



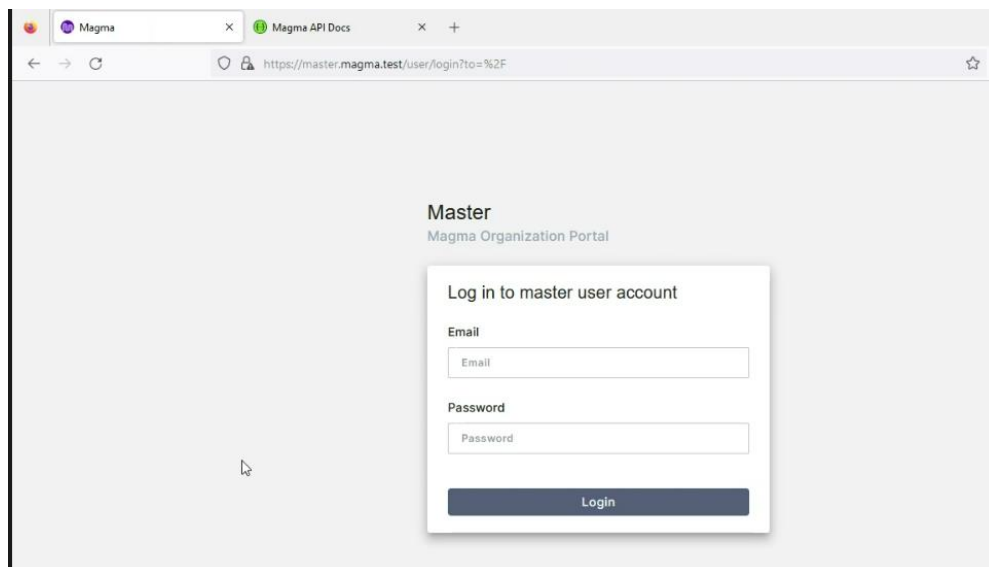
Configuration of AGW through NMS

Sl.No	Version	Author	Date
1.	0.1	Athira Vinod	25/10/2023

Configuring a Magma Access Gateway (AGW) through the Network Management System (NMS) and adding subscribers involves several steps. This document includes the creation of network, adding gateway and giving configuration details in each section of NMS and adding subscribers and validating it.

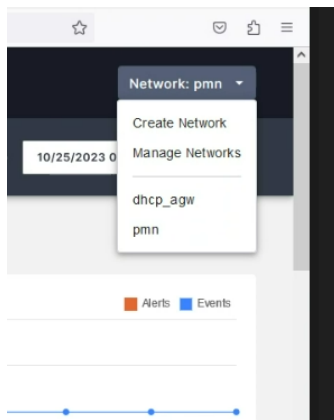
Steps Executed

1. Login to <https://magma-test.magma.test/> to visit NMS UI.





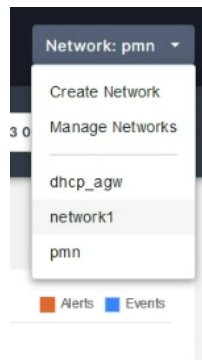
2. Create a network



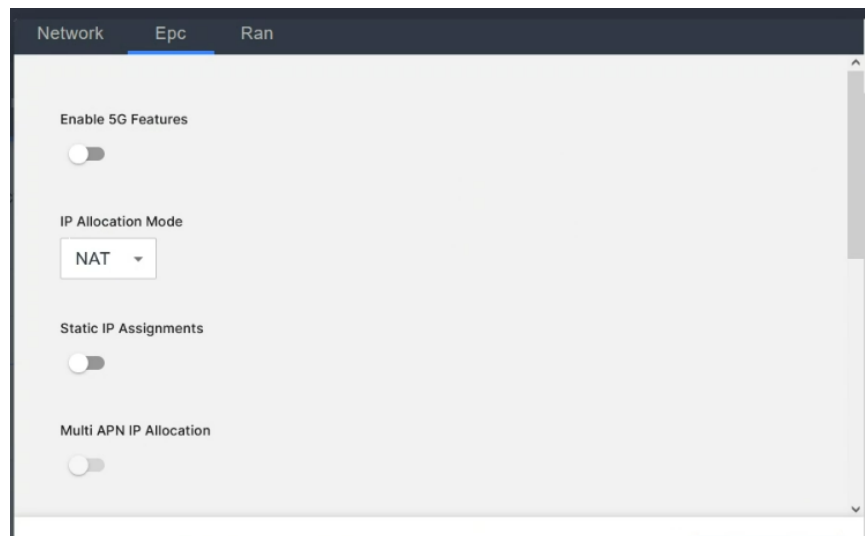
3. Give the details of network, click "Save And Continue"

