



- 1. How do the concepts fit together in IETF**
- 2. Top down versus bottom up /Top-bottom interplay**
- 3. What deliverables do we envisage ?**
- 4. Next Steps towards IETF102**

**COMS Problem Statement: draft-geng-coms-problem-statement-04 (work in progress)**

**COMS Use Cases: draft-qiang-coms-use-cases-00 (work in progress)**

# Recap from IETF 99 & 100 - Clarifications

- Network Slicing topics – Standardization high impact but is it **TOO BIG for one WG**  
→ Focus moved to common operation and management of network slicing (COMS)
- Should we work on Management of Network Slices in IETF? (i.e. current Slice-aware work in IETF is bottom-up only / data-plane only)
- **The answer is an absolute YES** - Future business model of network asks for network slicing capability with substantial interoperable management systems.
- The goal is to define/standardise common and inter-operative management single and multiple domain mechanisms / protocols for adoption in a system with heterogeneous network infrastructures and services functions.

## Clarifications:

- Popularized by activity in 3GPP/ITU-T/ETSI but not a 3GPP/ ITU-T/ETSI-owned concept
- Supporting either backhaul or common Internet/Service Evolution

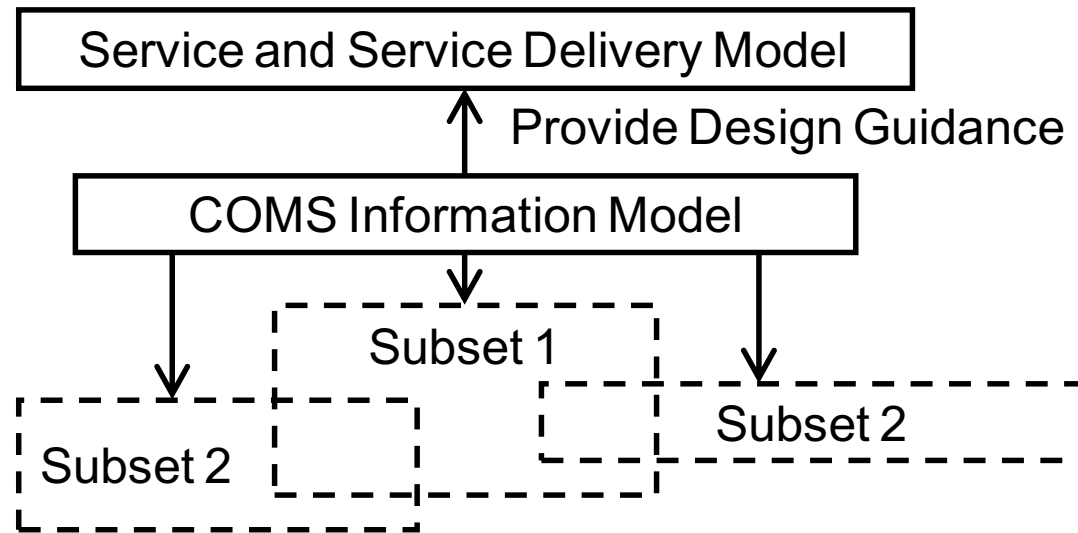
# COMS - Convergence of Top Down and Bottom Up Approach

## COMS designs

-a **Customer Service Interface (CSI)** and a **Service Delivery Interface (SDI)**.

- associated slice- level operations, administration, and maintenance.

