

CQ Workflows

For the Rest of Us

Host

Andreas Schaefer

JBoss Core Developer 2000 - 2002

SeeBeyond AppServer Lead Developer

Magnolia / JCR User / Developer since 2005

CQ Consultant since 2011

Stadiyum iPhone App Developer

TOC

- ✦ Workflow
- ✦ Introduction
- ✦ User / System Interaction
- ✦ Workflow Additions
- ✦ Traps & Pitfalls
- ✦ Performance, Debugging and Configuration
- ✦ Q&A

Wikipedia

A workflow consists of a **sequence** of **concatenated** (connected) steps. Emphasis is on the **flow paradigm**, where each step follows the precedent without delay or gap and ends just before the subsequent step may begin.

CQ 5

A Workflow is a **Guided** Sequence of Steps that is executed in Order with or without User Interaction. A **Model** defines that Sequence whereas an **Instance** is the actual Execution.

Thursday, April 18, 13

In CQ 5 the focus of the Workflow is on execution of the Steps in the Background and only interact with the User when they need to make a decision.

CQ 5 Internal Usage

- ✦ (De) Activate Later
 - ✦ (De) Activates at a Later Date
- ✦ DAM Update Asset
 - ✦ Thumbnail Creation, Metadata Extraction
- ✦ Comment Moderation
- ✦ etc

Model

Execution

Instances

Steps



Launcher

Docu

Interaction

That is how I felt when I started a Year Ago.

Workflow Scenarios

- ✦ Review & Publication
- ✦ Automated Properties / Tag Handling
- ✦ Content Propagation
- ✦ External System Integration
- ✦ Translation
- ✦ Delayed Execution

4-Step Crash Course

- ✦ Create WF Model
- ✦ Edit / Add Steps to Model
- ✦ Start Workflow in Sidekick
- ✦ Handle Workflow Step in Inbox

TOC

- ✦ Workflow
- ✦ Introduction
- ✦ User / System Interaction
- ✦ Workflow Additions
- ✦ Traps & Pitfalls
- ✦ Performance, Debugging and Configuration
- ✦ Q&A

Components

- ✦ Workflow Console
- ✦ Workflow Inbox
- ✦ Sidekick
- ✦ Siteadmin, DAM Editor
- ✦ Tools / Workflow Packages

Workflow Console

- ✦ Administration Console for Workflows
- ✦ Manage Model and Edit them
- ✦ Review Running Instances
- ✦ Investigate Archive of Finished Instances
- ✦ Manage Launcher to Trigger Workflows

Thursday, April 18, 13

Launchers are Triggers on Node Creation, Modification or Deletion to execute a Workflow with that Node as Payload.

Workflow Inbox

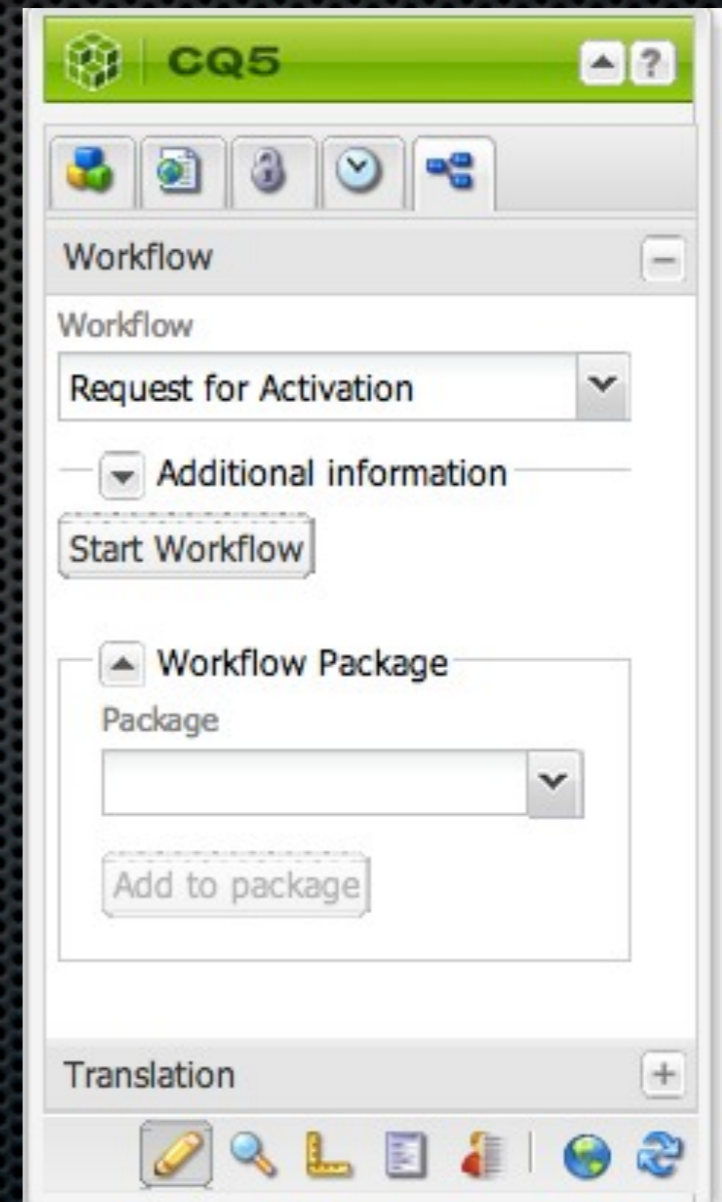
- ✦ **One-Stop** for Workflow Users
- ✦ List of Workflows a User can **Interact** With
- ✦ **Complete**, Step Back or Delegate a Step
- ✦ Select next Step, add Data and Comments

