

How to build your business on IBM Cloud with Serverless

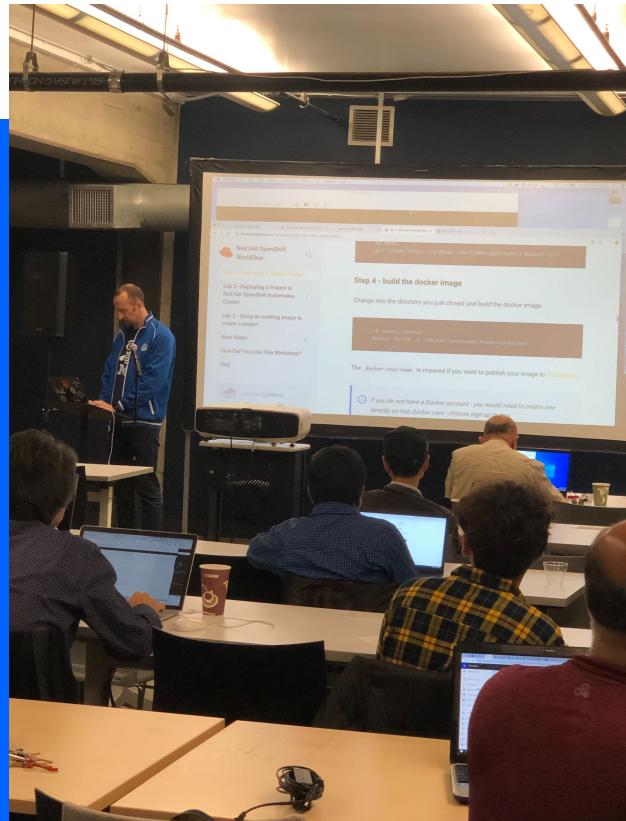
Marek Sadowski

Developer Advocate, IBM

- Serverless
- Containers
- AI
- Edge Computing

V1 2020 06 15

<http://ibm.biz/202006-cloudnative-1>

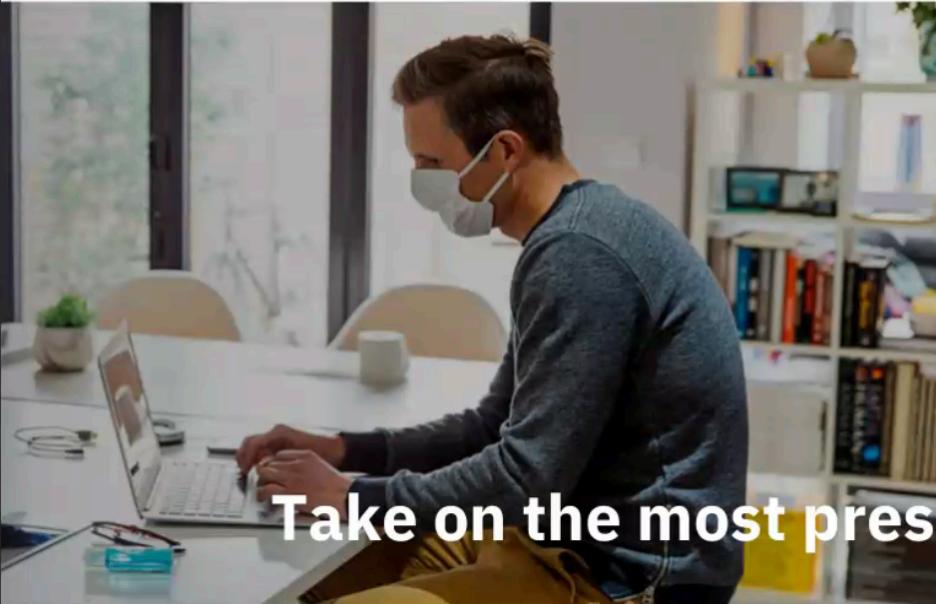


IBM Developer

IBM

2020 CALL FOR CODE®

Global Challenge



Take on the most pressing issues of our time

COVID-19 has revealed limits of the systems we take for granted, compromising our health, our planet, and our survival.

We've expanded the 2020 Call for Code Global Challenge to take on COVID-19, while we remain steadfastly committed to combating climate change.



Why Call for Code matters to IBM and the world

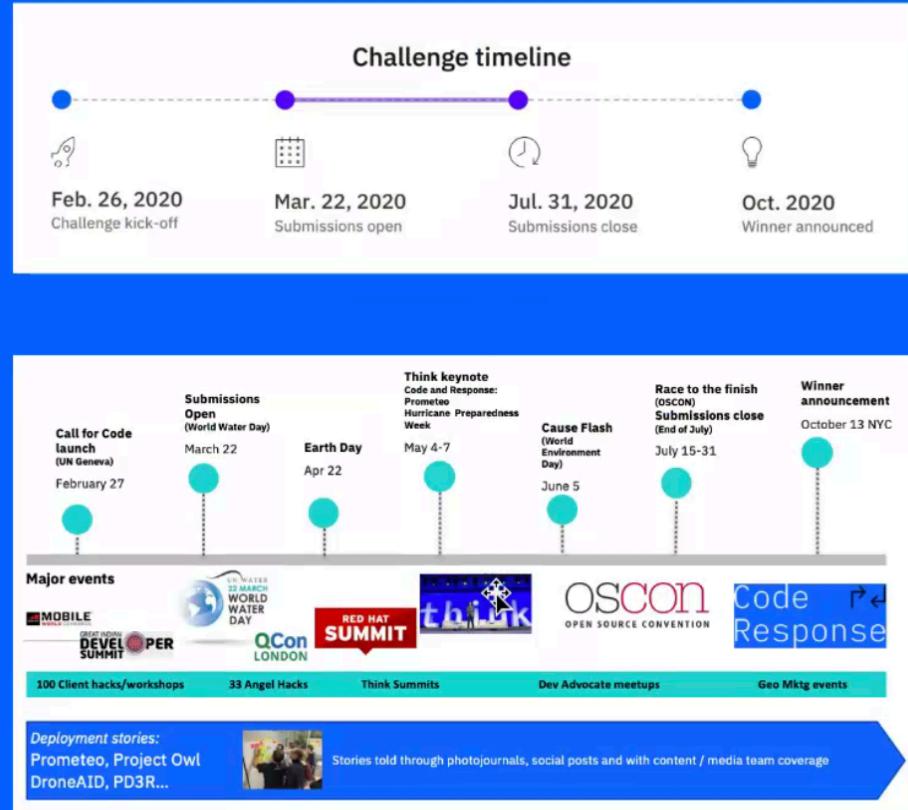
- We are in year three of our five-year commitment as a Founding Partner of Call for Code in partnership with David Clark Cause and the United Nations
- Call for Code is a multi-month yearly competition that builds upon IBM's history of matching technology to the world's greatest challenges
- This differs from other technology-for-good competitions in that we deploy the winning solutions through Code and Response
- This isn't just about the money, there are additional prizes that encourage sustainable open source solutions
- We raise awareness of the IBM Cloud among our existing ecosystem and new participants
 - They learn about IBM, Red Hat, and open source solutions and build skills while pursuing tech for good
 - We hope they have a positive experience that they bring to the communities that they in turn influence as decisionmakers

ibm.biz/callforcode



Global Challenge

What does the competition and event schedule look like?