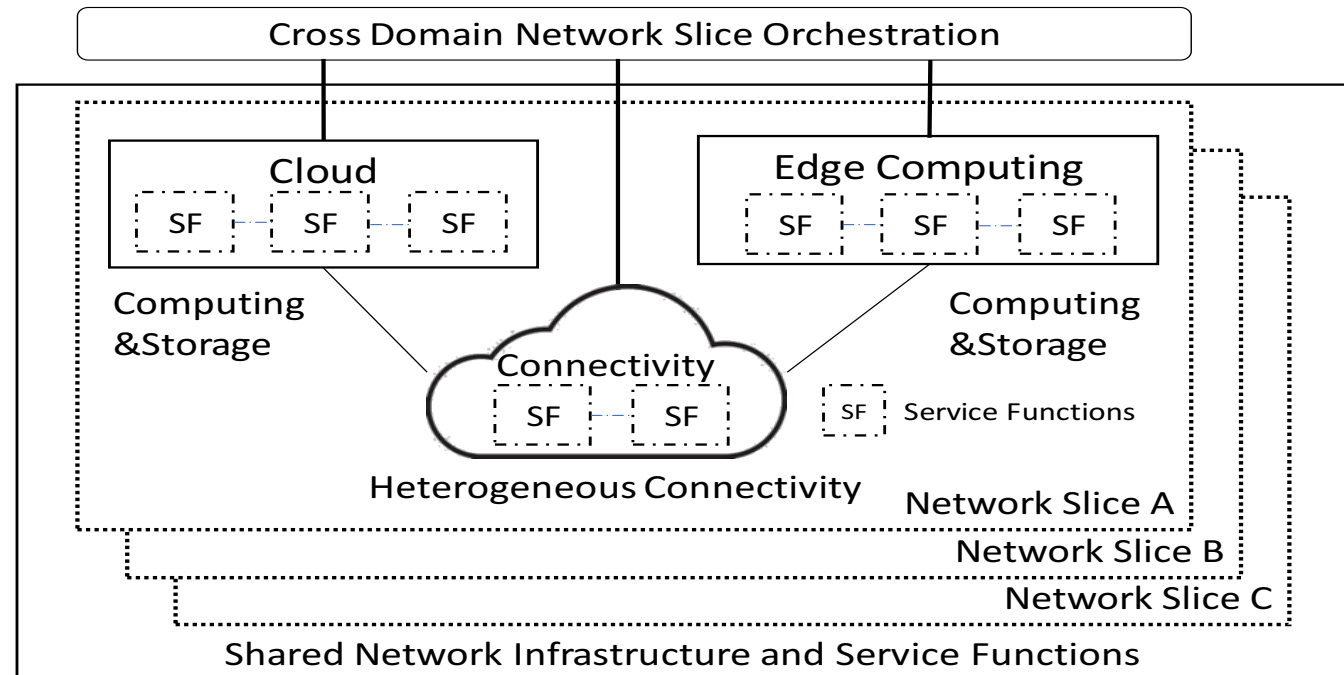
As CSI is translated to SDI in network slice service language, the network orchestrator selects the appropriate technologies and maps the service requests into technology specific configuration models.



**COMS provides guidance for the design of service delivery models and each underlay refers to a subset of this in the information model.**

