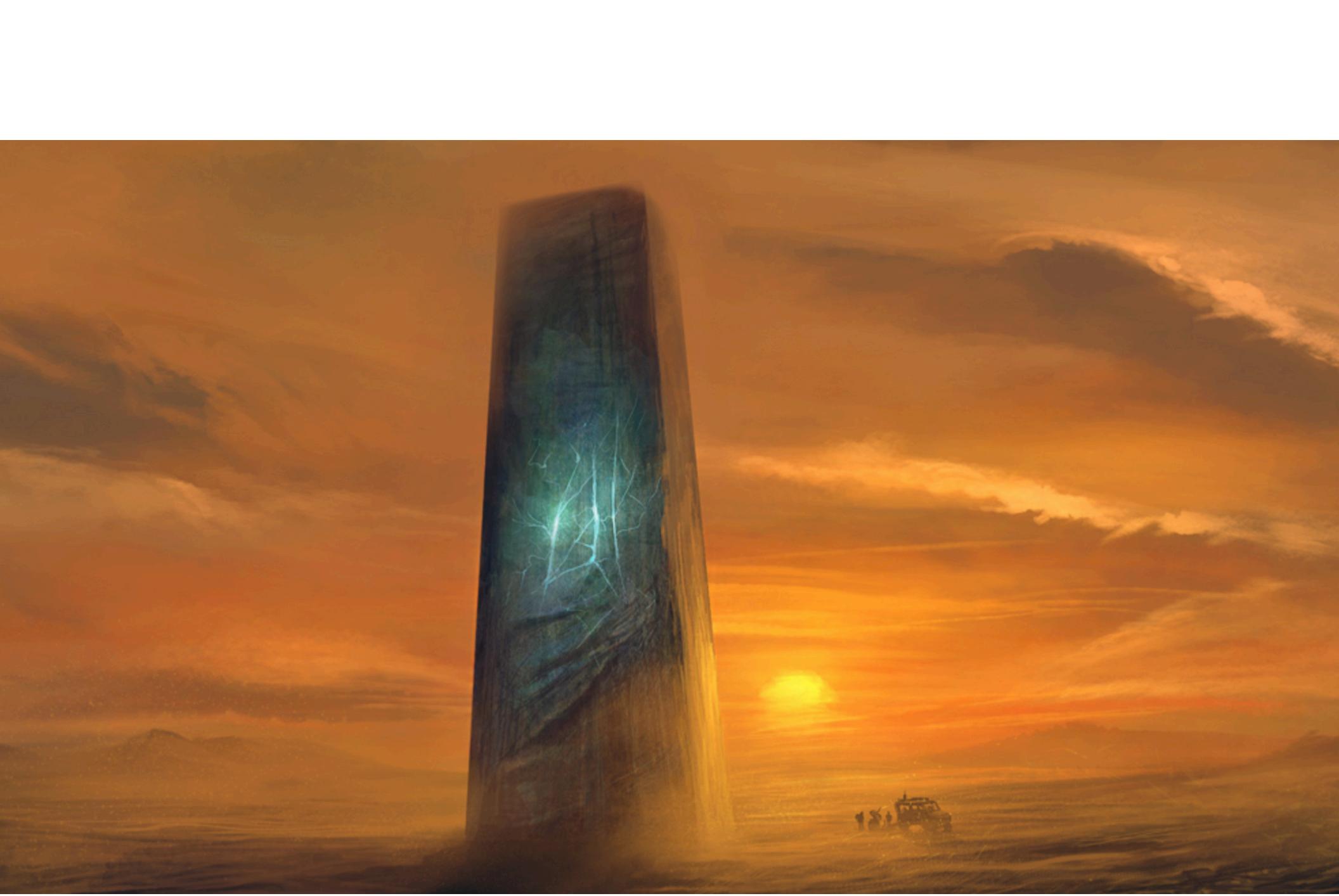


5 Pillars of a Successful Java Web Application

Eder Ignatowicz
Sr. Software Engineer @ Red Hat

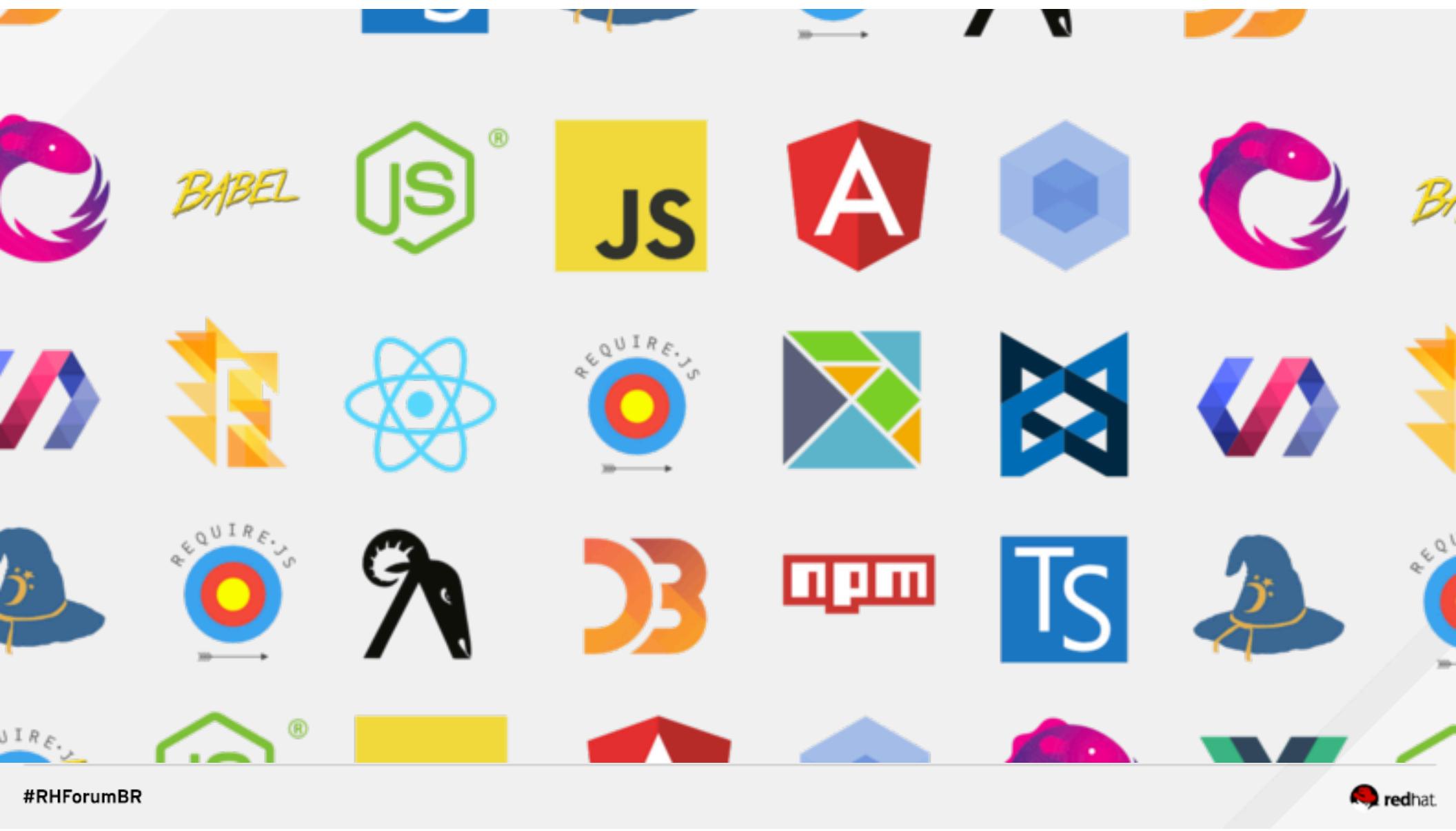
Alex Porcelli
Principal Software Engineer @ Red Hat





Which backend architecture?

And what about front-end?



