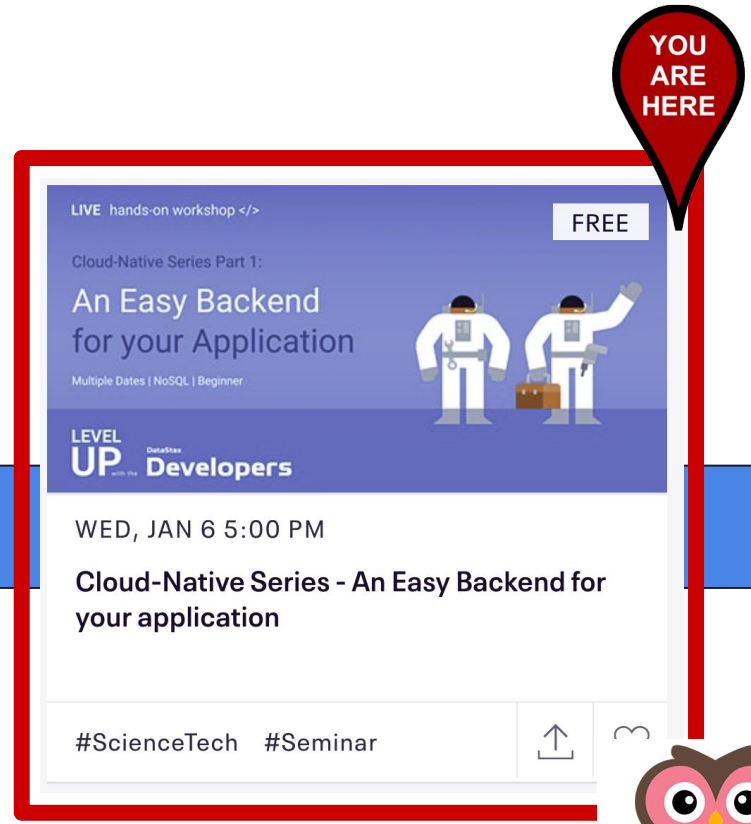
DataStax

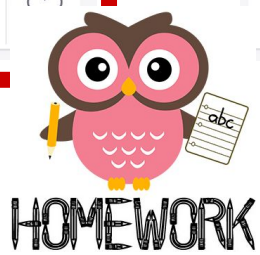
An Easy Backend for your application

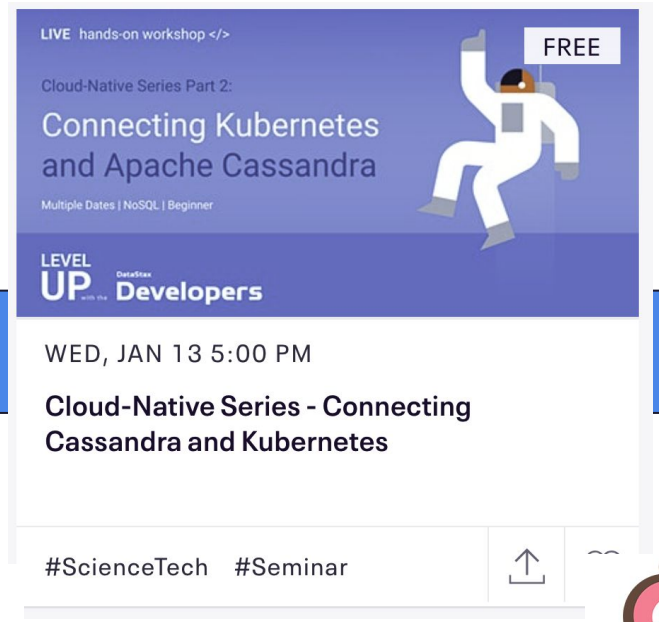
Cloud-native Cassandra series

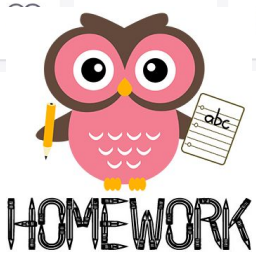
LEVEL UP with the DataStax Developers

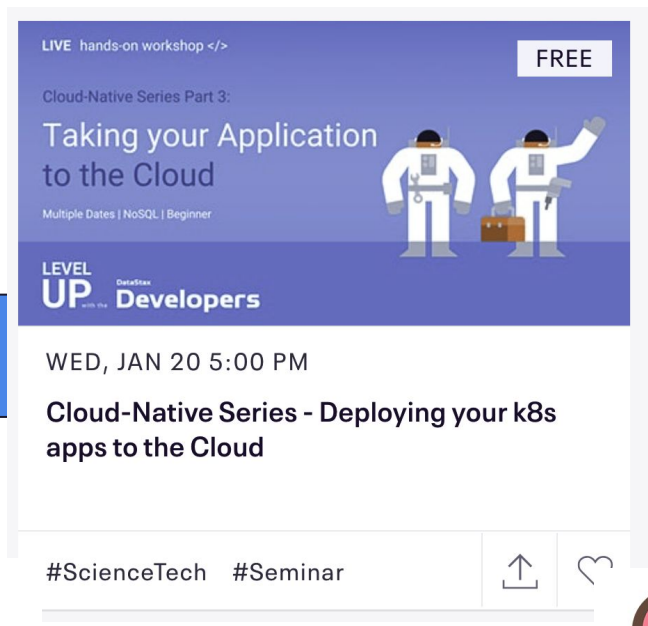
Buckle up and Register for each week

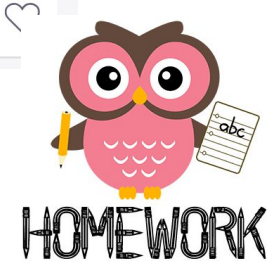






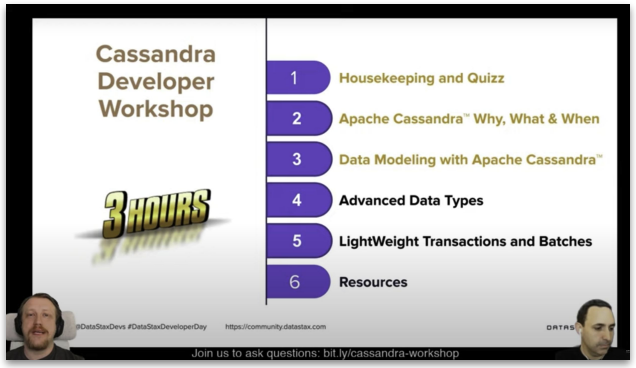






Housekeeping

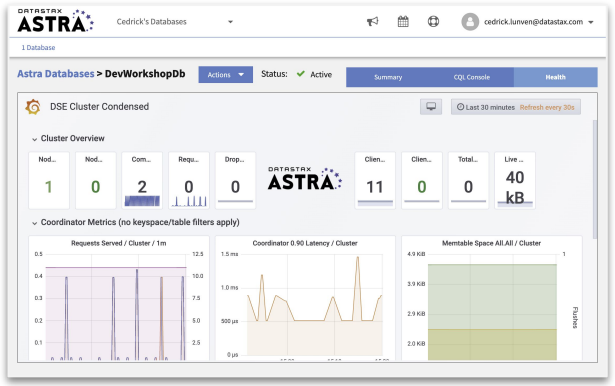
Courses: youtube.com/DataStaxDevs



YouTube

Twitch

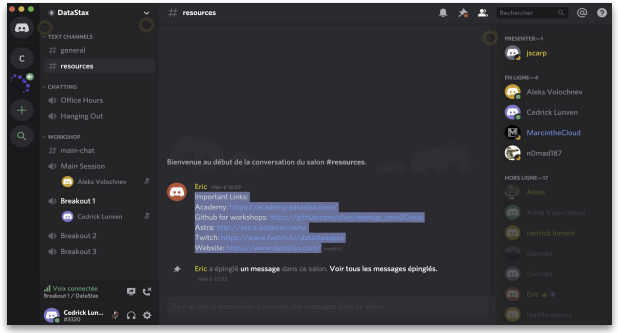
Runtime: dtsx.io/workshop



DataStax Astra DB

cassandra

Questions: bit.ly/cassandra-workshop

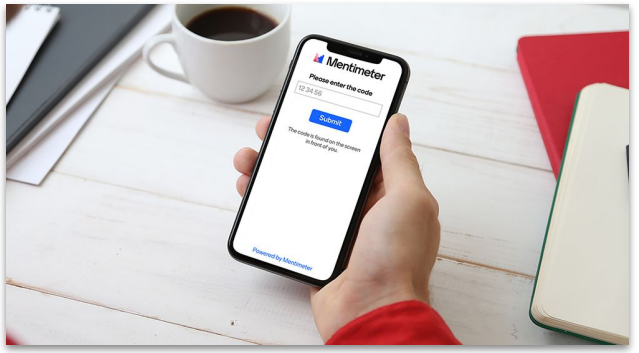


Discord

YouTube

Available on the iPhone App Store

Quizz: menti.com



