5G SBP Use Case - Edge Site Selection and Placement

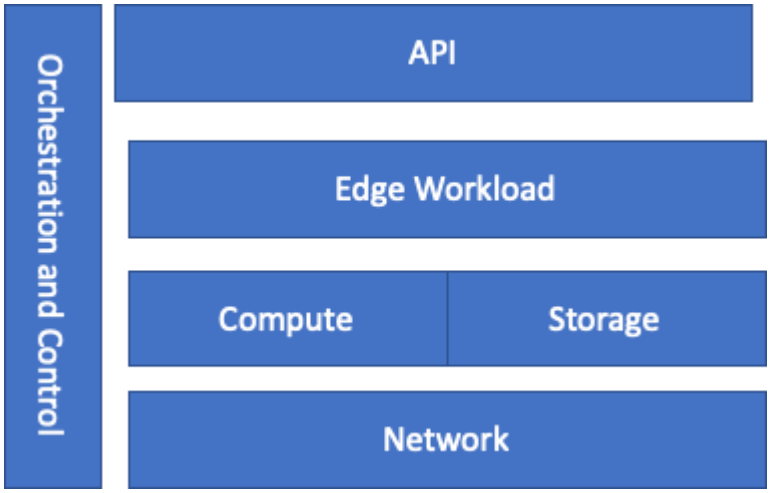
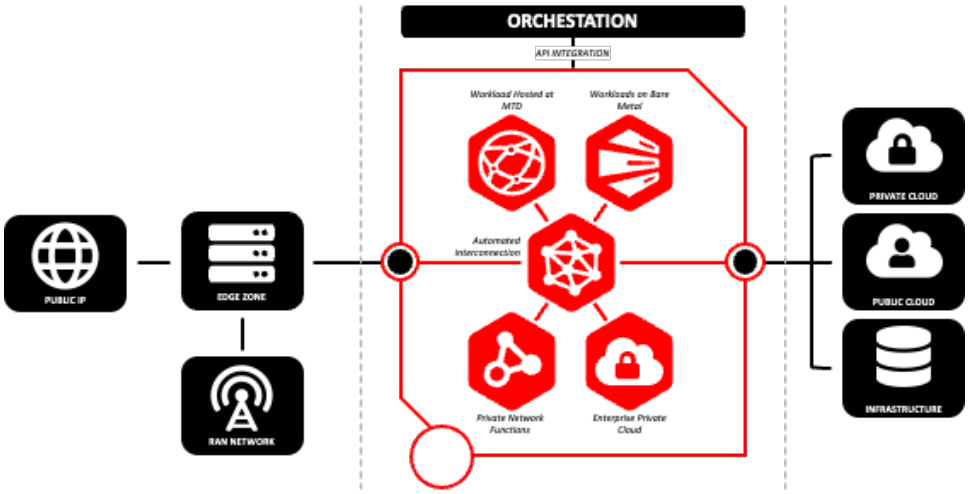
Use this template to submit Use Cases for submission to the 5G Super Blueprint Use Case & Requirements Advisory Group. All input marked Mandatory is required for the blueprint use case proposal to be deemed ready for review by the Use Case & Requirements Advisory Group.

Use Case Name: **(Mandatory)**	**Edge Placement**
Use Case Description: (Mandatory)	Edge placement of network functions (RAN) deployment at the edge. Create a cell site (leveraging Equinix metro site availability) and place CU/DU workloads at the cell site. For slicing Use Case and cell site deployment (edge placement) Use Case. Also include slicing latency at the network edge. Find the characteristcs of the slice, example; maximum number of UEs, maximum number of videos sessions that can be supported; latency at the core and RAN Build on Public/Provate Interconnect work that has been done (PCEI/Oleg). This Use Case takes the next step of adding the edgecomponents and scales out to the edge. Reference: 5G SBP Use Case - Public Cloud Edge Interface
-Epic -Problem Statement (Mandatory)	Operators are looking for methods to place Edge Infrastructure in enough proper places to enable scaling of Edge operations from day 0 to day 3 (full production). This becomes technically challenging, to support day 0 edge infrastructure for a targeted number of UE subscribers with just enough infrastructure to commercially support initial subscribers, but also enough capabilities to scale as subscribers are added. This leads to challenges of physical and logical placement of compute and interconnection. In this Epic, it can explore the current standards state and identify gaps of real world implementations, redundancy and resiliency. Umbrella goal- Network as aService (NaaS) - evaluate above as they apply to NaaS, example; RAN, Network. NaaS can become a tenant of these services. (not a separate Use Case).
Blueprint Owner (Mandatory)	*enter name*

