

UPDATE your VIEW on DELETE

The benefits of Event Sourcing





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Event Sourcing.

**(With an appearance
of CQRS architecture.)**

What is Event Sourcing?

What is an Event?

**This poor buggger is
horrendously
overloaded.**

**An event is a
business fact...**

**...that happened at
a particular time.**

- **Appointment Scheduled**
- **Appointment Rescheduled**
- **Appointment Location Moved**
- **Appointment Cancelled**
- **Invitation Extended**
- **Invitation Notification Sent**
- **Invitation Accepted**
- **Invitation Declined**

- **Item Version Submitted**
- **Item Version Approved**
- **Item Added To Cart**
- **Item Removed From Cart**
- **Item Licence Purchased**
- **Item Support Purchased**
- **Withdrawal Request Submitted**
- **Withdrawal Completed**

Event Sourcing, in this context.

Standard practice is
store the **current state**
of an object in a
database using an ORM.

When *state changes*,
the DB representation
changes.

**John wants to take
his partner's last
name.**

ORM

```
#<User id: 216, first_name: "John",  
last_name: "Reed" ...>
```

id	first_name	last_name	...
216	John	Reed	...
...

ORM

```
@user.update(last_name: "Hill")
```

id	first_name	last_name	...
216	John	Hill	...
...

Event Sourcing
doesn't do that.

**An append-only set
of immutable events
as source of truth.**

Derive **everything**
else from the events.

Source the current
state by replaying
events.

Event Sourcing

```
{  
  user_id: 216,  
  event_type: "signed_up",  
  body:  
    { first_name: "John", last_name: "Reed" }  
}
```

```
#<User id: 216, first_name: "John",  
last_name: "Reed", ...>
```

Event Sourcing

```
@user.change_name(last_name: "Hill")  
  
{  
  user_id: 216,  
  event_type: "name_changed",  
  body:  
    { last_name: "Hill" }  
}
```

Event Sourcing

```
{  
  event_type: "sign_up",  
  body: { first_name: "John", last_name: "Reed" }  
},  
{  
  event_type: "name_changed",  
  body: { last_name: "Hill" }  
}
```

```
#<User id: 216, first_name: "John",  
last_name: "Hill", ...>
```

Make everything
else completely
disposable.

Including
current state.

Language agnostic.

Why Event Sourcing?

DELETE is evil.

Every **UPDATE**
is a **DELETE.**

...so **UPDATE**
is evil too.

Business concepts
at the heart of
the system.

It's tried and tested.
(For centuries.)

You're using it
already and would
refuse to do it any
other way.

**Current state is
hard to distribute.**

Append-only streams
of events are easy
to distribute.

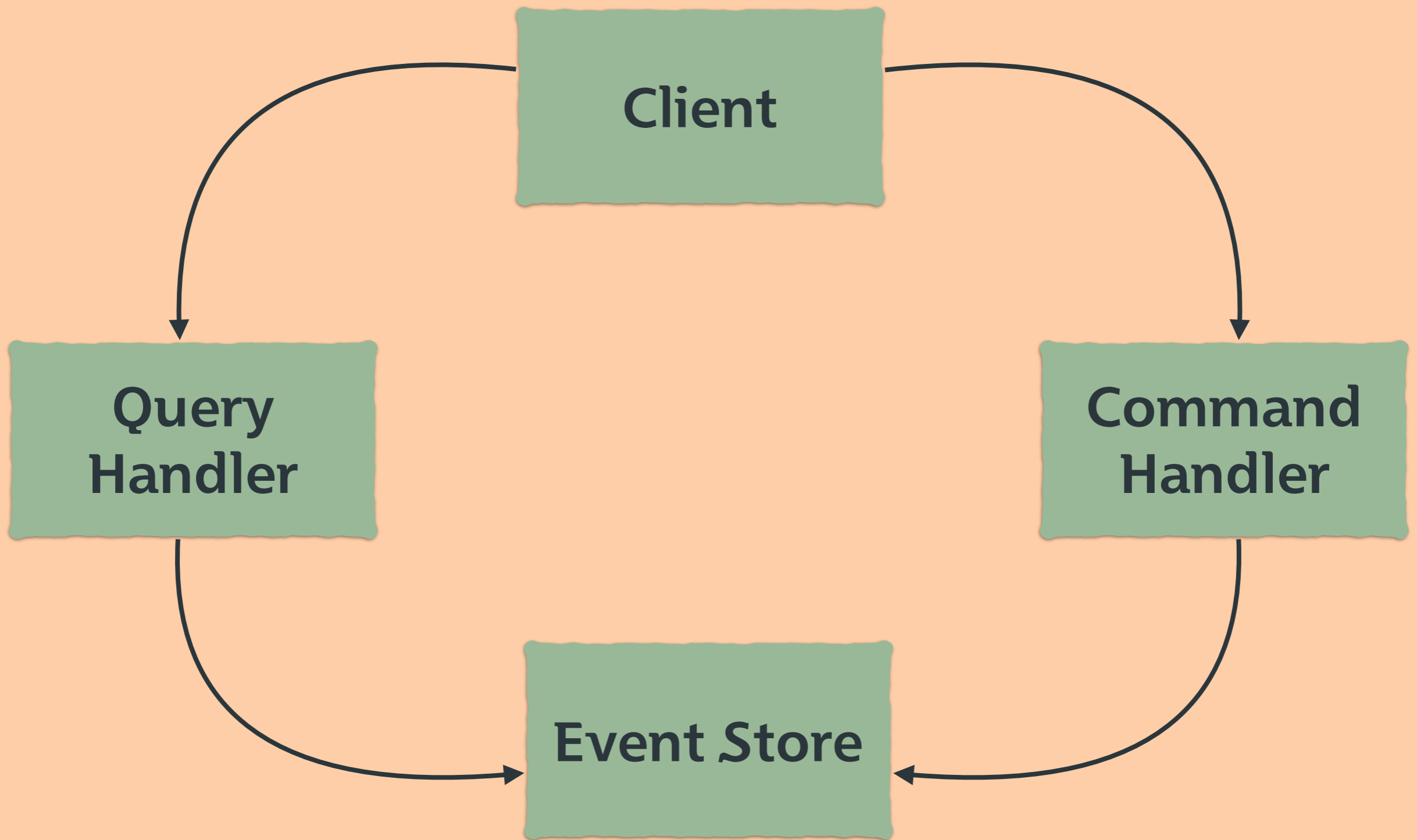
**Last but not least:
free time machine!**

