BRTSys

IoT Portal

Sense | Monitor | Control

USER GUIDE

Mobile App for Android

(Release 2.3.0)

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1. About This Guide

This guide explains the usage of IoTPortal Mobile App for Android. **The screenshots used are for illustration purpose only**.

1.1 Intended Audience

The intended audience comprises System Integrators, Technical / Administrative users who will assist in realizing the capabilities, functions, and the full benefits of the product.

1.2 Document References

Document Name	Document Type	Format
BRTSYS_AN_086_IoTPortal User Guide – Introduction	Application Note/ User Guide	PDF
BRTSYS_AN_089_IoTPortal User Guide - iOS Mobile App		
BRTSYS_AN_087_IoTPortal User Guide – Portal Web Application (WMC)		
BRTSYS IoTPortal Gateway M2M Configuration		
BRTSYS_AN_091_IoTPortal - LoRaWAN Getting Started Guide		

1.3 What's New in IoTPortal 2.3.0?

- Support for LoRaWAN node devices
- Improvements in consumption charts

1.4 Known Issues and Limitations

NA

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2. Getting Started

2.1 Supported Android Platforms and Requirements

Operating System	Technical Requirement
Android	Android devices with Android 10+

2.2 Installing IoTPortal Mobile App for Android

Users can search for "IoTPortal" in the App store. The IoTPortal app can be identified by its icon (shown below).

Alternatively, use the following link to go directly to the app: https://play.google.com/store/apps/details?id=com.brtsys.iotportal&hl=en.

Once installed, sign up for an account to get started with IoTPortal.

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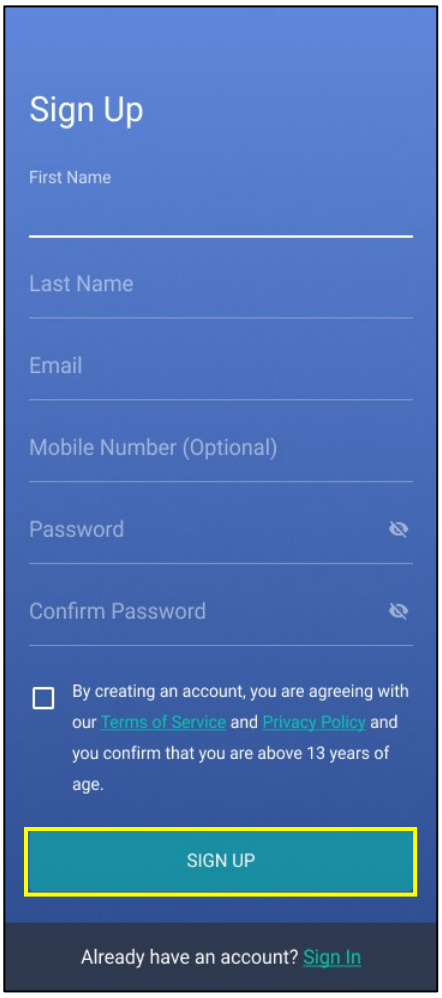
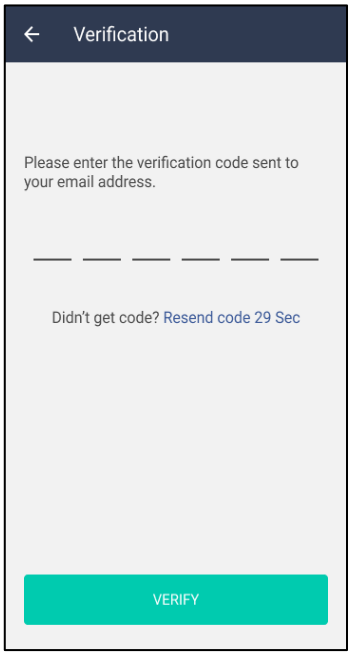
3. Authentication

3.1 IoTPortal Account Sign Up



To access the IoTPortal for the first time, create an account by entering the required details and tapping **[SIGN UP]** to proceed with the registration.

To complete the registration, the user must verify their phone number through OTP verification.



Once registration is complete, a confirmation email will be sent to the registered email address.

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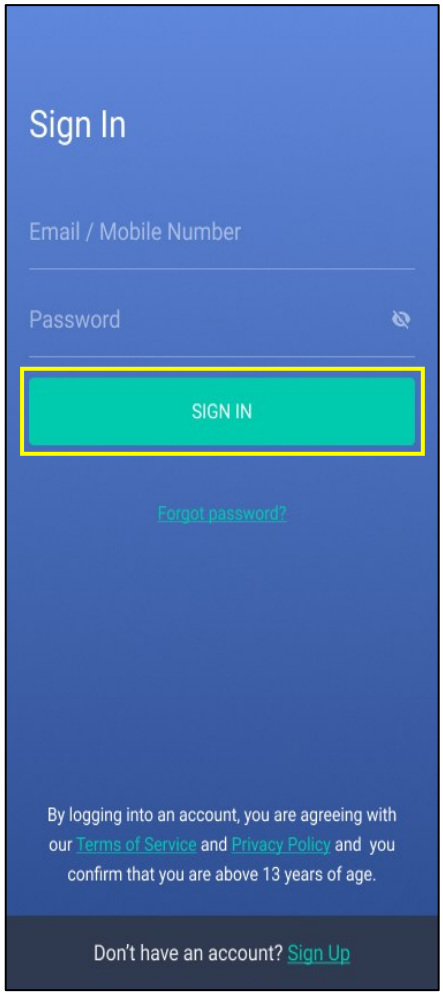
3.2 IoTPortal Account Sign In



IoTPortal customers need to sign in using their *email address* or *mobile number* and *password* to access the app.

If MFA (multi-Factor Authentication) is enabled, user will be required to input the OTP code to verify sign in. For more information on MFA, refer to section 11.1.

NOTE: If sign in attempts fail more than 5 times, then the account will be locked for 30 minutes.

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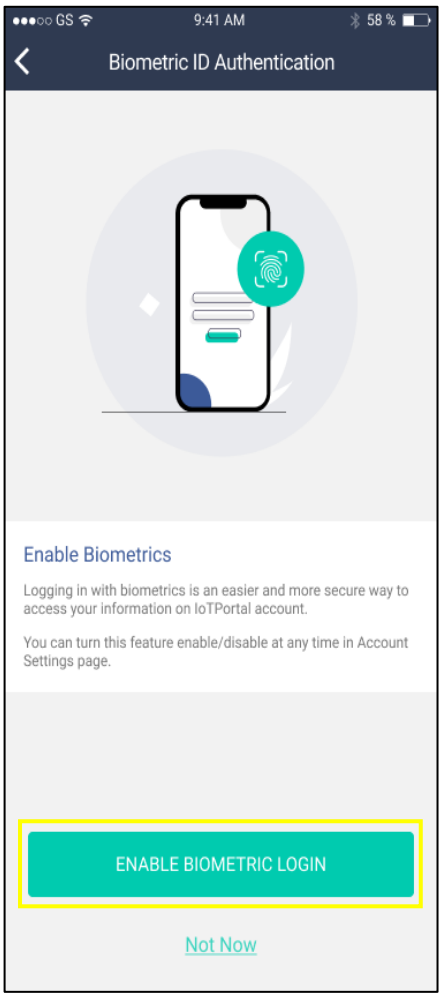
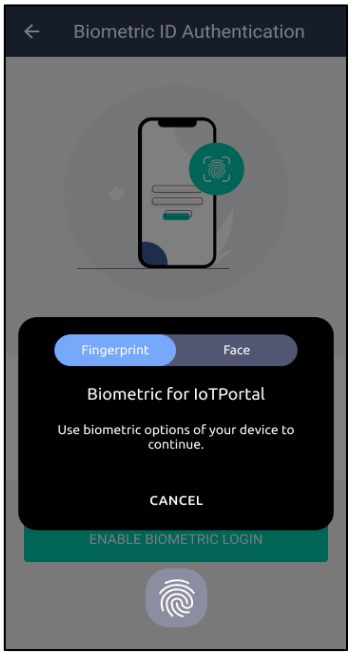
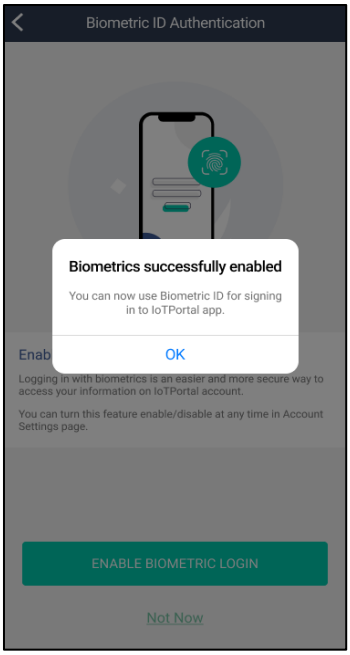
3.3 Biometric Authentication



When signing in to the IoTPortal app for the first time, users will be prompted to enable biometric authentication. Biometric authentication relies on the device's default verification screen.
Based on the device configuration, this may prompt fingerprint or facial recognition, as illustrated below.



Once the biometric data is captured, it can be used for future sign-ins.
This feature can be disabled later if needed. For more details, refer to section 11.1.



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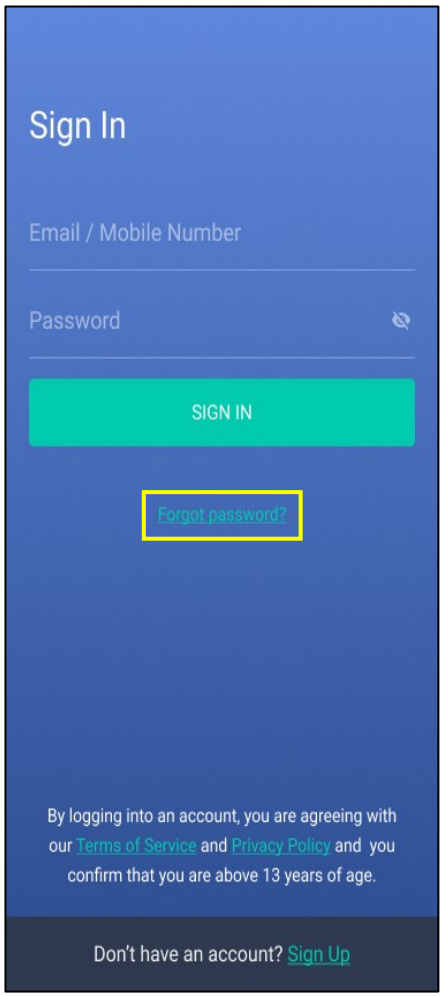
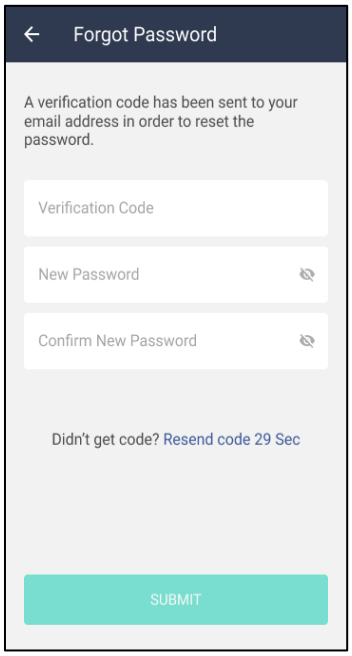
3.4 Forgot / Reset Password



To reset password, click on **[Forgot Password]** where user will be asked to enter the registered Email Address. Confirm new password by adding the verification code sent to the registered email address.



If successful, an appropriate message indicating the same is displayed.

NOTE: *"Attempt limit exceeded, please try after some time"* – message is displayed if the user enters an invalid verification code more than 5 times. Please enter a valid verification code.

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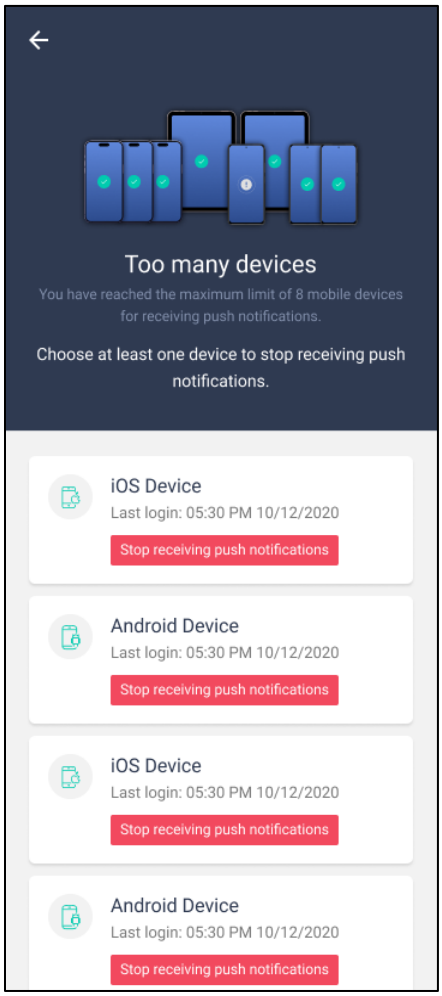
3.5 Device Limit Reached



Users are limited to accessing the IoTPortal from a maximum of eight devices.
If this limit is exceeded, the user will be unable to proceed until they log out from at least one of the currently connected devices.

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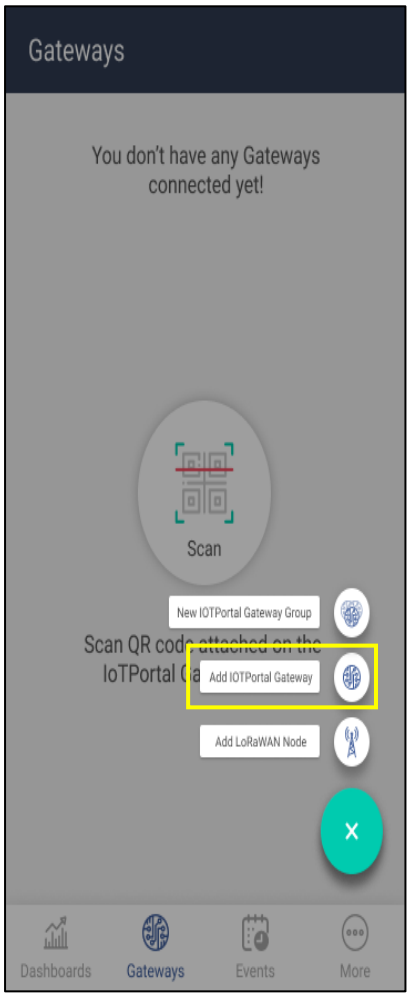
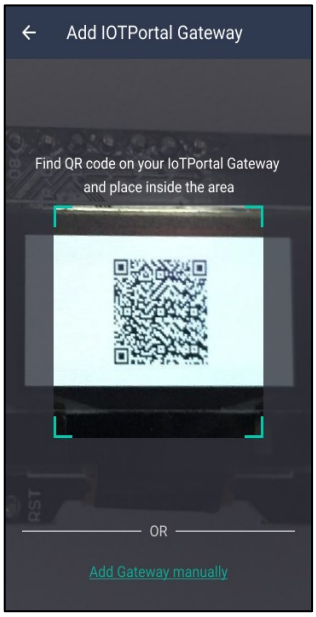
4. Add IoTPortal Gateway

4.1 Add IoTPortal Gateway - Using QR Code

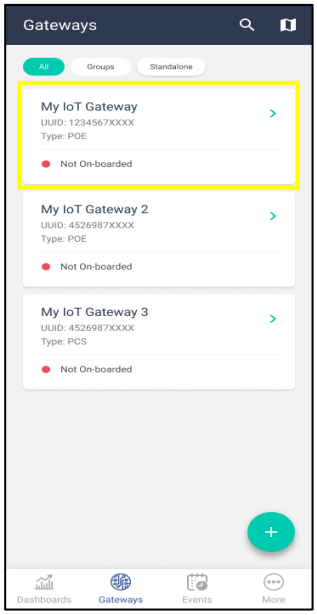


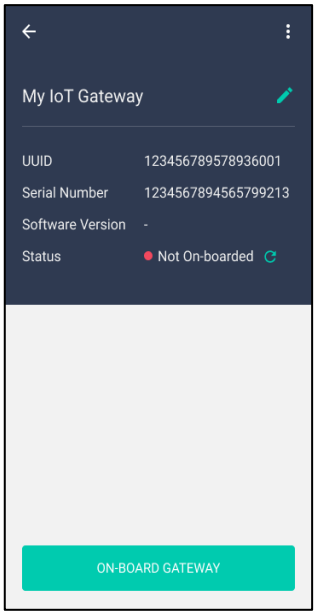
To add a gateway using QR code, tap **[+]** icon followed by **[Add IOTPortal Gateway]** option.

Using the Camera App, scan the QR Code of Gateway device. If the QR code scanning is successful, the device details are displayed. Enter a *Gateway Name* and tap **[NEXT]**.



If device is registered successfully, an appropriate message indicating the same is displayed and the Gateway device is displayed in the Gateways UI.





NOTE: IoTPortal Gateway must be on-boarded before using it. Refer to On-board Gateway for more details.

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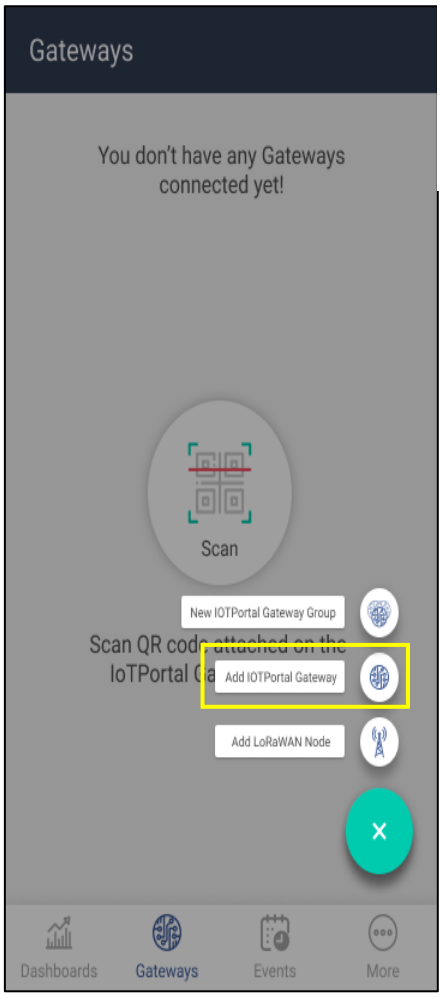
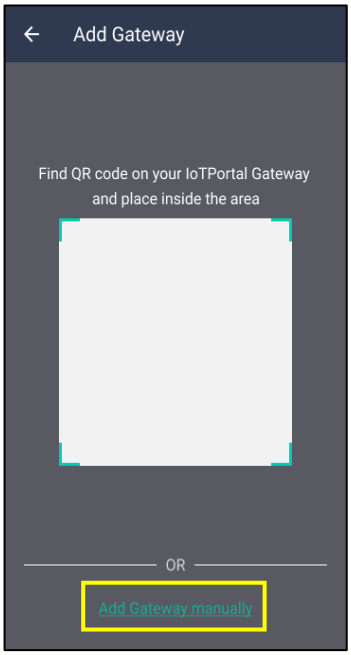
4.2 Add IoTPortal Gateway – Manually

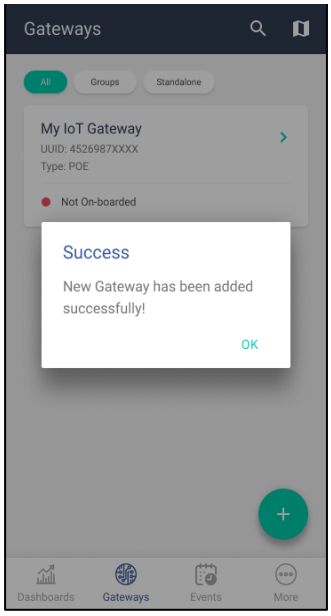


To add a gateway manually, tap **[+]** icon followed by **[Add IOTPortal Gateway]** option.

Select **[Add Gateway manually]** and enter the *UUID, Serial Number* & *Ethernet MAC Address and Gateway Name*.



If device is registered successfully, the Gateway device will be displayed in the Gateways UI.



NOTE: At any point of time, if any error message is encountered, try adding the gateway (using QR Code or Manually) again.

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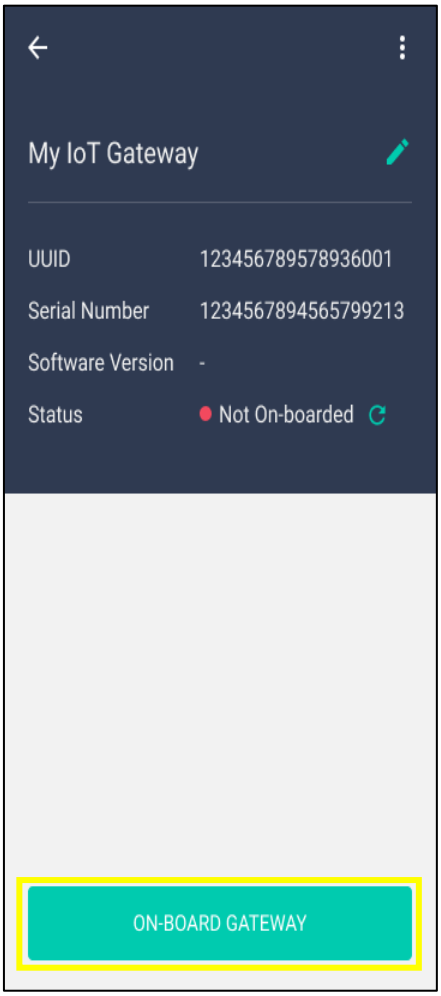
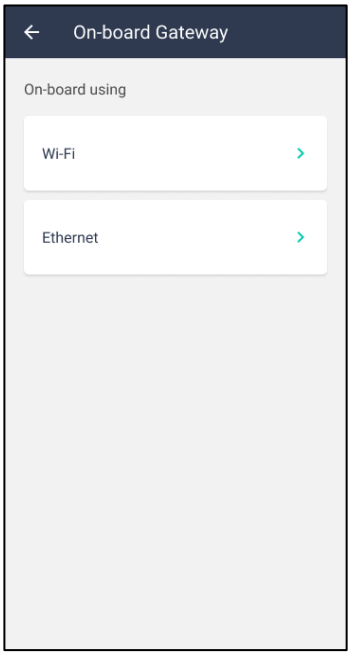
4.3 On-board IoTPortal Gateway



Upon adding the IoTPortal gateway, users must on-board it before using. Gateways that need to be on-boarded are indicated with the Status – *"Not On-boarded."* A gateway can be on-boarded using *Wi-Fi* or *Ethernet*.



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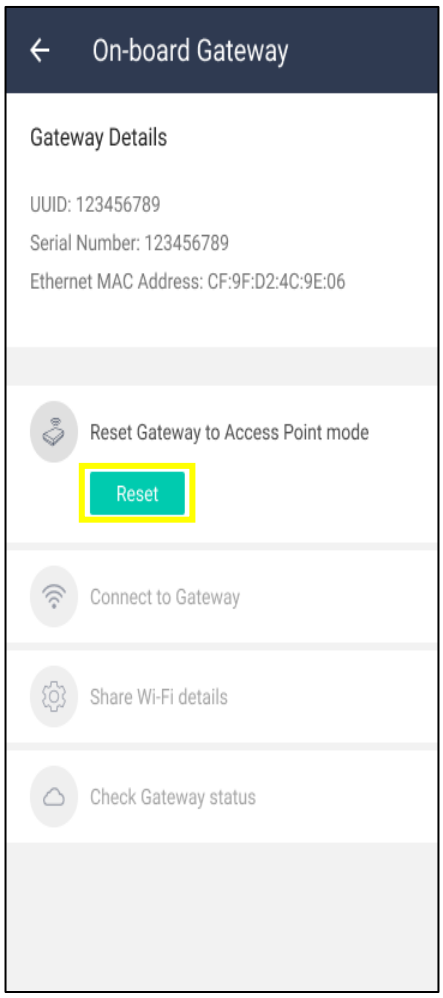
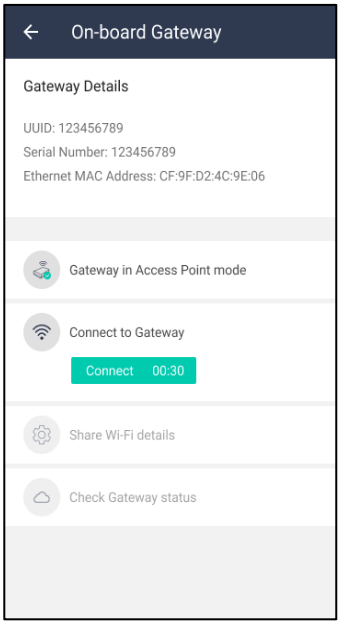
4.3.1 On-board IoTPortal Gateway – Using Wi-Fi

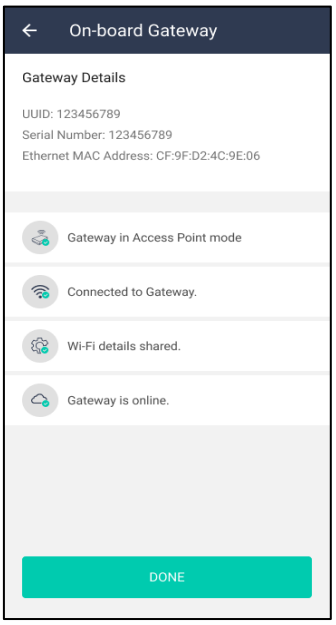


Upon selecting the option "Wi-Fi", follow the step-by-step instructions on the page to onboard the gateway.

Once gateway is reset, Select and connect to the gateway device Wi-Fi by providing the password. The password is the *"product key"* which can be found on the label behind the gateway device.



Select a Wi-Fi network and share the details. Once successful, follow the instructions to initiate gateway status verification. Upon status check, the gateway is on-boarded successfully and gateway status changes to online.



NOTE: During the on-boarding procedure, at any point of time, if any error is encountered, go through the steps from the beginning.

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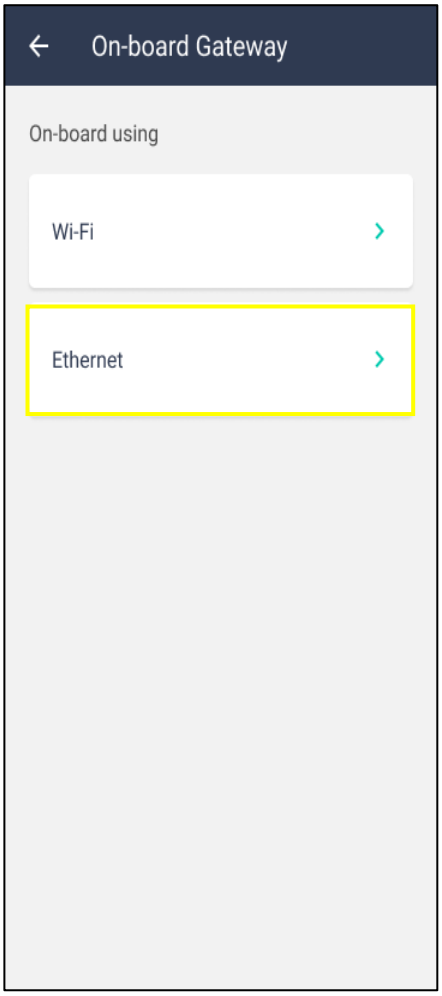
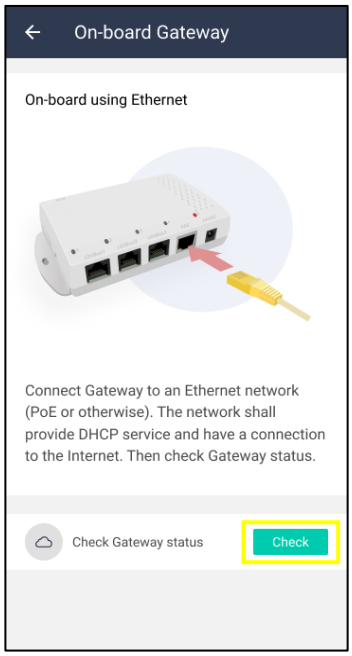
4.3.2 On-board IoTPortal Gateway - Using Ethernet

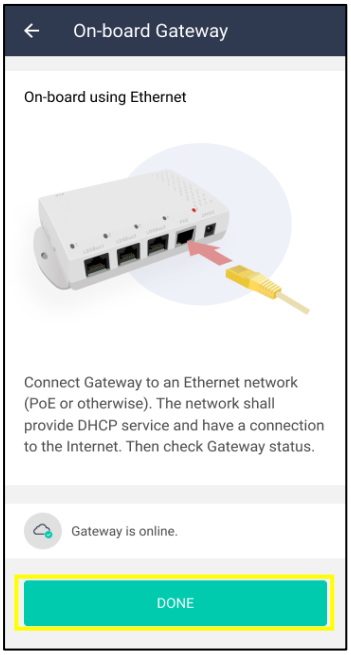


To on-board gateway using Ethernet, tap and select *Ethernet.*

Connect to an Ethernet Network as shown in the UI. Tap **[Check]** to verify the gateway connection status.



Upon status check, the gateway is on-boarded successfully and gateway status changes to online. Tap **[DONE]** to complete the on-boarding procedure.



NOTE: During the on-boarding procedure, at any point of time, if an error is encountered, go through the steps from the beginning.

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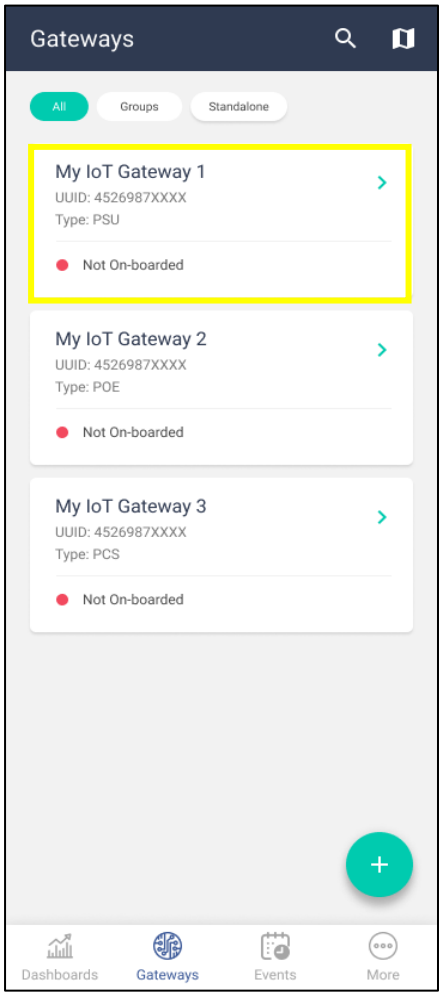
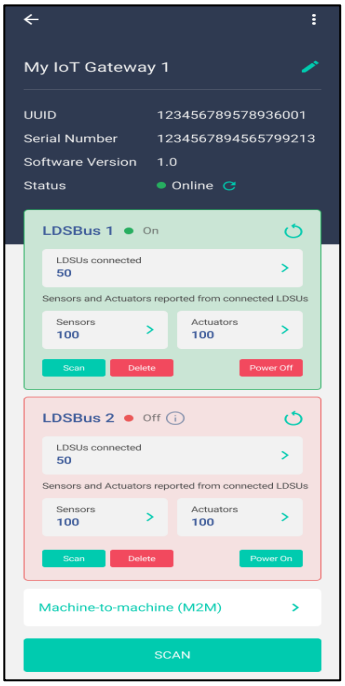
4.4 IoTPortal Gateway Detail Page



Once successfully onboarded, the gateway will appear on the Gateways page. Clicking the gateway name opens its detail page as shown below.



The IoTPortal gateway has 3 LDSBus ports. Each LDSBus port can connect to multiple LDSUs (up to 80 LDSUs) vis LDSBus Quad T-Junctions.

For more information about the gateway details page, see section 6.

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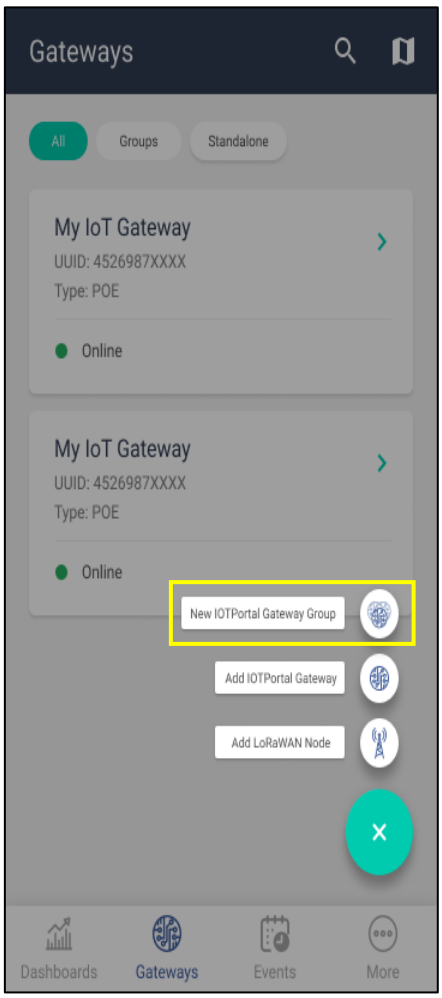
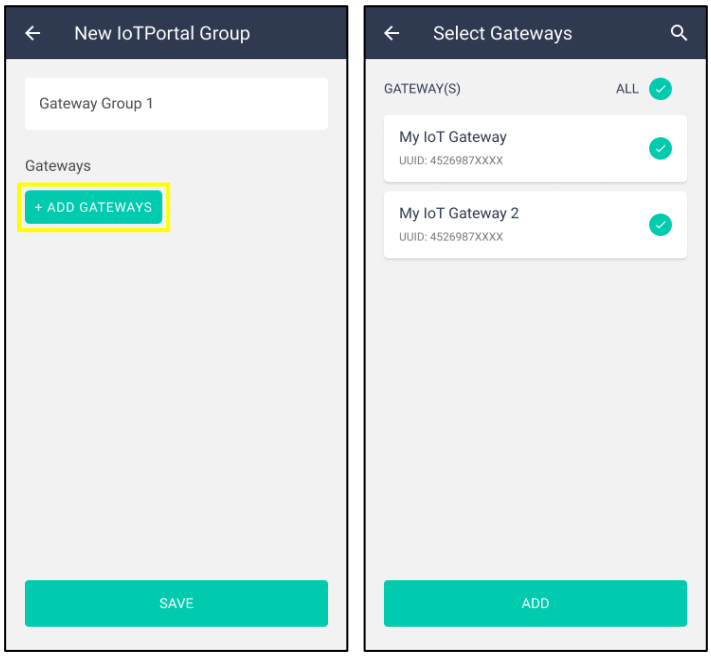
4.5 Create IoTPortal Gateway Group

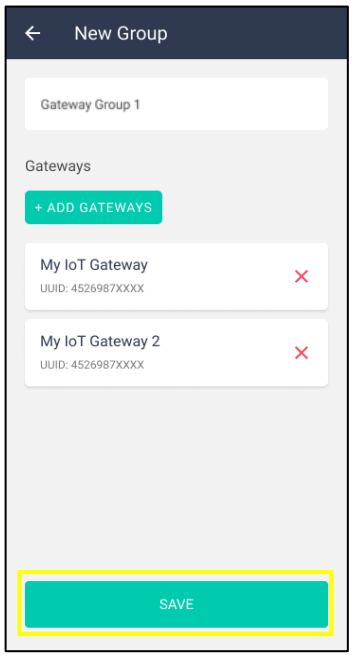


Multiple IoT Portal gateways can be grouped to form a gateway group.

