

GraphQL for Network and Security Engineers

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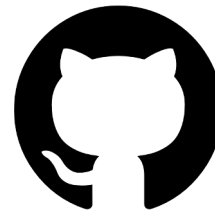
Damien Garros

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Infrastructure as Code, Automation & Observability for
15+ years



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@dgarros



GraphQL



- Data **query and manipulation language** for APIs
- Designed to make APIs fast, flexible, and developer-friendly.
- Move some complexity out of the client, on the server side.
- Complementary / Alternative to REST API
- Developed at Facebook, released in 2015





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GraphQL Sandbox



Object
Type



```
1 query {  
2   InfraDevice(site__name__value: "atl1") {  
3     edges {  
4       node {  
5         name {  
6           value  
7         }  
8       }  
9     }  
10  }  
11 }
```



Filters

Variables

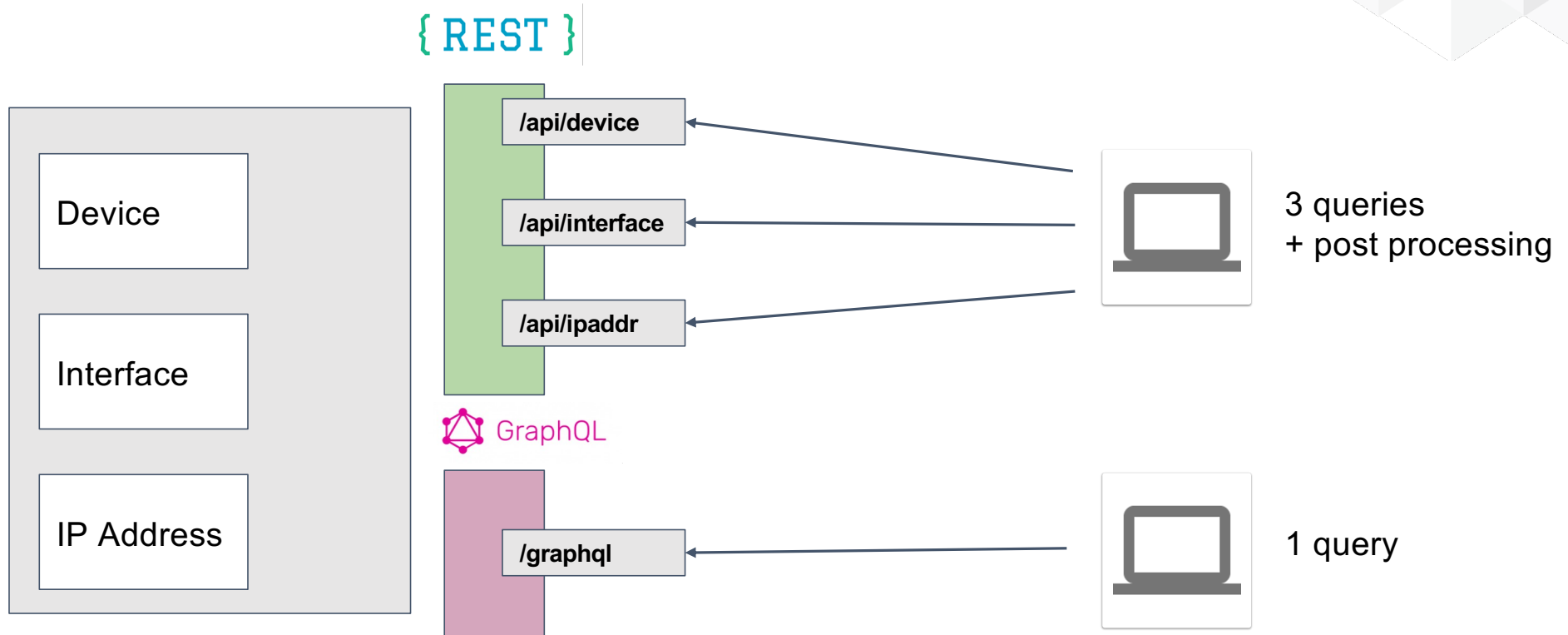
Headers

1

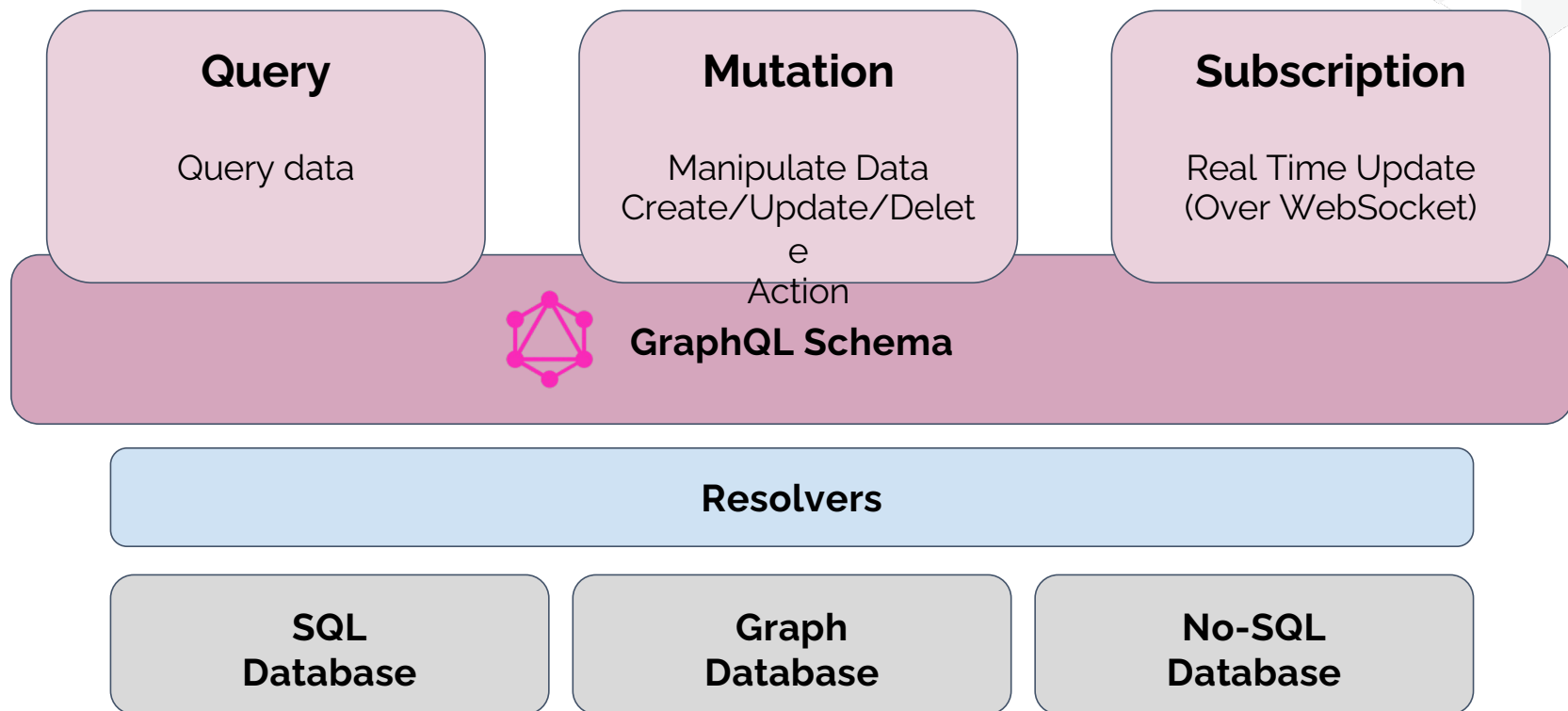
+ GraphQL



```
{  
  "data": {  
    "InfraDevice": {  
      "edges": [  
        {  
          "node": {  
            "name": {  
              "value": "atl1-core1"  
            }  
          }  
        },  
        {  
          "node": {  
            "name": {  
              "value": "atl1-core2"  
            }  
          }  
        },  
        {  
          "node": {  
            "name": {  
              "value": "atl1-edge1"  
            }  
          }  
        }  
      ]  
    }  
  }  
}
```


