

Serverless : build modern applications

Mangesh Patankar
– IBM Developer Advocate



About Me

- Developer Advocate @IBM
- 18+ years of IT Experience
- Been in IBM for 3 years
- Working as Technical Evangelist on trending technologies, solutions like Serverless, Containers, Orchestrations, Private Cloud (Cloud Native), Blockchain, IoT, More...
- Speaker in Technical Conferences by OSI, Cypher, Container Conference, More
- Meetup Organizer – Cloud Mumbai
- Twitter: @MangeshPatank



Agenda For Today



Agenda

- Demo
- Serverless
 - Evolution
 - Basics
 - Serverless Key Concepts
- IBM Cloud Functions: Platform Walkthrough
- Workloads, Use Cases :When to use and When not to use
- Things to consider
- Code Patterns
- Resources

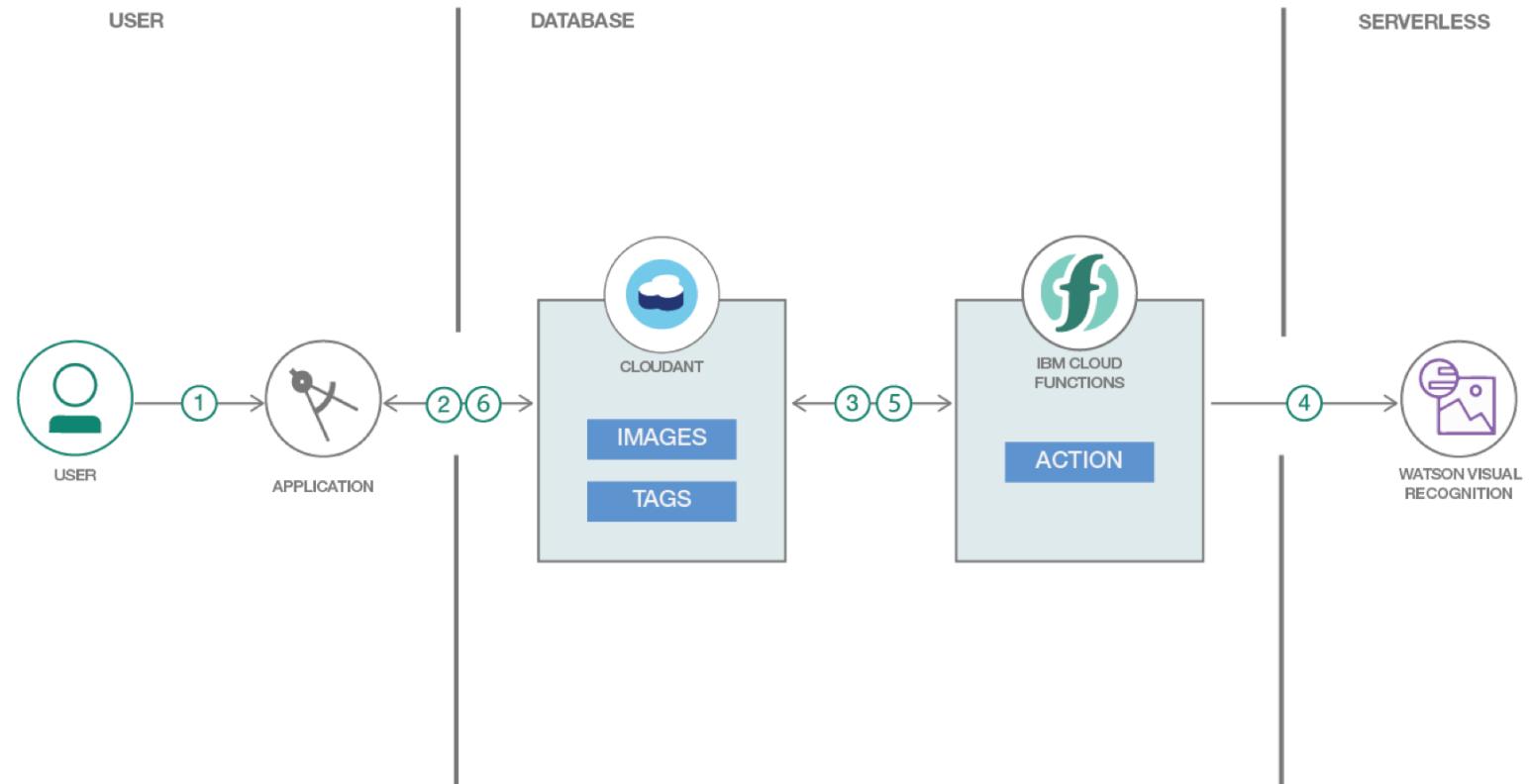
Demo Flow: Serverless Image Recognition with Cloud Functions

Architectural flow:

1. Web interface
2. Database update
3. Triggering Action
4. Calling Watson Visual Recognition

Technology stack:

