eForms: A Workflow Solution

California Polytechnic University

San Luis Obispo

Agenda

- Why do you need an electronic workflow?
- What should a workflow application do?
- How do you build one?
- Cal Poly History
- Show and Tell

Why?

University politics are vicious precisely because the stakes are so small.

Henry Kissinger

A few reasons . . .

- Better visibility and tracking, never lose a paper form again.
- Enforce a consistent process that all areas of campus will use?
- Interface with other electronic processes on campus.
- Reduce data entry errors by prepopulating enterprise data.

Workflow Shopping List

- Arbitrary activities during transitions
- Activity deadlines/timeouts
- Prepopulate forms with dynamic data
- Group assignment
- Process versioning
- Standards based
- Integration hooks
- Easy to develop new workflows

Contenders

ObjectWeb Bonita

Enhydra Shark

Open Business Engine

WfMOpen

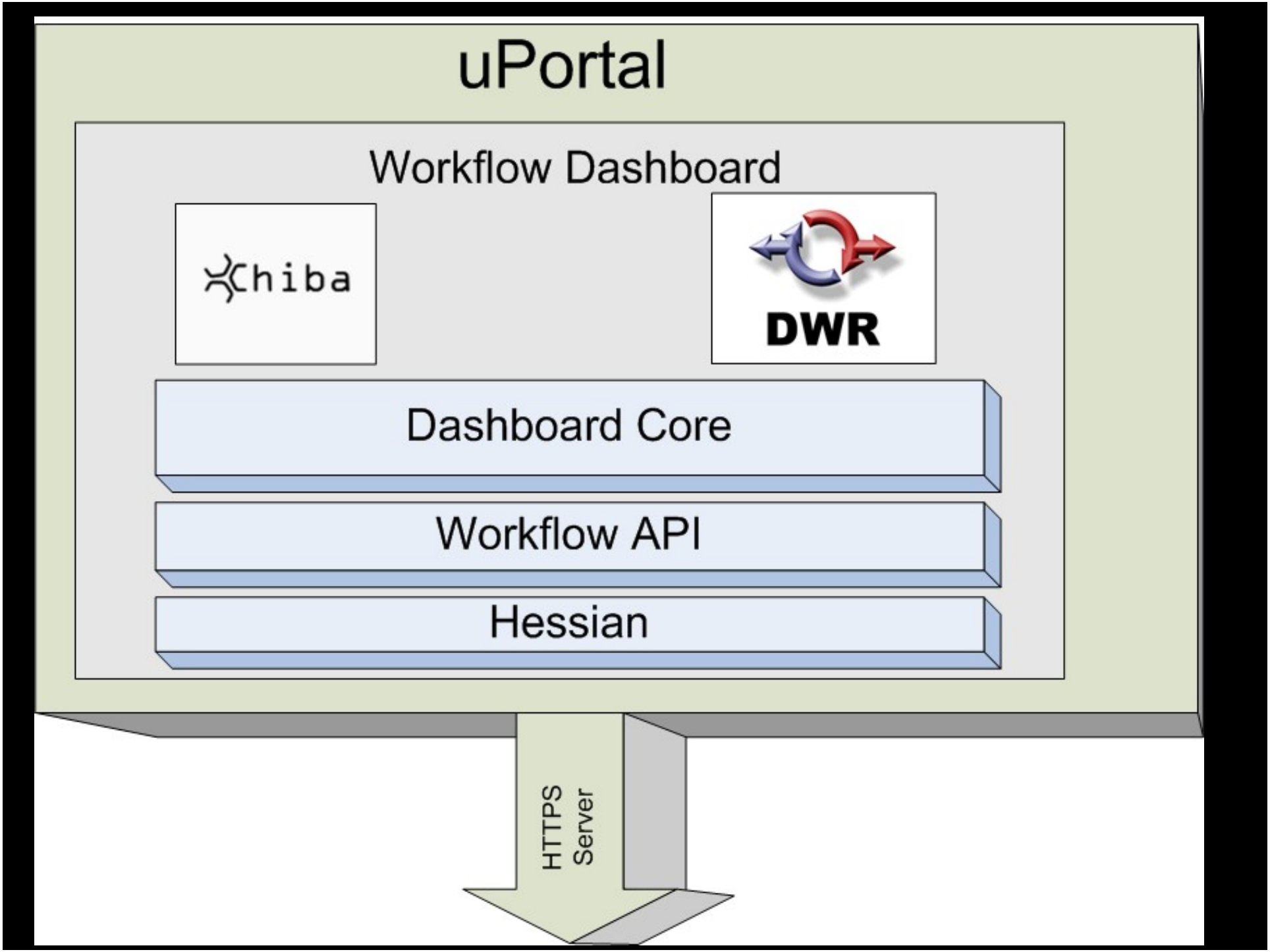
OSWorkflow

JBoss jBPM

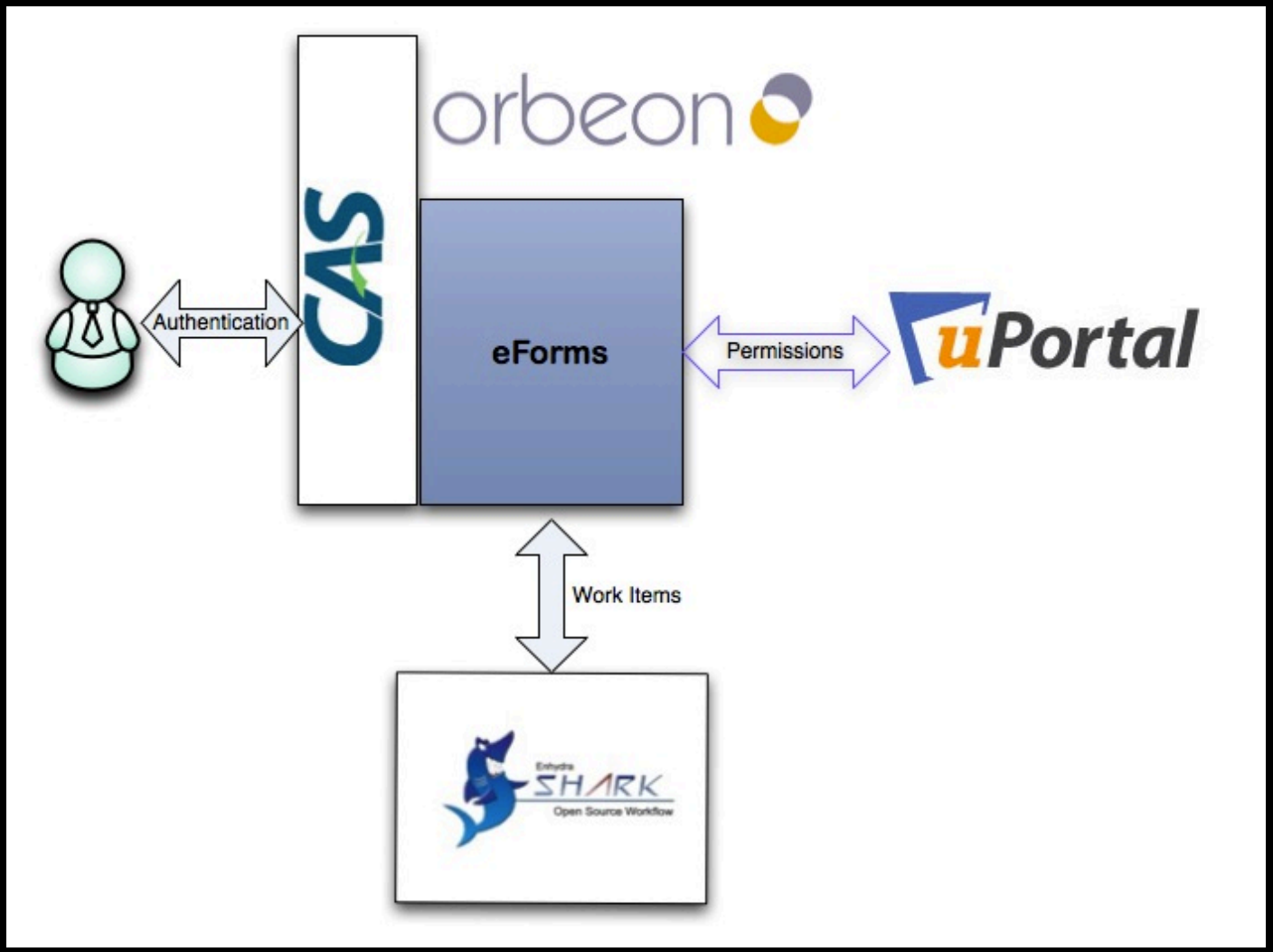
Apache OFBiz

OpenWFE

History


uPortal
Workflow Dashboard
Chiba
DWR
Dashboard Core
Workflow API
Hessian
HTTPS
Server

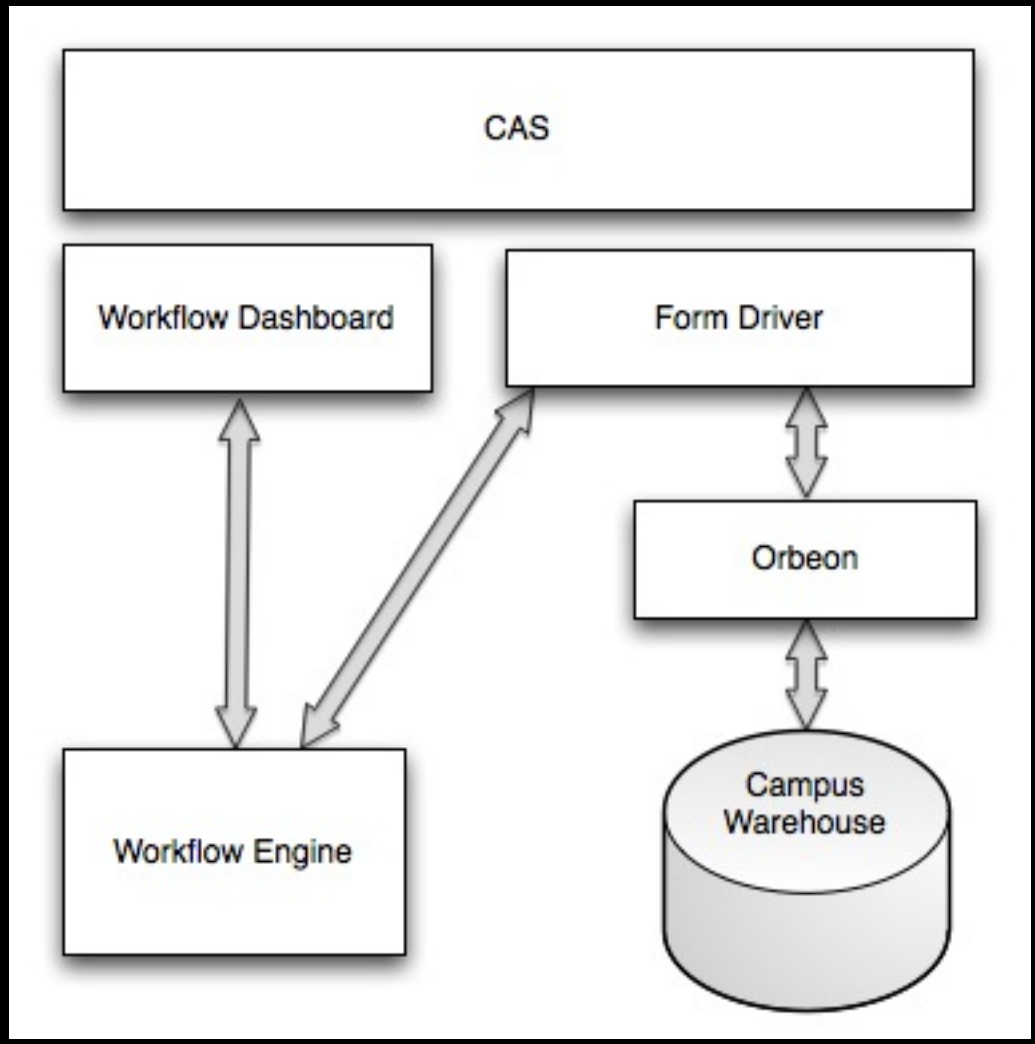
Open source to the rescue . . .


orbeon
CAS
Authentication
eForms
Permissions
uPortal
Work Items
Enhydra
SHARK
Open Source Workflow

