

Serverless (aka FaaS) computing with Swift

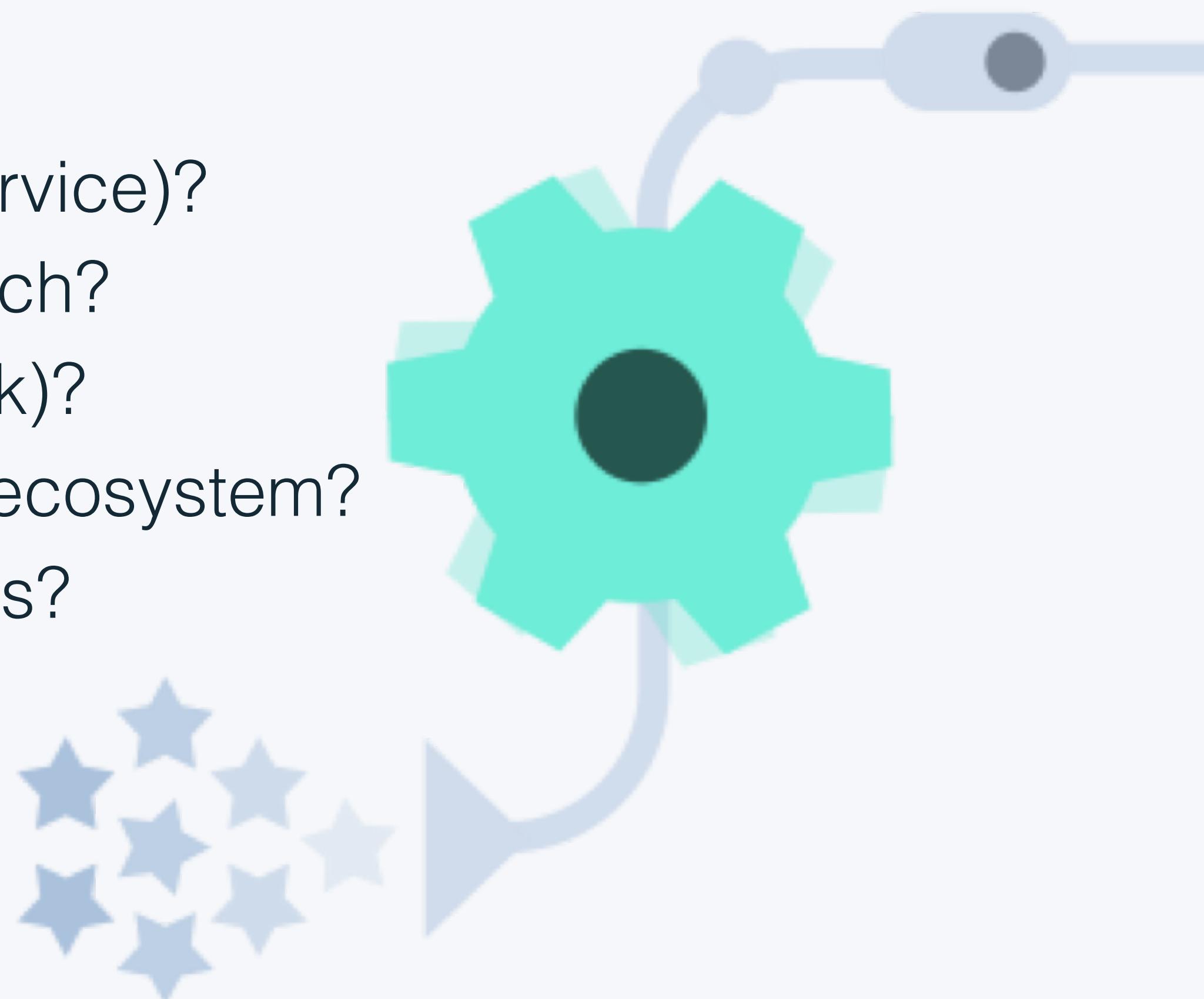
Marek Sadowski
San Francisco | Developer Advocate | IBM |
@blumareks



ibm.biz/sv-serverless-2018

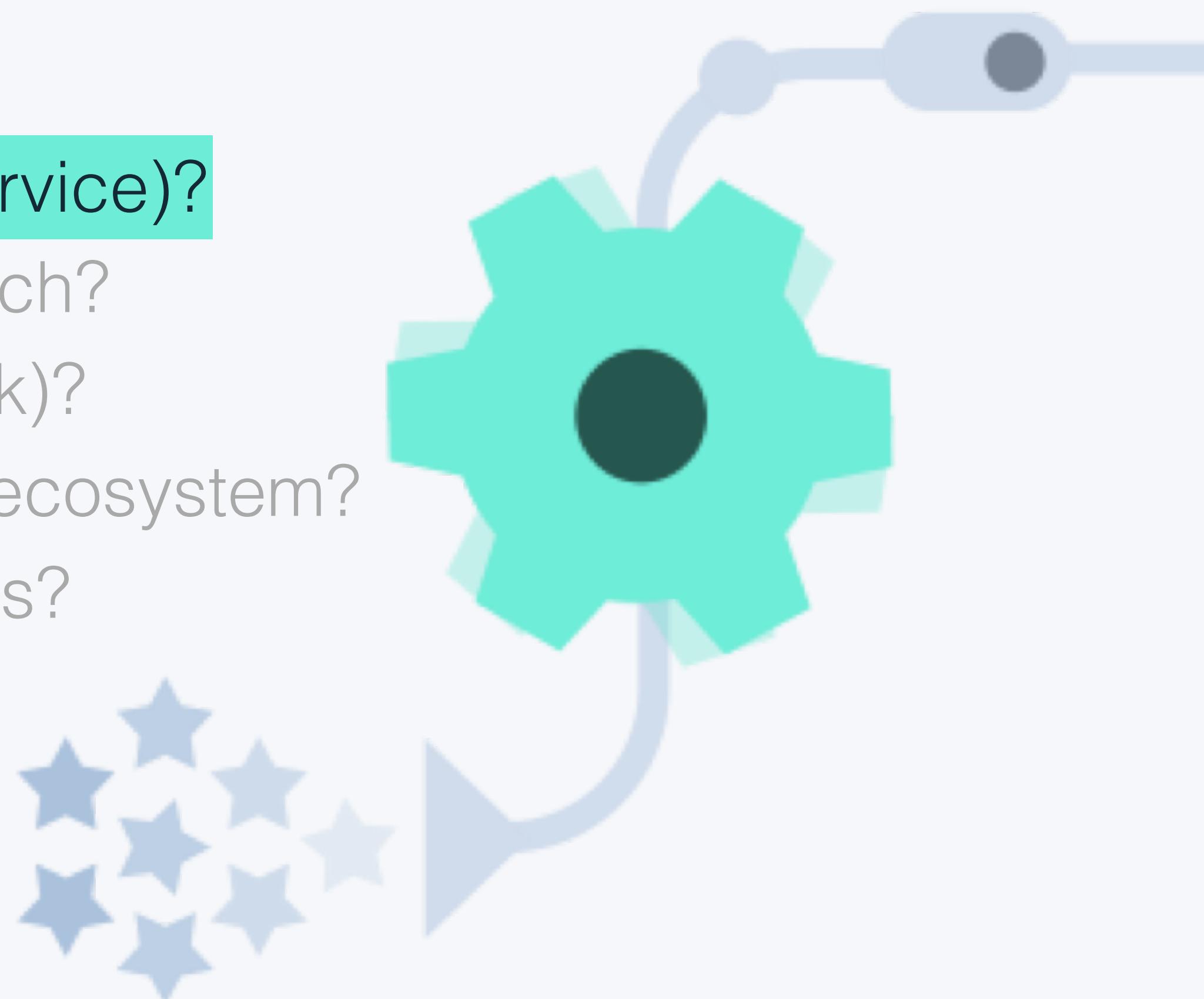
Agenda

1. What is Serverless computing (Functions-as-a-Service)?
2. Why is Serverless better than a traditional approach?
3. What is IBM Cloud Functions (Apache OpenWhisk)?
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5. What are the ideal IBM Cloud Functions use cases?
6. IBM Cloud Functions Shell and Composer
7. Example
8. Additional material

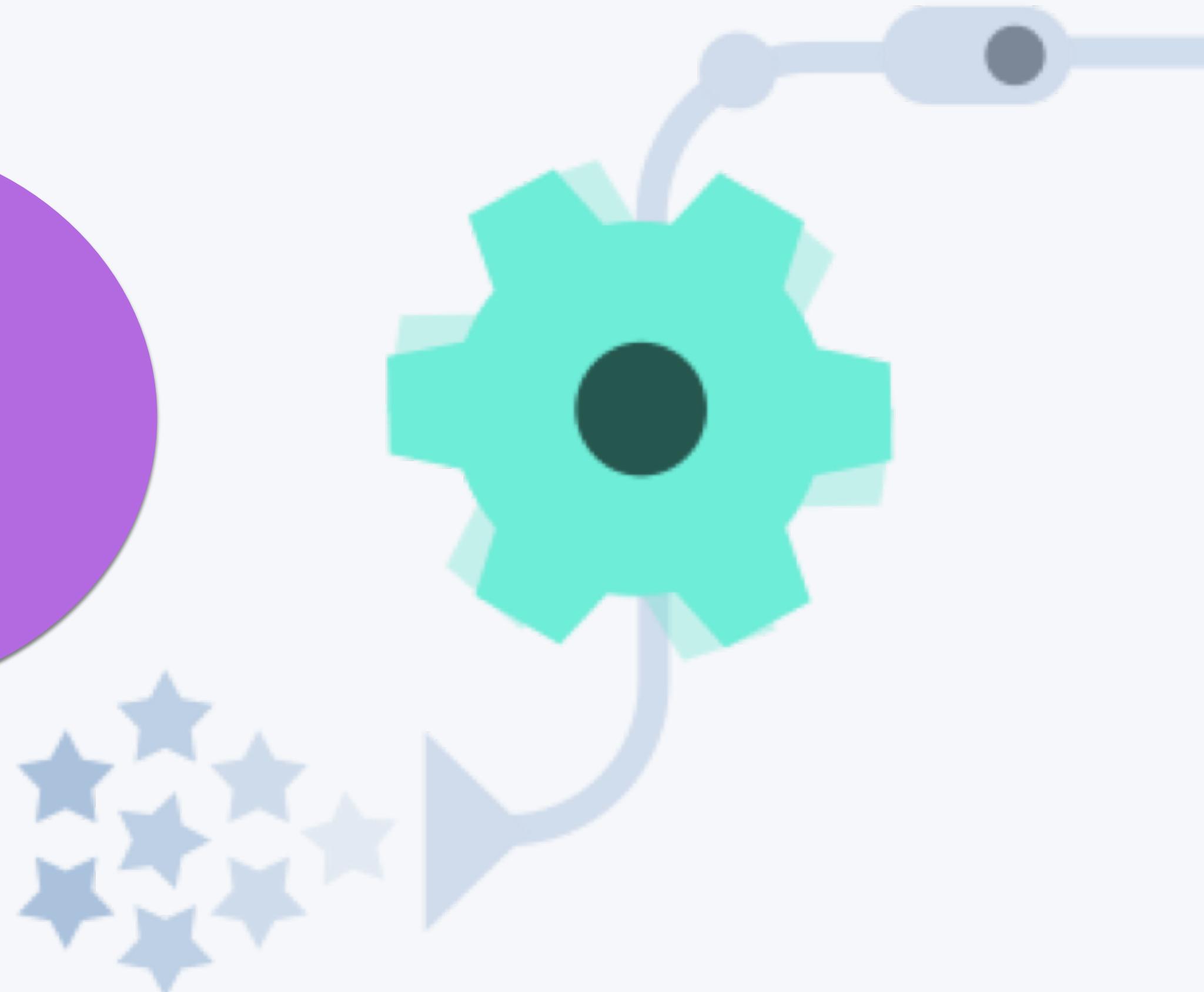
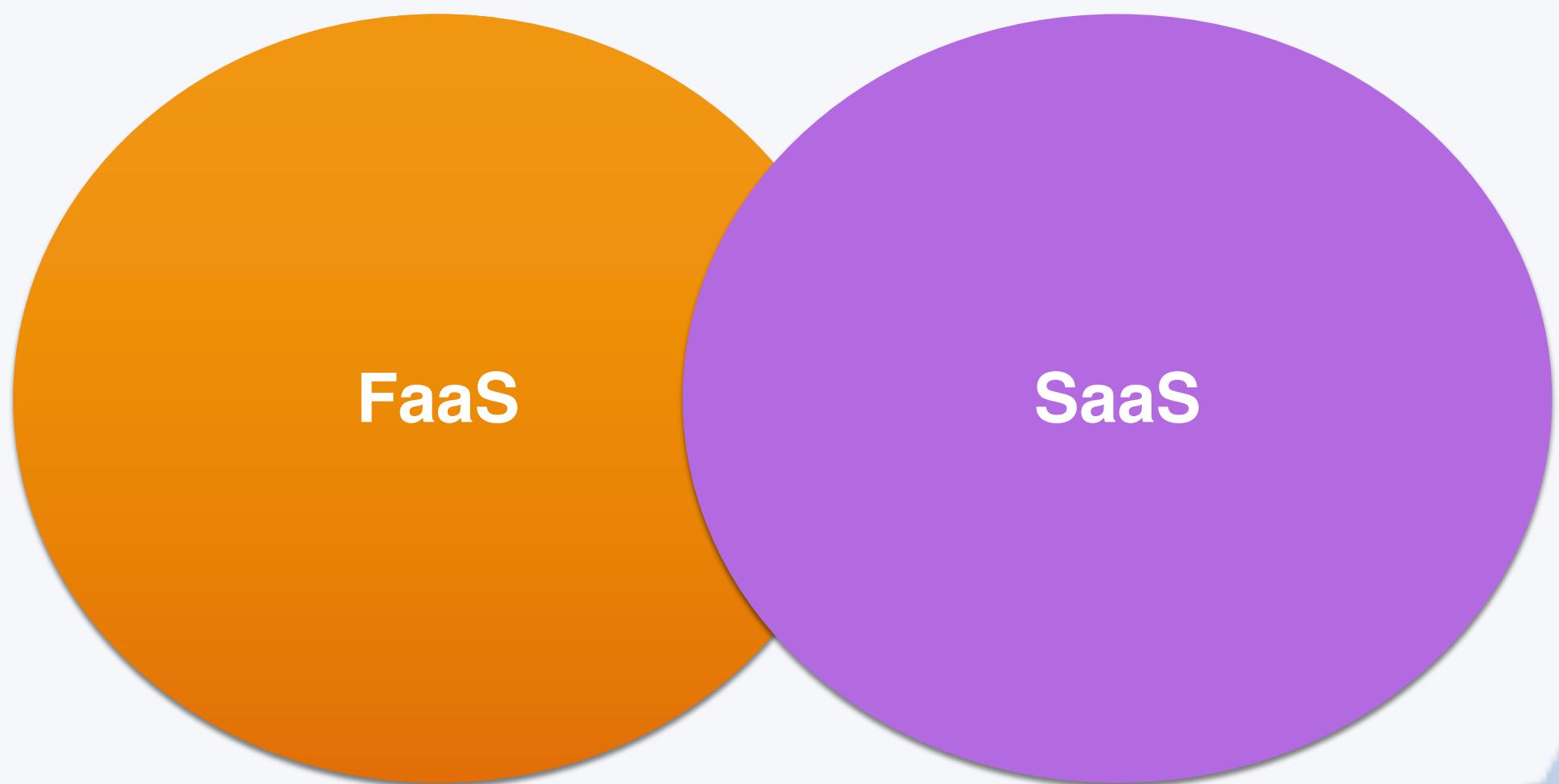


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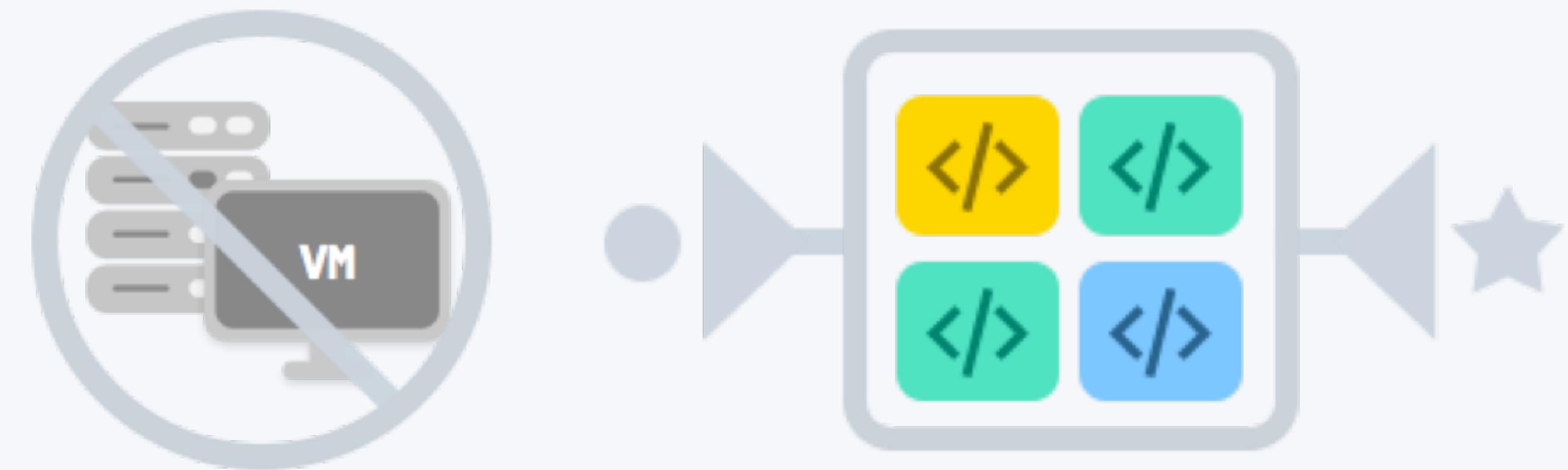


Serverless



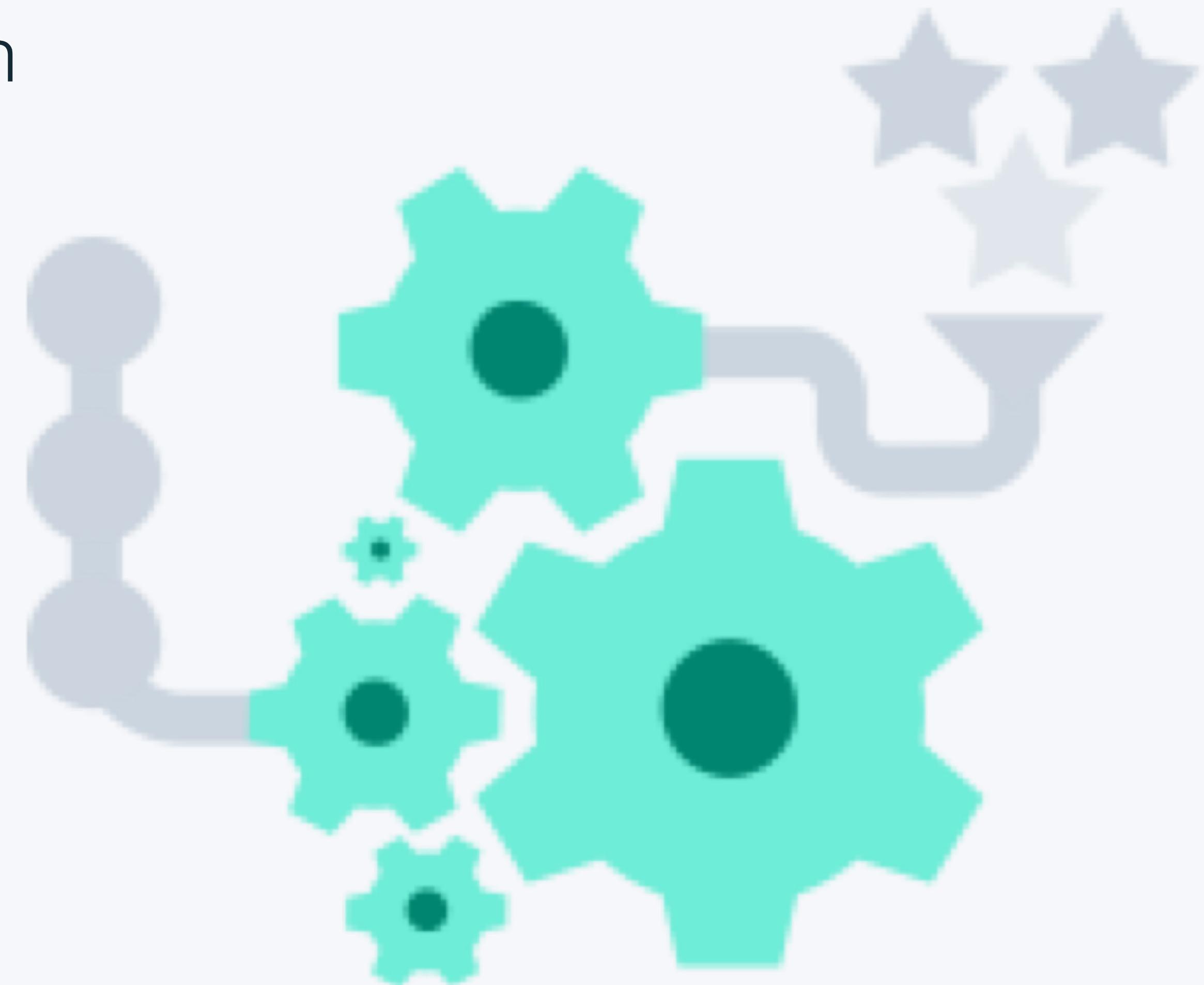
Runs code **only** on-demand on
a per-request basis

