

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



Dashboard Core

Workflow API

Hessian

HTTPS
Server

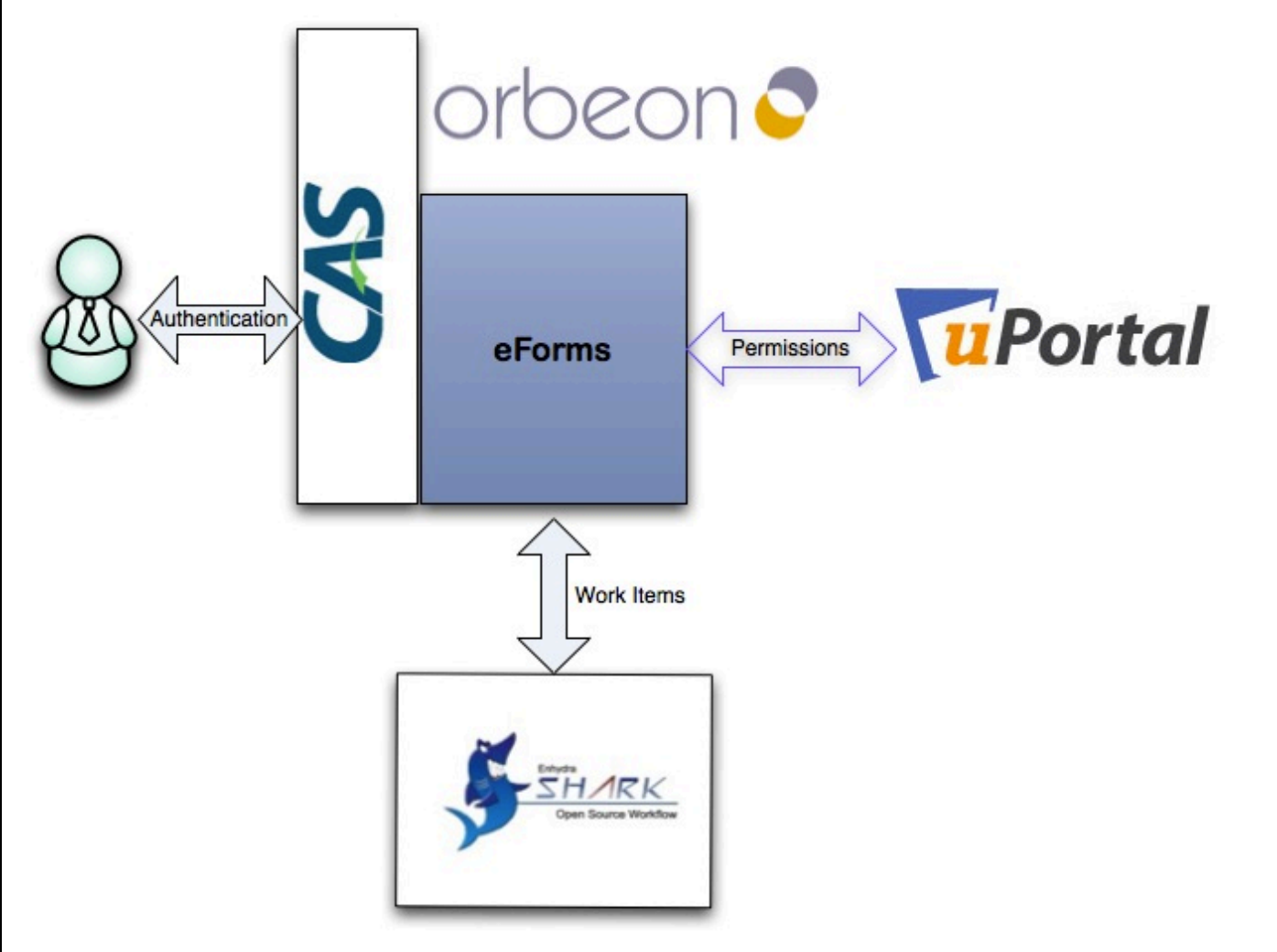
A large, downward-pointing arrow with a 3D effect, colored in a light greenish-grey. The text "HTTPS Server" is written vertically inside the arrow.

Open source to the rescue . . .

