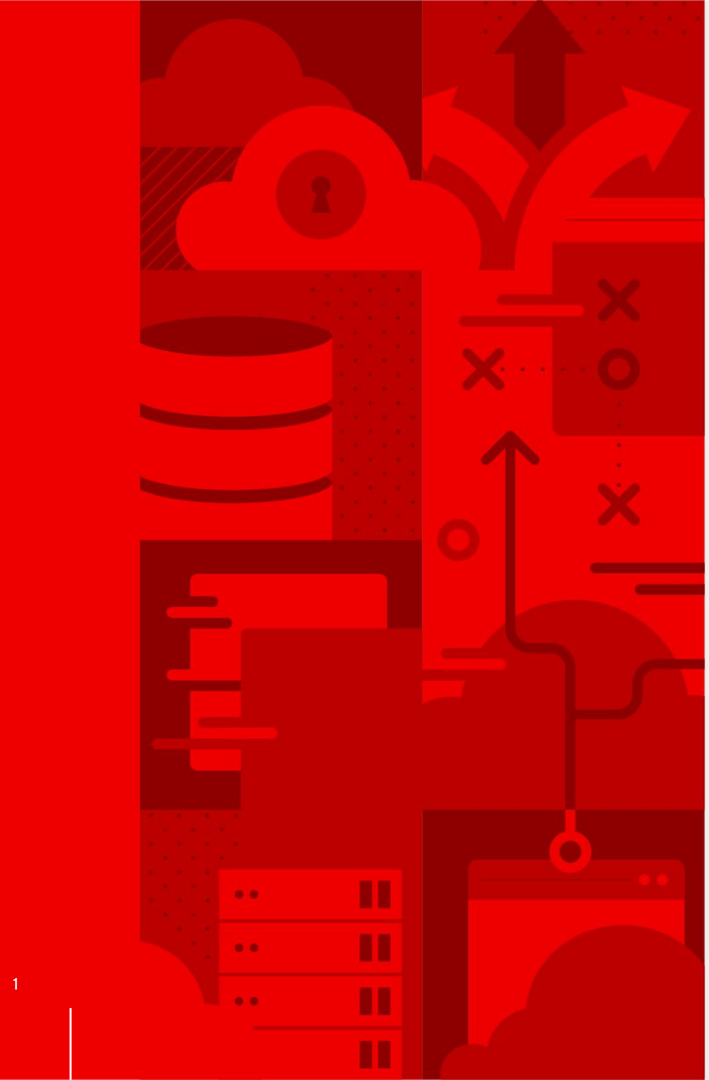


CQRS and Event Source with Kafka and Eclipse Vert.x

MIcroservices Data Patterns

Don Schenck
digital evangelist

Code is easy…

Unless it's RPG III

Code is easy…

…Data is **HARD**

Data Everywhere:

Data Everywhere: RDBMS

Data Everywhere:
RDBMS
NoSQL

Data Everywhere:
RDBMS
NoSQL
Flat files

Data Everywhere:
RDBMS
NoSQL
Flat files (including spreadsheets!)

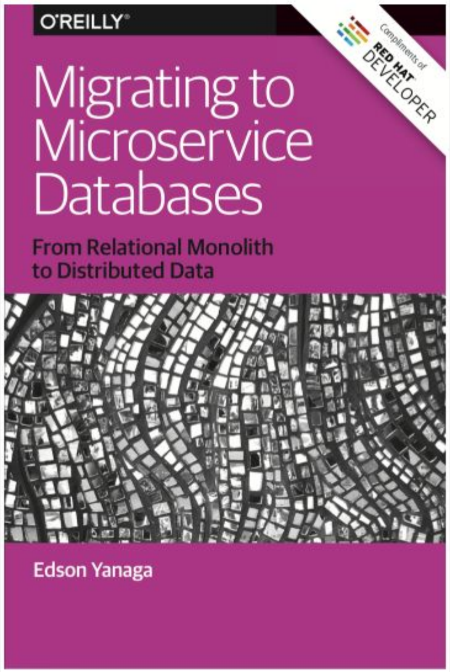
Ugh. Make it stop.

