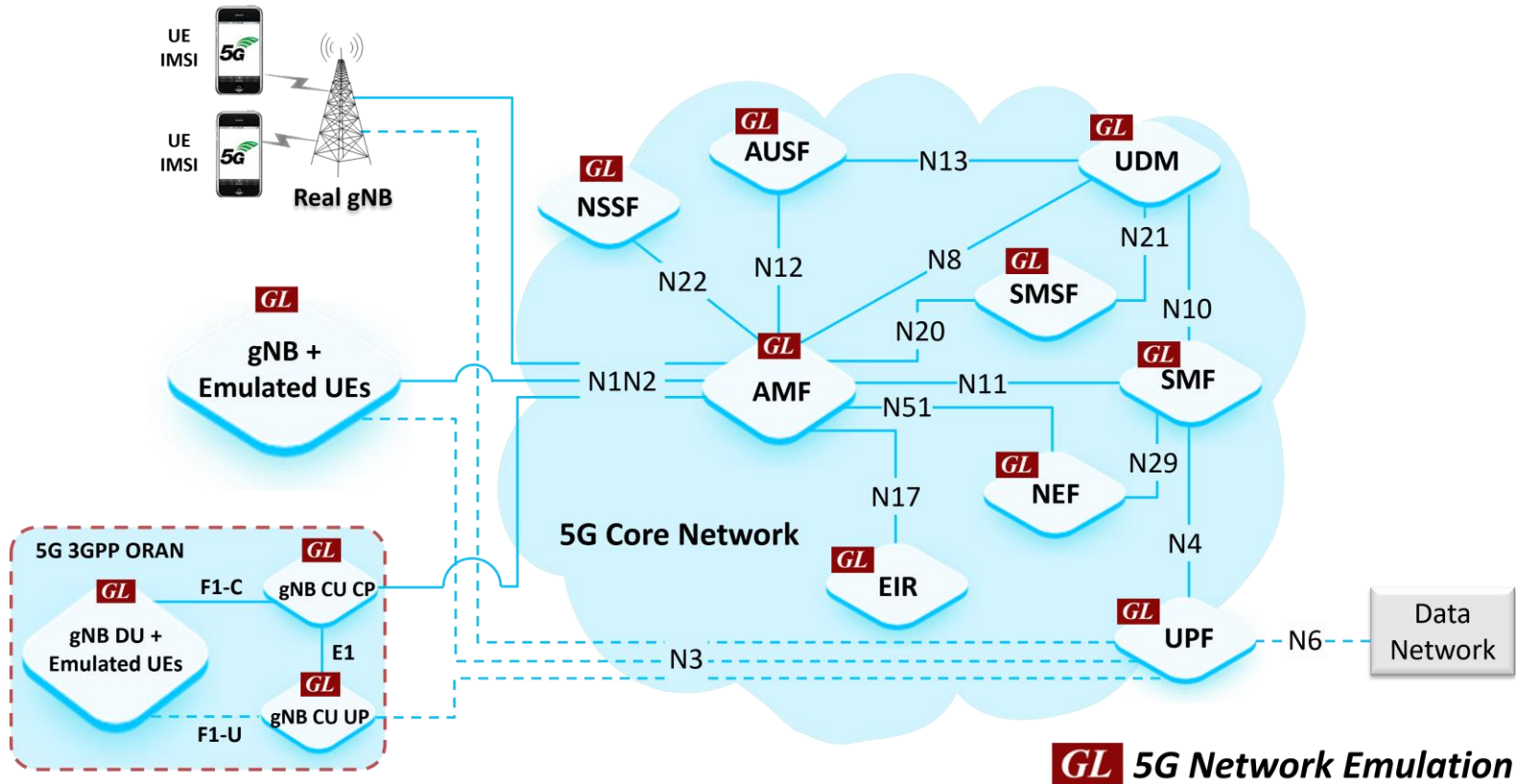

MAPS™ 5G N17 Interface Emulator

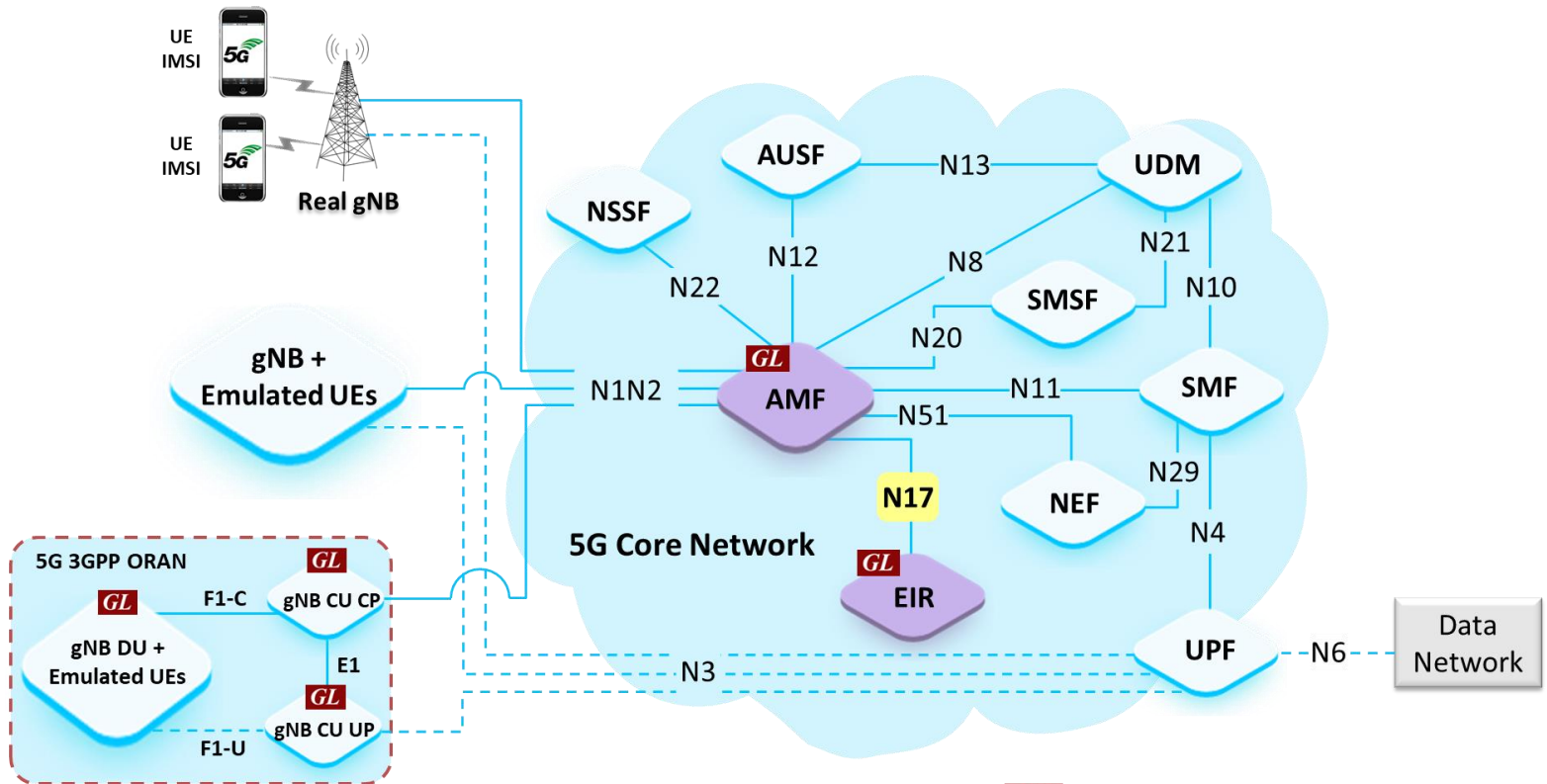


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5G Network Diagram



MAPS™ 5G N17 Network Architecture

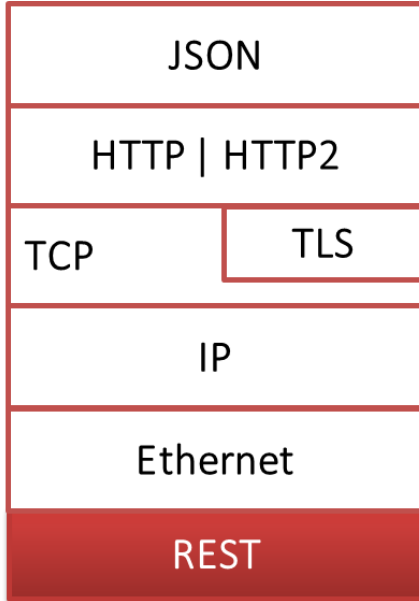


GL MAPS™ 5G N17 Interface Emulator

Main Features

- Emulate Equipment Identity Register (EIR) and Access and Mobility Management Function (AMF) network function
- Supports N5g-eir_EquipmentIdentityCheck Services via the N17 service-based interface
