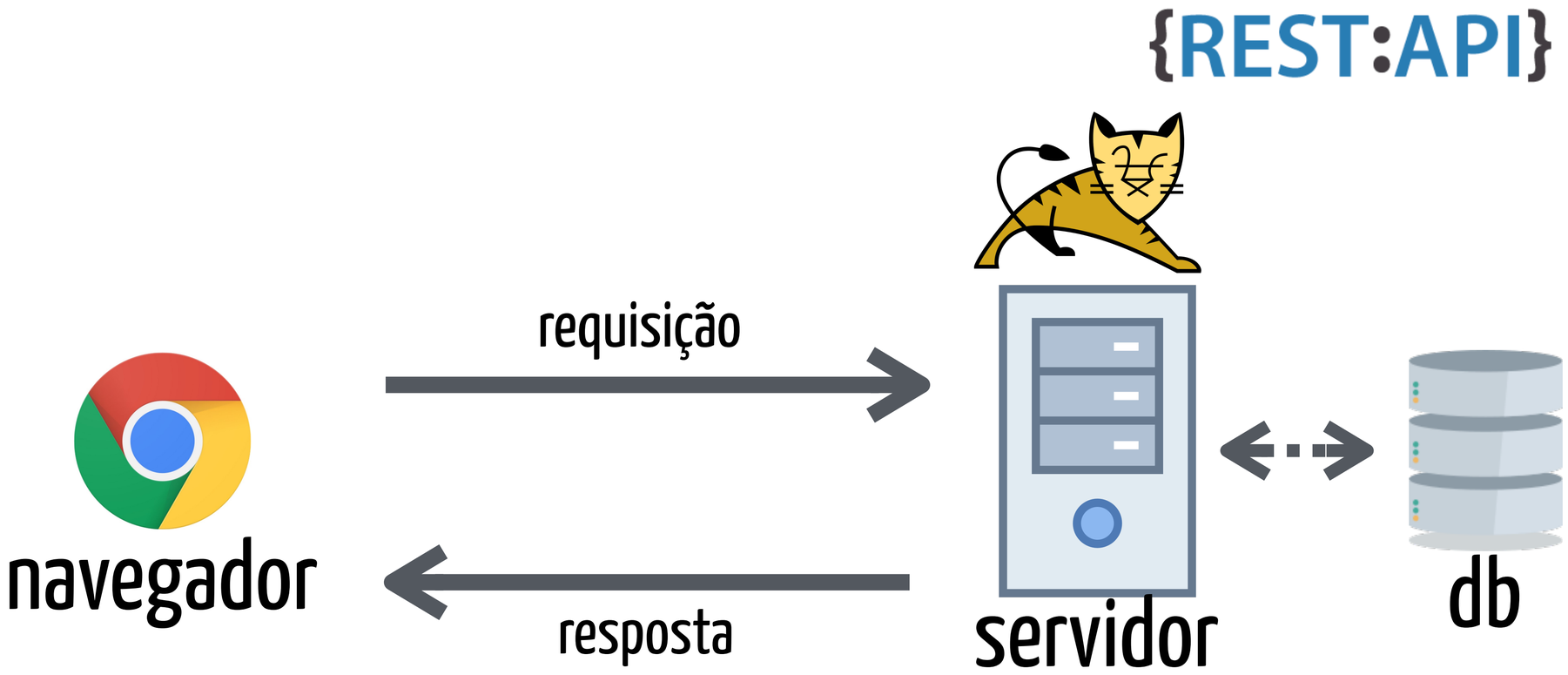
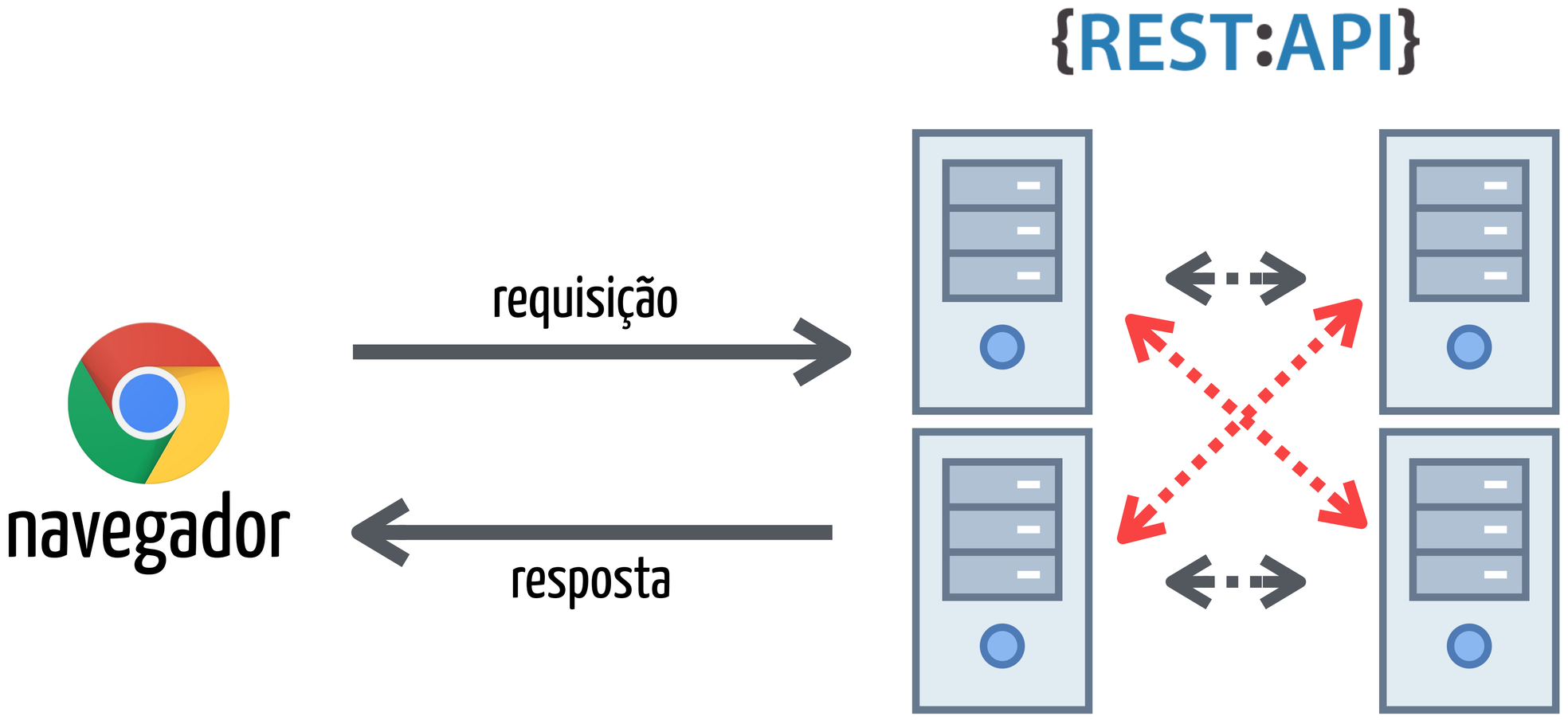
um framework moderno e performático para
comunicação entre microsserviços


{REST:API}
requisição
resposta
navegador
servidor
db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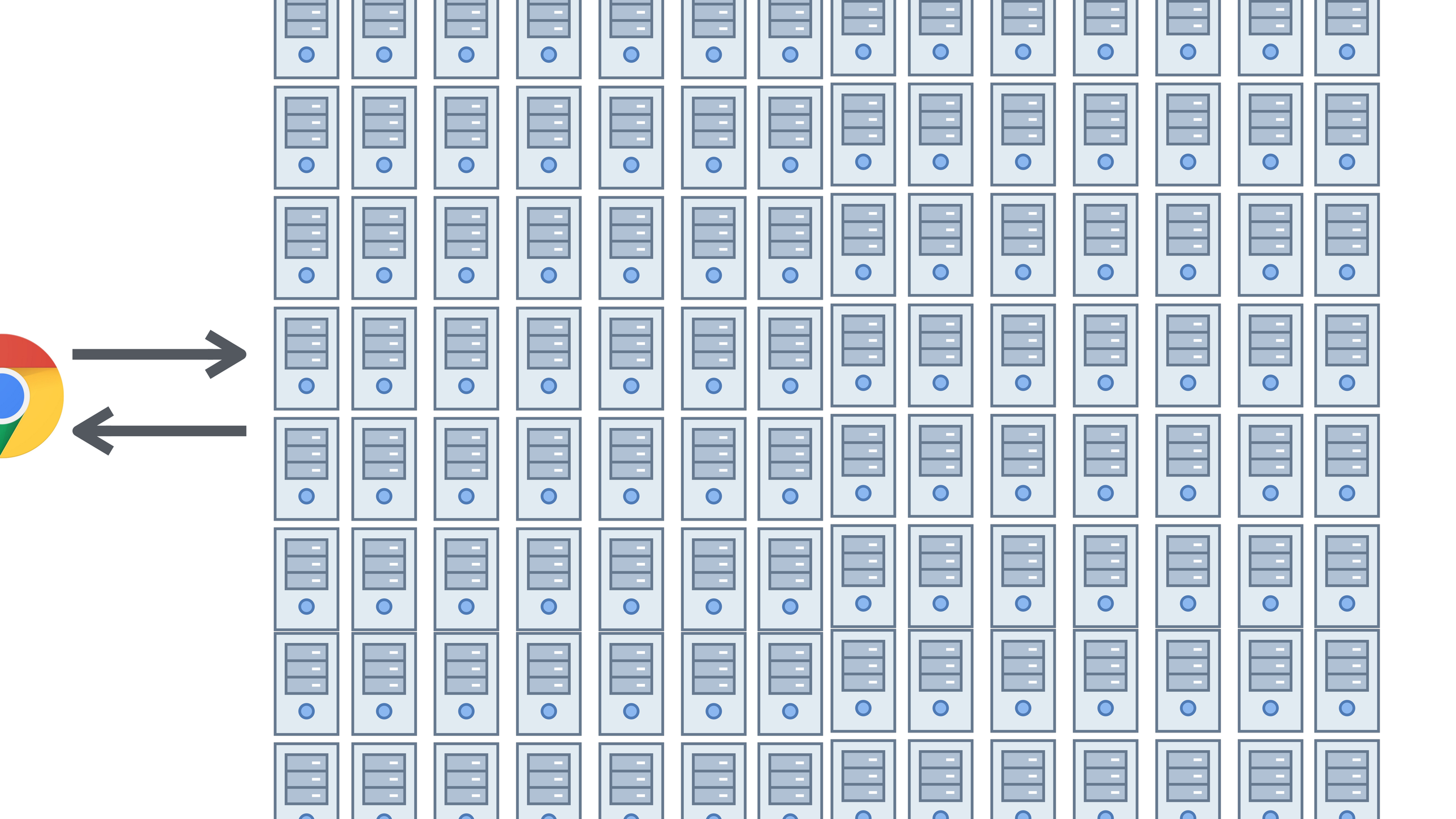
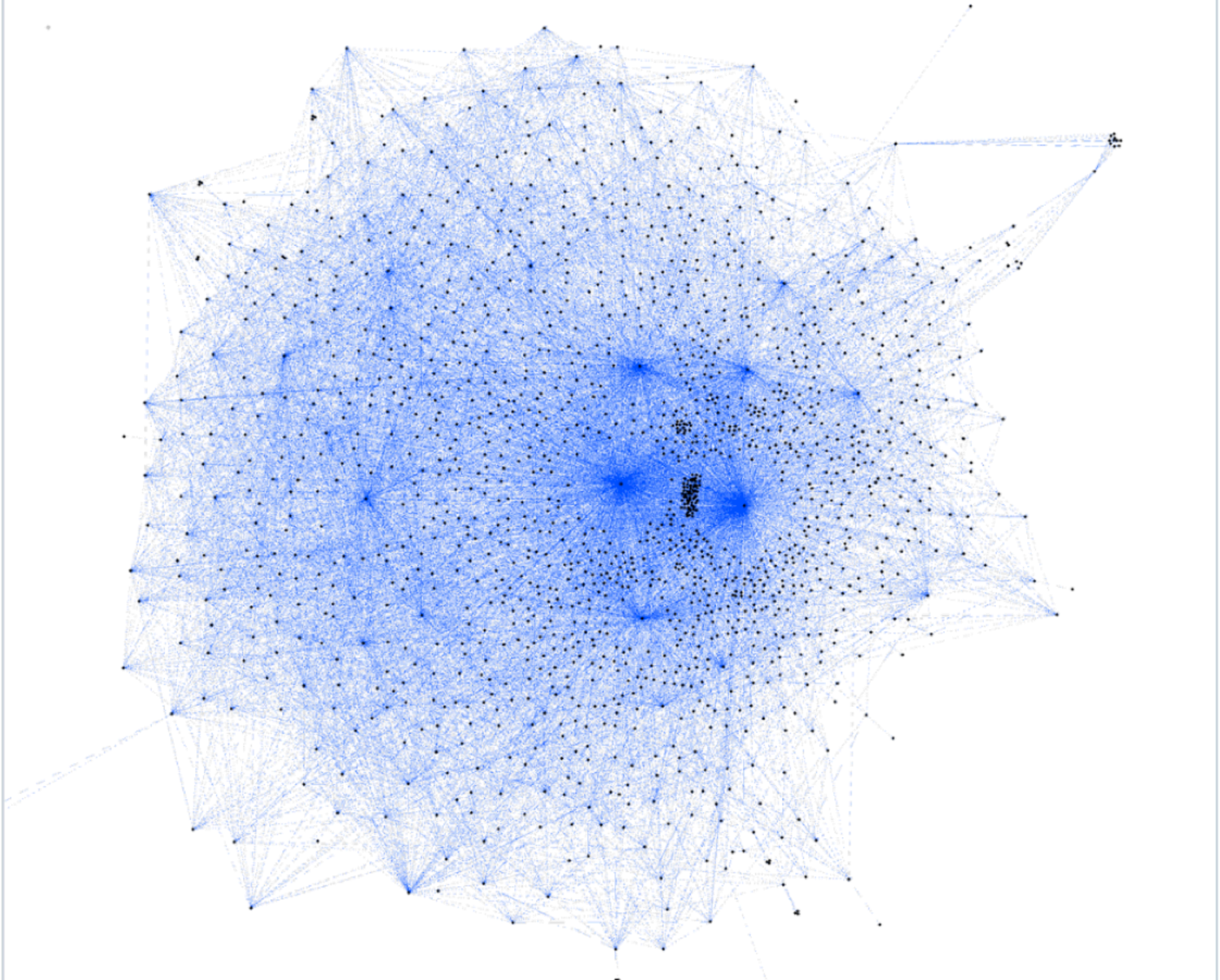
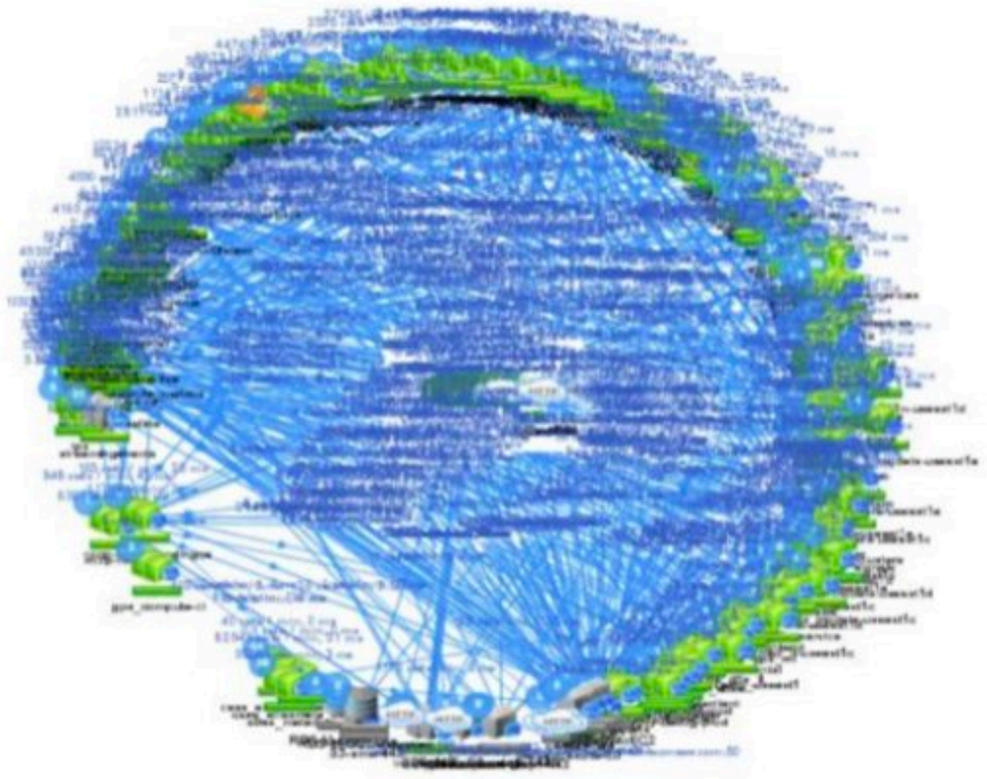
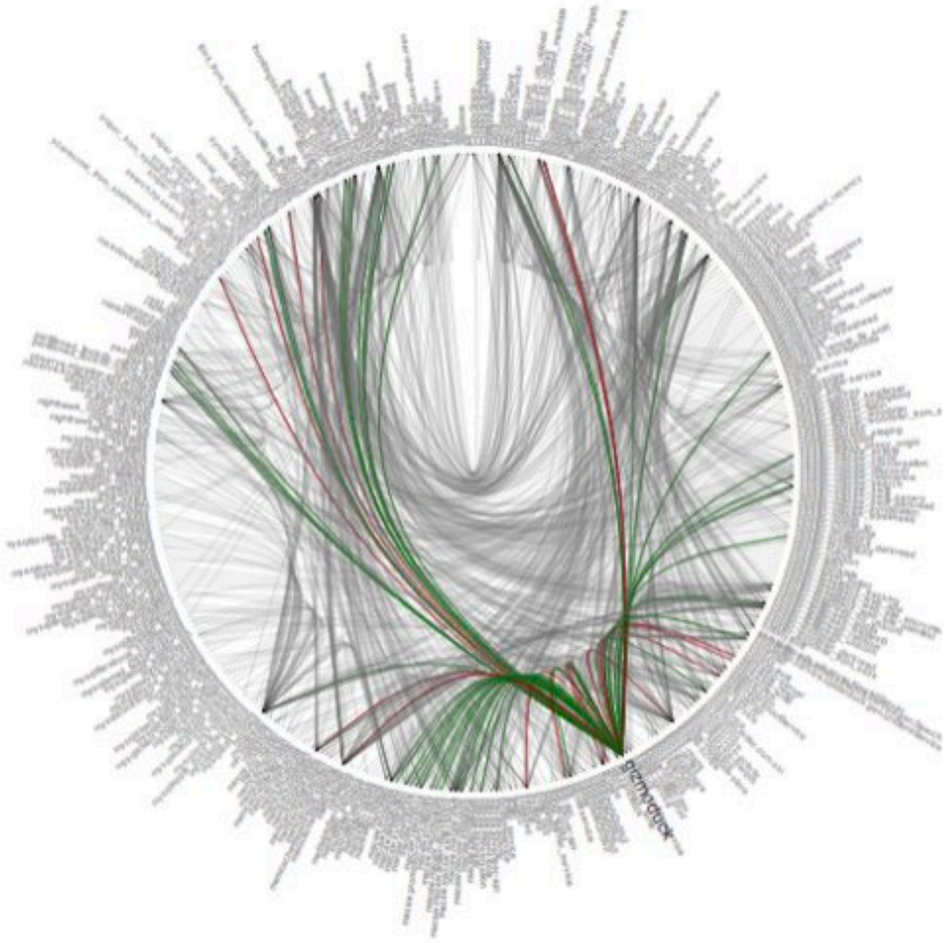
requisição
navegador
resposta



Pode piorar...





