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# Using GraphQL as a Secure Innovation Boundary and data-driven culture driver

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# Introduction



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Head of Information Technology  
@kjacobsen



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Lead Consultant  
@cuzzlor

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Delivery Innovation Lead  
@robdmoore



# Overview

Context



Pitching



Prototyping



Productionising



Launching



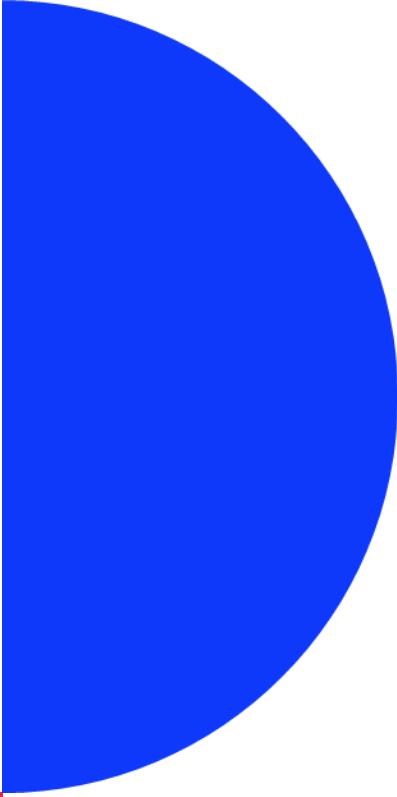
Operating





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# Context



“

**"It's hard to innovate; every time we want to access some data we need to talk to multiple teams and wait for approval."**



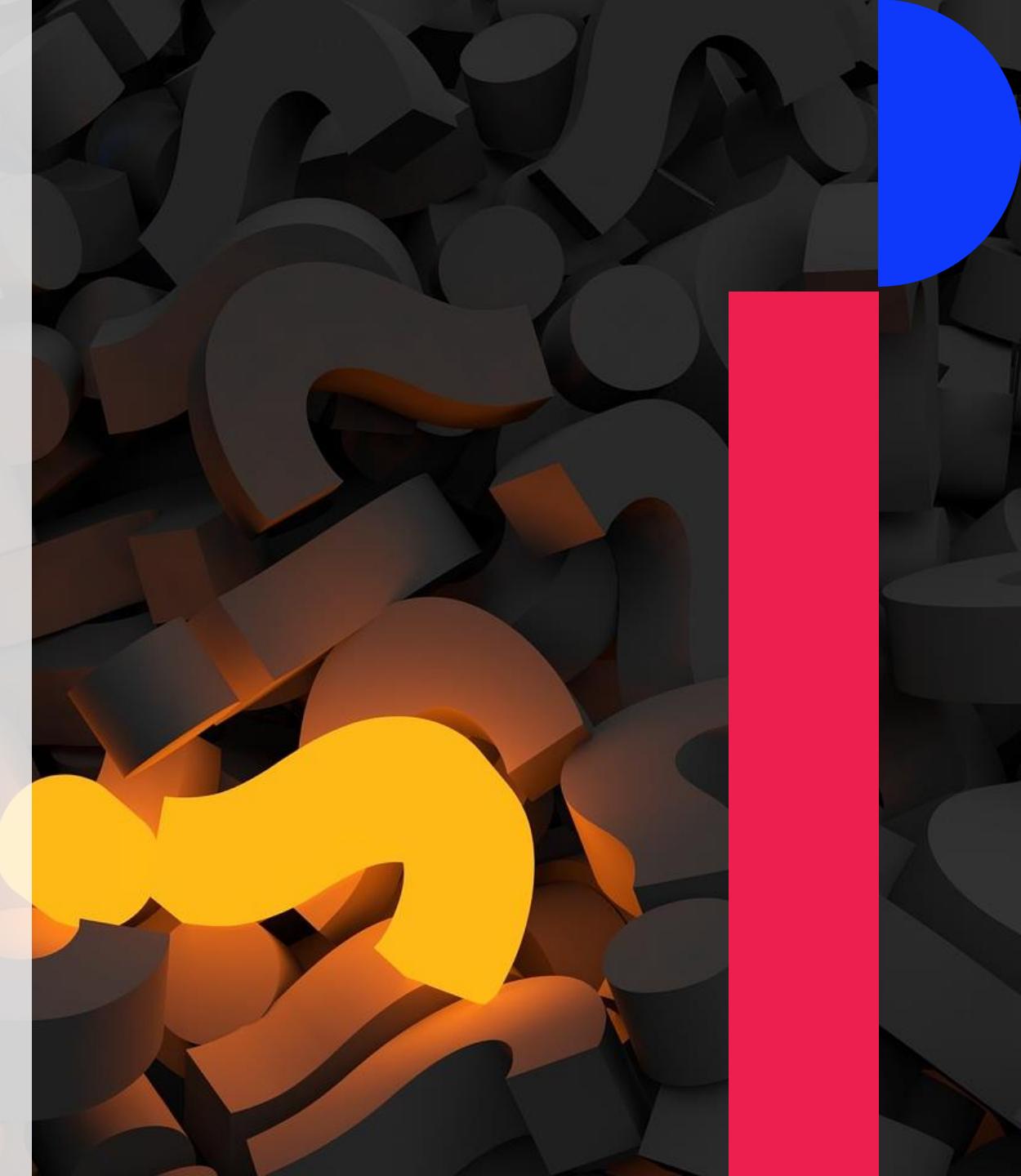
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"Our systems integration landscape is a security nightmare, there is no cross-cutting authentication, authorisation or telemetry, and we are using shared credentials between systems that give full access to all the data."