Serverless
deployment &
operations model



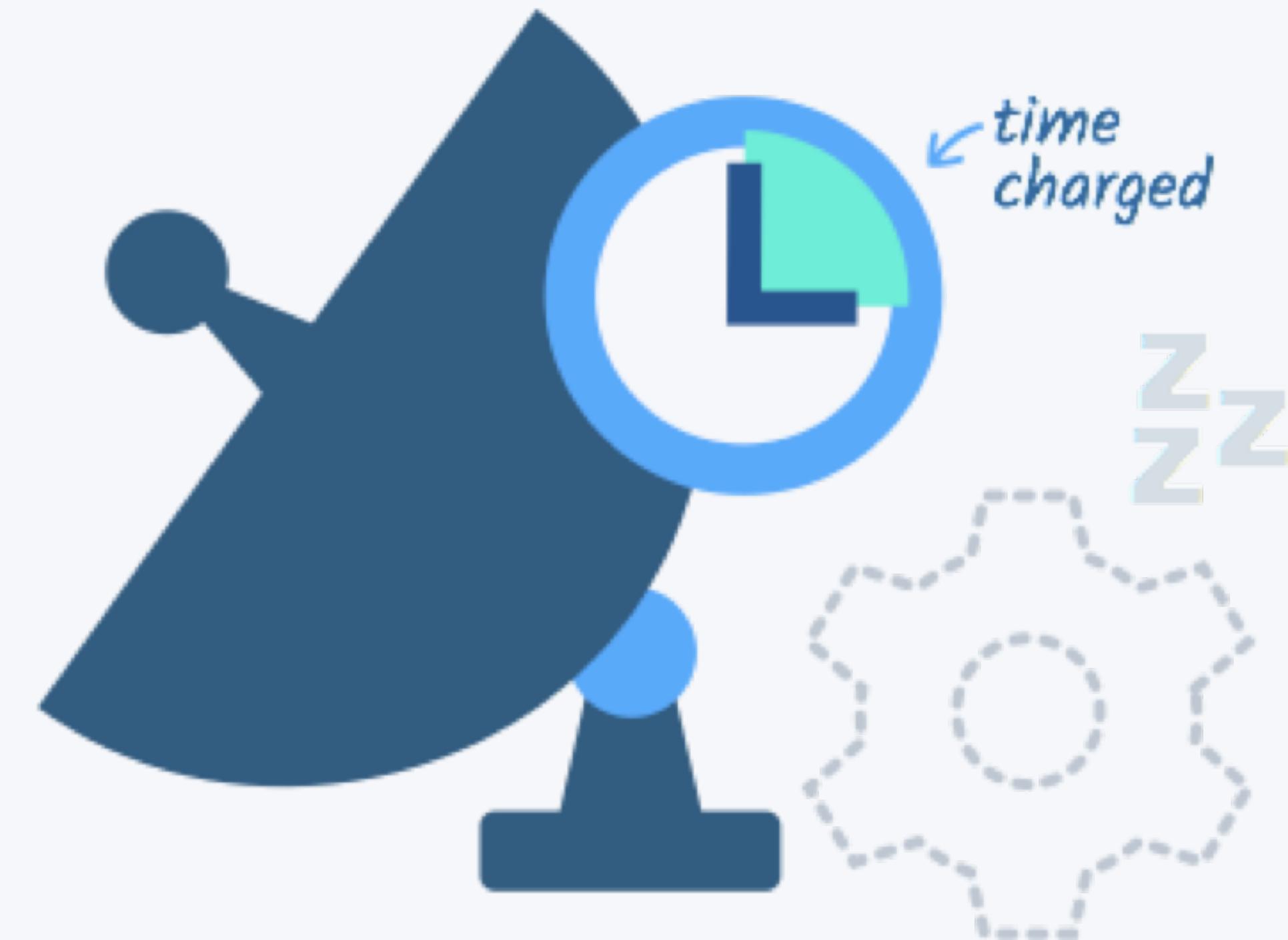
Runs code **only** on-demand on
a per-request basis

Scales on
a per-request
basis



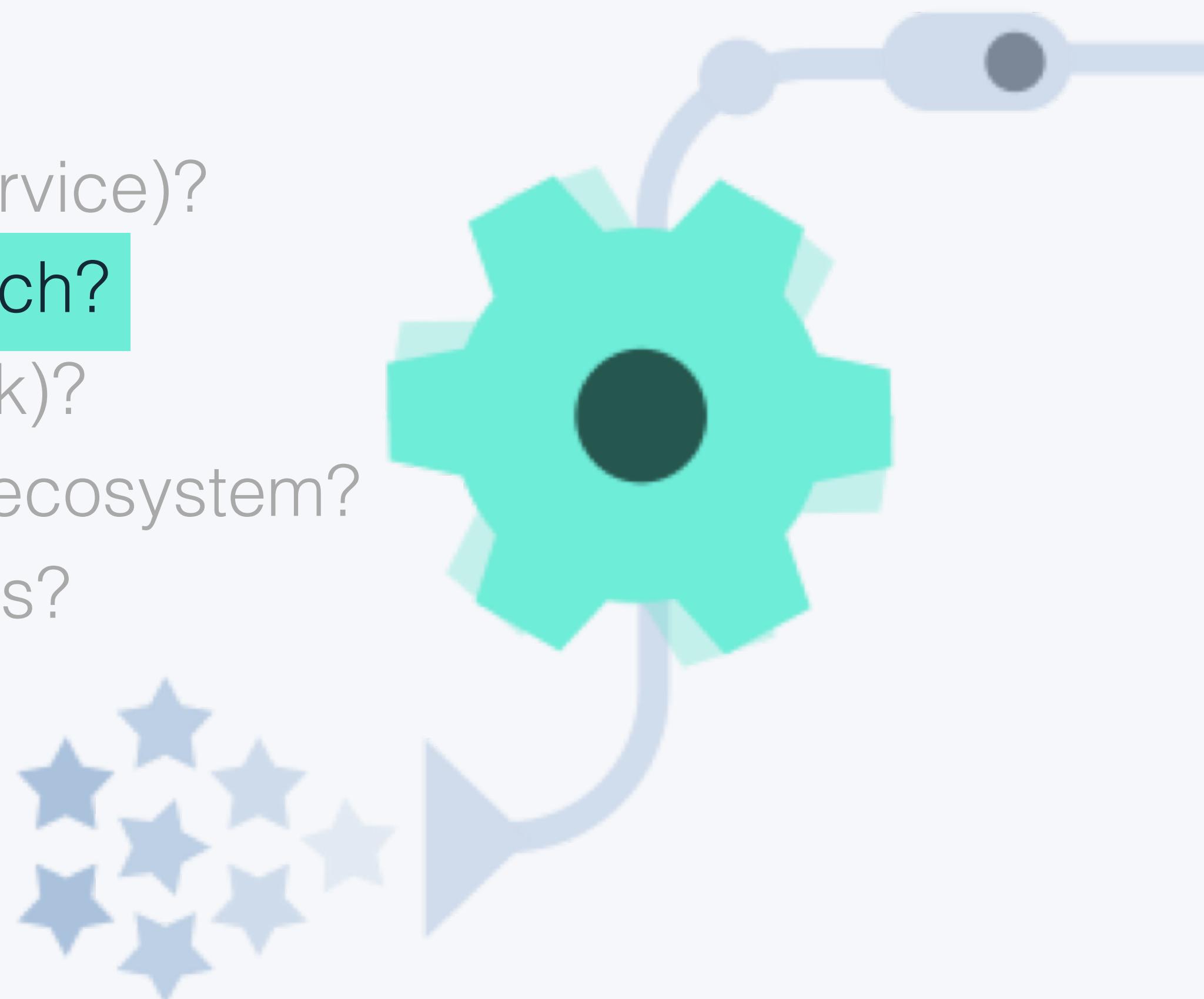
Runs code **only** on-demand on
a per-request basis

Optimal
utilization &
granular pricing



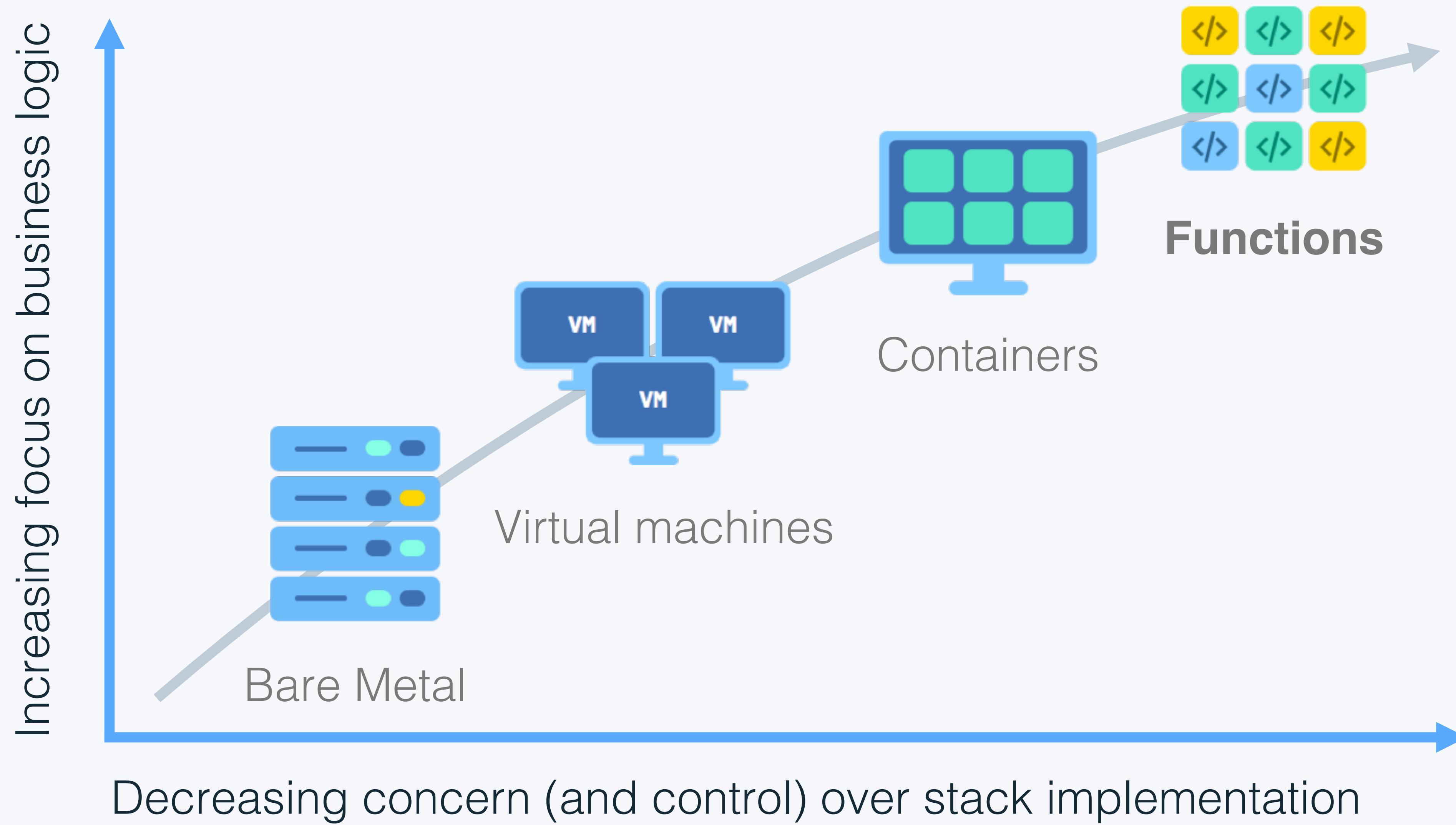
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What is Serverless computing (Functions-as-a-Service)?

IBM Cloud Functions



Traditional model

Worry about scaling

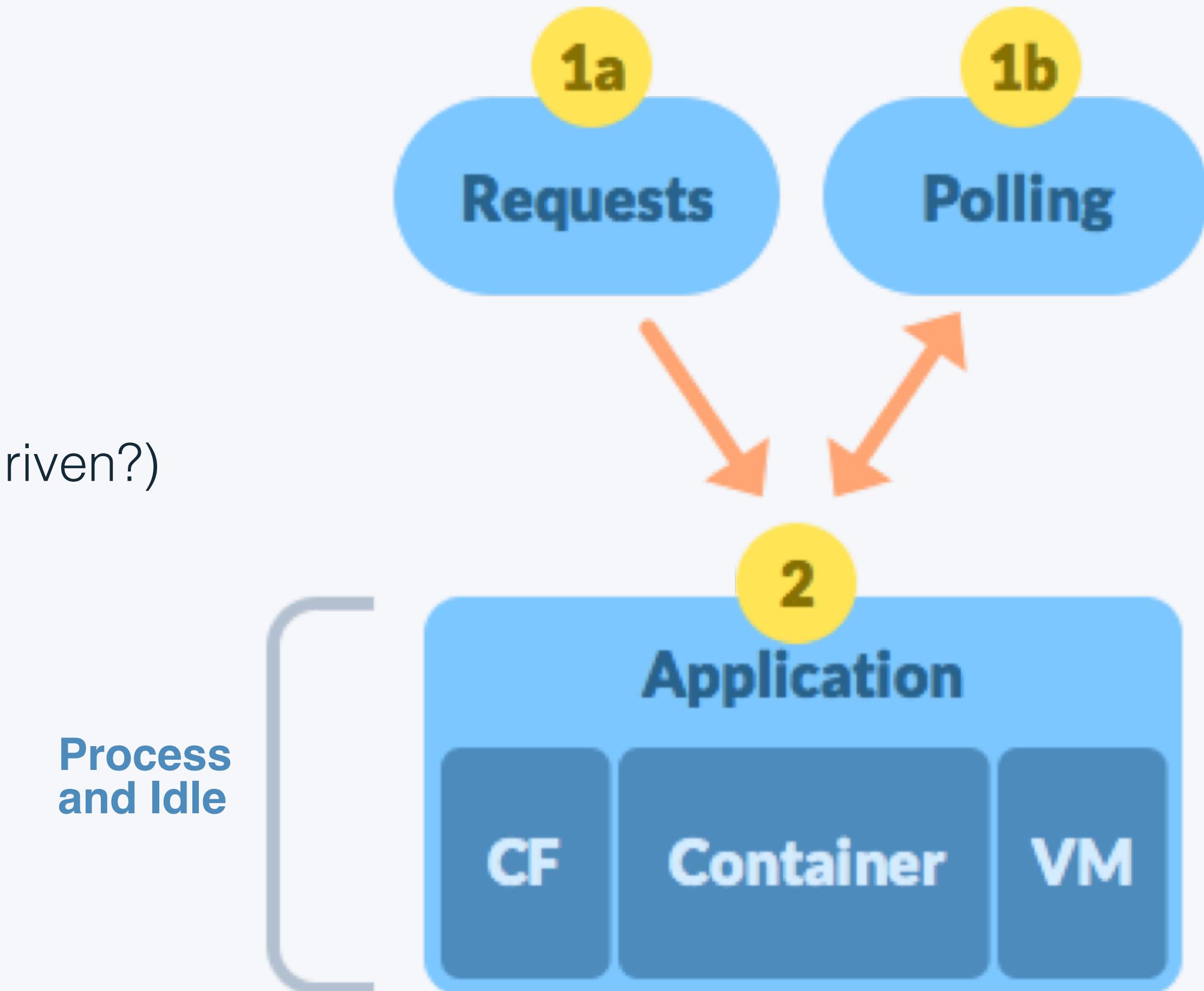
- When to scale? (mem-, cpu-, response time-, etc. driven?)
- How fast can you scale?

Worry about resiliency & cost

- At least 2 processes for HA
- Keep them running & healthy
- Deployment in multiple regions