GraphQL vs REST



GraphQL Components























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▼

GraphQL Sandbox





☐ type__owner__id:
☐ type__source__id:
☐ type__value:
☐ type__values:
☐ count
▼ edges
 ▼ node
 ☐ _updated_at
 ▶ artifacts
 ▶ asn
 ▶ description
 ☒ display_label
 ☐ hfid
 ☐ id
 ▶ interfaces
 ▶ member_of_groups
 ▶ mlag_domain
 ▼ name
 ☐ id
 ☐ is_default
 ☐ is_from_profile
 ☐ is_inherited
 ☐ is_protected
 ☐ is_visible
 ☐ owner
 ▶ permissions
 ☐ source

Query Builder





```
1 {  
2   InfraDevice(name__value: "atl1-core1") {  
3     edges {  
4       node {  
5         name {  
6           value  
7         }  
8         display_label  
9       }  
10    }  
11  }  
12 }
```

Variables

Headers

▼

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GraphQL Sandbox



< Docs



InfraDevice

Generic Device object

Implements

CoreNode

CoreArtifactTarget

Fields

id: String!

Unique identifier

hfid: [String]

Human friendly identifier

display_label: String

_updated_at: DateTime

status: Dropdown

type: TextAttribute!

description: TextAttribute

role: Dropdown

Builtin
Documentation

```
1 query {  
2   InfraDevice(name__value: "atl1-core1") {  
3     edges {  
4       node {  
5         name {  
6           value  
7         }  
8         interfaces {  
9           edges {  
10            node {  
11              name {  
12                value  
13              }  
14            }  
15          }  
16        }  
17      }  
18    }  
  }
```



