CLI Failover

SAP on z Systems and Db2 for z/OS

Version 13 (Mar 22, 2019)

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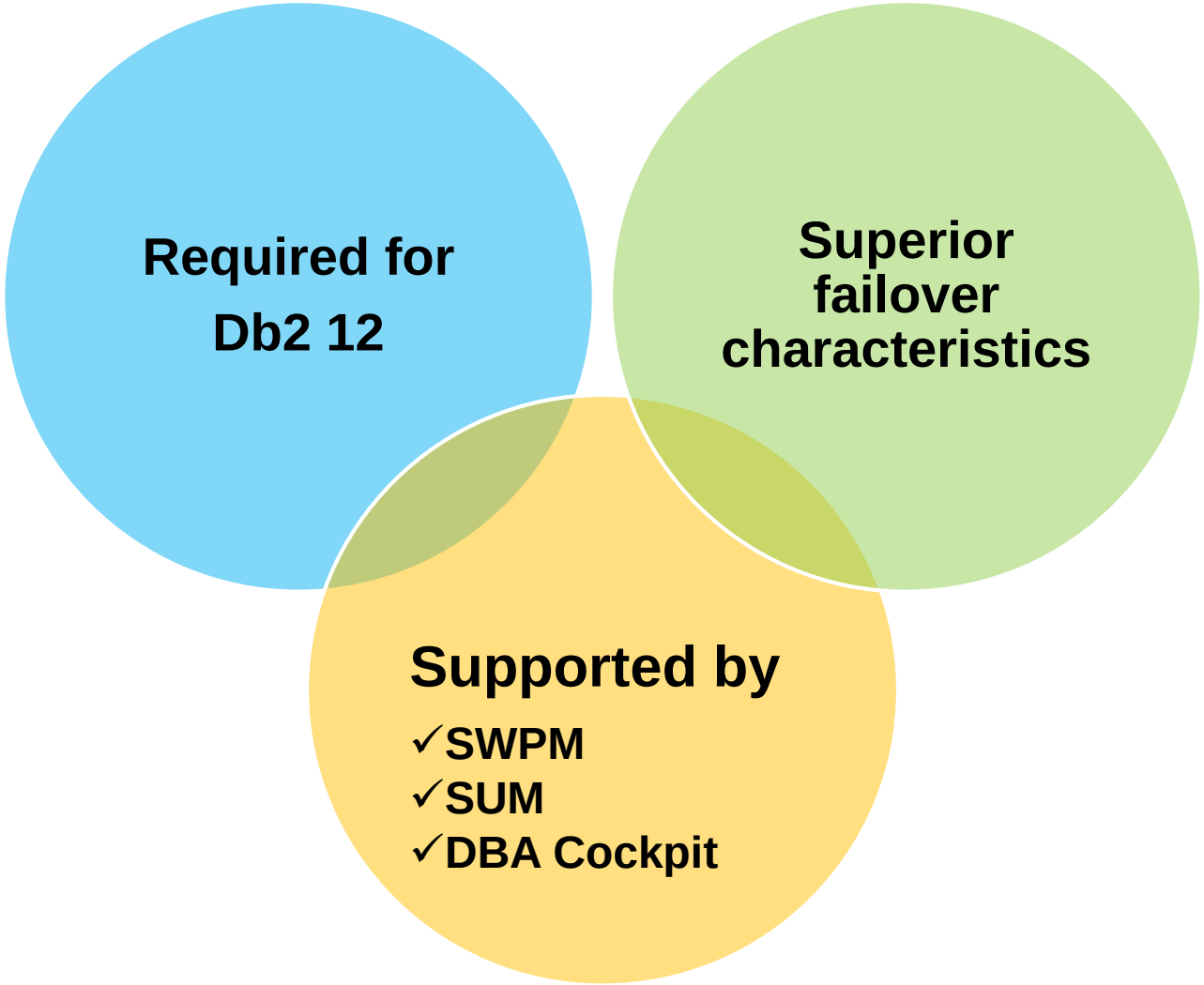
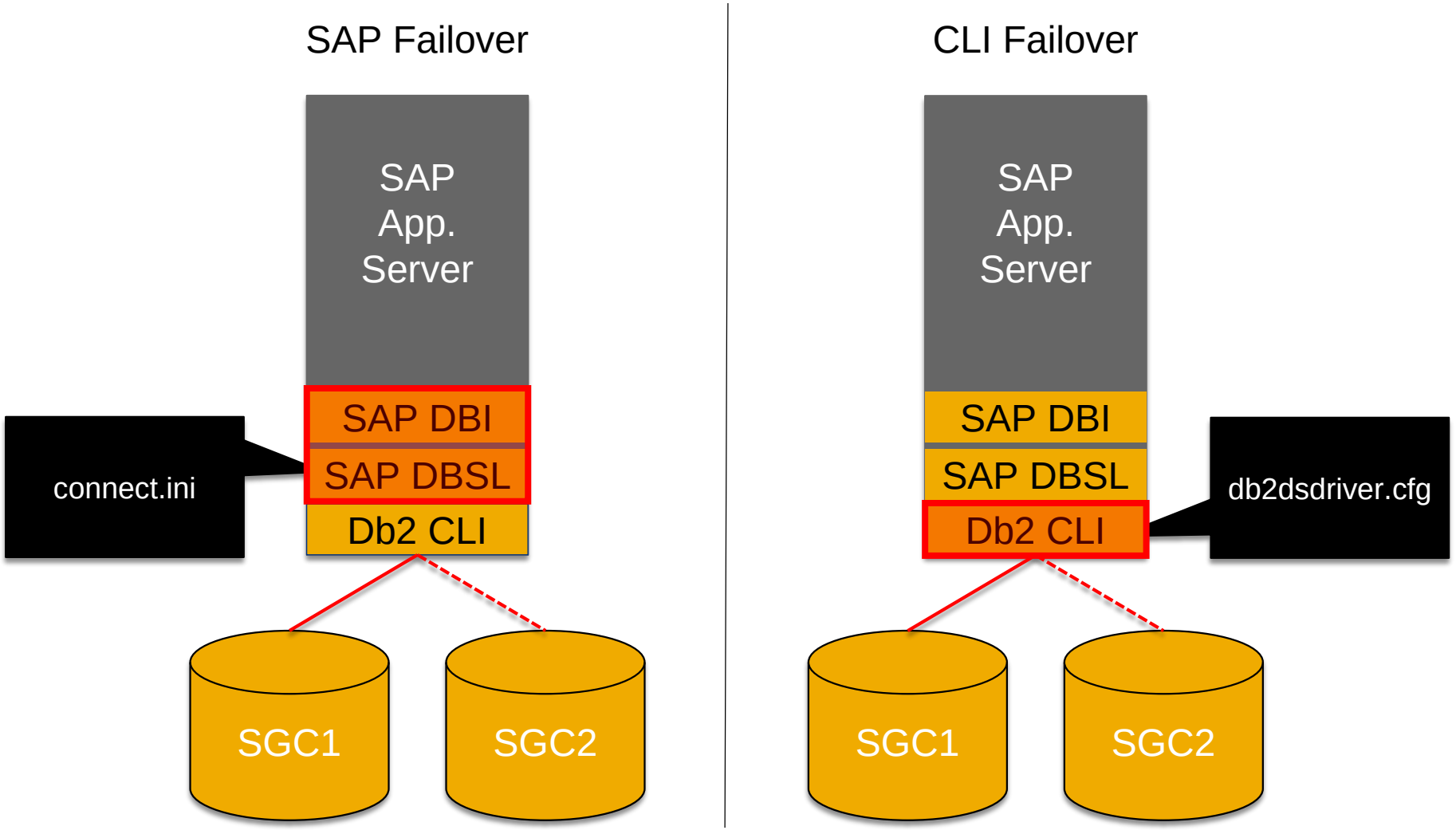
Peter Mohrholz, SAP

Why CLI Failover ?



