

Developers

Connecting to Astra DB in iOS app

Building efficient IOS applications in Swift that connect to Astra



01



Intro - What are we doing?

02

Prerequisites

03

Core Workshop -
Connecting to Astra in
Swift

04

Completed App - Demo

05

Takeaways

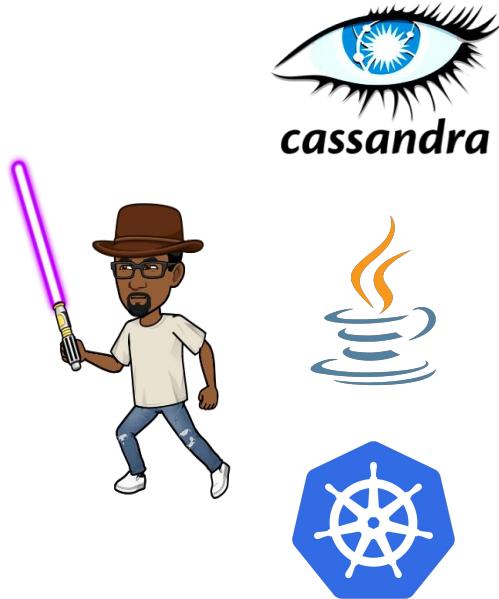
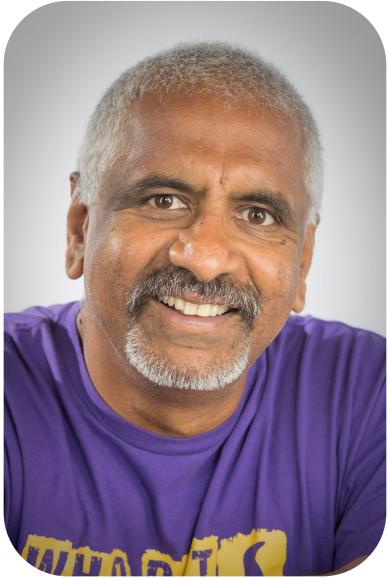
06

SWAG



Agenda

Developer Advocate



- Developer/Architect
- Mechanical Engineer (so many moons ago)
- Distributed systems
- Love to teach and communicate
- Inner loop == developer productivity



Raghavan "Rags" Srinivas



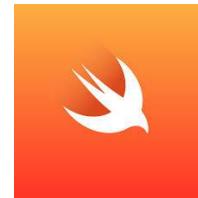
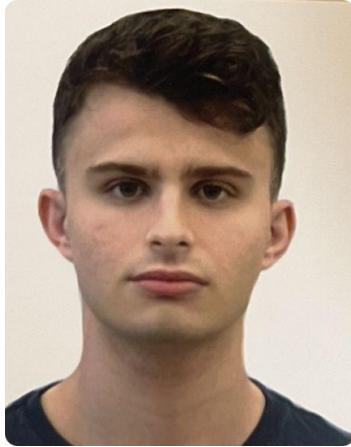
@rags



@ragsns



@ragss

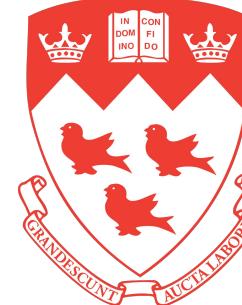


@victor-micha



@vmic2002

- Developer Relations * Software Engineering Intern
- Entering 3rd year Major in Software Engineering at McGill University



Victor Micha

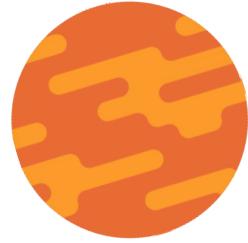
The screenshot shows the DataStax Academy course page for DS220. At the top, it says "Course Content" and "Introduction". Below that, there are three sections: "Data Modeling Overview", "Data Modeling Overview Quiz", and "Relational Vs. Apache Cassandra". Each section has a "Start" button. To the right, there's a progress bar showing "Not Started 0/56" and a circular progress indicator at 0%. Below the progress bar are sections for "Badges" and "Competencies".

The screenshot shows the DataStax /dev learning series page for "Cassandra Fundamentals". It features a "GET STARTED" button and a list of topics: 01 Introduction to Apache Cassandra™, 02 Cassandra Query Language, 03 Keyspaces and Data Replication Strategies, 04 Tables with Single-Row Partitions, and 05 Tables with Multi-Row Partitions.

The screenshot shows a GitHub repository named "DataStax-Examples / todo-astra-jamstack-netlify". It displays a list of branches (master, 1.2, 1.3) and commits. One commit by "kidrecursive" is highlighted, showing updates to "functions", "public", and "src" folders. The repository also includes links to "astra.datastax.com/register" and "Readme".



DataStax Developers



S



Cedrick
Lunven



David
Dieruf



Rags
Srinivas



Artem
Chebotko



Stefano
Lottini



Aleksandr
Volochnev



Aaron
Ploetz



S



Jack
Fryer



Kirsten
Hunter



Gary
Harvey



Mary
Grygleski



Ryan
Welford



David
Gilardi



DataStax Developers Crew



Go to www.menti.com and use the code 3491 9972

Leaderboard

4821 p	spanda
4820 p	Agent X9
4775 p	fastest
4775 p	Sam
4711 p	CCedrickThePresenter
4468 p	shubham
4371 p	aaa
3895 p	vignesh
3877 p	adry
3861 p	Millie
3812 p	Puggie

2.11.07 / 2.26.05



Play with us with Menti.com (new TAB)

01



Intro - What are we doing?