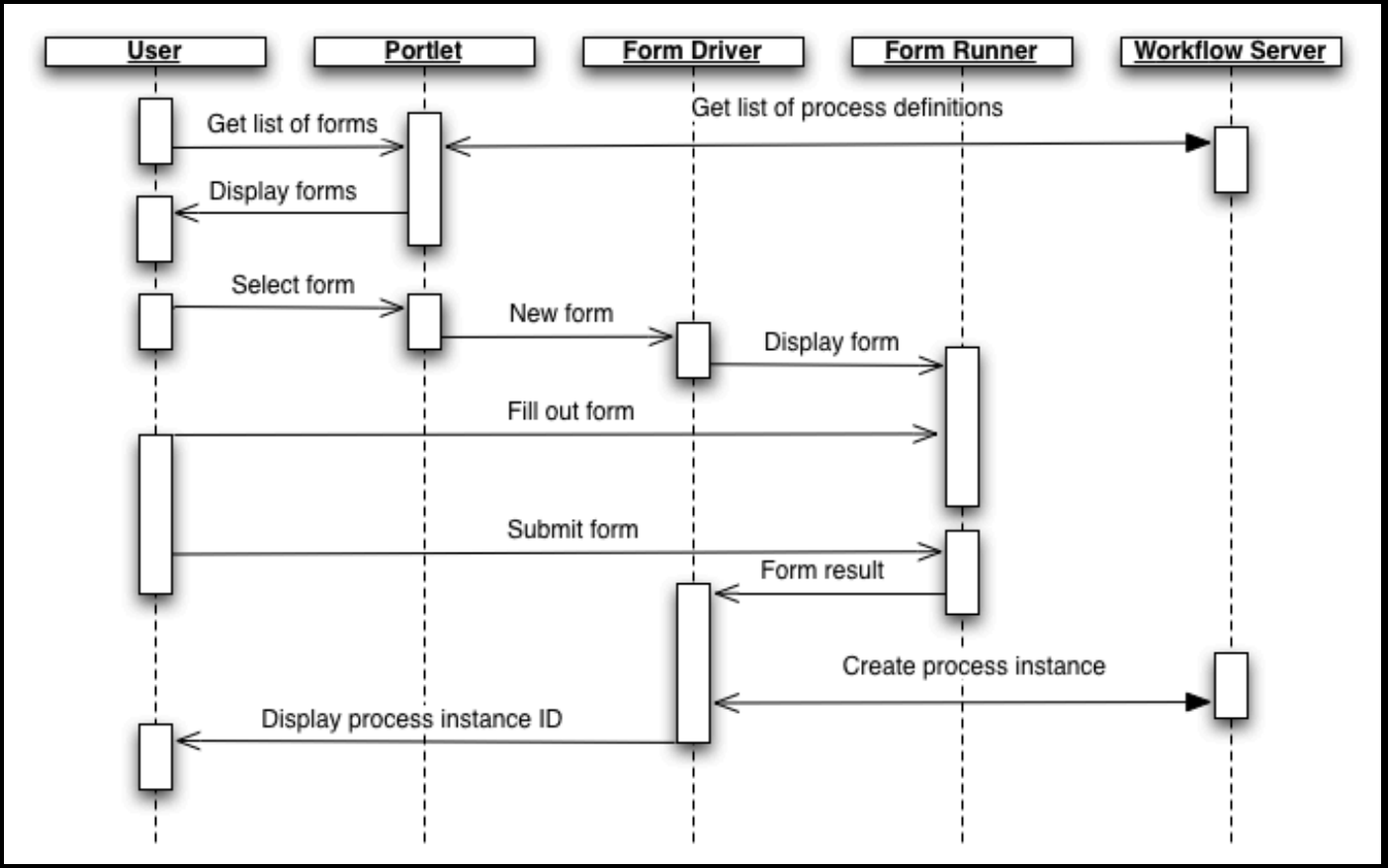
DEMO

- Building workflow
- Building forms
- Email templates
- Deploy
- Create workflow
- Route
- Report