A screenshot of a mobile application interface showing the 'Network' form. The form has three sections: 'Network ID', 'Network Name', and 'Add Description'. Each section has a text input field containing the value 'network1'. At the bottom right of the form, there are two buttons: 'Cancel' and 'Save And Continue'.

4. Network Created (Here it is *network1*). See the snippet below.



5. EPC Configuration (5g features are disabled by default. We will change that)



6. Checking the backend configuration. For that login to magma cli.
Go to this path `/etc/magma` and open `gateway.mconfig`.



```
"dmfDefaultSliceServiceType": 1,
"amfName": "MAGMAAMF1",
"amfPointer": "0",
"amfRegionId": "1",
"amfSetId": "1",
"attachedEnodebTacs": [],
"cloudSubscriberdbEnabled": false,
"congestionControlEnabled": true,
"csfbMcc": "001",
"csfbMnc": "01",
"dnsPrimary": "8.8.8.8",
"dnsSecondary": "8.8.4.4",
"enable5gFeatures": false,
"enableDnsCaching": false,
"hssRelayEnabled": false,
"ipv4PcscfAddress": "172.27.23.150",
"ipv6DnsAddress": "2001:4860:4860:0:0:0:8888",
"ipv6PcscfAddress": "2a12:577:9941:f99c:0002:0001:c731:f114",
"lac": 1,
"logLevel": "INFO",
"mcc": "901",
"mmeCode": 1,
"mmeGid": 1,
"mmeRelativeCapacity": 11,
"mnc": "70",
"natEnabled": true,
"nonEpsServiceControl": 0,
"relayEnabled": false,
"tac": 1
},
"mobilityd": {
"@type": "type.googleapis.com/magma.mconfig.MobilityD",
"gateway.mconfig" 167 lines --35%--
60/8
```

Initial value of 'enable5gFeatures' is false like the snippet above.

7. Enable the feature in Step 6 and additional options in section *EPC* are given below. You can modify according to the requirements or keep as default values and click 'Save And Continue'.

The screenshot shows a configuration window with three tabs: Network, Epc (selected), and Ran. Under the Epc tab, there are several configuration options:

- Policy Enforcement Enabled: A dropdown menu currently set to "Disabled".
- LTE Auth AMF: A text input field containing four asterisks (****).
- MCC: A text input field containing "001".
- MNC: A text input field containing "01".
- TAC: A text input field (empty).

At the bottom right of the window, there are two buttons: "Cancel" and "Save And Continue".

8. Going to the *RAN* part. You can modify according to the requirements or keep as default values and click 'Save And Continue'.
9. We didn't attach AGW till now. Network is created. Under one network, you can create multiple AGWs.



Add Network

Network Epc **Ran**

Bandwidth
20

Band Type
TDD

EARFCNDL
44590

Special Subframe Pattern
7

Subframe Assignment
2

10. After network creation, move to section 'Equipment'. In this section, we need to add a *gateway*.

eways eNodeB CBSDs Gateway Pools Upgrade Add New

Dashboard

Equipment Add Gateway

Network

Subscriber

Traffic

Call Tracing

Metrics

Alerts

Account & Settings

NMS-@LOCAL_DEV

Install and configure an Access Gateway

- Create bootable USB with OS (Ubuntu). [View documentation](#)
- Install Magma service
- Install rootca.pem and contro1_proxy.yml. [View documentation](#)
- Restart Magma services
- Gather hardware ID and challenge key to add to the NMS (show_gateway_info.py)

Add an Access Gateway

The Access Gateway (AGW) is configured and managed via the orchestrator and is part of a specific organization. This configuration is made through the NMS as part of adding a new gateway to the system.

