Microservices with Go

Tilix Conference
24 April 2019

Guilherme Rezende
Globo.com

About me

- Software Engineer at Globo.com
- Tsuru Team (tsuru.io)

Social

- github.com/**guilhermebr**
- in/**guilhermebr**
- twitter.com/**gbrezende**

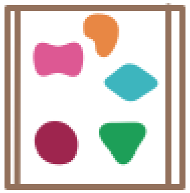
Agenda

- Monolithic
- Microservices
- Go
- Microservices with Go
- Authentication / Authorization
- Hands On
- Serverless / Functions

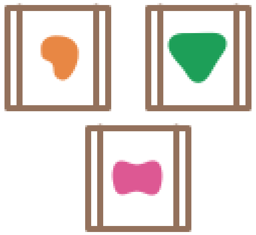
Monolithics vs Microservices

Monolithics vs Microservices

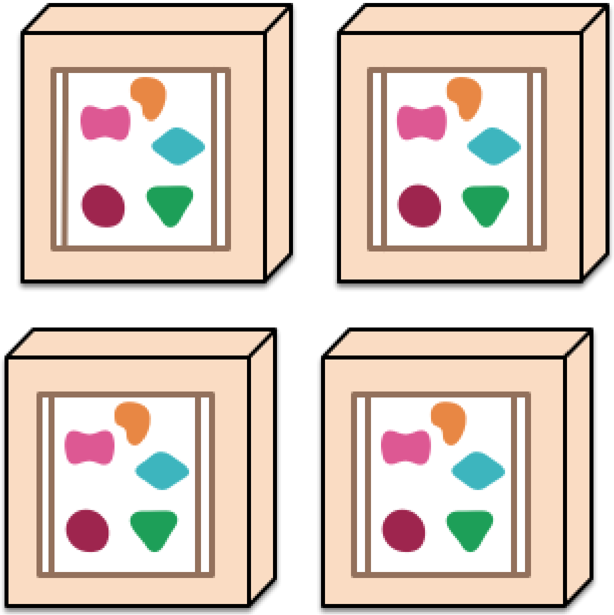
A monolithic application puts all its functionality into a single process...



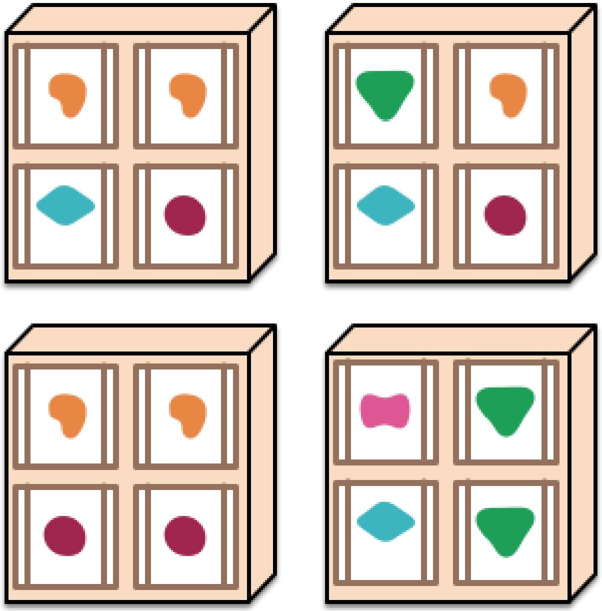
A microservices architecture puts each element of functionality into a separate service...



... and scales by replicating the monolith on multiple servers



... and scales by distributing these services across servers, replicating as needed.