Introduction

The Cloud is a key component of today's startup market in Silicon Valley and beyond.

Some of the leading clouds are AWS, Azure, IBM Cloud, Alibaba and TenCent and others.

IBM Cloud accounts:

IBM Free Lite account:

Doesn't require a credit card and offers free access to over 40 IBM Cloud services including IBM Watson®.

Pay-as-you-go account:

You are only billed for the resources that you use without the hassle of commitments

<https://www.ibm.com/cloud/pricing>

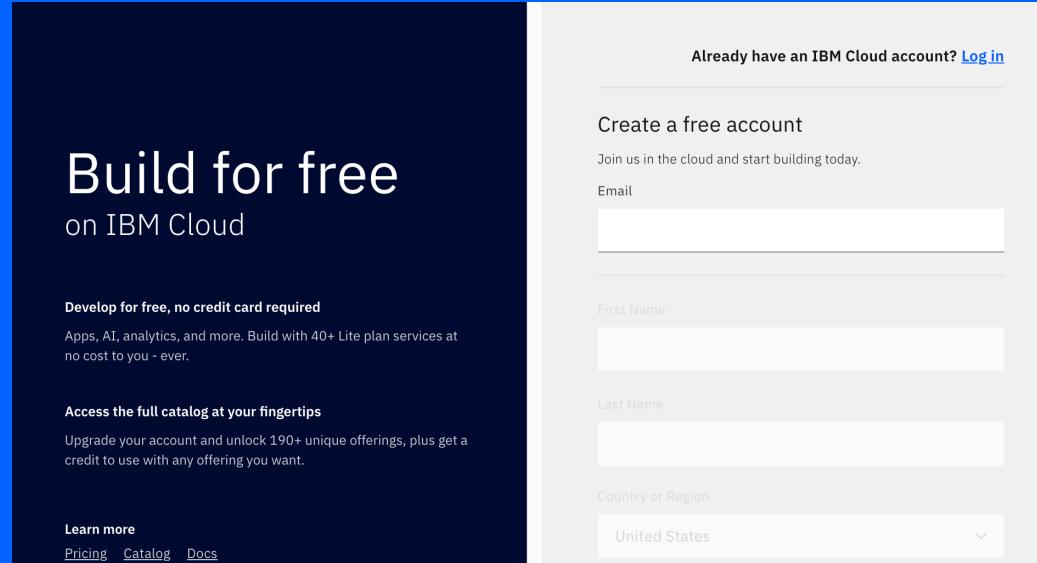
How we can leverage IBM Cloud credits?

<https://developer.ibm.com/startups/>

Builder Credits	Builder Qualifications	Premium Credits	Premium Qualifications
\$1,000/month in IBM Cloud credits for one year = \$12,000	Your business revenue in the last 12 months is less than \$1M USD Your business has been in business for fewer than five years You have previously received no IBM technology credits You are not a paying IBM Cloud customer	\$10,000/month in IBM Cloud credits for up to one year, = \$120,000	You are in an approved VC/accelerator/incubator You're working with innovative technologies like blockchain, AI, etc.

Signup to the IBM cloud

<http://ibm.biz/202006-cloudnative-1>



The screenshot shows the IBM Cloud sign-up page. On the left, a dark blue sidebar features the text "Build for free on IBM Cloud". Below this, two sections are shown: "Develop for free, no credit card required" and "Access the full catalog at your fingertips". At the bottom of the sidebar, there are links for "Learn more", "Pricing", "Catalog", and "Docs". On the right, a white form area is titled "Create a free account" with the sub-instruction "Join us in the cloud and start building today." It includes fields for "Email" (with a placeholder), "First Name" (placeholder), "Last Name" (placeholder), and "Country or Region" (placeholder set to "United States"). At the top right of the form area, there is a link "Already have an IBM Cloud account? [Log in](#)".

Already have an IBM Cloud account? [Log in](#)

Create a free account

Join us in the cloud and start building today.

Email

First Name

Last Name

Country or Region

United States

Build for free
on IBM Cloud

Develop for free, no credit card required

Apps, AI, analytics, and more. Build with 40+ Lite plan services at no cost to you - ever.

Access the full catalog at your fingertips

Upgrade your account and unlock 190+ unique offerings, plus get a credit to use with any offering you want.

Learn more

Pricing Catalog Docs

IBM Cloud Catalog

<https://cloud.ibm.com/catalog>

The screenshot shows the IBM Cloud Catalog interface. At the top, there's a navigation bar with links for Catalog, Docs, Log in, and Sign up. Below the navigation is a search bar labeled "Search the catalog...". A sidebar on the left contains a "Services" tab (which is highlighted in blue) and a "Software" tab. Under the "Services" tab, a dropdown menu is open, showing "All Categories" and a list of service categories: VPC Infrastructure, Compute, Containers, Networking, Storage, AI, Analytics, Databases, Developer Tools, Integration, Internet of Things, and Security and Identity. To the right of the sidebar, the main content area has a heading "Services" and a sub-section titled "Featured". The "Featured" section highlights the "Kubernetes Service", which is described as "Deploy secure, highly available apps in a native Kubernetes experience." It includes icons for the service, its status (Free), and its compatibility (IAM-enabled, Service Endpoint Supported). On the far right edge of the screen, there's a vertical "FEEDBACK" button.

Hybrid Cloud.



Public cloud

A broad range of compute choices: from bare metal and virtual servers, to serverless architectures, to Cloud Foundry apps, to Kubernetes containers.

- Support applications of any design
- Leverage IBM Watson™ AI
- Power blockchain and IoT use cases



Private cloud

The IBM Cloud Private platform includes a portfolio of containerized middleware offerings to extend cloud functionality throughout the enterprise.

- Build on a Kubernetes foundation
- Modernize enterprise software and apps
- Option to deploy on IBM Z® infrastructure



Hybrid cloud

An integrated environment including public and private cloud, with supporting technologies for integration and multi-cloud management.