The image displays a screenshot of the CalPoly eForms web application interface. At the top, the title "CalPoly eForms" is shown in green, followed by the user information "Logged in as dkraker" and buttons for "Logout" and "Help & Feedback". Below this is a navigation menu with tabs for "Worklist", "My Requests", "My Assignments", "Forms", and "All Processes". The "Worklist" tab is active, showing a green checkmark and the message "You do not have any workitems.".

Surrounding the screenshot are several logos for open-source software:

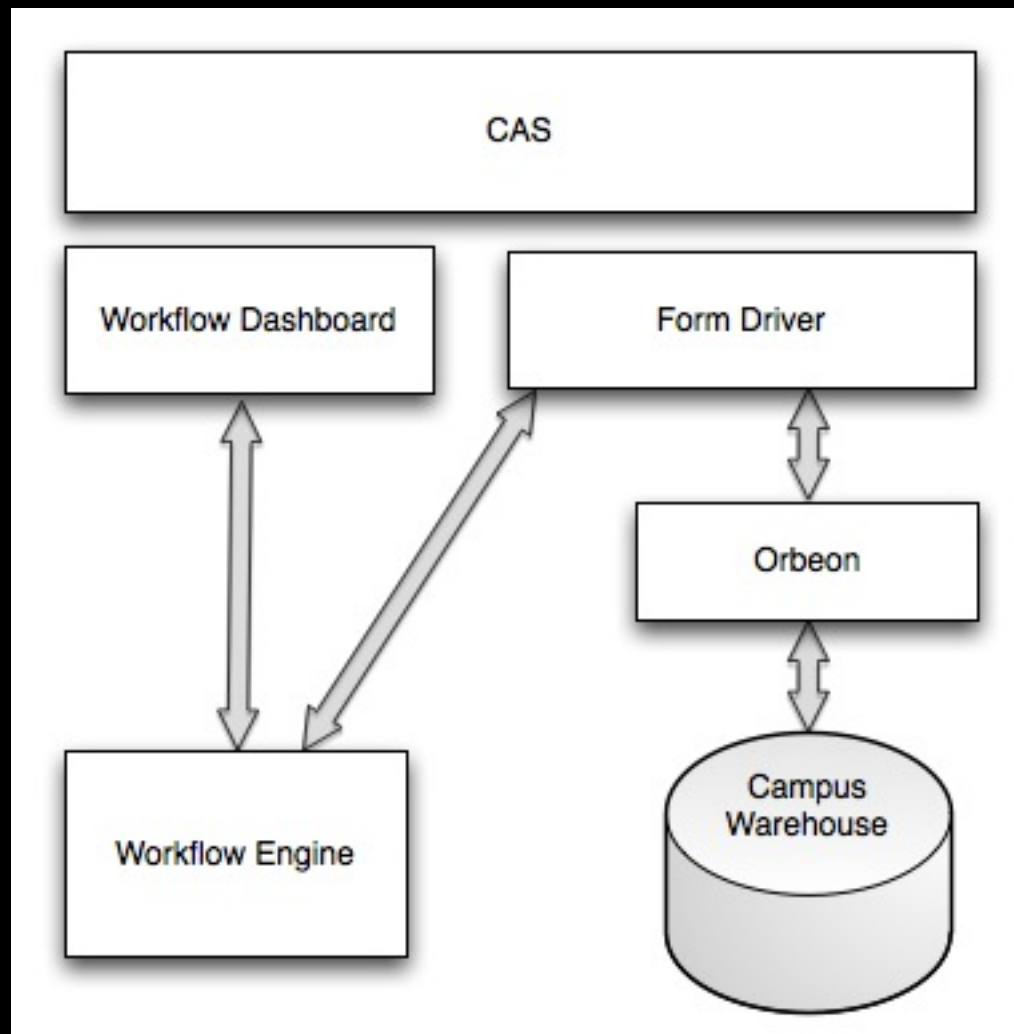
- uPortal**: A logo with a blue square and the text "uPortal" in orange and black.
- Spring**: The word "Spring" in a black serif font with a yellow leaf icon above the letter "i".
- CAS**: The letters "CAS" in a bold blue font with a green leaf icon above the letter "A".
- dojo toolkit**: The word "dojo" in white lowercase letters on a dark blue background, with "toolkit" in smaller white lowercase letters below it.
- Enhydra SHARK**: A blue shark icon with the text "Enhydra SHARK" and "Open Source Workflow" below it.