Monolithic

- Simplicity
- Monolithic code base
- Monolithic database
- Tighly coupled architecture

Microservices

'...the microservice architectural style is an approach to developing a single application as a suite of small services, each running in its own process and communicating with lightweight mechanisms, often an HTTP resource API.'
- **Martin Fowler**

Microservices

- 12Factor Manifesto
- Cloud Native App
- Ephemeral File System
- Resilient
- Preferably Stateless
- Horizontal Scalable
- Single business logic
- Hide your data
- Design for failure
- DevOps Culture

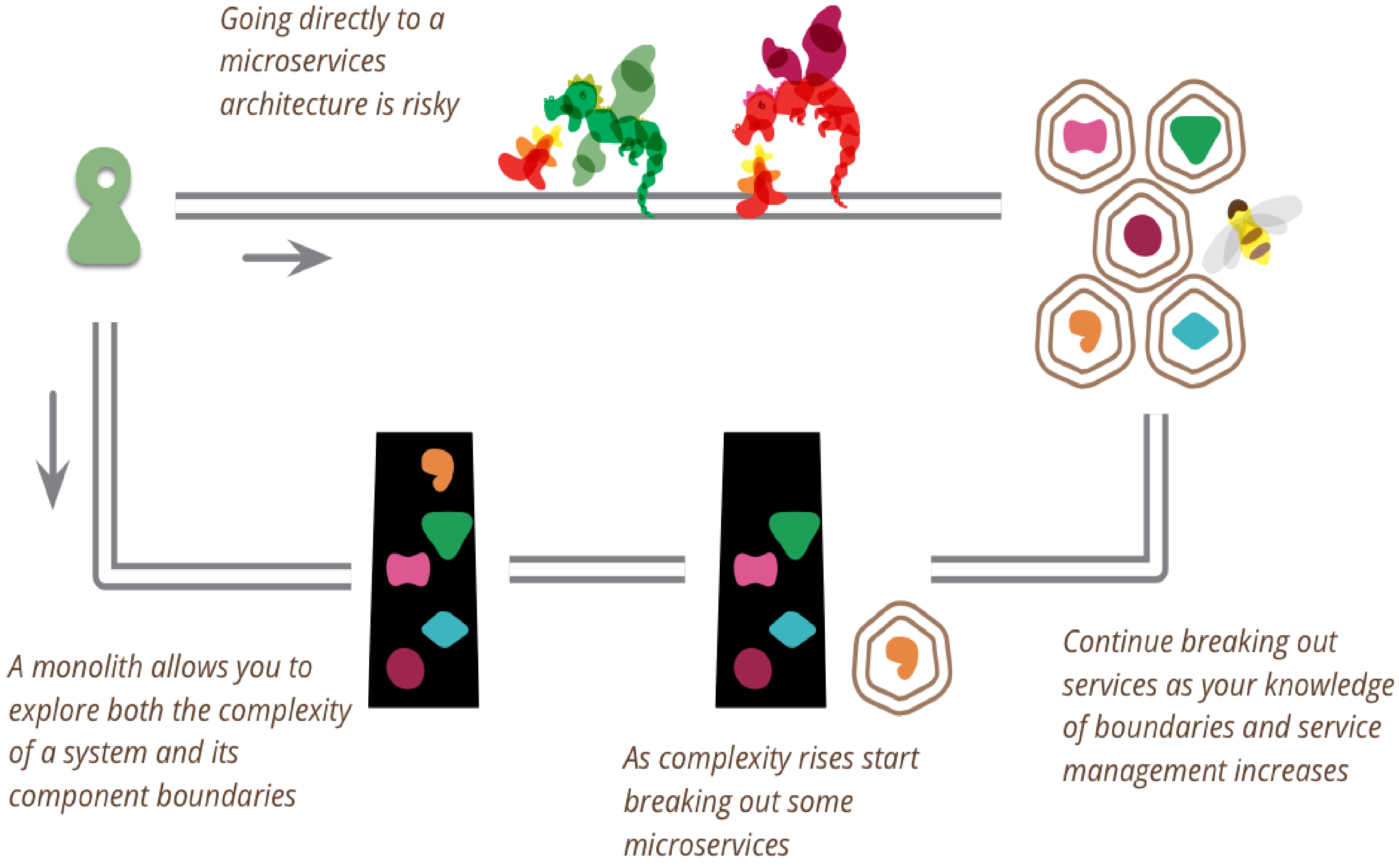
Microservices benefits

- Easier to scale
- Clear ownership
- Easier to maintain and evolve
- New releases take minutes
- Increased agility
- Faster innovation

Microservice performance gotchas

- Slow data serialization
- Network contention

From Monolithic to Microservices



Going directly to a microservices architecture is risky

A monolith allows you to explore both the complexity of a system and its component boundaries

As complexity rises start breaking out some microservices

Continue breaking out services as your knowledge of boundaries and service management increases

Go

Why Go?