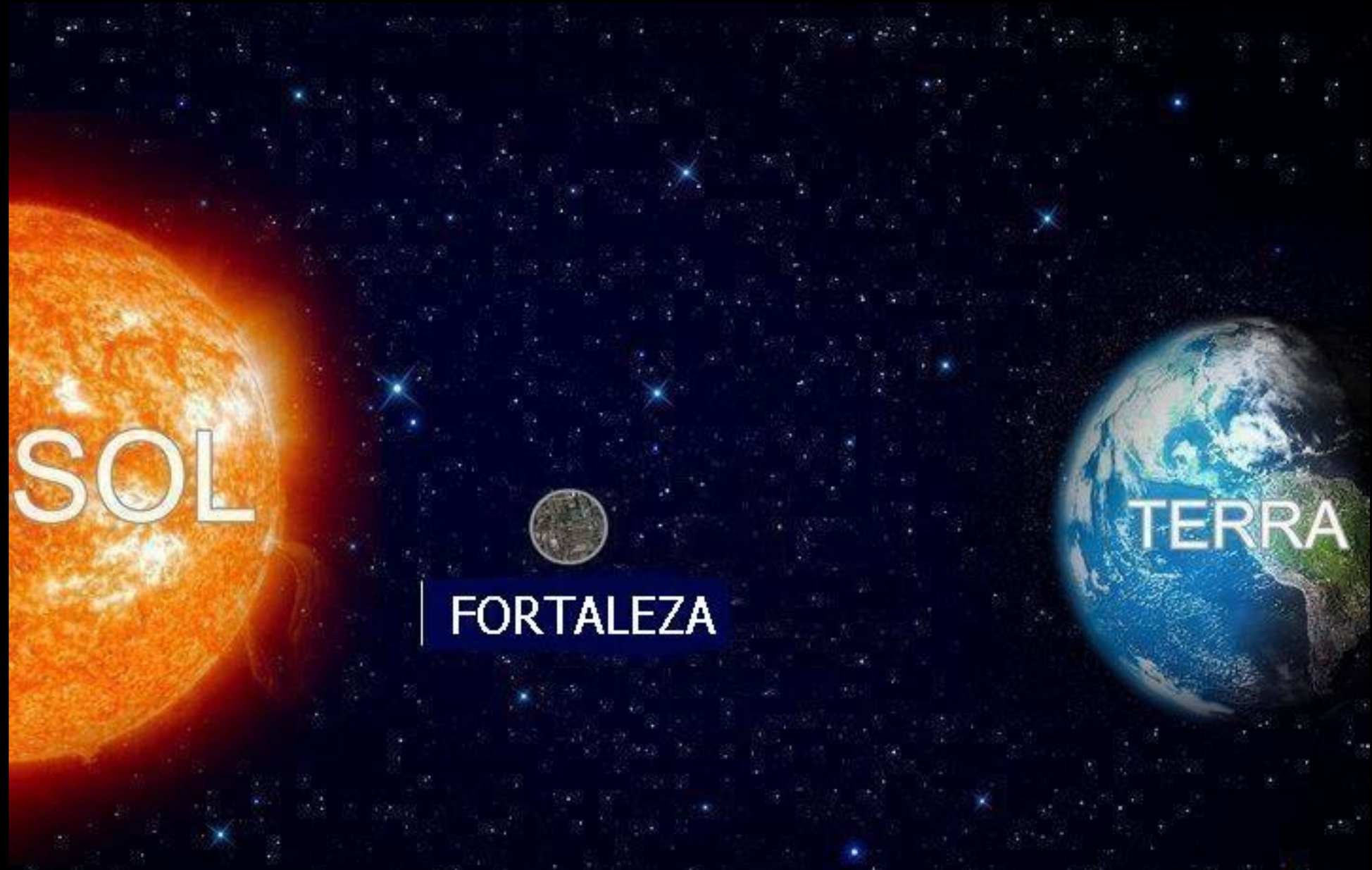


NETFLIX


GRPC


Rafael Ponte
@rponte


ZUP



Fortaleza - Terra do Sol

devs cansados

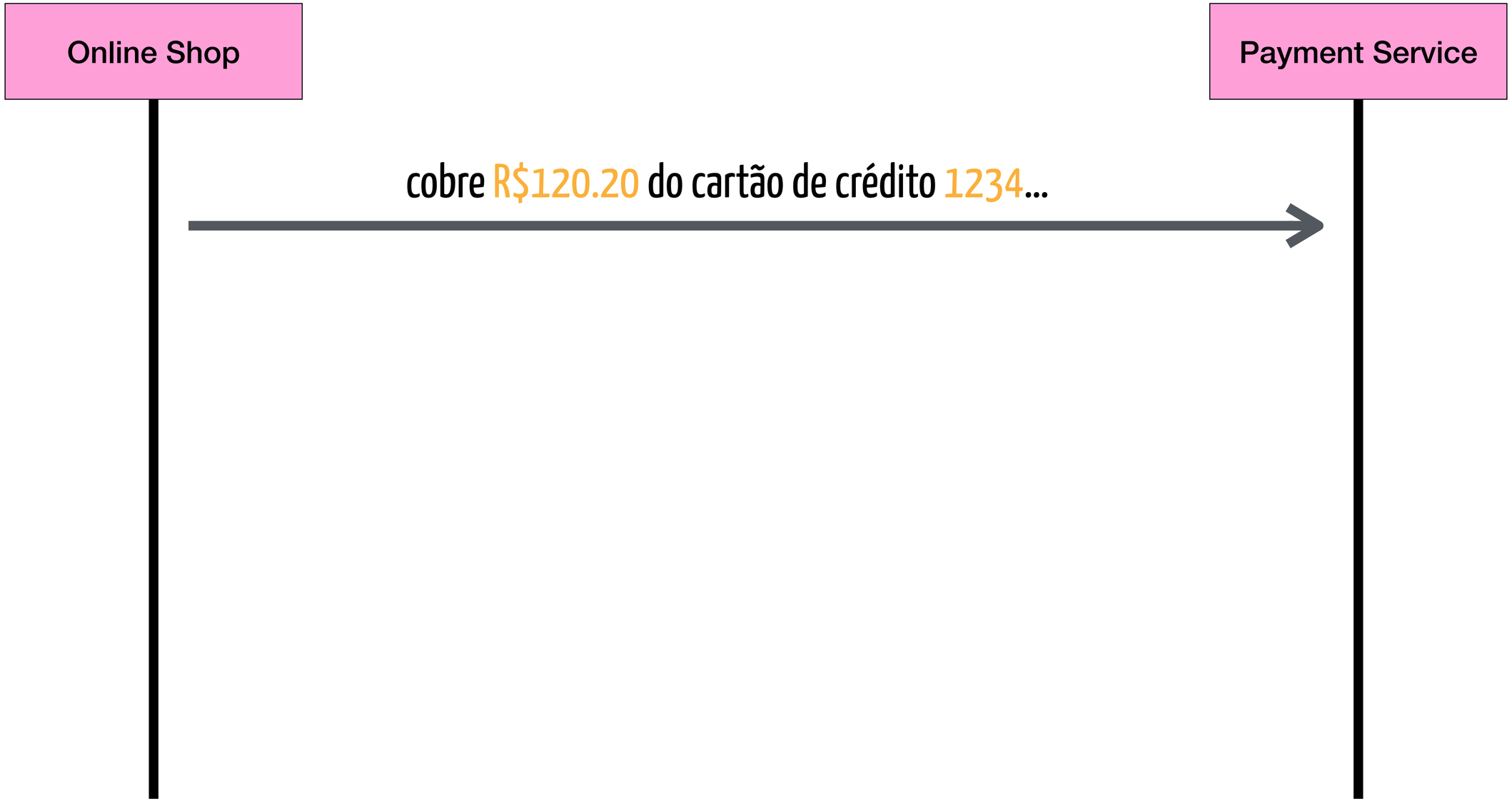
gRPC Remote Procedure Call framework

Remote Procedure Call

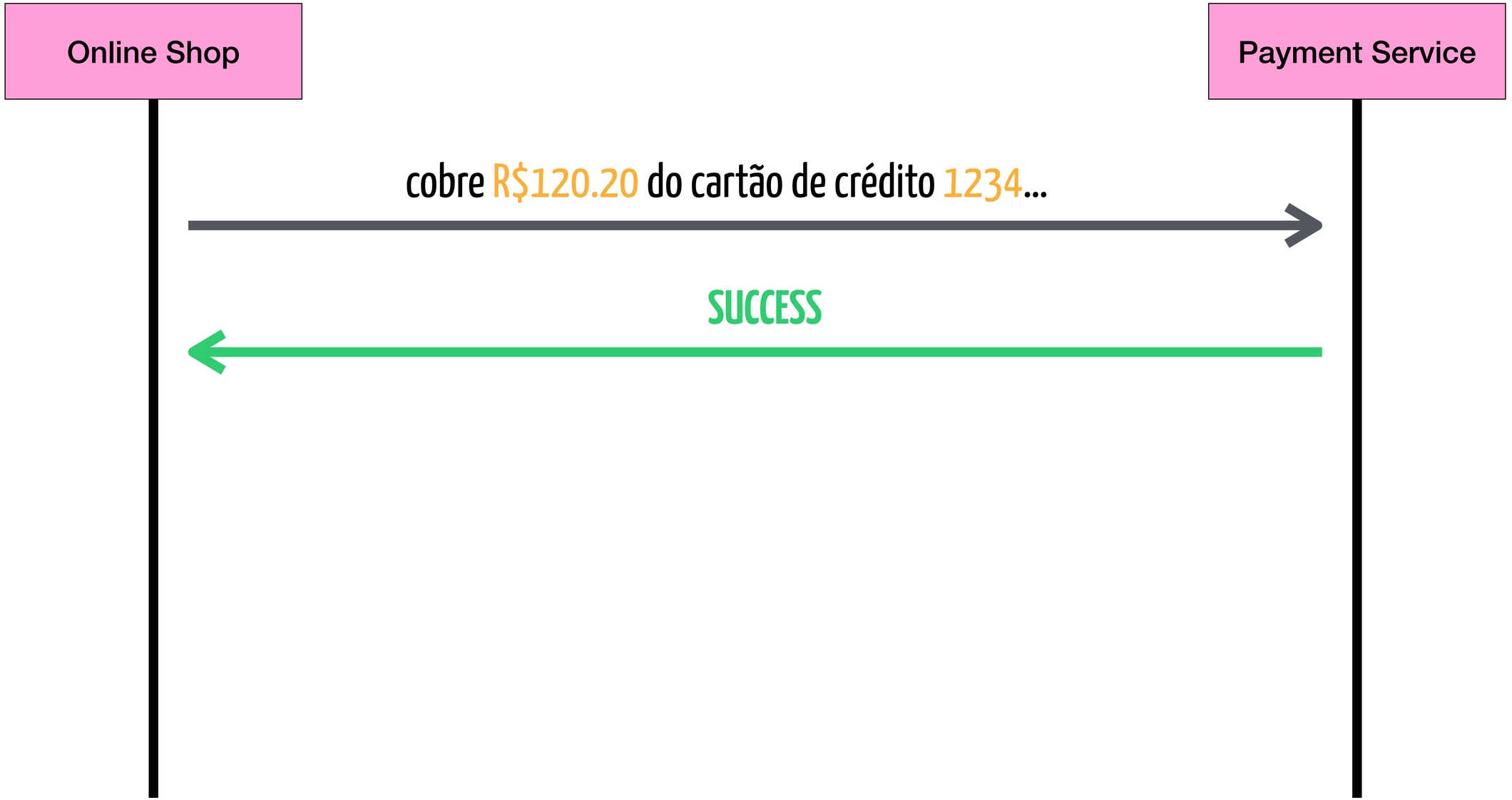
Loja Virtual

Pagamento Online

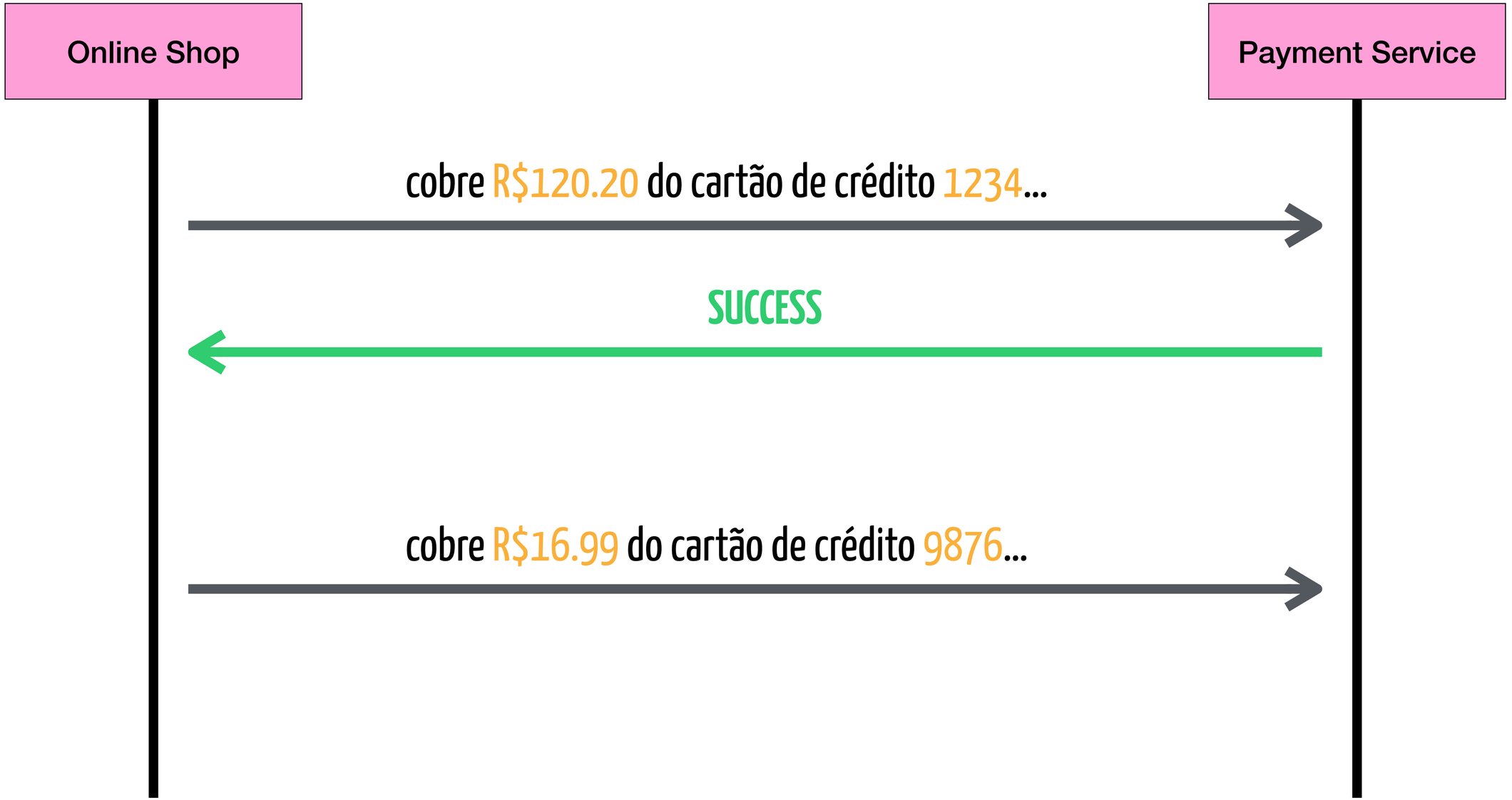
Pagamento Online



Pagamento Online



Pagamento Online



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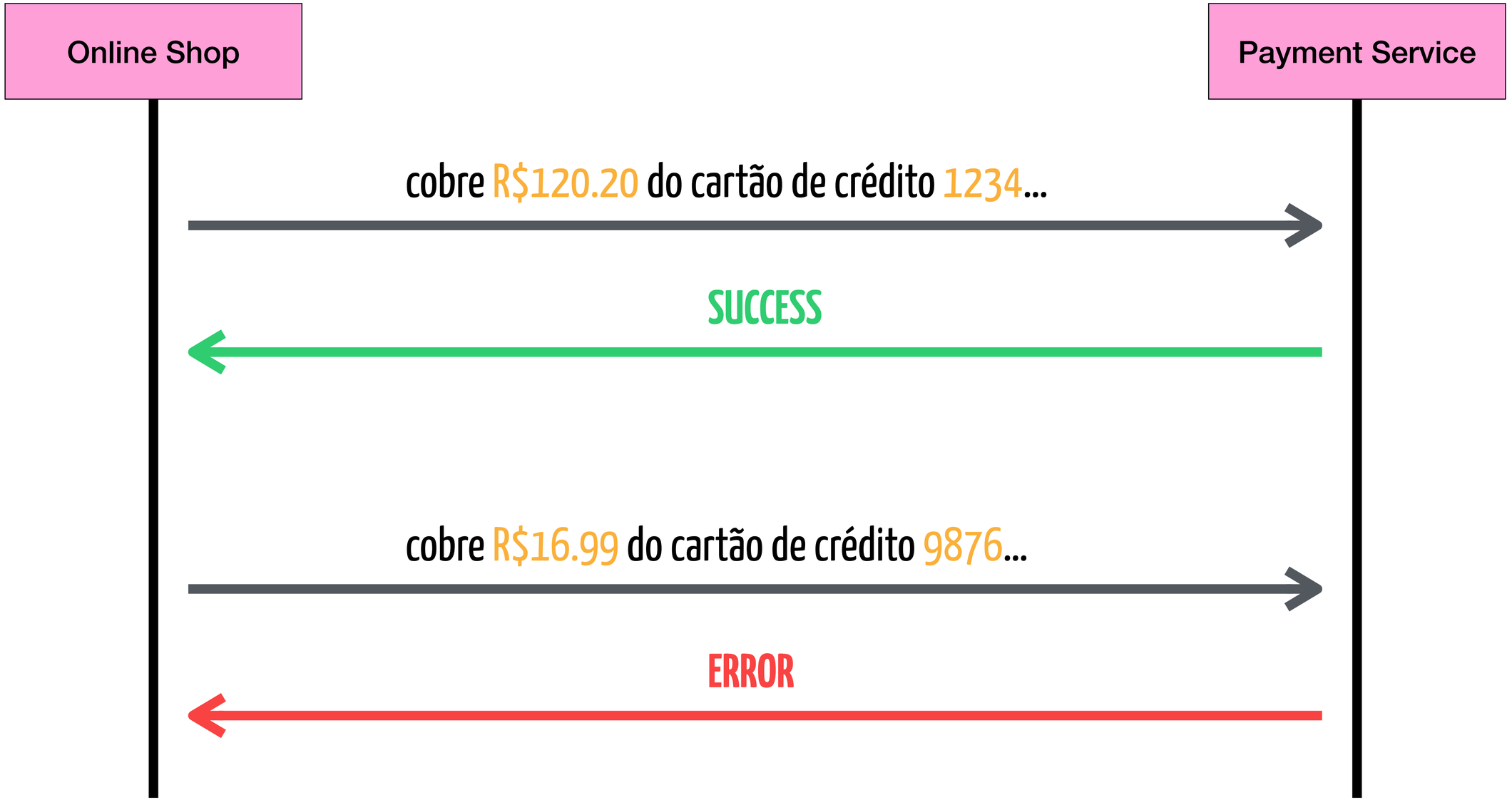
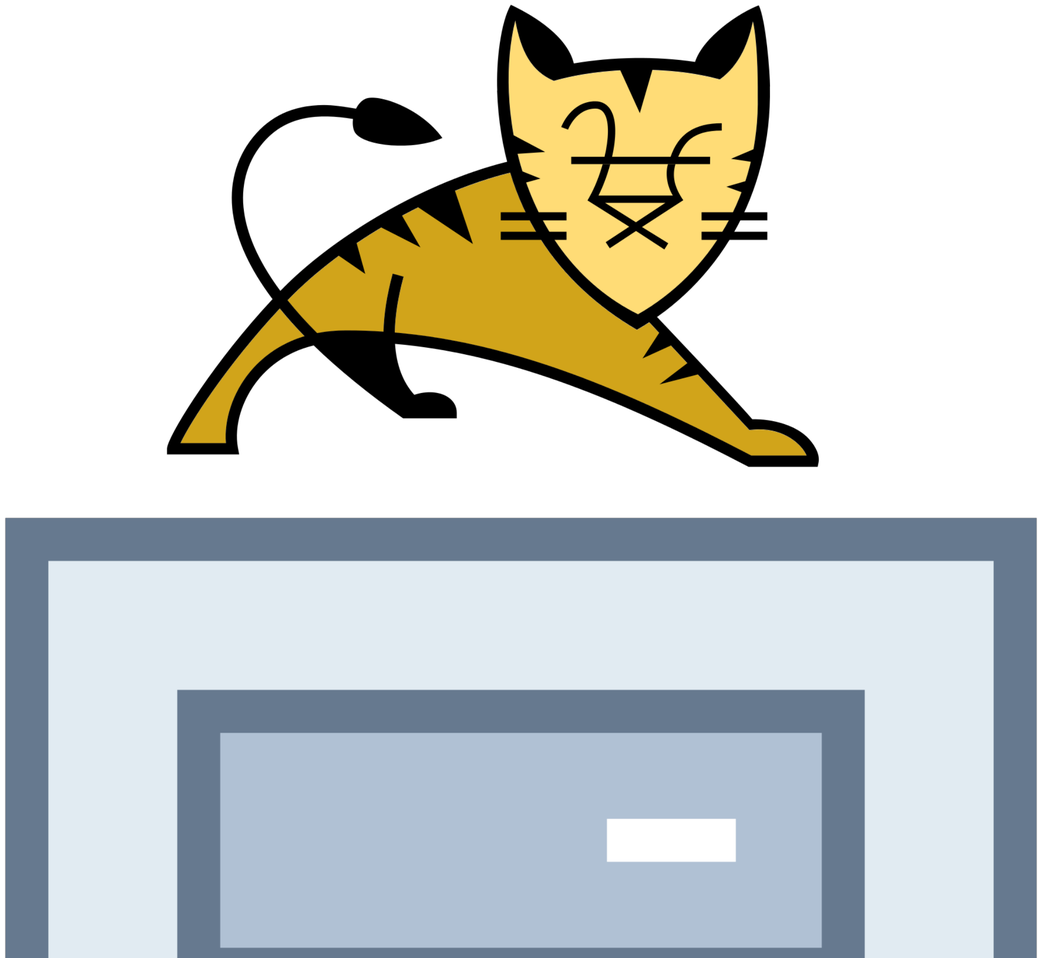
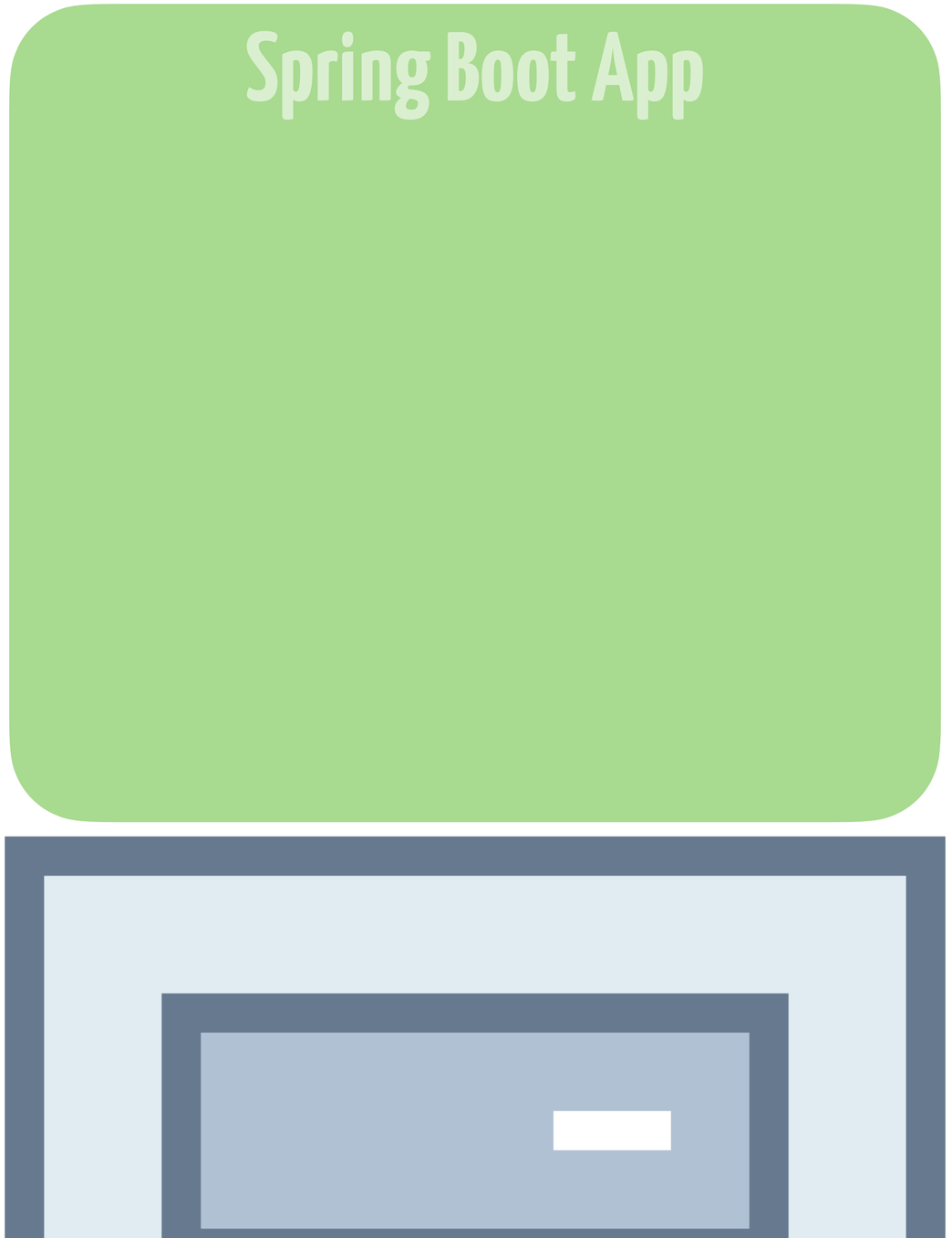
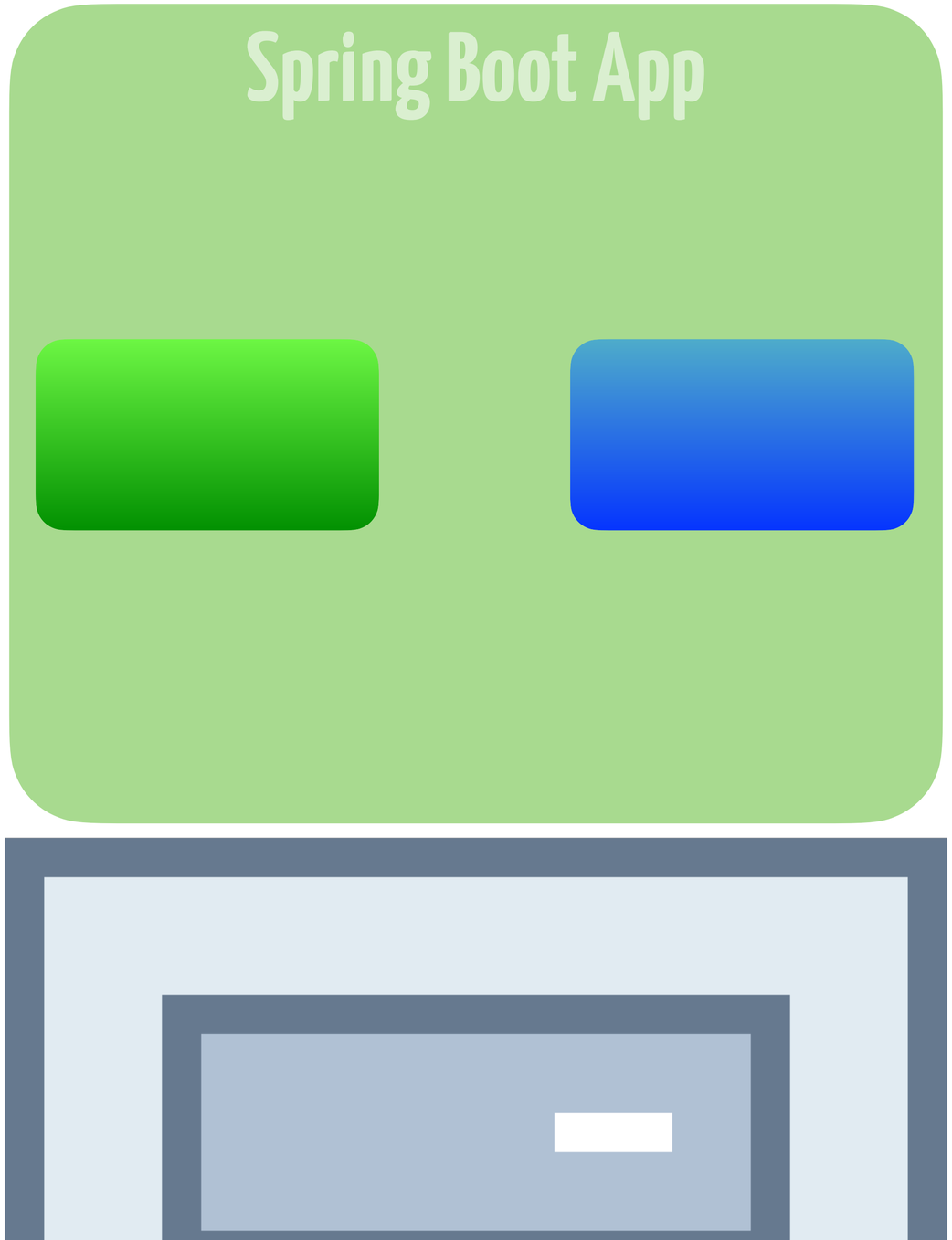
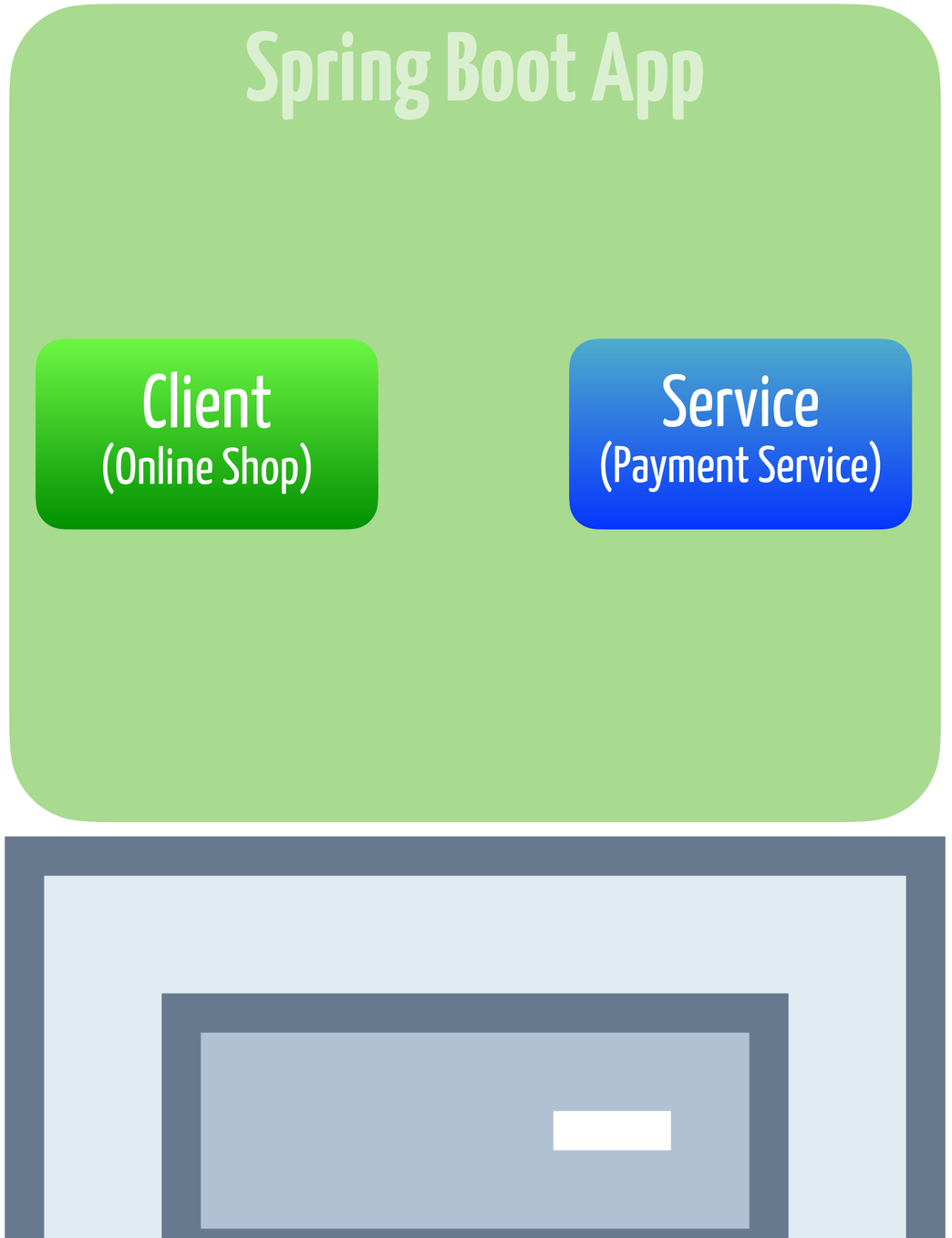


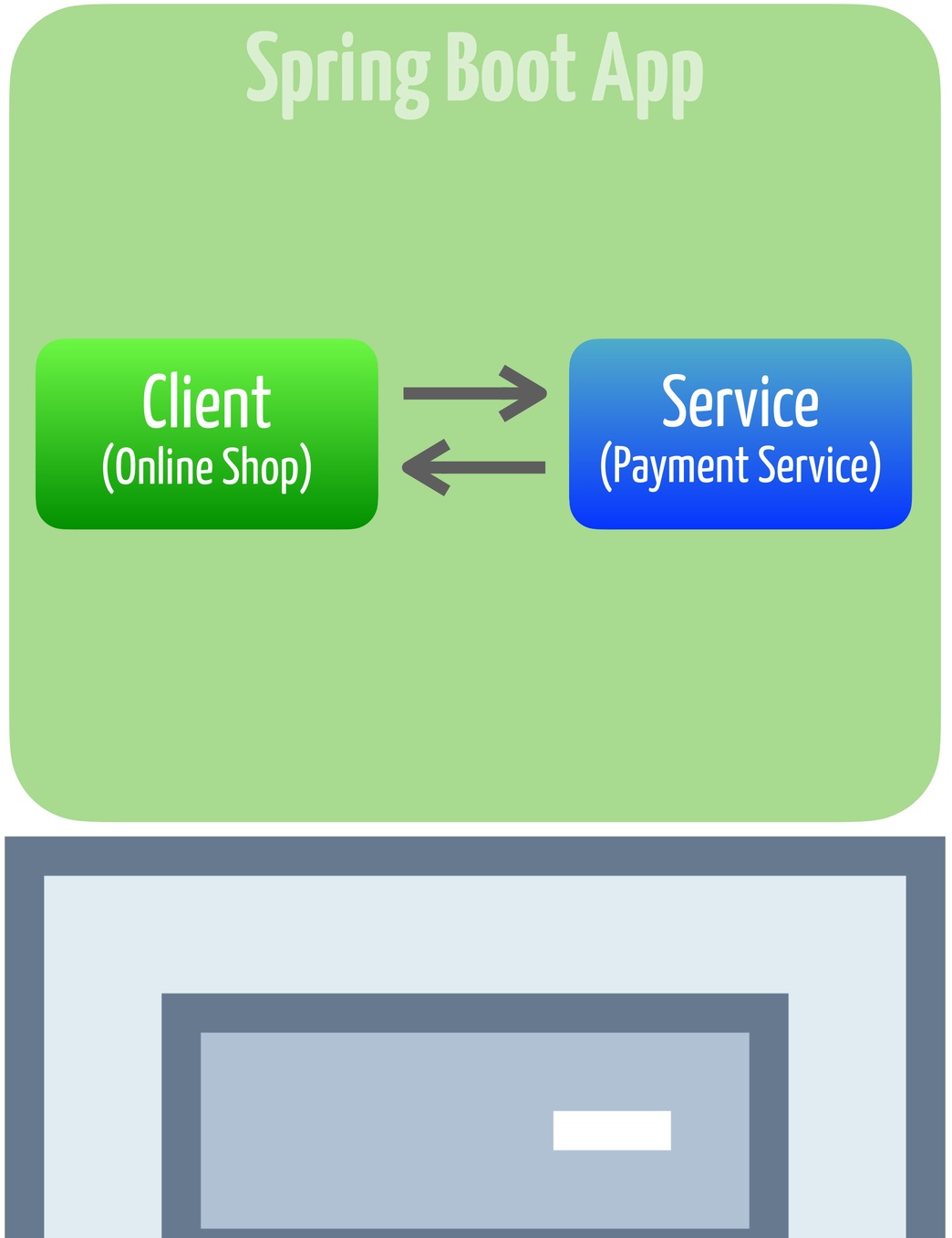
Como implementamos essa lógica?




