



Waukee Schools Cisco Hackathon

03/24/2018

[System Mixer Vol : 30]



Getting Started

- What is Cisco Spark?
- What is IoT ?

Beginner

- Building with Cisco Spark
- Building with IoT Kits

Expert

- IoT Kit – report Temperature and Humidity
- ChatBots with Dialogflow
- Python & REST API

Getting Started What is Spark?

Cisco Spark – User Interface

- Dashboard walk-through
- Visit Cisco Spark on your Web browser

<https://web.ciscospark.com/>

- Create New Room

<https://web.ciscospark.com/rooms/new>

- Add more people by Email



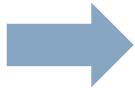
Getting Started What is IoT?

What does the term ‘IoT’ Mean to you

IoT is driving Shift In End Points - Users to Things

From Consumer

Tablets, Laptops, Phones
Human Interactions



To Enterprise & Operational Technologies

Sensors, Smart Objects, Device Clustered Systems
Machine to machine interactions



Energy Saving
Smart Grid



Transport and
Connected Vehicles



Analytics and
Modelling



Intelligent
Buildings

Improve
Productivity



Precision
Agriculture



Safety & Security



Predictive
Maintenance



Smart Home
S+CC



Healthcare



Lighting goes Digital with POE/UPOE



Color beacons create pathway lighting or indicate room status



Integrated BTLE for nearby devices



Integrated Speaker modules



Any light can be backed up with a UPS



Integrated CO2 and other gas or particle sensors



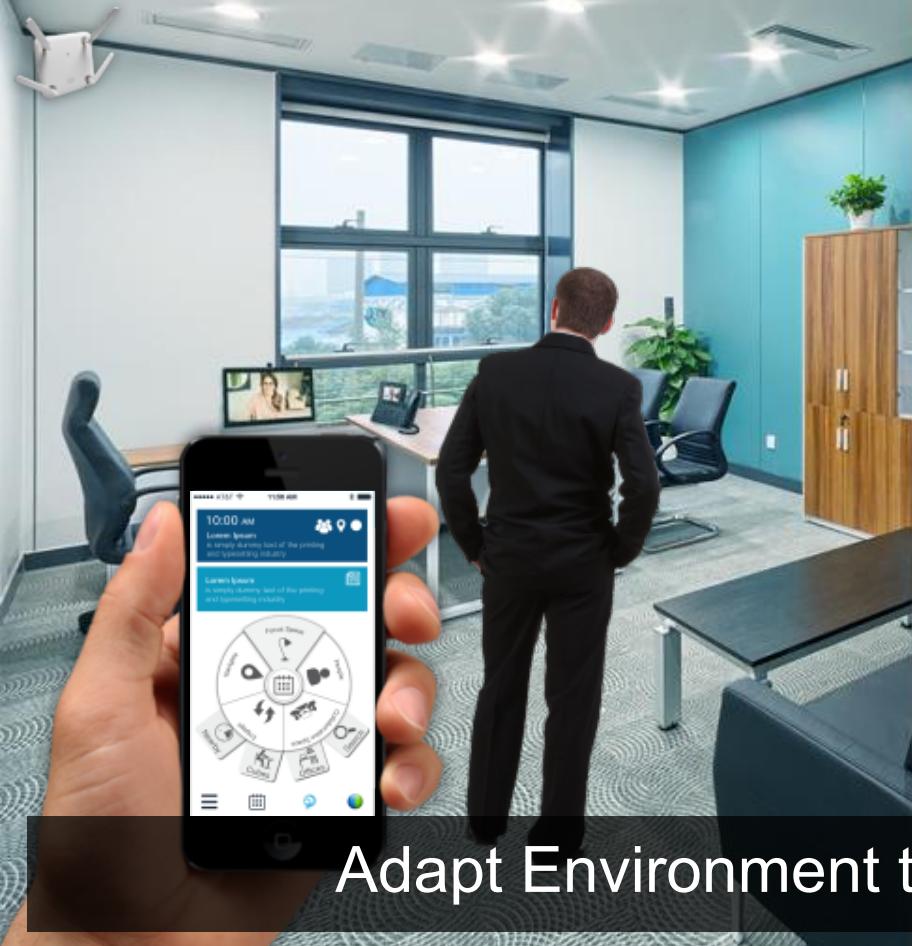
LiFi to data streaming applications



Lighting provides strategic ceiling placement for advanced sensor technologies and other devices



User Experience



- Customized Lighting (Intensity and Color)
- Natural Light
- Room Temperature
- Preset Phone & Video Profile



Adapt Environment to Personal Preferences

IoT generate Massive, Messy Data Everywhere



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Challenge- Tons of Data – Fast decision

In One Week

500 Gigabytes

Data generated by an offshore oil rig

Every 30 Minutes per flight

10,000 Gigabytes

Data generated by a jet engine (e.g., PW1000G)

In The Past 2 years

90% of the world's data

Has been created



In One Day

1.1 Billion

Data points generated by sensors

In One Day

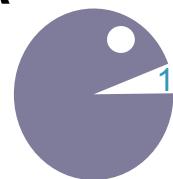
1,000 Gigabytes

Data generated by an oil refinery

In One Day

2.5 Billion Gigabytes

Data generated worldwide



#Real-world IoTChallenge

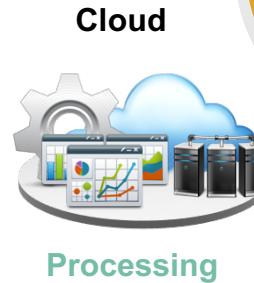
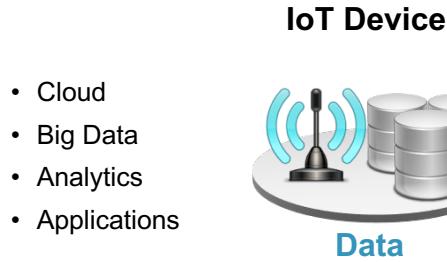
Getting all this Data to one place to process is the real challenge ...

