Developer Workshop Lab 4

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IoT Application Platform & Analytics

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Lab 4 – Moisture & Alcohol Sensor Application

- **Application:**
  - Reads the sensor data & shows in the dashboard
- **Key functionality**
  - Read sensor data from moisture & alcohol sensor
  - Send data to AerCloud via MQTT
  - Set alerts for moisture level (low, medium, high)

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Lab 4 (a) – Read and Send Data to AerCloud

- Tasks
  - Login into AerPort and update your password
  - Update the device embed program
  - Create Data Model & Containers in AerCloud
  - See the data through the COM port

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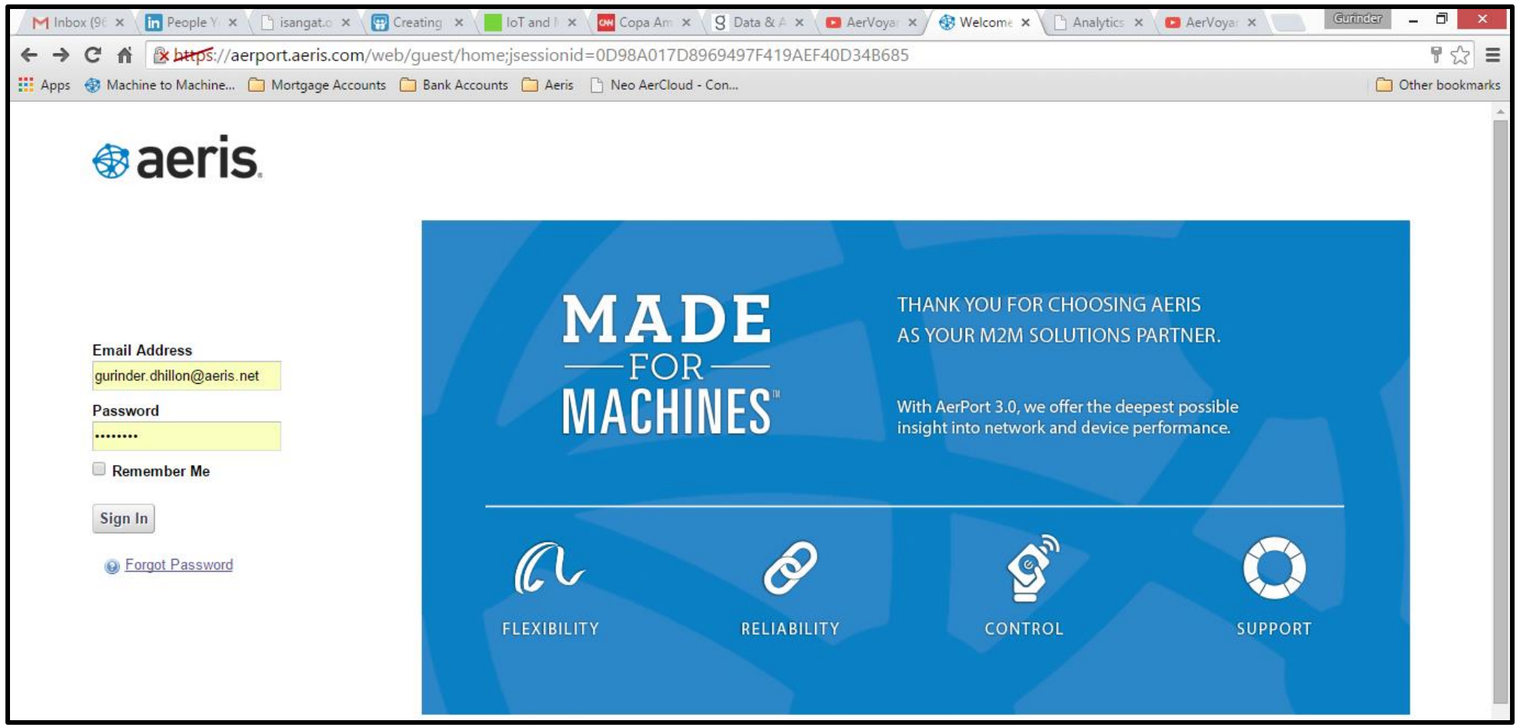
Login into AerPort and update password

- Go to AerPort at http://aerport.aeris.com
- Enter your login & password
- Reset your password & security question
- Make sure to remember your password (not recoverable since arbitrary email address)



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Update the mbed program for device

- The device must be programmed to
  - Read the sensor values
  - Determine what data to send
  - When to send that data to AerCloud

- Go to - https://developer.mbed.org/teams/AerCloud/code/Aeris_Moisture_Workshop/
- Click on – “Import this Program” button and save it in a location
- Open main.cpp file for editing

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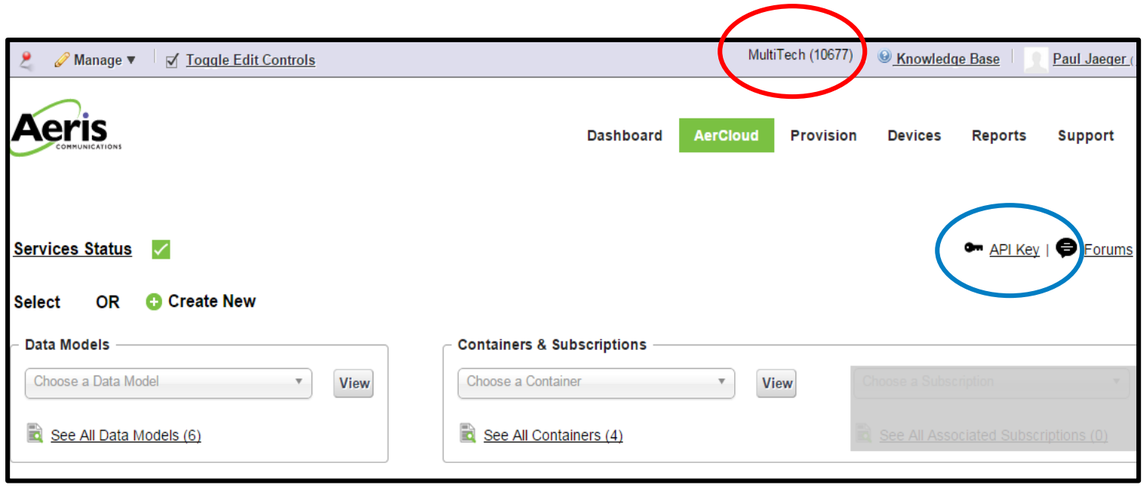
Edit the program to update relevant information

