

A Lightweight Architecture of an ECA Rule Engine for Web Browsers

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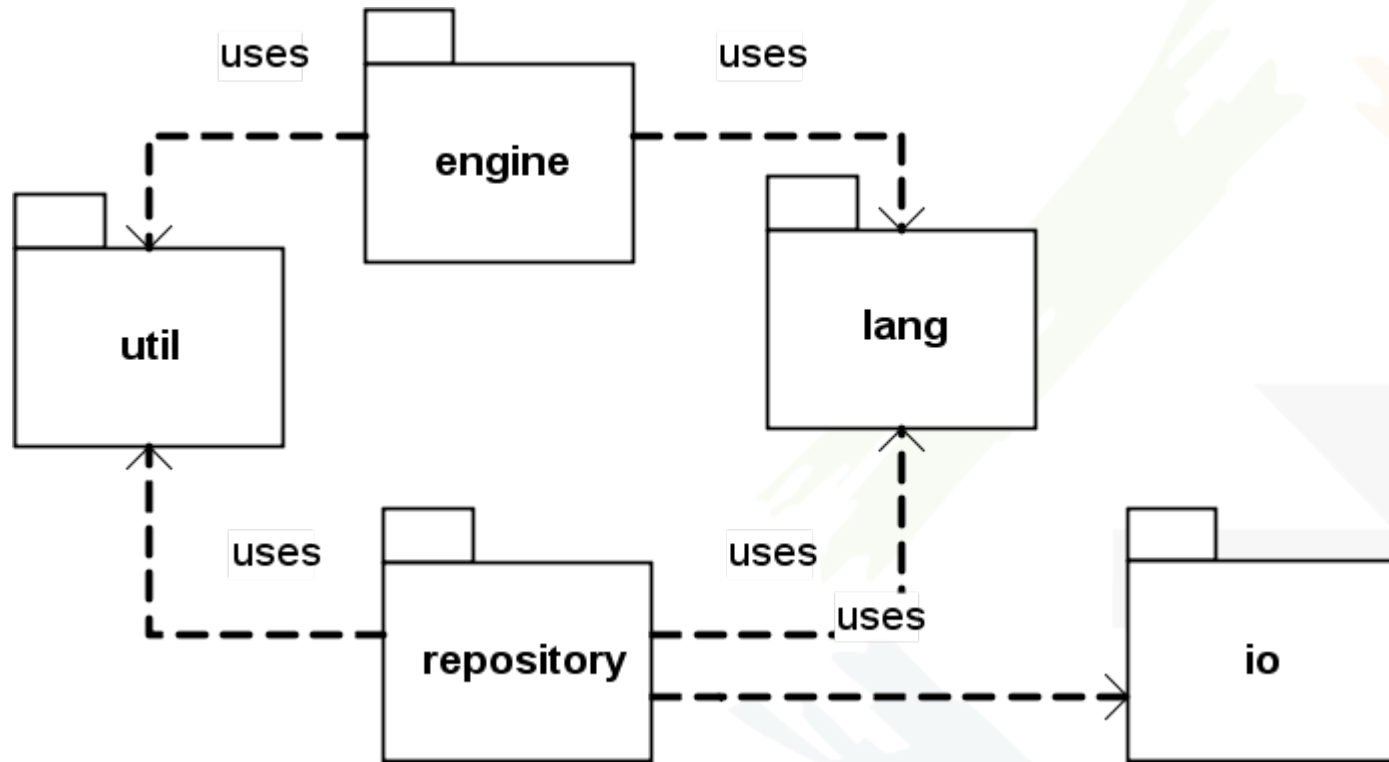
The engine – main goals

- ECA rule engine capable to handle DOM Events
- Move the reasoning process to the client-side
- Handle business workflows
- Information can be fetched and displayed in anticipation of the user response
- Pages can be updated incrementally as response to the user input
- To offer support for intelligent user interfaces
- Enable users to collaborate and share information on the WWW (rule sharing and interchange)