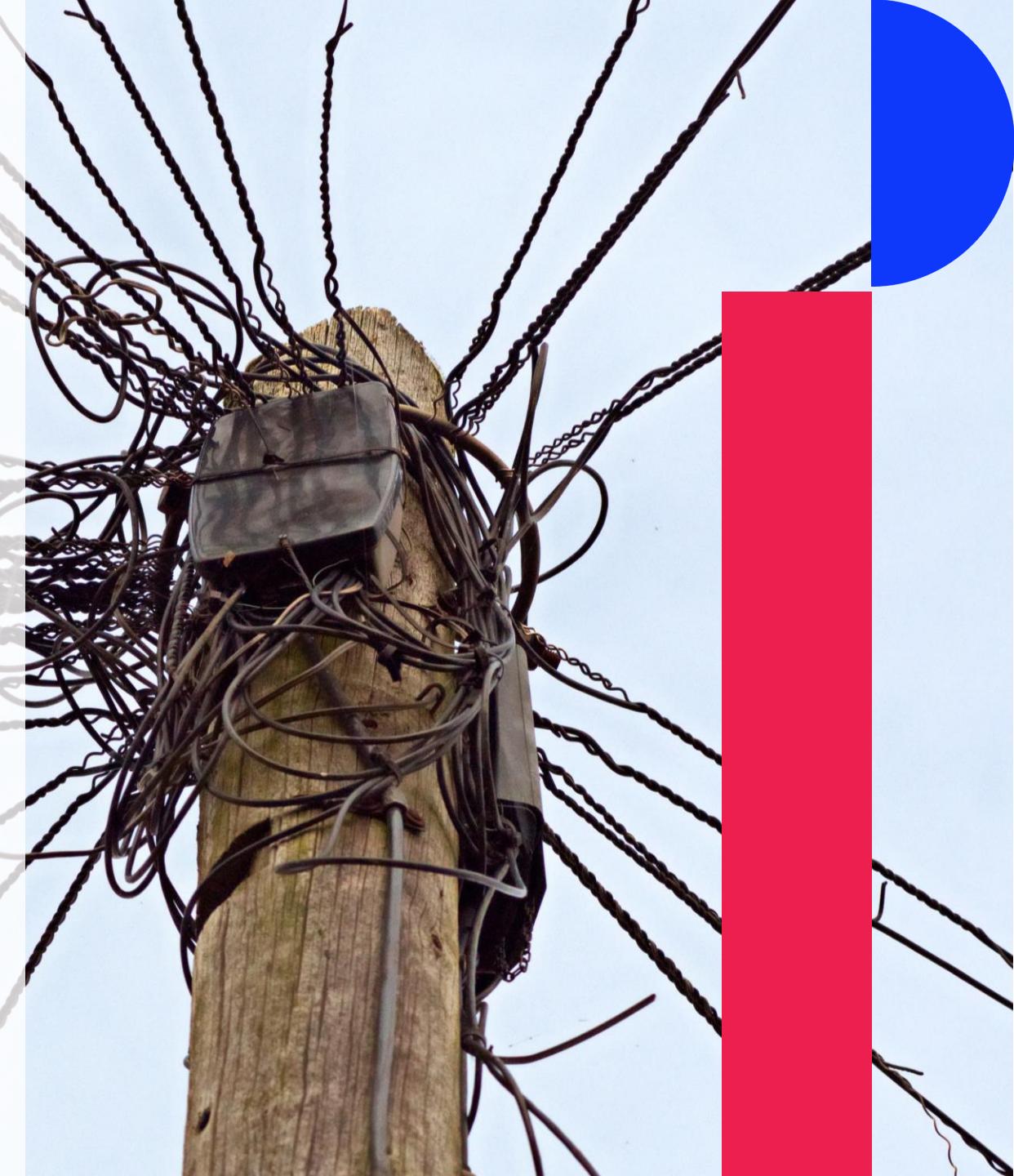
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"When we access our core data we need to wait for a time-constrained subject matter expert to help us out; the data schema of our core systems is hard to decipher without their help."



“

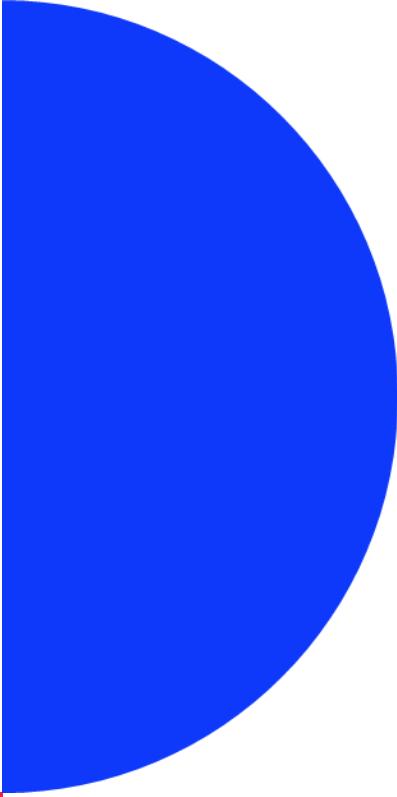
"The easiest way for us to integrate with core systems is via the reporting replica databases, but now all of our systems are tightly coupled, and we can't evolve our core systems."



