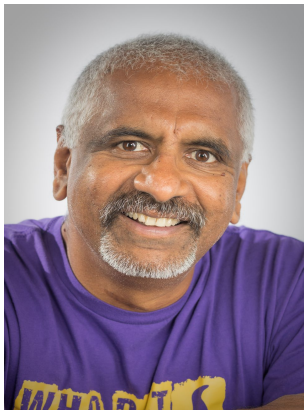
Building an E-commerce Website on Astra DB

Session #1
Product Catalog and Pricing

DataStax Developers

Your presenters



Raghavan Srinivas
Developer Advocate

Apache Cassandra™ expert

All things distributed!

Still working on simplifying the developer "inner loop!"

@ragsns @ragss

Aaron Ploetz
Product Manager

Author  

Former DB Lead @
W.W. Grainger, Target

@aploetz

DatastaxDevs: Developer Advocates Team

Cedrick Lunven

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Jack Fryer

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Stefano Lottini

David Gilardi

Ryan Welford

Rags Srinivas

Sonia Siganporia

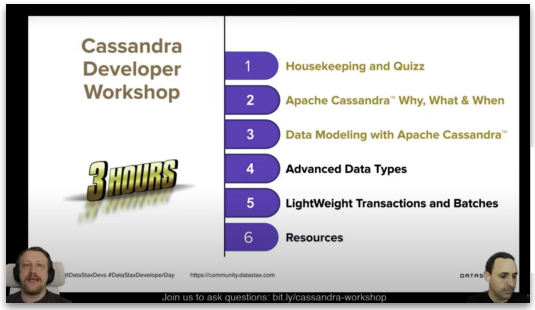
R

S

Housekeeping #1: Attending the workshop

Live and interactive

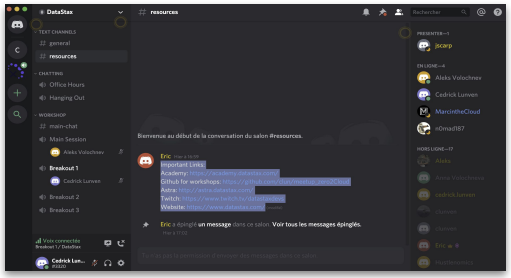
Livestream: youtube.com/DataStaxDevs



YouTube

Twitch

Questions: https://dtsx.io/discord

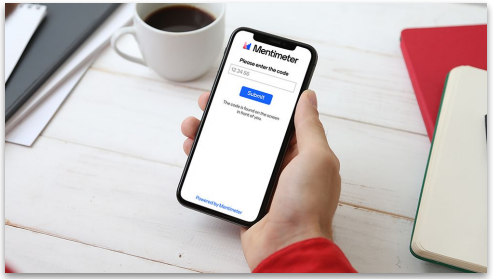


Discord

YouTube

Available on the iPhone App Store

Games menti.com



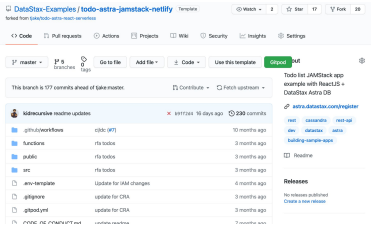
Mentimeter

GET IT ON Google play

Housekeeping #2: Doing Hands-On

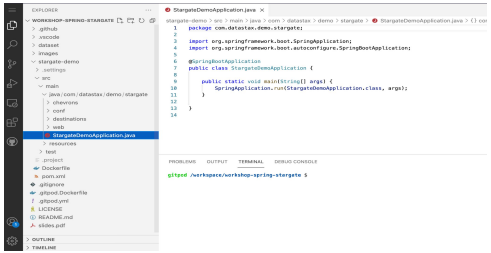
Nothing to install !

Source code + exercises + slides



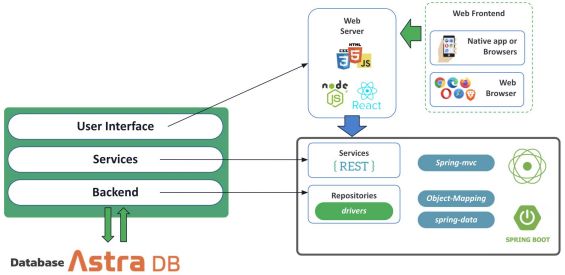
GitHub

IDE



Gitpod

Website based on Astra DB



DataStax Astra DB

DataStax Developers

Welcome!

Astra DB

Goals:

- Series on common e-tail use cases.
- Each session builds on previous.
- Show real, scalable solutions backed by:

DataStax

Astra DB

Agenda

01 DataStax Astra

Architecture

02

Use Cases

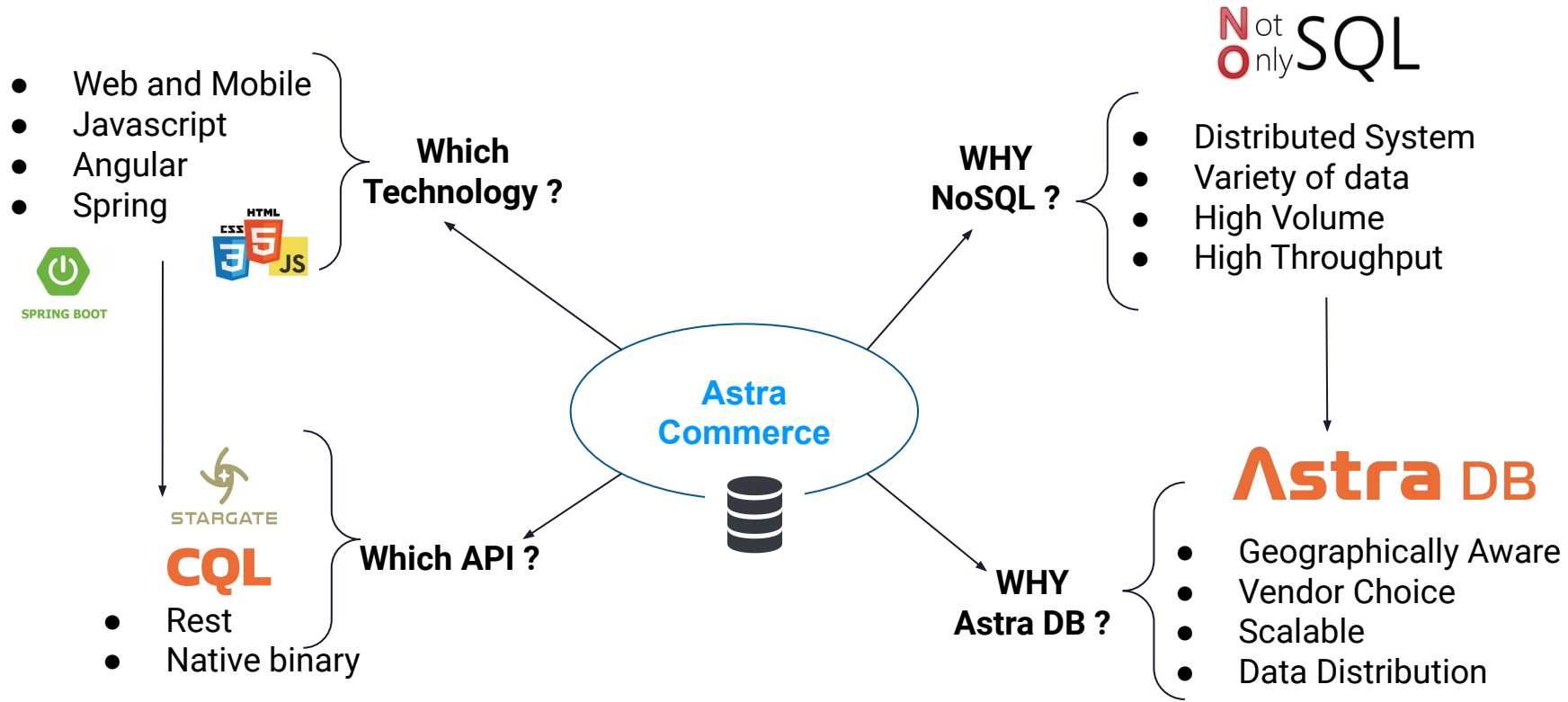
03 cassandra

Data Models

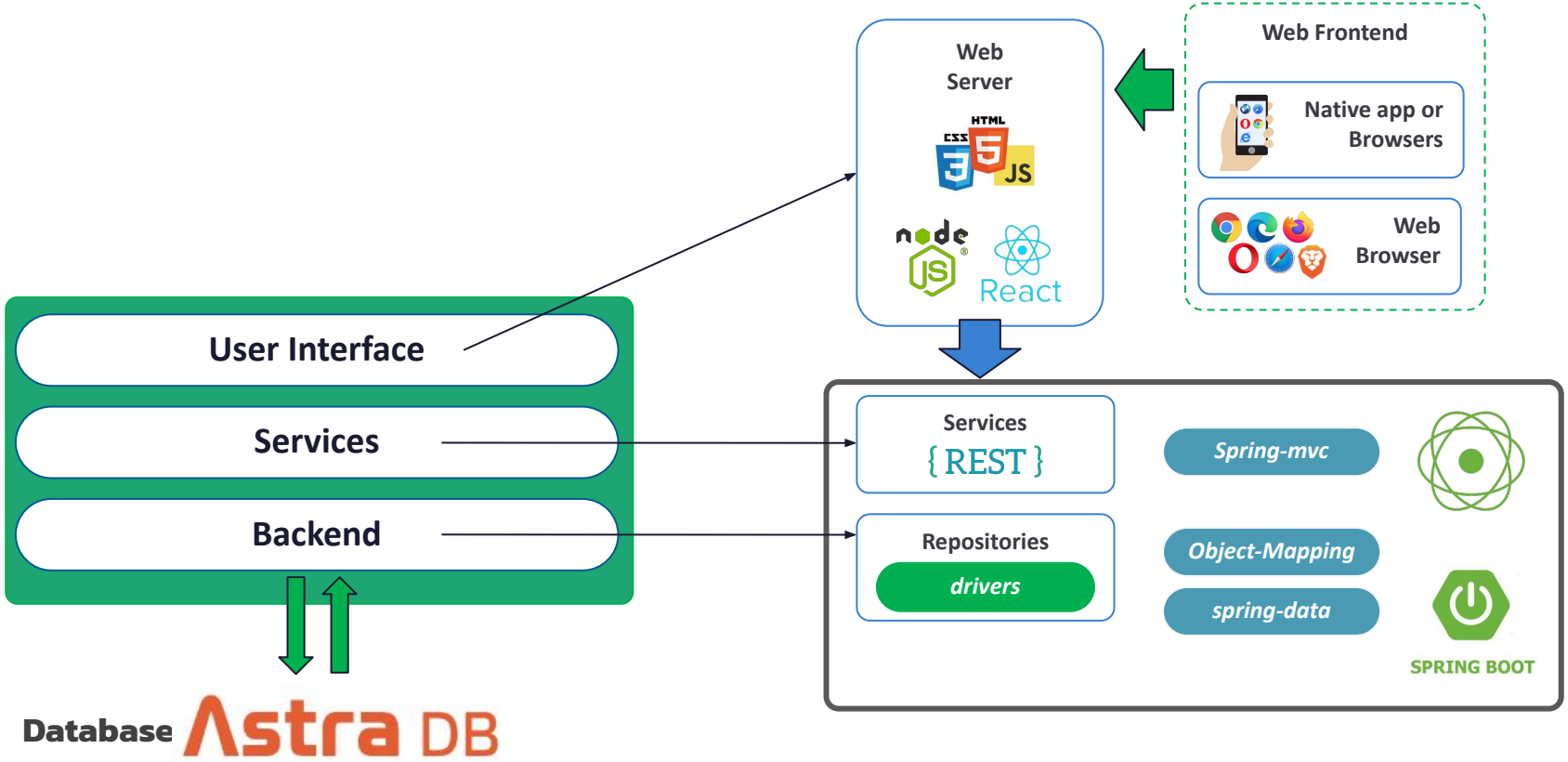
04

Service Layer

Ecommerce – Technology Architecture/Choice



Ecommerce – Solution and Opportunity



Why Astra DB?

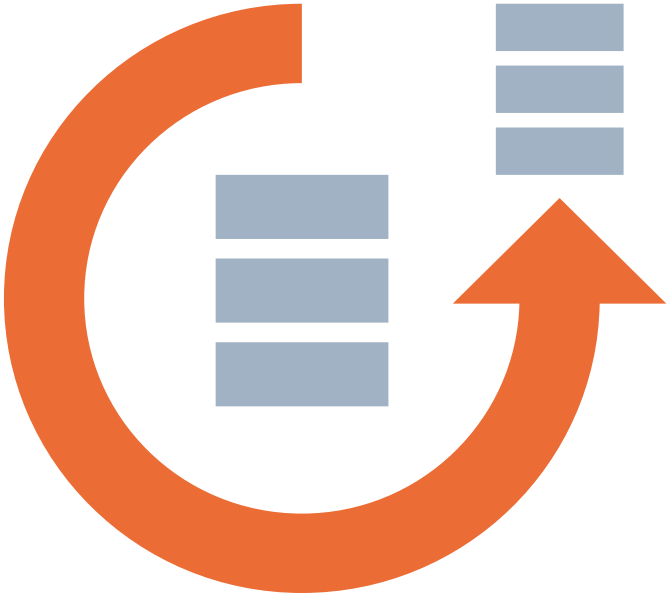
Can other DBs handle this?

Database: Why not a RDBMS?

Astra DB

RDBMS:

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

