

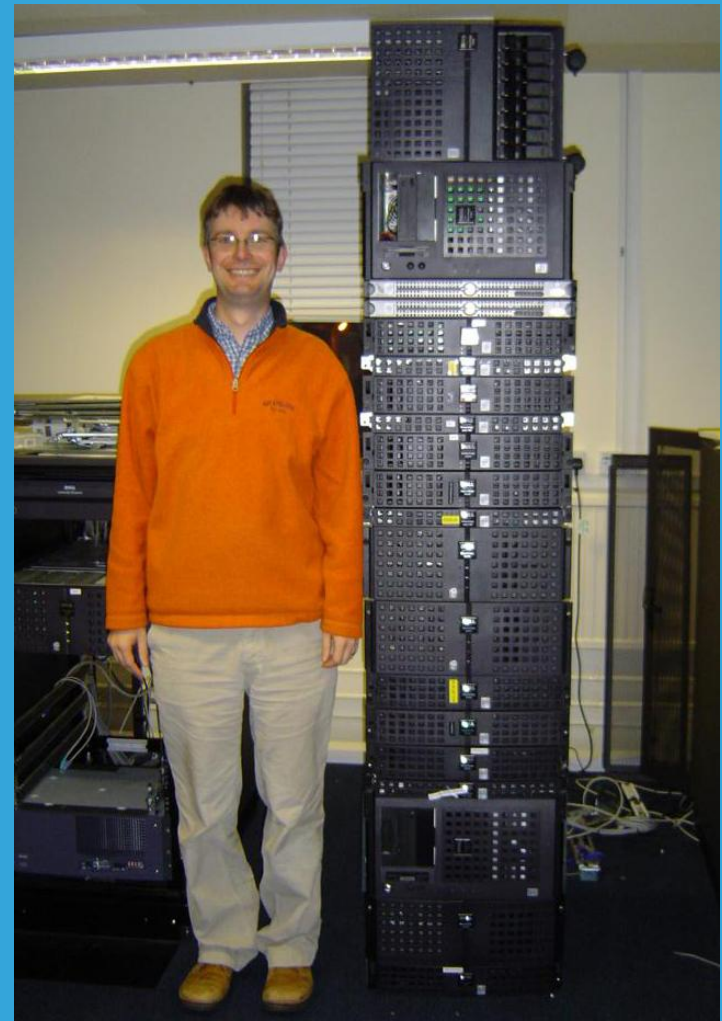
The background is a close-up photograph of server hardware. It shows a blue perforated metal panel on the left, a black cooling fan in the upper center, and a dense bundle of multi-colored cables (red, yellow, green, blue, black) on the right. In the lower center, there is a small blue component with the Intel logo and text. A semi-transparent dark grey rectangular box is overlaid on the center of the image, containing the title and author information in white text.