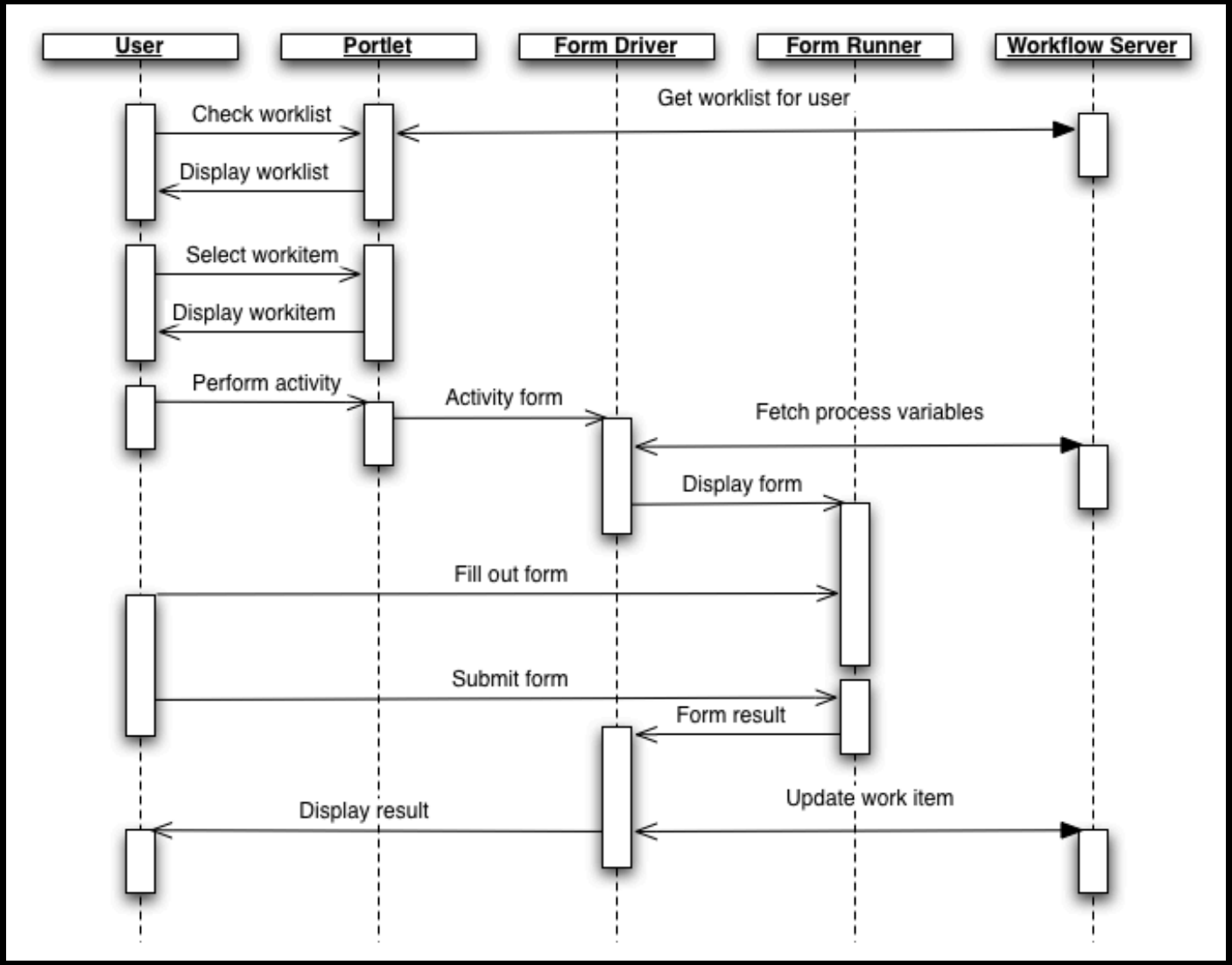
Architecture



New Form


User
Portlet
Form Driver
Form Runner
Workflow Server
Get list of process definitions
Get list of forms
Display forms
Select form
New form
Display form
Fill out form
Submit form
Form result
Create process instance
Display process instance ID

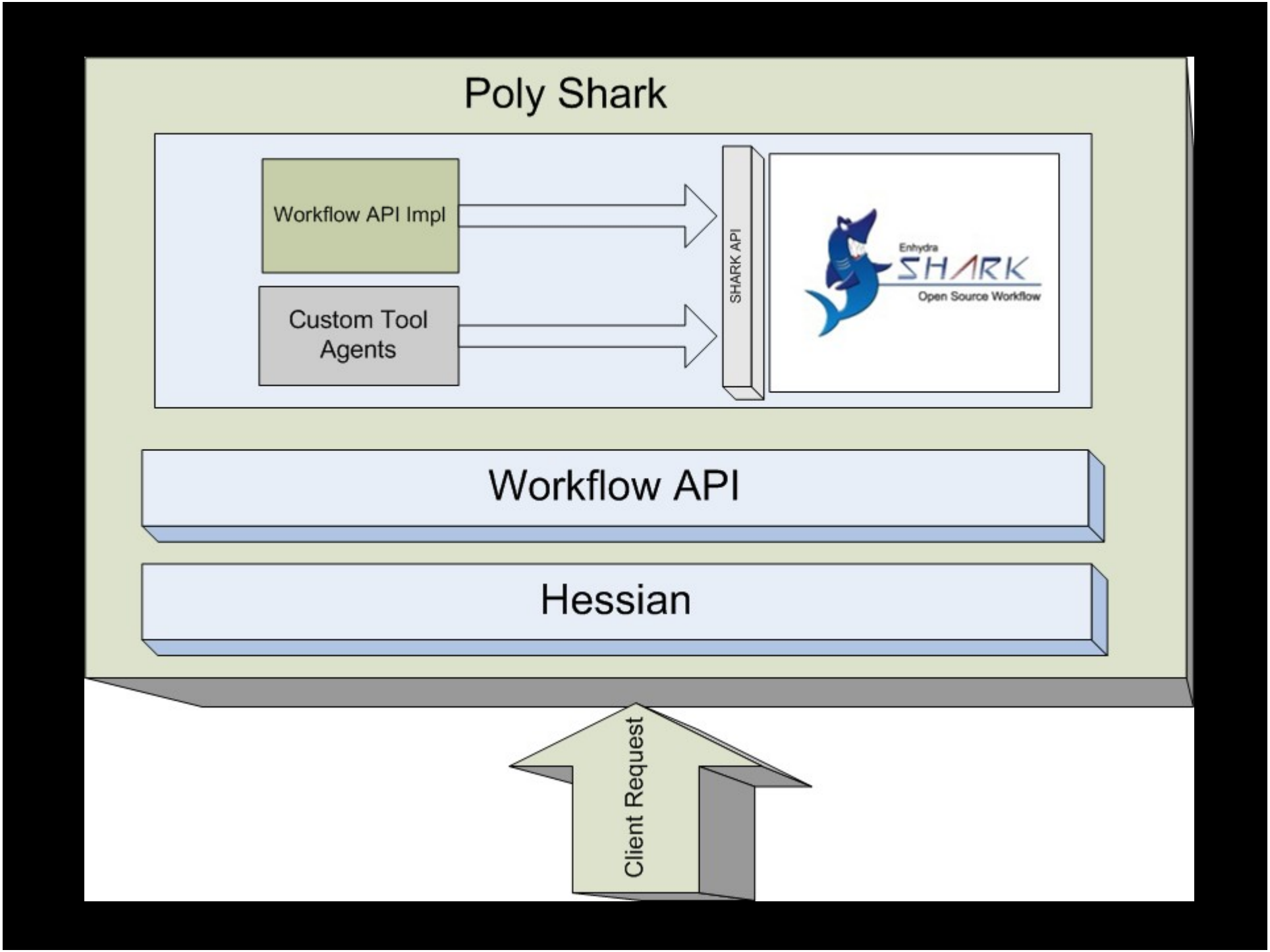
Performing Activity



How we built it

Don't swim with Sharks

- Shark native SOAP API
  - dependencies on Shark jars
  - not transactionally safe
    - each SOAP call is a transaction, problematic for multiple API calls


Poly Shark
Workflow API Impl
Custom Tool Agents
SHARK API
Enhydra
SHARK
Open Source Workflow
Workflow API
Hessian
Client Request

API

ProcessInstance

```
public String getProcessId();
public String getId();
public String getName();
public String getDescription();
public ProcessInstanceState getState();
public int getPriority();
public String getRequester();
public List<ProcessVariable> getVariables();
public ProcessVariable getVariableByName(String name);
public Date getCreatedTime();
public Date getStartedTime();
public Date getFinishedTime();
public String getXFormsFile();
```

