



Bounded Context +
Events
=>
Microservices



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Tomorrow®

ELECTRONICS
Gift Guide

'Tis the season for shiny, new tech

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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

★★★★★ 5 ▼ 884 customer reviews | 242 answered questions

List Price: \$59.95

Price: **\$44.96** | 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



\$44.96



\$44.96



\$33.99

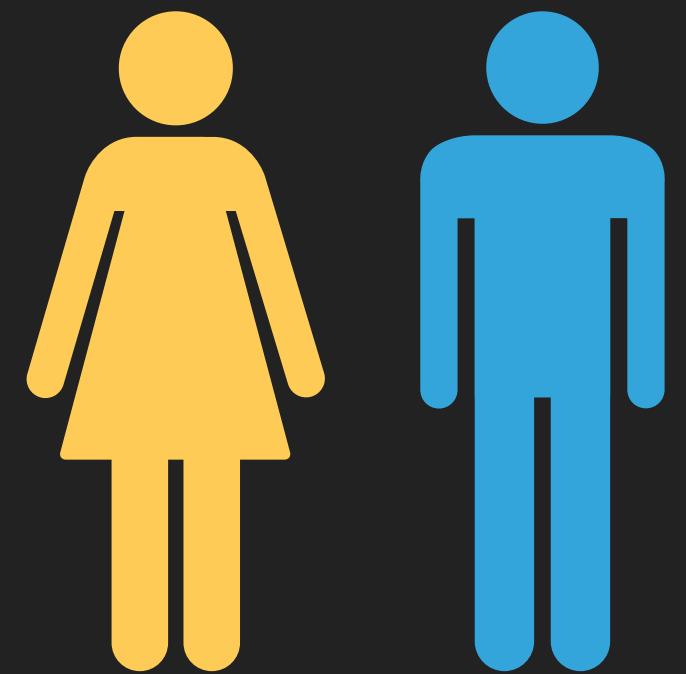
- Compatible with iPhone 8 & iPhone 7 NOT Plus
- Triple-layer defense: inner shell, outer cover and touchscreen protector
- Belt-clip holster included that doubles as a kickstand for hand-free media viewing
- Port covers keep out dust and debris. Synthetic rubber slipcover

Product

Name
Description
Product Images
List Price
Shipping Options
Stock Availability
Customer Reviews
Dimensions

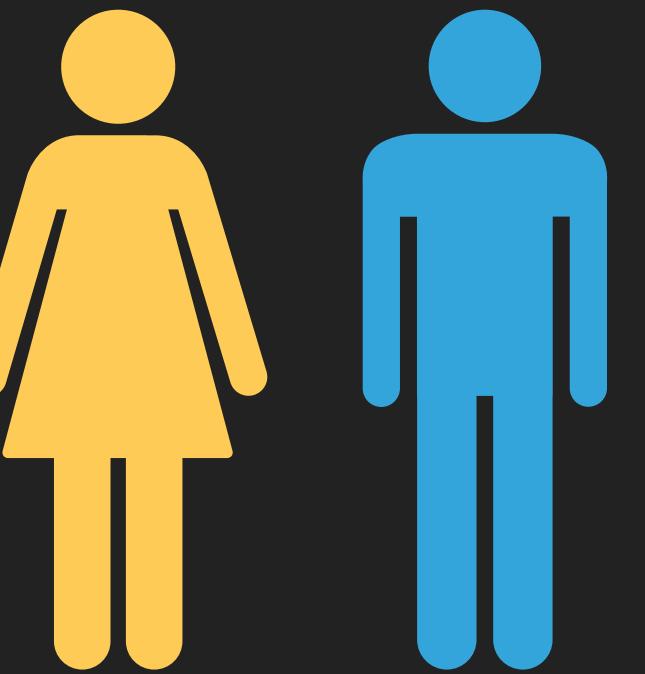
WHAT IS A PRODUCT ?

Sales



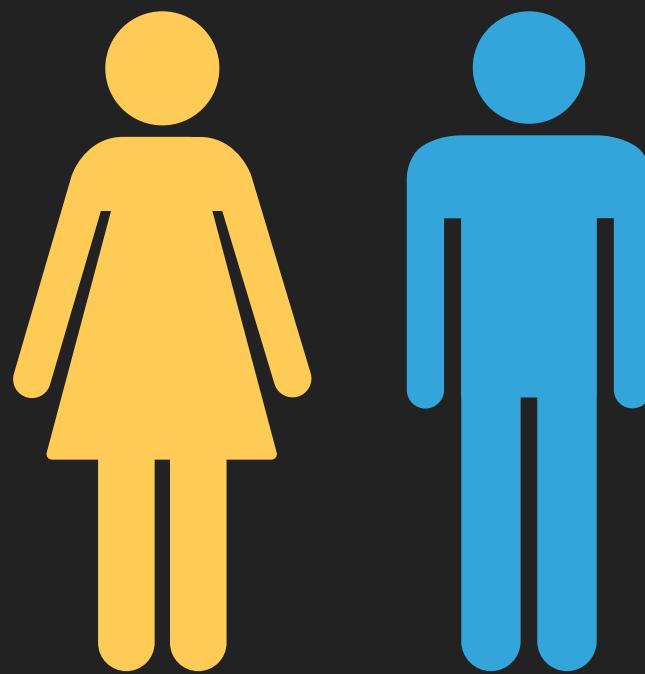
It's a thing that has a
description, images, price

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



BOUNDED CONTEXT IS A SAFE SPACE



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

CONTEXTS PROVIDE CLARITY



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

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	\$24.40 ✓prime		\$44.96 ✓prime		\$44.96 ✓prime		\$33.99 ✓prime
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HOW DO BOUNDED CONTEXTS COMMUNICATE? THE AIRLINE EXAMPLE