- Cloudant
- Cloud Functions
- Watson VR Service

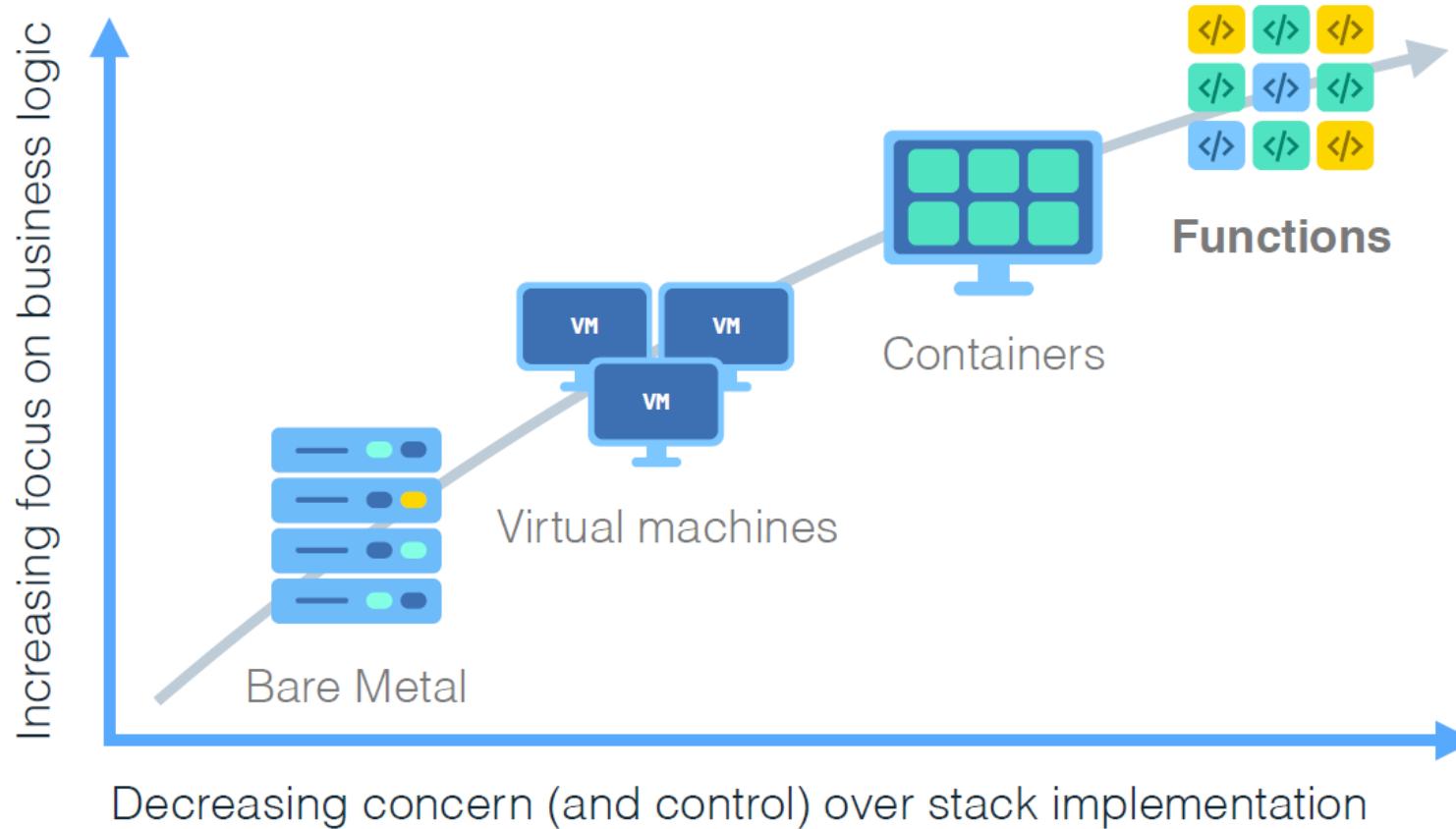




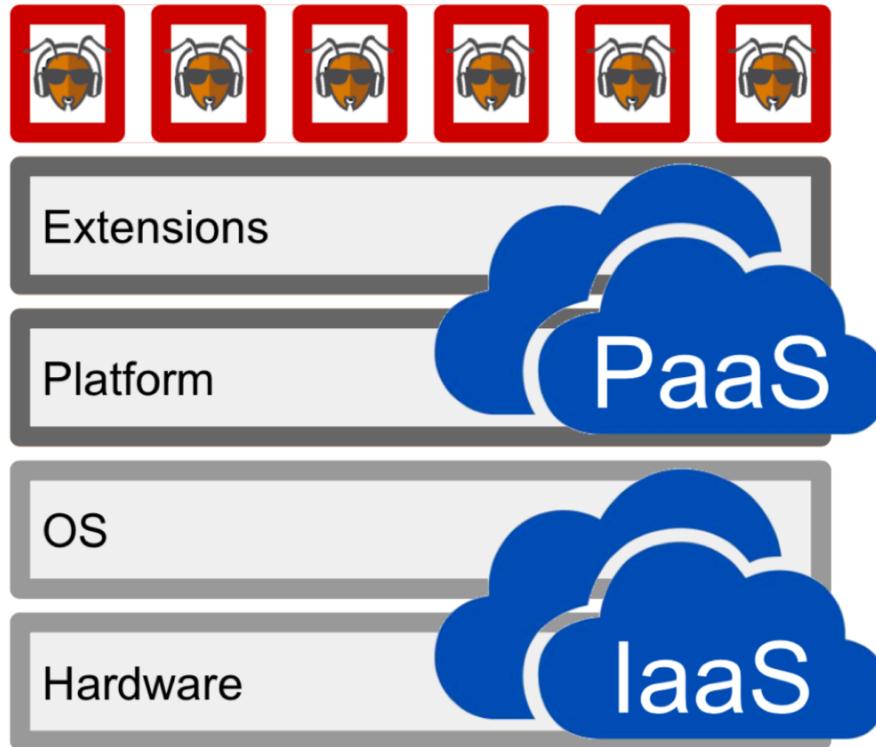
Quick overview of
Serverless

Evolution Of Serverless

Serverless developers focus more on code, less on infrastructure



Function as a Service

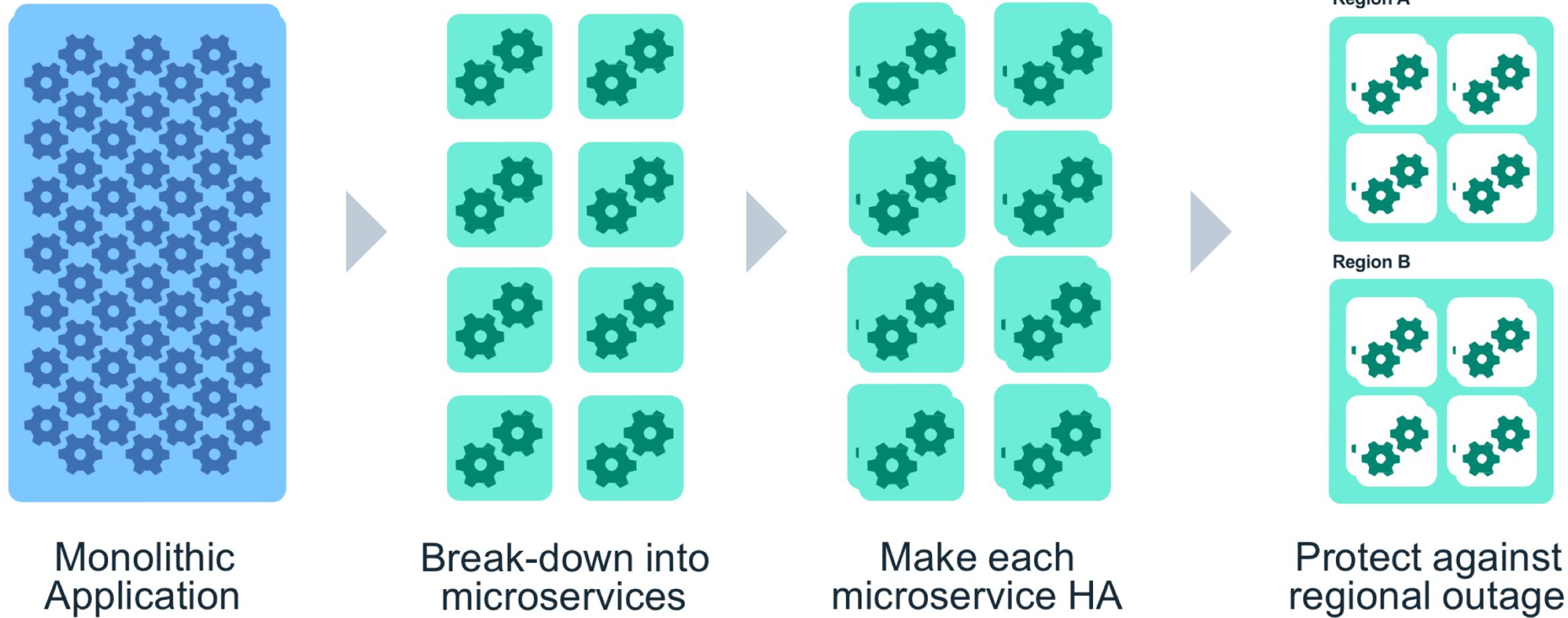


Functions are deployed independently, as each dev cycle requires

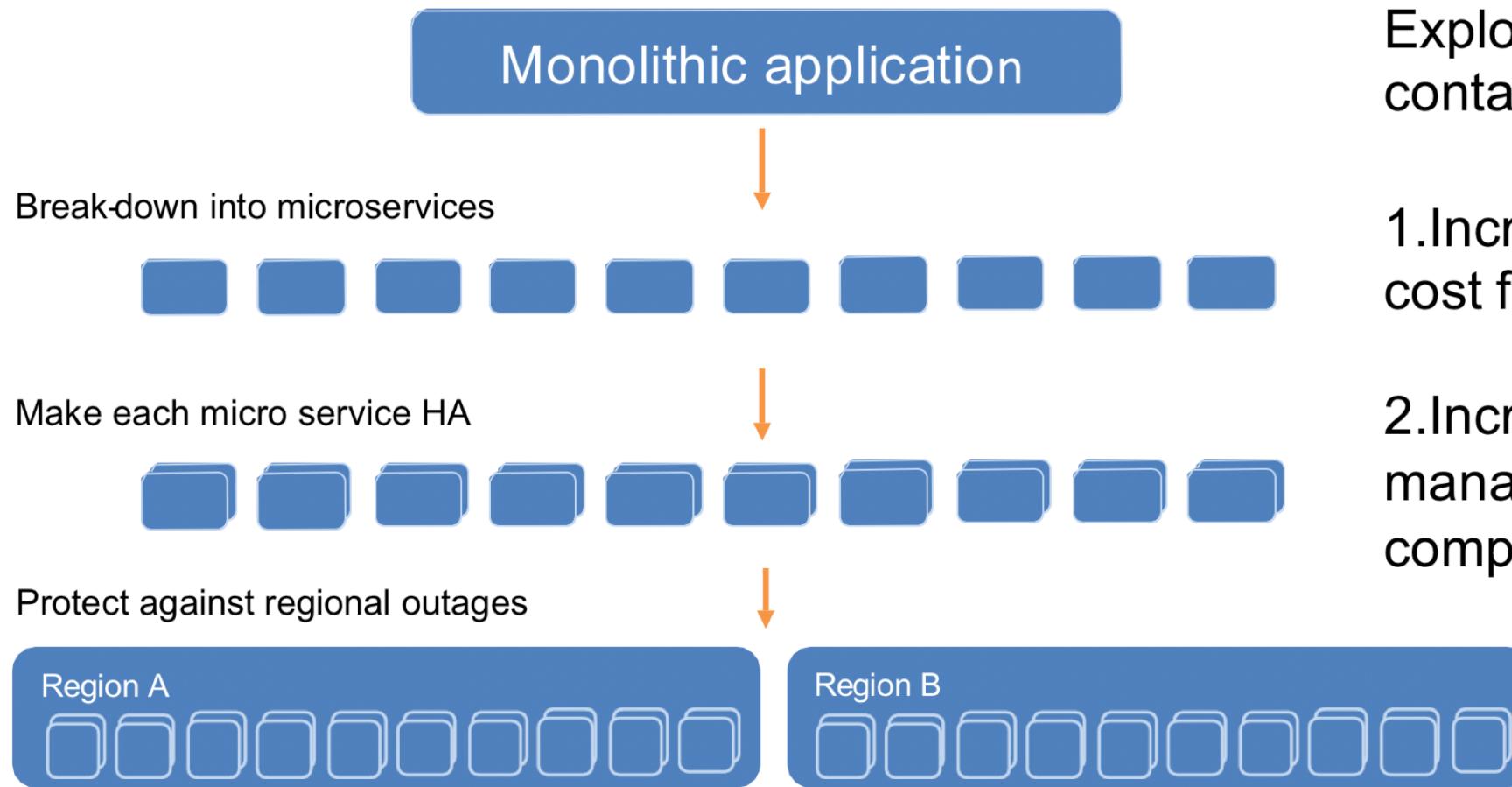
They're also run and scaled independently, as the event queue demands

