

**DataStax**

DataStax

**Astra**



**QUARKUS**

# Workshop - Building Microservices with Cassandra & Quarkus

**Raghavan “Rags” Srinivas**, DataStax

Developer Advocate

**Daniel Oh**, Redhat

Technical Marketing

**Stefano Lottini** , DataStax

Developer Advocate



# Astra DB

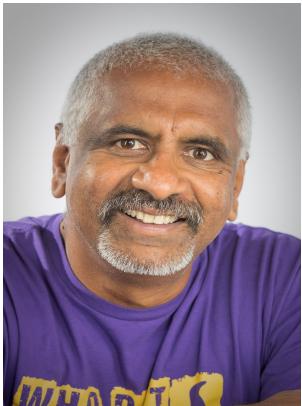
 STARGATE

The Stargate logo features a stylized, swirling orange and yellow icon resembling a star or a gate, positioned to the left of the word "STARGATE" in a bold, sans-serif font.

# DataStax



# Your presenters



**Raghavan Srinivas**  
Developer Advocate

*Apache Cassandra™ expert*

*All things distributed!*

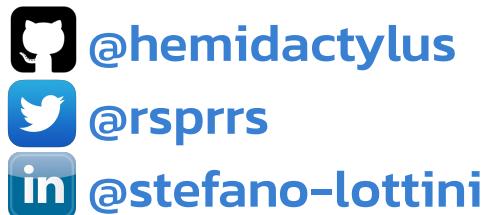
*Still working on simplifying  
the developer “inner loop!”*



**Stefano Lottini**  
Developer Advocate

*Apache Cassandra™ expert*

*Developer/architect*



# Special Guest(s)



## Daniel Oh

Senior Principal Technical Marketing Manager at Red Hat

*Cloud Native Runtimes (Quarkus, Spring, Node.js, Vert.x)*

*Serverless and Service Mesh Integration*

*CNCF and DevOps Institute Ambassador*



@danieloh30



@danieloh30



@daniel-oh-083818112



[bit.ly/danielohtv](https://bit.ly/danielohtv)

# DataStax Developers Advocates Team



Cedrick  
Lunven

Aleksandr  
Volochnev

Jack  
Fryer

Kirsten  
Hunter

Stefano  
Lottini

David  
Gilardi

Ryan  
Welford

Rags  
Srinivas

Sonia  
Siganporia

R

S

# Agenda

**01**

Quarkus

Why?  
How does it work?  
Use Cases

**02**

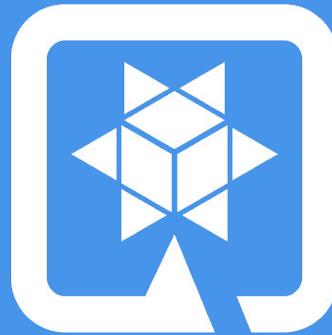
Astra

Serverless Cassandra on the cloud  
Quarkus Cassandra Extension

**03**

Hands-on

Deploy a Database  
Get started with Quarkus  
Build  
Swag



# QUARKUS

*SUPersonic, SUBatomic Java*



<https://quarkus.io>

# Java Designed for a Different Time



## Traditional

- **Throughput** at the expense of **footprint**
- **Long running** at expense of **startup speed**
- Rich, dynamic behaviour for mutable systems



## Cloud Native

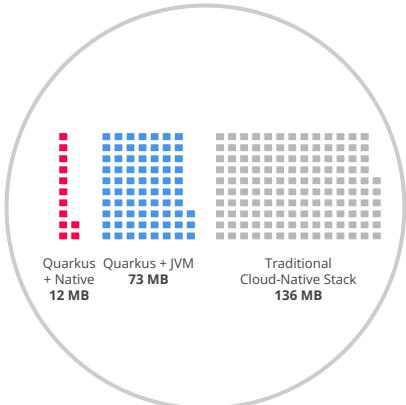
- **Throughput** solved by scaling
- **Ephemeral**, immutable systems
- Footprint and performance matter



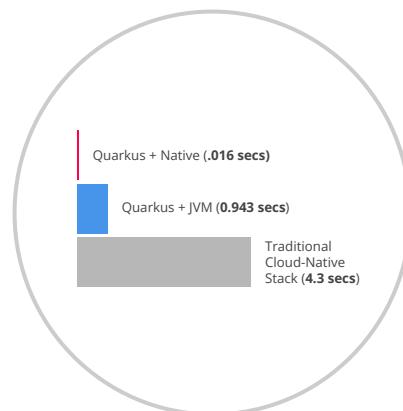
# Container First

"We went from **1-min** startup times to **400 milliseconds!**"

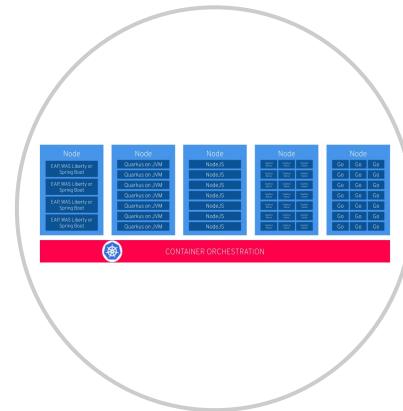
Reduced Memory Footprint



Fast Startup Time



Smaller Disk Footprint



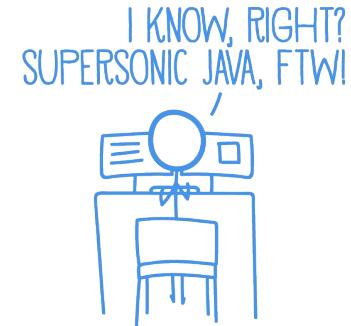
# Developer Joy

"Our developers used to wait **2 to 3 mins** to see their changes. **Live coding** does away with this!"

## A cohesive platform for optimized developer joy

- Based on standards
- Unified configuration
- Enhancing developer productivity
  - Zero-config [Live coding](#)
  - Developer services ([docs](#), [demo](#))
  - Continuous testing ([docs](#), [demo](#))
  - Dev UI ([docs](#), [demo](#))
  - CLI ([docs](#), [demo](#))
- Streamlined code for the 80% common usages
  - Flexible for the 20% uncommon
- No hassle native executable generation

WAIT.  
SO YOU JUST SAVE IT,  
AND YOUR CODE IS RUNNING?  
AND IT'S JAVA?!



I KNOW, RIGHT?  
SUPersonic Java, FTW!