Centralized App + Centralized Data = "Everything's fine"

But then …

iTunes Store
Yelp
Instagram
Phoster
Facebook
Twitter

Remember: The “S” in IoT stands for “Security” https://developers.redhat.com/books/migrating-microservice-databases-relational-monolith-distributed-data/


O'REILLY
Compliments of RED HAT DEVELOPER
Migrating to Microservice Databases
From Relational Monolith to Distributed Data
Edson Yanaga

Split data from RDBMS

Apps change; data tends to stick around

You always have data.

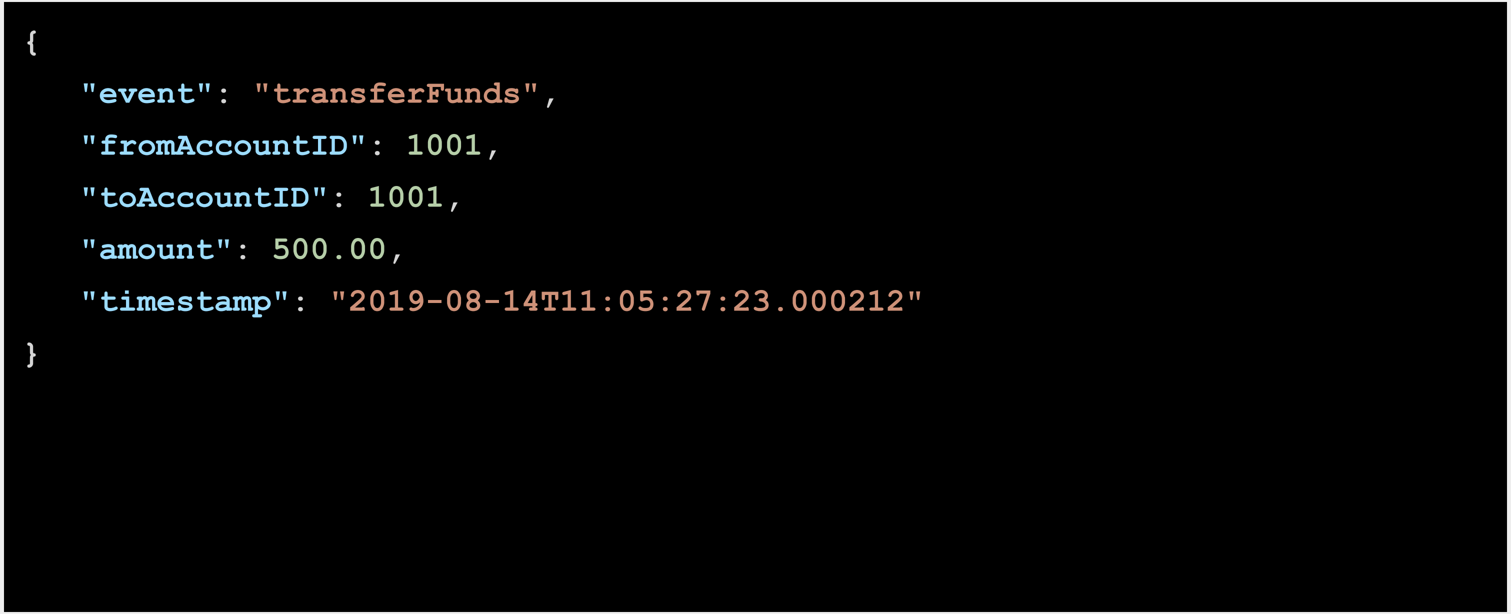
A decade (or so) ago:
ORM - Hibernate
POJOs and XML

Then ... Event Sourcing came along

Think “Events” instead of “Data Structure”.

Account

ID	customerID	balance
1001	990	1000
1002	991	0
1003	991	-500
1004	992	300



```
{
    "event": "transferFunds",
    "fromAccountID": 1001,
    "toAccountID": 1001,
    "amount": 500.00,
    "timestamp": "2019-08-14T11:05:27:23.000212"
}
```

