

---

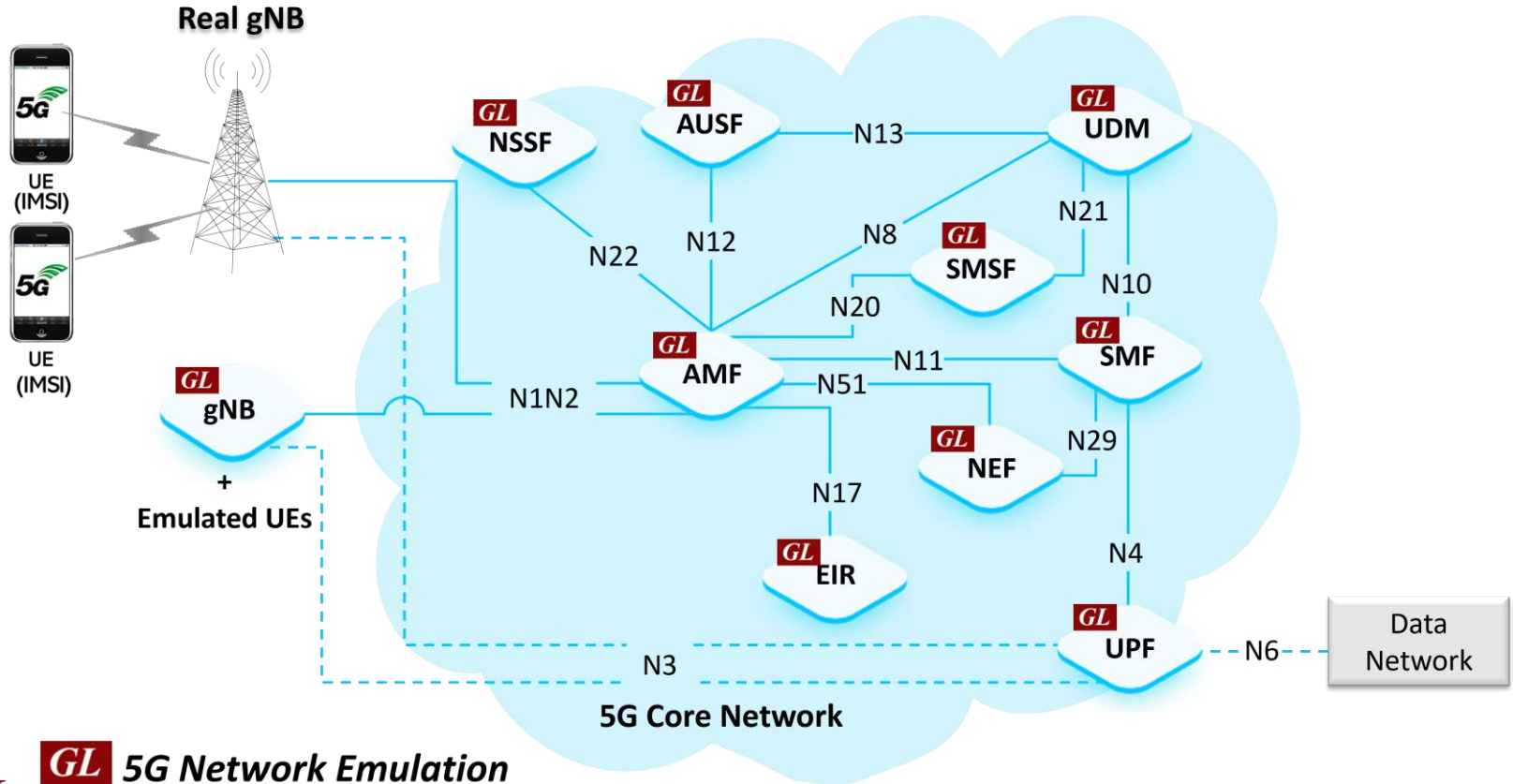
# MAPS™ 5G N1N2 Interface Emulator

---

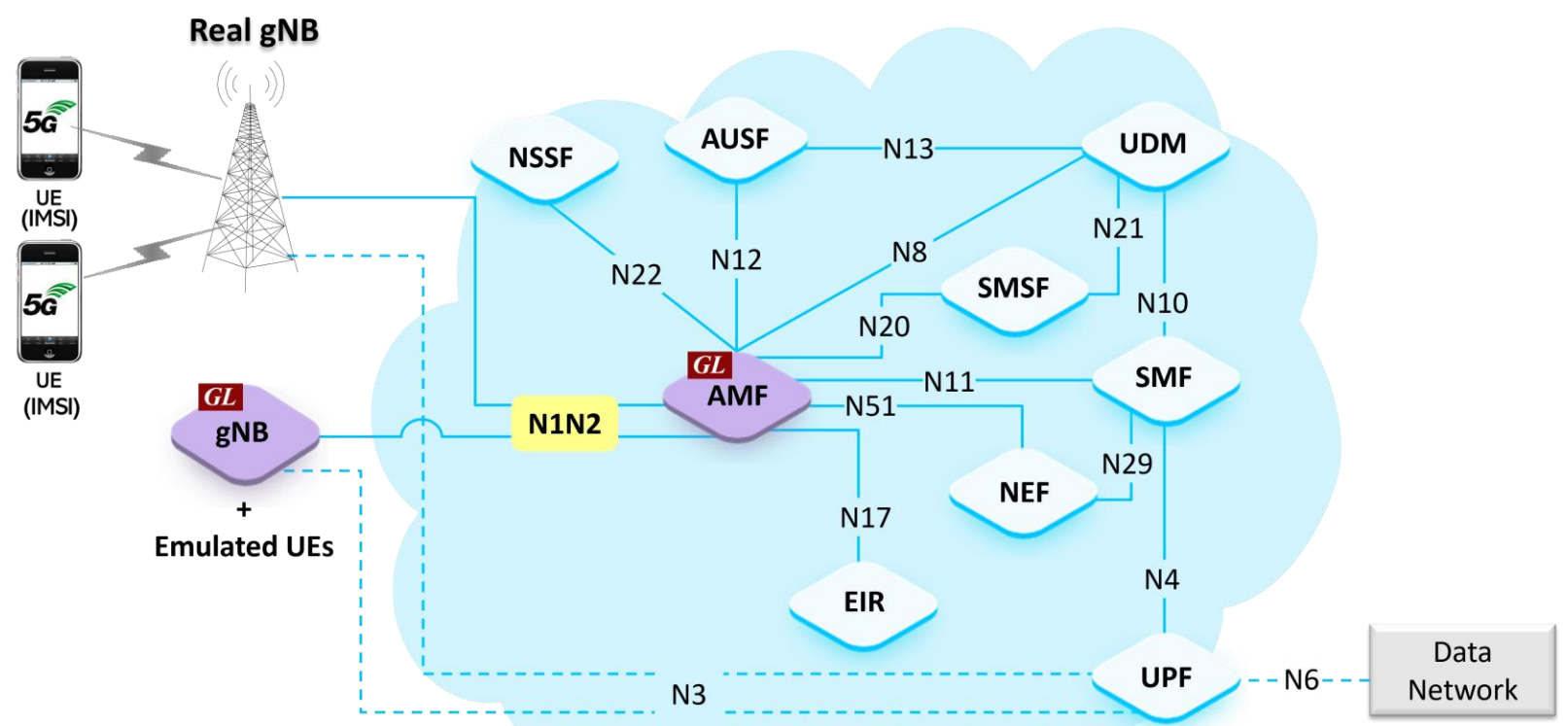


818 West Diamond Avenue - Third Floor, Gaithersburg, MD 20878  
Phone: (301) 670-4784 Fax: (301) 670-9187 Email: [info@gl.com](mailto:info@gl.com)  
Website: <https://www.gl.com>

