

Connecting Services



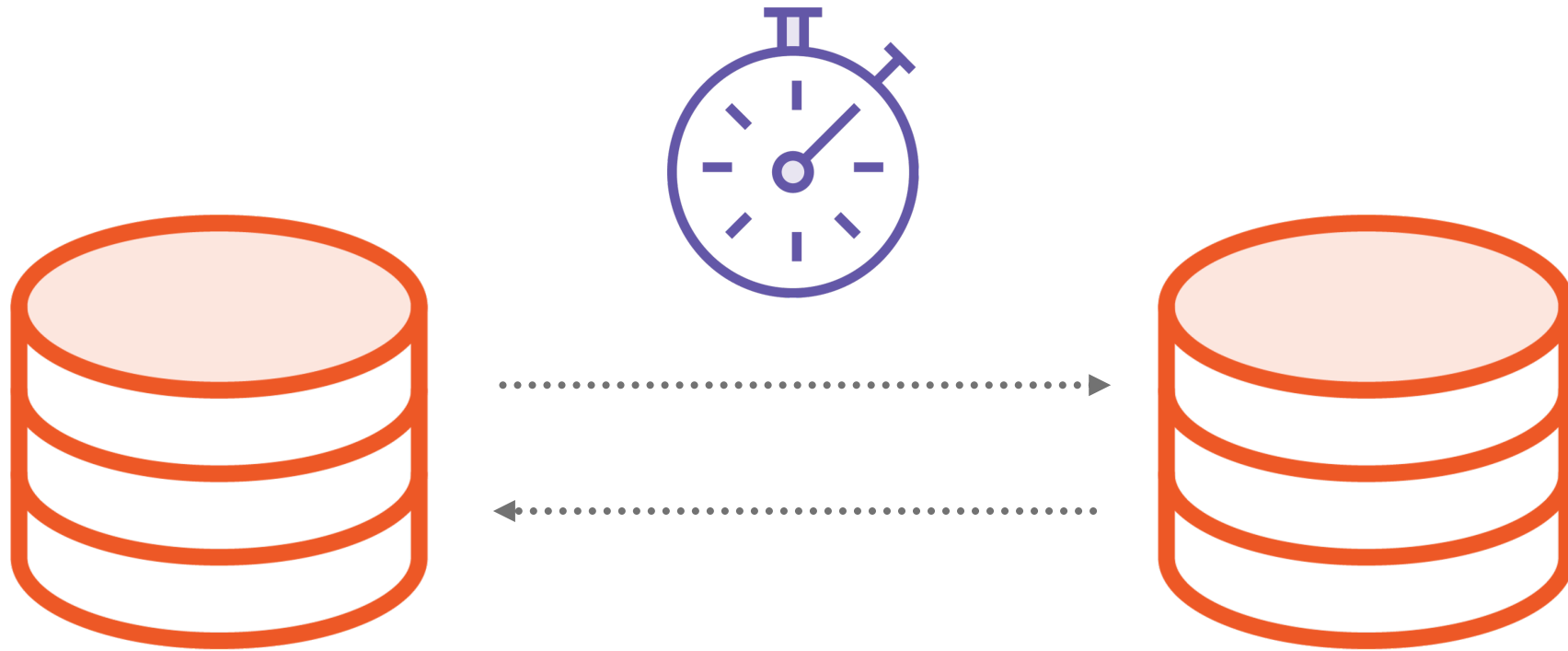
Michael L Perry

SOFTWARE MATHEMATICIAN

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Synchronization



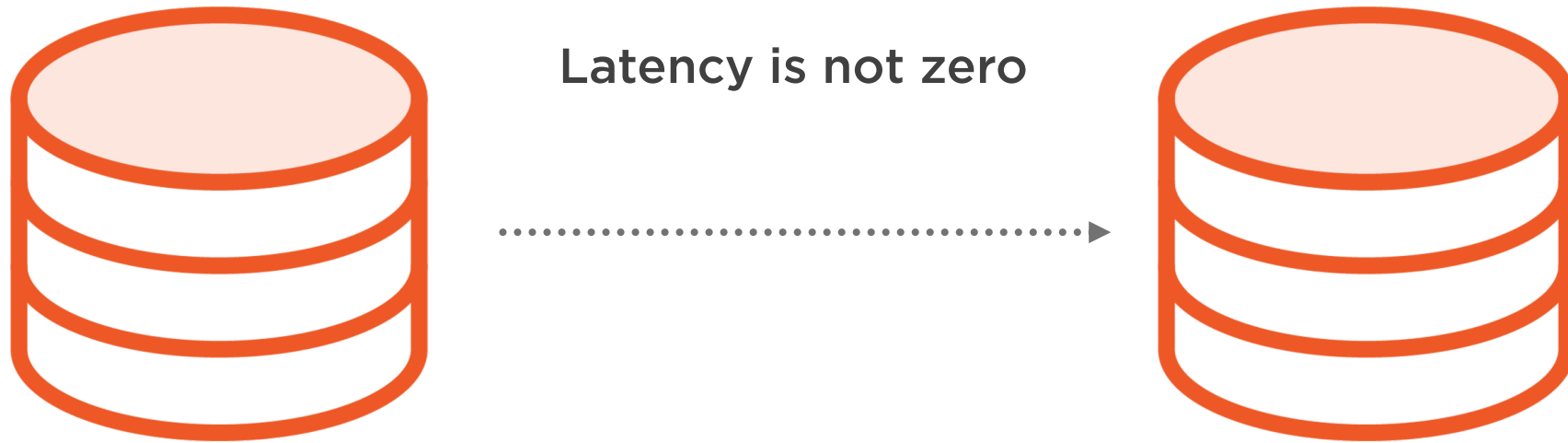
Consistency



Publish Subscribe



Eventual Consistency





Finishing Promotion application

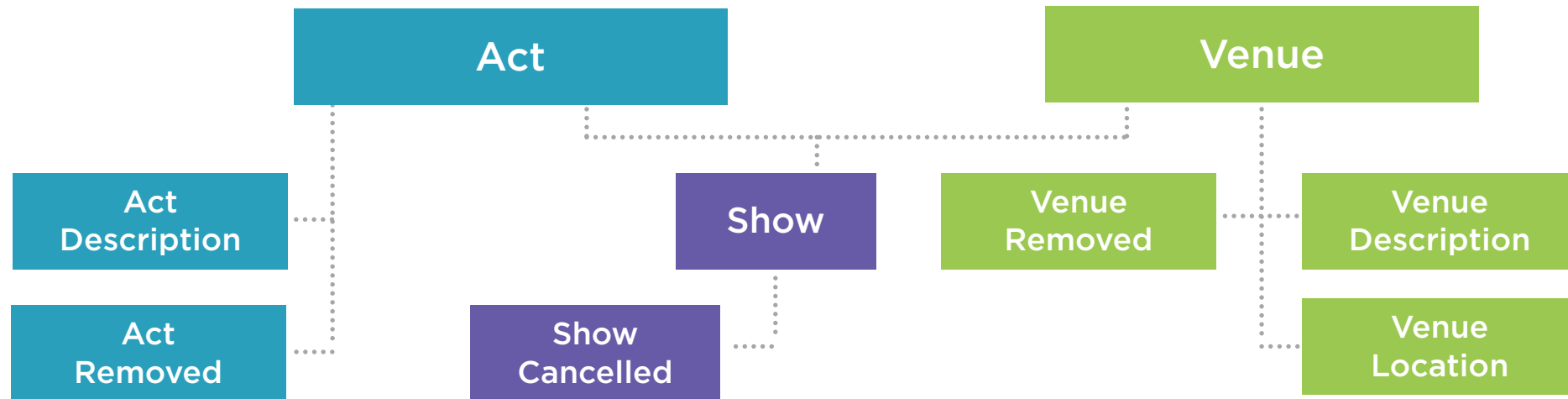
Starting public-facing site

Search for a show

- Act description
- Venue location
- Show date



Promotion SQL Database



Denormalized Search Index



Show Document



Show Info



Act Info



Venue Info



Denormalized Search Index



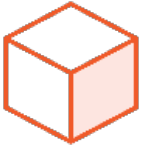
Show Document



Show Info



Act Info



Venue Info



elasticsearch



Search Service



Command Query Responsibility Segregation



Commands



Queries



Commands, Queries, and Events



Commands

Side-effect
Return no data



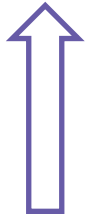
Queries

No side-effect
Return data



Events

After side-effect
Expose data



Commands, Queries, and Events



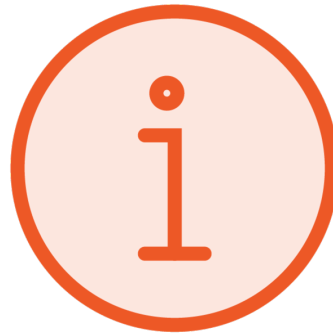
Commands

Imperative verb
“Schedule show”