To do this, enter a name for the gateway group and select the desired gateways.



Click **[SAVE]** to save the gateway group. The group will be created successfully.



NOTE: Only IoTPortal Gateway POE and PSU models can be part of a gateway group.

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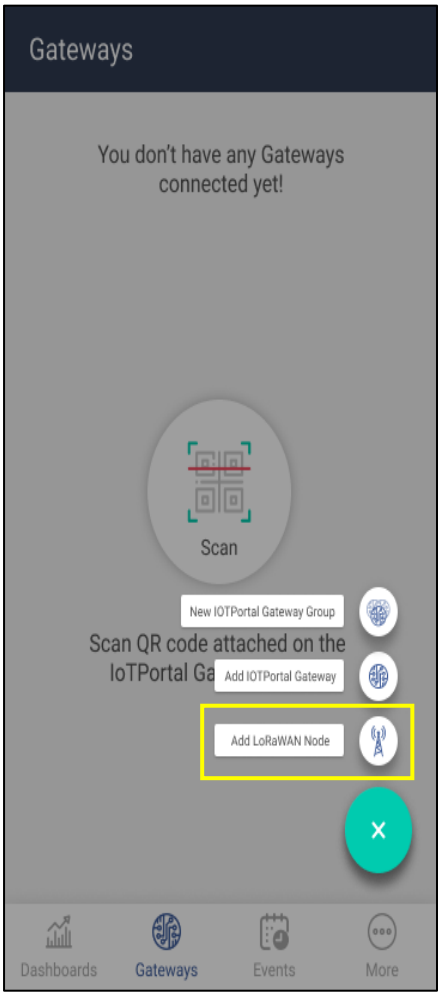
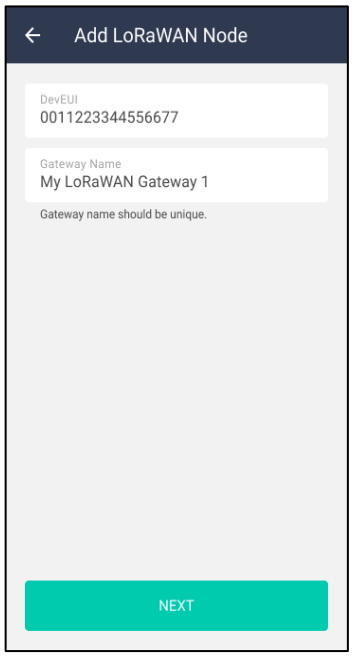
4.6 Add LoRaWAN Node



To add a LoRaWAN node, tap **[+]** icon followed by **[Add LoRaWAN Node]** option.

Enter the *DevEUI (Device Identifier)* and *Name.*



If device is registered successfully, node device is displayed in the Gateways UI.

NOTE: Any reference to a LoRaWAN gateway in the sections below actually refers to a LoRaWAN node (i.e. LoRaWAN Modbus Bridge).

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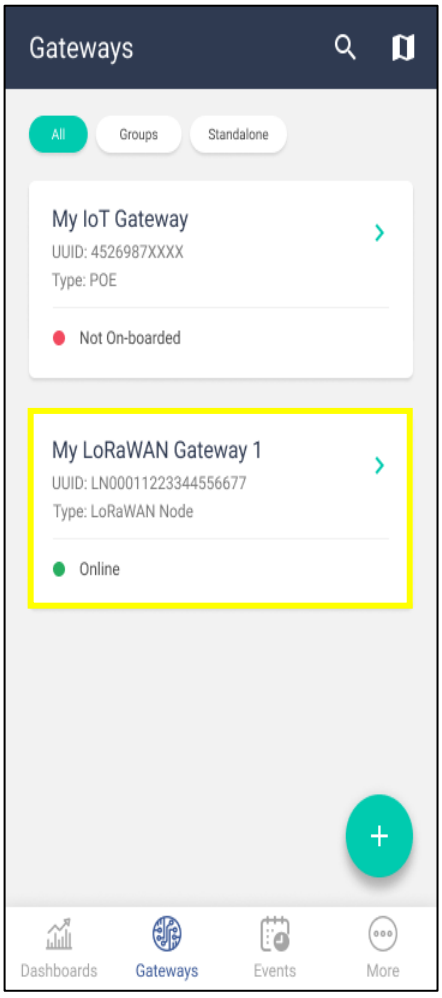
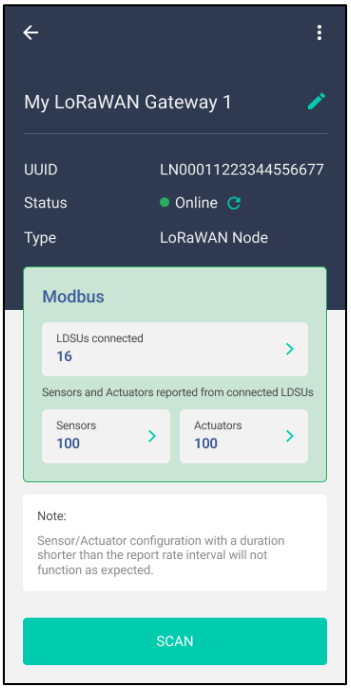
4.7 LoRaWAN Node Detail Page



Once successfully onboarded, the gateway will appear on the Gateways page. Clicking the gateway name opens its detail page as shown below.



The LoRaWAN node can support up to 16 RS485 devices.

For more information about the LoRaWAN node details page, see section 7.

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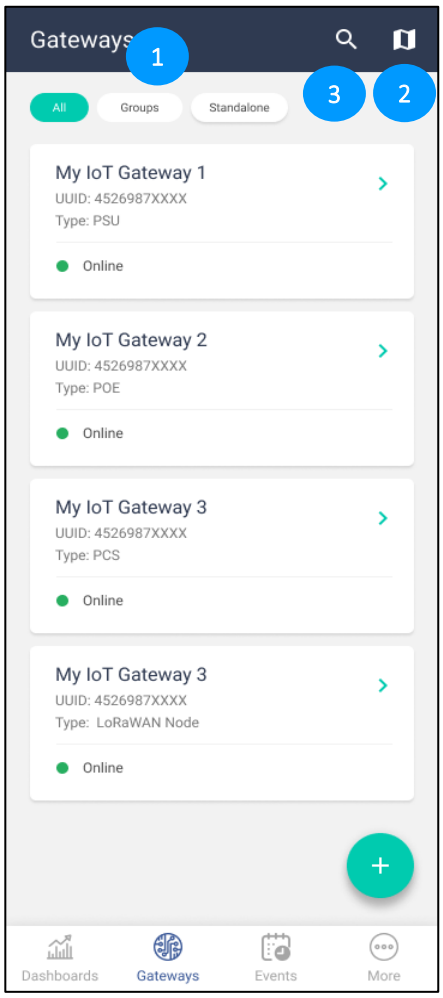
5. View Gateways/Nodes/Gateway Groups



The Gateway page displays connected IoTPortal gateways, IoTPortal gateway groups, and LoRaWAN nodes.
For each IoTPortal gateway and LoRaWAN node, it shows the UUID, type, and connection status, while for IoTPortal gateway groups, it displays the number of members.

1. **View:**
   a. **All** – view all gateways
   b. **Groups** – view gateway groups
   c. **Standalone** – view standalone gateways

2. **Map**
   Tap to switch to Map View and view the location of the gateway.

3. **Search**
   Tap to search for a specific gateway/gateway group.

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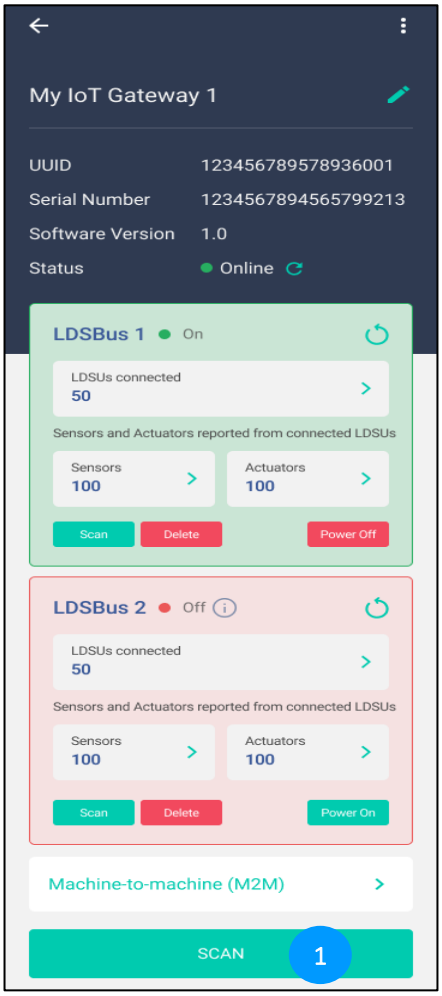
6. IoTPortal Gateway Features

6.1 IoTPortal Gateway Functions

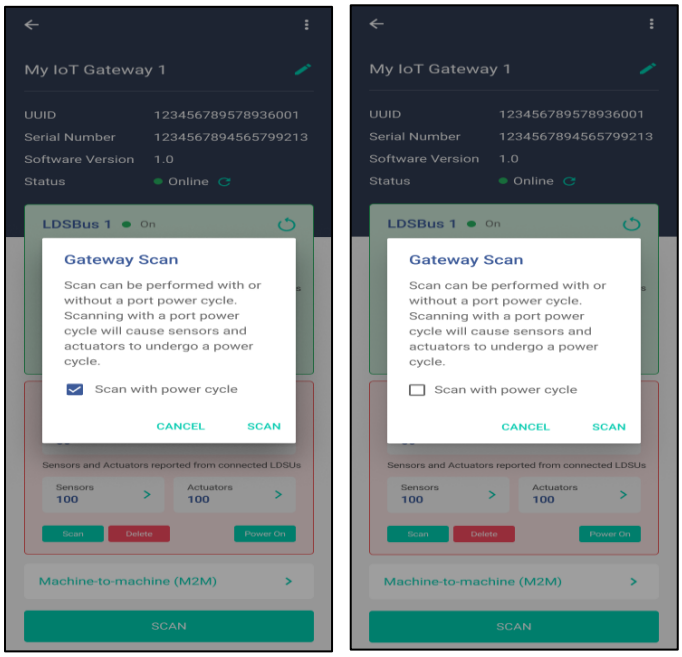


1. Scan

IoTPortal shall not initiate a gateway scan unless the user requests it. LDSU scan results are reported to the IoTPortal and may contain information about newly discovered LDSUs or LDSUs that are no longer accessible (offline devices).

The Gateway Scan has two options, namely – *Scan with Port Power Cycle, Scan without Port Power Cycle.*

a) Scan with Power Cycle: Selecting this checkbox will restart and discover all the newly connected devices on all the 3 ports.
b) Scan without Power Cycle: De-selecting this checkbox will just discover all the newly connected devices on all the 3 ports.



NOTE:
All connected devices will restart when the Scan with Power Cycle option is triggered. It will also identify all connected devices—both new and old—to the Gateway.
Scan without power cycle, will discover all the connected devices (old and new) to the gateway.

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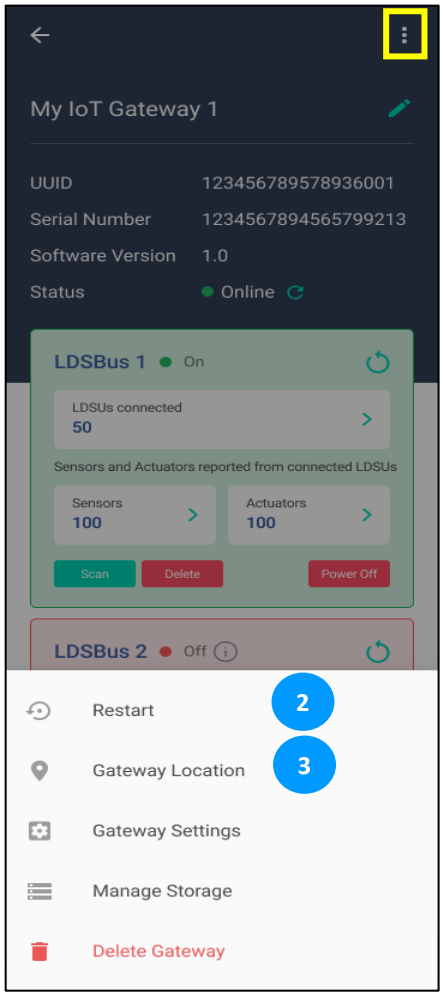

Click on ⋮ icon to view additional gateway functions.

2. Restart

A gateway restart will reboot the gateway and the connected LDSBus devices.

3. Gateway Location

The current location of the gateway is displayed. User can perform a long tap on the marker to change the location.

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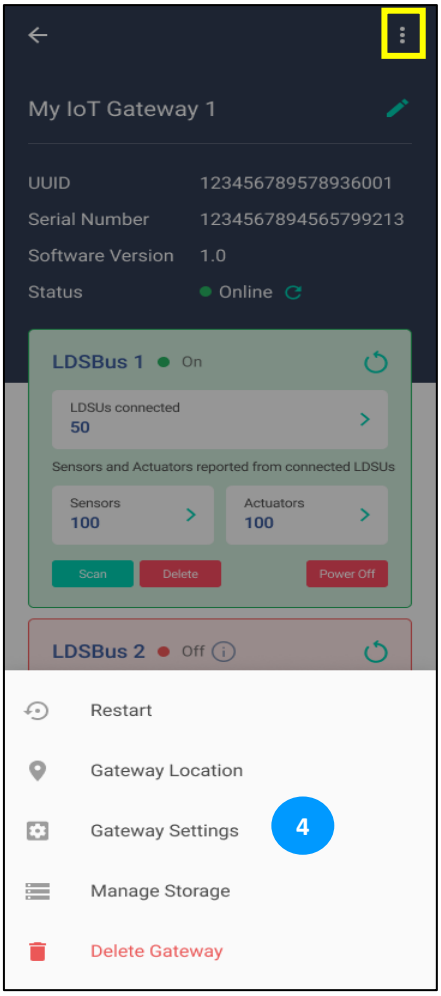
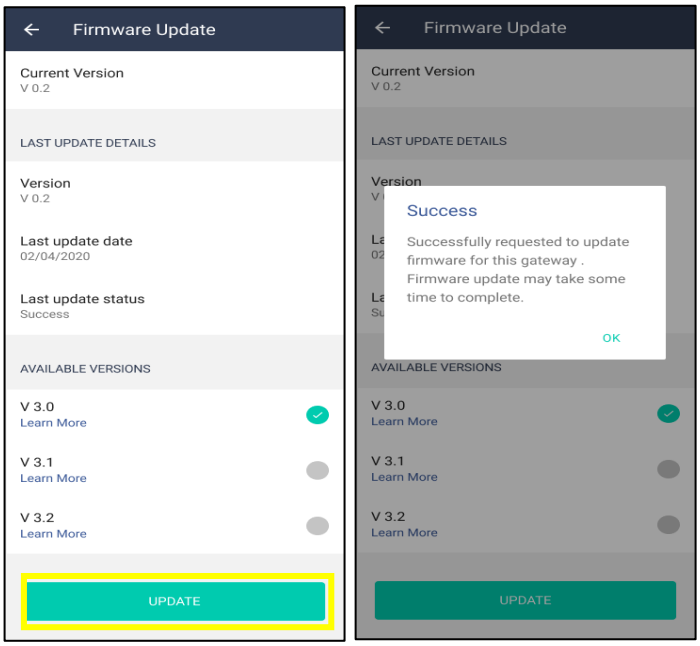


4. Gateway Settings

Following options are available under gateway settings:

a. Firmware Update

The Gateway's default firmware version is v1.6.17 for standard operations, but users must update to the latest version to access additional functionalities such as event handling.



b. Re-onboard Gateway

An onboarded gateway must be re-onboarded if there is a change in the Wi-Fi network, network credentials, configuration error, or if the user switches from Ethernet to Wi-Fi. This is made possible via the re-onboarding function.

The procedure for re-onboarding the gateway is the same as that of the On-board Gateway.

c. View Gateway Descriptors

Following details are shown:

- UUID
- Serial Number
- Ethernet Mac Address
- WiFi Mac Address
- Model Number
- Product Version
- Firmware Version
- Sensor Cache Storage Size (KB)
- Number of LDS Ports
- Configuration Storage (KB)
- Maximum LDSUs per Gateway
- Machine to Machine Configuration
- GPS Location
- Auto-Scan
- Sensor Cache Status

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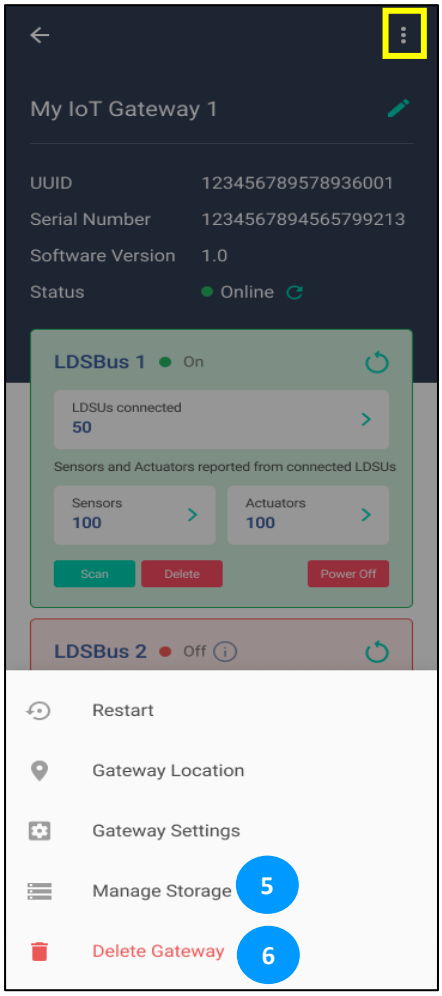
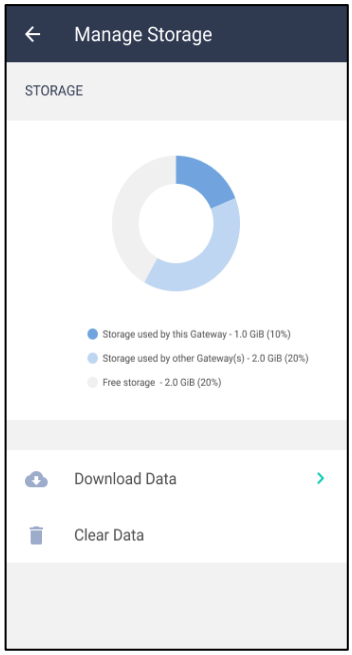
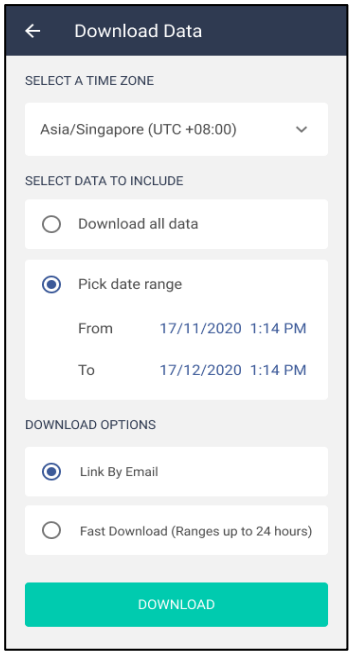


5. Manage Storage

The information related to storage usage is displayed. Users can download gateway data either in full or by selecting a specific date range.





User can choose to download data by:

a. Link By Email - An email will be sent to the registered email address with the set of instructions on how to download the data.

<u>Instructions on how to download the sensor data</u>

- Click **[Download Data]**.
- The data is downloaded to your local folder (for example – Downloads).
- Extract the zip file and its content by providing the password sent to your registered email address.
- Open the spreadsheet file that contains the downloaded sensor data.

b. Fast Download – If the selected date range is within the last 24 hours, the user can directly download the data to the device.

6. Delete Gateway

Users can remove the gateway by selecting the "Delete Gateway" option.

<u>NOTE:</u> Once a gateway is deleted, it can be re-onboarded only after 2 hours.

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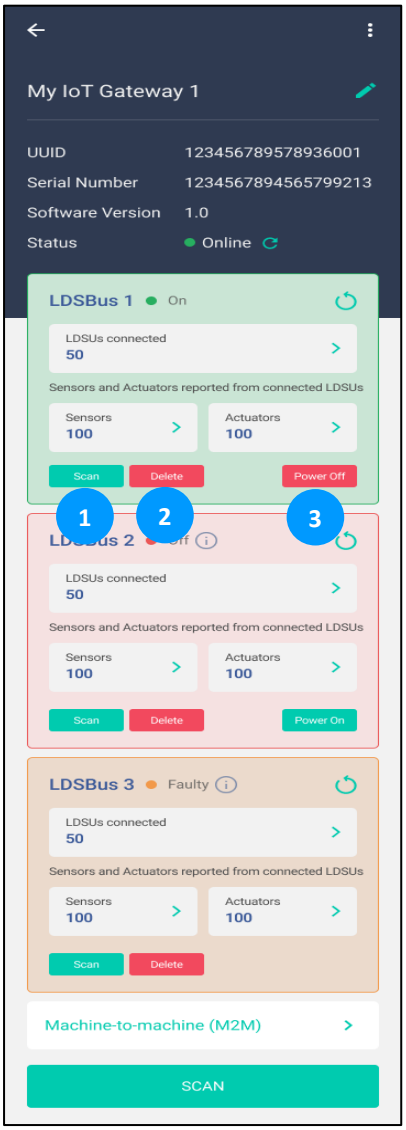
6.2 Manage LDSBus Ports

IoTPortal Gateway has 3 LDSBus ports. Each LDSBus port can connect to multiple LDSUs (total of 80 LDSUs across the 3 ports) via LDSBus Quad-T Junctions. The LDSBus port has the following features – *Scan*, *Delete* and Power On/Off (*Port Power Control).*

For Illustration purposes, the procedure for managing the LDSBus 1 is explained here. The same procedure can be used for managing LDSBus 2 and LDSBus 3.

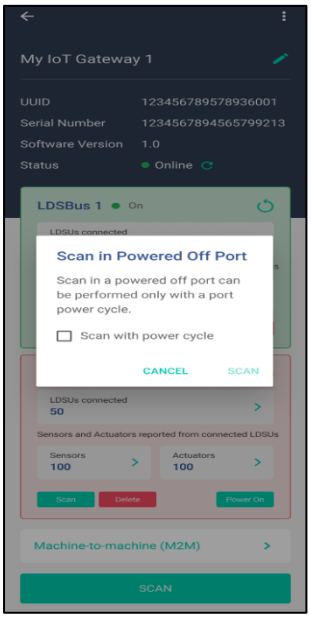


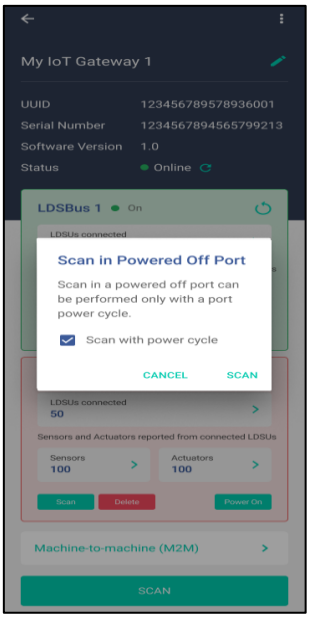
1. Port Scan

Tap **[Scan]** to perform port scan and get the latest list of devices connected to a specific LDSU port.
There are two options available – *Scan with Port Power Cycle* and *Scan without Port Power Cycle.*

a. Scan with Port Power Cycle: All connected devices will restart when the Scan with power cycle option is triggered. It will also discover all the connected devices – both new and old – to the specific LDSBus port **(OR)**

b. Scan without Port Power Cycle: De-selecting this checkbox will just discover all the connected devices on the specific LDSU port.





Tap on refresh ↻ icon, to view the updated list.

2. Delete Port

Tap **[Delete]** to remove all the connected LDSUs from the port.

3. Power On/Off Port

Tap **[Power Off]** to power off/on each port individually.

NOTE: Scanning must be done sequentially. First, complete LDSBus 1 scan and verify whether the devices are online or offline. Then proceed with LDSBus 2 scan, followed by LDSBus 3.

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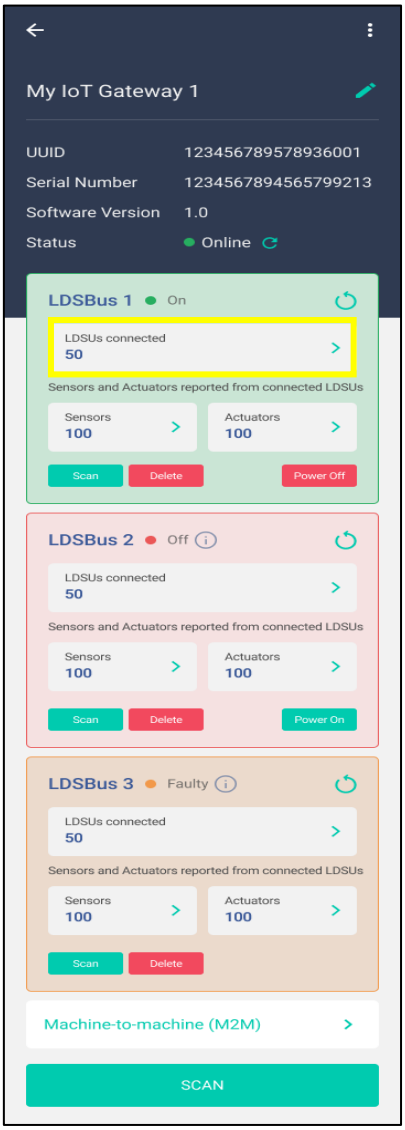
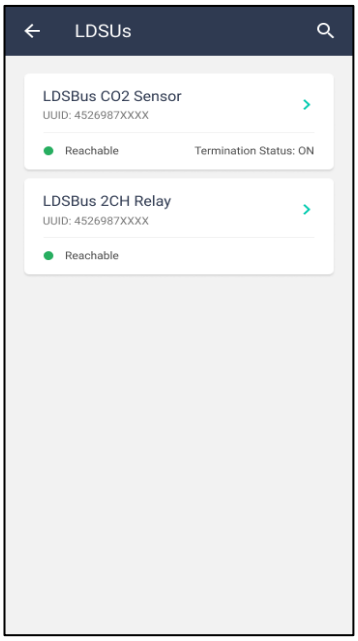
6.2.1 LDSU List and Categories

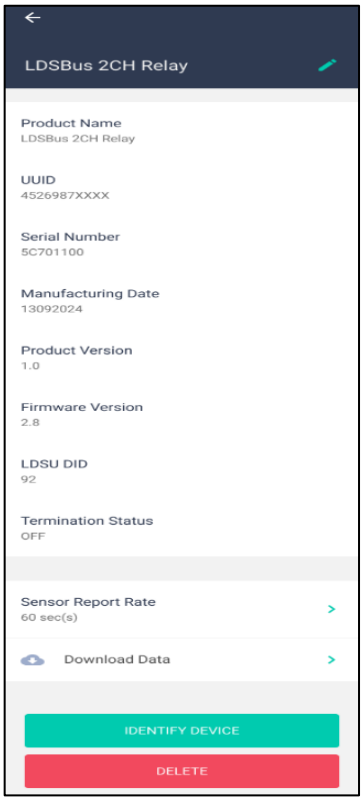


To access LDSU List and Categories interface, select a specific LDSBus Management widget, for example LDSBus 1. The LDSU List interface displays the number of *Sensors* and *Actuators* reported under the detected LDSUs.

LDSU Name, UUID, Status (reachable/not reachable) and *Termination Status* are displayed. Users may search for a specific LDSU using the **Search** field.



Tap on any LDSU to open its details interface, which displays information such as the UUID, Serial Number, Manufacturing Date, Product Version, Firmware Version, LDSU DID, and Termination Status.



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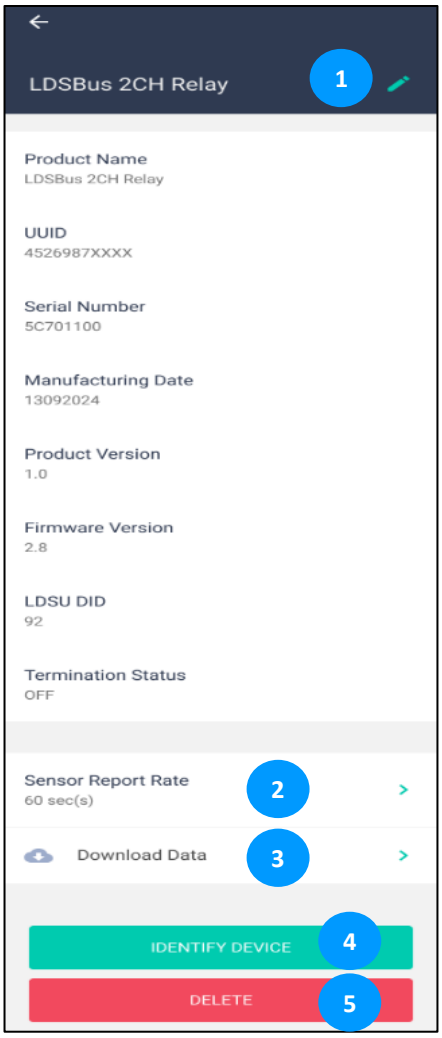
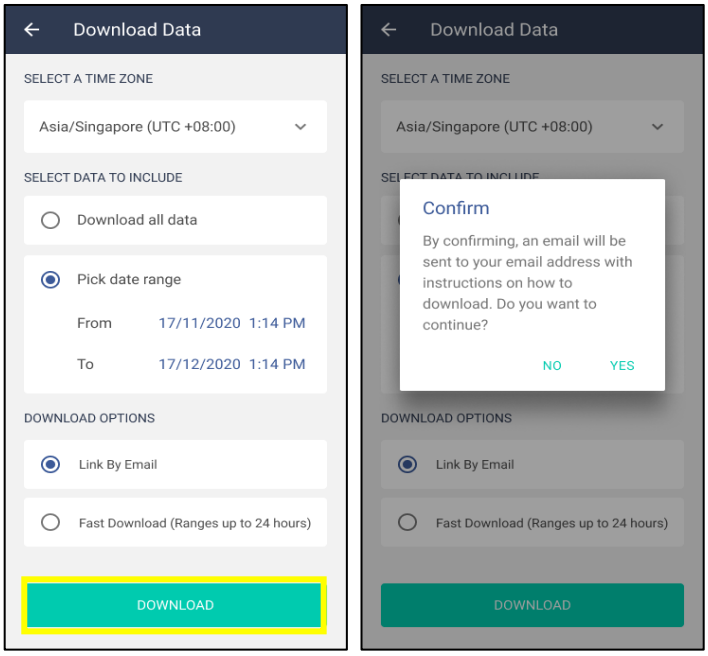
6.2.1.1 LDSU Details



Tap on any of the LDSU device to view the details.

1. Tap icon to edit the *LDSU Name.*
2. Tap on *Sensor Report Rate* to update the report rate.
3. Tap **[Download Data]** to access LDSU data. Then, choose either 'Download all data' or 'Pick data range' as required.

If the selected date range is within 24 hours, the data can be downloaded using the Fast Download option. Otherwise, a link with instructions to download will be sent to the registered email address.



4. Tap **[IDENTIFY DEVICE]** to identify the LDSU that is connected to the LDSBus Port.

5. Tap **[DELETE]** to delete LDSU device. Upon deleting, ensure that the LDSU is physically removed from the Bus, otherwise it will be reported as newly found LDSU device when the bus port is scanned.

NOTE: At any situation Hot plug In/Out is not recommended. In case, if there is a need to add or remove the devices in the network, then shut down the system and do the needful.

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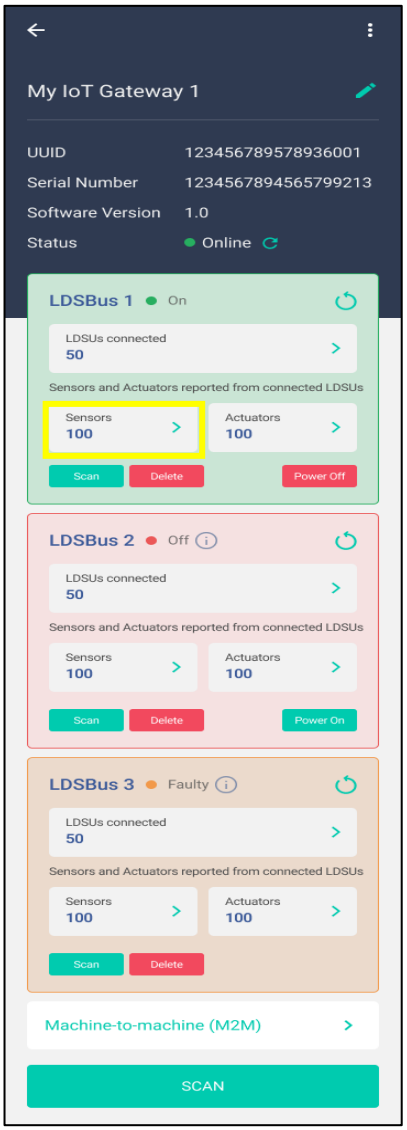
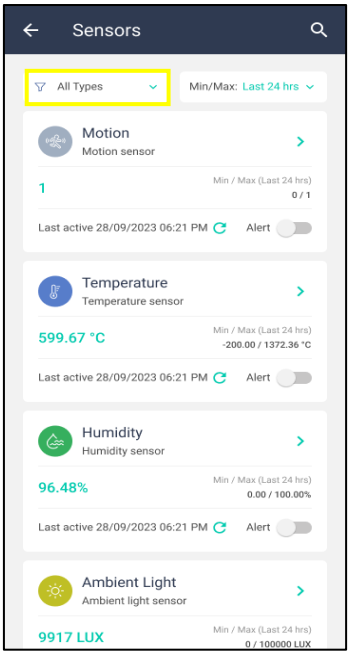
6.2.2 Sensor List

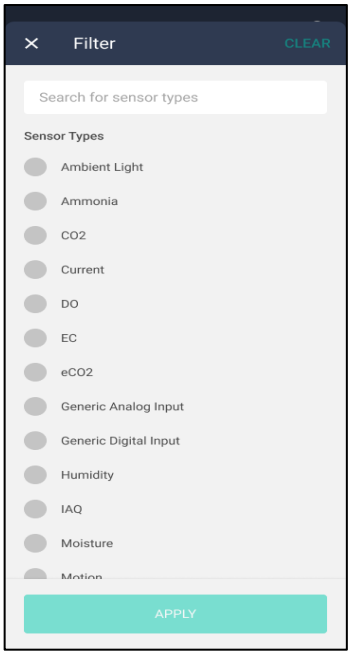


To access list of sensors connected to the LDSBus, select *Sensors* under a specific LDSBus Management widget, for example LDSBus 1. A list of sensors, if any, are displayed - Sensor Name, Sensor Type, Reading, when the Sensor was Last Active and Alert (if any).

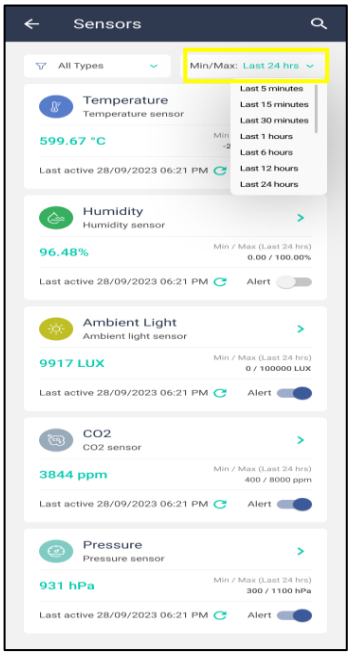
Users may search for a specific Sensor using the Search function.

