

**Build Scalable
APIs using
GraphQL and
Serverless**





2019 and Beyond



Nader Dabit
@dabit3



1. Serverless will continue to explode
2. Developers will continue to move important workloads to managed services (Auth0, Algolia, AppSync, Firebase, etc)
3. GraphQL will continue to gain market share, more companies / tools / frameworks enter market
4. Cross-platform flourishes

Nader Dabit @dabit3

🌟🌟 What are your top predictions for the software industry in 2019?

🍷 269 4:36 PM - Dec 27, 2018



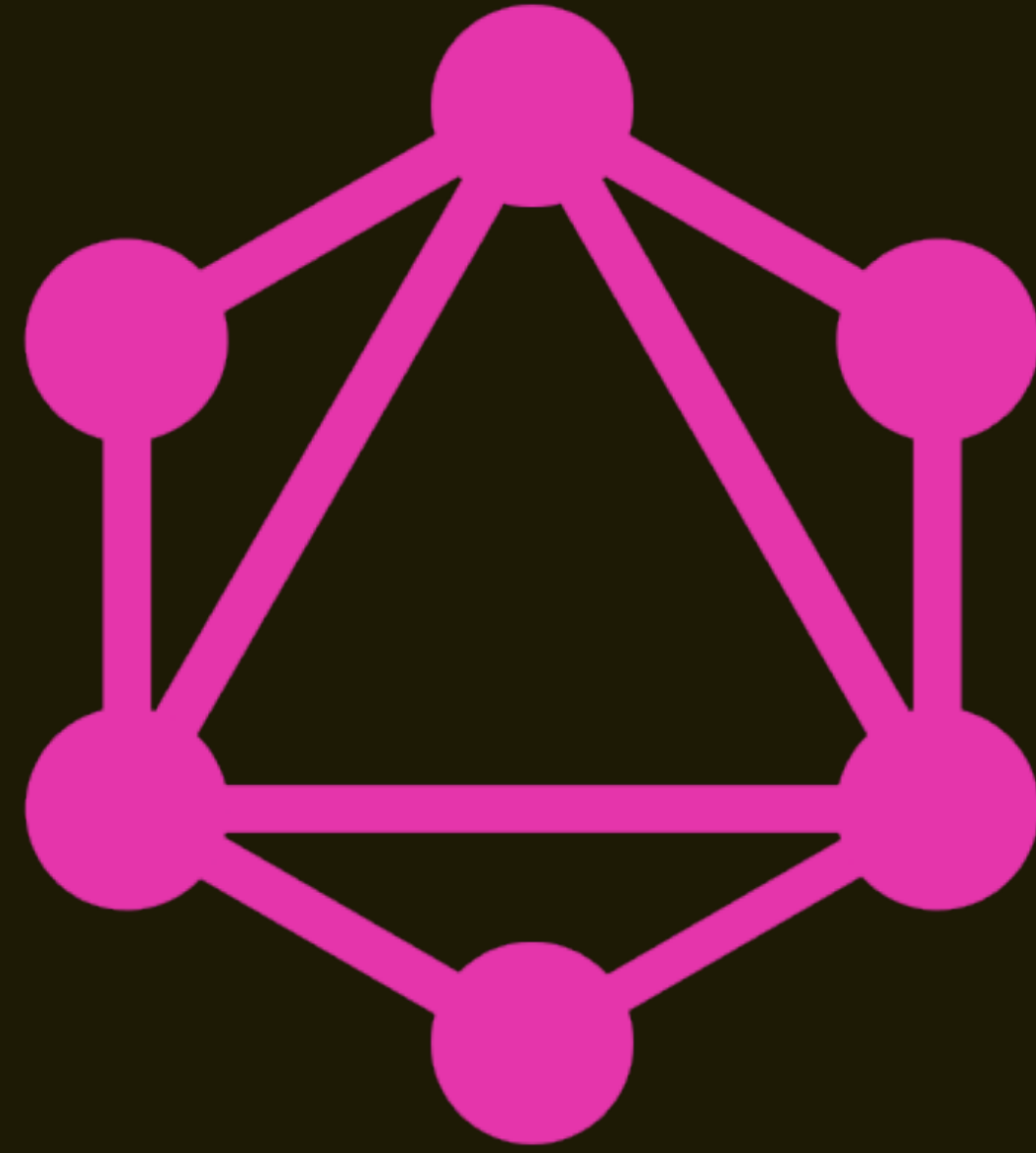
💬 94 people are talking about this



JS









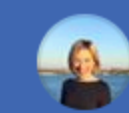
a data-fetching API powerful
enough to describe all of
Facebook

—Lee Byron





Search



Simona



Home



Simona Cotin



News Feed



Messenger



Marketplace

Shortcuts



AngularJS Develop... 20+



Angular JS Buchar... 2

Explore



Events 4



Groups



Pages



Friend Lists



Fundraisers 1

See More...

Create

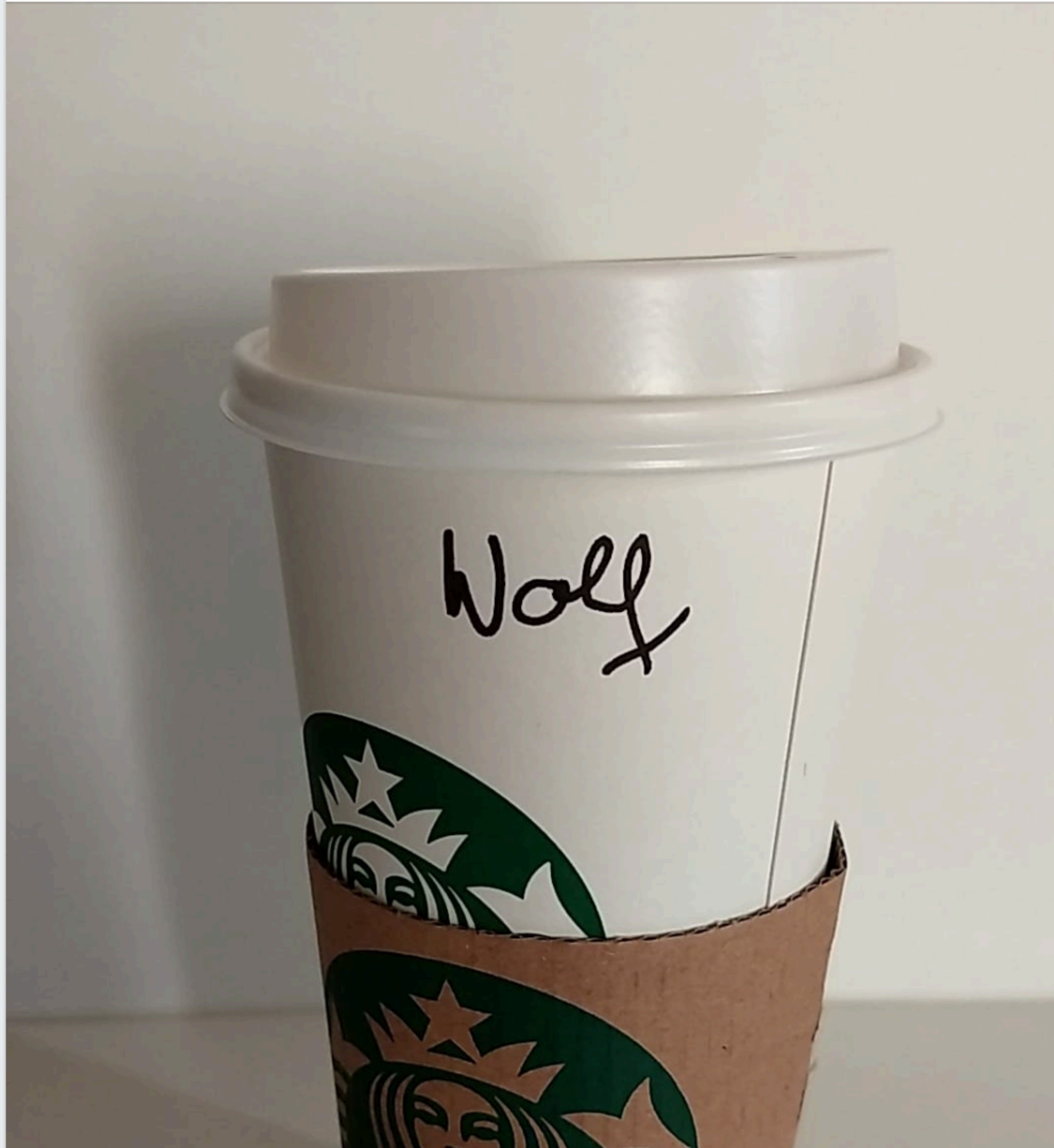
Ad · Page · Group · Event · Fundraiser



Dave Web

6 hrs · 🌐

She: your name?
Me: Dave
She:



Ioana Stepanschi

22 hours ago



Jasmine Greenaway

16 hours ago

See More

14 4 event invites

Rachele Tedesco's birthday is today

People You May Know

See All



Zachary Deptawa

12 mutual friends

Add Friend



Golnaz Babazadeh

16 mutual friends

Add Friend



Cecil L. Phillip

18 mutual friends

Add Friend



Seth Juarez

18 mutual friends

Add Friend



Mike Hartington

11 mutual friends

Add Friend



Zaharia Cătălina



<https://facebook.com/user/id>

<https://facebook.com/user/id/events>

<https://facebook.com/user/id/friends-suggestions>

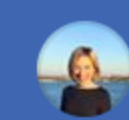
<https://facebook.com/user/id/friends-birthdays>

<https://facebook.com/user/id/events>

```
{
  "name": "ServerlessDays",
  "location": "Cardiff",
  "organiser": "Matt",
  "attendees": [
    {
      "name": "Ant Stanley",
      "company": "🏄",
      "role": "Father of ServerlessDays"
    }
  ]
}
```



Search



Simona



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4



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Friend Lists



Fundraisers

1

See More...

