Data Consistency Management with SAP Solution Manager

Cross-Database Comparison Tool (CDC)

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CUSTOMER
Customer Data Consistency and Interface Monitoring

Proactively ensure reliable business process flow and data consistency.

Overview – Data Consistency Management Tools

Cross-Database Comparison
Is data consistent between two systems, especially if one is a non-SAP/non-ABAP system?

Data Consistency and Interface Monitoring
Proactively ensure reliable business process flow and data consistency.

Internal Database Comparison
Are two linked tables consistent or have the correct content?

Guided Self-service DCM
Provide guidelines how to check and correct inconsistencies.

Transactional Correctness Tools
Find problems with transactional correctness in ABAP or Java code.

Business Process Completeness Check
Find problems with the business process completeness.

Data Consistency Management
Cross-Database Comparison: Motivation

Data in **different systems**, including **non-SAP systems**, needs to be checked for consistency. Typical situations include **interface errors** or **hardware failures** in a distributed system landscape.

Not all data inconsistencies can be detected by application-specific consistency check programs (for example involving custom tables or non-ABAP / 3rd-party systems).

<table>
<thead>
<tr>
<th>System 1 (SAP)</th>
<th>System 2 (non-SAP)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Table 1</strong></td>
<td><strong>Table 2</strong></td>
</tr>
<tr>
<td><strong>Key</strong></td>
<td><strong>Value</strong></td>
</tr>
<tr>
<td>A</td>
<td>11</td>
</tr>
<tr>
<td>B</td>
<td>12</td>
</tr>
<tr>
<td>C</td>
<td>13</td>
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<tr>
<td>D</td>
<td>14</td>
</tr>
<tr>
<td>E</td>
<td>15</td>
</tr>
<tr>
<td>A</td>
<td>11</td>
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<td>B</td>
<td>12</td>
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<td>C</td>
<td>20</td>
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<td>D</td>
<td>14</td>
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<tr>
<td>?</td>
<td></td>
</tr>
</tbody>
</table>
Cross-Database Comparison: Goal and Deliverable

Goal:
Comparison of two data sources to detect missing entries or inconsistent fields without the need to write additional coding.

Deliverable:
A generic infrastructure that facilitates
- data modeling and extractor generation
- scheduled or manual execution of comparisons
- saves and displays comparison results for later reference
- integration into monitoring and dashboards
Cross-Database Comparison: Features

• Delivered within SAP Solution Manager
• Supports multiple source types
  ▫ For SAP ABAP-based systems and non-ABAP / 3rd-party systems
  ▫ For On-premise and Cloud systems
  ▫ Can be enhanced by custom-build source types
• Offers comparison of multiple tables between two source systems
  ▫ Several tables can be joined to build complex application data models
  ▫ Offers easy-to-use graphical UI to enter the data model
  ▫ Offers possibility to re-use a comparison data model for several comparison instances
• Extracts data from source systems and executes comparison in SAP Solution Manager
  ▫ The comparison can be executed ad-hoc as well as periodically in background
  ▫ Allows splitting of the comparison data into multiple blocks of configurable size
  ▫ Offers functionality to save and display comparison results
• Supports integration into Business Process Monitoring
  ▫ Create alerts and notifications based on identified inconsistencies
Cross-Database Comparison: Terminology

• **Source System**
  - A data source from which data should be extracted for comparison. CDC uses two (different) Source Systems.

• **Source Type**
  - Contains the implementation of how a source system is technically accessed

• **Data Model** (fka. Comparison Object)
  - Defines the data model and fixed filters for each source system, as well as the mapping between the two data sources

• **Comparison** (fka. Comparison Instance)
  - Defines the runtime options for a Comparison
    - Connectivity Details for Source System 1 and 2
    - Variable application filters for partial data extraction
  - Each comparison execution creates a new “Comparison Run ID” to keep a history of results
    - Compare status, Compare result (counts only), error messages, admin info, …

• **Comparison Result**
  - Stores the complete detailed comparison results per Comparison Run ID
    - Keys of inconsistent rows / Data of inconsistent fields / Data of additional context fields (display-only fields)
Cross-Database Comparison: Source Types

CDC supports multiple Source Types, which can be freely combined with each other

• **SAP ABAP-based systems** using RFC (Remote Function Call)
  ◦ „ABDY“ with a **generic extractor** function module (dynamic SQL execution, no individual generation and transport required)
  ◦ „ABAP“ with **generated extractor** function modules (individual and extensible code in custom namespace)
  ◦ „IDC“ with a generic extractor function module to determine **inconsistent entries in one system** (like “Internal Database Comparison”)
  ◦ „BIQY“ / „BWRI“ extract data from a **BI system using MDX Queries or Data Manager Read Interface**

