

If this is your First-Time-Use of MAPS™ LTE eGTP (S11 interface) application, then we recommend you follow all the steps explained in MAPS-LTE-eGTP-Quick-Install-Guide to install MAPS™ LTE eGTP application before proceeding with the steps below.

To simulate LTE eGTP (S11) Signaling with Mobile Traffic you must install Mobile Traffic Core application (MobileIPCorex64.exe) and corresponding license (ETH101) after completing the installation process follow the below steps

Verification


Functional verification of MAPS-LTEeGTP application requires a system with 2 NIC cards for testing. MAPS-LTEeGTP is configured as **MME (Mobility Management Entity)** on one NIC and as **SGW (Serving Gateway)** on the other.

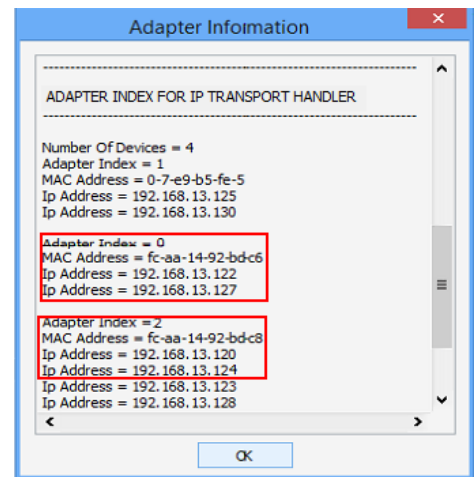
Note down the IP address of NIC1 and NIC2, in this example the IP addresses used and configured are:


- NIC1 IP address is 192.xx.xx.124, and configured as SGW
- NIC2 IP address is 192.xx.xx.122, and configured as MME

***Note:** In this test scenario, we have configured MAPS™ LTEeGTP as MME generating calls and SGW to receive calls.

First MAPS™ LTE eGTP (GUI) – (SGW)

- Right-click on the **MAPS-LTEeGTP** application using shortcut icon created on the desktop and select **‘Run as Administrator’**. This instance of MAPS™ is configured for **Call Reception**
- While invoking the first **MAPS-LTEeGTP** instance, verify the following in the **Protocol Selection** window -
 - Protocol Standard is set to **LTE eGTP**
 - Protocol Version to **RELEASE 9**
 - Select Node as **Serving Gateway**. Click **Ok**
- By default, **Testbed Setup** window is displayed. Click  and select **TestBedDefault_S11** and check for the parameter default values as listed below:

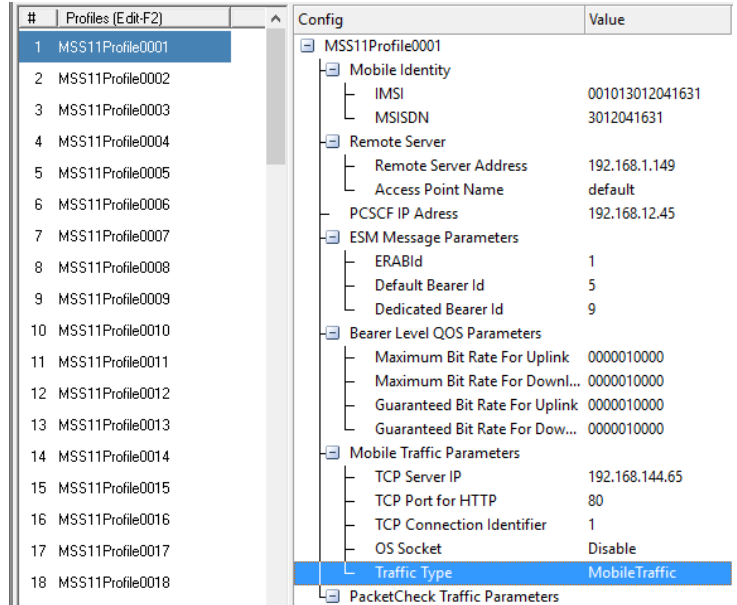


- The **Display Adapter Info** option from the **Help** menu displays all the network adapters available in the system. Choose and set the **Traffic Adapter Index** value displayed against the IP address in use.
- Set **SGW IP Address** to 192.xx.xx.124 (NIC1 IP address)
- Set **SGW Port** to 2123
- Set **MME IP Address** to 192.xx.xx.122 (NIC2 IP address)
- Set **MME Port** to 2123
- **Traffic = Enable**
- Click  **Save** button and save the changes to the same the **TestBedDefault_S11** configuration file.