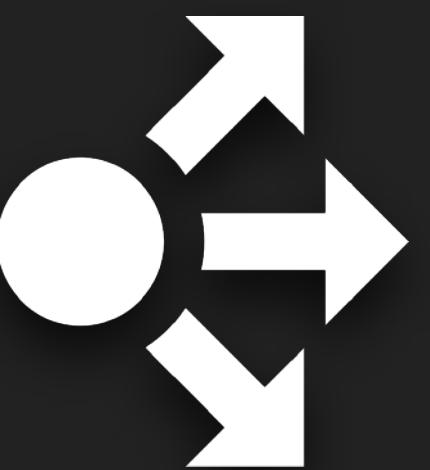
COMMANDS & EVENTS

Do
something

Something
of
importance
happened

Command

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):

DEPARTURE

COPENHAGEN (CPH)

ARRIVAL

ROME-

TRAVOLTO (FCO)

New flight(s):

DEPARTURE

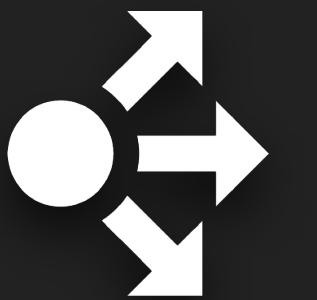
LOS ANGELES (LAX)

ARRIVAL

COPENHAGEN (CPH)

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

FLIGHT PLANNING
BOUNDED CONTEXT



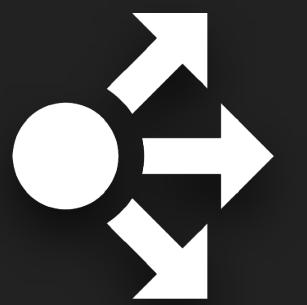
AircraftTypeHasChanged

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**

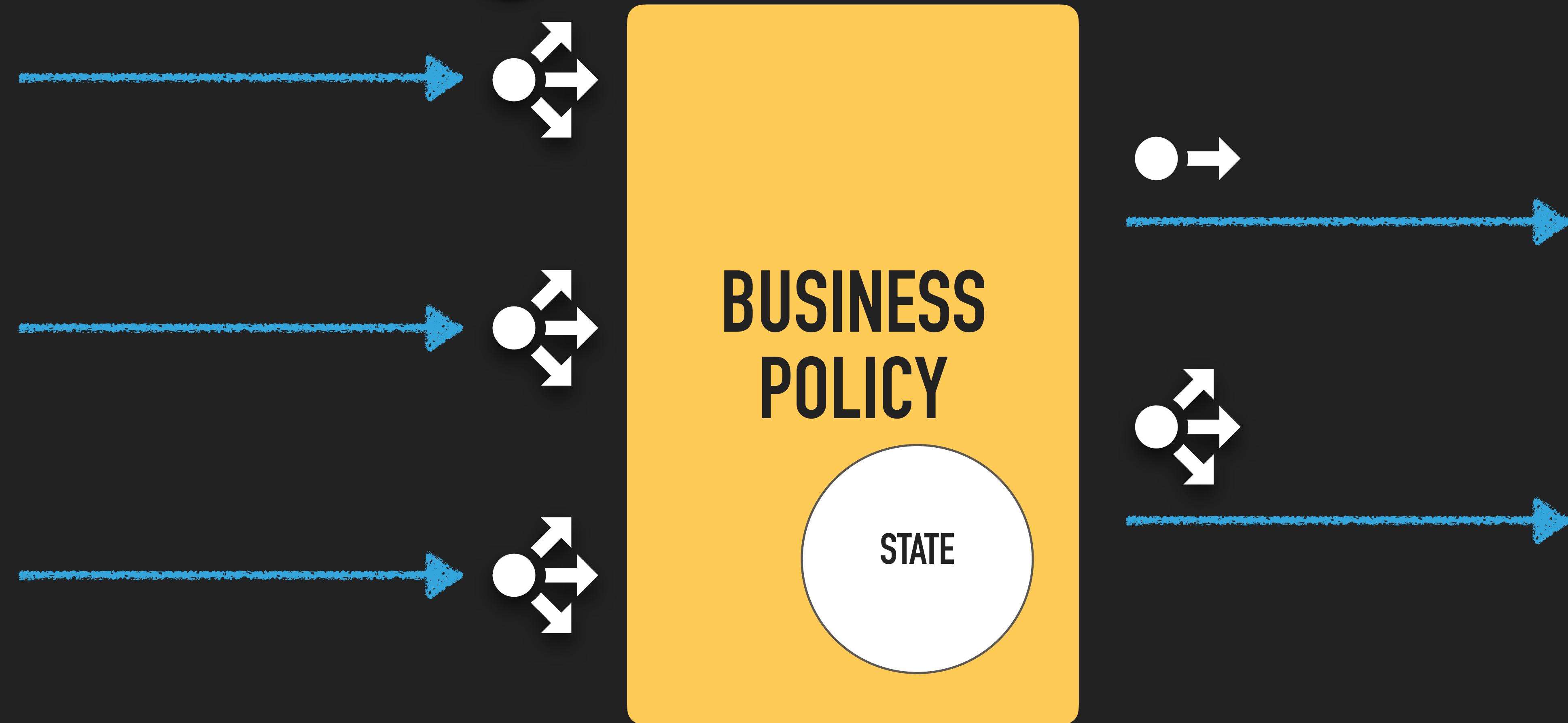
→ RebookFlight

→ NotifyCustomer



BookingWasCancelled

Saga Pattern



EVENTSTORMING

A photograph showing a group of approximately ten people gathered around a large, horizontal whiteboard. The whiteboard is covered with numerous yellow sticky notes, many of which appear to have handwritten text on them, likely representing events or entities from an EventStorming workshop. The people are standing in a loose circle, facing each other and the board, engaged in discussion and collaboration. The setting appears to be an office or conference room with a red wall and windows in the background.

