

# **z/OSMF Workflow Introduction**

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# What is a z/OSMF Workflow?

The z/OSMF Workflow is a framework that supports **z/OS System Programmers** (Workflow provider) to define a guided flow (workflow) through steps **to accomplish a system management or configuration task.**

- The z/OSMF Workflow is useful to:
  - Assist people unfamiliar with how to perform a given task, or a task that they perform rarely
  - Ensure that all tasks are performed in the right order and only when their dependencies have been met
  - Ensure that all steps are completed
    - Even if many of the tasks have been delegated to a number of different colleagues
  - Monitor and track progress toward the completion of the task
  - Provide a history (audit trail) of the steps performed for a task
  - Perform the same tasks on multiple systems
    - Enabling a function (e.g. zEDC)
    - Upgrading a new release of software (e.g., z/OS)
- The z/OSMF Workflow also provides RESTful APIs that allow user to run workflows programmatically

# Why should I learn about workflow?

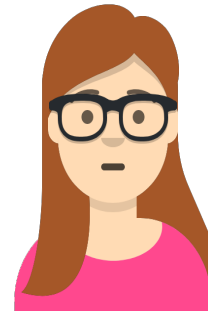
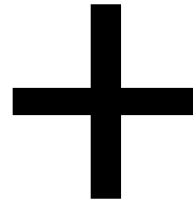
- z/OS upgrade process is performed with upgrade workflow provided by IBM
  - z/OS migration guide is not provided starting z/OS 2.4
  - Z/OS upgrade workflow can be obtained from github  
<https://github.com/IBM/IBM-Z-zOS/tree/master/zOS-Workflow/zOS%20V2.4%20Upgrde%20Workflow>
- Exploiters of workflow
  - DB2 migration workflow
  - z/OSMF Configure workflow
  - z/OSMF Config Assist workflow
  - z/OS Cloud Provisioning - CICS, MQ, Db2, WLP, IMS, z/OS Connect

# Value Proposition



Zach – IBM Z  
System Programmer

**Reduce the complexity** of their organization's z/OS management processes



Christina – Early tenure  
System Programmer

**Attract and retain** new system programmers without overwhelming them with underlying process and platform complexities

# Sample Workflow definition Files

- The Workflow definition is stored in XML format. z/OSMF provides several sample workflow files which could be used as a start.

Remote Site:

| Filename                                | Filesize | Date        | Time  | Permissions |
|---|----------|-------------|-------|-------------|
| workflow_sample_automation.xml          | 8203     | 06/22/20... | 05:54 | -rw-r--r--  |
| workflow_sample_automation_property.txt | 153      | 06/22/20... | 05:54 | -rw-r--r--  |
| workflow_sample_basic.xml               | 3748     | 06/22/20... | 05:54 | -rw-r--r--  |
| workflow_sample_bundle0.txt             | 731      | 06/22/20... | 05:54 | -rw-r--r--  |
| workflow_sample_calledwfBasic.xml       | 2430     | 06/22/20... | 05:54 | -rw-r--r--  |
| workflow_sample_calledwfMD5.xml         | 3268     | 06/22/20... | 05:54 | -rw-r--r--  |
| workflow_sample_calledwfVarMapping1.xml | 3760     | 06/22/20... | 05:54 | -rw-r--r--  |
| workflow_sample_calledwfVarMapping2.xml | 2783     | 06/22/20... | 05:54 | -rw-r--r--  |
| workflow_sample_condition.xml           | 13562    | 06/22/20... | 05:54 | -rw-r--r--  |
| workflow_sample_file_template0.xml      | 740      | 06/22/20... | 05:54 | -rw-r--r--  |
| workflow_sample_fragment0.xml           | 2530     | 06/22/20... | 05:54 | -rw-r--r--  |
| workflow_sample_fragment1.xml           | 2296     | 06/22/20... | 05:54 | -rw-r--r--  |
| workflow_sample_include_external.xml    | 5264     | 06/22/20... | 05:54 | -rw-r--r--  |

# Edit Your First Workflow – Flat file text editor

```
▼ <workflow>
  ▼ <workflowInfo>
    <workflowID>DB2V11CMMigrationWorkflow</workflowID>
    <workflowDescription>Standard Procedure to migrate DB2 V10 to V11 CM</workflowDescription>
    <workflowVersion>0.5</workflowVersion>
    <vendor>IBM</vendor>
    ▼ <Configuration>
      <productID>5740XYR00</productID>
      <productName>DB2 for z/OS</productName>
      <productVersion>B10</productVersion>
    </Configuration>
  </workflowInfo>
  ▶ <variable name="B" scope="instance">...</variable>
  ▼ <variable name="DSNSAMP" scope="instance">
    <label>DSNSAMP</label>
    <abstract>SAMPLE LIBRARY - prefix.SDNSAMP</abstract>
    ▼ <description>
      The value of the SAMPLE LIBRARY - prefix.SDNSAMP variable specifies the name of the JCL library v
      installation jobs.
    </description>
    <category>DB2</category>
    ▼ <string>
      <maxLength>40</maxLength>
    </string>
  </variable>
  ▼ <variable name="INSICPRE" scope="instance">
    <label>INSICPRE</label>
    <abstract>INSTALL IC PREFIX</abstract>
    ▼ <description>
      The INSTALL IC PREFIX field specifies the prefix for image copy data sets that are created by DB2
    </description>
    <category>DB2</category>
    ▼ <string>
```