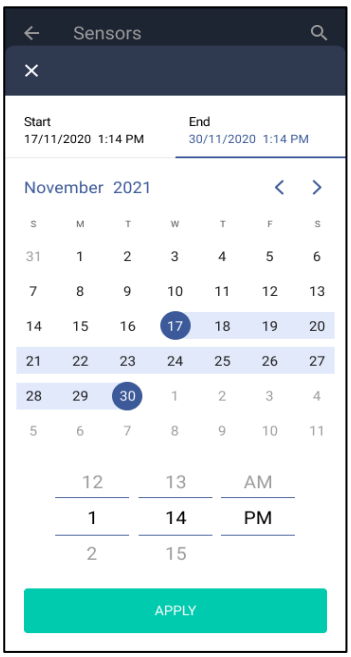
Tap the filter icon to choose from the available sensors.





To view the minimum and maximum reported value within a time period select the Min/Max drop-down. User can either select a predefined range or enter a custom one.





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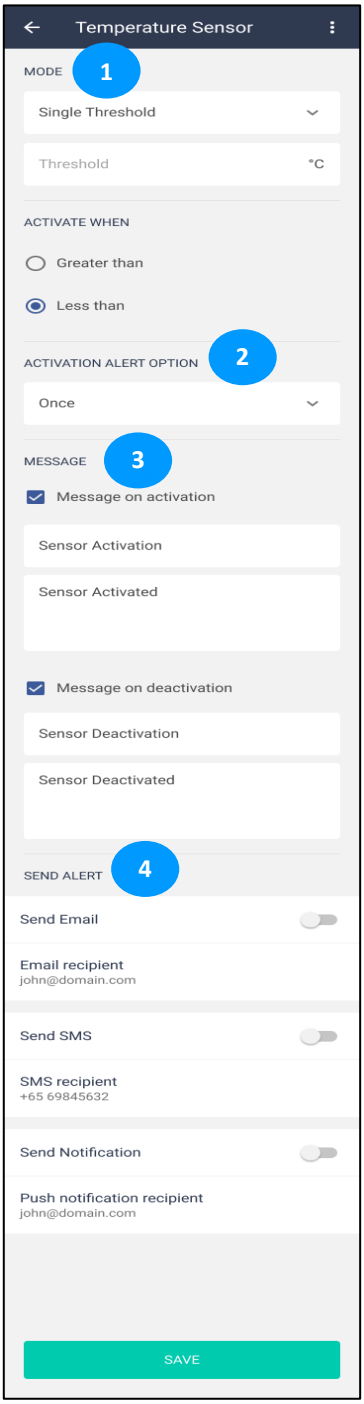
6.2.2.1 Configure Sensor / Alert



For illustration purposes, a temperature sensor is used.

1. Mode
There are two types of mode, namely Single Threshold and Dual Threshold.
Single Threshold: A single threshold is used when an action should be triggered if the current temperature is greater than or lesser than the specified threshold value.
Dual Threshold: A dual threshold is used when an action should be triggered if the current temperature value is within specified threshold range or out of specified threshold range.

2. Activation Alert Options
An activation alert refers to a notification that is triggered to indicate the user defined alert.
Once: If this option is selected, when activated, the activation alert is sent only once.
Continuously: If this option is selected, when activated, the activation alert is sent continuously until deactivated.

3. Message
Message on activation: Message to be send on sensor activation
Message on deactivation: Message to be send on sensor deactivation

4. Send Alert
Select alert mode(s) – Email, SMS, Push Notification. Accordingly, select the recipient information.
Tap on **[SAVE]** to save the configuration. Note that, if the configuration needs to be updated, then it can be done only after 2 minutes.

NOTE: Ensure token balance is sufficient to perform above operation.

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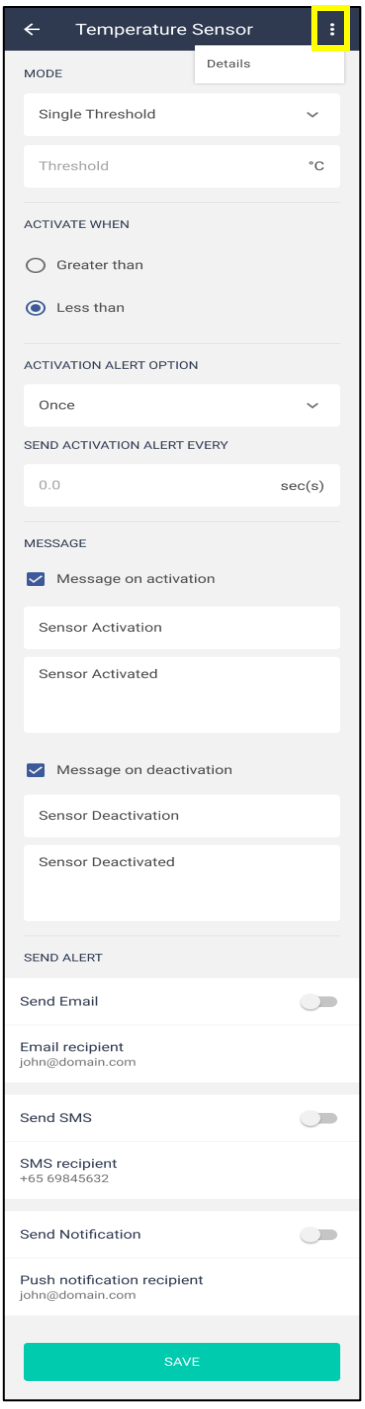
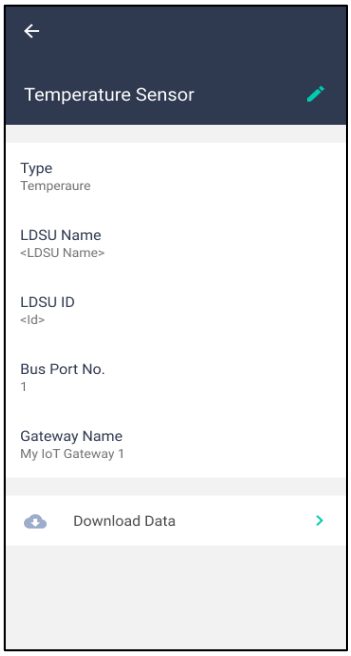
6.2.2.2 Sensor Details

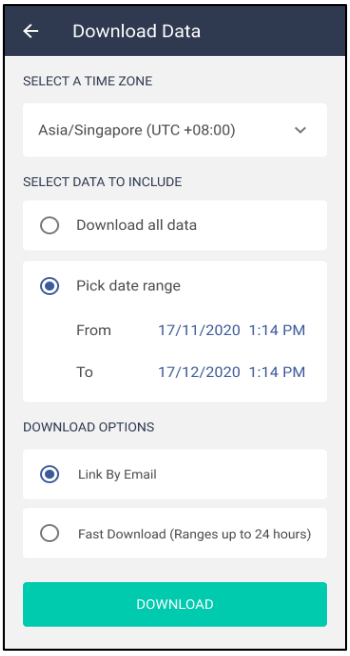


Select *Details* - sensor information like Type, LDSU name etc is displayed as shown below.

Tap to edit the sensor name.
Tap **[Download Data]** to access LDSU data.



Choose either 'Download all data' or 'Pick data range' as required. If the selected date range is within 24 hours, the data can be downloaded using the Fast Download option. Otherwise, a link with instructions to download will be sent to the registered email address.



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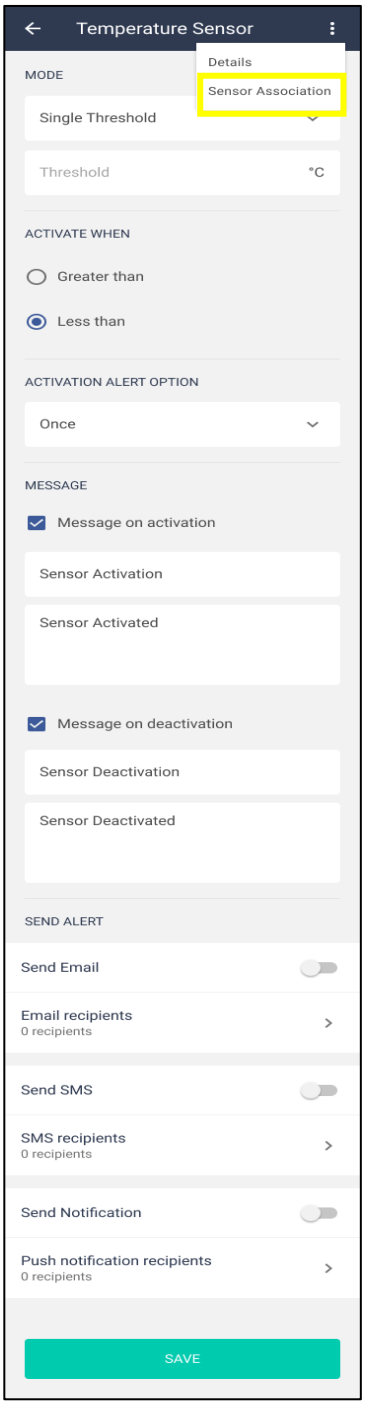
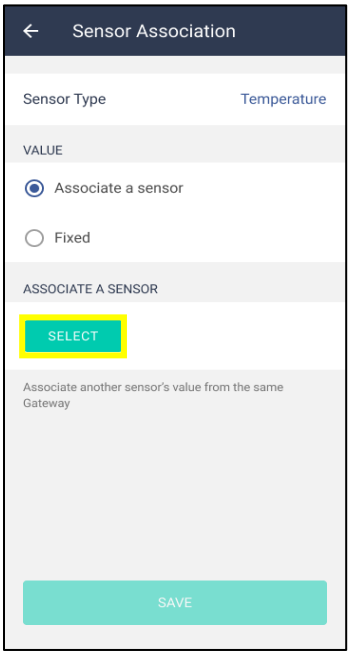
6.2.2.3 Sensor Association

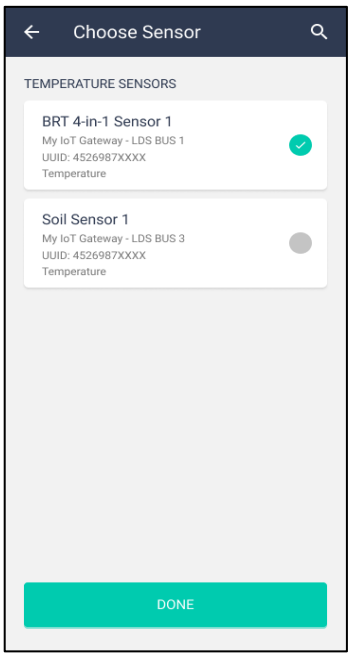


This option is used to associate additional parameter (like temperature) for compensation to improve sensor data accuracy. There are 2 ways to do sensor association:

- Use Sensor and its value

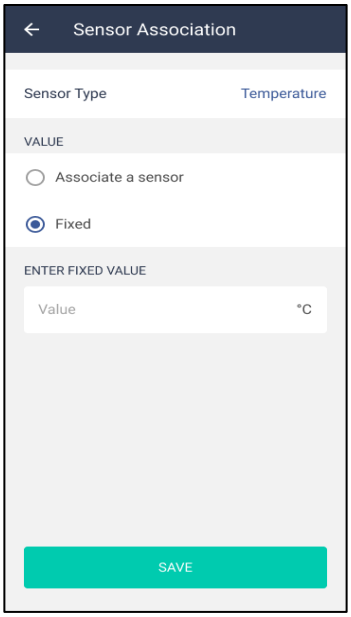
To associate temperature with pH sensor, select the **Sensor Type** – Temperature; Select the **Value** – Associate a sensor.





- Use Fixed Value

This option is used when a temperature sensor is not available. Instead, a fixed value is used to associate the sensor.



NOTE: This function can be used only for EC, Salinity, DO and pH sensors.

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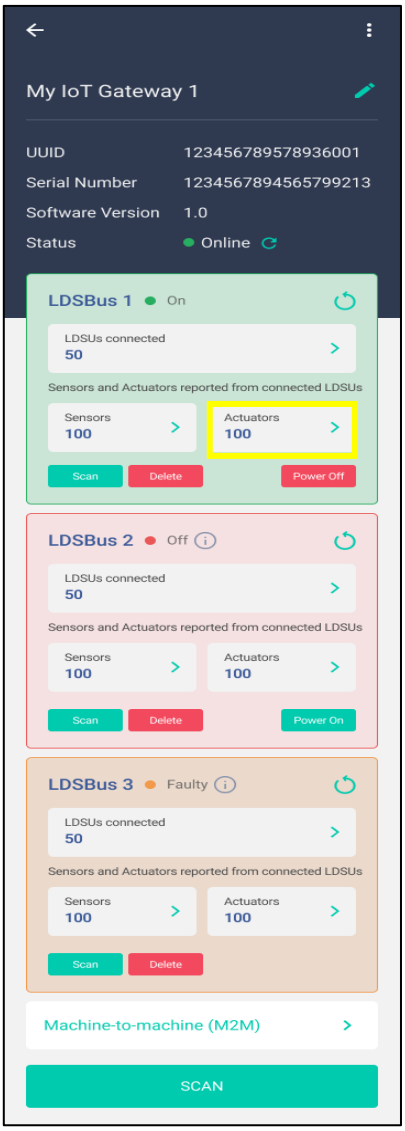
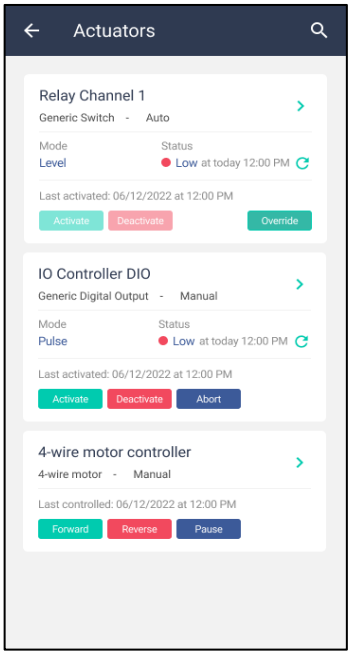
6.2.3 Actuators List



To access list of actuators connected to the LDSBus, select *Actuators* under a specific LDSBus Management widget, for example LDSBus 1. A list of actuators, if any, are displayed - *Actuator Name, Actuator Type, Control – Manual / Auto, Mode – Level / Pulse, Reading, Min / Max* values, Actuator Status, when the Actuator was *Last Active* and *Actions (Activate/Deactivate/Override/Abort).*

Users may search for a specific actuator using the **Search** function.

Tap the filter icon to choose from the available sensors.



Tap on **[Activate]** to trigger the actuator into active state.

Tap on **[Deactivate]** to trigger the actuator into inactive state.

Tap on **[Abort]** to cancel the current operation and return the actuator to inactive state immediately.

Tap on **[Override]** to change the control from *Auto* to *Manual*.

Tap on **[Forward]** to activate forward action.

Tap on **[Reverse]** to activate reverse action.

Tap on **[Pause]** to pause motor movement.

Tap on refresh icon, to view the updated status.

NOTE: The Abort feature is only available for Pulse mode.

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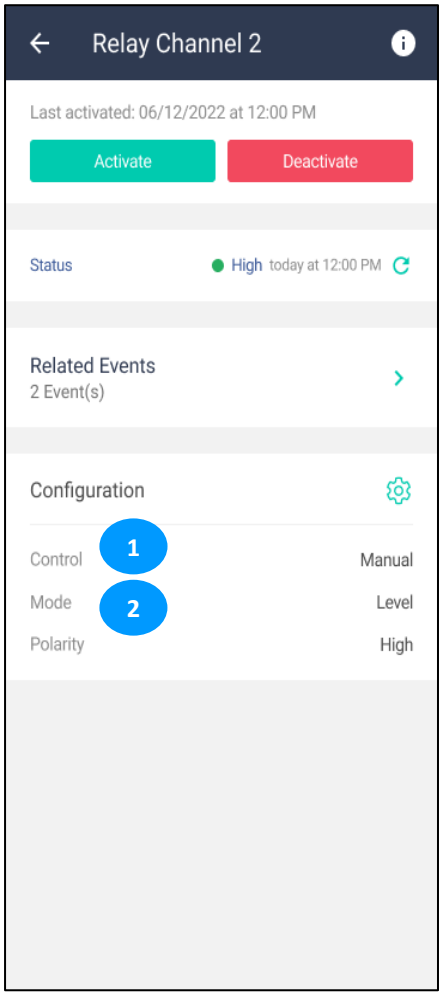
6.2.3.1 Configure Actuator



For illustration purposes, Relay – Channel 1 is used.

1. Control
There are two types of Control, namely Manual and Auto.

Manual: This mode allows user to activate and deactivate relay channels manually.

Auto: This mode operates autonomously, with the system managing the activation and deactivation of the relay channel automatically. In this mode, predefined events or conditions determine when the relay channel is activated or deactivated. These events could include specific times of the day, environmental triggers, or inputs from other systems. The system executes these actions based on programmed instructions without requiring manual intervention, enabling automated operation, and reducing the need for constant oversight.

2. Mode
There are two types of Modes, namely Level Mode and Pulse Mode.
Level: In Level mode, the functionality operates similarly to a standard switch mode commonly found in various electronic devices. Once a channel is activated, meaning the relay is turned on, it remains in that state until the user deactivates it. This mode provides a straightforward and intuitive way of controlling the relay, offering stability and consistency in maintaining the relay's state until the user takes a deliberate action to change it.

Pulse: In pulse mode, the functionality mirrors that of automatic doors.
Upon activation, the channel remains active for a predefined period, denoted as T1. During this time, the relay maintains its active state, allowing the load to be powered or controlled as required. This duration typically corresponds to the time required to perform a specific task or operation associated with the load.
Following the completion of the T1 period, the channel automatically deactivates. The duration of this inactive period is denoted as T2 and is adjustable based on the application requirements.

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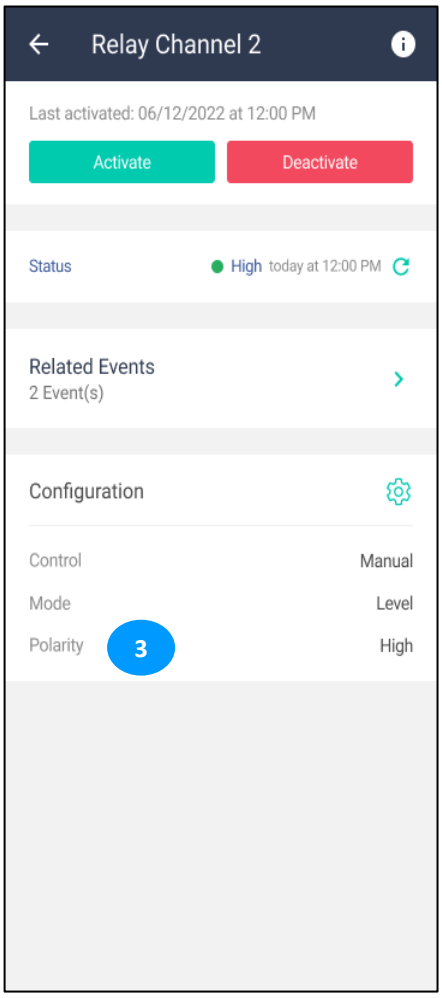
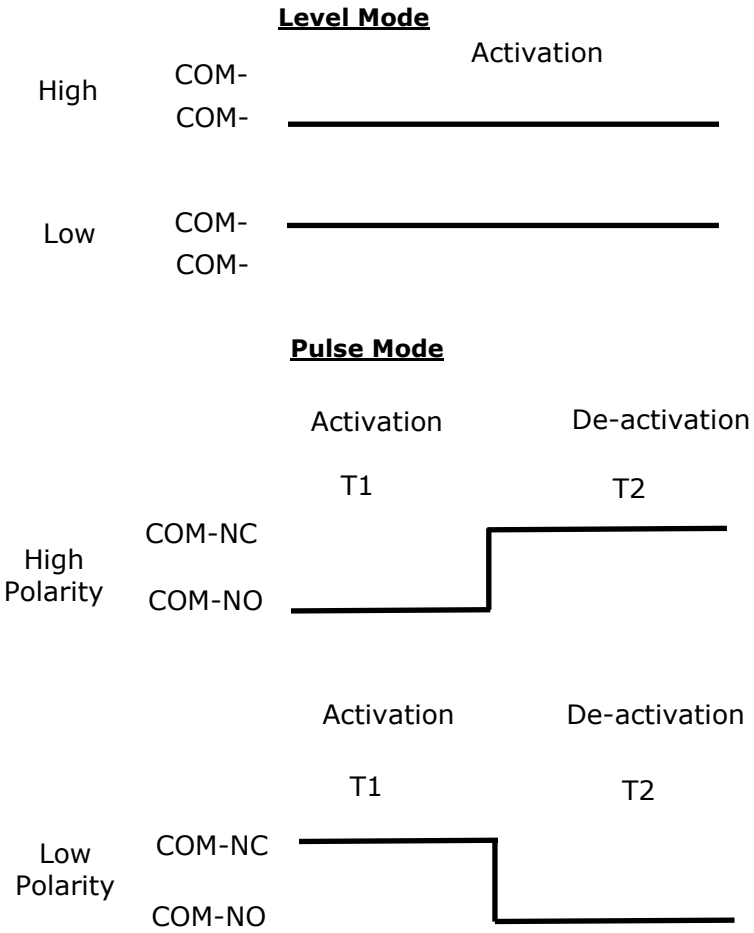


3. Polarity

The LDSBus 2CH relay utilizes Single Pole Double Throw (SPDT) relay type, offering two distinct ways of load connection. Load connection can be achieved by connecting the load to Normally Open (NO) or Normally Closed (NC) terminals. To accommodate these connection options, the controller features two configurations: High and Low.



High: In the default High configuration, the relay operates with the channel contact closed between the Common (COM) and Normally Open (NO) terminals for activation. Upon deactivation, the channel contact switches to close between the Common (COM) and Normally Closed (NC) terminals.
Low: In the Low configuration, the relay operates in the opposite manner compared to the High configuration. Upon activation, the channel contact closes between the Common (COM) and Normally Closed (NC) terminals. Then, upon deactivation, the channel contact switches to close between the Common (COM) and Normally Open (NO) terminals.

NOTE: Polarity feature is available for both Level mode and Pulse mode.

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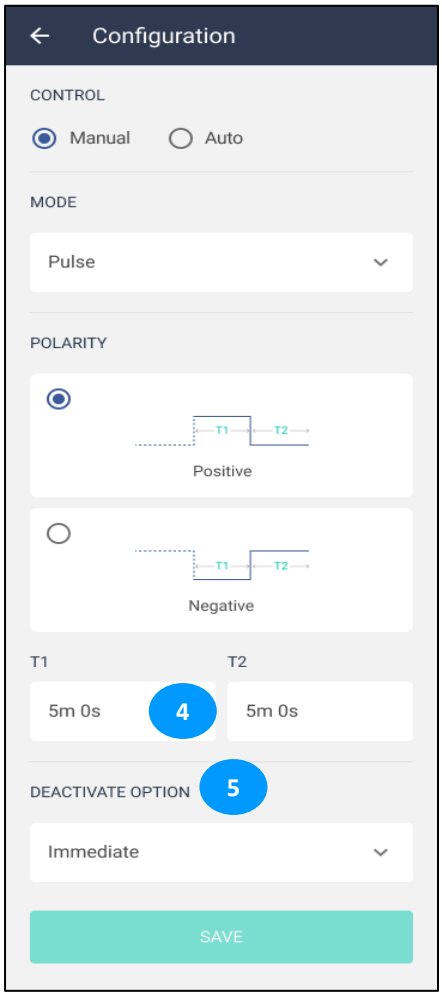

The following options are only available for **Pulse** Mode.

4. Pulse Phase – T1, T2
T1 and T2 indicate the first and second phase of the pulse, respectively.
Ensure that T1 and T2 duration are greater than 0 seconds and (T1 + T2) duration does not exceed 1 hour.

5. Deactivate Option
The following three distinct options are available for deactivation mode.

Immediate: With this option, the channel instantly returns to its deactivated state without any delay.

Immediate after T1: With this option, the channel returns to deactivated state after completing the T1 cycle.

Immediate after T2: With this option, the channel returns to deactivated state after completing the T1 and T2 cycle.

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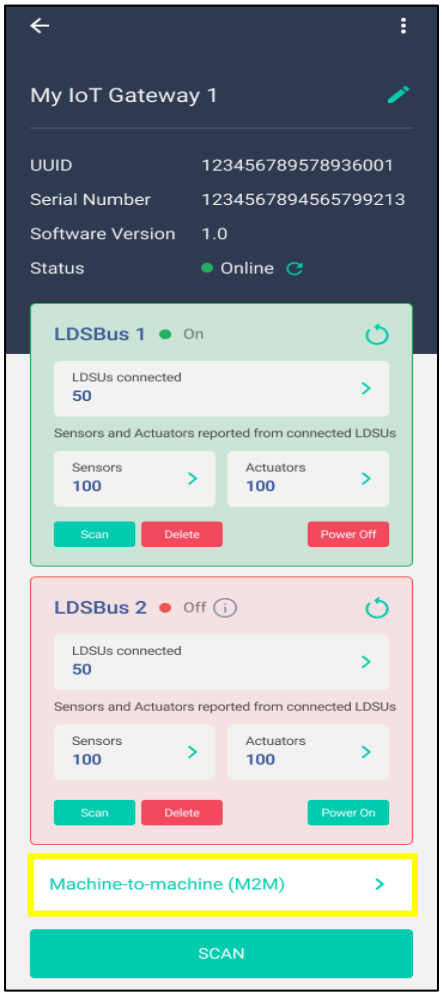
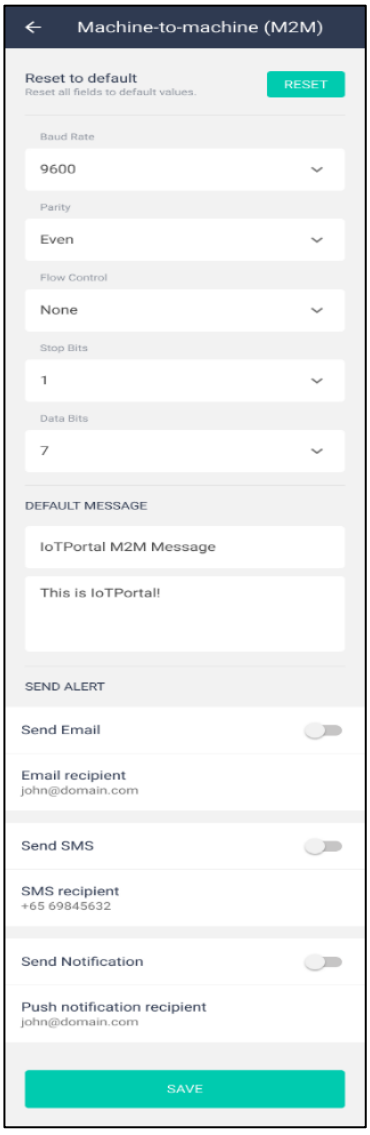
6.2.4 Machine-to-Machine



Machine To Machine (M2M) connection enables the user to download system level diagnostic messages about the gateway. These messages can be useful for further troubleshooting in case of issues.
On selecting Machine-to-machine(M2M) from the LDSU details page, user can view the serial communication parameters such as baud rate, parity, flow control, stop bits and data bits that are essential for communication with the gateway, default test message and alert configurations.



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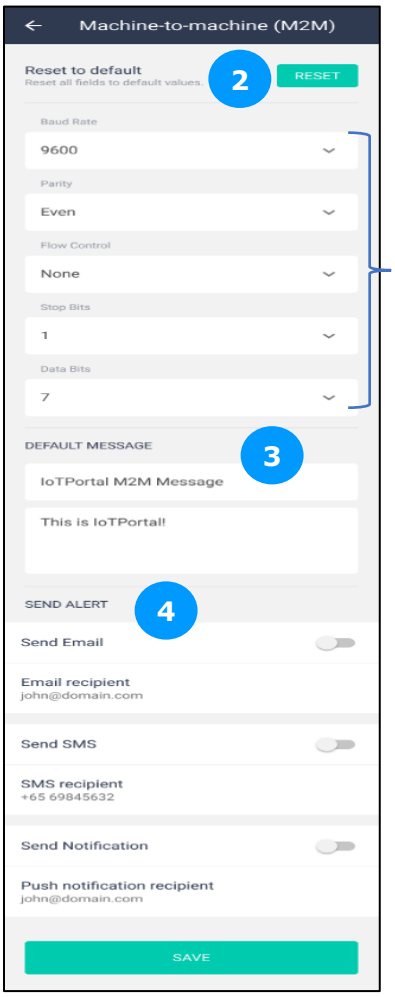

1. Communication Parameters

Baud Rate - Refers to the communications speed measured in "bits transferred per second." Select the Baud Rate from the drop-down control.

Parity - Parity is used for error-checking. Parity can be either Even, Odd, or None.

For example, for Even parity, if the data is 10010010, the serial port sets the parity bit as 1 to keep the number of logic-high bits Even. For Odd parity, the parity bit is 0 so that the number of logic-high bits is Odd. Select the Parity from the drop-down control.

Flow Control - Flow control used to manage the rate of data transmission between sender and receiver to prevent a fast sender from overwhelming a slow receiver.

Stop Bits - Stop bits are used to signal the end of a communication packet. Stop bits can be either 1 or 2 bits.

Data Bits - Data bits are a measurement of the actual data bits transferred within a word. Data Bits can be either 7 or 8 bits.

2. Reset

Tap on **[Reset]** to reset all fields to default values as shown in the table below.

M2M Parameter	Default Value
Baud Rate	115200
Parity	None
Flow Control	None
Stop Bits	1
Data Bits	8

Table 1 - M2M Default Values

3. Default Message

To confirm proper configuration of the M2M communication link, a command including a message may be transmitted to the gateway. This default message can be updated by the user, allowing verification that the gateway is responding correctly and the communication link is operational.

4. Send Alert

The user can choose to receive the default message via email, SMS, or push notifications by enabling the corresponding toggle switches.

NOTE: For detailed instructions on configuring M2M, refer to the IoTPortal Gateway M2M Configuration guide.

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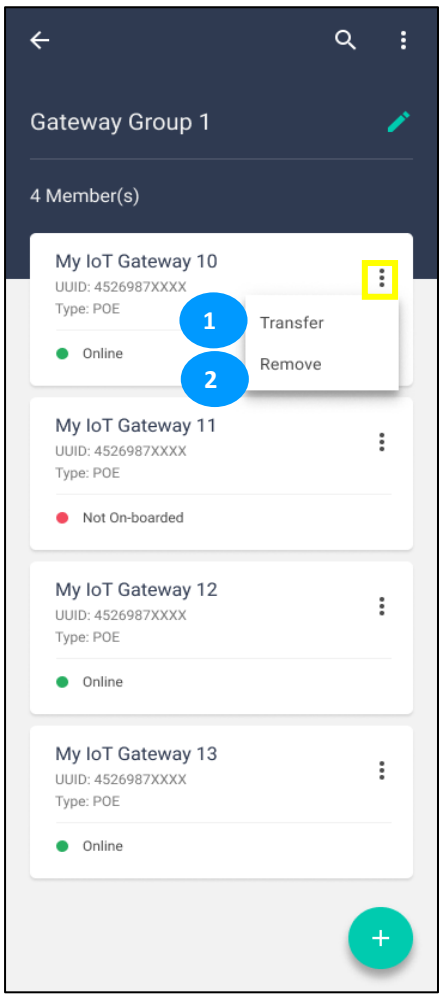
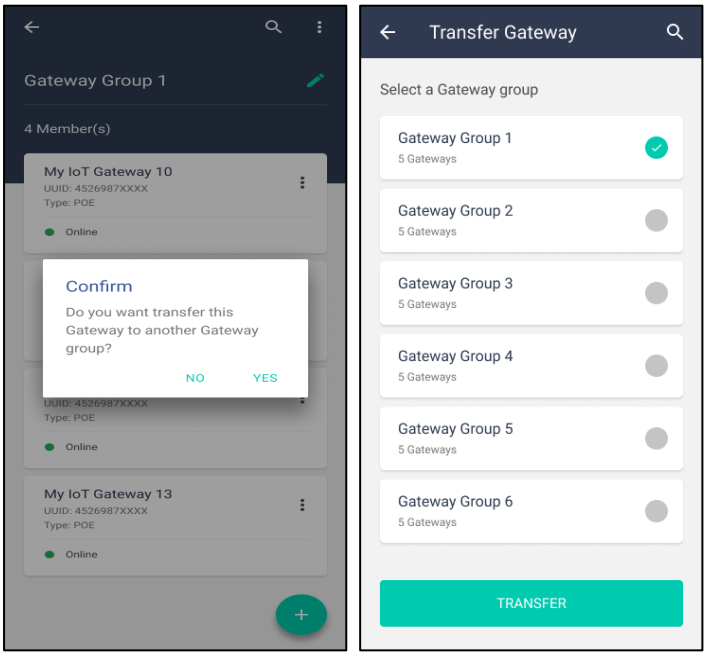
6.3 IoTPortal Gateway Group Functions

6.3.1 Gateway Features



1. Transfer

Transfer allows users to move a gateway to a different gateway group.



2. Remove

Remove gateway from the group. Upon successful removal, the removed gateway will become a standalone / single gateway.

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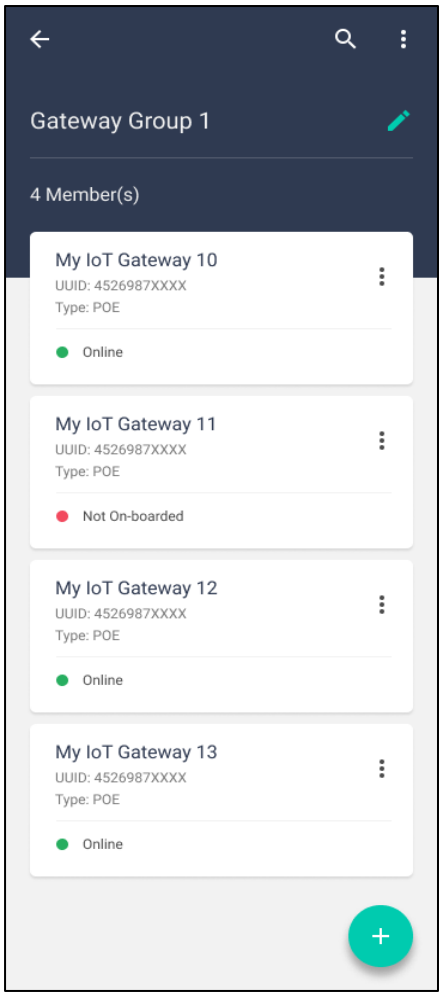
6.3.2 Gateway Group Features



Tap 🔍 to search for a specific gateway within the gateway group.

Tap ✎ icon to edit the *Gateway group Name.*

Tap **[+]** to add more gateways to the gateway group.

