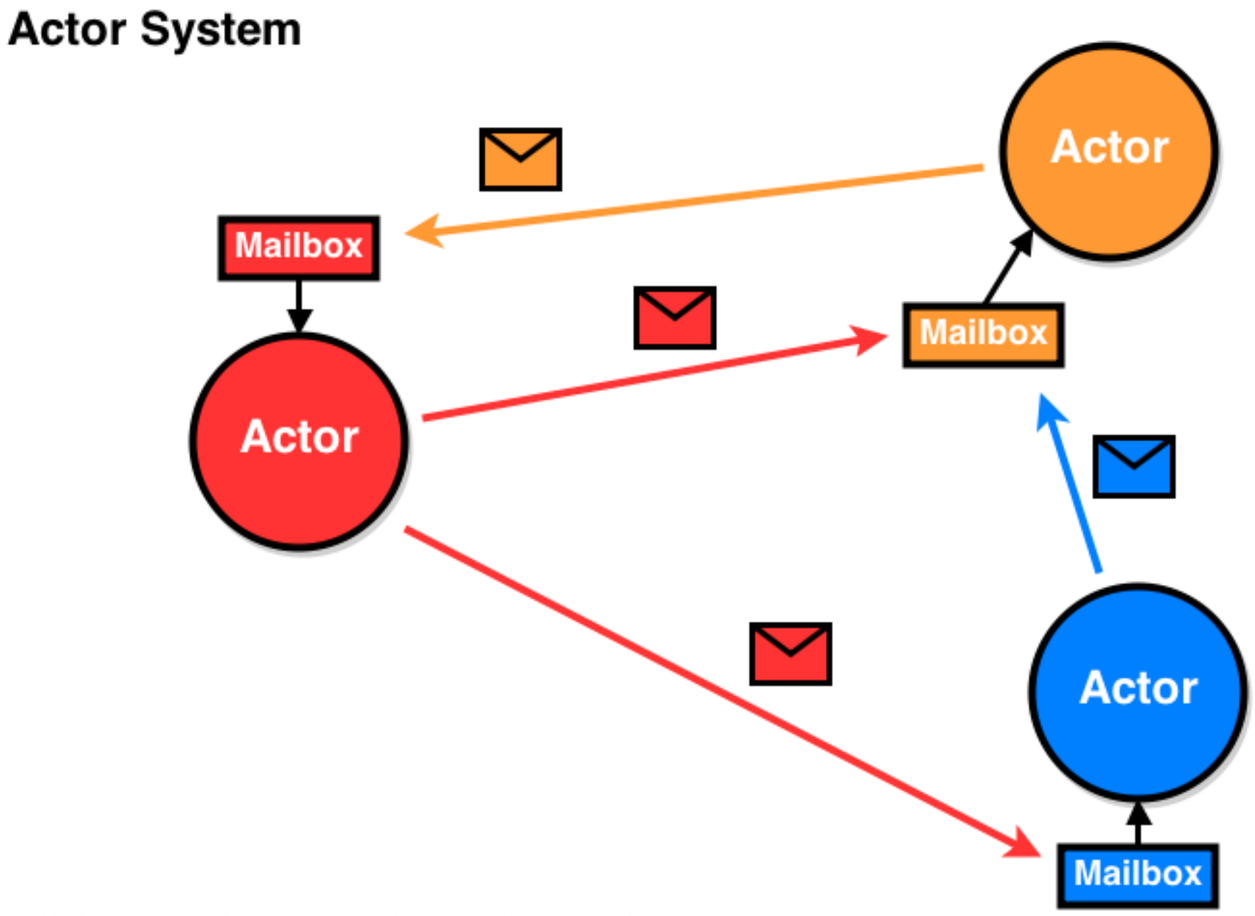
akka on Java

actor, persistence

What is Actor Model?