# Edit Your First Workflow – Workflow Editor UI

- z/OSMF “Workflow editor” allows user to create or edit workflow definition from GUI

The screenshot displays the IBM z/OS Management Facility interface. On the left is a navigation menu with options like 'Welcome', 'Notifications (319)', 'Workflow Editor', 'Workflows', 'Cloud Provisioning', 'Configuration', 'Consoles', 'Jobs and Resources', 'Links', 'Performance', 'z/OS Classic Interfaces', 'z/OSMF Administration', and 'z/OSMF Settings'. A 'Refresh' button is located below the menu. The main area shows a 'Workflow Editor' tab. A modal dialog titled 'Edit Workflow Definition' is open, featuring two radio buttons: 'Create New Workflow' and 'Open Existing Workflow' (which is selected). Below these are two text input fields for 'Workflow definition file' and 'Workflow variable input file', both with dropdown arrows. At the bottom of the dialog are 'OK', 'Cancel', and 'Help' buttons.

# Workflow Demo



# Edit Your First Workflow – Workflow Editor UI

- Define metadata for your workflow

The screenshot shows the Workflow Editor interface with the following elements:

- Navigation:** Tabs for "Welcome" and "Workflow Editor".
- Header:** "Workflow Editor" title and "File Path: /u/zoscloud-beta/zosmf/samples/workflow\_sample\_automation.xml".
- Metadata Tab:** Active tab with sub-sections:
  - Workflow ID:** Input field containing "automationSample".
  - Category:** Dropdown menu set to "Configuration".
  - Scope:** Dropdown menu set to "None".
  - Callable Workflow:** Unchecked checkbox.
  - Range:** Dropdown menu set to "System".
  - Default Name:** Empty input field.
  - Description:** Text area containing "Sample demonstrating the use of automated steps in workflow."
  - Version:** Input field containing "1.0".
- Product Information:** Fields for "Product ID" (ABC123), "Product Name" (Product ABC), and "Product Version" (Version 1).
- Footer:** "Save", "Save As...", and "Cancel" buttons.

# Edit Your First Workflow – Workflow Editor UI

- Create step for your workflow (1/2)

## Workflow Editor

File Path: /u/zoscloud-beta/zosmf/samples/workflow\_sample\_automation.xml

Metadata Steps Variables Input Properties

Actions Create Step Search

- Copy
- Create Step
  - Create a Step Above...
  - Create a Step Below... automatable step
  - Create a New Substep...
- Move Step
- Delete
- Expand
- Collapse
  - Automated Step
  - Non-automated Step
- Configure Columns...
  - EmptyJCL
  - Submit an empty JCL job
- Clear Search
- Expand All
- Collapse All

Save Save As... Cancel

### Create a New Step

Leaf Step  Parent Step

\* Name:

\* Title:

\* Description:

\* Weight (1-1000):

Skills:

\* Step Type:

Optional Step  
 Auto-Enable  
 Allow manual marking of step failure

OK Cancel Help

# Edit Your First Workflow – Workflow Editor UI

- Create step for your workflow (2/2)

The screenshot displays the Workflow Editor interface. At the top, there are tabs for 'Welcome', 'Workflow Editor', and 'Help'. Below this, the 'Workflow Editor' section shows the file path: /u/zoscloud-beta/zosmf/samples/workflow\_sample\_automation.xml. There are four tabs: 'Metadata', 'Steps', 'Variables', and 'Input Properties'. The 'Steps' tab is active, showing a table of steps. A blue callout bubble points to the 'Create Step' button with the text 'A new step has been created'. The table lists steps 3 through 6, with step 4 selected. Step 4 is 'Expstep' with the description 'This is an example step'. To the right, the 'Variable Details' panel is open, showing 'Step Details' with sub-tabs for 'Overview', 'Prerequisites', 'Instructions', 'Step Type', 'Conditions', and 'User IDs'. The 'Step Type' tab is selected, showing fields for 'Max RC:' and 'Max LRECL:'. Below these is a 'Template Contents' text area containing JCL code: 

```
//STEP1 EXEC PGM=IEFBR14
//SYSEXEC DD DUMMY
//* PRINT DD SYSOUT=A
/*
```

 A blue callout bubble points to the 'Step Details' section with the text 'You can now edit your step details here'.

