



# ATIS NFV Forum Background

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*January 13-14, 2016*

# Overview

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- Background
- NFV Forum Mission
- NFV Forum Differentiation
- Deliverables
- Use Cases
- Technical Overview of Current Work
- Architecture
- Progressing Inter-Administrative Domain NFV

# Background

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- ATIS' NFV Forum focuses on advancing industry solutions to enable new business models, accelerate time-to-market and improve efficiency.
  - Participants represent close to 40 companies
- The work is underpinned by addressing business implications and future considerations in the following areas:
  - Use cases
  - Service catalog
  - Multi-administrative NFV technical requirements

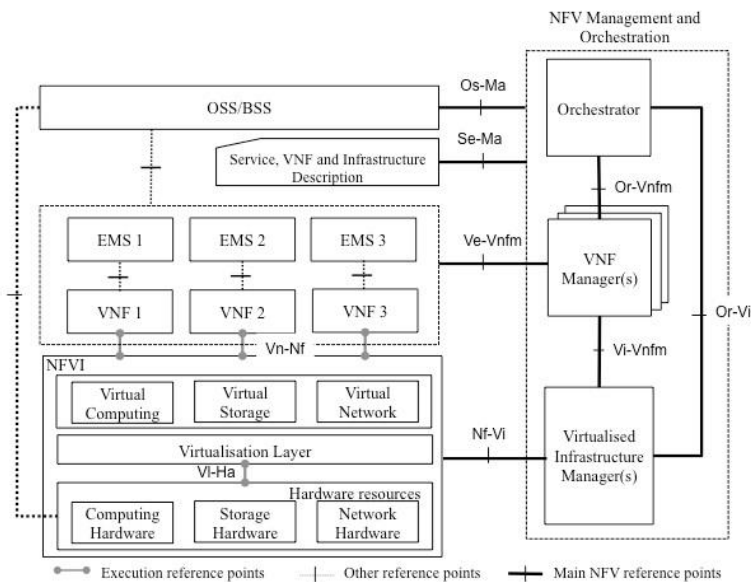
# NFV Forum Mission – Objectives

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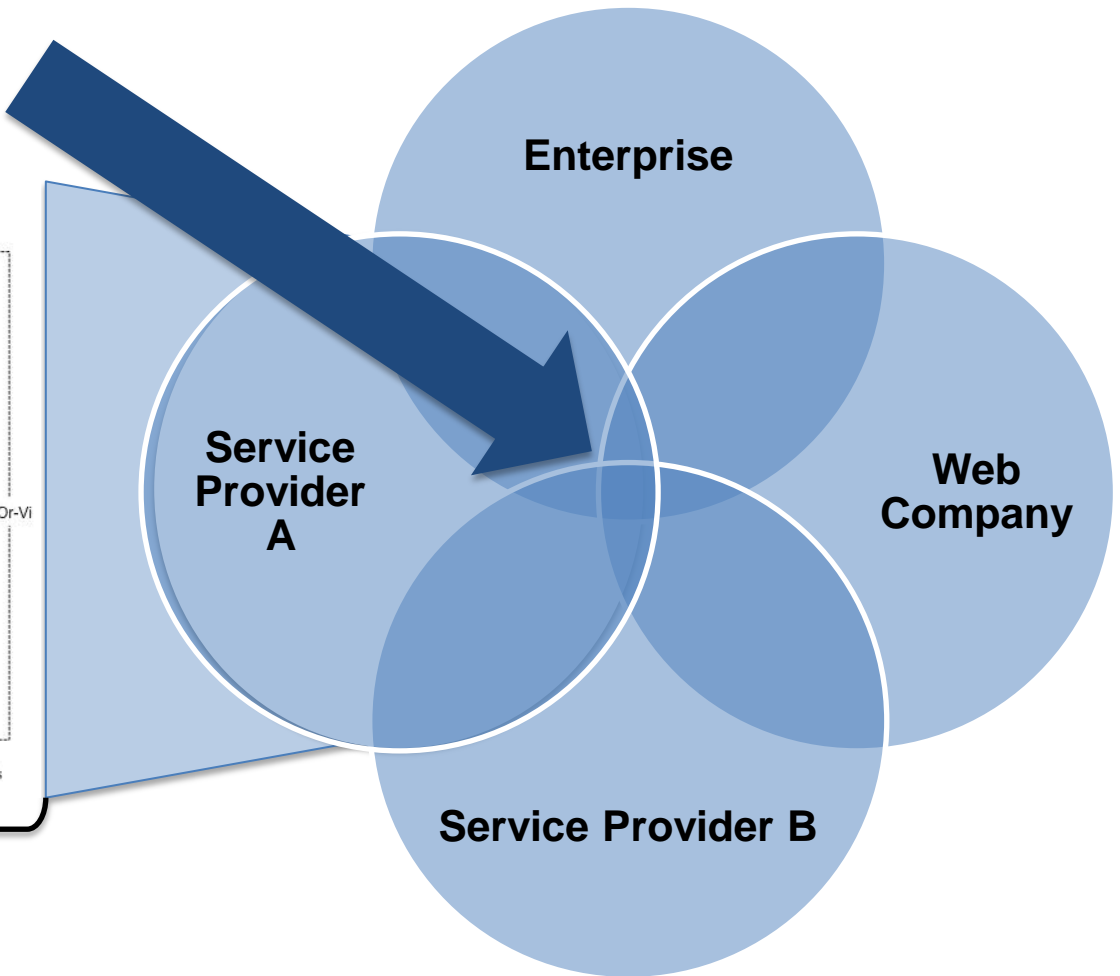
1. Define priority use cases and associated architecture and requirements that emphasize the benefits of NFV in a multi-administrative domain environment.
  2. Establish a common catalog of service descriptions that can be instantiated between service providers: runtime, network, and supporting functions.
  3. Specify the service advertising and discovery mechanisms that allow companies to find and incorporate these services.
  4. Incorporate service creation tools such as service chaining for construction of new, aggregate business applications and models.
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# NFV Forum – Differentiation

