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Top Secret <input type="checkbox"/> Secret <input type="checkbox"/> Unclassified <input checked="" type="checkbox"/>			Manual

LTE-WEBSOCKET-TCP

BASED – AT COMMANDS

Revision	Date	Author	Description of change
1.0	2023-05-31	RAHUL MAHAKALKAR	INITIAL

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1 Introduction

This document will be helpful to connect with websocket based server using AT command of TCP.

Many customers are using websocket, but we don't have direct API's or AT commands for 2G and LTE modules.

Although we don't have API's or AT command still, we can connect to websocket server over the TCP using TCP commands.

2 INFORMATION:

URL:

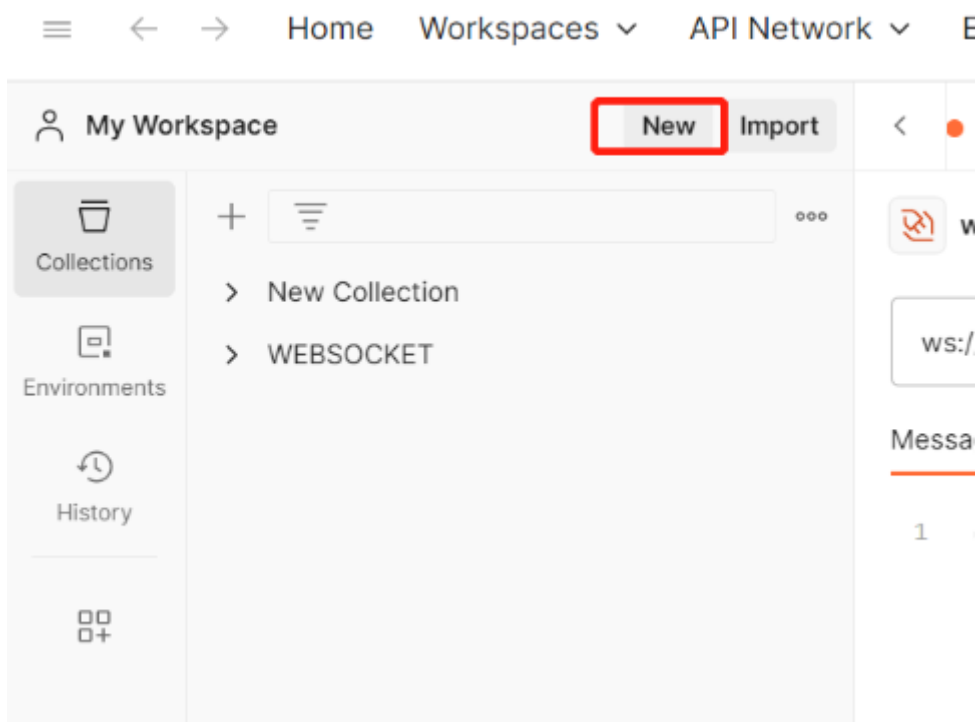
20.xxx.xxx.144:80

Follow below steps.

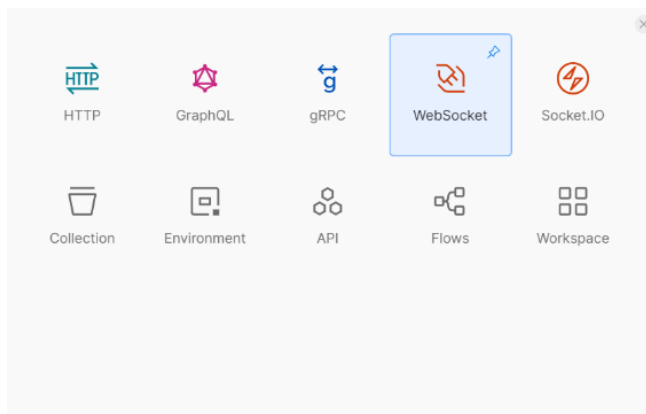
Test the URL on postman tool.

First make sure that websocket is working by using postman.

