WELCOME TO

INITECH

http://aka.ms/hcicsource

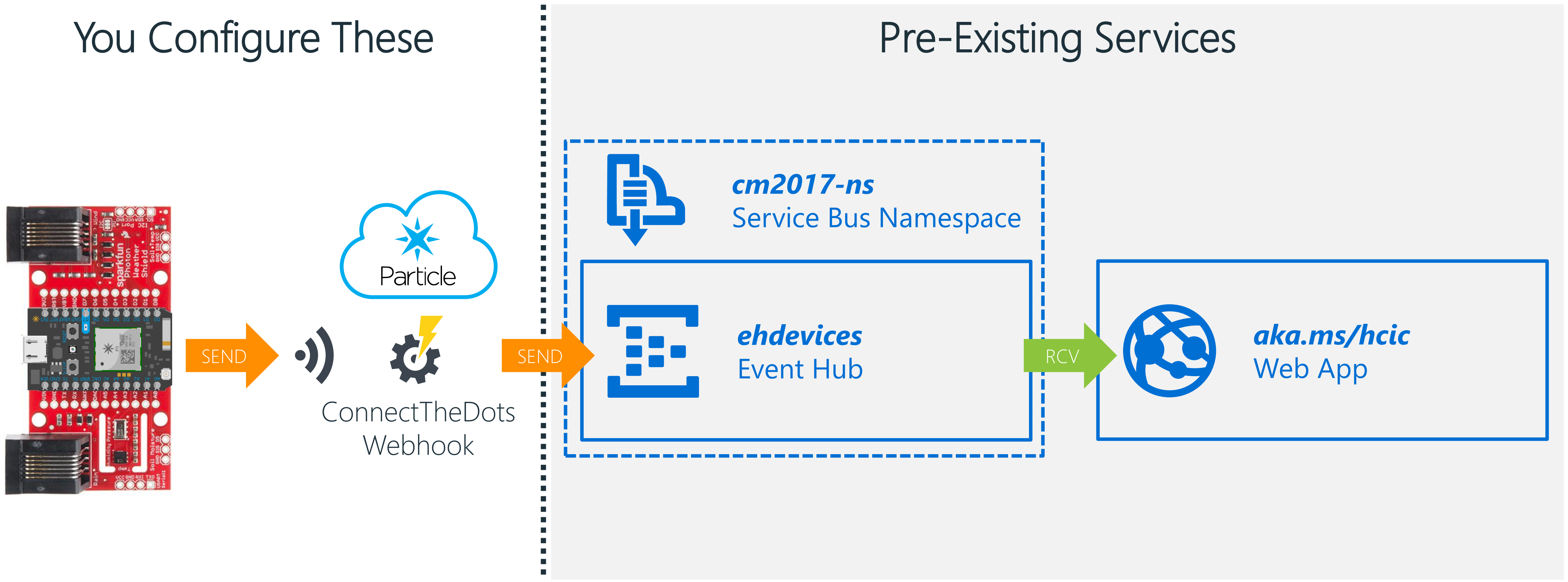
Microsoft

HOW COLD IS CODEMASH?

http://aka.ms/hcicsource

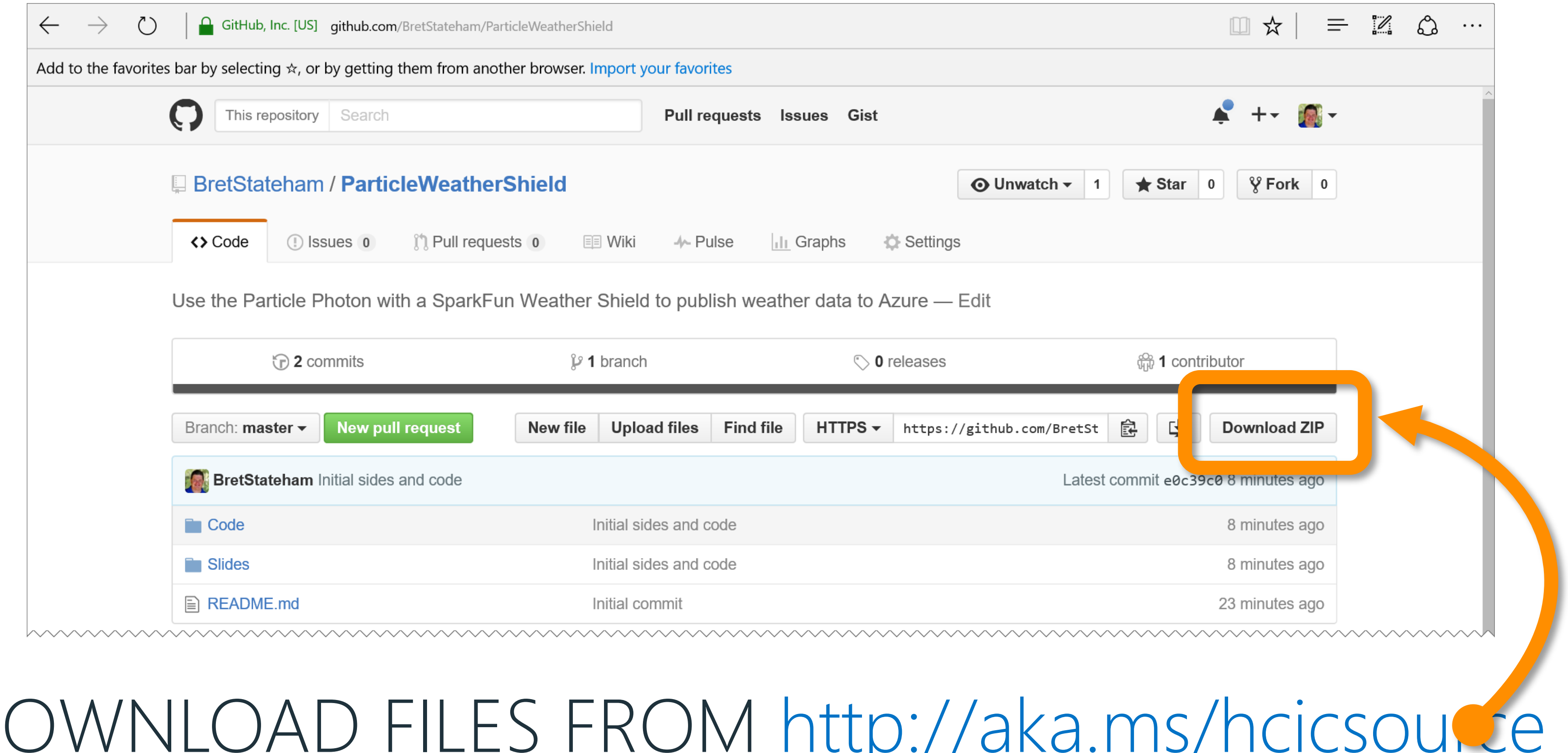
Microsoft

ARCHITECTURE OVERVIEW



http://aka.ms/hcicsource

GITHUB REPO


github.com/BretStateham/ParticleWeatherShield

Add to the favorites bar by selecting ☆, or by getting them from another browser. Import your favorites

BretStateham / ParticleWeatherShield

Use the Particle Photon with a SparkFun Weather Shield to publish weather data to Azure — Edit

2 commits · 1 branch · 0 releases · 1 contributor

Branch: master · New pull request · New file · Upload files · Find file · HTTPS · https://github.com/BretSt · Download ZIP

BretStateham Initial sides and code — Latest commit e0c39c0 8 minutes ago

Code	Initial sides and code	8 minutes ago
Slides	Initial sides and code	8 minutes ago
README.md	Initial commit	23 minutes ago

