Mathieu ANCELIN
Alexandre DELEGUE

Mathieu ANCELIN

- Développeur @SERLI
- Scala, Java, web & OSS
  - ReactiveCouchbase, Weld-OSGi, Weld, etc ...
  - Poitou-Charentes JUG
- Membre de l'expert group CDI 1.1 (JSR-346)
- Membre de l'expert group OSGi Enterprise
- @TrevorReznik

Alexandre DELEGUE

- Développeur @ SERLI
- Java
- Scala
- Web
- spring, play, …
- @chanksleroux

SERLI

- Société de conseil et d'ingénierie du SI
- 75 personnes
- 80% de business Java
- Contribution à des projets OSS
- 10% de la force de travail sur l'OSS
- Membre de l'EG JSR-346
- Membre de l'OSGi Alliance
- www.serli.com @SerliFr

SERLI

Les technologies présentées sont inspirées de technologies réelles
Les applications qui en découlent sont fictives
Toute ressemblance avec des applications existantes n’est que fortuite

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www.amazing.com

Amazing Store

Hello test | 0 items | Logout

Search a product

Search

Mitraillette années 30 canon court

Mitraillette années 30. S ...

3599.0 €

Add to cart

Mitraillette années 30

Mitraillette années 30. P ...

3599.0 €

Add to cart

Arbalète et accessoires

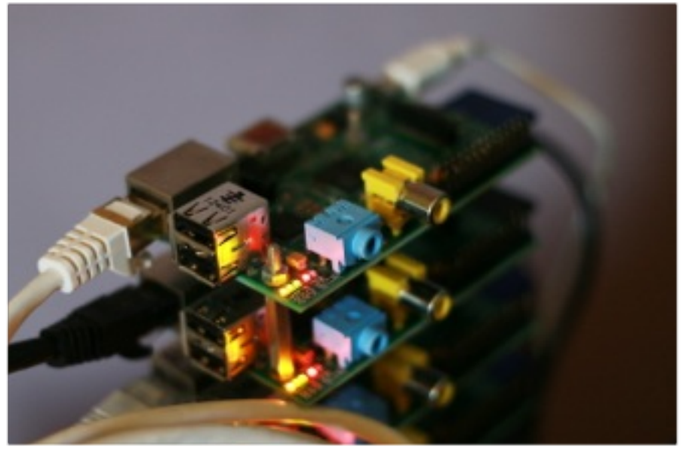
Magnifique arbalète pouli ...