Thursday, April 18, 13

The Workflow Inbox is the One-Stop Place for Users to Interact with Workflows. The Sidekick is merely there for Convenience.

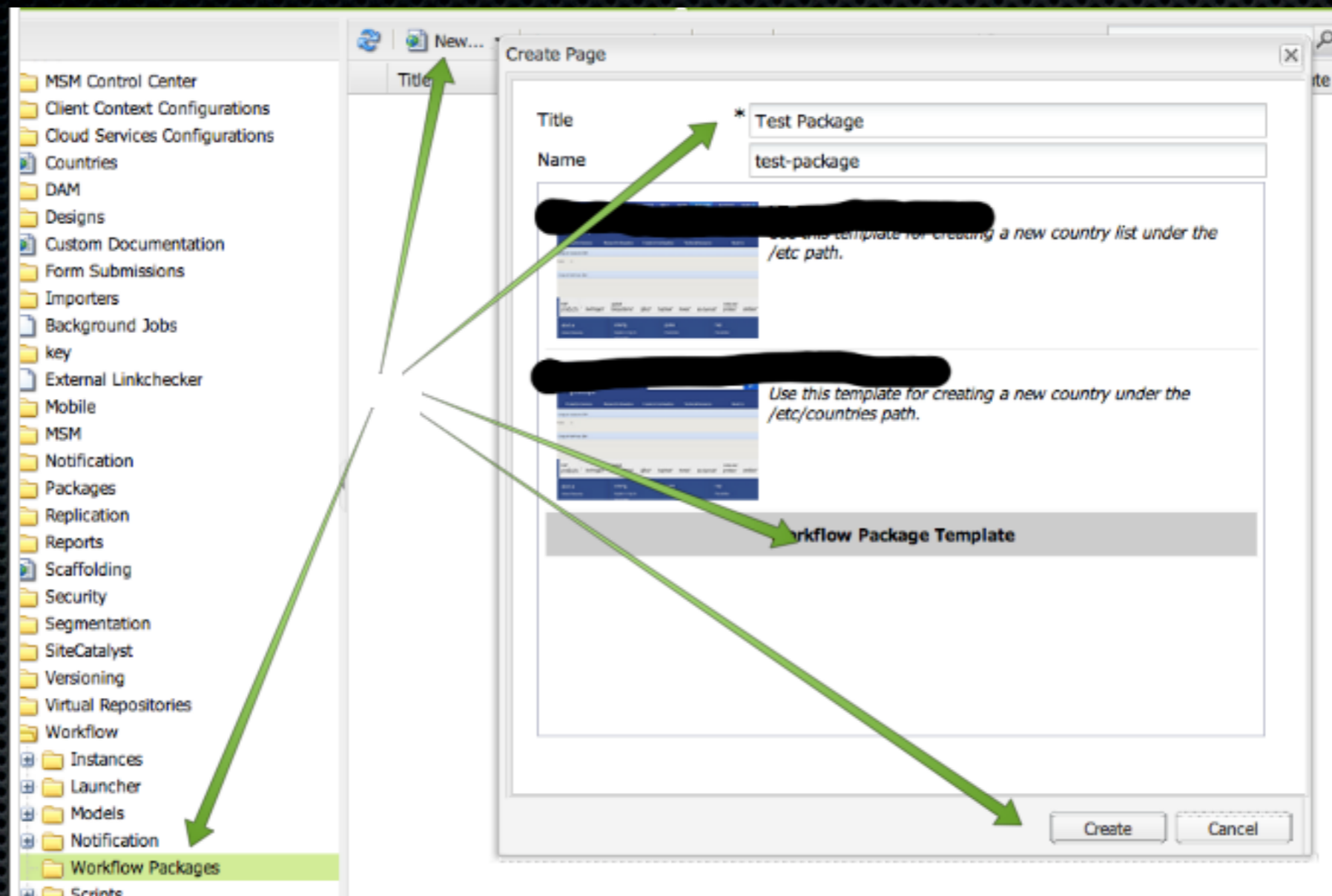
Page Editor Sidekick

- ✦ Workflow Selection
- ✦ Start
- ✦ Complete
- ✦ Step Back
- ✦ Delegate
- ✦ Workflow Packages



Siteadmin / DAM Assets

- ✦ Start Workflow from Selected Row in Detail Pane
- ✦ Enter Title, Start Comment
- ✦ Run It



Workflow Package

Container for Collection of Payload Items

Thursday, April 18, 13

This Image is from the “Tools” page.

Workflow Packages

- ✦ Container for Multiple Payload Entries
- ✦ Added through the Sidekick, Package Page
- ✦ Started from Tools or Workflow Console
- ✦ Packages are a Proxy for their Content

Thursday, April 18, 13

Not very intuitive and very difficult to setup and manage

TOC

- ✦ Workflow
- ✦ Introduction
- ✦ **User / System Interaction**
- ✦ Workflow Additions
- ✦ Traps & Pitfalls
- ✦ Performance, Debugging and Configuration
- ✦ Q&A

User Interaction

- ✦ CQ Workflows started as Background Service
- ✦ UI Integration is propped on Top
- ✦ Awkward at First but gets the Job Done
- ✦ Little to No Workflow Monitoring
- ✦ No User Level Error Handling

Thursday, April 18, 13

The first 2 points are what I felt when looking at the CQ Code.

There is no good Workflow Monitoring for regular Users and even the Workflow Console is cumbersome to use.

Any error makes the Workflow go into STALE status leaving them in the list of runnings instance but they are effectively dead.

