



IoT Platform

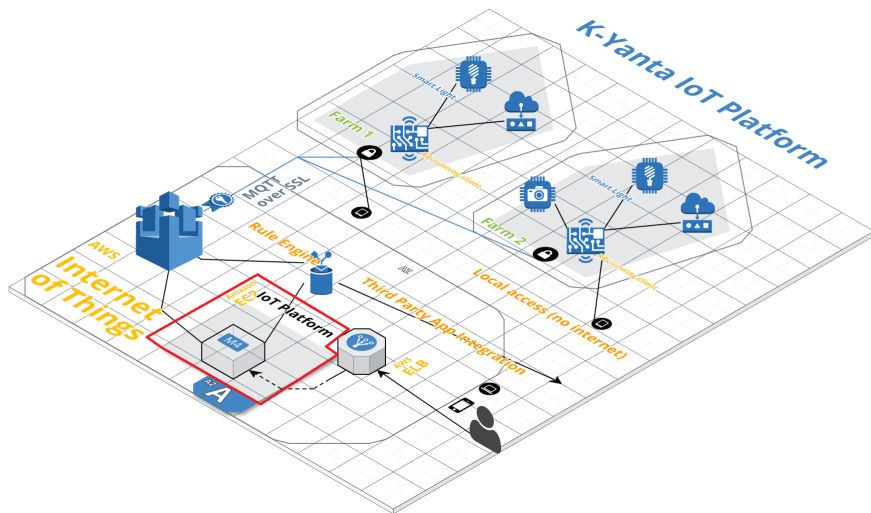
Embedded Real-Time Systems Lab
Indian Institute of Technology Bombay

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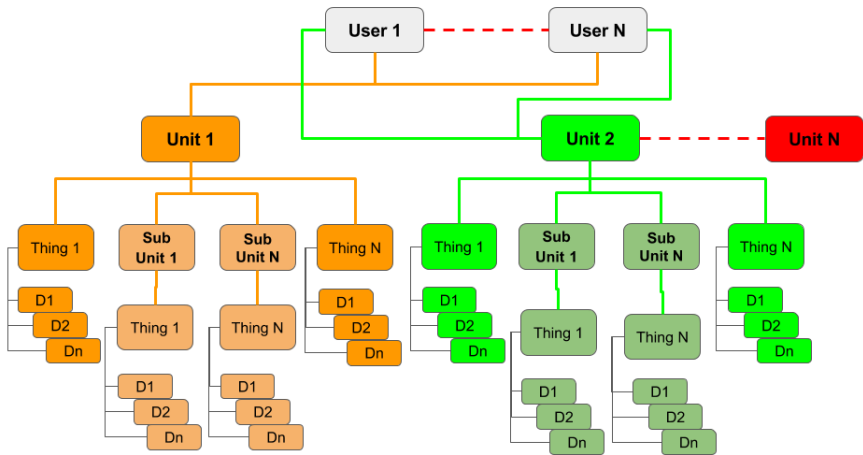
Platform Architecture



Platform Architecture

- IoT web platform communicates with AWS IoT and Rule engine.
- Its hosted on the AWS EC2 and managed by ELB(Elastic Load Balancing)
- The following technologies are part of the IoT Dashboard
 - **Grizzly Server** which is based on Java NIO
 - **Jersey** an implementation of JAX-RS for restful endpoints
 - **MySQL** database
 - **Hibernate** for database management
 - **Freemarker** for templating webpages and **VueJS** at front-end
 - **AWS Java SDK** to communicate with AWS IoT

Organization



• User

- A user will have an email id and a password (and an optional API token).
- A new user is linked to a unit by another authorized user.

• Unit

- A unit is an organization or a farm/lab in that organization.
- A unit can have units or things inside it.
- A user need to have permissions on a unit to add a thing, unit or authorize another user for that unit.

