WORKFLOW 101

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Winshuttle

Winshuttle User Group 2013 App

WUG 2013 App

- Download from your App store
  - “Winshuttle User Group App”

Introduction

Overview of Winshuttle workflow

- Platform
- Components
- Demonstration
- Methodology

WINSHUTTLE

Target Audience

Business Analysts

Beginners

End Users

Managers

WINSHUTTLE

Not intended for

Advanced Users

System Administrators

Help/IT analysts

*Not a cookbook class - no Advanced topics will be covered

Platform

SharePoint

- Collaboration
  - Share
  - Organize
  - Manage
- Limits (MS recommendations)
- Winshuttle Requirements (minimum)
  - Non Production
    - Single server
  - Production
    - 1 server for Winshuttle Server
    - 1 WFE

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Winshuttle Platform

SAP

- Scripts
  - Transaction
  - Query

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Winshuttle Platform (cont.)

Central

- Governance/control
  - Content management
  - Administration
  - Audit/reporting
  - User management

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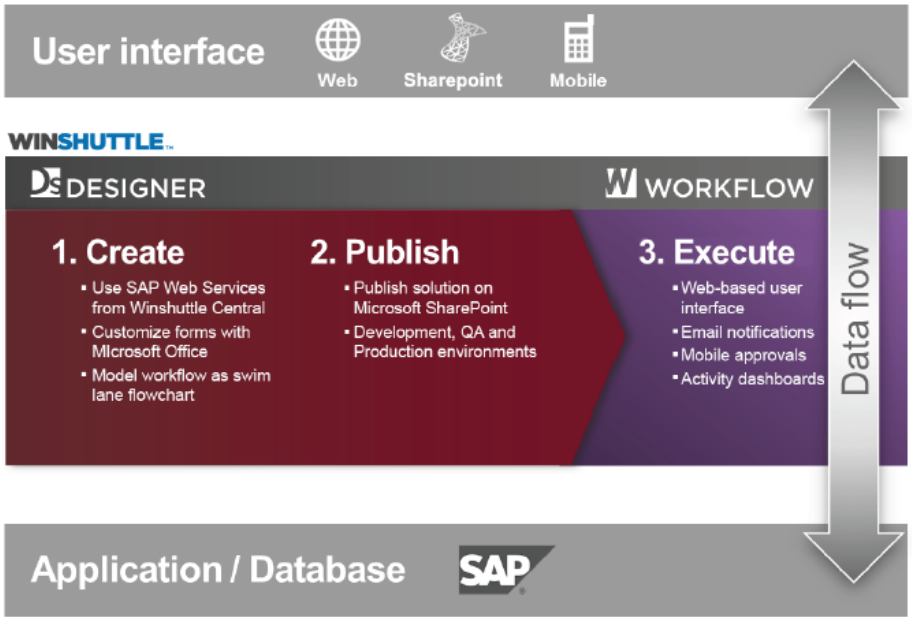
Winshuttle Platform (cont.)

Workflow (approval process)

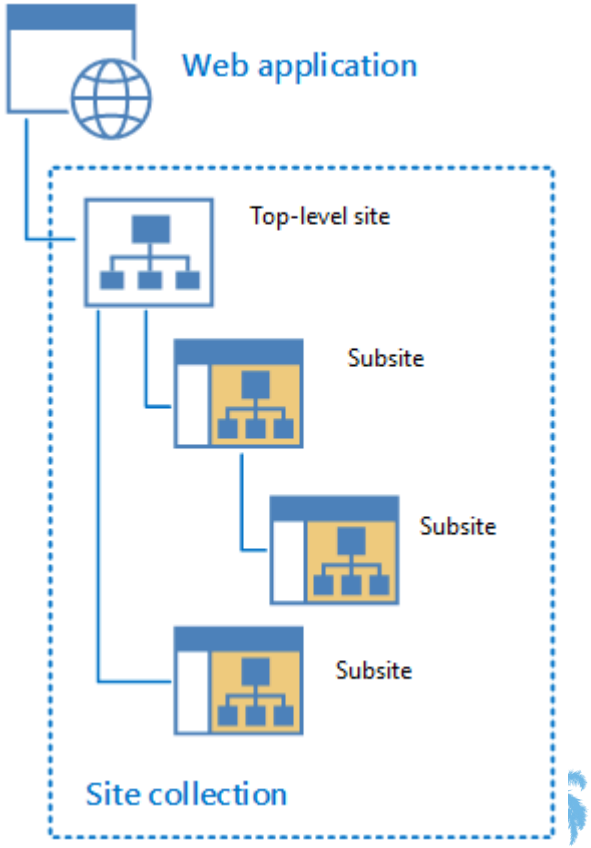
- Central
- Library
- Designer
- Form
  - List



Basic Concepts

Common (SharePoint/Winshuttle)

- Site
  - Group of pages, libraries, lists, etc.
- Library
  - Create and collect files
- List
  - Create and collect data
- Security
  - User permissions (site groups)



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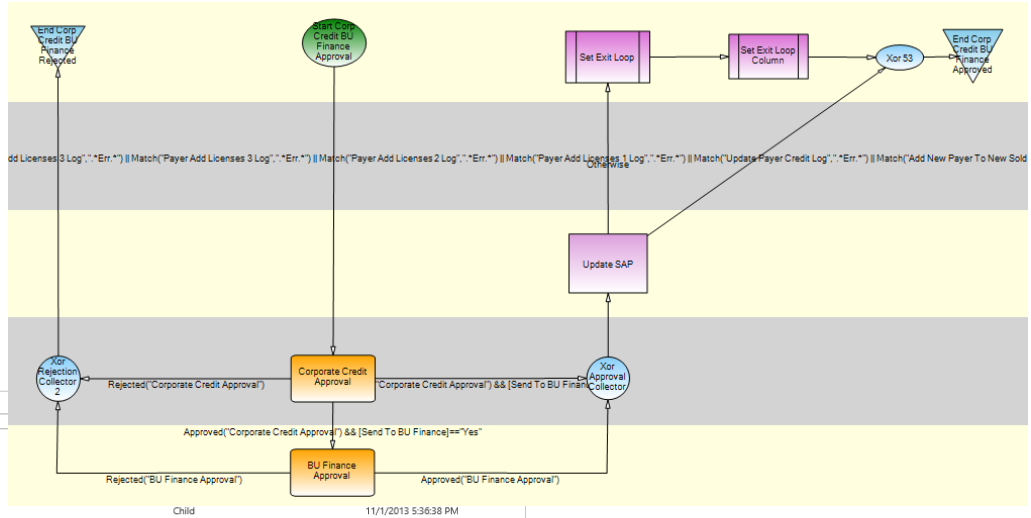
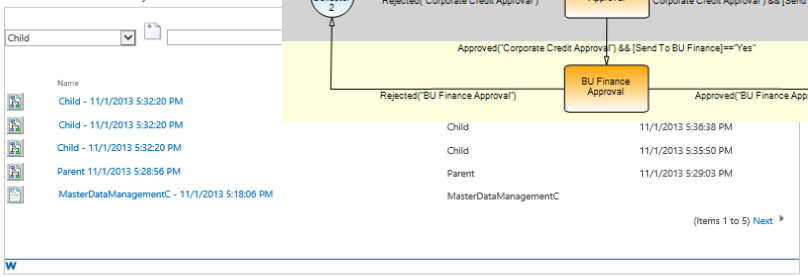
Basic Concepts (cont.)

Unique (Winshuttle)

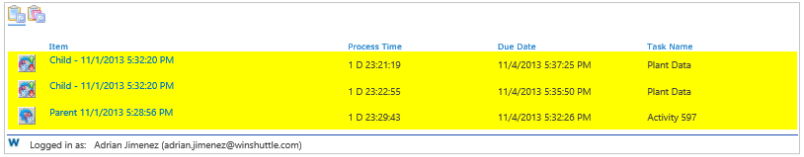
- Workflow engine
- Designer
- Web parts



Winshuttle Form Library



Winshuttle Task List



Winshuttle Process List

WINSHUTTLE

Q&A

Questions

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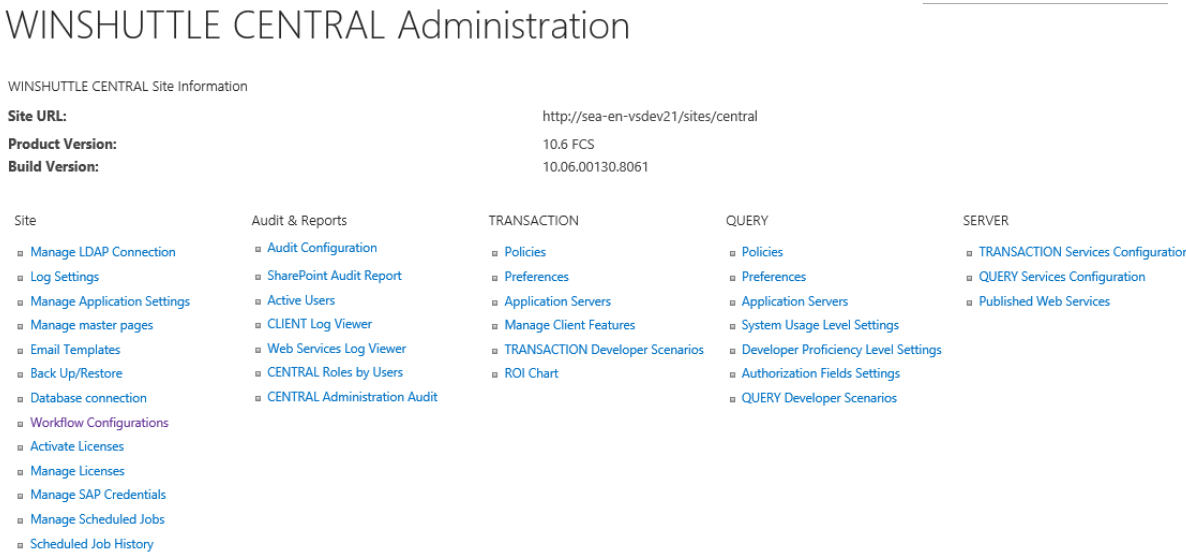
Winshuttle Components

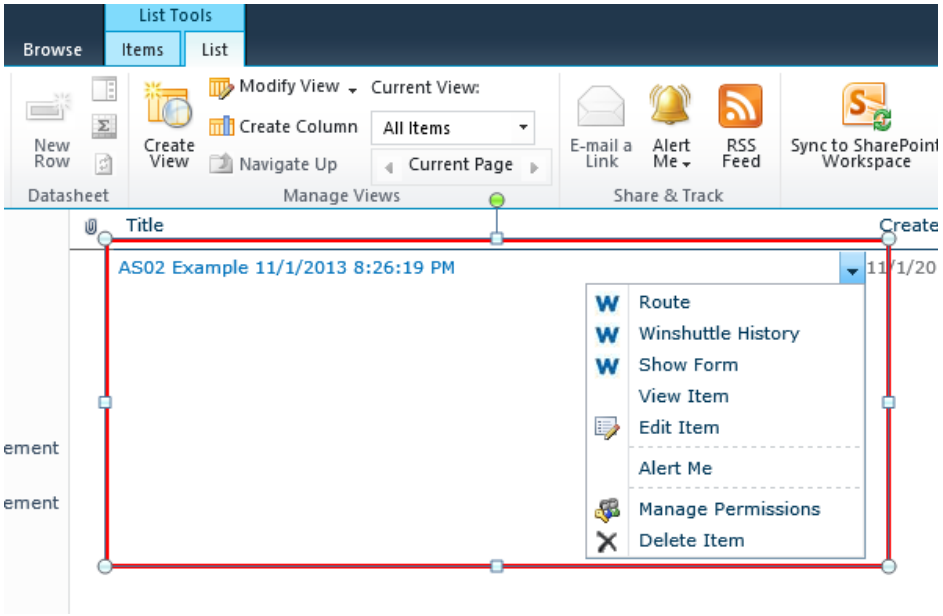
SharePoint

- Central
  - Libraries
  - Management
  - License
  - Permissions



Winshuttle Components (cont.)

