

PRACTICAL DOMAIN-DRIVEN DESIGN

**BOUNDED CONTEXTS + EVENTS =>
MICROSERVICES**



 @indu_alagarsamy

 Particular
Software



ELECTRONICS
Gift Guide

'Tis the season for shiny, new tech

Shop now ▸

Cell Phones & Accessories ▸ Cases, Holsters & Clips ▸ Cases



OtterBox

OtterBox DEFENDER SERIES Case for iPhone 8 & iPhone 7 (NOT Plus) - Frustration Free Packaging - CALL OF DUTY BLUE CAMO

★★★★★ ▾ 884 customer reviews | 242 answered questions

List Price: \$59.95

Price: \$44.96 ✓prime | FREE One-Day

You Save: \$14.99 (25%)

Get \$70 off instantly: Pay \$0.00 upon approval for the Amazon Prime Rewards Visa Card.

In Stock.

Get it tomorrow, Nov. 28. Order within 1 hr 53 mins and choose One-Day Shipping at checkout.

Details

Ships from and sold by Amazon.com. Gift-wrap available.

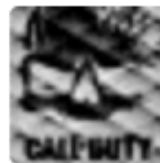
Color: CALL OF DUTY BLUE CAMO



\$24.40
✓prime



\$44.96
✓prime



\$44.96
✓prime



\$33.99
✓prime

- Compatible with iPhone 8 & iPhone 7 NOT Plus
- Triple-layer defense: inner shell, outer cover and touchscreen protector
- Belt-clip holster included that doubles as a kickstand for hand-free media viewing
- Port covers keep out dust and debris.Synthetic rubber slipcover

Product

Name

Description

Product Images

List Price

Shipping Options

Stock Availability

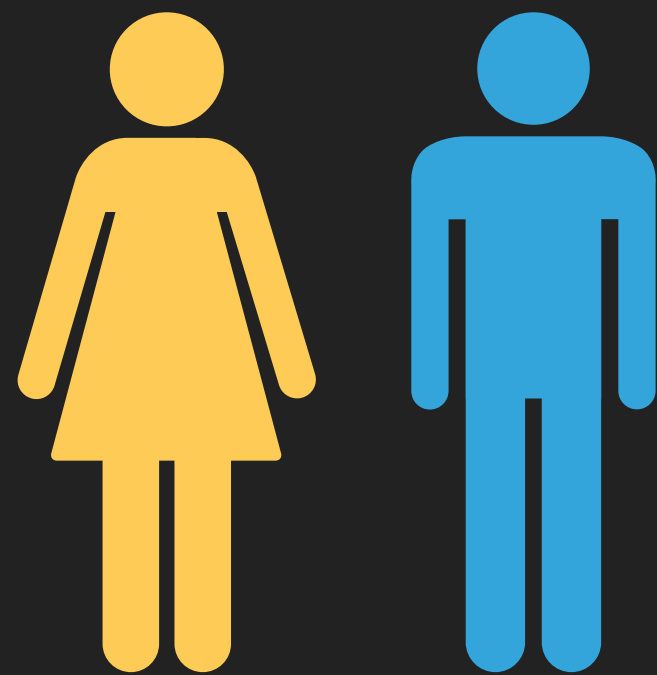
Customer Reviews

Dimensions



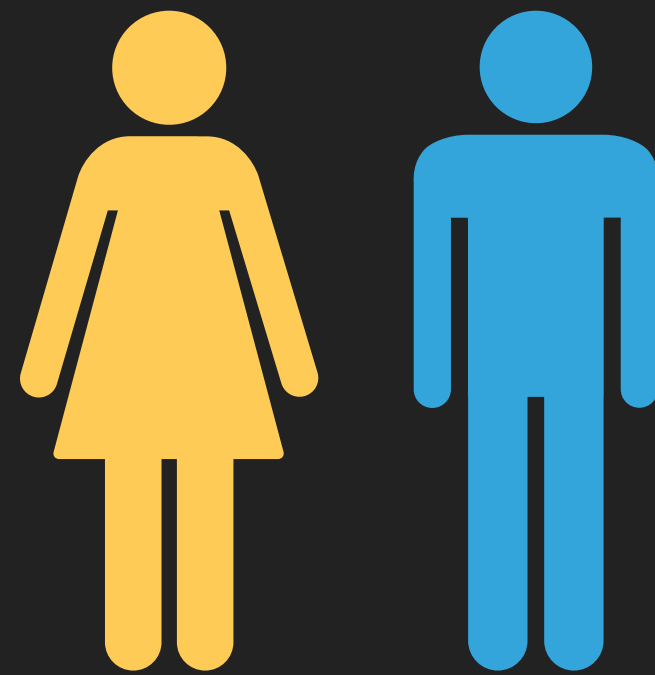
WHAT IS A PRODUCT ?

Sales



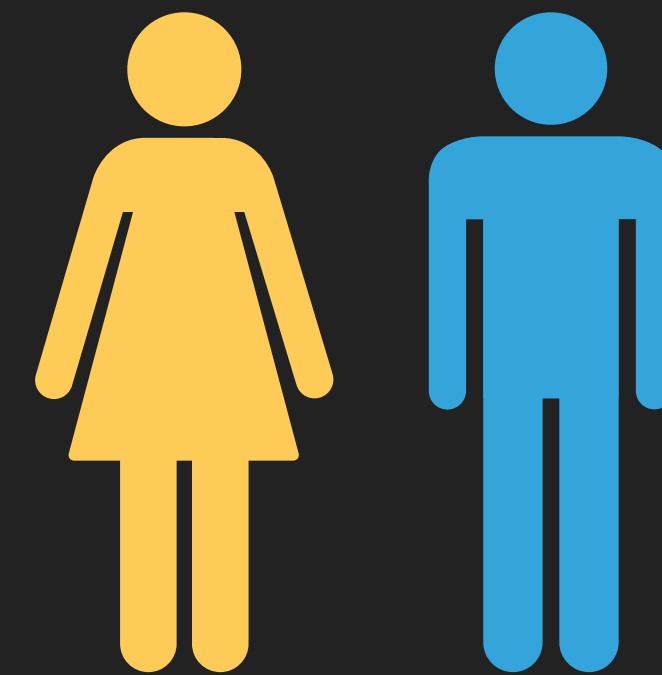
It's a thing that has a
description, images, price

Inventory



It's a thing that is either
available or not

Shipping



It's a thing that has weight
and dimensions that
needs to be packaged

UNIFIED MODELS ARE HARD



@indu_alagarsamy

BOUNDED CONTEXT IS A SAFE SPACE



Source: <https://www.airbnb.com/rooms/15448688?guests=1&adults=1>

CONTEXTS PROVIDE CLARITY



@indu_alagarsamy

FINDING THE BOUNDARY



Product

Name

Description

Product Images

List Price

Shipping Options

Stock Availability

Customer Reviews

Dimensions

Do you need transactional consistency for updating the description and the stock availability?