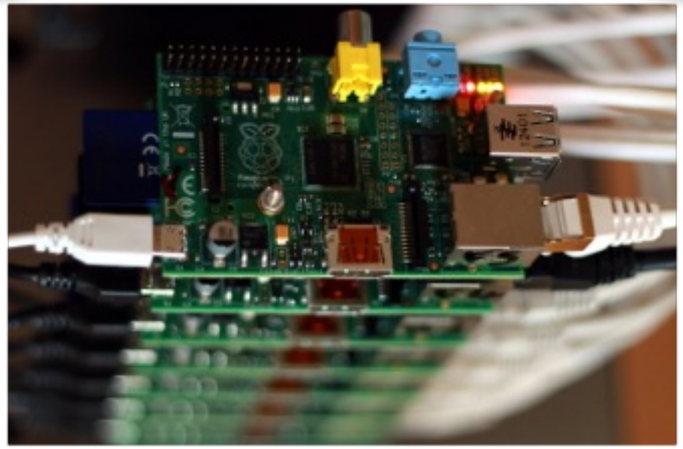
200.99 €

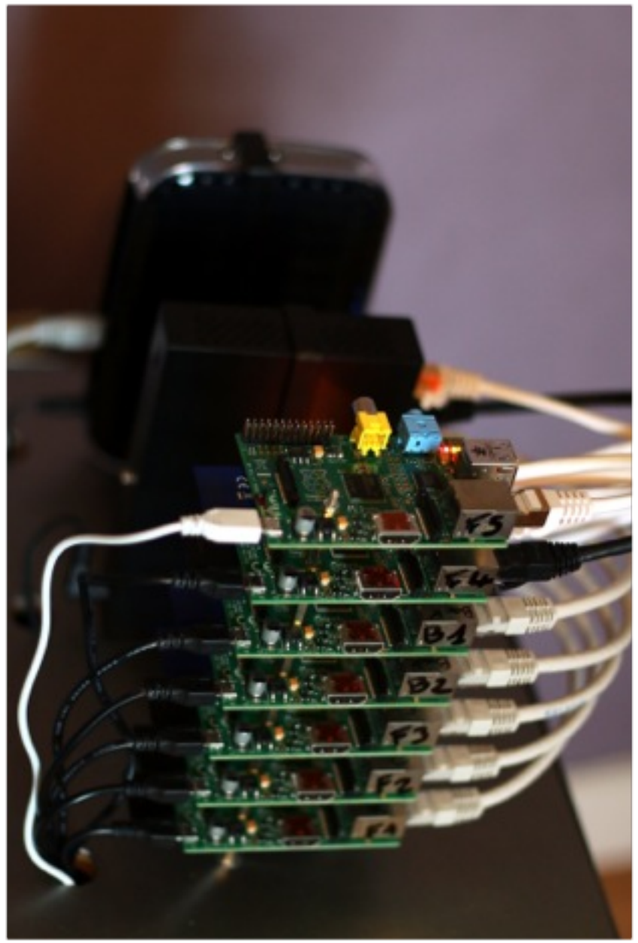
Add to cart

SERLI

Mobile infrastructure







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Mobile infrastructure

Raspberry pi
x 7

Routeur wifi

Switch

Demo

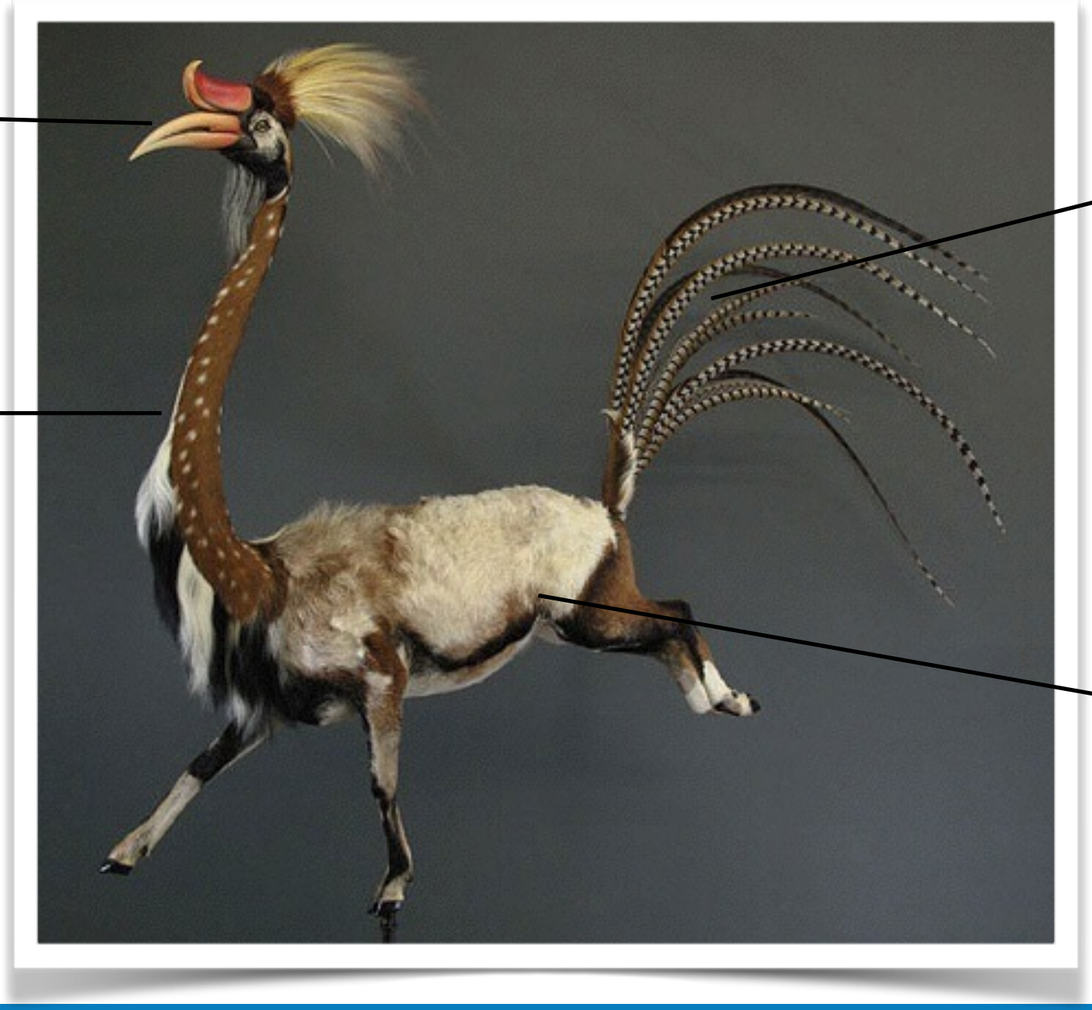
Résister à la charge

Résister aux pannes

Absorber une hausse de trafic

Approche classique

Monolithique



Latence

Bloquant

Charge

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Scalabilité

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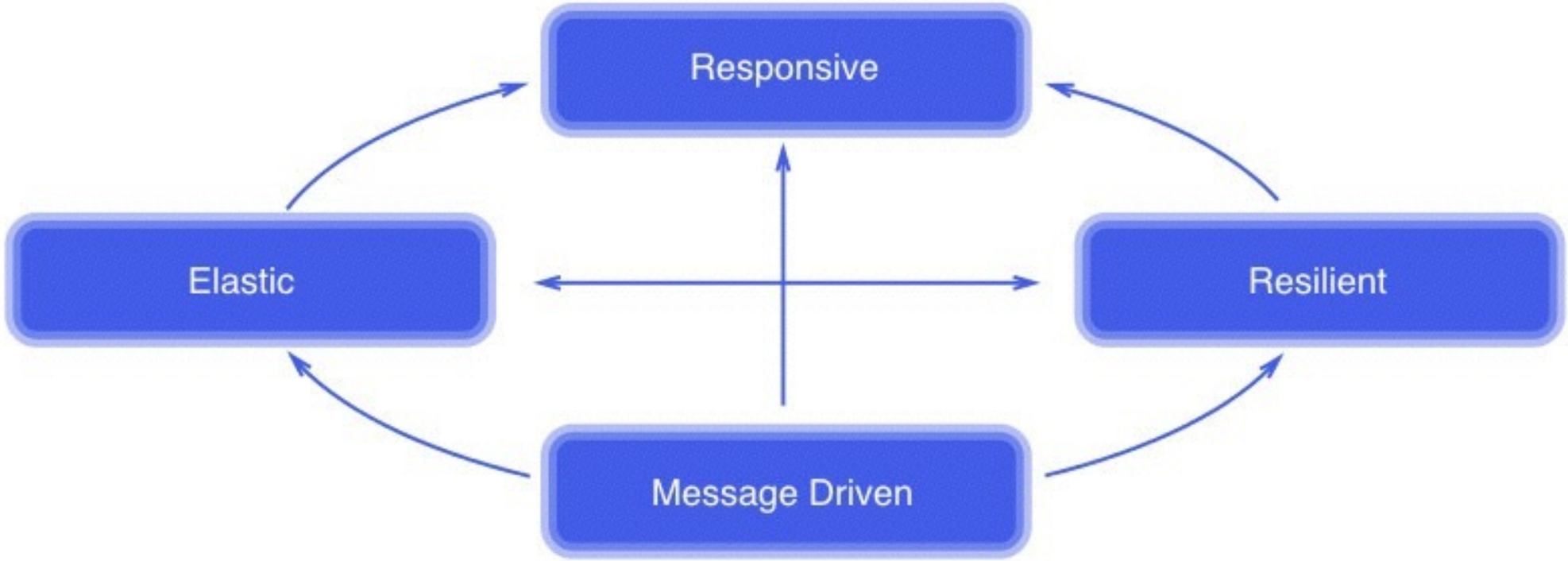
Reactive Manifesto

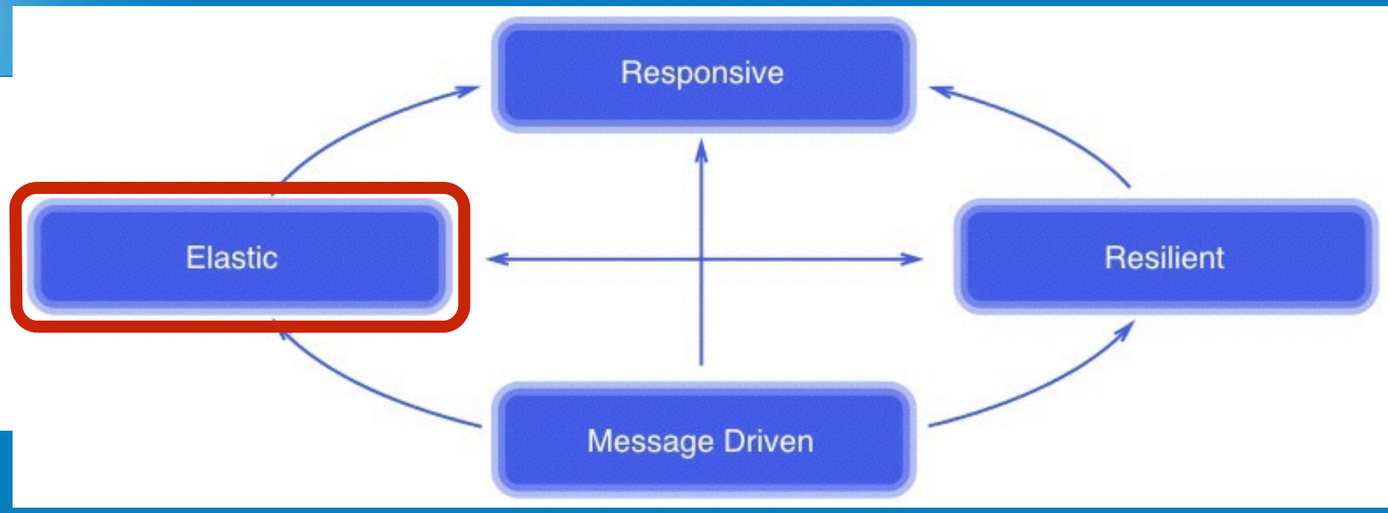
Reactive Manifesto



Reactive manifesto

- **react to event :** the event-driven nature enables the following qualities
- **react to load :** focus on scalability by avoiding contention on shared resources
- **react to failure :** build resilient systems with the ability to recover at all levels
- **react to user :** honor response time guarantees regardless of load

Scalable / React to load



Overview

play akka
Frontend

play akka
Cart

play akka
Identity

elasticsearch.

Cassandra

Cassandra

play akka
Backend

Datas

elasticsearch.

Cassandra

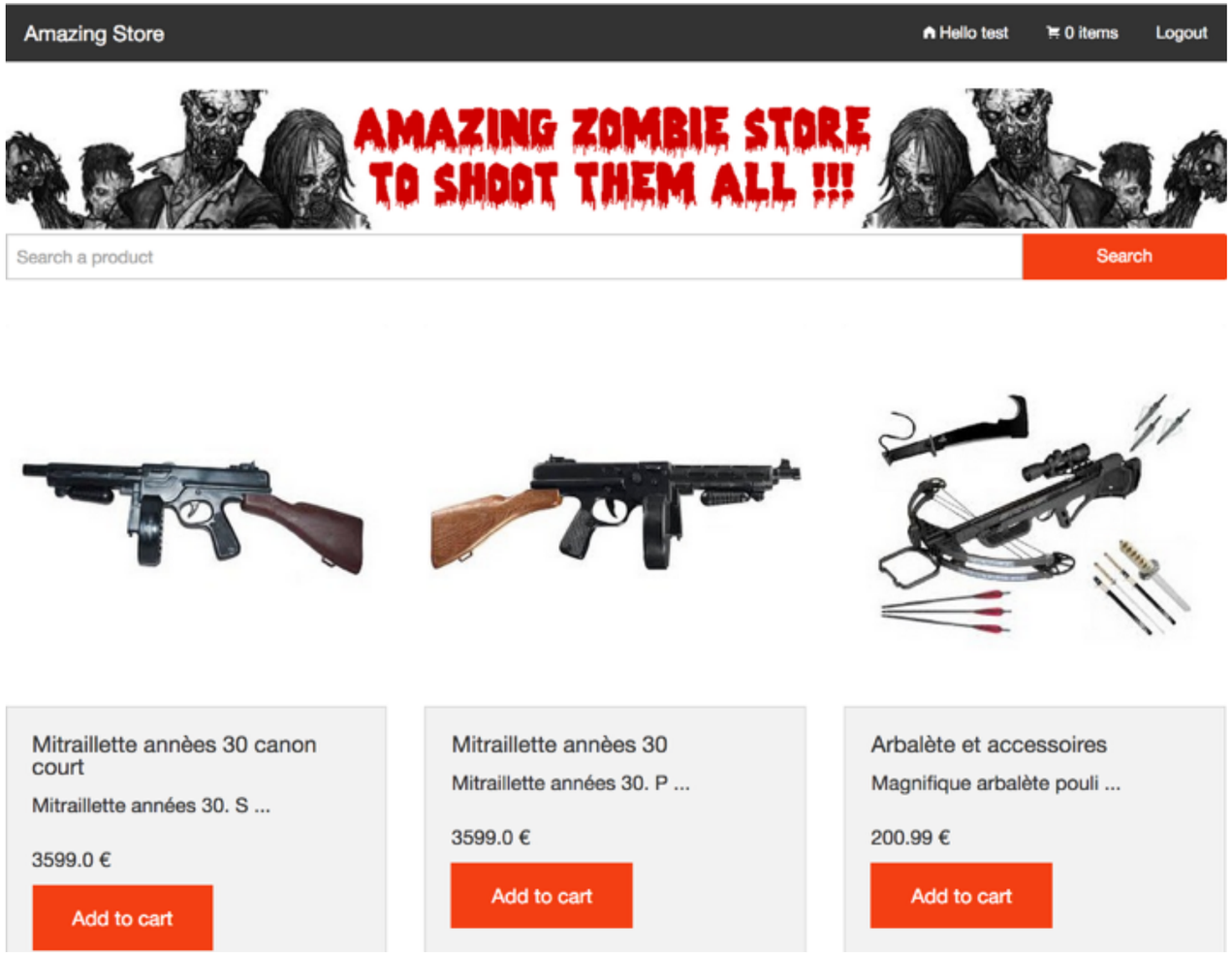
Mini / Micro Services

- Une application par domaine fonctionnel
  - store-frontend : présentation du contenu
  - store-identity : authentification / gestion de compte
  - store-cart : panier
  - store-backend : administration du site

Stateless

- Chaque application est stateless
  - aucune donnée n'est stockée dans l'application (pas de cache, pas de fichier …)
- Chaque application peut être clonée

Frontend



- 100 % html
- Indexation par les moteurs de recherche
- stateless
- une url == un contenu

Limiter la charge

Cache

Cache
Browser
CDN
nginx/http
varnish

play
akka
Frontend

elasticsearch.

Optimisations

elasticsearch.

Base de données ?

Cache
+
recherche full text

Modèle de données

```
{
    id: "04abe480-2521-11e4-acde-f7b0d99b8321",
    label: "Product number 1",
    description: "A description …",
    image: "image.jpeg",
    price: 1.5,
    fragments: [{
            type: "search",
            html: " <div >...</div>"
        },{
            type: "cart",
            html: " <tr >...</tr>"
        }
    ]
}
```

Données indexées pour la recherche

HTML pré-généré

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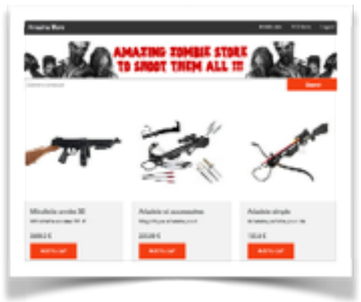
Recherche

GET /products?q=some%20text



Frontend

- Concat fragments
- Include into main template

Search
some text

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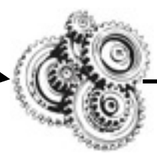
Créer / mettre à jour

UpdateProduct

Backend

ProductUpdated

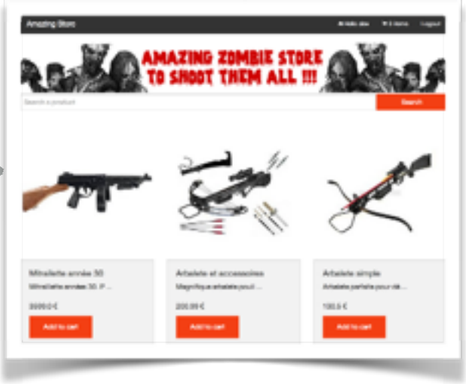
Frontend



HTML

EventSource

HTML



ProductUpdated

Cassandra

elasticsearch.