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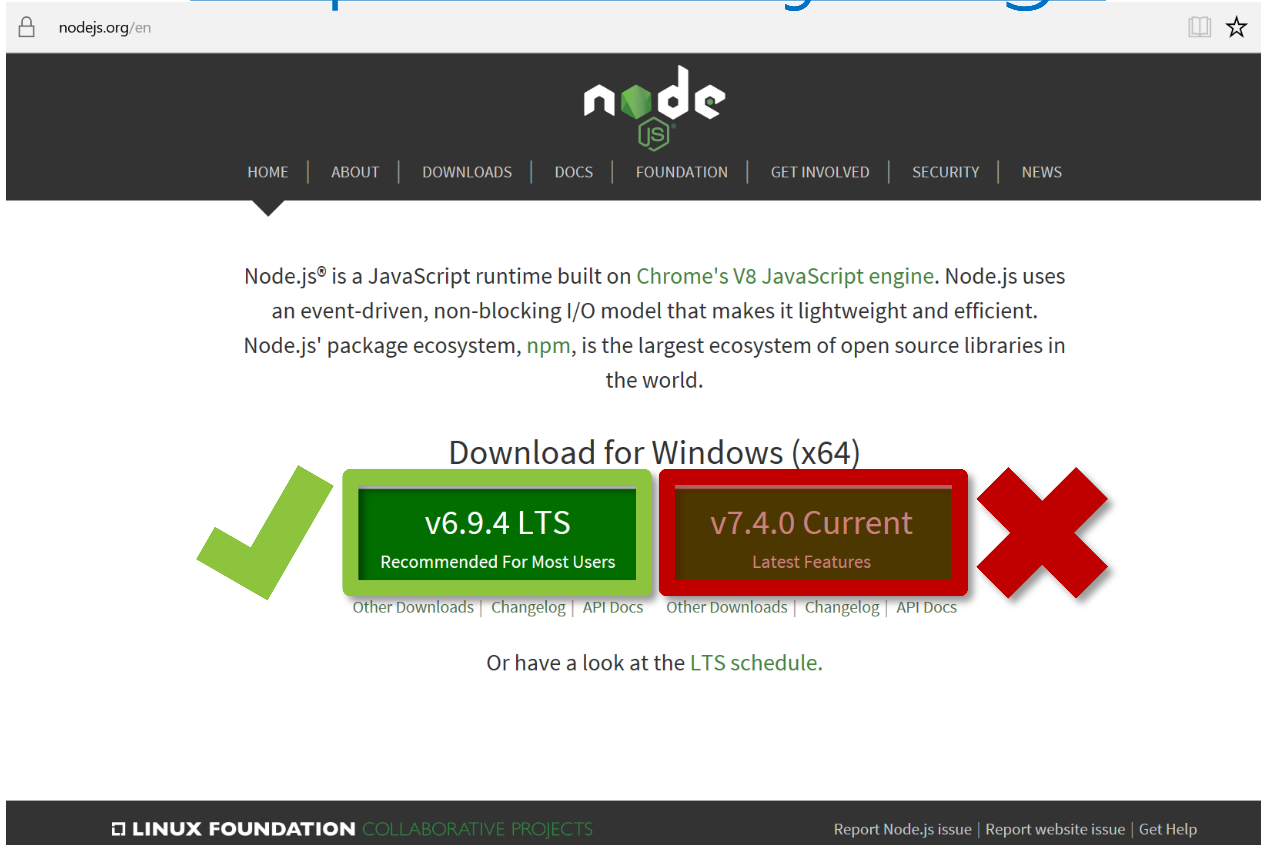
Installing prereqs, just a moment!

INSTALLING PREREQUISITES

INSTALL NODE.JS v6.9.4 NOT v7.4.0

https://nodejs.org/


nodejs.org/en

HOME | ABOUT | DOWNLOADS | DOCS | FOUNDATION | GET INVOLVED | SECURITY | NEWS

Node.js® is a JavaScript runtime built on Chrome's V8 JavaScript engine. Node.js uses an event-driven, non-blocking I/O model that makes it lightweight and efficient. Node.js' package ecosystem, npm, is the largest ecosystem of open source libraries in the world.

Download for Windows (x64)

v6.9.4 LTS
Recommended For Most Users

Other Downloads | Changelog | API Docs

v7.4.0 Current
Latest Features

Other Downloads | Changelog | API Docs

Or have a look at the LTS schedule.

LINUX FOUNDATION COLLABORATIVE PROJECTS

Report Node.js issue | Report website issue | Get Help

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Microsoft

INSTALL PREREQUISITES

- Install Node v6.9.4 LTS (NOT v7.4.0)
  https://nodejs.org/

  Need a version manager for node? Check out https://github.com/creationix/nvm for Mac OSx or Linux or http://github.com/coreybutler/nvm-windows for Windows

- Download and install Python 2.x (not 3+)
  https://www.python.org/downloads/

- On Windows? You *may* need Visual Studio C++ tools:
  http://aka.ms/msbuild2013

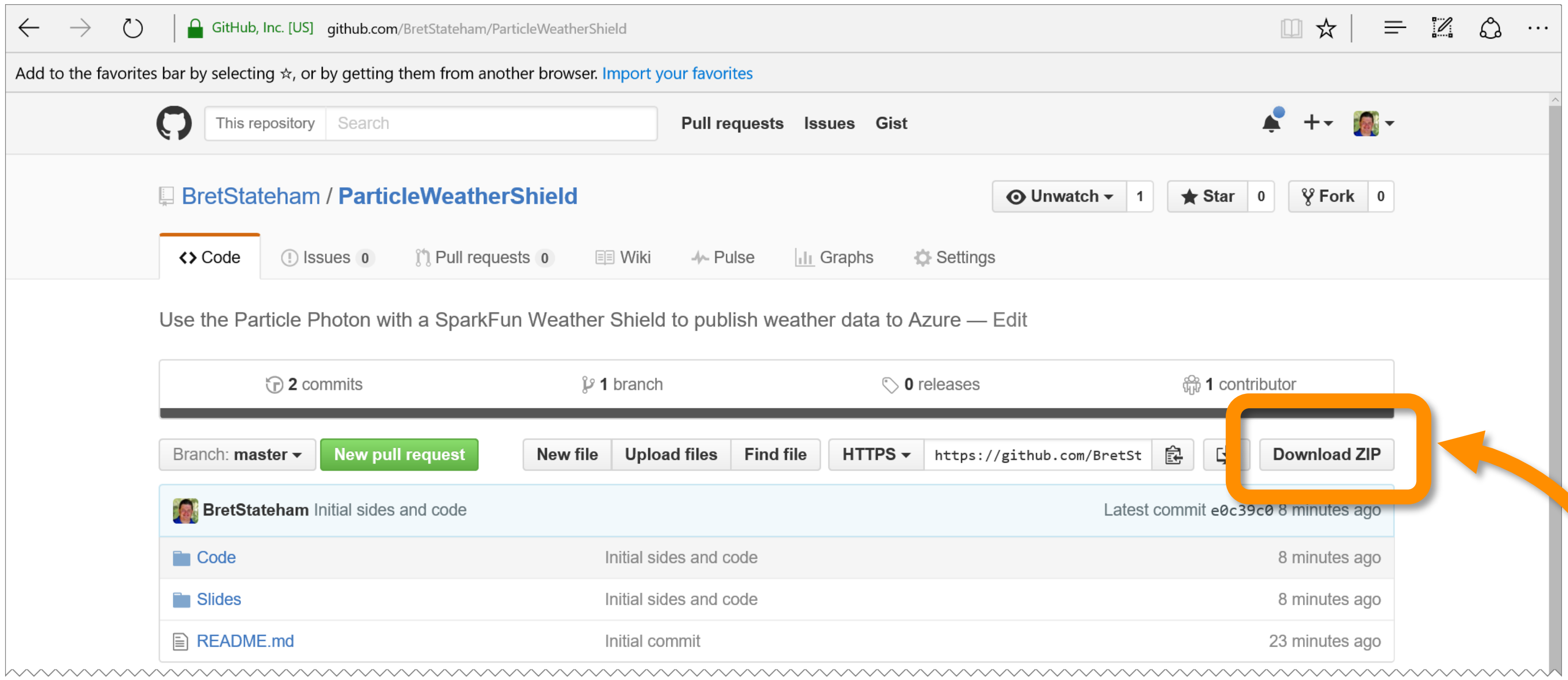
REBOOT AFTER

INSTALL THE PARTICLE-CLI

Windows:	Open a command prompt
Mac:	Open a terminal window (may need to use **sudo**)

```
npm install –g particle-cli
```

DOWNLOAD THE SOURCE



github.com/BretStateham/ParticleWeatherShield

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BretStateham Initial sides and code — Latest commit e0c39c0 8 minutes ago

Code	Initial sides and code	8 minutes ago
Slides	Initial sides and code	8 minutes ago
README.md	Initial commit	23 minutes ago

On Windows, "unblock" the .zip before you extract it:

- Right-click on .zip
- Select Properties
- Check "unblock"
- Click "OK"