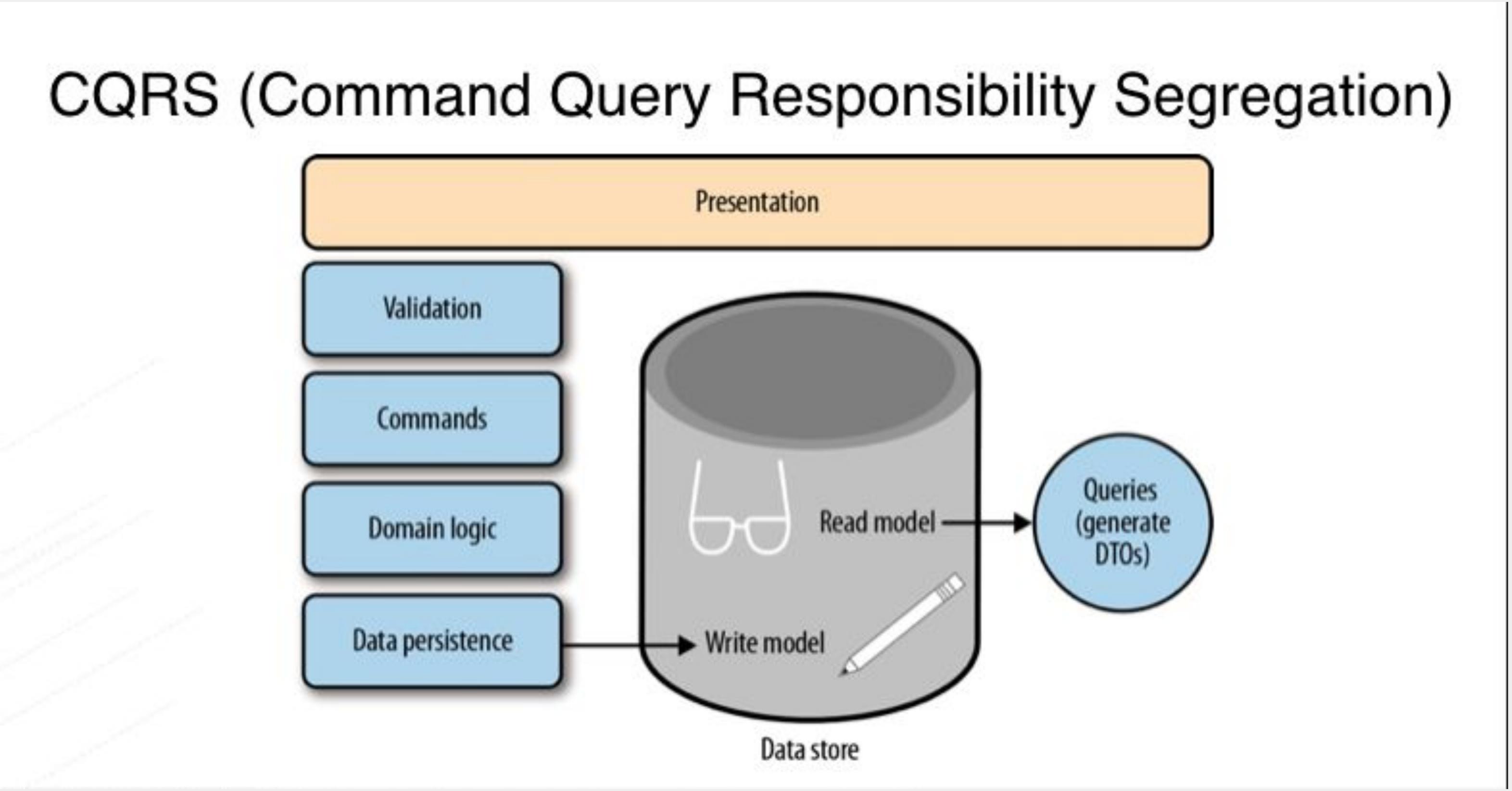
An Event is based on the real world, not IT-think.

