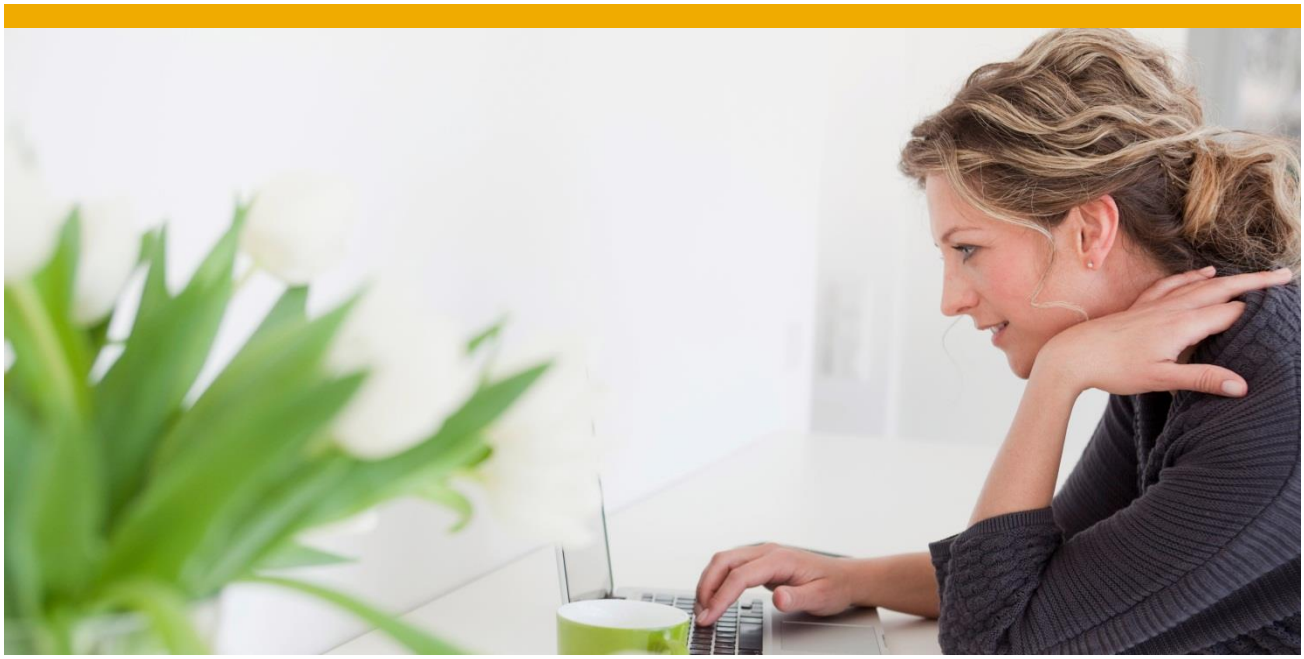

SAP Business Application Accelerator supported by DB2 for z/OS and the IBM DB2 Analytics Accelerator

Document version 1.10 – 2015-03-20

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The **IBM DB2 Analytics Accelerator (DB2 Accelerator)** is a workload-optimized appliance add-on to DB2 for z/OS that accelerates SQL queries with unprecedented response time. This documentation demonstrates how the DB2 Accelerator can be exploited to boost SAP business applications. See SAP Note 2146293 for information about prerequisites and setup.

1 DESIGN PRINCIPLE

The approach described in this document is based on the **SAP Business Application Accelerator (BAA)** concept, formerly known as Redirected Database Access (RBA), which comes with add-on SWT2DB. Basically this feature redirects certain queries to replicated tables in a secondary database according to a scenario. Using BAA with the DB2 Accelerator dramatically increases performance of long-running queries without the need to change the ABAP source code.

The SAP Business Application Accelerator was originally introduced to support accelerated data access powered by HANA in a side-by-side configuration. Individual BAA scenarios, identified by table, program and job name, must be defined and implemented. Queries that apply to these scenarios are not executed on the primary database but get re-directed to the SAP HANA database using a secondary database connection.

The same technique is used with DB2 and the DB2 Accelerator. The secondary database connection is setup such that it connects to the primary DB2 database, but allows offload to the DB2 Accelerator. See Figure 1 for the design principle.

