WiFi / Ethernet BluGW

August 2023

YieldPoint Sensing the future

WiFi/Eth BluGateway

What is the WiFi / Ethernet BluGateway?

YieldPoint's WiFi/Ethernet BluGateWay is a BlueTooth 5.2 Gateway that can aggregate readings a population of geotechnical instruments emitting three types of signal:

(i) 4 xRS485 digital signal,

(ii) BlueTooth 5 (Coded PHY) beacons,

(iii) 4 x VW + 2 x RS485 digital signal

It can then backhaul the data over WiFi/Ethernet.

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WiFi/Eth BluGateway

Outline

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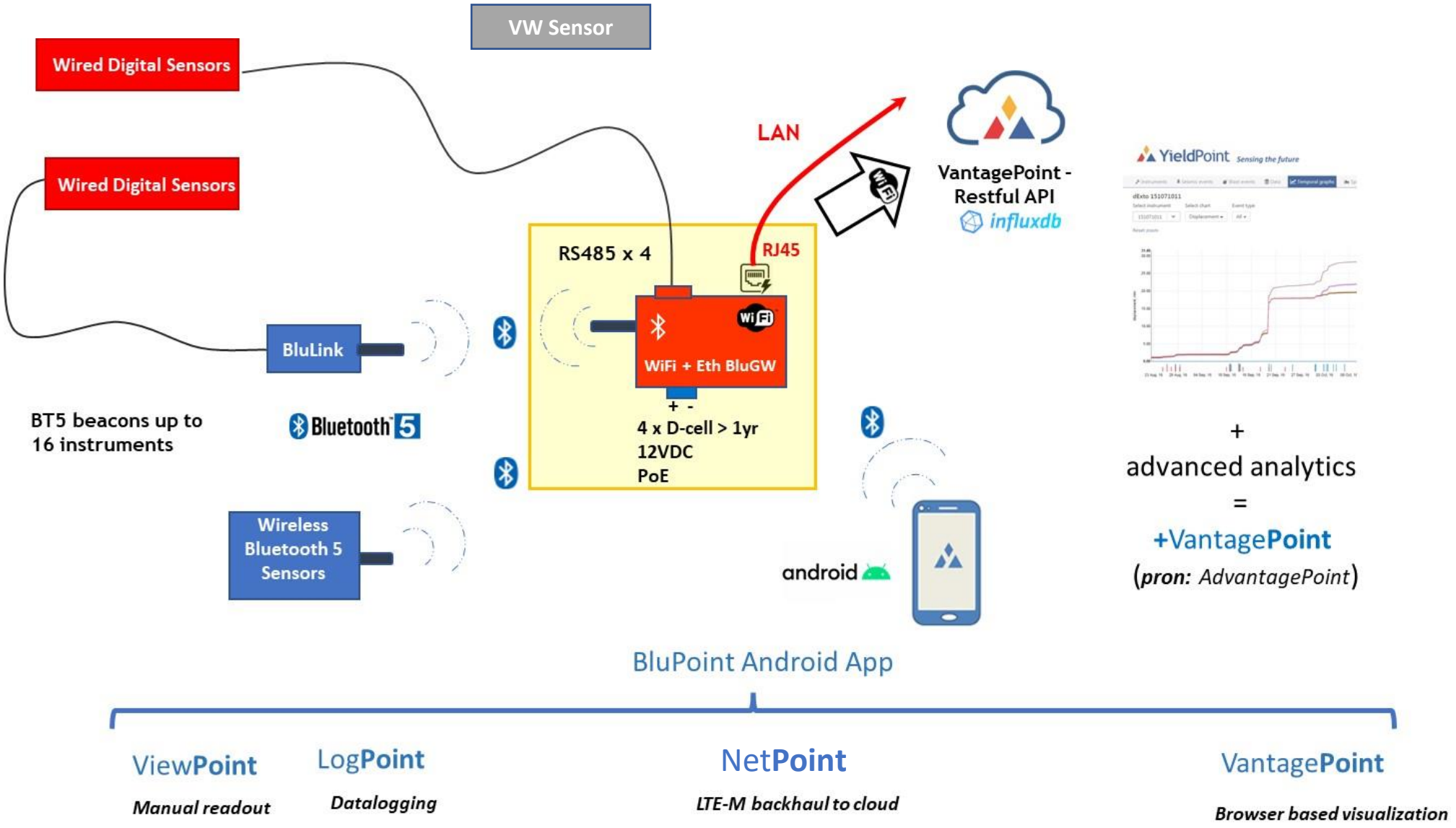
WiFi/Eth BluGateway



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1. Role in EcoSystem

3 types of Input:

1. 4 x YP RS485 wired instruments

2. Instruments beaconing BT5 (Coded PHY) beacons (up to 16)

3. 4 x VW instruments

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1. Role in EcoSystem

BluPoint App?

NetPoint, an activity within the BluPoint Android App, is used to:

(i) Configure the Time and Reading Interval
(ii) Configure the WiFi/Ethernet settings
(iii) Configure the upload interval
(iv) Configure the cloud DB target
(v) Check that the system is running correctly
(vi) Generate trouble-shooting log-files

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The LogPoint Activity

Purpose:

Configure BluGW datalogger functionality.

Functions:

- CONNECT: Extract, Wipe data
- LOGGER: Scan BT, Read instruments
- SETTINGS: Wet time, format.

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2.1 LogPoint Activity

The NetPoint Activity

Purpose:

Configure BluGW for backhaul communication and Transmission of data to a cloud dabase.

Functions:

- CONTROL : Console and monitoring
- SETTINGS : Setup for data upload
- WiFi : Configure WiFi IP settings
- LAN: Configure Ethernet IP settings
- VP: Configure VanatagePoint Cloud DB

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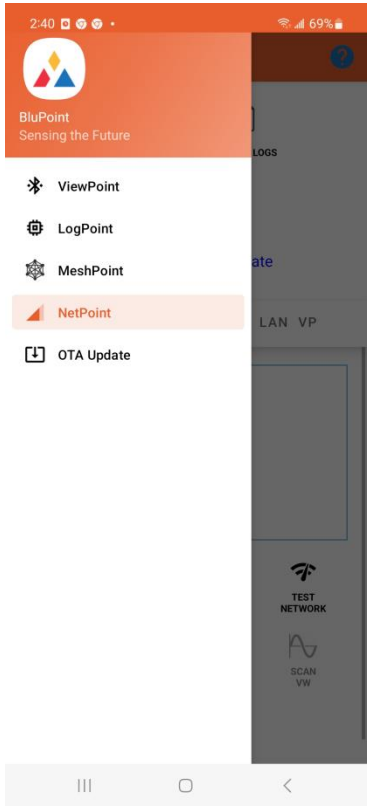
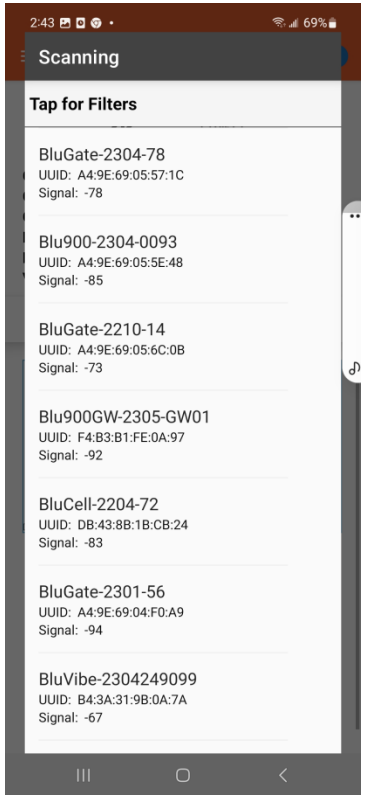
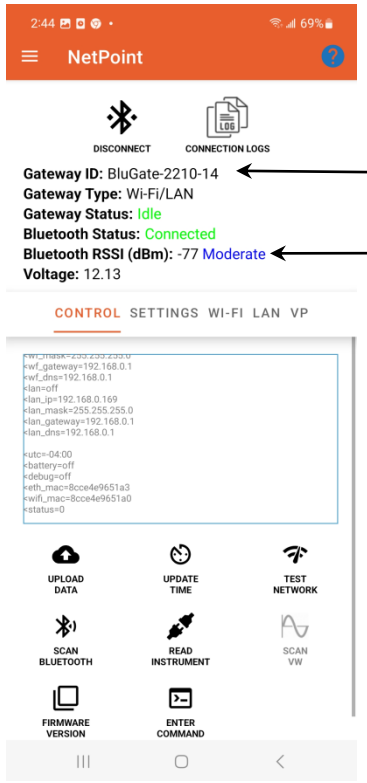
2.2 NetPoint Activity



1. Open BluPoint and drag from the left, Select the NetPoint activity



2. Tap connect and select the BluGate ID



Unique ID

BT5 Signal strength

3. NetPoint will connect to the Gateway and retrieve parameters. If the RSSI is <-70 then multiple attempts to connect may be required

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2.2 NetPoint Activity

BT5 Signal strength or RSSI

RSSI (Received Signal Strength Indicator in dB): Radios can communicate down to an RSSI of -92.