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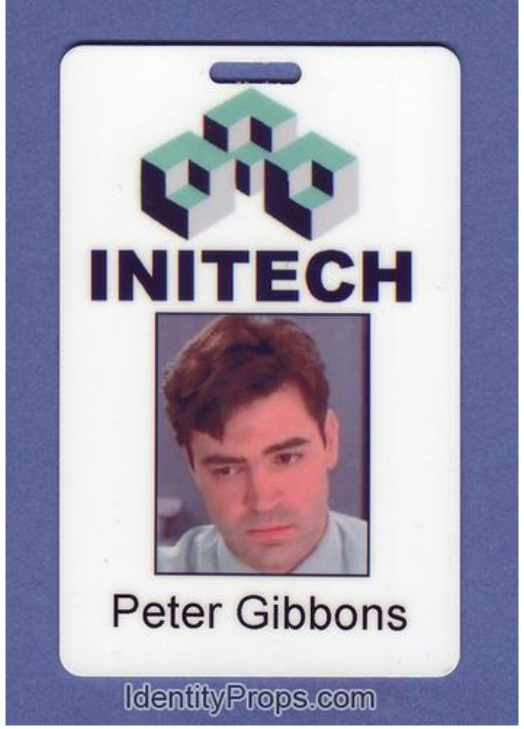
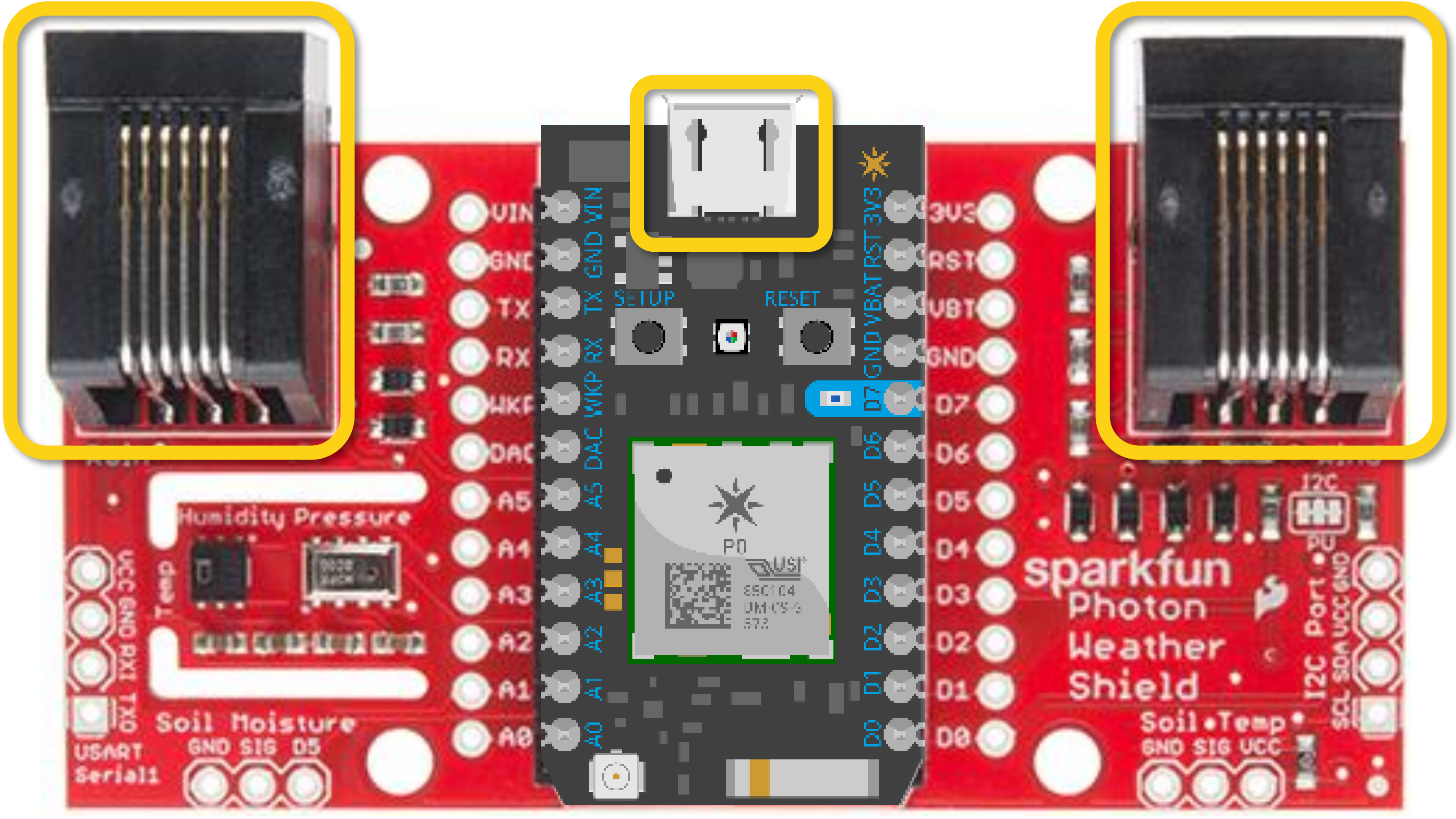
Microsoft



SETTING UP AND CLAIMING THE PHOTON

ASSEMBLE THE PHOTON AND WEATHER SHIELD



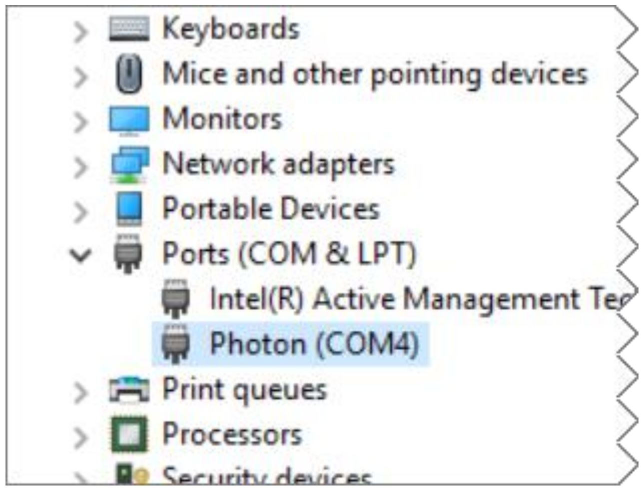
Photon's USB port on the same edge as the Rain and Wind sensor jacks

CONNECT THE PHOTON TO YOUR COMPUTER VIA USB CABLE

- On Windows? Install the driver:

  http://aka.ms/photondriver

- Extract the .zip file to a folder on your computer:
- Open Device Manager
- Right click-on the un-recognized device
- Select “Update Driver Software…”
- Point to the folder where you extracted the driver
- Complete the install
- Note the COM port it is attached to



IDENTIFY THE ATTACHED PHOTON

- First find the COM port it is attached to:

```
particle serial list
```

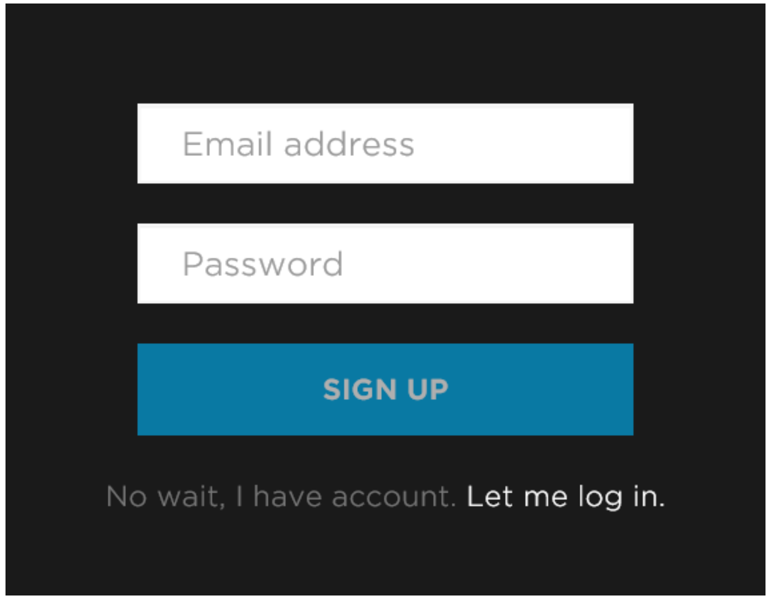
- Then, get the device ID:

```
particle serial identify
```