Spring Boot App


Spring Boot App


Spring Boot App
Client
(Online Shop)
Service
(Payment Service)


Spring Boot App
Client
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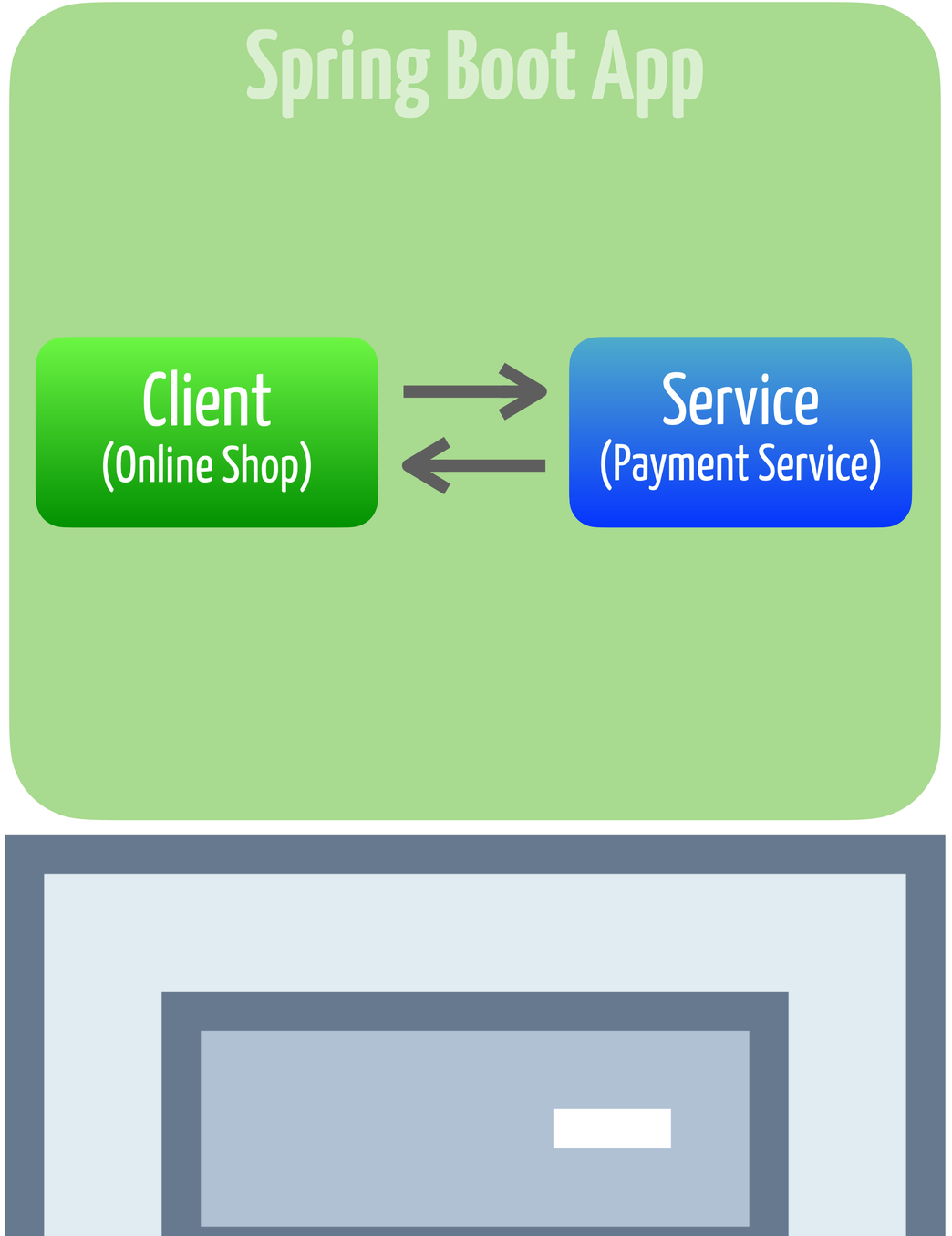
Local Calls


Spring Boot App
Client
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Service
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Local Calls


Spring Boot App
Client
(Online Shop)
Service
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request.setExpiryDate("03/2028");
request.setCvc("123");
request.setAmount(120.2);
request.setCurrency(Currency.BRL);

Result result = paymentService.processPayment(request);
if (result.isSuccess()) {
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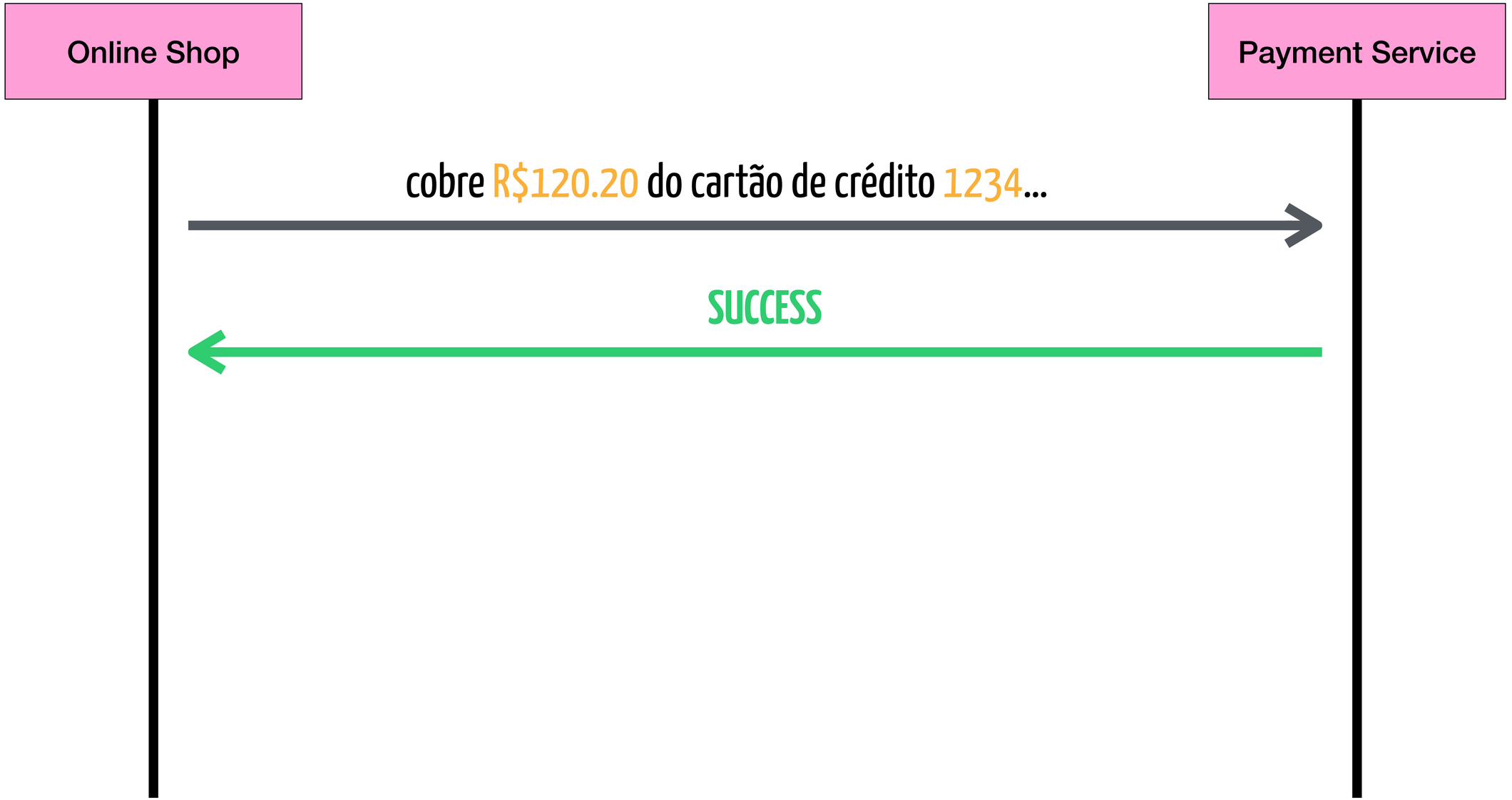
Mas quando trabalhamos com sistemas distribuídos...

Pagamento Online



Pagamento Online

Online Shop

Payment Service

cobre R$120.20 do cartão de crédito 1234...

SUCCESS

Pagamento Online

Online Shop

Payment Servic

cobre R$120.20 do cartão de crédito 1234...

SUCCESS

Spring Boot App

Spring Boot App

Spring Boot App

Client
(Online Shop)

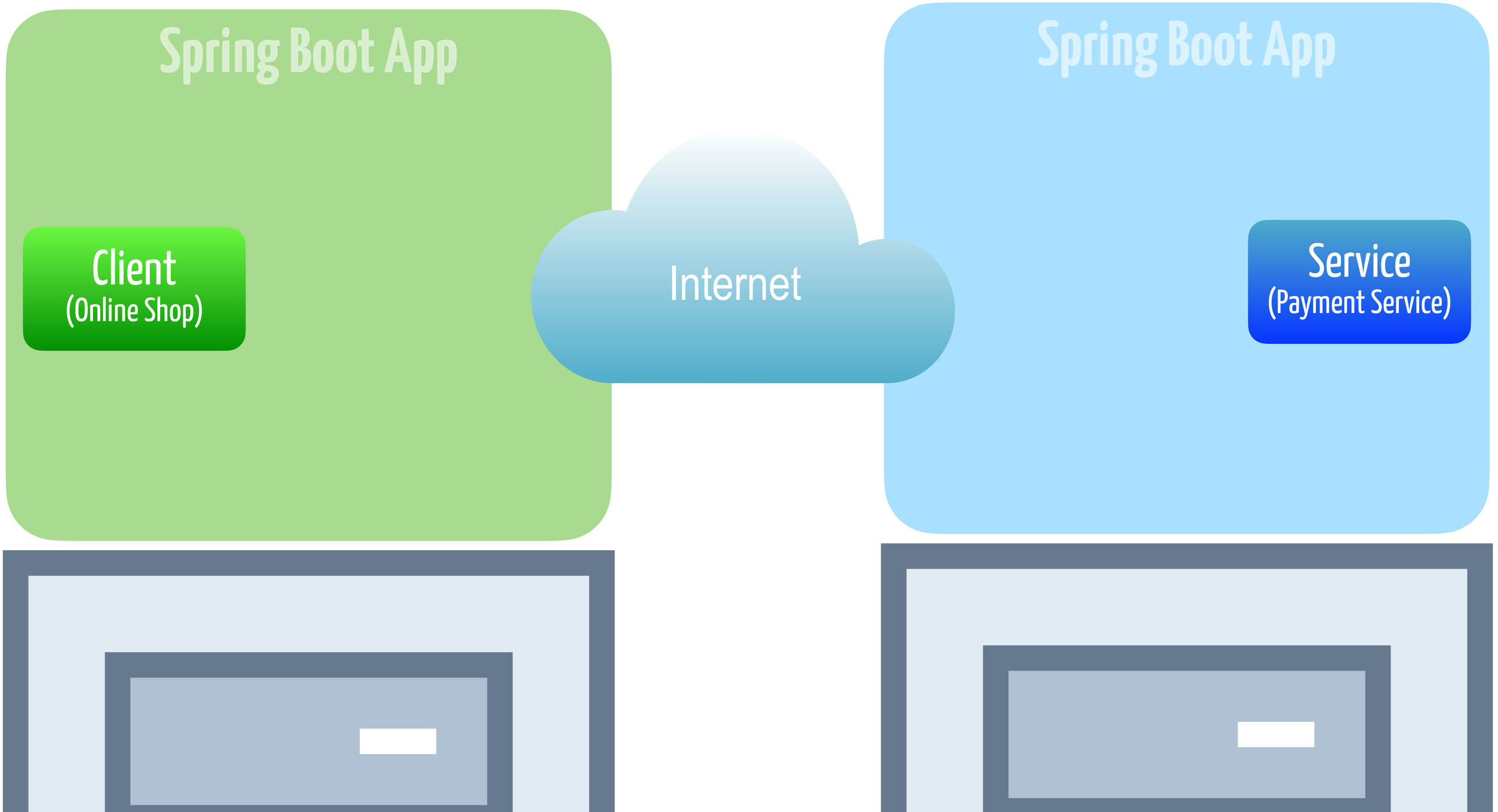
Spring Boot App

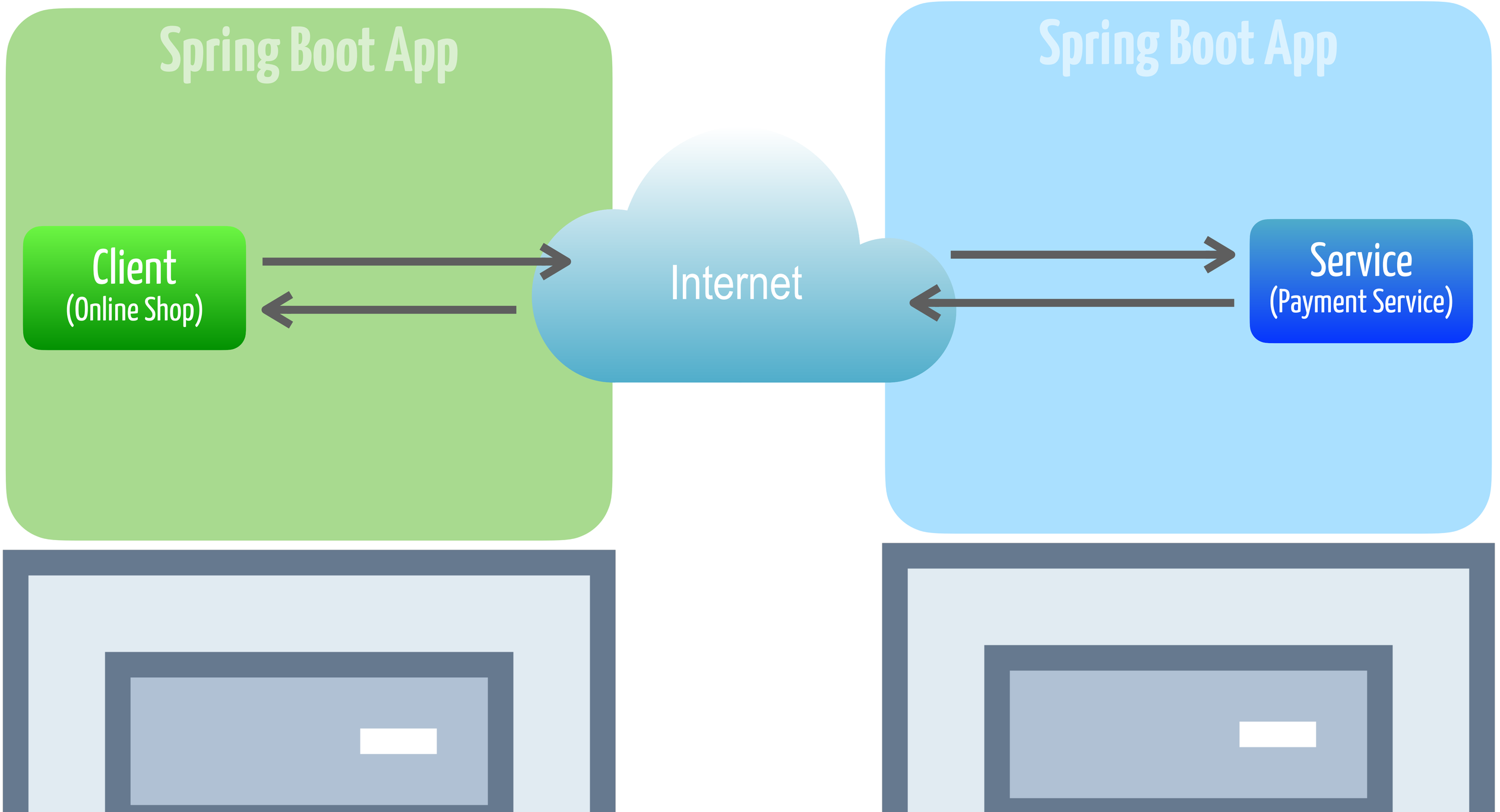
Spring Boot App

Client
(Online Shop)

Spring Boot App

Service
(Payment Service)


Spring Boot App
Client
(Online Shop)
Internet
Spring Boot App
Service
(Payment Service)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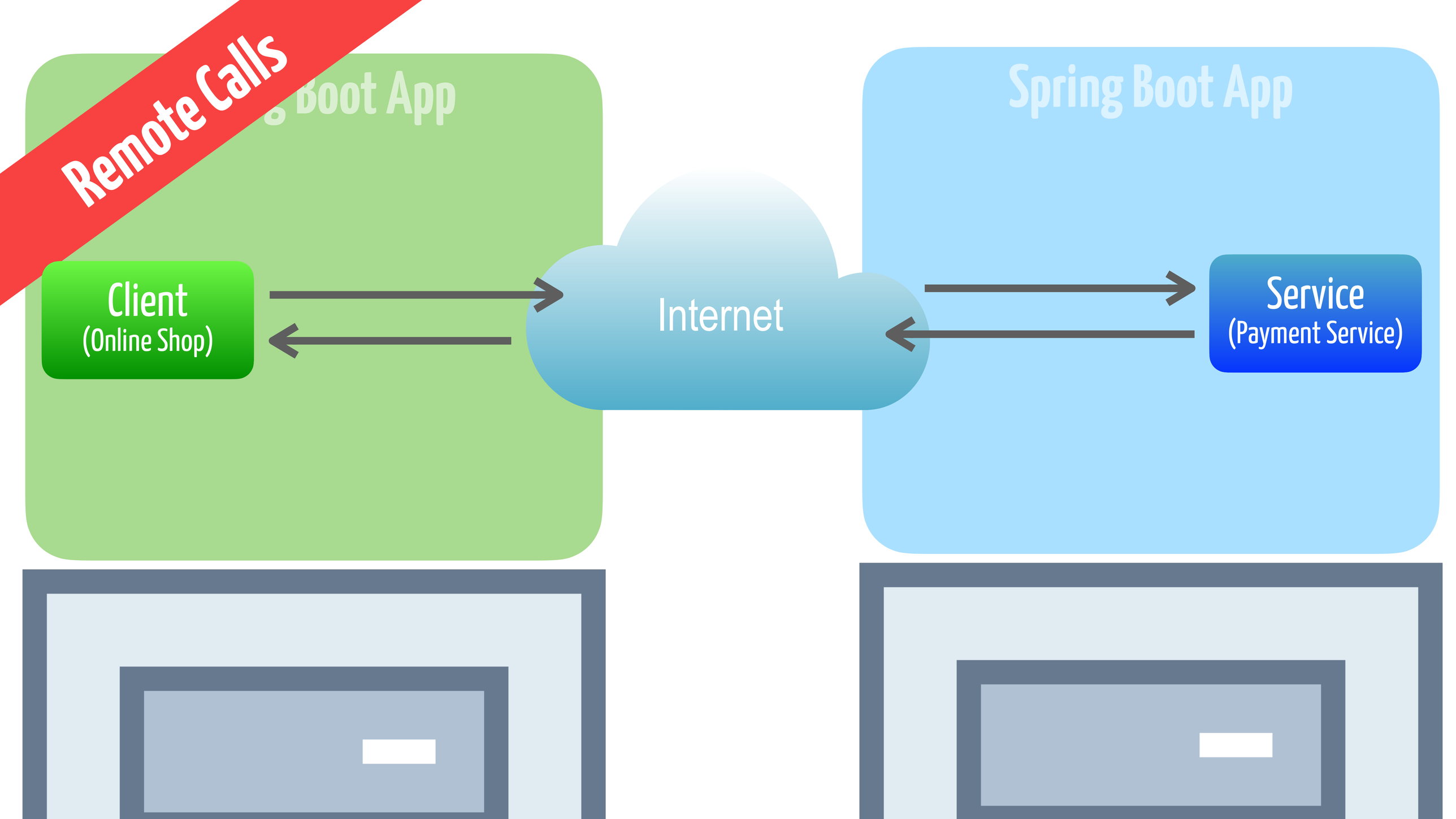
Remote Calls
Boot App
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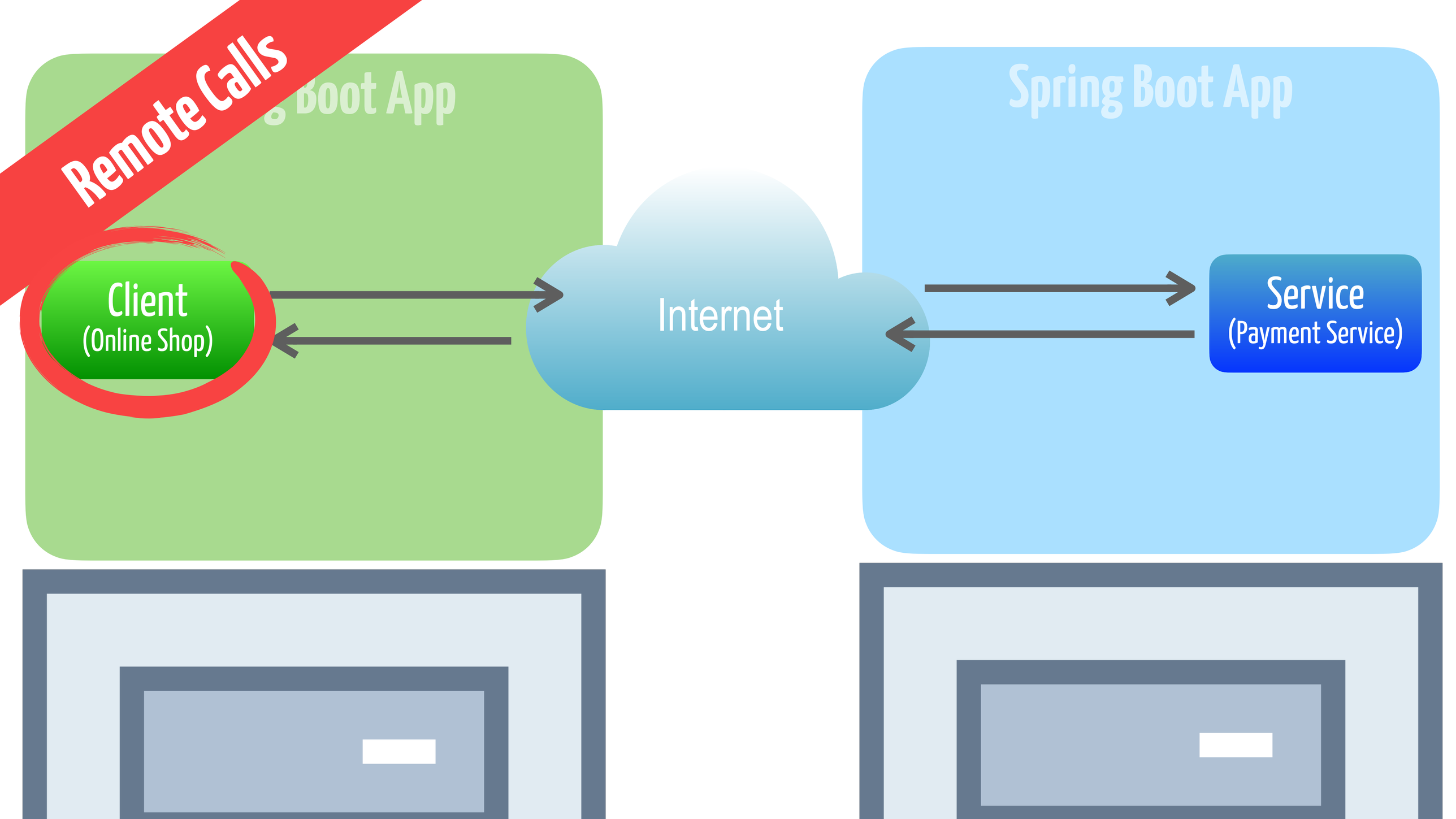
Spring Boot App
Service
(Payment Service)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RPC framework

