OSM#9 Hackfest

Day 2 VNF Operations

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Focus on Virtualised NF operations

OSM

PNF
PNF

Racks

VNF
VNF
VNF

VIM

Proxy Charm
Ops Code

Native Charm

KNF
KNF

Kubernetes
Magma vEPC

- Fixed VM image that pre-dates OSM and cannot be modified
  - Name: magma101_hf9
  - This image already has magma installed.
  - Requires a proxy charm because the image is static rather than being an installable app

- Proxy Charm:
  - Name: magmagw
  - Actions:
    - Add network
    - Add gateway
    - Delete gateway
    - Add hosts
    - Add test subscriber
    - Restart magma
    - Reset ID

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Magma vEPC VNF-Configuration

- SSH access: this proxy charm will use SSH to the VM appliance image so that it can drive the workload there; this directive tells OSM to inject the SSH keys for the proxy charm LXD instance into the VM appliance on launch.

- Initial config primitive: Deployment operations

- Config primitive: Day-2 operations

```yaml
vnf-configuration:
  juju:
    charm: magmagw
  config-access:
    ssh-access:
      required: true
  initial-config-primitive: [
  ]
  config-primitive:
    [...]
```

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VNFD: Magma vEPC

• Initial config primitive:
  • Config: In proxy charms, the first primitive must be config, which will provide the credentials to the proxy charm so it can access the VNF

vnf-configuration:

  [...]
  initial-config-primitive:
   - seq: '1'
     name: config
     parameter:
      - name: ssh-hostname
        value: <rw_mgmt_ip>
      - name: ssh-username
        value: magma
      - name: ssh-password
        value: magma
  [...]
  config-primitive:
  [...]

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vnf-configuration:
    
    initial-config-primitive:
        
        - seq: '2'
          name: reset-id
        - seq: '3'
          name: add-net

        parameter:
            - name: orch_ip
              value: <orch_ip>
            - name: orch_net
              value: <orch_net>
vnf-configuration:
  
  initial-config-primitive:
    
    - seq: '4'
      name: add-gw
      parameter:
        - name: agw_id
          value: <agw_id>
        - name: agw_name
          value: <agw_name>
        - name: orch_ip
          value: <orch_ip>
        - name: orch_net
          value: <orch_net>
vnf-configuration:

```
[...]
initial-config-primitive:
[...]
- seq: '5'
  name: add-test-subscriber
  parameter:
    - name: orch_ip
      value: <orch_ip>
    - name: orch_net
      value: <orch_net>
- seq: '6'
  name: add-hosts
  parameter:
    - name: orch_ip
      value: <orch_ip>
```

- Initial config primitive:
- Reset id
- Add network
- Add gateway
- Add hosts
- Restart magma
vnf-configuration:
  
initial-config-primitive:
  
- seq: '6'
  name: add-hosts
  parameter:
    - name: orch_ip
      value: <orch_ip>
  
- seq: '7'
  name: restart-magma

config-primitive:

• Initial config primitive:
  - Reset id
  - Add network
  - Add gateway
  - Add hosts
  - Restart magma
vnf-configuration:

initial-config-primitive:

cfg-config-primitive:

- name: add-gw
  parameter:
  - name: agw_id
    default-value: <agw_id>
  - name: agw_name
    default-value: <agw_name>
  - name: orch_ip
    default-value: <orch_ip>
  - name: orch_net
    default-value: <orch_net>

• Config primitive:
  • Add gateway
  • Delete gateway
  • Reset id
  • Restart magma
VNFD: Magma vEPC

- **Config primitive:**
  - Add gateway
  - Delete gateway
  - Reset id
  - Restart magma

```yaml
vnf-configuration:
  [...]
initial-config-primitive:
  [...]
config-primitive:
  [...]
  - name: del-gw
    parameter:
      - name: agw_id
        default-value: <agw_id>
      - name: orch_ip
        default-value: <orch_ip>
      - name: orch_net
        default-value: <orch_net>
      - name: reset-id
      - name: restart-magma
```
Primitives in EnodeB + UE emulator

OSM

Native Charm

PNF PNF
Racks

VNF VNF
VIM

VNF

KNF KNF
Kubernetes

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EnodeB and UE emulator

- Image: Based on Ubuntu (Bionic)
  - Name: srsLTEfauxRF_hf9
  - This image already has enodeB and UE installed.