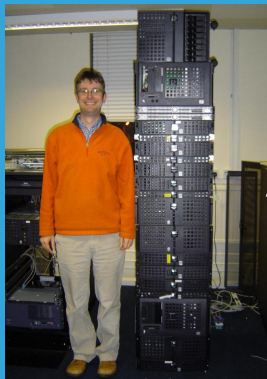
MICROSERVICES WITHOUT SERVERS

GLYNN BIRD, Developer Advocate @ IBM

@glynn_bird

SERVICES ARE
KILLING YOUR
PRODUCTIVITY





2005
Servers in
the server
room



2008
Our servers in a
data centre



2011
Rented servers in
a data centre



2013
Virtual servers in
the cloud



100%
uptime

scale



< Ops

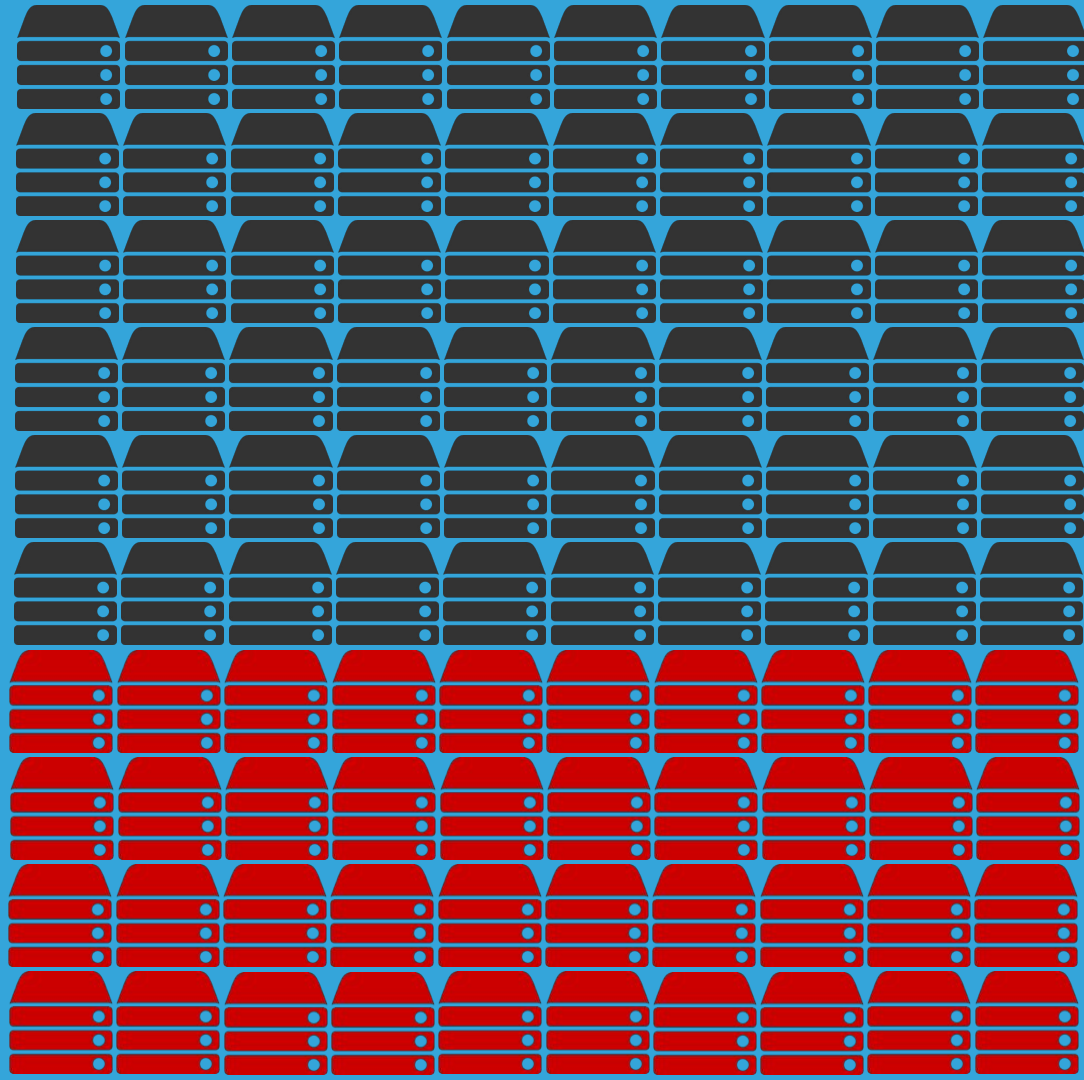
> Dev

WASN'T THE
CLOUD SUPPOSED
TO FIX THIS?



"COMPUTING AS A UTILITY"

Source:
<https://flic.kr/p/5aHJFh>



average
utilisation
20% - 40%
of capacity

Introducing AWS Lambda

An event-driven computing service for
dynamic applications

AWS LAMBDA

SEATTLE--(BUSINESS WIRE)--Nov. 13, 2014-- Today at AWS re:Invent, Amazon Web Services, Inc. (AWS), an Amazon.com company (NASDAQ: AMZN), announced

"RUNS CODE IN RESPONSE TO EVENTS, MANAGES COMPUTE RESOURCES"

compute time required to run their code. AWS Lambda charges for compute time in increments of 100 milliseconds, making it cost-effective and easy to scale apps to

...WHY IS THIS DIFFERENT?

Today, customers have many use cases where applications need compute cycles in

$f(x)$

FUNCTIONS-AS-A-SERVICE



SCALING: 0 to N

PAY-AS-YOU-GO



flickr photo by a loves dc <https://flickr.com/photos/alovesdc/3466740007> CC (BY) license

"No server is easier to manage than 'no server,'" quips Wood.

"ONE HAPPY LAMBDA CUSTOMER SAVING 80% OFF THEIR CLOUD BILLS"

The key benefit of Lambda is that programmers get a "laser-like focus" on just building their apps, Wood says. No matter how big their app gets, Amazon Lambda sets up the appropriate infrastructure behind the scenes.

Source:

<http://uk.businessinsider.com/amazon-web-services-lambda-explained-2015-11>

ISN'T THIS JUST
PLATFORM-AS-A-
SERVICE?

● **aws lambda**
Search term

+ Compare

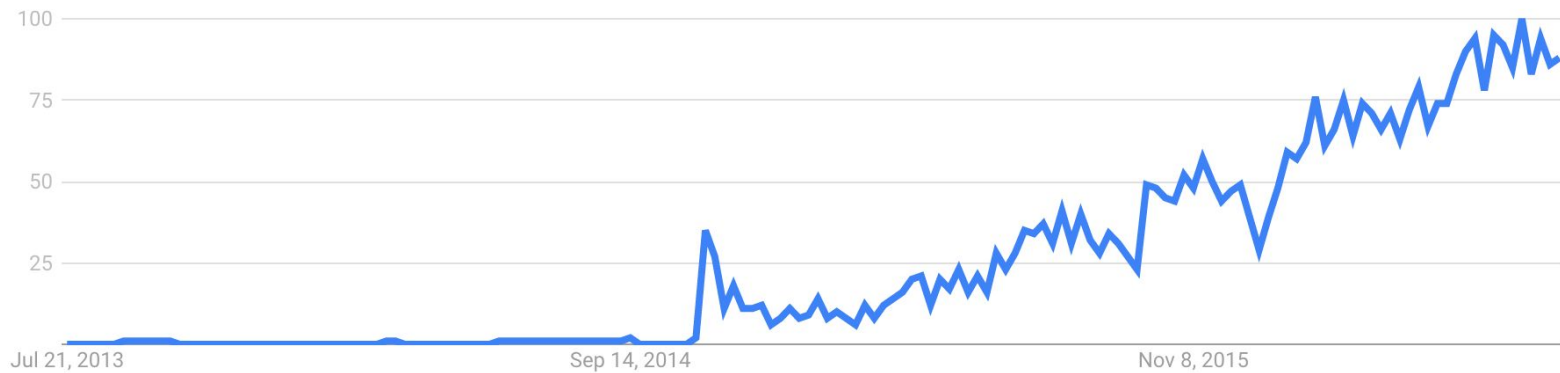
Worldwide ▼

7/15/13 - 8/15/16 ▼

All categories ▼

Web Search ▼

Interest over time ?