Think events! The message queue is becoming the source of truth

Micro Services – Hard to Manage when Scale



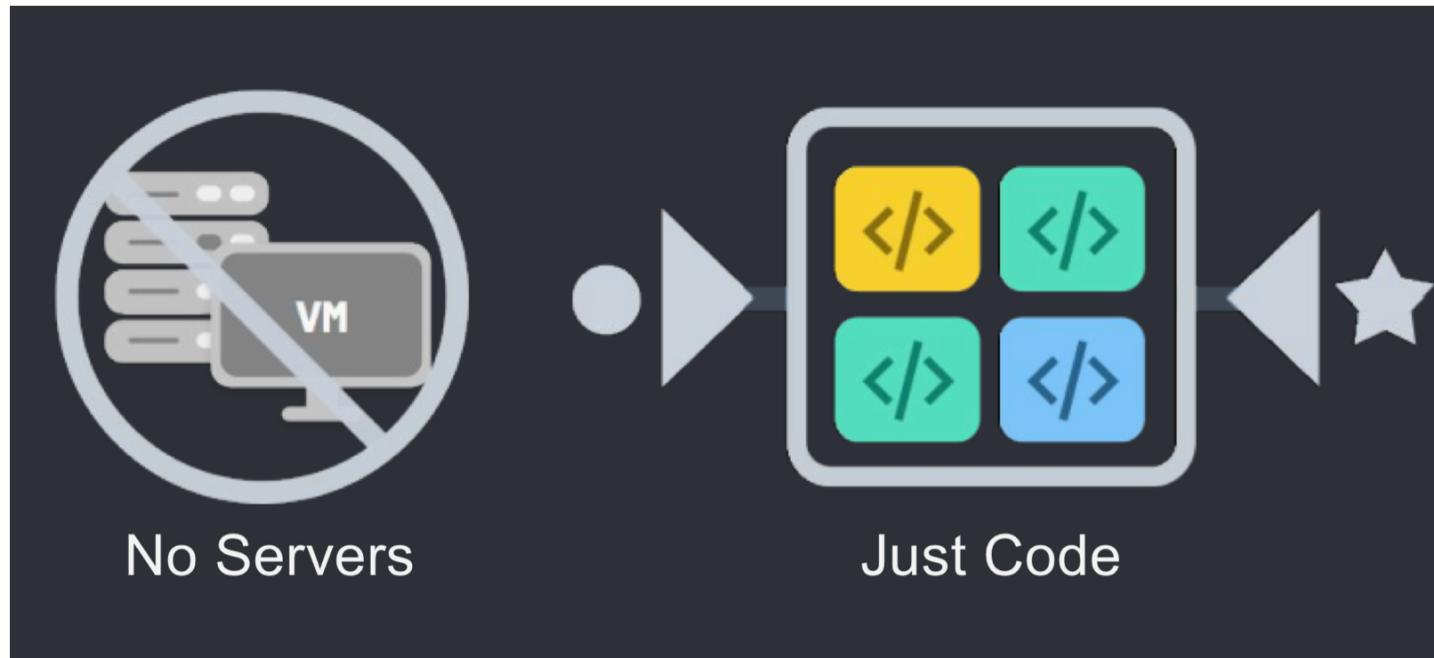
Micro Services : Expensive for Scaling



Explosion in number of containers / processes:

1. Increase of infrastructure cost footprint
2. Increase of operational management cost and complexity

Serverless Facts

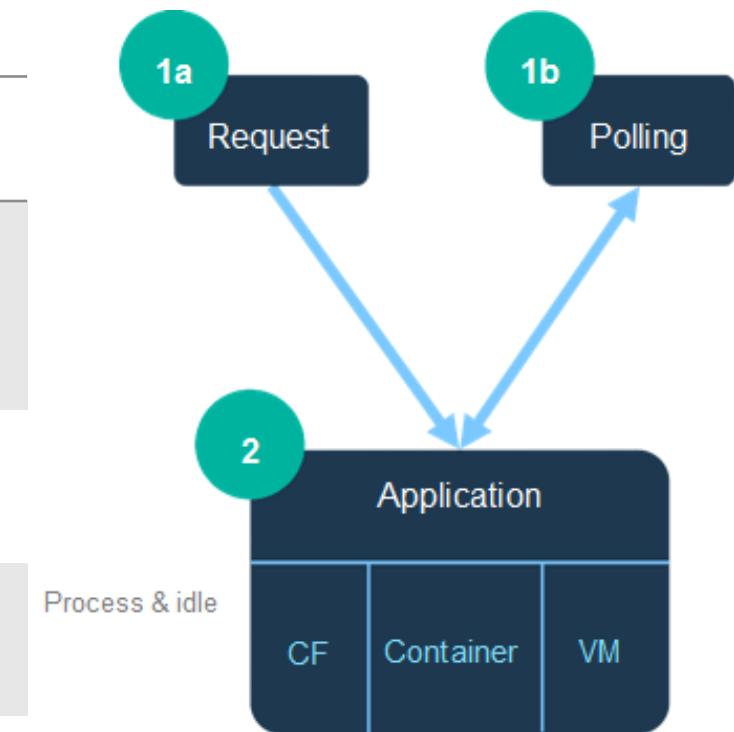


- Runs Code on Demand
- Scales on a Per-request basis
- Only billed for the resources used
- Easier to optimize costs when they are tied directly to the activity of your app
- Microservices architecture
- Event-driven (“stateless”)
- Agile teams development

Compare to Traditional Programming Model

- Continuous polling due to missing event programming model
- Charged even when idling
- No auto-scaling by default

Traditional Cloud	Serverless
You define and deploy infrastructure, install software and run code on servers. You then need to manage and Maintain these servers.	Developers no longer have to worry about the underlying infrastructure . They can run code without maintaining servers.
Servers capacity planned in advance and deployed.	No compute capacity blocked in advance. Applications are loaded only based on event based triggers.
Auto-scale is typically block based and reserved for a certain minimum amount of time.	Auto scale is gradient based and compute is billed for the exact amount of time used.
Server provisioning and configuration done by organization which owns the application.	ZERO server management by the developer organization.



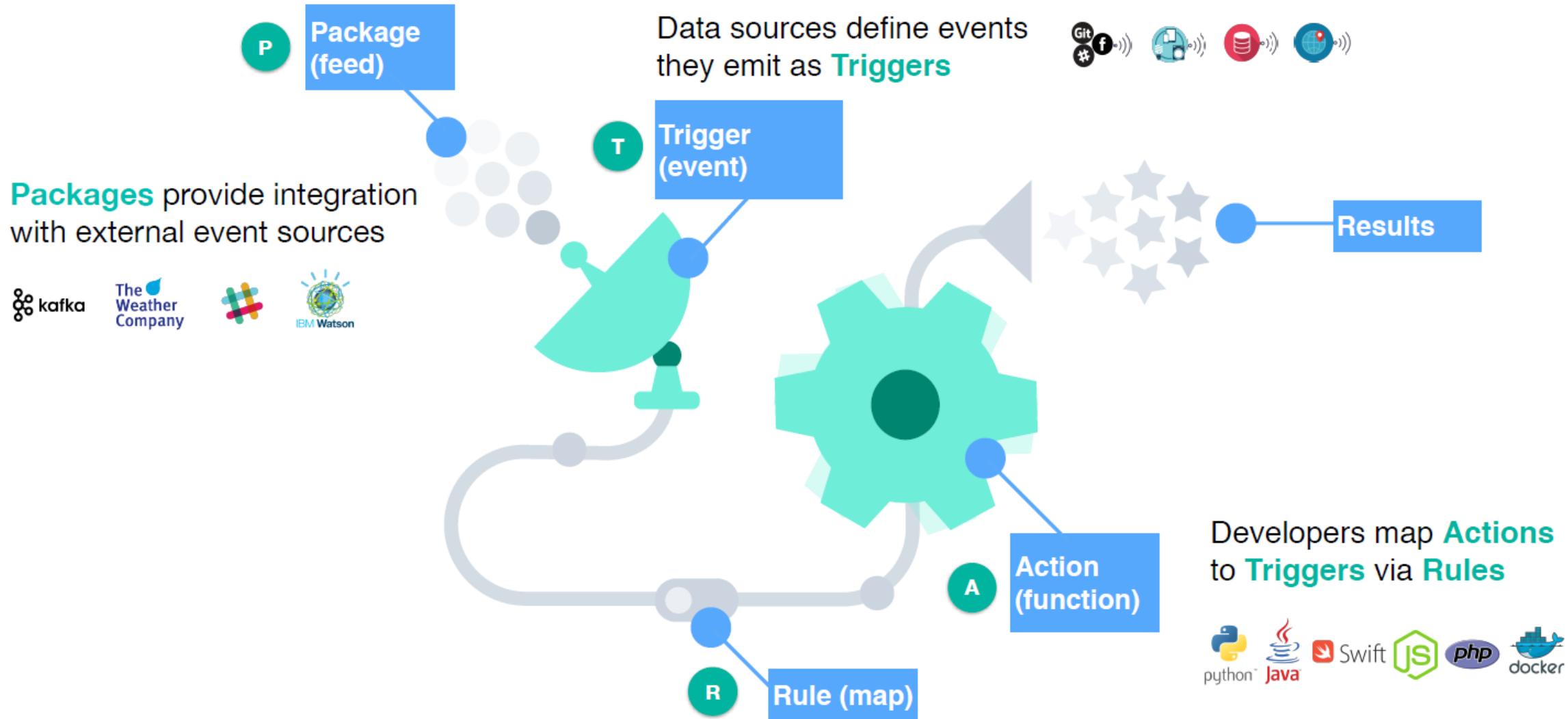
Serverless Providers



IBM Cloud Functions



Serverless - Key Concepts



Triggers

T

A class of events that can occur



Social events

Data changes



Device readings



Location updates



Event sources

Actions

A

*Code that runs in response to an event
(that is, an event handler)*



Actions

JS/NodeJS 8	Swift 3
Java	Docker / Binary
Python 3	PHP
Go	Scala
Rust	Haskell

A

Can be written in a variety of languages, such as
JavaScript, Python, Java, PHP, and Swift

```
function main(params) {  
    return { message: 'Hello, ' + params.name + ' from ' + params.place };  
};
```