- Native charm:
  - Name: enodeb
  - Actions:
    - Register
    - Attach UE
    - Unregister
    - Detach UE
    - Remove default gateway
EnodeB + UE Emulator

Native Charm

Workload VNF

OSM
VNFD: EnodeB + UE Emulator

- VDU Configuration: When the charm is not a proxy charm, it needs to be inside the vdu-configuration because it will be deployed inside the VM (=VDU)
  - Juju:charm:proxy = False: If proxy is False, it means we are working with a native charm
  - Initial config primitive:
    - Remove default gateway

```
vdu-configuration:
  juju:
    charm: enodeb
    proxy: False
  config-access:
    ssh-access:
      required: True
      default-user: ubuntu
  initial-config-primitive:
    - seq: '1'
      name: remove-default-gw
  config-primitive:
    [...]
```
VNFD: EnodeB + UE Emulator

- VDU Configuration:
  - Config primitive:
    - Register
    - Attach UE
    - Unregister
    - Detach UE

```yaml
vdu-configuration:
  [...]
config-primitive:
  - name: register
    parameter:
      - name: mme-addr
data-type: STRING
      - name: gtp-bind-addr
data-type: STRING
      - name: s1c-bind-addr
data-type: STRING
  [...]
```
VNFD: EnodeB + UE Emulator

• VDU Configuration:
  • Config primitive:
    • Register
    • Attach UE
    • Unregister
    • Detach UE

vdu-configuration:
  [...]  
config-primitive:  
  [...]  
  - name: attach-ue  
    parameter:  
      - name: usim-imsi  
        data-type: STRING
      - name: usim-k  
        data-type: STRING
      - name: usim-opc  
        data-type: STRING
  - name: unregister
  - name: detach-ue
Diving into the Charm
enodeb
Go to the workspace

- Change directory

$ cd ~/june_2/
$ ll
$ 11
hackfest_gateway_vnfd  hackfest_magma-agw-enb_nsd  hackfest_magma-agw-enb_vnfd
Deployment parameters

• params.yaml

```yaml
additionalParamsForVnf:
- member-vnf-index: 'MagmaAGW+srsLTE'

additionalParams:
  agw_id: 'agw_01'
  agw_name: 'AGW1'
  orch_ip: '172.21.251.x'  ## change this to your assigned address
  orch_net: 'osmnet'
```
Build and instantiate packages

- **Build:**
  
  ```
  osm nfpkg-create ~/june_2/hackfest_magma-agw-enb_vnfd
  osm nspkg-create ~/june_2/hackfest_magma-agw-enb_nsd
  ```

- **Instantiate:**
  
  ```
  osm ns-create --ns_name magmaAGW_x --nsd_name hackfest_magma-agw-enb_nsd
  --vim_account hackfest --config_file params.yaml
  ```
Wait until is deployed

• See network services:
  
osm ns-list

• Show how charms progress:
  
juju switch <ns_id>
watch -c juju status --color
Check day-1 actions

- Show actions

  juju show-action-status
Execute day-2 actions

- **Initiate radio:**

  osm ns-action magmaAGW_X --vnf_name "MagmaAGW+srsLTE" --vdu_id srsLTE-vdu --action_name register --params '{mme-add: "192.168.100.254", gtp-bind-add: "192.168.100.10", s1c-bind-add: "192.168.100.10"}'

- **Attach UE Emulator:**

  osm ns-action magmaAGW_X --vnf_name "MagmaAGW+srsLTE" --vdu_id srsLTE-vdu --action_name attach-ue --params '{usim-imsi: "722070000000008", usim-k: "c8eba87c1074edd06885cb0486718341", usim-opc: "17b6c0157895bcaa1efc1cef55033f5f"}'}
Checks

• Check MME logs

```bash
osm ns-list
ssh magma@<ip> # passwd=magma
tail -f /var/log/mme.log
```

• Magma Orch UI: admin@magma.test/password1234

```bash
VNFID=`osm vnf-list | grep orc8r | awk '{ print $2 }'`

osm vnf-show $VNFID --kdu orc8r > vnf-show.txt

MAGMAIP=`cat vnf-show.txt | grep nginx-proxy | grep "LoadBalancer" | awk '{print $4 }'`

echo Magma web interface is https://$MAGMAIP
```
Clean up

• Detach and unregister:

```bash
osm ns-action magmaAGW_X --vnf_name "MagmaAGW+srsLTE" --vdu_id srsLTE-vdu
--action_name detach-ue
osm ns-action magmaAGW_X --vnf_name "MagmaAGW+srsLTE" --vdu_id srsLTE-vdu
--action_name unregister
```

• Remove NS and packages:

```bash
osm ns-delete magmaAGW_X
osm nsd-delete hackfest_magma-agw-enb_nsd
osm vnfd-delete hackfest_magma-agw-enb_vnfd
```