

Automating DB2 for z/OS Migration With z/OS Management Facility

By Kewei Wei and Paul A. McWilliams

Executive summary

DB2 for z/OS is expected to run 24-7 with almost zero down time, and DB2 version upgrade has little tolerance for failure. Yet, DB2 migration is considered a cumbersome project. An automated and reliable approach is needed to simplify DB2 migration tasks and free the SMEs involved in DB2 migration. System administrators, database administrators and system programmers can use DB2 *z/OS Management Facility (z/OSMF) workflows* to define an automated DB2 migration process one time and execute it many times. z/OSMF is a free product of z/OS that improves the repeatability of tasks and improve efficiencies while saving time and workforce expenditures.

A new approach to DB2 migration challenges

DB2 for z/OS has been the underpinning of enterprise applications for the past few decades. As a synonym of reliability and availability, DB2 is expected to run 24-7 with almost zero down time. With this expectation, DB2 version upgrade has little tolerance for failure.

Yet, DB2 migration is considered a cumbersome project, especially for large enterprises that might have hundreds of DB2 subsystems. Traditionally, migration of every individual DB2 system involves many migration steps, and requires resources and effort, such that the processing of migrating all of the DB2 subsystems in one larger enterprise might last for weeks.

For instance, a DB2 for z/OS customer has more than 100 DB2 systems. However, the small administration team is unable to manage the migration of more than 20 DB2 systems at a time with the traditional approach. Therefore, they must spend several weeks on the migration project, which wastes resources, and prevents fast deployment of new business. It costs even more considering the preparation for the migration of so many systems, including pre-migration checking, collaboration with other groups, and so forth.

Therefore, strong demand exists for an automated and reliable approach to simplify DB2 migration tasks and free system programmers, database administrators, and other SMEs that are involved in DB2 migration.

z/OS Management Facility is a free product of z/OS, and an approach for automating DB2 migration with z/OSMF workflows. z/OSMF helps to improve the repeatability of tasks and improve efficiencies while saving time and workforce expenditures. z/OSMF is also designed to use role-based assignments, creating clear workforce tasks while minimizing questions about who should perform each task.

This article introduces a new approach for migrating a DB2 system or a DB2 data sharing group with z/OSMF. The new approach helps reduce the effort of managing multiple sets of migration jobs and automates the execution of these jobs. In the new procedure, users complete the following actions:

1. Generate the z/OSMF workflow artifacts with the enhanced DB2 installation CLIST.
2. Customize the workflow artifacts for the users' environment.
3. Create z/OSMF workflow instances for each DB2 system to migrate.

With the new approach, the migration steps can be expressed in customized z/OSMF workflows, which can be automated and managed on a web portal or through REST APIs.

This approach provides the following benefits:

- Improves speed of business
- Reduces costs
- Lowers skill barriers, with a modern user interface
- Provides a solution easily integrated into Cloud infrastructure

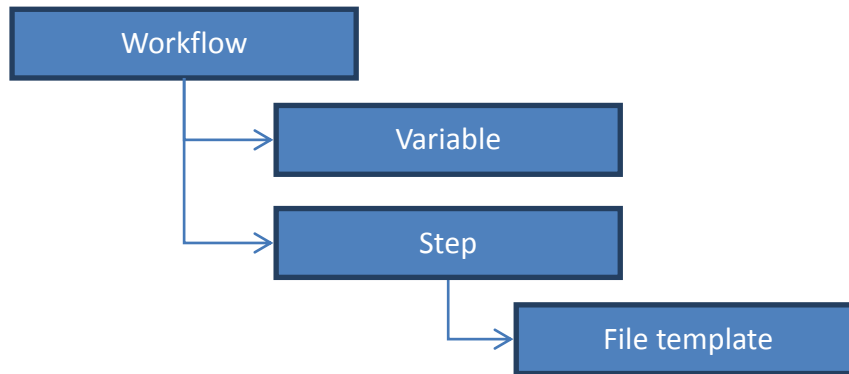
About z/OSMF workflows

z/OSMF is a free product for z/OS that simplifies, optimizes, and modernizes the z/OS system programmer experience. It delivers solutions in a task-oriented, Web-browser-based user interface with integrated user assistance, to improve system programmer productivity, and make z/OS functions easier to understand and use. It provides an engine which can execute workflows.

In z/OSMF, a *workflow* is a guided set of steps that help you perform an activity on z/OS, such as configuring a software product or component, managing a z/OS resource or structure, or simplifying some relatively complex operation. The steps of a workflow can be a descriptive instruction that guide users to take actions, or executable programs defined by template files. Templates are widely used in scenarios where the main motivation is automation and simplification.

A file template can be a JCL job, a REXX statement, or a shell script that contains embedded workflow variables, a key element for improving the productivity of repeated tasks with z/OSMF. Variables are embedded in the JCL, REXX, or shell script as symbols. At execution time, input values are required to substitute these symbols and produce an executable JCL, REXX, or shell script.

For example, assume that a DBA must grant access of a set of tables to a user when he or she receives a request. The DBA can create a workflow that has a step with a JCL template that executes GRANT statements. The grantee can be defined as a workflow variable. The following illustration depicts the structure of a workflow:



The file template GRANTU.JCL contains symbol `${USERID}` which represents a workflow variable USERID.

```

//GRANTU EXEC PGM=IKJEFT01,DYNAMNBR=20,COND=(4,LT)
//STEPLIB DD DSN=DSNB10.RUNLIB,DISP=SHR
//SYSTSPRT DD SYSOUT=*
//SYSTSIN DD *
    DSN SYSTEM(DB2A)
    RUN PROGRAM(DSNTEP2) PLAN(DSNTEPB1)
//SYSPRINT DD SYSOUT=*
//SYSUDUMP DD SYSOUT=*
//SYSIN DD *
    GRANT DELETE, INSERT, SELECT, UPDATE
    ON TABLE ZOSMFUSR.TABLE1 TO ${USERID};
    GRANT DELETE, INSERT, SELECT, UPDATE
    ON TABLE ZOSMFUSR.TABLE2 TO ${USERID};
    GRANT DELETE, INSERT, SELECT, UPDATE
    ON TABLE ZOSMFUSR.TABLE3 TO ${USERID};
    GRANT DELETE, INSERT, SELECT, UPDATE
    ON TABLE ZOSMFUSR.TABLE4 TO ${USERID};
    GRANT DELETE, INSERT, SELECT, UPDATE
    ON TABLE ZOSMFUSR.TABLE5 TO ${USERID};
  
```

The workflow variable must be substituted by a value so the GRANTU.JCL. For example, if the DBA needs to grant the access of these 5 tables to the user USR001, the DBA must provide the value "USR001" to z/OSMF. Then z/OSMF can substitute `${USERID}` with "USR001", produce the JCL as below, and submit it at workflow instance execution time.

```
//GRANTU EXEC PGM=IKJEFT01,DYNAMNBR=20,COND=(4,LT)
//STEPLIB DD DSN=DSNB10.RUNLIB,DISP=SHR
//SYSTSPRT DD SYSOUT=*
//SYSTSIN DD *
    DSN SYSTEM(DB2A)
    RUN PROGRAM(DSNTEP2) PLAN(DSNTEPB1)
//SYSPRINT DD SYSOUT=*
//SYSUDUMP DD SYSOUT=*
//SYSIN DD *
    GRANT DELETE, INSERT, SELECT, UPDATE
    ON TABLE ZOSMFUSR.TABLE1 TO USROO1;
    GRANT DELETE, INSERT, SELECT, UPDATE
    ON TABLE ZOSMFUSR.TABLE2 TO USROO1;
    GRANT DELETE, INSERT, SELECT, UPDATE
    ON TABLE ZOSMFUSR.TABLE3 TO USROO1;
    GRANT DELETE, INSERT, SELECT, UPDATE
    ON TABLE ZOSMFUSR.TABLE4 TO USROO1;
    GRANT DELETE, INSERT, SELECT, UPDATE
    ON TABLE ZOSMFUSR.TABLE5 TO USROO1;
```

A workflow is defined by an XML file that is called workflow definition file. The content of a workflow definition file includes the information about the workflow, step definitions, variable definitions, and file templates. As of today, the workflow definition file must be created from scratch in a text or XML editor.