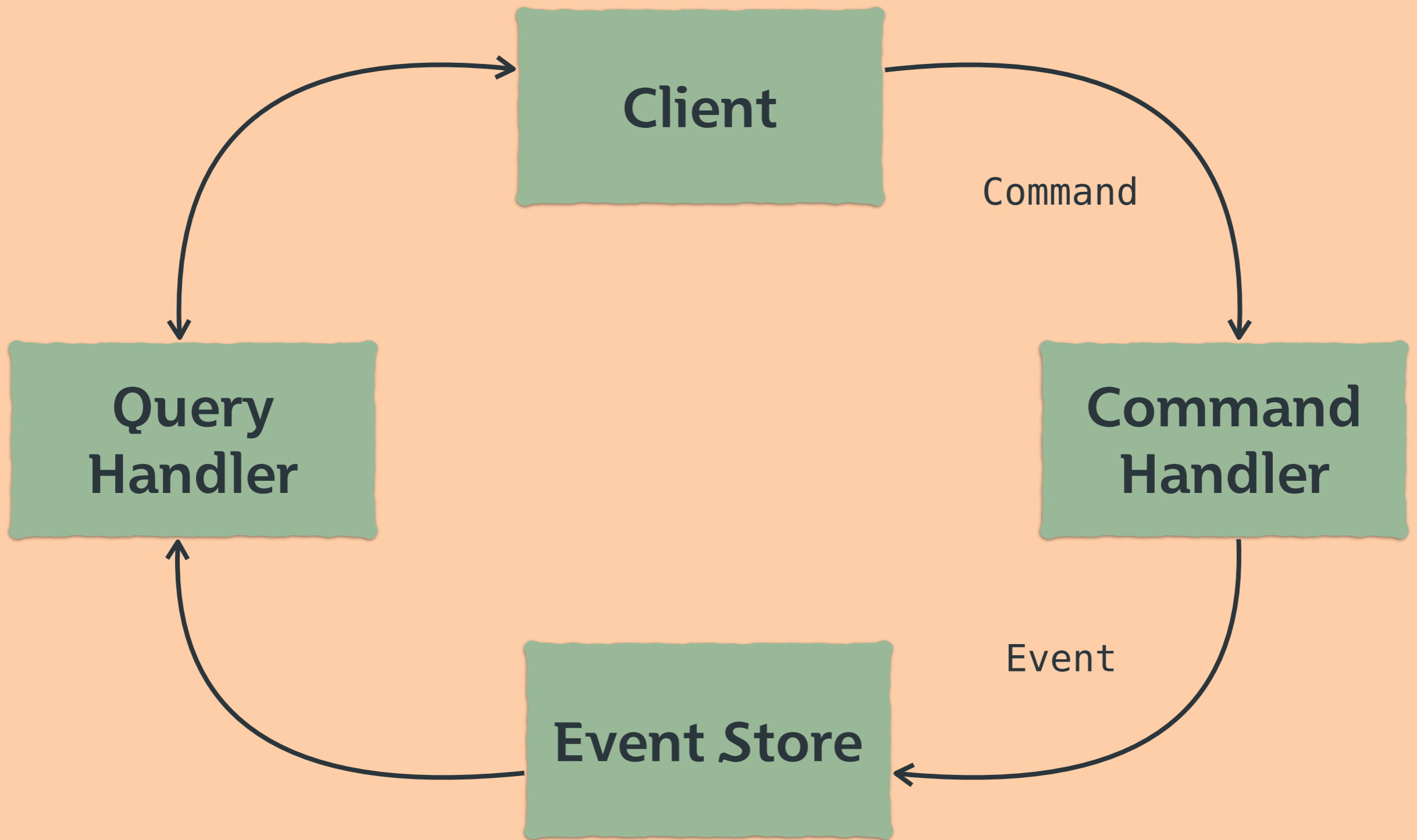
CQRS

**CQS: methods can
read (queries) or
write (commands)
but not both.**

**CQRS: objects have
queries or commands
but not both.**

**In our world we take
it one step further.**