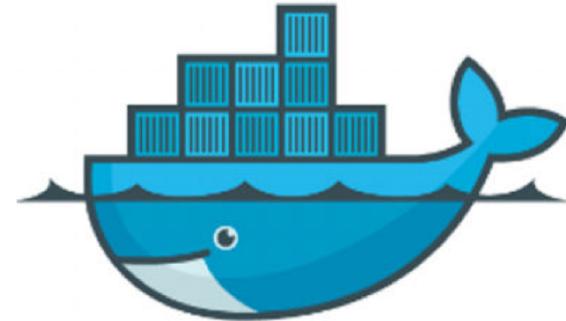
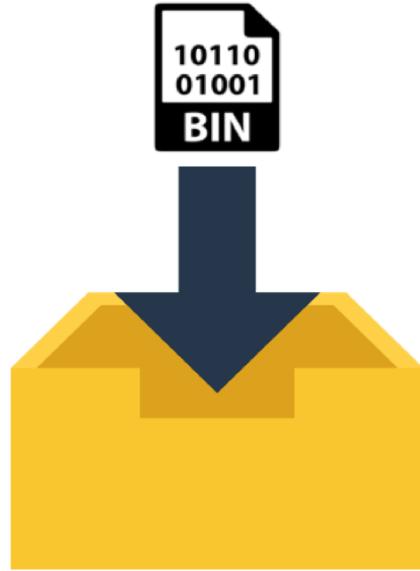


*A stateless, relatively short-running function invoked as an event handler
An Action's run time is measured in milliseconds,
... well under the defaulted maximum of 5 minutes*

Actions

A

Or any other language by packaging with Docker



Actions

- A Can be composed to create sequences that increase flexibility and foster reuse

$$\begin{aligned} A_A &:= A_1 + A_2 + A_3 \\ A_B &:= A_2 + A_1 + A_3 \\ A_C &:= A_3 + A_1 + A_2 \end{aligned}$$

Rules

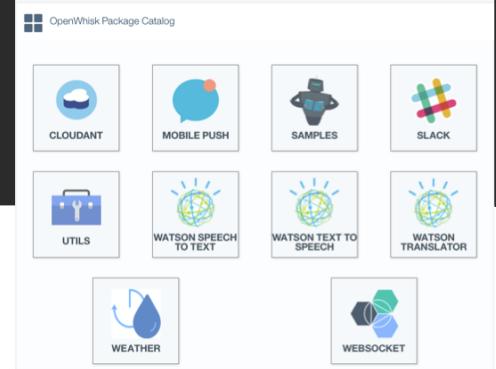


*An association of a trigger to an action
in a many to many mapping.*

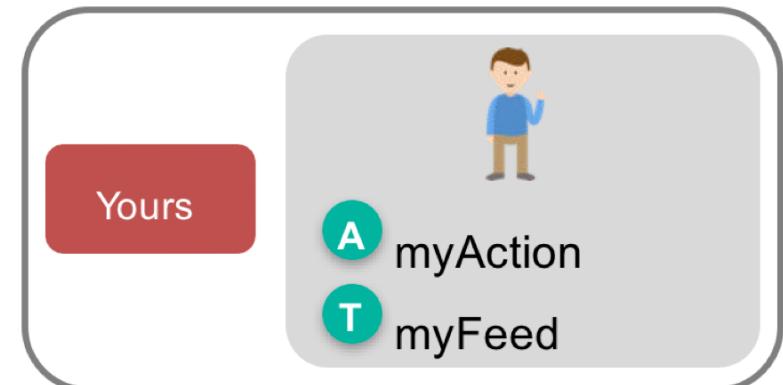
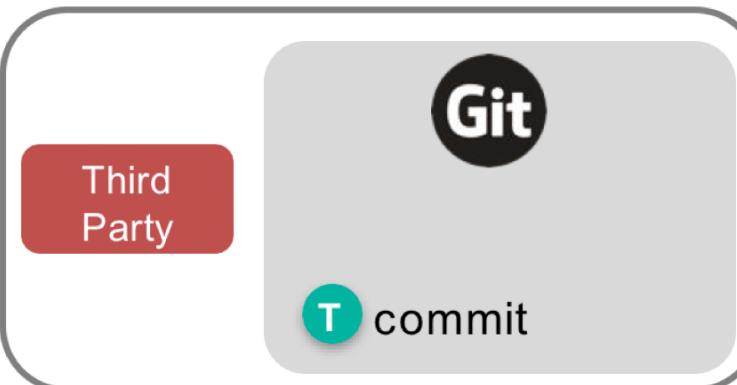
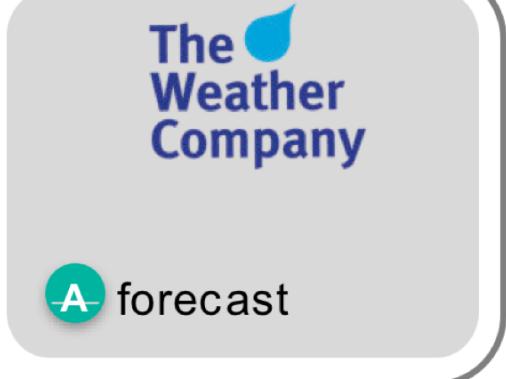
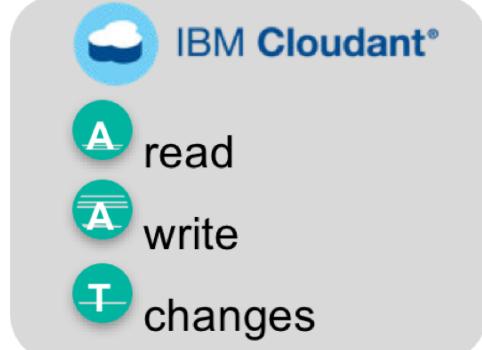


May contain simple conditional logic

Packages



P *A shared collection of triggers and actions*

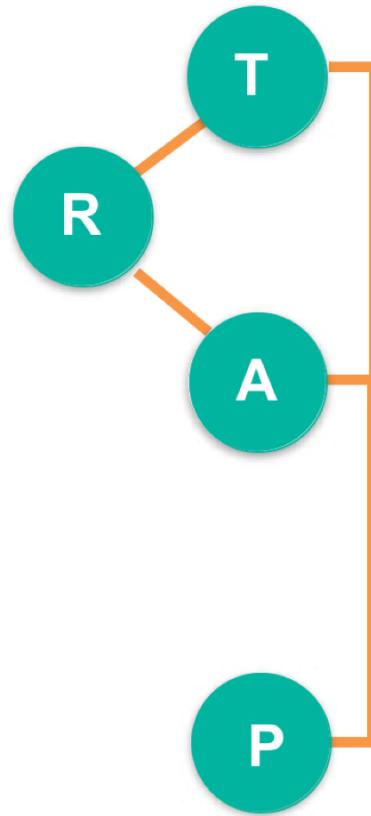


Developers work with triggers, actions, rules and packages

Data sources define events they emit as **Triggers**.

Developers map **Actions** to **Triggers** via **Rules**.

Packages provide integration with external services.