How to Work with WF

- ✦ Most User will interact through the **Inbox**
- ✦ **Email** Notification can provide links to Inbox and Payload
- ✦ Only Users member of a Participant Step will see and can **interact** with a Workflow
- ✦ The Sidekick can also handle / process Workflows
- ✦ Workflow in processing are **invisible**
- ✦ Sidekick disable Workflow Interaction if it cannot be handled by User (currently)

Thursday, April 18, 13

Emails are very important to keep a Workflow flowing because it tells Users what WFs need to be handled without having to go to their Inbox.

Sidekick is only useful if opened by an Email Notification or if there are multiple Steps to be handled by the same User.

Workflow Actions

- Complete: End the Participant Step, Select Next Step, Enter Data and Comment
- Step Back: transitions to a previous Step
- Delegate: assigns a Step to another User / Group

Step-Backs

- ✦ I **don't use** Step Backs
- ✦ Full Control of Flow with integrated Transitions
- ✦ Step-Backs require **in-depth** WF Knowledge
- ✦ Can Confuse the User
- ✦ Can Miss Required Steps to Manage WF Data
- ✦ Works only for **Simple** WFs

Delegates

- ✦ Delegates a Step to another User to Handle
- ✦ Is Needed if a User is not member of a Participant Step
- ✦ I **don't use** it but rather define WF groups that contain all users needed
- ✦ Delegates can lead to a Bottleneck in the WF processing

Thursday, April 18, 13

A Bottleneck is created when many WFs have to go through one User who is not handling them quickly enough.

