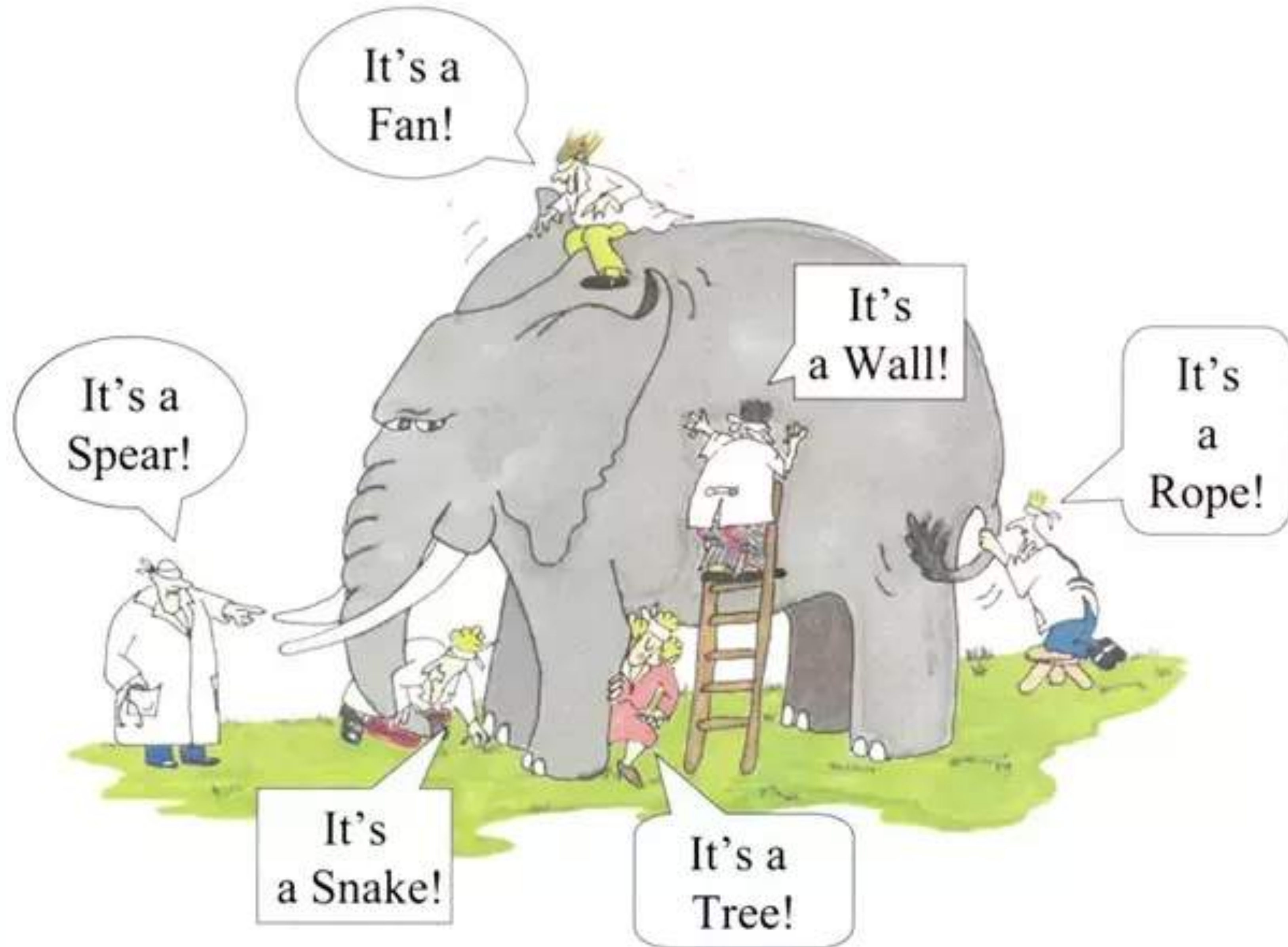


# CQRS & EventSourcing With Spring & Axon

By :  
Nakul Mishra

**“Success by design is infinitely better than a win by chance.”**





# Code is like water, it reflects



# Our perception

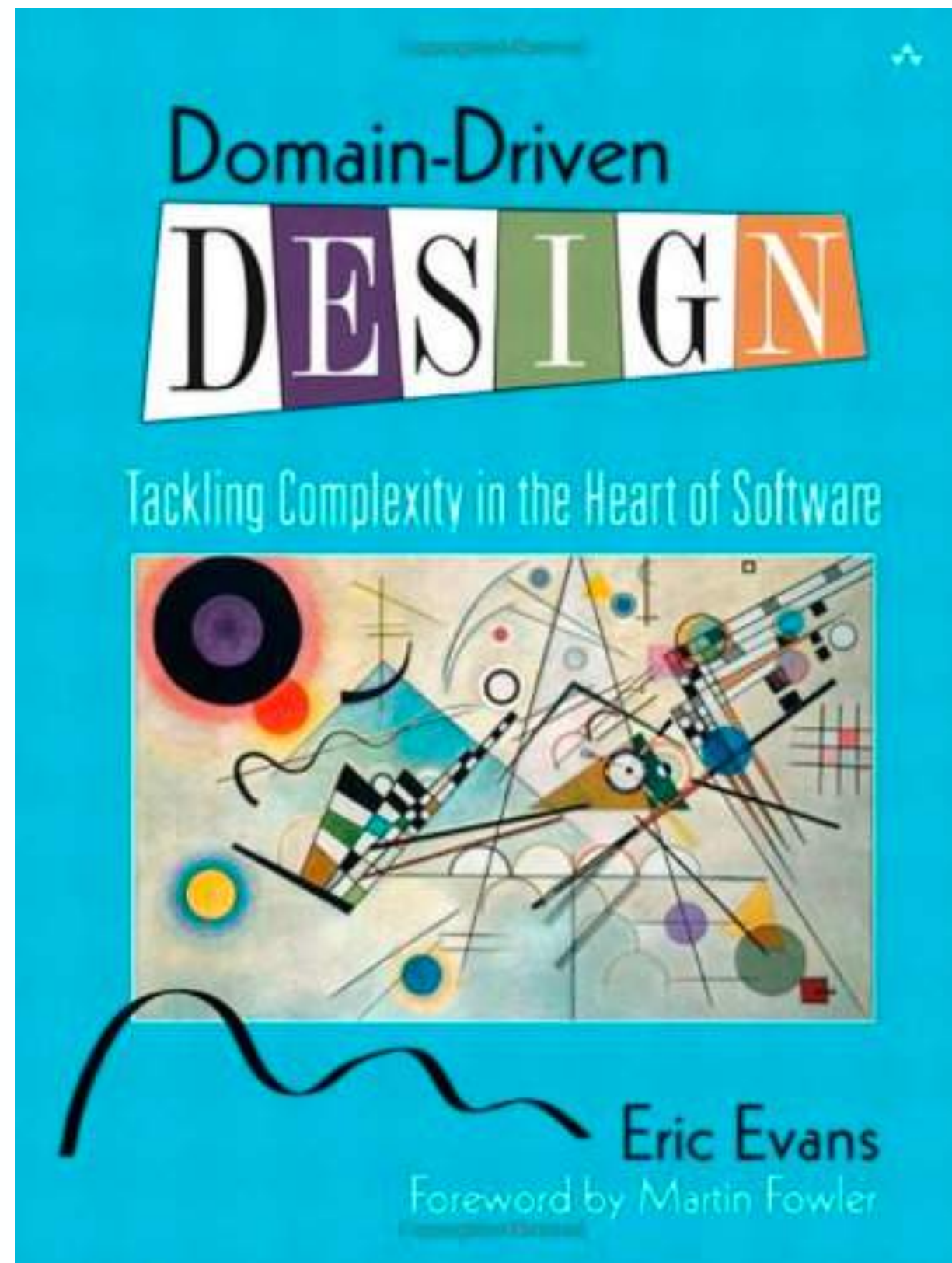


# Business Reality



#Java2Days

@nkImish



**DDD**

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#Java2Days

@nklmish

# DDD - Focus on domain



# DDD In Practice?

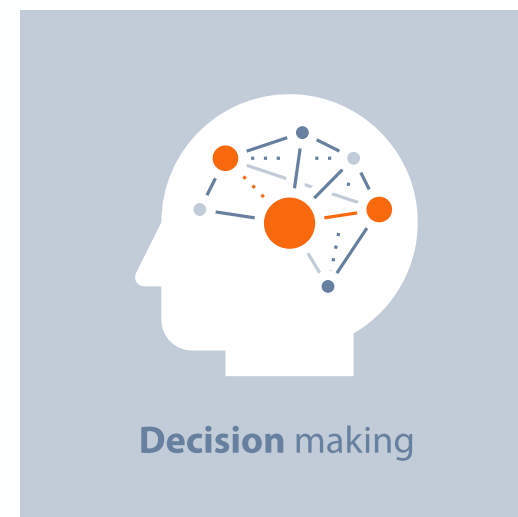


#Java2Days

@nklmish



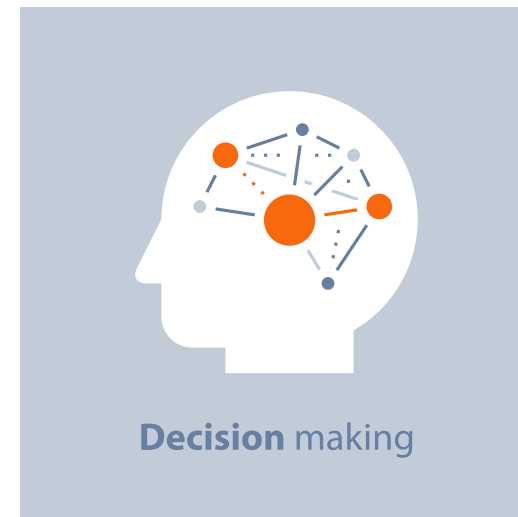
# DDD in a nutshell



**Place behaviour in “Domain Model”**



# DDD in a nutshell



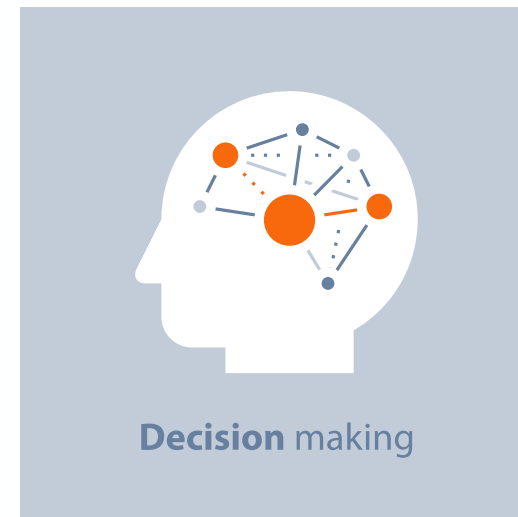
**Place behaviour in “Domain Model”**



**Code should reflect “Business REALITY”  
(Ubiquitous language)**



# DDD in a nutshell



**Place behaviour in “Domain Model”**



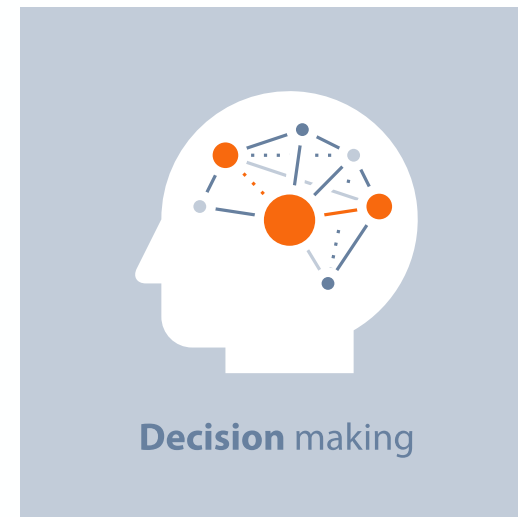
**Provide unit of consistency  
across Domain Model via “Aggregate”**



**Code should reflect “Business REALITY”  
(Ubiquitous language)**



# DDD in a nutshell



**Place behaviour in “Domain Model”**



**Provide unit of consistency  
across Domain Model via “Aggregate”**



**Code should reflect “Business REALITY”  
(Ubiquitous language)**



**Define clear “bounded context” &  
protect your model.**





# Aggregate





# Event Sourcing



# Traditional app



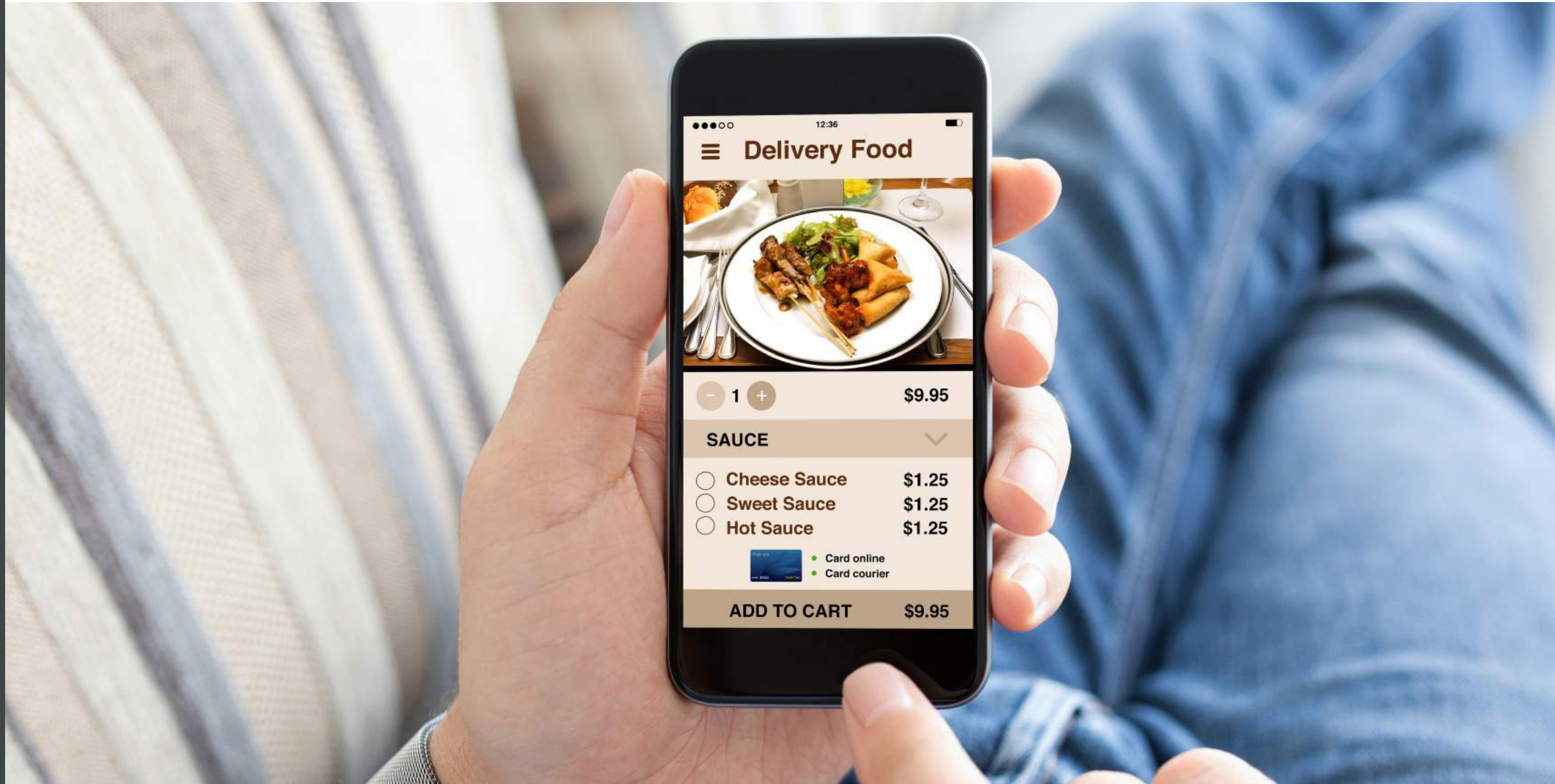
