# ACCELERATE AND MANAGE YOUR NOSQL DATABASE WITH CONTAINERS


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# AGENDA

01 Couchbase Overview

02 Container Transformation

03 Couchbase: The Container Data Platform

04 The Operator Framework

05 Couchbase Autonomous Operator

06 Demo

# 1 COUCHBASE OVERVIEW

# Couchbase at a glance

## Who we are

Created 2011

+150M in funding

Mayfield

ACCEL PARTNERS

ignition

North Bridge venture partners

Adams Street Partners

WestSummit Capital

Sorenson Capital

## What we do

- Help customers drive their digital transformation initiatives
- World's leading NoSQL data platform for performance at scale
- Subscription-based enterprise software company built on open source foundation

## Key locations

- HQ: Santa Clara, CA
- San Francisco, London, Manchester, Paris, Bangalore
- Sales hubs: US, Germany, Spain, Italy, Sweden, Israel, Australia
- Partners: South Africa, KSA, UAE, Turkey, Russia
- Headcount: 400+

## Customers

TESCO

GE

Marriott

amadeus

ebay

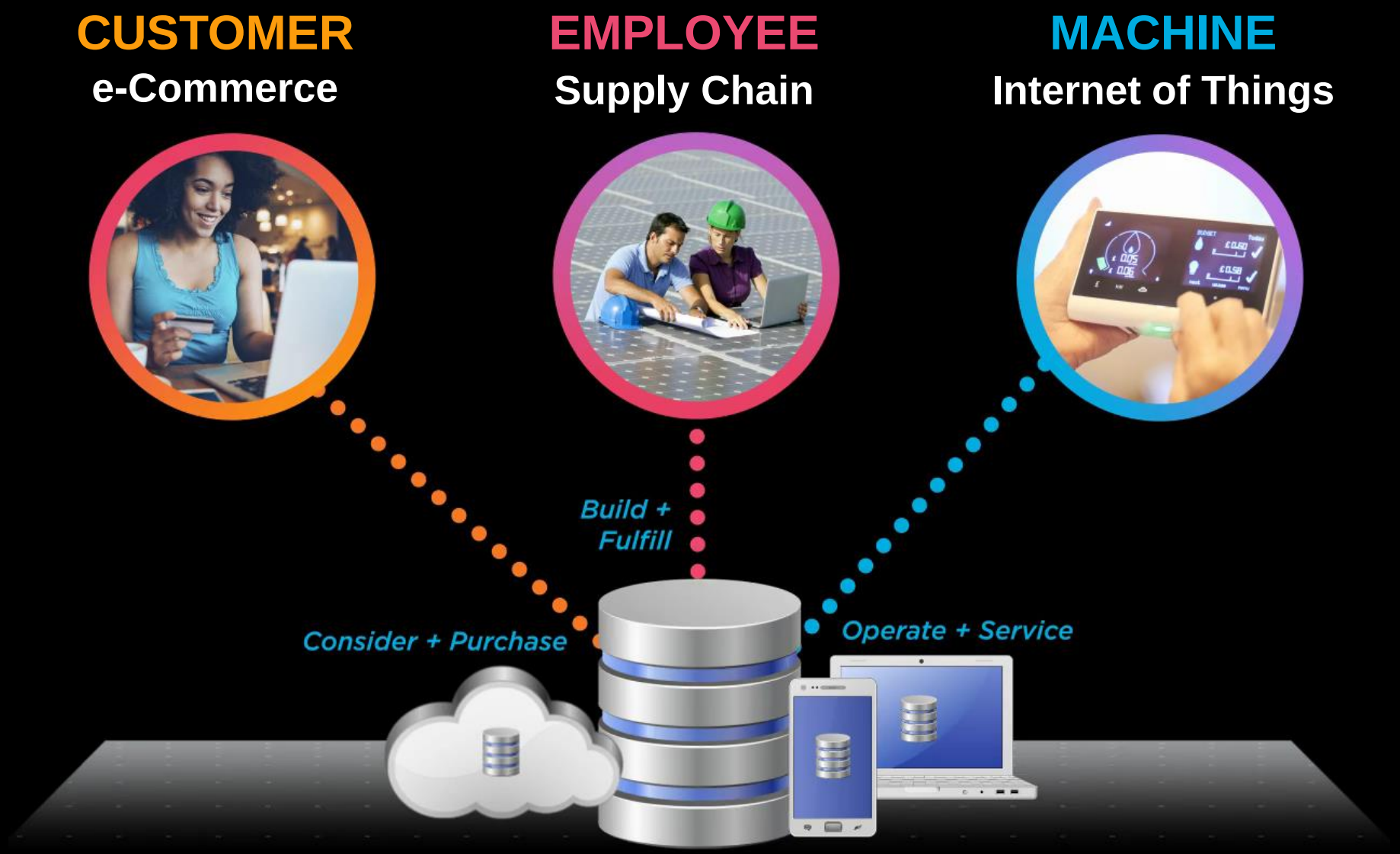
AT&T

Wells Fargo

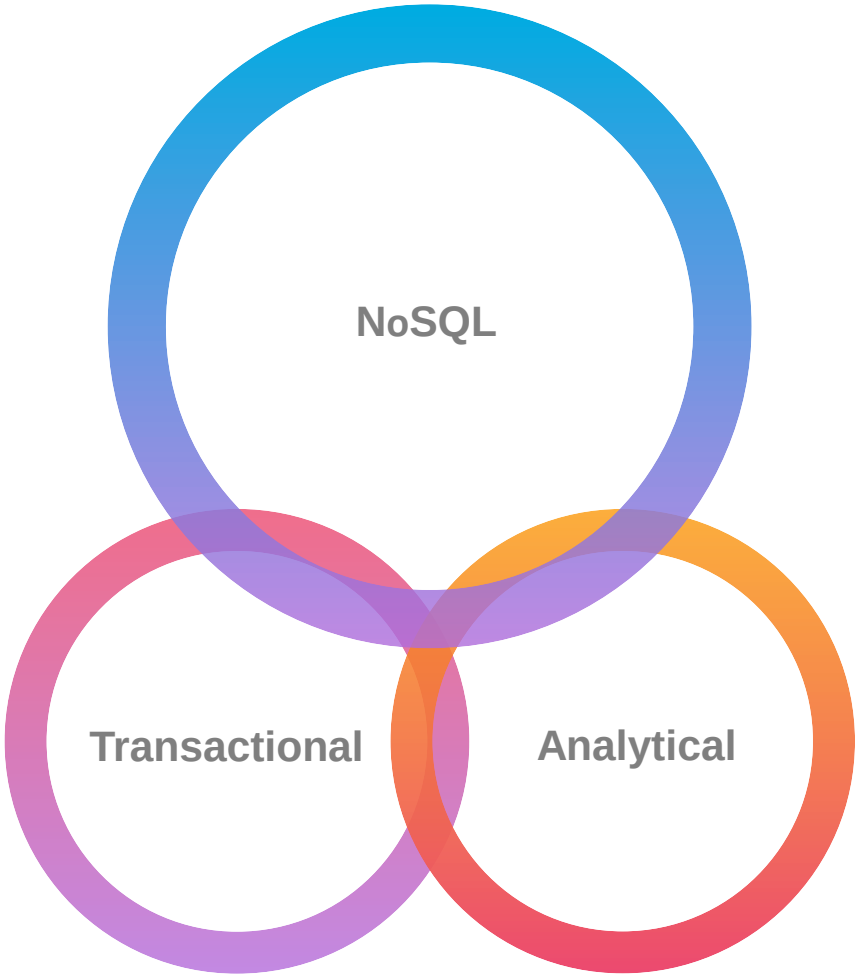
# Couchbase Top NoSQL Databases for 2019


**Customers spend more time interacting than transacting…**

# Massively Interactive Enterprises



# New Applications Fundamentally Different – Legacy Databases Insufficient




Interactions

Microservices architecture supports web, mobile and IoT experiences at scale, with performance to match


Couchbase

Transactions

Legacy monolithic infrastructure no longer an option to keep up with modern workloads


Oracle

# Application Examples – Couchbase Has Solved It

| | UPS | Amadeus | Comcast | United |
|---|---|---|---|---|
| **Application** | Package tracking, real-time logistics and field enablement | Flight availability, booking, pricing analytics, etc. | Customer 360 single view, unified notes | Real-time crew management, scheduling and resources |
| **Performance** | **20M** daily shipments<br>**142M** tracking req/day | **8M** requests / second<br>**<2.5ms** response time | **210M** documents<br>**100K** users | **41K** pilots and crew<br>**148M** travelers in 2017 |

**Infrastructure**

**Couchbase Data Platform**

- Performance
- Availability
- Flexibility
- Manageability

# A Proven Enterprise Solution Chosen by Industry Leaders








## E-Commerce

Walmart, cars.com, FANATICS, Office DEPOT OfficeMax, STAPLES, TESCO, QVC, BEST BUY