Range: -40 to -60 Good
-60 to -80 Moderate
<-80 Poor

IMPORTANT: Whatever the orientation of the device, the antenna should be VERTICAL

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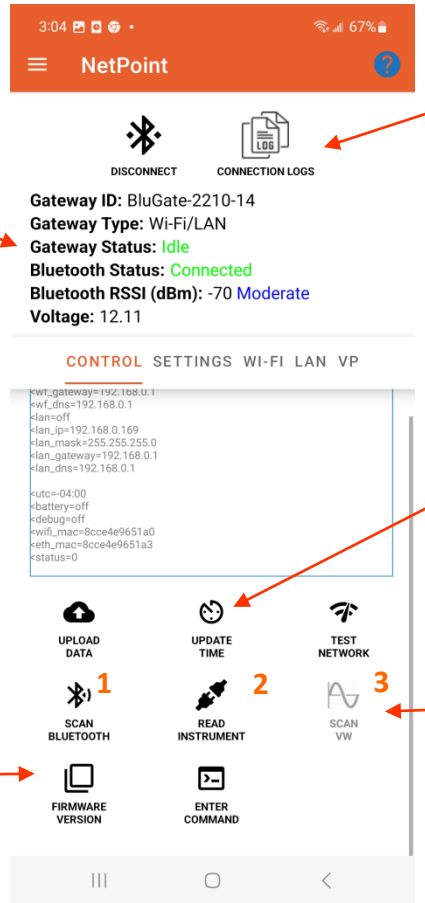
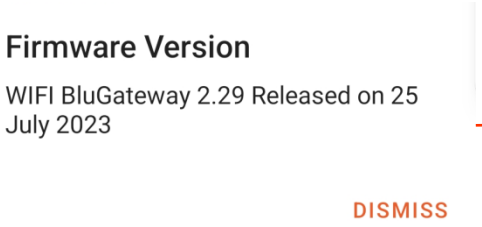
2.2 NetPoint Activity

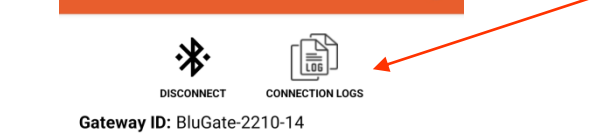
Gateway Status:

0: Idle (responsive)
1. BT Scan
2. Read Instrument
3. VW Scan
4: Uploading Data

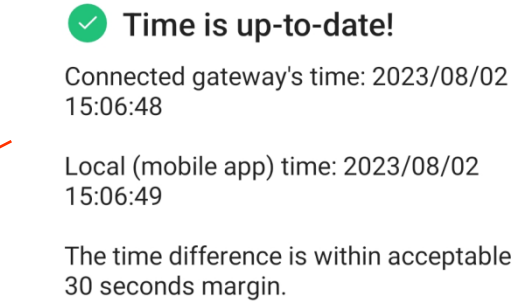


Console: Log of commands/ responses generated from session :





Share BT logs with Yieldpoint for trouble-shooting



1 20 s BT5 beacon scan
2 Mux RS485 d-Tech instruments
3 Mux VW (grey = No hardware)

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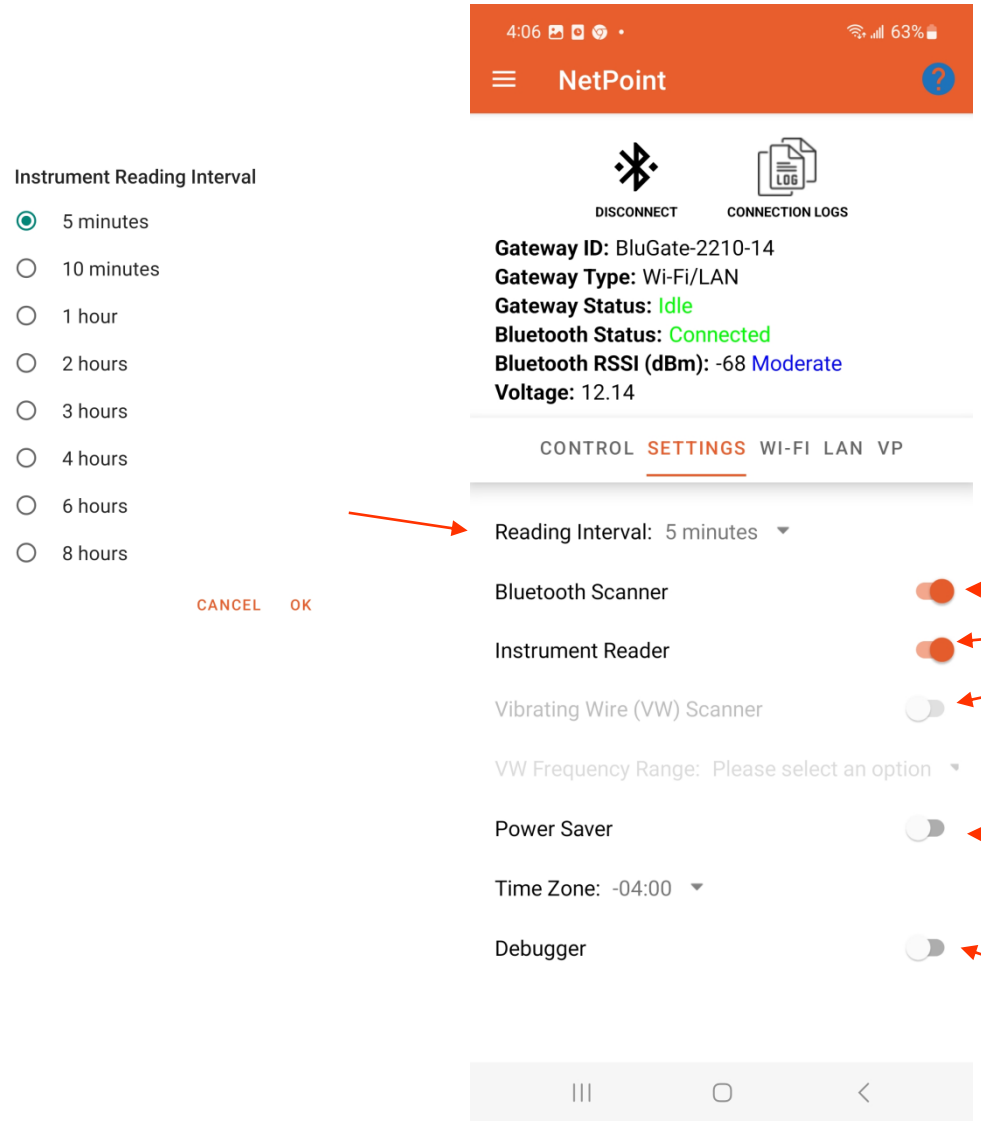
2.2.1 CONTROL Tab



Disable the Bluetooth 5.2 scanning

Disable RS485 d-tech instrument scanning

Disable VW scanning (grey: hardware not present)

OFF: External power.
ON: Internal battery power (webpage configuration disabled)

Turn on enhanced messaging for troubleshooting
See all Ucom and AT commands.