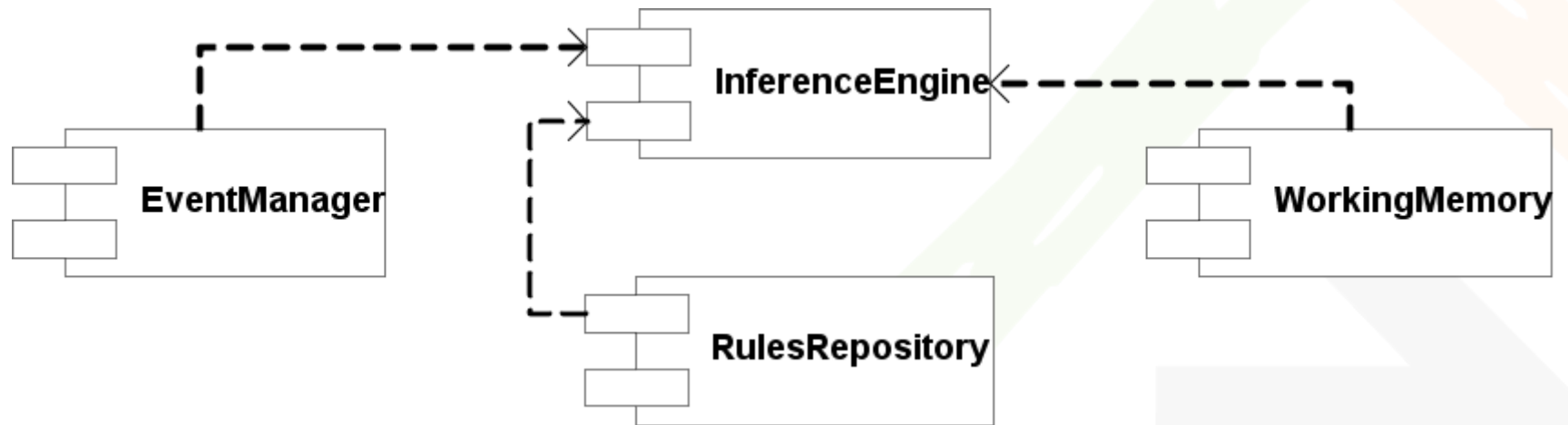
Design goals of the architecture

- Compliant with SaaS principles
- Distributed architecture - components could act and reside in different network locations
- Event-driven architecture – both human agents and software agents interact with this architecture by creating events
- Live system – reactive (responds to events) and proactive (creates events)