# Unifies Imperative & Reactive

```
@Inject  
SayService say;
```

```
@GET  
@Produces(MediaType.TEXT_PLAIN)  
public String hello() {  
    return say.hello();  
}
```

```
@Inject @Channel("kafka")  
Publisher<String> reactiveSay;
```

```
@GET  
@Produces(MediaType.SERVER_SENT_EVENTS)  
public Publisher<String> stream() {  
    return reactiveSay;  
}
```

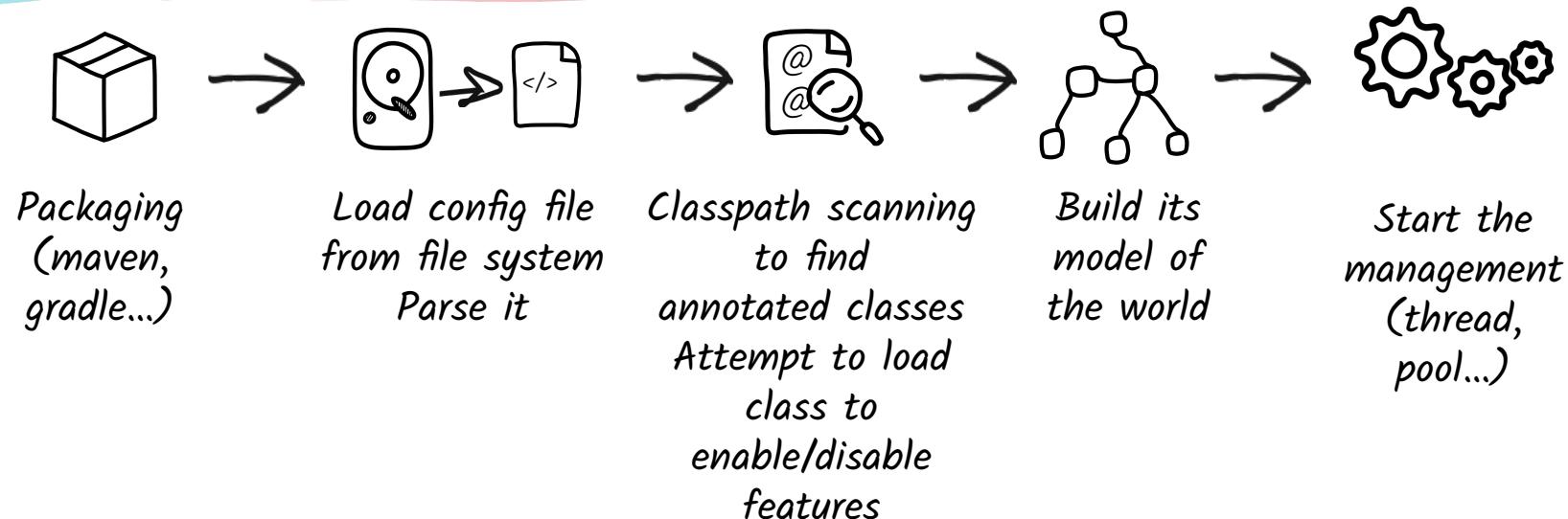
- Combine both reactive & imperative development within the same application
- Use the technology that fits your use case
- Key for reactive systems based on event driven applications



