

R3 - Test Documentation

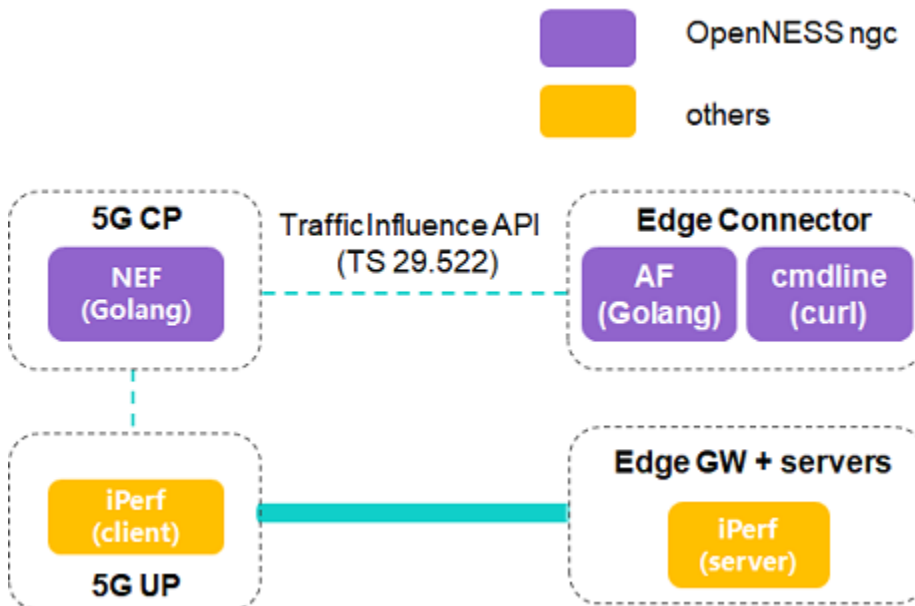
- Test-Env Setup
 - End-to-end test with the 5GC emulator
 - Offloading call flow
 - Setup guide
 - Unit Test
- Test results
 - End-to-end test
 - Unit Test
- CI/CD logs

Test-Env Setup

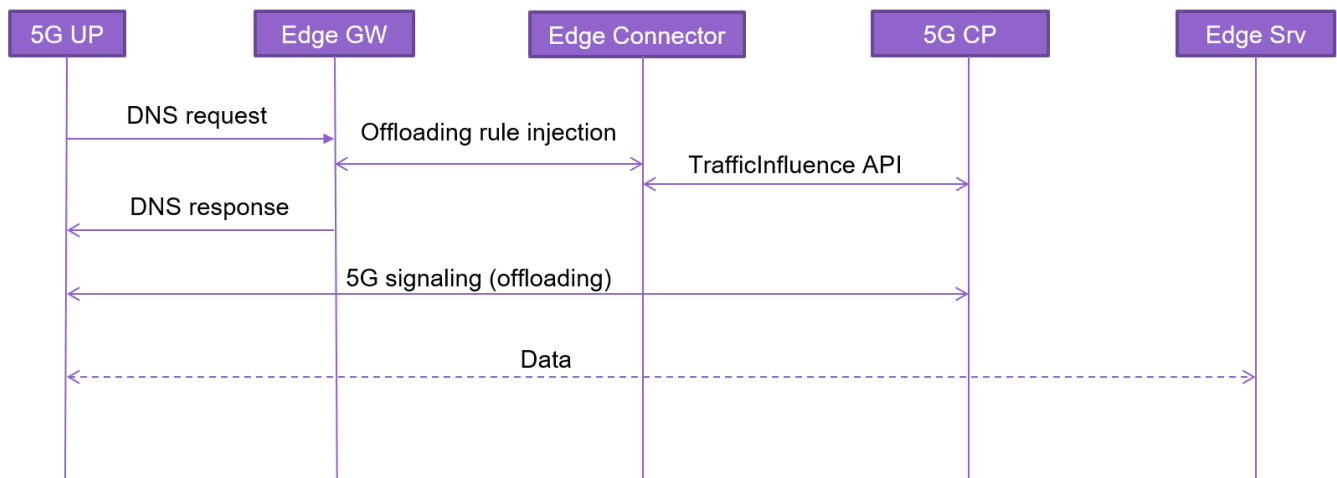
End-to-end test with the 5GC emulator

To validate the BP, a 5GC emulator is provided, which consists of a 5G CP and UP.

