



Open Source
MANO



Panther Demo

Team5



Task 1-2-3 OAI Deployment & Test

NS Instances

⌚ Init ✓ running / configured ✘ failed ✘ scaling

Name	Identifier	Nsd name	Operational Status	Config Status	Detailed Status
Name	Identifier	Nsd name	Select	Select	Detailed Status
5gcore_panther_team5	cf9f811e-7076-4cde-ab63-15241ce70782	oai_cn5g_ns	✓	✓	Done

```
ubuntu@hackfest-microk8s-5:~$ kubectl -n $NS get pod
NAME                           READY   STATUS    RESTARTS   AGE
modeloperator-f7767c8fc-gdmh8   1/1     Running   0          10m
amf-0                           3/3     Running   0          9m32s
db-0                            2/2     Running   0          9m26s
nr-ue-0                         3/3     Running   0          9m26s
nrf-0                           3/3     Running   0          9m12s
gnb-0                           3/3     Running   0          9m2s
spgwu-tiny-0                    3/3     Running   0          8m52s
smf-0                           3/3     Running   0          8m42s
ubuntu@hackfest-microk8s-5:~$ kubectl -n $NS logs spgwu-tiny-0 -c spgwu-tiny | grep 'Received SX HEARTBEAT REQUEST' | wc -l
48
ubuntu@hackfest-microk8s-5:~$ kubectl -n $NS logs smf-0 -c smf | grep 'Received N4'
2021-09-17T10:21:44.447Z [oai_smf] [2021-09-17T12:21:44.447192] [smf] [smf_n4 ] [info ] Received N4 ASSOCIATION SETUP RESPONSE from an UPF
2021-09-17T10:21:44.447Z [oai_smf] [2021-09-17T12:21:44.447212] [smf] [smf_n4 ] [info ] Received N4 ASSOCIATION SETUP RESPONSE
ubuntu@hackfest-microk8s-5:~$
```

Task 1-2-3 OAI Deployment & Test

- Functionality Test
- `kubectl -n $NS logs spgwu-tiny-0 -c spgwu-tiny | grep 'Received SX HEARTBEAT REQUEST' | wc -l`
- `kubectl -n $NS logs smf-0 -c smf | grep 'Received N4'`
- `kubectl -n $NS exec -it nr-ue-0 -c nr-ue -- sh`
- `root@nr-ue-0:/opt/oai-nr-ue# ping -c4 google.com`
- PING google.com (142.250.179.142) 56(84) bytes of data.
- 64 bytes from ams17s10-in-f14.1e100.net (142.250.179.142): icmp_seq=1 ttl=107 time=58.1 ms
- 64 bytes from ams17s10-in-f14.1e100.net (142.250.179.142): icmp_seq=2 ttl=107 time=58.3 ms

Task 1-2-3 OAI Deployment & Test

Model 1 (Cloud/Region): cloud-d3821316-79ed-4393-b77d-4fd5b023bc0b/ default

All	Apps - 7	Units - 7	Relations - 9	
App	Status	Scale	Charm	Store
● amf	active	1	oai-amf	local
● db	active	1	oai-db	local
● gnb	active	1	oai-gnb	local
● nr-ue	active	1	oai-nr-ue	local
● nrf	active	1	oai-nrf	local
● smf	active	1	oai-smf	local
● spgwu-tiny	active	1	oai-spgwu-tiny	local
Unit	Workload	Agent	Machine	Public Address / Address
● amf/0 (Leader)	active	idle	-	10.1.230.12
● db/0 (Leader)	active	idle	-	10.1.230.57
● gnb/0 (Leader)	active	idle	-	10.1.230.63
● nr-ue/0 (Leader)	active	idle	-	10.1.230.6
● nrf/0 (Leader)	active	idle	-	10.1.230.17
● smf/0 (Leader)	active	idle	-	10.1.230.58
● spgwu-tiny/0 (Leader)	active	idle	-	10.1.230.34

