



Rest Services with Play Framework, and a Security Level with JWT (JSON Web Tokens)

Community Day





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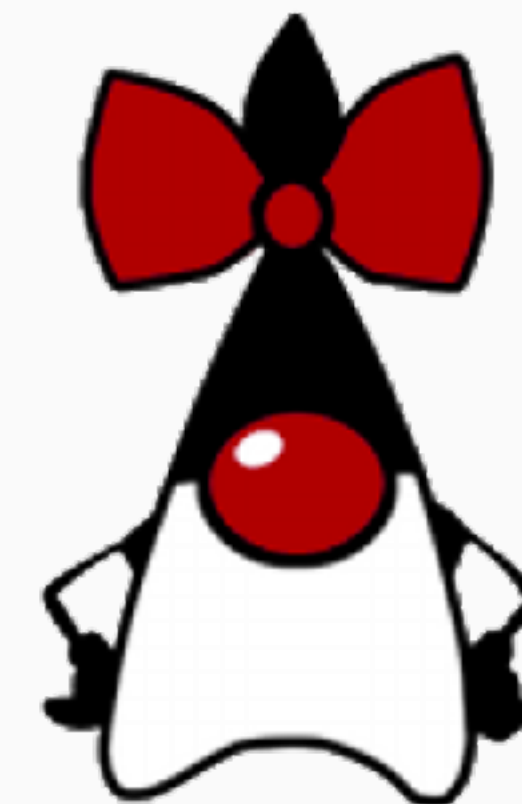
Ex-JUG Member
Guatemala Java Users Group (GuateJUG)

Chief Technology Officer (CTO) at Produactivity
Full Stack Developer

Auth0 Ambassador



Auth0



Agenda

- Play Framework
- Web Services Restful
- JSON
- JWT (JSON Web Tokens)



Agenda

- **Play Framework**
- Web Services Restful
- JSON
- JWT (JSON Web Tokens)



xplay

Play Framework

- Java or Scala
- Lightweight, stateless, web-friendly
- Minimal resources consumption for highly-scalable applications

CloudWatch Monitoring Details

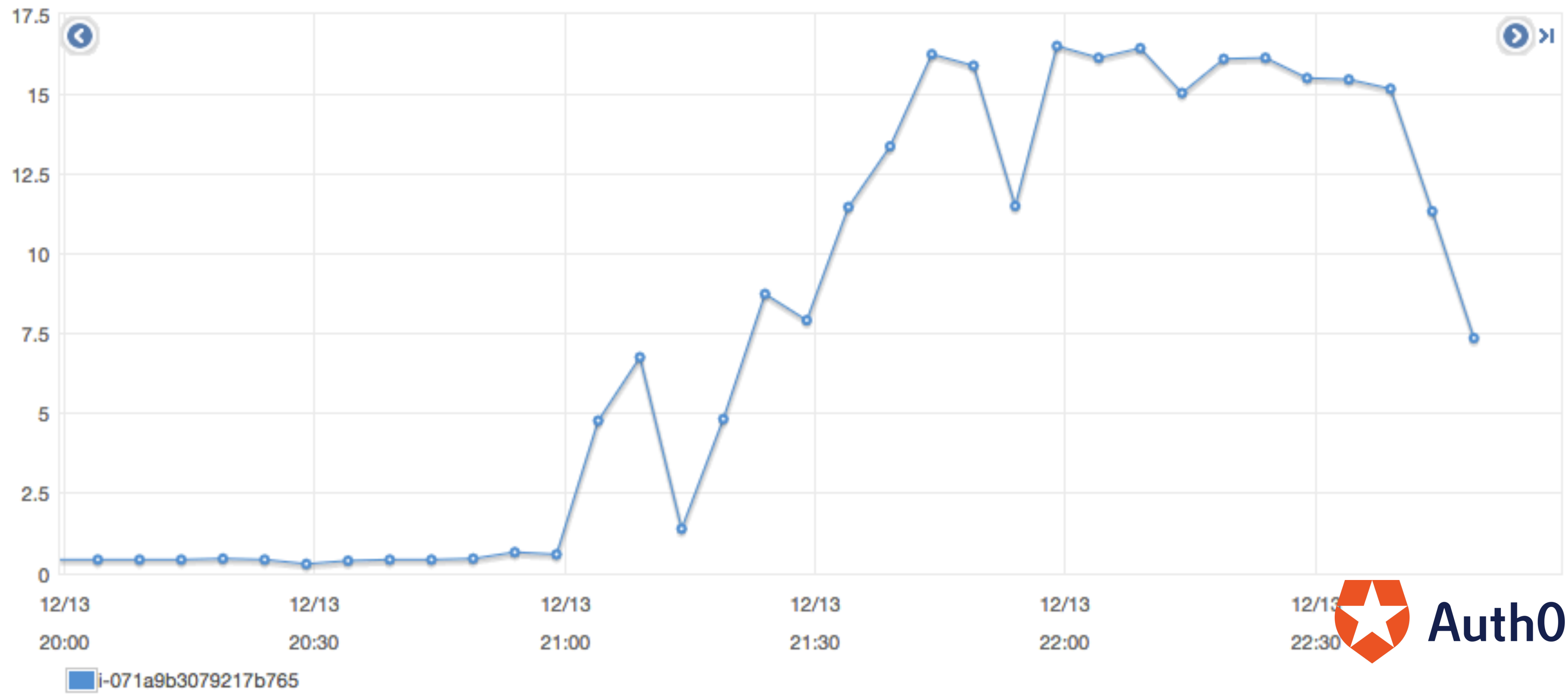


CPU Utilization (Percent)

