



# POSEDIO

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# CHOOSING THE RIGHT TOOL: A COMPARATIVE LOOK AT GRPC, REST, AND GRAPHQL

JAVA MEETUP - VIENNA

DAMJAN GJUROVSKI

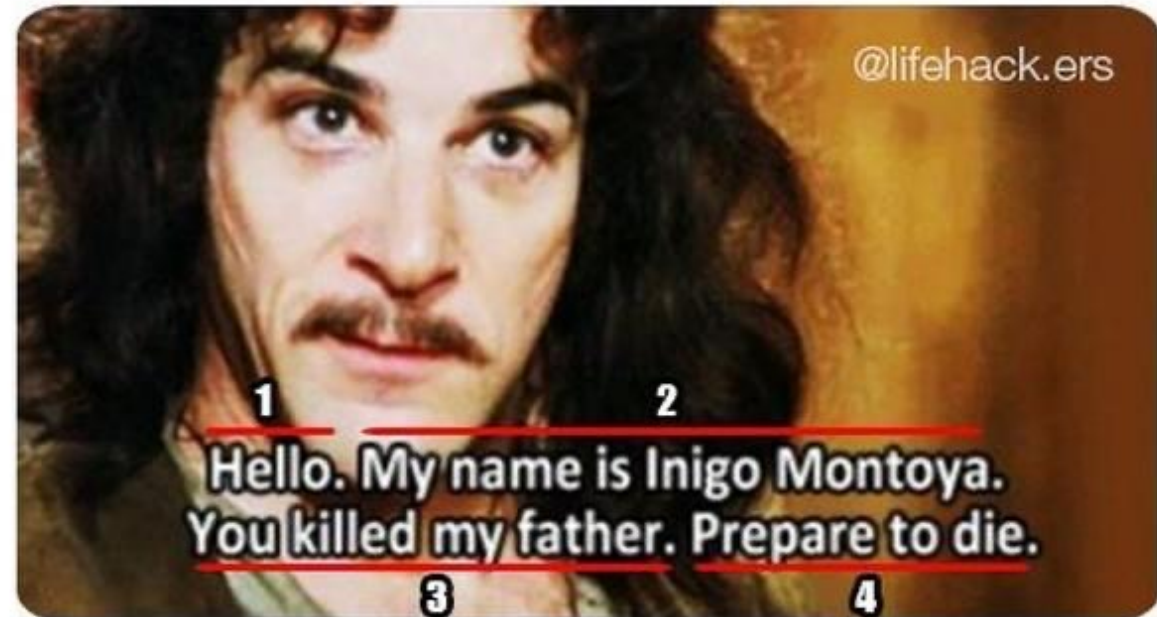
13 February 2024

# HI

- Damjan Gjurovski
- Dev and Ops ☺
- Written REST code for a long while, dabbled in GraphQL for some frontend apps and implemented (and debugged) gRPC in performance-critical applications