02

Prerequisites

03

Core Workshop -
Connecting to Astra in
Swift

04

Completed App - Demo

05

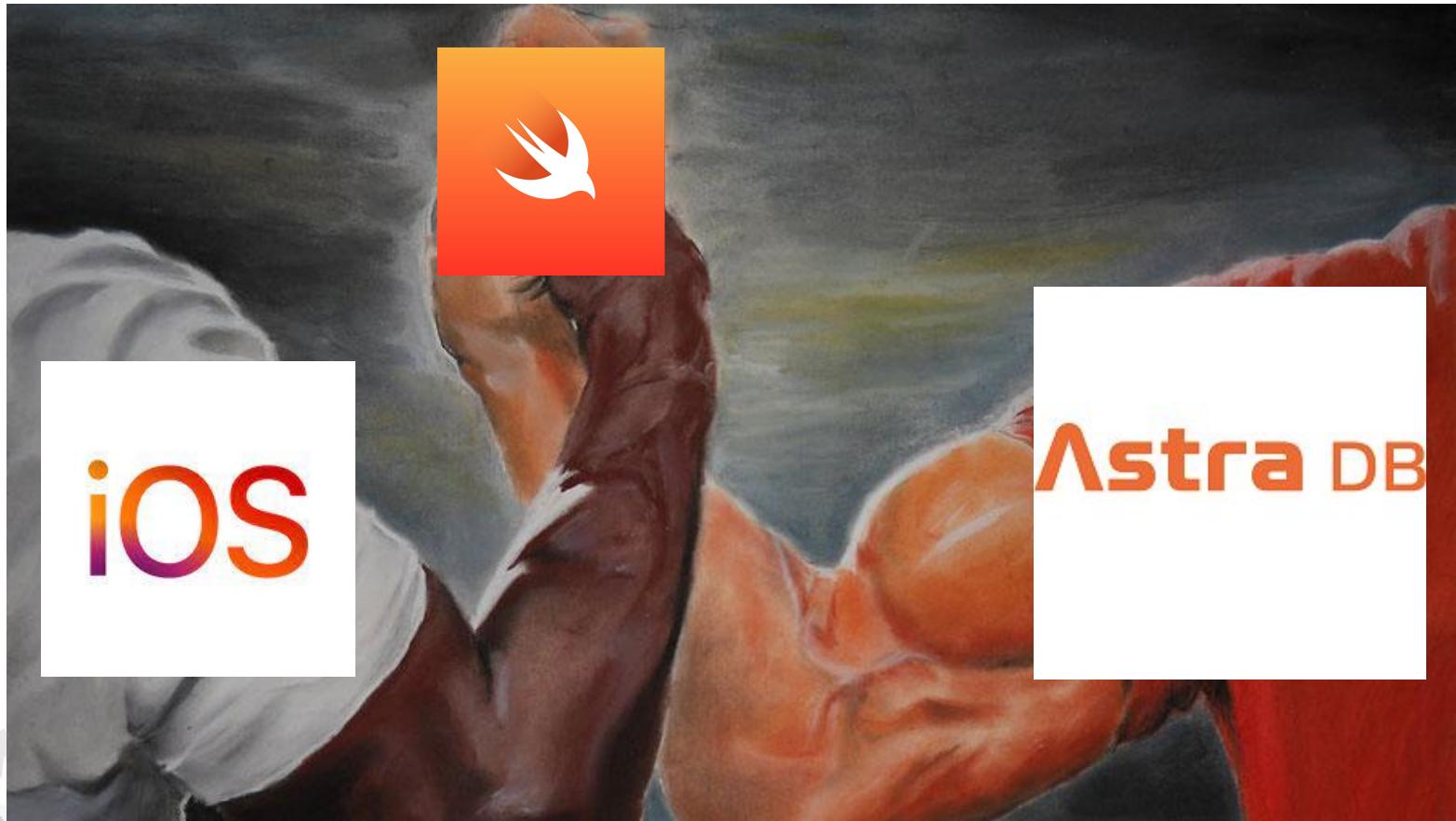
Takeaways

06

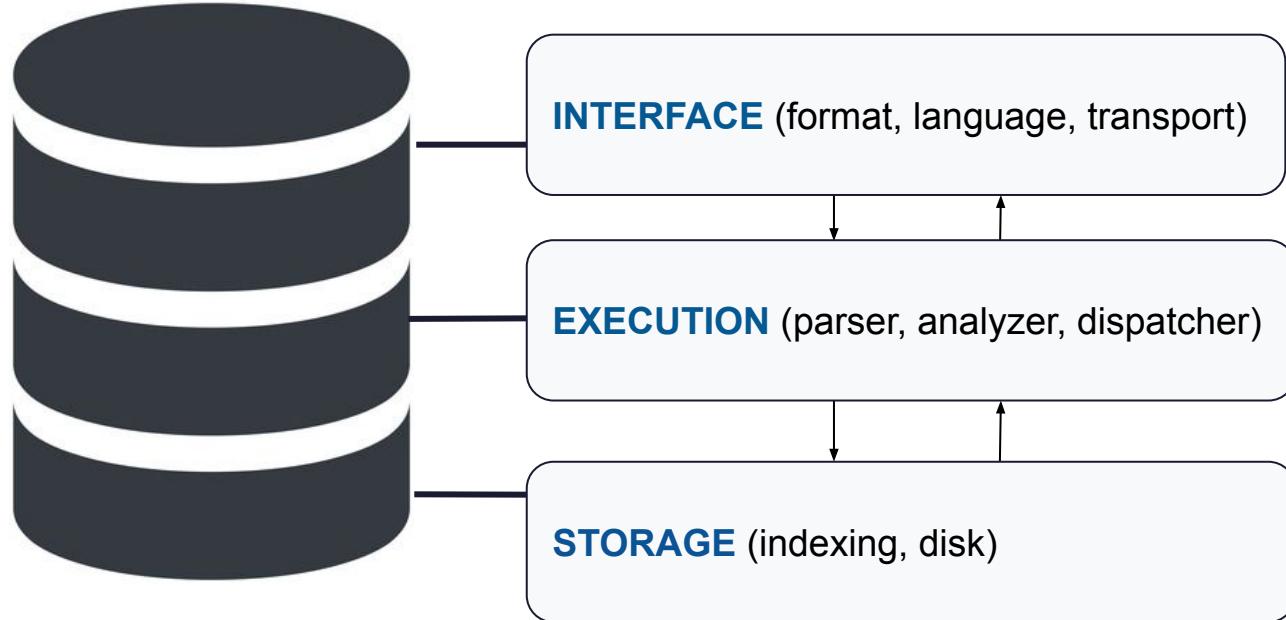
SWAG



Agenda

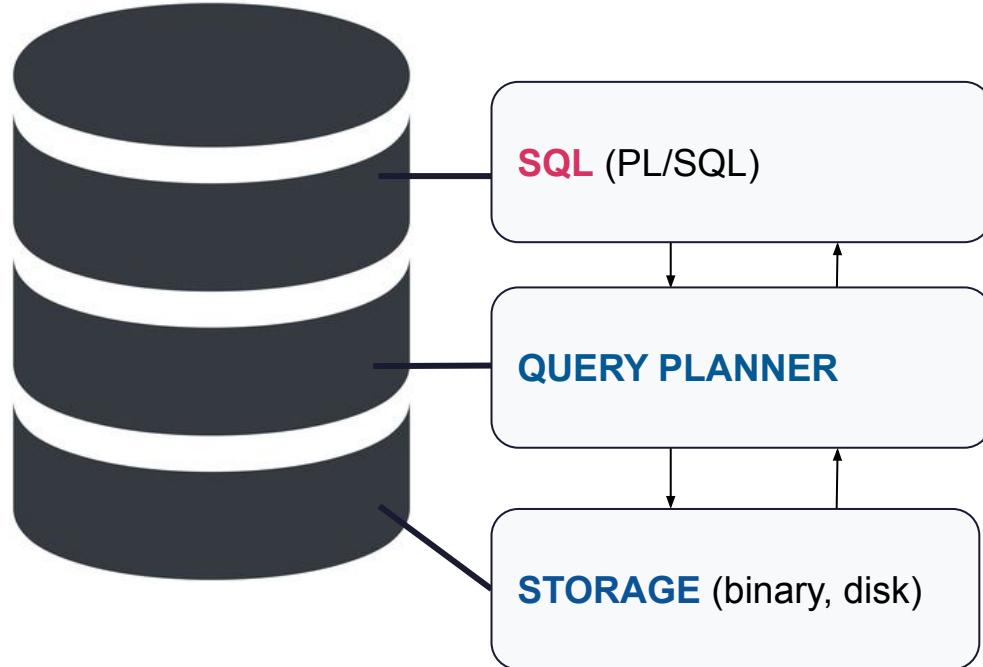


Objective



Introducing NoSQL





Introducing NoSQL

OLTP: Online Transaction Processing

Fast Processing
Transactional
High number of transactions
Hot / Live Data
“Row oriented”
Normalized Data (3NF)

OLAP: Online Analytical Processing

Slow Queries
Historical
High volume of data
Cold Data
“Column oriented”
Denormalized Data



Response Time



Volume of Data

Relational Databases are **versatile**

- They have been designed to run on a single machine

- New requirements

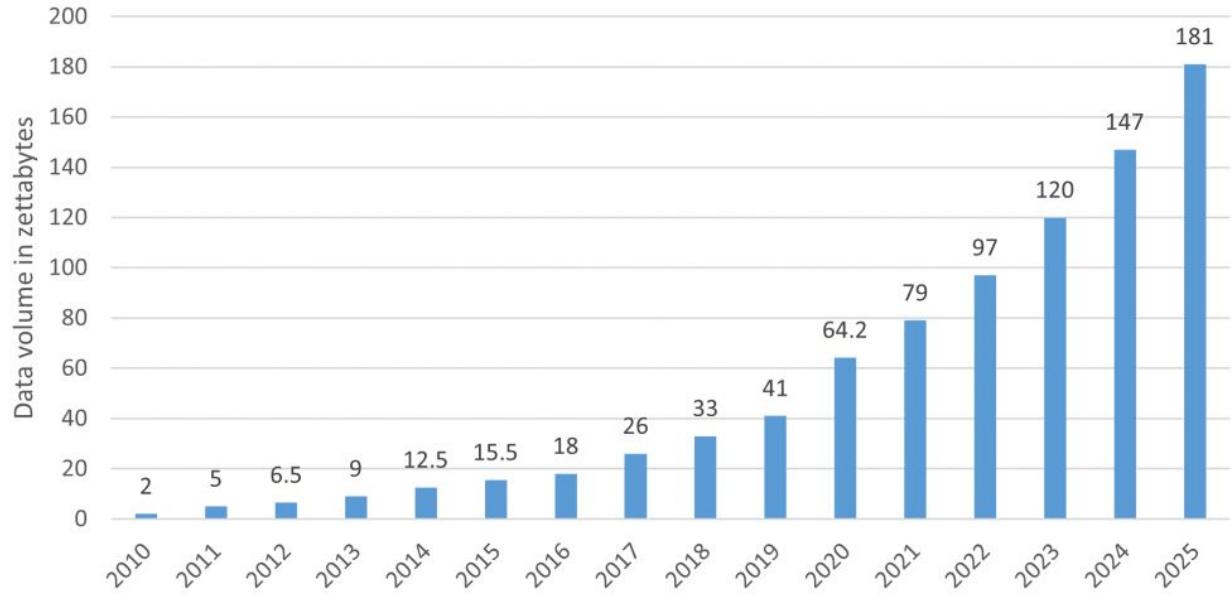
- V: VOLUME
- V: VELOCITY
- V: VARIETY

WHAT'S A ZETTABYTE?	
1 kilobyte	1,000 000,000,000,000,000,000
1 megabyte	1,000,000 000,000,000,000,000
1 gigabyte	1,000,000,000 000,000,000,000
1 terabyte	1,000,000,000,000 000,000,000