ProcessVariable

```
public String getName();
public String getDescription();
public ProcessVariableType getType();
public Object getValue();
public boolean isReadOnly();
```

ProcessInstanceState

```
public boolean isOpen() {
public boolean isClosed() {
```

Security

- Uses Groups and Permissions with uPortal
- Granular control
  - Create, view, edit, terminate, reassign
- Per work flow
- Remote API Security
  - Basic Authorization over SSL

Advantages of PolyShark API

- No Shark dependencies within the portal
- Fewer jars to deploy, easier to manage
- Transactions made safe across activities
  - single work units
  - call multiple APIs as needed

Disadvantages

- Need to constantly add functionality to the API that is already found in the Shark API
- Not as efficient as the Shark API
  - doesn't support result filtering at the server

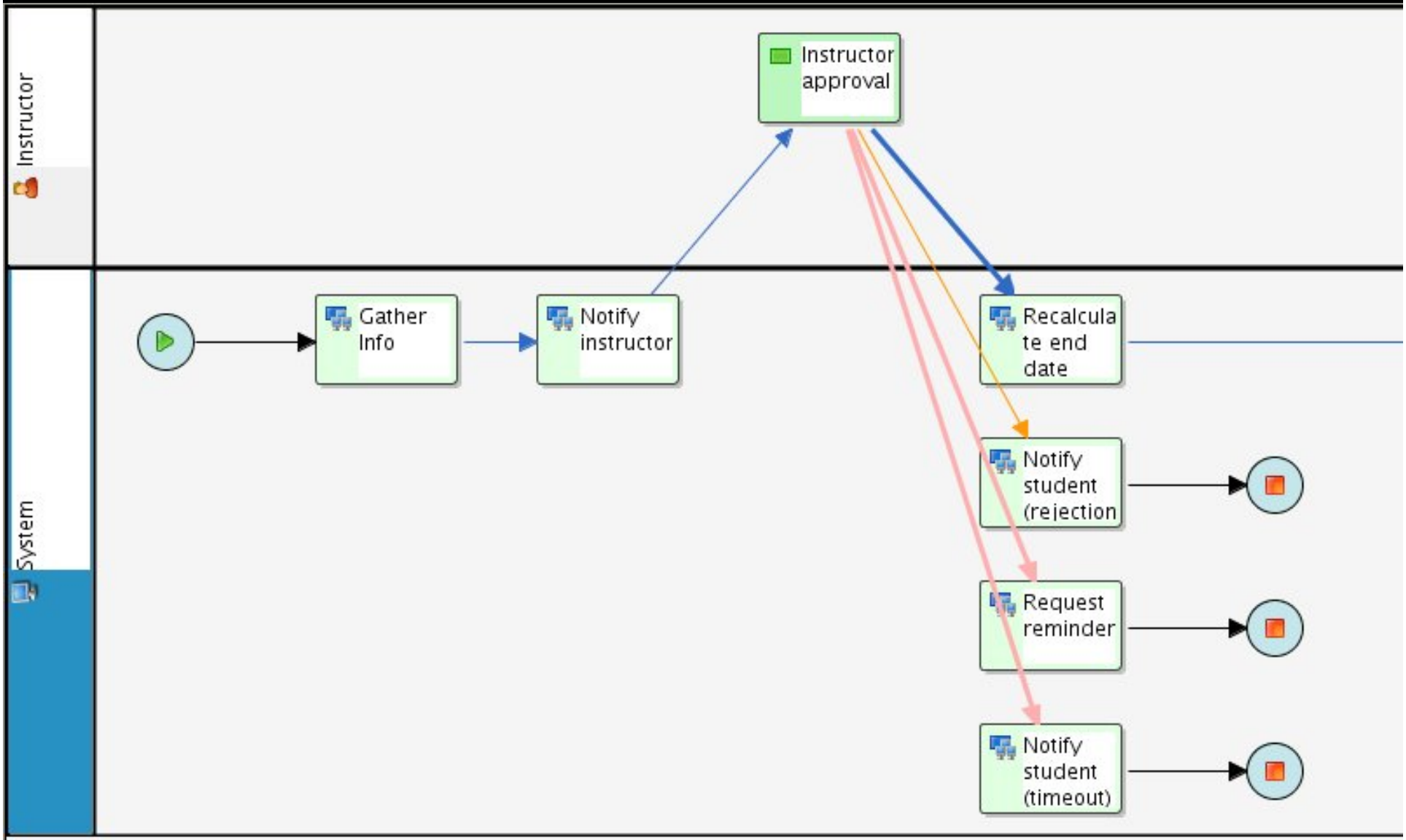
How to use PolyShark

- Technical
  - Define the process (process definition)
  - Collect initial data (formal parameters)
  - Manage the workflow
- Functionally
  - Review the process, improve the process
  - Understand reporting requirements