IBM Cloud Functions

Get Started with IBM Cloud Functions

Step 1 Create IBM Cloud Account

<http://bit.ly/cloudsign>

Step 2 IBM Cloud Functions

- Through IBM Cloud Console
- Command Line : Using IBM Cloud Functions CLI (Plugin)

Step 3:

Deploy Cloud Functions

IBM Cloud Functions

IBM Cloud Catalog Docs Support Manage

Search for resource... IBM

Functions

Getting Started

Overview Pricing Concepts Integrations CLI iOS SDK API Key Documentation Actions Triggers Monitor Logs APIs

Start Creating Download CLI

What's New:

- Updated Action runtimes: PHP 7.2, Ruby 2.5, Python 3.7
- Get started quickly with Templates: Try it now
- New logging service integration (see the Logs link in the left navigation)
- Compliance: New ISO certifications (ISO 27001, ISO 27017, ISO 27018)
- Available in new datacenter: Frankfurt, Germany (see the Region selector)
- Increased maximum execution time for Actions: 10 minutes

Getting Started with IBM Cloud Functions



IBM Cloud Functions (based on Apache OpenWhisk) is a Function-as-a-Service (FaaS) platform which executes functions in response to incoming events and costs nothing when not in use. [Learn More](#)

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

What's New:

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IBM Cloud Functions

IBM Cloud Catalog Docs Support Manage Search for resource... IBM 

REGION CLOUD FOUNDRY ORG CLOUD FOUNDRY SPACE
Dallas watsondemoibm serverless

Getting Started Actions Triggers Monitor Logs APIs

Create

 **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 Message Hub events.

 **Create Action**
Actions contain your function code and are invoked by events or REST API calls.

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

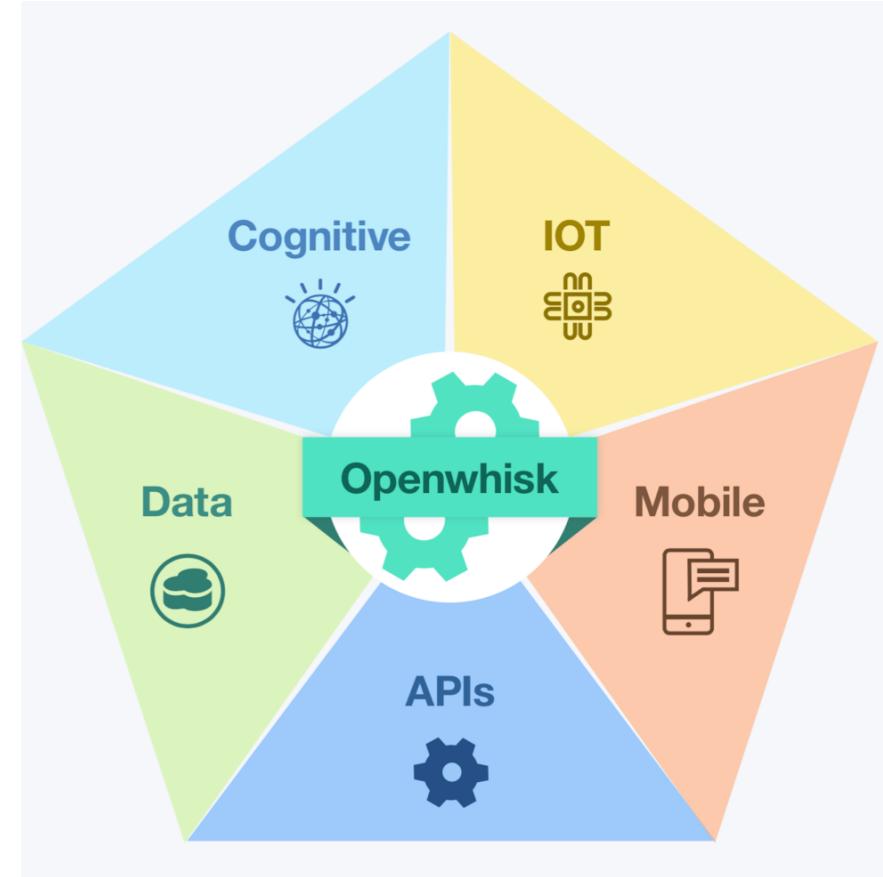
 **Create Trigger**
Triggers receive events from outside IBM Cloud Functions and invoke all connected Actions.

 **Install Packages**
Installing Packages installs reusable Actions into your namespace.

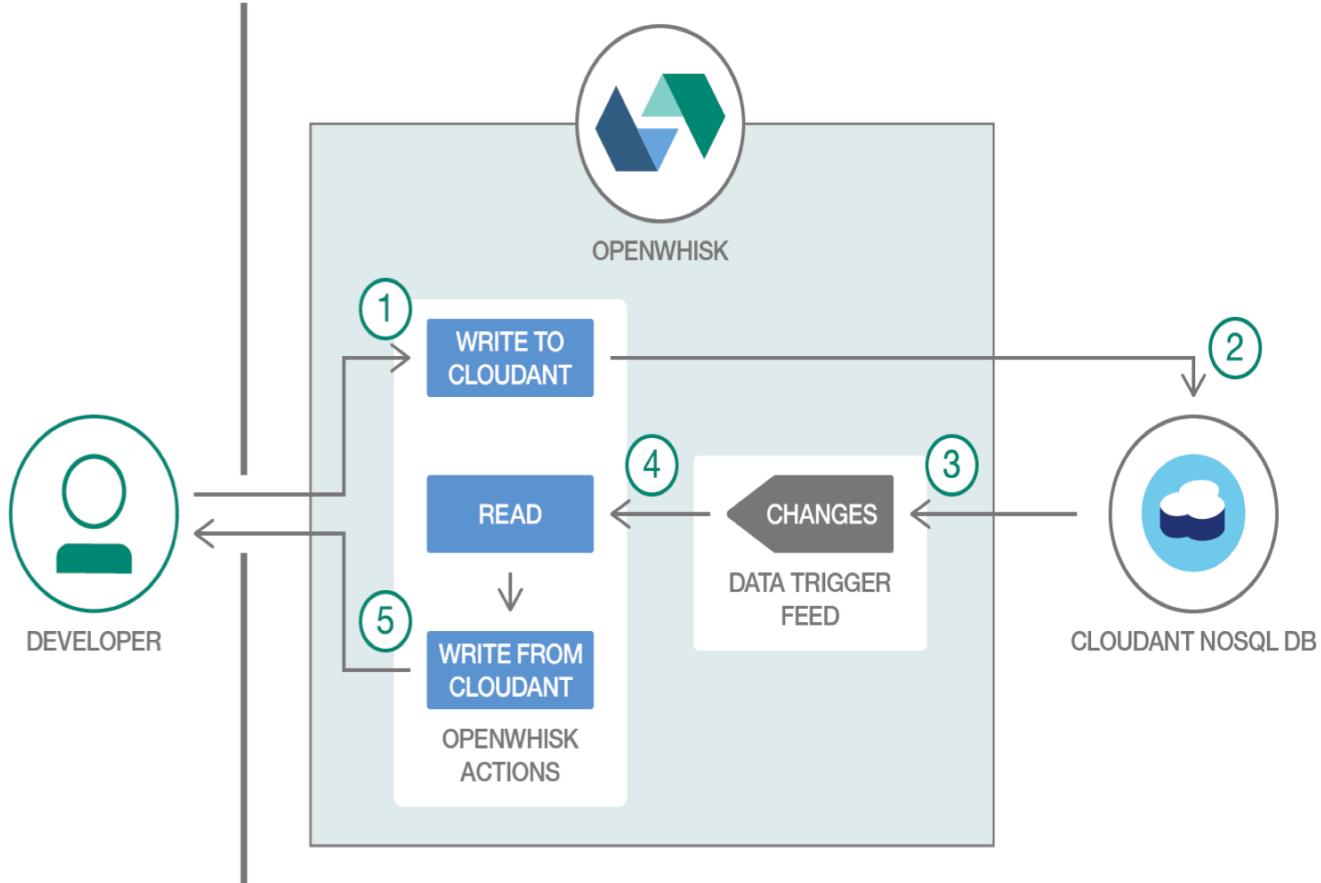
Demo : On Cloud
Platform Walkthrough

Applications Suitable for Serverless

- Execute logic in response to database change
- Perform analytics on sensor input messages
- Provide cognitive computing via chatbots
- Schedule tasks performed for a short time
- Invoke autoscaled APIs and mobile backends