Mentimeter

GET IT ON Google play

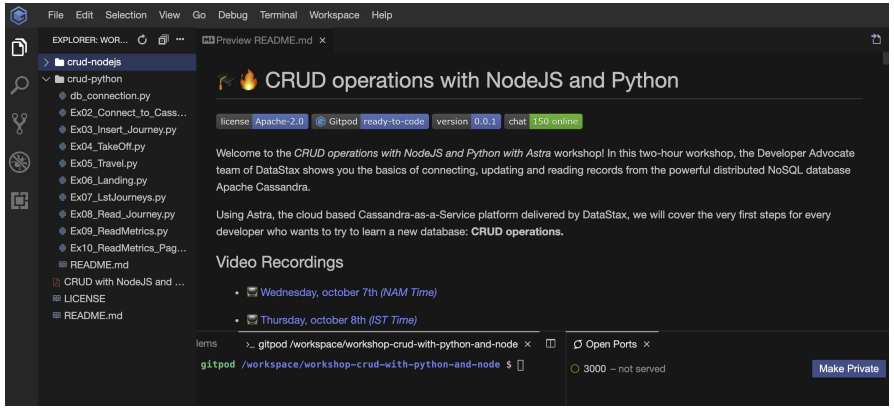
Disclaimer

This is a coding session. You will need some experience with the NodeJS or Python and have a github account.

You can do these exercises on a local install, but we will only use a preconfigured cloud-based IDE today during the workshop.

No need to install anything.

GitPod.io



Hands-on exercise material

DataStax Astra DB

Get your instance here:

- http://dtsx.io/workshop

GitHub

Repository:

- https://github.com/DataStax-Academy/workshop-crud-with-python-and-node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Mentimeter
What is the most desirable feature of your ideal workplace?
Flexible time
Available on the iPhone
App Store
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Application Development CRUD

