Serverless Framework

Build a serverless architecture with AWS

Manuel López

Who's this guy?

- Born and raised in Málaga
- Writing code since I was 8 with an AMSTRAD CPC 6128
- Started in PTA, then moved to Barcelona
- Came back as Senior Dev for PC
- Technical Lead and Solutions Manager
- I love Rick & Morty and playing golf

Today's Menu

- But… what is this serverless architecture thing?
- Serverless architecture with AWS: Lambda Functions
- Introducing Serverless Framework
- "Hello Lambdas" with Serverless Framework and AWS
- Communicate functions: SNS and SQS with serverless framework

So… what’s serverless architecture?

Where do we come from?

- There were On-Premises servers, then…
- "Let there be cloud" "Whatever as a Service"
- SaaS gives you already implemented apps.
- PaaS and IaaS need you to worry about infrastructure

On-premises approach

1. SysAdmins and DevOps to set-up network, user and permissions
2. Ask them to help you configure servers for:
   - Application server / runtime (Java, .NET, Python, Node..)
   - Messaging (RabbitMQ)
   - Database (SQLServer, MongoDB, Couchbase, etc.)
   - File server
   - Load balancing
   - Scaling
   - Etc.
3. Write your application code

Typical Developer – DevOps interaction

Would you help me?

“Ok Morty, let’s find a better place!”

The Serverless dimension

OK, so a serverless architecture is…

- Event-driven cloud-based system combining:
  - Third-party services
  - Client-side logic
  - Cloud-hosted remote procedure calls (Function as a Service).

Serverless is FaaS!

- Complete abstraction from servers
- Instantly scalable
- Pay per usage

Serverless is FaaS!

- Vendor takes care of :
  - OS, containers, runtime
  - Scaling
  - Load balancing and networking

- You just have to worry about coding!

Serverless is also BaaS!

- BaaS: Backend as a Service

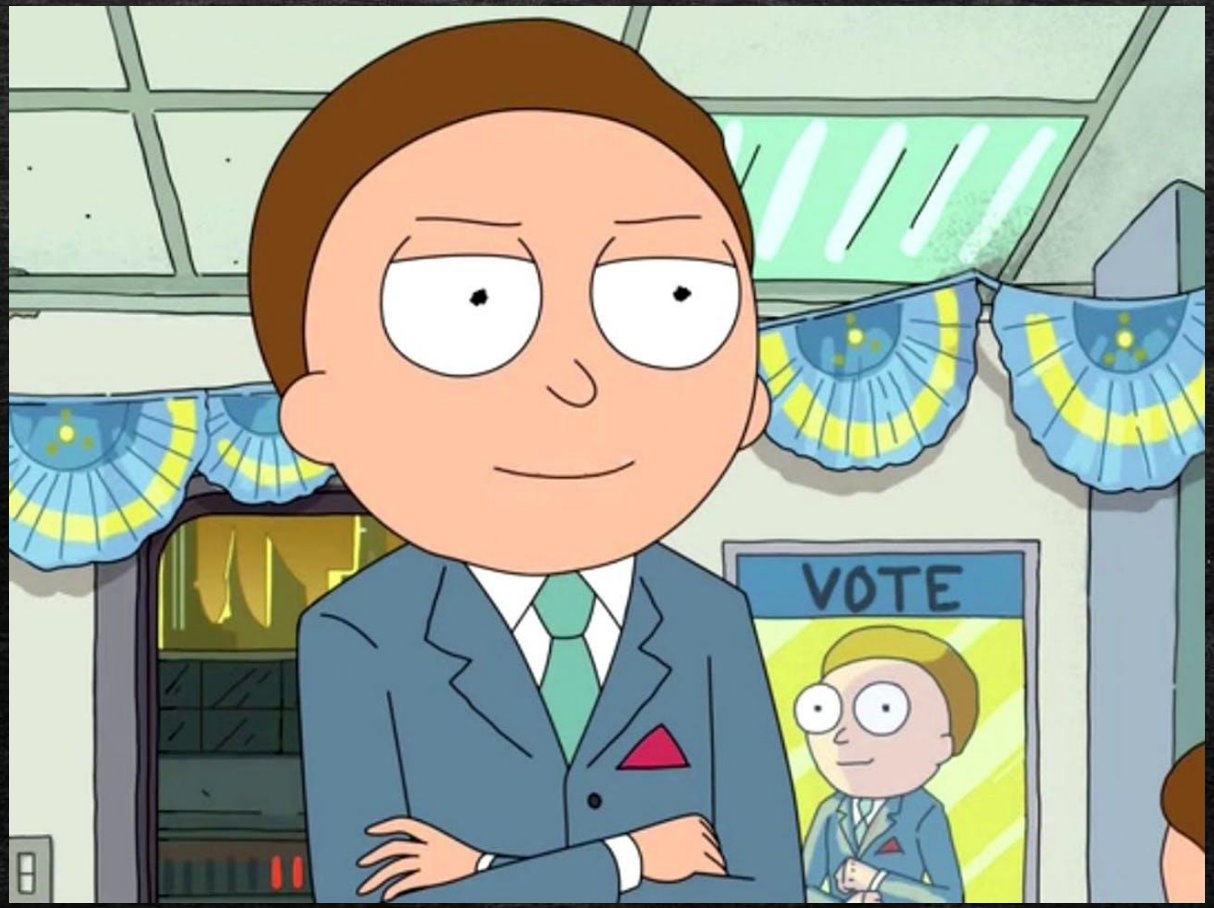
- Cloud services needed to support our code
  - Storage
  - Messaging
  - Databases
  - Auth
  - And everything your cloud vendor offers

