The Actor Model and why you should be using it

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About Me

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About You

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Outline

- Problem
- Solution Approaches
- Actor Model description and features

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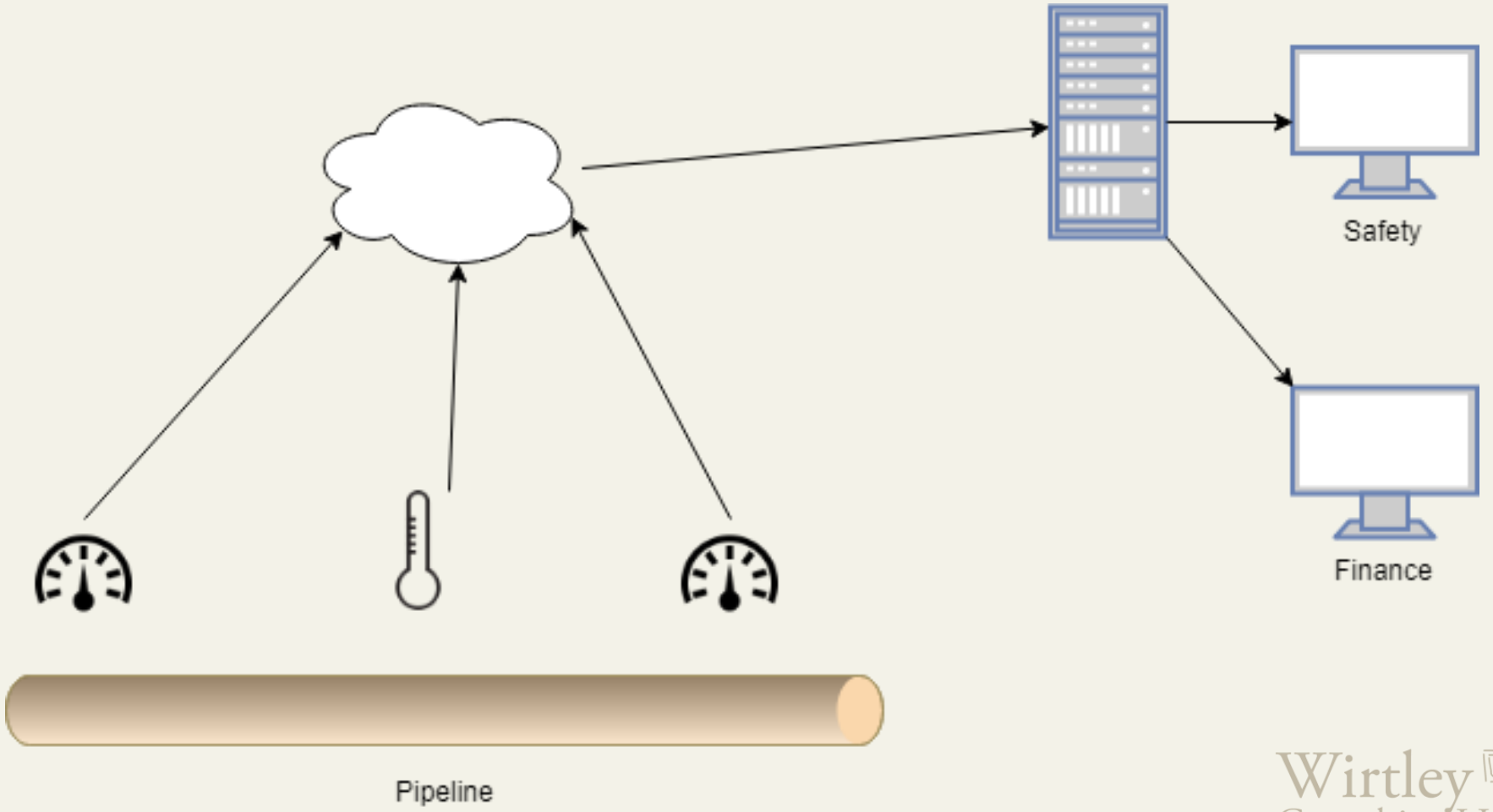
The Problem