- Program must be updated with right information so that data can be directed to AerCloud

- Go to http://aerport.aeris.com
- Click on “AerCloud”'
  - Copy “Account Number” & update in file
- Click on “API Key”
  - Copy the account “API Key” & update in file
- Cellular APN “**aer.aerisapn.net**” which enables connectivity to Aeris backend is already updated
- Device ID will be detected & provisioned automatically




```
// AerCloud BASE URL
#define AC_BASE     "http://api.aercloud.aeris.com/v1"

//! AerCloud API Key
//   You can find your api key at https://aerport.aeris.com"
char _AERCLOUD_API_KEY[] = "ff767bee-f5bf-403b-badb-fde13bc2b756";

//! Aercloud Account Id
//   You can find your account id at https://aerport.aeris.com
char _AERCLOUD_ACCOUNT_ID[] = "10975";

// AerCloud Container
//  The name of the AerCloud Container to write data into
char _AERCLOUD_CONTAINER[] = "AERIS_WORKSHOP_MAIN";
char _AERCLOUD_CONTAINER_ALARM[] = "AERIS_WORKSHOP_ALARM";

// AerCloud Device Id
//  The Device Id that is registered and provisioned at AerCloud
//  (random value here program automatically detects and provision it)
char _AERCLOUD_DEVICE_ID[] = "*****-nucleo-0001-***********";
```

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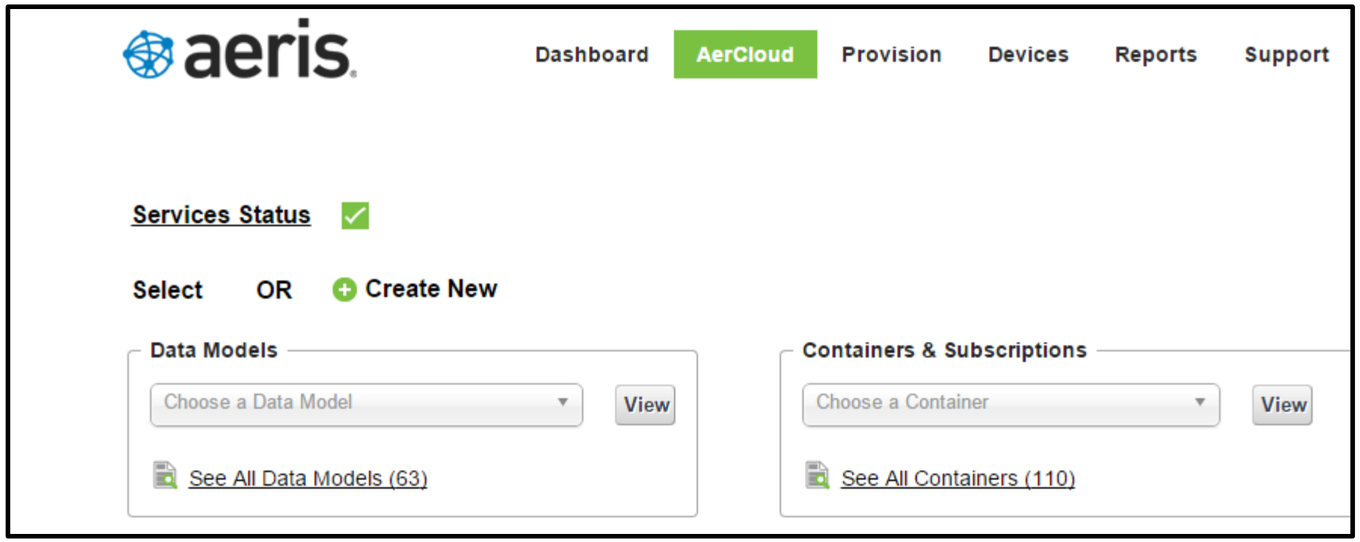
What is a Data Model & Container

- **Data Model**
  - It defines the structure of your data
  - Every Data Model must be given a name
  - Structure of data includes
    - Parameter name – what data is being sent to AerCloud e.g. Speed, Fuel Reading, etc
    - Data Type – what is the type of data e.g. String, Integer, Float, etc.
    - Unit of Measure – what is the unit of measure of the data
- **Container**
  - Location where the data is stored
  - Every container must be given a name