How to be good at talking

1. Polite greeting
2. Name
3. Relevant personal link
4. Manage expectations

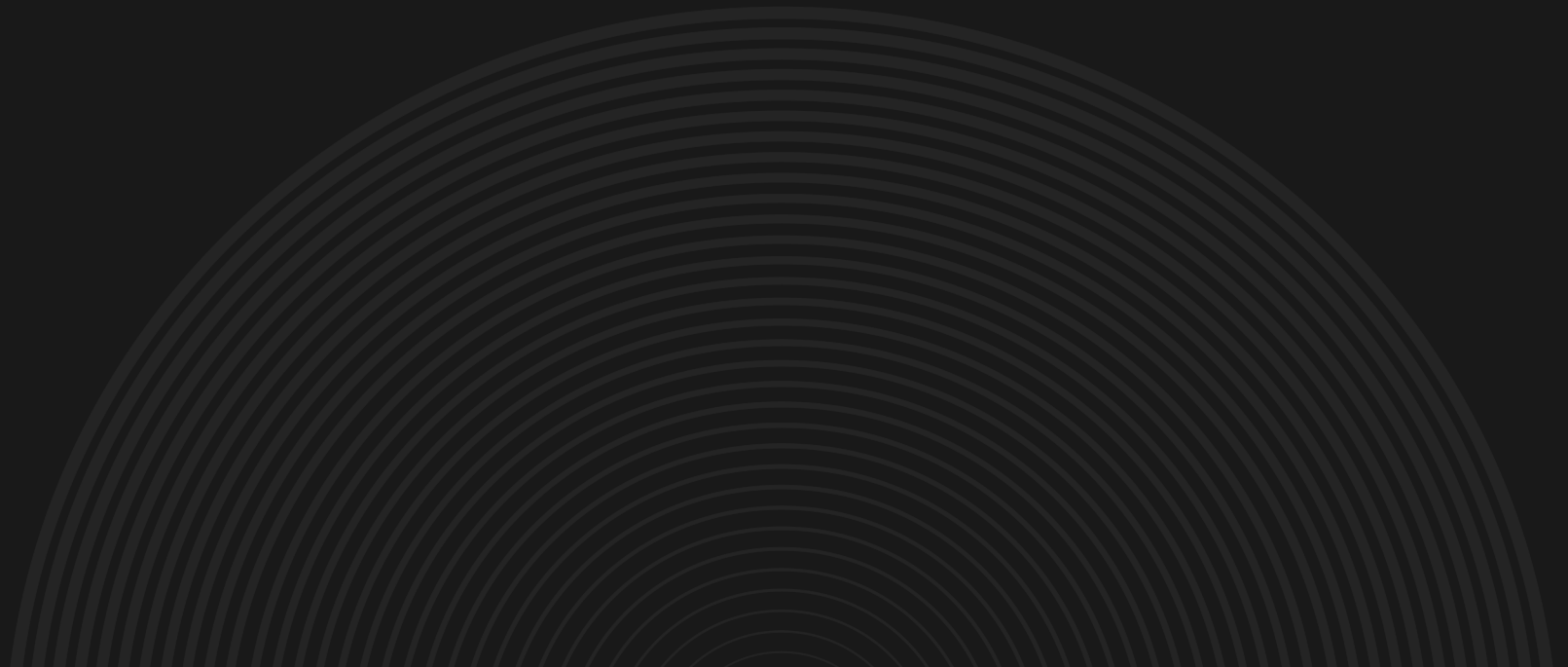


# WHAT'S IN IT FOR ME

1. The sandbox
2. REST, GraphQL, gRPC – what do the letters mean
3. Let's compare them, but fairly
4. What should I use in my project?



# THE SANDBOX



# OUR TINY APP

- Book rooms in a hotel
- Mental model
- What would a database model look like
- What would Java entities look like

## Room

Id  
Type  
Description

## Guest

Id  
Name  
    First name  
    Last name  
Email  
Address

## Booking

Id  
Room  
Guest  
Check-in  
    from  
    to  
Check-out  
    from  
    to  
Requests  
Internal notes



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# REST, GraphQL, GRPC – WHAT DO THE LETTERS MEAN



# REST

- Representational state transfer
- Resources on the server
- Identifiers
- Representation over the wire
- HTTP verbs to modify state

```
[
  {
    "id": "3865dcd4-f5b1-4f23-ba6d-e984fe1f5b2b",
    "guest": {
      "id": "dad94a6e-e49b-4bc6-a78d-201d63b49e53",
      "firstName": "Bruce",
      "lastName": "Wayne",
      "email": "bruce@batman.com",
      "address": "Gotham"
    },
    "checkInFrom": "2024-02-15T15:00:00.705871",
    "checkInTo": "2024-02-16T00:00:00.7059",
    "checkOutFrom": "2024-02-19T09:00:00.705906",
    "checkOutTo": "2024-02-19T12:00:00.70591",
    "requests": "Dark themed room",
    "internalNotes": "I think this is batman",
    "room": {
      "id": "a89e3e21-8531-4f48-8aa2-d43b2dd49704",
      "description": "The best Gotham has to offer",
      "type": "King Suite"
    }
  }
]
```



