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JSR 290: Empower Web User Interfaces for Mobile Java™ Technology

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Goals

Explore JSR 290, an API that enables the use of Web Technologies to create rich, animated and flexible User Interfaces for Java™ ME platform.

Agenda

- About JSR 290
- Warm up Demo
- Interfaces
- Development Cycle
- More Demos
- JSR Status
- Q&A

About JSR 290

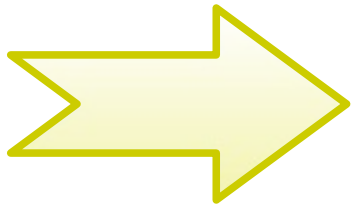
- This new API ...
  - is about Java™ Language & XML User Interface Markup Integration
  - targets FLexible User Interface Development
  - supports at least WICD Mobile 1.0:
    - XHTML Basic 1.1
    - ECMAScript CP
    - CSS MP 2.0
    - SVG Tiny 1.2
    - XHR
    - DOM ...

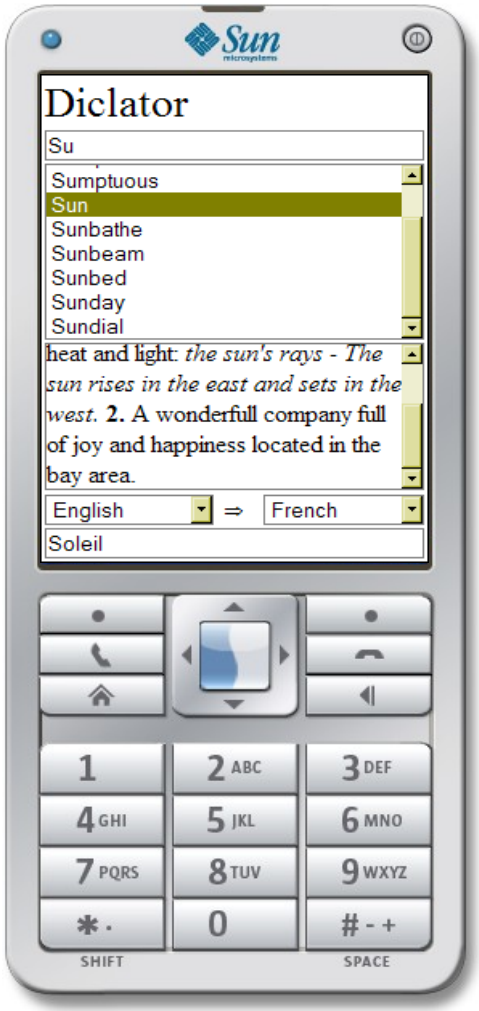
About JSR 290

Use Case #1 Web Technologies to create Rich UI

```
#title {
   font-size: 20pt;

}
#result {
   width: 234px;
   overflow: auto;
   font-weight: normal;
   border: 1px solid grey;
   height: 114px;
}
</style>
</head>

<body>
<div id="display">

<table id="table">
```

FLUID markup:
XHTML, SVG, CSS,
ECMAScript ...





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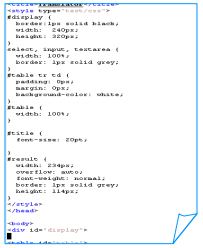
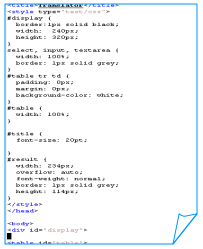
Use Case #2 Web UI from different locations