**3 of the Top 10**
eCommerce Companies

## Travel

Marriott, AMADEUS, Sabre, ORBITZ, tripadvisor, skyscanner

**3 of the Top 3**
GDS Companies

## Gaming

EA, betfair, zynga, BLIZZARD, Pokémon GO, Playtika, SGN

**6 of the Top 10**
Online Casino Gaming Companies

## Digital Health

WebMD, everyday HEALTH, BD, Cochlear, MONSENSO

**3 Fortune 500**
Healthcare Companies

## Financial Services

ADP, FICO, CONCUR, PayPal, WELLS FARGO, VISA

**3 of the Top 3**
Credit Reporting Companies

## Communications

COMCAST, KDDI, at&t, Viber, Telefónica

## Digital Media

sky, THOMSON REUTERS, FANDANGO, GANNETT, McGraw Hill, Disney, nielsen

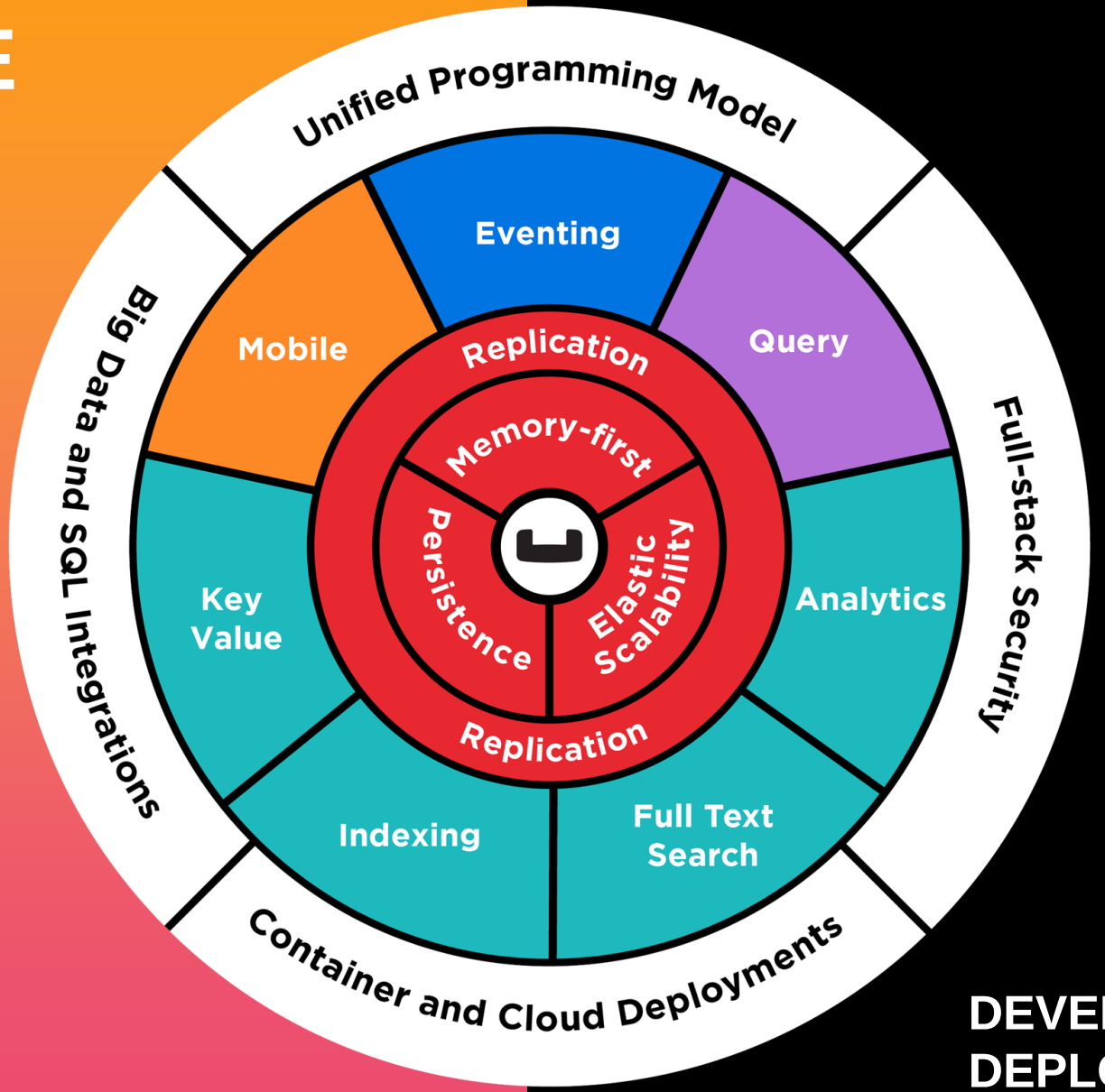
**6 of the Top 10**
Broadcast Companies

## Industrial IoT

verizon, Numerex, CHAMBERLAIN, GE

**2 of the Top 2**
IoT Platforms

# COUCHBASE DATA PLATFORM




DEVELOP WITH AGILITY
DEPLOY AT ANY SCALE

# Three Core Tenets of Couchbase

Agile Development

Scalable Performance

System Manageability

# 2 | CONTAINER TRANSFORMATION

**Dr Mohammed Haji**
**Principal Solution Engineer EMEA**

# Containers - An Evolution in Application Deployment

- Enable efficiency and automation for microservices, but also support traditional applications
- Enable faster and more consistent deployments from Development to Production
- Enable application portability across 4 infrastructure footprints: Physical, Virtual, Private & Public Cloud