Create

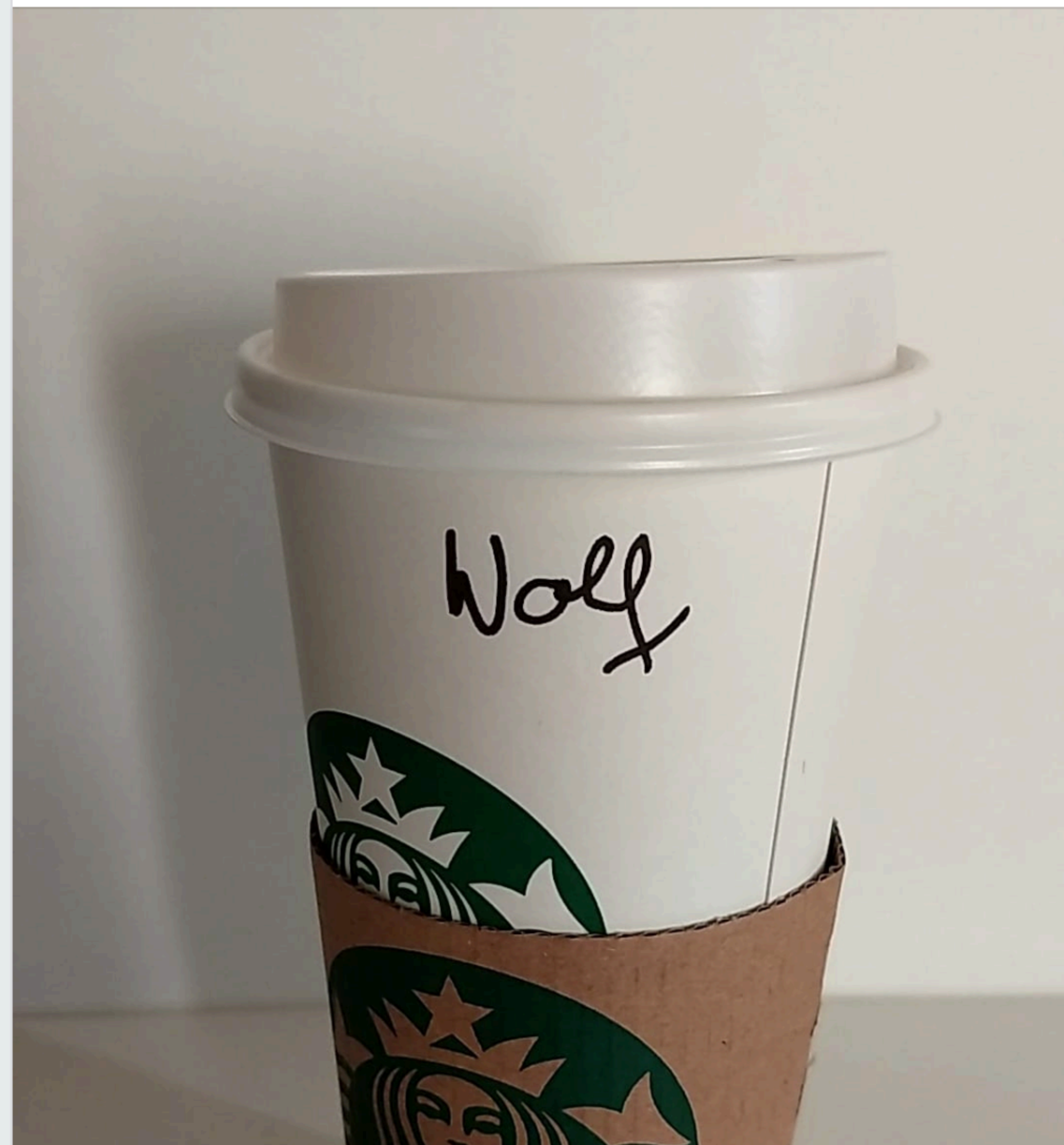
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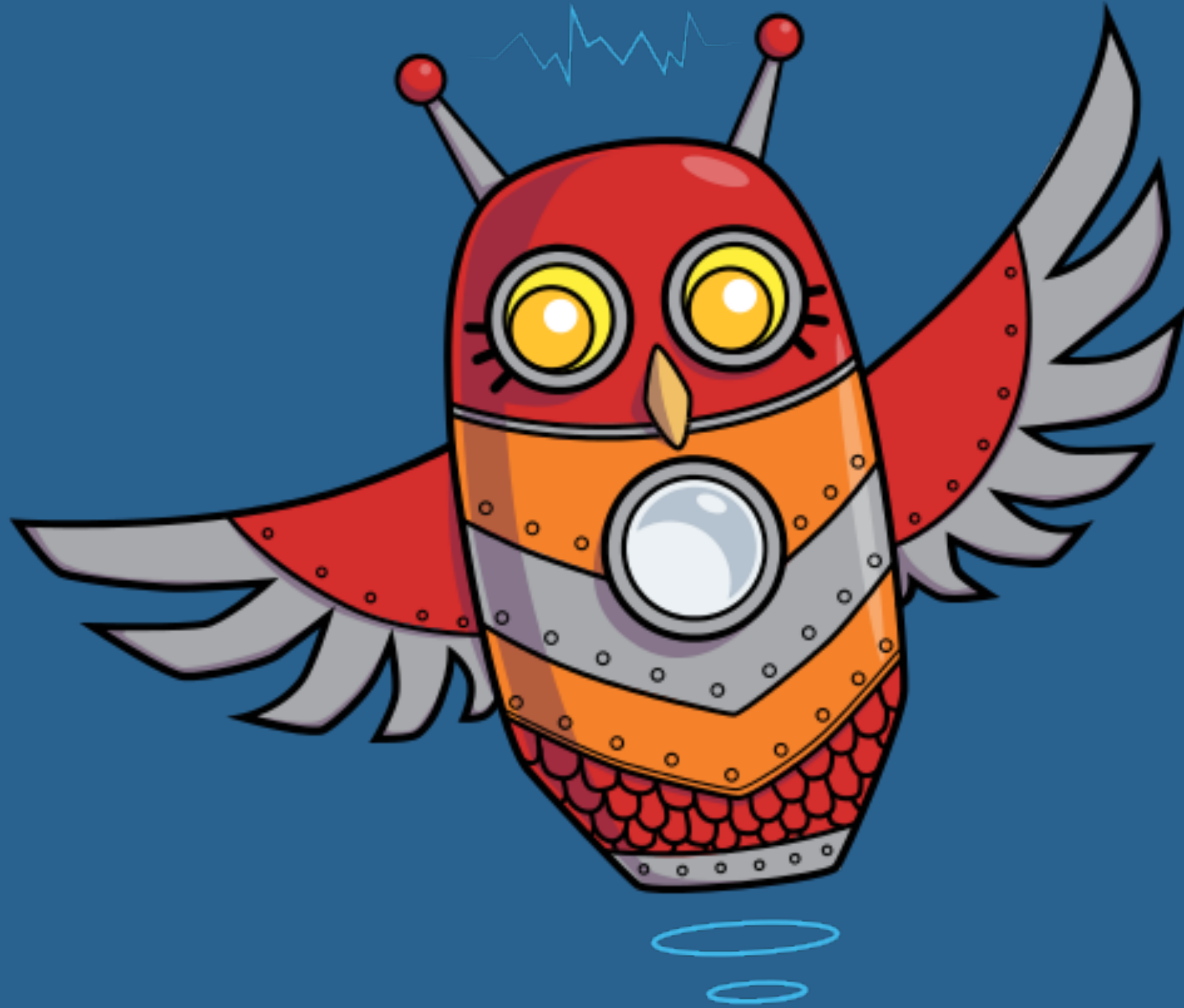
11 mutual friends

Add Friend



Zaharia Cătălina





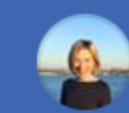
Overfetch

Or

New endpoint



Search



Simona



Home



Simona Cotin



News Feed



Messenger



Marketplace

Shortcuts



AngularJS Develop... 20+



Angular JS Buchar... 2

Explore



Events 4



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Fundraisers 1

See More...