- Build, deploy and operate apps and services wherever they run best
- Get secure and seamless data portability

In addition to the Public Cloud, the IBM Cloud also supports Hybrid Cloud.

An integrated environment including **public and private cloud**, with supporting technologies for integration and multi-cloud management

<https://www.ibm.com/cloud/hybrid/>

IBM Cloud Kubernetes Service

Why IBM Cloud Kubernetes Service?

We're leading the way with over 14,000 managed production clusters. And that's not all:

- Workload scale and diversity
- Premium security and compliance
- Integrates with Watson™, IBM Blockchain and more

[Get a free cluster](#)

[View demo \(3:14\)](#)

Kubernetes—also known as ‘k8s’ or ‘kube’—is a container orchestration platform for scheduling and automating the deployment, management, and scaling of containerized applications.

Kubernetes was first developed by engineers at Google before being open sourced in 2014.

<https://www.ibm.com/cloud/container-service/>



IBM Blockchain Platform



Kubernetes is an open-source container-orchestration system for automating application deployment, scaling, and management

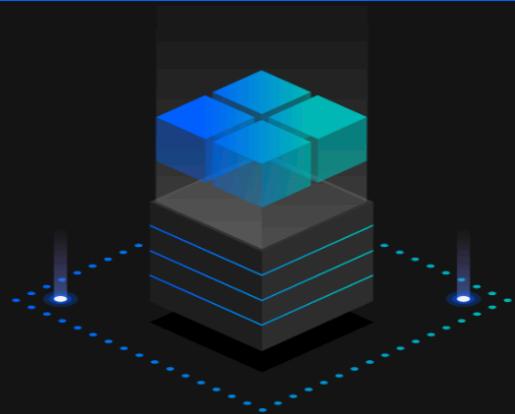
AWS, AZURE, IBM

IBM Cloud Paks

A faster, more reliable way to modernize and move to the cloud

Contact us

Watch the video (01:51)



01
Applications

02
Data

03
Integration

04
Automation

05
Multicloud Management

06
Security

Beyond containers and Kubernetes, **enterprises need to orchestrate their production topology, and to provide management, security and governance for their applications.**

IBM Cloud™ Paks are enterprise-ready, containerized software solutions that give clients an open, faster and more secure way to move core business applications to any cloud.

<https://www.ibm.com/cloud/paks/>

What are Virtual Servers?



IBM Cloud Virtual Servers

★★★★★ 43 Reviews - G2 Crowd

Good afternoon! Migrate and modernize your resources with newly available virtual servers on VPC infrastructure. Sign up today to get USD 200 toward your servers — on IBM.

Virtual servers,... are scalable and come with dedicated core and memory allocations

Virtual machines are deployed to the same VLANs as physical servers, enabling you to spread workloads across virtual servers and bare metal servers, while maintaining interoperability.

Spinning up Bare metal servers in the IBM Cloud

IBM Cloud Bare Metal Servers

IBM Cloud Bare Metal Servers

★★★★★ 31 Reviews - G2 Crowd

Good afternoon! Chat with an IBM Cloud sales rep to find the right server for your needs.

Configure, price and quote

→ Chat now



Bare Metal Servers Review

★★★★★

Nov 11, 2019

“ Bare Metal Server helps me to do heavy computational tasks easily. It's very useful for an AI engineer like me who needs lots of CPU and GPU power to train and test AI models. I have purchased bare me...

“ real-time support by IBM Cloud support is a deciding factor for me and it made my experience buttery smooth. I am a

Price to performance is unbeatable

★★★★★

Nov 8, 2019

“ IBM Cloud Bare Metal Servers are good all around for startups to the most advanced users and companies.

“ The speed of the provisioning is important when you need to get information set up on a server quickly. Including the transfer of data is important in a growing company compared

Great servers for a web reseller

★★★★★

Dec 5, 2019

“ They are well suited for high-performance websites and applications that require more resources than a traditional virtual machine can offer.

“ We use these servers to host the websites and applications of many of our clients. These servers provide us with the uptime and speed required for usage in

Leveraging IBM Cloud Bare Metal Se...

★★★★★

Feb 14, 2019

“ We position IBM Cloud Metal Servers for our clients seeking to spin off DevOps environments for critical but short term projects, and equally for building their Disaster recovery services for critical...

“ IBM Cloud Bare Metal Servers are great for testing Mobile Applications

IBM GPUs for cloud servers and Deep Learning

GPUs for cloud servers

You asked. We listened. We've lowered our bare metal prices and included up to 20 TB of bandwidth. Same power and flexibility. New competitive prices. Simple as that. Explore IBM GPU options below.

[Bare metal pricing](#)

[Virtual server pricing](#)



GPUs for Cloud Servers

GPUs explained:

Explore IBM GPU options below.

IBM Cloud Virtual Servers:

Backend as a Service progression

IaaS	CaaS	PaaS	FaaS/Serverless
Functions	Functions	Functions	Functions
Applications	Application	Applications	Applications
Runtimes	Runtimes	Runtimes	Runtimes
Operating Systems	Operating Systems	Operating Systems	Operating Systems
Infrastructure	Infrastructure	Infrastructure	Infrastructure

Provided by
Developer

Virtualization
Provided by Cloud



What is Serverless Computing?

Requires no management and operation of infrastructure, enabling developers to focus more narrowly on code/custom business logic.

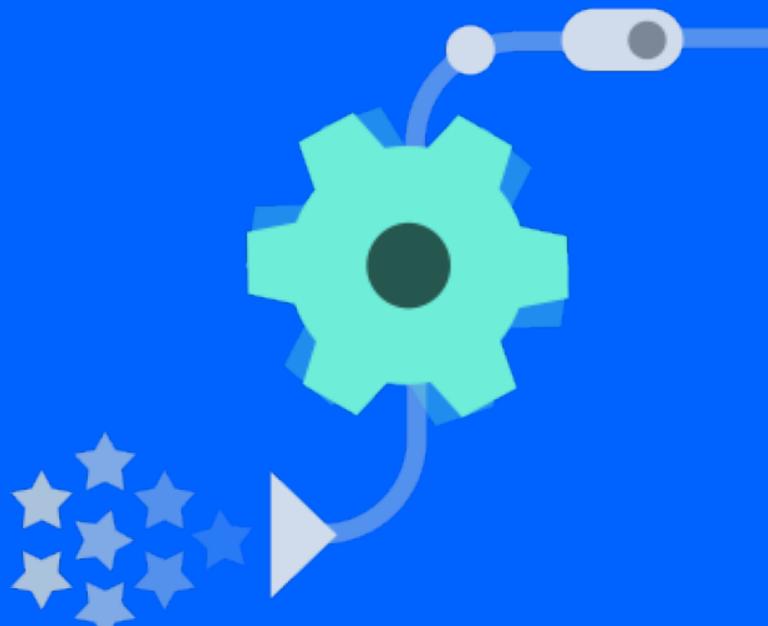
Runs code only on-demand on a per-request basis, scaling transparently with the number of requests being served.