1 petabyte	1,000,000,000,000,000 000,000
1 exabyte	1,000,000,000,000,000,000,000
1 zettabyte	1,000,000,000,000,000,000,000,000

SOURCE: CISCO



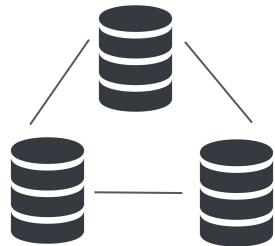
Volume of data created and replicated worldwide (source: IDC)



Relation Databases have **limited scalability**



- Meetup names on June 11, 2009 in San Francisco
- Web Giants needed more scalable systems
 - Distributed by design (horizontal scalability)
 - Data is replicated
 - Cope with the variety of data



NoSQL

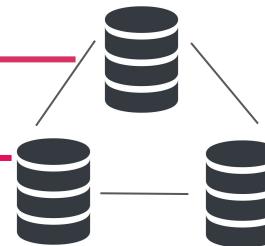
The text "NoSQL" is displayed in a large, stylized font. The "N" and "O" are in red, while the "S", "Q", and "L" are in black. The "N" and "O" are stacked vertically, while the "S", "Q", and "L" are stacked horizontally to the right of them.

Introducing NoSQL

A white rectangular box containing the text "Introducing NoSQL" in a dark grey sans-serif font.

AP vs CP (CA = not distributed)

Server vs VM vs Container vs Cloud



SQL or JSON or CQL or N1QL or Cypher...

