Become a Bluemix Architect in ~~an hour~~ 45 minutes

(a.k.a. learn my job in 2,700 seconds)

(perhaps not quite)

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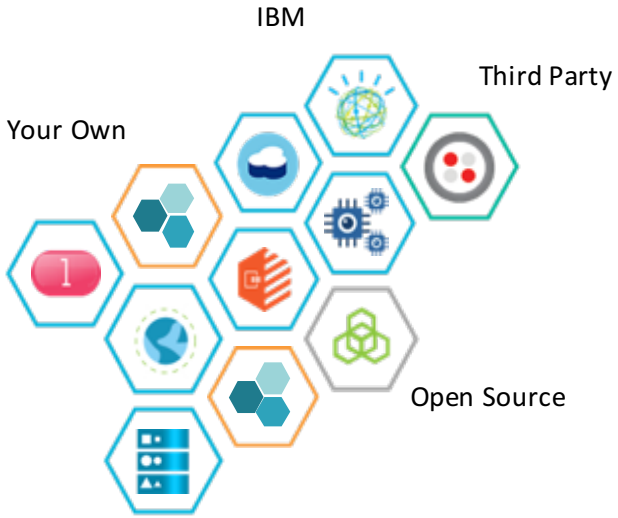
Agenda

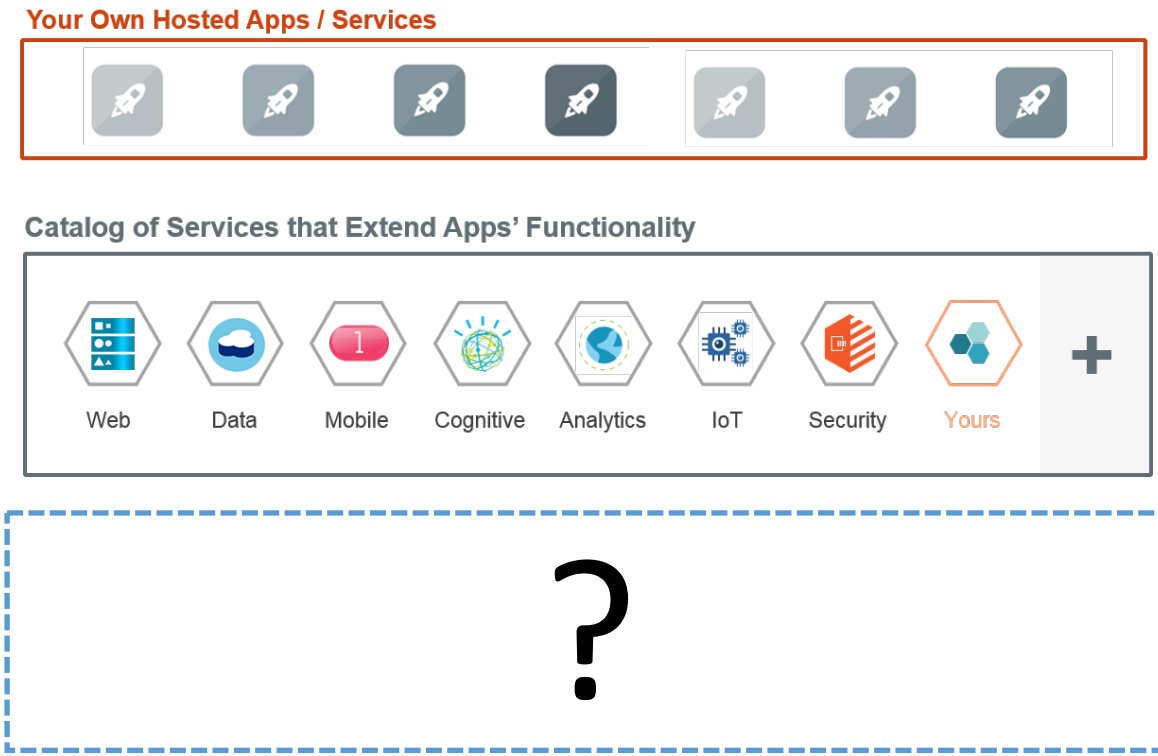
- What is Bluemix (and why would I use it)?
- Major Components – Compute Models
  - *An aside: Microservices*
- Major Components – Services
- NFRs – Security, Performance, Integration
- Further Information

What is Bluemix (and why whould I use it)?

What is Bluemix?

A managed platform to develop, deploy and run enterprise applications




Your Own Hosted Apps / Services
Catalog of Services that Extend Apps' Functionality
Web
Data
Mobile
Cognitive
Analytics
IoT
Security
Yours
?
Platform Deployment Options that Meet Your Workload Requirements
Bluemix
Public
Bluemix
Dedicated
Powered by IBM SoftLayer
Bluemix
Local*
In Your Data Center

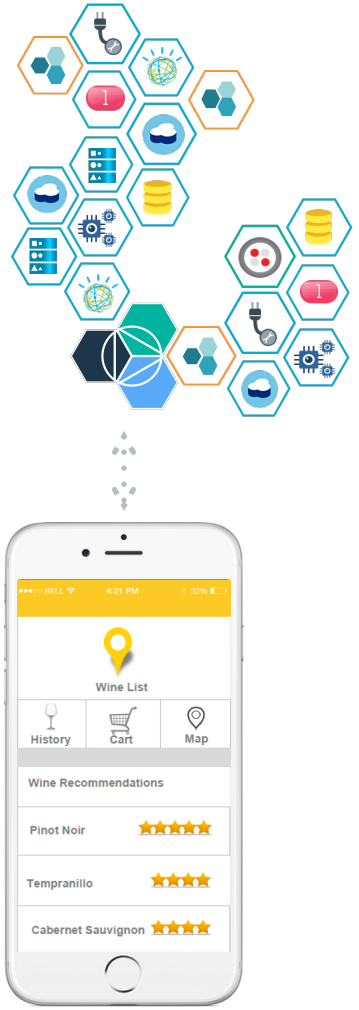
Why?

