SERVER INTEGRATION AND SMS COMMAND SET

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Introduction

This document talks about the details of protocols and exchange of the data format supported between the Server and the Atoll Gateway. Atoll's Gateway supports cloud communication protocols such as TCP/IP, HTTP (GET and POST) and HTTPS (GET and POST).
The user can configure all the server end points using ATOLLCONFIX application tool.

Atoll Gateway Data format representation

The below mentioned data format is an example sent by Atoll AT-501RM Gateway which was configured using ATOLLCONFIX in which all the parameters where enabled :

```
header=ATOLL&id=DEV01&imei=353173066847441&time=19:12:2016,16:46:33&di1=0&di2
=0&di3=0&di4=0&do1=0&do2=0&do3=0&do4=0&ai1=0.03&ai2=0.06&ai3=0.08&ai4=0.14&mo
dbus1=0000110103020403006&modbus2=MODBUS2_ERROR&modbus3=MODBUS3_ERROR&modbus4
=MODBUS4_ERROR&modbus5=MODBUS5_ERROR&modbus6=MODBUS6_ERROR&lat=00.000000&latd
ir=N&lon=00.000000&londir=E&alt=0.0&speed=000.0&cog=000.00&ns=00&mcc=404&mnc=
45&cellid=1F87&ver=1.02&bat=3.99&pwrsts=1&gsmver=10.00.188&gsmsig=30&end=0*
```

1) header= ATOLL , "ATOLL" is an example **header** configured by the user, it may vary from user to user . Maximum length of key value is 10 characters
2) id=DEV01,"DEV01" is the specific **device id** configured for the particular gateway, the maximum length of the field is 10 characters.
3) Imei = 353173066847441 ,"353173066847441" is the **IMEI number for the GSM module** and the length of this field will be 15 always.
4) time=19:12:2016,16:46:33 , the key values represents **date and time** in the format DD:MM:YYYY,HH:MM:SS.
5) di1=0 , the key value of "di1" represents **the status of digital input1** ,the key value will be '1' for high state(for voltage more than 6.5v at the digital input 1) and "0" represents low state(for voltage less than 6.5v at the digital input)
6) di2=0 , the key value of "di2" represents **the status of digital input2**, the key value will be '1' for high state(for voltage more than 6.5v at the digital input 2) and "0" represents low state(for voltage less than 6.5v at the digital input2)
7) di3=0 , the key value of "di3" represents **the status of digital input3**, the key value will be '1' for high state(for voltage more than 6.5v at the digital input 3) and "0" represents low state(for voltage less than 6.5v at the digital input2)
8) di4=0 , the key value of "di4" represents **the status of digital input4**, the key value will be '1' for high state(for voltage more than 6.5v at the digital input 4) and "0" represents low state(for voltage less than 6.5v at the digital input2)
9) do1=0 , the key value of "do1" represents **the status of digital output1**, the key value will be '1' for active state and "0" represents passive state.
10) do2=0 , the key value of "do2" represents **the status of digital output2**, the key value will be '1' for active state and "0" represents passive state.
11) do3=0 , the key value of "do3" represents **the status of digital output3**, the key value will be '1' for active state and "0" represents passive state.

12) do4=0 , the key value of "do4" represents **the status of digital output4**, the key value will be '1' for active state and "0" represents passive state.

13) ai1=0.06 ., "ai1" stands for **analog input voltage 1**,the key value will vary from 0.00 to 30.00, depend upon the input voltage applied the analog input terminal of the gateway.

14) ai2=0.06 ., "ai2" stands for **analog input voltage 2**,the key value will vary from 0.00 to 30.00, depend upon the input voltage applied the analog input terminal of the gateway.

15) ai3=0.06 ., "ai3" stands for **analog input voltage 3**,the key value will vary from 0.00 to 30.00, depend upon the input voltage applied the analog input terminal of the gateway.

16) ai4=0.06 ., "ai4" stands for **analog input voltage 4**,the key value will vary from 0.00 to 30.00, depend upon the input voltage applied the analog input terminal of the gateway.

17) modbus1=0000110103020403006 , the key value of modbus1 represents the reply for the 1st Modbus request configured for the gateway, the field values will be the bare reply from the Modbus device in HEX data format , depending upon the Meter/Modbus RTU device the decoding mechanism for this particular variable will change. In case of any Modbus communication error the key value will be as "MODBUS1_ERROR".

