



Setup of New DB2 Data-Sharing Failover Solution with the SAP Failover Configuration Tool

TABLE OF CONTENTS

APPLIES TO	3
SUMMARY	3
AUTHOR BIOS	3
INTRODUCTION	3
PREPARE THE TECHNICAL SETUP (TECHNICAL PREREQUISITES)	4
SYSTEM PREREQUISITES	4
REMOTE SYSTEMS	4
SUPPORT PACKAGES/CORRECTION INSTRUCTIONS	5
FEATURES	6
Application Toolbar Screen Area	7
Screen Area with System-Specific Information	7
General Information Screen Area	8
Saved Config	8
DB2 Members	9
Affinity Lists.....	10
Appservers.....	11
Parameters	12
RECOMMENDED USAGE	13
Migration from SAP Failover to CLI Failover for an ABAP system	13
Changing CLI Failover configuration for an ABAP system	14
Changing SAP Failover configuration for an ABAP system	14
CLI Failover for a JAVA system	14
TROUBLESHOOTING	15

APPLIES TO

SAP Basis Release 7.x for IBM DB2 10 and higher.

SUMMARY

The Failover Configuration Tool is a tool, that eases the definition of connections to an IBM DB2 for z/OS database and assists in the setup of a failover configuration environment. This article describes how to use the Failover Configuration Tool in detail and provides several screenshots that visualize the configuration of an ABAP-based SAP system. Different recommended usage scenarios are also briefly summarized in this article.

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INTRODUCTION

The new CLI seamless failover (CLI seamless automatic client reroute ACR) for connections to an IBM DB2 for z/OS data sharing group increases the resilience to failures of SAP solutions. This technology has been initially introduced with DB2 Connect 10.5 FP2 for the ABAP systems in SAP note 1777242. For SAP JAVA systems, an equivalent failover mechanism based on the JDBC Driver of DB2 Connect has already been available for a longer time. It is described in SAP Note 1426172.

In complex installations with many application servers and several DB2 data-sharing members, manually creating the necessary configuration file may be an error-prone task. The seamless failover feature allows different failover strategies for each application server, which increases the setup complexity additionally. In high availability (HA) environments, potential errors should be eliminated in every process step. The new Failover Configuration Tool within the DBA Cockpit supports this in various respects. It advises the administrator of harmful configuration settings and supports the transition from SAP failover (connect.ini) to CLI failover. In complex system environments, the Failover Configuration Tool also saves time by automatically detecting application servers and DB2 sharing members. Application server-specific failover strategies are implemented with the help of affinity lists. They contain a list of servers that are sorted to provide a failover sequence in the event of a system failure.

Configuration parameters for CLI Failover are generated automatically. Changed parameters are checked against the SAP recommendations.

PREPARE THE TECHNICAL SETUP (TECHNICAL PREREQUISITES)

The following technical setup must be completed first before you start using any of the features described below.

SYSTEM PREREQUISITES

In order to use the Failover Configuration Tool and CLI failover, DB2 Connect 10.5 FP2 and DB2 10 or higher are required. In addition, an appropriate DBSL patch level is required. For more information, see SAP Note [1777242](#). See also Table 4 “SAP Notes Related to Failover Configuration” in the appendix of this article.

REMOTE SYSTEMS

To use the Failover Configuration Tool for a remote ABAP system, it is necessary to setup a database connection, as well as an RFC Connection. To use the Failover Configuration Tool for a remote Java system, it is sufficient to define the database connection.

To display and modify the definitions of a remote system, use transaction DBACOCKPIT → *System Configuration* and double-click the system ID (see Figure 1).