Source: dddeurope.com

MODELING USING EVENT STORMING

Aircraft
type has
changed

Flight planning
context

Booked
Flight Was
Changed

Booking was
cancelled

Booking context

Booking was
confirmed

EVENT STORMING

Aircraft
type was
changed

Rebook
Flight

Booked
Flight Was
Changed

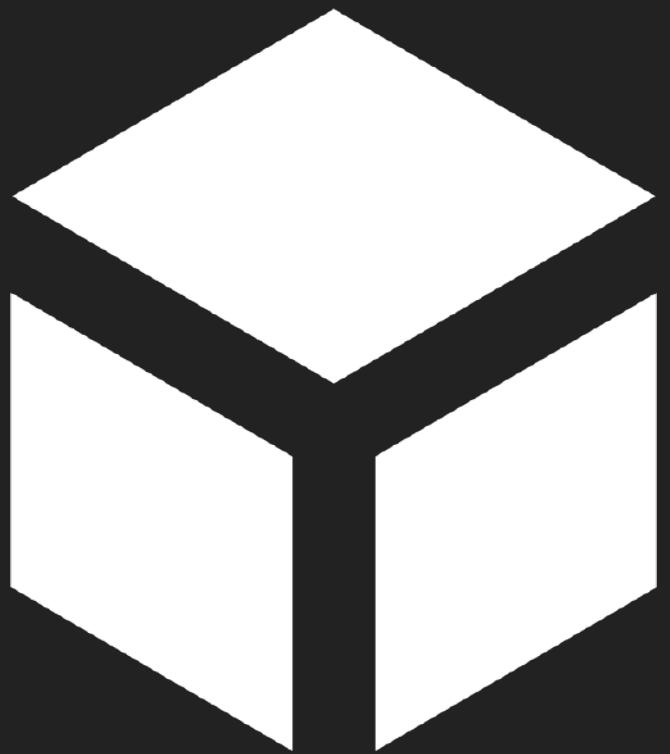
Notify
customer
about flight
change

Request
time out (5
days)

