



# Odmor za REST uz

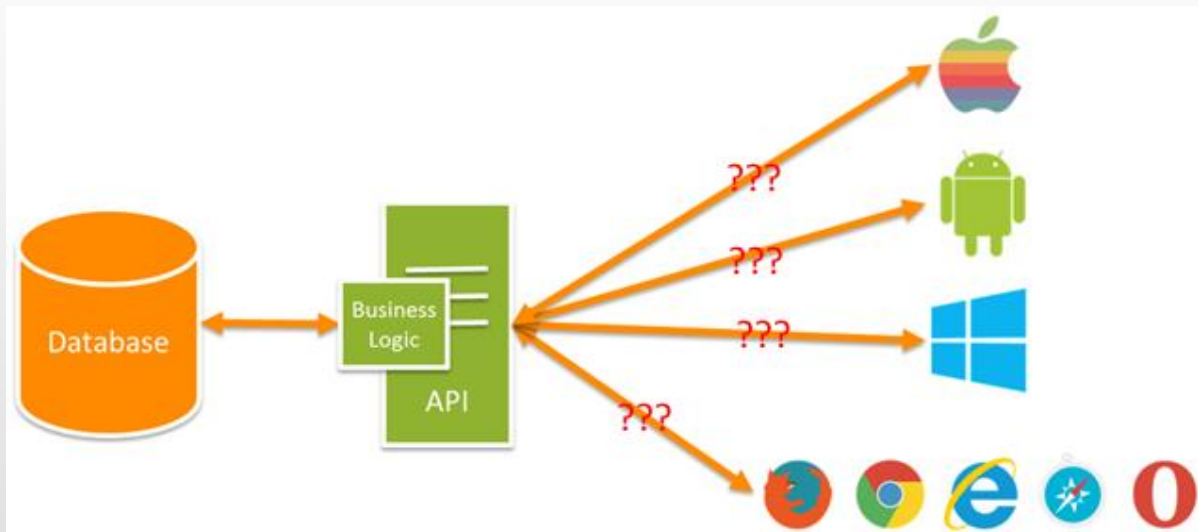
# GRPC

# Sadržaj

- REST i ostala klasika
- RPC
- gRPC, Protobuf, HTTP2
- gRPC i Java
- The great showdown!
  - gRPC, Thrift, Spring MVC
- ...i mikroservisi

# API naš svagdašnji

- Sučelje za pristup podacima ili funkcionalnostima neke aplikacije/sustava
- API = REST ?
  - Bitka za naziv REST je izgubljena! ☹



# REST

HATEOAS  
CLIENT-SERVER  
STATELESS  
UNIFORM-INTERFACE  
CACHEABLE  
HYPERMEDIA NOUNS  
RESOURCES

Vi stvarno pišete REST servise?



# RPC

- Fokus na akcijama, ne resursima
- Contract između klijenta i servera
- Nije nužno vezan uz HTTP
- Najčešće rabi binarne protokole
  - Protobuf, TBinary, CBOR
- Postoji dugi niz godina...
  - Java RMI, Spring HttpInvoker, NFS, XML-RPC, CORBA itd.

 slack API

## Basics

The Web API consists of [HTTP RPC-style methods](#), all of the form

```
https://slack.com/api/METHOD.
```

## Arguments

This method has the URL `https://slack.com/api/channels.kick` and follows the [Slack Web API calling conventions](#).