#Security #BigData

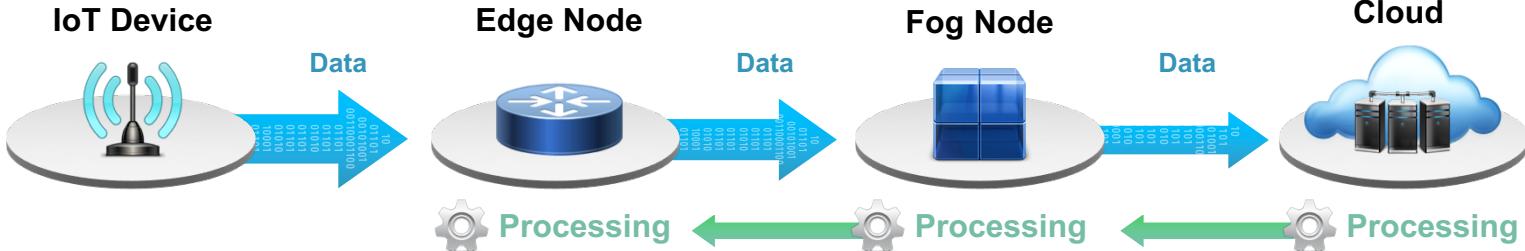
Solution - IoT Smart Edge

IoT
Computing
is a New
Computing
Paradigm

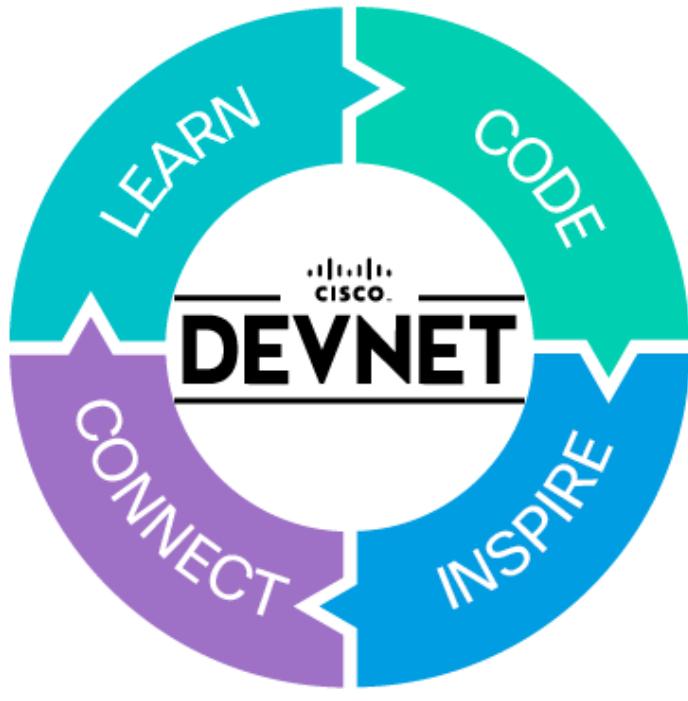
Taking Data to the Processing



Taking Processing to the Data



- ❖ Today we will Program the IoT devices to perform some Edge Compute.



DevNet

It's the place to create and find inspiring applications, learn about our APIs, and connect with other developers in our communities.

The single, resource for everything 'developer' at Cisco.



Scan and Join us now!
<https://developer.cisco.com>

The Learning Labs

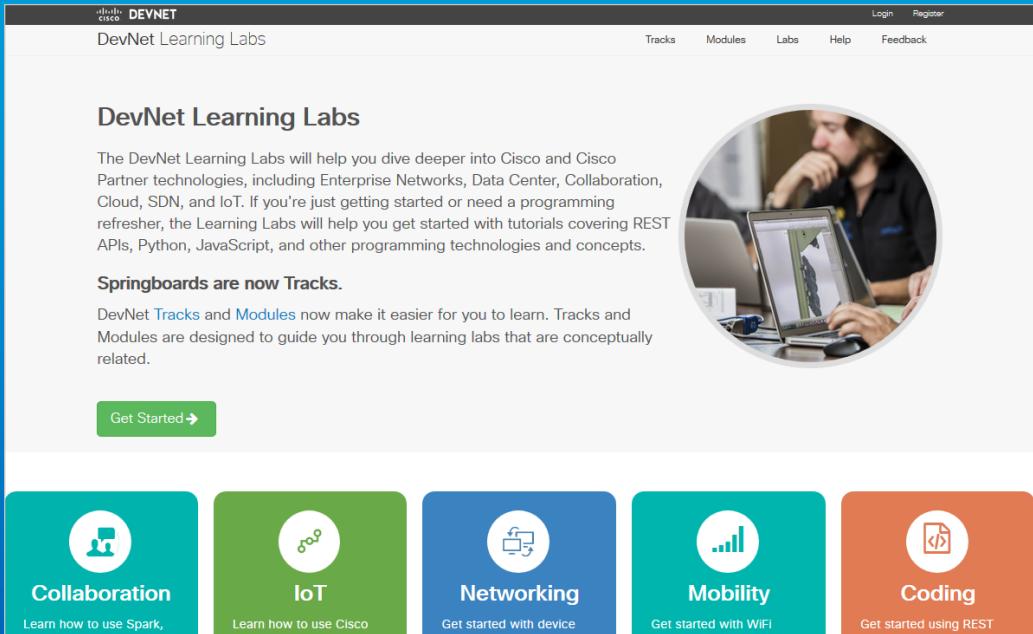
Self-paced, step-by-step tutorials on a wide range of programmability topics and solutions

Available online and at events with 1-on-1 support from the DevNet team

Learning centered around concrete tasks for specific types of developers



<https://learninglabs.cisco.com>



The screenshot shows the DevNet Learning Labs homepage. At the top, there's a navigation bar with links for Tracks, Modules, Labs, Help, and Feedback. Below the navigation, a large circular image shows a person working on a laptop. The main content area has a heading "DevNet Learning Labs" and a paragraph describing the purpose of the labs. It also features a section about "Springboards are now Tracks." At the bottom, there are five colored boxes representing different tracks: Collaboration (teal), IoT (green), Networking (blue), Mobility (teal), and Coding (orange). Each box contains an icon and a brief description.

DevNet Learning Labs

The DevNet Learning Labs will help you dive deeper into Cisco and Cisco Partner technologies, including Enterprise Networks, Data Center, Collaboration, Cloud, SDN, and IoT. If you're just getting started or need a programming refresher, the Learning Labs will help you get started with tutorials covering REST APIs, Python, JavaScript, and other programming technologies and concepts.

Springboards are now Tracks.

DevNet [Tracks](#) and [Modules](#) now make it easier for you to learn. Tracks and Modules are designed to guide you through learning labs that are conceptually related.

[Get Started →](#)

Collaboration
Learn how to use Spark,

IoT
Learn how to use Cisco

Networking
Get started with device

Mobility
Get started with WiFi

Coding
Get started using REST

The Learning Labs

Learning Labs are **Always On** and available from any web-enabled device
They're **Self Service** – just log in and go

Tracks



Modules



Labs

DevNet Learning Labs

Network Programmability for Network Engineers		
Learn about network programmability from the perspective of a Network Engineer. Contains information about programming, REST APIs, as well as new interfaces like NETCONF.		
3 Modules	11 Labs	6 Hours

DevNet Beginner		
Welcome DevNet beginner! Each module will contain an overview, a glossary, use cases, explanation of the technology, and how to implement the technology. You'll also find information on how to extend your learning and where to find resources to receive assistance. Good luck!		
3 Modules	9 Labs	4 Hours

Network Programmability for Application Developers		
Learn about network programmability from the perspective of an Application Developer. Contains information about basic networking concepts in addition to interfaces like RESTCONF.		
3 Modules	12 Labs	6 Hours

Cisco IOx		
Learn how to develop, deploy, and manage applications at the network edge with Cisco IOx.		
1 Module	3 Labs	2 Hours

Network Programmability for Network Engineers

Welcome about network programmability from the perspective of a Network Engineer. Contains information about programming, REST APIs, as well as new interfaces like NETCONF.

Choose a module to start learning

Please login to see your progress...