# How does a Typical Java Framework Work?

Build Time

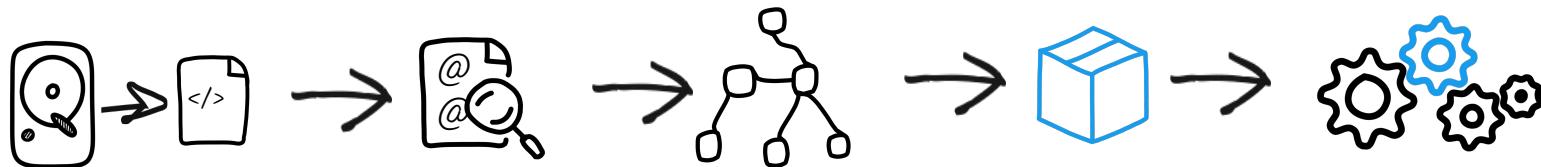
Runtime



# The Quarkus Way

*Build Time*

*Runtime*

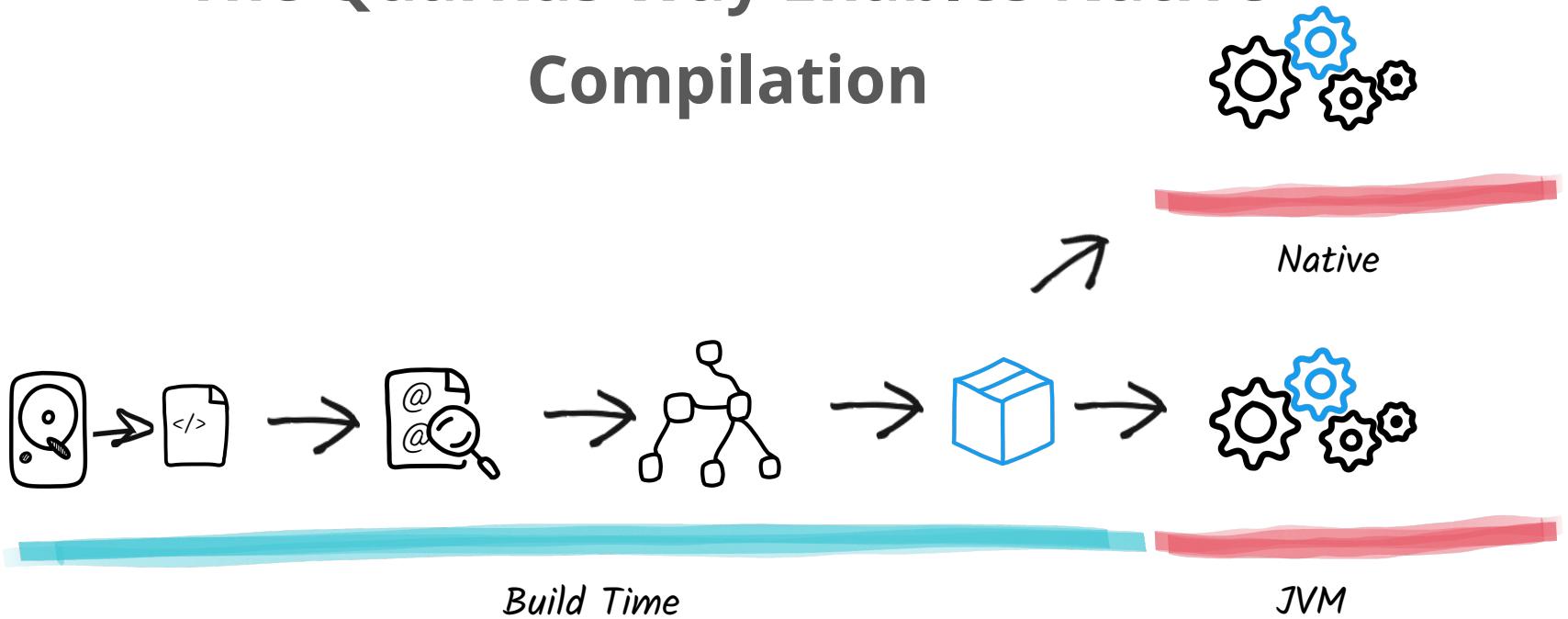


*Build Time*

*Runtime*

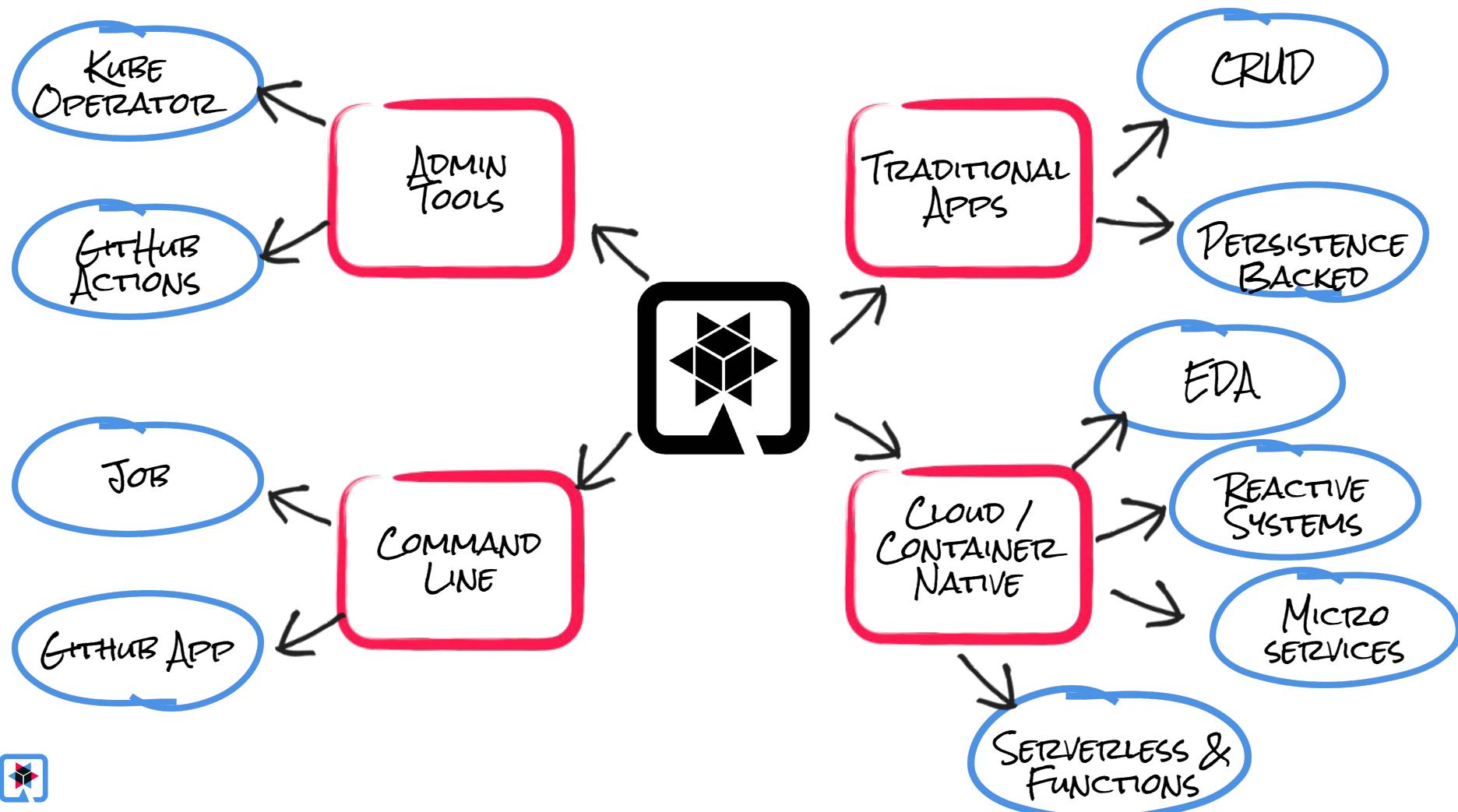


# The Quarkus Way Enables Native Compilation



IT'S  
STILL  
JAVA!





- Showcase & explain Quarkus, how it enables modern Java development & the Kubernetes-native experience
- Introduce familiar Spring concepts, constructs, & conventions and how they map to Quarkus
- Equivalent code examples between Quarkus and Spring as well as emphasis on testing patterns & practices
- Chapters devoted to
  - Why the need for Quarkus in the first place?
  - Getting started
  - RESTful applications
  - Persistence
  - Event-driven services
  - Cloud environments, containers, and Kubernetes



<https://red.ht/quarkus-spring-devs>

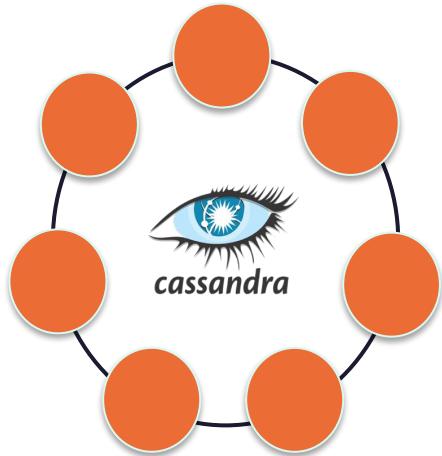


DataStax

# Astra

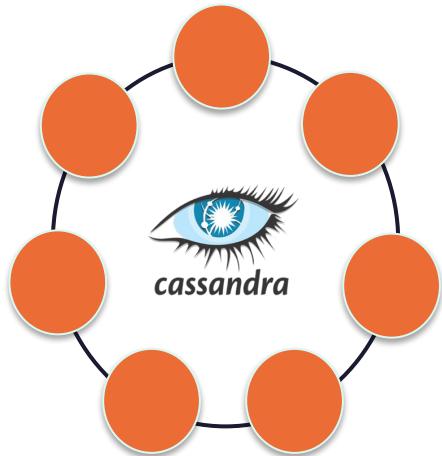
Serverless Cassandra on the cloud  
Cassandra Quarkus Extension

# Apache Cassandra™ = NoSQL Distributed Database



- World's Most Scalable Database
- Highest Availability
- Geographical Distribution
- Read/Write Performance
- Vendor Independent