- Services use REST APIs based on HTTP and JSON data format
- Supports TLS and TCP transports
- Supports Command Line Interface (CLI) through a client-server model, enabling users to control all features via Python APIs
- Supports scripted call generation and automated call reception
- Supports customization of call flow and message templates using Script Editor
- Ready-to-use scripts for quick testing
- Provides Call Statistics and Events Status
- Emulate multiple Subscribers using CSV Profiles
- Automation, Remote access, and Schedulers to run tests 24/7

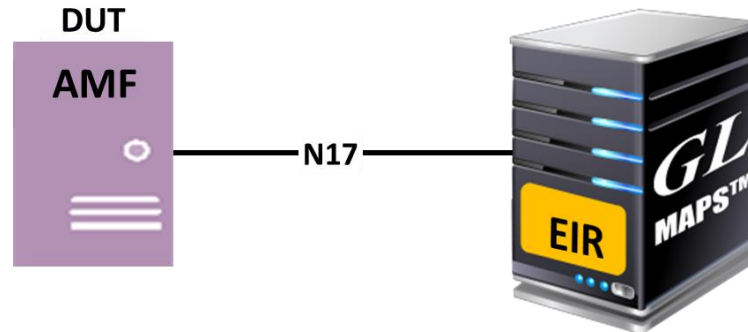
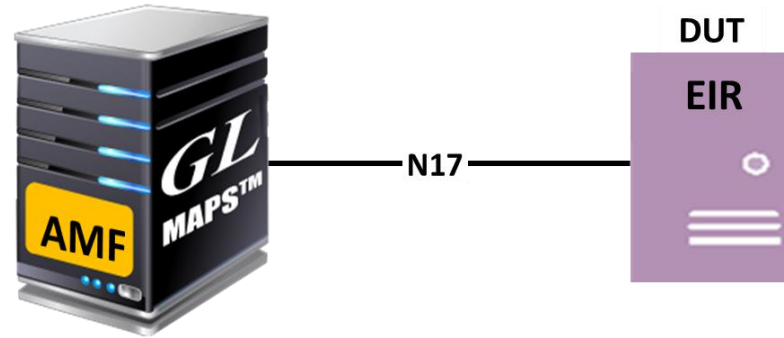
Protocol Stack Specification



Supported Protocols	Standard / Specification Used
N17 Interface (EIR)	3GPP TS 29.511 (Release 17)
JavaScript Object Notation (JSON)	IETF RFC 8259
HTTP	IETF RFC 7231
HTTP / 2	IETF RFC 7540/RFC 7541
TLS	IETF RFC 8446
TCP	IETF RFC 793
IPv4	IETF RFC 791 [5] IETF RFC 2460 [6]

MAPS™ 5G N17 Use Cases

- MAPS™ can emulate any one node (EIR/AMF) or both EIR and AMF nodes



Testbed Setup (EIR)