Serverless approach

1. Get a cloud account and permissions

2. Write your application Code (with some extra declarations)

“Mr. DevOps, you were saying… what?”

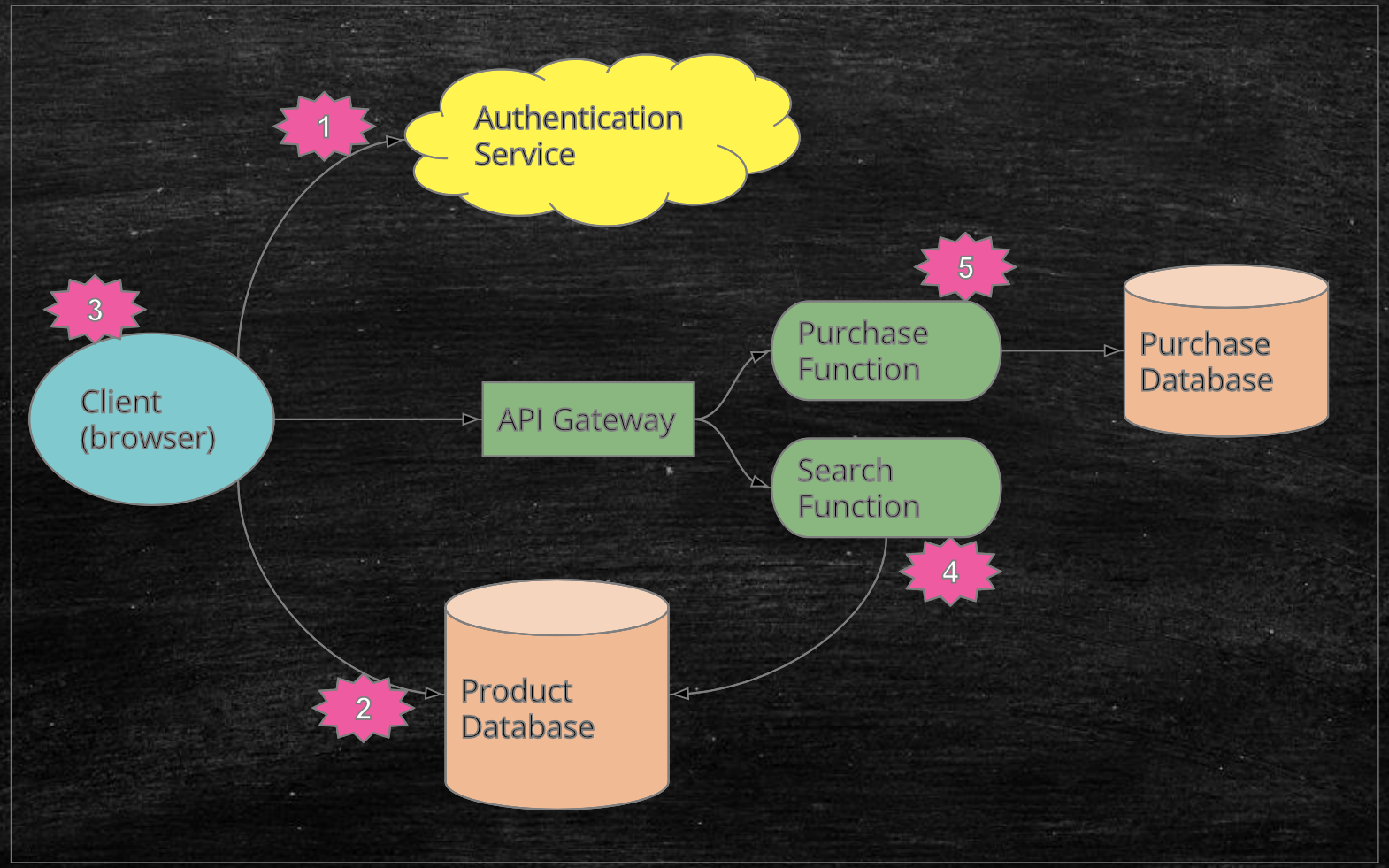


Not everything that glitters…

- Vendor dependency
- Lack of operational tools
- Architectural complexity
- Implementation drawbacks

Architecture goes from…

To...


1
Authentication Service
3
Client (browser)
API Gateway
5
Purchase Function
Purchase Database
Search Function
4
2
Product Database

AWS Lambda Functions

Serverless with Amazon Web Services

AWS Lambdas

- AWS implementation of Function as a Service
- Supports lots of runtimes!


- Layers allows you to share functionality across functions

Lambdas are Event Triggered

- API Gateway
- S3 storage events
- SNS / SQS messages
- DynamoDB operations
- Whatever you can think of (as long as is a AWS event)

Lambda Execution Context

- Provisioned and managed by AWS
- Amazon Linux (based on CentOS 7)
- Configures network interfaces and VPC
- Writable /tmp folder with 512 MB limit

Lambda Execution Context

