R9 E2E Network Slicing use case

Use Case Overview & Description

This use case intends to demonstrate the modeling, orchestration, assurance and optimization of end-to-end network slices, including RAN, Transport and Core slice sub-nets. This use case shall support different deployment scenarios of the Slice Management & Orchestration functions through a modular architecture and standards-based interfaces.

Use Case Key Information

TOPIC	DESCRIPTION	WIKI PAGE
Requirements Proposal	This is a link to the requirements proposal made on the Requirements Sub-committee	**E2E_Network_Slicing_R9_Requirements_20200329_v1.0.pptx**
Architecture S/C info	Information on the Architecture sub-committee presentation	~~**ONAPARC-703**~~ - (Istanbul-R9) - UC - 5G Network Slicing architecture for Istanbul release CLOSED Presentation: E2E_Network_Slicing_ArchCom_Review_v1.0.pptx
Prior Project "Base" Wiki	Link to the Honolulu release page for this use case	**R8 E2E Network Slicing use case**
Requirements Jira (REQ-###) Ticket	Link to the REQ Jira ticket for this use case	~~**REQ-721**~~ **- E2E Network Slicing use case enhancements for Istanbul release** DONE
Key Use Case Leads & Contacts	**USE CASE LEADS**: **LIN MENG , Saravanan A Ratna Shanker Mishra** **USE CASE KEY CONTACTS**: **LIN MENG , Saravanan A , Ratna Shanker Mishra , Henry Yu, Milind Jalwadi Borislav Glozman**	
Meetings Register & Recordings	Link to Use Case Team meetings	• Recent: **E2E Network Slicing Use Case ONAP Weekly Meetings** • Older: **E2E Network Slicing Use Case ONAP Weekly Meetings (Jun - Nov 2020)**

BUSINESS DRIVER

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.

Development Status

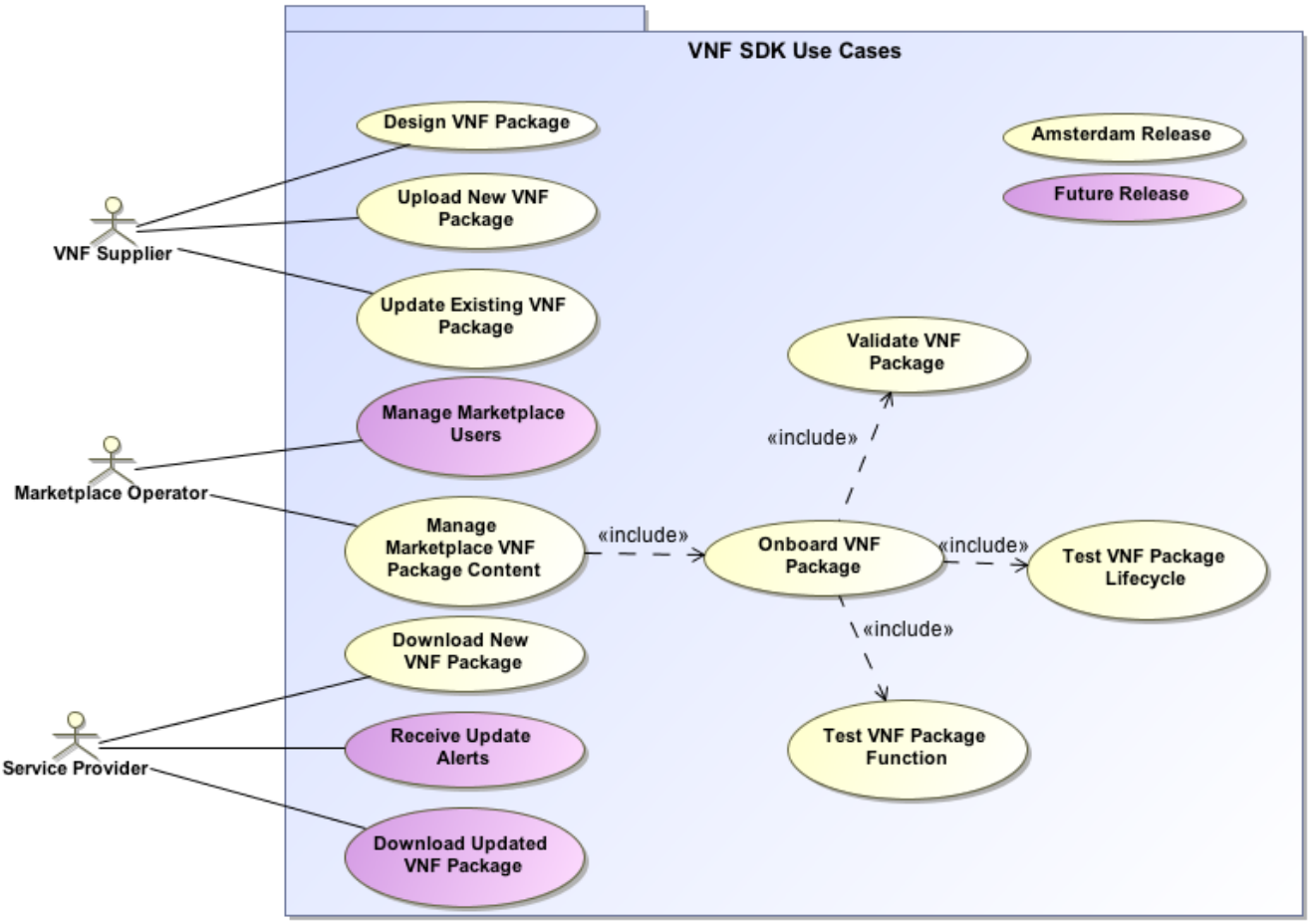
PROJECT	PTL	User Story / Epic	Requirement
A&AI	William Reehil		No impact
AAF	Jonathan Gathman		No impact
APPC	Takamune Cho		No impact
CLAMP	Gervais-Martial Ngueko		No impact
CC-SDK	Dan Timoney	~~CCSDK-3297~~ - CCSDK impacts for Network slicing in Istanbul Release CLOSED	Interface to CPS, RAN configuration & A1 interface
DCAE	Vijay Venkatesh Kumar	~~DCAEGEN2-2771~~ - DCAE Impacts for E2E Network Slicing in Istanbul release CLOSED	Enhancements in Slice Analysis MS, and KPI Computation MS (Stretch goal)
DMaaP	Fiachra Corcoran		No impact
External API	Adrian OSullivan		No impact
HOLMES	Guangrong Fu		No impact
MODELING	Hui Deng		No impact, CPS related modeling aspects will be covered by CPS project
Multi-VIM / Cloud	Bin Yang		No impact
OOF	krishna moorthy	~~OPTFRA-954~~ - OOF impacts for Network Slicing in Istanbul Release CLOSED	
OOM	Sylvain Desbureaux		No impact
POLICY	Jim Hahn		No impact
PORTAL	Sunder Tattavarada		No impact
SDN-C	Dan Timoney		No impact
SDC	Christophe Closset		No impact
SO	Seshu Kumar Mudiganti	~~SO-3649~~ - SO impacts for E2E Network Slicing in Istanbul Release CLOSED	Minor enhancements, some major enhancements are stretch goals
VID	Ikram Ikramullah		No impact
VF-C	Yuanhong Deng		No impact
VNFRQTS	Steven Wright		No impact
VNF-SDK	user-67d6f		No impact
CDS	Yuriy Malakov		No impact
CPS	Toine Siebelink		Models, and interface to store/retrieve use case related data

