IBM Cloud Fundamentals

—

Egor Margineanu
Application Developer

IBM

Contents

Cloud Computing

What is Cloud Computing

Cloud computing makes computer system resources, especially storage and computing power, available on demand without direct active management by the user. The term is generally used to describe data centers available to many users over the Internet. Large clouds, predominant today, often have functions distributed over multiple locations from central servers. If the connection to the user is relatively close, it may be designated an Edge server (https://en.wikipedia.org/wiki/Cloud_computing).
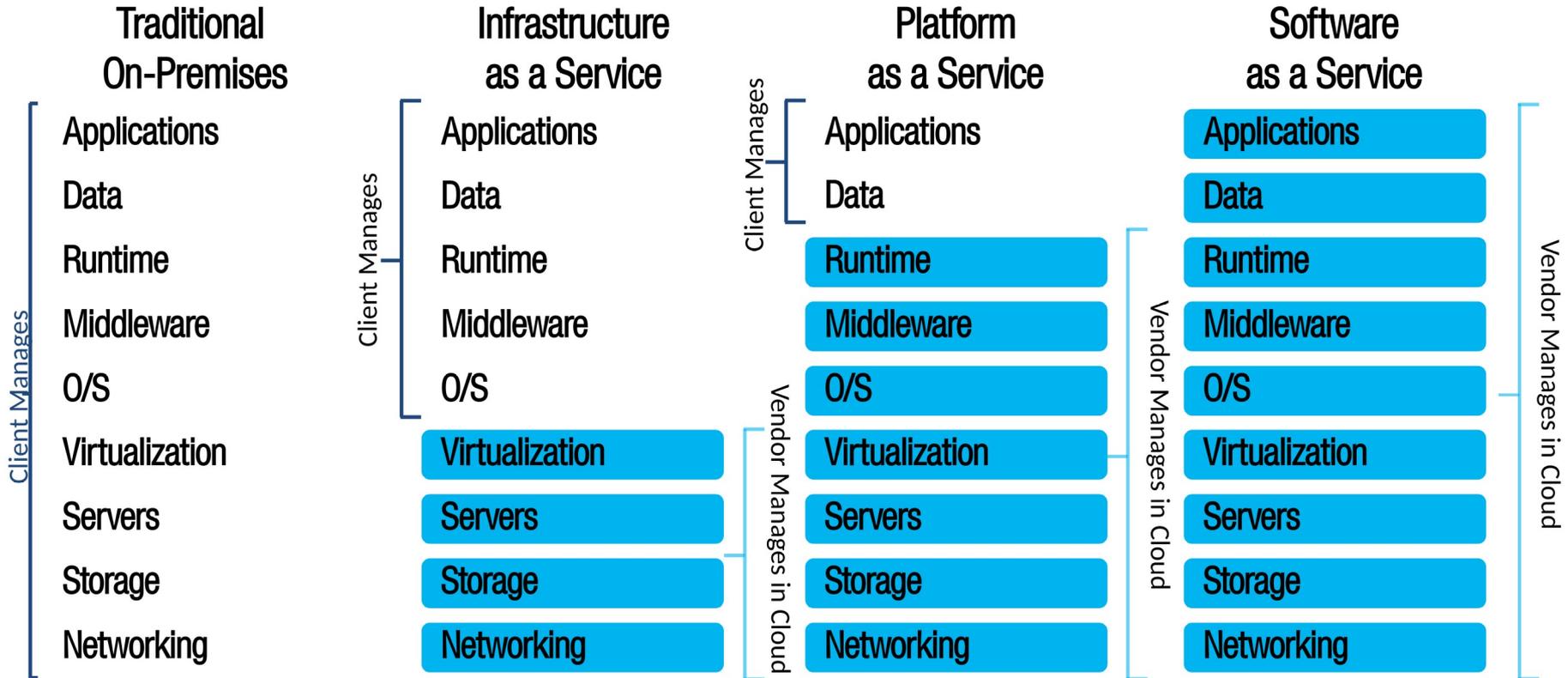
Cloud computing characteristics:
- Self-service
- Broad network access
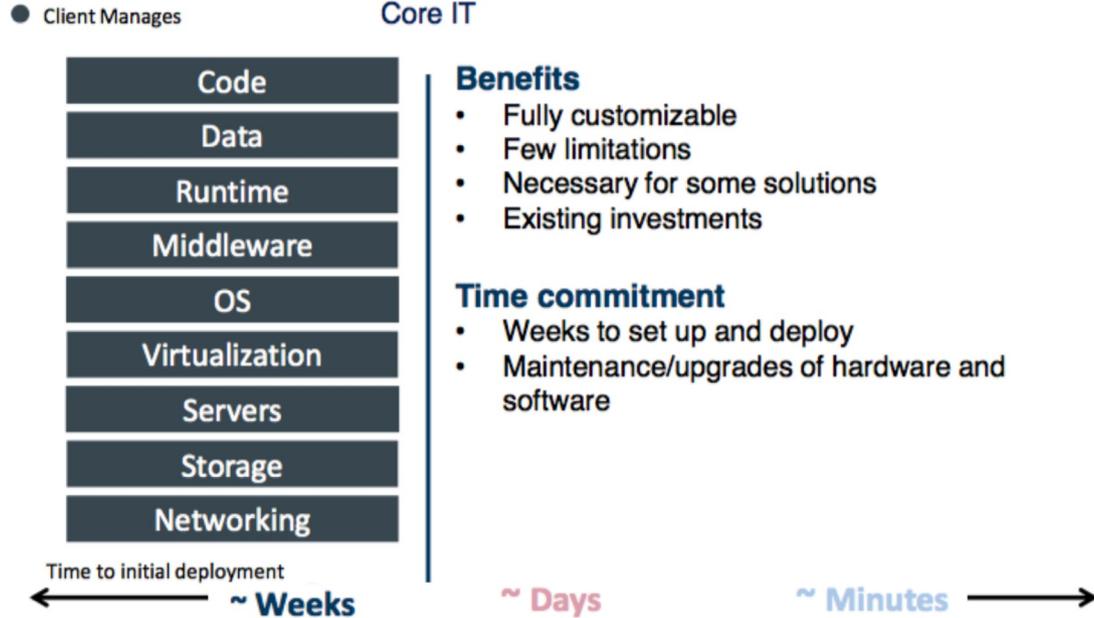- Resource pooling
- Rapid elasticity
- Measured service