- Form Site
  - Lists
    - Permissions



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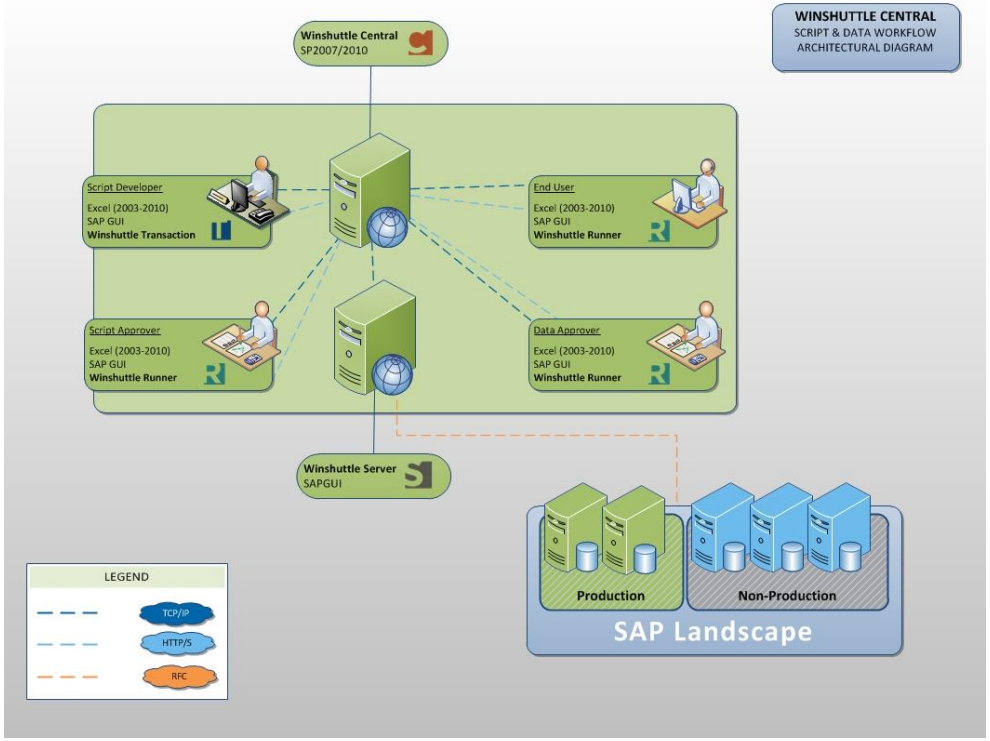
Winshuttle Components (cont.)

Server

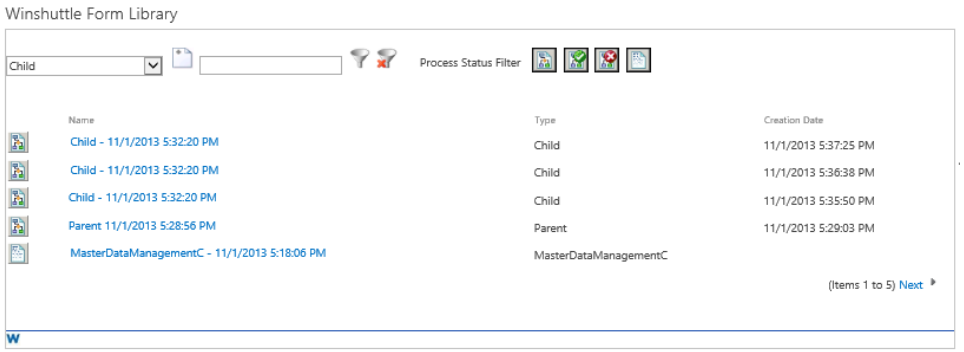
- Processing engine
  - Transactions
  - Web services



Winshuttle Components (cont.)

Web parts

- Form Library
  - Form Management



Uses:

- Start a new form
- Monitor your forms

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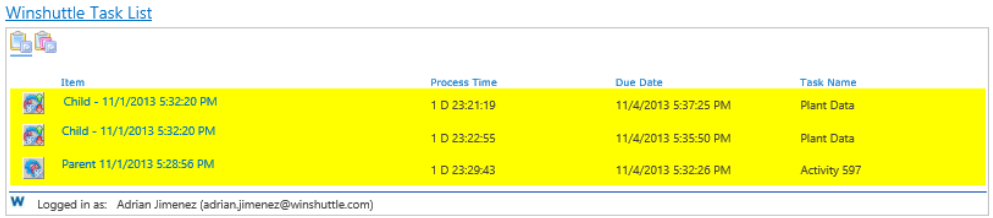
Winshuttle Components (cont.)

- Task List
  - Task Management
    - email



Uses:

- Manage Assignemnts

Winshuttle Components (cont.)

- Process List
  - Process Management

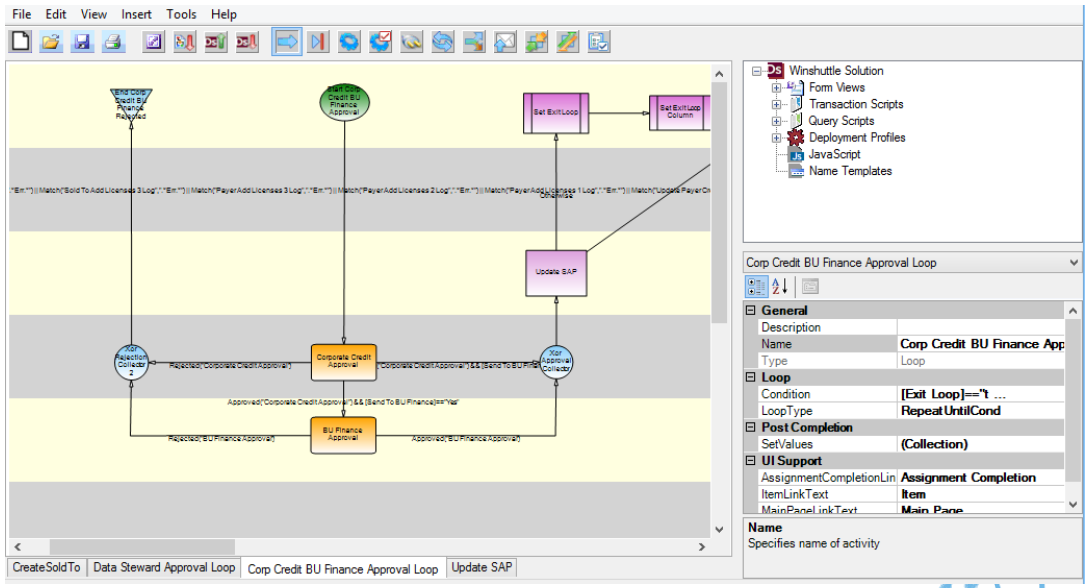
Uses:

- Manage workflow instances
- Monitor progress

Winshuttle Components (cont.)

Designer

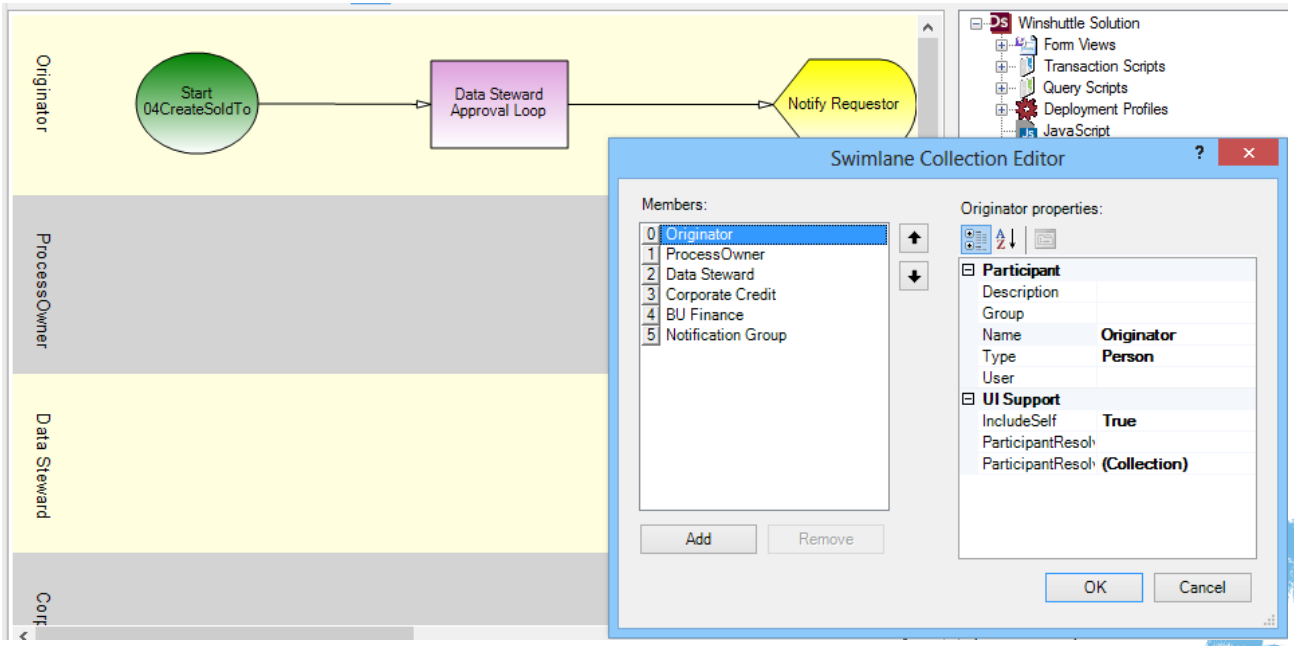
- **Canvas**
  - Workflow Properties
    - Process/form name
    - Duration (units)
    - Notifications



Winshuttle Components (cont.)

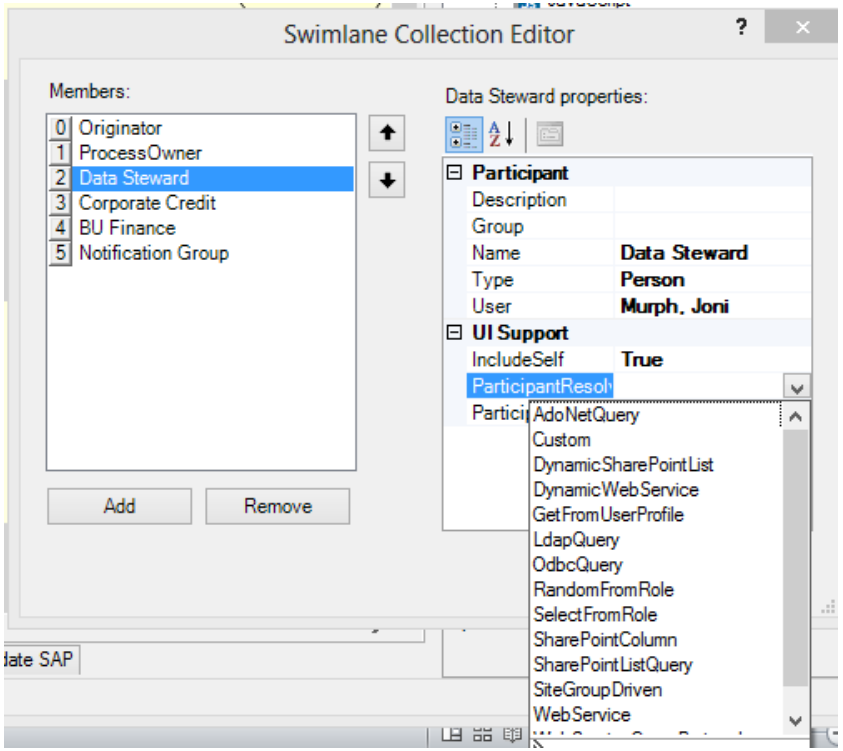
- Swimlanes (Roles)
  - SharePoint Site Groups*

* domain groups not supported



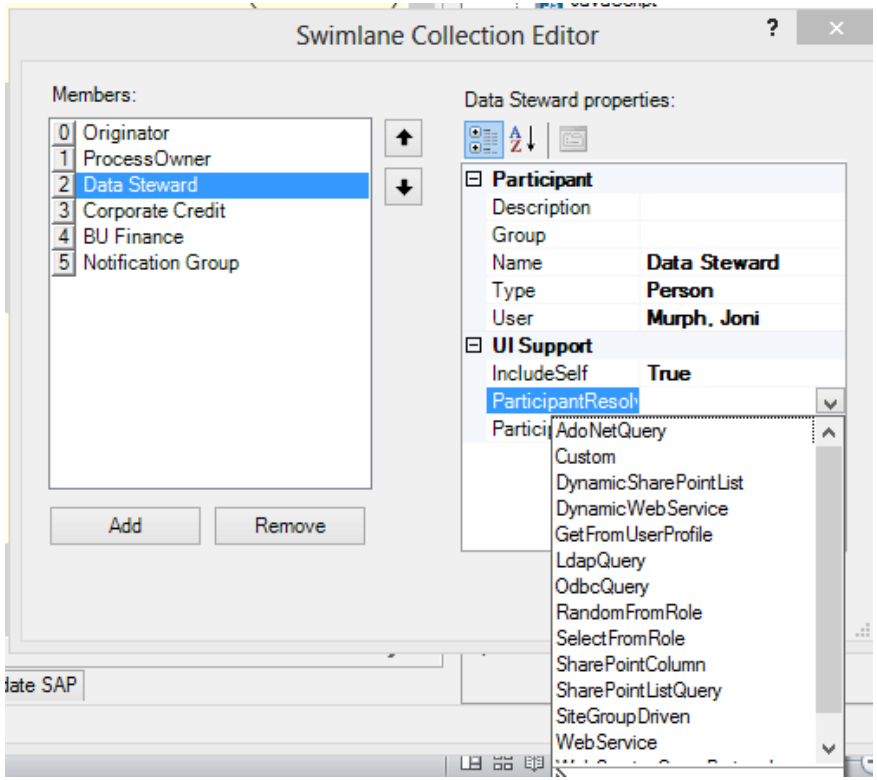
Winshuttle Components (cont.)