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Solution Approaches

- Paradigms
  - Object Oriented
  - Functional
  - Streams
  - Actor Model
- Considerations
  - Model
  - Concurrency
    - Consistency
    - Blocking
- I am primarily an object-oriented programmer

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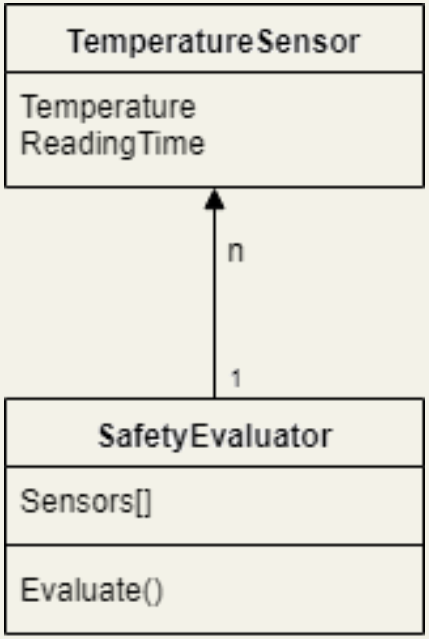
Object Oriented Approach



- Model
  - Combine state and behavior
- Mutable state
  - Read and write temperature

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Functional Approach

- Model
  - Separate state and behavior
- Immutable State
- Sensor?

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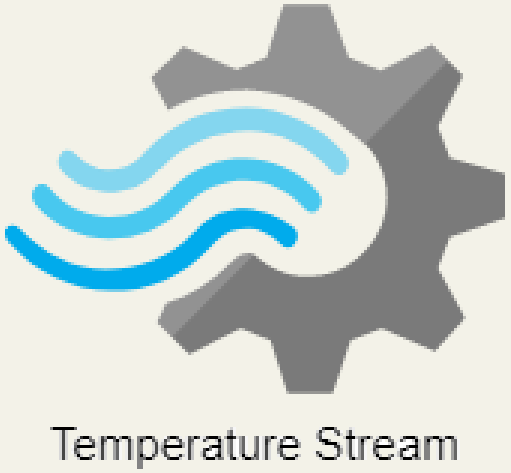
Streams Approach



- Model
  - Observable
- Immutable State
- Evaluator?

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What I want

- Modelling of object approach
  - State and behavior together
  - Entities corresponding to domain objects
- Concurrency handling of functional approach

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Actor Model!

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The Actor Model

- Everything is an actor
- Actors can
  - Send and receive messages
  - Create other actors
  - Change behavior based on a message
    - State machine
- Actors combine state and behavior

