



Deployment Scenarios and Derived Requirements

Fernando (Fred) Oliveira

Orchestration Scenarios

Confluence Page: <https://wiki.onap.org/display/DW/Orchestration+Scenarios>

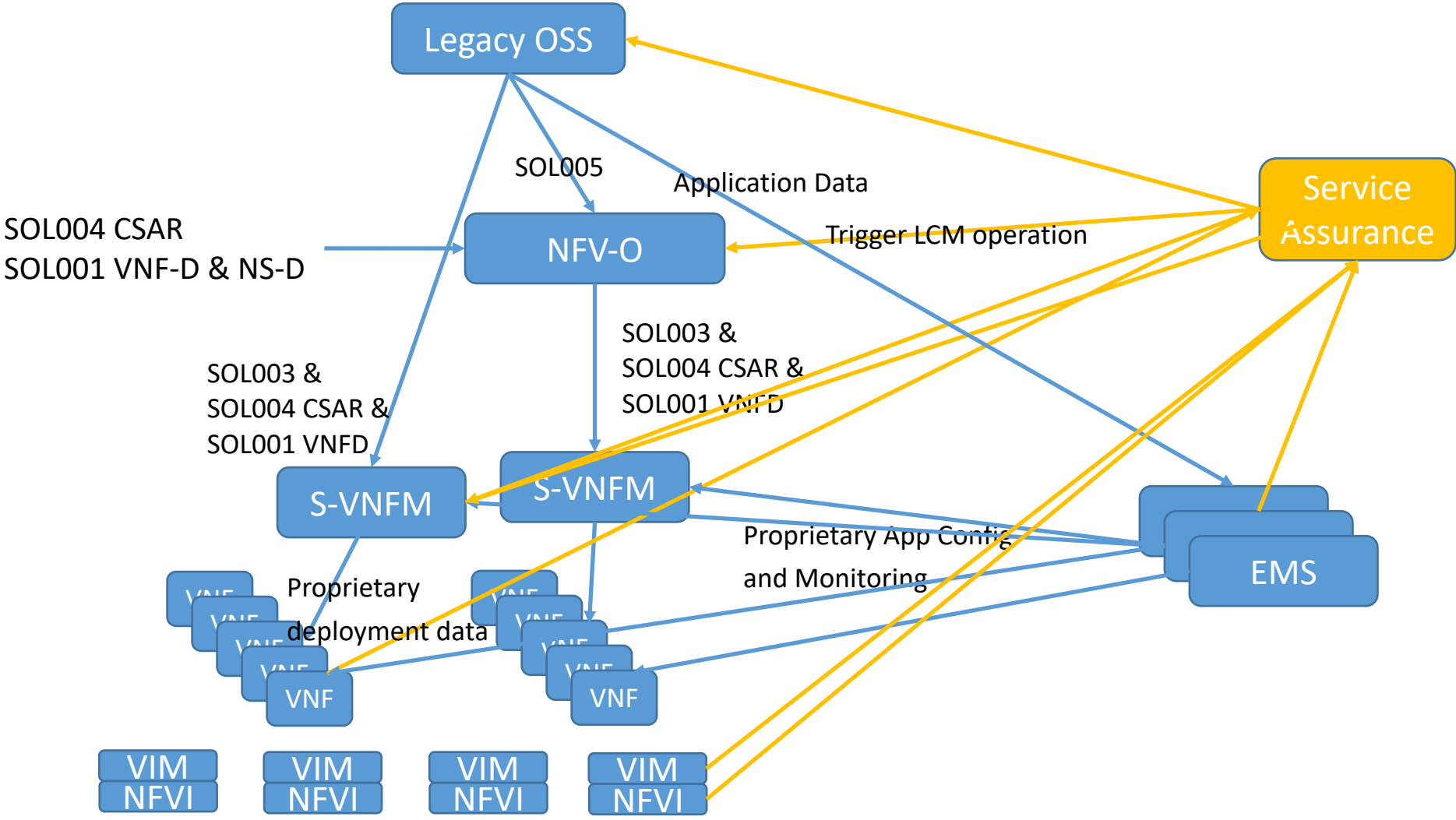
- Assumptions

- Operator has already deployed ETSI SOL003 compliant Vendor VNF Manager(s)
- Operator has already deployed ETSI SOL005 compliant NFVO(s)
- Operator has existing Service Assurance tools that VNF(s) and PNF(s) interact with
- Operator is currently using proprietary mechanisms to configure [P/V]NFs
- Operator has used above mechanisms to deploy SOL001/SOL004 compliant VNFs
- Operator has multiple VIMs; with different HW capabilities and configurations
- Operator desires to integrate ONAP into the existing environment

