ONAP & ETSI NFV converged architecture

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Alignment: Motivation and Meaning

Alignment Motivation:
Increase industry adoption of Automation through defragmentation and focus.

Alignment Meaning:
Alignment is when ONAP can call a realizations of ETSI-MANO functions (scenario 1) or ONAP can be considered (for the relevant scope) a realization of ETSI-MANO and exposes its external interfaces (scenario 2).

Alignment Scenarios

**Scenario-1:** ETSI components “Plug in to” ONAP
- Plug in the ETSI NFVO into the ONAP architecture
- Plug in the ETSI VNFM into the ONAP architecture

**Scenario-2:** Realize ETSI functionality external MANO interfaces via ONAP.
- Realize the ETSI NFVO functionality via ONAP
- Realize ETSI VNFM functionality via ONAP

*Both are valid approaches and valid business scenarios to address*
ETSI NFV MANO architecture: interfaces & operations

SOL005
NSD Management
NS Lifecycle Management
NS Performance Management
NS Fault Management
VNF Package Management

OSS/BSS

SOL002
VNF Lifecycle Management
VNF Performance Management
VNF Fault Management

EM

SOL002
VNF Indicator
VNF Configuration

VNF

NFVO

SOL005
NSD Management
NS Lifecycle Management
NS Performance Management
NS Fault Management
VNF Package Management

Os-Ma-nfvo

Ve-Vnfm-em

VNFM

SOL003
VNF Lifecycle Operation Granting
VNF Package Management
Virtualised Resources Quota Available Notification

SOL002
VNF Lifecycle Management
VNF Performance Management
VNF Fault Management
VNF Indicator

VNF Package: SOL004

NSD/VNFD: SOL001

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ETSI NFV Reference Point decomposition

**NFVO**
- NSD Mgt
- VNFP Mgt
- NS PM
- NS FM
- NS LCM

**VNFM**
- VNF LCM
- VNF Indicator
- VNF PM
- VNF FM

Stage 2
- Os-Ma
- IFA 013
- SOL 005
- Or-VNFM
- IFA 007
- SOL 003

Stage 3
- NSD Management
- VNF Management
- NS Performance Management
- NS Fault Management
- NS Lifecycle Management
- VNF Lifecycle Management
- Virt Resource Quota Avail Not
- VNF Indicator
- VNF Performance Management
- VNF Fault Management
- VNF Package Management

Note: Same applies to SOL002
Example of an ONAP implementation
**Approaches**

ONAP

**Realize** (Scenario 2)

- ONAP Realizing an NFVO
- ONAP Realizing a VNFM
  - SOL003 functional equivalent
  - Gen NFC microservice interacting with Adaptor

**Plug In** (Scenario 1)

- External VNFM
- SOL003
- SOL002

**SOL002**

- ETSI-Compliant VNF
- SOL002
- propriety

**ONAP Calling a VNFM**

- SOL003
- VNFM Adaptor
- Adaptor

**Could be a collection of microservices across multiple ONAP components (SO, DCAE, etc) supporting the (perhaps evolved) SOL005 API**

But ONAP may not need to implement the formal SOL003 APIs
Instantiate Example: Scenario 1, VNFM Plug In

SO

Assign VNF

SDNC

The VF Module level looping would be moved down from the VNF Level Workflow to the sub-flow.

SO Internal: VNF Level Workflow

SO sends to a VNF-level request to a sub-orchestration process to “create” the VNF. The “Routing/Proxy” function determines the endpoint.

In the internal ONAP case, it is an SO sub-flow that loops through the modules and calls MultiVIM on a per-VF Module basis.

Instantiate VNF (with optional data attributes)

Gathers assignments and other input data and maps to VNFM format.

VNF-Level

Routing
Proxy

VNFM Adaptor

VNF can ignore the VF Module structure if it likes, because the network assignments passed to it would be organized by VM.

Configure VNF (application level)

AppC

SO003 (CreateVnfId, Instantiate, Grant)

VNFM

Doesn’t necessarily care about VF Modules

Per Whatever for Scaling...or...