| Config | Value |
|----------------------------------|----------------|
| SGW Configuration | |
| Traffic Adapter Index | 2 |
| SGW | 1 |
| SGW 1 | |
| SGW IP Address | 192.168.13.124 |
| SGW Port | 2123 |
| SGW IP Address For Traffic | 192.168.100.62 |
| GTP Port For Traffic | 2152 |
| MME Configuration | |
| MME IP Address | 192.168.13.122 |
| MME Port | 2123 |
| Traffic Parameters | |
| Traffic | Enable |
| PacketLoad Traffic Type | PCAP Traffic |
| PacketLoad Management IP Address | 192.168.12.60 |

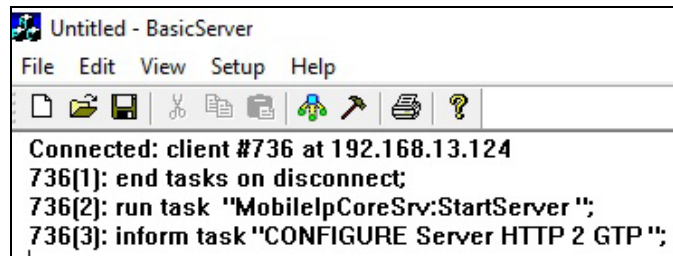
- From main window, select **Editor** → **Profile Editor**. This will invoke Profile Editor window.

- On the Profile Editor window, click on  and select **MS_S11Profiles**. Click on OK.
- Select **MSS11Profile0001**, scroll-down to **Mobile Traffic Parameters**, and set the **Traffic Type** as **MobileTraffic**. Click on  to save the profile.

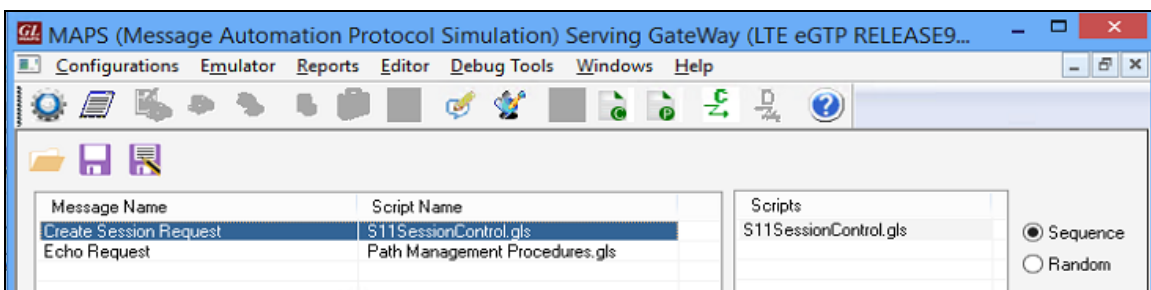


- Start the SGW TestBed Setup, observe that the Basic Server window is automatically invoked and user can see on the task-bar, the configured MAPS™ SGW will connect to the MAPS™ Mobile IP Core server which will be logged into the core server.


Note: The user can maximize the Basic Server GUI from the taskbar.

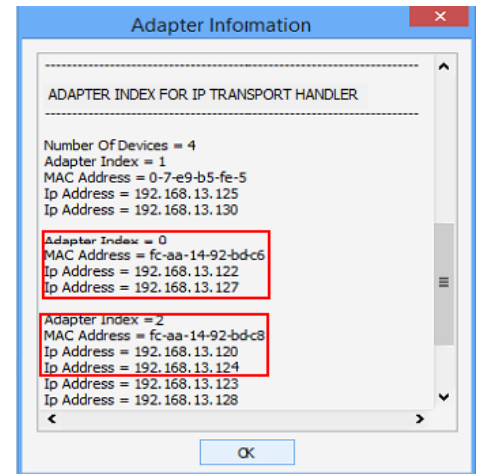


- On the same MAPS-LTEeGTP main window, from **Configuration** menu → select **Incoming Call Handler Configuration** and invoke the window. Verify that **S11SessionControl.gls** script is set against **Create Session Request** message. Exit from the window.