ATIS NFV Forum is focused on NFV-enabled services between administrative domains.



ETSI ISG is focused on NFV in a single administrative domain.



# Published Deliverables

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- Published *NFV Forum Use Cases* on May 13, 2015.
  - Technical editor, Laurent Laporte (Sprint)
  - Can be found on the NFV Forum home page:
    - <http://www.atis.org/nfv/index.asp>
- Collaborating with industry organizations:
  - ETSI ISG
  - Broadband Forum
  - GSMA
  - MEF
  - TM Forum

# Inter-Administrative Domain Use Cases

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1. Virtual Network Operator (VNO)
  - Seven deployment models represented by service function chains across the VNO, host service provider, and other service providers
2. Cooperative, Cloud-based CDN
  - The network operator provides a tenant environment where the CDN provider has access to the network operator's bearer plane and policy interfaces
3. Virtualized Content Delivery Across Multiple Access Domains
4. Roaming (traffic control in local breakout situations)

# Inter-Administrative Domain Use Cases

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5. Efficient Home-Routed VoLTE Roaming
  - Two models based on 3GPP home-routed architecture including instantiation in a visited network and a third party data center
6. Enterprise Voice/Collaboration Arrangements
  - The service terminates mobile traffic through an Access Point Name (APN) VNF to an enterprise VPN solution
7. Enabling Service Function Chains with Third Party VNF
  - Service Function Chaining of VNFs across network function service provider and network service provider
8. Enabling Third Party VNF Applications
  - An extension of #7 to allow for third party developers



# Use Case Conclusions

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- Inter-administrative domain NFV is highly relevant to today's needs of wireline, wireless, cable and enterprises.
  - Delivers new business opportunities
- Other current NFV standards activities don't address the inter administrative-domain aspects of NFV:
  - Discovery and selection of service functions in remote ADs
  - Inter-AD billing, management, security
- Both consumer and provider administrative domains benefit from a clear, unambiguous, structure to support inter-administrative domain service creation.