# Data is Distributed

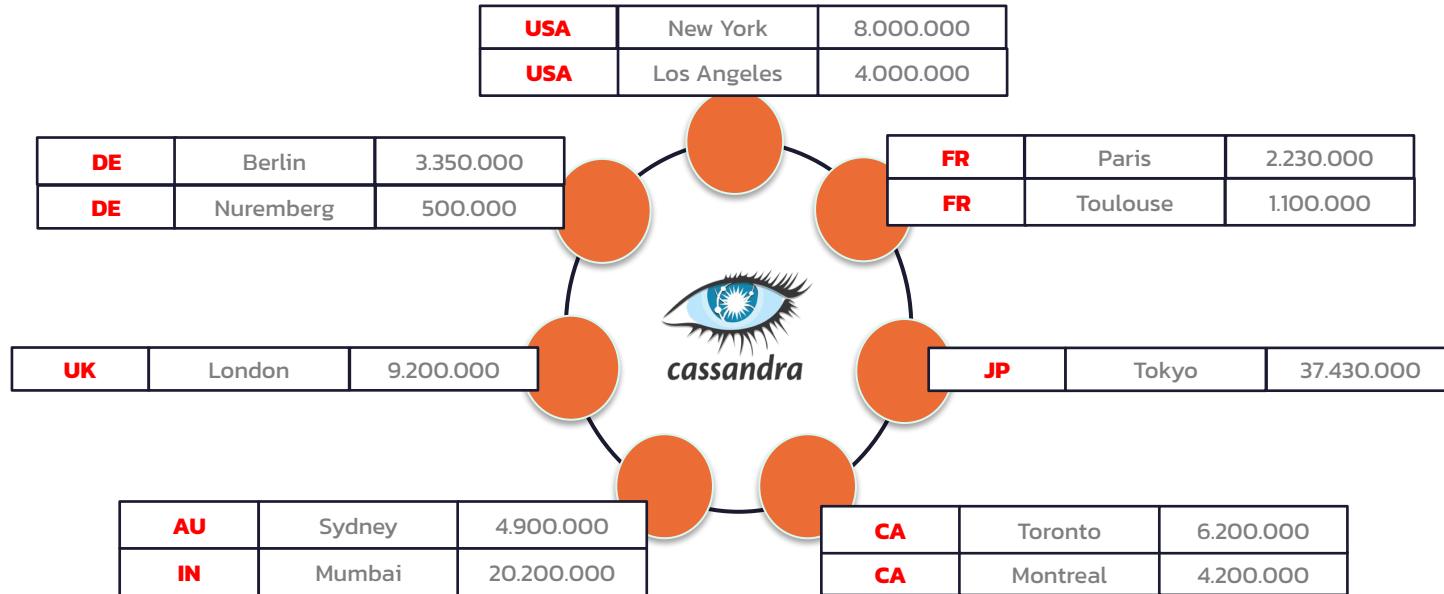


Country	City	Population
USA	New York	8.000.000
USA	Los Angeles	4.000.000
FR	Paris	2.230.000
DE	Berlin	3.350.000
UK	London	9.200.000
AU	Sydney	4.900.000
DE	Nuremberg	500.000
CA	Toronto	6.200.000
CA	Montreal	4.200.000
FR	Toulouse	1.100.000
JP	Tokyo	37.430.000
IN	Mumbai	20.200.000