1. Use Case and data model
2. Set up Astra database and schema
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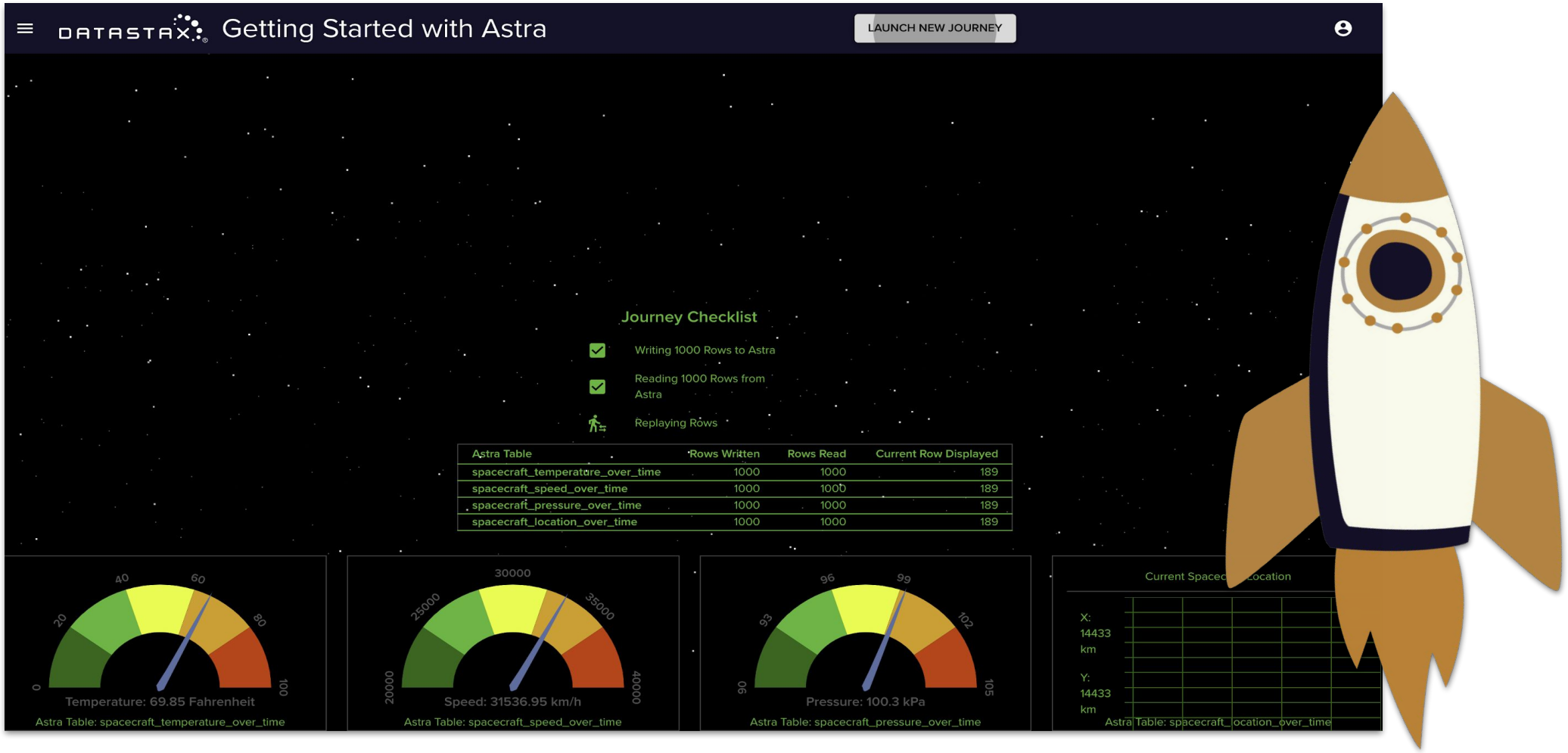
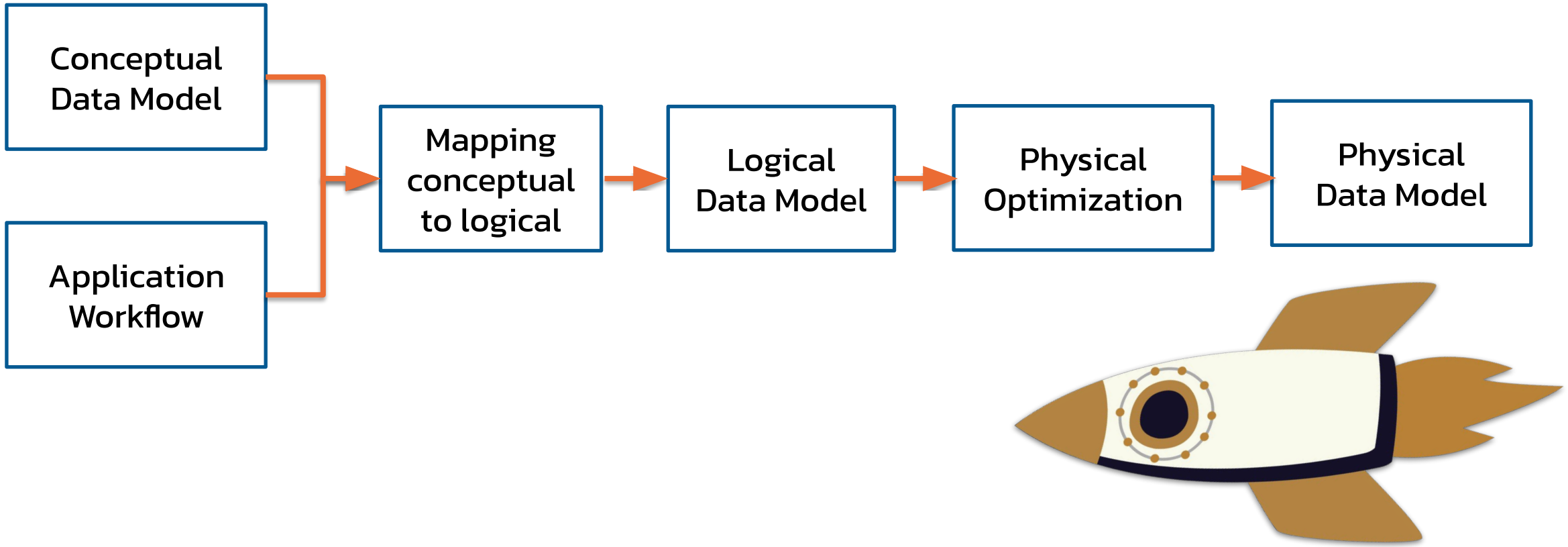
5. Read results

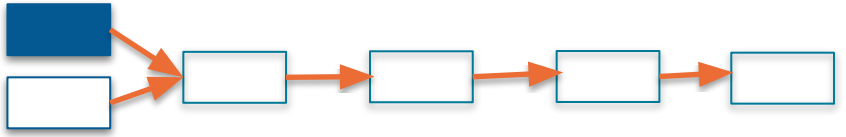
What does it do ?