● **aws lambda**
Search term

● **serverless**
Search term

+ Add comparison

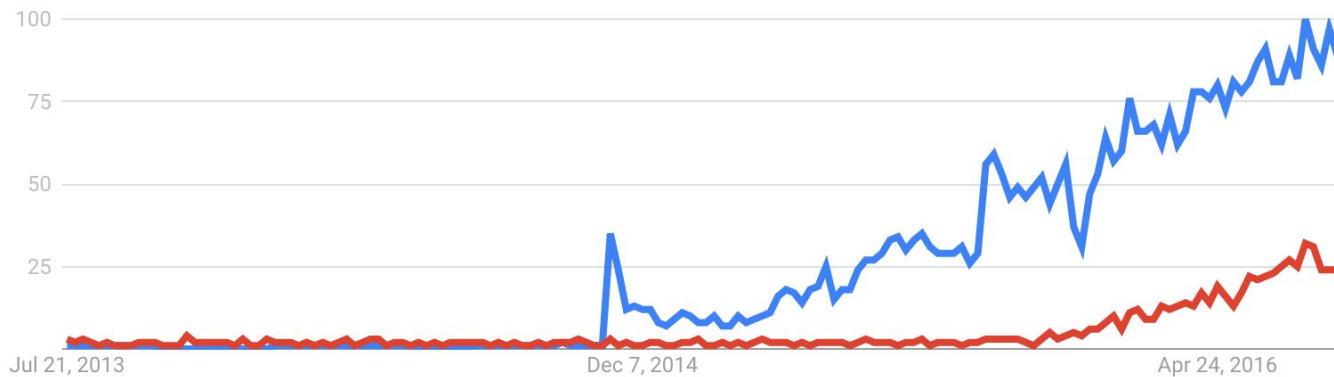
Worldwide ▼

7/15/13 - 8/15/16 ▼

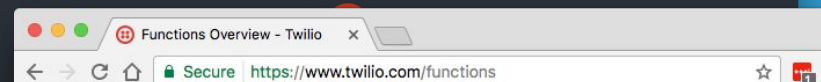
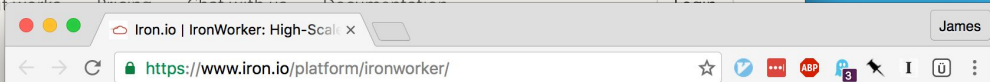
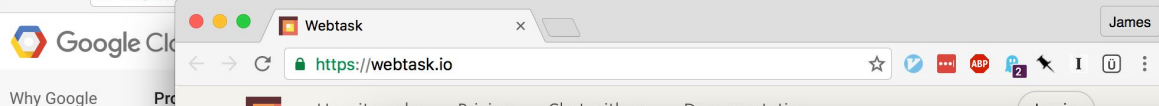
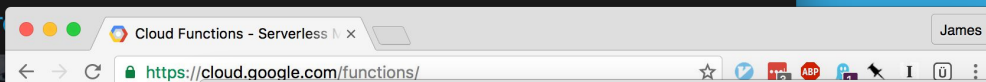
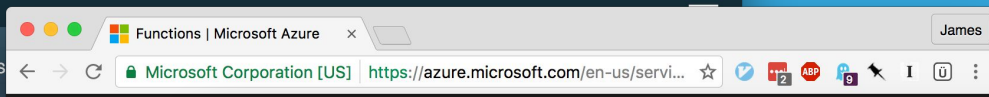
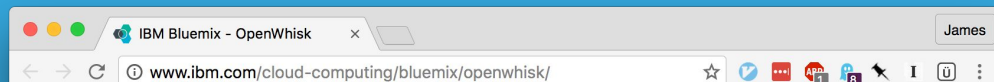
All categories ▼

Web Search ▼

Interest over time ?



PROVIDERS



DOCS ? HELP LOG IN + SIGN UP

Functions ^{Beta}

A serverless environment to build and run your Twilio code so you can get to production fast.

the future will be

SERVERLESSCONF



serverlessconf.io

#serverless

Source: <http://cloudacademy.com/blog/serverlessconf-recap-serverless/>



SPOILER:

THERE'S STILL SERVERS

flickr photo by BobMical https://flickr.com/photos/small_realm/11189803153 CC (BY-NC)
license

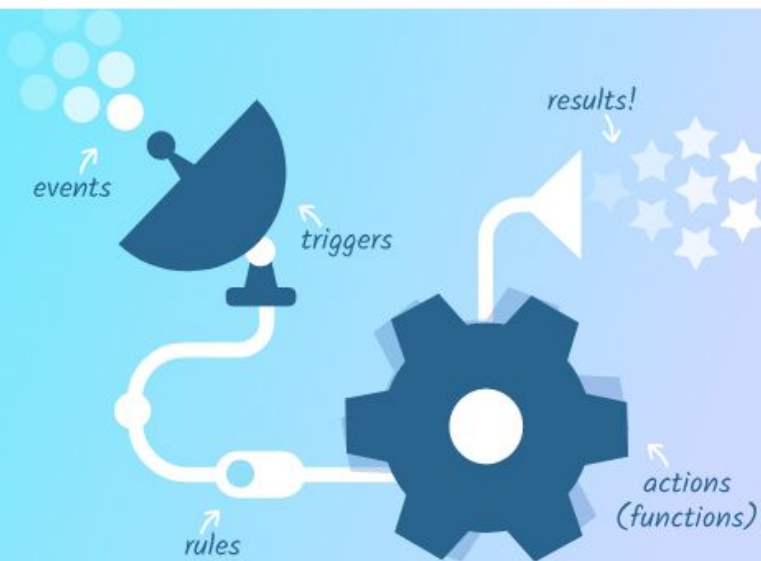
ENOUGH TALKING...
BRING ON THE
CODE.