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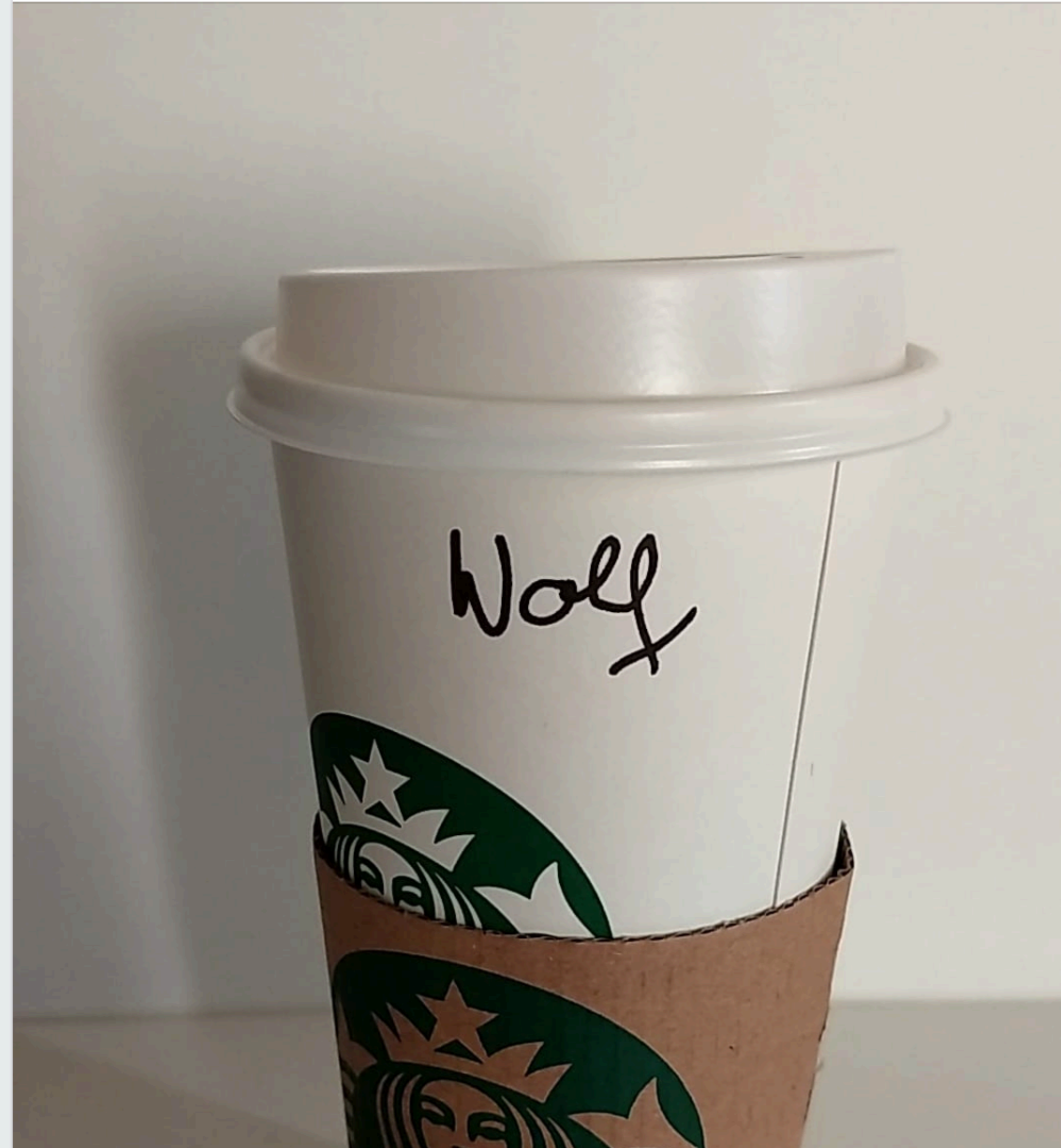
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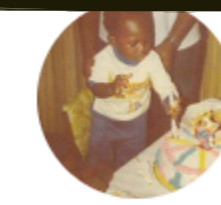
Add Friend



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16 mutual friends

Add Friend



Cecil L. Phillip

18 mutual friends

Add Friend



Seth Juarez

18 mutual friends

Add Friend



Mike Hartington

11 mutual friends

Add Friend



Zaharia Cătălina

<https://facebook.com/user/id/friends-suggestions>

```
{  
  "name": "Gołnaz Badazadeh",  
  "profile_pic": "some_url",  
  "mutual_friends": []  
}
```


<https://facebook.com/user/id/friends-suggestions/id/mutual>

```
{  
  "mutual_friends": [  
    {  
      "name": "Sarah Drasner",  
      "profile_pic": "some_url",  
      "tag": "Amazing!"  
    }  
  ]  
}
```



Underfetch

Or

New endpoint



Delay	User Perception
0-100 ms	Instant
100-300 ms	Small perceptible delay
300-1000 ms	Machine is working
1000+ ms	Likely context switch
10000+ ms	Task is abandoned

High performance Browser Networking



**The fastest network request is a
request not made**

—Ilya Grigorik

```

query {
  user(id:1) {
    name
    events {
      count
    }
    friends_suggestions {
      name
      mutual_friends {
        count
      }
    }
  }
}

{
  "data": {
    "user": {
      "name": "Simona Cotin",
      "events": {
        "count": 4
      },
      "friends_suggestions": {
        "name": "Gołnaz Babazadeh",
        "mutual_friends": {
          "count": 15
        }
      }
    }
  }
}

```

Schema driven development



Strongly typed



```
type People {  
  id: ID!  
  name: String  
  avatar: URL  
}
```



```
type People {
  id: ID!
  name: String
  avatar: URL
}
type Team {
  id: ID!
  name: String
  points: Int
  people: [People]
}
```

```
type Query {  
  teams: [Team]  
}  
type Mutation {  
  incrementPoints(id: ID!): Team  
}
```

```
const root = {
  teams: async () => {
    let teams = await axios.get(
      'https://graphqlvoting.azurewebsites.net/
api/score'
    );
    return teams.data;
  },
  incrementPoints: async obj => {
    let response = await axios.get(
      `https://graphqlvoting.azurewebsites.net/
api/score/${obj.id}`
    );
    return response.data;
  }
};
```

GraphiQL



Prettify

History

< Docs

```
1 # Welcome to GraphiQL
2 #
3 # GraphiQL is an in-browser tool
4 # testing GraphQL queries.
5 #
6 # Type queries into this side of
7 # typeahead aware of the current
8 # validation errors highlighted w
9 #
10 # GraphQL queries typically start
11 # with a # are ignored.
```

QUERY VARIABLES

GraphiQL



Prettify

History

[Docs](#)

```
1 query {  
2   teams {  
3     id  
4   }  
5 }
```

QUERY VARIABLES

GraphiQL



Prettify

History

< Docs

✖ Cannot query field "incrementPoint" on type "Mutation". Did you mean "incrementPoints"?

```
1 mutation incre
2   incrementPoint {
3     id
4     points
5   }
6 }
```

```
data: {
  "incrementPoints": {
    "id": "2",
    "points": 19107
  }
}
```

QUERY VARIABLES



✓ Performance

✓ Flexibility

✓ Tooling



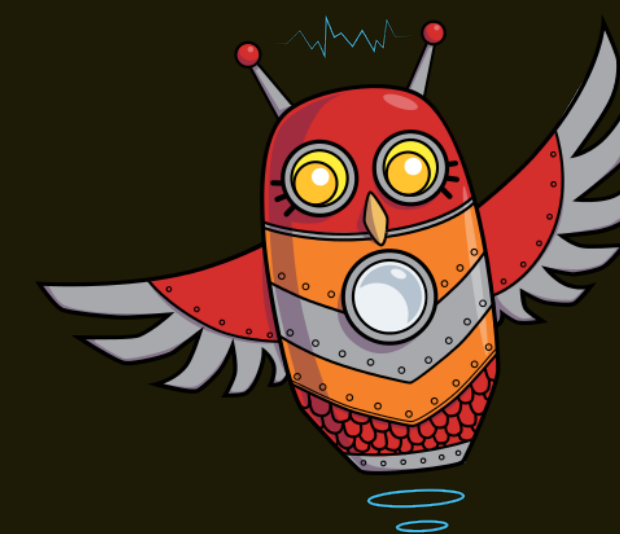
Serverless



The line of code that's the fastest to write, that never breaks, that doesn't need maintenance, is the line you never had to write.