- Copy the Photon ID to your clipboard and save somewhere for later

CREATE A FREE PARTICLE.IO ACCOUNT

- Go to http://particle.io
- Click on the "build" link: http://build.particle.io/build
- Create an account using
  - U: <id>@mailinator.com
  - P: <id>

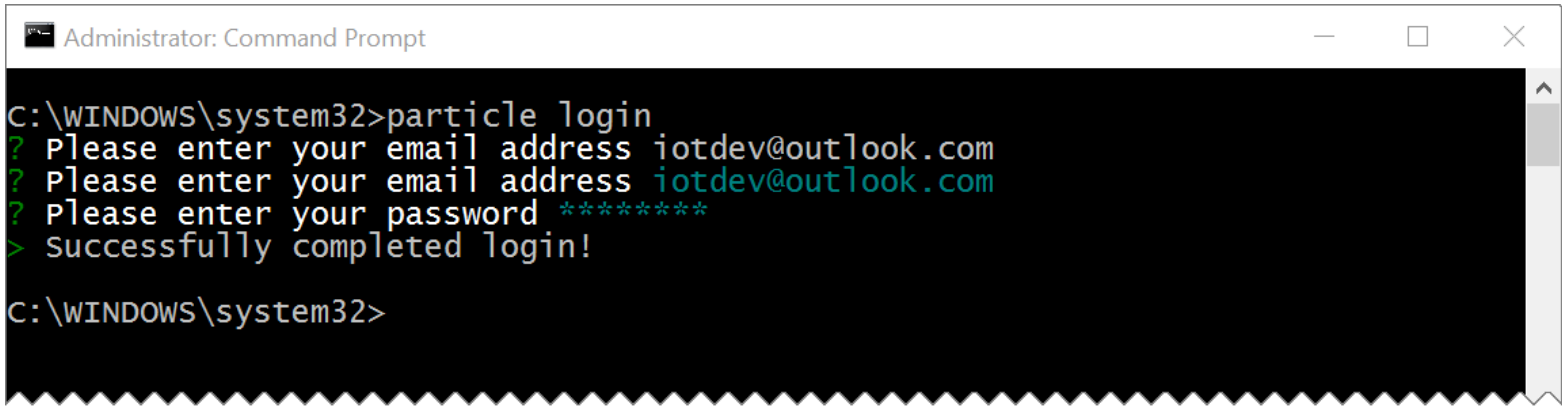


LOGIN TO THE PARTICLE-CLI

- From a command prompt / terminal window:

```
particle login
```

- Use the credentials for particle build account you created


Administrator: Command Prompt

```
C:\WINDOWS\system32>particle login
? Please enter your email address iotdev@outlook.com
? Please enter your email address iotdev@outlook.com
? Please enter your password ********
> Successfully completed login!

C:\WINDOWS\system32>
```

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CLAIM AND NAME YOUR PHOTON

- Then, get the device ID, copy the reported ID to your clipboard (Make sure the Photon is in Listening Mode):

```
particle serial identify
```

- Add the device to your account

```
particle device add <id>
```

- Name the device

```
particle device rename <id> <newname>
```

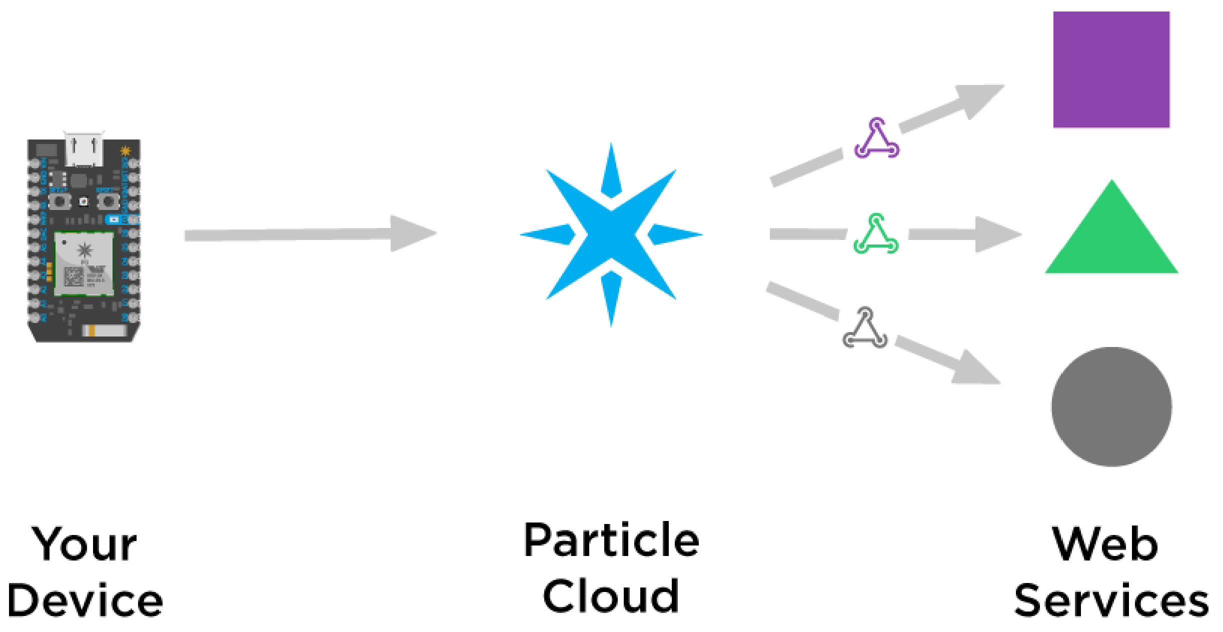
CONFIGURE THE PARTICLE WIFI

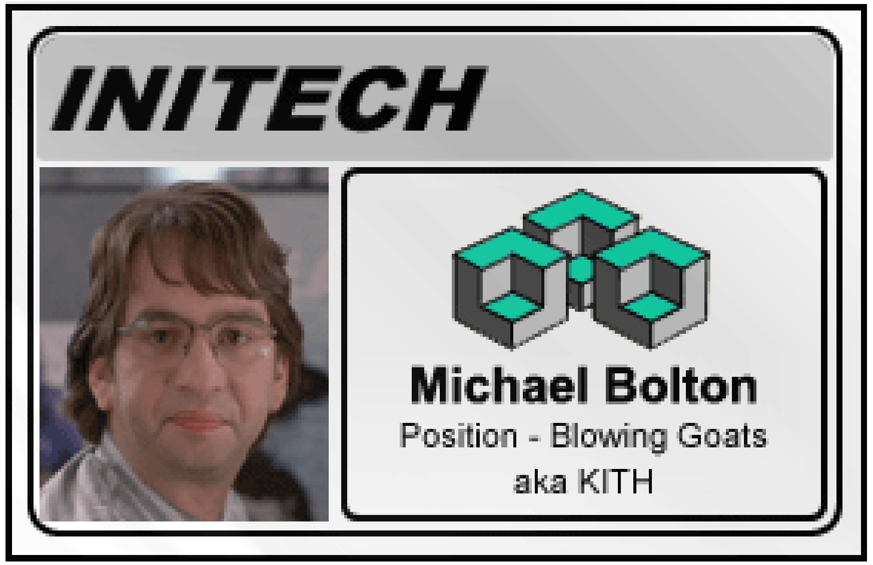
- From the command prompt:

```
particle serial wifi
```

Follow the prompts to connect the WiFi:

```
<your wifi ssid>
<your wifi security mode>
<your wifi cypher type>
<your wifi password>
```





CREATING THE WEBHOOK

http://aka.ms/hcicsource

Microsoft

```
{
  "event": "HowColdIsCodemash",
  "url": "https://cm2017-ns.servicebus.windows.net/ehdevices/messages",
  "requestType": "POST",
  "json": {
    "subject": "{{s}}",
    "unitofmeasure": "{{u}}",
    "measurename": "{{m}}",
    "value": "{{v}}",
    "organization": "{{o}}",
    "displayname": "{{d}}",
    "location": "{{l}}",
    "timecreated": "{{SPARK_PUBLISHED_AT}}",
    "guid": "{{SPARK_CORE_ID}}"

  },

  "azure_sas_token": {
    "key_name": "D1",
    "key": "30fpGKkPgzpKYXrl5nxYbb6OwIN/2h2ulVHXCsWxrpU="
  },
  "mydevices": true
}
```

The name of the "**`event`**" that will invoke the webhook.