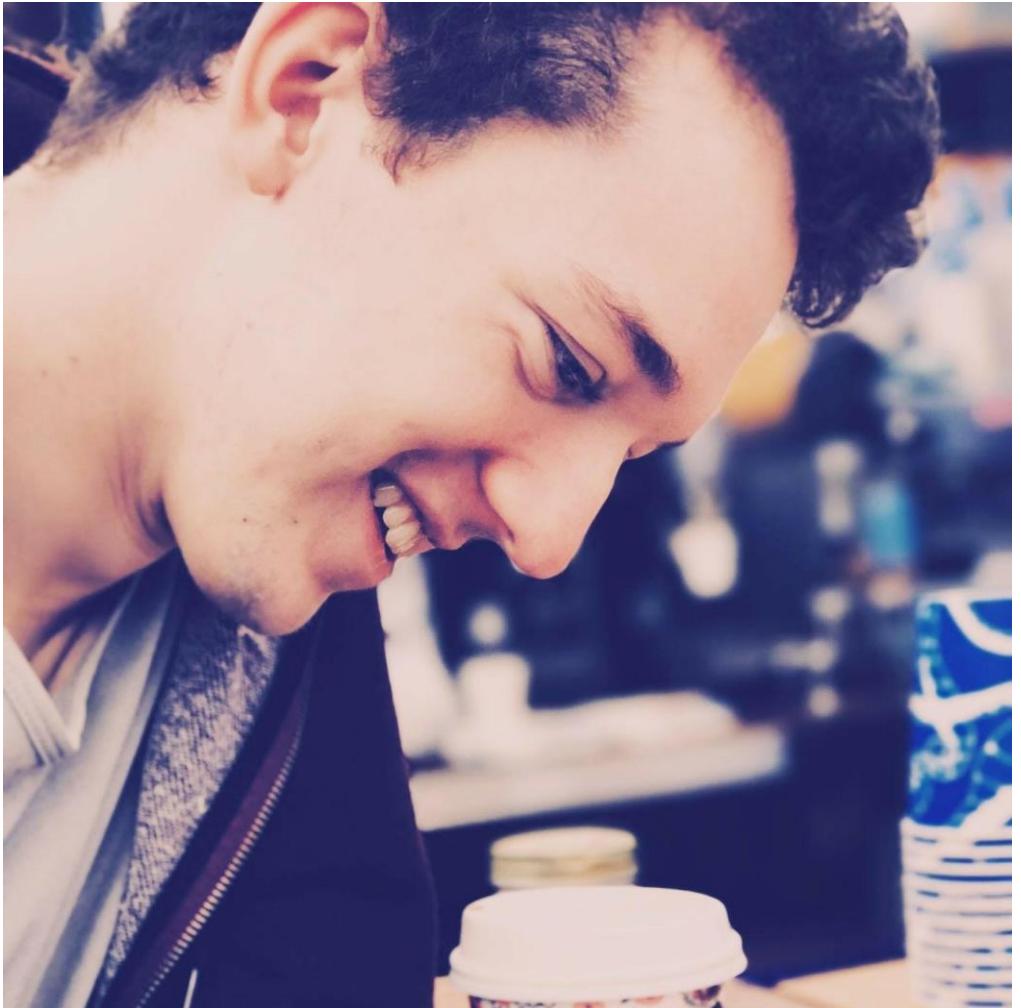


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# Pitching



**\*record scratch\* Rewiiiiiiind**



**Meet Ben**

# Pitching

Consistent, persistent  
and topical

Problem identification (why!)

Model-based solution

GraphQL as option  
to give confidence

Tailored to  
audience

Enterprise Architect

Head of Information Technology

Head of Operations

Head of Delivery

Anyone that would listen



# (Internal) Marketing



“

“Secure innovation boundary”



# Enterprise architecture

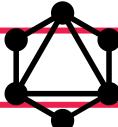
Unmanaged apps – on the ground innovation and experimentation, ad hoc and programmatic data access

Business apps – open for contribution, reviewed by DevSecOps

Custom  
apps

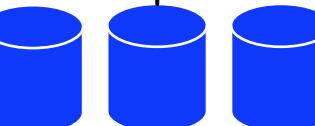
Power BI

Secure  
Innovation  
Boundary



DevSecOps – reviewed by Telstra Security

Data export and  
transformation automation



Data stores

Core Systems

HRIS

CRM

PSA

Finance

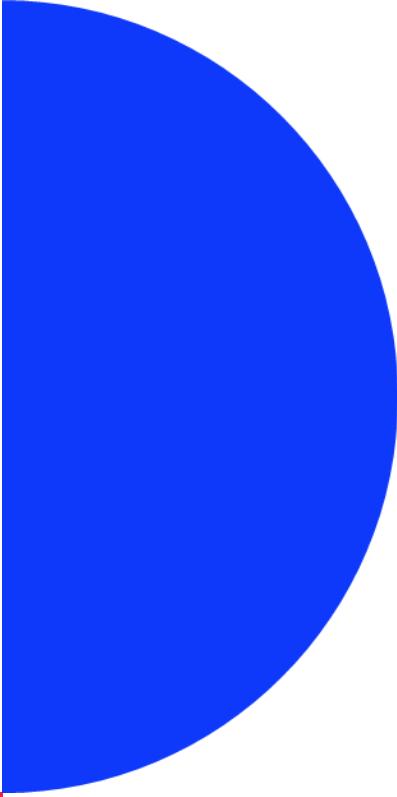
# The stars aligned!





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# Prototyping



“

I have experience building a GraphQL API for a large corporate client.

I *really* wanted to set this project up for success.

I asked for 4 weeks to work on a prototype and was given the green light.

Sam Curry

# Model First

- › Model the organisation, not the systems used to run it
- › Use Schema Definition Language (SDL) as the medium to model the organisation



# Consumer Experience

- › Discoverability is key
- › GraphQL Playground
- › GraphQL Voyager
- › Schema Documentation



# Operational Confidence

- › Can we confidently land changes?
- › Is the hosting reliable, performant, scalable?
- › Can we observe and understand the running system?
- › As the system and usage grows, we can tweak the performance and scale?