# The Business Benefits Of Containers

5 year
ROI

**531%**

Average Annual Benefits
per 100 Developers

**$1.29M**


Payback Period

**8 Months**

# Containers Transform


Monolith

N-Tier

Microservices

## Applications

Datacenter

Hosted

Hybrid

## Infrastructures

Waterfall

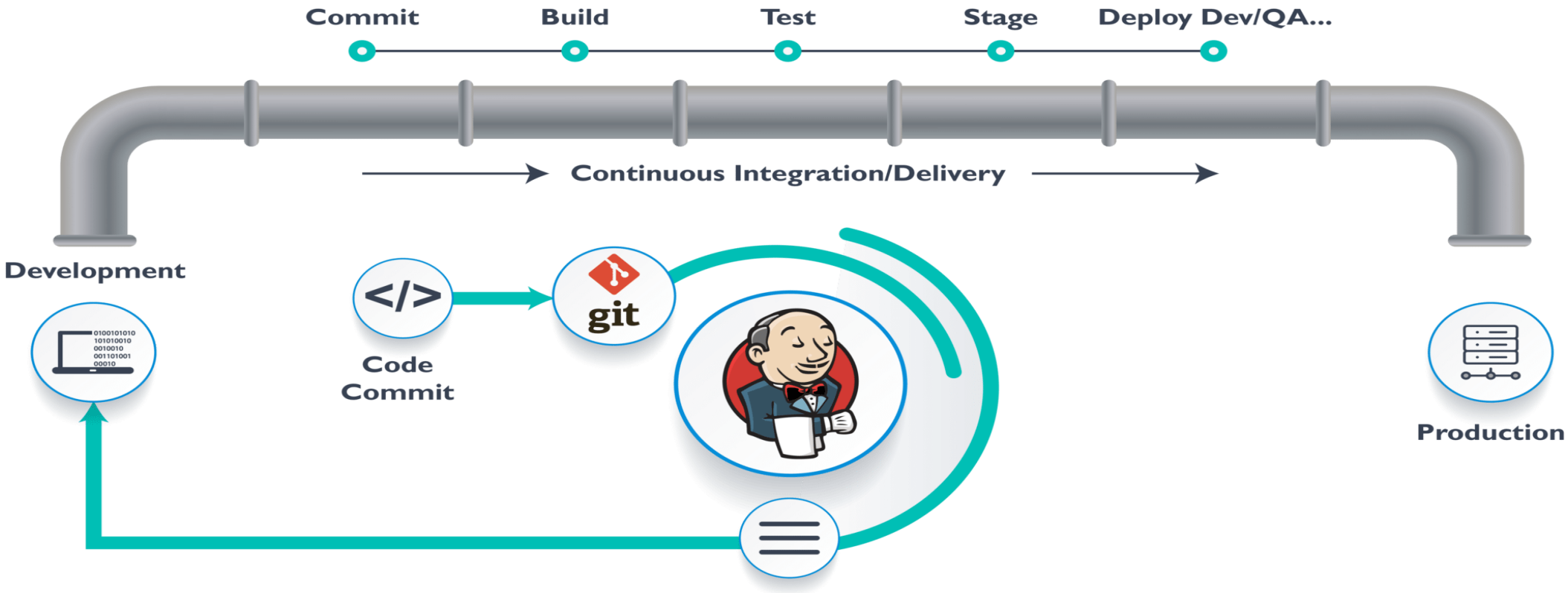
Agile

DevOps

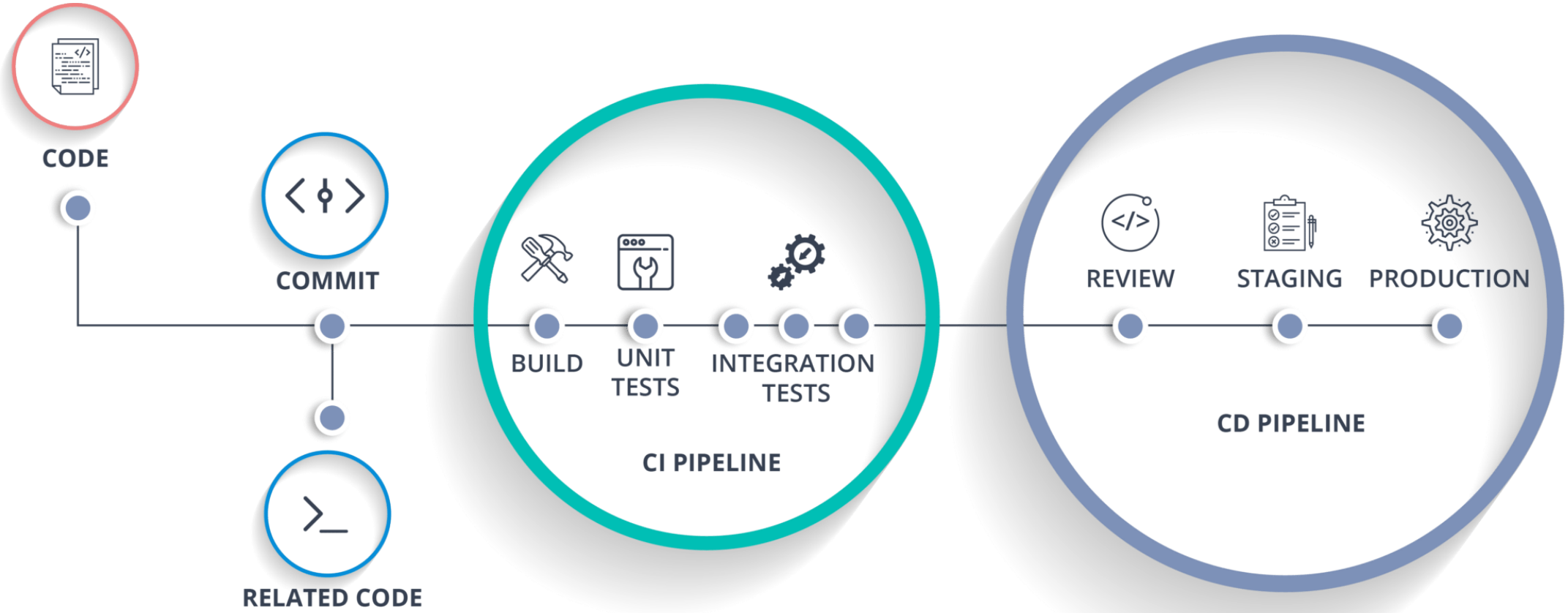
## Processes

# CI/CD Pipeline

*CI/CD process centers on rapid code deployment, ensuring shorter go to market cycles. For such a process you need to be able to stand up data fabric environment with standard deployment and Couchbase support YAML configuration files.*



# CI/CD Pipeline. Continued…

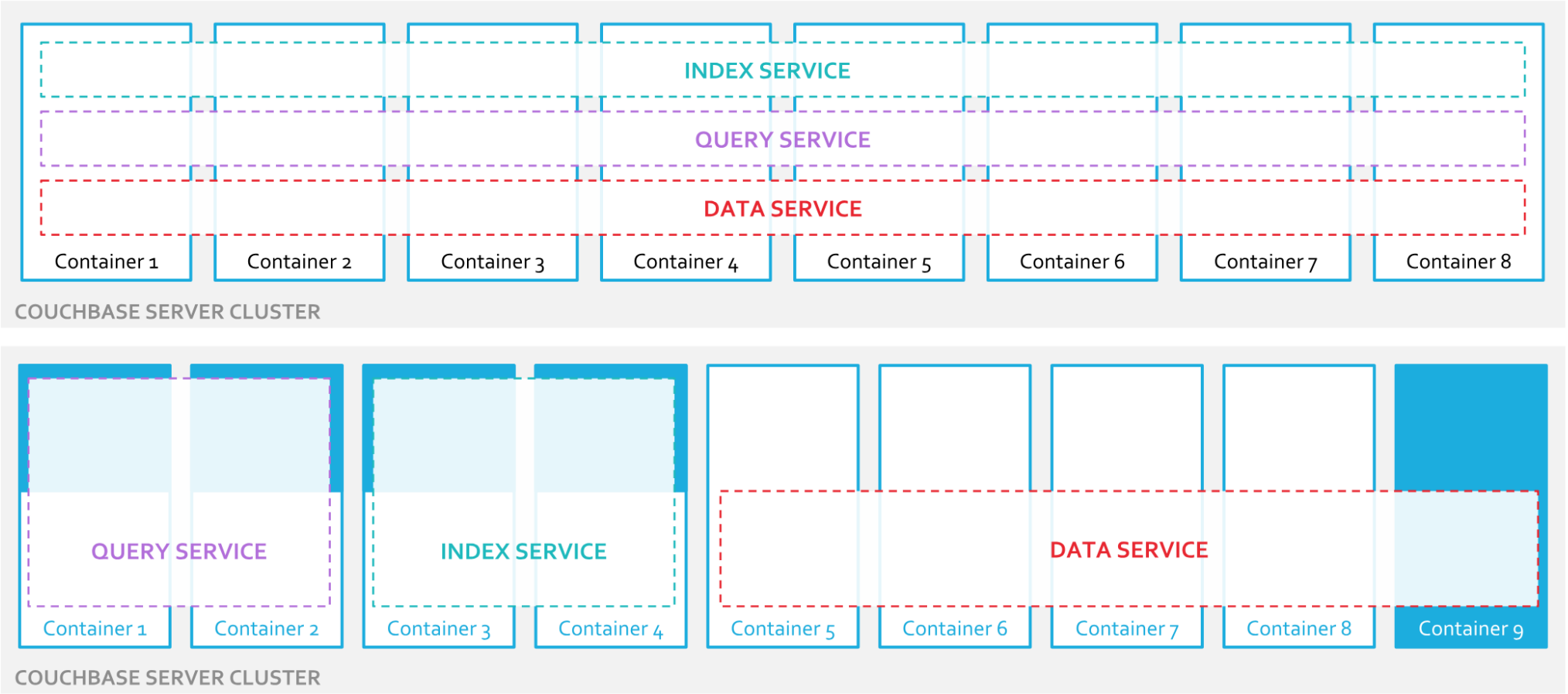


# 3

# COUCHBASE: THE CONTAINER DATA PLATFORM

# Couchbase designed for containerized applications

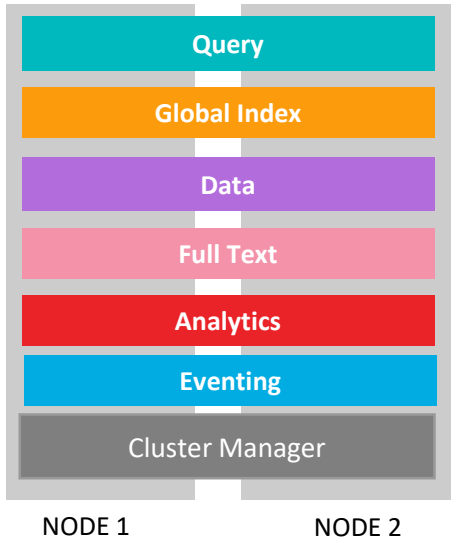
## Microservice Architecture == Multi-Dimensional Scaling