Network Programming

Learn the elements of network programming

NETCONF 101: Introduction to NETCONF

Learning the basics of the NETCONF protocol and how it differs from other programmatic interfaces such as RESTCONF

NETCONF 102: Using Python to generate NETCONF API calls

Learn how to call and consume a NETCONF API in Python

NETCONF 103: Parsing Your Scripts in NETCONF

Learn the basics of how NETCONF simplifies and improves network scripting

RESTCONF 101: Introduction to RESTCONF

Learning the basics of the RESTCONF protocol and how it differs from other programmatic interfaces such as NETCONF

RESTCONF 102: Generate RESTCONF API calls with Python

Learn how to call and consume a RESTCONF API in Python

NETCONF 103: Parsing Your Scripts in RESTCONF

DevNet Learning Labs

All (221) In Progress Completed Sort By Search >

Tags

- All
- Coding
- Collaboration
- Cloud
- Networking
- Mobility
- Security
- Featured

Please login to see your progress...

Spark: DevNet Bot

Introducing Devie, our DevNet Bot for Cisco Spark. Come play with Devie. Interact with the DevNet Train, Crm and more.

Spark Featured Crm Fun IoT Login to Start Lab

ACI 101 - The APIC Interfaces

Learn the basics of the APIC controller and interfaces, and issue basic commands using the CLI

Data Center SDN



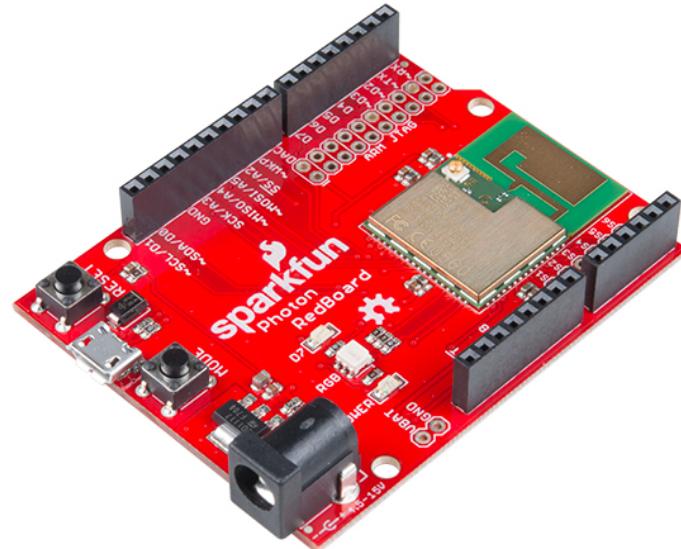
<https://tinyurl.com/iothacker>

Beginner Level

Build with IoT

Welcome!

Today we will hack some code on to the Photon Board and push this data to the internet



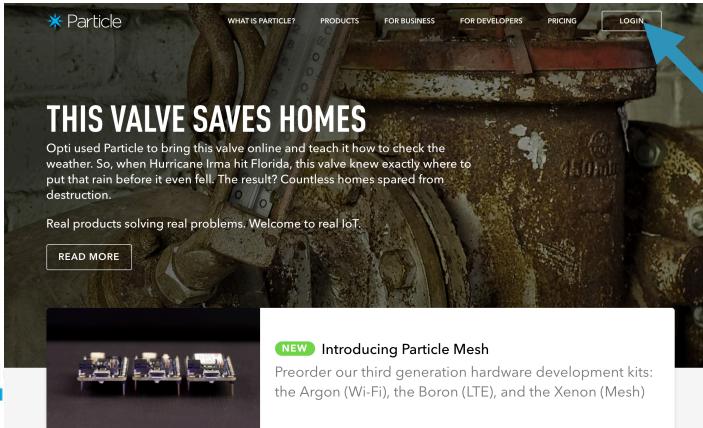
Photon

The Photon is an amazing piece of low cost gear with built in Wifi.

Think of it like a turbo charged Arduino.