# Traditional app - What Happened

12345	1	Veggie Burger	Shipped
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# Event sourcing

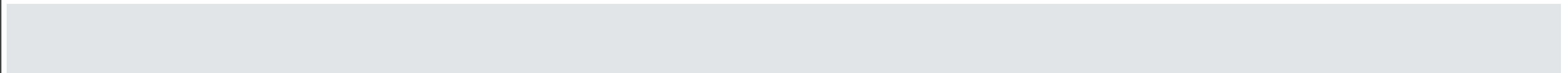
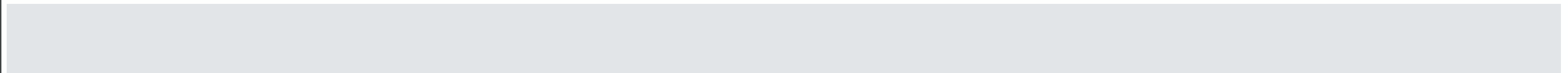
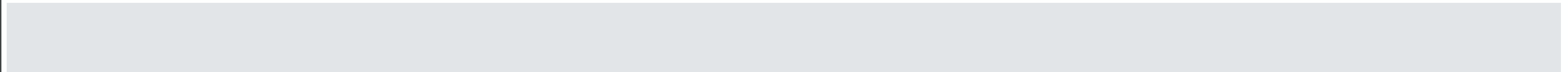


# Event Sourcing - What ACTUALLY Happened

Item Added

1

Veggie Burger



# Event Sourcing - What ACTUALLY Happened

Item Added

1

Veggie Burger

Item Added

1

Salad



# Event Sourcing - What ACTUALLY Happened

Item Added	1	Veggie Burger
Item Added	1	Salad
Item Added	1	Ice cream



# Event Sourcing - What ACTUALLY Happened

Item Added	1	Veggie Burger
Item Added	1	Salad
Item Added	1	Ice cream
Item Removed	1	Ice cream



# Event Sourcing - What ACTUALLY Happened

Item Added	1	Veggie Burger
Item Added	1	Salad
Item Added	1	Ice cream
Item Removed	1	Ice cream
Item Removed	1	Salad



# Event Sourcing - What ACTUALLY Happened

Item Added	1	Veggie Burger
Item Added	1	Salad
Item Added	1	Ice cream
Item Removed	1	Ice cream
Item Removed	1	Salad
OrderConfirmed		



# Event Sourcing - What ACTUALLY Happened

Item Added	1	Veggie Burger
Item Added	1	Salad
Item Added	1	Ice cream
Item Removed	1	Ice cream
Item Removed	1	Salad
OrderConfirmed		
Order Shipped		





# Event Sourcing - What ACTUALLY Happened

Item Added	1	Veggie Burger
Item Added	1	Salad
Item Added		Ice cream
Item Removed		Ice cream
Item Removed		Salad
OrderConfirmed		
Order Shipped		

Food for Big Data, ML, etc.