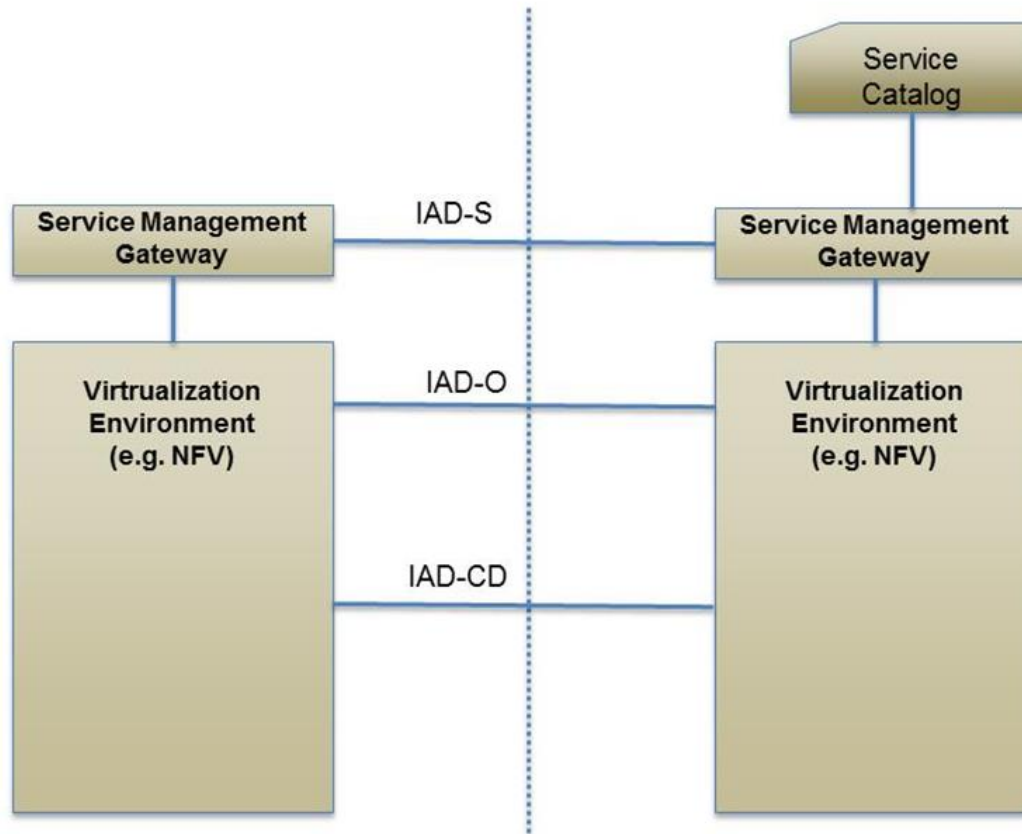
# Technical Overview of Current Work

- Objective: create framework to allow commercial operation of inter-administrative domain NFV.
- Technical requirements:
  - Develop consumer/producer model to frame technical/business relationship
  - Address inter-administrative domain support for Software-aaS, Infrastructure-aaS and Platform-aaS
  - Integrate lifecycle management and orchestration
  - Consider security implications
- Service Function Catalog:
  - Enable service discovery
  - Support automation of discovery and initiation