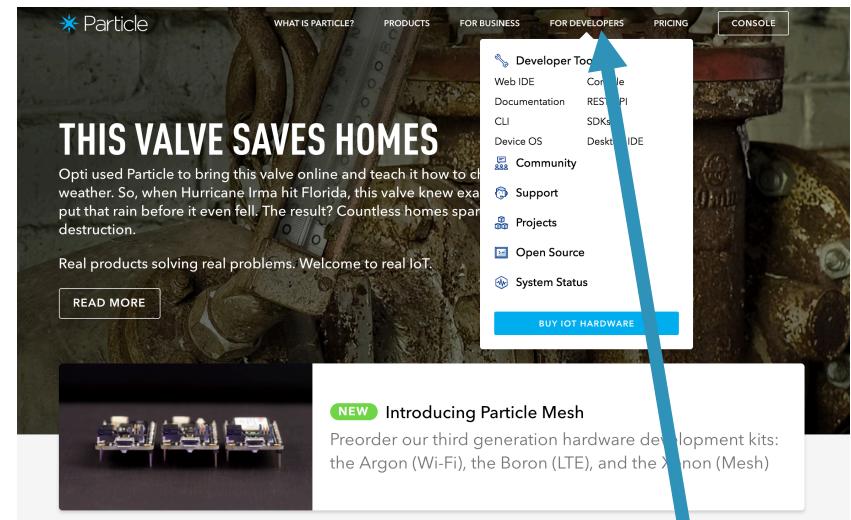
Step1) Login to particle.io

- Username:
ciscoiot2018+<Pod>@gmail.com
- Password: Cisco123/
Jeffcon2018



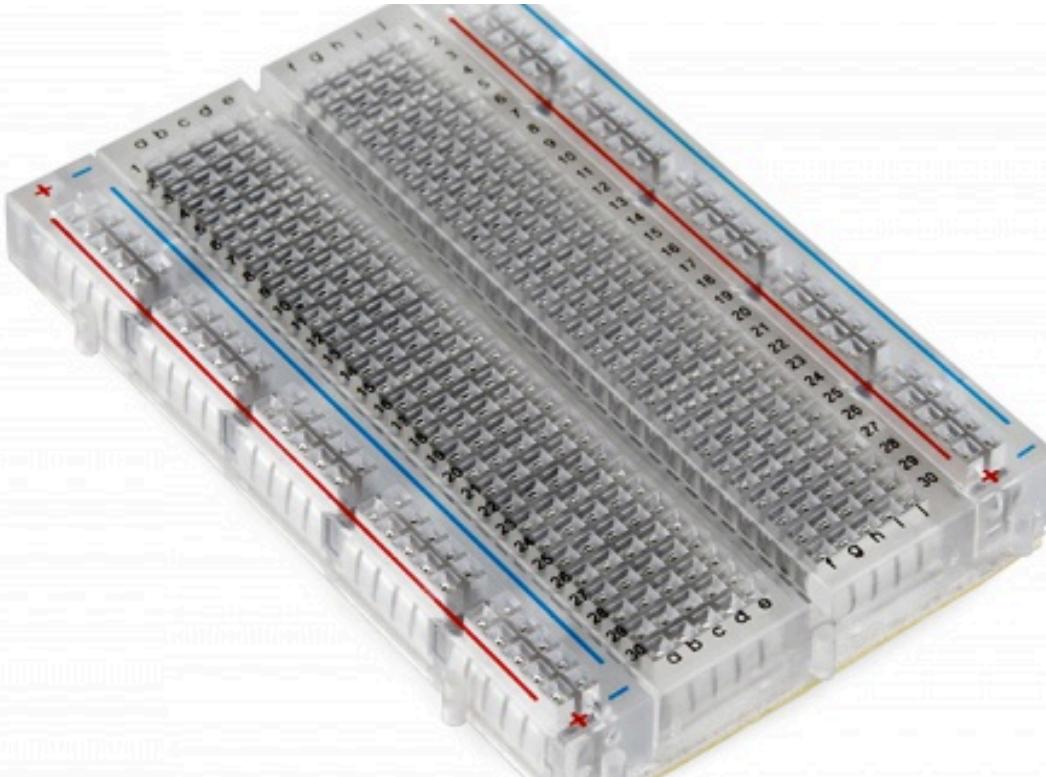
Login

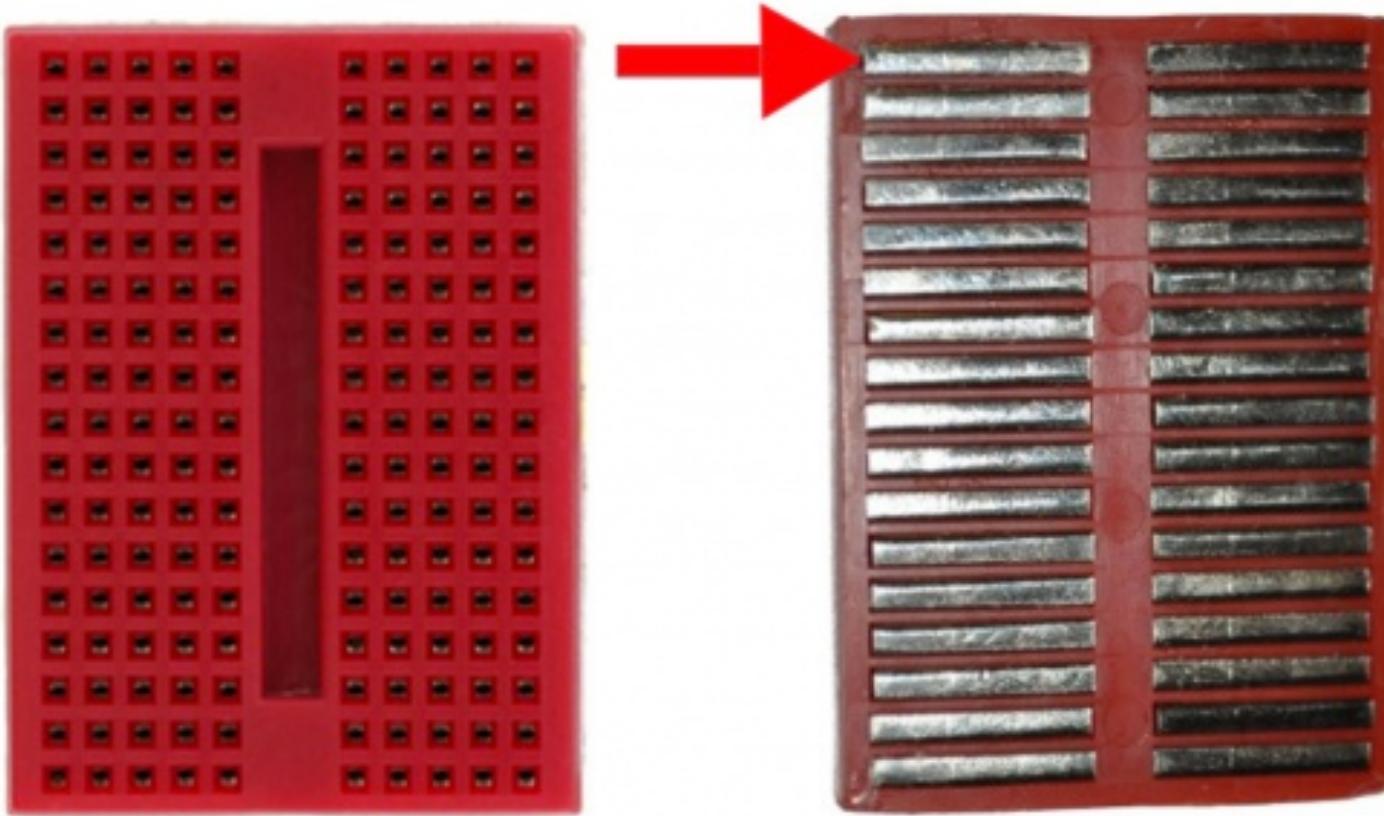
Step 2) Navigate to Web IDE “For Developers” > “Web IDE”