- The 5G CP is based on the Network Exposure Function (NEF) implemented by openNESS ngc
- The 5G UP is an iPerf instance running in the client mode, controller by the 5G CP



Offloading call flow



- Offloading case

The 5GC prints "Offloading in progress", while the Edge GW prints the amount of data it receives in realtime.

```
^Cyangf@fengfyang-LC0:~/Documents/5GCEmulator/ngc$ iperf -u -s -i 1
-----
Server listening on UDP port 5001
Receiving 1470 byte datagrams
UDP buffer size: 208 KByte (default)
-----
[ 3] local 127.0.0.1 port 5001 connected with 127.0.0.1 port 46324
[ ID] Interval           Transfer     Bandwidth       Jitter    Lost/Totl  Datagrams
[ 3]  0.0- 1.0 sec      129 KBytes   1.06 Mbits/sec   0.004 ms    0/   90 (0%)
[ 3]  1.0- 2.0 sec      128 KBytes   1.05 Mbits/sec   0.001 ms    0/   89 (0%)
[ 3]  2.0- 3.0 sec      128 KBytes   1.05 Mbits/sec   0.002 ms    0/   89 (0%)
[ 3]  3.0- 4.0 sec      128 KBytes   1.05 Mbits/sec   0.001 ms    0/   89 (0%)
[ 3]  0.0- 4.0 sec      514 KBytes   1.05 Mbits/sec   0.001 ms    0/  358 (0%)
[ 4] local 127.0.0.1 port 5001 connected with 127.0.0.1 port 49316
[ 4]  0.0- 1.0 sec      129 KBytes   1.06 Mbits/sec   0.001 ms    0/   90 (0%)
[ 4]  1.0- 2.0 sec      128 KBytes   1.05 Mbits/sec   0.003 ms    0/   89 (0%)
[ 4]  2.0- 3.0 sec      128 KBytes   1.05 Mbits/sec   0.006 ms    0/   89 (0%)
[ 4]  3.0- 4.0 sec      128 KBytes   1.05 Mbits/sec   0.001 ms    0/   89 (0%)
[ 4]  0.0- 4.0 sec      514 KBytes   1.05 Mbits/sec   0.001 ms    0/  358 (0%)
[ 3] local 127.0.0.1 port 5001 connected with 127.0.0.1 port 44311
[ 3]  0.0- 1.0 sec      129 KBytes   1.06 Mbits/sec   0.001 ms    0/   90 (0%)
[ 3]  1.0- 2.0 sec      128 KBytes   1.05 Mbits/sec   0.001 ms    0/   89 (0%)
[ 3]  2.0- 3.0 sec      128 KBytes   1.05 Mbits/sec   0.001 ms    0/   89 (0%)
[ 3]  3.0- 4.0 sec      128 KBytes   1.05 Mbits/sec   0.001 ms    0/   89 (0%)
[ 3]  0.0- 4.0 sec      514 KBytes   1.05 Mbits/sec   0.001 ms    0/  358 (0%)
[ 4] local 127.0.0.1 port 5001 connected with 127.0.0.1 port 42806
[ 4]  0.0- 1.0 sec      129 KBytes   1.06 Mbits/sec   0.002 ms    0/   90 (0%)
[ 4]  1.0- 2.0 sec      128 KBytes   1.05 Mbits/sec   0.001 ms    0/   89 (0%)
[ 4]  2.0- 3.0 sec      128 KBytes   1.05 Mbits/sec   0.002 ms    0/   89 (0%)
[ 4]  3.0- 4.0 sec      128 KBytes   1.05 Mbits/sec   0.005 ms    0/   89 (0%)
[ 4]  0.0- 4.0 sec      514 KBytes   1.05 Mbits/sec   0.005 ms    0/  358 (0%)
<134>Mar 2 13:14:15 nef[4652]: [NEF] HTTP Request Received :HTTP/2.0
<134>Mar 2 13:14:15 nef[4652]: [NEF] =====
<134>Mar 2 13:14:15 nef[4652]: [NEF] Method : POST
<134>Mar 2 13:14:15 nef[4652]: [NEF] URL PATH : /3gpp-traffic-influence/v1/1/subscriptions
<134>Mar 2 13:14:15 nef[4652]: [NEF] Route Name : CreateTrafficInfluenceSubscription
<134>Mar 2 13:14:15 nef[4652]: [NEF] =====
<134>Mar 2 13:14:15 nef[4652]: [NEF] HTTP Request Handling -- STARTS
<134>Mar 2 13:14:15 nef[4652]: [NEF] AFID : 1
<131>Mar 2 13:14:15 nef[4652]: [NEF] NO AF PRESENT CREATE AF
<134>Mar 2 13:14:15 nef[4652]: [NEF] PCFs PolicyAuthorizationCreate Entered
<134>Mar 2 13:14:15 nef[4652]: [NEF] PCFs Policy Authorization DB size : 0
<134>Mar 2 13:14:15 nef[4652]: [NEF] PCFs Policy Authorization AppSessionId created: 8081
<134>Mar 2 13:14:15 nef[4652]: [NEF] PCFs PolicyAuthorizationCreate [CorrId,NotifUrl,DnaiChg
<134>Mar 2 13:14:15 nef[4652]: [NEF] PCFs PolicyAuthorizationCreate Exited successfully with
<134>Mar 2 13:14:15 nef[4652]: [NEF] PCF Policy Authorization Create Success. Response Code:
<134>Mar 2 13:14:15 nef[4652]: [NEF] NEW AF Subscription added 11111
<134>Mar 2 13:14:15 nef[4652]: [NEF] https://localhost:8060/3gpp-traffic-influence/v1/1/subs
<134>Mar 2 13:14:15 nef[4652]: [NEF] CreateTrafficInfluenceSubscription responses => 201
<134>Mar 2 13:14:15 nef[4652]: [NEF] AF count 1
<134>Mar 2 13:14:15 nef[4652]: [NEF] AF ID : 1, Sub Registered Count 1
<134>Mar 2 13:14:15 nef[4652]: [NEF] SubId : 11111, ServiceId:
<134>Mar 2 13:14:15 nef[4652]: [NEF] HTTP Request Handling -- ENDS. Time Taken: 387.002µs
<134>Mar 2 13:14:15 af[4643]: [ngc-af] Deleted transaction ID 1
offloading in progress...
offloading in progress...
offloading in progress...
offloading in progress...
offloading in progress...
offloading in progress...
offloading in progress...
offloading in progress...
offloading in progress...
```