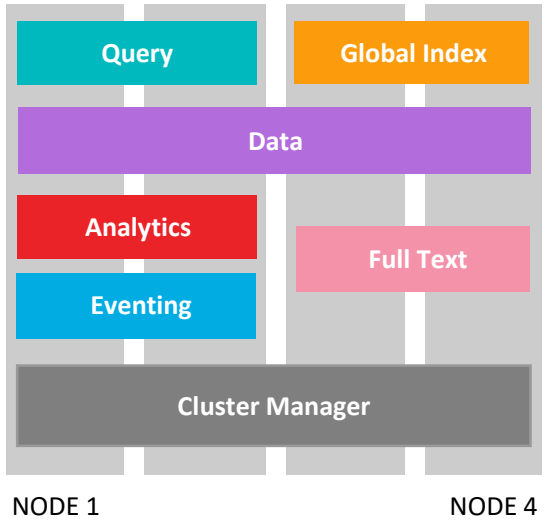
# Elastic scaling architecture

## Flexible cluster topology adjusts with growing demand

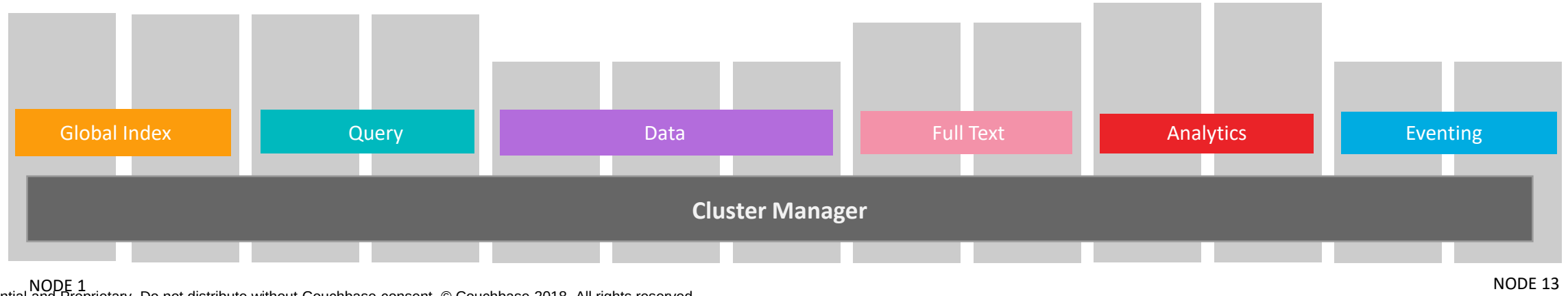
### Sample Dev Setup



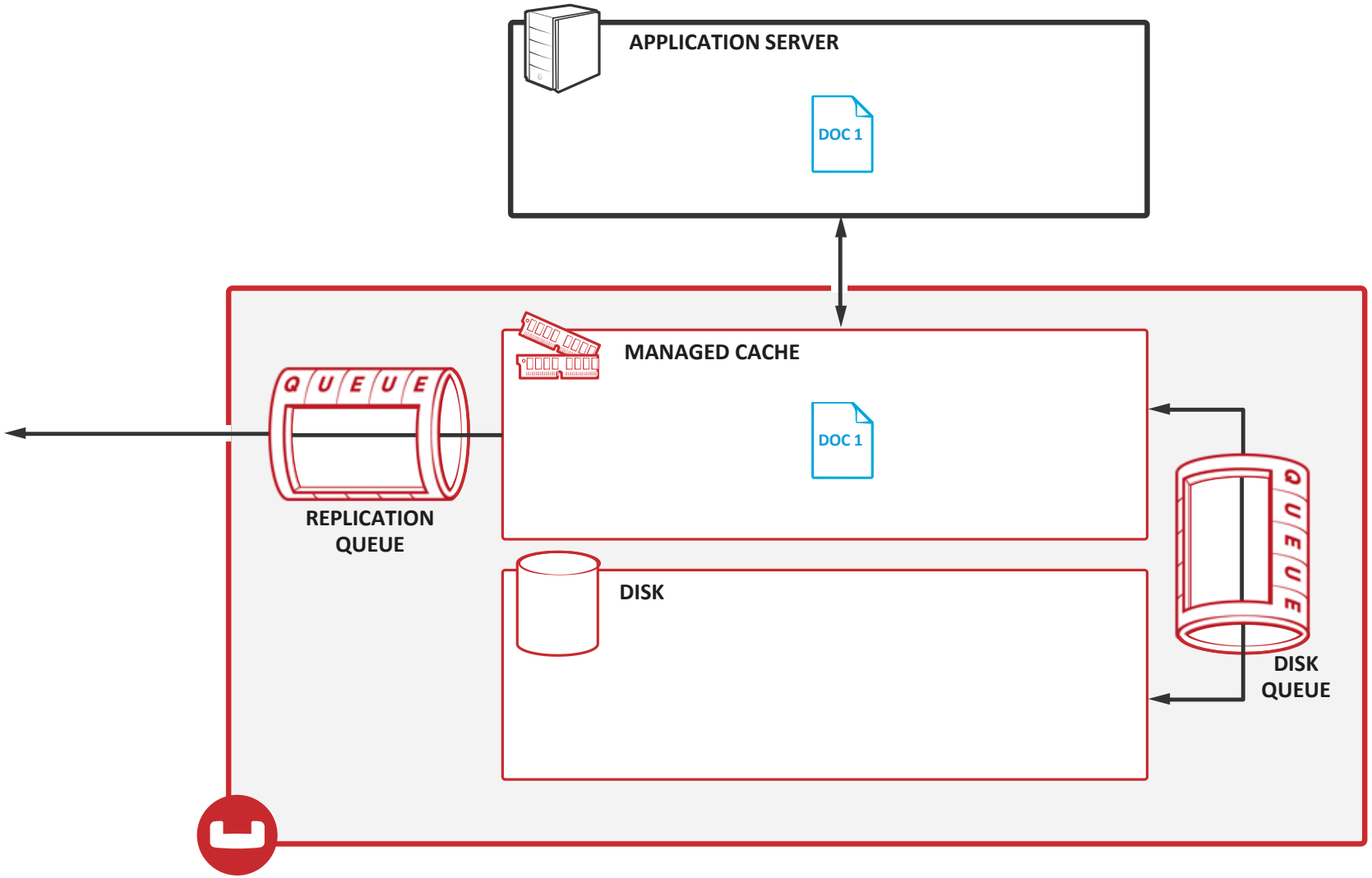

### Sample QA Setup



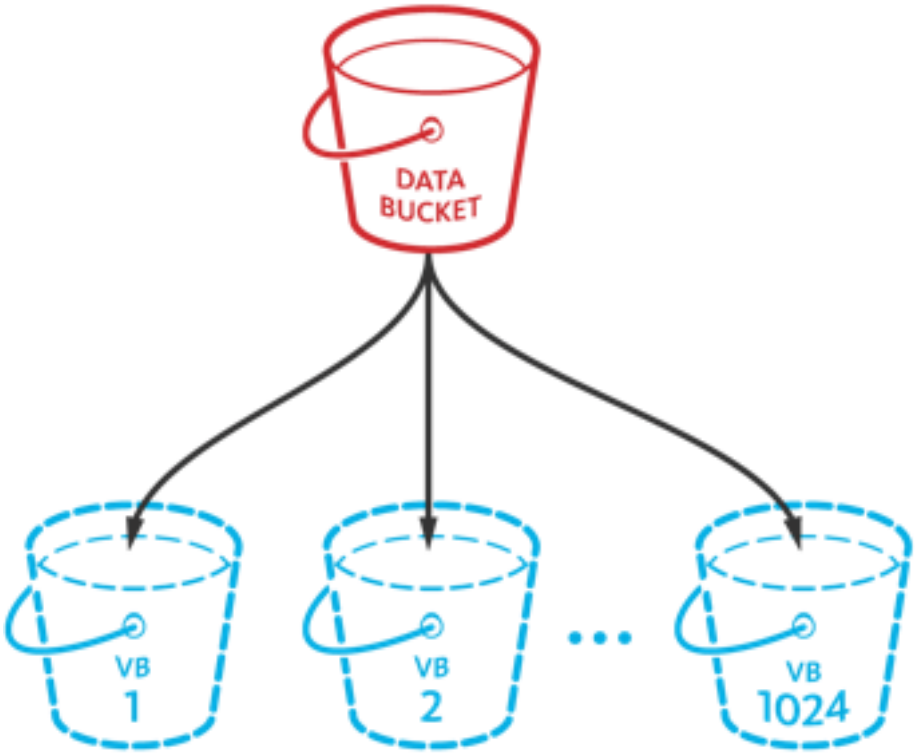

### Sample Production Deployment



# Write Operation



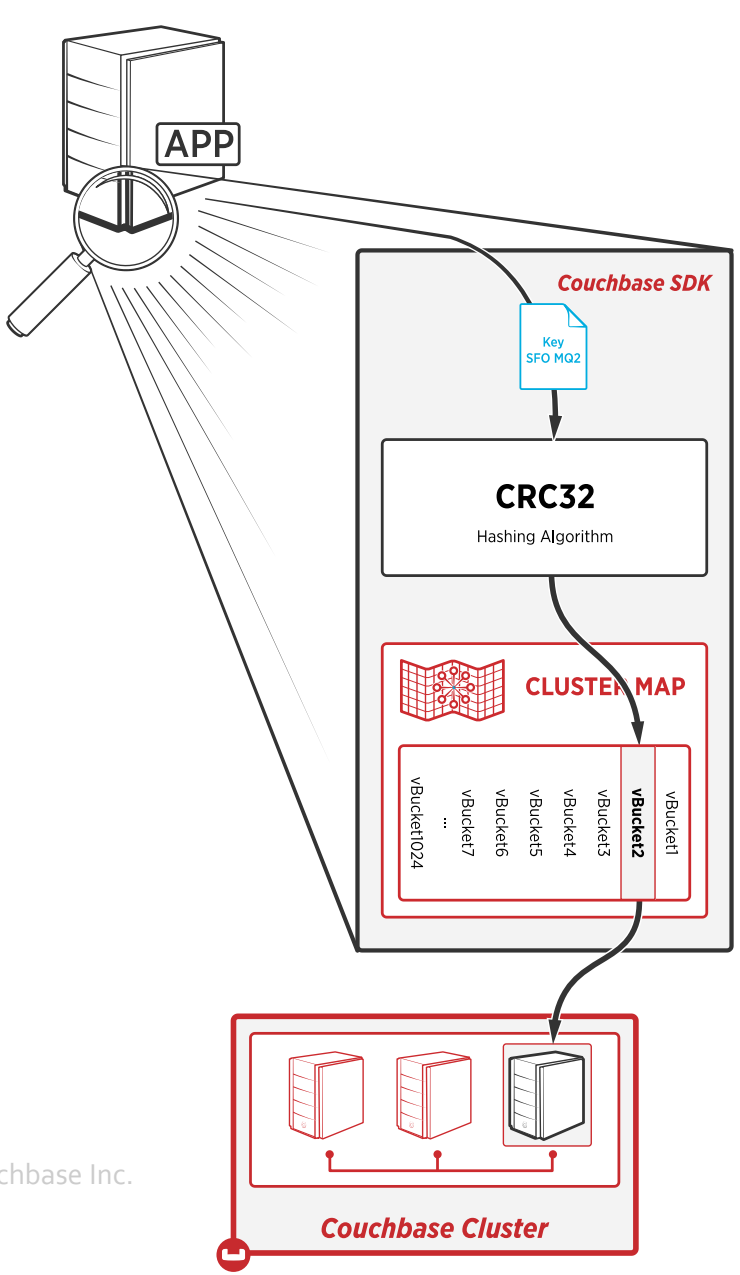
# Auto sharding – Bucket and vBuckets

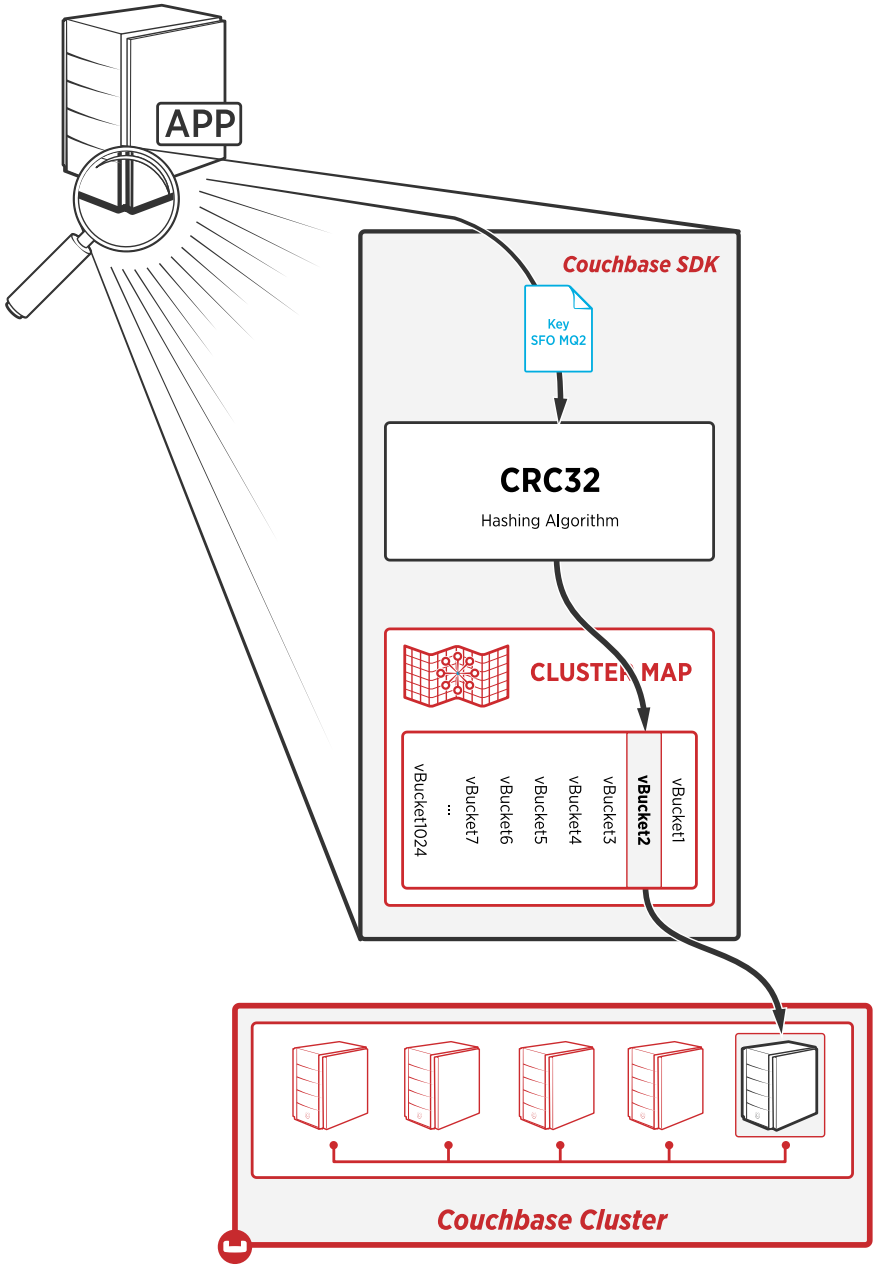



**Virtual buckets**

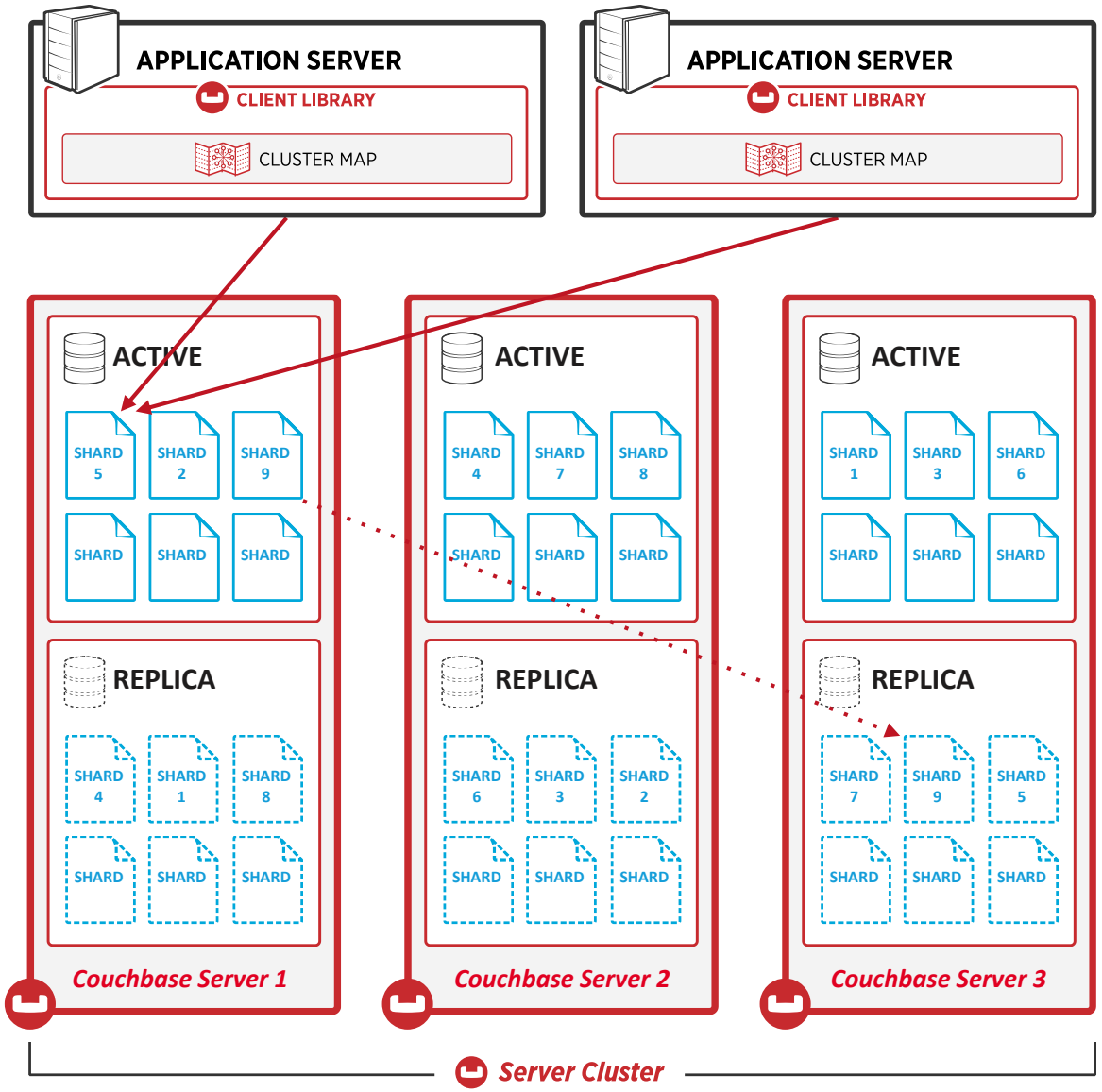
- A bucket is a logical, unique key space
- Multiple buckets can exist within a single cluster of nodes
- Each bucket has active and replica data sets (1, 2 or 3 **extra** copies)
- Each data set has 1024 Virtual Buckets (vBuckets)
- Each vBucket contains 1/1024th portion of the data set
- vBuckets do not have a fixed physical server location
- Mapping between the vBuckets and physical servers is called the cluster map
- Document IDs (keys) always get hashed to the same vbucket
- Couchbase SDK's lookup the vbucket -> server mapping