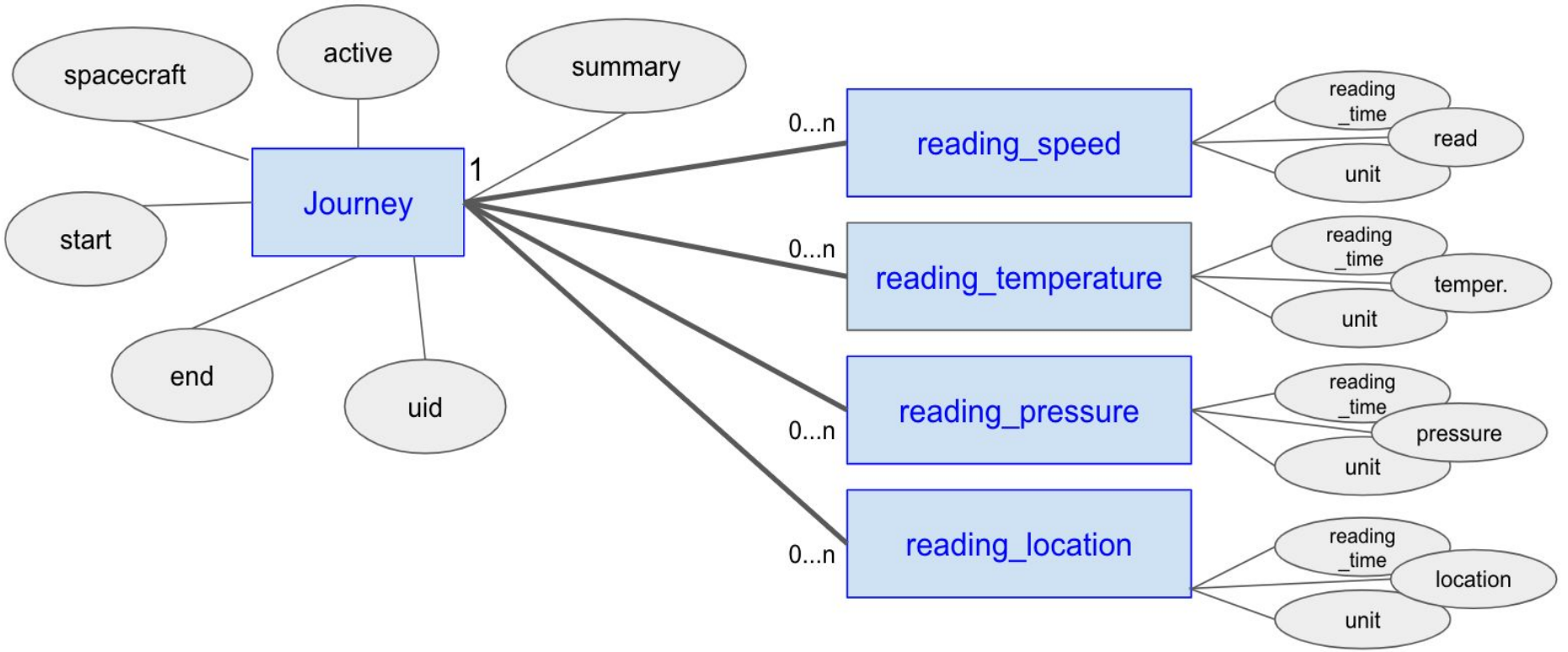


Designing your data model

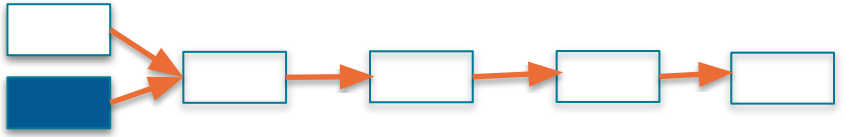


#1 Conceptual Data Model



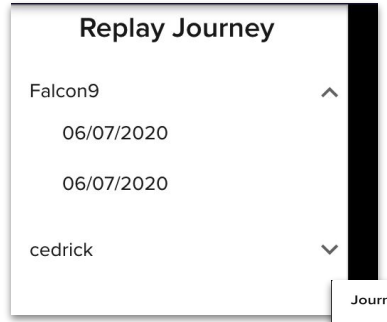


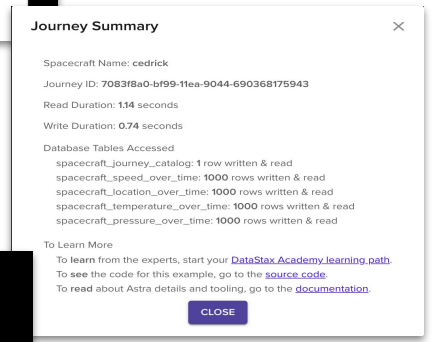
#1 Application Workflow

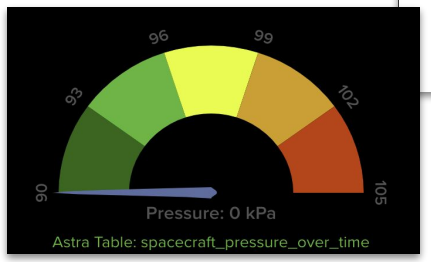


- **Space crafts catalog queries**
  - Look up all of the journeys for a spacecraft
  - Look up the state of a journey
  - Create a new journey

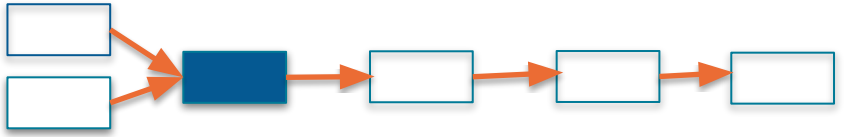
- **Sensor readings queries** : Speed, Pressure, Temperature, Location
  - Save readings over time
  - Analyze each dimension independently
  - Analyze data per journey
  - Less than 100.000 records per journey per dimension







#2 Map to Logical Data Model



spacecraft_temperature_over_time

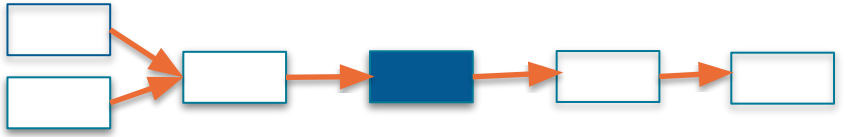
spacecraft_location_over_time

spacecraft_journey_catalog

spacecraft_speed_over_time

spacecraft_pressure_over_time

#3 Logical Data Model



spacecraft_temperature_over_time

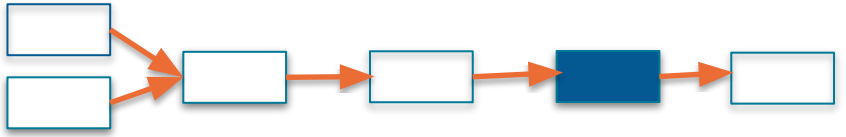
spacecraft_location_over_time

spacecraft_journey_catalog	
spacecraft_name	K
journey_id	C ↓
start	
end	
active	
summary	

spacecraft_speed_over_time	
spacecraft_name	K
journey_id	K
reading_time	C ↓
speed	
speed_unit	

spacecraft_pressure_over_time	
spacecraft_name	K
journey_id	K
reading_time	C ↓
pressure	
pressure_unit	

