ONAP CNFO

Orchestration of the Containerized Network Functions

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**Executive Summary** - Provide CNF orchestration support through integration of K8s adapter in ONAP SO

- Support for provisioning CNFs using an external K8s Manager
- Support the Helm based orchestration
- Leverage the existing functionality of Multi cloud in SO
- Bring in the advantages of the K8s orchestrator and
- Set stage for the Cloud Native scenarios

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**Business Impact** - Enables operators and service providers to orchestrate CNFs based services along with the VNFs and PNFs

**Business Markets** - All operators and service providers that are intended to use the CNFs along with PNFs / VNFs

**Funding/Financial Impacts** - Reduction in the footprint of the ONAP for CNF support.

**Organization Mgmt, Sales Strategies** - There is no additional organizational management or sales strategies for this requirement outside of a service providers "normal" ONAP deployment and its attendant organizational resources from a service provider.
ONAP CNF Orchestration – Impacted Components - Guilin

Model to drive the flows:
✓ SDC to denote the flow of which VNFM should be used - similar to Orchestration Type
✓ Information model – optional
✓ Need to investigate the best place to have the meta data, we can perhaps use the existing fields

SDC:
On-board the helm and process it as an artifacts of the CSAR to be distributed
✓ On-board Helm Charts
✓ Resource model to include type
✓ Distribute them

SO:
Won’t consume the Helm by itself but parse it and push it forward to other ONAP components
✓ Parse the CSAR, extract helm
✓ SOL003 adapter enhancements
✓ New K8s Adapter (Interface to K8s Proxy)

K8s Plugin:
✓ Separation from MultiCloud
✓ Perhaps call it as K8s Proxy
✓ Support new API for the SO interaction
✓ Monitoring of status of k8s resources

AAI:
✓ Persist the Service instance
✓ (Persist CNF as a resource)

ESR:
✓ Assisted k8s cluster registration
✓ (K8s cluster auto-discovery)

ETSI Catalog DB:
✓ Persist the ETSi VNFM data (IFA-29 and IFA-40)
✓ Persist Images
ONAP - ETSI model Alignment

Integration of Native (K8s Adapter) with ETSi (SOL003 Adapter) paths in SO
Approach 1 - Future

New model type into the SDC, AAI built over the helm charts as an input and would be distributed to the other ONAP components

Pros
✓ Onboard a design template to the SDC and create a new resource from that
✓ Requires a new model to be introduced
✓ Will be inline to the existing models of the heat and TOSCA based VNFs
✓ Can also be extended to other formats for CNF modeling

Cons
✓ Initial analysis for understanding the standard model
✓ Requires more effort and may span across multiple ONAP releases
✓ The grouping model currently used in ONAP may pose a one-one mapping to the other standard formats
Helm Chart on-boarded as an artifact type to the SDC and distributed to ONAP, AAI would persist it as existing VNF. Helm chart would be stored as flat file and add it to the CSAR package to be distributed.

**Pros**
- Easy to develop comparing with Approach 1
- Better reuse of the existing functional code

**Cons**
- Initial analysis for AAI persisting the CNF instance – Extend the VNF
- Very specific implementation and non extendable (non-helm)
Helm Package – From package in SDC to instantiation in K8s
Guilin - K8s Adapter (Helm) Flow
Day 0 + Day 1 Simplified
Backward compatibility with CNF Macro Instantiation Workflow [Frankfurt] -> cvFW Example

Instantiation of Helm Package with existing VNF model

Status and synchronization of instantiated k8s resources
- Helm Resource Artifact in SDC/SO
- Selected k8s resources added to VNF model in AAI: i.e. Deployment/Stateful Set/Service etc.
- Update of AAI Information by SO: vf-module + CNF specific sub-objects (stretch)

K8s Plugin as a standalone MS
- K8s Adapter in SO to interact directly with the K8s Plugin
- Enhance it to support the functions like the monitoring resources and status update (stretch)

Improvements in k8s cluster registration process (stretch)

Validation through flows
- cvFW Use Case
- E2E (Core) Network Slicing Use Case (stretch)
As part of extending the existing modeling to support the CNFO a separate group is formed with the SMEs from AAI, Modeling and existing function implementers.

The key is to make sure we use the existing VNF model and adapt it to the CNFs to make them generic enough to handle most of the functional use cases

- Generic VNF model to be re-used
- Generic VF Module model to be extended to support CNFs?

This group is discussing the details

- How CNFs should be modeled
- How to persist the available resources to be used by the CNFO
- How to persist the CNF resource instances after they are validated
- Who are the consumers
- The intended format of the resource to be consumed by the Day 2 operations
- Looking to other standardization bodies (CNCF, ETSi)

Meeting is scheduled on every Friday 12:30 AM UTC
Thank You!
Guilin - Design and Distribution of the Helm Chart - Day 0

Designer
- Helm Chart On-board
  - Distribution
  - Distribution
  - Distribution

Admin
- Create Update
- Configure K8S cluster
- Add K8S cluster
  - Add tenant
  - POST Connectivity Info
  - Kubeconfig file
  - Auto Discovery [stretch]

SDC | VID | SO | CDS | AAI | ESR | Artifact Broker | K8s Plugin | K8s cluster
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Distribution
Distribution
Distribution
Guilin – Instantiation of the Helm Chart – k8s Paths in SO - Day 1

- Create Service Instance
- Process Model Info & decide flows
- Homing Information
- Create vf-module in K8s
- vf-module in K8s created
- Update vf-module
- Assign Service, Assign VNF – No Change
- To external SVNFM
- RB Instance
- Instance Status
- To External K8s Custer

ETSI Flow
Native flow

SO
SO: BPMN
SO: SOL003
OOF
AAI
SDNC
CDS
SO: K8s Adapter
SOL003 Adapter
K8s Plugin
Guilin – Instantiation of the Helm Chart (Simplified- k8s Adapter Flow) - Day 1

Create SO

Homing Information

Assign Service, Assign VNF

Create vf-module

Assign vf-module

vf-module assigned

Assign vf-module

vf-module

Assign result

Build RB Profile

Install K8s Resources

Assign Service, Assign VNF

Create vf-module in K8s

vf-module in K8s created (deployments)