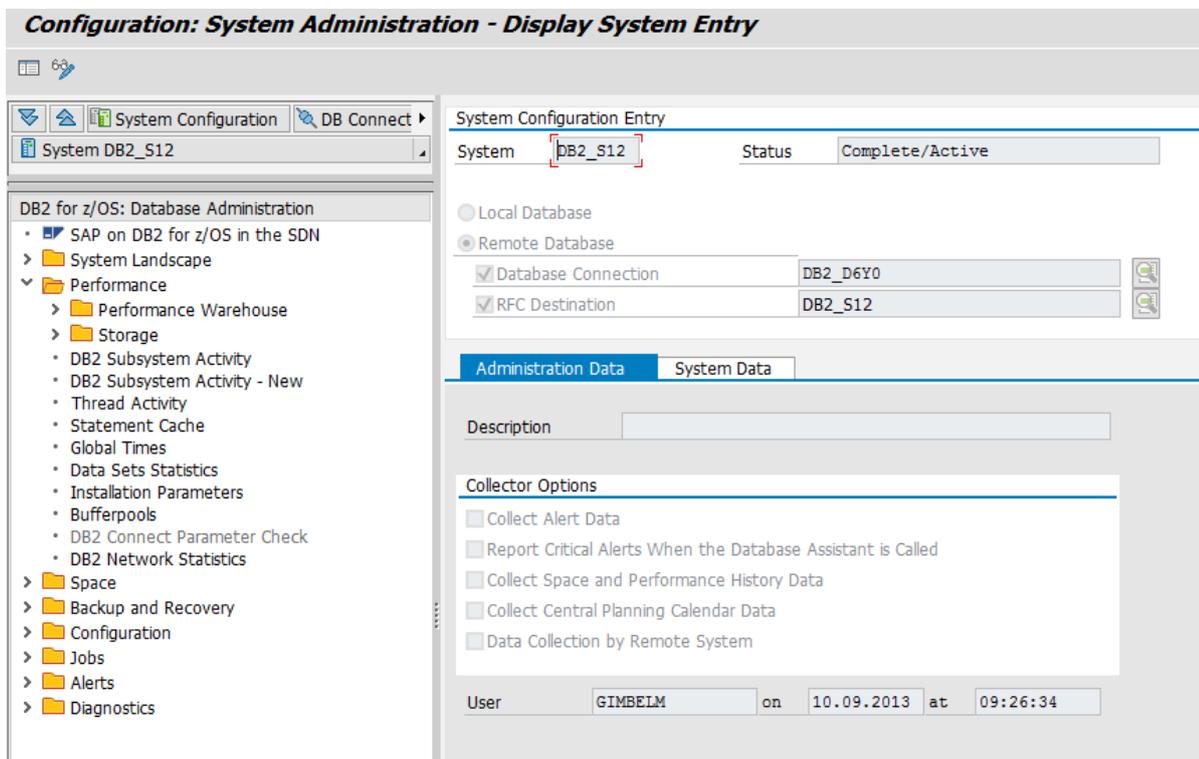


Figure 1: System Configuration Setup with Database and RFC Connection for a Remote ABAP System

SUPPORT PACKAGES/CORRECTION INSTRUCTIONS

The following SAP support package levels are required for the Failover Configuration Tool:

SAP Basis Release	Support Package
7.00	SAPKB70030 plus correction instructions of SAP Note 1931595
7.01	SAPKB70115 plus correction instructions of SAP Note 1931595
7.02	SAPKB70215
7.10	SAPKB71018
7.11	SAPKB71113
7.30	SAPKB73011
7.31	SAPKB73111
7.40	SAPKB74006

Table 1: SAP Recommended SP Levels

FEATURES

To launch the new Failover Configuration Tool use transaction DBACOCKPIT → *Configuration* → *Failover Configuration* (see Figure 2).