Second MAPS™ LTEeGTP (GUI) – (MME)

- Right-click on the **MAPS-LTEeGTP** application using shortcut icon created on the desktop and select **'Run as Administrator'**. This instance of MAPS™ is configured for *Call Generation*.
- While invoking the second **MAPS-LTEeGTP** instance, verify the following in the Protocol Selection window -
 - **Protocol Standard** is set to **LTE eGTP**
 - **Protocol Version** to **RELEASE 9**
 - Select **Node** as **MME**. Click **Ok**
- By default, Testbed Setup window is displayed loaded with **TestBedDefault** configuration. Verify and validate the following parameter settings:
 - The **Display Adapter Info** option from the **Help** menu displays all the network adapters available in the system. Choose and set the **Traffic Adapter Index** value displayed against the IP address in use.
 - Set **MME IP Address** to 192.xx.xx.122 (NIC2 IP address)
 - Set **MME Port** to 2123
 - Set **SGW IP Address** to 192.xx.xx.124 (NIC1 IP address)
 - Set **SGW Port** to 2123
 - **Traffic = Enable**
 - Click  **Save** button and save the changes to the same the **TestBedDefault** file.



| Config | Value |
|----------------------------|----------------|
| MME Configuration | |
| Traffic Adapter Index | 0 |
| MME | 1 |
| MME 1 | |
| MME IP Address | 192.168.13.122 |
| MME Port | 2123 |
| PLMN Identities | |
| Mobile Country Code | 001 |
| Mobile Network Code | 01 |
| SGW Configuration | |
| SGW IP Address | 192.168.13.124 |
| SGW Port | 2123 |
| eNB IP Address for Traffic | 192.168.200.65 |
| GTP Port For Traffic | 2152 |
| Traffic Parameters | |
| Traffic | Enable |
| PacketLoad Traffic Type | PCAP Traffic |

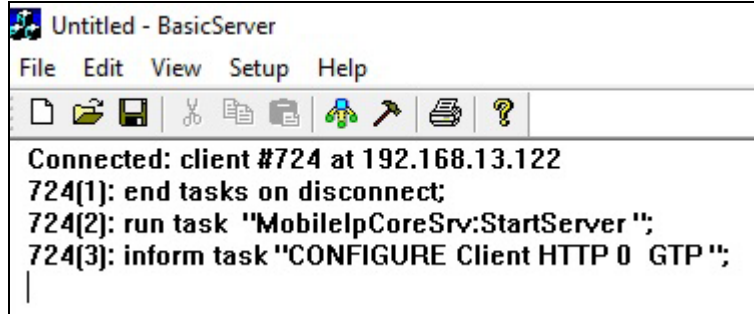
- From main window, select **Editor** → **Profile Editor**. This will invoke Profile Editor window.

- On the Profile Editor window, click on  and select **MS_Profiles**. Click on **OK**.
- Select **MSProfile0001**, scroll-down to **Mobile Traffic Parameters**, and set the **Traffic Type** as **MobileTraffic**. Click on  to save the profile.