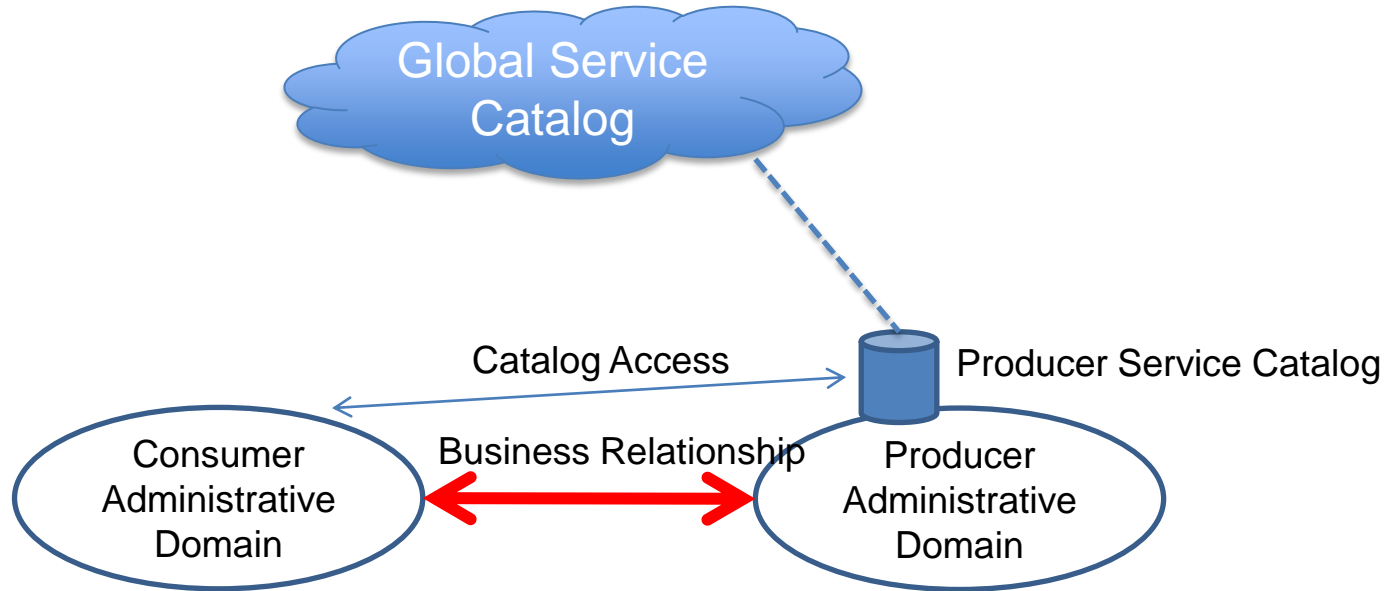
# Architecture Diagram

Consumer Administrative Domain

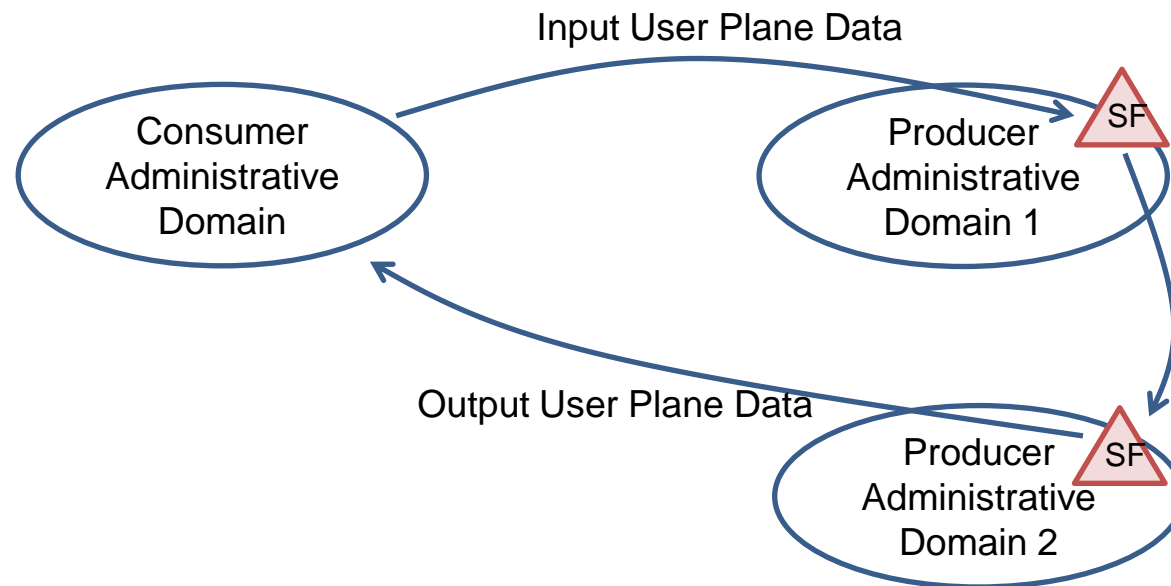
Producer Administrative Domain



# Service Catalog Access



# Service Function Chaining



# Next Steps

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- Technical requirements:
  - Further elaborate on management and administration of services
  - Finalize security assessment
  - Target completion early 2016
- Service function catalog:
  - Agree to high-level architecture
  - Define catalog functions and contents
  - Target completion 2Q 2016
- Industry communications:
  - Continue to drive alignment with other organizations

# Progressing Inter-administrative Domain NFV

- Inter-administrative domain NFV is acknowledged as an industry priority:
  - Foreseen as key to future wireless networks (including 5G) by GSMA and other organizations
  - Addresses issues of scaling and economy of networks (e.g., CDNs, content delivery, SaaS explored in use cases)
- ATIS NFV Forum is today the leading systematic framework to support inter-administrative domain NFV:
  - Elements emerging in ETSI ISG NFV and TM Forum do not address the whole system view
- ATIS is collaborating with industry organizations to commercially enable inter-administrative domain NFV:
  - Encouraging input and engagement to best align technology and timing

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## **Supplemental Information**

- **ATIS NFV Forum Focus Areas**
- **ATIS NFV Forum Use Case Details**
- **ATIS Overview**



# Focus Area – Use Case Development

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Define priority use cases that emphasize the benefits of NFV in a multi-administrative domain environment (including enterprise-to-provider).

- Analyze use cases in a multi-administrative domain context (and at the next level of detail) to identify requirements and an architectural framework for these scenarios
- Consider different ways the use case could be realized, which will effectively identify various architecture options to implement the use case
- Capture the requirements (e.g. service descriptions, service creation) associated with each architectural option

# Focus Area – Service Function Descriptions

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Establish a common catalog of service function descriptions that can be instantiated between administrative domains: runtime, network, and supporting functions.