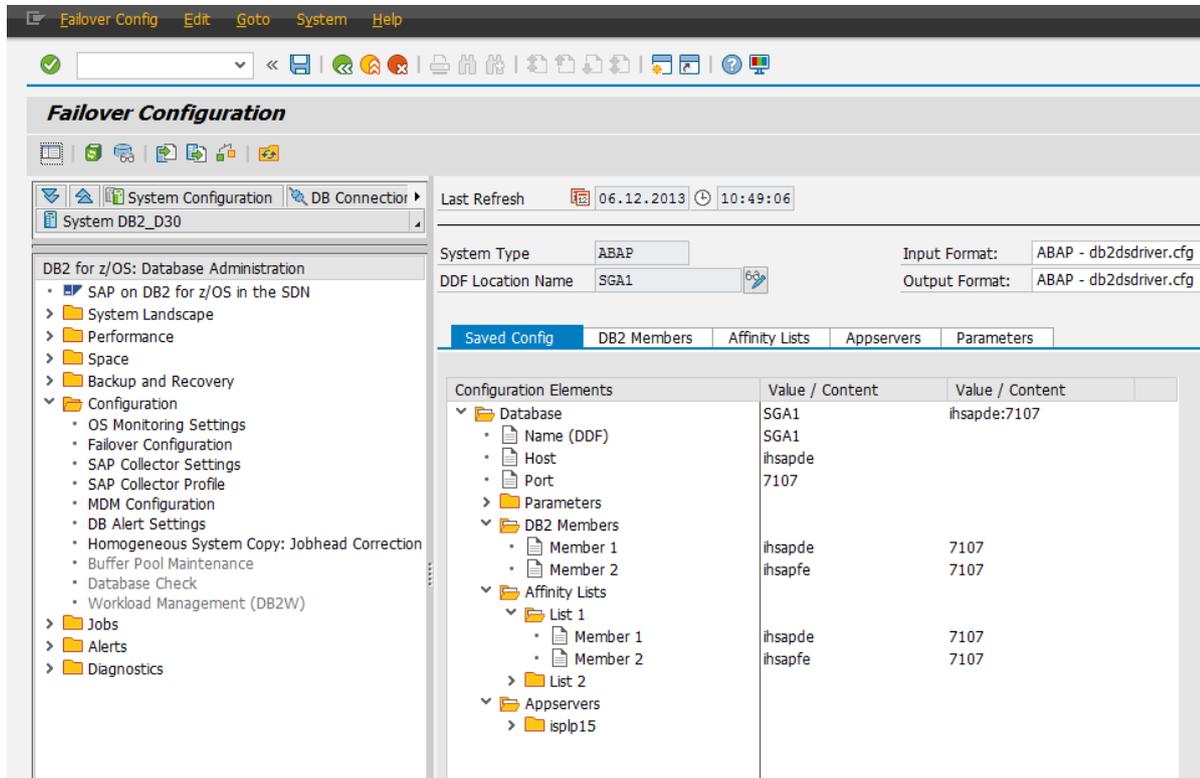


Figure 2: Start Screen of Failover Configuration Tool

For an ABAP system the Failover Configuration Tool is able to read in the SAP failover configuration file `connect.ini` and as well the CLI failover configuration file `db2dsdriver.cfg`. The failover configuration for a JAVA system is supported, too.

The main screen can be divided into three functional parts, which will be described in the following sections.

Application Toolbar Screen Area

The following application toolbar features are available for both ABAP and JAVA systems (see Figure 3):

- Import a failover configuration from the frontend ; Upload an .ini, .cfg or .xml failover configuration file from your PC.
- Export a failover configuration to the frontend : Download an .ini, .cfg or .xml failover configuration file from your PC.

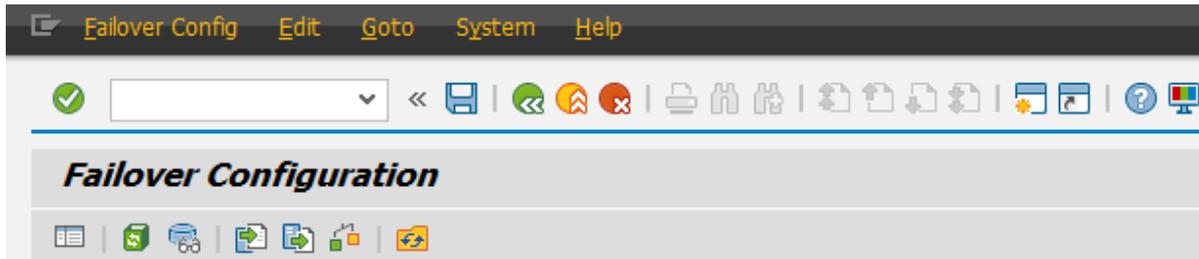


Figure 3: Application Toolbar with the Provided Functions

For an ABAP system the following additional application toolbar features are available:

- Load/Reload the currently active failover configuration from the SAP application server 
- Read/Reread selected failover configuration from disk of the SAP application server 
- Perform a sanity check to verify the configuration for the monitored system 
- Instruct the CLI driver to reload the failover configuration file 
- Save the changed failover configuration and write it to the disk of the SAP application server 

Screen Area with System-Specific Information

The following system-specific information is shown above the tab pages (see Figure 4):