| # | Profiles (Edit-F2) | Config | Value |
|----|--------------------|----------------------------------|----------------|
| 1 | MSProfile0001 | ESM Message Parameters | |
| 2 | MSProfile0002 | ERABId | 1 |
| 3 | MSProfile0003 | Default Bearer Id | 5 |
| 4 | MSProfile0004 | Dedicated Bearer Id | 5 |
| 5 | MSProfile0005 | Bearer Level QoS Parameters | |
| 6 | MSProfile0006 | Maximum Bit Rate For Uplink | 0000010000 |
| 7 | MSProfile0007 | Maximum Bit Rate For Downli... | 0000010000 |
| 8 | MSProfile0008 | Guaranteed Bit Rate For Uplink | 0000010000 |
| 9 | MSProfile0009 | Guaranteed Bit Rate For Dow... | 0000010000 |
| 10 | MSProfile0010 | QoS Class Identifier | 6 |
| 11 | MSProfile0011 | Mobile Traffic Parameters | |
| 12 | MSProfile0012 | TCP Server Ip | 192.168.144.65 |
| 13 | MSProfile0013 | TCP port for HTTP | 80 |
| 14 | MSProfile0014 | Transmission Type | Once |
| 15 | MSProfile0015 | Start File Count | 1 |
| 16 | MSProfile0016 | Traffic File Name | www.etsi.org |
| 17 | MSProfile0017 | File Count For Concurrent an... | 3 |
| | | File Playback Count | 1 |
| | | Tx File For Once Transmission... | 5 |
| | | OS Socket | Disable |
| | | Traffic Type | MobileTraffic |
| | | PacketCheck Traffic Parameters | |


- Start the MME TestBed Setup, observe that the Basic Server window is automatically invoked and user can see on the task-bar, the configured MAPS™ MME will connect to the MAPS™ Mobile IP Core server which will be logged into the client.

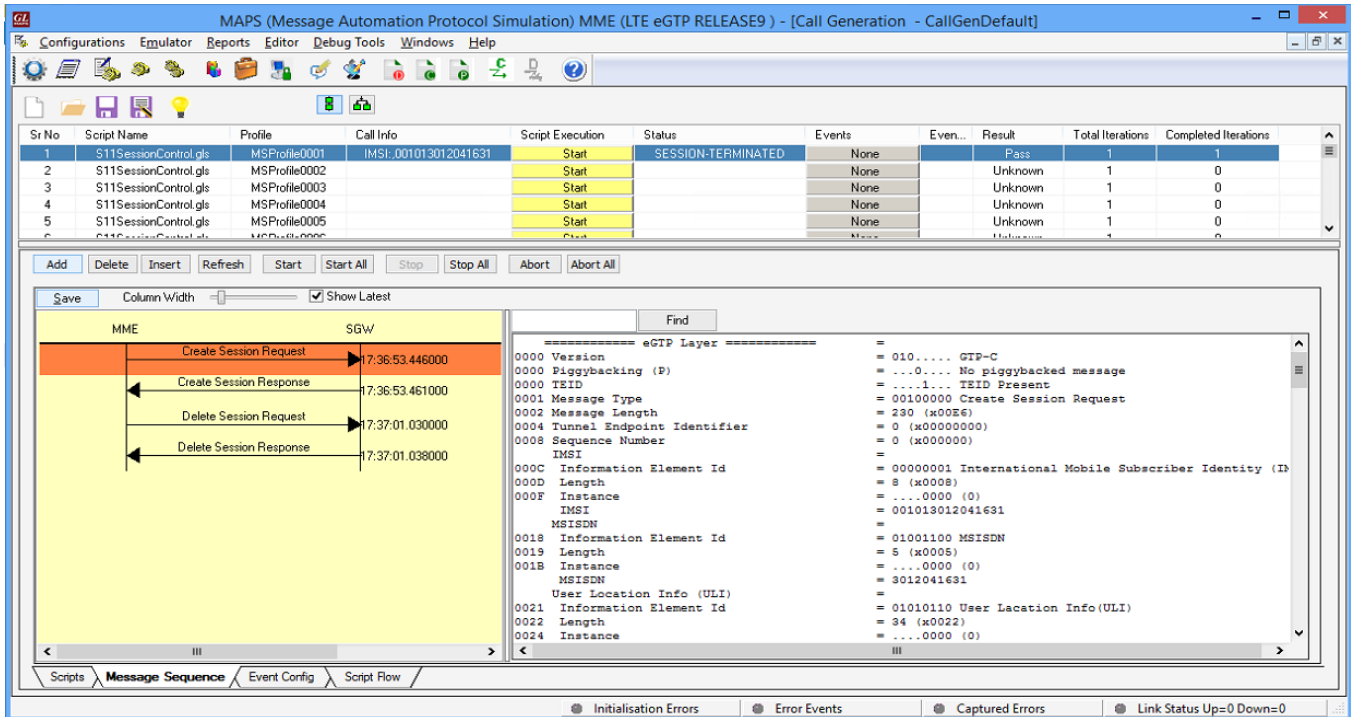
Note: The user can maximize the Basic Server GUI from the taskbar.



```

Untitled - BasicServer
File Edit View Setup Help
[Icons]
Connected: client #724 at 192.168.13.122
724(1): end tasks on disconnect;
724(2): run task "MobileIpCoreSrv:StartServer ";
724(3): inform task "CONFIGURE Client HTTP 0 GTP ";
    
```