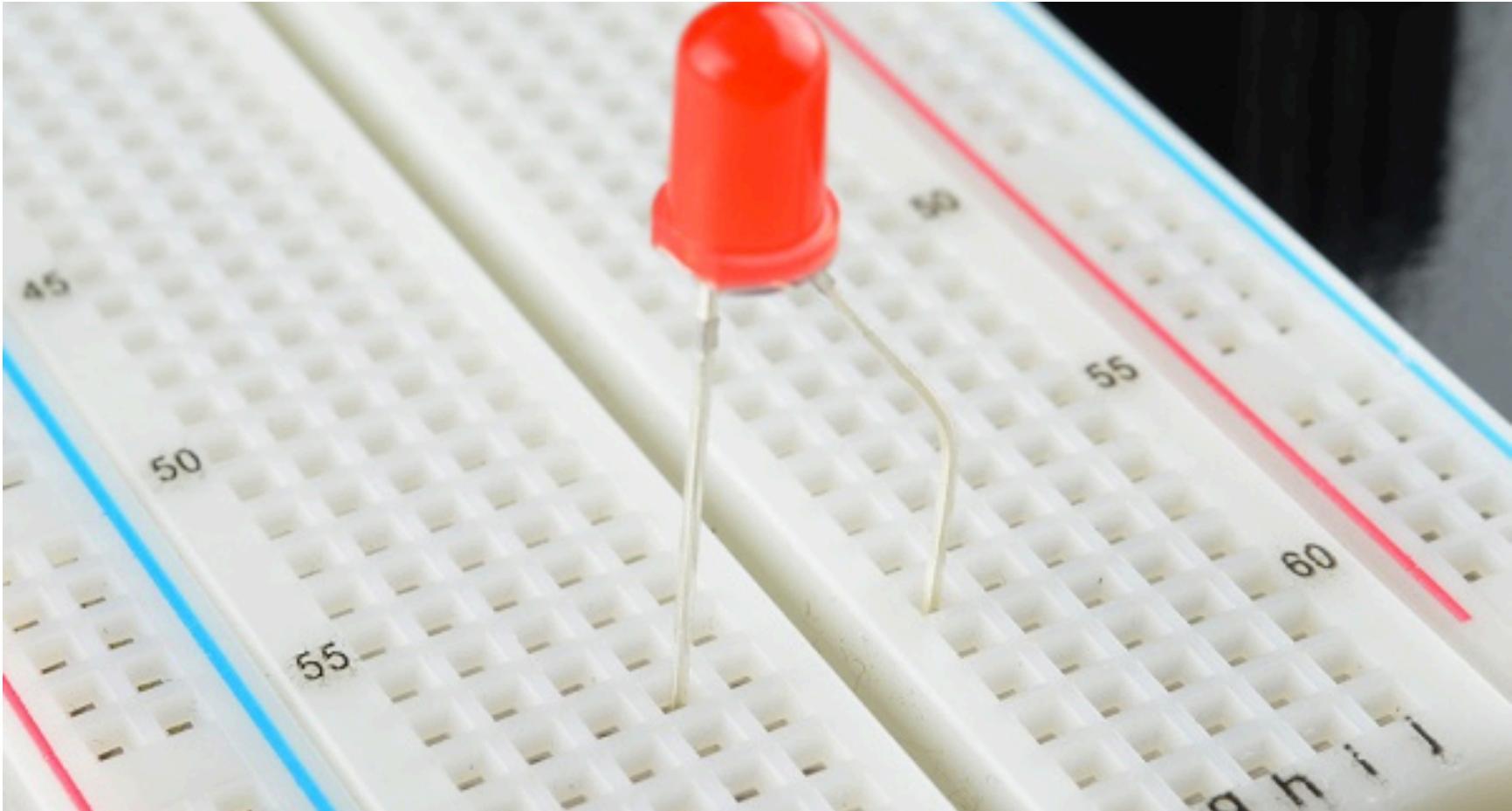


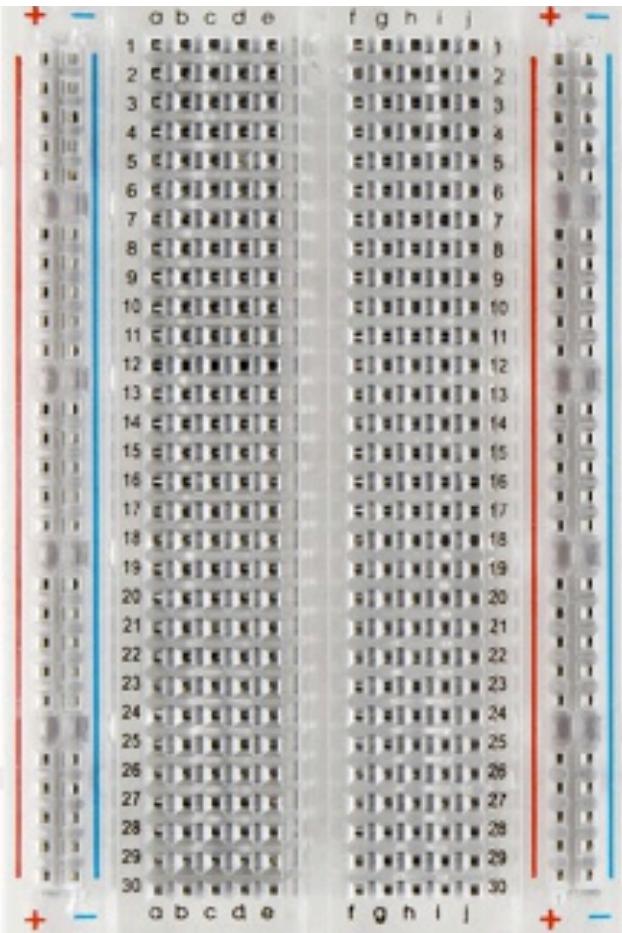
Web IDE

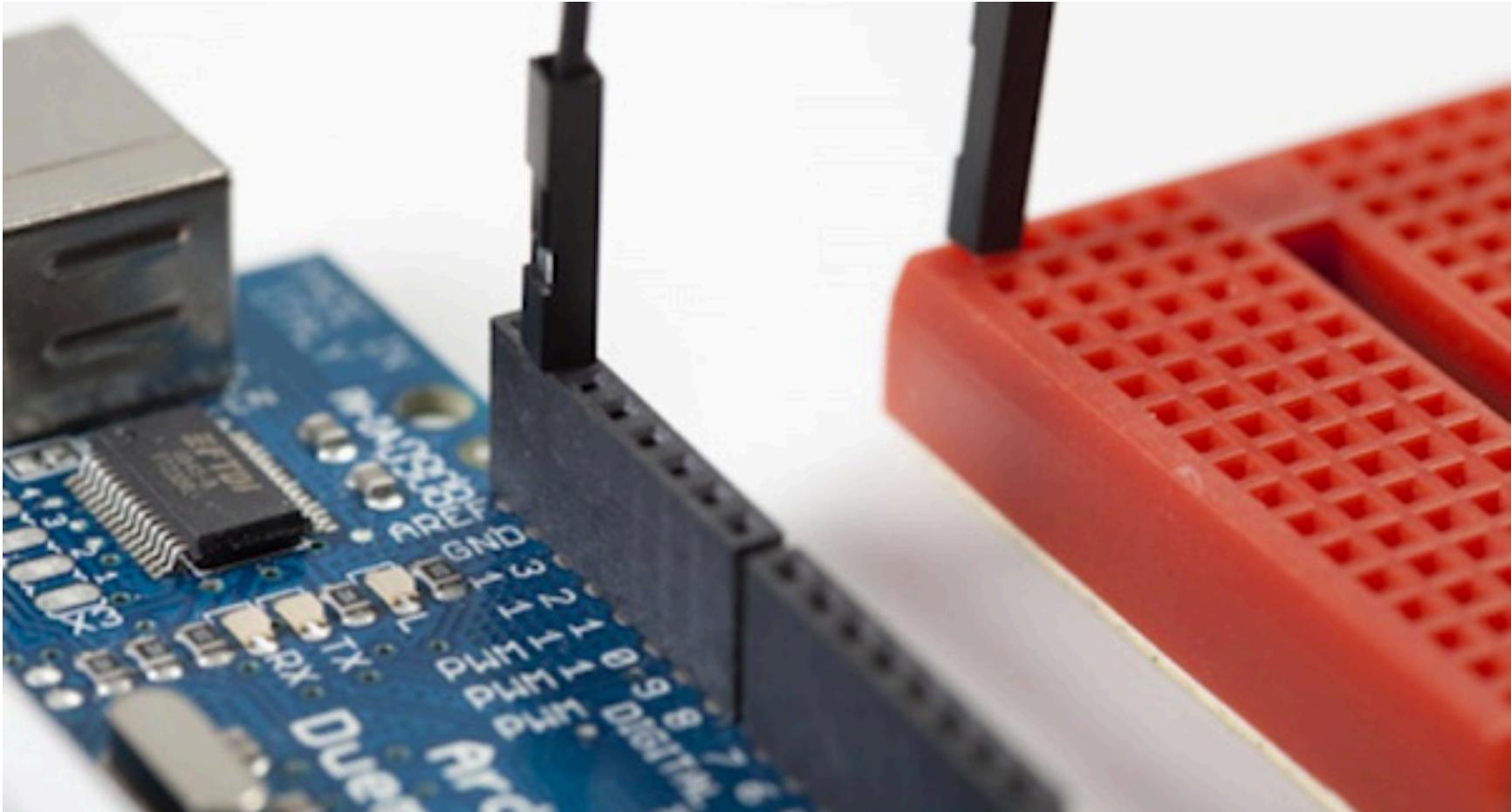
How Breadboards work