- Swimlanes (Roles)
  - Participant Resolver
    - Data Source
    - Form/list values



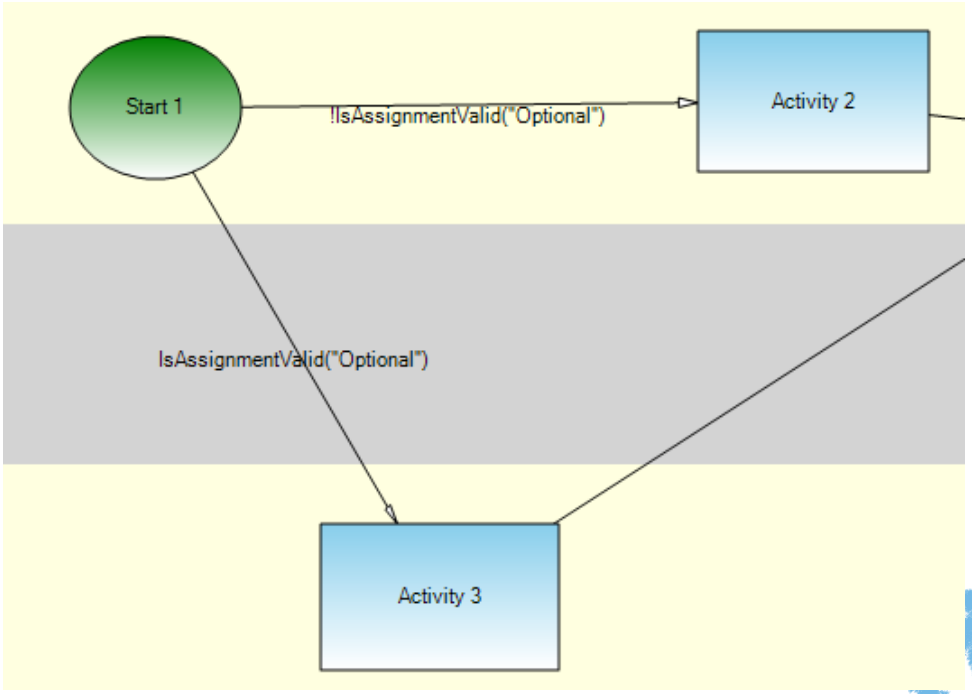
Winshuttle Components (cont.)

- Swimlanes (Roles)
  - Assignment style
    - Person
      - hardcoded
    - Person from role
      - Single assignee
    - Team from role
      - One or more assigned
    - Include self
      - To include/exclude
  - Optional assignments
    - Transition conditions



Winshuttle Components (cont.)

- Swimlanes (Roles)
  - Optional assignments
    - Transition conditions
    - “If assigned”



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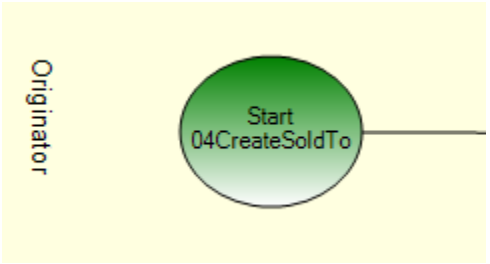
Winshuttle Components (cont.)

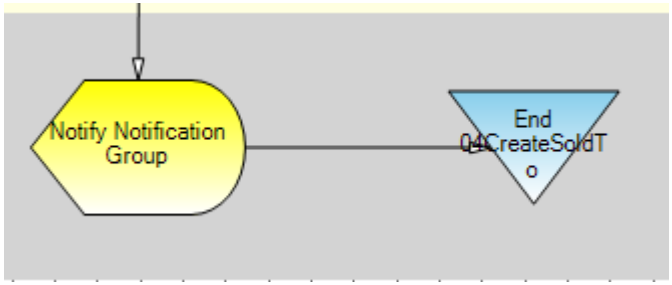
- Nodes
  - Start
    - Required
    - Single/unique



WINSHUTTLE

Winshuttle Components (cont.)

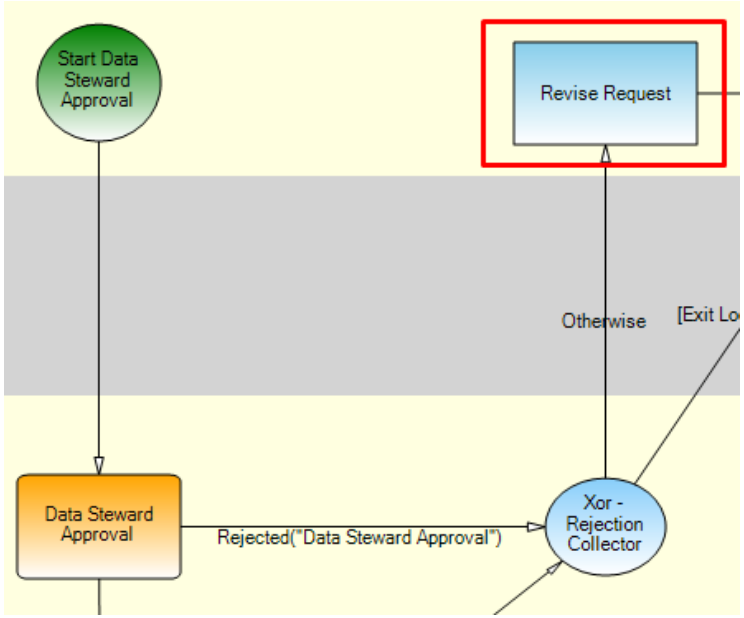
- Nodes
  - End
    - Required
    - Multiple



Winshuttle Components (cont.)

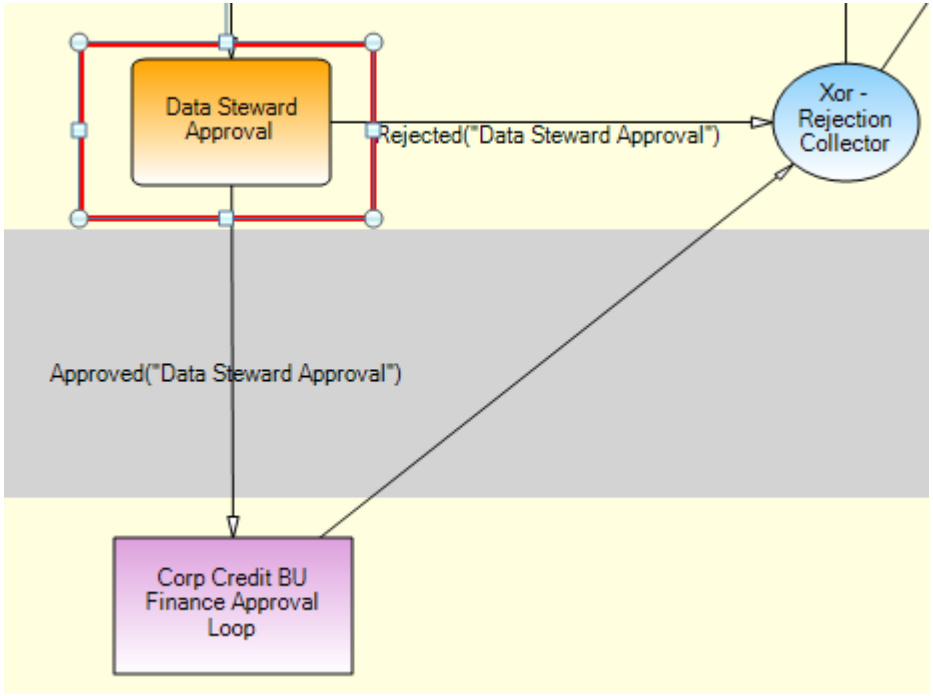
- Nodes
  - Activity
    - Assignment - completion
      - email

Uses:
- Task/assignment for participant
- Assignee “completes” task



Winshuttle Components (cont.)

- Nodes
  - Approval
    - Assignment - decision
      - Email



Uses:

- Task/assignment for participant
- Assignee(s) “approve” or “reject”
- Team vote

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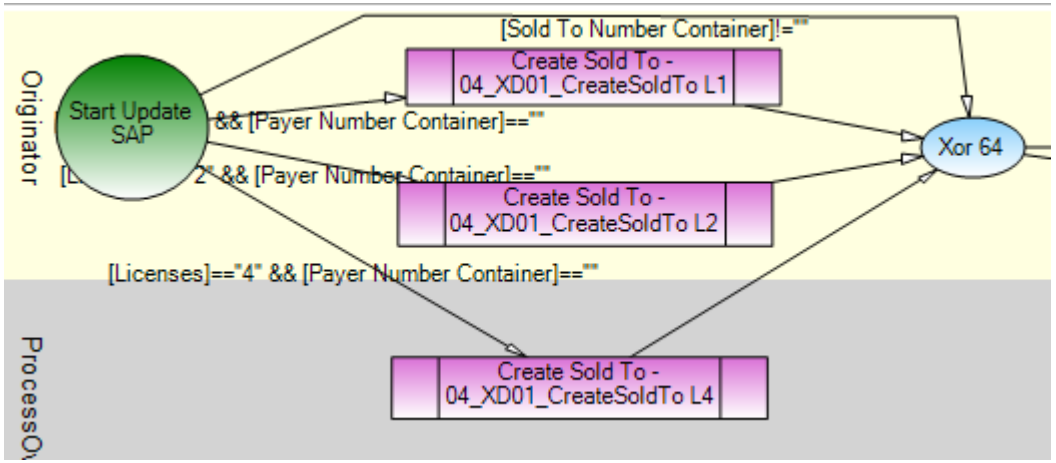
Winshuttle Components (cont.)

- Nodes
  - Plugins
    - Automated action
    - “Helper” functionality

Uses:

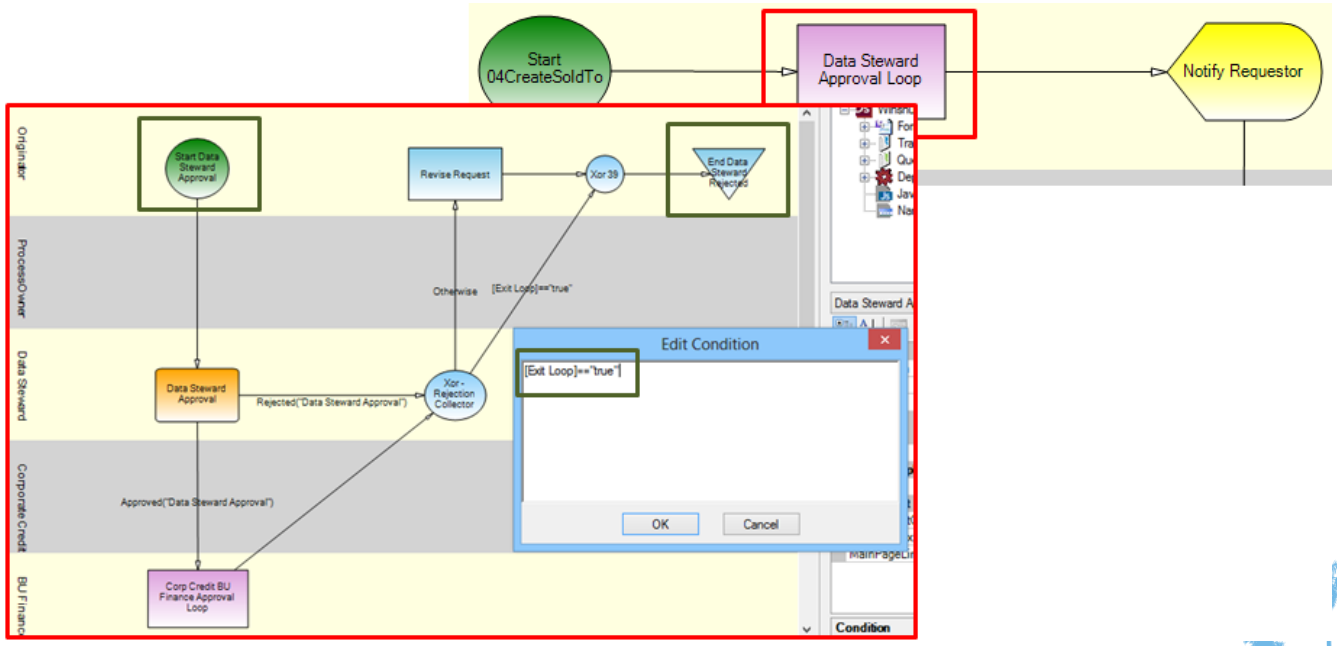
- Execute web services to SAP
- Copy a form
- Send an email to outside
- Update SharePoint list/library
- Export form data to database
- Start a process



Winshuttle Components (cont.)