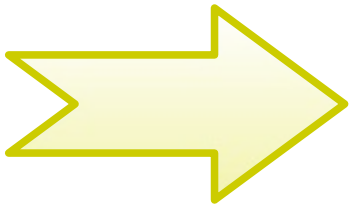
SIM

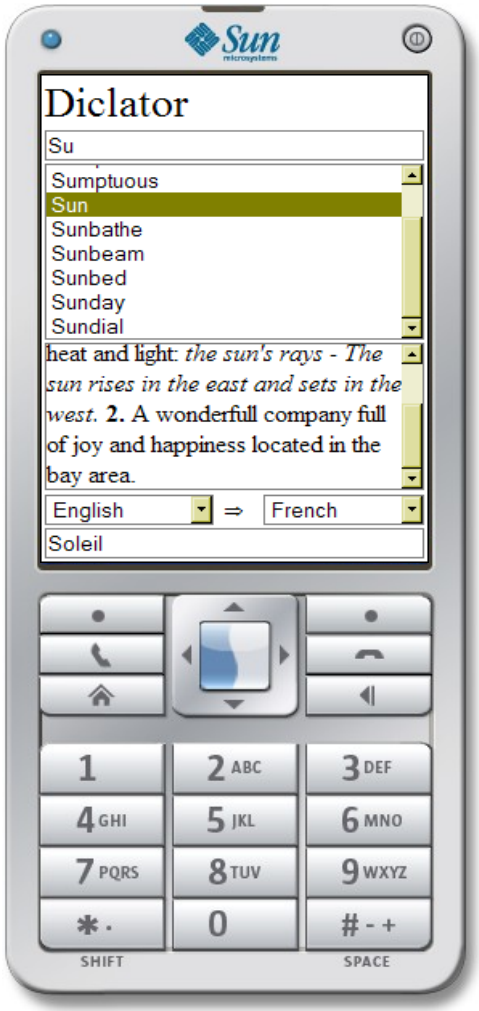


JAR



Server





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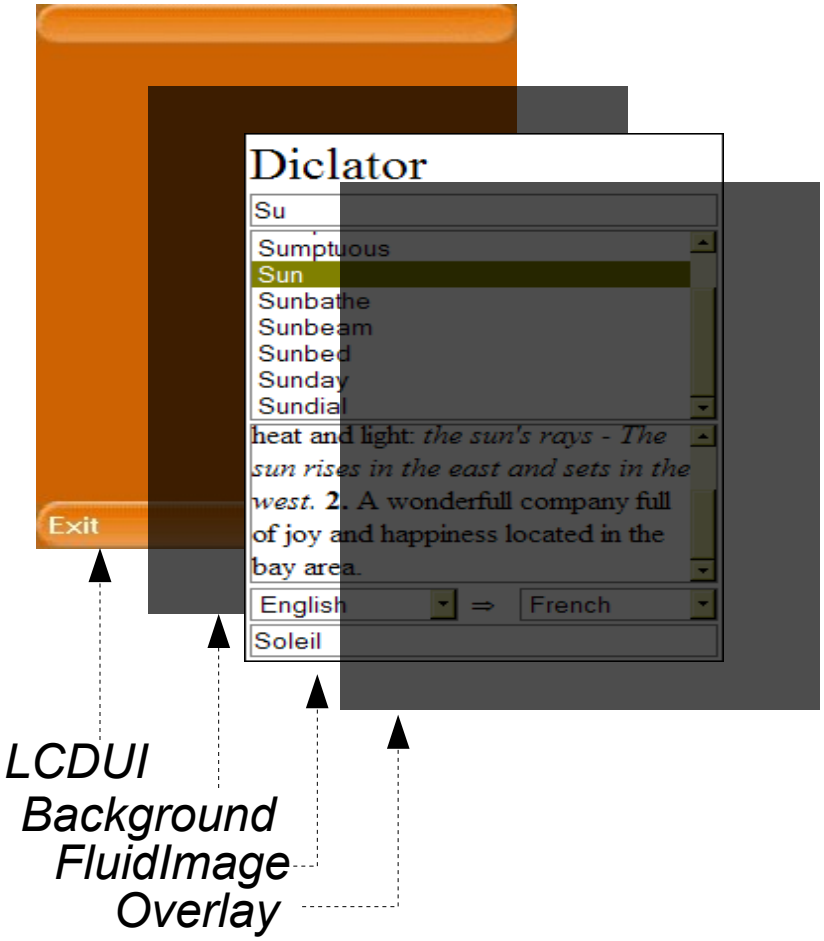
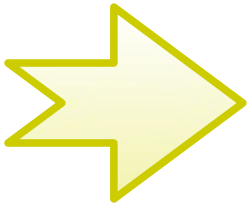
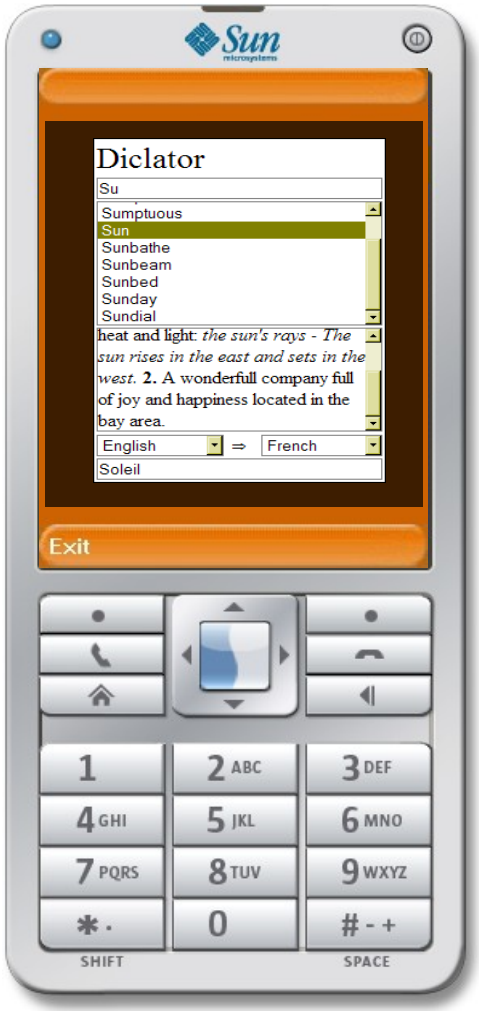
Use Case #3 Combine Web UI and Java UI







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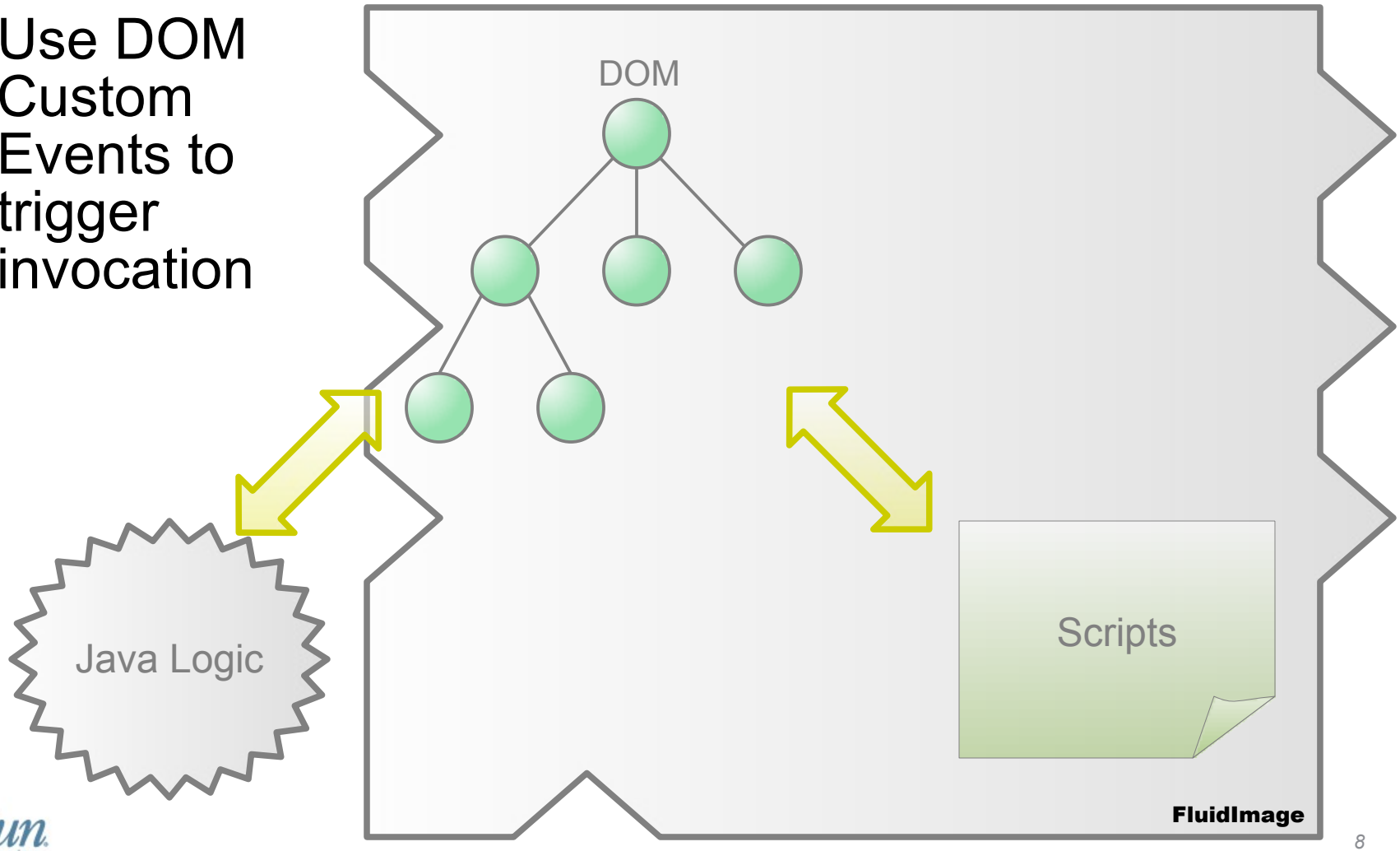
Use Case #4 Web to invoke Java and vice-versa

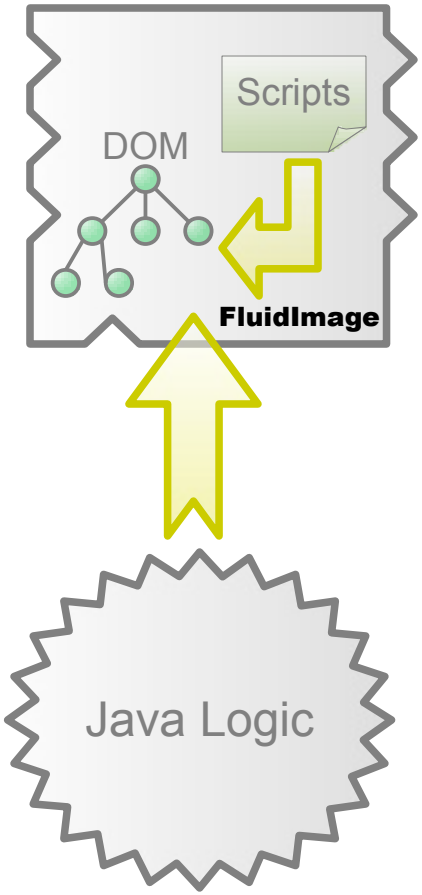
- Use DOM Custom Events to trigger invocation