# 5G Network Diagram



# MAPS™ 5G N1N2 Interface Network Architecture

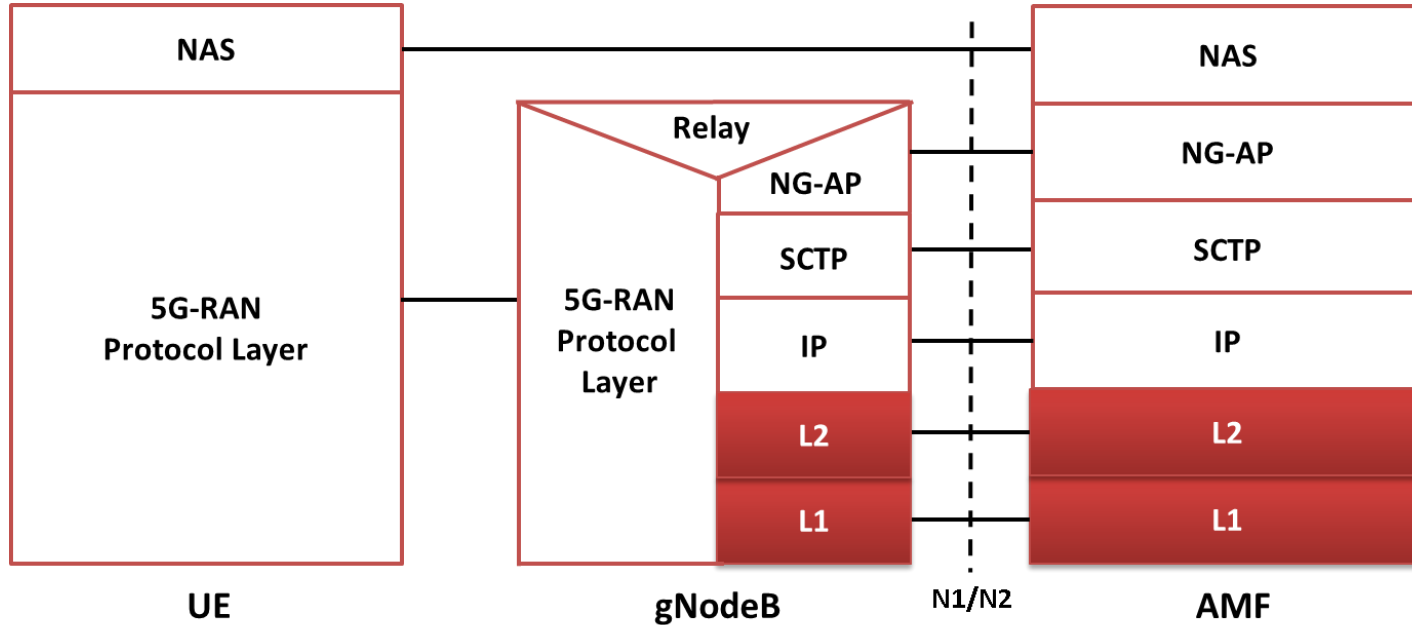


**GL** MAPS™ 5G N1N2  
Interfaces Emulator

# Features

- End-to-End 5G Network Emulation
- Emulate UE+gNodeB and AMF nodes
- Supports Control plane signaling and User plane traffic
- Generate and process NGAP/NAS (valid and invalid) messages
- Insertion of impairments to create invalid messages
- Supports customization of call flow and message templates using Script and Message Editor
- Ready-to-use scripts for quick testing
- Supports scripted call generation and automated call reception
- Emulate Massive UEs (up to 64,000) with Voice Traffic
- Emulate User-plane GTP traffic at high line rates (up to 40 Gbps)
- Provides Call Statistics and Events Status
- Supports Command Line Interface (CLI) using Python API Client

# Protocol Stack Specification



# Protocol Stack Specification (Contd.)

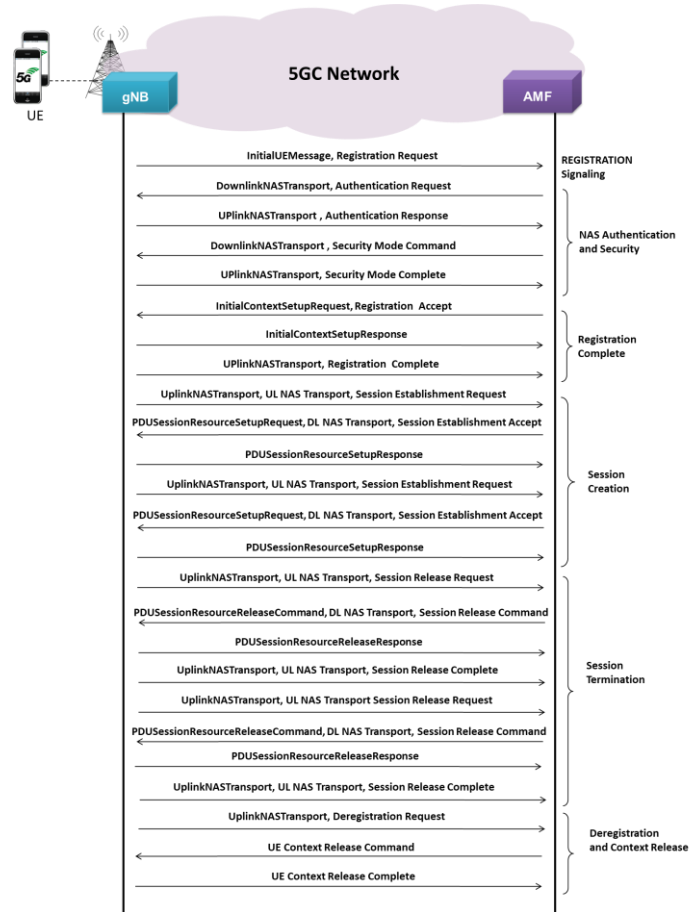
Supported Protocols	Standard / Specification Used
N1N2 Interface (gNB - AMF)	TS24.501
NG-AP	3GPP TS 38.413 V0.7.0 (2018-03)
SCTP	RFC 4960
Non-Access-Stratum (NAS)	3GPP TS 24.501 V1.0.0 (2018-3)
NR and NG-RAN	3GPP TS 28.300 V2.0.0 (2017-12)

- NG Application Protocol (NGAP): Application Layer Protocol between the gNodeB and the AMF
- SCTP for the control plane (SCTP): This protocol guarantees delivery of signaling messages between AMF and gNodeB (N1N2). SCTP is defined in RFC 2960