This is often a political decision when a manager wants to stay in Control but is overwhelmed by workload.

WF Administration

- ✦ WF Console lets the Administrator
 - ✦ manage and edit Models and Launchers
 - ✦ handle Instances
- ✦ Administrators needs to be member of Group "Workflow Editor"
- ✦ **Tools** needed for Packages

TOC

- ✦ Workflow
- ✦ Introduction
- ✦ User / System Interaction
- ✦ **Workflow Additions**
- ✦ Traps & Pitfalls
- ✦ Performance, Debugging and Configuration
- ✦ Q&A

Workflow Additions

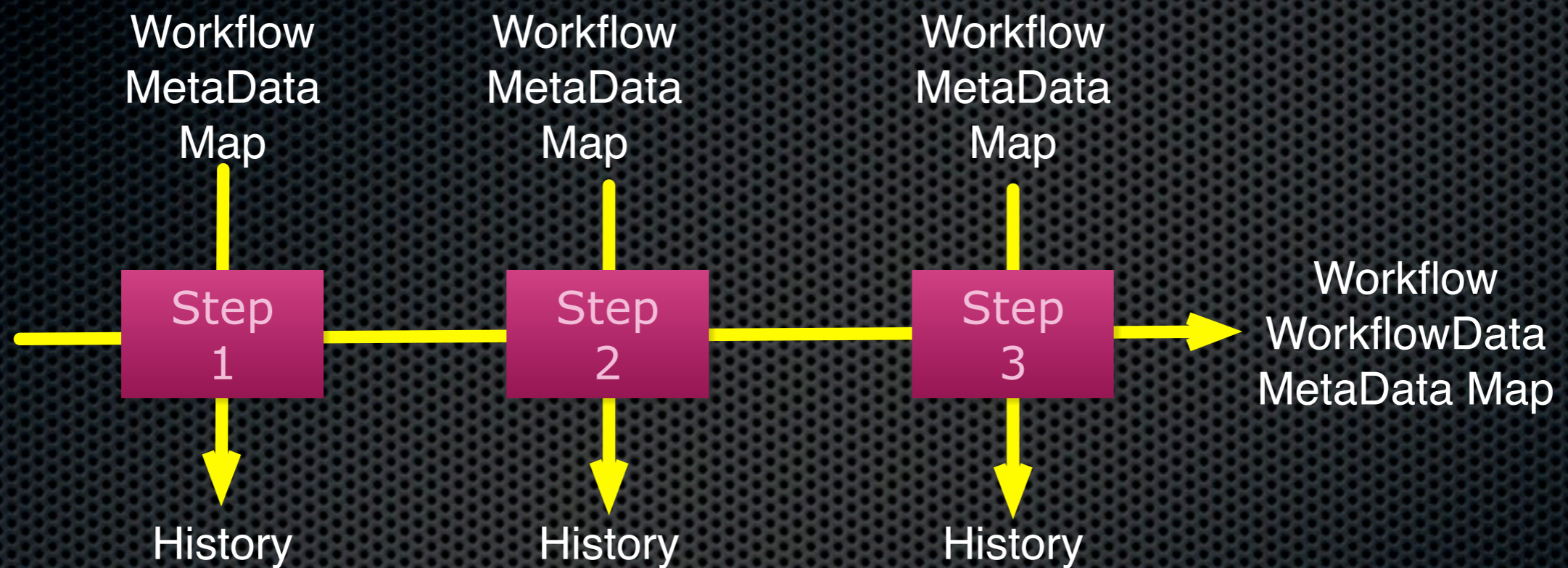
- ✦ To Expand Workflows
 - ✦ **Workflow Processes** to add Steps
 - ✦ Workflow Steps to provide a **Custom UI**
 - ✦ Participant Selector to use Dynamic Users / Groups
 - ✦ Dialogs to add **Input Fields** to Dialog Steps
 - ✦ Scripts for OR Splits

Workflow Process

- ✦ Implement “WorkflowProcess”
- ✦ Define method
 - ✦ public void **execute(WorkItem, WorkflowSession, MetaDataMap)** throws **WorkflowException**
- ✦ Provided as OSGi Service
- ✦ Use “Process Step” to integrate into Model