Task 4 Service Restart Action

Execute stoptcpdump action on amf application

Execute startcpdump action on amf application

```
#####
# Custom Actions
#####

def _on_starttcpdump_action(self, event):
    try:
        self._start_service("tcpdump", "tcpdump")
        event.set_results({
            "output": f"tcpdump started successfully"
        })
    except Exception as e:
        event.fail(f"Start tcpdump action failed with the following exception: {e}")

def _on_stoptcpdump_action(self, event):
    try:
        self._stop_service("tcpdump", "tcpdump")
        event.set_results({
            "output": f"tcpdump stoped successfully"
        })
    except Exception as e:
        event.fail(f"Stop tcpdump action failed with the following exception: {e}")
```

Task 5 Scale up Operation

<https://ui.172.21.18.15.nip.io/login>

```
df:
- id: default-df
  kdu-resource-profile:
    - id: amf-scale
      kdu-name: native-kdu
      resource-name: amf
      min-number-of-instances: 1
      max-number-of-instances: 5
    - id: smf-scale
      kdu-name: native-kdu
      resource-name: smf
      min-number-of-instances: 1
      max-number-of-instances: 5
    - id: nrf-scale
      kdu-name: native-kdu
      resource-name: nrf
      min-number-of-instances: 1
      max-number-of-instances: 5
    - id: gnb-scale
      kdu-name: native-kdu
      resource-name: gnb
      min-number-of-instances: 1
      max-number-of-instances: 5
```

```
number-of-instances: 1
- id: scale-nrf
  name: scale-nrf
  max-scale-level: 10
  aspect-delta-details:
    deltas:
      - id: kdu-delta
        kdu-resource-delta:
          - id: nrf-scale
            number-of-instances: 1
- id: scale-gnb
  name: scale-gnb
  max-scale-level: 10
  aspect-delta-details:
    deltas:
      - id: kdu-delta
        kdu-resource-delta:
          - id: gnb-scale
            number-of-instances: 1
```

Task 5 gNB Scale up Operation

```

2021-09-17T10:58:18 DEBUG lcm.ns libjuju.py:823 Scaling application gnb in model native-kdu-c8101f37-51d1-430a-8e93-73fb07e280ad
2021-09-17T10:58:18 DEBUG lcm.ns libjuju.py:833 Waiting for application gnb to be scaled in model native-kdu-c8101f37-51d1-430a-8e93-73fb07e280ad...
2021-09-17T10:59:11 DEBUG lcm.ns libjuju.py:850 Application gnb is scaled in model native-kdu-c8101f37-51d1-430a-8e93-73fb07e280ad
2021-09-17T10:59:11 DEBUG lcm.ns ns.py:5629 Task ns=c8101f37-51d1-430a-8e93-73fb07e280ad scale=fcb9a54d-dd63-47b7-8788-89101edbfff12 vdu info: {'osm_kdu_id': 'native-kdu', 'member-vnf-index': 'oai_cn5g_amf', 'typ': 'create', 'kdu_index': 0}
2021-09-17T10:59:11 DEBUG lcm.ns ns.py:3291 Task ns=c8101f37-51d1-430a-8e93-73fb07e280ad scale=fcb9a54d-dd63-47b7-8788-89101edbfff12 _deploy_n2vc vnf_id=oai_cn5g_cnf, vdu_id=None
2021-09-17T10:59:11 DEBUG lcm.lcm kafka_read receives ns scaled: {'ns lcmop_id': 'fcb9a54d-dd63-47b7-8788-89101edbfff12', 'nsr_id': 'c8101f37-51d1-430a-8e93-73fb07e280ad', 'operationState': 'COMPLETED'}
2021-09-17T10:59:11 DEBUG lcm.ns ns.py:5983 Task ns=c8101f37-51d1-430a-8e93-73fb07e280ad scale=fcb9a54d-dd63-47b7-8788-89101edbfff12 Exit
  
```

daeae1c94-c52c-4341-8fee-298ada80d299	instantiate	✓	Sep-17-2021 13:52:12	Sep-17-2021 13:54:33	i
fcb9a54d-dd63-47b7-8788-89101edbfff12	scale (SCALE_OUT)	✓	Sep-17-2021 13:58:18	Sep-17-2021 13:59:11	i