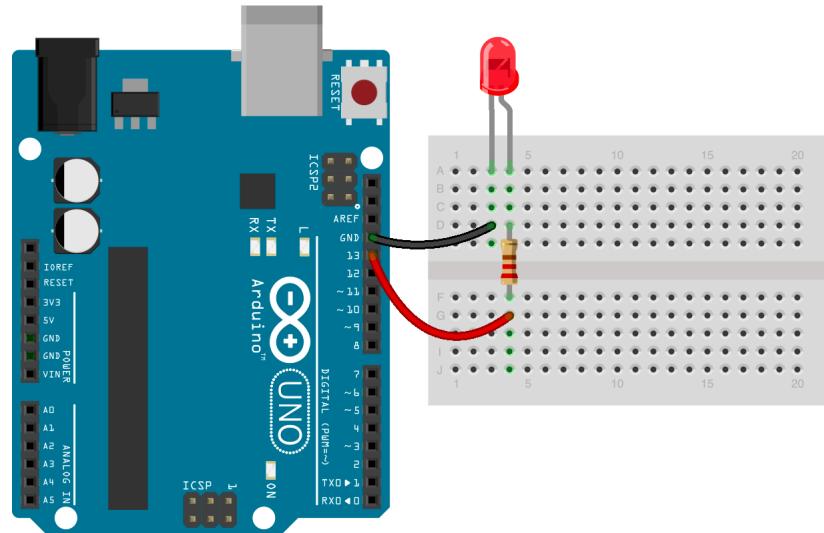






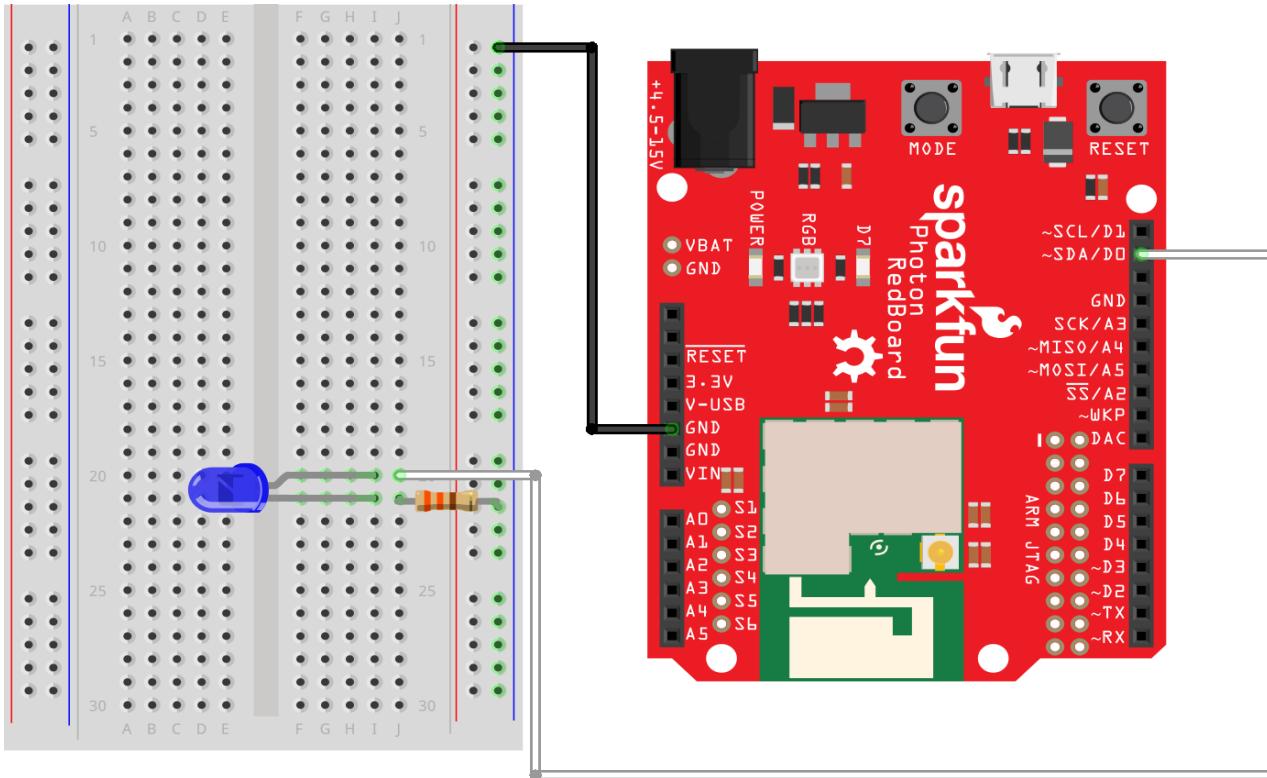
LED

- Light Emitting Diode's
- They run at ~2V.
- Use a resistor because the Photon is 3.3V.