Unit Test

- 5GCEmulator

```

-----
NefServer NefServer init
  Will init NefServer - No HTTP endpoints
/home/gerriit/5g-mec-cloud-gaming/5GCEmulator/ngc/pkg/nef/nef_server_test.go:33
<3>Jun 8 12:52:55 nef.test[4805]: [NEF] Failed to load NEF configuration: open noconfig: no such file or directory
.
Ran 27 of 27 Specs in 8.097 seconds
SUCCESS! -- 27 Passed | 0 Failed | 0 Pending | 0 Skipped
PASS
<6>Jun 8 12:52:55 nef.test[4805]: [NEF] ***** NGC NEF CONFIGURATION *****
<6>Jun 8 12:52:55 nef.test[4805]: [NEF] APIRoot: localhost
<6>Jun 8 12:52:55 nef.test[4805]: [NEF] LocationPrefix: /3gpp-traffic-influence/v1/
<6>Jun 8 12:52:55 nef.test[4805]: [NEF] UpfNotificationResUriPath: /3gpp-traffic-influence/v1/notification/upf
<6>Jun 8 12:52:55 nef.test[4805]: [NEF] UserAgent: NEF-OPENNESS-1912
<6>Jun 8 12:52:55 nef.test[4805]: [NEF] ----- NEF SERVER -----
<6>Jun 8 12:52:55 nef.test[4805]: [NEF] EndPoint(HTTP):
<6>Jun 8 12:52:55 nef.test[4805]: [NEF] EndPoint(HTTP2):
<6>Jun 8 12:52:55 nef.test[4805]: [NEF] ServerCert(HTTP2):
<6>Jun 8 12:52:55 nef.test[4805]: [NEF] ServerKey(HTTP2):
<6>Jun 8 12:52:55 nef.test[4805]: [NEF] AFClientCert(HTTP2):
<6>Jun 8 12:52:55 nef.test[4805]: [NEF] *****
<6>Jun 8 12:52:55 nef.test[4805]: [NEF] PCF Stub Client created with initial session id: 1847
<6>Jun 8 12:52:55 nef.test[4805]: [NEF] UDR Stub Client created
<6>Jun 8 12:52:55 nef.test[4805]: [NEF] NEF Location URL Prefix :http://localhost/3gpp-traffic-influence/v1/
<6>Jun 8 12:52:55 nef.test[4805]: [NEF] SMF UPF Notification URL :http://localhost/3gpp-traffic-influence/v1/notification/upf
<6>Jun 8 12:52:55 nef.test[4805]: [NEF] HTTP Server not configured
<6>Jun 8 12:52:55 nef.test[4805]: [NEF] HTTP 2 Server not configured
<3>Jun 8 12:52:55 nef.test[4805]: [NEF] HTTP Servers are not configured
coverage: 71.1% of statements

Ginkgo ran 1 suite in 36.760164264s
Test Suite Passed
make: 离开目录"/home/gerriit/5g-mec-cloud-gaming/5GCEmulator/ngc"
[ root@127 5g-mec-cloud-gaming]#