The background features a dark navy blue field with three large, overlapping triangles. A teal triangle points upwards from the bottom center. A darker teal triangle points downwards from the top center. A medium blue triangle points upwards from the bottom left, overlapping the other two.

IBM
OPENWHISK

Apache OpenWhisk is a serverless,
open source cloud platform that
 executes functions in **response to**
events at any scale.

Get Started



ok:updated action hello

```

$ wsk action invoke -b hello -p name "Alice"
-p place "Wonderland" --result
{
  "message": "Hello, Alice from Wonderland"
}
  
```

Where to start.

With Apache OpenWhisk you can easily create
 actions, test, connect to other actions or debug
 them. Use the [Apache OpenWhisk CLI](#), target your
 Apache OpenWhisk instance, and run your first
 action in seconds.



This repository

Search

Pull requests

Issues

Gist



openwhisk / openwhisk

Watch

73

★ Unstar

362

Fork

114

<> Code



Issues 235



Pull requests 27



Wiki



Pulse



Graphs

OpenWhisk is a cloud-first distributed event-based programming service.

490 commits

2 branches

0 releases

32 contributors

Branch: master

New pull request

Create new file

Upload files

Find file

Clone or download



rabbah Remove statics in WskCLI to avoid leaks across suites.

Latest commit 8e336f3 3 hours ago

.github

Add issue template to provide a framework for reporting problems and ...

11 days ago

ansible

issue #629: update verification part for README

2 days ago

bin

Initial OpenWhisk com

catalog

Add a switch to all the

common

Fix issue #816. When

config

Detect target automati

core

Fix issue #816. When updating an action that is already a sequence or...

3 days ago

OPEN SOURCE

<http://openwhisk.org/>

```
$ git clone https://github.com/openwhisk/openwhisk.git
```

```
$ cd openwhisk/tools/vagrant
```

```
$ vagrant up
```



MY ACTIONS

stackoverflow/notifier

stackoverflow/pubwriter

stackoverflow/storer

testy/woo

MY SEQUENCES

petition/submit

stackoverflow/qhandler

stackoverflow/socron

MY RULES

myDetachmentRule

so_couchdbrule

MY TRIGGERS

+ Create an Action

▶ Run this Action

VIEW ACTION DETAILS

Browse Public Packages

idea

NODE.JS 6 ACTION

```
21 } else {
22     resolve(b);
23 }
24 });
25 });
26 }
27
28
29 var main = function(msg) {
30     var bits = msg.text.split('|');
31     var title = bits[0].trim();
32     var description = (bits.length > 1)? bits[1].trim() : '';
33     return createCard(title, description).then(function(data) {
34         console.log('typeof data', typeof data);
35         var response = "*" + msg.command + " " + msg.text + "*\n";
36         response += "> " + data.shortUrl + "\n";
37         var reply = {
38             statusCode: 200,
39             headers: { 'Content-Type': 'application/json', 'Access-Control-Allow-Origin': '*' },
40             body: new Buffer(response).toString('base64'),
41         };
42         return reply;
43     });
44 }
```

Saved, but Not Live

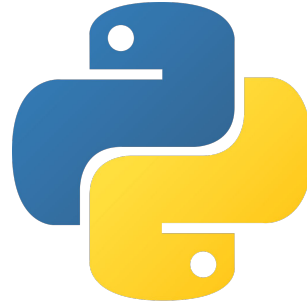
Next Steps:



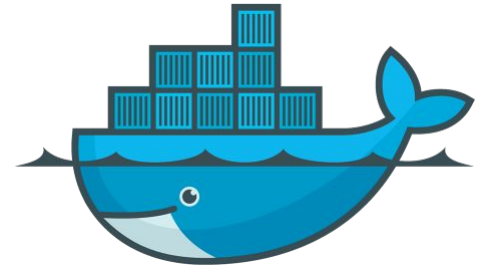
Discard Draft



Make It Live



RUNTIMES



```
path_un (un_path) {  
  const endpoint = url.parse(this.options.api)  
  endpoint.pathname = path.resolve(endpoint.pathname, url_path)  
  return url.format(endpoint)  
}
```

```
namespace (options) {  
  if (options && options.hasOwnProperty('namespace')) {  
    return options.namespace  
  } else if (this.options.hasOwnProperty('namespace')) {  
    return this.options.namespace  
  }  
  
  throw new Error(messages.MISSING_NAMESPACE_ERROR)  
}
```

```
qs (options, names) {  
  return names.filter(name => options.hasOwnProperty(name))  
    .reduce((previous, name) => {  
      previous[name] = options[name]  
      return previous  
    }, {})  
}
```

my_service.js

Entry Point



Event
Parameters



```
function main(params) {  
  // put your code here!
```

```
  return {...};  
}
```