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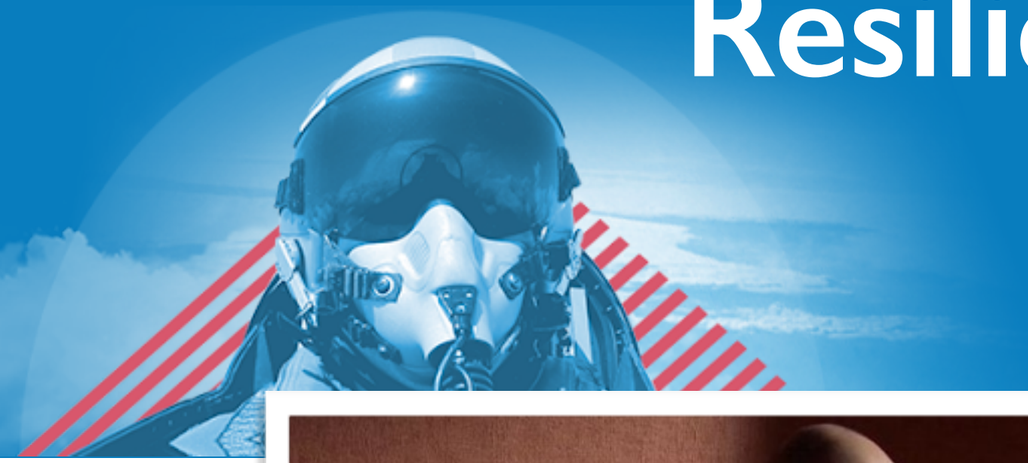
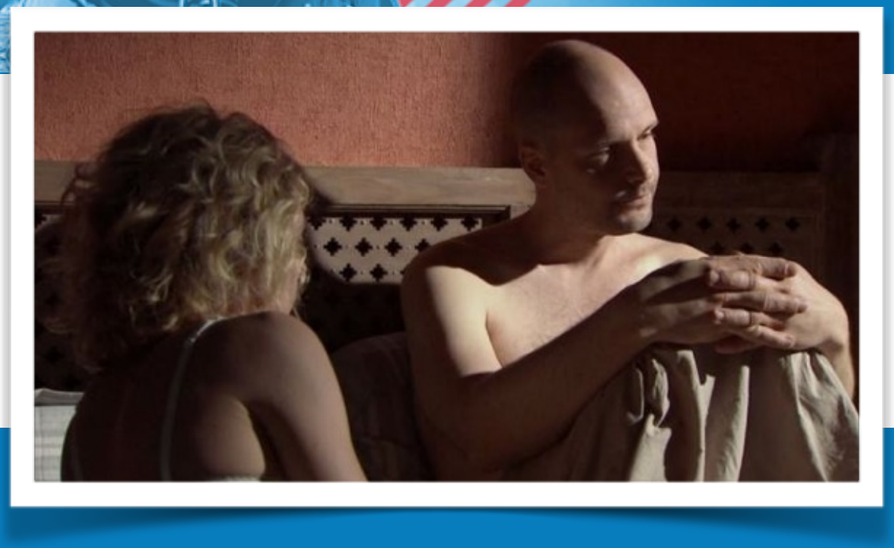
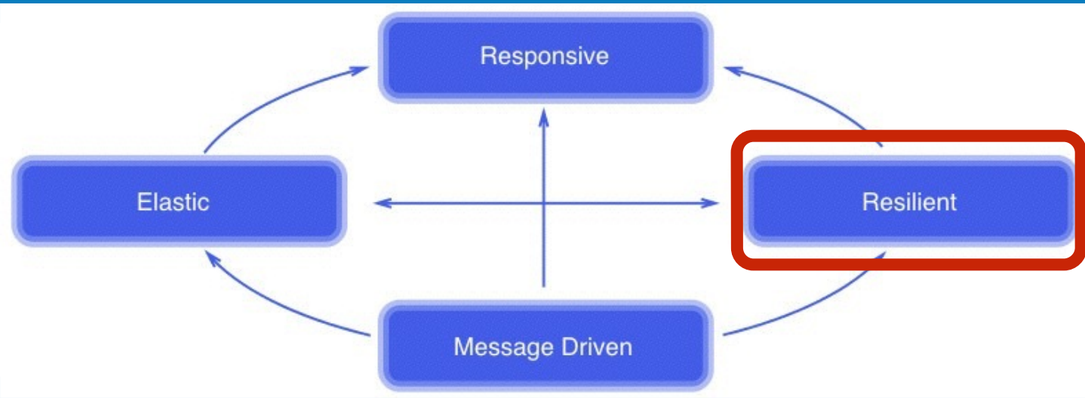
Resilient / react to failure







Infrastructure

NGINX

play akka Identity

play akka Frontend

play akka Identity

play akka Cart

play akka Backend

play akka Frontend

play akka Cart

play akka Backend

play akka Identity

Cassandra

elasticsearch.

SERLI

Infrastructure

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play akka Identity

Cassandra

elasticsearch.

SERLI

Infrastructure

NGINX

play akka Identity

play akka Frontend

play akka Identity

play akka Cart

play akka Backend

~~play akka Frontend~~

~~play akka Cart~~

play akka Backend

play akka Identity

Cassandra

elasticsearch.

Infrastructure

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play akka Cart

play akka Backend

~~play akka Frontend~~

~~play akka Cart~~

~~play akka Backend~~

~~play akka Identity~~

Cassandra

elasticsearch.

Demo

Let It Crash !!!

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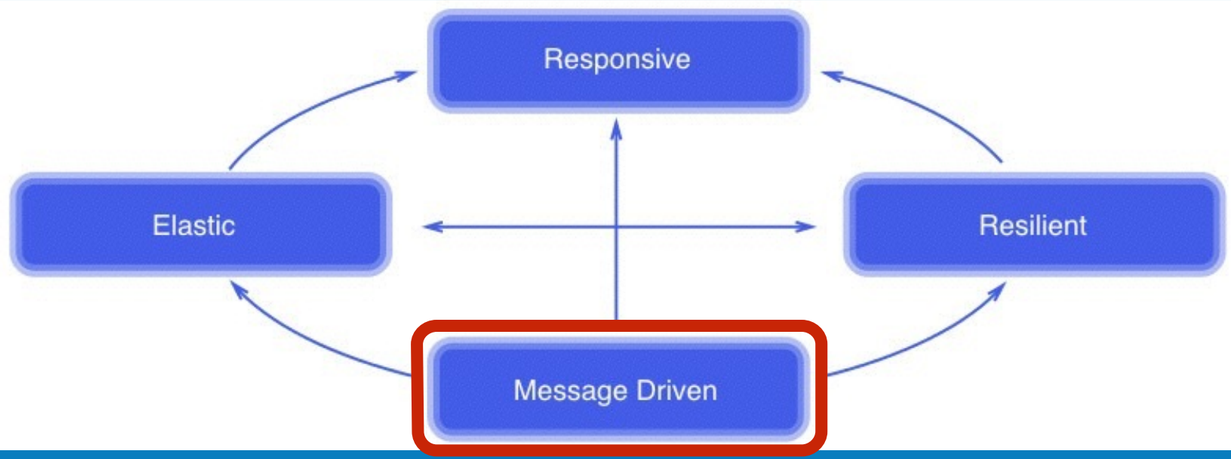
Event-driven / react to event



Akka ?

Akka ??

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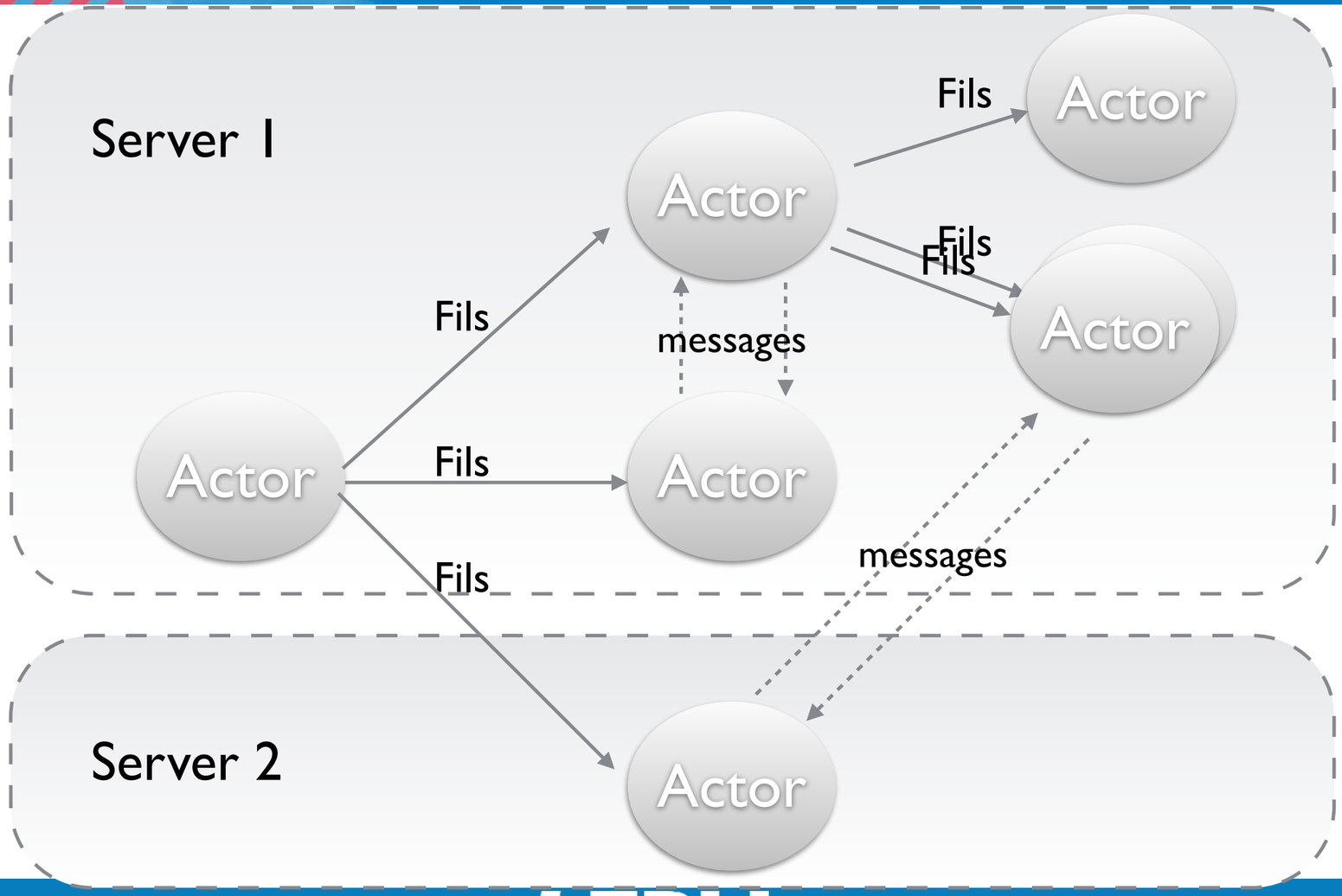
Akka