RPC Framework

Online Shop

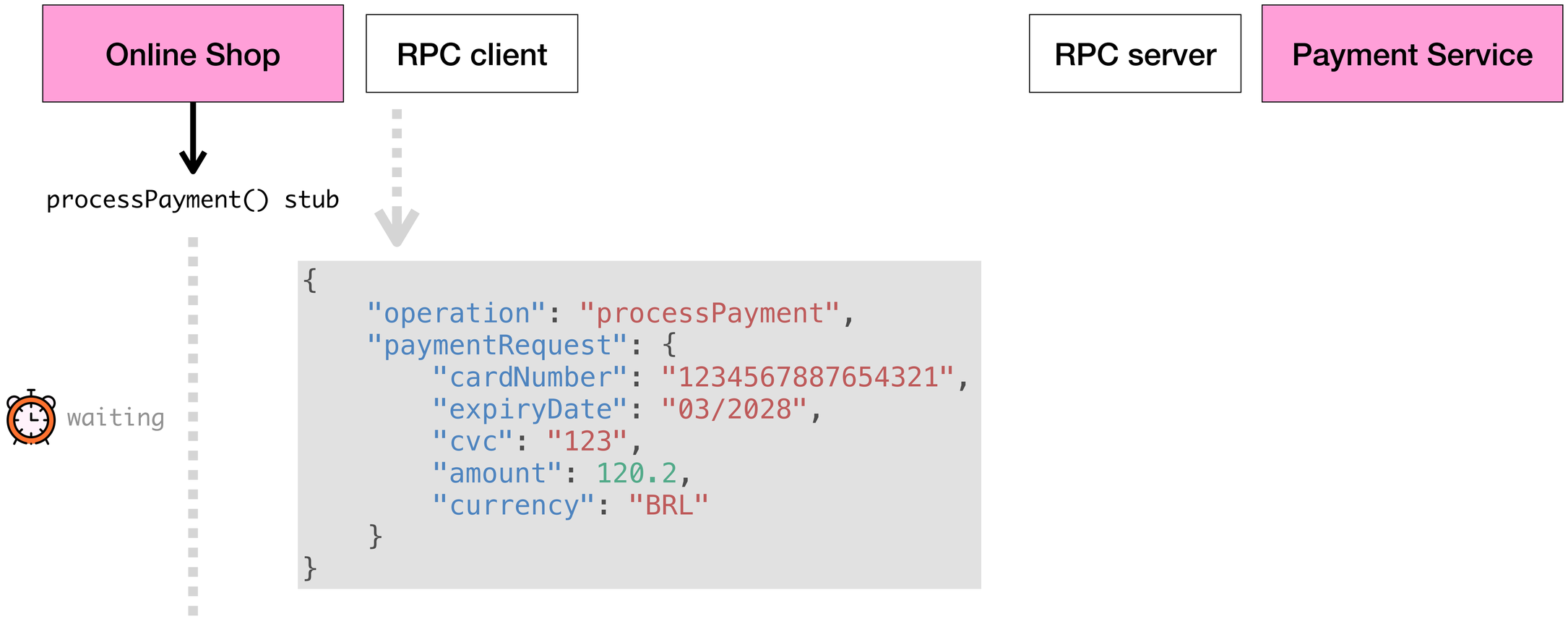
Payment Service

RPC Framework

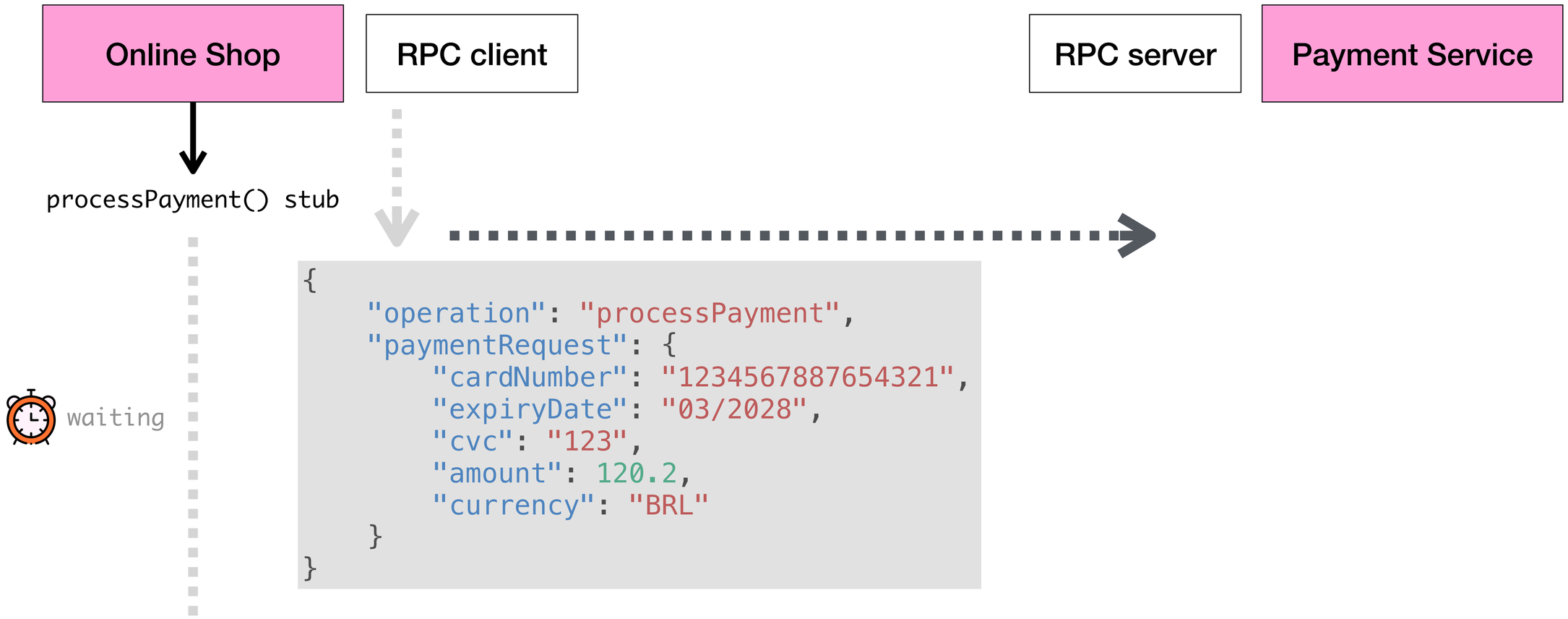
RPC Framework

RPC Framework

RPC Framework



RPC Framework



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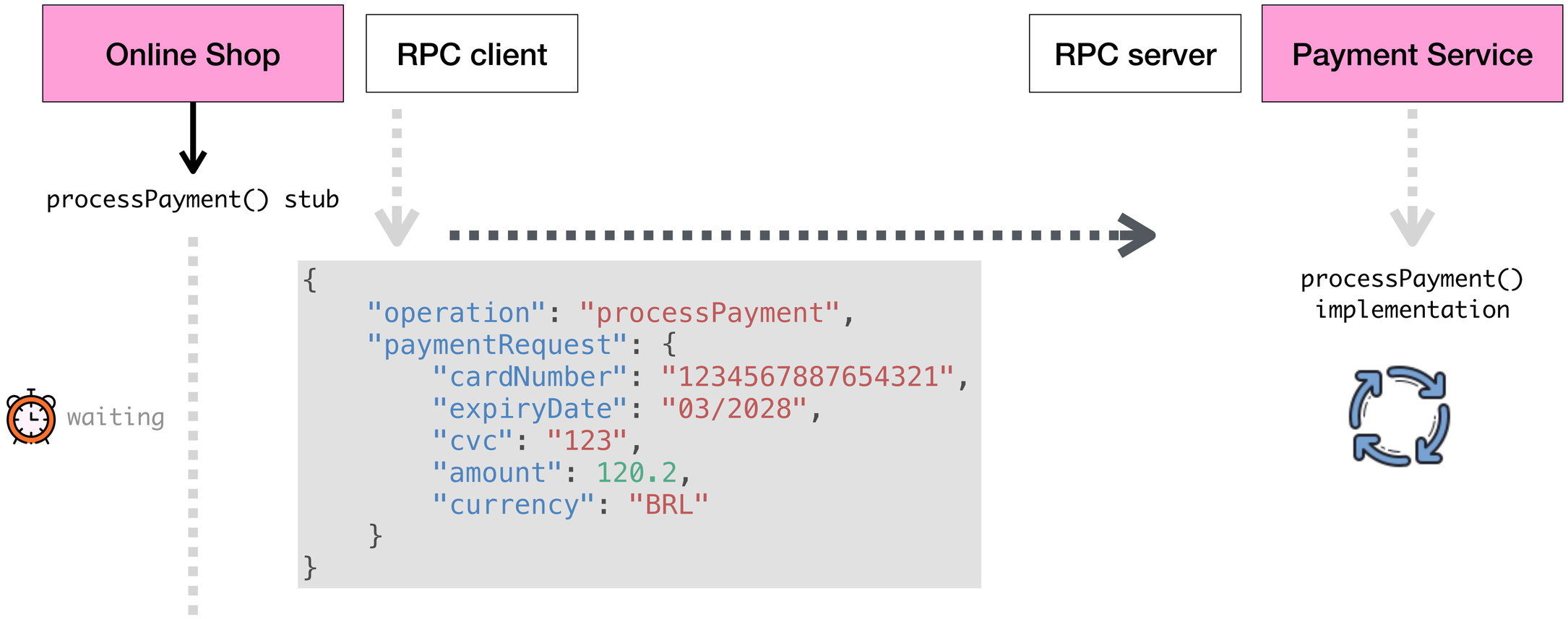
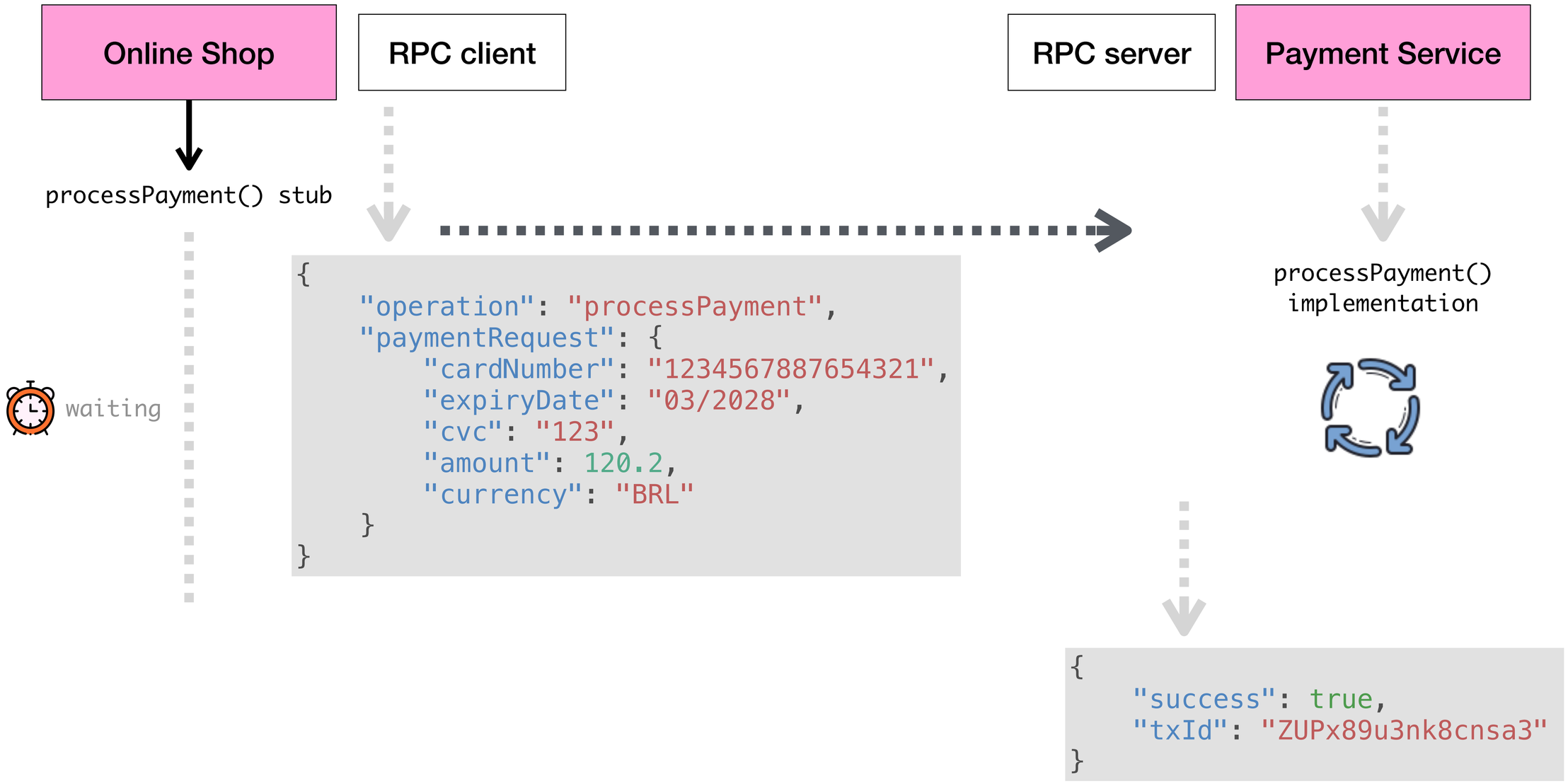
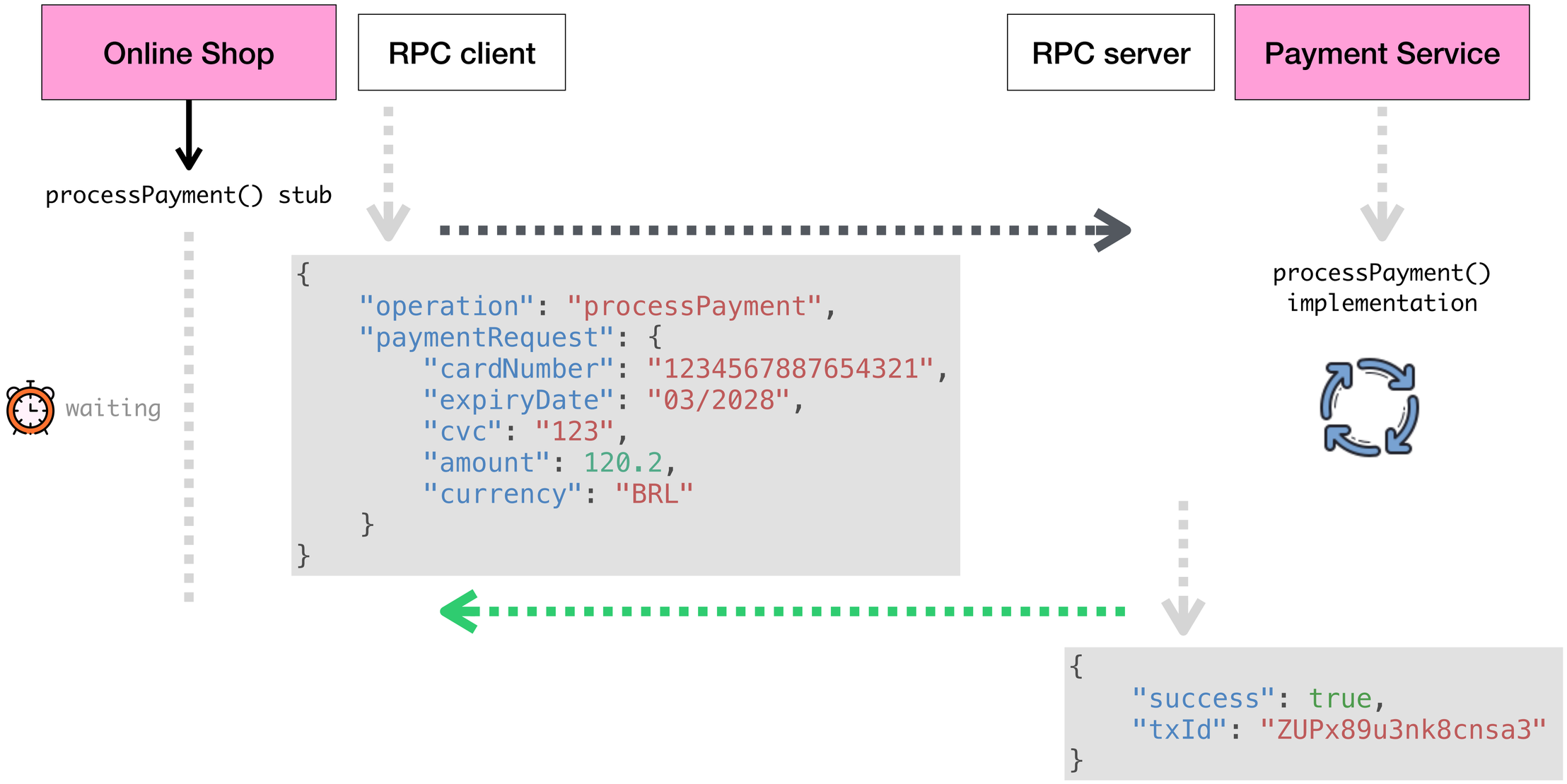


RPC Framework



RPC Framework



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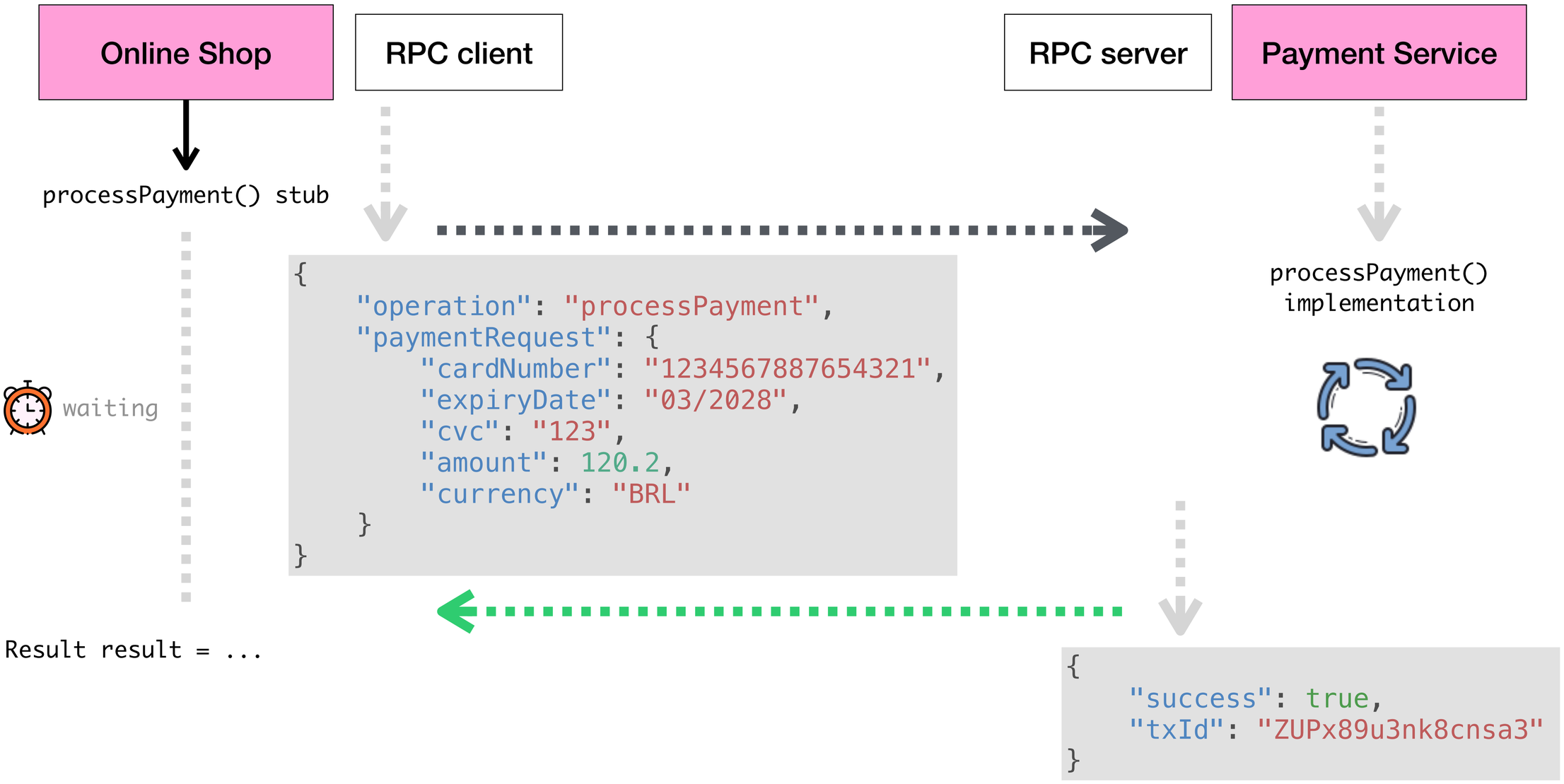

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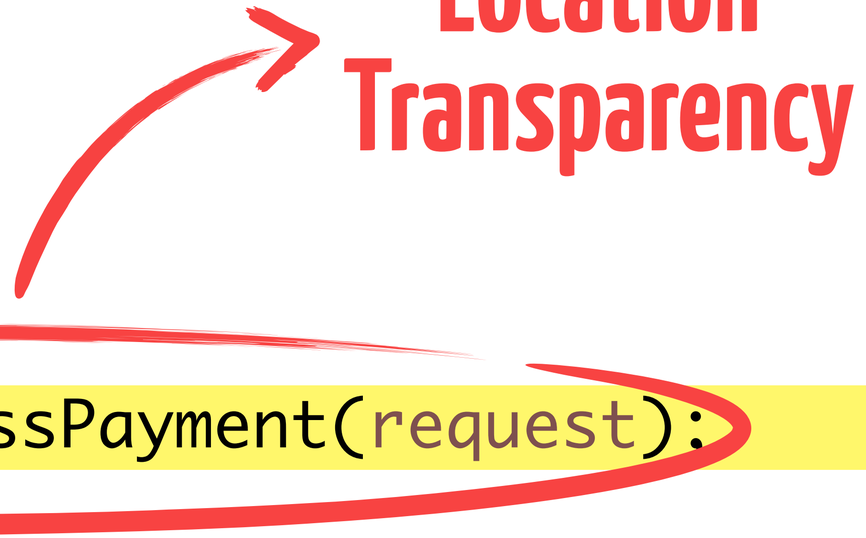
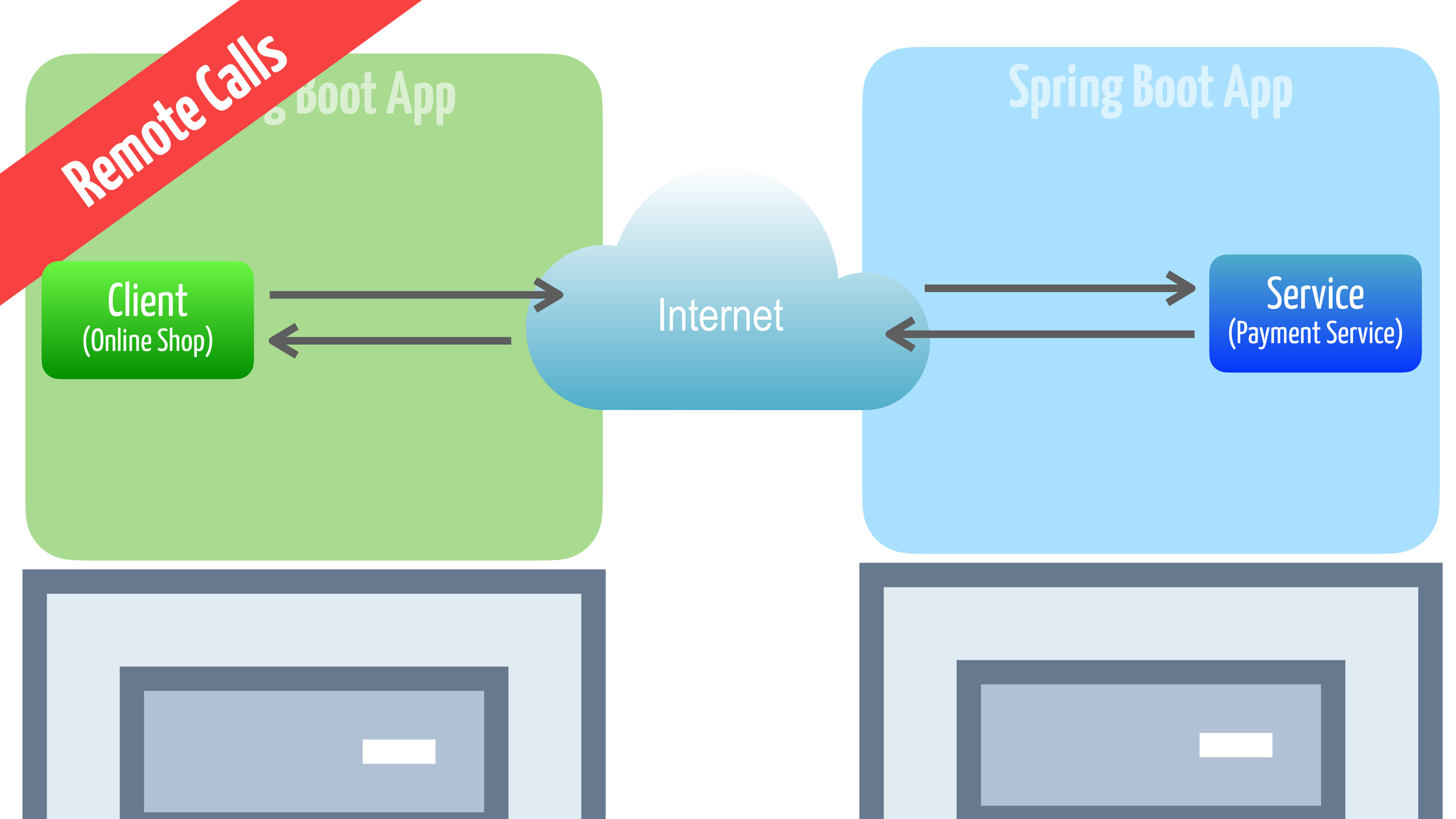