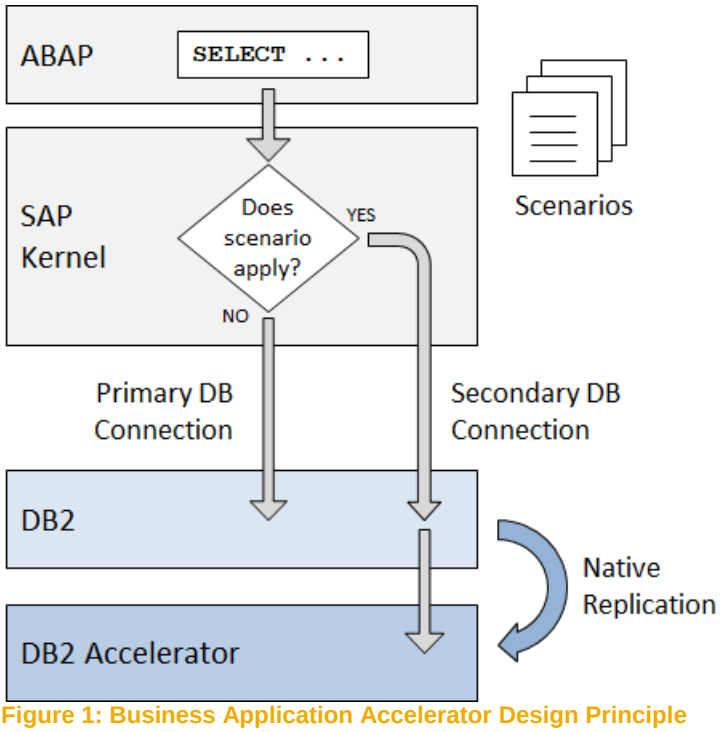

Figure 1: Business Application Accelerator Design Principle

To learn more about BAA see SAP Note 1694697. In particular, read the *Customer Guide* that is attached to the SAP note. Although the documentation refers to HANA only, it is mostly valid also with BAA supported by the DB2 Accelerator. The chief difference is the replication methodology that is used. With HANA, SAP's System Landscape Transformation (SLT) is required whereas with the DB2 Accelerator the available native replication techniques are utilized.

The SAP Business Application Accelerator can be exploited with custom programs. In addition, SAP provides scenarios that can be used with some standard programs. See SAP Note 1919094 for a list of these standard scenarios.

2 EXAMPLE

The exploitation of BAA with the DB2 Accelerator is illustrated by a simple example that is introduced in this section. This example is referred to throughout this documentation.

2.1 ABAP Sample Code

The ABAP program `Z_ANALYSIS` compiles a list that shows revenue per plant of controlling area 2000 in 2010. Please note that this report is used for education purposes only, it does not provide any reasonable business value.

```
report z_analysis.

data:
  begin of l_s_analysis,
    plant   type ce1idea-werks,
    items   type i,
    revenue type ce1idea-vv010,
  end of l_s_analysis,
  l_t_analysis like standard table of l_s_analysis.

select ce1~werks         as plant
       count( * )        as items
       sum( ce1~vv010 ) as revenue
  into table l_t_analysis
  from ce1idea as ce1
       inner join
       ce4idea as ce4
       on
       ce1~paobjnr = ce4~paobjnr and
       ce1~pasubnr = ce4~pasubnr
 where ce4~kokrs = '2000' and
       ce1~gjahr = '2010'
 group by ce1~werks.

loop at l_t_analysis into l_s_analysis.
  write: / l_s_analysis-plant, l_s_analysis-items,
           l_s_analysis-revenue.
endloop.
```

Figure 2: Code of sample ABAP report Z_ANALYSIS

2.2 Running ABAP Sample Code Without Acceleration

The ABAP sample code performs a join of two tables. Table `CE1IDEA` has approximately 120 million records, while table `CE4IDEA` has approximately 1.6 million records. Since an index exists neither on the join columns nor on the filter columns, the database needs to perform huge table scans when executing the query. The SQL trace (`ST05`) shows a query runtime of more than 18 minutes (1111 seconds).