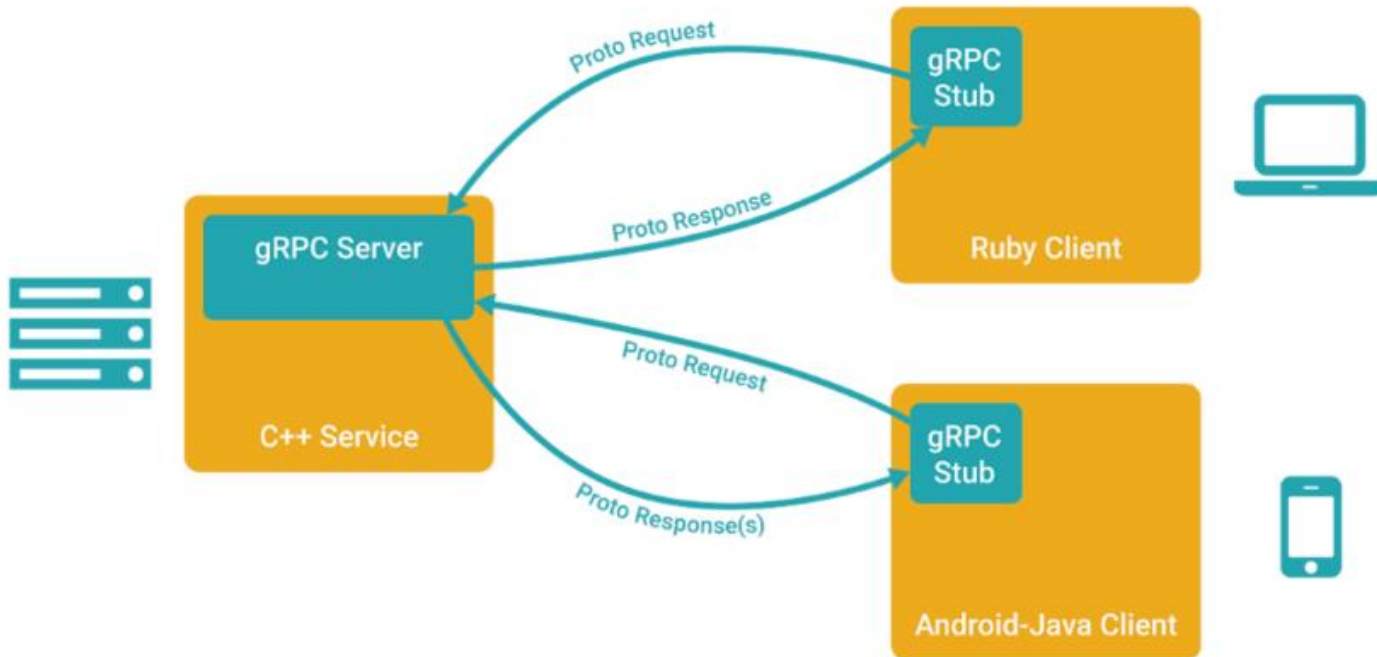
Argument	Example	Required	Description
<code>token</code>	<code>xxxx-xxxxxxxx-xxxx</code>	Required	Authentication token. Requires scope: <code>channels:write</code>
<code>channel</code>	<code>C1234567890</code>	Required	Channel to remove user from.
<code>user</code>	<code>U1234567890</code>	Required	User to remove from channel.

# gRPC

- RPC framework iz Google-a
- HTTP/2, Protocol Buffers v3
- Protocol Buffers IDL
- Podržava 10 jezika (Java, C, nodejs...)
- Mikroservisi!



# gRPC



# Protobuf

- Google, razni jezici, neovisan o platformi
- Kao XML (samo „kao!”) no brži, manji i jednostavniji