Mas na prática...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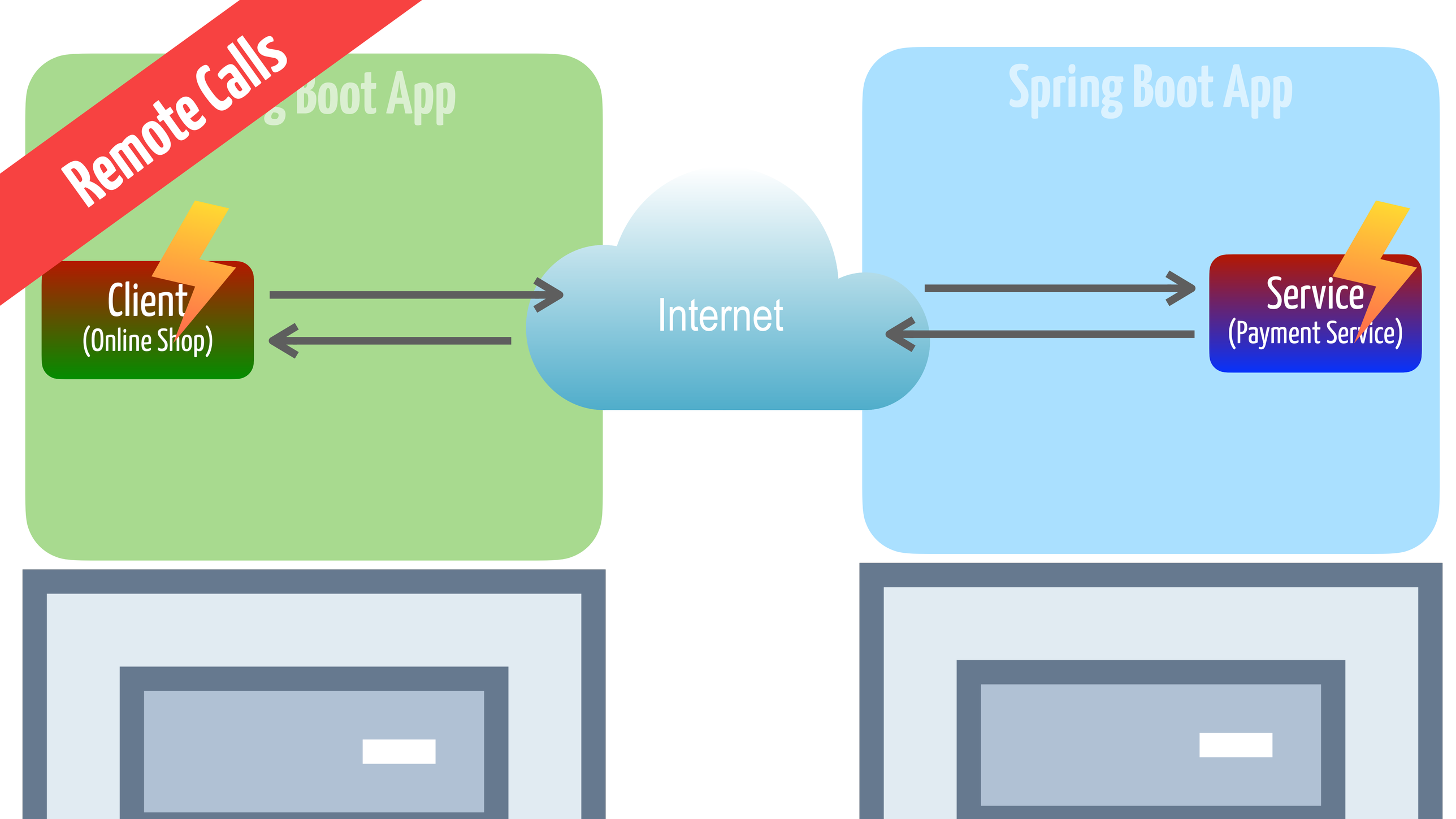
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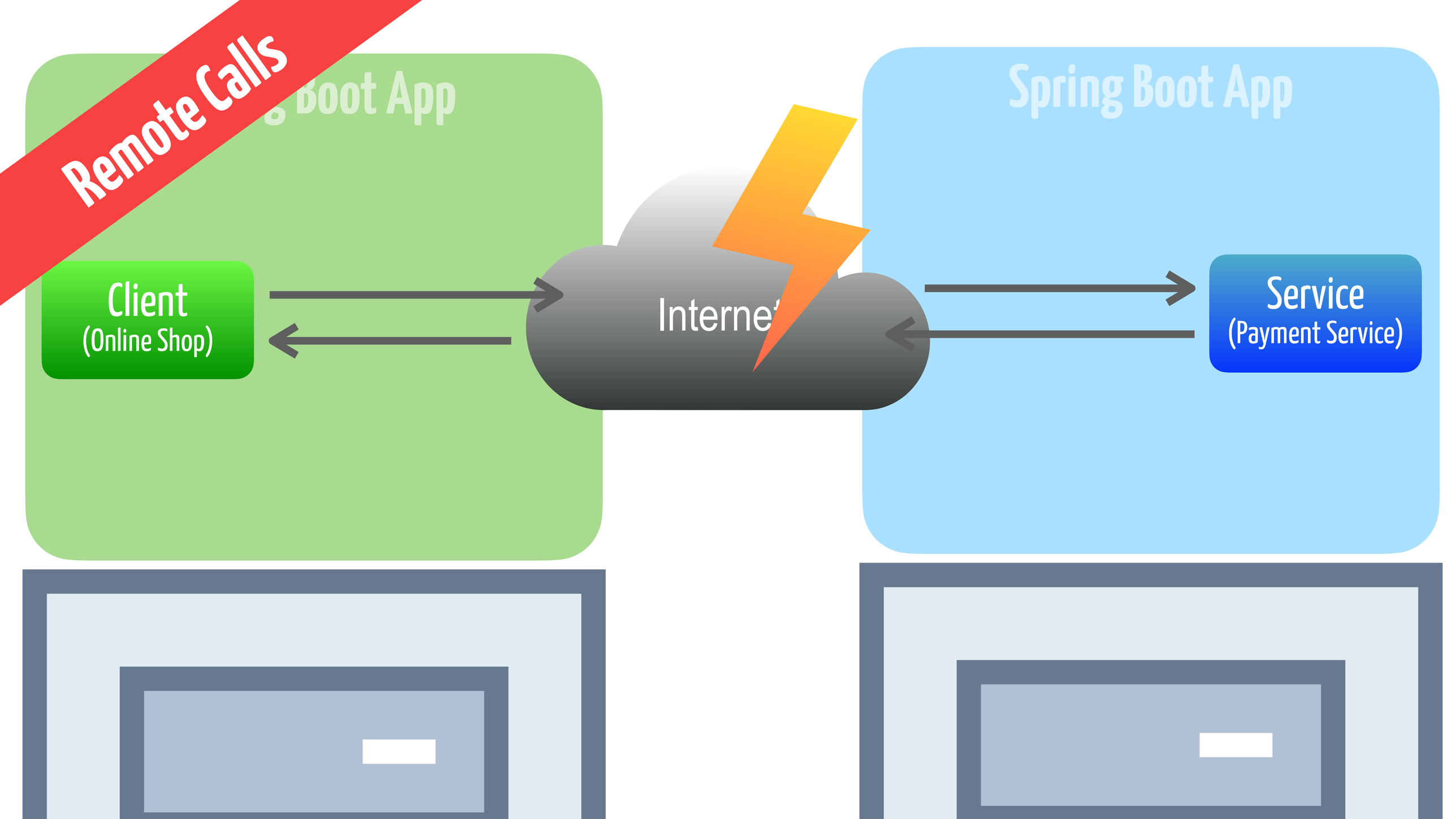
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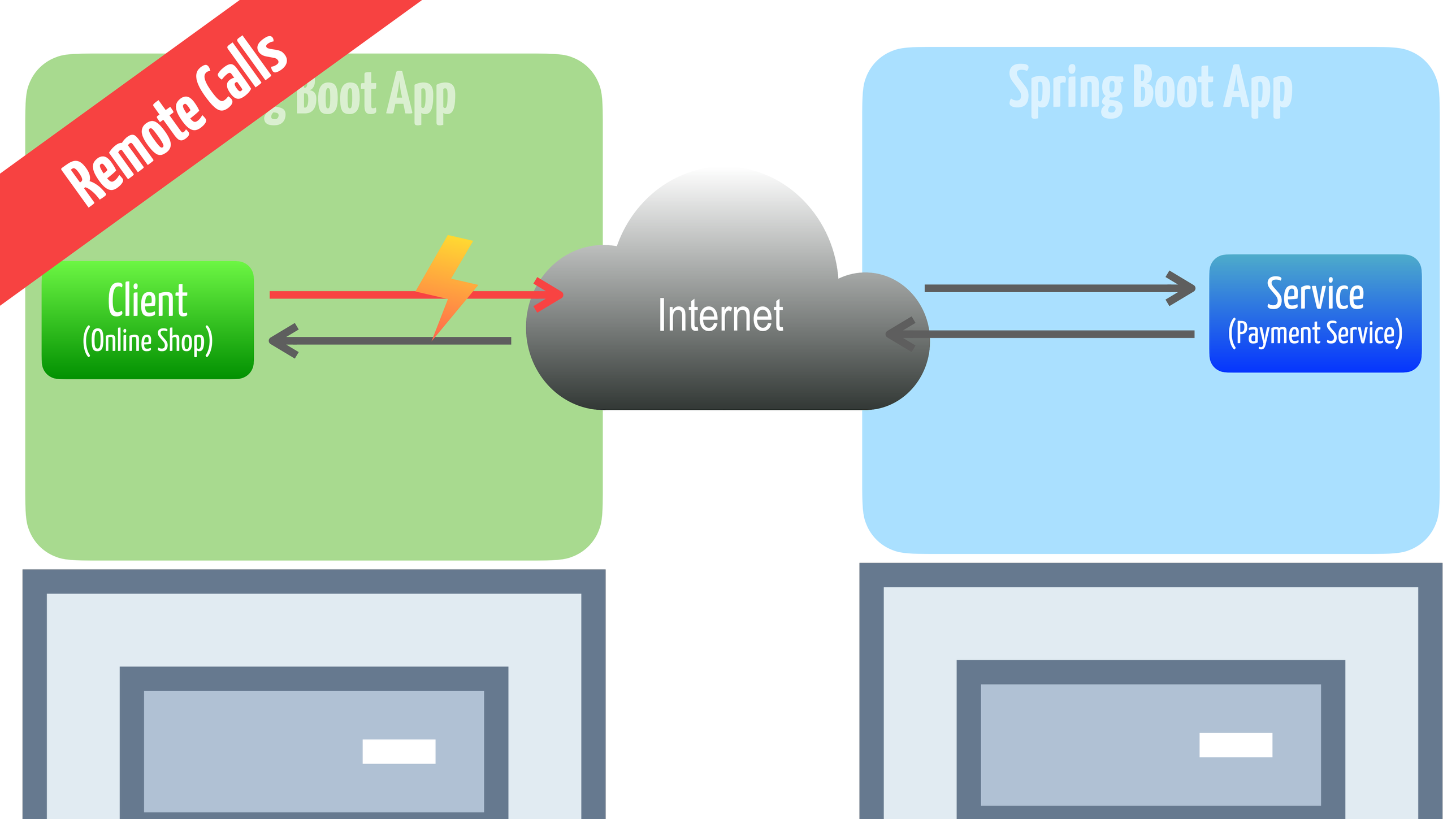
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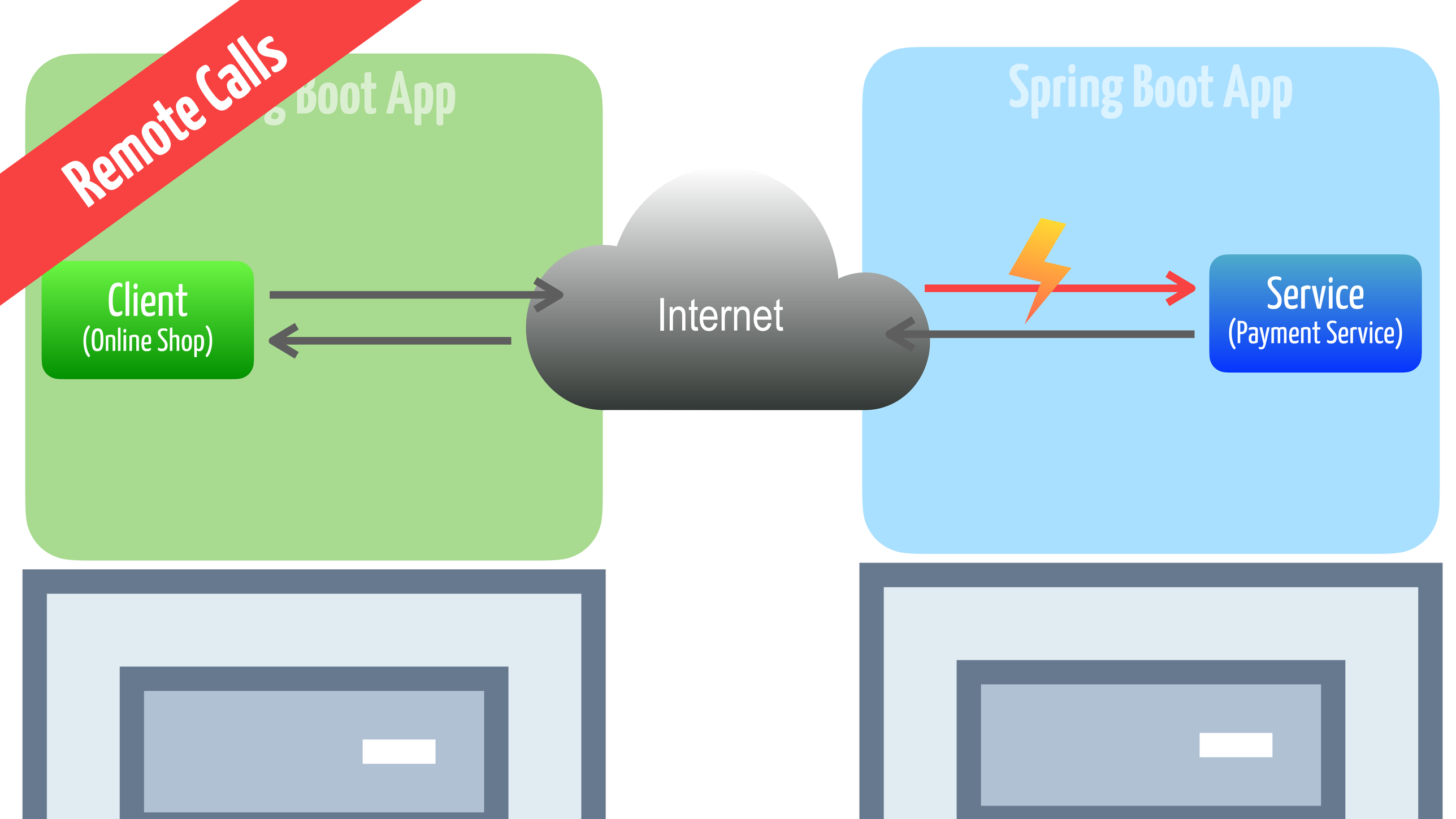
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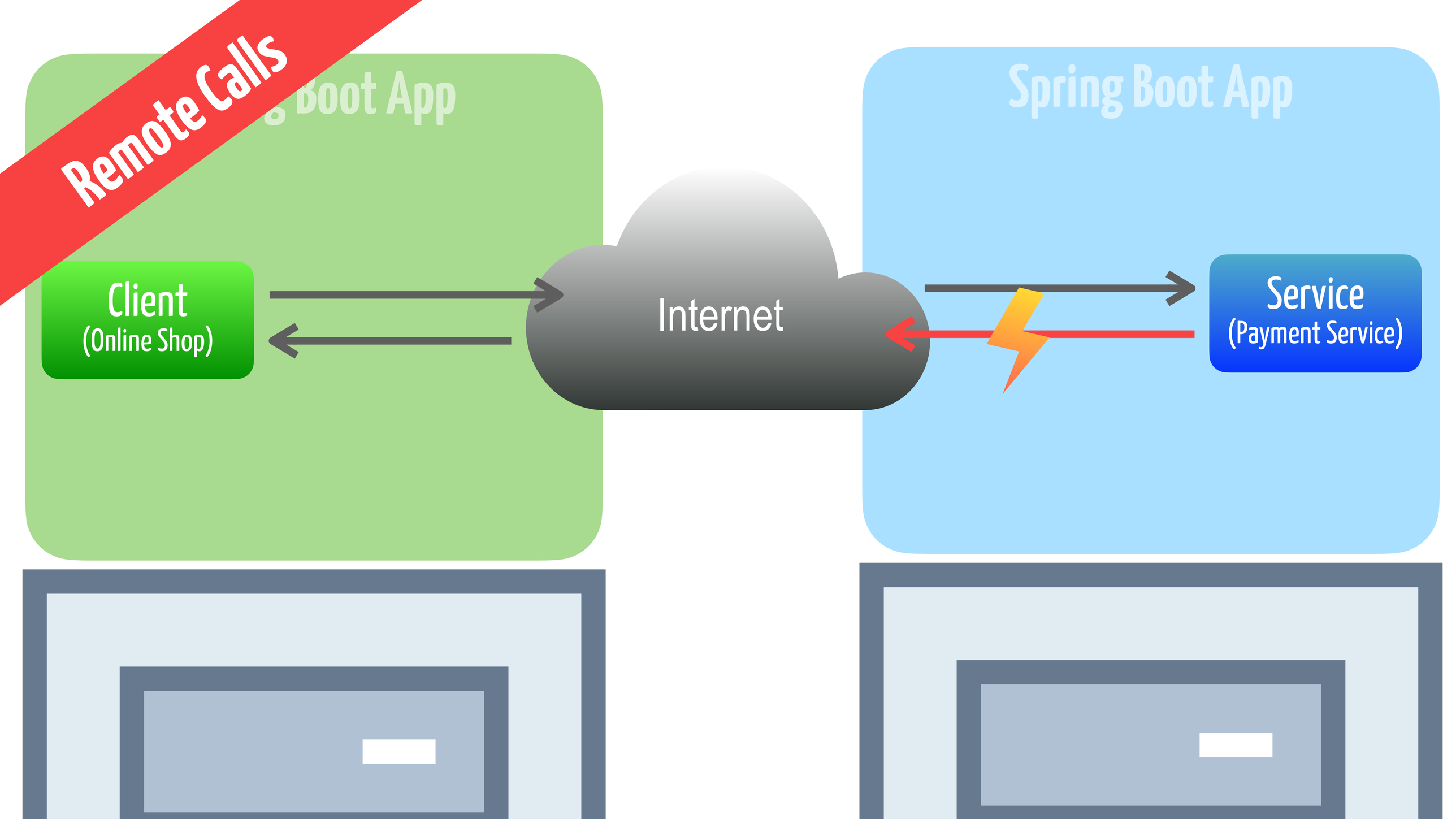
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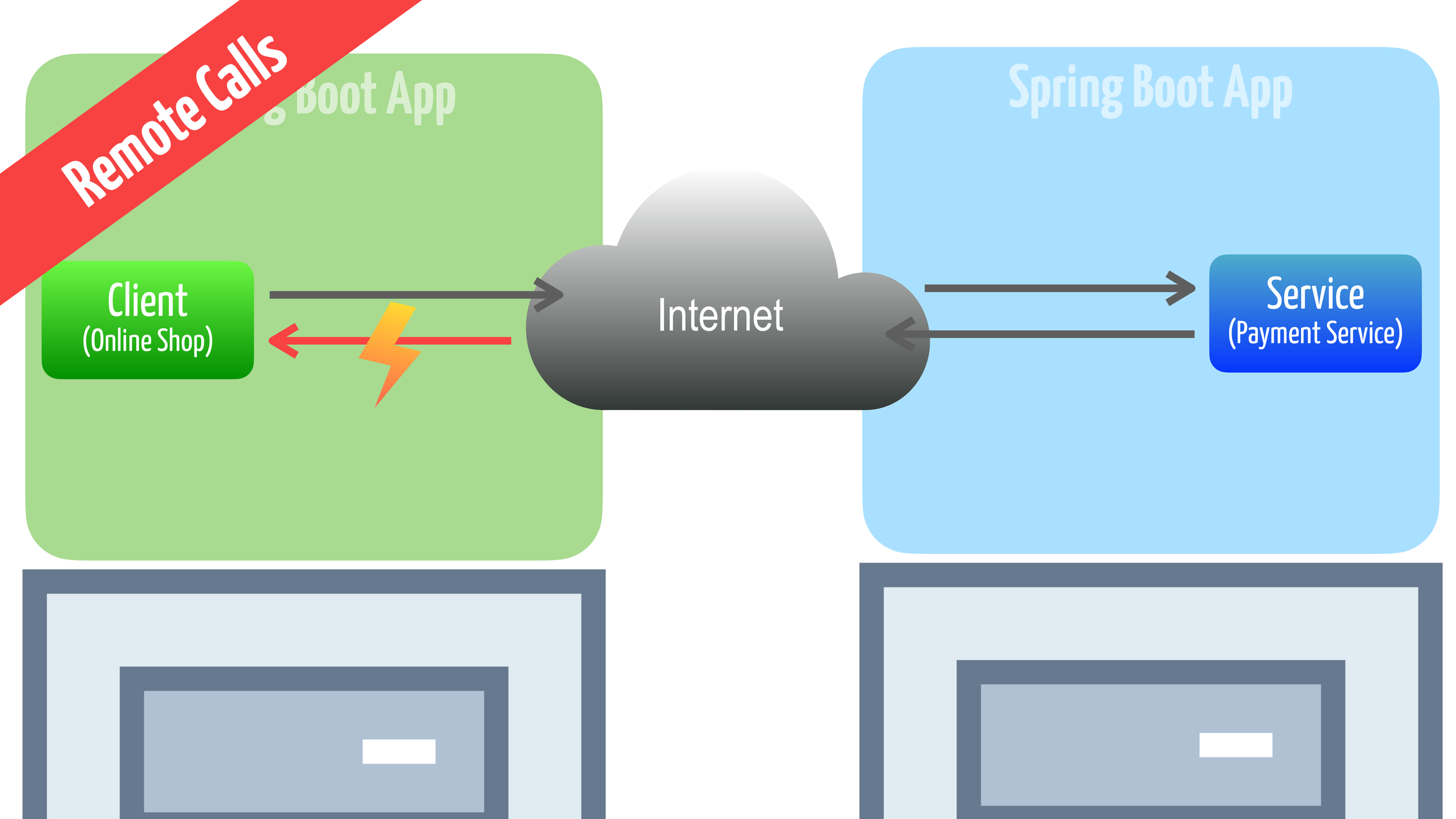
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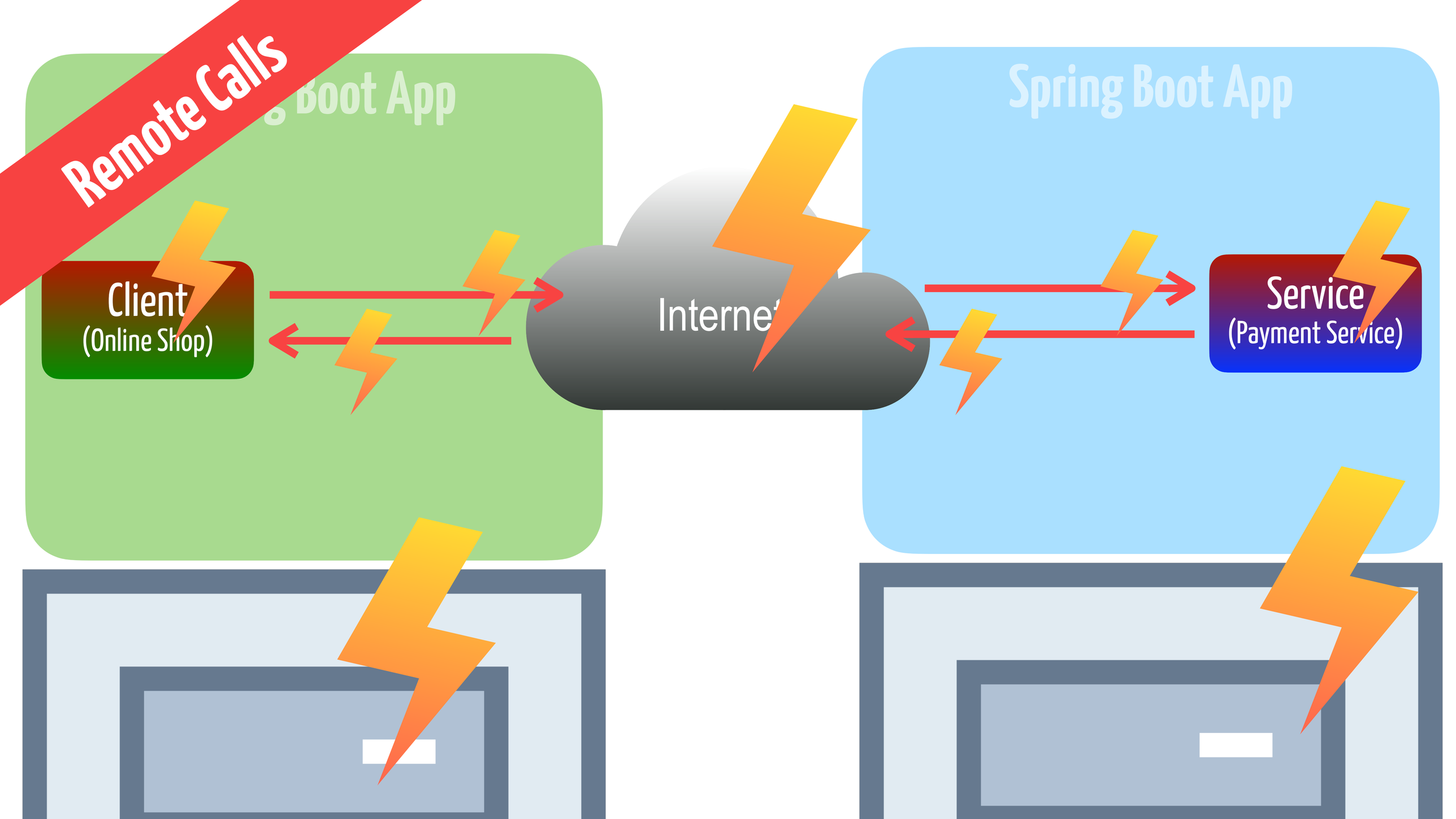
Remote Calls
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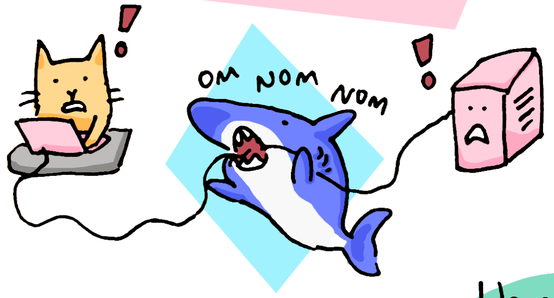
the 8 Fallacies of Distributed Computing

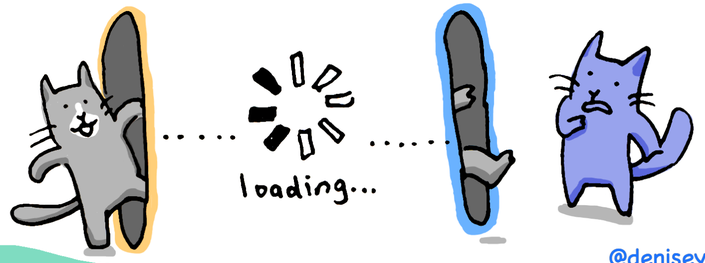
@deniseyu21

Originally formulated by L. Peter Deutsch & Colleagues at Sun Microsystems in 1994; #8 added in 1997 by James Gosling

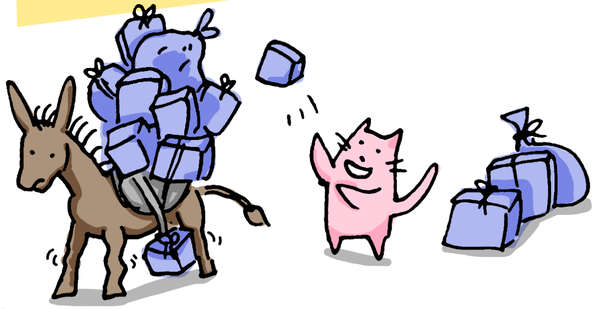
(1) The network is reliable



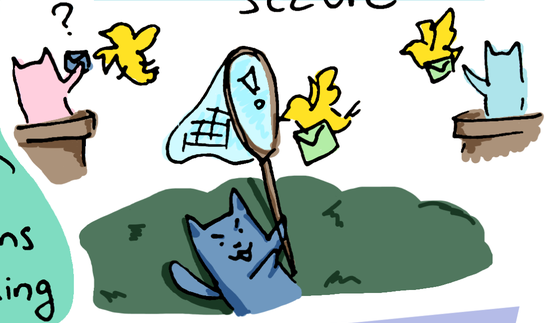
(2) Latency is ZERO



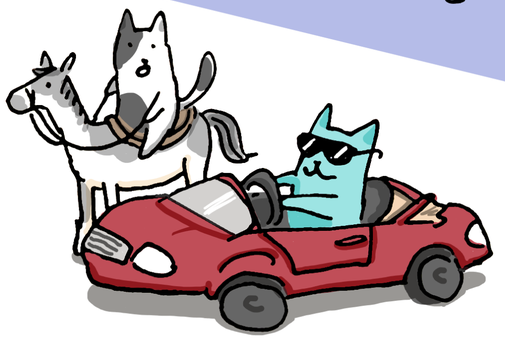
(3) Bandwidth is infinite



(4) The network is secure



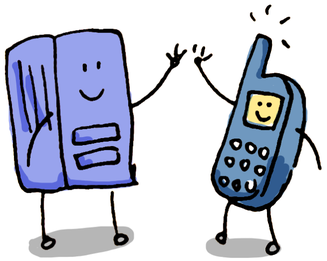
(5) Topology doesn't change



(6) There is only one administrator

(7) Transport costs $0

(8) The network is homogeneous

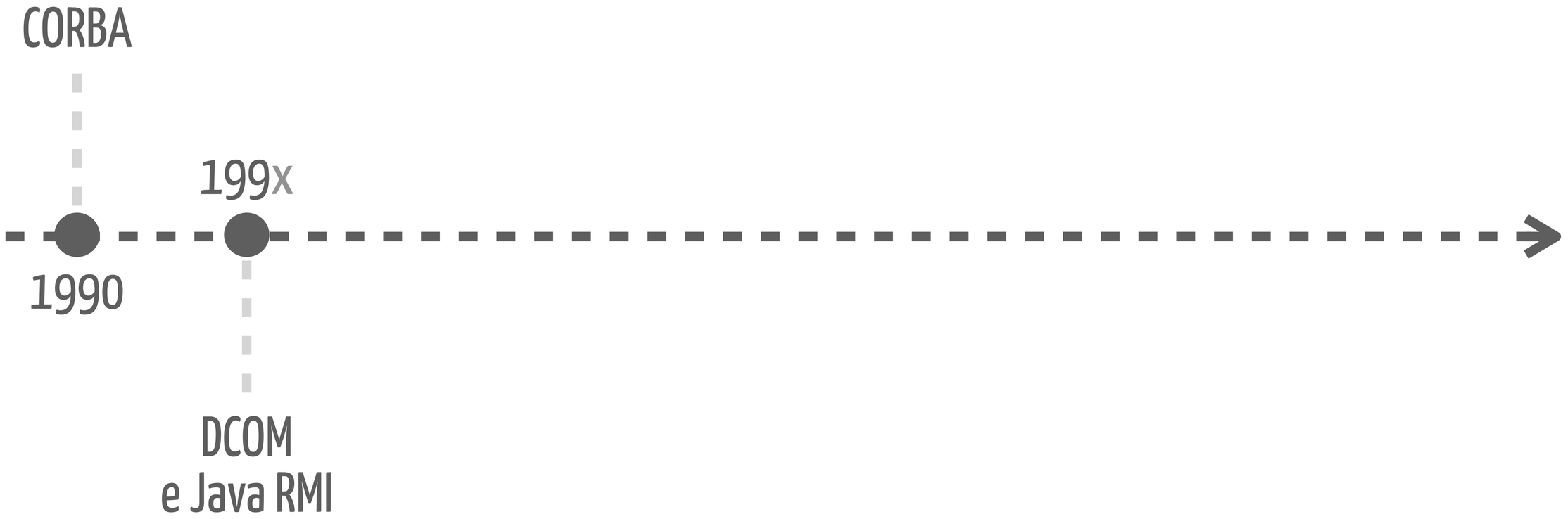


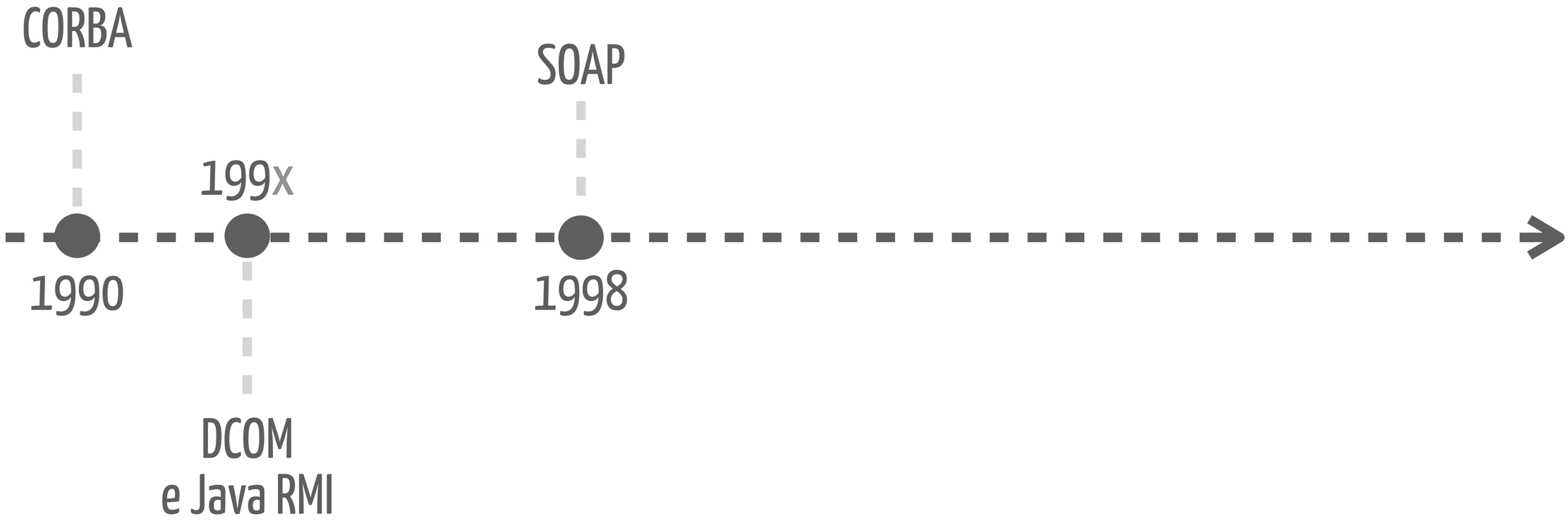
https://deniseyu.io/art/

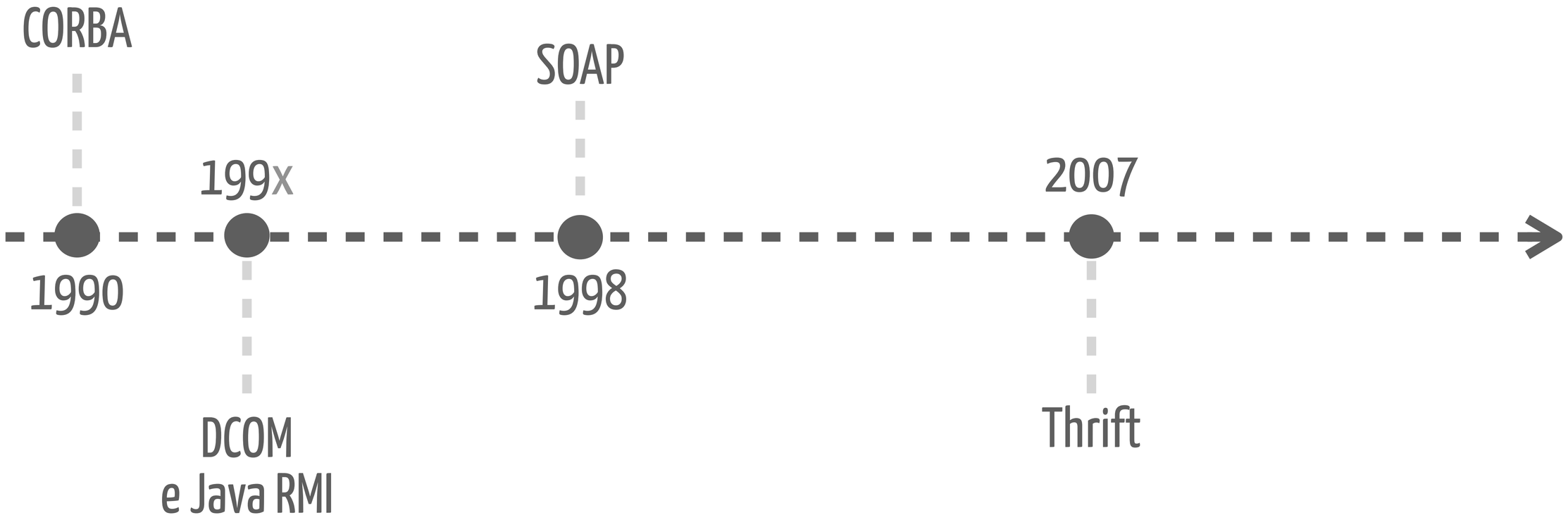
Falando em frameworks...