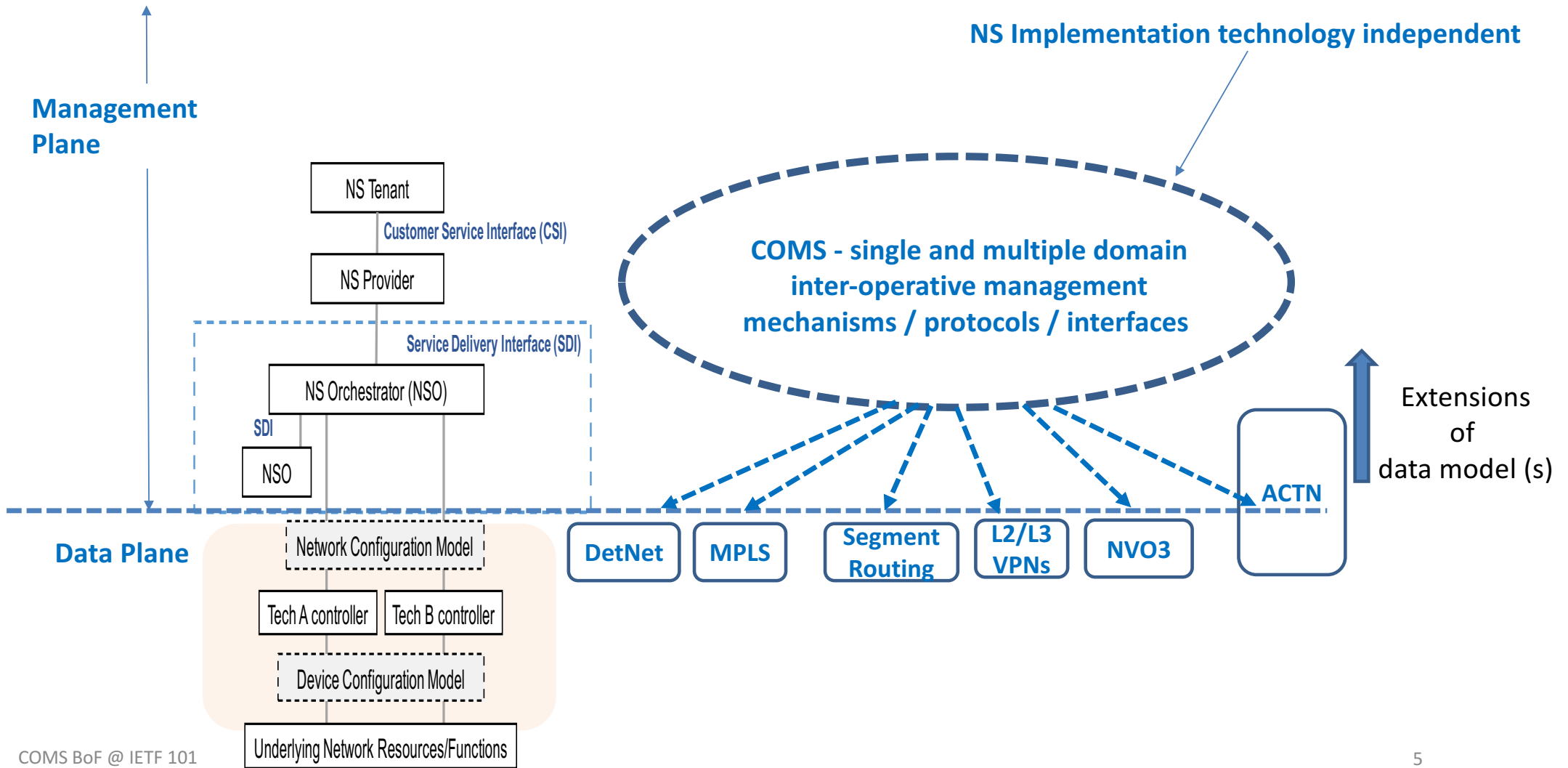
# How underlay technologies fit COMS

**COMS would not attempt to replicate device models and data plane technologies including DetNet, TE-Tunnels, MPLS, Segment Routing VPNs, NVO3, etc.**