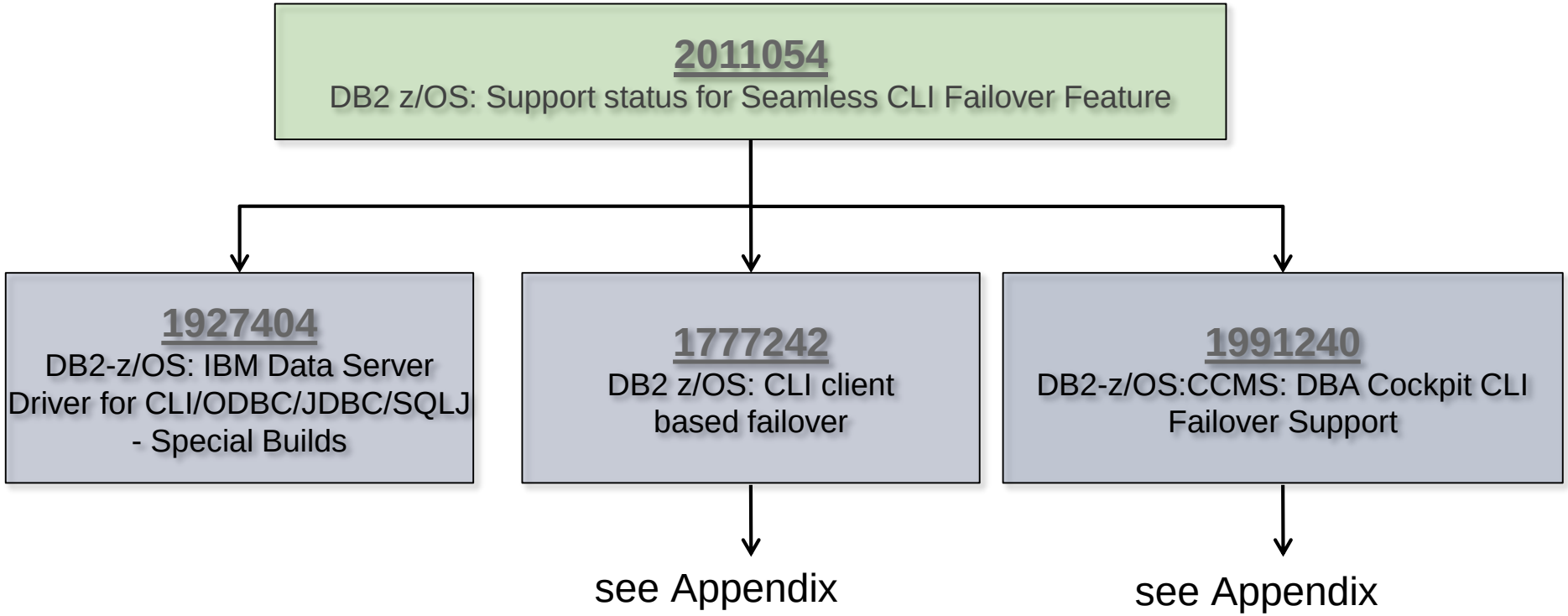
Differences between SAP Failover and CLI Failover



CLI Failover - Benefits

- **Same configuration method for ABAP stacks, Java stacks, non-SAP CLI based applications**
- **Seamless failover for read-only transactions in case of unplanned failover**
  - Less ABAP dumps compared to SAP failover, see preconditions for seamless failover at: https://www.ibm.com/support/knowledgecenter/en/SSEPGG_11.1.0/com.ibm.db2.luw.apdv.cli.doc/doc/c0056552.html)
- **Reconnect to alternative Db2 member in case of planned failover**
  - CLI Failover: At end of Db2 transaction – at Commit when no resources are held or at Rollback
  - SAP Failover: Only at SAP task handler commit
- **More flexible by using dynamic location aliases**
  - Ability to stop alias without stopping DDF and/or Db2
- **Automated failback can be configured**
- **Activate a changed configuration**
  - CLI Failover: reload (activate) configuration – integrated into DBA Cockpit
  - SAP Failover: Restart of all SAP work process needed

SAP Notes for CLI Failover

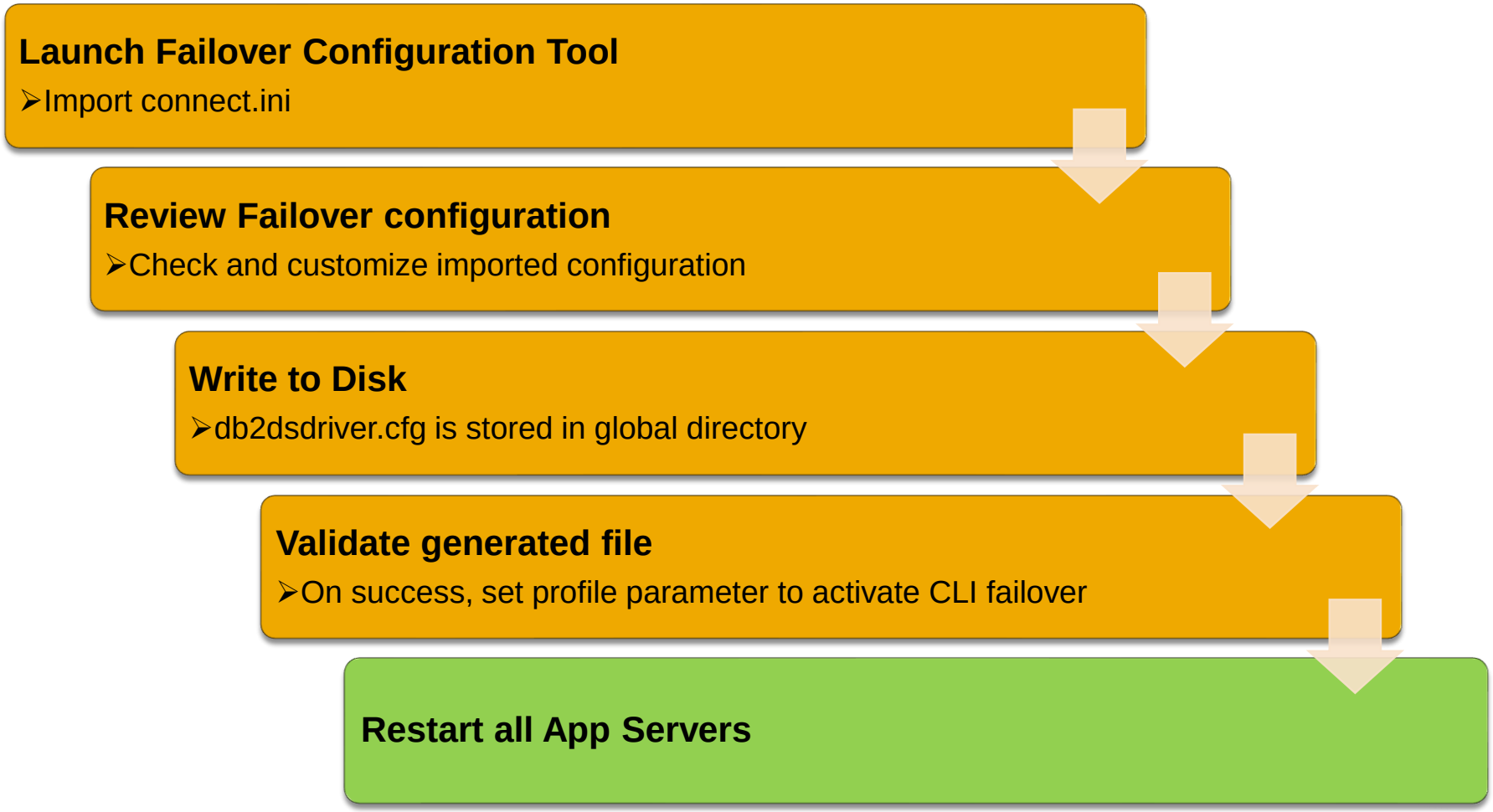


Recommended CLI Driver and SAP Kernel Levels

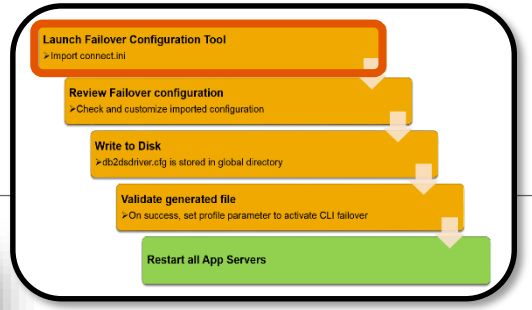
- **Db2 CLI Driver**
  - Check SAP note 1927404 for recommended CLI Driver levels
  - All OS platforms: release 11.1 FP4 Special Build 38143 4.25.16
    Special case SLES 11 SP4 on IBM Z: release 11.1 is not supported for SLES 11 - use 10.5 FP8 Special Build 36210 or higher instead
  - For supported operating systems for CLI Driver 11.1 see:
    http://www-969.ibm.com/software/reports/compatibility/clarity-reports/report/html/softwareReqsForProduct?deliverableId=1E974E509FE011E389FAED6C8DACE45F&osPlatforms=AIX|Linux|Windows&duComponentIds=A003&mandatoryCapIds=183|25&optionalCapIds=30|47|17|1|20|28