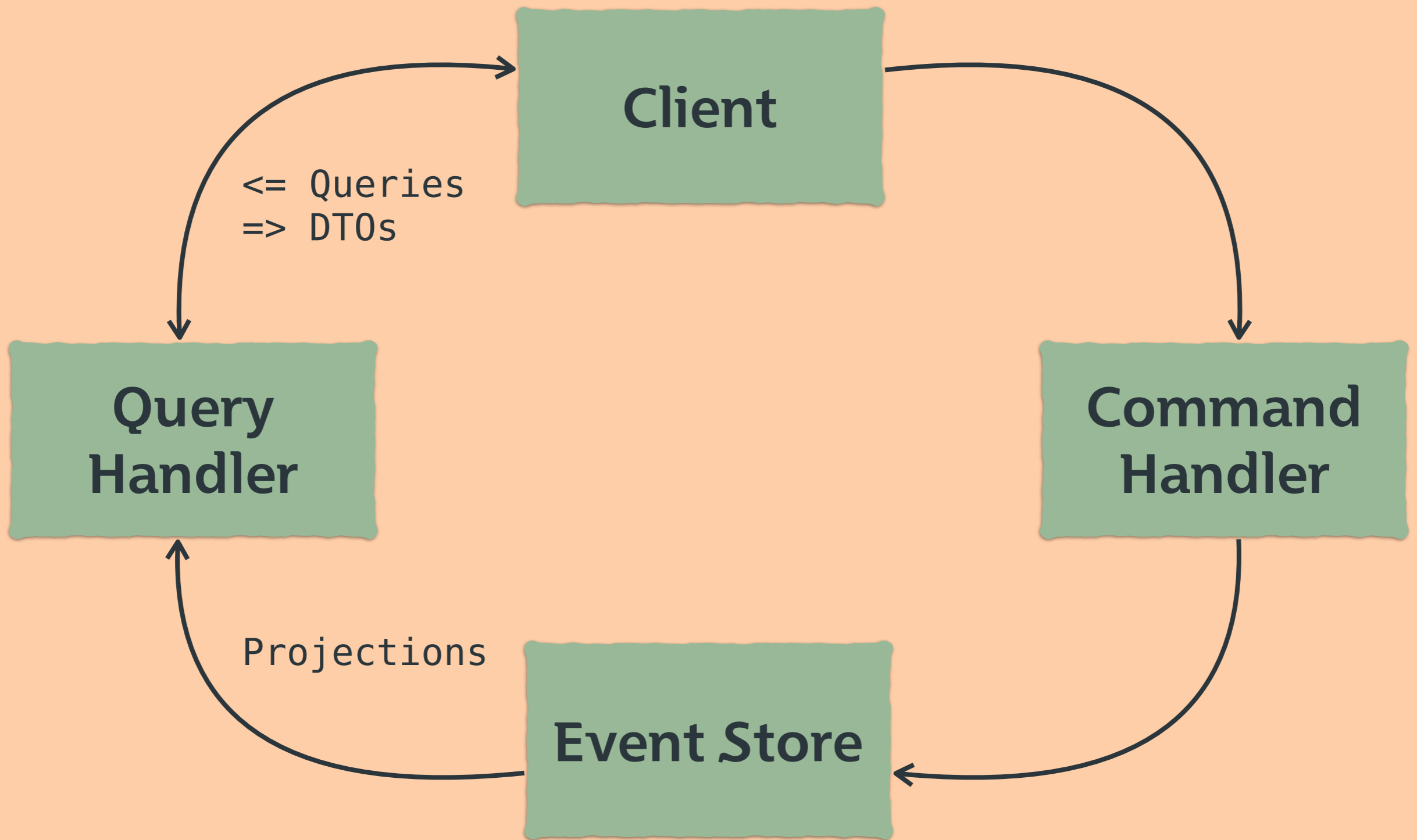




**Commands represent
user intent.**

**Commmands can
be rejected.**

**Events are created
when commands
are accepted.**



Projectors process Events in order.