Add Gateway

[Learn more about Access Gateway Configuration](#)

Access Gateway Overview

The Access Gateway (AGW) provides network services and policy enforcement. In an LTE network, the AGW implements an evolved packet core (EPC). It works with existing, unmodified commercial radio hardware.



Set up a Gateway

- 1. Install and configure an Access Gateway**
 - Create bootable USB with OS (Ubuntu). [View documentation](#)
 - Install Magma service
 - Install root:ca.pem and control_proxy.yml. [View documentation](#)
 - Restart Magma services
 - Gather hardware ID and challenge key to add to the NMS (show_gateway_info.py)
- 2. Add an Access Gateway**

The Access Gateway (AGW) is configured and managed via the orchestrator and is part of a specific organization. This configuration is made through the NMS as part of adding a new gateway to the system.

Add Gateway

[Learn more about Access Gateway Configuration](#)

Access Gateway Overview

The Access Gateway (AGW) provides network services and policy enforcement. In an LTE network, the AGW implements an evolved packet core (EPC). It works with existing, unmodified commercial radio hardware.

11. Give details for configuring gateway and save it.

Add New Gateway

Gateway Aggregation Epc Ran APN Resources Header Enrichment NGC AMF

Gateway Name: gateway1

Gateway ID: gateway1

Hardware UUID: 3bed59d2-1c44-4637-85c5-9008a57312d2

Version: Enter Version

Hardware UUID: 3bed59d2-1c44-4637-85c5-9008a57312d2

Version: Enter Version

Gateway Description: Gateway1

Challenge Key: :ovPÜrQlvDOJ88Q7ESxzoqVCPJ3WrqHFiz98btMFCt1fnzIV4T+gVtnOYE7KvbDJ0T5j8E2EhZ4cUF3B0pEzPVUErLRZExn04XPEG43tzAKwMhZHNm3irKYm+WumWXW

Cancel **Save And Continue**



12. We will get 'Hardware UUID' from backend. Login to magma. Go to path `/magma/lte/gateway/python/scripts` and execute `show_gateway_info.py`.

```
(python) vagrant@magma-dev:~/magma/lte/gateway/python/scripts$
(python) vagrant@magma-dev:~/magma/lte/gateway/python/scripts$
(python) vagrant@magma-dev:~/magma/lte/gateway/python/scripts$
(python) vagrant@magma-dev:~/magma/lte/gateway/python/scripts$ show_gateway_info.py
/home/vagrant/magma/orc8r/gateway/python/scripts/show_gateway_info.py:20: DeprecationWarning: This package has been renamed to snowflake and will be removed shortly. Please update immediately.
  import snowflake

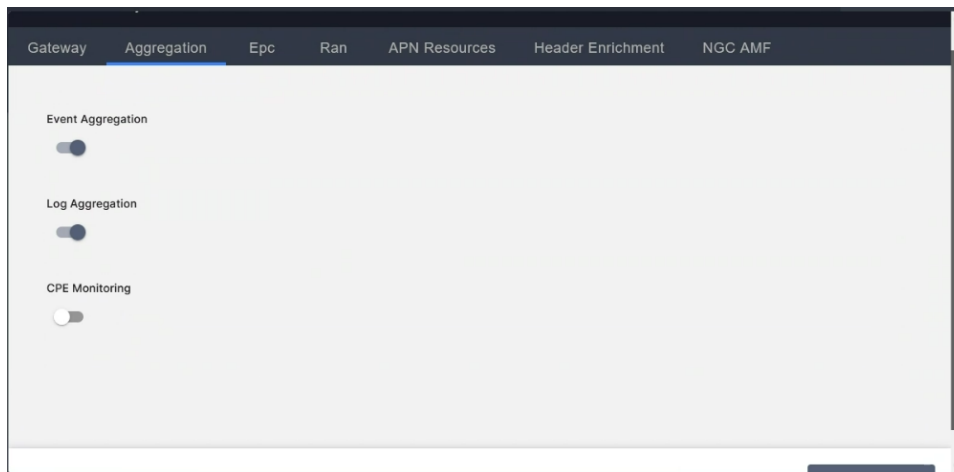
Hardware ID
-----
3bed59d2-1c44-4637-85c5-9008a57312d2
challenge key
-----
MRYkEAYHRoZiIzj0CAQYFK4EEACIDYgAEovPurQlv00J88Q7ESxzooVCPJ3MrqHFIz96btMF-CtIfnzLV4T+gVtrn0YE7KvbDj0T5j8E2EH24cUF380cEzPVUErLRZExn04X
TzAbu4Rz3a8es1k37e8umovw

Build info
-----
Commit Branch: unknown
Commit Tag: unknown
Commit Hash: unknown
Commit Date: unknown

Notes
-----
- Hardware ID is this gateway's unique identifier
- Challenge key is this gateway's long-term keypair used for bootstrapping a secure connection to the cloud
- Build info shows git commit information of this build

(python) vagrant@magma-dev:~/magma/lte/gateway/python/scripts$
```