- Editing existing steps are also supported

# Edit Your First Workflow – Workflow Editor UI

- Save your workflow definition

The screenshot displays the Workflow Editor UI. At the top, there are tabs for 'Welcome' and 'Workflow Editor'. The main area is titled 'Workflow Editor' and shows the file path: `/u/zoscloud-beta/zosmf/samples/workflow_sample_automation.xml`. Below this, there are tabs for 'Metadata', 'Steps', 'Variables', and 'Input Properties'. The 'Steps' tab is active, showing a table of steps:

| Step No. | Name             | Title                      |
|----------|------------------|----------------------------|
| 3        | nonAutomatedStep | Non-automated Step         |
| 4        | Expstep          | This is an example         |
| 5        | submitEmptyJCL   | Submit an empty JCL        |
| 6        | verifyUserID     | Verify the UID of the user |

Below the table, it says 'Total: 10 Selected: 1'. A 'Save File As' dialog box is open in the center, with the following content:

**Save File As**

\* Workflow definition file:  
`/u/zoscloud-beta/zosmf/samples/workflow_sample_automation.xml`

Buttons: OK, Cancel

The background editor interface also shows a 'Variable Details' panel on the right with tabs for 'Overview', 'Prerequisites', 'Instructions', 'Step Type', 'Conditions', and 'User IDs'. The 'Step Type' tab is selected. At the bottom of the editor, there are buttons for 'Save', 'Save As...', and 'Cancel', along with a 'Help' button.

# Quick Overview of Workflow UI

- Create workflow instance

**Progress bar**

**Step progress**

**Workflow status**

**Workflow supports calling other workflows**

**Add notes or review History here**

**Provides security control**

**Assignees**

**Steps**

**Eligible for automation**

**Step status**

**State Filter**

| State Filter | No. Filter | Title Filter   | CalledWorkflow Filter | Automated Filter | Owner Filter | Skill Category Filter | Assignees Filter |
|--------------|------------|--|-----------------------|------------------|--------------|-----------------------|------------------|
| Unassigned   | 1          | Chapter 1. Migration: Introduction                                       |                       |                  |              |                       |                  |
| Unassigned   | 1.1        | Typical migration steps  |                       | No               |              |                       |                  |
| Unassigned   | 1.2        | Using IBM Health Checker for z/OS for migration checking                 |                       |                  |              |                       |                  |
| Unassigned   | 1.2.1      | System REXX considerations   |                       | No               |              |                       |                  |
| Unassigned   | 1.3        | Elements and features that do not have migration actions                 |                       | No               |              |                       |                  |
| Unassigned   | 2          | Chapter 2. General migration actions for everyone migrating to z/OS V2R2 |                       |                  |              |                       |                  |
| Unassigned   | 2.1        | Migration actions for everyone moving to z/OS V2R2                       |                       |                  |              |                       |                  |
| Unassigned   | 2.2        | Hardware migration actions   |                       |                  |              |                       |                  |
| In Progress  | 3          | Chapter 3. Migration from z/OS V2R1                                      |                       |                  |              |                       |                  |
| Unassigned   | 3.1        | Sysplex migration actions  |                       |                  |              |                       |                  |

# Quick Overview of Workflow UI

- A typical workflow instance

**Progress bar**: Shows 3% completion for the workflow.

**Step progress**: Indicates 8 of 205 steps are complete.

**Workflow status**: The workflow is currently 'In Progress'.

**Workflow supports calling other workflows**: The workflow is 'Is Callable'.

**Provides security control**: The workflow is 'Public'.

**Add notes or review History here**: Links for 'Notes' and 'History' are available.

**Assignees**: A filter for assigning users to workflow steps.

**Steps**: A list of workflow steps with their state and titles.

**Step status**: The state of each step (e.g., Unassigned, In Progress).

**Eligible for automation**: A filter to identify steps that can be automated.

| State Filter | No. Filter | Title Filter   | CalledWorkflow Filter | Automated Filter | Owner Filter | Skill Category Filter | Assignees Filter |
|--------------|------------|--|-----------------------|------------------|--------------|-----------------------|------------------|
| Unassigned   | 1          | Chapter 1. Migration: Introduction                                       |                       |                  |              |                       |                  |
| Unassigned   | 1.1        | Typical migration steps  |                       | No               |              |                       |                  |
| Unassigned   | 1.2        | Using IBM Health Checker for z/OS for migration checking                 |                       |                  |              |                       |                  |
| Unassigned   | 1.2.1      | System REXX considerations   |                       | No               |              |                       |                  |
| Unassigned   | 1.3        | Elements and features that do not have migration actions                 |                       | No               |              |                       |                  |
| Unassigned   | 2          | Chapter 2. General migration actions for everyone migrating to z/OS V2R2 |                       |                  |              |                       |                  |
| Unassigned   | 2.1        | Migration actions for everyone moving to z/OS V2R2                       |                       |                  |              |                       |                  |
| Unassigned   | 2.2        | Hardware migration actions   |                       |                  |              |                       |                  |
| In Progress  | 3          | Chapter 3. Migration from z/OS V2R1                                      |                       |                  |              |                       |                  |
| Unassigned   | 3.1        | Sysplex migration actions  |                       |                  |              |                       |                  |

# Collaborating with various personas

The image shows a screenshot of the IBM z Systems workflow management interface. The top part shows a workflow step selection screen with a table of steps and a context menu open over the 'Unassigned' step. A callout box points to the 'Add Assignees...' option in the menu. Below this, the 'Add Assignees' dialog box is shown, which allows selecting assignees from a list of available roles and adding them to a list of assignees to be added. The dialog also includes a comments field and a checkbox for sending notifications.