Charged even when idling / not 100% utilized

Continuous polling due to missing event programming model



Serverless model

Scales inherently

- One process per request

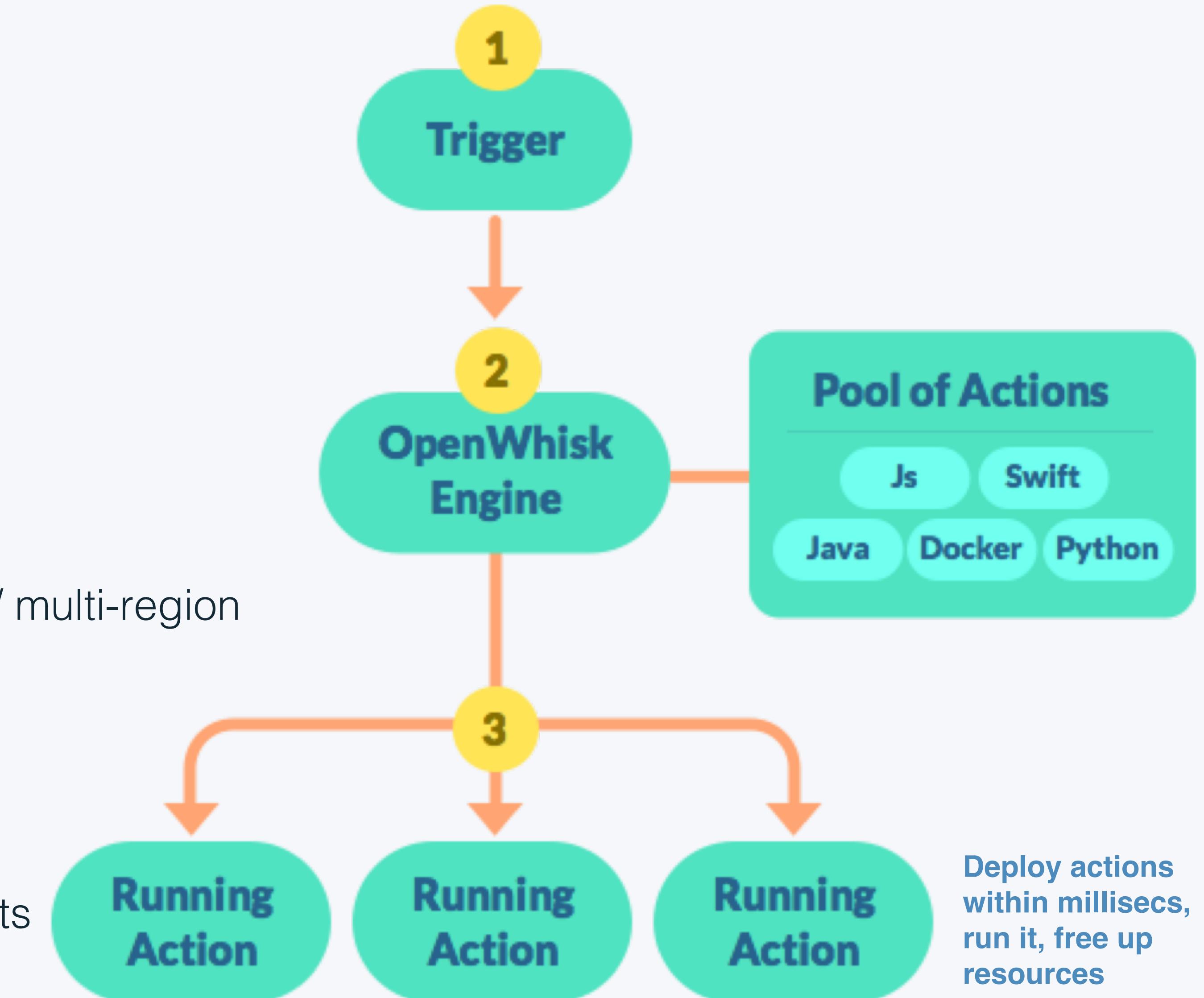
No cost overhead for resiliency

- No long running process to be made HA / multi-region

Introduces event programming model

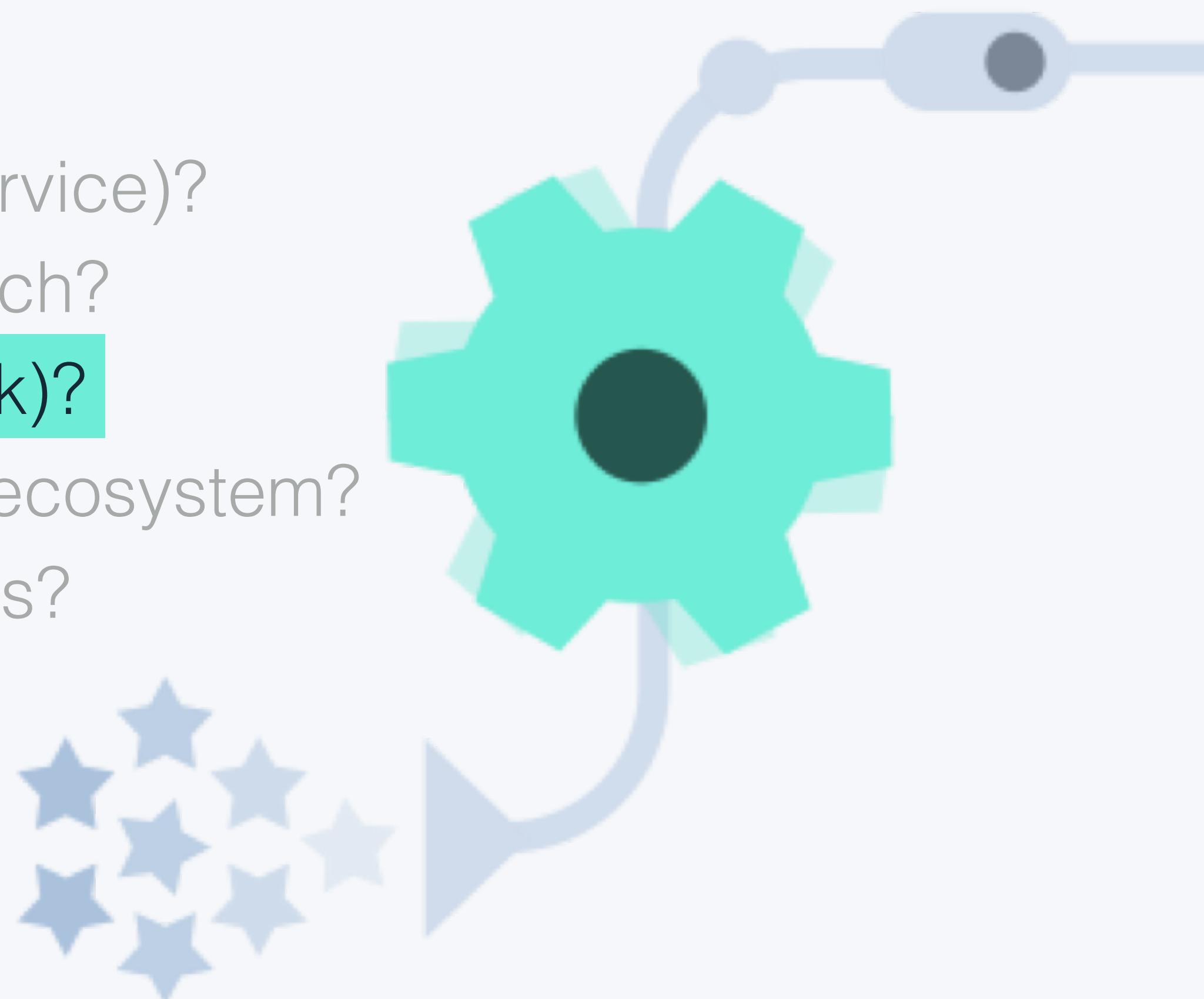
Charges only for what is used

- Only worry about code
higher dev velocity, lower operational costs

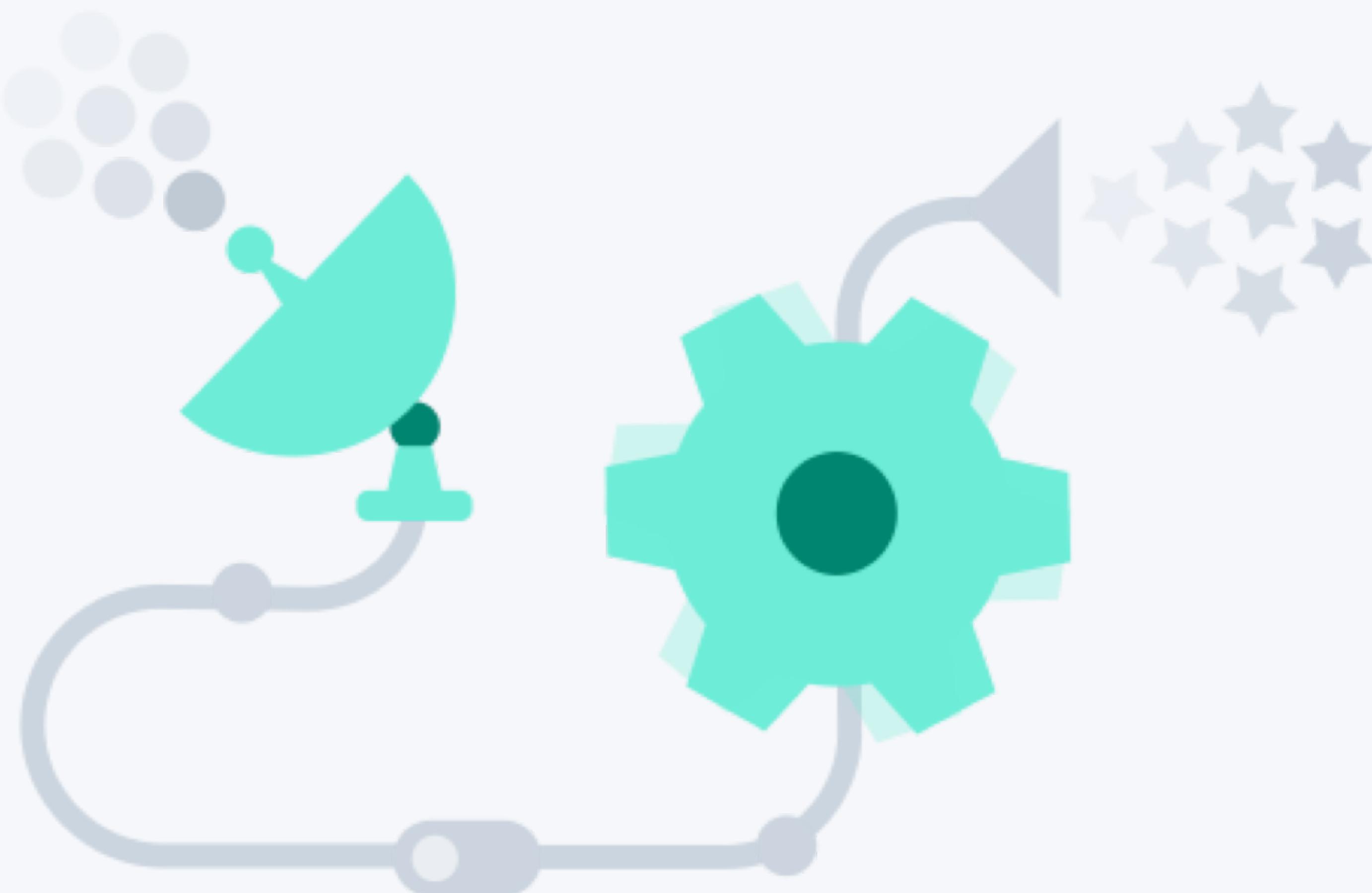


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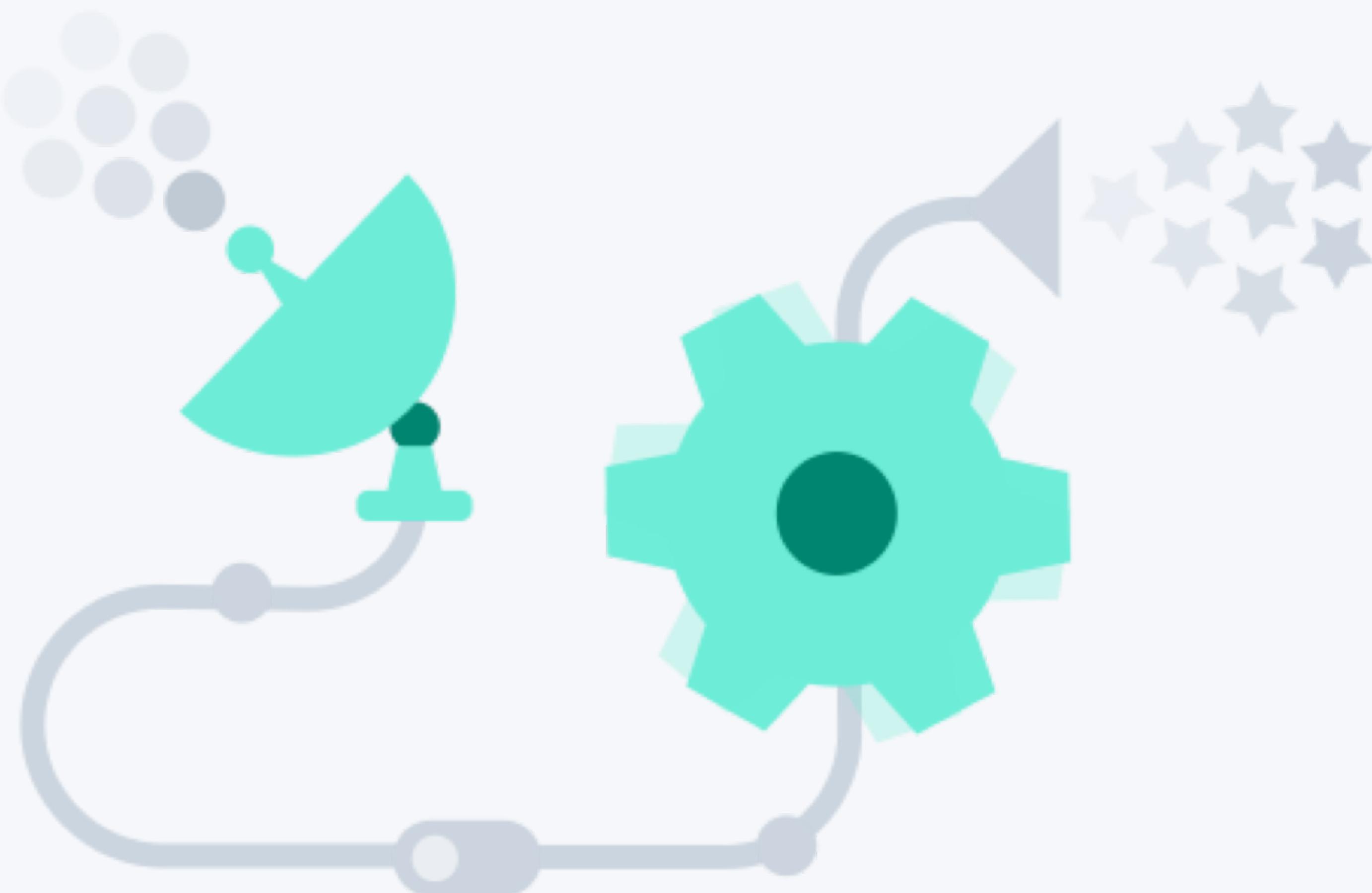


Serverless
platform to
execute code in
response to
events



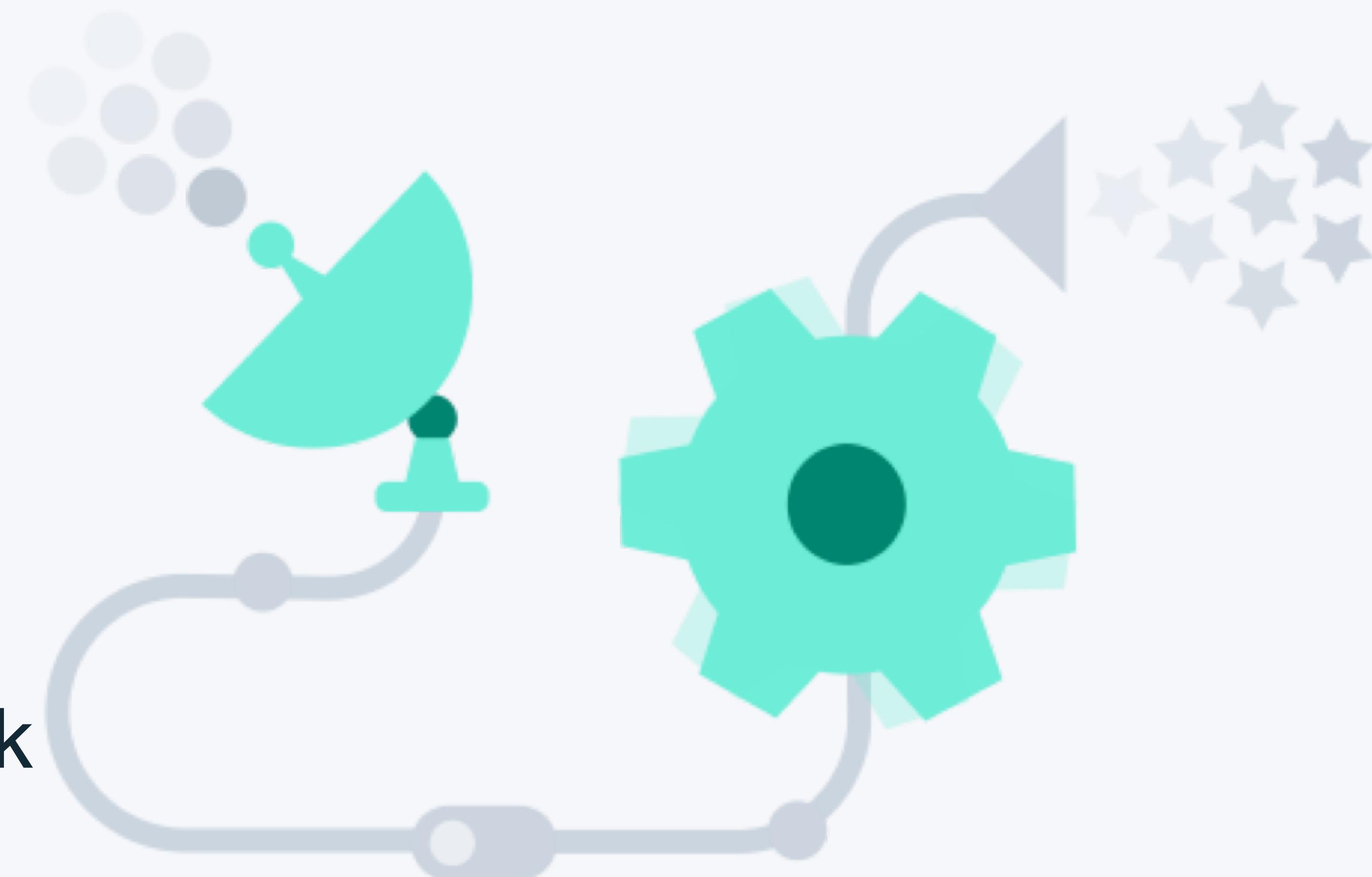
Serverless platform to execute
code in response to events

Developed as
open source software
via Apache Foundation
openwhisk.org



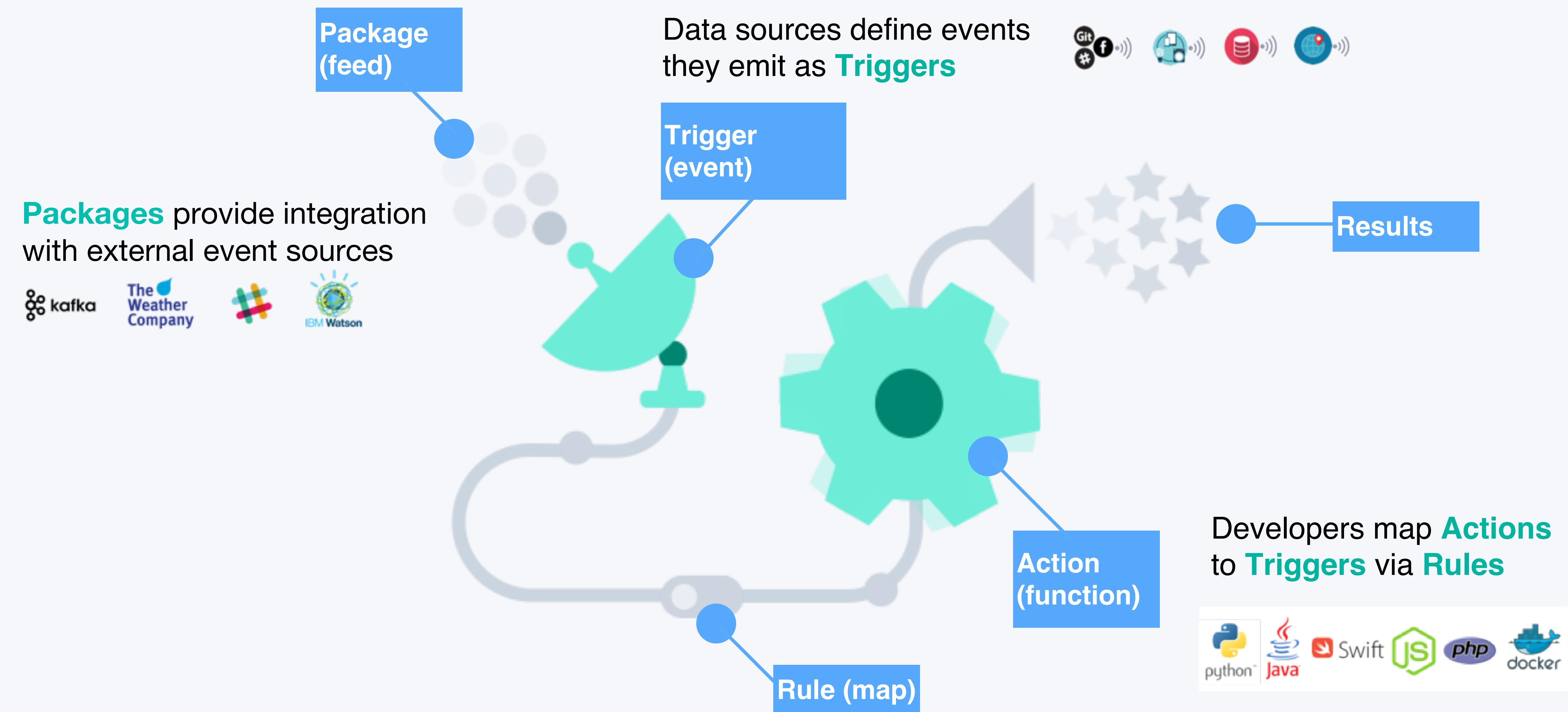
Serverless platform to execute
code in response to events

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



What is IBM Cloud Functions (Apache OpenWhisk)?