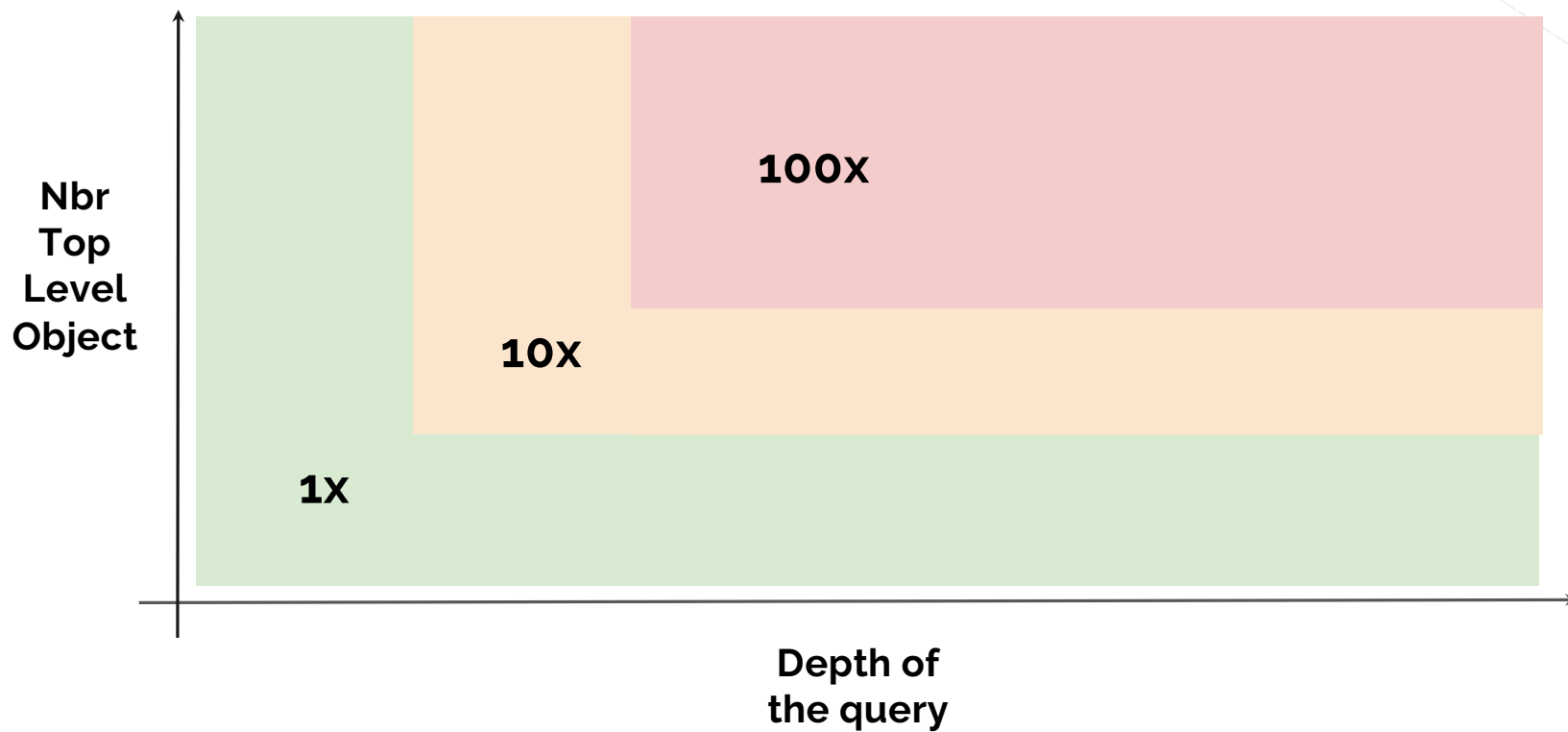
Variables

Headers



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GraphQL Query Cost



Other Features

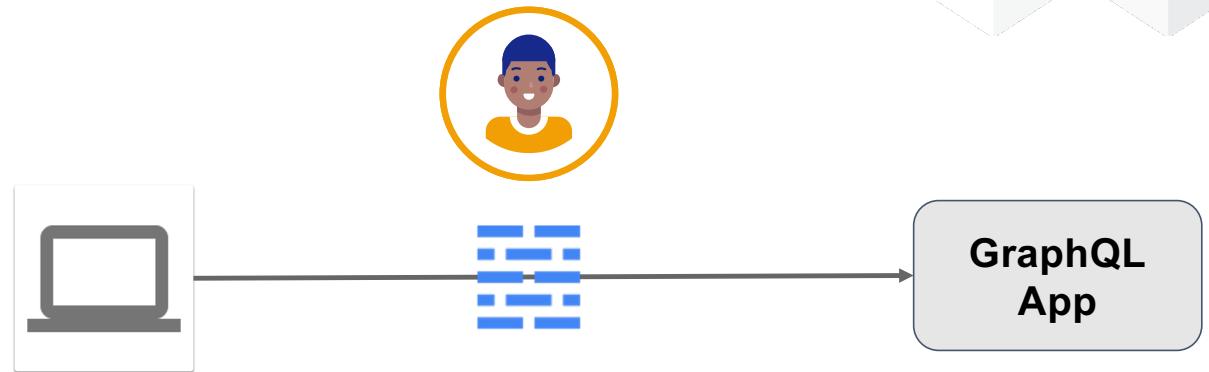
- Variables
- Fragments
- Multiple queries
- Introspection Query

The background of the slide is a solid blue color with a complex, low-poly geometric pattern. This pattern consists of numerous small, irregular triangles and polygons in various shades of blue, creating a textured, crystalline effect. The pattern is dense and covers the entire area of the slide.