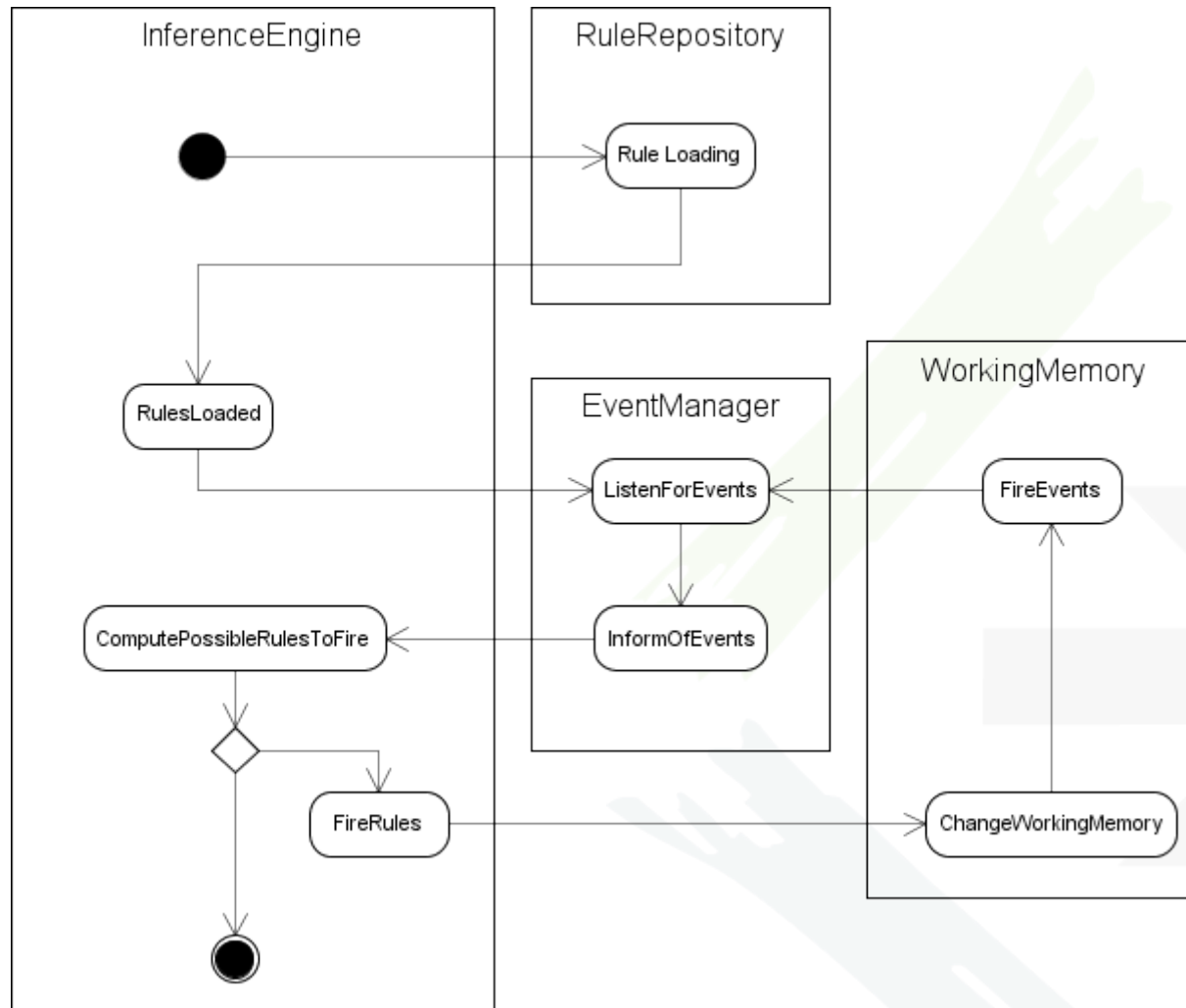
Rule Engine - Packages



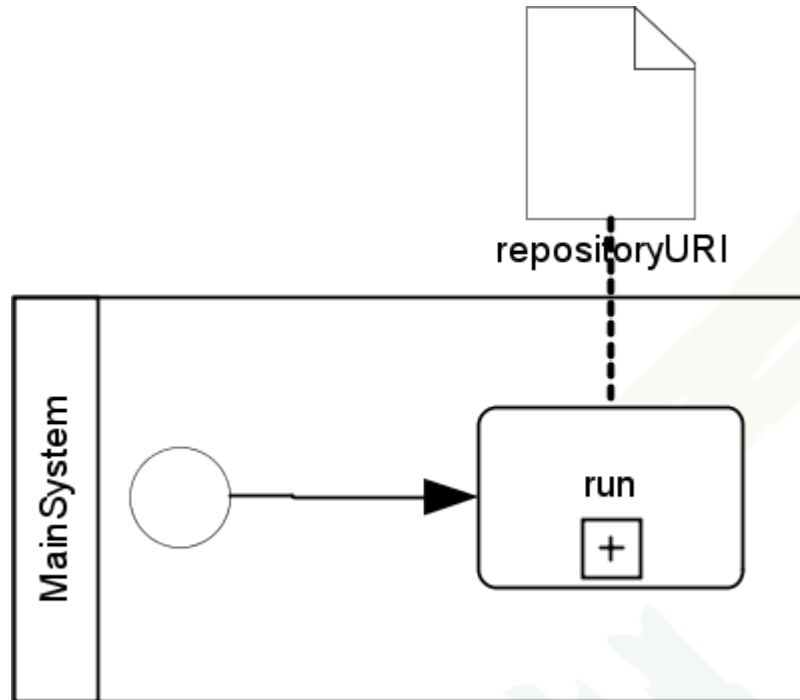
Components view



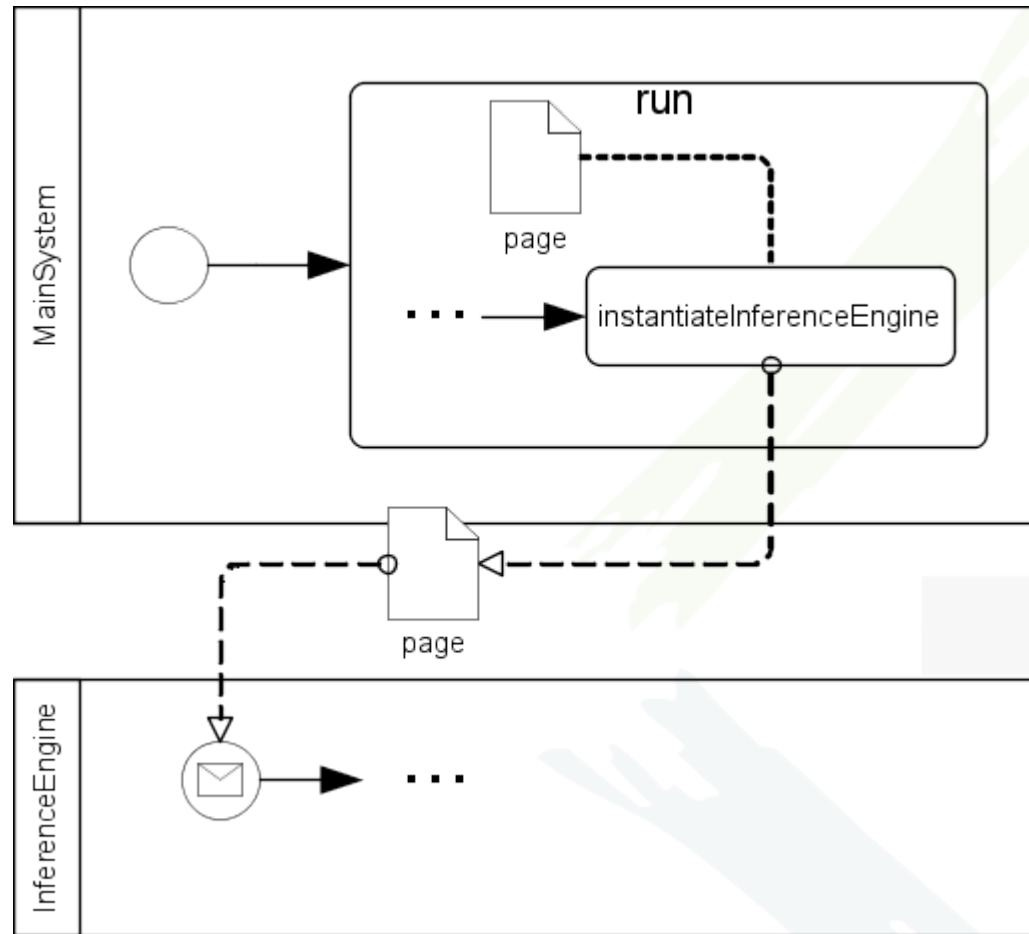
Rule Engine – State diagram



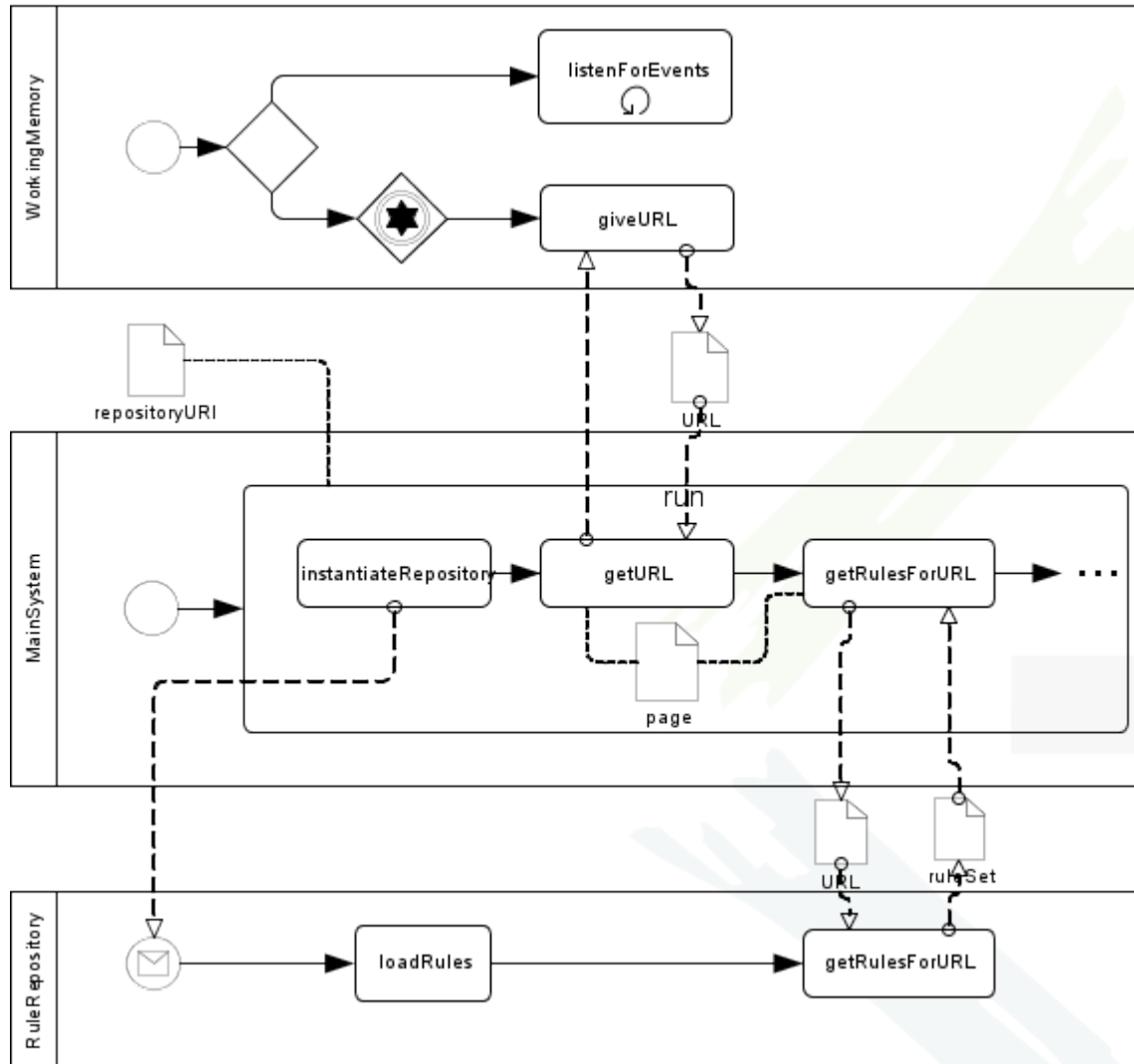
Main System



System - Inference Engine



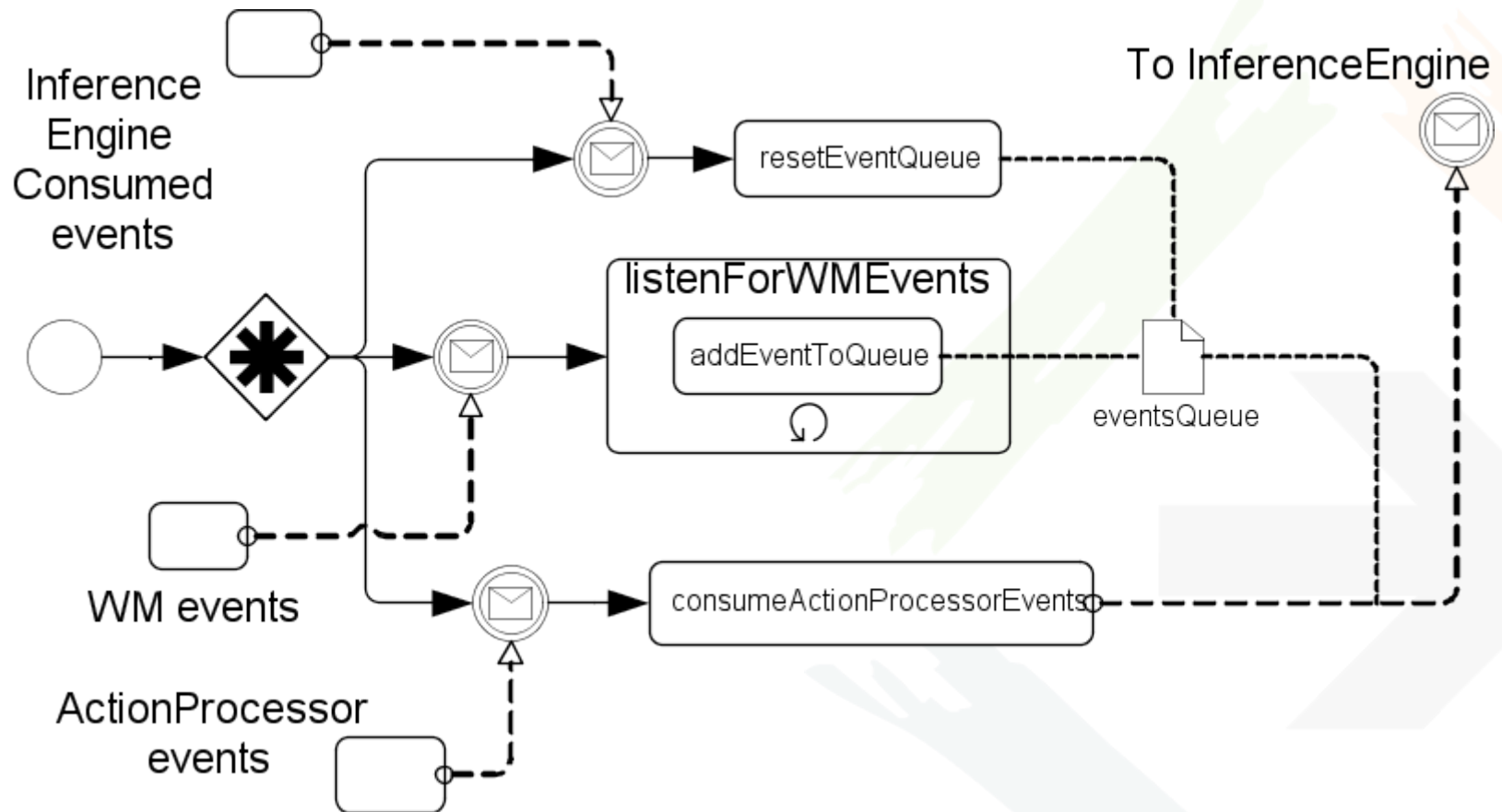
Rule Repository



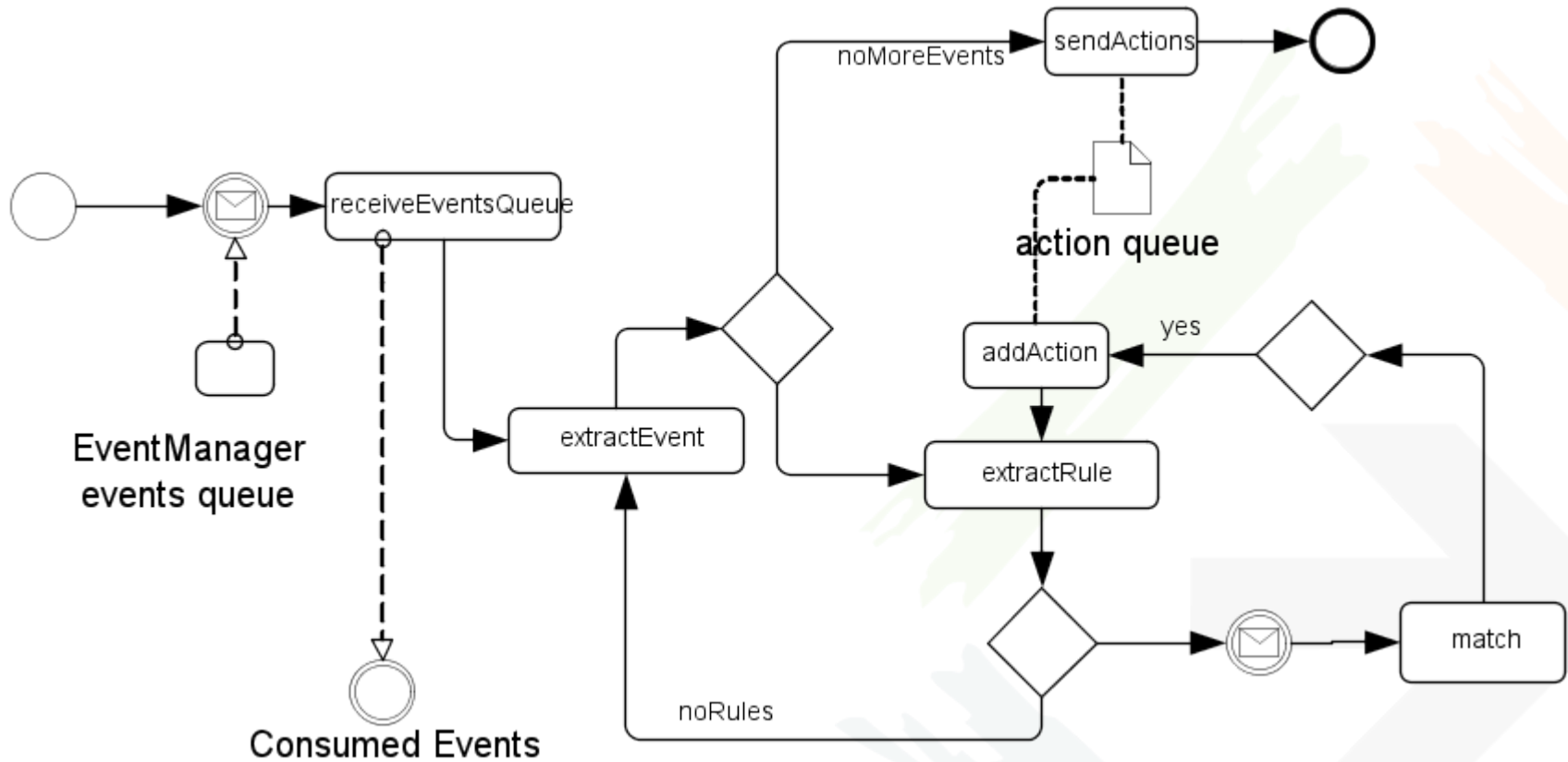
The Working Memory

- A collection of DOM trees (HTML documents & XML documents)
- A collection of AJAX responses (as DOM XML)
- A collection of events facts

The Event Manager



The Inference Engine



Embeddable JavaScript

- Embedded in pages as any JavaScript library
- Tailored towards scenarios