Enables end users to pay only for resources being used, never paying for idle capacity.

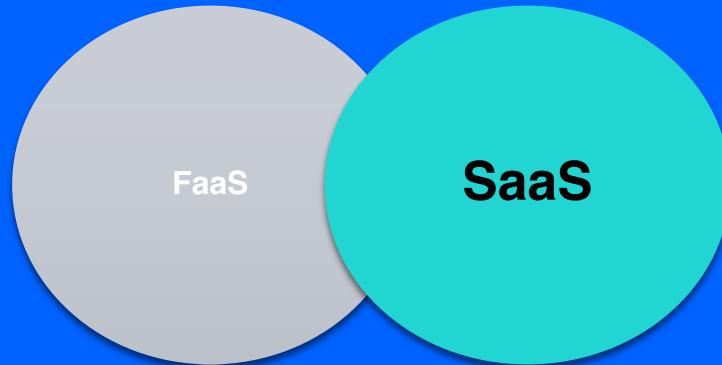
When did Serverless Computing start?

- AWS Lambda is an event-driven, serverless computing platform
- provided by Amazon as a part of Amazon Web Services.
- It is a computing service that runs code in response to events
- and automatically manages the computing resources required
- by that code.
- It was introduced in November 2014

Serverless computer providers



Serverless and SaaS



IBM Cloud Functions

<https://cloud.ibm.com/functions/>

IBM Cloud Functions

Functions-as-a-Service (FaaS) platform based on Apache OpenWhisk

Run your application code without servers, scale it automatically, and pay nothing when it's not in use.

[Start Creating](#) [Download CLI](#)

Developer Advocacy_Cloud Developer ...
Dallas (CF-Based)



Create

Let's write Hello World!

Single entities



Action

Actions contain code performing the work and can be invoked directly (REST API) or by Triggers.



Trigger

Triggers receive events from outside IBM Cloud Functions and invoke all connected Actions.



Sequence

Sequences invoke Actions in a linear order, passing parameters from one to the next.



Starters



Quickstart Templates

Choose from a number of available use cases, from a hello world action to invoking functions from Cloudant or Event Streams.



Installable Packages

Installable packages contain pre-made actions you can use to quick start your project. You are able to delete or edit them afterwards.



1. Action
2. Trigger
3. Sequence
4. Quickstart Templates
5. Installable Packages

Quickstart Templates

Get started quickly using one of the Templates. A number of use cases are available, from a hello world action to invoking functions from Cloudant or Event Streams.

Hello World

This action will accept a single parameter, which must be a JSON object.

Cloudant Events

When a Cloudant DB has a document edited or added, log the change in the console.

Event Streams

When an Event Streams topic has new data added, log the change in the console.

Get HTTP Resource

A web action that is invoked in response to a HTTP event.

Periodic Slack

Reminder

An action that will post to slack based on a periodic trigger.

[Previous](#)

[Cancel](#)

Let's write Hello World!

Deploy Template

Hello World

This action will accept a single parameter, which must be a JSON object.

This Template creates:
 Action helloworld

 Add to a Package

Create a Package to place your Template Actions in. Packages act like folders, and contain only Actions and/or Sequences.

Package Name

A package by this name already exists.

Action helloworld

Actions are stateless code snippets that run in response to events. They can be invoked manually, via a Trigger, or API calls.

Choose runtime for the actions you will own.

Node.js 10

```
1- /**
2 * 
3 * main() will be invoked when you Run This Action.
4 * 
5 * @param Cloud Functions actions accept a single parameter,
6 *      which must be a JSON object.
7 * 
8 * In this case, the params variable will look like:
9 *      { "name": "xxxx" }
10 * 
11 * @return which must be a JSON object.
12 *      It will be the output of this action.
13 * 
14 */
15- function main(params) {
16-   if (params.name) {
17-     return { greeting: `Hello ${params.name}` };
18-   } else {
19-     return { greeting: 'Hello stranger!' };
20-   }
21- }
22- exports.main = main;
23-
```

Cancel

Previous

Deploy



Let's write Hello World!

Code [Node.js 10](#) View mode - press **Enter** to edit Change Input Invoke

```
1  /**
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23
```



Let's write Hello World!

Activations	Collapse ↗	Clear ✎
▼ ✓ helloworld	81 ms	1/12/2020, 08:16:31
Activation ID: cfe5eb9c8d0f4189a5eb9c8d0f018990		
Results: <pre>{ "greeting": "Hello stranger!" }</pre>		
Logs: []		

Hands-on

Sign up to the IBM Cloud: <http://ibm.biz/202006-cloudnative-1>

- gitbook:

<http://ibm.biz/2020-cloudnative-lab1>

Welcome to the workshop!

Build your business on IBM Cloud or "how to build your business on IBM Cloud". Please follow the next section.

Start lean

Let us start by imagining us as a brand new two-person startup with seed funding of \$1.1 million from a friendly Venture Capitalist. What cloud should we use and what version? There are quite a few clouds to choose between; AWS, Azure, the IBM Cloud, the Google Cloud and others.

Let's select the IBM Cloud. To read up on the IBM Cloud let's check here:

<https://www.ibm.com/cloud>

Let's then check what benefits IBM may give us as a startup company.