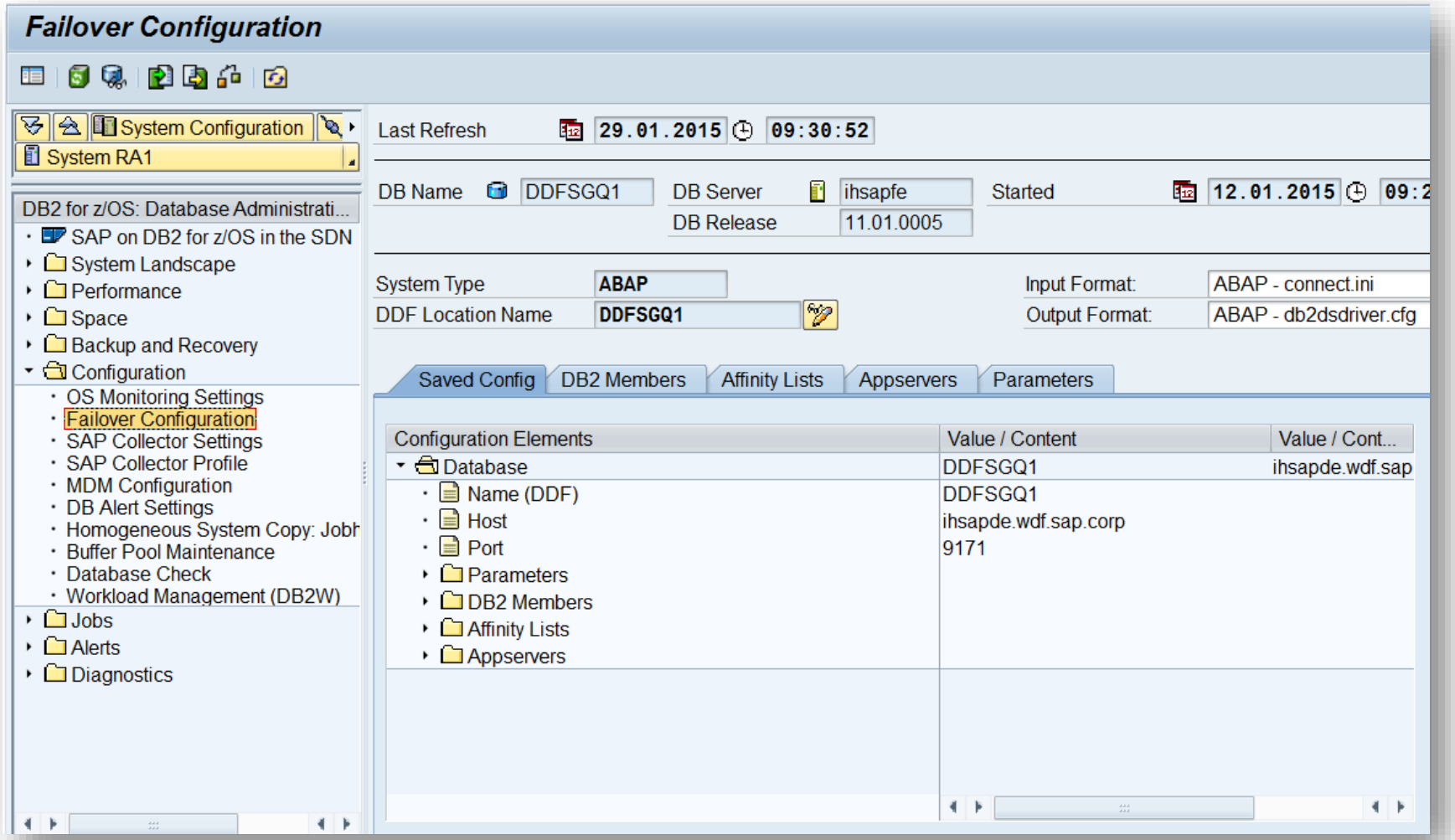
- **SAP Kernel**
  - SAP Kernel 7.49 or higher
  - SAP Kernel 7.22 or higher
  - Prerequisites for older SAP kernel versions: SAP note 1777242

How to move from SAP Failover to CLI Failover

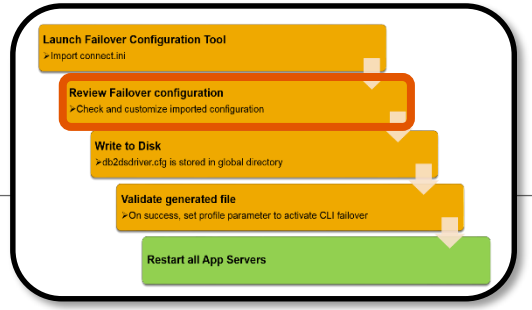


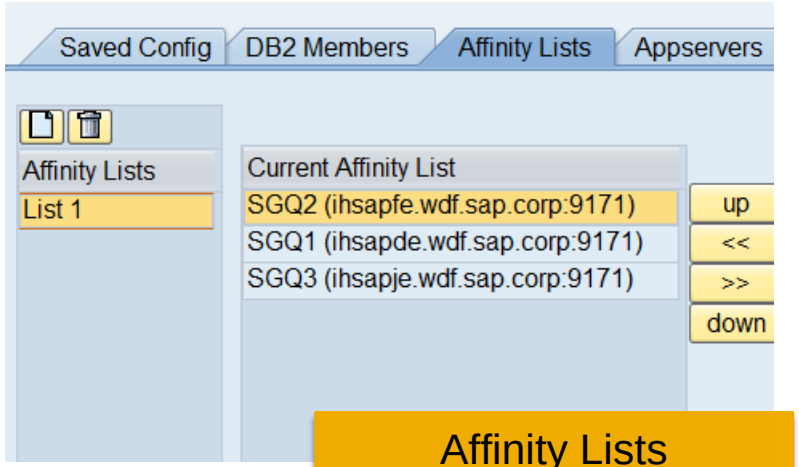
Launch Failover Configuration Tool



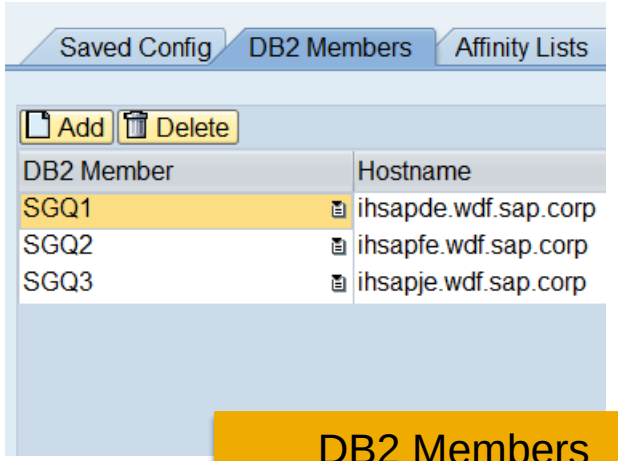


Review the Failover Configuration



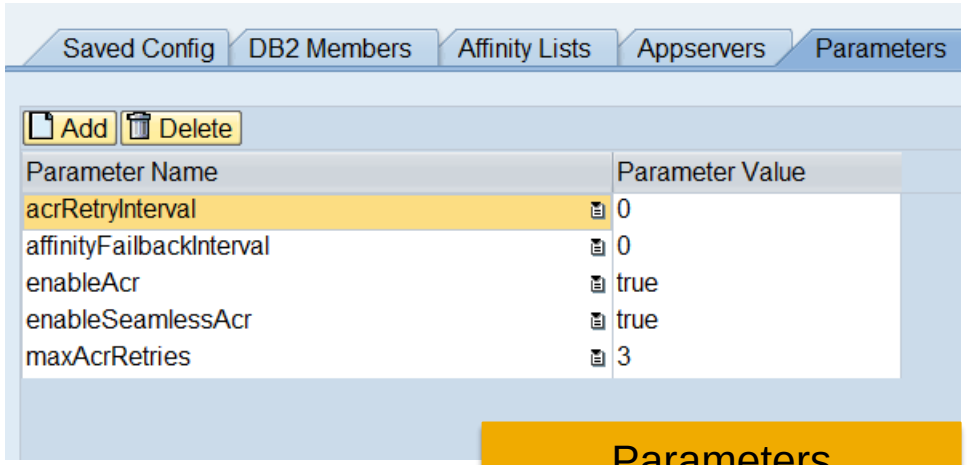


Affinity Lists

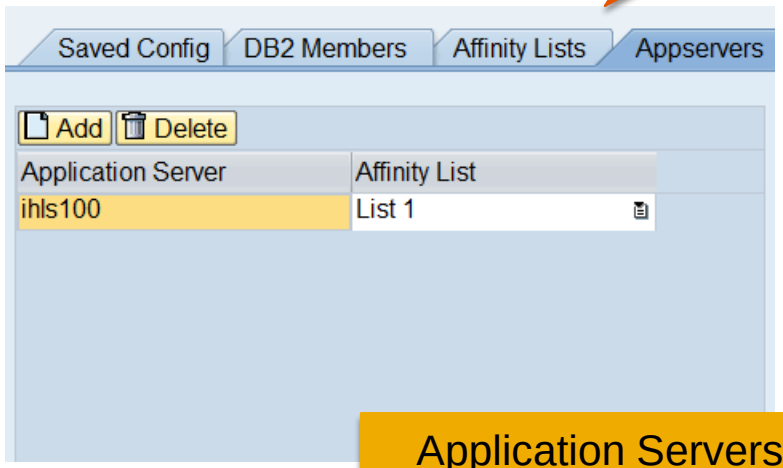


DB2 Members

There is no [DEFAULT_GROUP] like in connect.ini.
Every appserver must have an explicit affinity list assigned to it.