- brz
- shematiziran
- strong typing



- čitljivost
- podrška

# Protobuf

Predefinirani tipovi, defaultne vrijednosti verzioniranje, višejezičnost....

```
syntax = "proto3";

package javacro;

option java_multiple_files = false;
option java_package = "hr.svg.javacro.grpc.api";
option java_outer_classname = "GreetingServiceProto";
option objc_class_prefix = "TS1P";

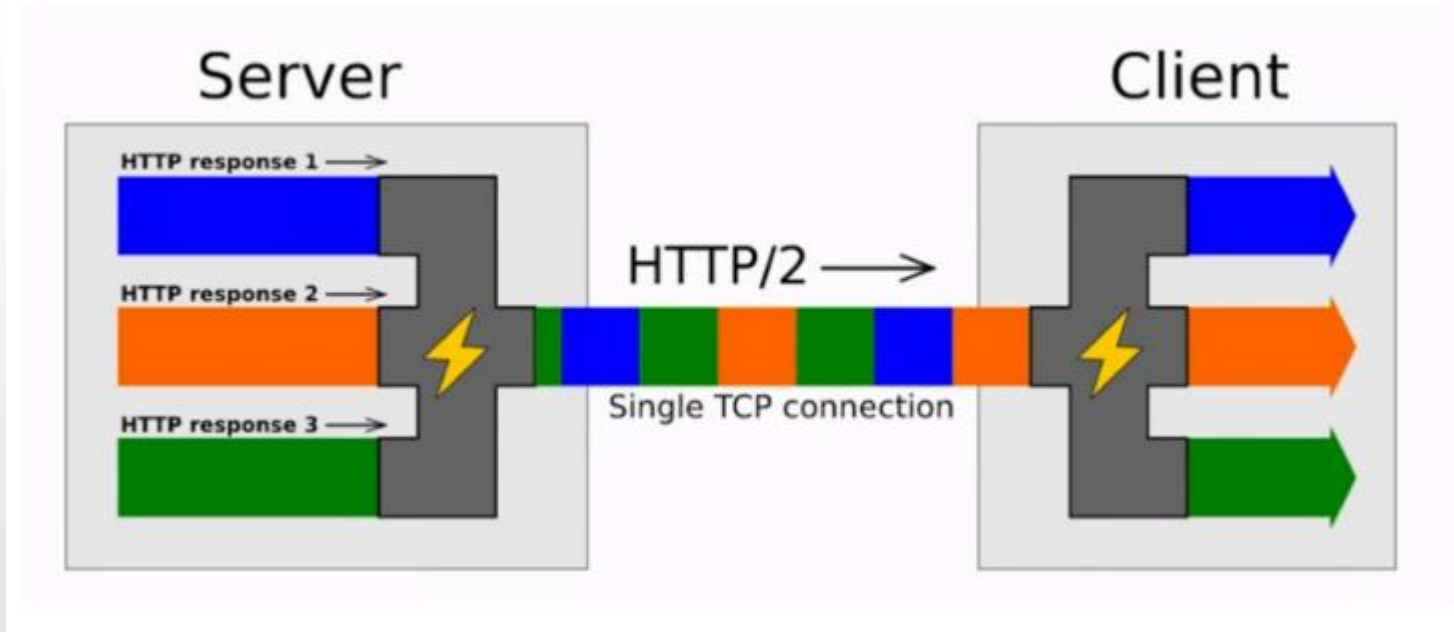
service GreetingService {
  rpc Greet (GreeterRequest) returns (GreeterResponse) {}
}

message GreeterRequest {
  int64 requestId = 1;
  string sender = 2;
  string greeting = 3;
}

message GreeterResponse {
  int64 requestId = 1;
  bool success = 2;
}
```

# HTTP/2

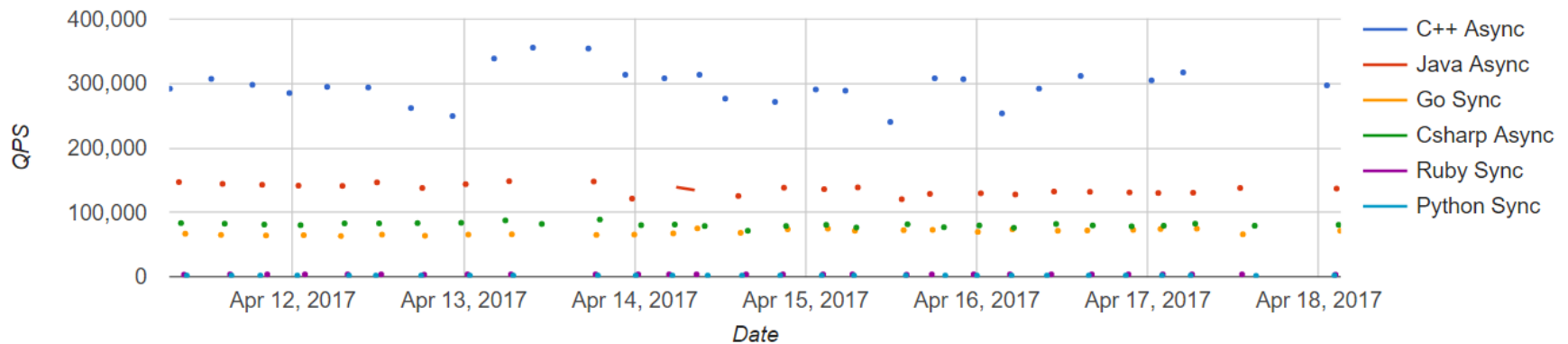
- Binaran prijenos
- Multiplexing
- Kompresija headera
- Bidirectional streaming