# REST PROBLEMS

- Misuse / verbs in URL
- Batch transactions
- Partial data requests

```
[
  {
    "id": "3865dcd4-f5b1-4f23-ba6d-e984fe1f5b2b",
    "guest": {
      "id": "dad94a6e-e49b-4bc6-a78d-201d63b49e53",
      "firstName": "Bruce",
      "lastName": "Wayne",
      "email": "bruce@batman.com",
      "address": "Gotham"
    },
    "checkInFrom": "2024-02-15T15:00:00.705871",
    "checkInTo": "2024-02-16T00:00:00.7059",
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      "description": "The best Gotham has to offer",
      "type": "King Suite"
    }
  }
]
```

# GRAPHQL

- Only request data as needed
- Schema is defined separately, and compatibility can be ensured/enforced

```
1▼ {
2▼   bookings {
3▼     guest {
4       firstName
5       lastName
6     }
7     internalNote
8     requests
9▼    room {
10      type
11    }
12    checkInFrom
13    checkOutTo
14  }
15 }
```

```
▼ {
▼   "data": {
▼     "bookings": [
▼       {
▼         "guest": {
▼           "firstName": "Bruce",
▼           "lastName": "Wayne"
▼         },
▼         "internalNote": null,
▼         "requests": "Dark themed room",
▼         "room": {
▼           "type": "King Suite"
▼         },
▼         "checkInFrom": "2024-02-15T15:00:00.654864",
▼         "checkOutTo": "2024-02-19T12:00:00.654928"
▼       }
▼     ]
▼   }
}
```

# GRAPHQL PROBLEMS

- Caching
- Complex queries
- Schema evolution

```
1 ▾ {  
2   bookings {  
3     guest {  
4       firstName  
5       lastName  
6     }  
7     internalNote  
8     requests  
9     room {  
10      type  
11    }  
12    checkInFrom  
13    checkOutTo  
14  }  
15 }
```

```
▾ {  
  ▾ "data": {  
    ▾ "bookings": [  
      ▾ {  
        ▾ "guest": {  
          "firstName": "Bruce",  
          "lastName": "Wayne"  
        },  
        "internalNote": null,  
        "requests": "Dark themed room",  
        "room": {  
          "type": "King Suite"  
        },  
        "checkInFrom": "2024-02-15T15:00:00.654864",  
        "checkOutTo": "2024-02-19T12:00:00.654928"  
      }  
    ]  
  }  
}
```

# GRPC

- Binary protocol – super fast
- Protobuf schema is defined separately, and compatibility can be ensured/enforced
- Nice features for scale

```
23 package com.posedio.roombooking.proto;
24
25 service Guests {
26     rpc fetchGuests (google.protobuf.Empty) returns (GuestsReply) {}
27 }
28
29 message GuestsRequest {
30 }
31
32 message GuestsReply {
33     repeated GuestReply guests = 1;
34 }
35
36 message GuestReply {
37     string id = 1;
38     string firstname = 2;
39     string lastname = 3;
40     string email = 4;
41     string address = 5;
42 }
```

# GRPC PROBLEMS

- Remote procedure calls
- Server to server communication
- Code generation / stubs
- Debugging

```
23 package com.posedio.roombooking.proto;
24
25 service Guests {
26     rpc fetchGuests (google.protobuf.Empty) returns (GuestsReply) {}
27 }
28
29 message GuestsRequest {
30 }
31
32 message GuestsReply {
33     repeated GuestReply guests = 1;
34 }
35
36 message GuestReply {
37     string id = 1;
38     string firstname = 2;
39     string lastname = 3;
40     string email = 4;
41     string address = 5;
42 }
```