Workflow Step

- ✦ Defines **Custom UI** for WF Model Editor
- ✦ Can be dragged by Name from **Sidekick**
- ✦ Can use Custom Parameter Input Field / Widgets
- ✦ Can Provide **Label** and **Description** to User
- ✦ Can Provide Multiple Tabs



Workflow vs Step MD-Map

Comments / Dialog Input Value are only accessible through History

Dropdown Boxes

- ✦ **Dynamic:** Servlet provides JSon Array with
 - ✦ key: Displayed Name
 - ✦ value: Stored Value
 - ✦ qtip: Tooltip Text
- ✦ Dialog Contains URL to Servlet
- ✦ **Static:** Dialog Contains Options XML Element

Developing Models

- ✦ Models can only be Edited in the WF Model Editor
- ✦ Store Models in VCS
- ✦ Export Models using a Package
 - ✦ Building / Download can be **Automated** with REST
- ✦ Using a DIFF Tool to Merge
- ✦ Store Models, Notifications and Scripts in own **Sub Folder**

Thursday, April 18, 13

Mention that I just posted an Article about the Automated Package Build, Download and Extraction to my Blog.

This can be found here: <http://madplanet.com/wordpress/2013/04/cq-workflow-tutorial-export-workflow-models-quickly/>

RunMode Configuration

- ✦ RunMode: Configuration per Run Mode
 - ✦ **author, dev, author.dev** etc
- ✦ File Name: <fully qualified name>[.supl.].xml
- ✦ Provided in Component Context's Dictionary
 - ✦ **activate / modified** method
- ✦ Allows to Configure Workflow Steps based on the **Runtime Environment**

Thursday, April 18, 13

Run Modes are configured inside the sling.properties file as comma separated list.
Run Modes Configuration are places inside /apps inside a directory name config.<dot separated lists of run modes>
Place all Run Modes Configuration in a sub folder called “runmodes” to easily drop them by deleting that folder.
For Example Log Level settings can be done this way on a per Model bases.

Hit the Wall: Quo Vadis?

- Decompile CQ WF Classes
 - Artifact: `com.day.cq.workflow:cq-workflow-impl`
- Search /libs
 - Create Maven Project with /libs Content
- Create Test Projects on **clean** CQ Instance
- Switch `error.log` to **Trace** and search for clues

Thursday, April 18, 13

I use IntelliJ to search and discover items in /libs.

/libs can be extracted from “`cq-content-<version>.jar`” file inside the `cq-quickstart-<version>-standalone.jar` (`resources/install/0`)

TOC

- ✦ Workflow
- ✦ Introduction
- ✦ User / System Interaction
- ✦ Workflow Additions
- ✦ **Traps & Pitfalls**
- ✦ Performance, Debugging and Configuration
- ✦ Q&A

Thursday, April 18, 13

As a Developer I often have to deal in length with Problems when using a Framework and the CQ Workflow are no exception. Even though this might sound negative and taunting it should actually help you develop Workflows faster and give you pointers on how to deal with problems. Workflows are not easy but they are useful and get their job done. That said you need to be committed to implement good, reliable and easy to use Workflows so that they are accepted and used by the Users.

Enemy #1: Complexity

- ✦ KISS
- ✦ Workflow Model Editor is limited
- ✦ Even small Changes require a Re-Testing
- ✦ Hard to Comprehend by the User
- ✦ Hard to Manage by the Admin
- ✦ Bottlenecks delay WFs
 - ✦ Hamper User Acceptance

Bugs

- ✦ Dialog Input does not work on Sidekick
- ✦ Copying a Step resets Title and Description
- ✦ Send Email Step: Old “Junk”
- ✦ Auto Advance after Transition
 - ✦ Transition is ignored
- ✦ Siteadmin Status is coming from Intermediary CQ Payload Map which can go out of sync

Thursday, April 18, 13

Point 3): there is a workflow in the Sidekick of the WF Model Editor under “Collaboration Workflow” called “Send Email”. This one is based on outdated code and does not follow the Email Template from the Participant Step.