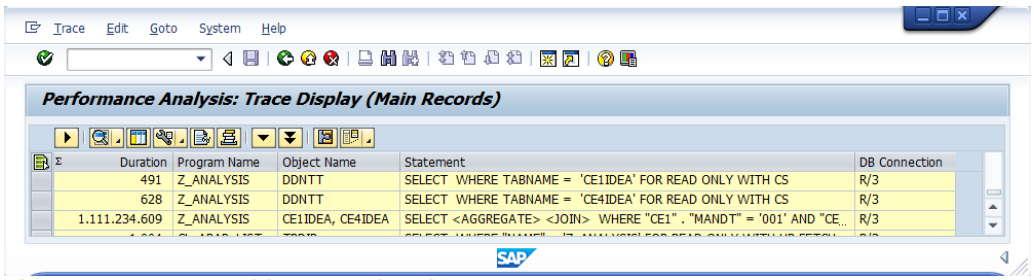

Figure 3: SQL trace without acceleration

3 SETTING UP BAA FOR THE DB2 ACCELERATOR

3.1 Prerequisite Software Levels

Before the BAA feature can be used, the SAP Business Application Accelerator add-on **SWT2DB** needs to be installed. See SAP Note 1696402 for more information and prerequisites.

In addition, you need to install kernel version 7.21 if the system runs on SAP basis 7.0x or 7.3x. Apply a kernel patch level according to SAP Note 1755992 to make sure it supports query acceleration on secondary database connections.

If the system runs on SAP NetWeaver 7.40, kernel version 7.40 needs to be installed. See SAP note 1949508 for the required patch level.

Furthermore the latest DB2 Accelerator support as of SAP Note 1801132 must be applied.

The following SAP profile parameter must be set on all application servers that are utilized for BAA:
`rsdb/rda = on`

Note that this is a global parameter that enables re-direction. Actual re-direction only takes place for certain defined scenarios as shown in the later sections. In addition, check the documentation of this parameter in transaction RZ11 for the type of SQL statements that will be re-directed.

3.2 Setting up a Secondary Database Connection

To create a secondary database connection that points to the primary database but allows query offload to the DB2 Accelerator, proceed as follows:

1. Call transaction `DB2ACCEL`.
2. Select *Extras* → *Add application*.
3. A dialog screen appears. Specify an appropriate *DB Connection Name*, for example `DB2_ACCELERATOR`, and click *Create*. The entries that are needed to specify a secondary database connection for DB2 Accelerator access are inserted into table `DBCON`. A green light next to the *Check* button indicates that no error has occurred and thus the connection can be used.

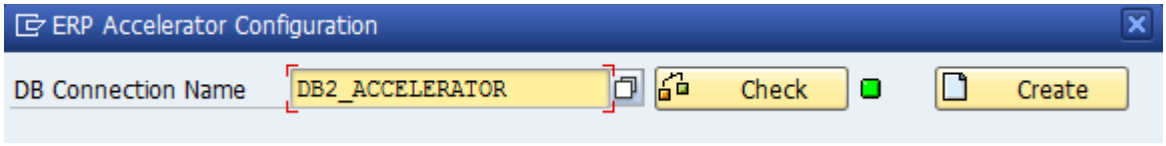

Figure 4: Secondary database connection to the DB2 Accelerator

4 CONFIGURING THE SCENARIO

4.1 Creating the Scenario Definition File

The BAA approach relies on so-called scenarios. A scenario consists of a set of context items. A context item is defined as a triple of table name (TABNAME), main program (MAINPROG), and job name (JOBNAME). You can either specify TABNAME only, or TABNAME and MAINPROG, or TABNAME, MAINPROG and JOBNAME. It is not allowed to specify JOBNAME without MAINPROG, or MAINPROG without TABNAME.
A scenario is described in an xml file. You need to choose a scenario name in the Z* namespace. MAINPROG must be a program in the customer namespace. If MAINPROG is not specified, TABNAME must be in the customer namespace. Otherwise the scenario is considered a modification and will not be supported by SAP.
The long running query in ABAP sample program Z_ANALYSIS accesses tables CE1IDEA and CE4IDEA. Figure 5 shows scenario definition file analysis_scenario.xml, which is used to accelerate the sample program.

```
<?xml version="1.0" encoding="utf-8"?>
<asx:abap version="1.0" xmlns:asx="http://www.sap.com/abapxml">
 <asx:values>
  <FORMAT_VERSION>1</FORMAT_VERSION>
  <SCENARIO>
   <NAME>Z_ANALYSIS_SCENARIO</NAME>
   <VERSION>1</VERSION>
   <DESCRIPTION>My analysis</DESCRIPTION>
   <CONTEXT>
    <ITEM>
     <TABNAME>CE1IDEA</TABNAME>
     <MAINPROG>Z_ANALYSIS</MAINPROG>
     <JOBNAME></JOBNAME>
    </ITEM>
    <ITEM>
     <TABNAME>CE4IDEA</TABNAME>
     <MAINPROG>Z_ANALYSIS</MAINPROG>
     <JOBNAME></JOBNAME>
    </ITEM>
   </CONTEXT>
  </SCENARIO>
 </asx:values>
</asx:abap>
```

