Function as a Service (FaaS) - why you should care and what you need to know

S109151

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SERVERLESS = FaaS

AGENDA

WHAT SERVERLESS ISN'T
WHAT IT IS
WHY YOU NEED IT
THE GOOD, THE BAD, ...

WHAT SERVERLESS ISN'T


WHAT IF I TOLD YOU THERE IS NO CLOUD
IT'S JUST SOMEONE ELSE'S COMPUTER?
...emegenerator.net

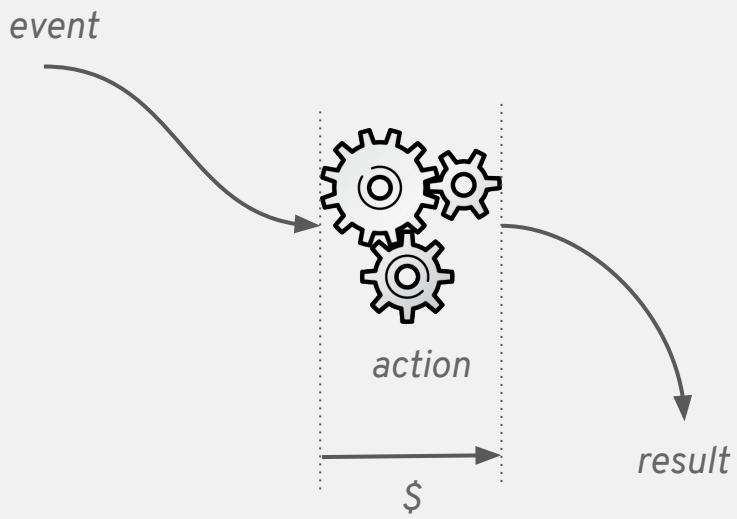
DOGS ARE ALSO GREAT …

WHAT SERVERLESS IS

SERVERLESS DEFINED

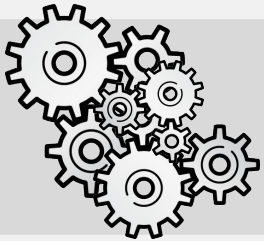
*"... is a cloud computing **code execution model** in which the cloud provider fully manages starting and stopping of a function's container platform as a service (PaaS) as necessary to **serve requests**, and requests are **billed by an abstract measure** of the resources required to satisfy the request ..."*