For complete instructions for creating workflow definition files, see [IBM z/OS Management Facility Programming Guide](#).

The following example workflow definition file authorizes users to use tables:

```

▼<workflow>
  ▼<workflowInfo>
    <workflowID>Authorize users to use tables</workflowID>
    ▼<workflowDescription>
      This workflow helps authorize users to use tables ZOSMFUSR.TABLEn
    </workflowDescription>
    <workflowVersion>0.1</workflowVersion>
    <vendor>IBM</vendor>
    ▼<Configuration>
      <productID>5740XYR00</productID>
      <productName>DB2 for z/OS</productName>
      <productVersion>B10</productVersion>
    </Configuration>
  </workflowInfo>
  ▼<variable name="USERID" scope="instance">
    <label>USERID</label>
    <abstract>User name.</abstract>
    <description>User name of grantee.</description>
    <category>DB2</category>
    ▼<string>
      <maxLength>8</maxLength>
    </string>
  </variable>
  ▼<step name="step1" optional="false">
    <title>Grant user access</title>
    <description>Grant user access of the table ZOSMFUSR.TABLEn.</description>
    <variableValue name="USERID" scope="instance" required="true" noPromptIfSet="true"/>
    <instructions>Run job GRANTU</instructions>
    <weight>1</weight>
    <skills>Database Administrator</skills>
    <autoEnable>true</autoEnable>
    ▼<template>
      <fileTemplate substitution="true">GRANTU.jcl</fileTemplate>
      <submitAs maxRc="4">JCL</submitAs>
      <maxLrecl>80</maxLrecl>
    </template>
  </step>
</workflow>

```

A workflow instance is created from a workflow definition and the file templates that are defined in the workflow. Optionally, a workflow input variable file can be provided so users don't need to manually input the values in the Web interface. The default values of the variables can be loaded from the workflow input variable file. Collectively, the workflow definition file, the workflow input variable file, and the file templates are called *workflow artifacts*.

If the DBA needs to grant access of these tables to another user USR002, the DBA can create another workflow instance with the same set workflow artifacts but with "USR002" as input for the USERID variable.

Planning for migrating DB2 with z/OSMF

Before you begin

DB2 installation CLIST DSNTINST can generate z/OSMF workflow artifacts used for DB2 11 installation or migration, enabled by DB2 11 for z/OS APAR PI38553 and z/OSMF V2R1 APAR PI42725.

The advantage of using z/OSMF workflows for the migration process is the efficiency of the *defining once, and executing multiple times*.

Today many DB2 customers create many sets of migration JCL jobs for their systems. A common approach is to use DB2 installation CLIST DSNTINST to tailor the migration jobs for one system. Then they duplicate these jobs and customize them for other systems. The result of this approach is many jobs, which are hard to maintain and error-prone in the customization.

With z/OSMF, you can generate only one set (or a few) of z/OSMF workflow artifacts, create multiple workflow instances by filling system-specific input to these workflow instances. Then these workflow instances can be reused to for many DB2 subsystems. Moreover, the migration workflow execution can be fully automated and reduce the burden of constantly submitting jobs and checking return codes.

In order to leverage z/OSMF in DB2 migration, you must decide how many z/OSMF artifacts that you need in the first place. It is determined by the migration steps and the variable selections.

Migration steps

For migration to DB2 11 for z/OS, the migration process uses 3 migration modes, each with different steps:

1. Migrating a non-data-sharing DB2 subsystem or the first member of a data sharing group to conversion mode (CM).
2. Migrating subsequent members of data sharing groups to CM.
3. Migrating a DB2 subsystem or data-sharing group to new-function mode (NFM).

For an overview of the process for migrating to DB2 11 for z/OS, see [Introduction to Migration](#).

The migration steps might have slight differences for different types of subsystems in some shops. For the subsystems whose migration steps are different, new set of workflow artifacts should be created for them.

Selecting variables

More than 1000 input fields are variable candidates in DB2 migration. However, choosing all of them as variables introduces a huge amount management effort and might result in unexpected problems. A good practice is to choose the right variable set because, most settings are the same across a single enterprise.

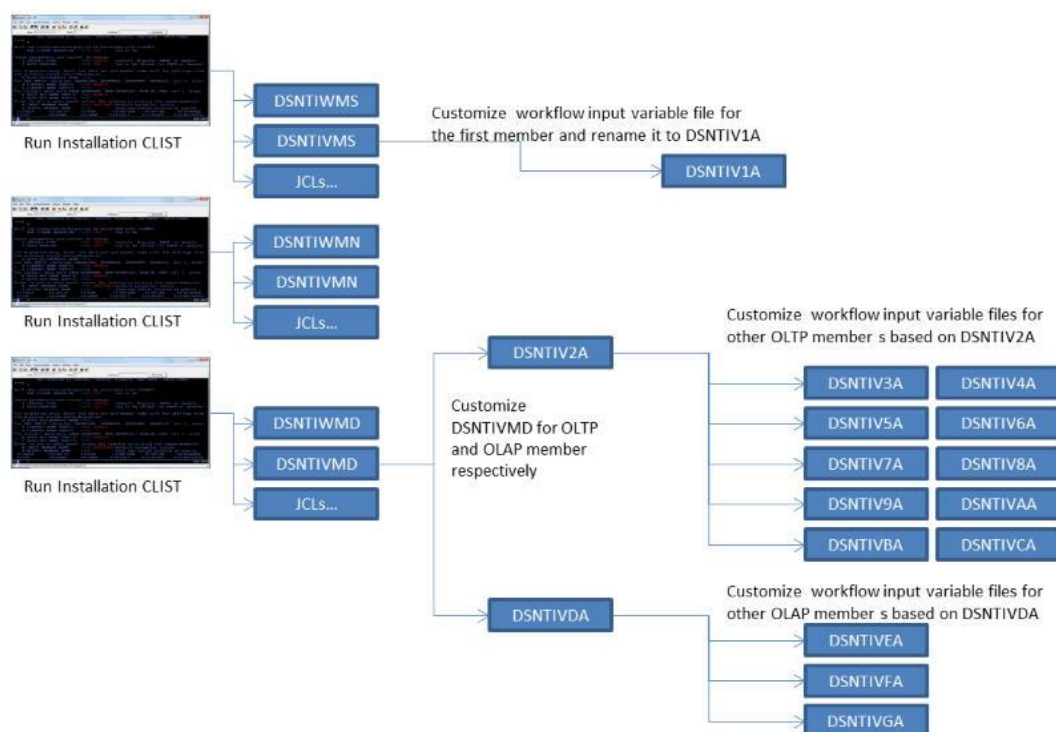
An example of workflow artifacts generation migrating a data sharing group with z/OSMF

For example, assume that a data sharing group consists of 16 members. 12 members process the online transaction processing (OLTP) workload, and the other 4 members process the online

analytical processing (OLAP) workload. The OLTP members and OLAP members might have different subsystem parameters setting for buffer pool sizes, sort pool sizes, and even accelerator settings. You can create 3 sets of workflow artifacts to migrate the data sharing group:

1. Workflow to migrate the first OLTP member - DSNTIWMS;
2. Workflow to migrate the subsequent OLTP and OLAP member - DSNTIWMD;
3. Workflow to migrate to new function mode - DSNTIWMN.