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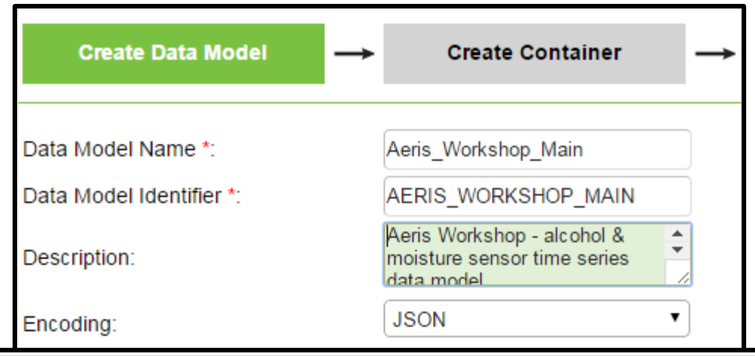
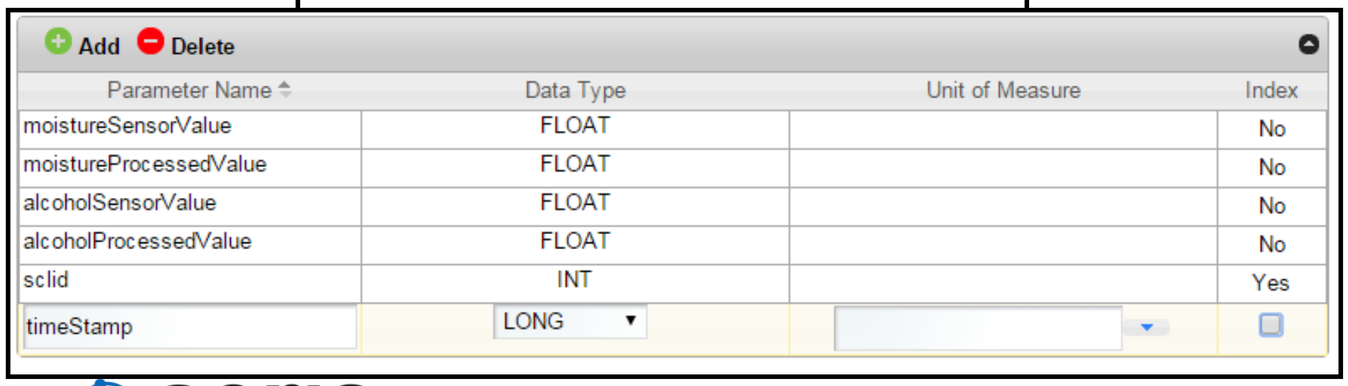
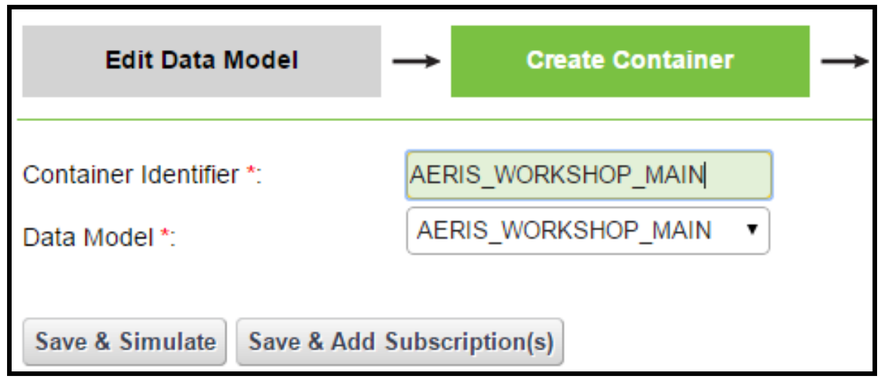
Create Main Data Model, Parameters & Container

- Go to AerCloud tab
- Click “Create New” & select “Data_Model”
  - Add Data Model name “Aeris_Workshop_Main”
  - Ensure encoding is set to “JSON”





- Click on “Add” to add parameters
- Enter the Parameter info as follows
  - Use the values from the picture
- Click “Save & Create Container”
- Enter Container name as
  - “AERIS_WORKSHOP_MAIN”
- The code is already updated with this name
  - Click on Save



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Main DM Parameters

Parameter Name	Data Type	Unit of Measure	Index	Remarks
moistureSensorValue	FLOAT		No	Value read frrom moisture sensor
moistureProcessedValue	FLOAT		No	Processed value of moisture sensor (LOW / MEDIUM / HIGH)
alcoholSensorValue	FLOAT		No	Value read frrom alcohol sensor
alcoholProcessedValue	FLOAT		No	Processed value of alcohol sensor (LOW / MEDIUM / HIGH)
sclid	INT		Yes	Device-id
timeStamp	LONG		No	timestamp when event occurred