- Nodes
  - Loop
    - Nested sub process
    - Linear
    - Multiple/nested

Uses:
- Review cycle
- Break apart complex workflows

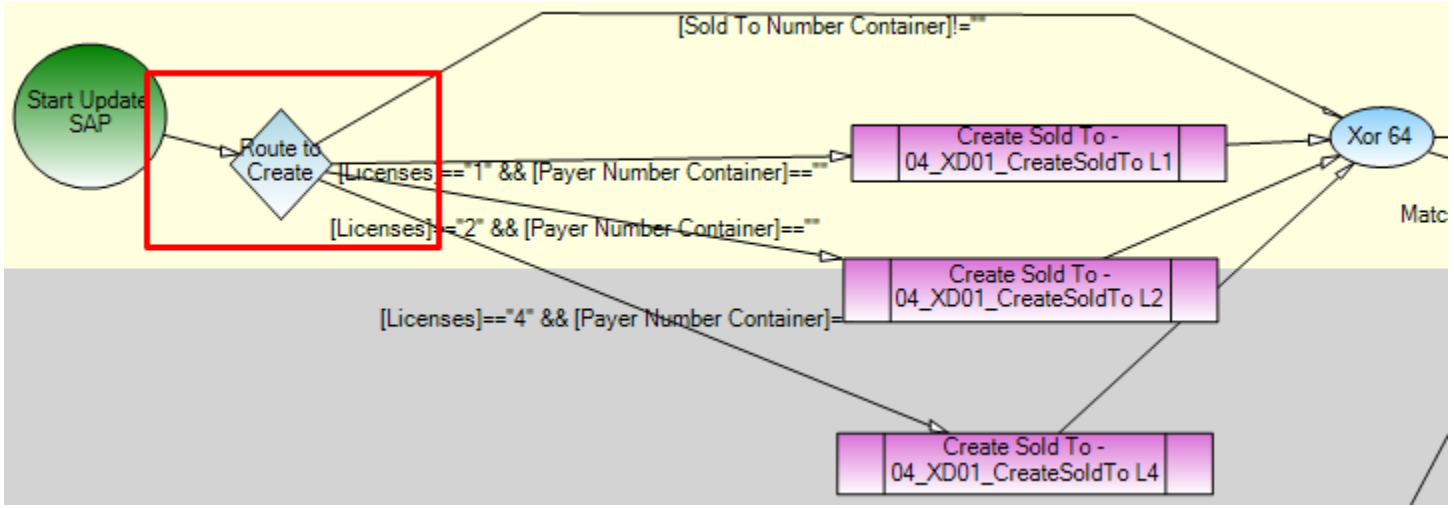


WINSHUTTLE

Winshuttle Components (cont.)

- Nodes
  - Decision
    - Visual guide

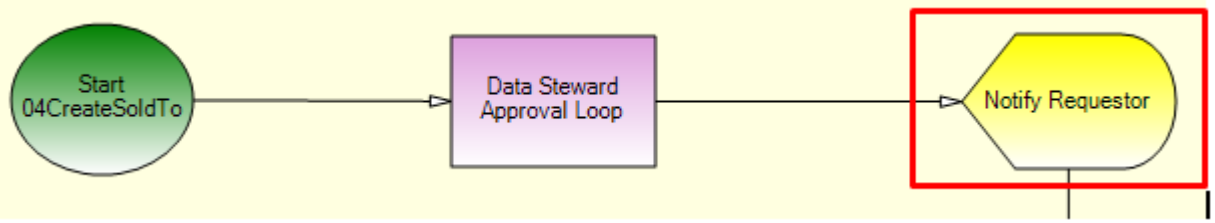
Uses:
- Visual reference of activities/branching



Winshuttle Components (cont.)

- Nodes
  - Notification
    - Email
      - Form/list/library information

Uses:
- Notify participants of workflow progress
- Forward form data without assigning a task

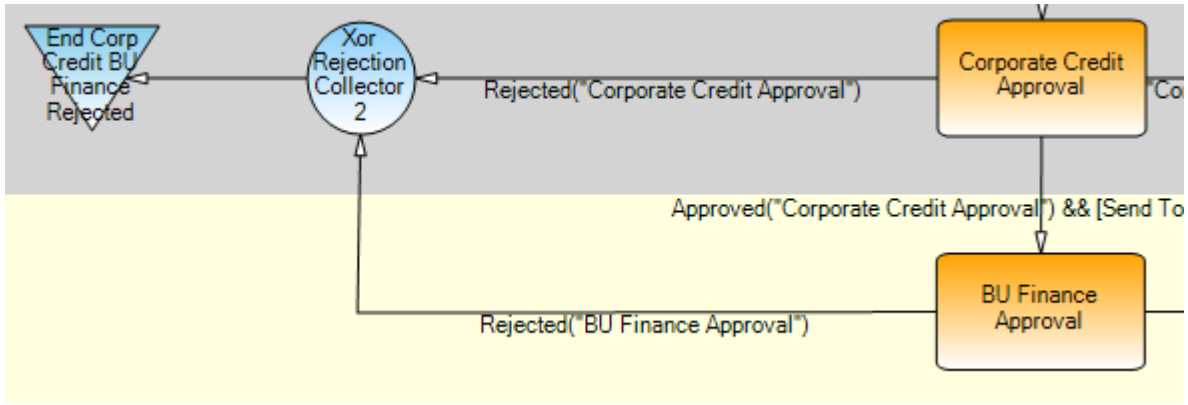


WINSHUTTLE

Winshuttle Components (cont.)

- Nodes
  - OR

Uses:
- Evaluate workflow logic to proceed to next steps



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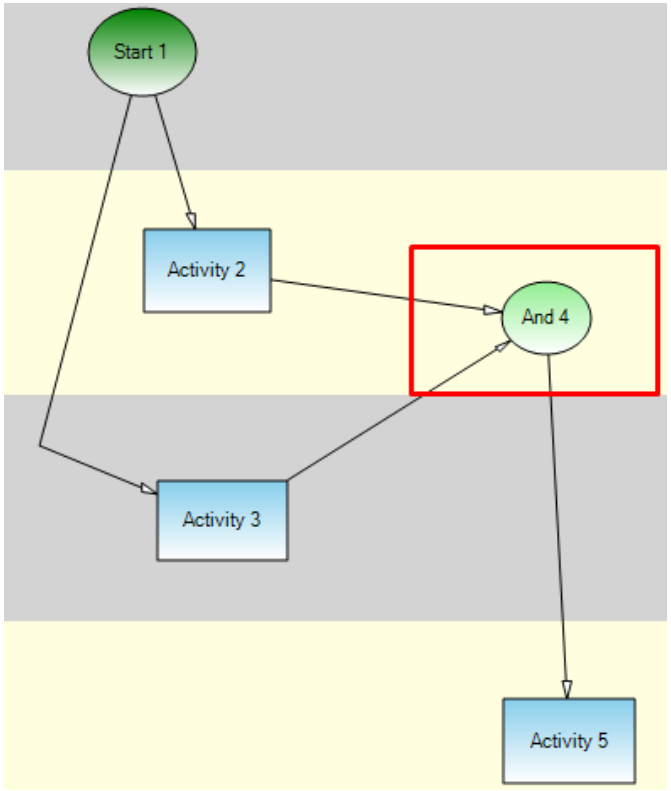
Winshuttle Components (cont.)

- Nodes
  - AND



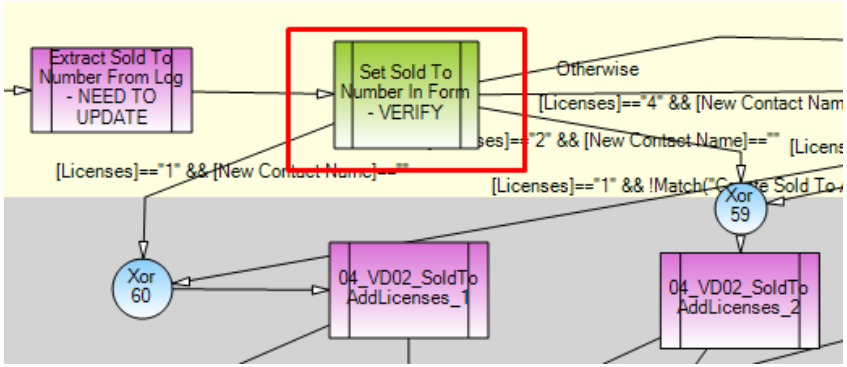
Uses:

- Evaluate workflow logic to proceed to next steps

WINSHUTTLE

Winshuttle Components (cont.)

- Nodes
  - Value Setter
    - Column (library or list)
    - Form field



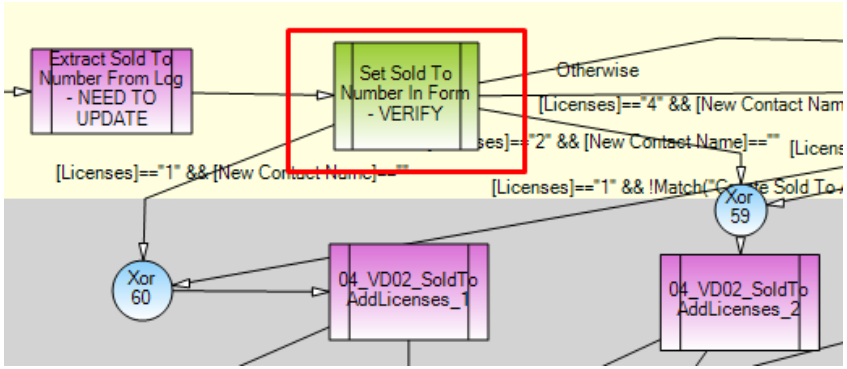
Uses:

- Set form field value based on workflow progress
- Set column value based on workflow progress

WINSHUTTLE

Winshuttle Components (cont.)

- Nodes
  - Transitions
    - Conditional Workflow path
      - Column value
      - Functions

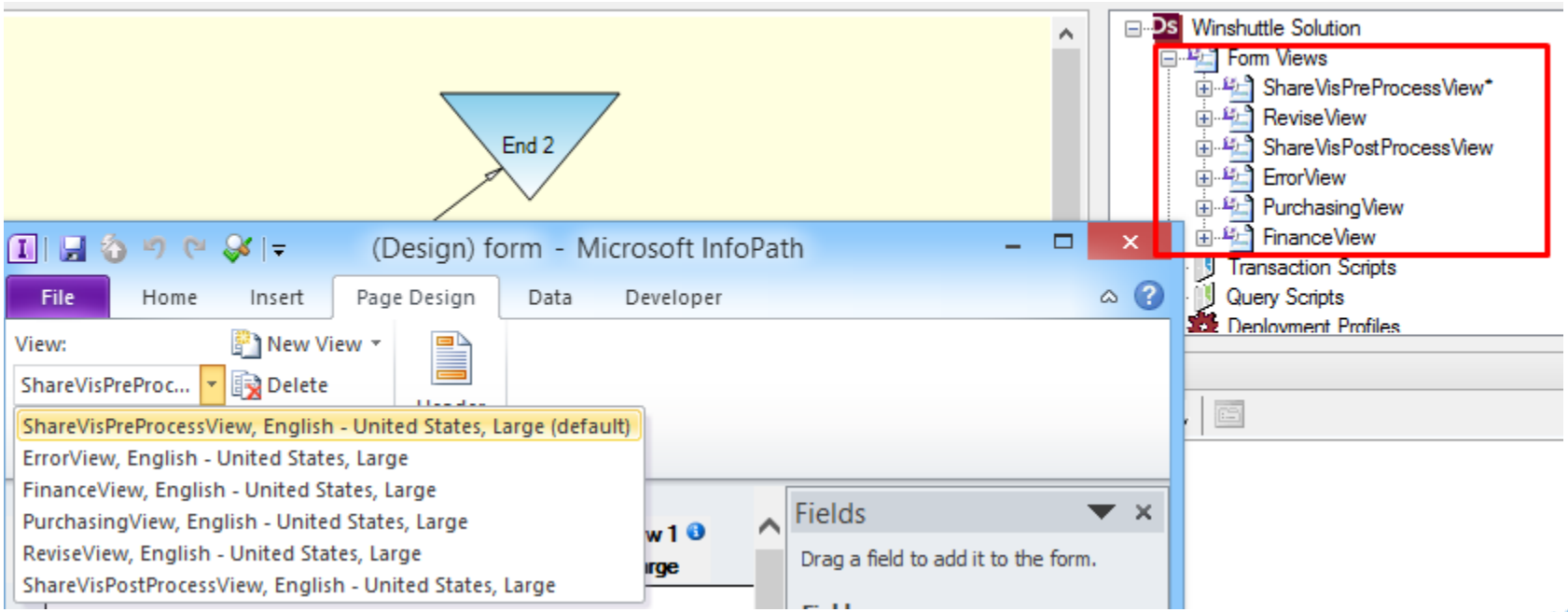


Uses:
- Workflow logic
- Conditional branching

Winshuttle Components (cont.)