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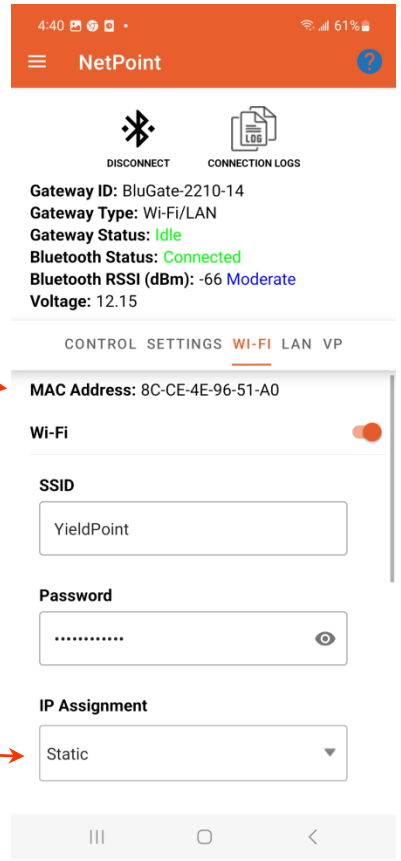
2.2.2 SETTINGS Tab

Wi-Fi Modem MAC address

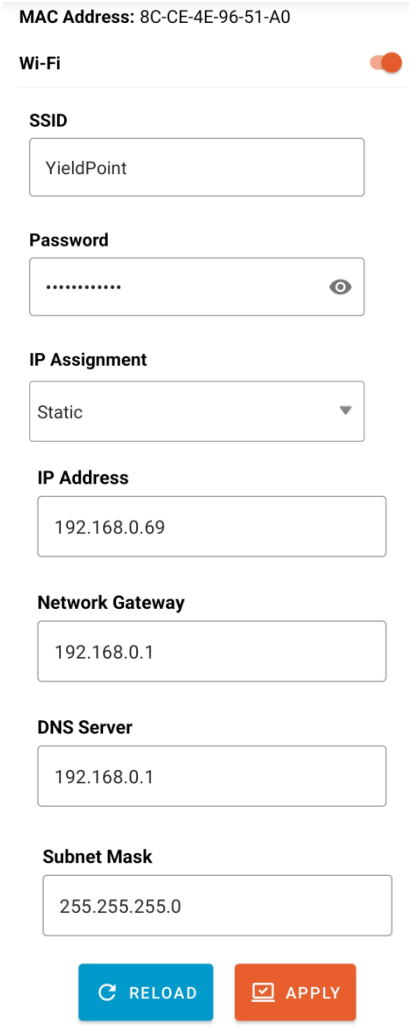


IP Assignment

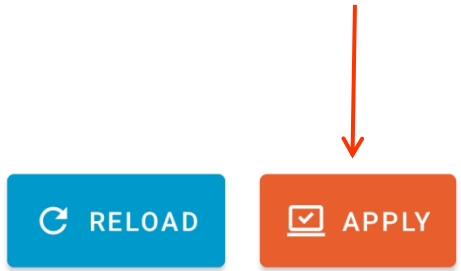
DHCP

Static

ON /OFF



Applies entered values



The button of “TRUTH”. Returns the true values of the IP settings.

Tap RELOAD to Discover true DHCP IP address.

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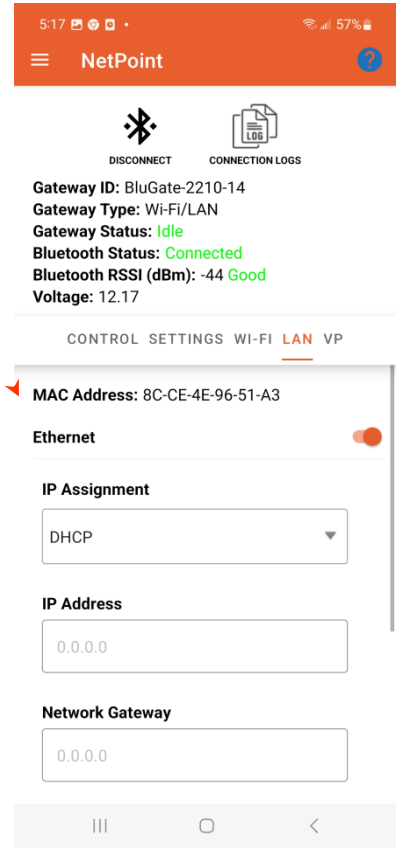
2.2.3 WiFi Tab



Ethernet Modem MAC address

IP Assignment

DHCP

Static

Tap RELOAD to populate

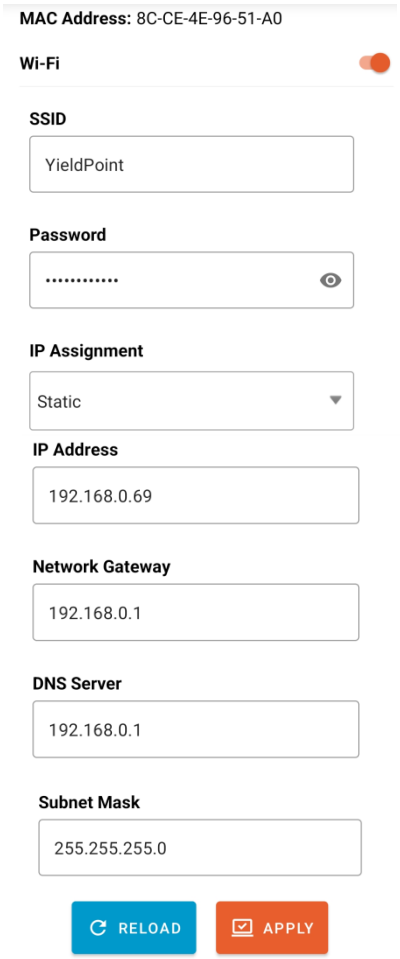
IP Assignment

DHCP

IP Address

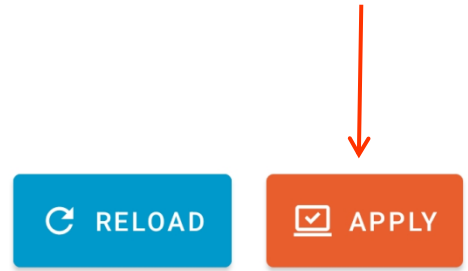
192.168.0.249

ON /OFF



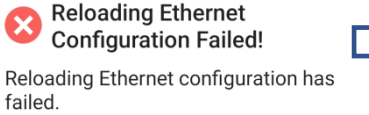
ON /OFF

Applies entered values



The button of “TRUTH”. Returns the true values of the IP settings.

Tap RELOAD to Discover true DHCP IP address.



Check Ethernet connection

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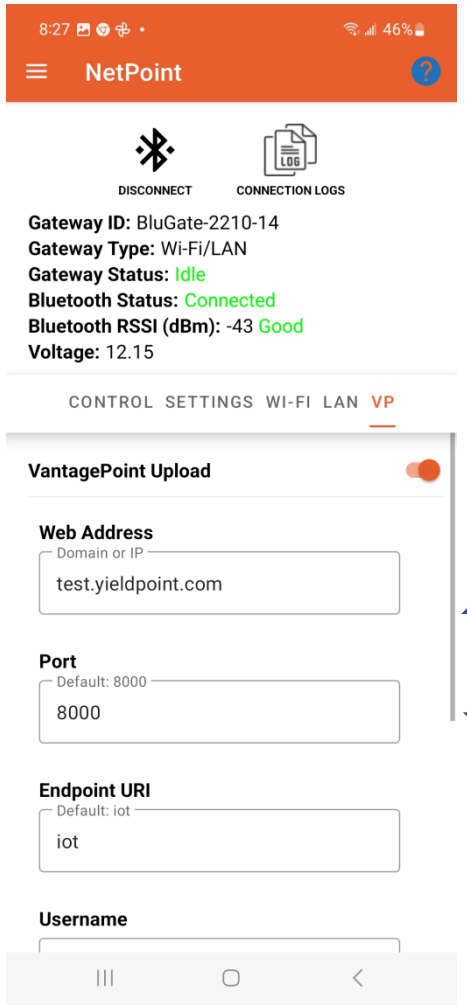
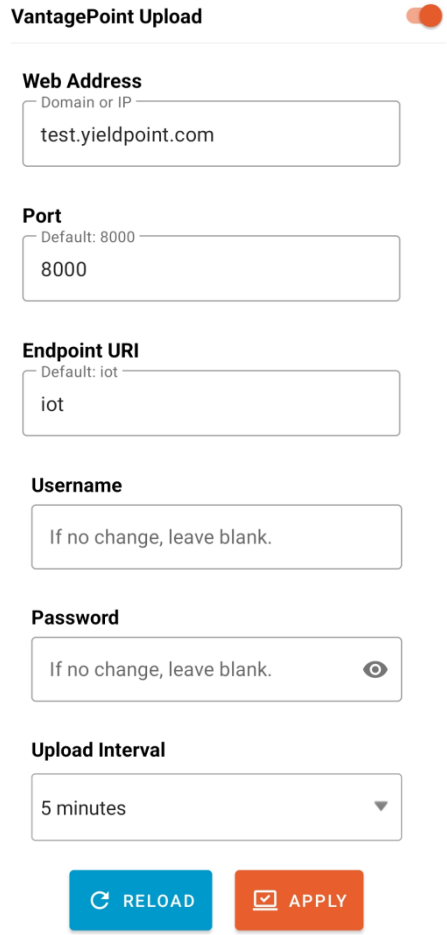
2.2.4 LAN Tab

