Clojure

Clojure

- A lisp

Clojure

- A lisp
- That run on the JVM

Clojure

- A lisp
- That run on the JVM
- Dynamic

Clojure

- A lisp
- That run on the JVM
- Dynamic
- Functional programming

Clojure syntax

List

```
(1 "two" 3)
```

Clojure syntax

List

```
(1 "two" 3)
```

Vector

```
[1 "two" 3]
```

Clojure syntax

List

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(1 "two" 3)
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Vector

```
[1 "two" 3]
```

Map

```
{:first-key 1
:second-key "two"}
```

Clojure syntax

List

```
(1 "two" 3)
```

Vector

```
[1 "two" 3]
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Map

```
{:first-key 1
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Function definition

```
(defn my-function [param1 param2]
  (str param1  param2))
```

Clojure syntax

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(1 "two" 3)
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Vector

```
[1 "two" 3]
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Map

```
{:first-key 1
:second-key "two"}
```

Function definition

```
(defn my-function [param1 param2]
  (str param1  param2))
```

Function call

```
(my-function 1 "two") ;"1two"
```

Clojure syntax

Code is data, data is code

Data structures

Immutable data structures

Clojurescript

core.async

- Communicating sequential processes (CSP) ... Go

core.async

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- Asynchronous, reactive, event-driven ... multithreaded

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- Asynchronous, reactive, event-driven ... multithreaded
- Channel $\simeq$ Queues

core.async

- Communicating sequential processes (CSP) ... Go
- Asynchronous, reactive, event-driven ... multithreaded
- Channel $\simeq$ Queues
- Clojure + Clojurescript

core.async

```
(go (>! channel {:name "event" :value 3}))
```

```
(go (<! channel))
```

core.async

Asynchronous

```
async_call(param, function(result){
   console.log(result);
});
```

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Asynchronous

```
async_call(param, function(result){
   console.log(result);
});
```

```
async_call(param, new Future());
```

core.async

Asynchronous

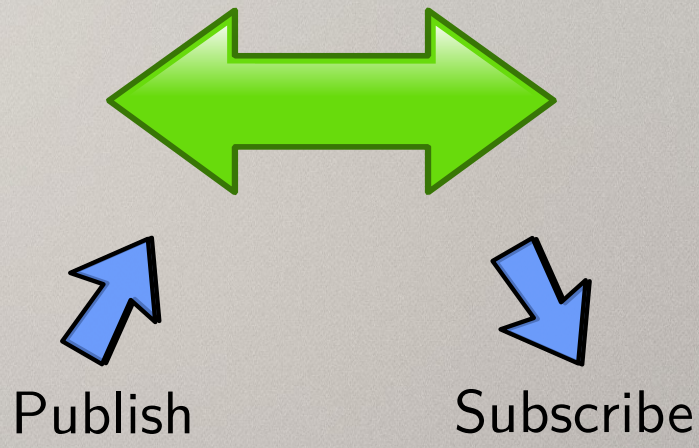
```
async_call(param, function(result){
   console.log(result);
});
```