# MAPS™ 5G Call Scenarios

- UE Registration Signaling
  - Initial UE Message
  - Downlink NAS Transport
  - Uplink NAS Transport
  - Registration Procedure
  - Authentication Procedure
  - Security Mode Procedure
  - PDN Connectivity Request
  - Initial Context Setup Procedure
- Session Establishment Procedure
  - Session Establishment Request
  - Session Establishment Accept
- Session Release Procedure
  - Session Release Request
  - Session Release Command
  - Session Release Complete
- Deregistration procedures
  - Deregistration Request
  - Deregistration Accept
- UE Context Release Procedure
  - UE Context Release Command
  - UE Context Release Complete

# MAPS™ 5G N1N2 Call Scenario





# Testbed Configuration (AMF)

The screenshot displays the MAPS AMF configuration window for a testbed setup. The interface is titled "MAPS AMF (N1N2 RELEASE17) - [Testbed Setup - TestBedDefault]" and includes a menu bar with options like Configurations, Emulator, Reports, Editor, Debug Tools, Windows, and Help. The main area is a tree view of configuration parameters, with a table showing the values for each. An "Enable" checkbox is visible on the right side of the table.

Config	Value	Enable
AMFConfiguration		<input checked="" type="checkbox"/>
AMF	1	
AMF 1		
Traffic Adapter Index	1	
AMF IP Address	192.168.13.61	
AMF Port	38412	
AMF GTP IP Address	192.168.13.61	
PLMN Identity		
MCC	001	
MNC	01	
Network Slicing NSSAI	1	
Network Slicing NSSAI 1		
AMF Name	glamf	
AMF Region ID	2	
AMF Set ID	1	
AMF Pointer	63	
DNN Configuration	3	
DNN Configuration 1		
DNN Name	default	
IPv4 Range		
Start IP	192.168.15.121	
End IP	192.168.15.140	
IPv6 Range		
DNN Configuration 2		
DNN Configuration 3		
Traffic Parameters		
Traffic	Enable	
GTP Port for Traffic	2152	
Traffic Type	GateWay	
GateWay Configuration		
IPv4 Gateway Address	192.168.12.1	
Subnet Mask	255.255.252.0	
IPv6 Allocation for UE	Enable	
IPv6 Gateway Address	fe80::48c3:9457:9b6d:3133	
IPv6 Subnet Mask	ffff::	
Packet Load Traffic Configuration		
Primary DNS IP Address	8.8.8.8	
Primary DNS IPv6 Address	2001:4860:4860:8888	
UE Simulation Parameters		
Type Of UE Simulation	Profiles	
End User Configuration	AMF_Profiles.xml	
CSV FileName	C:\Program Files\GL Communications Inc\MAPS...	
Auto Generated Users Info		
No Of Users To Be Simulated	1000	
Starting IMSI	001013012041631	

# Testbed Configuration (gNB)

The screenshot displays the MAPS gNB configuration window for a testbed setup. The interface includes a menu bar (Configurations, Emulator, Reports, Editor, Debug Tools, Windows, Help) and a toolbar with various icons. The main area is a tree view of configuration parameters, with a 'Value' column and an 'Enable' checkbox on the right.

Config	Value	Enable
gNB		<input checked="" type="checkbox"/>
gNBConfiguration	1	
gNBConfiguration 1		
Traffic Adapter Index	2	
gNB IP Address	192.168.13.12	
gNB GTP IP Address	192.168.13.12	
GTP Port For Traffic	2152	
SCTP Mode	Client	
Global RAN Node Type	globalgNB-ID	
gNB ID	10000001	
Ng ENB Configuration	Macro gNB Id	
Macro gNB Id	12345	
Short Macro gNB Id	12345	
Long Macro gNB Id	12345	
N3IWF Name	GLWifi	
RAN Node Name	gnb000000001	
Paging DRX	v128	
Cell Identity	00000001	
Supported TA List	1	
Destination Parameters		
Select AMF Pool	1	
AMF Pool Configurations		
AMF Pool	1	
AMF Pool 1		
AMF	1	
AMF 1		
AMF IP Address	192.168.13.61	
AMF Port	38412	
gNB Port	38412	
Traffic Parameters		
Traffic	Enable	
MobilePCore Traffic		
GTP Client IP Address	192.168.13.12	
Packet Load Traffic Configuration		
PacketLoad Traffic Type	HTTP Traffic	
Management IP Address	192.168.12.60	
Traffic Mode	GTP TO GTP	
External GateWay Configuration For PacketGen		
GTP Gateway for SIP or RTP Generation Over IP		
UE Simulation Parameters		
Type Of UE Simulation	Profiles	
End User Configuration	UE_Profiles.xml	
CSV FileName	C:\Program Files\GL Communications ...	
Auto Generated Users Info		

Buttons: Start, Edit

Status: Initialisation Errors, Error Events

# Profile Configuration (AMF)

The screenshot displays the 'MAPS AMF (N1N2 RELEASE17) - [Profile Editor -AMF\_Profiles]' application window. The interface includes a menu bar (Configurations, Emulator, Reports, Editor, Debug Tools, Windows, Help) and a toolbar with various icons. The main area is divided into three panes:

- Profiles (Edit-F2):** A list of 29 profiles, with 'MSIN3012041631' selected at the top.
- Config:** A tree view showing the configuration structure for the selected profile. The tree is expanded to show the following settings:
  - Mobile Identity
    - Type Of Identity: SUCI
    - IMSI: 001013012041631
  - SUCI
    - SUPI Format: IMSI
    - Protection Scheme Identifier: Null Scheme
    - Home Network Public Key Identifier: 0
    - IMEI: 359877068325248
    - IMEISV: 1234567890123001
    - MSISDN: 3012041631
  - Authentication Parameters
    - Authentication Type: 5G-AKA
    - Authentication Algorithm Type: Milenage
    - Key: 00112233445566778899aabbccddeeff
    - Operator Variant Parameter Type: OPc
    - OP: 0102030405060708091011121314151601...
    - OPc: 01020304050607080910111213141516
    - AMF: 8000
    - SQN: 00000000079
  - Integrity and Encryption Algorithm Selection
    - NAS Key Set Identifier: 7
    - Type Of Security Context Flag: Native Security Context
  - Required QoS
  - Network Initiated Deregistration Parameters
  - SMS Call Parameters
  - UE Context
    - PCSCF IP Address: 192.168.12.181
    - PCSCF IPv6 Address: fe80::48c3:9457:9b6d:3133
    - IMS Voice Over PS Support: Supported
    - DNN: internet
  - QoS Rule
  - Session AMBR
  - Traffic Parameters
    - PacketCheck Traffic Parameters
    - Mobile Traffic Parameters
      - TCP Server Ip: 192.168.15.80
      - TCP port for HTTP: 80
      - OS Socket: Enable
- Enable:** A panel on the right with an 'Enable' checkbox checked and buttons for 'Add', 'Insert', 'Delete', and 'Properties'.

At the bottom of the window, there are status indicators for 'Initialisation Errors', 'Error Events', and 'Captured Errors', all of which are currently empty.