- Akka
  - Modèle acteur
  - Un acteur = Une entité statefull
  - Communication entre acteurs par messages (même à distance)
  - Un acteur peut créer/détruire des enfants
  - Un acteur peut surveiller d'autres acteurs
  - Plus de problèmes de concurrence, asynchrone par nature
  - Résistant aux pannes
  - Java or Scala

Akka


Server 1
Actor
Fils
Actor
Fils
Fils
Actor
messages
Actor
Fils
Actor
Fils
messages
Server 2
Actor

Akka messages

```
import akka.actor.{Props, ActorSystem, ActorLogging, Actor}

case class Greeting(who: String)

class GreetingActor extends Actor with ActorLogging {
  def receive = {
    case Greeting(who) ⇒ log.info("Hello " + who)
  }
}

val system = ActorSystem("MySystem")
val greeter = system.actorOf(Props[GreetingActor], name = "greeter")
greeter ! Greeting("Charlie Parker")
```

Struts 2

Play 2

- Framework web
- java or scala
- Support pour les websocket et le server sent event
- Asynchrone
  - pré-requis pour une application orientée événements

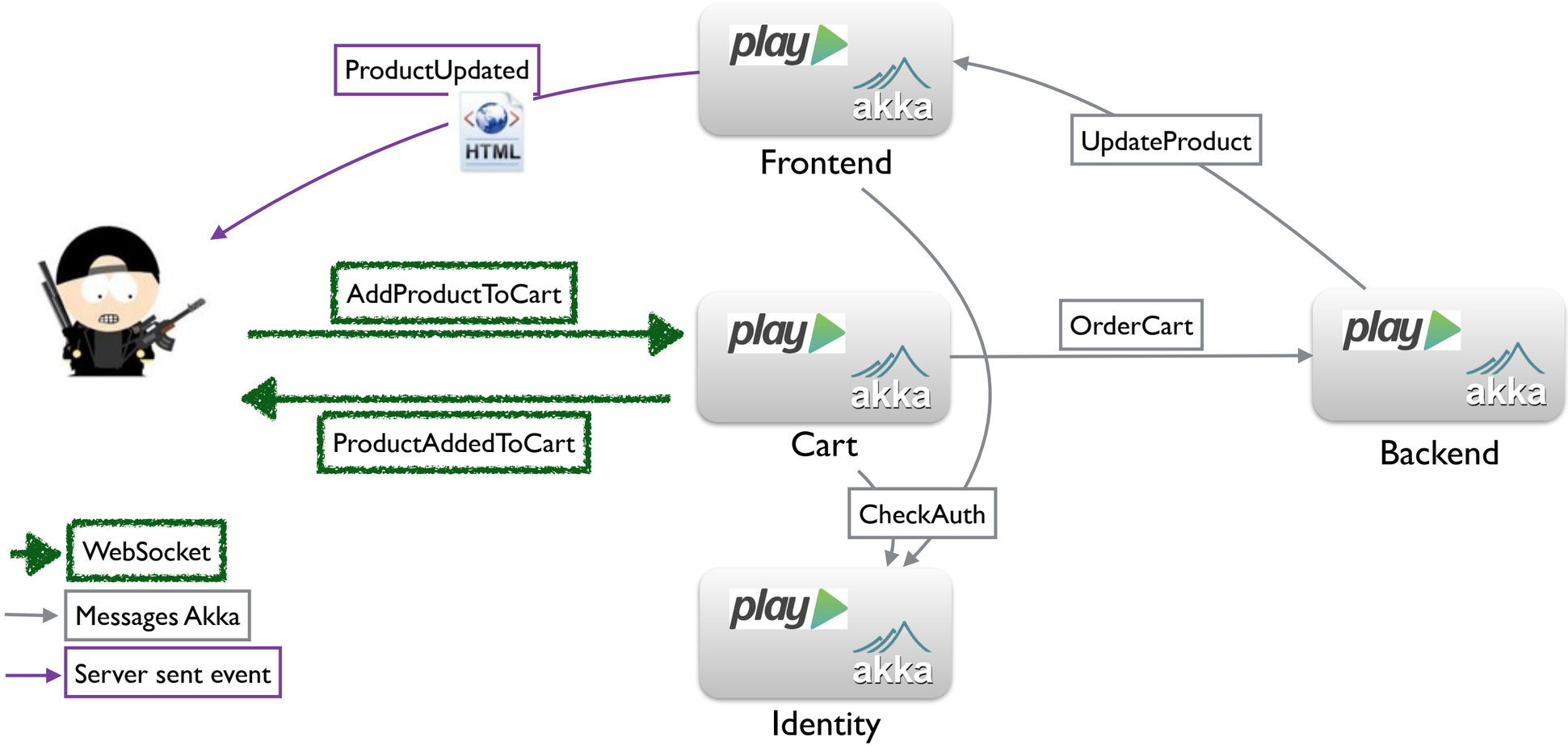
Play async

```
case class ListProductsQuery()

class ProductView extends Actor {
  override def receive: Receive = {
    case ListProductsQuery() => models.Product.list() pipeTo sender()
  }
}

class ProductsController  extends Controller {
  private def listProducts(): Future[List[models.Product]] = {
    (Actors.productView() ? ListProductsQuery()).mapTo[List[models.Product]]
  }
  def index() = Action.async {
    listProducts().map(products => Ok(views.html.index(products)))
  }
}
```

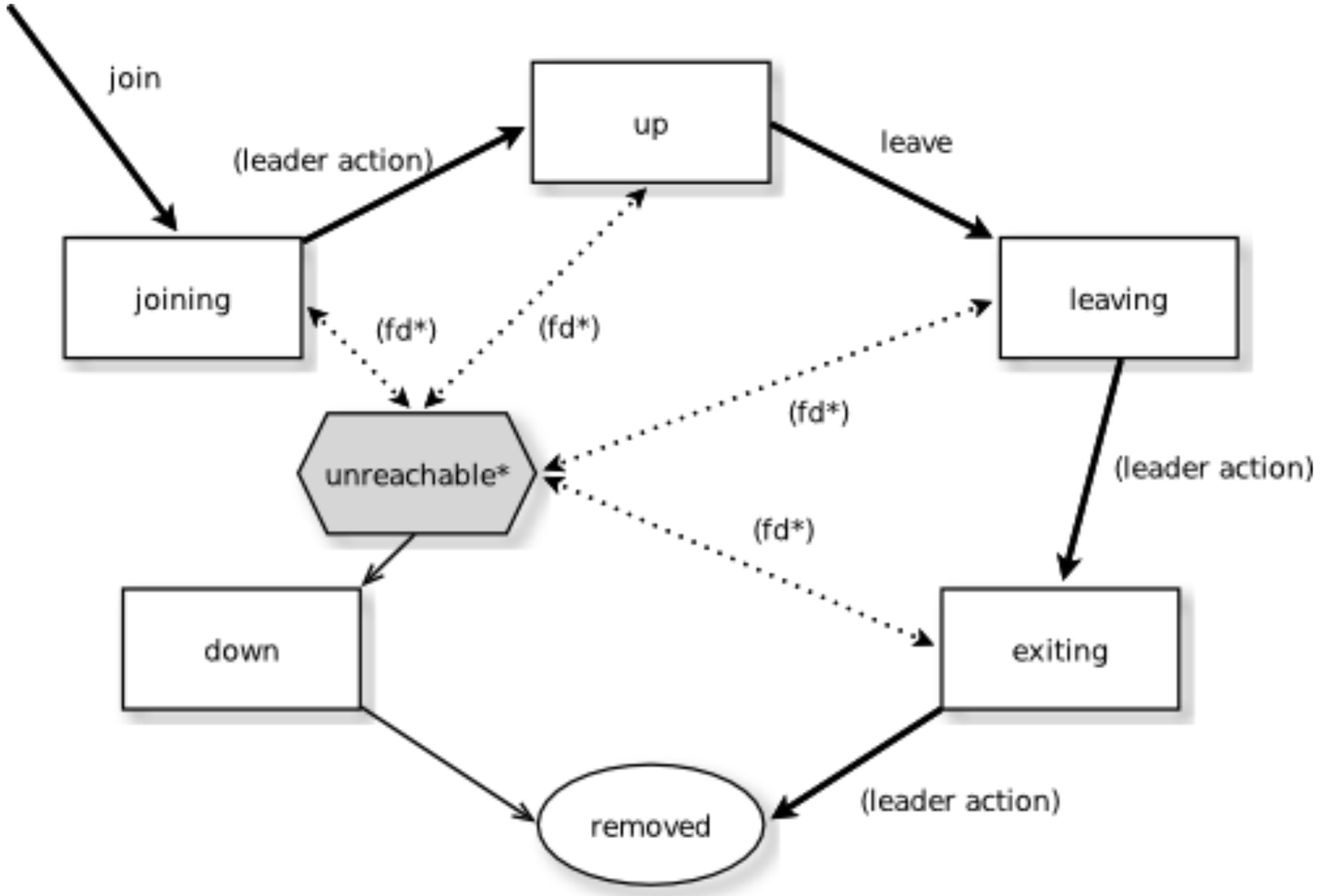
Messages


ProductUpdated
HTML
play
akka
Frontend
UpdateProduct
AddProductToCart
ProductAddedToCart
play
akka
Cart
OrderCart
play
akka
Backend
CheckAuth
play
akka
Identity
WebSocket
Messages Akka
Server sent event