NAME	READY	STATUS	RESTARTS	AGE
modeloperator-8fdd55447-5wgpv	1/1	Running	0	8m49s
db-0	2/2	Running	0	7m55s
nr-ue-0	3/3	Running	0	7m48s
amf-0	3/3	Running	0	7m48s
smf-0	3/3	Running	0	7m38s
nrf-0	3/3	Running	0	7m28s
spgwu-tiny-0	3/3	Running	0	7m28s
gnb-0	3/3	Running	0	7m28s
gnb-1	3/3	Running	0	2m48s

kubectl -n \$NS logs amf-0 -c amf

```

21-09-17T12:45:40.835Z [oai_amf] [2021-09-17T14:45:40.835782] [AMF] [amf_app] [info] |-----[gNBs' information]-----|
21-09-17T12:45:40.835Z [oai_amf] [2021-09-17T14:45:40.835815] [AMF] [amf_app] [info] |-----[gNBs' information]-----|
21-09-17T12:45:40.835Z [oai_amf] [2021-09-17T14:45:40.835818] [AMF] [amf_app] [info] |-----[gNBs' information]-----|
21-09-17T12:45:40.835Z [oai_amf] [2021-09-17T14:45:40.835820] [AMF] [amf_app] [info] |-----[gNBs' information]-----|
21-09-17T12:45:40.835Z [oai_amf] [2021-09-17T14:45:40.835824] [AMF] [amf_app] [info] |-----[gNBs' information]-----|
21-09-17T12:45:40.835Z [oai_amf] [2021-09-17T14:45:40.835827] [AMF] [amf_app] [info] |-----[gNBs' information]-----|
21-09-17T12:45:40.835Z [oai_amf] [2021-09-17T14:45:40.835829] [AMF] [amf_app] [info] |-----[gNBs' information]-----|
  
```

Task 6 Api Version Upgrade

- NRF Api version Change in NRF application

```
#Custom action
def _on_changeapiversion_action(self, event):
    try:
        container = self.unit.get_container(self.container_name)
        config = container.pull('/openair-nrf/etc/nrf.conf').read()
        if 'v1' in config:
            newconfig = config.replace('v1', 'v2')
            container.push('/openair-nrf/etc/nrf.conf', newconfig)
            event.set_results({ "output": f"nrf api version updated successfully" })
        else:
            event.set_results({ "output": f"nrf api version not updated" })
    except Exception as e:
        event.fail(f"update action failed with the following exception: {e}")
```

Task 6 Api Version Upgrade

- NRF Api version Change in NRF application

```
ubuntu@hackfest-team-5:~$ osm ns-op-list 5gcore_panther_team5
+-----+-----+-----+-----+-----+-----+
| id | operation | action_name | status | date | detail |
+-----+-----+-----+-----+-----+-----+
| deae1c94-c52c-4341-8fee-298ada80d299 | instantiate | N/A | COMPLETED | 2021-09-17T10:52:12 | - |
| fcb9a54d-dd63-47b7-8788-89101edbfff12 | scale | N/A | COMPLETED | 2021-09-17T10:58:18 | - |
| 27b4b433-4e7e-4388-8d11-71921442706a | action | stoptcpdump | COMPLETED | 2021-09-17T11:57:56 | - |
| 4da63117-0c30-4d43-8f82-1e9e9bc3e84e | action | changeapiversion | COMPLETED | 2021-09-17T13:17:28 | - |
+-----+-----+-----+-----+-----+-----+
```

```
NRF =
{
    INSTANCE      = 0;          # 0 is the default
    PID_DIRECTORY = "/var/run"; # /var/run is the default

    SBI_INTERFACE :
    {
        # NRF binded interface for SBI interface (e.g., communication with other NFs e.g., AMF, SM)
        INTERFACE_NAME = "eth0";      # YOUR NETWORK CONFIG HERE
        IPV4_ADDRESS  = "read";
        PORT          = 80;          # YOUR NETWORK CONFIG HERE (default: 80)
        HTTP2_PORT    = 9090; # YOUR NETWORK CONFIG HERE
        API_VERSION   = "v2";          # YOUR NRF API VERSION CONFIG HERE
    };
};

root@nrf-0:/openair-nrf/etc#
```

Difficulties

- Upgraded Juju version
- Can not execute subprocess command in the core network containers

Panther Team



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