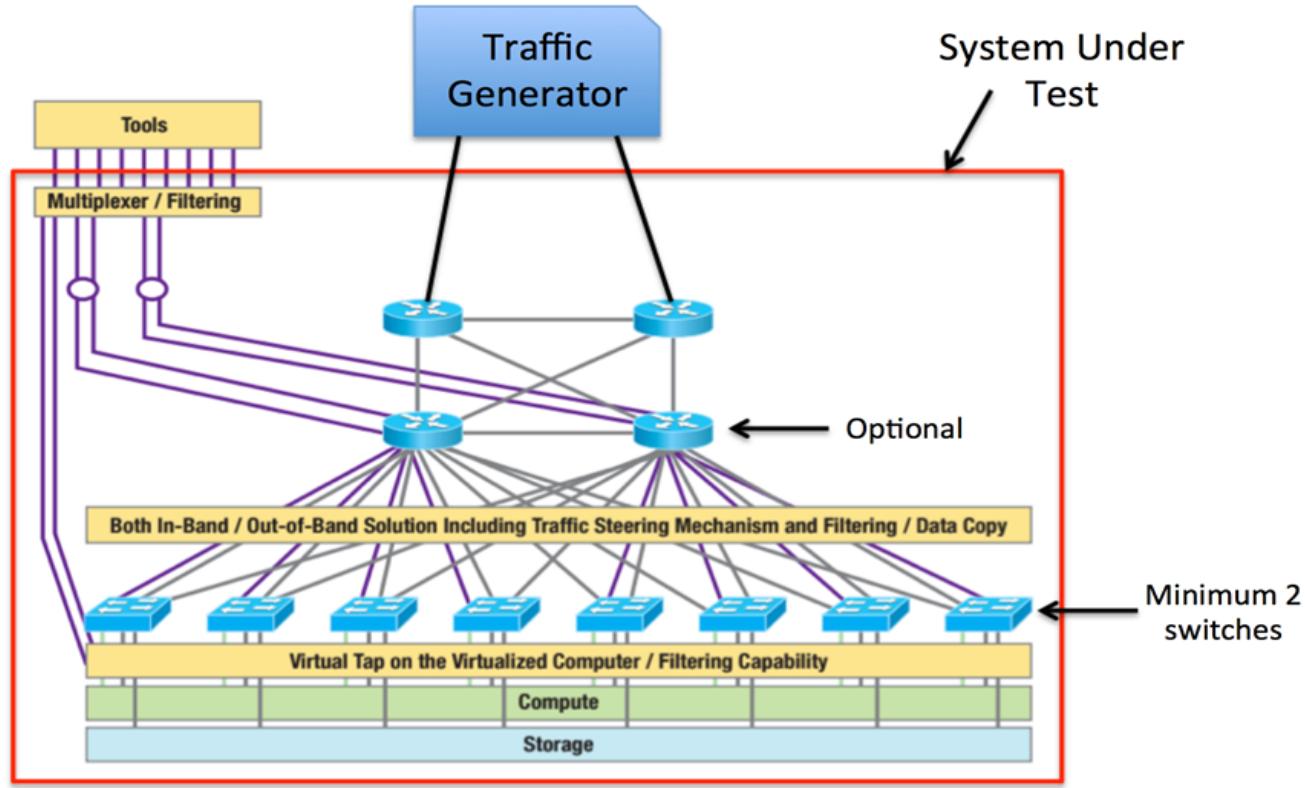
1. Commodity hardware based upon merchant silicon with either an open or propriety Switch OS.
2. Granular filtering based on 5-Tuple and/or even more, including Application signatures, and QoS marking capability.
3. Capability to work with both underlay and overlay protocols, providing independent filtering on either, and/or correlate both traffic.
4. Process data without impact to production flow/processing flow (CPU/Memory/Bandwidth).
5. Horizontal scalability with the capability of resource management feedback.
6. Must be able to locally process data and create traffic signaling/alerting, while executing defined traffic-based actions.
7. Interoperability between vendors: integration and output that will support data collection integration. Open API for access and management (in/out).
8. Capability of Packet De-duplication/Packet Slicing/Data Masking and Application Recognition, including Packet Organization.
9. Must be **Security and Compliance aware**.
10. Multilayer visibility between underlay and overlay protocol use for management/SLA, monitoring/alerting, troubleshooting and reporting capabilities.



# Recap on the Prioritization of the Requirement



# Validation Test Setup



## What is Next

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1. Vendor/Community review the test plan
2. Will jump start again the WG to be ready for ONUG Spring



# Q&A Panel

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