**Projectors maintain
denormalised
Projections.**

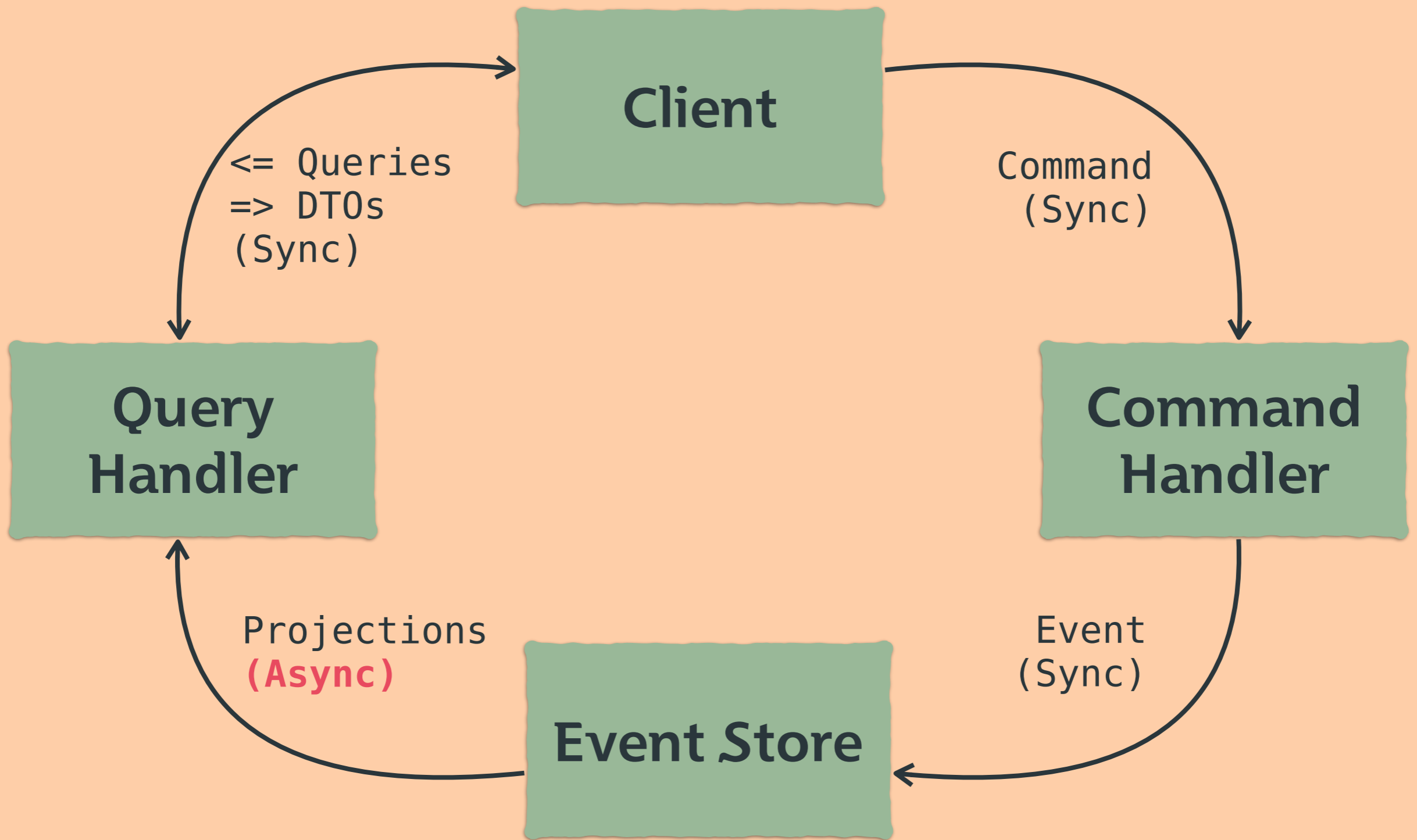
**Projectors and
Projections are 1:1.**

**One Projection per
screen/endpoint.**

Query Handlers

query projections.

**Query Handlers
return DTOs to
clients.**



Eventual Consistency.

(That thing we're
not supposed to
talk about.)