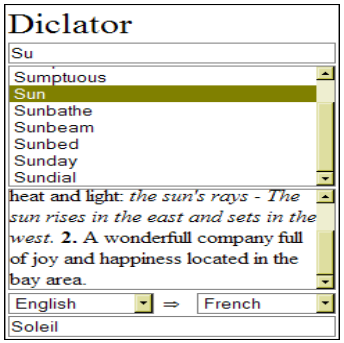


About JSR 290

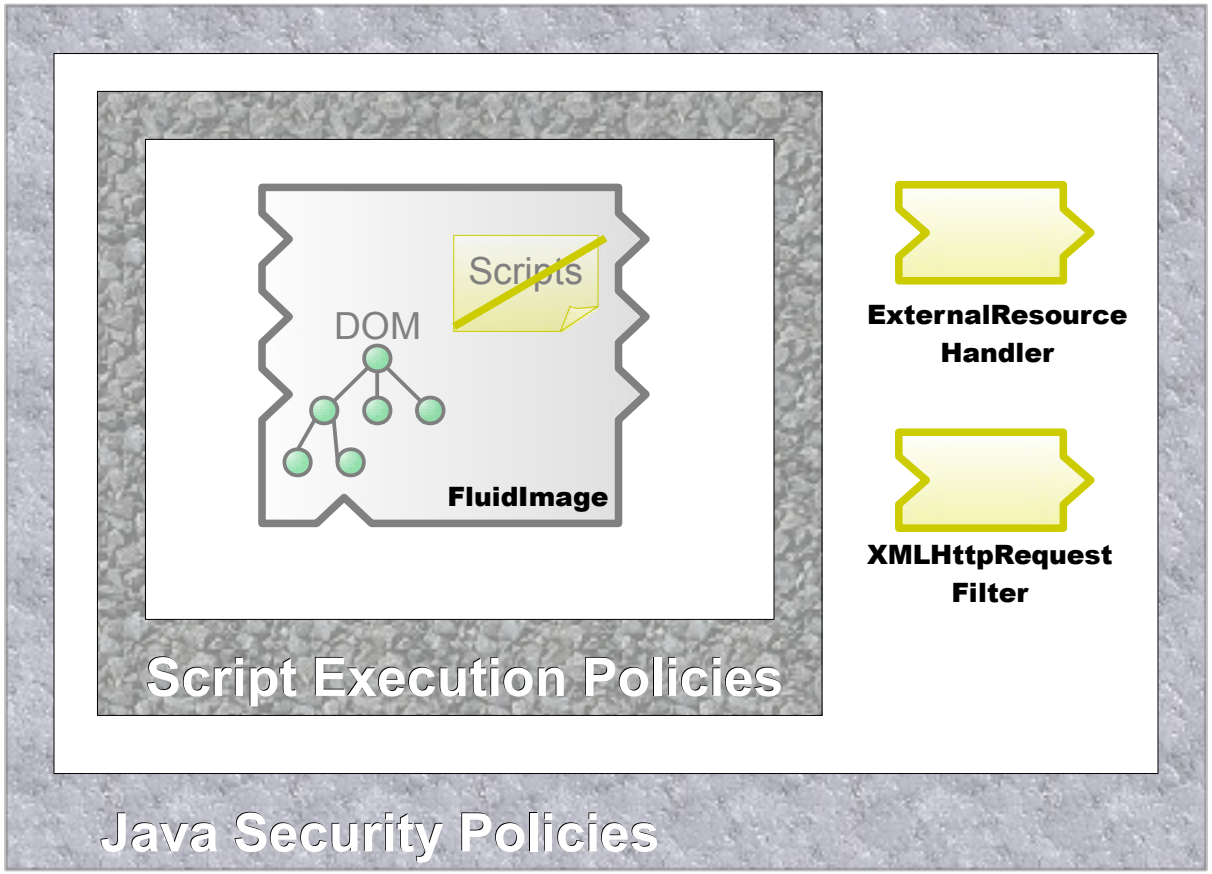
Use Case #5 DOM between ECMAScript and Java

```
#title {
  font-size: 20pt;

}
#result {
  width: 234px;
  overflow: auto;
  font-weight: normal;
  border: 1px solid grey;
  height: 114px;
}
</style>
</head>

<body>
<div id="display">
<table id="table">
```





About JSR 290
Use Case #6 Security



Control Hooks:

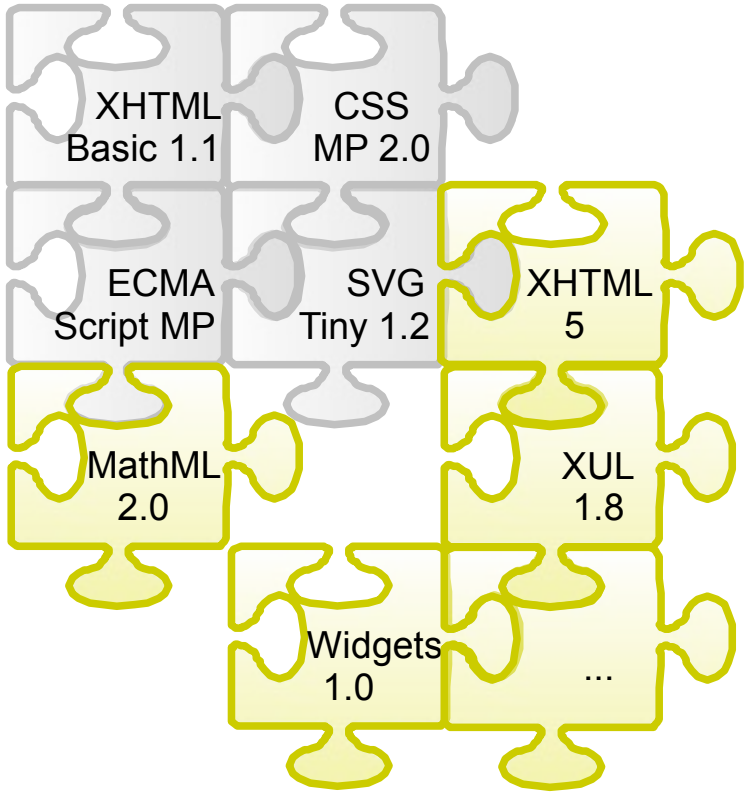
- No script
- Filter XHR
- Filter Links

Constrained by:

- Web rules
- Java Sandbox

About JSR 290

Use Case #7 Feature Extensibility

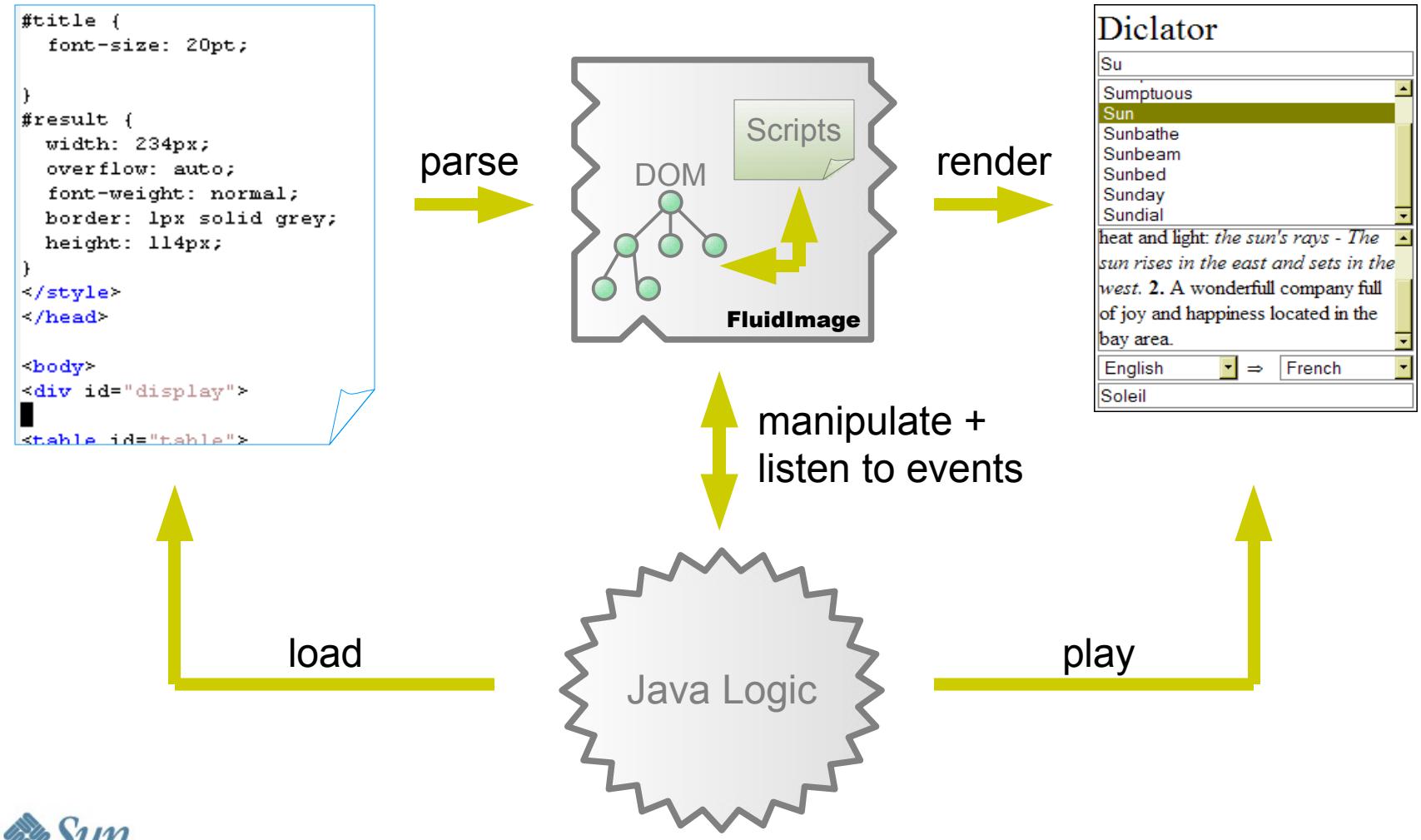


- WICD Mobile 1.0 is common denominator
- Implementation may support more
- Features can be queried
- Generic API allows feature additions in maintenance or MSAs

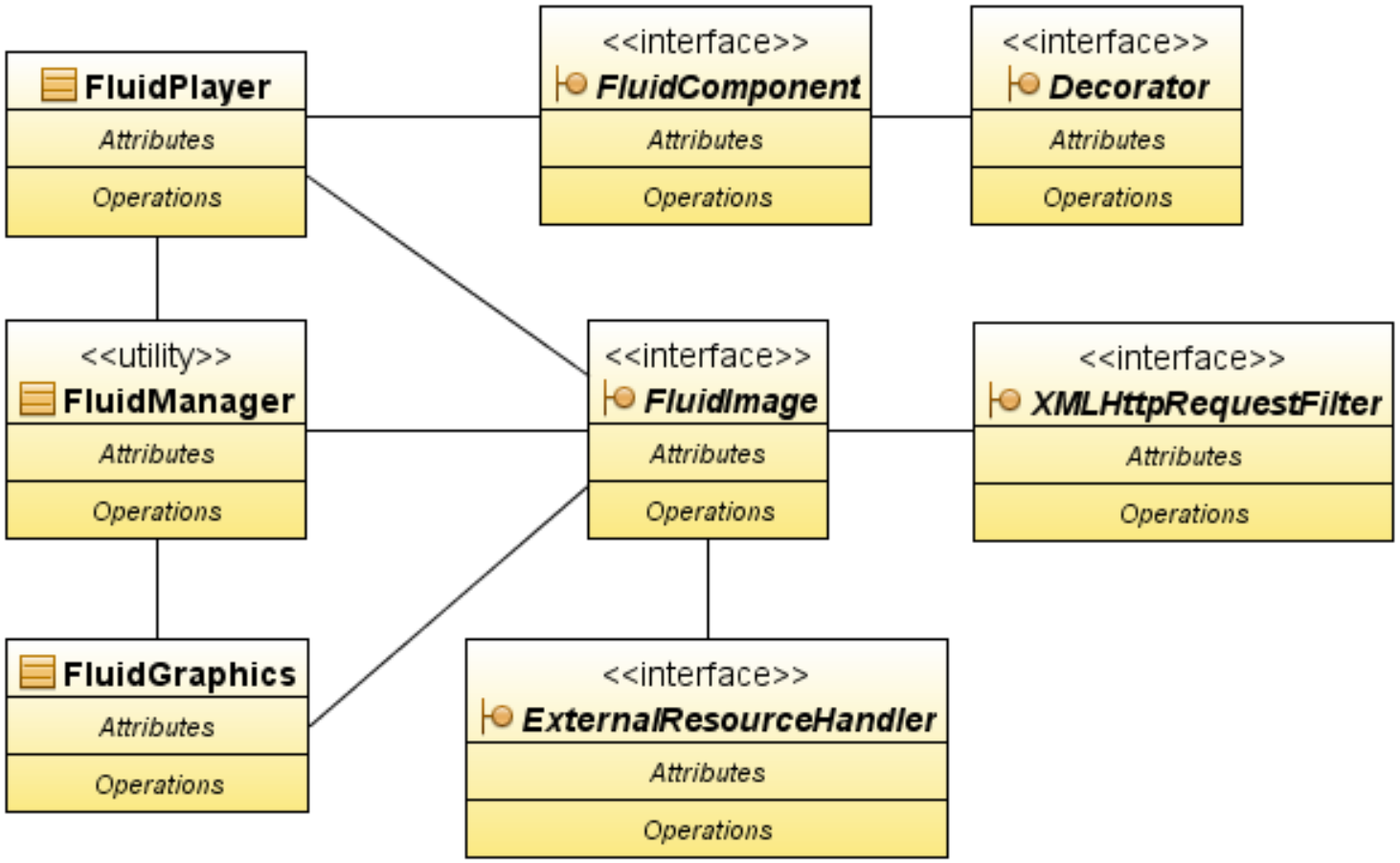
Warm up Demo
Local Web UI, Remote Data

- Java MIDlet
- UI as a combination of XHTML, SVG, CSS
- UI in Java Source
- ECMAScript for dynamic content
- Java to handle secure networking