Cluster

- Utilisation de Akka-cluster
- Librairie permettant de former un cluster de systèmes d'acteurs
  - simple service d'adhésion
  - tolérant aux pannes
  - décentralisé (P2P, gossip)
  - pas de SPOF
  - pas de SPOB
  - détection des pannes

Akka cluster

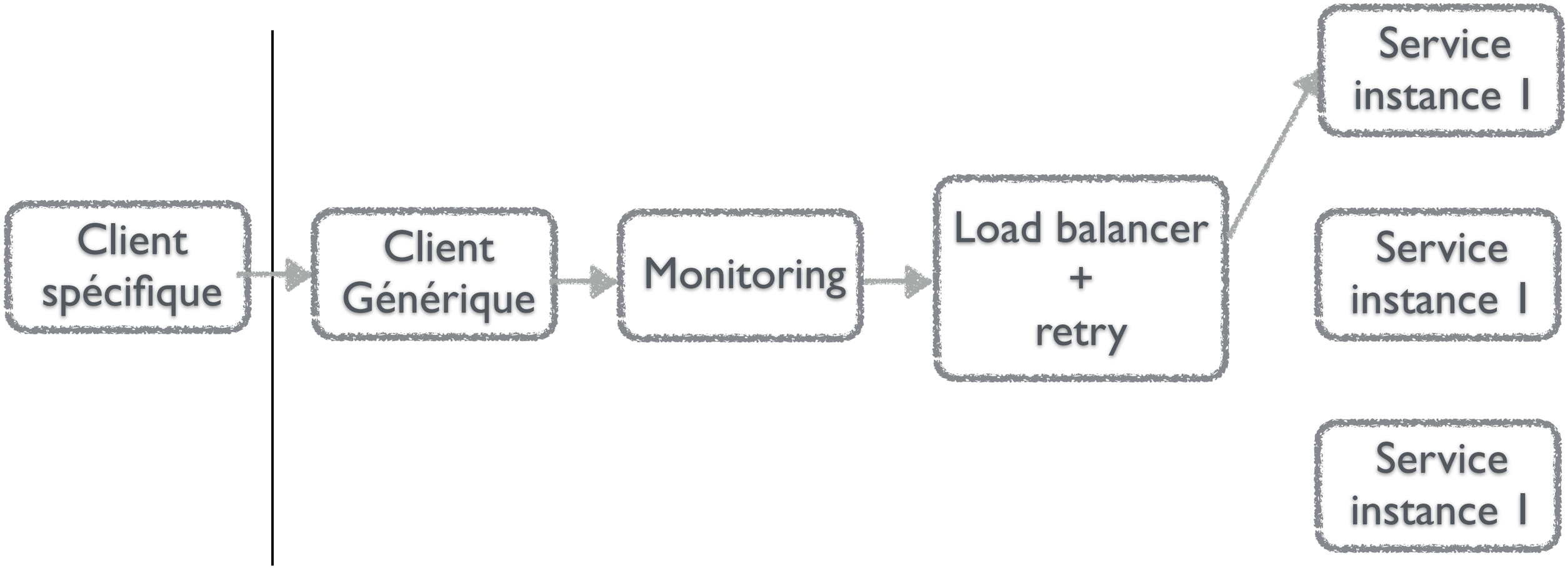


Cluster services

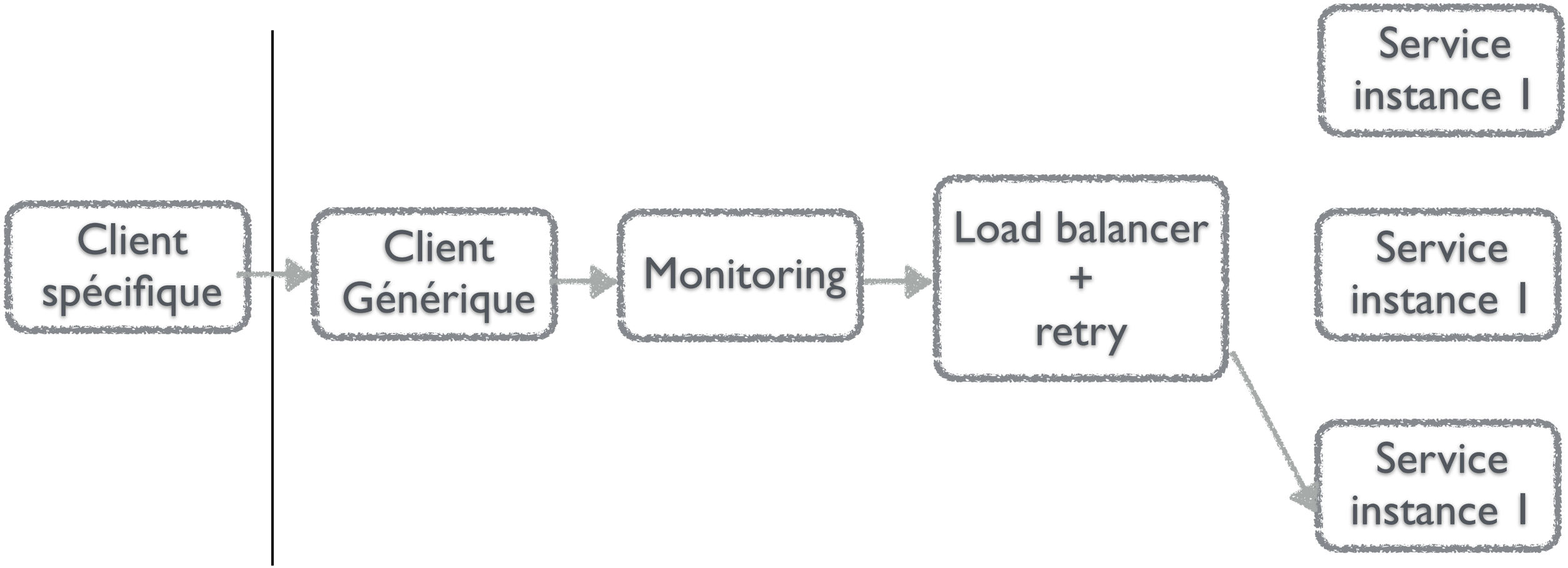
- Librairie de découverte de services distribués
- Exposition descripteurs de services (URL, protocole, version, nom)
- Repose sur les memberships du cluster Akka
- Clients de services
  - HTTP, Akka, Thrift, Memcached …
- Petits plus
  - Monitoring
  - Load balancing (pas très intelligent)
  - Retry with exponential back off

