JEC JCAD

JEC

JavaScript Entreprise Container

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What is JCAD?

JCAD stands for JavaScript Connector API for Decorators.

Both, JAVA annotations and TypeScript decorators, use the @ character to add metadata to source code.

JAVA Annotations:

- declarative interface + class implementation
- members defined through a one dimension array

TypeScript Decorators:

- use decorator pattern to modify behavior of the target object
- properties defined as function parameters

JCAD turns TypeScript decorators into an abstraction layer that let developers choose implementations to execute routines depending on injected metadata.

TypeScript Decorators 1/2

TypeScript Decorators are special kind of declarations that can be attached to classes declarations, methods, accessors, propertys, or parameters.

Decorators use the form `@expression`, where `expression` must evaluate to a function that will be called at runtime with information about the decorated declaration:

```
export class MyClass {

  @log()
  public myMethod(arg:any):string {
    return "Message: " + arg;
  }
}
```

Given the decorator `@log` we might write the `log()` function as follows:

```
function log(target:any) {
  // do something with 'target' ...
}
```

TypeScript Decorators 2/2

We define the concrete behavior of the `@log` decorator as shown below:

```
export function log(target:any, propertyKey:string,
                                descriptor:TypedPropertyDescriptor<any>) {

  const originalMethod = descriptor.value;

  descriptor.value = function(...args:any[]):any {
    console.log("The method args are: " + JSON.stringify(args));
    const result = originalMethod.apply(this, args);
    console.log("The return value is: " + result);
    return result;
  };

  return descriptor;
}
```

concrete code

EcmaScript (*TypeScript*) decorators are built over the Decorator Pattern, where `@expression` is used to directly invoke its implementation.

JCAD allows to inject concrete code into the decorator function.

JCAD Decorators

JCAD decorators:

- are POJOs *(Plain Old JavaScript Objects)*
- implement the `Decorator` interface

```
export class Log implements Decorator  {

  constructor(){}

  public decorate(target:any, key:string, descriptor:PropertyDescriptor,
                  ...args:any[]):any {

    const originalMethod = descriptor.value;

    descriptor.value = function(...args:any[]):any {
      console.log("The method args are: " + JSON.stringify(args));
      const result = originalMethod.apply(this, args);
      console.log("The return value is: " + result);
      return result;
    };

    return descriptor;
  };
}
```

concrete code

JCAD Abstraction

We use JCAD registries to define abstraction for `@expression`.

JCAD connectors:

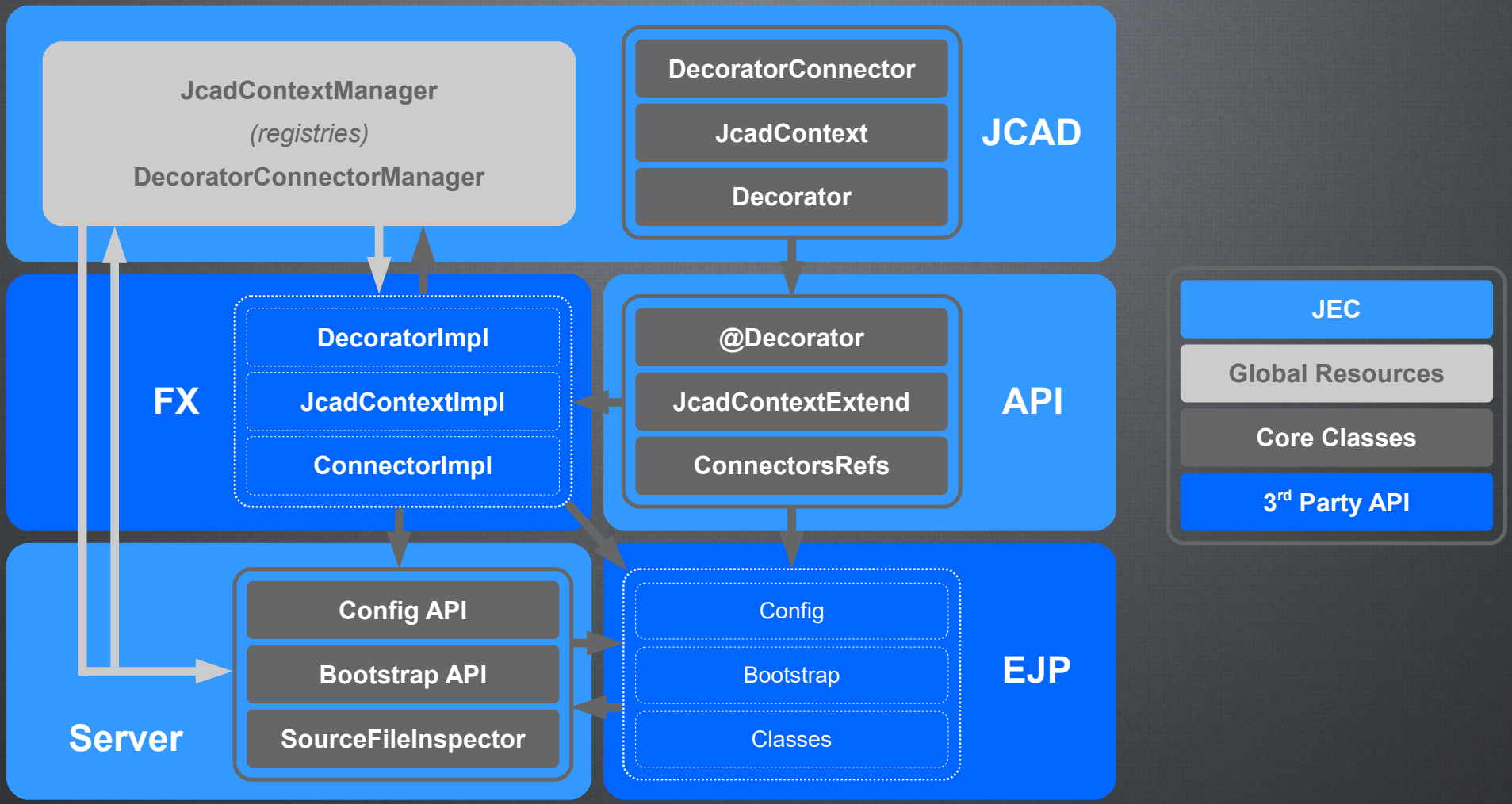
- inject concrete code into the abstract decorator function
- are registered by the implementator (3rd party framework) and are associated to a specific JCAD context

```
const REF:string = LogConnectorRef.CONNECTOR_REF;

export function log(...args:any[]):Function {

    return function (target:any, key:string, descriptor:PropertyDescriptor):any {

      var ctx:JcadContext = JcadContextManager.getInstance().getContext(REF);
      return DecoratorConnectorManager.getDecorator(REF, ctx)
                                      .decorate(target, key, descriptor, args);

    }
}
```

JCAD abstraction

JCAD Architecture

JCAD is designed as a **S**ervice **P**rovider **I**nterface *(SPI)*.



Flexibility

The JCAD abstraction layer allows to:

- create specifications and APIs based upon TypeScript decorators
- make EJPs based on these specifications portable
- create custom implementations of abstract top-level APIs

Frameworks integration is made through the bootstrap API:

```
import { BootstrapScript, Bootstrap, JecContainer } from "jec-commons";
import { SandcatBuilder } from "jec-sandcat";

@Bootstrap()
export class InitApp extends BootstrapScript {

  public run(container:JecContainer):void {
    new SandcatBuilder().build(container)
                        .process((err:any)=>{});
  }
}
```

Processing

Principle

TypeScript decorators are processed at runtime during instantiation phases.

- JCAD detect TypeScript decorators before instantiation phases
- frameworks use JCAD to perform the autowiring process

Framework containers are responsible for:

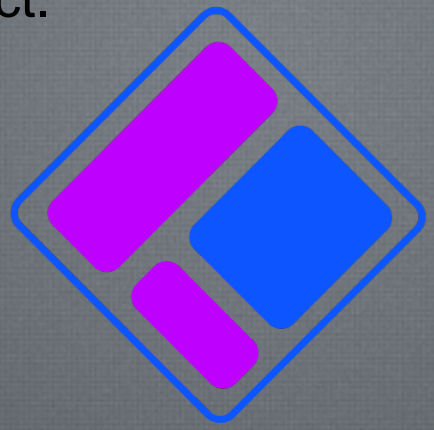
- managing objects depending on annotations (e.g. instantiation)
- injecting metada into managed objects
- establishing communications with the current JEC implementation

Performances

- developers can create their own processors
- JEC provides access to each container processor to improve performances and save development time

Where to go from here?

JCAD is part of the JEC project.



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For more information and documentation on JCAD and JEC visit:

- JEC project on GitHub

JEC implementations that are based on JCAD:

- jec-glasscat-core
- jec-sandcat
- jec-tiger