- Initially this will be a tentative list of service enablers to analyze use cases
- Build on the ETSI ISG service descriptors and other models where applicable (e.g., vendor models, enterprise IT models)
- Select/define one model for analysis and populate it with service enablers required for the use case assessment

# Focus Area – Service Creation

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Incorporate service creation tools such as service chaining for construction of new, aggregate business applications and models.

- At least initially, work item will focus on analysis of use cases in a multi-administrative domain environment.
- Incorporate service networking into the use case implementation to identify application connectivity for the service chain/forwarding graph.
- Analysis will feed requirements back into the service descriptions, and also generate requirements for multi-administrative domain NFV, and associated architecture(s).

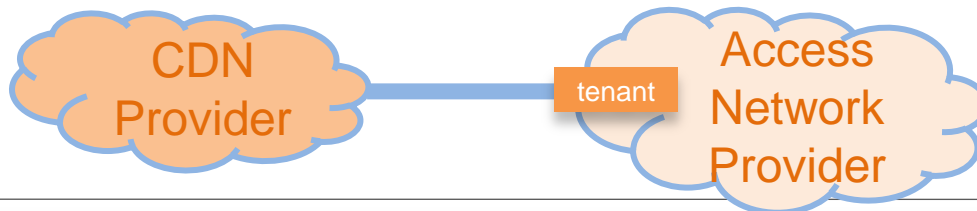
# Virtual Network Operator Use Case

- Virtual network operations provides a lower barrier to market entry for entities that do not have sufficient capital and/or interest available with which to build and operate a network.
- Businesses wishing to offer network services may instantiate service by virtualizing some or all of the necessary network functions in a tenant domain with the balance being provided by a “physical” network operator.
  - Overall capex and opex may be substantially lowered by the use of COTS h/w and DevOps tool sets
  - A resultant greater flexibility in service creation and reduction in lifecycle thus promotes ecosystem expansion



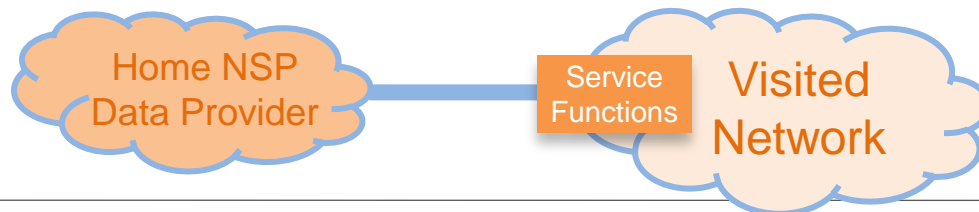
# Cooperative, Cloud-Based CDN

- Network Service Provider (NSP) opens a tenant environment to the CDN provider to enable content delivery at the access edge.
- CDN Provider has relationships with many content owners and acts as an intermediate for the NSP
- NSP can open selected APIs to the tenant to more easily exchange information and control/policy directives to create/manage new service capabilities such as:
  - Exchange of real-time user location data along with traffic information to inform applications of network congestion.
  - Cell site identification
  - Subscriber identification
  - Respond to Network Conditions with Adaptive Image Compression
  - Application awareness using an operator asset (e.g. PCRF) to accelerate both fixed and mobile applications with critical performance needs (e.g. subscriber specific QoS enablement)



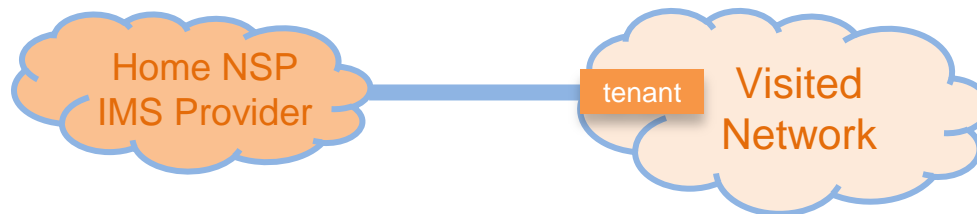
# Local Breakout Data Roaming

- Virtualization affords the possibility for service providers to offer continuity of value-added data services (e.g., parental controls) when subscribers roam to other networks.
  - Continuity of value-added data services while roaming is currently non-existent and a source of customer dis-satisfaction
  - With the advent of virtualization, the “home” service provider instantiates virtualized network functions in the “visited” service provider’s tenant domain
  - When roaming to the “visited” service provider’s network, the subscriber now experiences service continuity while outside the “home” network
- Considerable efficiency savings over home-routing traffic while preserving full home service set. Lower latency experience possible for the user.