- Prerequisites: Dojo JavaScript Library
- Rules must reside on the same server with the page from which the engine is used

Install the embeddable JavaScript (1)

1. Set Dojo configurations

```
<script type="text/javascript"> djConfig = {parseOnLoad :  
    false, isDebug : true };  
</script>
```

2. Load Dojo

```
<script type="text/javascript"  
src="http://o.aolcdn.com/dojo/1.3/dojo/dojo.xd.js">  
</script>
```

or

```
<script type="text/javascript" src="./dojo/dojo/dojo.js">  
</script>
```

Install the embeddable JavaScript (2)

3. Embed the engine

```
<script type="text/javascript"  
src="http://jsonrules.googlecode.com/files/jsonRules_Alpha_26.08.2  
009.js">  
</script>
```

Or

```
<script type="text/javascript"  
src="http://localhost/example/jsonRules_Alpha.js">  
</script>
```

Install the embeddable JavaScript (3)

```
function loadEngine() {  
  try{  
    var engine=new org.jsonrules.JSONRulesMainSystem();  
    engine.run("http://localhost/example/rules.txt");  
  }catch(e){  
    console.error(e);  
  }  
}  
  
dojo.addOnLoad(loadEngine);
```

Firefox add-on

- Works at browser level
- Full DOM access
- *Declarative access to XMLHttpRequest objects*
- *Creation of client-side mashups*

Capturing user activity

- R1: When the mouse is over the Handbook of rules image, resize the image; if mouse out resize image to initial size.