**COMS focuses on the cross-domain management of network slices in network infrastructure and service functions.**

# How do the concepts fit together in IETF?



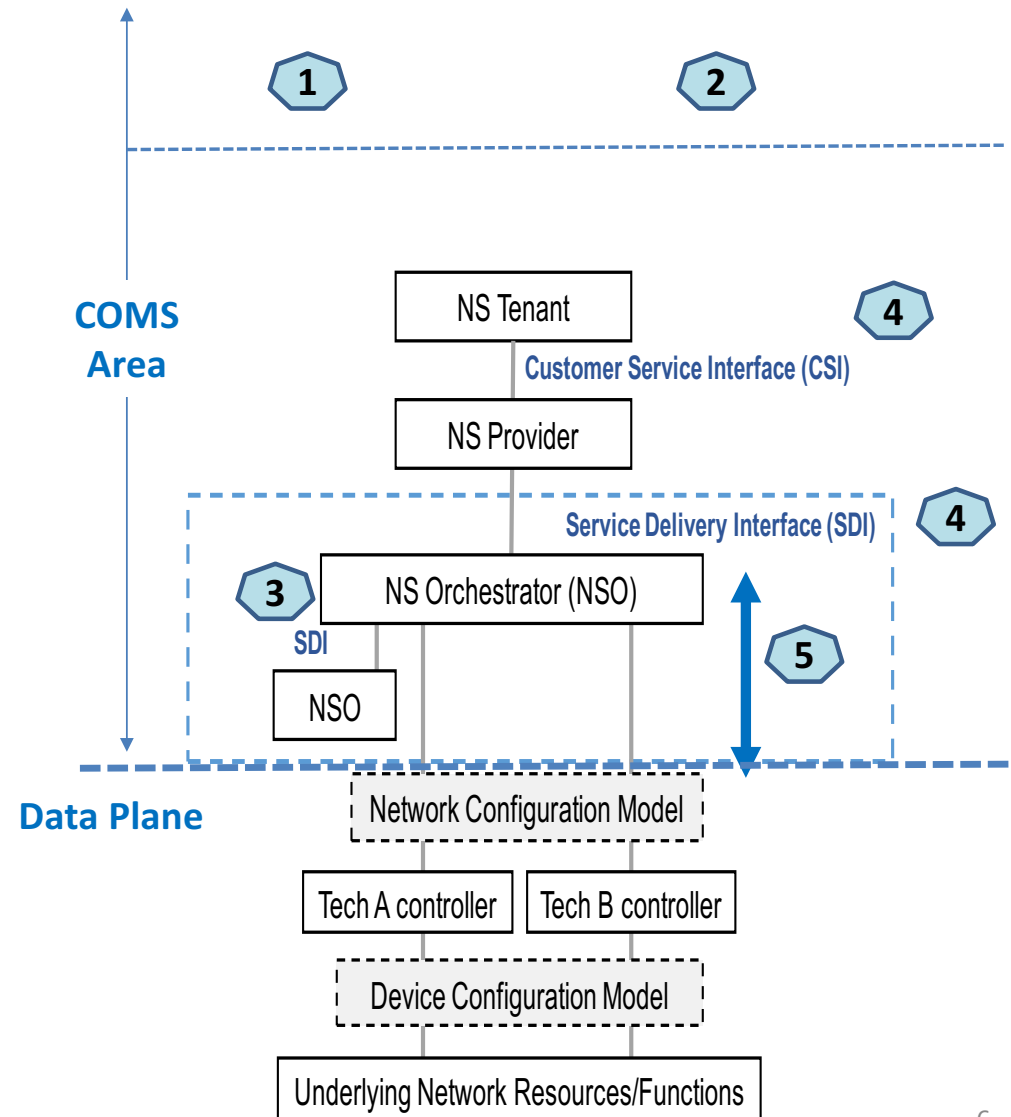
# COMS Deliverables?

The goal is to define/standardise **network slicing common, inter-operative, single and multi-domain management mechanisms** for adoption in a system with heterogeneous network infrastructures and services functions.

COMS would not attempt to replicate device models and data plane technologies.

## DELIVERABLES

1. Problem statement and use cases for management of network slices.
2. Architecture of network slices.
3. Information model(s) and operations for network slices on topics described above in the scope section.
4. SDI and CSI interface specifications and relevant YANG models.
5. Mappings of technology independent network equipment configurations derived from the information model towards specific technologies (coordination with relevant WGs as needed).



