DataStax

Developers

Build an E-commerce site on Astra DB

Session #4: Order Processing

Cedrick Lunven

David Dieruf

Rags Srinivas

Artem Chebotko

Stefano Lottini

Aleksandr Volochnev

Aaron Ploetz

Jack Fryer

Kirsten Hunter

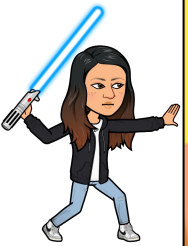
Gary Harvey

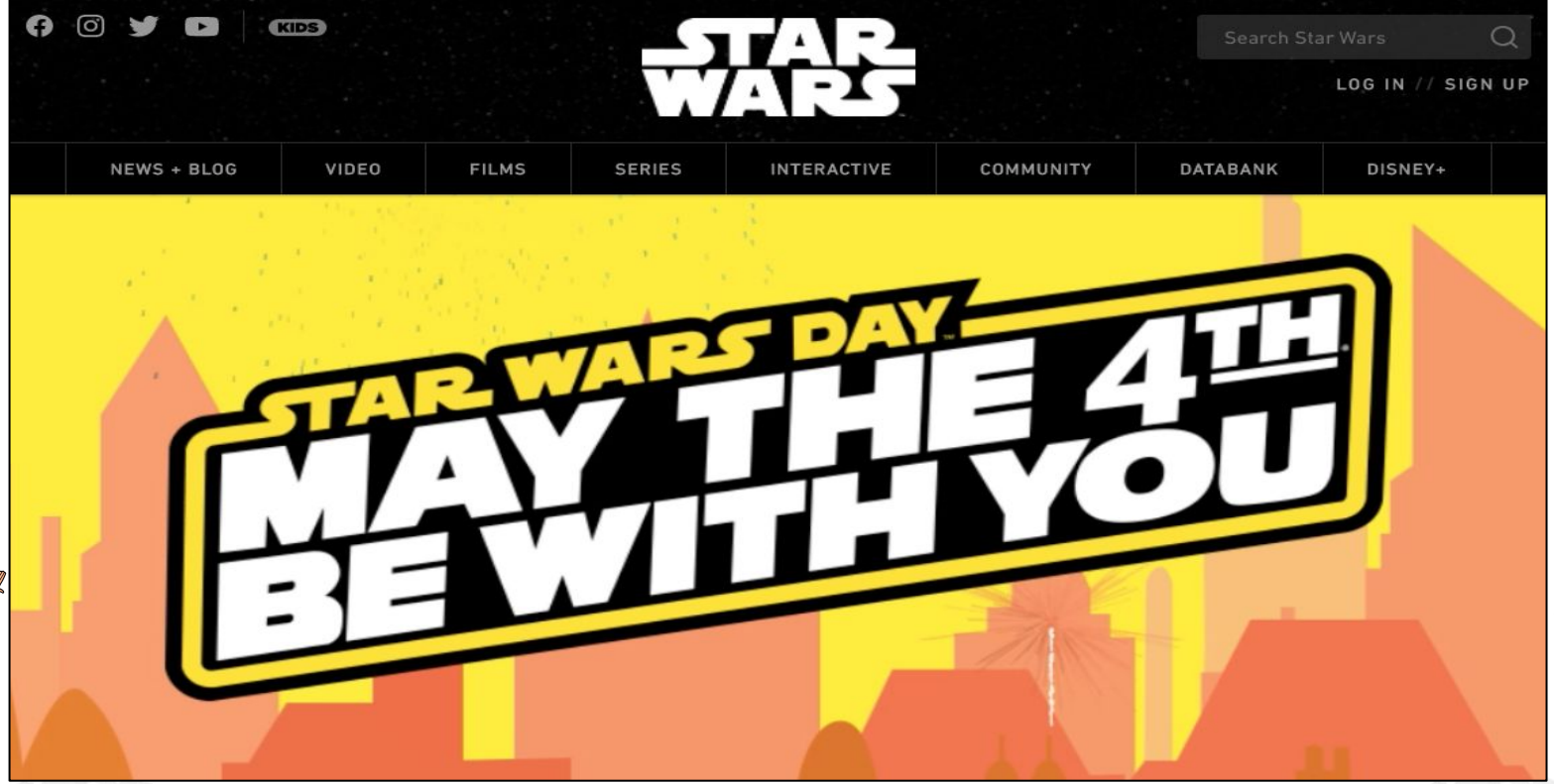
Mary Grygleski

Ryan Welford

David Gilardi

DataStax Developers Crew





www.starwars.com

Happy Star Wars Day!

DBRE/Developer Advocate

@aaronploetz

@aploetz

@aploetz

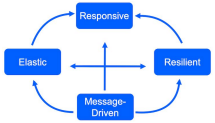
- DB Engineer, Author
- Former SWE/DevOps/DB Lead @ W.W. Grainger & Target
- Leads S.O. “Cassandra” tag in rep.
- Worked as an author on:
  - Mastering Apache Cassandra 3.x
  - Seven NoSQL Databases in a Week