--Steve Jobs

 [@simona_cotin](https://twitter.com/simona_cotin)



```
module.exports = async function(context, req) {  
  context.res = {  
    body: 'Hello ' + req.query.name  
  };  
};
```

JS index.js

```
1  module.exports = async function(context, req) {  
2      context.res = {  
3          body: 'Hello ' + req.query.name  
4      };  
5  };
```

6

PROBLEMS

OUTPUT

DEBUG CONSOLE

TERMINAL

1: bash

Simonas-MacBook-Pro-2:sldies simonacotin\$

Right-Click Deploy



JS index.js x

```
1 module.exports = async function(context, req) {  
2     context.res = {  
3         body: 'Hello ' + req.query.name  
4     };  
5 };  
6
```



Github Deploy

Home > sicotinjamstack

sicotinjamstack

Function Apps

Search: "sicotinjamstack" (X)

Dropdown: sicotin (v)

Function Apps

- sicotinjamstack (refresh, right arrow)
- Functions (Read Only)
 - GetTeams
 - Integrate
 - Manage
 - Monitor
 - Proxies
 - Slots (preview)

Overview

Platform features

Stop Swap Restart Get publish profile Reset publish profile Download app content

Delete

Status	Subscription	Resource group
Running	sicotin	sicotinjamstack
	Subscription ID	Location
	3b39d901-dea9-4a3c-b6de-8e16105de4b0	West US
URL	https://sicotinjamstack.azurewebsites.net	
App Service plan / pricing tier	WestUSPlan (Consumption)	

Datasources 3rd party APIs



[Advanced editor](#)

Triggers ⓘ

HTTP (req)

Inputs ⓘ

Azure Blob Storage (data)

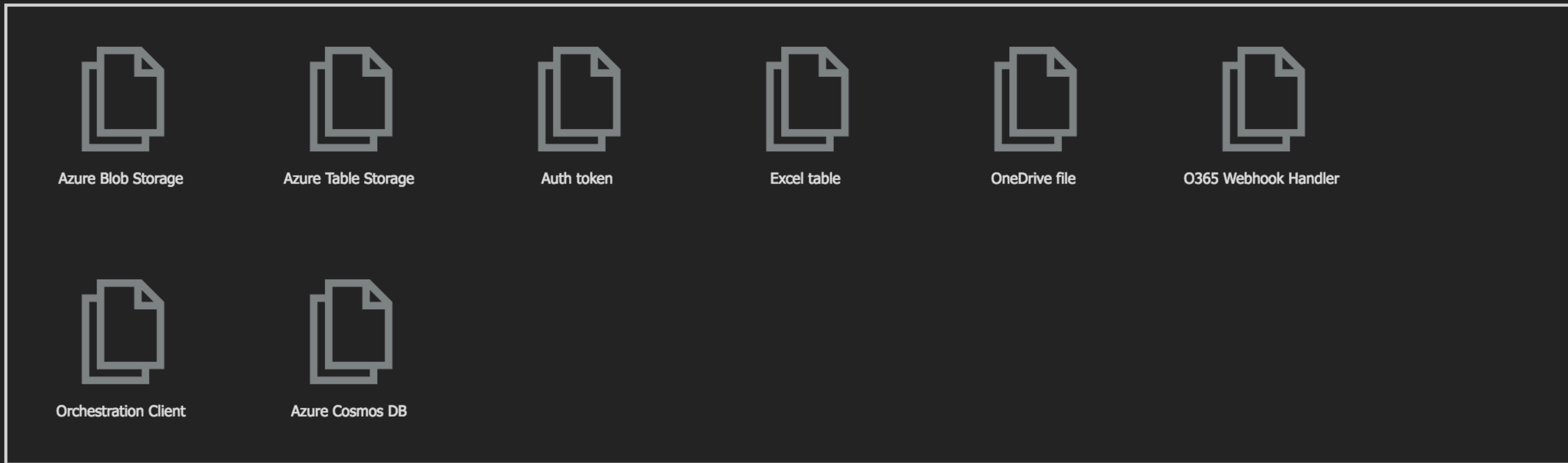
Azure Cosmos DB (inputDocument)

+ New Input

Outputs ⓘ

HTTP (res)

+ New Output



A grid of eight icons, each representing a different component. Each icon is a document symbol with a folded corner. Below each icon is its name:

- Azure Blob Storage
- Azure Table Storage
- Auth token
- Excel table
- OneDrive file
- O365 Webhook Handler
- Orchestration Client
- Azure Cosmos DB

Select

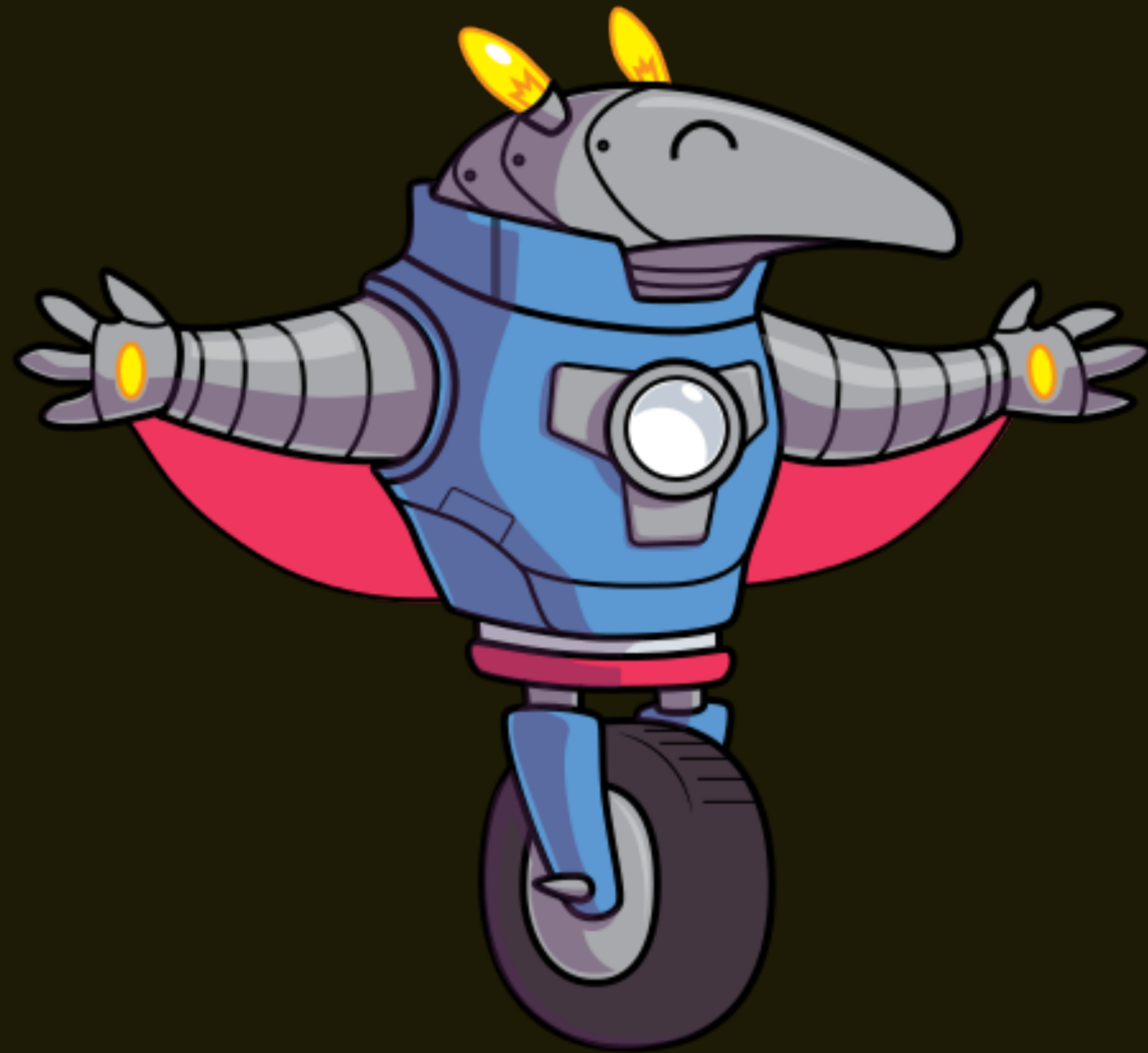
Cancel

```
{  
  "type": "cosmosDB",  
  "name": "inputDocument",  
  "databaseName": "admin",  
  "collectionName": "Recipes",  
  "connectionStringSetting": "tacos-sql_DOCUMENTDB",  
  "direction": "in"  
}
```

