



The Story of why we migrate to gRPC and how we go about it



KubeCon



CloudNativeCon

Europe 2019

@mattgruter

2019-05-22

**“Developers
don’t care
about new
RPC technologies”**

-- someone at KubeCon 2018





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Why?

Why are we doing this?

How?

How do we get there?

Why?

Spotify's Infrastructure



~2.5k services

~1k developers

~250 teams

Java, Python, ...

Spotify's Infrastructure



~2.5k services

~1k “**developers**”

~250 teams

Java, Python, ...

Hermes



Not this Hermes!

Hermes



But this

Hermes

Written in 2012

Based on ZeroMQ

JSON or protobuf payload

Not a RPC framework

Hermes works!

Why Change?

Hermes Ecosystem

404 Not Found

From DIY to FOSS

Why gRPC?

Why gRPC?

CLOUD NATIVE



The gRPC Advantage

The Proto

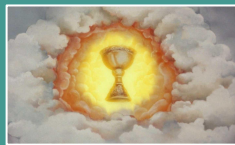


Code Generation

Java, Golang, Python, Ruby,
Dart, PHP, Node.js,
Objective-C, C#, C++

Schema Management

1. Embrace the **proto**



2. Shared repo for all **protos**

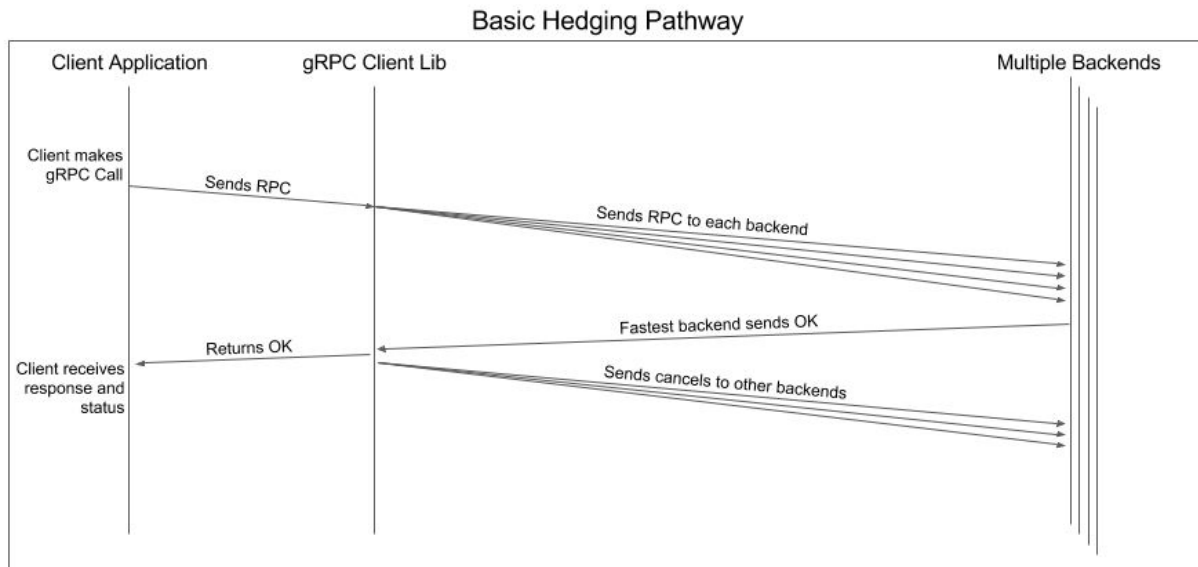
3. Version on the **proto** level

Resiliency

Retries

- Transparent
- Configurable

Hedging

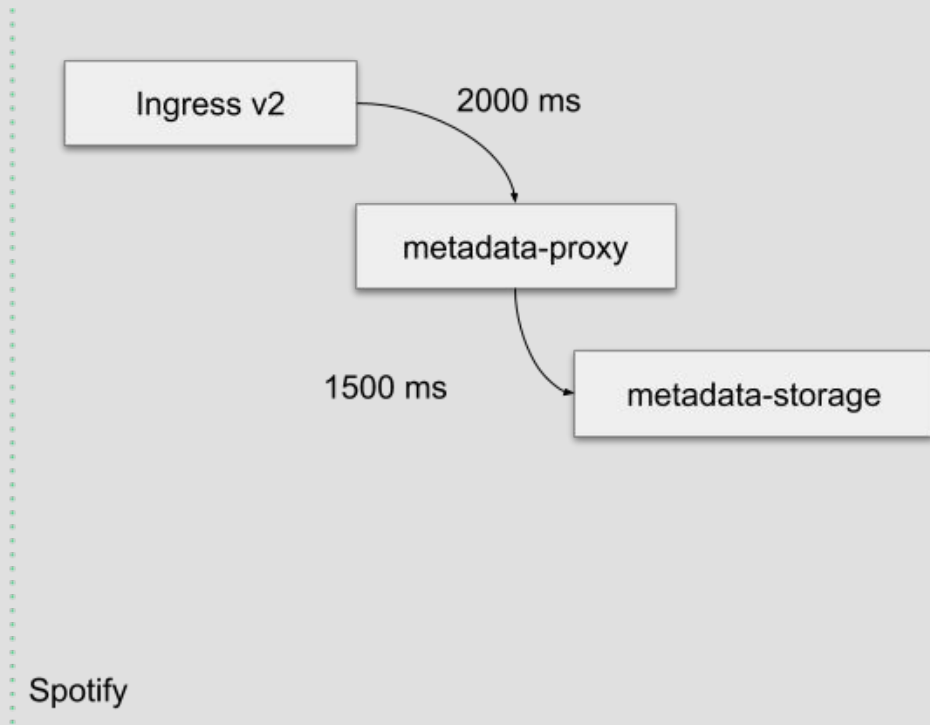


Thundering Herd

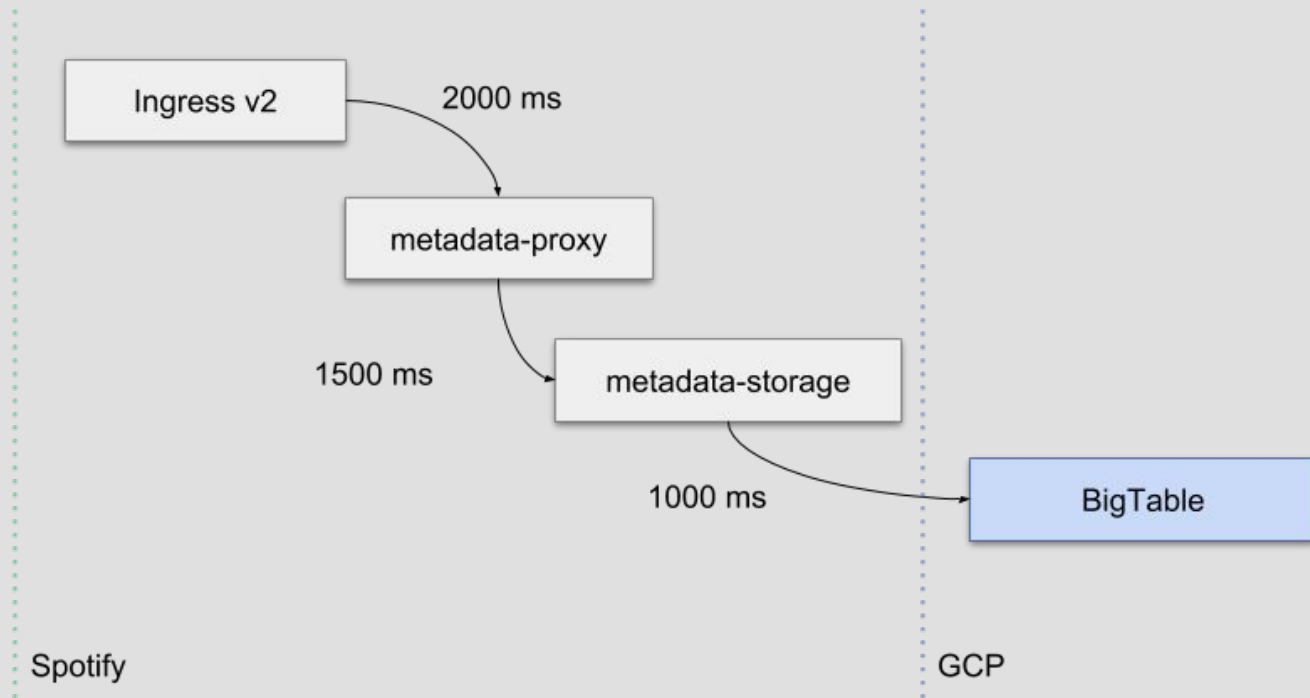


Retry throttling

Deadlines



A common RPC



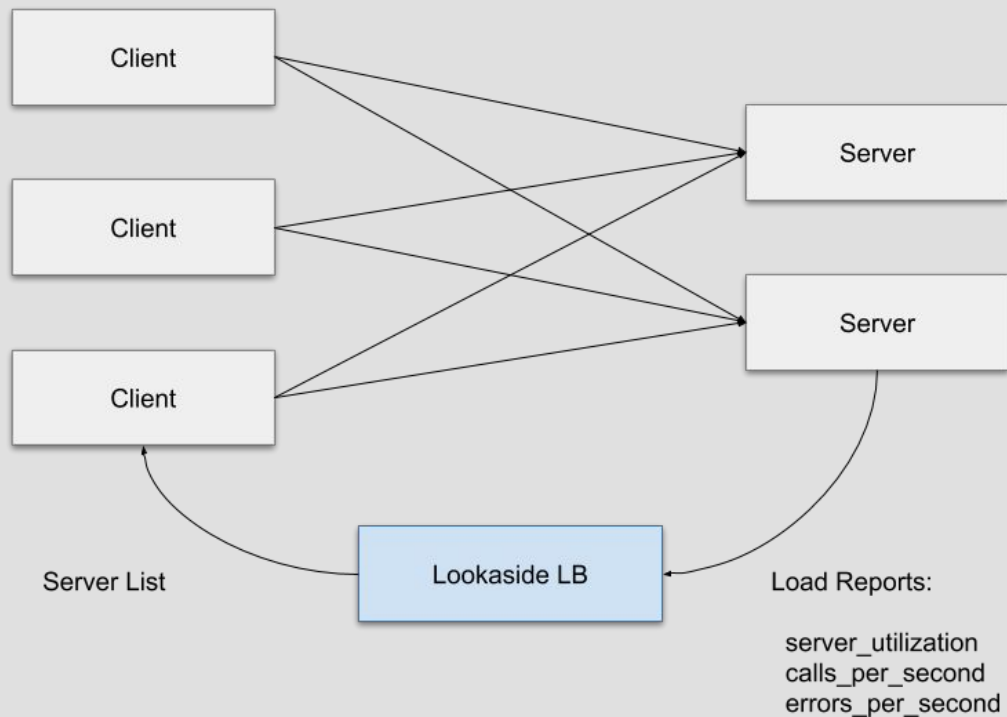
Load Balancing & Routing

Load Balancing

- Client-side
- Proxy
- Lookaside

Load Balancing

lookaside



The gRPC Advantage

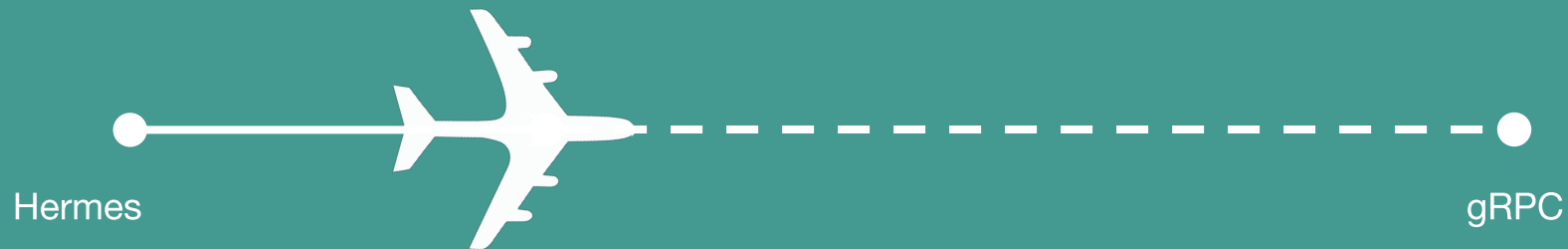






How?