The screenshot shows the MAPS EIR (N17 RELEASE17) configuration window. The window title is "MAPS EIR (N17 RELEASE17) - [Testbed Setup - TestBedDefault]". The menu bar includes "Configurations", "Emulator", "Reports", "Editor", "Debug Tools", "Windows", and "Help". The toolbar contains various icons for file operations and system functions. The main area displays a configuration tree with the following structure:

Config	Value	Enable
EIR Configurations		<input checked="" type="checkbox"/>
EIR	1	
EIR 1		
N5g EIR IP Address	192.168.1.20	
N5g EIR Port	5055	
URI Scheme	HTTP	
N5g EIR API Version	v1	
NRF		
UE Simulation Parameters		
Type Of UE Simulation	Profiles	
End User Configuration	UE_Profiles_EIR.xml	
CSV FileName	UE_Profiles.csv	
Auto Generated Users Info		

At the bottom right of the window, there are "Start" and "Edit" buttons, and an "Initi" button in the status bar.

Testbed Setup (AMF)

The screenshot shows the MAPS AMF (N17 RELEASE17) configuration window titled "[Testbed Setup - TestBedDefault]". The window has a menu bar with "Configurations", "Emulator", "Reports", "Editor", "Debug Tools", "Windows", and "Help". Below the menu bar is a toolbar with various icons. The main area displays a configuration tree for "AMF" with a table of values and an "Enable" checkbox.

Config	Value	Enable
AMF	1	<input checked="" type="checkbox"/>
AMF 1		
AMF IP Address	192.168.1.165	
URI Scheme	HTTP	
AMF Name	AMF001	
EIR	1	
EIR 1		
N5g EIR IP Address	192.168.1.20	
N5g EIR Port	5055	
N5g EIR API Version	v1	
UE Simulation Parameters		
Type Of UE Simulation	Profiles	
End User Configuration	UE_Profiles_N17AMF.xml	
Auto Generated Users Info		
No Of Users To Be Simulated	100000	
Starting IMSI	001013012061631	
Starting MSIN	3012061631	
Starting IMEI	359877068345248	
Starting IMEISV	1234567890143001	

Buttons: Start, Edit

Initialisation Errc

Profile Editor (EIR)

MAPS EIR (N17 RELEASE17) - [Profile Editor -UE_Profiles_EIR]

Configurations Emulator Reports Editor Debug Tools Windows Help

Profiles (Edit-F2)

#	Profiles (Edit-F2)
1	MSIN3012041631
2	MSIN3012041632
3	MSIN3012041633
4	MSIN3012041634
5	MSIN3012041635
6	MSIN3012041636
7	MSIN3012041637
8	MSIN3012041638
9	MSIN3012041639

Config

Config	Value
MSIN3012041631	
Subscriber Info	
IMEI	359877068325248
IMEISV	1234567890123001
IMSI	001013012041631
MSISDN	3012041631
Equipment Status	WHITELISTED

Enable

Add Insert Delete

Properties

Insert Delete Clear

Initialisation Errors Error Events

Profile Editor (AMF)

MAPS AMF (N17 RELEASE17) - [Profile Editor -UE_Profiles_N17AMF]

Configurations Emulator Reports Editor Debug Tools Windows Help

Profiles (Edit-F2)

#	Profiles (Edit-F2)
1	MSIN3012041631
2	MSIN3012041632
3	MSIN3012041633
4	MSIN3012041634
5	MSIN3012041635
6	MSIN3012041636
7	MSIN3012041637
8	MSIN3012041638

Config

Config	Value
MSIN3012041631	
Subscriber Info	
IMEI	359877068325248
IMEISV	1234567890123001
IMSI	001013012041631
MSIN	3012041631
AMF Client	AMF001
Include SUPI or GPSI Equipment Check Request	None