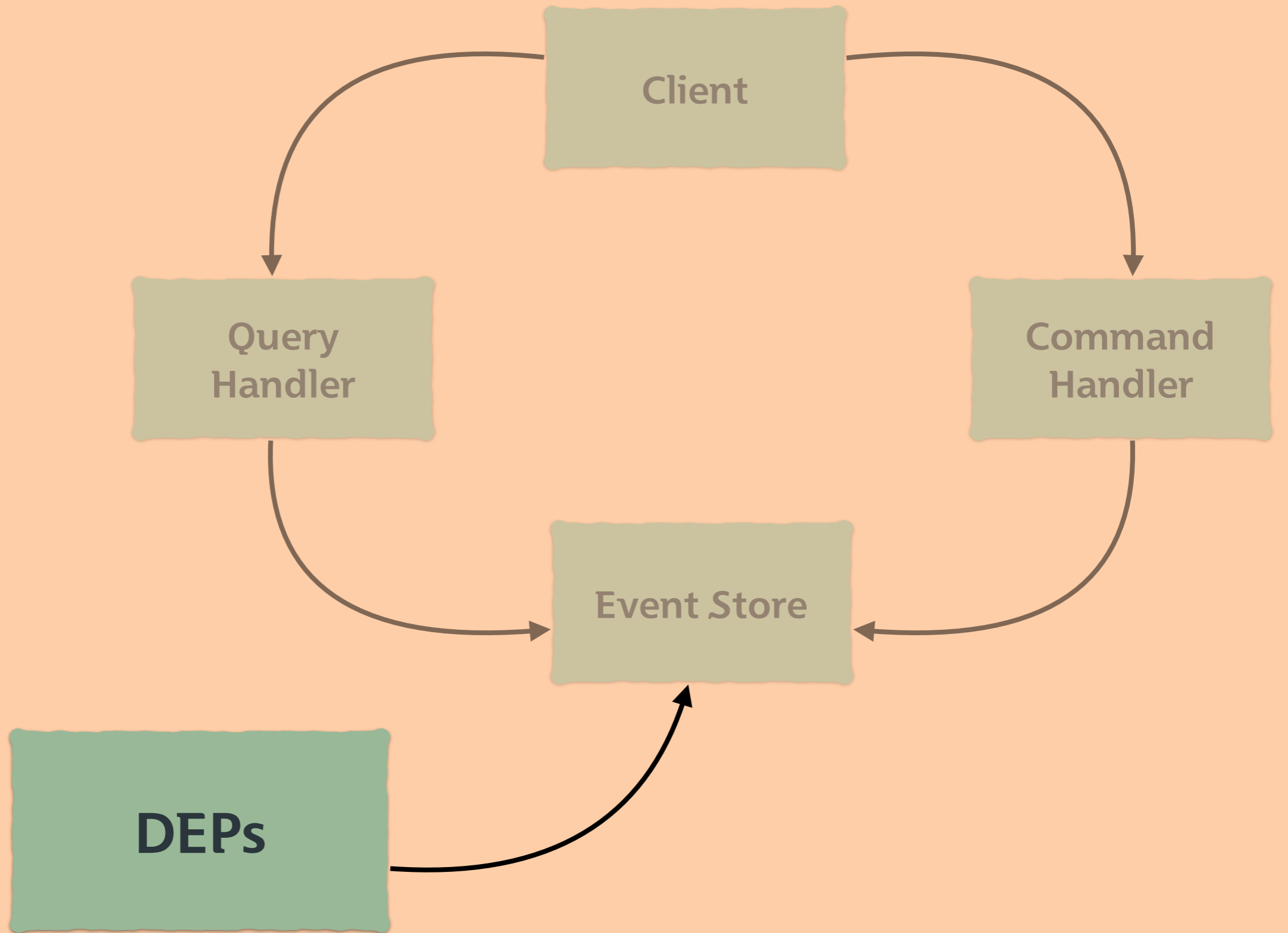
The world is
eventually
consistent.

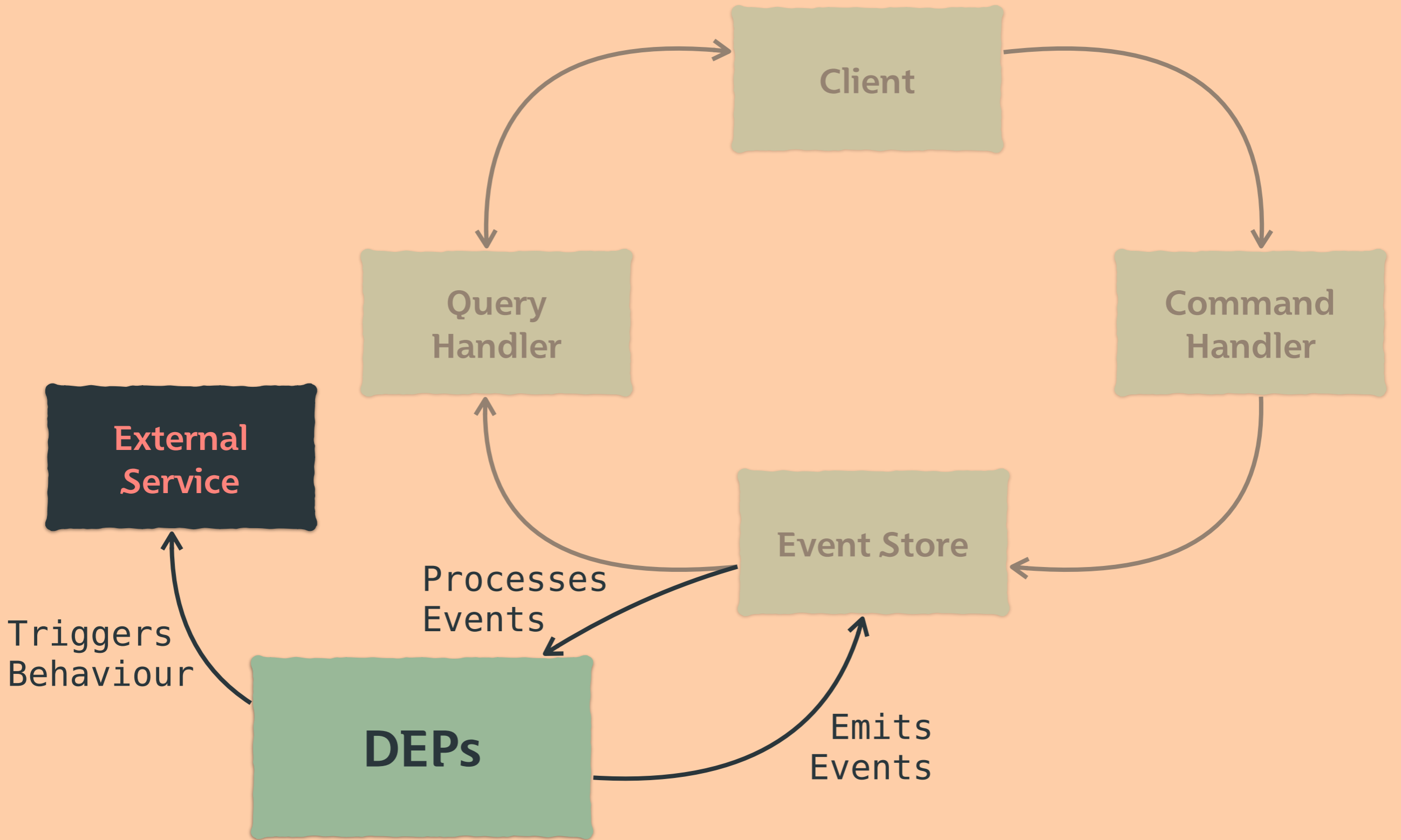
Is a nanosecond okay?