Queries

Specification
“Shows for act”

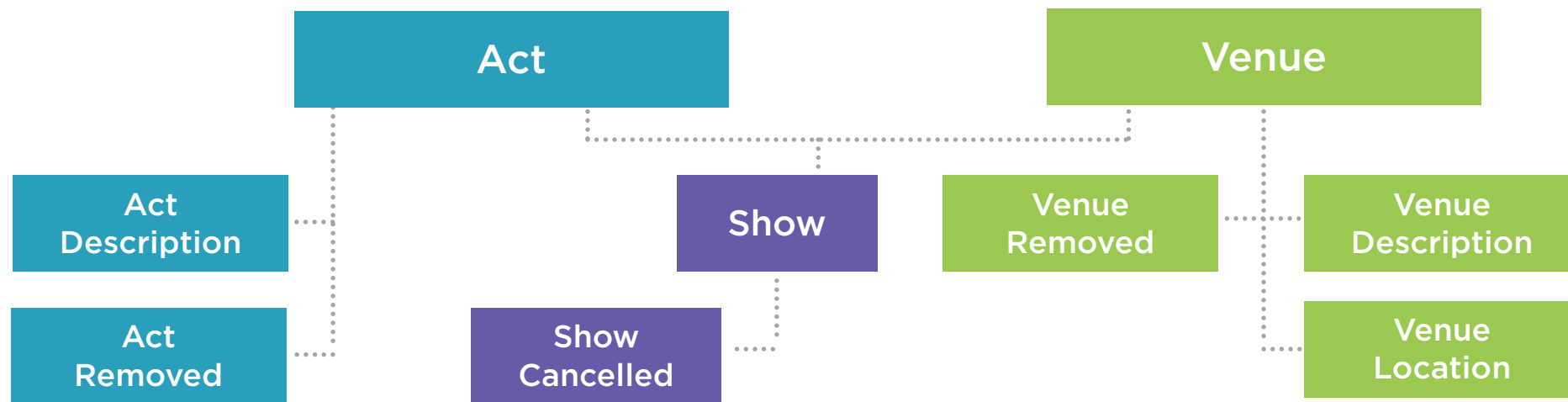


Events

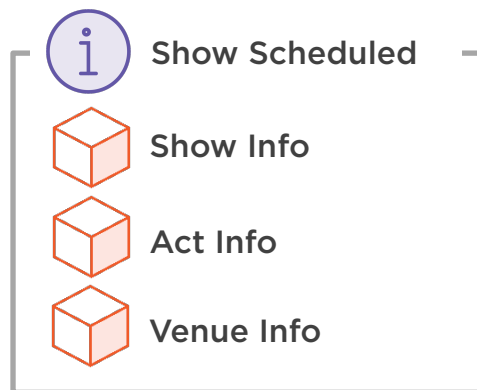
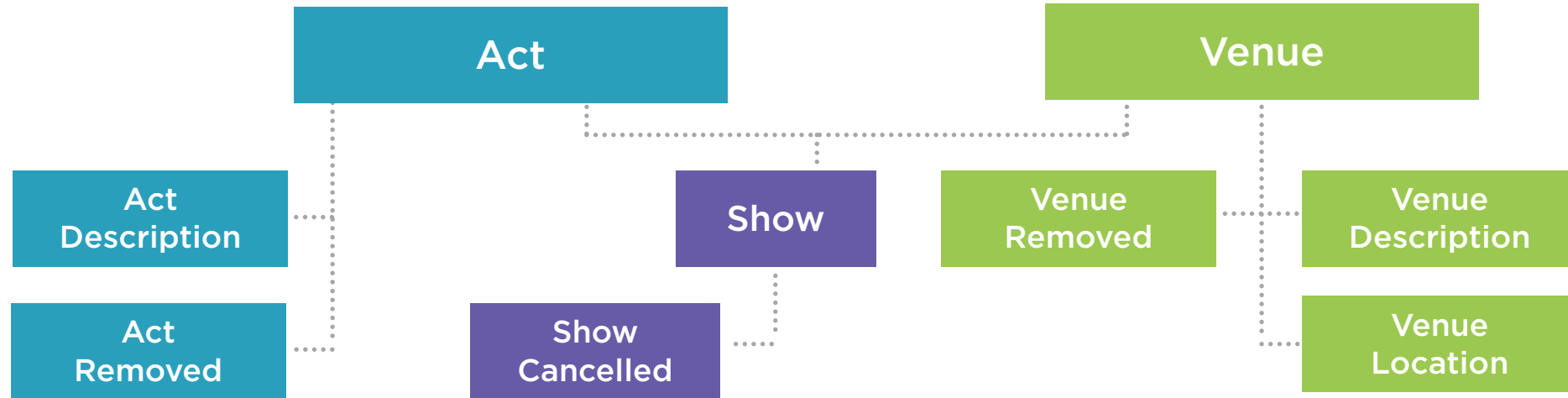
Past-tense verb
“Show scheduled”



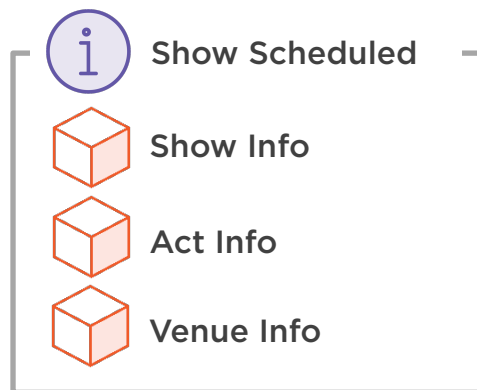
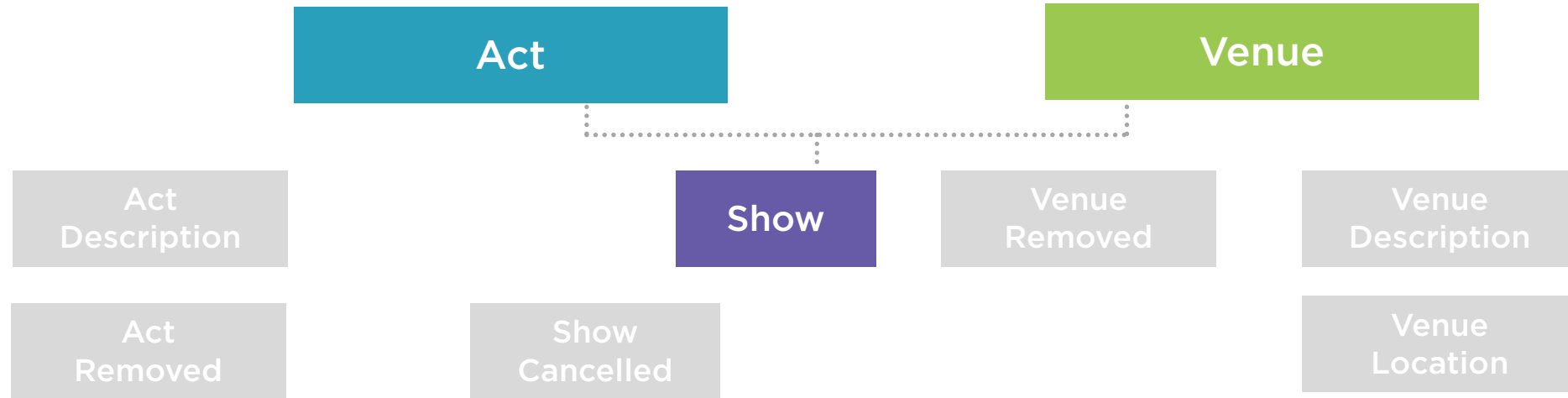
Published Events