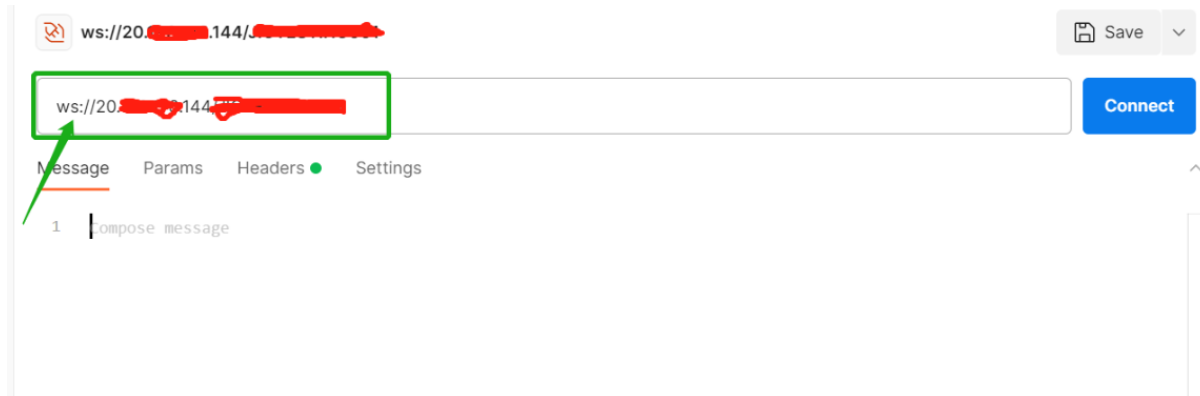
Open the postman and click on new.



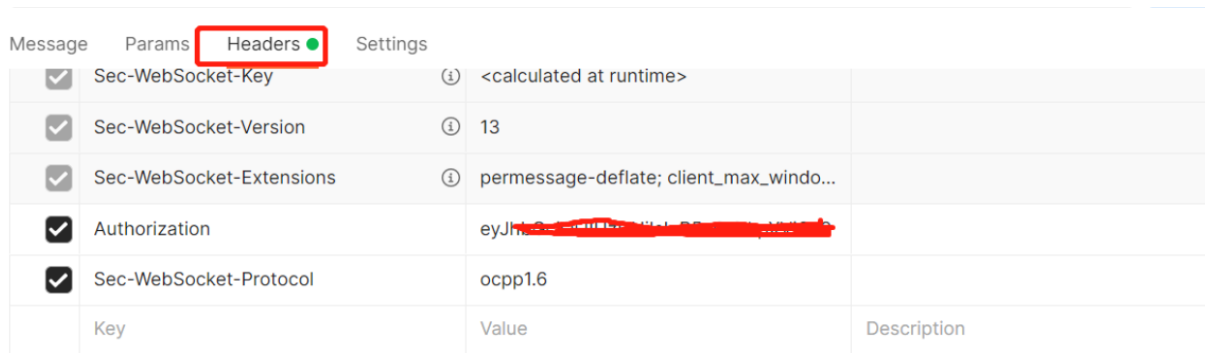
Select websocket



Insert the URL, it starts with ws:// or wss:// similar to http:// and https://



Add header if needed like Authorization, Sec-WebSocket-Protocol.



Click on Connect.



Please check the connection, if it is connected click on the drop down to see the header.

Response ● Connected ▾

Search All Messages ▾ 🗑 Clear Messages

✓ Connected to ws://20.193.178.144/JIOTESTING001 00:45:01 ▾

Status Code: **101 SWITCHING PROTOCOLS**

▼ Request Headers

- Sec-WebSocket-Version: "13"
- Sec-WebSocket-Key: "CH5b1UpkUXz2ci9djosmUQ=="
- Connection: "Upgrade"
- Upgrade: "websocket"
- Authorization: "eyJhbGciOiJIUzI1NiIsInR5cGU6IiwiZXh0cm9z"
- Sec-WebSocket-Protocol: "ocpp1.6"
- Sec-WebSocket-Extensions: "permessage-deflate; client_max_window_bits"
- Host: "20.193.178.144"

▼ Response Headers

The above header is for handshake and same we must use same.

Header creation:

Please refer the below header

```
GET /Jxxxx001 HTTP/1.1\r\nHost: 20.xxx.xxx.144\r\nUpgrade: websocket\r\nConnection: Upgrade\r\nSec-WebSocket-Key: gXWDjiKcOBqyTA2v/vFk6w==\r\nOrigin: http://20.xxx.xxx.144:80\r\nSec-WebSocket-Protocol: ocpp1.6\r\nAuthorization: eyJhxxxxxxxxxxxxxxxx\r\nSec-WebSocket-Version: 13\r\n\r\n
```

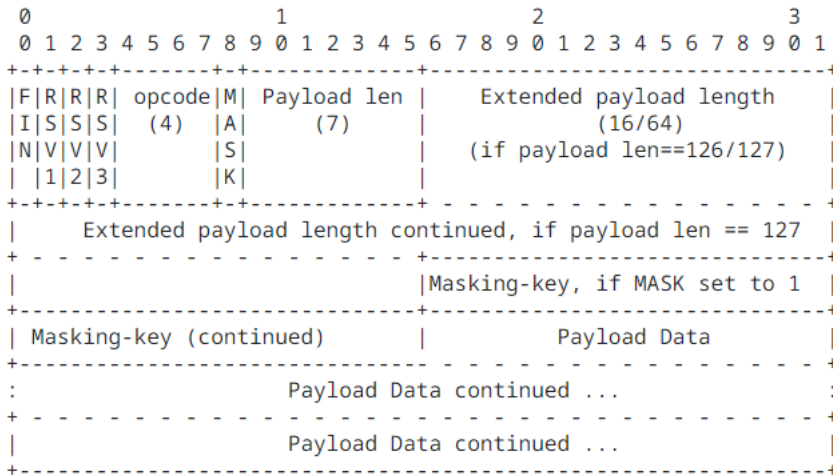
Note: at the end of header you have to add `\r\n`

3 WebSocket Data Frames.

Please refer to the below URL to understand the websocket data frames.