SPLIT THE MODEL ACCORDING TO TEAMS OR DEPARTMENTS

Product

Description
Product Images
List Price
Dimensions

Sales

Product

Stock Availability

Inventory

Product

Shipping Options
Dimensions

Shipping

SPLIT THE MODEL ACCORDING TO BUSINESS PROCESSES

OtterBox

OtterBox DEFENDER SERIES Case for iPhone 8 & iPhone 7 (NOT Plus) - Frustration Free Packaging - CALL OF DUTY BLUE CAMO

★★★★★ | 884 customer reviews | 242 answered questions

List Price: \$59.95

Price: **\$44.96** ✓prime | FREE One-Day

You Save: **\$14.99 (25%)**

Get \$70 off instantly: Pay \$0.00 upon approval for the Amazon Prime Rewards Visa Card.

In Stock.

Get it tomorrow, Nov. 28. Order within **1 hr 53 mins** and choose **One-Day Shipping** at checkout.

[Details](#)

Ships from and sold by Amazon.com. Gift-wrap available.

Color: **CALL OF DUTY BLUE CAMO**



- Compatible with iPhone 8 & iPhone 7 NOT Plus
- Triple-layer defense: inner shell, outer cover and touchscreen protector
- Belt-clip holster included that doubles as a kickstand for hand-free media viewing
- Port covers keep out dust and debris. Synthetic rubber slipcover

Get \$70 off instantly: Pay \$0.00 upon approval for the Amazon Prime Rewards Visa card

Get it tomorrow. Order within 1hr 53 mins and choose One-Day Shipping at checkout

More info on finding boundaries:

[http://go.particular.net/
qcon-ny](http://go.particular.net/qcon-ny)

HOW DO BOUNDED CONTEXTS COMMUNICATE? THE AIRLINE EXAMPLE

COMMANDS & EVENTS

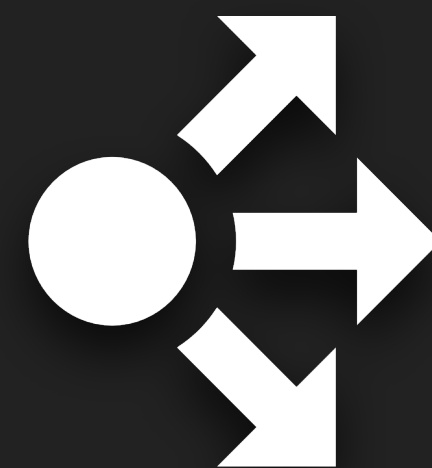
**Do
something**

Command



**Something
of
importance
happened**

Domain Event



WHEN an aircraft type is changed:

Passenger gets notified with a new booking proposal

Passenger can cancel flight

Passenger can accept proposed booking



Please note, this is an automated e-mail. Response to this e-mail address will not be read.

Greetings traveller,

We are sorry to inform you about these changes, but sometimes we need to make modifications to our flight schedule.

We regret to inform that we will no longer offer direct flight to your destination. An alternative has been made in your reservation.

Please verify your reservation, and provide us with feedback at your earliest convenience. .

Your changes 

Booking Reference: **DDDAUS**

Old flight(s):

<u>DEPARTURE</u>	<u>ARRIVAL</u>
COPENHAGEN (CPH)	ROME- FUMICINO (FCO)

New flight(s):

<u>DEPARTURE</u>	<u>ARRIVAL</u>
LOS ANGELES (LAX)	COPENHAGEN (CPH)

