Injection de dépendances

Une application :

- doit répondre aux besoins actuels
- mais aussi être évolutive

Objectif :

faciliter la maintenance du code en impactant le moins possible l'existant.

Solution → réduire les dépendances au sein du code.

Couplage fort

Product ne peut pas être utilisé
ni testé **indépendamment** de Command

```java
public class Command {
    private Product product;

    public Command() {
        this.product = new Product("something");
        System.out.println(product);
    }
}
```

```java
public class MainDependanceExemple {

    public static void main(String[] args) {
        Command command = new Command();

    }
}
```

```java
public class Product {
    private String productName = "";

    public Product(String productName) {
        this.productName = productName;
    }

    @Override
    public String toString() {
        return "Product [productName=" + productName + "]";
    }
}
```

Note sur le logging

`System.out.println(product);` → Règle générée/rapellée par Sonarlint

Problems | Javadoc | Declaration | Search | Console | Terminal | Coverage | Git Staging | History | SonarLint Rule Descrip | Chat View

Standard outputs should not be used directly to log anything

Code smell Major java:S106

Why is this an issue? More Info

When logging a message there are several important requirements which must be fulfilled:

- The user must be able to easily retrieve the logs
- The format of all logged message must be uniform to allow the user to easily read the log
- Logged data must actually be recorded
- Sensitive data must only be logged securely

If a program directly writes to the standard outputs, there is absolutely no way to comply with those requirements. That's why defining and using a dedicated logger is highly recommended.

```
System.out.println("My Message"); // Noncompliant
```

Le logging pour : déboguer, traces d'exécution, recherches d'anomalie, etc.

Voir : https://www.jmdoudoux.fr/java/dej/chap-logging.htm , logiciel **Log4j**

Pattern Dependency Injection

New Product() a disparu (Command ne s'occupe plus de l'instanciation)

setProduct() insère l'objet instancié dans l'objet Command : ***injection par le setter***

```java
public class Command {
    private Product product;

    public Product getProduct() {
        return product;
    }

    public void setProduct(Product product) {
        this.product = product;
    }

    public Command() {
        // TODO
    }
}
```

```java
public class MainDependanceExemple {

    public static void main(String[] args) {

        Product product = new Product("something");
        Command command = new Command();
        command.setProduct(product);
        System.out.println(command.getProduct());

    }
}
```

Problems | Javadoc | Declaration | Search | Console

```
<terminated> MainDependanceExemple [Java Application] C:\Progra
Product [productName=something]
```

Pattern Dependency Injection

setProduct() est "caché" dans Command (diapo d'avant), alors :

Injection de l'objet Product dans le constructeur de Command : ***injection par le constructeur***

Idem avec l'ajout de l'objet Delivery supplémentaire

```java
class Command {
    private Product product;
    private Delivery delivery;

    public Command(Product product, Delivery delivery)
{
        this.product = product;
        this.delivery = delivery;
    }
}
```

```java
public class MainDependanceExemple {

    public static void main(String[] args) {

    // dependencies
    Product product = new Product("something");
    Delivery delivery = new Delivery(product);

    // injections
    Command command = new Command(product, delivery);
    }
}
```

```java
class Delivery {
    private Product product;

    public Delivery(Product product) {
        this.product = product;
    }
}
```

Inversion of Control (IoC)

La construction des objets est déléguée à un conteneur IoC (IoC container)

Une interface s’écrit comme une classe

Spring Framework fournit avant tout un conteneur IoC (création d’objets, dépendances entre eux)

```java
public class IoC {

    public static void main(String[] args) {

        IoC container = new IoC();
        // On peut aussi bien mettre MySQLDatabase que
        // OracleDatabase
        User user = container.new User(container.new OracleDatabase());
        user.add("This is some data!");
    }

    // Business Layer Logic
    public class User {

        private IDatabase database;

        public User(IDatabase database) {
            this.database = database;

        }

        public void add(String data) {
            database.persist(data);
        }
    }

    public interface IDatabase {
        void persist(String data);
    }

    // Database Access Layer
    public class MySQLDatabase implements IDatabase {
        @Override
        public void persist(String data) {
            System.out.println("Persisting: " + data);
        }
    }

    public class OracleDatabase implements IDatabase {
        @Override
        public void persist(String data) {
            System.out.println("Persisting: " + data);
        }
    }

}
```

Framework Spring

Si beaucoup de classes → beaucoup de New

@Bean avec le Framework Spring :

- Instanciation (singleton par défaut)
- gestion du cycle de vie des objets
- code plus clair

Spring Boot peut être considéré comme extension plus pratique de **Spring.**

Spring Tools 4 for Eclipse (outils de dév.)

