



SAP HANA-based Analytics for SAP Master Data Governance 9.0

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1. Introduction

Emerging technologies and trends are impacting every aspect of IT landscapes. Big data, mobile, social, and cloud are generating enormous amounts of business data. Intelligence extracted from this data forms the foundation for all business interactions.

New value can be derived by better exploiting the full potential of data to make smarter decisions, react more quickly to changes in the market, accelerate key processes (like planning) or simply innovate new data-driven business models not possible before.

With SAP Business Suite powered by SAP HANA SAP is simply combining the best suite of applications (SAP Business Suite) and the next generation best performing platform (SAP HANA) for driving your business in real-time.

This new and unique approach in the market allows your organization to always work on a single source of truth for real-time planning, execution, reporting and analysis on very large volumes of data.

By combining analytics with transactions, business users can now get a unified view of information within context rather than having to go back and forth between applications. New people-centric interfaces based on design thinking have enabled simplified and user-driven experiences.

Business users can now perform real-time operational reporting and analytics on top of large volumes of data in ERP and other SAP Business Suite applications.

1.1 Business Use Case and Overview

MDG Hana-based Analytics provides you with queries tailored to key roles in Master Data Governance so that business users can always stay on top of their business by deciding and acting in real-time: more accurately, more interactively, more collaboratively and simpler. Supporting insight-to-action scenarios, a business user can analyze strategic or operational KPIs for Master Data Governance processes on a single source of real-time information available anywhere and anytime for easy access to personalized insight, evaluate the situation in case of deviations and trigger follow-up actions immediately. This allows you to:

- Make fact based decisions that is based on up to date information rather than rely on their gut feeling
- Respond to deviations and alerts in real time and within the window of opportunity

With Master Data Governance 9.0, the scope was enhanced by analytical scenarios that cover the change analysis of critical attributes of master data objects.

The enhanced capabilities are described in more detail in chapter 2.

1.2 User Benefits

SAP Business Users can optimize the Master Data Governance processes to create data efficiently, timely and in high quality by:

- Identifying process issues in large amounts of information in real time
- Collaboration with the relevant and responsible person
- Access to data using different devices (desktop, tablet)
- Systematic analysis of SLA violations
- Operational data available instantaneously for analysis
- SAP HANA Studio provides all necessary functions for modeling new views or using plain SQL
- Using various SAP BusinessObjects BI Clients to explore MDG HANA-based analytical content such as SAP Lumira and SAP BO Analysis for Office.
- Leveraging SAP Smart Business to create analytical cockpit for MDG process-related KPIs
- A detailed analysis and drill-down available based on master data attributes and their changes and the related SAP Business Workflow data.

2. Extended Capabilities

2.1 Overview

With SAP Master Data Governance 7.0 SP02 Feature Pack on SAP ERP 6.0 SAP Enhancement Package 7, HANA-based content was delivered that enabled the functionality to analyze KPIs related to change request data via analytical applications like SAP Smart Business.

With MDG 8.0 or MDG 7.0 SP05, respectively, these capabilities have been extended in a way that not only the Change Request data itself can be analyzed but also in combination with additional data that is directly linked to the Change Request data. For analytical purposes with release MDG 8.0 (or MDG 7.0 SP05, respectively) the change request data can be linked with the following additional information:

- Object-based change request analytics:
A combination of the change request data with its contained master data objects/entities
- Change document-based change request analytics:
A combination of the change request data with change document information related to the contained master data objects/entities
- Workflow-based change request analytics:
A combination of the change requests data with information of the workflow that is assigned to the change request

Starting with MDG 9.0, critical attribute-based change request analytics were introduced as an additional analytical scenario.

The extended capabilities are described in more detail in the following subchapter.

2.2 Critical Attribute-Based Change Request Analytics

The critical attribute-based change request analytics enable scenarios that combine the information of the change request data with change information on attribute level of the objects which are contained in the change request. In contradiction to the change document-based change request analytics, the focus for the critical attribute-based change request analytics is set to the monitoring of changes of a specific critical attribute of the master data object. It can be clearly identified how often a specific attribute of an object was changed in a given timeframe or, additionally, the list of objects can be identified for which a specific attribute was changed.

The following sample scenarios are possible:

- Total number of changed objects with respect to the monitoring of a specific attribute change
- Total number of attribute changes per object
- Average number of changes per object
- Average number of attribute changes per object

To realize the described scenarios, new calculation views/queries can be generated for the critical attribute-based change request analytics. These calculation views/queries offer especially the following parameters/variables as well as counters/measures.

