

E2E Network Slicing Use Case in R7 Guilin

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This page and its sub-pages captures all requirement and implementation details for the E2E Network Slicing use case for Guilin release.

The E2E Network Slicing use case started in Frankfurt. Details of the Frankfurt implementation can be found at [E2E Network Slicing Use Case in R6 Frankfurt](#).

Participating Organizations

China Mobile, Wipro, Huawei, AT&T, Amdocs, Verizon, Reliance Jio, Tencent, China Telecom, Tech Mahindra, TIM, LTTS

Use Case Owners and Contacts

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USE CASE KEY INFORMATION

USE CASE	LEAD CONTACTS / DESCRIPTION	WIKI
E2E Network Slicing	LIN MENG Swaminathan Seetharaman	E2E Network Slicing Use Case in R7 Guilin
Integration Leads	Zhang Min dhebeha mj	
Requirement ID	Jira for the requirement	REQ-342 - Getting issue details... STATUS
Architecture Sub-committee Jira tracker	Architecture sub-committee presentation	ONAPARC-583 - Getting issue details... STATUS
Prior projects wiki link	Frankfurt Release	E2E Network Slicing Use Case in R6 Frankfurt

BUSINESS DRIVER

This section describes Business Drivers needs.

Executive Summary: 5G Network Slicing is one of the key features of 5G. The essence of Network Slicing is in sharing network resources (PNFs, VNFs, CNFs) while satisfying widely varying and sometimes seemingly contradictory requirements to different customers in an optimal manner. Same network is expected to provide different Quality of Experience to different consumers, use case categories and industry verticals including factory automation, connected home, autonomous vehicles, smart cities, remote healthcare, in-stadium experience and rural broadband. An End-to-End Network Slice consists of RAN, Transport and Core network slice sub-nets. This Use Case intends to demonstrate the modeling, orchestration and assurance of a simple network slice (e.g. eMBB). While 3GPP standards are evolving and 5G RAN and core are being realized, this Use Case will start with realizing an E2E Network Slice with a simple example of a 5G RAN, Core and Transport Network Slice sub-nets. It will also align with relevant standard bodies (e.g., 3GPP, ETSI, TM Forum) as well as other open initiatives such as O-RAN where relevant, [w.r.to](#) both interfaces as well as the functional aspects.

Business Impact: Network Slicing is a feature that almost every service provider will leverage. It allows a service provider to improve their network efficiency by maximizing the network throughput more tailored to each user's use of the network. It is seen as an imperative for efficient and optimal use of their network. This will be particularly relevant as 5G is expected to have upwards of 10,000x the traffic load over 4G and 20GB peak data rates.

Business Markets: Network Slicing, for this use case, is specifically aimed at a 5G access, core and transport. In the future, this might be extended to other domains or applications such as fixed-wireless convergence, Wi-Fi access, all aspects of transport including fronthaul, or unified network management orchestration. Network Slicing functionality is what almost every wireless service provider will inevitably find valuable. The concepts and modeling work being done for Network Slicing will find applications in other areas as well. (**Industries**) Some applications and industries such as smart cities, remote maintenance, video streaming vs life-saving first-responder type applications will demand different requirements from Network slicing. (**Markets/Regions**) There are no regional specific aspects to Network Slicing.

Funding/Financial Impacts: Network slicing engenders the optimal use of resources for a Network. Thus, this represents OPEX savings for a service provider.

Organization Mgmt, Sales Strategies: There is no additional organizational management or sales strategies for this use case outside of a service providers "normal" ONAP deployment and its attendant organizational resources from a service provider.

FUNCTIONAL DEVELOPMENT IMPACTS

Requirement			
PROJECT	PTL	User Story / Epic	Requirement
A&AI	William Reehil	AAI-3016 - Getting issue details... STATUS	
AAF	Jonathan Gathman		No impact foreseen
APPC	Takamune Cho		No impact foreseen
CLAMP	Gervais-Martial Ngueko		No impact foreseen
CC-SDK	Dan Timoney	CCSDK-2533 - Getting issue details... STATUS	CDS impacts related to initial configuration of Core NSSI NFs, reconfiguration during Core NSSI reuse as well as due to Closed Loop actions. Potential impacts for RAN Slicing.
DCAE	Vijay Venkatesh Kumar	DCAE-22338 - Getting issue details... STATUS	Impacts for (a) KPI Monitoring (b) Closed Loop Control (c) Intelligent Slicing
DMAAP	Mandar Sawant		No impact foreseen
External API	Adrian OSullivan	EXTAPI-449 - Getting issue details... STATUS	Impacts for Service Activation/Deactivation and Termination based on TMF 641
Integration	Morgan Richomme		
MODELING	Hui Deng	MODELING-367 - Getting issue details... STATUS	
Multi-VIM / Cloud	Bin Yang		No impact foreseen
OOF	krishna moorthy	OPTFRA-797 - Getting issue details... STATUS	Impacts for (a) Improvements in Frankfurt functionality - e.g., callback for NST/NSI selection (b) Slice profile generation (c) RAN/Core/Transport Slice NSSI selection
		OPTFRA-798 - Getting issue details... STATUS	