IBM Cloud Functions



Supported Languages

Multi-language Support

JS/NodeJS 8

Swift 4

Java

Docker

Python 3

PHP 7

GO

Community Efforts

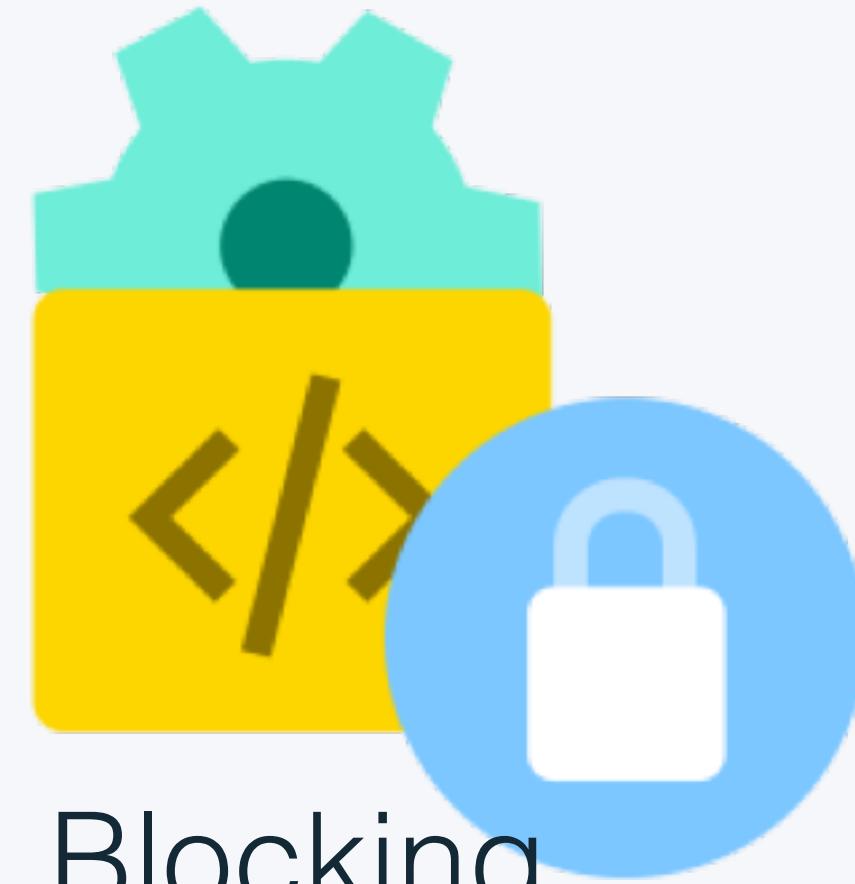
Haskell

Scala

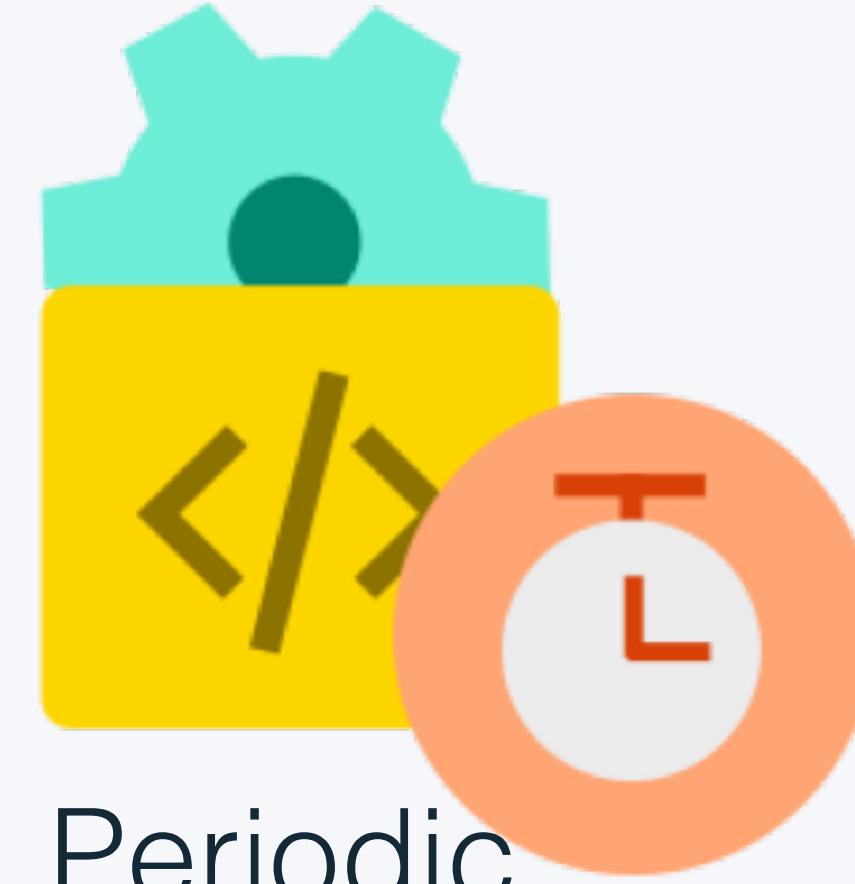
...

... and more to come

Support for different invocation models



Blocking

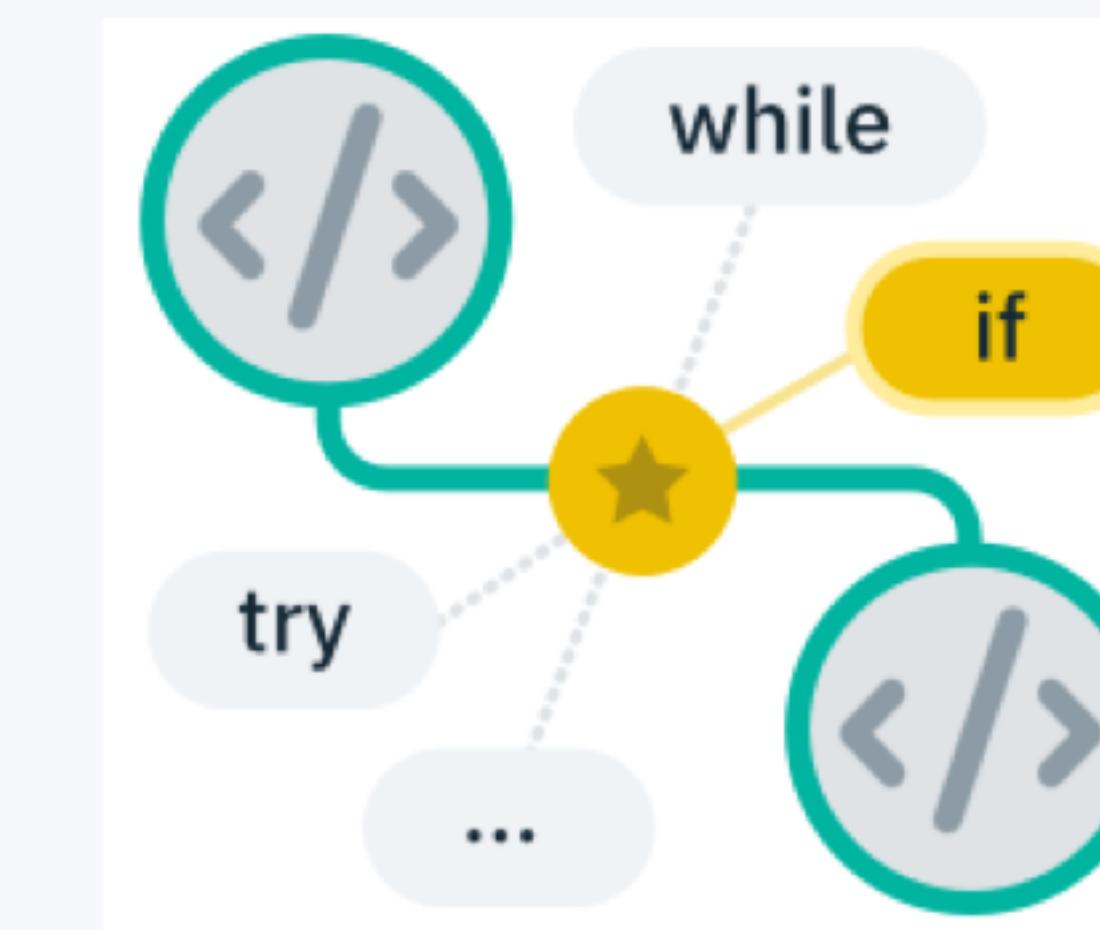


Periodic

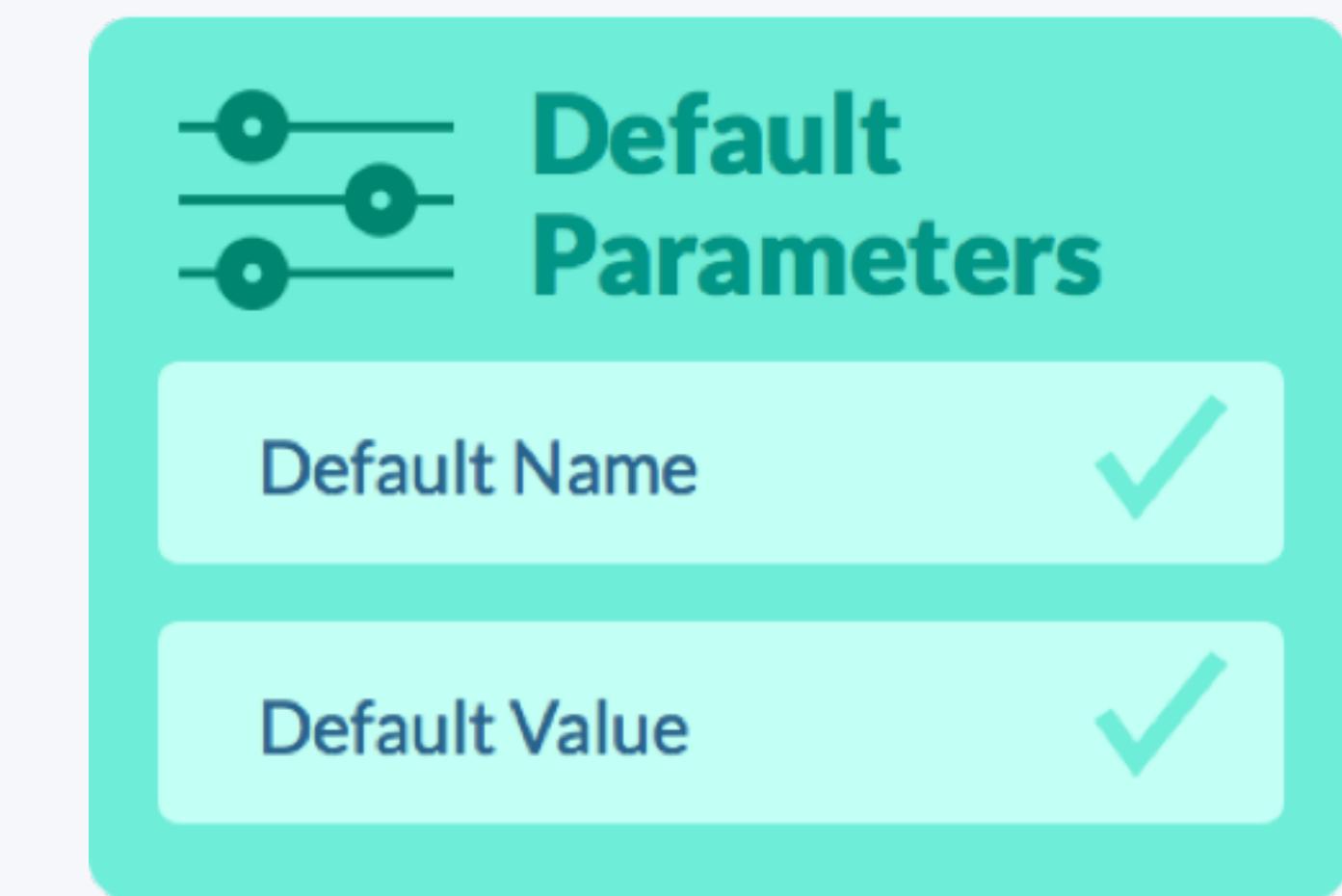


Non-blocking

Supports higher-level programming constructs

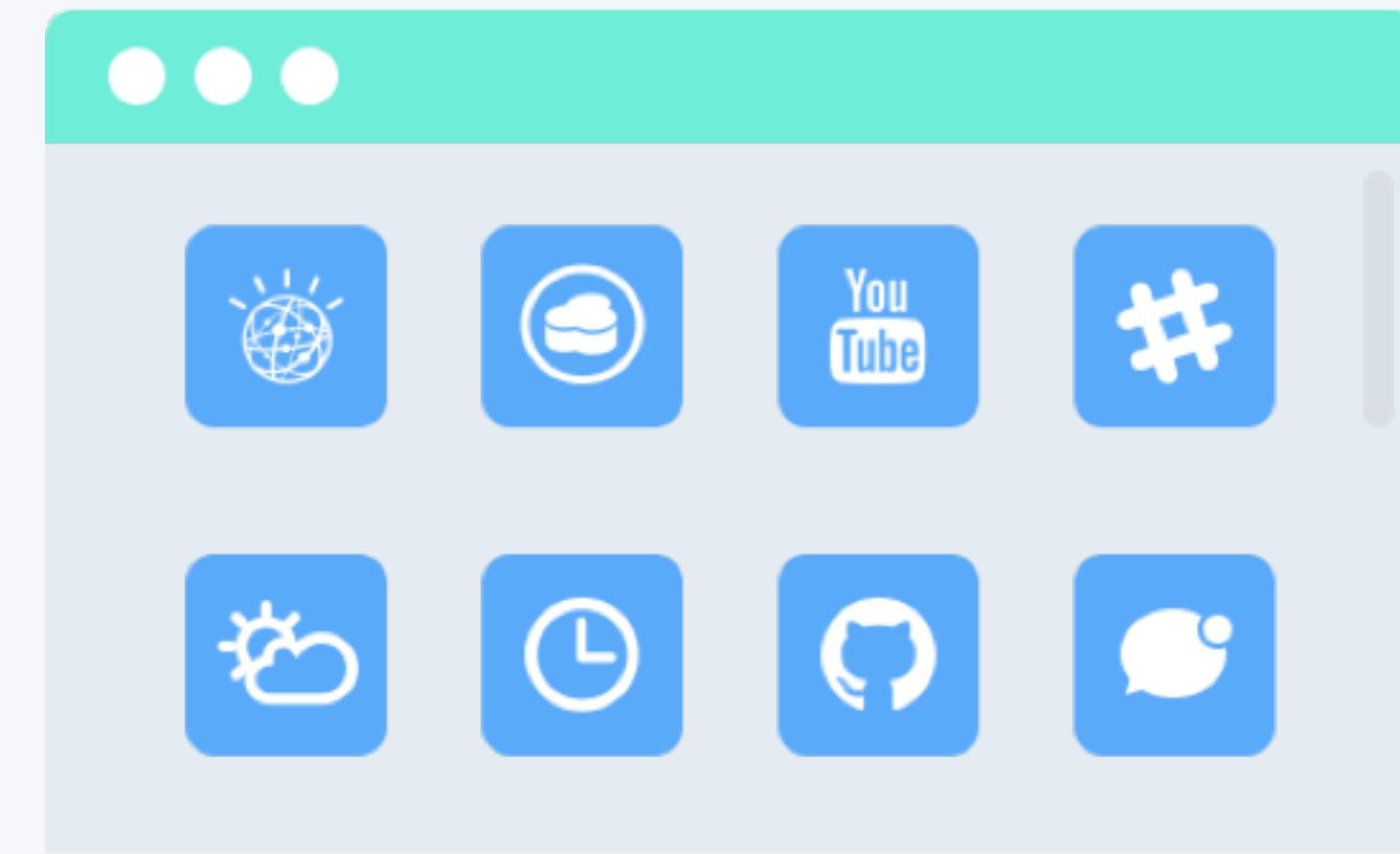


Sequencing
Conditionals
Loops
Error handling



Parameter
binding

Event Provider



Open event emitter
(consumer ecosystem)



Open interface
for event emitters

Event Provider



Periodic



IBM Cloudant



IBM Message Hub



Mobile Push



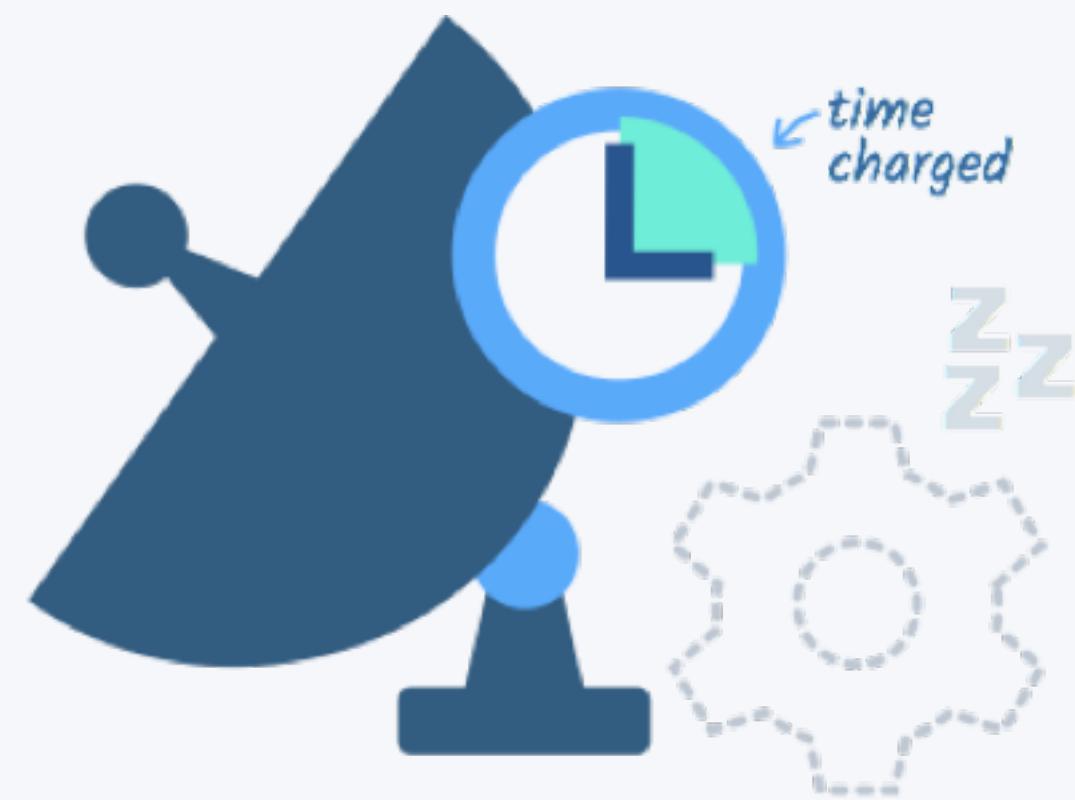
Github



IBM App Connect

Granular pricing

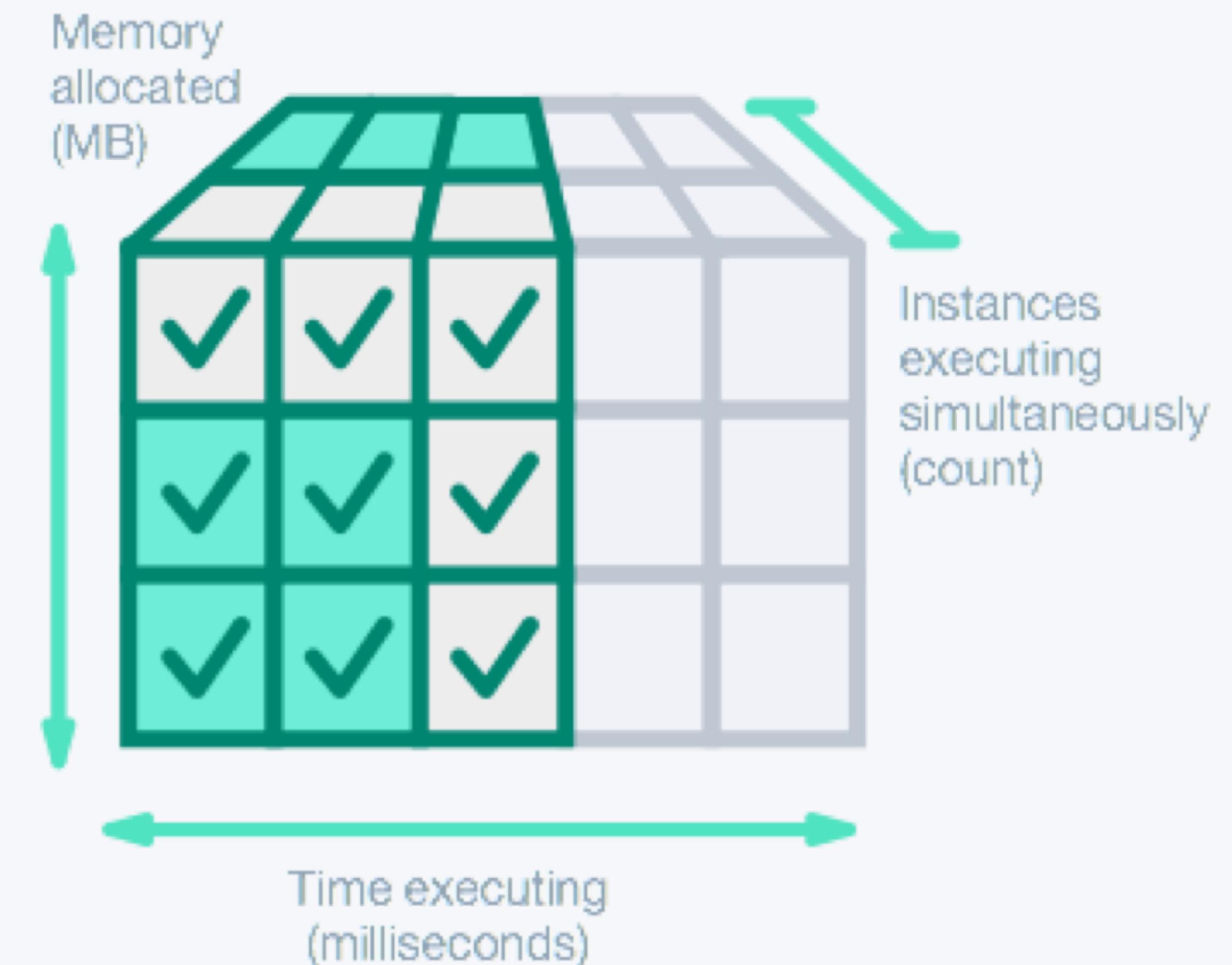
Pay only for the exact time your actions run. When an action is not invoked, it's not in memory, so you don't pay anything.