Query Parser and execution engine

Text, Binary, Graph

Ledger Databases

awsqldb, ksql_db

Time-Series Databases

Influx, OpenTSDB, Prometheus

Tabular Databases

Cassandra, Hbase, Bigtable

Object Databases

S3, Minio, Ceph

Document Databases

MongoDB, Elastic, DocDb

Graph Databases

Neo4j, Datastax Graph, Titan

Key/Value Databases

Redis, Dynamo, Memcache

DataStax

DataStax Developers

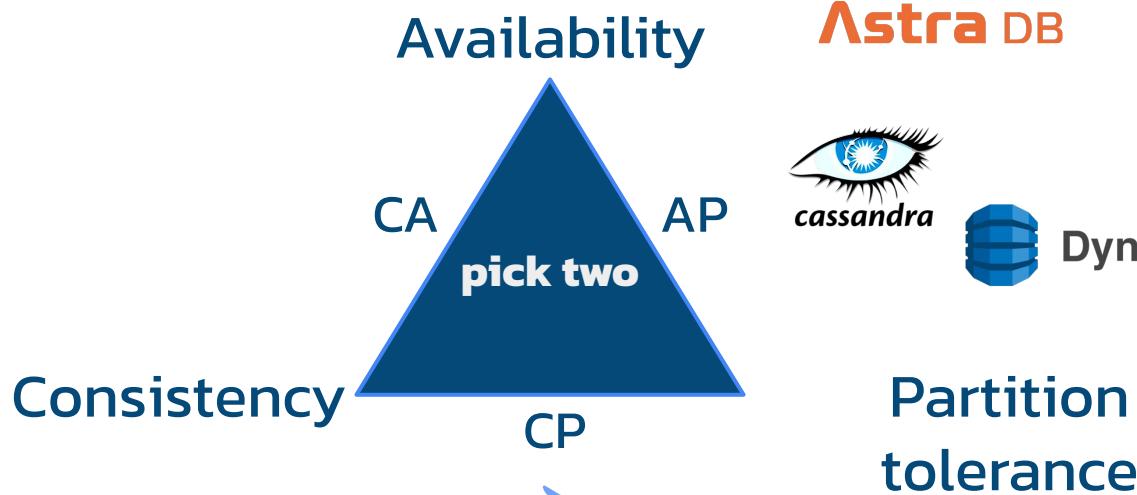
NoSQL Databases

sky

Origin of the term “NoSQL”

- Meetup name on June 11, 2009 in San Francisco
 - Catchy hashtag intended to refer to databases like BigTable and DynamoDB
 - Meetup presentations: Cassandra, MongoDB, CouchDB, HBase, Voldemort, Dynomite, and Hypertable
- Sometimes referred to “Not only SQL”

The CAP Theorem



mongoDB®



redis



BigTable



APACHE
HBASE



Couchbase

17

DataStax Developers



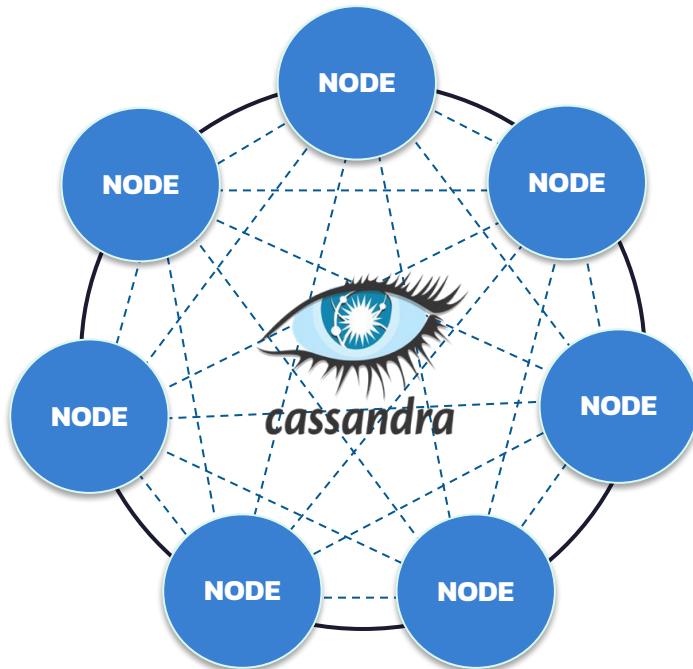
Apache Cassandra

NoSQL Distributed Decentralised Database Management System



- Big Data Ready
- Read / Write Performance
- Linear Scalability
- Highest Availability
- Self-Healing and Automation
- Geographical Distribution
- Platform Agnostic
- Vendor Independent