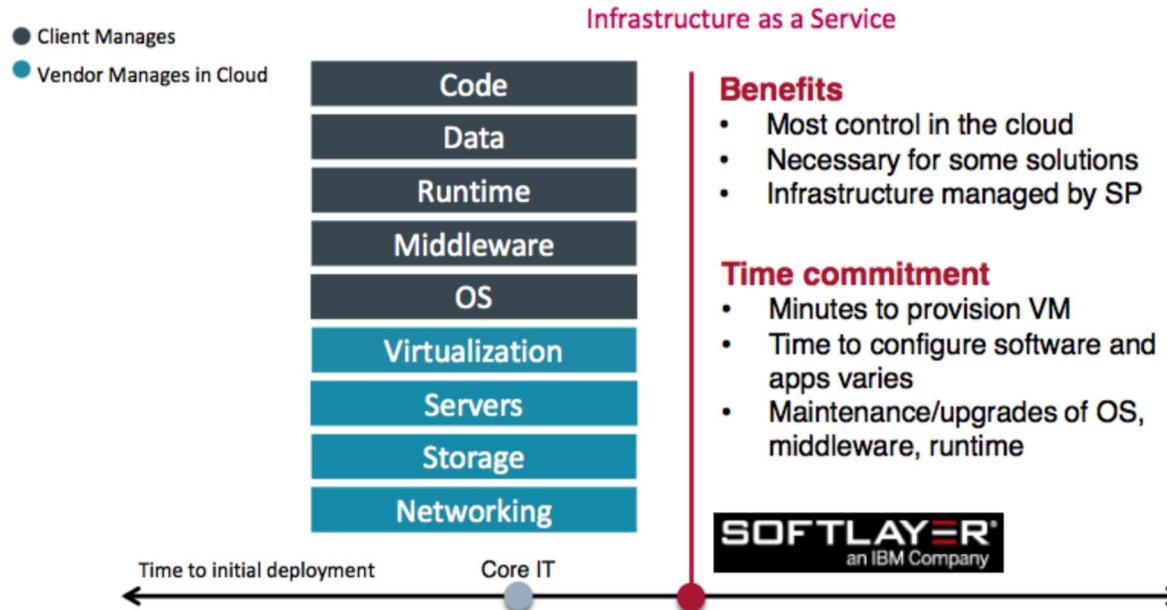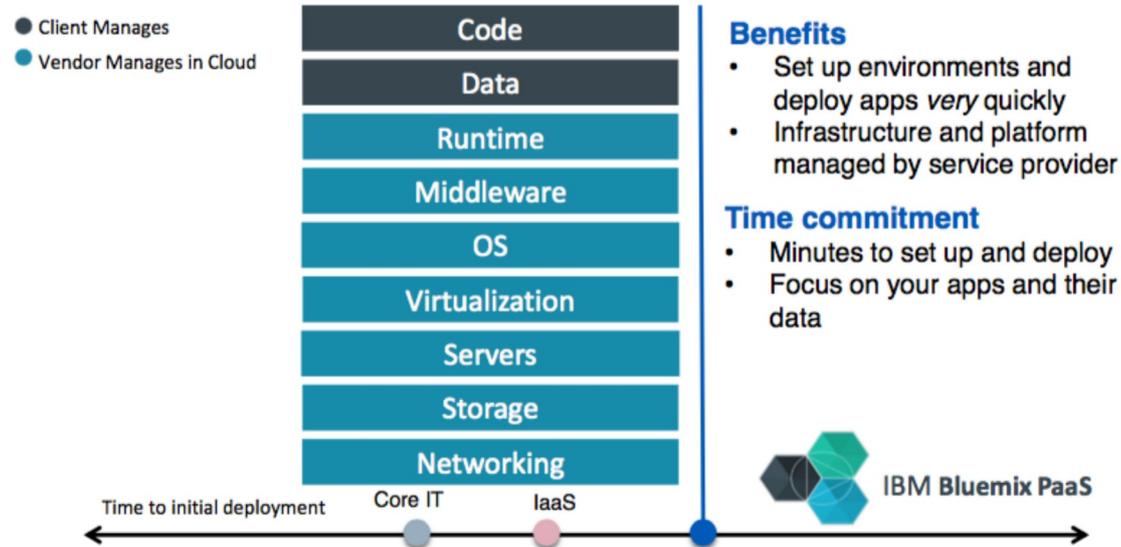# Examples of known applications using cloud
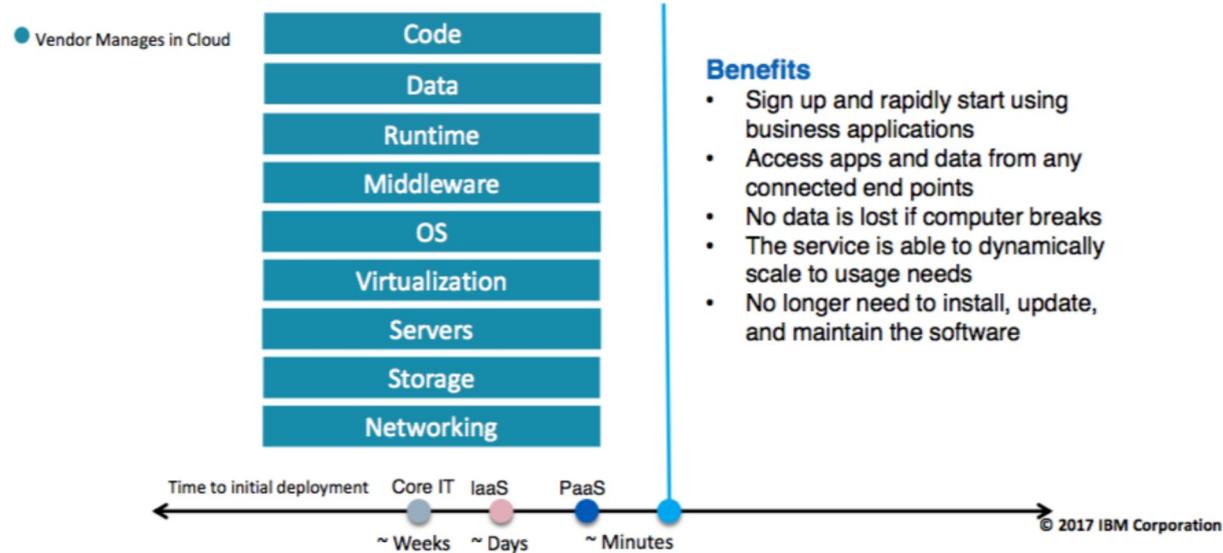
Cloud Service Models