Statistic: Average ▾

Time Range: Last 3 Hours ▾

Period: 5 Minutes ▾



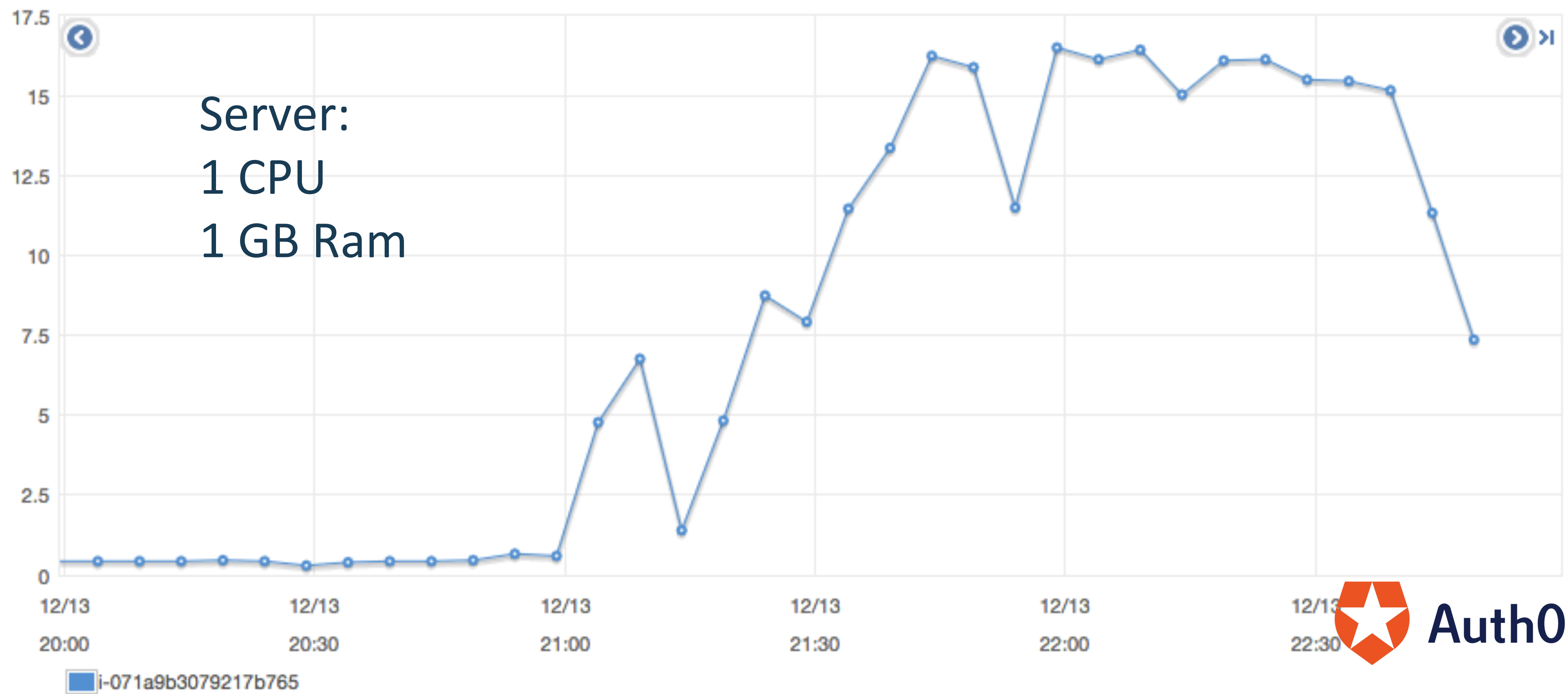
CPU Utilization (Percent)