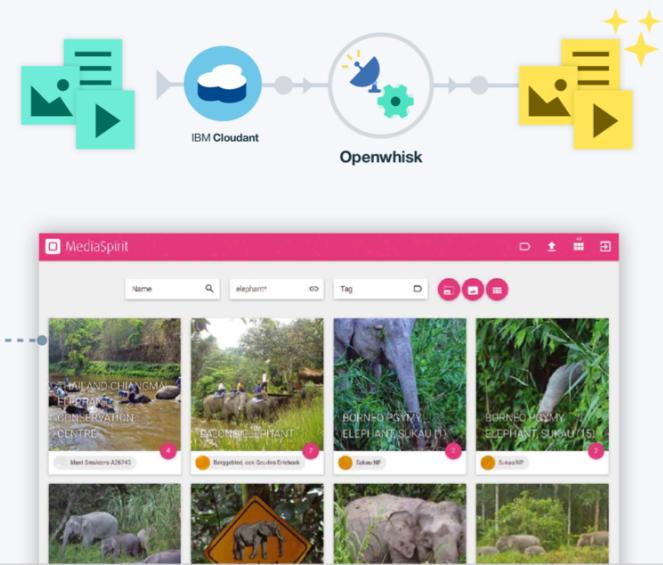
Database change triggered action



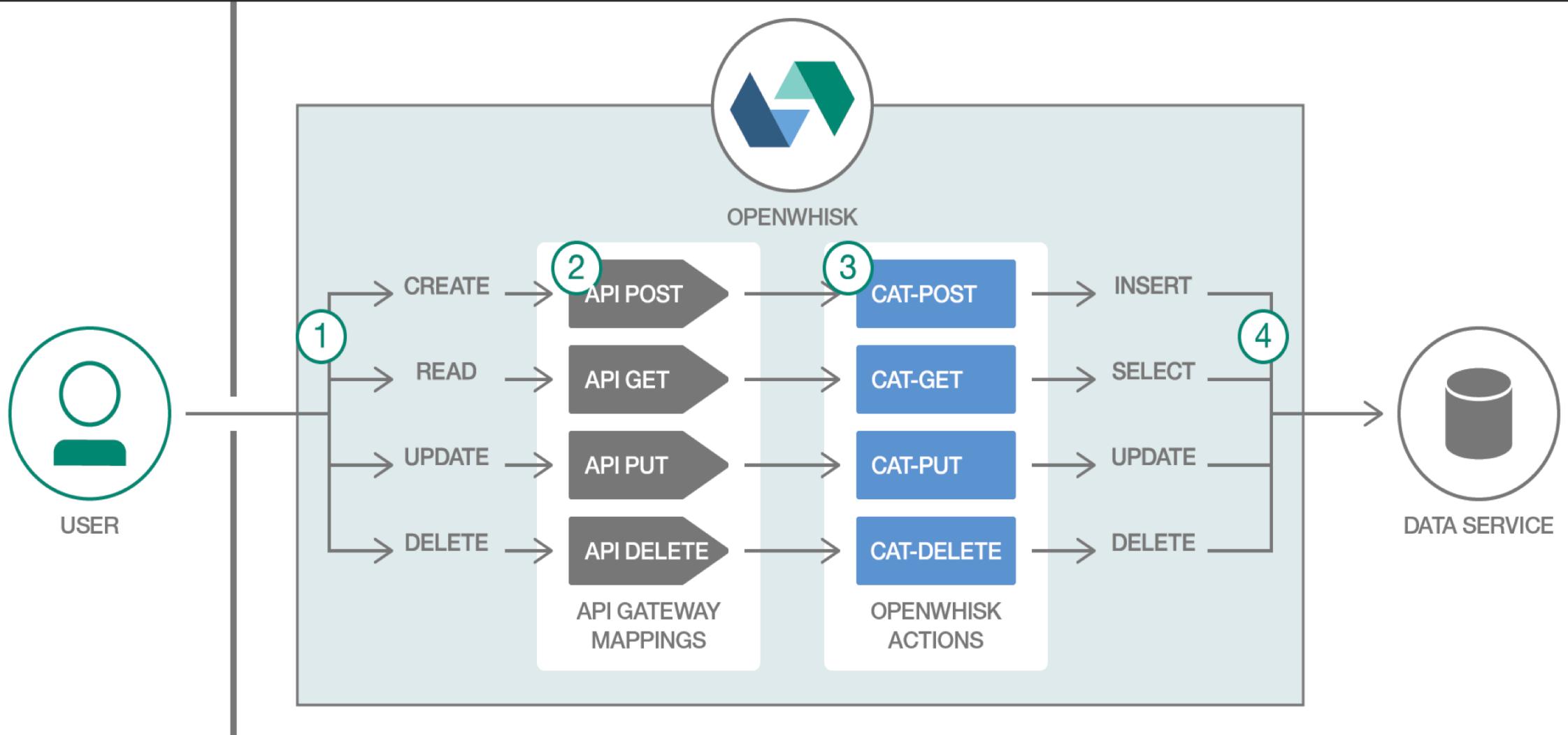
Data processing

SiteSpirit
<http://ecc.ibm.com/case-study/us-en/ECCF-CDC12387USEN>

**10x faster
90% less cost**



HTTP API request triggered action

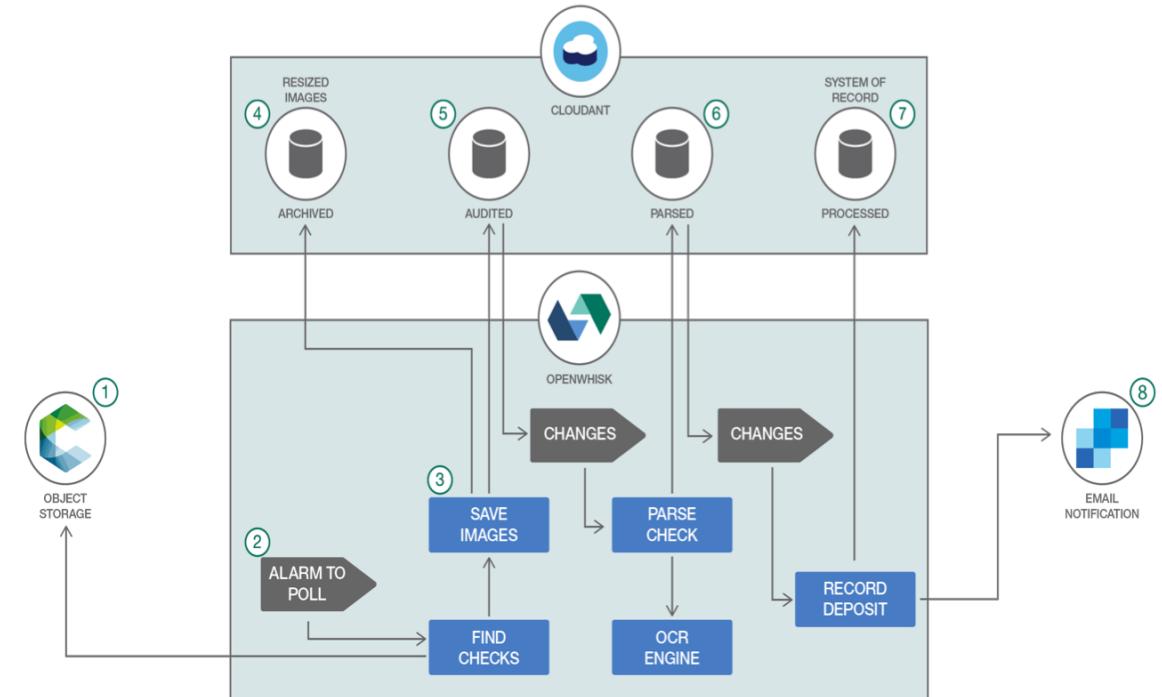
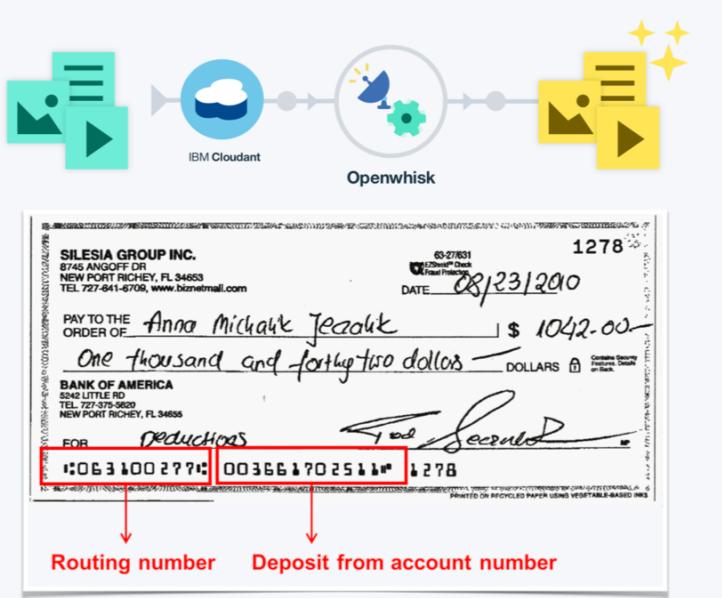