finagle

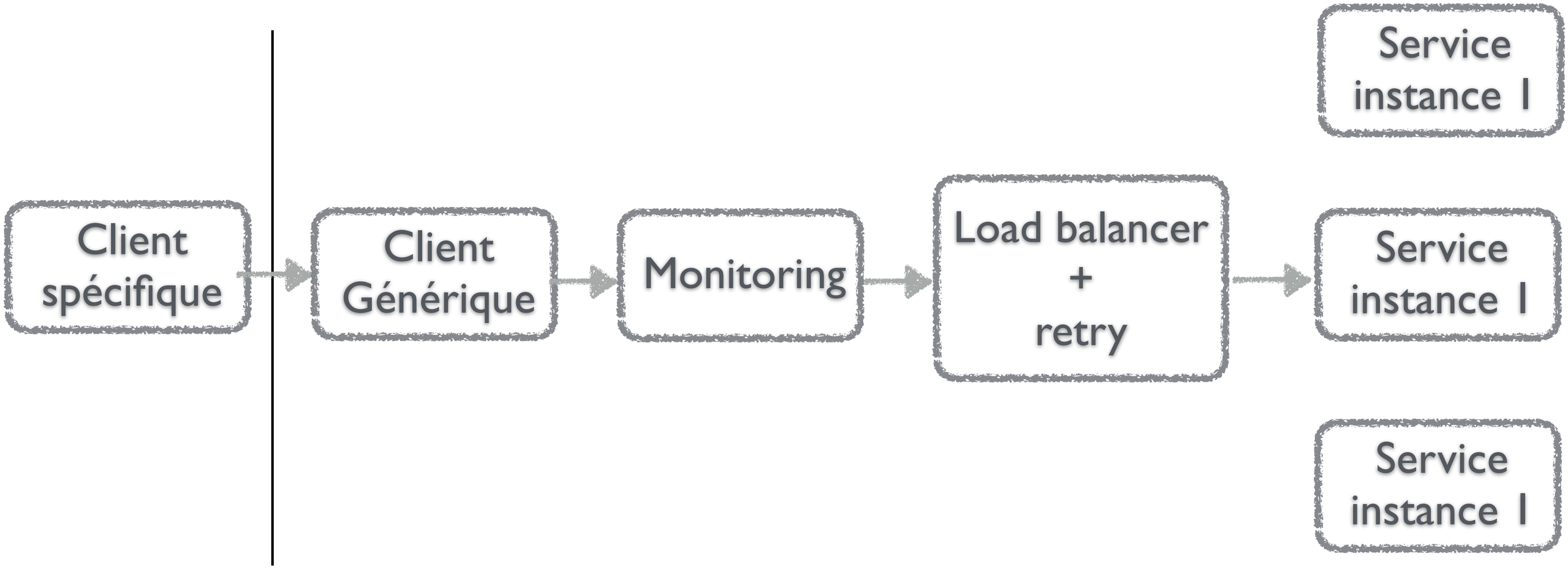
Cluster services



Cluster services

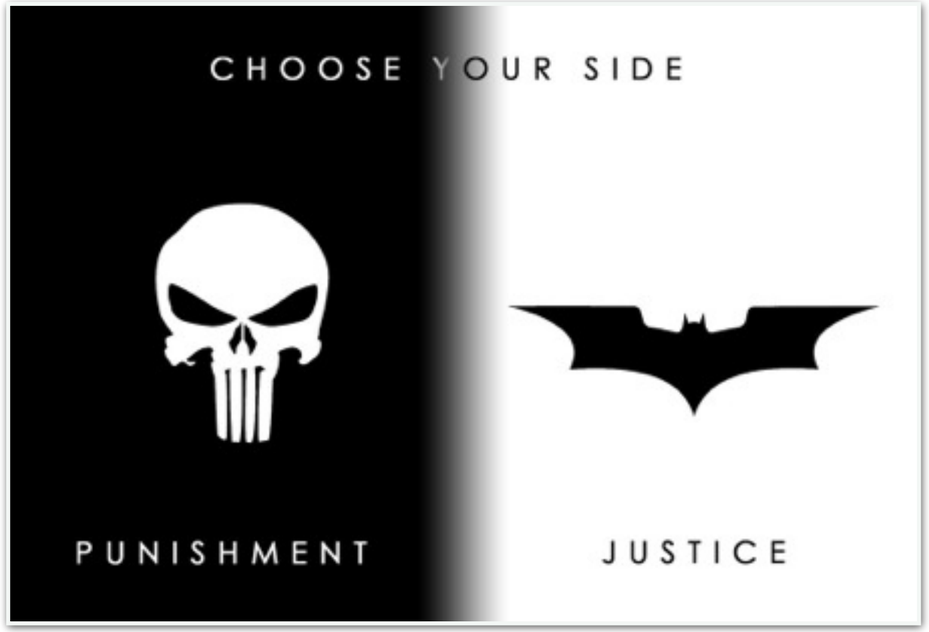


Cluster services

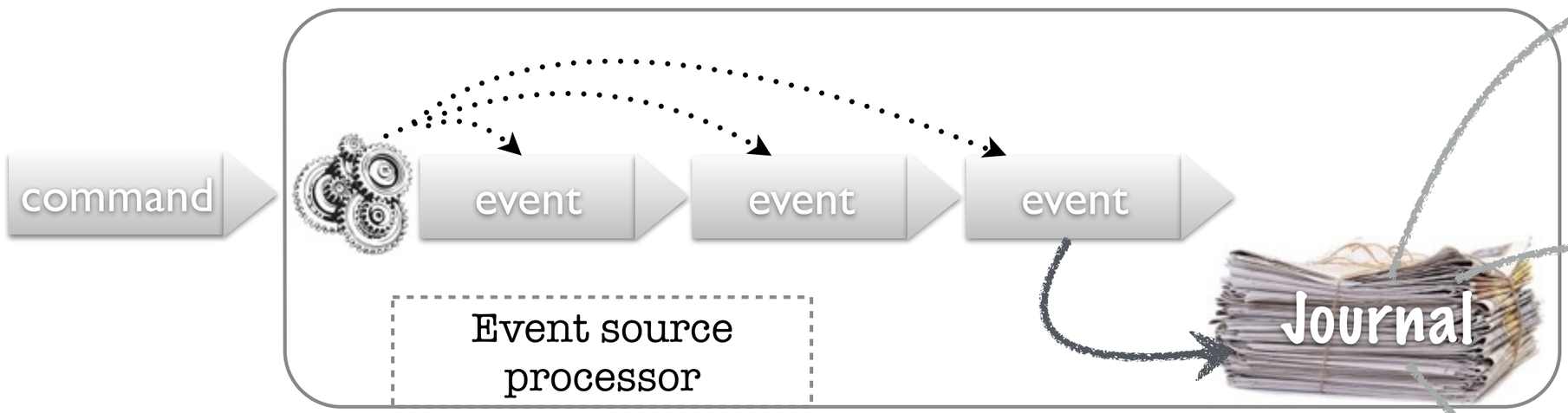


CQRS & EventSourcing

- Command Query Responsibility Segregation
  - Command : Enregistrement
  - Query : Lecture
  - 2 modèles distincts
  - Séparation des services
- Event sourcing
  - Stockage des événements



Persistence



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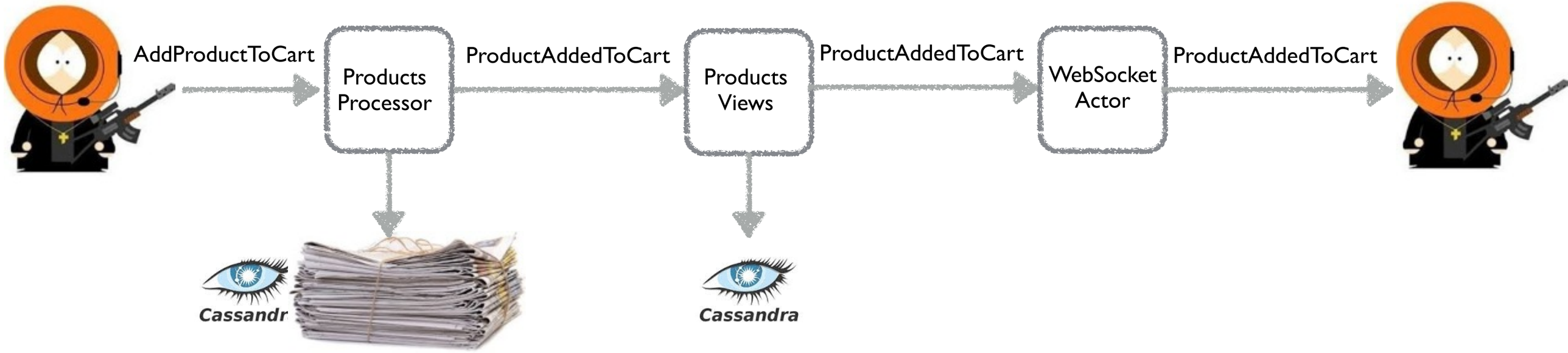
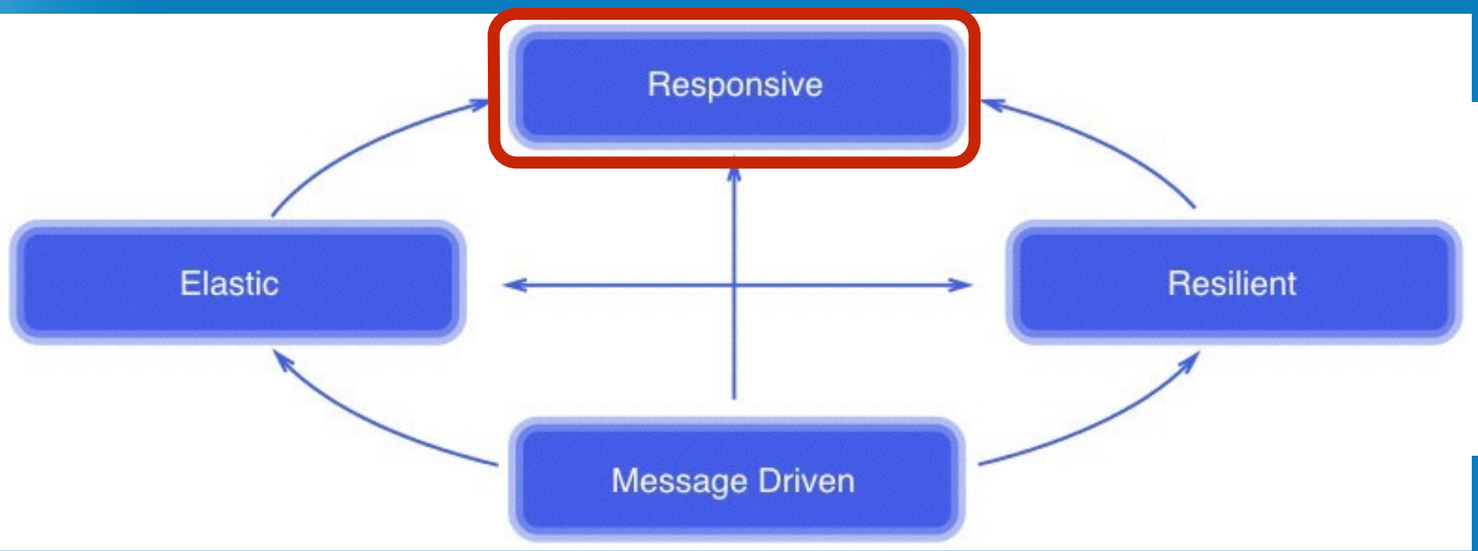
Exemple

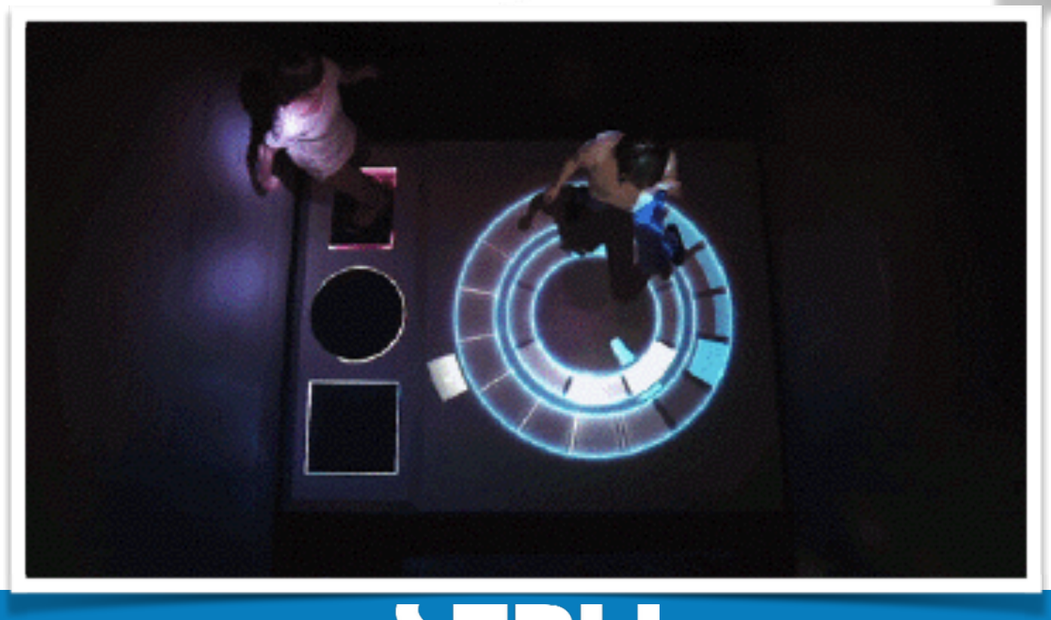

AddProductToCart
Products Processor
ProductAddedToCart
Products Views
ProductAddedToCart
WebSocket Actor
ProductAddedToCart
Cassandr
Cassandra

SERLi

Responsive



Frontend réactif



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Demo

Realtime web!