- Develop in the cloud – reduce infrastructure hassles
- Fast Development using DevOps
- Standards-based – NodeJS, Java, Cloud Foundry, Docker are just some of the many open technologies
- Diverse set of services

- Analytics, cognition
- Mobile, location
- Internet of Things
- Social engagement
- Identity
- Reviews
- Travel
- Messaging
- Weather

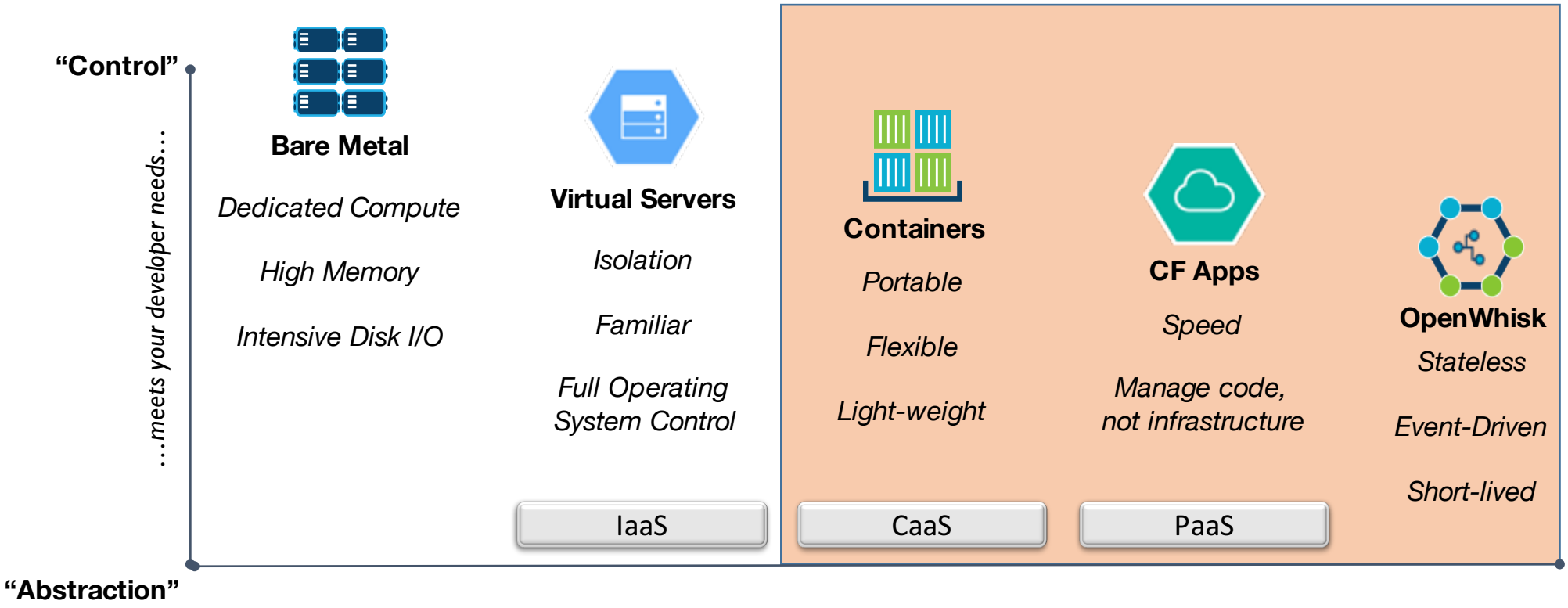
…

- Your company private APIs and services



Major Components – Compute Models

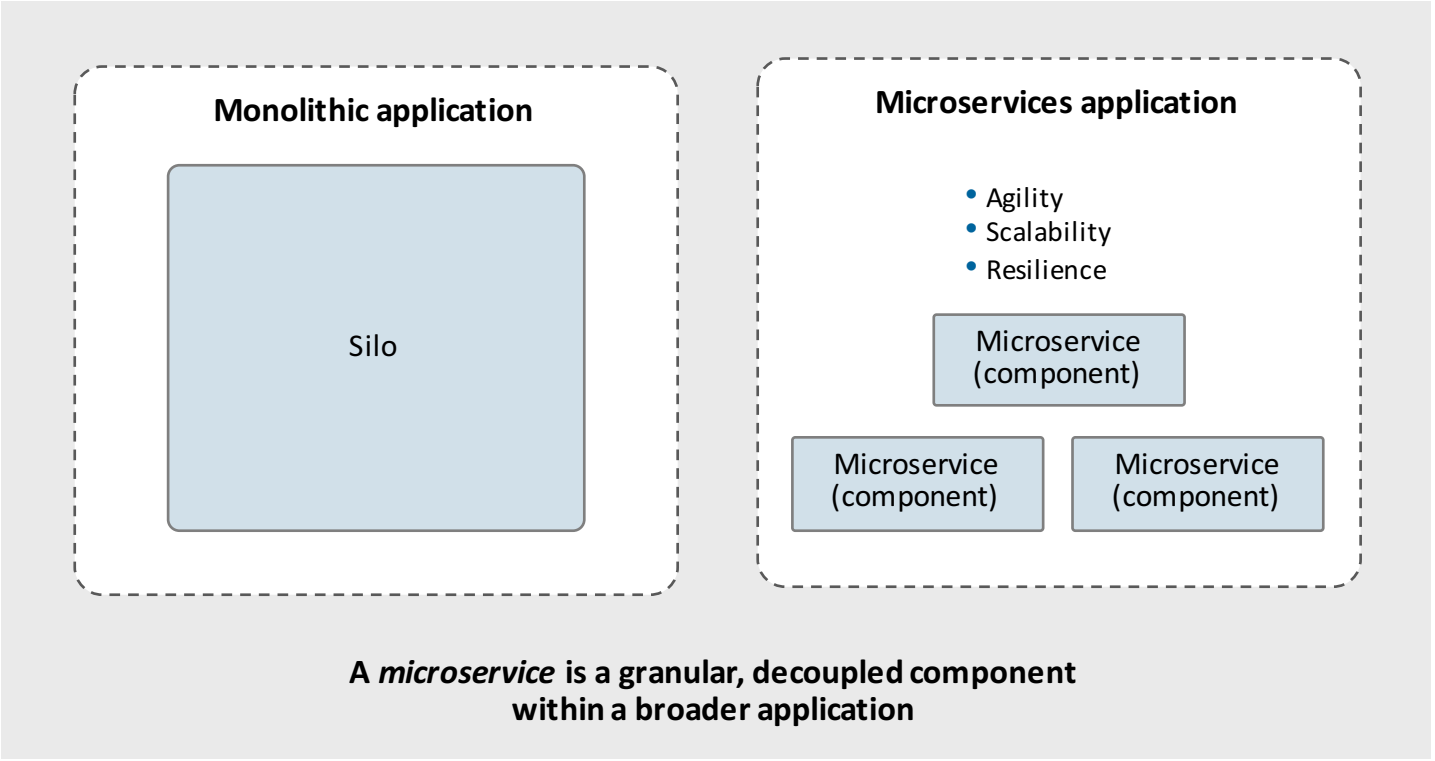