Our Journey



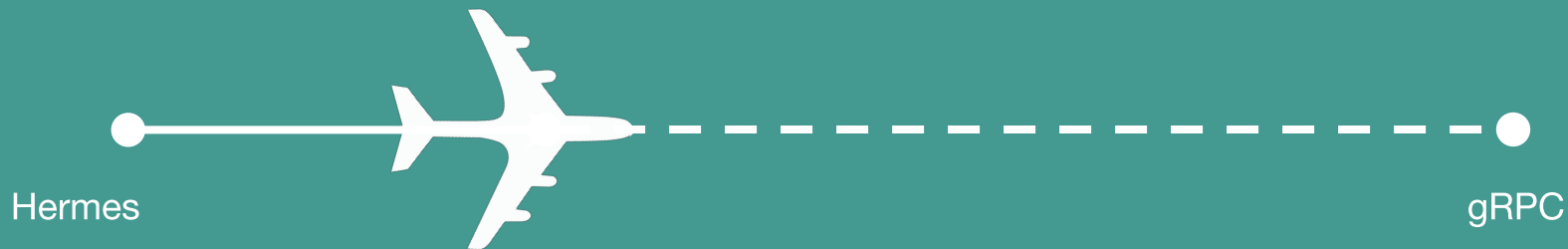
Our Journey

10%

Distance Travelled

90%

Remaining Distance to Destination



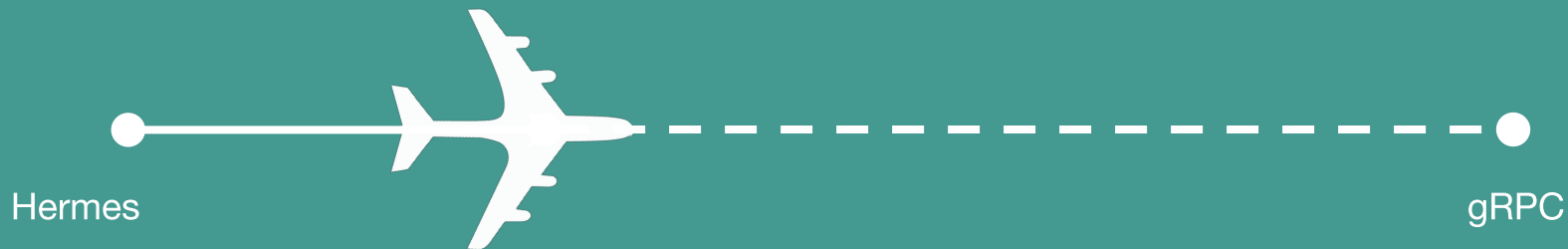
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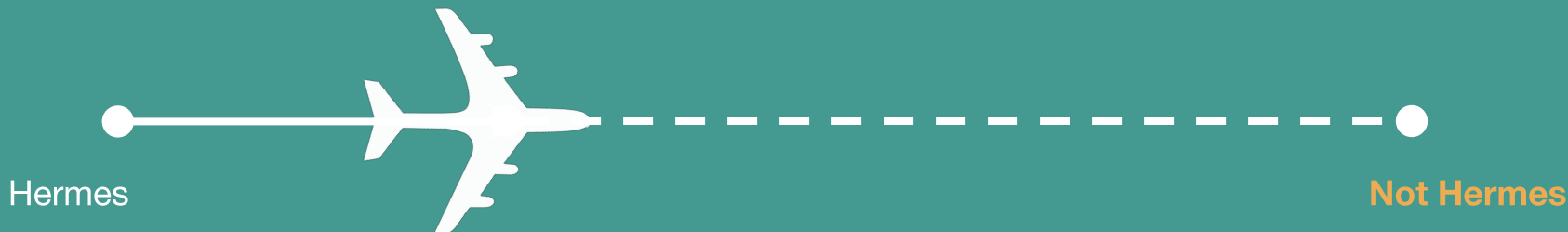
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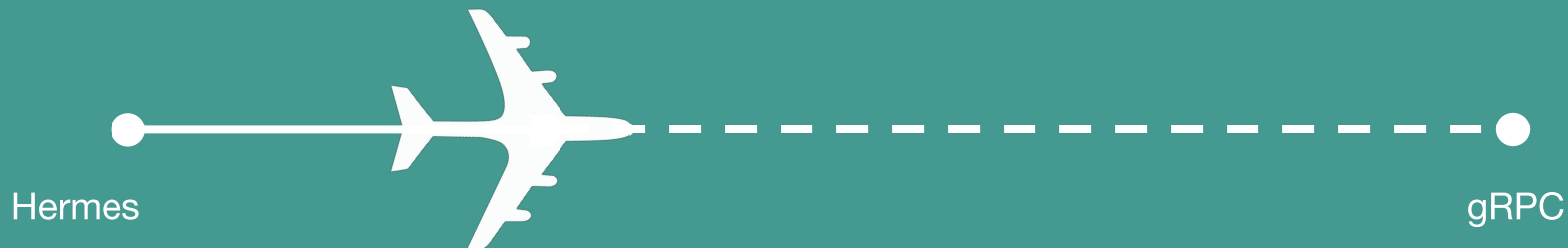
Our Journey