*Partition Key*

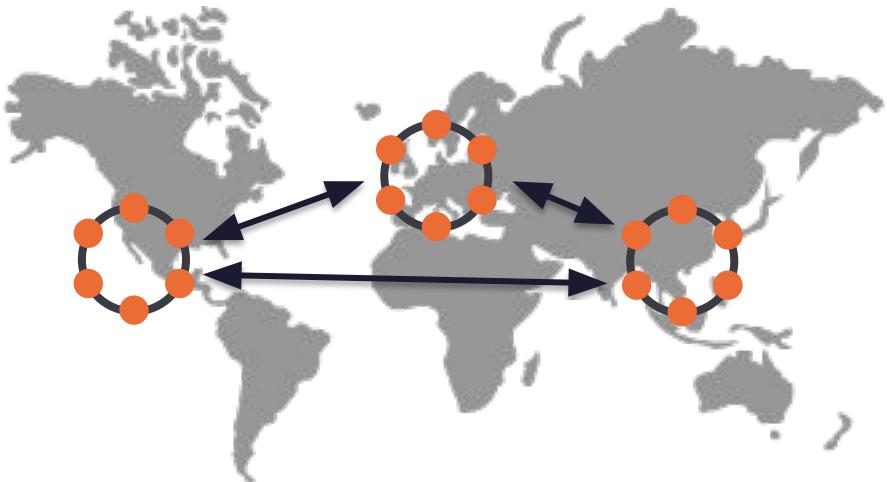
# Data is Distributed

Country	City	Population
---------	------	------------

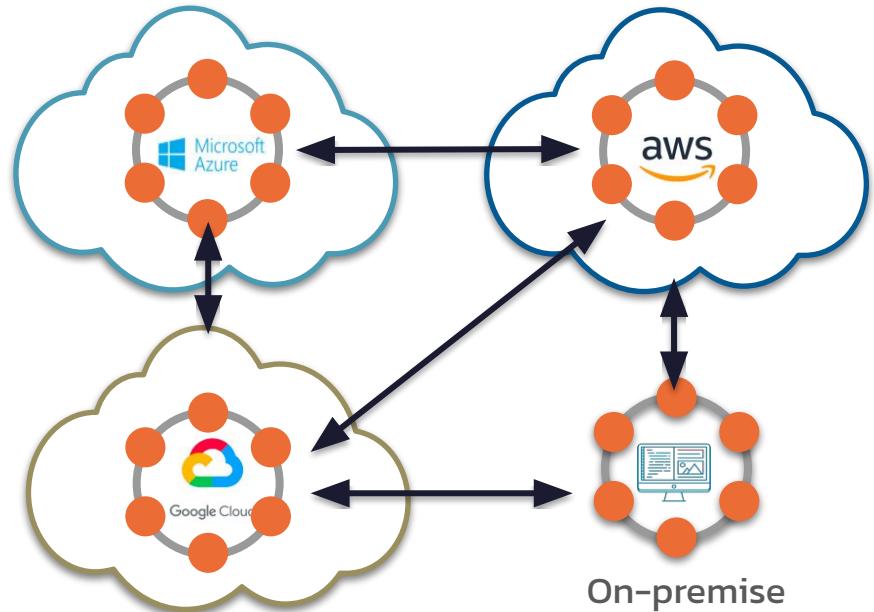


# Data Everywhere

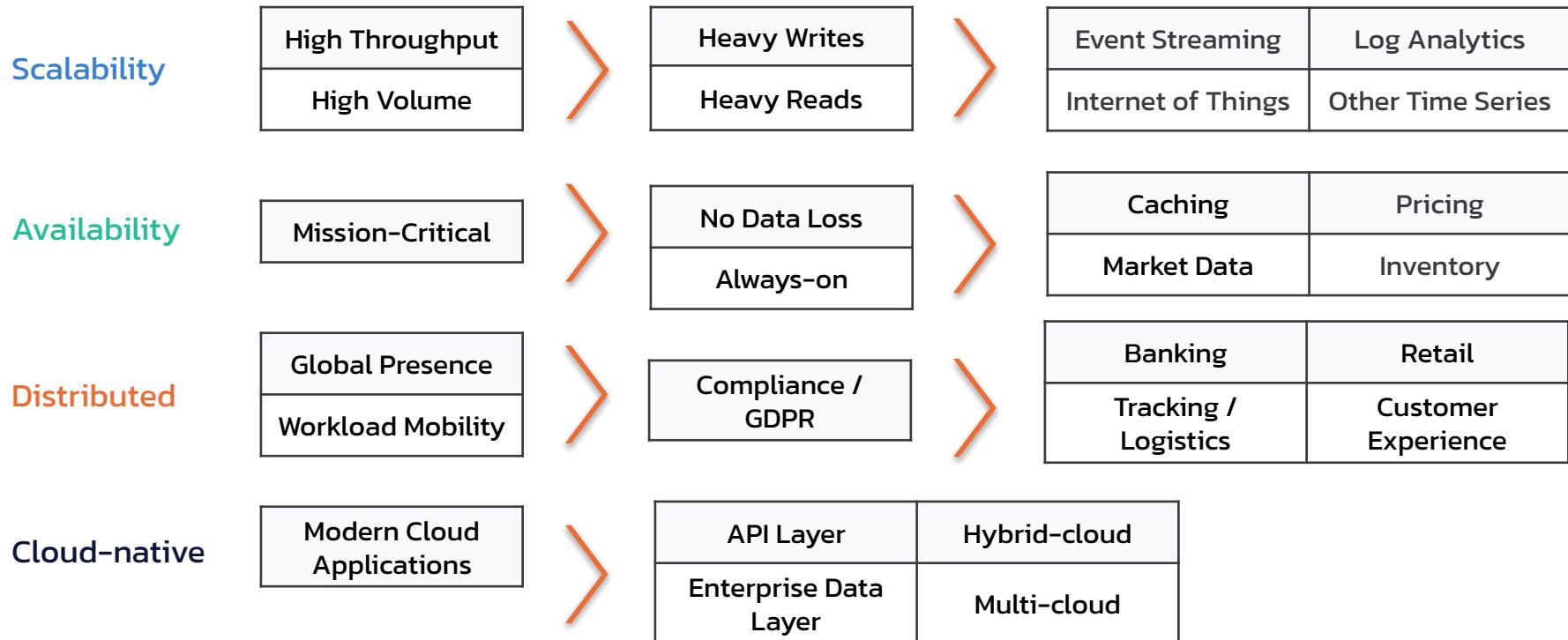
- Geographic Distribution



- Hybrid-Cloud and Multi-Cloud



# When do you use Cassandra?



# What is DataStax Astra: Cassandra Made Easy in the Cloud



## Cassandra-as-a-Service

Cloud-native  
Database-as-a-Service built  
on Apache Cassandra



## Serverless

Eliminate the overhead  
to install, operate, and  
scale Cassandra



## Powerful APIs

Out-of-the-box REST, Doc  
and GraphQL endpoints  
and browser CQL shell



## Cloud Native

Powered by our  
open-source Kubernetes  
Operator for Cassandra



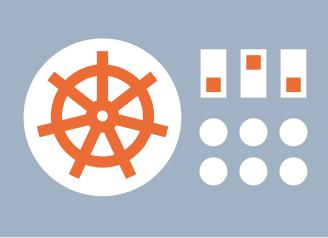
## Zero Lock-in

Deploy on AWS, Azure or GCP  
and  
keep compatibility with  
open-source Cassandra



## \$25 free per month

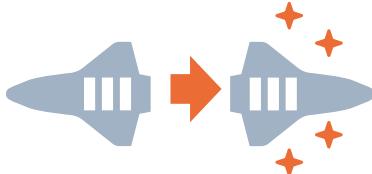
Launch a database in the  
cloud with a few clicks,  
no credit card required



# What is **Astra**

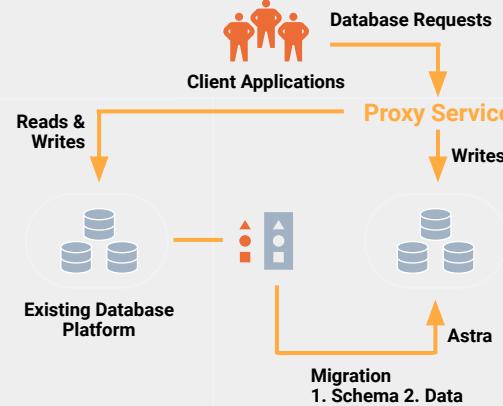
- Serverless, auto-scaling DBaaS
- Always the latest Cassandra OSS
- Auto-generated API endpoints
  - REST, Document API,  
GraphQL, CQL
- Separated storage and compute
- True cloud economics, i.e. priced based on:
  - Storage
  - Network Data Out
  - Read & Write Operations





# Astra Migrations

Zero downtime



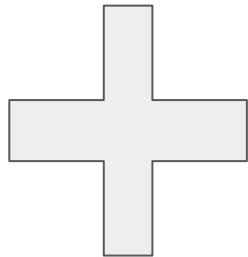
From any modern Cassandra version CloudGate proxy double writes for you. Only change your connection string, the proxy handles the hard stuff:

- Support for CQL protocol v2 and greater
- Routes reads go to origin cluster
- Routes writes to both clusters





QUARKUS



# Quarkus Cassandra Extension

- Native Quarkus Config
- Cassandra Driver Session Support
- Cassandra Driver Object Mapper Support
- Support for Mutiny Types (Reactive Types)
- Native Image Support
- Support for DataStax Astra (Cassandra DBaaS)

# Native Quarkus Config

```
quarkus.cassandra.cloud.secure-connect-bundle=/path/to/astra/bundle.zip  
quarkus.cassandra.keyspace=ks1
```

```
quarkus.cassandra.auth.username=alice  
quarkus.cassandra.auth.password=s3cr3t
```

```
quarkus.cassandra.request.timeout=5 seconds  
quarkus.cassandra.request.consistency-level=LOCAL_ONE  
quarkus.cassandra.request.page-size=1000
```

```
quarkus.cassandra.metrics.enabled=true  
quarkus.cassandra.health.enabled=true
```

