



EPSI

l'École
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Initiation au Scala



Scala

Multi-paradigm programming language
designed to express common programming patterns
in a concise, elegant, and type-safe way.

Key concepts

- Run on the JVM, interoperability with Java

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- Extensible language (DSL using implicits)

DSL



```
Set(1, 2, 3) should have size (3)
```

```
List(1, 2, 3, 4) should contain atMostOneOf (4, 5, 6)
```

```
select (id, name)
```

```
from Book
```

```
where (id <> 2) or (author === "Robin Hobb")
```

Key concepts

- Run on the JVM, interoperability with Java
- Extensible language (DSL using implicits)
- Statically typed with type inference

Type & inference - Java



```
static Map<Integer, List<String>> map = new HashMap<>();  
ArrayList<String> list = new ArrayList<String>("one");
```

Type & inference - Scala



```
val map = Map(  
  1 -> List("one"),  
  2 -> List("one", "two")  
)  
  
// val map: Map[Int, List[String]]
```


Type safety



```
def op(l: List[String]): Option[Long] = ???
```

```
op(List("one", "two")) // OK
```

```
op(List(1, 2)) // Compile error: Type mismatch, found Int, expected String
```

Key concepts

- Run on the JVM, interoperability with Java
- Extensible language (DSL using implicits)
- Statically typed with type inference
- Multi-paradigm, object-oriented & functional

Object-oriented programming

Every **value** is an **object**

Inheritance (trait, mixin)

Encapsulation (classes, case classes)

Polymorphism (type parameters)

Functional programming

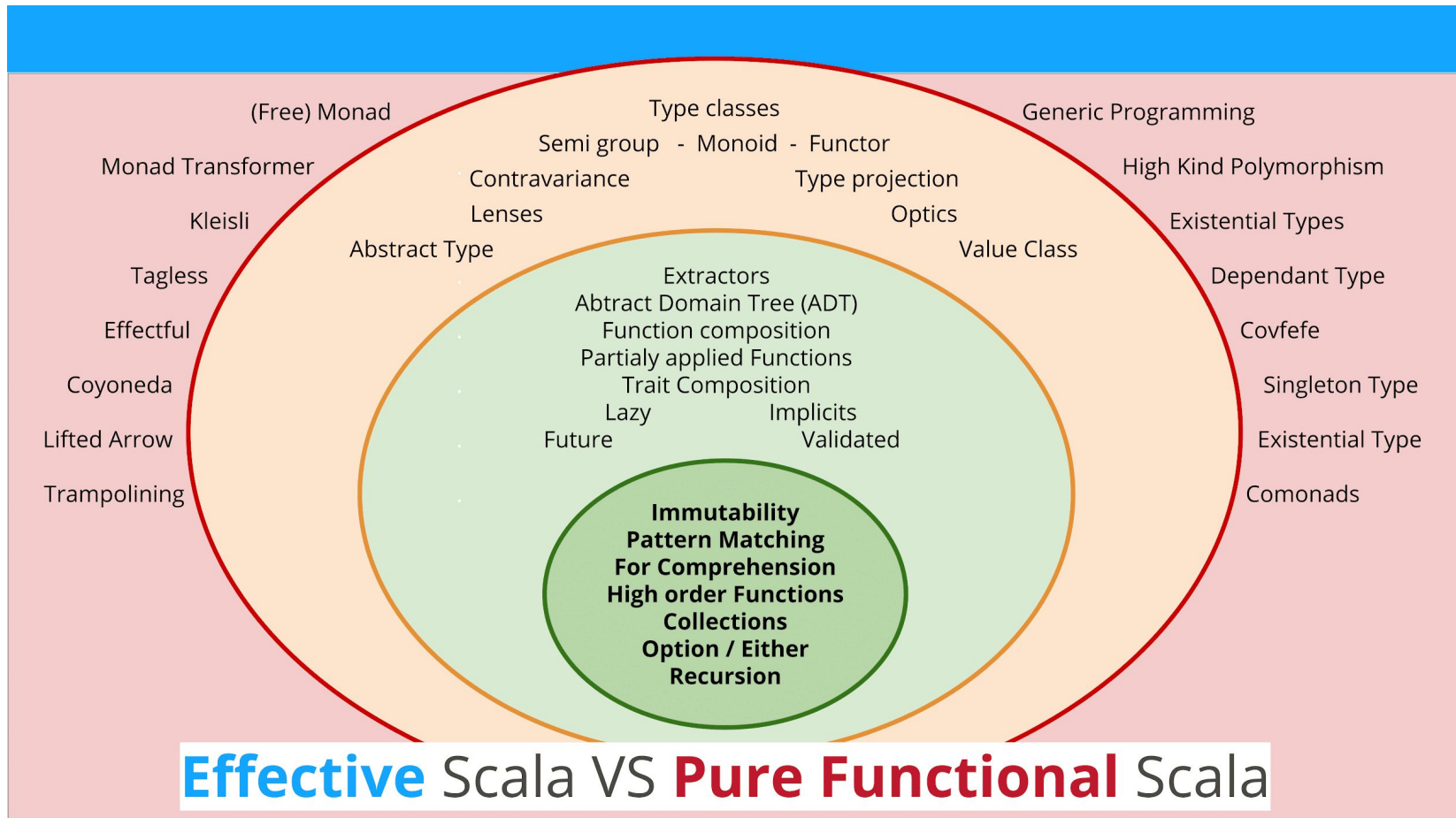
Every **function** is a **value**

Immutability

Anonymous functions

Pattern matching

Singleton objects



Weaknesses

- Type hierarchy & inference does not provide strong typing

/!\ Type inference /!\



```
val x = if (true) "a" else 1  
x: Any
```

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- Type hierarchy & inference does not provide strong typing
- Compilation time
- Java compatibility (null, casting)
- Lot of freedom about syntax