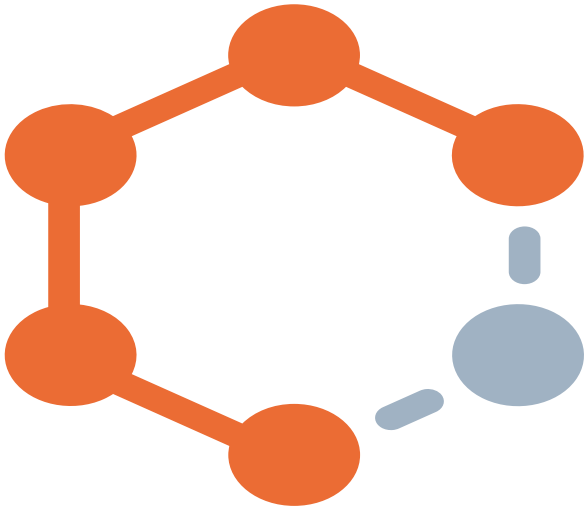


Database: Why not a Document DB?

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.*

Database: Why Astra DB?

Astra DB

Astra DB:

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

Astra DB

Jump to README step #2

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

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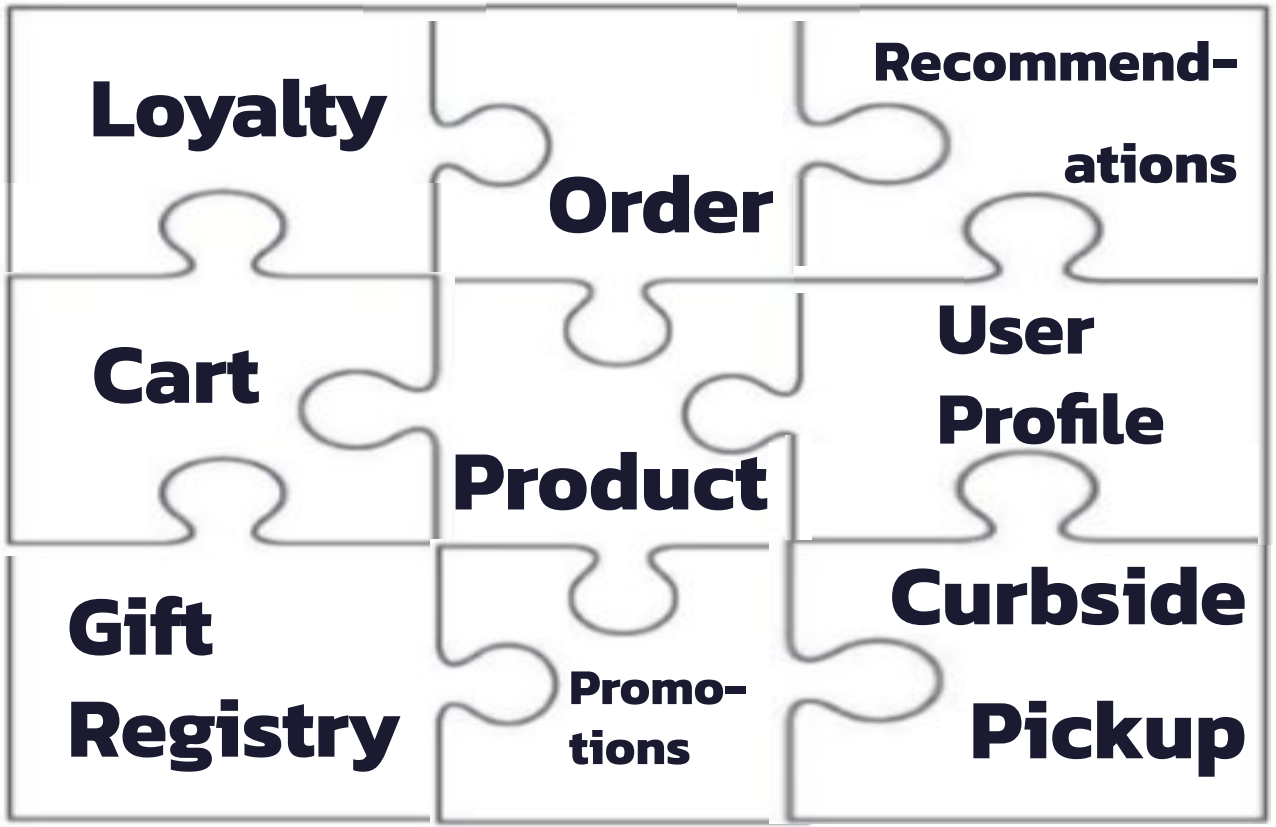
Service Layer