Bluemix Compute Models



An Aside: Microservices

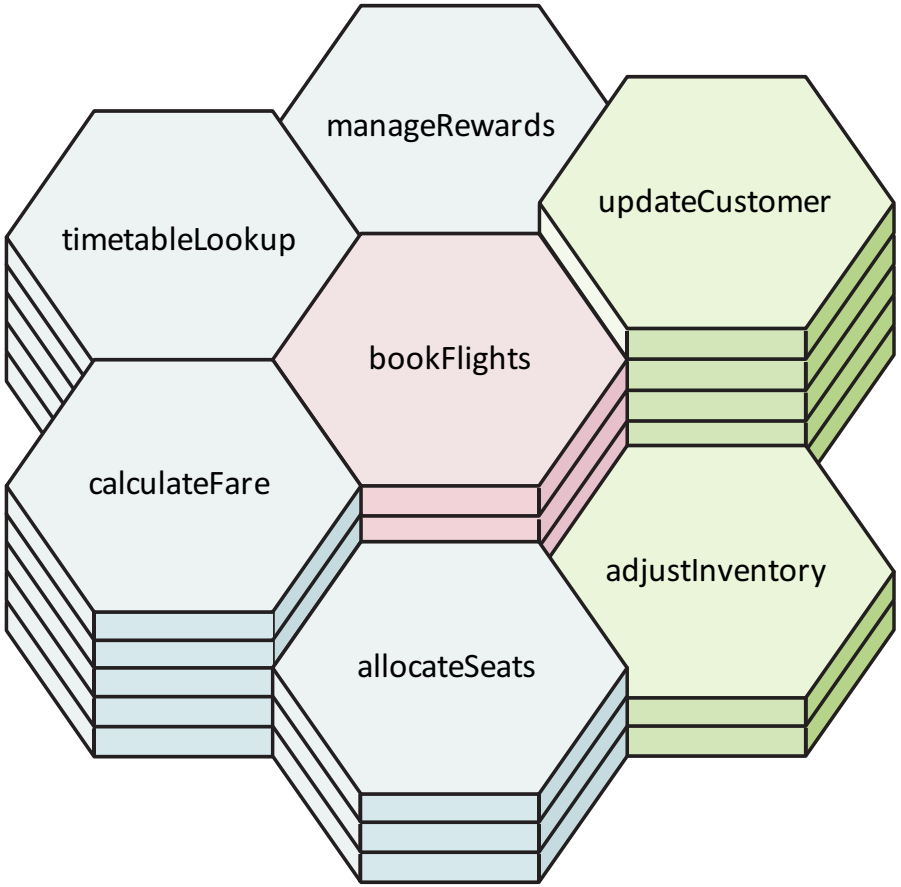
Microservices architecture

Simplistically, microservices architecture is about breaking down large silo applications into more manageable, fully decoupled pieces



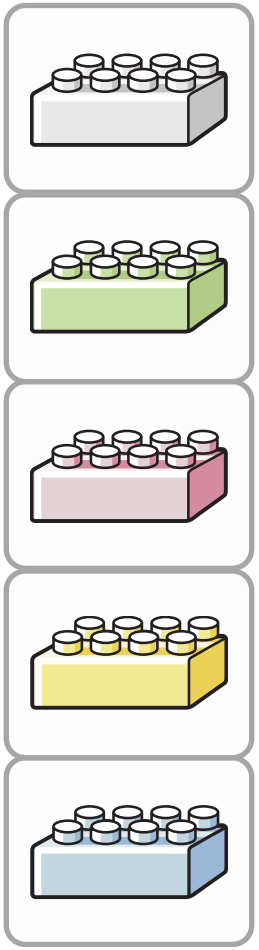
Sample application that uses microservices

- Airline reservation application
  - Book flights
  - Timetable lookup
  - Calculate fare
  - Allocate seats
  - Manage rewards
  - Update customer
  - Adjust inventory