# Where to store events?



# Event Store

---



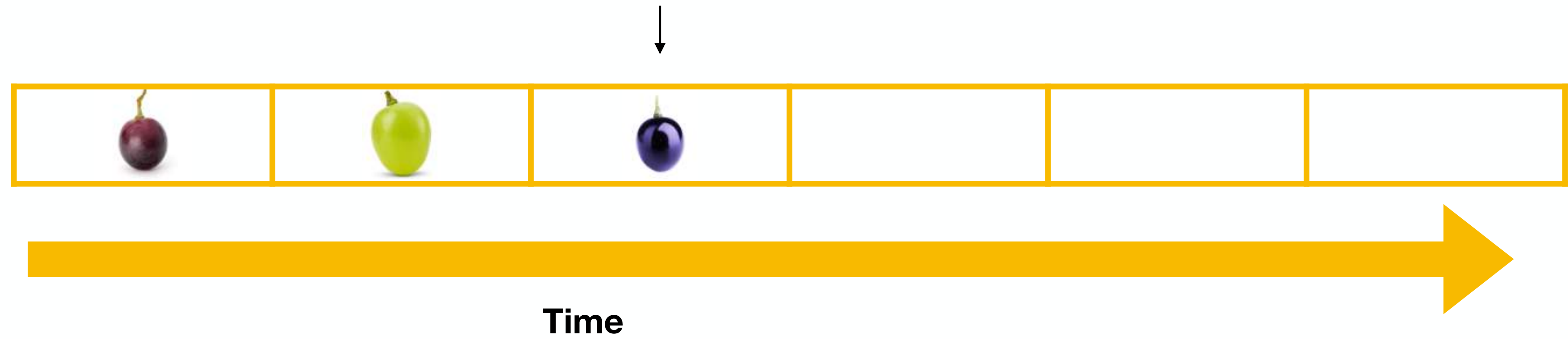
# Event Store



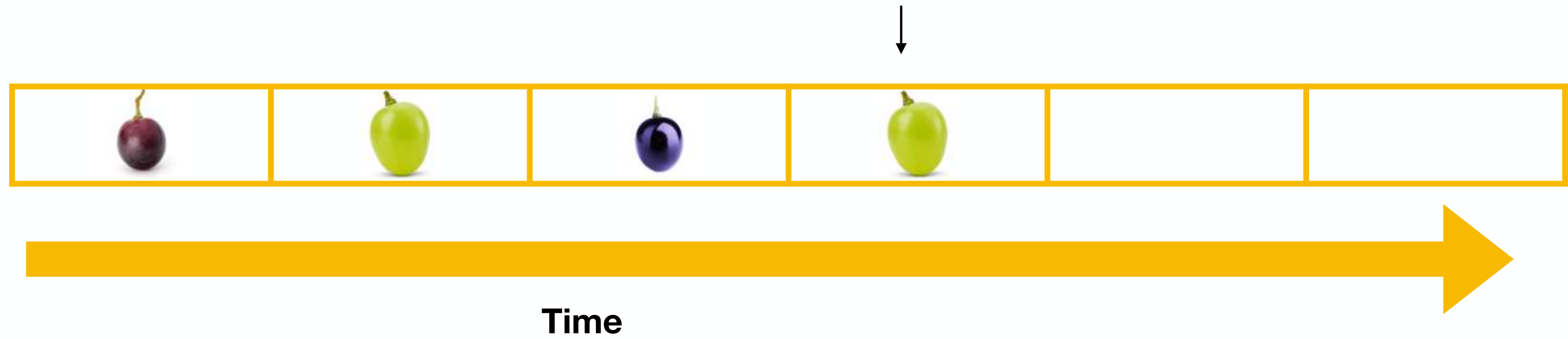
# Event Store



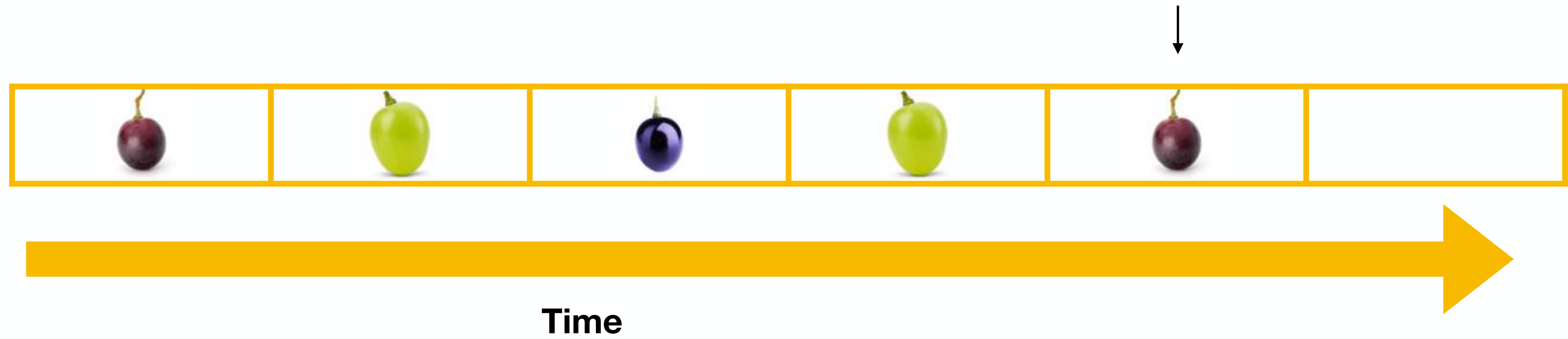
# Event Store



# Event Store

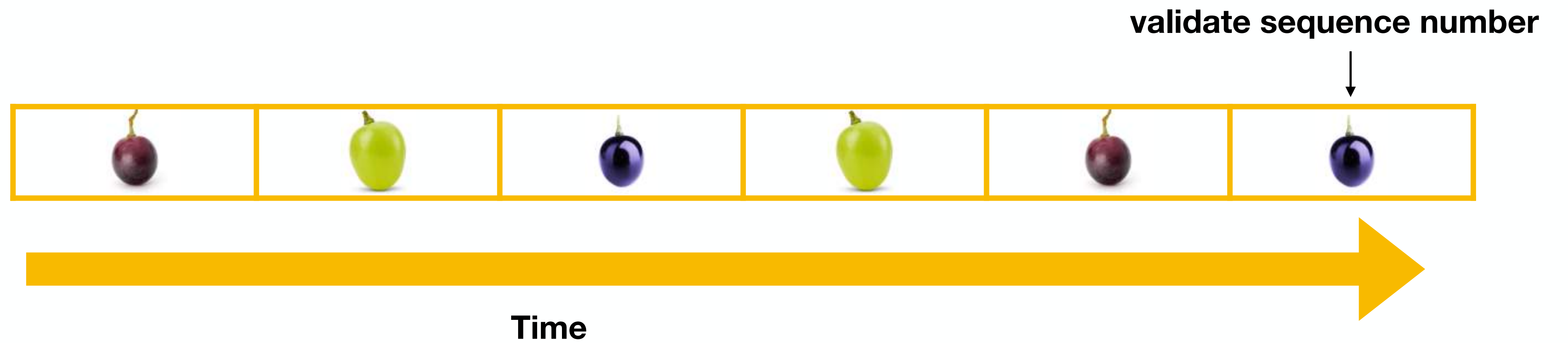


# Event Store





# Event Store



# Event Store Implementation

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- EventStore - Greg Young
- AxonDB - AxonIQ
- Relational DBMS
- Roll out your own....