• Thing

- Anything that can connect to Internet.
- A thing is interfaced with sensors and actuators.
- Example of thing RPi, ESP, Arduino


• Device and Device Attributes


- A device is a sensor or an actuator
- A device attribute is type of the data the device measures (float, string, integer or boolean).


Login View


← → ↻ ec2-13-229-107-106.ap-southeast-1.compute.amazonaws.com

IoT Platform


Home 

My Profile 


Rules 

Logout 

CS684

 300 x 300

This is a unit created for the iot workshop.

 MANAGE

Manage Page

IoT Platform

Home
My Profile
Rules
Logout

CS684 **ALL**

This is a unit created for the iot workshop.

DELETE EDIT

Things

No Things for this Unit.

Subunits

No Subunits for this Unit.

Create Subunit Create Thing Import Export Add

Authorized Users

ID	Name	Email	Role	Actions
8	Lohit Penubaku	lohitjgi@gmail.com	ALL	EDIT
1	Super Admin	admin@e-yantra.org	ALL	EDIT
10	kedar	kedar@qwe.com	ALL	EDIT

Create Thing

ec2-13-229-107-106.ap-southeast-1.compute.amazonaws.com/units/get/8

IoT Platform

Home My Profile Rules Logout

CS684 ALL

This is a unit created for

DELETE EDIT

Things

No Things for this Unit.

Subunits

No Subunits for this Unit.

Create/Edit Thing

Thing Name:

Thing Name

Thing Description:

Description

Save Close

Subunit Create Thing Import Export Add

Email	Role	Actions
subaku	lohit.jgi@gmail.com	ALL EDIT
imin	admin@e-yantra.org	ALL EDIT
	kedar@qwe.com	ALL EDIT

Create Subunit

IoT Platform

Home My Profile Rules Logout

CS684 ALL

This is a unit created for

DELETE

Things

Name	Actions
ESP	EDIT

Subunits

Create/Edit Unit

Unit Name:
Student

Unit Description:
Students test subunit

Unit Photo:
Photo

Save Close

Subunit Create Thing Import Export Add

Email	Role	Actions
admin	admin@e-yantra.org	ALL EDIT
subaku	lohitjgi@gmail.com	ALL EDIT
	kedar@qwe.com	ALL EDIT

Newly created

The screenshot displays a web interface with two main sections: 'Things' and 'Subunits'.

Things Section:

Name	Actions
ESP	EDIT

Subunits Section:

- Student

A red line connects the 'ESP' entry in the 'Things' section to the 'Student' entry in the 'Subunits' section. A red callout box with the text 'Newly created Thing and Subunit' points to this connection.

Things page/Adding new device

The screenshot shows a web browser window with the URL `ec2-13-229-107-106.ap-southeast-1.compute.amazonaws.com/things/get/14`. The page title is "IoT Platform" and the user is logged in as "Lohit Penubaku".

Left Sidebar:

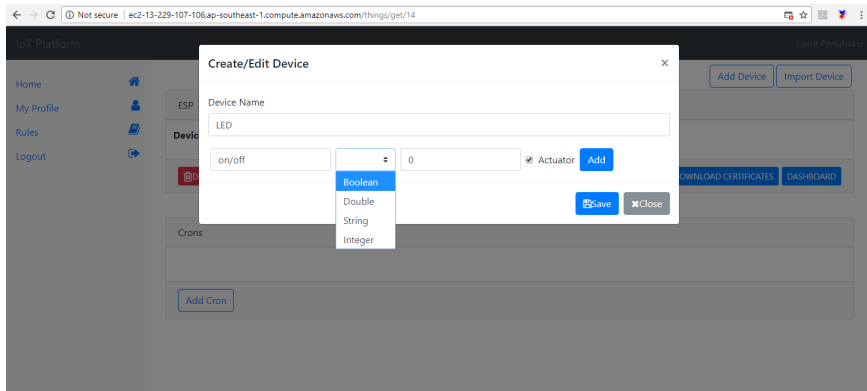
- Home
- My Profile
- Rules
- Logout

Top Right: "Add Device" and "Import Device" buttons.