**Assign security related steps to Security Administrator**

| State Filter                                   | No. Filter | Title Filter                |
|--|------------|-----------------------------|
| <input type="checkbox"/> Assigned              | 1          | Plan User ID and Group Name |
| <input checked="" type="checkbox"/> Unassigned | 2          | Make security changes       |
| <input checked="" type="checkbox"/> Properties |            | Create user                 |
| <input checked="" type="checkbox"/> Accept     |            | Connect user to a group     |
| <input checked="" type="checkbox"/> Perform    |            |                             |
| Skip   |            |                             |
| Status   |            |                             |
| Override Complete                              |            |                             |
| Resolve Conflicts                              |            |                             |
| Assignment And Ownership                       |            | Add Assignees...            |
| Expand   |            | Remove Assignees...         |
| Collapse                                       |            | Take Ownership              |
|  |            | Return                      |

Total: 4, Selected: 3

Welcome x Workflows x

Workflows > Simple workflow for demo > Add Assignees Help

### Add Assignees

Select one or more SAF user IDs, SAF groups or z/OSMF roles to be assigned to the selected steps.

Selected Steps

Available assignees

| Name Filter   | Type Filter |
|---|-------------|
| <input checked="" type="checkbox"/> z/OS Security Administrator | z/OSMF role |
| <input type="checkbox"/> z/OSMF Administrator                   | z/OSMF role |
| <input type="checkbox"/> z/OSMF User                            | z/OSMF role |

Total: 3, Selected: 1

+ Assignees to be added:  
z/OS Security Administrator

Buttons: Add >, Add All >>, < Remove, << Remove All

Comments:  
Workflow owner assigns these security related steps to Security Administrator

Send z/OSMF notifications to assignees (comments are not included on notifications)

OK Cancel

# Collaborating with various personas

The image shows two screenshots from the IBM z/OS Management Facility. The top screenshot displays a notification received, and the bottom screenshot shows the workflow step assigned to that notification.

**Notification received**

Notification (1)

| Description Filter  | Task Filter | Recipients Filter           | Time Filter             |
|---|-------------|-----------------------------|-------------------------|
| One or more steps in workflow "Simple workflow for demo" have been assigned to you. | Workflows   | z/OS Security Administrator | Jul 23, 2014, 10:54:... |

**Click notification brings you to assigned step in workflow**

**Simple workflow for demo**

Description: Sample workflow for demo  
Percent complete: 0%

Owner: zosmfad  
Steps complete: 0 of 3

System: PLEX1.SY1  
Status: In Progress

**State: Assigned**

| State Filter | Automated Filter | Owner Filter                | Skill Categ Filter     | Assignees Filter     |
|--------------|------------------|-----------------------------|------------------------|----------------------|
| Assigned     | Yes              | Plan User ID and Group Name | zOSMF Administrator    | z/OSMF Administrator |
| In Progress  |                  | Make security changes       |                        |                      |
| Assigned     | Yes              | Creat user                  | Security Administrator | ibmuser              |
| Assigned     | Yes              | Connect user to a group     | Security Administrator | ibmuser              |

**Current assignee**



# Collaborating with various personas

Actions

| State Filter | No. Filter | Title Filter                |
|--------------|------------|-----------------------------|
| Assigned     | 1          | Plan User ID and Group Name |
| In Progress  | 2          | Make security changes       |
| Assigned     | 2.1        | Create user                 |
| Assigned     |            | Connect user to a group     |

Properties

- Accept
- Perform
- Skip
- Status
- Override Complete
- Resolve Conflicts
- Assignment And Ownership
- Expand
- Collapse

Total: 4, Selected: 3

Accept step



Accept Step

Selected Steps

| No. | Title                   | State       | Owner |
|-----|-------------------------|-------------|-------|
| 2   | Make security changes   | In Progress |       |
| 2.1 | Create user             | Assigned    |       |
| 2.2 | Connect user to a group | Assigned    |       |

Total: 3

Comments:  
Security Administrator accepts these steps.

OK Cancel Help

Input comments if needed

Welcome Workflows

Workflows > Simple workflow for demo

**Simple workflow for demo**

Description: Sample workflow for demo

Percent complete: 0 of 3

Owner: zosmfad System: PLEX1.SY1

Steps complete: 0 of 3 Status: In Progress

Notes | History

Workflow Step

State:

- Ready
- Not Ready

| State Filter | No. Filter | Title Filter                | Automated Filter | Owner Filter | Skill Category Filter  | Assignees Filter            |
|--------------|------------|-----------------------------|------------------|--------------|------------------------|-----------------------------|
| Ready        | 1          | Plan User ID and Group Name | Yes              | zosmfad      | zOSMF Administrator    | z/OSMF Administrator        |
| In Progress  | 2          | Make security changes       |                  |              |                        |                             |
| Not Ready    | 2.1        | Create user                 | Yes              | ibmuser      | Security Administrator | z/OS Security Administrator |
| Not Ready    | 2.2        | Connect user to a group     | Yes              | ibmuser      | Security Administrator | z/OS Security Administrator |