Startup with IBM - Build with free IBM Cloud credits and grow your business

Startup with IBM. Build. Scale. Win. With \$120,000 in free IBM Cloud



Watson AI Services

AI							
 Watson Assistant IBM • AI Watson Assistant lets you build conversational interfaces into any application, device or channel Lite • Free • IAM-enabled	 Watson Studio IBM • AI Embed AI and machine learning into your business. Create custom models using your own data Lite • Free • IAM-enabled	 Annotator for Clinical Data IBM • AI Analyze text to extract medical codes and concepts such as diseases, lab values, medications Lite • Free • IAM-enabled	 Compare and Comply IBM • AI Process governing documents to convert, identify, classify, and compare important elements Lite • Free • IAM-enabled	 Discovery IBM • AI Add a cognitive search and content analytics engine to applications. Lite • Free • IAM-enabled	 Insights for Medical Literature IBM • AI Search a medical literature corpus and discover insights. Lite • Free • IAM-enabled		
 Knowledge Catalog IBM • AI Discover, catalog, and securely share enterprise data. Lite • Free • IAM-enabled	 Knowledge Studio IBM • AI Teach Watson the language of your domain. Lite • Free • IAM-enabled	 Language Translator IBM • AI Translate text, documents, and websites from one language to another. Create industry or region-specific models. Lite • Free • IAM-enabled	 Machine Learning IBM • AI IBM Watson Machine Learning - make smarter decisions, solve tough problems, and improve user experience. Lite • Free • IAM-enabled	 Natural Language Classifier IBM • AI Natural Language Classifier uses advanced natural language processing and machine learning Free • IAM-enabled	 Natural Language Understanding IBM • AI Analyze text to extract meta-data from content such as concepts, entities, emotion relations Lite • Free • IAM-enabled		
 Personality Insights IBM • AI The Watson Personality Insights service derives insights from transactional and social media data to identify personality traits. Lite • Free • IAM-enabled	 PowerAI Third party • AI The accelerated deep learning platform for enterprise. Built on the IBM PowerAI platform, powered by TensorFlow. IAM-enabled	 Speech to Text IBM • AI Low-latency, streaming transcription Lite • Free • IAM-enabled	 Text to Speech IBM • AI Synthesizes natural-sounding speech from text. Lite • Free • IAM-enabled	 Tone Analyzer IBM • AI Tone Analyzer uses linguistic analysis to detect three types of tones from communications. Lite • Free • IAM-enabled	 Visual Recognition IBM • AI Find meaning in visual content! Analyze images for scenes, objects, and other content. Choose a default model. Lite • Free • IAM-enabled		
 Watson OpenScale IBM • AI IBM Watson OpenScale is an enterprise-grade environment for AI infused applications that provides automated monitoring, explainability, and governance. Lite • Free • IAM-enabled							

<https://cloud.ibm.com/catalog?category=ai>

Watson Visual Recognition



Author: IBM • Date of last update: 03/13/2020 • [Docs](#) • [API docs](#)

Create

About

Select a region

Select a region

Dallas

Select a pricing plan

Displayed prices do not include tax. More

Plan

Lite

Features:

Custom Models



Pre Trained Models



Watson has pre-trained models that are category-specific to enable you to analyze images for scenes, objects, colors, food, and other content. Click on an image on the right to see how Watson analyzes each image, or upload your own image. You can also see the results against the Food and Explicit Models.

By using this application, you agree to the [Terms of Use](#)

Configure your resource

Service name:

Visual Recognition-64



Paste an image URL here...

General Model

Quickly understand objects, actions, scenes, and colors within an image.

fabric **0.96**

gray color **0.95**

Harris Tweed (jacket) **0.87**

clothing **0.80**

tweed **0.79**

garment **0.52**

overgarment **0.52**

coat **0.51**

Norfolk jacket **0.50**

Food Model



Explicit Model



Hands-on

Sign up to the IBM Cloud: <http://ibm.biz/202006-cloudnative-1>

- gitbook:

<http://ibm.biz/2020-cloudnative-lab1>

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Let's select the IBM Cloud. To read up on the IBM Cloud let's check here:

<https://www.ibm.com/cloud>

Let's then check what benefits IBM may give us as a startup company.

Startup with IBM - Build with free IBM Cloud credits and grow your business

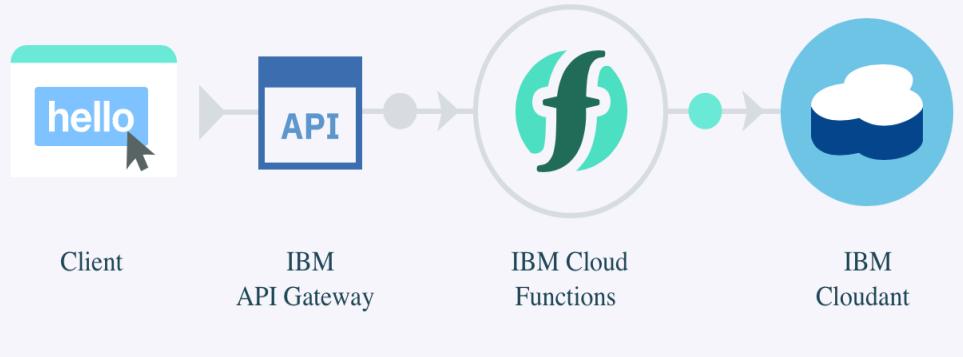
Startup with IBM. Build. Scale. Win. With \$120,000 in free IBM Cloud



What can I use Cloud functions for ?

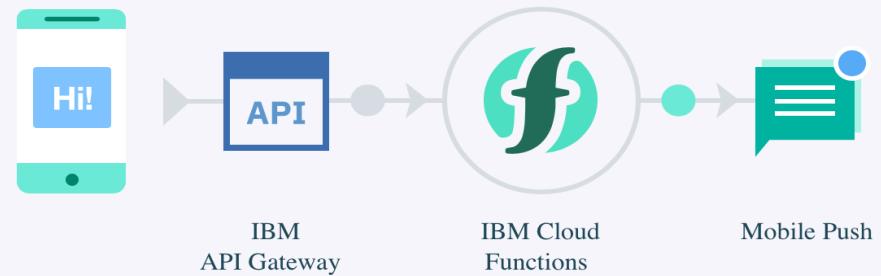
Serverless Backends

Expose application logic by implementing serverless microservices. Simply map your functions to well-defined API endpoints any client can call by making use of Web Actions or our latest API Gateway integration.



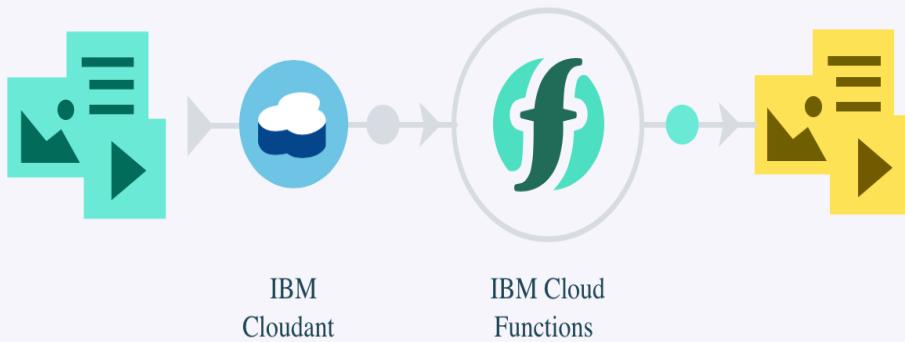
Mobile Backend

Allow mobile developers to easily access server-side logic and to outsource compute-intensive tasks to a scalable cloud platform. Let them implement functions in languages like Swift and easily consume server-side functions using our iOS SDK.