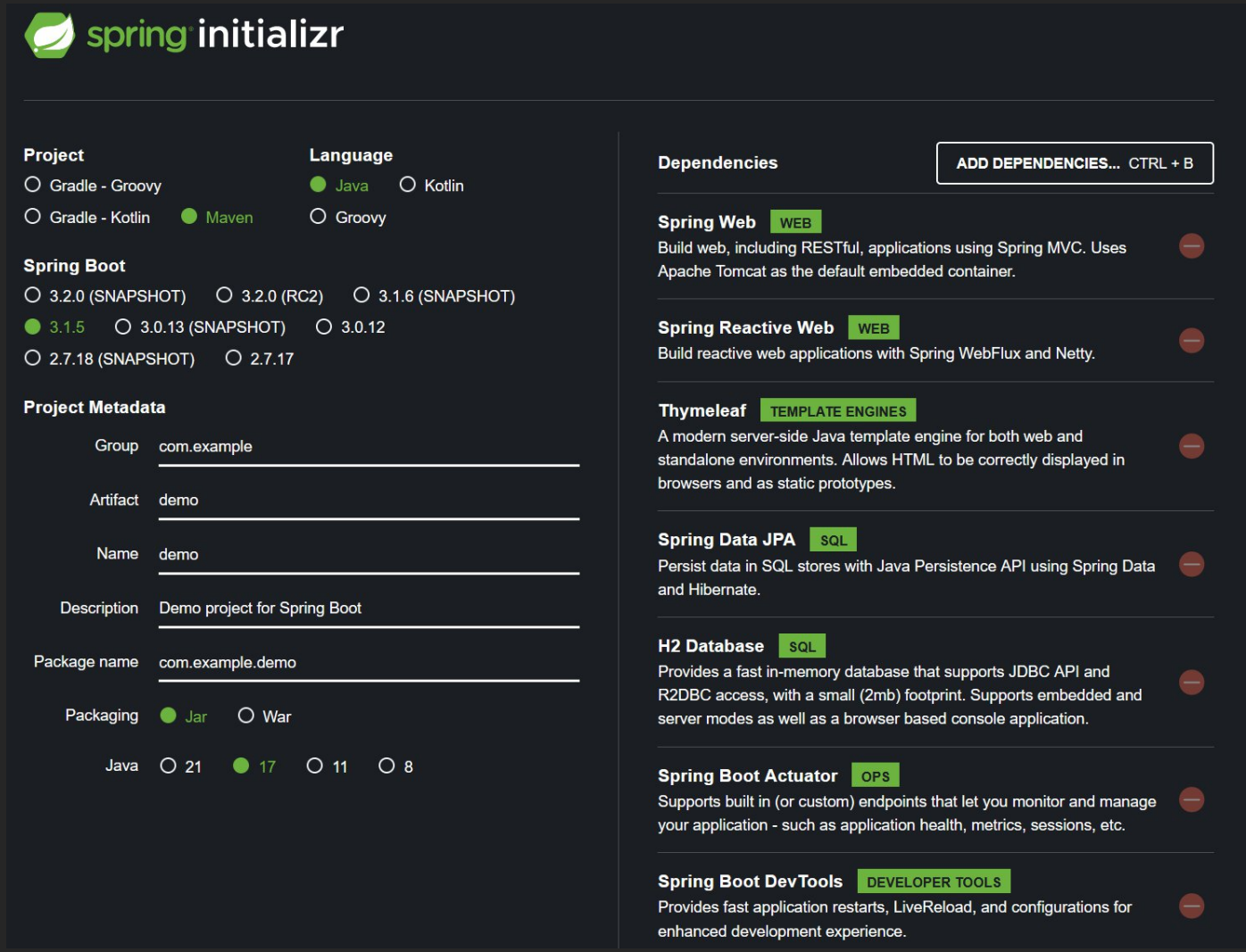
https://spring.io/tools

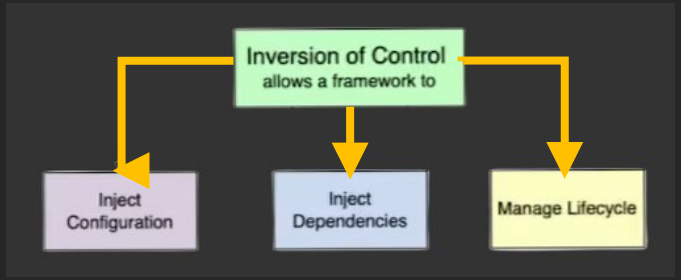