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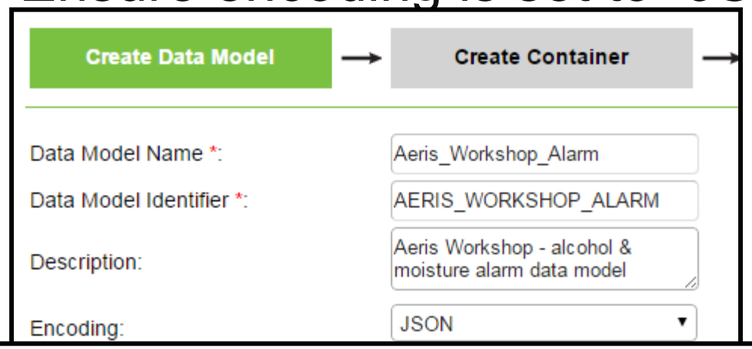
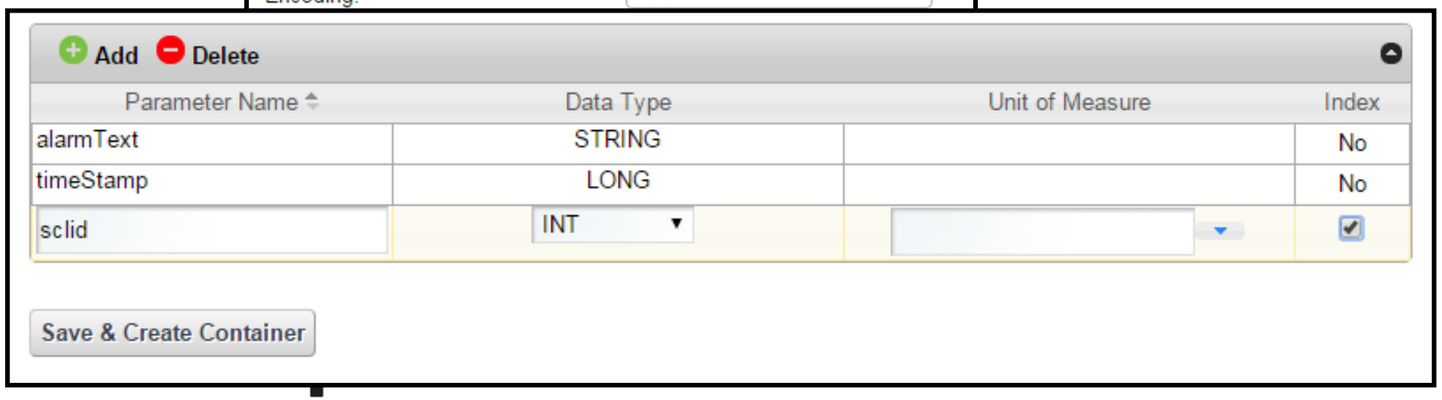
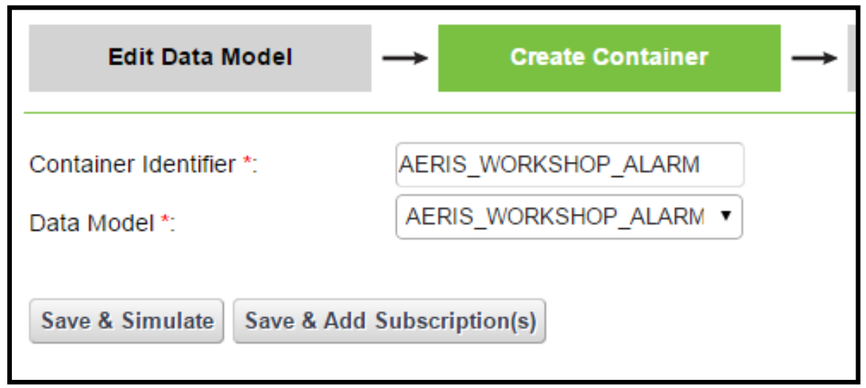
Create Alarm Data Model, Parameters & Container

- Go to AerCloud tab
- Click “Create New” & select “Data_Model”
  - Add Data Model name as “Aeris_Workshop_Alarm”
  - Ensure encoding is set to “JSON”





- Click on “Add” to add parameters
- Enter the Parameter info as follows
  - Use the values from the picture
- Click “Save & Create Container”
- Enter Container name as
  - “AERIS_WORKSHOP_ALARM”
- The code is already updated with this name
  - Click on Save



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Alarm DM Parameters

Parameter Name	Data Type	Unit of Measure	Index	Remarks
alarmText	STRING		No	alarm string
timeStamp	LONG		No	time at which alarn has been generated
sclid	INT		Yes	Device-id

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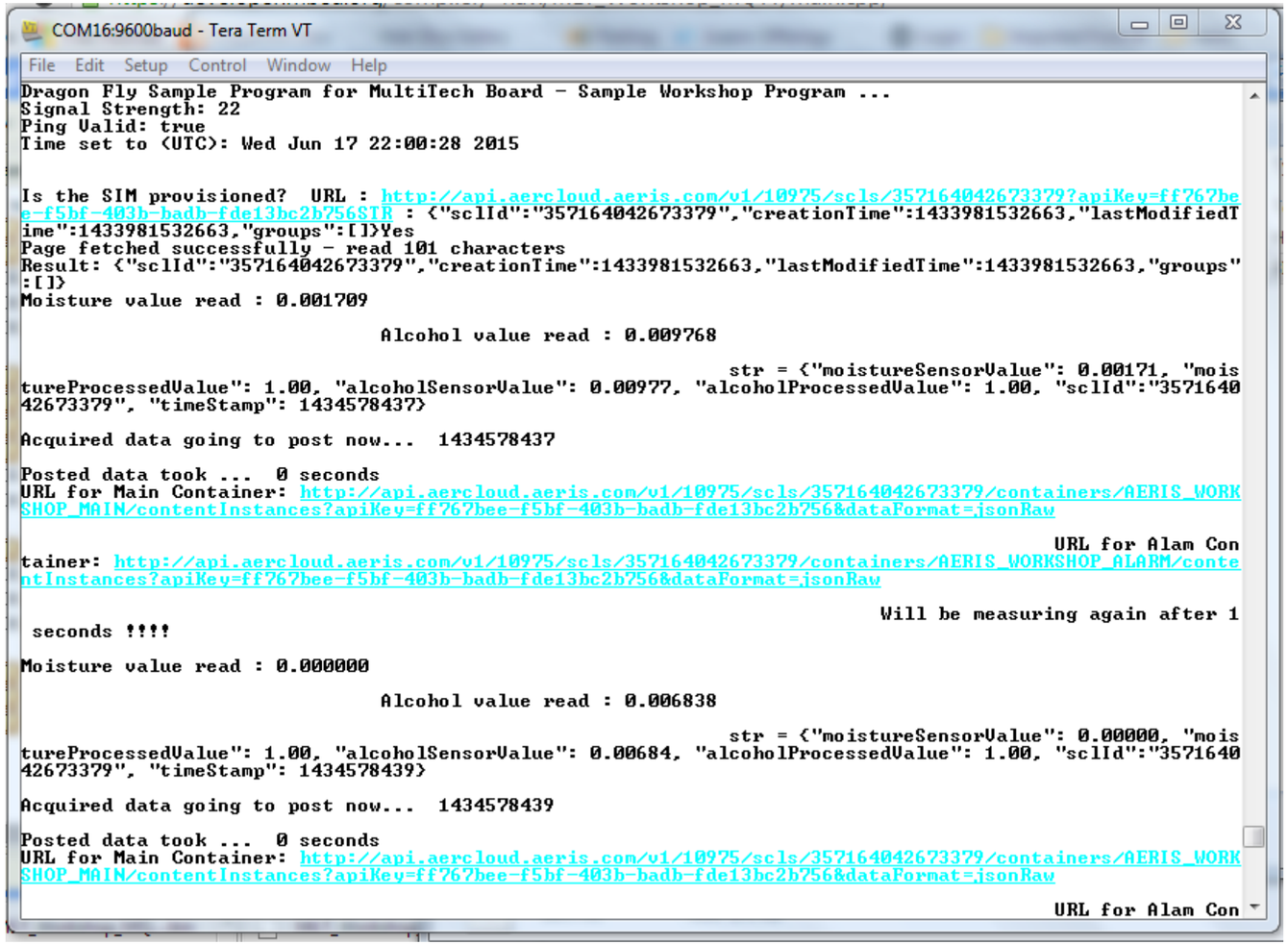
Compile and see live sensor data on PC