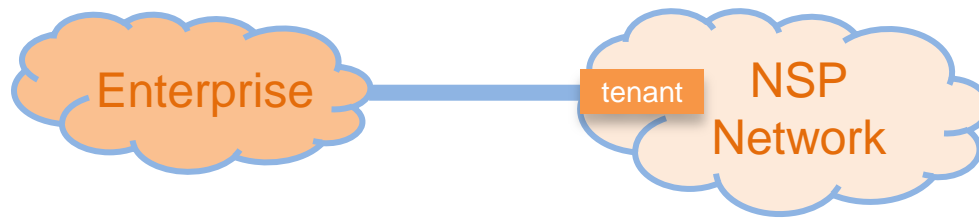
# Efficient Home Routed VoLTE Roaming

- Home Network Service Provider (NSP) commonly has a SIP session interface to the visited network
  - Calls are terminated and handled by the visited P-CSCF on the IMS APN
  - Emergency calls are always handled by the local/visited network as there is a separate APN
- However, this may preclude certain “home” features that require capabilities on the P-CSCF or associated media processing elements (so called SBC functions).
- But backhauling the IMS data sessions to a home based P-CSCF and associated media functions can cause excessive delay
- SOLUTION: enable a tenant environment in (or close to) the visited network to instantiate the home NSPs P-CSCF and associated media processing elements.



# Enterprise Voice/Collaboration Arrangements

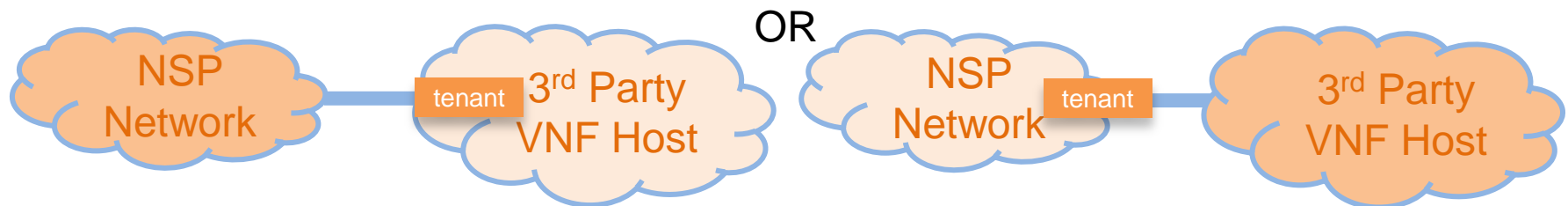
- With the increasing use of VoIP mobile clients and the introduction of VoLTE, Enterprises are better able to offer mobile enabled corporate collaboration services
- Real time based collaboration services can benefit from NSP QoS capabilities.
- SOLUTION: enable a tenant environment in (or close to) the NSP to instantiate the Enterprise collaboration/VoIP real time media functions
  - NSP can more easily avail QoS APIs to the tenant environment.
  - Can be coupled with today's NSP VPN services (particularly when a separate Enterprise APN is enabled).





# Virtual Network Functions as a Service

- An NSP may need a service that can be provided more efficiently by a third party (e.g. Authentication services, Security services, Parental control ) or
- Third party application provider wants to instantiate a function in a service providers network to get better access to APIs and other capabilities or for performance
- SOLUTION: enable a tenant environment that allows companies to host their functions for better scaling, flexibility, velocity or proximity to users.



# ATIS NFV Forum Participation



NFV Forum participants include: ADTRAN, Alcatel-Lucent, Applied Communication Sciences, AT&T, Integra, BAE Systems, Bell Canada, Cavium, CenturyLink, Cisco, Comcast, Cox, Ericsson, Harris Corp, Hewlett Packard, Hitachi, Huawei, iconectiv, Intel, Juniper Networks, Motorola Solutions, Neustar, Nexius, Nokia Networks, Oracle, Qualcomm, Rogers, Sprint, T-Mobile, TDS, TELUS, Viavi, Verizon, XO Communications