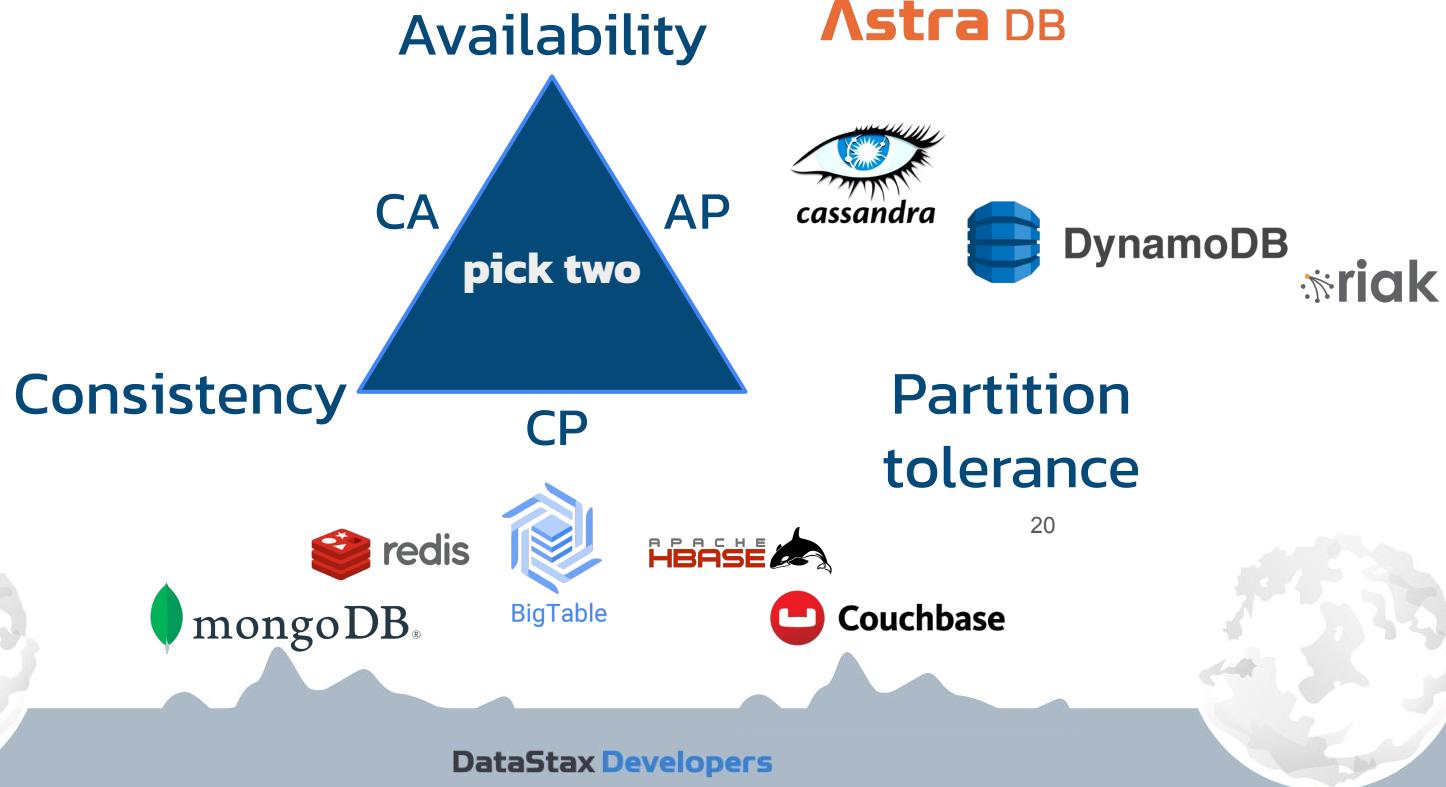


1. NO Single Point of Failure
2. Scales for writes and reads
3. Application can contact any node
(in case of failure - just contact next one)



Master-less (Peer-to-Peer) Architecture

The CAP Theorem



Apache Cassandra @ Netflix

- . 98% of streaming data is stored in Apache Cassandra
- . Data ranges from customer details to viewing history to billing and payments
- . Foundational datastore for serving millions of operations per second

- 30 million ops/sec on most active single cluster
- 500 TB most dense single cluster
- 9216 CPUs in biggest cluster

O(100) Clusters
O(10000) Instances
O(10,000,000) Replications per second
O(100,000,000) Operations per second
O(1,000,000,000,000,000) Petabytes of data

dtsx.io/cassandra-at-netflix

Apple Scale

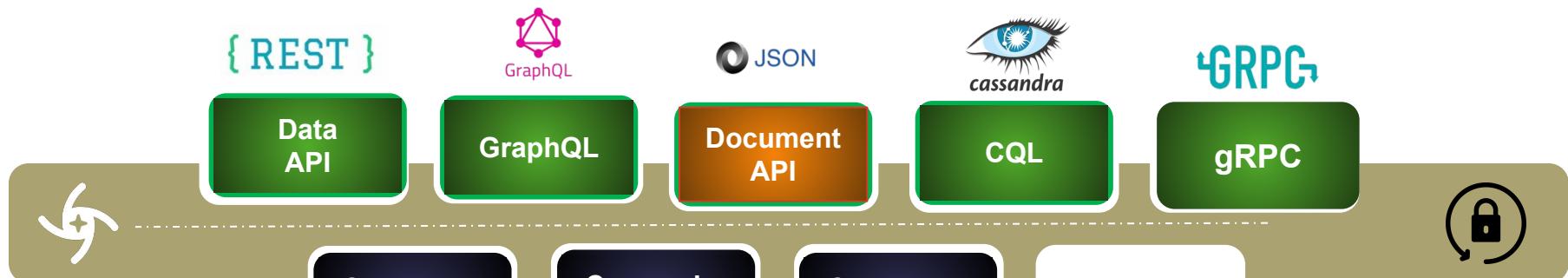
- 160K+ Apache Cassandra instances
- 100+ PB stored
- Several million ops / sec
- 1000s of clusters

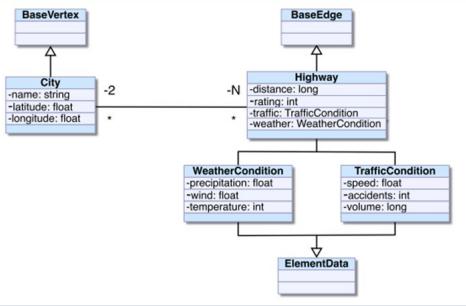


And many others...



Cassandra Biggest Users (and Developers)





- Cassandra already handles both **JSON** and **nested objects**
 - INSERT JSON, SELECT JSON
 - Set<>, List<>, Map<>, and User Defined type (UDT) even nested
- But...
 - Strongly coupled with a [SCHEMA VALIDATION](#)
 - Dangerous with [tombstones](#) on updates

```
select json title,url,tags from videos;
```

```

INSERT INTO videos JSON '{
    "videoid": "e466f561-4ea4-4eb7-8dcc-126e0fbfd578",
    "email": "clunven@sample.com",
    "title": "A JSON videos",
    "upload": "2020-02-26 15:09:22 +00:00",
    "url": "http://google.fr",
    "frames": [1,2,3,4],
    "tags": ["cassandra", "accelerate", "2020"]
}';
  
```



“What rules ?”

- You want to insert and retrieve any JSON documents efficiently
- Allow “schemaless” (Validation less)
- Write to a single document is a single batch of statements
- Read from a single document is a single SELECT statement.
- Limit Tombstones with range deletes



Schemaless





Swagger

powered by SMARTBEAR

/swagger.json

Explore

documents

GET /v2/namespaces/{namespace-id}/collections List collections in namespace**POST** /v2/namespaces/{namespace-id}/collections Create a new empty collection in a namespace**GET** /v2/namespaces/{namespace-id}/collections/{collection-id} Search documents in a collection**POST** /v2/namespaces/{namespace-id}/collections/{collection-id} Create a new document**DELETE** /v2/namespaces/{namespace-id}/collections/{collection-id} Delete a collection in a namespace**POST** /v2/namespaces/{namespace-id}/collections/{collection-id}/upgrade Upgrade a collection in a namespace**POST** /v2/namespaces/{namespace-id}/collections/{collection-id}/batch Write multiple documents in one request**GET** /v2/namespaces/{namespace-id}/collections/{collection-id}/{document-id} Get a document**PUT** /v2/namespaces/{namespace-id}/collections/{collection-id}/{document-id} Create or update a document with the provided document-id**DELETE** /v2/namespaces/{namespace-id}/collections/{collection-id}/{document-id} Delete a document**PATCH** /v2/namespaces/{namespace-id}/collections/{collection-id}/{document-id} Update data at the root of a document**GET** /v2/namespaces/{namespace-id}/collections/{collection-id}/{document-id}/{document-path} Get a path in a document**PUT** /v2/namespaces/{namespace-id}/collections/{collection-id}/{document-id}/{document-path} Replace data at a path in a document**DELETE** /v2/namespaces/{namespace-id}/collections/{collection-id}/{document-id}/{document-path} Delete a path in a document**PATCH** /v2/namespaces/{namespace-id}/collections/{collection-id}/{document-id}/{document-path} Update data at a path in a document**GET** /v2/namespaces/{namespace-id}/collections/{collection-id}/json-schema Get a JSON schema from a collection

- Schemaless! (validationless)
- Add any JSON document to a collection
- Uses “Document shredding” approach

Because we are sick of Mongo

Document Oriented
Apis like a Champ`

O RLY?