```

- EdgeNode

```

Step 9/15 : RUN echo '%sudo ALL=(ALL) NOPASSWD:ALL' >> /etc/sudoers
--> Using cache
--> d3666b70a917
Step 10/15 : RUN echo 'Set disable_coredump false' >> /etc/sudo.conf
--> Using cache
--> 8cf8b5bdc0ff
Step 11/15 : USER $username
--> Using cache
--> 4fb34038f995
Step 12/15 : WORKDIR $user_dir
--> Using cache
--> da4de25f7dfa
Step 13/15 : COPY ./edgednssvr ./
--> ea822a827fce
Step 14/15 : ENTRYPOINT ["sudo", "./edgednssvr"]
--> Running in 7a43029600d8
Removing intermediate container 7a43029600d8
--> 5441ebe3b7a2
Step 15/15 : CMD ["-port=53", "-fwd=8.8.8.8"]
--> Running in e84bd8018bbe
Removing intermediate container e84bd8018bbe
--> a5fec2d50f6a
Successfully built a5fec2d50f6a
Successfully tagged edgednssvr:1.0
VER=1.0 docker-compose build syslog-ng
WARNING: The OVN_NB_DB variable is not set. Defaulting to a blank string.
WARNING: The NTS_MEM_MB_SO variable is not set. Defaulting to a blank string.
WARNING: The NTS_MEM_MB_S1 variable is not set. Defaulting to a blank string.
WARNING: The OVS_BRIDGE_NAME variable is not set. Defaulting to a blank string.
WARNING: The OVSE variable is not set. Defaulting to a blank string.
WARNING: The REMOTE_SYSLOG_IP variable is not set. Defaulting to a blank string.
syslog-ng uses an image, skipping
make: 离开目录"/home/gerriit/5g-mec-cloud-gaming/edgenode"

```

- EdgeController

```

-----
CLI test when DNS CLI DelA is called With folder path instead of file
Should trigger an error
/home/gerriit/5g-mec-cloud-gaming/edgecontroller/edgednsccli/cli_test.go:345
del failure: Failed to read JSON file /tmp: Failed to read file /tmp: read /tmp: is a directory•
-----
CLI test when DNS CLI DelA is called Correct del, empty record_type field
Should pass
/home/gerriit/5g-mec-cloud-gaming/edgecontroller/edgednsccli/cli_test.go:243
RecordType not provided, setting "A" as defaultConnecting to EdgeDNS server(localhost:14204)[Test Server] DeleteAuthoritative: [A
d authoritative host: [A, baz.bar.foo.com.]]•
-----
CLI test when DNS CLI DelA is called Wrong record_type
Should fail
/home/gerriit/5g-mec-cloud-gaming/edgecontroller/edgednsccli/cli_test.go:313
del failure: RecordType of HostRecordSet is not valid[incorrect_type_passed]. Please provide 'None' or 'A' or ... in JSON file•
-----
CLI test when DNS CLI DelA is called With non existing file
Should trigger an error
/home/gerriit/5g-mec-cloud-gaming/edgecontroller/edgednsccli/cli_test.go:333
del failure: Failed to read JSON file /some/not/existing/file: Failed to find file /some/not/existing/file: stat /some/not/existir
-----
CLI test when DNS CLI DelA is called Correct del, without record_type field
Should pass
/home/gerriit/5g-mec-cloud-gaming/edgecontroller/edgednsccli/cli_test.go:266
Connecting to EdgeDNS server(localhost:14204)[Test Server] DeleteAuthoritative: [A baz.bar.foo.com.]Successfully deleted authorita
Ran 15 of 15 Specs in 4.061 seconds
SUCCESS! -- 15 Passed | 0 Failed | 0 Pending | 0 Skipped
PASS

Ginkgo ran 1 suite in 22.368337811s
Test Suite Passed
make: 离开目录"/home/gerriit/5g-mec-cloud-gaming/edgecontroller"
[root@127 5g-mec-cloud-gaming]#

```

CI/CD logs

Pushed to the [Nexus server](#).