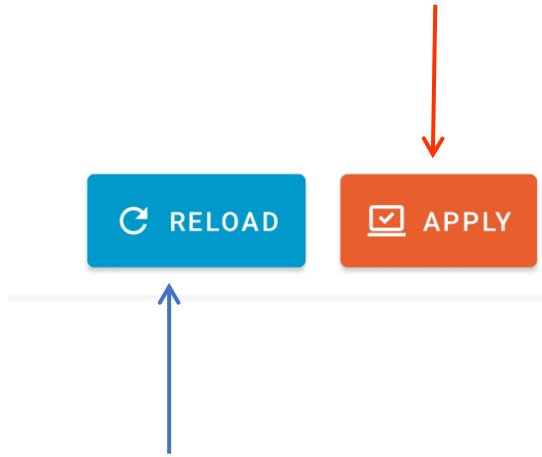


ON /OFF



ON /OFF

Applies entered values



The button of “TRUTH”.
Returns the true values
of the VantagePointP settings.

Tap RELOAD to Discover true
VP settings.

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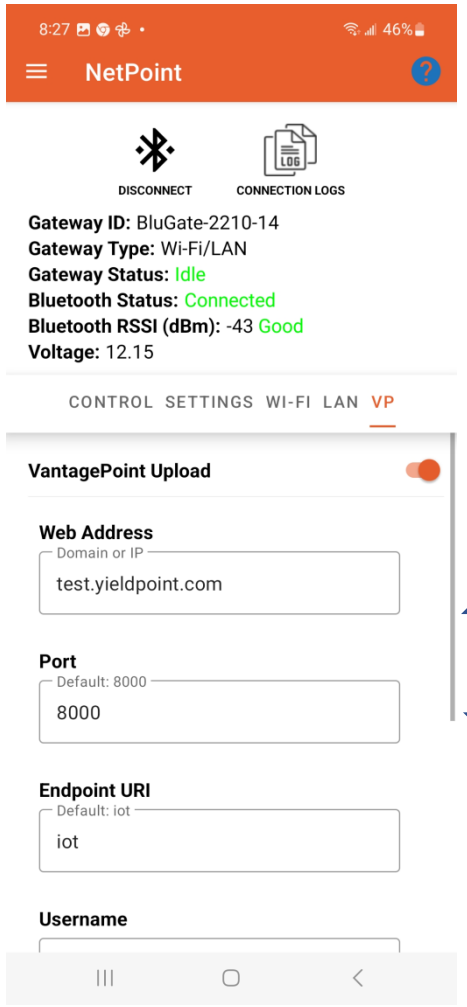
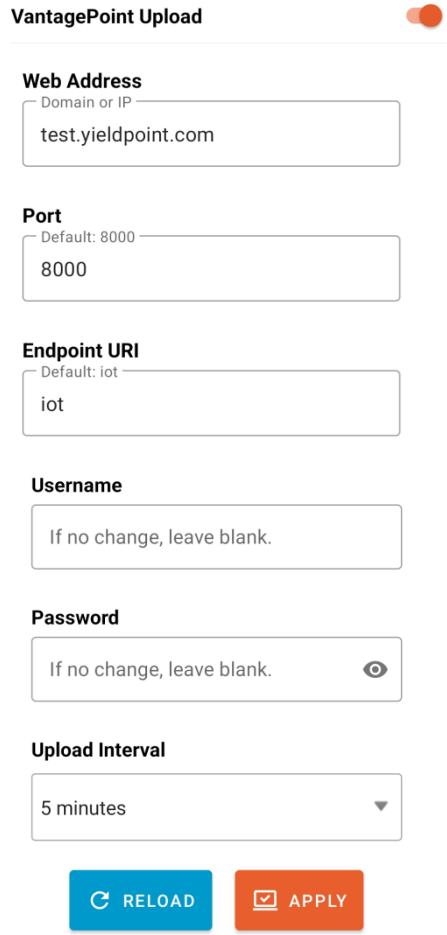
2.2.5 VP Tab

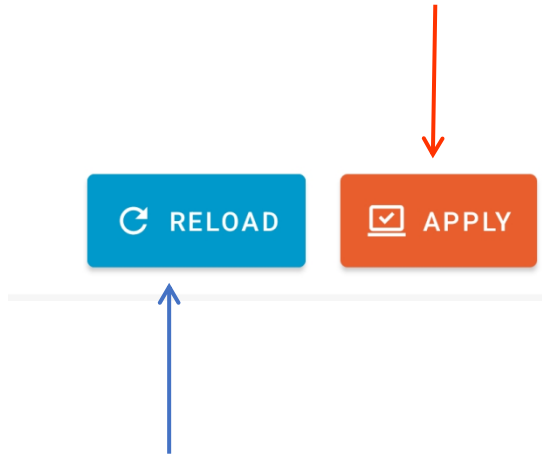


ON /OFF



ON /OFF

Applies entered values



The button of “TRUTH”.
Returns the true values
of the VantagePointP settings.

Tap RELOAD to Discover true
VP settings.

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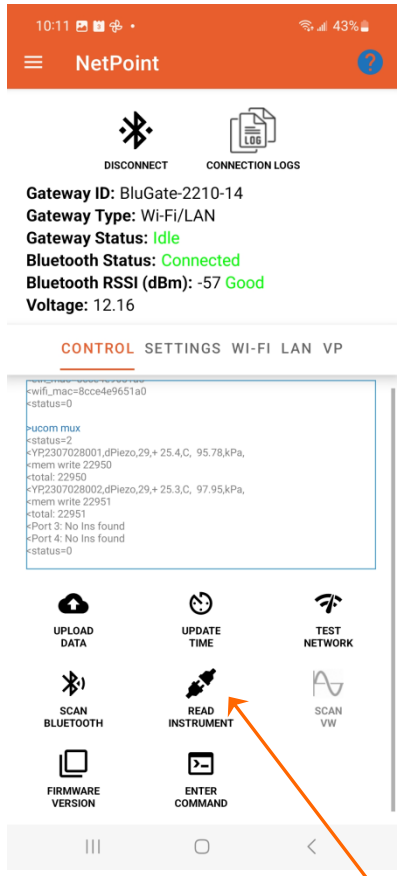
2.2.5 VP Tab