	Traditional On-Premises	Infrastructure as a Service	Platform as a Service	Software as a Service
	Applications	Applications	Applications	**Applications**
	Data	Data	Data	**Data**
	Runtime	Runtime	**Runtime**	**Runtime**
	Middleware	Middleware	**Middleware**	**Middleware**
	O/S	O/S	**O/S**	**O/S**
	Virtualization	**Virtualization**	**Virtualization**	**Virtualization**
	Servers	**Servers**	**Servers**	**Servers**
	Storage	**Storage**	**Storage**	**Storage**
	Networking	**Networking**	**Networking**	**Networking**

Traditional On-Premises: Client Manages (all)

Infrastructure as a Service: Client Manages (Applications, Data, Runtime, Middleware, O/S); Vendor Manages in Cloud (Virtualization, Servers, Storage, Networking)

Platform as a Service: Client Manages (Applications, Data); Vendor Manages in Cloud (Runtime, Middleware, O/S, Virtualization, Servers, Storage, Networking)

Software as a Service: Vendor Manages in Cloud (all)

Traditional on-premises: Core IT

Client Manages   Core IT

Code		
Data		
Runtime		
Middleware		
OS		
Virtualization		
Servers		
Storage		
Networking		

Benefits
- Fully customizable
- Few limitations
- Necessary for some solutions
- Existing investments

Time commitment
- Weeks to set up and deploy
- Maintenance/upgrades of hardware and software

Time to initial deployment

← ~ **Weeks**   ~ **Days**   ~ **Minutes** →

Infrastructure as a Service

Infrastructure as a Service

● Client Manages
● Vendor Manages in Cloud

| Code |
| Data |
| Runtime |
| Middleware |
| OS |
| Virtualization |
| Servers |
| Storage |
| Networking |

Time to initial deployment — Core IT

Benefits
- Most control in the cloud
- Necessary for some solutions
- Infrastructure managed by SP

Time commitment
- Minutes to provision VM
- Time to configure software and apps varies
- Maintenance/upgrades of OS, middleware, runtime

SOFTLAYER®
an IBM Company

Platform as a Service

- Client Manages
- Vendor Manages in Cloud

| Code |
| Data |
| Runtime |
| Middleware |
| OS |
| Virtualization |
| Servers |
| Storage |
| Networking |

Time to initial deployment — Core IT — IaaS

Benefits
- Set up environments and deploy apps *very* quickly
- Infrastructure and platform managed by service provider

Time commitment
- Minutes to set up and deploy
- Focus on your apps and their data

IBM Bluemix PaaS

Software as a Service

Vendor Manages in Cloud

Code	
Data	
Runtime	
Middleware	
OS	
Virtualization	
Servers	
Storage	
Networking	

Benefits
- Sign up and rapidly start using business applications
- Access apps and data from any connected end points
- No data is lost if computer breaks
- The service is able to dynamically scale to usage needs
- No longer need to install, update, and maintain the software

Time to initial deployment   Core IT   IaaS   PaaS

~ Weeks   ~ Days   ~ Minutes

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Deployment models

Managed multi-tenant
off-premise

Managed single-tenant
off-premise

Managed single-tenant
on-premise

TJBot

What is TJBot

TJBOT CZ EDITION

First artificial intelligence out of a cardboard. Easily. In three steps.