POLICY	Pamela Dragosh	POLICY-2701 - Getting issue details... STATUS	Control Loop enhancements
PORTAL	Manoop Talasila		No impact foreseen
SDN-C	Dan Timoney	SDNC-915 - Getting issue details... STATUS	Initial configuration of RAN NSSI, reconfiguration during NSSI reuse, RAN NSSI termination, Closed Loop actions.
SDC	Ofir Sonsino	SDC-3086 - Getting issue details... STATUS	NSST design (RAN, Core, Transport)
SO	Seshu Kumar Mudiganti	SO-3036 - Getting issue details... STATUS	Impacts for (a) CSMF/NSMF improvements (b) NSMF interactions with all 3 NSSMFs - internal and external (c) Core NSSMF (d) RAN NSSMF (e) Transport NSSMF (f) Closed Loop (g) Intelligent Slicing
VID	Ittay Stern		No impact foreseen
VF-C	Yan Yang		No impact foreseen
VNFRQTS	Steven Wright		No impact foreseen
VNF-SDK	Weitao Gao		No impact foreseen
CDS	Yuriy Malakov	See CCSDK	See CCSDK impacts
UUI	Tao Shen	USECASEUI-442 - Getting issue details... STATUS USECASEUI-443 - Getting issue details... STATUS	
Runtime Config DB	Benjamin Cheung Joanne Liu Rudel		No impact foreseen, as Config DB shall be used in Guilin release.

List of PTLs:[Approved Projects](#)

Use Case Functional Definitions

Note: This section will be shortly updated with links to relevant wiki pages/presentations.

Section	Description
Use Case Title	<i>E2E Network Slicing</i>
Actors (and System Components)	<i>The list of Actors and System Components that participate in the Use Case</i>
Description	<i>Short overview of the Use Case</i>
Points of Contact	<i>Authors and maintainers of the Use Case.</i> <i>Use Case Lead, Key Use Case members and code contributors.</i>
Preconditions	<i>A list of conditions that are assumed to be true before the Use Case is invoked</i> <i>Includes description of Information Consumed</i>
Triggers / Begins when	<i>Describes the trigger for beginning the Use Case</i>
Steps / Flows (success)	<i>Describes the sequence of steps and interactions that occur during the Use Case (may include: description, data exchanges, functionality, state changes)</i> <i>Interaction diagrams may be included or referenced</i>
Post-conditions	<i>The expected results of the execution of the Use Case</i> <i>Includes description of Information Produced</i>
Alternate / Exception Paths	<i>Description of any exceptions or special process that could occur during Use Case</i>
Related Use Cases	<i>List of the Use Cases referenced by this Use Case</i>
Assumptions	<i>Describes any assumptions that are made for this use case</i>

Tools / References / Artifacts	List of any tools or reference material associated with this Use Case as well as any JIRA trace-ability.
	List of any associated diagrams or modelling artifacts associated with the Use Case

GENERIC INFORMATION MODEL FOR E2E Network Slicing

This information is taken from this template: [Generic Information Element Template](#)

should be copied in the Parent Page (CNF Modeling Workspace) for each Information Element to be defined.

Information Element Template (one table for each Information Element)

Information Element Name	RAN NSST, TN NSST and Slice Profile T (Service template), Endpoint, ConnectionLink and Transport-sla(Data type)
Points of Contact	Information Element Main Contact : Chuyi Guo Borislav Glozman Swaminathan Seetharaman Information Modeling and Data Modeling Contact: Chuyi Guo Zhang Min Schema Definition Contact : Chuyi Guo @Henry Yu
Related Use Cases	The E2E Network Slicing Use Case: WIKI: E2E Network Slicing Use Case in R7 Guilin and CCVPN Use Case are related to TN Network Slicing: WIKI: CCVPN-TransportSlicing
Participating ONAP Components	SDC, OOF, SO, AAI, SDN-C, UII
Related JIRA	The related Modeling JIRA is here: blocked URLMODELING-367 - E2E Network Slicing: Network Slicing, blocked URLAAI-2920 - CCVPN - Transport Slicing: AAI schema for TN NSSI
Description	The modeling design is to enable RAN NSSMF and TN NSSMF internal or external ONAP, and 3 sub-domains combination.
Related Standards & Industry Activities	Related Standards : 3GPP TS 28.530, TS 28.531, TS 28.541 IETF Related Industry : ORAN
Attributes	<i>Attributes: Name and describe each attribute of this Information Element. Please include the datatype of the attribute if possible. Is this attribute read-only, read-write? Are there any default values?</i>
Relationships	<i>Relationships: Describe how this Information Element is related to other Information Elements. Also describe nature of the relationship: association, inheritance, dependency, etc. and multiplicity.</i>
Originator	<i>Where does this information come from? (What component initially creates it)</i>
Consumers	<i>Who uses this information inside & outside of ONAP? How do they use it?</i> <i>Includes description of information consumed (whole class, specific attributes, etc.)</i>
Producers	<i>Who updates this information inside & outside of ONAP? Under what conditions do they update it?</i> <i>Includes description of information produced (whole class, specific attributes, etc.)</i>
Steward	<i>Where will this information stored and maintained in ONAP?</i>
Impacted APIs & Schemas	<i>Identify impacted ONAP schemas & APIs</i> <i>Are there existing schemas be used or extended?</i>
Information Modeling Status	<i>What is the status of ONAP Information Modeling activities associated with this Information Element.</i> <i>Please provide links to relevant wiki pages & JIRA.</i>
Schema Definition Status	<i>What is the status of ONAP Schema Definition activities associated with this Information Element.</i> <i>Please provide links to relevant wiki pages & JIRA.</i>
ONAP Release Priority	<i>Prioritization for ONAP Releases</i>