fritzing

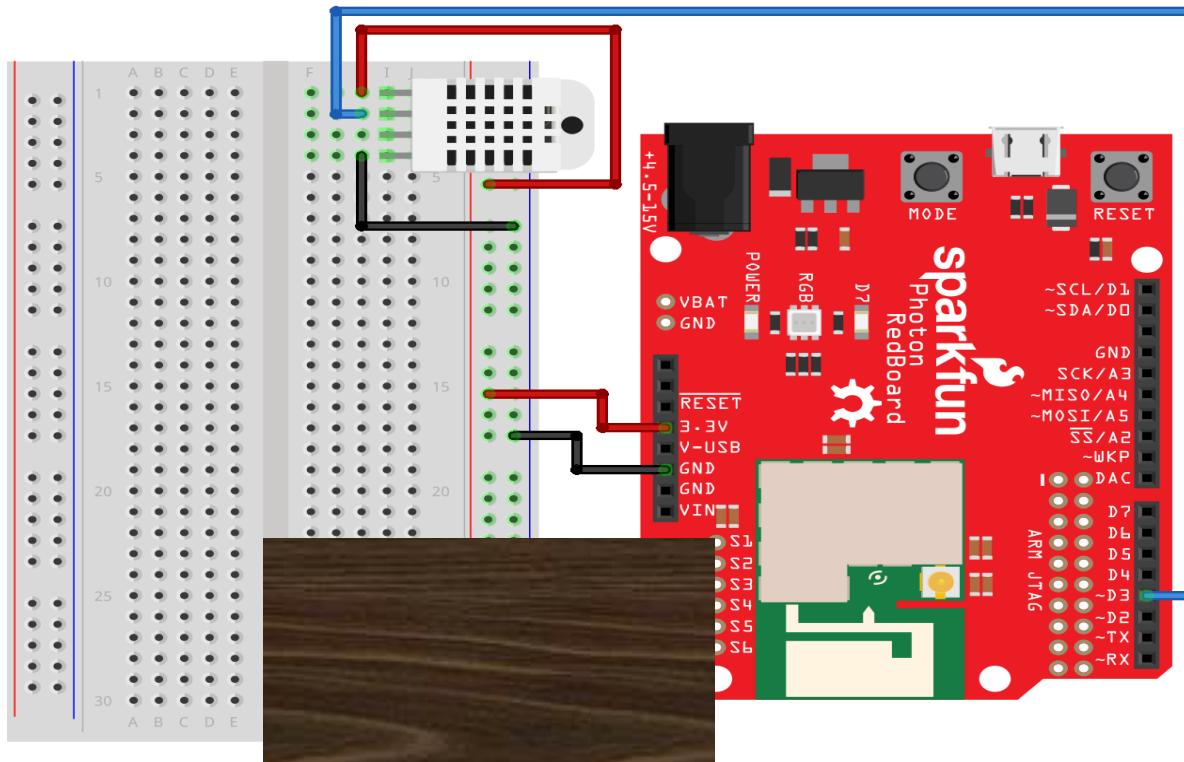
Blink



Blink

```
int led = D0; // LED is connected to D0  
  
// This routine runs only once upon reset  
void setup()  
{  
    pinMode(led, OUTPUT); // Initialize D0 pin  
    as output  
}  
  
// This routine loops forever  
void loop()  
{  
    digitalWrite(led, HIGH); // Turn ON the LED  
    delay(1000);           // Wait for 1000mS = 1 second  
    digitalWrite(led, LOW); // Turn OFF the LED  
    delay(1000);           // Wait for 1 second  
}
```

Temperature & Humidity



Have fun, but don't break
them. ☺

Writing your code and compiling in Particle

The image shows a screenshot of the Particle Apps interface. On the left, there's a sidebar with icons for a lightning bolt, a checkmark, and a folder. Below these are sections for "Current App" (with fields for "Title" and "Optional description"), "Files" (with a "Save" button), and "My apps" (listing "SparkTest", "Blank", and "TemperatureSpark"). A search bar at the bottom says "Type to find". On the right, there's a code editor window with the following code:

```
1 - void setup() {  
2 }  
3 }  
4  
5 void loop() {  
6 }  
7 }
```

Blue arrows point from the sidebar icons to the "Step (3) Verify code" and "Step (2) Save" buttons. Another blue arrow points from the "Step (1) Write your Code here" text to the code editor area.

Step (4) Flash Code to

Step (3) Verify code

Step (2) Save

Step (1) Write your Code here

Try the IoT Exercises 1 & 2 in Handout

Beginner Level Build with Cisco Spark?

Cisco Spark for Developers

The screenshot shows the homepage of the Cisco Spark for Developers website. At the top, there's a navigation bar with the Cisco logo, the text "Spark for Developers", and links for "Documentation", "Blog", "Support", and "Log In". Below the header, a large blue banner features the text "Your team. Your tools. Your work." and "Bring them together, wherever they are, through Spark." A "Get Started" button is located in the lower-left corner of this banner. The main visual is a stylized illustration of a city skyline with various icons (Trello, pd, stripe, IFTTT, etc.) floating in a cloud above it, set against a background of a park and a bus. At the bottom, there are three circular icons with text below them: "Explore" (magnifying glass icon), "Share" (square with a circular arrow icon), and "Create" (wrench and screwdriver icon). Each icon has a brief description: "Dive into the Documentation to quickly find what you need" for Explore, "Show off your work or find inspiration from others in the Forum" for Share, and "Open to integration, Spark gives you the tools to build your own apps" for Create.

<https://developer.ciscospark.com/>



Developer Portal



Interactive Docs



24/7 Dev Support



Server SDKs

<https://developer.ciscospark.com> – Log In

The screenshot shows the homepage of the Cisco Spark for Developers website. At the top right, a user profile for "Brett Tiller" is displayed, showing a photo, a copyable access token ("NWRhZDdmZjtrYJewI"), and a "Log Out" button. A red oval highlights this area. Below the profile, there's a large blue header with the Cisco logo and the text "Spark for Developers". The main content features the slogan "Your team. Your tools. Your work." with a subtext "Bring them together, wherever they are, through Spark." A prominent "Get Started" button is located on the left. To the right, there's a central graphic of a white cloud containing a green and blue cross icon, with various application icons floating around it, set against a background of stylized buildings and clouds.

Documentation Blog

Brett Tiller
NWRhZDdmZjtrYJewI Copy
Log Out My Access Token

cisco Spark for Developers

Your team. Your tools.
Your work.

Bring them together, wherever they are, through Spark.

Get Started

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Spark API Documentation: <https://developer.ciscospark.com>

 Spark for Developers Documentation Test Mode OFF 

GUIDES
Getting Started
Quick Reference
Pagination
Message Attachments
Formatting Messages
Webhooks Explained

APPS
Integrations (OAuth)
Bots

API REFERENCE
People
Rooms
List Rooms
Create a Room
Get Room Details
Update a Room

List Rooms

List rooms.
By default, lists rooms to which the authenticated user belongs.

Query Parameters

Name	Type	Description	Required
teamId	string	Limit the rooms to those associated with a team, by ID.	
max	integer	Limit the maximum number of rooms in the response.	
type	string	Available values: <code>direct</code> and <code>group</code> . <code>direct</code> returns all 1-to-1 rooms. <code>group</code> returns all group rooms. If not specified or values not matched, will return all room types.	

Example Response

```
{ "items" : [ { "id" : "Y2lzY29zcGFyazovL3VzL1JPT00vYmJjZWIxYwQtNDNm", "title" : "Project Unicorn - Sprint 0", "type" : "group", "isLocked" : "true", "teamId" : "Y2lzY29zcGFyazovL3VzL1JPT00vNjR1NDVhZTA", "lastActivity" : "2016-04-21T19:12:48.920Z", "created" : "2016-04-21T19:01:55.966Z" } ] }
```



Spark API Documentation: <https://developer.ciscospark.com>

The screenshot shows the Cisco Spark API documentation for the 'List Rooms' endpoint. The page has a left sidebar with navigation links for Guides, Quick Reference, Pagination, Message Attachments, Formatting Messages, Webhooks Explained, Integrations (OAuth), and Bots. Under 'API REFERENCE', there are sections for People, Rooms, and Memberships. The 'Rooms' section is expanded, showing 'List Rooms' (which is circled in red), 'Create a Room', 'Get Room Details', 'Update a Room', and 'Delete a Room'. Below these are 'Memberships', 'Messages', and 'Teams'.

The main content area is titled 'List Rooms' and contains the following information:

- A 'Test Mode' button with a switch icon and the word 'ON' (also circled in red).
- A description: 'List rooms. By default, lists rooms to which the authenticated user belongs.'
- A 'GET' button followed by the URL: <https://api.ciscospark.com/v1/rooms>.
- 'Request Headers' section with two entries: 'Content-type: application/json; charset=utf-8' and 'Authorization: Bearer MDU3ZjI3ODMtY2ZlMy00MDY2LTk3YztOGYxM...' (also circled in red).
- 'Query Parameters' table:

Name	Type	Your values	Required
teamId	string	<input type="text"/>	<small>i</small>
max	integer	<input type="text"/>	<small>i</small>
type	string	<input type="text"/>	<small>i</small>
- A large red circle highlights the 'Run' button at the bottom of the query parameters table.
- To the right, a 'Response' panel shows a JSON array of room objects, each with fields like id, title, type, isLocked, lastActivity, creatorId, and created.
- A status bar at the top right indicates '200 / success'.