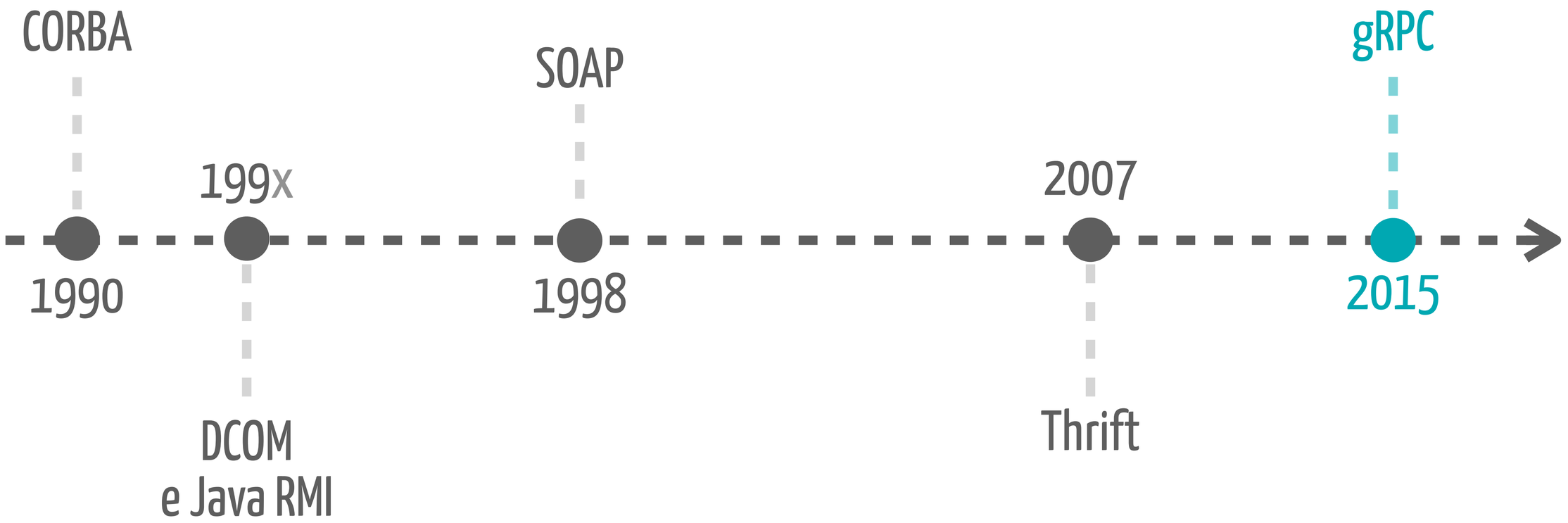

1990


CORBA
1990


CORBA
199x
1990
DCOM
e Java RMI


CORBA
SOAP
199x
1990
1998
DCOM
e Java RMI


CORBA
SOAP
199x
2007
1990
1998
DCOM
e Java RMI
Thrift


CORBA
199x
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2007
gRPC
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2015
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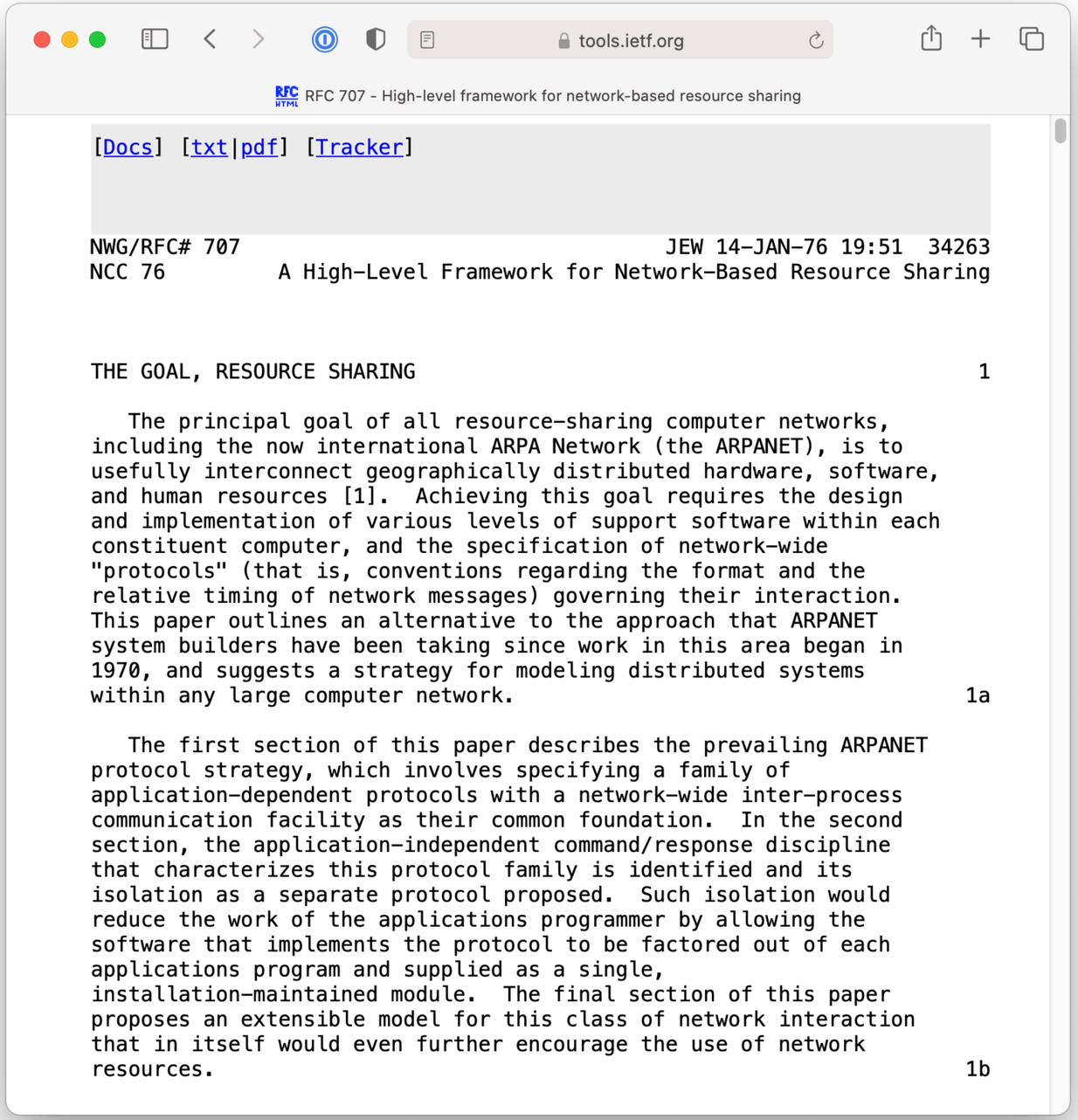
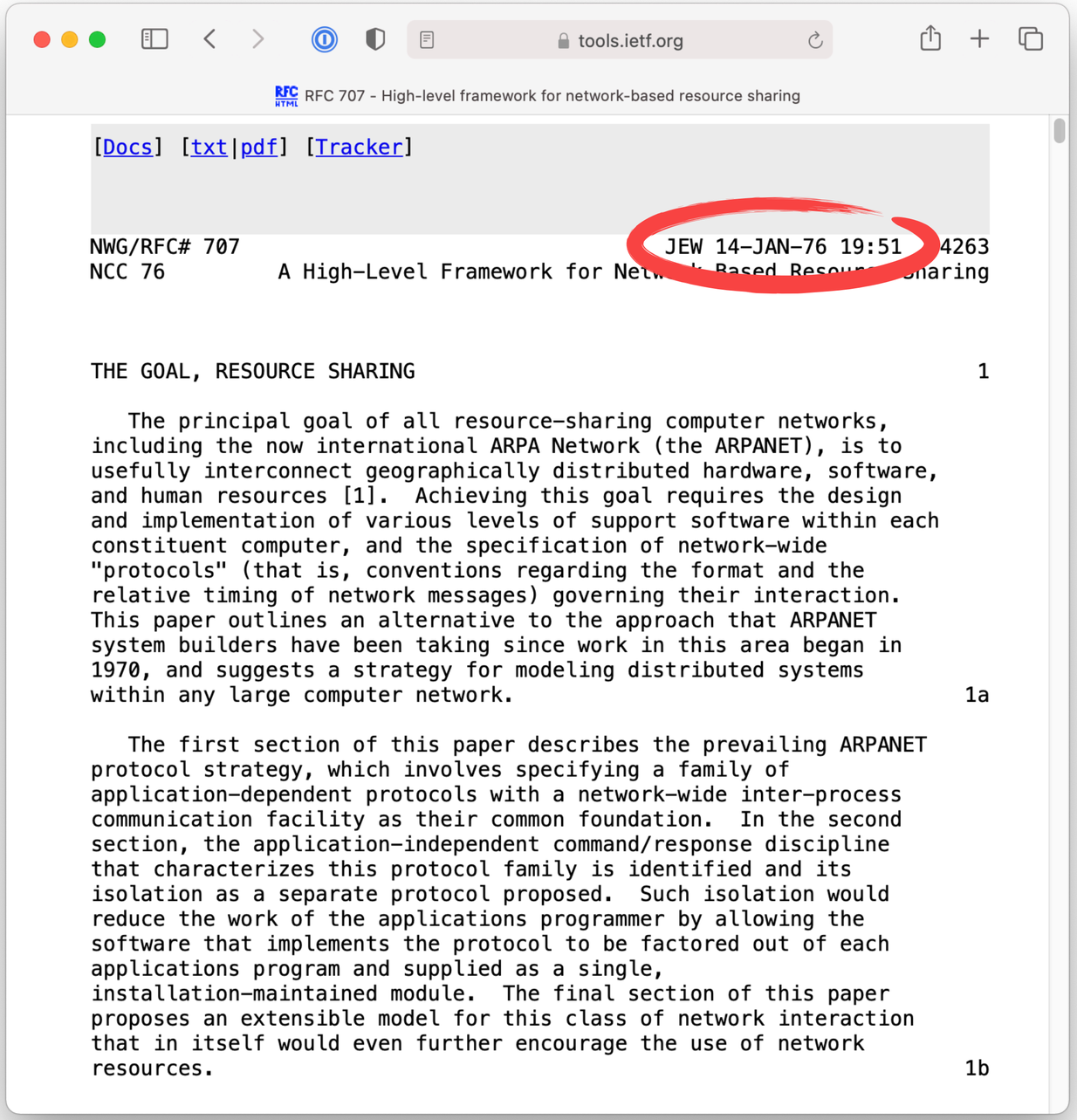
https://tools.ietf.org/html/rfc707



https://tools.ietf.org/html/rfc707



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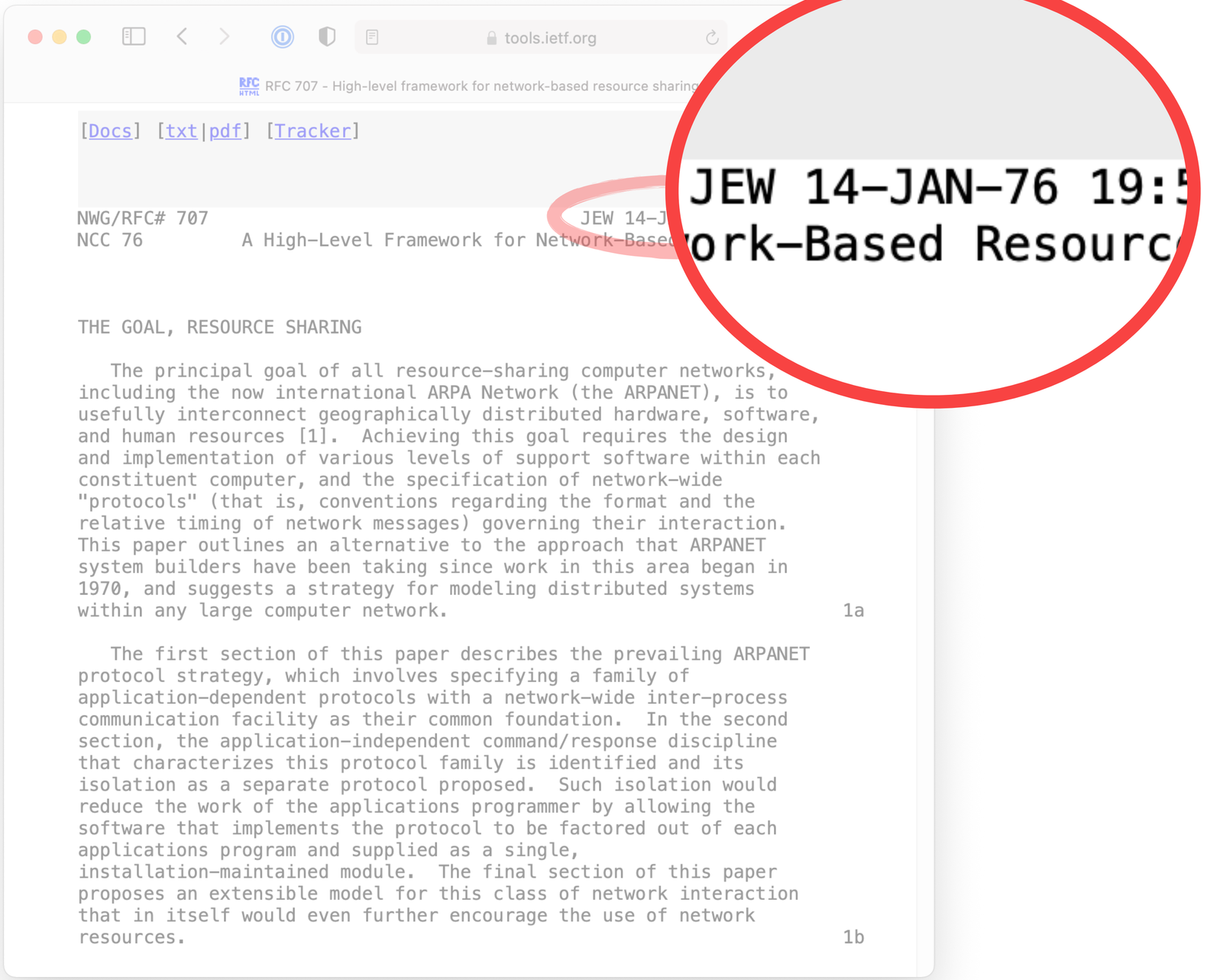


gRPC Remote Procedure Call framework

gRPC Remote Procedure Call framework

gRPC Remote Procedure Call framework

simple & idiomatic

gRPC Remote Procedure Call framework

simple & idiomatic

performant & scalable

gRPC Remote Procedure Call framework

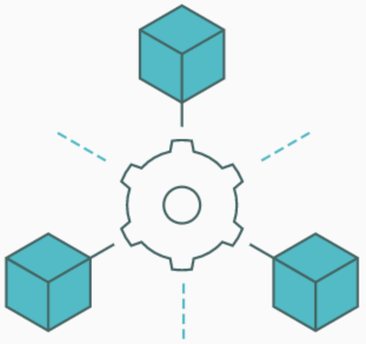
simple & idiomatic

performant & scalable

interoperable & extensible

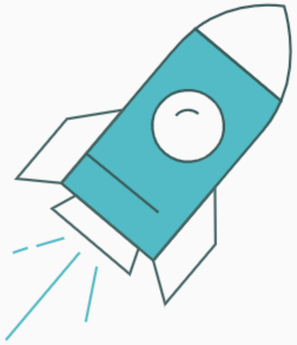
Simple service definition

Define your service using Protocol Buffers, a powerful binary serialization toolset and language



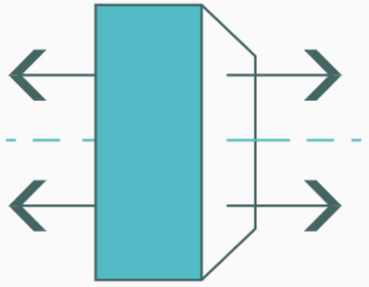
Start quickly and scale

Install runtime and dev environments with a single line and also scale to millions of RPCs per second with the framework



Works across languages and platforms

Automatically generate idiomatic client and server stubs for your service in a variety of languages and platforms



Bi-directional streaming and integrated auth

Bi-directional streaming and fully integrated pluggable authentication with HTTP/2-based transport

gRPC vs REST API with JSON

High-level comparison

The following table offers a high-level comparison of features between gRPC and HTTP APIs with JSON.

Feature	gRPC	HTTP APIs with JSON
Contract	Required (*.proto*)	Optional (OpenAPI)
Protocol	HTTP/2	HTTP
Payload	Protobuf (small, binary)	JSON (large, human readable)
Prescriptiveness	Strict specification	Loose. Any HTTP is valid.
Streaming	Client, server, bi-directional	Client, server
Browser support	No (requires grpc-web)	Yes
Security	Transport (TLS)	Transport (TLS)
Client code-generation	Yes	OpenAPI + third-party tooling