- Objectives

- Examine orchestration scenarios in order to determine if new architectural requirements are necessary
- Develop recommendations for composition of the ONAP Service DM.
- Develop recommendations for interfaces between the orchestration elements (OSS, SO, VF-C, VNFM, NFVO)
- Develop recommendations for how ONAP controllers work with external orchestration elements (NFVO, VNFM, EMS)
- Develop recommendations for how external Service Assurance interacts with DCAE and Policy

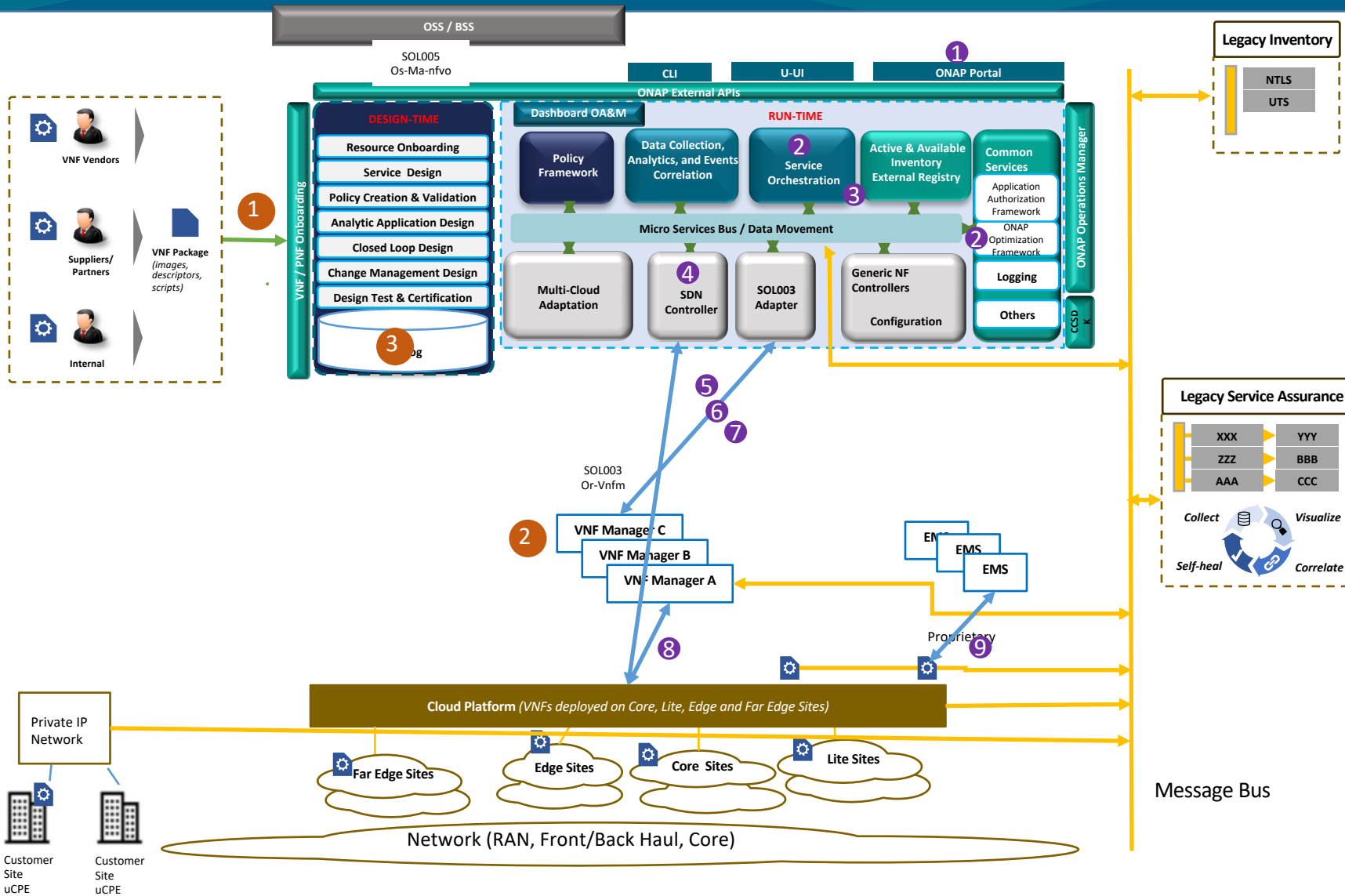
Existing NFVO, VNFM, EMS and Service Assurance