Et les perfs dans tout ca ?

Les chiffres

367 998 456 756

Les chiffres

367 998 456 756 €

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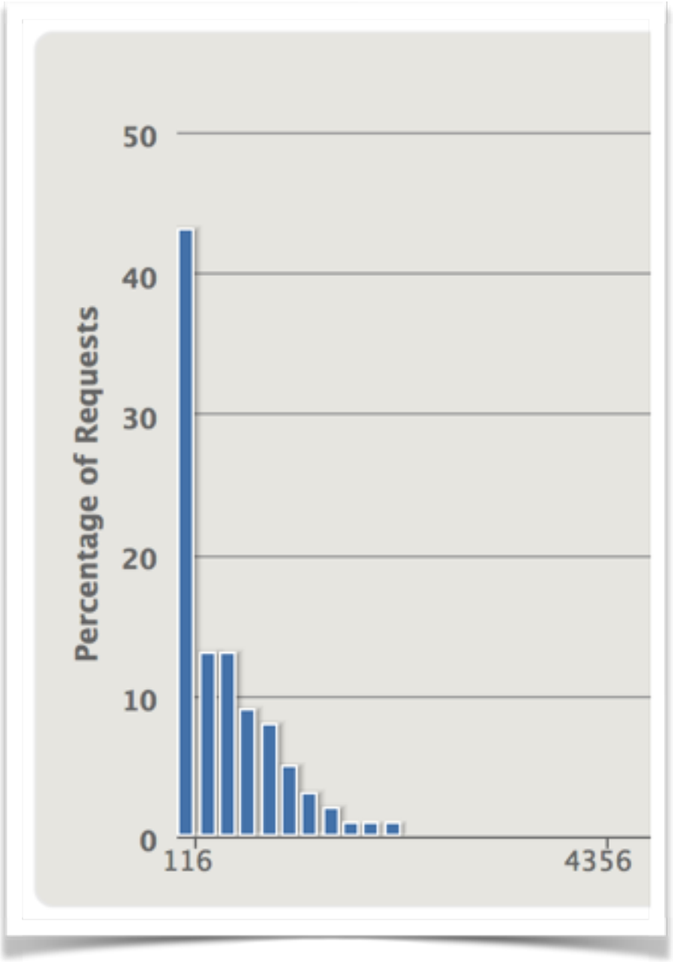
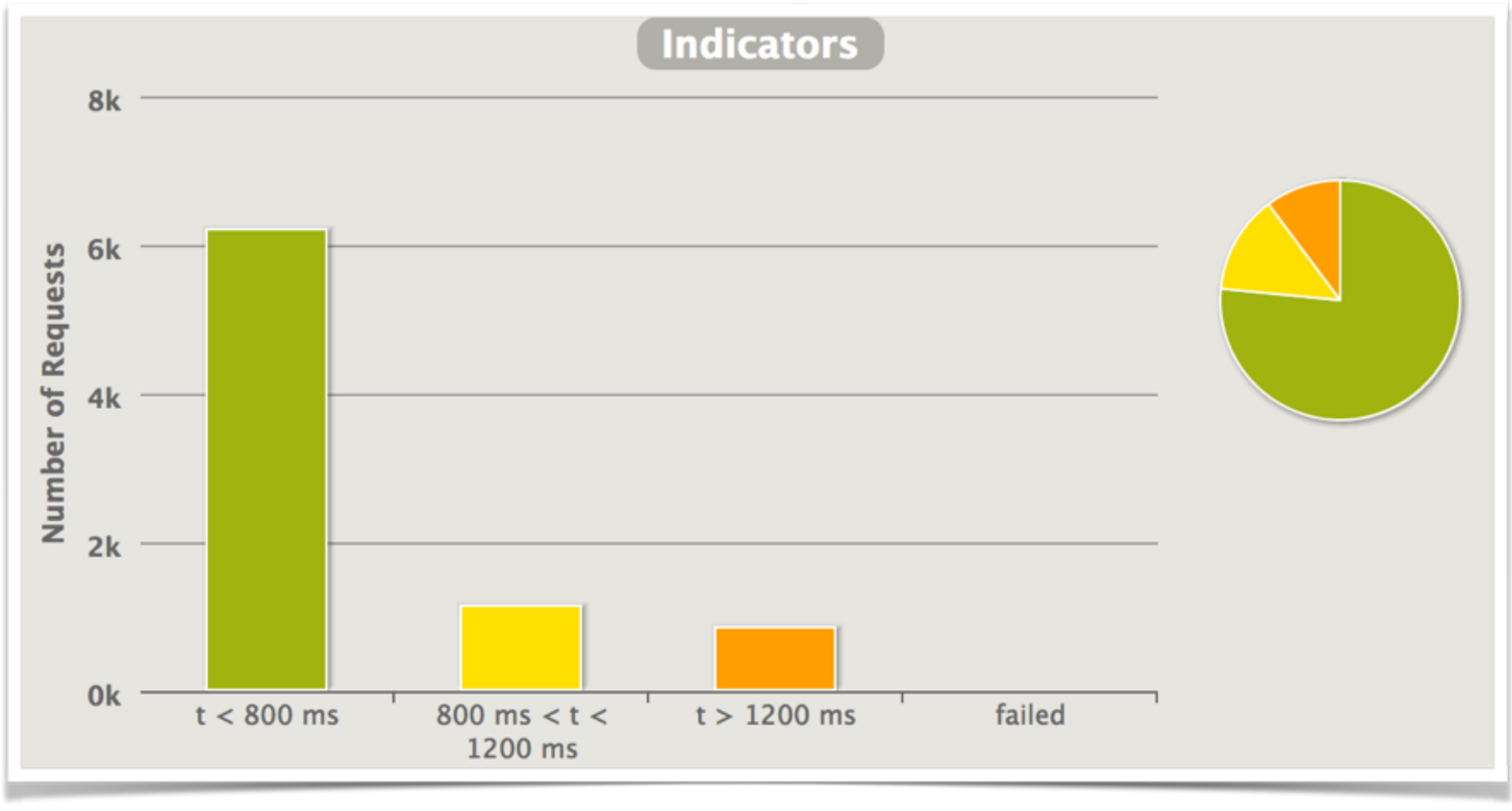
200 clients





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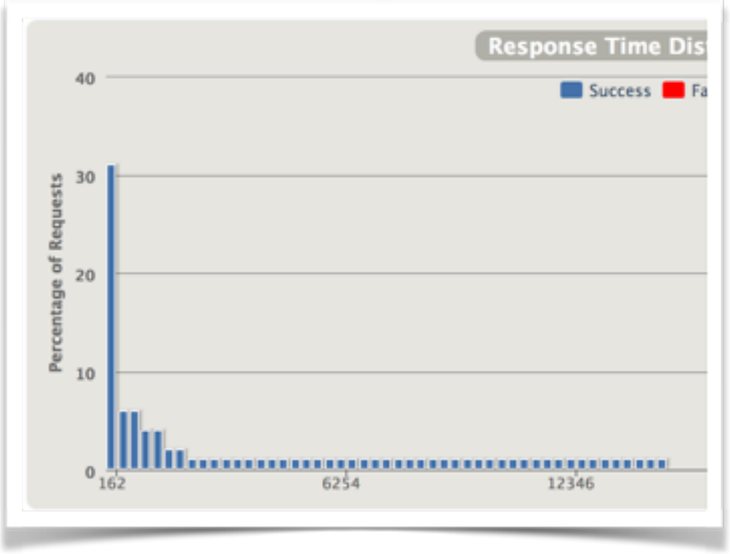
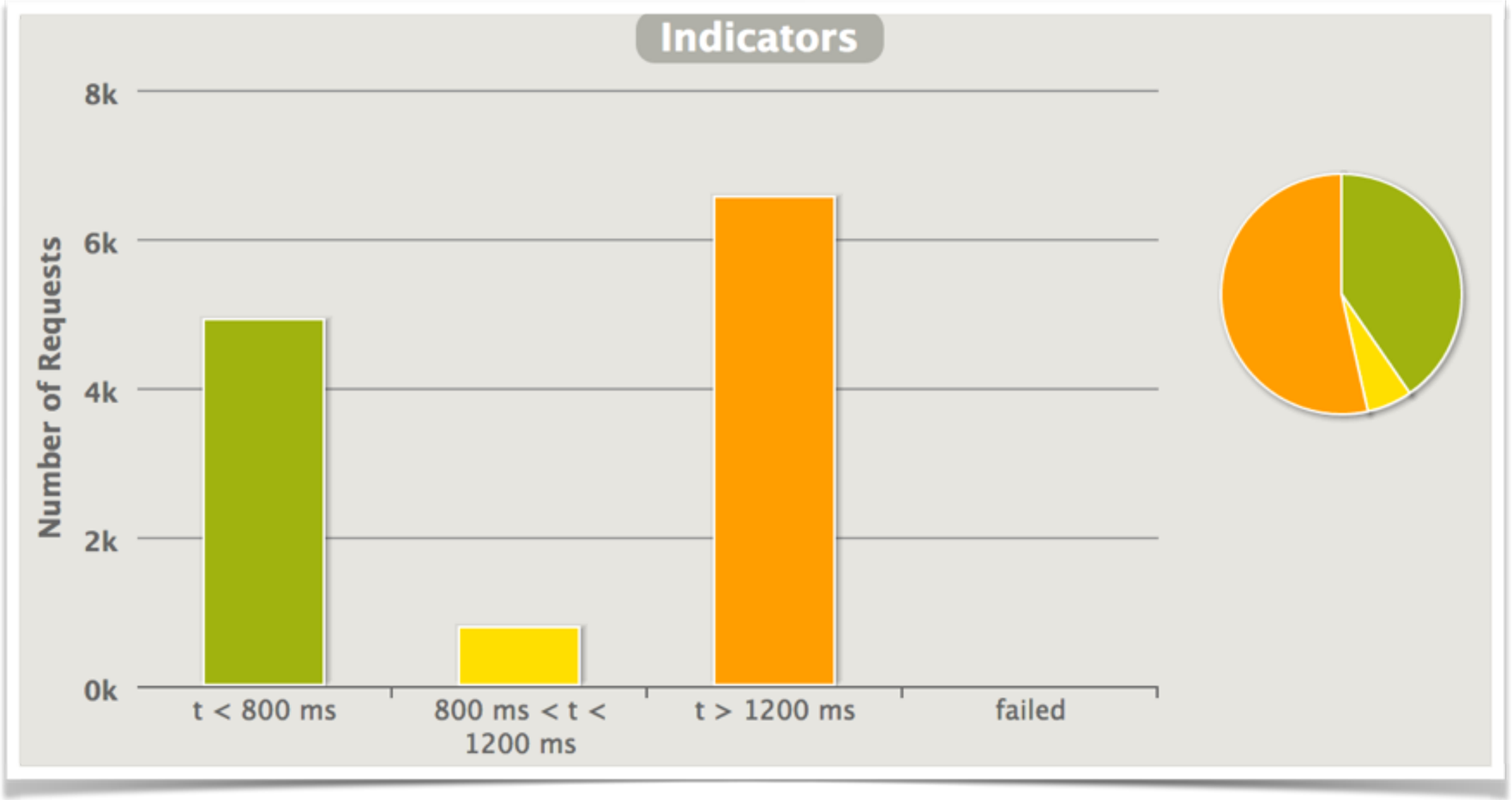
400 clients