https://docs.microsoft.com/en-us/aspnet/core/grpc/comparison?view=aspnetcore-5.0

gRPC Remote Procedure Call framework

simple & idiomatic

performant & scalable

interoperable & extensible

gRPC Remote Procedure Call framework

IDL

performant & scalable

interoperable & extensible

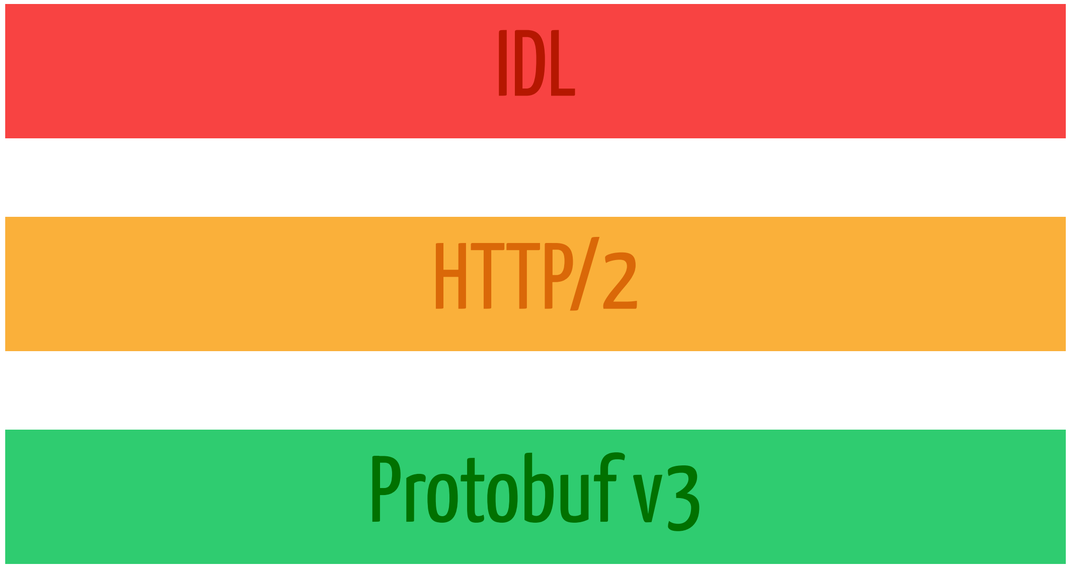
gRPC Remote Procedure Call framework

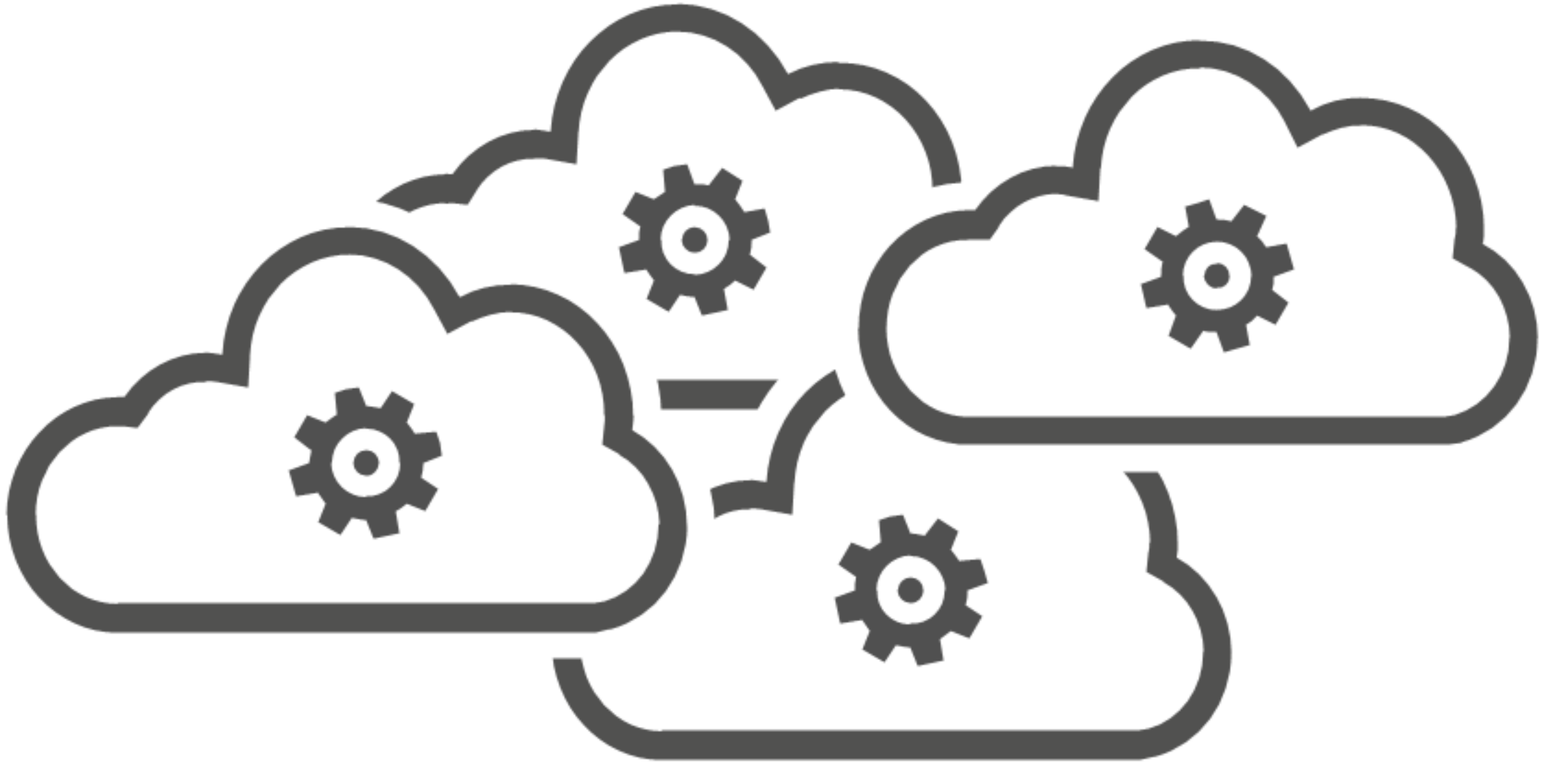
IDL

HTTP/2

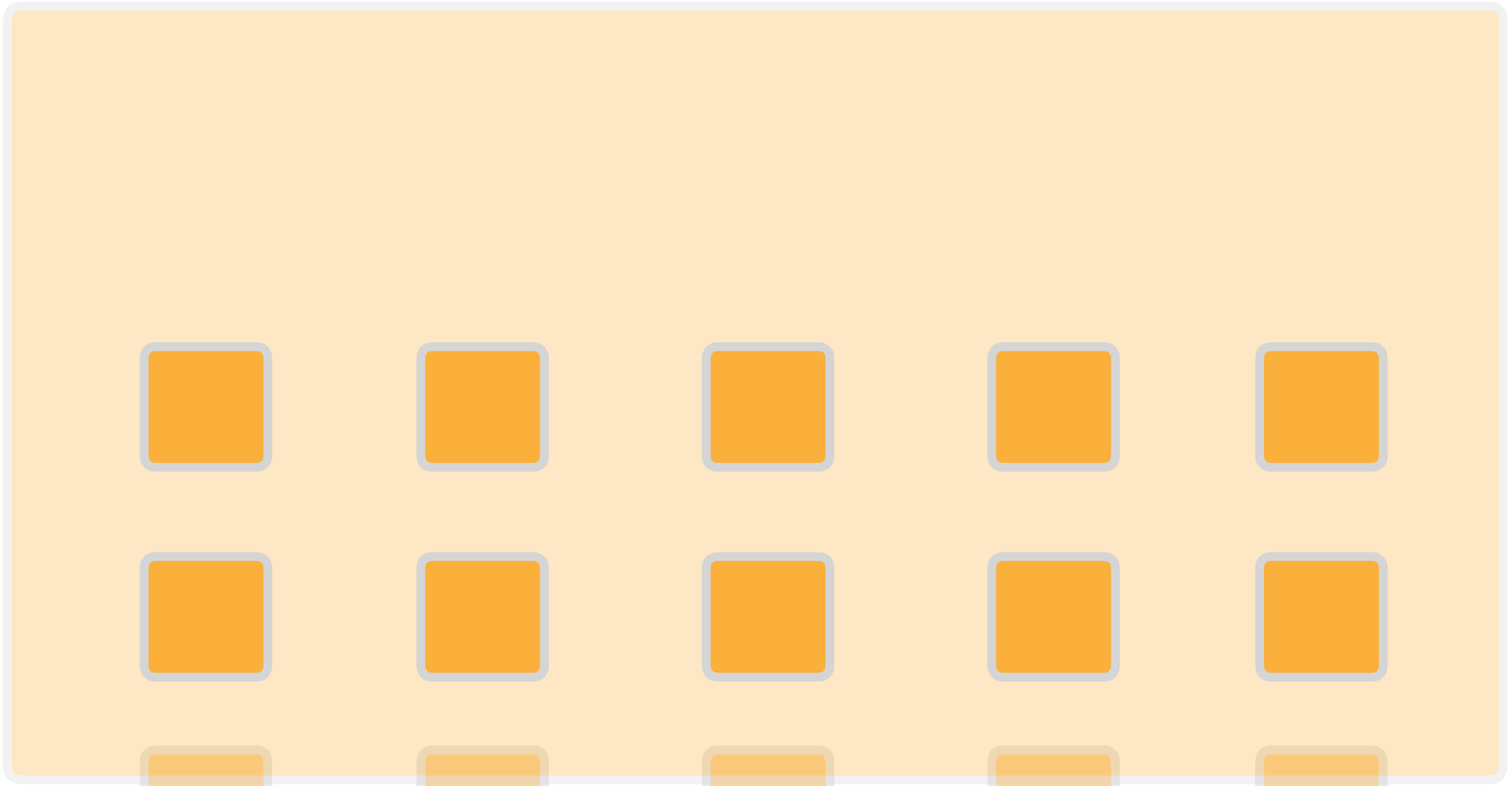
interoperable & extensible

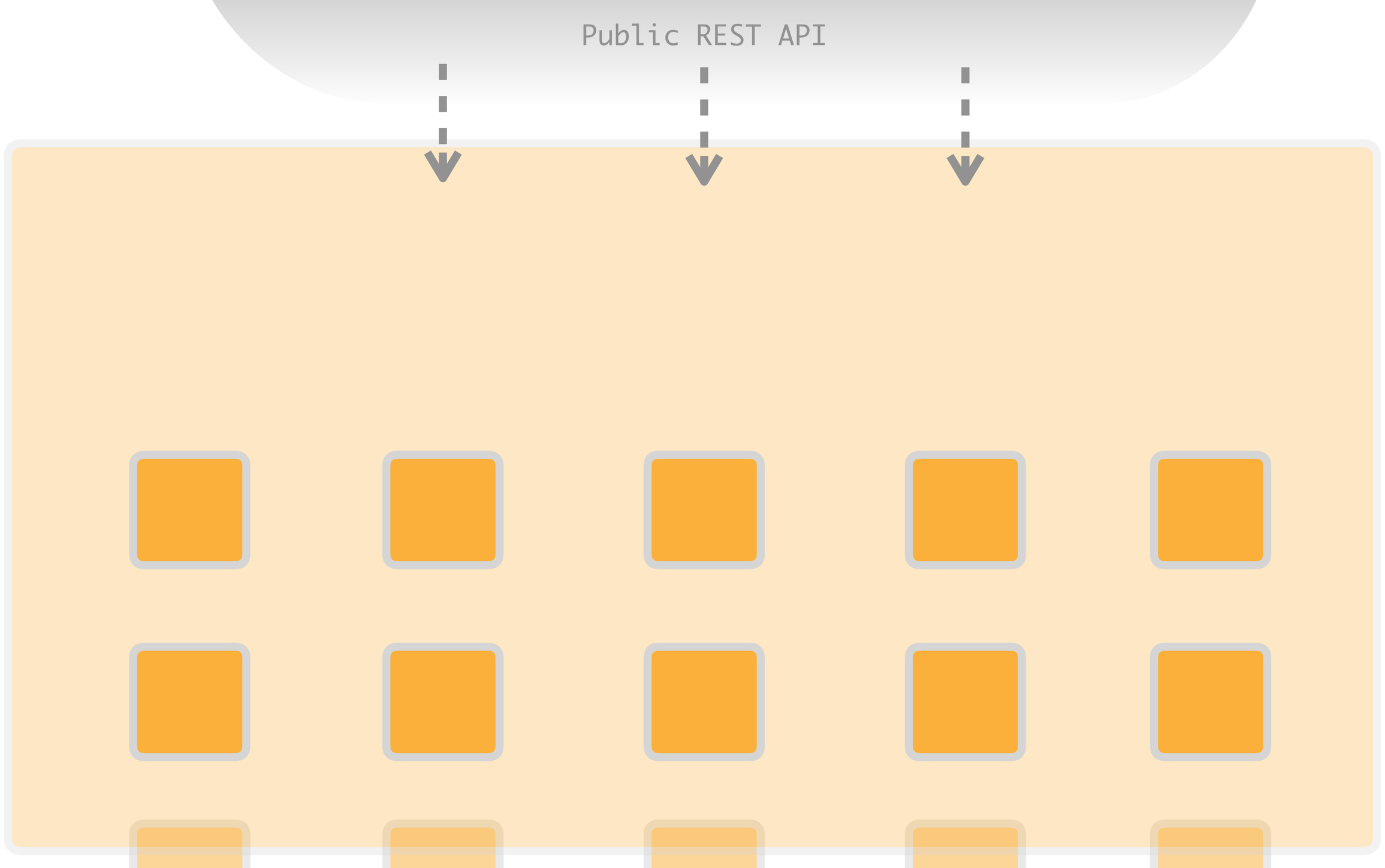
gRPC Remote Procedure Call framework

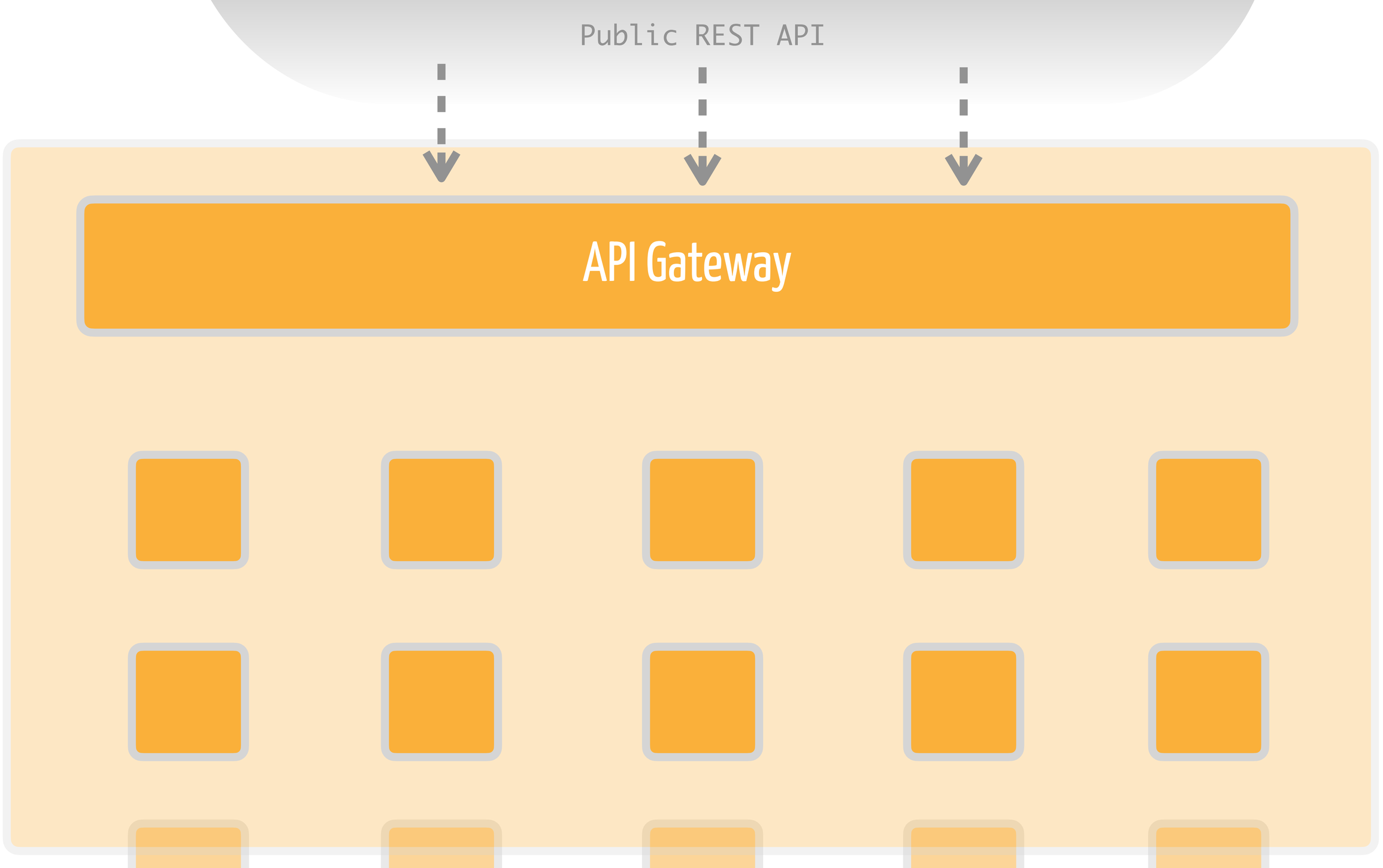


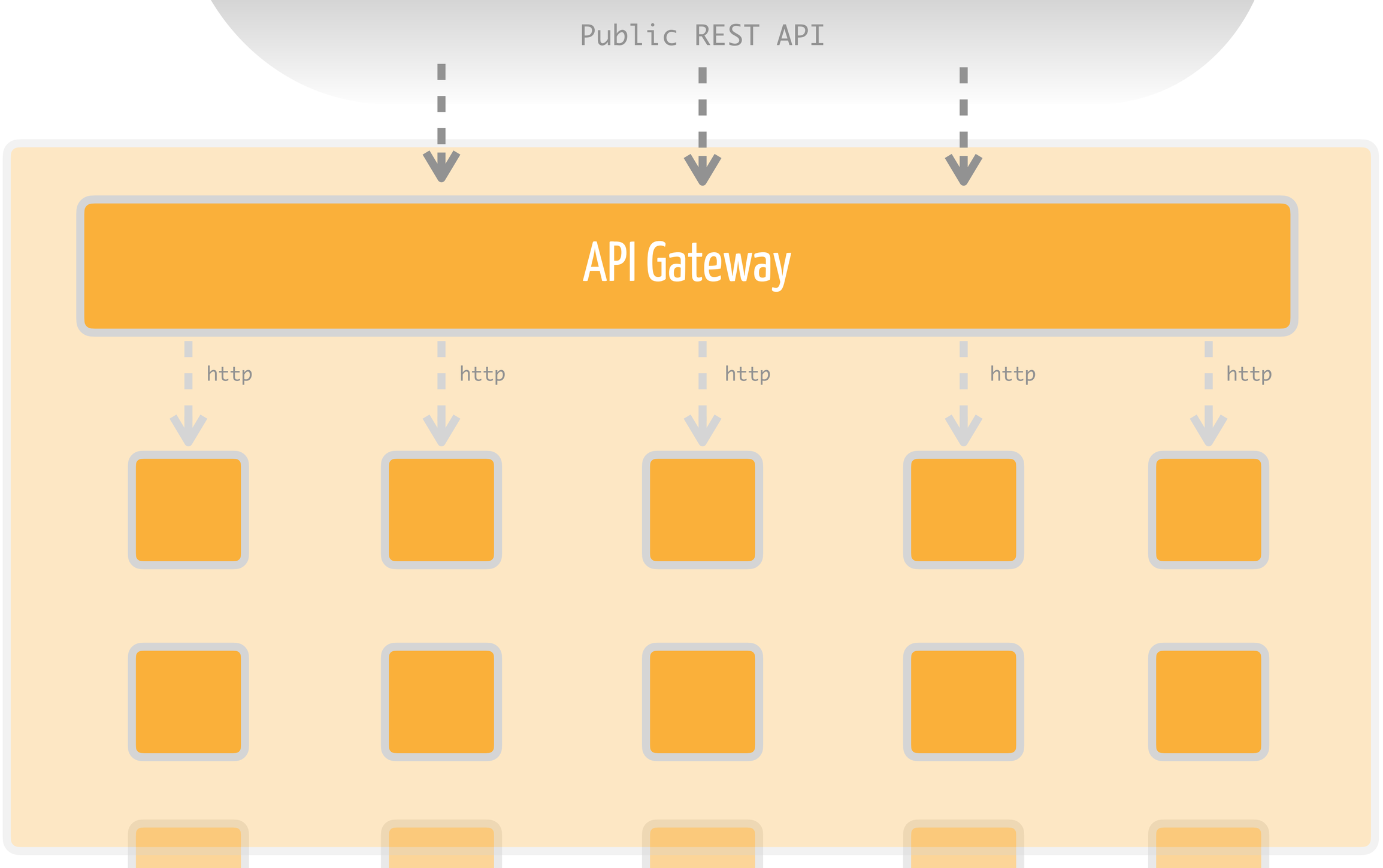


Microservices




Public REST API


Public REST API
API Gateway


Public REST API
API Gateway
http
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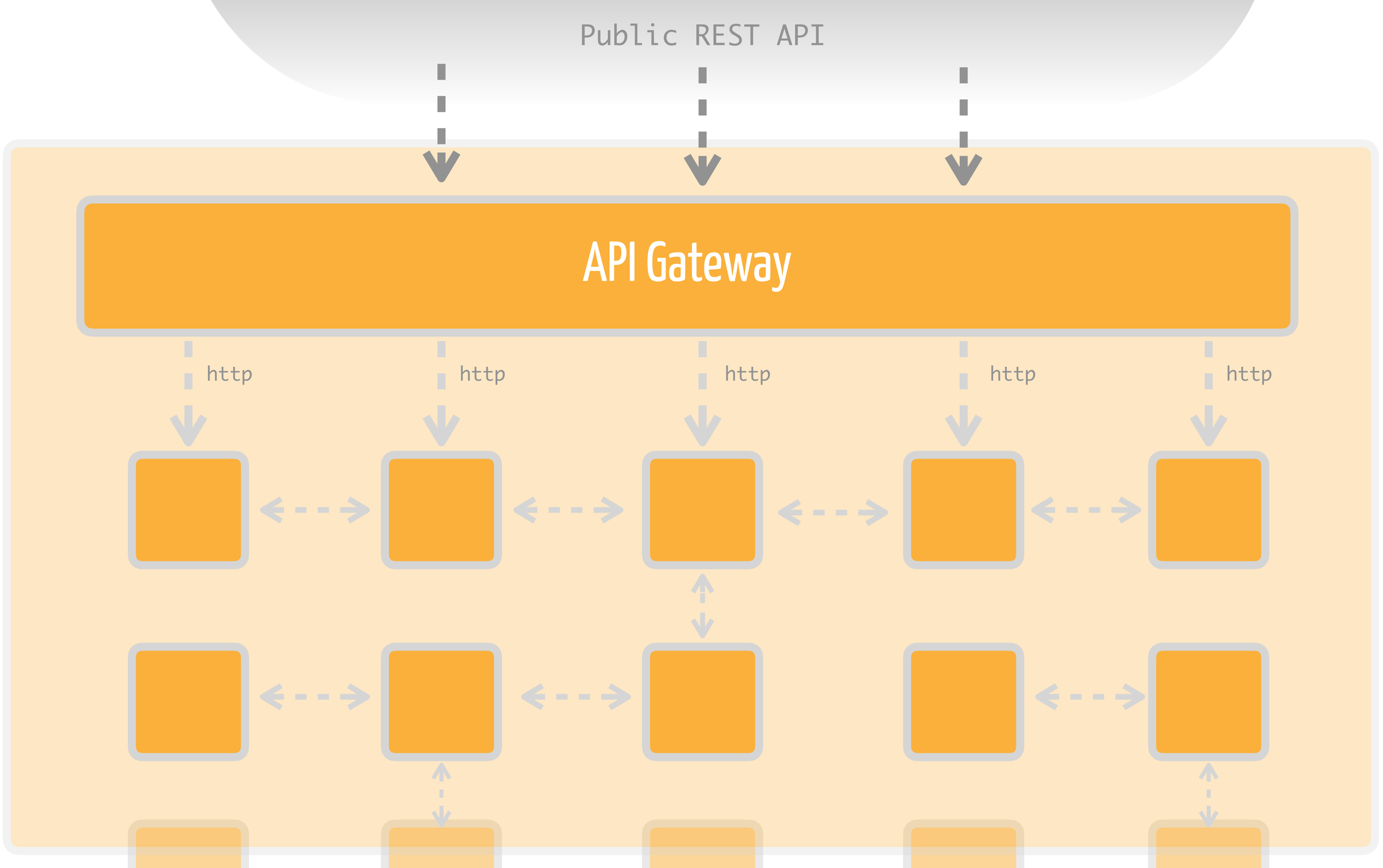
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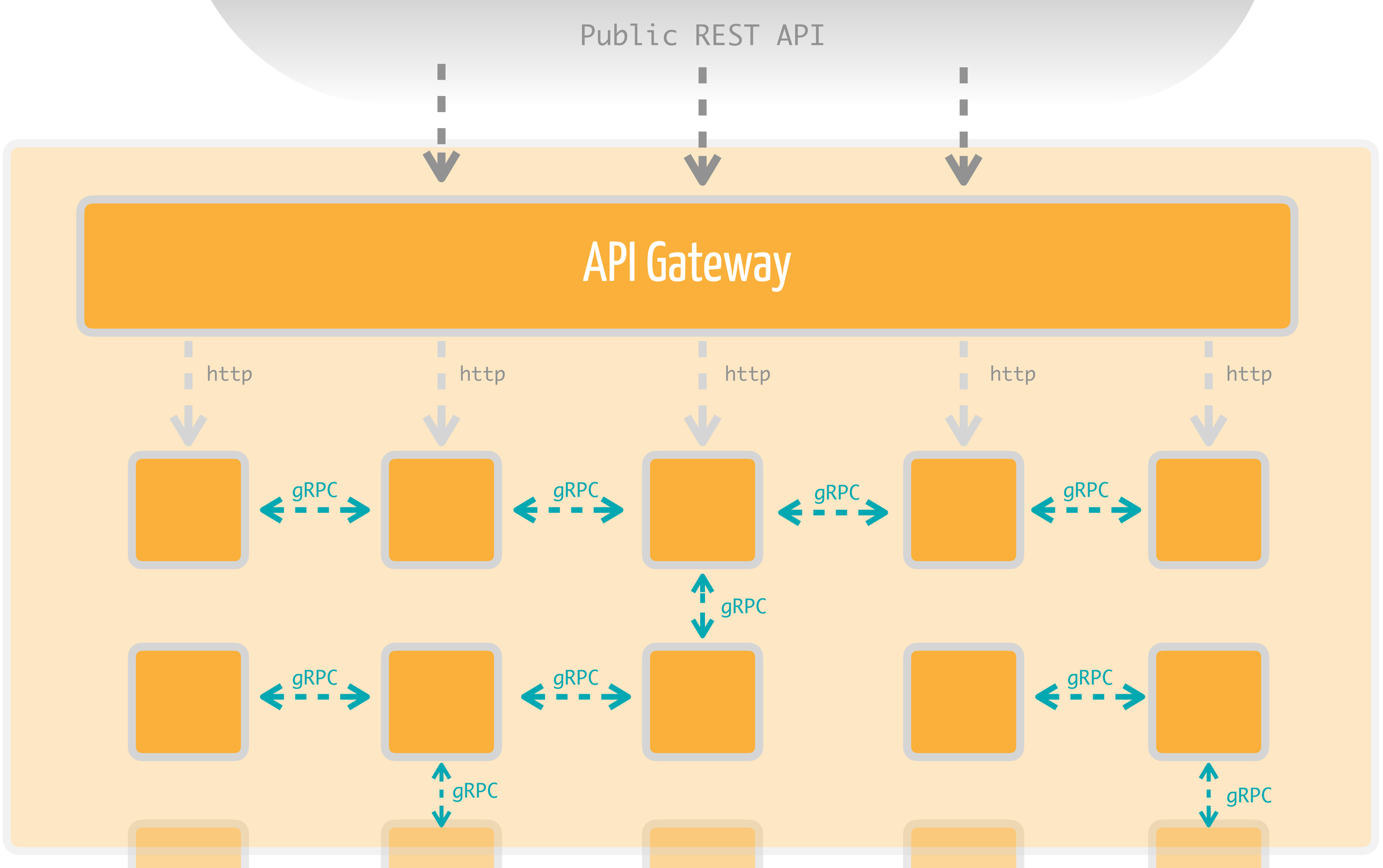
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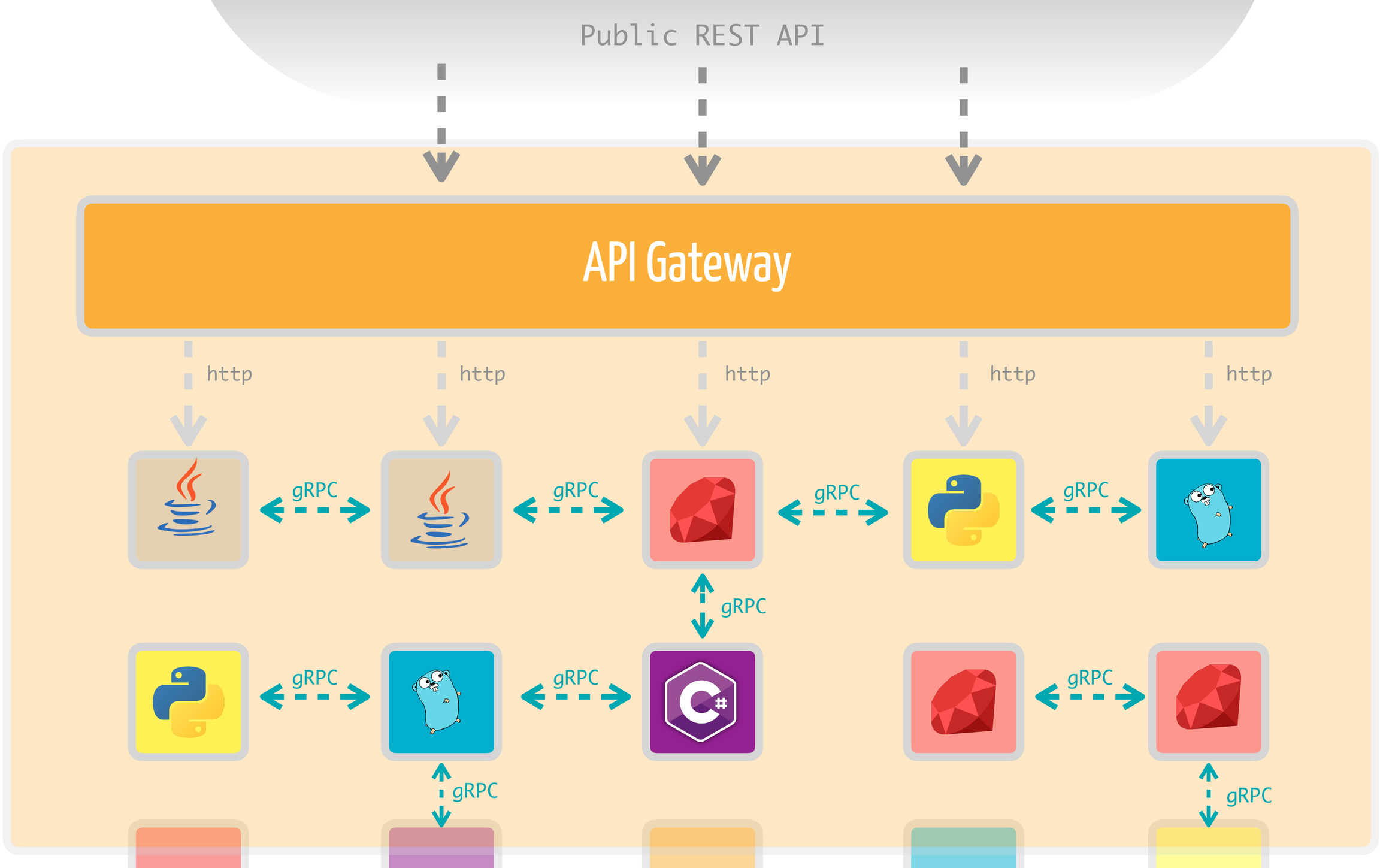
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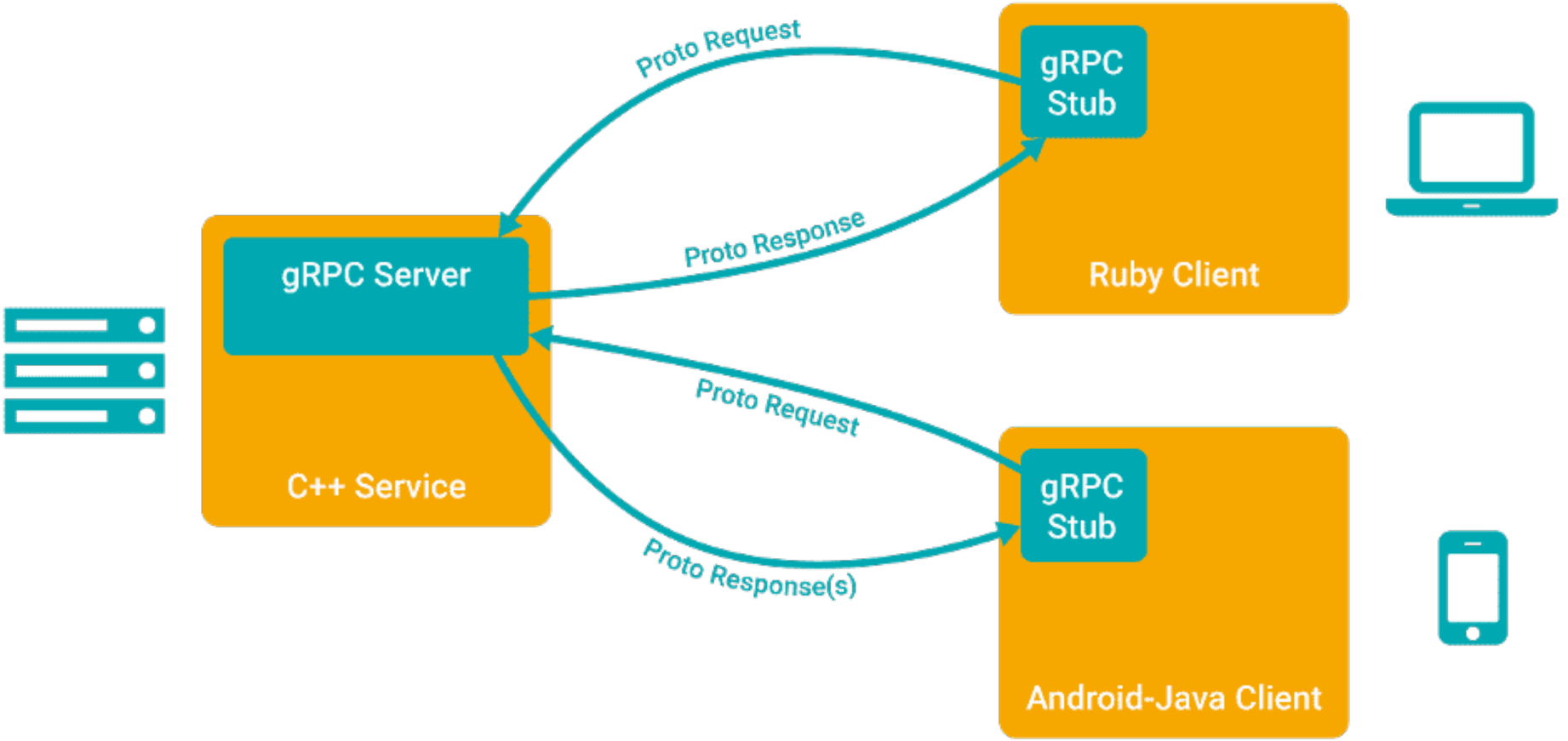
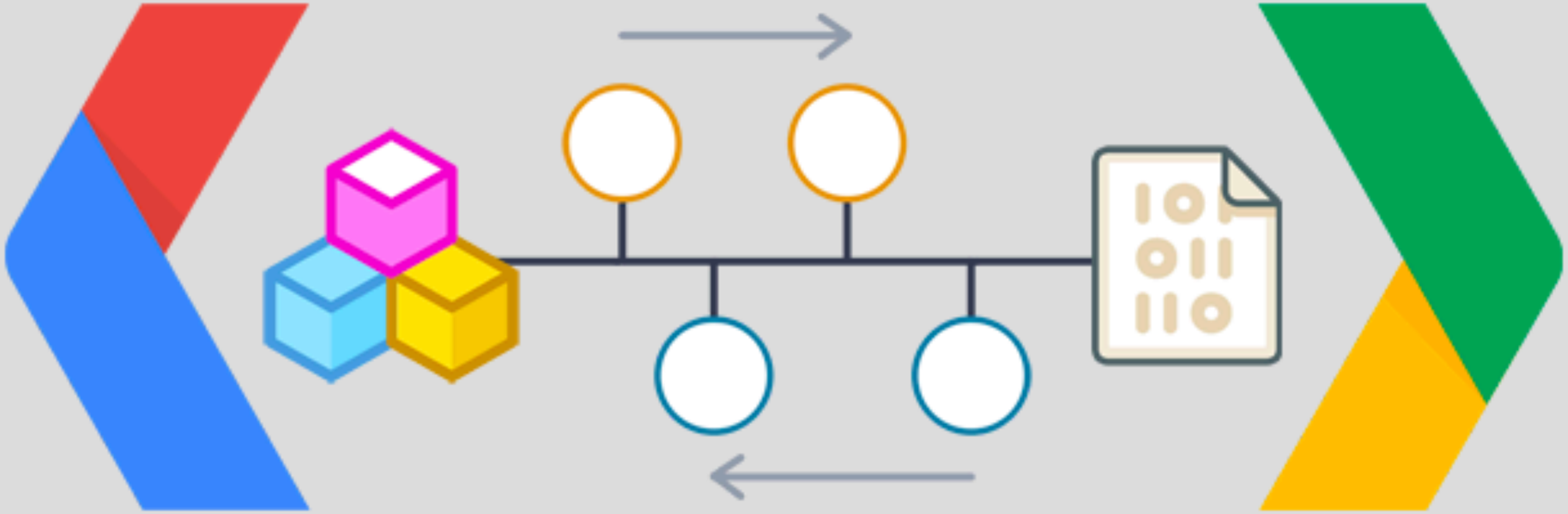

Proto Request
gRPC Stub
Ruby Client
Proto Response
gRPC Server
C++ Service
Proto Request
gRPC Stub
Android-Java Client
Proto Response(s)


protobuf
Protocol Buffers

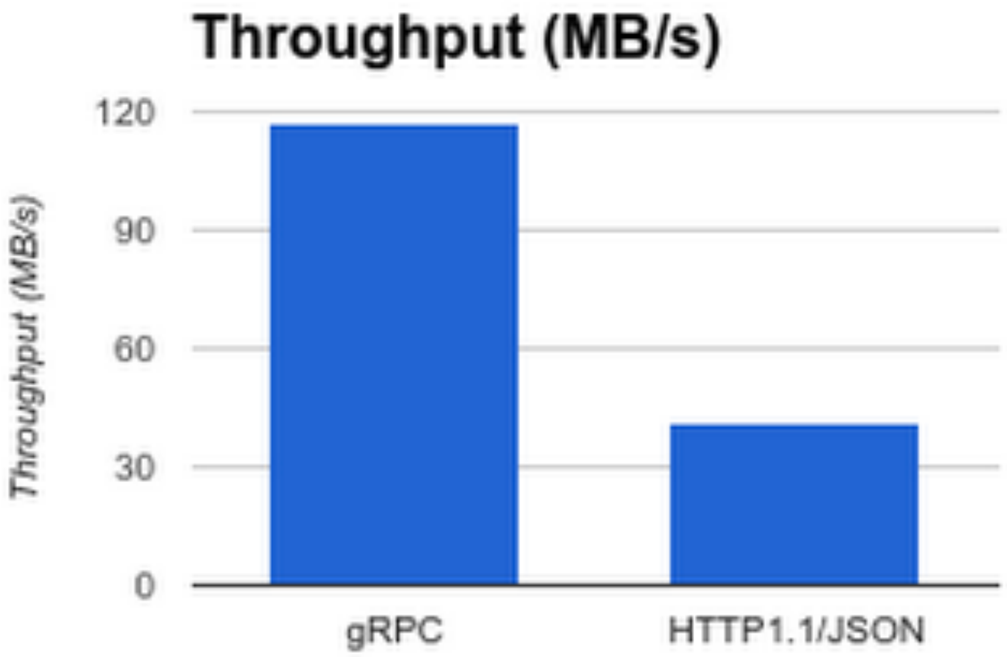
Binary Serialization with



Google Protocol Buffers

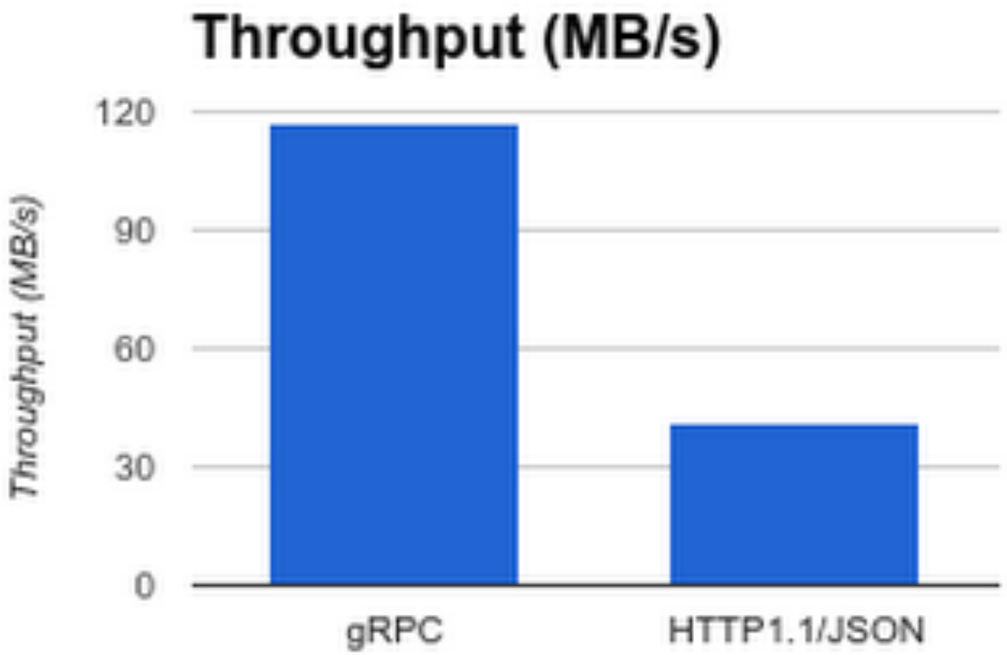
Performance

Performance



3x increase in throughput

Performance



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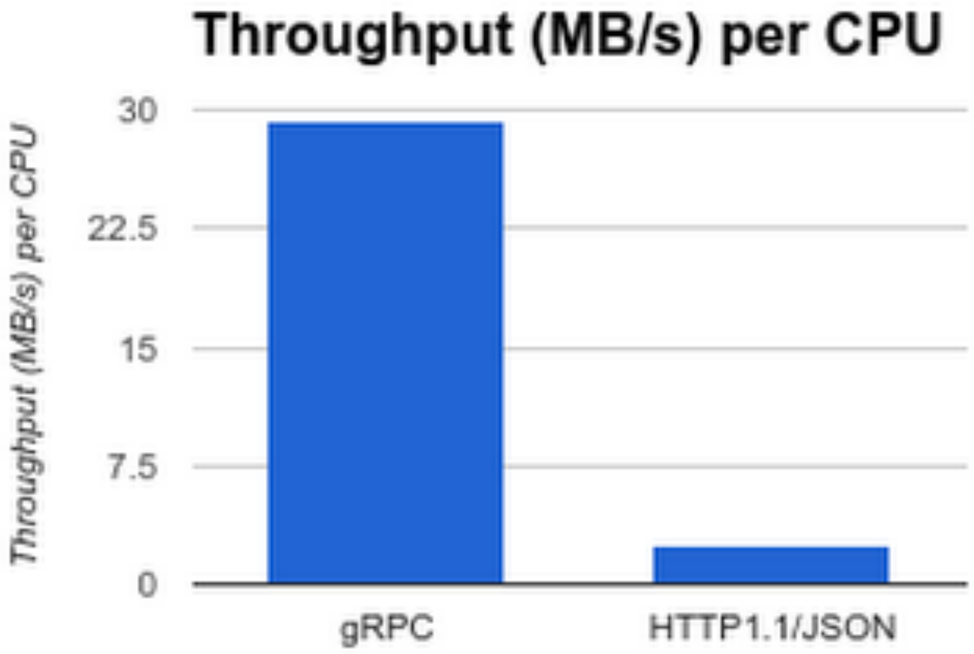

11x difference per CPU

https://cloud.google.com/blog/products/gcp/announcing-grpc-alpha-for-google-cloud-pubsub

Seu smartphone agradece!