Scenarios examined

- ONAP with Vendor VNFM, EMS, SA and Inventory #1a (VNF deployment)
- ONAP with Vendor VNFM, EMS, SA and Inventory #1b (VNF Scale Out)
- ONAP with Vendor VNFM, EMS, SA and Inventory #1c (VNF Scale In)
- ONAP with Vendor VNFM, EMS, SA and Inventory #1d (VNF deployment with Application Configuration via SOL003 ModifyVnflInfo interface)
- ONAP with Vendor VNFM, EMS, SA and Inventory #1e (VNF deployment with Application configuration via SOL003 ModifyVnflInfo interface and SOL002 ConfigureVNF interface)
- ONAP with Vendor VNFM, EMS, SA and Inventory #1f (VNF deployment with Application configuration via ONAP Netconf/Restconf)
- ONAP with Legacy Orchestration, EMS, SA and Inventory #2 (NS deployment)
- ONAP with Legacy Orchestration, EMS, SA and Inventory #3a&b (Service deployment with VNF with ONAP App config and NS deployment)

ONAP with Legacy Orchestration, EMS, SA and Inventory #1a (VNF deployment)



Design/Develop Time:

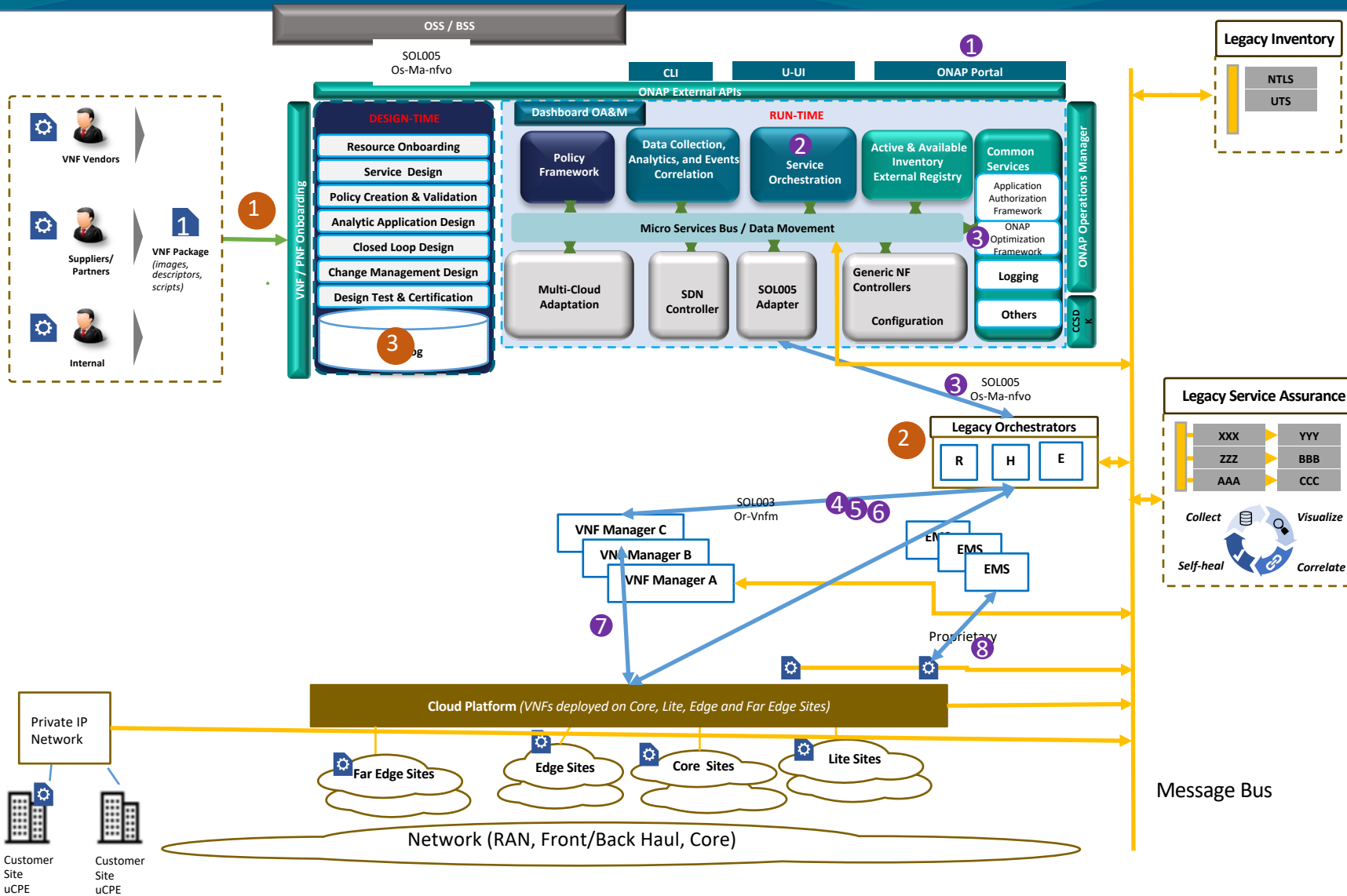
1. Onboard and catalog a SOL004 VNF package with a SOL001 VNF-D.
2. VNFM C registers as a SOL003 compliant VNFM
3. Design an ONAP Service A with only deployment configuration referencing the onboarded VNF and VNFM C to manage it.
 - a) At Design time this should only select the VNFM type (vendor). A specific instance of that VNFM type would be selected at Run time.