Define the process

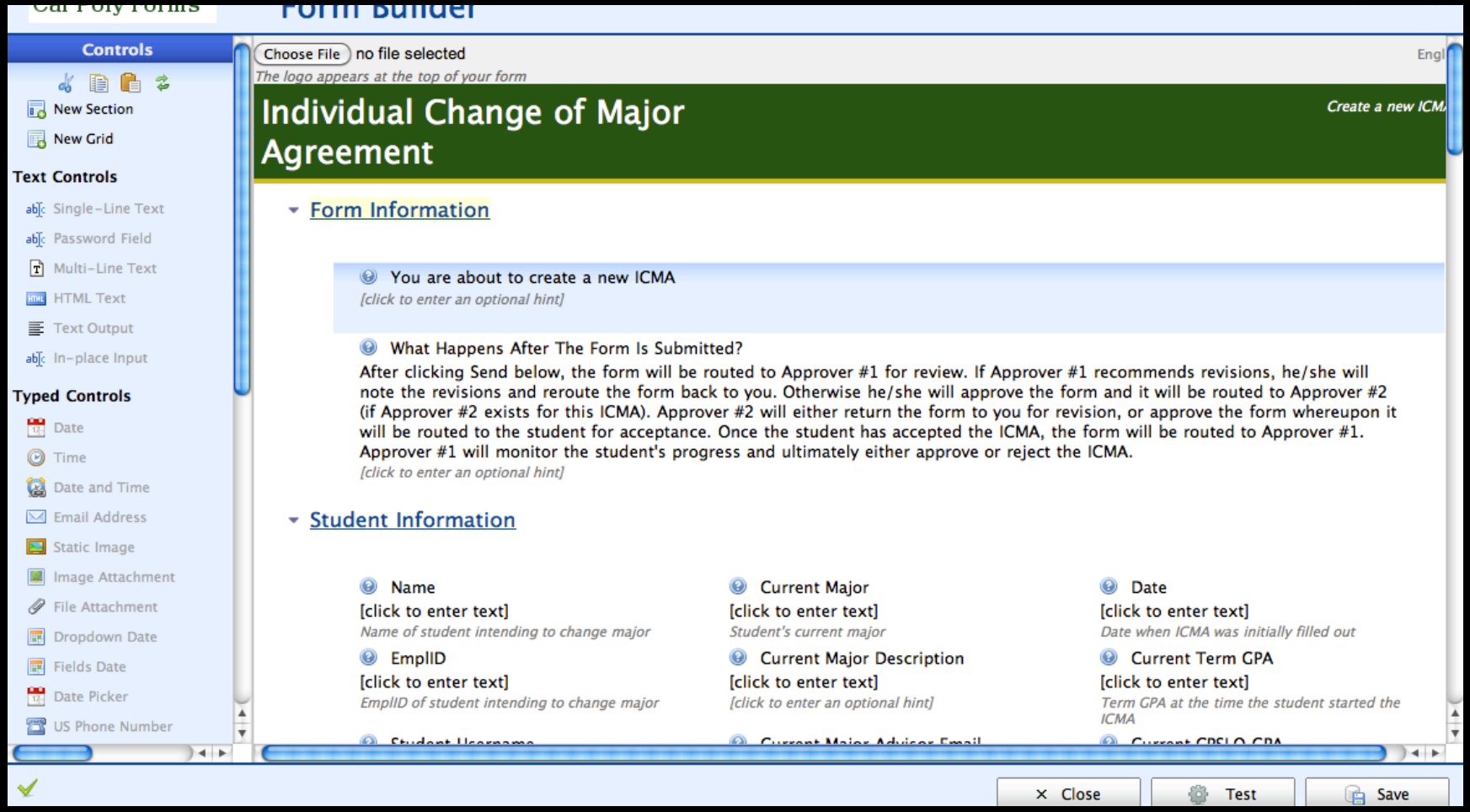
- XPDL describes the process design
  - Participants
  - Activities
  - Transitions
    - tie activities together
  - Applications (Tool agents)
    - Something the server does, send email, insert into db
- Creating a process always uses the latest version
    - effective dating on process definition

Enhydra JaWE



```
<?xml version="1.0" encoding="UTF-8" standalone="no"?>
<xpdl:Package xmlns:xpdl="http://www.wfmc.org/2002/XPDL1.0" xmlns="http://www.wfmc.org/2002/XPDL1.0" xmlns:xsi="http://www.w3.org/2001/XML
    <xpdl:PackageHeader>
        <xpdl:XPDLVersion>1.0</xpdl:XPDLVersion>
        <xpdl:Vendor>Together</xpdl:Vendor>
        <xpdl:Created>2010-12-13 11:36:00</xpdl:Created>
    </xpdl:PackageHeader>
    <xpdl:ConformanceClass GraphConformance="NON_BLOCKED"/>
    <xpdl:Script Type="text/java"/>
    <xpdl:Applications>
        <xpdl:Application Id="msg_db">
            <xpdl:FormalParameters>
                <xpdl:FormalParameter Id="key" Mode="IN">
                    <xpdl:DataType>
                        <xpdl:BasicType Type="STRING"/>
                    </xpdl:DataType>
                </xpdl:FormalParameter>
                <xpdl:FormalParameter Id="result" Mode="OUT">
                    <xpdl:DataType>
                        <xpdl:BasicType Type="STRING"/>
                    </xpdl:DataType>
                </xpdl:FormalParameter>
            </xpdl:FormalParameters>
            <xpdl:ExtendedAttributes>
                <xpdl:ExtendedAttribute Name="ToolAgentClass" Value="edu.calpoly.shark.toolagent.MessageDatabaseToolAgent"/>
            </xpdl:ExtendedAttributes>
        </xpdl:Application>
        <xpdl:Application Id="send_email">
            <xpdl:FormalParameters>
                <xpdl:FormalParameter Id="from_addresses" Mode="IN">
                    <xpdl:DataType>
                        <xpdl:BasicType Type="STRING"/>
                    </xpdl:DataType>
                </xpdl:FormalParameter>
                <xpdl:FormalParameter Id="to_addresses" Mode="IN">
                    <xpdl:DataType>
                        <xpdl:BasicType Type="STRING"/>
                    </xpdl:DataType>
                </xpdl:FormalParameter>
                <xpdl:FormalParameter Id="subject" Mode="IN">
                    <xpdl:DataType>
```

GUI Forms tool



Xforms based

```
    <xforms:bind constraint="normalize-space()='' or (. &gt;=0 and .&lt;=4.0)" id="req_course_gpa_final-bind" name="req_co
</xforms:bind>
<xforms:bind id="approvals_section-bind" name="approvals_section" nodeset="approvals_section">
    <xforms:bind calculate="if($creator_is_advisor1 = 'true') then $creator_username else $advisor1_username" constraint="
    <xforms:bind constraint="string-length(.) &lt;= 8 and ($advisor1_username != $advisor2_username)" id="advisor2_usernam

    <xforms:bind id="initial_approval_1-bind" name="initial_approval_1" nodeset="initial_approval_1" relevant="false()" ty
    <xforms:bind id="initial_approval_2-bind" name="initial_approval_2" nodeset="initial_approval_2" relevant="false()" ty




    <xforms:bind id="student_approval-bind" name="student_approval" nodeset="student_approval" relevant="false()" type="xf
    <xforms:bind id="advisor2_dept-bind" name="advisor2_dept" nodeset="advisor2_dept"/>
    <xforms:bind id="advisor1_dept-bind" name="advisor1_dept" nodeset="advisor1_dept"/>
    <xforms:bind constraint="$advisor1_username='' or . != ''" id="advisor1_name-bind" name="advisor1_name" nodeset="advis
    <xforms:bind constraint="$advisor2_username='' or . != ''" id="advisor2_name-bind" name="advisor2_name" nodeset="advis
    <xforms:bind id="creator_is_advisor1-bind" name="creator_is_advisor1" nodeset="creator_is_advisor1" readonly="false()"


</xforms:bind>
<xforms:bind id="requrements_section-bind" name="requrements_section" nodeset="requrements_section">
    <xforms:bind id="course_work_req-bind" name="course_work_req" nodeset="course_work_req" type="xs:boolean"/>
</xforms:bind>
<xforms:bind id="creator_section-bind" name="creator_section" nodeset="creator_section" readonly="true()">
    <xforms:bind id="creator_username-bind" name="creator_username" nodeset="creator_username"/>
    <xforms:bind id="creator_phone-bind" name="creator_phone" nodeset="creator_phone"/>
    <xforms:bind id="creator_dept-bind" name="creator_dept" nodeset="creator_dept"/>
    <xforms:bind id="creator_name-bind" name="creator_name" nodeset="creator_name"/>




</xforms:bind>
<xforms:bind id="form_information_section-bind" name="form_information_section" nodeset="form_information_section" relevar
```