Test Cases and Status

#	Test Case	Status
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1	Successful design of CST, Service Profile and Slice Profile Templates	NOT YET TESTED
2	Successful design of NST, NSSTs (RAN, Core and Transport)	NOT YET TESTED
3	Service instantiation via CSMF portal which involves RAN, Core and Transport sub-nets (RAN NSSMF within ONAP). It should result in a new NSI and new NSSIs to be created for all sub-nets. (Option 1)	NOT YET TESTED
4	Service instantiation via CSMF portal which involves RAN, Core and Transport sub-nets (RAN NSSMF outside ONAP). It should result in a new NSI and new NSSIs to be created for all sub-nets. (Option 2)	NOT YET TESTED
5	Service instantiation via CSMF portal which involves RAN, Core and Transport sub-nets (RAN NSSMF within ONAP). It should result in existing NSSI to be reused at least for 1 subnet. (Option 1)	NOT YET TESTED
6	Service instantiation via CSMF portal which involves RAN, Core and Transport sub-nets (RAN NSSMF outside ONAP). It should result in existing NSSI to be reused for RAN sub-net (Option 2)	NOT YET TESTED
7	Service instantiation via CSMF portal which involves RAN, Core and Transport sub-nets (RAN NSSMF within ONAP). It should result in existing NSI to be reused (Option 1)	NOT YET TESTED
8	Service instantiation via CSMF portal which involves RAN, Core and Transport sub-nets (RAN NSSMF outside ONAP). It should result in existing NSI to be reused. (Option 2)	NOT YET TESTED
9	Service activation from CSMF portal – resulting in slice service activation	NOT YET TESTED
10	Service de-activation from CSMF portal – resulting in slice service deactivation	NOT YET TESTED
11	Service termination from CSMF portal (remove service profile/slice profile from NSI/NSSI only)	NOT YET TESTED
12	Service termination (terminate NSI/NSSI also)	NOT YET TESTED
13	Service instantiation request via ExtAPI (using postman) - resulting in new NSI to be instantiated (similar to test case 3)	NOT YET TESTED
14	Service instantiation request via ExtAPI (using postman) - resulting in reuse of existing NSI (similar to test case 5)	NOT YET TESTED
15	Service activation request via ExtAPI (using postman) - resulting in slice service activation	NOT YET TESTED
16	Service de-activation via ExtAPI (using postman) - resulting in slice service deactivation	NOT YET TESTED
17	Service termination via ExtAPI (using postman) - (remove service profile/slice profile from NSI/NSSI only)	NOT YET TESTED
18	KPI Monitoring request to be sent from UUI	NOT YET TESTED
19	KPI Monitoring response to be displayed on UUI	NOT YET TESTED
20	Simple closed loop for NSI/NSSI resource optimization (RRM Policy update) (stretch goal)	NOT YET TESTED
21	Intelligent Slicing - take actions based on ML recommendations to ensure KPI adherence (Admission Control in RAN) (stretch goal)	NOT YET TESTED

Supporting Files

Description	File
Presentations from LFN Virtual DTF on Jun 24, 2020 - Session 1: Frankfurt Overview, Demo & Guilin Overview - Session 2: Core and RAN Slicing - Session 3: Transport Slicing, KPI Monitoring, Closed Loop Control & Intelligent Slicing	All presentations and recordings are available at: https://wiki.lfnetworking.org/pages/viewpage.action?pageId=34606742 (or) https://wiki.lfnetworking.org/pages/viewpage.action?pageId=34606297
Presentation to ArchCom on 26 May, 2020	ONAP_E2E_Network_Slicing_Arch_Com_26_May_2020_v_2.0.pptx
Joint S/C presentation	RAN and Transport Slicing: Joint Meeting Apr 30, 2020
Presentation on Use Case Realization Call on 1 Apr, 2020	https://wiki.onap.org/download/attachments/81403386/ONAP_E2E_Network_Slicing_Usecase_realization_call_20200401.pptx?version=1&modificationDate=1585804290000&api=v2
Presentation to Requirements Sub-Committee on 2 Mar, 2020	ONAP_E2E_Network_Slicing_Req_Subcommittee_Mar2_v1.0.pptx