CQS
Command-Query Separation

“Asking a question should not change the answer” -- Bertrand Meyer

CQRS - Command Query Responsibility Segregation

A simple, basic example

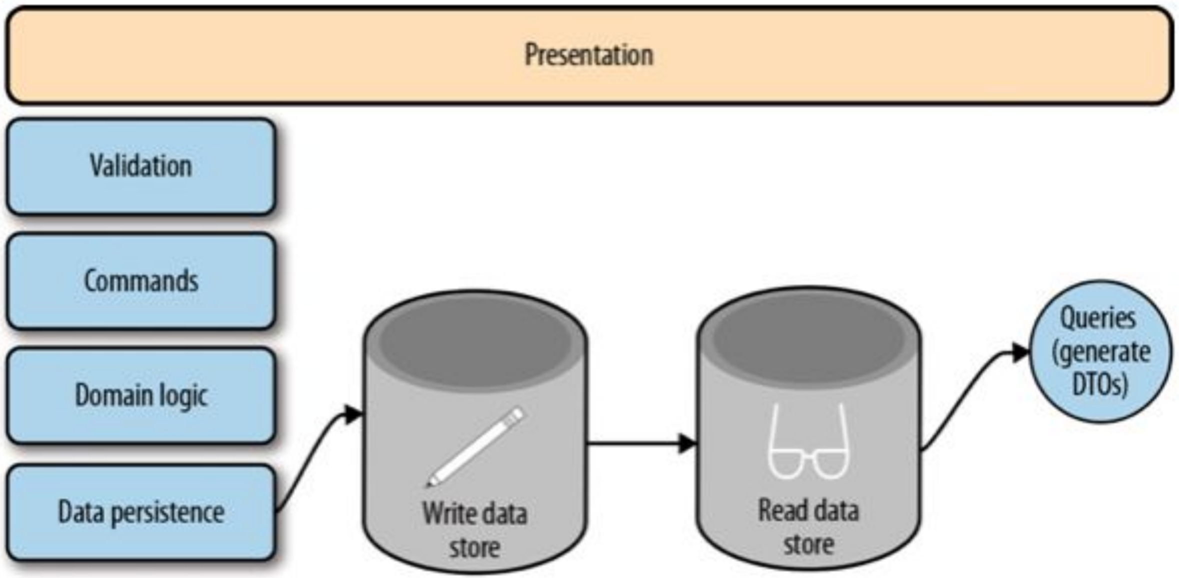


CQRS (Command Query Responsibility Segregation)

This is simple?

But distributed systems bring complexity…

CQRS with separate data stores



Examples:

- Read one
- Read a list
- Search...

CQRS & Event Sourcing

Why CQRS?

Performance

...and...

- Distribution
- Availability
- Integration
- Analytics

WHEN CQRS?

Single Source of Truth: The WRITE data store

Next: Create your READ data stores.

Add Events to update data stores.

More about Event Sourcing:

It’s WRITE-ONLY

You get audit trails/history built in

Well … that's nice

Events are immutable

The Event Store fires events that are independent of the origin

So convenient. I guess it's a convenience store yuk yuk

Events...