# Next Steps & Scope of CSI & SDI specification?

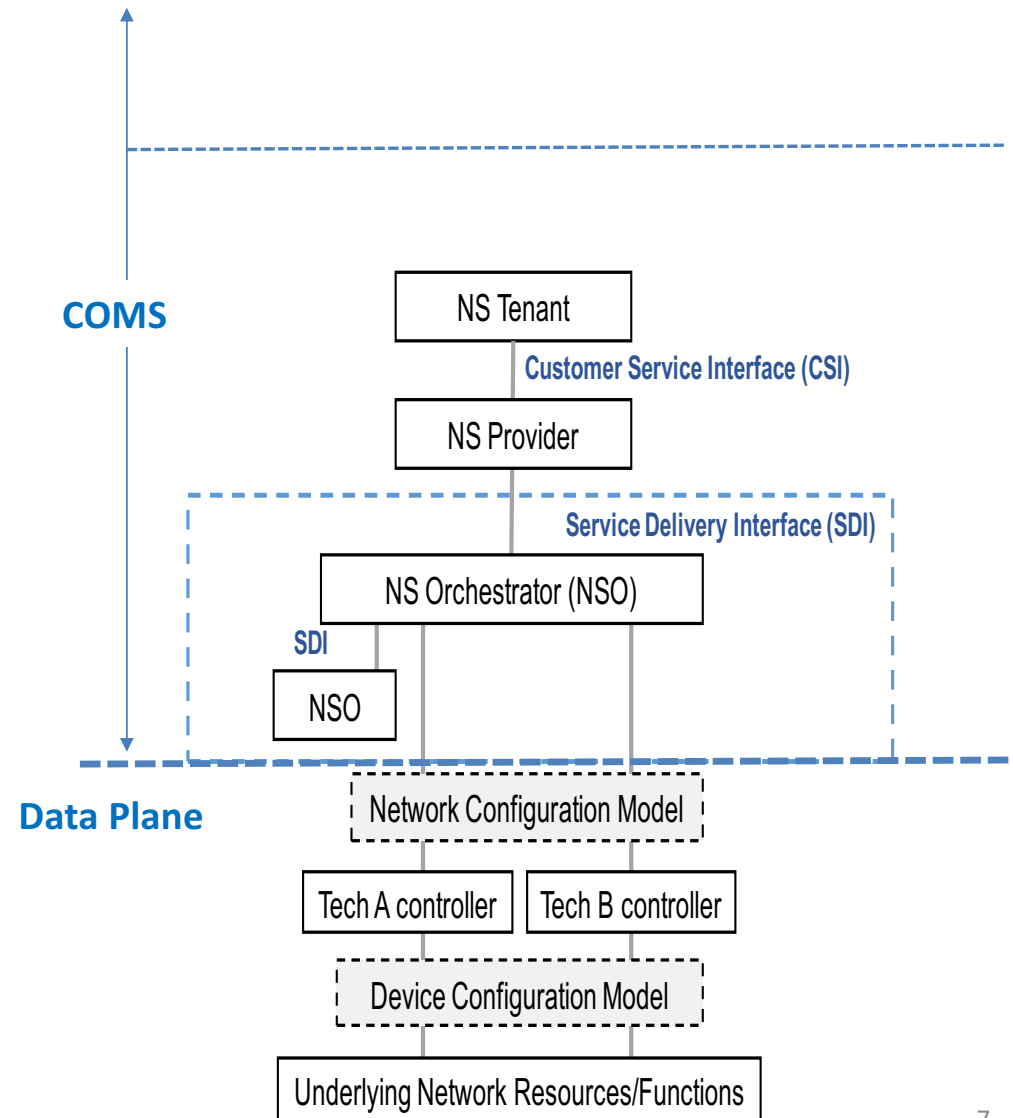
## Suggestions:

### CSI – Customer Service Interface

- Service deployment request
- Network slice tenant in a “NSaaS” environment
- Negotiation cycles with NS provider
- Network slice, subnets and related service functions parameters
- Interface ID, configuration and monitoring
- Extending /using RFC8343 - YANG Data Model for Interface Management and draft-ietf-opsawg-service-model-explained (it is about to be published as RFC8309)

### SDI – Service Delivery Interface

- Triggers slice design and instantiation
- Service on-boarding using orchestration logics
- Slice instantiation /update / subnet
- Based upon relevant data model; Interface ID, configuration and monitoring
- Extending /using RFC8343 - YANG Data Model for Interface Management draft-ietf-opsawg-service-model-explained (it is about to be published as RFC8309)



# Concluding Remarks and Next Steps towards IETF102

- Management of Network Slicing is the Top Emerging Interoperability Impactful Problem at IETF.
- Review and feedback from the BoF @IETF101
- *COMS-centric working items*
  - Update /consolidate 9 existing COMS drafts; Align terminologies among related drafts.
  - Commonly usable data models and interoperability interfaces (SDI, CSI) at several layers of abstraction – including Service delivery model design /Management capability exposure with focuss on E2E and cross-domain