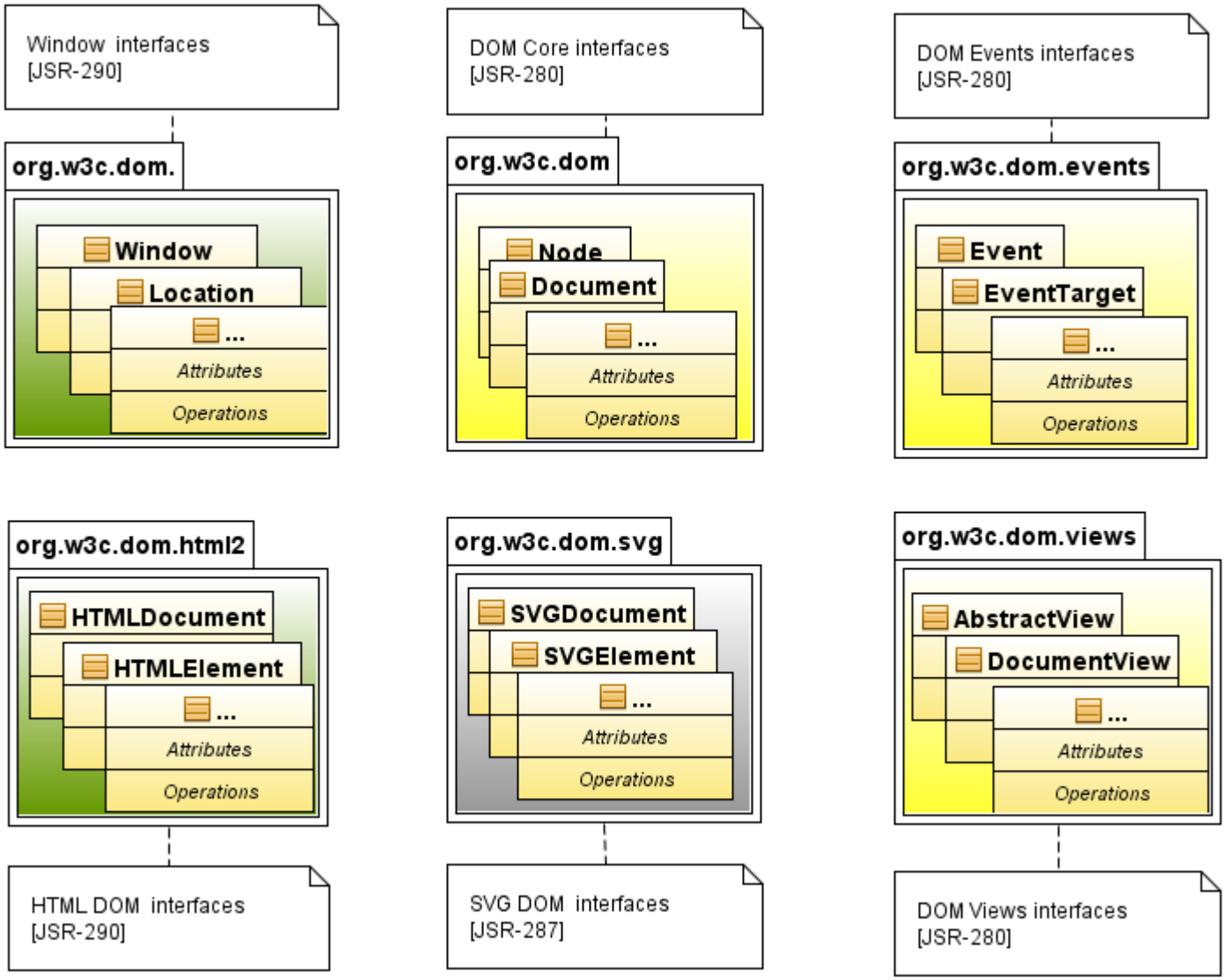
JSR 290 Workflow



Fluid API - javax.fluid.*



DOM API - org.w3c.dom.*



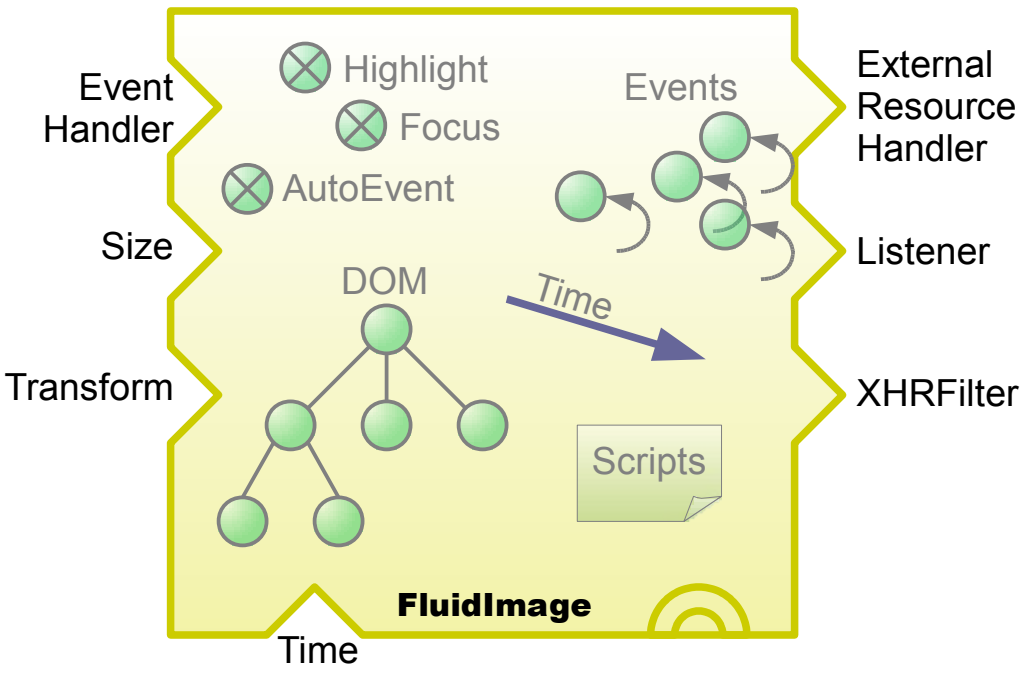
Fluid API - javax.fluid.*

- Create
  - *FluidManager*
- Play
  - *FluidPlayer*
- Render
  - *FluidGraphics*, *FluidComponent*
- Filter, Handler
  - *XMLHTTPRequestFilter*
  - *ExternalResourceHandler*

Fluid API - Listeners

- FluidImageListener
  - document loading stages
  - loading errors and warnings
- FluidEventListener
  - keyboard events
  - mouse events
  - show, hide and resize
- DOM event listener