When you call

```
Spark.publish("HowColdIsCodemash",
payload);
```

from your Photon, the Particle cloud back end will trigger this webhook and publish your **`payload`** to the Azure Event Hub, specified by the "**`url`**"

```
{
  "event": "HowColdIsCodemash",
  "url": "https://cm2017-ns.servicebus.windows.net/ehdevices/messages",
  "requestType": "POST",
  "json": {
    "subject": "{{s}}",
    "unitofmeasure": "{{u}}",
    "measurename": "{{m}}",
    "value": "{{v}}",
    "organization": "{{o}}",
    "displayname": "{{d}}",
    "location": "{{l}}",
    "timecreated": "{{SPARK_PUBLISHED_AT}}",
    "guid": "{{SPARK_CORE_ID}}"

  },

  "azure_sas_token": {
    "key_name": "D1",
    "key": "30fpGKkPgzpKYXrl5nxYbb6OwIN/2h2ulVHXCsWxrpU="
  },
  "mydevices": true
}
```

The "`url`" of the Azure Event Hub that the data will be published to.

In this case, we are posting to the "`cm2017-ns`" service bus namespace into an event hub named "`ehdevices`"

```
{
  "event": "HowColdIsCodemash",
  "url": "https://cm2017-ns.servicebus.windows.net/cmdevices/messages",
  "requestType": "POST",
  "json": {
    "subject": "{{s}}",
    "unitofmeasure": "{{u}}",
    "measurename": "{{m}}",
    "value": "{{v}}",
    "organization": "{{o}}",
    "displayname": "{{d}}",
    "location": "{{l}}",
    "timecreated": "{{SPARK_PUBLISHED_AT}}",
    "guid": "{{SPARK_CORE_ID}}"

  },

  "azure_sas_token": {
    "key_name": "D1",
    "key": "30fpGKkPgzpKYXrl5nxYbb6OwIN/2h2ulVHXCsWxrpU="
  },
  "mydevices": true
}
```

The data will be sent to the url using an HTTP POST

```
{
  "event": "HowColdIsCodemash",
  "url": "https://cm2017-ns.servicebus.windows.net/ehdevices/messages",
  "requestType": "POST",
  "json": {
    "subject": "{{s}}",
    "unitofmeasure": "{{u}}",
    "measurename": "{{m}}",
    "value": "{{v}}",
    "organization": "{{o}}",
    "displayname": "{{d}}",
    "location": "{{l}}",
    "timecreated": "{{SPARK_PUBLISHED_AT}}",
    "guid": "{{SPARK_CORE_ID}}"

  },

  "azure_sas_token": {
    "key_name": "D1",
    "key": "30fpGKkPgzpKYXrl5nxYbb6OwIN/2h2ulVHXCsWxrpU="
  },
  "mydevices": true
}
```

The json template is used to create the data for the message that will be sent to the Azure Event Hub

```
{
  "event": "HowColdIsCodemash",
  "url": "https://cm2017-ns.servicebus.windows.net/ehdevices/messages",
  "requestType": "POST",
  "json": {
    "subject": "{{s}}",
    "unitofmeasure": "{{u}}",
    "measurename": "{{m}}",
    "value": "{{v}}",
    "organization": "{{o}}",
    "displayname": "{{d}}",
    "location": "{{l}}",
    "timecreated": "{{SPARK_PUBLISHED_AT}}",
    "guid": "{{SPARK_CORE_ID}}"

  },

  "azure_sas_token": {
    "key_name": "D1",
    "key": "30fpGKkPgzpKYXrl5nxYbb6OwIN/2h2ulVHXCsWxrpU="
  },
  "mydevices": true
}
```

```
{
“s”: ”Weather”,
“u”: “F”,
“m”: “Temperature”,
“v”:  79.234,
“o”: “My Organization”,
“d”: “My Device Name”
“l”: “My Location”,
}
```

Sample Payload from the Photon’s Particle.Publish() call

```
{
  "event": "HowColdIsCodemash",
  "url": "https://cm2017-ns.servicebus.windows.net/ehdevices/messages",
  "requestType": "POST",
  "json": {
    "subject": "{{s}}",
    "unitofmeasure": "{{u}}",
    "measurename": "{{m}}",
    "value": "{{v}}",
    "organization": "{{o}}",
    "displayname": "{{d}}",
    "location": "{{l}}",
    "timecreated": "{{SPARK_PUBLISHED_AT}}",
    "guid": "{{SPARK_CORE_ID}}"

  },

  "azure_sas_token": {
    "key_name": "D1",
    "key": "30fpGKkPgzpKYXrl5nxYbb6OwIN/2h2ulVHXCsWxrpU="
  },
  "mydevices": true
}
```

The values:

SPARK_PUBLISHED_AT
and
SPARK_CORE_ID

Are supplied by the Particle cloud back end

```
{
  "event": "HowColdIsCodemash",
  "url": "https://cm2017-ns.servicebus.windows.net/ehdevices/messages",
  "requestType": "POST",
  "json": {
    "subject": "{{s}}",
    "unitofmeasure": "{{u}}",
    "measurename": "{{m}}",
    "value": "{{v}}",
    "organization": "{{o}}",
    "displayname": "{{d}}",
    "location": "{{l}}",
    "timecreated": "{{SPARK_PUBLISHED_AT}}",
    "guid": "{{SPARK_CORE_ID}}"

  },

  "azure_sas_token": {
    "key_name": "D1",
    "key": "30fpGKkPgzpKYXrl5nxYbb6OwIN/2h2ulVHXCsWxrpU="
  },
  "mydevices": true
}
```

The Shared-Access-Signature key name, and key value used to access the Azure Event Hub

The key name and key used here are from an event hub that Michael Bolton has setup already in the cloud for you to use.

```
{
  "event": "HowColdIsCodemash",
  "url": "https://cm2017-ns.servicebus.windows.net/ehdevices/messages",
  "requestType": "POST",
  "json": {
    "subject": "{{s}}",
    "unitofmeasure": "{{u}}",
    "measurename": "{{m}}",
    "value": "{{v}}",
    "organization": "{{o}}",
    "displayname": "{{d}}",
    "location": "{{l}}",
    "timecreated": "{{SPARK_PUBLISHED_AT}}",
    "guid": "{{SPARK_CORE_ID}}"

  },

  "azure_sas_token": {
    "key_name": "D1",
    "key": "30fpGKkPgzpKYXrl5nxYbb6OwIN/2h2ulVHXCsWxrpU="
  },
  "mydevices": true
}
```

Restricts the webhook to being triggered only from events published from your own devices

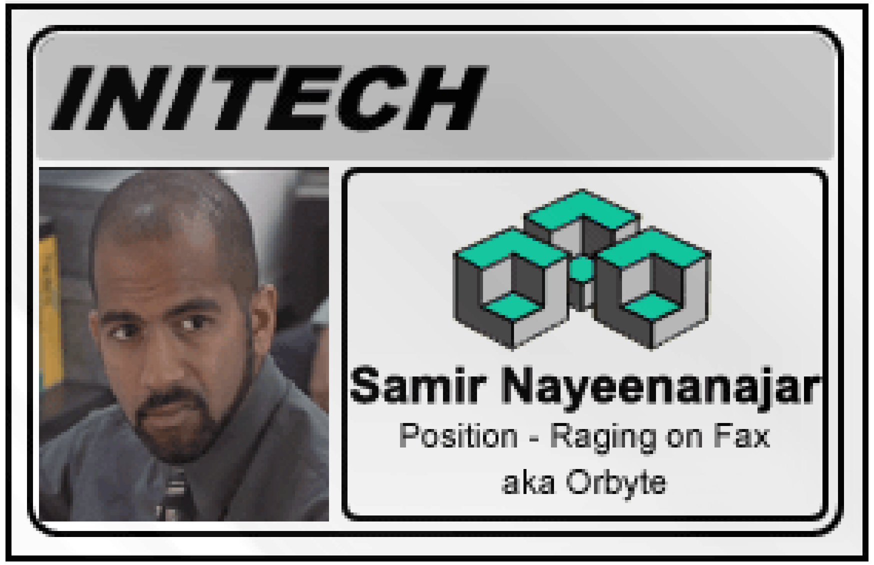
CREATE THE PARTICLE WEBHOOK

- From the command prompt, get in the same folder as the webhook.json file you downloaded, and run:

```
particle webhook create webhook.json
```

- Other particle-cli webhook commands include:

```
particle webhook list
particle webhook delete hookid
```