- System type of the currently monitored system
- DDF location of connected DB2 with edit toggle
- Selection field for input format, to read other than default configuration
- Selection field for output format, which is relevant for the export and the writing of the configuration file

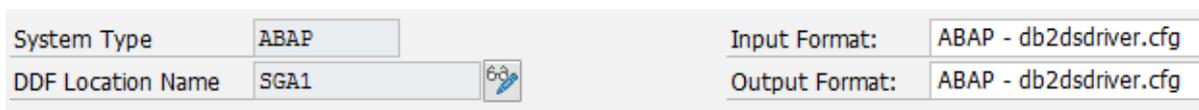


Figure 4: System-Specific Information Area

Once the CLI based failover is activated as described in section **Migration from SAP Failover to CLI Failover**, all future changes to `db2dsdriver.cfg` can be dynamically reloaded after saving by executing “Reload into CLI” . Detailed descriptions concerning changes of the configuration in a CLI failover enabled system can be found section **Error! Reference source not found..**

General Information Screen Area

The general information area is separated into the following five tab pages:

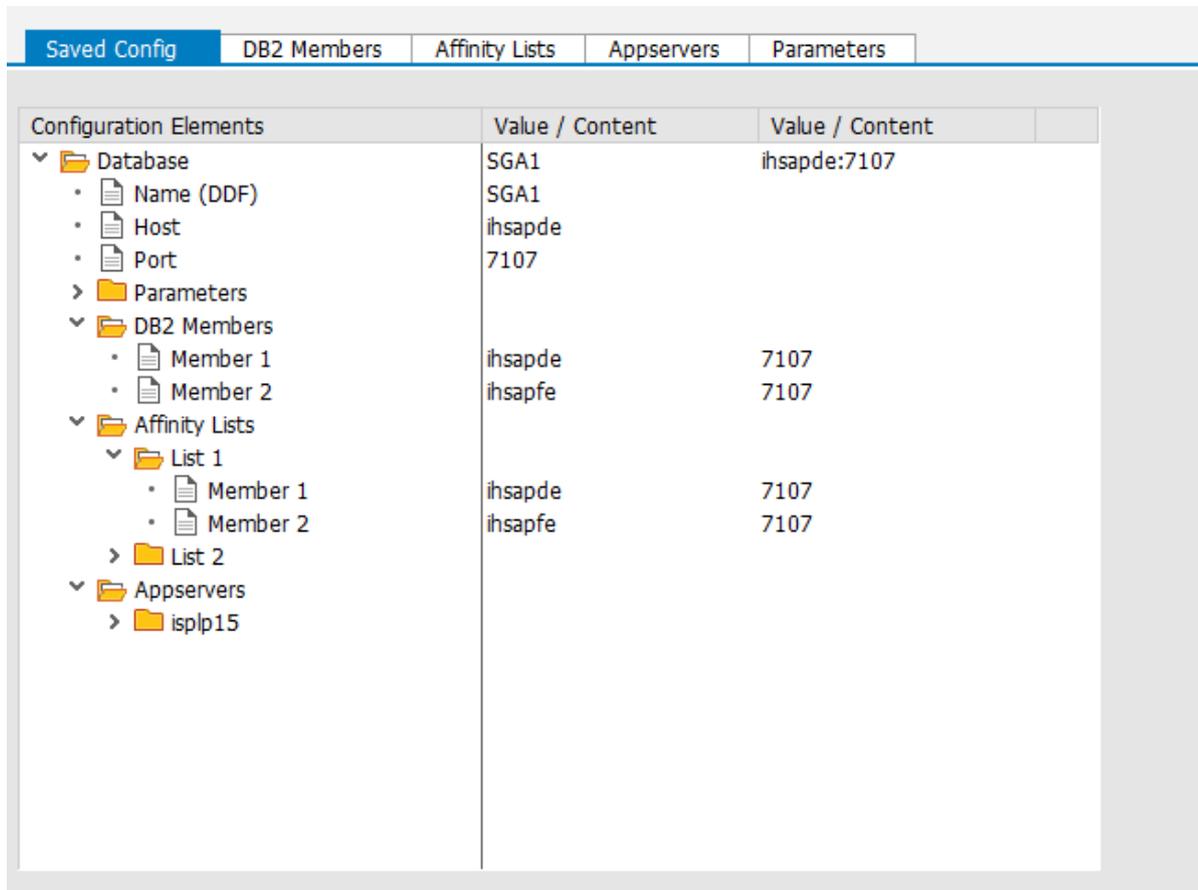


Figure 5: General Information Screen Area with five Tab Pages

Saved Config

Saved configuration is an overview of the currently active failover configuration. A double click on a folder icon navigates to the relevant detail tab page (see Figure 5).