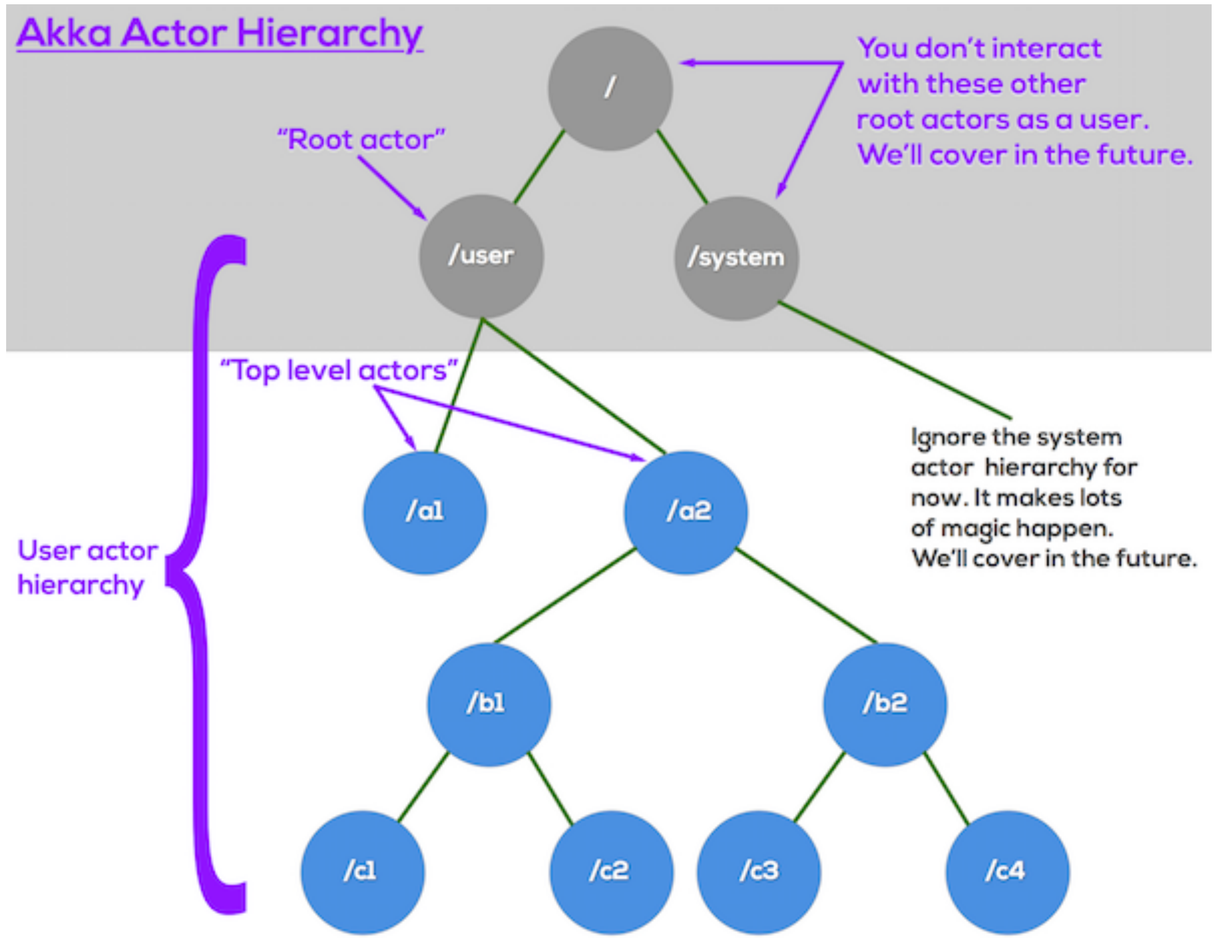
- Founded in 1973, Carl Hewitt
- Unit of Computation
- Single-threaded
- Encapsulates states and behavior
- “One Actor is no Actor”
  they comes as system

http://blog.scottlogic.com/rdoyle/assets/ActorModel.png

Akka actor elements

- **ActorSystem** - group of actors with common configuration; entry point for creating or looking up actors
- **ActorRef** - immutable and serializable handle to an actor
- **Props** - configuration object to create an Actor
- **ActorPath** - unique path according to Actors tree

