

# z/OSMF Workflows

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# z/OSMF

## Desktop style user interface

- Built-in support for data set filter and display, browse, edit etc.
- Built-in support for Unix file filter and display, browse, edit etc.
- Built-in support for JOB filter and display, browse, cancel, purge, etc

## Workflow Support – guided actions

- A series of steps to accomplish a task and a tool to track each steps status
- Can involve one person or many
- Workflow authors decide on style and technical approach
- Can be: Manual instructions, Semi-automated instructions, Fully automated actions
- Consist of Jobs, Shell scripts, REXX execs, REST calls, file updates etc.
- Optionally retains a log of what has been done
- Useful for Installation, Service, Upgrade, or any configuration actions

## Task focused activities

- Sysplex configuration, Workload Manager Policy setup, Network Configuration, Security Configuration validation, Sending doc into IBM, Performance and status monitoring, etc.

# Usability & Skills

## z/OSMF Desktop – Replaces Tab UI in z/OS 2.5

- Customer grouping of items in folders, such as data sets via PH24527 (CD)
- Search, Browse, Edit files and data sets via PH16076 (CD)
- Submit, query, browse jobs – Job Output Task via PH16076 (CD)
- Syntax highlighting, user created links, improved performance PH24527 (CD)

The screenshot displays the z/OSMF Desktop interface. On the left, a search window titled 'Data Set Search' shows results for 'IZU\*SEC' in the 'SYS1.SAMPLIB' library, listing 27 members. A blue arrow points from this search window to a file browser window titled 'zOSMF sample jobs', which displays a grid of file icons labeled with library names like 'SYS1.SAMPLIB(IZUASSEC)'. In the background, a code editor window shows a JCL program with syntax highlighting and comments. Another window displays an XML file named 'workflow\_sample\_wizards.xml' with its content visible. The interface includes a top navigation bar with icons for various tasks and a bottom status bar with a 'debug1' indicator.

# 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

# What is a z/OSMF Workflow?

- **Workflow Editor task**  
A z/OSMF plug-in that provides a UI to create workflow definition files.
- ***Workflow definition file***  
An XML file that defines steps, variables and metadata. These are used to create workflow instances.
- **Workflow instance**  
A single entity generated from a workflow definition file inside of the Workflows Task.
- **Workflows task**  
A z/OSMF plugin that creates and manages workflow instances from workflow definitions.
- ***Workflows properties file***  
An optional text file used to define variable values when creating workflow instances.

# What is a z/OSMF Workflow?

## Workflow Step

- Contains executable code or instructions
- Steps can be assigned to different users when there is a separation of responsibility
- Conditional logic can decide if step should be executed or skipped
- Steps execution can be dependent on completion of previous steps
- Steps can be automated (when all steps can run under single user) or performed manually
- Automated steps can run in parallel when there is no dependency

## Workflow step types

- The z/OSMF Workflow can execute variety of step types:
  - Instruction – Provides instructions to user about how to perform specific task
  - Invoke JCL via submitting job
  - Invoke Shell script via submitting job
  - Invoke REXX Exec via submitting job
  - Invoke REST APIs (both internal to z/OSMF and external APIs)
  - Invoke other workflows
- JCL, shell scripts or REXX exec can be coded inline or can be in z/OS dataset or files
- Output from jobs (JCL, shell scripts, REXX exec) or REST APIs are recorded in workflow instance

# Why should I learn about workflow?

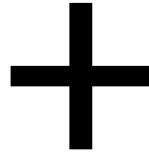
- Workflow helps you to persist, streamline and orchestrate z/OS tasks. You can take advantage of workflow by using others' shipped workflow or creating your own workflow definition.
- Several z/OS key solutions are now using workflow to streamline and automate z/OS tasks. E.g.,
  - z/OS upgrade workflow has replaced z/OS Upgrade Guide book
  - zCX (z/OS Container Extension) is using workflow to provision zCX image
  - Many software on z/OS platform are now using Workflow for their configuration (invoked by z/OSMF Software Management task)
  - Cloud Provisioning and Management for z/OS is using workflows to provision/deprovision 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
/usr/lpp/zosmf/samples/	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.SDSNSAMP</abstract>
    ▼ <description>
      The value of the SAMPLE LIBRARY - prefix.SDSNSAMP 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 image displays the Workflow Editor GUI. On the left, a dialog box titled "Edit Workflow Definition" is open. It contains the following options and fields:

- Create New Workflow
- Open Existing Workflow
- Type or enter name of the workflow definition file and, optionally, the variable input file. For each value, specify a sequential data set, a member of a partitioned data set (PDS), or a z/OS UNIX path and file name.
- Edit raw text of workflow definition
- \* Workflow definition file:
- Workflow variable input file:
- Buttons: OK, Cancel, Help

The main Workflow Editor window is titled "Workflow Editor" and shows the workflow definition for "zusr/lpp/zosmf/samples/workflow\_sample\_parallel\_steps.xml". It includes a menu bar (Main, Steps, Variables, Feedback, Help/Properties) and a toolbar (Actions, Create Step, Search). The main area contains a table of workflow steps:

Step No.	Name	Title
1	rootStep	Root Step
2	isntConditionalStep	Step Attribute Conditional Step
3	isntAdminStep	Non-Admin Step
4	isSubflow1	Output Step 1
5	isSubflow2	Output Step 2

On the right side of the editor, there is a "Variable Overview" panel with tabs for Overview, Prerequisites, Instructions, Type, Conditions, Security, Variables, Feedback, and Advanced. The "Overview" tab is active, showing "Step Overview" information for the selected step, including fields for Name, Title, and Description.

# Workflow Demo

# Edit Your First Workflow – Workflow Editor UI

- Define metadata for your workflow

The screenshot displays the Workflow Editor interface. At the top, there are two tabs: 'Welcome x' and 'Workflow Editor x'. Below the tabs, the title 'Workflow Editor' is followed by the file path: 'File Path: /uzoscloud-beta/zosmf/samples/workflow\_sample\_automation.xml'. The main area is divided into four tabs: 'Metadata', 'Steps', 'Variables', and 'Input Properties'. The 'Metadata' tab is active and contains the following fields:

- Workflow ID:** automationSample
- Category:** Configuration (dropdown menu)
- Scope:** None (dropdown menu)
- Product ID:** ABC123
- Callable Workflow**
- Range:** System (dropdown menu)
- Product Name:** Product ABC
- Product Version:** Version 1
- Default Name:** (empty text field)
- Description:** Sample demonstrating the use of automated steps in workflow. (text area)
- Version:** 1.0

At the bottom of the form, there are three buttons: 'Save', 'Save As...', and 'Cancel'.

# Edit Your First Workflow – Workflow Editor UI

- Create step for your workflow (1/2)

## Workflow Editor

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

Workflow Editor UI showing the 'Create Step' menu and the workflow table.

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
- Configure Columns...
- Clear Search
- Expand All
- Collapse All

Automated Step	Non-automated Step
Empty JCL	Submit an empty JCL job

Save Save As... Cancel

### Create a New Step

Leaf Step  Parent Step

\* Name:  \* Weight (1-1000):

\* Title:  Skills:

\* Description:  \* Step Type:

Optional Step  
 Auto-Enable  
 Allow manual marking of step failure

OK Cancel Help

# Edit Your First Workflow – Workflow Editor UI

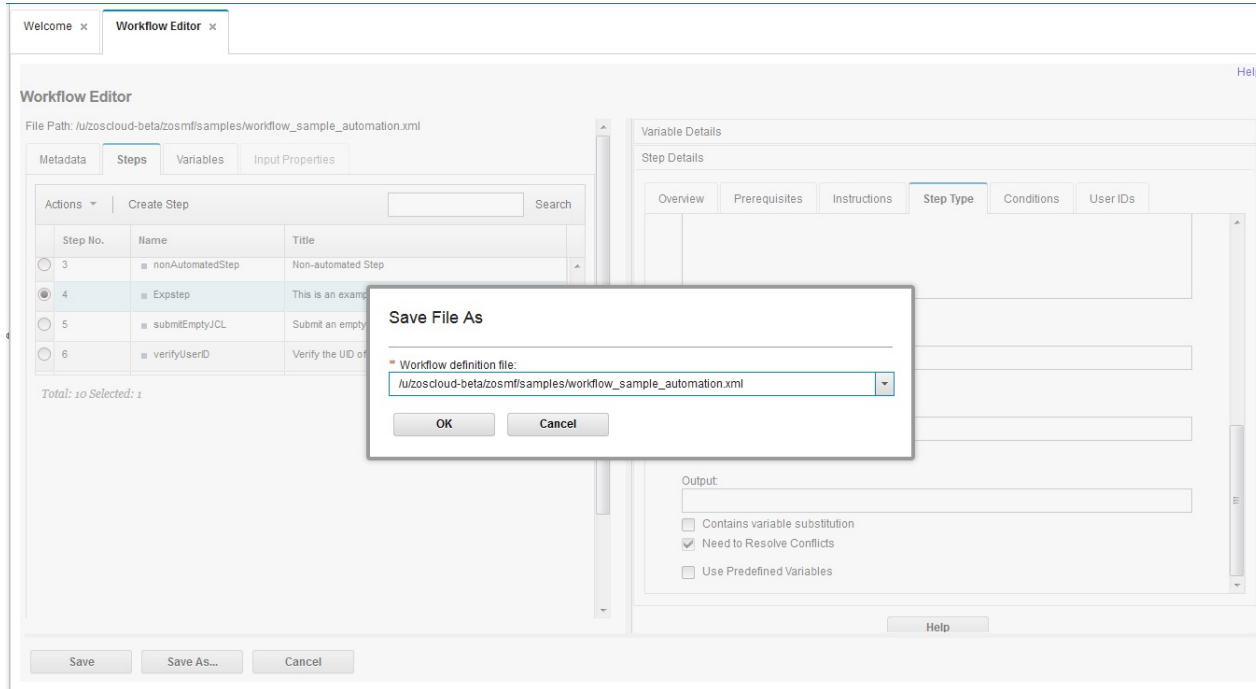
- Create step for your workflow (2/2)

The screenshot displays the Workflow Editor interface. At the top, there are tabs for 'Welcome', 'Workflow Editor', and 'Help'. Below the tabs, the 'Workflow Editor' section is active, showing the file path: /uzoscloud-beta/zosmf/samples/workflow\_sample\_automation.xml. The main area is divided into two panes. The left pane, titled 'Steps', shows a list of steps. A new step, 'Expstep', is highlighted with a blue box and a callout bubble that says 'A new step has been created'. The right pane, titled 'Step Details', shows the details for the selected step. A callout bubble points to this pane with the text 'You can now edit your step details here'. The 'Step Details' pane has tabs for 'Overview', 'Prerequisites', 'Instructions', 'Step Type', 'Conditions', and 'User IDs'. The 'Step Type' tab is selected, showing fields for 'Max RC:', 'Max LRECL:', and 'Template Contents:'. The 'Template Contents' field contains the following JCL code:

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

# Edit Your First Workflow – Workflow Editor UI

- Save your workflow definition





# Quick Overview of Workflow UI

- Create workflow instance

The screenshot displays the workflow management interface for 'SHARA16 Migration Workflow Lab for zOS V2.2'. The interface includes a progress bar at the top left showing 3% completion (8 of 205 steps complete). A 'Workflow status' callout points to the 'In Progress' indicator. A 'Workflow supports calling other workflows' callout points to the 'Is Callable' section, which states 'Cannot be called by another workflow'. A 'Provides security control' callout points to the 'Access' section, which is set to 'Public'. A 'Step progress' callout points to the 'Steps complete' section. A 'Step status' callout points to the 'State Filter' column in the 'Workflow Steps' table. A 'Steps' callout points to the 'Title Filter' column. An 'Eligible for automation' callout points to the 'Automated Filter' column. An 'Assignees' callout points to the 'Assignees Filter' column. A 'Add notes or review History here' callout points to the 'Notes | History' link at the top right.

State Filter	No. Filter	Title Filter	Called/Workflow 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

The screenshot displays the Workflow UI for 'SHARA16 Migration Workflow Lab for zOS V2.2'. The interface includes a progress bar at 3%, a description, owner information, and a list of workflow steps. Callouts highlight various features: 'Progress bar', 'Step progress', 'Workflow status', 'Workflow supports calling other workflows', 'Add notes or review History here', 'Provides security control', 'Assignees', 'Steps', and 'Eligible for automation'.