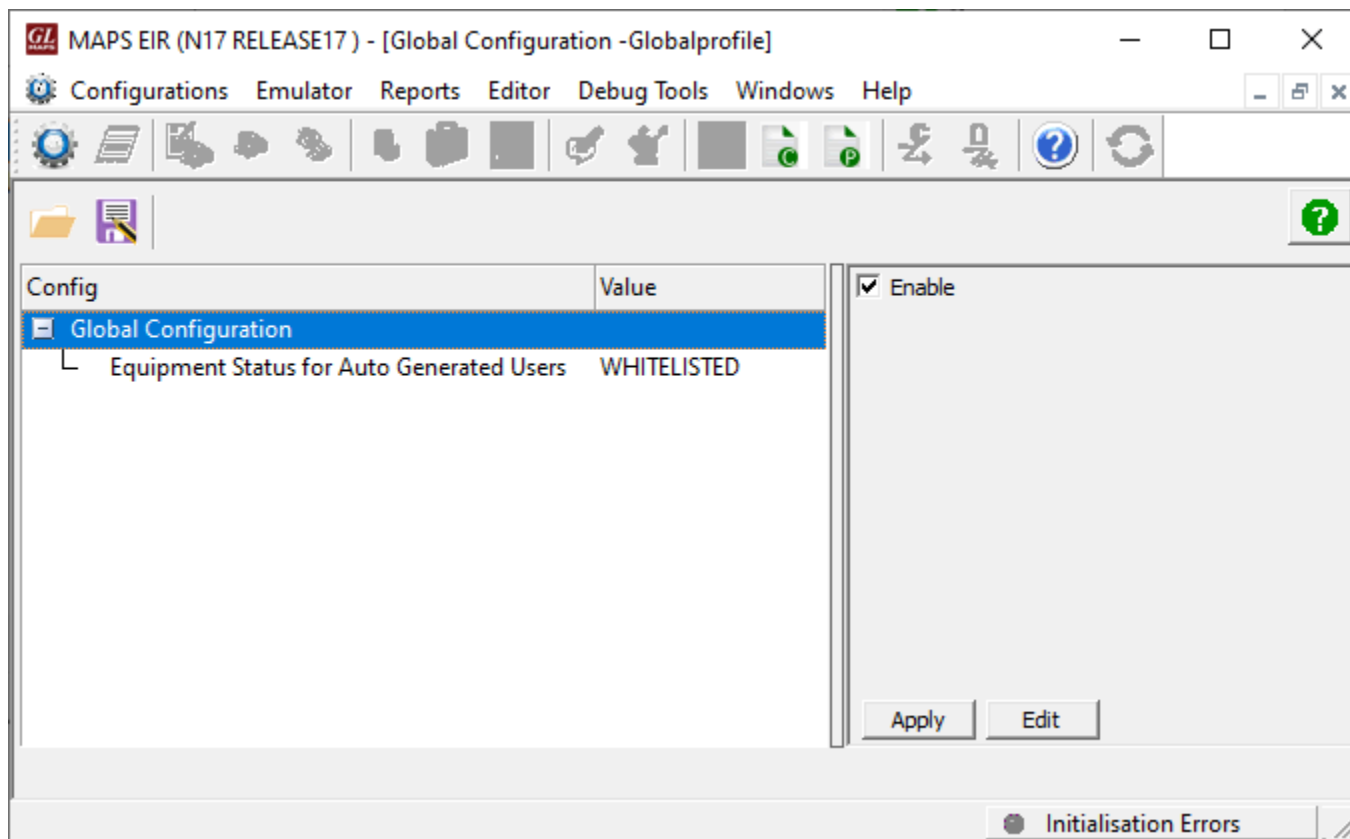
Enable

Add Insert Delete

Properties

Initialisation Errors Error Events Ca

Global Configuration



Call Generation

GL MAPS AMF (N17 RELEASE17) - [Call Generation -Default]