```
async_call(param, new Future());
```

```
async_call(param, channel);
```

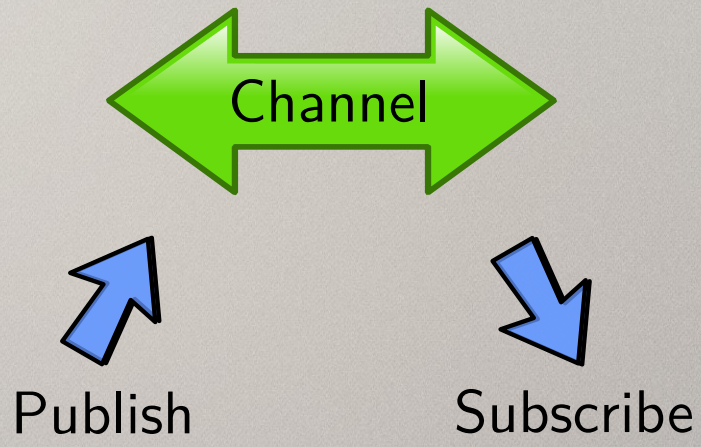
core.async

Pub/Sub



core.async

Pub/Sub



core.async

Composable

- map

core.async

Composable

- map
- filter

core.async

Composable

- map
- filter
- merge

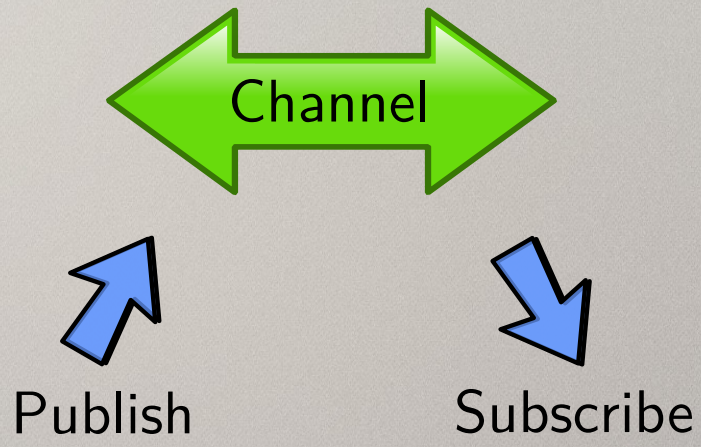
core.async

Composable

- map
- filter
- merge
- choose

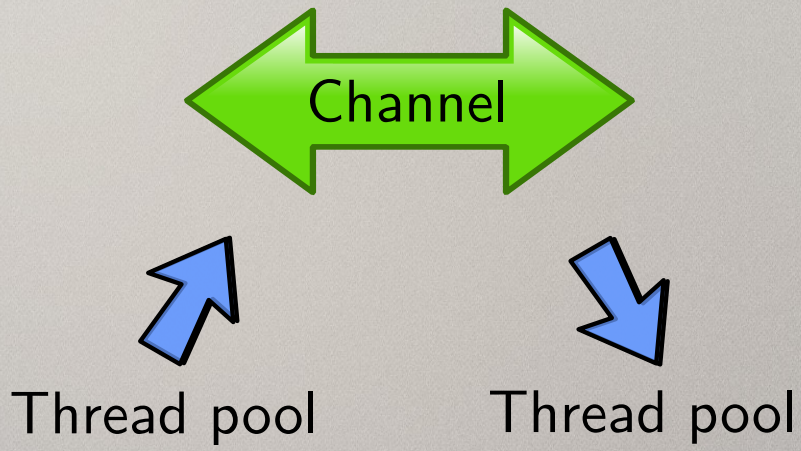
core.async

Pub/Sub

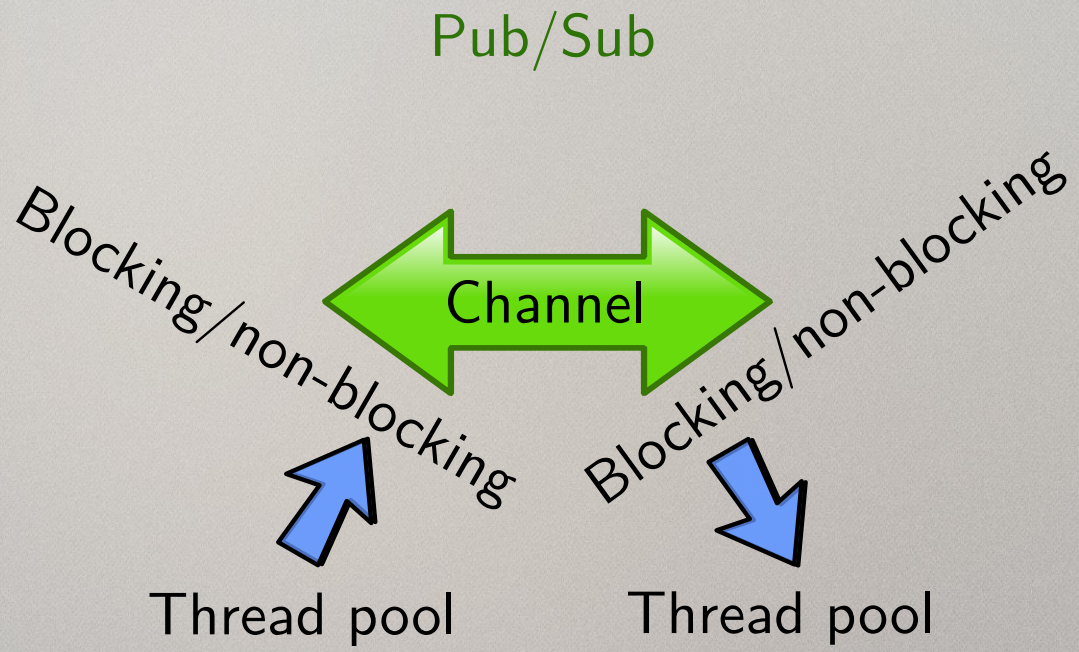


core.async

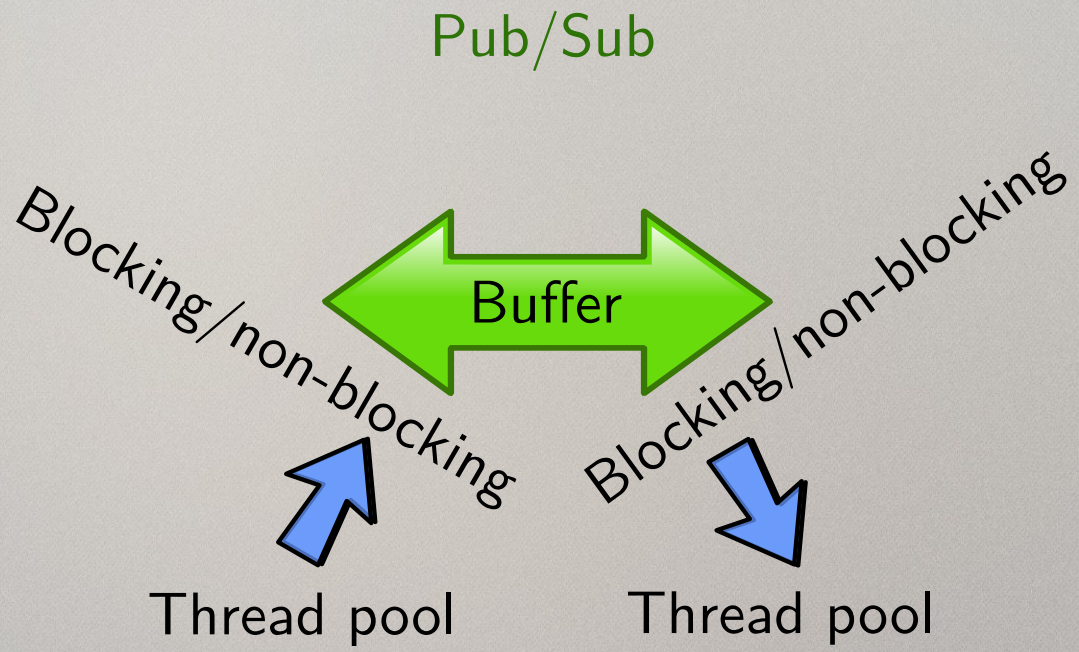
Pub/Sub



core.async


Pub/Sub
Channel
Blocking/non-blocking
Blocking/non-blocking
Thread pool
Thread pool

core.async


Pub/Sub
Blocking/non-blocking
Buffer
Blocking/non-blocking
Thread pool
Thread pool

core.typed

Static typing

- Early error catching

core.typed

Static typing

- Early error catching
- Documentation by types

core.typed

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- Documentation by types
- Faster

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Dynamic typing

- Duck typing $\Rightarrow$ better code reuse

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Dynamic typing

- Duck typing $\Rightarrow$ better code reuse
- Live programming

core.typed

Static typing

- Early error catching
- Documentation by types
- Faster

Dynamic typing

- Duck typing $\Rightarrow$ better code reuse
- Live programming
- Compilation speed / compiler complexity

core.typed

- Optional type system

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No more beans

```
(HMap :mandatory {:a Number} :optional {:b Symbol})
```

core.typed

- Optional type system

No more beans

```
(HMap :mandatory {:a Number} :optional {:b Symbol})
```

Union types

```
(Fn [(U String Number) -> (Value 3)])
```

Immutant

- JBoss

Immutant

- JBoss
- Standard deployment

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- Standard deployment
- Logs

Immutant

- JBoss
- Standard deployment
- Logs
- Jobs / Daemons

Immutant

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- Logs
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- Messaging (HornetQ)

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- Distributed transactions

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- REPL

Wrap up

- Lisp is great

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- Asynchronous / multithread $\Rightarrow$ core.async

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- Asynchronous / multithread $\Rightarrow$ core.async
- Type checking $\Rightarrow$ core.typed

Wrap up

- Lisp is great
- Asynchronous / multithread $\Rightarrow$ core.async
- Type checking $\Rightarrow$ core.typed
- Application server $\Rightarrow$ Immutant