Run Time:

1. ONAP receives request to create an instance of Service A.
2. ONAP “decomposes” request into VNF 1 and homes it a cloud region.
3. ONAP makes resource assignments for deployment of VNF 1 based on information in the VNF-D
 - a) Resources : #vCPU, Ram, Network, storage, CPU pinning, SR-IOV, EPA
 - b) Issue on if/how resources are “reserved” by OOF/A&AI
4. ONAP makes assignments (IP Address) for the VNF
5. ONAP calls VNFM C via SOL003 API, requesting creation of VNF 1, passing necessary “deployment data” values.
6. VNFM C upcalls ONAP asking for a “grant” of resources based on information in the VNF-D.
 - a) Should be same resources as were allocated in 3
7. ONAP responds with resource information allocated in #3 along with VIM credentials.
8. VNFM C calls VIM to create VNF 1, and applies any needed deployment data via proprietary API.
 - a) Could use multi-cloud for indirect VIM access
9. External user updates the EM(s) with the appropriate application configuration data which gets pushed to the VNF via a proprietary mechanism

Goal: Design and deploy a composite Service consisting of multiple vendor VNFs in an automated and repeatable way leveraging vendor provided SOL003 compliant VNF Manager(s) and out of band application configuration. (Legacy approach)

ONAP with Legacy Orchestration, EMS, SA and Inventory #2 (NS deployment)



Design/Develop Time:

1. Onboard and catalog a SOL004 VNF package with a SOL001 VNFD.
2. NFVO R registers as a SOL005 compliant NFVO
3. Design an ONAP Service A with only deployment configuration referencing VNF 1 and NFVO R to orchestrate it.

Run Time:

1. ONAP receives request to create an instance of Service A.
2. ONAP "decomposes" the request into an NS.
3. ONAP calls NFVO R via SOL005 API, requesting creation of NS 1, passing necessary "deployment data" values.
4. NFVO R calls VNF M C requesting creation of an instance of VNF 1.
5. VNF M C upcalls NFVO R asking for a "grant" of resources.
6. NFVO R responds with resource information and VIM credentials.
7. VNF M C calls VIM to create VNF 1, and applies any needed deployment data via proprietary API.
8. External user updates the EM(s) with the appropriate application configuration data which gets pushed to the VNF via a proprietary mechanism.