Service
Result



my_service.js

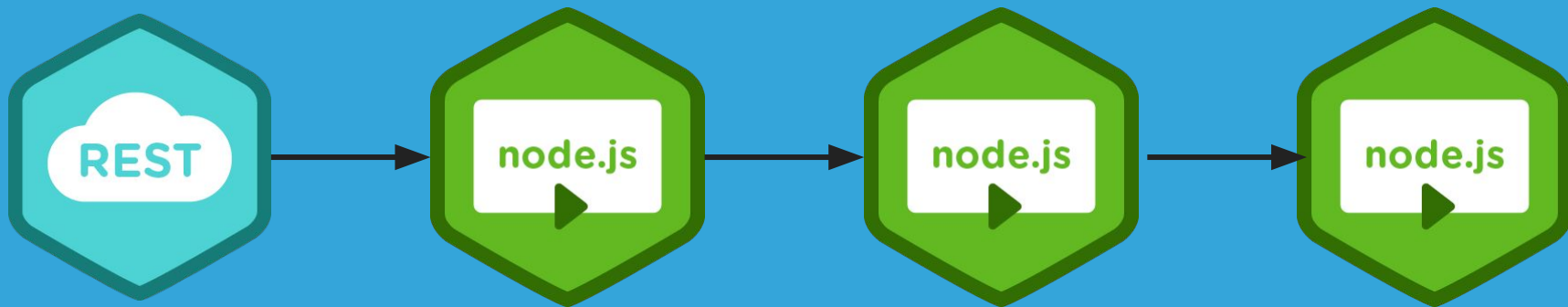
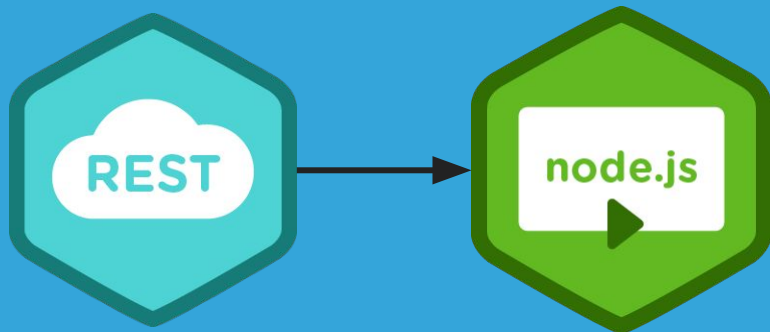
Entry Point

Event
Parameters

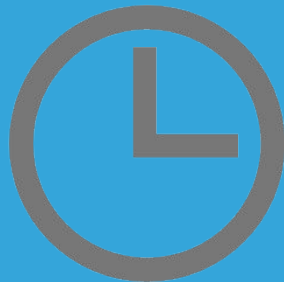
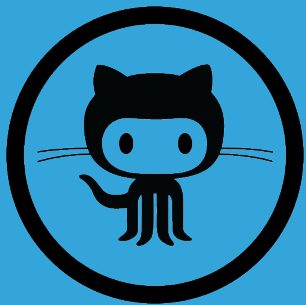
```
import com.google.gson.JsonObject;
public class Hello {
    public static JsonObject main(JsonObject args) {
        JsonObject response = new JsonObject();
        return response;
    }
}
```