Aaron Ploetz

Senior Developer Advocate

Passionate Advocate

Java Champion

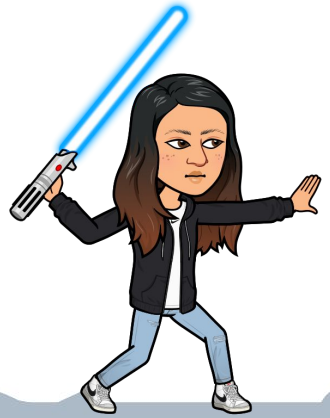


mgrygles

mary-grygleski

mgrygles

mgrygles



- Streaming
- Distributed Systems
- Reactive Systems
- IoT/MQTT

Mary Grygleski

DataStax Developers

And series badge for your pleasure

01

Weeks 1 Reminder(s)
HouseKeeping

02

DataStax Astra

Architecture

03

Use Cases

04

Data Models

05

Service Layer

06

What's next?
Quiz, Homework, Next week

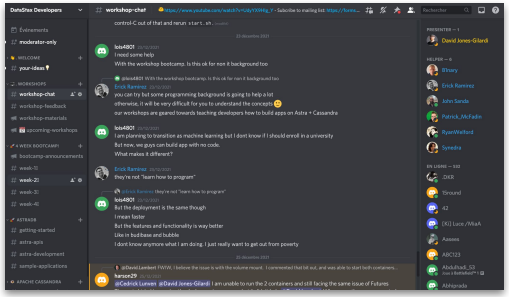
Agenda

Livestream: youtube.com/DataStaxDevs

YouTube

Twitch

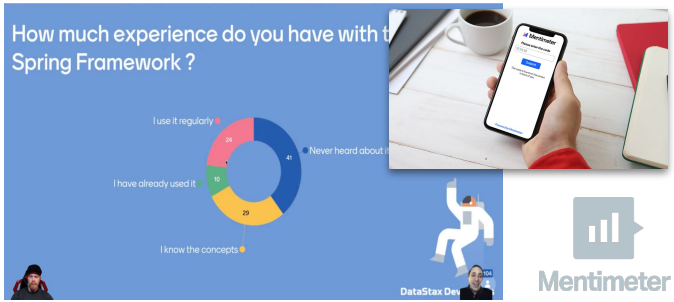
Questions: https://dtsx.io/discord



YouTube

Discord

Games and quizzes: menti.com

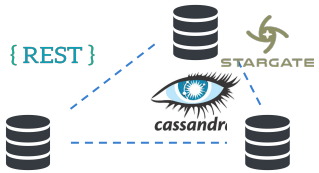


Mentimeter

1 Attend the live sessions

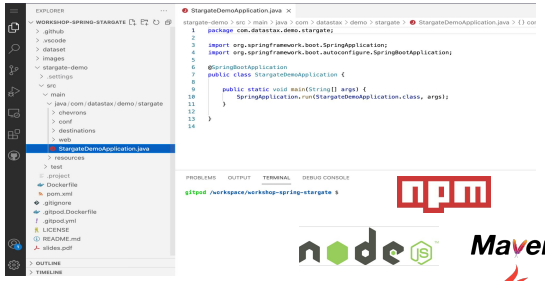
Astra astra.datastax.com

Database + REST + Streaming



DataStax Astra DB

Gitpod IDE: https://gitpod.io

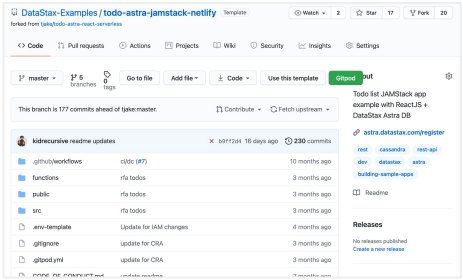


Gitpod

npm

node.js

Maven



GitHub

2 Complete Workshops Labs

01

Weeks 1 Reminder(s)
HouseKeeping

02

DataStax Astra

Architecture

03

Use Cases

04

Data Models

05

Service Layer

06

What's next?
Quiz, Homework, Next week

Agenda

Astra DB

Part 4 of common e-tail use cases.

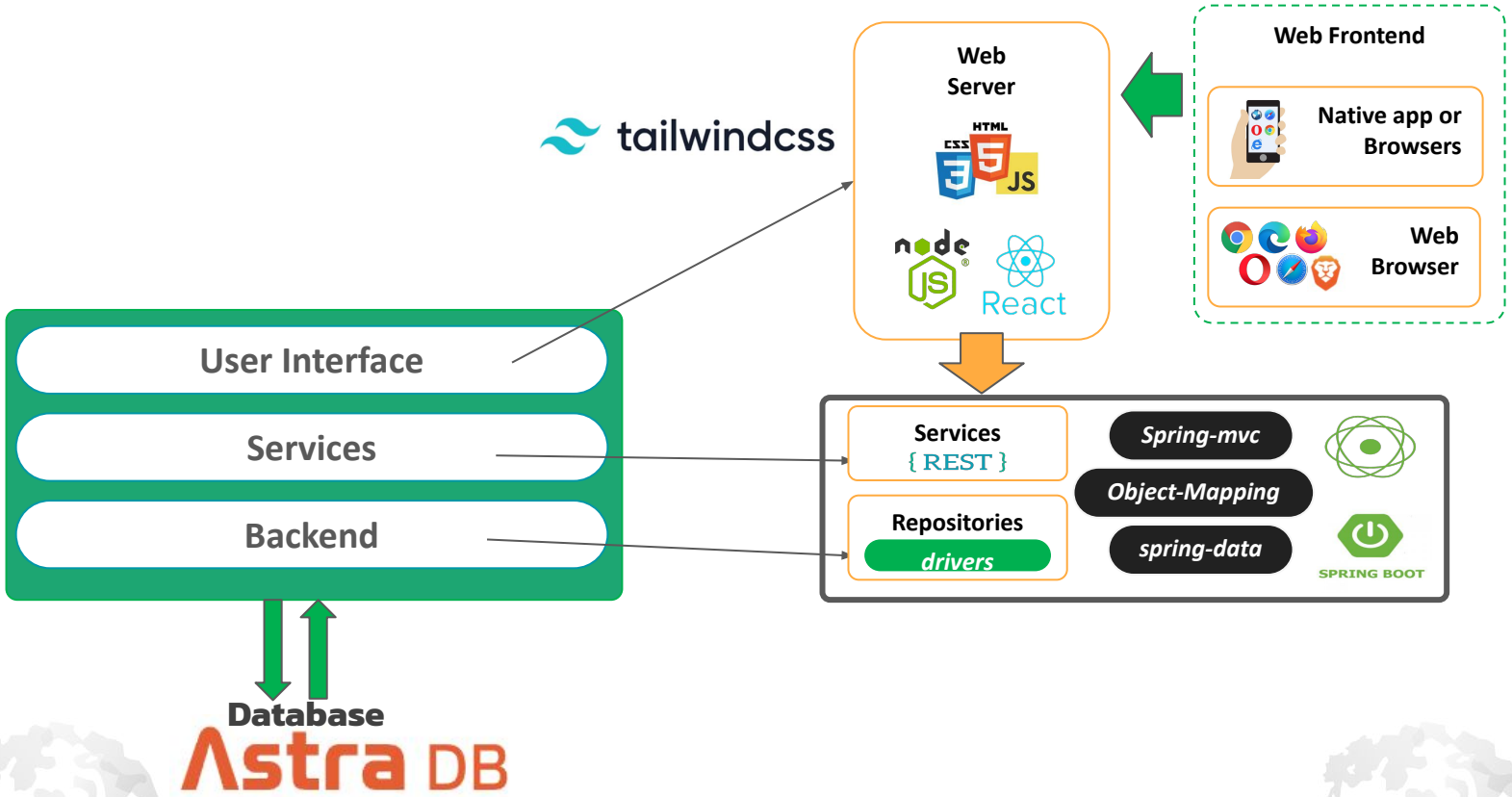
- Show real, scalable solutions backed by:

  DataStax

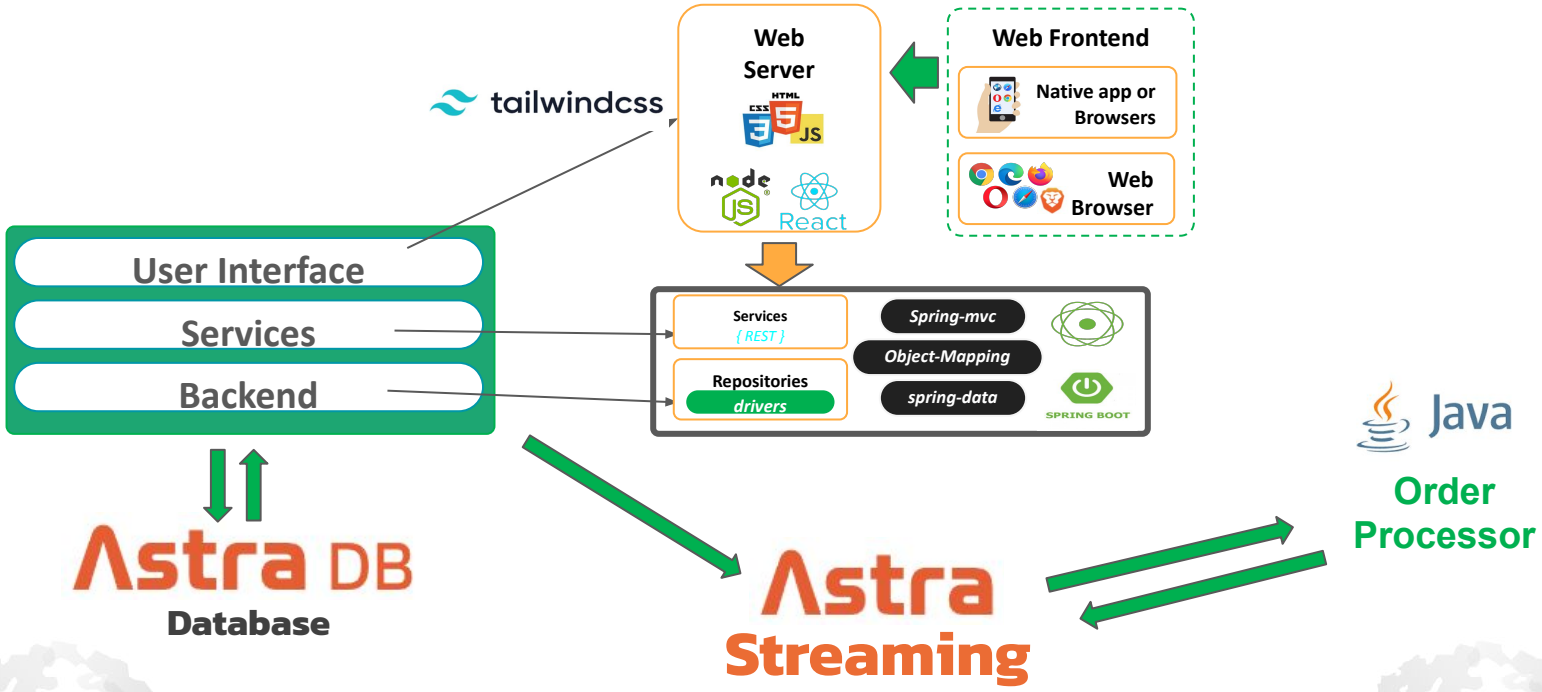
  Astra DB

  Astra Streaming

Technologies Stack



E-commerce – Solution and Opportunity

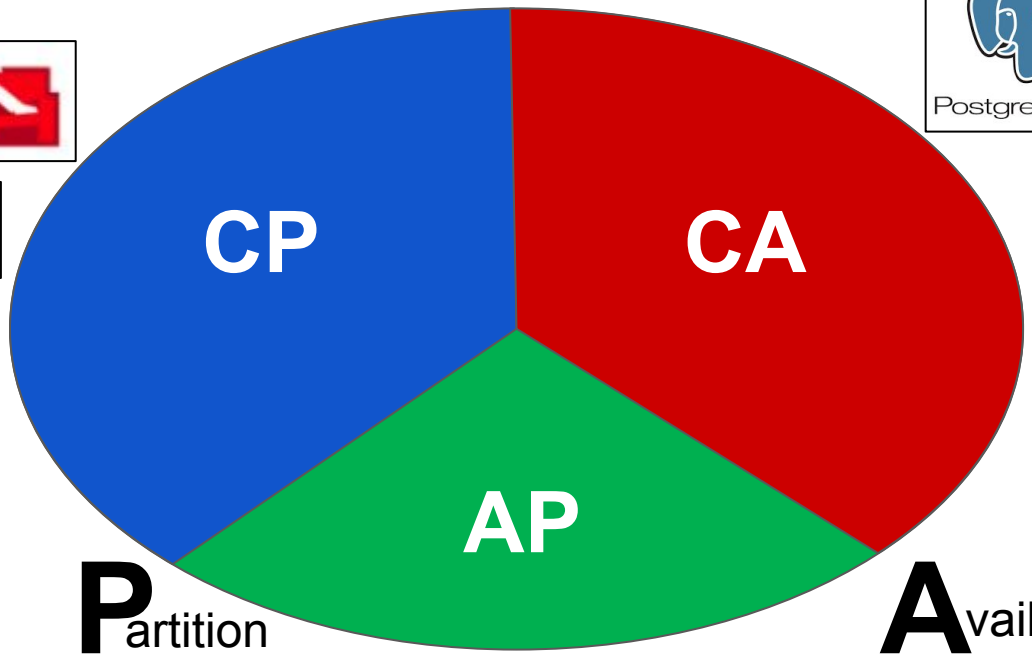


E-commerce – Solution and Opportunity

Why Astra DB?

Brewer's CAP Theorem

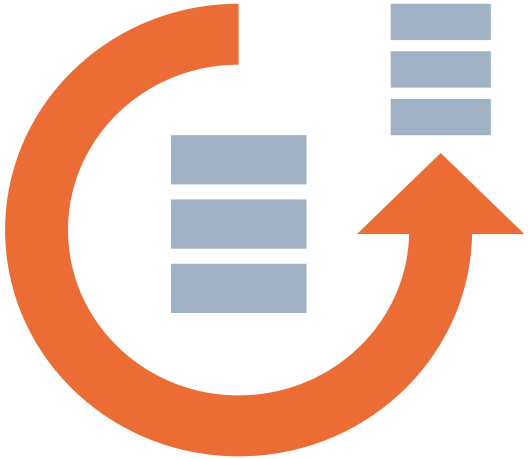
All distributed systems try to achieve consistency, availability and partition tolerance. But realistically they can only pick two.