Spring initializr :

https://start.spring.io/

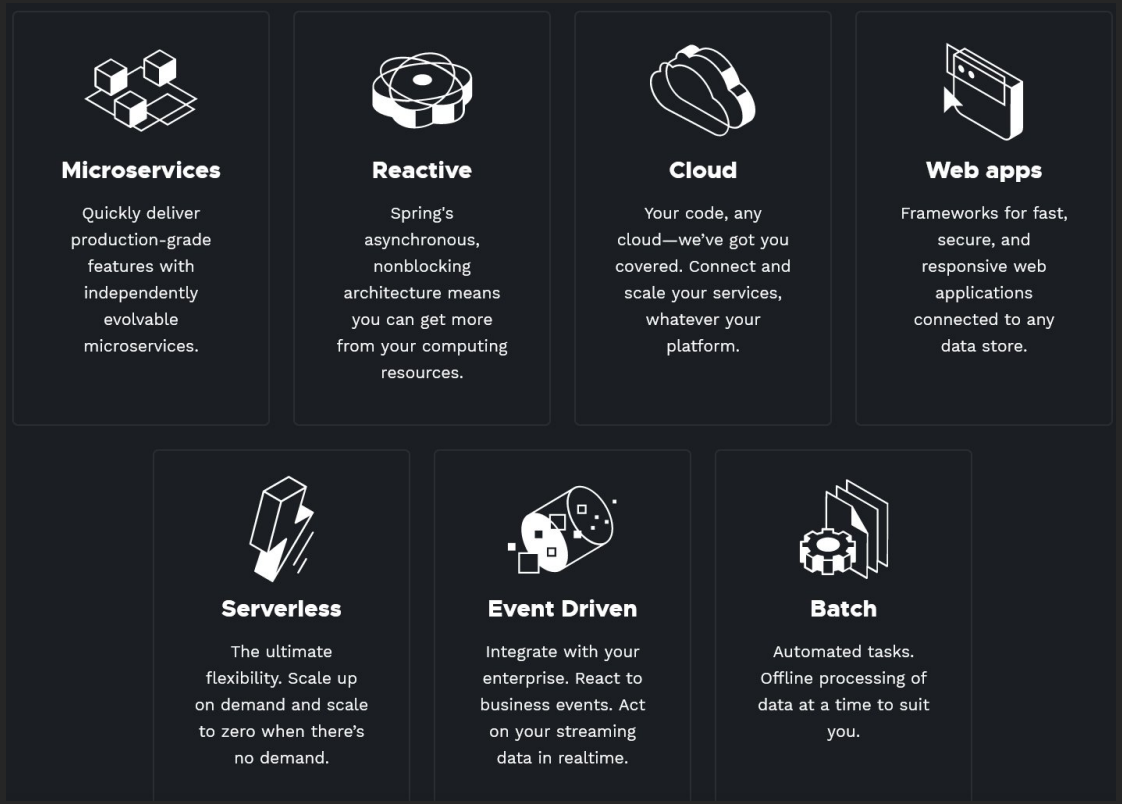
Dependency Injection and IoC :