Service
Result

my_service.java



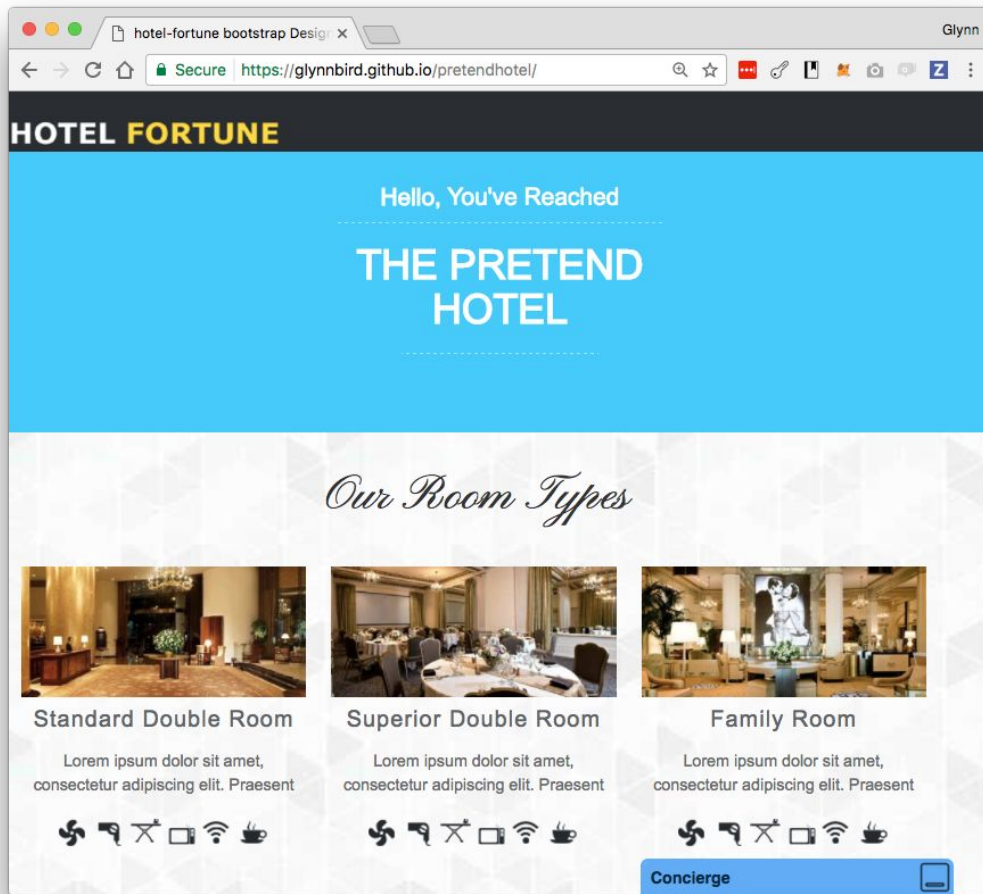
ACTIONS



TRIGGERS

CHATBOTS





HOTEL FORTUNE

Hello, You've Reached

THE PRETEND HOTEL

Our Room Types



Standard Double Room

Lorem ipsum dolor sit amet,
consectetur adipiscing elit. Praesent



Superior Double Room

Lorem ipsum dolor sit amet,
consectetur adipiscing elit. Praesent



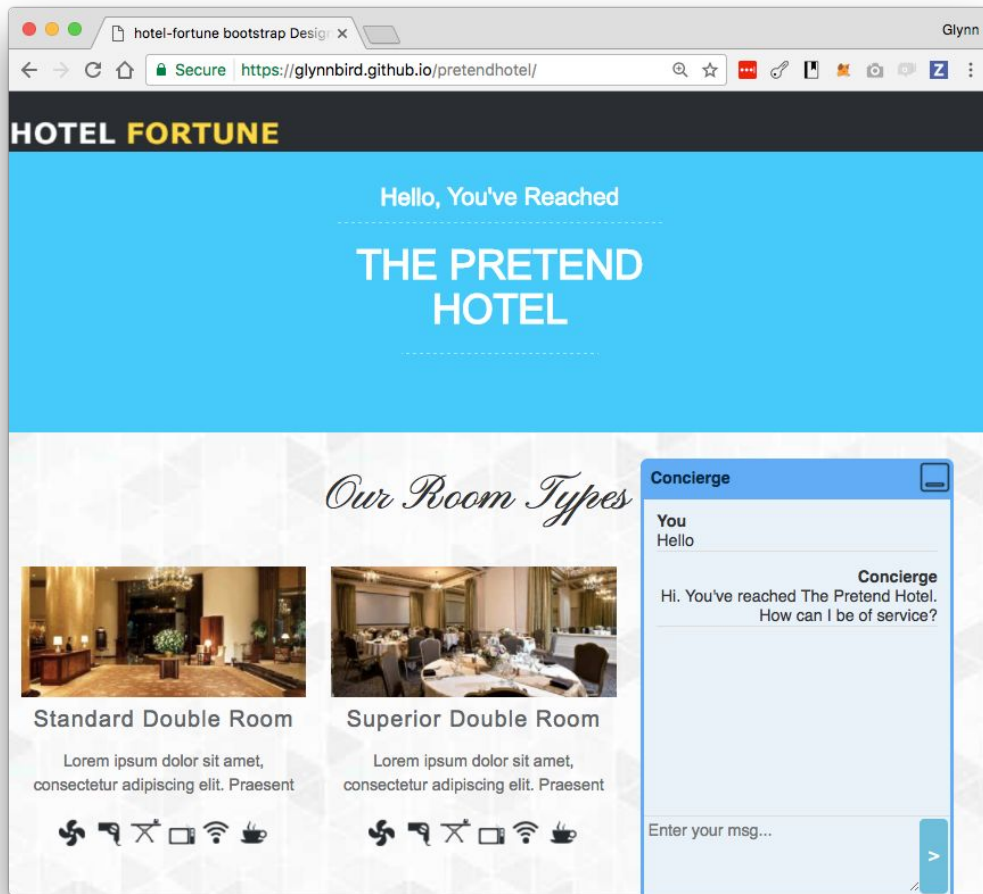
Family Room

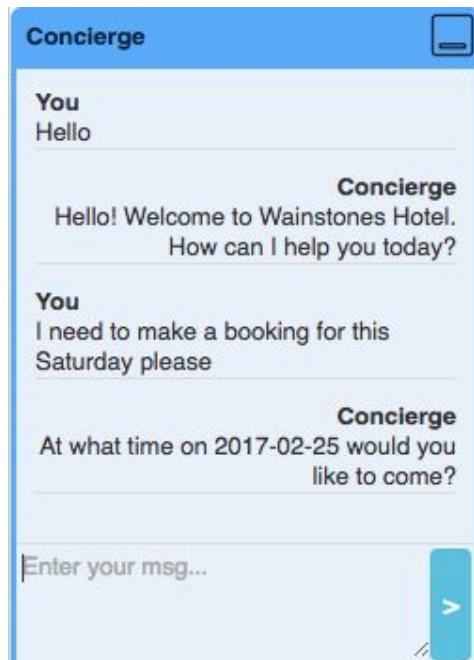
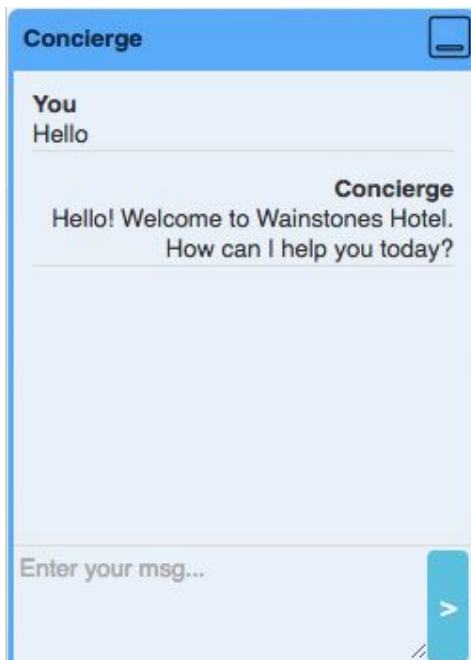
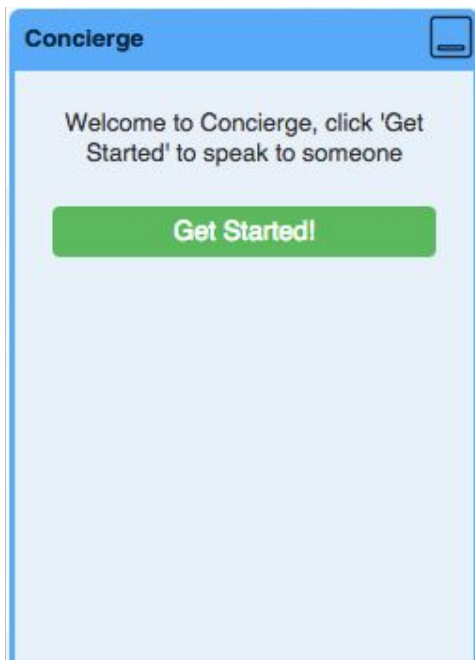
Lorem ipsum dolor sit amet,
consectetur adipiscing elit. Praesent