#4 Physical Data Model



spacecraft_temperature_over_time

spacecraft_location_over_time

spacecraft_journey_catalog

spacecraft_name	text
journey_id	timeuuid
start	timestamp
end	timestamp
active	boolean
summary	text

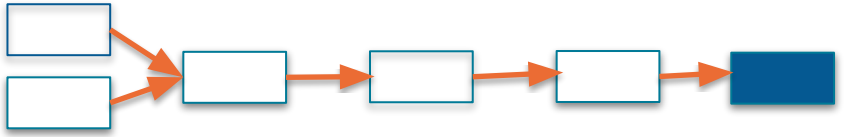
spacecraft_speed_over_time

spacecraft_name	text
journey_id	timeuuid
reading_time	timestamp
speed	double
speed_unit	text

spacecraft_pressure_over_time

spacecraft_name	text
journey_id	timeuuid
reading_time	timestamp
pressure	double
pressure_unit	text

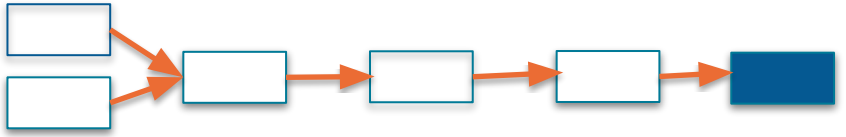
#5 CQL DDL



```
CREATE TABLE IF NOT EXISTS spacecraft_journey_catalog (
  spacecraft_name text,
  journey_id      timeuuid,
  start           timestamp,
  end             timestamp,
  active          boolean,
  summary         text,
  PRIMARY KEY ((spacecraft_name),
  WITH CLUSTERING ORDER BY (journ
```

```
CREATE TABLE IF NOT EXISTS spacecraft_speed_over_time (
  spacecraft_name text,
  journey_id      timeuuid,
  speed           double,
  reading_time    timestamp,
  speed_unit      text,
  PRIMARY KEY ((spacecraft_name, journey_id), reading_time))
  WITH CLUSTERING ORDER BY (reading_time DESC);
```

#5 CQL DDL with UDT



```
CREATE TYPE IF NOT EXISTS location_udt (
    x_coordinate double,
    y_coordinate double,
    z_coordinate double
);
```

```
CREATE TABLE IF NOT EXISTS spacecraft_location_over_time (
    spacecraft_name text,
    journey_id timeuuid,
    reading_time timestamp,
    location frozen<location_udt>,
    location_unit text,
    PRIMARY KEY ((spacecraft_name, journey_id), reading_time)
);
```

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Introduction to Astra

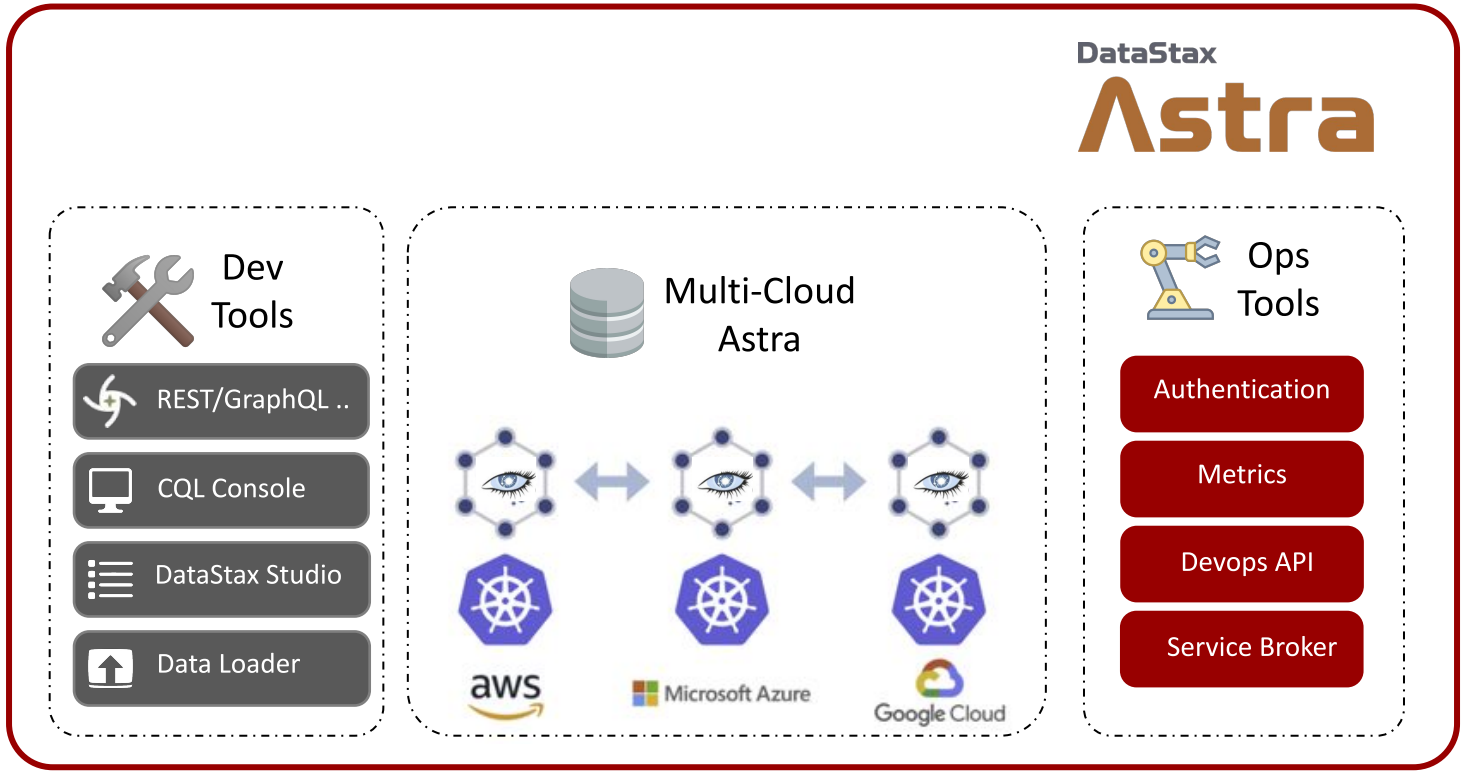
DataStax Astra DB == cassandra

Global Scale
Put your data where you need it without compromising performance, availability, or accessibility.