# Script Editor

```
ScriptEditor - [E:\17-01-24\MAPSSG-N1N2 -Verylatest\MAPS\N1N2\RELEASE17\gNB\Scripts\5GNGAP_gNB.gls]
File View Edit Shortcuts Tools Help
Command Window
5GNGAP_gNB
2 //UE Registration Procedure//
3 //Initiates Registration procedure by sending Registration Request Message //
4
5 ParentScriptId = "";
6 RANState="Null";
7 SGMMSubState="SGMM-NULL";
8 SGMMState = "RM-NULL";
9 RAN_UE_NGAPID=0;
10 //RAN_UE_NGAPIDs="RAN";
11 //AllocUniqueId RAN_UE_NGAPIDs RAN_UE_NGAPID; //Signaling Binding Id
12 PostSend=1; //It is required in case of multithreading as per developers.
13 RegistrationAttemptCounter = 0;
14 DeRegistrationAttemptCounter = 0;
15 KGNB = (binarystring)0x0000;
16 PTI = 0;
17 PDUSessionId = 4;
18 ULNasSeq = 1;
19 DestinationSCNumberPlan=1;
20 DestinationSCNumberType=1;
21 RoutingIndicatorDigit=(binarystring)0000;
22 ProtectionSchemeIdentifier=0;
23 HomeNetworkPublicKeyId=0;
24 UEsUsageSetting=0; //Voice Centric
25 InitialCtxtSetupReqWithRegAccept=0;
26 MaxRequestAttempt=0;
27 //Initialization PDU Status Indicator(array) variable
28 i=0;
29 PSI.Size=15;
30 loop(PSI.Size)
31     PSI[i]=0;
32 endloop;
33
34 MsgHandler:"NGAPMessageHandler";
35 KiDDispStr1="RAN_UE_NGAPID :";
36 KiDDispStr2="AMF_UE_NGAPID :";
37 KiDDispStr3="TMSI :";
38 KiDDispStr4="IMSI :";
39 KeyIdentifier:KiDDispStr3,TMSI,KiDDispStr4,IMSI,KiDDispStr1,RAN_UE_NGAPID,KiDDispStr2,AMF_UE_N
40 //NGAP Causes
41     IsRadioNetwork=0;
42     IsTransport=0;
43     IsNas=0;
44     IsMisc=0;
45
46 //CLI Parameters
47     MsgSeqCount = 0;
48     LoopCount1 = 0;
49     LoopCount = 0;
Ready Line Count - 257 | Line: 1 Col: 1 NUM
```

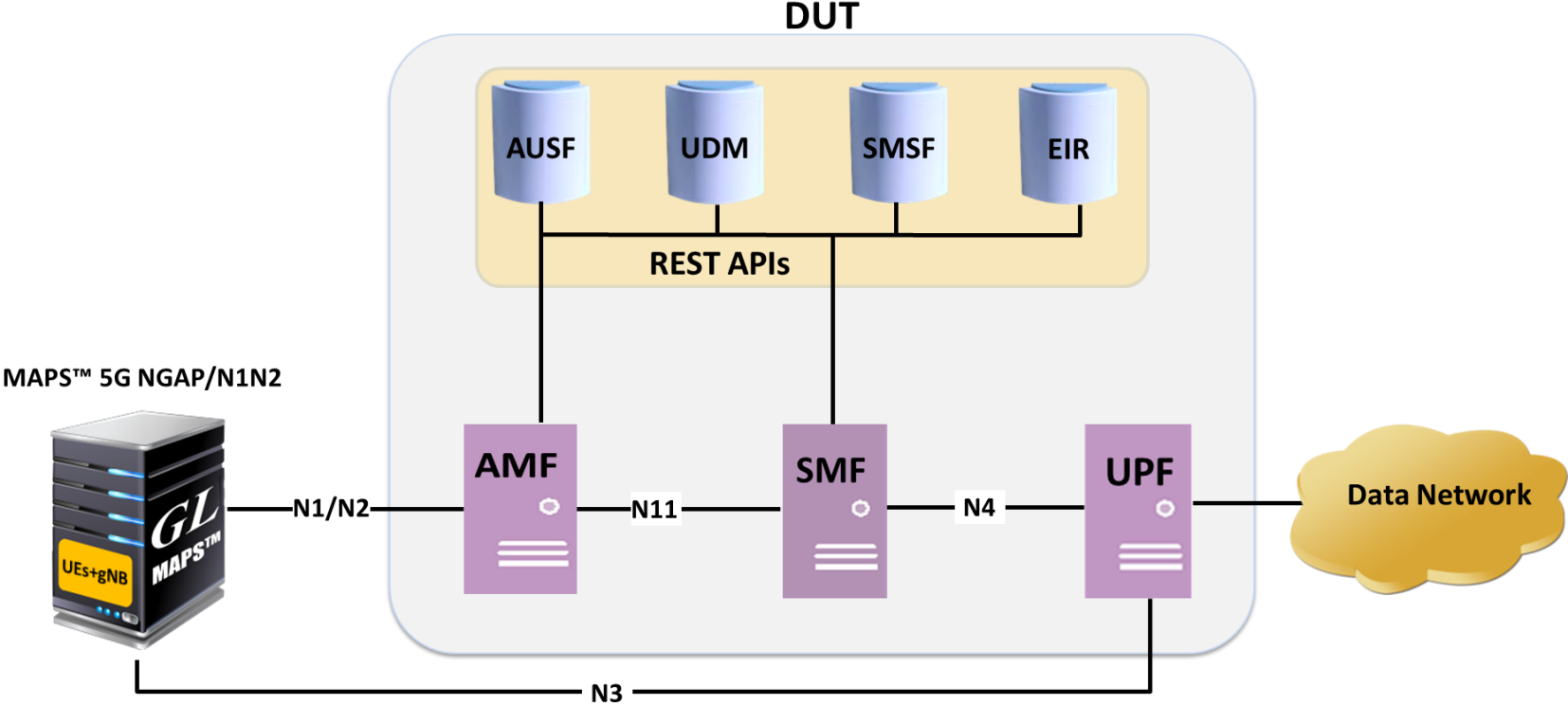
# Message Editor

The screenshot shows the 'Message Editor - AuthenticationRequest' application. The interface includes a menu bar (File, View, Direction, Tools, Help) and a toolbar with icons for file operations and help. The main area is divided into two panes. The left pane shows a tree view of the message structure under the 'NAS' root, with 'MM Message Type' selected. The right pane displays a list of message types, with 'Registration Request = 65' selected. Below these panes is a large text area showing the hex dump of the message, with the following content:

```
===== NGAP Layer =====  
NGAP-PDU = CHOICE  
Extensibility Marker = 0  
Choice Index = 0  
ProcedureCode = INTEGER  
Contents = 4 id-DownlinkNASTransport  
procedureCriticality = ENUMERATOR  
Contents = 0 reject(0)  
Value = Open Type  
Length = 29  
Extensibility Marker = 0  
ProtocolIE-Container = SEQUENCE OF  
Iteration Count = 3  
ProtocolIE-Container = Instance 0  
ProtocolIE-ID = INTEGER  
Contents = 10 id-AMF-UE-NGAP-ID  
procedureCriticality = ENUMERATOR  
Contents = 0 reject(0)  
Value = Open Type  
Length = 3  
AMF-UE-NGAP-ID = INTEGER
```