# gRPC i Java

- Baziran na Nettyu
- Maven plugin (protoc)
- Blocking, Future, Observer stub

Unary secure throughput QPS (8 core client to 8 core server)



Throughput as number of unary RPCs per second between two GCE VMs (8 cores each). Secure connection is used.

# The great showdown!

- gRPC vs Thrift vs Spring Boot (MVC - JSON)
- Stress test API-a koji prima request:
  - Integer requestId, String sender, String greeting
- I vraća response:
  - Integer requestId, Boolean success

50 korisnika, 20.000 iteracija, 1.000.000 requestova



Obrada  
1.000.000  
requestova

Executions				
Total	OK	KO	% KO	Req/s
1000000	1000000	0	0%	22727.273

Response Time (ms)					
Min	95th pct	99th pct	Max	Mean	Std Dev
0	3	12	750	1	2
0	3	12	750	1	2

gRPC  
44 sec.

Executions				
Total	OK	KO	% KO	Req/s
1000000	1000000	0	0%	23255.814

Response Time (ms)					
Min	95th pct	99th pct	Max	Mean	Std Dev
0	4	6	128	1	1
0	4	6	128	1	1

Thrift  
42 sec.

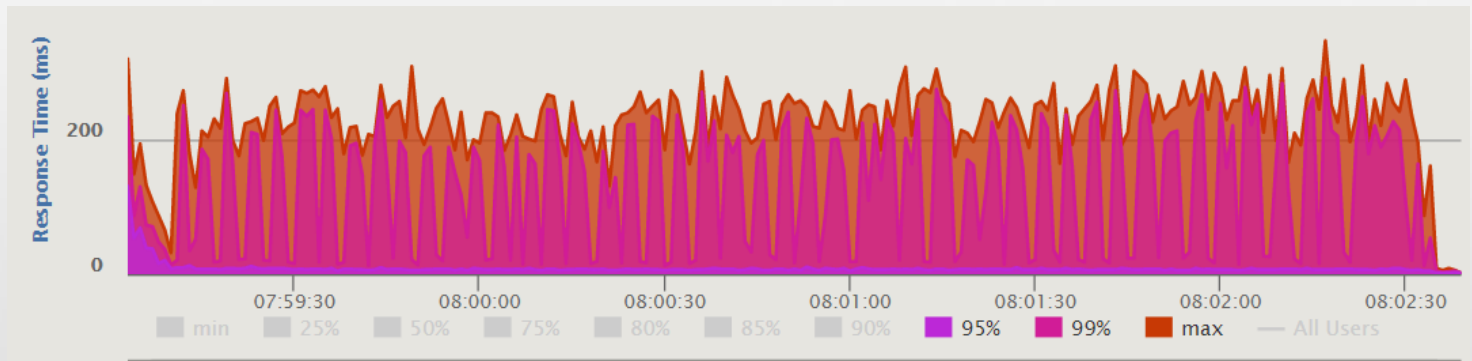
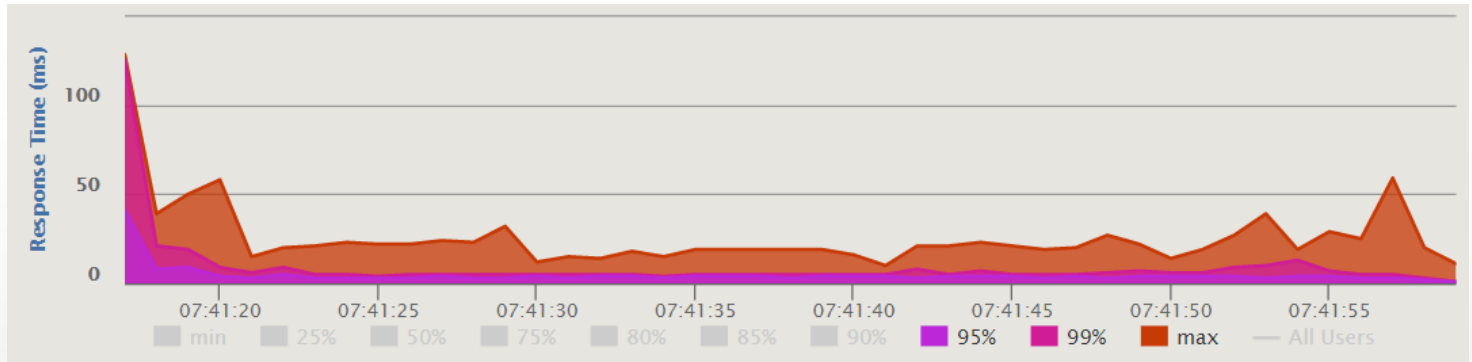
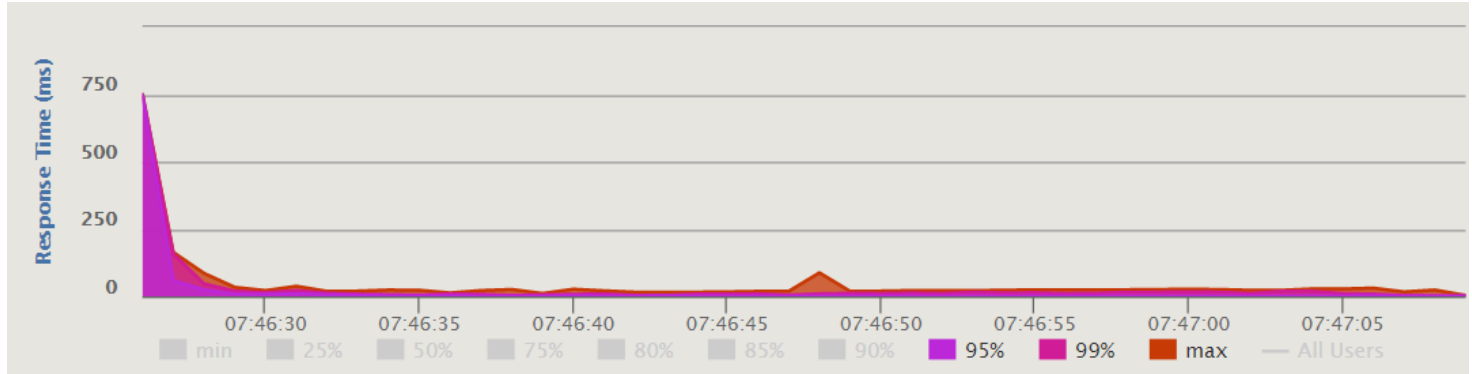
Executions				
Total	OK	KO	% KO	Req/s
1000000	1000000	0	0%	4608.295

Response Time (ms)					
Min	95th pct	99th pct	Max	Mean	Std Dev
0	8	181	347	4	24
0	8	181	347	4	24

Spring  
217 sec.

Response  
kroz vrijeme





# MIKROSERVISI!!!

- Višejezičnost & višeplatformnost
- Odaberite jezik koji odgovara problemu/servisu
- Lagana izmjena i kombiniranje tehnologija generiranjem klijenata i servera
- Performanse!
  - Mikroservisi su teški na HTTP pozivima
  - HTTP2 i Protobuf čine razliku

# Zaključak

- (punokrvni) REST je kompliciran
- RPC je fleksibilniji
- gRPC je brz, jako brz
- Zamjena za REST i JSON?
  - Ovisi o veličini throughputa

**Nije srebrni metak, nije za svakoga!**

# A sad vi...