No Operations
Eliminate the overhead to install, operate, and scale Cassandra.

5 Gig Free Tier
Launch a database in the cloud with a few clicks, no credit card required.

Astra Platform



Hands-on prep work: Create your Astra database

- If you are new to Astra, sign up here: **dtsx.io/workshop**
- add a new keyspace (if you already have one)
- Take a note of the username, password, keyspace of your cluster
- We will be using these defaults:
  - keyspace: spacecraft
  - user name: SUser
  - password: SPassword1
- Download the secure-connect-bundle, **this is unique to you and your database instance**

Hands-on Exercise 1:

- Create the Astra database
- Create the schema in the database
  - Log into Astra CQL console
  - Copy schema from github and paste into CQL console

Application Development CRUD

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Datastax Drivers

One of set drivers to connect them all – **January 2020**

Connectivity

- Token & Datacenter Aware
- Load Balancing Policies
- Retry Policies
- Reconnection Policies
- Connection Pooling
- Health Checks
- Authentication | Authorization
- SSL

Query

- CQL Support
- Schema Management
- Sync/Async/Reactive API
- Query Builder
- Compression
- Paging

Parsing Results

- Lazy Load
- Object Mapper
- Spring Support
- Paging

Install Drivers

```
npm install cassandra-driver
```

```
pip install cassandra-driver
```

Connection to Cassandra ...with ASTRA

```
const client = new cassandra.Client({
  cloud: { secureConnectBundle: 'secure.zip' },
  credentials: { username: 'u', password: 'p' }
});
```

```
auth_provider = PlainTextAuthProvider(
   username='U', password='P')
cluster = Cluster(
   Cloud ={ Secure_connect_bundle: 'secure.zip'},
   auth_provider=auth_provider, protocol_version=2)
session= cluster.connect('killrvideo')
```

Important about the session

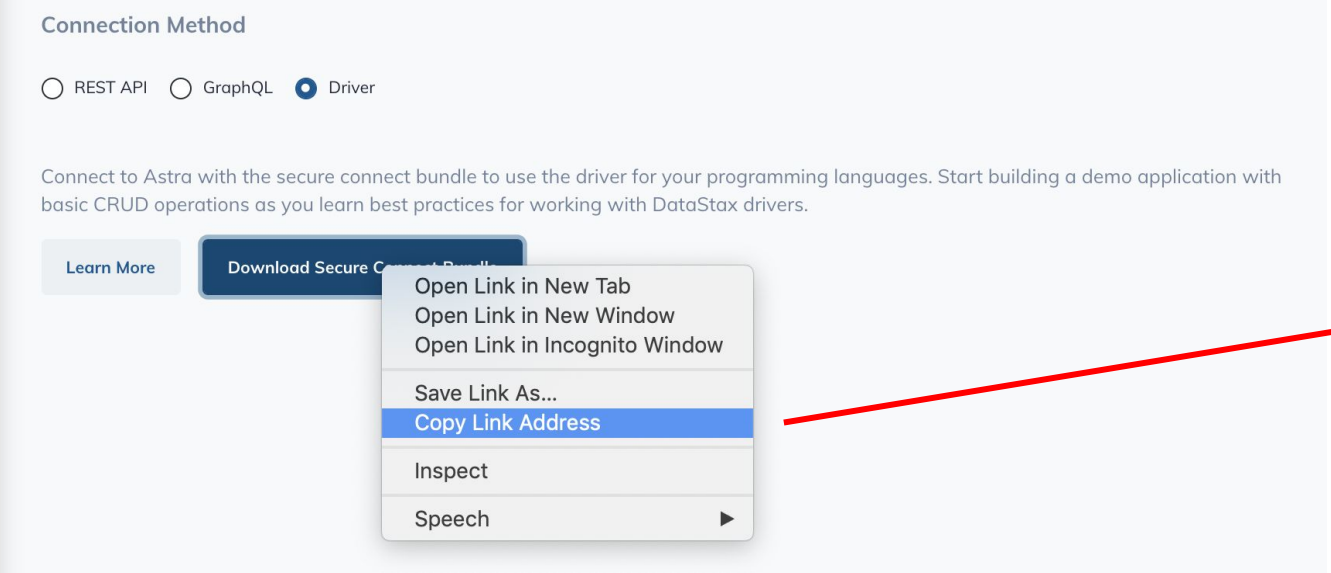
- It is a stateful object handling communications with each node
- session should be unique per application (Singleton)
- session should be closed at application shutdown (shutdown hook) in order to free opened TCP sockets (stateful)

```
Node:    client.shutdown();
Python:  session.shutdown();
```

Hands-on Exercise 2: Setup connection to Astra

- Get gitpod ready
- Install the drivers
- Save the secure connection bundle in gitpod
- Update the connection settings in node and python
- Test the connection:
  - Run Ex02 code

Get the secure bundle with curl



click to copy the link to clipboard
(refresh page before copy, link is only 'fresh' for short time)

```
curl -L "<insert link here>" > creds.zip
```

Application Development CRUD

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Execute simple statements

```
client.execute('select * from t1 where c1 = ?', [5]);
```

```
session.execute("select * from t1 where c1 = %s", 5);
```

Prepared and Bound Statements

- Compiled once on each node automatically as needed
- Prepare each statement only once per application

```
const query = 'select * from t1 where c1 =?;';
client.execute(query, [5], { prepare: true })
```

```
prepared = session.prepare("select * from t1 where c1=?")
result = session.execute(prepared, [5])
```

Hands-on Exercise 3 and 4: Inserts with simple and prepared statements

- Simple insertion into spacecraft_journey_catalog:
  - Run Ex03 code
- Insertion with prepared statement:
  - Adapt Ex04 code and run