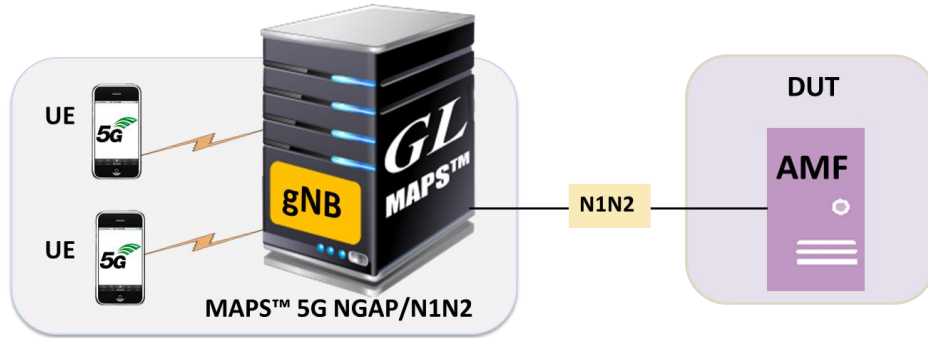
The status bar at the bottom shows 'Ready' and a 'NUM' field.

# MAPS™ gNB Emulator testing 5G Core Network

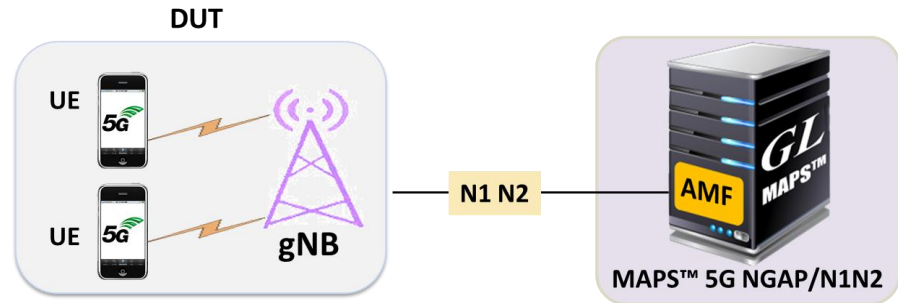


# MAPS™ 5G N1N2 Use Cases

MAPS™ N1N2 configured as AMF to test gNB (DUT)

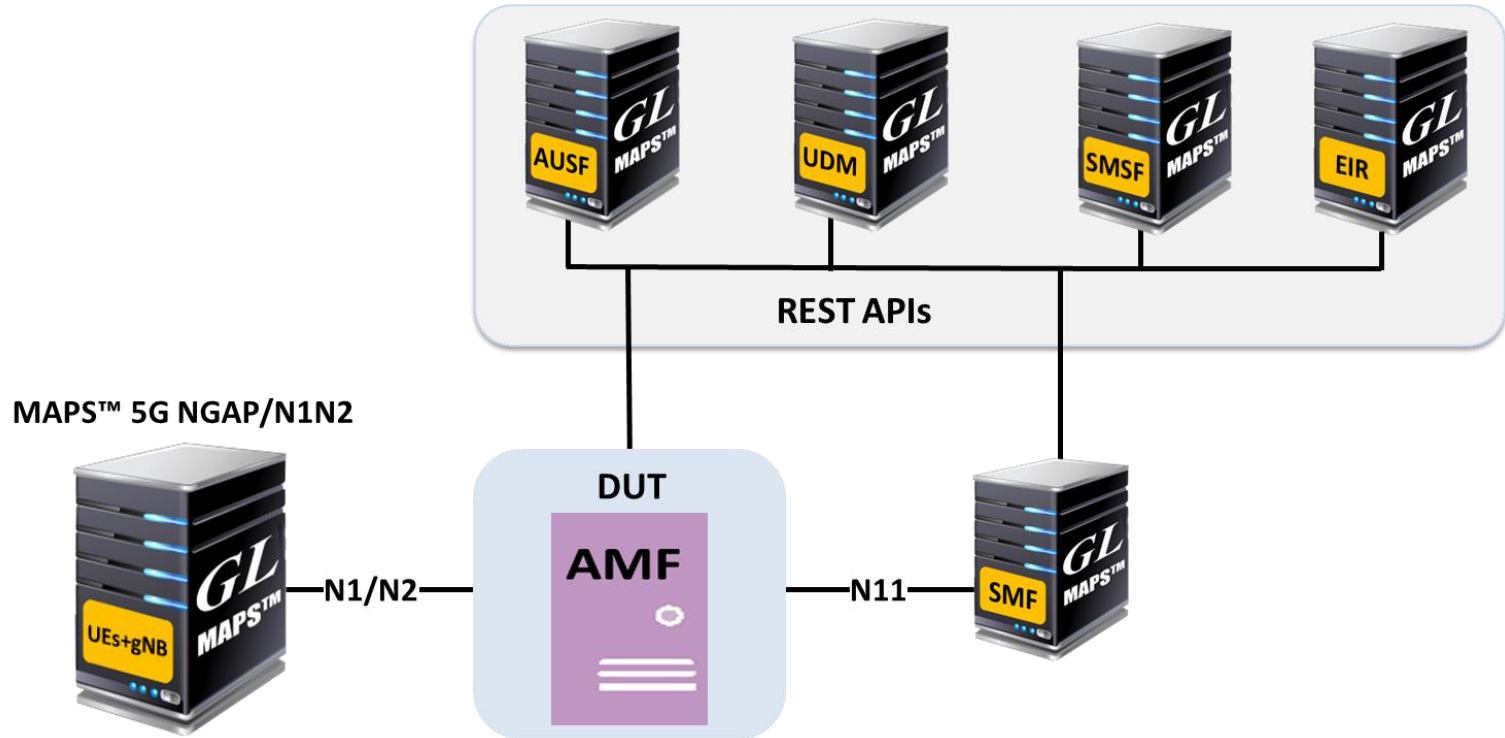


MAPS™ N1N2 configured as gNB to test AMF (DUT)



# MAPS™ 5G N1N2 Use Cases (Contd.)

## Wrap Around Testing of AMF





# MAPS™ 5G N1N2 Interface – Call Generation

The screenshot displays the MAPS gNB (N1N2 RELEASE17) - Call Generation - CallGenDefault interface. The top section shows a table of script executions:

Sr No	Script Name	Profile	Call Info	Script Execution	Status	Events Profile	Result	Total Iterations	Completed Iterations
1	5NGAP_UESessionControl.gls	MSIN3012041631	TMSI_0x80FBD308JMSI_001013012	Start	UE CONTEXT RELEASED	..	Pass	1	1
2	5NGAP_UESessionControl.gls	MSIN3012041632		Start	..	..	Unknown	1	0
3	5NGAP_UESessionControl.gls	MSIN3012041633		Start	..	..	Unknown	1	0
4	5NGAP_UESessionControl.gls	MSIN3012041634		Start	..	..	Unknown	1	0
5	5NGAP_UESessionControl.gls	MSIN3012041635		Start	..	..	Unknown	1	0