Astra DB

RDBMS:

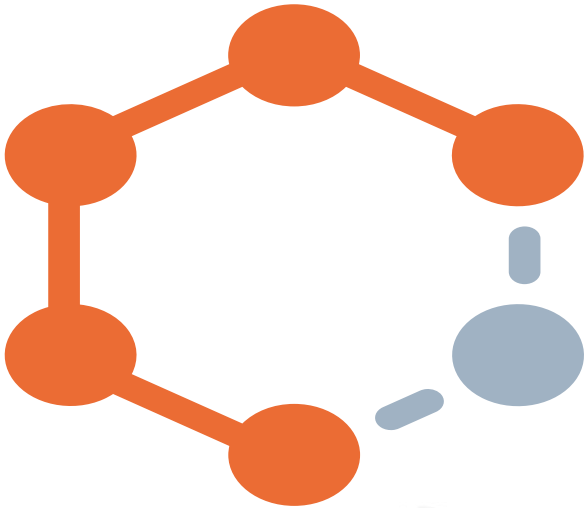
- Scaling (H/V) is limited.
- Data distribution is an add-on, rather than a core component.
- Geographic distribution is problematic.



Astra DB

Document Store:

- Strong consistency limits throughput.
- Reads become CPU-bound.
- Schema is actually important!
- Heterogeneous node types complicate DevOps.*



*Not an issue for “serverless” implementations.

Astra DB:

- No operational overhead
- Geographic Awareness
- Not cloud vendor bound
- “No touch” Scalability

Why Astra Streaming?

- A Cloud Native data streaming and event processing service that is tightly integrated into the Astra DB cloud platform
- Powered by Apache Pulsar
- Augments the Astra database capabilities with pub/sub messaging, queueing, and streaming

What is Astra Streaming?

- A unified messaging and streaming platform
- Multi-tenancy
- Geo-replication
- Separation of compute and log storage management (Apache BookKeeper)
- Delegation of cluster-level management and task coordination (Apache Zookeeper)

Astra STREAMING

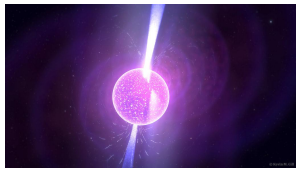
PULSAR

A quick peek into Apache Pulsar

- Real-Time Processing
- Fast Access to Data
- Modern System Architecture
- Streaming Data Analytics and enabling Machine Learning Ops
- Overall a win-win for your target audience – responsive systems and applications with good customer experience

Astra STREAMING

PULSAR



Benefits of Pulsar

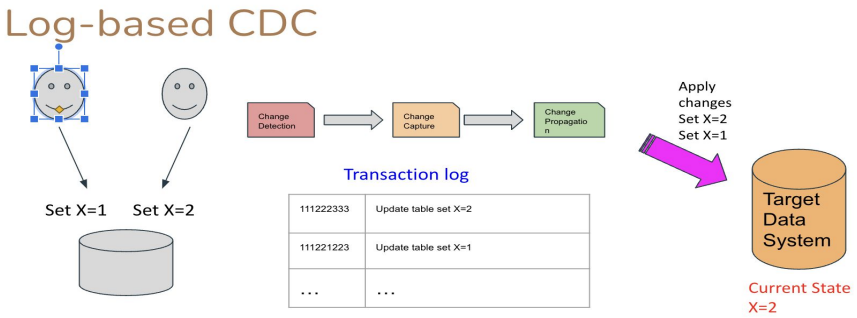
- Create Streaming: Pulsar instances
- Manage Pulsar clusters
- Scale across regions
- Manage Pulsar resources such as:
    - Topics
    - Connectors
    - Functions
    - Subscriptions

Ease of use: Astra Streaming in Astra DB

Why not a database?

Astra STREAMING

- An example to illustrate: Log-based Change Data Capture
  - Performance concern



Streaming: Advantages over database

Astra DB

Jump to README step #2

https://github.com/datastaxdevs/workshop-ecommerce-app#2-create-astra-db-instance