Working with batch statements

```
var myBatch = [
       { query: insertSpeed, params: [spacecraft_name, journey_id, speed,readingTime,'km/hour' ] },
       { query: insertTemperature, params: [spacecraft_name, journey_id, pressure, readingTime,'Pa' ] },
       { query: insertPressure, params: [spacecraft_name, journey_id, temperature, readingTime,'K' ] },
       { query: insertLocation, params: [spacecraft_name, journey_id, location,readingTime,'AU' ] }
]
const result = await connection.client.batch(myBatch, { prepare: true })
```

```
batch = BatchStatement()
batch.add(prepared_insertLocation, [spacecraft_name, journey_id, Location(x,y,z),readingTime,'AU' ])
batch.add(prepared_insertSpeed, [spacecraft_name, journey_id, speed,readingTime,'km/hour' ])
batch.add(prepared_insertTemperature, [spacecraft_name, journey_id, pressure, readingTime,'Pa' ])
batch.add(prepared_insertPressure, [spacecraft_name, journey_id, temperature, readingTime,'K' ])
connection.session.execute(batch)
```

Working with UDTs (Python special)

- Recommended to register UDTs with Cluster instance
- When using prepared statements, not necessary to register

```
class Foo(object):
    def __init__(self, street, zipcode, otherstuff):
        self.street = street
        self.zipcode = zipcode
        self.otherstuff = otherstuff

insert_statement = session.prepare("INSERT INTO users (id, location) VALUES (?, ?)")

session.execute(insert_statement, [0, Foo("123 Main St.", 78723, "some other stuff")])
```

Hands-on Exercise 5 and 6: Inserts with UDTs and batches

- Adapt and run Ex05
- Mark journey complete:
  - Run Ex06

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Hands-on Exercise 7: Simple selects, parsing results and paging

- Simple selects: Ex07
- Parsing: Ex08 and Ex09
- Paging: Ex10


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What is the most desirable feature of your ideal workplace?
Flexible time
Available on the iPhone
App Store
GET IT ON
Google play

Developer Resources

LEARN

New hands-on learning at www.datastax.com/dev
Classic courses available at DataStax Academy

ASK/SHARE

Join community.datastax.com
Ask/answer community user questions – share your expertise

CONNECT

Follow us @DataStaxDevs
We are on Youtube – Twitter – Twitch!

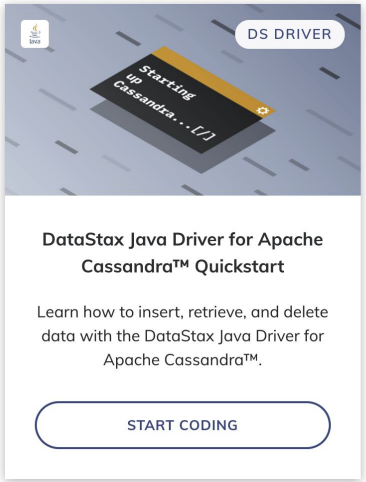
MATERIALS

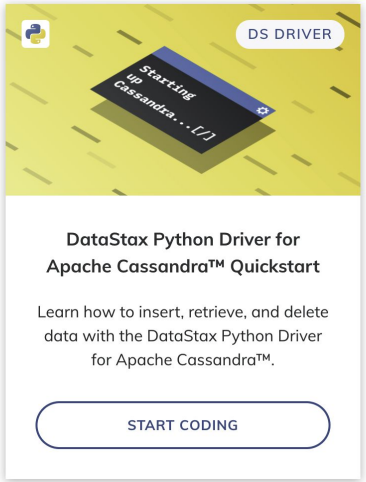
Slides and exercises for this workshop are available at https://github.com/DataStax-Academy/workshop-crud-with-python-and-node

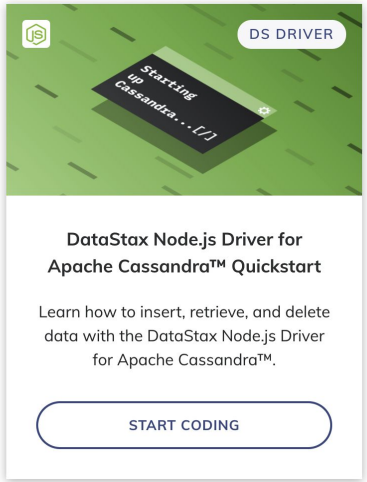
Homework (datastax.com/dev)

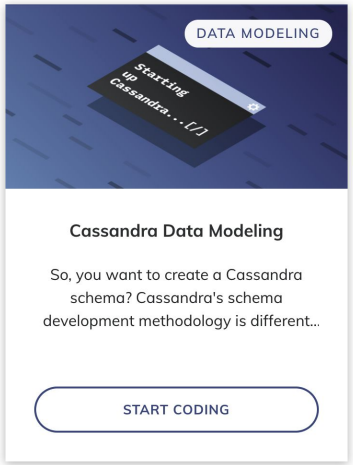
[Review week 1] – https://www.datastax.com/try-it-out

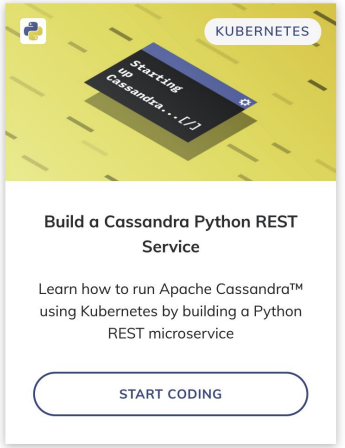
- Ex1: Cassandra Query Language (CQL)
- Ex2: Pick one of the driver quickstarts
- Bonus: Build a REST Service with Python
- Bonus: Cassandra Data Modeling







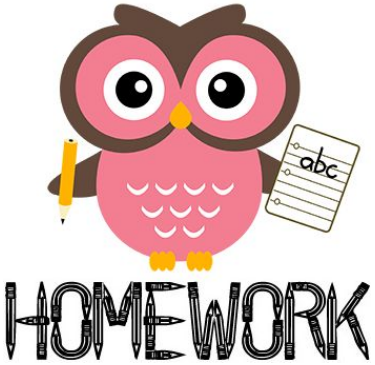




KataKoda

[Get ready for week 2]