# Cluster Map

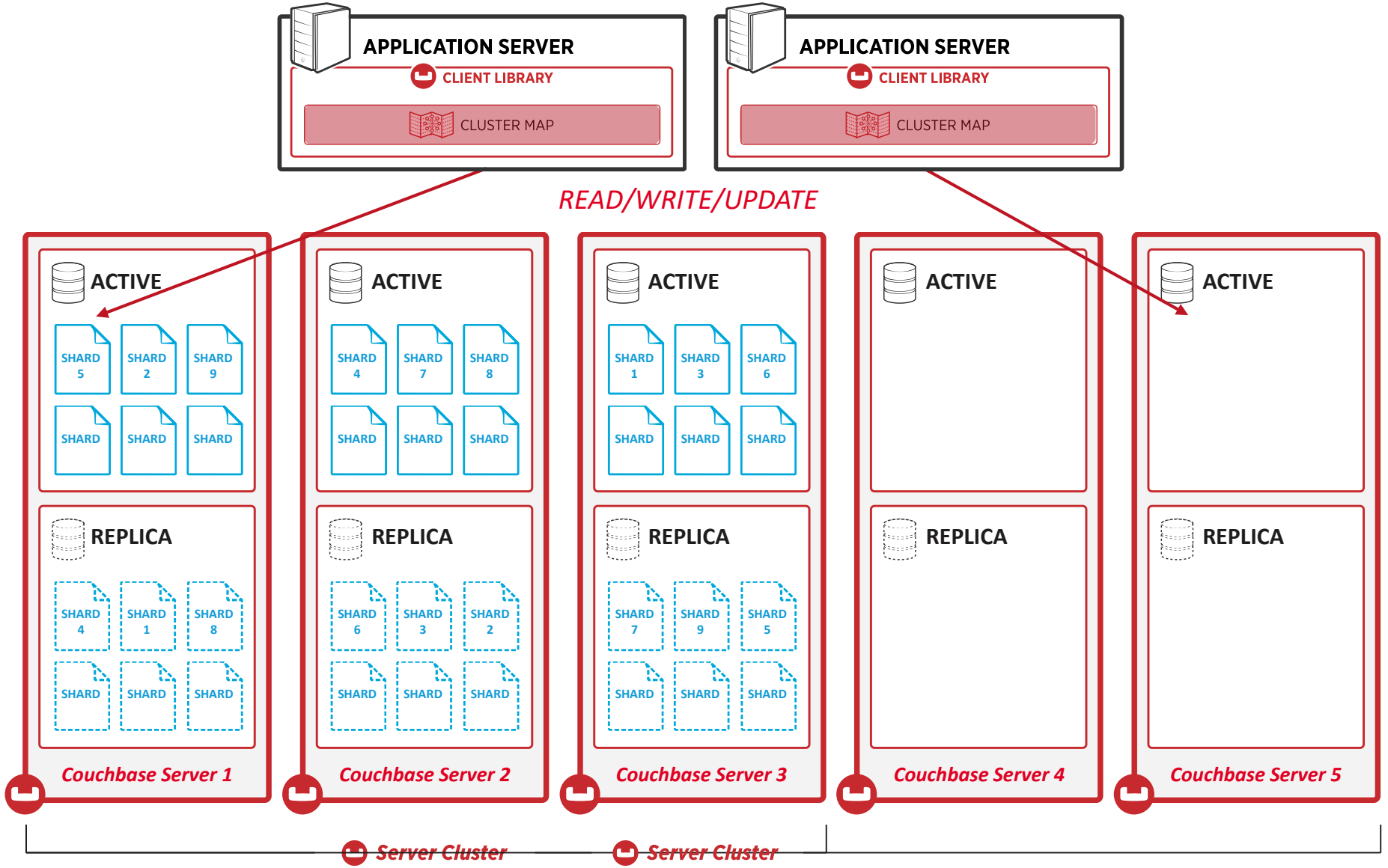


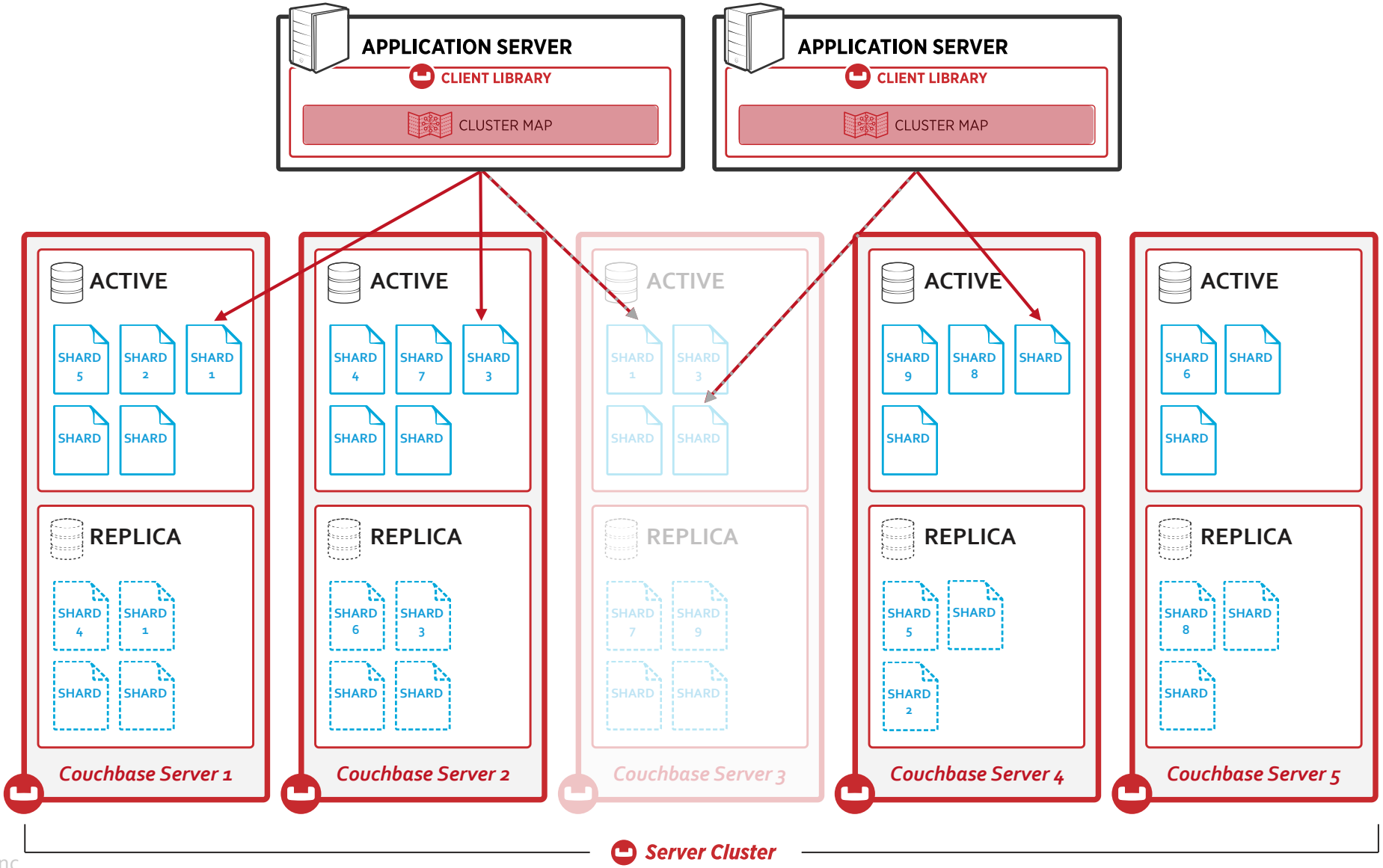
# Basic Operation



# Rebalance



# Fail Over



# Couchbase – Red Hat partnership




Couchbase is **the first** NoSQL vendor with native integration with Kubernetes Operator

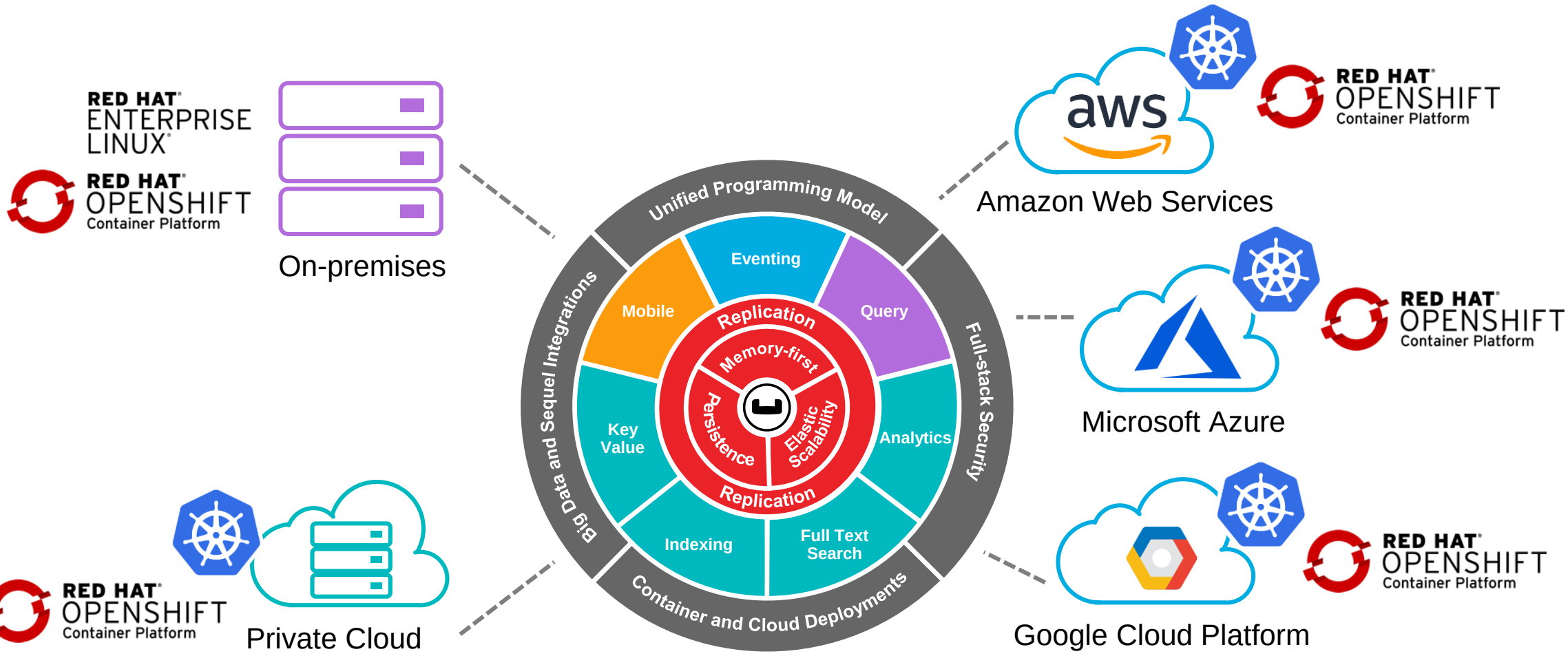
**Launch partner for "Operators on Red Hat OpenShift Container Platform"**

**Run stateful business critical applications for the Enterprise**

- **Hybrid and cross-cloud portability (no lock-in)**
- **Automated operational best practices (no downtime)**
- **Elastic scaling (push-button dynamic scaling)**

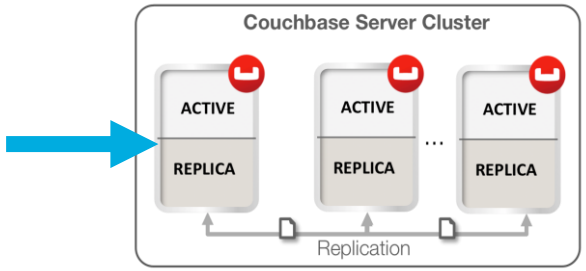
# 2019 Red Hat Partner Technology Innovation Award