- *wikipedia*



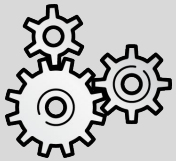
ARCHITECTURAL EVOLUTION

Service



> Autonomous
> Loosely-coupled

Microservice

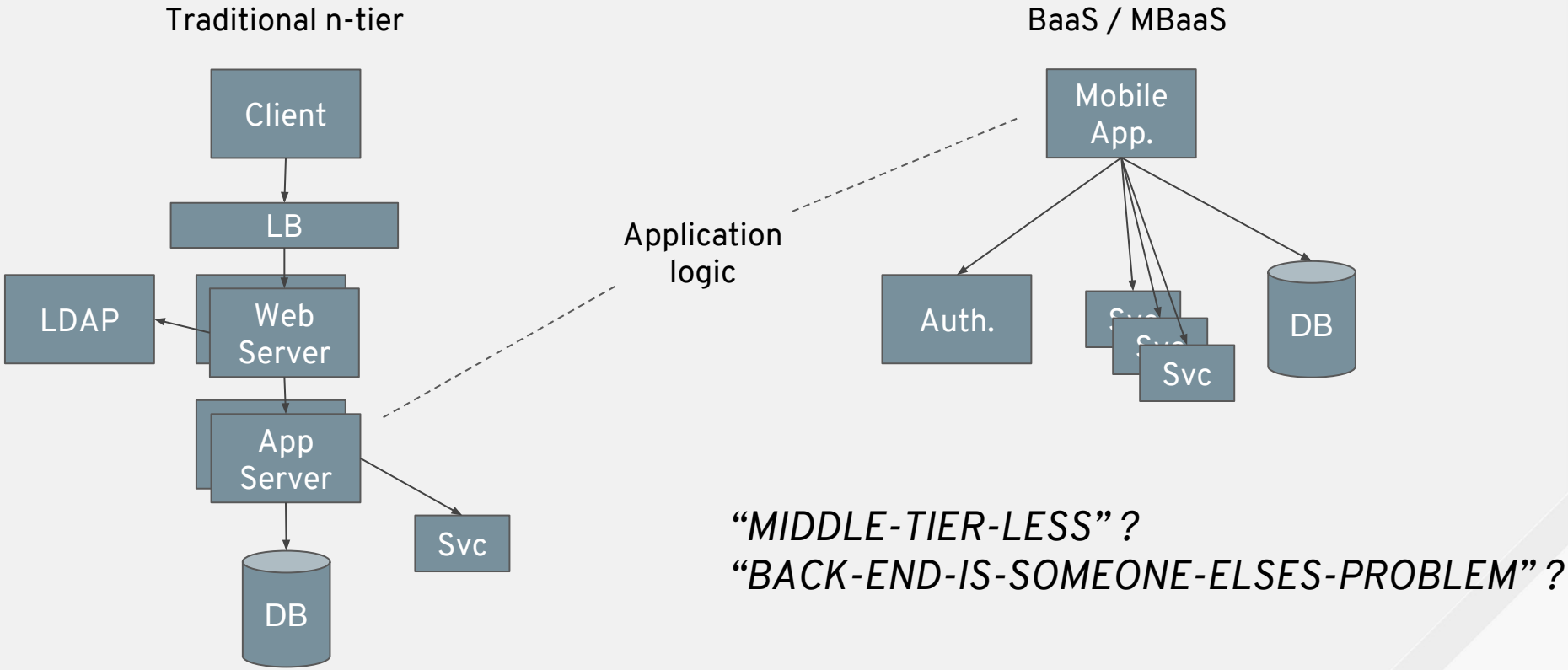


> Single Purpose
> Stateless
> Independently Scalable
> Automated

Function

> Single Action
> Ephemeral

ARCHITECTURAL EVOLUTION



"MIDDLE-TIER-LESS"?
"BACK-END-IS-SOMEONE-ELSES-PROBLEM"?

SERVERLESS - KEY CHARACTERISTICS

- Developers focus on code ; not operations
- Reactive Architecture (vs. Reactive Programming)
- Typically polyglot (node.js, java, python, etc.)
- Ephemeral - spin up / down on invocation
- Stateless
- Loosely coupled / Task focussed
- Asynchronous - event-triggered
- Typically exposed as a REST API, typically receive JSON events
- Utility billing - pay only for usage - 1/10s granularity

GOOD SERVERLESS USE-CASES

- Processing Web-hooks
- Scheduled tasks (ala cron)
- Data Transformation :
  - (Mobile) Image manipulation (compression, conversion, etc)
  - Voice packet to JSON transformation (eg. Alexa, Cortana)
  - (Mobile) Video Analysis (Frame-grabbing)
  - PDF Generation
- Mobile / MBaaS / Single Page Apps.
- ChatBots

BAD SERVERLESS USE-CASES

- Any long-running process
  - Simulating particle interactions
  - Two dimensional, single-precision, complex FFT
  - Monte Carlo Simulations
  - Risk Analysis
  - Etc.
- Any task that requires large amounts of memory
- Any blocking process

SERVERLESS - THE GOOD

- High concurrency
- In-place updates / replacement
- Identify dead code
- High utilization
- Scalable
- Granular pricing
- App. / Infra. Separation
- Polyglot
- Security - small attack area
- Singular focus
- Strong motivation to optimize, easier to prioritize

*

* I don't drink light beer

SERVERLESS - THE BAD

- It's different than what you're used to
- You will likely have to live without your favourite framework or library
- Increased latency (vs long-lived server model or local function call)
- Large variance in latency
- Very complex at scale
- Stateless and ephemeral
- Little time for code optimization
- Cloud Provider Resource Limits
- Pricing can be complex - look out for extras

SERVERLESS - THE UGLY

- Vendor / Service Provider Control
- Debugging
  - Your usual tricks won't work
- Integration testing
- It's very new
  - stack**overflow** won't help you
  - Dearth of skills / experience
  - Patterns are still emerging
  - No / few books
- No / few tools

AMAZON LAMBDA

- GA - Apr. 2015
- License - proprietary
- Pricing : $0.20 / 1 million requests (first 1 million requests per month are free)
- Polyglot : Node.js, Java
- Security : AWS AIM
- Event Sources : AWS resources, HTTP
- Lambda@Edge

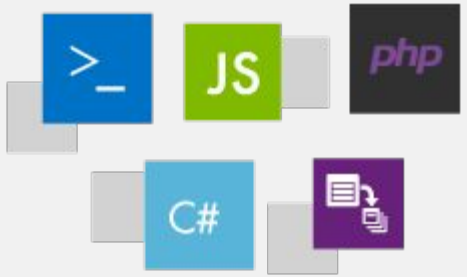
AWS Lambda

https://aws.amazon.com/lambda/

MICROSOFT AZURE FUNCTIONS

- GA - Nov. 2016
- License - proprietary
- Security - OAuth
- Polyglot - C#, F#, Node.js, Python or PHP.
- Event Sources - Azure Services, Timers, WebHooks, HTTP Req.
- Pricing - $0.000016/GB-s (1 million requests and 400,000 GB-s per month free)
- 99.95% availability