Goal: Leverage ONAP VNF onboarding and Service Design capabilities to develop a composite service that can be instantiated and managed by an existing SOL005 compliant orchestrator. (ONAP acting as an OSS/BSS)

Derived Requirements

- External VNFM scenarios (1a, 1b, 1c):
 - ONAP needs to ingest and save (without modification) a SOL004 CSAR package for later consumption by a SOL003 compliant VNF Manager (VNFS SDK, SDC)
 - ONAP needs to ingest and interpret a SOL001 compliant VNF Descriptor in order to design an ONAP Service (VNFS SDK, SDC)
 - ONAP needs to understand resource requirements in the VNF-D for each deployment and scaling level (SO, A&AI, OOF)
 - ONAP needs to have a SOL003 compliant SBI (SO, VF-C, GNF-C)
 - ONAP needs a mechanism for specifying that a VNF instance should be runtime managed by a particular VNFM type (design time) and instance (run time) (SO, OOF, A&AI)
 - ONAP needs to have a way to inventory a VNF that was deployed using an external VNFM (A&AI)
- External NFVO scenarios (2, 3a, 3b):
 - ONAP needs to ingest and save (without modification) a SOL004 CSAR package for later consumption by a SOL003 compliant VNF Manager (VNFS SDK, SDC)
 - ONAP needs to ingest and interpret a SOL001 compliant VNF Descriptor in order to design an ONAP Service (VNFS SDK, SDC)
 - ONAP needs to be able to convert an ONAP Service into a SOL001 compliant Network Service Descriptor (NS-D)
 - ONAP needs to have a SOL005 compliant SBI (SO)
 - ONAP needs a mechanism for specifying that a service should be runtime managed by SO, VF-C or an external NFVO (SDC)
 - ONAP needs to have a way to inventory a Service that was deployed as a Network Service using and external NFVO (SO, A&AI)
 - ONAP needs a way to ingest and save (without modification) a SOL007 Network Service Package. (VNFS SDK, SDC)
 - ONAP needs to ingest and interpret a SOL001 Network Service Descriptor (SDC)
 - ONAP needs to be able to design a Service that includes some VNFs and some hierarchy of NSs (SDC)
 - ONAP needs a way to Deploy and Life Cycle Manage a Service that includes some VNFs and some hierarchy of NSs (SO, A&AI, SOL003 & SOL005 Adapter)

Derived Requirements (Casablanca)

- External VNFM scenarios (1a, 1b, 1c):
 - ONAP needs to ingest and save (without modification) a SOL004 CSAR package for later consumption by a SOL003 compliant VNF Manager (VNFSDK, SDC)
 - ONAP needs to ingest and interpret a SOL001 compliant VNF Descriptor in order to design an ONAP Service (VNFSDK, SDC)
 - ONAP needs to understand resource requirements in the VNF-D for each deployment and scaling level (SO, A&AI, OOF)
 - ONAP needs to have a SOL003 compliant SBI (VF-C, SO)
 - ONAP needs a mechanism for specifying that a VNF instance should be runtime managed by a particular VNFM type (design time) and instance (run time) (SO, OOF, A&AI)
 - ONAP needs to have a way to inventory a VNF that was deployed using an external VNFM (SO, A&AI)
- External NFVO scenarios (2, 3a, 3b):
 - ONAP needs to ingest and save (without modification) a SOL004 CSAR package for later consumption by a SOL003 compliant VNF Manager (VNFSDK, SDC)
 - ONAP needs to ingest and interpret a SOL001 compliant VNF Descriptor in order to design an ONAP Service (VNFSDK, SDC)
 - ONAP needs to be able to convert an ONAP Service into a SOL001 compliant Network Service Descriptor (NS-D)
 - ONAP needs to have a SOL005 compliant SBI (SO)
 - ONAP needs a mechanism for specifying that a Service should be runtime managed by SO, VF-C or an external NFVO (SDC)
 - ONAP needs to have a way to inventory a Service that was deployed as a Network Service using and external NFVO (SO, A&AI)
 - ONAP needs a way to ingest and save (without modification) a SOL007 Network Service Package. (VNFSDK, SDC)
 - ONAP needs to ingest and interpret a SOL001 Network Service Descriptor (SDC)
 - ONAP needs to be able to design a Service that includes some VNFs and some hierarchy of NSs (SDC)
 - ONAP needs a way to Deploy and Life Cycle Manage a Service that includes some VNFs and some hierarchy of NSs (SO, A&AI, SOL003 & SOL005 Adapter)

Derived Requirements (**Dublin**)