https://www.youtube.com/watch?v=EPv9-cHEmQw





Framework Spring



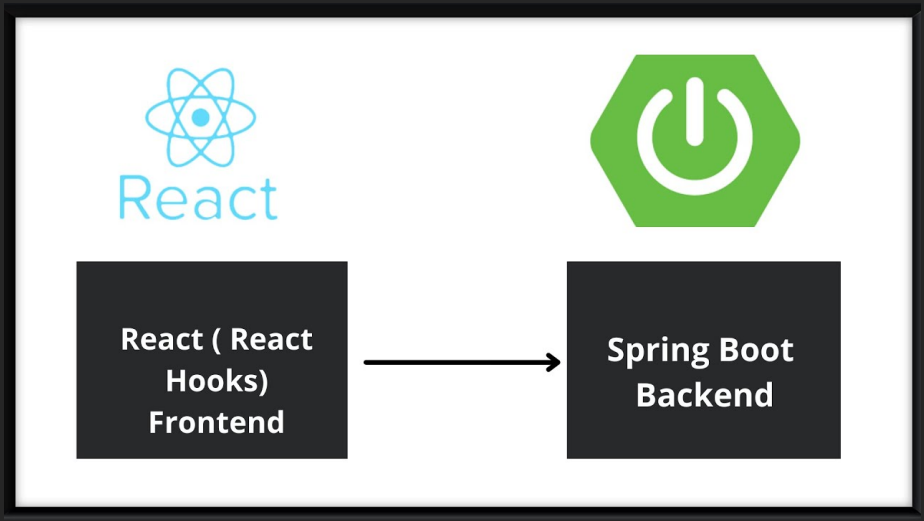
Difference Between Spring Framework and Spring Boot

Spring Framework	Spring Boot
Spring is an open-source lightweight framework widely used to develop enterprise applications.	Spring Boot is built on top of the conventional spring framework, widely used to develop REST APIs.
To test the Spring project, we need to set up the sever explicitly.	Spring Boot offers **embedded server** such as **Jetty** and **Tomcat**, etc.
It helps to create a loosely coupled application.	It helps to create a stand-alone application.
The most important feature of the Spring Framework is dependency injection.	The most important feature of the Spring Boot is Autoconfiguration.
It does not provide support for an in-memory database.	It offers several plugins for working with an embedded and **in-memory** database such as **H2**.
Developers manually define dependencies for the Spring project in **pom.xml**.	Spring Boot comes with the concept of **starter** in pom.xml file that internally takes care of downloading the dependencies **JARs** based on Spring Boot Requirement.
Configurations are done in xml file	In spring boot, XML configuration is eliminated as it has autoconfiguration feature
To create a Spring application, the developers write lots of code.	It reduces the lines of code.

Spring Boot et REST

Avantages de Spring Boot :

- Optimisation de la gestion des dépendances (starters)
- Autoconfiguration (permet de se concentrer sur le code)
- Gestion des propriétés (fichier applications.properties)
- Monitoring et gestion du programme (endpoints Actuator)
- Déploiement (un simple fichier jar)

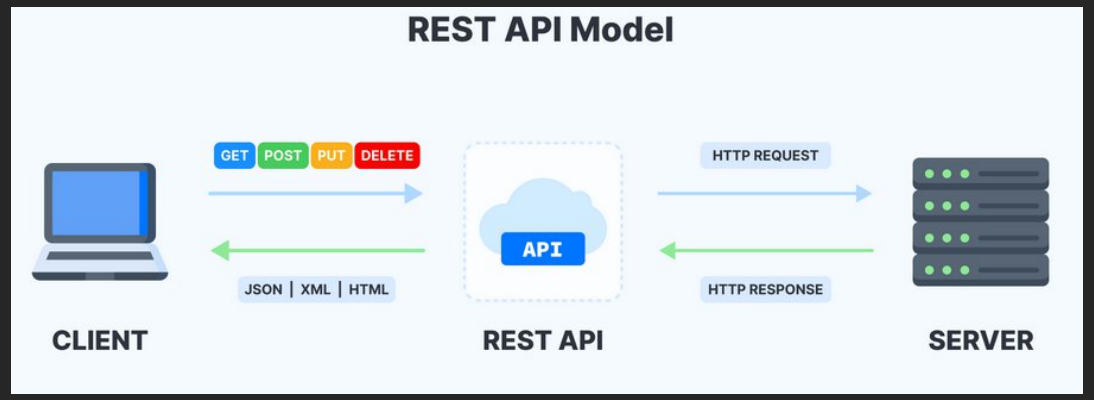


REST (Representational State Transfer) :