Parameters/Variables:

- V_SAPClient:
Mandatory variable for the SAP Client
- V_Fieldname:
Mandatory variable for the technical field name which represents the attribute of the master data object that should be taken into consideration for the critical attribute analysis

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- V_ChangedOnDate:
Mandatory interval for the date timeframe in which the master data object (respectively attribute change) happened. By using this interval the analysis of the critical attributes can be restricted on a timely manner.

Counters/Measures:

- Total object changes:
Counter for the number of objects that have been changed
- Average object changes:
Measure for the average number of changes per object (for example, number of object changes divided by the number of objects evaluated)
- Total attribute changes
Counter for the number of attributes that have been changed
- Average attribute changes per object:
Measure for the average number of attribute changes per object (for example, number of attribute changes divided by the number of objects evaluated)
- Total objects evaluated:
Counter for the total number of evaluated objects

3. Technical Adaptations/Changes with respect to SAP Master Data Governance 7.0 SP05 and SAP Master Data Governance 8.0

3.1 Overview

Since the development of SAP Master Data Governance 7.0 SP05 and SAP Master Data Governance 8.0, enhancements and improvements have been done according to changes in central guidelines as well as improvements in the functionality.

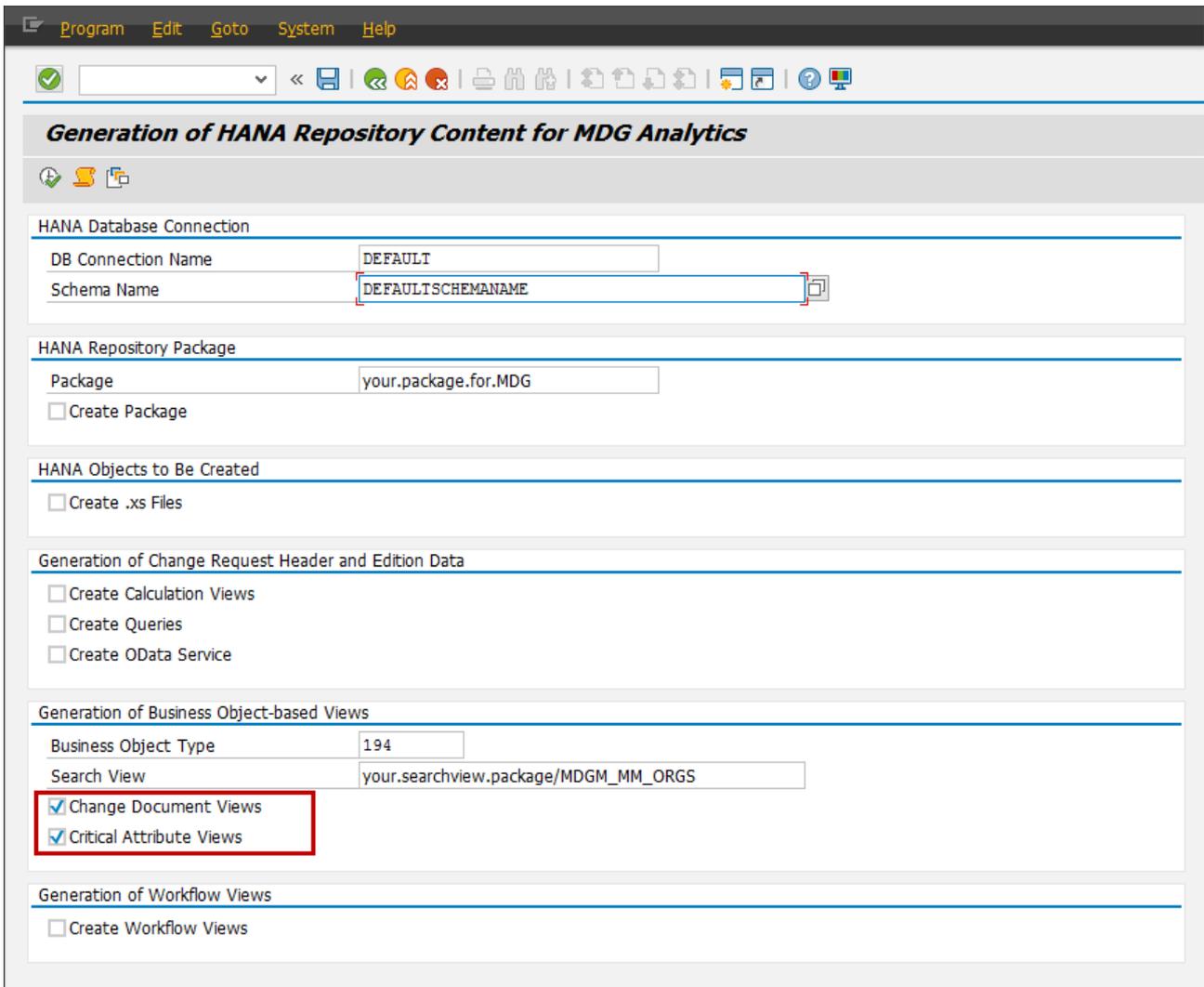
This section gives an overview about these changes. This is especially important in scenarios when you are already using the functionality of SAP Master Data Governance 7.0 including SP05 or SAP Master Data Governance 8.0 and now want to move on with the extended capabilities.