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LET'S COMPARE THEM, BUT  
FAIRLY



# COMMUNICATION TYPES

- Client – Server
  - Browser – Server
  - API Client - Server
- Server – Server
  - Microservices
  - Backend servers

# DATA

- Lots of data
  - Only partially used data
  - Streaming data
- Little data
  - Data represents state





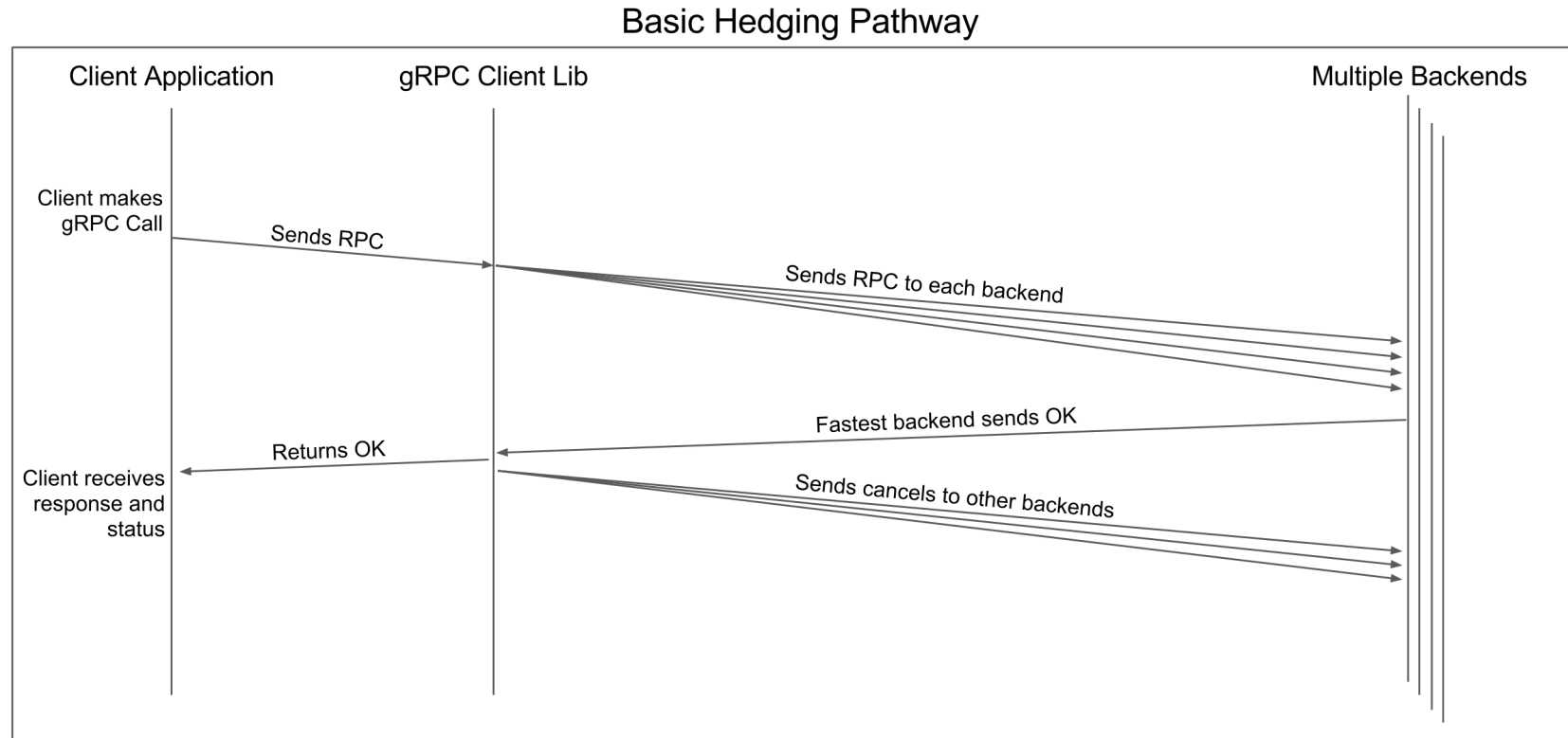
# NON-FUNCTIONAL REQUIREMENTS

- Security
- Latency
- Schema evolution



# HOW TO BUILD FAST ON TOP OF SLOW SYSTEMS

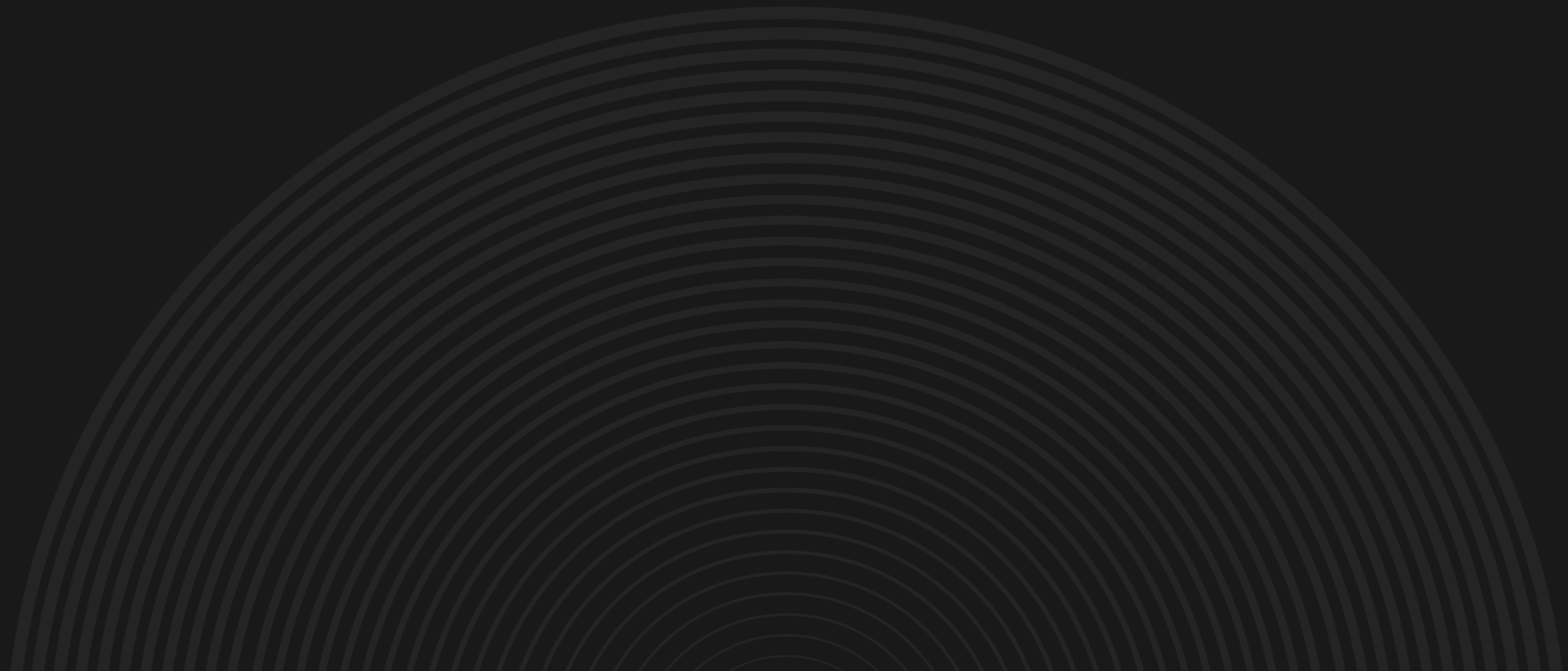
# HOW TO BUILD FAST ON TOP OF SLOW SYSTEMS