**Workflow Details:**

- Description: e023m110
- Percent complete: 3%
- Owner: shara16
- Steps complete: 8 of 205
- System: SHARPLEX.LOCAL
- Status: In Progress
- Is Callable: Cannot be called by another workflow Access (Learn More).
- Access: Public

**Workflow Steps Table:**

State Filter	No. Filter	Title Filter	Called/Workflow 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

**Assign security related steps to Security Administrator**

Actions

State	No. Filter	Title
Assigned	1	Plan User ID and Group Name
Unassigned	2	Make security changes

- Properties
- Accept
- Perform
- Skip
- Status
- Override Complete
- Resolve Conflicts
- Assignment And Ownership
  - Add Assignees...**
  - Remove Assignees...
  - Take Ownership
  - Return
- Expand
- Collapse

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	Type
z/OS Security Administrator	z/OSMF role
z/OSMF Administrator	z/OSMF role
z/OSMF User	z/OSMF role

Total: 3, Selected: 1

Assignees to be added:

- z/OS Security Administrator

Comments:

Workflow owner assigns these security related steps to Security Administrator

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

# 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 the notification.

**Notification received**

Notification (1)

Description	Task	Recipients	Time
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  
Status: In Progress

Workflow Steps

State	Automated	Owner	Skill Cated	Assignees
Assigned	Yes		zOSMF Administrator	z/OSMF Administrator
In Progress				
Assigned	Yes		Security Administrator	ibmuser
Assigned	Yes		Security Administrator	ibmuser

**State: Assigned**

**Current assignee**

Note: Notification can be sent through email



# 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	Select 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. Create 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	Create user	Yes
<input type="checkbox"/> Properties		Connect user to a group	Yes

**Perform options**

- 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.

**Customize embedded JCL via Input**

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

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

### Review JCL

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

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

**Customize embedded JCL directly**

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]

**Automation indication**

Workflow Steps

State Filter	No. Filter	Title Filter	Automated Filter	Owner Filter	Skill Category Filter	Assignees Filter
<input type="checkbox"/>	Complete	1	<input checked="" type="checkbox"/>	zosmfad	zOSMF Administrator	z/OSMF Administrator
<input type="checkbox"/>	In Progress	2	<input type="checkbox"/>			
<input checked="" type="checkbox"/>	Complete	2.1	<input checked="" type="checkbox"/>	ibmuser	Security Administrator	z/OS Security Administrator
<input type="checkbox"/>	Ready	2.2	<input checked="" type="checkbox"/>	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

**Automation Done**

Workflow Steps

State Filter	No. Filter	Title Filter	Automated Filter	Owner Filter	Skill Category Filter	Assignees Filter
<input type="checkbox"/>	Complete	1	<input checked="" type="checkbox"/>	zosmfad	zOSMF Administrator	z/OSMF Administrator
<input type="checkbox"/>	Complete	2	<input checked="" type="checkbox"/>			
<input type="checkbox"/>	Complete	2.1	<input checked="" type="checkbox"/>	ibmuser	Security Administrator	z/OS Security Administrator
<input type="checkbox"/>	Complete	2.2	<input checked="" type="checkbox"/>	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) Filter	Action Filter	Messages [More   Less] Filter	User ID Filter	Comments [More   Less] Filter
<input type="radio"/>	Jul 23, 2014, 2:37:19 PM	Workflow Created	IZUWF0020:The workflow name is set to "Simple workflow for demo" . IZUWF0021:The workflow owner is set to "zosmfad" . IZUWF0022:The workflow system is set to "SY1" .  <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" 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" IZUWF0028:Step "Creat user" has changed to state "Assigned".  <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. IZUWF0028:Step "Creat user" has changed to state "Not Ready" . IZUWF0045>User "ibmuser" has accepted step "Connect user to a group" . This user is now the step  <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. IZUWF0028: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	IZUWF0028:Step "Plan User ID and Group Name" has changed to state "Complete" . IZUWF0028:Step "Creat user" has changed to state "Ready" .	zosmfad	
<input type="radio"/>	Jul 23, 2014, 3:38:56 PM	Automation Started	IZUWF0180: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	IZUWF0028:Step "Creat user" has changed to state "Submitted" .	ibmuser	
<input type="radio"/>	Jul 23, 2014, 3:38:57 PM	Step Completed	IZUWF0028:Step "Creat user" has changed to state "Complete" . IZUWF0028: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	IZUWF0184:Automation processing for step "Creat user" is complete.	ibmuser	
<input type="radio"/>	Jul 23, 2014, 3:38:59 PM	Submitted	IZUWF0028: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