A Business Process can be triggered by an event from a different bounded context

**FLIGHT PLANNING
BOUNDED CONTEXT**



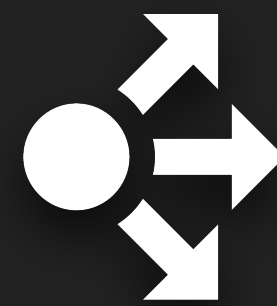
AircraftTypeHasChanged

**BOOKING
BOUNDED CONTEXT**

WHEN an aircraft type is changed

Multiple messages can take part in a business process

**FLIGHT PLANNING
BOUNDED CONTEXT**

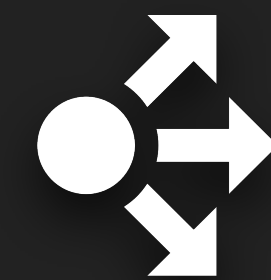


AircraftTypeHasChanged

**BOOKING
BOUNDED
CONTEXT**

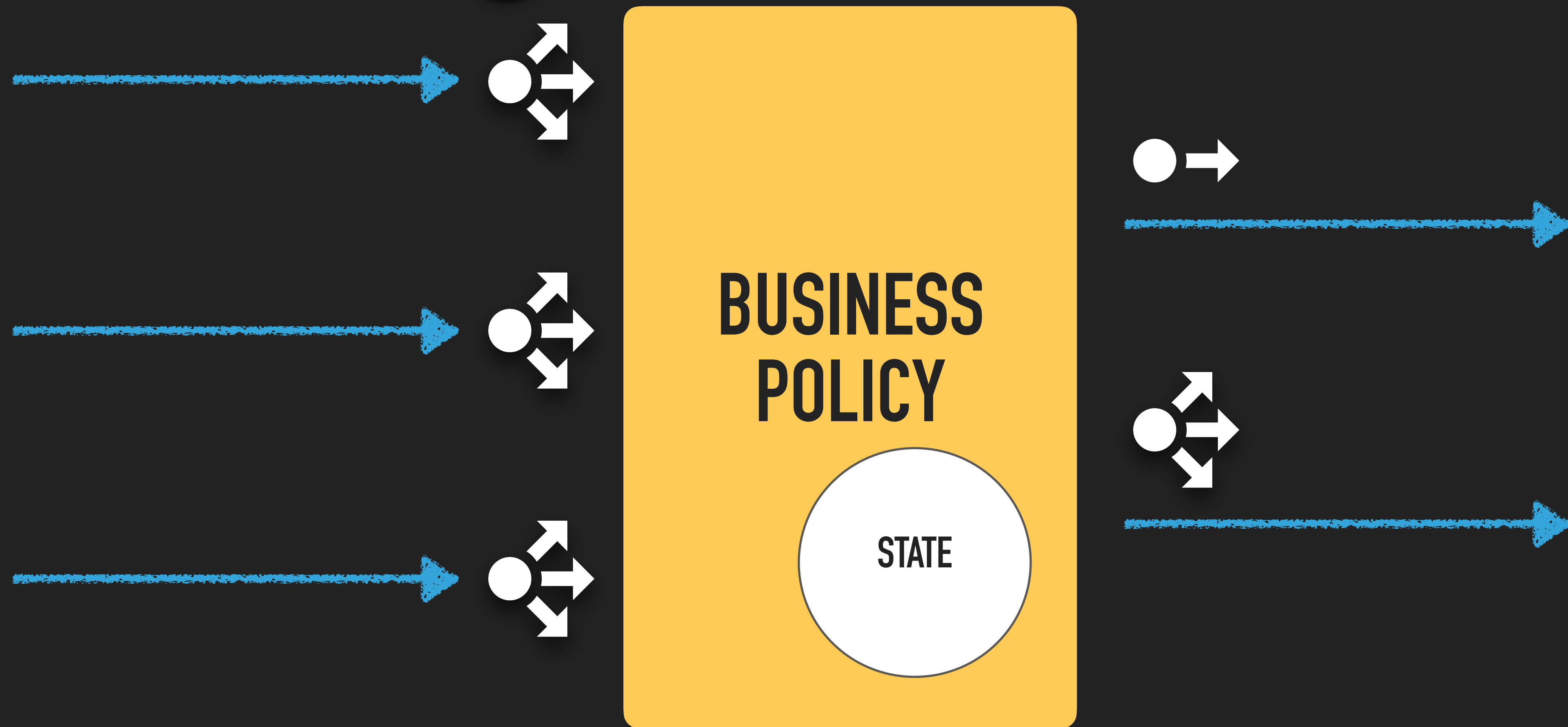
● → RebookFlight

● → NotifyCustomer



BookingWasCancelled

Saga Pattern



EVENTSTORMING



MODELING USING EVENT STORMING

**Aircraft
type has
changed**

**Flight planning
context**

**Booked
Flight Was
Changed**

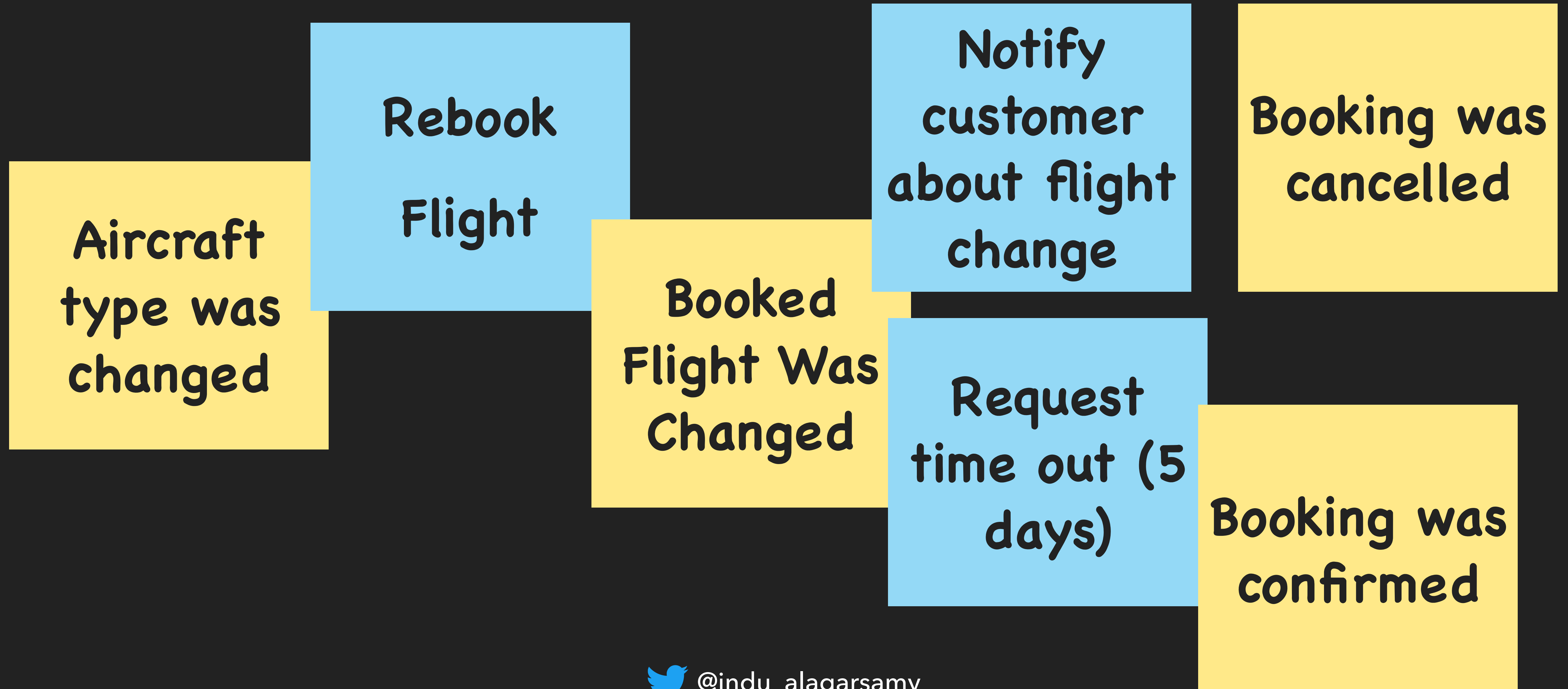
**Booking was
cancelled**

**Booking was
confirmed**

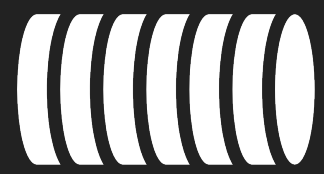
Booking context



EVENT STORMING



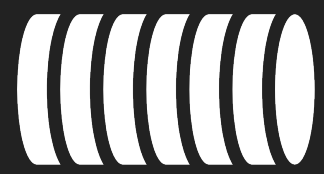
Booking Context



AircraftType Was
Changed

```
class AircraftTypeWasChangedHandler :  
    IHandleMessages  
    <AircraftTypeWasChanged>  
{  
    Handle (AircraftTypeWasChanged msg,  
            MessageHandlerContext context)  
    {  
        // Find all the relevant booking references  
        context.Send (new RebookFlight {...}) ;  
    }  
}
```


Booking Context



RebookFlight

```
class RebookFlightHandler :
    IHandleMessages<RebookFlight>
{
    Handle (RebookFlight msg,
    MessageHandlerContext context)
    { // Find a good proposed route
        context.Publish (new
            BookedFlightWasChanged{...}) ;
    }
}
```


Booking Context



BookedFlight
WasChanged



Booking
WasCancelled



Cancellation
GracePeriodElapsed

```
public class BookingChangePolicy :  
    Saga<BookingChangePolicyData>,  
  
    IAmStartedByMessages<BookedFlightWasChanged>,  
  
    IAmStartedByMessages<BookingWasCancelled>,  
  
    IHandleTimeouts<CancellationGracePeriodElapsed>
```