- Compile the program & download to the device
- Start TeraTerm on the right Com Port
- You should see the data coming on the TeraTerm interface
- You may need to press the reset button on the device
- If you want to see the AerCloud container data, please go to the URL in the TeraTerm screen



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Lab 4(b) – Use App Express to develop application

- Tasks
  - Create a portal for your application (already done for you)
  - Create application using the Widgets
  - Run your application & see the data on the Application Dashboard

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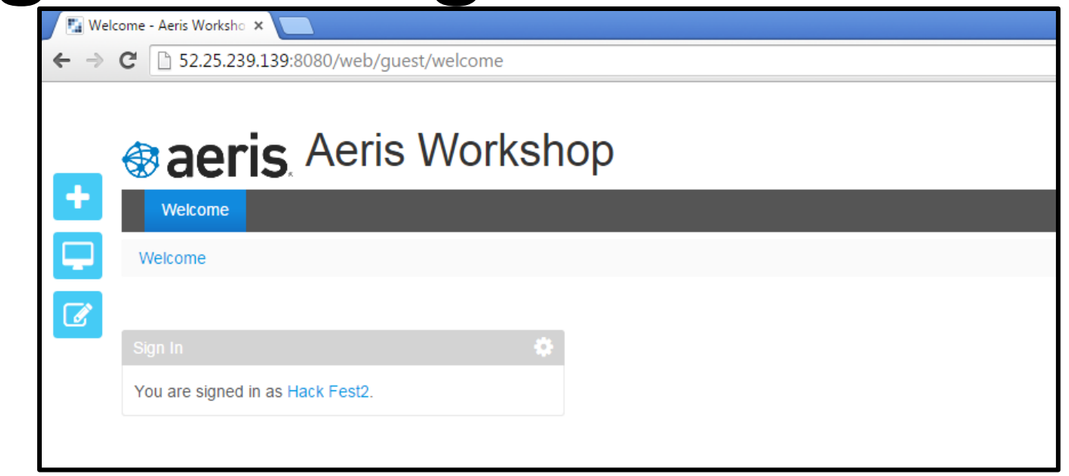
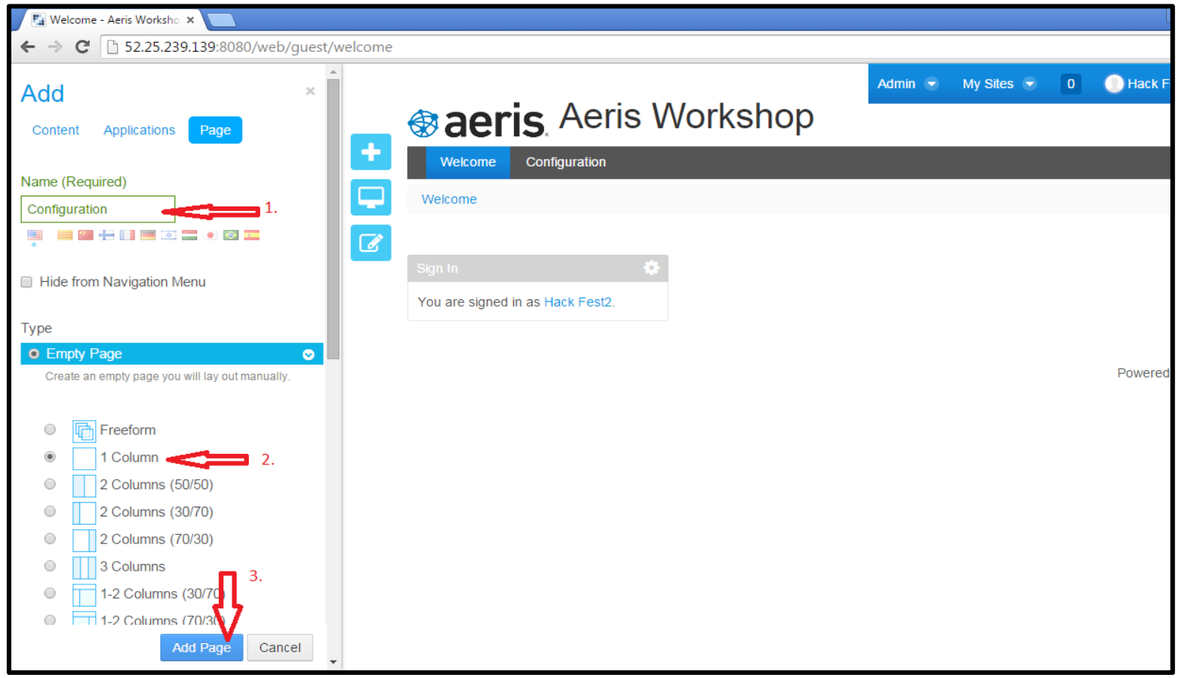
Create application – add page “Configuration”

- Login using the AAE account that you are provided
- Create new page
  - Click on the “+” sign on left and select “Page”
  - Enter page name as “Configuration”
  - Select page layout as “1 Column”
  - Click on “Add Page”
  - Configuration page will show up on right side