Because the OLTP members and OLAP members might have different patterns of parameter configurations it is best to use two base workflow input variables files: one for OLTP members, and one for the OLAP members. You can customize other members based on their particular characteristics.



DB2 Subsystem	Workflow definition file	Workflow input variable file
DB1A (OLTP)	DSNTIWMS + DSNTIWMN	DSNTIV1A + DSNTIVMN
DB2A (OLTP)	DSNTIWMD	DSNTIV2A
DB3A (OLTP)	DSNTIWMD	DSNTIV3A
DB4A (OLTP)	DSNTIWMD	DSNTIV4A
DB5A (OLTP)	DSNTIWMD	DSNTIV5A
DB6A (OLTP)	DSNTIWMD	DSNTIV6A
DB7A (OLTP)	DSNTIWMD	DSNTIV7A
DB8A (OLTP)	DSNTIWMD	DSNTIV8A
DB9A (OLTP)	DSNTIWMD	DSNTIV9A

DBAA (OLTP)	DSNTIWMD	DSNTIVAA
DBBA (OLTP)	DSNTIWMD	DSNTIVBA
DBCA (OLTP)	DSNTIWMD	DSNTIVCA
DBDA (OLAP)	DSNTIWMD	DSNTIVDA
DBEA (OLAP)	DSNTIWMD	DSNTIVEA
DBFA (OLAP)	DSNTIWMD	DSNTIVFA
DBGA (OLAP)	DSNTIWMD	DSNTIVGA

Generating z/OSMF workflow artifacts

The z/OSMF workflow artifacts generation follows the usual process of tailoring DB2 installation and migration jobs. The main entry is also DSNTINST which is in the data set *prefix*.SDSNCLST. For example, if the DB2 SMP/E libraries' prefix on your system is DSNB10 then you can execute 'DSNB10.SDSNCLST(DSNTINST)' to start the guided process through DB2 installation panels.

For detailed instructions for tailoring DB2 installation and migration job, see [Tailoring DB2 jobs to your environment using the installation CLIST](#).

With APAR PI38553 applied, DB2 installation panel DSNTIPA1 contains a new option for generating z/OSMF workflow artifacts and using the z/OSMF workflow feature to migrate or install a DB2 subsystem.

```

DB2 VERSION 11 INSTALL, UPDATE, MIGRATE, AND ENFM - MAIN PANEL
===> -
Will the installation/migration be performed with z/OSMF?
USE Z/OSMF WORKFLOW ===> NO Yes or No

Check parameters and reenter to change:
1 INSTALL TYPE ===> MIGRATE Install, Migrate, ENFM, or Update
2 DATA SHARING ===> NO Yes or No (blank for ENFM or Update)

For migration only: Enter the data set and member name with the settings from
the previous Installation/Migration:
3 DATA SET (MEMBER) NAME ===> DSNB10.SDSNSAMP (DSNTID1A)
For DB2 SMP/E libraries (SDSNLOAD, SDSNMACS, SDSNSAMP, SDSNCLST, etc.), enter:
4 LIBRARY NAME PREFIX ===> DSNB10
5 LIBRARY NAME SUFFIX ===>
For install data sets (NEW.SDSNSAMP, NEW.SDSNCLST, RUNLIB.LOAD, etc.), enter:
6 DATA SET NAME PREFIX ===> DSNB10
7 DATA SET NAME SUFFIX ===>
Enter to set or save panel values (by reading or writing the named members):
8 INPUT MEMBER NAME ===> DSNTIDXA Default parameter values
9 OUTPUT MEMBER NAME ===> Save new values entered on panels
F1=HELP F2=SPLIT F3=END F4=RETURN F5=RFIND F6=RCHANGE
F7=UP F8=DOWN F9=SWAP F10=LEFT F11=RIGHT F12=RETRIEVE
MA A 02/007

```

The default setting of the USE Z/OSMF WORKFLOW field is "NO." Under this setting, only the usual tailored jobs are generated. Specify "YES" to generate to also generate the z/OSMF workflow artifacts.


```

DB2 VERSION 11 INSTALL, UPDATE, MIGRATE, AND ENFM - MAIN PANEL
==> _
Will the installation/migration be performed with z/OSMF?
USE Z/OSMF WORKFLOW ==> YES Yes or No

Check parameters and reenter to change:
1 INSTALL TYPE ==> MIGRATE Install, Migrate, ENFM, or Update
2 DATA SHARING ==> NO Yes or No (blank for ENFM or Update)

For migration only: Enter the data set and member name with the settings from
the previous Installation/Migration:
3 DATA SET (MEMBER) NAME ==> DSNB10.SDSNSAMP (DSNTID1A)
For DB2 SMP/E libraries (SDSNLOAD, SDSNMACS, SDSNSAMP, SDSNCLST, etc.), enter:
4 LIBRARY NAME PREFIX ==> DSNB10
5 LIBRARY NAME SUFFIX ==>
For install data sets (NEW.SDSNSAMP, NEW.SDSNCLST, RUNLIB.LOAD, etc.), enter:
6 DATA SET NAME PREFIX ==> DSNB10
7 DATA SET NAME SUFFIX ==>
Enter to set or save panel values (by reading or writing the named members):
8 INPUT MEMBER NAME ==> DSNTIDXA Default parameter values
9 OUTPUT MEMBER NAME ==> Save new values entered on panels
F1=HELP F2=SPLIT F3=END F4=RETURN F5=RFIND F6=RCHANGE
F7=UP F8=DOWN F9=SWAP F10=LEFT F11=RIGHT F12=RETRIEVE
MA A 02/007

```

When "YES" is specified, you can select input fields as z/OSMF workflow variables. As variables, the values that you provide on the installation panels are not used in the generated JCL templates directly. Instead, the generated JCL templates contains the variable symbolic, and the generated workflow input variable file contains the values in "key=value" pairs.