Key tenets of a microservices architecture

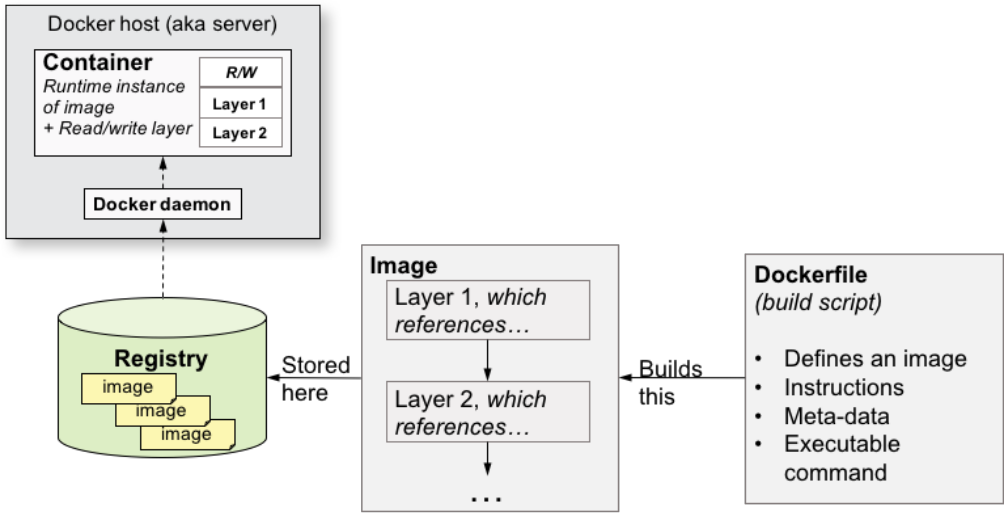
1. Large monoliths are broken down into many small services
   - Each service runs in its own process
2. Services are optimized for a single business function
3. Communication via REST API or message brokers
4. Per-service continuous integration and continuous deployment (CI/CD)
5. Per-service high availability (HA) and clustering decisions
   - One size or scaling policy is not appropriate for all

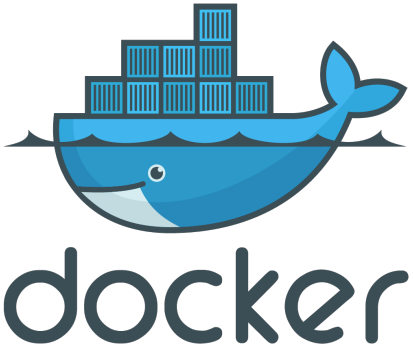


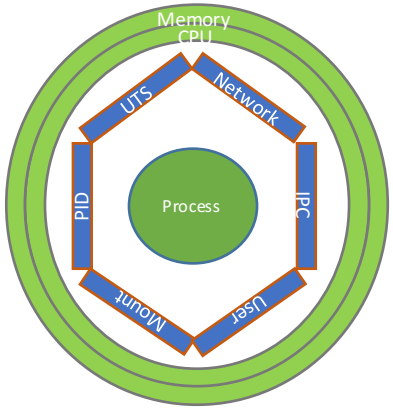
Back to those compute models…

What is Docker?

- Open Software, Launched March 2013, contributors include IBM, Red Hat, Google, Microsoft, VMware, AWS, Rackspace, …
- Automates deployment of applications in software containers
- Applications are wrapped in a complete filesystem that includes Code, runtime, system tools, and system libraries
- Will always run the same way, independent of the environment
- *Merely the most popular implementation of a general concept of containers*
- Docker is Linux-only







= Namespaces for isolation
= Control groups for resource constraint

IBM Bluemix Container Service

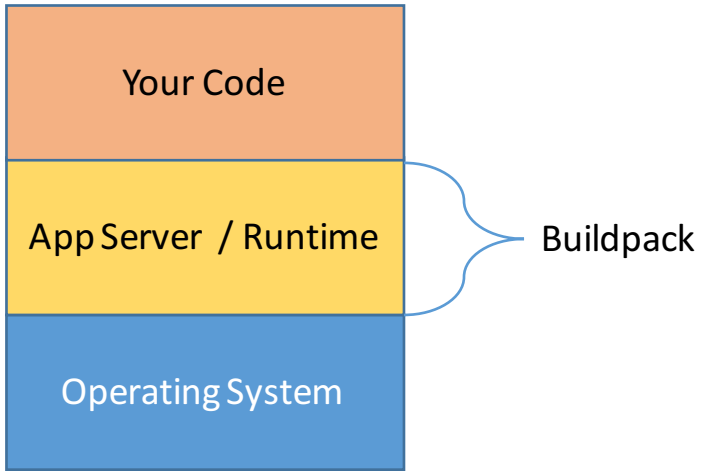
Docker-based container runtime, plus:

- Manage and distribute Docker images in private image registries
- Built-in elasticity and auto-recovery
- Built-in logging and monitoring
- Vulnerability scanner to detect issues and propose resolution
- Integration with DevOps tools to support building of images

- New beta based on Kubernetes (container orchestrator) as of March 20th, bringing:
  - Declarative topology of containers
  - Automatic deployment of containers to resources
  - Self-healing abilities
  - Integrated service discovery
  - Ability to do rich secret and configuration management