Why Go?

```go
package main

import "fmt"

var motivos = []string{
	"Compilada - desempenho aproximando C para tarefas de uso intensivo da CPU",
	"Concorrente - Projetado para hardware moderno (multicore, redes)",
	"Estaticamente Tipada (mas com sentimento de dinamico)",
	"Simples",
	"Produtiva",
	"Divertida",
	"UTF-8 ♥",
	"Sem ponto e virgula ツ",
}

func main() {
	for i, motivo := range motivos {
		fmt.Printf("%d - %s,\n", i, motivo)
	}
}
```

Run

Go: the language of the cloud.

- Small footprint runtime
- Modern and efficient networking
- Open source

Who uses Go?

- Kubernetes
- Docker
- Uber
- Dropbox
- Twitter
- Google
- Tilix
- ...

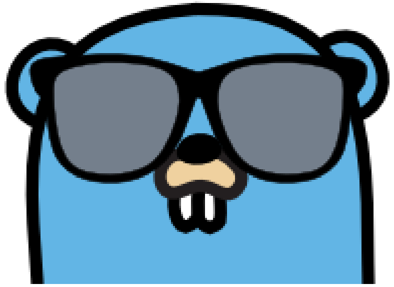
Go at Globo.com

- G1
- Cartola
- GloboID
- Cassino
- Tsuru :)
- ...

Microservices with Go

"[...] if you're building a server, I can't Imagine
using anything other than Go"
- Ryan Dahl

- **Ryan Dahl** is a software engineer and **original developer** of **Node.js javascript runtime**



Authentication / Authorization

- Client Token
- Single sing-on
- API Gateway

Client Token

JSON Web Tokens (JWT)

Compact, self-contained method for transferring secure data as a JSON object.

- RFC 7519
- Signed (HMAC algorithm, public/private key pair RSA)
- Authentication (Stateless)
- Information Exchange

JWT Struct

- Header

```
{
  "alg": "HS256",
  "typ": "JWT"
}
```

- Payload

```
{
  "sub": "1234567890",
  "name": "John Doe",
  "admin": true
}
```

- Signature

```
HMACSHA256(
  base64UrlEncode(header) + "." +
  base64UrlEncode(payload),
  secret)
```

JWT Encoded

- Token

```
eyJhbGciOiJIUzI1NiIsInR5cCI6IkpXVCJ9.
eyJzdWIiOiIxMjM0NTQ0NDY3ODkwIiwibmFtZSI6IkphbWVzaG4gRG9lIiwiYWRtaW4iOnRydWV9.
XdIyfynto3N3IbzjQ0BDhDdW1uIgPmbvfvuTTUjWeDk
```

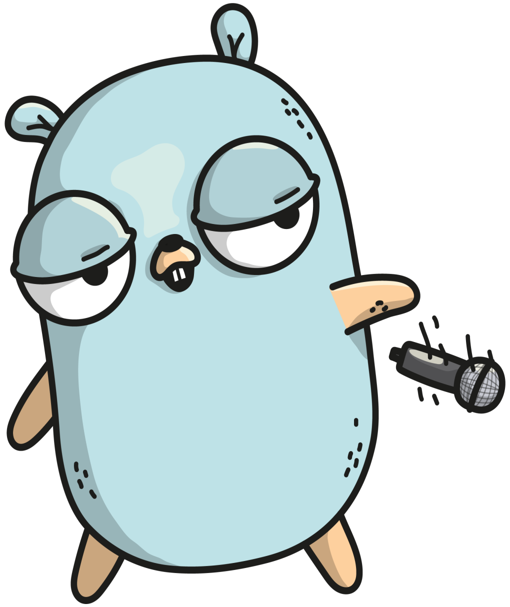
- How to use

```
curl -H 'Authorization: Bearer eyJhbGciOiJIUzI1NiIs...' http://127.0.0.1:5000/secure
```