How it works

How it works

How it works – Rock-Paper-Scissors Game

- Uses TJBotCZ library https://github.com/tjbotcz/tjbotczlib
  - Implements various functions to interact with hardware and cloud, e.g.:
    - Shows text on display
    - Plays sounds
    - Sends sound to speech-to-text server in cloud
- Uses TJBotCZ_RPS application https://github.com/tjbotcz/tjbotcz_rps
  - Implements RPS game logic using function from TJBotCZ library
- User IBM Cloud Watson services
  - Text-To-Speech
  - Speech-To-Text
  - Visual Recognition

IBM Cloud

Compute options

Bare Metal

- *Dedicated Compute*
- *High Memory*
- *Intensive Disk I/O*

Virtual Servers

- *Isolation*
- *Familiar*
- *Full Operating System Control*

Containers

- *Portable*
- *Flexible*
- *Light-weight*
- *Orchestration*

Cloud Foundry Apps

- *Speed*
- *Manage code, not infrastructure*
- *Multiple runtime choices*

Cloud Functions

- *Serverless*
- *Event-Driven*
- *Short-lived*

Infrastructure

Platform

Compute options

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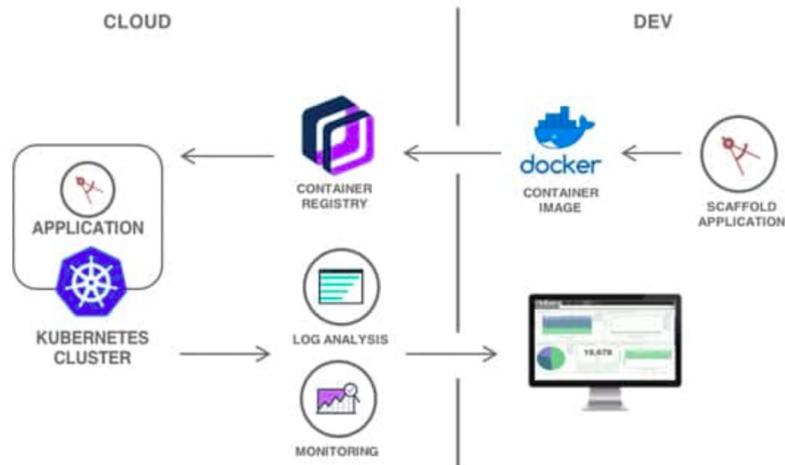### Cloud Functions
- *Serverless*
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Infrastructure

Platform

IaaS Compute Options

Bare Metal Servers

Raw IaaS horsepower for processor intensive and disk I/O-intensive workloads

Virtual Servers

Fast deployment when resources are needed on the fly

Specific workloads servers

- SAP Certified Servers

- VMWare

- GPU Computing

- Power Servers

- Network Devices (Routers, Firewalls)

Public Services

Block and File
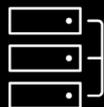
Object

Mass Data Migration

Backup

For when you need...
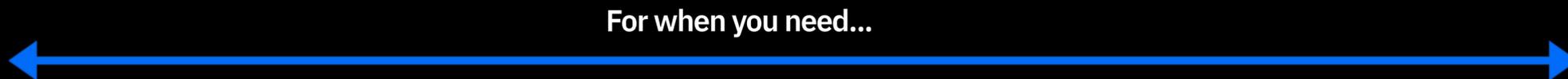
- File sharing
- Local archiving
- Data protection
- Data bases
- Email servers
- RAID
- Virtual machines

- Huge data storage
- API driven web applications support
- Big archived backups
- Cost effective dynamic data accessibility

- To move TBs of data to the cloud
- Sensitive data solutions
- Economical storage to cloud pricing
- Limited internet connection support
- Data center decommission strategy

- Copies and instances of data
- Full control over retrieval and restoration
- Customizable choices
- Turnkey or custom-built options

- Private SAN/NAS storage
- Unlimited access
- Data-intensive, redundant power solutions
- High performance and functionality

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Infrastructure

Platform

Compute options

IBM Cloud kubernetes Service

IBM Cloud™ kubernetes Service is a managed container service for the rapid delivery of applications that can bind to advanced services like Watson™ and blockchain. As a certified K8s provider, IBM Cloud kubernetes Service provides intelligent scheduling, self-healing, horizontal scaling, service discovery and load balancing, automated rollouts and rollbacks, and secret and configuration management. The kubernetes service also has advanced capabilities around simplified cluster management, container security and isolation policies, the ability to design your own cluster, and integrated operational tools for consistency in deployment.

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Infrastructure

Platform

Compute options

Cloud Foundry: Instant Runtimes

Cloud Foundry is an open source PaaS that lets developers focus on their application code and let the platform handle the rest (runtime, scaling, networking, operating system).

IBM Cloud extends Cloud Foundry with a number of managed runtimes and services, enterprise-grade DevOps tooling, and a seamless overall developer experience.