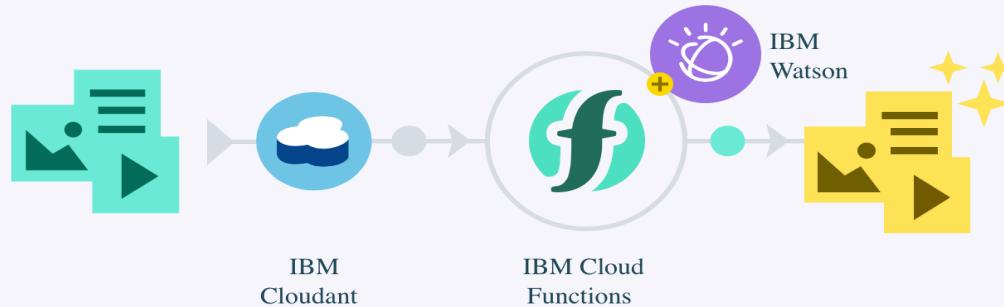
Data Processing

Execute code whenever data is updated in your datastore. Easily automate processes like audio normalization, image rotation, sharpening, noise reduction, thumbnail generation, or video transcoding.



Cognitive Data Processing

Analyze data as soon as it becomes available. Let your function make use of powerful cognitive services like IBM Watson to detect objects or people appearing in images or videos.



Case-Study: With Skylink, a drone is continuously taking and analyzing pictures while flying using an IBM Watson service.

IoT Ready

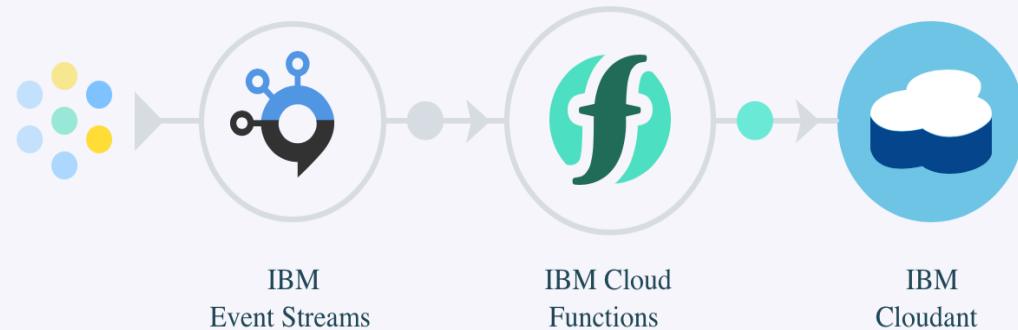
React to and process IoT sensor data. Let any IoT device send data to our IBM Watson IoT platform and define cloud rules to call your functions and execute custom application logic.



Case-Study: GreenQ: Cloud Functions for a Smart City Data Application.

Event Stream Processing

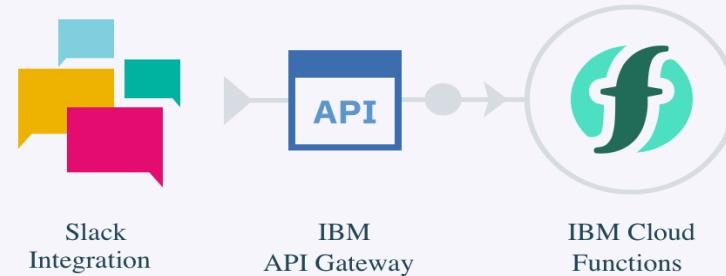
Process data in-motion and make your functions react to incoming messages. Benefit from our IBM Event Streams—an IBM Cloud managed Apache Kafka—integration.



Conversational Scenarios

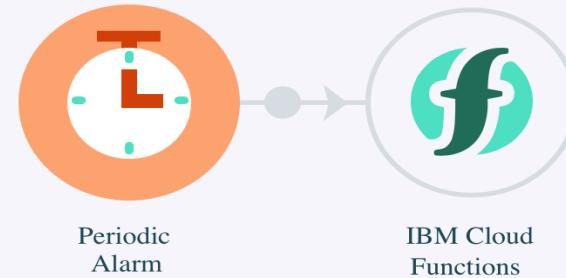
Implement serverless conversational applications, like chatbots, by passing chat messages to your functions for further processing.

[Go to tutorial](#)



Scheduled Tasks

Execute your functions periodically. Define schedules following a cron-like syntax to specify when actions are supposed to be executed.



IBM Cloud Functions

Functions-as-a-Service (FaaS) platform based on Apache OpenWhisk

Develop your functions directly in one of the [natively supported languages](#), or run code in any other language (including compiled Go, C, etc. binaries) by providing us with a Docker container.

Developer Advocacy_Cloud Developer ...
Dallas (CF-Based)



Python



.NET



Ruby



Any language
(via Docker)

Event Providers

Benefit from an ecosystem of event consumers and emitters from different areas like analytics, cognitive, data, IoT, mobile, and more. Using our open event-provider interface, [you can enable](#) any service you would like to use.