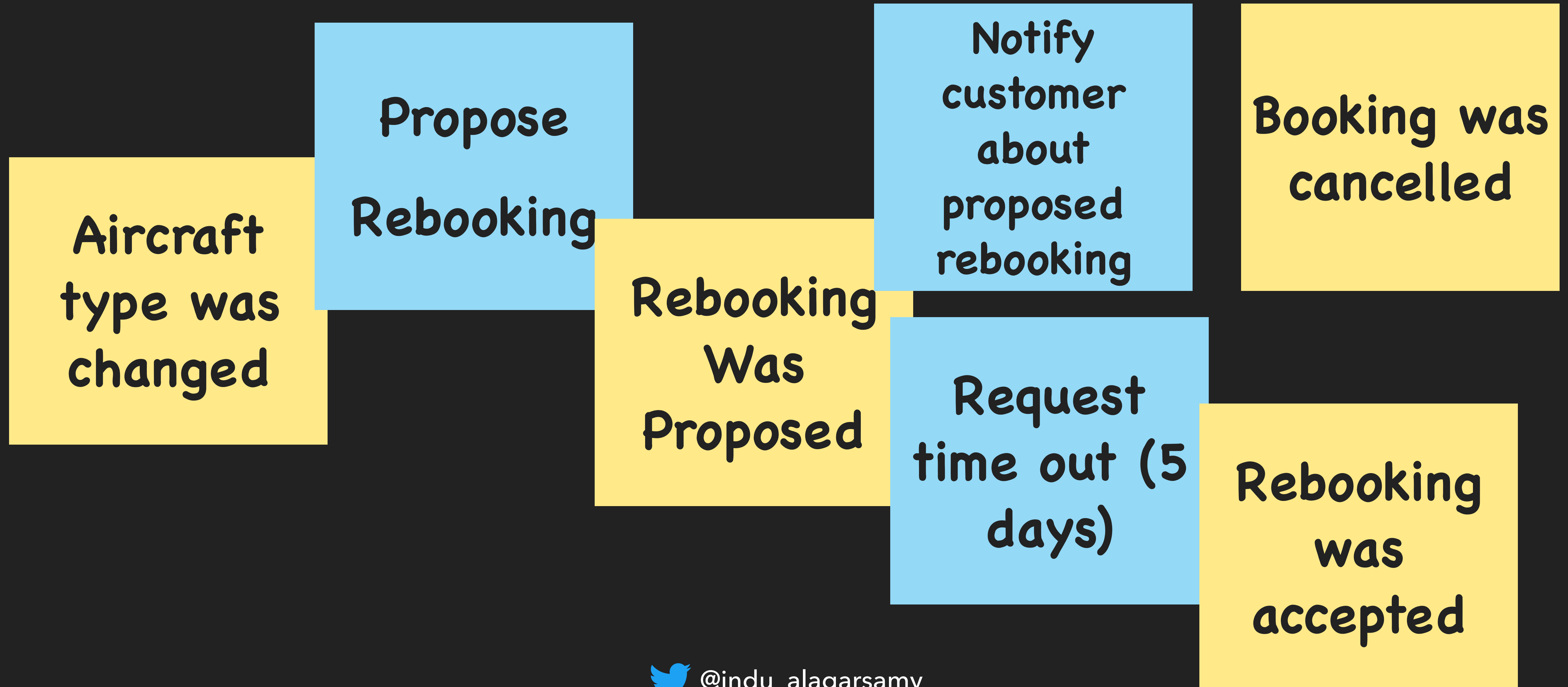
@indu_alagarsamy

NAMING THINGS ARE HARD



@indu_alagarsamy

Passenger gets notified with a new booking proposal



HEALTHY OBSESSION WITH LANGUAGE

```
class AircraftTypeWasChangedHandler :  
    IHandleMessages<AircraftTypeWasChanged>
```

```
class  
ProposeNewRebookingWhenAircraftTypeWasChanged :  
    IHandleMessages<AircraftTypeWasChanged>
```


HEALTHY OBSESSION WITH LANGUAGE

```
public class BookingChangePolicy :  
    Saga<BookingChangePolicyData>,  
        IAmStartedByMessages<BookedFlightWasChanged>,  
        IAmStartedByMessages<BookingWasCancelled>,  
        IHandleTimeouts<CancellationGracePeriodElapsed>
```

```
class GracePeriodForAcceptingRebookings :  
  
    Saga<GracePeriodForAcceptingRebookingsData>,  
        IAmStartedByMessages<RebookingWasProposed>,  
        IAmStartedByMessages<BookingWasCancelled>,  
        IHandleTimeouts<CancellationGracePeriodElapsed>
```


MAKE MESSAGES IMMUTABLE

```
public class AircraftTypeWasChanged
{
    public OldAircraftId {get; set;}
}
```

Get rid of the public setters
Set the properties at construction time

WHEN Aircraft type is changed:

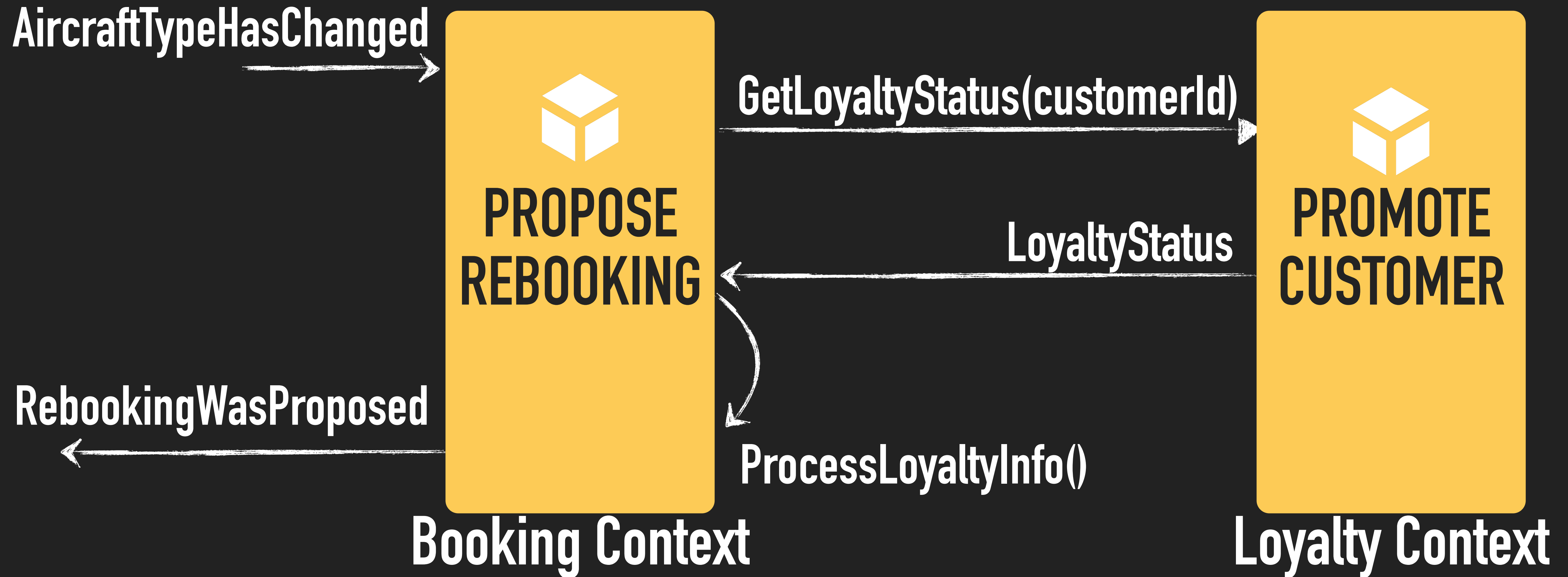
Passenger gets notified with a new booking proposal