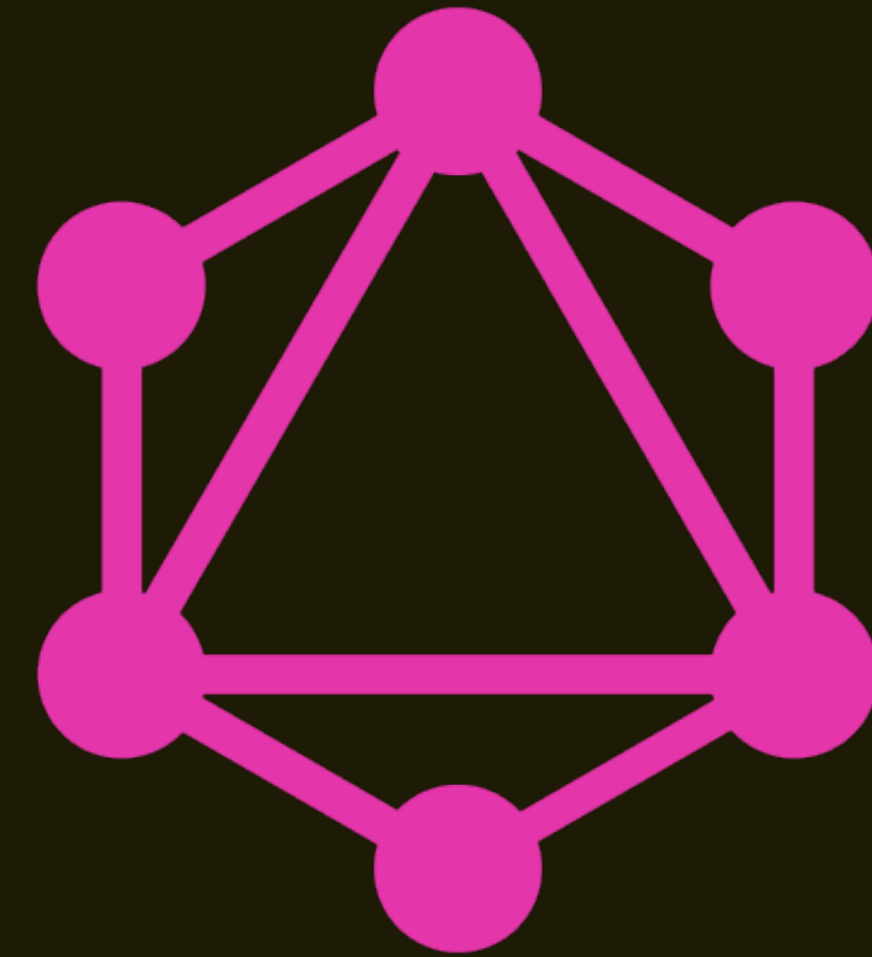
```
module.exports = async function(context, req) {  
  context.res = {  
    body: context.bindings.inputDocument  
  };  
};
```



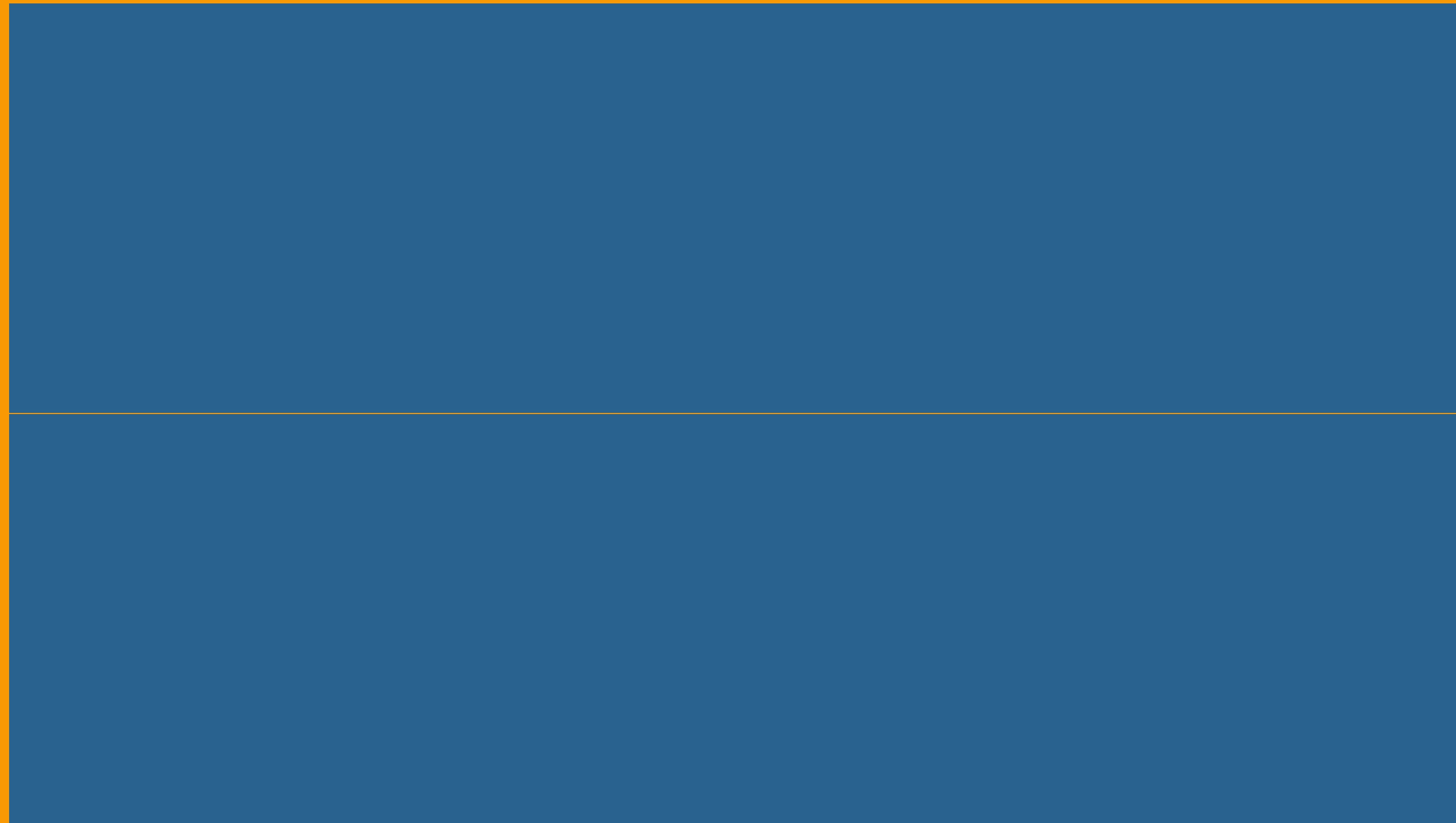
- ✓ Reusable API
- ✓ VS Code dev & debug
- ✓ Easy Integration
Datasources



**No servers
to
manage**

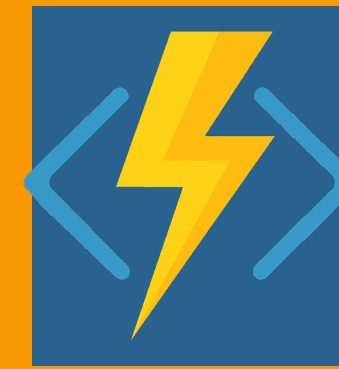
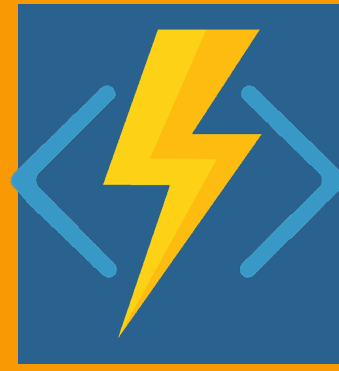
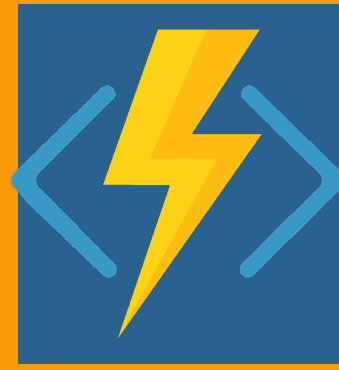
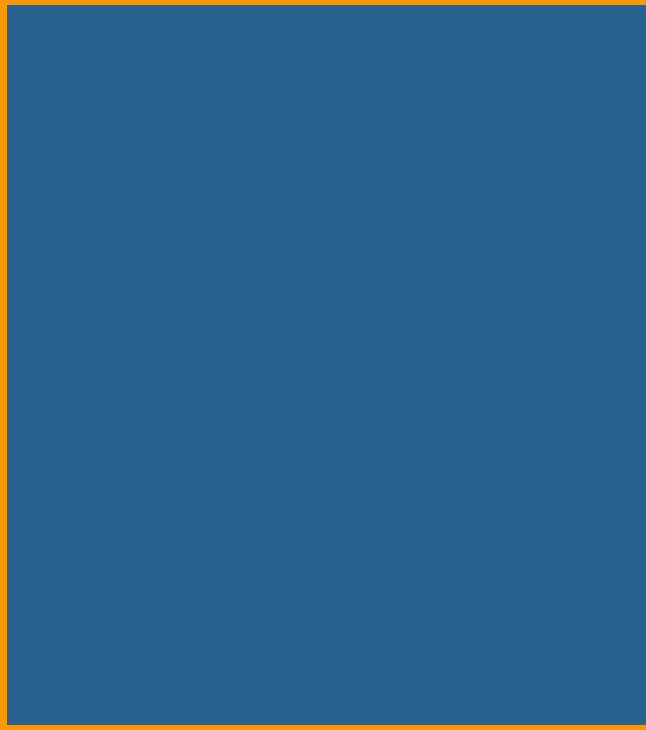
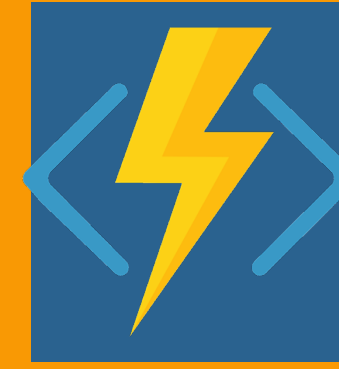
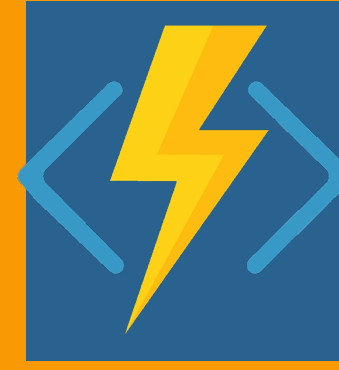
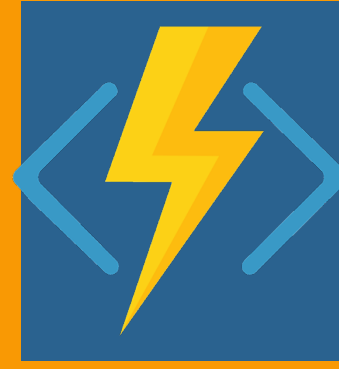


