CQRS & EVENT SOURCING
A DEVOPS PERSPECTIVE

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THE JOURNEY

- project & technical introduction
- deployments
- production support
- monitoring
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project &
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monitoring
LET ME TELL YOU ABOUT THIS PROJECT
LET ME TELL YOU ABOUT THIS PROJECT

The old world
LET ME TELL YOU ABOUT THIS PROJECT

*The old world*

*20M+ accounts*
LET ME TELL YOU ABOUT THIS PROJECT

The old world

20M+ accounts

Bunch of monoliths
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The old world

20M+ accounts

Bunch of monoliths

Snowflake servers
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The old world

20M+ accounts

Bunch of monoliths

Unscalable architecture

Snowflake servers
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*The new world*

*Scalable*
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The new world

Scalable

Auditable
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The new world

Scalable

Extensible

Auditible
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*The new world*

- Scalable
- Extensible
- Automated
- Auditable
LET ME TELL YOU ABOUT THIS PROJECT

The new world

Scalable

Automated

Extensible

Resilient

Auditable
Client 1 … Client N

Third party 1 … Third party N

Mainframe 1 … Mainframe n

Platform

Domain1 Domain2 … DomainN
Platform

Domain1  Domain2  ...  DomainN
Platform

Domain1

Domain2

... DomainN
CQRS & Event Sourcing

Platform

Domain1  Domain2  ...  DomainN
CQRS
Command Query Responsibility Segregation

**Command:**

*Create customer named Mark*

**Query:**

*Get all customers named Mark*
PROS OF CQRS

- Extensible
- Automated
- Auditable
- Scalable
- Resilient
- Extensible
CONS OF CQRS

Command

Write

Query

Read
CQRS & Event Sourcing

Platform

Domain1  Domain2  DomainN
WHAT IS AN EVENT?

CustomerSkillAddedEvent

{ name: Stacey Watro
  skill: awesome
}
Event Sourcing

- $300.37

$33.12
$100.02
$68.91
- $300.37
$294.37
$50.04
$122.22
$300.37
Event Sourcing

\[
f(x) = \$668.68
\]
PROS OF EVENT SOURCING

- Scalable
- Resilient
- Automated
- Extensible
- Auditable
- Resilient
CONS OF EVENT SOURCING: BACKWARDS COMPATIBILITY

CustomerSkillAddedEvent

{ name: Stacey Watro, skill: awesome }
CONS OF EVENT SOURCING: BACKWARDS COMPATIBILITY

CustomerSkillAddedEvent

{ 
  name: Stacey Watro 
  skill: awesome 
}

CustomerSkillAddedEvent

{ 
  name: Stacey Watro 
  firstName: Stacey 
  lastName: Watro 
  skill: awesome 
}
CONS OF EVENT SOURCING: BACKWARDS COMPATIBILITY

CustomerSkillAddedEvent

{ name: Stacey Watro skill: awesome }

CustomerSkillAddedEvent

{ name: Stacey
  firstName: Stacey
  lastName: Watro
  skill: awesome }
THE JOURNEY

- **Project & Technical Introduction**
- **Deployments**
- **Production Support**
- **Monitoring**
BENEFITS FOR APPLICATION DEVELOPMENT
CHALLENGES FOR OPERATIONS DEVELOPMENT
HOW DO WE PUT THE PLATFORM INTO PRODUCTION?

Client 1

Client N

Mainframe 1

Mainframe n

Third party 1

Third party N

Platform

Domain1

Domain2

... DomainN
DEPLOY REQUIREMENTS

Zero Downtime
DEPLOY REQUIREMENTS

Zero Downtime

Safe & Repeatable
DEPLOY REQUIREMENTS

Zero Downtime

Safe & Repeatable

Handle Event Versions
DEPLOY REQUIREMENTS

- Zero Downtime
- Safe & Repeatable
- Handle Event Versions
- Prevent Data Loss
Blue
Domain1

Domain2

....

DomainN
Event Bus
Green

Event Bus
DEPLOY REQUIREMENTS

- **Zero Downtime**
- **Safe & Repeatable**
- **Handle Event Versions**
- **Prevent Data Loss**
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resilience

monitoring
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HOW DO WE MONITOR THE PLATFORM?
MONITORING REQUIREMENTS

Log statement for every action

Ability to find origin of each request

Usability
WHAT IS DIFFERENT ABOUT LOGGING FOR CQRS & EVENT SOURCING?

Domain1  Event Bus  Domain2

Event Bus

Domain

Write

Read
WHAT SHOULD YOU LOG?
WHAT SHOULD YOU LOG?
WHY IS NAMING SO IMPORTANT?

CustomerSkillAddedEvent

{ name: Stacey Watro
  skill: awesome }
MONITORING REQUIREMENTS

- Log statement for every action
- Ability to find origin of each request
- Usability
ABILITY TO FIND THE ORIGIN OF A REQUEST

Client 1

Mainframe 1

Mainframe N

Domain 1

Domain 2

Domain N

Platform

Third party 1

Third party N

Client N

...
ABILITY TO FIND THE ORIGIN OF A REQUEST

Client 1  .....  Client N

Mainframe 1  .....  Mainframe N

Third party 1  .....  Third party N

Platform

Domain1  Domain2  ...  DomainN
ABILITY TO FIND THE ORIGIN OF A REQUEST
ABILITY TO FIND THE ORIGIN OF A REQUEST

Client 1 \[\ldots\] Client N

Third party 1 \[\ldots\] Third party N

Mainframe 1 \[\ldots\] Mainframe N

Platform

Domain 1 \[\ldots\] Domain N

TraceID
MONITORING REQUIREMENTS

- Log statement for every action
- Ability to find origin of each request
- Usability
MONITORING REQUIREMENTS

- Log statement for every action
- Ability to find origin of each request
- Usability
USABILITY: LOG AGGREGATOR

Log Statements

Trace IDs
USABILITY: LOG AGGREGATOR

Log Statements

Trace IDs
LOG AGGREGATOR
LOG AGGREGATOR
LOG AGGREGATOR
Client 1  
...  
Client N  

Third party 1  
...  
Third party N  

Mainframe 1  
...  
Mainframe n  

Platform  

Domain1  
Domain2  
...  
DomainN  

...
MONITORING REQUIREMENTS

- Log statement for every action
- Ability to find origin of each request
- Usability
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HOW DO WE SUPPORT THE PLATFORM?
SUPPORT REQUIREMENTS

*Resilience over reliability*

*Prevent Data Loss*

*Smart Alerts*
EVENT BUS FAILS
EVENT BUS FAILS
EVENT FAILS

Broker

Consumer
EVENT FAILS
EVENT FAILS

Broker

Consumer

Dead Letter Queue
EVENT FAILS

Broker ➔ Consumer

Dead Letter Queue

Event metadata:
- Event type
- Timestamp

/retry
/delete
CONSUMER IS FULL/STUCK
CONSUMER IS FULL/STUCK

Broker

Consumer
CONSUMER IS FULL/STUCK

Broker

# processed messages

speed

# pending messages

Consumer

# processed messages
CONSUMER IS FULL/STUCK

# processed messages in Broker > # processed messages in Consumer after x period of time

# pending messages above average for x period of time
SUPPORT REQUIREMENTS

Resilience over reliability

Prevent Data Loss

Smart Alerts
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KEY LEARNINGS

CQRS & Event Sourcing heavily influenced deployment, monitoring & support

Blue/Green was best given our constraints

Log aggregation was not enough for us

Invested in making the system resilient
THANK YOU

For questions or suggestions:
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