Javascript Development is complex

Web Javascript development is complex

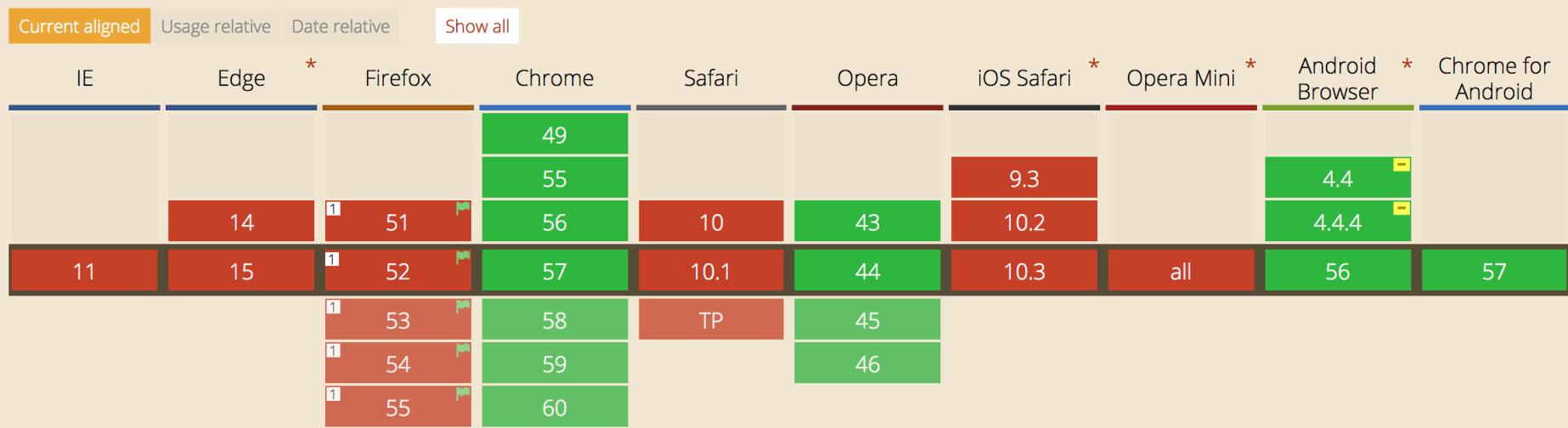
Web development will stay complex

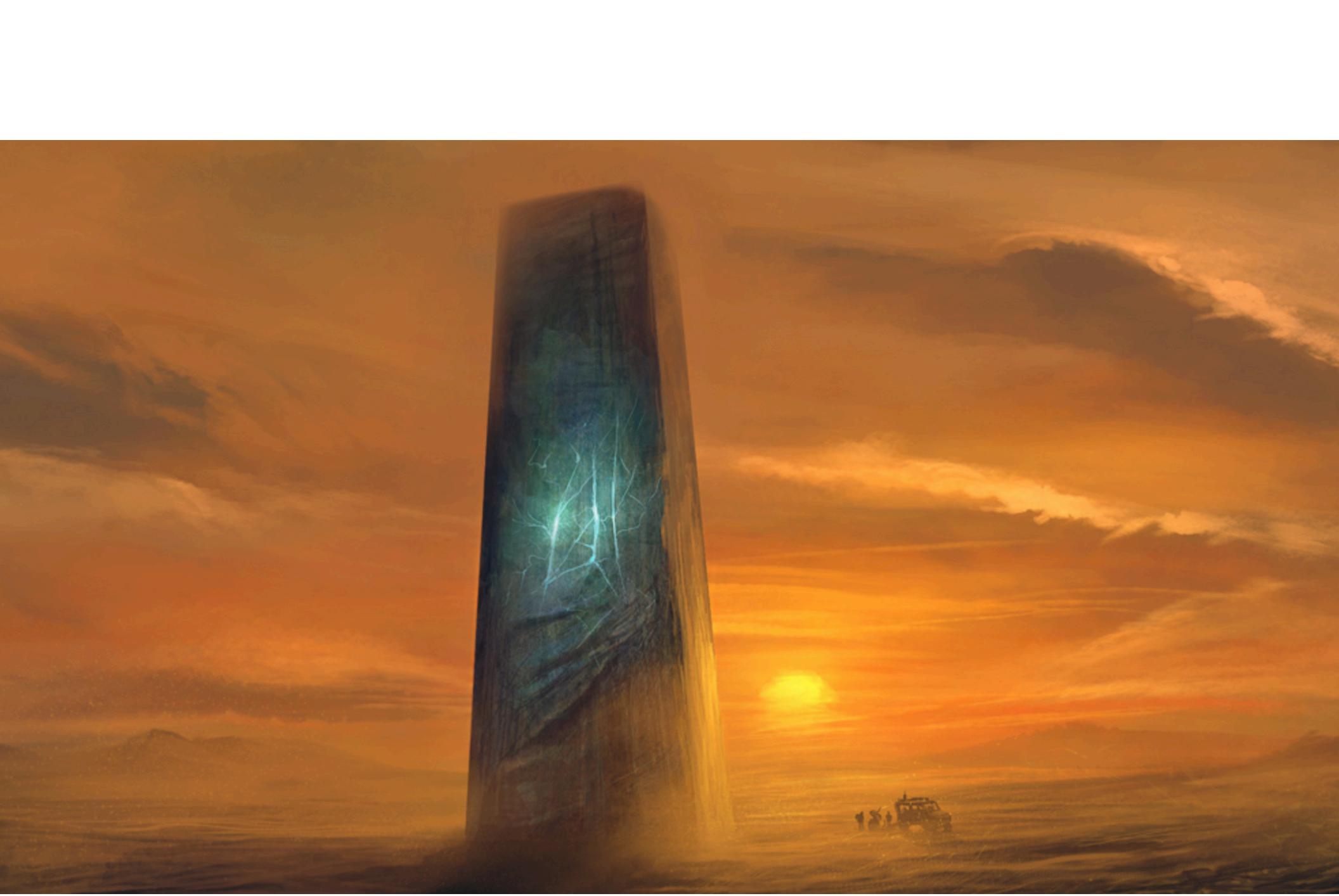
Shadow DOM v0 WD

Global 69.05%

unprefixed: 63.57%

Method of establishing and maintaining functional boundaries between DOM trees and how these trees interact with each other within a document, thus enabling better functional encapsulation within the DOM.





KIE Group

Open source projects for business systems automation and management.



Drools 5 introduces the **Business Logic integration Platform** which provides a unified and integrated platform for **Rules, Workflow and Event Processing**. It's been designed from the ground up so that each aspect is a first class citizen, with no compromises.

Drools team



jBPM is a flexible **Business Process Management (BPM) Suite**. A business process allows you to model your business goals by describing the steps that need to be executed to achieve those goals, and the order of those goals are depicted using a flow chart...

jBPM team



OptaPlanner optimizes business resource usage. Every organization faces planning problems: provide products or services with a limited set of constrained resources. OptaPlanner optimizes such planning to do more business with less resources...

Optaplanner team



UberFire is a web based workbench framework inspired by Eclipse Rich Client Platform. This is a very strategic project for Drools & jBPM team, once this is the base technology for our next generation of web tooling.



Dashbuilder is a full featured web application for the visual composition of custom business dashboards. Data comes from heterogeneous sources of information such as JDBC databases or regular text files and can be displayed using different charting libraries.

Which web stack?

Which web architecture best fits for this problem?

5 pillars:

Large scale application
Full stack Developers
UX Integration
5~10 years Life-Span
Interoperability

5 pillars:

Large scale application
Full stack Developers
UX Integration
5~10 years Life-Span
Interoperability

Large Scale Application

1mi+ lines of web code
5 projects
~150 subprojects
~30 devs
Code base of 7+ years

Large Scale Application

Static Typing

Large Scale Application

Refactoring

Large Scale Application

The screenshot shows an IDE interface with a Java code editor and a 'Find Usages' tool window.

Code Editor: The main window displays `PlaceManager.java` with the following content:

```
41 /**
42 * A Workbench-centric abstraction over the browser's history mechanism. Allows the application to initiate
43 * to any displayable thing: a {@link WorkbenchPerspective}, a {@link WorkbenchScreen}, a {@link WorkbenchEditor}
44 * {@link WorkbenchEditor}, a {@link WorkbenchPart} within a screen or editor, or the editor associated with
45 * located at a particular {@link Path}.
46 */
47 @JsType
48 public interface PlaceManager {
49
50     @JsMethod(name = "goToId")
51     void goTo(final String identifier);
52
53     @JsMethod(name = "goToPlace")
54     void goTo(PlaceRequest place);
55
56     @JsMethod(name = "goToPath")
57     void goTo(Path path);
58
59     @JsMethod(name = "goToPathAndPlace")
60     void goTo(Path path,
```

Tool Window: The bottom-left panel shows the 'Find Usages of goTo(String) in Project Files' results:

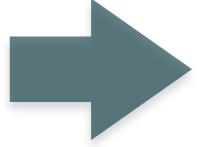
- Method:** `goTo(String)`
- Found usages (4 usages):**
 - Unclassified usage (4 usages)
 - `uberfire-apps-client` (1 usage)
 - `org.uberfire.ext.apps.client.home` (1 usage)
 - `AppsHomePresenter` (1 usage)
 - `generateComponentViewCommand0` (1 usage)

Bottom Status Bar: Compilation completed successfully with 20 warnings in 16s 389ms (today 15:34)

Bottom Right: redhat logo

JavaScript Transpilers

Large Scale Application



<https://github.com/jashkenas/coffeescript/wiki/List-of-languages-that-compile-to-JS>

Dojo Secure Framework for building secure mashups.

Static typing

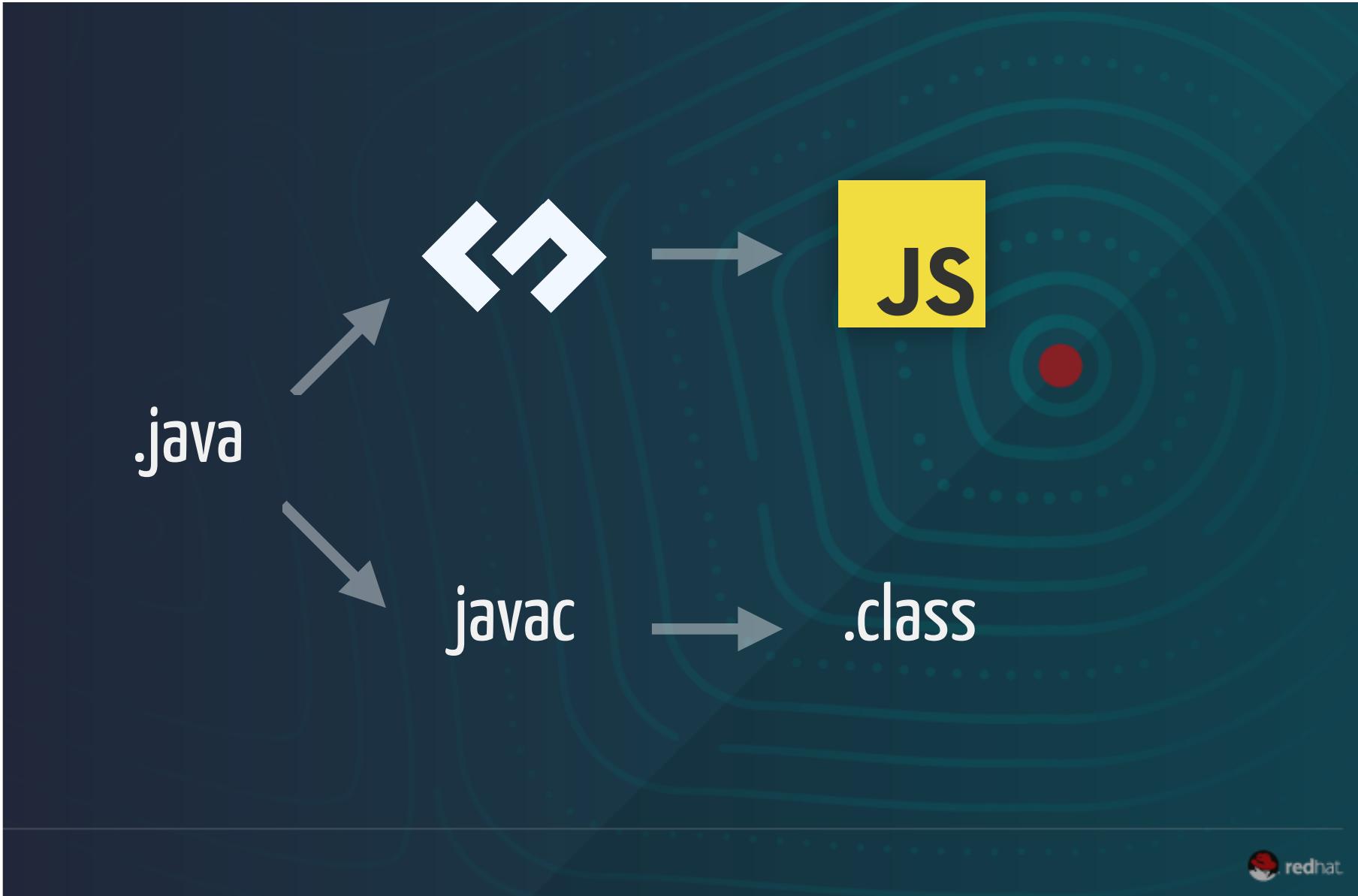
NOTE: Some of the projects listed below are also statically typed, such as mobl, GWT, JSIL, NS Basic, and Haxe.

Name	Description
Dart	C/Java-like syntax with optional typing by Google.
TypeScript	Typed superset of JavaScript by Microsoft.
TeJaS	From Brown PLT. Types for JavaScript (itself).
asm.js	Subset of JavaScript that can be used as a low-level, efficient target language for compilers. Now included in Firefox.
JavaScript++	JavaScript superset with classes, type checking, among other features
Mascara	[commercial] Enhances JavaScript with powerful features like classes, namespaces and type-checking.
Roy	Tries to meld JavaScript semantics with some features common in static functional languages
Elm	Type-safe functional language that compiles to HTML, CSS, and JavaScript.
Swym	Statically typed, with type inference and generics
Typecast.js	JavaScript platform for statically typed variables without a custom compiler.
PureScript	A small, strongly typed programming language that compiles to JavaScript and C++, featuring extensible records and effects, and type classes.
Flow	Static type checker for JavaScript, supports optional types and null checks by Facebook.
ActionScript	With Apache FlexJS - Based on ECMAScript 4, ActionScript provides typing and can be compiled to JavaScript.