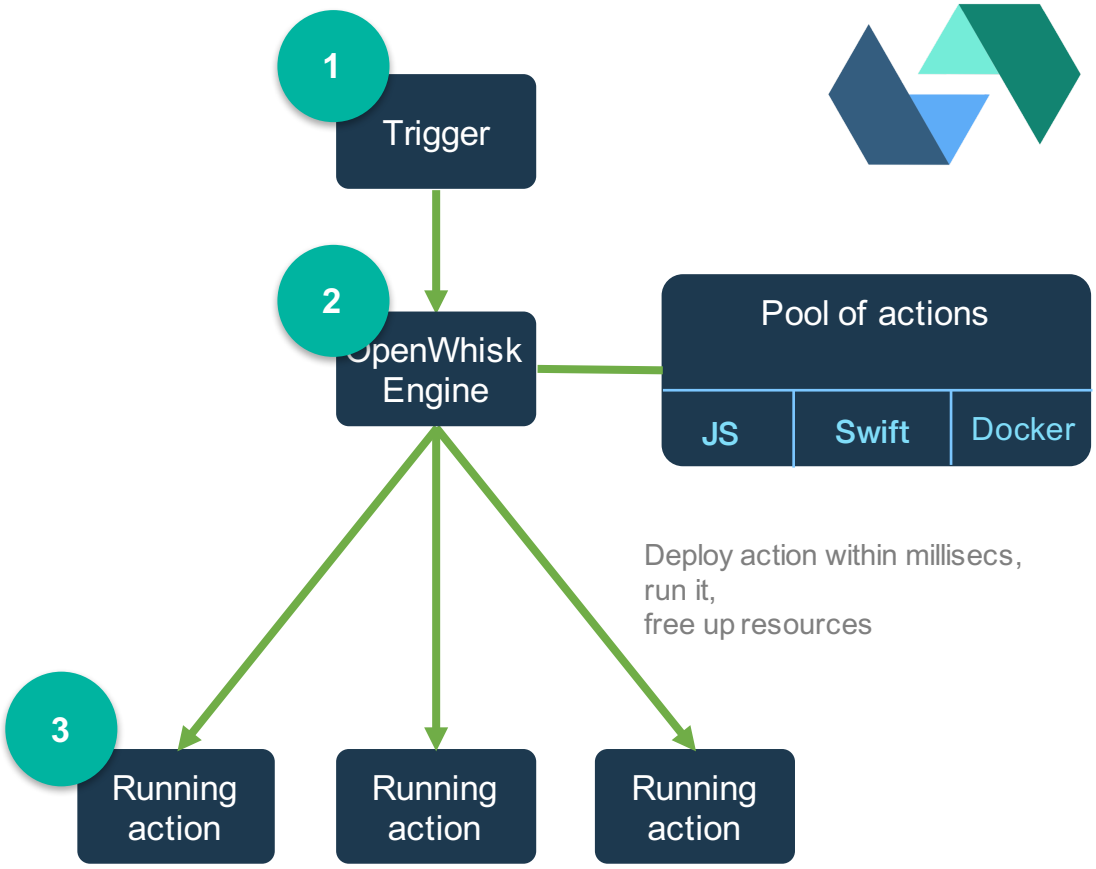
Cloud Foundry (aka Instant Runtimes)

- Buildpack-based runtimes
- Bluemix provides hosted open-source Cloud Foundry, plus custom buildpacks:
  - Liberty for Java
  - Node.js
  - Swift
  - *Access to Bluemix Service Catalog*