Syntax flexibility

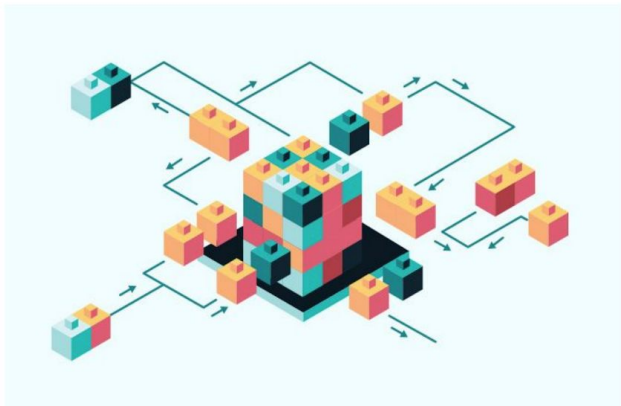


```
stuff.run()  
stuff.run  
stuff run()  
stuff run
```

```
option.map({ case i => i * 2 })  
option.map { i => i * 2 }  
option.map(i => i * 2)  
option.map(_ * 2)
```

Ecosystem

APIs



High Performance HTTP1&2 Servers [\[Akka HTTP\]](#)

Full Stack Web Servers [\[Play2\]](#)

CQRS / Event Sourcing frameworks [\[Lagom\]](#)

Protocol Agnostic RPC System [\[Finch\]](#)

Allow to build **stateless**, **scalable**, **fault-tolerant** and **typesafe** microservices

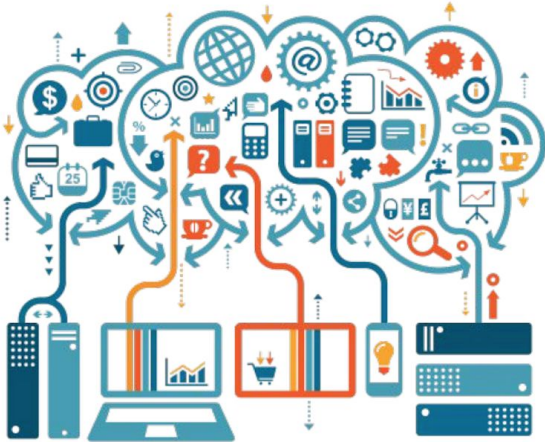
Ecosystem

Big Data

Realtime Streaming Processing [\[Akka-Stream\]](#)

Cluster Computing [\[Spark/Flink\]](#)

Message Broker [\[Kafka\]](#)



Ecosystem



Data Science

Machine Learning [[SparkML](#)]

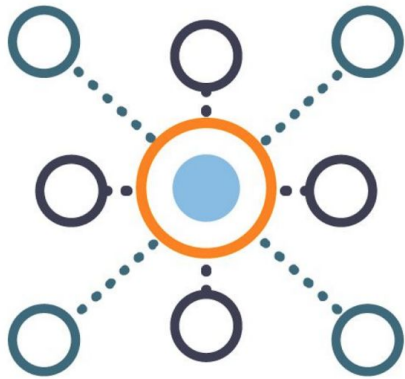
Distributed Deep Learning [[BigDL](#)]

Numerical Processing [[Breeze](#)]

Statistical Machine Intelligence [[Smile](#)]

Data Analysis [[Saddle](#)]

Ecosystem



Distributed Systems

Actors Concurrency Model

Clustering / Sharding

Distributed Data / Event Sourcing

*Toolkit for building **highly concurrent, distributed,**
and **fault tolerant event-driven** applications.*

Ecosystem



ScalaTest



Learning

- Scala tour
<https://docs.scala-lang.org/tour/tour-of-scala.html>
- Creative scala (+ Play, Slick, Cats, Shapeless)
<https://underscore.io/books>
- Scala exercises (+ Play, Slick, Cats, Shapeless, Doobie, Circe)
<https://www.scala-exercises.org/>
- Coursera
<https://fr.coursera.org/learn/progfun1>

Companies in Montpellier

Teads,
ZenDesk, Tabmo,
Fruition Sciences, Decision Brain,
Tell Me Plus, LibreAir, MedinCell, Atos

Companies in France

Samsung IoT, Zengularity, Captain Dash,
MFG Labs, Canal+, Criteo, Lunatech, Xebia,
Zalando, Deezer, Meetic, Vente privée,
Axa, Ebiznext, Clever Cloud, iAdvize,
Kreative, Digischool group, Lizeo, Valraiso

Teads^{tv}

<https://medium.com/teads-engineering>

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Slack Communautés Montpellier



<https://bit.ly/slack-mtp>

#lang-scala

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