Synchronous to Asynchronous JavaScript Compilers (CPS)

Name	Description
Streamline.js	Uses underscore (_) to stand for callbacks. This fork preserves line numbers for debugging.

Large Scale Application





GWT



Google Web Toolkit especialmente para o QC

Presented by Errai Uberfire App Former

<http://redhat.com>

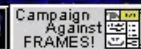
Some pages may work very slowly or not at all. Many webapps are just too advanced for GWT.

Created by [Eder Ignatowicz](#)

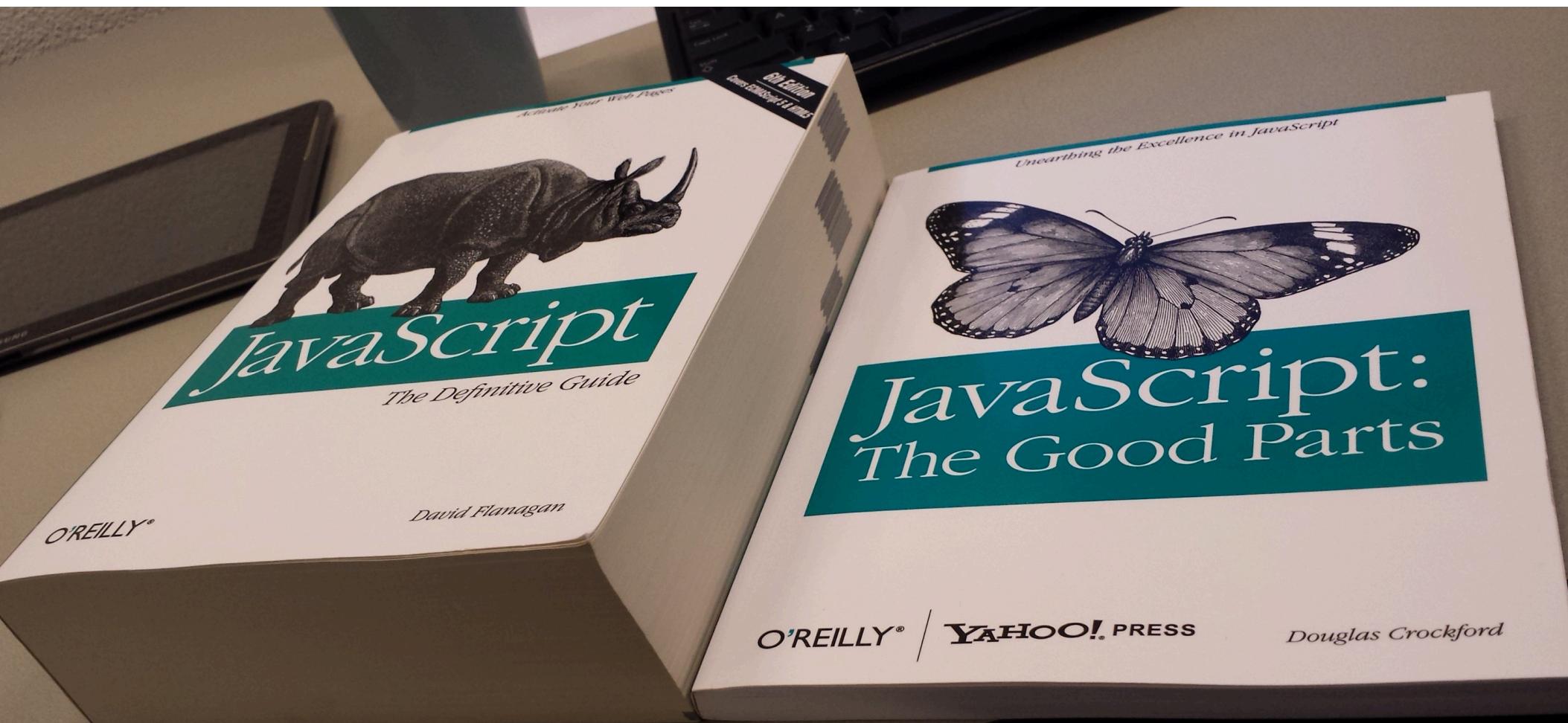
Have a problem? [Contact us](#)

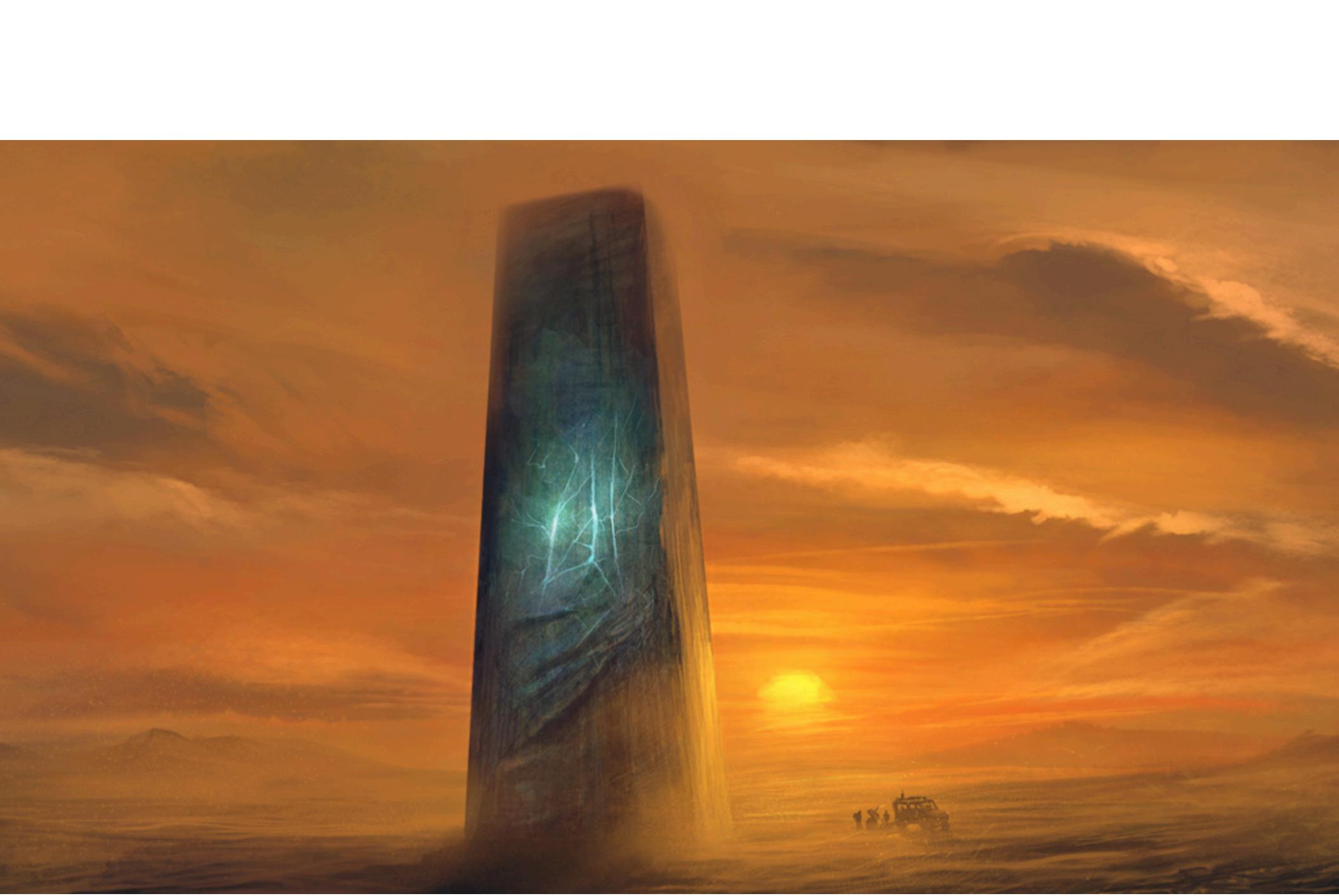


1



SITE CREATED WITH
NOTE PAD
THE RIGHT WAY







GWT

The Good Parts

Java to JavaScript

java.* emulation

GWT • Good Parts

JS Interop

Java

```
@JsType(isNative = true)
public abstract class JQuery {

    @JsMethod(namespace=GLOBAL)
    public native static JQuery $(String selector);

    public native JQuery css(String prop, String val);

    public native JQuery attr(String name, String val);
}
```

Java

```
import static jquery.JQuery.$;
// ...
$("ul > li").css("color", "red").attr("data-level", "first");
```

Java

```
package foo;

@jsType
public class Dora {
    public boolean late = true;
    public Dora() {}
    public String auAu() { return "Hello QCon!"; }
}
```

JavaScript

```
var dora = new foo.Dora();
if (dora.late) {
    alert(dora.auAu());
}
```

Large Scale Application

Refactoring

5 pillars:

Large scale application
Full stack Developers
UX Integration
5~10 years Life-Span
Interoperability

Shared Programming Model

“Java EE” in browser

CDI-Lite



ERRAI

CDI @ Browser

```
@ApplicationScoped
public class ProjectsView {

    @Inject
    Document document;

    @Inject
    @DataField( "projects-view" )
    Div view;

    @Inject
    @DataField( "new-project" )
    Button newProject;

    @Inject
    @DataField( "projects-list" )
    UnorderedList projectsList;

    @Inject
    Instance<ProjectItem> projects;
```

CDI no Browser

```
if (!filter.doFilter(event)) {  
    ...  
    if (event.kind().equals(StandardWatchEventKind.ENTRY_ADD)) {  
        resourceAddedEvent.fire(buildEvent(ResourceAddedEvent.class,  
                                             event).getK2());  
    }  
    ...  
}
```

CDI no Browser

```
public void onNewFile(@Observes ResourceAddedEvent event) {  
    Window.alert("ResourceAddedEvent:" +  
        event.getPath().toURI() +  
        " [" + event.getMessage() + "]");  
}
```

CDI no Browser

The screenshot shows a browser window displaying a Java application's code editor and a modal dialog.

Modal Dialog: A central modal window titled "New Perspective Layout Plugin..." is open. It contains a single input field labeled "Name" with the value "QConPerspective". Below the input field are two buttons: "+ Ok" and "Cancel".