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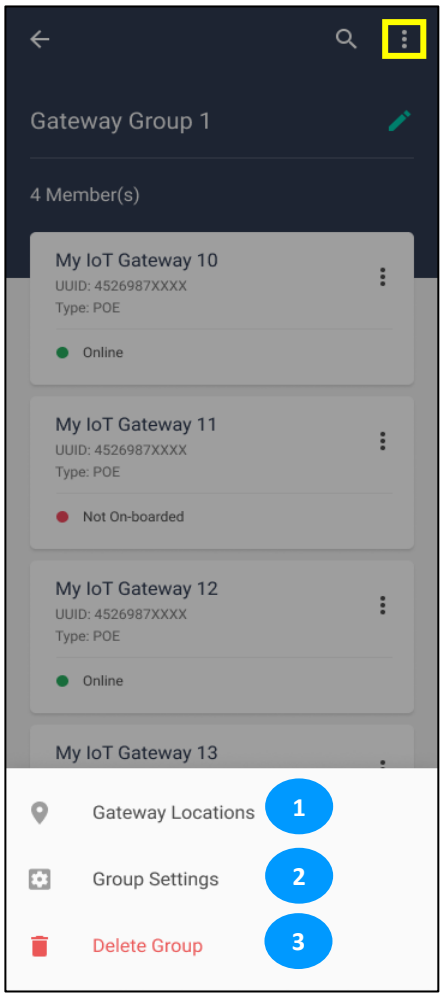
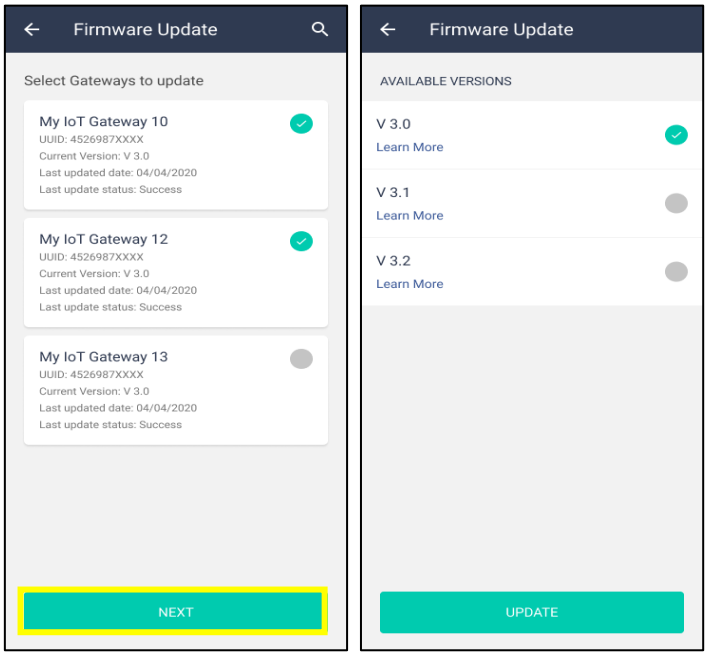


Tap on ⋮ to view additional features of gateway groups.

1. Gateway Locations
The current location of the gateway group is displayed.

2. Group Settings
Group settings include *Firmware Updates* which allows user to perform firmware update for gateway group members.
If successful, a request for firmware update will be submitted.



3. Delete Group
Users can remove the gateway group by selecting the "Delete Group" option.

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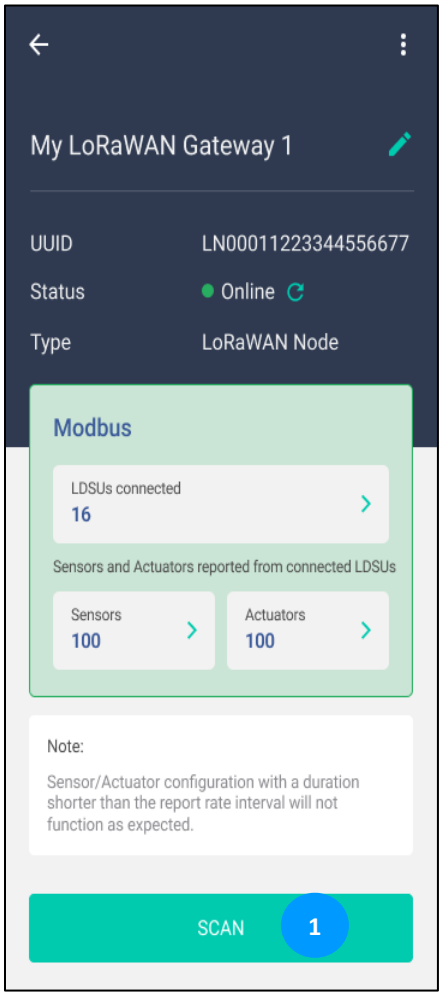
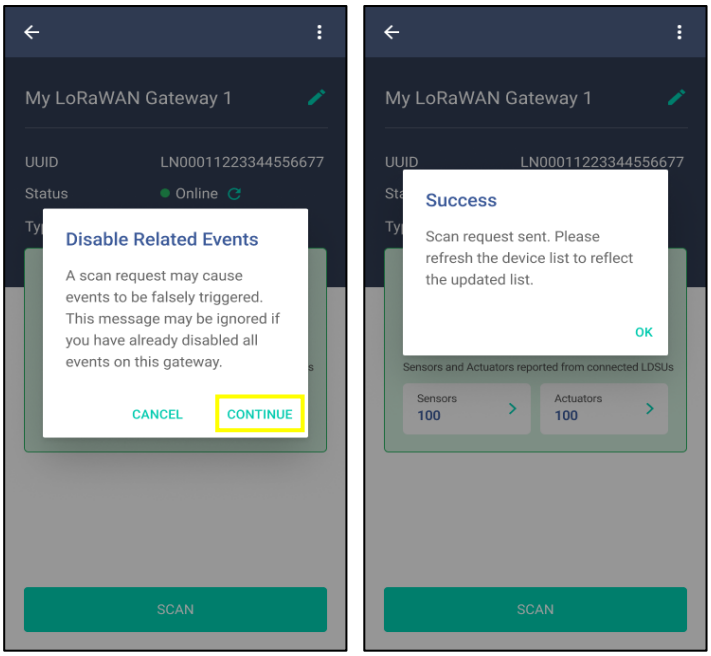
7. LoRoWAN Node Features

7.1 LoRaWAN Node Functions



1. Scan

A gateway scan updates the current LDSU, sensor, and actuator list, and also adds any newly discovered devices.



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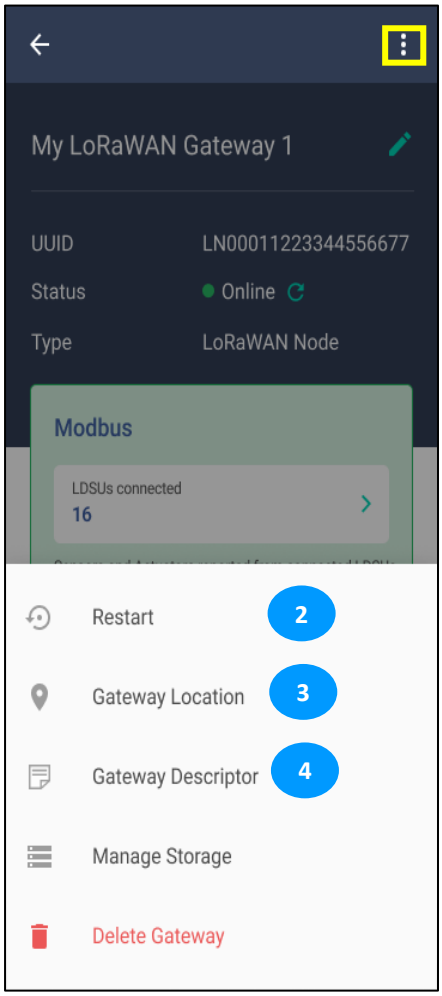
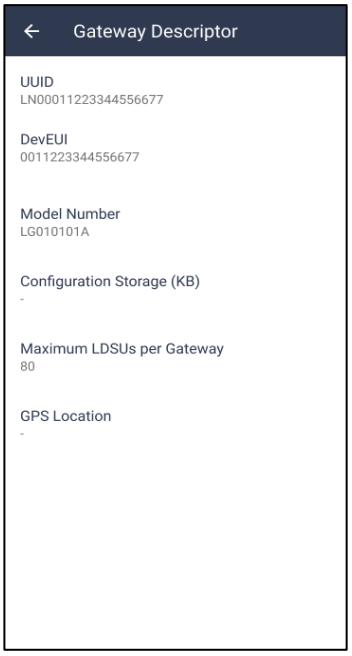


Click on ⋮ icon to view the gateway details.

2. Restart
A gateway restart will reboot the gateway and the connected Modbus devices.

3. Gateway Location
The current location of the gateway is located. User can perform a long tap on the marker 📍 to change the location.

4. Gateway Descriptor
Gateway descriptor details are shown as follows:



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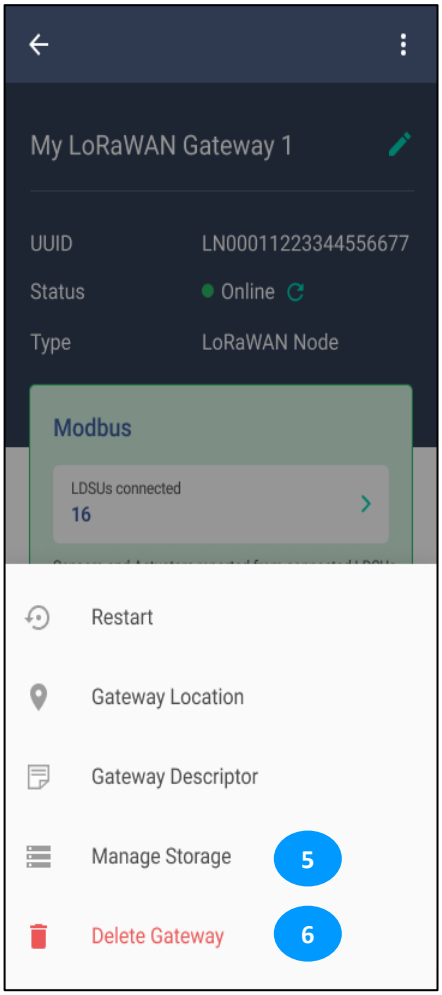
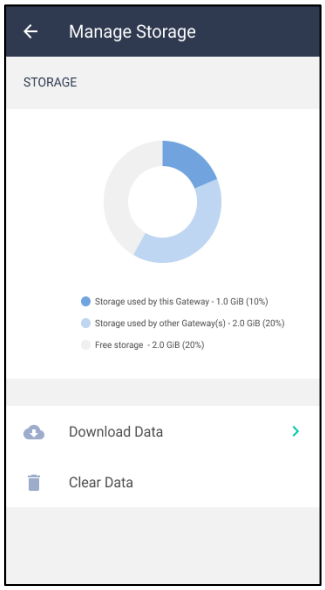


5. Manage Storage
The information related to storage usage is displayed. Users can download gateway data either in full or by selecting a specific date range.



6. Delete Gateway
Users can remove the gateway by selecting the "Delete Gateway" option.

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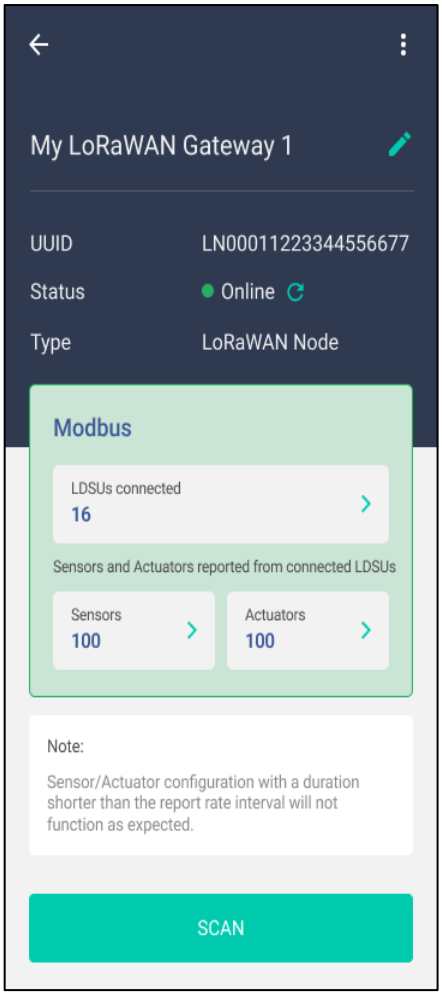
7.2 Manage Modbus Ports



LoRaWAN node can be used to connect multiple Modbus devices. The Modbus ports have the same features as the IoTPortal LDSBus ports.

Refer to the section 6.2 for more details.

NOTE: Unlike IoTPortal gateway, a LoRaWAN node supports a single reporting rate for all LDSUs.

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8. Event Management

An event is a set of triggers evaluated against a set of conditions that cause an action or sequence of actions to happen. There are 5 types of events. The following table provides the list of events and action triggered.

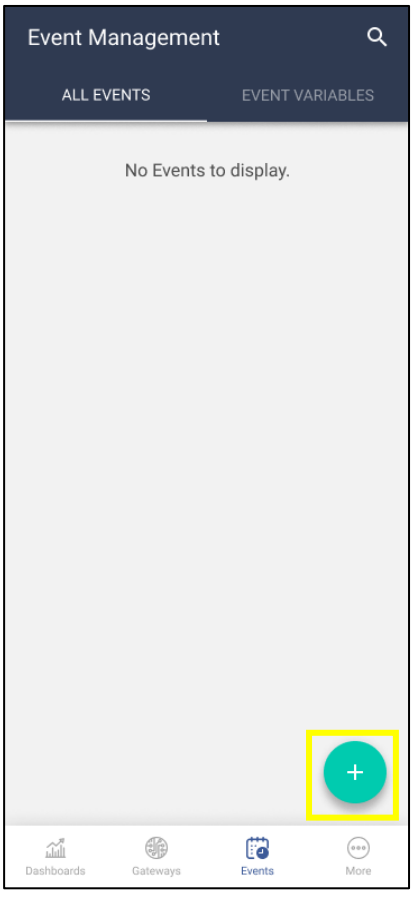
	Event Type	Action Triggered
1	Sensor based events	The trigger signal is generated by one or more sensors
2	Time based events	The trigger signal is generated by a clock
3	Duration based events	The trigger signal is generated by a timer
4	Attribute based events	The trigger signal is generated by an attribute of an object that is not a sensor (for example, an attribute of a gateway, a storage attribute, a subscription entitlement attribute, etc.
5	Complex events	Combination of one or more above triggers

Table 2 – Event Types

In every event, conditions are evaluated, and when the conditions are met, an action or sequence of actions is taken. Alerts and actuation sequences may be included in such actions. A triggered event cannot be re-armed until all its action components have been completed.

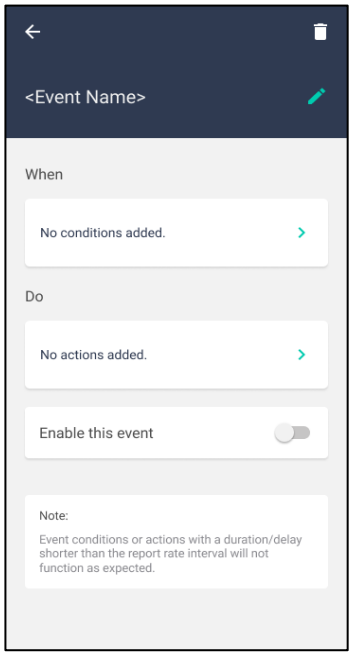
The events are created by the event owner, or any member of the organization authorised to perform the action, such as Create/Read/Update/Delete (CRUD). Events are given friendly names, and a log of event activations is kept and counts towards storage. Events can be enabled or disabled. Events are not enabled by default and must be enabled. A disabled (disarmed) event ignores its trigger signals and does not evaluate its conditions.

8.1 Create Event



To create an event, tap on **[+]** followed by entering an Event name.

The newly created event is displayed.



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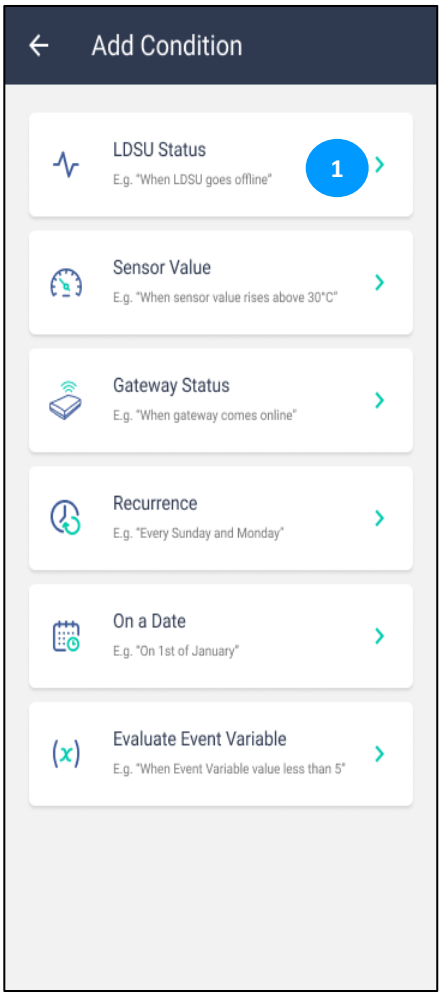
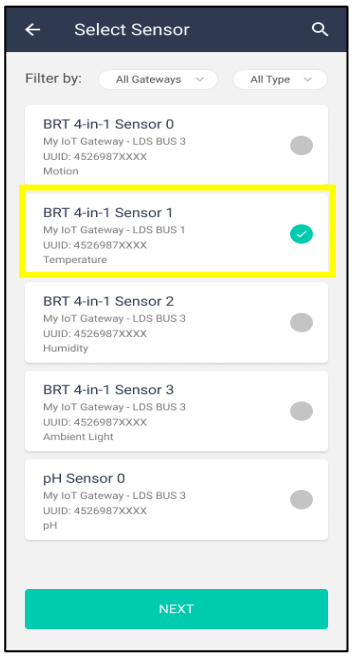
8.1.1 Add condition

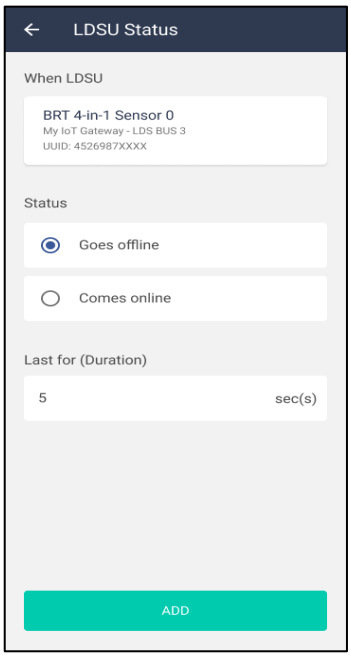


User can add the following type of conditions (Refer section 8.1) to trigger an event:

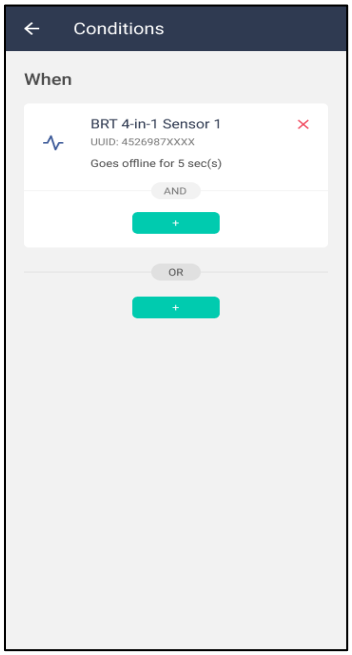
1. LDSU Status

An event can be configured to trigger when an LDSU device changes its status to offline or online. A duration can be set to ensure the event is triggered only if the device remains in that state for the specified period.





Users can add multiple conditions by choosing between AND or OR to match their desired criteria.



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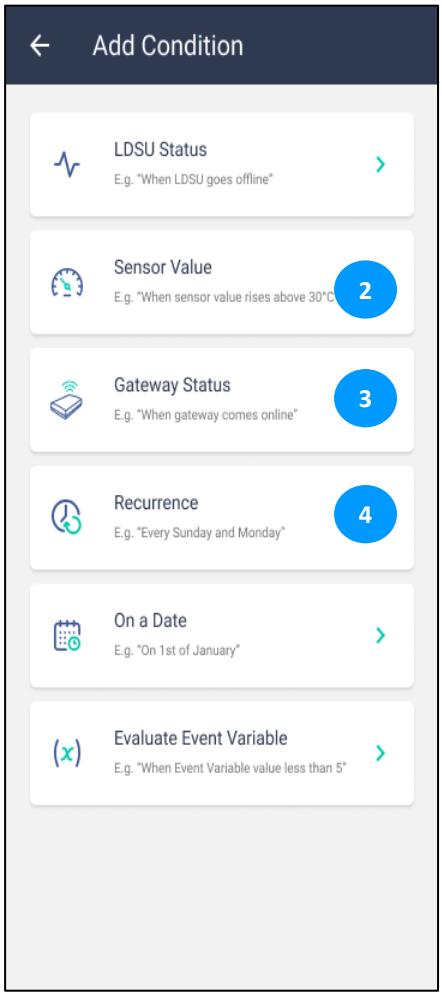
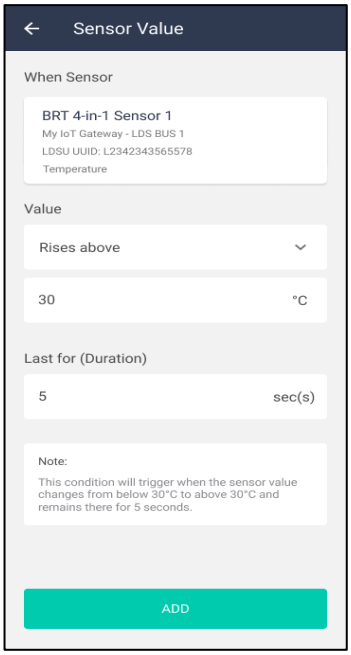


2. Sensor Value

An event can be configured to trigger when the sensor value – *Rises above, falls below, enters a range, exits a range, changes to 1 or changes to 0.*

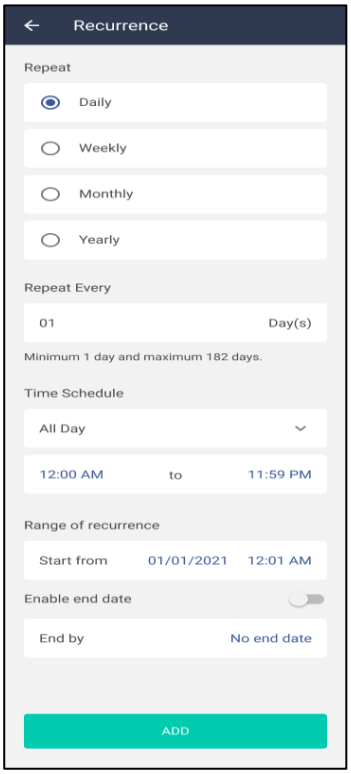


3. Gateway Status

Similar to LDSU status.

4. Recurrence

Users can configure recurring events that repeat at specified intervals and are active within a defined date and time range as shown below.



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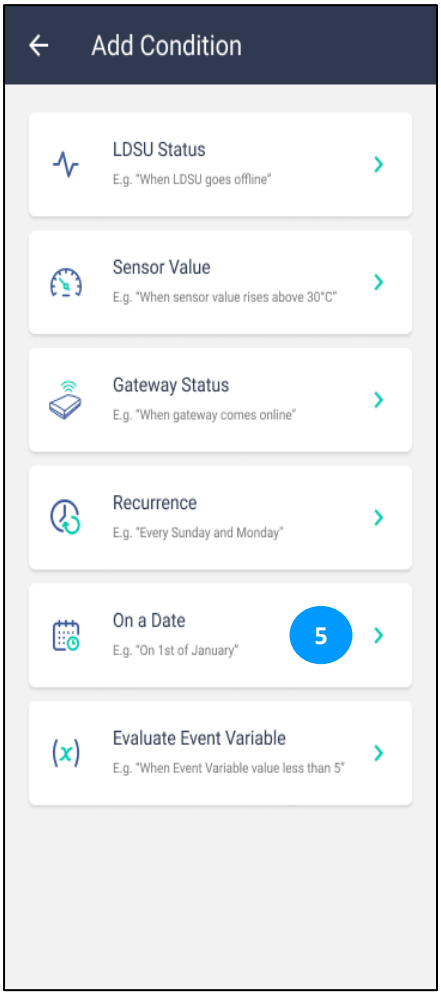
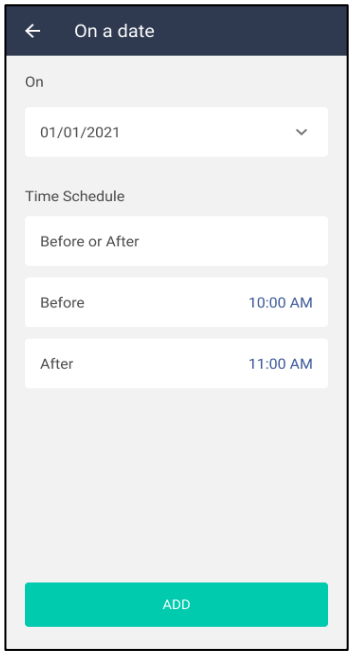


5. On a Date

Users can configure the event to be triggered on a particular date and time.



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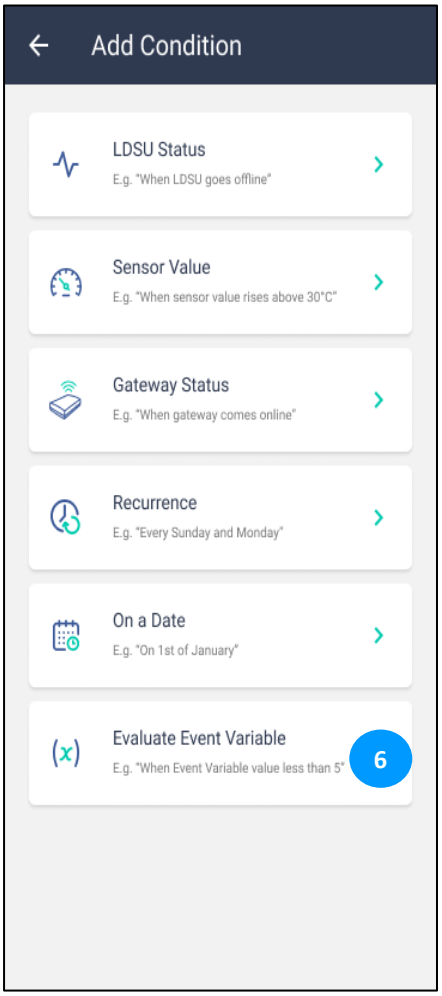
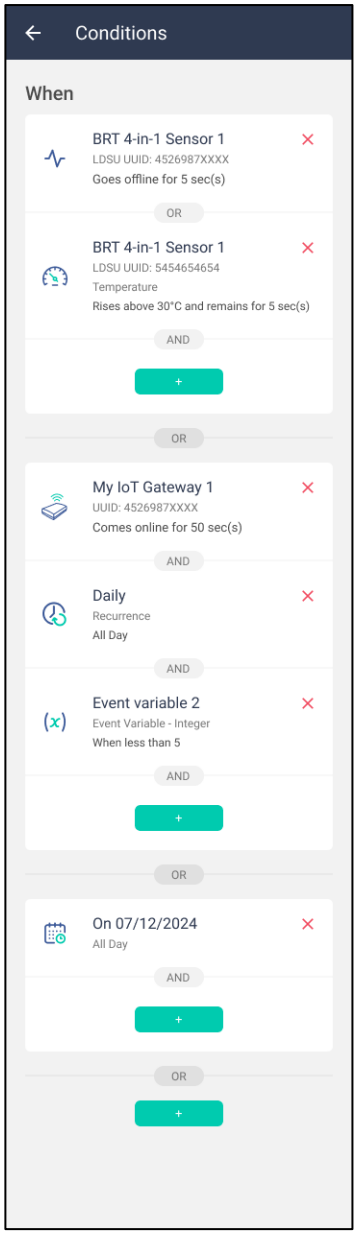


6. Evaluate Event Variable

An event is triggered based on the evaluation of its associated event variable. The event variable can take multiple forms, such as a Boolean (true/false), integer, floating-point value, counter (with conditions such as less than, equal to, or greater than), or a timer. The system monitors the specified condition, and once the defined threshold or state is met, the corresponding event is initiated.

For more information on how to create an event variable, refer to section 8.3.

Below is an example on how different conditions can be configured for an event.



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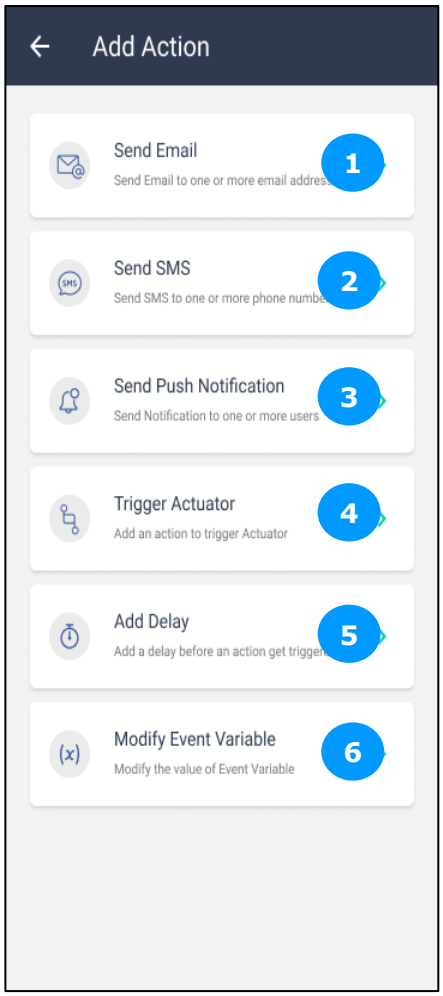
8.1.2 Add Action



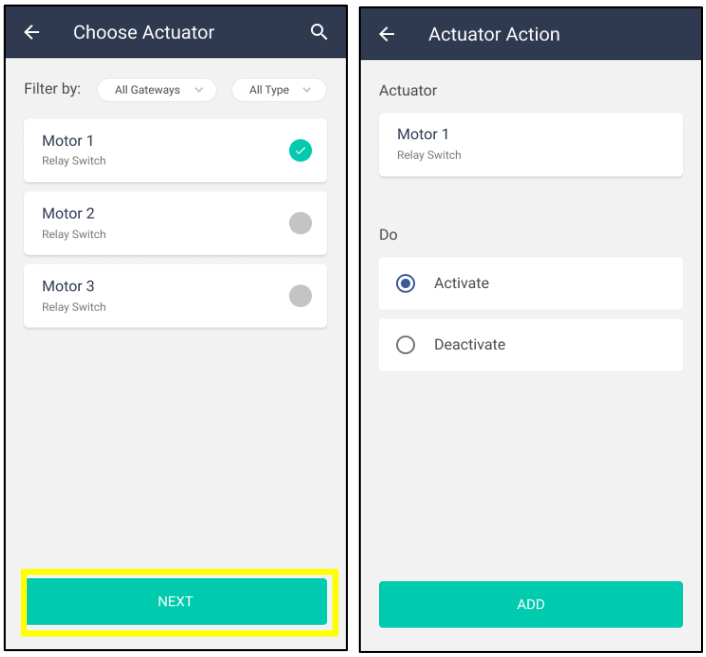
User can add the following type of actions (Refer section 8.1) that will run when the conditions are met:

1. Send Email
User can configure the message content, subject line, and recipient email list.

2. Send SMS
User can configure the message content and recipient mobile number list.

3. Send Push Notification
User can configure the message content and recipient list.

4. Trigger Actuator
User can configure to trigger an actuator as an action. Do note that, only actuators that have *Auto* mode enabled will be available. User can choose to either activate or deactivate the actuator.



5. Add Delay
User can add a delay as an action.

6. Modify Event Variable
User can choose to modify an event variable as an action. An event variable can be *boolean, integer, float, counter (less than, equal to, greater than) or a timer.*

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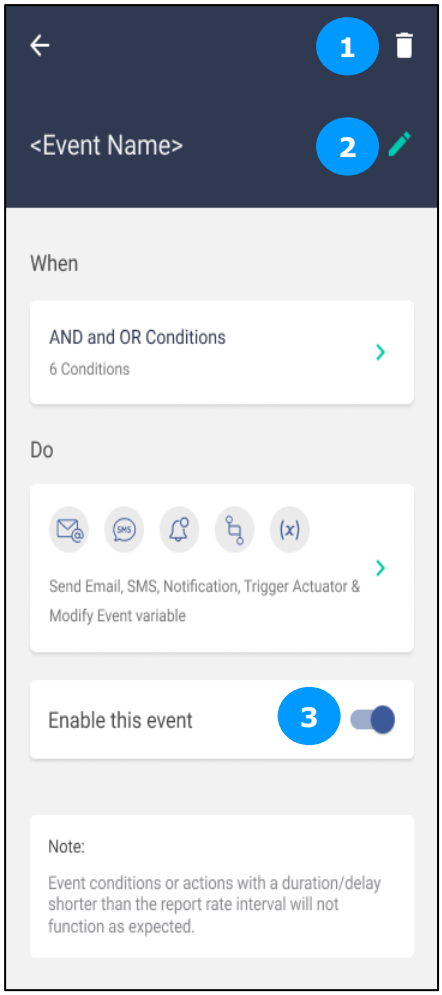
8.1.3 Enable Event



1. Delete Event

Click on icon to delete the event.

2. Rename Event

Tap on to edit the event name.

3. Enable this event

Enable event using the toggle button. By default, the events are disabled.

Event Status	Toggle Button State
Enabled	
Disabled	

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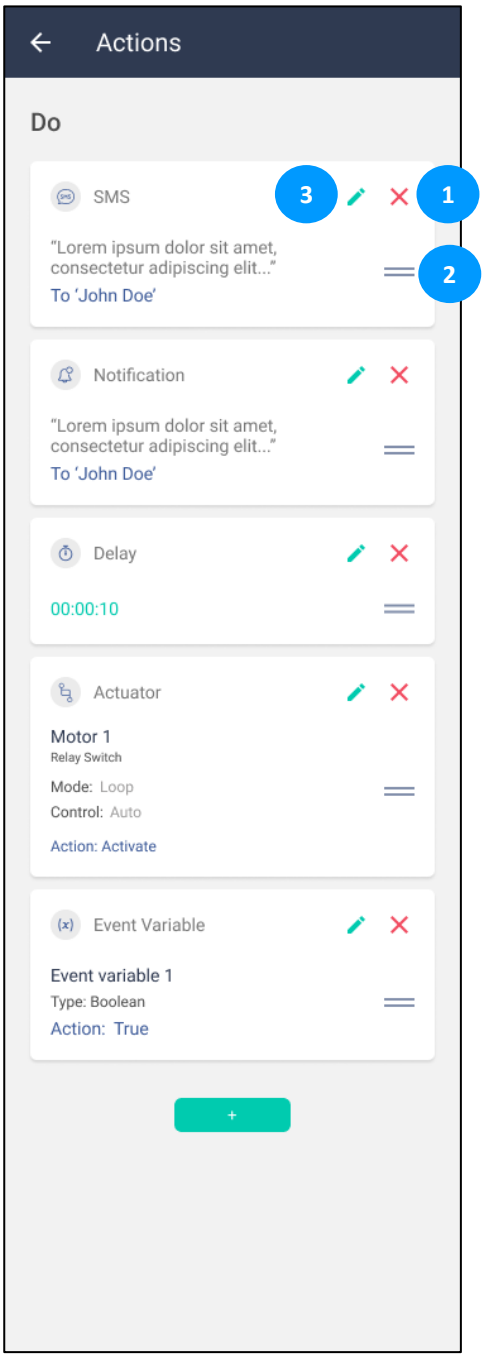
8.2 Condition/Action Features

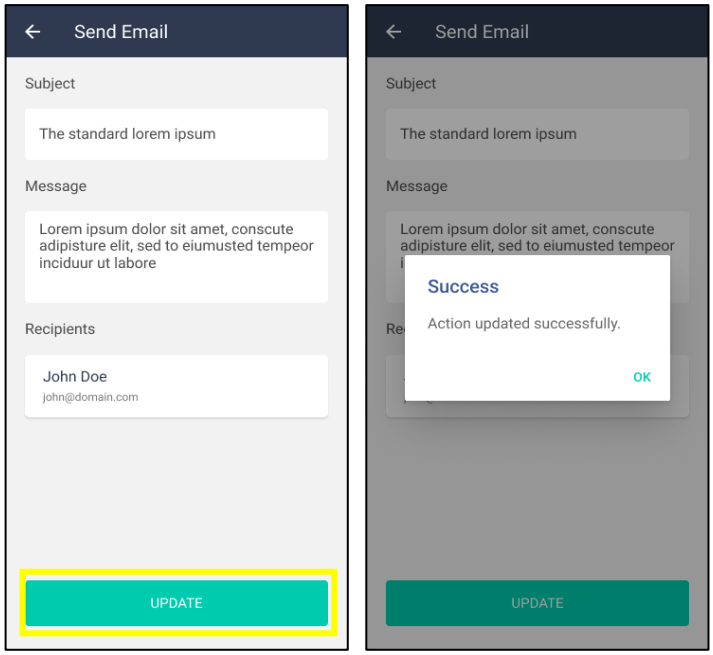


The following features are common for both conditions and actions. For illustration purposes the action page is shown.