What about a month?

Risk is always a
function of **time.**

Downstream Event Processors (aka DEPs).





**DEPs process events
like projectors.**

**Can react by emitting
events back to the
Event stream.**

**Can react by
triggering external
behaviour.**

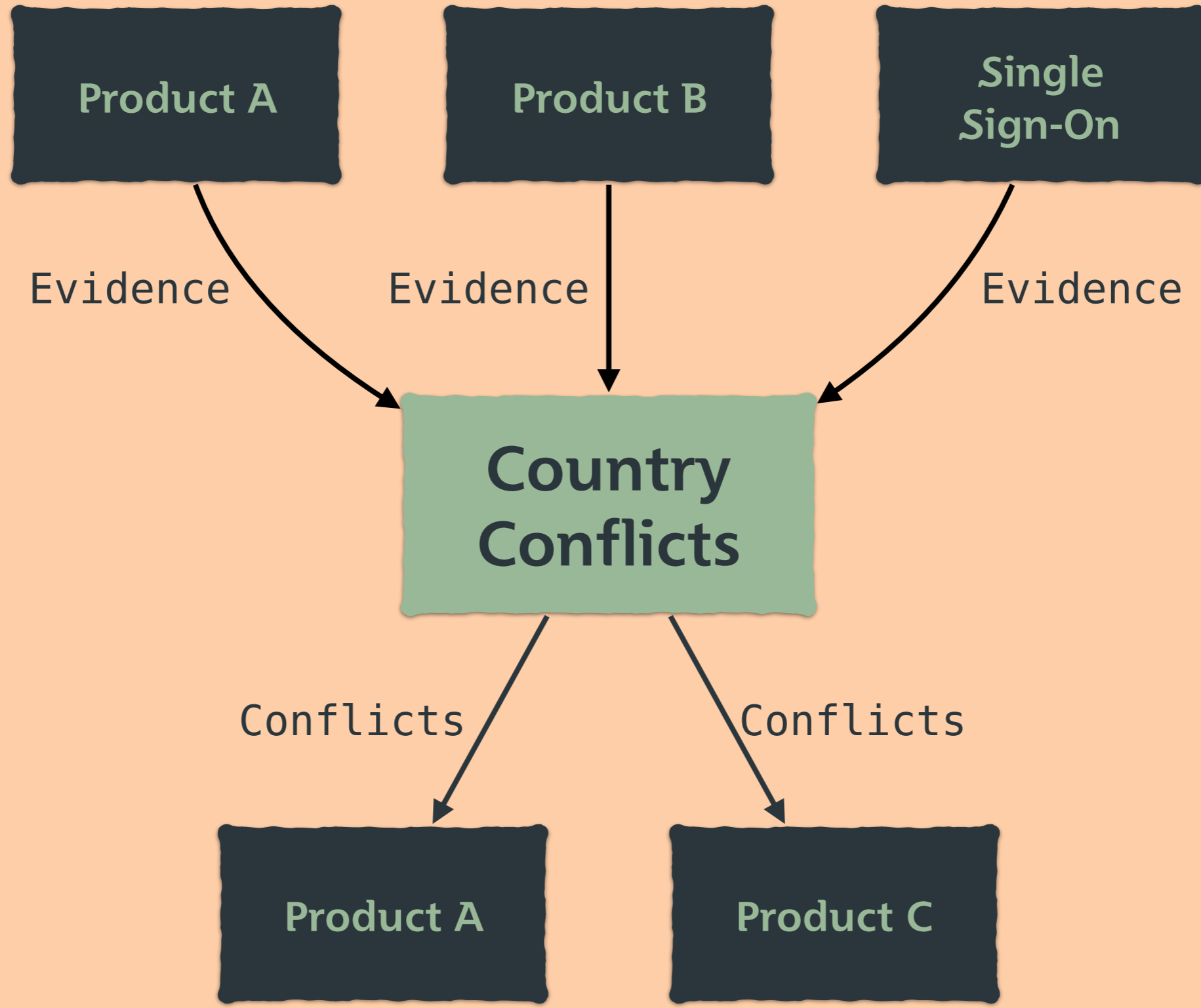
**Encourages clean
separation of
concerns.**

Case study.