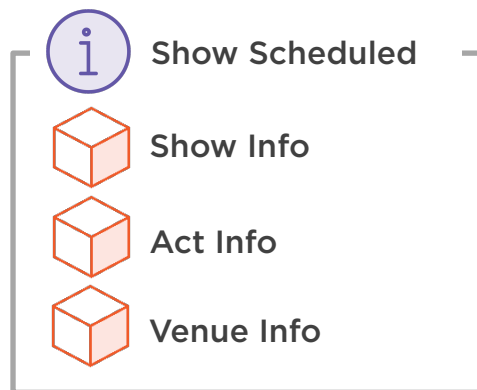
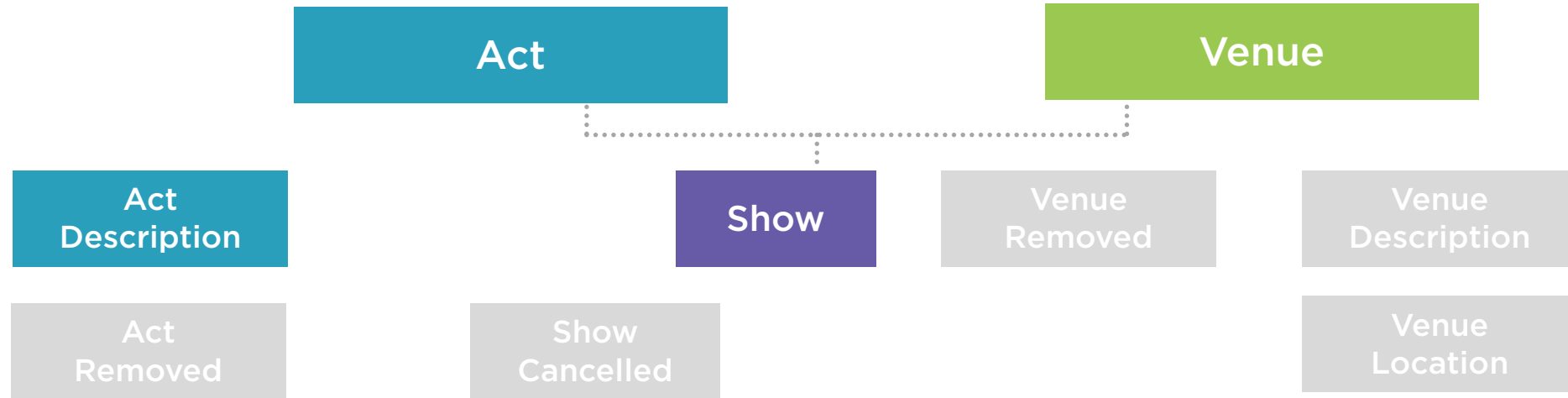
Published Events



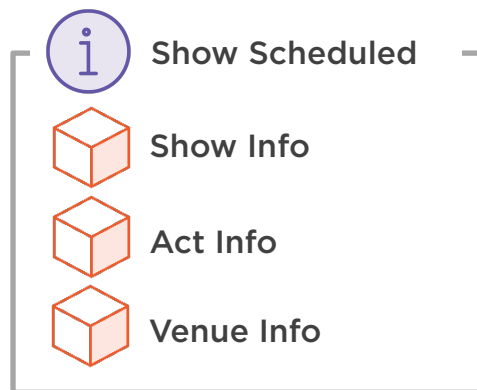
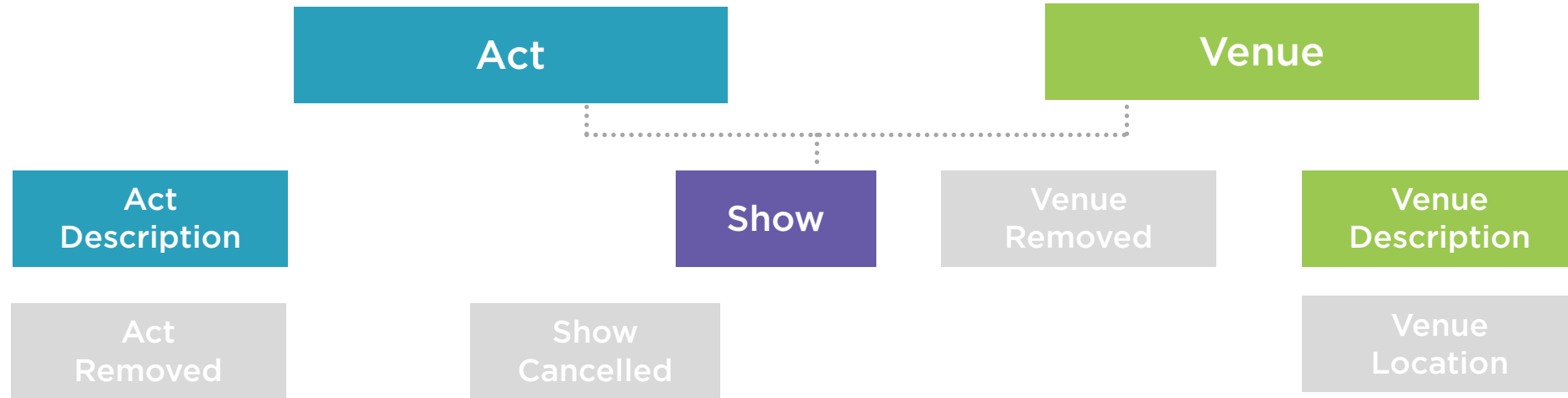
Published Events