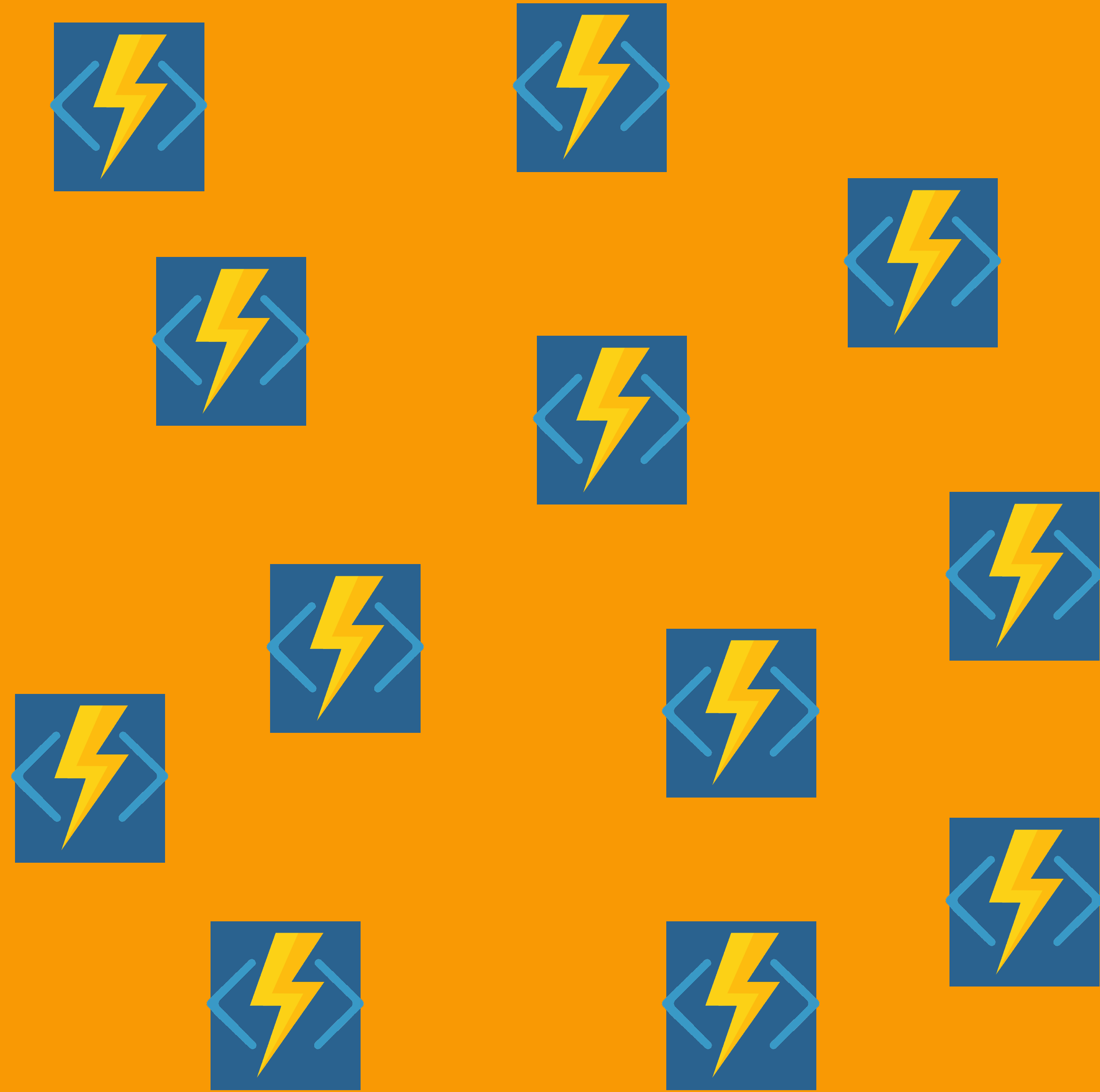
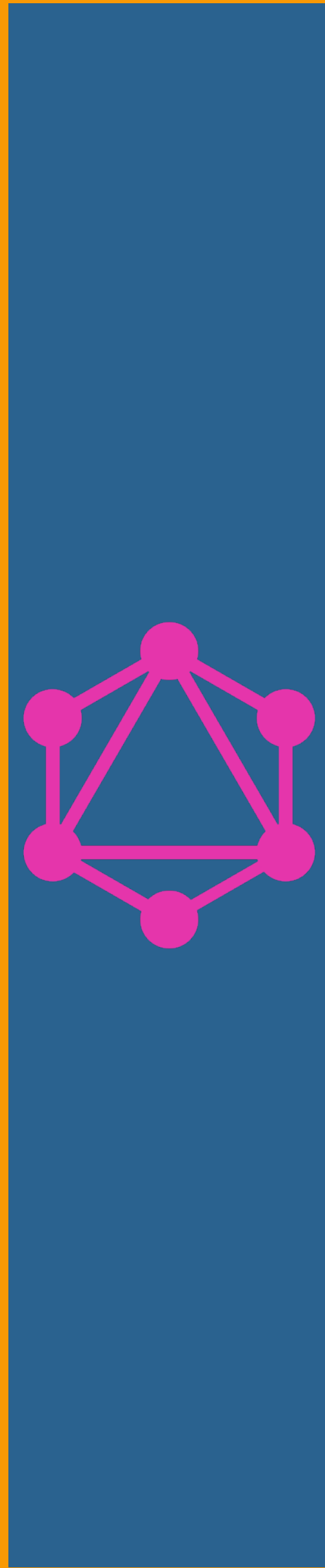
Serverless



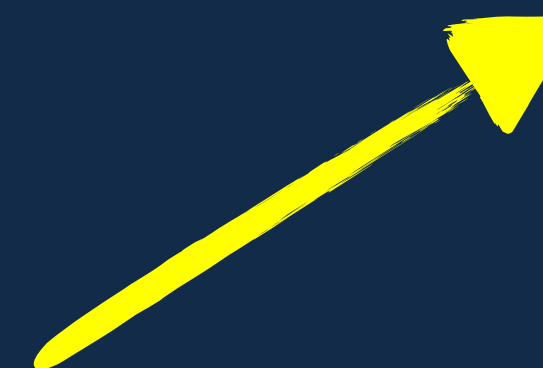
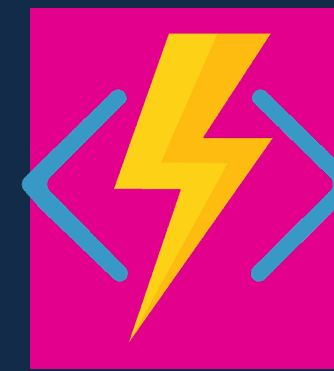
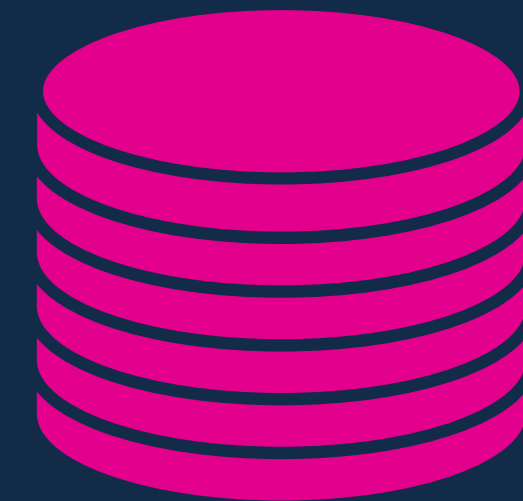
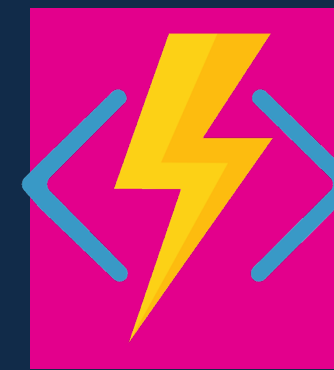
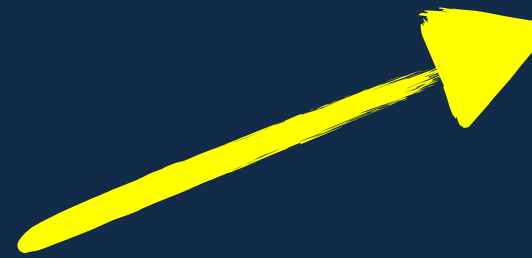
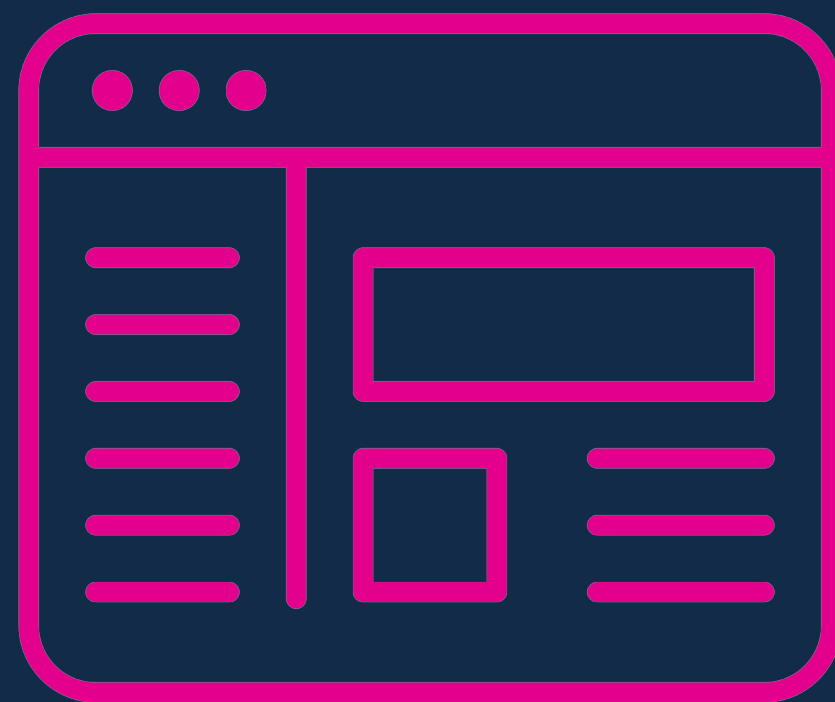