Actor System creates

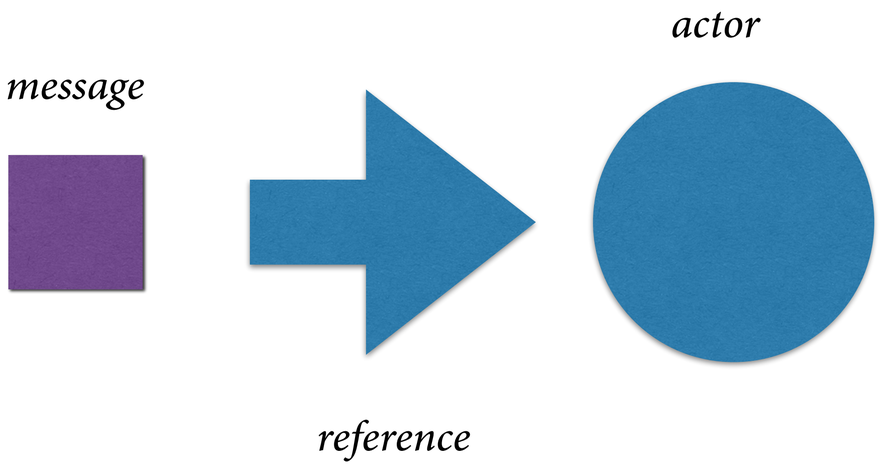


An ActorSystem is a heavyweight structure that will allocate 1…N. Threads, so create one per logical application

https://petabridge.com/blog/how-actors-recover-from-failure-hierarchy-and-supervision/

ActorRef

- It is something you can use to send message only
- It hides real Actor implementation class