- In the second MAPS-LTEeGTP (MME) instance, click the **Call Generation**  icon on main window, and invoke the **Call Generation** window.
 - By default, you will observe multiple call instances loaded with **S11SessionControl.gls** scripts and **MSPProfile00**** profiles. **Note:** If the profile is not loaded, click on the call instance in the Profile column and select the configured **MSPProfile0001** profile and set it for the call instance.
 - Select the call instance loaded with **S11SessionControl.gls** script and **MSPProfile0001** profile in the Call Generation window and click **Start** button to initiate the call generation.
- Wait for the calls to terminate and verify the call flow under the **Message Sequence** tab at both generation and reception end.
- Select any message in the ladder diagram and observe the respective decode message on the right pane for the respective message.



| Sr No | Script Name | Profile | Call Info | Script Execution | Status | Events | Even... | Result | Total Iterations | Completed Iterations |
|-------|-----------------------|----------------|-----------------------|------------------|--------------------|--------|---------|--------|------------------|----------------------|
| 1 | S11SessionControl.gls | MSPProfile0001 | IMSI: 001013012041631 | Start | SESSION-TERMINATED | None | Pass | | 1 | 1 |
| 2 | S11SessionControl.gls | MSPProfile0002 | | Start | | None | Unknown | | 1 | 0 |
| 3 | S11SessionControl.gls | MSPProfile0003 | | Start | | None | Unknown | | 1 | 0 |
| 4 | S11SessionControl.gls | MSPProfile0004 | | Start | | None | Unknown | | 1 | 0 |
| 5 | S11SessionControl.gls | MSPProfile0005 | | Start | | None | Unknown | | 1 | 0 |
| 6 | S11SessionControl.gls | MSPProfile0006 | | Start | | None | Unknown | | 1 | 0 |

Message Sequence Diagram:

```

MME (Left) --- SGW (Right)
MME: Create Session Request (17:36:53.446000) --> SGW
SGW: Create Session Response (17:36:53.461000) --> MME
MME: Delete Session Request (17:37:01.030000) --> SGW
SGW: Delete Session Response (17:37:01.038000) --> MME
    
```

Decode Message (eGTP Layer):

```

0000 Version = 010..... GTP-C
0000 Piggybacking (P) = ...0.... No piggybacked message
0000 TEID = ....1... TEID Present
0001 Message Type = 00100000 Create Session Request
0002 Message Length = 230 (x00E6)
0004 Tunnel Endpoint Identifier = 0 (x0000000)
0008 Sequence Number = 0 (x000000)
000C Information Element Id = 00000001 International Mobile Subscriber Identity (IMSI)
000D Length = 8 (x0008)
000F Instance = ...0000 (0)
IMSI = 001013012041631
0018 Information Element Id = 01001100 MSISDN
0019 Length = 5 (x0005)
001B Instance = ...0000 (0)
MSISDN = 3012041631
0021 Information Element Id = 01010110 User Location Info (ULI)
0022 Length = 34 (x0022)
0024 Instance = ...0000 (0)
    
```

- Return to first instance of MAPS-LTEeGTP (SGW), click  icon and invoke **Call Reception** window, observe that the calls are automatically received running the Rx script.