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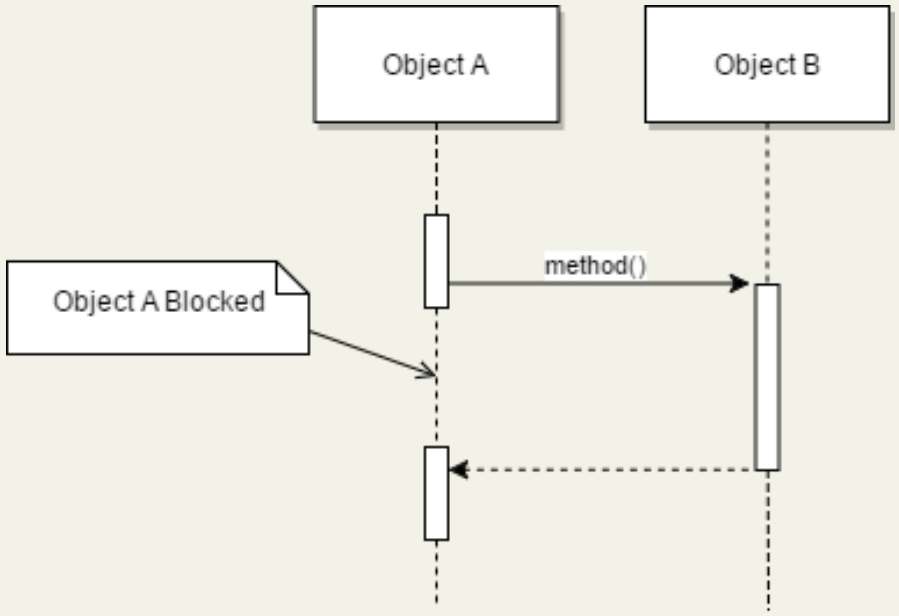
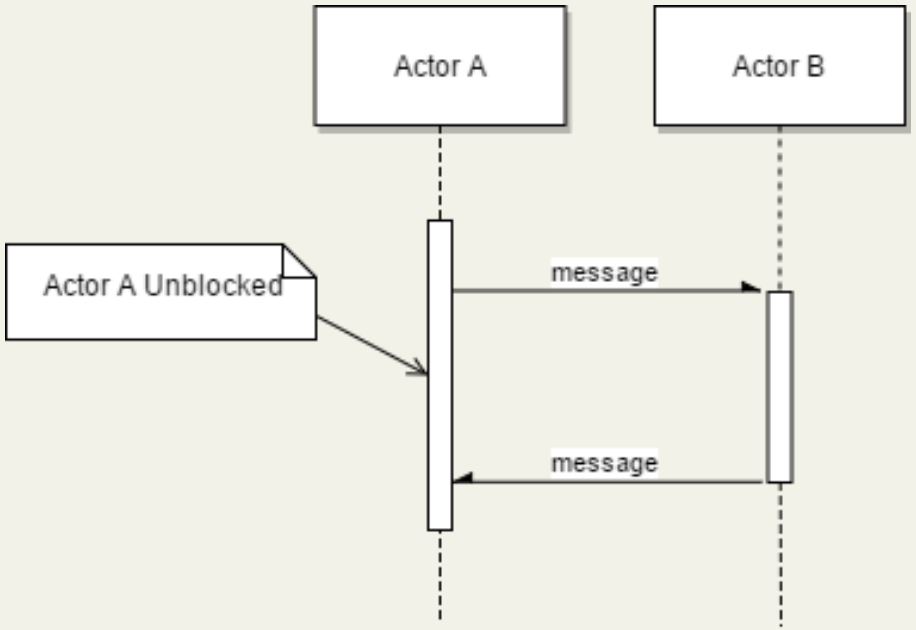
Concurrency – Part 1





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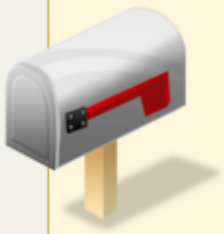
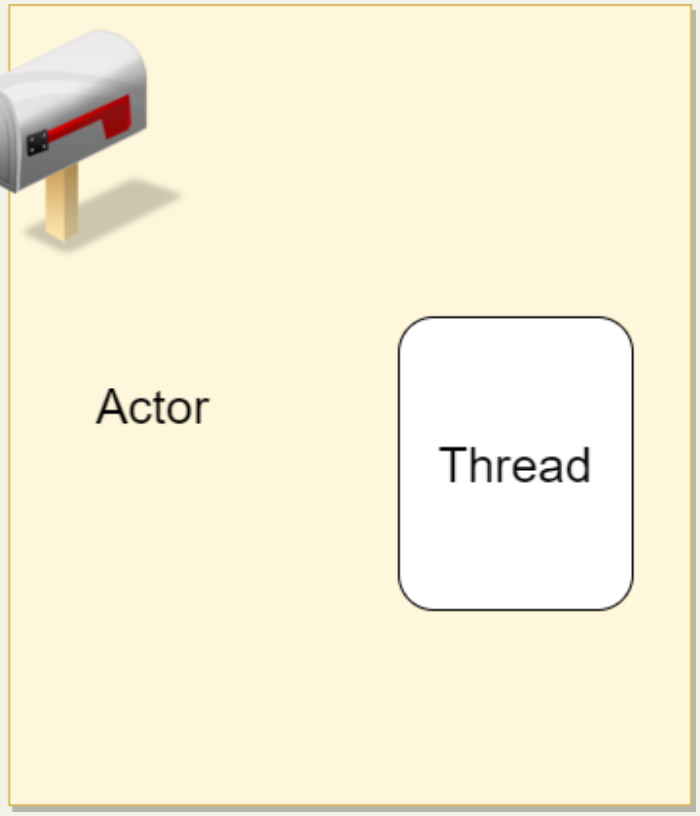
Concurrency – Part 2