# z/OSMF Workflow Flow Control

| State Filter | No. Filter | Title Filter                | Automated Filter | Owner Filter | Skill Category Filter  | Assignees Filter            |
|--------------|------------|-----------------------------|------------------|--------------|------------------------|-----------------------------|
| Ready        | 1          | Plan User ID and Group Name | Yes              | zosmfad      | zOSMF Administrator    | z/OSMF Administrator        |
| In Progress  | 2          | Make security changes       |                  |              |                        |                             |
| Not Ready    | 2.1        | Create user                 | Yes              | ibmuser      | Security Administrator | z/OS Security Administrator |
| Not Ready    | 2.2        | Assign user to a group      | Yes              | ibmuser      | Security Administrator | z/OS Security Administrator |

Click the step



Welcome x Workflows x  
 Workflows > Simple workflow for demo > 2.1. Create user Help

## Properties for Workflow Step 2.1. Creat user

General **Details** Notes Perform Status Input Variables

State: Not Ready Skill category: Security Administrator

Owner: ibmuser Assignees: z/OS Security Administrator

Step Dependencies

| State Filter | No. Filter | Title Filter                | Automated Filter | Owner Filter | Skill Category Filter | Assignees Filter     |
|--------------|------------|-----------------------------|------------------|--------------|-----------------------|----------------------|
| Ready        | 1          | Plan User ID and Group Name |                  | zosmfad      |                       | z/OSMF Administrator |

Total: 1

Step Dependencies

Prerequisite steps need to be completed

# z/OSMF Workflow Automation (1)

| State Filter                                    | No. Filter | Title Filter   | Automated Filter |
|---|------------|--|------------------|
| <input type="checkbox"/> Complete               | 1          | Plan User ID and Group Name  |                  |
| <input checked="" type="checkbox"/> In Progress | 2          | Make security changes  |                  |
| <input checked="" type="checkbox"/> Ready       | 2.1        | <ul style="list-style-type: none"> <li>Create user</li> <li>Connect user to a group</li> </ul> | Yes              |

**Perform options**

- Properties
- Accept
- Perform**
- Skip
- Status
- Override Complete
- Resolve Conflicts
- Assignment And Ownership
- Expand
- Collapse

### Perform Automated Step

The selected step can be performed automatically. How would you like to proceed?

- Automatically perform the selected step, and all subsequent automated steps, according to their declared step dependencies, until one of the following occurs:
  - all workflows steps have been completed.
  - a non-automated, non-Complete step, is reached, or
  - an error occurs.
- Automatically perform the selected step only.
- Manually perform the selected step.

When input file variable conflicts occur:

- Always use input file values. Existing values will be overwritten and automation will continue.
- Always keep existing values. Input file values will be ignored and automation will continue.
- Allow step or workflow owner to choose whether the input file value or existing value should be used for each conflicting variable. Automation will be stopped.

OK Cancel Help

### Input Variables - User information

Enter the variable values for this input category.

- Input Variables
- User information
- Review Instructions
- Create JOB statement
- Review JCL
- Submit and Save JCL

**Customize embedded JCL via Input**

\*User name- The user name to be created: CJOEY

\*UID- z/OS UNIX System Services UID: 5008

**Customize embedded JCL directly**

### Review JCL

Review the generated JCL, then click Next to proceed. Optionally, you can edit

```
//IZUWFJB JOB (ACCTINFO),CLASS=A,MSGCLASS=0,
//
//          MSGLEVEL=(1,1),REGION=0M,NOTIFY=IBMUSER
/*JOBPARM  SYSAPP=SY1
//STEP1   EXEC  PGM=IKJEFT01,DYNAMNBR=20
//SYSTSPT DD   SYSOUT=A
//SYSTSIN DD   *
ADDUSER   CJOEY NOPASSWORD OMVS (UID(5008))
/*
```

Edit JCL Maximum record length: 1,024

< Back Next > Save Finish Cancel

# z/OSMF Workflow Automation (2)

Welcome x Workflows x

Workflows > Simple workflow for demo Help

## Simple workflow for demo

Description: Sample workflow for demo  
 Percent complete:

Owner: zosmfad  
 Steps complete: 2 of 3

System: PLEX1.SY1  
 Status: Automation in Progress [ibmuser]

Notes | History

Automation indication

### Workflow Steps

| State Filter                                 | No. Filter | Title Filter                | Automated Filter | Owner Filter | Skill Category Filter  | Assignees Filter            |
|--|------------|-----------------------------|------------------|--------------|------------------------|-----------------------------|
| <input type="checkbox"/> Complete            | 1          | Plan User ID and Group Name | Yes              | zosmfad      | zOSMF Administrator    | z/OSMF Administrator        |
| <input type="checkbox"/> In Progress         | 2          | Make security changes       |                  |              |                        |                             |
| <input checked="" type="checkbox"/> Complete | 2.1        | Creat user                  | Yes              | ibmuser      | Security Administrator | z/OS Security Administrator |
| <input type="checkbox"/> Ready               | 2.2        | Connect user to a group     | Yes              | ibmuser      | Security Administrator | z/OS Security Administrator |