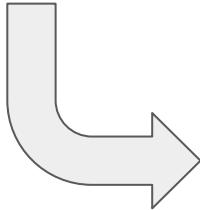
A frontend guy

Stargate Document API

```
create table <name> (
    key text,
    p0 text,
    ... p[N] text,
    bool_value boolean,
    txt_value text, d
    dbl_value double, leaf text
)
```

```
{"a": { "b": 1 }, "c": 2}
```

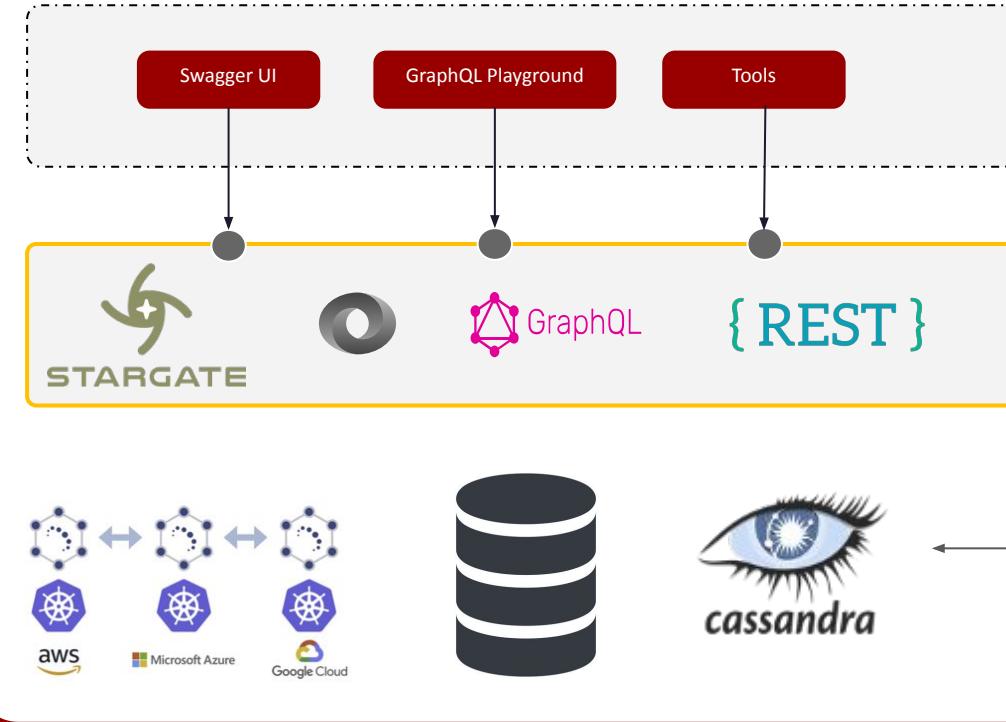
The document would be “shredded” into rows looking like this:



key	p0	p1	dbl_value
x	a	b	1
x	c	null	2



Document Shredding



Astra = Cassandra + Stargate in SaaS



About the app



Keyspace: "gh_orders_userinfo"

Collection: "userInfo"

```
{  
  "userName":"user1",  
  "password":"password1"  
}
```

```
{  
  "userName":"user2",  
  "password":"password2"  
}
```

```
{  
  "userName":"user3",  
  "password":"password3"  
}
```

```
{  
  "userName":"user4",  
  "password":"password4"  
}
```

Collection: "orders"

```
{  
  "userName":"user1",  
  "receipt": [  
    {"price":10.2, "users":["user1", "user2"]}  
  ],  
  "time":"6/27/2022, 2:04 PM",  
  "paid":false  
}
```

```
{  
  "userName":"user2",  
  "receipt": [  
    {"price":4.5, "users":["user2", "user3"]}  
  ],  
  "time":"7/27/2022, 5:24 PM",  
  "paid":false  
}
```



Intro to Document API



01



Intro - What are we doing?

02

Prerequisites

03

Core Workshop -
Connecting to Astra in
Swift

04

Completed App - Demo

05

Takeaways

06

SWAG



Agenda

Download Xcode and create Astra DB

For more info see -> “Prerequisites” in repo:

<https://github.com/datastaxdevs/workshop-IOS-Swift-Astra#prerequisites>



Prerequisites



Create collections “userInfo” and “orders”

For more info see -> “Now you should create your own collection using swagger ui” in repo:

<https://github.com/datastaxdevs/workshop-IOS-Swift-Astra#now-you-should-create-your-own-collection-using-swagger-ui>



Intro to HTTP requests

For more info see -> “For beginners to databases” in repo:

[https://github.com/datastaxdevs/workshop-IOS-Swift-Astra#fo
r-beginners-to-databases](https://github.com/datastaxdevs/workshop-IOS-Swift-Astra#fo)



HTTP requests – cURL – Swift



01



Intro - What are we doing?

02

Prerequisites

03

Core Workshop -
Connecting to Astra in
Swift

04

Completed App - Demo

05

Takeaways

06

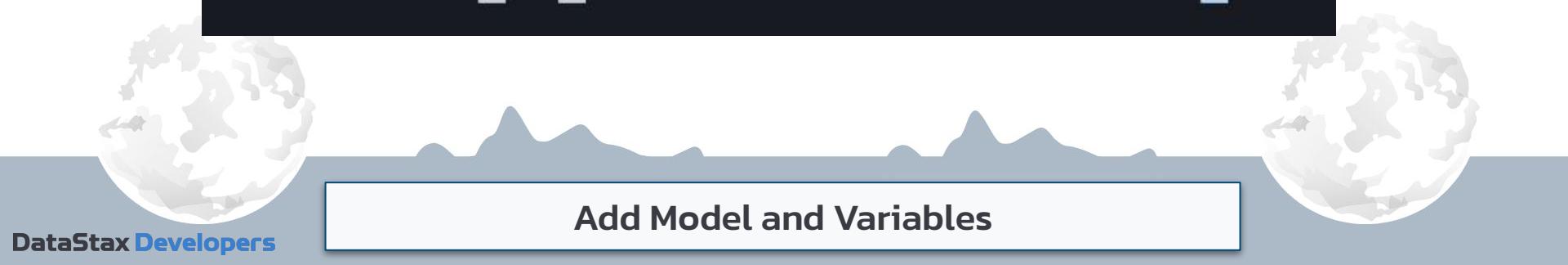
SWAG





Using Swift in Xcode

```
struct UserInfo : Codable {  
    let userName : String  
    let password : String  
}  
  
let ASTRA_DB_ID = "REPLACE_ME"  
let ASTRA_DB_TOKEN = "REPLACE_ME"  
let ASTRA_DB_REGION = "REPLACE_ME"  
let ASTRA_DB_KEYSPACENAME = "REPLACE_ME"
```