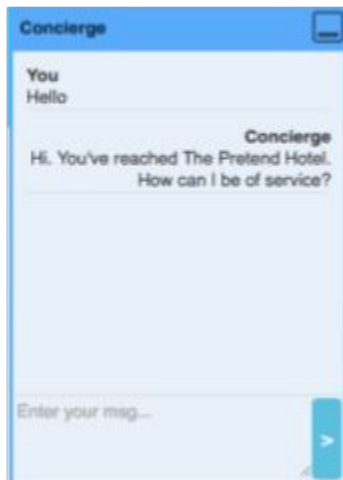
Concierge







Your website



OpenWhisk



Watson Conversation



"Hello"



*"How can I
help?"*



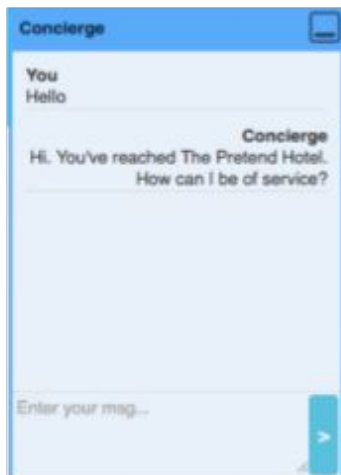
"Hello"



*"How can I
help?"*



Your website



"Hello"

"How can I help?"

OpenWhisk



Save

Watson Conversation



"Hello"

"How can I help?"



IBM Cloudant®



Prevent Donald Trump from making a State Visit to the United Kingdom

Secure <https://petition.parliament.uk/petitions/1719...>

Petitions
UK Government and Parliament

Closed petition

Prevent Donald Trump from making a State Visit to the United Kingdom.

Donald Trump should be allowed to enter the UK in his capacity as head of the US Government, but he should not be invited to make an official State Visit because it would cause embarrassment to Her Majesty the Queen.

[More details](#)

Donald Trump's well documented misogyny and vulgarity disqualifies him from being received by Her Majesty the Queen or the Prince of Wales. Therefore during the term of his presidency Donald Trump should not be invited to the United Kingdom for an official State Visit.