Step 2.2 will be automatically started



Welcome x Workflows x

Workflows > Simple workflow for demo Help

## Simple workflow for demo

Description: Sample workflow for demo  
 Percent complete:

Owner: zosmfad  
 Steps complete: 3 of 3

System: PLEX1.SY1  
 Status: Complete

Notes | History

Automation Done

### Workflow Steps

| State Filter                                 | No. Filter | Title Filter                | Automated Filter | Owner Filter | Skill Category Filter  | Assignees Filter            |
|--|------------|-----------------------------|------------------|--------------|------------------------|-----------------------------|
| <input checked="" type="checkbox"/> Complete | 1          | Plan User ID and Group Name | Yes              | zosmfad      | zOSMF Administrator    | z/OSMF Administrator        |
| <input checked="" type="checkbox"/> Complete | 2          | Make security changes       |                  |              |                        |                             |
| <input checked="" type="checkbox"/> Complete | 2.1        | Creat user                  | Yes              | ibmuser      | Security Administrator | z/OS Security Administrator |
| <input checked="" type="checkbox"/> Complete | 2.2        | Connect user to a group     | Yes              | ibmuser      | Security Administrator | z/OS Security Administrator |

# z/OSMF Workflow Operation Traces (1)

Welcome x Workflows x

Workflows > Simple workflow for demo > History

## History for Simple workflow for demo

Actions ▾

|                       | Date and Time (GMT)<br>Filter | Action<br>Filter       | Messages [More   Less]<br>Filter  | User ID<br>Filter | Comments [More   Less]<br>Filter   |
|-----------------------|-------------------------------|------------------------|---|-------------------|--|
| <input type="radio"/> | Jul 23, 2014, 2:37:19 PM      | Workflow Created       | IZUWF0020:The workflow name is set to "Simple workflow for demo".<br>IZUWF0021:The workflow owner is set to "zosmfad".<br>IZUWF0022:The workflow system is set to "SY1".<br><a href="#">[More]</a>  | zosmfad           |  |
| <input type="radio"/> | Jul 23, 2014, 2:44:21 PM      | Step Assigned          | IZUWF0025:The following users have been assigned to step "Plan User ID and Group Name" : Users: "z/OSMF Administrator"<br>IZUWF0029:Step "Plan User ID and Group Name" has changed to state "Assigned".   | zosmfad           |  |
| <input type="radio"/> | Jul 23, 2014, 2:54:57 PM      | Step Assigned          | IZUWF0025:The following users have been assigned to step "Creat user" : Users: "z/OS Security Administrator"<br>IZUWF0026:Step "Creat user" has changed to state "Assigned".<br><a href="#">[More]</a>  | zosmfad           | Workflow owner assigns these security related steps to Security Administrator. |
| <input type="radio"/> | Jul 23, 2014, 3:07:12 PM      | Step Accepted          | IZUWF0045>User "ibmuser" has accepted step "Creat user". This user is now the step owner.<br>IZUWF0026:Step "Creat user" has changed to state "Not Ready".<br>IZUWF0045>User "ibmuser" has accepted step "Connect user to a group". This user is now the step<br><a href="#">[More]</a> | ibmuser           | Security Administrator accepts these steps.                                    |
| <input type="radio"/> | Jul 23, 2014, 3:10:42 PM      | Step Accepted          | IZUWF0045>User "zosmfad" has accepted step "Plan User ID and Group Name". This user is now the step owner.<br>IZUWF0026:Step "Plan User ID and Group Name" has changed to state "Ready".  | zosmfad           | z/OSMF admin accepts this step to plan the user name to be created.            |
| <input type="radio"/> | Jul 23, 2014, 3:30:55 PM      | Step Completed         | IZUWF0026:Step "Plan User ID and Group Name" has changed to state "Complete".<br>IZUWF0026:Step "Creat user" has changed to state "Ready".  | zosmfad           |  |
| <input type="radio"/> | Jul 23, 2014, 3:38:56 PM      | Automation Started     | IZUWF0160:The automation processing for workflow "Simple workflow for demo" has been started by user "ibmuser" from step "Creat user".  | ibmuser           |  |
| <input type="radio"/> | Jul 23, 2014, 3:38:56 PM      | Submitted              | IZUWF0026:Step "Creat user" has changed to state "Submitted".   | ibmuser           |  |
| <input type="radio"/> | Jul 23, 2014, 3:38:57 PM      | Step Completed         | IZUWF0026:Step "Creat user" has changed to state "Complete".<br>IZUWF0026:Step "Connect user to a group" has changed to state "Ready".  | ibmuser           |  |
| <input type="radio"/> | Jul 23, 2014, 3:38:59 PM      | Automate Step Complete | IZUWF0164:Automation processing for step "Creat user" is complete.  | ibmuser           |  |
| <input type="radio"/> | Jul 23, 2014, 3:38:59 PM      | Submitted              | IZUWF0026:Step "Connect user to a group" has changed to state "Submitted".  | ibmuser           |  |

Total: 15, Selected: 0

# z/OSMF Workflow Operation Traces (2)

Workflows ▶ Standard Procedure to migrate DB2 V10 to V11 - DB1A ▶ 1. Actions to complete before migration