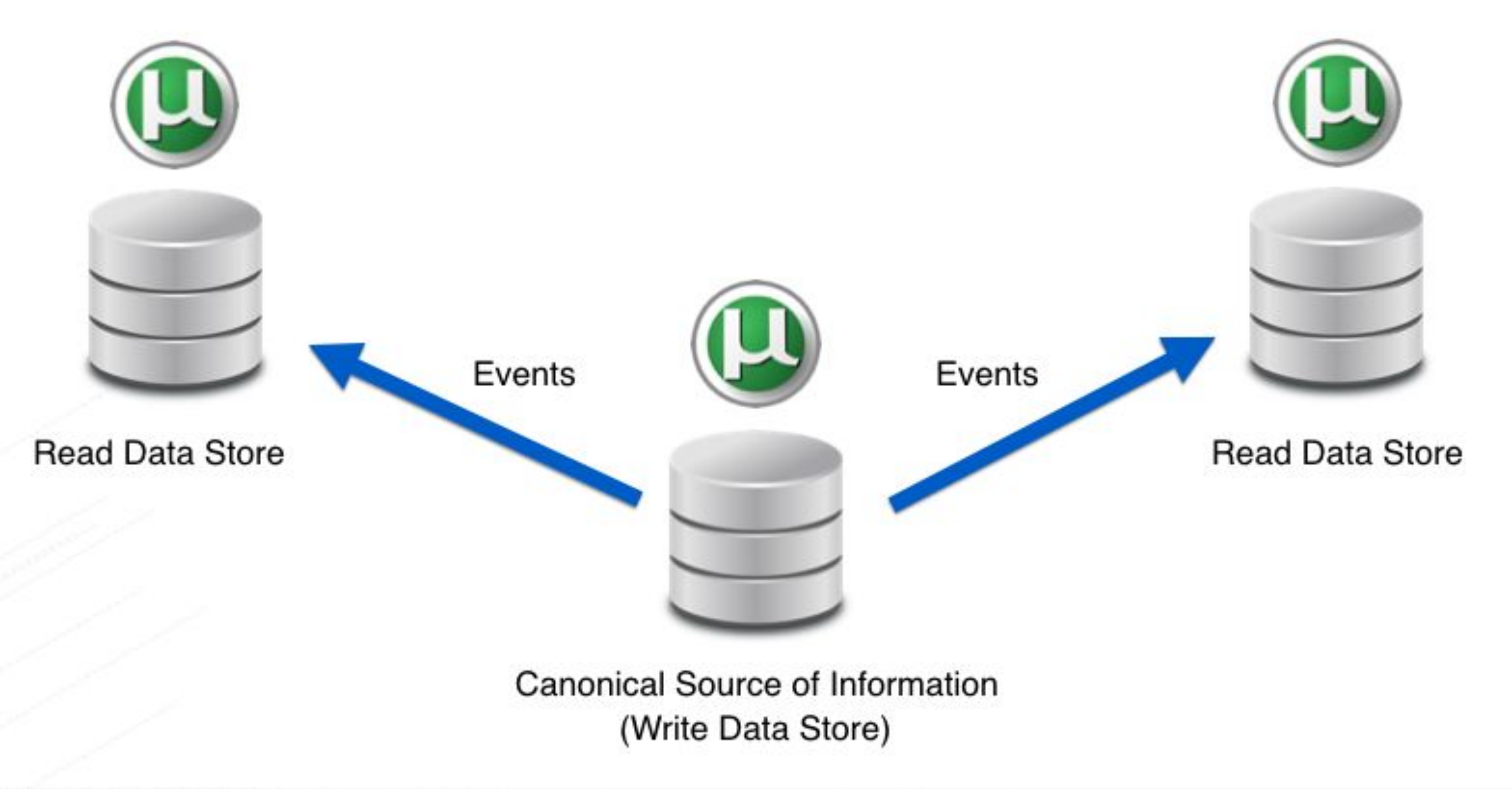
Maintain a Materialized View

Integrate external systems

Are not reliant on a database schema

Can materialize the current state (This can be a batch job!)

Events follow the “Fire-and-Forget” model of operation.



It was time for another pretty picture

Somethings that affect your decision regarding updating READ stores:

Latency

Size

Staleness

Ownership

Security

Nature and depth of information

So how do we find the current state?

Cheat Mode = ON (It’s okay to bookmark data)

Up up down down left right left right B A

CQRS considerations:

CQRS considerations:

- Complexity

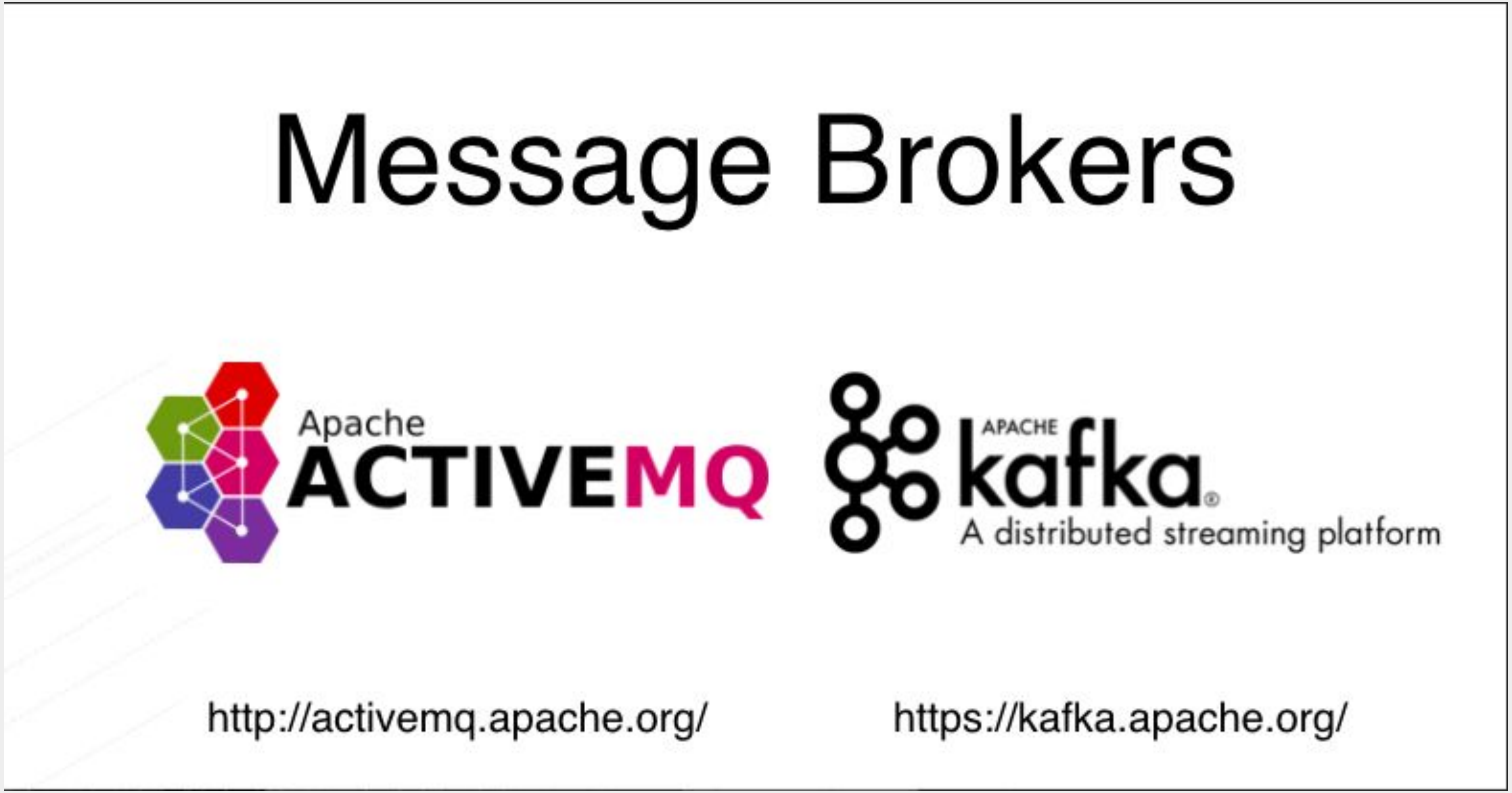
CQRS considerations:

- Complexity
- Consistency

CQRS considerations:

- Complexity
- Consistency
- Communication

Distributing events using a Message Broker



Message Brokers

Apache
ACTIVEMQ
APACHE
kafka
A distributed streaming platform

http://activemq.apache.org/

https://kafka.apache.org/

Kafka
Streaming platform (with ordered delivery)

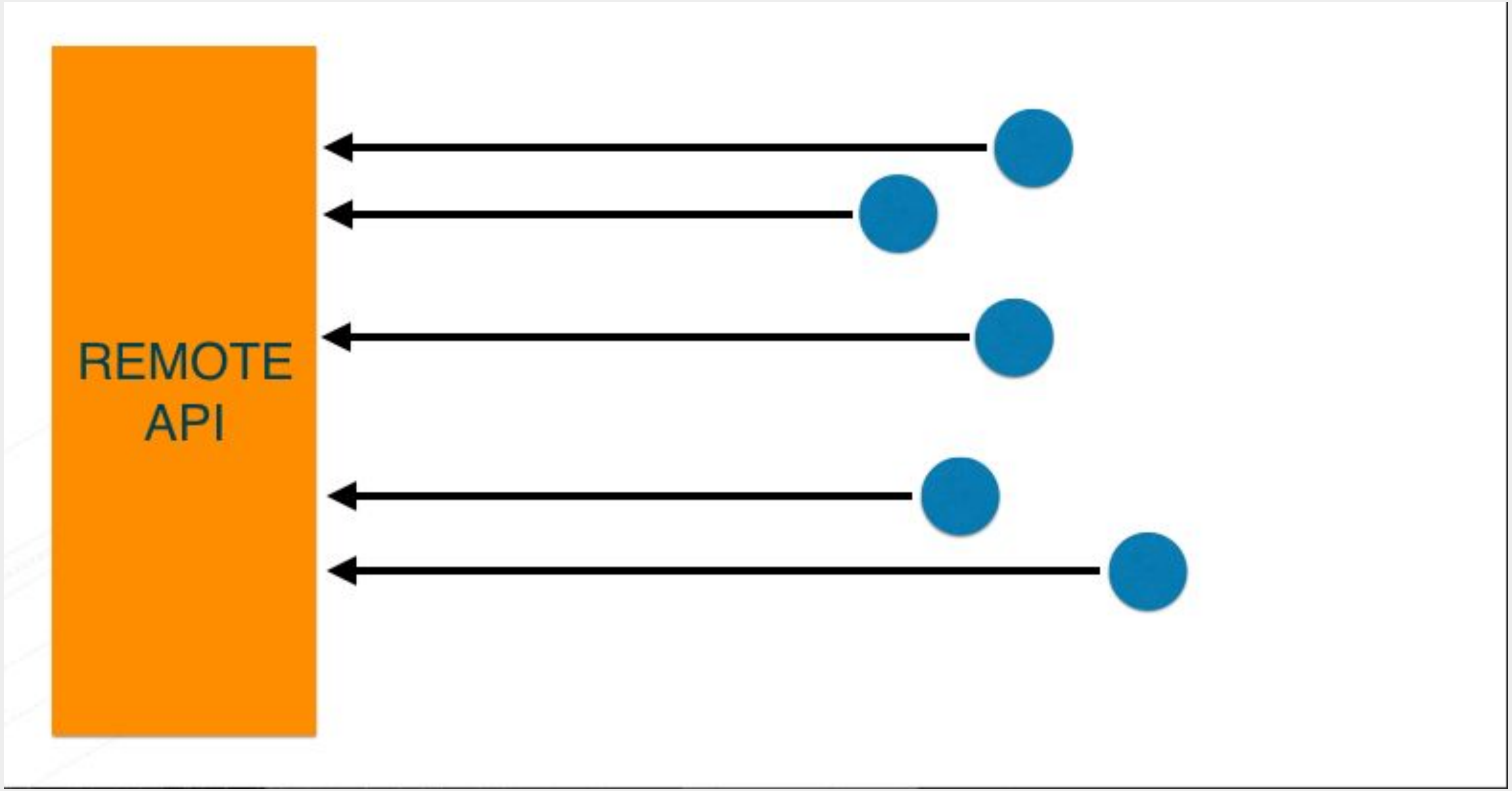
Kafka uses a Publish/Subscribe model with Topics