Supported runtimes:

- Node.JS

- Java

- Python

- .Net

- Custom runtimes

Compute options

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Infrastructure

Platform

Compute options

IBM Cloud Functions

A serverless platform for event-driven compute

- Runs code only on-demand on a per-request basis

- No management or operations required

- Focus on developing value-adding code

No servers   Just code

Compute options

Increasing focus on business logic →

Functions

Apps

Containers

Virtual machines

Bare Metal

Decreasing concern (and control) over stack implementation →
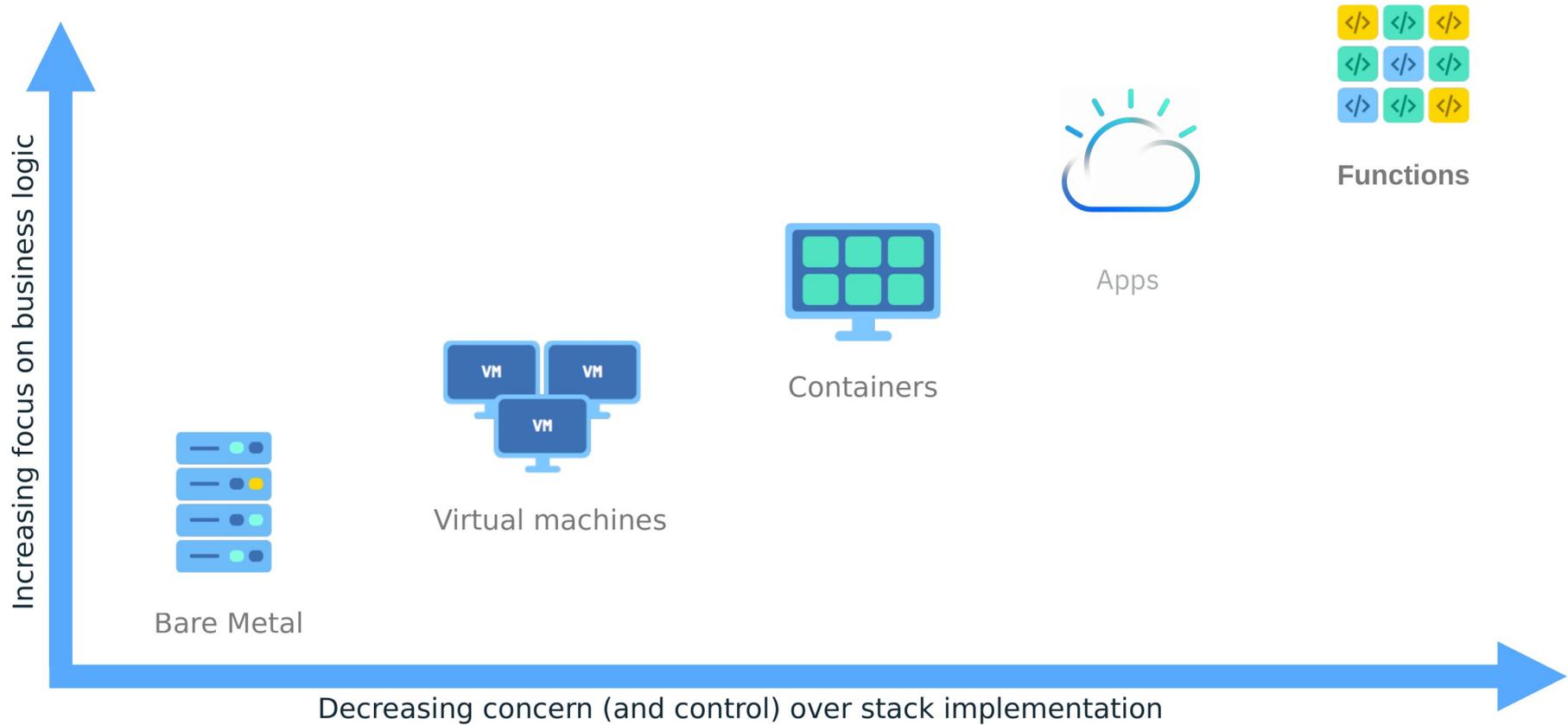
Compute options

IBM Cloud Managed Services

- Building blocks of applications running in IBM Cloud runtimes available as infrastructure or platform.

- Add ready to use features and functionality to application code

- Covers AI, Internet of Things, Analytics, DevOps, Blockchain, Storage and many more…

- Are provided by IBM, Open-source communities and third-party partners

Compute options

Example service: Watson Studio

Watson Studio democratizes machine learning and deep learning to accelerate infusion of AI in your business to drive innovation. Watson Studio provides a suite of tools and a collaborative environment for data scientists, developers and domain experts.