1. Remove order of actions
Click X to remove an action from the list.

2. Change order of actions
Hold the ☰ icon to change the order of the action moving it up or down.

3. Edit action
Click ✎ to edit an action.



NOTE: Ensure that the event is disabled before performing the above functions.

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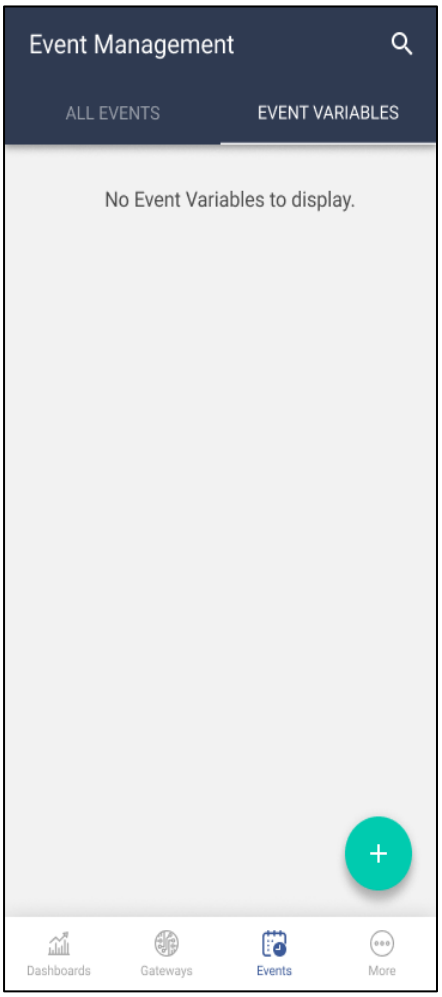
8.3 Create Event Variables

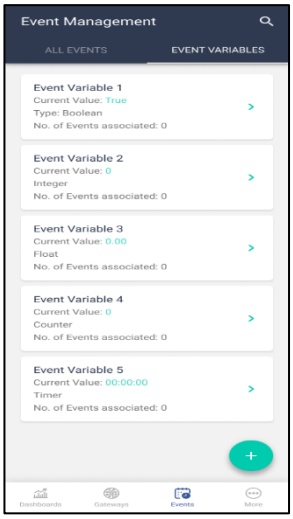
Event variables are values used to trigger or control the behaviour of an event. They may take different forms, such as Boolean, integer, float, counter (e.g., less than, equal to, greater than), or timer values.



To create an event variable, tap on **[+]** icon under the *Event Variables* tab. Following types and values are supported:

Variable Type	Fields	Value
Boolean	Initial Value	True/False
Integer	Initial Value	0 - 65535
	Upper Limit	Should be >= Initial value and between 0 – 65535
	Lower Limit	Should be <= Initial value and between 0 – 65535
Float	Initial Value	0 – 65535, up to 2 decimal places
	Upper Limit	Should be >= Initial value and between 0 – 65535, up to 2 decimal places
	Lower Limit	Should be <= Initial value and between 0 – 65535, up to 2 decimal places
Counter	Count	Up/ Down count
	Initial Value	0 - 65535
	Terminal Value	0 – 65535, must be > initial value
	Step Size	1 – 65535, absolute difference of Initial and Terminal Value must be a multiple of step size.
	Wraparound	Enabled: Terminal Value + Step Size = Initial Value Disabled: Terminal value+ Step Size = Terminal Value
Timer	Initial Value	00:00:01 – 23:59:59

Newly created event variable will look as follows:



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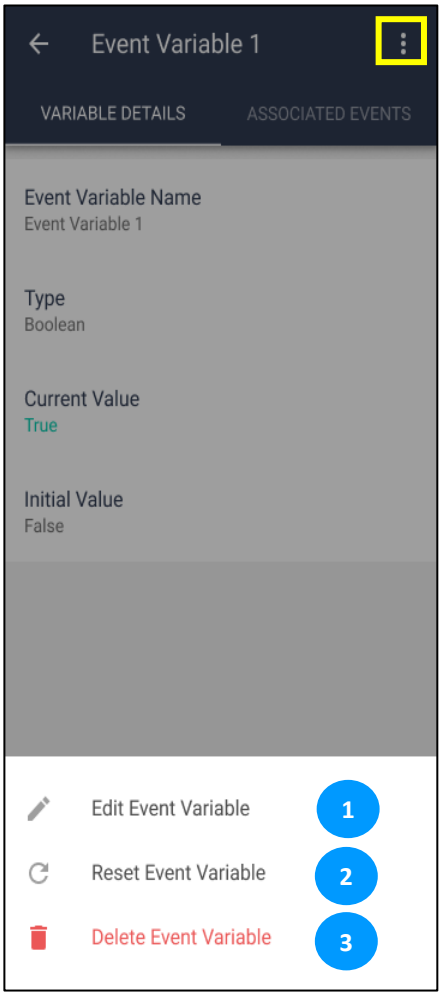
8.3.1 Event Variable Submenu

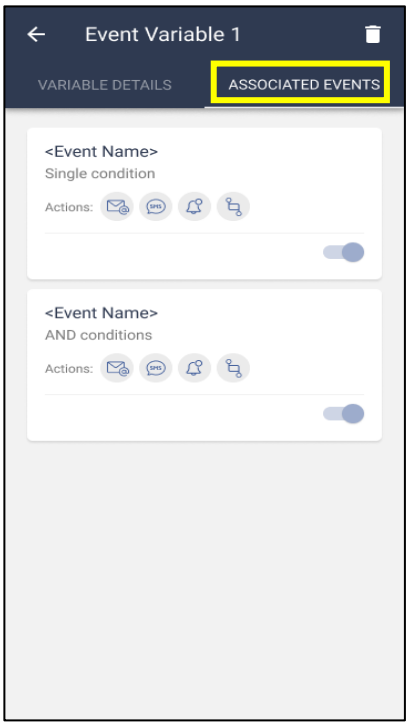


Tap on ⋮ icon to open the sub menu for event variables.

1. Edit Event Variable
Modify previously defined values.

2. Reset Event Variable
Reset the current value to the defined initial value.

3. Delete Event Variable
Remove event variable from the list. Do note that if the variable is linked to any active event, it cannot be deleted. Users can view the events associated with the event variable under the *Associated Events* tab.



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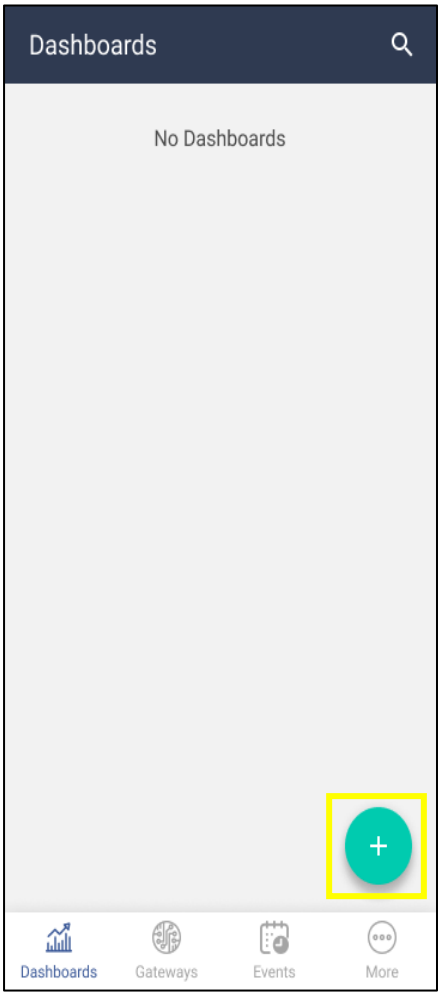
9. Dashboard Management

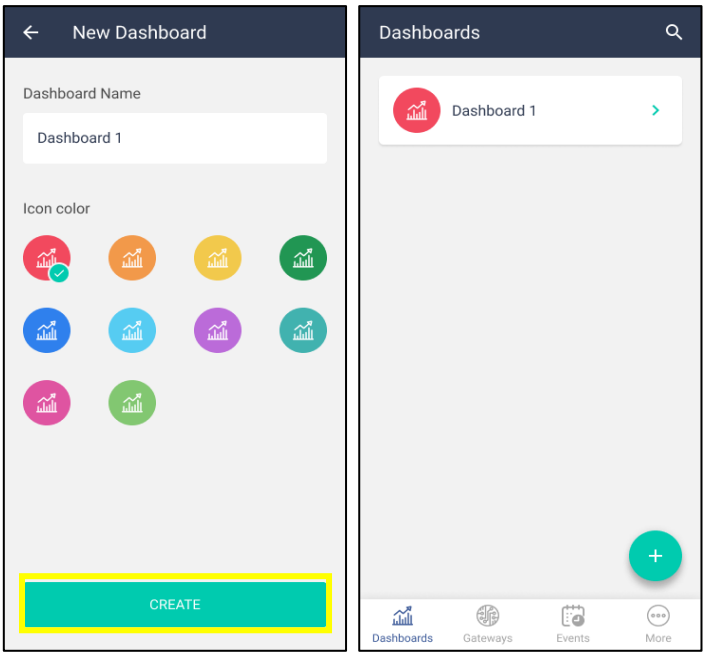
The dashboard function allows users to create dashboards for data visualization and remote device control in real time. Users can create dashboards and add attributes for Gateways, Sensors (Temperature, Humidity, Ambient Light etc.) and Actuators.

9.1 Create Dashboard



Tap on **[+]** to add a new dashboard.

Enter the *Dashboard Name*; Select an appropriate *icon color* for the dashboard. Tap **[CREATE]**.



Users can now begin customizing their dashboard by adding various types of charts, including:

- Gateway Charts
- Sensor Charts
- Actuator Charts
- Other Charts (Water consumption, energy consumption etc.).

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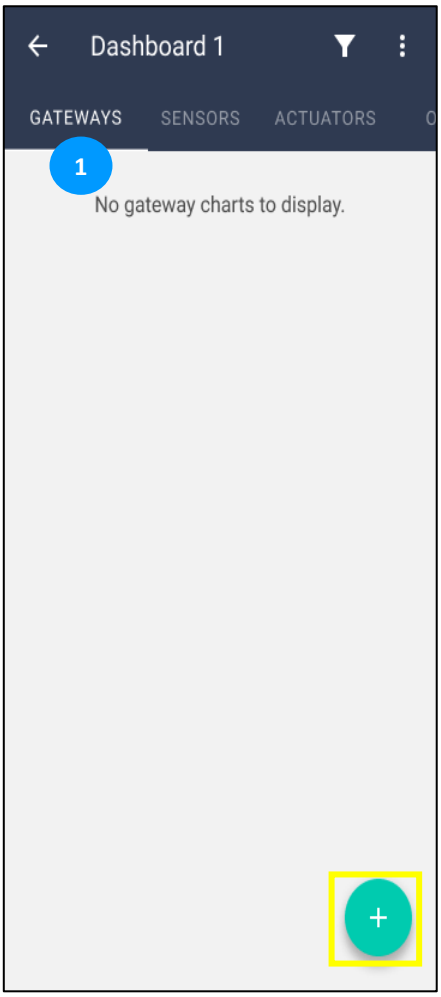
9.2 Add Chart

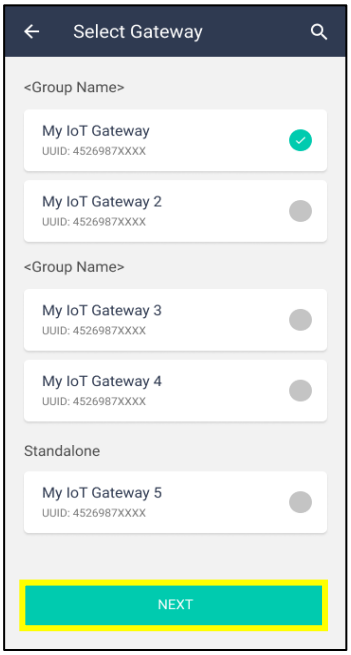


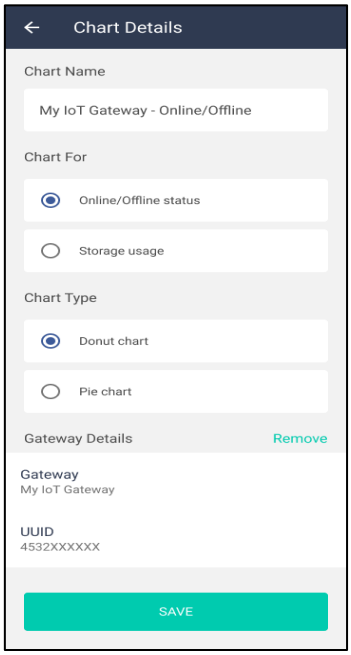
1. Add Gateway Chart

Tap on **[+]** under *Gateways* tab to add a gateway chart.

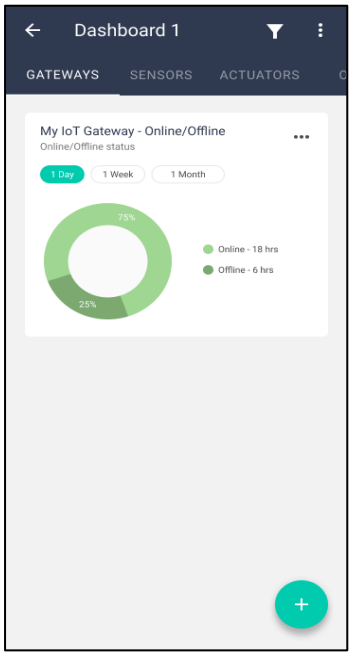
Enter a name for the chart and select the gateways to be included. Click **[NEXT]** to proceed.

Select chart type, data to be displayed, confirm gateway details and click on **[SAVE].**





The newly created Gateway Chart displays the storage usage of all the gateways connected to the IoTPortal system.



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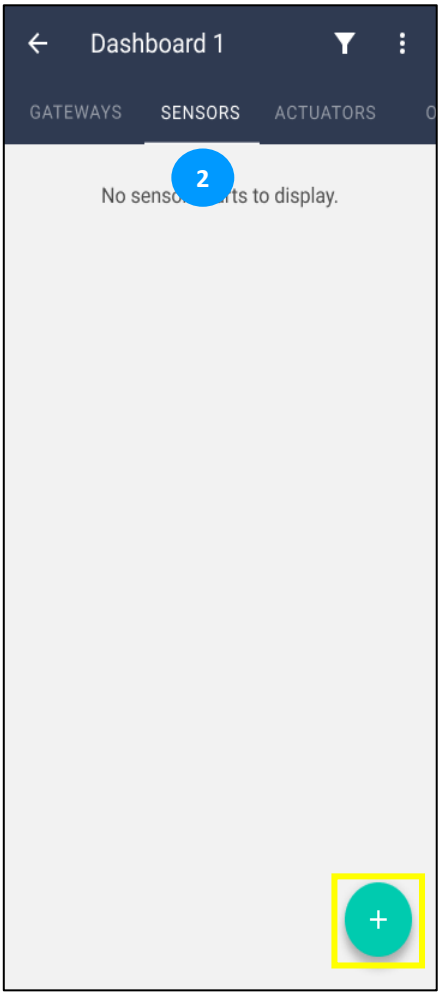
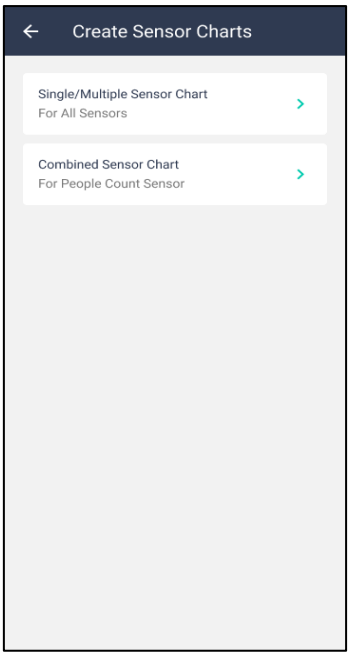


2. Add Sensor Chart

Tap on **[+]** under *Sensors* tab to add a sensor chart.

User can either create:

a) Chart with a single sensor
b) Chart with multiple sensors
c) combined sensor chart (applicable only for people counting sensors)



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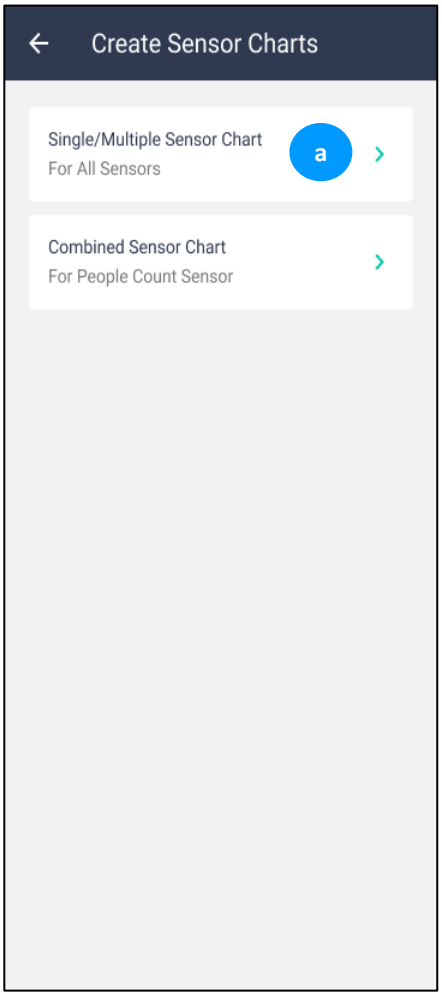
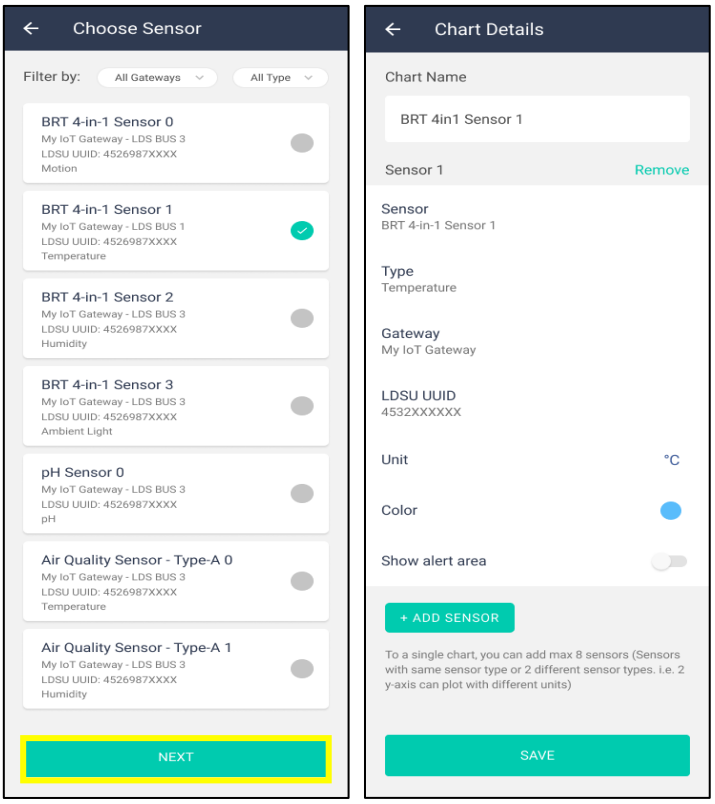
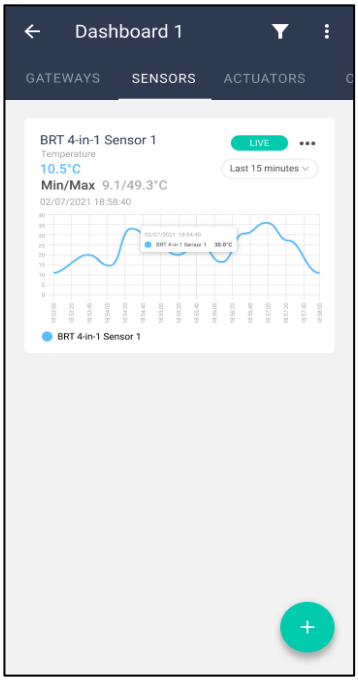


a. Add Single Sensor Chart

To add a single sensor chart, user can select *Single/Multiple Sensor Chart* option.
Select the sensor, unit and color. Tap on **[SAVE].**



Newly created single sensor chart with the values are displayed.
User can see the current sensor value, Min/Max range, last reported time and date and the time interval.



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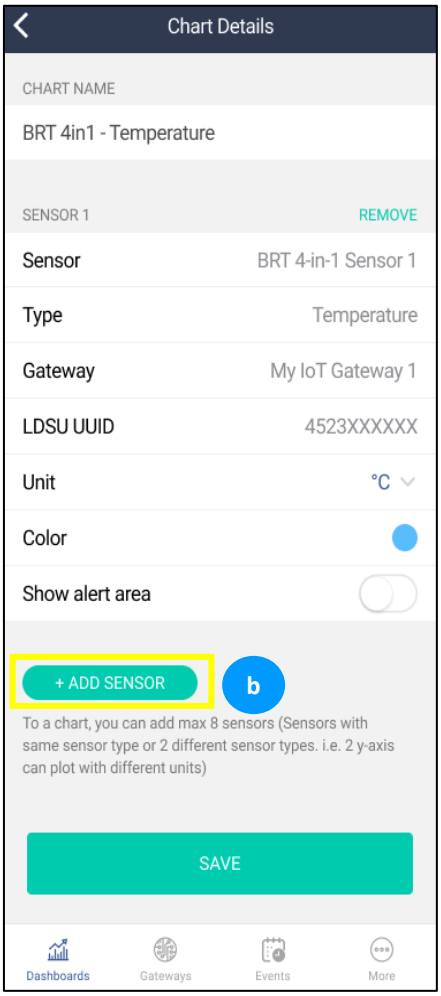
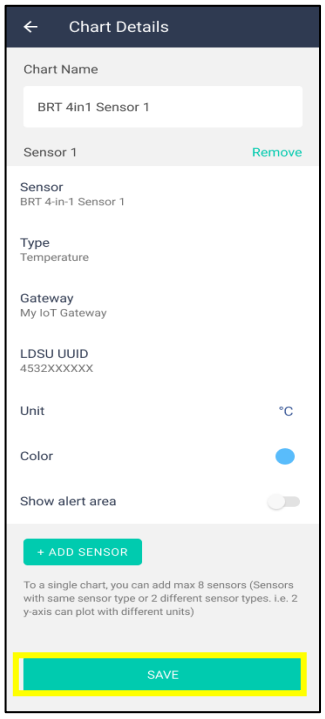


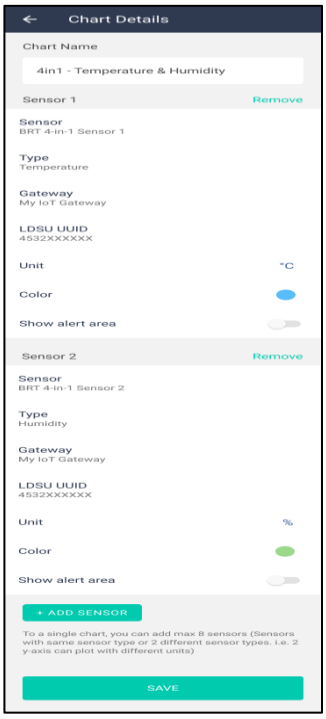
b. Add Multiple Sensor Chart

To add a chart displaying multiple sensor values select *Single/Multiple Sensor Chart* option.

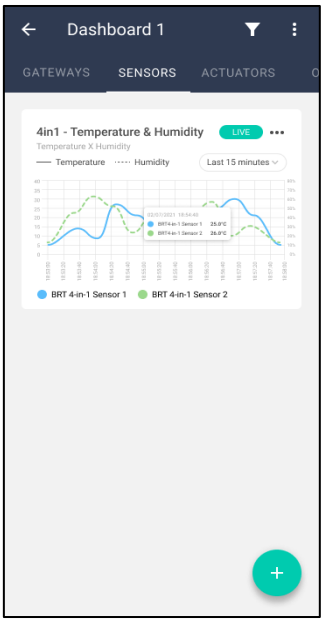
Select the sensor (follow the steps shown above for *Add Single Sensor Chart*), unit and color.

To add another sensor to the chart, click on [**+ADD SENSOR]** button.





Newly created multiple sensor chart with the values are displayed.



NOTE: 8 sensors and 2 sensor types are allowed per chart.

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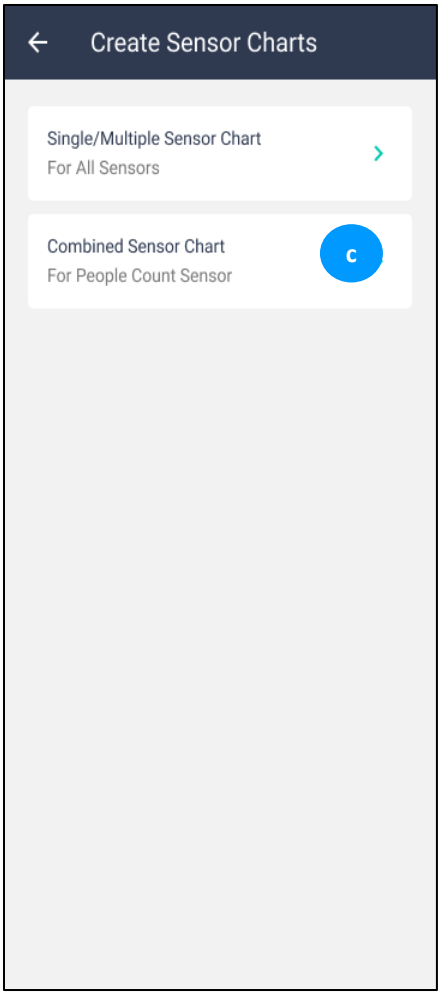
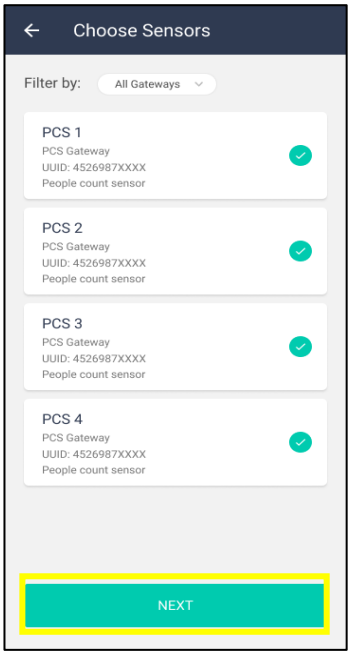


c. Add Combined Sensor Chart

This chart is used to view the combined PCS (People Counting Sensors) values.
Select the at least 2 PCS gateways to see the combined sensor readings.



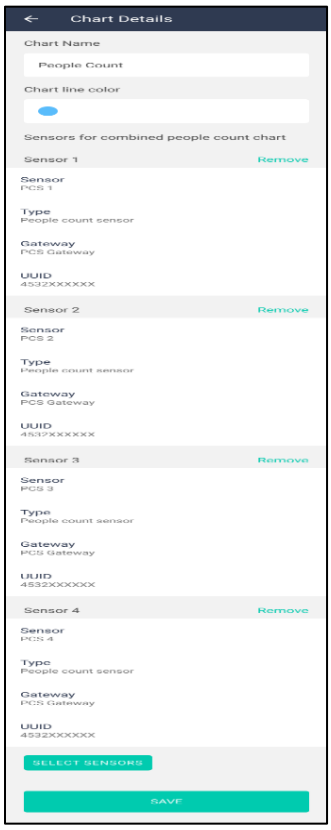
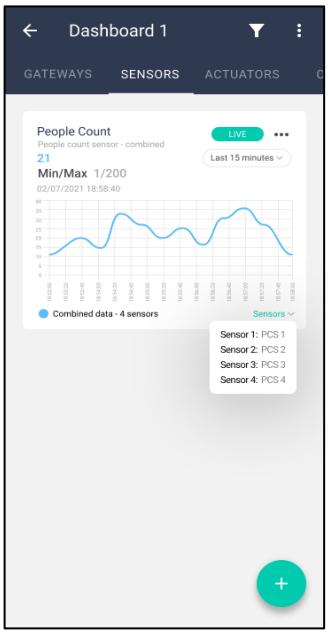


Chart is created and displayed as shown below. User can view the detection value, Min/Max range, last reported time and date and the time interval.
User can view the different sensors by clicking the dropdown under *Sensors.*



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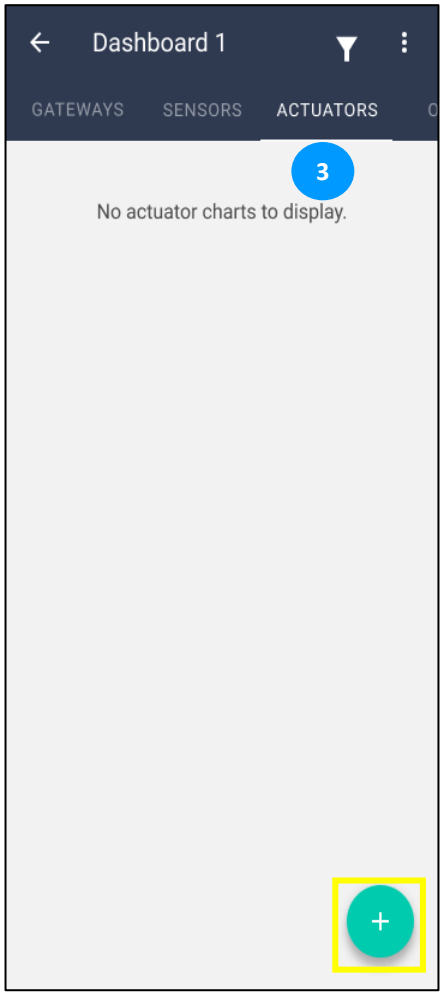
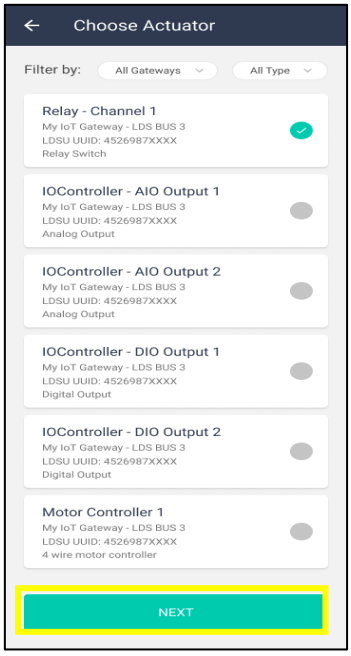


3. Add Actuator Chart

Tap on **[+]** icon under Actuators tab to add an actuator chart.

Choose the actuator and color for the graph.



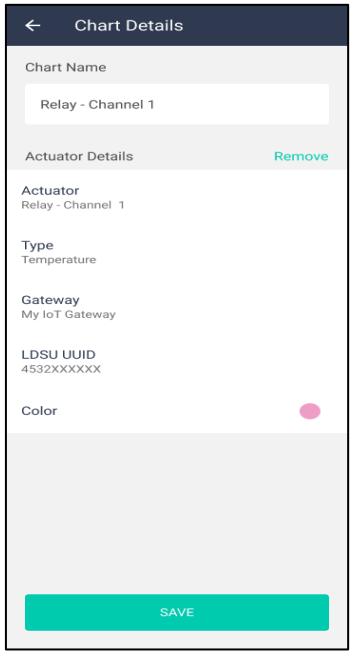
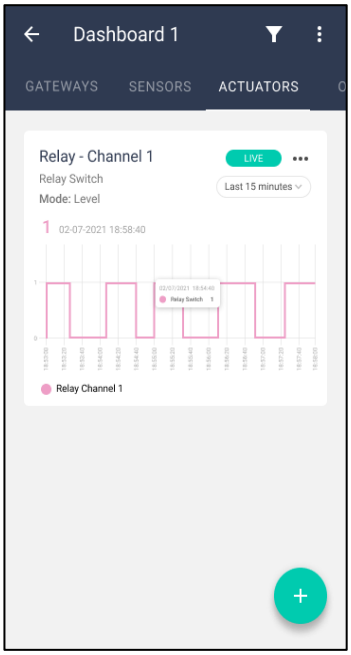


Chart is created and displayed as shown below. User can see the current actuator value, mode, last reported time and date and the time interval.



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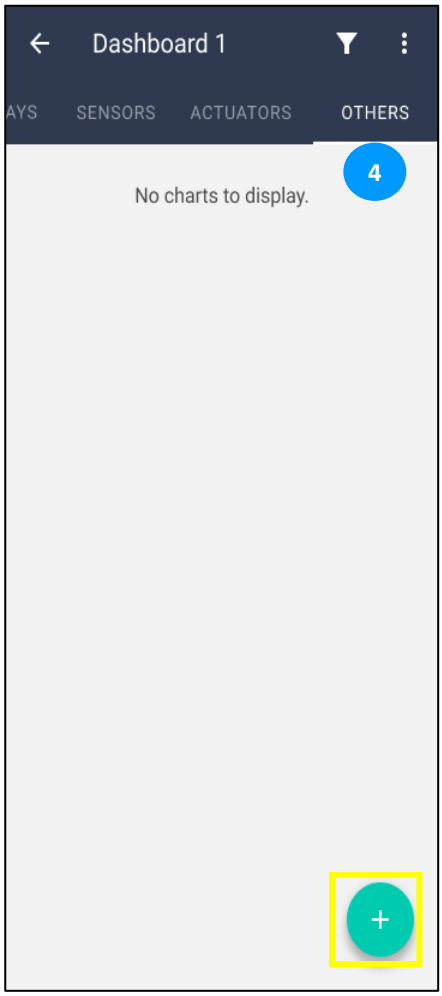
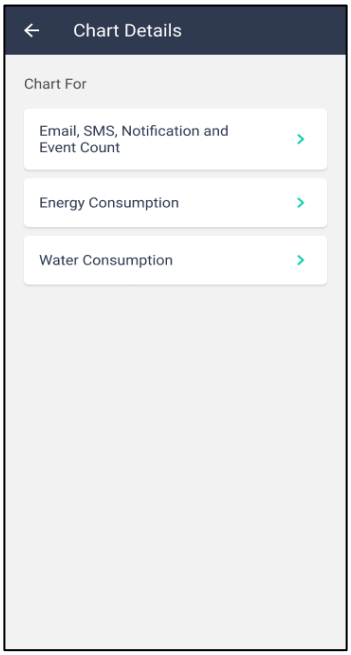


4. Add Chart - Others

The following chart types can be added under the *Others* category.