Passenger can cancel flight

Passenger can accept proposed booking

**Only applies to passengers who are flying
business class or first or Platinum loyalty**

Temporal Coupling



Make Autonomous Decisions



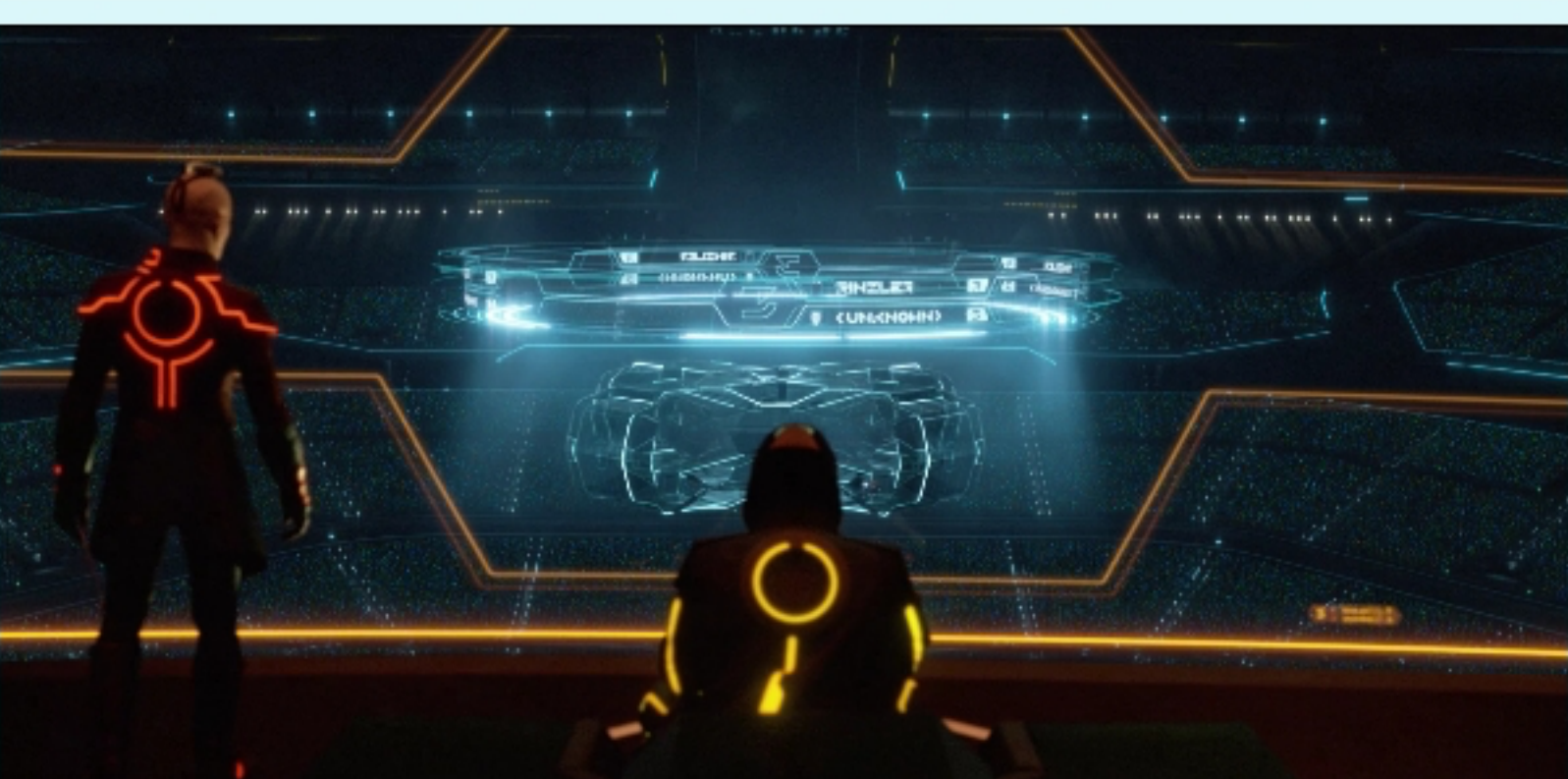
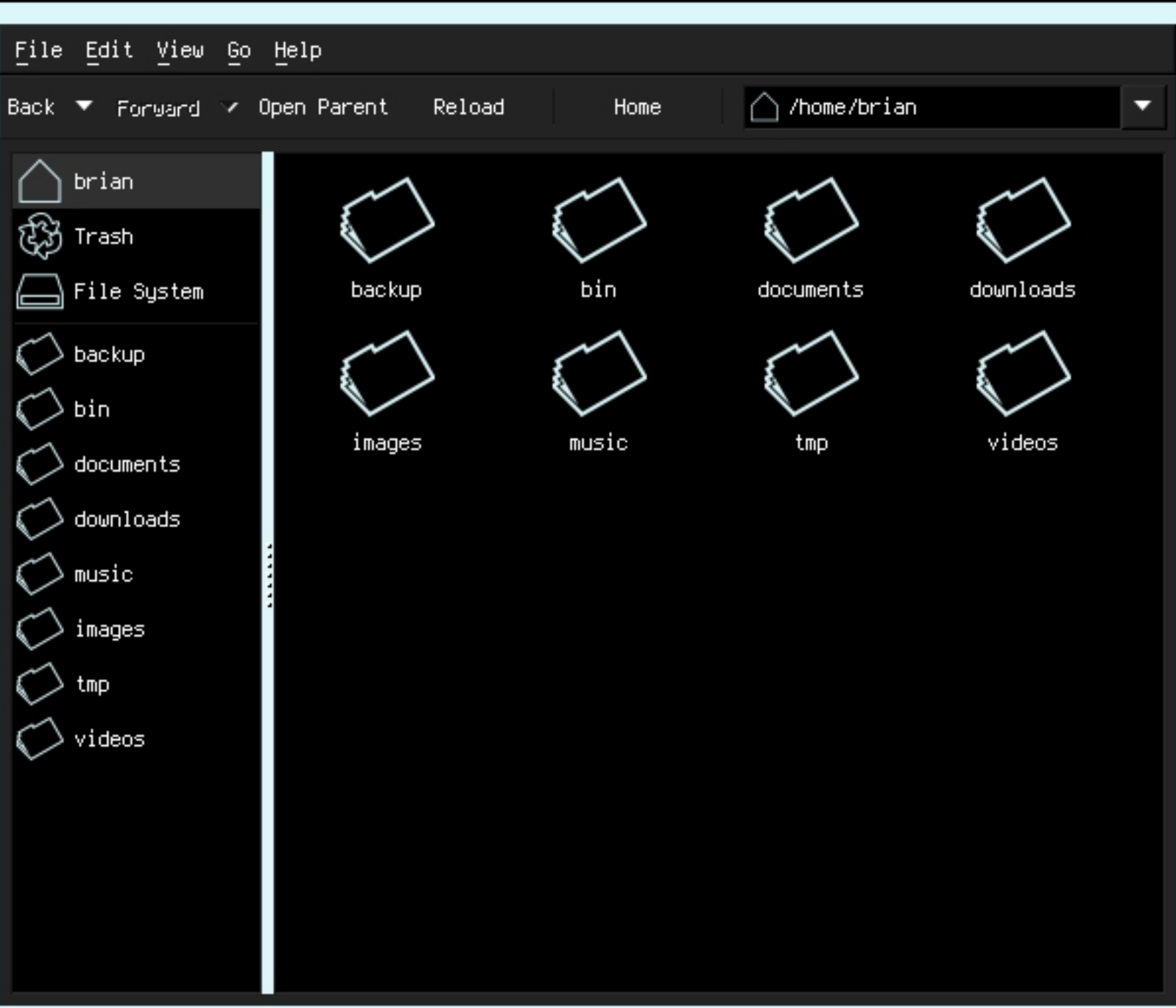
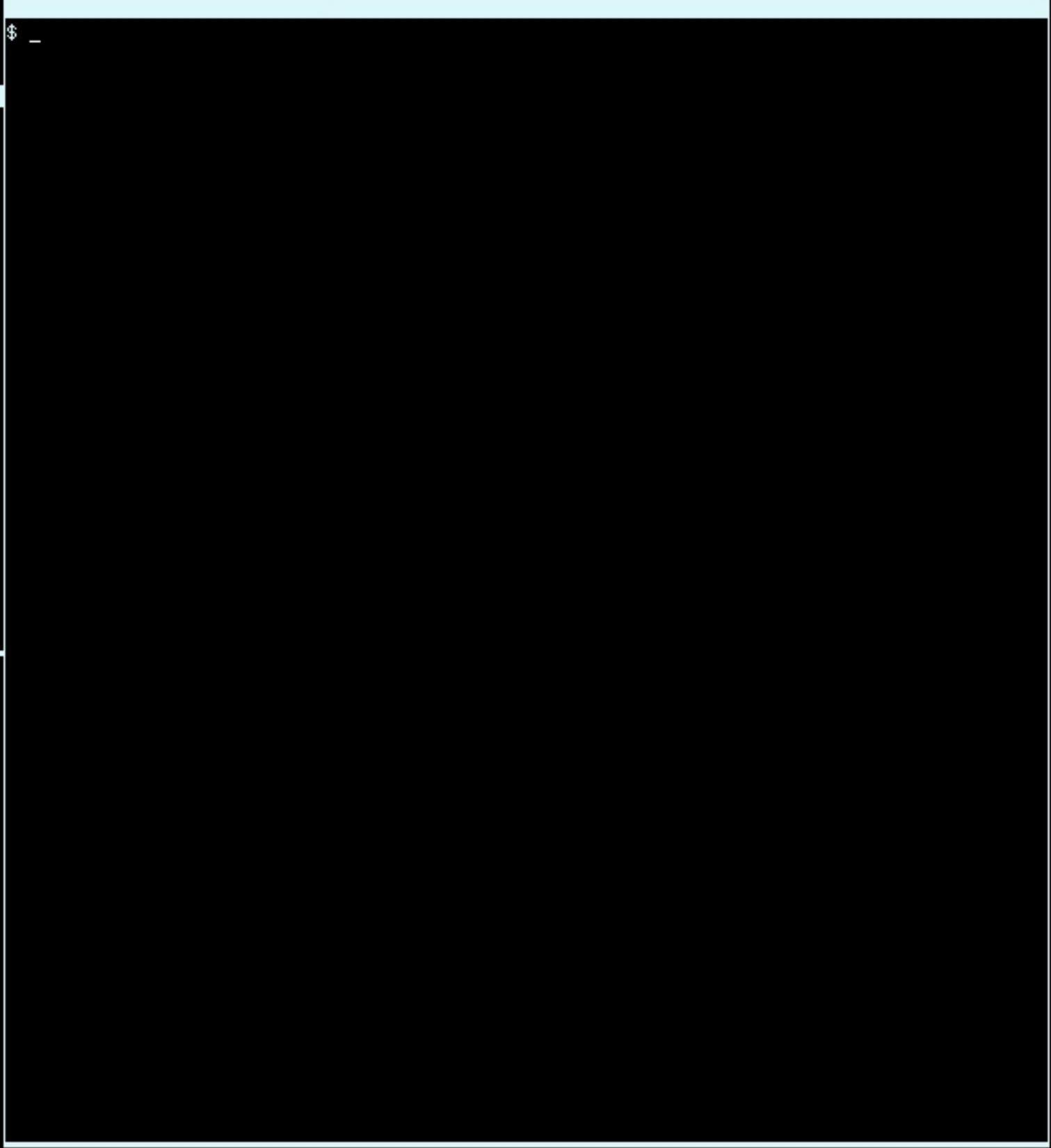

```
top - 02:38:28 up 5:20, 6 users, load average: 0.04, 0.13, 0.13
Tasks: 195 total, 1 running, 193 sleeping, 0 stopped, 1 zombie
Cpu(s): 0.7%us, 0.2%sy, 0.0%ni, 99.2%id, 0.0%wa, 0.0%hi, 0.0%si, 0.0%st
Mem: 3243988k total, 2671908k used, 572080k free, 768724k buffers
Swap: 3905528k total, 0k used, 3905528k free, 1344216k cached
```