- Observe the traffic log in the client log window.

```

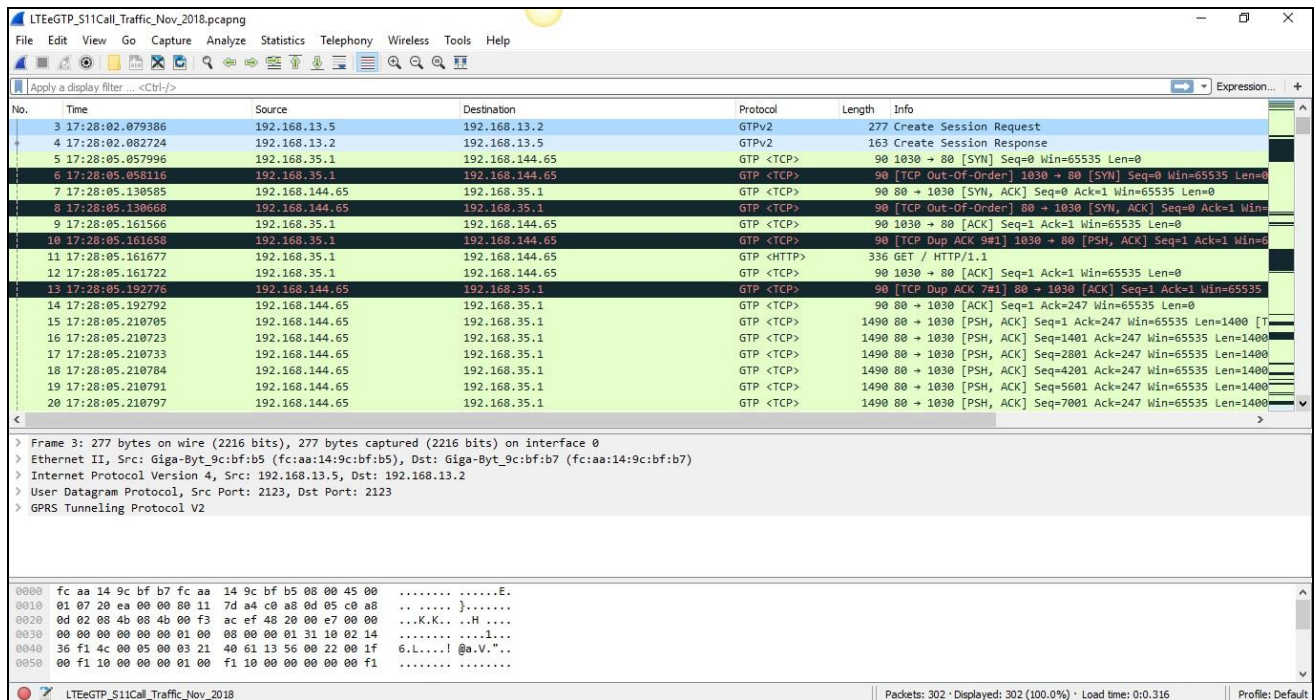
Untitled - BasicServer
File Edit View Setup Help
[Icons]
Connected: client #624 at 192.168.13.122
624(1): end tasks on disconnect;
624(2): run task "MobileIpCoreSrv:StartServer ";
624(3): inform task "CONFIGURE Client HTTP 0 GTP ";
624(4): inform task "ADDGTPSTREAM 192.168.10.1 101 3 192.168.100.65 2152 192.168.100.62 2152 ";
624(5): inform task "ADDCONNECTION 101 1 192.168.14.65 80 192.168.10.1 www.etsi.org ITERATION_COUNT 1 ";
624(6): inform task "DELETEDGTPSTREAM 192.168.10.1 101 ";
  
```

- Observe the traffic log in the server log window.

```

Untitled - BasicServer
File Edit View Setup Help
[Icons]
Connected: client #700 at 192.168.13.124
700(1): end tasks on disconnect;
700(2): run task "MobileIpCoreSrv:StartServer ";
700(3): inform task "CONFIGURE Server HTTP 2 GTP ";
700(4): inform task "CREATESERVER 192.168.14.65 80 ";
700(5): inform task "ADDGTPSTREAM 192.168.10.1 3 101 192.168.100.62 2152 192.168.100.65 2152 ";
700(6): inform task "DELETEDGTPSTREAM 192.168.10.1 101 ";
  
```

- User can also observe the traffic using Wireshark application as shown below.