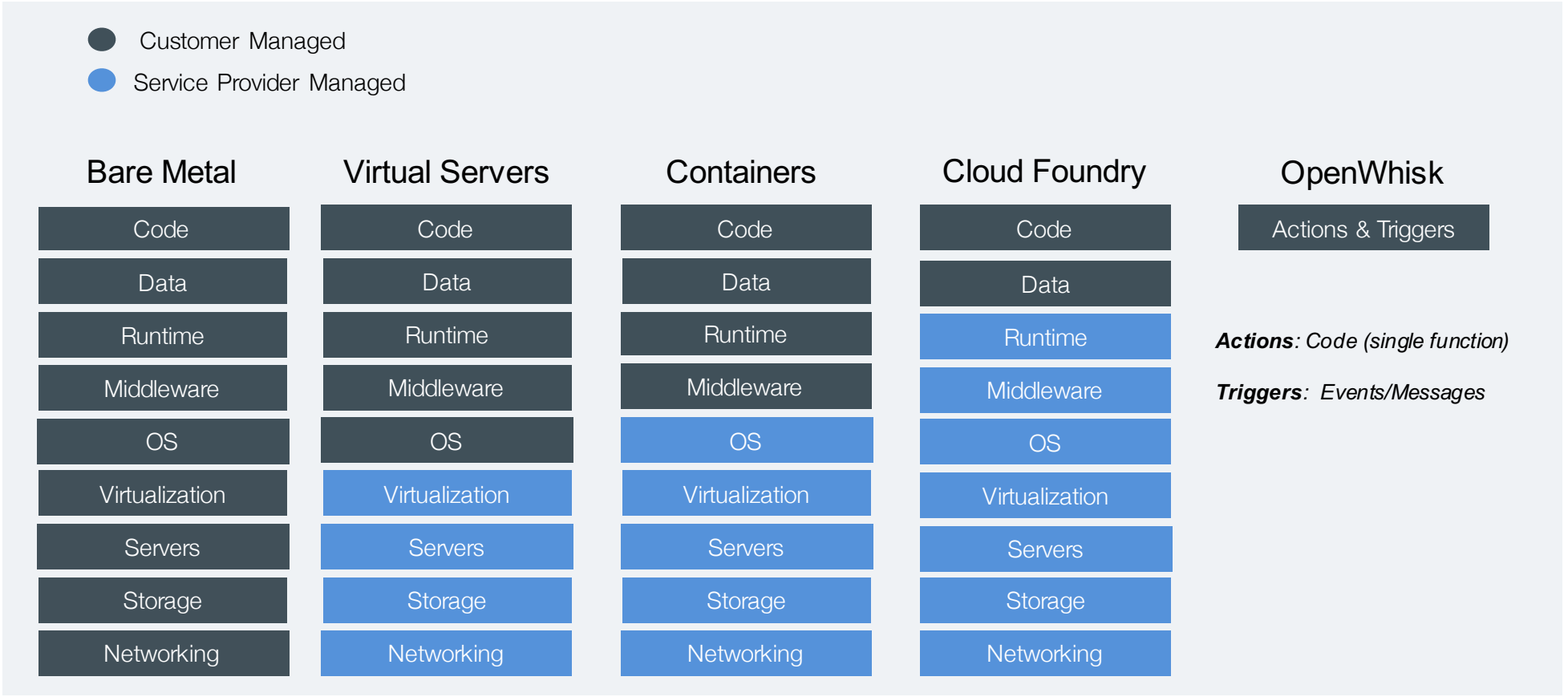


OpenWhisk

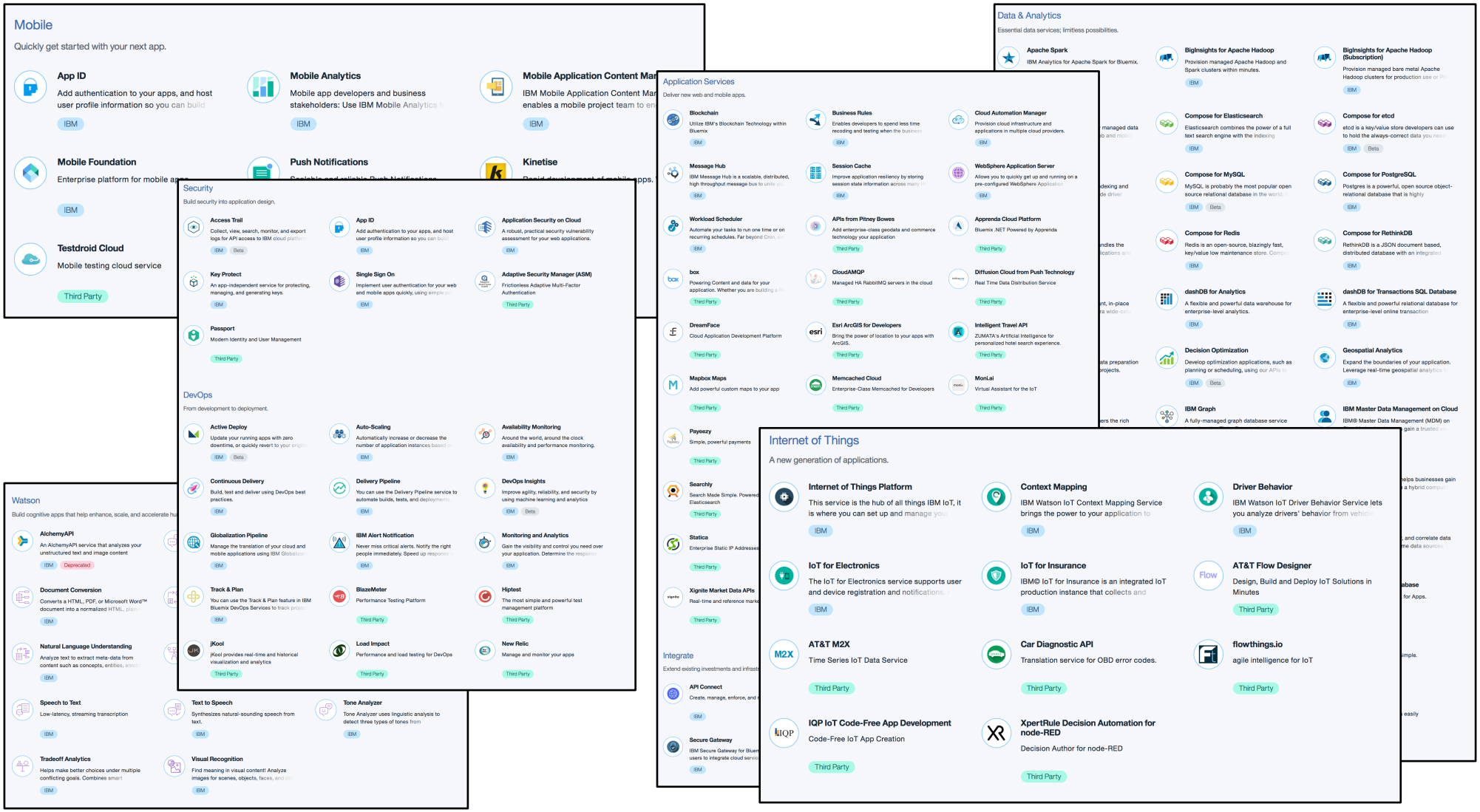
- Serverless application hosting, event-driven execution
- Programming model
  - Rule := Trigger → Action(s)
- Triggers
  - Events from REST, Cloudant, Watson, Weather, etc.
- Action programming model
  - Ideally a microservice, short-running
  - Cloud Foundry application
  - Docker container
  - Actions can use Bluemix service catalog



Levels of Responsibility



Major Components – Service Catalog



Mobile

Quickly get started with your next app.

App ID
Add authentication to your apps, and host user profile information so you can build
IBM

Mobile Analytics
Mobile app developers and business stakeholders: Use IBM Mobile Analytics fo
IBM

Mobile Application Content Mar
IBM Mobile Application Content Mar
enables a mobile project team to en
IBM

Mobile Foundation
Enterprise platform for mobile ap
IBM

Push Notifications

Kinetise

Testdroid Cloud
Mobile testing cloud service
Third Party

Security

Build security into application design.

Access Trail
Collect, view, search, monitor, and export logs for API access to IBM cloud platform
IBM Beta

App ID
Add authentication to your apps, and host user profile information so you can build
IBM

Application Security on Cloud
A robust, practical security vulnerability assessment for your web applications.
IBM

Key Protect
An app-independent service for protecting, managing, and generating keys.
IBM

Single Sign On
Implement user authentication for your web and mobile apps quickly, using simple pr
IBM

Adaptive Security Manager (ASM)
Frictionless Adaptive Multi-Factor Authentication
Third Party

Passport
Modern Identity and User Management
Third Party

DevOps

From development to deployment.