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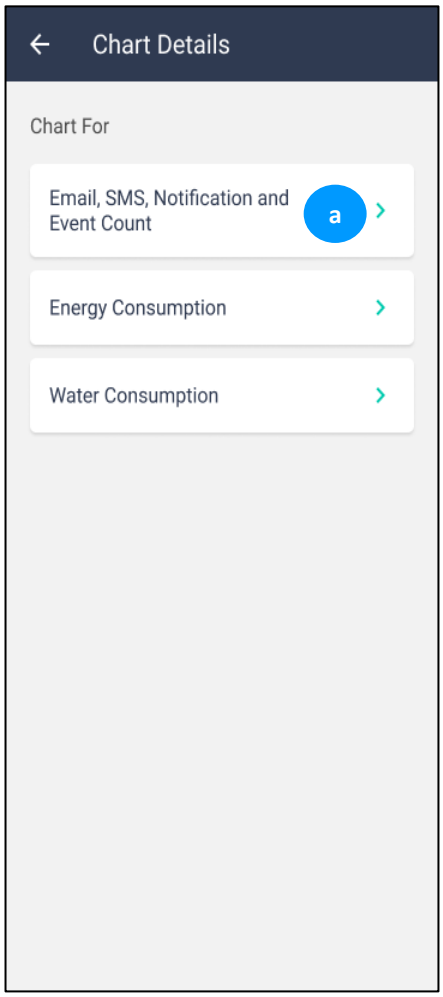
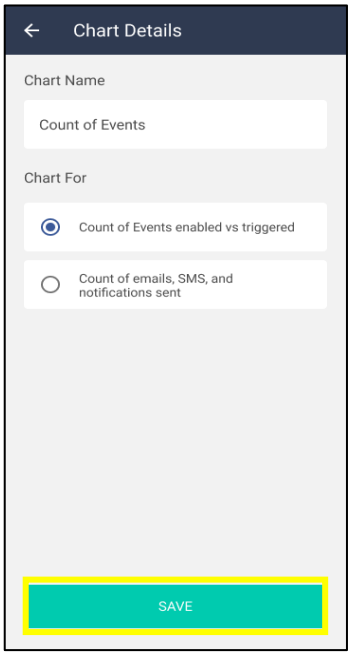
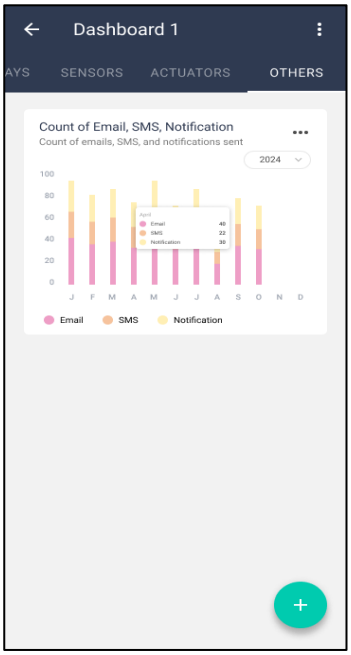


a. Email, SMS, Notification and Event Count

User can view the following types of data using this chart option:



Once created, user can view count of email, SMS and notifications sent to the user.
Similarly, user can also view the count of events enabled vs actually triggered.



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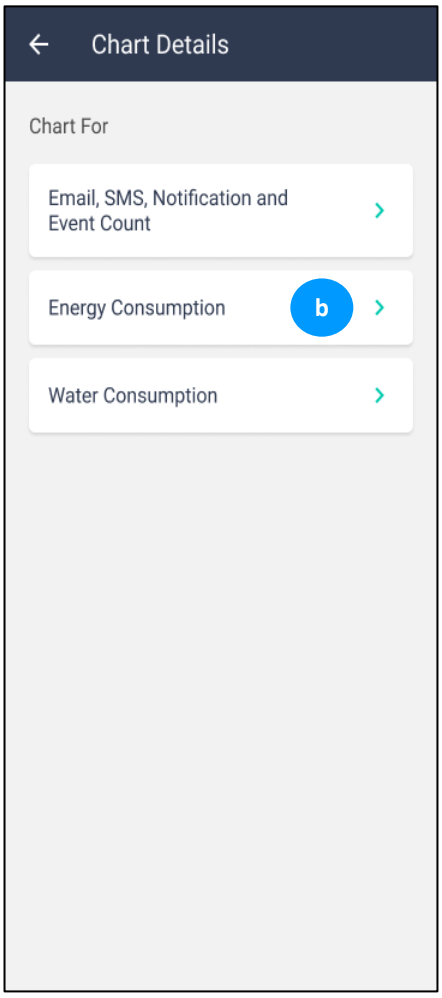
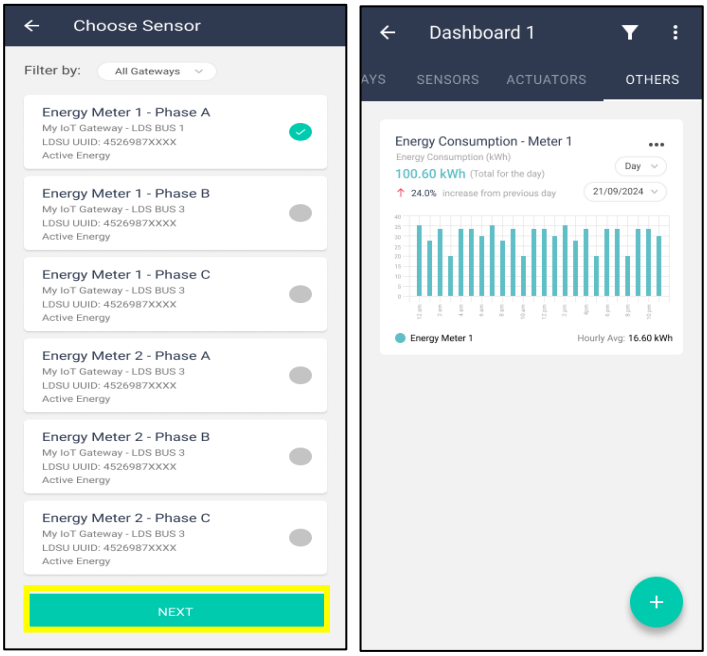


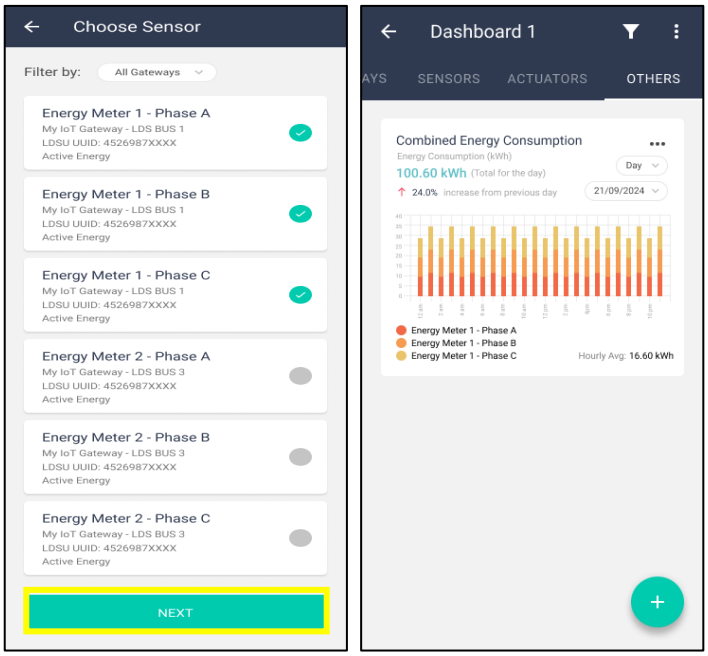
b. Energy Consumption

Users can monitor energy consumption over time by tracking data from various energy sensors and visualizing it through charts. User can choose between the following type of charts:

- Individual Consumption Chart – For a single energy sensor



- Combined Consumption Chart – Combined energy consumption reading from multiple sensors.



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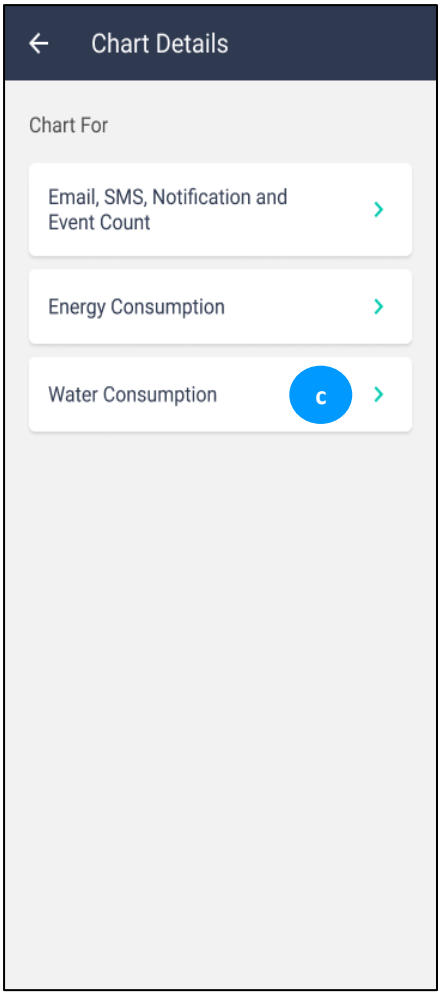
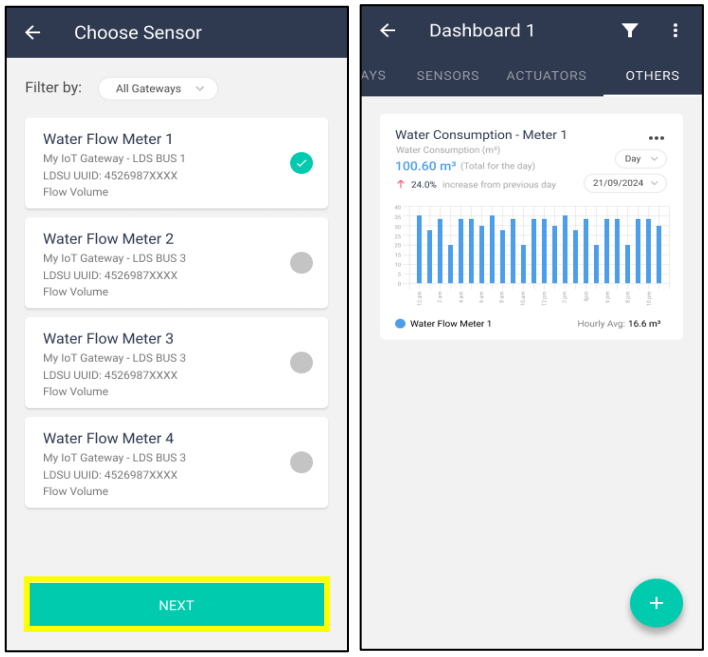


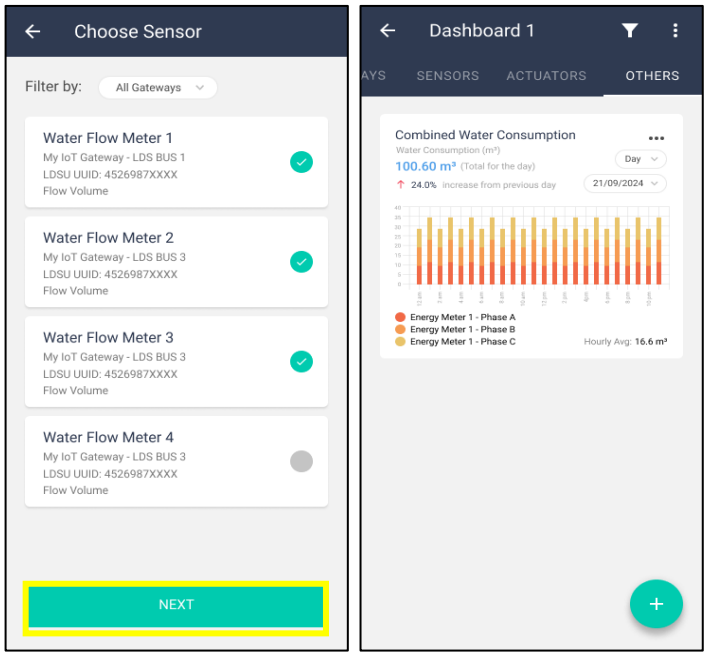
c. Water Consumption

Users can monitor water consumption over time by tracking data from various flow volume sensors and visualizing it through charts. User can choose between the following type of charts:

- Individual Consumption Chart – For a single flow volume sensor



- Combined Consumption Chart – Combined water consumption reading from multiple sensors.



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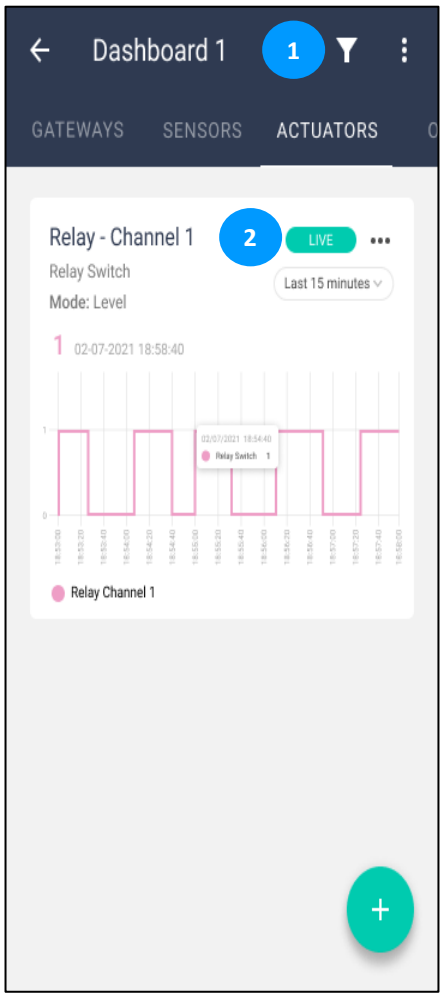
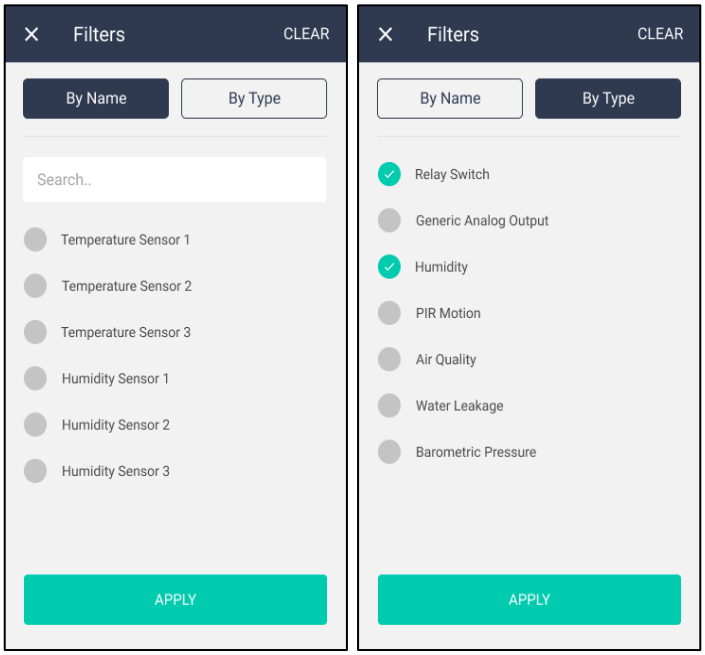
9.3 Chart Features



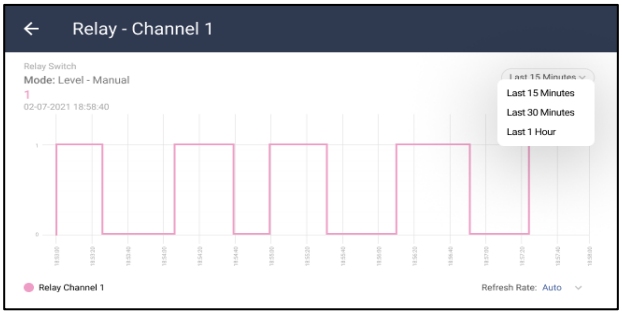
1. Apply Filter

User can apply filter either by chart name or chart type to filter the list.



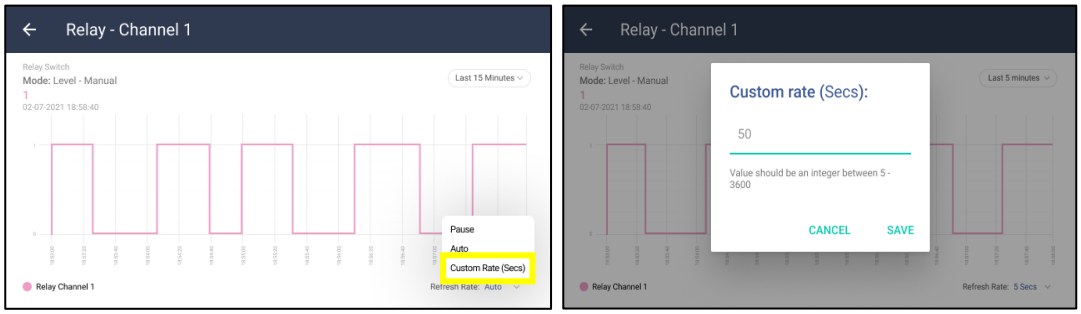
2. LIVE Mode

User can enable LIVE mode where the chart displays real-time data from devices as it is being collected. On selecting LIVE option, user can view the data within the last 15 minutes, 30 minutes or 1 hour as shown below:



Refresh rate controls how often sensor data is updated. There are 3 options available:

- Pause – Stop updates
- Auto – Let system adjust based on activity
- Custom Value – User can set a custom value (in seconds)



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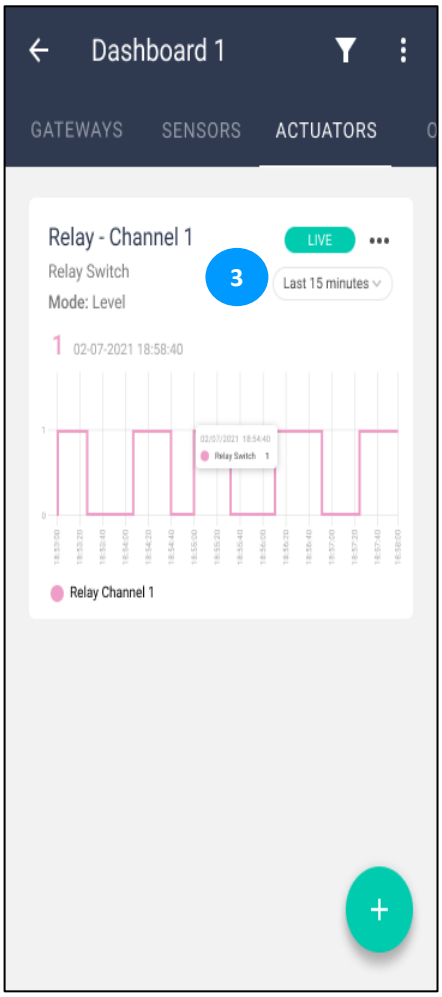
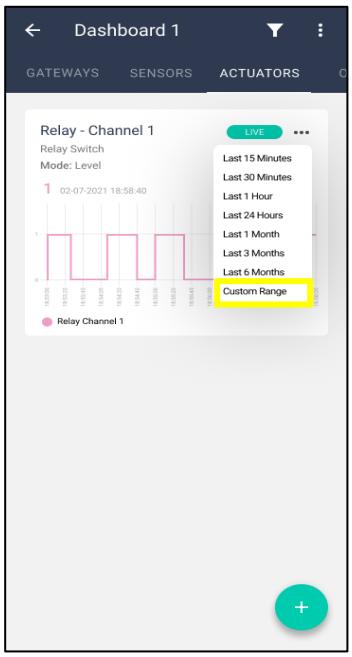
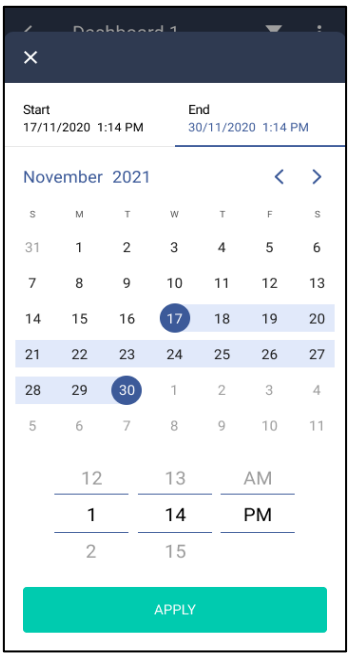


3. Apply Time Interval Filter

This filter allows users to select a specific period or duration of time to analyse data within a dashboard.

LIVE mode will be disabled if user applies the time interval filter.





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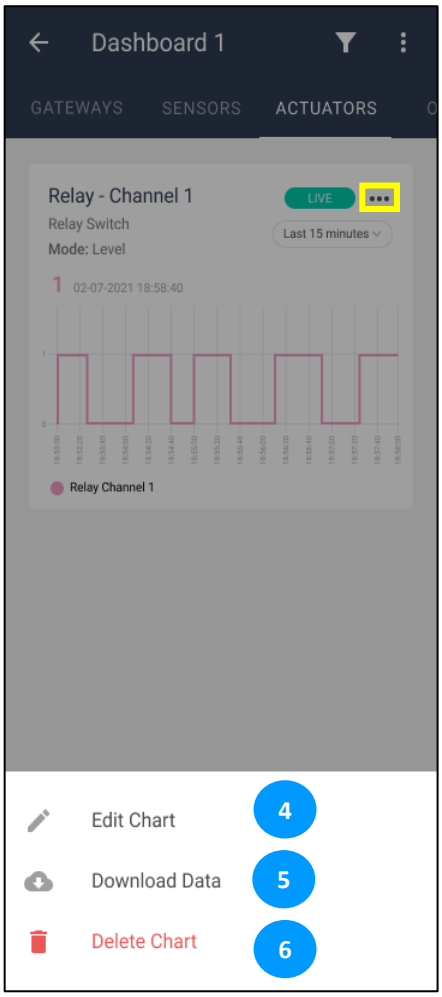


Tap on ● ● ● icon to open the sub menu for charts.

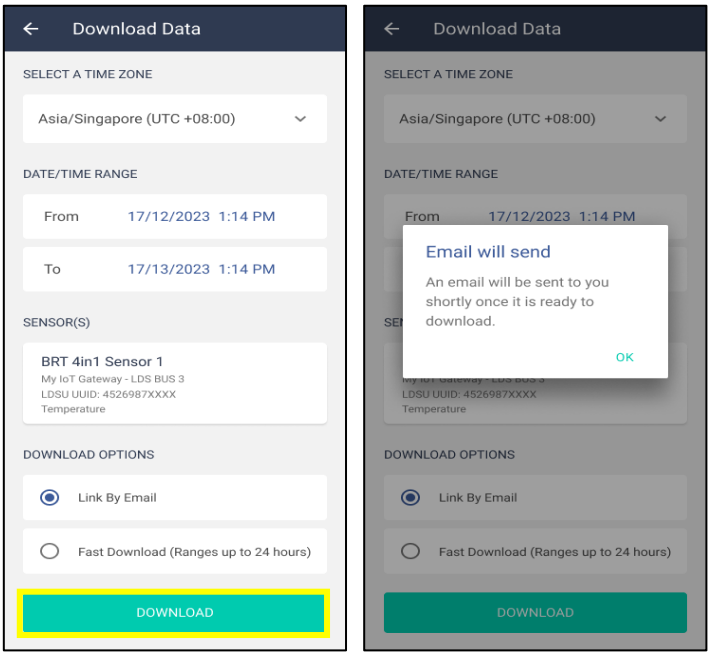
4. Edit Chart

Use the option to modify the chart attributes.

5. Download Data

Use this option to access sensor/actuator/other chart data. Do note, this is not available for gateway chart.

If the selected date and time range is within 24 hours, the data can be downloaded using the Fast Download option. Otherwise, a link with instructions to download will be sent to the registered email address.



6. Delete Chart

Remove chart by using the *Delete Chart* option**.**

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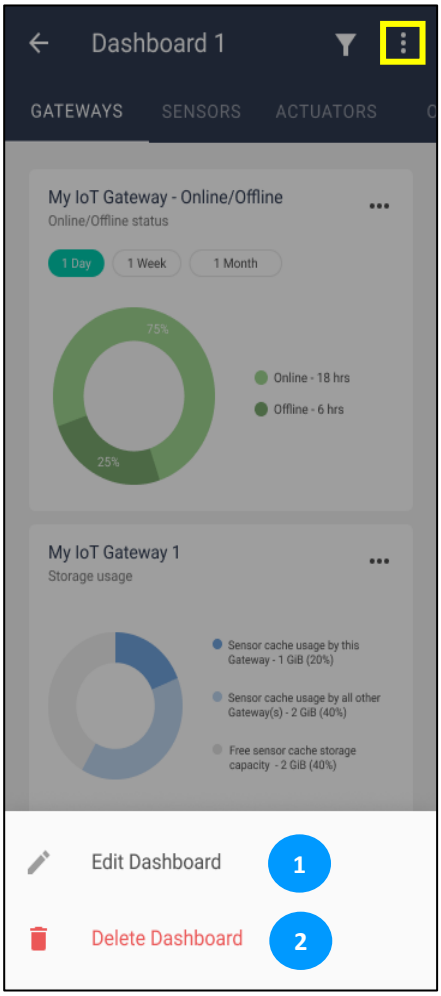
9.4 Dashboard Features



Tap on ⋮ icon to open the sub menu for dashboard.

1. Edit Dashboard
Users can modify the dashboard name and icon color using this feature.

2. Delete Dashboard
Use this option to delete the dashboard along with all associated charts.

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10. Organisation Management

Organisations are collections of users groups assigned with predefined permissions to achieve usage and access policies. The user may create one or more organisations and be invited to join and become a member. A user who creates an organisation becomes its owner. Any user who is invited to join the organisation becomes a member. Owners can create up to 8 organisations. Organisations cannot be created on IoTPortal without a verified email address of the owner.

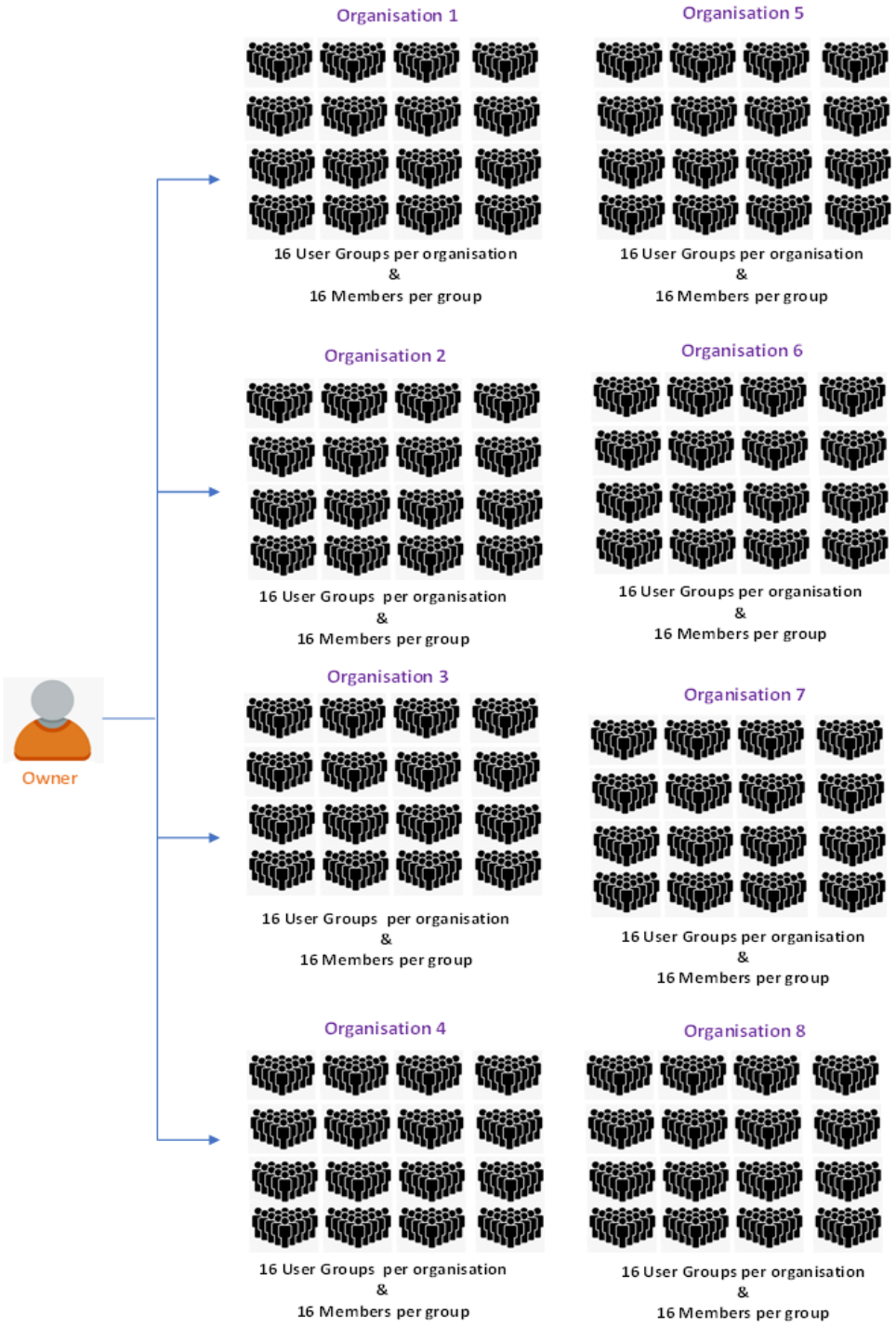

Figure 1 - Organisation Management

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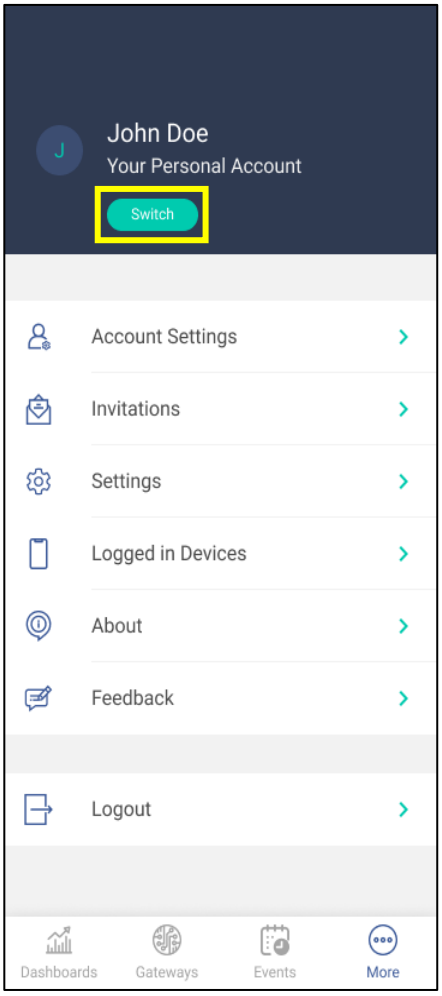
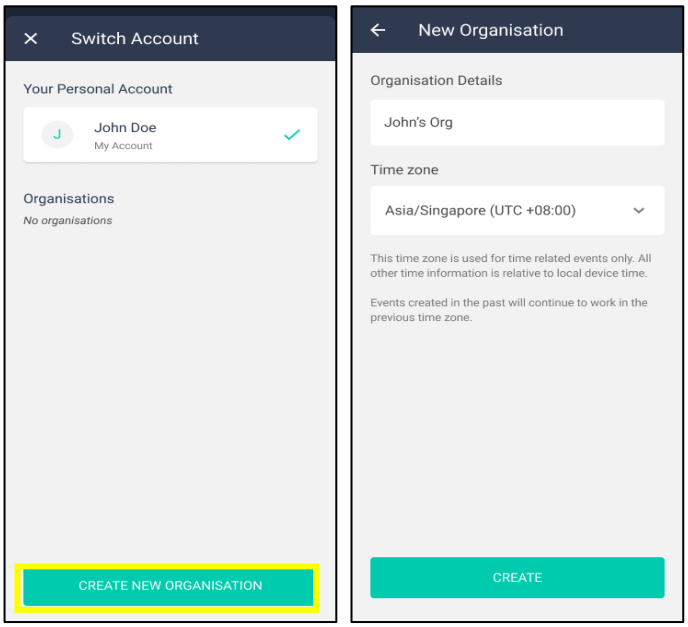
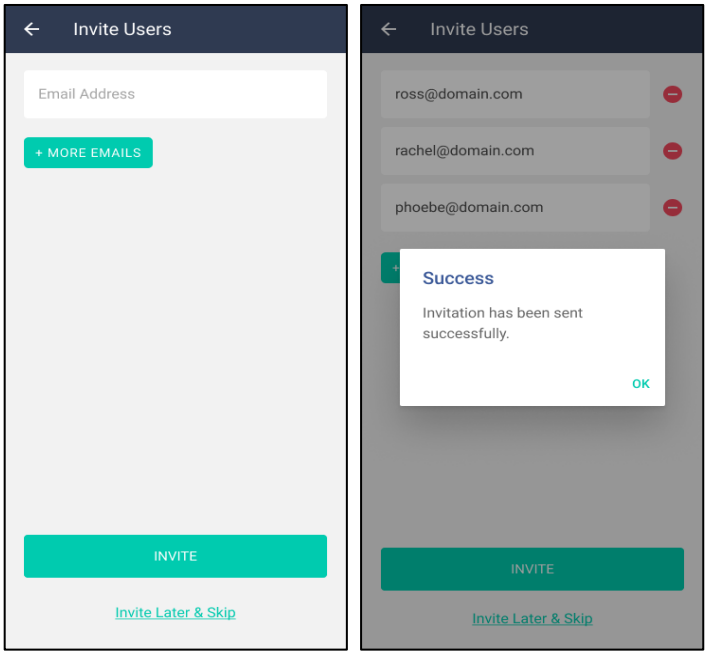
10.1 Create Organisation



To create an organisation –
From the **More** page, tap **[Switch]**. A list of existing organisations under the owner/user if any are displayed. If no organisations are available, the interface will be empty.
Tap **[CREATE NEW ORGANISATION]** to add a new organisation.
Add name for the organisation, select time zone and click **[CREATE]**.



Once the organisation has been successfully created, the user can send invitations to prospective members to join the organisation. This action can be performed immediately or deferred to a later stage.



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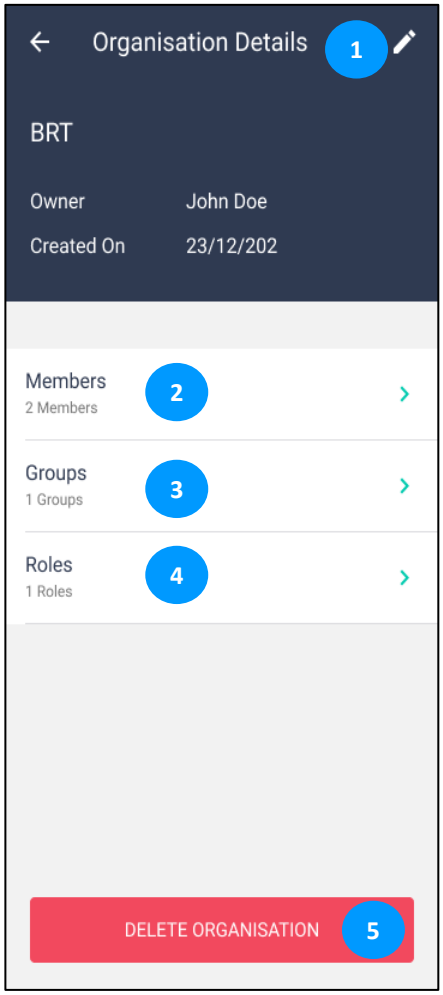
10.2 Organisation Detail



The Organisation Details page displays the organisation name, the owner's name, and the date of creation.