# Cassandra Driver Session Support

```
@Inject QuarkusCqlSession session;
```

// But, but, but ... CQL is not reactive

# gRPC – the Cloud Native Way to Call CQL

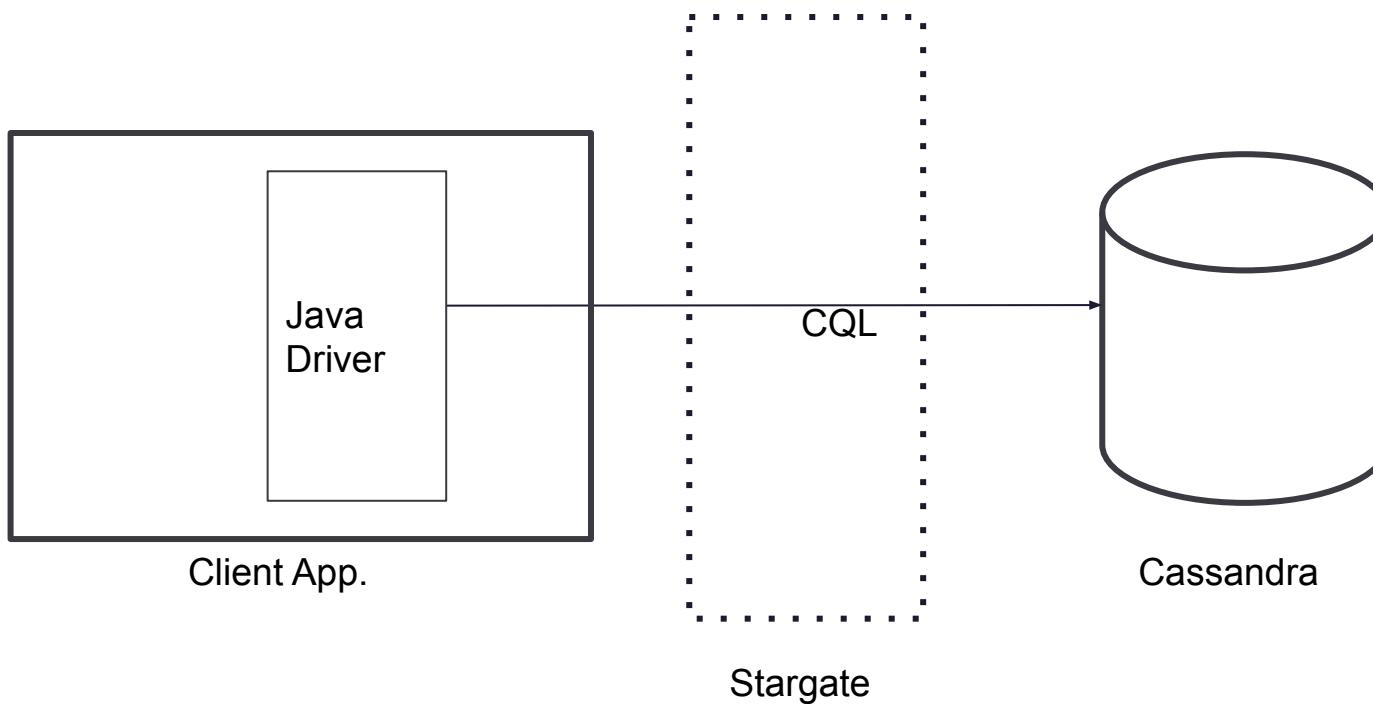
## Key benefits of gRPC

- Common operational tasks (retries, load balancing, etc.) are handled automatically
- Bidirectional calls via HTTP/2 boosts network performance
- Improved data serialization boosts network performance
- Protobuf file provides a skeleton for making CQL calls in your language of choice

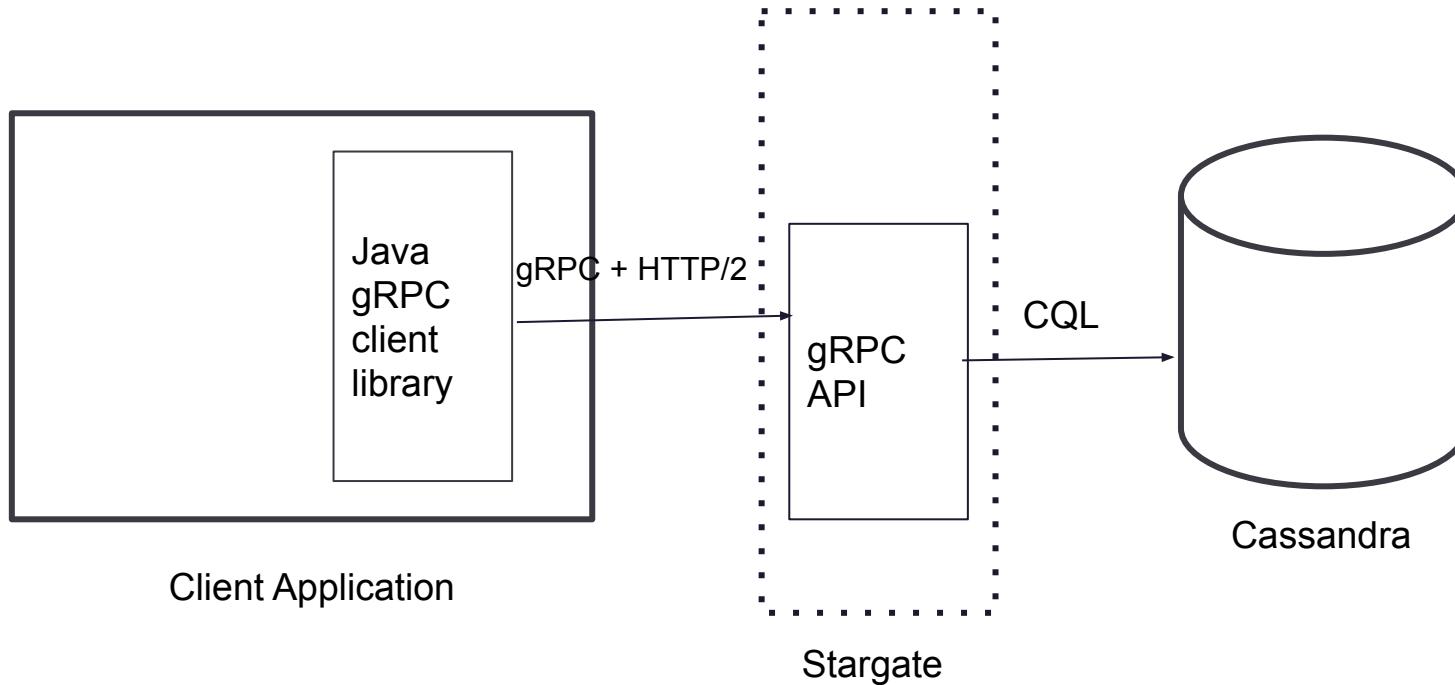
## The result

- Lightweight client library that requires little to no maintenance
- Template for easily extending CQL calls to new languages