DB2 Members

On this tab page you can add, update and delete data-sharing members in the configuration file. Only data-sharing members can be added that exist in the DB2 data sharing group (see Figure 6). If a failover profile is imported or read from disk, undefined DB2 data sharing members are marked red and a warning is displayed in the message window (see Figure 7). In this case, valid DB2 members should be chosen and the affinity lists should be adjusted (see Error! Reference source not found.).

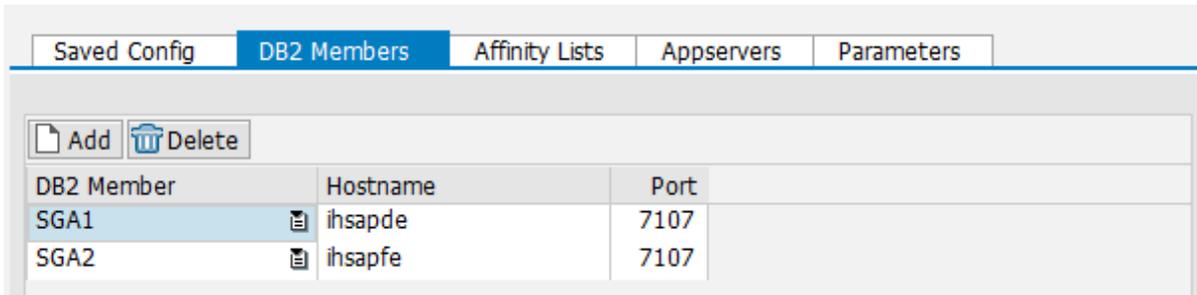


Figure 6: DB2 Members with Two Valid Instances

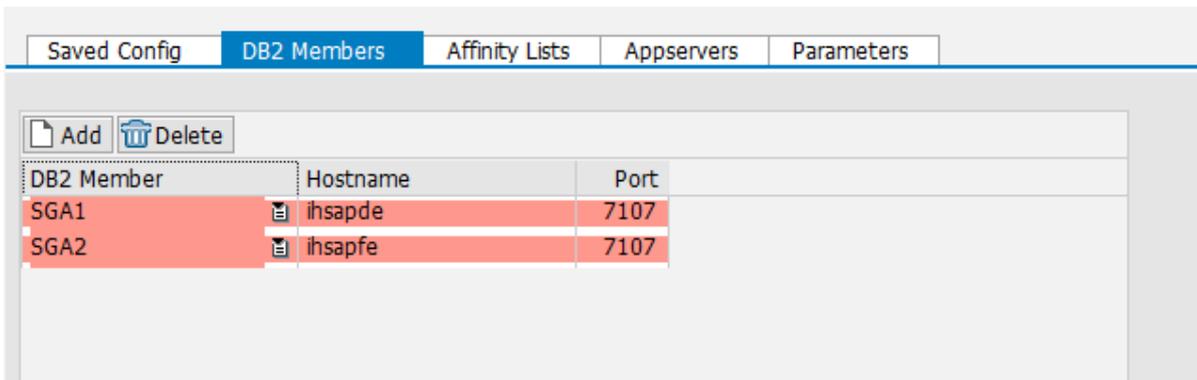


Figure 7: DB2 Members with Two Unknown Instances

Affinity Lists

On this tab page, the user can define new affinity lists, remove unused affinity lists, and edit current affinity lists in a comfortable way.

Note: An affinity list can only be deleted if it is not assigned to any application server.