Code Editor: The main content area is a code editor with tabs for "PlaceManagerImpl.java", "PerspectiveEdit...Presenter.java", and "PluginAuthoring...rspective.java". The "PluginAuthoring...rspective.java" tab is active, showing the following code:

```
private PerspectiveDefinition buildPerspective() {
    final PerspectiveDefinitionImpl perspective = new PerspectiveDefinitionImpl(
        MultiListWorkbenchPanelPresenter.class.getName());
    perspective.setName("Plugin Authoring");
    return perspective;
}

public void onNewFile(@Observes ResourceAddedEvent event) {
    Window.alert("ResourceAddedEvent:" + event.getPath().toURI() +
        " [" + event.getMessage() + "]");
}
```

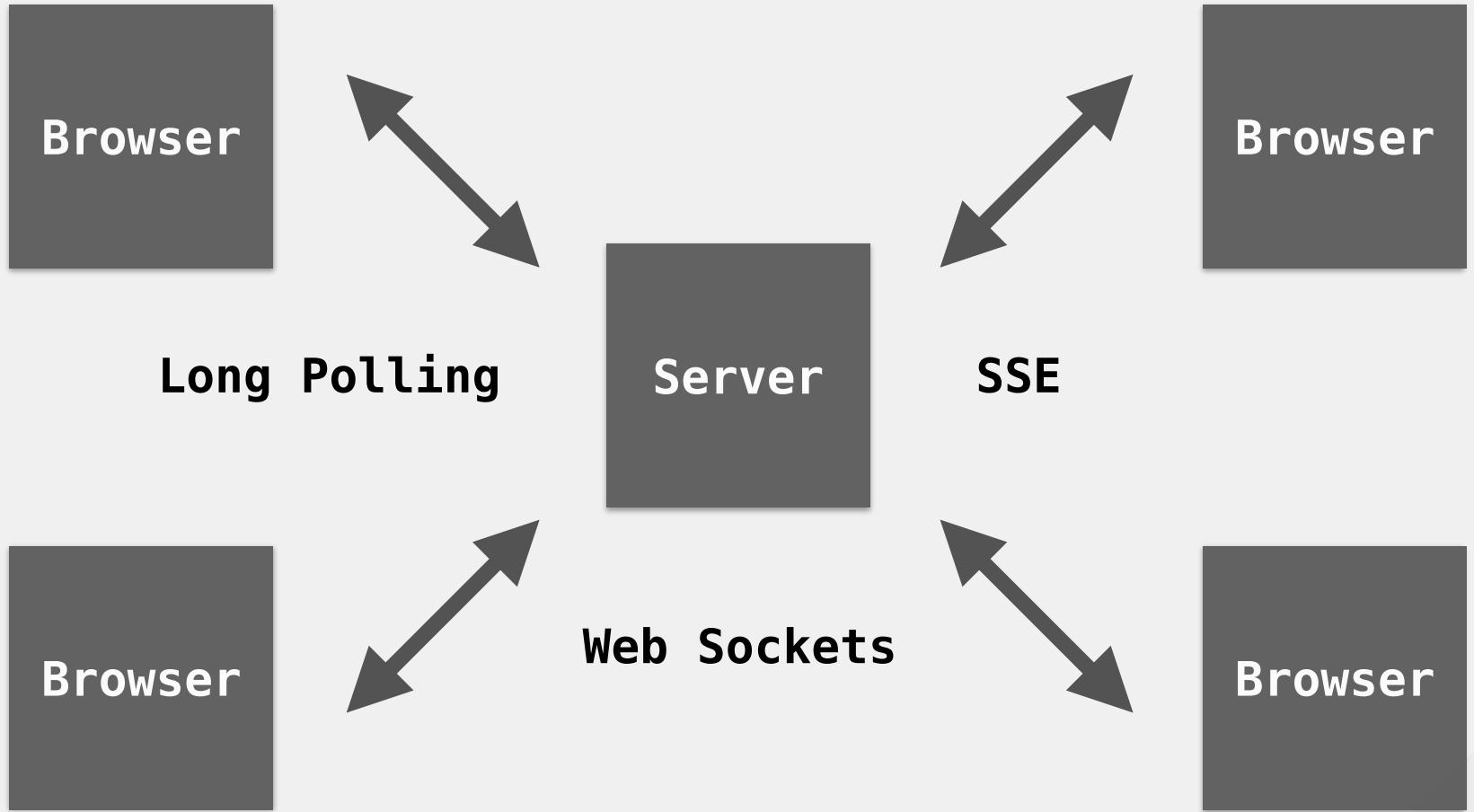
The line `Window.alert("ResourceAddedEvent:" + event.getPath().toURI() + " [" + event.getMessage() + "]");` is highlighted with a blue selection bar, indicating it is currently being debugged. The status bar at the bottom of the code editor indicates "Line 74, Column 1".

Call Stack: To the right of the code editor, a call stack is visible under the heading "Call Stack". It lists several frames, all starting with "OOt_g\$". The frames are:

- OOt_g\$
- M0t_g\$
- L0t_g\$
- t\$J_g\$
- u0J_g\$
- k0J_g\$
- q0J_g\$
- K0J_g\$

Each frame is associated with a file path and line number, such as "PluginAuthoring...ective.java:74".

ERRAI BUS



Shared Programming Model

5 pillars:

Large scale application
Full stack Developers
UX Integration
5~10 years Life-Span
Interoperability

```

<form action="orderResult.jsp" method="POST">
    <h3>Pizza Types</h3>
    <div>
        <ul>
            <% for ( Pizza pizza : pizzaTypes ) { %>
                <li>
                    <input type="radio" name="pizzaTypeOptions" value="<%=pizza.getName()%>" checked />
                    <span class="pizzaType"><%=pizza.getName()%></span>
                    <span class="pizzaPrice"><%=pizza.getPrice()%>$</span>
                </li>
            <% } %>
        </ul>
    </div>
    <h3>Size</h3>
    <h3>Extra Toppings</h3>
    <div class="section group">
        <% for ( int j = 0; j < 3; j++ ) { %>
            <div class="col span_1_of_3">
                <ul class="ul_2">
                    <% for ( int i = sliceSize * j; i < ( j + 1 ) * sliceSize; i++ ) { %>
                        <li class="li_2">
                            <input type="checkbox" name="pizzaToppings" value="<%=pizzaToppings.get( i )%>" />
                            <%=pizzaToppings.get( i )%>
                        </li>
                    <% }
                    <if ( j == 0 && remainder > 0 ) { %>
                        <li class="li_2">
                            <input type="checkbox" name="pizzaToppings" value="<%=pizzaToppings.get( pizzaToppings.size() - 2 )%>" />
                            <%=pizzaToppings.get( pizzaToppings.size() - 2 )%>
                        </li>
                    <% } else if ( j == 1 && remainder > 1 ) { %>
                        <li class="li_2">
                            <input type="checkbox" name="pizzaToppings" value="<%=pizzaToppings.get( pizzaToppings.size() - 1 )%>" />
                            <%=pizzaToppings.get( pizzaToppings.size() - 1 )%>
                        </li>
                    <% } %>
                </ul>
            </div>
        <% } %>
    </div>
    <h4>Each extra topping is 0.65$</h4>
    <input type="submit" value="Order"/>
</form>

```

```
<h1>{{title}}</h1>
<h2>My favorite hero is: {{myHero}}</h2>
<p>Heroes:</p>
<ul>
  <li *ngFor="let hero of heroes">
    {{ hero }}
  </li>
</ul>
```

```
<div>

    <ul class="list-group" data-field="projects-list">

    </ul>

    <button type="button" class="btn" data-field="new-project">

        <i class="fa fa-plus"></i> New Project

    </button>

</div>
```

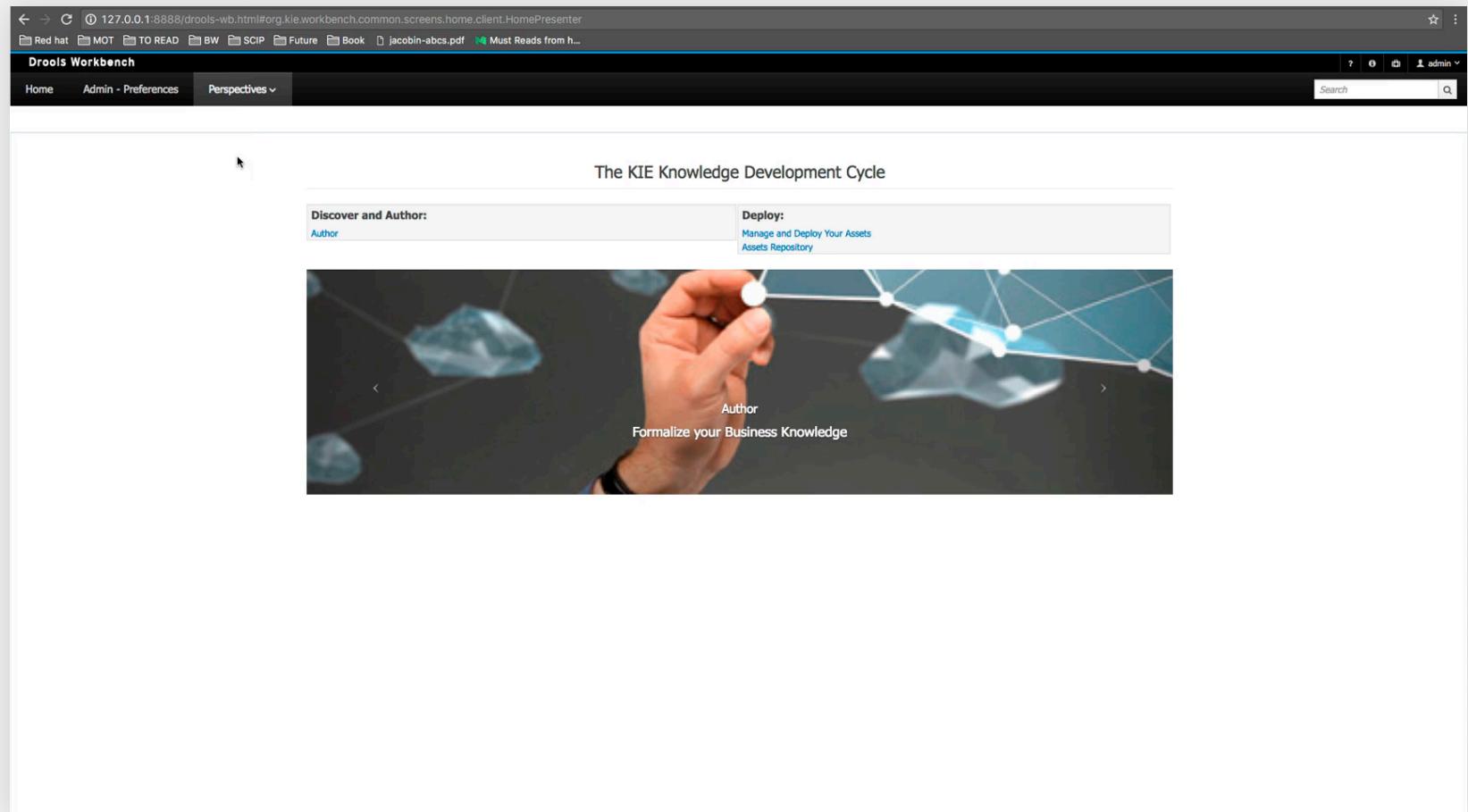
```
@Dependent
@Templated
public class ProjectsView {

    @Inject
    @DataField( "projects-view" )
    Div view;

    @Inject
    @DataField( "new-project" )
    Button newProject;

    @Inject
    @DataField( "projects-list" )
    UnorderedList projectsList;

}
```