- External VNFM scenarios (1a, 1b, 1c):
 - ONAP needs to ingest and save (without modification) a SOL004 CSAR package for later consumption by a SOL003 compliant VNF Manager (VNFS SDK, SDC)
 - ONAP needs to ingest and interpret a SOL001 compliant VNF Descriptor in order to design an ONAP Service (VNFS SDK, SDC)
 - ONAP needs to understand resource requirements in the VNF-D for each deployment and scaling level (SO, A&AI, OOF)
 - ONAP needs to have a SOL003 compliant SBI (VF-C, **SO**)
 - ONAP needs a mechanism for specifying that a VNF instance should be runtime managed by a particular VNFM type (design time) and instance (run time) (SO, OOF, A&AI)
 - **ONAP needs to have a way to inventory a VNF that was deployed using an external VNFM (SO, A&AI)**
- External NFVO scenarios (2, 3a, 3b):
 - ONAP needs to ingest and save (without modification) a SOL004 CSAR package for later consumption by a SOL003 compliant VNF Manager (VNFS SDK, SDC)
 - ONAP needs to ingest and interpret a SOL001 compliant VNF Descriptor in order to design an ONAP Service (VNFS SDK, SDC)
 - ONAP needs to be able to convert an ONAP Service into a SOL001 compliant Network Service Descriptor (NS-D)
 - **ONAP needs to have a SOL005 compliant SBI (SO, VF-C)**
 - ONAP needs a mechanism for specifying that a Service should be runtime managed by SO, VF-C or an external NFVO (SDC)
 - ONAP needs to have a way to inventory a Service that was deployed as a Network Service using and external NFVO (SO, A&AI)
 - ONAP needs a way to ingest and save (without modification) a SOL007 Network Service Package. (VNFS SDK, SDC)
 - ONAP needs to ingest and interpret a SOL001 Network Service Descriptor (SDC)
 - ONAP needs to be able to design a Service that includes some VNFs and some hierarchy of NSs (SDC)
 - ONAP needs a way to Deploy and Life Cycle Manage a Service that includes some VNFs and some hierarchy of NSs (SO, A&AI, SOL003 & SOL005 Adapter)

Derived Requirements (El Alto Proposal)

- External VNFM scenarios (1a, 1b, 1c):
 - ONAP needs to ingest and save (without modification) a SOL004 CSAR package for later consumption by a SOL003 compliant VNF Manager (VNFSDK, SDC)
 - ONAP needs to ingest and interpret a SOL001 compliant VNF Descriptor in order to design an ONAP Service (VNFSDK, SDC)
 - ONAP needs to understand resource requirements in the VNF-D for each deployment and scaling level (SO, A&AI, OOF)
 - ONAP needs to have a SOL003 compliant SBI (VF-C, **SO**)
 - ONAP needs a mechanism for specifying that a VNF instance should be runtime managed by a particular VNFM type (design time) and instance (run time) (SO, OOF, A&AI)
 - **ONAP needs to have a way to inventory a VNF that was deployed using an external VNFM (SO, A&AI)**
- External NFVO scenarios (2, 3a, 3b):
 - ONAP needs to ingest and save (without modification) a SOL004 CSAR package for later consumption by a SOL003 compliant VNF Manager (VNFSDK, SDC)
 - ONAP needs to ingest and interpret a SOL001 compliant VNF Descriptor in order to design an ONAP Service (VNFSDK, SDC)
 - ONAP needs to be able to convert an ONAP Service into a SOL001 compliant Network Service Descriptor (SOL005 Adapter)
 - **ONAP needs to have a SOL005 compliant SBI (SO, VF-C)**
 - ONAP needs a mechanism for specifying that a Service should be runtime managed SO, VF-C or external NFVO (SDC, SO)
 - ONAP needs to have a way to inventory a Service that was deployed as a Network Service using an external NFVO (SO, A&AI)
 - ONAP needs a way to ingest and save (without modification) a SOL007 Network Service Package. (VNFSDK, SDC)
 - ONAP needs to ingest and interpret a SOL001 Network Service Descriptor (SDC)
 - **ONAP needs to be able to design a Service that includes some VNFs and some hierarchy (nested) of Services (NSs) (SDC)**
 - **ONAP needs a way to Deploy and Life Cycle Manage a Service that includes some VNFs and some hierarchy of Services (NSs) (SO, A&AI, SND-C, SOL003 & SOL005 Adapters)**