Statistic: Average ▾

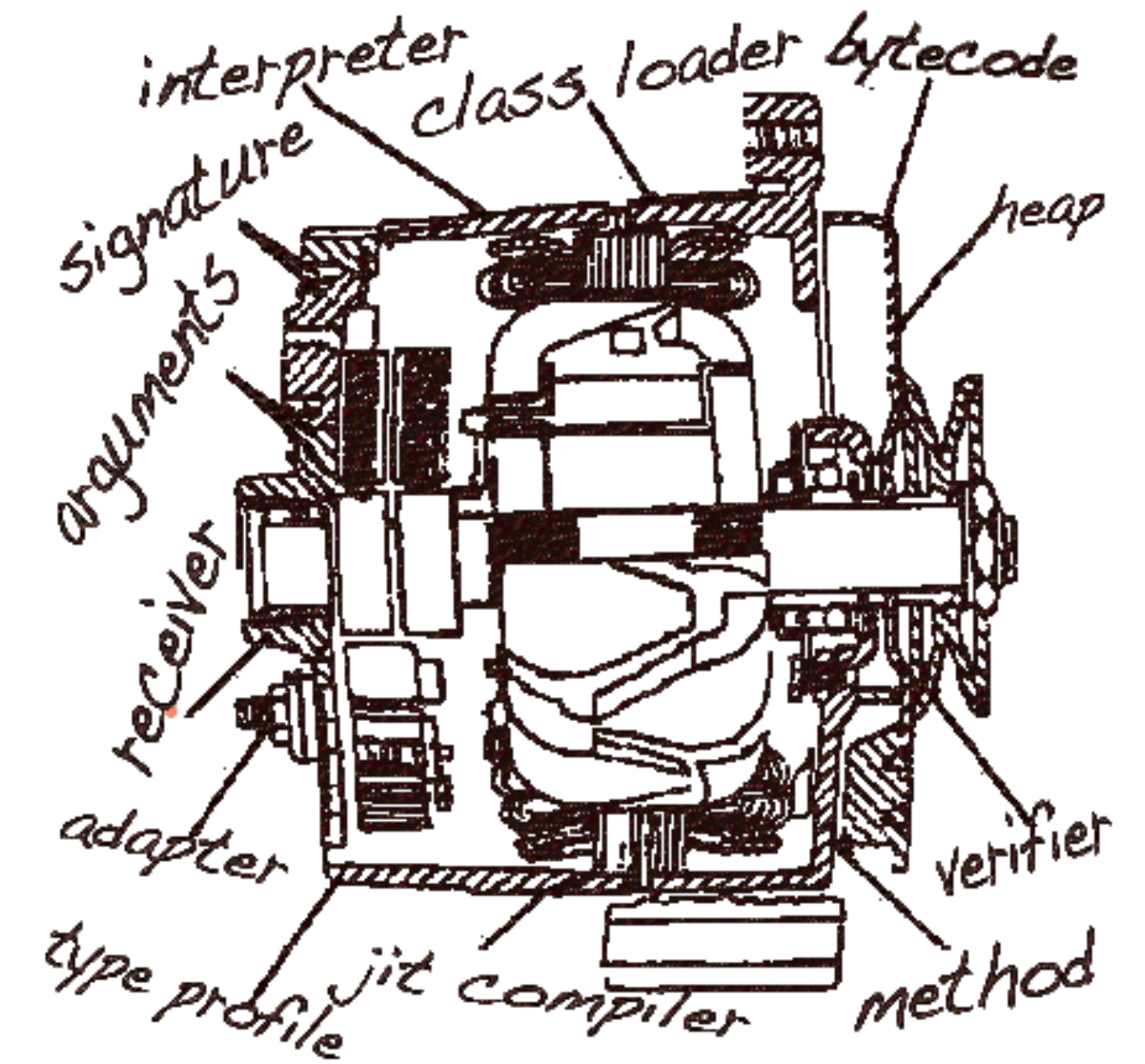
Time Range: Last 3 Hours ▾

Period: 5 Minutes ▾

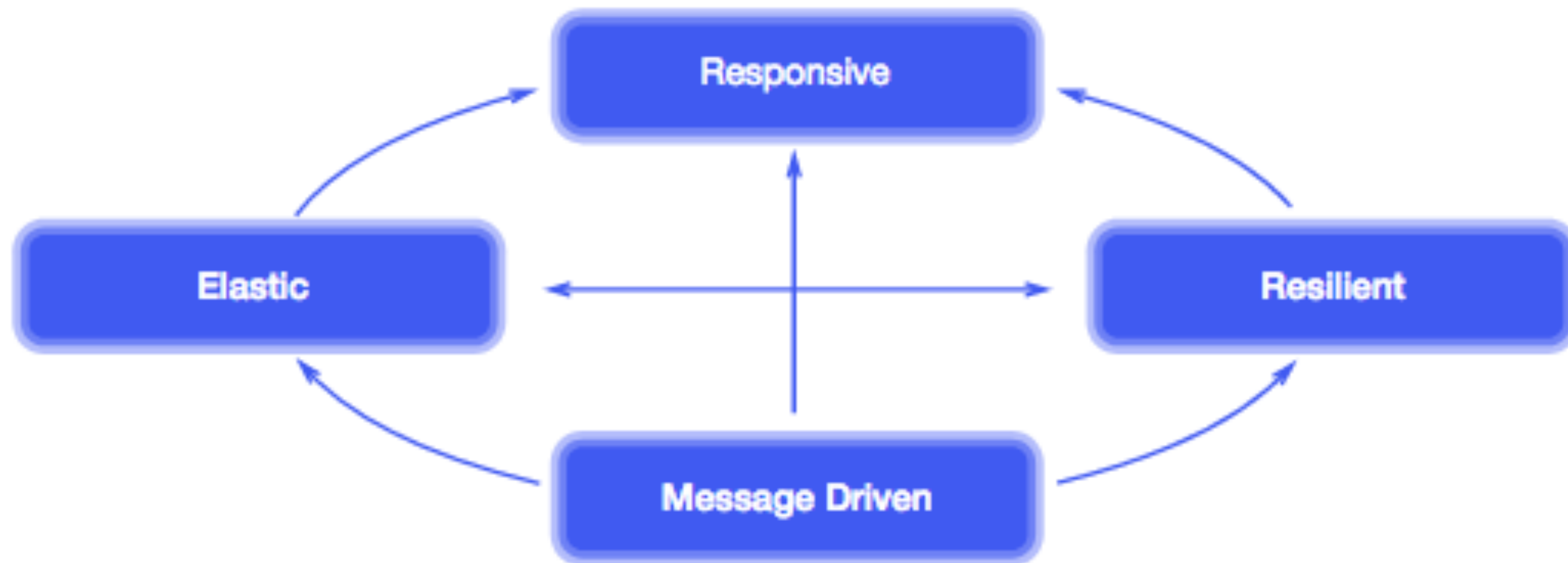
↺↻



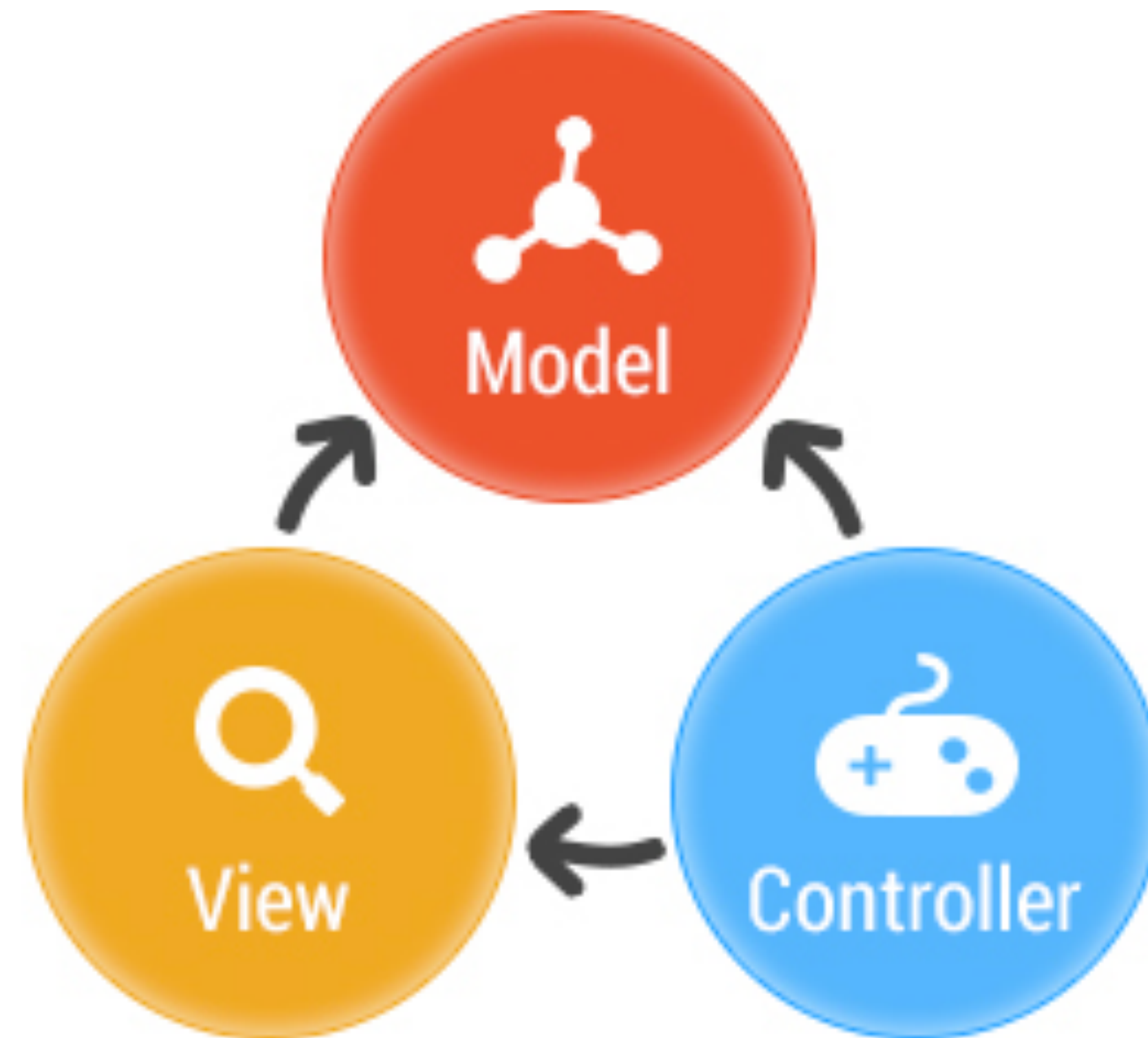
Java or Scala



Is Reactive



MVC Architecture



App Server



+ Since Version 2.6.x

+ Fewer Configurations



JRebel Behavior

More Code, Less Deploys



• How start a Play project?

- We need **SBT**

- **Create**

- set new playframework/play-java-seed.g8

- set new playframework/play-scala-seed.g8

- **Deploy**

- set run



```
$ sbt new playframework/play-java-seed.g8
```

This template generates a Play Java project

```
name [play-java-seed]: JavaOne17  
organization [com.example]: com.auth0  
scala_version [2.12.2]:  
play_version [2.6.5]:
```