Compute options

Example service: DevOps Toolchains
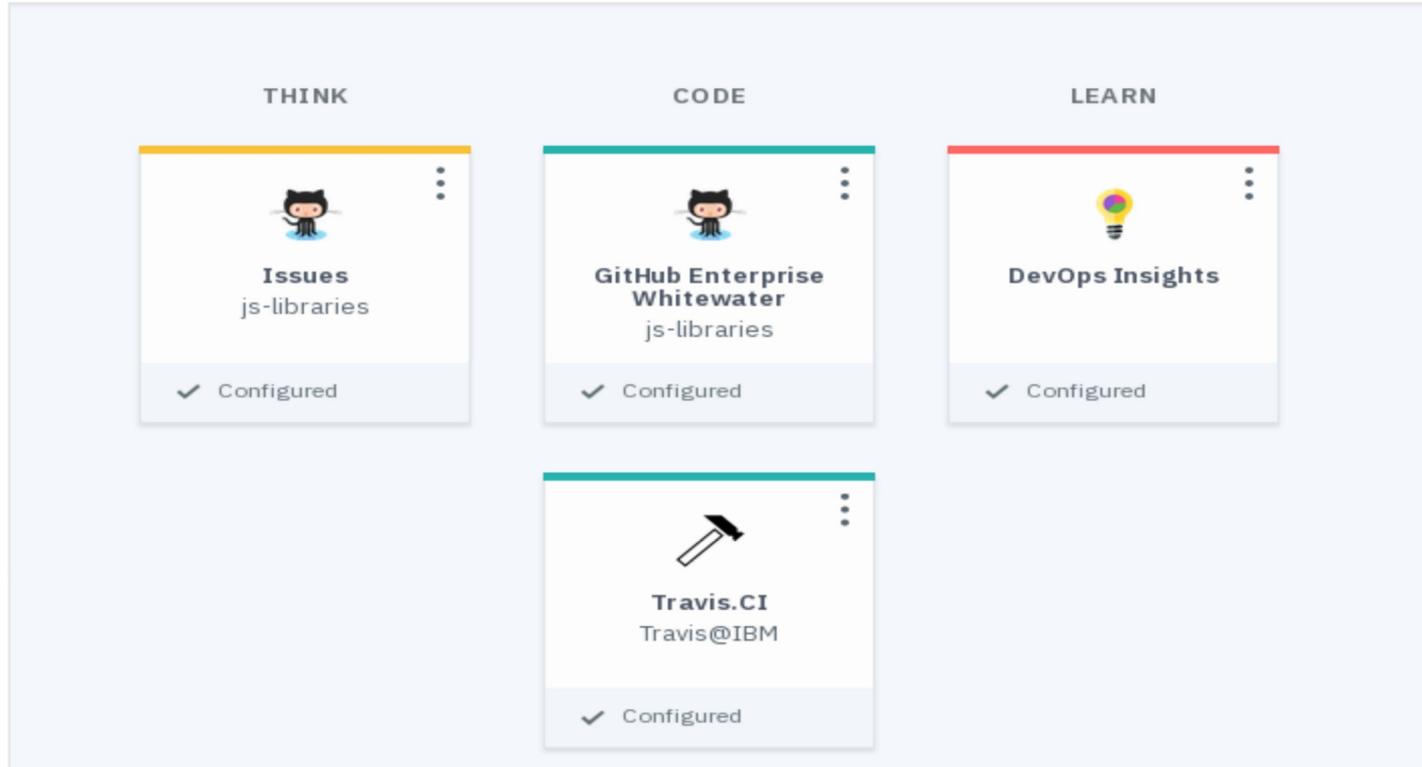
Practice
Working with IBM Cloud
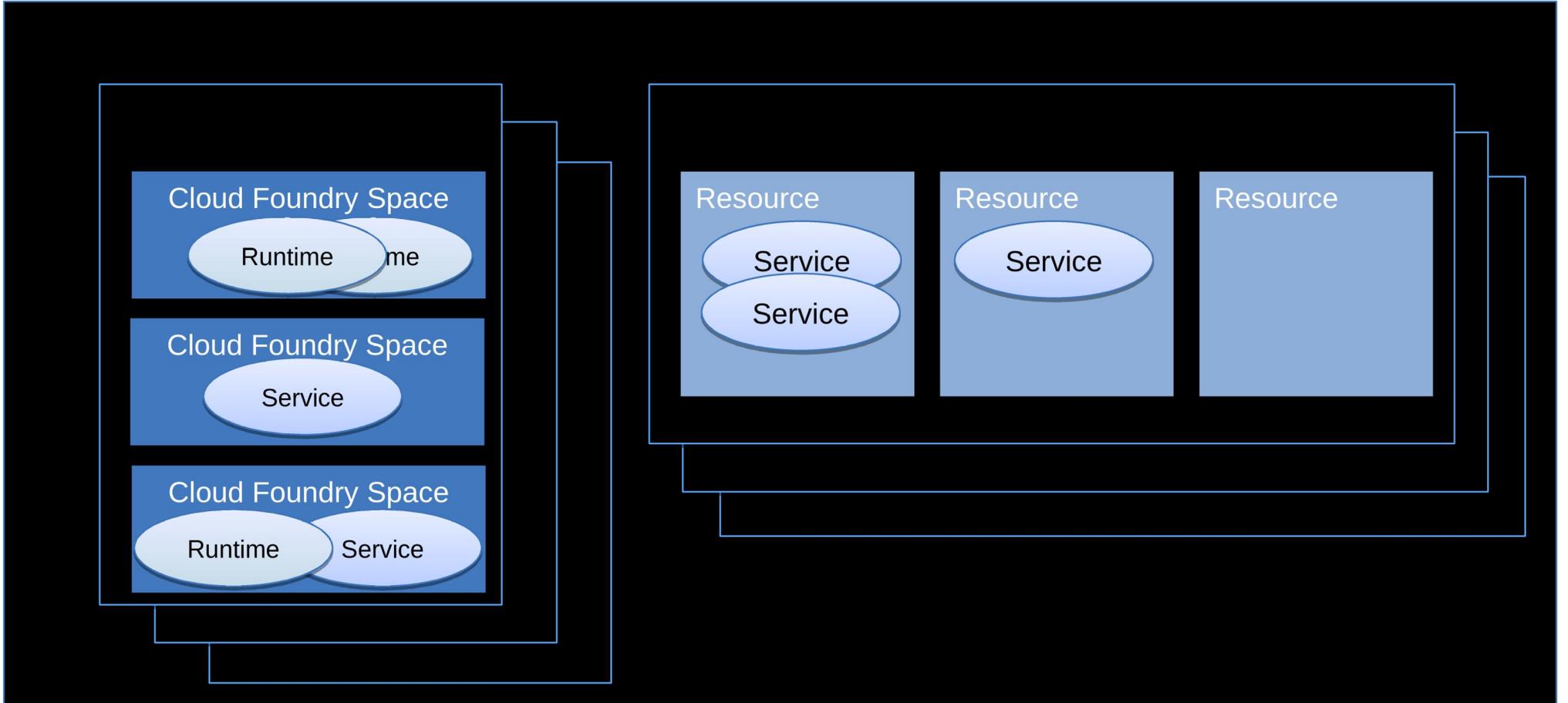
IBM Cloud Account types