Designer

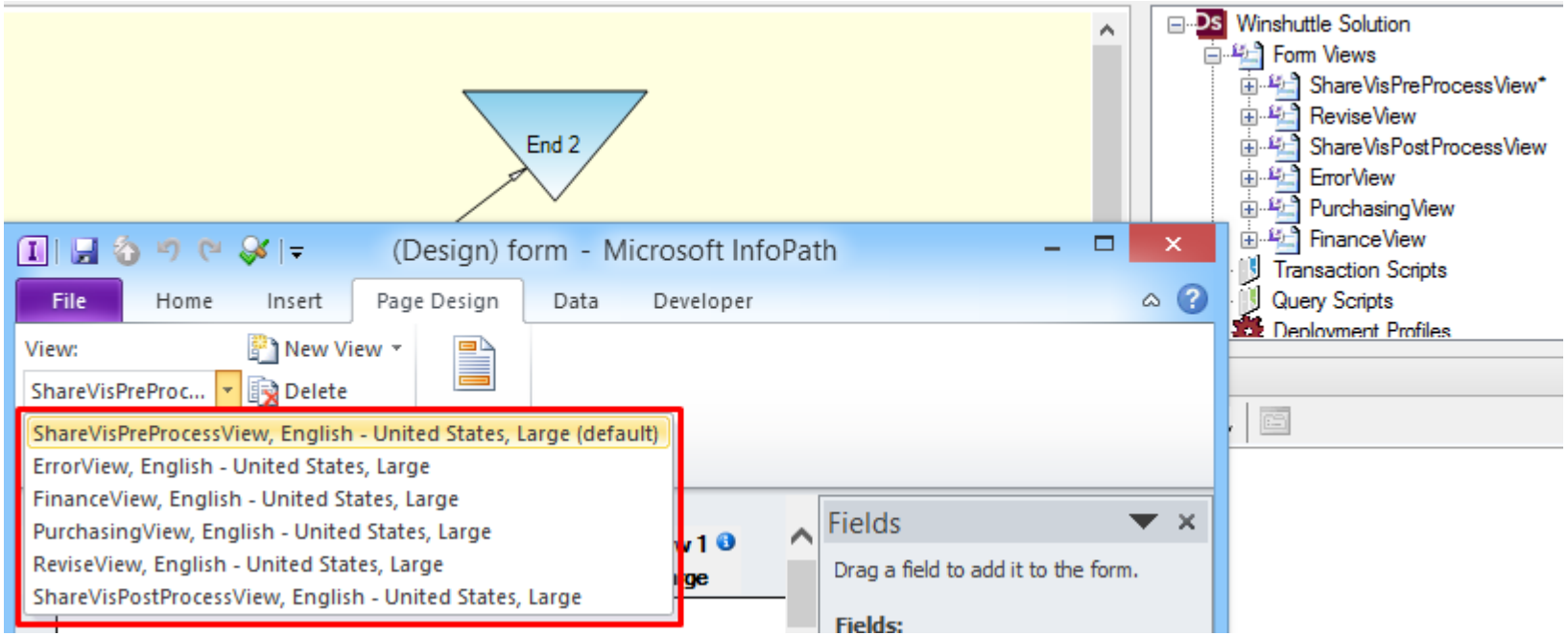
- Views



WINSHUTTLE

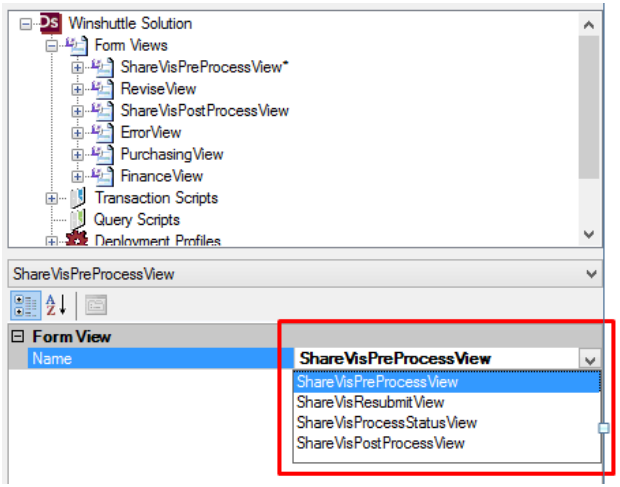
Winshuttle Components (cont.)

- Views
  - Form Views



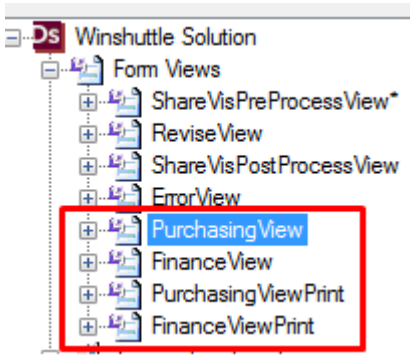
Winshuttle Components (cont.)

- Views
  - **Winshuttle Workflow Views**
    - ShareVisPreProcessView
      - Presented at form instantiation
    - ShareVisPostProcessView
      - Presented at process completion
    - ShareVisResubmitView
      - Presented when form instance is resubmitted
    - ShareVisProcessView
      - Presented when form instance is accessed outside of an assignment



Winshuttle Components (cont.)

- Views
  - PrintViews



Uses:

- Define a printable view of an assignment view

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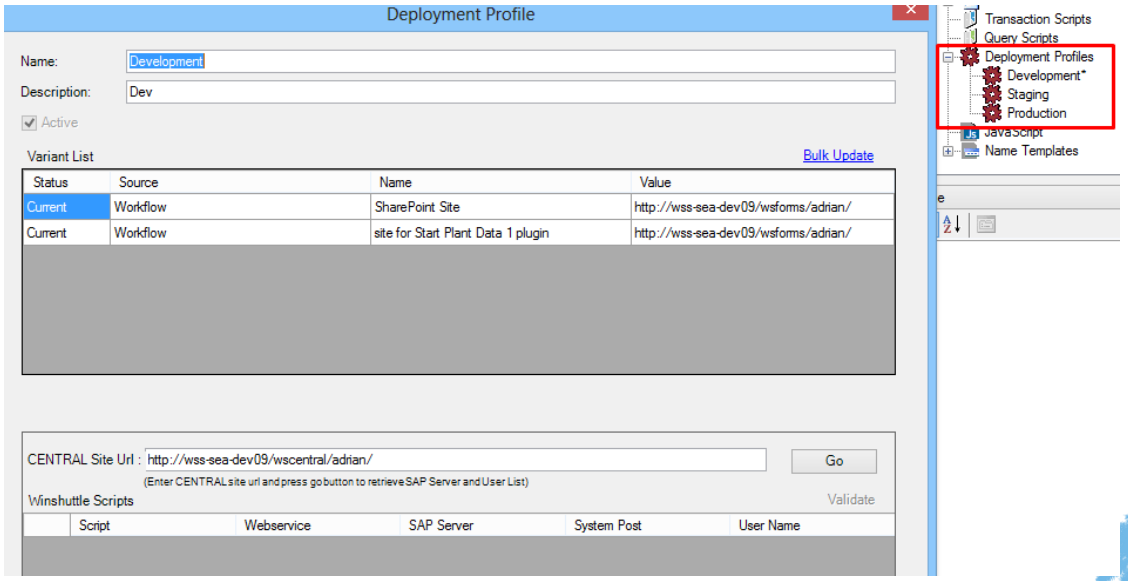
Winshuttle Components (cont.)

Designer

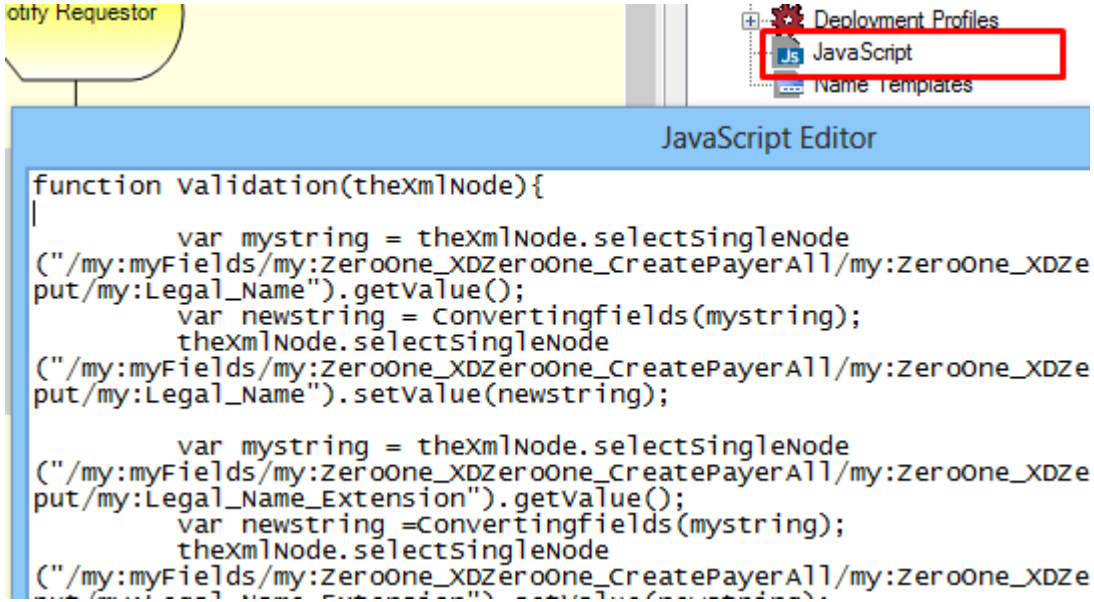
- **Deployment Profiles**
  - Environment (Development/QA/Production)
    - Central site
    - Form site
    - Data connections



Winshuttle Components (cont.)

Designer

- JavaScript
  - Winshuttle hooks



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Winshuttle Components (cont.)

Designer

- Web Services/**Scripts**
  - Excel Template (Scripts)
    - Central Library
    - Published to Central via desktop client
      - Transaction
      - Query
  - Benefits
    - More robust support of scripts
  - Limits
    - Workflow started by submission via Winshuttle Excel add-in
    - Must Use participant Resolver
    - Executed by Workflow
      - Autopost

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Winshuttle Components (cont.)

Designer

- **Web Services**/Scripts
  - Form
    - Winshuttle Forms Site
      - Can also be published to “non-form” site
    - Published to Central via Designer
      - Transaction scripts imported into Designer
      - Query scripts imported into Designer
  - Benefits
    - Customizable UI
    - Mapping
      - Web service input/output to InfoPath fields
    - Web service executed by user or workflow
  - Limits
    - Partial support for script recordings

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Winshuttle Components (cont.)

Designer

- **Solution vs Legacy Mode**
  - **Solution**
    - Single file to store all components
      - Scripts (Transaction/Query)
      - JavaScript
      - Form
      - Workflow
      - Deployment profiles
    - Single file to deploy all components
      - Web Services
    - Import workflows and forms created in Legacy Mode
    - Requires Central and Forms site

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Winshuttle Components (cont.)

Designer

- Legacy Mode
  - All components stored separately
    - Scripts (Transaction/Query)
    - JavaScript
    - Form
    - Workflow
    - No deployment profiles
  - All components deployed separately
    - Web Services
      - Transaction client
      - Query client
    - Form
      - Designer
    - Workflow
      - Designer
  - Does not require Central or Workflow site

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Winshuttle Components (cont.)

Designer

- **InfoPath**
  - Layout tool
    - XSN file is not used
  - Supported functionality
    - Rules
    - Controls
    - Functions
  - Unsupported functionality
    - Controls
    - Nested functions

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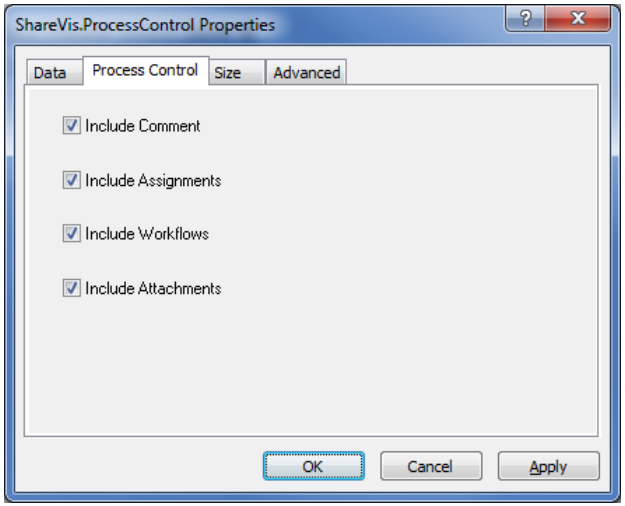
Winshuttle Components (cont.)

- InfoPath
  - Custom Controls
    - Process control



Uses:
- Default Assignment Method
- Audit Trail

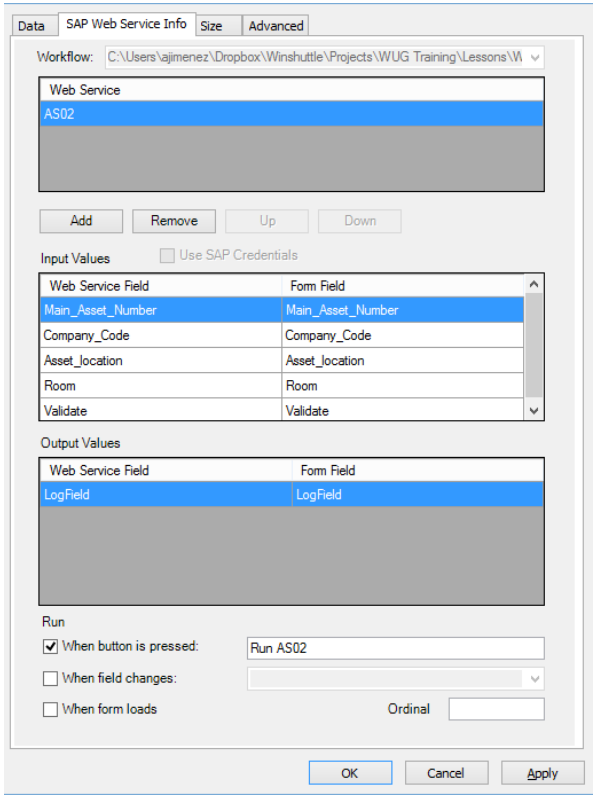
Properties:
Include Assignments: Toggles the display of the Workflow Participant Assignment area.
Include Attachments: Allows the attachments in the comment section to be controlled independently.
Include Comment: Toggles the display of the Comments area when a workflow assignment is being completed.
Include Workflows: Toggles the display of the Process Control area that shows all available workflows

Winshuttle Components (cont.)