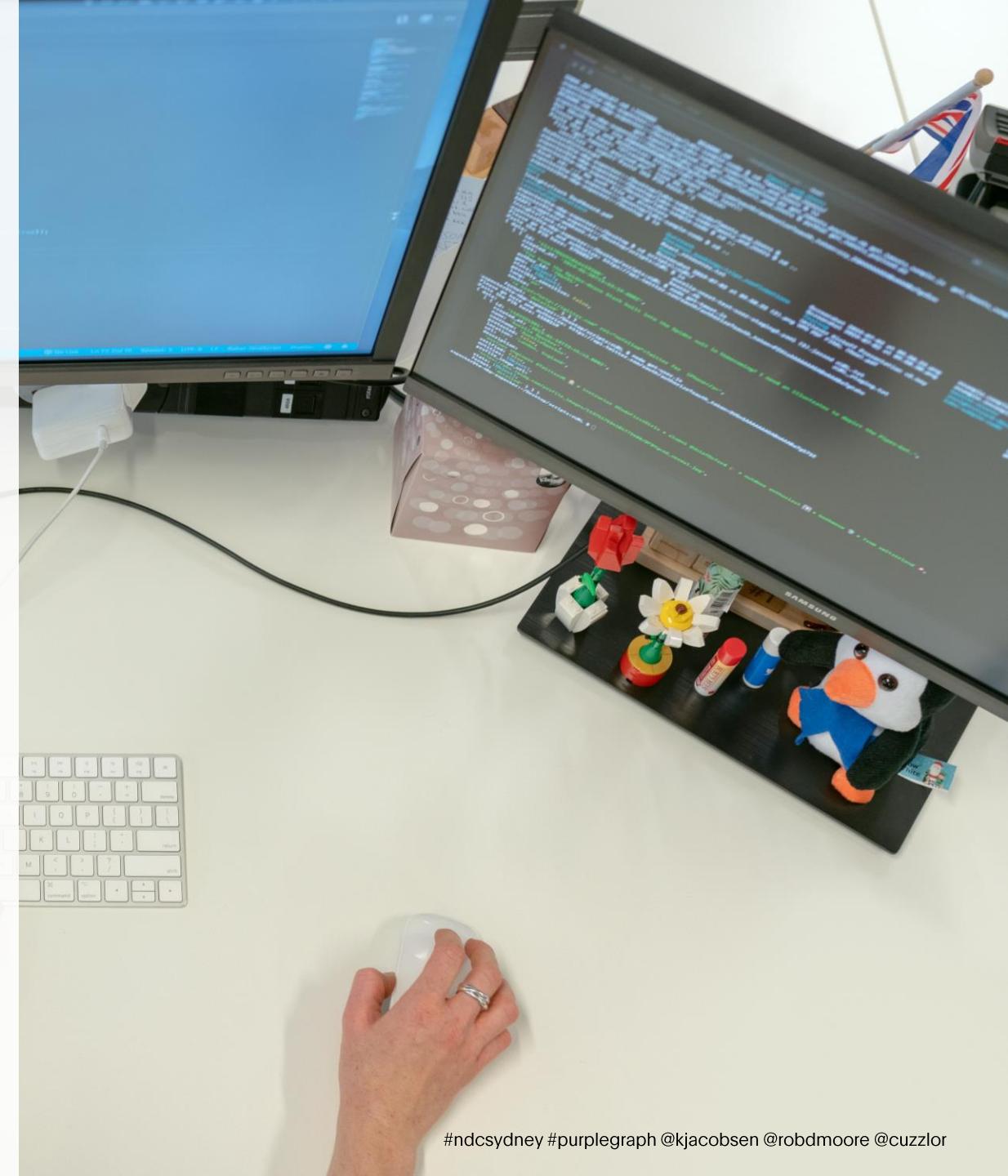
# Security

- › Platform: Azure Active Directory
  - App registrations
  - Identity data (& access control)
  - People data (via MS Graph)
  - OAuth 2.0 & OpenID Connect
- › Authentication (server-side): Passport
  - Modular auth middleware
  - Azure AD Plugin
  - BearerStrategy (backend)
  - OIDCStrategy (front-ends)
- › Authorisation: GraphQL Shield



# Developer Experience

- › Great README + [TOC]
- › Typescript for the best IDE experience
- › Seamless 'F5 experience'
- › Formatted, useful console output
- › Auto-format on save + prettier
- › GraphQL IDE support
- › Great testing experience
  - VS Code Test Explorer
  - Approval Tests (automated)
  - Load Tests (Artillery)



# Demonstration

DX

Playground

Real data

Voyager



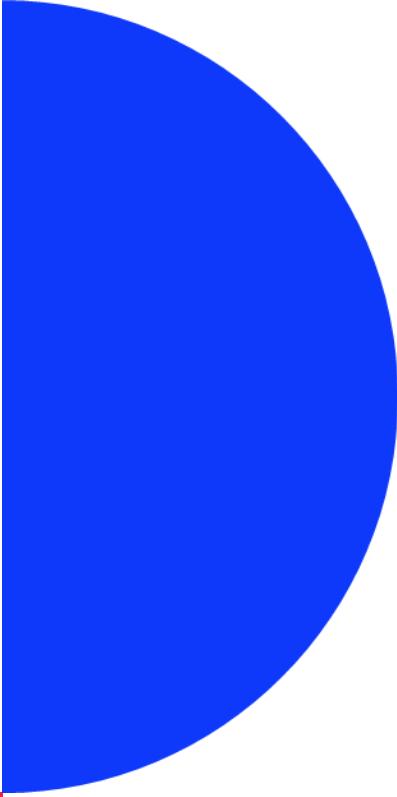
README

Telemetry



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# Productionising



# Advocating

- › Technology teams and the business need confidence in the solution
- › Documentation is a key to building confidence of technology teams
- › Critical issue:
  - DevSecOps team is Microsoft focused
  - Apollo uses Node.js
  - Would the lack of knowledge and experience be a problem?



# Organise by feature

- › Composability to drive sustainability
- › Dependency injection + schema composition ftw
  - Express middleware
  - Apollo Server + GraphQL Tools + GraphQL Middleware = profit
  - Inversify



# Final touches

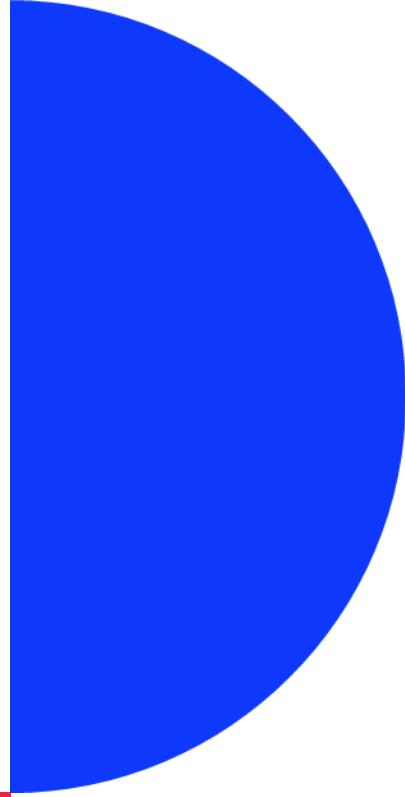
- › Production Environment
  - Infrastructure as Code (IaC)
  - Multi-stage deployments
  - Deployment slots with testing
- › Security
  - Vulnerability scanning
  - Dependency Management
  - Secrets Management