Each data sharing member can be present in multiple affinity lists, but can appear only once in a specific affinity list. Each affinity list is uniquely defined by its order and contains at least one data sharing member. To display an affinity list, double-click its name in the “Affinity Lists” table. The details will be displayed in the “Current Affinity List” box. Remaining data sharing members that are not used in the affinity list are displayed on the right in the table labeled “Alternative DB2 Members”. Members can be assigned to and removed from an affinity list using the following buttons. It is also possible to modify the order of an affinity list:

- moves the selected data-sharing member up in the failover hierarchy.
- assigns selected data-sharing member to the current list.
- deletes selected data-sharing member from the current list.
- moves selected data-sharing member down in the failover hierarchy.

The tool checks the consistency of the current affinity list after each modification to make sure that each affinity list is unique. If an inconsistent state is configured, the current affinity list is not persisted but editing can be continued seamlessly.

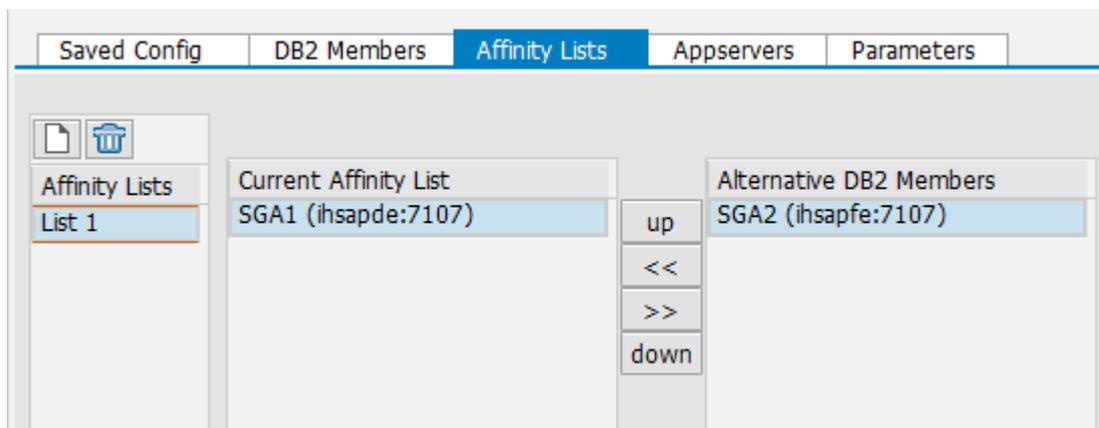


Figure 8: Affinity List Tab Page with a List Containing One Member

Appservers

Each application server is defined by its hostname and an assigned affinity list. So the IP addresses are not supported in this case. The names of the application servers are retrieved from the monitored system. If an unknown application server is entered, a warning is displayed in the message window at the bottom of the screen. The currently assigned affinity list is previewed in a separate table at the right side.

An application server can be added to the list without being up and running. In this case a warning is displayed in the message window. By default the first affinity list available on the affinity list tab page is assigned to each application server. Different affinity lists can be selected from a dropdown box in the appropriate column. If a failover configuration with unknown application servers is loaded, a warning message will be displayed.

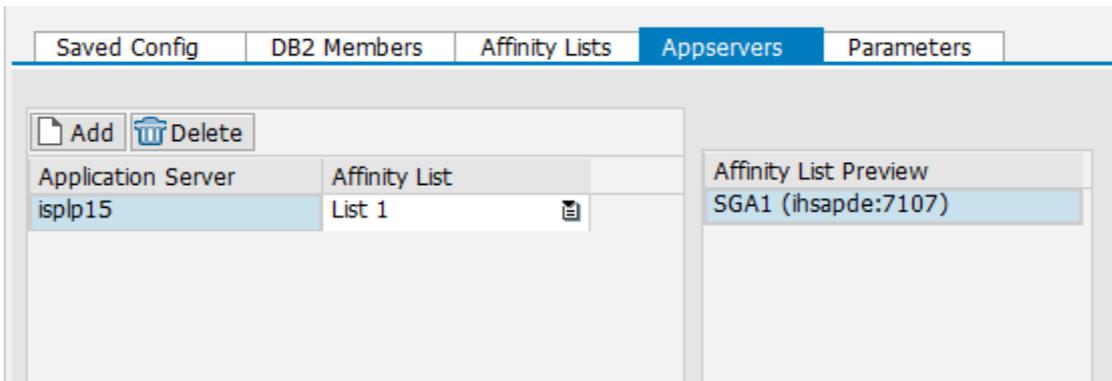


Figure 9: Application Servers Tab Page with Affinity List

Parameters

A specific set of parameters is required to use the new CLI failover mechanism. These five parameters are listed with their values recommended by SAP in the following table.