Booking was
cancelled

Booking was
confirmed

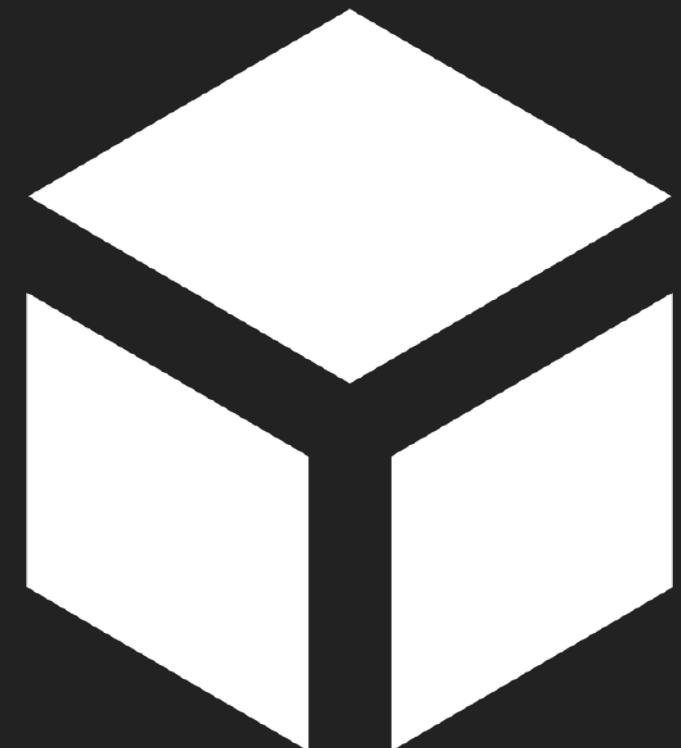
Booking Context



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{...});  
    }  
}
```

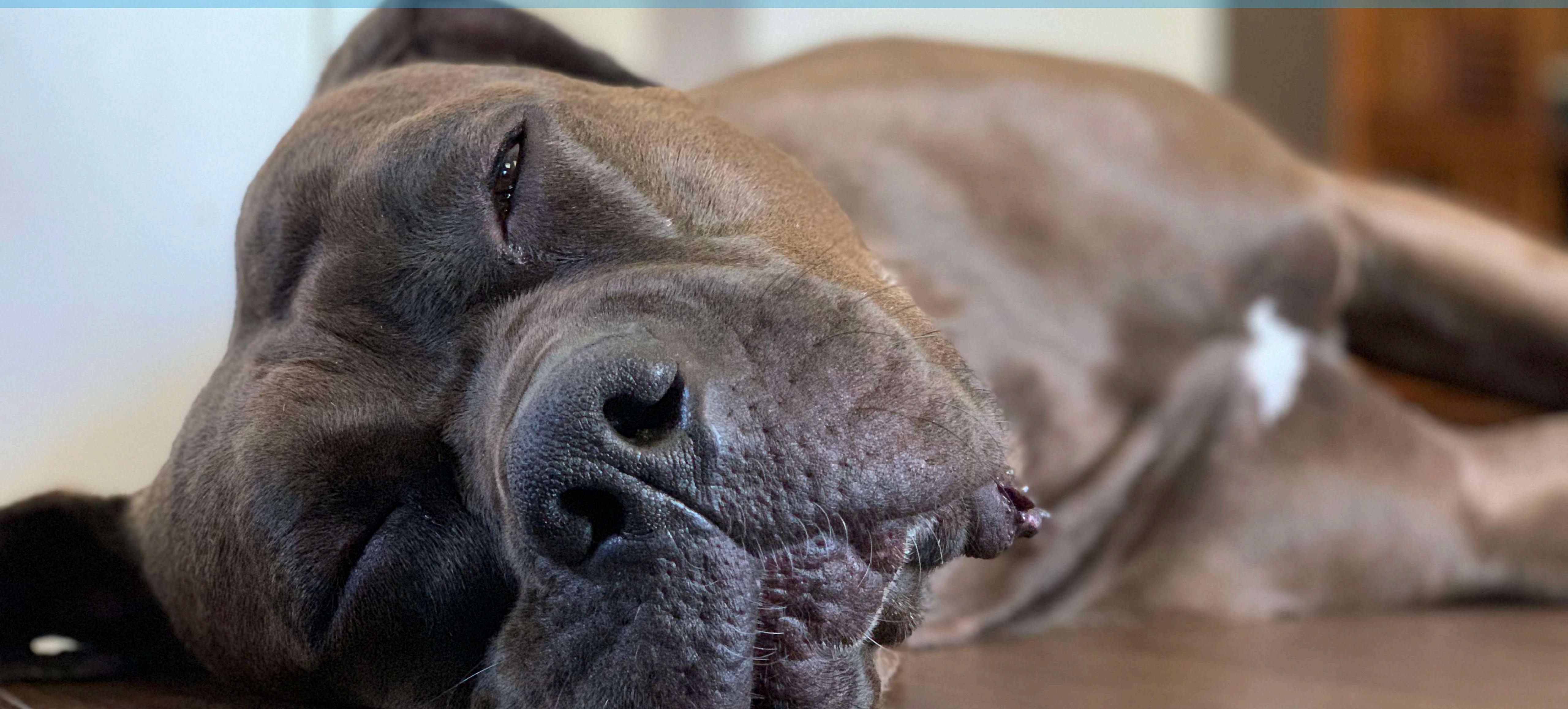
Booking Context



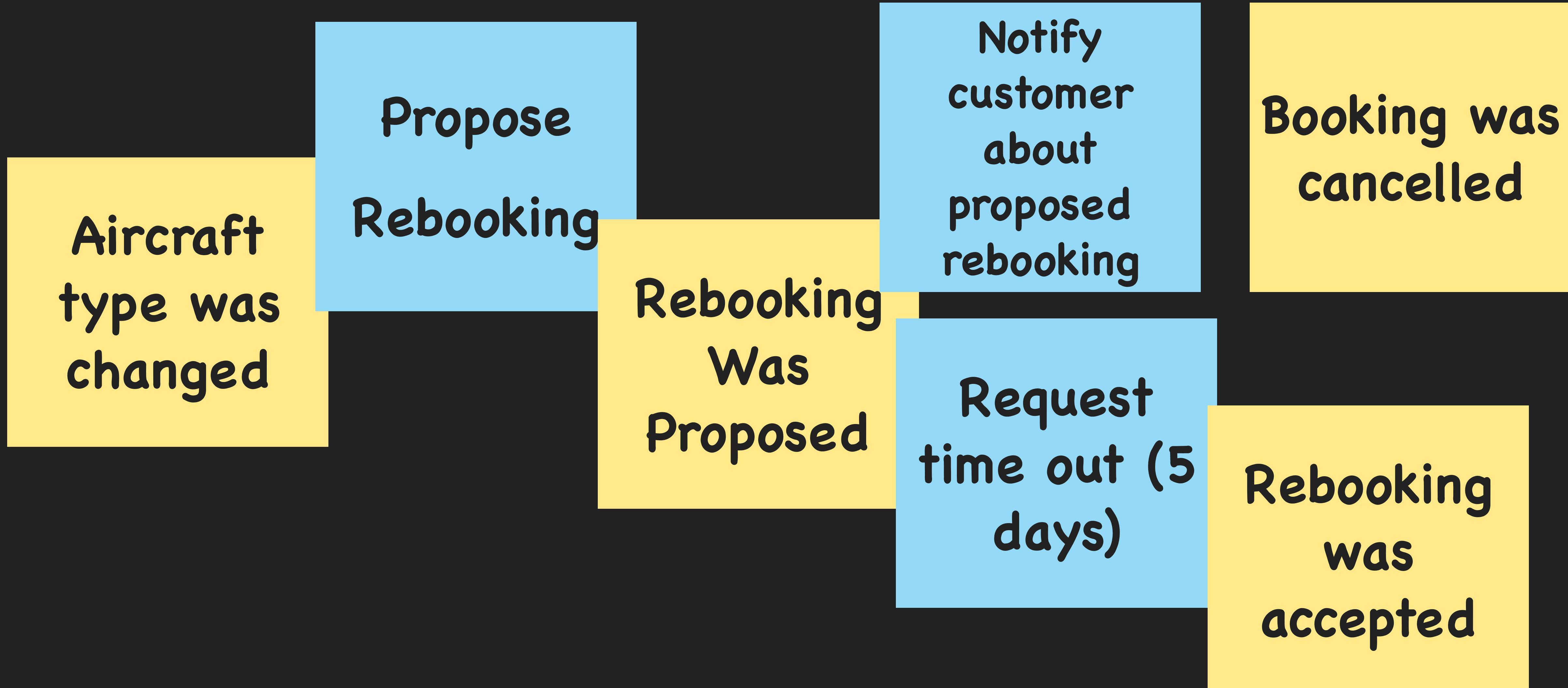