Pricing model

Time an action was running *
memory allocated to action

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



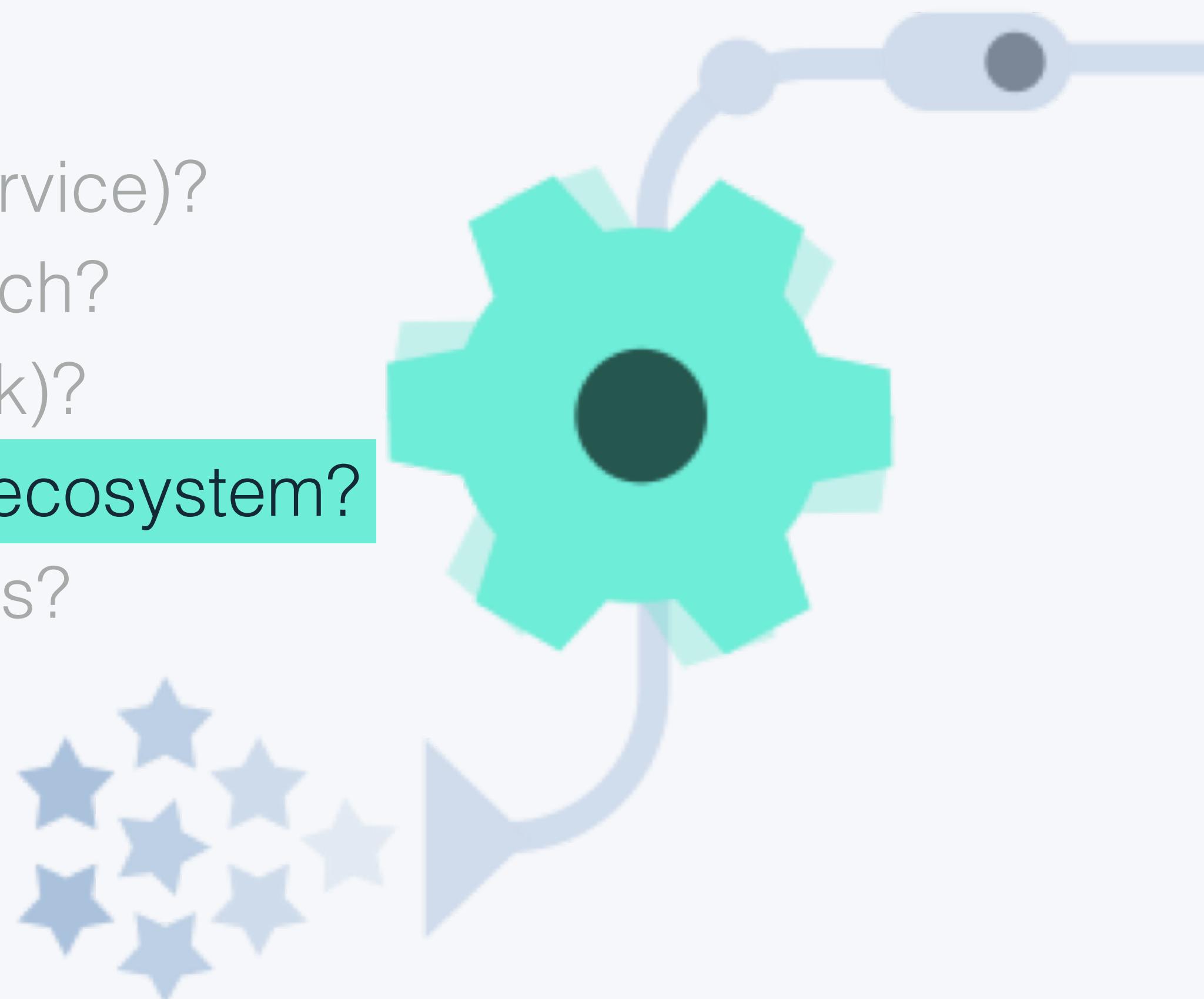
Serverless Framework support

Allows packaging of pieces of a serverless application into a single project and deploy it in a vendor-agnostic way.



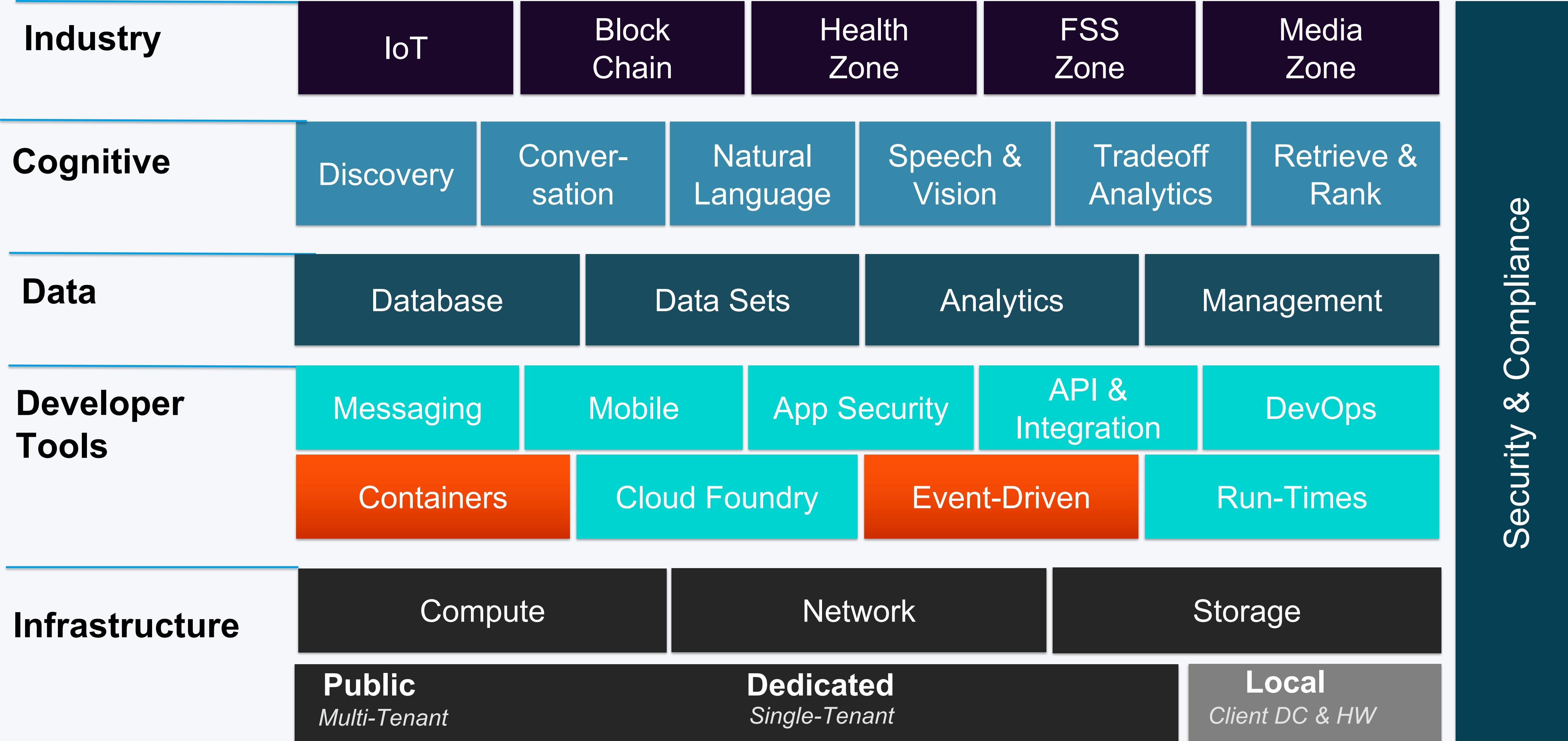
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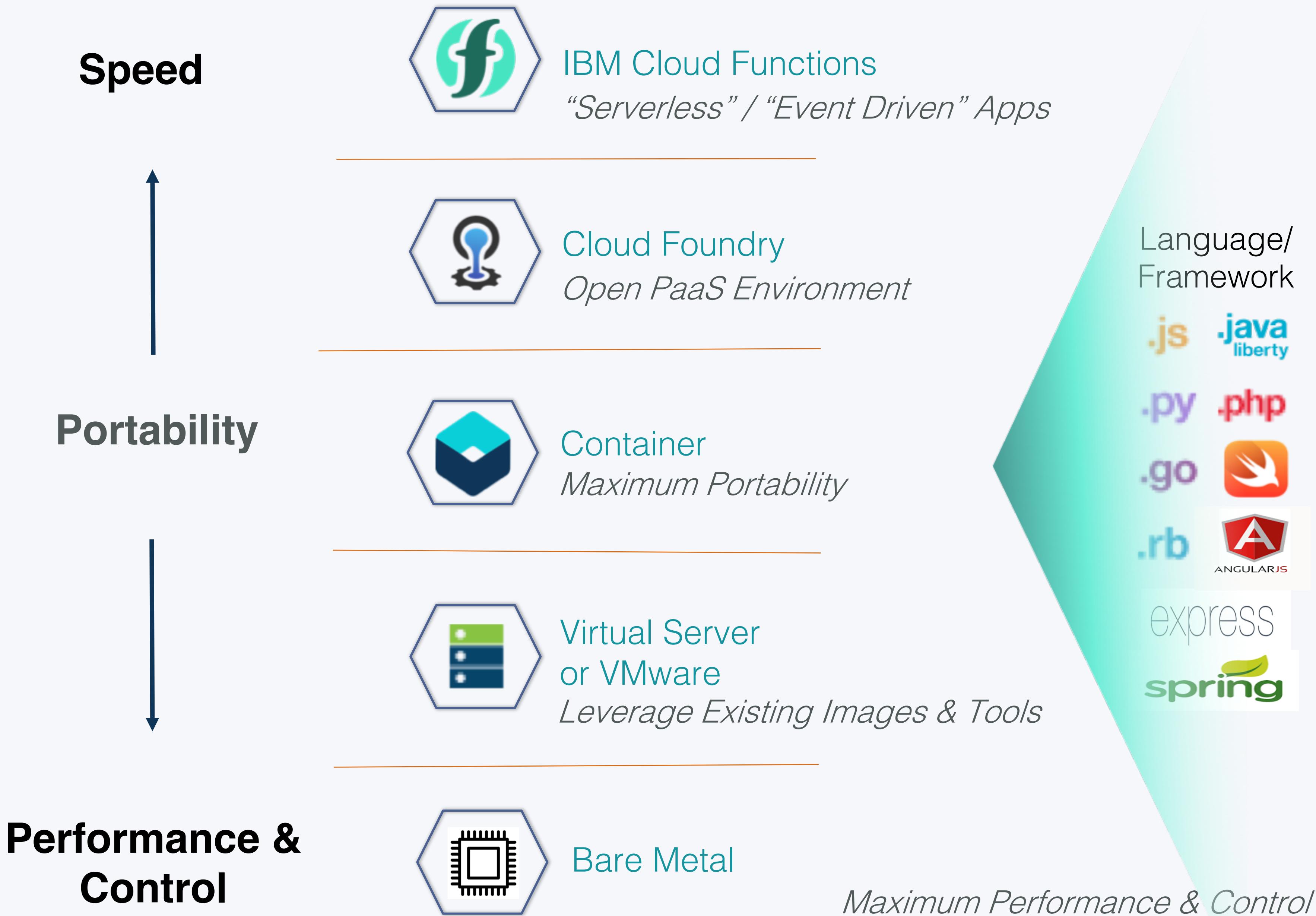
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How does IBM Cloud Functions fit into our cloud ecosystem?

IBM Cloud Functions







Full control over infrastructure
and maximum portability

Containers-as-a-Service

- **Control** over runtime environment (runtimes, versions, minimal OS).
- Greater **reusability and portability** of container images.
- Great fit for bringing containerized **apps and systems to the cloud**.
- More responsibility over package configuration (security patches).
- Need to understand distributed systems.



Focus on the application and let
the platform handle the rest

Platform-as-a-Service

- No need to manage underlying OS.
- **Buildpacks provide influence over the runtime**, giving as much or as little control (**sensible defaults**) as desired.
- Great fit for many **existing web apps** with a stable programming model.
- Loss of control over operating system, possibly at the mercy of buildpack versions.
- Limited to **HTTP/HTTPS**



APACHE
OpenWhisk™

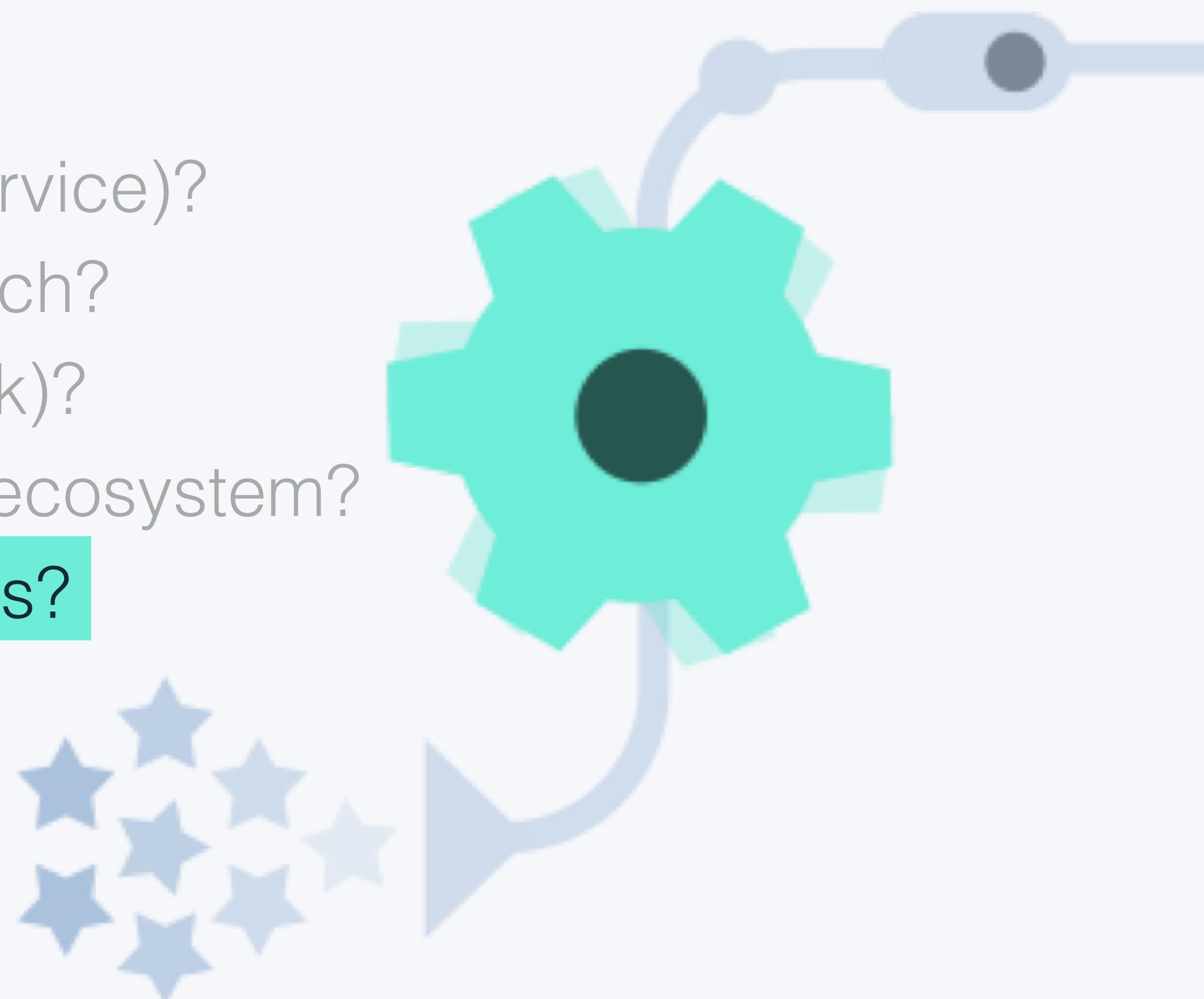
Auto-scaled, event-driven applications
that respond to a variety of triggers

Functions-as-a-Service

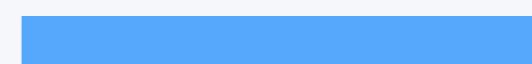
- OS, runtime, and even **container lifecycle is completely abstracted** (serverless).
- **Autoscales** in response to demand, with an associated **granular cost model**.
- Great fit for emerging, non-HTTP, **event-driven workloads** involving IoT, data, messages.
- An emerging computing model, rapid innovation with less comprehensive and stable documentation, samples, tools, and best practices.

Agenda

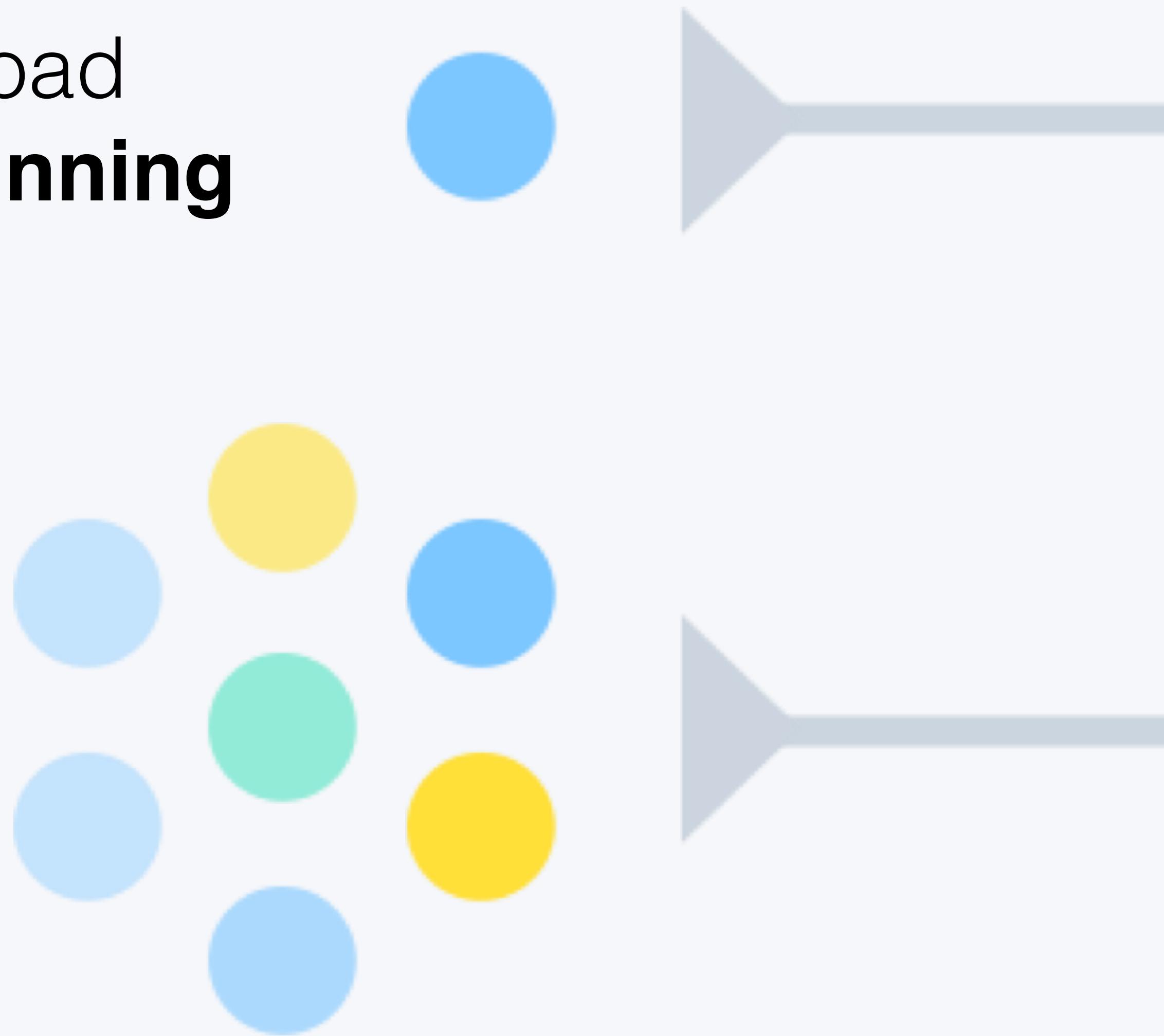
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Volatile and/or **event-driven** workload
that can be split in smaller **short-running**
pieces.