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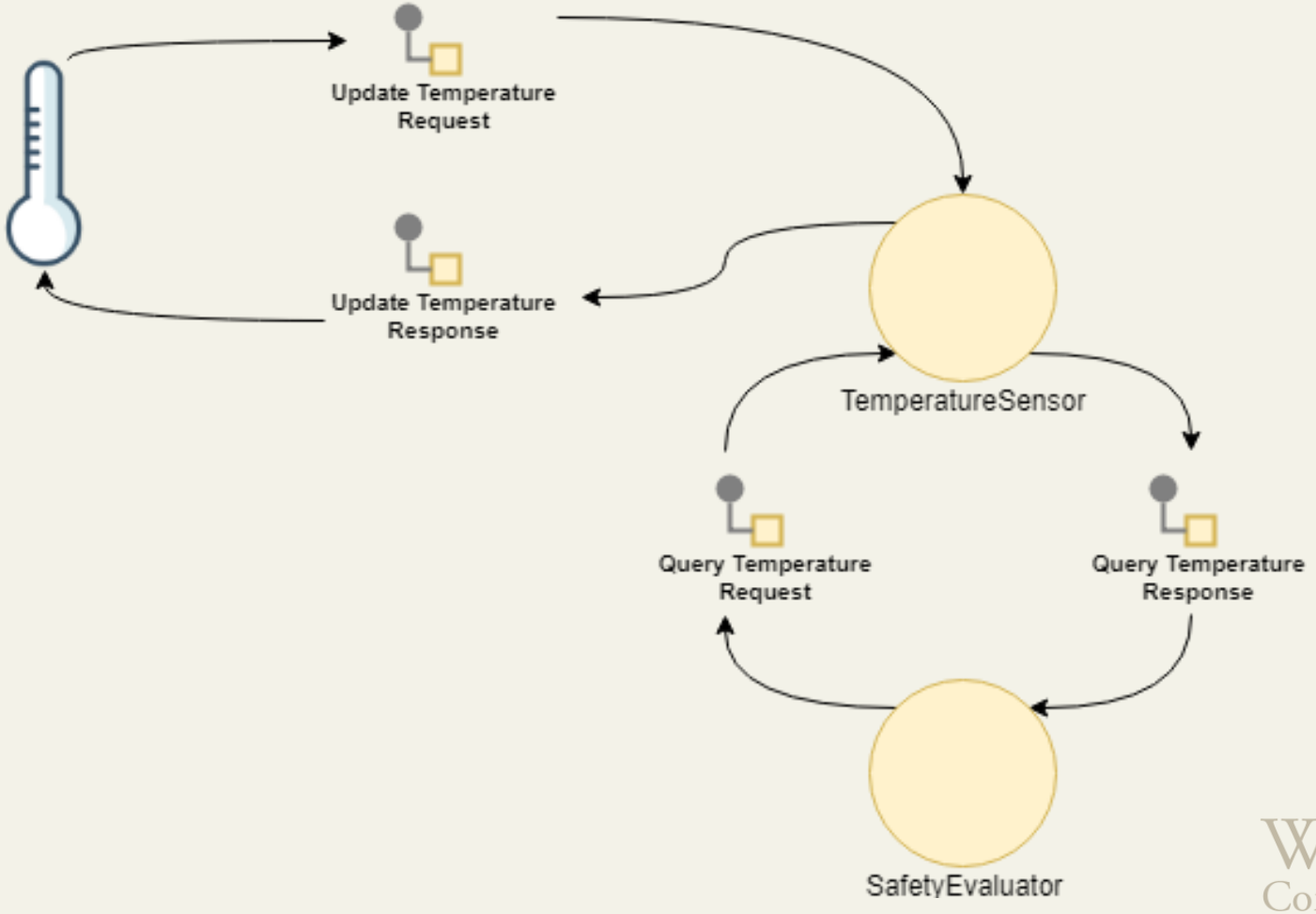
Actor Model Solution