Active Deploy
Update your running apps with zero downtime, or quickly revert to your origina
IBM Beta

Auto-Scaling
Automatically increase or decrease the number of application instances based o
IBM

Availability Monitoring
Around the world, around the clock availability and performance monitoring.
IBM

Continuous Delivery
Build, test and deliver using DevOps best practices.
IBM

Delivery Pipeline
You can use the Delivery Pipeline service to automate builds, tests, and deployments
IBM

DevOps Insights
Improve agility, reliability, and security by using machine learning and analytics
IBM Beta

Globalization Pipeline
Manage the translation of your cloud and mobile applications using IBM Globalizat
IBM

IBM Alert Notification
Never miss critical alerts. Notify the right people immediately. Speed up responsiv
IBM

Monitoring and Analytics
Gain the visibility and control you need over your application. Determine the respons
IBM

Track & Plan
You can use the Track & Plan feature in IBM Bluemix DevOps Services to track projec
IBM

BlazeMeter
Performance Testing Platform
Third Party

Hiptest
The most simple and powerful test management platform
Third Party

jKool
jKool provides real-time and historical visualization and analytics
Third Party

Load Impact
Performance and load testing for DevOps
Third Party

New Relic
Manage and monitor your apps
Third Party

Watson

Build cognitive apps that help enhance, scale, and accelerate hu

AlchemyAPI
An AlchemyAPI service that analyzes your unstructured text and image content
IBM Deprecated

Document Conversion
Converts a HTML, PDF, or Microsoft Word™ document into a normalized HTML, plain
IBM

Natural Language Understanding
Analyze text to extract meta-data from content such as concepts, entities, emotio
IBM

Speech to Text
Low-latency, streaming transcription
IBM

Text to Speech
Synthesizes natural-sounding speech from text.
IBM

Tone Analyzer
Tone Analyzer uses linguistic analysis to detect three types of tones from
IBM

Tradeoff Analytics
Helps make better choices under multiple conflicting goals. Combines smart
IBM

Visual Recognition
Find meaning in visual content! Analyze images for scenes, objects, faces, and oth
IBM

Application Services

Deliver new web and mobile apps.

Blockchain
Utilize IBM's Blockchain Technology within Bluemix
IBM

Business Rules
Enables developers to spend less time recoding and testing when the business
IBM

Cloud Automation Manager
Provision cloud infrastructure and applications in multiple cloud providers.
IBM

Message Hub
IBM Message Hub is a scalable, distributed, high throughput message bus to unify yo
IBM

Session Cache
Improve application resiliency by storing session state information across many in
IBM

WebSphere Application Server
Allows you to quickly get up and running on a pre-configured WebSphere Application
IBM

Workload Scheduler
Automate your tasks to run one time or on recurring schedules. Far beyond Cron, an
IBM

APIs from Pitney Bowes
Add enterprise-class geodata and commerce technology your application
Third Party

Apprenda Cloud Platform
Bluemix .NET Powered by Apprenda
Third Party

box
Powering Content and data for your application. Whether you are building a fr
Third Party

CloudAMQP
Managed HA RabbitMQ servers in the cloud
Third Party

Diffusion Cloud from Push Technology
Real Time Data Distribution Service
Third Party

DreamFace
Cloud Application Development Platform
Third Party

Esri ArcGIS for Developers
Bring the power of location to your apps with ArcGIS.
Third Party

Intelligent Travel API
ZUMATA's Artificial Intelligence for personalized hotel search experience.
Third Party

Mapbox Maps
Add powerful custom maps to your app
Third Party

Memcached Cloud
Enterprise-Class Memcached for Developers
Third Party

Moni.ai
Virtual Assistant for the IoT
Third Party

Payeezy
Simple, powerful payments
Third Party

Searchly
Search Made Simple. Powered
Elasticsearch
Third Party

Statica
Enterprise Static IP Addresses
Third Party

Xignite Market Data APIs
Real-time and reference marke
Third Party

Integrate

Extend existing investments and infrastr

API Connect
Create, manage, enforce, and
IBM

Secure Gateway
IBM Secure Gateway for Bluem
users to integrate cloud servic
IBM

Internet of Things

A new generation of applications.

Internet of Things Platform
This service is the hub of all things IBM IoT, it is where you can set up and manage you
IBM

Context Mapping
IBM Watson IoT Context Mapping Service brings the power to your application to
IBM

Driver Behavior
IBM Watson IoT Driver Behavior Service lets you analyze drivers' behavior from vehicl
IBM

IoT for Electronics
The IoT for Electronics service supports user and device registration and notifications
IBM

IoT for Insurance
IBM© IoT for Insurance is an integrated IoT production instance that collects and
IBM

AT&T Flow Designer
Design, Build and Deploy IoT Solutions in Minutes
Third Party

AT&T M2X
Time Series IoT Data Service
Third Party

Car Diagnostic API
Translation service for OBD error codes.
Third Party

flowthings.io
agile intelligence for IoT
Third Party

IQP IoT Code-Free App Development
Code-Free IoT App Creation
Third Party

XpertRule Decision Automation for node-RED
Decision Author for node-RED
Third Party

Data & Analytics

Essential data services; limitless possibilities.

Apache Spark
IBM Analytics for Apache Spark for Bluemix.

BigInsights for Apache Hadoop
Provision managed Apache Hadoop and Spark clusters within minutes.
IBM

BigInsights for Apache Hadoop (Subscription)
Provision managed bare metal Apache Hadoop clusters for production use or PO
IBM

Compose for Elasticsearch
Elasticsearch combines the power of a full text search engine with the indexing
IBM

Compose for etcd
etcd is a key/value store developers can use to hold the always-correct data you need
IBM Beta

Compose for MySQL
MySQL is probably the most popular open source relational database in the world. It
IBM Beta

Compose for PostgreSQL
Postgres is a powerful, open source object-relational database that is highly
IBM

Compose for Redis
Redis is an open-source, blazingly fast, key/value low maintenance store. Compos
IBM

Compose for RethinkDB
RethinkDB is a JSON document based, distributed database with an integrated
IBM

dashDB for Analytics
A flexible and powerful data warehouse for enterprise-level analytics.
IBM

dashDB for Transactions SQL Database
A flexible and powerful relational database for enterprise-level online transaction
IBM

Decision Optimization
Develop optimization applications, such as planning or scheduling, using our APIs to
IBM Beta

Geospatial Analytics
Expand the boundaries of your application. Leverage real-time geospatial analytics
IBM

IBM Graph
A fully-managed graph database service

IBM Master Data Management on Cloud
IBM® Master Data Management (MDM) on

(Very) Selected Highlights

Cloudant – NoSQL Database

API Connect – APIs/Integration for 2017

WebSphere on Cloud – Migration Path

Watson Services (Conversation, Natural Language, Visual Recognition, etc.)