- InfoPath
  - Custom Controls
    - SAP Web Service control
      - Push/pull data from SAP

Uses:

- Execute web service(s)

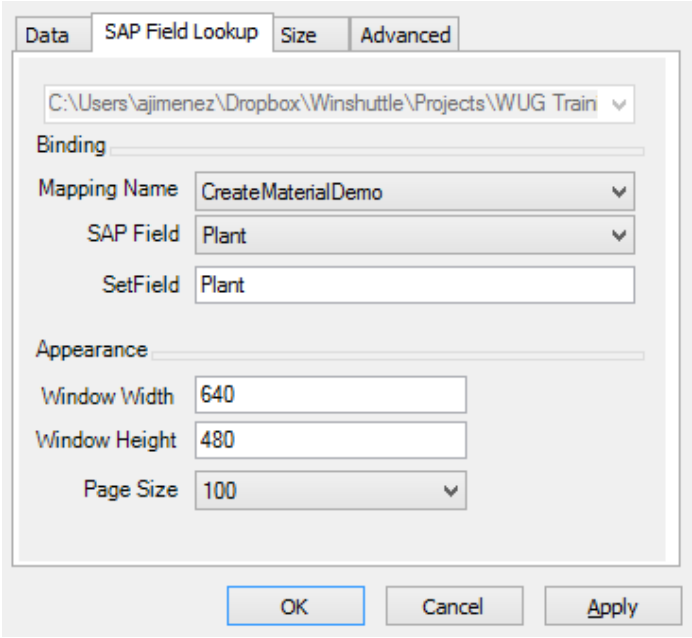


Properties:

Add/Remove: Adds or removes web service(s).
When button is pressed: renders a button and runs the web service(s) when pressed
When field changes: runs the web service(s) when a field changes
When form loads: runs the web service(s) when the form is opened

Winshuttle Components (cont.)

- InfoPath
  - Custom Controls
    - SAP Lookup control
      - Pulls data from SAP in a windows
      - Only selection is added into the form

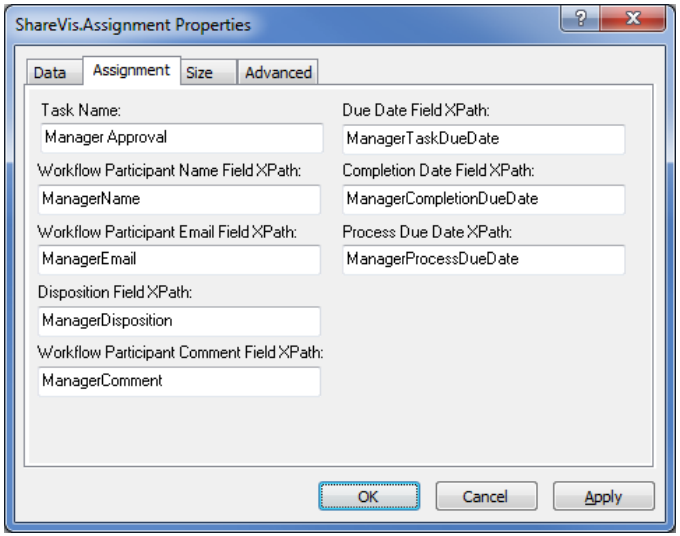


Uses:
- Search an SAP field

Properties:
Mapping Name: web service to lookup
SAP Field: Web service field to pull data
Set Field: Form field to populate with selected data
Appearance properties: lookup window configuration

Winshuttle Components (cont.)

- InfoPath
  - Custom Controls
    - Assignment control
      - Pulls assignment data



Uses:

- Build audit trail within form
- Capture assignment data in form fields
- Submit workflow audit trail to SAP (via form fields and web service)

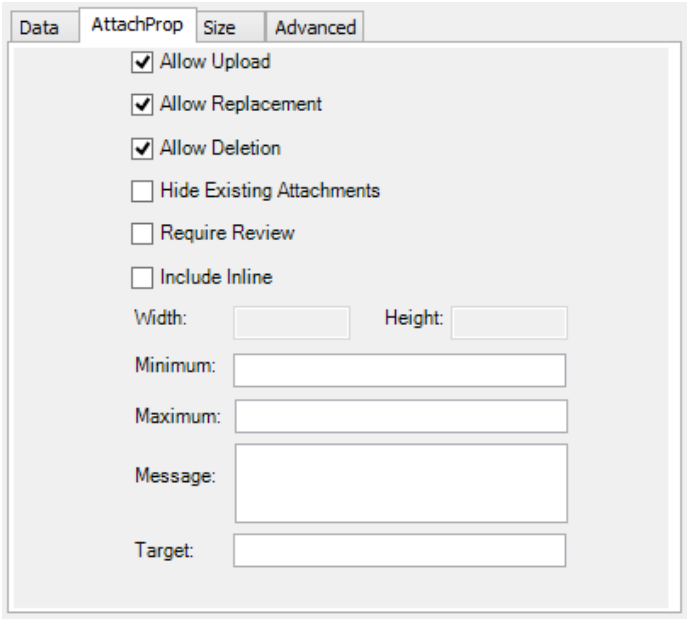
Properties:

Completion Date Field XPath: The name of the field that will receive the completion date of the assignment.
Disposition Field XPath: The name of the XML field that will receive the disposition selected by the workflow participant when the assignment was completed. This will be either Approved, Rejected, or Completed, depending upon how the workflow is defined.
Due Date Field XPath: The name of the field that will receive the due date for the assignment.
Process Due Date XPath: The name of the field that will receive the due date for the process.
Task Name: The name of the task in the workflow whose details should be recorded.
Workflow Participant Comment Field XPath: The name of the XML field that will receive the comment entered by the workflow participant after the assignment is complete.
Workflow Participant Email Field XPath: The name of the XML field that will receive the workflow participant's email address.
Workflow Participant Name Field XPath: The name of the XML field that will receive the workflow participant's name.

WINSHUTTLE

Winshuttle Components (cont.)

- InfoPath
  - Custom Controls
    - Attachment control
      - Attach files



Uses:

- Add/replace/remove attachments to a form
- Require review of attachments before task completion
- Require attachment of file(s) before task completion

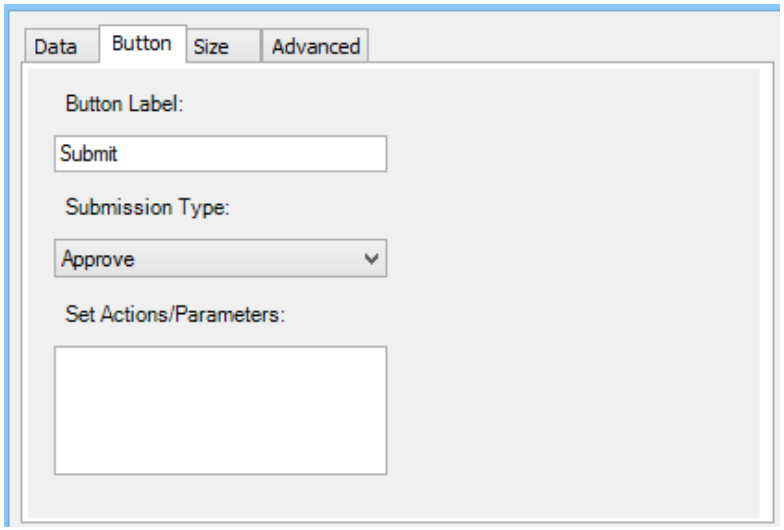
Properties:

Allow Deletion: Enables the deletion of files that have been uploaded previously.
Allow Replacement: Enables the replacement of files that have been uploaded previously.
Allow Upload: Enables the uploading of files.
Hide Existing Attachments: Hides the attachments that have been uploaded previously.
Include Inline: Allows the attachments in the form to be displayed inline in the form.
Maximum: The maximum number of attachments that are required before the form can be submitted.
Message: The message to display if the minimum or maximum requirement is not met.
Minimum: The minimum number of attachments that are required before the form can be submitted.
Require Review: Requires that the user click on the attachments and view them before they can proceed.
Target: A label that you can enter to make the attachment display in another browser. The special _blank target will always bring up the attachment in a new window. If you use anything other than _blank the attachment will be brought up in the browser that already has that label, if it exists. Otherwise, it opens a new browser window.

WINSHUTTLE

Winshuttle Components (cont.)

- InfoPath
  - Custom Controls
    - Button control



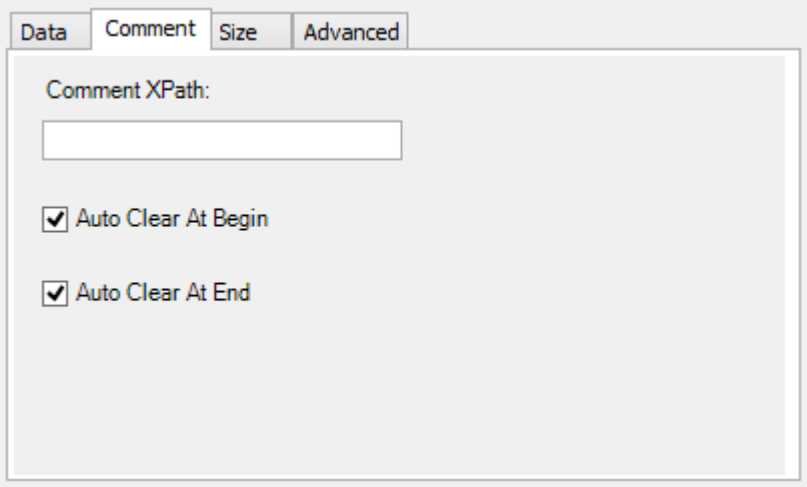
Uses:
- Integrate task completion controls into form
- Execute javascript
- Execute a plugin
- Set a field value

Properties:
Button Label: Name that will appear on the button.
Set Actions/Parameters: Sets the value of a field in the form when the button is clicked
Submission Type: Submission action the button takes when clicked.
- Approve: approves the form and moves it to the next step in the workflow.
- Cancel: cancels action taken on the form and returns without submitting the form.
- Complete: completes the current assignment and moves the workflow to the next step.
- Reject: rejects the form and moves it to the next step in the workflow.
- Save: saves the work performed on the form.
- Save and Route: saves the work performed on the form and moves it to the next step in the workflow.
- Embedded Plugin: allows the Process Designer to specify a plug-in and its arguments to invoke on the server when the button is clicked.
- JavaScript: Allows the Process Designer to specify a JavaScript function to invoke when the button is clicked
- Delete: deletes the form.
- Set Field Date: sets the field to the value specified when the specified action is executed.

WINSHUTTLE

Winshuttle Components (cont.)

- InfoPath
  - Custom Controls
    - Comment control
      - Uses form field

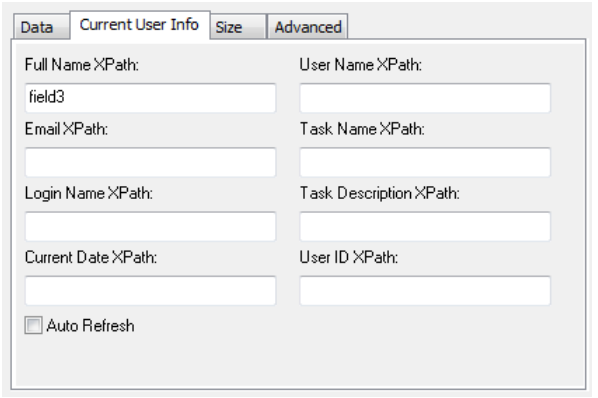


Uses:
- Integrate Comments field into form layout
- Use form field to capture task comments

Properties:
Auto Clear At Begin: Clears the contents of the specified form field when the form is started.
Auto Clear At End: Clears the contents of the specified form field when the form is submitted.
Comment XPath: Specifies the field that will be retrieved by the workflow engine to use as the comment for the assignment completion.

Winshuttle Components (cont.)

- InfoPath
  - Custom Controls
    - Current User control
      - Pulls current user information



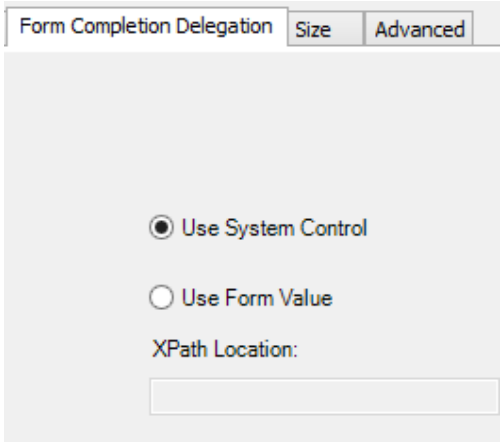
Uses:
- Capture current user data in form fields
- Submit workflow audit trail to SAP (via form fields and web service)

Properties:
Auto Refresh: Forces an update of the specified field(s) regardless of the field contents.
Current Date XPath: The form field that will receive the current date.
Email XPath: The form field that will receive the email of the current user.
Full Name XPath: The form field that will receive the full name of the current user.
Login Name XPath: The form field that will receive the login name of the current user.
Task Description XPath: The form field that will receive the current task's description.
Task Name XPath: The form field that will receive the name of the current task.
User ID XPath: The form field that will receive the internal SharePoint ID of the current user.
User Name XPath: The form field that will receive the user name (the login name without the domain qualifier) of the current user.