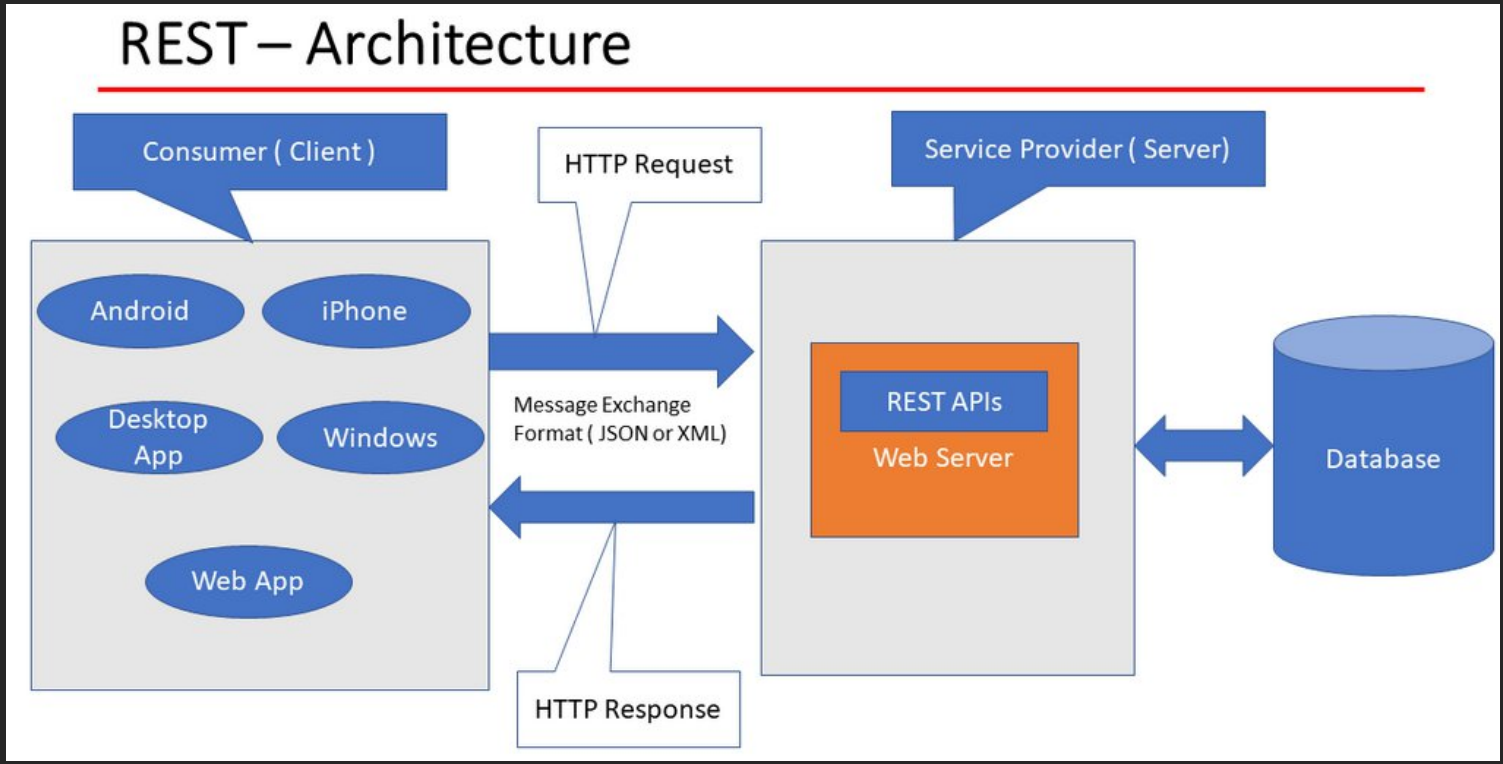
(JSON , data , HTTP Protocol)