The `FluidImage`
All-in-One



- Living Object
- DOM accessible through any Java org.w3c.dom.* API
- Time relates to SMIL time container
- Visual transforms
- May catch XHR and Links

The `FluidImage` /2
Code: Creation

```
FluidImage fi = FluidManager.createImage(
                    "http://localuicc/test.xhtml",
                    null,
                    false,
                    null,
                    null);
```

- From an URL
- No External Resource Handler
- Scripts allowed
- No XHR Filter
- No Listener

```
String svgRect = '<?xml version="1.0"?>'
               + '<svg ...><rect .../></svg>';
FluidImage fi = FluidManager.createImage(
                    svgRect,
                    "image/svg+xml",
                    null, true, null, null);
```

- From a String
- Need a MIME-Type

```
InputStream is = this.getClass()
                     .getResourceAsStream("menu.xhtml");
FluidImage fi = FluidManager.createImage(
                    is,
                    "application/xhtml+xml",
                    null, false, null, null);
```

- From a Stream
- Need a MIME-Type

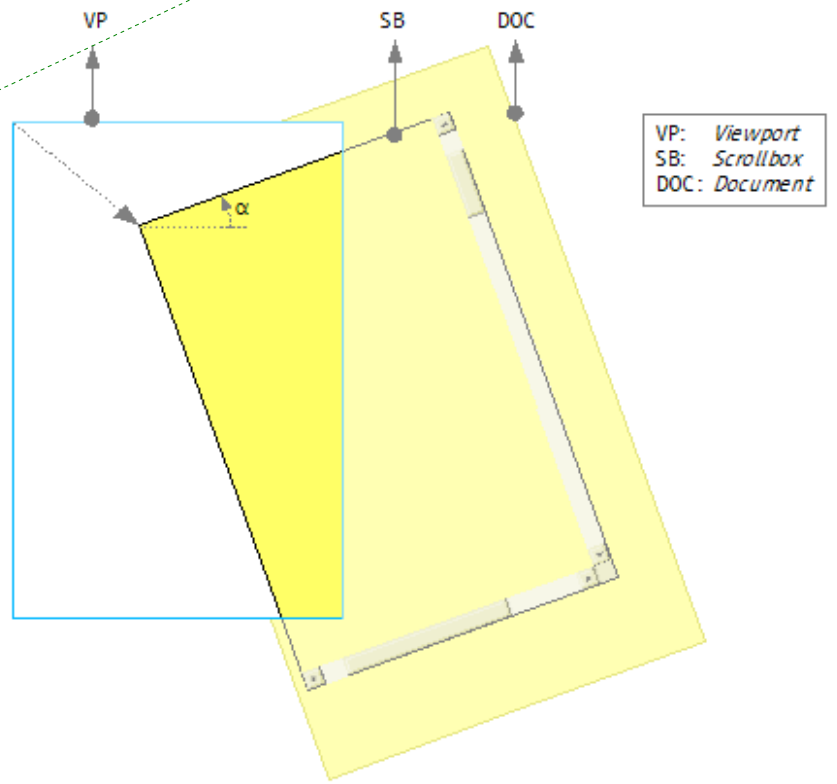
The `FluidImage` /3
Code: Views & Transforms

```
FluidImage fi = ...;

fi.setViewportHeight(HEIGHT);
fi.setViewportWidth(WIDTH);
fi.setScrollboxHeight(HEIGHT)
fi.setScrollboxWidth(WIDTH);

fi.setScrollbarsActivated(true);

fi.setCurrentTranslate(30.0f, 20.0f);
fi.setCurrentRotate(30.0f);
fi.setCurrentScale(0.5f)
```

Control all views

Set Scrollbars

Transform Image



The `FluidImage` /4
Code: Feature Handling

```
if (FluidManager.getSupportedFeatures("SVG 1.2 Tiny").length > 0)
{
   FluidImage fi = FluidManager.createImage(
       svgTmplt, "image/svg+xml", null, true, null, null);
}
```

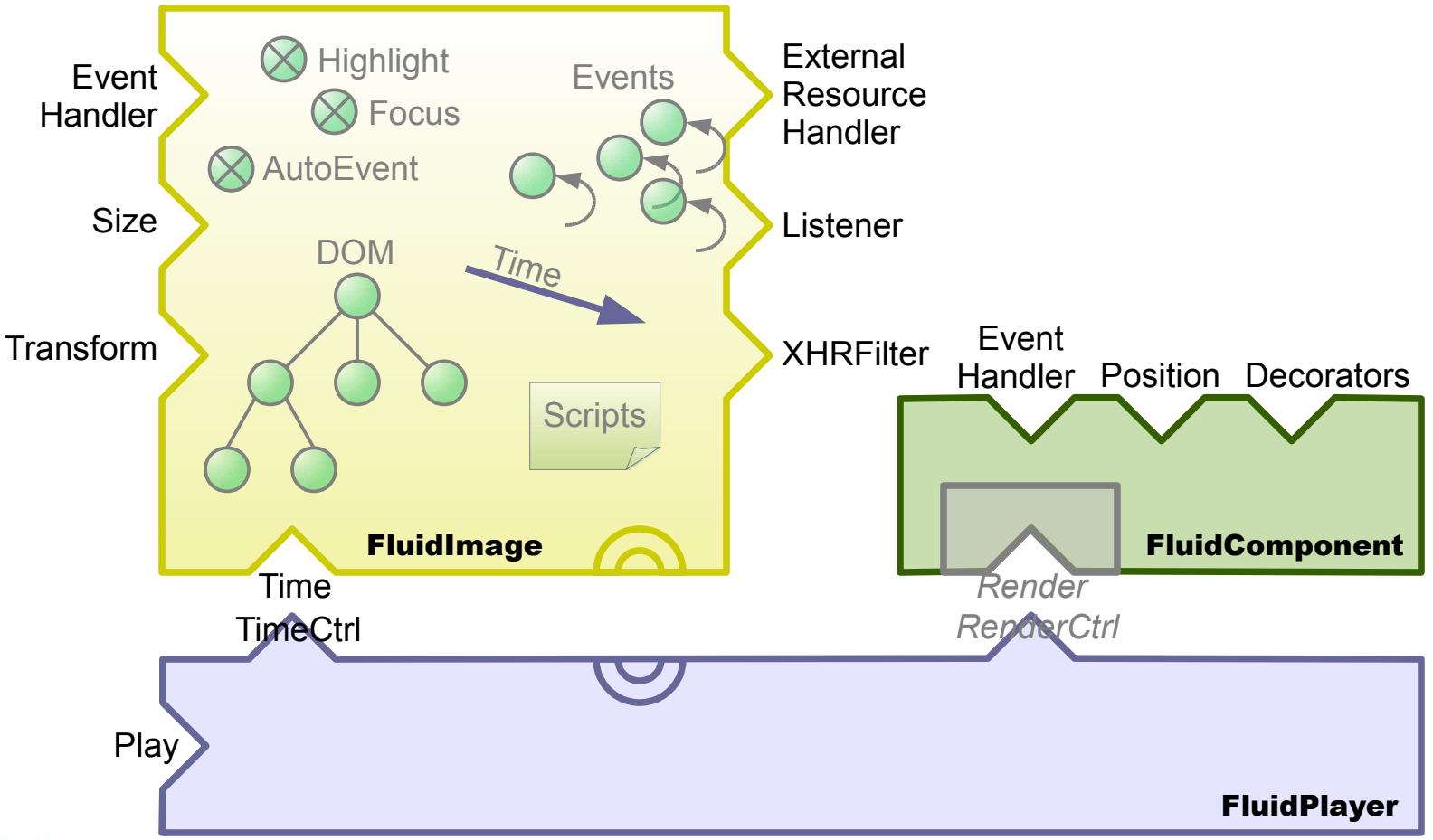
Creation depending on features

```
FluidImage fi = FluidManager.createImage(xhtml ...);
Element elm = fi.getDocument().getElementById("logo");
Element obj = null;
if (FluidManager.getSupportedFeatures("SVG 1.2 Tiny").length > 0)
{
   obj = doc.createElement("object");
   obj.setAttribute("src",  "animation.svg");
   obj.setAttribute("type", "image/svg+xml");
}
else if (FluidManager.getSupportedFeatures("PNG").length > 0) {
   obj = doc.createElement("img");
   obj.setAttribute("src",  "animation.png");
}
elm.appendChild(obj);
```