13. Give details in section 'Aggregation' or keep it with default values.



14. EPC Section details (default values). Click 'Save And Continue'.



Gateway Aggregation **Epc** Ran APN Resources Header Enrichment NGC AMF

Nat Enabled

IP Block
192.168.128.0/24

IPv6 Block
fd0e:5:6c::/48

DNS Primary
8.8.8.8

Cancel Save And Continue

DNS Secondary
8.8.4.4

Sgi network Gateway IP address
1.1.1.1

Sgi management interface IP address
1.1.1.1/24

Sgi management Gateway IPv6 address
2001:4860:4860:0:0:0:0:1

Sgi management interface IPv6 address
2001:4860:4860:0:0:0:8888/64

Cancel Save And Continue

15. Give details in section 'RAN' or keep it with default values.

Gateway Aggregation Epc **Ran** APN Resources Header Enrichment NGC AMF

PCI
260

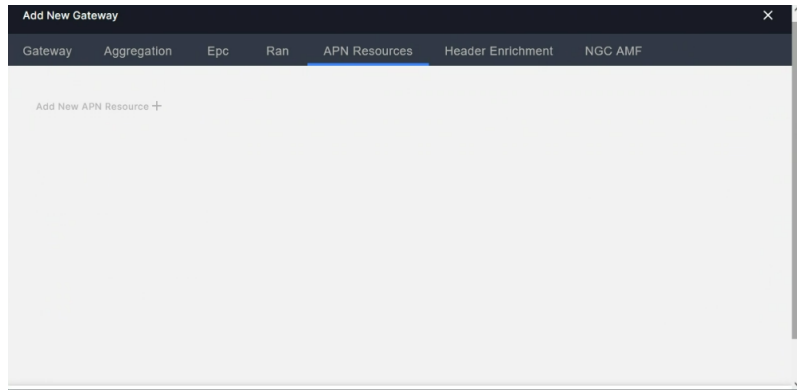
Registered eNodeBs
Select eNodeBs

Transmit Enabled

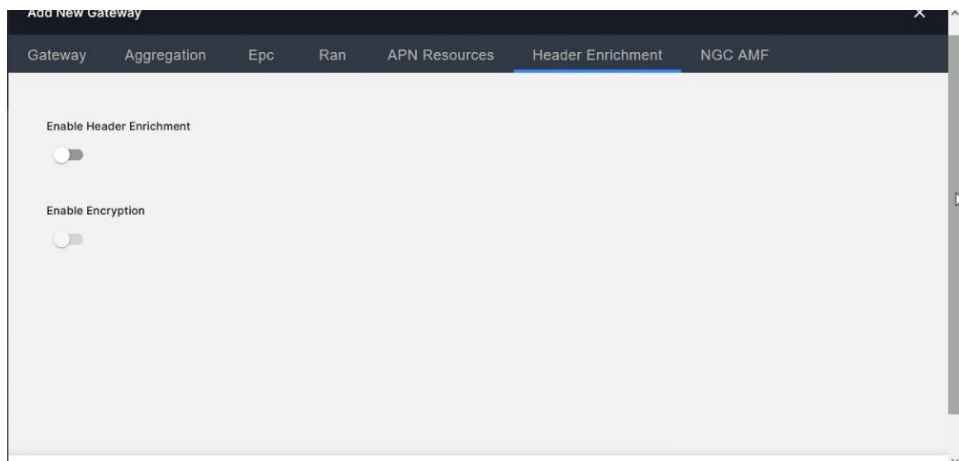
eNodeB DHCP Service

Cancel Save And Continue

16. Give requirements in section 'APN Resources' or skip it.



17. Give details in section *'Header Enrichment'* or keep it with default values.



18. Give details in section *'NGC AMF'* or keep it with default values.



Gateway Aggregation Epc Ran APN Resources Header Enrichment **NGC AMF**

Name
amf.example.org

Pointer
1F

Region ID
C1

Set ID
2A1

Cancel Save And Close

Gateway Aggregation Epc Ran APN Resources Header Enrichment **NGC AMF**

Region ID
C1

Set ID
2A1

Default Slice Service Type
3

Default Slice Descriptor
AFAF

Cancel Save And Close

19. Now AGW is added. You can check the state of it. If the health is bad, it is not connected with backend.



Name	ID	enodeBs	Subscribers	Health	Check In Time	Actions
gateway1	gateway1	0	0	Good	25/10/2023, 1:35:33 pm	