- ✉️ BookedFlight
WasChanged
- ✉️ Booking
WasCancelled
- ✉️ Cancellation
GracePeriodElapsed

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

NAMING THINGS ARE HARD



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:

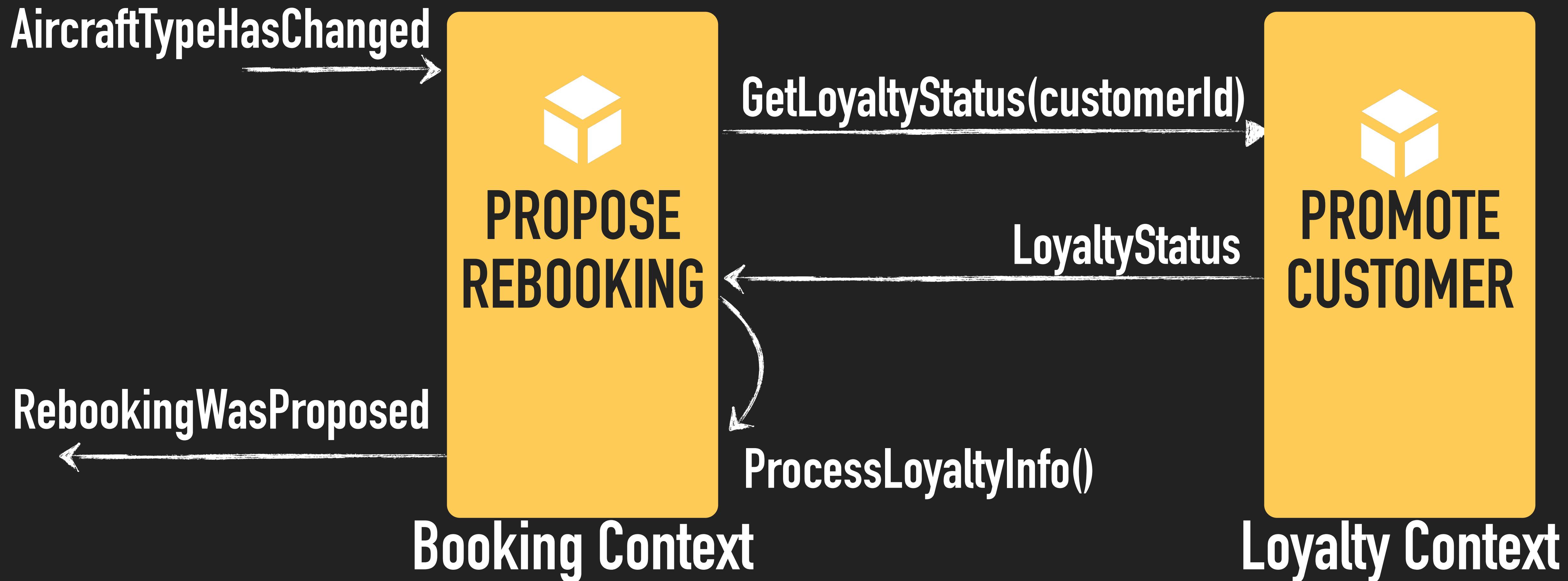