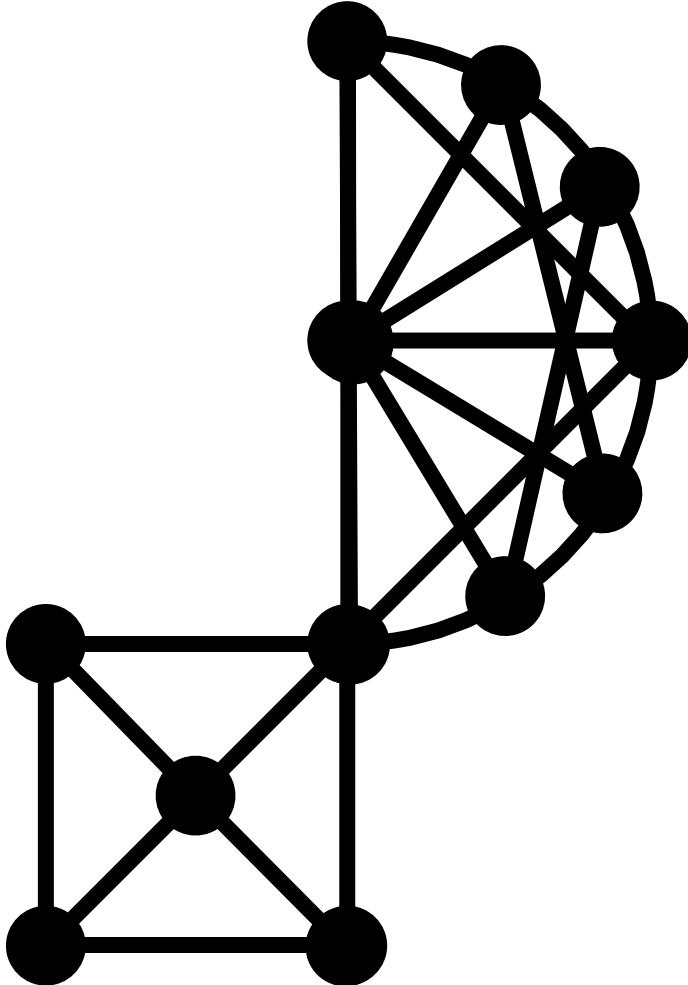


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Launching



# Magnitude Graph



# Comn Docur



Kieran Jacobs

Introduc

TL; DR:

- Launching
- It is still be
- Learn mor
- Everyone
- [Source co](#)
- What the
- Join us in
- Even more

Hey Everyone

It is with grea  
Boundary. Pu  
the next step  
[Individuals ar](#)

I have written  
[Solutions.](#)

Secure Innov

WDA WA Quokkas

## Exploring the data in Purple Graph

If you access Purple Graph then the default interface is a playground that allows you to write [GraphQL queries](#). While it may look like a technical language, it's actually really easy to learn and anyone in our business should be able to pick it up in a few minutes. While in the playground you can explore the model by hitting **ctrl+space** at any point to get auto-complete suggestions. You can hover over a field to see any documentation that explains what the data in that field contains. You can also explore the model using the [Model Explorer](#) to understand what data is available visually.

Here's some example queries to get you started:

### [Information about a person.](#)

*Explore further: use the `me` query to get information about yourself.*

```
query Person {  
  peopleSearch(nameLike: "Rob Moore") {  
    id  
    name  
    email  
    positionTitle  
    department  
    portfolio {  
      name  
    }  
    location  
    hireDate  
    continuousServiceDate  
    positionHistory {  
      title  
      department  
      startDate  
      endDate  
    }  
    manager {  
      name  
    }  
    squad {  
      id  
      name  
      lead {  
        name  
      }  
      associateLead {  
        name  
      }  
    }  
  }  
}
```

### [Search StoryHub.](#)

*Explore further: change the sort order and search by tag instead to get stories tagged with `Public Cloud` instead.*

```
query SearchStories {  
  storySearch(searchText: "Azure IoT") {  
    totalResults  
    pageSize  
    results {  
      title  
      customerName  
      url  
    }  
  }  
}
```

### [Projects and StoryHub stories for a customer.](#)

*Explore further: Find the WDA WA Quokkas squad and then find all projects within that squad.*

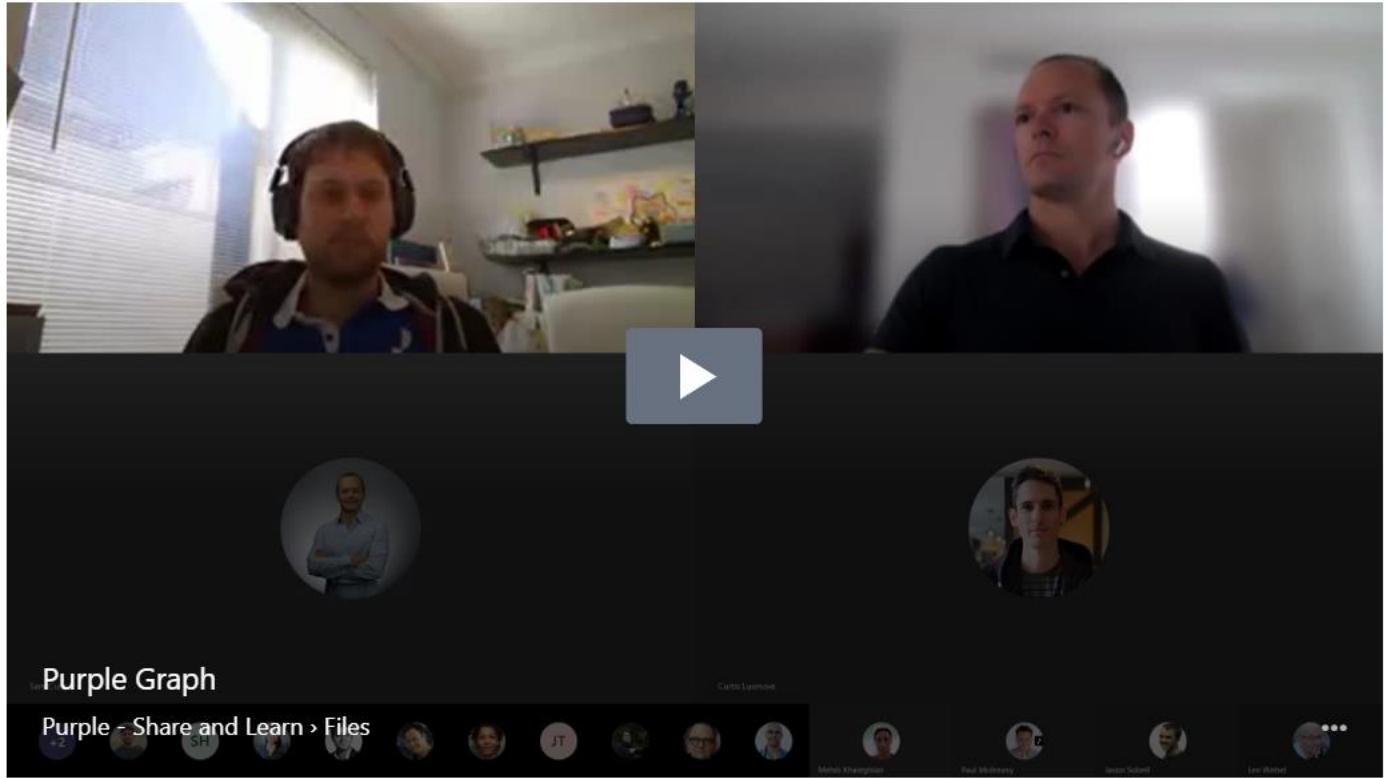
```
query Customer {  
  customerSearch(nameLike: "Telstra") {  
    id  
    name  
    salesTerritory  
  
    projects {  
      name  
    }  
  
    stories {  
      results {  
        title  
        url  
        tags {  
          capabilities {  
            value  
          }  
        }  
      }  
    }  
  }  
}
```