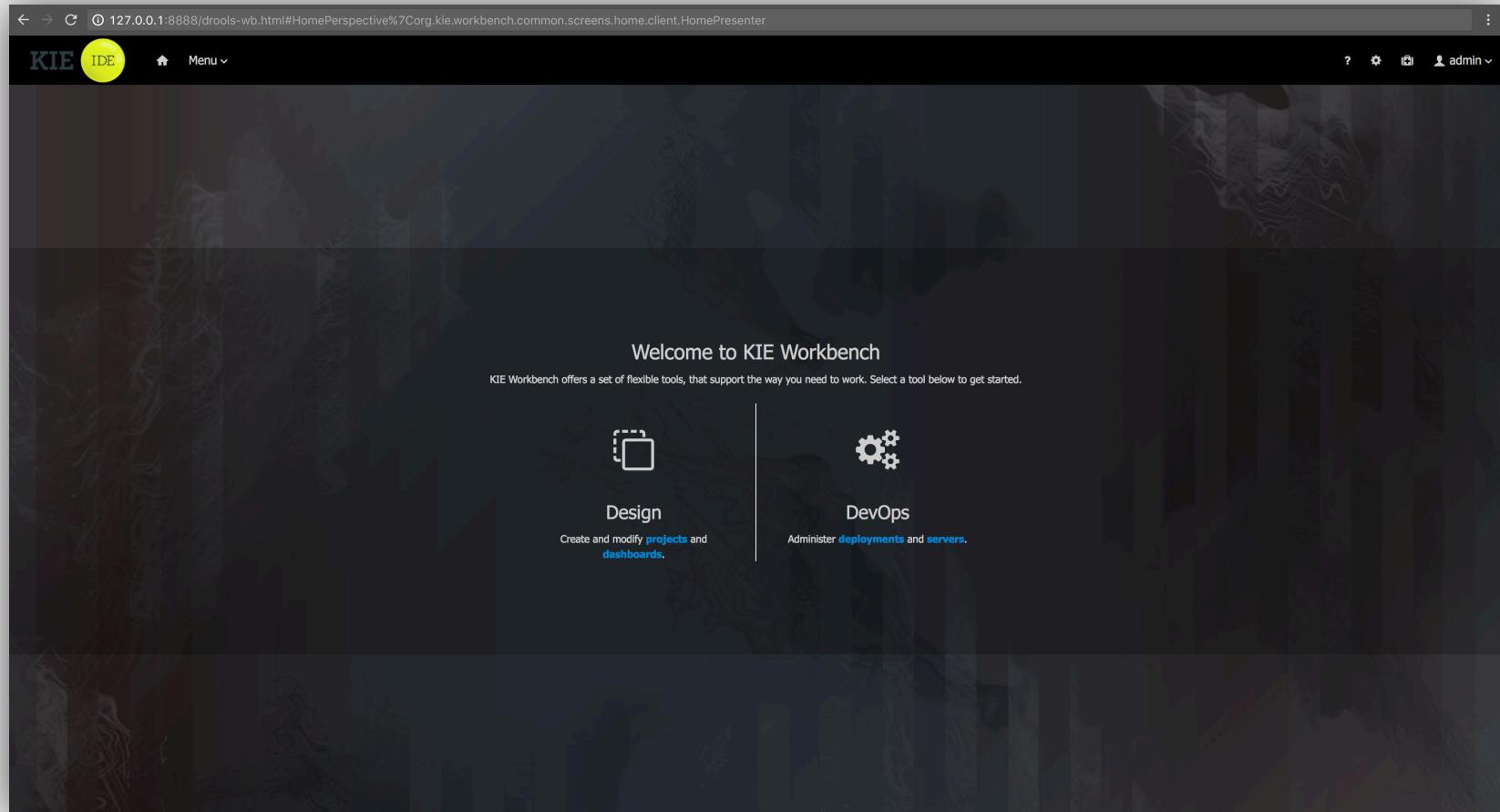
```

<!-- Masthead -->
<nav class="navbar navbar-default navbar-pf ">
  <div class="navbar-header ">
    <button type="button" class="navbar-toggle" data-toggle="collapse" data-target=".navbar-collapse-2">
      <span class="sr-only">Toggle navigation</span>
      <span class="icon-bar"></span>
      <span class="icon-bar"></span>
      <span class="icon-bar"></span>
    </button>
    <a href="/" class="navbar-brand">
      
    </a>
  </div>

  <div class="collapse navbar-collapse navbar-collapse-2">
    <ul class="nav navbar-nav "><!-- navbar-iconic -->
      <li class="dropdown">
        <a class="dropdown-toggle nav-item-iconic" id="dropdownMenu2" data-toggle="dropdown" aria-haspopup="true" aria-expanded="true">
          Home
          <span class="caret"></span>
        </a>
        <ul class="dropdown-menu" aria-labelledby="dropdownMenu2">
          <li><a href="#">Design</a></li>
          <li><a href="#">Processes & Tasks</a></li>
          <li><a href="#">Runtime</a></li>
          <li><a href="#">Settings</a></li>
        </ul>
      </li>
    </ul>

    <ul class="nav navbar-nav navbar-right">
      <li class="dropdown">
        <a class="dropdown-toggle nav-item-iconic" id="notifications" data-toggle="dropdown" aria-haspopup="true" aria-expanded="true">
          <span title="Notifications" class="fa pficon-warning-triangle-o"></span>
          Messages: 0
        </a>
        <div class="dropdown-menu infotip bottom-right">
          <div class="arrow"></div>
          <ul class="list-group">
            <li class="list-group-item">
              <span class="i pficon pficon-info"></span> Modified Datasources ExampleDS
            </li>
            <li class="list-group-item">
              <span class="i pficon pficon-info"></span> Error: System Failure
            </li>
          </ul>
          <div class="footer">
            <a>Clear Messages</a>
          </div>
        </div>
      </li>
    </ul>
  </div>
</li>
<li class="dropdown">
  <a class="dropdown-toggle nav-item-iconic" id="dropdownMenu2" data-toggle="dropdown" aria-haspopup="true" aria-expanded="true">
    <span title="Username" class="fa pficon-user"></span>
    Brian Johnson
    <span class="caret"></span>
  </a>
  <ul class="dropdown-menu" aria-labelledby="dropdownMenu2">
    ...

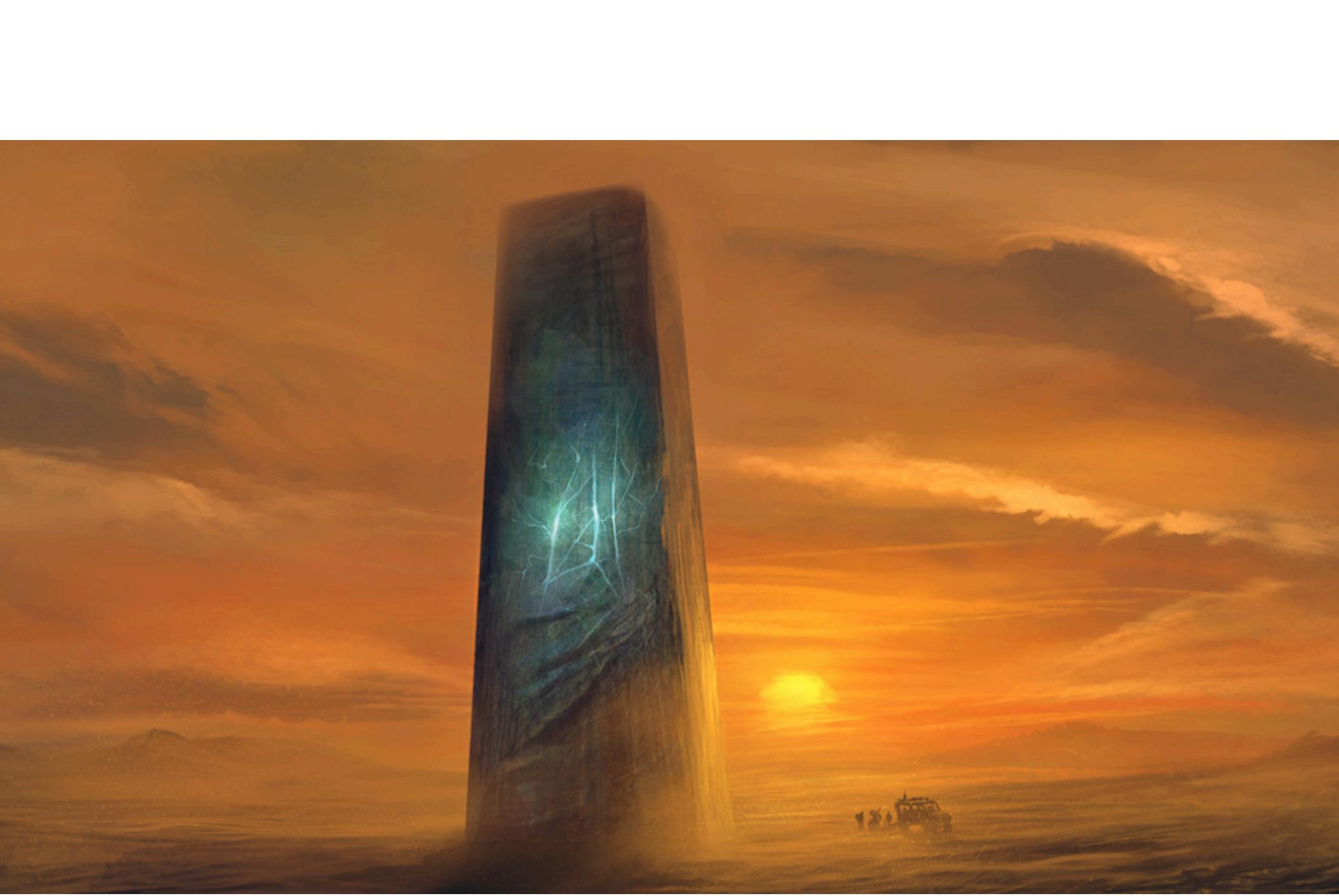
```



Leave the HTML/CSS in peace

5 pillars:

Large scale application
Full stack Developers
UX Integration
5~10 years Life-Span
Interoperability



Architecture

Hexagonal Architecture - Alistair Cockburn
Onion Architecture - Jeffrey Palermo
DCI - James Coplien e Trygve Reenskaug.
BCE - Ivar Jacobson
Clean Architecture - Robert C. Martin

