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Modification Analysis

Business Modification Calculation Logic

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This document helps you to understand the calculation logic of business modifications in your system.

Background: Why Analyzing Modifications?

SAP system implementations involve creating customer-specific instances which are a copy of the original SAP software. Organizations make changes in the copy of these instances to meet their unique business requirements, which are documented as repair tasks or modifications. These customizations, known as modifications, alter standard SAP objects in a customer instance. Besides regular upgrades, customers implement SAP-delivered updates (bug fixes, enhancement packages, and localization versions), some of them via transport requests and SAP Notes. Additionally, organizations may implement third-party solutions within designated partner namespaces.

The SMODILOG table serves as a comprehensive registry, tracking all modifications to SAP objects, whether resulting from your customizations, SAP updates, or partner solution implementations. During system upgrades, organizations can evaluate their custom modifications and make strategic decisions: either revert objects to SAP standard functionality or maintain their customizations. This modification adjustment process requires manual intervention, with the workload directly correlating to the volume of modifications present. To facilitate this process, SAP provides specialized modification analysis dashboards that offer visibility into business-critical modifications. These dashboards filter out non-business-related entries from the modification log, allowing organizations to focus specifically on customizations implemented to address business requirements. The business modification determination described in this document is realized by the two analysis dashboards mentioned below. They can help your organization optimize their upgrade strategy by identifying essential modifications to maintain business continuity and which can potentially be standardized. The following two dashboards are provided by SAP:

- **Custom Code Analytics dashboard**
- **Intelligent Custom Code Management dashboard**

Both dashboards use a similar core logic to identify business modifications from the modification log. However, the **Intelligent Custom Code Management** dashboard adds extra validation checks in the SAP Analytics Cloud frontend. These checks help you reduce false positives, improving the accuracy of identified business modifications. This improvement makes the newer dashboard more reliable for your modification analysis during upgrade planning.

First Tool: Custom Code Analytics Dashboard

The **Custom Code Analytics** dashboard uses the SAP EarlyWatch Alert service and online ABAP code to collect data from your system. The online ABAP code, however, has limitations in data collection from customer systems.

The following two sections explain the data selection process and the rules for determining business modifications.

Data Selection

First, you extract the necessary modification records from the modification log using the following conditions:

SMODILOG Outer Join TADIR

TADIR	PRMID = 'R3TR'		
TADIR	OBJECT	SMODILOG	OBJ_TYPE
TADIR	OBJ_NAME	SMODILOG	OBJ_NAME
		SMODILOG	MOD_DATE >=Rundate

Rundate = Extraction triggered data

You perform an outer join between the SMODILOG and TADIR tables to retrieve all records from both tables.

Rules to Determine Business Modifications

After you obtain the necessary modification records, you apply rules (steps 1 to 19) to exclude non-business modifications. For each record, you update the REASON column with the exclusion reason. At the end of the process, records with an empty REASON column (REASON = '') are considered as business modifications. The **Custom Code Analytics** dashboard classifies the excluded records as technical modifications.

1. Step: Exclude inactive modifications

WHEN SMODILOG-INACTIVE <> SPACE

REASON = 'INACTIVE'

Note: Inactive modifications are determined as

SMODILOG-InActive = 1, R, D, X

R = 'Reset objects and SAP Note corrections'

D = 'Deleted objects'

1 = 'UXX Includes not displayed'

X = 'Obsolete entry'

Explanation: This step removes deleted, obsolete, and already reset modifications from previous upgrades and SPAU adjustments. It focuses on active modifications where SMODILOG-InActive is blank (SMODILOG-InActive = space).

2. Step: Exclude objects not in TADIR

SMODILOG-PGMID is blank

SMODILOG-OBJ_TYPE IS NOT 'ACGR'

REASON = 'NOT_IN_TADIR'

Explanation: This step excludes objects from the active modification list if they are missing in the object repository TADIR, even though they exist in the modification log.

3. Step: Exclude generated objects

SMODILOG-GENFLAG = 'T' or 'X'

"X Generated (preserved in the upgrade)"

"T Generated (can be deleted in the upgrade)"

REASON = 'GENERATED'

Explanation: In each SAP client, certain objects, such as ABAP Query and Multipurpose Internet Mail Extensions (MIME) objects are created. This step removes the generated objects from your active modifications list because they aren't considered as business modifications.

4. Step: Exclude translation

SMODILOG-OPERATION = 'TRSL'

REASON = 'TRSL'

Explanation: The operation TRSL describes customer-specific translations of texts that were created in the system. This step removes translation-related objects from the list of active modifications because they aren't considered as business modifications.