Template applied in ./javaone17

```
Javaone17 $ sbt run
```




```
[info] Loading project definition from /Users/mercedeswyss/Documents/Presentaciones/2017/OracleCode/Mexico/play-java-starter-example/project
[info] Updating {file:/Users/mercedeswyss/Documents/Presentaciones/2017/OracleCode/Mexico/play-java-starter-example/project/}play-java-starter-example-build...
[info] Resolving org.fusesource.jansi#jansi;1.4 ...
[info] downloading https://repo.scala-sbt.org/scalasbt/sbt-plugin-releases/com.typesafe.play/sbt-plugin/scala_2.10/sbt_0.13/2.6.0/jars/sbt-plugin.jar ...
[info] [SUCCESSFUL] com.typesafe.play#sbt-plugin;2.6.0!sbt-plugin.jar (3794ms)
[info] downloading https://repo.scala-sbt.org/scalasbt/sbt-plugin-releases/com.typesafe.sbt/sbt-play-enhancer/scala_2.10/sbt_0.13/1.1.0/jars/sbt-play-enhancer.jar ...
[info] [SUCCESSFUL] com.typesafe.sbt#sbt-play-enhancer;1.1.0!sbt-play-enhancer.jar (2439ms)
[info] downloading https://repo1.maven.org/maven2/com/typesafe/play/sbt-routes-compiler_2.10/2.6.0/sbt-routes-compiler_2.10-2.6.0.jar ...
[info] [SUCCESSFUL] com.typesafe.play#sbt-routes-compiler_2.10;2.6.0!sbt-routes-compiler_2.10.jar (961ms)
[info] downloading https://repo1.maven.org/maven2/com/typesafe/play/run-support_2.10/2.6.0/run-support_2.10-2.6.0.jar ...
[info] [SUCCESSFUL] com.typesafe.play#run-support_2.10;2.6.0!run-support_2.10.jar (441ms)
[info] downloading https://repo1.maven.org/maven2/com/typesafe/config/1.3.1/config-1.3.1.jar ...
[info] [SUCCESSFUL] com.typesafe#config;1.3.1!config.jar(bundle) (494ms)
[info] downloading https://repo.scala-sbt.org/scalasbt/sbt-plugin-releases/net.contentobjects.jnotify/jnotify/0.94-play-1/jars/jnotify.jar ...
[info] [SUCCESSFUL] net.contentobjects.jnotify#jnotify;0.94-play-1!jnotify.jar (8790ms)
[info] downloading https://repo.scala-sbt.org/scalasbt/sbt-plugin-releases/com.typesafe.sbt/sbt-twirl/scala_2.10/sbt_0.13/1.3.2/jars/sbt-twirl.jar ...
[info] [SUCCESSFUL] com.typesafe.sbt#sbt-twirl;1.3.2!sbt-twirl.jar (2286ms)
[info] downloading https://repo.scala-sbt.org/scalasbt/sbt-plugin-releases/com.typesafe.sbt/sbt-native-packager/scala_2.10/sbt_0.13/1.2.0/jars/sbt-native-packager.jar ...
[info] [SUCCESSFUL] com.typesafe.sbt#sbt-native-packager;1.2.0!sbt-native-packager.jar (4539ms)
[info] downloading https://repo.scala-sbt.org/scalasbt/sbt-plugin-releases/com.lightbend.sbt/sbt-javaagent/scala_2.10/sbt_0.13/0.1.2/jars/sbt-javaagent.jar ...
[info] [SUCCESSFUL] com.lightbend.sbt#sbt-javaagent;0.1.2!sbt-javaagent.jar (2553ms)
[info] downloading https://repo.scala-sbt.org/scalasbt/sbt-plugin-releases/com.typesafe.sbt/sbt-web/scala_2.10/sbt_0.13/1.4.1/jars/sbt-web.jar ...
[info] [SUCCESSFUL] com.typesafe.sbt#sbt-web;1.4.1!sbt-web.jar (2814ms)
[info] downloading https://repo.scala-sbt.org/scalasbt/sbt-plugin-releases/com.typesafe.sbt/sbt-js-engine/scala_2.10/sbt_0.13/1.2.1/jars/sbt-js-engine.jar ...
[info] [SUCCESSFUL] com.typesafe.sbt#sbt-js-engine;1.2.1!sbt-js-engine.jar (2613ms)
[info] downloading https://repo1.maven.org/maven2/com/typesafe/play/twirl-api_2.10/1.3.2/twirl-api_2.10-1.3.2.jar ...
[info] [SUCCESSFUL] com.typesafe.play#twirl-api_2.10;1.3.2!twirl-api_2.10.jar (1042ms)
[info] downloading https://repo1.maven.org/maven2/commons-io/commons-io/2.5/commons-io-2.5.jar ...
[info] [SUCCESSFUL] commons-io#commons-io;2.5!commons-io.jar (949ms)
[info] downloading https://repo1.maven.org/maven2/com/typesafe/play/build-link/2.6.0/build-link-2.6.0.jar ...
[info] [SUCCESSFUL] com.typesafe.play#build-link;2.6.0!build-link.jar (513ms)
[info] downloading https://repo1.maven.org/maven2/com/lightbend/play/play-file-watch_2.10/1.0.0/play-file-watch_2.10-1.0.0.jar ...
[info] [SUCCESSFUL] com.lightbend.play#play-file-watch_2.10;1.0.0!play-file-watch_2.10.jar (563ms)
[info] downloading https://repo1.maven.org/maven2/com/typesafe/play/play-exceptions/2.6.0/play-exceptions-2.6.0.jar ...
[info] [SUCCESSFUL] com.typesafe.play#play-exceptions;2.6.0!play-exceptions.jar (523ms)
[info] downloading https://repo1.maven.org/maven2/com/lightbend/play/jnotify/0.94-play-2/jnotify-0.94-play-2.jar ...
[info] [SUCCESSFUL] com.lightbend.play#jnotify;0.94-play-2!jnotify.jar (2244ms)
[info] downloading https://repo1.maven.org/maven2/com/github/pathikrit/better-files_2.10/2.14.0/better-files_2.10-2.14.0.jar ...
[info] [SUCCESSFUL] com.github.pathikrit#better-files_2.10;2.14.0!better-files_2.10.jar (1089ms)
[info] downloading https://repo1.maven.org/maven2/com/typesafe/play/twirl-compiler_2.10/1.3.2/twirl-compiler_2.10-1.3.2.jar ...
[info] [SUCCESSFUL] com.typesafe.play#twirl-compiler_2.10;1.3.2!twirl-compiler_2.10.jar (1010ms)
[info] downloading https://repo.scala-sbt.org/scalasbt/sbt-plugin-releases/org.scala-js/sbt-scalajs/scala_2.10/sbt_0.13/0.6.16/jars/sbt-scalajs.jar ...
[info] [SUCCESSFUL] org.scala-js#sbt-scalajs;0.6.16!sbt-scalajs.jar (5827ms)
[info] downloading https://repo1.maven.org/maven2/com/typesafe/play/twirl-parser_2.10/1.3.2/twirl-parser_2.10-1.3.2.jar ...
```



