

Sample Content for Process Mining on SAP S/4HANA – Purchase to Pay

Processes and Functions supporting Sample Business Scenarios

Typographic Conventions

Type Style	Description
<i>Example</i>	Words or characters quoted from the screen. These include field names, screen titles, pushbuttons labels, menu names, menu paths, and menu options. Textual cross-references to other documents.
Example	Emphasized words or expressions.
EXAMPLE	Technical names of system objects. These include report names, program names, transaction codes, table names, and key concepts of a programming language when they are surrounded by body text, for example, SELECT and INCLUDE.
Example	Output on the screen. This includes file and directory names and their paths, messages, names of variables and parameters, source text, and names of installation, upgrade and database tools.
Example	Exact user entry. These are words or characters that you enter in the system exactly as they appear in the documentation.
<Example>	Variable user entry. Angle brackets indicate that you replace these words and characters with appropriate entries to make entries in the system.
EXAMPLE	Keys on the keyboard, for example, F2 or ENTER .

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1 Introduction and Basics

1.1 About this Guide

This guide provides information about the sample content for Process Mining on SAP S/4HANA – Purchase to Pay, which can be installed on top of SAP Profitability and Performance Management. This sample content describes a project accelerator, ideas, and best practices for modeling an end-to-end profitability and cost calculation model that is feasible for actuals, planning, forecasting and simulations. It covers the full contribution margin scheme at a granular product level. It also contains references to further documentation that you should read before performing these tasks.

The structure of this document is organized around the following topic:

Business Example

This part of the guide covers the main features of the sample content. It describes the information model and calculation model.

Target Audience

- Business experts
- Solution consultants
- Presales teams

Considerations

It is essential that you are familiar with the content of the corresponding guides and documents related to this topic before beginning with this example. For more information about the available guides and documents, as well as integration with other systems, roles, configuration information, users and authorization concept, see [Related Documentation](#).

1.2 Constraints

This guide does not provide information about the installation of the sample content. For more information about this, see [Related Documentation](#).

1.3 Related Documentation

The following table lists related documents.

Topic	Guide/Tool/Title	Links
• Installation and planning of your system landscape • Activities to keep the system running • Information about how to ensure the required security for your SAP landscape	Administration Guide	Administration Guide
• SAP Note for Sample Content for Process Mining on SAP S/4HANA – Purchase to Pay	Sample Content for Process Mining on SAP S/4HANA – Purchase to Pay	For more information, see the Overview of Available Sample Contents table including the links to the corresponding SAP Note. Note The link to the Overview of Available Sample Contents table points to the latest available SP version. If you want to open a previous version of this table, select the required SP version from the drop-down list in the header.
• Operation of SAP NetWeaver	Technical Operations Manual	https://help.sap.com/viewer/p/SAP_NETWEAVER_750
• Application Help	Detailed Application Help for SAP Profitability and Performance Management	SAP Profitability and Performance Management
• SAP HANA Administration Guide	Administration Guide for SAP HANA; supported SDA databases	https://help.sap.com/viewer/product/SAP_HANA_PLATFORM/
• SAP Notes		https://launchpad.support.sap.com/

1.4 Glossary

P2P	Purchase to Pay
ERP	Enterprise Resource Planning System
KPI	Key Performance Indicator

2 Business Example

The market is at the dawn of the next big technology change where everything is connected, and software is imbedded in people's lives. This technology change is bringing new opportunities and new threats. Cycle time for innovation is 5–10 times faster, and enterprises can reduce complexity to be more competitive. Business efficiency is ahead of the market and product and service profitability are constantly tracked and optimized.

That is why digital performance management will be the game-changer for companies that want to be successful in the digital economy. A digital performance management solution for 21st century business needs to measure and manage enterprise efficiency and drive product and service profitability in real time.

Built on SAP HANA, SAP Profitability and Performance Management is a next generation digital performance management solution that provides breakthrough real-time business data aggregation capabilities for SAP and non-SAP systems, a high-speed finance and risk calculation engine and comprehensive simulation and scenario management.