Add Model and Variables

```
func getURLRequest(httpMethod:String, endUrl:String) -> URLRequest{  
    //add code here  
}
```



Create `getURLRequest()` function



To POST an Order/UserInfo:

1. Encode an instance of an Order/UserInfo struct into an instance of the Data struct using an instance of the JSONEncoder class
2. Create instance of URLRequest struct and set the HTTP request info with the appropriate information (URL, HTTP headers, HTTP method)
3. Make the HTTP request to the server using the URLSession class, taking two parameters: the instance of URLRequest struct and the Data to POST
4. Ensure that the response code indicates a successful POST

To PATCH an Order/UserInfo:

- Same process as POST, except change HTTP method from POST to PATCH
- Encode a different struct which only encompasses the password, not the username



PATCH userInfo (change password)



To GET an Order/UserInfo:

1. Create instance of URLRequest struct and set the HTTP request info with the appropriate information (URL, HTTP headers, HTTP method)
2. Make the HTTP request to the server using the URLSession class, taking the instance of URLRequest struct as a parameter

-> A JSON string is returned: {"data": {"4890b95d-a27e-4259-9654-f524826d09ba": {"password": "pass", "userName": "vmic"}}}

-> We need to process this string to make it look like this:

```
{"4890b95d-a27e-4259-9654-f524826d09ba": {"password": "pass", "userName": "vmic"}}
```

-> Then convert it into a Dictionary or map where the keys are docIDs and the values are UserInfo/Order

```
"4890b95d-a27e-4259-9654-f524826d09ba" -> UserInfo(userName:"vmic", password:"pass")
```



GET order/userInfo according to userName



To DELETE a doc using the Document API, we need the docID

1. Create instance of URLRequest struct and set the HTTP request info with the appropriate information (URL, HTTP headers, HTTP method)
2. Make the HTTP request to the server using the URLSession class, taking the instance of URLRequest struct as a parameter
3. Ensure that the response code indicates a successful DELETE



DELETE order/userInfo



To GET all docs:

Perform GET request

If there is no page-state{

We are done

} else {

While there is a page-state {

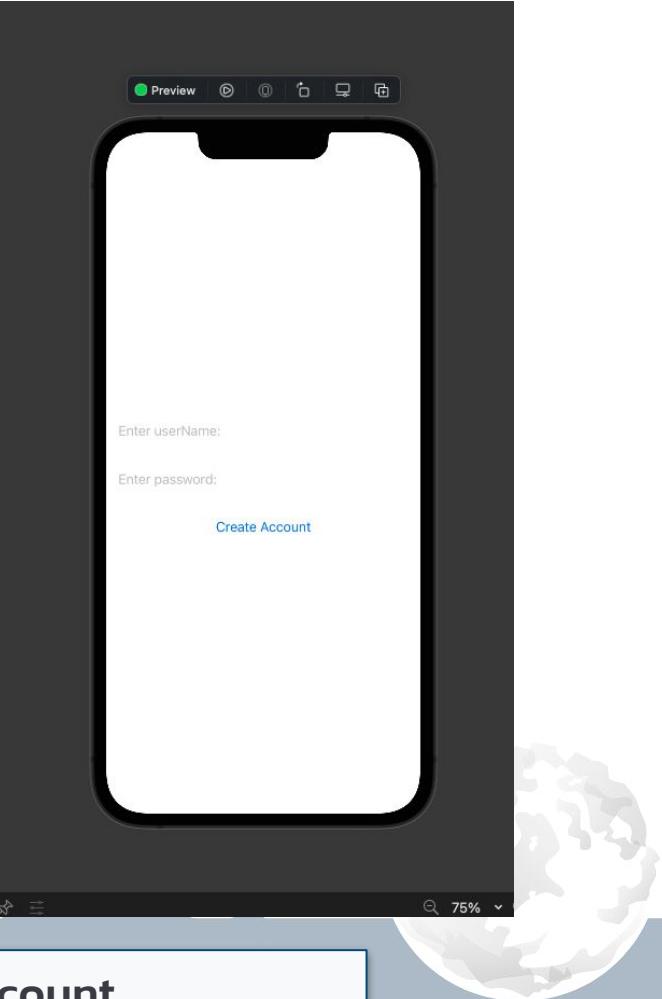
 Perform GET request with page-state from previous GET request

 Update page-state

}



```
1 //  
2 // ContentView.swift  
3 // GroupAccounting  
4 //  
5 // Created by Victor Michal on 8/5/22.  
6 //  
7  
8 import SwiftUI  
9  
10 struct ContentView: View {  
11     @State private var userName = ""  
12     @State private var password = ""  
13     var body: some View {  
14         VStack{  
15             TextField("Enter user Name:", text: $userName)  
16                 .padding(.all, 15)  
17             TextField("Enter password:", text: $password)  
18                 .padding(.all, 15)  
19             Button("Create Account"){  
20                 if (userName.isEmpty || password.isEmpty){  
21                     print("User Name and password cannot be empty!")  
22                     return  
23                 }  
24                 Task{  
25                     let dict = try await getUserInfo(userName: userName)  
26                     if (dict.count == 1){  
27                         print("Account already exists. Cannot create new one")  
28                         return  
29                     }  
30                     try await postUserInfo(userInfo: UserInfo(userName: userName,  
31                                         password: password))  
32                 }.padding(.all, 15)  
33             }  
34         }  
35     }  
36  
37 struct ContentView_Previews: PreviewProvider {  
38     static var previews: some View {  
39         ContentView()  
40     }  
41 }
```



Simple view to create account

01



Intro - What are we doing?

02

Prerequisites

03

Core Workshop -
Connecting to Astra in
Swift

04

Completed App - Demo

05

Takeaways

06

SWAG



Agenda

The screenshot shows the Xcode interface with the following details:

- Project Structure:** The left sidebar shows the project structure under "GroceryHandler".
- Main Storyboard:** The storyboard preview shows a sign-in screen titled "Welcome to GroceryHandler" with fields for "Username" and "Password", and buttons for "Sign in", "Create Account", "Delete Account", and "Change Password".
- Code View:** The right pane displays the `GroceryHandlerApp.swift` file, which defines the main application structure using SwiftUI.
- Output View:** The bottom pane shows the "All Output" tab with logs from July 20, 2022, including a warning about a primary keyboard device.