01

Weeks 1 Reminder(s)
HouseKeeping

02

DataStax Astra

Architecture

03

Use Cases

04

Data Models

05

Service Layer

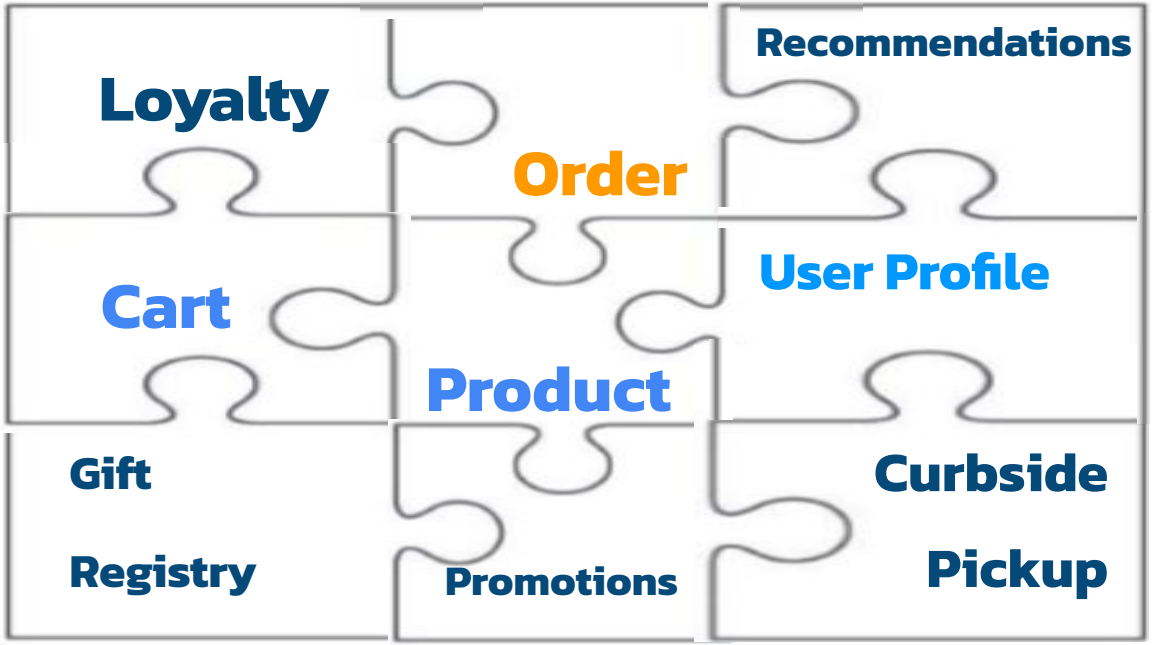
06

What's next?
Quiz, Homework, Next week

Agenda

E-commerce Subsystems

Astra DB

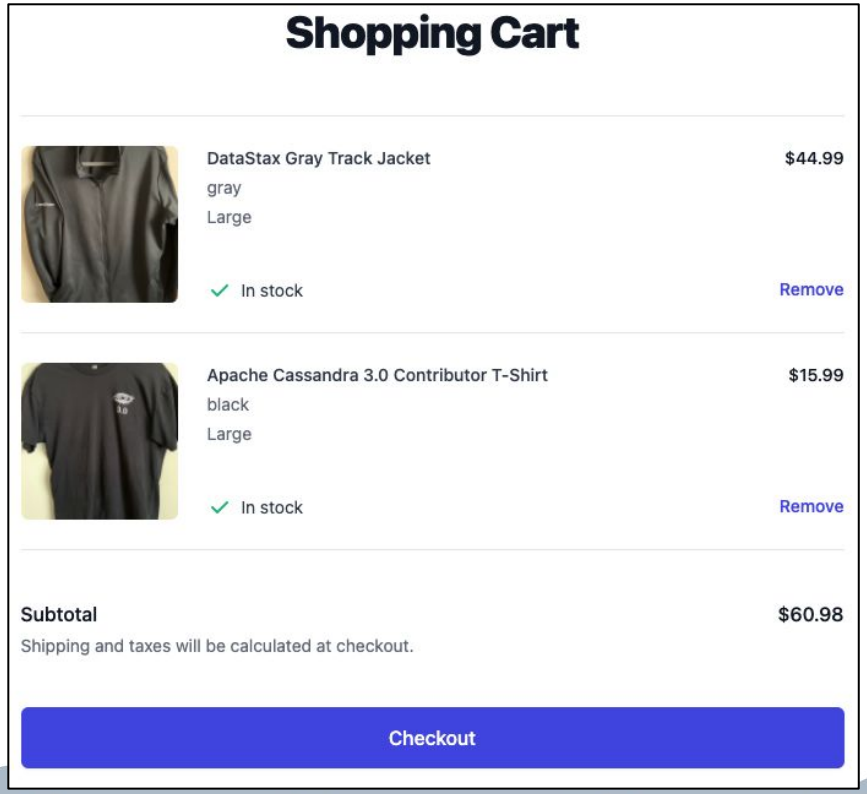


Use Cases – E-commerce Subsystems

Ordering System

Astra DB

- Order Data Processing



Focus for today: Ordering System

01

Weeks 1 Reminder(s)
HouseKeeping

02

DataStax Astra

Architecture

03

Use Cases

04

Data Models

05

Service Layer

06

What's next?
Quiz, Homework, Next week

Agenda

Cassandra Data Modeling

Astra DB

Data modeling for:

- Performance
- Tables built to suit a query

Pros:

- Fast reads
- Simple query model

Cons:

- Data duplication *(but that's ok)*
- Manual integrity enforcement

Employees

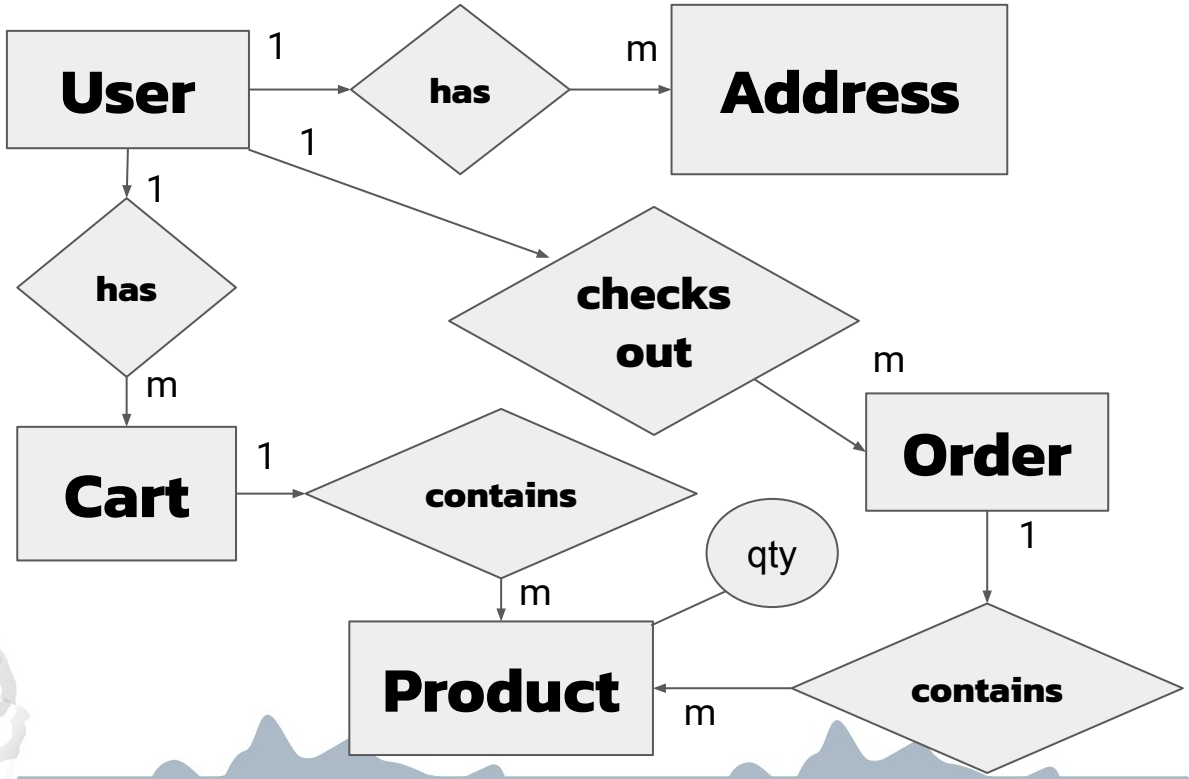
userId	firstName	lastName	department
1	Edgar	Codd	Engineering
2	Raymond	Boyce	Engineering
3	Sage	Lahja	Math
4	Juniper	Jones	Botany

Astra DB

Tips for Large Scale:

- Data queried together should be stored together.
- Use high-cardinality key values.
- No full table scans!
- Keep things small!
  - Partitions
  - Result sets

Astra DB



Data Model – Conceptual

Astra DB

Queries / Actions

- Place a user's order.
- Query a specific order.
- Query a user's past orders.
- Query the status timeline of an order.