20. Checking from backend. Go to same path mentioned in Step 12 and execute *checkin_cli.py*.

```
(python) vagrant@magma-dev:~/magma/lte/gateway/python/scripts$ checkin_cli.py
/home/vagrant/magma/orc8r/gateway/python/scripts/checkin_cli.py:25: DeprecationWarning: This package has been renamed to snowflake_uuid
and will be removed shortly. Please update immediately.
  import snowflake
1. -- Testing TCP connection to controller.magma.test:7443 --
2. -- Testing Certificate --
3. -- Testing SSL --
4. -- Creating direct cloud checkin --
5. -- Creating proxy cloud checkin --
Success!
(python) vagrant@magma-dev:~/magma/lte/gateway/python/scripts$
```

21. Changed value of 'enable5gFeatures' can be checked by seeing the backend. For loading the change, execute:

```
sudo service magma@* stop
sudo service magma@magmad start
sudo service magma@mme status
```

File: */var/opt/magma/configs/gateway.mconfig*

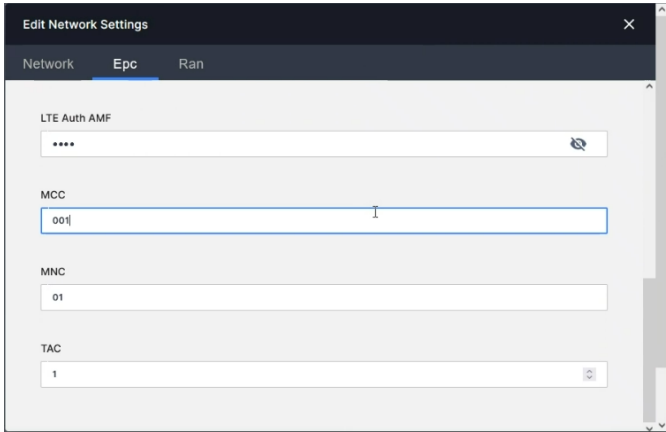
Wait for few seconds to reflect on the values like below.



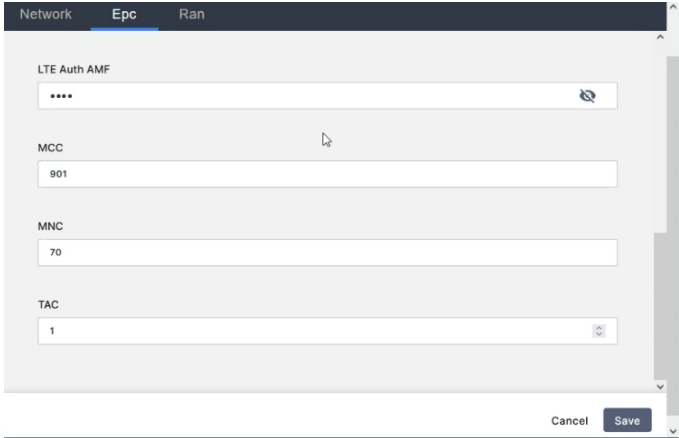
```
"subframeAssignment": 2
},
},
"eventd": {
"@type": "type.googleapis.com/magma.mconfig.EventD",
"eventVerbosity": -1,
"logLevel": "INFO"
},
"liagentd": {
"@type": "type.googleapis.com/magma.mconfig.LIAgentD",
"logLevel": "INFO"
},
"magmad": {
"@type": "type.googleapis.com/magma.mconfig.Magmad",
"autoupgradeEnabled": true,
"autoupgradePollInterval": 60,
"checkinInterval": 60,
"checkinTimeout": 30,
"dynamicServices": [
"eventd",
"td-agent-bit"
],
"logLevel": "INFO",
"packageVersion": "0.0.0-0"
},
"metricsd": {
"@type": "type.googleapis.com/magma.mconfig.MetricsD",
"logLevel": "INFO"
},
"mme": {
"@type": "type.googleapis.com/magma.mconfig.MME",
"enableSgFeatures": true,
"lac": 1,
"logLevel": "INFO",
"mcc": "001",
"mmcCode": 1,
"mmcGid": 1,