Principles

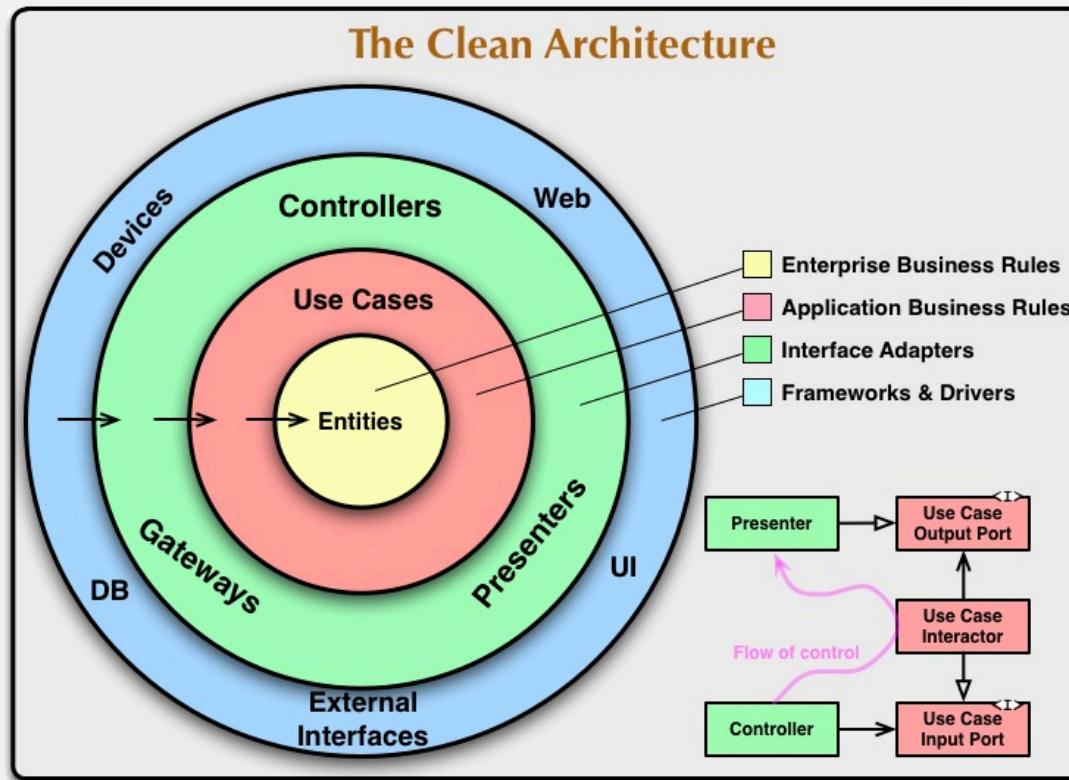
Decoupled from Frameworks

Testable

Decoupled from UI

Decoupled from Database

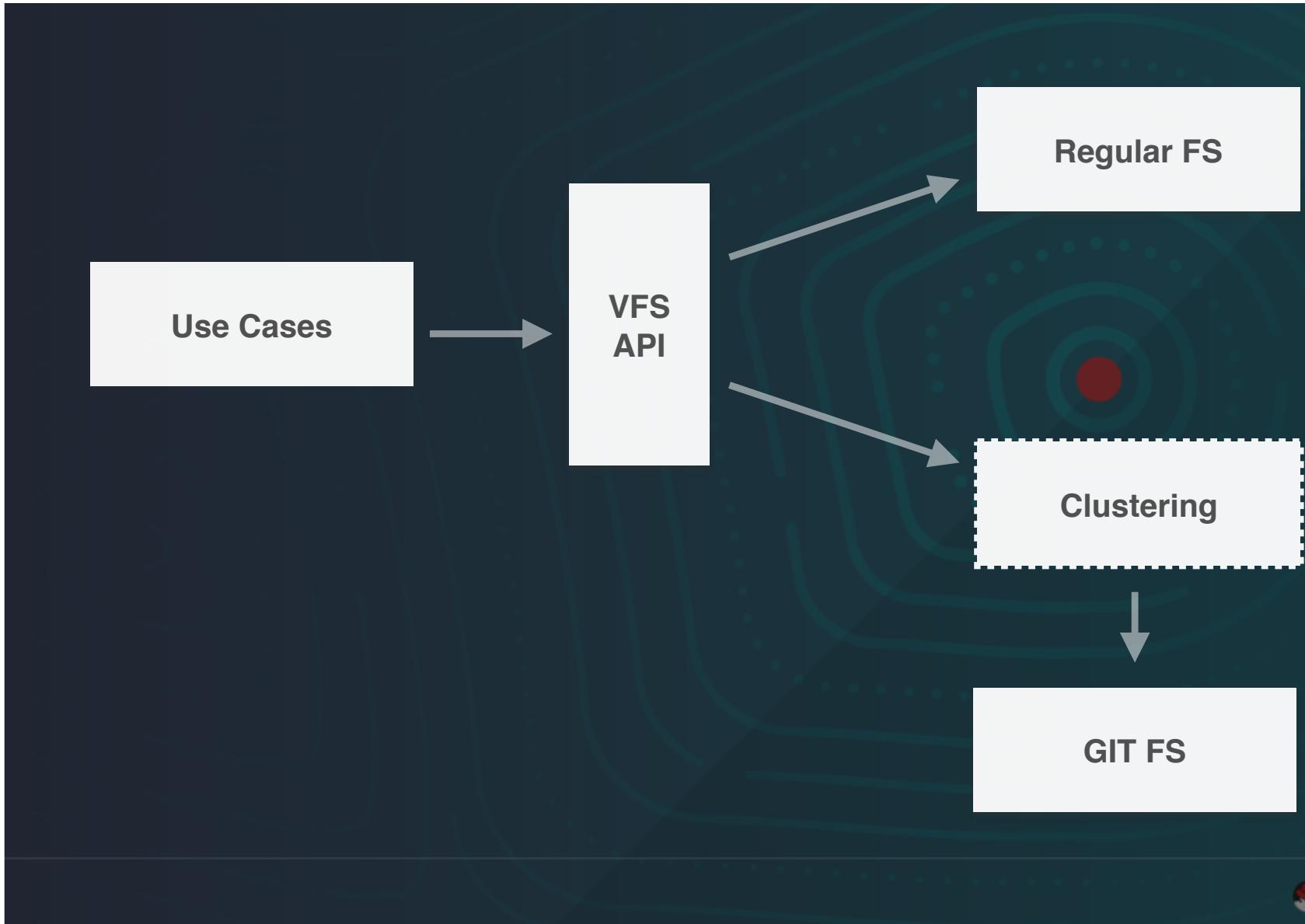
Independent of external systems



“Architecture is about intent.
We have made it about
frameworks and details”

Robert C. Martin

APPFORMER VFS



KIE IDE

Menu ▾

Teams > myteam > mortgages > Pricing loans

Project Explorer

- DRL
- DATA OBJECTS
- DOMAIN SPECIFIC LANGUAGE DEFINITIONS
- ENUMERATION DEFINITIONS
- GUIDED DECISION TABLES ▾
- Pricing loans
- GUIDED RULES
- GUIDED RULES (WITH DSL)
- TEST SCENARIOS

Pricing loans.gdst - Guided Decision Tables

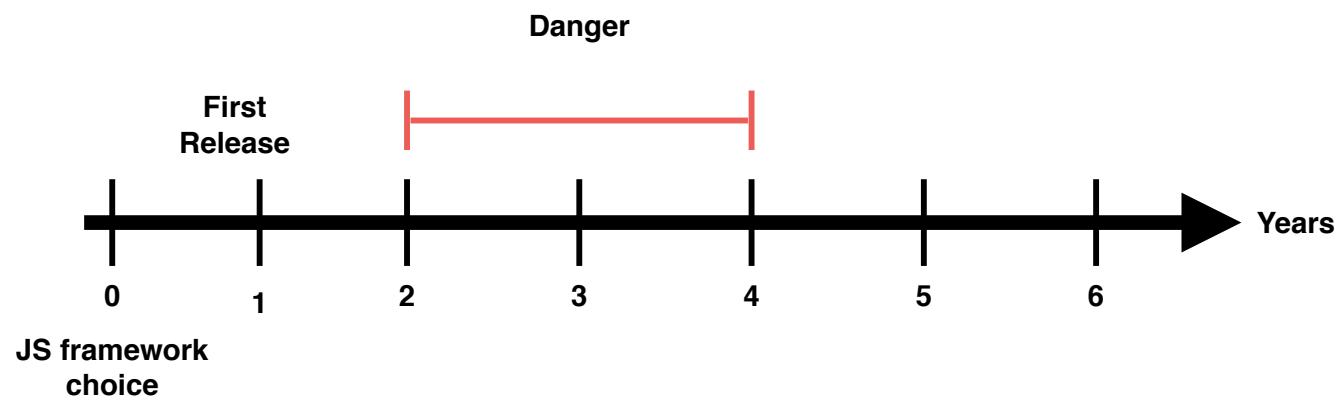
Editor Overview Source Data Objects

Add Column Edit Columns

Pricing loans		application : LoanApplication				IncomeSource			application		
#	Description	amount min	amount max	period	deposit max	income	Loan approved	LMI	rate		
1		131000	200000	20	20000	Job	true	0	2		
2		10000	100000	20	2000	Job	true	0	4		
3		100001	130000	20	3000	Job	false	5	6		
4		100001	130000	20	3000	Job	true	5	6		

Which web framework should I use?

Which JS framework?



What's next for Angular 1.x?

“In all honesty, no one really knows what will happen”

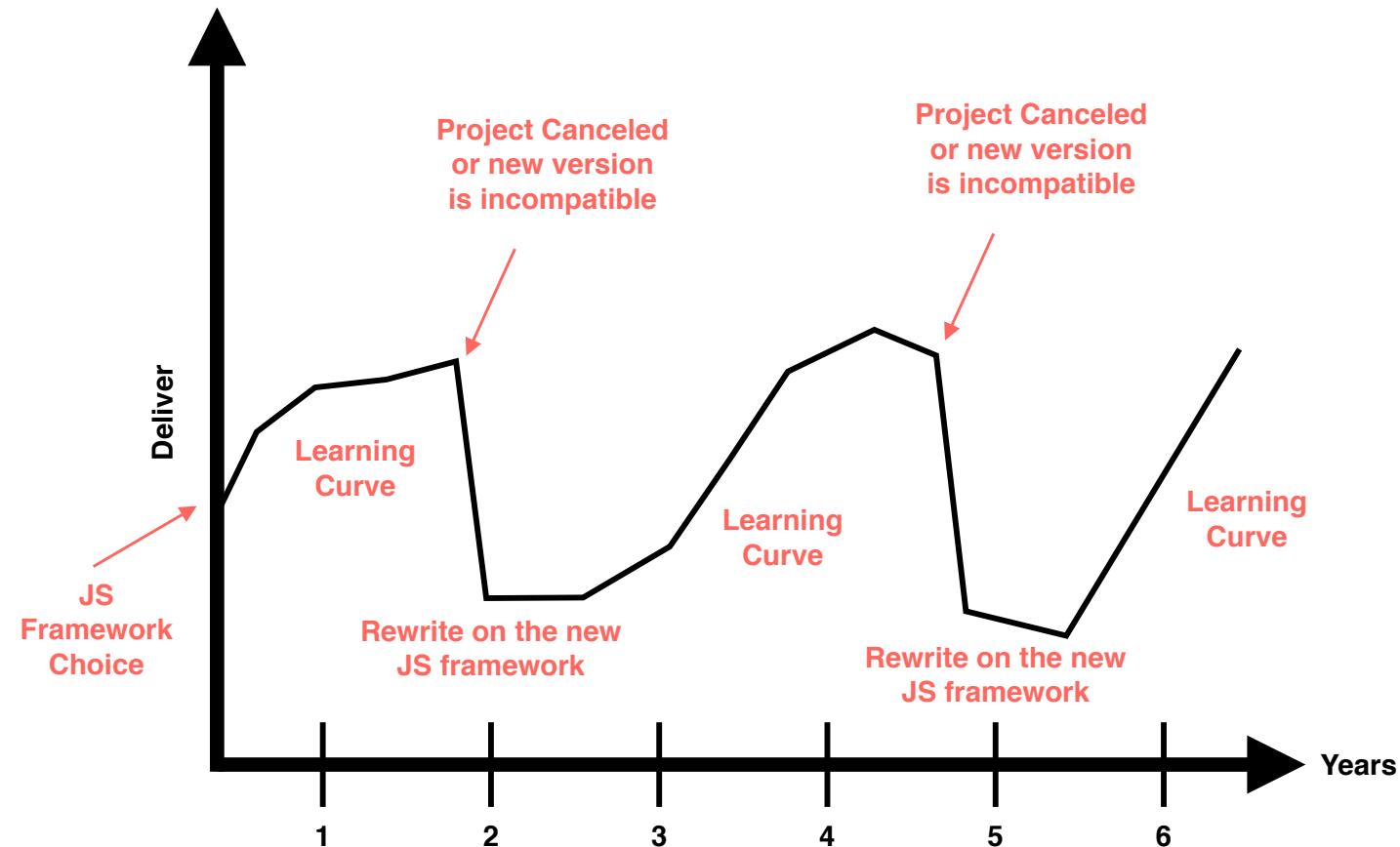


I'm Todd, I teach the world Angular through [@UltimateAngular](#).
Conference speaker and Developer Expert at Google.