Auth0


```
[warn] Executing in batch mode.
[warn]   For better performance, hit [ENTER] to switch to interactive mode, or
[warn]   consider launching sbt without any commands, or explicitly passing 'shell'
[info] Loading project definition from /Users/mercedeswyss/Documents/Presentaciones/2017/OracleCode/Sydney/OracleCodeSydney/project
[info] Set current project to OracleCodeSydney (in build file:/Users/mercedeswyss/Documents/Presentaciones/2017/OracleCode/Sydney/OracleCodeSydney/)
```

--- (Running the application, auto-reloading is enabled) ---

```
[info] p.c.s.AkkaHttpServer - Listening for HTTP on /0:0:0:0:0:0:0:0:9000
```

(Server started, use Enter to stop and go back to the console...)

```
[info] Compiling 6 Scala sources and 3 Java sources to /Users/mercedeswyss/Documents/Presentaciones/2017/OracleCode/Sydney/OracleCodeSydney/target/scala-2.12/classes...
[info] p.a.h.EnabledFilters - Enabled Filters (see <https://www.playframework.com/documentation/latest/Filters>):
```

```
play.filters.csrf.CSRFFilter
play.filters.headers.SecurityHeadersFilter
play.filters.hosts.AllowedHostsFilter
```

```
[info] play.api.Play - Application started (Dev)
```

Project Structure

```
└─ .g8
└─ app
  └─ controllers
    └─ HomeController.java
  └─ views
    └─ index.scala.html
    └─ main.scala.html
└─ conf
└─ logs
└─ project
└─ public
└─ target
└─ test
└─ build.sbt
```

Directory	Description
app	The app and client side source directory controllers/ views/
conf	Config directory, route mapping, application config and log config
public	Static assets directory (images, css, js)
Test	Test source directory
project	sbt configuration files

main.scala.html

```
@*
 * This template is called from the `index` template. This template
 * handles the rendering of the page header and body tags. It takes
 * two arguments, a `String` for the title of the page and an `Html`
 * object to insert into the body of the page.
 *@
@(title: String)(content: Html)

<!DOCTYPE html>
<html lang="en">
  <head>
    @* Here's where we render the page title `String`. *@
    <title>@title</title>
    <link rel="stylesheet" media="screen" href="@routes.Assets.versioned("stylesheets/main.css")">
    <link rel="shortcut icon" type="image/png" href="@routes.Assets.versioned("images/favicon.png")">
  </head>
  <body>
    @* And here's where we render the `Html` object containing
    * the page content. *@
    @content

    <script src="@routes.Assets.versioned("javascripts/main.js")" type="text/javascript"></script>
  </body>
</html>
```



index.scala.html

```
@()
```

```
@main("Welcome to Play") {  
  <h1>Welcome to Play!</h1>  
}
```



HomeController.java

```
package controllers;

import play.mvc.*;

/**
 * This controller contains an action to handle HTTP requests
 * to the application's home page.
 */
public class HomeController extends Controller {

    /**
     * An action that renders an HTML page with a welcome message.
     * The configuration in the <code>routes</code> file means that
     * this method will be called when the application receives a
     * <code>GET</code> request with a path of <code>/</code>.
     */
    public Result index() {
        return ok(views.html.index.render());
    }
}
```