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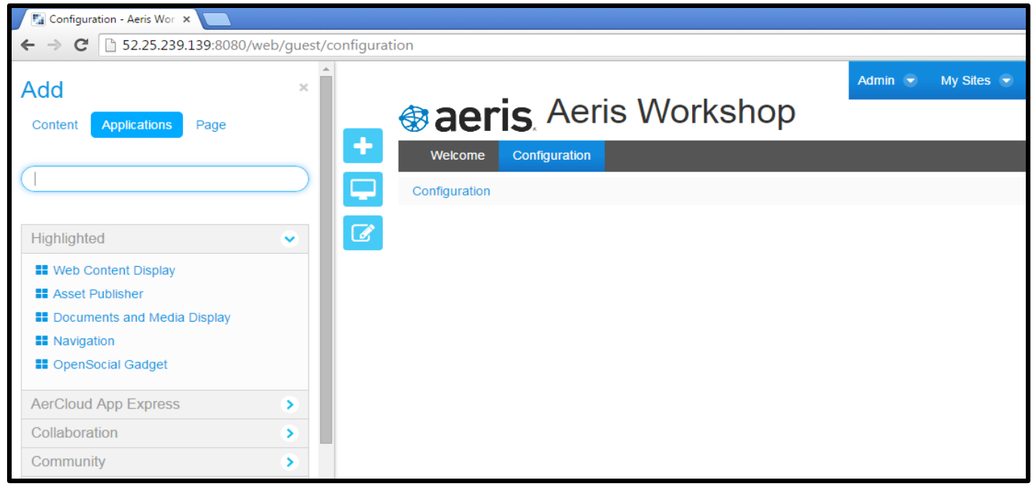
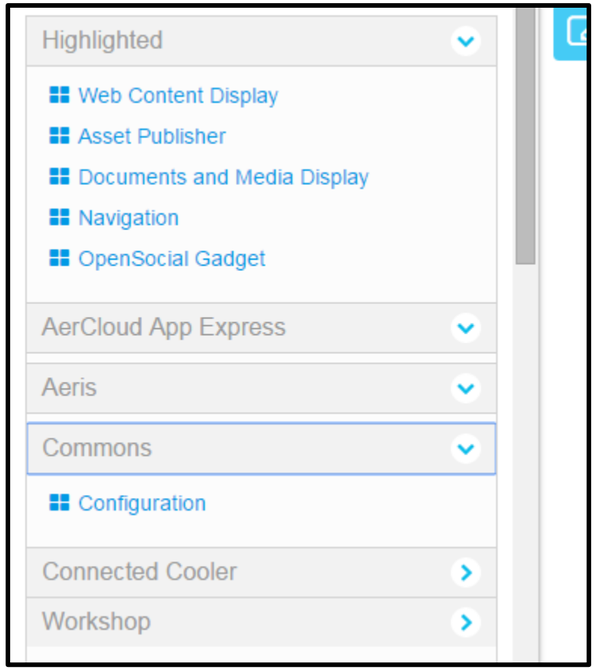
Create application – add application “Configuration”

- Add Application in the Configuration page
  - Click on “Configuration” on right side
  - Click on the “+” sign on left and select “Application”
  - Go to below location
    - “AerCloud App Express”
    - “Aeris”
    - “Commons”
  - Next to “Configuration” widget click “Add”





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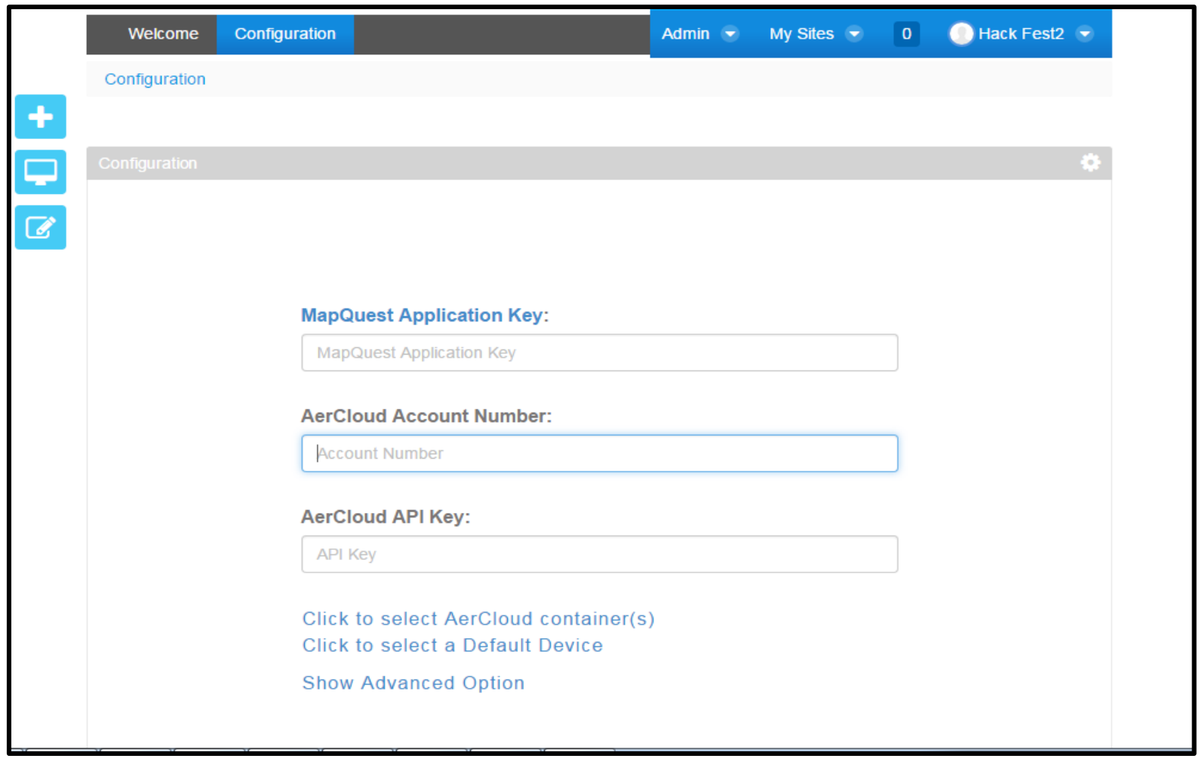
Create application – update configuration