[Follow @toddmotto](#)

33.6K followers

<https://toddmotto.com/future-of-angular-1-x>

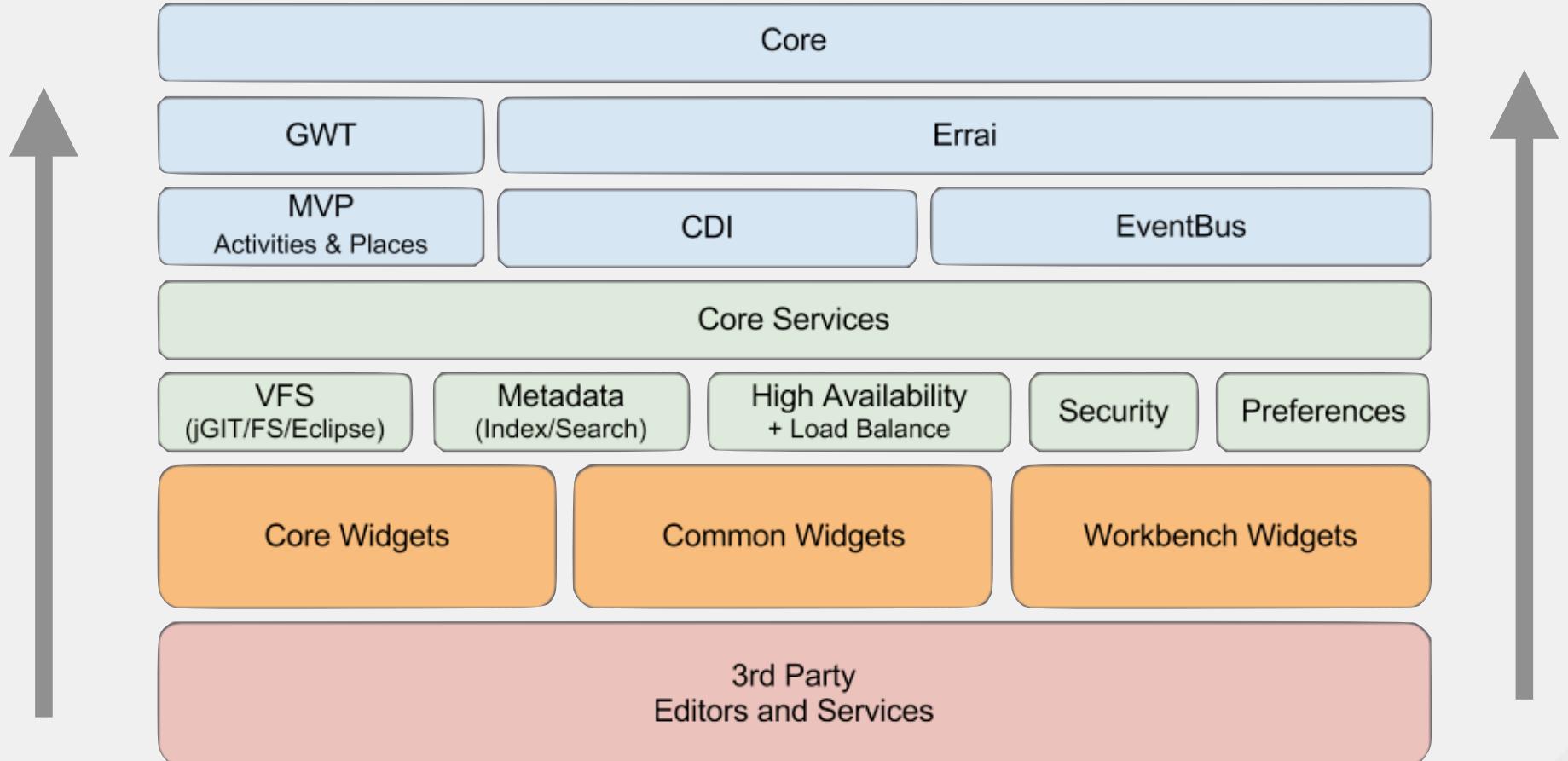


**“A good architecture allows
volatile decisions to be
easily changed”**

Robert C. Martin

What if I dealt with the volatility of
JS frameworks as a fact?





Programming Model

Component Model:

- Screen
- Editors
- Perspectives
- Popups

Programming Model

LifeCycle:

- OnStart
- OnSave
- IsDirty
- OnClose

...

Perspective

The screenshot shows the Drools Workbench interface with the "Perspective" tab selected. The main area displays the "Pricing loans.gdst - Guided Decision Tables" editor, which contains a decision table for loan pricing. The table has columns for #, Description, application : LoanApplication, income : IncomeSource, Loan approved, LMI, and rate. Rows 1 and 2 show standard data, while rows 3 and 4 are highlighted in orange, indicating they are subsumptant rows. To the right of the editor is the "Analysis" tool, which shows a list of validation errors related to subsumptant rows. The left sidebar shows the Project Explorer with a tree structure for a demo project, and the bottom left and right corners contain red boxes labeled "Screen".

Editor

Analysis

#	Description	application : LoanApplication	income : IncomeSource	Loan approved	LMI	rate			
1		amount min 131000	amount max 200000	period 30	deposit max 20000	income Asset	true	0	2
2		10000	100000	20	2000	Job	true	0	4
3		100001	130000	20	3000	Job	false	10	6
4		100001	130000	20	3000	Job	false	10	6

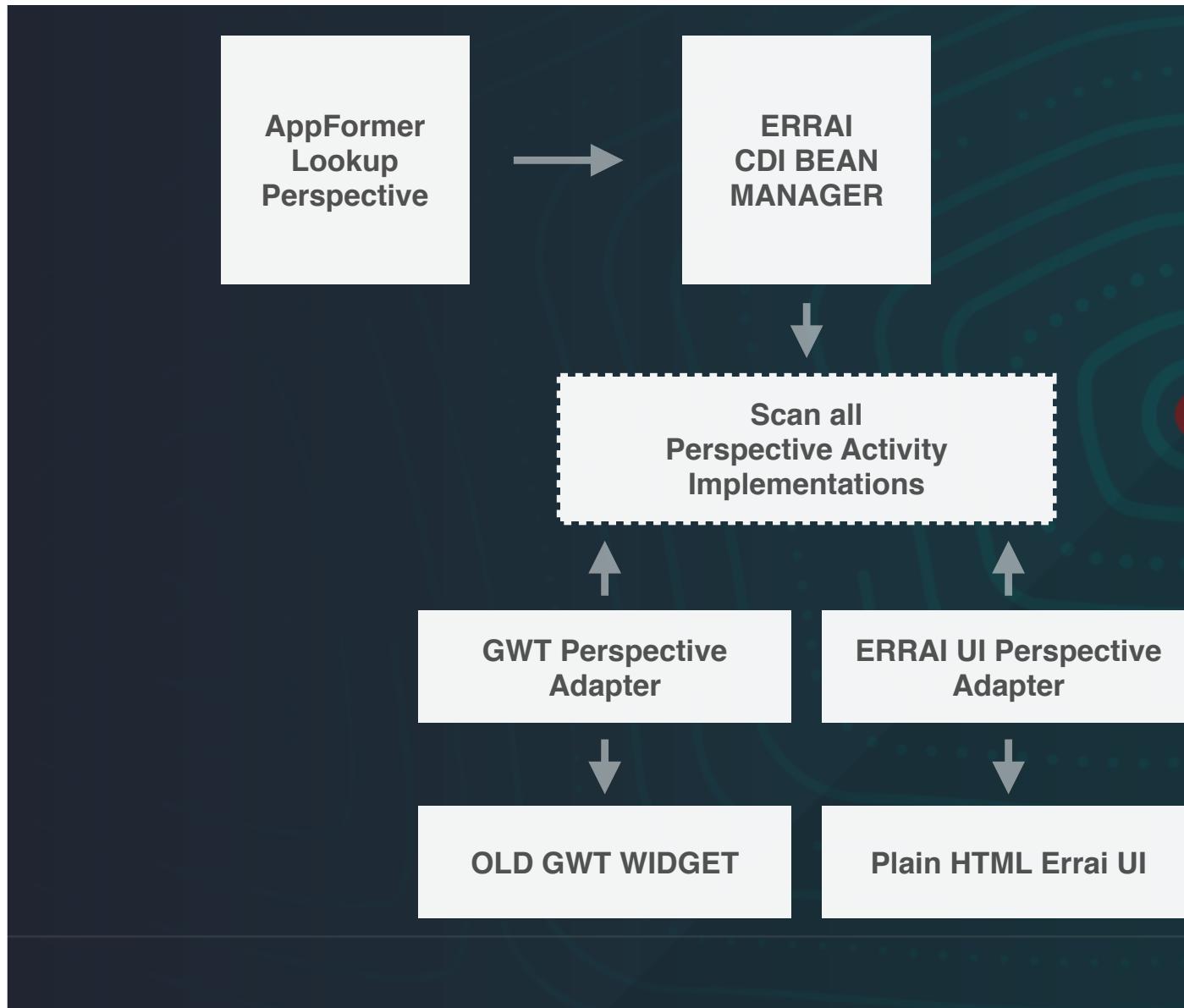
Screen

Screen

Programming Model

Screen → Interface WorkbenchScreenActivity
Editor → Interface WorkbenchEditorActivity
Perspective → Interface PerspectiveActivity

Perspectives Lookup



localhost:8080/kie-wb/kie-wb.jsp#GuidedDecisionTableEditor?path_uri=default://master@uf-playground/mortgages/src/main/resources/org/mortgages/Pricing%252520loans.gdst&file_name=Pricing%2520loans.gdst&has_version_support=true