DOM Manipulation depending on features

Managed Rendering

Use `FluidPlayer` and `FluidComponent`



Managed Rendering /2
Code

```
FluidImage fi = FluidManager.createImage(
                  "http://localuicc/test.xhtml",
                  null, false, null, null);

FluidPlayer fp = FluidManager.createPlayer(
                  fi,
                  "javax.microedition.lcdui.Canvas")

FluidComponent fc = (FluidComponent)fp.getTargetComponent();

fp.setXRenderLocation(20);
fp.setYRenderLocation(30);

Display.getDisplay(this).setCurrent((Canvas)fc);

fp.play();
```

From an URL

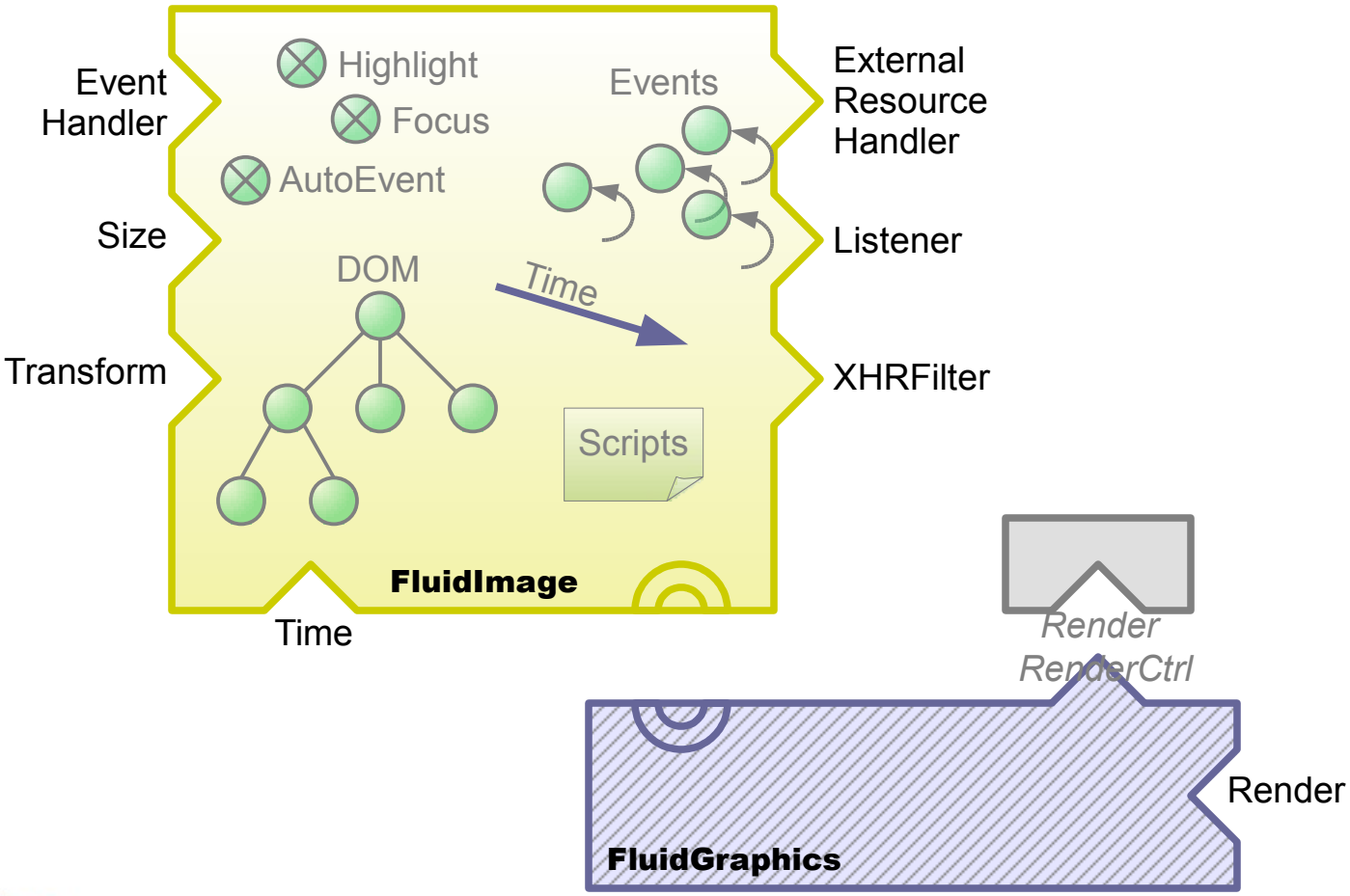
Extend Canvas

Position Player

Start rendering and animations

One-Shot Rendering

Use `FluidGraphics`



One-Shot Rendering /2
Code

```
public class FluidCanvasSample extends Canvas {

    FluidGraphics fg;
    FluidImage fi;

    public FluidCanvasSample() {
        fg = FluidManager.createGraphics();
        fi = FluidManager.createImage(
            "http://example.com/test.xhtml",
            null, false, null, null);
    }

    public void paint(Graphics g) {
        fg.bindTarget(g);
        fg.render(0, 0, fi);
    }

    ...
}
```