10%

Distance Travelled

90%

Remaining Distance to Destination



Main Challenge

Change is hard

**“This is not the protocol
you’re looking for”**

Main Challenge

Change is hard

Trust

Aligned Autonomy

Aligned Autonomy

Autonomy \neq Freedom

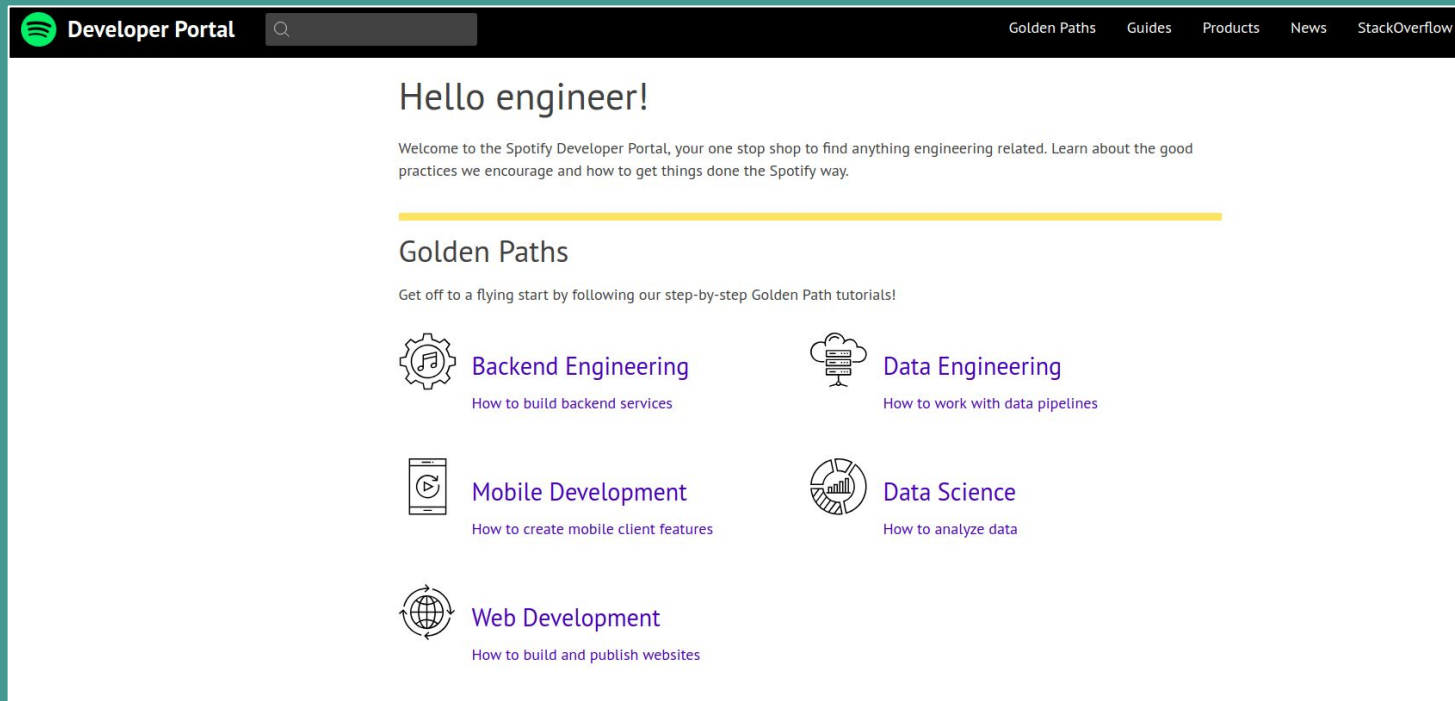
Alignment \neq Consensus

Aligned Autonomy

Autonomy \neq Freedom

Align by making
the **right** choice
the **easy** choice.

1. Right Choice = Easy Choice



The screenshot shows the Spotify Developer Portal homepage. At the top is a dark navigation bar with the Spotify logo and 'Developer Portal' on the left, and links for 'Golden Paths', 'Guides', 'Products', 'News', and 'StackOverflow' on the right. Below the navigation bar, the main content area has a white background. It starts with the heading 'Hello engineer!' followed by a welcome message. A yellow horizontal line separates this from the 'Golden Paths' section. Under 'Golden Paths', there's a sub-header and a paragraph. Below this are five cards, each with an icon, a title, and a description: 'Backend Engineering' (gear icon), 'Data Engineering' (cloud and server icon), 'Mobile Development' (mobile phone icon), 'Data Science' (pie chart icon), and 'Web Development' (globe icon).

Developer Portal


Golden Paths Guides Products News StackOverflow

Hello engineer!

Welcome to the Spotify Developer Portal, your one stop shop to find anything engineering related. Learn about the good practices we encourage and how to get things done the Spotify way.


Golden Paths

Get off to a flying start by following our step-by-step Golden Path tutorials!