Create Workflow

- Process required input
- Create process instance
  - Work flows are versioned
- Identifier for every process definition id
  - logical mapping of data elements

```
...
 map.put("student_phone", runtimeData.getParameter
    ("studentPhoneNumber"));

 WorkflowEngine workflowEngine =
    WorkflowEngineFactory.getWorkflowEngine();

 workflowEngine.createProcessInstance("dkraker", "DRC_ALT_TESTING",
    map);

...
```

View my worklist

- Fetching / Manage work list
- Process instance management
- Remote web service API (Hessian)
  - get activity
  - get process creation date

```
 WorkflowEngine workflowEngine =
    WorkflowEngineFactory.getWorkflowEngine();

processes = workflowEngine.getMyProcessInstances(“dkraker”),
    “DRC_ALT_TESTING”);

for (ProcessInstance processInstance : processes) {

 data.append(processInstance.getCreatedTime().getTime());
…
```

eForms Application

- Worklist
  - Display pertinent activities and status
- My Requests
  - List of previous and current activites I've initiated
- My Processes
  - List of previous and current activities I was involved in
- Lookup Process
  - Simple interface to allow searching based on process variables or workflow attributes

eForms Application

- Administration
  - Form editing entry point, workflow attributes

Adminsitrative Login

Cal Poly Forms

Accessible Version

Individual Change of Major Agreement

Create a new ICMA

Form Information

Student Information

Name
Darren E. Kraker

EmplID
000018768

Student Username
dkraker

Current Major
99UDCNDP

Current Major Description
Undeclared

Current Major Advisor Email

Current Catalog Year
[Select...]
The starting year of the course catalog for the student's current major

Date
Tuesday May 24, 2011 10:46 a.m.

Current Term GPA
0.000

Current CPSLO GPA
2.889

Current Higher Ed GPA
2.994

Target Major

Target Major
[Select...]
Major into which the student intends to transfer

Target Major Description

Proposed Catalog Year*
[Select...]
*Starting year of catalog for proposed major. *Subject to eligibility. Final determination of eligibility made by Registrar's Office*

Requirements

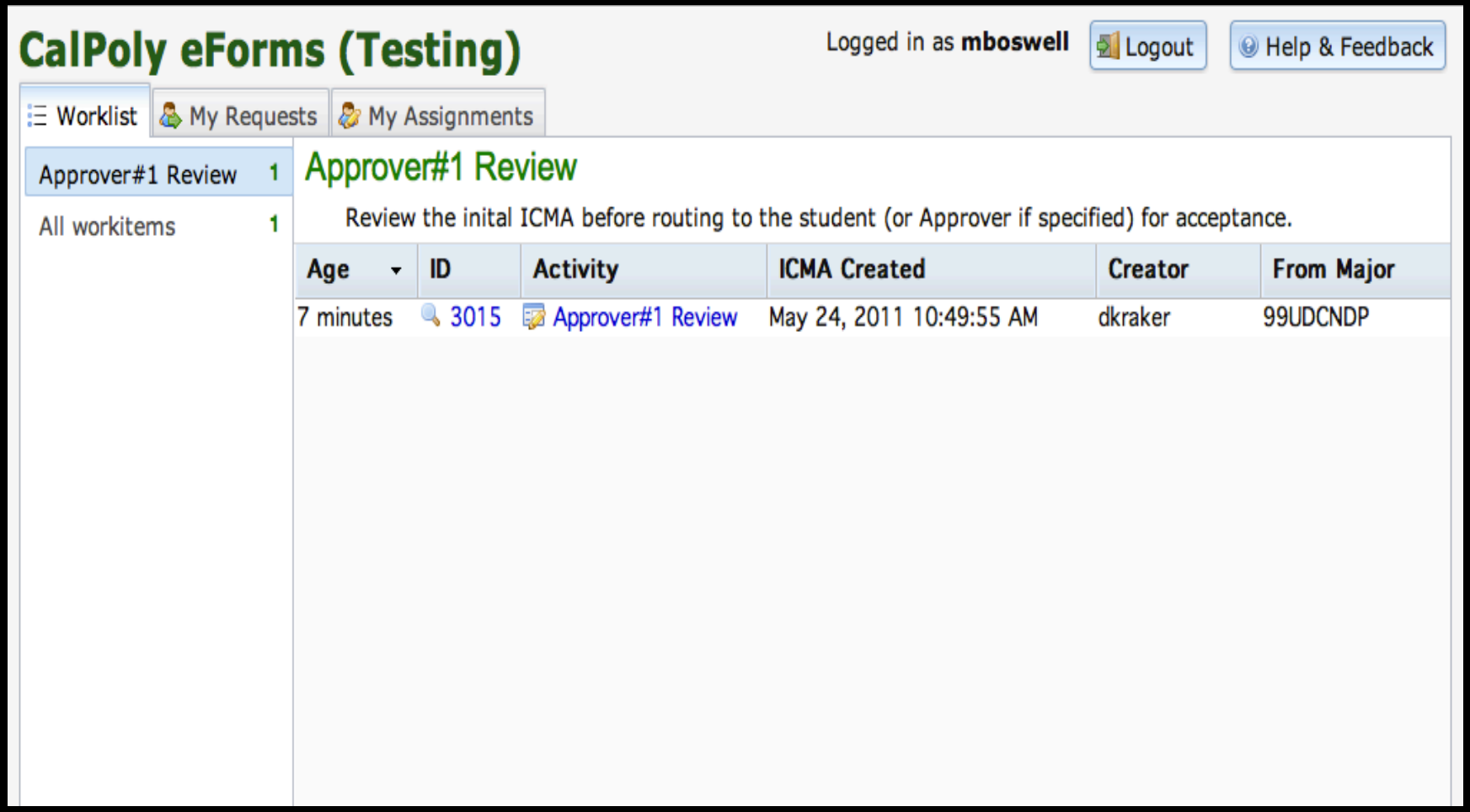
Course Work Required
☑
Deselect if no courses are required in order for the student to change major

Course Requirements

Required Course #1: Subject
[Select...]