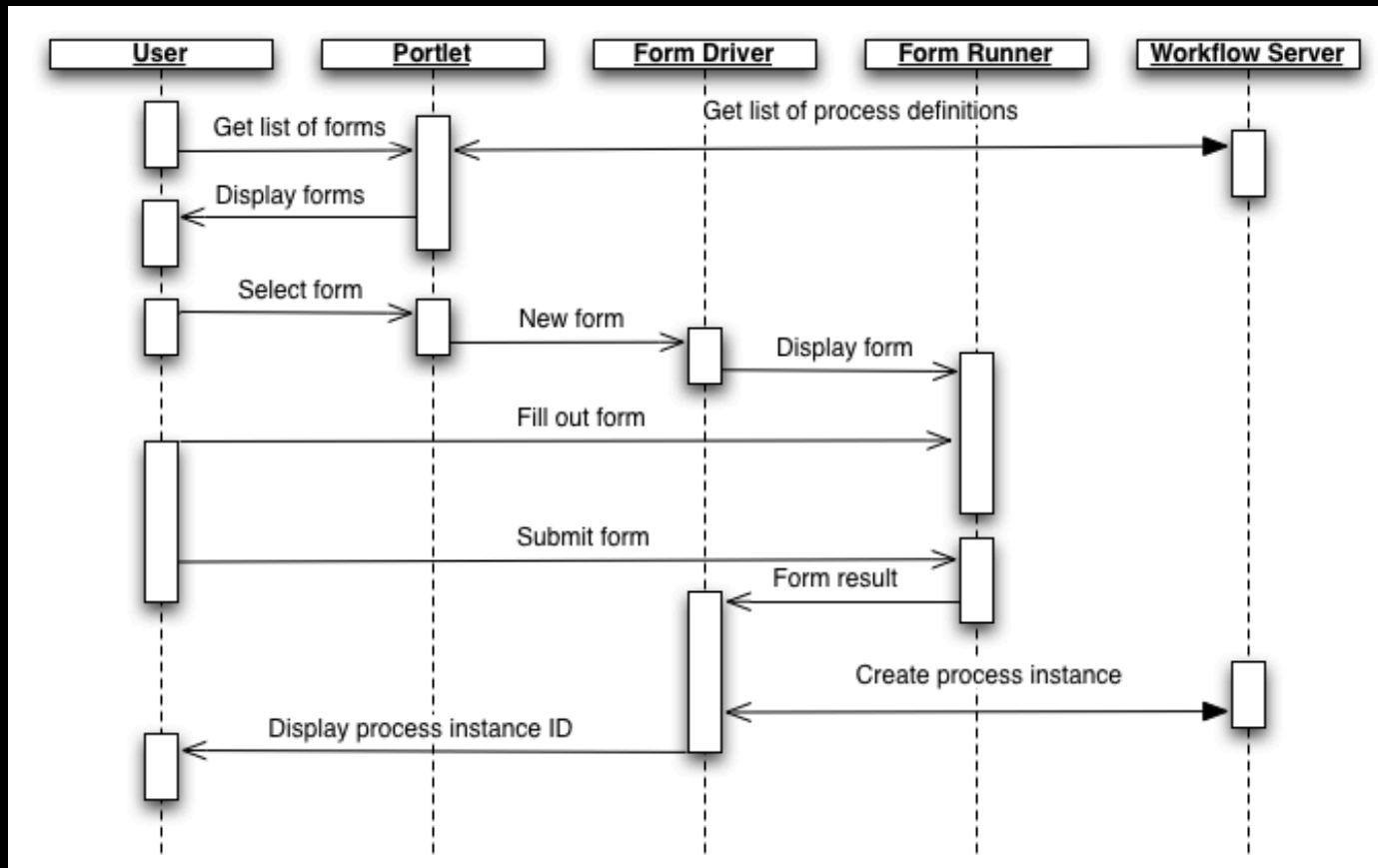
DEMO

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

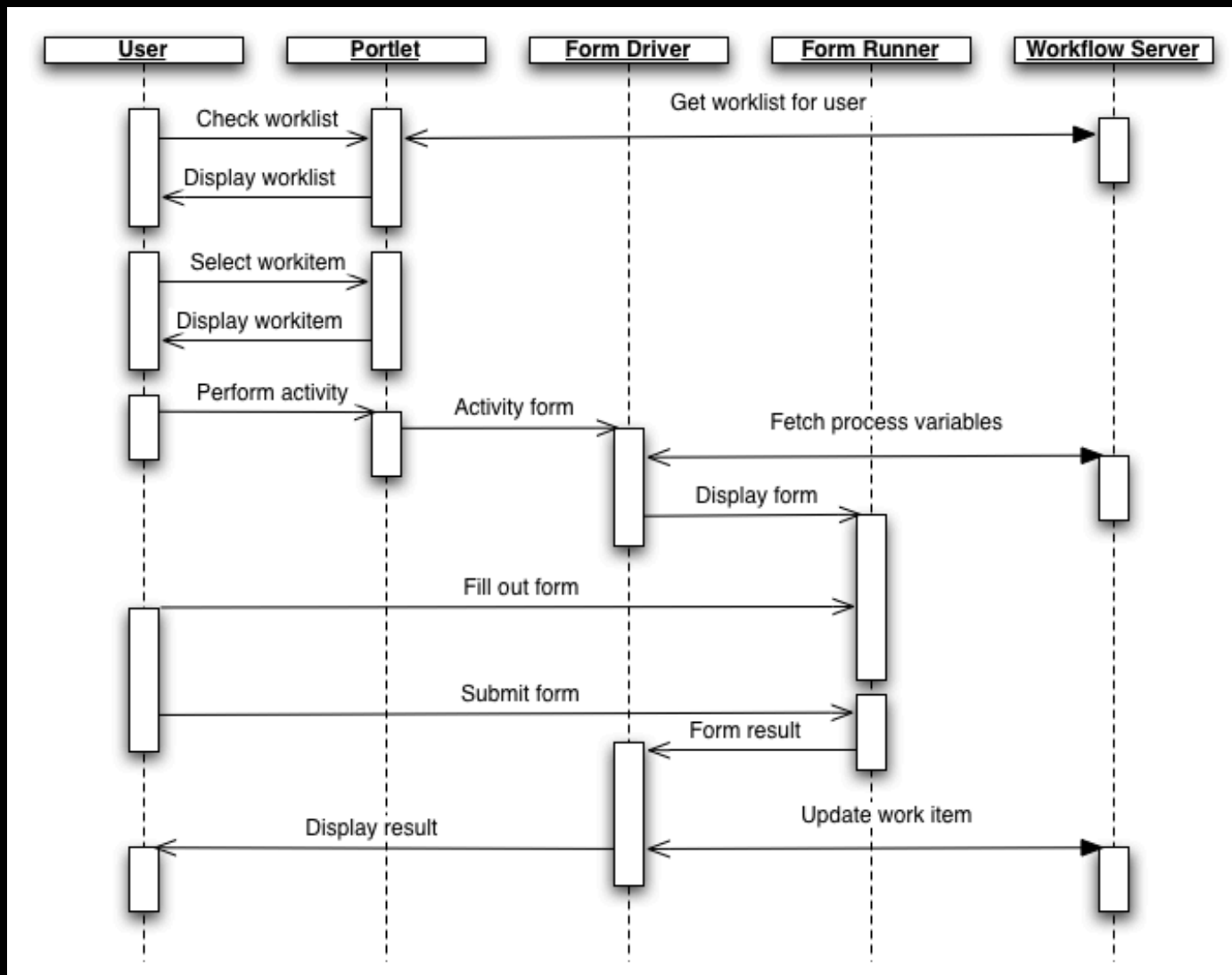