# CQRS



#Java2Days

@nklmish

# Command

**I WANT SOMETHING DONE**

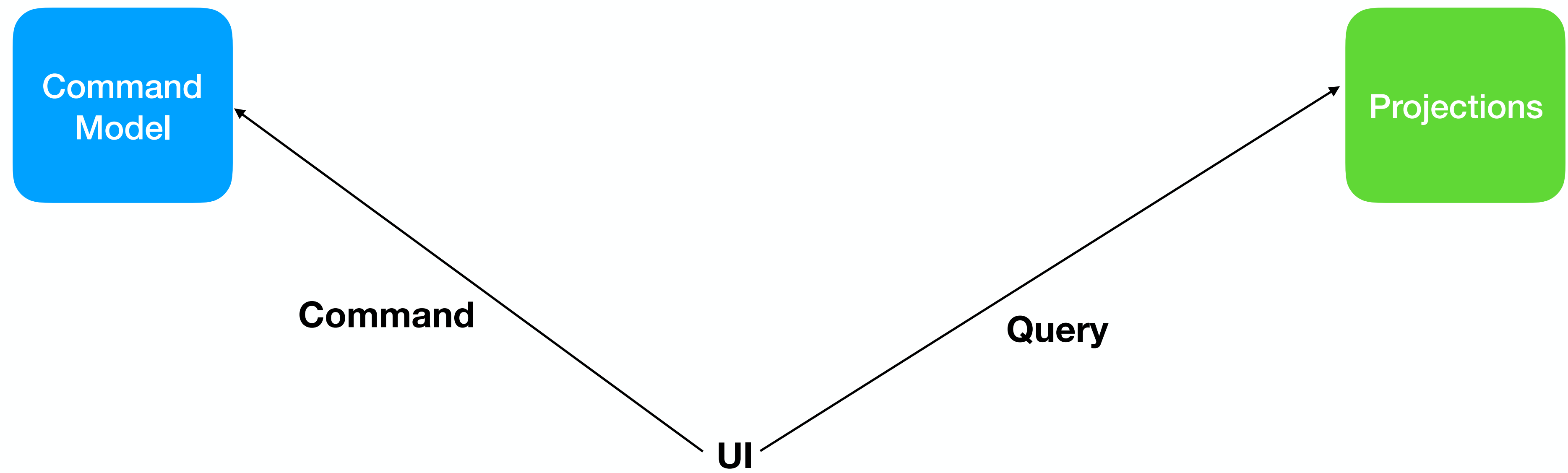


# Query (Projections)

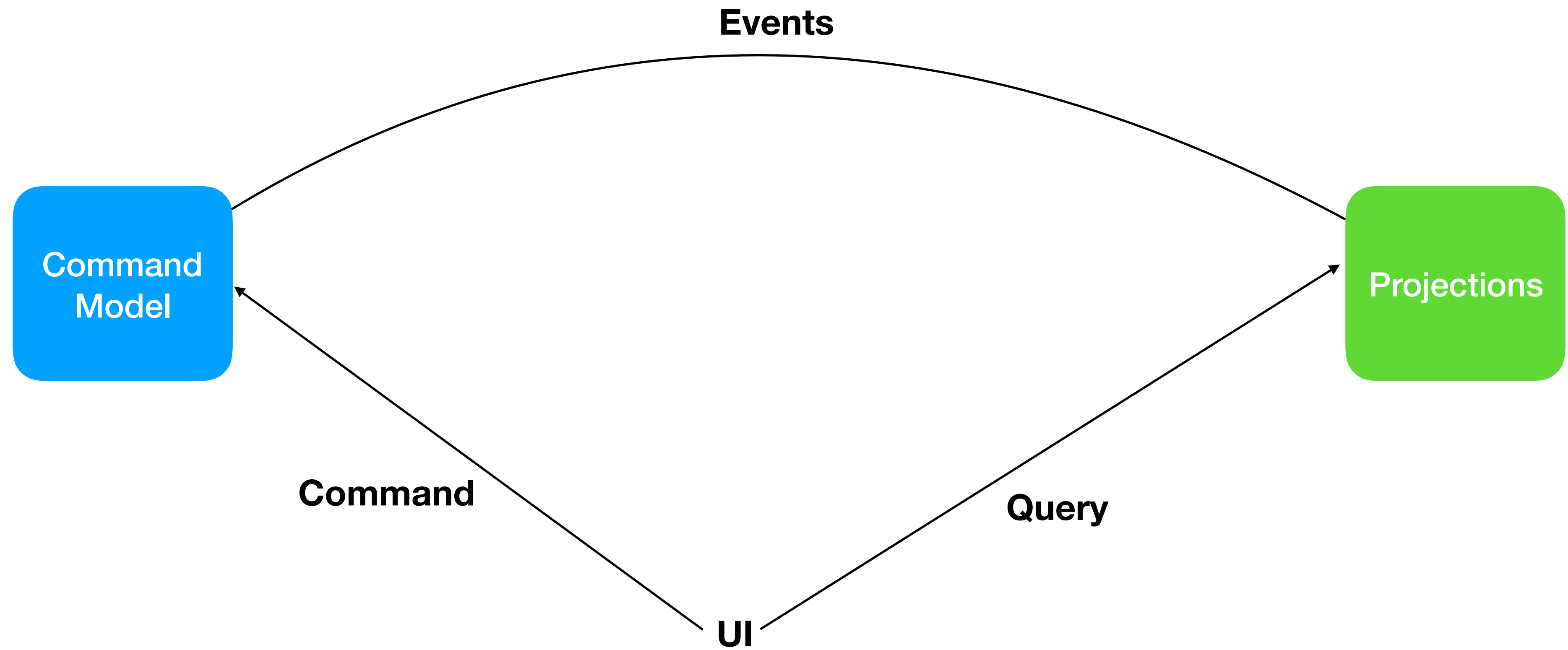
**I WANT TO KNOW SOMETHING**



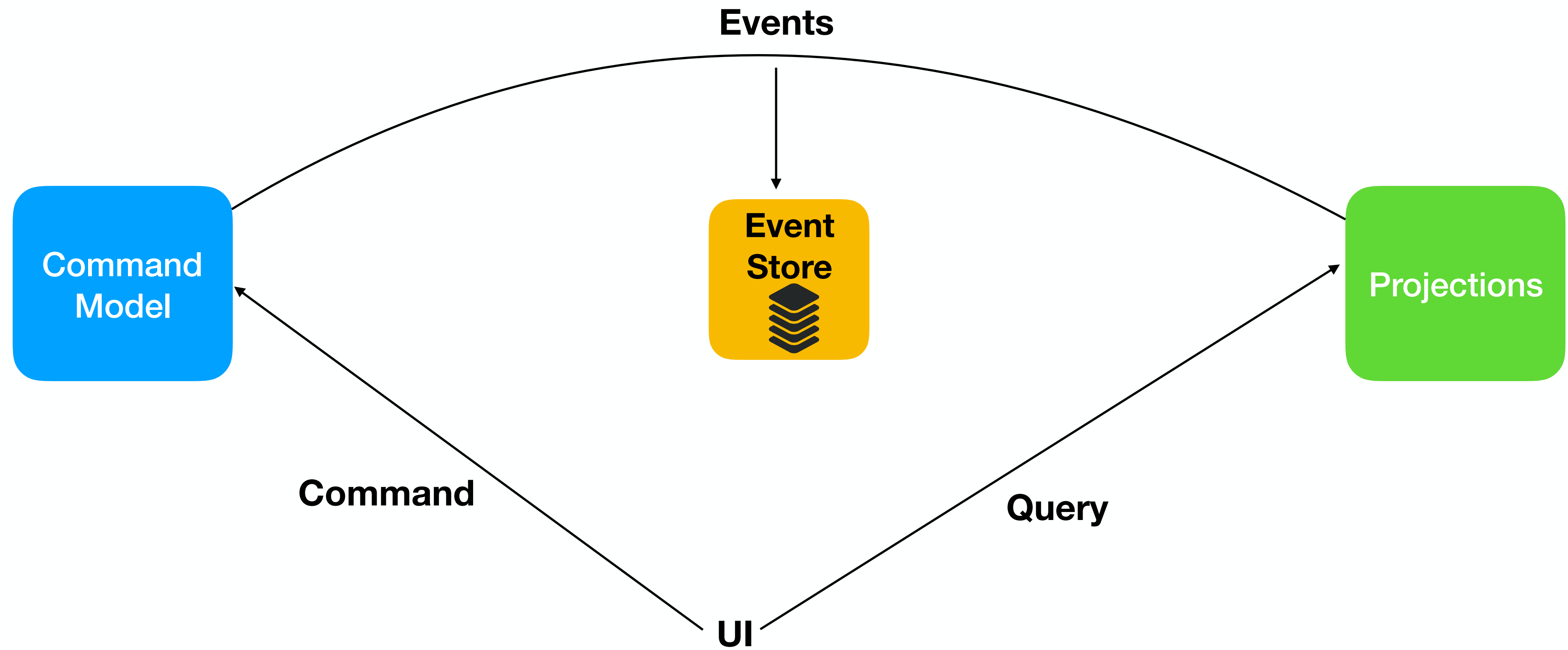
# CQRS



# CQRS

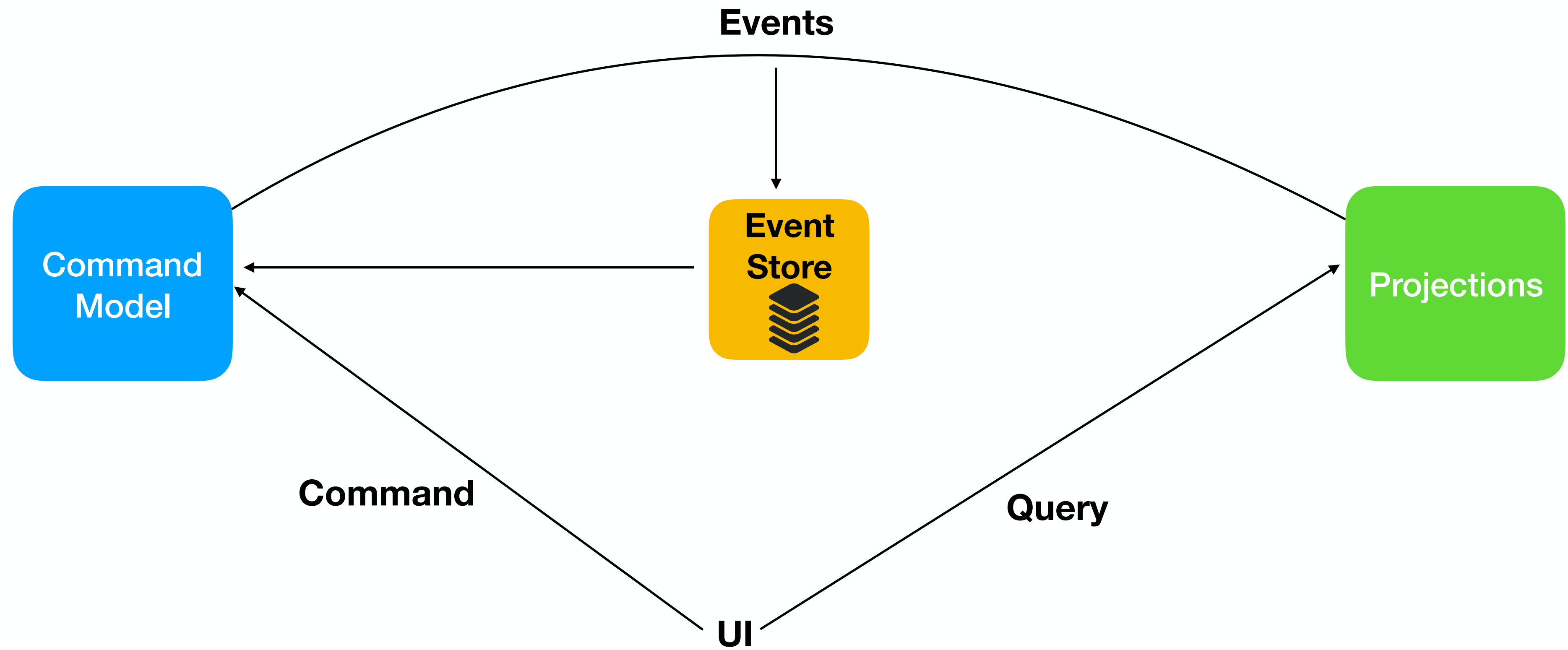


# CQRS





# CQRS

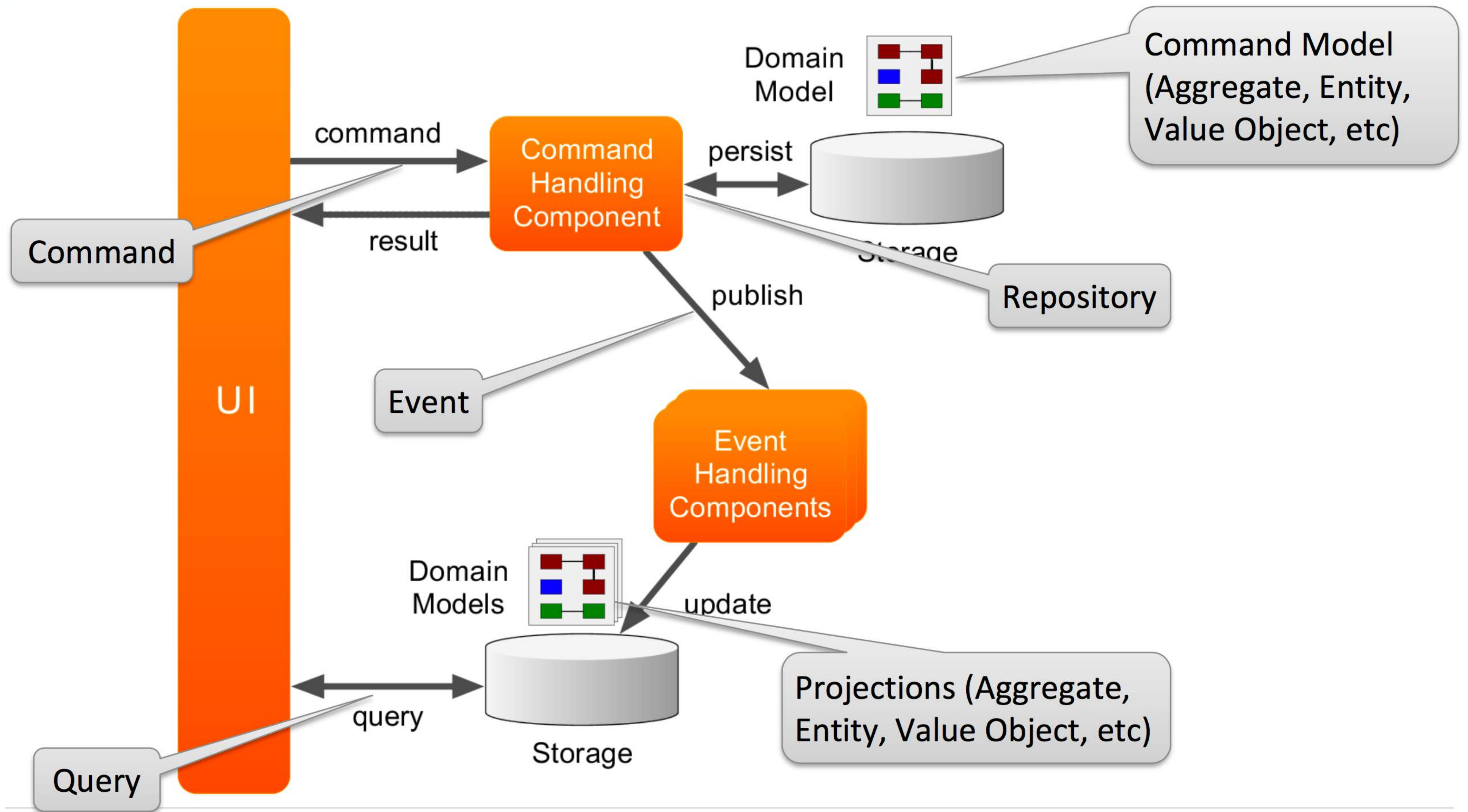




**IT'S EASY!**



**D**et**a**ils



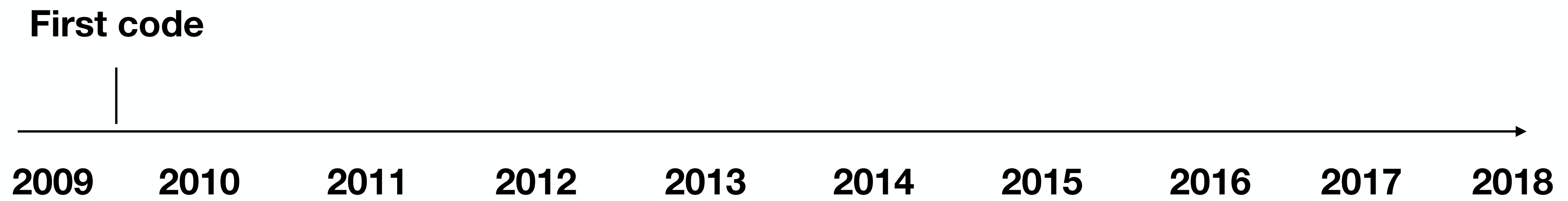