Device List:

Device Name	Actions
ESP	DELETE THING EDIT GENERATE CLIENT DOWNLOAD CERTIFICATES DASHBOARD
Crons	Add Cron

Creating new device



Newly added device to ESP thing

IoT Platform

Home My Profile Rules Logout

Add Device Import Device

ESP

Device Name	Actions
LED	DELETE EDIT

Newly added device

DELETE THING EDIT GENERATE CLIENT DOWNLOAD CERTIFICATES DASHBOARD

Crons

Add Cron

Intiating Cron job for Device

The screenshot shows the AWS IoT Platform console interface. The browser address bar indicates the URL: `ec2-13-229-107-106.ap-southeast-1.compute.amazonaws.com/things/get/14`. The page title is "IoT Platform" and the user is logged in as "Lohit Penubaku".

Left Sidebar:

- Home
- My Profile
- Rules
- Logout

Main Content Area:

At the top right, there are buttons for "Add Device" and "Import Device".

Device List:

Device Name	Actions
ESP	
LED	DELETE EDIT

Below the device list, there is a red button labeled "DELETE THING".

Crons Section:

The "Crons" section shows a newly created cron job. The cron expression is `0 12 * * ? *` and the payload is `{"device26.35":0}`. A red "Delete" button is present next to the cron job. Below the cron job, there is a red line indicating the status "Newly created Cron Job".

At the bottom of the "Crons" section, there is a button labeled "Add Cron".

Cron job settings

Minutes	Hours	Day of month	Month	Day of week	Year	Meaning
0	10	*	*	?	*	Run at 10:00 am (UTC) every day
15	12	*	*	?	*	Run at 12:15 pm (UTC) every day
0	18	?	*	MON-FRI	*	Run at 6:00 pm (UTC) every Monday through Friday
0	8	1	*	?	*	Run at 8:00 am (UTC) every 1st day of the month
0/15	*	*	*	?	*	Run every 15 minutes
0/10	*	?	*	MON-FRI	*	Run every 10 minutes Monday through Friday
0/5	8-17	?	*	MON-FRI	*	Run every 5 minutes Monday through Friday between 8:00 am and 5:55 pm (UTC)

Create a cron

Cron Express:

0 12 * * ? *

The cron expression should be of format [specified here](#)Time here is **UTC**

Device:

LED

Attribute:

on/off

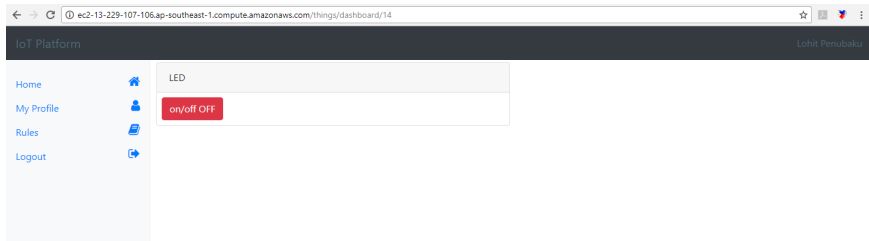
Set Value:

False

Save

Close

Dashboard to control device



MQTT topics before/after

• Before creation of device

MQTT Topics for Hardware Engineers ×

```
clientId:thing14
Subscribe to Delta Topic : $aws/things/thing14/shadow/update/delta
Publish to reporting Topic : $aws/things/thing14/shadow/update
```

×Close

• After creation of device

MQTT Topics for Hardware Engineers ×

```
clientId:thing14
Subscribe to Delta Topic : $aws/things/thing14/shadow/update/delta
Publish to reporting Topic : $aws/things/thing14/shadow/update
For Device LED
Use the following property names

device26.35    Boolean //LED on/off
```

×Close