• **Non-ABAP systems**
  ◦ „ADBC“ (ABAP Database Connectivity) for a **direct remote database access** to all SAP-supported RDBMS including HANA
  ◦ „HANA“ for a direct comparison of **HANA data with a connected other database** using „**Smart Data Access**“ (running in HANA itself)
  ◦ „ODAT“ extracts data using **OData Services** (Open Data Protocol) HTTP calls
  ◦ „ARIB“ / „ARIP“ extract data from **Ariba P2P/P2O and Ariba Networks using the Operational Reporting API / Transaction Monitoring API**

• **Files** (created by native non-SAP application)
  ◦ „FIXS“ for XML-files available on **Application Server** of SAP Solution Manager
  ◦ „FIXL“ for XML-files available for upload from **local frontend**
  ◦ „CSV“ for **comma-separated files** on Application Server
The CDC application extracts data from both data sources and compares them centrally in SAP Solution Manager.

1. Extract data block
2. Extract data block
3. Compare data blocks
Comparison in one single system

Alternatively the CDC application can compare data in one system and send only the result back to SAP Solution Manager.

Choose Extraction Strategy **Execute comparison in one system** for the following source types:

- **Determine inconsistent entries in one system (IDC)**
- **Comparison in one HANA database**
  - Technical realization with “**SAP HANA Smart Data Access**” (SDA)
  - Remote database tables can be directly joined with local tables
Operational procedure of Cross-Database Comparison

1. Create a Data Model
   • In 7.2 the Data Model maintenance is no longer isolated but already embedded in a Comparison definition

2. Create Comparison(s) based on a Data Model
   • Choose Source Types → Define connection parameters to the involved source systems
   • Choose/Define a Data Model → Generate Extractors
   • Create additional application filters or time-dependent filters for partial extractions

3. Optionally assign the Comparisons to a Comparison Group

4. Execute a Comparison Run
   • Manually or as periodic job

5. Display Comparison Result
   • For single Comparison or correlated Group Result
Cross-Database Comparison: Create Comparison

**Basic Attributes**
- Name and Description of the Comparison
- Extraction Strategy, Comparison Block Size, Max Number of Differences

**Source Types** for both Source Systems and their source type specific **Parameters**

**Iteration Parameters**

**Variable Filter Criteria**
For the same Data Model multiple Comparisons can be created, which use different source systems, e.g. Dev/QA/Prod landscape, or use different filter values

**Embedded Data Model**
Cross-Database Comparison: Create Data Model

**Data Model**

- Select **Data Source** (typically database tables and selected columns)
  - Foreign key relationships (join conditions between several tables to build complex models)
  - Fixed filter values
  - Variable filter fields
- **Mapping connections** between the Source Systems
  - Comparison Keys
  - Data Fields
  - Context Fields
  - Conversion Rules
- **Generate Extractors**
Starting a Comparison Run – Scheduling Options

You start a new Comparison Run by selecting a Comparison in the Comparison Overview and pressing “Start”

- Create job only (will not be released automatically)
- Create job and start immediately
- Start Comparison Run immediately in dialogue

Each start creates a new Run ID for the Comparison
## Starting a Comparison Run – Run Status and Inconsistency Status

The **Comparison Overview** gives an overview about the execution of Comparisons.

### Run Status

- **Grey** – not started yet
- **Yellow** – currently running
- **Green** – finished successfully
- **Green tick** – result confirmed by user
- **Red** – aborted due to a system error

### Inconsistency Status

- **Grey** – no result yet
- **Yellow** – still running, but already inconsistencies found
- **Green** – no inconsistencies found
- **Red** – inconsistencies were found

The column “**Run Status**” shows the current Comparison Run execution status.

The column “**Inconsistency Status**” shows whether a Comparison Run has detected an inconsistency.

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Comparison Run Detail screen: Overview

The **Comparison Run Detail screen** is structured into a layout of four areas:

- **Global Result Parameters**
  - Switch between Run IDs
  - Objects Expected from Source 1 and 2
  - Objects Processed (Progress)

- **Result Overview**
  - Basic Key Figures

- **Result Details** (See next slide)

- **Comparison Runtime Statistics**
Comparison Run Detail screen: Result Details per Type

Result Details shows the list of affected objects per **Type of Inconsistency**

- For **Objects existing in System 1 / 2** only, the result of the existence check shows comparison keys only
- For **Objects with Differences**, the result shows the comparison keys and the detailed data value differences
Thank you.