Passenger gets notified with a new booking proposal

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



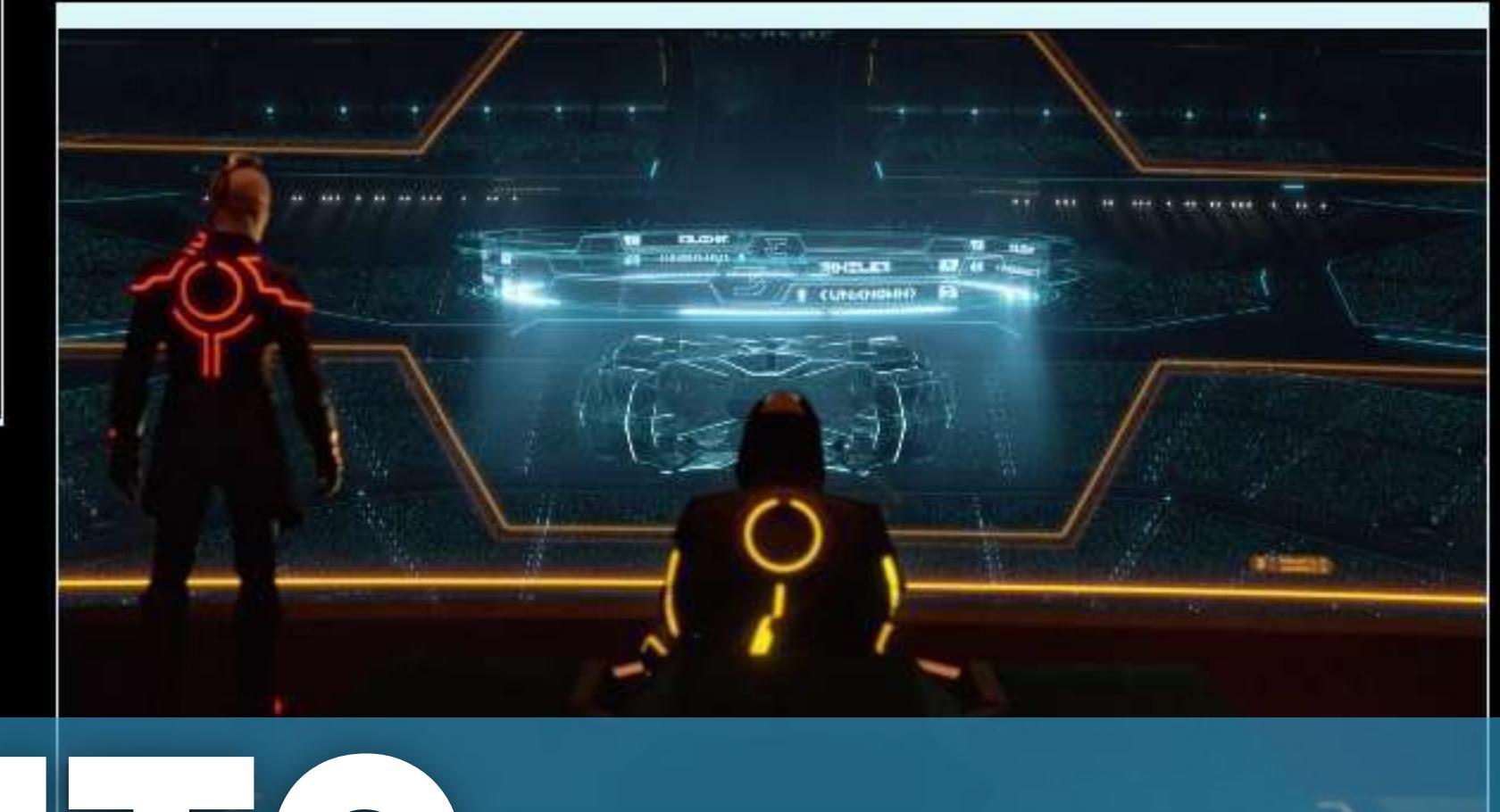
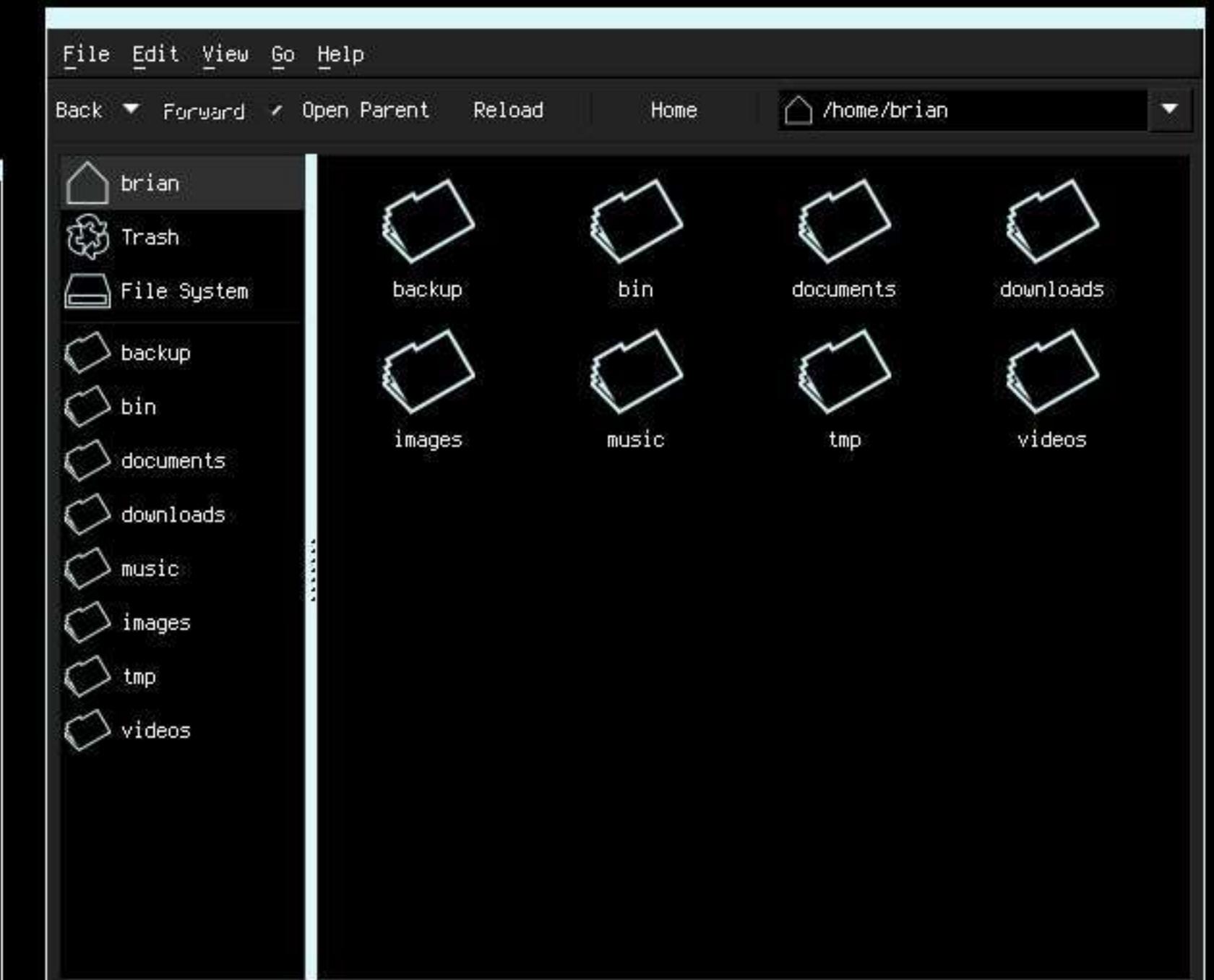
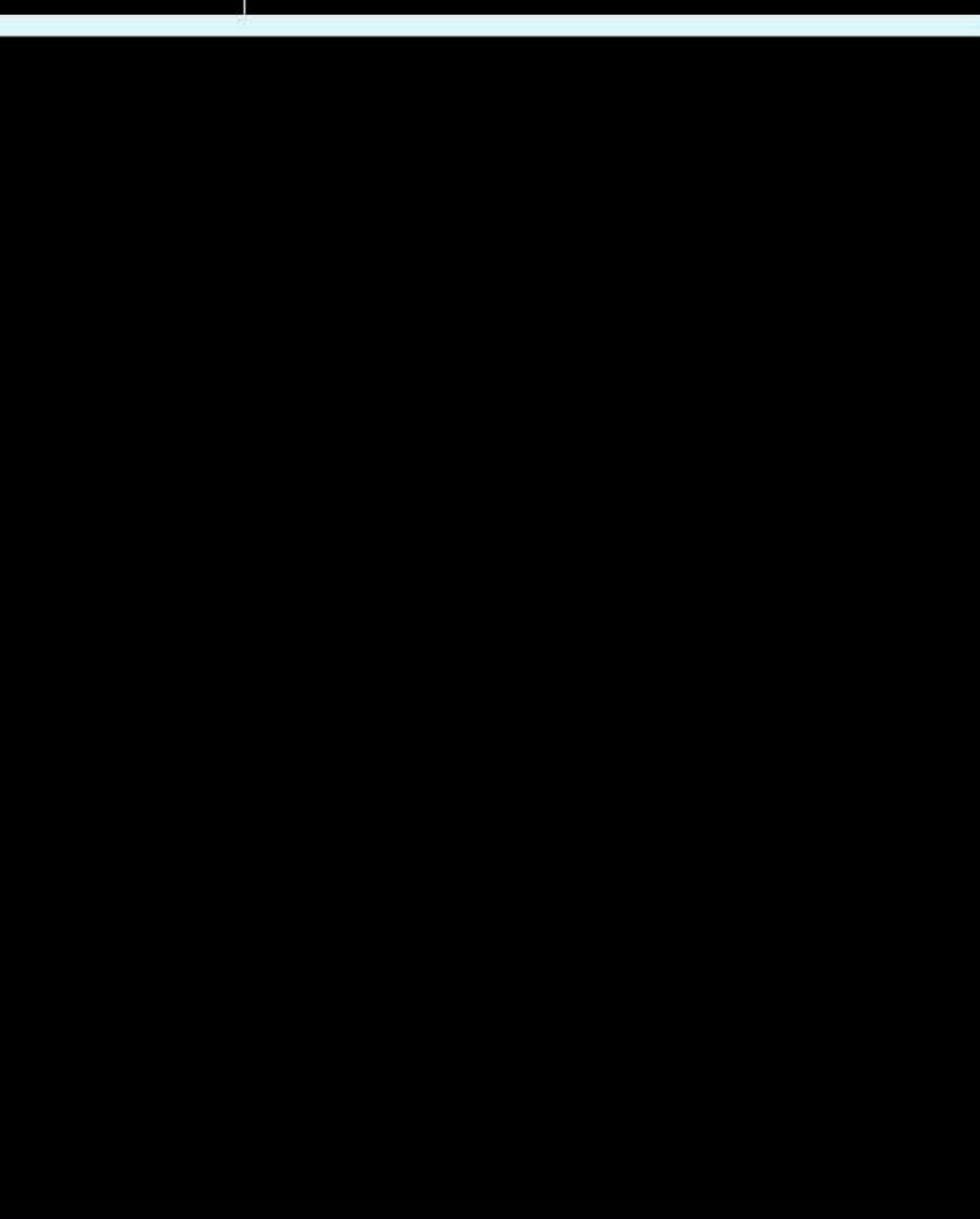
DEPLOYMENTS

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