Astra DB

order
order_id
product_name
product_id
shipping_address
product_qty
order_status
shipping_handling
subtotal
tax
user_id

Data Model – Logical

Astra DB

order_by_user
user_id PK
order_id CK ↓
order_status
order_total

order_by_id
order_id PK
product_name CK ↑
product_id CK ↑
shipping_address
product_qty
order_status
shipping_handling
subtotal
tax

order_status_history
order_id PK
status_timestamp CK ↓
order_status

Partition Key PK
Clustering Key CK

Data Model – Physical

Order by ID

Astra DB

- Order detail.
- Decimal type for currency.
- shipping_address
  - address UDT
- STATIC columns for order data

```
CREATE TABLE order_by_id (
    order_id timeuuid,
    product_name text,
    product_id text,
    order_shipping_handling decimal static,
    order_status text static,
    order_subtotal decimal static,
    order_tax decimal static,
    order_total decimal static,
    payment_method text static,
    product_price decimal,
    product_qty int,
    shipping_address address static,
PRIMARY KEY (order_id,
  product_name, product_id));
```

Address UDT

Astra DB

- User Defined Type
- Allows for multiple types:
  - Ship-to
  - Bill-to
  - Mail-to

```
CREATE TYPE address (
  type TEXT,
  mailto_name TEXT,
  street TEXT,
  street2 TEXT,
  city TEXT,
  state_province TEXT,
  postal_code TEXT,
  country TEXT
);
```

Order by User

Astra DB

- Solves for the “past orders” query.
- Clustering order on order_id DESC keeps the most-recent orders on top.

```
CREATE TABLE order_by_user (
    user_id uuid,
    order_id timeuuid,
    order_status text,
    order_total decimal,
    PRIMARY KEY (user_id, order_id)
) WITH CLUSTERING ORDER BY
(order_id DESC);
```

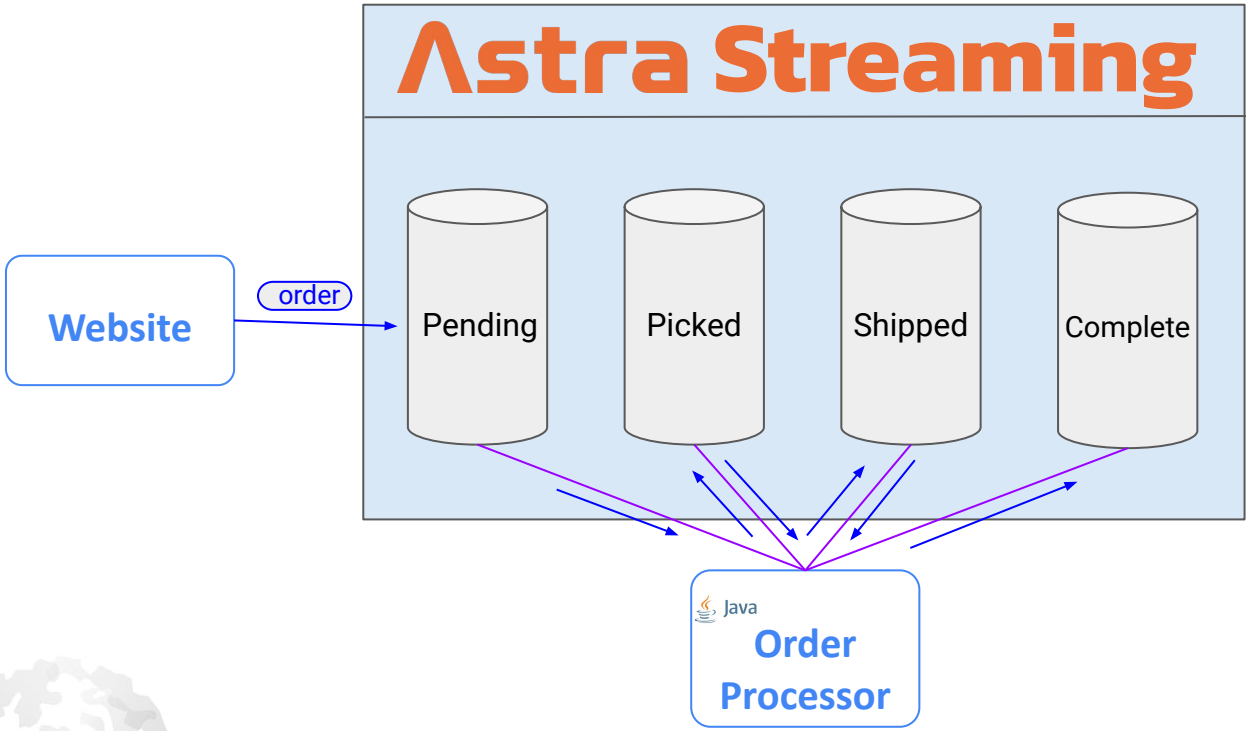
Order Status History

Astra DB

- Keeps a timeline of status changes for each order.
- Clustering order on status_timestamp DESC keeps the most-recent orders on top.

```
CREATE TABLE order_status_history (
    order_id timeuuid,
    status_timestamp timestamp,
    order_status text,
    PRIMARY KEY (order_id,
status_timestamp)
) WITH CLUSTERING ORDER BY
(status_timestamp DESC);
```

Order Processing System



Order Streaming

Messaging requirements:

Astra STREAMING

- Message ordering
- Message delivery (guaranteed, exactly one – especially for payment)
- Scalability (high volumes, handling spikes, backpressure)
- Using the Publish-Subscribe pattern (Pub/Sub) for sending and receiving messages with the help of a serverless broker

The Apache Pulsar Pub/Sub broker

- Illustration of the order flow
- State of the data – capturing the change (CDC)

Astra DB

Jump to README step #3

https://github.com/datastaxdevs/workshop-ecommerce-app
#3-create-your-schema

01

Weeks 1 Reminder(s)
HouseKeeping

02

DataStax Astra

Architecture

03

Use Cases

04

Data Models

05

Service Layer

06

What's next?
Quiz, Homework, Next week

Agenda

User Data

Astra DB

http://localhost:8080/swagger-ui/index.html?configUrl=/v3/api-docs/swagger-config#/

Service Endpoint – User Data GETs

Order by ID example:

Astra DB

```
token@cqlsh:sag_ecommerce> SELECT * FROM order_by_id WHERE order_id=49e00f00-c7ed-11ec-90bd-a99c9f841c53;

 order_id                             | product_name                       | product_id | order_shipping_handling | order_status |
order_subtotal | order_tax | order_total | payment_method | product_price | product_qty | shipping_address

--------------------------------------+------------------------------------+------------+-------------------------+--------------+

 49e00f00-c7ed-11ec-90bd-a99c9f841c53 |       DataStax Gray Track Jacket |    DSS821L |                       4 |      PENDING |
80.98 |      4.05 |       89.03 |           null |         44.99 |           1 | {type: null, mailto_name: null, street: '193 Main
St.', street2: null, city: 'Minneapolis', state_province: 'Minnesota', postal_code: '55369', country: 'United States'}

 49e00f00-c7ed-11ec-90bd-a99c9f841c53 | DataStax Vintage 2015 MVP Hoodie |    DSH916L |                       4 |      PENDING |
80.98 |      4.05 |       89.03 |           null |         35.99 |           1 | {type: null, mailto_name: null, street: '193 Main
St.', street2: null, city: 'Minneapolis', state_province: 'Minnesota', postal_code: '55369', country: 'United States'}

(2 rows)
```

GET `/api/v1/order/{orderid}/` Retrieve data for a specifc order by a orderid

Service Endpoint – User Data

Order by User example:

Astra DB

```
token@cqlsh:sag_ecommerce> SELECT * FROM order_by_user WHERE
user_id=0a744717-7fff-466f-9c71-2efbc7ff8cc0;

user_id                              | order_id                             |
order_status | order_total

-------------------------------------+--------------------------------------+--
0a744717-7fff-466f-9c71-2efbc7ff8cc0 | 49e00f00-c7ed-11ec-90bd-a99c9f841c53|
PENDING      |       89.03

(1 rows)
```

Service Endpoint – User By Email

Order Status History example:

Astra DB

```
token@cqlsh:sag_ecommerce> SELECT * FROM order_status_history WHERE
order_id=49e00f00-c7ed-11ec-90bd-a99c9f841c53;

 order_id                             | status_timestamp                 | order_status
--------------------------------------+----------------------------------+--------------
 49e00f00-c7ed-11ec-90bd-a99c9f841c53 | 2022-04-30 12:43:41.451000+0000 |      SHIPPED
 49e00f00-c7ed-11ec-90bd-a99c9f841c53 | 2022-04-29 22:33:51.551000+0000 |       PICKED
 49e00f00-c7ed-11ec-90bd-a99c9f841c53 | 2022-04-29 18:50:50.224000+0000 |      PENDING

(3 rows)
```

Service Endpoint – User By Email

Astra DB

Jump to README step #5

https://github.com/datastaxdevs/workshop-ecommerce-app
#5-setup-your-application

Spring Security

Protects your application with comprehensive and extensible authentication and authorization support.

Spring-Security

Thymeleaf

Spring MVC

WebClient

Spring Data Cassandra

Cassandra Drivers

GITHUB

GOOGLE

Data Tier

Astra DB

Cassandra DB

Cql Console

DataStax Astra DB

User Profile

Astra DB

Jump to README step #8

https://github.com/datastaxdevs/workshop-ecommerce-app#8-enable-social-login

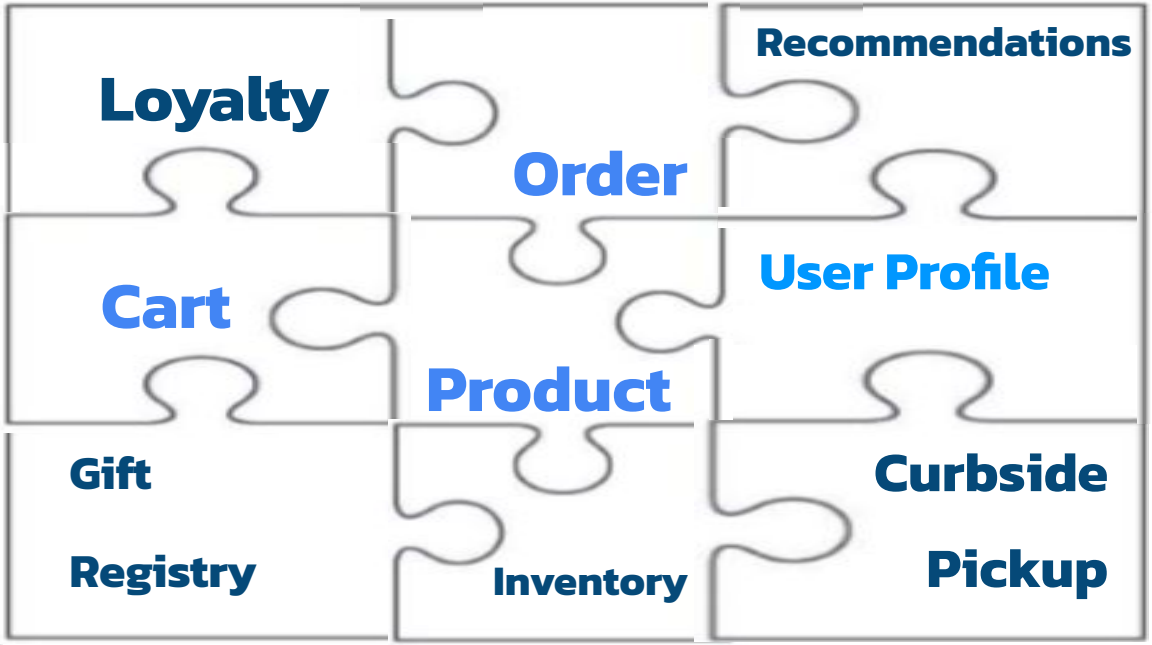
Astra DB

Jump to README step #9

https://github.com/datastaxdevs/workshop-ecommerce-app#9-start-the-application

E-commerce Subsystems

Astra DB



Future Sessions – Maybe?

Extra Reading

Astra DB

- Dynamo Paper – https://www.allthingsdistributed.com/files/amazon-dynamo-sosp2007.pdf
- Harvest, Yield, and Scalable Tolerant Systems – https://s3.amazonaws.com/systemsandpapers/papers/FOX_Brewer_99-Harvest_Yield_and_Scalable_Tolerant_Systems.pdf
- 10 Best Ecommerce Sales Tax Software For 2022 – https://theecommmanager.com/ecommerce-sales-tax-software/