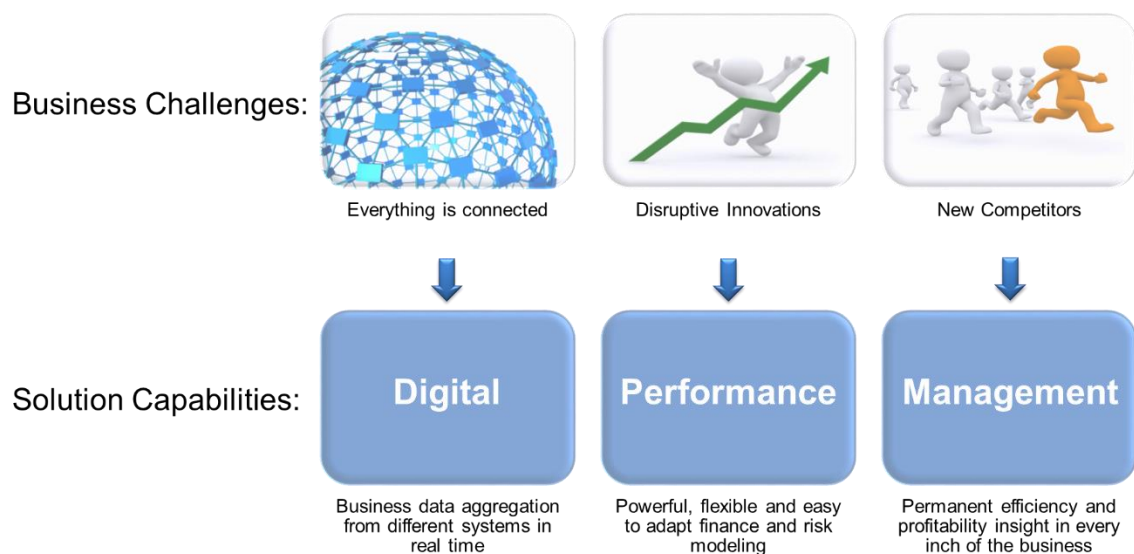


Figure 1: Digital Imperative

2.1 Scope and Business Definition

This sample content covers the analysis of sample process data coming from standard SAP tables in the area of Purchase to Pay, comprising certain aspects of data integration, data input, processing (including derivations and calculations), as well as reporting.

As a result, business users will gain useful insights into their organization's processes and equip them with information that could be used as basis for managing these processes.

The following screenshot shows the function hierarchy of the sample content and the process template.

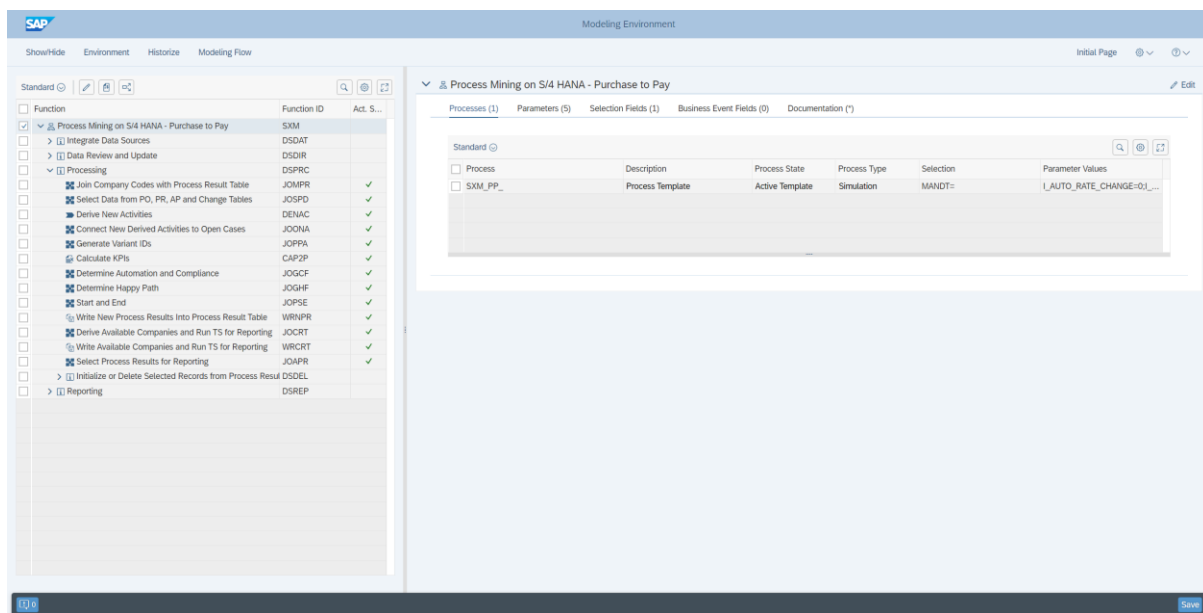


Figure 2: Sample Content Information and Calculation Model

You can also find the information contained in the following chapters on the respective [Documentation](#) tabs for the model.