Pitfalls

- ✦ Use Wrong MetaData Map
- ✦ User is not part of “WF User” Group
- ✦ User is not part of the Participant Step Group
- ✦ WF is **STALE** due to Exception so looks like dead
- ✦ Page is locked but WF Ended (CQ Payload Map)

Pitfalls 2

- ✦ Server Calls fail on UI but is not Reported (FireBug)
- ✦ Some WFs are not removed when Terminated
- ✦ Sub Workflows run as separate WF
 - ✦ More to Manage
- ✦ Payload is deleted while WF is running
- ✦ Verify that a Bundle is **Activated**
- ✦ Verify that a **Service** is **Listed**

Thursday, April 18, 13

First Point: If a HTTP Call fails due to some exceptions (404 etc) the page will not show certain entries or shows none but the User is not aware of it.

Not “Active” Bundles do not install the Services and so Workflow Steps fail.

Services with “unresolved” References are not listed and so not available making WF Steps fail, too.

Show how to Investigate an OSGi Bundle.

TOC

- ✦ Workflow
- ✦ Introduction
- ✦ User / System Interaction
- ✦ Workflow Additions
- ✦ Traps & Pitfalls
- ✦ Performance, Debugging and Configuration
- ✦ Q&A

Performance

- ✦ Slow CQ makes WFs even slower
- ✦ Old WFs might become Zombies
- ✦ Finished WFs Instances are not purged by CQ
- ✦ Bulk Imports might trigger many WFs by Launchers
- ✦ Increase Thread Number and Priority on Workflow Engine
 - ✦ Sling Job Queue Configuration: CQ Workflows

Friend #1: Stability

- ✦ Even slight changes in WFs can lead to unexpected Behavior often difficult to figure out
- ✦ Make Processes, Data Providers, Logic etc:

OSGi Services

- ✦ Able to Configure them through Run Modes
- ✦ Inject References to other Services
- ✦ Dependencies are checked at Deploy Time

Thursday, April 18, 13

In General Everything that can be a OSGi Service should be made one. I even started to make Scripts just a Front to an OSGi Service.

Debugging

- ✦ Debugger not useful
- ✦ Logging, Logging, **SLF4J** Logging
- ✦ Log Workflow Step reports Payload, Meta Data Maps
 - ✦ Enhanced it so that Log Level can be set per Model
- ✦ Append WF Logs to a separate File
- ✦ Log Start / End of a WF Process Prominently
- ✦ Log **Any** Exceptions

Tips

- ✦ By Default **Catch All** Workflow Exceptions
- ✦ Loop to Retry Failed Workflow Steps
- ✦ Delayed Release Date / Notification can be placed as **Comment** Displayed on WF Inbox
- ✦ Participant Step uses a Single Email Template
 - ✦ Create **Custom Email** Service and use Custom Template whenever Possible

Tips 2

- ✦ Clean-Up old WF Instances from **/etc/workflow/instances**
- ✦ To Develop WFs create a User that is member of **all** WF Groups
- ✦ To Test WFs
 - ✦ Create a User for **each** WF Group and Impersonate
 - ✦ Create Local Mail Server (Mailserve, James etc)
- ✦ **Train** Testers to avoid WF Pitfalls

Testing WFs

- WF Bug Reports: Check
 - Determine the WF Instance
 - Check if the WF is STALE or FINISHED
 - Check if the Tester has the correct Group Membership
 - Check Log File if Possible
 - Discuss Report with Tester to Understand the Problem

Thursday, April 18, 13

Tester Must Report: Server / CQ Instance, Workflow, Payload, Last Action and What was Discovered

Custom Workflow Steps

- ✦ Log Workflow
- ✦ Replicate to Particular Agent(s)
- ✦ Jump to Node (+ If Set)
- ✦ Place Comment History (on Workflow Map)
- ✦ Dialog Parameter Handler (History to WF Map)
- ✦ Email Notification (with Custom Templates)
- ✦ Place Values on WF Map

In The Works

- ✦ Dynamic Participant and Dialog Step
- ✦ (Do) While Loop
- ✦ 4-Eyes Reviews
 - ✦ Dynamic Participant Chooser
- ✦

Thursday, April 18, 13

4-Eyes Review means that even if a User is part of the Group that Reviews a Page he/she will be Excluded to make sure 4-Eyes Review the Changes

Q & A

- ✧ CQ Workflow Tutorial
 - ✧ <http://blog.madplanet.com> (category: Adobe CQ)
- ✧ Twitter: andy_mpc
- ✧ App.net: schaefera
- ✧ Email: schaefera@me.com