Github



Cloudant



Event Streams



Mobile Push

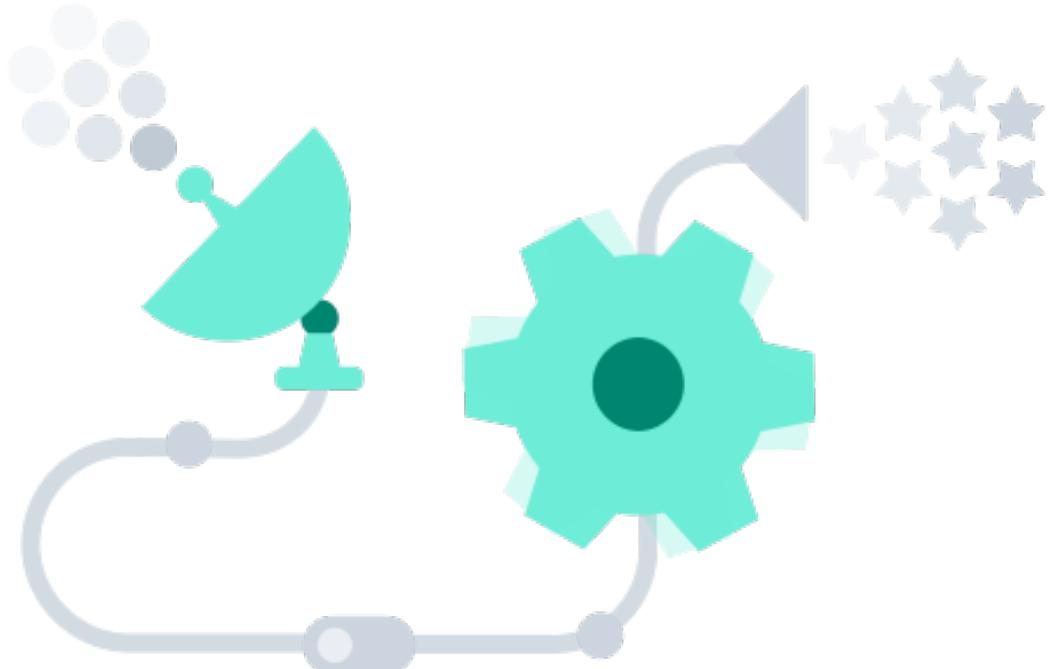


Periodic Alarm

What is IBM Cloud Functions (Apache OpenWhisk)?

Serverless platform to execute code in response to events

Developed as
open source software
via Apache Foundation
openwhisk.org

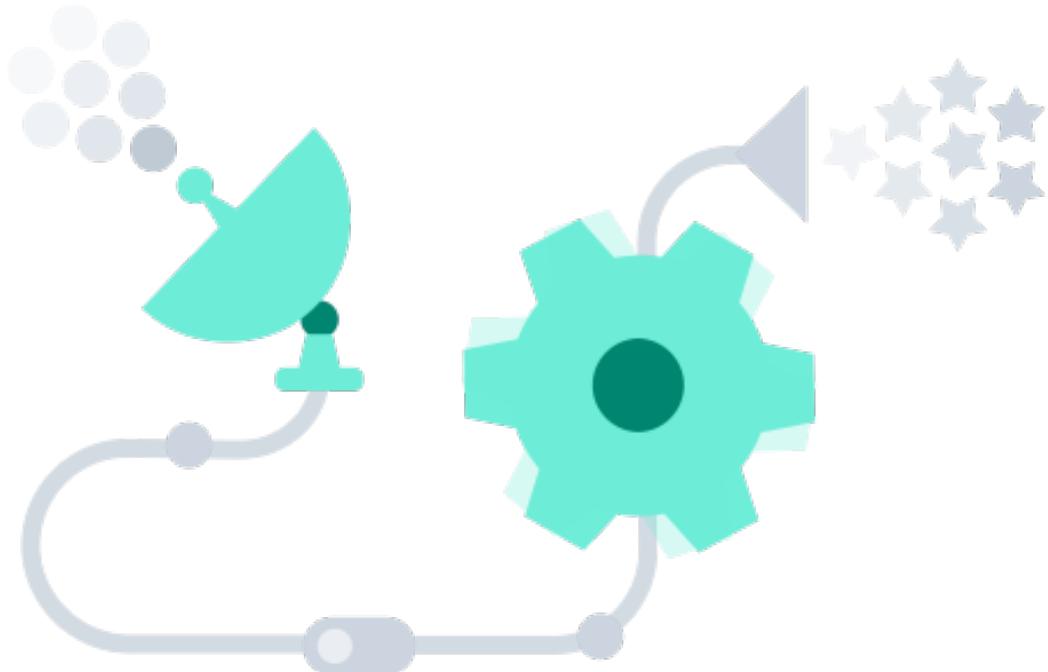


What is IBM Cloud Functions (Apache OpenWhisk)?

Serverless platform to execute
code in response to events

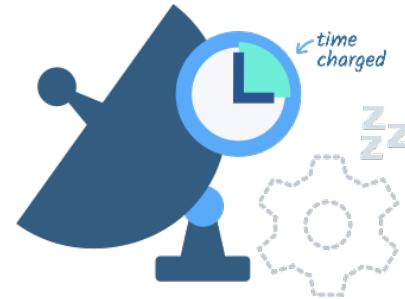


Managed service on
IBM Cloud
cloud.ibm.com/functions



Granular pricing

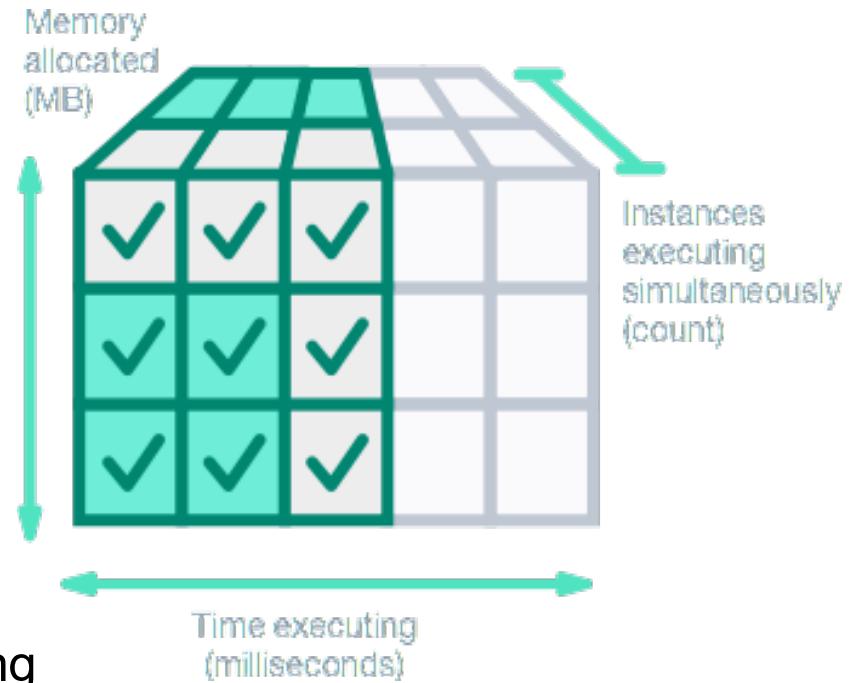
Pay only for the exact time your actions run. When an action is not invoked, it's not in memory, so you don't pay anything.