Backend Engineering

How to build backend services




Data Engineering

How to work with data pipelines




Mobile Development

How to create mobile client features



Data Science

How to analyze data



Web Development

How to build and publish websites

gRPC at Spotify- KubeCon/CloudNativeCon Europe 2019 - @mattgruter

2. Don't force it!



2. Don't force it!



code generation

2. Don't force it!



Resiliency
patterns

code generation

2. Don't force it!

Tracing

Resiliency
patterns

code generation



2. Don't force it!

Tracing

Resiliency
patterns

code generation

Istio



In case of emergency

aka. ever-ending migration
aka. yet another protocol



gRPC



3. Force it!



```
$ sudo migrate
```

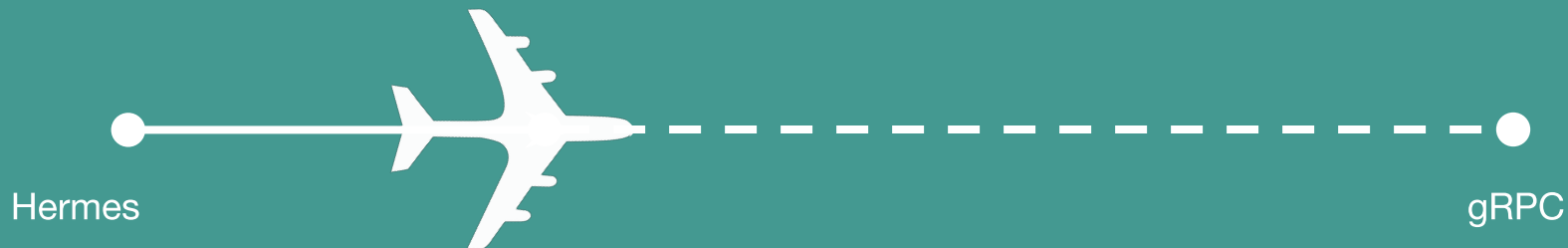
Our Journey

10%

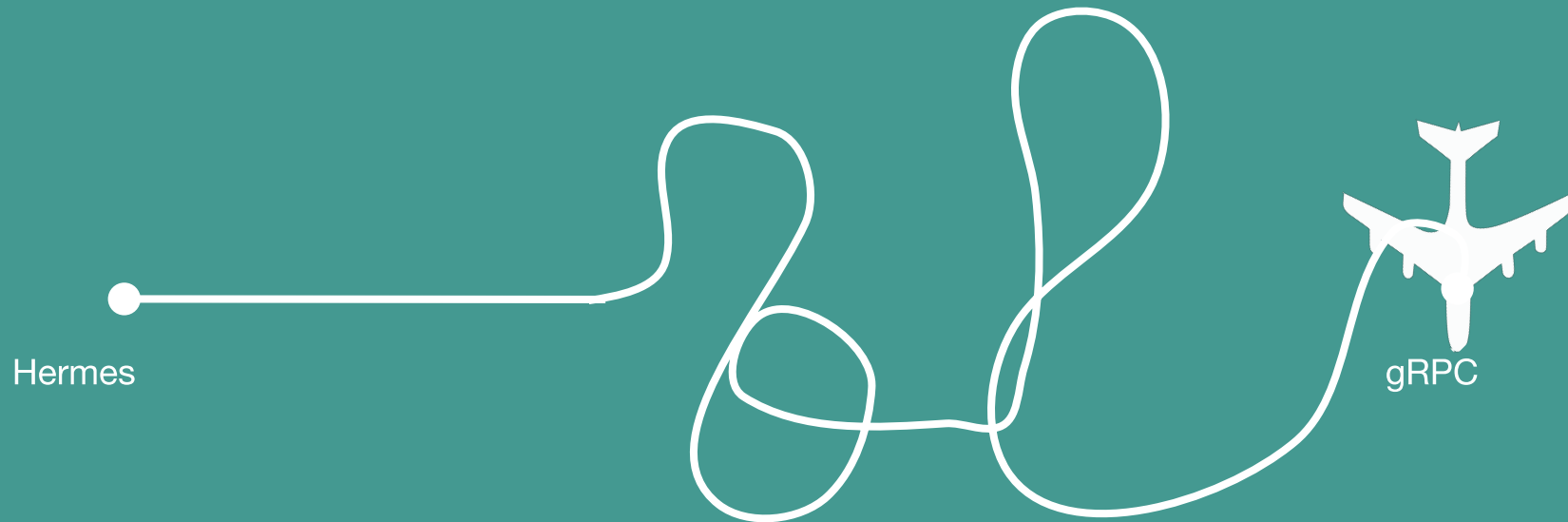
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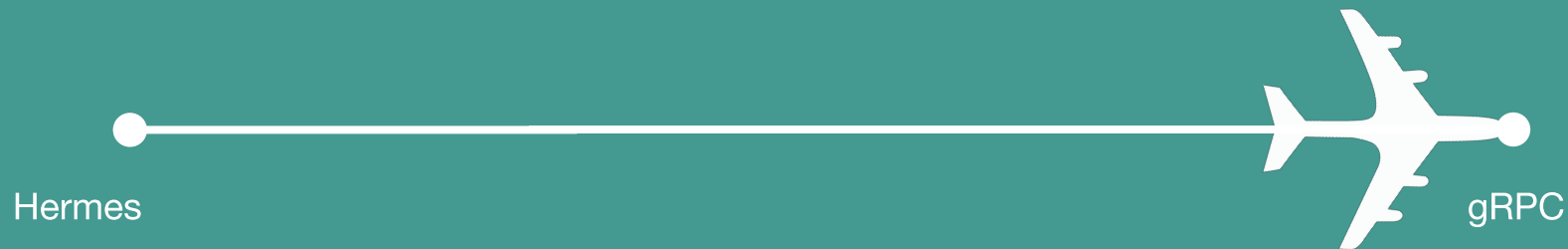
Remaining Distance to Destination



Our Journey



Our Journey



**“Developers
don’t care
about new
RPC technologies”**

-- overheard at KubeCon 2018 Seattle

**“Developers
don’t have to care
about new
RPC technologies”**

-- “overheard” at KubeCon 2019 Barcelona



Thank You

Matthias Grüter
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