Configurations Emulator Reports Editor Debug Tools Windows Help

Sr No	Script Name	Profile	Call Info	Script Execution	Status	Events	Result	Total Iterations	Completed Iterations
1	N5g-eir_AMF_Control.gls	MSIN3012041631	imei-359877068325248	Start	WHITELISTED	None	Pass	1	1
2	N5g-eir_AMF_Control.gls	MSIN3012041632		Start		None	Unknown	1	0
3	N5g-eir_AMF_Control.gls	MSIN3012041633		Start		None	Unknown	1	0
4	N5g-eir_AMF_Control.gls	MSIN3012041634		Start		None	Unknown	1	0
5	N5g-eir_AMF_Control.gls	MSIN3012041635		Start		None	Unknown	1	0

Add Delete Insert Refresh Start Start All Stop Stop All Abort Abort All

Save Column Width Show Latest

AMF EIR

GET /n5g-eir-eic/v1/equipment-status?pei=imei-359877068325248 16:45:16.342000

200 OK 16:45:16.359000

Find

```
Status: 200
:status : 200
content-type : application/json
content-length : 24

{
  "status": "WHITELISTED"
}
```

Scripts Message Sequence Event Config Script Flow

Initialisation Errors Error Events Captured Errors Link Sta

Call Reception

The screenshot displays the MAPS EIR (N17 RELEASE17) - [Call Reception] application window. The interface includes a menu bar (Configurations, Emulator, Reports, Editor, Debug Tools, Windows, Help) and a toolbar with various icons. Below the toolbar is a table showing script execution details.

Sr No	Script Name	Profile	Call Info	Script Execution	Status	Events	Results
1	EIR_HTTP2_Connection_Monitor.gls		EIR Server Clients : .AMF.	Stop	Monitoring HTTP2 Connection Status	None	Unknown
2	N5g-eir_Control.gls		imei-359877068325248	Completed	WHITELISTED	None	Pass

Below the table, there are control buttons: Stop, Stop All, Abort, Abort All, Show Records (checked), Select Active Call, Auto Trash, and Trash. Below these are options for Save, Column Width, and Show Latest. The main area shows a message sequence diagram between AMF and EIR. The diagram shows a GET request from AMF to EIR for the endpoint /n5g-eir-eic/v1/equipment-status at 16:46:21.730000, and a 200 response from EIR to AMF at the same time. To the right of the diagram is a 'Find' button and a text area displaying the response status and content-type, along with a JSON body.

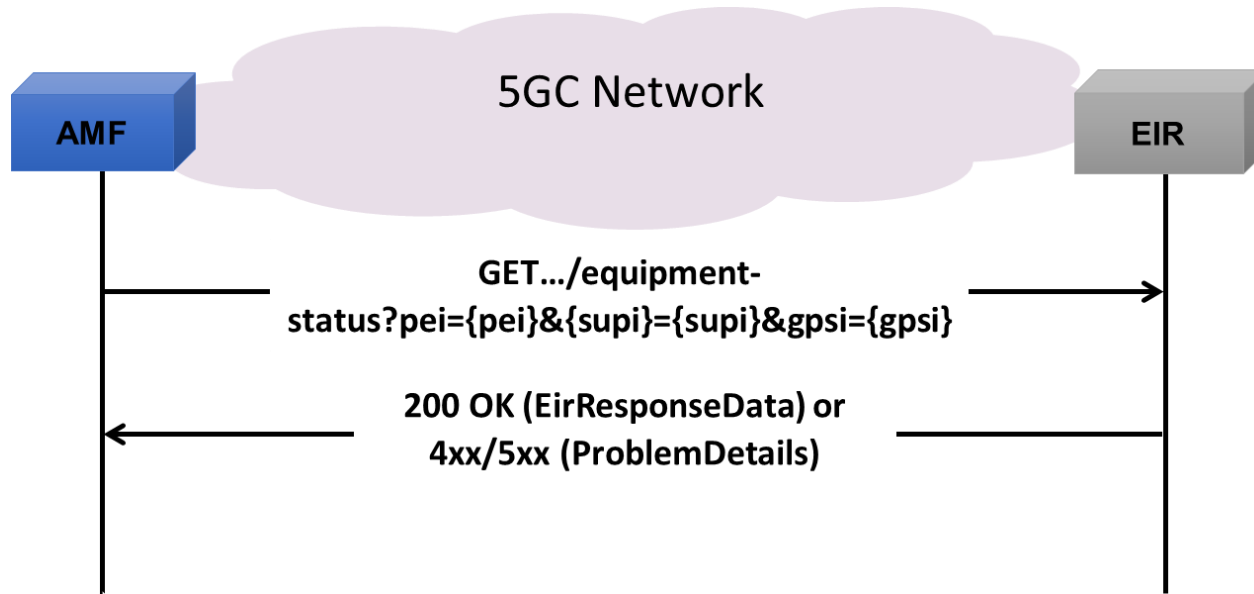
```
Status: 200
content-type : application/json

{
  "status": "WHITELISTED"
}
```