List of PTLs:**Approved Projects**

*Each Requirement should be tracked by its own User Story in JIRA

USE CASE DIAGRAM

Use cases define how different users interact with a system under design. Each use case represents an action that may be performed by a user (defined in UML as an Actor with a user persona).



Use Case Functional Definitions

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

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

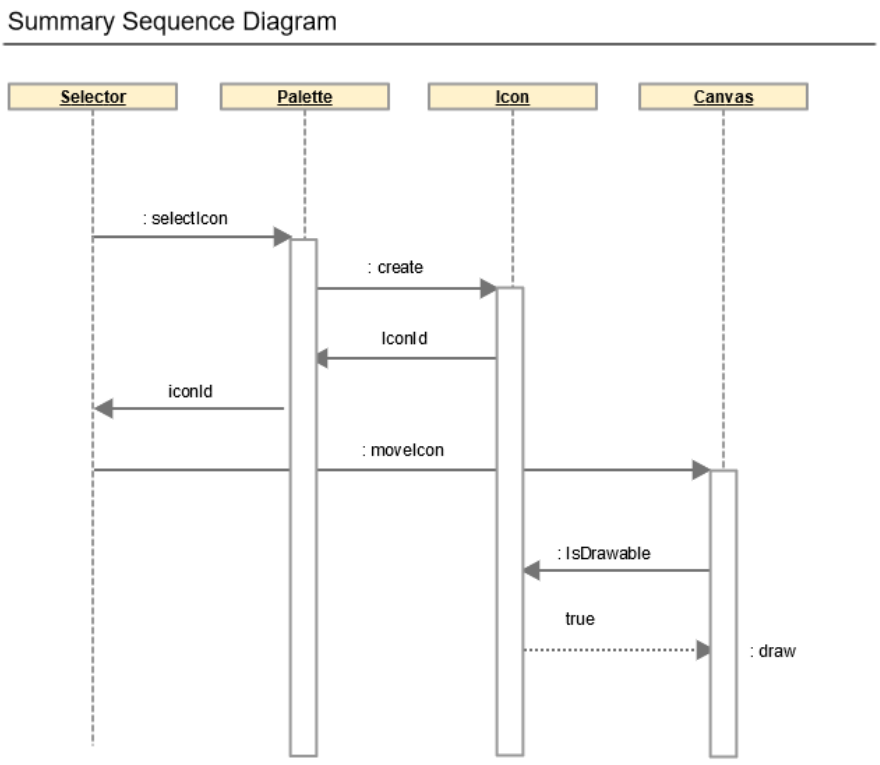
TESTING

Current Status

1. Testing Blockers
2. High visibility bugs
3. Other issues for testing that should be seen at a summary level
4. Where possible, always include JIRA links

End to End flow to be Tested

This should be a summary level Sequence diagram done in Gliffy



Test Cases and Status

1	There should be a test case for each item in the sequence diagram	NOT YET TESTED
2	create additional requirements as needed for each discreet step	COMPLETE
3	Test cases should cover entire Use Case	PARTIALLY COMPLETE

Supporting Files

Date	Description	File
Mar 29, 2021	Presentation given to Requirements Sub-Committee	E2E_Network_Slicing_R9_Requirements_20200329_v1.0.pptx