Lite

- Free account

- No time limit

- Learn, explore and build POCs

- One Cloud Foundry Organization in one Region;

- One Resource Group

- Auto sleep, garbage collection, alerts before approaching data thresholds

- 256 MB of Cloud Foundry runtime memory;

- Kubernetes Cluster Lite Plan: 2 CPUs, 4 GB RAM

- Access to usage capped plans for services with Lite label
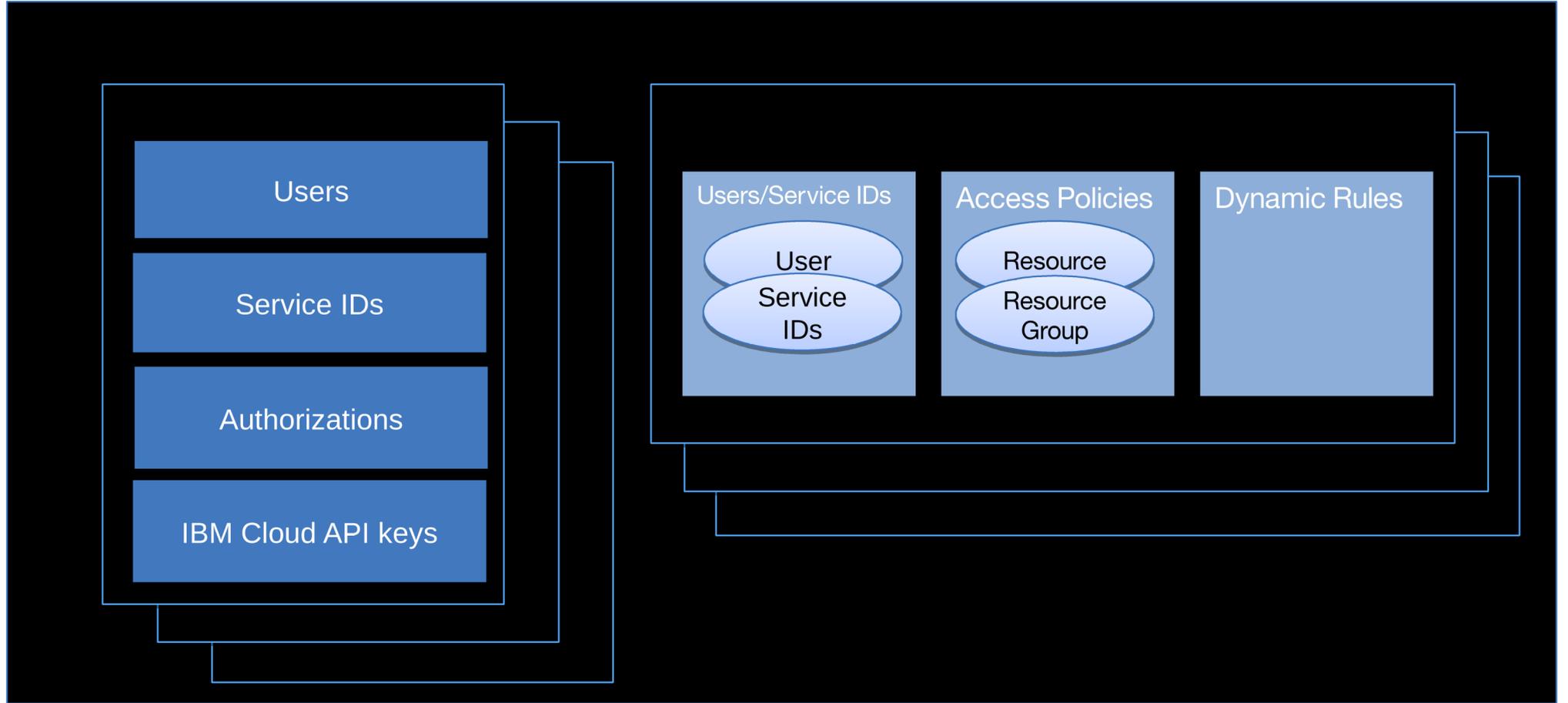
Pay-As-You-Go and Subscription

- Access to the full catalog, including the free plans

- Production use cases

- Multiple resource groups

- Pay-as-you-go:

  - Monthly IBM Cloud invoice

  - Charges are based on your use of IBM Cloud compute and services

- Subscription:

  - Get a monthly discount based on a minimum monthly spending

  - Commitment, negotiated pricing

Account structure

Cloud Foundry Space
- Runtime
- me

Cloud Foundry Space
- Service

Cloud Foundry Space
- Runtime
- Service

Resource
- Service
- Service

Resource
- Service

Resource

Identity and Access Management

Users

Service IDs

Authorizations

IBM Cloud API keys

Users/Service IDs

User

Service IDs

Access Policies

Resource

Resource Group

Dynamic Rules

Practice

Billing and usage

Key elements:

- Usage

    – By resource group

    – By plan

    – By service

- Billing items

- Payments

- Invoices

Documentation

IBM Cloud Docs

- Quickstarts

- Service documentation

- Avaiable in Github

Developer@IBM and Cloud Garage resources

- [Courses](#)

- [Architectures](#)

- [Tutorials](#)

- [Code patterns](#)

Practice
Catalog

All Categories >

Compute
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Storage
AI
Analytics
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Developer Tools
Integration
Internet of Things
Security and Identity
Starter Kits
Web and Mobile
Web and Application

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Deploy secure, highly available apps in a native Kubernetes experience.

