



NETWORK SLICE USE CASES (OPERATIONS AND MANAGEMENT) DISCUSSION

[DRAFT-NETSLICES-USECASES-02](#)

NETWORK SLICING USE CASES: NETWORK CUSTOMIZATION AND DIFFERENTIATED SERVICES

[DRAFT-QIANG-COMS-USE-CASES-00](#)

USE CASES OF COMMON OPERATION AND MANAGEMENT OF NETWORK SLICING

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AGENDA

1. Introduction
2. Problem Statement
3. Use Case classifications
4. Stake holders
5. Management and Operations aspects
6. Opportunities and Challenges
7. NMRG relevance and Next Steps



INTRODUCTION

- Informal Definition of Network Slices
 - Purpose built for a specific service requirements and constraints
 - Allow for logical isolation of network [N], compute [C], storage [S] and functions [F] resources.
 - Support for multi-tenancy across heterogenous technology and multiple administrative domains
 - [N] [C] [S] [F] resources to be independently managed, orchestrated and controlled independently by tenants
 - Dynamic aspects of network slices – elastic scale in/out and customized based on service needs.



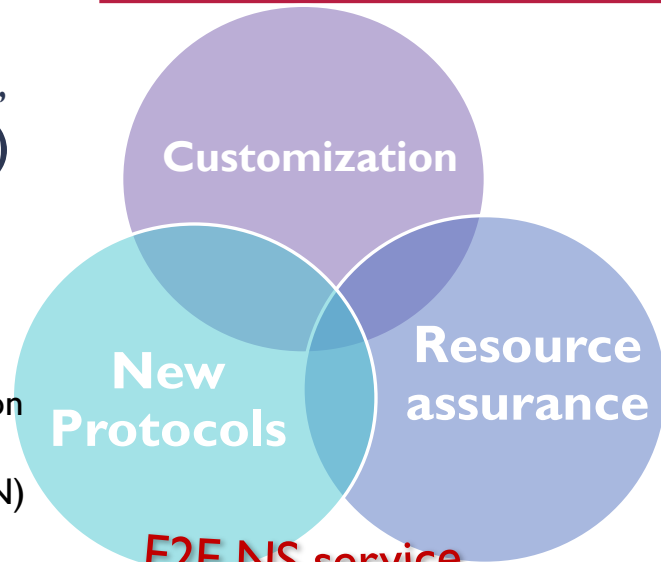
PROBLEM STATEMENT

- **Network Slices are different from traditional VPNs**
 - Has to guarantee resources and guaranteed QoS for every single flow in the service; every time
 - Constant monitoring and protection against degradation
 - Slices enable service verticals – End to End orchestration and runtime management
- **Service providers/operators will offer Network slice as a service (NSaaS)**
 - Common interface descriptions.
 - Common data models for different technology networks
 - Automation of resource customization
 - Capability exposure to the vertical business customers for managing their own slices
- **Comprehensively study all aspects of network slices (not Fragmented)**
 - Slice life cycle (create, delete)
 - OAM, FCAPS (Fault, Configuration, Accounting, Performance, Security)



NSaaS: USE CASE CLASSIFICATIONS

E,g (vCPE,
SD-WAN)



Data, control and management planes

Enhanced Mobile Broadband (eMBB)

Ultra-Reliable/ Low-Latency Communication (URLLC)

Massive Machine Type Communication (mMTC)

Mission Critical Service (MCS)