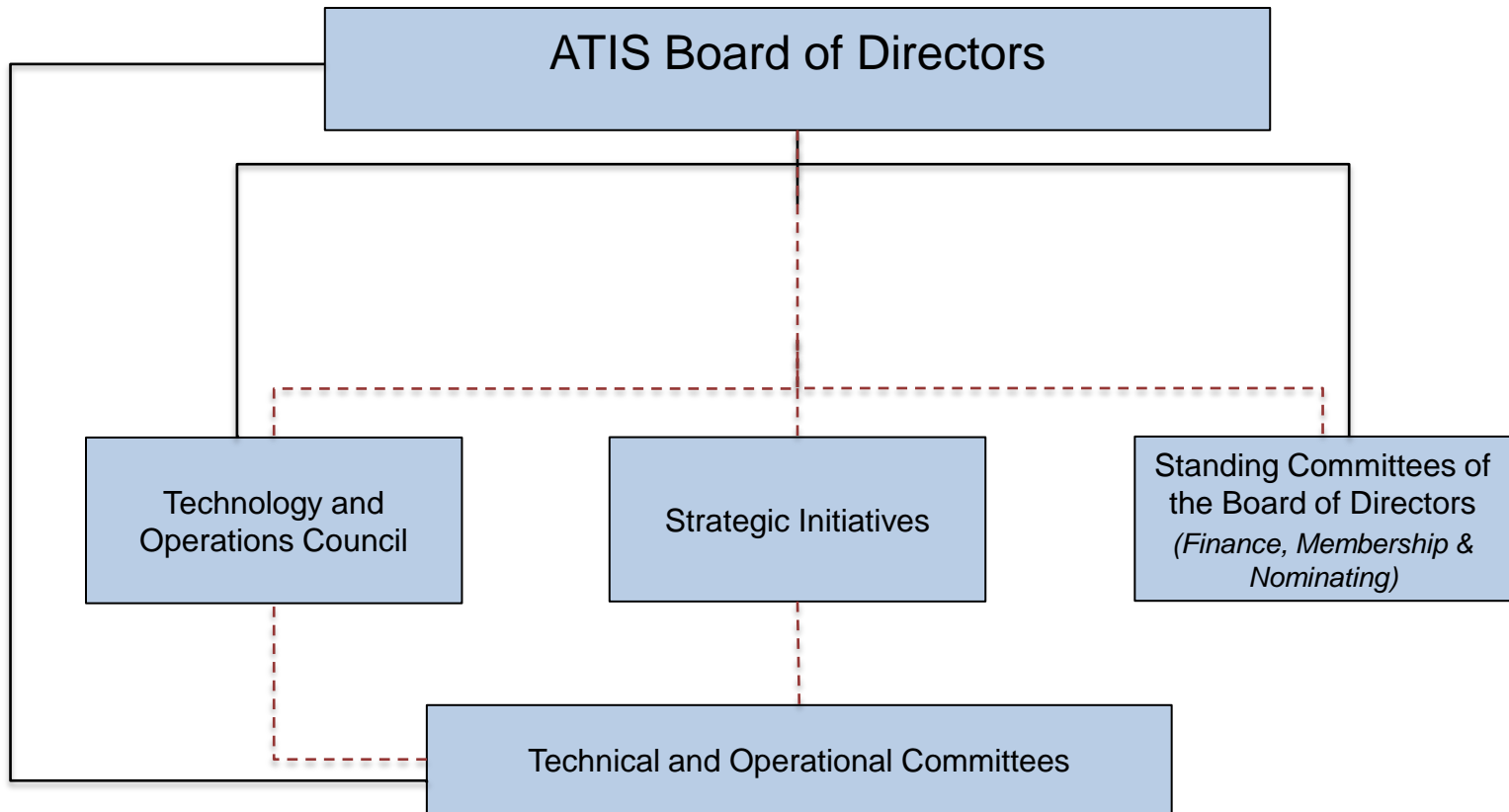
# ATIS in Brief

## Alliance for Telecommunications Industry Solutions (ATIS):

A leading ICT organization with more than 30 years experience working with member companies to define, address and advance technology solutions and standards to support the timely roll-out of new products and services.



# ATIS Structure and Governance



# ATIS Board of Directors

## Board of Directors:

Executive-level Board defines the strategic vision and technology priorities to advance members' business needs.