Country Conflicts.

Business problem?

**Detect and investigate
conflicting information
regarding a user's
physical location.**

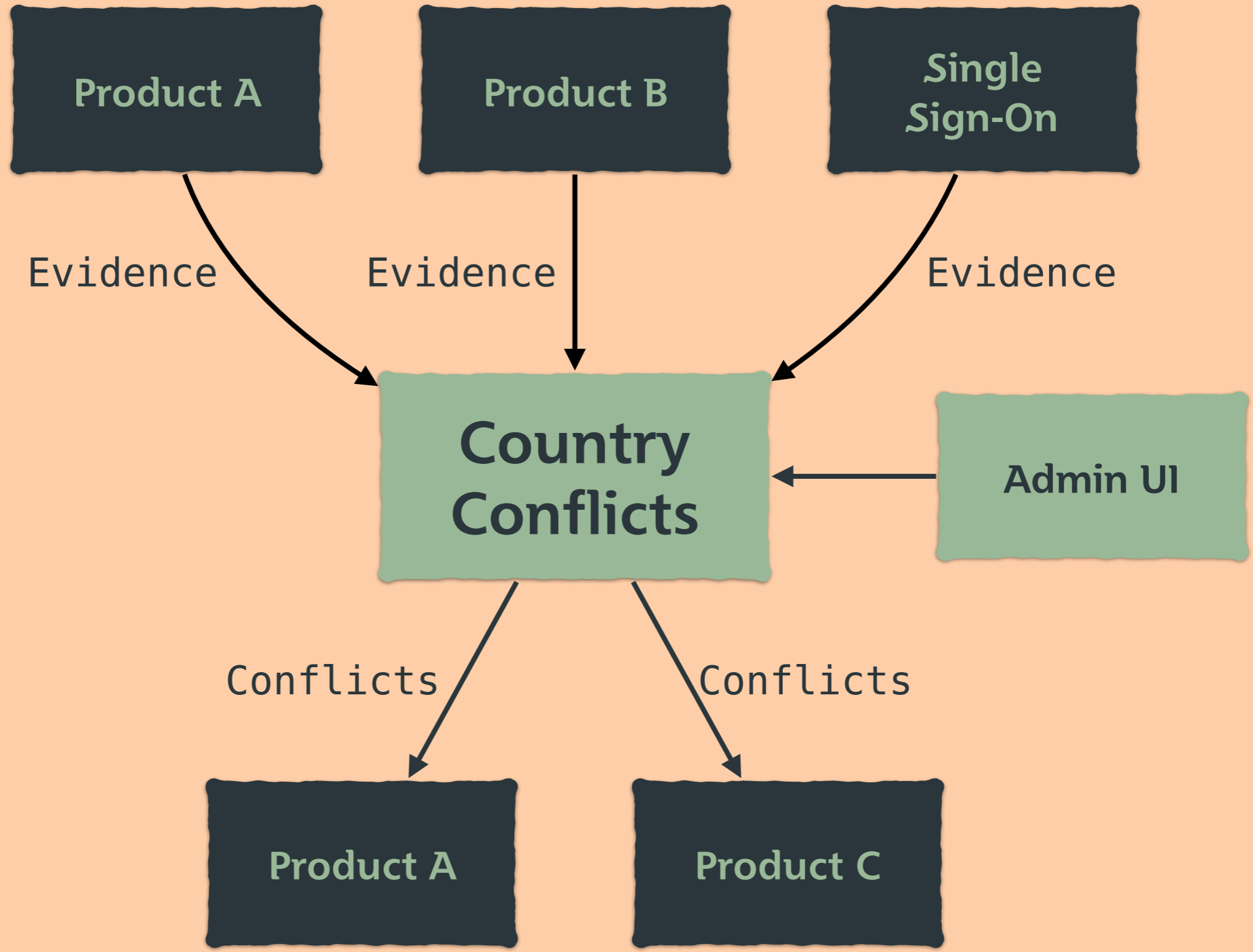


**Gather evidence and
store as events.**

**DEP looks at
evidence and raises
ConflictDetected.**

**(Another) DEP sees
conflict event and
emails a notification.**

**(Another) DEP might
auto-resolve the
conflict based on
more evidence.**



**Admins issue
Commands to
manually resolve
conflicts.**

**After 30 days,
GracePeriodExpired
is raised.**

**DEP checks whether
it is. If not, raises
ConflictActivated.**

- **Evidence Provided**
- **Conflict Detected**
- **Conflict Notification Email Sent**
- **Conflict Automatically Resolved**
- **Conflict Manually Resolved**
- **Conflict Grace Period Expired**
- **Conflict Activated**

**Other systems are
querying conflicts
through projections.**

Small, well-defined,
and simple.