| No. | Time | Source | Destination | Protocol | Length | Info |
|-----|-----------------|----------------|----------------|------------|--------|---|
| 3 | 17:28:02.079386 | 192.168.13.5 | 192.168.13.2 | GTPv2 | 277 | Create Session Request |
| 4 | 17:28:02.082724 | 192.168.13.2 | 192.168.13.5 | GTPv2 | 163 | Create Session Response |
| 5 | 17:28:05.057996 | 192.168.35.1 | 192.168.144.65 | GTP <TCP> | 90 | 1030 → 80 [SYN] Seq=0 Win=65535 Len=0 |
| 6 | 17:28:05.058116 | 192.168.35.1 | 192.168.144.65 | GTP <TCP> | 90 | [TCP Out-Of-Order] 1030 → 80 [SYN] Seq=0 Win=65535 Len=0 |
| 7 | 17:28:05.136585 | 192.168.144.65 | 192.168.35.1 | GTP <TCP> | 90 | 80 → 1030 [SYN, ACK] Seq=0 Ack=1 Win=65535 Len=0 |
| 8 | 17:28:05.136668 | 192.168.144.65 | 192.168.35.1 | GTP <TCP> | 90 | [TCP Out-Of-Order] 80 → 1030 [SYN, ACK] Seq=0 Ack=1 Win=65535 Len=0 |
| 9 | 17:28:05.161566 | 192.168.35.1 | 192.168.144.65 | GTP <TCP> | 90 | 1030 → 80 [ACK] Seq=1 Ack=1 Win=65535 Len=0 |
| 10 | 17:28:05.161658 | 192.168.35.1 | 192.168.144.65 | GTP <TCP> | 90 | [TCP Dup ACK 9#1] 1030 → 80 [PSH, ACK] Seq=1 Ack=1 Win=65535 Len=0 |
| 11 | 17:28:05.161677 | 192.168.35.1 | 192.168.144.65 | GTP <HTTP> | 336 | GET / HTTP/1.1 |
| 12 | 17:28:05.161722 | 192.168.35.1 | 192.168.144.65 | GTP <TCP> | 90 | 1030 → 80 [ACK] Seq=1 Ack=1 Win=65535 Len=0 |
| 13 | 17:28:05.192776 | 192.168.144.65 | 192.168.35.1 | GTP <TCP> | 90 | [TCP Dup ACK 7#1] 80 → 1030 [ACK] Seq=1 Ack=1 Win=65535 Len=0 |
| 14 | 17:28:05.192792 | 192.168.144.65 | 192.168.35.1 | GTP <TCP> | 90 | 80 → 1030 [ACK] Seq=1 Ack=247 Win=65535 Len=0 |
| 15 | 17:28:05.218705 | 192.168.144.65 | 192.168.35.1 | GTP <TCP> | 1490 | 80 → 1030 [PSH, ACK] Seq=1 Ack=247 Win=65535 Len=1400 [T... |
| 16 | 17:28:05.218723 | 192.168.144.65 | 192.168.35.1 | GTP <TCP> | 1490 | 80 → 1030 [PSH, ACK] Seq=1401 Ack=247 Win=65535 Len=1400 [T... |
| 17 | 17:28:05.218733 | 192.168.144.65 | 192.168.35.1 | GTP <TCP> | 1490 | 80 → 1030 [PSH, ACK] Seq=2801 Ack=247 Win=65535 Len=1400 [T... |
| 18 | 17:28:05.218784 | 192.168.144.65 | 192.168.35.1 | GTP <TCP> | 1490 | 80 → 1030 [PSH, ACK] Seq=4201 Ack=247 Win=65535 Len=1400 [T... |
| 19 | 17:28:05.218791 | 192.168.144.65 | 192.168.35.1 | GTP <TCP> | 1490 | 80 → 1030 [PSH, ACK] Seq=5601 Ack=247 Win=65535 Len=1400 [T... |
| 20 | 17:28:05.218797 | 192.168.144.65 | 192.168.35.1 | GTP <TCP> | 1490 | 80 → 1030 [PSH, ACK] Seq=7001 Ack=247 Win=65535 Len=1400 [T... |