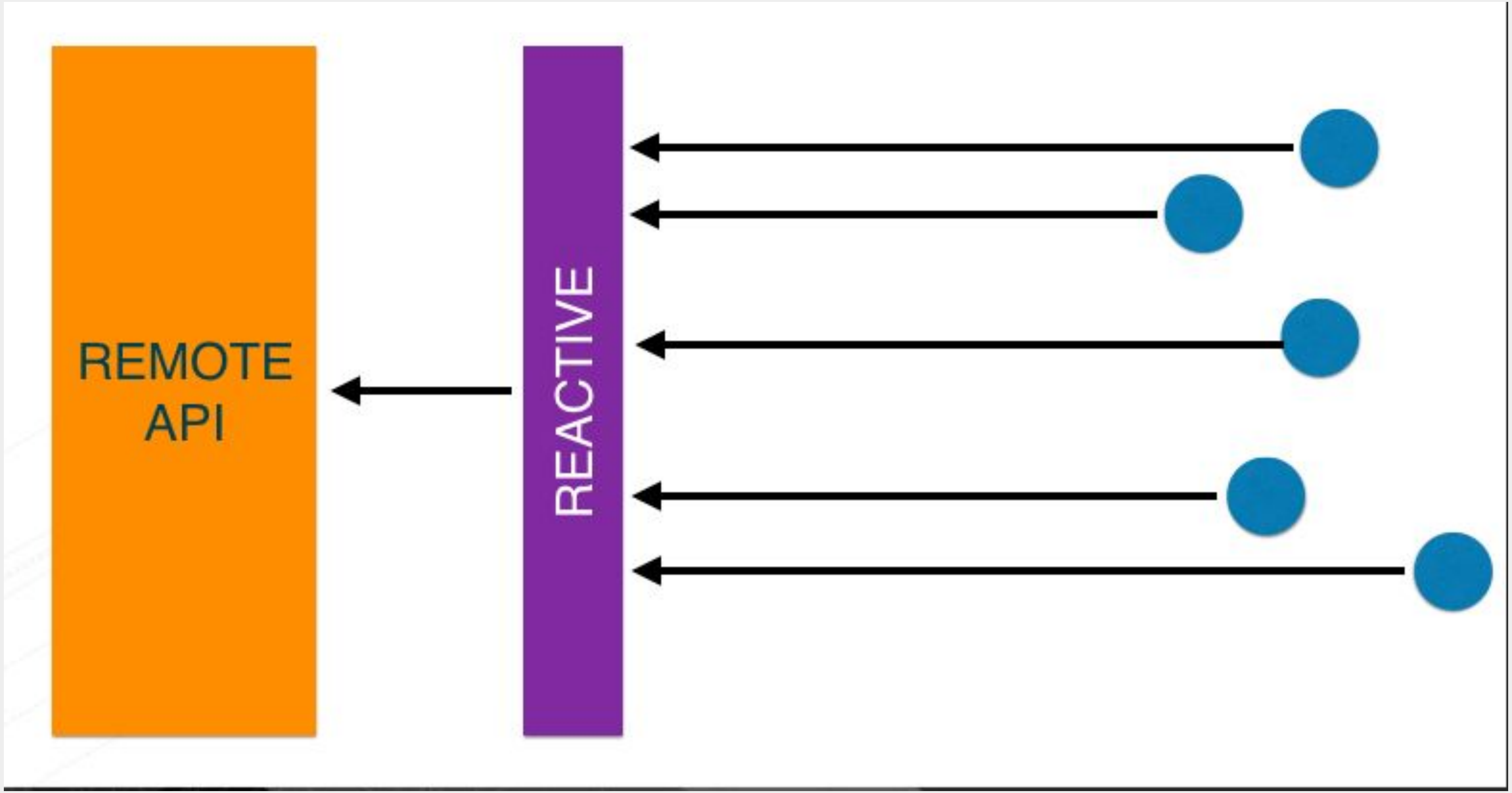
Vert.x
Reactive platform

Reactive Platform

VERT.X

http://vertx.io/


REMOTE
API


REMOTE API
REACTIVE

github.com/reactica/rhte-demo

github.com/vert-x3/vertx-examples

developers.redhat.com

@DonSchenck

So many URLs, so little time. What's another browser tab open between friends?

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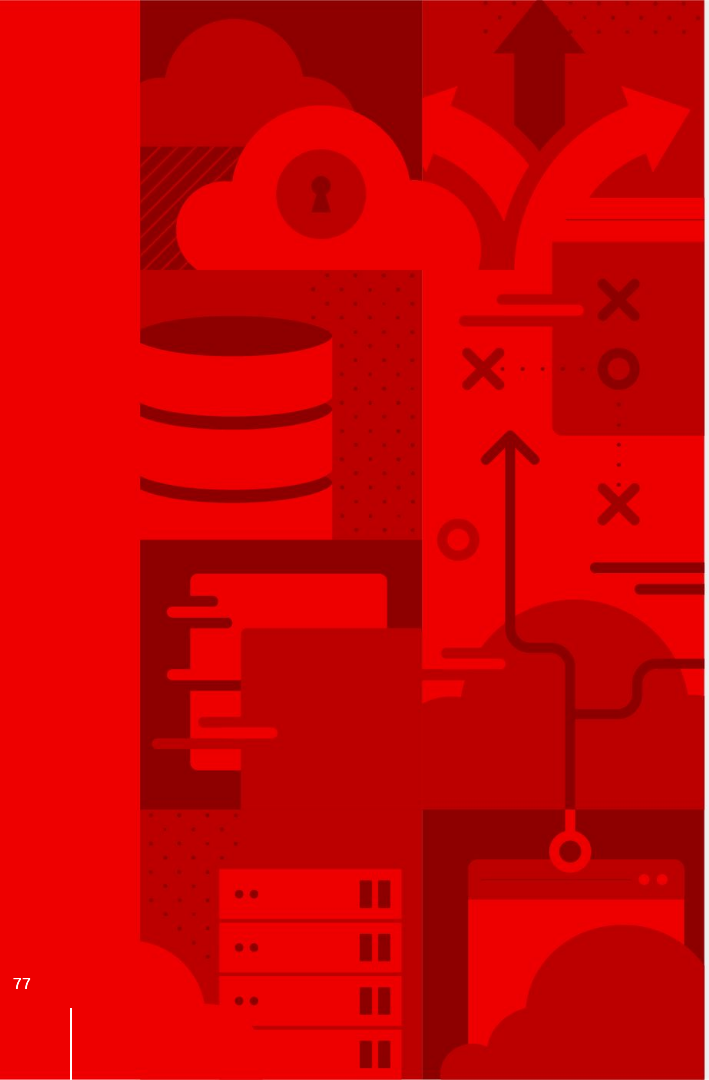

Thank you

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