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IBM • Beta • IAM-enabled
Try the next generation of the IBM Blockchain Platform for free, with all the tooling you need to build, operate, and grow blockchain networks.

Compute

Infrastructure

Bare Metal Server
IBM

Bare metal servers provide the raw horsepower you demand for your processor-intensive and disk I/O-intensive

Cloud Foundry Enterprise Environment
IBM • IAM-enabled

An isolated environment for hosting your Cloud Foundry apps with full admin control over configuration, capacity and access.

HPC Cluster
IBM • IAM-enabled

Provides the capability to configure, deploy and manage powerful HPC clusters to add new or expand existing HPC footprint.

Virtual Server
IBM

Our virtual servers deliver a higher degree of transparency, predictability, and automation for all workload types. Virtual servers are

WebSphere Application Server
IBM

Allows you to quickly get up and running on a pre-configured WebSphere Application Server installation in a hosted cloud

Practice
Dashboard

Resource summary
View resources

Devices	2
Kubernetes Clusters	1 ✅
Services	1 ⚠️

Add more resources ⊕

Planned maintenance
View events

Next event: Tue, Mar 26 2019

PLANNED: Planned Maintenance- March 26th 10am

Upcoming

PLANNED: SSL Certificate Vendor System Upgrade Notifi...

Location status
View status

Asia Pacific	✅
Europe	✅
North America	⚠️
South America	✅

Apps

You can view your apps here after you create them. Learn more about how to get started.

Create an app ⊕

Support cases
View support

1 Unresolved cases
13 Resolved cases

Recent cases

CSO199796 Private Network Question

CSO193185 Customer Upgrade Request!

CSO189594 Sales Request

Usage
View usage

There aren't enough resources or costs to make a chart.

Estimated total

$66.12

* This is not an invoice. Accuracy is not guaranteed.

Application deployment

Starter Kits

Basic Web for Mendix
IBM • EU Supported
A starter that provides a basic web serving application using Mendix.

Custom Vision Model for Core ML with Watson
IBM • EU Supported
Create Apple Core ML Models using the Watson Visual Recognition service to process and tag images locally.

Java Microservice with MicroProfile and Java EE
IBM • EU Supported
A starter for building a microservice in Java using the MicroProfile / Java EE framework.

Java Microservice with Spring
IBM • EU Supported
A starter building a microservice backend in Java, using the Spring framework.

Node.js Microservice with Express.js
IBM • EU Supported
A starter for building a microservice backend in Node.js, using the Express.js framework.

Node.js Web App with Express.js
IBM • EU Supported
A starter that provides a basic web serving application in Node.js, using the Express.js framework.

Using starter kits

- Access Catalog/Starter Kits
- Select Starter Kit
- Press Create App button and fill App details
- Press Create button
- Optionally
  - Download code
  - Configure continuous delivery

Application deployment

```
Executable File | 10 lines (9 sloc) | 148 Bytes

1  applications:
2  - host: starfighter-${random-word}
3    disk: 512M
4    name: starfighter
5    path: .
6    memory: 512M
7    instances: 1
8    services:
9    - newrelic
```

Existing application

- Add manifest.yml resource

- Run `ibmcloud cf push` command

- Optionally

   - Create Deploy to IBM Cloud button

   - Create DevOps Toolchain resources
     See example at
     https://github.com/open-toolchain/simp
     le-toolchain

Application deployment

With this cloud-native toolchain, you use a sample to create an online store that consists of three microservices: a Catalog API, an Orders API, and a UI that calls both of the APIs. The toolchain is preconfigured for continuous delivery, source control, functional testing, issue tracking, online editing, and alert notification.

The Catalog and Orders API are backed by a Cloudant store. As part of deploying this application, a no-cost Cloudant service instance is created. For more information and terms, see the Bluemix catalog.

This toolchain uses tools that are part of the Continuous Delivery service. If an instance of that service isn't already in the selected resource group or organization, when you click **Create**, it is automatically added with the free Lite plan selected.
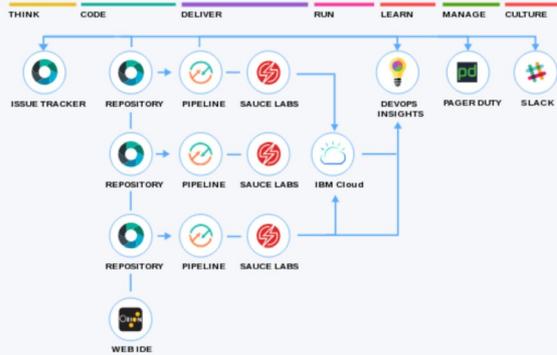
To get started, click **Create**.

For step-by-step instructions, follow the tutorial.

TEMPLATE INFO

| GIT URL | https://github.com/open-toolchain/... |
| GIT BRANCH | master |

Toolchain Name:

microservices-toolchain-20190326102841039

Select Region:

Dallas ▾

Select a resource group:

Default ▾

Select a CF Organization (deprecated)

Tool Integrations

| DevOps Insights | Git Repos and | Eclipse Orion | PagerDuty | Delivery Pipeline | Sauce Labs | Slack |
| Required | Issue Tracking | Web IDE | | Required | | |

Q&A

Thank you

Egor Margineanu
Application Developer
—
egor_margineanu@cz.ibm.com