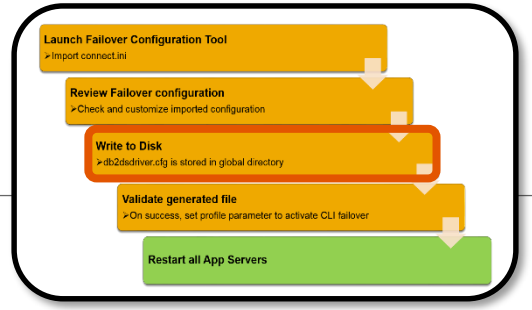


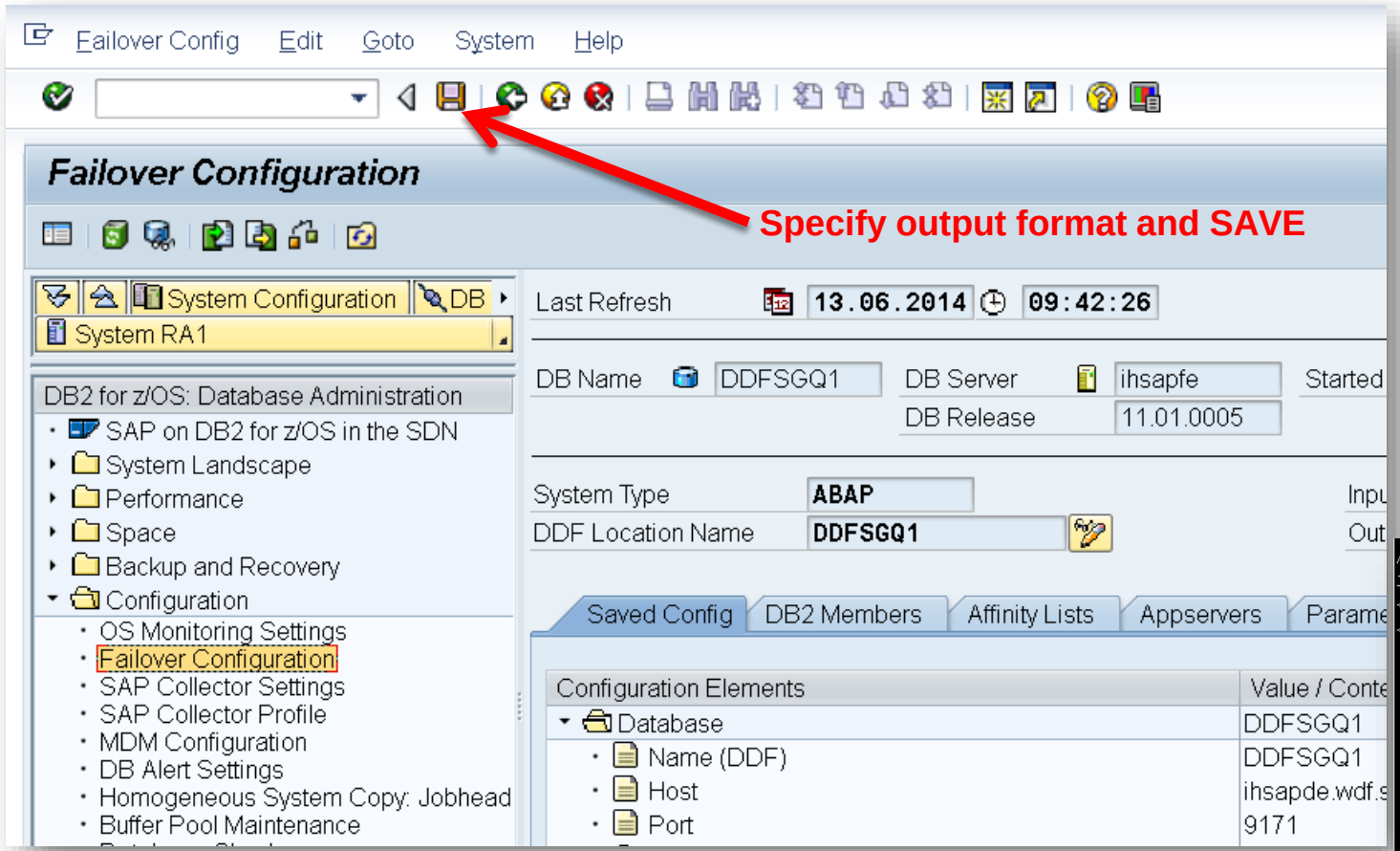
Parameters



Application Servers

Write db2dsdriver.cfg File to Disk



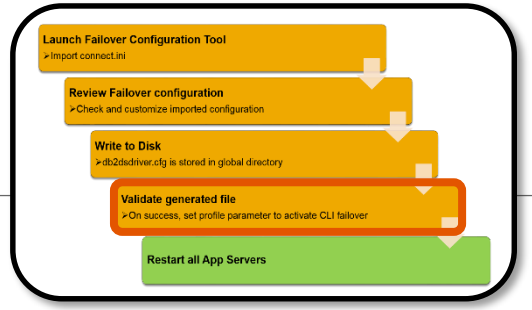


db2dsdriver.cfg:

```
/mnt/dataRA1/sapmnt.RA1/global
ihls100:ra1adm 55> cat db2dsdriver.cfg
<?xml version="1.0" encoding="utf-8"?>
<configuration>
  <dsncollection>
    <dsn alias="RA1" name="DDFSGQ1" host="ihsapde.wdf.sap.corp"
  </dsncollection>
  <databases>
    <database name="DDFSGQ1" host="ihsapde.wdf.sap.corp" port="
      <acr>
        <parameter name="acrRetryInterval" value="0"/>
        <parameter name="affinityFailbackInterval" value="0"/>
        <parameter name="enableAcr" value="true"/>
        <parameter name="enableSeamlessAcr" value="true"/>
        <parameter name="maxAcrRetries" value="3"/>
        <alternateserverlist>
          <server name="SGQ1" hostname="ihsapde.wdf.sap.corp" p
          <server name="SGQ2" hostname="ihsapfe.wdf.sap.corp" p
```

Parameter values are converted to lower case during save. Be careful with paths.

Validate db2dsdriver.cfg

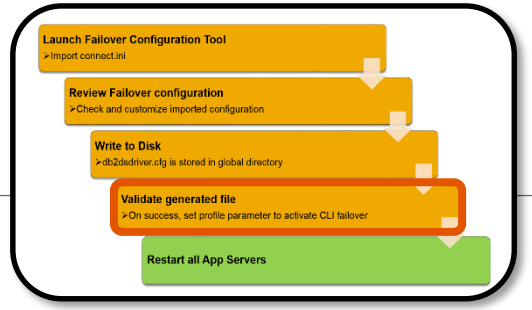


Test db2dsdriver.cfg file with program db2cli:

1. **Set temporarily in shell: DB2DSDRIVER_CFG_PATH to directory where db2dsdriver.cfg is located**
2. **Set temporarily in shell: DB2_CLI_DRIVER_INSTALL_PATH to directory where CLI driver is installed.**
3. **Validate only:**
   `$DB2_CLI_DRIVER_INSTALL_PATH/bin/db2cli validate -dsn $dbs_db2_dsn_alias`
4. **Validate and perform test connect:**
   `$DB2_CLI_DRIVER_INSTALL_PATH/bin/db2cli validate -dsn $dbs_db2_dsn_alias -connect -user <user> -passwd <password>`

```
> $DB2_CLI_DRIVER_INSTALL_PATH/bin/db2cli validate -dsn $dbs_db2_dsn_alias

=============================================================================
Client information for the current copy:
=============================================================================

Client Package Type       : IBM Data Server Driver For ODBC and CLI
Client Version (level/bit): DB2 v11.1.1.1 (special_36176/64-bit)
Client Platform           : Linux/Z64
… … …

alternate server list:

name:S1  hostname:coh1vipa.boeblingen.de.ibm.com  port:12020
name:S2  hostname:coh2vipa.boeblingen.de.ibm.com  port:12020
name:S3  hostname:coh3vipa.boeblingen.de.ibm.com  port:12020

affinity list:

name:L1  serverorder:S1,S2,S3
name:L2  serverorder:S2,S3,S1

client affinity defined:

name:C1  hostname:ihlscoh4v  listname:L1
name:C2  hostname:ihlscoh5v  listname:L2

=============================================================================
The validation is completed.
=============================================================================
```