Architecture



New Form



Performing Activity



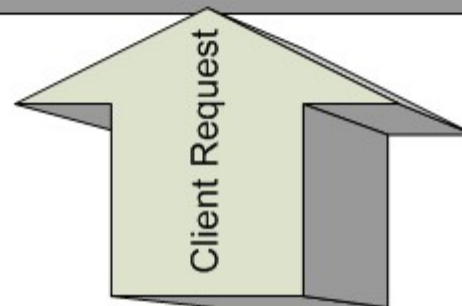
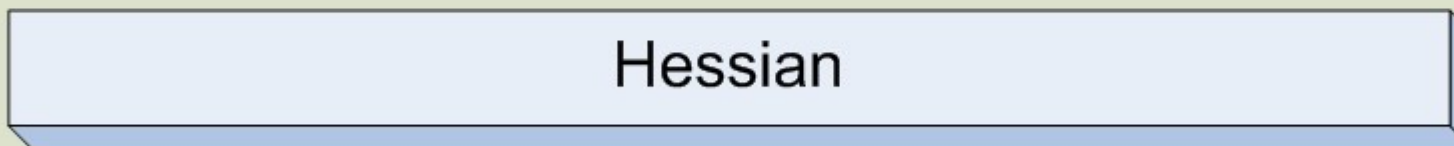
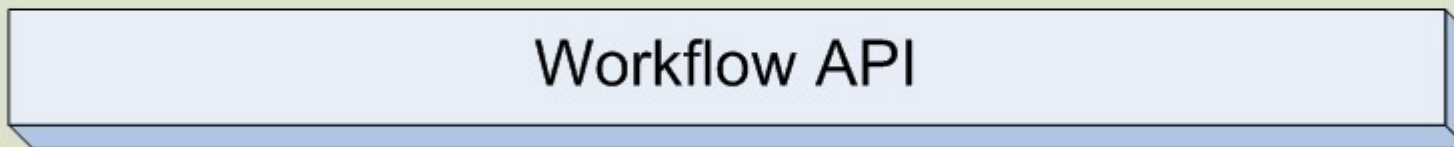
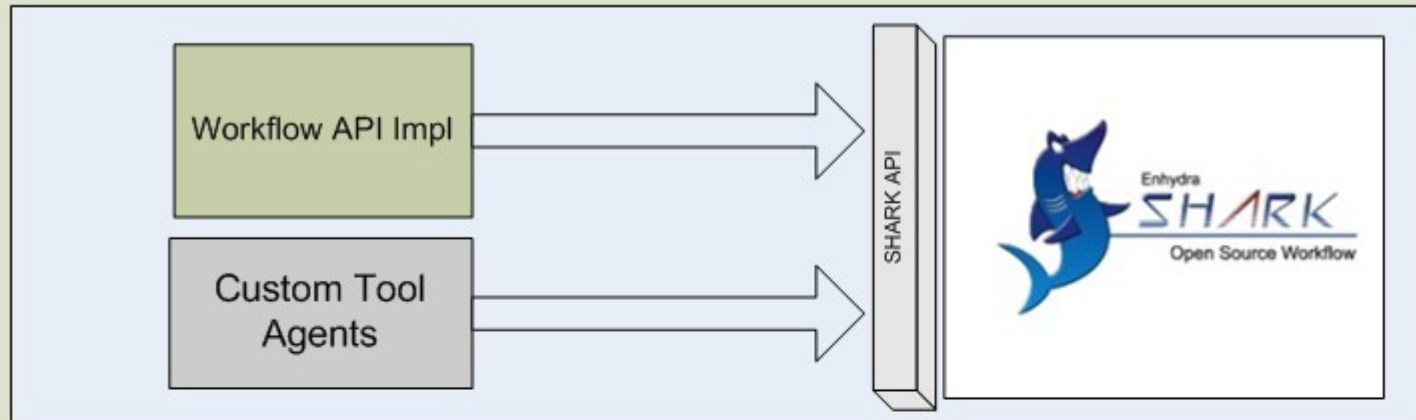
How we built it