The main area shows a message sequence for gNB 0 and AMF 0. The sequence includes:

- InitialUEMessage, Registration Request (11:18:15.231000)
- DownlinkNAS Transport, Authentication Request (11:18:16.057000)
- UplinkNAS Transport, Authentication Response (11:18:16.058000)
- DownlinkNAS Transport, Security Mode Command (11:18:16.157000)
- UplinkNAS Transport, Security Mode Complete (11:18:16.158000)
- InitialContextSetupRequest, Registration Accept (11:18:16.267000)
- InitialContextSetupResponse (11:18:16.269000)
- UplinkNAS Transport, Registration Complete (11:18:16.270000)
- UplinkNAS Transport, UL NAS Transport, Session Establishment Request (11:18:16.313000)
- PDU Session Resource Setup Request, DL NAS Transport, Session Establishment Accept (11:18:16.458000)
- PDU Session Resource Setup Response (11:18:16.462000)
- UplinkNAS Transport, UL NAS Transport, Session Establishment Request (11:18:16.466000)
- PDU Session Resource Setup Request, DL NAS Transport, Session Establishment Accept (11:18:16.556000)
- PDU Session Resource Setup Response (11:18:16.558000)
- UplinkNAS Transport, UL NAS Transport, Session Release Request (11:18:25.879000)
- PDU Session Resource Release Command, DL NAS Transport, Session Release Command (11:18:25.971000)
- PDU Session Resource Release Response (11:18:25.973000)
- UplinkNAS Transport, UL NAS Transport, Session Release Complete (11:18:25.973000)
- UplinkNAS Transport, UL NAS Transport, Session Release Request (11:18:25.974000)

The right pane shows the protocol details for the InitialUEMessage:

```
===== NGAP Layer =====  
NGAP-PDU = InitiatingMessage (0)  
InitiatingMessage =  
  ProcedureCode = 15 id-InitialUEMessage  
  procedureCriticality = 0 reject (0)  
  Value =  
    InitialUEMessage =  
      ProtocolIE-Container = 6 Items  
      Item =  
        ProtocolIE-Field =  
          ProtocolIE-ID = 85 id-RAN-UE-NGAP-ID  
          procedureCriticality = 0 reject (0)  
          Value =  
            RAN-UE-NGAP-ID = 2  
            Item = 1  
            ProtocolIE-Field =  
              ProtocolIE-ID = 38 id-NAS-PDU  
              procedureCriticality = 0 reject (0)  
              Value =  
                NAS-PDU =  
                  x7E004171000D0100F110000 = 2  
                  Item =  
                    ProtocolIE-Field =  
                      ProtocolIE-ID = 121 id-UserLocationInform  
                      procedureCriticality = 0 reject (0)  
                      Value =  
                        UserLocationInformation = userLocationInformationN  
                        userLocationInformationNR =  
                          nR-CDI =  
                          pLMNIdentity =  
                            MCC = 001  
                            MNC = 01  
                            nRCellIdentity = 000000000  
                          tAI =  
                          pLMNIdentity =  
                            MCC = 001  
                            MNC = 01  
                            tAC = x000001  
                          Item = 3  
                          ProtocolIE-Field =  
                            ProtocolIE-ID = 90 id-RRCEstablishmentCa  
                            procedureCriticality = 0 reject (0)
```

# MAPS™ 5G N1N2 Interface – Call Reception

MAPS AMF (N1N2 RELEASE17) - [Call Reception]

Configurations Emulator Reports Editor Debug Tools Windows Help

Sr No	Script Name	Profile	Call Info	Script Execution	Status	Events	Events Profile	Results
1	NGAPManagementHandler.gs		RANName: gnb000000001, gNBId: 0x10000001, ConnectionId: 1001	Stop	NG Setup Successful	SendAMFConfigurationUpdate		Pass
2	AMFSessionControl.gs		MSIN: 3012041631	Completed	UE-CONTEXT RELEASED	None		Pass

Stop Stop All Abort Abort All  Show Records  Select Active Call  Auto Trash  Trash  Show Hidden Calls

Save Column Width Show Latest

gNB 0 AMF

- InitialUEMessage, Registration Request → 16:50:53.792000
- DownlinkNASTransport, Authentication Request ← 16:50:53.821000
- UplinkNASTransport, Authentication Response → 16:50:53.991000
- DownlinkNASTransport, Security Mode Command ← 16:51:00.006000
- UplinkNASTransport, Security Mode Complete → 16:51:00.108000
- InitialContextSetupRequest, Registration Accept ← 16:51:00.210000
- InitialContextSetupResponse → 16:51:00.390000
- UplinkNASTransport, Registration Complete → 16:51:00.395000
- UplinkNASTransport, UL NAS Transport, Session Establishment Request → 16:51:00.400000
- PDUSessionResourceSetupRequest, DL NAS Transport, Session Establishment Accept ← 16:51:00.423000
- PDUSessionResourceSetupResponse → 16:51:00.590000
- UplinkNASTransport, UL NAS Transport, Session Establishment Request → 16:51:00.596000
- PDUSessionResourceSetupRequest, DL NAS Transport, Session Establishment Accept ← 16:51:00.606000
- PDUSessionResourceSetupResponse → 16:51:00.690000
- UplinkNASTransport, UL NAS Transport, Session Release Request → 16:52:00.783000
- PDUSessionResourceReleaseCommand, DL NAS Transport, Session Release Command ← 16:52:00.809000
- PDUSessionResourceReleaseResponse → 16:52:00.884000
- UplinkNASTransport, UL NAS Transport, Session Release Complete → 16:52:00.984000
- UplinkNASTransport, UL NAS Transport, Session Release Request → 16:52:00.988000
- PDUSessionResourceReleaseCommand, DL NAS Transport, Session Release Command ← 16:52:00.989000
- PDUSessionResourceReleaseResponse → 16:52:01.085000
- UplinkNASTransport, UL NAS Transport, Session Release Complete → 16:52:01.088000