Documentation

Share and lea

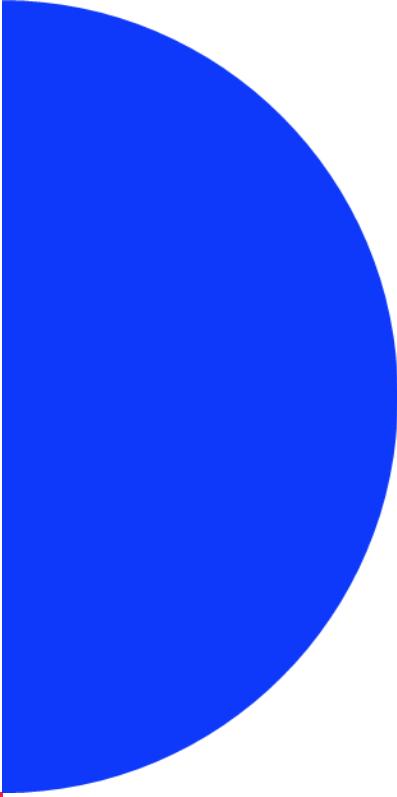
# Following through



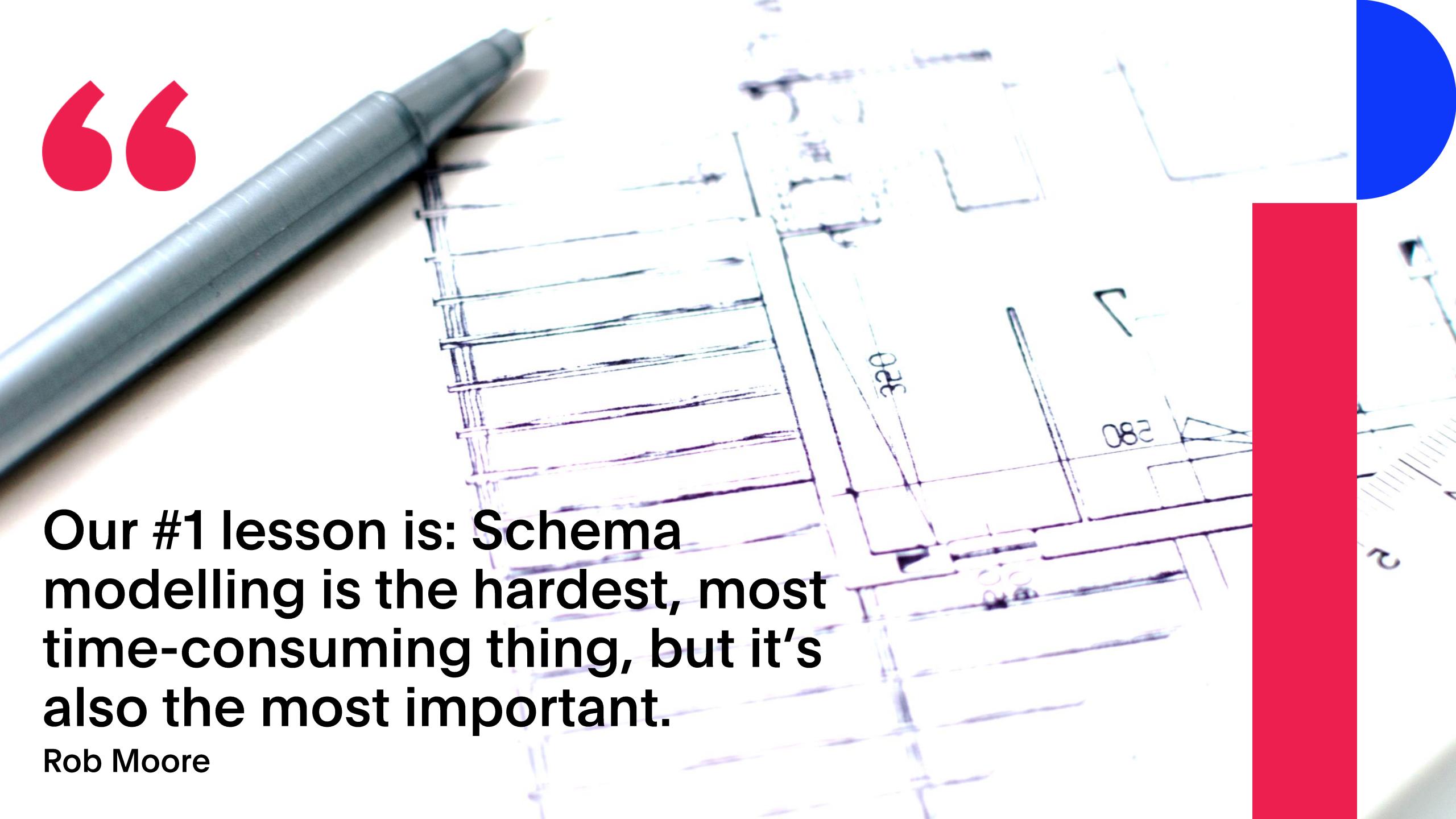


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# Operating



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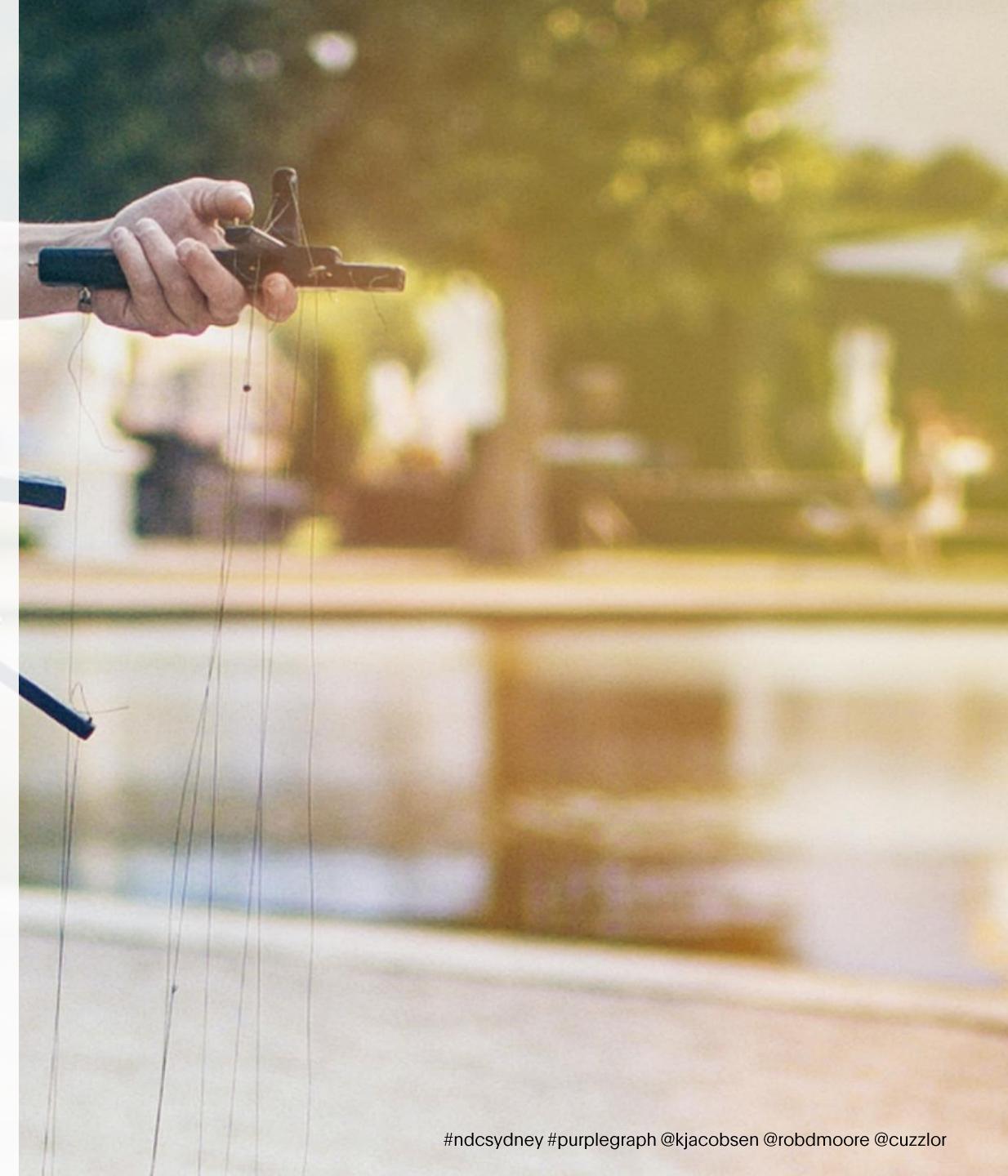


**Our #1 lesson is: Schema modelling is the hardest, most time-consuming thing, but it's also the most important.**

Rob Moore

# Schema modelling and ownership

- › YAGNI Schema modelling *mindset*
- › Great platforms serve their consumers, but sometimes they need a push too
- › Schema ownership, SME identification and quick decision making
- › Pull requests + SDL ftw!



“

option

?

/

CREATE

return

Building an Inner Source  
community can drive  
adoption and success.