```
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, 758724k 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-browse
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 vlc
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 0:00.06 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 0:00.04 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 0:00.02 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
$ -
```

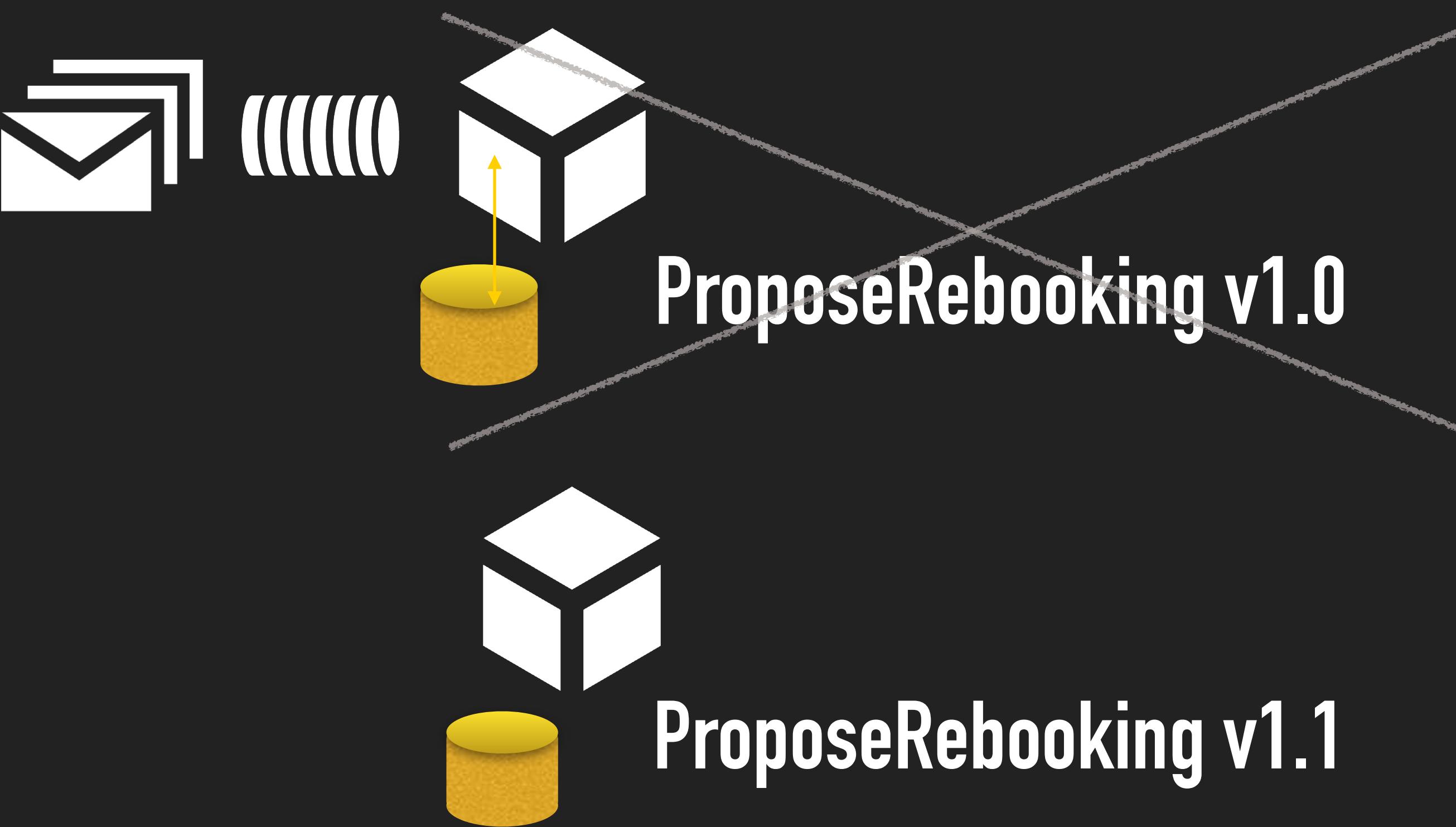