Find

```

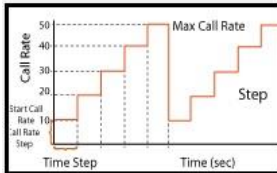
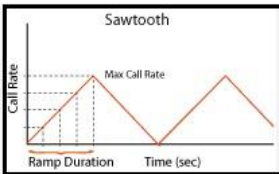
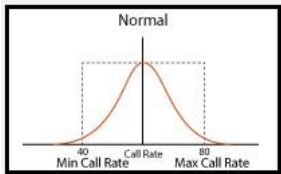
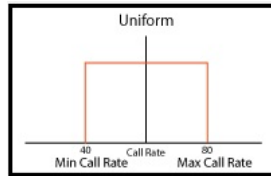
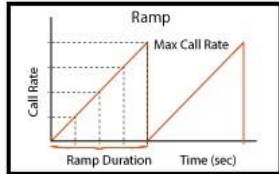
===== NGAP Layer =====
NGAP-PDU                               = InitiatingMessage (0)
InitiatingMessage                       = 15 id-InitialUEMessage
ProcedureCode                           = 0 reject(0)
procedureCriticality                     =
Value                                    =
InitialUEMessage                       =
ProtocolIE-Container                    = 6 Items
Item                                     = 0
ProtocolIE-Field                        =
ProtocolIE-ID                           = 86 id-RAN-UE-NGAP-ID
procedureCriticality                     = 0 reject(0)
Value                                    =
RAN-UE-NGAP-ID                          = 2
Item                                     = 1
ProtocolIE-Field                        =
ProtocolIE-ID                           = 38 id-NAS-PDU
procedureCriticality                     = 0 reject(0)
Value                                    =
NAS-PDU                                  = x7E004171000D0100F1100000000032140E
Item                                     = 2
ProtocolIE-Field                        =
ProtocolIE-ID                           = 121 id-UserLocationInformation
procedureCriticality                     = 0 reject(0)
Value                                    =
UserLocationInformation                  = userLocationInformationNR (1)
userLocationInformationNR                =
nR-CGI                                  =
gNBIDentity                             =
MCC                                       = 001
MNC                                       = 01
nRCellIdentity                          = 0000000000
tAI                                       =
gNBIDentity                             =
MCC                                       = 001
MNC                                       = 01
tAC                                       = x000001
Item                                     = 3
ProtocolIE-Field                        =
ProtocolIE-ID                           = 90 id-RRCEstablishmentCause
procedureCriticality                     = 0 reject(0)
Value                                    =
RRCEstablishmentCause                   = 3 mo-Signalling(3)
Item                                     = 4
ProtocolIE-Field                        =
ProtocolIE-ID                           = 3 id-AMFSetID
procedureCriticality                     = 0 reject(0)
                    
```

Scripts Message Sequence Event Config Script Row

Initialisation Errors Error Events Captured Errors Link Status Up=1 Down=0

# Load Generation

- Stability/Stress and Performance testing using Load Generation
- Different types of Load patterns to distribute load
- User can load multiple patterns for selected script
- User configurable Test Duration, CPS, Maximum and Minimum Call Rate etc.



The screenshot shows the MAPS gNB (N1N2 RELEASE15) - [Load Generation - LoadGendefault] software interface. The window title is "MAPS gNB (N1N2 RELEASE15) - [Load Generation - LoadGendefault]". The menu bar includes "Configurations", "Emulator", "Reports", "Editor", "Debug Tools", "Windows", and "Help". The toolbar contains various icons for file operations and execution. The main area displays the following settings:

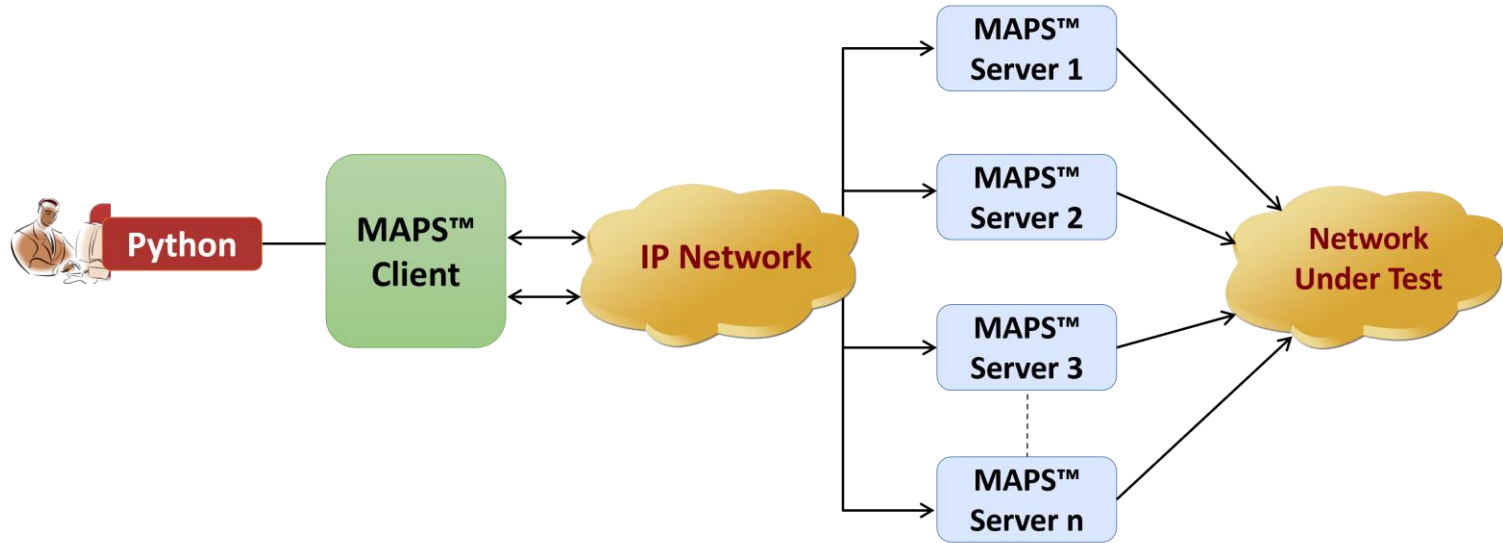
- Total Calls To Generate: \* (no value entered) (\* indicates no limit)
- Max Active Calls: 100
- Unique Distributions Per Script:
- Multi Distributions:
- Statistical Distribution: Fixed
- Call Rate: 25

Below these settings are two tables:

Scripts	Profile
SGINGAP_UESessionControl	MSIN30 12041631
	MSIN30 12041632
	MSIN30 12041633
	MSIN30 12041634
	MSIN30 12041635
	MSIN30 12041636
	MSIN30 12041637

Buttons for "Add" and "Delete" are present below each table. At the bottom, there are fields for "Stop Time" (Days: 0, Hours: 0, Minutes: 0), "Start Time - 00:00:00.000", "End Time - 00:00:00.000", and "Pause" and "Start" buttons.

# MAPS™ API Architecture



- API wraps our proprietary scripting language in standard languages familiar to the user:
  - Python
- Clients and Servers support a “Many-to-Many” relationship, making it very easy for users to develop complex test cases involving multiple signaling protocols