WINSHUTTLE

Winshuttle Components (cont.)

- InfoPath
  - Custom Controls
    - Form Completion Delegation control
      - Start a form as a delegate

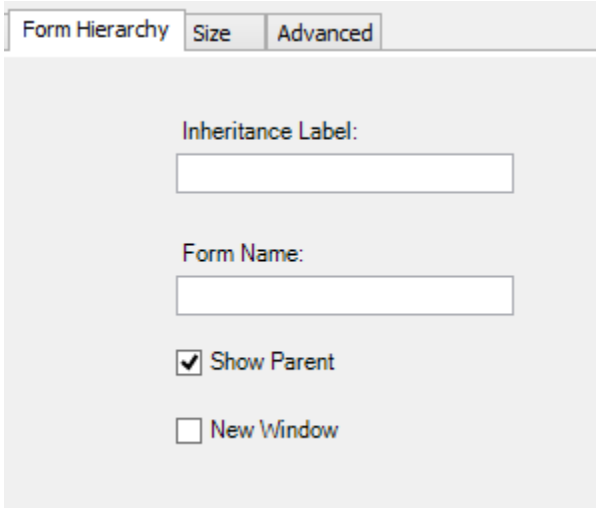


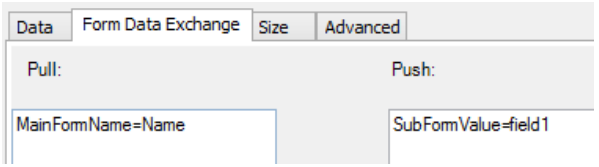
Uses:
- Fill out a form on someone else's behalf
- Review prior to workflow

Properties:
Use System Control: Converts the existing Custom Control added to the form when designing to a Drop Down List Box.
Use Form Value: Give you the ability to create your own field in the form.
XPath Location: Name of the InfoPath Field in which the value will be held in the form.

Winshuttle Components (cont.)

- InfoPath
  - Custom Controls
    - Form Hierarchy/Data Exchange controls
      - Start a sub form
      - Exchange data



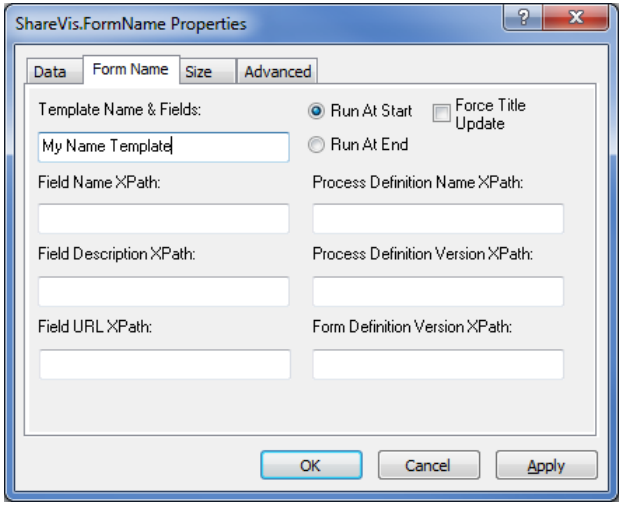


Uses:
- Start an instance of a form/process from within another form
- Exchange data between the parent form and the child form

Properties:
Inheritance Label: name of parent/child relationship
Form Name: Form name to instantiate
Show Parent: displays parent form when button is clicked
New Window: displays form in a new browser window
Pull: Mapping from Parent form field to Child form field
Push: Mapping from Child form field to Parent form field

Winshuttle Components (cont.)

- InfoPath
  - Custom Controls
    - Form Name control
      - Generates unique ID
      - Pulls workflow data



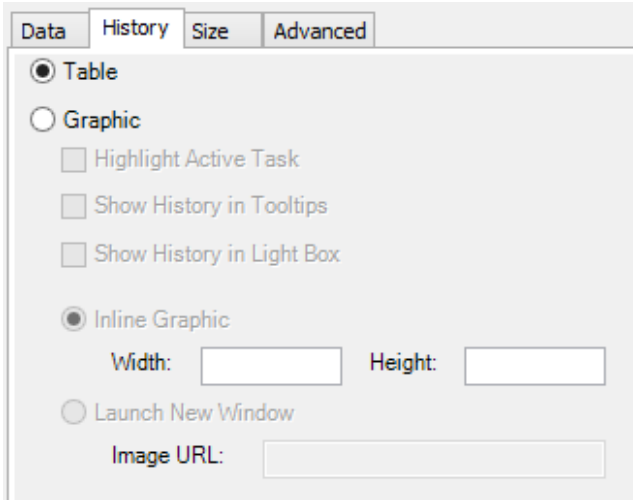
Uses:
- Generate unique ID for a form instance
- Create shortcut to default form view
- Display workflow file details

Properties:
Field Description XPath: The field name that should receive the description of the form.
Field Name XPath: The field name that should receive the generated name.
Field URL XPath: The field name that should receive the URL to the form.
Force Title Update: If selected, executes the control to assign a form name even if a name already exists.
Form Definition Version XPath: The field name that should receive the form version that is running.
Process Definition Name XPath: The field name that should receive the process definition name that is running.
Process Definition Version XPath: The field name that should receive the process definition version that is running.
Run at End: Assigns the form name after the form is submitted.
Run at Start: Assigns the form name when the form is started.
Template Name & Fields: Comma-separated list of name template names and field names to combine into the name for the form.

WINSHUTTLE

Winshuttle Components (cont.)

- InfoPath
  - Custom Controls
    - History control
      - Pulls workflow details into a table
      - Pulls workflow graph



Uses:
- Display workflow audit trail
- Display graphic of task within the context of the workflow

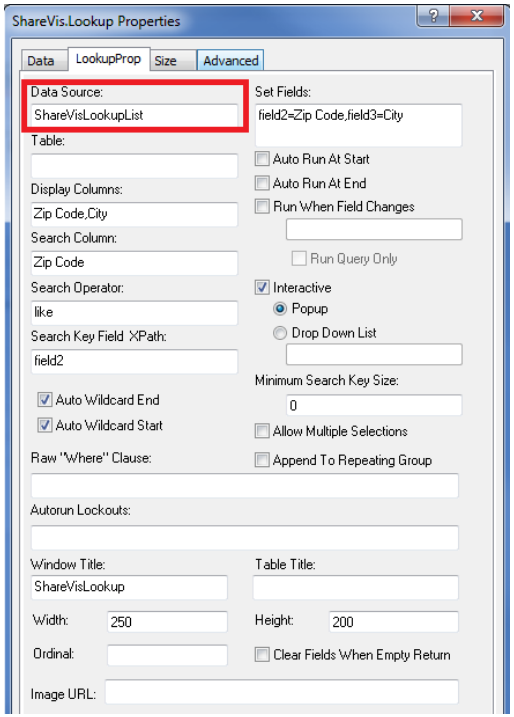
Properties:
Graphic: creates a graphic representing the current state of the workflow.
- Highlight Active Task: select this option to make the graphic have an outline around the active task in the workflow graphic.
- Show History in Tooltips: select this option to enable tooltips that show the entire history for the given task when the mouse pointer is hovered over the task node in the graphic.
- Show History in Light Box: select this option to allow clicking on the task node to produce a light box effect that displays the history for the given task.
- Inline Graphic: Select this option to show the graphic in the form itself. The graphic will be placed wherever you place the Ws.History control in the form. You can specify the dimensions as follows: Width: the width of the inline graphic, Height: the height of the inline graphic.
- Launch New Window: select this option to launch a new window when the user clicks the History Control button in the form.
- Image URL: enter the URL (http://) that points to the image that you would like to use in place of the standard History Control button.

Table: places a tabular view in the form at whatever position you insert the Ws.History control.

WINSHUTTLE

Winshuttle Components (cont.)

- InfoPath
  - Custom Controls
    - **Lookup control**
      - Pull data from a data source



Uses:

- Query a data source

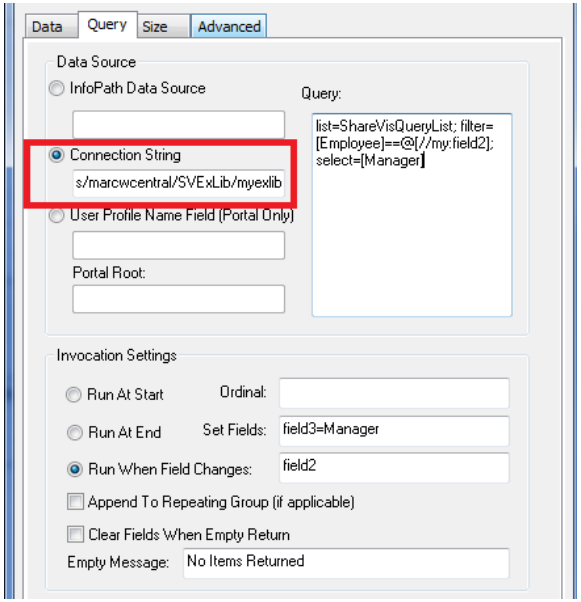
Properties:

Append To Repeating Group: Appends results to an existing repeating group.
Auto Run At End: Query runs when the form is submitted.
Auto Run At Start: Query runs when the form starts.
Data Source: Name of the InfoPath data source or ODBC connection string.
Auto Wildcard End: Automatically appends a SQL wildcard character to the end of the where clause.
Auto Wildcard Start: Automatically appends a SQL wildcard character to the beginning of the where clause.
Autorun Lockouts: When using multiple Ws.Lookup controls that run when field values change, circular references can occur if one Ws.Lookup control is attempting to update a field that is being used by another Ws.Lookup control, which can cause infinite loops. This property can be set to a comma-separated list of field names that are referenced by other Ws.Lookup controls, and when this Ws.Lookup control runs, it will not update the fields specified, which would cause other Ws.Lookup controls to run.
Display Columns: Comma-separated list of columns to display in the pop-up selection window. If a Web Service data source is configured, this value also serves to name the columns of data returned from the Web Service.
Allow Multiple Selections: Allows you to select multiple listings from the returned query results when the pop-up option is selected.

WINSHUTTLE

Winshuttle Components (cont.)

- InfoPath
  - Custom Controls
    - Query control
      - Pull data from data source



Uses:

- Query a data source

Properties:

Data Source

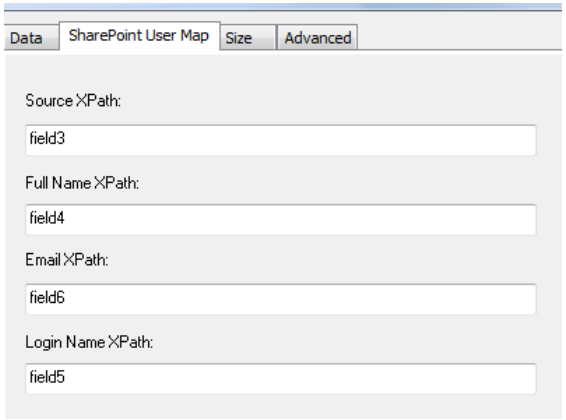
- InfoPath Data Source: specifies an InfoPath data source to query.
- Portal Root: URL to the root of the SPS or MOSS.
- Query: SQL query to execute on the data source
- User Profile Name Field (Portal Only):the name of the field that contains the current user's name. This functionality works in conjunction with the Ws.CurrentUser control, where the control populates a given field with the current user's login name.

Invocation Settings

- Run at Start: runs the query when the form is started.
- Run at End: runs the query when the form is submitted.
- Run When Field Changes: runs the query when the specified field is changed.
- Ordinal: order that the query should be performed (if multiple Ws.Query controls are used).
- Set Fields: Sets values in the XML to query return values. The format is <field name>=<query field name>,<field name>=<query field name>,....
- Append To Repeating Group: appends results to an existing repeating group.
- Clear Fields When Empty Return: if the query returns no rows, selecting this option will cause the form fields to be cleared.
- Empty Message: the message to display to the End User if the query returns no rows. If this field is left empty, no message will be displayed.

Winshuttle Components (cont.)

- InfoPath
  - Custom Controls
    - SharePoint User Map control
      - Pulls SharePoint User Data



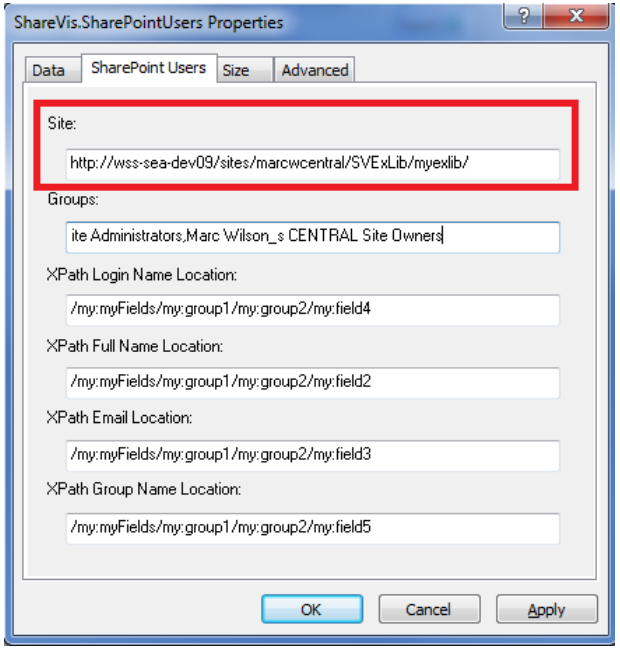
Uses:

- Retrieve SharePoint user profile data into form fields

Properties:
Email XPath: The field into which to place the email address of the looked up user.
Full Name XPath: The field into which to place the full name of the looked up user.
Login Name XPath: The field into which to place the login name of the looked up user.
Source XPath: The form field from which to get the identifier for the user. This field can contain a user name, an email address, or a full name that will be used as the basis for the user lookup.