Configure CLI Failover



<sid>adm environment

(set in .dbenv_xxx.sh/.csh file)

dbs_db2_dsn_alias=<dsn_alias>

DB2DSDRIVER_CFG_PATH=<directory>

DIR_GLOBAL

(default)

db2dsdriver.cfg

connect.ini

CLI

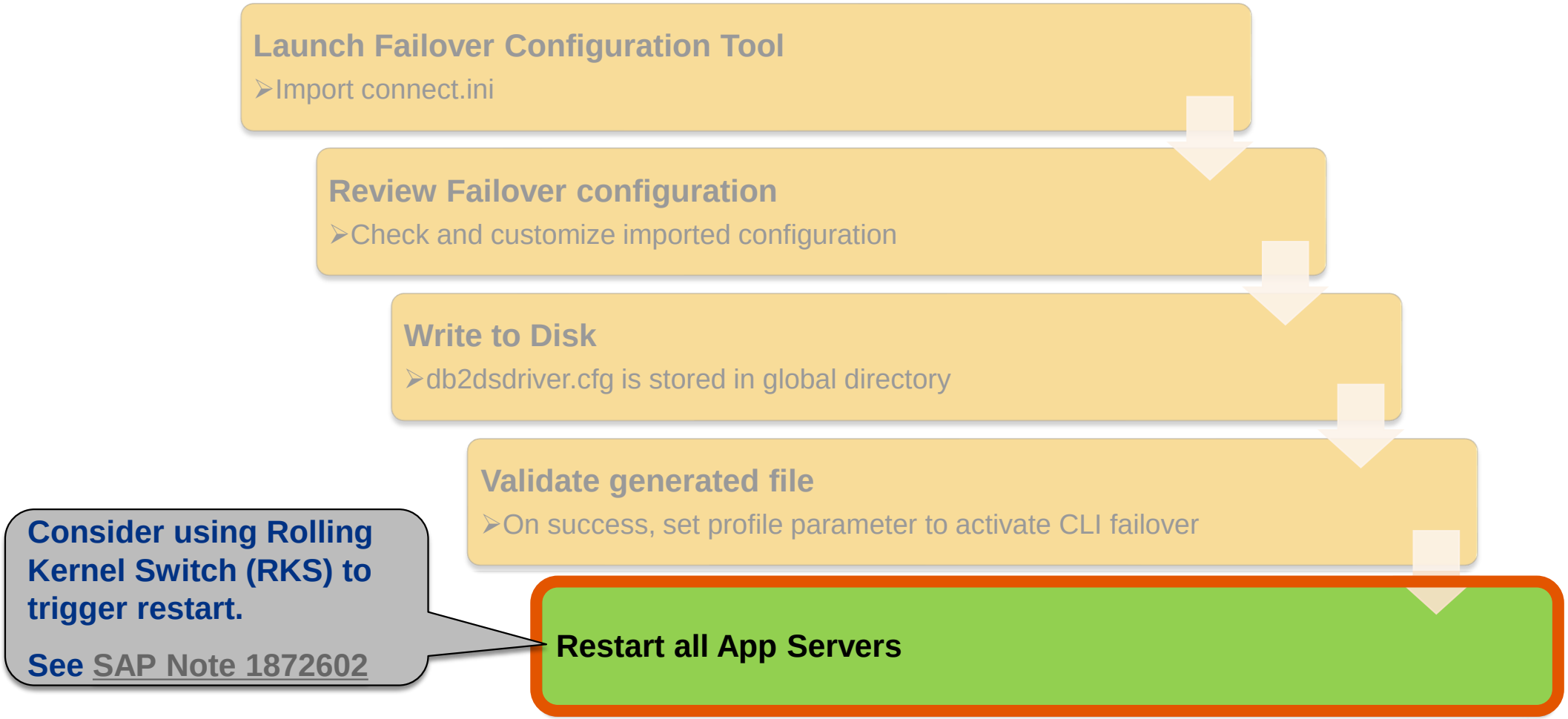
DbSI

SAP Profile

dbs/db2/dsn_alias=<dsn_alias>

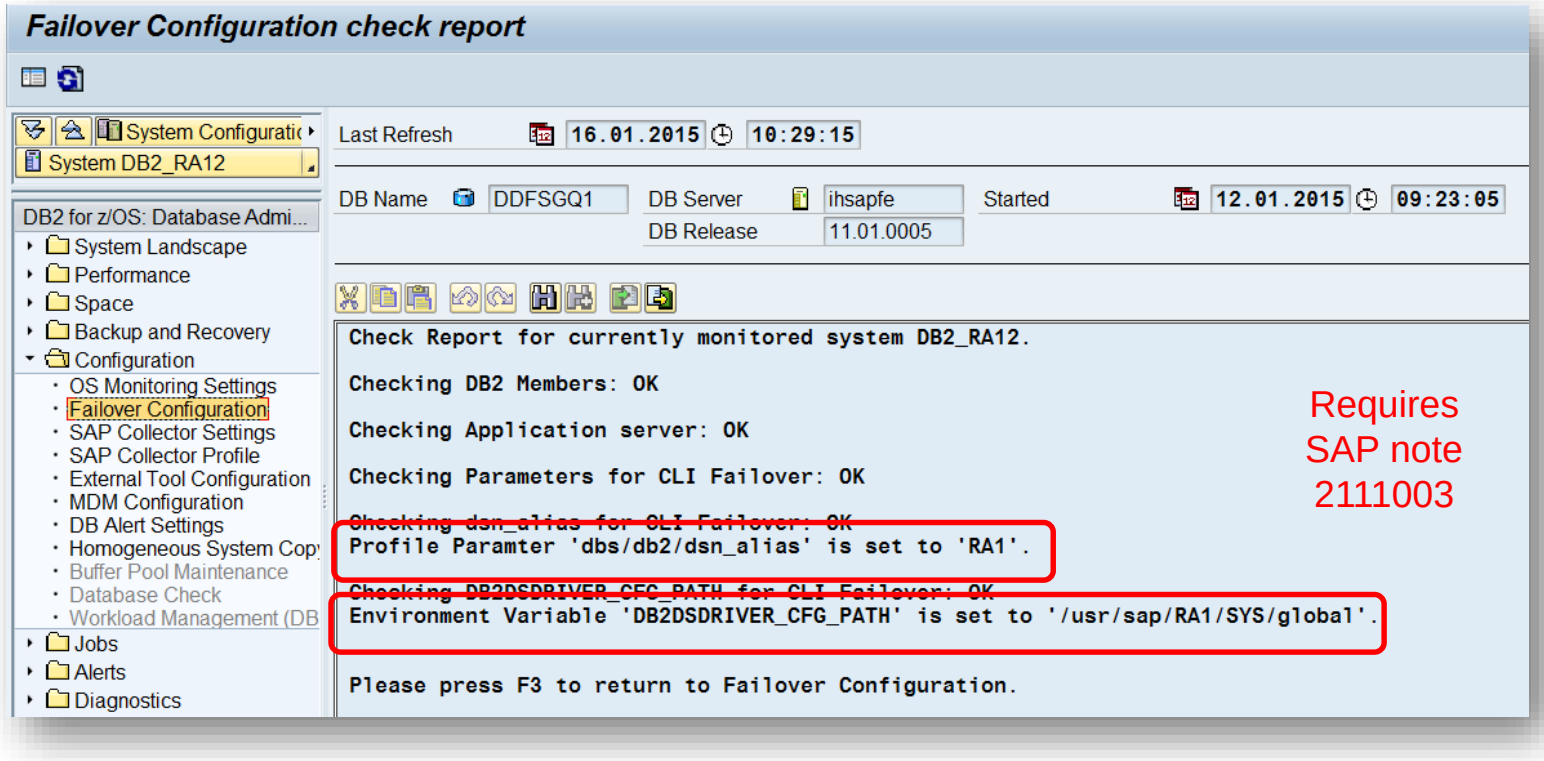
~~dbs/db2/con_profile=....~~

Restart Application Servers

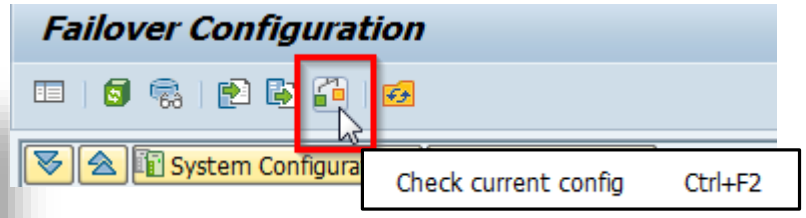


Which Failover Method is defined?

- **How to check dsn_alias and DB2DSDRIVER_CFG_PATH settings**
  - See SAP Profile for dbs/db2/dsn_alias or Environment for dbs_db2_dsn_alias
  - check environment variable DB2DSDRIVER_CFG_PATH for <sid>adm user
  - Perform “Check current config” in DBA Cockpit Failover Configuration



Requires SAP note 2111003



Which Failover Method is active?