routes

Routes

This file defines all application routes (Higher priority routes first)

~~~~

An example controller showing a sample home page

GET / controllers.HomeController.index

Map static resources from the /public folder to the /assets URL path

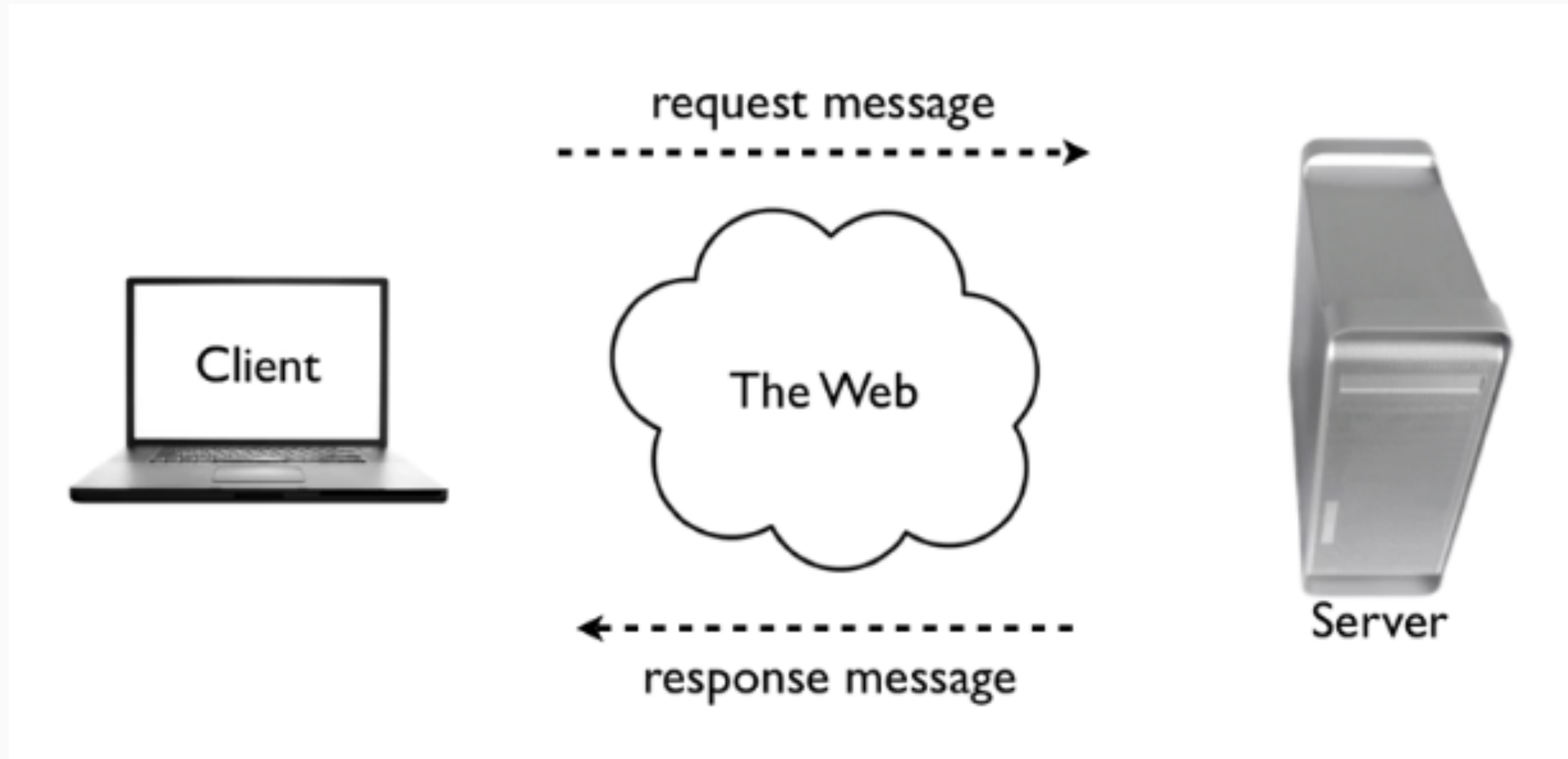
GET /assets/*file controllers.Assets.versioned(path="/public", file: Asset)



Agenda

- Play Framework
- **Web Services Restful**
- JSON
- JWT (JSON Web Tokens)





Linda.com (June 2017) <https://www.lynda.com/Software-Development-tutorials/What-web-service/126131/145941-4.html>

Restful

- Representational State Transfer
- Software Architecture
- Based on HTTP methods



HomeController.java

```
package controllers;
```

```
import play.mvc.Controller;
```

```
import play.mvc.Result;
```

```
public class HomeController extends Controller {
```

```
    public Result index() {
```

```
        return ok(views.html.index.render());
```

```
    }
```

```
}
```



HomeController.java

```
package controllers;
```

```
import play.mvc.Controller;
```

```
import play.mvc.Result;
```

```
public class HomeController extends Controller {
```

```
    public Result index() {
```

```
        return ok(views.html.index.render());
```

```
    }
```

```
}
```



Simple.java

```
package controllers;

import play.mvc.Controller;
import play.mvc.Result;

public class Simple extends Controller {

    public Result text(){
        return ok("This is just a return message");
    }

}
```



Agenda

- Play Framework
- Web Services Restful
- **JSON**
- JWT (JSON Web Tokens)



{JSON}

JSONController.java

```
package controllers;

import play.libs.Json;
import play.mvc.Controller;
import play.mvc.Result;

import java.util.HashMap;
import java.util.Map;

public class JSONController extends Controller {

    public Result usingMap(){
        Map<String, Object> result = new HashMap<>();
        result.put("Event", "Java One 2017");
        result.put("Track", "Communtty Day");
        result.put("Talk", "Restful Services with Play Framework");
        result.put("Schedule", "Sunday Oct 1, 17:00 to 17:45");

        return ok(Json.toJson(result));
    }
}
```



Event.java

```
package com.auth0.objects;
```

```
public class Event {
```

```
    public String event;
```

```
    public String track;
```

```
    public String talk;
```

```
    public String schedule;
```

```
    public Event(String event, String track, String talk, String schedule){
```

```
        this.event = event;
```

```
        this.track = track;
```

```
        this.talk = talk;
```

```
        this.schedule = schedule;
```

```
    }
```

```
}
```



JSONController.java

```
import com.auth0.objects.Event;