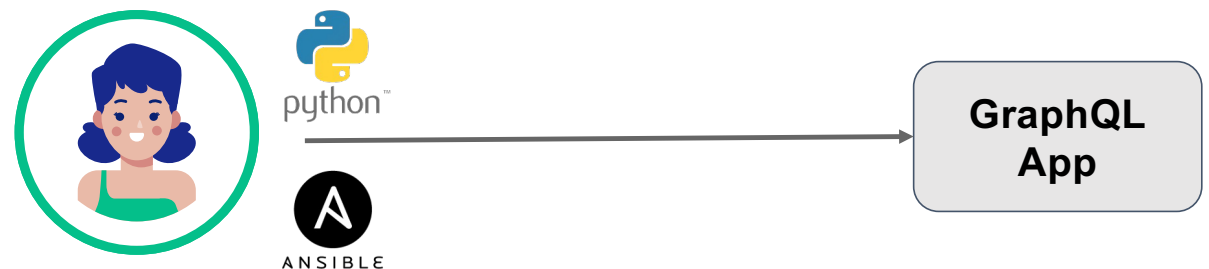
Use Cases for Network and Security Engineer

Use Cases for Network and Security Engineer

**Manage / Secure
a GraphQL Application**



Network Automation



Applications supporting GraphQL today



INFRAHUB
by OpsMill



List non exhaustive

Applications that COULD support GraphQL tomorrow ??

FORTINET

kentik

paloalto
NETWORKS

Anyone
exposing relational
data via a REST API

PeeringDB

zayo

EQUINIX

NANOg



IX API

Some might already support it but I couldn't find it in my research

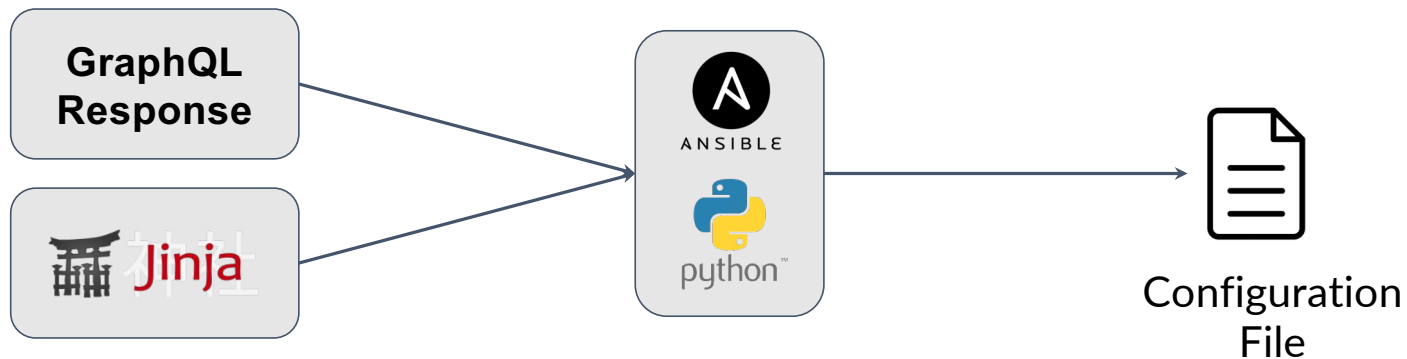
Manage / Secure GraphQL Applications



- All requests goes to the same endpoint, HTTP status code are not relevant (always returns 200)
- Potential vector of attack
 - DOS / Query are very powerful (too powerful ?)
 - Batch of queries
 - Full schema available

Network Automation with GraphQL

- Easier to query and consume data.
- Less effort required on the client or in Jinja
- Very easy to pair with Jinja2 to generate files



Best Practices



- Be mindful of the “**Cost**” of your queries
- Use filter to narrow down what you want to retrieve
- In Ansible / Nornir, don't query everything in the inventory, query additional information at the beginning of the playbook instead

Try It Yourself

Public Sandbox with Networking Data

<https://demo.infrahub.app/graphql>

No login or sign up required



Thank you

GraphQL vs REST



GraphQL

{ REST }

Schema	Yes	Recommended
Endpoint(s)	Only One	1 per Object Type
Payload	On Demand	Fixed
Read	Query	GET
Create	Mutation	POST
Update	Mutation	PUT
Delete	Mutation	DELETE
Notification	Subscription	With HTTP/2