5. Step: Exclude SAP Note implementations

SMODILOG-OPERATION = 'NOTE'

REASON = 'NOTE'

Explanation: All SAP Note implementations are logged with the operation NOTE. Note implementations are overwritten and become obsolete during upgrades if they are included in the current software version delivered by SAP. This step removes them from the list of active modifications because they aren't considered as business modifications.

6. Step: Exclude SMOD (SAP customer exits) migrations

SMODILOG-OPERATION = 'MIGR'

REASON = 'MIGR'

Explanation: When you migrate old user exits into BAdI implementations, the system creates these types of objects in the modification log. This step removes them from the list of active modifications because they aren't considered as business modifications.

7. Step: Exclude new SAP standard function modules implemented in the system

SMODILOG-OPERATION = 'NEW'

REASON = 'NEW'

Explanation: When you implement a new function module in the SAP namespace as suggested by SAP, the function modules are created with a NEW status. Since these are part of a NOTE implementation, they are removed from the active modification list.

8. Step: Exclude append structures

SMODILOG-INT_TYPE = 'APPD'

REASON = 'APPEND'

Explanation: You can add custom fields to standard core SAP tables using append structures to store additional data according to your business needs. SAP also provides additional fields through append structures in Add-Ons or for localization versions, which appear in the modification log. Append structures are recommended in SAP ERP Central Component or before the SAP S/4HANA version adds custom or industry-specific fields to standard core tables. They aren't considered as business modifications and are excluded from the active modification list.

9. Step: Exclude log entries, modification assistance is switched off

SMODILOG-INT_TYPE = 'DUMMY'

REASON = 'LOG'

Explanation: Modification-related logs provided by SAP aren't considered as business modifications. This step removes these objects from the list of active modifications.

10. Step: Exclude objects when source system is not SAP

SMODILOG-SRCSYSTEM NOT 'SAP' and SMODILOG-OBJ_TYPE NE 'ACGR'

REASON = 'SOURCE_NOT_SAP'

Explanation: If an object exists in the modification log and the original system is not SAP, it isn't considered as a modification. This step removes these objects from the list of active modifications because they aren't considered as business modifications.

11. Step: Exclude Sales and Distribution (SD) user exits

SMODILOG-SUB_TYPE = 'REPS and

(SMODILOG-SUB_TNAME = 'RV++*' or

SMODILOG-SUB_TNAME = 'MV++*').

Explanation: SAP user exits that are related to Sales and Distribution aren't considered as modifications. This step removes these objects from the list of active modifications.

12. Step: Exclude customer exits

```
(SMODILOG-SUB_TNAME +2(1) >= '0' and  
SMODILOG-SUB_TNAME +2(1) <= '9' and  
SMODILOG-SUB_TNAME +3(1) >= '0' and  
SMODILOG-SUB_TNAME +3(1) <= '9')  
REASON = 'EXIT'
```

Explanation: SD user exits are indirect modifications. Some customers classify them as classic enhancements. We currently categorize them as non-modifications and remove them from the active modification list. We are collecting feedback from more customers.

13. Step: Exclude table index

```
(SMODILOG-OBJ_TYPE = 'TABL' and  
SMODILOG-SUB_TYPE = 'INDX'  
REASON = 'TABL_INDEX'
```

Explanation: You create secondary indices in standard core tables for performance reasons. This step removes these objects from the list of active modifications because they aren't considered as business modifications.

14. Step: Exclude MIME objects in UI5

```
(SMODILOG-OBJ_TYPE = 'SMIM' and  
TADIR-devclass CP '/UI5/*'  
REASON = 'MIME_IN_UI5'
```

Explanation: In each SAP client, the system generates objects like images, non-ABAP Internet Application Components (IAC), and UI5 components. These objects create MIME objects. This step removes these objects from the list of active modifications because they aren't considered as business modifications.

15. Step: Exclude role definitions

```
SMODILOG-OBJ_TYPE = 'ACGR'  
REASON = 'ROLE'
```

Explanation: Role definitions (related to user authorizations in SAP) aren't considered as modifications. This step removes these objects from the list of active modifications.

16. Step: Exclude SAP HANA Data Connector Interfaces container

```
SMODILOG-OBJ_TYPE = 'HOTA'
```

```
REASON = 'HOTA'
```

Explanation: SAP HANA data connector interfaces aren't considered as modifications. This step removes these objects from the list of active modifications.

17. Step: Namespace rules for each object

Get NAMESPACE and NAMESPACE_CLASS from configuration

```
IF NAMESPACE_CLASS = CUSTOMER
```

```
REASON = 'CUST_NS'
```

```
IF NAMESPACE is not Initial and
```

```
NAMESPACE <> '/0*/' and
```

```
NAMESPACE <> '/*/'
```

```
REASON = 'MISSING_NS'
```

```
IF NAMESPACE_CLASS <> SAP
```

```
REASON = 'NS_NE_SAP'
```

Explanation: When you implement a partner or customer namespace, you maintain the namespace configuration. Objects from the partner or customer namespace appear in the modification log. During the modification elimination process, the system reads the namespace configuration from your system. This step classifies the objects into customer or partner namespaces and removes them from the active modification list. Only modifications related to the SAP namespace remain as active modifications.