PROGRAMMING THE PHOTON

http://aka.ms/hcicsource

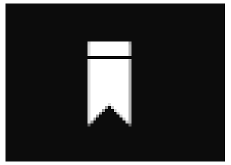
Microsoft

Create the ParticleWeatherShield sketch

- Create a new "App" here: https://build.particle.io/build/new
- Name it "ParticleWeatherShield"
- Download the sketch from: aka.ms/hcicsketch
- Copy the text from the downloaded ParticleWeatherShield.c file
- Paste into the ParticleWeatherShield app in Particle Build

ADD THE WEATHER SHIELD LIBRARY

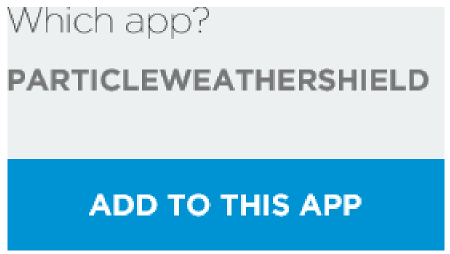
- In the Particle Build web interface, click the "Libraries" icon



- Search for the SparkFun_Photon_Weather_Shield_Library

- Select it, and then click the "INCLUDE IN APP" button:

- Then, select the "ParticleWeatherShield" app, and click the "ADD TO THIS APP" button



LIBRARY INCLUDE AND FIELDS

```
// This #include statement was automatically added by the Particle IDE.
#include "SparkFun_Photon_Weather_Shield_Library/SparkFun_Photon_Weather_Shield_Library.h"

Weather sensor;

char Org[] = “Initech";
char Disp[] = “Samirs Printer";
char Locn[] = “OH";
```

LIBRARY INCLUDE AND FIELDS

```
// This #include statement was automatically added by the Particle IDE.
#include "SparkFun_Photon_Weather_Shield_Library/SparkFun_Photon_Weather_Shield_Library.h"

char Org[] = "ORGANIZATION_NAME";
char Disp[] = "DISPLAY_NAME";
char Locn[] = "LOCATION";

//Create Instance of the Weather Shield
Weather sensor;

//The amount of time (in milliseconds) to wait between each publication of data
int sendDelay = 6000;
```

SETUP METHOD

```
void setup()
{

  //Open up the Serial port for local diagnostics
  Serial.begin(9600);

  //Initialize the I2C sensors and ping them
  sensor.begin();
```

SETUP METHOD

```
  //The following two lines tell the sensor what mode to use
  sensor.setModeBarometer();//Set to Barometer Mode
  //These are additional MPL3115A2 functions the MUST be called for the sensor to work.
  sensor.setOversampleRate(7);

  //Give the sensors some time to initialize
  delay(10000);
}
```

LOOP METHOD, AND SENSOR READING

```
void loop()

{
  //Measure Relative Humidity from the HTU21D or Si7021
  float h = sensor.getRH();

  //Measure Temperature from the HTU21D or Si7021
  float f = sensor.getTempF();
```

PUBLISH TEMPERATURE DATA

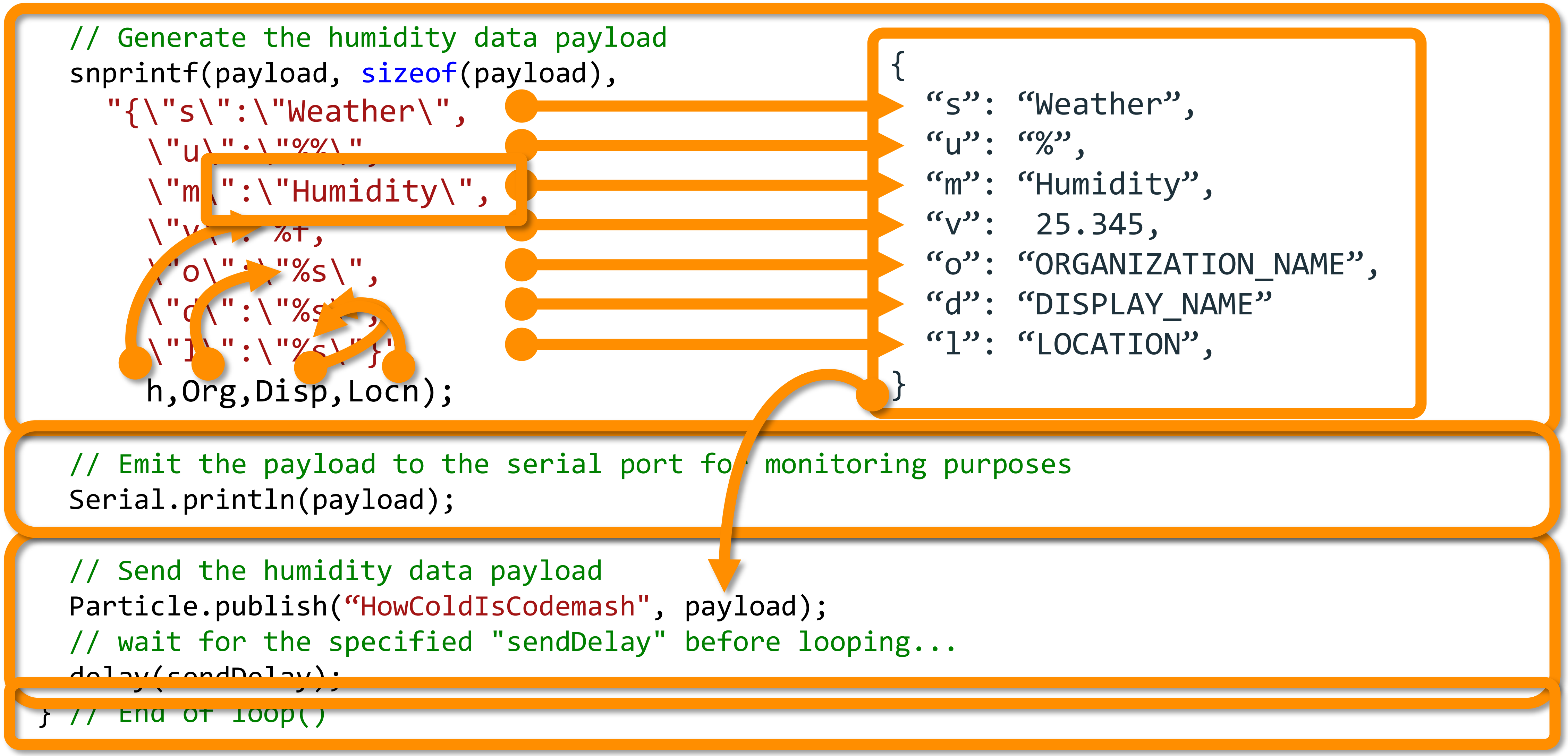
```
// Generate the temperature data payload
char payload[255];
snprintf(payload, sizeof(payload),
  "{\"s\":\"Weather\",
    \"u\":\"F\",
    \"m\":\"Temperature\",
    \"v\":%f,
    \"o\":\"%s\",
    \"d\":\"%s\",
    \"l\":\"%s\"}"
    f,Org,Disp,Locn);
```

```
{
  “s”: “Weather”,
  “u”: “F”,
  “m”: “Temperature”,
  “v”:  79.234,
  “o”: “ORGANIZATION_NAME”,
  “d”: “DISPLAY_NAME”
  “l”: “LOCATION”,
}
```

```
//Emit the payload to the serial port for monitoring purposes
Serial.println(payload);
```

```
// Send the temperature data payload
Particle.publish(“HowColdIsCodemash", payload);
//Wait for the specified "sendDelay" before sending the humidity data...
delay(sendDelay);
```

GROKING THE PHOTON CODE



```
  // Generate the humidity data payload
  snprintf(payload, sizeof(payload),
    "{\"s\":\"Weather\",
      \"u\":\"%%\",
      \"m\":\"Humidity\",
      \"v\":%f,
      \"o\":\"%s\",
      \"d\":\"%s\",
      \"l\":\"%s\"}",
      h,Org,Disp,Locn);
```

```
{
  “s”: “Weather”,
  “u”: “%”,
  “m”: “Humidity”,
  “v”:  25.345,
  “o”: “ORGANIZATION_NAME”,
  “d”: “DISPLAY_NAME”
  “l”: “LOCATION”,
}
```

```
  // Emit the payload to the serial port for monitoring purposes
  Serial.println(payload);
```

```
  // Send the humidity data payload
  Particle.publish(“HowColdIsCodemash", payload);
  // wait for the specified "sendDelay" before looping...
  delay(sendDelay);
} // End of loop()
```