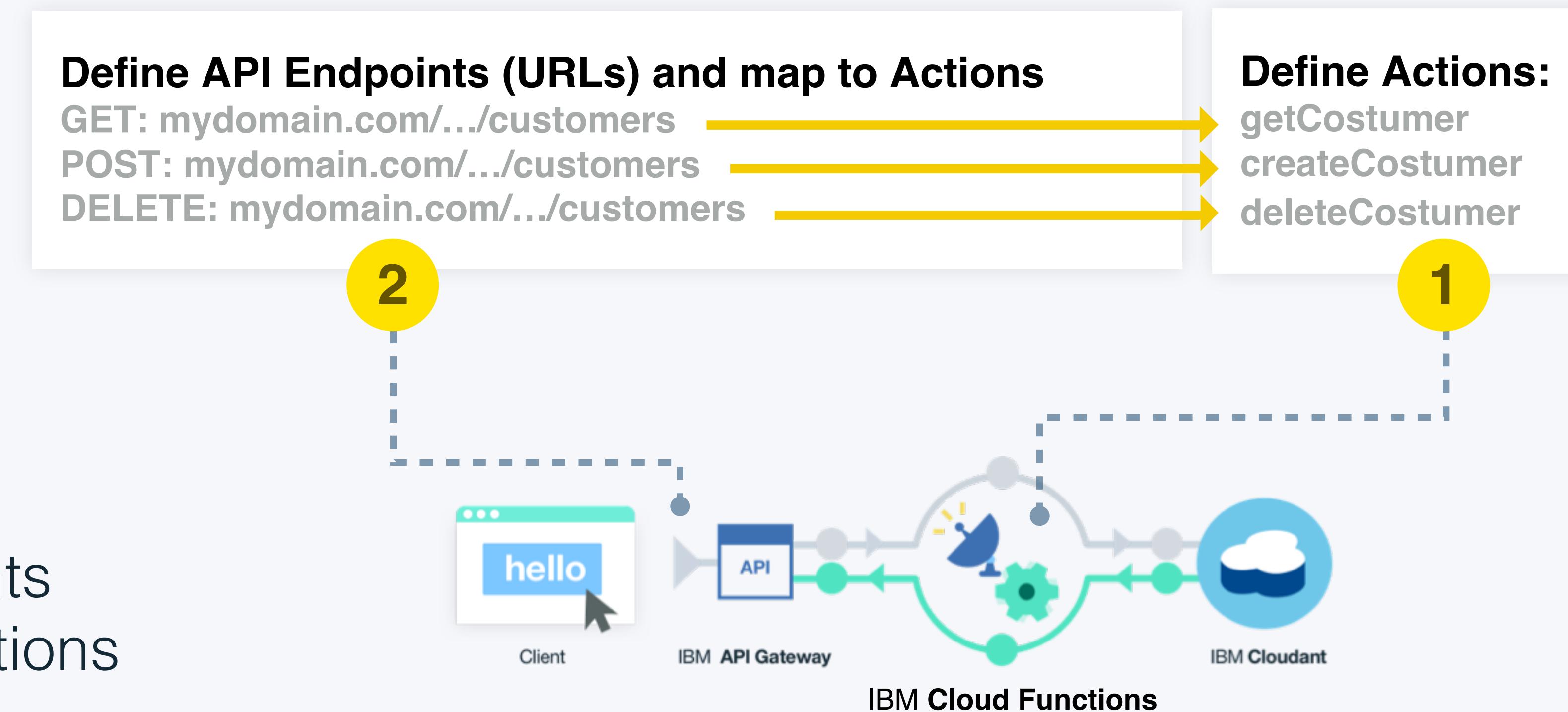
Suited for sporadic as well
as heavy load scenarios.



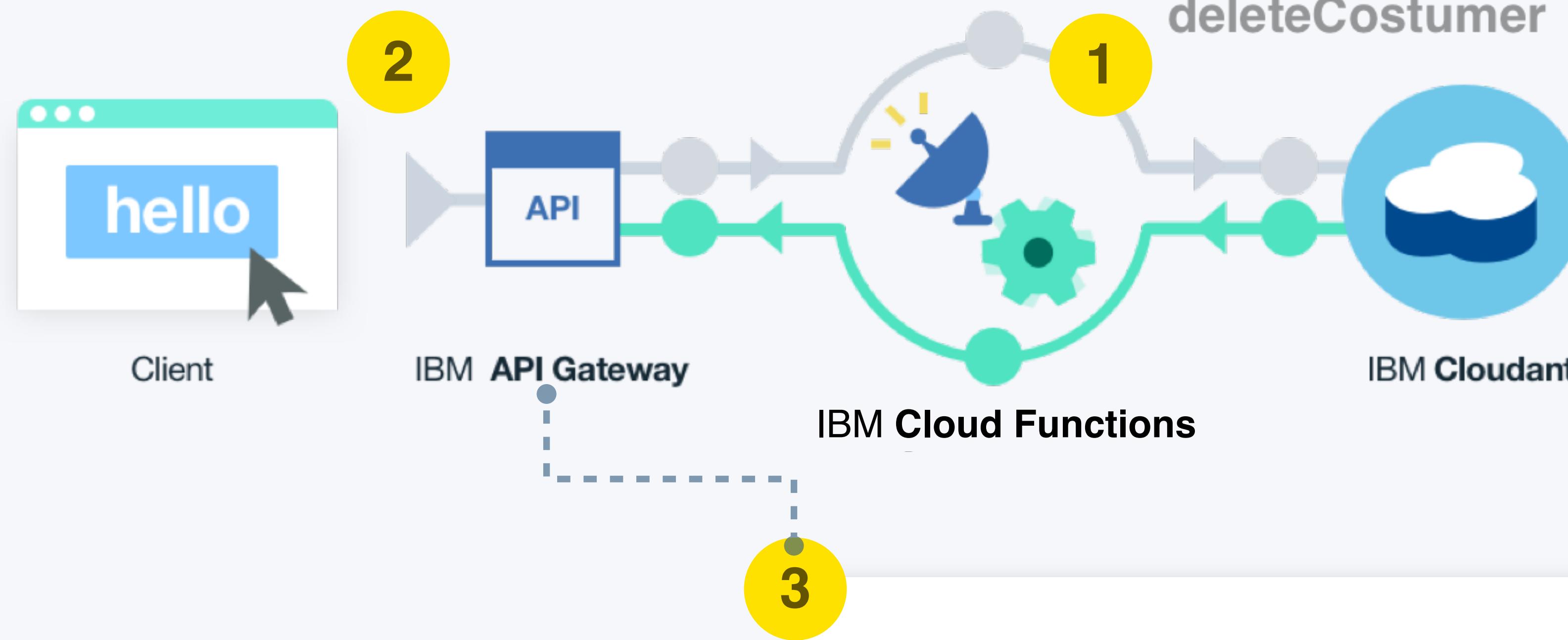
Serverless microservice APIs/backend

API Gateway support

Allows to map API endpoints to IBM Cloud Functions actions



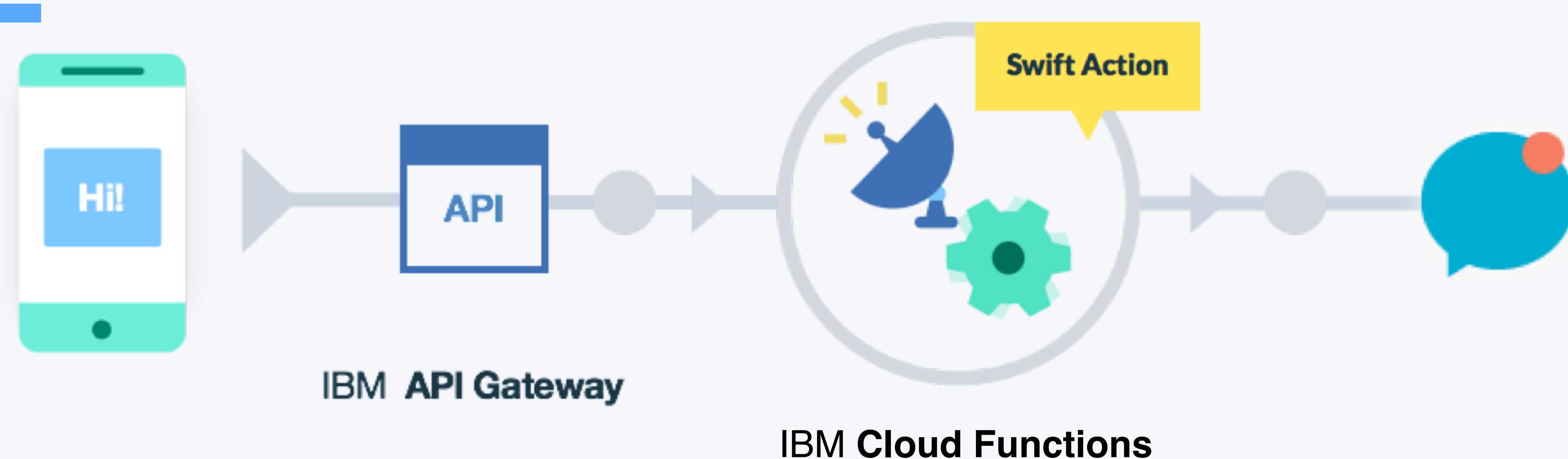
Available for free, without limits



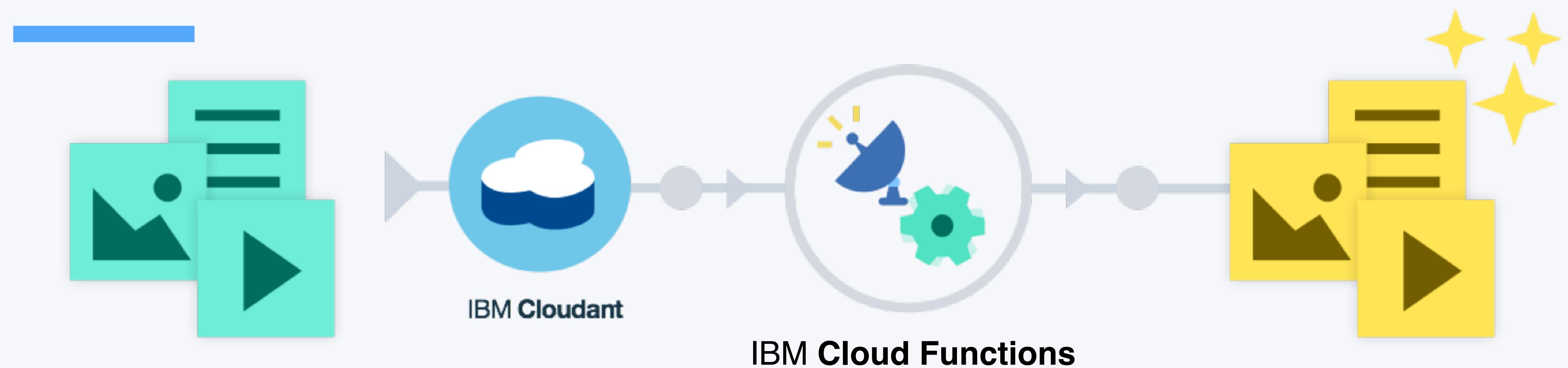
- 1 CreateCustomer
deleteCostumer
 - 2
 - 3
- Easy to add and edit:**
- Security (API key, API secret, OAuth validation, CORS)
 - Rate-Limiting
 - Map actions to API endpoints (OpenAPI Doc creation)
 - Easy socialization (sharing, API key creation)
 - Analytics (API calls, errors, response time)
 - Test your API (API Explorer)
 - Upload Swagger/OpenAPI Doc

Mobile backend

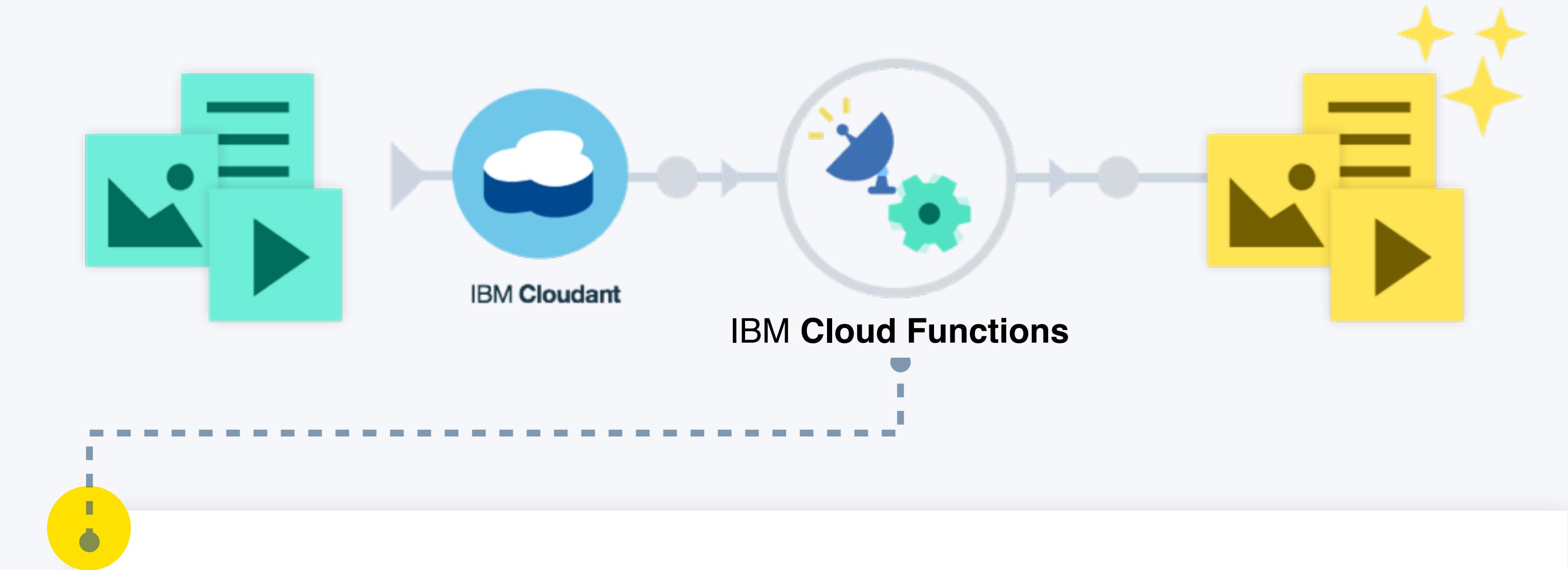
Outsource compute-intensive tasks to a powerful & scalable serverless platform and implement your actions even without changing the programming language.



Data processing



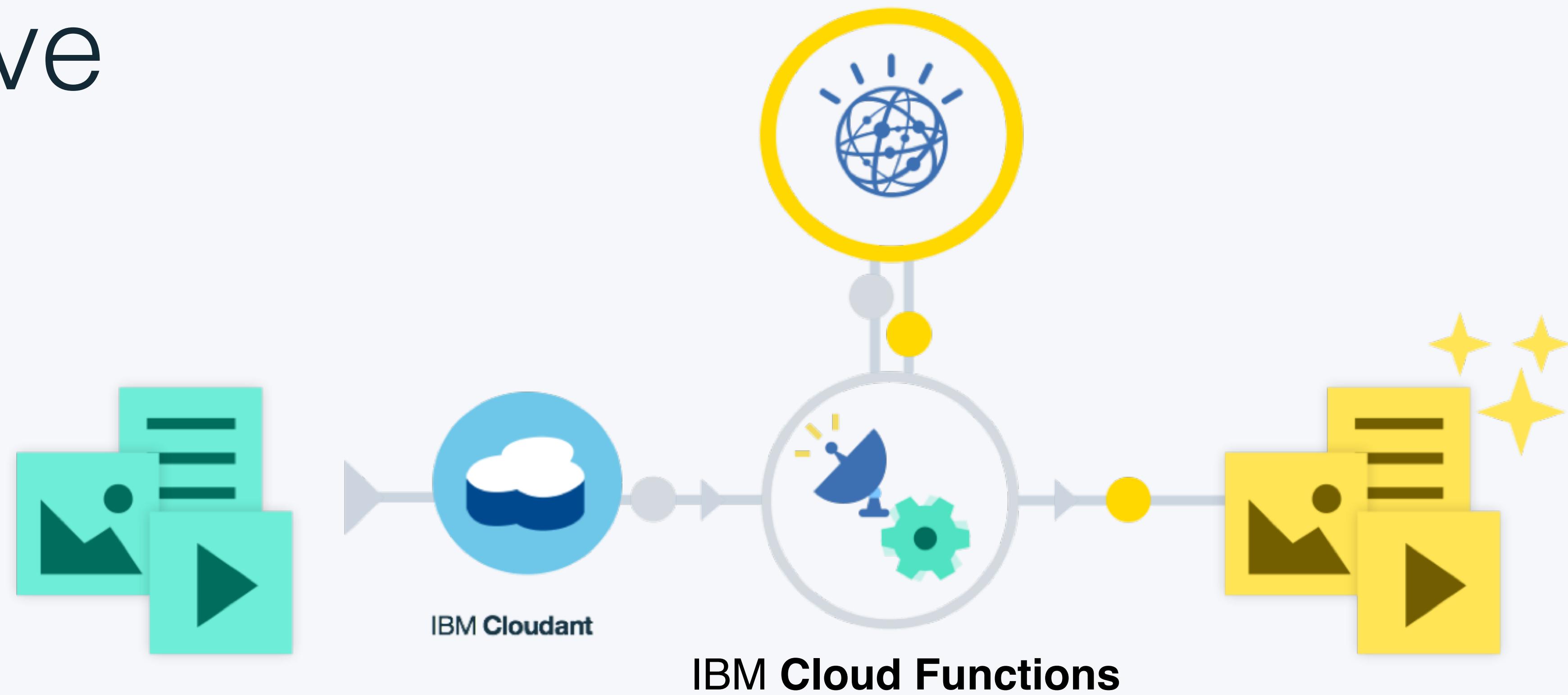
Data processing



Ideally suited for working with multimedia data like audio, image and video data:

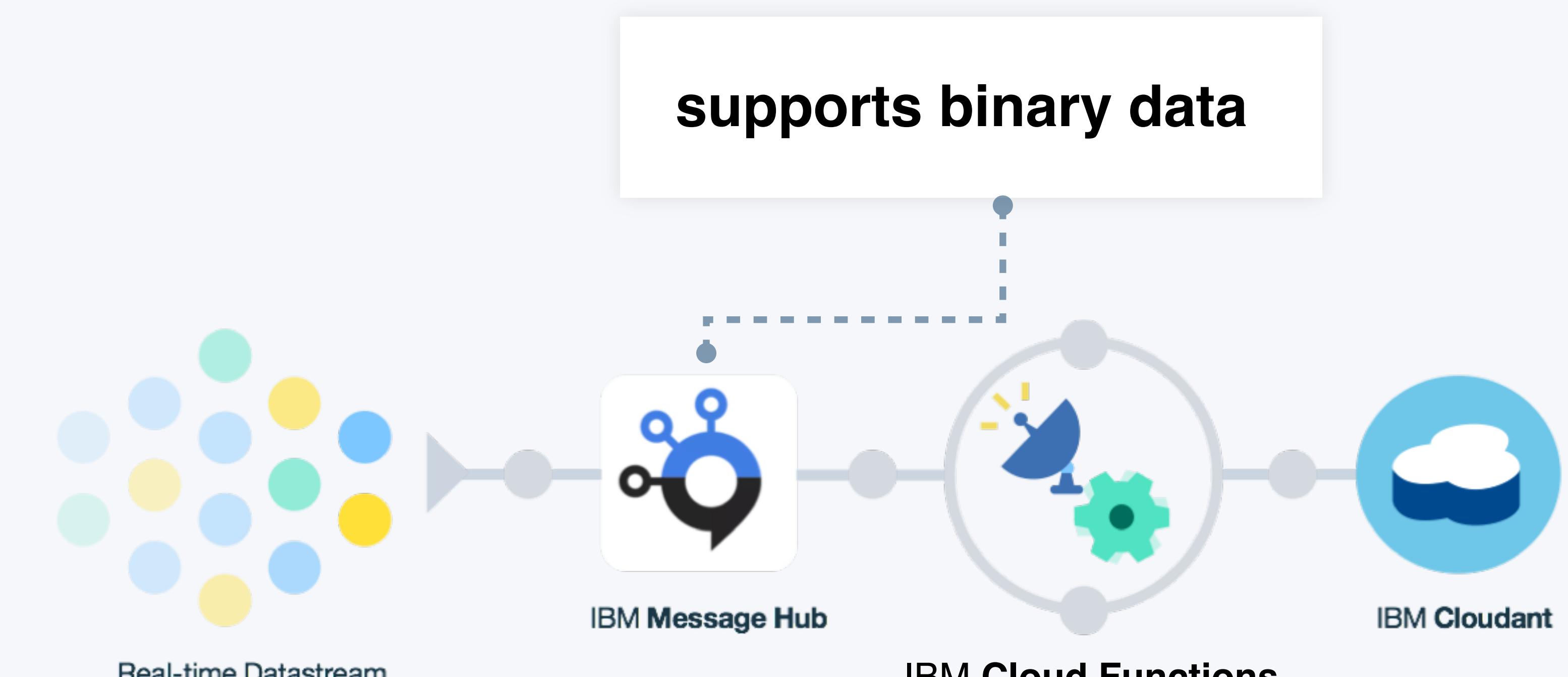
- Audio normalization
- Image rotation, sharpening, noise reduction or Thumbnail generation
- Image OCR'ing
- Video transcoding