- Click on “Configuration” tab on right side
  - Enter any value for “MapQuest App Key”
  - Enter “Account Number” from AerCloud
  - Enter “API Key” from AerCloud
  - Click “AerCloud Container”
    - Select your main container name
  - Click “Default Device”
    - Select your device name [same as on board]
  - Click “Save”



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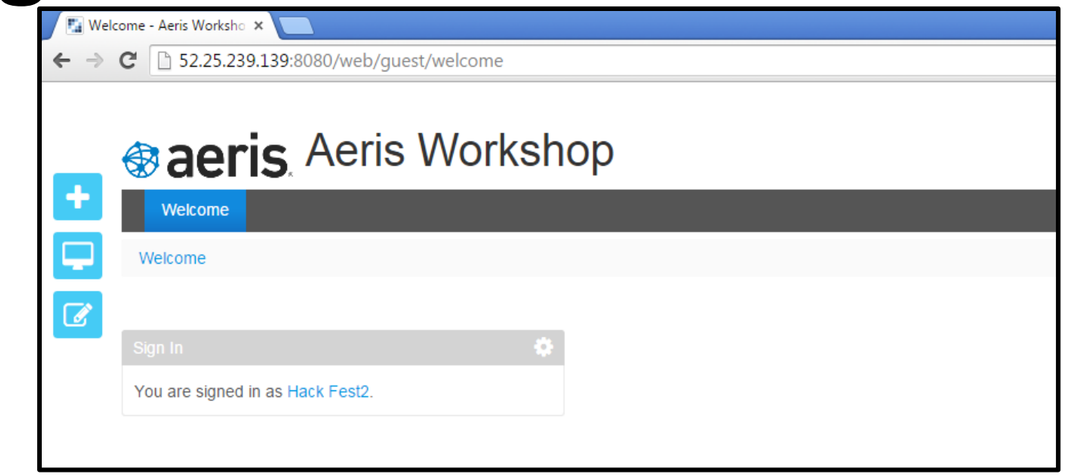
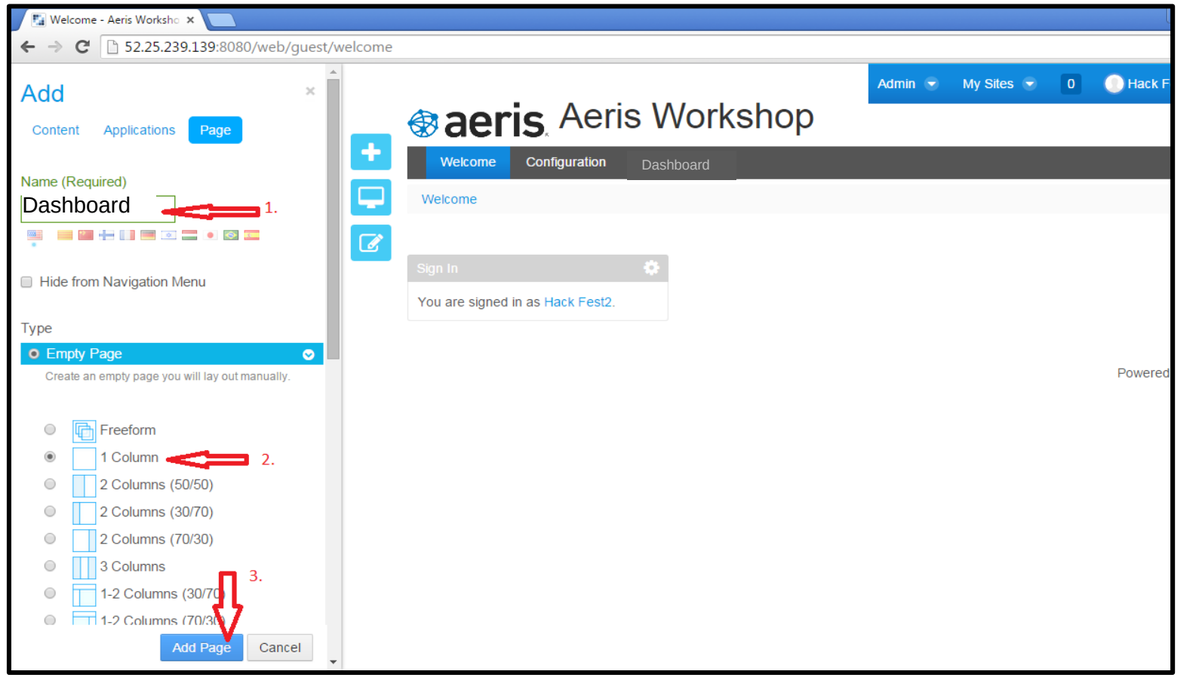
Create application – add page “Dashboard”

- Create new page – “Dashboard”
  - Click on the “+” sign on left and select “Page”
  - Enter page name as “Dashboard”
  - Select page layout as “1 Column”
  - Click on “Add Page”
  - Dashboard page will show up on right side