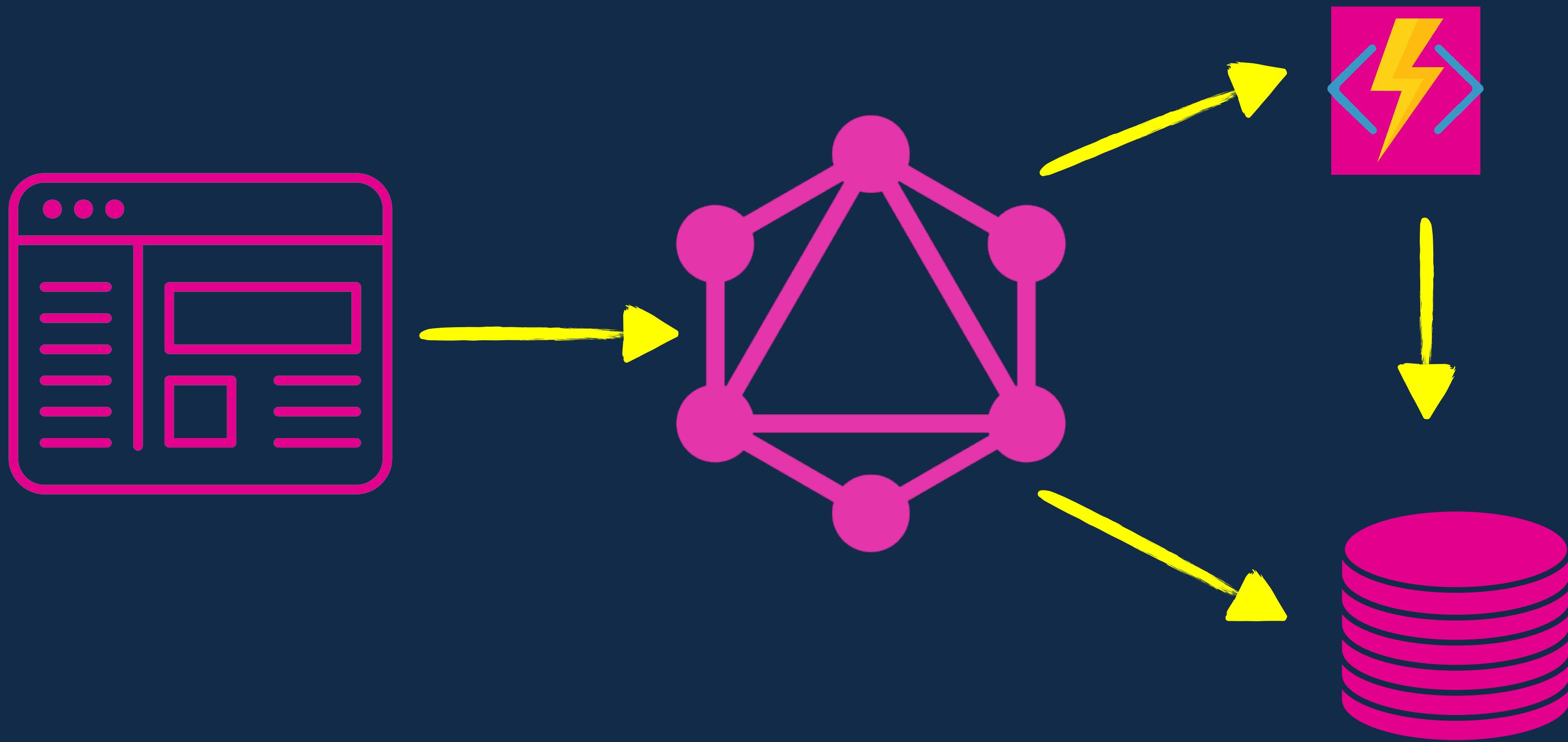


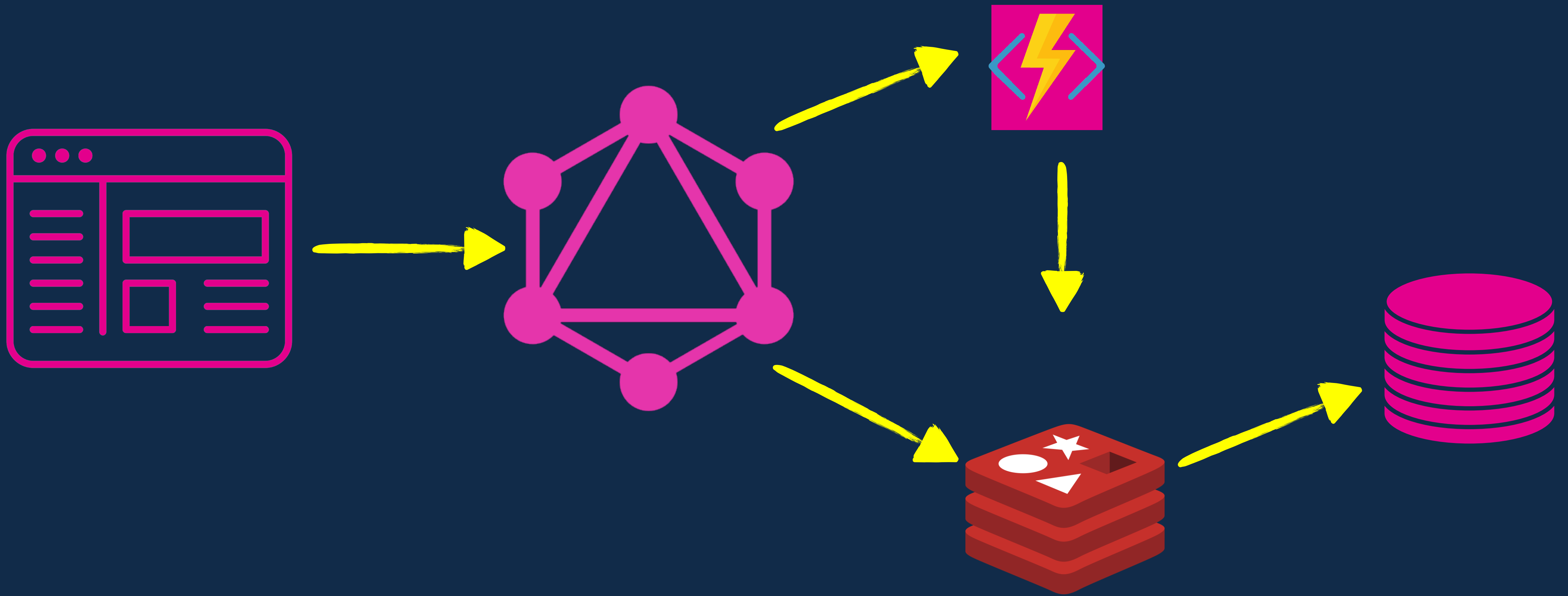


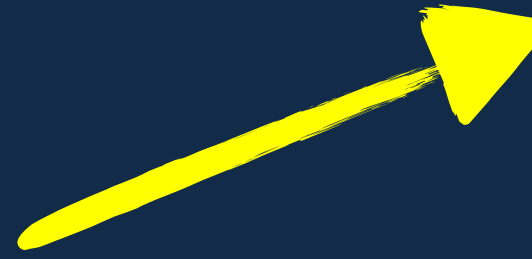
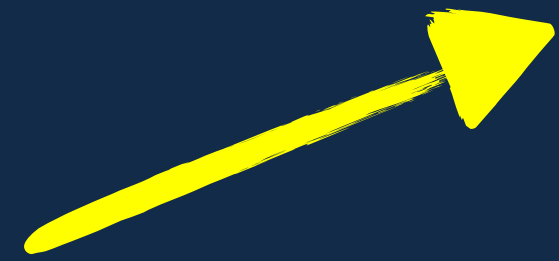
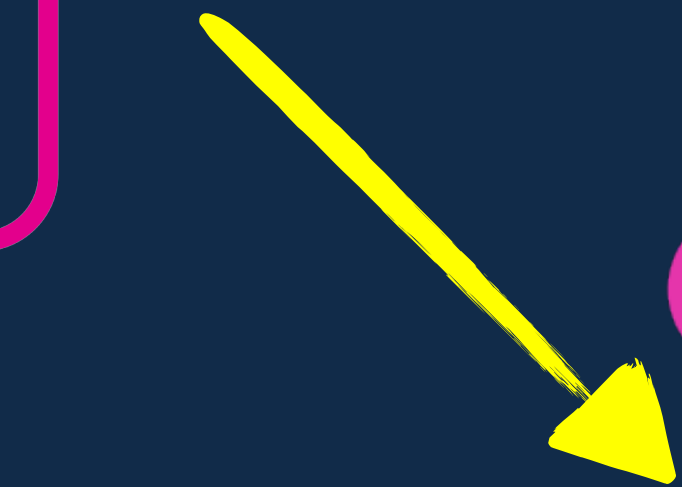
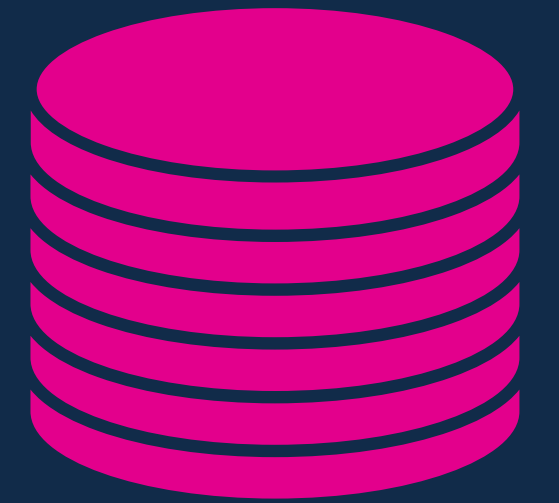
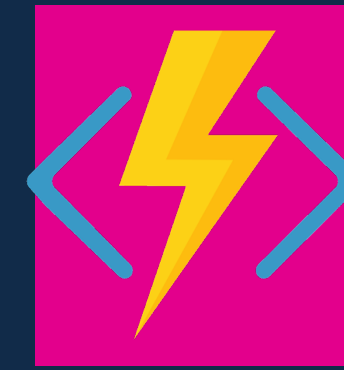
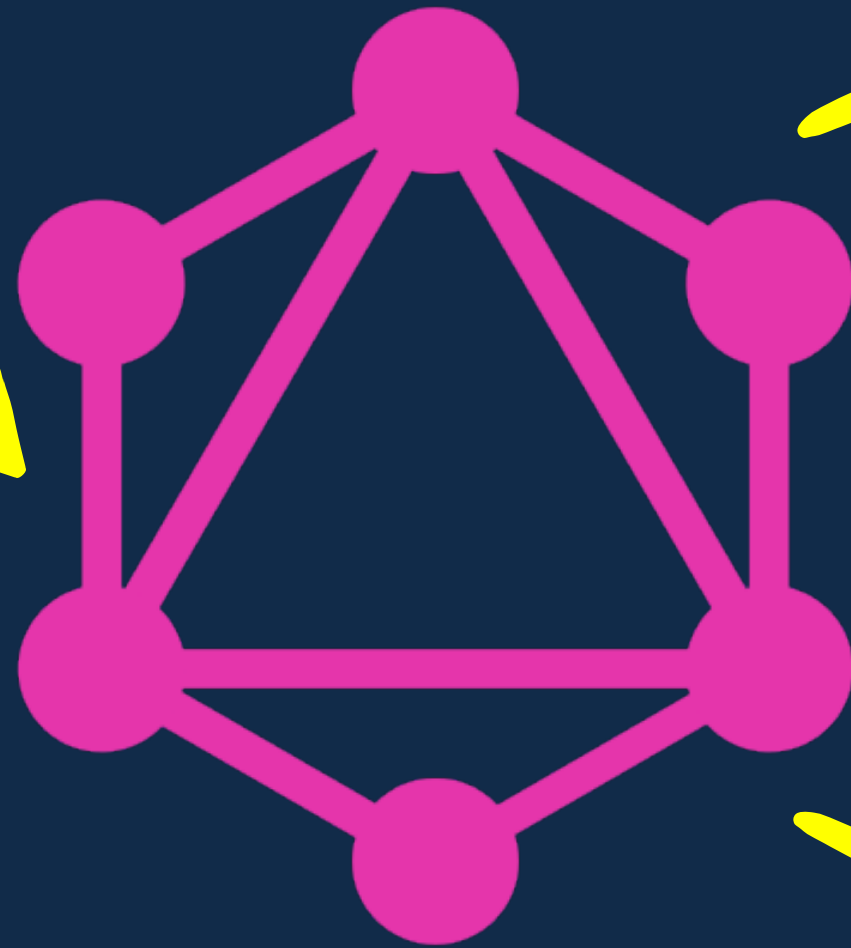
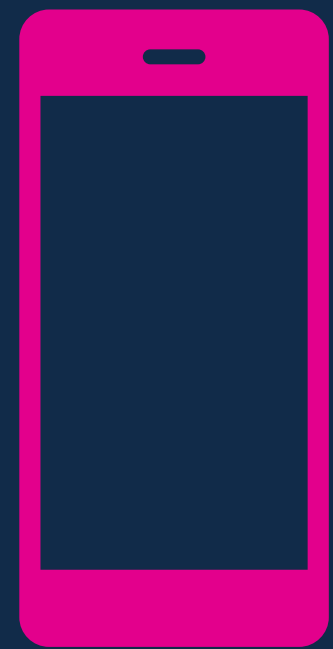
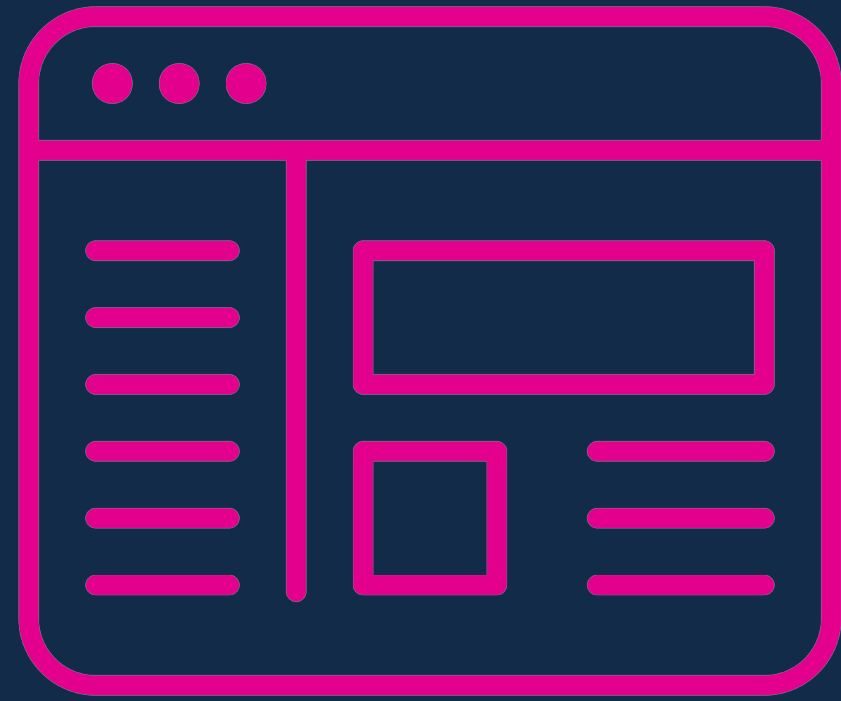


```
module.exports = async function(context, req) {  
  const body = req.body;  
  let response = await graphql(  
    typeDefs,  
    body.query,  
    root,  
    null,  
    body.variables,  
    body.operationName  
  );  
  context.res = {  
    body: response  
  };  
};
```









Serverless

Easy Integration of Datasources

Autoscalability

Less code

GraphQL

Easy Abstraction of Datasources

Single Endpoint

Smaller no requests



Dev productivity

Easy Integration of Datasources

Easy Abstraction of Datasources

Autoscalability

Single Endpoint

Less code

Smaller no requests



Achieve more
by
doing less



<https://github.com/simonaco/serverless-graphql-workshop>