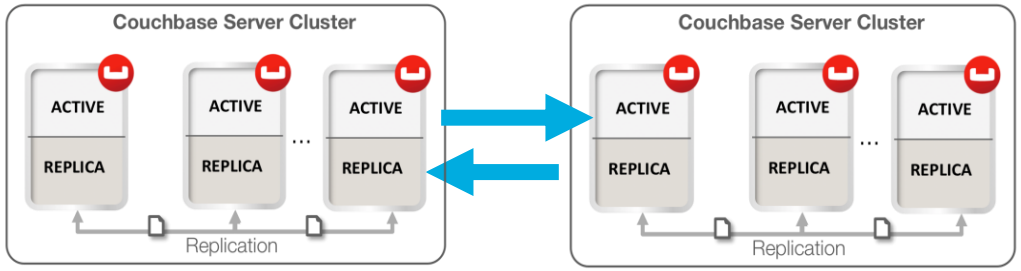
# Couchbase Hybrid / Multi-cloud



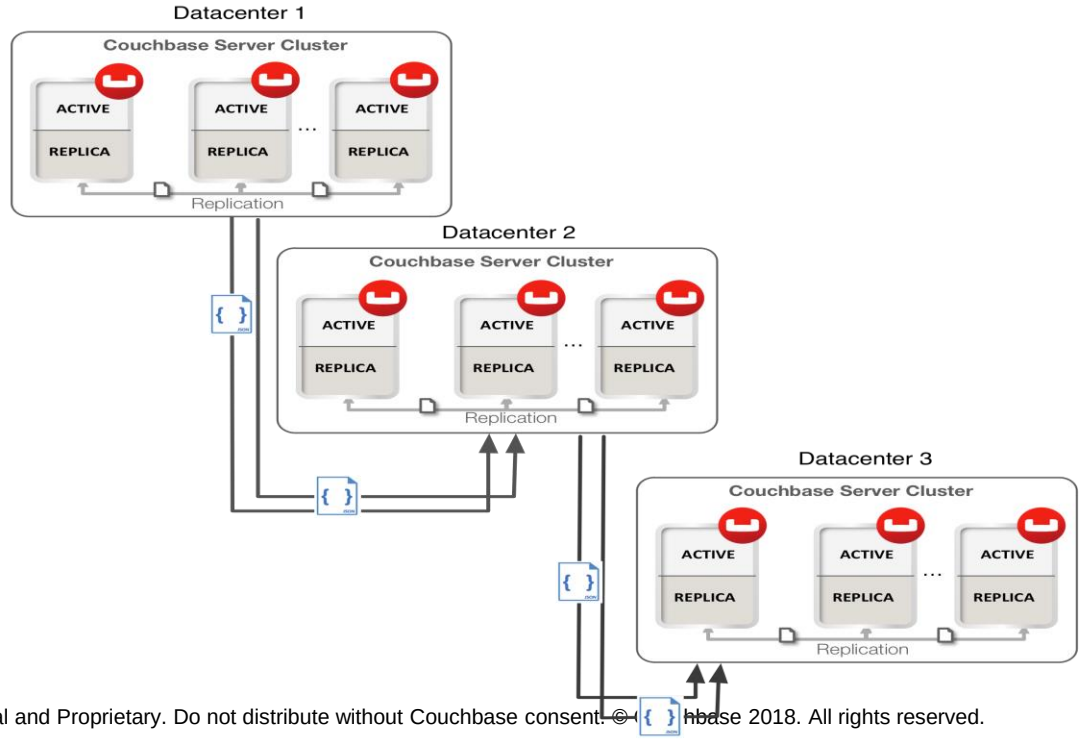
# Cross Datacenter Replication (XDCR)

## Unidirectional Replication

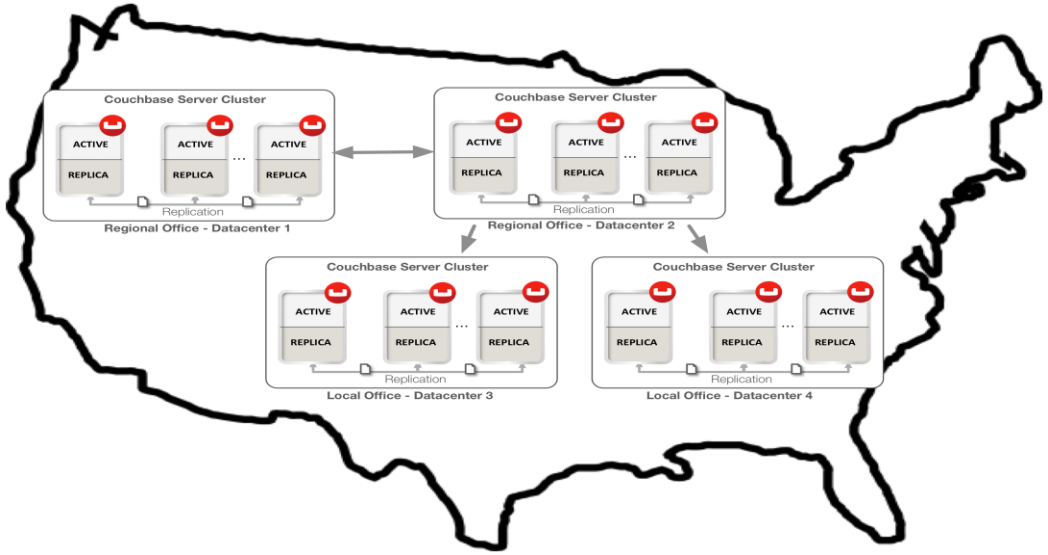



## Chain




## Propagation



# N1QL – Developer Friendly

Non-first Normal Form Query Language

It is based on ANSI 92 SQL

Its query engine is optimized for modern, highly parallel multi-core execution


+

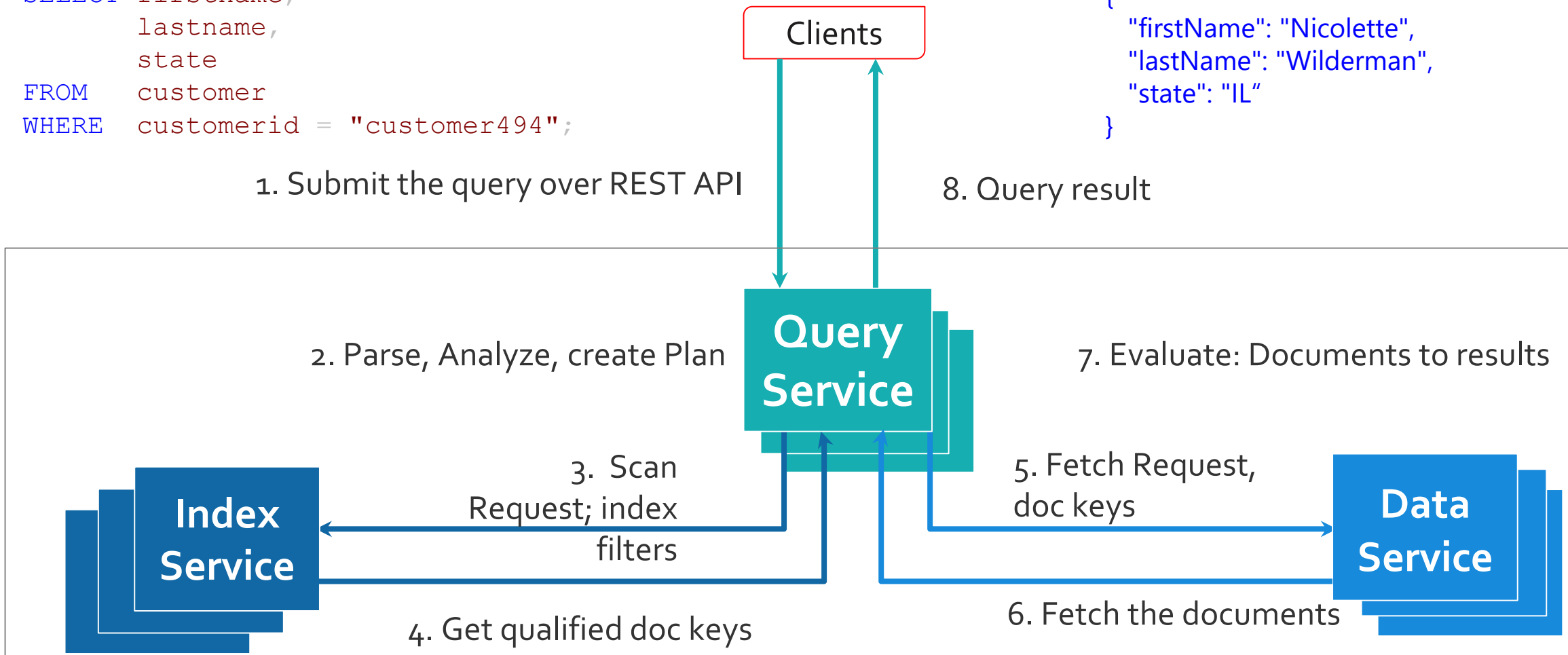

```
1  SELECT name, DATE_PART_STR(published,"year"), as published
2  FROM books
3  WHERE author = "Alastair Reynolds"
4  ORDER BY published
```

**Power of SQL**

**Flexibility of JSON**

# N1QL: Query Execution Flow

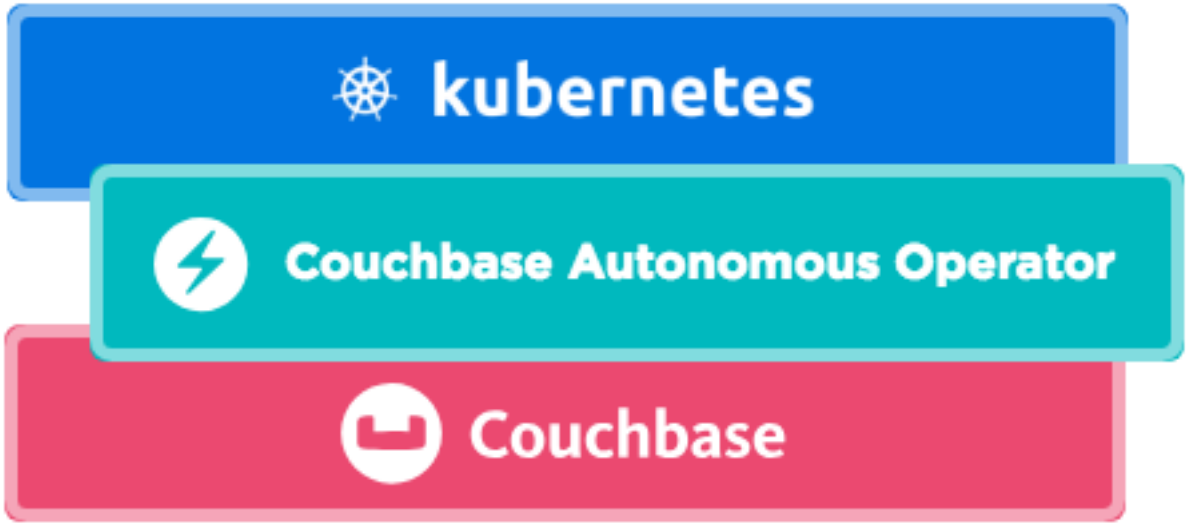
```
SELECT firstname,
       lastname,
       state
FROM   customer
WHERE  customerid = "customer494";
```