18. Step: SMODILOG INT_TYPE = 'XXXX'

```
IF SMODILOG INT_TYPE = 'XXXX'
```

Check if the object with the attributes below exists with NOTE as well. If it exists, set the REASON = 'NOTE' for 'XXXX' record as well

```
SMODILOG-OBJ_TYPE
```

```
SMODILOG-OBJ_NAME
```

```
SMODILOG-SUB_TYPE
```

```
SMODILOG-SUB_NAME
```

```
REASON = 'NOTE'
```

Explanation: When the modification assistance is turned off, the system fills certain object types with the value 'XXXX'. The system then checks to ensure these objects aren't part of a NOTE implementation. If an object is related to a NOTE implementation, it is removed from the active modification list.

19. Step: Duplicate entries

IF Duplicate entries exist for these field combinations

SMODILOG-OBJ_NAME

SMODILOG-SUB_TYPE

SMODILOG-SUB_NAME

SMODILOG-INT_NAME

SMODILOG-INT_TYPE

REASON = 'DUPLICATED'

Explanation: Duplicate objects are identified and eliminated by comparing the object attributes mentioned above. This step removes these objects from the list of active modifications as they aren't considered as business modifications.

Business Modifications

After applying the rules above to remove non-real modifications, the remaining modifications are considered as business modifications. When the attribute REASON is set to a space (' '), it indicates a business modification.

Second Tool: Intelligent Custom Code Management Dashboard

Data Selection

First, you extract the necessary modification records from the modification log using the following conditions:

SMODILOG Outer Join TADIR

TADIR	PRMID = 'R3TR'		
TADIR	OBJECT	SMODILOG	OBJ_TYPE
TADIR	OBJ_NAME	SMODILOG	OBJ_NAME
		SMODILOG	MOD_DATE>=Rundate

Rules to Determine Business Modifications

The modification records extracted above are processed using the same rules as in the **Custom Code Analytics** dashboard (steps 1 to 19). In addition to that, the SAP Analytics Cloud frontend applies specific rules to remove false positives (based on feedback from multiple customers). In the future, these rules will also be implemented in the backend to ensure consistent content for all users. The **Intelligent Custom Code Management** dashboard only displays business modifications and does not provide any information on technical modifications by design.

Additional Rules - Intelligent Custom Code Management Dashboard

Here are additional checks that are implemented using SAP Analytics Cloud:

1. Step:

Exclude **when** SMODILOG-Obj_Type = 'TABL' **and** SMODILOG-Sub_Type = 'TABD'

REASON = 'Table Pattern'

Explanation: In most cases, when electronic documents (e-documents) are implemented, a report creates tables that appear in the modification log. These tables aren't considered as business modifications and are therefore removed.

2. Step:

Exclude **when** SMODILOG-Obj_Type = 'TABL' **and** SMODILOG-Sub_Type = 'TABT'

REASON = 'Table Pattern'

Explanation: If e-documentation is implemented, in most cases a report changes table attributes that appear in the modification log. These table attributes aren't considered as business modifications and are therefore removed.

3. Step:

Exclude **when** SMODILOG-Obj_Type = 'DTEL' **and** SMODILOG-Sub_Type = 'DTED'

REASON = 'New Data Element Pattern'

Explanation: In most cases, when e-documents are implemented, a report creates data elements, which appear in the modification log. These data elements aren't considered as business modifications and are therefore removed.

4. Step:

Exclude **when** SMODILOG-OBJ_TYPE = 'DOMA' **and** SMODILOG-SUB_TYPE = 'DOMD'

REASON = 'New Domain Pattern'

Explanation: In most cases, when e-documents are implemented, the system creates domains through a report, which appear in the modification log. These reports aren't considered as business modifications and are therefore removed.

5. Step:

Exclude **when** SMODILOG-OBJ_TYPE = 'TTYD' **and** SMODILOG-SUB_TYPE = 'TTYD'

REASON = 'New TTYD Pattern'

Explanation: In most cases, when e-documents are implemented, a report creates table type definitions, which appear in the modification log. These table type definitions aren't considered as business modifications and are therefore removed.

6. Step:

Exclude **when** SMODILOG-OBJ_TYPE = 'FUGR' **and** SMODILOG-SUB_TYPE = 'FUGR'
REASON = 'New FUGR Pattern'

Explanation: If new function groups are created by add-on components or the import of transports, they're added as entries to the modification log. They aren't considered as business modifications and are therefore removed.