Cognitive

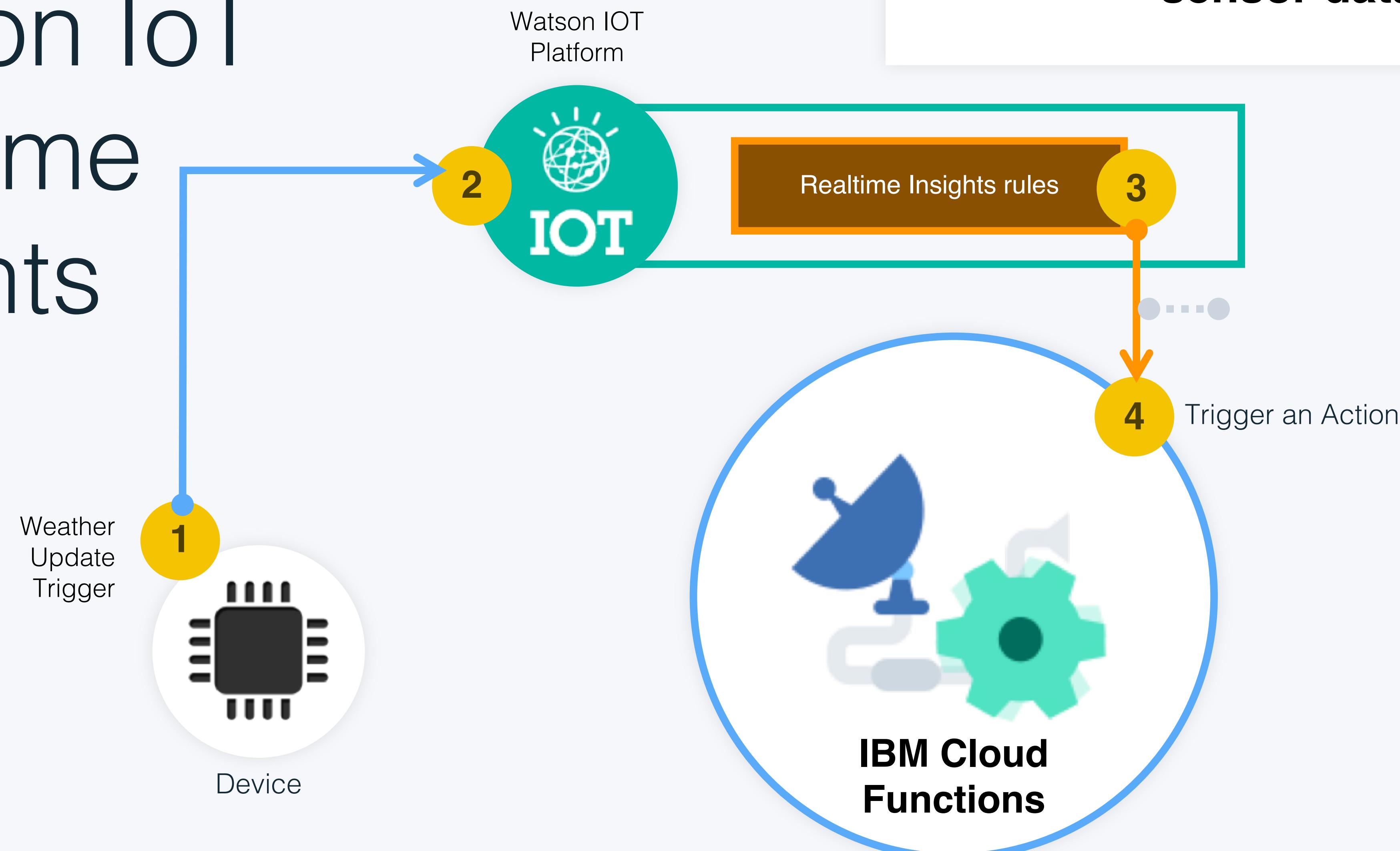


Event processing/Mess age Hub

Managed Apache Kafka service for real-time build outs of data pipelines and streaming apps



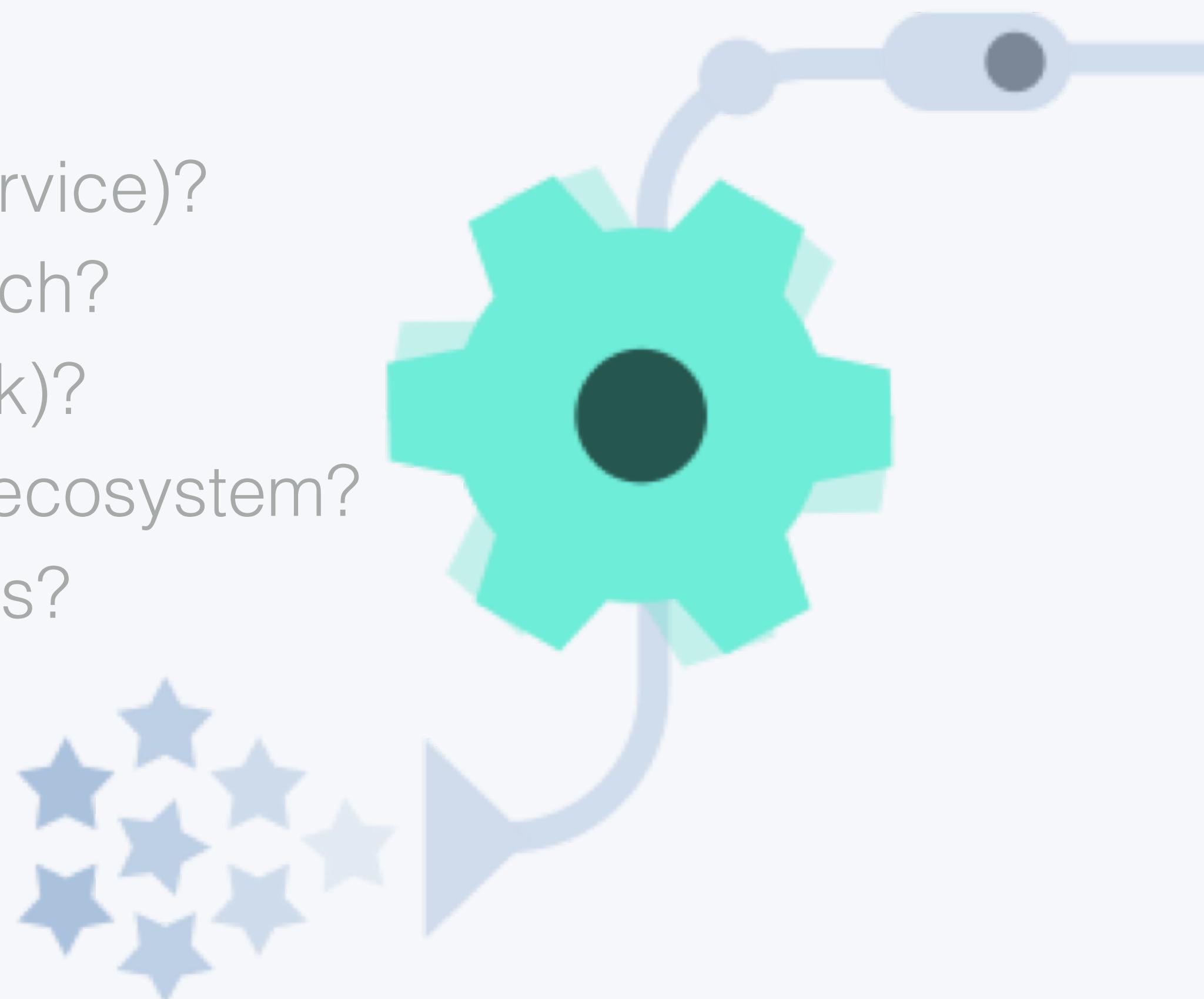
Watson IoT Realtime Insights



Trigger events based on IoT sensor data

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IBM Cloud Functions Shell

```
> $ ls
```

14205e3f64724676a05...	foo	74ms	ok
fbe12a1e0f1a4d22a12...	foo	3ms	ok
ed1f34092ddc43789f3...	foo	3ms	ok
79698e22220144e1a98...	foo	91ms	ok
7be10a84f5864fbba10...	bar	3ms	ok
c008ee7b92a5480388e...	bar	2ms	ok
4d201f524a2f4e09a01...	bar	3ms	ok
fb51e5549dc4439f91e...	bar	61ms	ok
85956eb2aae844f7956...	seq-2	72ms	ok
1f9a5e04c6be4af9a5...	seq-1	63ms	ok

```
SUMMARY TIMELINE GRID      Showing 1-10 < >
```

```
ok
```

```
> grid
```

```
ok
```

```
> screenshot
```

```
/
```

OPENWHISK.NG.BLUEMIX.NET VMRC_WSKNG_TEST HELP

GRID Recent Activity

fastest 320 slowest 4
59 16 4
failures 1

Showing 400 activations from 1/29/2018, 3:44:45

foo

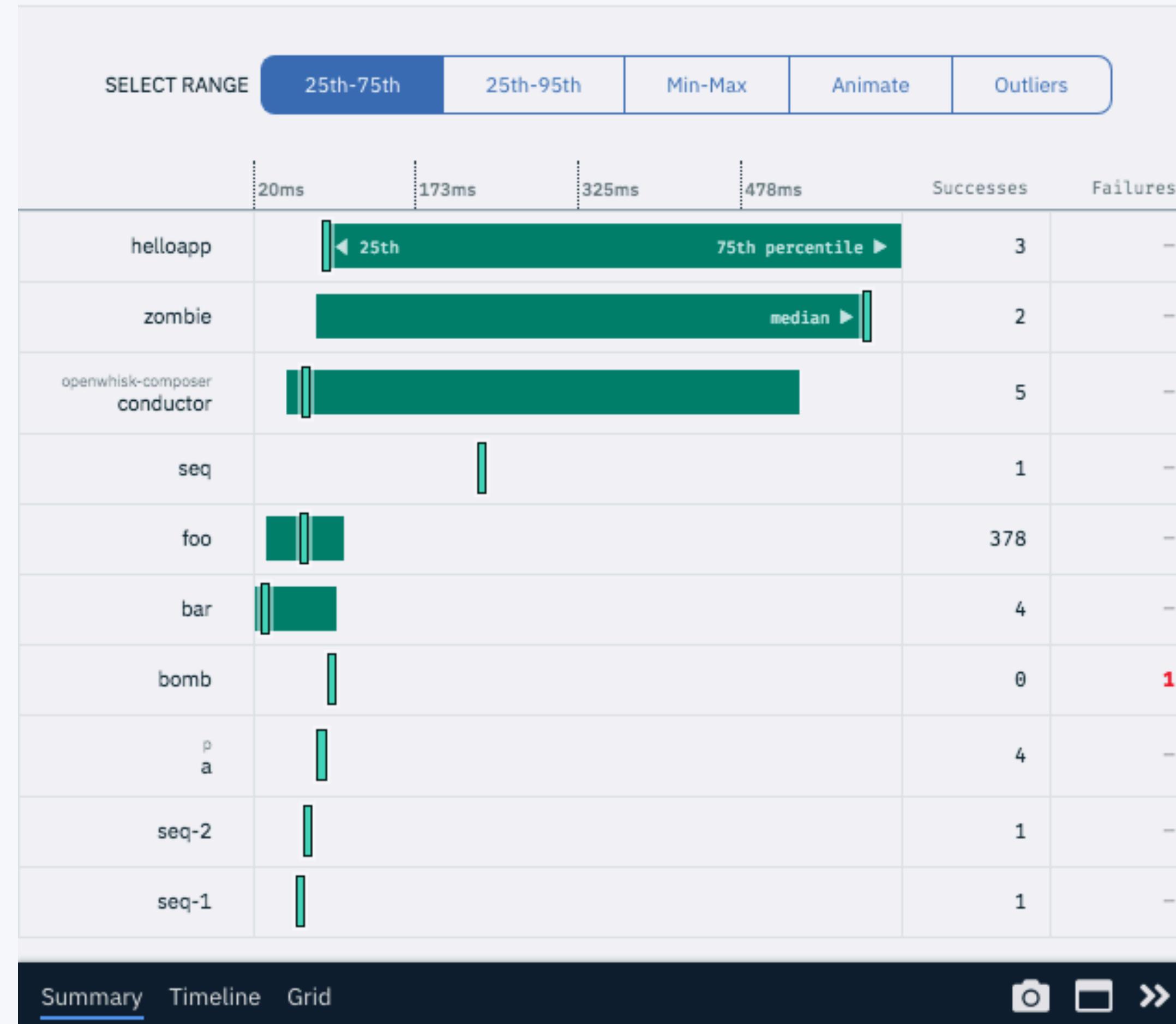
Summary Timeline Grid

grid

SUMMARY

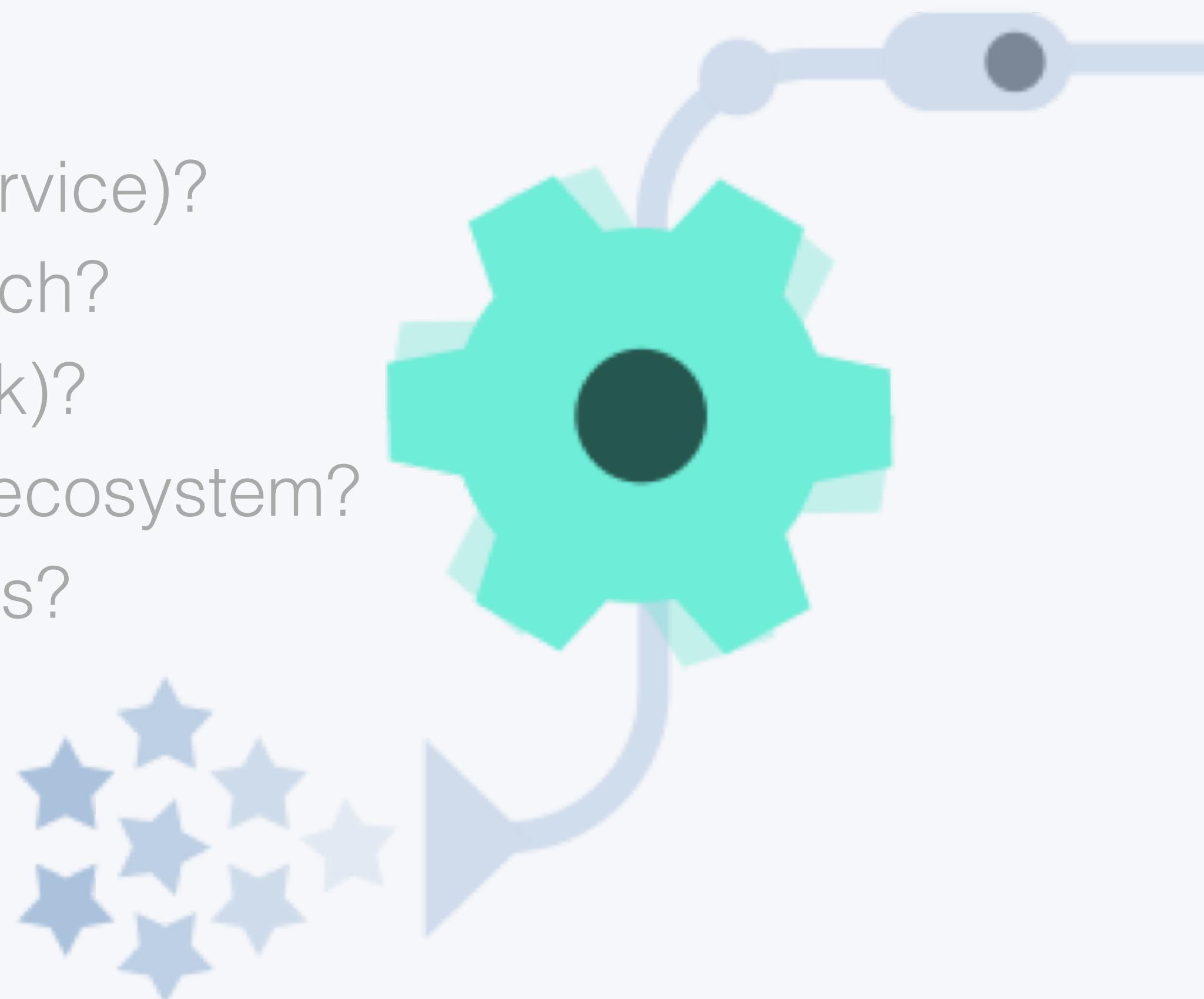
Recent Activity

Showing 400 activations from 1/29/2018, 3:44:49 PM spanning ~8d



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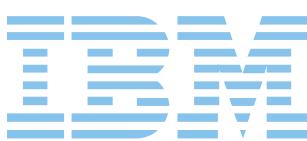
Coding 1

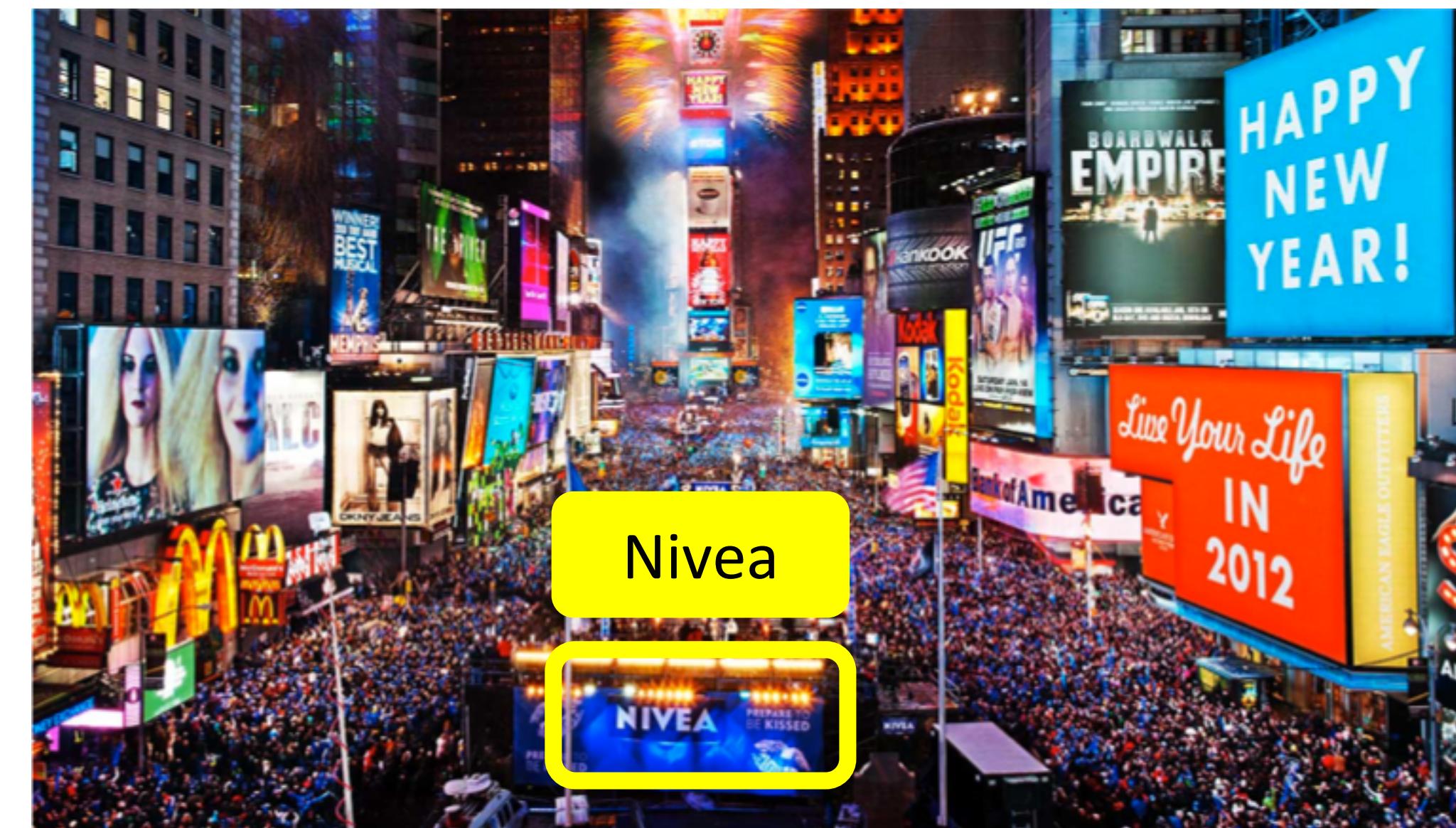
- **ibm.biz/sv-serverless-2018** - GITHUB.com/blumareks
- ibmcloud – use a free of charge LITE account (you need to provide just an email – yes, GDPR would allow you to protect you from the unwanted emails from the platform).
- Go to the CATALOG -> look for functions
- Provision the service, “start creating”, “Quickstart Templates”

2.5 quintillion bytes of data every day

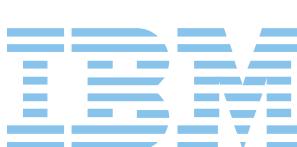
400 hours of video uploaded every minute

Video will account for 80 to 90% of all consumer Internet traffic by 2019





Places, products, objects, texts



Improve search results

Better navigation

Make recommendations

Detect brands

Use the data to improve search, navigation, recommendation, brand resonance



Scale with the number of videos

Run asynchronously

Several independent actions

A good fit for a serverless architecture



iPad Air 2 - iPad Air 2 / iOS 9.3 (13E230)

< Dark Vision

Food Network - Part 1.mp4



Food Network - Part 1.mp4

2 months ago

4025 views

★★★★★

tags

person food flower sport sign Face Winter Scene

Indoors Shoes Blue Boating Fishing Human

Mixed Color Room Dental Care Room Male Adult

People in the video



Guy Fieri

Age 35-44

Related videos



Travel Channel - CLIP 1....