NFRs (the Difficult Bits)

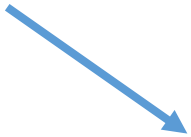
Integration (Networking)

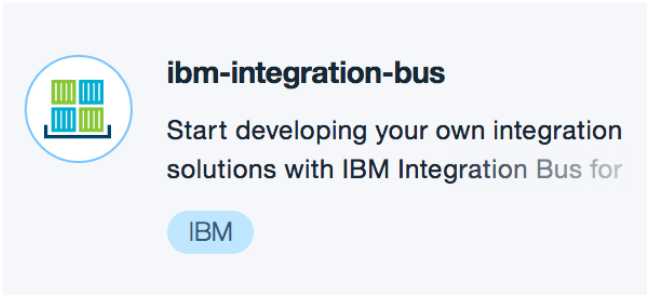
- Bluemix Public
  - **Part of the public internet**
  - Internetworking with on-prem:
    1. Use Service Gateway and/or VPN *OR*
    2. Expose APIs from existing on-premise
- Bluemix Dedicated
  - **By default, network is part of customer's network**
  - **Can be opened to public internet also**
- Bluemix Local
  - **Always networked to be part of customer's infrastructure**

Integration (Functional)

- API Connect for Greenfield

- IIB is also an option:





Security

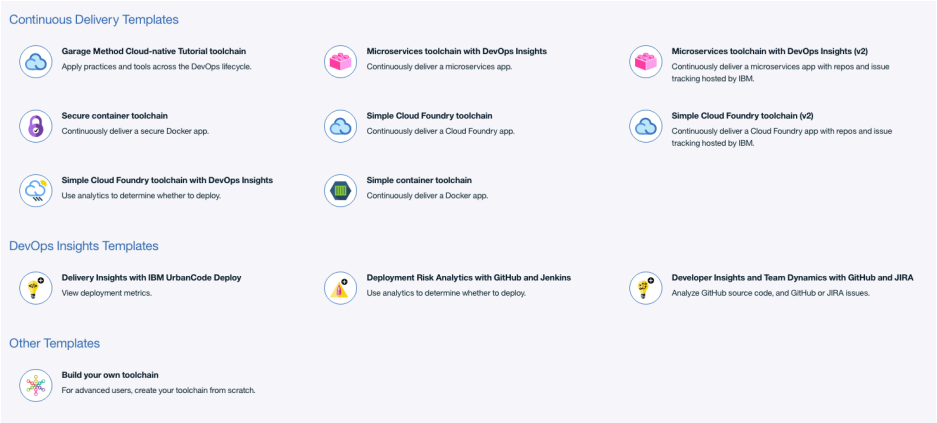
- Bluemix Public
  - Make everything run over HTTPS
  - All CF runtimes are exposed **publically;** Docker (in particular with Kubernetes) will provide more capability
  - Think about data residency – CF services can be provisioned anywhere
- Bluemix Dedicated
  - Data resides outside your datacenter
- Bluemix Local
  - Data resides locally as long as you use a local service
  - If you use a federated service, you are using Public

Performance

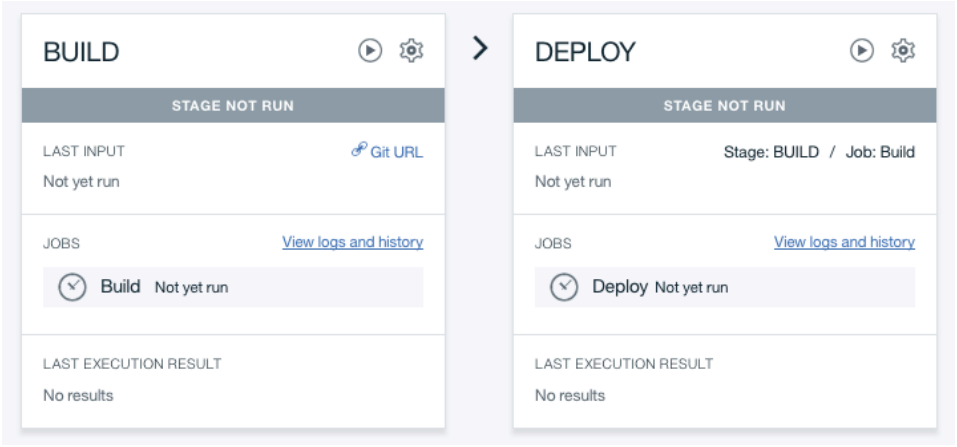
- Think horizontal scaling i.e. scaling is pretty much constant against number of instances
  - *Implies stateless architectures (no more sessions)*
- This is the 12-factor concurrency principle: https://12factor.net/concurrency

DevOps – Toolchains + Pipelines

- Best-of-breed industry toolchains
- **Customizable** toolchain **templates**, one click setup



- Build pipelines for Cloud Foundry, Containers, etc.



Links

- **Try Bluemix Public free for 30 days: https://console.ng.bluemix.net/registration/**
- **IBM Cloud Architecture Center: https://www.ibm.com/devops/method/category/architectures/**
- The 12-factor app: https://12factor.net/
- Microservices from Theory to Practice: **https://www.redbooks.ibm.com/Redbooks.nsf/RedbookAbstracts/sg248275.html?Opendocument**
- Bluemix Blog: https://www.ibm.com/blogs/bluemix/
- Watson Developer Cloud: https://www.ibm.com/watson/developercloud/
- Creating Effective Mobile Applications with Bluemix: http://ibm.biz/mobile-bluemix
- Understanding Docker and IBM Bluemix Container Service: http://ibm.biz/docker-bluemix
- Need some help? – IBM Bluemix Garage: http://ibm.biz/bluemix-garage