Enhancing ONAP to orchestrate container VNFs using container orchestration as VIMs

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links

- [https://wiki.onap.org/display/DW/September+26-28+Topics#September26-28+Topics-M8](https://wiki.onap.org/display/DW/September+26-28+Topics#September26-28+Topics-M8)
  - Enhancing ONAP to orchestrate container VNFs using container orchestration as VIMs
- [https://zoom.us/j/1625999919](https://zoom.us/j/1625999919)
- This slide:
  [https://docs.google.com/presentation/d/18lh8g-GpN8fJi2MYOKNx-s-Lyhlc6bkLrMR0mndWgjQ/edit?usp=sharing](https://docs.google.com/presentation/d/18lh8g-GpN8fJi2MYOKNx-s-Lyhlc6bkLrMR0mndWgjQ/edit?usp=sharing)
- Meeting minutes:
  [https://wiki.onap.org/display/DW/2017-09-26+Meeting+notes%3A+Enhancing+ONAP+to+orchestrate+container+VNFs+using+container+orchestration+as+VIMs?flashId=-674792111](https://wiki.onap.org/display/DW/2017-09-26+Meeting+notes%3A+Enhancing+ONAP+to+orchestrate+container+VNFs+using+container+orchestration+as+VIMs?flashId=-674792111)
- IRC freenode #onap-meeting
Session goal
Enhancing ONAP to orchestrate container VNFs using container orchestration as VIMs

Description: Release 1 ONAP instantiates VNFs as VMs in compute farm using VIMs such as Openstack which manages VM. Increasing VNF density on each node, need for multiple networks/slices, Services using SFC and reduced bringup & network latency requirements in market such as 5G and vCPE are driving container based VNFs. This project proposal is to enhance ONAP to support VNFs as containers in addition to VNFs as VMs by container orchestration as VIM instead of VM manager like openstack.
Session goals: Objective/Outcome desired

- Get consensus on crawl/walk/run direction.
- Get agreement on K8S as container VIM in R2
- Get feedback on proposed architecture and changes to various ONAP projects.
- Get an understanding that VNFs as container is needed for ONAP R-2 use cases (5G-RAN and vCPE)
Next steps...

Tech discussion

- Is this proposal good idea?
  - Are there VNFs that uses container?
- plan for R-2
  - First target: Kubernetes/Docker/CNI plugin
- Under existing projects or new project?
- timeframe
- Alignment with Use cases
- Architecture

For technical details we can continue discussion. Let’s schedule room...

If it’s go,

Next steps?

- TBD...

Project logistics

- Wiki pages
- Source code repo
  - multi-VIM
  - SO
- jira/irc/zoom/slack/whatever
- Weekly meeting?
- Volunteers
overview
Background

- The trend is to shift from VM world to container world. Can’t be pushed back
- Deliver them up through ONAP to users
- There are many container related technologies which can be utilized at ONAP layer
  - OPNFV container4nfv
  - K8s feature node
Demands for container technology

- Many telco operators are interested in container instead of VM
Goal and Scope

- Investigate/understand how container will be integrated into ONAP orchestration
- Container managed by ONAP as VIM
- Figuring out necessary enhancements/changes etc
  - How interface
  - How features are exposed to user eventually
- And then (jointly) propose for Release2
Non goal/out-of-scope

- Not installer. ONAP running over container
  - ONAP on kubernetes
  - Self hosting might be possible. But it would be further phase.

- kubernetes/container deployment
- On-demand Installing docker/kubernetes on VMs/baremetal as VIM
  - This is also out of scope for now.
  - For ease of use/deployment, this will be further phase.
architecture
Yet Another Managed Environment
Kubernetes
Node feature
discovery
Enhance for
container
New adapter for
Container
networking
Infra-c
w/Kubernetes
DCAE
collector for
k8s. Maybe
it exists
New interface
to instantiate
PoDs.
Establish container
deployment
Node feature
discovery
New
adapter
to VNF in
container
Enhance for
container
Kubernetes
Stretched goal: containerize approved use cases

- Containerize more approved use cases
- From R-1 use cases
  - vCPE, VoLTE
- From R-2 use cases
  - 5G-RAN, vCPE, SD-WAN, ONAP change management
- Open Source VNF is needed to create container image
Relationship to ONAP components/API

- **Model**
  - TOSCA:
    - Need to align with ETSI VNF model strategy

- **Adapters and its API for SO**
  - Adapter in SO

- **APP-C/VF-C and CCSDK as g-VNFM**
  - VNF life cycle management, VNFM/EMS driver

- **AAI and multi-VIM**
  - To report container features/capabilities
  - Enhance northbound API of multi-vim to accept requests for containers

- **Policy enforcement**
  - Placement policy
  - Operational policy

- **DCAE: collectors for k8s**

- **VNF-SDK**
  - VNF packaging. Maybe container specific?
  - How to describe VNF requirement would/should be VIM-agnostic
Use Cases alignment

R-1 use cases: https://wiki.onap.org/display/DW/Release+1+Use+Cases

- Sample VNF
- vCPE
- VoLTE

R-2 use cases: https://wiki.onap.org/display/DW/Release+2+Use+Cases

- Use case proposal: 5G- RAN deployment, Slicing, SON
- Use Case:Enterprise vCPE --potential R1 use cases’ extension
- Use Case proposal: ONAP Change Management
- Use Case: SD-WAN
Random Considerations

- **Transition from VM to container**
  - Run VM inside container so that VM based VNF can be managed as container.
    - Only for transition. Unify deployment interface with container.

- **Cloud portability**
  - All the major cloud players joined CNCF.
  - Container technology:
    - Docker Moby and linuxkit: this allows to deploy docker on all the major cloud environment
  - Container orchestrator:
    - Kubernetes is winning in this space
    - Kubernetes has various support for container runtime

- **Orchestrator**
  - Kubernetes and docker swarm
  - Kubernetes pod api

- **Container scheduling?**
  - Pod level scheduling
  - Valet: host level scheduling
Open questions

● Container deployment: the first target is k8s on baremetal for simplicity
  ○ K8s over openstack
  ○ K8s on baremetal

● Container technology: The first target is k8s as it’s winning in container space
  ○ Kubetentes
  ○ Docker
  ○ CNI plugin
  ○ Follow CNCF direction: all the major player of cloud space have joined CNCF.

● Scheduling at the level container orchestration layer
  ○ Equivalent to Vallet?
discussion...