Use Cases – Ecommerce Subsystems

Astra DB

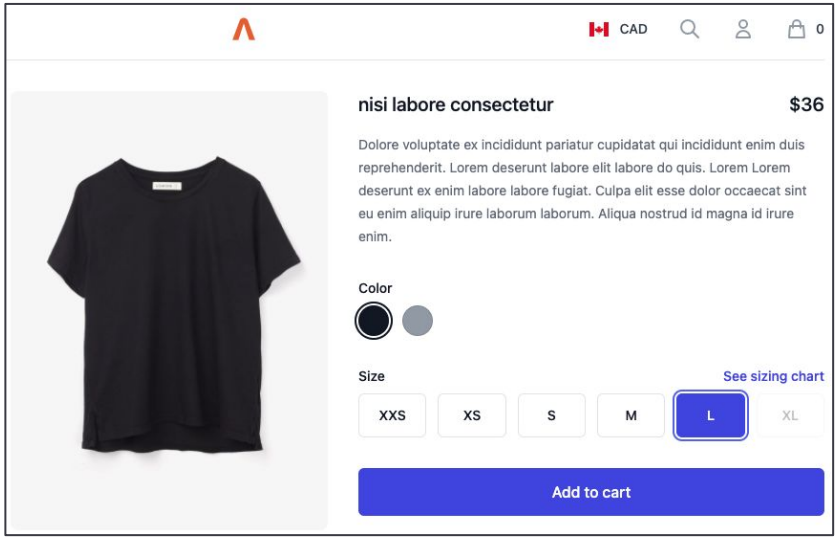


Focus for today: Product Services

Astra DB

Product Catalog

- Product (*data*)
- Product Category (*navigation*)
- Pricing



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Service Layer

Data Modeling – Normalization

Data modeling for:

- Efficient storage
- Data integrity

Pros:

- Simple writes

Cons:

- Slow reads
- Complex query model

Employees

userId	deptId	firstName	lastName
1	1	Edgar	Codd
2	1	Raymond	Boyce

Departments

departmentId	department
1	Engineering
2	Math

Normalization

One table serves many queries

Data Modeling – Denormalization

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

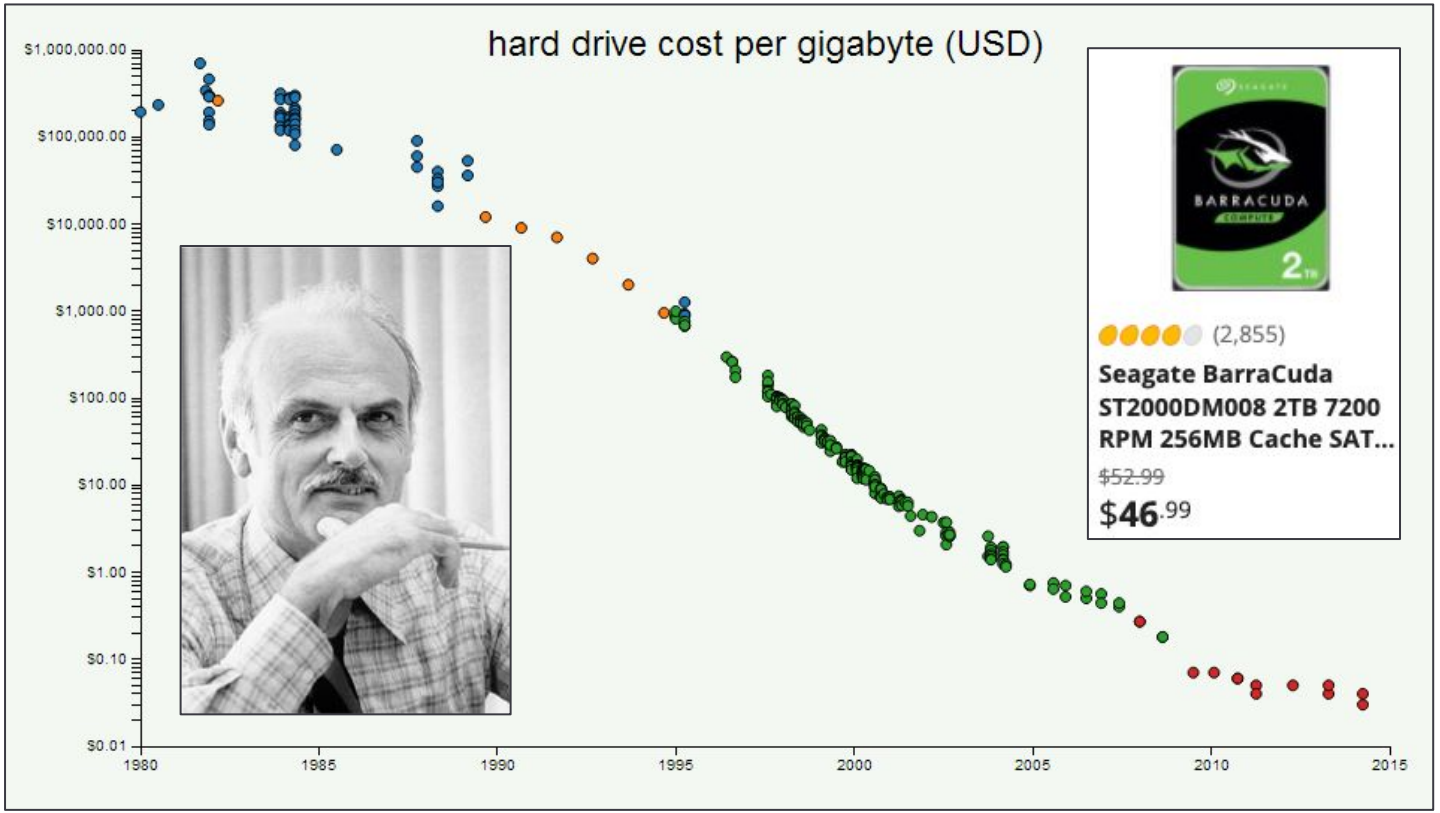
Employees

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

Denormalization

One table serves one query

Data Duplication ok? Disk *used to be* Expensive!



MySQL Forums, 2013

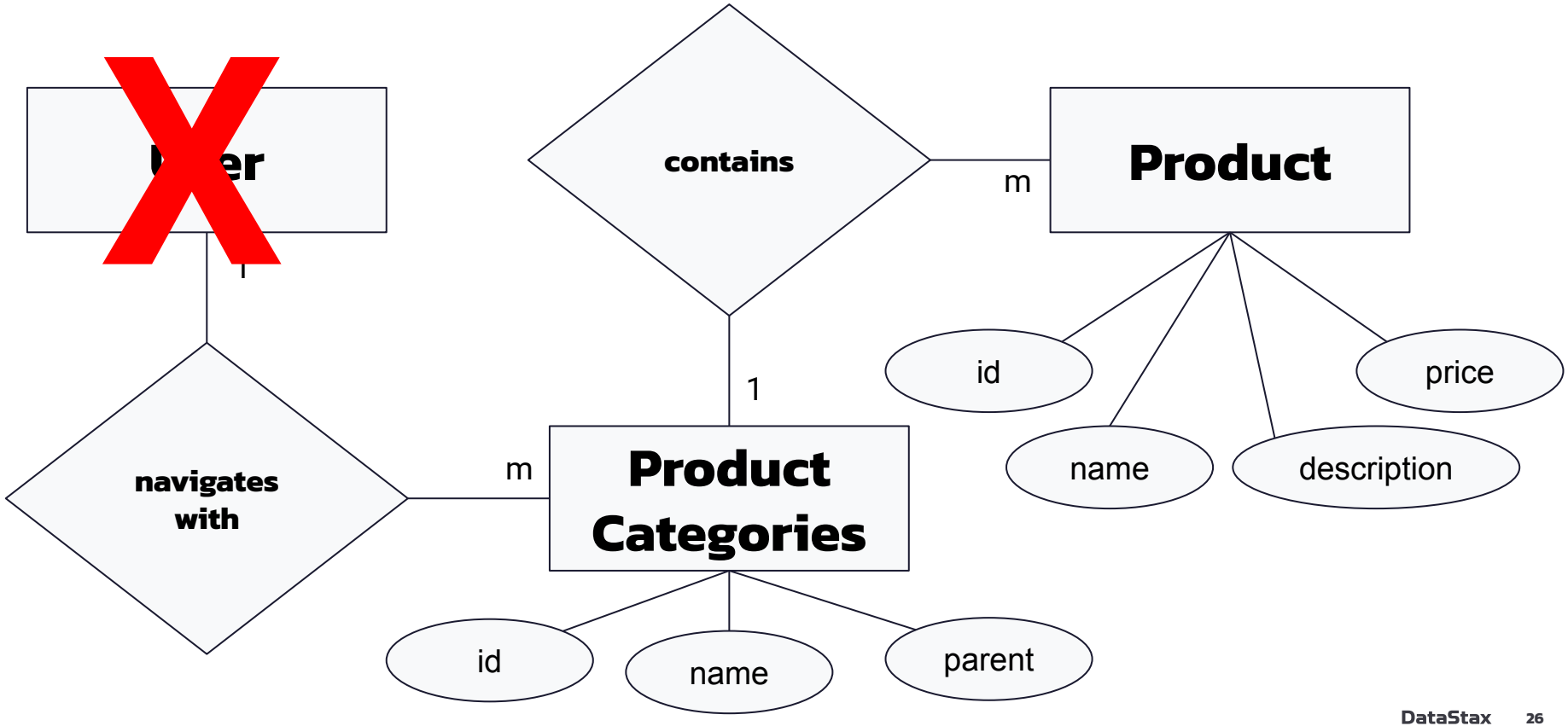
"E.F. Codd must be rolling over in his grave. But by now, he should be used to that."