1,863,707 signatures

100,000

Petition System



Serve web
page



Submit form



IBM OpenWhisk

Save



IBM Cloudant®

Send email



SendGrid

Petition verification



Serve web
page



API Call

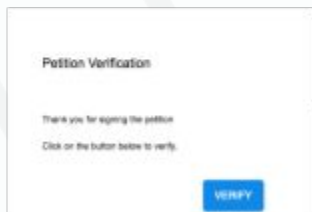


IBM OpenWhisk

Update

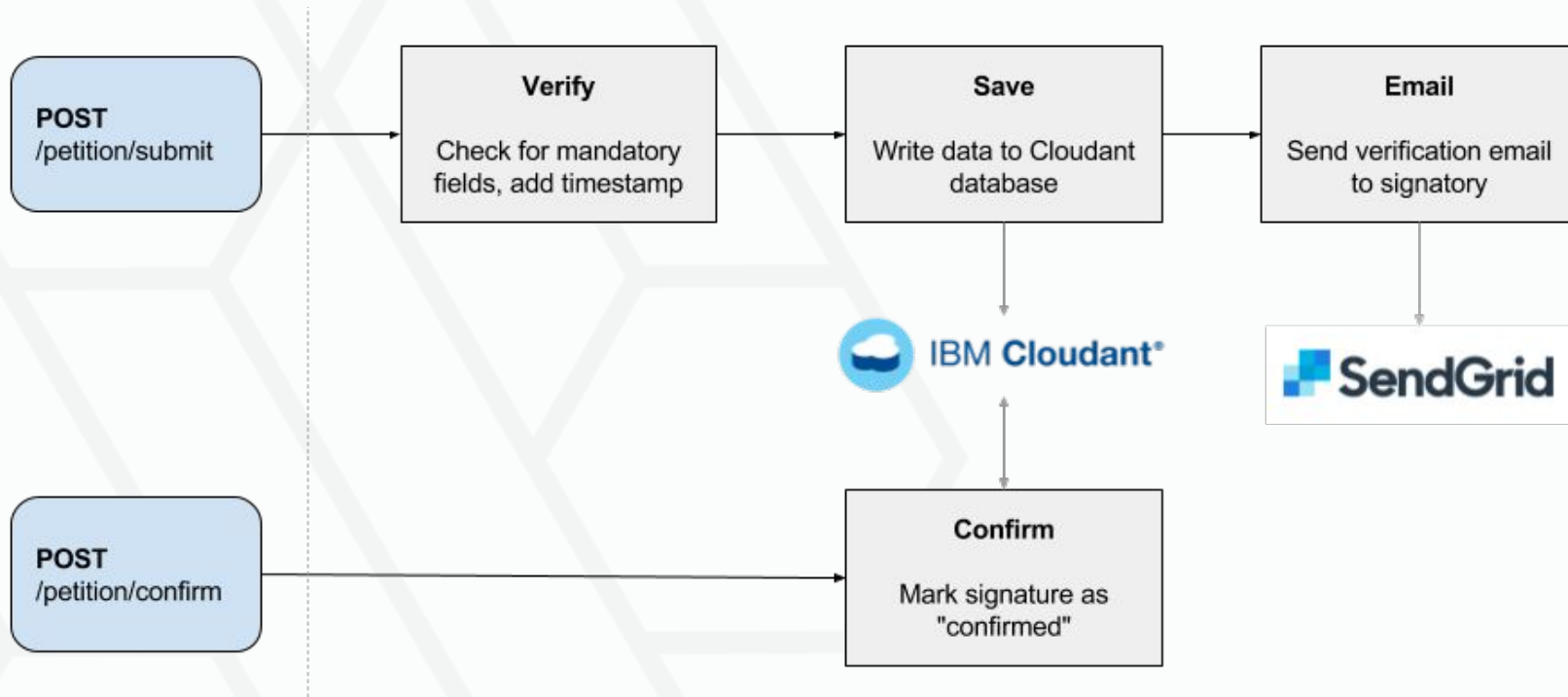


IBM Cloudant®



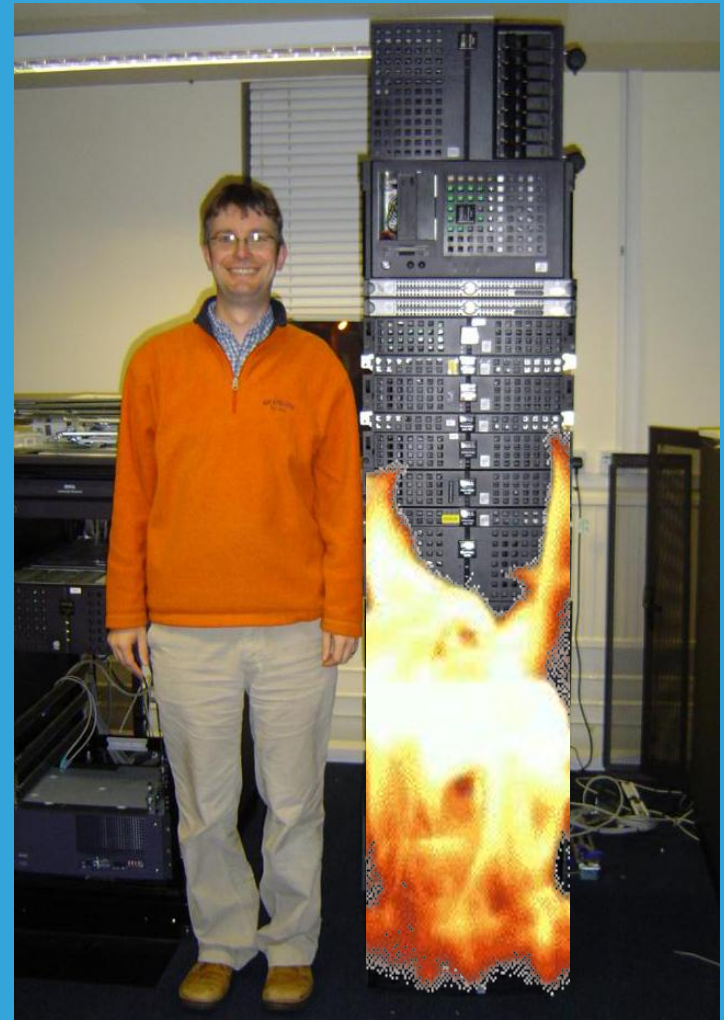
Verification
Email

Petition microservices



"BURN YOUR SERVERS"

@glynn_bird





Flickr <https://www.flickr.com/photos/hzeller/4261947108/>



COMPUTE LIMITS

flickr photo by zund <https://flickr.com/photos/zund/12202485675> CC (BY-NC-ND)
license



MONITORING, DEBUGGING AND TESTING

Build more, manage less

With the **Serverless Framework**

[VIEW THE FRAMEWORK](#)



Microsoft Azure



Google Cloud
Platform



IBM OpenWhisk

```
# Install serverless globally
$ npm install serverless -g

# Create an AWS Lambda function in Node.js
$ serverless create --template aws-nodejs

# Deploy to live AWS account
$ serverless deploy

# Function deployed!
$ http://api.amazon.com/users/update

-> Read the docs or connect with the community
```

FRAMEWORKS





<https://goo.gl/pJqgrc>



slack.openwhisk.org



#openwhisk



@glynn_bird

@openwhisk