- More info

jwt.io/ (https://jwt.io/)

Hands On



Serverless / Functions

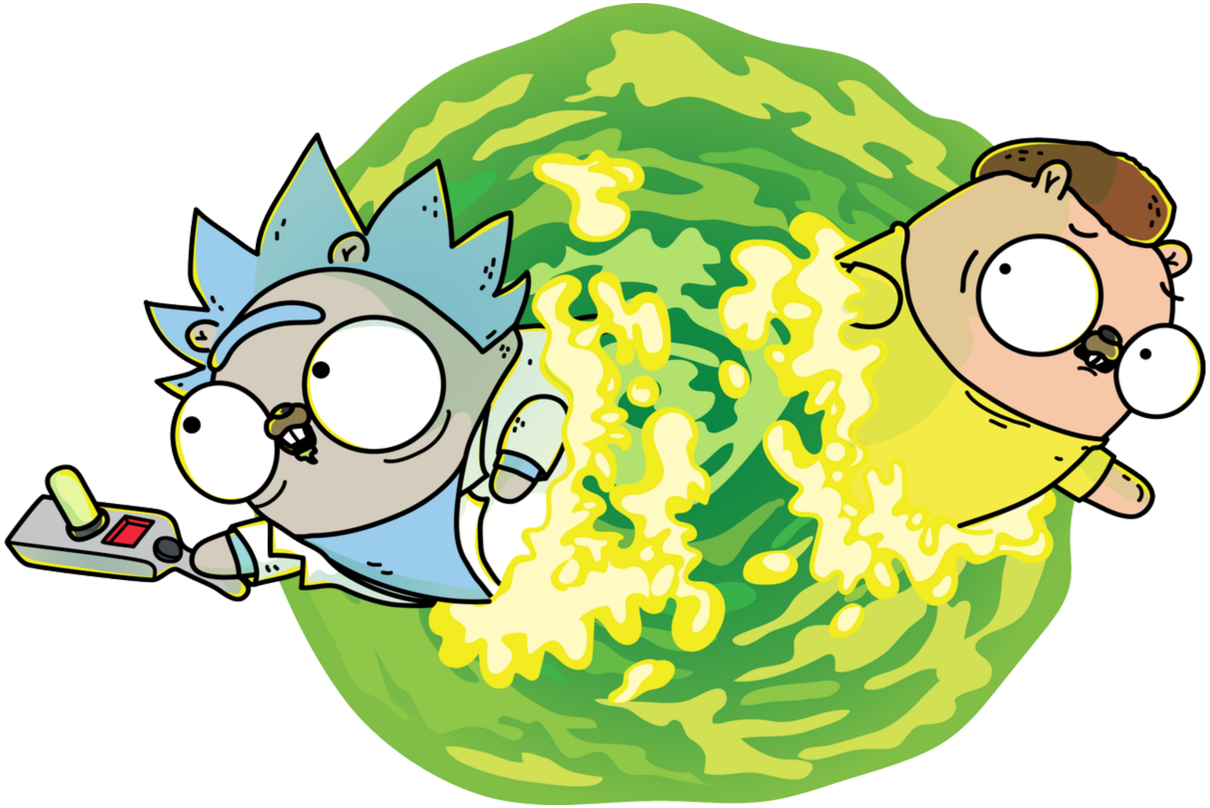
- Serverless for the Dev
- Run code without managing servers
- CGI (request in, start process to handle it, return something)
- HotFunctions

To Learn

- gRPC (grpc.io)
- GraphQl (graphql.org)

Convinced of Go?

Gopher



Gopher

Gophercon Brasil

- 26 a 28 Setembro 2019
- Canasvieiras - Floripa

gopherconbr.org (gopherconbr.org)

Thank you

Guilherme Rezende
Globo.com
@gbrezende (http://twitter.com/gbrezende)