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Demo

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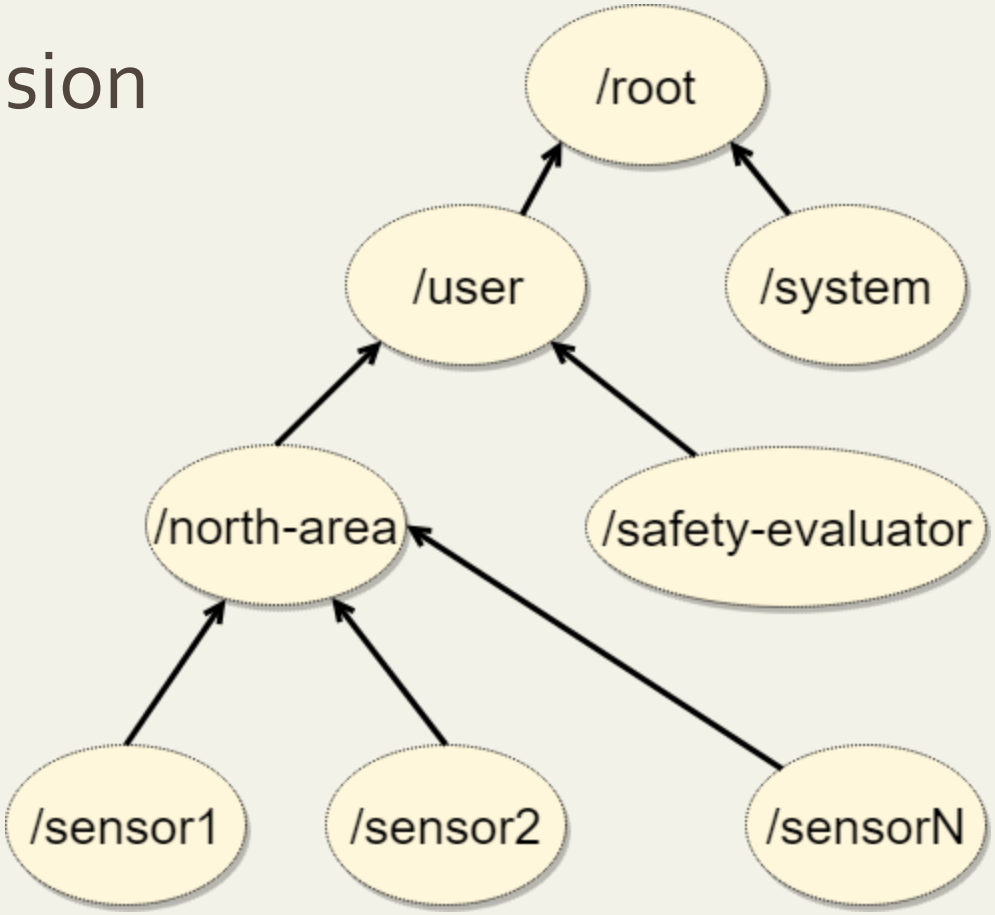
Fault Tolerance

Supervision



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Other Features

- State machines
  - Become
- Location Transparency
  - Local
    akka://system/user/service-a/worker1
  - Remote
    akka.tcp://system@example.com:5678/user/service-b

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Scalability

- Routers
- Clustering
- Akka.NET metrics
  - 50 million messages/sec on a single machine
  - ~2.5 million actors per GB of heap