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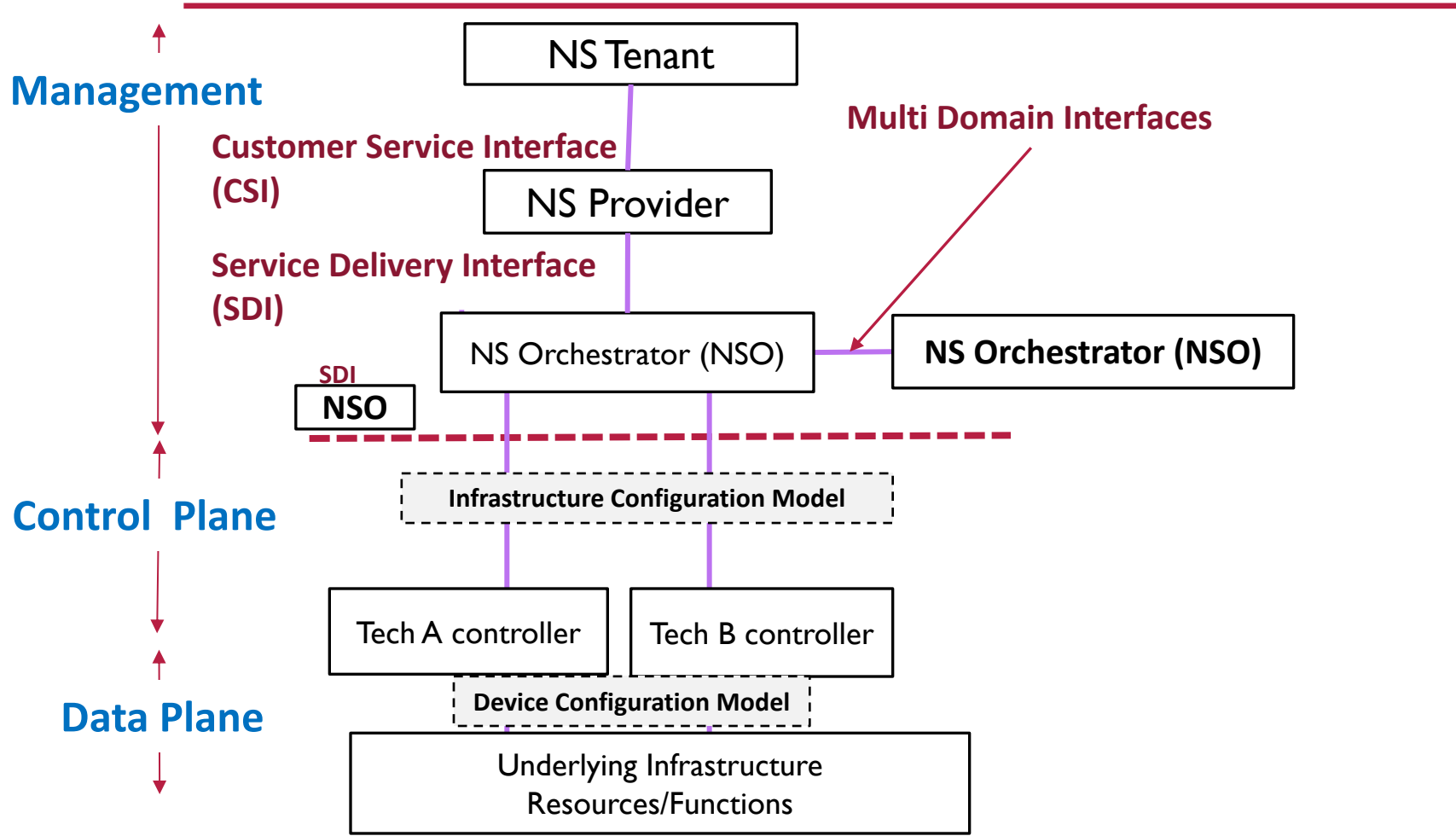
**NS Management
(use cases)**

Dynamic management

1. End-to-end Orchestration of Network Slice
2. Tenant customization of Network Slice
3. Network Slice FCAPS
4. Interoperation Multiple Domain
5. Network Slice Stitching and Recursion