PID	USER	PR	NI	VIRT	RES	SHR	S	%CPU	%MEM	TIME+	COMMAND
3158	root	20	0	129m	116m	90m	S	2	3.7	1:23.72	Xorg
3315	brian	20	0	57840	3980	2936	S	0	0.1	0:06.83	conky
6107	brian	20	0	116m	31m	12m	S	0	1.0	0:00.20	chromium-browser
6446	brian	20	0	2464	1224	896	R	0	0.0	0:03.29	top
6763	brian	20	0	212m	147m	96m	S	0	4.7	0:51.42	vic
1	root	20	0	2032	700	608	S	0	0.0	0:01.28	init
2	root	20	0	0	0	0	S	0	0.0	0:00.00	kthreadd
3	root	RT	0	0	0	0	S	0	0.0	0:00.00	migration/0
4	root	20	0	0	0	0	S	0	0.0	0:00.00	ksoftirqd/0
5	root	RT	0	0	0	0	S	0	0.0	0:00.00	watchdog/0
6	root	RT	0	0	0	0	S	0	0.0	0:00.00	migration/1
7	root	20	0	0	0	0	S	0	0.0	0:00.00	ksoftirqd/1
8	root	RT	0	0	0	0	S	0	0.0	0:00.00	watchdog/1
9	root	RT	0	0	0	0	S	0	0.0	0:00.00	migration/2
10	root	20	0	0	0	0	S	0	0.0	0:00.00	ksoftirqd/2
11	root	RT	0	0	0	0	S	0	0.0	0:00.00	watchdog/2
12	root	RT	0	0	0	0	S	0	0.0	0:00.00	migration/3
13	root	20	0	0	0	0	S	0	0.0	0:00.00	ksoftirqd/3
14	root	RT	0	0	0	0	S	0	0.0	0:00.00	watchdog/3
15	root	20	0	0	0	0	S	0	0.0	0:00.13	events/0

```
$ uname -a
Linux GSLYR-NIX 2.6.32-5-686 #1 SMP Mon Jun 13 04:13:06 UTC 2011 i686 GNU/Linux
$ whoami
brian
$ -
```

```
http://keyboardscience.org | Wiki: http://keyboardscience.org/wiki/
02:35 -!- Brianith [~brian067.252.85.140] has joined #keyboardscience
02:35 -!- Topic for #keyboardscience: http://keyboardscience.org | Wiki: http://keyboardscience.org/wiki/
02:35 -!- Topic set by acfrazier [~acfrazier@unaffiliated/acfrazier] [Mon Jul 4 23:10:28 2011]
02:35 [Users #keyboardscience]
02:35 [ChanServ] [ Brianith ] [ draca ] [ HansNeon ] [ ruumis ]
02:35 [ acfrazier ] [ daemonraccoon ] [ dw_junon ] [ iMav ] [ Soarer ]
02:35 [ bhtoeifr ] [ dfj ] [ HaaTa ] [ izza ] [ xbigbossloff ]
02:35 -!- Irssi: #keyboardscience: Total of 15 nicks [1 ops, 0 halfops, 0 voices, 14 normal]
02:35 -!- Channel #keyboardscience created Mon Jul 4 19:51:27 2011
02:35 -!- Irssi: Join to #keyboardscience was synced in 3 secs
```

```
02:38 Brianith( i) 4:freenode/#keyboardscience( cnt)
[#keyboardscience] _
```

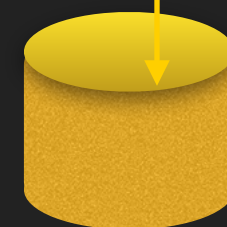
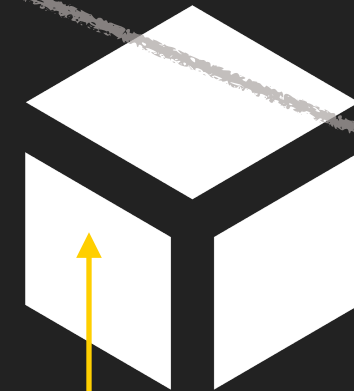
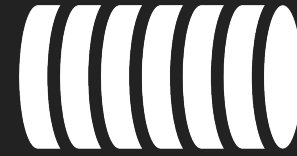


DEPLOYMENTS

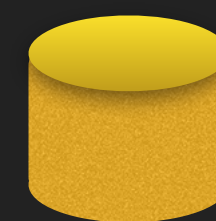
Source: http://www.gameslayer.org/articles/My_Tron_Style_Working_Environment-4/work-environment-02.jpg