Data Processing :Cheque Deposits

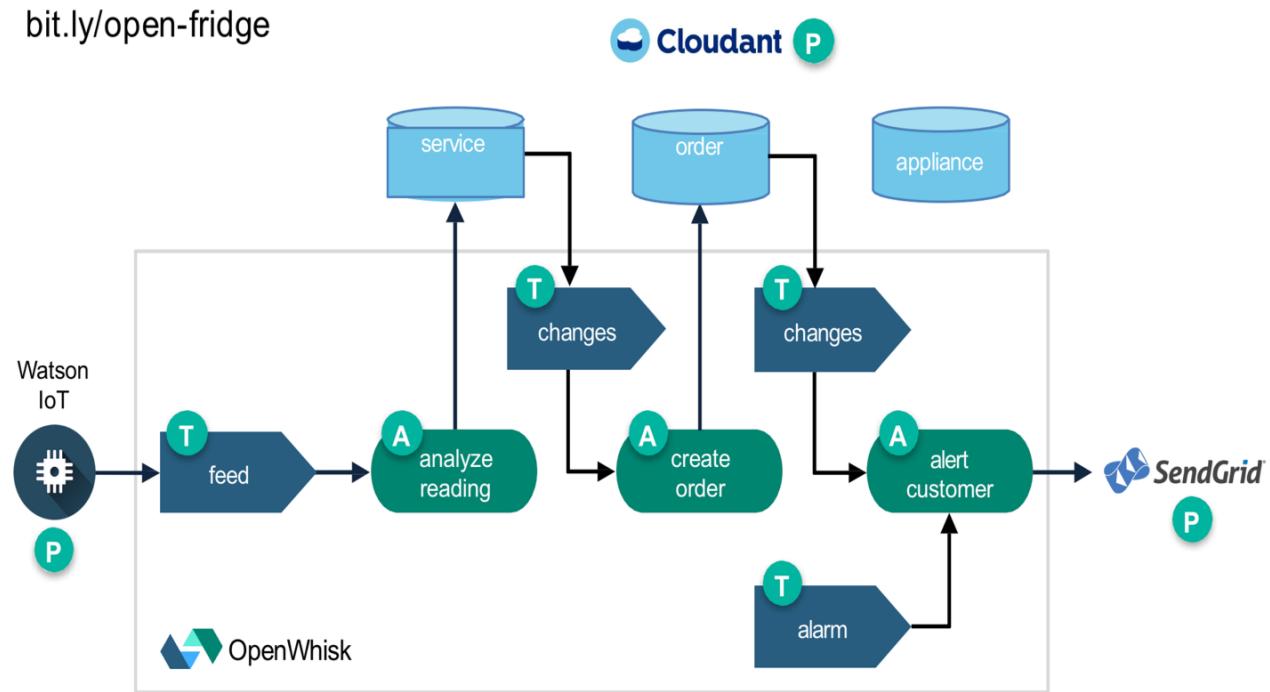
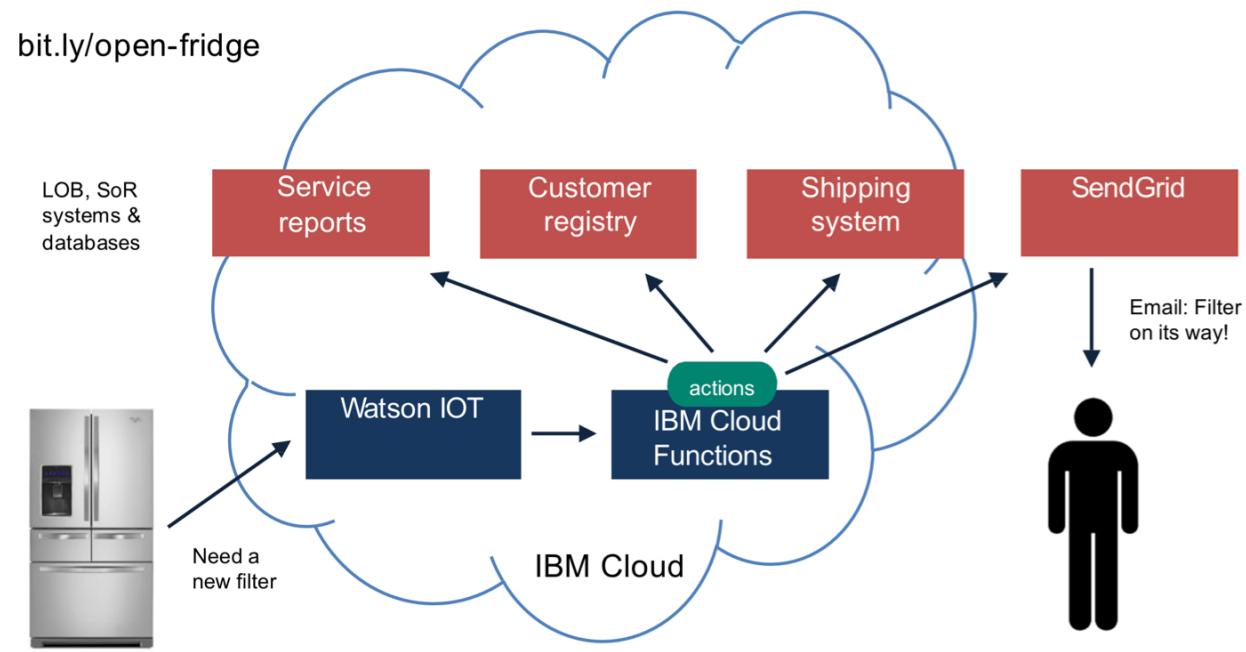
Data processing



Less cost
\$2 for all paper checks
processed within 1 year



IoT :and Functions



More Patterns....

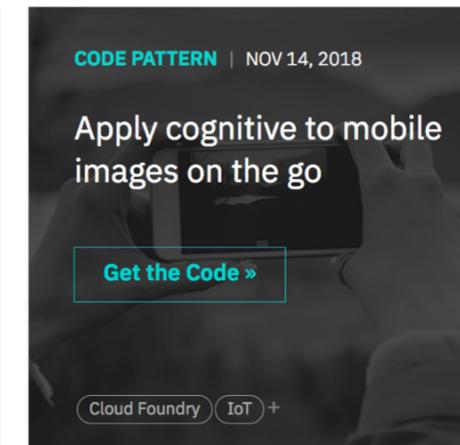
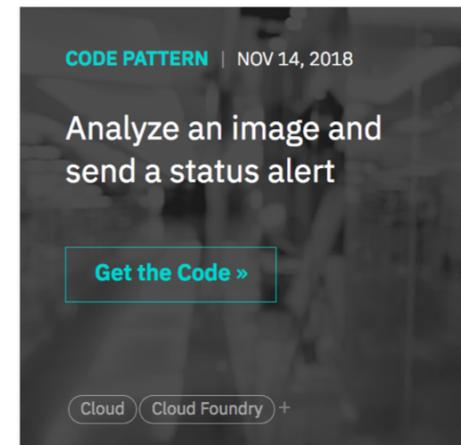
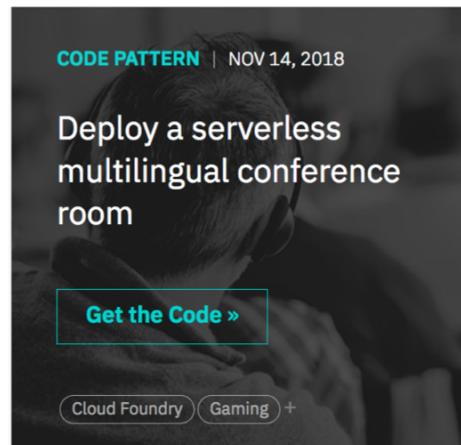
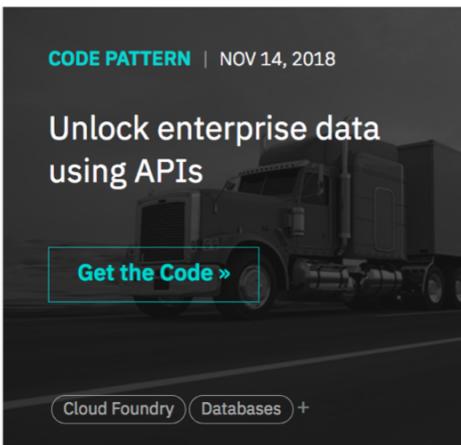
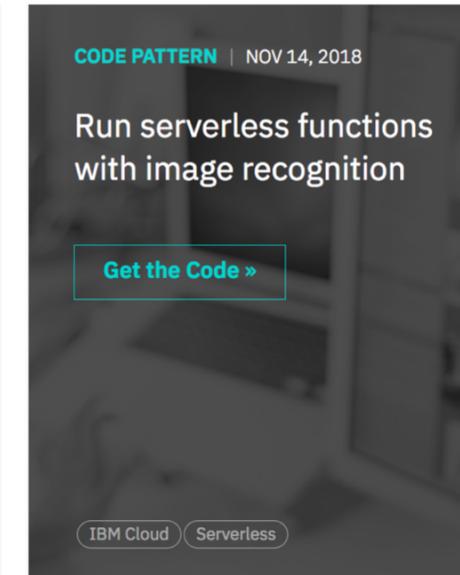
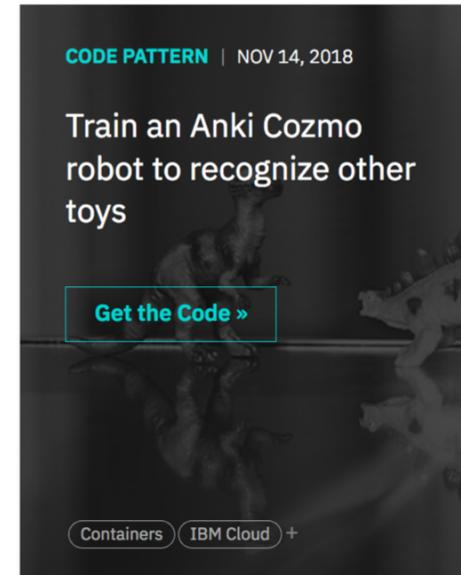
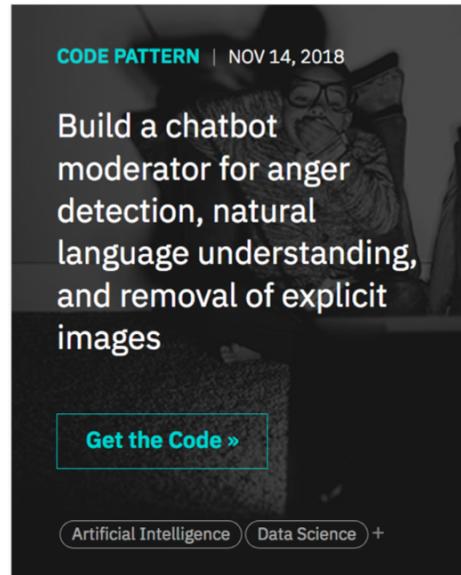
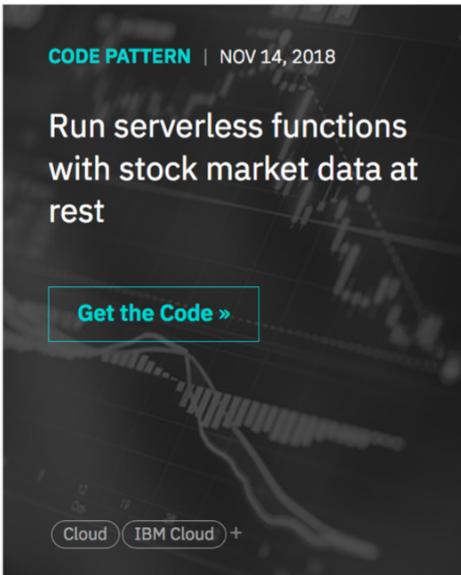
- **Decouple services** by introducing a queue. Typically in asynchronous messaging in web apps and services to take the load off the application
- Once a video is uploaded, you may want to **encode** them in multiple formats in parallel and also transcribe
- Functions can work as a pipe (connector) or a **filter** (transformation) - To manage a sequential series of tasks – like a data pipeline
- Managing Dialog responses in **Chatbots**