MODIFY THE METADATA PROPERTIES

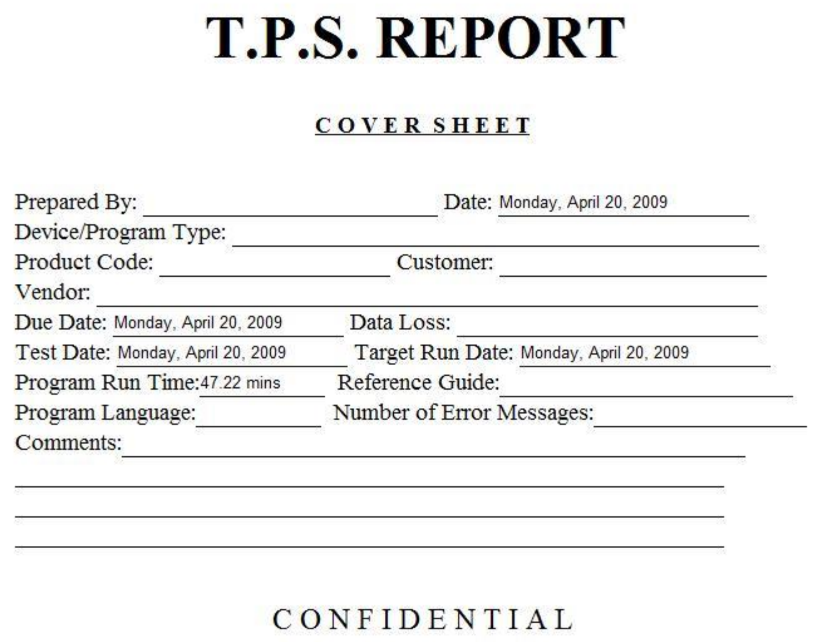
- Put your own values in. Make sure that the “Display Name” is appropriate and identifies your Photon clearly:

```
char Org[] = "ORGANIZATION_NAME";
char Disp[] = "DISPLAY_NAME";
char Locn[] = "LOCATION";
```

HAS ANYBODY SEEN A RED STAPLER?

SAVE, VERIFY AND FLASH

- Click the save icon to save your sketch:
- Click the verify icon to compile and verify:
- Click the flash icon to deploy your sketch:



T.P.S. REPORT

COVER SHEET

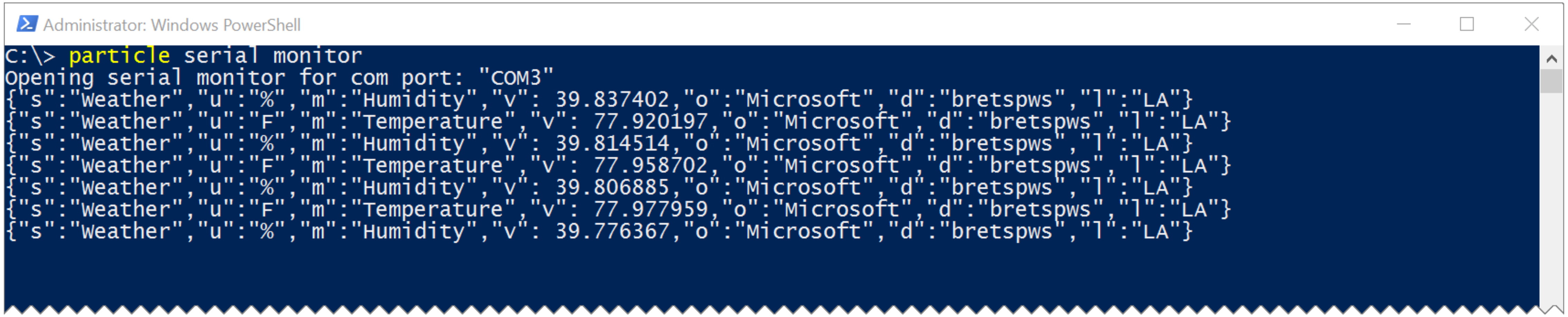
Prepared By:		Date:	Monday, April 20, 2009
Device/Program Type:			
Product Code:		Customer:	
Vendor:			
Due Date:	Monday, April 20, 2009	Data Loss:	
Test Date:	Monday, April 20, 2009	Target Run Date:	Monday, April 20, 2009
Program Run Time:	47.22 mins	Reference Guide:	
Program Language:		Number of Error Messages:	
Comments:			

CONFIDENTIAL

MONITORING YOUR PHOTON

MONITORING PHOTON VIA SERIAL

```
particle serial monitor
```

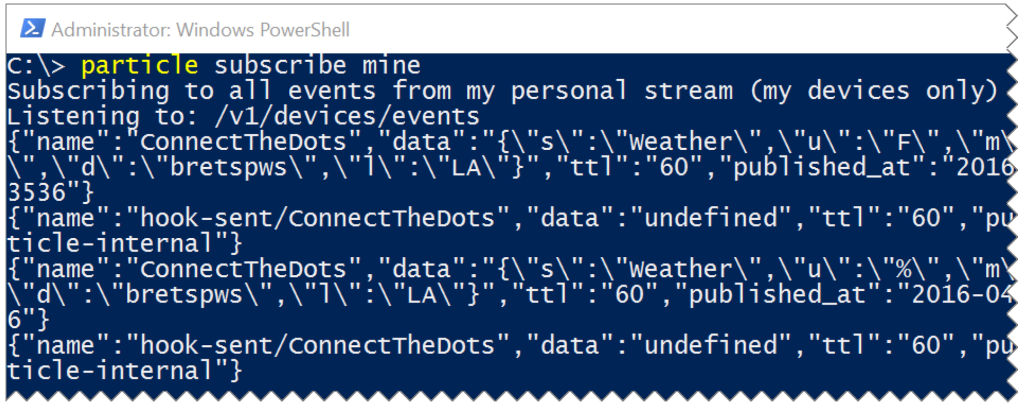


```
C:\> particle serial monitor
Opening serial monitor for com port: "COM3"
{"s":"Weather","u":"%","m":"Humidity","v": 39.837402,"o":"Microsoft","d":"bretspws","l":"LA"}
{"s":"Weather","u":"F","m":"Temperature","v": 77.920197,"o":"Microsoft","d":"bretspws","l":"LA"}
{"s":"Weather","u":"%","m":"Humidity","v": 39.814514,"o":"Microsoft","d":"bretspws","l":"LA"}
{"s":"Weather","u":"F","m":"Temperature","v": 77.958702,"o":"Microsoft","d":"bretspws","l":"LA"}
{"s":"Weather","u":"%","m":"Humidity","v": 39.806885,"o":"Microsoft","d":"bretspws","l":"LA"}
{"s":"Weather","u":"F","m":"Temperature","v": 77.977959,"o":"Microsoft","d":"bretspws","l":"LA"}
{"s":"Weather","u":"%","m":"Humidity","v": 39.776367,"o":"Microsoft","d":"bretspws","l":"LA"}
```

MONITORING WEBHOOK

- Particle-cli:
  `particle subscribe mine`

- Particle Dashboard:
  http://dashboard.particle.io/user/logs


Administrator: Windows PowerShell

```
C:\> particle subscribe mine
Subscribing to all events from my personal stream (my devices only)
Listening to: /v1/devices/events
{"name":"ConnectTheDots","data":"{\"s\":\"Weather\",\"u\":\"F\",\"m\
\",\"d\":\"bretspws\",\"l\":\"LA\"}","ttl":"60","published_at":"2016
3536"}
{"name":"hook-sent/ConnectTheDots","data":"undefined","ttl":"60","pu
ticle-internal"}
{"name":"ConnectTheDots","data":"{\"s\":\"Weather\",\"u\":\"%\",\"m\
\"d\":\"bretspws\",\"l\":\"LA\"}","ttl":"60","published_at":"2016-04
6"}
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ticle-internal"}
```
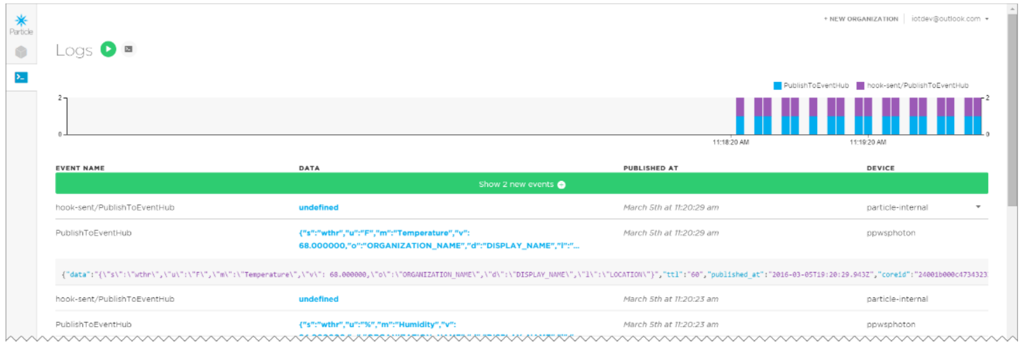