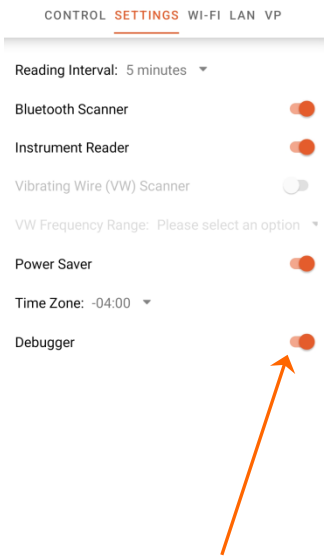
STEP 1: Generate some readings



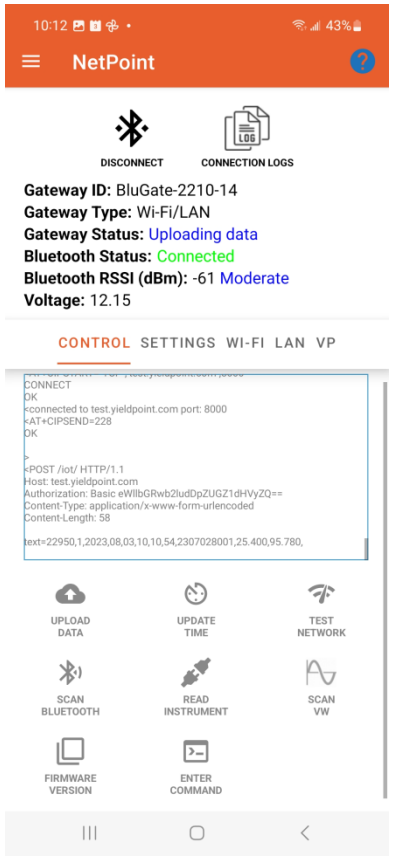
Readings

Read instrument

STEP 2: Turn on Debugger and UPLOAD DATA

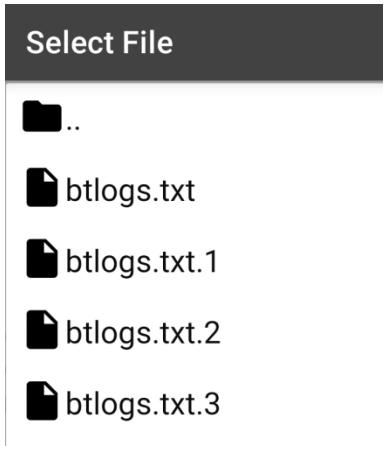


Turn Debugger on for all messaging



Messages

STEP 3: Share blogs files



The Logfiles will include all the messages on the console.

Share with YieldPoint for trouble shooting

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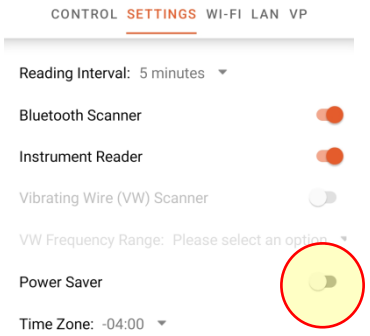
2.3 Test GW in BluPoint

(i) Turn off Power Saver and (ii) Browse to Local IP address

IMPORTANT: In NetPoint
Turn Power Saver OFF

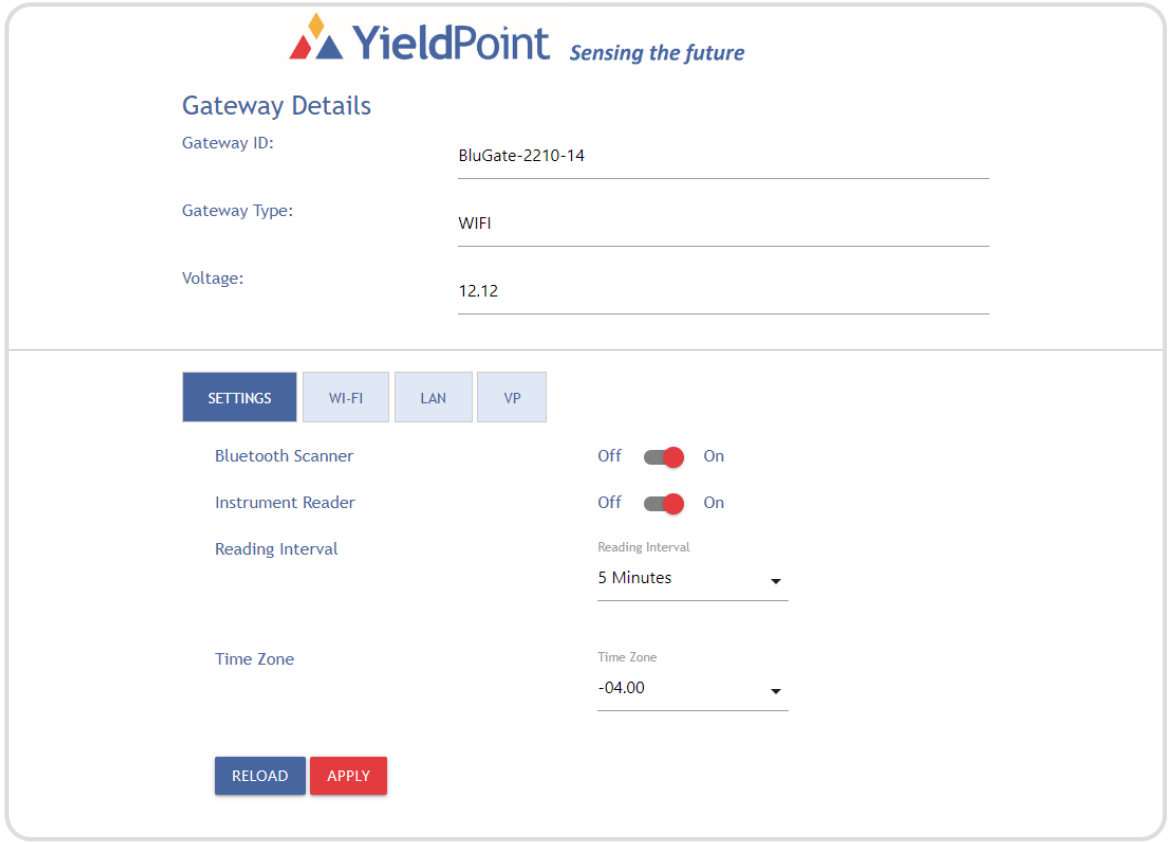
SETTINGS TAB



OFF

WIFI or LAN TAB

Browse to this IP address



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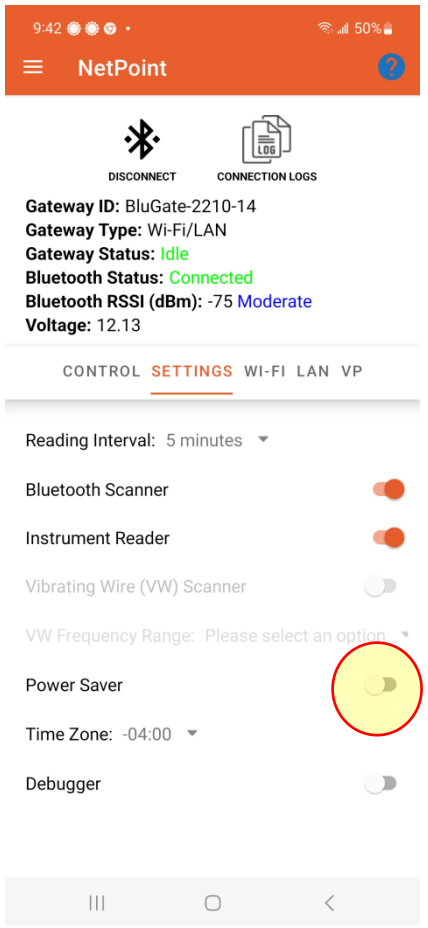
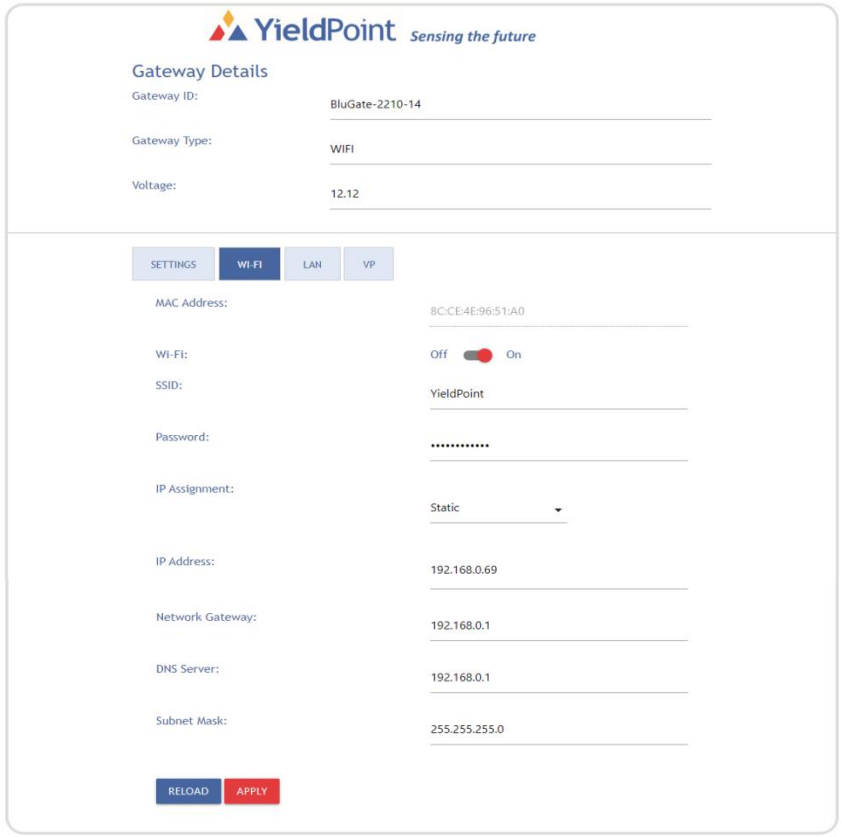
3. Browser Configuration