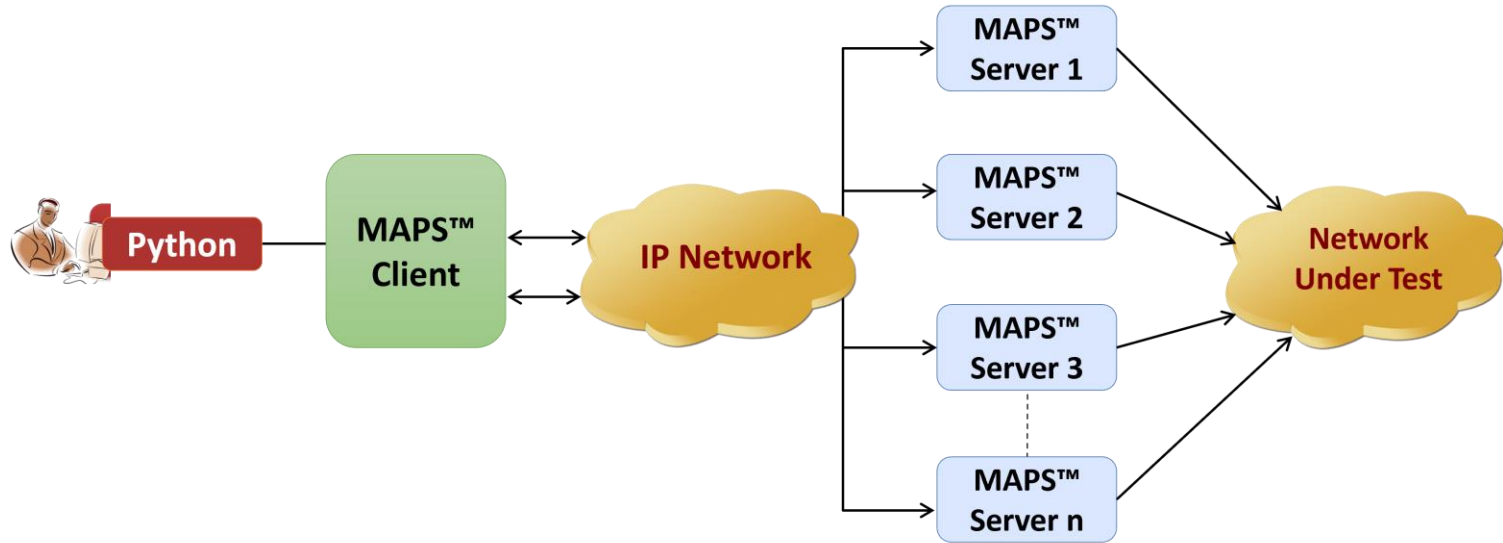
At the bottom of the window, there are tabs for Scripts, Message Sequence (selected), Event Config, and Script Flow. The status bar at the very bottom shows: Initialisation Errors, Error Events, Captured Errors, and Link Status Up=0.

MAPS™ 5G N17 Interface Procedure

N5g-EIR_EquipmentIdentityCheck Service



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

Thank you