Microsoft Azure

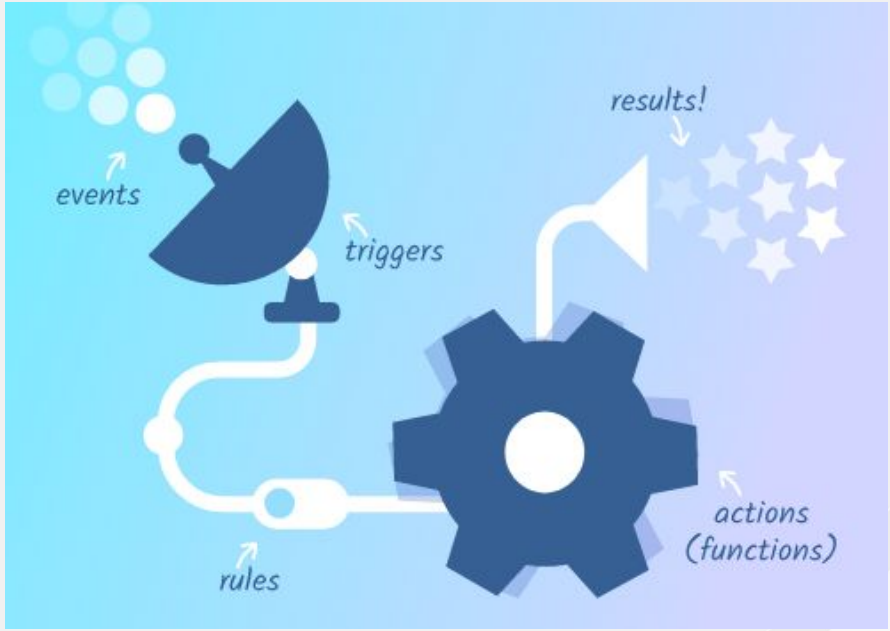


azure.microsoft.com/Azure/Functions

IBM BLUEMIX OPENWHISK

APACHE OpenWhisk™

- http://openwhisk.org/
- GA : Feb 2016
- License : ASL v2
- Polyglot : Node.js, Swift
- Event Sources : BlueMix services, Watson, other SaaS
- Pricing : $0.000017 GB-s
- Event Sequencing, Templates



CLOUD FUNCTIONS BETA

A serverless environment to build and connect cloud services

- License - proprietary
- GA : Feb. 2016 (Beta)
- PolyGlot : Node.js only
- Event Sources : HTTP, FireBase, Stackdriver logging, etc.
- Pricing : $0.40 / invocation (first 2 million / month free) - CPU, memory, disk, network extra

https://cloud.google.com/functions/

FUNKTION

open source event based lambda programming for kubernetes

funktion.fabric8.io

- License : ASL v2
- GA : June 2016 (project)
- PolyGlot : java, groovy, node.js, kotlin
- Orchestration / EIPs
- Tightly integrated with Kubernetes / OpenShift
- 200+ event sources (messaging, protocols, databases, social media services and cloud functions)
- Vert.x support coming
- Multiple implementation options
- Pricing TBD

- A framework - not a service
- License : MIT
- Node.js based
- Support for AWS Lambda, Apache OpenWhisk, Microsoft Azure Functions
- Provider independent
- Packaging, deployment, project structure, automation
- CLI and yaml base UI (for now)

https://serverless.com

https://github.com/serverless

OTHER SERVERLESS PROJECTS / SERVICES

webtask

APEX | SERVERLESS INFRASTRUCTURE

Iron.io

Back&

http://funcatron.org

fission

WHERE THINGS ARE HEADING

- Event chaining, pipelines
- Orchestration
- Execution optimization
- Better developer experience
  - Templating / generators for connecting event sources
  - Broader language support
  - Instant deployment from a (Web) IDE
  - CI/CD
- Better debugging, monitoring, diagnostics

SUMMARY

- Stateless, ephemeral, event-driven, task-focussed
- Utility billing
- Likely augment existing architectures, not replace them
- Think about the code; not infrastructure / ops.
- Still emerging (AWS Lambda - only 3 years old)
- Predominantly experimental, non-critical use-cases
- Red Hat's Plans :
  - Building on Kubernetes / Linux Containers (OpenShift)
  - Investing in Funktion
  - Also looking at other OSS projects
  - Serverless Dev Preview availability in OpenShift this year

QUESTIONS ?

RED HAT SUMMIT

THANK YOU

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linkedin.com/company/red-hat

twitter.com/RedHatNews

youtube.com/user/RedHatVideos

LEARN. NETWORK.
EXPERIENCE
OPEN SOURCE.