6027 views

★★★★★



Travel Channel - CLIP 2....

6027 views

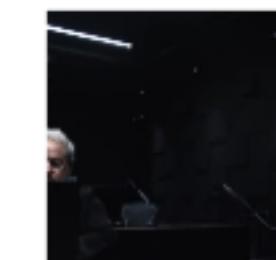
★★★★★



Novak Djokovic and Ger...

4074 views

★★★★★



Ridley Scott + IBM Wats...

3045 views

★★★★★

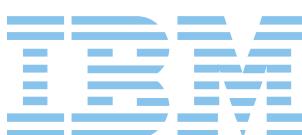


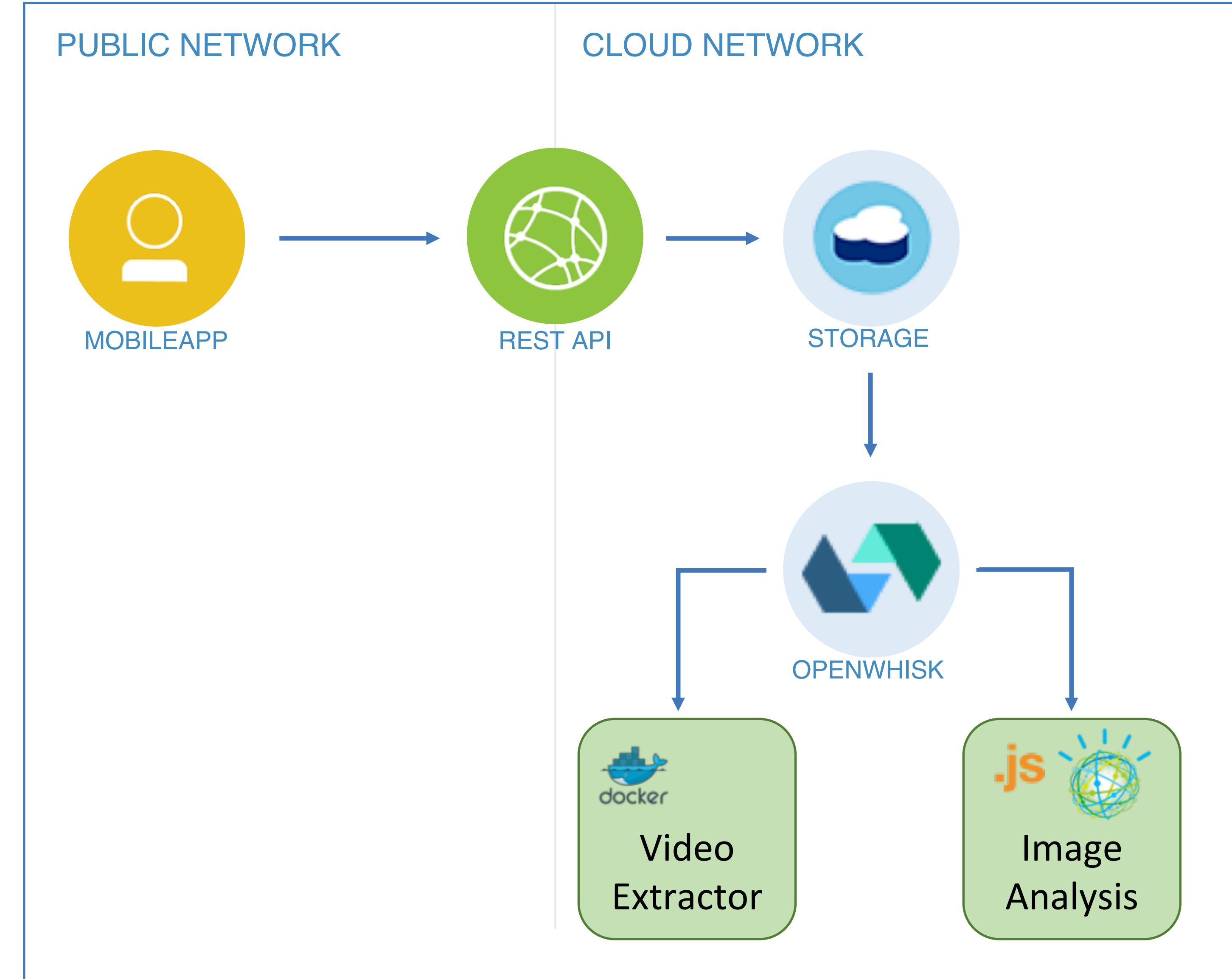
Food Network - Part 2.m...

4025 views

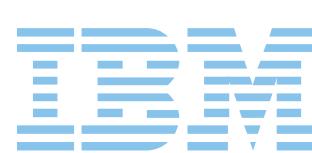
★★★★★

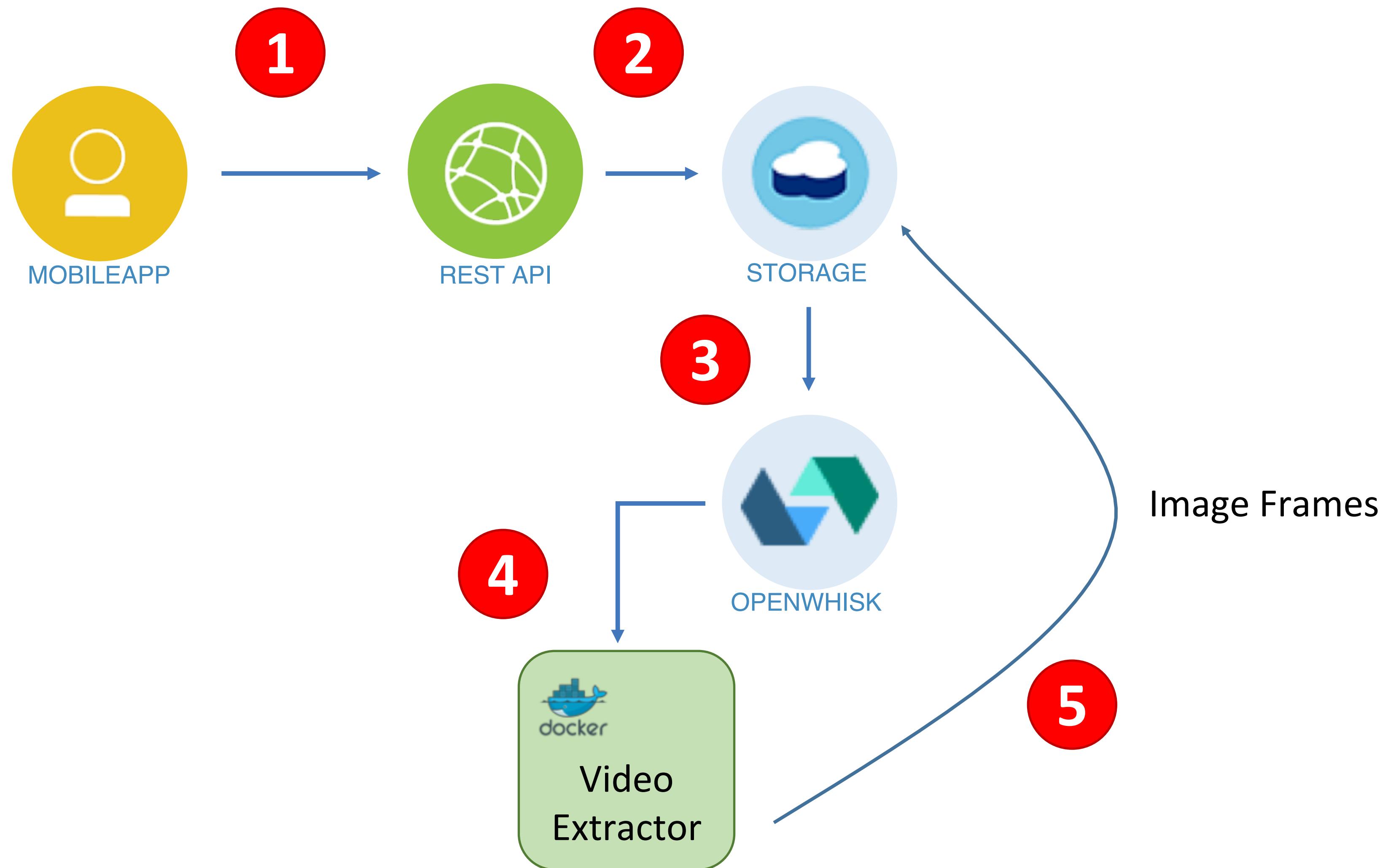
Using the data we discovered, we can deliver an improved user experience.



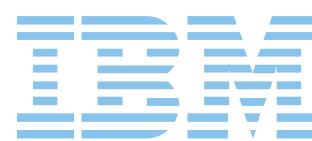


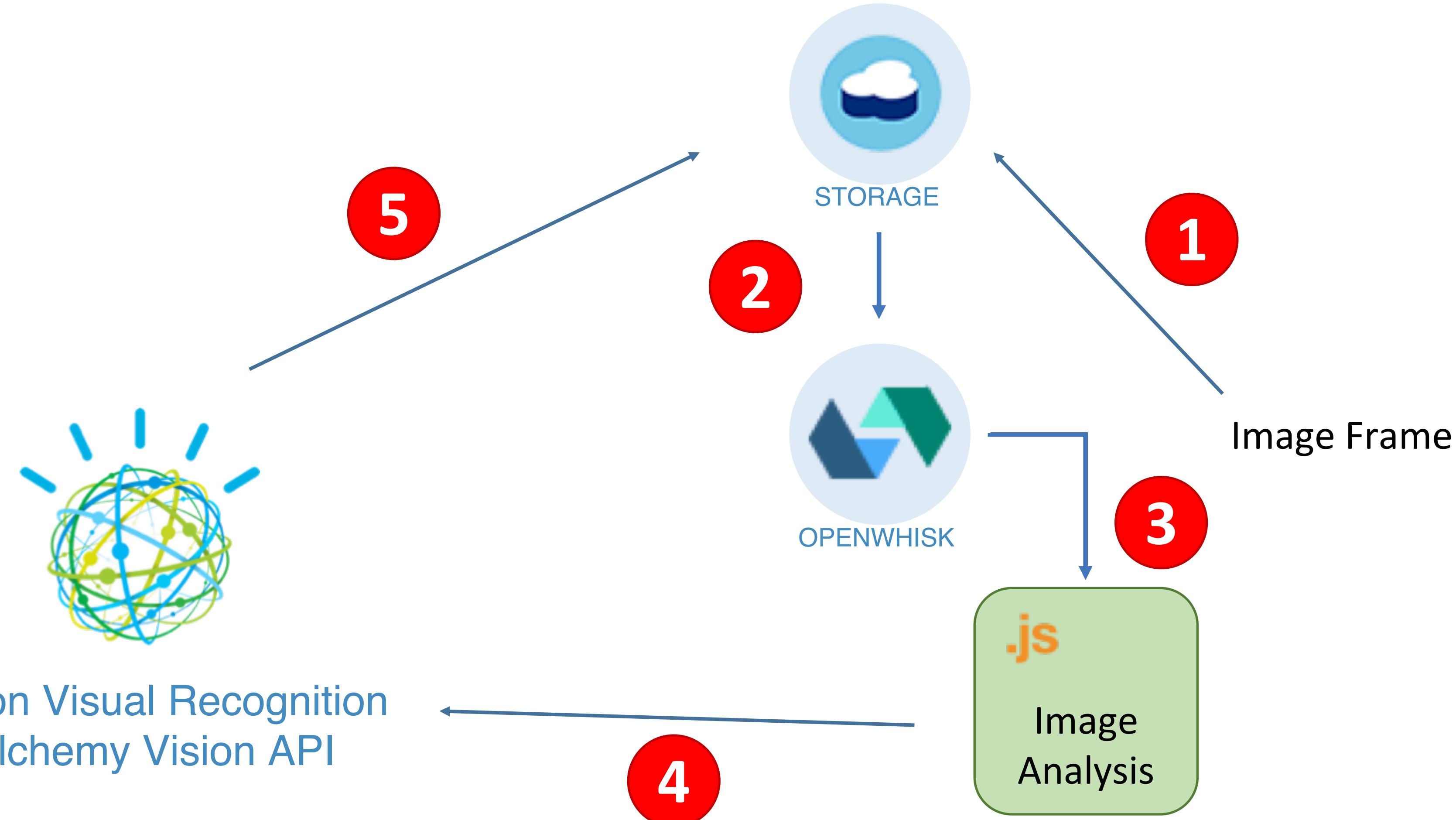
Built with IBM Bluemix, OpenWhisk, Watson





What happened: extracting Frames with a Docker action



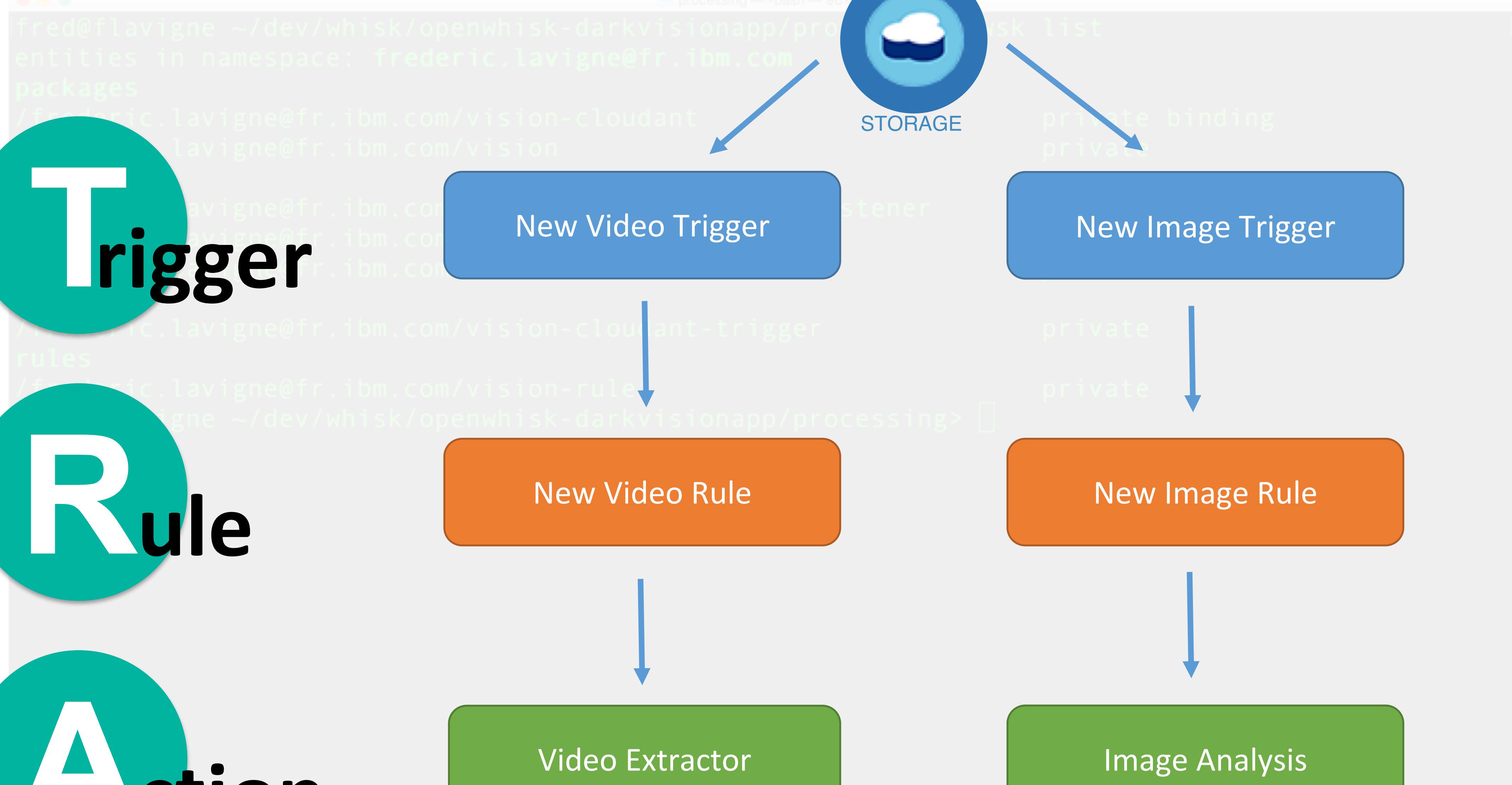


What happened: analyzing frames with a JavaScript action

Trigger

Rule

Action



OpenWhisk artifacts used by Dark Vision



No server to deploy

Single purpose polyglot actions

Event-driven

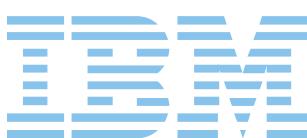
Dark Vision video processing is a good serverless citizen!



Get the code

<https://github.com/IBM-Bluemix/openwhisk-darkvisionapp>

Contributions welcome to perform audio analysis (speech to text, tone and sentiment analysis)





IBM Developer

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San Francisco, CA · 5,645 members · Public group

Part of IBM Developer – 16 groups



Organized by
Angie K and 6 others

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18
DEC

Tue, Dec 18, 2018, 9:30 AM

Online Meetup: Best practices on securing Kubernetes system...



Hosted by Lisa Jung

Sign up NOW: <http://ibm.biz/SecuringContainer-CI-CD> Curious about securing a container deployment to production? Wondering how to lock down your Kubernetes system services? Join IBM Developer and NeuVector's online meetup on Tuesday, December 18th 9:30 AM PT. Learn about techniques to improve container architecture, design...



You + 26 going

10
JAN

Thu, Jan 10, 2019, 12:00 PM

Jamming with a Quantum Computer - A Musical Journey...

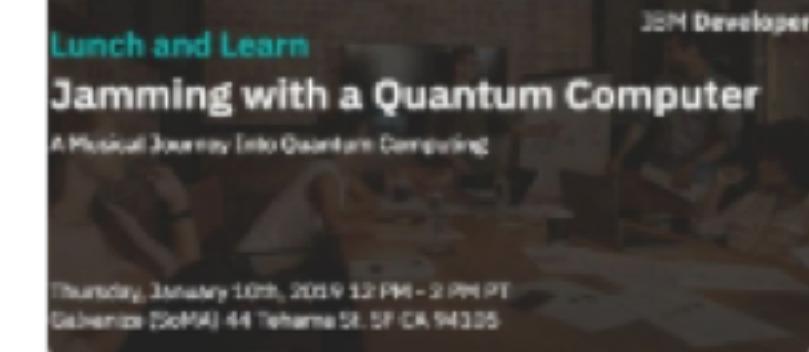


Hosted by Lisa Jung

Who knew Quantum Computing could be so musical? Come learn about how a quantum computer can compose music and let your inner musician out at IBM Developer's jamming Lunch and Learn! What are you waiting for? Sign up NOW! BACKGROUND: Musical improvisation is the creative activity of composing music "in the...



You + 30 going



Organizer tools



Galvanize San Francisco - Soma
44 Tehama St, San Francisco, CA 94105 - San Francisco, CA

IBM Partners

Enabling Independent Software Vendors (ISVs)
and tech companies for growth

Target audience

- ISVs and tech companies building and selling cloud solutions
- New to IBM Cloud
- Startups who aspire to build and sell their own solutions

Offers to help you get started



Build with up to \$12,000 of free IBM Cloud™ credits (\$1,000 per month for 12 months)

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