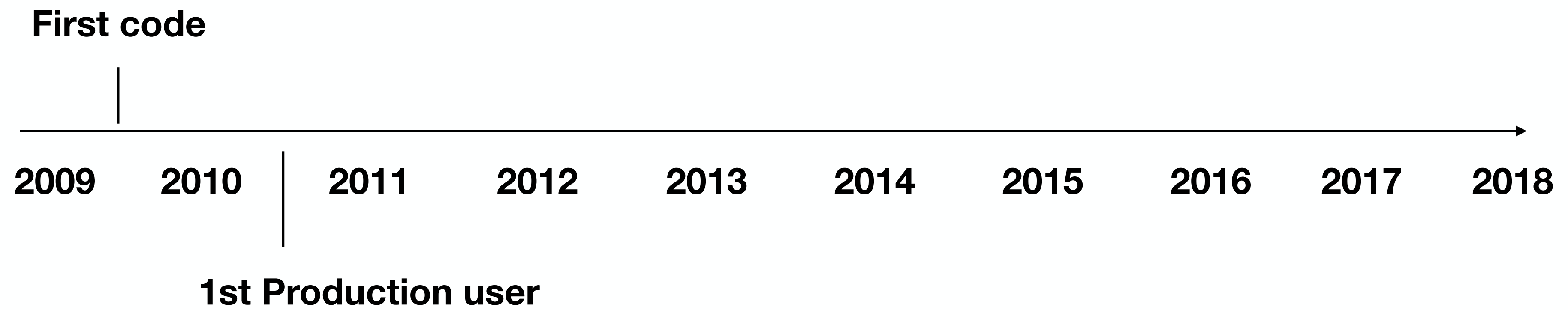
#Java2Days

@nklmish

A photograph of a spiral-bound notebook on a dark wooden surface. The notebook is open to a page with vertical lines. The words "Make it Easy.." are written in a large, black, cursive font. A horizontal line is drawn under the word "Easy..". To the left of the notebook is a glowing yellow lightbulb. To the right is a silver pen.

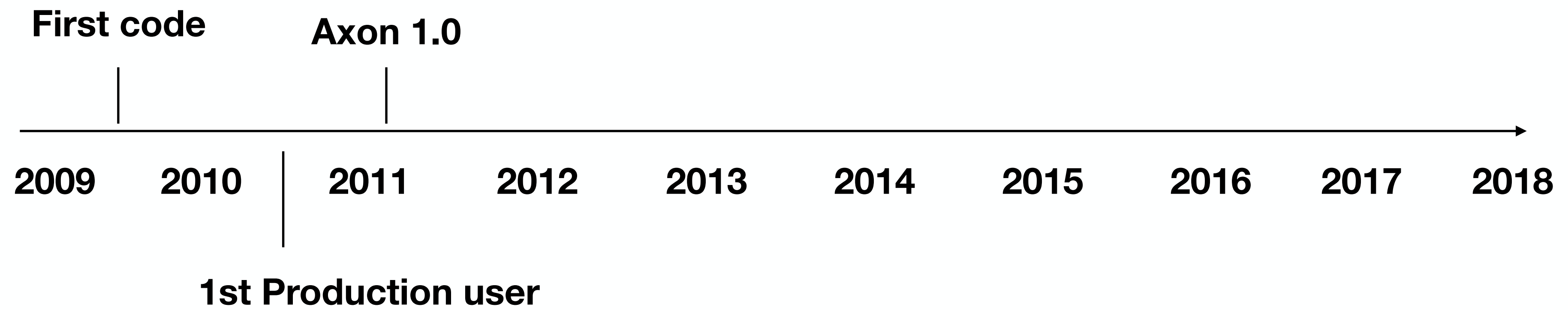
Make it  
Easy..