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



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

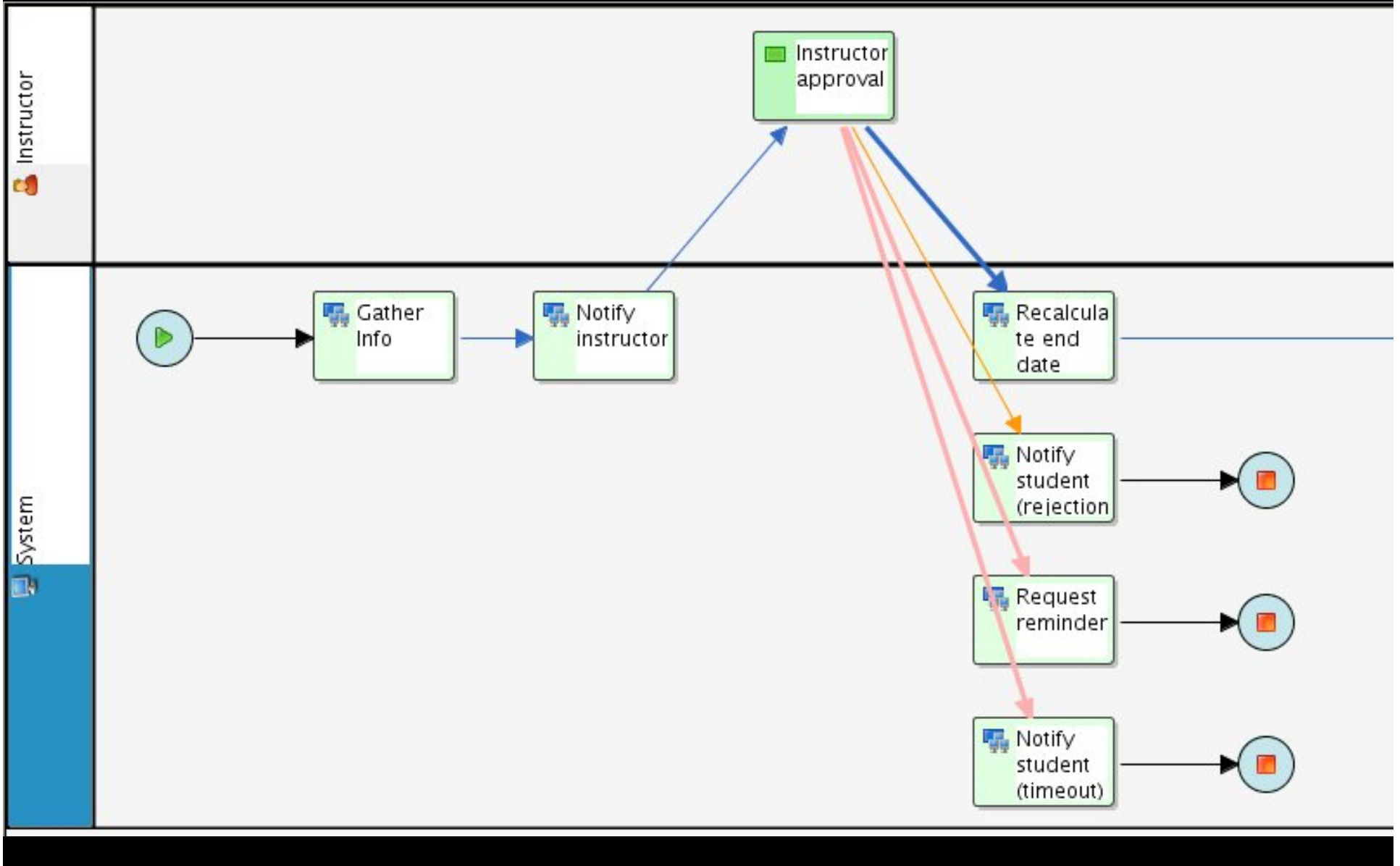
How to use PolyShark

- 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/XMLSchema-instance" xsi:schemaLocation="http://www.wfmc.org/2002/XPDL1.0 http://www.wfmc.org/2002/XPDL1.0/XPDL1.0.xsd">
  <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>
            <xpdl:BasicType Type="STRING"/>
          </xpdl:DataType>
        </xpdl:FormalParameter>
      </xpdl:FormalParameters>
    </xpdl:Application>
  </xpdl:Applications>
</xpdl:Package>
```

GUI Forms tool

The screenshot displays the 'GUI Forms tool' interface, specifically the 'Form Builder' window. The window title is 'GUI Forms FORM BUILDER'. On the left, there is a 'Controls' sidebar with various options: 'New Section', 'New Grid', 'Text Controls' (Single-Line Text, Password Field, Multi-Line Text, HTML Text, Text Output, In-place Input), and 'Typed Controls' (Date, Time, Date and Time, Email Address, Static Image, Image Attachment, File Attachment, Dropdown Date, Fields Date, Date Picker, US Phone Number). The main workspace shows a form titled 'Individual Change of Major Agreement' with a green header. Below the header, there are sections for 'Form Information' and 'Student Information'. The 'Form Information' section contains two text blocks: 'You are about to create a new ICMA' and 'What Happens After The Form Is Submitted?'. The 'Student Information' section contains a grid of text input fields for 'Name', 'Current Major', 'Date', 'EmplID', 'Current Major Description', 'Current Term GPA', 'Student Username', 'Current Major Advisor Email', and 'Current CSLO GPA'. The bottom of the window has a status bar with a green checkmark and buttons for 'Close', 'Test', and 'Save'.

Choose File no file selected

The logo appears at the top of your form

Individual Change of Major Agreement

Create a new ICMA

▼ Form Information

④ You are about to create a new ICMA
[click to enter an optional hint]

④ What Happens After The Form Is Submitted?
After clicking Send below, the form will be routed to Approver #1 for review. If Approver #1 recommends revisions, he/she will note the revisions and reroute the form back to you. Otherwise he/she will approve the form and it will be routed to Approver #2 (if Approver #2 exists for this ICMA). Approver #2 will either return the form to you for revision, or approve the form whereupon it will be routed to the student for acceptance. Once the student has accepted the ICMA, the form will be routed to Approver #1. Approver #1 will monitor the student's progress and ultimately either approve or reject the ICMA.
[click to enter an optional hint]

▼ Student Information