- **Check SAP Application Server developer trace file**
  - The following string can be found in file dev_w0 if **CLI Failover** is active

```
C  DB2Trc: dbs/db2/dsn_alias is set (RA1) -> we use the DB2 Connect fail over feature
```

  - The following string can be found in file dev_w0 if **SAP Failover** is active

```
C  DB2Trc: dbs/db2/dsn_alias is not set -> we use the SAP fail over feature
```

ABAP Supported Functions

- **DBA Cockpit Failover Configuration Tool**
  - Generate a db2dsdriver.cfg file out of an existing connect.ini file and vice versa
  - Edit and reload (activate) the changed db2dsdriver.cfg file
- **Planned failover via DBA Cockpit**
  - Switch current application server to a new target DS member:
    - double-click an entry in DBA Cockpit -> Diagnostics -> DB Connections -> DB Connection List
- **Planned failover via program interface**
  - Execute ABAP Report RSDB2SWITCH
  - Call STU3_ADMIN_SWITCH_DB_CON via SAP RFC
    - Input parameter NEWDBCON is a “server name” from db2dsdriver.cfg
    - Find server name in column “Logical Name” in:

      DBA Cockpit -> Diagnostics -> DB Connections -> DB Connection List

Prerequisites to db2dsdriver.cfg File

Long database host names including domain are required by Db2 CLI driver

```
<configuration>
  <dsncollection>
    <dsn alias="RA1" name="DDFSGQ1" host="ihsapde.wdf.sap.corp" port="09171"/>
  </dsncollection>
  <databases>
    <database name="DDFSGQ1" host="ihsapde.wdf.sap.corp" port="09171">
      <acr>
        <parameter name="acrRetryInterval" value="0"/>
        <parameter name="affinityFailbackInterval" value="0"/>
        <parameter name="enableAcr" value="true"/>
        <parameter name="enableSeamlessAcr" value="true"/>
        <parameter name="maxAcrRetries" value="3"/>
        <alternateserverlist>
          <server name="SGQ1" hostname="ihsapde.wdf.sap.corp" port="09171"/>
          <server name="SGQ2" hostname="ihsapfe.wdf.sap.corp" port="09171"/>
          <server name="SGQ3" hostname="ihsapje.wdf.sap.corp" port="09171"/>
        </alternateserverlist>
```

Domain names required!

ABAP Prerequisites for Planned Failover

SAP Basis related prerequisites:

- SAP note 1973798 - DB2-z/OS:CCMS: db2dsdriver.cfg and SAPCL / DB13
- SAP note 1975716 - DB2-z/OS:CCMS: db2dsdriver.cfg and DB Connection List / RSDB2SWITCH

Db2dsdriver.cfg File Prerequisites:

- The values for parameter „server name“ in db2dsdriver.cfg need to be in UPPER CASE

```
<database name="DDFSGQ1" host="ihsapde.wdf.sap.corp" port="09171">
  <acr>
    <parameter name="acrRetryInterval" value="0"/>
    <parameter name="affinityFailbackInterval" value="0"/>
    <parameter name="enableAcr" value="true"/>
    <parameter name="enableSeamlessAcr" value="true"/>
    <parameter name="maxAcrRetries" value="3"/>
    <alternateserverlist>
      <server name="SGQ1" hostname="ihsapde.wdf.sap.corp" port="09171"/>
      <server name="SGQ2" hostname="ihsapfe.wdf.sap.corp" port="09171"/>
      <server name="SGQ3" hostname="ihsapje.wdf.sap.corp" port="09171"/>
    </alternateserverlist>
```

CLI Connection Timeouts and Failover

- If the Db2 member hostname/IP is -not- pingable/active[1], then CLI relies on timeout, when connecting or reconnecting - error “Connection timed out”
- CLI timeout parameter are not defined by default or thru SAPinst
  ➔ Operating System (OS) ‘tcp connect timeout’ hits
- Formula for Failover Time for existing SAP connections to next Db2 member:
  `(<Timeout> + acrRetryInterval) * maxAcrRetries`
  - acrRetryInterval defines the sleep time in seconds between connect retries, default is 0
  - maxAcrRetries defines how often a connect to **one** Db2 Member is attempted, default is 3
- OS ‘tcp connect timeout’ is ~125 seconds under Linux (~75 sec. AIX).
  ➔ Delay for the first successful connection to second/next Db2 member:
  - Linux: `(125 + 0) * 3 * 1 = 375 sec`
  - AIX: `(75 + 0) * 3 * 1 = 225 sec`

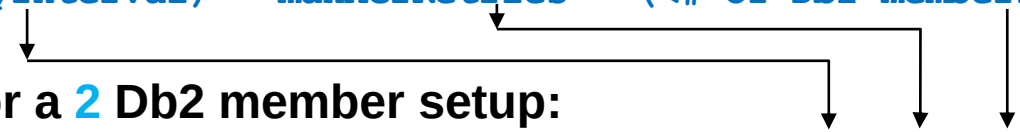
[1] and IP is forwardable by default gateway

CLI Connection Timeouts and Failover Recommendations

Set CLI timeout parameter:

- tcpipConnectTimeout to 5 (seconds)
- ConnectionTimeout to 1 + <value resulting from below formula>

```
(<Timeout> + acrRetryInterval) * maxAcrRetries * (<# of Db2 members in affinity list> - 1)
```



Recommendation for a 2 Db2 member setup:

- **Set ConnectionTimeout to 16** (seconds) = 1 + (5 + 0) * 3 * (2 - 1)

Recommendation for a 4 Db2 member setup:

- **Set ConnectionTimeout to 46** (seconds) = 1 + (5 + 0) * 3 * (4 - 1)

Setting ConnectionTimeout to smaller values as recommended results in not attempting all members for failover.

More details: See Appendix

TCP/IP KEEPALIVE Timeout

Changed default value for TCP/IP KEEPALIVE parameter

- For Db2 Connect 10.1 or higher the default is 15 seconds
- SQL error -30081 may occur in high load situations

➢ Consider explicitly setting **DB2TCP_CLIENT_KEEPALIVE_TIMEOUT** or **keepAliveTimeout** to avoid this error

For recommendations and details see SAP Note 2082467 - DB2-z/OS: TCP/IP timeout hit for communication between DB2 client and DB2 server

Additional recommended SAP Profiles changes

Db2 server has per default a hourly recycling of the Db2 threads

- If this periodic recycling of Db2 threads –is- desirable:
  - Remove from SAP Profile:
    rdisp/wp_auto_restart

- If this periodic recycling of Db2 threads –is NOT- desirable:
  - Proceed as follows:
    Issue the following Db2 commands, which are introduced with Db2 12. These commands change the recycle frequency to 1500 minutes:

    MODIFY DDF KDRMUSED(1500)
    MODIFY DDF KDRMIDLE(1500)

    Set rdisp/wp_auto_restart = 86400

    With this configuration, the SAP work processes are recycled before DDF recycles threads.

See https://help.sap.com/viewer/db2_administration_guide/6866ef6c07394a139590c10bc16ab797.html

CLI Failover and Virtual Application Server host names

- Environment variable `SAPLOCALHOST`
  - no longer needed for support of virtual host names - it was needed for connect.ini
- Use virtual application server host names in client affinity definition in db2dsdriver.cfg
- CLI driver maps virtual host names to the physical host, on which the virtual host name is defined, and assigns the correct affinity list to the SAP application server.

```
 <affinitylist>
  <list name="l1" serverorder="SZ81,SZ82" />
  <list name="l2" serverorder="SZ82,SZ81" />
</affinitylist>
<clientaffinitydefined>
  <client name="APP1" hostname="ihlscoh5v" listname="l1" />
  <client name="APP2" hostname="ihlscoh4v" listname="l2" />
</clientaffinitydefined>
```

Real host names are ‘ihlscoh5’ and ‘ihlscoh4’

- Note: In case of a wrong hostname you get the following error message:

```
SQL5163N  A required configuration parameter "a qualifying client in affinity group" is
missing from the db2dsdriver.cfg configuration file.
```

CLI Failover and Virtual Application Server host names

- Special case: Multiple Application Server instances on the same host with different affinity lists for each instance:

  Assume there are 3 Application Server instances (APP1,2 and 3) and 3 network interfaces. The hostname is ihls100 for example and 3 additional hostnames ihls100**0**, ihls100**1** and ihls100**2** are defined in /etc/hosts per network interface:

  192.168.216.100 ihls100**0**
  192.168.217.100 ihls100**1**
  192.168.218.100 ihls100**2**

  1. Add the following definition for the DB2DSDRIVER client hostname in each SAP Application Server instance profile:
     `SETENV_xx = DB2DSDRIVER_CLIENT_HOSTNAME=<virtual hostname>`
     where xx is the next free number in the instance profile for SETENV_nn statements.
     The `DB2DSDRIVER_CLIENT_HOSTNAME` should be set to the hostname of the interface it should use to communicate with a specific Db2 Data Sharing member. For example:
     `SETENV_08 = DB2DSDRIVER_CLIENT_HOSTNAME=ihls1000`
  2. Adapt the db2dsdriver.cfg and define for each Application Server an affinity as shown:

```
<clientaffinitydefined>
  <client name="APP1" hostname="ihls1000" listname="l1" />
  <client name="APP2" hostname="ihls1001" listname="l2" />
  <client name="APP3" hostname="ihls1002" listname="l3" />
</clientaffinitydefined>
```

  3. For R3trans (and other utilities) the environment of <sapsid>adm must be changed and one of the hostnames must be defined as client hostname. Add in .dbenv.csh for example:
     `setenv DB2DSDRIVER_CLIENT_HOSTNAME ihls1000`
     and in .dbenv.sh for example:
     `DB2DSDRIVER_CLIENT_HOSTNAME = ihls1000; export DB2DSDRIVER_CLIENT_HOSTNAME`

Thank You!