## COMS BoF Proponents

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# Spare Slides

# Clarifications

- **Network Slicing** - A management mechanism that Network Slice Provider can use to allocate dedicated network resources from shared network infrastructures to Network Slice Tenant.
- **Network Slice** - A network slice is a managed group of dedicated network **components** (including both resources and generalized network/service functions) to meet certain network functionality and performance characteristics required by the network slice tenant(s)

Additional viewpoints:

- From a **business point of view, a slice includes** a combination of all the relevant network resources, functions, and assets required to fulfill a specific business case or service, including OSS, BSS and DevOps processes.
- From the **network infrastructure point of view, network slice instances** require the partitioning and assignment of a set of resources that can be used in an isolated, disjunctive or non- disjunctive manner for that slice.
- From the **tenant point of view, network slice instance provides** different capabilities, specifically in terms of their management and control capabilities, and how much of them the network service provider hands over to the slice tenant. As such there are two types of slices:
  - (1) **Internal slices**, understood as the partitions used for internal services of the provider, retaining full control and management of them.
  - (2) **External slices**, being those partitions hosting customer services, appearing to the customer as dedicated networks.
- From the **management plane point of view, network slices refers** to the managed fully functional dynamically created partitions of physical and/or virtual network resources, network physical/virtual and service functions that can act as an independent instance of a connectivity network and/or as a network cloud. Network resources include connectivity, compute, and storage resources.
- From the **data plane point of view, network slices refers** to dynamically created partitions of network forwarding devices with guarantees for isolation and security.

# What resources are /are not in scope of COMS network slicing?

Connectivity	Computing	Storage	Network Function	Others
<ul style="list-style-type: none"> <li>Physical &amp; virtual Topology</li> <li>Bandwidth</li> <li>...</li> </ul>	<ul style="list-style-type: none"> <li>CPU</li> <li>RAM</li> <li>Virtual resources</li> <li>Computing functions</li> <li>...</li> </ul>	<ul style="list-style-type: none"> <li>General storage</li> <li>Storage functions</li> <li>CDN</li> </ul>	<ul style="list-style-type: none"> <li>PNF/VNF including               <ul style="list-style-type: none"> <li>NAT</li> <li>DHCP</li> <li>Firewall</li> </ul> </li> <li>Service Instances</li> <li>Monitors/Management</li> <li>Configuration</li> <li>QoS metrix</li> <li>Automation metrix</li> </ul>	<ul style="list-style-type: none"> <li>ICN</li> <li>...</li> </ul>
<ul style="list-style-type: none"> <li>Network slicing does not have any constraints on what type of resources NSPs may or may not use as part of the network slice creation. This is completely subjected to NSP's policy.</li> <li>COMS endeavors to provide a prototype catalogue of the resource/network functions/services components for network slice creation.</li> </ul>				

# COMS What resources are /are not in the scope?

Connectivity	Computing	Storage	Net Functions
<ul style="list-style-type: none"> <li>• Node</li> <li>• Link</li> <li>• Topology</li> <li>• Bandwidth</li> <li>• ...</li> </ul>	<ul style="list-style-type: none"> <li>• CPU</li> <li>• RAM</li> <li>• Virtual resources</li> <li>• ...</li> </ul>	<ul style="list-style-type: none"> <li>• General storage</li> <li>• CDN</li> </ul>	<ul style="list-style-type: none"> <li>• PNF/VNF including ...</li> <li>• NAT</li> <li>• DHCP</li> <li>• Firewall</li> <li>• ...</li> </ul>

**Network slice creation** - Created using pre-defined templates or with the manner of customization

## Slice Managers/ Controllers

- decomposes the network slice service profile and assigns corresponding segment network slice information to multiple segment slice managers

-translate service model to resource- level description, coordinates heterogeneous network slice domain agents

**COMS** would not attempt to replicate device models and data plane technologies