Demo of completed app

01



Intro - What are we doing?

02

Prerequisites

03

Core Workshop -
Connecting to Astra in
Swift

04

Completed App - Demo

05

Takeaways

06

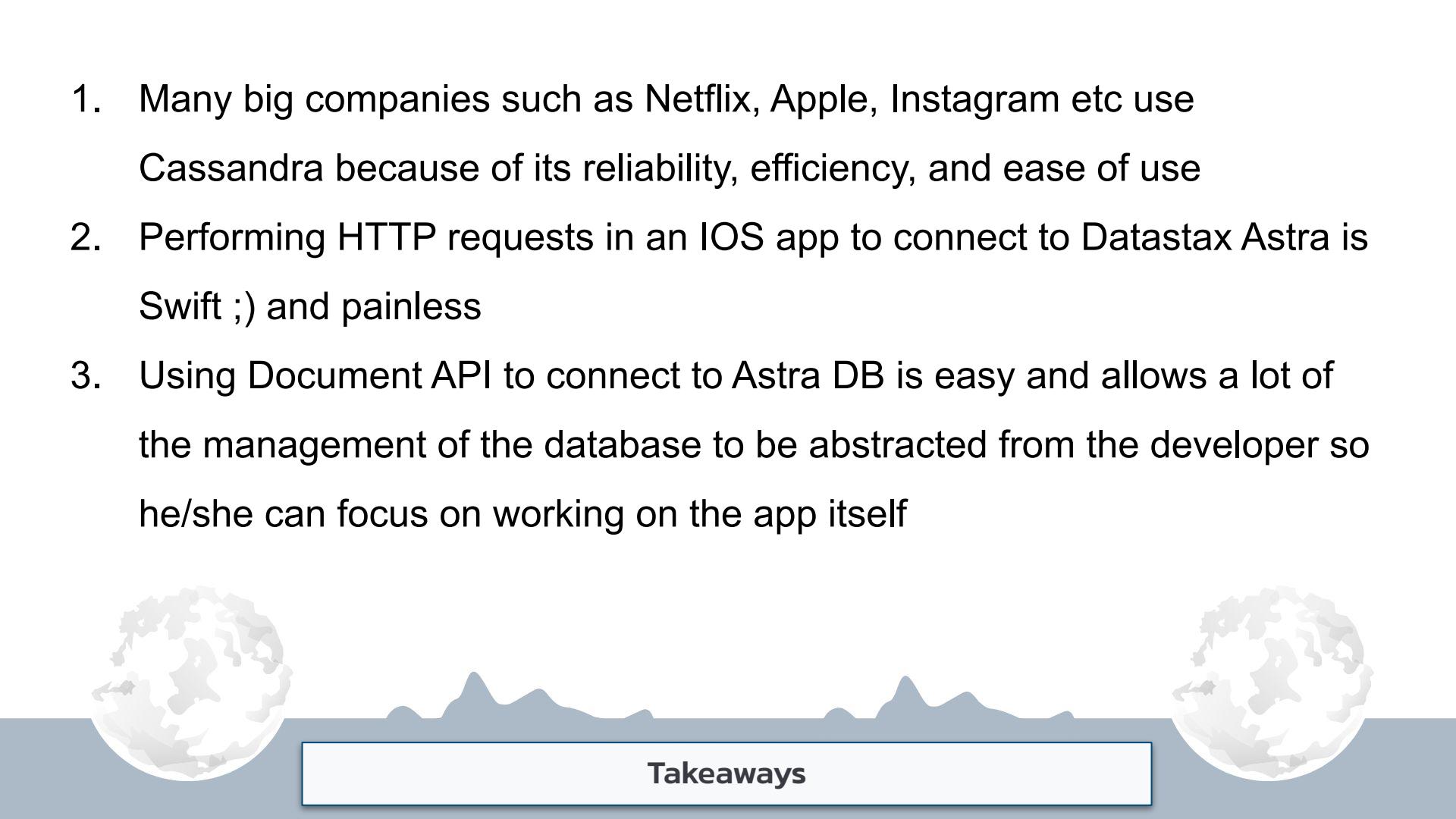
SWAG



Agenda



1. Many big companies such as Netflix, Apple, Instagram etc use Cassandra because of its reliability, efficiency, and ease of use
2. Performing HTTP requests in an IOS app to connect to Datastax Astra is Swift ;) and painless
3. Using Document API to connect to Astra DB is easy and allows a lot of the management of the database to be abstracted from the developer so he/she can focus on working on the app itself



Takeaways

01



Intro - What are we doing?

02

Prerequisites

03

Core Workshop -
Connecting to Astra in
Swift

04

Completed App - Demo

05

Takeaways

06

SWAG



Agenda

SWAG WINNERS



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

To claim your prize:

Take a screenshot of your Menti screen

Fill the form at dtsx.io/workshop-swag

A screenshot of a Google Forms survey titled "Workshop Swag". The form includes fields for "Email *", "Workshop date *", "Workshop name *", and a file upload field for "Your winning Menti screenshot *". Buttons for "Submit" and "Clear form" are at the bottom.



Swag Winners!



Join our 19k Discord Community

DataStax Developers



!discord

dtsx.io/discord

The screenshot shows the DataStax Developers Discord server interface. The left sidebar lists various channels: Événements, moderator-only, WELCOME, start-here, code-of-conduct, introductions, upcoming-events, useful-resources, memes, your-ideas, the-stage, WORKSHOPS, workshop-chat, workshop-feedback, workshop-materials, upcoming-workshops, ASTRADB, getting-started, astra-apis, astra-development, sample-applications, and APACHE CASSANDRA. The main window is the #workshop-chat channel, which contains a message from RIGGITYREKT about mixed DSE versions and another from Cedrick Lunven about removing analytics parameters. The right sidebar shows a list of presenters, helpers, and online members.

Discord Community



Astra Day San Francisco

August 24th 2022

3PM – 7PM

Register: bit.ly/SFAstraDB

Who should attend:

Sr Managers, IT Decision Makers, Architects, &
App/Dev Managers



AGENDA

- 2:30 - 3:00 Registration
- 3:00 - 3:30 Welcome + Why Real-Time Data Matters
- 3:30 - 4:30 How Astra DB Propels Digital Transformation + Product Demo
- 4:30 - 5:00 Customer Success Fireside Chat with Samar Abbas, CTO Temporal
- 5:15 - 5:30 Closing + Open Q&A
- 5:30 - 7:00 Reception (Open bar + hors d'oeuvre)

Who wants some SWAG?

It's time for some questions...



Thank You!