For example, it is very likely that the high level qualifiers of DB2 SMP/E library name prefix are different across subsystems. Then you can select the "LIBRARY NAME PREFIX" field as a variable by typing "S" to the left of the field.

```

DB2 VERSION 11 INSTALL, UPDATE, MIGRATE, AND ENFM - MAIN PANEL
==> _
Will the installation/migration be performed with z/OSMF?
USE Z/OSMF WORKFLOW ==> YES Yes or No

Check parameters and reenter to change:
1 INSTALL TYPE ==> MIGRATE Install, Migrate, ENFM, or Update
2 DATA SHARING ==> NO Yes or No (blank for ENFM or Update)

For migration only: Enter the data set and member name with the settings from
the previous Installation/Migration:
3 DATA SET (MEMBER) NAME ==> DSNB10.SDSNSAMP (DSNTID1A)
For DB2 SMP/E libraries (SDSNLOAD, SDSNMACS, SDSNSAMP, SDSNCLST, etc.), enter:
S 4 LIBRARY NAME PREFIX ==> DSNB10
5 LIBRARY NAME SUFFIX ==>
For install data sets (NEW.SDSNSAMP, NEW.SDSNCLST, RUNLIB.LOAD, etc.), enter:
6 DATA SET NAME PREFIX ==> DSNB10
7 DATA SET NAME SUFFIX ==>
Enter to set or save panel values (by reading or writing the named members):
8 INPUT MEMBER NAME ==> DSNTIDXA Default parameter values
9 OUTPUT MEMBER NAME ==> Save new values entered on panels
F1=HELP F2=SPLIT F3=END F4=RETURN F5=RFIND F6=RCHANGE
F7=UP F8=DOWN F9=SWAP F10=LEFT F11=RIGHT F12=RETRIEVE
MA A 02/007

```

With "LIBRARY NAME PREFIX" selected as a variable, all the jobs referring to DB2 SMP/E libraries are tailored to use a symbolic representing the prefix of the DB2 libraries.

For example, in DSNTIJIC, the JOBLIB refers to \${DSNTLIBP}.SDSNEXIT and \${DSNTLIBP}.SDSNLOAD. DSNTILIBP is the variable name which is prefixed by \$ and enclosed by brace to identify it as a variable.

```

000103 //JOB LIB DD DISP=SHR,DSN=${DSNTLIBP}.SDSNEXIT
000104 // DD DISP=SHR,DSN=${DSNTLIBP}.SDSNLOAD
000105 // DD DISP=SHR,DSN=CEE.SCEERUN
000106 //*
000107 //* DSNTRVFY: Verify the DB2-supplied routines
000108 //*
000109 //DSNTRVY EXEC PGM=DSNTRVY,COND=(4,LT),

```

Any values that you provide on the panel are saved in the workflow input variable file as the default value of the prefix of DB2 libraries.

```

000013 ## "DSNTLIBP" on panel DSNTIP1: LIBRARY NAME PREFIX
000014 ## The LIBRARY NAME PREFIX field specifies the input prefix for the SDSN
000015 DSNTLIBP=DSNB10

```

When the workflow is instantiated in z/OSMF, it substitutes the symbolic with the value saved in the workflow input variable file and produces an executable JCL.

```

//JOB LIB DD DISP=SHR,DSN=DSNB10.SDSNEXIT
// DD DISP=SHR,DSN=DSNB10.SDSNLOAD
// DD DISP=SHR,DSN=CEE.SCEERUN
// *
// * DSNTRVY: Verify the DB2-supplied routines
// *
//DSNTRVY EXEC PGM=DSNTRVY,COND=(4,LT),

```

Besides the four input fields on the entry panel, most of the input fields can be selected as variables.

Some of them might have different level of granularity so one can override another. For example, on the panel DSNTILT, if the checkbox for the input field "EXIT LIBRARY" is selected, the full library path instead of its prefix is considered as a variable. All other libraries will still use the prefix as variables in their path. This is useful when most of the libraries have the same prefix but a few do not.

```

Data sets allocated by SMP/E and other methods:
- 7 LINK LIST LIBRARY ==> DSNB10.SDSNLINK
- 8 LOAD LIBRARY ==> DSNB10.SDSNLOAD
- 9 JDBC AND SQLJ DLLS ==> DSNB10.SDSNLOAD2
- 10 MACRO LIBRARY ==> DSNB10.SDSNMACS
- 11 LOAD DISTRIBUTION ==> DSNB10.SDSNLOAD
$ 12 EXIT LIBRARY ==> USER.SDSNEXIT
- 13 DBRM LIBRARY ==> DSNB10.SDSNDBRM
- 14 IRLM LOAD LIBRARY ==> DSNB10.SDXRRESL
- 15 IVP DATA LIBRARY ==> DSNB10.SDSNIVPD
- 16 INCLUDE LIBRARY ==> DSNB10.SDSNC.H

```

As a comparison, when the "EXIT LIBRARY" is selected as a variable, DSNTIJRW refers to the full path of the library as a variable.

```

000103 //JOB LIB DD DISP=SHR,DSN=${DSNEXIT}
000104 // DD DISP=SHR,DSN=${DSNTLIBP}.SDSNLOAD
000105 // DD DISP=SHR,DSN=CEE.SCEERUN
000106 //*
000107 //* DSNTRVY: Verify the DB2-supplied routines
000108 //*
000109 //DSNTRVY EXEC PGM=DSNTRVY,COND=(4,LT),

```

Some input fields are grouped as they are related. For example, the work file database settings on DSNTIL9.

```

MIGRATE DB2 - WORK FILE DATABASE
==> _
Enter options for creating sort work table spaces:
S 4K SORT TABLE SPACE:
 1 4K SORT PRIMARY SPACE ==> 0          Total primary space (MB)
 2 4K SORT WORK TS'S      ==> 0          Number of table spaces to create
 3 4K SORT WORK SEG SIZE ==> 16         Segment size
S 32K SORT TABLE SPACE:
 4 32K SORT PRIMARY SPACE==> 0          Total primary space (MB)
 5 32K SORT WORK TS'S     ==> 0          Number of table spaces to create
 6 32K SORT WORK SEG SIZE==> 16         Segment size
Enter options for creating temporary (DGTT) work table spaces:
_ 4K TEMP TABLE SPACE:
 7 4K TEMP PRIMARY SPACE ==> 0          Total primary space (MB)
 8 4K TEMP WORK TS'S     ==> 0          Number of table spaces to create
 9 4K TEMP WORK SEG SIZE ==> 16         Segment size
_ 32K TEMP TABLE SPACE:
10 32K TEMP PRIMARY SPACE==> 0          Total primary space (MB)
11 32K TEMP WORK TS'S     ==> 0          Number of table spaces to create
12 32K TEMP WORK SEG SIZE==> 16         Segment size

F1=HELP      F2=SPLIT      F3=END      F4=RETURN      F5=RFIND      F6=RCHANGE
F7=UP        F8=DOWN      F9=SWAP     F10=LEFT      F11=RIGHT     F12=RETRIEVE
MA  A 02/007