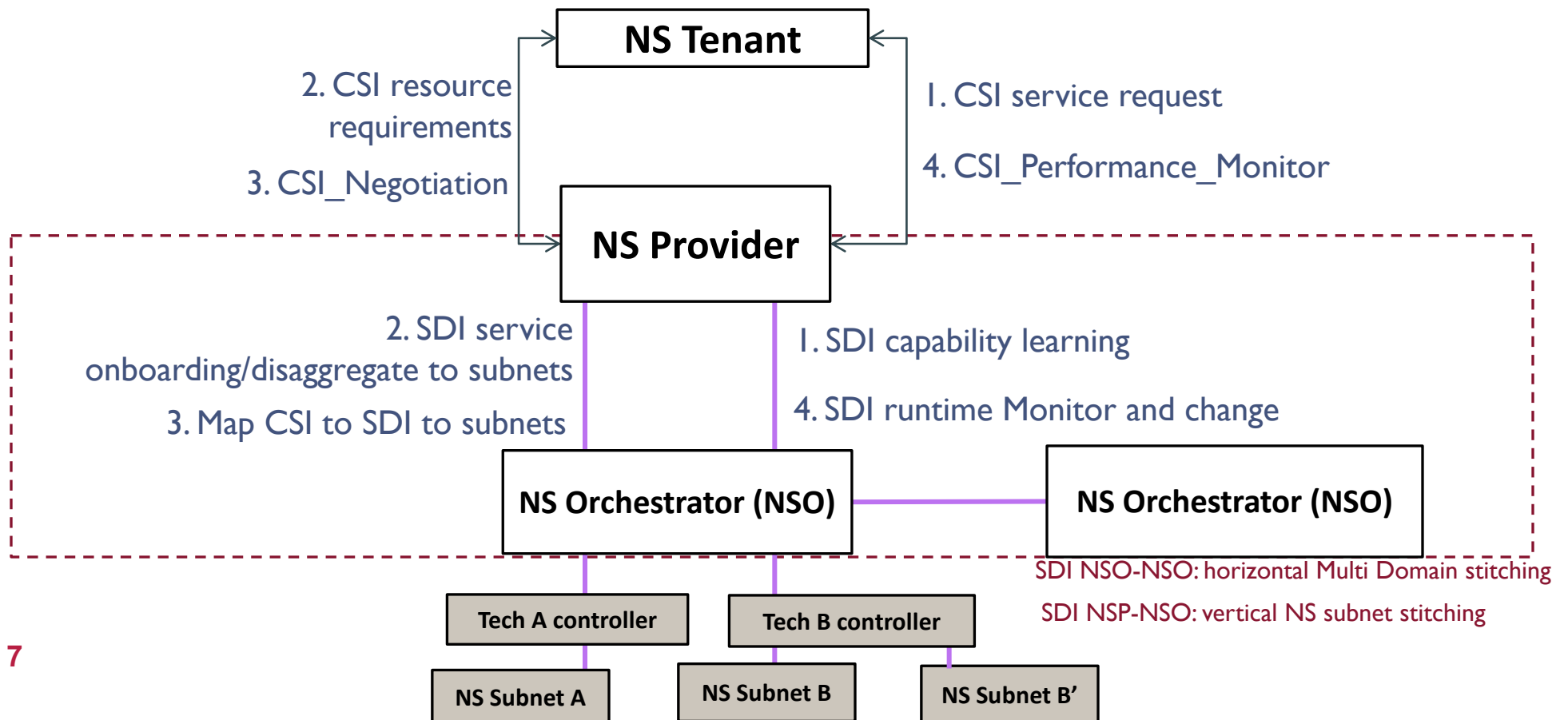


REFERENCE FRAMEWORK FOR NSaaS





NaaS: MANAGEMENT AND OPERATIONS ASPECTS





NSaaS: RESOURCE ASSURANCE USE CASE

CUSTOMER SERVICE INTERFACE

1. CSI service request: A tenant describes end to end connectivity
2. CSI resource requirements: such as X mbps bandwidth per flow, Y number of flows, acceptable bounded latency Z ms.
3. CSI Negotiates: for NS subnets, onboarding costs, capabilities and operations (NS provider – broker)
4. CSI monitors: push/pull statistics, alarms for performance assurance.

SDI – SERVICE DELIVERY INTERFACE

1. SDI capabilities: NS provider uses SDI with NSOs to first learn the overall capabilities in the units of subnets (Resources available, path costs, latency parameters). From capabilities: Triggers slice design and instantiation
2. SDI On-boarding: Identify subnets/NSO and distribute per-subnet operations and performance parameters
3. SDI NSO-NSO and NSO-NSP: Monitor slices, runtime changes etc.
4. NSP specific data models: NSO may use relevant data models per subnet; for configuration and monitoring but map to data model between NSO and NSP.



OPPORTUNITIES AND CHALLENGES FOR NMRG

OPPORTUNITIES

- To describe complete end-to-end network slicing management plane
- Integrating resources and operation to services.
- Modeling of common interfaces for dynamic management, monitoring.

CHALLENGES

- Integration of several data models (existing YANG models)
- Need to describe and generalize operations as a part of slice specification
- Inter-domain/Resource abstraction for sharing
- Stitching of heterogeneous technologies



RELEVANCE TO NMRG

- Assume Data plane and control plane work will be done by different WGs
- Management aspects start with specification of NSaaS
 - Describe type of service
 - Describe monitoring/performance capabilities
 - Describe service graph, essentials for mapping tenant resources to infrastructure
 - describe slices X-agnostic (such as not preferring specific architecture such as NFV, SFC, YANG etc or technologies – overlays, VPNs, L2, L3 etc).
- Exploit know-how of nmrg to build a lean network-management system



SUMMARY AND NEXT STEPS

Scope of Use cases

- Use cases will give us guidelines and requirements of what is needed for NSaaS management.
- NMRG can be a place for building all management aspects for NSaaS.

Request Feedback on this work

- Is it suitable work for NMRG?
- Starting point: Describe everything related to CSI and SDI.

Questions/Clarifications/Suggestions?