```
http://keyboardscience.org | Wiki: http://keyboardscience.org/wiki/
02:35 --!- Brianith [brian@67.252.85.140] has joined #keyboardscience
02:35 --!- Topic for #keyboardscience: http://keyboardscience.org | Wiki: http://keyboardscience.org/wiki/
02:35 --!- Topic set by acfrazier ["acfrazier@unaffiliated/acfrazier"] [Mon Jul 4 23:10:28 2011]
02:35 [Users #keyboardscience]
02:35 (@ChanServ) [Brianith] draca HansNeon ruumis
02:35 [acfrazier] daemonraccoon dw_junon iMay Soarer
02:35 [bhtooefr] dfj HaTa 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

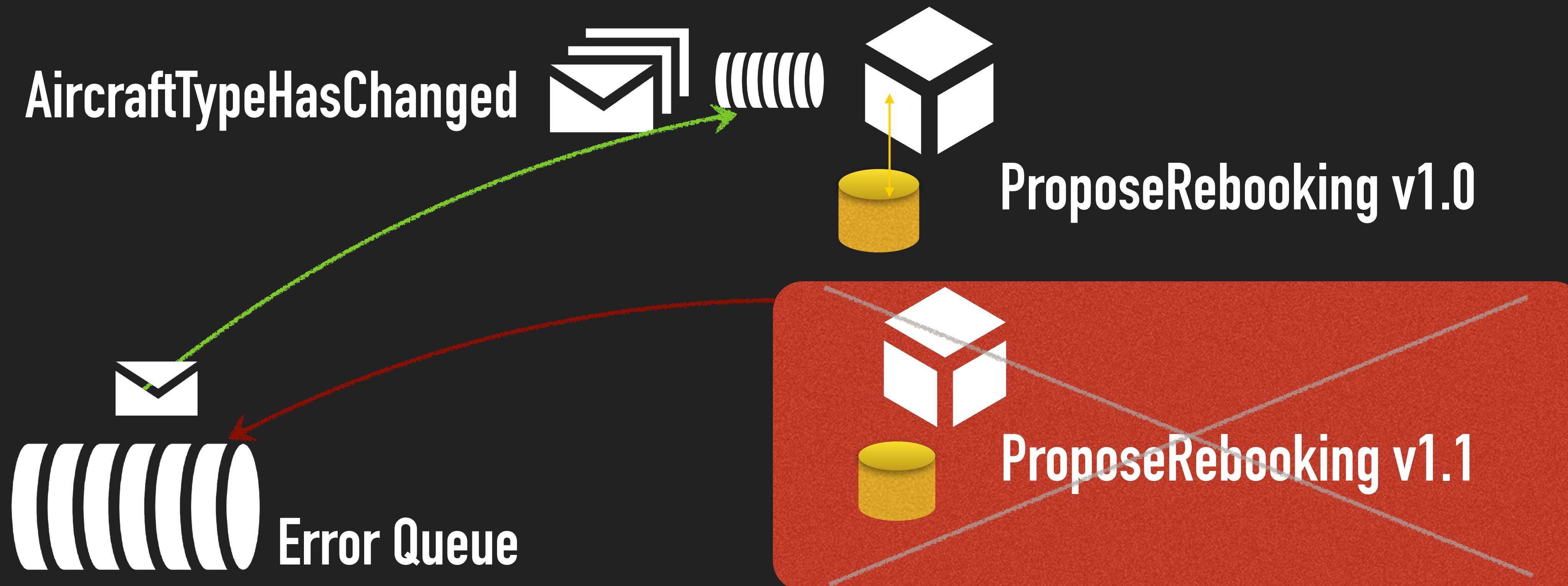
02:38 Brianith(i) 4:freenode/#keyboardscience( cnt)
[#keyboardscience] _
```

SIDE BY SIDE

AircraftTypeHasChanged

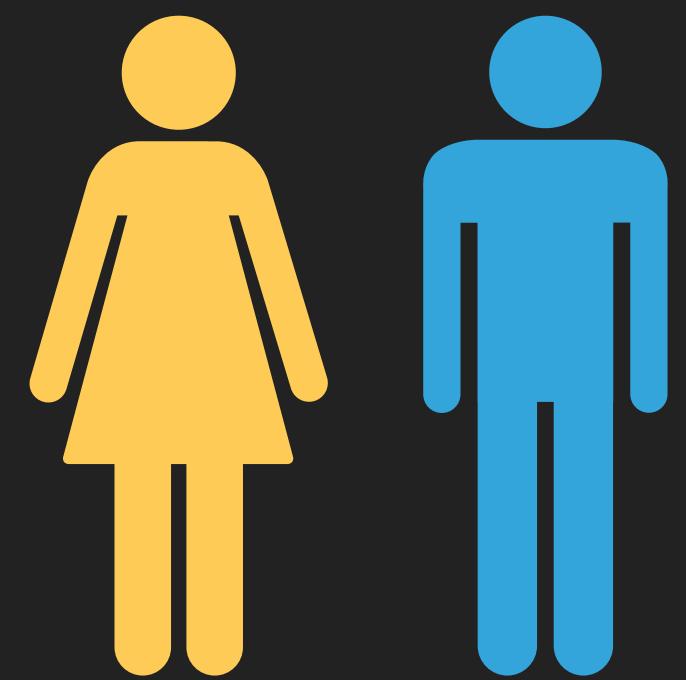


ROLLBACKS



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**



THANKS