1. **Edit Name**
Tap to rename the organisation.

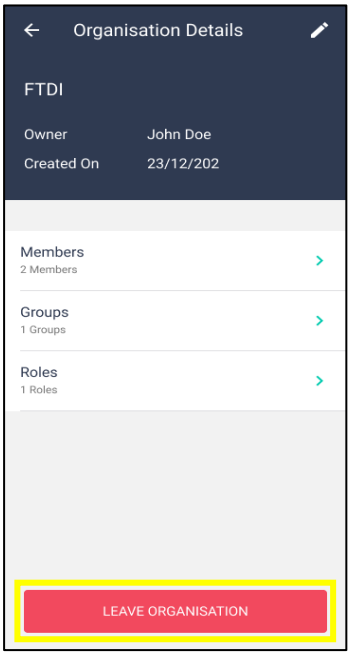
2. **Members**
Tap to view members of the organisation. For more details refer section 10.3.

3. **Groups**
Tap to view members within the organisation. For more details refer section 10.4.

4. **Roles**
Tap to view different user roles within the organisation. For more details refer section 10.5.

5. **Delete Organisation**
Organisation will be deleted.

If the user is **not the owner**, they will have the option to leave the organisation by selecting **[LEAVE ORGANISATION]**.



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10.3 Members

The number of members in each group may be up to 16. Invitations are used to invite members into organisations. The invited user receives an email or push notification inviting them to download and register for an IoTPortal account and accept or decline the invitation. A member who is not assigned to a group does not inherit any default policies, except policy-leave-organisation.

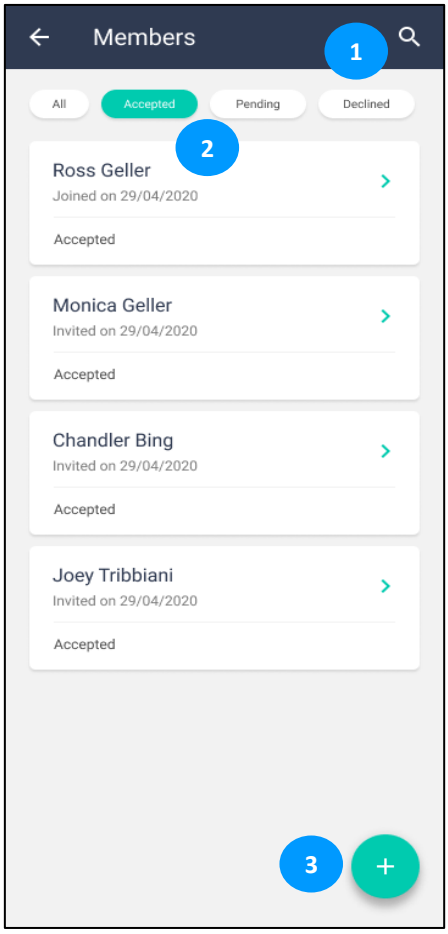
A group owner or member with a group-manager policy can add, remove, or transfer users into, out of, and between groups. Members are re-invited back to an organisation when they are removed from it. Pending invitation can be cancelled by the owner. Owners can re-assign an invited user or member to another group.

Members who have been moved to a different group or removed from an organisation may have active ongoing sessions in progress at the time of change. As a result, the member's next actions will fail (e.g., invalidate access and refresh tokens). To allow the new group policy and permissions to take effect, the member must log into the IoTPortal again and select the organisation. If a member is removed from the organisation, the organisation will not appear on the list of organisations. Members and owners who have been re-assigned or removed will be notified via email (verified email) or push notification (verified mobile).

10.3.1 Member List

Users are invited into organisations through invitations via email address. The email address used in the invitation may be verified (existing IoTPortal user) or unverified.

An invited user is sent an email inviting the user to download and sign-up for an IoTPortal account (for unverified user) or login (for verified user) and accept/decline the invitation. Existing users will be able to view the invite notification under the Invitations page in the mobile app or under the notification icon in the webpage.



The organisation owner has access to view the complete list of members associated with their organisation.

1. Search Member
Tap 🔍 to search for a member.

2. Filter
Members can be filtered based on the status of their invitations: All, Accepted, Pending, or Declined.

3. Add Members
Tap the **[+]** icon to add additional members by sending them an invitation via email.

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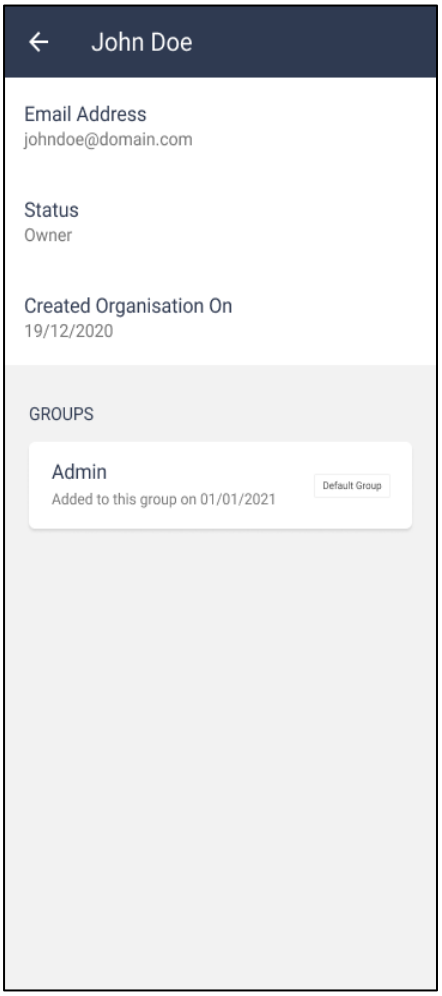
10.3.2 Member Detail



Selecting any of the member names for the member list (Refer section 10.3.1) displays the member detail page.
This page and its features vary on the member status (owner, accepted invitation, pending reply or rejected invitation).

- Owner

If the member is the organisation owner, they will be able to view their registered email address, account status, the date the organisation was created, and any associated groups.

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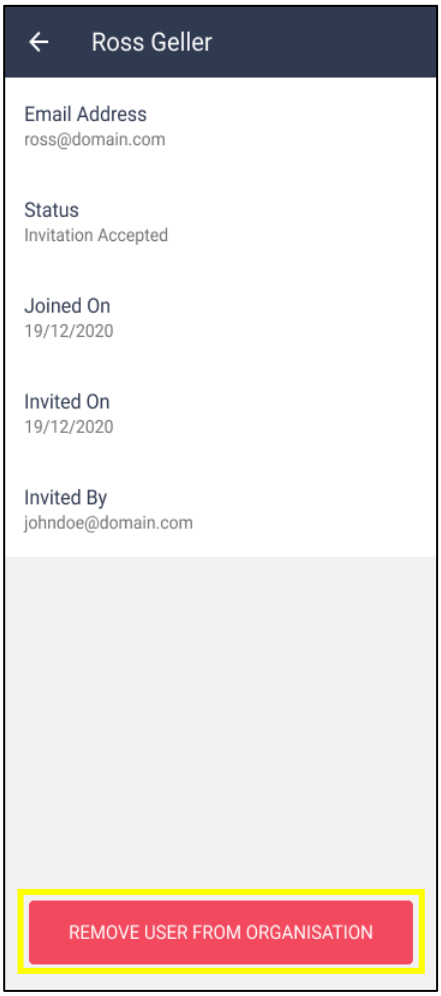

- Member of the Organisation (Accepted Invite)

Tap **[REMOVE USER FROM ORGANISATION]** to remove a member who is part of the organisation.

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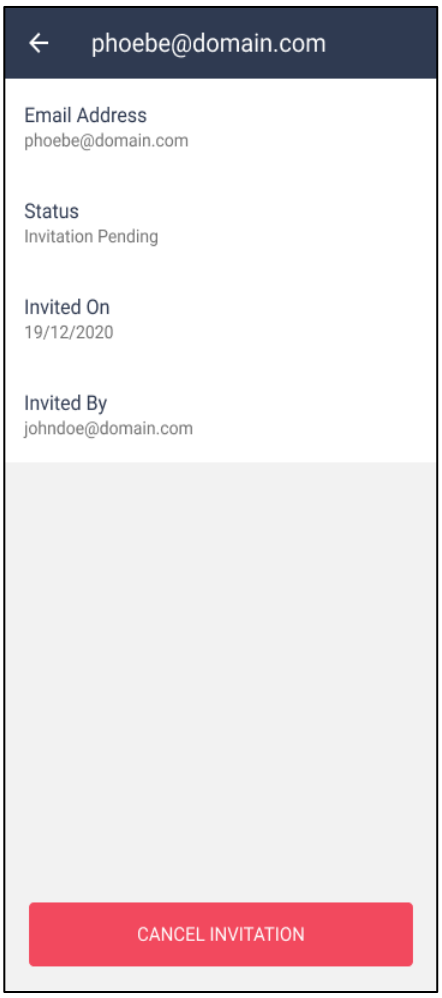

- Pending Reply

Tap **[CANCEL INVITATION]** to revoke an invitation that has not yet been accepted or declined.

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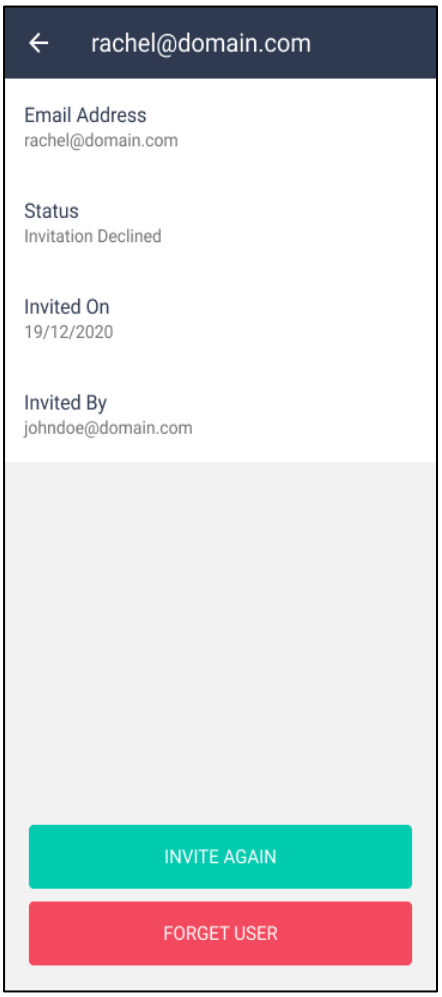
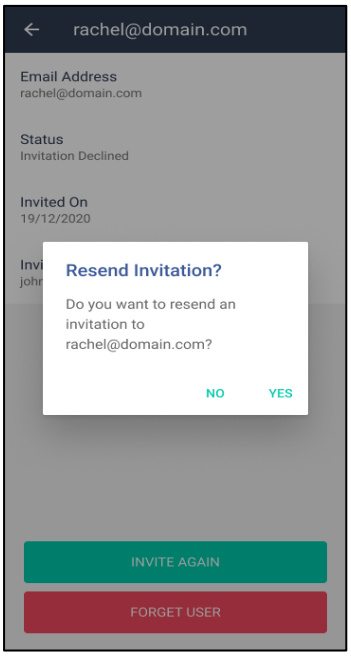
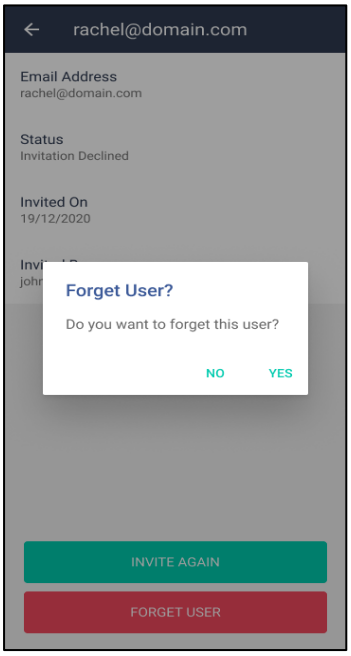


- Declined Invite

The organisation owner may choose to either resend the invitation or remove the user from the member list.
Click **[INVITE AGAIN]** to resend the invitation to the email address.



Click **[FORGET USER]** to remove user details from the organisation.



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10.4 Groups

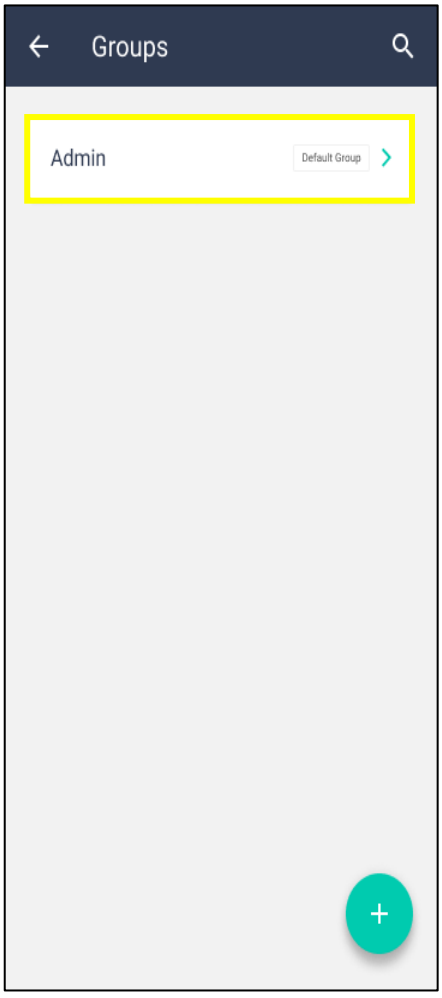
The owner of an organisation can create up to 16 groups. Groups can be divided into two types:

1. **Fixed Owner Group:** This group is pre-created. Only one owner group can exist, and it cannot be deleted, but members can be added and removed except the organisation owner. The members of this fixed group have unrestricted access to the organisation's configuration.

2. **Regular Group:** The second type of group is a regular group that can be assigned policies. The policies define a set of privileges for a particular action or set of actions withing the IoTPortal or for access to protected resources. Owners may perform *Create/Read/Update/Delete (CRUD)* operations on their groups. Organisations can have up to 15 regular groups besides the owner group.

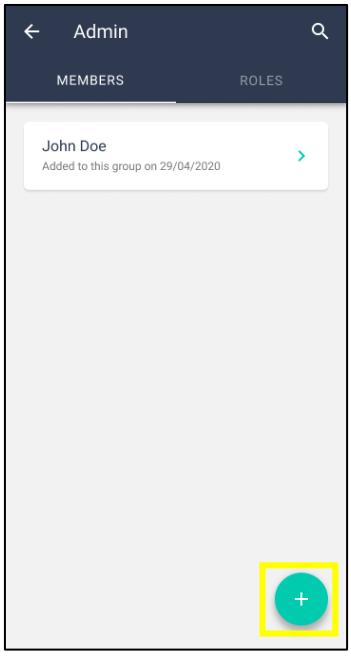
Each member is added to a group, and group membership is not exclusive; each member can belong to more than one group.

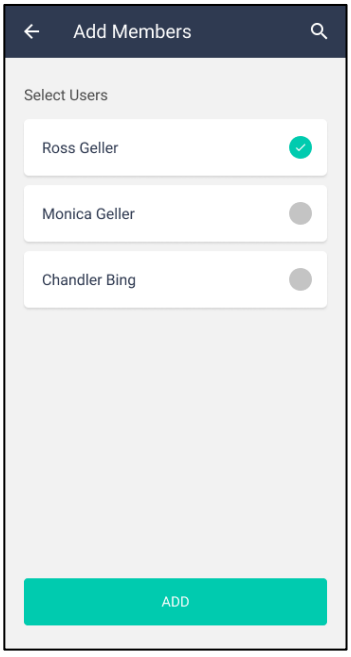
10.4.1 Default Group



This is a default group where members can be added and removed except the organisation owner.

Click on the Admin group to open the group detail page. Tap on **[+]** to add members to the group.





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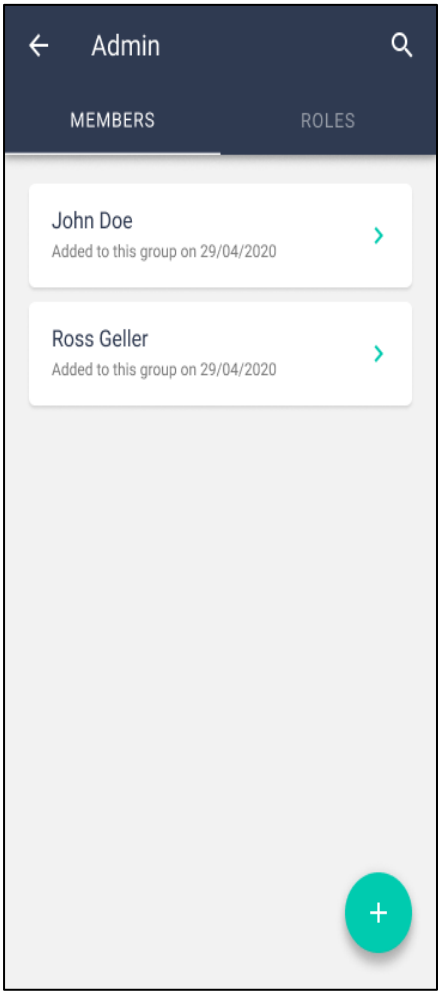
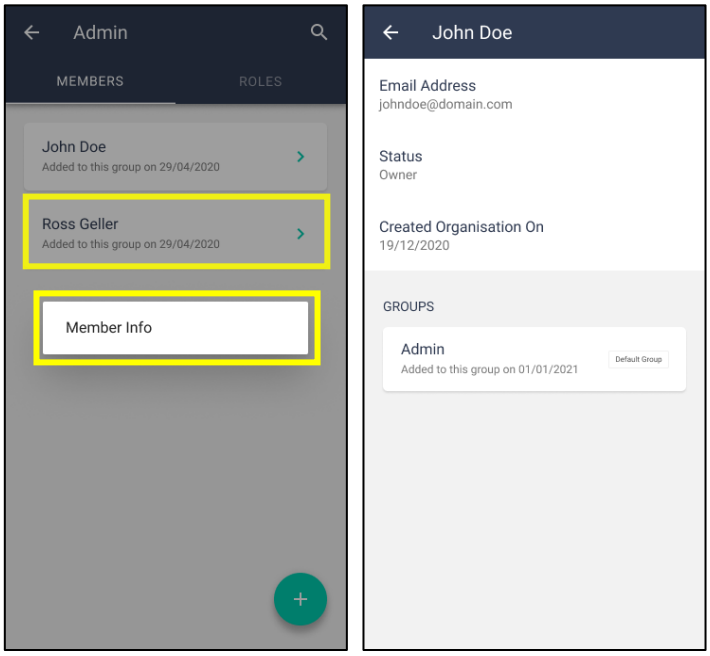


Once member/s are successfully added to the admin group, the organisation owner can view the member detail page as shown:

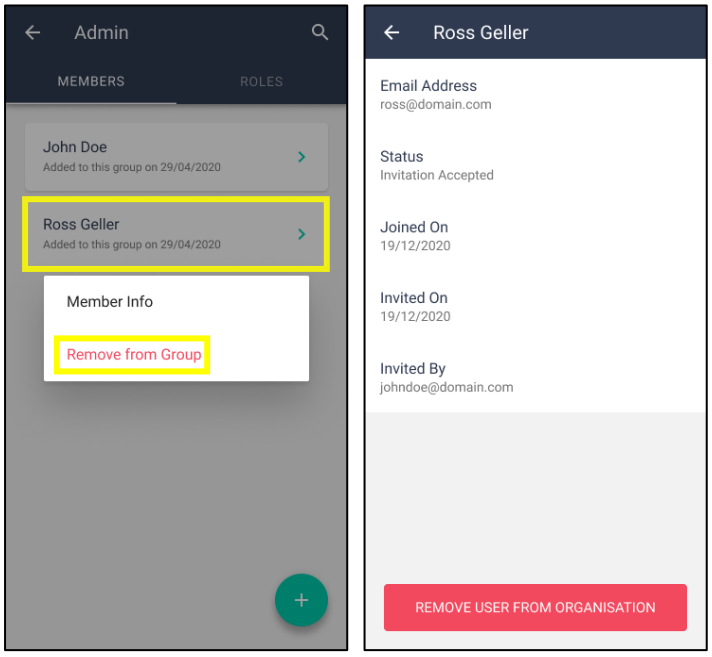
- Owner Detail Page

To view member details for the organisation owner, tap on the name and then select the **[Member Info]** button.



- User Detail Page

To view member details for any user, tap on the name and then select the **[Member Info].**
User can be removed from the group using the **[Remove from Group]** button.



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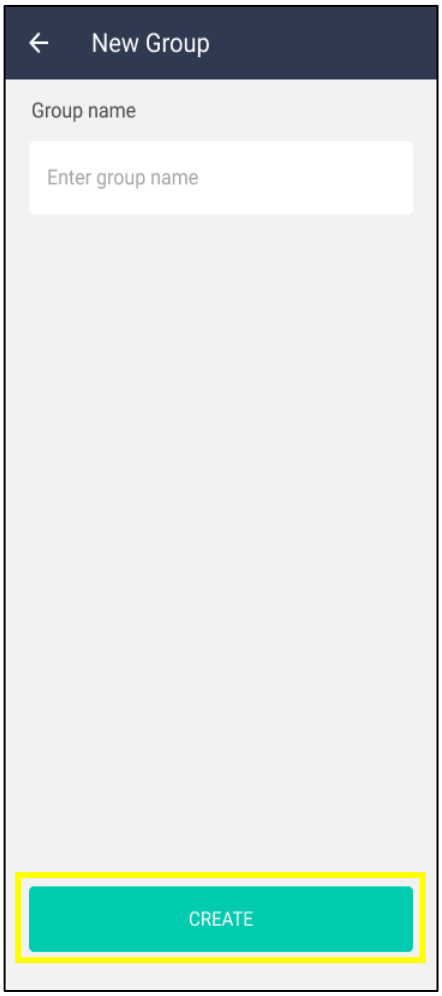
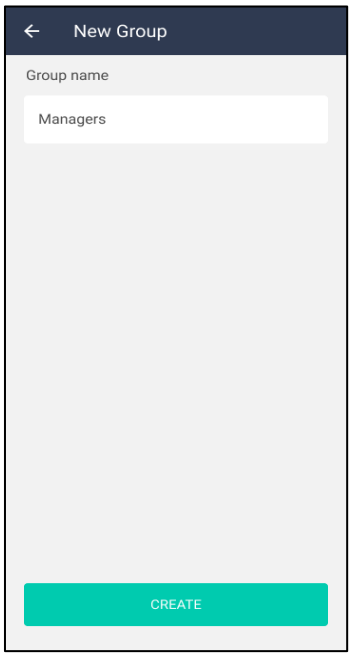
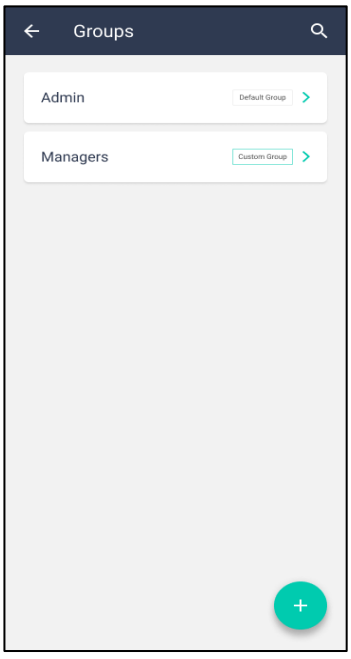
10.4.2 Custom Group



Tap on **[+]** to create a custom group. Provide a name and click **[CREATE]**.



Newly created group is displayed.



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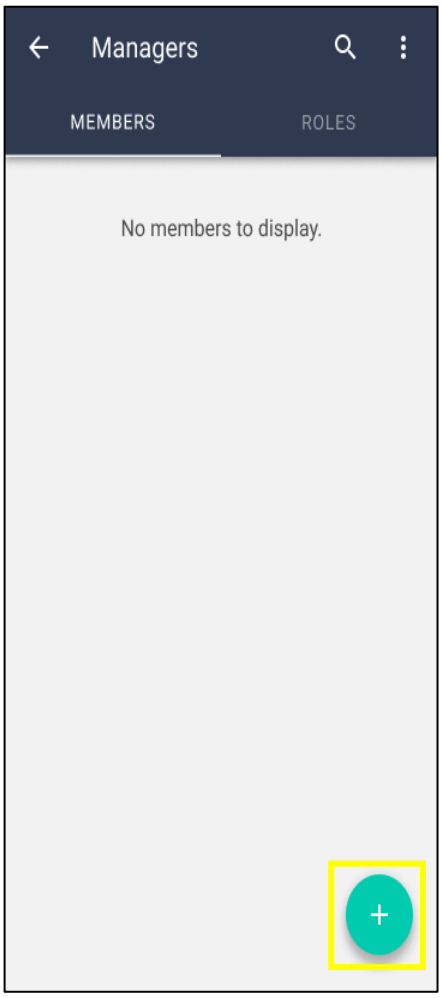
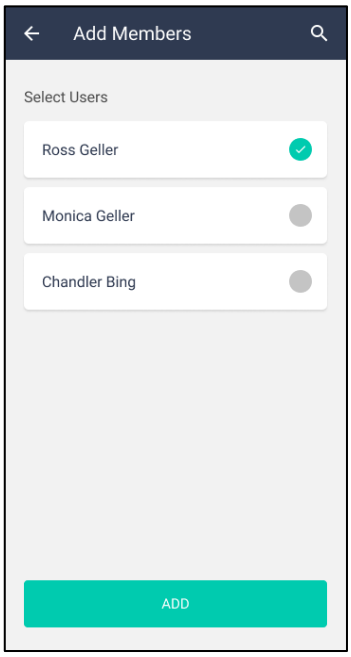
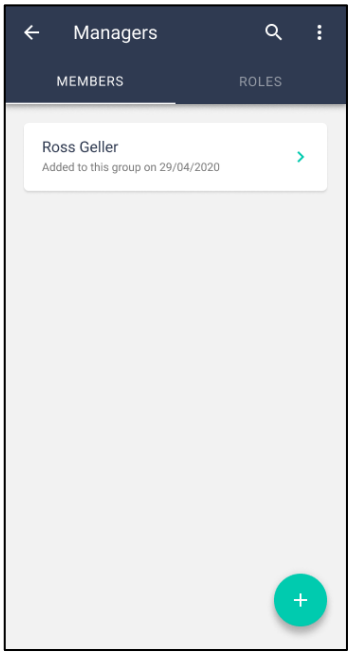


Tap on **[+]** to add members to the group.



Once successfully added, the member names will be listed under the group detail page.



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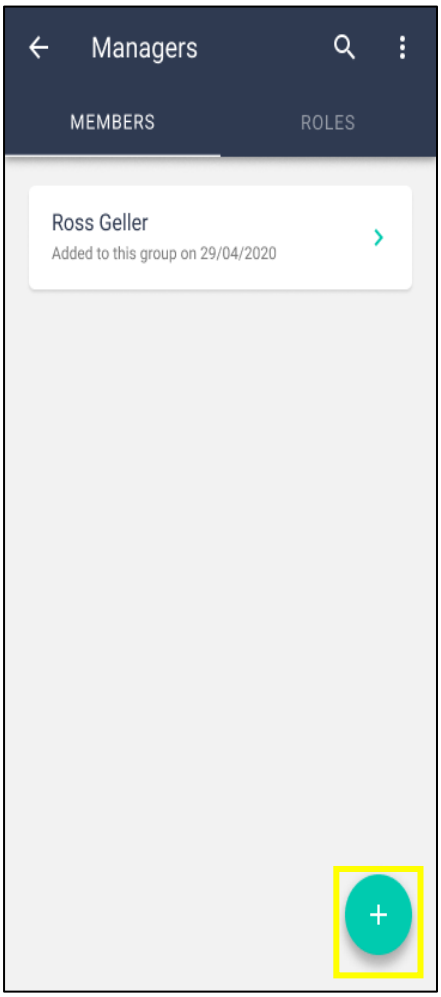
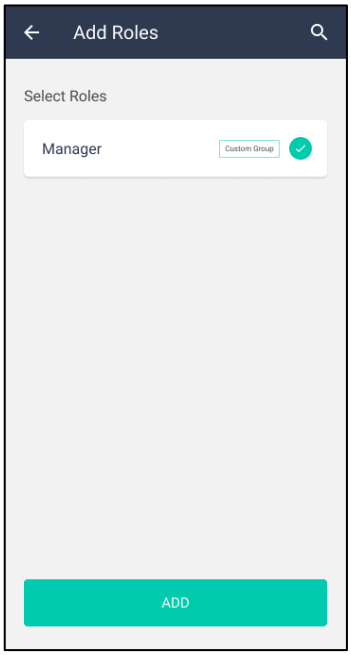
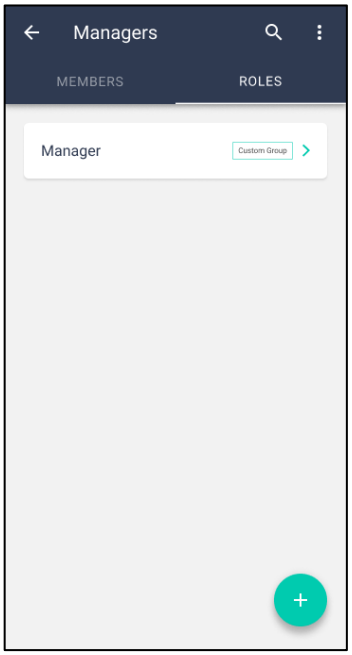


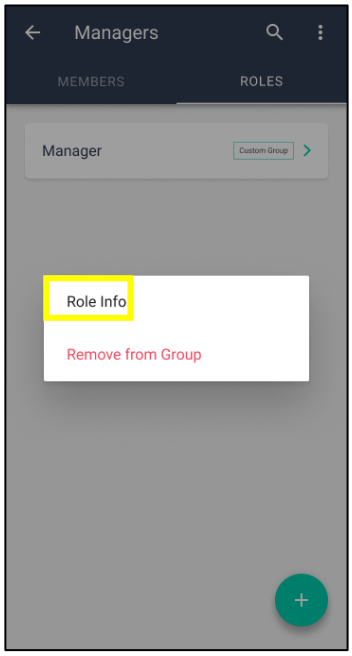
Roles can be assigned to a custom group. Refer to section 10.5 for more information about roles.

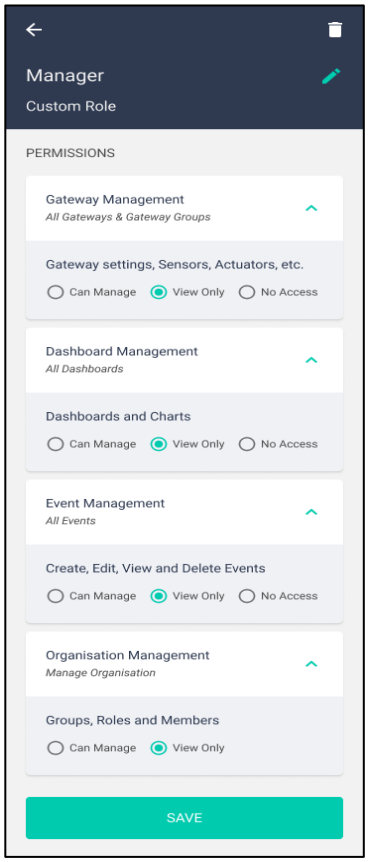
Under *Roles* tab in a grip, tap the **[+]** button.
Select one of the pre-defined roles and tap **[ADD]**. The newly added role is displayed.





Tapping on the role, displays a sub menu where user can view *Role Info* or *Remove from Group.*





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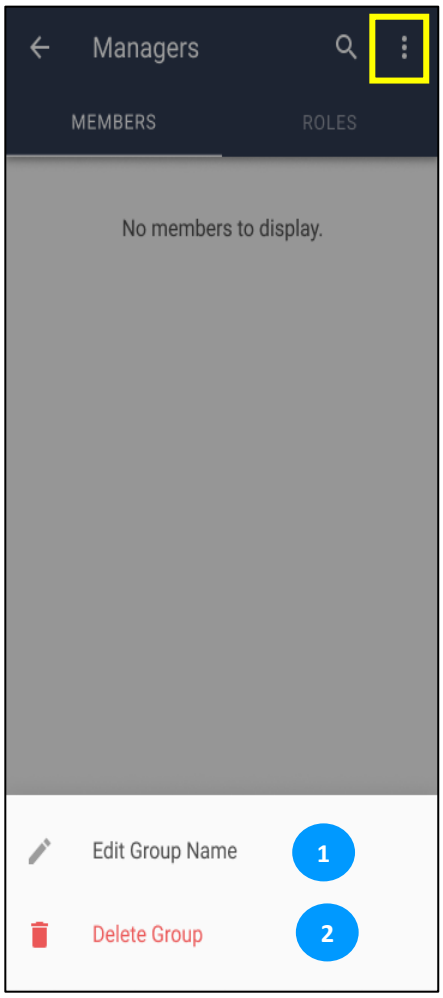
10.4.3 Group Detail



Click ⋮ to open submenu for a group.

1. **Edit Group Name**
Change group name.

2. **Delete Group**
Remove group from group list.

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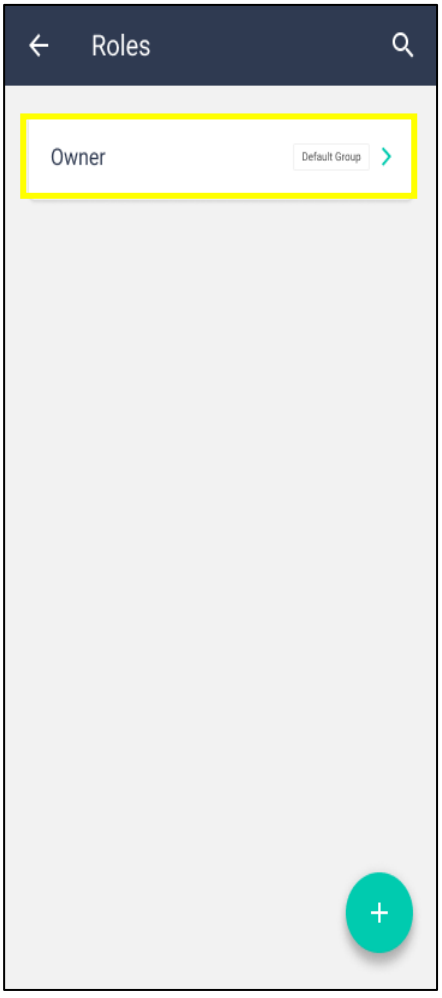
10.5 User Roles

The IoTPortal users can have one or more roles. Roles have associated Access Rights Create/Read/Update/Delete (CRUD) and Resources (device/sensor page, dashboard page etc.). Roles can be defined in number of ways. Roles can be restrictive or loose, generic, or specific. Some examples of roles are *Finance role, Operator role, Customer role, Guest role* etc. Alternatively, it can be generic such as *Full Control, Restrictive, View Only* etc. Owners and members are given permission to perform actions in the system or access resources when they have permissions. Refer to the table given below for the list of Policies and Permissions.