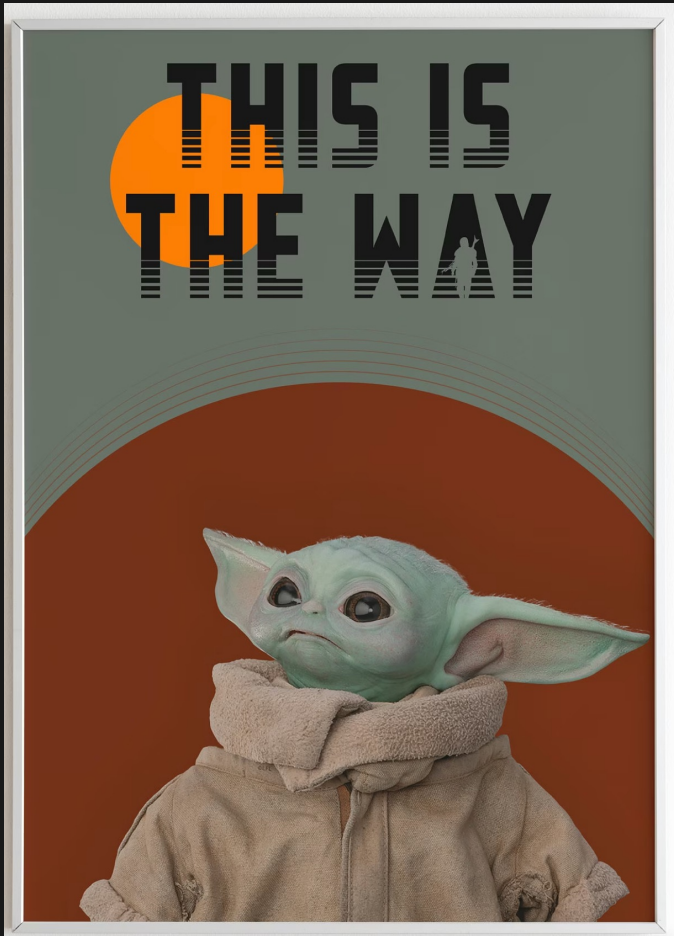


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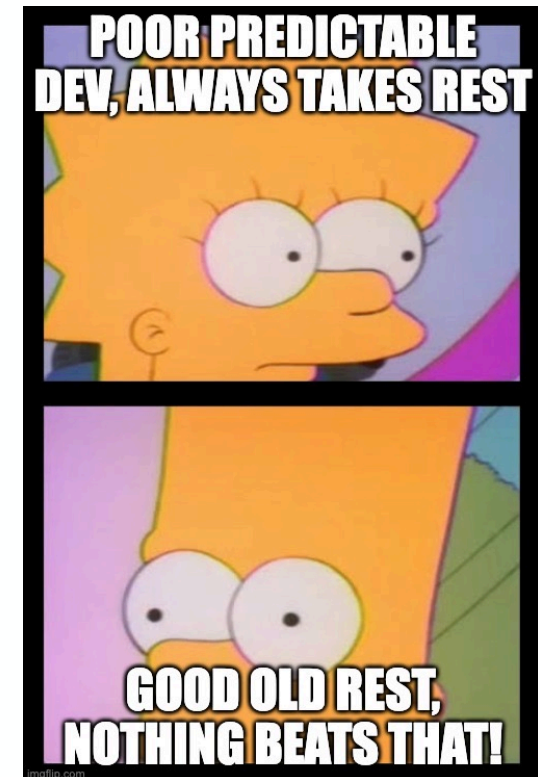
# WHAT SHOULD I USE IN MY PROJECT



# THIS IS THE WAY



- Use gRPC for critical, complex projects
- Use GraphQL when you need to support multiple clients with different needs
- When not sure use REST



WANT TO KEEP THE  
DISCUSSION  
GOING? MESSAGE  
ME ON LINKEDIN!



Damjan Gjurovski  
Head of Technology