Create an Instance

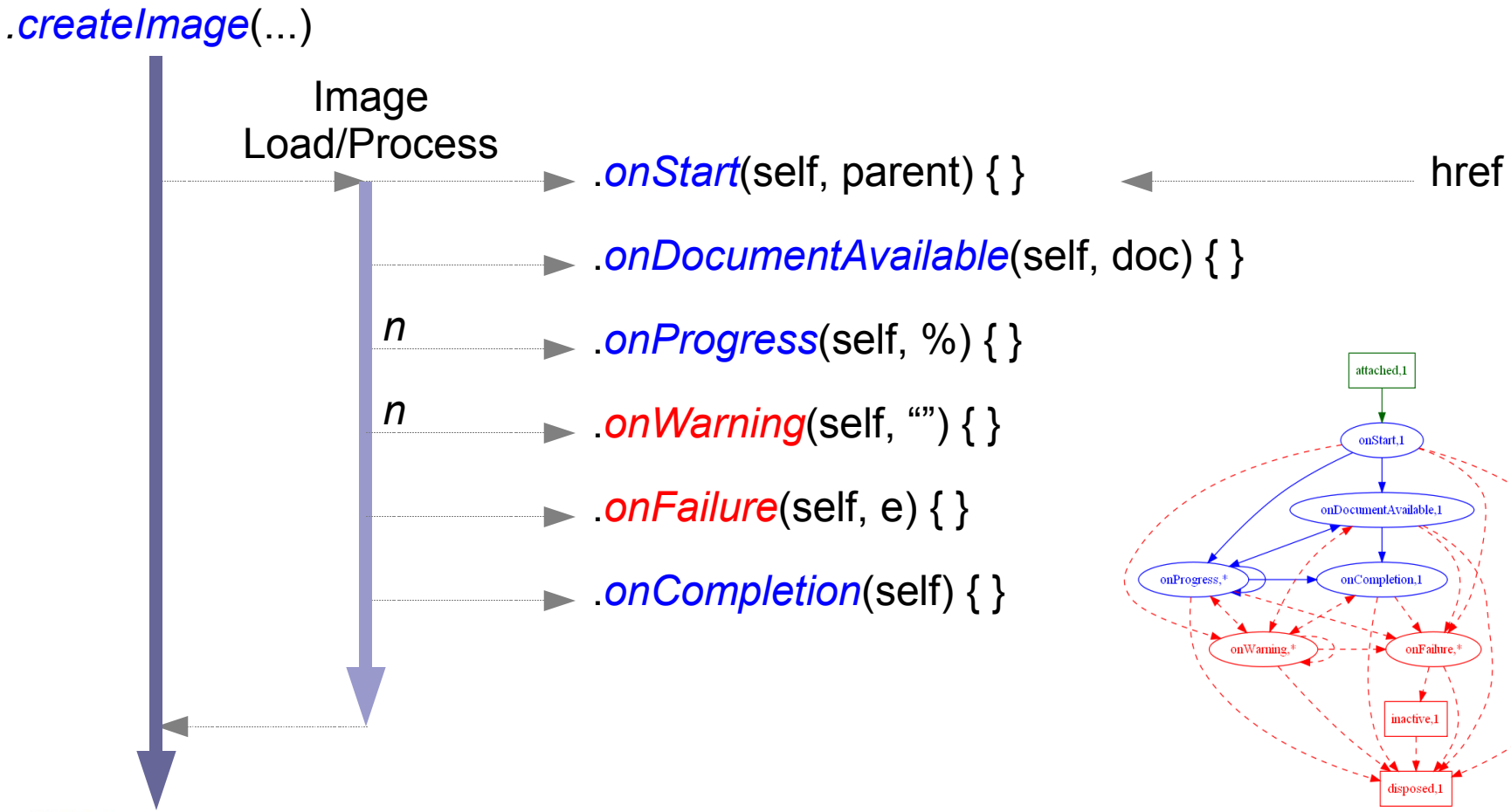
Create an URL based Fluid Image

Bind to platform

Render once

The `FluidImageListener`

Listen to the Image's insides



Development Cycle

FluidPlayerTest - NetBeans IDE 6.5

File Edit View Navigate Source Refactor Run Debug Profile Versioning Tools Window Help

TestMidlet.java

```
public void startMIDlet() {
    FluidImage fluidImage = FluidManager.createImage(
            "http://localuicc/index.html", null, false, null, null);
    FluidPlayer fluidPlayer = FluidManager.createPlayer(fluidImage,
            "javax.microedition.lcdui.Canvas");
    FluidComponent fluidComponent =
            (FluidComponent)fluidPlayer.getTargetComponent();
    fluidImage.setViewportWidth(WIDTH);
    fluidImage.setViewportHeight(HEIGHT);
    fluidPlayer.play();
    Display.getDisplay(this).setCurrent((Canvas)fluidComponent);
}
```

31:25 INS

More Demos
Demo #1 Remote UI

- Page template loaded from remote server
- Application look&feel and layout managed by CSS
- Local Stylesheet switch

More Demos
Demo #2 Browser

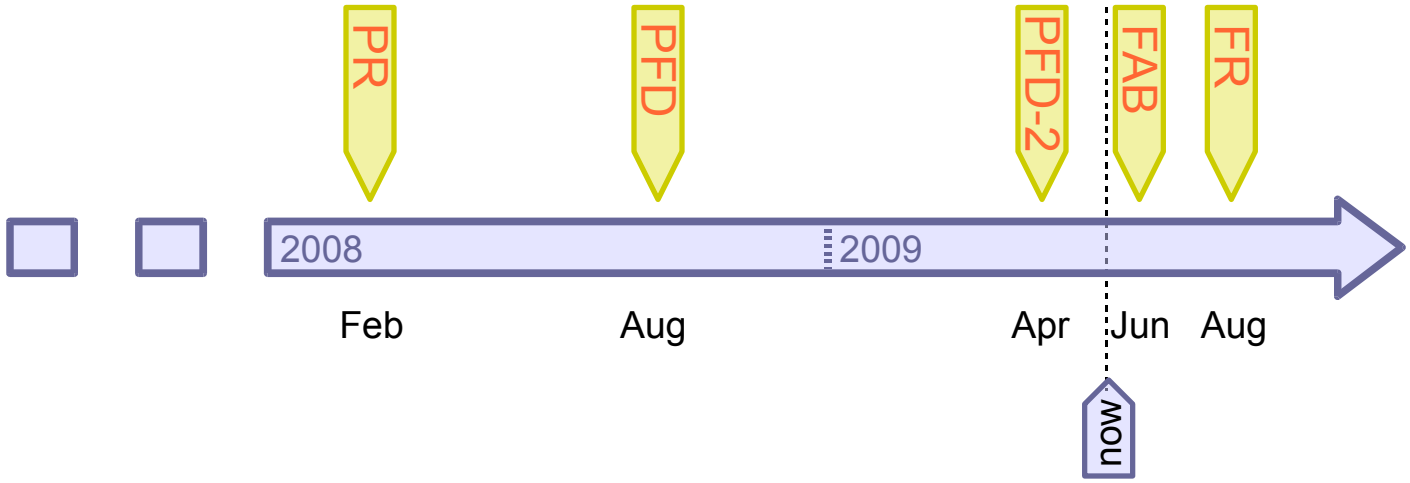
- Local XML for UI
- Remote URL
- Browsing History tracked via Listener
- 290 Implementation extended to support more formats: HTML...

Summary

- JSR 290 ...
  - is not just yet-another UI toolkit for ME
  - extends existing UI toolkit for ME
  - is generic: same API can support more web formats
  - lets You use existing expertise and tools
  - lets You integrate with web services
  - lets You separate user interface from appl. logic
  - lets You switch user interfaces on the fly
  - lets You create a develop flexible user interfaces

Status

- JSR 290 Mandatory in JSR-249-MSA2
- Targets Advanced Platform
- Schedule:



More about JSR 290

- Web Page
  - http://www.jcp.org/en/jsr/detail?id=290
- Specification/Javadoc [soon]
  - http://java.sun.com/javame/reference/apis/jsr290
- Expert Group
  - jsr-290-comments@jcp.org
- Spec Lead
  - Jean-Yves.Bitterlich@Sun.COM

Q&A

JavaOne℠

Thank You

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