- First invocation creates and provisions a context
- Subsequent invocations can reuse existing contexts
- Concurrent invocations can create new contexts

Lambda Limits

- Memory: 128 MB to 3008 MB
- Deployment package:
  - 50MB zipped
  - 250 MB unzipped, including layers
- Execution processes/threads: 1024
- Network interfaces per VPC: 160

“So, how can I use these Lambdas…

… without ending up buried in the backyard?“

Serverless Framework

“Ok, I’ll give you some help”

Serverless Framework

- CLI to define and deploy serverless components
- Depends on NodeJS
- Installed as global NPM package
- Used from command line

Serverless Framework is our Mr. Meeseeks!

serverless

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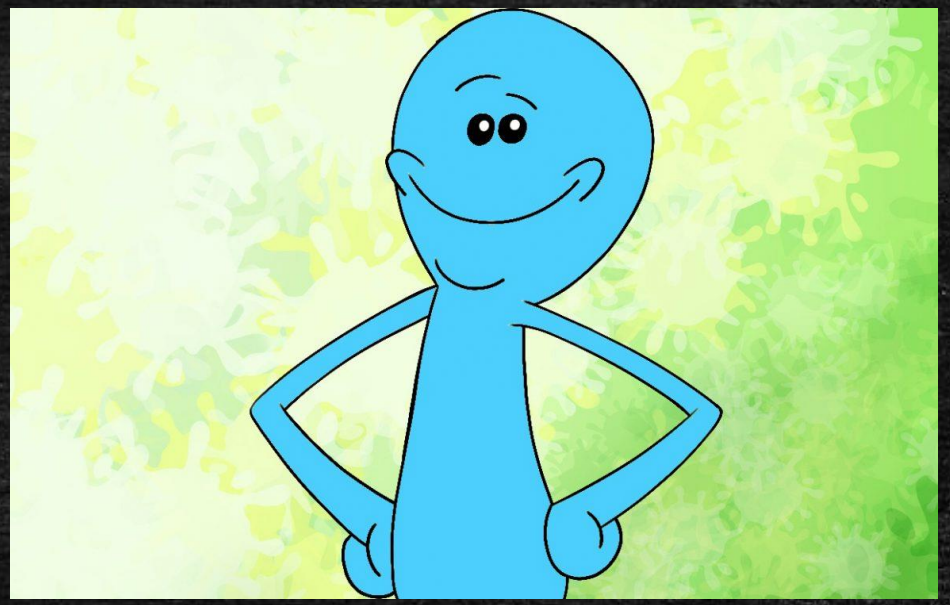


Serverless Framework

- Uses a YAML file to define functions and architecture
- Lots of plugins for different purposes
- Runtimes and components templates available
- Deploy, log and monitor your functions

Compatible with different vendors

- AWS
- Azure
- Google Cloud
- Alibaba Cloud
- And More!