Figure 5: RDA scenario definition XML file analysis_scenario.xml

Do not use lower case letters for xml tags; otherwise the SAP program might fail to parse the file correctly when it is uploaded.

4.2 Uploading the Scenario

To upload the scenario, you need to call ABAP report RDA_MAINTAIN. Select *Upload Scenario*, specify *XML File* and click *execute* (or press F8). Figure 6 shows the corresponding parameter screen.
Check table RDA_CONTEXT for all context items of the uploaded scenario.

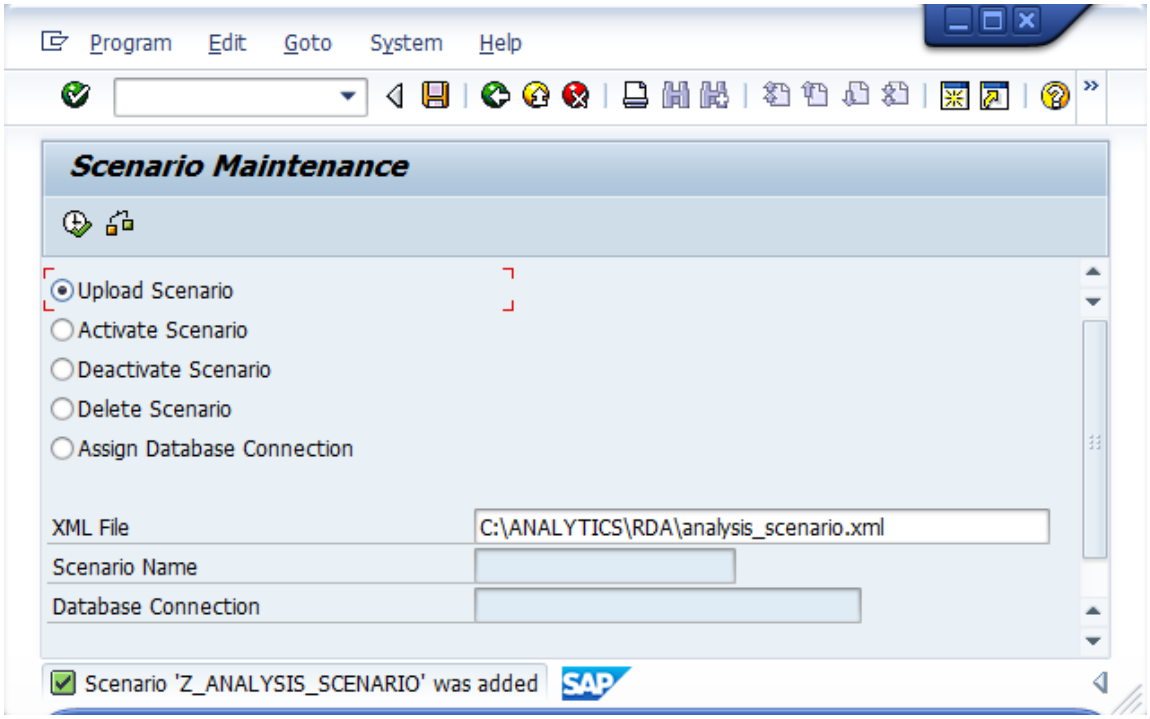

Figure 6: ABAP program RDA_MAINTAIN, Upload Scenario

4.3 Setting Connection for the Scenario

You must assign a secondary database connection to the scenario. To do so, call ABAP report `RDA_MAINTAIN`. Select *Assign Database Connection*, enter *Scenario Name* and *Database Connection* (use field help). You need to specify the database connection that has been created in section 3.2. Click *execute* (or press F8) afterwards. See also Figure 7.