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Metrics everywhere !!!

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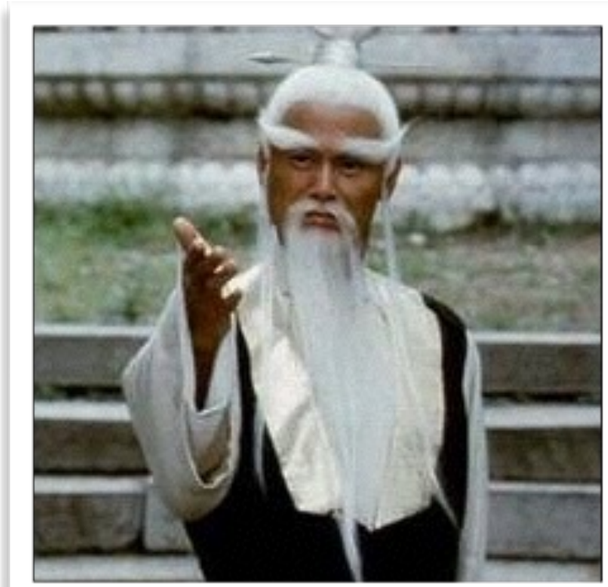
Les problèmes rencontrés

Nginx / mongo ...



Cassandra

Bench web socket

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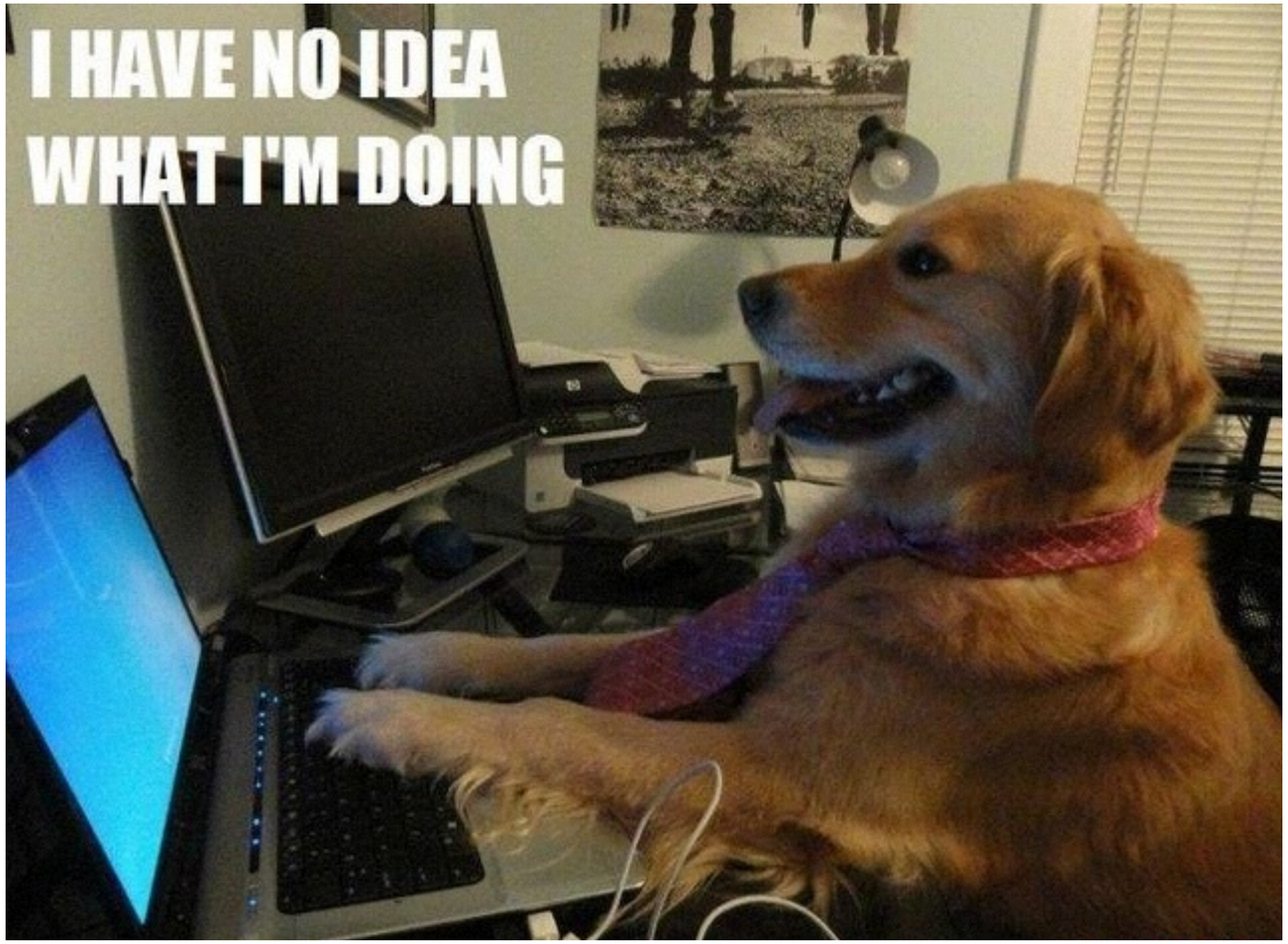
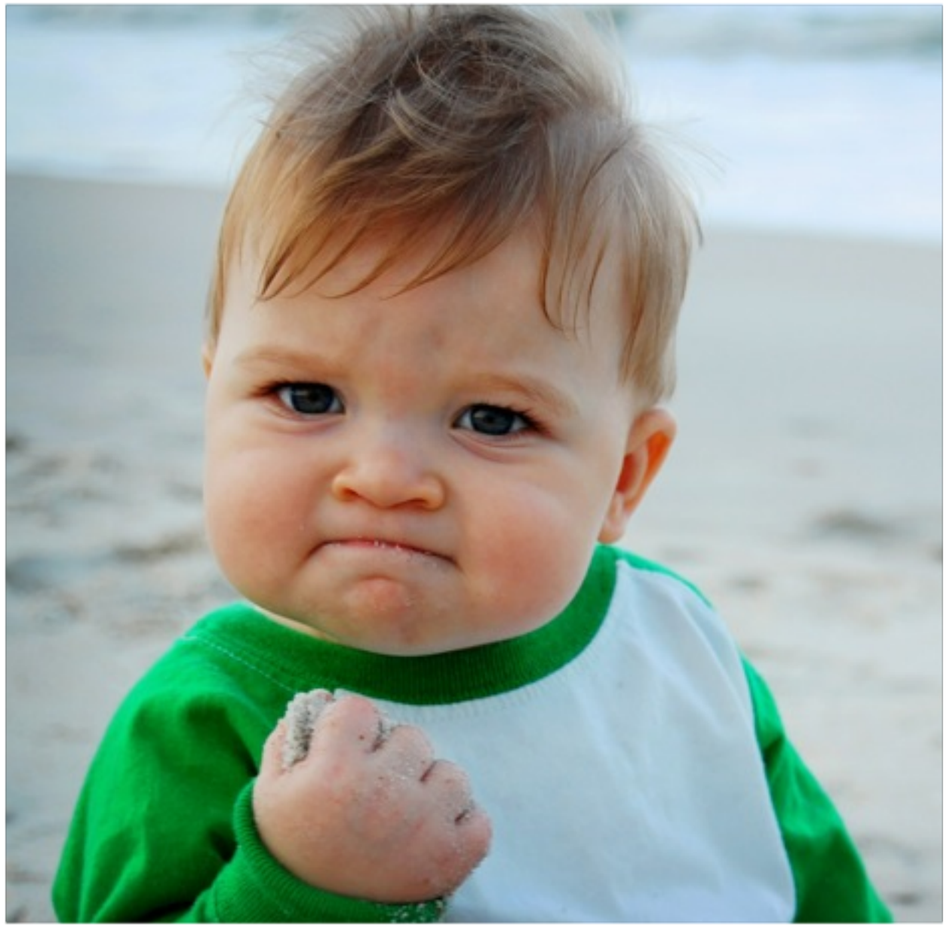
Configuration akka-cluster



Conclusion



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scala

akka

Scala

play

SERLI

This is the end ...