Users Stories
 	
(at least one (1) User Story is Mandatory)
	• Incremental Edge Placement
	  ○ Scenario - an operator has an existing 5G NSA core for typical retail operations and seeks to support deployment of a 5G SA infrastructure to support a Day 1 customer with some defined number of scheduled subscribers over a defined geography. In this use case it could be demonstrated for a scaled deployment of 100K subscribers incrementally added at 25K per quarter with geographic coverage for North America.
	• **UPF placement use case**
	  ○ **Leverage Free5GC/EMCO**
	  ○ **Lab resources**
	  ○ **Interested parties:**
	  ▪ **Rodney**
	  ▪ **Lincoln**
	  ▪ **Parthiban**
	  ▪ **Muddasar**
	  ▪ **Bhagyalakshmi**

Interaction with other open source projects and components (Mandatory)	
Resources - people (Mandatory)	Resources (people) to execute on the blueprint: • *enter name 1* • *enter name 2* • ...

Steps to Realization	• First Step - Identify the physical and virtual elements widely necessary to achieve edge workloads.
	  ○ Compute
	  ○ Storage
	  ○ Network
	• Second Step - define the essential parameters required for edge workload. e.g.
	  ○ Amount of Compute and sub components Cores/RAM
	  ○ Network speed, ports and capacity
	  ○ Location, represented as approximate latency to associated elements or components
	  ○ Amount of Storage (for compute OS/NOS and or for supported workloads)
	• Third Step - Identify sources of information needed for first and second step.
	  ○ HyperScale Cloud services - API's providing data for above requirements.
	  ○ Multi-Tenant Data Centers (Bare Metal Compute)
	  ○ Private Cloud
	• Forth Step - Select the Assets meeting the requirements.
	• Fifth Step - Deploy
	
	<u>Gaps</u>- need data from multiple operational entities. Each entity has unique requirements. Can they be unified today? How to span across multiple organizational domains? Can data be normalized?
	
	Muddasar- Resource pooling, resource attributes; "where to place" criteria.
	
	Potential avenues
	
	• Reduce problem scope to 2 operational entities
	• Machine Learning approach

High-level architecture diagram (Mandatory)	
High level lab topology diagram (Mandatory)	

Dependencies - list of any dependencies that rely of future releases of a specfic component. (Mandatory)	☐ Yes ○ *Enter details*: or ☐ No
High-level timeline (Mandatory)	• Month that build can begin: *enter month/year* • Approximate duration of build: *enter number of weeks or months* • Approximate completion of outputs: *enter month/year*
Upstreaming Opportunities (Mandatory)	• *enter project(s) and details*
Blueprint Outputs (Mandatory)	check all that apply: ☐ Code repository ☐ Configuration files (e.g. Helm charts, etc.) ☐ Upstreaming to relevant projects ☐ Continuous Integration ☐ Test requirements and test results (if applicable) ☐ Documentation: ☐ Overview and Theory of Operation (i.e., what does it do?) ☐ Deployment and setup ☐ Videos ☐ demo ☐ lab setup/behind the scenes ☐ other
High-level timeline (Mandatory)	• Month that build can begin: *enter month/year* • Approximate duration of build: *enter number of weeks or months* • Approximate completion of all outputs: *enter month/year*
Links to existing documentation (Build Guide, Slideware, etc), if available (optional).	Developer & Testing Forum Presentation June 2023 - This is reference material used to develop the Use Case.
Links to existing demo/video, if available (optional).	
Links to existing code/repos, if available (optional).	

Notes:

18 Apr 2023

Site selection tools. What tools exist, what should exist? Muddasar- traditionally a manual process. Suggested to use existing 5G SBP labs + Equinix to simulate MNO sites.

Requirements/capabilities-

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GV- understand the Use Case. Understand The HW and SW requirements. Delta between what is in the lab now and what is needed.