Help

## Properties for Workflow Step 1. Actions to complete before migration

| General  | Details  | Notes  | Perform | Status  |              |
|----------|----------|--------|---------|---------|--------------|
| Name:    | ID:      | Class: | Type:   | Status: | Return code: |
| DSNTIJPM | JOB00078 | A      | JOB     | OUTPUT  | CC 0000      |

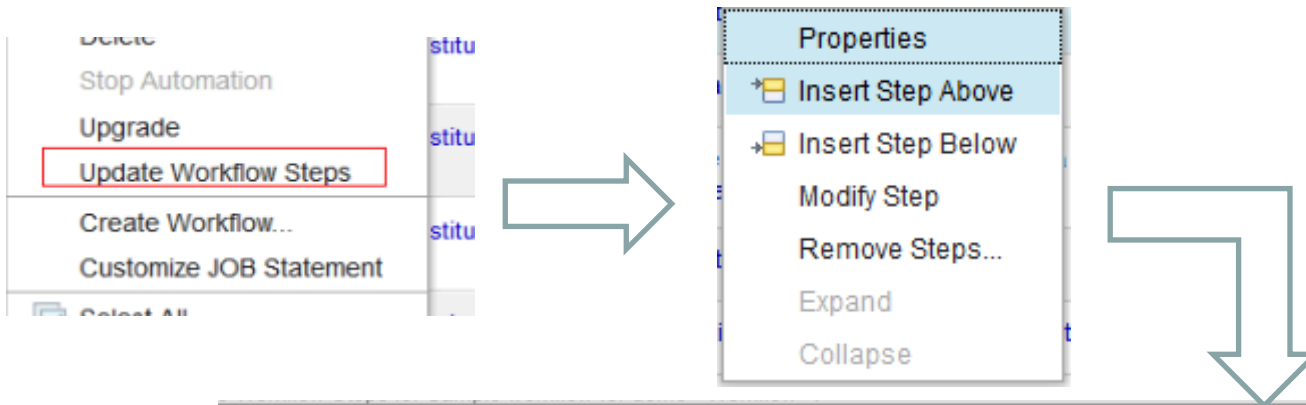
| ◀        | JESMSG LG  | JESJCL               | JESYSMSG    | SYS PRINT | SYSTSPRT      | REPORT01 | REPORT02 | REPORT03 | REPORT04 | REPORT05 | REF | ▶ | ▼ |
|----------|------------|----------------------|-------------|-----------|---------------|----------|----------|----------|----------|----------|-----|---|---|
| DD name: | Step name: | Procedure step name: | Dataset ID: | Class:    | Record count: |          |          |          |          |          |     |   |   |
| REPORT01 | DSNTPMQ    |                      | 107         | H         | 12            |          |          |          |          |          |     |   |   |

Output (0.729KB of 0.729KB shown)

```
==== REPORT 1 =====  
= The following lists the DB2 Version 10 sample database, DSN8D10A. =  
= This database is needed for verifying migration to DB2 Version 11 =  
= Conversion Mode. If DSN8D10A is not listed below, you are =  
= recommended to recreate it before commencing migration to DB2 V11. =  
= Run V10 IVP job DSNTTEJ1 to recreate it. You should also run one =  
= or more of the phase 2 and phase 3 IVP jobs in V10. See the DB2 =  
= V10 Installation Guide, the chapter on Verifying with Sample =  
= Applications for more information. =  
=====
```

NAME  
-----

# Edit Your Workflow instance



## Modify Step

- ✓ Modify General Information
- ✓ Modify Instruction
- ➔ **Modify Script**

### Modify Script

Edit the new script here, then click the **Finish** button to submit the modification.

```
-----1-----2-----3-----4-----5-----6-----7-----8
/*MAIN SYSTEM=DUMBNODE
//STEP1 EXEC PGM=IKJEFT01,DYNAMNR=20
//SYSPRINT DD SYSOUT=A
//SYSIN DD *
ADDGROUP SYS1 OMVS(GID(500))
/*
```

Undo All Changes

# Workflow service – API list

- Workflow RESTful service allows user to create, start and manage workflow in z/OS through programmatic way instead of having to operate in z/OSMF UI.
- Workflow RESTful service provides below operations (APIs):

| Operation                                   | Method |
|---|--------|
| Create a workflow                           | POST   |
| Get the properties of a workflow            | GET    |
| Start a workflow                            | PUT    |
| Lists the workflows for a system or sysplex | GET    |
| Delete a workflow                           | DELETE |
| Cancel workflow                             | PUT    |
| Retrieve a workflow definition              | GET    |
| List the archived workflows for a system    | GET    |
| Get the properties of an archived workflow  | GET    |
| Delete an archived workflow                 | DELETE |



# z/OSMF Workflow Best Practices

- Prepare workflow using workflow editor
  - User won't require knowledge of XML and workflow XML schema
  - Workflow editor performs syntax checks, so workflow can be run without any syntax errors
  - Intuitive online help that guides user to prepare workflow
  - Provides various samples in tool-box that can be imported into the workflow and modified as needed
- If you are planning to use workflow editor, don't create workflow fragment files using XML editors
  - Workflow editor does not preserve the fragments
- If workflow needs to be run multiple times, do not specify `scope="system"`.
  - `<workflowID scope="system">test</workflowID>`