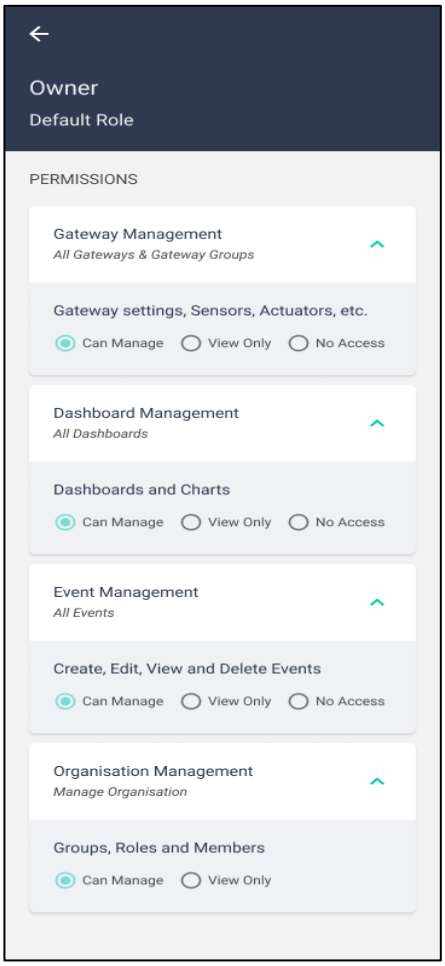
Policies	Permissions		
Gateway Management *(All Gateways and Gateway Groups)*			
Gateway Settings, Sensors, Actuators etc.	Can Manage	View Only	No Access
Dashboard Management *(All Dashboards)*			
Dashboards and Charts	Can Manage	View Only	No Access
Organisation Management (*Manage Organisations*)			
Groups, Roles, and Members	Can Manage	View Only	
Event Management *(All events)*			
Create, Edit, View and Delete Events	Can Manage	View Only	No Access

Table 3 – Permissions

10.5.1 Default Role



Similar to groups, there is also a default role for the owner of the organisation which has access to all the features of IoTPortal.
Upon selecting a role, the user can view all permissions associated with that role.



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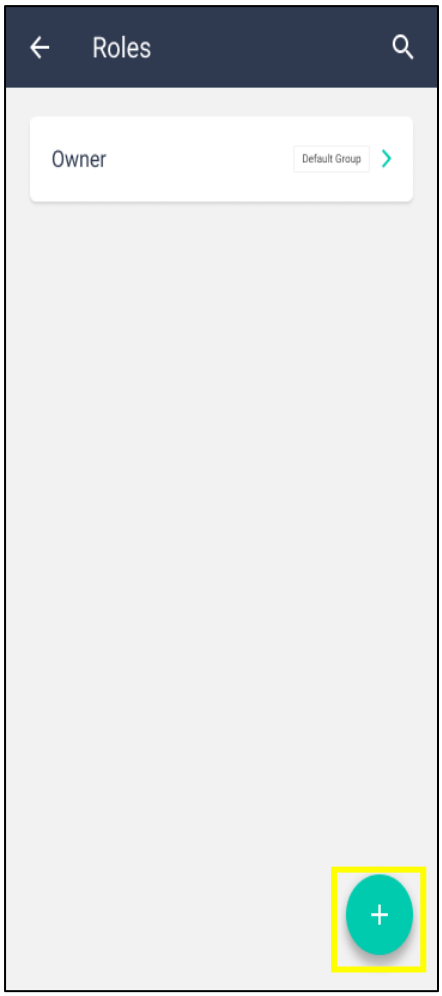
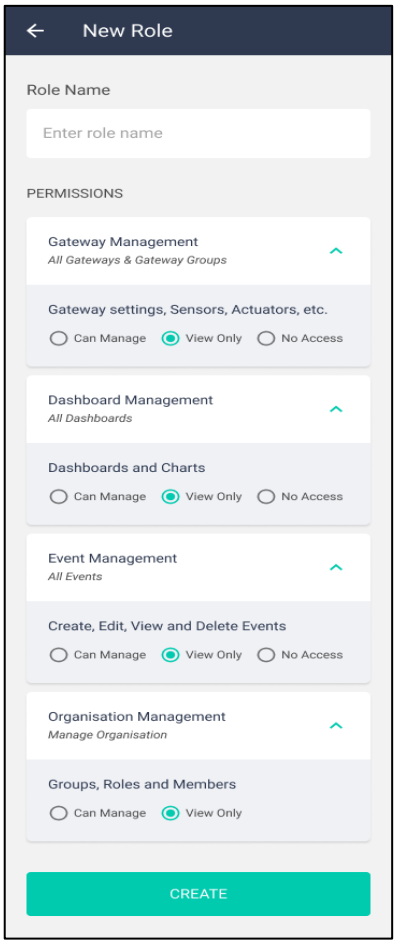
10.5.2 Custom Role



Tap on **[+]** to create a custom role. Provide a name and update the permissions.
User can choose between 3 levels – *Can Manage, View Only and No Access.*



Newly created role is displayed.

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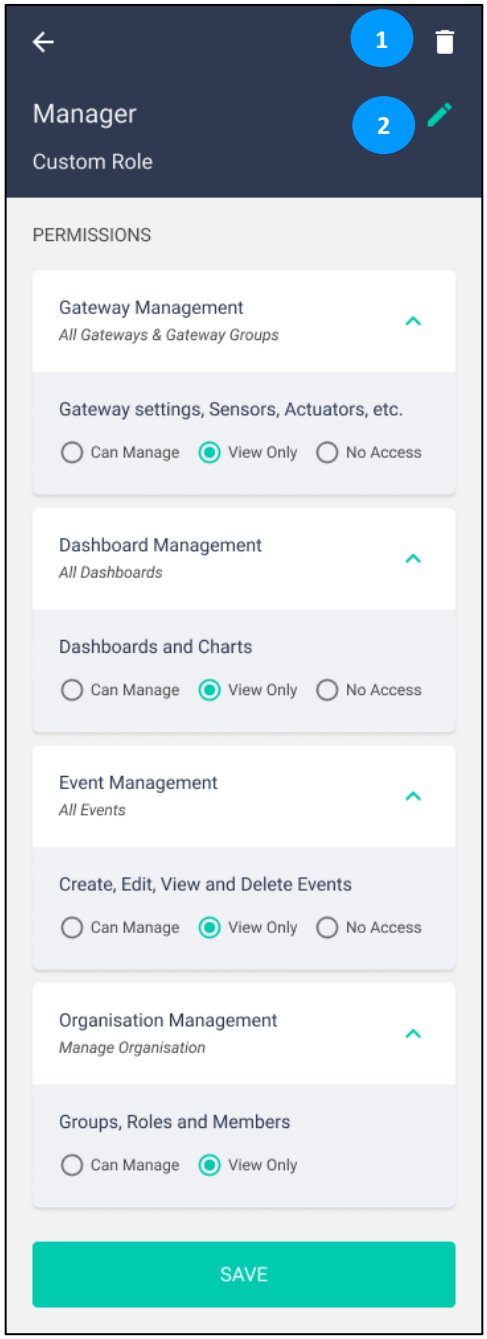

1. Delete Role
Remove role from role list.

2. Edit Role Name
Change role name.

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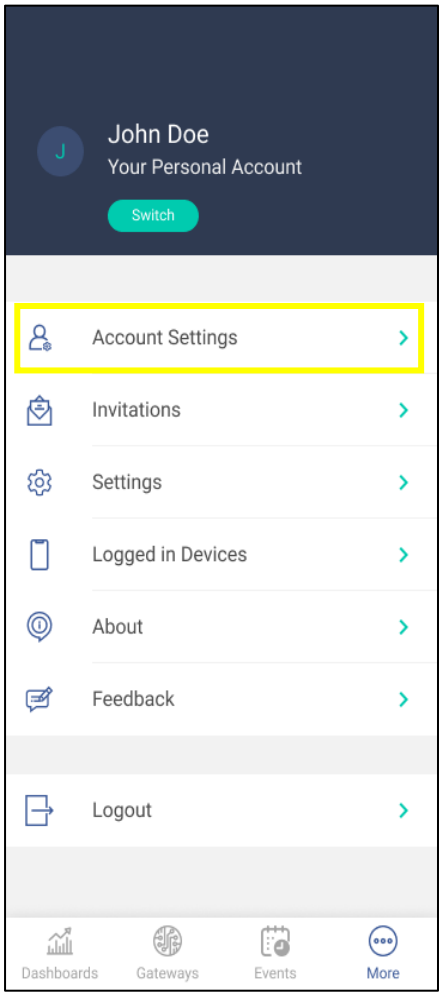
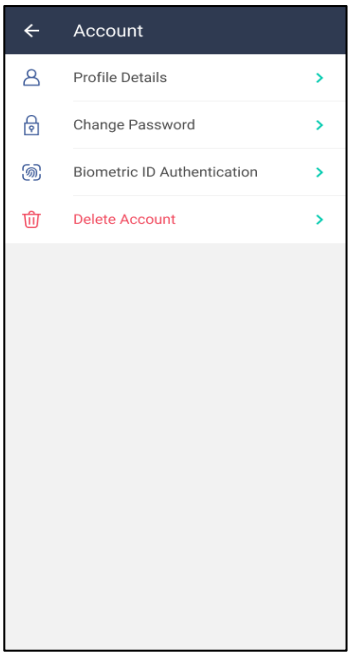
11. More Functions

11.1 Account Settings



Users can access their IoTPortal account settings by selecting the 'Account Settings' option.



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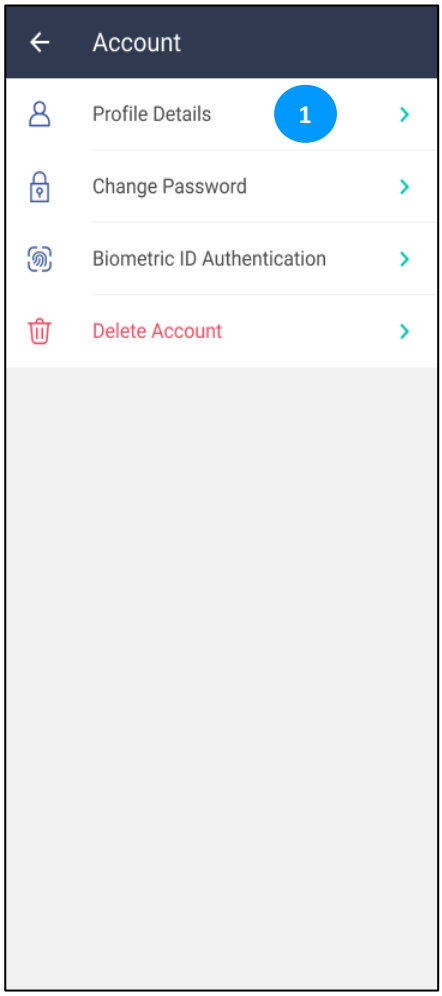
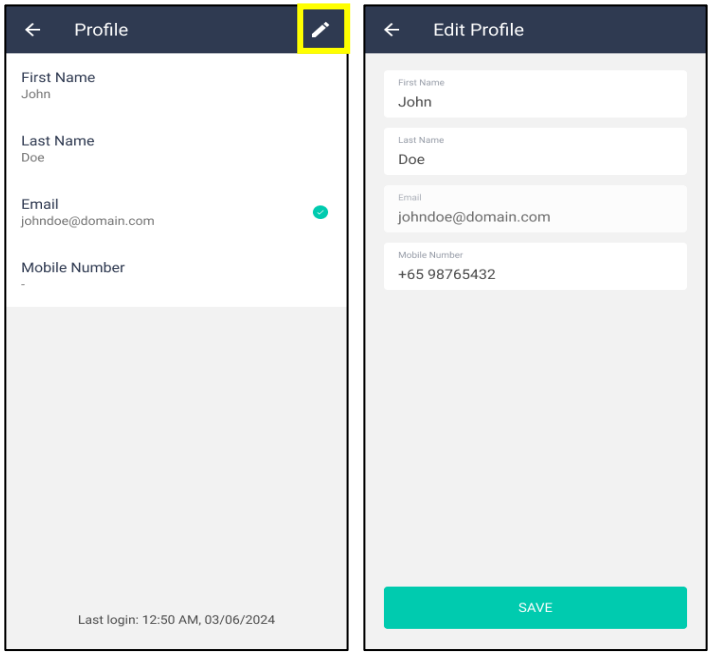


1. Profile Details

Profile contains user information such as First Name, Last Name, Email Address and Mobile Number associated with the user.

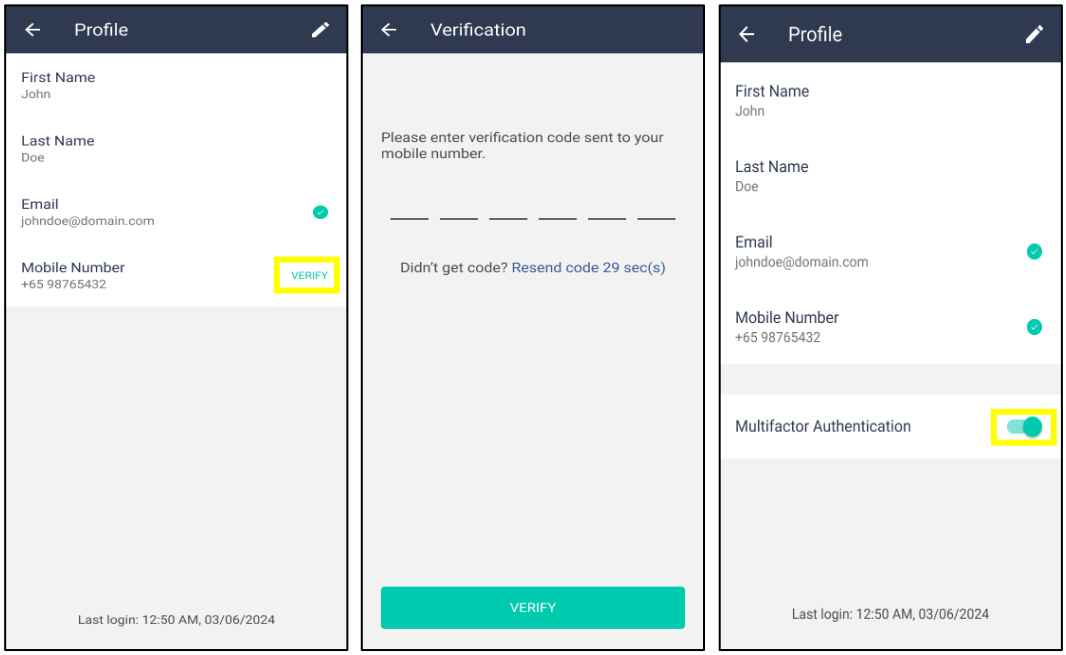
Tap icon to edit profile details.



Tap on **[VERIFY]**, if the user has not verified their registered mobile number.

Enter the verification code and tap **[VERIFY]** to complete verification.

Once verification is complete, users can enable the Multifactor Authentication toggle to receive a one-time password (OTP) during future sign-ins.



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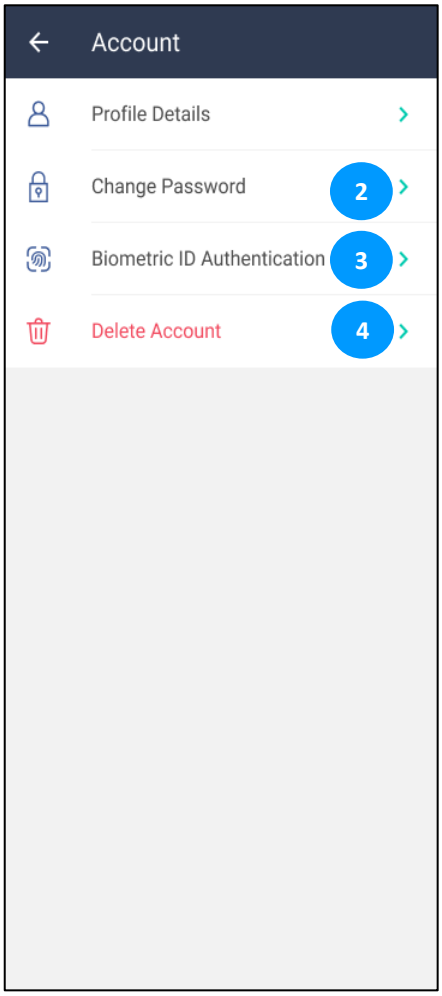
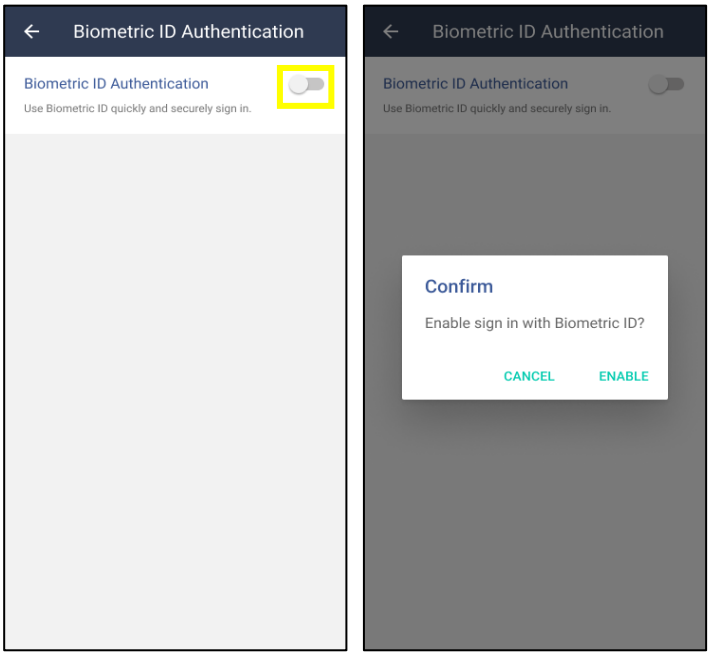
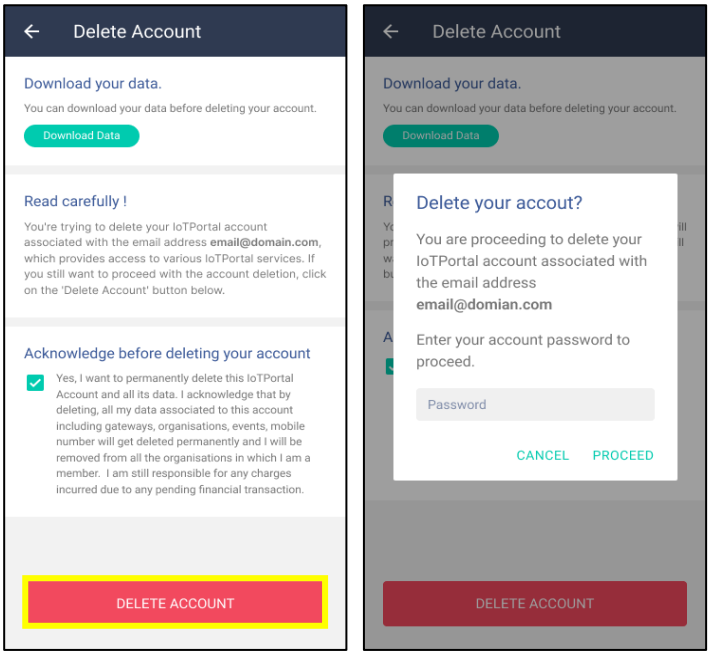


2. Change Password
Tap on [Change Password] to replace the existing password with a new one.

3. Biometric ID Authentication
User can enable Biometric ID Authentication to sign in without entering a password.



4. Delete Account
Use this option to delete your IoTPortal account. Do note that when the IoTPortal account is deleted, all services linked to that account will be lost. Data may be downloaded before account deletion.



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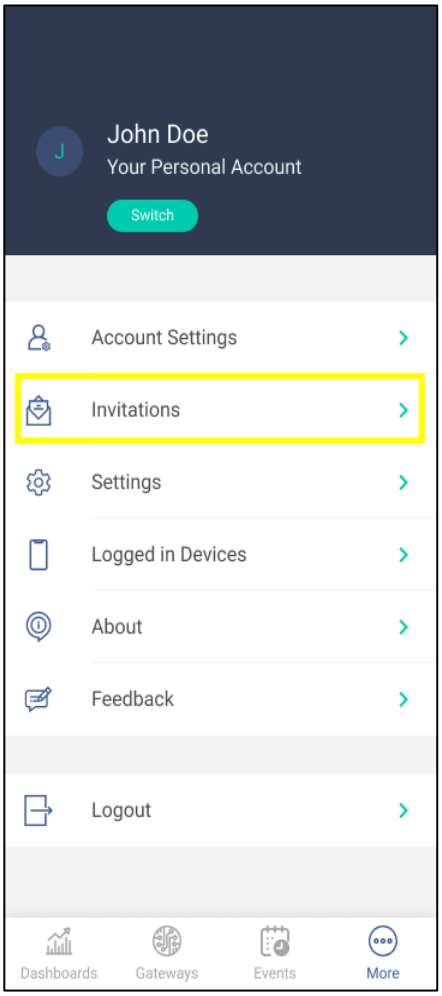
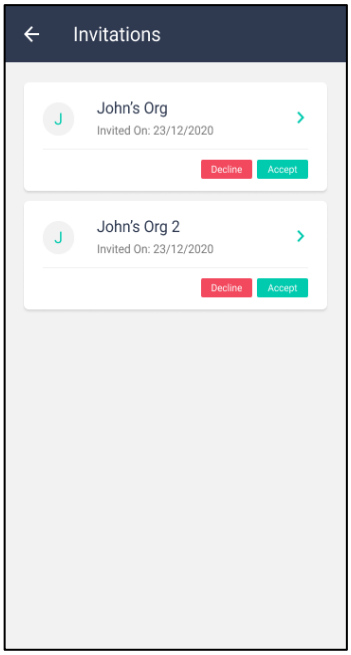
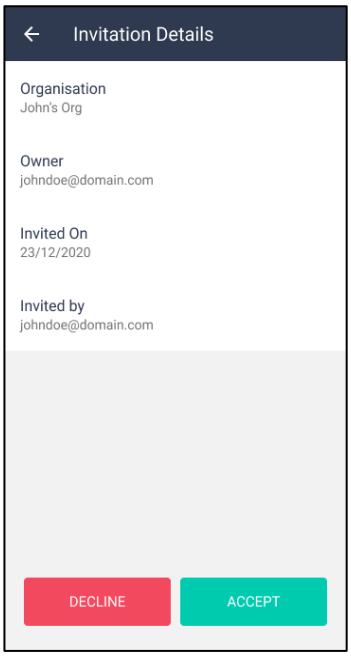
11.2 Invitations



Select **[Invitations]** to view the list of invitations received from other organisations (if any).
A list of invitations received from other organisations (if any) are displayed. Click **[ACCEPT]** or **[DECLINE]**.



To view the invitation details, tap on the invitation. The Invitation details are displayed.



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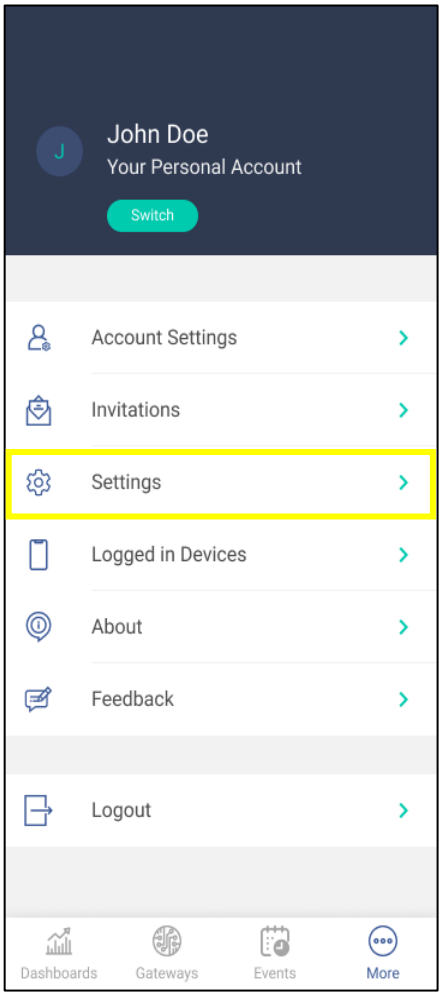
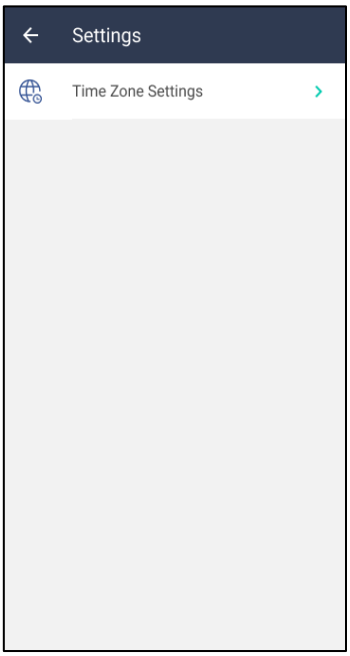
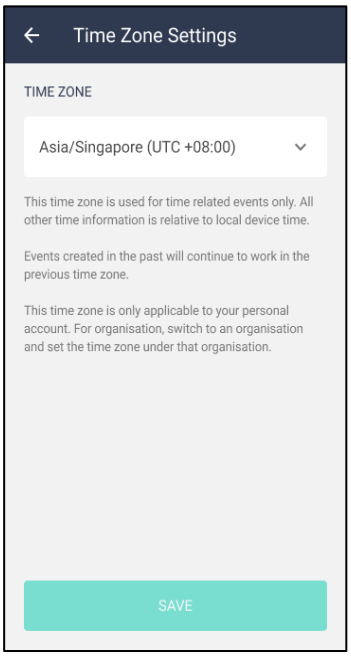
11.3 Settings



Within the **Settings** menu, users can adjust the time zone according to their preferences.
The time zone setting applies only to individual profiles. Therefore, organisation owners should switch to their organisation account to update the time zone for that specific organisation.





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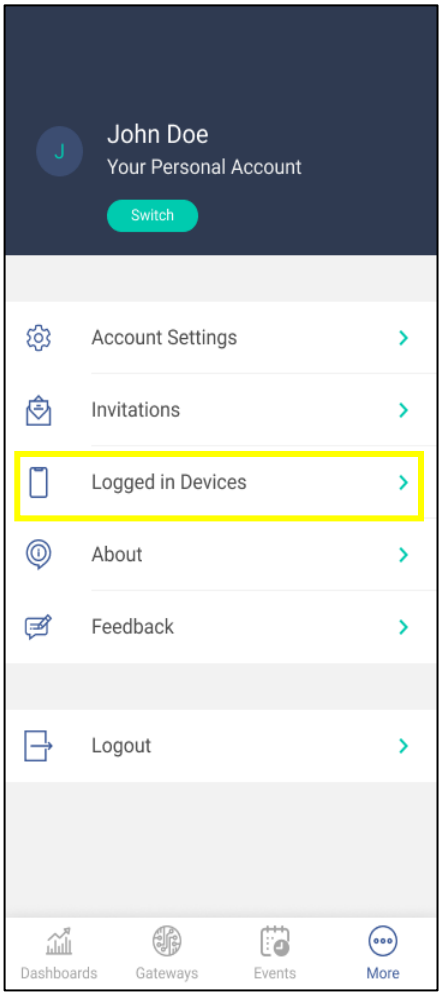
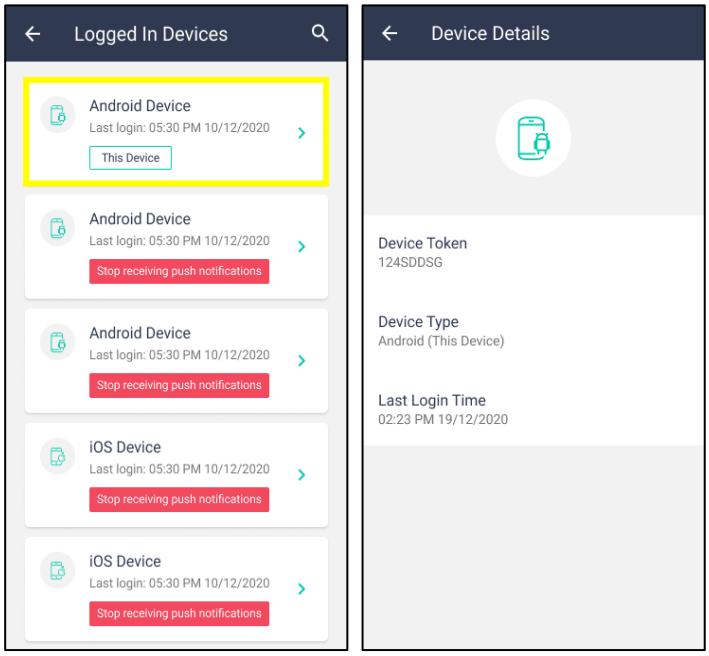
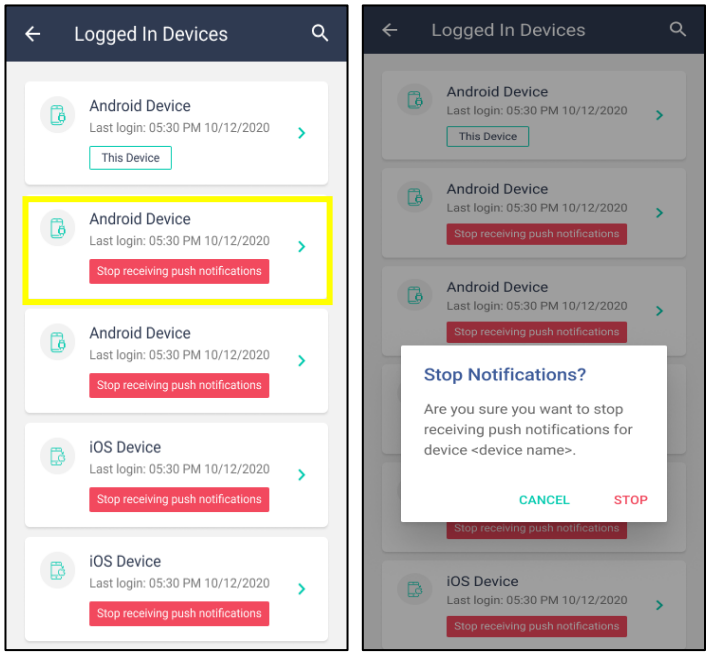
11.4 Logged In Devices



Use **Logged In Devices** option to view the list of devices that have been used to log into IoTPortal account.



To view the details of the device, tap on the device information. The details pertaining to device token; device type and last login time are displayed.
Tap **[STOP RECEIVING PUSH NOTIFICATIONS]** to stop receiving push notifications to this specific device.



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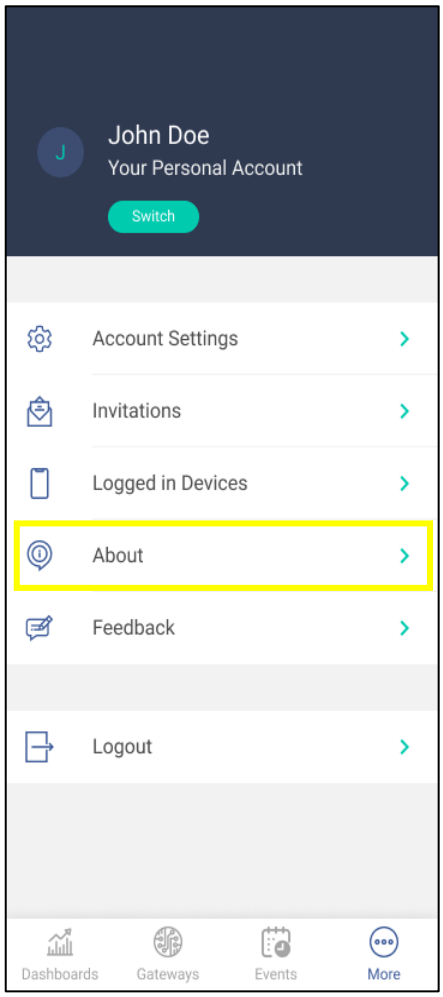
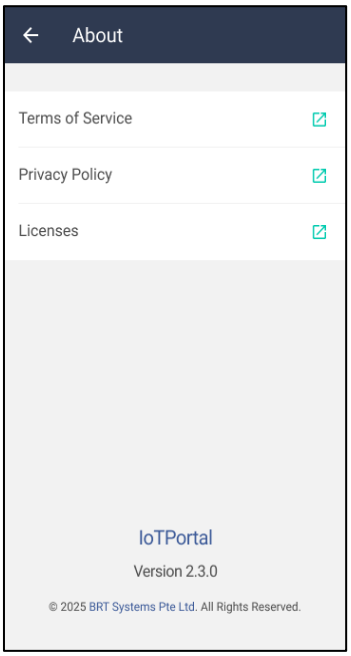
11.5 About



The **About** option includes information about IoTPortal version, terms of service, privacy policy and licenses.



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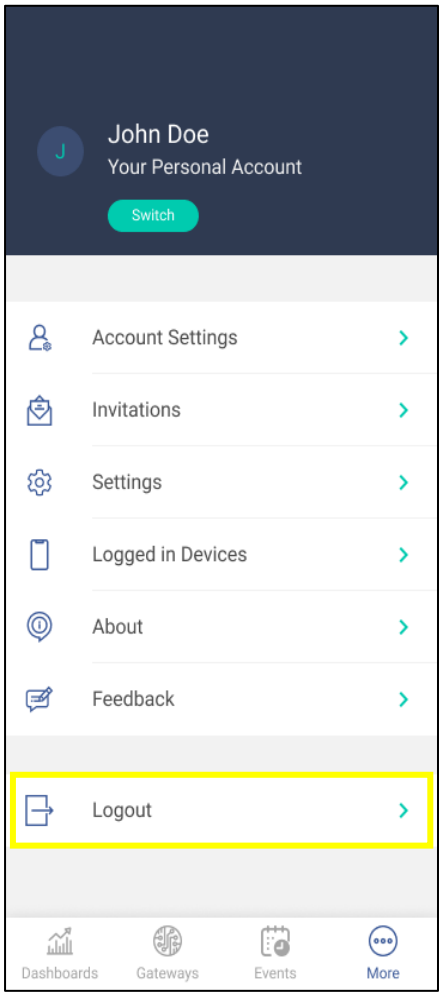
11.6 Logout



Tap **Logout** to sign out of the IoTPortal mobile app.

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12. Contact Information

Refer to https://brtsys.com/contact-us/ for contact information.

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Appendix

Glossary of Terms, Acronyms & Abbreviations

Term or Acronym	Definition or Meaning
CRUD	In computer programming, Create, Read, Update and Delete are the four basic operations of persistent storage.
GUI	A Graphical User Interface is a digital interface in which a user interacts with graphical components such as icons, buttons, and menus.
IoT	The Internet of Things is a network of interrelated devices that connect and exchange data with other IoT devices and the cloud.
MFA	Multi-factor Authentication is an authentication method that requires the user to provide two or more verification factors to gain access to a resource such as an application, online account, or a VPN.
M2M	Machine-to-Machine refers to the direct, automated communication and data exchange between devices, machines, or systems without human intervention. M2M forms a fundamental component of the Internet of Things (IoT), acting as a key enabler for connected systems to monitor processes, make real-time decisions, and improve operational efficiency across various industries.
OTP	A one-time password is an identity verification tool for authenticating users logging into an account, network, or system.
POE	Power Over Ethernet
PSU	Power Supply Unit
QR Code	A quick-response code is a type of two-dimensional matrix barcode, invented in 1994, by Japanese company Denso Wave for labelling automobile parts.
UUID	Universal Unique Identifier is a 128-bit value used to uniquely identify an object or entity on the internet.

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Revision History

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