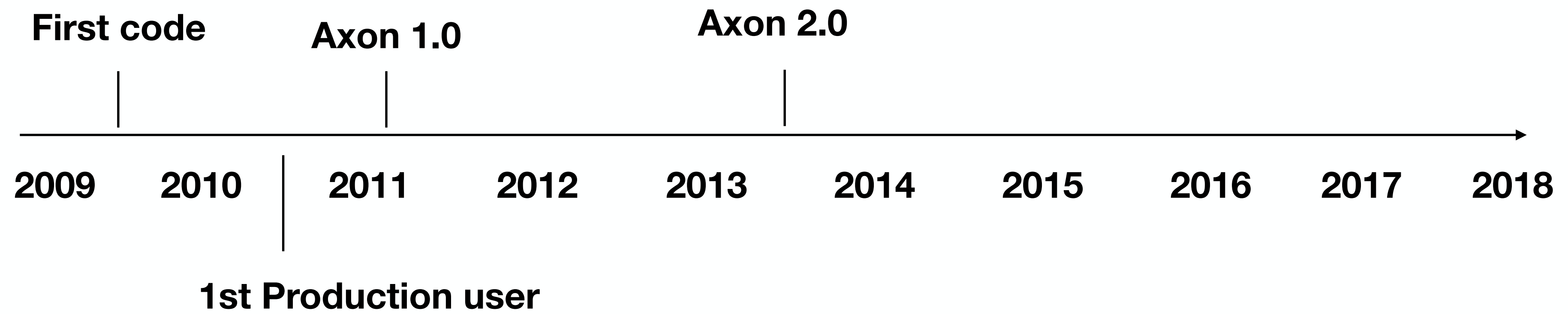




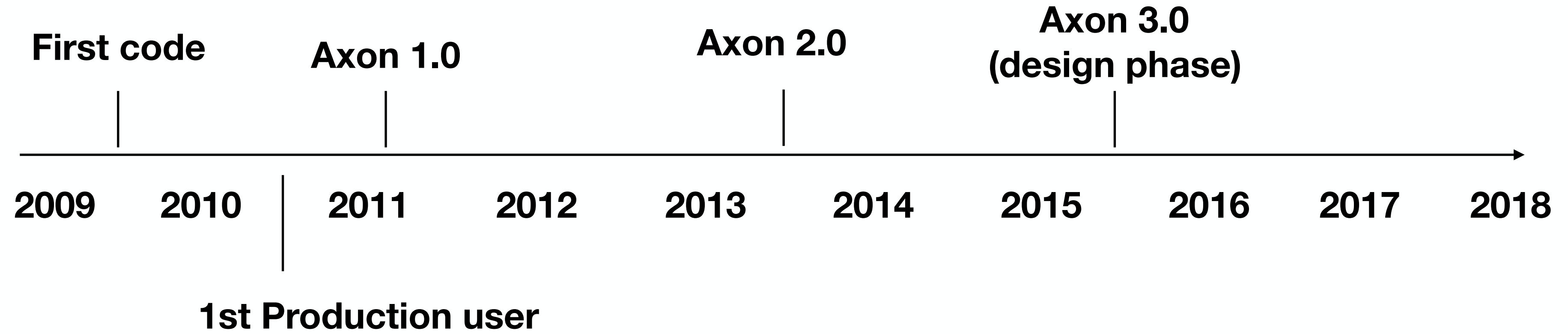
# Axon History



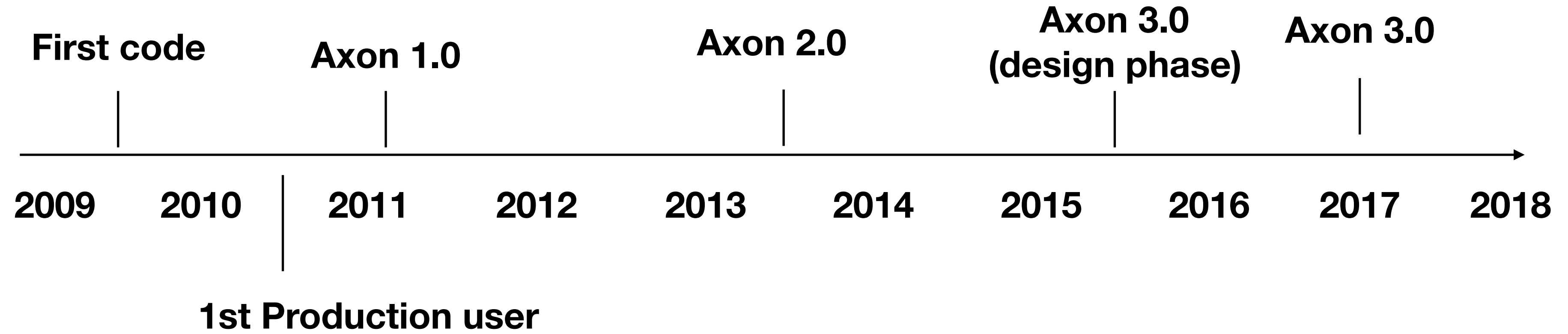
# Axon History



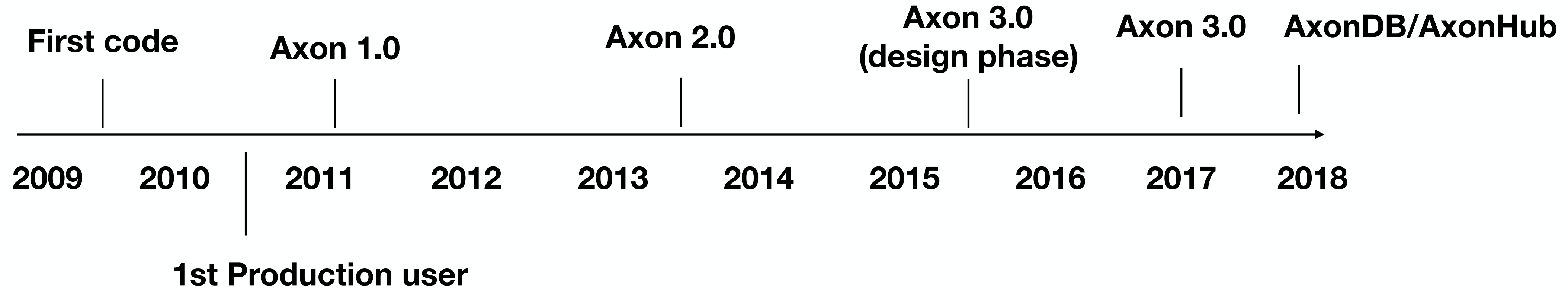
# Axon History



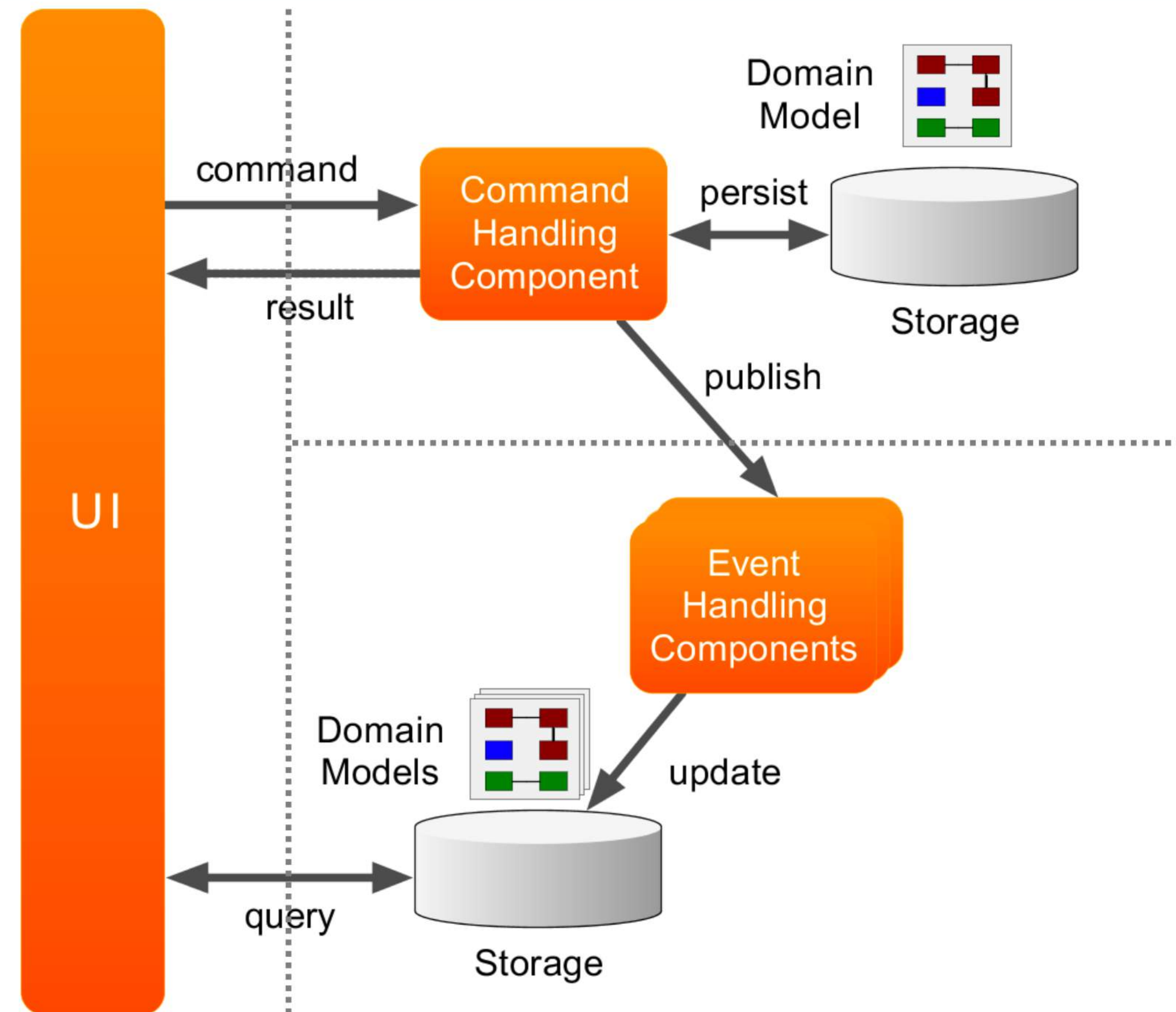
# Axon History



# Axon History



# Axon, Location Transparency + Other Stuff





# Demo

<https://github.com/nklmish/axon-casino>

“I hear and I forget. I see and I remember. I do and I understand.”- Confucius



# Complex Transaction Management ?





**ACID?**



**BASE**



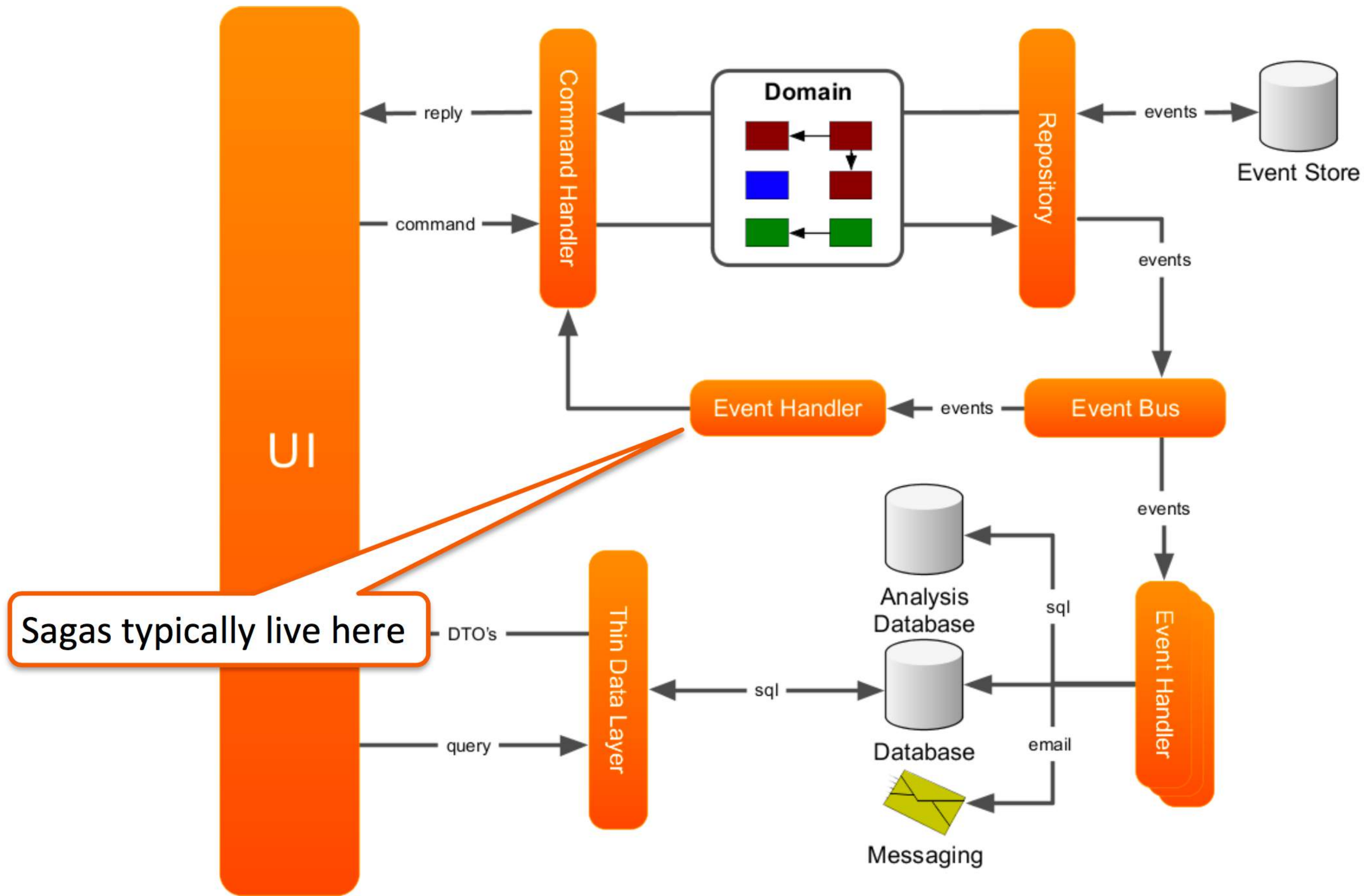
**Basic Availability, Soft state,  
Eventual consistency**



# Saga

- Use to manage BASE transactions.
- React on event
- Coordinates activities between
  - Bounded contexts
  - Aggregates





# Demo at Scale



#Java2Days

@nklmish

# How Can YOU Find...



#Java2Days

@nklmish

# Commands?



# Aggregates?





# Bounded Context?



# DomainEvent?



# Projections?



# Policy?



**Etc?**

---



#Java2Days

@nklmish



#Java2Days

@nklmish

# EventStorming = bringing together



# EventStorming ≠ Brainstorming







**BET WAS PLACED**

- DOMAIN EVENT
- VERB IN PAST TENSE
- SQUARE **ORANGE** STICKY NOTE
- VALUABLE IN CONTEXT TO STAKEHOLDERS

**BALANCE IS NOT VERIFIED AT THIS STAGE BUT IT SHOULD BE**

- HOTSPOT
- POINT OF INTEREST OR CONFLICT
- SQUARE **PURPLE** STICKY NOTE

**BOOST BET WITH CARD**

- COMMAND • = AUTHENTICATED
- SQUARE **BLUE** STICKY NOTE
- VERB IN IMPERATIVE TENSE
- INSTRUCTION FOR THE SYSTEM OR ~~DECISION~~ DECISION

**Suspicious player**

...	...	...	...
...	...	...	...
...	...	...	...
...	...	...	...