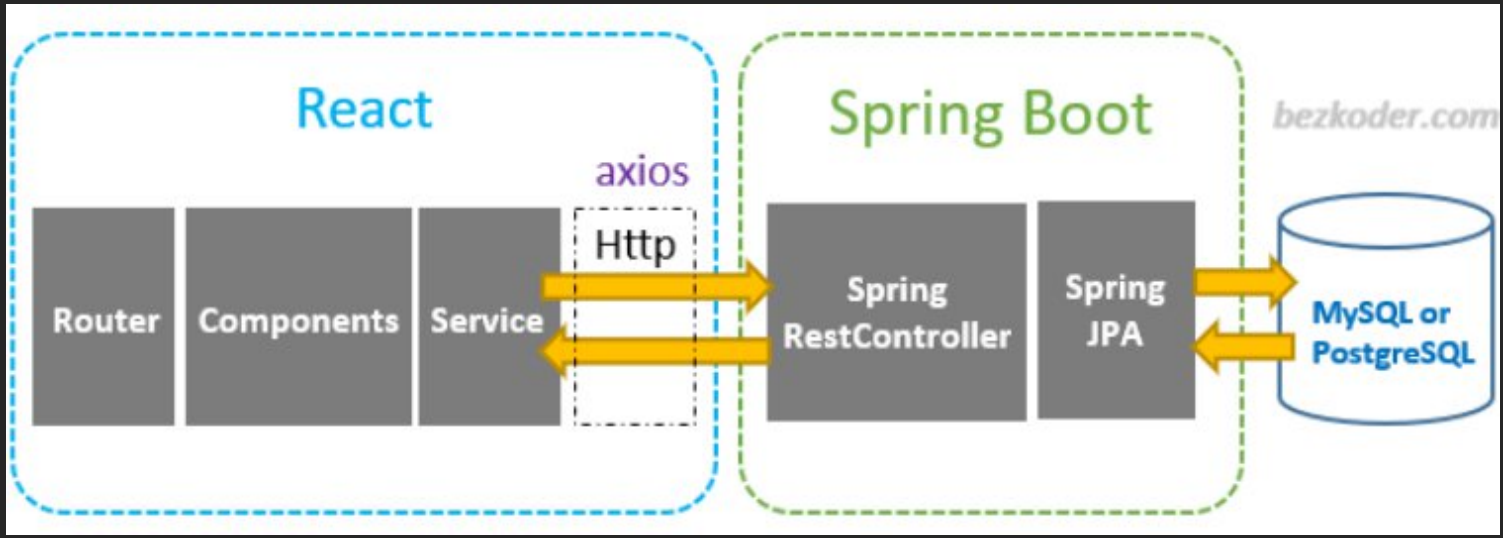
la norme pour la création de services Web sur le Web ("modèle objet de HTTP") :

- Facilité de développement
- Facilité d'utilisation
- Réponses à des requêtes en HTML, XML, **JSON**
- Utilise les méthodes HTTP (GET, POST, PUT, DELETE) pour gérer le CRUD



REST Architecture





REST API VS RESTful API

tous les services Web sont des API
mais toutes les API ne sont pas des services Web.

https://www.geeksforgeeks.org/know-the-difference-between-rest-api-and-restful-api/

https://medium.com/@shikha.ritu17/rest-api-architecture-6f1c3c99f0d3

REST API VS Web Socket API

En IoT, un Web service peut être implémenté soit :
- en utilisant REST
- en utilisant le protocole Web Socket

https://www.geeksforgeeks.org/difference-between-rest-api-and-web-socket-api/?ref=next_article