Other systems are
substantially larger.

So why this CQRS architecture?

Encourages *Single*
Responsibilities.

Command and Query
Handlers can scale
independently.

Writes are fast.

Reads are faster.

Projections can be
thrown away when
no longer needed.

Separating recording
from interpreting
what happened.

Limit **blast radius** of changes.

Reduces **fear**
and enables
rapid change.

Keep the
cost of change
lower for longer.

The heart of a system
is far more stable
than the edges.

Should you use it?

Well, maybe.

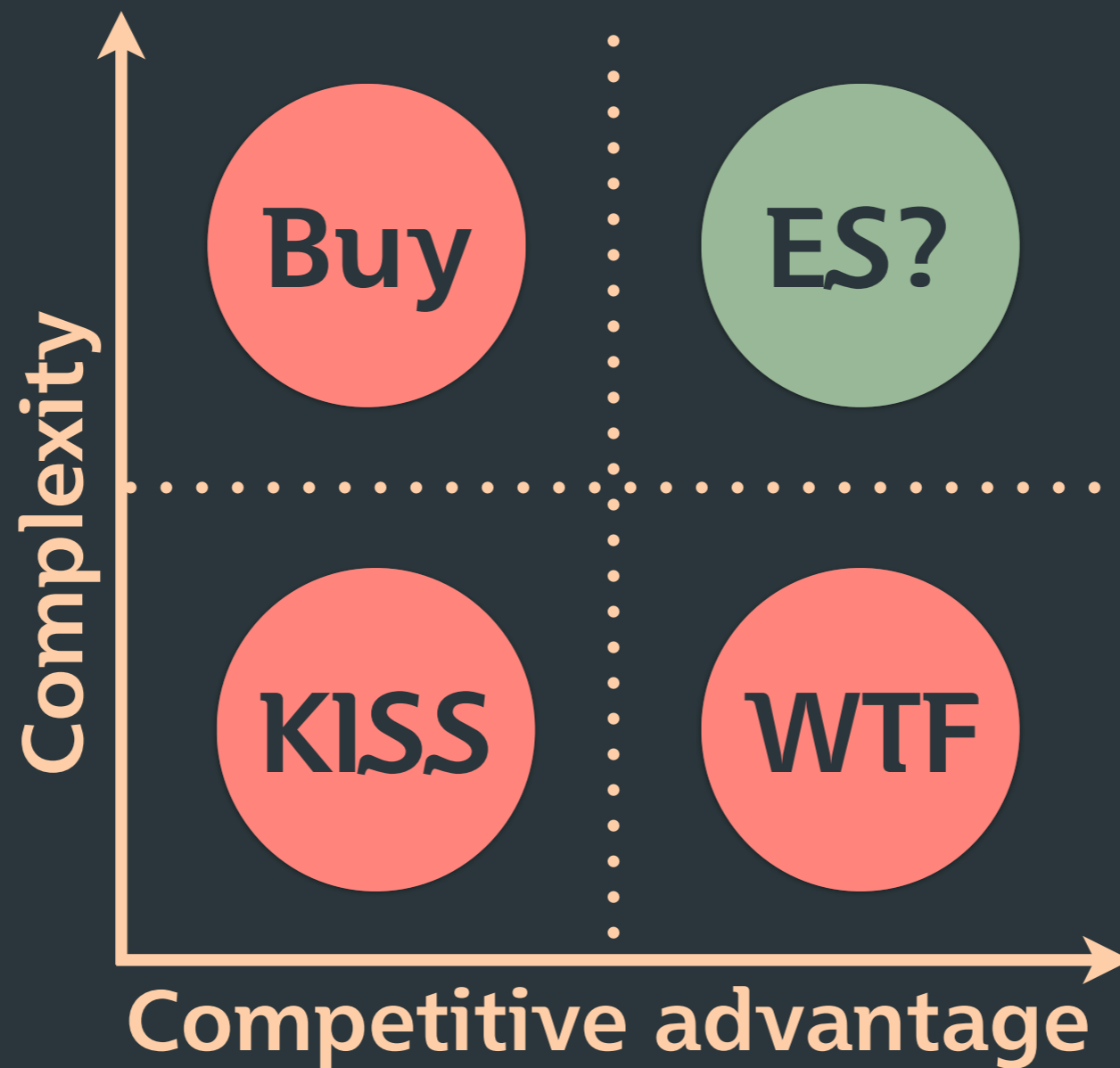
Not appropriate for
every problem.

Works better for
read-heavy systems.

Well suited for
commerce-oriented
domains, for example.

Or anywhere where
history is important.

Strategic Design*



It's a **great tool** to
have in your toolbox.

Thank you.
Questions?