```

22. Initial version of *mcc* and *mnc*.



23. Adding subscribers. Updated *mcc* and *mnc*.





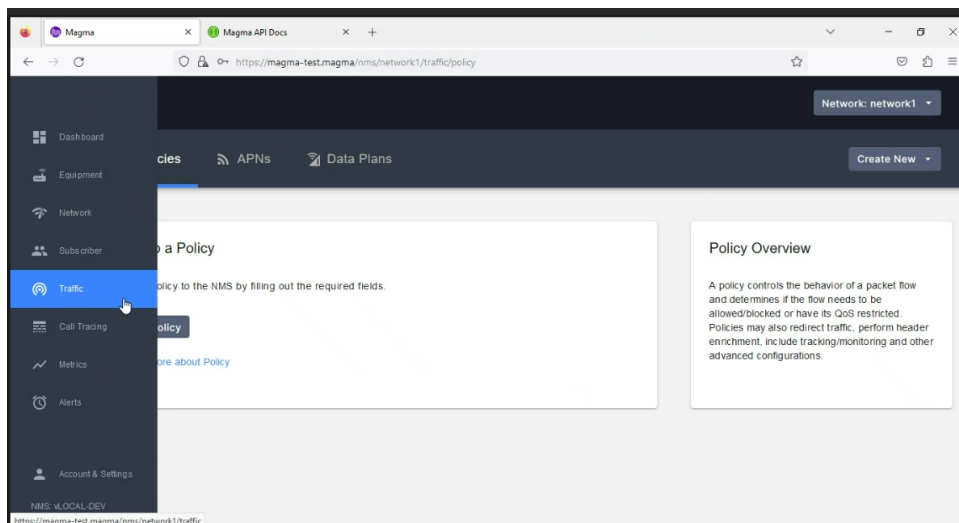
24. Verify the backend. For reflection, it will take a few mins.

Updated values

```
1. Home 2. 172.16.9.8 (rameshwar) 3. 172.16.9.8 (rameshwar)
{
  "checkInterval": 60,
  "checkTimeout": 30,
  "dynamicServices": [
    "eventd",
    "td-agent-bit"
  ],
  "logLevel": "INFO",
  "packageVersion": "0.0.0-0"
},
"metricsd": {
  "@type": "type.googleapis.com/magma.mconfig.MetricsD",
  "logLevel": "INFO"
},
"mme": {
  "@type": "type.googleapis.com/magma.mconfig.MME",
  "enableSgFeatures": true,
  "lac": 1,
  "logLevel": "INFO",
  "mme": "9001",
  "mmeCode": 1,
  "mmeGid": 1,
  "mmeRelativeCapacity": 10,
  "mnc": "70",
  "natEnabled": true,
  "tac": 1
},
"mobilityd": {
  "@type": "type.googleapis.com/magma.mconfig.MobilityD",
  "ipBlock": "192.168.128.0/24",
  "logLevel": "INFO"
},
"ovpn": {
  "@type": "type.googleapis.com/magma.mconfig.OpenVPN"
},
"pipelined": {
  "@type": "type.googleapis.com/magma.mconfig.PipelineD",
  "defaultRuleId": "default_rule_1",

```

25. Before adding subscribers, if you have some additional policy requirements, add it and save it. Here default setup is considered. Add APN details also. This APN will be used in adding subscribers. Here APN is *internet*. Data Plan is also based on requirements.