JESMSGLG	JESJCL	JESYSMSG	SYSPRINT	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 DSNTEJ1 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

The diagram illustrates the process of editing a workflow instance. It starts with a menu where 'Update Workflow Steps' is highlighted. An arrow points to a context menu where 'Insert Step Above' is selected. A second arrow points to a 'Modify Step' dialog box. The dialog box has three tabs: 'Modify General Information', 'Modify Instruction', and 'Modify Script'. The 'Modify Script' tab is active, showing a script editor with the following content:

```
/*MAIN SYSTEM=DUMBNODE
//STEP1 EXEC PGM=IKJEFT01,DYNAMNBR=20
//SYSTSPRT DD SYSOUT=A
//SYSTSIN DD *
ADDGROUP SYSL OMVS(GID(500))
/*
```

At the bottom of the dialog box, there is an 'Undo All Changes' button.

# 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

# 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>
```

# Usability & Skills

## IBM z/OS Management Services Catalog – Planned new plugin

z/OS Management Services Catalog in z/OSMF plans to leverage the power of z/OSMF workflows to enable system programmers to run services that help complete z/OS management tasks faster and with fewer errors.

- Experienced z/OS system programmers are planned to be able to create a catalog of customized services, each written with unique institutional knowledge, protocols, and processes.
- These services can then be run by less experienced colleagues.
- IBM plans to provide an initial set of services to help z/OS system programmers of all skill levels get started, demonstrate accepted practices, and simplify information sharing.
  - Such as grow a ZFS.

### Capabilities:

- Planned are a powerful graphical interface for creating new services, editing IBM-provided services, and updating existing services
- Step-by-step guidance for completing z/OS management tasks
- History of all services performed on a system is planned

You can learn more and watch for future developments on the release at the [z/OS Management Services Catalog content page](#).

# Ansible drives Workflow – What's Ansible

## Red Hat Ansible Automation Platform



### Flexibility

Bring disparate IT into a coherent whole using a market leading open solution backed with enterprise support

Interact directly with z/OS resources or integrate with existing platform tools



### Consistency

Integrate z/OS into an enterprise automation strategy in a consistent way

Centralize management of your IT infrastructure



### Simplicity

The certified collections codify much of the z/OS specific knowledge and complexity

Developer or system programmer can focus on their tasks and be more productive

## Ansible drives Workflow – z/OSMF Ansible collection

- **IBM z/OSMF Ansible collection “ibm\_zosmf”, intends to provide simple and consistent experience for Ansible users to drive z/OSMF REST APIs for z/OS operations and automation.**
    - **Part of Red Hat Ansible Certified Content for IBM Z.**
    - **Available in both Ansible Galaxy and Red Hat Ansible Automation Hub:**
      - [https://cloud.redhat.com/ansible/automation-hub/repo/published/ibm/ibm\\_zosmf](https://cloud.redhat.com/ansible/automation-hub/repo/published/ibm/ibm_zosmf)
      - [https://galaxy.ansible.com/ibm/ibm\\_zosmf](https://galaxy.ansible.com/ibm/ibm_zosmf)
    - **Documentation:**
      - [https://ibm.github.io/z\\_ansible\\_collections\\_doc/ibm\\_zosmf/docs/ansible\\_content.html](https://ibm.github.io/z_ansible_collections_doc/ibm_zosmf/docs/ansible_content.html)
  - **What’s available today via z/OSMF Ansible collection “ibm\_zosmf”**
- “ibm\_zosmf” collection drives z/OSMF REST APIs start with:**
- **Workflow operations**  
Drive a z/OSMF workflow to complete, Delete a workflow instance, Query workflow status, etc.
  - **Provision and Manage z/OS software instances** via Cloud Provisioning and Management for z/OS  
Provision or deprovision a z/OS middleware/software instance, start or stop the software instance, etc.

# Ansible drives Workflow – Use case

- **Workflow extends z/OS tasks Ansible can drive**
  - **Semi-automated tasks**
  - **Tasks that require to keep data on z/OS platform**
- **Ansible extends flexibility of Workflow and CP&M**
  - **Scheduled Workflow or CP&M operations through Ansible Tower**
  - **Ansible can orchestrate Workflow or CP&M services with tasks on other platforms**
  - **Ansible provides consistent front-end to manage automation cross platforms**

# 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.



# 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!**

THANK  
YOU!



IBM