Parameter Name	Recommended Value
acrRetryInterval	0
enableAcr	true
enableSeamlessAcr	true
maxAcrRetries	3

Table 2: Parameters Recommended by SAP

Missing parameters will be inserted automatically when the failover configuration is saved. Only parameters within the <acr> section of db2dsdriver.cfg are displayed on this tab page. Other Database-specific or configuration-wide parameters must be edited manually in db2dsdriver.cfg. If such parameters exist, the Failover Configuration Tool reads and saves the parameters to/from db2dsdriver.cfg, but does not display it in the Parameters tab page.

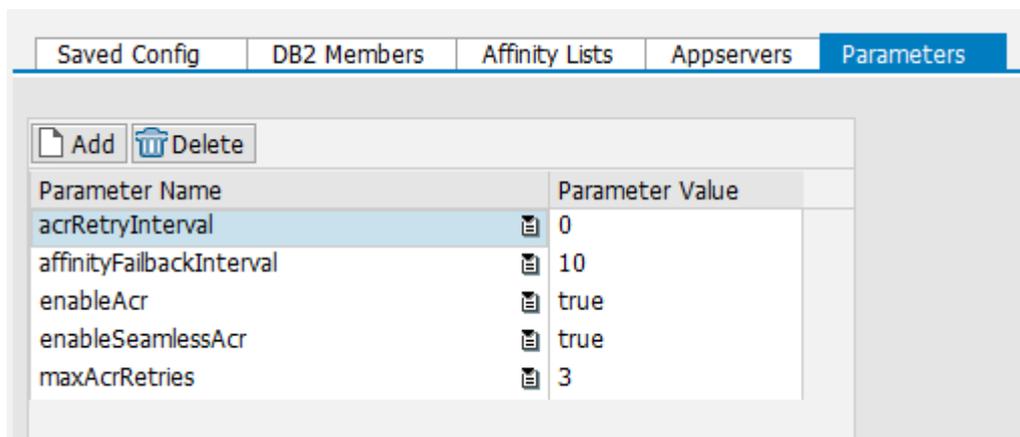


Figure 10: Parameter TabPage with Recommended Parameters

RECOMMENDED USAGE

Migration from SAP Failover to CLI Failover for an ABAP system

The Failover Configuration Tool helps to migrate a system from the `connect.ini`-based SAP failover mechanism to CLI-based failover mechanism.

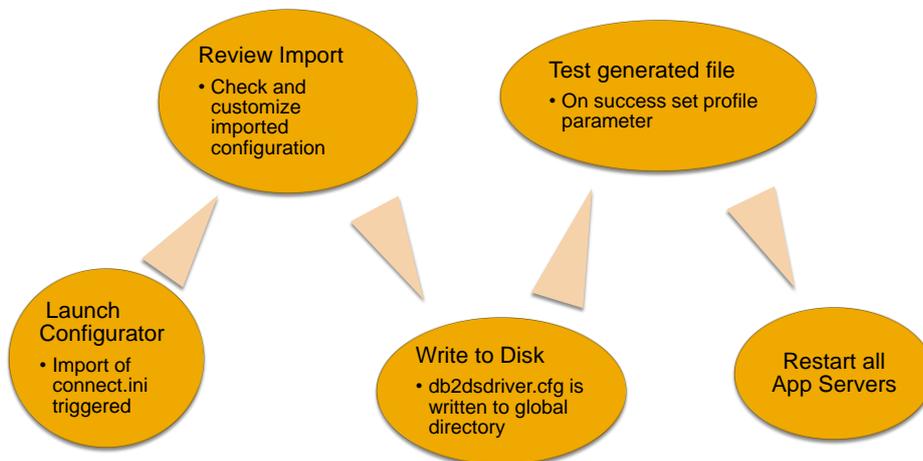


Figure 11: Migration Steps to CLI Failover

Perform the following steps to migrate from SAP Failover to CLI Failover:

1. Prepare your environment: All DB2 data-sharing members must have the same DDF location alias.
2. Launch the Failover Configuration Tool using transaction DBACOCKPIT → *Configuration* → *Failover Configuration*: The transaction automatically loads the current `connect.ini` file.
3. Review the loaded failover configuration:
 - a. Adjust missing DB2 data-sharing members
 - b. Define new affinity lists and review the displayed lists.
 - c. Check the application server tab page in order to verify that each application server has the correct affinity list assigned.
 - d. Adjusted parameters and the DDF location name, if necessary.
 - e. Perform sanity check.
4. Choose “ABAP – db2dsdriver.cfg” from the listbox “Output Format”.
5. Click on the *Save* button and confirm that the new failover configuration should be written to the disk.