Policy Flows Tracking Redirect Header Enrichment

Basic policy rule fields

Policy ID
A unique identifier for the policy rule

Eg. policy_id

Priority Level
Higher priority policies override lower priority ones

1

Network Wide

QoS Profile

Traffic Network: network1

Policies APNs Data Plans Create New APN

Set up an APN

Add an APN to the HMS. The APNs can then be assigned to subscriber profiles.

[Add APN](#)

[Learn more about APN](#)

APN Overview

APN is an access point name. APN is used to identify the packet data network(PDN), the UE wants to be connected to. From Magma's perspective, APN configuration consists of two main entities. The APN id and the QoS profile being applied to it.



APN ID
internet

Class ID
9

ARP Priority Level
15

Max Required Bandwidth
Upload
1000000 bps

Cancel Save

26. Add Subscriber.

Network: network1

Dashboard

Equipment

Network

Subscriber

Traffic

Call Tracing

Metrics

Alerts

Account & Settings

Logout

fig Sessions

Add New Subscribers

Add a new subscriber by manually entering subscriber information, or uploading a CSV file.

Subscribers

[more about Subscribers](#)

Subscribers Overview

The subscriber page allows you to add, edit, and delete your subscribers. You'll be able to view current data usage, average data usage, last reported time (displayed if subscriber monitoring is enabled), and other status information from the subscriber table.

27. Click 'Add New Row' and give values. If the Forbidden network, if you select both options, this won't work.



Add Subscriber(s)

Adding 0 subscriber(s)

Search Upload CSV Add New Row

IMSI	Subscriber Name	Auth Key	Auth OPC	Service	Forbidden Network Types	Data Plan	Active APNs	Active Policies	Actions
Enter IMSI	Enter Name	K	C	ACTIVE	Select Forbidden	default	Select APNs	Select Policies	✓ X

Back Cancel Save And Add Subscribers

Add Subscriber(s)

Adding 0 subscriber(s)

Search Upload CSV Add New Row

IMSI	Subscriber Name	Auth Key	Auth OPC	Service	Forbidden Network Types	Data Plan	Active APNs	Active Policies	Actions
000001	sub1	•	•	ACTIVE		default	Internet	default	✓ X

Back Cancel Save And Add Subscribers

28. Wait for a few mins to reflect. After that you can verify the addition of subscribers from NMS and backend.

Config Sessions

Subscribers Export Manage Subscribers

Search IMSI00101123456C

IMSI	Name	Service	Current Usage	Daily Average	Last Reported Time	Actions
IMS90170000000001	sub1	ACTIVE	0	0	-	⋮

Subscriber(s) saved successfully



Magma API Docs

https://magma-test.magma/nms/network1/subscribers/overview/sessions

Subscribers Network: network1

Config Sessions

Subscriber Sessions Autorefresh

Search

Name	IMSI	Service	Current Usage	Daily Average	Last Reported Time	Active Sessions	Active APNs	Session IP Address	Actions
sub1	IMSI901700000000001	ACTIVE	0	0	-	0	-	-	

Type here to search

14:12 25-10-2023

```
(python) vagrant@magma-dev:~/magma/lte/gateway/python/scripts$ subscriber_cli.py list
IMSI901700000000001
(python) vagrant@magma-dev:~/magma/lte/gateway/python/scripts$ subscriber_cli.py get IMSI901700000000001
sid {
  id: "901700000000001"
}
lte {
  state: ACTIVE
  auth_key: "F[\\350\\261\\231\\264\\237\\252 \\n.\\3428\\246\\274"
  auth_opc: "\\350\\355\\235\\353\\251R\\344(;T\\350\\216a\\203\\312"
}
network_id {
  id: "network1"
}
sub_profile: "default"
non_3gpp {
  ambr {
    max_bandwidth_ul: 200000000
    max_bandwidth_dl: 400000000
  }
  apn_config {
    service_selection: "internet"
    qos_profile {
      class_id: 9
      priority_level: 15
    }
    ambr {
      max_bandwidth_ul: 1000000
      max_bandwidth_dl: 1000000
    }
  }
}
sub_network {
}
(python) vagrant@magma-dev:~/magma/lte/gateway/python/scripts$
```