Kieran Jacobsen



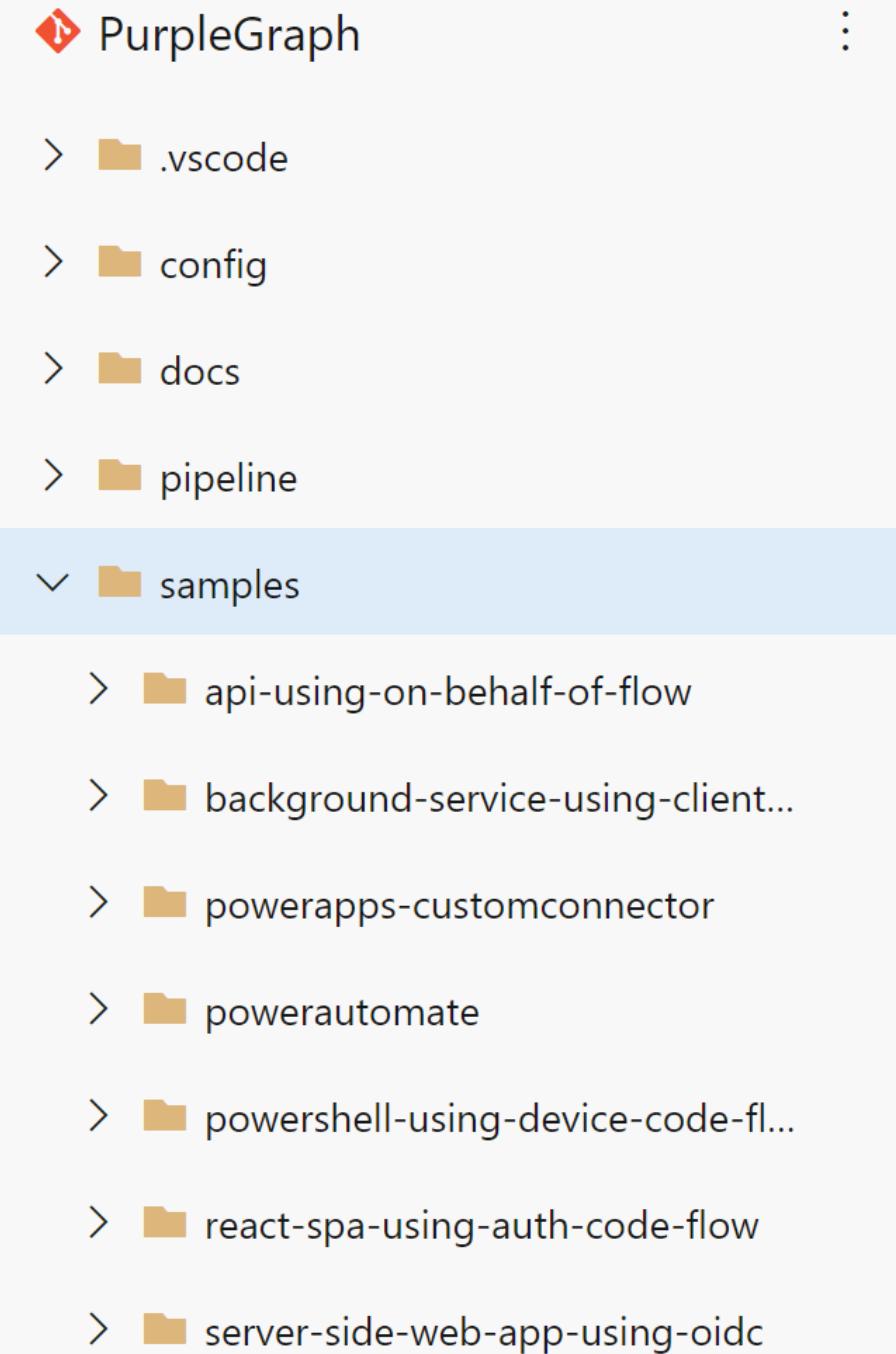
# Inner Source

- › Open Source Software (OSS) practices within your organisation
- › Quality Assurance through PR Reviews



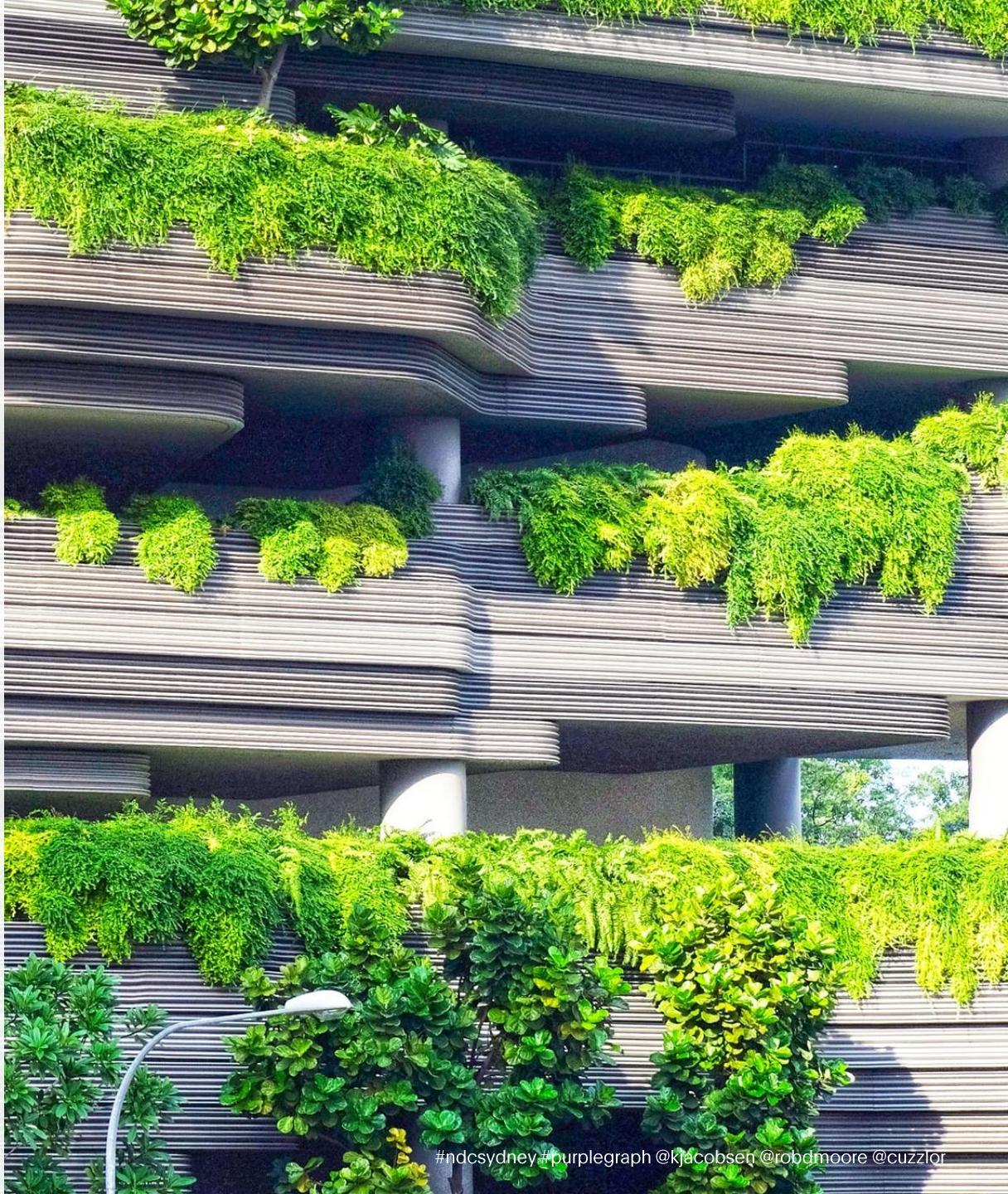
# Examples

- › Provide examples of how to access GraphQL data



# Architectural evolution

- › Do one thing well – expose model with authorisation and telemetry
- › No complex logic, just translation
- › Don't expose underlying systems
- › Optimise perf based on data
- › User-attended over unattended



# Cultural evolution

- › Answering business questions
- › Executives running queries
- › Ad hoc self-service vs waiting for complex BI environment spin-up
- › Teams bots and innovative visualisations and experiences
- › Connecting data is POWERFUL & inspirational





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# Conclusion and key learnings

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# Free stuff! :O

Try Azure for free: <https://azure.com/free>

Learn Azure for free: <https://aka.ms/learn>

Join Community Newsletter:

<https://aka.ms/DevNewsletterJoin>

Claim your Azure swag\*:

<https://aka.ms/AzureDeveloperSwag>

\* First 4 entrants per code below. T&Cs apply. Swag may or may not look like picture to the right. If problems persist see a health professional.

Kieran: JAC022

Rob: ROBM21

Sam: SAMC20



# Questions?



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