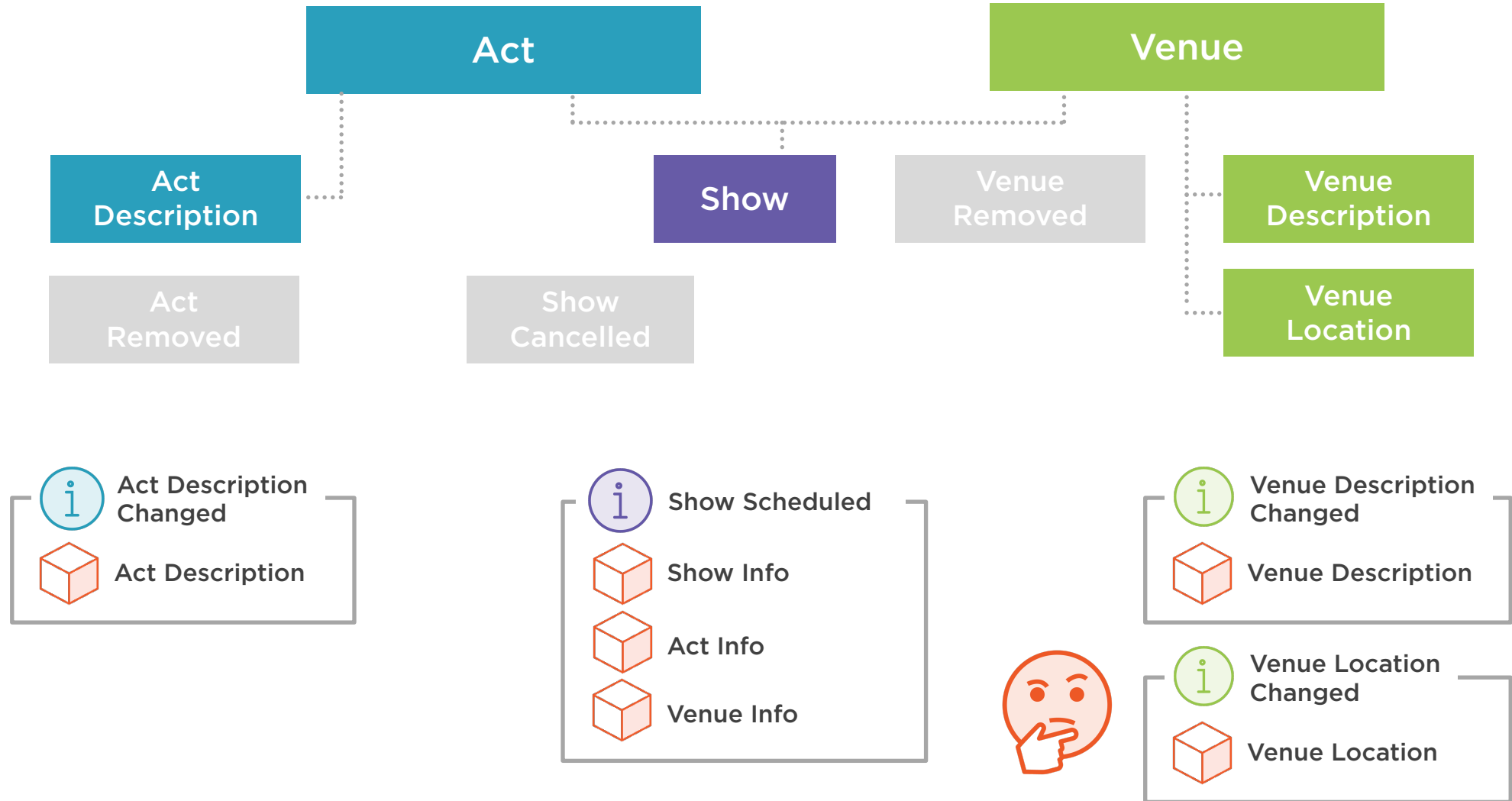
Published Events



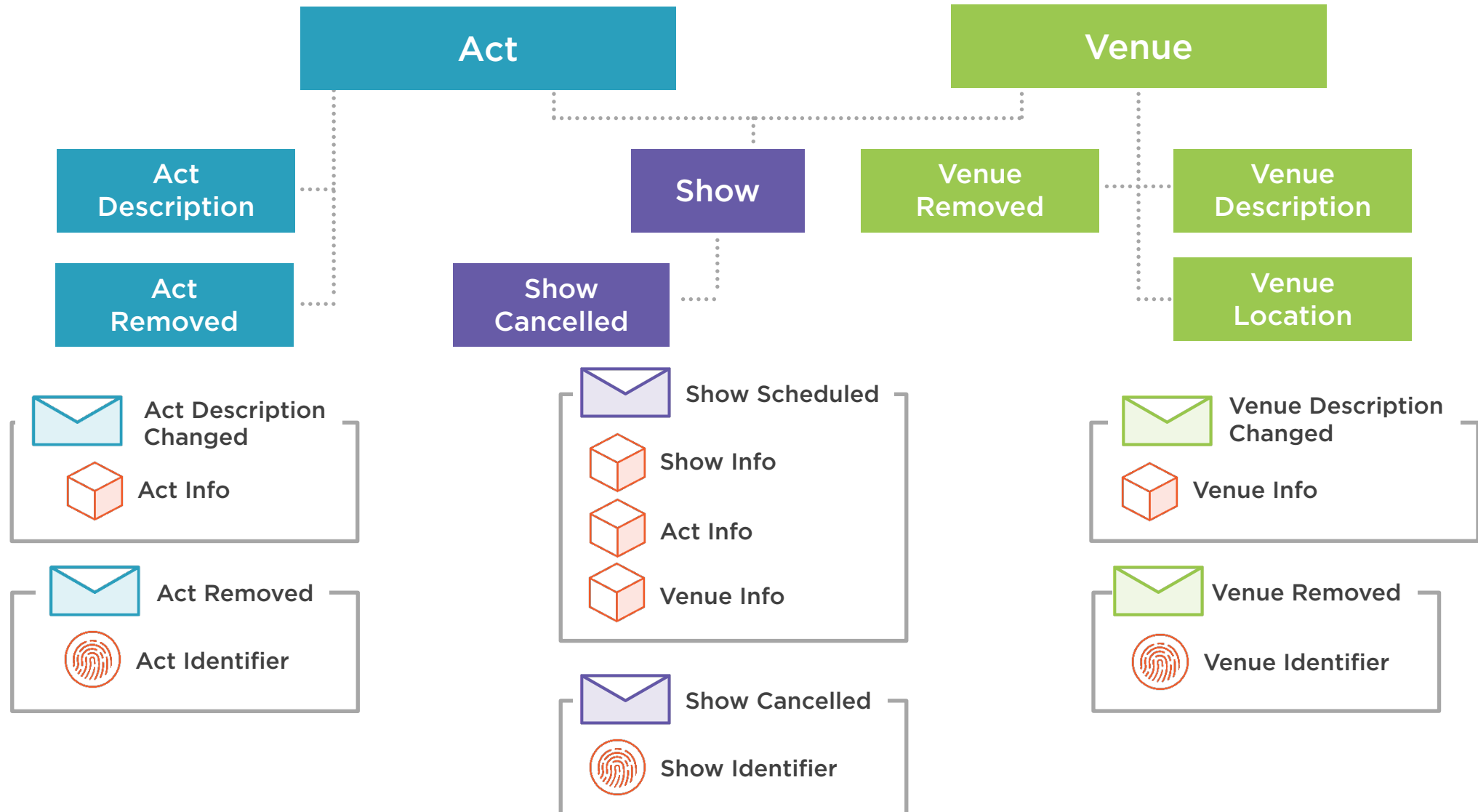
Published Events



Published Events



Published Events



Events



Publisher doesn't know subscribers

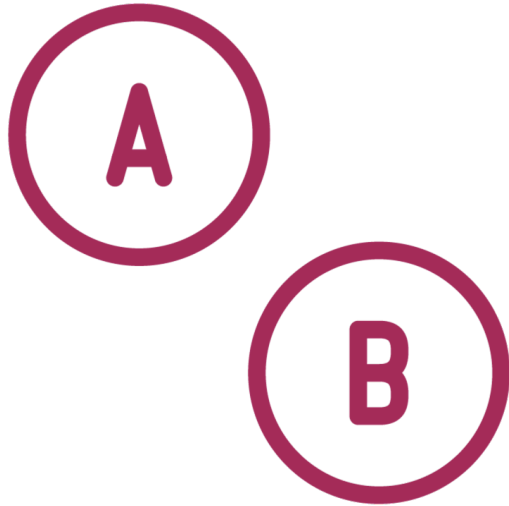
Fan out

Publish-subscribe

- Single publisher
- Multiple subscribers
- Decoupling

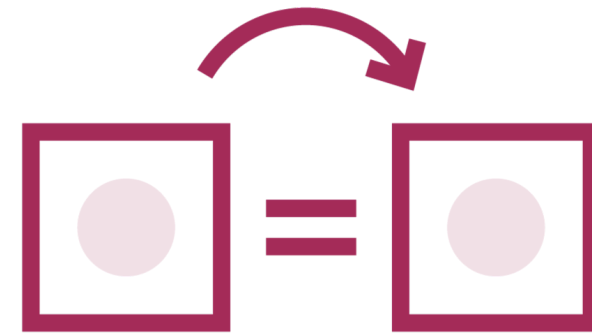


Multiple Subscribers



Different kinds

Each receives