Required Course #2: Subject
[Select...]

Required Course #3: Subject
[Select...]


CalPoly eForms (Testing)
Logged in as mboswell
Logout
Help & Feedback
Worklist
My Requests
My Assignments
Approver#1 Review 1
All workitems 1
Approver#1 Review
Review the inital ICMA before routing to the student (or Approver if specified) for acceptance.
Age
ID
Activity
ICMA Created
Creator
From Major
7 minutes
3015
Approver#1 Review
May 24, 2011 10:49:55 AM
dkraker
99UDCNDP

Approvals

Change of Major Approver #1 Username
mboswell

Change of Major Approver #1's Approval of ICMA
- ○ Accept
- ◉ Revise
- ○ Reject

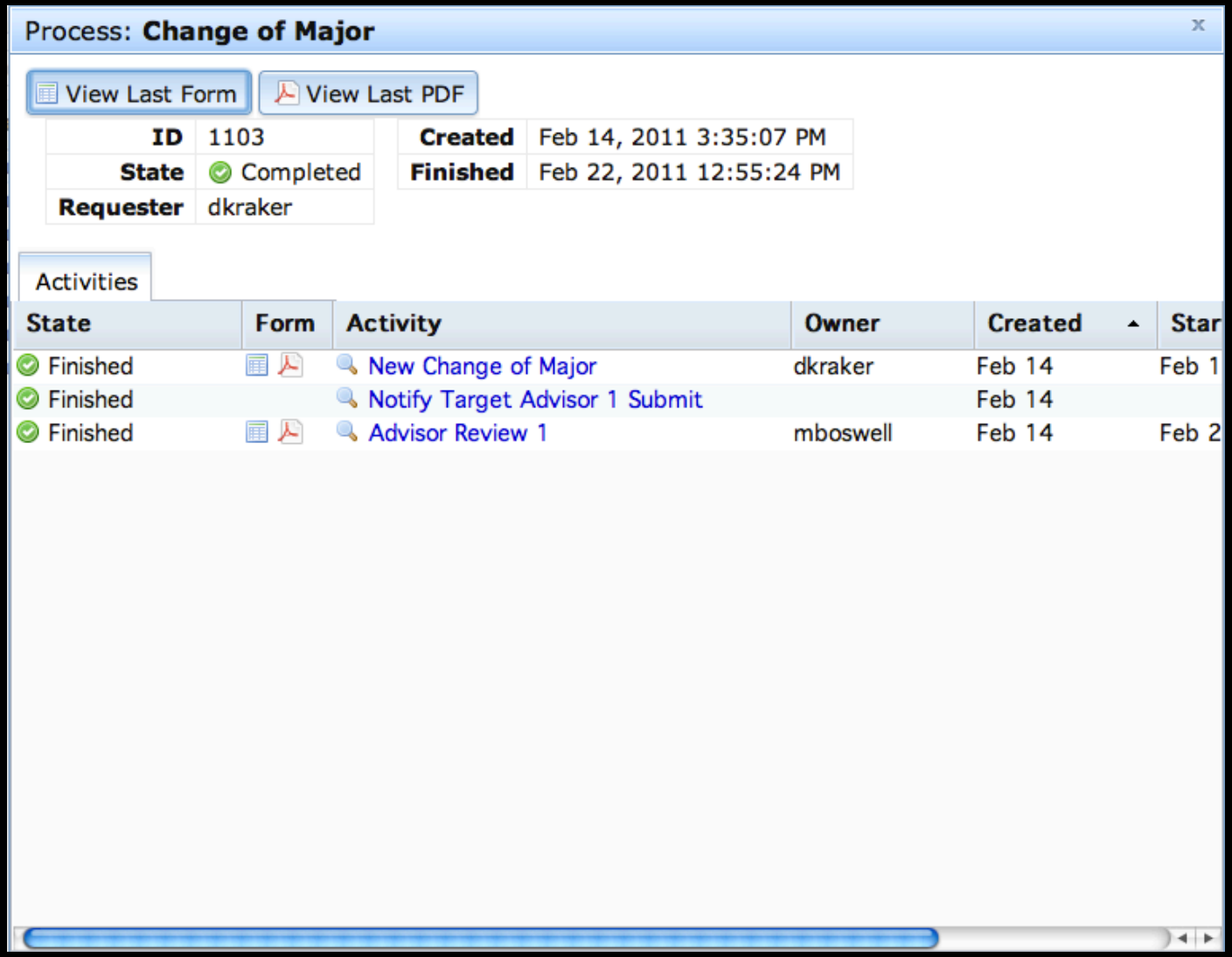
Accept: I approve the ICMA for this student. Form will be forwarded to next approver; Revise: Return to sender for revision; Reject: ICMA not approved for this student.

Change of Major Approver #1 Name
Michael Boswell

Change of Major Approver #1 Dept
CAED-City & Regional Planning

Approver #1's Requested Revision

Enter the recommended revision. Note: these comments will be visible on the form the student receives.


Process: Change of Major
View Last Form
View Last PDF
ID 1103
State Completed
Requester dkraker
Created Feb 14, 2011 3:35:07 PM
Finished Feb 22, 2011 12:55:24 PM
Activities
State Form Activity Owner Created Star
Finished New Change of Major dkraker Feb 14 Feb 1
Finished Notify Target Advisor 1 Submit Feb 14
Finished Advisor Review 1 mboswell Feb 14 Feb 2

Questions?

Darren Kraker
dkraker@calpoly.edu

Arlo White
awhite@calpoly.edu