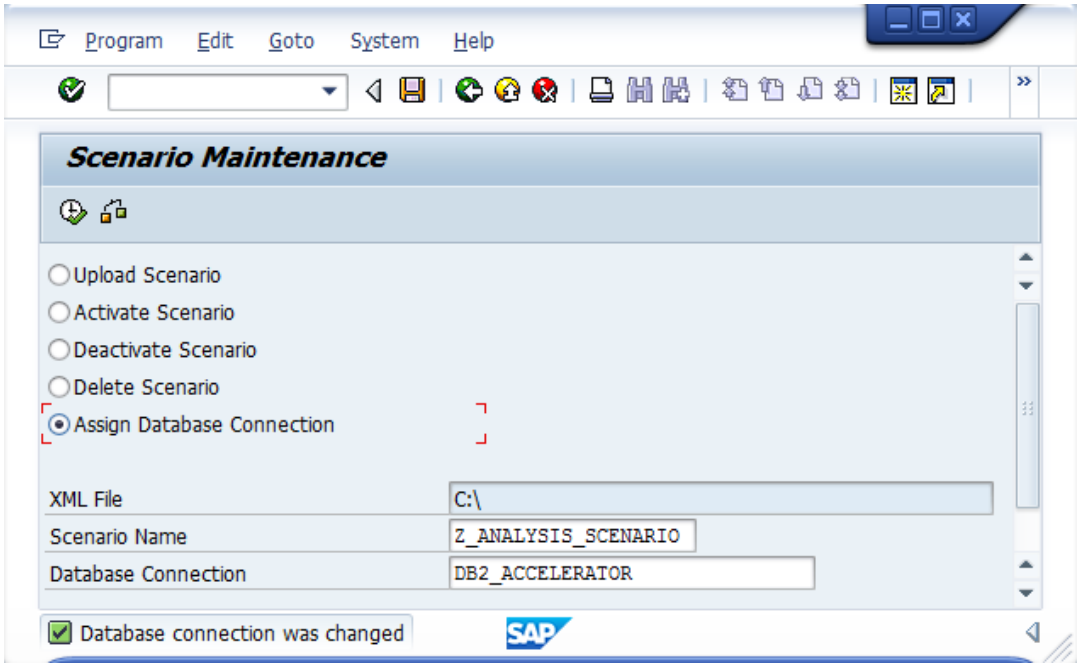

Figure 7: ABAP report RDA_MAINTAIN, Assign Database Connection

4.4 Loading Scenario Tables to the DB2 Accelerator

BAA is supported by the IBM DB2 Analytics Accelerator Control Center (transaction `DB2ACCEL`). To add all tables that belong to a scenario to the DB2 Accelerator and to load these tables, proceed as follows:

1. Call transaction `DB2ACCEL`.
2. Select menu item *Extras → Add application*.
3. Expand tree node *Business Appl Accelerator* to see all available BAA scenarios.
4. Mark your scenario and click button *Add application tables*. A green checkmark icon beside the scenario name indicates that all relevant tables have been successfully added to the DB2 Accelerator, see also Figure 8.
5. Click the green checkmark button (*Enter*) to close the dialog screen. Afterwards you find the scenario under tree node *[Enterprise Resource Planning] → Business Application Accelerator*, see Figure 9.
6. If you want to activate an incremental update, mark the scenario and select *Start replication* from the context menu. As a prerequisite, *Replication* must be *STARTED* for the database.
7. Mark the scenario and select *Load* from the context menu or click the respective tool bar button to schedule initial load to the DB2 Accelerator of the scenario tables.

After the load job has finished you should click *Refresh status*. The status icon will turn green if the data has been loaded to the DB2 Accelerator successfully and thus is consistent.
For more information about the IBM DB2 Analytics Accelerator Control Center, see the documentation *SAP NetWeaver Business Warehouse on DB2 z/OS and IBM DB2 Analytics: User's Guide*, which is attached to SAP Note 1861115.