## Board Officers:



**Chair of the Board**  
**Andre Fuetsch, AT&T**  
SVP - Domain 2.0  
Architecture & Design



**First Vice Chair**  
**Joseph Hanley, TDS**  
SVP, Technology, Services  
& Strategy

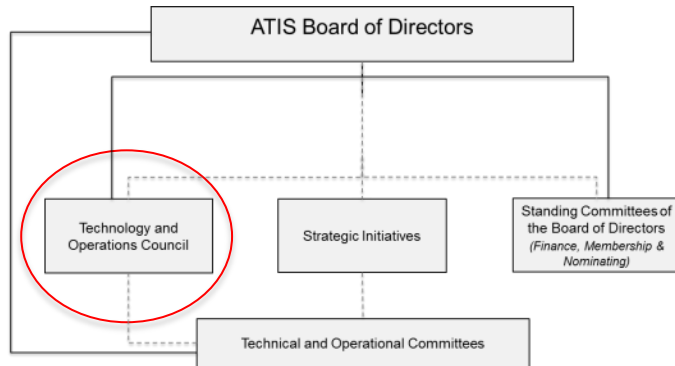


**Treasurer**  
**Kelly Ahuja, Cisco**  
SVP, Service Provider  
Products & Solutions



**Secretary**  
**Sue Spradley, Viavi**  
SVP & GM, Business Operations  
and P&L, Network and Services  
Enablement

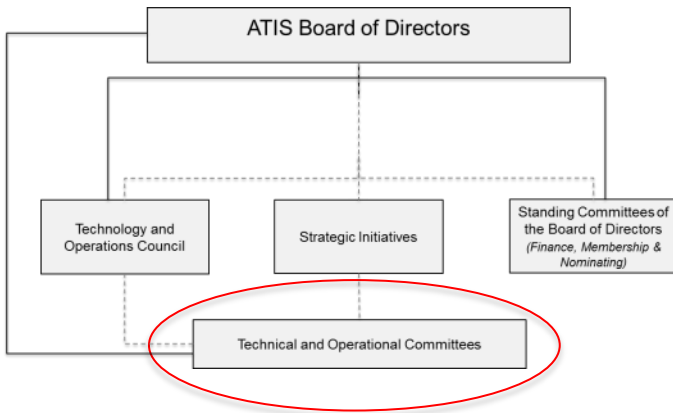
# ATIS Technology and Operations Council



The TOPS Council undertakes important strategic initiatives to meet the industry's long-term technology needs and achieve member business objectives. Priorities are developed, analyzed and studied, with output developed in the form of recommendations on a path forward. Current projects include:

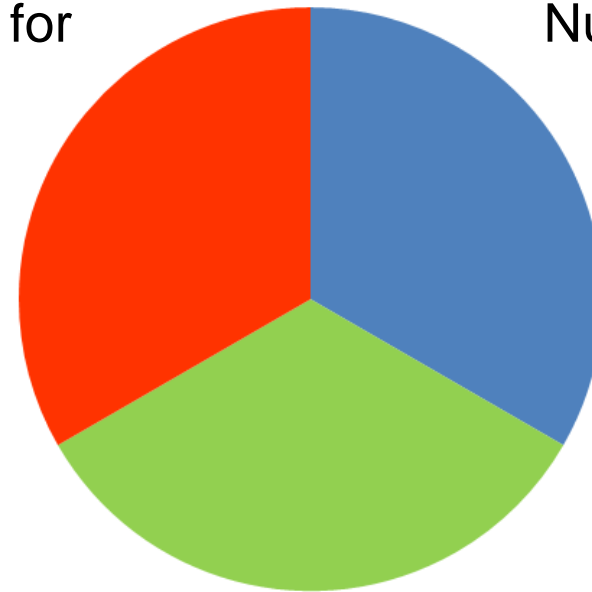
- Calling Party Anti-Spoofing; *Leaders: AT&T, Cox, Verizon Wireless*
- Intelligent Peering, with a focus on DDoS attack mitigation; *Leader: TELUS*
- oneM2M Open Source Community; *Leaders: AT&T, Qualcomm*
- WiFi Emergency Calling; *Leader: AT&T, Qualcomm*
- Neutral Host; *Leader: Cisco*
- Number Assignment/Distributed Registry; *Leader: Comcast*
- Testbeds Focus Group; *Leaders: CenturyLink, iconectiv*
- WebRTC Signalling Server; *Leader: Comcast*

# ATIS Technical and Operations Committees and their Focus Areas



Architecture and Services:  
Framework for Success

Information Infrastructure:  
Numbering & Metadata



Operational Excellence:  
Manage Implementation and Risk

# ATIS' Technical and Operations Committees: Typical Issues and Output

## Architecture and Services

- Wireless, Fixed, and Cable Architecture and Interconnection (IP-NNI)
- Emergency Services (including Multimedia and SMS)
- Lawful Intercept
- Communications APIs

## Information Infrastructure

- Telephone Numbering Evolution
- SMS/800 Number Administration and Evolution
- Inter-provider Ordering and Billing
- Inventory Management

## Operational Excellence

- Next Generation Interconnection and Interoperability
- Network Reliability (in conjunction with FCC Network Outage Reporting System)
- Best Practices with Implementation Guidelines



# ATIS Detail