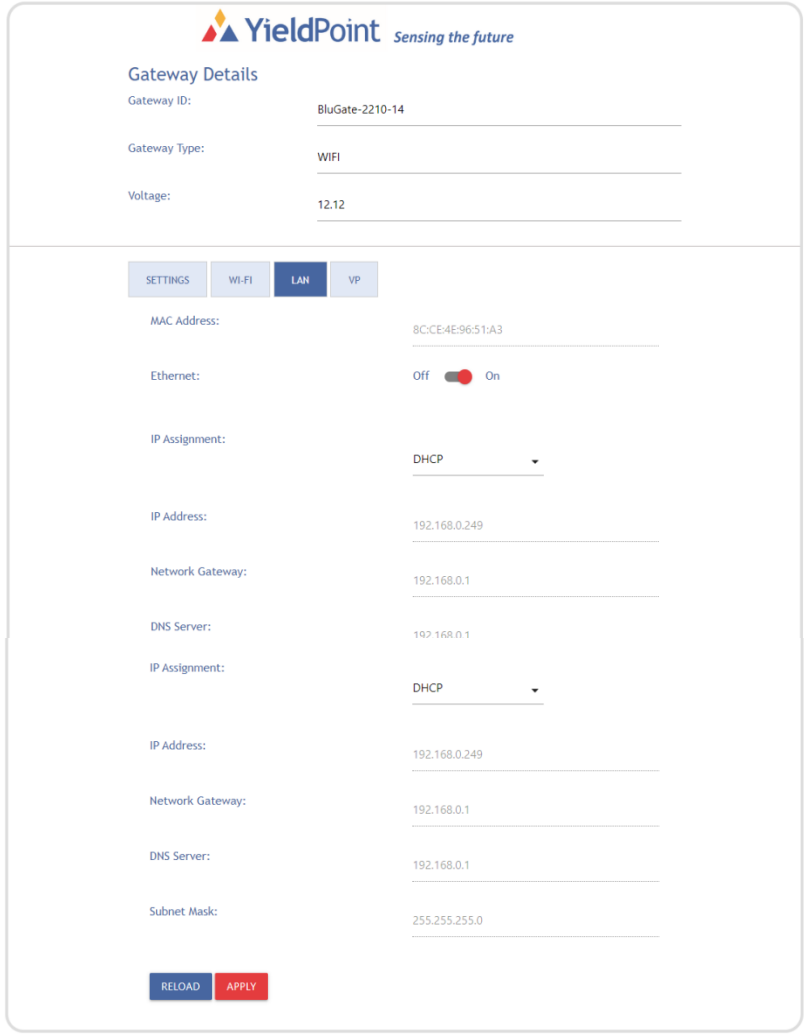
Turn Power saver setting to OFF



OFF



WiFi settings. WiFi SSID, Passkey must be set using the BluPoint App or Ethernet



IMPORTANT: Ethernet cable must be connected

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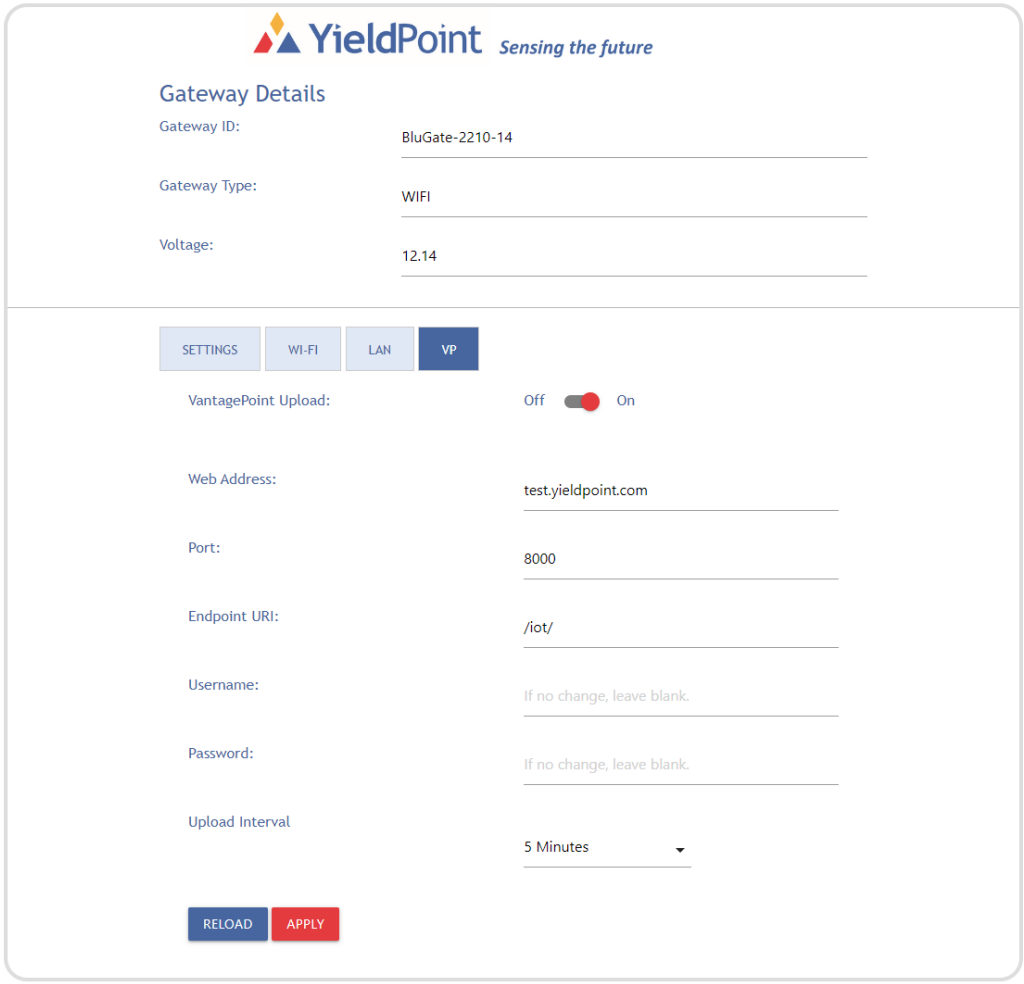
3.1 WiFi and LAN Tab



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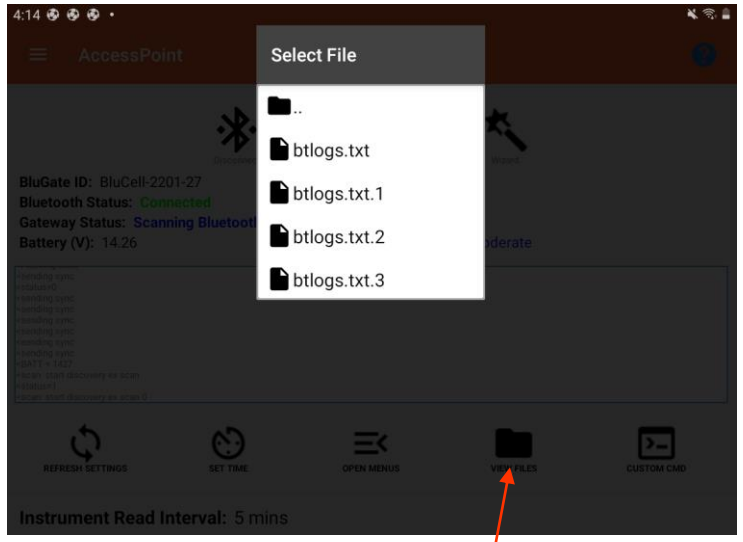
3.2 VP Tab