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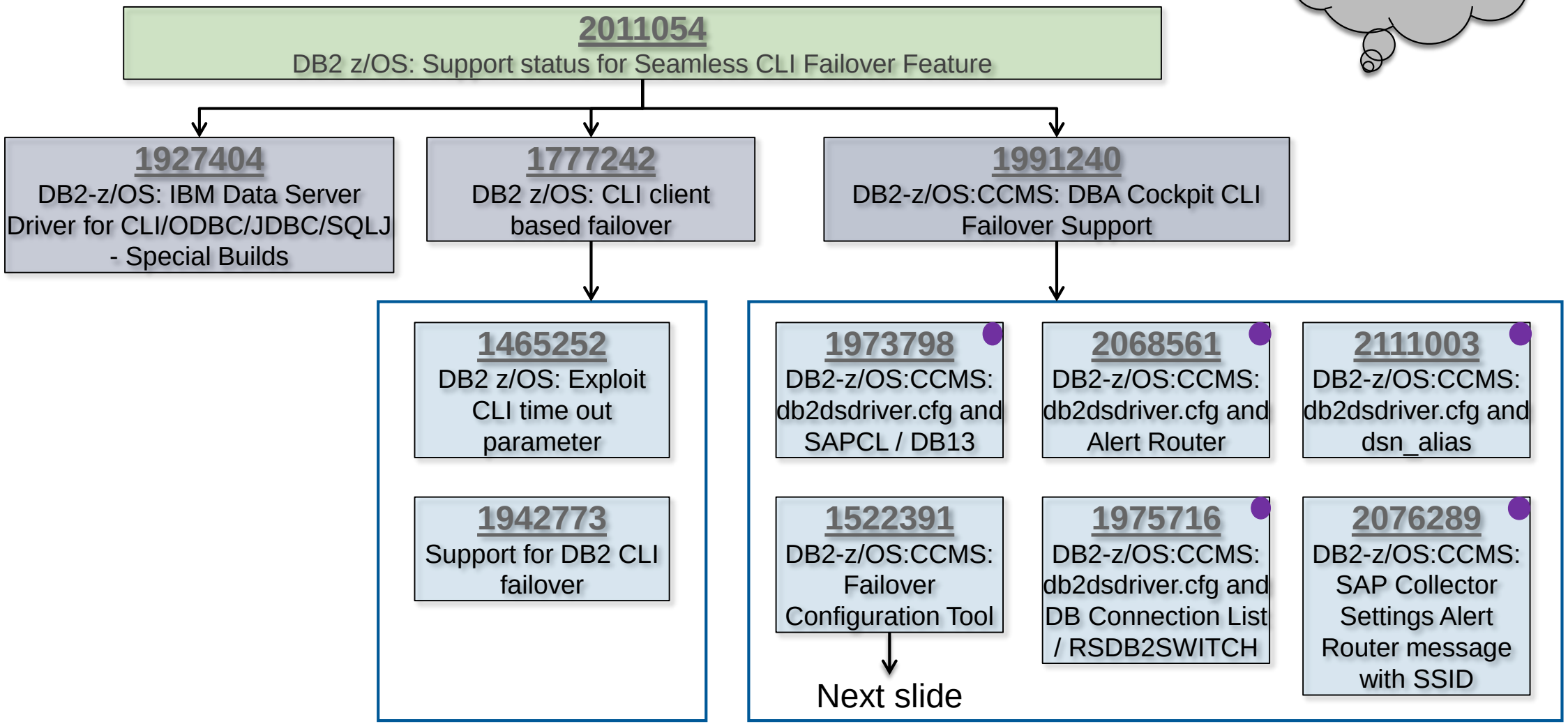
Appendix

SAP Notes for CLI Failover - Details



SAP Notes for CLI Failover – Details (cont.)

From previous slide →

1522391 DB2-z/OS:CCMS: Failover Configuration Tool

1931595 DB2-z/OS:CCMS: Failover Configuration Tool - Parameter Names

1993249 DB2-z/OS:CCMS: Failover Configuration Tool - Error non-ABAP system

2007164 DB2-z/OS:CCMS: Failover Configuration Tool - Short dump

2013417 DB2-z/OS:CCMS: Failover Configuration Tool - Upper case hostnames

2033045 DB2-z/OS:CCMS: Failover Configuration Tool - Path of db2dsdriver.cfg

2061431 DB2-z/OS:CCMS: Failover Configuration Tool - Error Invalid value

2115470 DB2-z/OS:CCMS: Failover Configuration Tool - Could not write /db2dsdriver.cfg

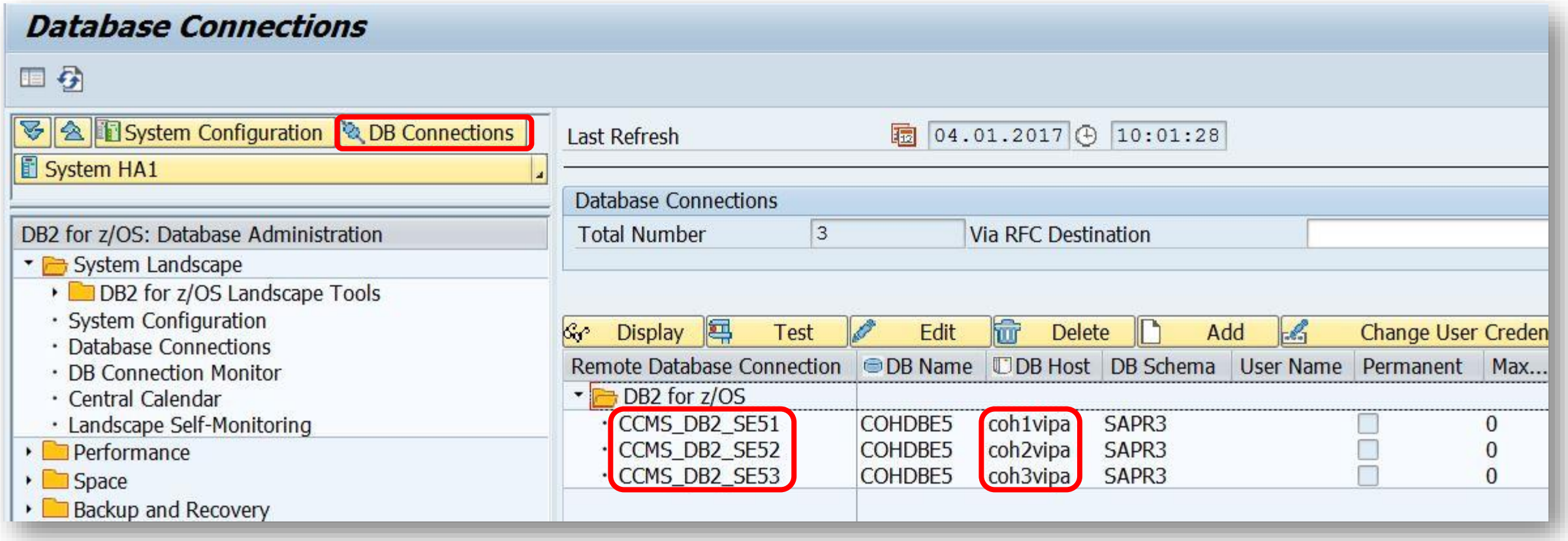
2201230 DB2-z/OS:CCMS: Failover Configuration Tool - Export missing Newline

2201432 DB2-z/OS:CCMS: Failover Configuration Tool - Processing connect.ini

2348707 DB2-z/OS:CCMS: Failover Configuration Tool - RSDB2SWITCH ends with timeout

Alert Router Setup - DBCON Connections

- Review DBA Cockpit -> DB Connections with Name CCMS_DB2_*
  - Check that database host names in DBCON do not include the domain name