Tips for **Large Scale**:

- Data **queried** together should be **stored** together.
- High-cardinality keys.
- **No** `ALLOW FILTERING`!
- Keep things **small**!
  - Partitions
  - Result sets

Data Model – Conceptual

Astra DB



Data Model – Queries to Support

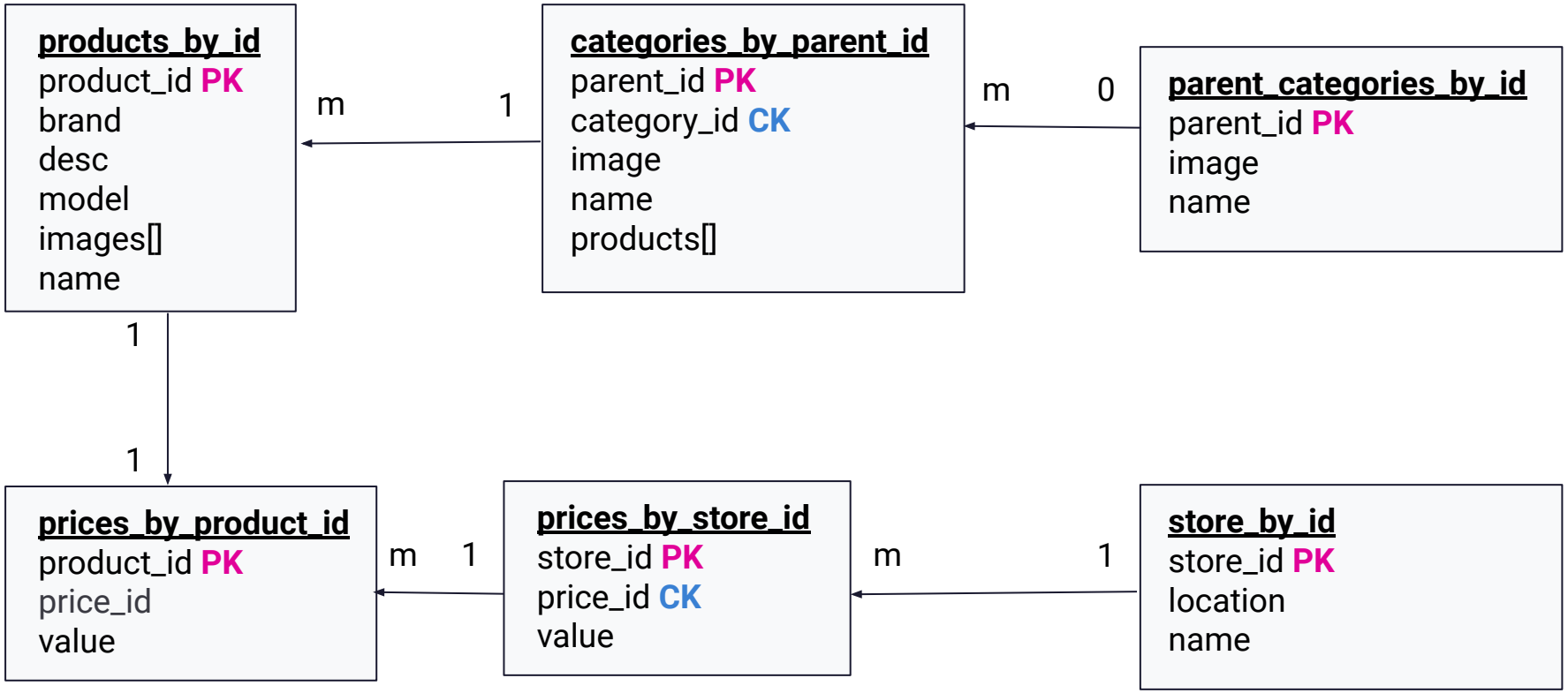
Astra DB

Queries

- Need to be able to query a product by its identifier.
- Need to be able to query a product's "online" price.
- Need to be able to query product categories in a hierarchy.