Pricing model

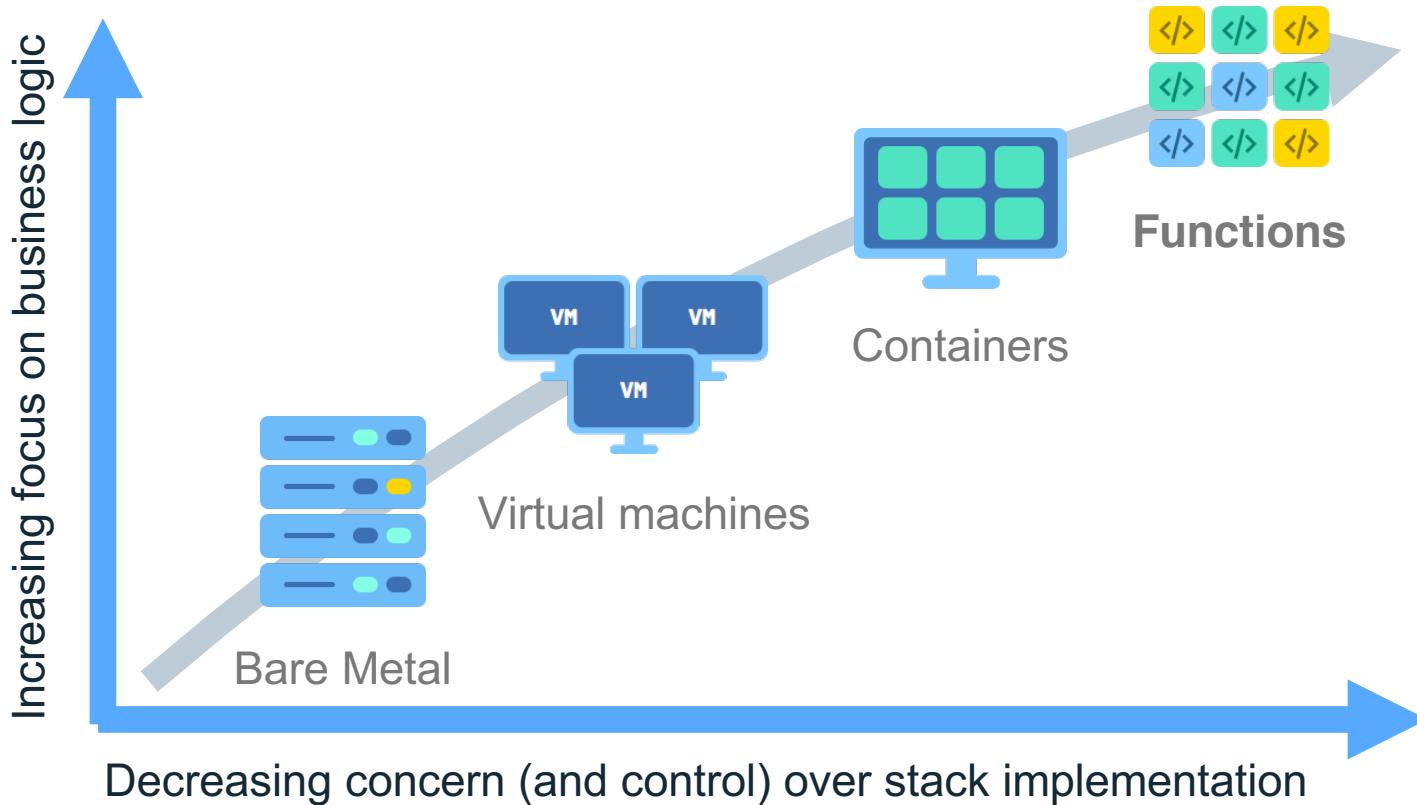
Time an action was running *
memory allocated to action

\$0.000017 per GBs
Free tier: 400,000 GBs



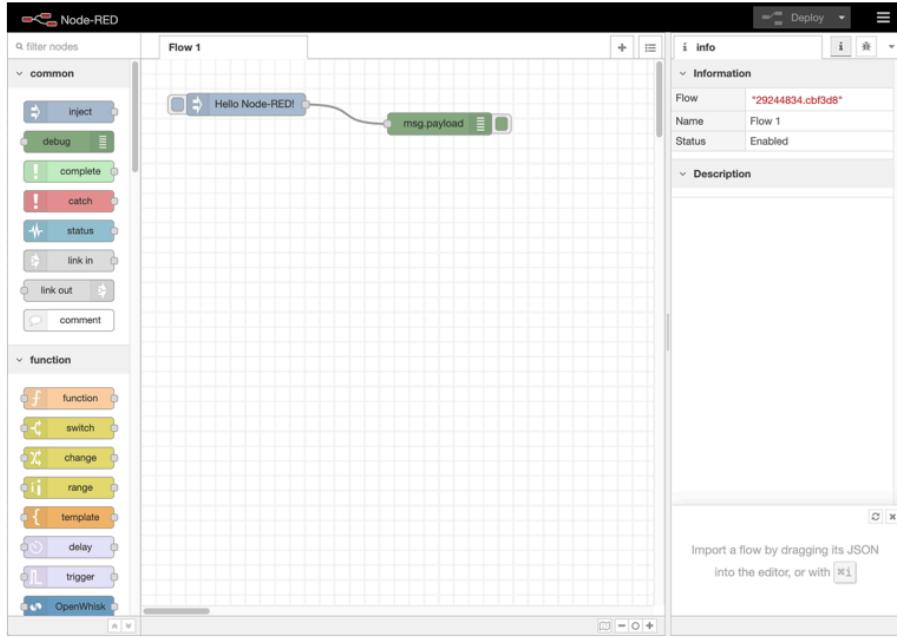
<https://cloud.ibm.com/functions/learn/pricing>

What is Serverless computing (Functions-as-a-Service)?



No Code development for Cloud Native with Node-RED

Node Red



Tutorial Build your first IoT application March 17, 2020 →	Tutorial Use Terjmat to easily translate text March 17, 2020 →	Tutorial Build a simple earthquake monitoring system March 17, 2020 →
Tutorial Create a Node-RED starter application March 17, 2020 →	Tutorial Create an Internet of Things Platform Starter application January 13, 2020 →	Tutorial Leverage deep learning in your Node-RED flows September 12, 2019 →
Tutorial Program a Tello drone to take pictures and then classify the images May 21, 2019 →	Tutorial Invoking Building Insights APIs using Node-RED May 6, 2019 →	Tutorial Build a spoken universal translator using Node-RED and Watson AI services April 2, 2019 →

<https://developer.ibm.com/components/node-red/tutorials/>

LAB 2 – gitbook

<http://ibm.biz/2020-cloudnative-lab1>

↳ Conclusions

Slack Channel https://join.slack.com/t/biz-on-cloud/shared_invite/zt-eiyr9dxe-XrArake~2BaBMKBFQaANzg



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