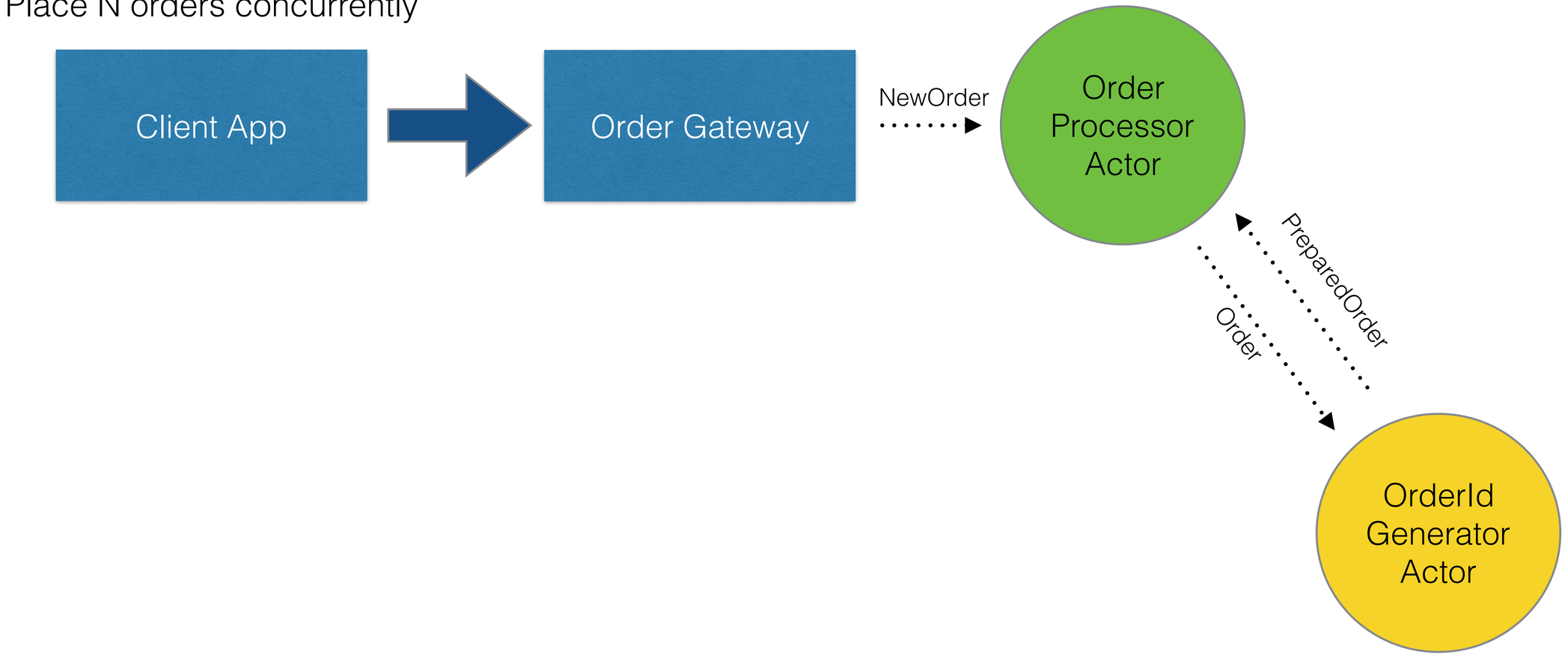
Sample App

1. Generate N Stock Exchange Orders
2. Send them to OrderProcessor Actor
3. Generate order id by another Actor and reply
4. Log prepared orders to database by OrderLogger actor