Serverless Framework with AWS

- Relies on Cloud Formation and IAM
- Cloud Formation: AWS Infrastructure as Code
- IAM: Identity and Access Management in AWS

Serverless Framework with AWS

- Each YAML file generates a single CloudFormation stack
- Stack includes always a S3 bucket for deployment artifacts
- CloudFormation declarations can be used directly in YAML
- IAM permissions must be specified for Lambdas to access different features

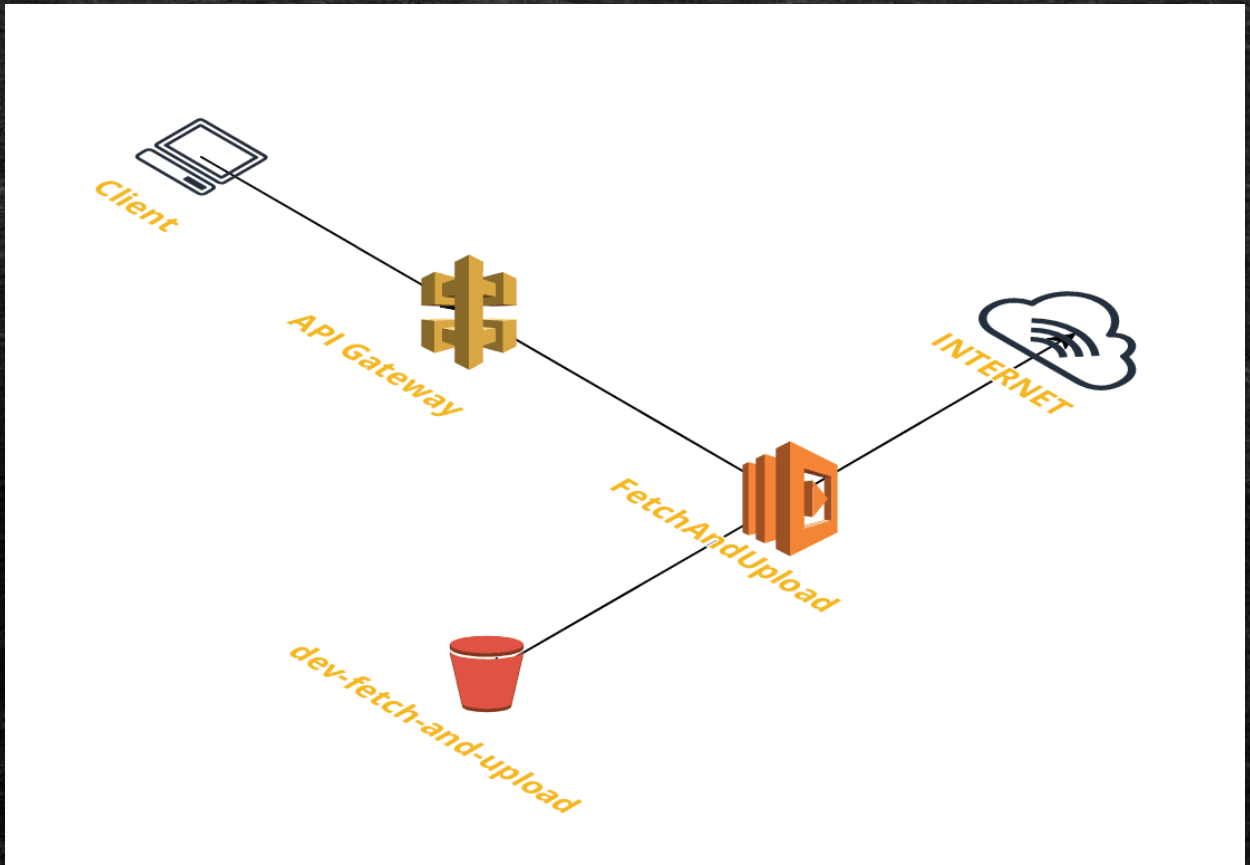
Some basic commands

- `serverless create`
- `serverless deploy (-f)`
- `serverless remove`
- `serverless invoke`

Deploy your Lambdas with Serverless framework

Let's code!
https://github.com/mlopezperez/serverless-talk

Upload an image to a S3 bucket



“Pay attention, Morty, we’re coding!”

Making your Lambdas work together

Simple Notification Service

- Push based instant notifications
- No persistence: if there's no consumer message is lost
- Different topics for different message types
- Different subscribers for each topic: SQS, Lambdas, client app…

Simple Queue Service

- Message queue to be polled
- Persistent: messages only deleted when processed
- Can subscribe to SNS topics
- “Loose FIFO” and strict FIFO available.