- R2: If the user clicks on Publications open the link in a new window.
- R3: Anytime a link is clicked append the clicked link to a list.
- R4: If the mouse is over a publication entry extract the RDFa triples associated with it.

R2

R2: If the user clicks on Publications open the link in a new window.

```
{  "id": "rule104",
  "priority": 1,
  "appliesTo": ["http://localhost/example/"],
  "eventExpression": {"type": "click", "target": "$X"} ,
  "condition": [ "$X:HTMLAnchorElement
(href==`http://localhost/example/Publications.htm`,
$Y:href) ],
  "actions": [ "openPublications($currentEvent,$Y)" ]
}
```

R2 jsonified

```
#rule#
{
  "id": "rule104",
  "priority": 1,
  "appliesTo": ["http://localhost/example/"],
  "eventExpression": {
    "type": "click",
    "target": { "variable": { "name": "$X" } }
  },
  "condition": [
    { "description": {
      "type": "HTMLAnchorElement",
      "binding": { "variable": { "name": "$X" } },
      "constraints": [
        { "propertyRestriction": { "property": "href",
          "operator": "EQ",
          "value": "http://localhost/example/Publications.htm" }
        },
        { "propertyBinding": { "property": "href",
          "variable": { "name": "$Y" } } } ] ] }
  ],
  "actions": [ { "functionName": "openPublications",
    "functionArgs": [ "$currentEvent", "$Y" ] }
  ]
}
```