18) Modbus2= MODBUS2_ERROR , the key value of modbus2 represents the reply for the 2nd Modbus request configured for the gateway, the field values will be the bare reply from the Modbus device in HEX data format , depending upon the Meter/Modbus RTU device the decoding mechanism for this particular variable will change. In case of any Modbus communication error the key value will be as "MODBUS2_ERROR".

19) Modbus3= MODBUS3_ERROR , the key value of modbus3 represents the reply for the 3rd Modbus request configured for the gateway, the field values will be the bare reply from the Modbus device in HEX data format , depending upon the Meter/Modbus RTU device the decoding mechanism for this particular variable will change. In case of any Modbus communication error the key value will be as "MODBUS3_ERROR".

20) Modbus4= MODBUS4_ERROR , the key value of modbus4 represents the reply for the 4th Modbus request configured for the gateway, the field values will be the bare reply from the Modbus device in HEX data format , depending upon the Meter/Modbus RTU device the decoding mechanism for this particular variable will change. In case of any Modbus communication error the key value will be as "MODBUS4_ERROR".

21) Modbus5= MODBUS5_ERROR , the key value of modbus5 represents the reply for the 5th Modbus request configured for the gateway, the field values will be the bare reply from the Modbus device in HEX data format , depending upon the Meter/Modbus RTU device the decoding mechanism for this particular variable will change. In case of any Modbus communication error the key value will be as "MODBUS5_ERROR".

22) Modbus6= MODBUS6_ERROR , the key value of modbus6 represents the reply for the 6th Modbus request configured for the gateway, the field values will be the bare reply from the Modbus device in HEX data format , depending upon the Meter/Modbus RTU device the decoding mechanism for this particular variable will change. In case of any Modbus communication error the key value will be as "MODBUS6_ERROR".

23) lat=00.000000, denotes **Latitude** and the format is ddmm.mmmm
Where,
dd denotes degrees = 0 to 90 degrees
mm.mmmm denotes minutes = 00.0000..59.9999

24) latdir=N , denotes **Direction of the Latitude** and the format is **N/S** which denotes North / South

25) lon=00.000000 , denotes Longitude and the format is dddmm.mmmm
Where,
ddd denotes degrees = 000..180
mm.mmmm denotes minutes = 00.0000...59.9999

26) londir=E , denotes **Direction of the Longitude** and the format is **E/W** which denotes East / West

27) alt=0.0 , denotes Altitude and the format is x.x Altitude - mean-sea-level (geoid) in meters

28) speed=000.0 , denotes **Speed** over ground in knots

29) cog=000.00 **,** denotes **Course over Ground (degrees, True)** and the format is **ddd.mm**
Where,
ddd denotes degrees = 000..360
mm denotes minutes = 00..59

30) ns=00 , denotes **Total number of satellites** in use 00..12

31) mcc=404 , denotes **Mobile Country Code , 3 digits.**

32) mnc=45 ,denotes **Mobile Network Code , 2 or 3 digits.**

33) cellid=1F87 , denotes **Cell Id** (string type; two bytes in hexadecimal format for equal to 0, four bytes in hexadecimal format otherwise)

34) ver=1.02, the key value of "ver" represents the **version number of the Gateway firmware**.

35) bat=3.99 ,this key value represents the **internal battery voltage** of the Gate way. We can view Oscillated Battery values once the battery is removed from the Gateway.

36) pwrsts=1, this key value represents the **main power status of the gateway**, the key value '1' represents that gateway is running on main power . Key value '0' represents the gate way is running on internal battery (without main power).