# CLI/API Support

## Python Client

```
Python 3.7.5 Shell
File Edit Shell Debug Options Window Help
Python 3.7.5 (tags/v3.7.5:5c02a39a0b, Oct 15 2019, 00:11:34) [MSC v.1916 64 bit (AMD64)] on win32
Type "help", "copyright()", "credits()" or "license()" for more information.
>>>
** RESTART: C:\Program Files\GL Communications Inc\MAPSSG-NIN2\MAPSCLI\PythonClient\examples\gNB\NIN2_PlaceCall_Default.py
NIN2 Server Connection... True
NIN2 Testbed Starting ... 0
True
NIN2 Profile Loading... True
Check NGAP Link Status... True
NIN2 Call Initiated... True
Call Status... RM-REGISTER-INITIATED
Call Status... REGISTRATION-COMPLETED

PDU Session Initiate for Dnn lms ... True
PDU Session Established

PDU Session Initiate for Dnn internet ... True
PDU Session Established

De-register Initiated... True
Total Signalling Messages: 25
NIN2 Call's LastMSGRcv.....
Time Stamp Route Message
12:11:23.444 <- UEContextReleaseCommand, ,

**** NIN2 Call Message Flow ****
CLI(gNB) <-> DUT(AMF)

Time Stamp Route Message
12:11:10.624 -> InitialUEMessage, Registration Request
12:11:11.537 <- DownlinkNASTransport, Authentication Request, ,
12:11:11.532 -> UplinkNASTransport, Authentication Response
12:11:11.637 <- DownlinkNASTransport, Security Mode Command, ,
12:11:11.650 -> UplinkNASTransport, Security Mode Complete
12:11:11.903 <- InitialContextSetupRequest, Registration Accept, ,
12:11:11.929 -> InitialContextSetupResponse
12:11:11.937 -> UplinkNASTransport, Registration Complete
12:11:12.046 -> UplinkNASTransport, UL NAS Transport, Session Establishment Request
12:11:12.244 <- EDDSesResourceSetupRequest, DL NAS Transport, , Session Establishment Acc
12:11:12.324 -> EDD Session Resource Setup Response
12:11:12.464 -> UplinkNASTransport, UL NAS Transport, Session Establishment Request
12:11:12.639 <- EDDSesResourceSetupRequest, DL NAS Transport, , Session Establishment Acc
12:11:12.707 -> EDD Session Resource Setup Response
12:11:12.859 -> UplinkNASTransport, UL NAS Transport, Session Release Request
12:11:12.946 <- EDDSesResourceReleaseCommand, DL NAS Transport, , Session Release Command
12:11:12.956 -> EDD Session Resource Release Response
12:11:12.969 -> UplinkNASTransport, UL NAS Transport, Session Release Complete
12:11:12.983 -> UplinkNASTransport, UL NAS Transport, Session Release Request
12:11:12.245 <- EDDSesResourceReleaseCommand, DL NAS Transport, , Session Release Command
12:11:12.255 -> EDD Session Resource Release Response
12:11:12.262 -> UplinkNASTransport, UL NAS Transport, Session Release Complete
12:11:12.293 -> UplinkNASTransport, Deregistration Request
12:11:12.444 <- UEContextReleaseCommand, ,
12:11:12.453 -> UEContextReleaseComplete
NIN2 Script Stopping... True
NIN2 Server Disconnecting... True
>>>

***** RESTART: C:\Program Files\GL Communication
-g-NIN2\MAPSCLI\PythonClient\examples\gNB\NIN2_PlaceCall_Default.py *****
```

## MAPS™ CLI Server

```
MapsCLI gNB (NIN2 RELEASE17)
File Edit View
View Latest Command

1: 2024-2-19 12:19:37.252000 : Start 'TestBedDefault.xml' # "_gNB[0].gNBIPAddress[0]"="192.168.12.28", "_TypeOfUESimulation"="XML";
1: 2024-2-19 12:19:51.469000 : LoadProfile 'UE_Profiles.xml'
1: 2024-2-19 12:19:59.012000 : StartScript 1 'SGNGAP_UESessionControl.gls' 'MSIN3012041631' 1 * 'MSIN'=(binarystring)3012041631,'TMSI'=(binarystring)001013012041631,'
1: 2024-2-19 12:20:01.201000 : UserEvent 1 'IsTransportUp';
1: 2024-2-19 12:20:03.600000 : UserEvent 1 'StartRegistration';
1: 2024-2-19 12:20:05.250000 : UserEvent 1 'SessionEstablish';
1: 2024-2-19 12:20:05.580000 : UserEvent 1 'SessionEstablish';
1: 2024-2-19 12:20:15.852000 : UserEvent 1 'DeRegister';
1: 2024-2-19 12:20:26.244000 : UserEvent 1 'GetMessageCount';
1: 2024-2-19 12:20:26.349000 : UserEvent 1 'GetLastReceivedMessage';
1: 2024-2-19 12:20:26.454000 : UserEvent 1 'GetMessageCount';
1: 2024-2-19 12:20:26.574000 : UserEvent 1 'GetMessageInfo' # 'Index'=0;
1: 2024-2-19 12:20:26.679000 : UserEvent 1 'GetMessageInfo' # 'Index'=1;
1: 2024-2-19 12:20:26.783000 : UserEvent 1 'GetMessageInfo' # 'Index'=2;
1: 2024-2-19 12:20:26.888000 : UserEvent 1 'GetMessageInfo' # 'Index'=3;
1: 2024-2-19 12:20:27.008000 : UserEvent 1 'GetMessageInfo' # 'Index'=4;
1: 2024-2-19 12:20:27.113000 : UserEvent 1 'GetMessageInfo' # 'Index'=5;
1: 2024-2-19 12:20:27.218000 : UserEvent 1 'GetMessageInfo' # 'Index'=6;
1: 2024-2-19 12:20:27.338000 : UserEvent 1 'GetMessageInfo' # 'Index'=7;
1: 2024-2-19 12:20:27.443000 : UserEvent 1 'GetMessageInfo' # 'Index'=8;
1: 2024-2-19 12:20:27.548000 : UserEvent 1 'GetMessageInfo' # 'Index'=9;
1: 2024-2-19 12:20:27.653000 : UserEvent 1 'GetMessageInfo' # 'Index'=10;
1: 2024-2-19 12:20:27.773000 : UserEvent 1 'GetMessageInfo' # 'Index'=11;
1: 2024-2-19 12:20:27.878000 : UserEvent 1 'GetMessageInfo' # 'Index'=12;
1: 2024-2-19 12:20:28.103000 : UserEvent 1 'GetMessageInfo' # 'Index'=13;
1: 2024-2-19 12:20:28.208000 : UserEvent 1 'GetMessageInfo' # 'Index'=14;
1: 2024-2-19 12:20:28.313000 : UserEvent 1 'GetMessageInfo' # 'Index'=15;
1: 2024-2-19 12:20:28.418000 : UserEvent 1 'GetMessageInfo' # 'Index'=16;
1: 2024-2-19 12:20:28.538000 : UserEvent 1 'GetMessageInfo' # 'Index'=17;
1: 2024-2-19 12:20:28.643000 : UserEvent 1 'GetMessageInfo' # 'Index'=18;
1: 2024-2-19 12:20:28.748000 : UserEvent 1 'GetMessageInfo' # 'Index'=19;
1: 2024-2-19 12:20:28.973000 : UserEvent 1 'GetMessageInfo' # 'Index'=20;
1: 2024-2-19 12:20:29.078000 : UserEvent 1 'GetMessageInfo' # 'Index'=21;
1: 2024-2-19 12:20:29.198000 : UserEvent 1 'GetMessageInfo' # 'Index'=22;
1: 2024-2-19 12:20:29.303000 : UserEvent 1 'GetMessageInfo' # 'Index'=23;
1: 2024-2-19 12:20:29.408000 : UserEvent 1 'GetMessageInfo' # 'Index'=24;
1: 2024-2-19 12:20:30.728000 : StopScript 1;
ServerLog:errCode = 0,errString = connection has been gracefully closed for ClientId =1

NUM
```

Thank you