# 4

# COUCHBASE AUTONOMOUS OPERATOR

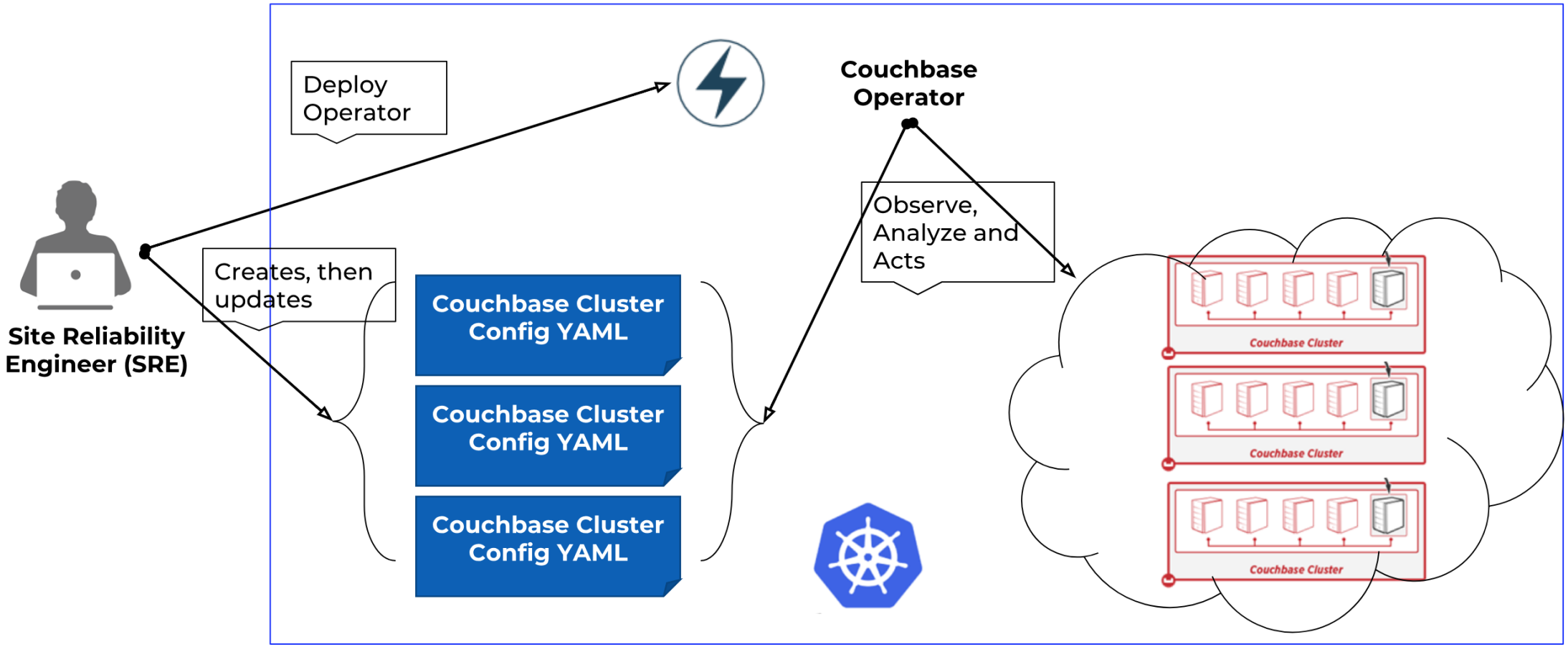
# Introducing Couchbase Autonomous Operator



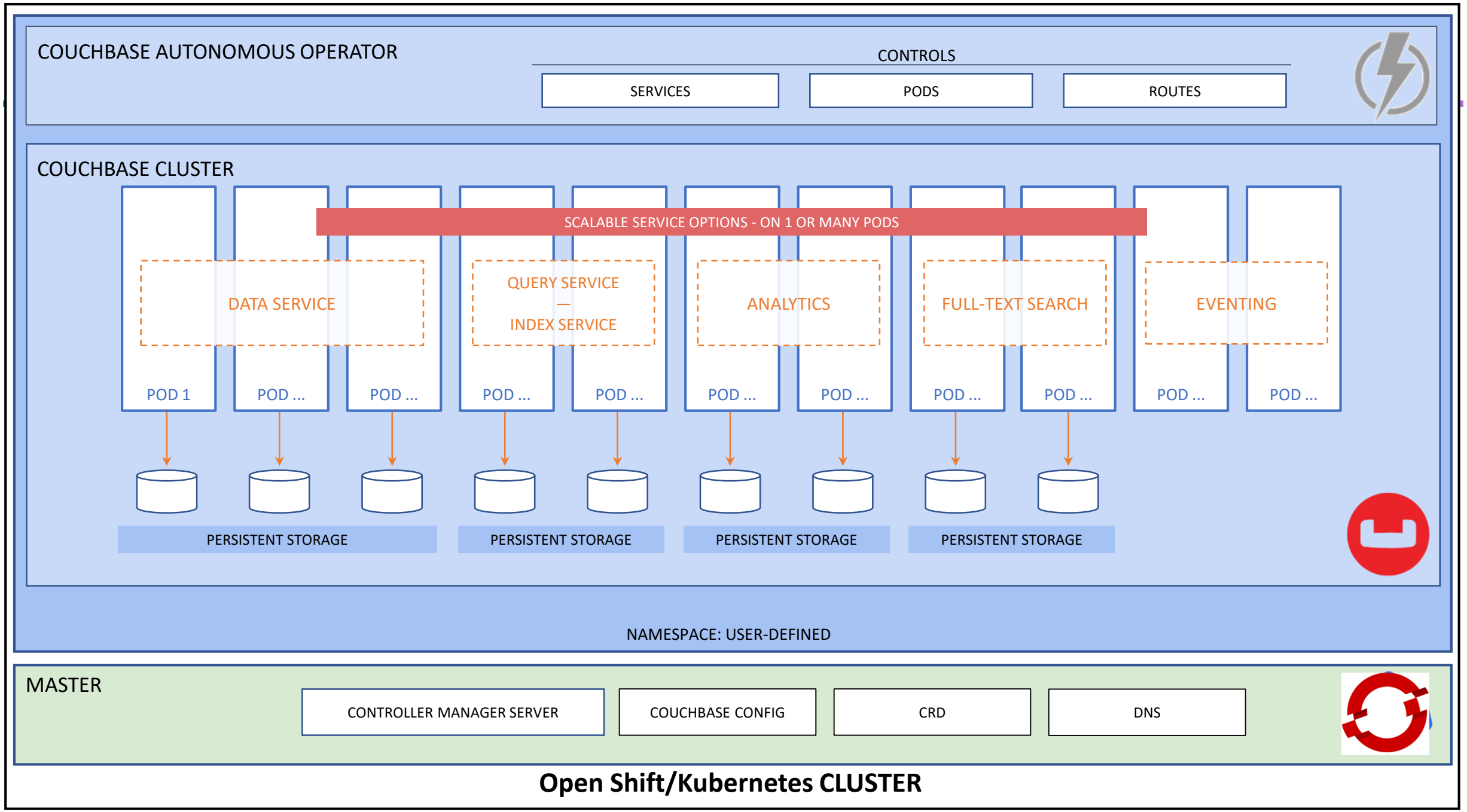

Couchbase Autonomous Operator is an application-specific controller that extends the Kubernetes API to create, configure and manage instances of complex stateful applications on behalf of a Kubernetes user.

It builds upon the basic Kubernetes resource and controller concepts, but also includes domain or application-specific knowledge to automate common tasks better managed by computers.

# Architecture




RED HAT® OPENSHIFT Container Platform Clusters


COUCHBASE AUTONOMOUS OPERATOR
CONTROLS
SERVICES
PODS
ROUTES
COUCHBASE CLUSTER
SCALABLE SERVICE OPTIONS - ON 1 OR MANY PODS
DATA SERVICE
QUERY SERVICE
—
INDEX SERVICE
ANALYTICS
FULL-TEXT SEARCH
EVENTING
POD 1
POD ...
POD ...
POD ...
POD ...
POD ...
POD ...
POD ...
POD ...
POD ...
POD ...
PERSISTENT STORAGE
PERSISTENT STORAGE
PERSISTENT STORAGE
PERSISTENT STORAGE
NAMESPACE: USER-DEFINED
MASTER
CONTROLLER MANAGER SERVER
COUCHBASE CONFIG
CRD
DNS
Open Shift/Kubernetes CLUSTER

# Couchbase Operator

https://blog.couchbase.com/introducing-couchbase-operator/

The first release of the Couchbase Operator provides:

- Automated Cluster Provisioning
- Elastic Scalability
- Auto Recovery
- Logging
- Access to Couchbase Web Console

# Questions?

Couchbase

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