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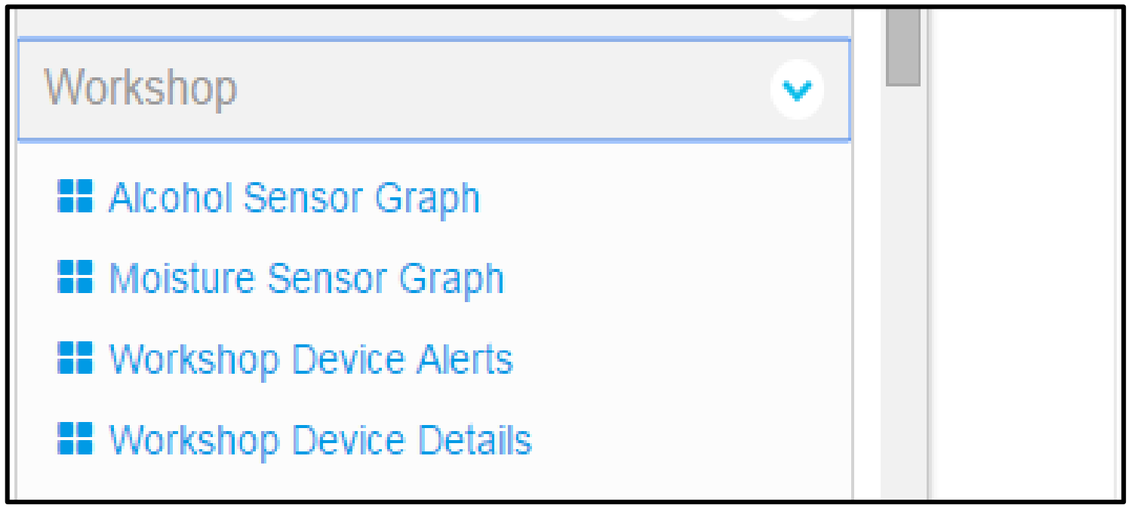
Create application – add applications

- Add Application in the Dashboard page
  - Click on “Dashboard” on right side
  - Click on the “+” sign on left and select “Application”
  - Go to below location
    - “AerCloud App Express”
    - “Aeris”
    - “Workshop”
  - Next to below items click “Add”
    - Moisture sensor graph
    - Alcohol sensor graph
    - Workshop device alerts
    - Workshop device details



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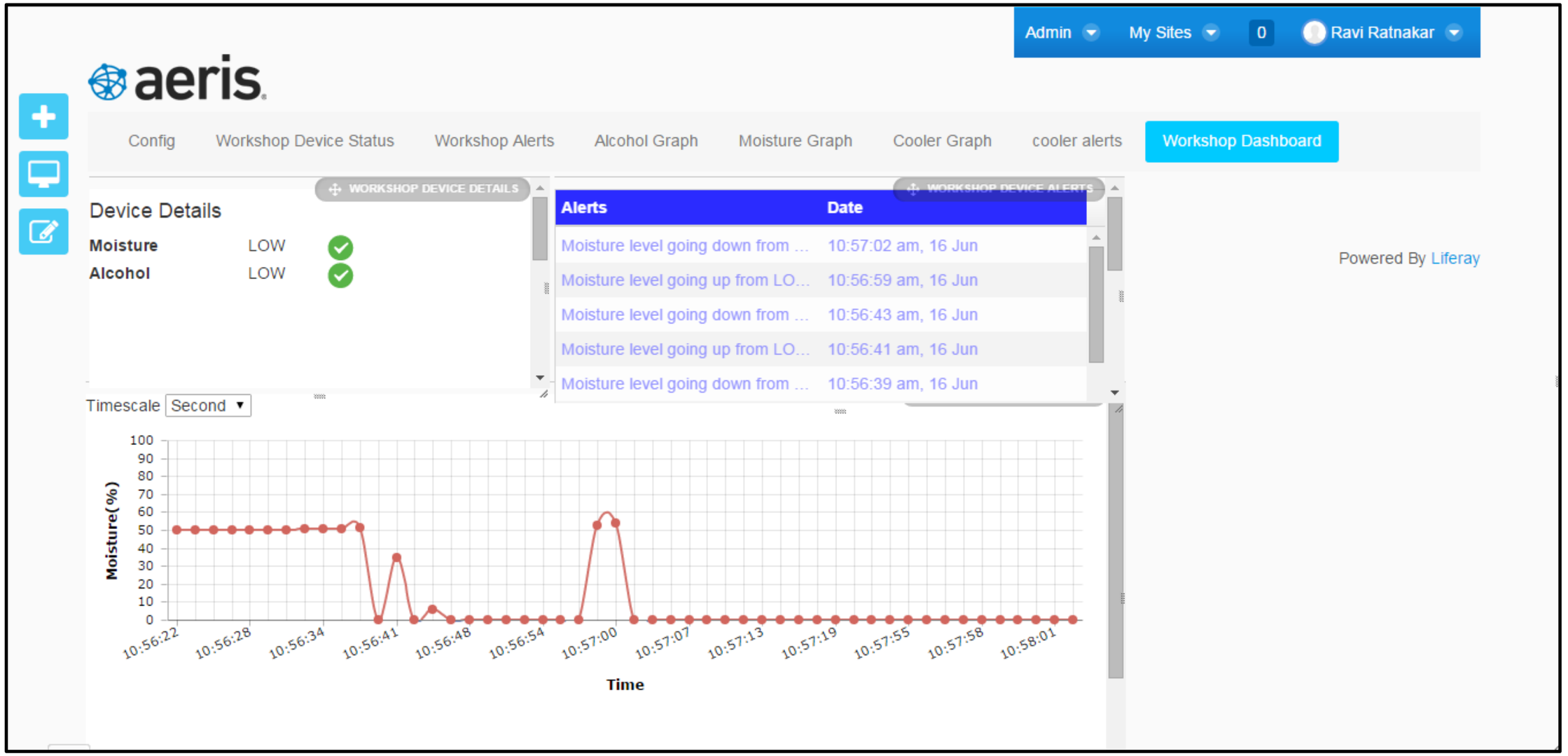
Application dashboard & data readings



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