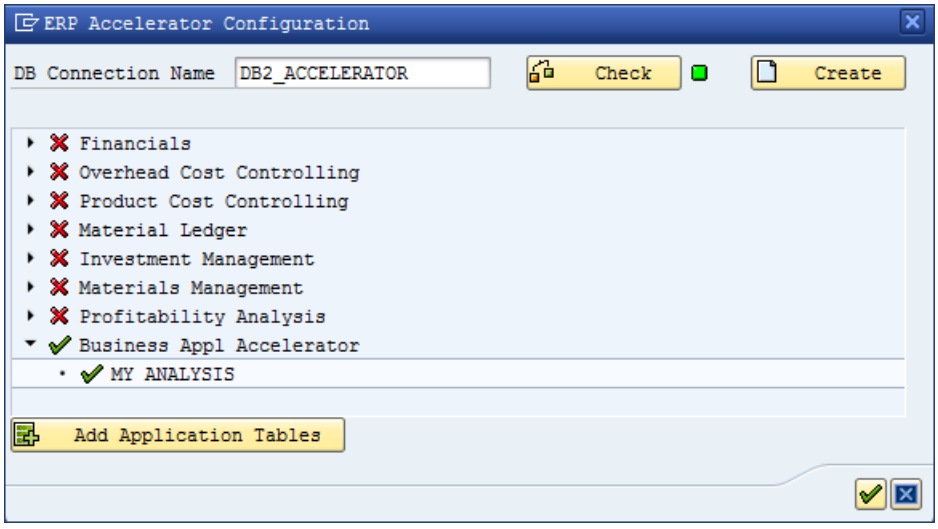

Figure 8: IBM DB2 Analytics Accelerator Control Center, add application tables

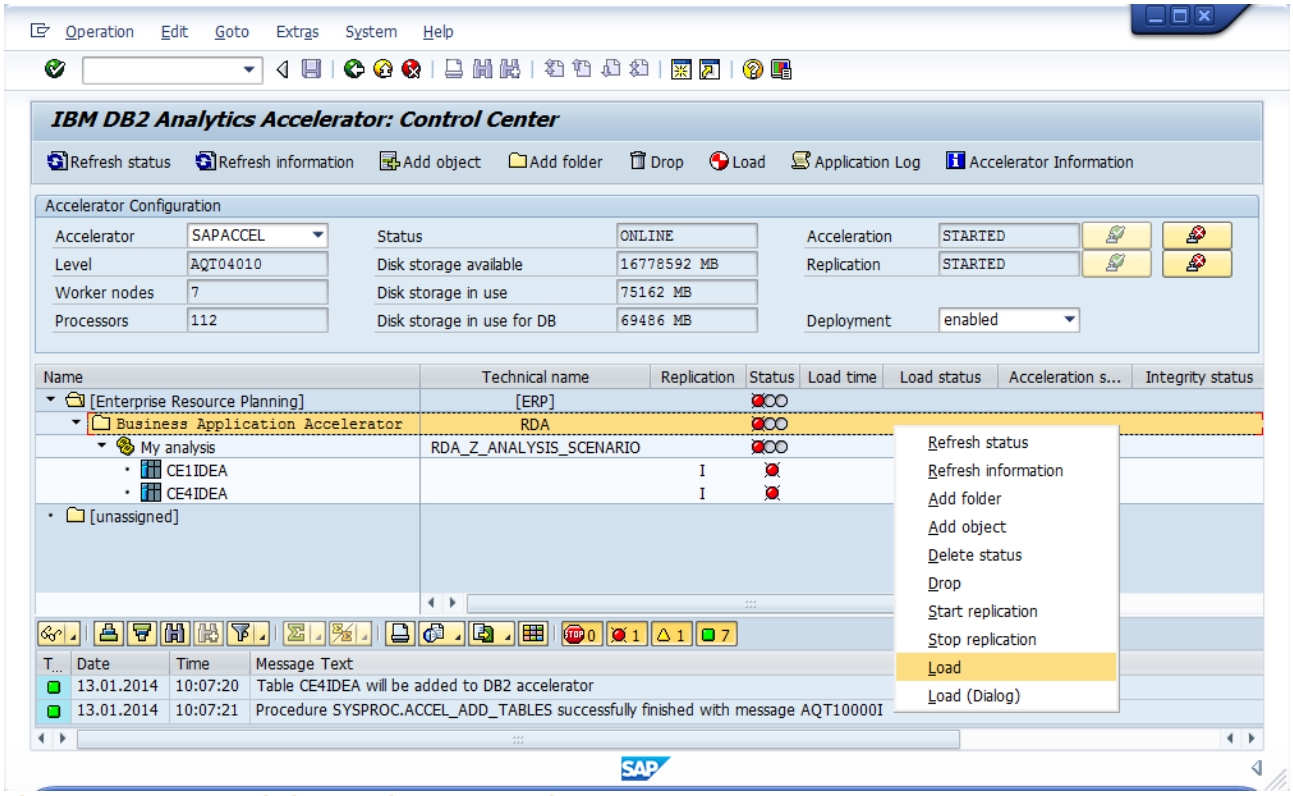

Figure 9: IBM DB2 Analytics Accelerator Control Center

4.5 Activating the Scenario

Finally, the scenario must be activated as follows: Call ABAP report `RDA_MAINTAIN`. Select *Activate Scenario*, specify *Scenario Name* and click *execute* (or press F8).
Afterwards check table `RDA_CONFIG` for correct scenario settings.

5 RUNNING SAMPLE ABAP PROGRAM WITH ACCELERATION

After the activation of the BAA scenario, ABAP program `Z_ANALYSIS` is run again. The elapsed time is considerably shorter now (74 seconds, which is 15 times less than without acceleration). The SQL trace shows that the long running query is indeed executed on the secondary database connection `DB2_ACCELERATOR`, see Figure 10.

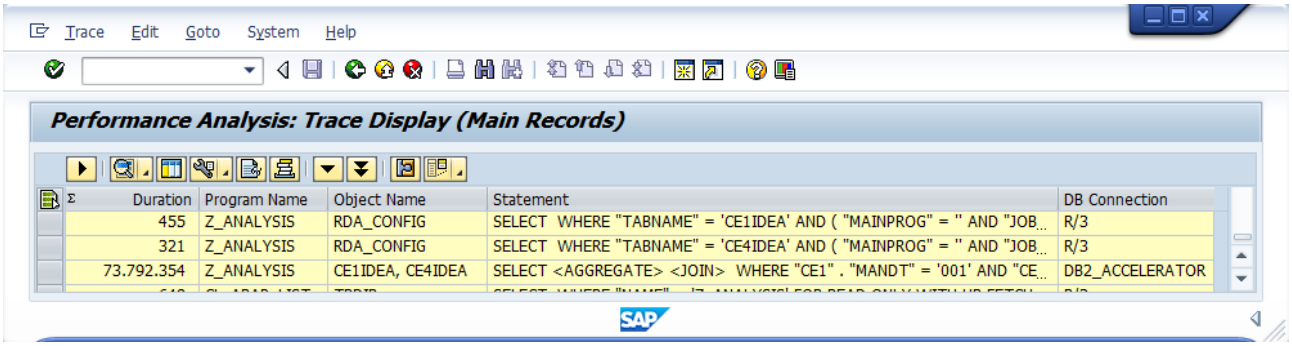

Figure 10: SQL trace with acceleration

6 REFERENCES

SAP Note 2146293: DB2-z/OS: SAP Business Application Accelerator combined with the IBM DB2 Analytics Accelerator
https://service.sap.com/sap/support/notes/0002146293?nlang=E

SAP Note 1694697: SAP Business Application Accelerator powered by HANA
https://service.sap.com/sap/support/notes/0001694697?nlang=E

SAP Note 1696402: Installation of SWT2DB 100/100_740 on SAP NetWeaver
https://service.sap.com/sap/support/notes/0001696402?nlang=E

SAP Note 1919094: Defined SAP Scenarios for the SAP Business Application Accelerator
https://service.sap.com/sap/support/notes/0001919094?nlang=E

SAP Note 1949508: SWT2DB: No redirection
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SAP Note 1649284: SAP support for IBM DB2 Analytics Accelerator
https://service.sap.com/sap/support/notes/0001649284?nlang=E

SAP Note 1755992: DB2 z/OS: lib_dbsl support for IDAA query
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SAP Note 1801132: DB2-z/OS: DB2 Accelerator support, latest FixPack
https://service.sap.com/sap/support/notes/0001801132?nlang=E

SAP Note 1861115: IBM DB2 Analytics Accelerator support with SAP BW
https://service.sap.com/sap/support/notes/0001861115?nlang=E

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