public Result usingObject(){
    Event event = new Event("Java One 2017", "Community Day",
        "Restful Services with Play Framework", "Sunday Oct 1, 17:00 to 17:45");
    return ok(Json.toJson(event));
}
```



Agenda

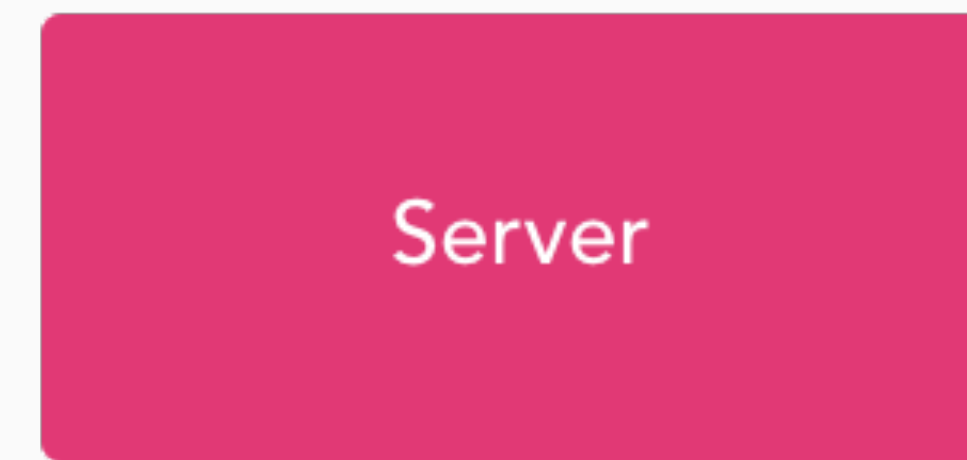
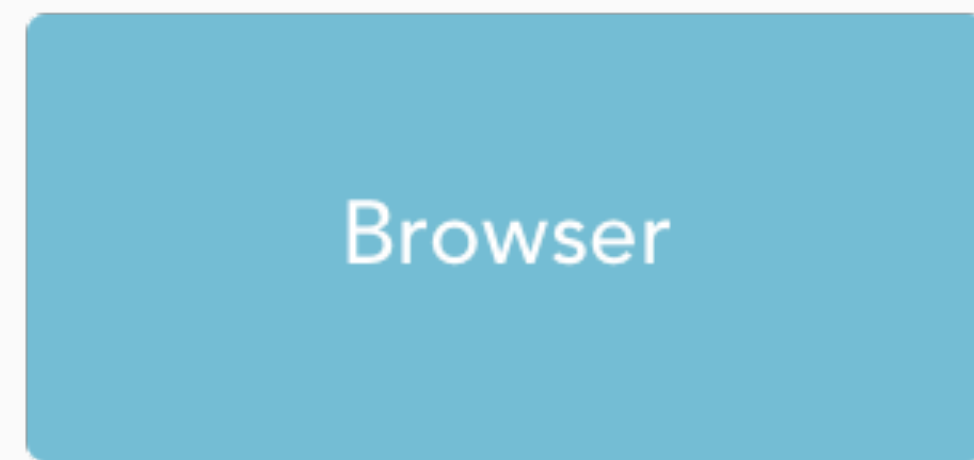
- Play Framework
- Web Services Restful
- JSON
- **JWT (JSON Web Tokens)**



JWT

Is an open standard (RFC 7519) that defines a compact and self-contained way for securely transmitting information between parties as a JSON object.





1. POST /users/login with username and password

2. Creates a JWT with a secret

3. Returns the JWT to the Browser

4. Sends the JWT on the Authorization Header

5. Check JWT signature. Get user information from the JWT

6. Sends response to the client

Header

Claims

eyJhbGciOiJIUzI1NiIsInR5cCI6IkpXVCJ9.eyJleH
AiOjE0MTY0NzE5MzQsInVzZXJfbmFtZSI6InVzZXIiL
CJzY29wZSI6WyJyZWFKIiwid3JpdGUiXSwiYXV0aG9y
aXRpZXMiaWlsIiUk9MRV9BRE1JTjIiIsImlJPTFVfVFNFUj
dLCJqdGkiOiI5YmM5MmE0NC0wYjFhLTRjNWUtYmU3MC
1kYTUyMDc1YjlhODQiLCJjbGllbnRfaWQiOiJteS1jb
GllbnQtd2l0aC1zZWNyZXQifQ.AZCTD_fiCcnrQR5X7
rJBQ5r0-2Qedc5_3qJJf-ZCvVY

Signature





JSON WEB TOKEN

Debugger

Libraries

Ask

Vote

467

Follow @auth0

1,881 followers

ENCODED

PASTE A TOKEN HERE

DECODED

EDIT THE PAYLOAD AND SECRET (ONLY HS256 SUPPORTED)

```
eyJhbGciOiJIUzI1NiIsInR5cCI6IkpXVCJ9.eyJhdWQiOiJ1Nm5uQXhHVmpiQmQ4ZXRYamo1NTRZS0dBRzVIdVZycCI6InNjb3BlcyI6eyJ0b2tlnMi0nsiYWN0aW9ucyI6WyJibGFja2xpc3QiXX19LCJpYXQiOiJlOTMjUzYmZyMjc5Ij09IjA2MTI4ZDg5ZmRhOWEwYjAzN2JhZDkxZTJiMlwiXN2RkIn0.YQzd4Y1weIRqDyR0FupXXmnp3k3AzCmUALPKHNfn-xs
```

```
{
  "alg": "HS256",
  "typ": "JWT"
}

{
  "aud": "u6nnAxGVjbBd8etXjj554YKGAG5HuVrp",
  "scopes": {
    "tokens": {
      "actions": [
        "blacklist"
      ]
    }
  },
  "iat": 1425336027,
  "jti": "06128d89fda9a0b037bad91e2b1b17dd"
}
```



Auth0

Signature Algorithms

JWS	Algorithm	Description
HS256	HMAC256	HMAC with SHA-256
HS384	HMAC384	HMAC with SHA-384
HS512	HMAC512	HMAC with SHA-512
RS256	RSA256	RSASSA-PKCS1-v1_5 with SHA-256
RS384	RSA384	RSASSA-PKCS1-v1_5 with SHA-384
RS512	RSA512	RSASSA-PKCS1-v1_5 with SHA-512
ES256	ECDSA256	ECDSA with curve P-256 and SHA-256
ES384	ECDSA384	ECDSA with curve P-384 and SHA-384
ES512	ECDSA512	ECDSA with curve P-521 and SHA-512

Registered Claims

iss	The issuer of the token
sub	The subject of the token
aud	The audience of the token
exp	The expiration in NumericDate value
nbf	sbt configuration files
iat	The time the JWT was issued
jti	Unique identifier for the JWT

Thanks and Enjoy
Java One