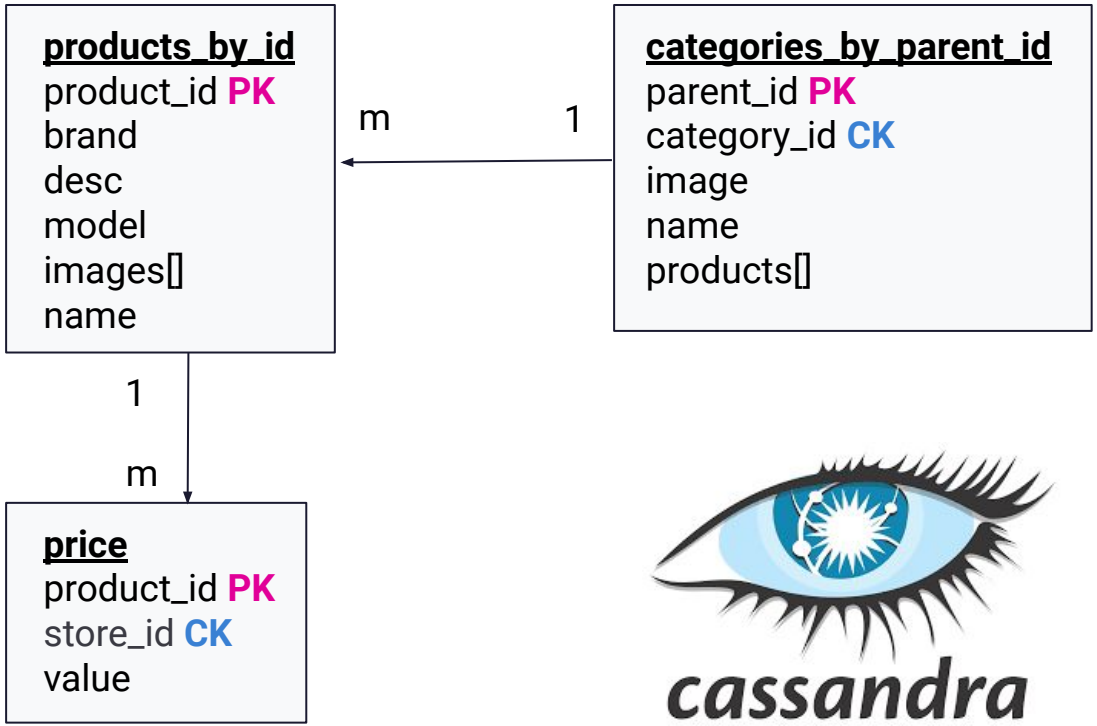
Data Model – Logical

Astra DB



Data Model – Physical

Astra DB



Data Model – Pricing

Astra DB

Price

- *Separate* from product.
- PK (`product_id, store_id`)
- Data distribution a challenge for non-Cassandra DBs.

```
CREATE TABLE price (
    product_id TEXT,
    store_id TEXT,
    value DECIMAL,
PRIMARY KEY(product_id,store_id));
```

Data Model – Product data

Astra DB

Product

- *Separate* from price.
- PK (`product_id`)
- Balancing of read traffic will be a challenge for non-Cassandra DBs.

```
CREATE TABLE product (
    product_id TEXT,
    product_group TEXT,
    name TEXT,
    brand TEXT,
    model_number TEXT,
    short_desc TEXT,
    long_desc TEXT,
    specifications MAP<TEXT,TEXT>,
    linked_documents MAP<TEXT,TEXT>,
    images SET<TEXT>,
    PRIMARY KEY(product_id));
```

Data Model – Product Navigation

Astra DB

Category

- Designed to be called *recursively*.
- PK (`parent_id, category_id`)
- Data distribution a challenge for non-Cassandra DBs.

```
CREATE TABLE category (
    parent_id UUID,
    category_id UUID,
    name TEXT,
    image TEXT,
    products LIST<TEXT>,
    PRIMARY KEY
(parent_id,category_id));
```

Astra DB

Jump to README step #3

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

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Service Layer

Service Endpoint – Pricing

Astra DB

Price

GET	/api/v1/prices/{productid}	Retrieve prices for a product from its id
GET	/api/v1/prices/price/{productid}	Retrieve prices for a product and the default store 'web'
GET	/api/v1/prices/price/{productid}/{storeId}	Retrieve price for a product and a store

Service Endpoint – Product

Astra DB

Price example:

```
> SELECT * FROM price WHERe product_id='LS534XL';


 product_id | store_id | value
------------+----------+-------
    LS534XL |      web | 14.99
```

Service Endpoint – Category

Astra DB

Category

GET	/api/v1/categories/{parentid}	Retrieve Categories for a product from its parentId
GET	/api/v1/categories/category/{parentid}/{categoryid}	Retrieve category for a parentId and a categoryId

Service Endpoint – Category

Astra DB

Navigation example:

Start with top-level parent_id:

ffdac25a-0244-4894-bb31-a0884bc82aa9

```
> SELECT name,category_id,products FROM category WHERE parent_id=ffdac25a-0244-4894-bb31-a0884bc82aa9;

 name             | category_id                          | products
------------------+--------------------------------------+----------
         Clothing | 18105592-77aa-4469-8556-833b419dacf4 |     null
       Wall Decor | 591bf485-de09-4b46-8fd2-5d9dc7ca101e |     null
 Tech Accessories | 5929e846-53e8-473e-8525-80b666c46a83 |     null
    Cups and Mugs | 675cf3a2-2752-4de7-ae2e-849471c29f51 |     null
```

Service Endpoint – Category

Astra DB

Navigation example:

2nd-level parent_id for “Clothing”:

18105592-77aa-4469-8556-833b419dacf4

```
> SELECT name,category_id,products FROM category WHERE parent_id=18105592-77aa-4469-8556-833b419dacf4;

 name     | category_id                          | products
----------+--------------------------------------+----------
  Hoodies | 6a4d86aa-ceb5-4c6f-b9b9-80e9a8c58ad1 |     null
 T-Shirts | 91455473-212e-4c6e-8bec-1da06779ae10 |     null
  Jackets | d887b049-d16c-46e1-8c94-0a1280dedc30 |     null
```

Service Endpoint – Category

Astra DB

Navigation example:

3rd-level parent_id for “Hoodies”:

6a4d86aa-ceb5-4c6f-b9b9-80e9a8c58ad1

```
SELECT name, category_id, products FROm category WHERe parent_id=6a4d86aa-ceb5-4c6f-b9b9-80e9a8c58ad1;

 name                             | category_id                          | products
----------------------------------+--------------------------------------+-----------------------------------------------
 DataStax Vintage 2015 MVP Hoodie | 86d234a4-6b97-476c-ada8-efb344d39743 | ['DSH915S', 'DSH915M', 'DSH915L', 'DSH915XL']
            DataStax Black Hoodie | b9bed3c0-0a76-44ea-bce6-f5f21611a3f1 | ['DSH916S', 'DSH916M', 'DSH916L', 'DSH916XL']
```