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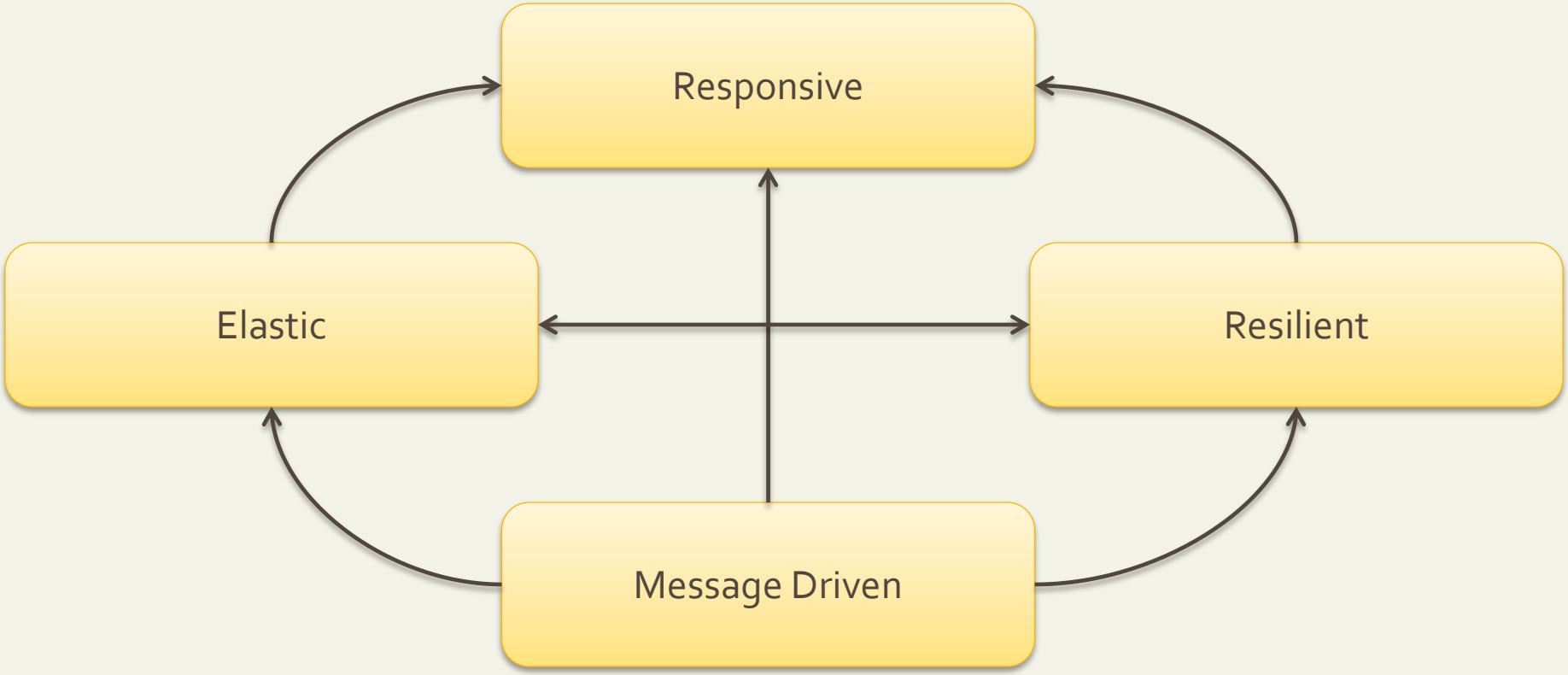
Reactive Manifesto



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Message Delivery

- Default delivery rules
  - At most once delivery
  - Message ordering guaranteed per sender-receiver
- Patterns exist for
  - At least once delivery
  - Exactly once delivery

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Implementations

- Akka
  - Java and Scala
- .NET
  - Akka.NET
  - Orleans
  - Service Fabric Reliable Actors
- Proto.Actor
  - .NET and Go
- Erlang
- Elixir

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When to use the Actor Model

If you are an object-oriented programmer

and you work on concurrent problems,

you should consider the actor model.

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Contact Me

Presentation and source on GitHub:

http://bit.ly/ActorModelPresentation

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