all events



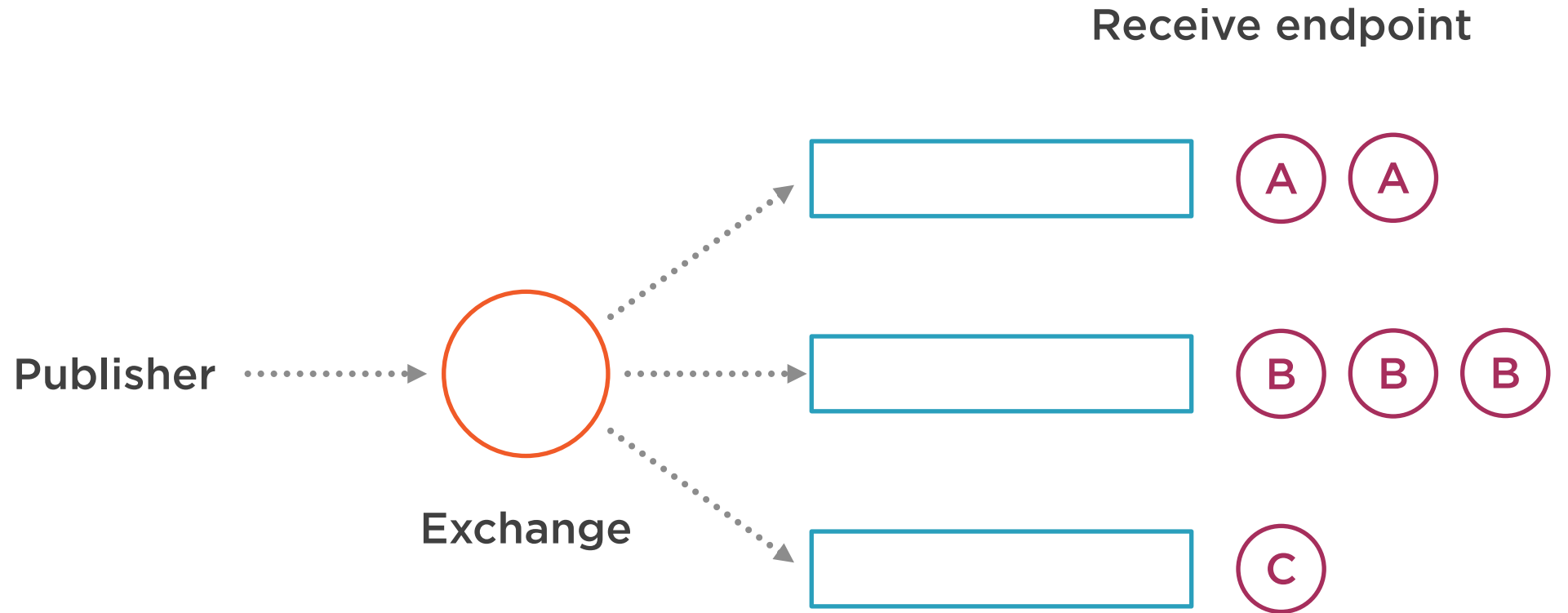
Multiple instances

Only one receives
each event

MassTransit



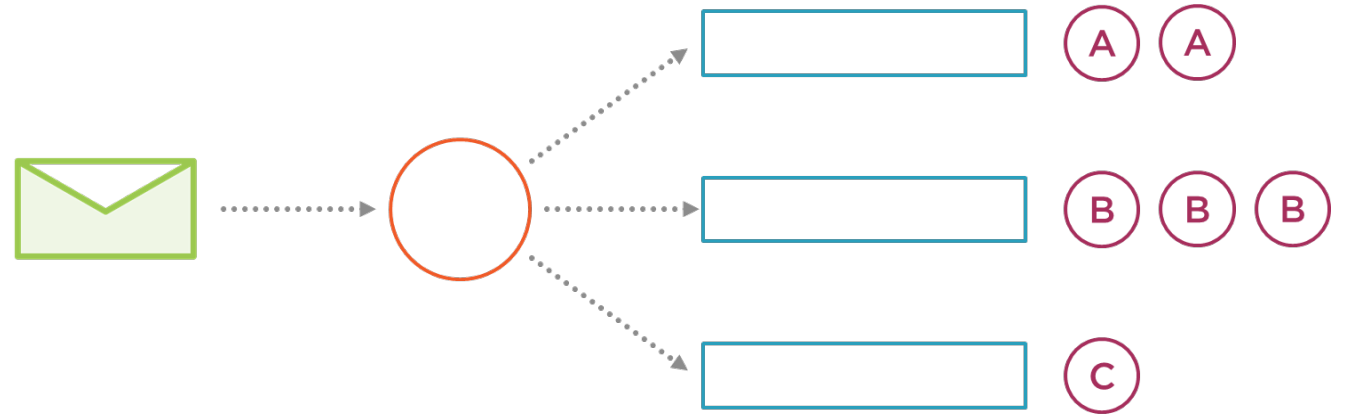
MassTransit



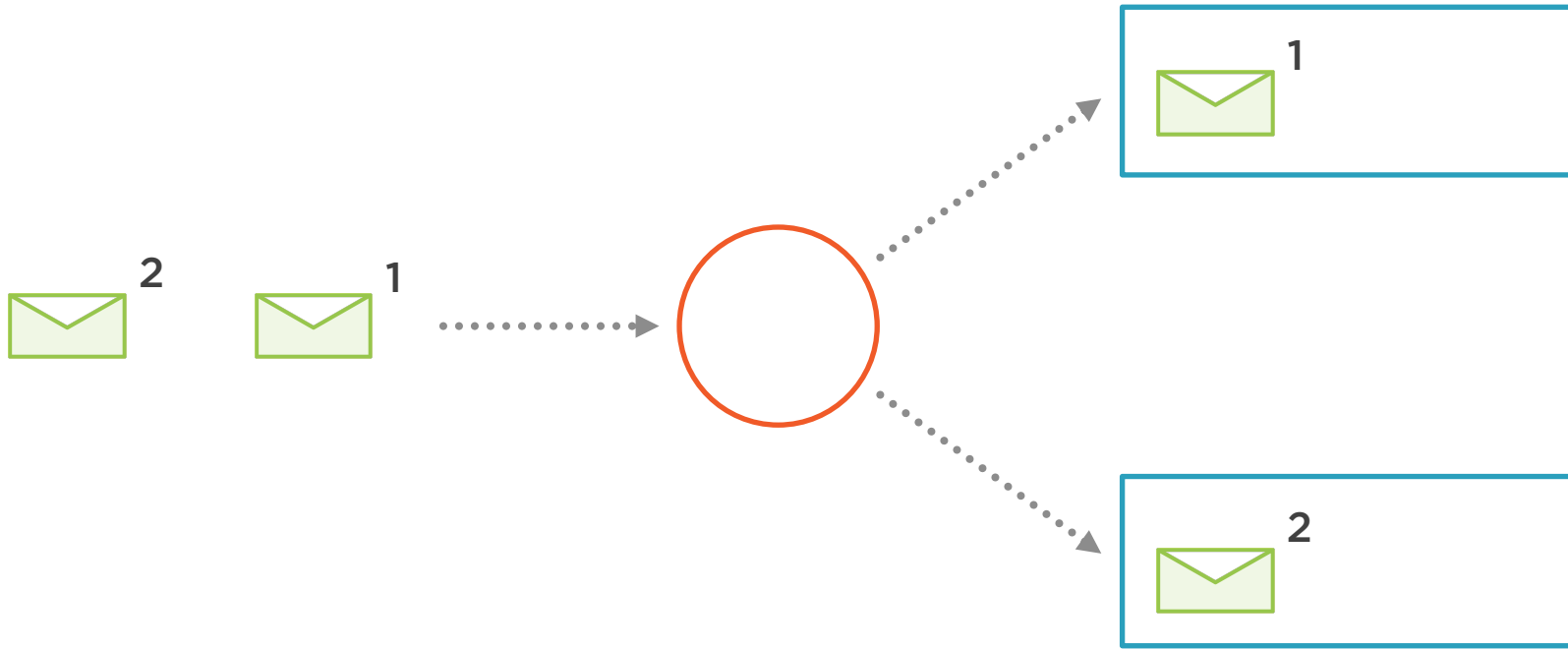
Queues

Difficult to guarantee
order of delivery

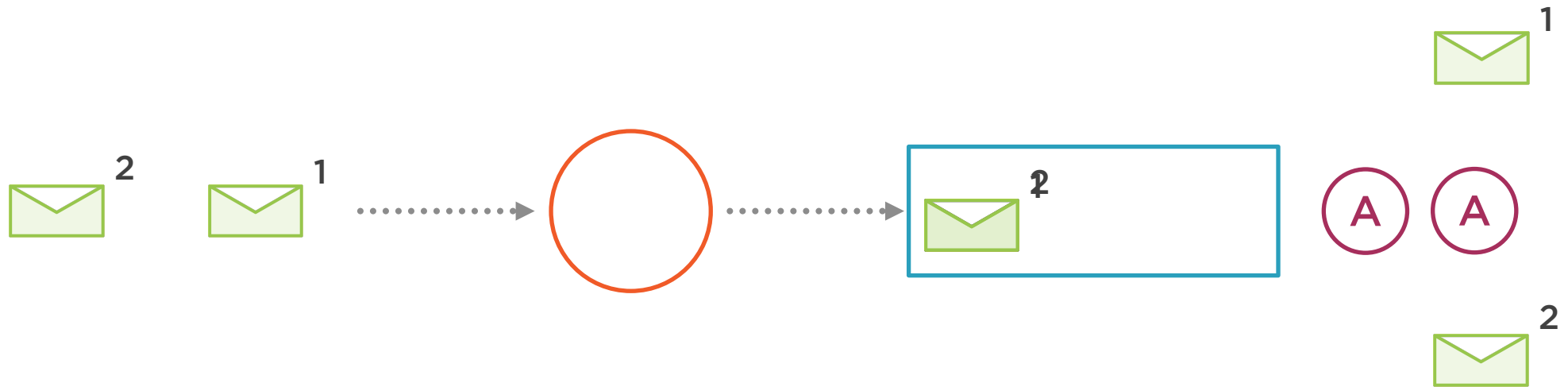
First-in first-out



Different Kinds to Different Queues



Single Queue Competing Consumers



Single Queue Single Consumer