Service Endpoint – Product

Astra DB

Product

Service Endpoint – Product

Astra DB

Product example:

```
 product_id | brand    | images        | linked_documents | long_desc
| model_number | name                                      | product_group | short_desc
| specifications

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

   DSA1121L | DataStax | {'apc30.jpg'} |             null | Given out at the internal summit, show how proud you are to
talk about the world's best multi-region, multi-cloud, serverless database! |      DSA1121 | DataStax Astra "One Team"
Long Sleeve Tee |       DSA1121 | DataStax Astra "One Team" Long Sleeve Tee - Large | {'color': 'black', 'material':
'cotton, polyester', 'size': 'Large'}
```

Application

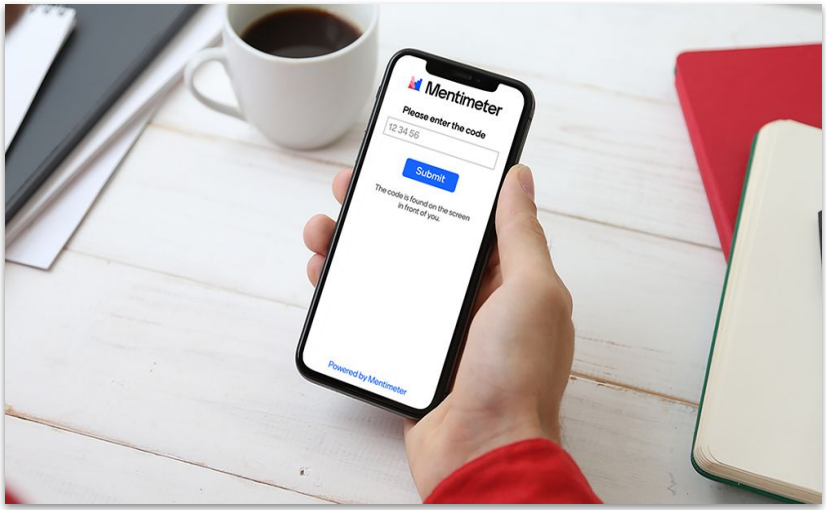
Astra DB

Jump to README step #6

https://github.com/datastaxdevs/workshop-ecommerce-app#6-setup-your-application

Quiz Time – Menti.com

Astra DB

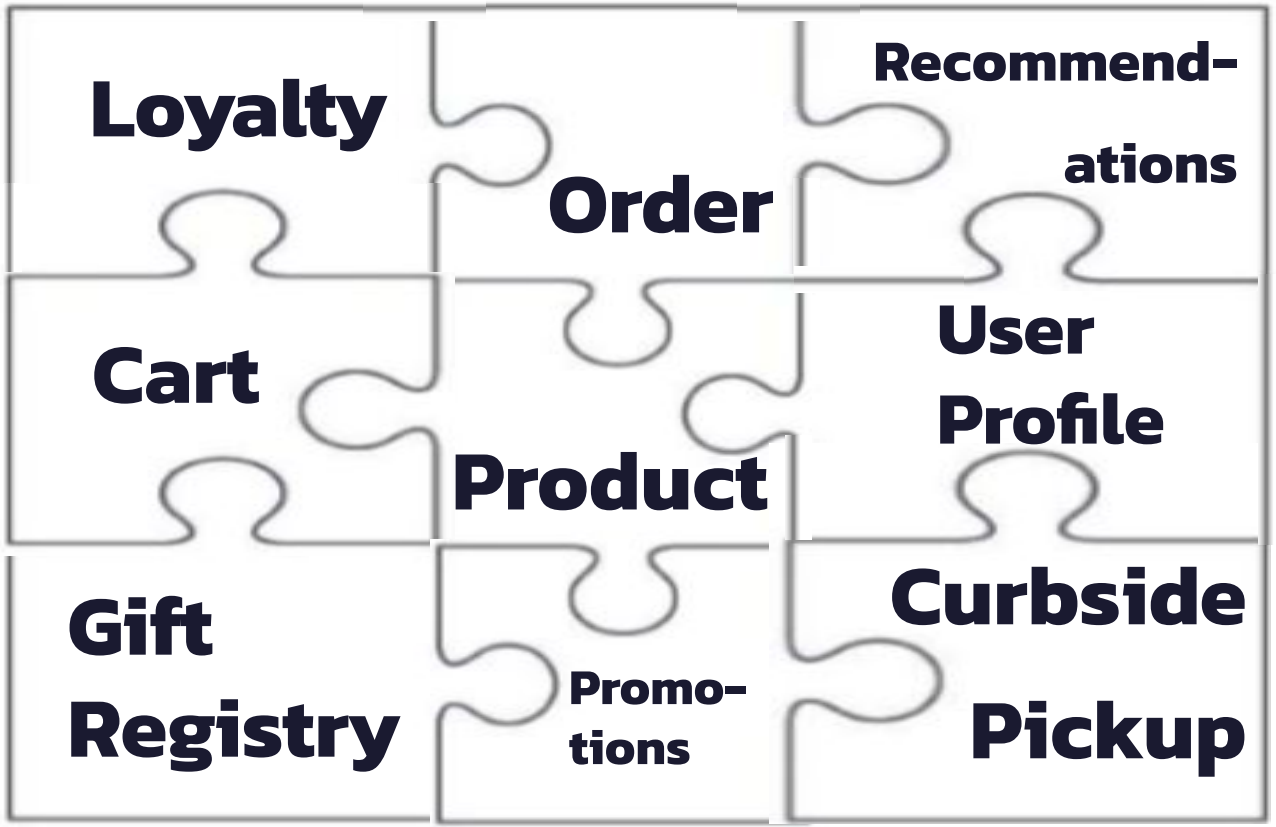


Mentimeter

GET IT ON Google play

Use Cases – Ecommerce Subsystems

Astra DB



DataStax

Thank You!