- READ MODEL
- LARGE RECTANGULAR **GREEN** STICKY NOTE
- INFORMATION REQUIRED TO MAKE INFORMED DECISION

**PAYMENT SERVICE PROVIDER**

- EXTERNAL SYSTEM
- SOURCE OR DESTINATION OF INFORMATION
- RECTANGULAR **PINK** STICKY NOTE

**PLAYER THATS SHOULD NOT BE NEGATIVE**

- POLICY
- DECISION MAKING CRITERION
- SQUARE **LEAD** STICKY NOTE

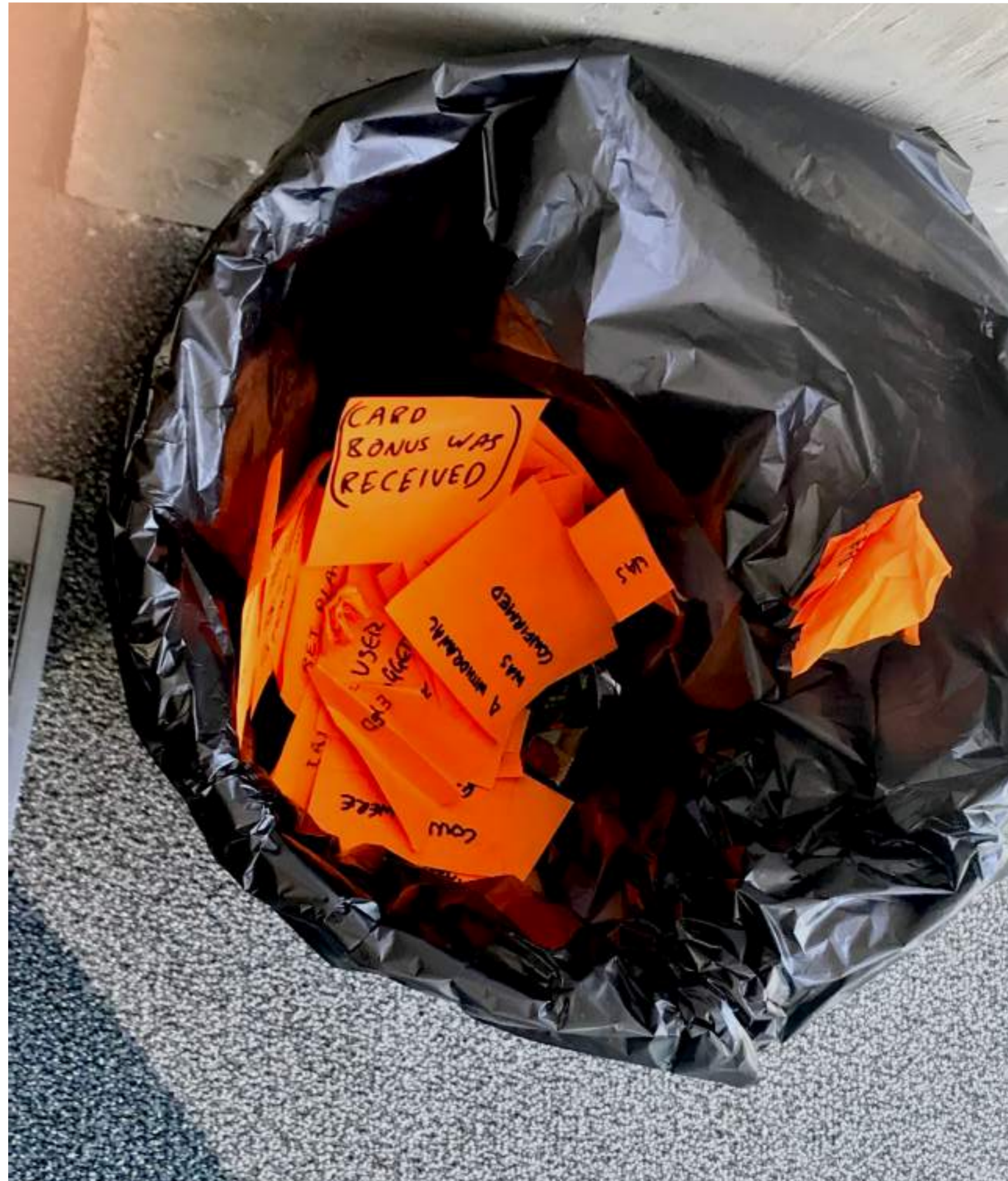
# EventStorming





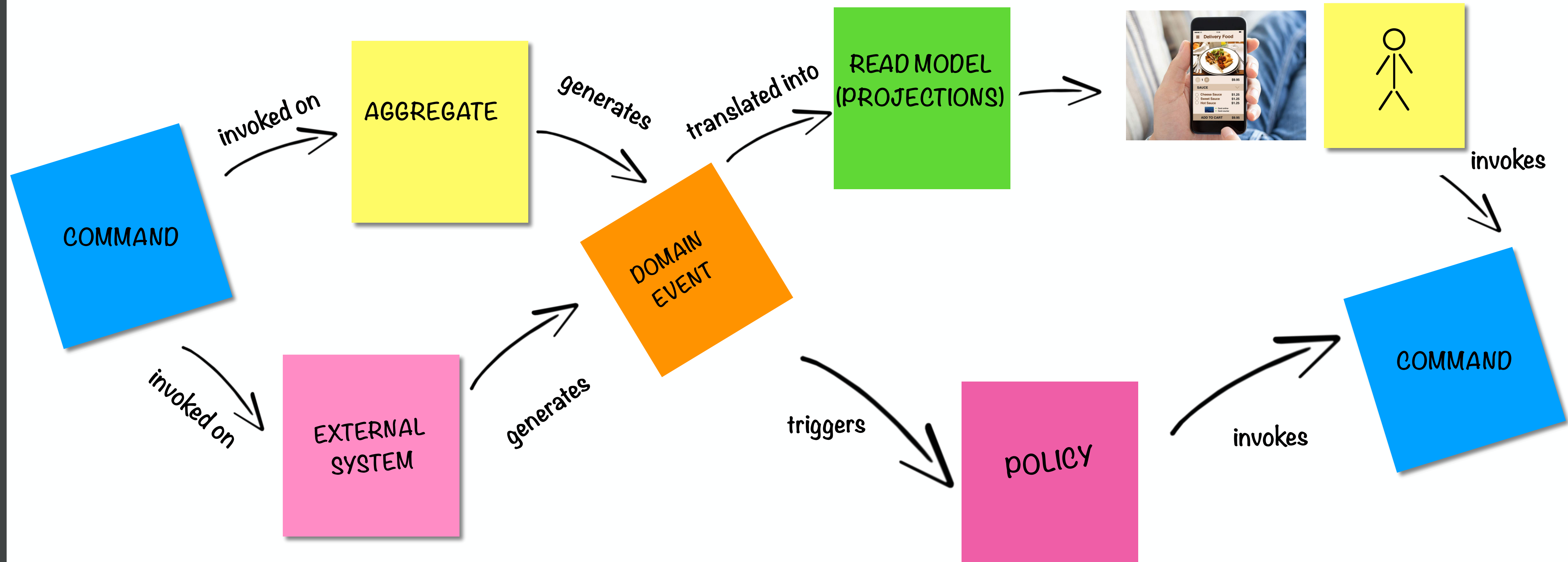









# Final Result == Engineering Input





# Summary

- Domain first, technology later.
- DDD != perfection.
- CQRS + Event sourcing = 
- Axon, theory to practise
- Event Storming == collective learning
- Learning & connecting dots



# Thank You

## Q&A

<https://github.com/nklmish/axon-casino>

<http://tiny.cc/lsauuy>



**Feedback**



#Java2Days

@nklmish