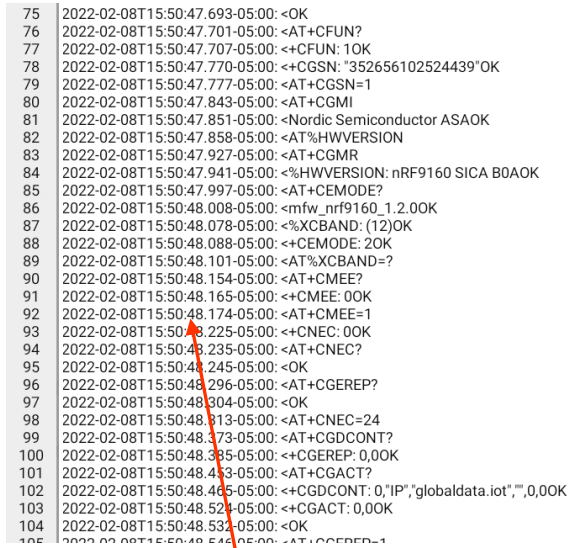
Connection Log Files

AT Commands and responses with the LTE modem exchange quickly. A logfile of connection session is stored in the logfile

On the Status page:



Click view files to select a Logfile. Btlogs, btlogs.txt.1 are the youngest.



```
75  2022-02-08T15:50:47.693-05:00: <OK
76  2022-02-08T15:50:47.701-05:00: <AT+CFUN?
77  2022-02-08T15:50:47.707-05:00: <+CFUN: 1OK
78  2022-02-08T15:50:47.770-05:00: <+CGSN: "352656102524439"OK
79  2022-02-08T15:50:47.777-05:00: <AT+CGSN=1
80  2022-02-08T15:50:47.843-05:00: <AT+CGMI
81  2022-02-08T15:50:47.851-05:00: <Nordic Semiconductor ASAOK
82  2022-02-08T15:50:47.858-05:00: <AT%HWVERSION
83  2022-02-08T15:50:47.927-05:00: <AT+CGMR
84  2022-02-08T15:50:47.941-05:00: <%HWVERSION: nRF9160 SICA B0AOK
85  2022-02-08T15:50:47.997-05:00: <AT+CEMODE?
86  2022-02-08T15:50:48.008-05:00: <mfw_nrf9160_1.2.0OK
87  2022-02-08T15:50:48.078-05:00: <%XCBAND: (12)OK
88  2022-02-08T15:50:48.088-05:00: <+CEMODE: 2OK
89  2022-02-08T15:50:48.101-05:00: <AT%XCBAND=?
90  2022-02-08T15:50:48.154-05:00: <AT+CMEE?
91  2022-02-08T15:50:48.165-05:00: <+CMEE: 0OK
92  2022-02-08T15:50:48.174-05:00: <AT+CMEE=1
93  2022-02-08T15:50:48.225-05:00: <+CNEC: 0OK
94  2022-02-08T15:50:48.235-05:00: <AT+CNEC?
95  2022-02-08T15:50:48.245-05:00: <OK
96  2022-02-08T15:50:48.296-05:00: <AT+CGEREP?
97  2022-02-08T15:50:48.304-05:00: <OK
98  2022-02-08T15:50:48.313-05:00: <AT+CNEC=24
99  2022-02-08T15:50:48.373-05:00: <AT+CGDCONT?
100 2022-02-08T15:50:48.385-05:00: <+CGEREP: 0,0OK
101 2022-02-08T15:50:48.453-05:00: <AT+CGACT?
102 2022-02-08T15:50:48.465-05:00: <+CGDCONT: 0,"IP","globaldata.iot","",0,0OK
103 2022-02-08T15:50:48.524-05:00: <+CGACT: 0,0OK
104 2022-02-08T15:50:48.532-05:00: <OK
```

Part of the MODEM connection exchange

```
120 2022-02-08T15:50:51.236-05:00: <Operator: "", Band: 12, Cell ID: "00889E09",
121 2022-02-08T15:50:51.246-05:00: <Connected
122 2022-02-08T15:50:51.264-05:00: <Connected
123 2022-02-08T15:50:51.519-05:00: <OK
124 2022-02-08T15:50:51.527-05:00: <AT#XTCPCLI=0
125 2022-02-08T15:50:51.667-05:00: <AT#XTCPCLI=1,"test.yieldpoint.com",8000
126 2022-02-08T15:50:52.212-05:00: <#XTCPCLI: 1,"connected"OK
127 2022-02-08T15:50:52.225-05:00: <AT%XMONITOR
128 2022-02-08T15:50:52.347-05:00: <%XMONITOR: 5,"","","302720","6720",7,12,"00889E09",184,5060,6(
129 2022-02-08T15:50:52.355-05:00: <Uploading 30328
130 2022-02-08T15:50:52.444-05:00: <AT#XTCPSEND="POST /iot/ HTTP/1.1Host: test.yieldpoint.com,
131 2022-02-08T15:50:53.186-05:00: <#XTCPSEND: 230OKHTTP/1.1 201 CreatedDate: Tue, 08 Feb 20
132 2022-02-08T15:50:53.340-05:00: <: 213SEND: 230OKHTTP/1.1 201 CreatedDate: Tue, 08 Feb 2022
133 2022-02-08T15:50:53.397-05:00: <Uploading 30329
134 2022-02-08T15:50:53.472-05:00: <AT#XTCPSEND="POST /iot/ HTTP/1.1Host: test.yieldpoint.com,
135 2022-02-08T15:50:54.166-05:00: <#XTCPSEND: 230OKHTTP/1.1 201 CreatedDate: Tue, 08 Feb 20
136 2022-02-08T15:50:54.296-05:00: <: 213SEND: 230OKHTTP/1.1 201 CreatedDate: Tue, 08 Feb 2022
137 2022-02-08T15:50:54.304-05:00: <Uploading 30330
138 2022-02-08T15:50:54.456-05:00: <AT#XTCPSEND="POST /iot/ HTTP/1.1Host: test.yieldpoint.com,
139 2022-02-08T15:50:55.133-05:00: <#XTCPSEND: 229OKHTTP/1.1 201 CreatedDate: Tue, 08 Feb 20
140 2022-02-08T15:50:55.283-05:00: <Uploading 30331
141 2022-02-08T15:50:55.295-05:00: <: 213SEND: 229OKHTTP/1.1 201 CreatedDate: Tue, 08 Feb 2022
142 2022-02-08T15:50:55.351-05:00: <AT#XTCPSEND="POST /iot/ HTTP/1.1Host: test.yieldpoint.com,
143 2022-02-08T15:50:56.172-05:00: <#XTCPSEND: 252OKHTTP/1.1 201 CreatedDate: Tue, 08 Feb 20
```

Posting data to VantagePoint

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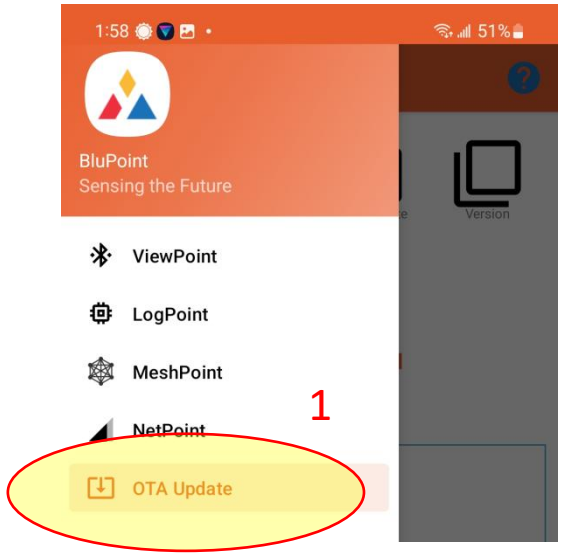
4. Connection Logs