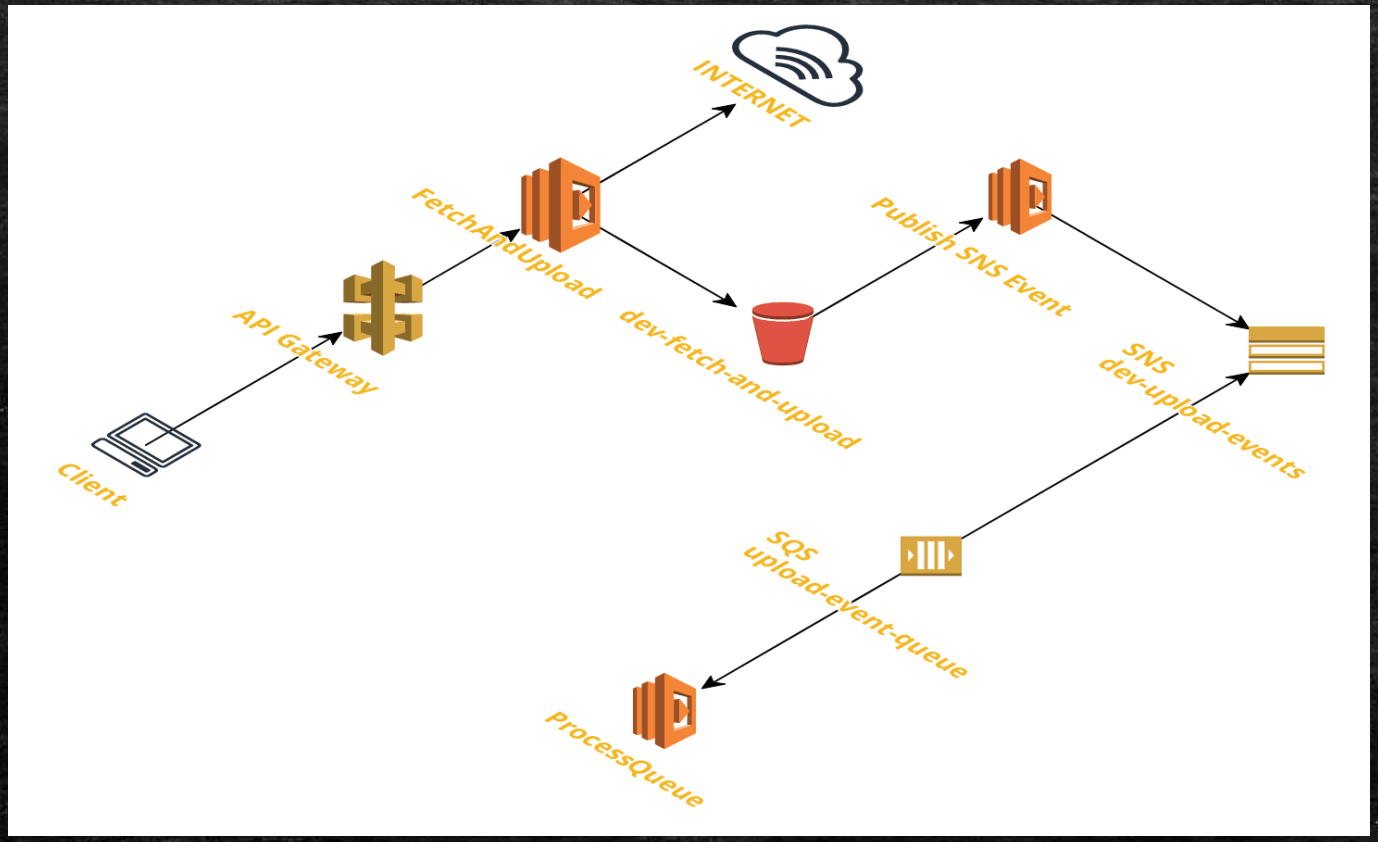
Step Functions

- State machine with AWS
- Not only with Lambdas but also with other services!
- Depending on inputs/outputs you move to another state
- Execution finishes as “Success” or “Fail”

Add SNS and SQS with Serverless

Let's see some more code!

Communicate using SNS and SQS



Summarizing

- Serverless means Functions as a Service + other backend services in the cloud
- AWS offers Lambda functions to implement serverless
- Serverless Framework uses YAML to define and deploy a serverless architecture
- You can communicate and orchestrate Lambdas using SNS, SQS and Step Functions in AWS

And also…

- There's 3 seasons of Rick & Morty
- They're available in Netflix
- A 4th one is coming

Questions?

Easy ones, please ☺

Thank you!

loma@ciklum.com
https://github.com/mlopezperez/serverless-talk

Sources

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