3.2 Report for HANA Content Generation

To generate the HANA Content, the already established report MDG_ANA_HDB_GEN_REPO_CONTENT was enhanced in a way that this report now also enables the generation of the change request related HANA content.

Technically, the major enhancement of the report is located in the section "Generation of Business Object-Based Views" starting with Master Data Governance 9.0. Starting with this release, the generation of the change document-Based change request analytics as well as the newly incorporated critical Attribute-based change request analytics are now part of the runtime configuration of the report.

As you can see by the following screenshot, the two mentioned scenarios can now be separately enabled selecting the corresponding checkbox. This differs from the prior releases as the change document-based change request analytics have always been implicitly generated if they have been available. This behavior was changed to allow more manual control about the objects being generated as well as to have a more transparent report behavior.



3.3 Database Schema and Required Data Base Tables

The generated calculation views are accessing database tables stored in a specific database schema (for example, SAP_MDG) in the HANA database. As a prerequisite, several database tables need to be in this database schema upfront. It is important to choose the schema that is assigned as the standard database schema to the user in the database connection table (DBCON) on the ABAP system. As another prerequisite, the database schema, must exist or needs to be created in the HANA database.

The following list of database tables were newly added/required for the critical attribute-based change request analytics.

3.3.1 Critical Attributes

For the critical attribute-related scenario, the following additional database tables are required in the corresponding database schema. As this analytical scenario links the change request information with the critical attribute information, also the mentioned change request related database tables in the prior guide are a prerequisite and need to be mapped to the database schema:

<u>Object/Entity</u>	<u>Corresponding Database Table</u>	<u>Description</u>
Change Documents – Header Information	CDHDR	Detailed information about the change document header

By analyzing the data contained in these database tables, the corresponding calculation views for the critical attribute scenario can retrieve the information whether a specific entity (or one of its attributes) has been changed with respect to the change request.

Additional remark: As all these database tables are a technical prerequisite for the calculation view generation, they need to be in the corresponding database schema regardless of the fact that analytical scenarios will be driven on a specific dataset or part of the tables.

3.4 .xsodata Files

Due to the changed generation process of the object-related calculation views (clear separation of object-based, change document-based as well as critical attribute-related scenarios) also the .xsodata files have been separated in the following way:

- .xsodata file name for object-related change request analytics:
CRHeaderFor<OTC>By<SVN>
- .xsodata file name for change document-related change request analytics:
ChgDocFor <OTC>By<SVN>
- .xsodata file name for critical attribute-related change request analytics:
CriAttrFor<OTC>By<SVN>

4. Generation of SAP HANA Content

4.1 Concept

The SAP HANA content for HANA-Based Analytics applications consists of a virtual data model (VDM) which is built up by different attribute and calculation views and files for the oData service, e.g. xsodata, xsaccess, xsapp and xsprivileges. In these calculation views, we distinguish between view categories, e.g. private, reuse and query views. While private views are encapsulated SQL calculations on database tables or even other private views, reuse views are the building blocks of the VDM. They expose the business data in a structured and consistent way. They incorporate the relevant business data in SAP Business Suite systems. Reuse views are designed for reuse by other views and they do not have to be consumed directly by analytic tools. Finally query views are always the top view in a hierarchy of views of the VDM. They are considered for direct use by analytic applications. In the next sections, we are going to explain the content of views and their properties for the HANA-Based Analytics application of MDG.

The SAP HANA content for MDG applications consists of views that are built up by different calculation views and files for the OData service, for example `.xsodata`, `.xsaccess`, `.xsapp` and `.xsprivileges`. In these calculation views, we distinguish between view categories, for example private views, reuse views and query views.