# Native driver architecture



# gRPC Architecture



# Cassandra Driver Object Mapper Support

```
@Dao interface ProductDao {  
    @Insert Uni<Void> create(Product product);  
    @Select Uni<Product> findById(String id);  
    @Select Multi<Product> findAll();  
}  
  
class ProductDaoProducer {  
    @Produces @ApplicationScoped  
    public ProductDao produceProductDao() { ... }  
}  
  
@ApplicationScoped class ProductService {  
    @Inject ProductDao dao;  
}
```

# Support for Mutiny Types

```
@GET  
@Produces(MediaType.APPLICATION_JSON)  
@Path("/product/{id}")  
public Uni<Response> findProduct(@PathParam("id") String id) {  
    return dao.findById(id)  
        .map(todo -> Response.ok(todo).build())  
        .ifNoItem().after(Duration.ofSeconds(5))  
        .recoverWithItem(Response.status(Status.NOT_FOUND).build());  
}
```

# Astra Developer Endpoints

## REST / JSON Document API

- Built in OpenAPI (swagger) Test Harness
- <https://quarkus.io/guides/rest-client>

## GraphQL

- Built in GraphQL playground

## Javascript SDK

## Java SDK

```
curl -L -X GET  
'http://localhost:8082/v2/keyspaces/blog/vehicle?  
where=\{"manufacturer":\{"$eq":"Tesla"\}\}' \  
-H "X-Cassandra-Token: $AUTH_TOKEN" \  
-H 'Content-Type: application/json'
```

```
curl --location \  
--request POST  
'localhost:8082/v2/namespaces/blog/collections/ve  
hicles' \  
--header "X-Cassandra-Token: $AUTH_TOKEN" \  
--header 'Content-Type: application/json' \  
--data '{  
  "vin": "70S5T5HQLGT073117",  
  "model": "Spyder",  
  "type": "Sedan",  
  "color": "teal",  
  "manufacturer": "Tesla"  
}'
```

DataStax

# Live Coding

Deploy a Database  
Get started with Quarkus  
Build  
Swag

# Try it out

- Create your quarkus + cassandra app (code.quarkus.io or running the following):

```
$ mvn io.quarkus:quarkus-maven-plugin:2.3.0.Final:create \
-DprojectGroupId=io.quarkus.astra \
-DprojectArtifactId=quarkus-astra-demo \
-DprojectVersion=1.0.0 \
-DclassName="io.quarkus.astra" \
-Dextensions="resteasy-reactive-jackson, micrometer-registry-prometheus, smallrye-openapi, smallrye-health,
cassandra-quarkus-client"

$ cd quarkus-astra-demo
$ ./mvnw clean quarkus:dev
```

- Browse to http://localhost:8080/q/dev
- Stand up your Astra free database ([astradb.datastax.com](https://astradb.datastax.com))
- Point your app to Astra

```
quarkus.cassandra.cloud.secure-connect-bundle=<path>/secure-connect-bundle.zip
quarkus.cassandra.auth.username=<user>
quarkus.cassandra.auth.password=<pw>
```

- Get coding + see docs for more info

<https://quarkus.io/guides/cassandra>

<https://github.com/datastaxdevs/quarkus-astra-intro-demo>

# Call for Action

- This workshop

<https://github.com/datastaxdevs/workshop-intro-quarkus-cassandra>

- Homework (do quarkus:dev) and submit results

<https://github.com/datastax/cassandra-quarkus>

# Dzone Refcard

- Create a Quarkus Serverless Project
  - Run Serverless Functions Locally
  - Test Serverless Functions Continuously
  - Deploy Functions to a Knative Service on OpenShift
- Make Serverless Functions Run Faster With GraalVM
- Make Portable Functions Across Serverless Platforms
  - Deploy a Quarkus Funqy Application to AWS Lambda
- Bind CloudEvents on Knative With Quarkus Serverless Functions

<https://dzone.com/refcardz/getting-started-with-quarkus-serverless-functions>



# Your feedback is welcome!



## Daniel Oh

Senior Principal Technical Marketing Manager at Red Hat

*Cloud Native Runtimes (Quarkus, Spring, Node.js, Vert.x)*

*Serverless and Service Mesh Integration*

*CNCF and DevOps Institute Ambassador*



@danieloh30



@danieloh30



@daniel-oh-083818112



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# BUILD WITH US !



# DataStax

## Astra DB

STARGATE

<https://github.com/datastaxdevs/workshop-intro-quarkus-cassandra>



# PLAY WITH US !

Go to [menti.com](https://menti.com) and  
enter code: 6303 5160  
*Look at your phone!*



Go to [www.menti.com](https://www.menti.com) and use the code 3491 9972

### Inequality predicates are allowed on ...

Category	Allowance
An isolate columns	✗
Non isolation key columns	✗
clustering key columns	✓
no inequality predicate are allowed	✗

Go to [www.menti.com](https://www.menti.com) and use the code 3491 9972

### Leaderboard

Rank	Score	User
1	4821 p	spanda
2	4820 p	Agent X9
3	4775 p	Sam
4	4711 p	CCedrickThePresenter
5	4468 p	shubham
6	4371 p	aaa
7	3895 p	vignesh
8	3877 p	adry
9	3861 p	Millie
10	3812 p	Puggie

DataStax

# Swag Winners



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

To claim your prize, please send an email to:

**jack.fryer@datastax.com**

**\*\* Include your Menti winning screenshot**

**\*\* Make sure you tell us:**

Your name / full Address (+ country, zipcode) /  
email / phone number / XL-L-M-S / Men-Women

**\*\* ... and put "Quarkus+<today>" in the subject**

# DataStax

# Claim your **FREE** Certification Voucher



Vouchers (normally 145\$ each)

valid for 3 months,  
valid for 2 attempts

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

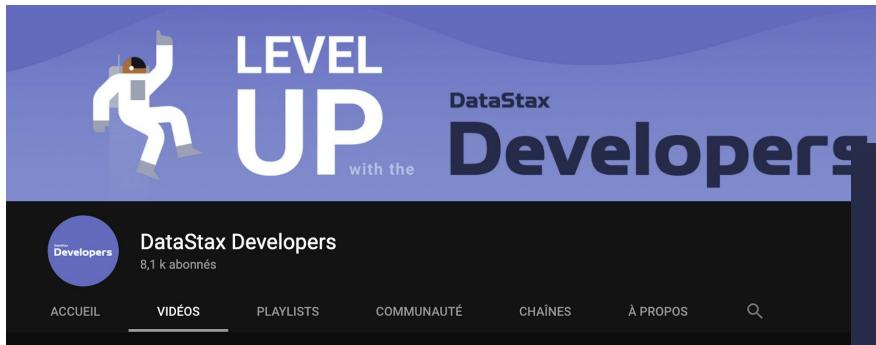
Claim using the link:

<http://dtsx.io/workshop-voucher>



# Weekly Workshops

[datastax.com/workshops](https://datastax.com/workshops)



LEVEL UP with the DataStax Developers

8,1 k abonnés

ACCUEIL VIDÉOS PLAYLISTS COMMUNAUTÉ CHAÎNES À PROPOS

Vidéos mises en ligne ▾ TOUT REGARDER

Hands-on live workshop Microservices with Cassandra + Spring 1:23:56 ADVANCED TOPIC	Hands-on live workshop Advanced Data Modeling with Aleksey Volkov 2:41:51 INTERMEDIATE TOPIC	LIVE hands-on workshop An Introduction to Apache Cassandra™ with Aleksey Volkov 1:28:14 INTERMEDIATE TOPIC	Hands-on live workshop Streaming to C* with Apache Pulsar! with Cedrick Lumeau 2:11:40 INTERMEDIATE TOPIC	Apache Cassandra™ Certification Preparation
Building Microservices with Cassandra + Spring 1,1 k vues • Diffusé il y a 20 heures	Advanced Data Modeling in Apache Cassandra™ 1,3 k vues • Diffusé il y a 1 semaine	Polska DataOps Meetup: Introduction to Apache... 151 vues • Diffusé il y a 1 semaine	Bring Streaming to Cassandra with Apache... 703 vues • Diffusé il y a 2 semaines	Apache Cassandra™ Certification Preparation Multiple Dates   NoSQL   Beginner
Taking your K8s app to the Cloud! 1 k vues •	RESTful Data Access from a Spring Boot App 215 vues • il y a 1 mois	Ask Me Anything Hackathon Special 667 vues • Diffusé il y a 1 mois	Connecting Apache Cassandra™ and Kubernetes 1,1 k vues • Diffusé il y a 1 mois	Build Microservices with Apache Cassandra™! Feb 17 or Feb 18   NoSQL   Beginner
Learn how to build a Serverless Game! Feb 24 or Feb 25   Game Development   Beginner	Build Microservices with Cassandra & Quarkus March 11   Microservices   Beginner			

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MULTIPLE DATES | NoSQL | Beginner

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Certification Exam Preparation Workshop

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LIVE hands-on workshop </>

Build Microservices with Apache Cassandra™!

FEB 17 OR FEB 18 | NoSQL | Beginner

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LIVE hands-on workshop </>

Learn how to build a Serverless Game!

FEB 24 OR FEB 25 | Game Development | Beginner

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START

Register Now

LIVE hands-on workshop </>

Build Microservices with Cassandra & Quarkus

MAR 11 | Microservices | Beginner

LEVEL UP with the DataStax Developers

Cloud-Native Workshop: Build Microservices w/ Apache Cassandra™ + Quarkus!

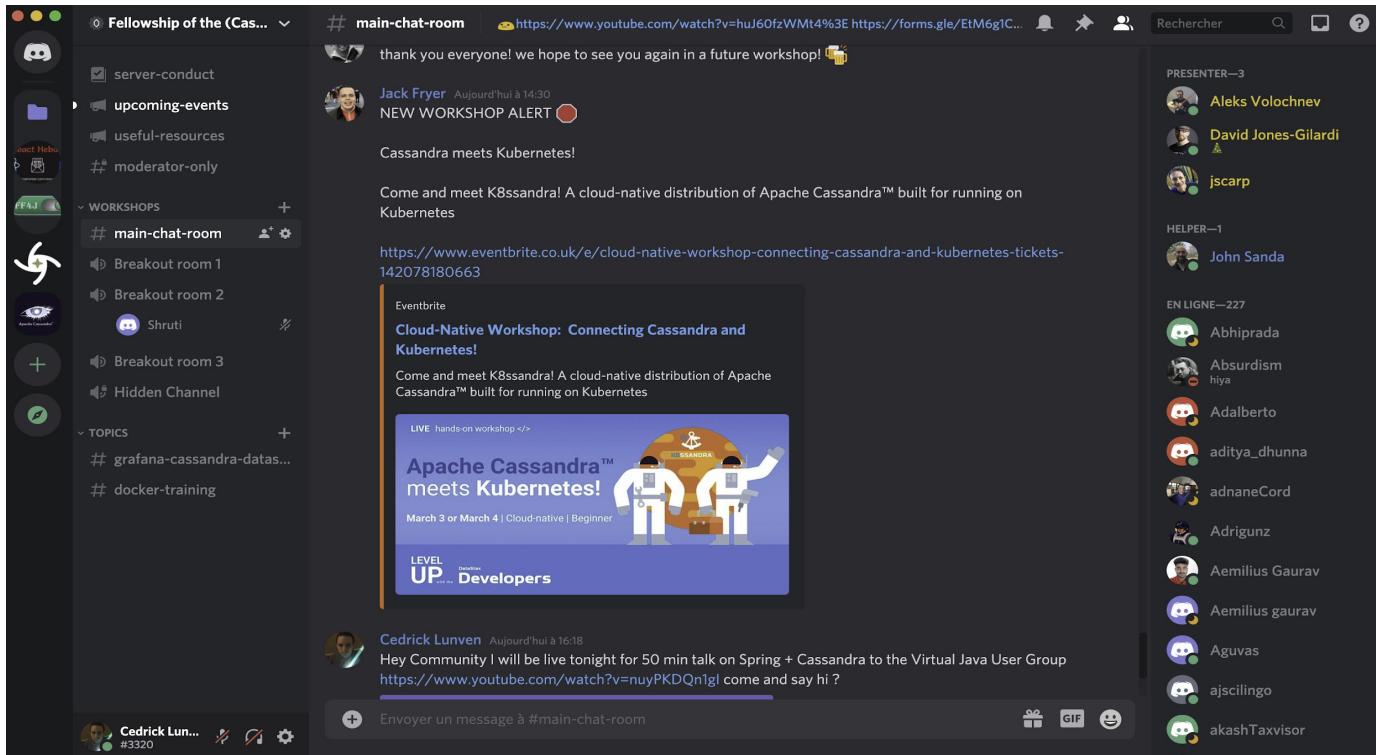
THU MAR 11 2021

Register Now

# Join our 16k Discord Community

## The Fellowship of the RINGS

<https://dtsx.io/discord>





# Thank You!

Now try Astra + Quarkus!