```

Some fields are calculation results. They still can be selected as variables, for example, the fields on the panel DSNTILC.

```

MIGRATE DB2 - CLIST CALCULATIONS - PANEL 1
==> _
You can update the DSMAX, EDM STATEMENT CACHE (if CACHE DYNAMIC is YES),
EDM DBD CACHE, EDM SKELETON POOL, SORT POOL, and RID POOL sizes if necessary.
          Calculated      Override
_ 1 DSMAX - MAXIMUM OPEN DATA SETS = 20000 (1-200000)
_ 2 DSNT485I EDM STATEMENT CACHE = 122880 K K
_ 3 DSNT485I EDM DBD CACHE = 40960 K K
_ 4 DSNT485I EDM SKELETON POOL SIZE = 81920 K K
_ 5 DSNT485I EDM LIMIT BELOW THE BAR = 0 K K
_ 6 DSNT485I BUFFER POOL SIZE = 109 M
_ 7 DSNT485I SORT POOL SIZE = 10000 K K
_ 8 DSNT485I MAX IN-MEMORY SORT SIZE = 1000 K K
_ 9 DSNT485I RID POOL SIZE = 400000 K K
10 DSNT485I DATA SET STORAGE SIZE = 26000 K
11 DSNT485I CODE STORAGE SIZE = 38200 K
12 DSNT485I WORKING STORAGE SIZE = 45024 K
13 DSNT486I TOTAL MAIN STORAGE = 617 M M
14 DSNT487I TOTAL STORAGE BELOW 16M = 1036 K WITH SWA ABOVE 16M LINE
15 DSNT438I IRLM LOCK MAXIMUM SPACE = 2160 M, AVAILABLE = 2160 M

F1=HELP      F2=SPLIT      F3=END      F4=RETURN      F5=RFIND      F6=RCHANGE
F7=UP        F8=DOWN      F9=SWAP     F10=LEFT      F11=RIGHT     F12=RETRIEVE
MA  A 02/007

```

Besides the existing input fields, the subsystem parameters not on the installation panels before PI38553 can also be selected as variables.

```

====> _
Z/OSMF WORKFLOW ARTIFACTS GENERATION

Type 's' in front of the subsystem parameters to be set as variables:
MACRO DSN6SPRM
  _ ACCELMODEL
  _ CACHE_DEP_TRACK_STOR_LIM
  _ EN_PJSJ
  _ INDEX_IO_PARALLELISM
  _ MAX_CONCURRENT_PKG_OPS
  _ MINRBLK
  _ OPT1ROWBLOCKSORT
  _ REMOTE_COPY_SW_ACCEL
  _ RESTRICT_ALT_COL_FOR_DCC
  _ SIMULATED_CPU_COUNT
  _ SJTABLES
  _ SUBQ_MIDX
  _ XML_RESTRICT_EMPTY_TAG
  _ CACHEDYN_FREELocal
  _ COMCRIT
  _ HONOR_KEEPDICTIONARY
  _ INLISTP
  _ MINDVACL
  _ NPGTHRSH
  _ REALSTORAGE_MAX
  _ RENAMETABLE
  _ RETRY_STOPPED_OBJECTS
  _ SIMULATED_CPU_SPEED
  _ SQWIDSC
  _ SUPPRESS_HINT_SQLCODE_DYN
  _ ZOSMETRICS

F1=HELP      F2=SPLIT      F3=END      F4=RETURN      F5=RFIND      F6=RCHANGE
F7=UP        F8=DOWN       F9=SWAP     F10=LEFT      F11=RIGHT     F12=RETRIEVE
MA A                                               02/007

```

It's recommended to select those input fields that have different configurations on different systems, such as subsystem ID, buffer pool size, and so forth. Because each DB2 subsystem to migrate has its own input variable input file, selecting too many variables makes the variable input file longer, meaning that maintenance work might be error prone.

Installation or migration steps can also be customized to support specific customer's processes that add to or skip steps in the documented migration process.

```

====> _
REVIEW STEPS IN Z/OSMF MIGRATION WORKFLOW DEFINITION

Select the steps which should be included in the workflow definition:
s Actions to complete before migration (DSNTIJPM)
s Take image copies of the directory and catalog (DSNTIJIB/DSNTIJDB)
s Make DB2 CLISTS available to TSO and batch users (DSNTIJVC)
s Stop DB2 Version 10 activity (DSNTIJSO)
s Define DB2 initialization parameters (DSNTIJUZ)
s Define DB2 Version 11 for z/OS (DSNTIJMV)
s Define system data sets (DSNTIJIN)
s Define user authorization exit routines (DSNTIJEX)
s Start DB2 Version 11 (DSNTIJSA)
s Tailor DB2 Version 11 catalog (DSNTIJTC)
s Ensure that the catalog indexes have no problems (DSNTIJCX)
s Prepare dynamic SQL program (DSNTIJTM)
s Bind SPUFI and DCLGEN and user-maintained DB activity (DSNTIJSG)
s Set up DB2-supplied routines (DSNTIJRW)
s Configure DB2 for running SPs and user-defined routines (DSNTIJRT)
s Validate the installation of DB2-supplied routines (DSNTIJRV)
s Convert EXPLAIN tables to the current format (DSNTIJXA)
s Take an image copy of the DB2 11 mode catalog (DSNTIJIC/DSNTIJDC)
F1=HELP      F2=SPLIT      F3=END      F4=RETURN      F5=RFIND      F6=RCHANGE
F7=UP        F8=DOWN       F9=SWAP     F10=LEFT      F11=RIGHT     F12=RETRIEVE

```

The z/OSMF workflow artifacts are generated in the PDS that you specify. The workflow definition file and the workflow input variable file are generated in the "WORKFLOW DEFINITION LIBRARY". The JCL templates will be generated in the "JCL TEMPLATE LIBRARY".

```
MIGRATE DB2 - Z/OSMF ARTIFACTS CONFIGURATION PANEL
===> _
z/OSMF artifacts allocated by the installation CLIST for edited output:
1 WORKFLOW DEFINITION LIBRARY ==> DSNB10.NEW.SDSNMFSA
2 JCL TEMPLATE LIBRARY ==> DSNB10.NEW.SDSNSAM2
For migration only: input the information of the prior release:
_ 3 PRIOR RELEASE SDSNLOAD LIBRARY ==> DSNB10.SDSNLOAD

F1=HELP      F2=SPLIT    F3=END      F4=RETURN   F5=RFIND    F6=RCHANGE
F7=UP        F8=DOWN     F9=SWAP     F10=LEFT    F11=RIGHT   F12=RETRIEVE
MÁ          Á                                     02/007
```

Customizing z/OSMF workflow JCL templates

The JCL templates that the installation CLIST generates work for most users. However, you need to customize JCLs for your shop. You can edit the JCL templates to further customize them by adding or removing steps.

Automating DB2 migration in z/OSMF

Creating the workflow instance

For every DB2 subsystem to be migrated, a workflow instance must be created. The path of the workflow definition file must be provided for instantiating a workflow instance. The path of the workflow input variable file is optional. However, it is always best to save the variable values for a specific subsystem into the workflow input variable file and provide it when creating the instance. Otherwise, z/OSMF prompts you to provide the value during execution, preventing a fully automated migration.

Create Workflow

Type or select a workflow definition file to use for creating a new workflow.
For a z/OS data set, specify a fully qualified name, with no quotes.

* Workflow definition file:
DSNB10.NEW.SDSNMFSA(DSNTIWMS)

Type or select a variable input file to populate the new workflow.
For a z/OS data set, specify a fully qualified name, with no quotes.

Workflow variable input file:
DSNB10.NEW.SDSNMFSA(DSNTIVMS)

* System:
XESDEV.CSREC402

< Back Next > Finish Cancel Help

z/OSMF prompts you to input the name of the workflow instance. It is best to name it with the workflow purpose and the target system. For example, "V10 to V11 CM Non-data-sharing - DB2A". "V10 to V11 CM Non-data-sharing" indicates the migration is from Version 10 to Version 11 conversion mode. DB2A is the name subsystem to be migrated.