Alert Router Setup - DBCON host names

- Database host names in db2dsdriver.cfg have to include the domain name
- Database host names in CCMS_DB2_* DBCON connections do not include the domain name
- See SAP Note 2068561 - DB2-z/OS:CCMS: db2dsdriver.cfg and Alert Router
- Reason:
  - CCMS_DB2_* DBCON connections are used to start and stop the Alert Router
  - One Alert Router serves one and only one specific Db2 data sharing member and therefore Automatic client reroute (ACR) of the CLI driver must not happen during start and stop of the Alert Router
  - ACR does not take place if CCMS_DB2_* DBCON host name and db2dsdriver.cfg host names differ
  - A CCMS_DB2_* DBCON short host name and the fully qualified host names of db2dsdriver.cfg fulfill this requirement, although they point to the same host

CLI Connection Timeouts and Failover

- If the Db2 member hostname/IP is -not- pingable/active[1], then CLI relies on timeouts, when connecting or reconnecting - error “Connection timed out”
- CLI timeouts are defined differently:
  - For establishing a new Application connection (like R3trans/AppServer start) the timeout is defined for the application by setting
    → **ConnectionTimeout** CLI parameter, which defines the maximum time allowed to establish a connection (corresponds to SQL_ATTR_LOGIN_TIMEOUT); details
  - For an established/existing connection (like an established SAP Application Server connection to Db2 DDF) the timeout to reconnect is defined for CLI by setting
    → **tcpipConnectTimeout** CLI parameter, which defines the maximum time allowed for opening a socket; details
- Rules:
  - If tcpipConnectTimeout is not explicitly set, it takes the value of ConnectionTimeout
  - tcpipConnectTimeout must be less than ConnectionTimeout

[1] and IP is forwardable by default gateway

CLI Connection Timeouts and Failover con't

- db2dsdriver.cfg defines for each SAP Application Server the sequence of Db2 members to try to connect to (affinity list)
- maxAcrRetries defines how often a connect to **one** Db2 Member is attempted, default is 3
- acrRetryInterval defines the sleep time in seconds between connect retries, default is 0

Formula for Failover Time for existing SAP connections to next Db2 member:

```
(<Timeout> + acrRetryInterval) * maxAcrRetries
```

where <Timeout> is ConnectionTimeout or tcpipConnectTimeout or OS-level 'tcp connect timeout' (if neither CLI parameter is defined)
Remember: <Timeout> is 0, if the connection request is directly refused, for example, if hostname/IP is active but Db2 member is down.

Formula for Failover Time for new Application connection to next Db2 member:

Same as above, BUT failover happens ONLY, if tcpipConnectTimeout is set and the following condition is satisfied:

```
(tcpipConnectTimeout * maxAcrRetries) < ConnectionTimeout
```

CLI Connection Timeouts and Failover samples

- **Worst case:** Of <n> Db2 members <n>-1 are not pingable, only the last one in the affinity list. The time to establish a SAP connection to this 'last' Db2 member is:

  `(<Timeout> + acrRetryInterval) * maxAcrRetries * (<# of Db2 members in affinity list> - 1)`

  ➔ `Set ConnectionTimeout to above value + 1`

- Example '2-way' data sharing system and the first Db2 member hostname is **not** pingable:
  - Case 1: No CLI timeout parameter set:
    → the OS level 'tcp connect timeout', for example about 125 sec. under Linux, causes a long delay for the first successful connection to second Db2 member: `(125 + 0) * 3 * 1 = 375 sec (75/225 sec AIX)`
  - Case 2: ConnectionTimeout/ SQL_ATTR_LOGIN_TIMEOUT set to 15 sec:
    → the first successful connection to second Db2 member: `(15 + 0) * 3 * 1 = 15 sec for existing connections BUT no failover to second member for new connections (tcpipConnectTimeout is implicitly set to 15 sec)`
  - Case 3: ConnectionTimeout set to 16 sec and tcpipConnectTimeout set to 5 sec:
    → the first successful connection to second Db2 member: `(5 + 0) * 3 * 1 = 15 sec (< 16 sec)`
  - Case 4: ConnectionTimeout set to 10 sec and tcpipConnectTimeout set to 5 sec:
    → `no failover to second member at all`: `(5 + 0) * 3 * 1 = 15 sec (> 10 sec)`
- Example '2-way' data sharing system and first Db2 member hostname **is** pingable: `(0 + 0) * 3 * 1 = 0 sec`

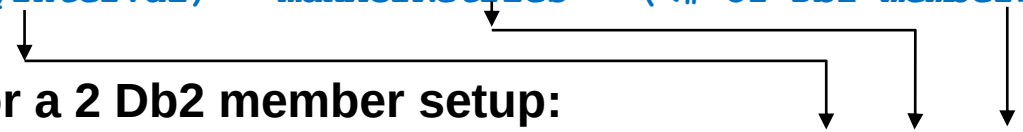
Note:

SAPinst does **not** insert a value for either `ConnectionTimeout` or `tcpipConnectTimeout`.
See the SAP Database Administration Guide for the CLI parameter values that SAP installation inserts into db2dsdriver.cfg.

CLI Connection Timeouts and Failover Recommendations

1. **Set tcpipConnectTimeout to 5 (seconds)**
2. **Set ConnectionTimeout to 1 + <value resulting from below formula>**

```
(<Timeout> + acrRetryInterval) * maxAcrRetries * (<# of Db2 members in affinity list> - 1)
```



Recommendation for a 2 Db2 member setup:

- **Set ConnectionTimeout to 16** (seconds) = 1 + (5 + 0) * 3 * (2 - 1)
- **Set tcpipConnectTimeout to 5** (seconds)

Recommendation for a 4 Db2 member setup:

- **Set ConnectionTimeout to 46** (seconds) = 1 + (5 + 0) * 3 * (4 - 1)
- **Set tcpipConnectTimeout to 5** (seconds)

Setting ConnectionTimeout to smaller values as recommended results in not attempting all members for failover.

SAP Failover vs. CLI Failover Timeout Parameters

Semantic changed for pcon_timeout and scon_timeout

SAP Profile Parameter
db2dsdriver.cfg Parameter

Setting for	SAP Failover	CLI Failover
Number of retries per DS Member	rsdb/reco_trials	maxAcrRetries
Sleep time between retries	rsdb/reco_sleep_time	acrRetryInterval
Individual time per connection attempt for SAP primary connection	dbs/db2/pcon_timeout	ConnectionTimeout
Individual time per connection attempt for SAP secondary connection	dbs/db2/scon_timeout	ConnectionTimeout
Maximum time to establish a SAP primary connection	Results out of the above parameter	(tcpipConnectTimeout+acrRetryInterval)*maxAcrRetries*(# of Db2 members -1)
Maximum time to establish a SAP secondary connection	Results out of the above parameter	(tcpipConnectTimeout+acrRetryInterval)*maxAcrRetries*(# of Db2 members -1)

Failover Timeout Parameter Defaults and Behavior

SAP Profile Parameter
db2dsdriver.cfg Parameter

Parameter Name	Value set by SAP AppServer installation	Comment
maxAcrRetries rsdb/reco_trials	3 3	CLI Failover SAP Failover
acrRetryInterval rsdb/reco_sleep_time	0 5	CLI Failover SAP Failover
affinityFailbackInterval	300 (for ABAP AS) 300 (for Java AS)	Automatic failback attempted every 300 seconds. If you want to control failover for ABAP via SAP DBA Cockpit or ABAP report RSDB2SWITCH, it needs to be set to 0.
ConnectionTimeout	not set (default: 0 second)	Recommendation: Set to 16 (seconds) for 2 member setup, 46 (seconds) for 4 member setup
tcpipConnectTimeout	not set (default: 0 second)	Recommendation: Set to 5 (seconds) ConnectionTimeout must be set greater than (tcpipConnectTimeout * maxAcrRetries), so that there is time to complete all the maxAcrRetry attempts for a member.

Migrating Connection Timeout settings from SAP Failover to CLI Failover

If: you previously used SAP Failover and SAP profile parameters:

- dbs/db2/pcon_timeout
- dbs/db2/scon_timeout

to set timeouts for DB connection attempts of primary and secondary DB connections,

Then: switching to CLI Failover you should:

- Set **tcpipConnectTimeout** and **ConnectionTimeout** in db2dsdriver.cfg to the recommended values as described on page 36 or
- Set **ConnectionTimeout** in db2dsdriver.cfg to the value of pcon_timeout or scon_timeout and
  - Set **tcpipConnectTimeout** in db2dsdriver.cfg to the value resulting from:
    tcpipConnectTimeout <= (((**ConnectionTimeout** - 1) / (<# of Db2 members in affinity list> - 1)) / maxAcrRetries) - acrRetryInterval
- Remove pcon_timeout and scon_timeout parameters from SAP profile

For details on pcon_timeout and scon_timeout parameters
see SAP note 1465252 - DB2 z/OS: Exploit CLI time out parameter

ABAP Support Availability

- **ABAP support including DBA Cockpit Failover Configuration Tool is shipped in the following SAP Basis Support Packages:**
  - 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
  - 7.50 Base Release
- **For details see SAP note 1991240 - DB2-z/OS:CCMS: DBA Cockpit CLI Failover Support**