IDL

(Interface Definition Language)

paymentService.proto

```
syntax = "proto3";

service PaymentService {
  rpc processPayment(PaymentRequest) returns (PaymentResponse) {}
}

message PaymentRequest {
    enum Currency {
        BRL = 0;
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    }

    string cardNumber = 1;
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Compilando o arquivo .proto

```
$ protoc --proto_path=src --java_out=build/gen src/paymentService.proto
```

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Channel channel = ManagedChannelBuilder
                    .forAddress("paymentservice.com", 50051)
                    .build();

PaymentServiceBlockingStub paymentService = PaymentServiceGrpc.newBlockingStub(channel);

PaymentRequest request = newBuilder()
                          .setCardNumber("1234 5678 8765 4321")
                          .setExpiryDate("03/2028")
                          .setCvc("123")
                          .setAmount(120.2)
                          .setCurrency(Currency.BRL)
                          .build();

PaymentResponse result = paymentService.processPayment(request);
if (result.getSuccess()) {
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No final das contas...

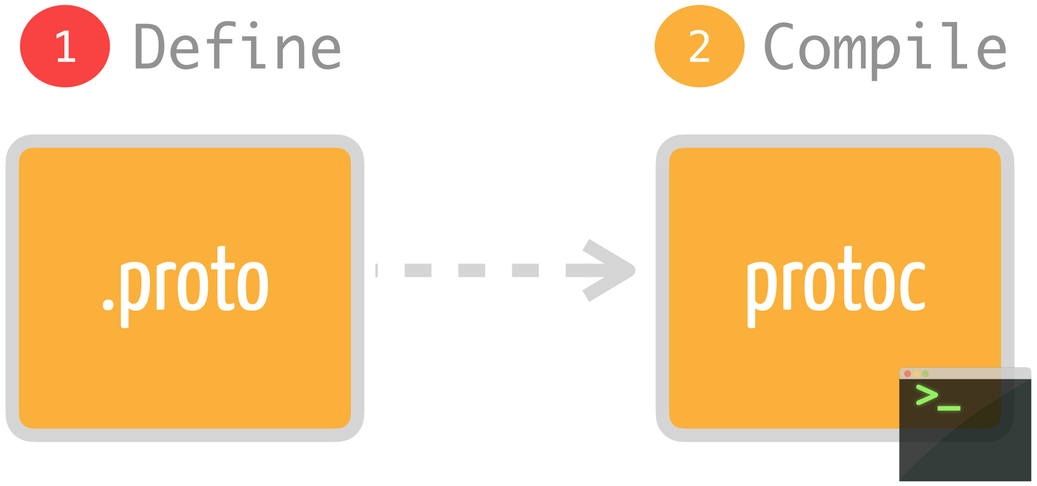
Protobuf Workflow

Protobuf Workflow

1 Define

.proto

Protobuf Workflow



Protobuf Workflow

1 Define

2 Compile

.proto

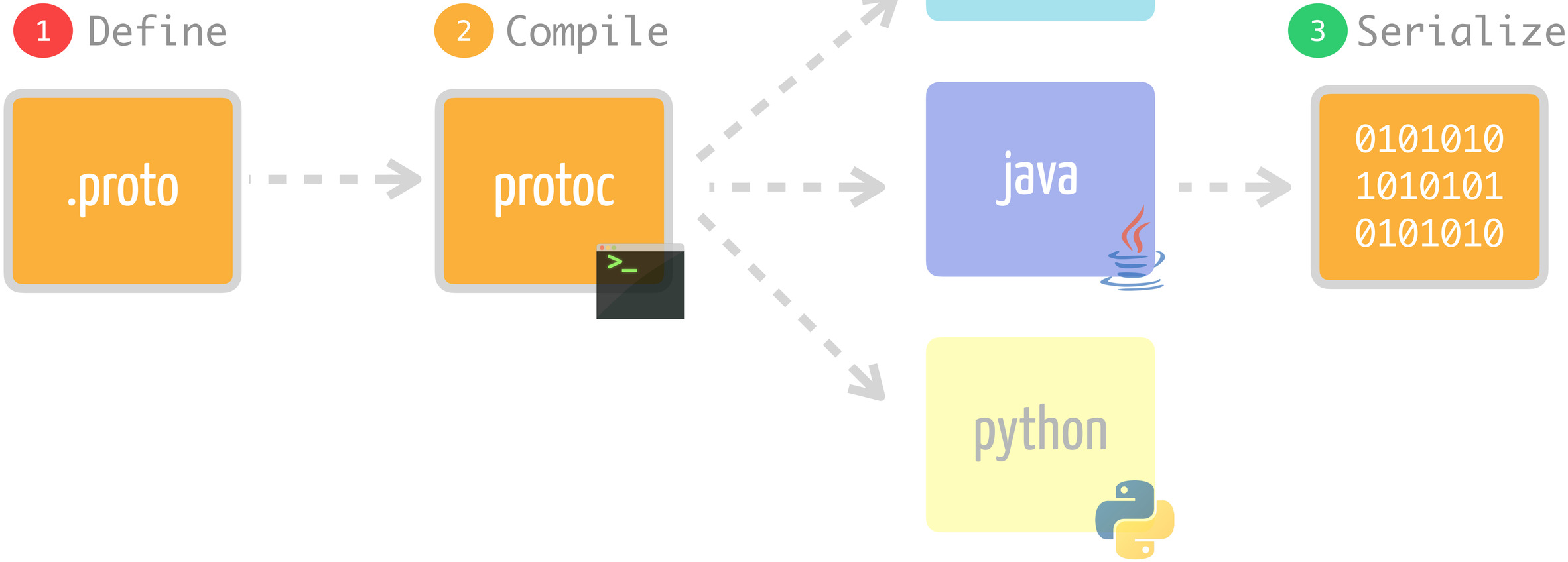
protoc

go

java

python

Protobuf Workflow

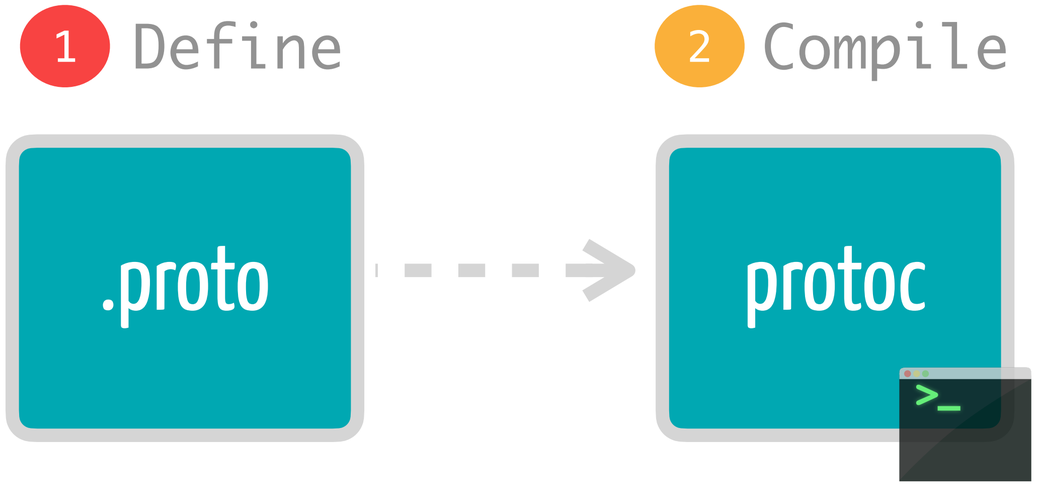


gRPC Workflow

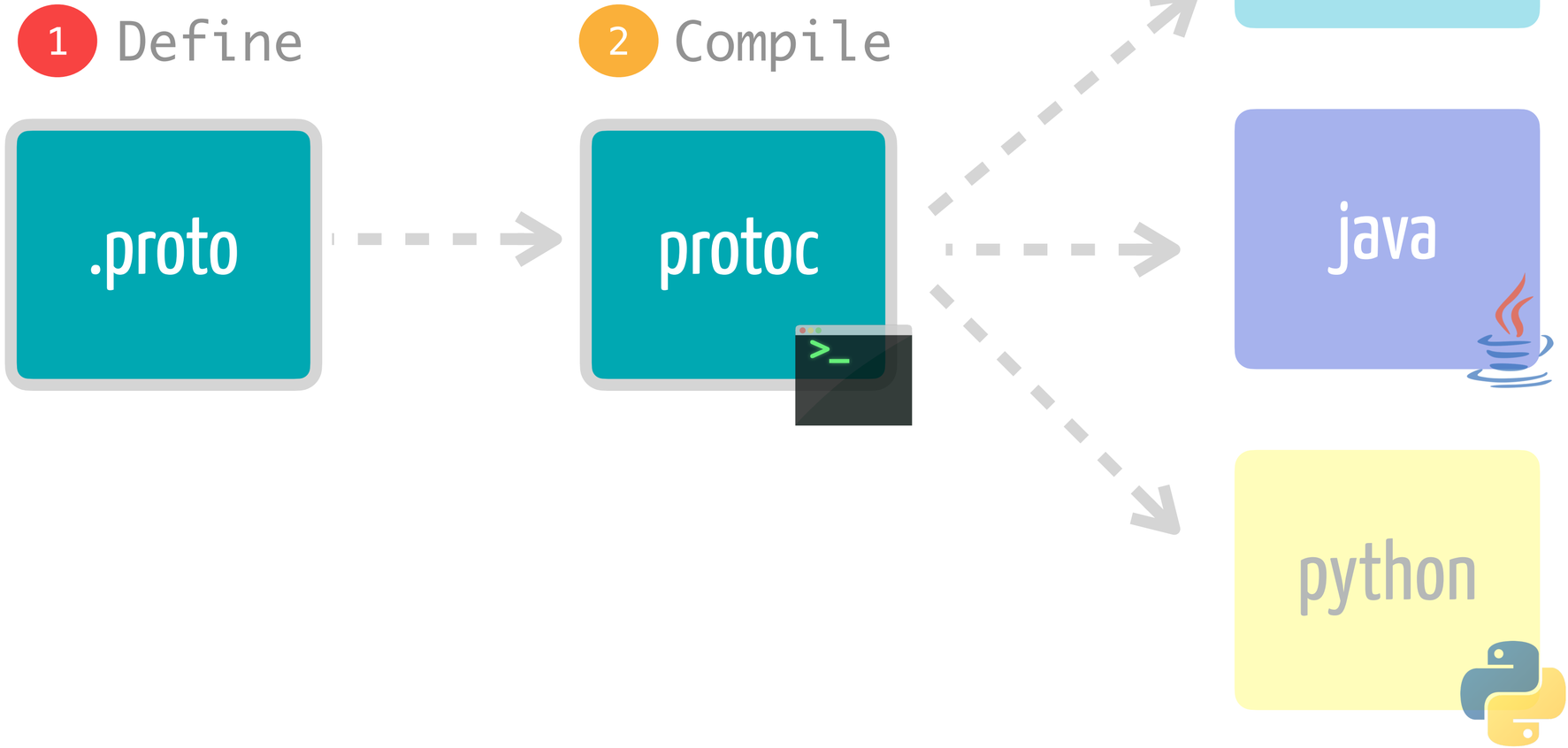
gRPC Workflow

1 Define

gRPC Workflow



gRPC Workflow



gRPC Workflow

1 Define

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java

python

3 Implement

server

client

gRPC Workflow

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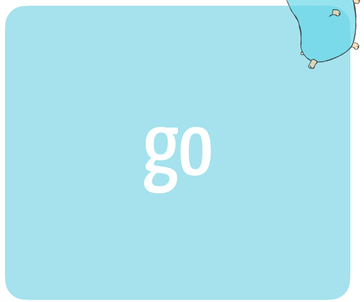
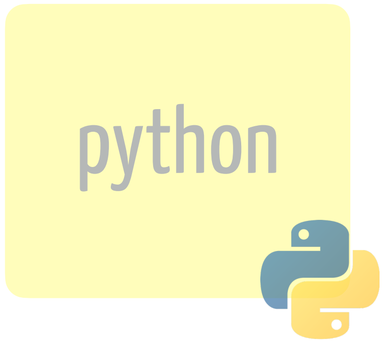
.proto

2 Compile

protoc





3 Implement

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client

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    }

    string cardNumber = 1;
    string expiryDate = 2;
    string cvc        = 3;
    double amount     = 4;
    Currency currency = 5;
}

message PaymentResponse {
    bool success = 1;
    string txId  = 2;
}
```

paymentService.proto

```
syntax = "proto3";

service PaymentService {
  rpc processPayment(PaymentRequest) returns (PaymentResponse) {}
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message PaymentRequest {
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        BRL = 0;
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        Payment payment = toPayment(request); // converte para modelo de domínio
        UUID transactionId = new PaymentService().process(payment);

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Padrões de comunicação

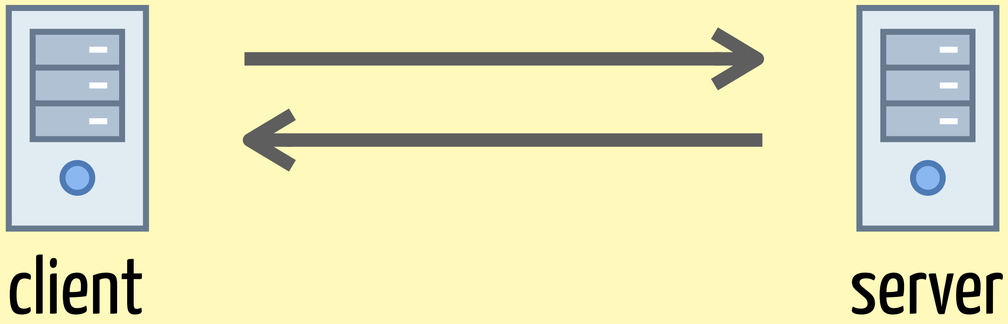
1

2

3

4

Simple RPC (Unary RPC)



2

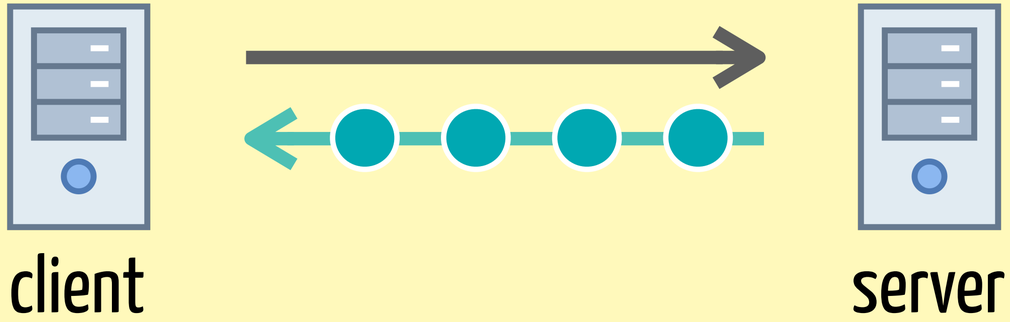
3

4

Simple RPC (Unary RPC)

3

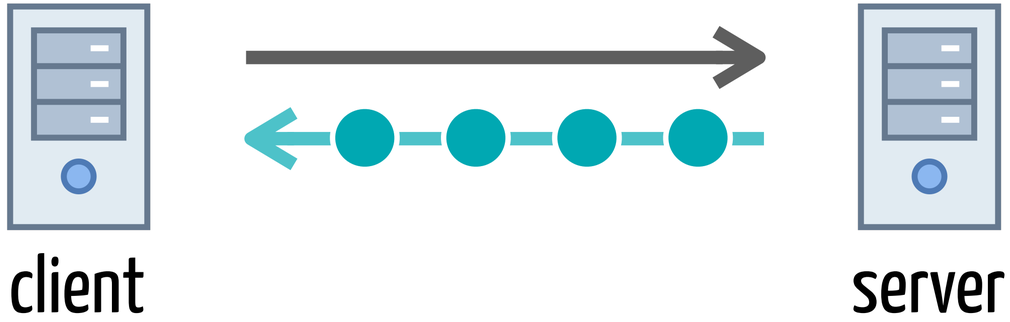
Server-side Streaming RPC

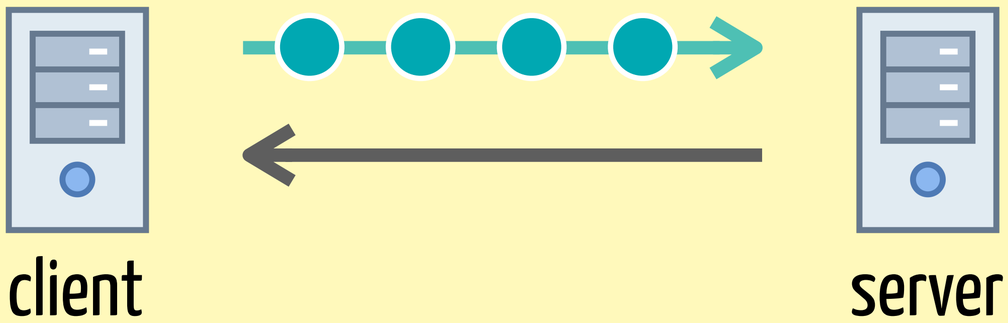


4

Simple RPC (Unary RPC)

Server-side Streaming RPC



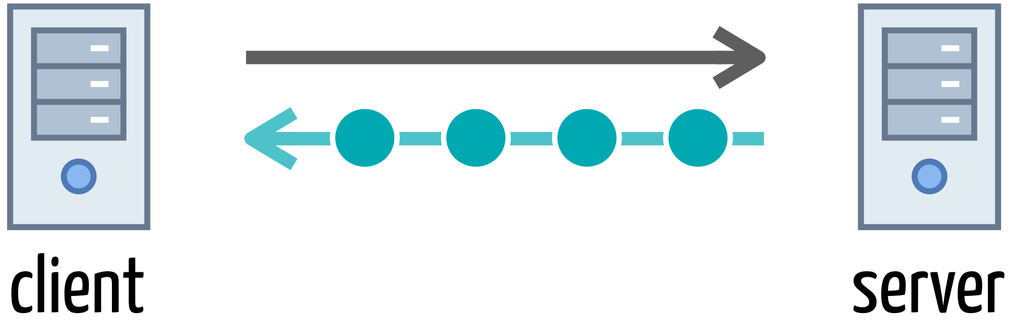


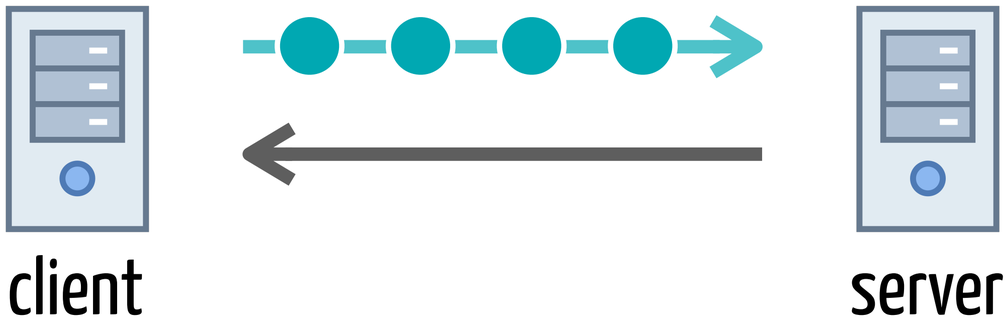
Client-side Streaming RPC

4

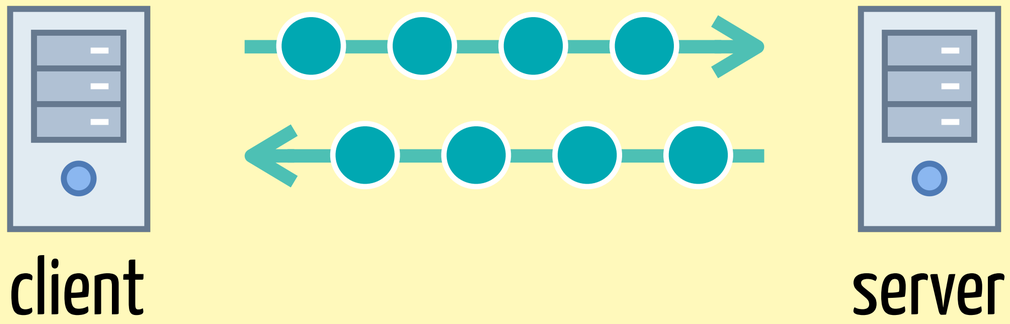
Simple RPC (Unary RPC)

Server-side Streaming RPC





Client-side Streaming RPC



Bidirectional Streaming RPC

paymentService.proto

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Server-side Streaming RPC

paymentService.proto

```
syntax = "proto3";

service PaymentService {

  rpc processPayment(PaymentRequest) returns (PaymentResponse) {}

  rpc listenToTransactions(TransactionRequest) returns (stream TransactionResponse) {}

  rpc processPaymentInBatch(stream PaymentInBatchRequest) returns (PaymentInBatchResponse) {}


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gRPC Workflow

1 Define

.proto

2 Compile

protoc

go

java

python

3 Implement

server

client

CONCLUINDO

Microservices

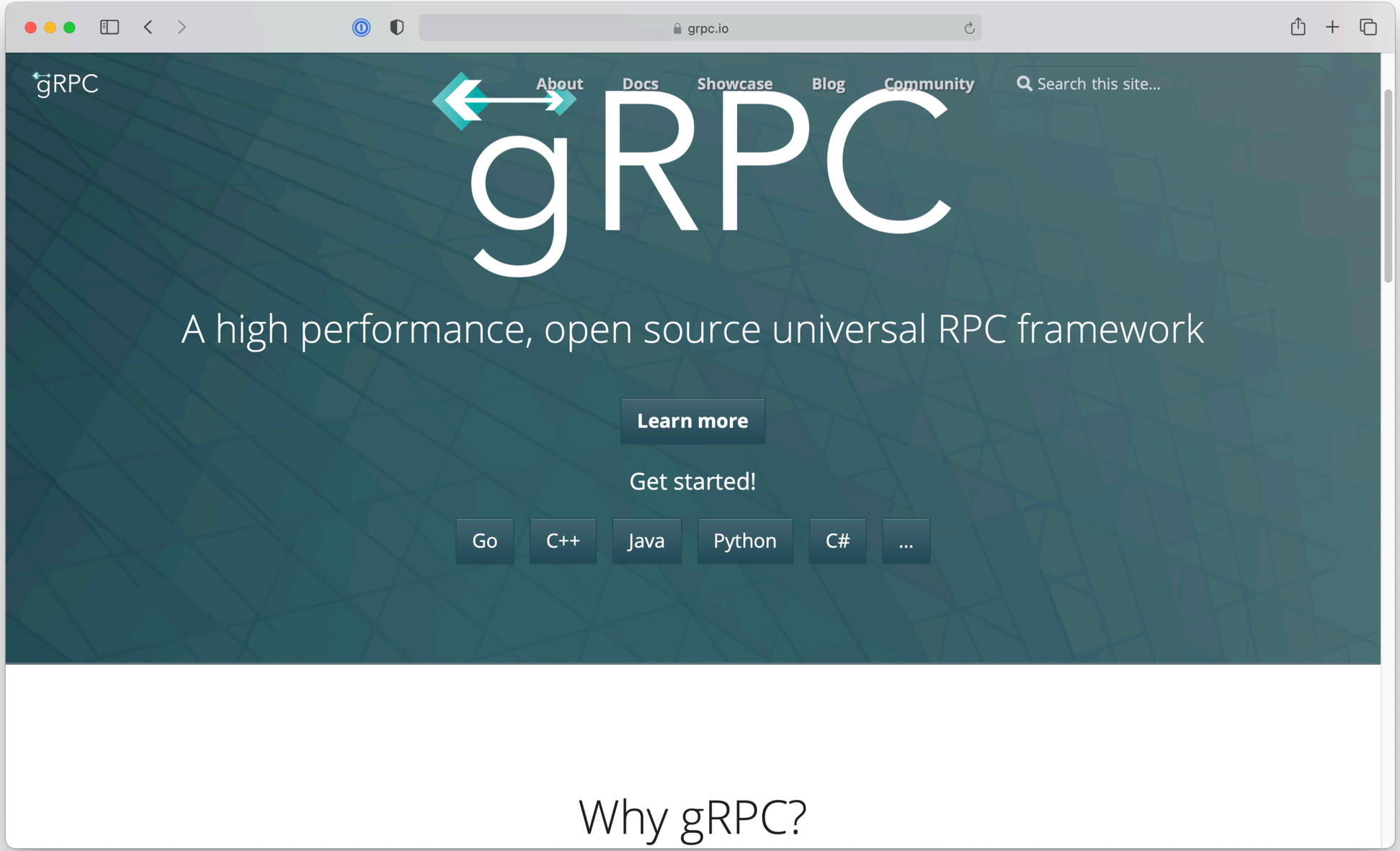
Microservices

Mobile

Microservices

Mobile

Realtime



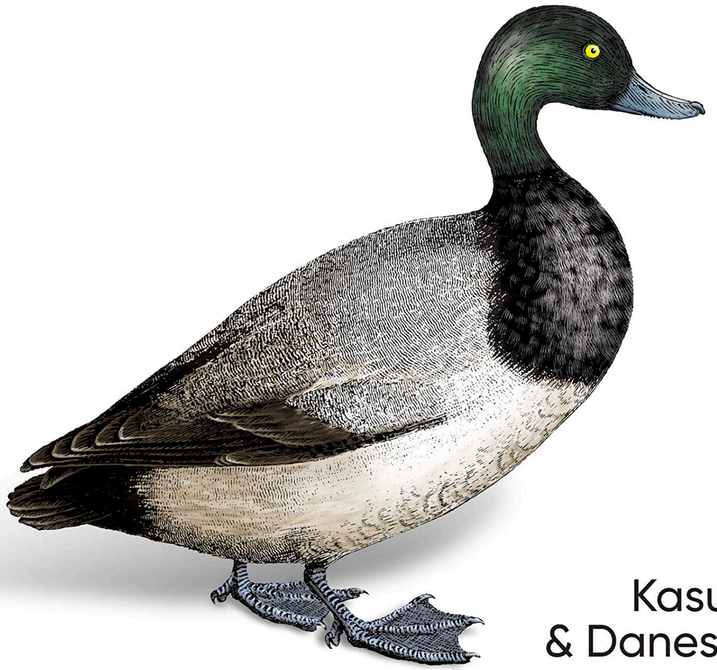
Why gRPC?

https://grpc.io/

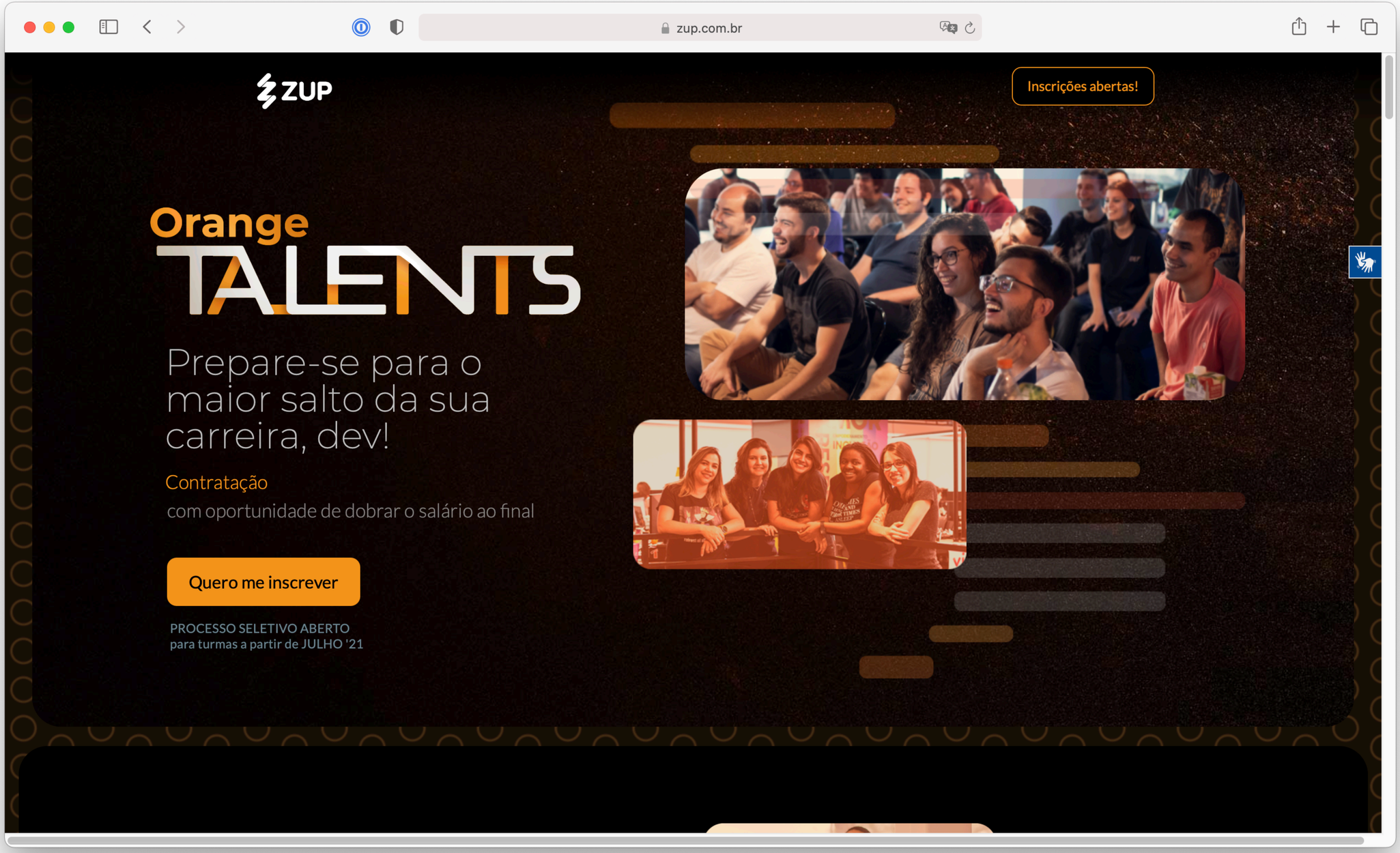
O'REILLY®

gRPC Up & Running

Building Cloud Native Applications with Go and Java for Docker and Kubernetes



Kasun Indrasiri
& Danesh Kuruppu



https://www.zup.com.br/orange-talents

Rafael Ponte
@rponte