<https://datatracker.ietf.org/doc/html/rfc6455>

Data frame structure:



FIN: 1 bit

Indicates that this is the final fragment in a message. The first fragment MAY also be the final fragment.

RSV1, RSV2, RSV3: 1 bit each

MUST be 0 unless an extension is negotiated that defines meanings for non-zero values. If a nonzero value is received and none of the negotiated extensions defines the meaning of such a nonzero value, the receiving endpoint MUST _Fail the WebSocket Connection_.

Opcode: 4 bits

Defines the interpretation of the "Payload data". If an unknown opcode is received, the receiving endpoint MUST _Fail the WebSocket Connection_. The following values are defined.

- * %x0 denotes a continuation frame
- * %x1 denotes a text frame
- * %x2 denotes a binary frame
- * %x3-7 are reserved for further non-control frames
- * %x8 denotes a connection close
- * %x9 denotes a ping
- * %xA denotes a pong
- * %xB-F are reserved for further control frames

Mask: 1 bit

Defines whether the "Payload data" is masked. If set to 1, a masking key is present in masking-key, and this is used to unmask the "Payload data" as per [Section 5.3](#). All frames sent from client to server have this bit set to 1.

For example:

if want to send the data string

[2,"531531531","BootNotification",{"chargePointVendor":"xxx","chargePointSerialNumber":"1234","chargePointModel":"xxx test"}] having length of 125 (0x7D) bytes, so for before this string we have to append 0x81 (FIN, TEXT FRAME) and 0xFD(MASK-1 | Length of string) (0x80|0x7D)

4 AT LOGS

Refer the below logs of EC200U for websocket

AT+CGREG?

+CGREG: 0,5

OK

AT+QICSGP=1,1,"airtelgprs.com","", "",1

OK

AT+QIACT?

OK

AT+QICSGP=1,1,"airtelgprs.com","", "",1

OK

AT+QIACT=1

OK

AT+QIACT?

+QIACT: 1,1,1,"100.72.170.162"

OK

AT+QIOPEN=1,1,"TCP","20.xxx.xxx.144",80,0,0

OK

+QIOPEN: 1,0

AT+QISEND=1

> GET /JIOTESTING001 HTTP/1.1

Host: 20.xxx.xxx.144

Upgrade: websocket

Connection: Upgrade

Sec-WebSocket-Key: gXWDjiKcOBqyTA2v/vFk6w==

Origin: http://20.xxx.xxx.144:80

Sec-WebSocket-Protocol: ocpp1.6

Authorization: eyJhbXXXXXXXXXXXXXXXXXXXXXXXXXXXX

Sec-WebSocket-Version: 13

SEND OK

+QIURC: "recv",1

AT+QIRD=1,1500

+QIRD: 216
HTTP/1.1 101 Switching Protocols
Upgrade: websocket
Connection: Upgrade
Sec-WebSocket-Accept: TuNHNYAVKuHKr8iSI6bmJmvayH4=
Sec-WebSocket-Protocol: ocpp1.6
date: Sat, 10 Jun 2023 05:29:19 GMT
server: uvicorn

OK

+QIURC: "recv",1
AT+QIRD=1,1500

+QIRD: 103
• e[2,"e4e14f97-b503-4c24-8920-16e2dd330300","TriggerMessage",{"requestedMessage":"StatusNotification"}]

OK

AT+QISEND=1
> ý[2,"531531531","BootNotification",{"chargePointVendor":"xxx","chargePointSerialNumber":"1234","chargePointModel":"xxx test"}]
SEND OK

+QIURC: "recv",1
AT+QIRD=1,1500
+QIRD: 107
• e[2,"fdde7c41-d5b9-424d-a48e-bef33b7f6c01","TriggerMessage",{"requestedMessage":"StatusNotification"}]]^__ê

OK

ati

Quectel
EC200U
Revision: EC200UCNAAR03A06M08

OK

5 References

- 1) <https://datatracker.ietf.org/doc/html/rfc6455>
- 2) <https://en.wikipedia.org/wiki/WebSocket>