Lets review what just happened?

What is REST API?

REST Web Service

What is a Web Service?

- A way for two systems to communicate through a defined interface.
- Two major types of Web Services – REST or SOAP

What is a REST Web Service?

- REST is *an architecture style* for designing networked applications.
- A REST web service is a web service that is as **easy to call as making an HTTP request**.
- RESTful interfaces often offer the CRUD operations

What is so great about REST?

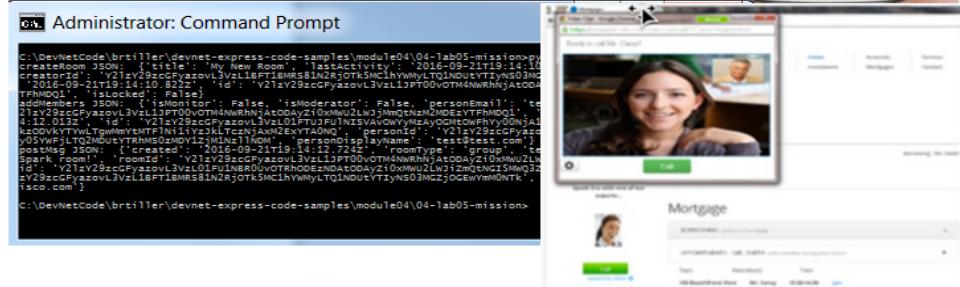
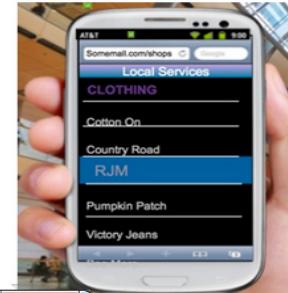


Spark REST APIs

- Rooms
- People
- Memberships
- Messages

How does this work?

- Easy to use:
- In mobile apps
- In console apps
- In web apps



What is in the Response?

HTTP Status Codes

- <http://www.w3.org/Protocols/HTTP/HTRESP.html>
- 200 OK
- 201 Created
- 500 Internal Error

Body Headers (9) STATUS 201 Created TIME 455 ms

Pretty Raw Preview   JSON XML

```
1 {  
2   "version": "0.0",  
3   "response": "349117ce-3c7f-4e14-bc6f-83071e990198: Acl Policy  
Appended Successfully on the Device : 9cb0df12-b9f7-4551-932e-  
3391974da58f"  
4 }
```

Headers

Body

- JSON
- XML

Spark APIs Extend Cisco Collaboration Cloud

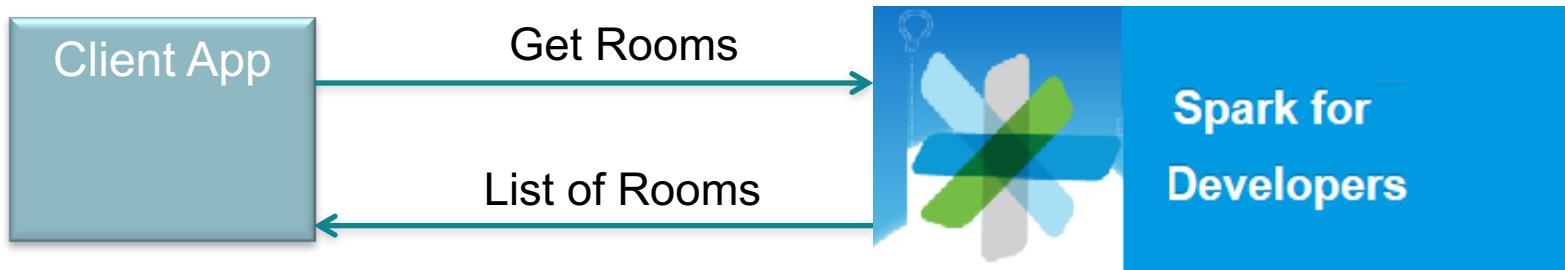
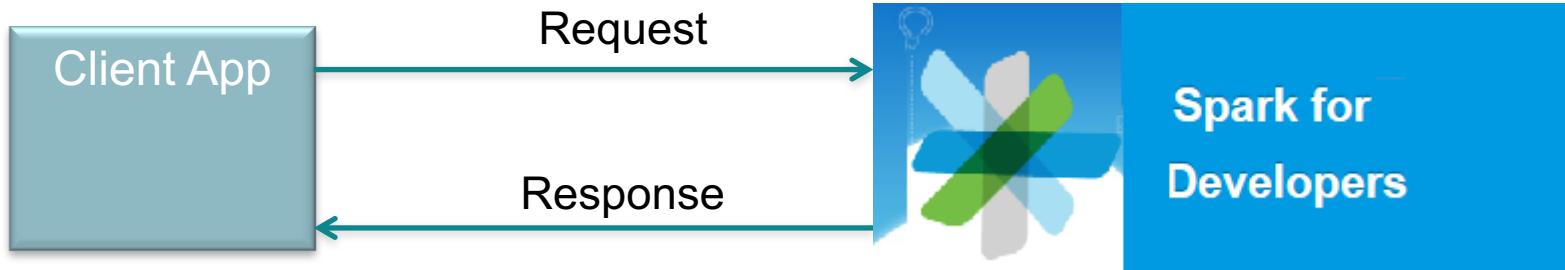


**'Your App'
Now with
Cisco Collab!**

The diagram shows a large grey rounded rectangle containing a vertical list of API endpoints. To the left of each endpoint is a colored button indicating the HTTP method: GET (grey), POST (yellow), PUT (blue), or DELETE (red).

- GET /People
- POST /Memberships
- PUT /Rooms
- DELETE /Messages
- DELETE /Webhooks

How does this work?



Spark Example: Get List of Rooms



<https://tinyurl.com/iothacker>

Expert Level
Build Your own Program

Chatbot
IoT program
Python API

Cisco CMX

#NetDevOps #Devnet



Use Case

- Location based services, Analytics – WiFi & BLE
- Allow for users to check how “crowded” an area (event, line, store, etc) is relative to capacity.
- Automate attendance and classroom assignments from mobile device

Getting Started with Cisco CMX : <https://developer.cisco.com/site/cmx-mobility-services/>

Hello World

Signup & Login to developer.cisco.com

visit following URL <https://learninglabs.cisco.com/modules/dna-cmx-mse>

Sandbox * Dashboard: <http://cmxlocationsandbox.cisco.com/> * Username: learning * Password: learning

<https://github.com/akshayakumar/CiscoHackathon>



Cisco Spark

#ChatOps #Spark #Devnet



Use case

- Chat bot that can be interrogated
- Public announcements: Allow for broadcast messages to be sent/received
- Bot to Order Pizza, show direction to airport, report network health
- Alerts, Notifications share to individual or Group

Getting Started with <https://developer.ciscospark.com/getting-started.html>

Hello World

<https://learninglabs.cisco.com/tracks/collab-cloud>

Sandbox

Create your own Cisco account

<https://developer.ciscospark.com/getting-started.html>

API Test-mode <https://developer.ciscospark.com/endpoint-people-get.html>

<https://github.com/akshayakumar/CiscoHackathon>