Private Views

Private views are encapsulated SQL calculations on database tables or even other private views.

Reuse Views

Reuse views are the building blocks of private views that expose the business data in a structured and consistent way. They incorporate the relevant business data in SAP Business Suite systems. Reuse views are designed for reuse by other views and they do not have to be consumed directly by analytic tools.

Query Views

Query views are always the top view in a hierarchy of views. They are considered for direct use by analytic applications. In the next sections, we are going to explain the content of views and their properties within our delivered views for MDG applications.

The generation of the SAP HANA Content is done using the ABAP-based report MDG_ANA_HDB_GEN_REPO_CONTENT which is described in detail in chapter 3.2. Report for HANA Content Generation.

4.2 Critical Attribute-Related HANA Content

The SAP HANA-based Content related to change documents is generated only for the following business object type codes (<BOTC>):

- 194 (MATERIAL: Material)
- 147 (BP_HEADER: Business Partner).

The HANA Content related to the critical attribute analysis are generated only on purpose if the corresponding checkbox was marked on the generation report as described above.

4.2.1 HANA Reuse Views

The HANA views generated in this context are built up on the SAP HANA views generated in the object-related context for the business object type codes (BOTC). The SAP HANA search view is optional to generate these views. Supplying the generation report with the business object type code is sufficient to

generate the change document SAP HANA content. The information regarding the objects is still available. However, the information about objects attributes is not available.

<HSVN> = HANA Search View Name (used in the report described in chapter 3.2. Report for HANA Content Generation.

<BOTC> = Business Object Type Code (used in the report described in chapter 3.2. Report for HANA Content Generation.)

There are two generic HANA views for the analysis of the critical attributes generated in the CR package as mentioned below. Due to their generic character, these views can be reused by all domain and object type code-specific scenarios.

Name of Reuse View	Joined Database Tables/Reuse Views	Description
ChangeDocumentHeaderAndPosition	CDHDR CDPOS	Contains the complete view on the change documents including header and position information Filtered on activated changes (pending changes are omitted)
ChangeDocumentComplete	ChangeDocumentHeaderAndPosition CDPOS_UID CDPOS_STR	Contains a complete view on change documents based on change request header and position(→ filtered on activated changes)

For the critical attribute analysis for each selected business object type code (<BOC>) in combination with the optional SAP HANA search view name (<HSVN>). These views are stored in the data model related subfolder of the SAP HANA target package structure.

Name of Reuse View	Joined Database Tables/Reuse Views	Description
FieldnameValueHelp	MDG_MDF2006	Value help for the field name to offer high-performing value help
<BOC>CriAttr<HSVN>	ChangeDocumentComplete <BOTC>UnionViewFor<HSVN> OR <BOTC>ObjectListWithCR DD07T MDG_MDF2006	Contains complete change document information including the change request object list data for the specific business object type code. If a HANA search view is included, the object data is also taken into consideration.

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4.2.2 SAP HANA Query Views

<HSVN> = HANA search view name (used in the report described in chapter 3.2. Report for HANA Content Generation.)

<BOTC> = Business object type code (used in the report described in chapter 3.2. Report for HANA Content Generation.)

<u>Name of Query View</u>	<u>Input Variables/Parameters</u>	<u>Description</u>
<BOC>CriAttr<HSVN>Query	V_SAPClient V_Fieldname: V_ChangedOnDate (Interval)	Critical attribute, change document, change request as well as object information provided as query

4.2.3 OData Services

The MDG applications support access to the data using a service that uses the OData protocol. The OData service file is called **CriAttrFor<BOTC>By<HSVN>.xsodata**. Providing an MDG HANA search view for generating change document HANA content is optional. However, providing a BOTC is mandatory.

<HSVN> = HANA search view name (used in the report described in chapter 3.2. Report for HANA Content Generation.)

<BOTC> = Business object type code (used in the report described in chapter 3.2. Report for HANA Content Generation.)

This service provides access to the mentioned query view which provides the following data set with regard to the critical attribute scenario:

- <BOTC>CriAttr<HSVN>

This entity set provides the measures **TotalChangeRequests**, **AverageProcessingTime**, **AverageSLAExpiryDays**, **AverageDueDateExpiryDays** and **AverageExpiryDays** as well as **AverageObjectChanges**, **AverageAttributeChanges**, **TotalObjectChanges**, **TotalAttributeChanges** and **TotalObjectsEvaluated**