Commutative

$$a+b = b+a$$

Applies in mathematics

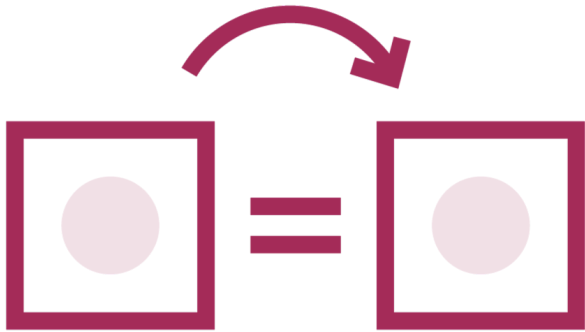
Can apply to message handlers

Outcome does not depend upon order

Don't have to rely upon infrastructure

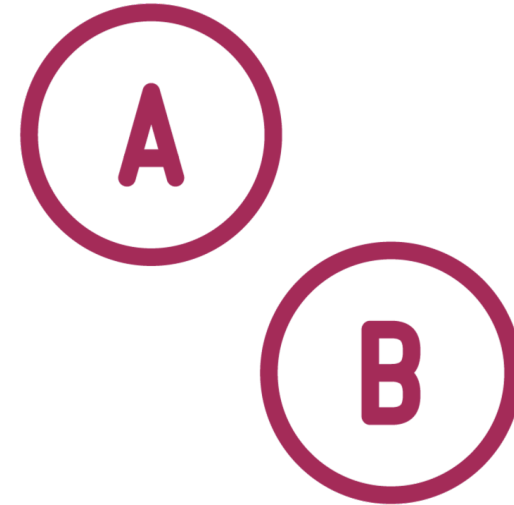


Scenarios



**Messages of
same kind**

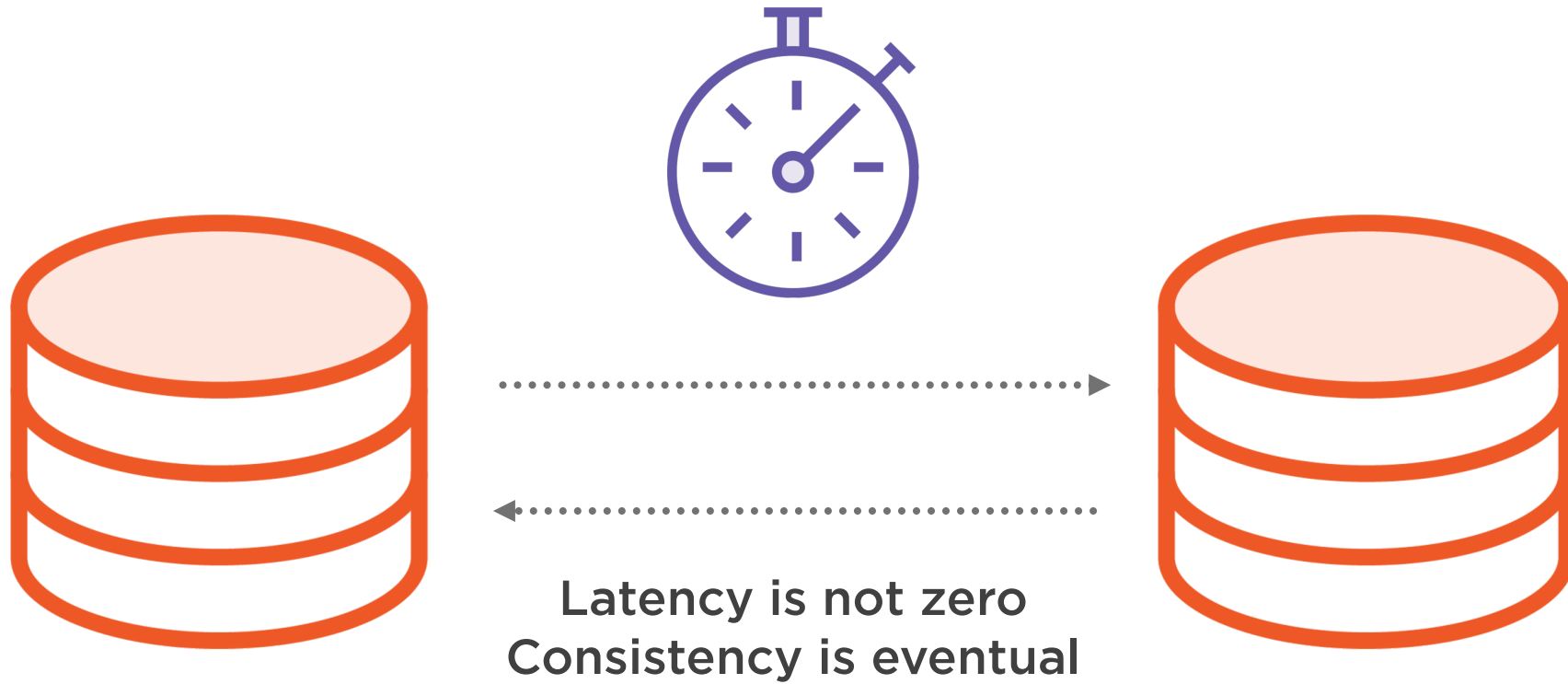
Act description
Modified date



**Messages of
different kinds**

Show vs act description
Additional information