Create Workflow

Workflow definition file:
DSNB10.NEW.SDSNMFSA(DSNTIWMS)

Variable input file:
DSNB10.NEW.SDSNMFSA(DSNTIVMS)

Description:
Standard Procedure to migrate DB2 V10 to V11 CM

Vendor: IBM **Version:** 0.5 **Is Callable:** Cannot be called by another workflow

*** Workflow name:**
Standard Procedure to migrate DB2 V10 to V11 CM - DB2A

*** Owner user ID:** omvsadm **System:** XESDEV.CSREC402

Comments:

Open workflow on finish Assign all steps to owner user ID

All the steps in the workflow are assigned to the same person to fully automate the migration process. Dependencies have been set to these steps by the installation CLIST. Only the steps in the "Ready" state can be performed.

[Workflows](#) > V10 to V11 CM Non-data-sharing - DB2A

V10 to V11 CM Non-data-sharing - DB2A

Description:
Standard Procedure to migrate DB2 V10 to V11 CM

Percent complete:
0%

Owner: omvsadm **System:** XESDEV.CSREC402

Steps complete: 0 of 17 **Status:** ■ In Progress

Is Callable: Cannot be called by another workflow

[Notes](#) | [History](#)

Workflow Steps

State Filter	No. Filter	Title Filter	CalledWorkflow Filter	Automated Filter	Owner Filter	Skill Category Filter
<input type="checkbox"/>	1	Actions to complete before migration(DSNTIJPM)		Yes	omvsadm	Database Administrator
<input type="checkbox"/>	2	Take image copies of the directory and catalog(DSNTIJDB)		Yes	omvsadm	Database Administrator
<input type="checkbox"/>	3	Connect DB2 to TSO(DSNTIJVC)		Yes	omvsadm	Database Administrator
<input type="checkbox"/>	4	Stop DB2 Version 10 activity(DSNTIJSO)		Yes	omvsadm	Database Administrator
<input type="checkbox"/>	5	Define DB2 initialization parameters(DSNTIJUZ)		Yes	omvsadm	Database Administrator
<input type="checkbox"/>	6	Define DB2 Version 11 to z/OS(DSNTIJMV)		Yes	omvsadm	Database Administrator
<input type="checkbox"/>	7	Define system data sets(DSNTIJIN)		Yes	omvsadm	Database Administrator
<input type="checkbox"/>	8	Start DB2 Version 11 in MAINT mode(DSNTIJSM)		Yes	omvsadm	Database Administrator
<input type="checkbox"/>	9	Tailor DB2 Version 11 catalog(DSNTIJTC)		Yes	omvsadm	Database Administrator

Validating JCL with symbolic substitution

It is best to validate the JCLs with variable substitution before executing them. The JCLs with variables substituted can be found on the "Perform" tab of a step. First review the values of the input variables.

Workflows > V10 to V11 CM Non-data-sharing - DB2A > 1. Actions to complete before migration(DSNTIJPM) Hel

Properties for Workflow Step 1. Actions to complete before migration(DSNTIJPM)

General Details Dependencies Notes **Perform** Status Input Variables

✓ Input Variables
 ➔ DB2
✓ Review Instructions
✓ Create JOB statement
 Review JCL
 Submit and Save JCL


Input Variables - DB2
Enter the variable values for this input category.


DSNTLIBP - LIBRARY NAME PREFIX : ⓘ
DSNB10

MVSSNAME - SUBSYSTEM NAME : ⓘ
VA1A

By default, the values are loaded from the workflow input variable file, they don't need to be changed here. However, if changes are required, click the exclamation mark next to the variable name, and check "Mark value editable." Then the input variable textbox becomes editable. The changed value applies to this workflow instance only.

Input Variables - DB2
Enter the variable values for this input category.

DSNTLIBP - LIBRARY NAME PREFIX : 
DSNB10

MVSSNAME - SUBSYSTEM NAME : 
VA1A

DSNTLIBP


The LIBRARY NAME PREFIX field specifies the input prefix for the SDSNLOAD, SDSNMACS, SDSNSAMP, SDSNDBRM, and SDSNCLST libraries.

This variable is also referenced by the following steps:

State	No.	Title	Owner
Not Ready	2	Take image copies of the directory and catalog(DSNTIJDB)	omvsadm
Not Ready	3	Connect DB2 to TSO(DSNTIJVC)	omvsadm
Not Ready	4	Stop DB2 Version 10 activity(DSNTIJSO)	omvsadm
Not Ready	5	Define DB2 initialization parameters(DSNTIJUZ)	omvsadm
Not Ready	6	Define DB2 Version 11 to z/OS(DSNTIJMV)	omvsadm
Not Ready	7	Define svstem data	omvsadm

Make value editable

The value of this variable was stored previously and is now set to uneditable for this workflow step. Select this option if you want to override this setting and edit the variable.

 If you choose to override the current value of the variable, it is recommended that you review the steps listed above.

OK Cancel

In the step "Create JOB statement", you are prompted to review and update "JOB statement JCL". Update the job statement with a job name, a proper CLASS or MSGCLASS. For the migration steps that require INSTALL SYSADM authorization, you can also add one line to specify USERNAME and PASSWORD.

Apply the updated job statements to all the jobs referred by the workflow or only the job referred by this step of the workflow.

General Details Dependencies Notes Perform Status Input Variables

✓ Input Variables
✓ DB2
✓ Review Instructions
⇒ **Create JOB statement**
Review JCL
Submit and Save JCL

Create JOB statement
Specify the JOB statement to use for this job. You can accept the default or define a new JOB statement.

```
* JOB statement JCL:List variables for substitution
//IZUWF3B JOB (ACCTINFO),CLASS=A,MSGCLASS=0,
//          MSGLEVEL=(1,1),REGION=0M,NOTIFY=OMVSADM
```

Undo All Changes View Substitutions

Apply updates to:
 All steps in workflow 'V10 to V11 CM Non-data-sharing - DB2A'.
 This step 'Actions to complete before migration(DSNTIJPM)' only.

Then review the content of the JCL including the job statement. For anything to be updated, click the "Edit JCL" button then the JCL textbox becomes editable. The change on the JCL only applies to the particular workflow instance. If there is any change applying to all the workflow instances,

it's best to change on the JCL template before creating workflow instances.

The screenshot shows a software interface with a top navigation bar containing tabs: General, Details, Dependencies, Notes, Perform (selected), Status, and Input Variables. On the left, a sidebar lists steps: Input Variables, DB2, Review Instructions, Create JOB statement, Review JCL (selected), and Submit and Save JCL. The main area is titled 'Review JCL' and contains the following text:

Review the generated JCL, then click **Next** to proceed. Optionally, you can edit the JCL. To do so, click the **Edit JCL** button.

```
///IZUWFJB JOB (ACCTINFO),CLASS=A,MSGCLASS=0,
///          MSGLEVEL=(1,1),REGION=0M,NOTIFY=OMVSADM
/*JOBPARM SYSAFF=STL0
*****
/** NAME = DSNTIJPM
/**
/** DESCRIPTIVE NAME = DB2 INSTALL JOB
/**
/** Licensed Materials - Property of IBM
/** 5615-DB2
/** (C) COPYRIGHT 1982, 2013 IBM Corp. All Rights Reserved.
/**
/** STATUS = Version 11
/**
/** FUNCTION = RUN THIS JOB ON DB2 VERSION 10 PRIOR TO MIGRATION TO
/**           DB2 VERSION 11. IT QUERIES THE DB2 CATALOG TO IDENTIFY
/**           CONDITIONS THAT WILL NEED TO BE REMEDIED BEFORE YOU
/**           ATTEMPT TO MIGRATE TO DB2 VERSION 11 OR THAT NEED TO BE
/**           ATTENDED TO AFTER YOU HAVE MIGRATED TO DB2 VERSION 11.
/**
/** PSEUDOCODE =
/** DSNTGEN STEP COPY DSNTPMQ EXEC TO A TEMP PDS
/** DSNTPMQ STEP CALL DSNTPMQ TO GENERATE PREMIGRATION REPORTS
```

At the bottom of the JCL text area, there is an 'Edit JCL' button (highlighted with a red box) and a text field labeled 'Maximum record length: 80'.