The new Failover Configuration is now written to disk but the SAP system is still running with the SAP failover mechanism. To activate CLI failover perform the following steps:

1. Add the following parameter `dbs/db2/dsn_alias` to the SAP application server profile.
2. Add environment variable `dbs_db2_dsn_alias` and `DB2DSDRIVER_CFG_PATH` to `<sid>adm` environment.
3. Test the new configuration. This can be done with the program `db2cli`, which can be executed from the command line of the application server.
 - a. `$DB2_CLI_DRIVER_INSTALL_PATH/bin/db2cli validate -dsn $dbs_db2_dsn_alias`
 - b. `$DB2_CLI_DRIVER_INSTALL_PATH/bin/db2cli validate -dsn $dbs_db2_dsn_alias -connect -user <user> -passwd <password>`
4. Restart the application server. Check work file `dev_w0` for the following message: `DB2Trc: dbs/db2/dsn_alias is set (sgc) -> we use the DB2 Connect fail over feature`

Changing CLI Failover configuration for an ABAP system

The following steps are recommended if changes are necessary to a CLI failover enabled system:

1. Start Failover Configuration Tool to load the current configuration file `db2dsdriver.cfg`.
2. Apply changes.
3. Check warnings and errors in the message window.
4. Perform sanity check.
5. Save the new configuration.
6. Use function “Reload into CLI” to apply changes dynamically to all application servers of the currently monitored system.

Changing SAP Failover configuration for an ABAP system

The following steps are recommended if changes are necessary to a SAP failover enabled system:

1. Start Failover Configuration Tool to load the current configuration file `connect.ini`.
2. Apply changes.
3. Check warnings and errors in the message window.
4. Perform sanity check.
5. Save the new configuration.
6. Restart SAP application server.

The CLI failover parameters of the Parameter tab will be ignored.

CLI Failover for a JAVA system

No all features of the Failover Configuration Tool are available for JAVA systems:

1. Reading from and writing to disk of failover configuration file (`config.xml`) is not possible.
2. Reload into CLI are not possible, either.

These restrictions lead to the following recommended procedure:

1. Transfer the current failover configuration (`config.xml`) from the JAVA application server to a file system accessible by SAP GUI.
2. Launch the new Failover Configuration Tool using transaction *DB2 → Configuration → Failover*.
3. Use the “Import” function to upload the transferred failover configuration `config.xml` file.
4. Apply changes.
5. Check warnings and errors.
6. Choose “JAVA – config.xml” in the listbox for output format.
7. Use the “Export” function to download the changed failover configuration to your frontend.
8. Transfer the modified failover configuration on your JAVA application server

TROUBLESHOOTING

Symptom/Issue	Solution
DBA Cockpit remote system missing	Setup the system and the corresponding database connection using transaction DBACOCKPIT→ System Configuration and DBACOCKPIT→ DB Connection
Exceptions in the message window concerning missing RFC connections	Using transaction SM59, you can define RFC connections to the monitored systems to make them available in the system configuration.
Exceptions in the message window concerning a file not parsed with RFC connection	The function modules for reading and writing configuration files must be available in the monitored systems. Upgrade local and remote systems to the required support packages.

Table 3: Solutions to Symptoms and Issues

For more information about related SAP Notes see Table 4:

SAP Note	Topic
1991240	DB2-z/OS:CCMS: DBA Cockpit CLI Failover Support
1522391	DB2-z/OS:CCMS: Failover Configuration Tool
1777242	DB2 z/OS: CLI Client Based Seamless Failover
1426172	DB2-z/OS: Connection Profile for SAP Java Stack

Table 4: SAP Notes Related to Failover Configuration

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