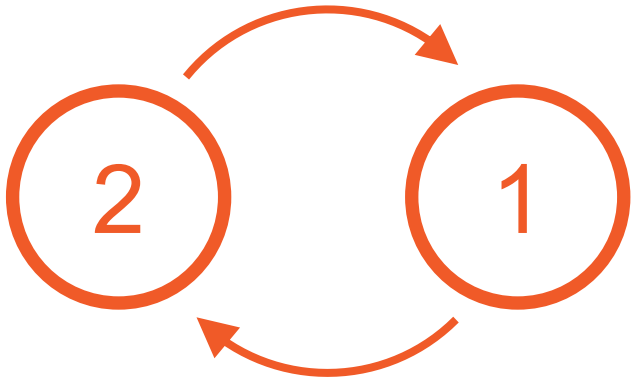
Consistency



Achieving Consistency



Achieving Consistency



Commutative

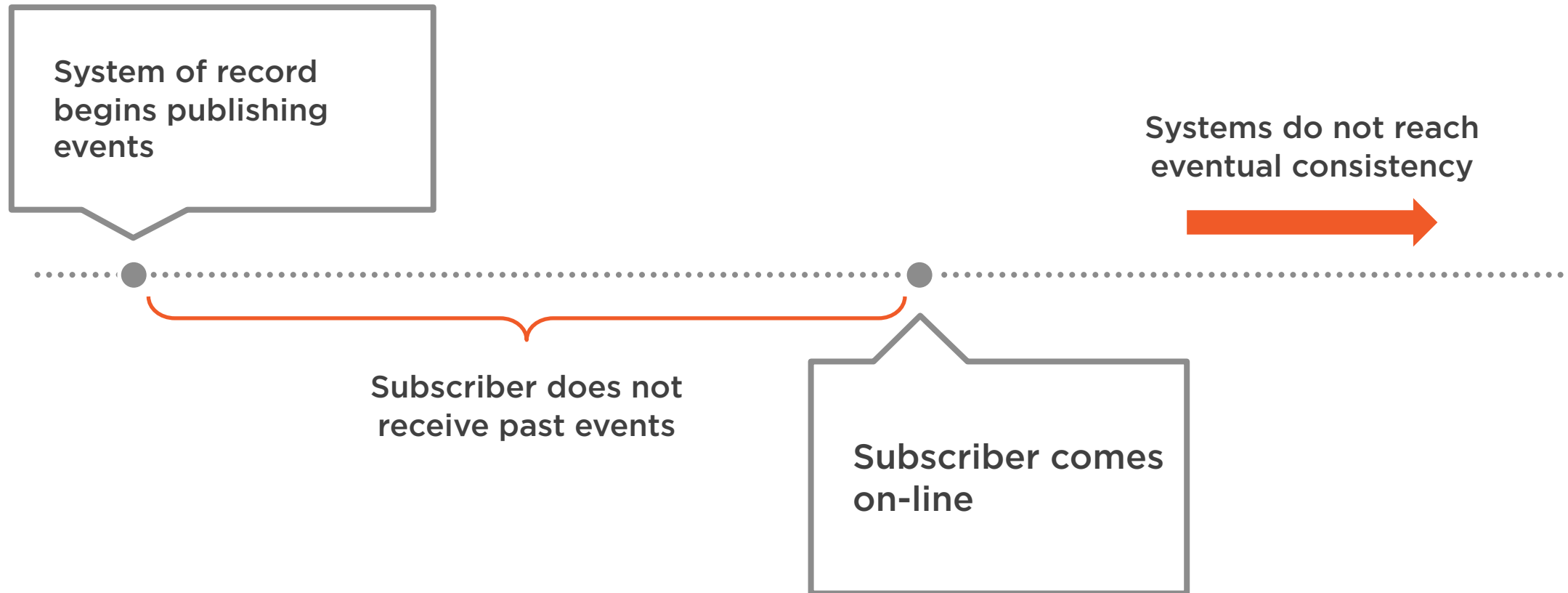
Can't guarantee the
order of delivery



Idempotent

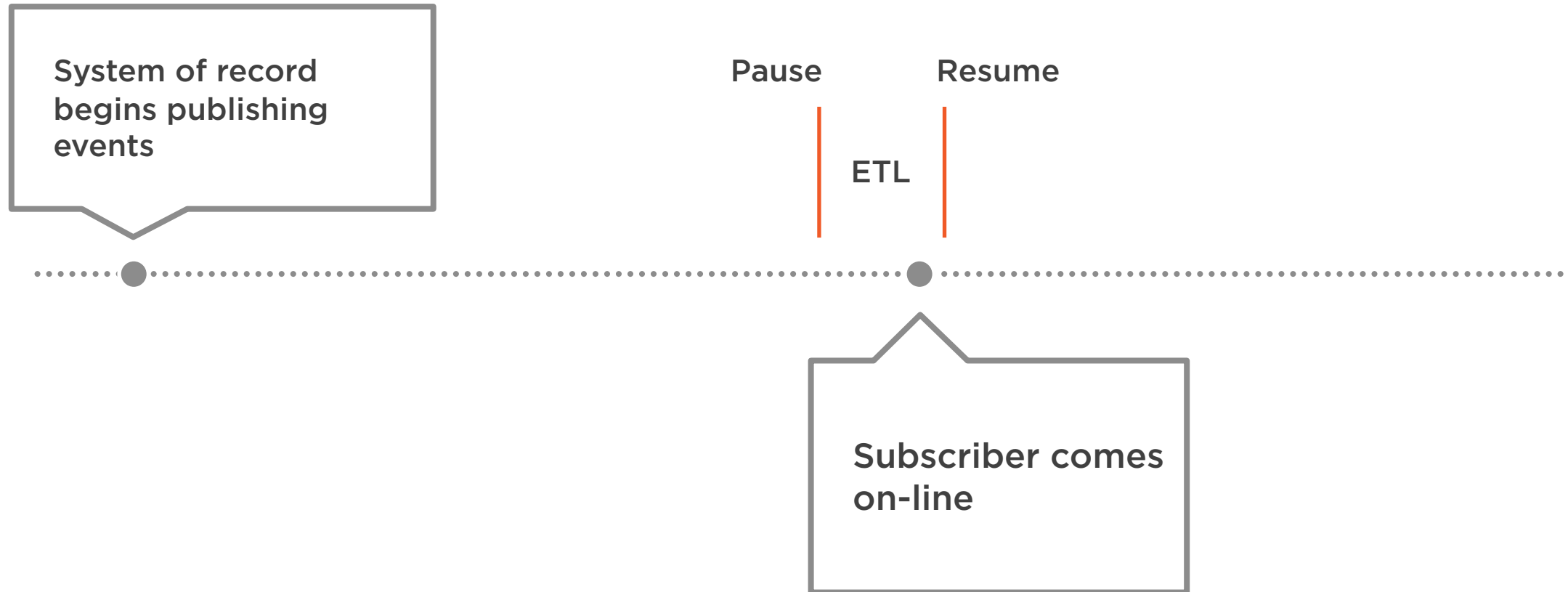
Can't guarantee the
number of times

New Subscriber

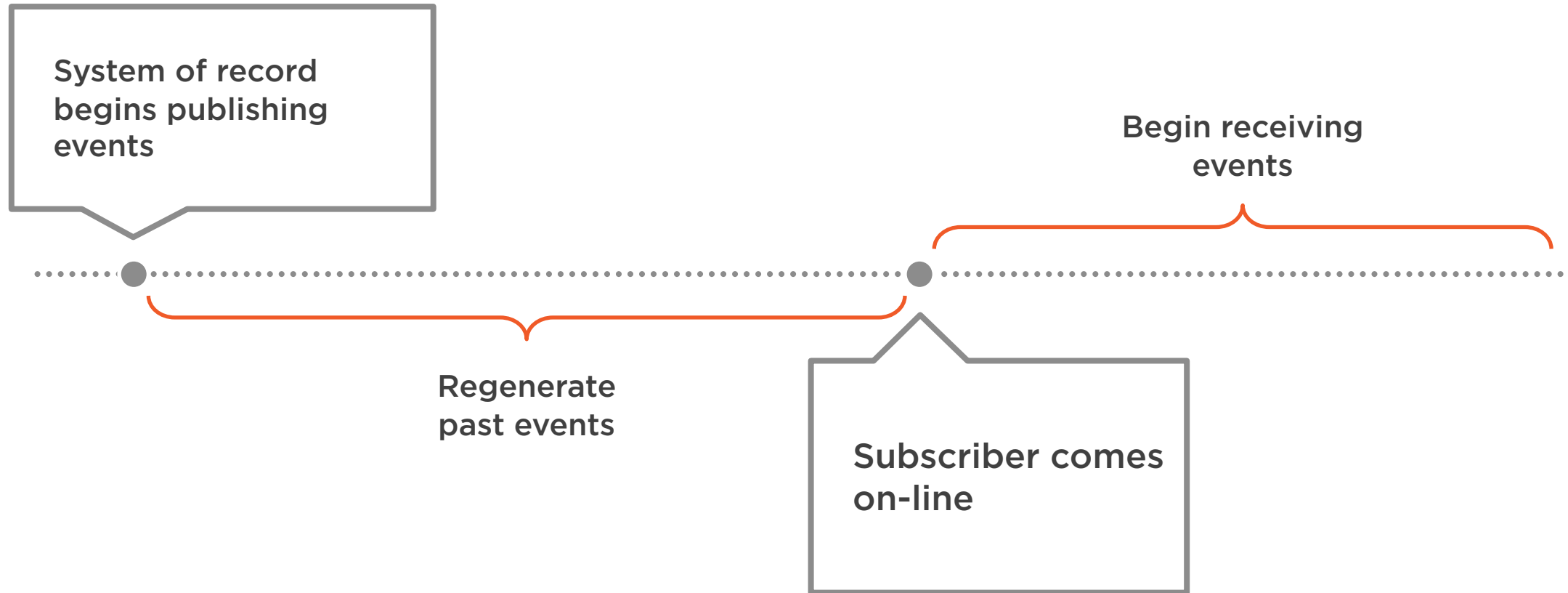


Extract Transform and Load

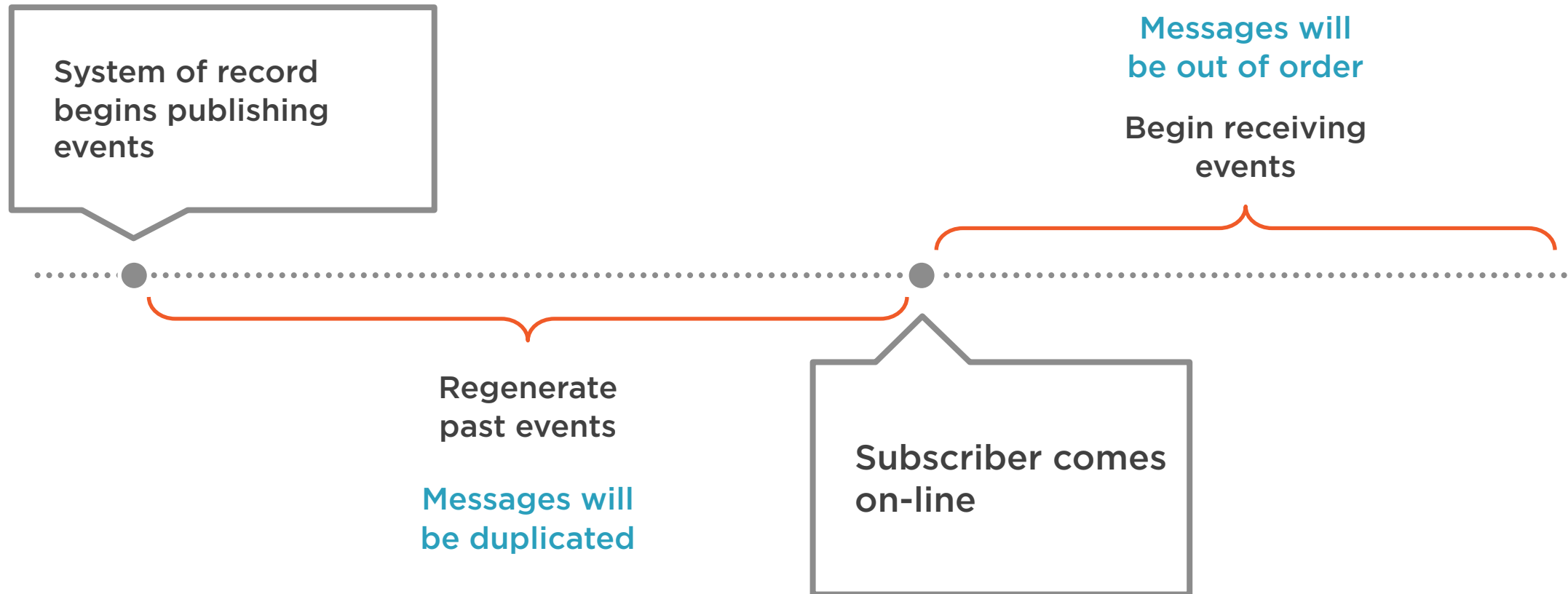