Because migration is a critical activity in an enterprise, every JCL must be verified after the substitution, for every workflow instance.

Executing the workflow

After all workflow instances are tested, execute them. Some DB2 steps can repeatedly run, such as DSNTIJPM. For DSNTIJPM, select the option "Manually perform the selected step only".

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

Open the "Status" tab, the job status can be found, including job name, job ID, return code, and job outputs. However, return code 0 of DSNTIIPM does not mean no action should be taken. Follow the instructions on DB2 manual and check the output of each pre-migration reports to determine the actions to be taken.

Properties for Workflow Step 1. Actions to complete before migration(DSNTIJPJ)

General Details Dependencies Notes Perform **Status** Input Variables

Name: DSNTIJPJ ID: JOB00088 Class: A Type: JOB Status: OUTPUT Return code: CC 0000

DD name: JESMSGGLG Step name: JES2 Procedure step name: JES2 Dataset ID: 2 Class: H Record count: 16

Output (0.804KB of 0.804KB shown)

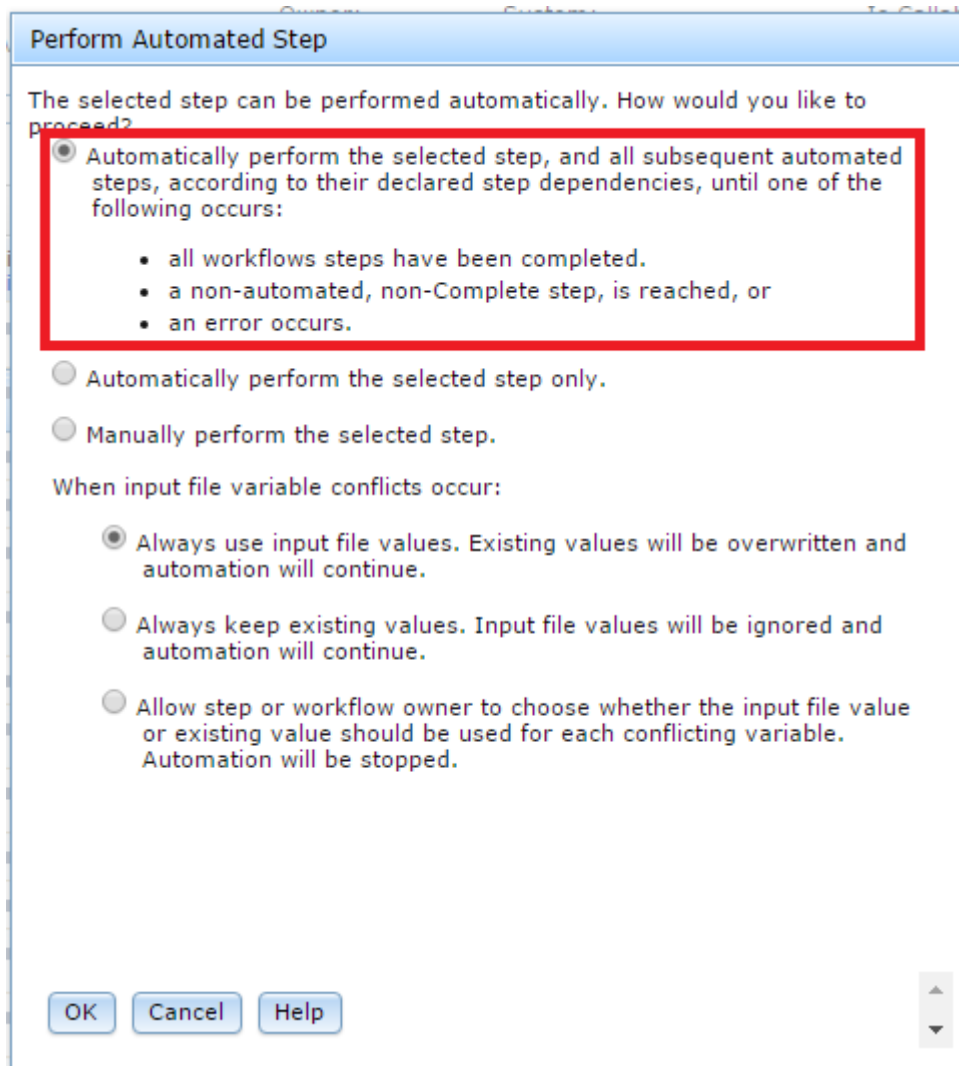
```

1          J E S 2   J O B   L O G   --   S Y S T E M   S T L 0   --   N O D E   S T L V M 3
0
19.51.27 JOB00088 ---- TUESDAY, 10 NOV 2015 ----
19.51.27 JOB00088 IRR010I USERID OMVSADM IS ASSIGNED TO THIS JOB.
19.51.28 JOB00088 ICH70001I OMVSADM LAST ACCESS AT 01:13:50 ON TUESDAY, NOVEMBER 10, 2015
19.51.28 JOB00088 $HASP373 DSNTIJPJ STARTED - INIT 8 - CLASS A - SYS STL0
19.51.29 JOB00088 SMF000I DSNTIJPJ DSNTGEN IEBGENER 0000
19.51.37 JOB00088 SMF000I DSNTIJPJ DSNTPHQ IKJEFT01 0000
19.51.37 JOB00088 $HASP395 DSNTIJPJ ENDED
0----- JES2 JOB STATISTICS -----
- 10 NOV 2015 JOB EXECUTION DATE
- 2,804 CARDS READ
- 676 SYSOUT PRINT RECORDS
- 0 SYSOUT PUNCH RECORDS
- 47 SYSOUT SPOOL KBYTES
- 0.16 MINUTES EXECUTION TIME
    
```

After the first successful execution of a step, its status is marked "Complete". However, you can still re-execute the step. That is, if actions must be taken after the first execution of DSNTIJPJ, take the actions and then return to z/OSMF and rerun the step. Check the reports until all pre-migration tasks are done.