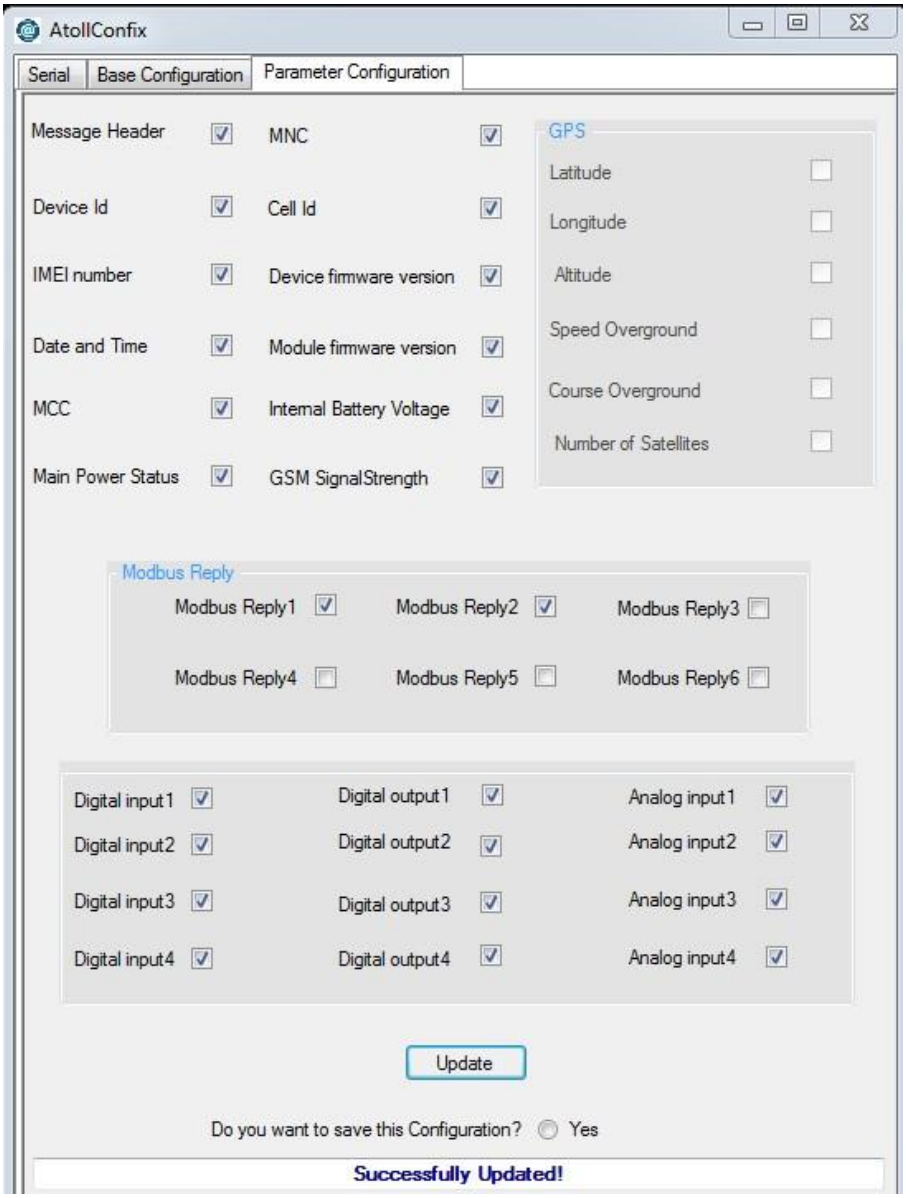
37) gsmver=10.00.188, this key value represents the **firmware version of the GSM module** inside the gateway.

38) gsmsig=30 , the key value represents the **GSM signal strength** of the gateway **the value varies from 0 to 31**.
15 is the average signal strength required for the gateway, and 31 is the maximum signal strength.

39) end=0*, the key value of "end" represents the **end of the string** also key value ="0*" means the data is a live data from the gate way and key value will be "1*" in case of sending an old data from the gateway memory.

The data format will vary depending upon the parameters selected by the user using the application tool ATOLLCONFIX.