Things to take care : Serverless

- Need to trust the provider
- New architecture to learn
- Debugging , Monitoring , Logging tools
- Performance (Latency will become non-issue)
- Unpredictable Costs (Cost saving primary driver, but developer agility is long term value)

Code Patterns

<https://developer.ibm.com/patterns/category/serverless/>



Summary: FaaS & Furious

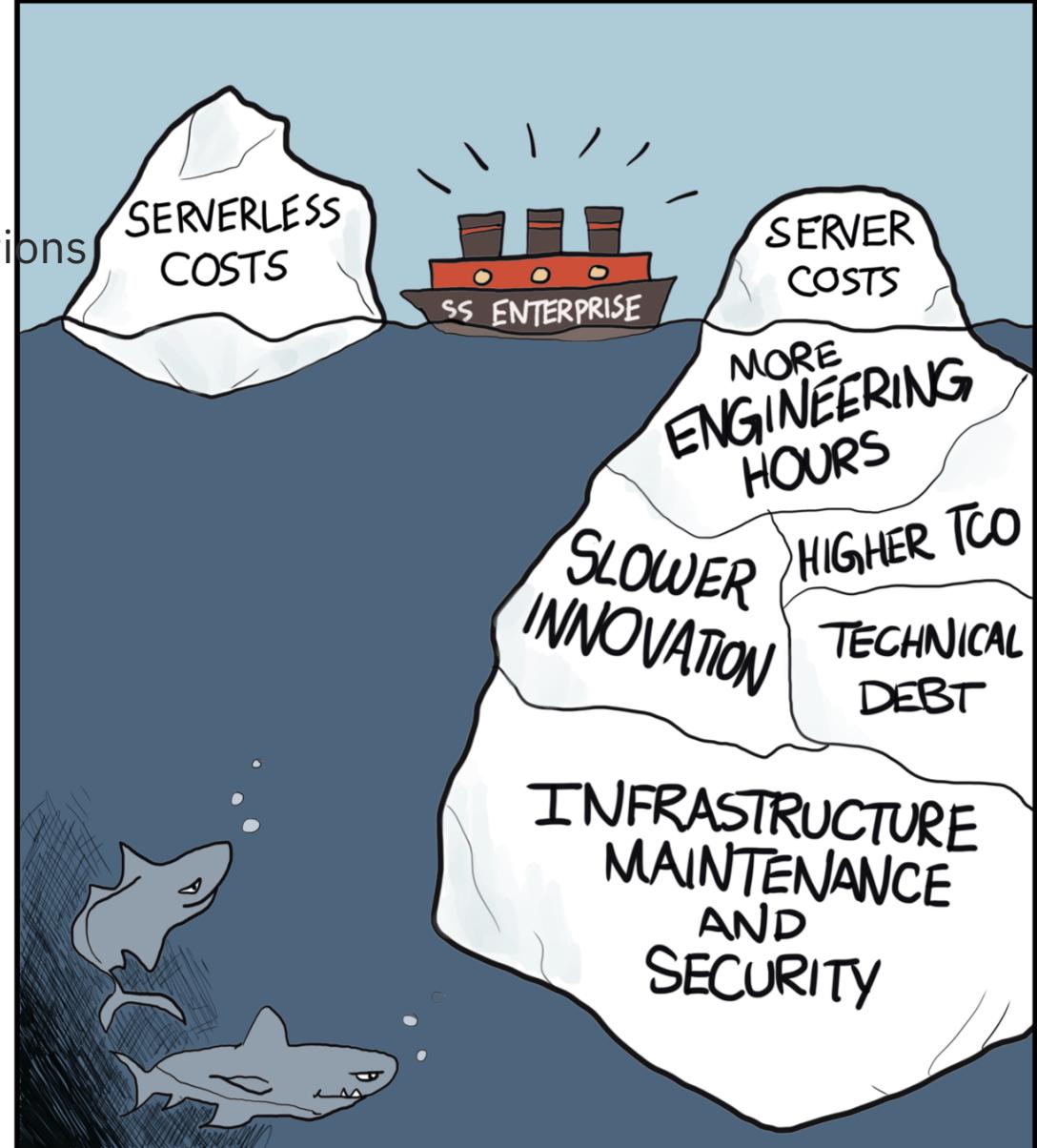
Serverless is an approach to building *modern* applications

Serverless consists of:

1. APIs/managed services
2. FaaS/cloud functions (or just functions)

Serverless architecture allows developers to focus on the application (value) rather than what kind of resources are needed to run the application.

It allows to build applications faster.



"Steer away from serverless! Full speed ahead!"

Source: <https://www.trek10.com/blog/business-case-for-serverless/>

Resources

Code Patterns

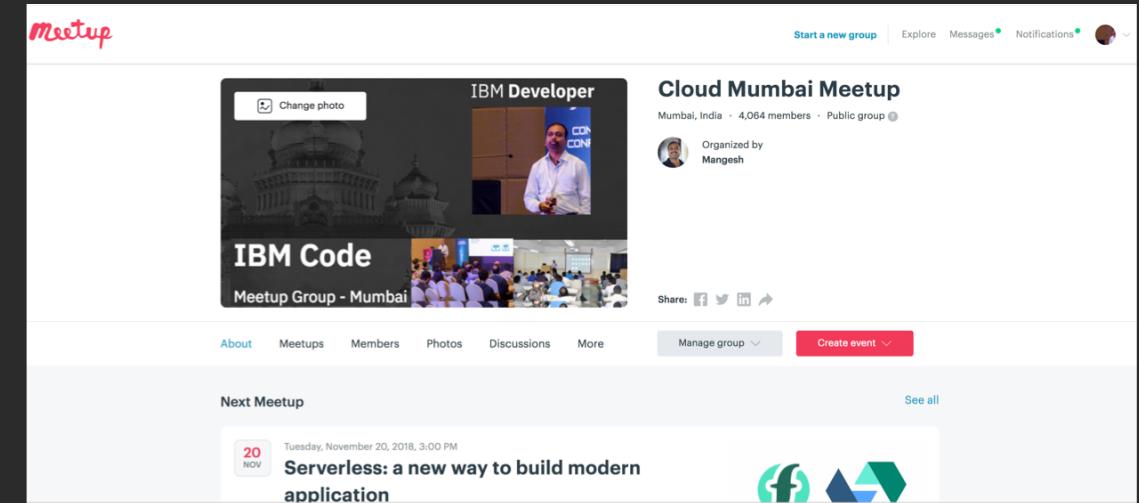
- <https://developer.ibm.com/patterns/category/serverless/>

Serverless architecture

- <https://martinfowler.com/articles/serverless.html>

IBM Cloud Functions Documentation and

<https://console.bluemix.net/openwhisk/>



The screenshot shows the Meetup.com group page for "IBM Code Meetup Group - Mumbai". The header includes the Meetup logo and navigation links for "Start a new group", "Explore", "Messages", "Notifications", and a user profile. The main content area features a banner with a photo of a person speaking at a podium, the text "IBM Developer" and "IBM Code", and "Meetup Group - Mumbai". Below the banner are tabs for "About", "Meetups", "Members", "Photos", "Discussions", and "More", along with "Manage group" and "Create event" buttons. A "Next Meetup" section displays an event for "Serverless: a new way to build modern application" on Tuesday, November 20, 2018, at 3:00 PM. It includes social sharing icons for Facebook, LinkedIn, and Twitter.



@MangeshPatank



/mdpatankar

in/mangesh-patankar-1961a019

mapatank@in.ibm.com

<http://bit.ly/ibmserverlessworkshop>