Deployment Data

MultiVIM

Per VF-Module for Scaling (data attributes map to HEAT ENV for example)

VIM

VNF

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ONAP
Scenario-2: Realize ETSI functionalities & external MANO interfaces via ONAP

- Some ETSI-NFV members are considering creating a SBA work-item
- Opportunity for further alignment by reviewing Functional blocks

Example of converged architecture

Service Catalog (NSD & VNF Package)

DCAE

Inventory

Other OSS functions

E2E Orchestration*

Network Application Controller*

NFVI

VIM

Physical Infrastructure

L1-2-3 PNFs

L1-2-3 VNFs

L4-L7 PNFs

L4-L7 VNFs

SBA

* Further study is required on how to rationalize the ONAP SO and Controller functions with the ETSI NFVO and VNFM functions, and on their decomposition
Next Steps

- Scenario-1: Plug-in
  - Evolve details on the interface between ONAP and plugged in VNFM, and implications on the adapter
  - Evolve the details on the interface between ONAP and the plugged in NFVO and implications on the adapter
  - Plan for ONAP Rel-C.

- Scenario-2: Realizing
  - Work to define the set of ONAP Microservices that would support the ETSI-NFV external APIs
  - Plan for ONAP Rel-C/D.

- Create a joint expert group between ONAP and ETSI NFV to progress the work
Thank You
ONAP and ETSI have differing scopes, with ETSI scope being a proper subset of ONAP scope.
ETSI NFV Architecture: point to point representation

Dedicated interface & protocol between Functional Blocks

- **OSS/BSS**
- **EM**
- **VNF**
- **NFVI**

**NFV Or orchestrator (NFVO)**
- **NS Catalog**
- **VNF Catalog**
- **NFV Instances**
- **NFV Resources**

**VNF Manager (VNFM)**
- **Virtualised Infrastructure Manager (VIM)**
  - **Virtual Resource Management** → Manage the use of NFVI resources
  - **Network Service Management** → Manage combinations of connected VNFs, PNFs and nested NSs
  - **VNF Management** → Manage individual VNFs
Evolving ETSI NFV to Service-Base Architecture

NFVO & VNFM can be further decomposed as shown in the previous slide. The SBA approach is intended to facilitate communication between elementary functions irrespective of the software implementation/packaging.

SBA Service-Based Architecture
RDF Registration and Discovery function
ETS NFV Functional sub blocks
The NFVO can:
- Gather VNF-level FM/PM information from VNFM and VL-level FM/PM information from the VIMs.
- Correlate FM/PM information with NS instances
- Provide NS-level FM/PM information to the OSS/BSS
- Trigger LCM actions on receipt of FM/PM information

The VNFM can:
- Gather resource-level FM/PM information from the VIMs
- Correlate FM/PM information with VNF instances
- Provides VNF-level FM/PM information to the NFVO and VNF/EM instances
- Trigger LCM actions on receipt of FM/PM information
NSD and VNF Package management

- The NFVO can:
  - On-board NSDs, PNFDs and VNF Package upon request of the OSS/BSS
  - Distribute software images extracted from VNF Packages to the VIMs
  - Create and manage Compute Flavours in the NFVI, via the VIM.

- The VNFM (LCM) can:
  - Retrieve the VNFD and other VNF package elements from the NFVO
NS LCM

- The NFVO can:
  - Manage the LC of the virtualised resources for NS instances
  - Delegate the LCM of virtualized resources for VNF instances to VNFMs while retaining control through the Granting procedure
  - Request VIMs to create virtual networks for interconnecting VNF instances

- The VNFM can:
  - Manage the LC of the virtualised resources for VNF a instance
  - Request permission (Grant) from the NFVO before performing an LCM operation
Focus on Granting

- The Grant response contains:
- The list of resources approved to be added/modified/removed
- Information about the VIM(s) to use for allocating resources to a VNF instance
- The NFVI Zone(s)/ZoneGroup(s) where to allocate resources
- Reservation identifiers (of resources have been reserved)
- List of compute flavours and software images to use.
- List of external VLs to connect the VNF instance (incl. Connection Points address configuration). (*)
- List of VNFs internals VLs not managed by the VNFM (*)

(*) can also be provided in LCM operation request