EVENT NAME	DATA	PUBLISHED AT	DEVICE
hook-sent/PublishToEventHub	undefined	March 5th at 11:20:29 am	particle-internal
PublishToEventHub	{"s":"wthr","u":"F","m":"Temperature","v": 68.000000,"o":"ORGANIZATION_NAME","d":"DISPLAY_NAME","l":"...	March 5th at 11:20:29 am	ppwsphoton
hook-sent/PublishToEventHub	undefined	March 5th at 11:20:23 am	particle-internal
PublishToEventHub	{"s":"wthr","u":"%","m":"Humidity","v":	March 5th at 11:20:23 am	ppwsphoton

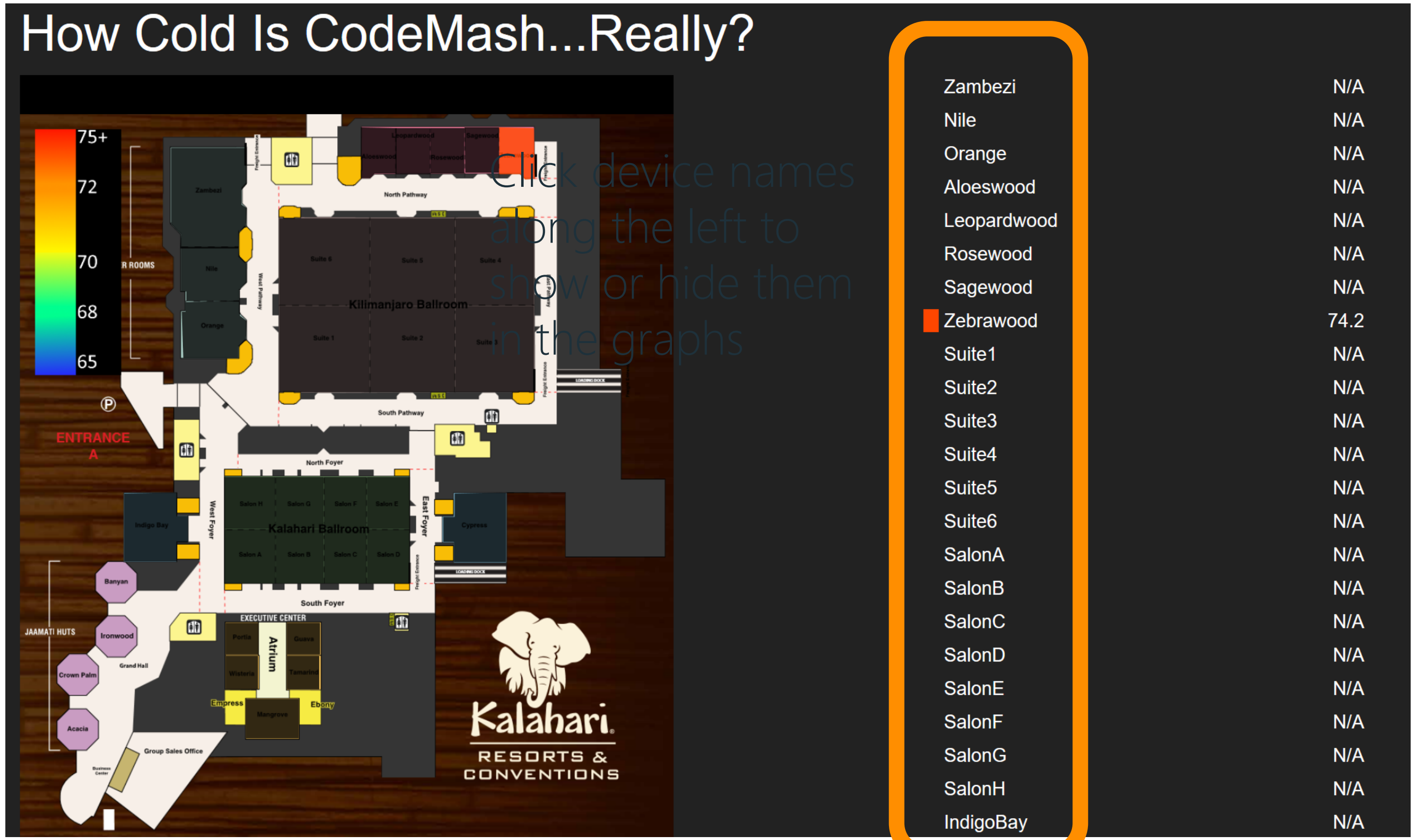
```
{"data":"{\"s\":\"wthr\",\"u\":\"F\",\"m\":\"Temperature\",\"v\": 68.000000,\"o\":\"ORGANIZATION_NAME\",\"d\":\"DISPLAY_NAME\",\"l\":\"LOCATION\"}","ttl":"60","published_at":"2016-03-05T19:20:29.943Z","coreid":"24001b000c4734323
```

http://aka.ms/hcicsource

Microsoft

MONITOR VIA THE WEB

http://aka.ms/hcic



How Cold Is CodeMash...Really?

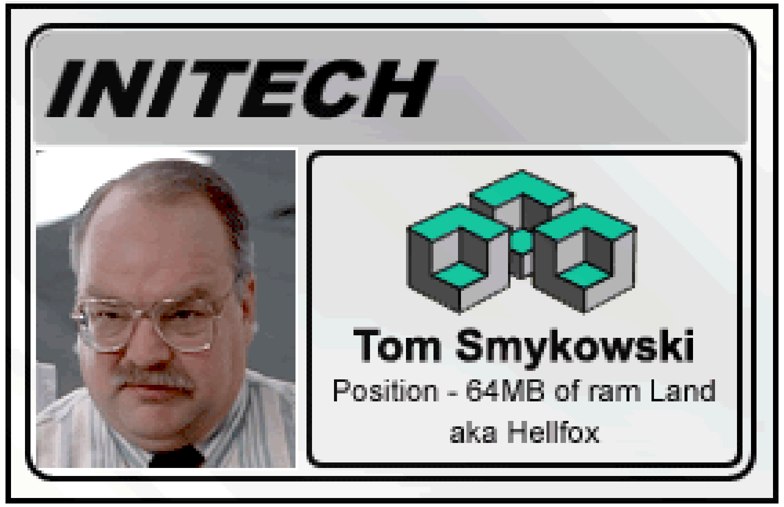
Click device names along the left to show or hide them in the graphs

	Zambezi	N/A
	Nile	N/A
	Orange	N/A
	Aloeswood	N/A
	Leopardwood	N/A
	Rosewood	N/A
	Sagewood	N/A
🟥	Zebrawood	74.2
	Suite1	N/A
	Suite2	N/A
	Suite3	N/A
	Suite4	N/A
	Suite5	N/A
	Suite6	N/A
	SalonA	N/A
	SalonB	N/A
	SalonC	N/A
	SalonD	N/A
	SalonE	N/A
	SalonF	N/A
	SalonG	N/A
	SalonH	N/A
	IndigoBay	N/A

http://aka.ms/hcicsource

Microsoft

FIRE!!!!!!!!!



JUMPING TO CONCLUSIONS

WHERE TO GO FROM HERE?

- Publish other sensor values. There are TON's of other sensors you can use.   As an example, check out:

  http://aka.ms/sparkfunsensors

- Don't want to use our existing event hub & web site? Make your own event hub and publish to Power BI, or consume the data from a client app! Check out my step by step walkthrough at:

  http://aka.ms/ppws

- Don't want to be limited by the Particle Cloud's rate limits? Try publishing to your own API:

  http://aka.ms/iotree