    - Generate random fail to trigger redelivery

Step 1

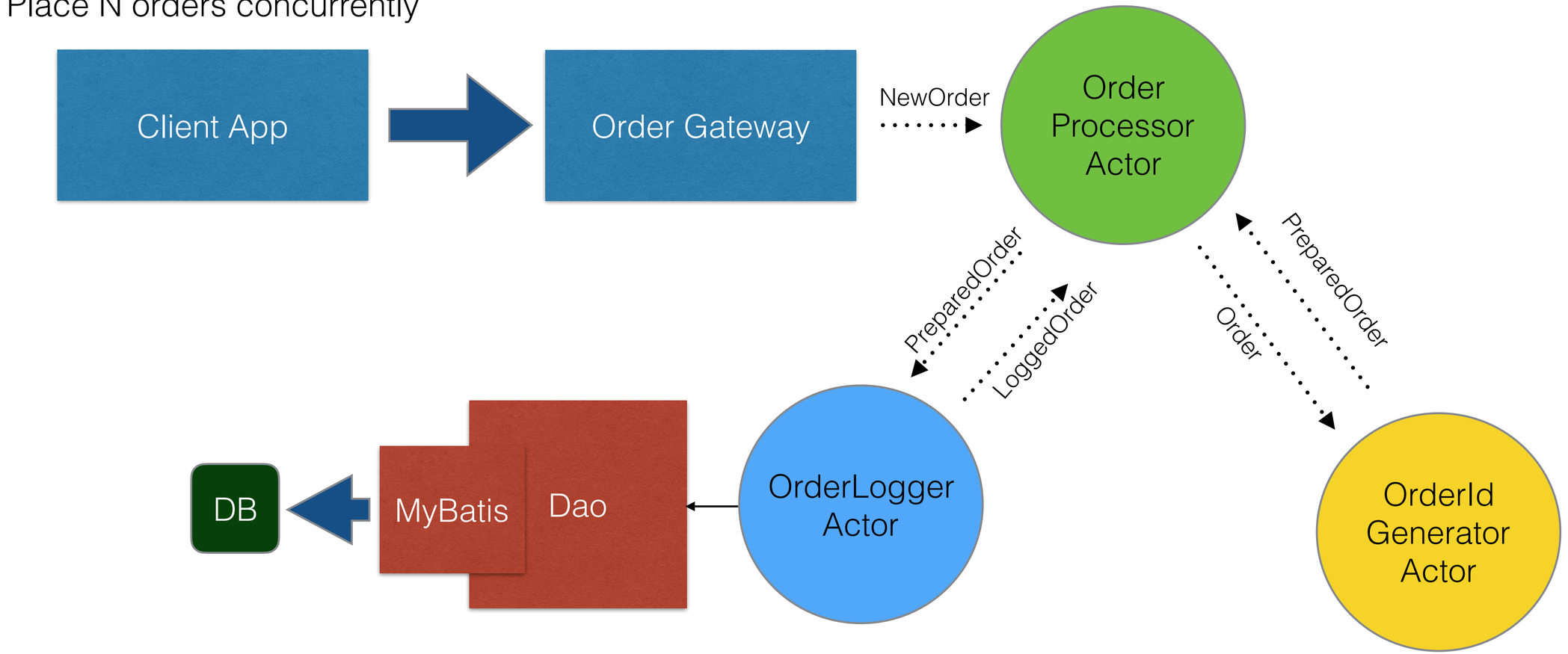
Place N orders concurrently



◂·· async call

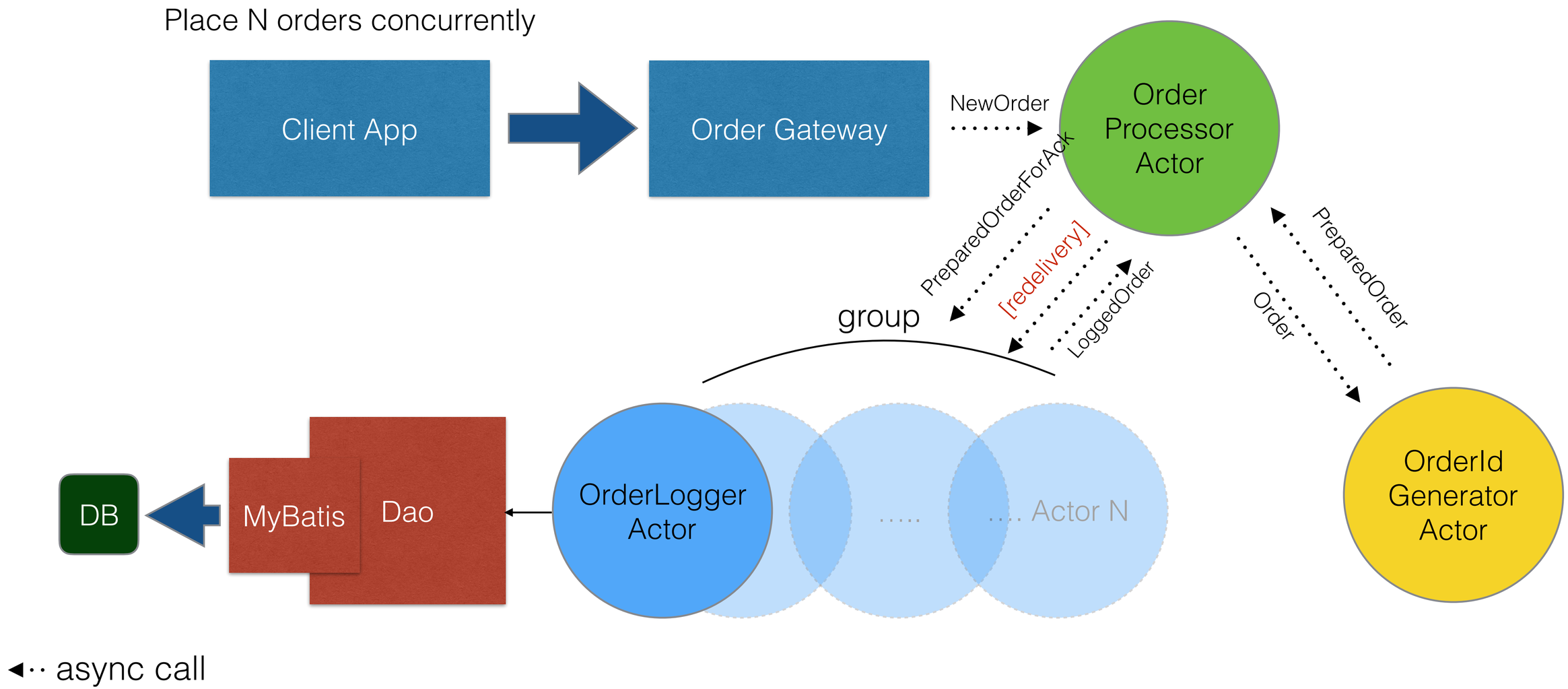
Step 2

Place N orders concurrently

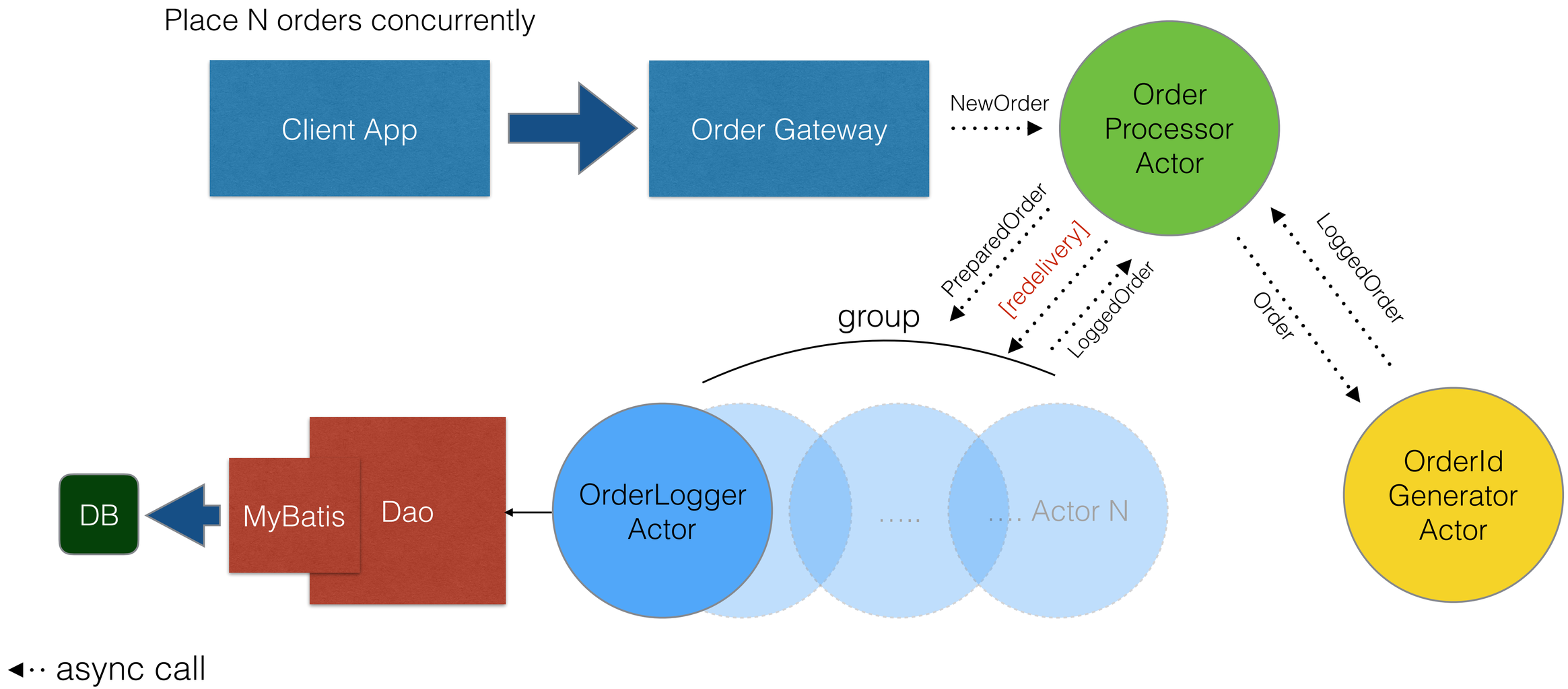


◂·· async call

Step 3


Place N orders concurrently
Client App
Order Gateway
NewOrder
Order Processor Actor
PreparedOrderForAck
[redelivery]
LoggedOrder
group
Order
PreparedOrder
OrderId Generator Actor
OrderLogger Actor
..... Actor N
MyBatis
Dao
DB
async call

Step 3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async call

Akka-Persistence

- Based on “Event-Sourcing”: Command, Events
- Pluggable journal/snapshot storage (LevelDB, Cassandra, MongoDB, others)
- Can recover starting giving sequence id
- Guarantee: no new command processed between “persist” and call of “handler”

```
"com.typesafe.akka" %% "akka-persistence" % "2.4.4"
"org.iq80.leveldb"  % "leveldb"  % “0.7"
"org.fusesource.leveldbjni"   % "leveldbjni-all"   % "1.8"
```

Summary

- Actor incapsulates state, behavior and has mailbox (queue)
- Class UntypedActor is a regular Actor on Java API
- Methods:
  - tell(), ask() <- to get Future<Reply>
  - self(), sender()
  - context() - select/create more actors, change state

Why Actors, Akka

By design

- Highly-scalable
- Loosely coupled
- Asynchronous, lock-free
- Routing, persistence, monitoring is in Akka OTB!

Thank you!

Questions?