7. Step:

Exclude **when** SMODILOG-OBJ_TYPE = 'DEVC' **and** SMODILOG-SUB_TYPE = 'DEVC'
REASON = 'New DEVC Pattern'

Explanation: If new development packages are imported, they appear in the modification log. These development packages aren't considered as business modifications and are therefore removed.

8. Step:

Exclude **when** SMODILOG-OBJ_TYPE = 'TOBJ' /***and** SMODILOG-SUB_TYPE = 'TOBJ'*/
REASON = 'TOBJ Pattern'

Explanation: New table contents, such as configuration data, appear in the modification log. They aren't considered as business modifications and are therefore removed.

9. Step:

Exclude **when** SMODILOG-OBJ_TYPE = 'PROG' **and** SMODILOG-SUB_TYPE = 'VARI'
REASON = 'Program Variants Pattern'

Explanation: Program variants appear in the modification log. They aren't considered as business modifications and are therefore removed.

10. Step:

Exclude **when** SMODILOG-OBJ_TYPE = 'IATU' **and** SMODILOG-SUB_TYPE = 'IATU'
REASON = 'Internet Application Components Pattern (Generated)'

Explanation: SAP Internet Transaction Server (ITS)-based internet application components are generated (they are old technology web applications) and appear in the modification log. They aren't considered as business modifications and are therefore removed.

11. Step:

Exclude **when** SMODILOG-OBJ_TYPE = 'SHLP' **and** SMODILOG-SUB_TYPE = 'SHLD'
REASON = 'New Search Help Definition Pattern'

Explanation: New search help definitions appear in the modification log. They aren't considered as business modifications and are therefore removed.

12. Step:

Exclude **when** SMODILOG-OBJ_TYPE = 'VIEW' **and** SMODILOG-SUB_TYPE = 'VIED'
REASON = 'New View Definition Pattern'

Explanation: New table view definitions appear in the modification log. They aren't considered as business modifications and are therefore removed.

13. Step:

Exclude **when** SMODILOG-OBJ_TYPE = 'TRAN' **and** SMODILOG-SUB_TYPE = 'TRAN'
REASON = 'New Transaction Definition Pattern'

Explanation: New transactions imported into the system appear in the modification log. They aren't considered as business modifications and are therefore removed.

14. Step:

Exclude **when** SMODILOG-OBJ_TYPE = 'SMOD' **and** SMODILOG-SUB_TYPE = 'SMOD'
REASON = 'SMOD Definition Pattern'

Explanation: New SAP modification components, for which user exit projects can be implemented, appear in the modification log. They aren't considered as business modifications and are therefore removed.

15. Step:

Exclude **when** SMODILOG-OBJ_TYPE = 'INTF' **and** SMODILOG-SUB_TYPE = 'INTF'
REASON = 'New Interface Definition Pattern'

Explanation: New interface definitions appear in the modification log. They aren't considered as business modifications and are therefore removed.

16. Step:

Exclude **when** SMODILOG-OBJ_TYPE = 'SXCI' **and** SMODILOG-SUB_TYPE = 'SXCI'

REASON = 'BADI Interface Pattern 1'

Explanation: New BAdI implementations delivered by SAP, by transports, by add-on components, or by localization versions appear in the modification log. They aren't considered as business modifications and are therefore removed.

17. Step:

Exclude **when** SMODILOG-OBJ_TYPE = 'SXCD' **and** SMODILOG-SUB_TYPE = 'SXCD'

REASON = 'BADI Interface Pattern 2'

Explanation: New BAdI definitions delivered by SAP, by transports, by add-on components, or by localization versions appear in the modification log. They aren't considered as business modifications and are therefore removed.

18. Step:

Exclude **when** SMODILOG-OBJ_TYPE = 'CHDO' **and** SMODILOG-SUB_TYPE = 'CHDO'

REASON = 'New Change Document Pattern'

Explanation: New change document definitions appear in the modification log. They aren't considered as business modifications and are therefore removed.

19. Step:

Exclude **when** SMODILOG-OBJ_TYPE = 'ENQD' **and** SMODILOG-SUB_TYPE = 'ENQD'

REASON = 'Locking Object Pattern'

Explanation: New locking objects appear in the modification log. They aren't considered as business modifications and are therefore removed.

Business Modifications

The **Intelligent Custom Code Management** dashboard applies additional conditions at the frontend level to implement rules quickly. Rules can be refined or redefined based on your feedback to improve accuracy. After applying the rules to remove non-real modifications, the system considers the remaining modifications as business modifications. When the attribute REASON is set to a space (' '), it indicates a business modification.

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