Codes HTTP

200: OK

201: Created

400: Bad Request

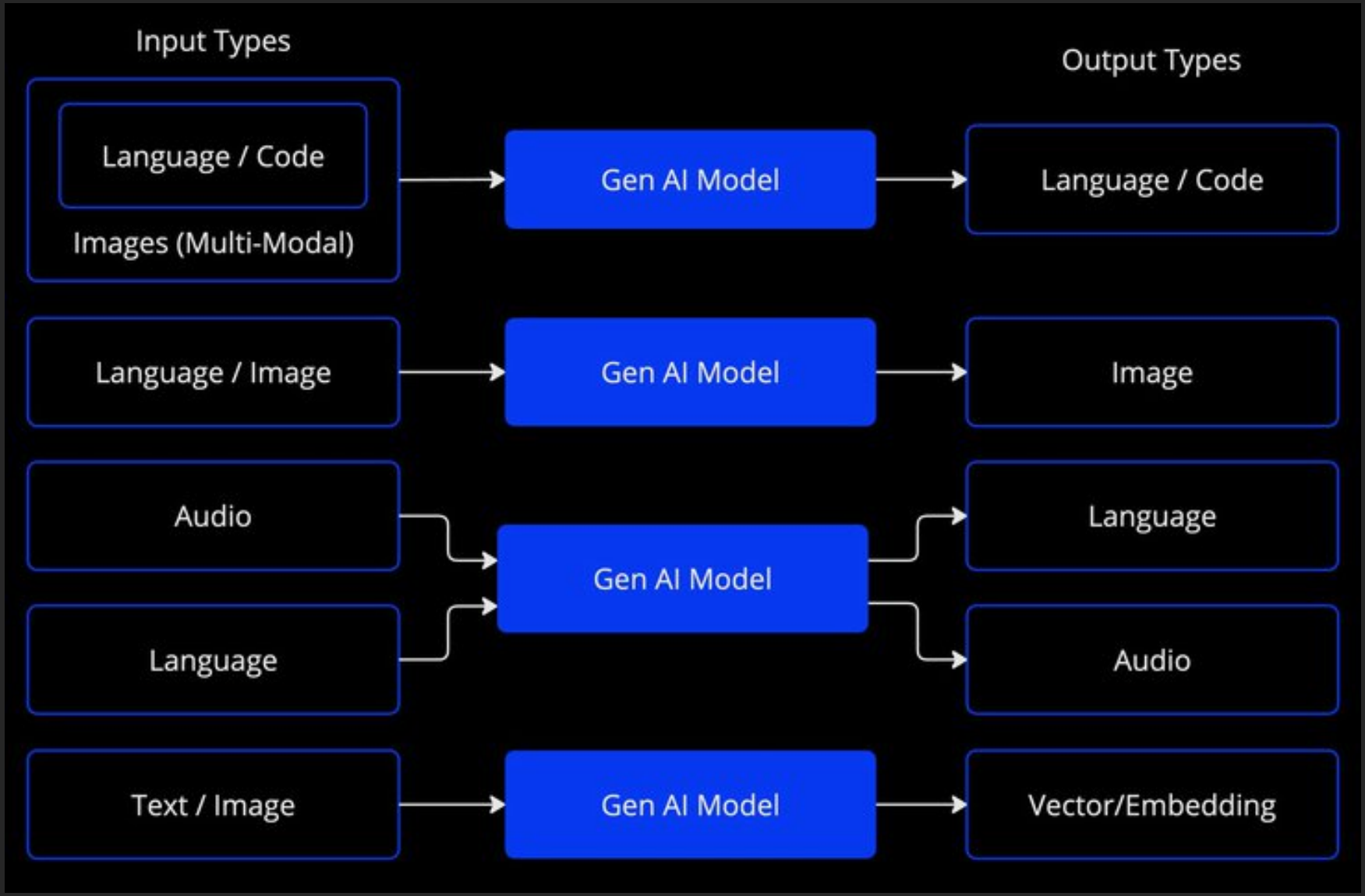
404: Not Found

500: Internal Server Error

https://fr.wikipedia.org/wiki/Liste_des_codes_HTTP

Spring AI

https://docs.spring.io/spring-ai/reference/index.html



Audit Site Web

Prompt :

Établis une checklist pour un audit de sécurité informatique complet de l'entreprise.

Outils :

- vitesse de téléchargement des pages Web

PageSpeed Insights :
https://pagespeed.web.dev/?utm_source=psi&utm_medium=redirect&hl=fr

- analyse d'un site (gratuit) : SEO mais aussi technique

  https://hellotools.org/fr/

Vérifier la pertinence du nommage dans les classes métiers

Astuce du nuage de mots

https://www.wordclouds.com/ , https://nuagedemots.co/