01

Weeks 1 Reminder(s)
HouseKeeping

02

DataStax Astra

Architecture

03

Use Cases

04

Data Models

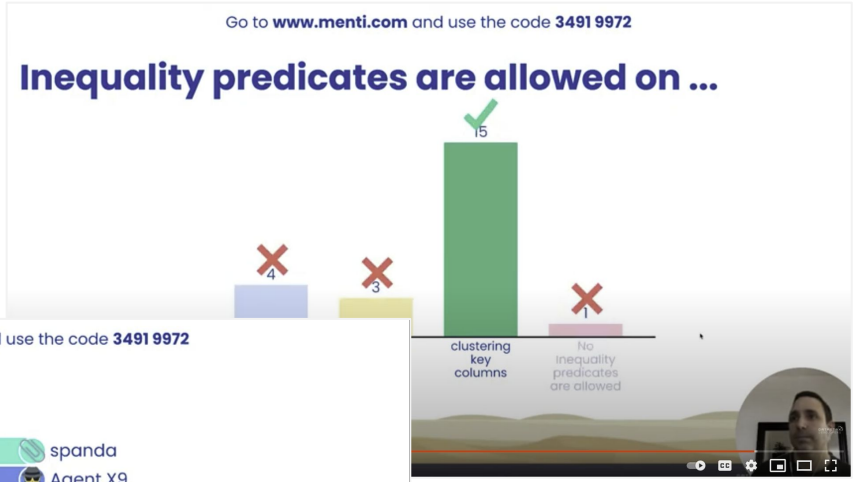
05

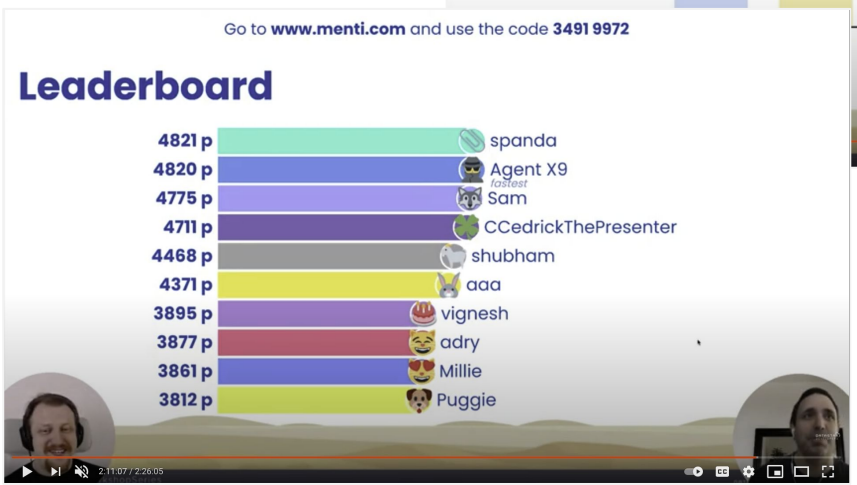
Service Layer

06

What's next?
Quiz, Homework, Next week

Agenda





Play with us with Menti.com (new TAB)

SWAG WINNERS 🎉

Congratulations to 1st, 2nd and 3rd place on the Menti quiz!

To claim your prize, please send an email to:

gary.harvey@datastax.com

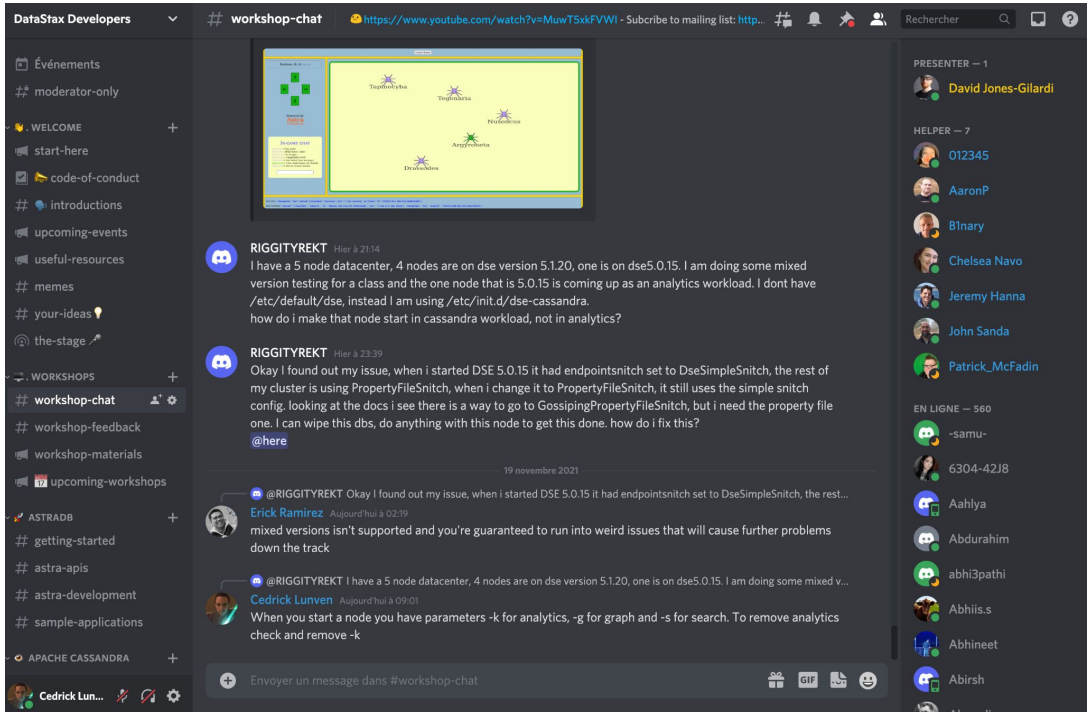
** Include a screenshot of your Menti screen

Homework

[Complete hands-on]

1. Add your own product to the database.
2. Add your product to the shopping cart and then check out.
3. Submit screenshots of:
   a. The product page
   b. The shopping cart
   c. The order detail page

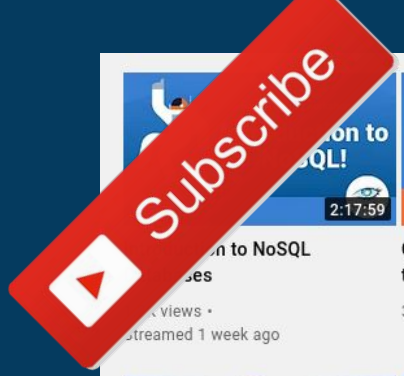
aaron.ploetz@datastax.com
Subject: Ecom Homework

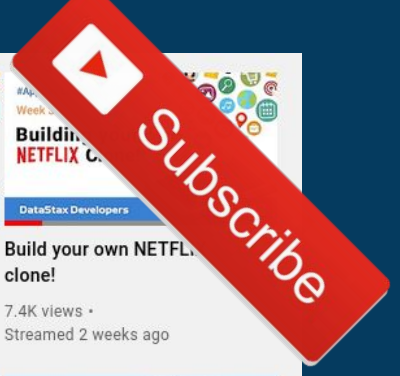


!discord

dtsx.io/discord

Datastax Developers Discord (18k+)





…n to NoSQL …ses

…k views •
…Streamed 1 week ago

Crash Course | Introduction to Cassandra for Developers

331 views • 1 week ago

Introduction to NoSQL Databases

3.5K views •
Streamed 1 week ago

Introduction to NoSQL Databases

10K views •
Streamed 1 week ago

Build your own NETFLIX clone!

4K views •
Streamed 2 weeks ago

Build your own NETFL… clone!

7.4K views •
Streamed 2 weeks ago

Astra Streaming Demo

177 views • 2 weeks ago

Kubernetes Ingress Management with Traefik…

496 views •
Streamed 2 weeks ago

Build your own TikTok clone!

1.9K views •
Streamed 3 weeks ago

Build your own TikTok Clone!

4K views •
Streamed 3 weeks ago

How to use the Connect Driver in Astra DB

113 views • 4 weeks ago

How to use the CQL Console in Astra DB

39 views • 4 weeks ago

How to create an Authentication Token in…

37 views • 4 weeks ago

How to use the Data Loader in Astra DB

62 views • 4 weeks ago

Astra DB Sample App Gallery

36 views • 4 weeks ago

How to use Secure Connect in Astra DB

42 views • 4 weeks ago

Cassandra Day India: CL Room (Workshops)

2.4K views •
Streamed 4 weeks ago

Cassandra Day India: RF Room (Talks)

1.3K views •
Streamed 1 month ago

Thank You!