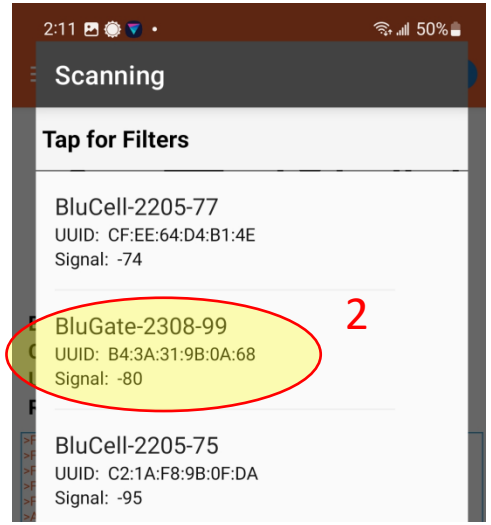
OTA Update the BluGW WiFi/LAN-1

YieldPoint is continually optimizing the software that runs on the WiFi/LAN BluGateway and also upgrading BluPoint App. The appropriate version of the WiFi/Lan BluGateway is bundled with the BluPoint App which can be downloaded from the Google Play Store . OTA (**O**ver-**T**he-**A**ir) enables the update using BluPoint

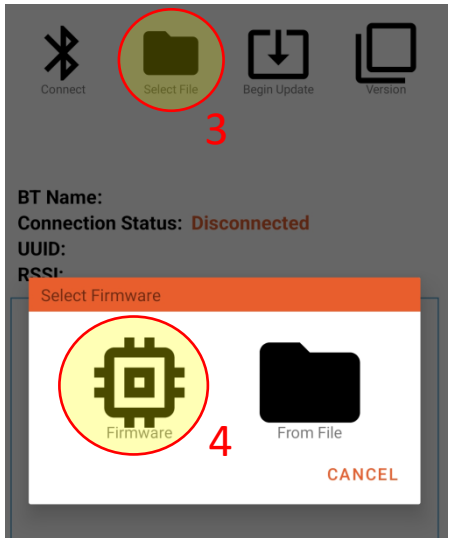
Step 1: OTA Activity



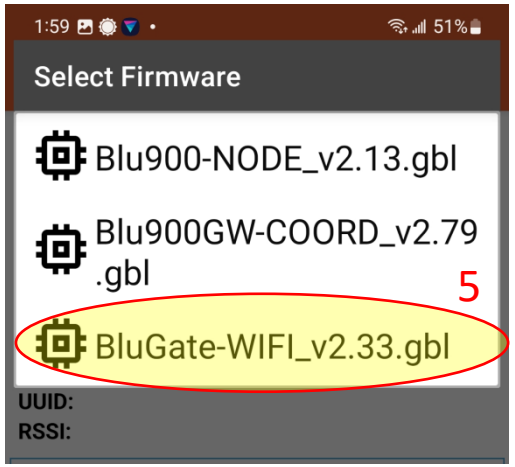
STEP 2: Connect



Step 3: Select File



Step 4: BluGate-WiFi



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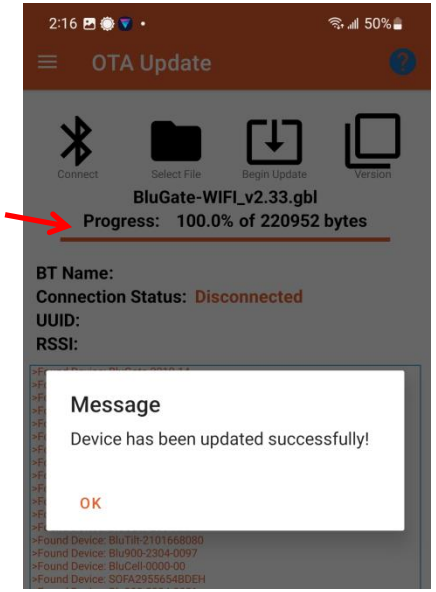
5. OTA Update the GW FW

OTA Update the BluGateway WiFi/LAN - 2

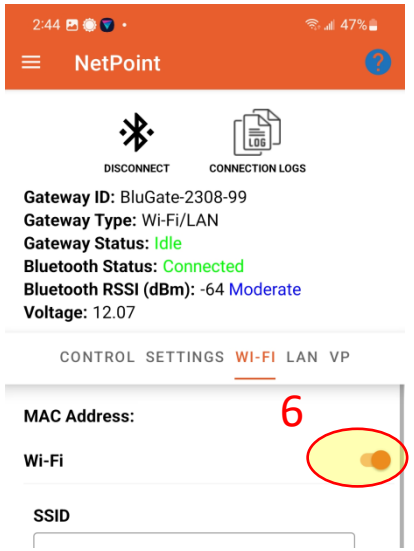
In rare cases it may be necessary to update the WiFi/LAN setting

Step 5: Success

Progress bar

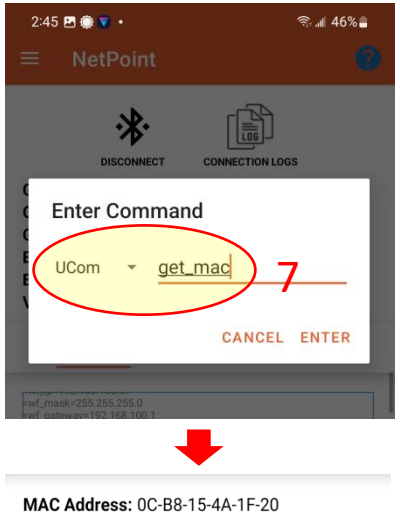


Step 6: Turn WiFi OFF

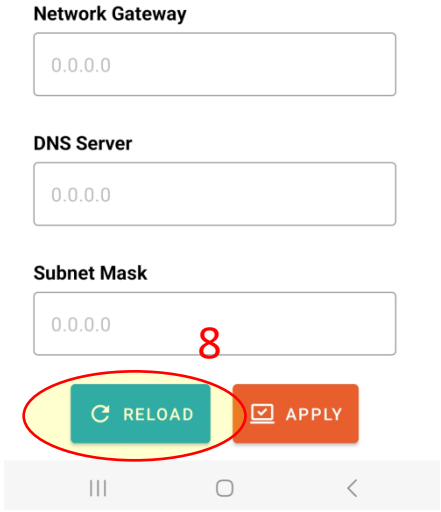


OFF

Step 7: UCom get_mac



Step 8: Reload



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5. OTA Update the GW FW

Ucom Custom Commands -1

Get Version	*	ucom ver	
Upload Enable/Disable		ucom upload (on/off)	
Set bt On/Off		ucom bt (on/off)	
Set Vibe On/Off		ucom vibe (on/off)	
Set Mux On/Off		ucom muxs (on/off)	
Get Mux		ucom mux	
Start Discovery Scan		ucom scan	
		ucom vw	
Debug Log On/Off		ucom debug (on/off)	
Get IMEI	Cellular - LTE	ucom imei	
Get ICCID	Cellular - LTE	ucom iccid	
Wire Freq Range		ucom freq	
Wifi Modem Off		ucom xb_off	
Test Modem		ucom xb_test	
Forced Send		ucom xb_send	
Scan		ucom xb_scan	
Upload Period		ucom xb_period	
Set Encryption		ucom xb_ee %s	
Get Encryption		ucom xb_ee	
Modem On		ucom xb_on	
Modem Off		ucom xb_off	
Get SSID		ucom xb_ssid	
Set SSID		ucom xb_ssid %s	
Set Password		ucom xb_pk %s	
Save Config		ucom xbee WR	
APN		ucom xbee AN	
Get Raw Value		ucom tilt	
Get Ref		ucom tilt_ref	
Set Ref		ucom tilt_ref_set	
Tilt Mode		ucom tilt_mode	
Tilt Gain		ucom tilt_gain	
Tilt Offset		ucom tilt_offset	
Tilt z Up		ucom tilt_z_up	
Set Temp Offset		ucom temp %s	

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6. Custom ucom commands

Ucom Custom Commands -2

USEAGE	TYPE	COMMAND	
Request Details	Logger	data	
Request Time	Logger	time	
Request Reading	Logger	getall	
Request Next	Logger	getnext	
Request New	Logger	getnew	
Request Specific	Logger	getx%d	//expecting reading #
Set Time	Logger	settime%s	//current format yymmdd
Set Date	Logger	setdate%s	//current format hhmmss
Set Interval	Logger	setp%s	//expecting prelisted intervals
Wipe Data	Logger	wipe	
Get Threshold	Logger	ucom xl_thres	
Get Range	Logger	ucom xl_range	
Set Threshold	Logger	ucom xl_thres %s	
Set Range	Logger	ucom xl_range %s	
Calibrate	Logger	ucom xl_g	

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6. Custom Ucom commands

Freq Ch# Start Span