One-time process



Initialize New Subscriber



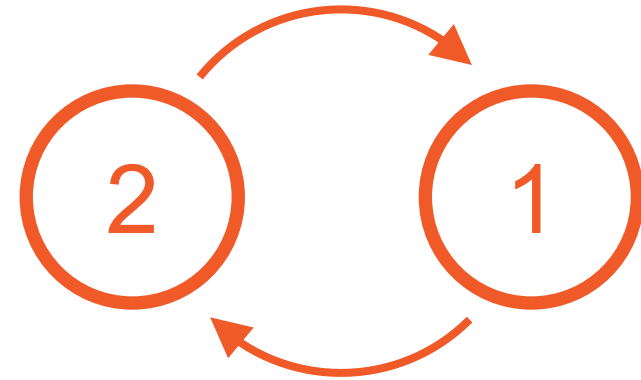
Feed and Seed



Eventual Consistency



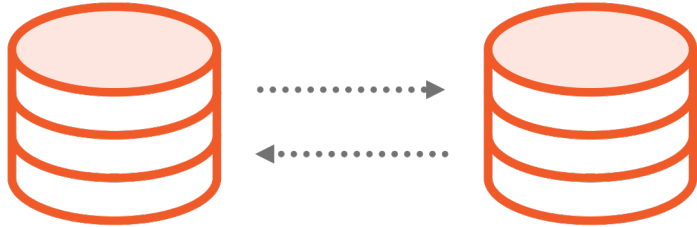
Idempotence



Commutativity



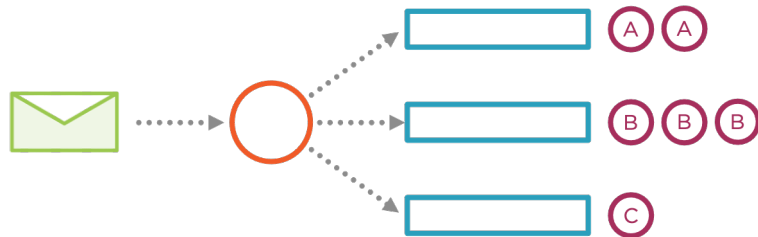
Making and Maintaining Connections



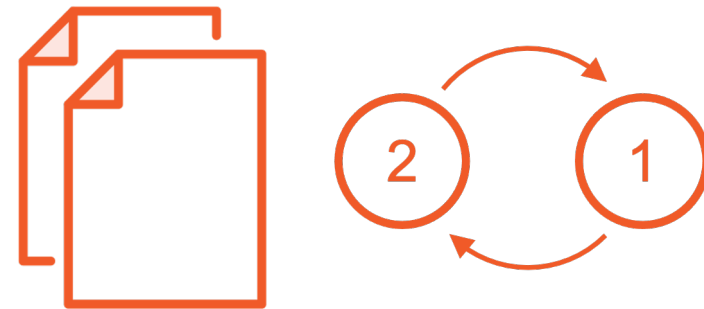
Consistency



Events



Publish-subscribe



Idempotence and
commutativity

Up Next:

Identifying Service Boundaries