# z/OSMF Workflow Best Practices

- Workflow editor supports workflow and file templates from PDS (or Sequential) dataset as well as zFS file system files
- Workflow editor makes it easy to copy or move steps
- Property file can be prepared in workflow editor along with defining workflow
- Workflow editor provides toolbox with samples. You can import steps from the toolbox and customize based on your need
- Workflow editor also provides 'export' functions to share steps across multiple workflows
- Workflow editor also provides plain text editor to view/modify workflow xml definition
  - Simplifies fixing XML issues
  - Provides capability to validate XML definition

# z/OSMF Workflow Best Practices

- What is currently not covered by workflow editor?
  - Workflow editor does not validate that variables used in workflows are defined
    - Create workflow variables before using them in step.
  - Workflow editor does not validate that property value is defined for variable identified as “required” for the step
    - Set the property value before identifying variable as ‘required’ for the step.
  - Workflow editor can not validate JCL, shell script or REXX syntax error

# z/OSMF Workflow Best Practices

- Use System variables when same variable (with same value) is used across multiple workflows e.g. `SYSTEM_HOST_IP_ADDR`
- System variables can be defined using zOSMF Settings -> Systems user interface task (or using REST APIs)
- These variables can be accessed in any workflow without defining them in a workflow
  - Workflow running on a specific system, can access variable value associated with that specific system.
  - `${_sys-varName}` (e.g. `${_sys-SYSTEM_HOST_IP_ADDR}`) convention can be used in JCL, REXX or shell script to reference a system variable
- System variables can be exported and imported to create same variables across multiple systems in the sysplex

# z/OSMF Workflow Best Practices

- Use setVariable to dynamically set variable value during workflow execution
  - `<setVariable name="{instance-INS DSPRE}" scope="instance" substitution="true"> {instance-INS DSPRE}. { workflow-softwareServiceInstanceName}</setVariable>`
- This is a simpler way than creating output file to set variable value.
- setVariable sets any WF variable at the completion of some step (could be instruction step).
  - Saves 3 steps that you would need otherwise to set variable value
- setVariable only supports setting string type variables.

# z/OSMF Workflow Best Practices

- Variable value can use substitution in property file
- `_IZU_VARIABLE_SUBSTITUTION_ON` & `_IZU_VARIABLE_SUBSTITUTION_OFF` tags in property file
- For example,

```
_IZU_VARIABLE_SUBSTITUTION_ON
```

```
PATH_ROOT=/usr
```

```
PATH_LIB=${PATH_ROOT}/lpp/zosmf ###-> /usr/lpp/zosmf
```

```
_IZU_VARIABLE_SUBSTITUTION_OFF
```

# z/OSMF Workflow Best Practices

- Variable value can be set dynamically by JCL, shell scripts via SYSOUT DD
- **Usage:** A workflow author who wishes to use the sysoutDD feature will need to set the "sysoutDD" to true as part of a step's <output> element:

```
<output needResolveConflicts="true" sysoutDD="true" substitution="false">stepName.ddName2</output>
```

- Example script:

```
<template>  
  <inlineTemplate substitution="false">  
    host=$(hostname)  
    echo "var = $host"</inlineTemplate>  
  <submitAs maxRc="0">shell-JCL</submitAs>  
  <output needResolveConflicts="false" sysoutDD="true"  
    substitution="false">STDOUT</output>  
</template>
```

# How can you help modernize z/OS?

- z/OS System Programmers have historically built their own home grown processes to perform common system management tasks
- Organizations are wanting to modernize z/OS platform and reduce the complexity of their organization's z/OS management processes
  - Additional skills are needed to create z/OSMF Workflows
- More experienced z/OS System Programmers need to share best practices and build workflow patterns
  - Workflows can be fully automated and driven through modern tools like z/OSMF UI or REST APIs



# Z Open Repository Of Workflows (zorow)

- Provides a repository for z/OS systems programmers and product vendors to contribute and share z/OSMF workflows
  - All workflows made available under an [Apache 2 license](#)
  - IBM and Rabobank have made initial contributions of z/OSMF workflows to this community
- Community is led by both vendors along with customers, and open to anyone to participate.
  - [Vendor-neutral open source governance](#) established with the guidance of the Open Mainframe Project.



OPEN MAINFRAME PROJECT

**ZOROW**

# How to get involved in Zorow



Sign up to the Zorow email lists

User List:

<https://lists.openmainframeproject.org/g/zorow-user/>

Developer List:

<https://lists.openmainframeproject.org/g/zorow-dev/>



Find other users and developers on Slack

<https://slack.openmainframeproject.org>

Channel: #zorow



View the code and contribute workflows

<https://github.com/openmainframeproject/zorow>

Contribution Guidelines at

<https://github.com/openmainframeproject/zorow/blob/master/CONTRIBUTING.md>

# Thank You!