Winshuttle Components (cont.)

- InfoPath
  - Custom Controls
    - SharePoint Users control
      - Pulls SharePoint Site group members



Uses:

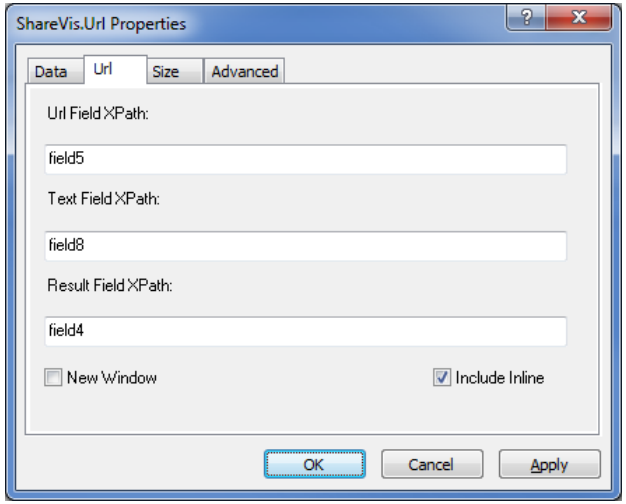
- Display SharePoint Site Group members into form fields
- Use retrieved data to assign tasks

Properties:
Groups: The name of the group(s) you want to work with.
Site: The SharePoint site containing the group you want to work with.
XPath Email Location: The repeating table field to receive the email addresses retrieved from the group.
XPath Full Name Location: The repeating table field to receive the names retrieved from the group.
XPath Group Name Location: The repeating table field that will receive the name of the group.
XPath Login Name Location: The repeating table field to receive the login names retrieved from the group

WINSHUTTLE

Winshuttle Components (cont.)

- InfoPath
  - Custom Controls
    - **URL control**
      - Render URL in form



Uses:

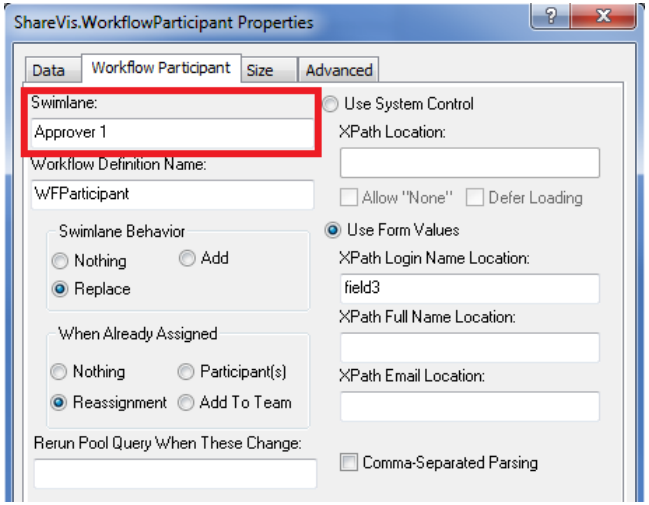
- Create a hyperlink in the form

Properties:
Include Inline: Displays the results of the URL inline in the form.
New Window: Whether or not to create a new window in which to display the URL when the user clicks the link.
Result Field XPath: The field that should be replaced in the form with the URL and its text.
Text Field XPath: The field from which to get the text to display in the page for the link.
Url Field XPath: The field from which to get the URL.

WINSHUTTLE

Winshuttle Components (cont.)

- InfoPath
  - Custom Controls
    - Workflow Participant control
      - Set workflow assignment



Uses:

- Integrate task assignment into form
- Use form fields to set assignments

Properties:

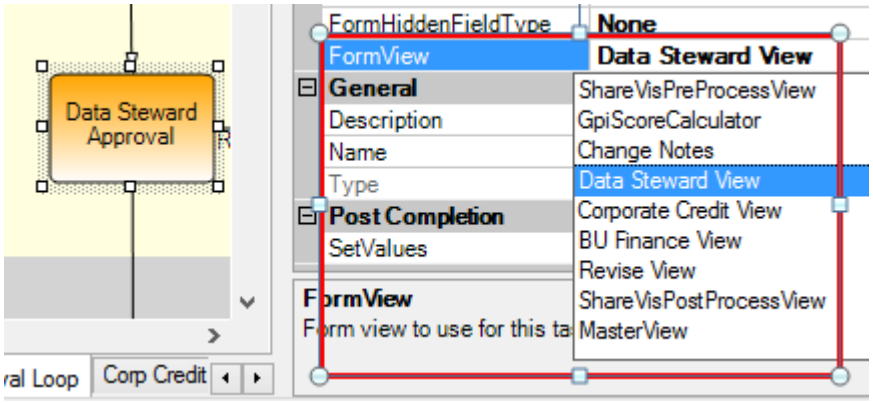
Comma-Separated Parsing: Indicates whether the control should use a comma-separated list in a single field for making multiple assignments.
Rerun Pool Query When These Change: Allows you to run the Pool Query Participant Resolver in the workflow when the value in a field changes.
Swimlane: The name of the swimlane that this control will assign.
Swimlane Behavior: Check this option to reassign the entire swimlane when a reassignment operation is done.
- XPath Login Name Location: allows you to use a value in the specified field to assign the task to a user, based on their login name.
- XPath Full Name Location: allows you to use a value in the specified field to assign the task, based on the full name.
- XPath Email Location: allows you to use a value in the specified field to assign the task, based on the email address.
- XPath Location: the field in the XPath that must be bound to an InfoPath text box control that will be replaced with the system drop-down list.
- Allow None: allows the user to leave the workflow participant unselected.
- Defer Loading: allows you to defer the loading of participants until the user clicks on the Click to Assign link that is presented instead of the menu.
- Nothing: show nothing when the swimlane is already assigned.
- Reassignment: allows the user to reassign the assignment to another user.
- Participant(s): show a read-only list of workflow participants assigned to the swimlane.
- Add To Team: allows the user to add another user in a group-based swimlane.

Workflow Definition Name: The name of the process that contains the swimlane defined above.

WINSHUTTLE

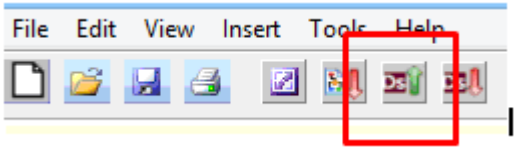
Winshuttle Components (cont.)

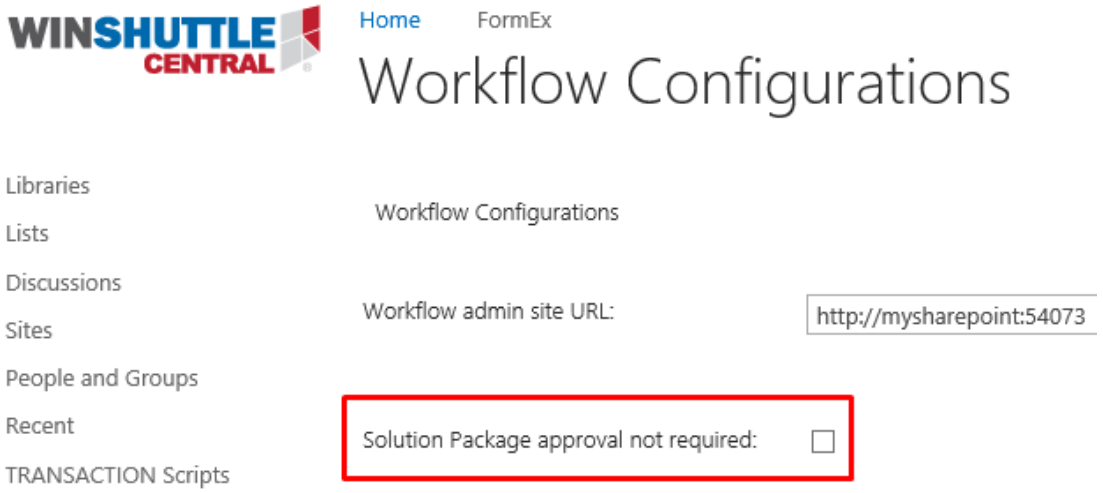
- InfoPath
  - Views
    - Assignment view
    - Master View
    - Change Log



Winshuttle Components (cont.)

- Deployment
  - Publish to a profile
    - Approval status
      - Central





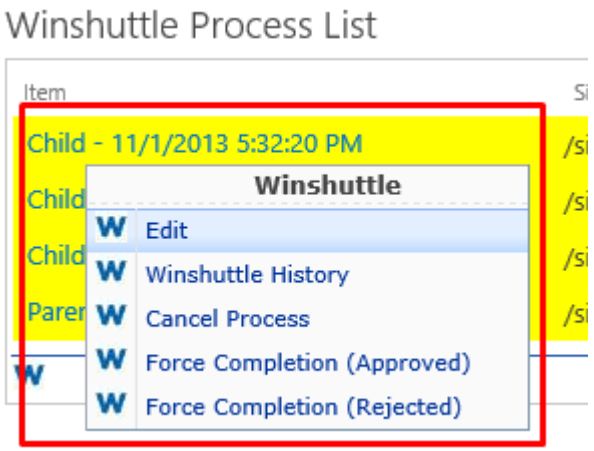
Winshuttle Components (cont.)

- Instantiation (Starting a process)
  - Form/Workflow
    - Form Library Web Part
    - Direct URL
    - Another form (Winshuttle InfoPath Control)
    - Another Workflow (Winshuttle Designer plugin)
  - Workflow
    - Excel add-in

WINSHUTTLE

Winshuttle Components (cont.)

- Administration
  - SharePoint Layer
    - Assignment
      - Reassign
      - Out of office
    - Process
    - Force approve/reject or cancel



Winshuttle Components (cont.)

- Backend
  - Winshuttle Workflow Admin
    - Trace Logging
      - Core
      - SvService
      - Timer
    - Admin Commands
    - Configurator
      - Keys
        - Scope
          - Global
          - Site
          - List
    - Workflow cleanup
      - Mark Inactive Processes
      - Process Control (bulk approve/reject or cancel)

WINSHUTTLE

Winshuttle Components (cont.)

- Backend
  - Winshuttle Workflow config file (ShareVis.config)
    - Authentication
      - Windows
      - SQL
    - User account(s)
    - SQL server (Workflow database)

WINSHUTTLE

Winshuttle Components (cont.)

- Monitoring
  - SQL
    - Custom reports
  - SharePoint
    - Process Status list
    - Assignment Status list
  - Workflow Central Admin
    - Charts

Q&A

Questions

WINSHUTTLE

Demo

Demonstration of solution development

WINSHUTTLE

Demo

Questions

WINSHUTTLE

WINSHUTTLE USER GROUP

Methodology

Breaking down a project

- Know where you are going
  - Basic/core functionality: to put data into SAP
- Forms cannot recreate the SAP GUI
- Forms vs. Excel
  - Line entry limitations
  - Submission method
- Script
  - Not all scripts can be leveraged as web services
- Smaller manageable components

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Methodology

Breaking down a project

- Launch GUI
  - Web services must be executed by the workflow engine
    - Autopost
    - Error checking

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Methodology

Travel light

- No applications
- 3rd Party Application integration
  - Web services
    - Limited integration options
  - Form instantiation
    - Developer extensions (web services)
      - XML
        - Form
        - Workflow

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Methodology

Travel light

- Informal rules vs. functional rules
  - Form cannot recreate the SAP GUI client

WINSHUTTLE

Methodology

Pitfalls

- Breath of knowledge vs depth of knowledge
  - SAP
  - SharePoint
  - Winshuttle

Methodology

Pitfalls

- Bad planning
  - SAP expert vs Process SME
  - Learning curve

WINSHUTTLE

Methodology

Pitfalls

- "Can it be done" vs. "Should it be done"
  - Know how/when to say "no"
  - Negotiate/compromise
  - Split into smaller forms
    - Parent/child
    - Hierarchy/data exchange
  - Innovate

WINSHUTTLE

Methodology

Pitfalls

- Feature bloat vs feature creep
  - Know your limits
    - Out Of The Box
    - Development time

WINSHUTTLE

Methodology

Pitfalls

- Form size
  - Base fields
  - Repeating elements
  - Rules/actions

WINSHUTTLE

Methodology

Pitfalls

- Data connections
  - Query vs “on start”

WINSHUTTLE

Methodology

Pitfalls

- Bad SAP data
  - Validation
  - Cascading queries

WINSHUTTLE

Methodology

Pitfalls

- Testing
  - Scenarios
    - Success
    - Fail

WINSHUTTLE

Q&A

Questions

WINSHUTTLE

Thank you!!