SIDE BY SIDE

AircraftTypeHasChanged



~~ProposeRebooking v1.0~~

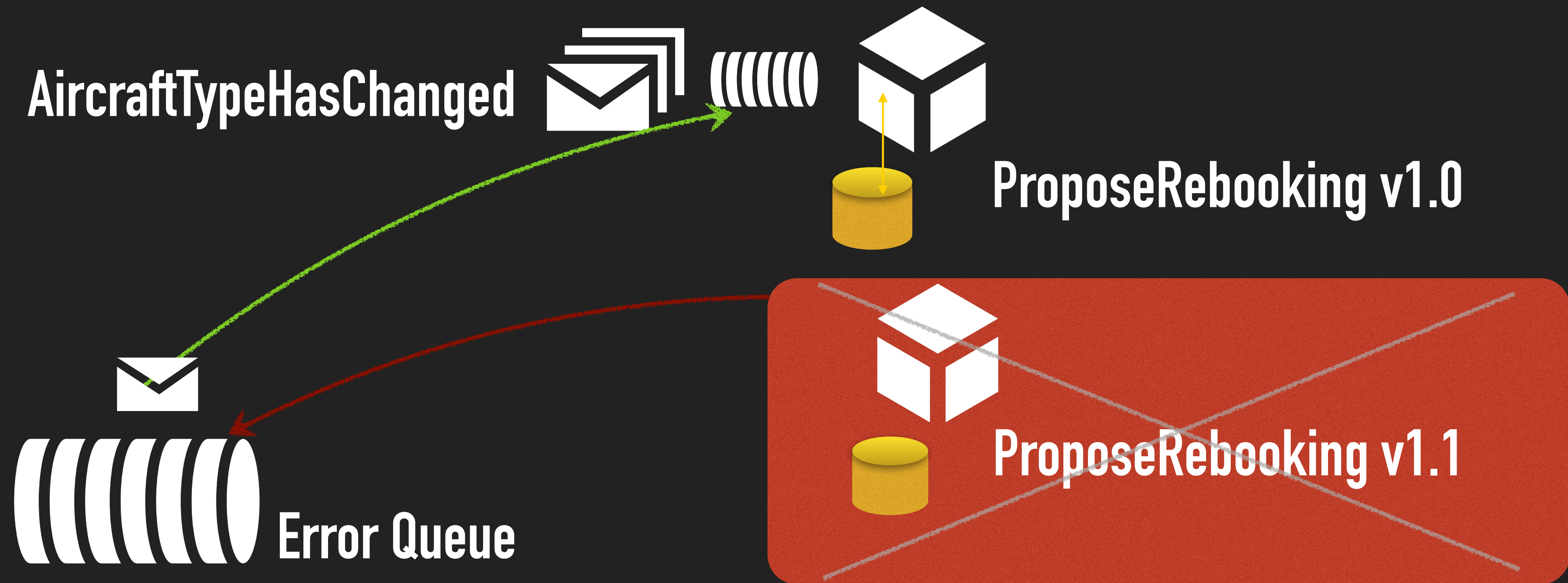


ProposeRebooking v1.1



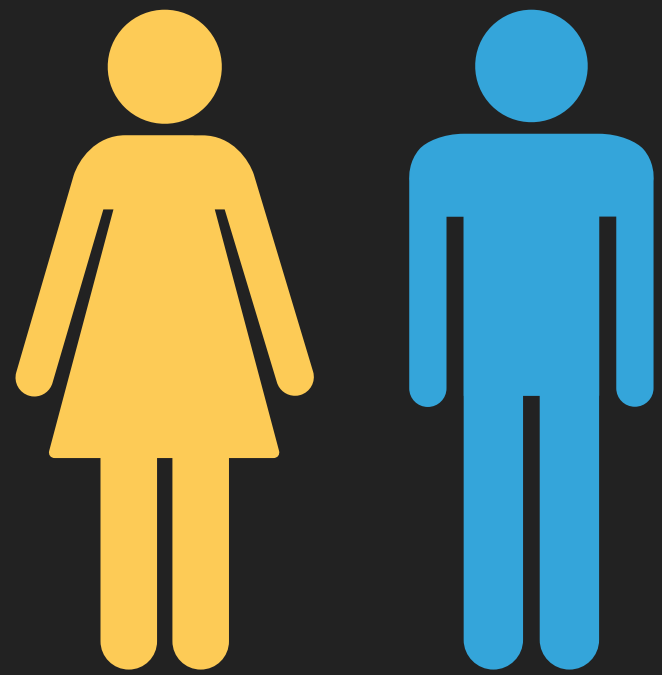
@indu_alagarsamy

ROLLBACKS



MONITORING

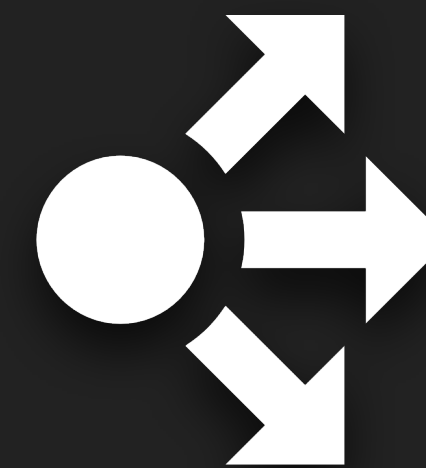




Talk to domain experts. Event storm with them.

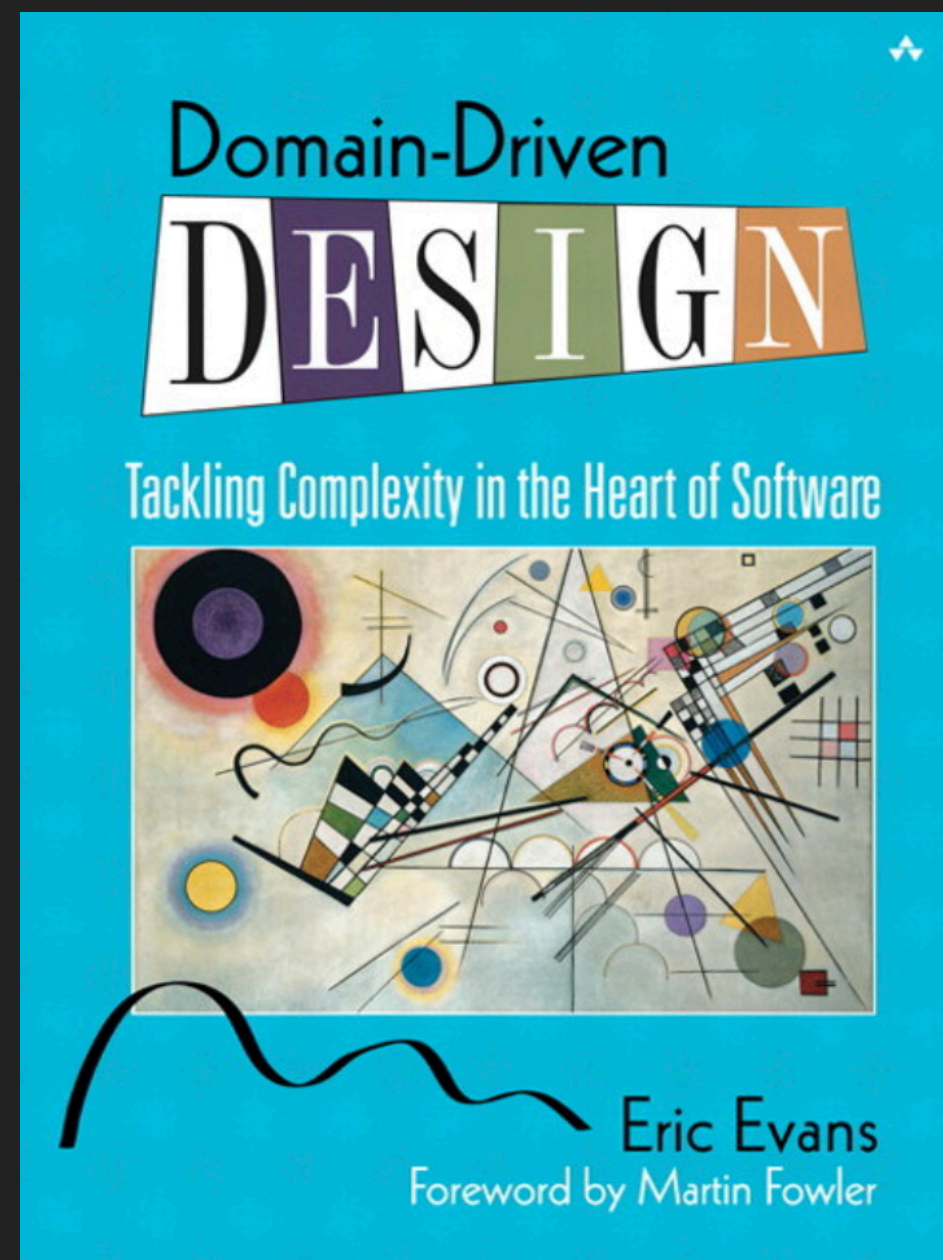
Models are not perfect

Evolve and refactor with an obsession for domain language



Strive for Autonomy. Use events to communicate between bounded contexts

MORE ON DDD



Domain-Driven Design
Tackling complexity in the heart of software
– Eric Evans



Sept 16–20, 2019
exploreddd.com



Feb 3–7, 2020
dddeurope.com

https://leanpub.com/ddd_first_15_years



THANK YOU

@indu_alagarsamy

<https://indu.dev>