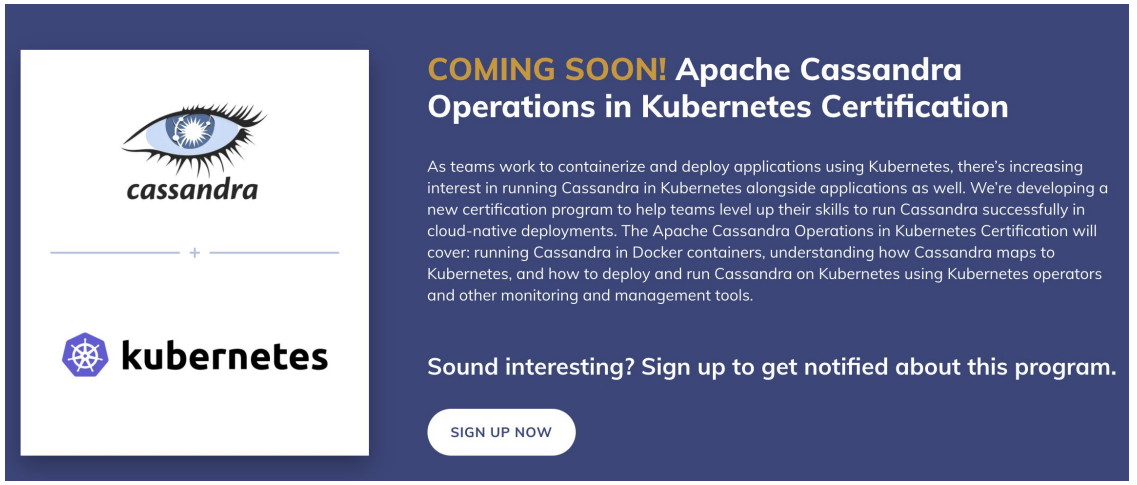
- Please read https://www.datastax.com/cloud-native
- Please read https://www.datastax.com/dev/kubernetes



https://community.datastax.com/questions/9897/materials-and-homework-for-week-1-of-the-cloud-nat.html

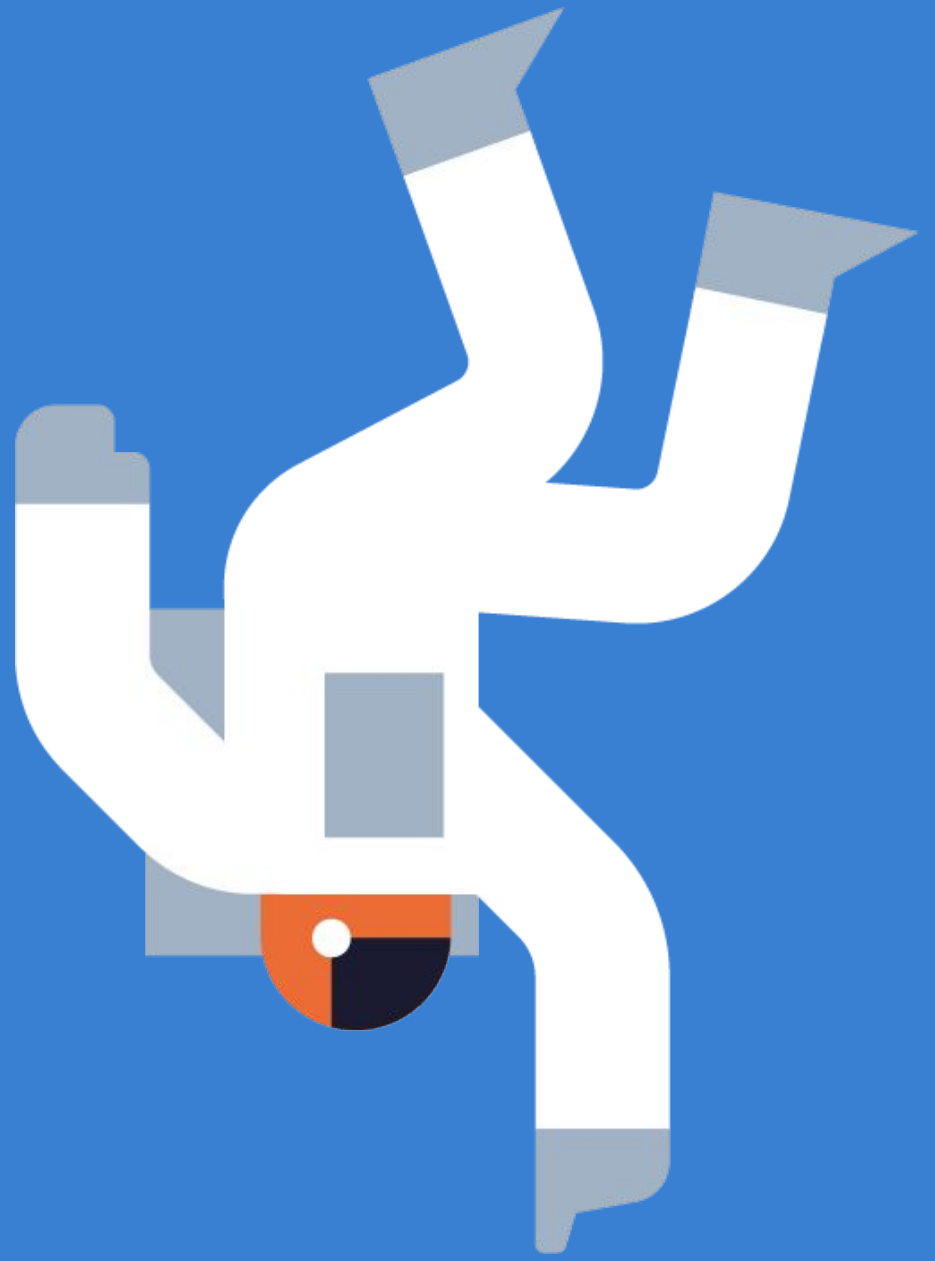
Certifications

https://www.datastax.com/dev/certifications



Vouchers (145$ each) , valid 3 months, with 2 attempts will be given to people who apply and register to the 3 episodes.

Thank you



Quiz Time!