④ Name [click to enter text] <i>Name of student intending to change major</i>	④ Current Major [click to enter text] <i>Student's current major</i>	④ Date [click to enter text] <i>Date when ICMA was initially filled out</i>
④ EmplID [click to enter text] <i>EmplID of student intending to change major</i>	④ Current Major Description [click to enter text] <i>[click to enter an optional hint]</i>	④ Current Term GPA [click to enter text] <i>Term GPA at the time the student started the ICMA</i>
④ Student Username	④ Current Major Advisor Email	④ Current CSLO GPA

Close Test Save

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="$advisor1_username = '' or . != ''" id="advisor1_name-bind" name="advisor1_name" nodeset="advise
  <xforms:bind constraint="$advisor2_username = '' or . != ''" id="advisor2_name-bind" name="advisor2_name" nodeset="advise
  <xforms:bind id="creator_is_advisor1-bind" name="creator_is_advisor1" nodeset="creator_is_advisor1" readonly="false()"

</xforms:bind>
<xforms:bind id="requirements_section-bind" name="requirements_section" nodeset="requirements_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" releva
```

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 activities 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

Administrative Login

CalPoly eForms (Development)

Logged in as **dkraker**

[Logout](#)

[Help & Feedback](#)

[Worklist](#)

[My Requests](#)

[My Assignments](#)

[Forms](#)

[Lookup Process](#)

[All Processes](#)

[Administration](#)

Change Of Major ICMA

Telephone Request

WPE Registration

Dynamic Participant Test

Orbeon Test Hello

CMS Access Request

Dates Test

Travel Request 1A

DRC Alternate Testing

Allan's Test Workflow

Change Of Major ICMA

[Submit a new form](#)

Logical Name	icma_changemajor
Package	registrar
Workflow Process Id	icma_changemajor
Tag	100
XPDL Version	102

Use Form Drafts

Form Editor will always get from and save to the drafts directory. If the form does not exist in the drafts directory it will be copied from the deployed directory before being edited.

Activities

Forms

Activities that have forms (manual activities). Currently only shows forms that have already been created in the file system.

Activity	Deployed Modified	Draft Modified	Description
Initial Activity	Apr 25, 2011 1:52 PM	Apr 21, 2011 12:40 PM	Starting form for this workflow.
advisor_1_review	Apr 25, 2011 1:52 PM	Apr 14, 2011 9:59 AM	Form for advisor_1_review activity.
advisor_2_review	Apr 7, 2011 10:21 AM	Apr 4, 2011 9:59 AM	Form for advisor_2_review activity.
	Apr 25, 2011	Apr 14, 2011	

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

Approver#1 Review

All workitems 1

Review the initial 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?

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