For Example if the User has AR-501RM and wishes to configure few parameters that the user requires as shown in the figure:



As shown in the above image, since the user is configuring AR-501RM , The GPS parameters are disabled by default. Here the User has disabled Modbus Reply [3-6]. The data format that is sent to the server would appear like this:

```
header=ATOLL&id=DEV01&imei=353173066847441&time=19:12:2016,16:46:33&di1=0&di2
=0&di3=0&di4=0&do1=0&do2=0&do3=0&do4=0&ai1=0.03&ai2=0.06&ai3=0.08&ai4=0.14&mo
dbus1=0000110103020403006&modbus2=0000110103020403006&mcc=404&mnc=45&cellid=1
F87&ver=1.02&bat=3.99&pwrsts=1&gsmver=10.00.188&gsmsig=30&end=0*
```

CONTROL MESSAGES EXCHANGED BETWEEN SERVER AND GATEWAY

Atolls Gateway supports a unique feature which allows User to update firmware and Control digital outputs by sending unique server control messages to the Gateway.
There are 2 control messages which allows the user to perform Firmware upgrade over the air and control the digital outputs respectively:

1) Control Message sent from Server to the Gateway to control the Digital Outputs:

AT_DOUT;1111;

Where,

AT_DOUT represents the unique Header for controlling the Digital Output from the Server

Digital Outputs (1 to 4) **1111** represents Digital Outputs (1 to 4)
Where 1 indicates Active State
0 indicates Passive State

For example if the User wants to deactivate the Digital output 3 and Digital output 4, the command must be set as shown below:
AT_DOUT;1100;

Similarly if the User wants to deactivate the Digital output 2 and activate the other outputs, then the command looks like this:
AT_DOUT;1011;

After Configuring the Atoll Gateway with the help of ATOLLCONFIX, In case of TCP/IP Server the user can send the command to control the Digital Outputs in the same format as mentioned in the above.

But in case of HTTP and HTTPS Server, The command must be sent along with the HTTP reply.

During Normal communication, after the gateway pushes the entire data to the server it receives an acknowledgment back from the server shown below:

HTTP-Version: HTTP/1.0 200 OK

Content-Length: 3012

Content-Type: text/html

<blank line>

<body>

In order to control the Digital outputs, the command must be sent after receiving the HTTP reply received from the server:

HTTP-Version: HTTP/1.0 200 OK

Content-Length: 3012

Content-Type: text/html

<blank line>

AT_DOUT;1011;

<body>

Atoll Gateway SMS command set

Atoll provides unique set of SMS commands that allows user to:

1) Remotely change to Basic configurations like :
    - Access Point Name
    - Port
    - IP Address
    - Message Interval
2) Remotely activate or deactivate the digital Outputs.
3) Remotely perform FOTA (Firmware upgrade over the air).

The SMS Commands are accepted only by the mobile numbers which are configured with the help of application tool ATOLLCONFIX. Atoll Gateway Supports provision to set up to 3 Mobile numbers.

The SMS received by any other mobile number will simply be discarded.

SMS FORMAT REPRESENTATION

1) SMS Command to change the Basic Configurations:

CONFIG;apn;Ip address;port;message interval;

CONFIG;airtelgprs.com;54.11.168.10;80;0060;

Where,

CONFIG denotes the **Message header**
apn denotes the **Access point name** for the network provider (eg: for airtel it is airtelgprs.com)
Ip address denotes **IP address or the host name** for the server.
Message interval denotes **Message interval** in seconds.

Length Restrictions for the above parameters:

- Maximum length of APN is set to 20 characters.
- Maximum length of IP Address/hostname is set to 30 characters
- Maximum length of the port is set to 5 characters.
- Length of the message interval is fixed to 4 characters
  For Example, if the Gateway has to push data to the server in every 60 seconds then the Message interval must be set to "0060".

Once the SMS has been received by the Gateway, it sends back an Acknowledgment back to the Same number from which the SMS was sent. The acknowledgment format is shown below:

CONFIGRESPONSE:apn ipaddress port message interval

NOTE: Command must include a ";" as a separator between each field.
In case there is a mismatch in the SMS format, the SMS will be simply discarded.

2) SMS Command to control the Digital Outputs of the Gateway:

ATDOUT;0100;

Where,

ATDOUT represents the unique Header for controlling the Digital Output from the Server

Digital Outputs (1 to 4) **1111** represents Digital Outputs (1 to 4)
Where 1 indicates Active State
0 indicates Passive State

For example if the User wants to deactivate the Digital output 3 and Digital output 4, the command must be set as shown below:
ATDOUT;1100;

Similarly if the User wants to deactivate the Digital output 2 and activate the other outputs, then the

command looks like this:
ATDOUT;1011;

NOTE: Command must include a ";" as a separator between each field.
In case there is a mismatch in the SMS format, the SMS will be simply discarded.