State Filter	No. Filter	Title Filter	CalledWorkflow Filter	Automated Filter	Owner Filter	Skill Category Filter
Complete	1	Actions to complete before migration(DSNTIJPJ)		Yes	omvsadm	Database Administrator
Ready	2	Take image catalog(DSN...)		Yes	omvsadm	Database Administrator
Not Ready	3	Connect DB...		Yes	omvsadm	Database Administrator
Not Ready	4	Stop DB2 Ve...		Yes	omvsadm	Database Administrator
Not Ready	5	Define DB2 i parameters(...)		Yes	omvsadm	Database Administrator
Not Ready	6	Define DB2 z/OS(DSNTIJPJ)		Yes	omvsadm	Database Administrator
Not Ready	7	Define syste...		Yes	omvsadm	Database Administrator
Not Ready	8	Start DB2 Ve mode(DSNTIJPJ)		Yes	omvsadm	Database Administrator

Except the first step, all other steps in migration can be done automatically at the migration window. Select the first option in the "Perform Automated Step" panel. With that option, z/OSMF executes the selected steps and all the subsequent steps in the workflow, until all steps are executed successfully or an error occurs. An error in a step execution is not necessarily a nonzero return code. The maximum return code that a step can tolerate is defined in the workflow definition file. It can be 0, 4, 8 or any number. In the DB2 sample installation and migration workflows, most steps have 0 or 4 as the maximum return code.



If any error occurs, check the job output on z/OSMF "Status" tab. Problem diagnosis and resolution remains is business as usual.

If everything goes smoothly, all the steps are marked as "Completed."

Migrating multiple DB2 subsystems

The biggest benefit of using z/OSMF is for migrating multiple DB2 subsystems. In particular, when the migration steps and the migration jobs used in the migration of these subsystems are the same, and only the parameters used for these migrations, such as subsystem name and buffer pool sizes, are different. With z/OSMF, the rule "define once, execute multiple times" applies.

DB2 installation CLIST can help generate one workflow input variable file that fits for one DB2 system. To create the workflow input variable files working for other systems, the original workflow input variable file should be duplicated for each subsystem. Then you can edit the workflow input variable file with the proper parameters for that subsystem.

DB2 installation CLIST also provides an UPDATE function to generate a z/OSMF workflow input variable file based on an existing workflow input variable file and an input member such as DSNTIDxx.

For example, if the workflow artifacts were generated for an OLTP member, but the DBA wants to customize the workflow input variable file, the DBA can use the UPDATE mode and provide the input member DSNTIDAP from the existing OLAP member.

```
DB2 VERSION 11 INSTALL, UPDATE, MIGRATE, AND ENFM - MAIN PANEL
===> _
Will the installation/migration be performed with z/OSMF?
USE Z/OSMF WORKFLOW   ===> YES      Yes or No

Check parameters and reenter to change:
 1 INSTALL TYPE        ===> UPDATE   Install, Migrate, ENFM, or Update
 2 DATA SHARING       ===>         Yes or No (blank for ENFM or Update)

For migration only: Enter the data set and member name with the settings from
the previous Installation/Migration:
 3 DATA SET (MEMBER) NAME ===>
For DB2 SMP/E libraries (SDSNLOAD, SDSNMACS, SDSNSAMP, SDSNCLST, etc.), enter:
_ 4 LIBRARY NAME PREFIX  ===> DSNB10
_ 5 LIBRARY NAME SUFFIX  ===>
For install data sets (NEW.SDSNSAMP, NEW.SDSNCLST, RUNLIB.LOAD, etc.), enter:
_ 6 DATA SET NAME PREFIX ===> DSNB10
_ 7 DATA SET NAME SUFFIX ===>
Enter to set or save panel values (by reading or writing the named members):
 8 INPUT MEMBER NAME    ===> DSNTIDAP Default parameter values
 9 OUTPUT MEMBER NAME   ===>         Save new values entered on panels
F1=HELP   F2=SPLIT   F3=END   F4=RETURN   F5=RFIND   F6=RCHANGE
F7=UP     F8=DOWN    F9=SWAP   F10=LEFT   F11=RIGHT  F12=RETRIEVE
MA      A                                                    02 / 007
```

Enter the source and the target workflow input variable files.

```
Enter the libraries where the source z/OSMF artifacts were generated:
 1 WORKFLOW DEFINITION LIBRARY ===> DSNB10.NEW.SDSNMFSA
 2 JCL TEMPLATE LIBRARY       ===> DSNB10.NEW.SDSNSAM2

Enter the source workflow input variable file:
 3 SOURCE INPUT VARIABLE FILE ===> DSNTIVTP

Enter the target workflow input variable file:
 4 TARGET INPUT VARIABLE FILE ===> DSNTIVAP

Please note that the UPDATE process will not regenerate the workflow
definition file and JCL templates. It only generates a new workflow
input variable file based on the source workflow input variable file
and the values specified in DSNTIDAP .
```

Then DSNTIVAP is generated which will use the same workflow variable definition in DSNTIVTP but use the value in the input member from DSNTIDAP.

As a comparison, the value of the variable "ACCEL" in the source workflow input variable file DSNTIVTP is NO.

```
000007 ## "ACCEL" on panel DSNTIPB: ACCELERATION STARTUP
000008 ## Specifies whether accelerator servers can be used with a DB2 subsystem
000009 ACCEL=NO
```

In the target workflow input variable file DSNTIVDP is AUTO.

```
000007 ## "ACCEL" on panel DSNTIPB: ACCELERATION STARTUP
000008 ## Specifies whether accelerator servers can be used with a DB2 subsystem
000009 ACCEL=AUTO
```

The DBA can use the same workflow definition file, the file templates and the new workflow input variable file to create a new workflow instance to migrate the OLAP member.

Migrating a data sharing group

To migrate a data-sharing group, at least 2 sets of workflow artifacts need to be generated. The first set is for the first member to be migrated in that data sharing group. The workflow definition of the first member in a data sharing group is the same as a non-data-sharing DB2 subsystem. It is also named DSNTIWMS. The second set, for the subsequent members, is named DSNTIWMD.

The process to generate the set of workflow artifacts for the first member is the same as the process for a non-data-sharing DB2 subsystem except YES should be specified for DATA SHRING and first member should be specified.

It is best to generate the second set for the subsequent in a different data set because the JCL jobs used by the first set and the second set might have the same name but different content.

Moving workflow artifacts

If the generated workflow artifacts need to be moved or copied to another location, the workflow variable input file must be modified to update with the name of data set containing the JCL templates.

In the workflow definition file, the references of the JCL templates contain the variable NEWSAMP2 whose input is defined in the workflow input variable file.

```
- <template>
  <fileTemplate substitution="true" filePathSubstitution="true": ${NEWSAMP2}{DSNTJPM} </fileTemplate>
  <submitAs maxRc="4">JCL</submitAs>
  <maxLrecl>80</maxLrecl>
</template>
```

After the JCL templates are moved to a new location, change the value of NEWSAMP2 in the new workflow variable file.

```
## "INSTYPE": INSTALLATION TYPE
## The INSTYPE is the type for which the workflow input variable file is
INSTYPE=MNDS
## "NEWSAMP2" on panel DSNTILM1: JCL TEMPLATE LIBRARY
## The NEWSAMP2 is the partitioned data set where the tailored JCL templ
NEWSAMP2=DSNB10.NEWLOC.SDSNMFS
```

References

DB2 11 for z/OS Installation and Migration Guide (GC19-4056)

IBM z/OS Management Facility Programming Guide (SA32-1066-04)

IBM DB2 for z/OS in the age of cloud computing

<http://ibm.biz/BdXCZ6>

Acknowledgements

Special thanks to Maryela Weihrauch who provided much inspiration and good advice during the writing of this article.

Kewei Wei (魏可伟) is a senior software engineer in DB2 for z/OS development.

Paul A. McWilliams is a content developer in DB2 for z/OS development

If you have any questions about the solution, please feel free to contact Kewei (weikewei@cn.ibm.com).