KIE Workbench

Home Authoring Deploy Process Management Tasks Dashboards Extensions

Explore New Item Repository

Project Explorer Open Project Editor

demo > uf-playground > mortgages

Pricing loans.gdst - Guided Decision Tables

Editor Overview Source Data Objects

All the rules inherit: None selected

+ Decision table

#	Description	amount min	amount max	period	deposit max	income	Loan approved	LMI	rate
1		131000	200000	30	20000	Asset	true	0	2
2		10000	100000	20	2000	Job	true	0	4
3		100001	130000	20	3000	Job	true	10	6

Add row... Otherwise Audit log

DRL DATA OBJECTS DOMAIN SPECIFIC LANGUAGE DEFINITIONS ENUMERATION DEFINITIONS GUIDED DECISION TABLES aaaa Pricing loans GUIDED RULES GUIDED RULES (WITH DSL) TEST SCENARIOS

Messages

Save Delete Rename Copy Validate Latest Version

7+ years old code with “old school” GWT

#	Description	amount min	amount max	period	deposit max	income	Loan approved	LMI	rate
1		131000	200000	30	20000	Asset	true	0	2
2		10000	100000	20	2000	Job	true	0	4
3		100001	130000	20	3000	Job	true	10	6

KIE IDE

Menu

Teams > myteam > mortgages > Pricing loans

Project Explorer

<default> > mortgages > mortgages

DRL

DATA OBJECTS

DOMAIN SPECIFIC LANGUAGE DEFINITIONS

ENUMERATION DEFINITIONS

GUIDED DECISION TABLES

Pricing loans

GUIDED RULES

GUIDED RULES (WITH DSL)

TEST SCENARIOS

Pricing loans.gdst - Guided Decision Tables

Editor Overview Source Data Objects

Add Column Edit Columns

Save Delete Rename Copy Validate Edit View Insert Latest Version

Pricing loans

Pricing loans		application : LoanApplication				IncomeSource			application		
#	Description	amount min	amount max	period	deposit max	income	Loan approved	LMI	rate		
1		131000	200000	20	20000	Job	true	0	2		
2		10000	100000	20	2000	Job	true	0	4		
3		100001	130000	20	3000	Job	false	5	6		
4		100001	130000	20	3000	Job	true	5	6		

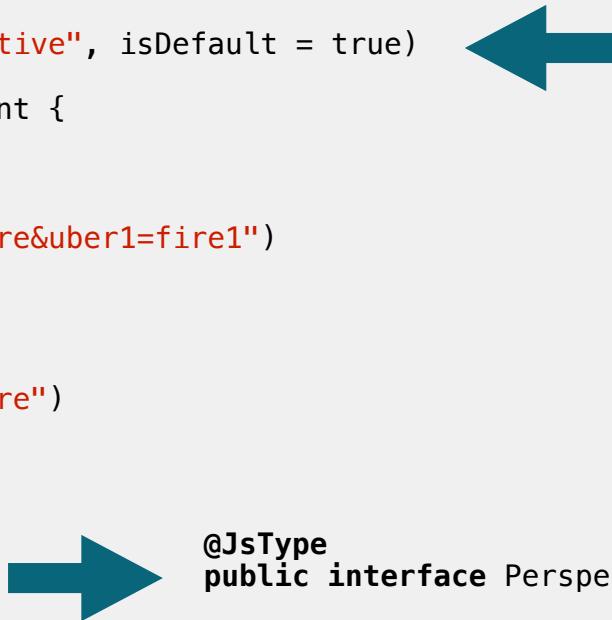
HTML 5 canvas
fresh code

The Web architecture should be
treated with the same respect as
you treat your backend.

5 pillars:

Large scale application
Full stack Developers
UX Integration
5~10 years Life-Span
Interoperability

```
@WorkbenchPerspective(identifier = "HomePerspective", isDefault = true)  
@Templated  
public class HomePerspective implements IsElement {  
  
    @Inject  
    @DataField  
    @WorkbenchPanel(parts = "MoodScreen?uber=fire&uber1=fire1")  
    Div moodScreen;  
  
    @Inject  
    @DataField  
    @WorkbenchPanel(parts = "HomeScreen?uber=fire")  
    Div homeScreen;  
  
    @Inject  
    @DataField  
    @WorkbenchPanel(parts = "AnotherScreen")  
    Div anotherScreen;  
}
```



```
@JsType  
public interface PerspectiveActivity{  
  
    PerspectiveDefinition getDefaultPerspectiveLayout();  
  
    @Override  
    default String getName() {  
        return getDefaultPerspectiveLayout().getName();  
    }  
  
    boolean isDefault();  
  
    Menus getMenus();  
  
    ToolBar getToolBar();  
}
```



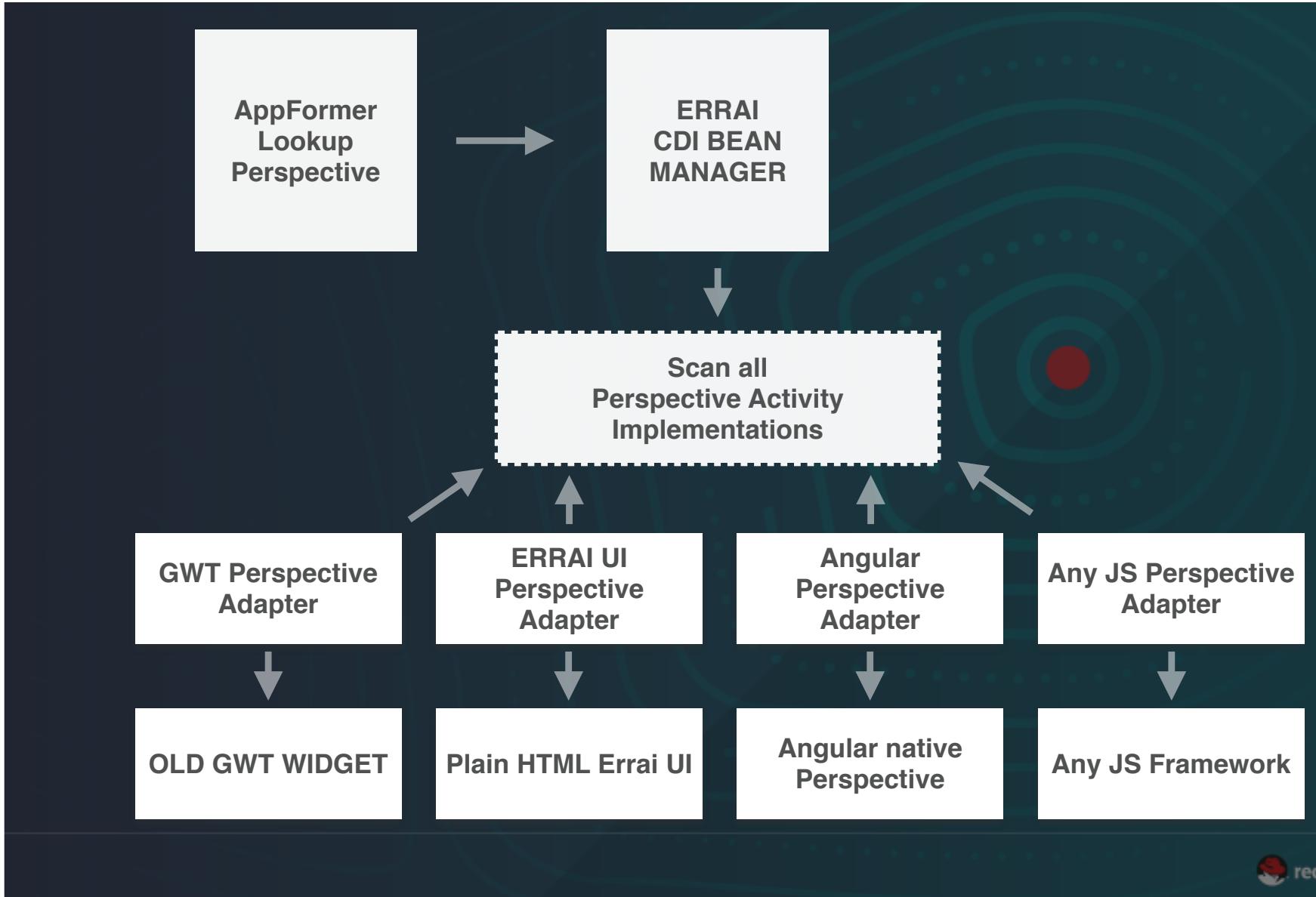
```

function TodoCtrl($scope) {
    $scope.placeText = "MiscellaneousFeatures";
    $scope.todos = [
        {text: 'learn angular', done: true},
        {text: 'build an angular app', done: false}
    ];
    $scope.addTodo = function () {
        $scope.todos.push({text: $scope.todoText, done: false});
        $scope.todoText = '';
    };
    $scope.remaining = function () {
        var count = 0;
        angular.forEach($scope.todos, function (todo) {
            count += todo.done ? 0 : 1;
        });
        return count;
    };
    $scope.archive = function () {
        var oldTodos = $scope.todos;
        $scope.todos = [];
        angular.forEach(oldTodos, function (todo) {
            if (!todo.done) {
                $scope.todos.push(todo);
            }
        });
    };
    $scope["goto"] = function () {
        $goToPlace($scope.placeText);
    };
}

$registerPlugin({
    id: "my.angular_js",
    type: "angularjs",
    templateUrl: "angular.sample.html",
    title: function () {
        return "angular " + Math.floor(Math.random() * 10);
    },
    on_close: function () {
        alert("this is a pure JS alert!");
    }
});

```

Perspectives



The screenshot shows the UberFire application interface. At the top, there is a navigation bar with 'Home', 'Perspectives ▾', 'Screens ▾', and a search icon. Below the navigation bar, there are two main sections:

- Quick Tour**: A section describing a quick tour of UberFire's cool features, with a 'Play' button.
- Sample App**: A section describing a good example of an application built on top of UberFire, with a 'Play' button.

The central part of the interface is a screen titled "angular 2". This screen contains a "Todos" list with three items:

- learn angular (checked)
- build an angular app (checked)
- Talk at QCon (unchecked)

Below the list are two input fields: "MiscellaneousFeatures" and "add new todo here", followed by "GoTo" and "Add" buttons.

A large yellow box highlights the "Angular JS Screen" title at the bottom of the central screen.

To the right of the central screen is a sidebar with the following sections:

- Todo List ▾**: Includes buttons for "Save", "Delete", "Edit ▾", and "x".
- UberFire Todo List**: A section describing UberFire's future improvements, listing:
 - Improve Look & Feel
 - Implement Themes
 - Grid/Tile layout manager
 - ...
- Links**: A list of external links:
 - Source @ GitHub
 - UberFire User List
 - UberFire Dev List
 - Drools Project
 - jBPM Project
- Contribution**: A section encouraging users to contribute to the project.

5 pillars:

Large scale application
Full stack Developers
UX Integration
5~10 years Life-Span
Interoperability

Web development is complex

Web applications are
important pieces of
our architecture

Principles

Decoupled from Frameworks

Testable

Decoupled from UI

Decoupled from Database

Independent of external systems

Software architecture is trade-offs exercise

5 pillars:

- Large scale application
- Full stack Developers
- UX Integration
- 5~10 years life-span
- Interoperability

Thank you.

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