3 Process Mining on SAP S/4HANA – Purchase to Pay in Detail

Process Mining on SAP S/4HANA for Purchase to pay module aims to extract event information from standard ERP tables and use this information to understand how processes flow within an organization and gain insights on where improvements can be made in the process chain.

This Sample Content for Process Mining on SAP S/4HANA – Purchase to Pay (Environment ID=SXM, Version=PP08) covers many end-to-end examples of processes common to different industries with focus on some important Key Performance Indicators (KPIs) like Throughput Time, Happy Path, Level of Automation and Compliance to standard processes.

This sample content comes with the SAP Profitability and Performance Management Software Installation.

It consists of one Calculation Unit function and is structured underneath by description functions in the following sections:

- ***Integrate Data Sources***

Defines manually loaded data, as well as an option to fetch data from a remote SAP system, as input for the subsequent functions.

- ***Data Review and Update***

Provides specific review and update options for all the tables.

- ***Processing***

All the processing functions such as data enrichment, derivation of activities and calculation of KPIs are defined in this part.

Basic processes are:

- Collection of main data from header and item tables, as well as data from change tables and data enrichment where some characteristics are fetched from other tables, such as customer/vendor, country/region, and so on
- Derivation of activities
- Calculation of KPIs
- Determination of Automation and Compliance
- Determination of Happy Path
- Finalization of data for use in reporting, such as generation of a START and END activity ID for all cases and ranking of variants according to their frequency of occurrence
- Selection of company codes and run timestamps to be used in reporting

- **Reporting**

This section provides reports specific to Purchase to Pay module. There are self-service reports where all the relevant key figures and characteristics are included, which, through selections and filters can produce reports tailor-made for the user's requirements.

All execution activities are configured without dependency, so that they can be executed in parallel for demo purposes. In implementation projects dependent activities can be defined instead if needed.

Note that for execution activities, performer and reviewer teams are assigned as an example. In implementation projects, teams need to be assigned to restrict the authorizations to relevant users.

3.1 Integrate Data Sources

In this section the necessary data sources are defined. This sample content works with own data and cannot presume any custom specific system landscape, application or interface.

The integration of data sources uses therefore functions of type Model Table to make test data available and these Model Tables need to be exchanged with other model functions in an implementation project to connect to the real and concrete customer data sources and targets.

A selection is done on the *Client (MANDT)* in the top views as it is what is expected in the implementation project. These views can also be redirected to own data for testing purposes.

Standard SAP ERP tables and fields are being used but the information model is kept lean to ease the adaption in an implementation project. For example, it assumes just some fields from each table are used, which is enough in most cases and obviously much easier to provide.

This section defines manually loaded data used in the subsequent functions:

- *Process Result Table*
- *BKPF - Accounting Documents Header*
- *BSEG - Accounting Documents Items*
- *CDHDR - Change Documents Header*
- *CDPOS - Change Documents Item*
- *EKKO - Purchasing Documents Header*
- *EKPO - Purchasing Documents Items*
- *EBAN - Purchase Requisitions*
- *LFA1 - Vendor Master Data*
- *T001 – Company Codes*
- *USR02 – Logon Data*
- *Process Compliance Rules*
- *Available Company Codes and Run Timestamps for Reporting*
- *Process Forecast Data*
- *Automatic Transactions*

3.1.1 Process Result Table

This model table consists of all available fields in the join function *Start and End - JOPSE*. This is the table where all process results data from processing runs are stored. A combination of company code and run timestamp is used to select the data from this table via the join function *Select Process Results for Reporting - JOAPR*, the result of which will be used for reporting.

Records are added to this table by:

- Execution of join function *Start and End - JOPSE*
- Execution of writer function *Write New Process Results into Process Result Table - WRNPR*

There are two ways to delete data from this table:

1 - To delete a specific company code and run timestamp combination:

- Via query function *Select Company and Run TS for Reporting - QECRT*, mark the company code and run timestamp combination to be deleted by entering '1' in the field *MARK_DEL (Mark for Deletion)*
- Execute join function *Prepare for Deletion of Selected Process Results Data - JODEL*
- Execute writer function *Delete Selected Process Results Data - WRDEL*

2 - To initialize the Process Result Table:

- Execute join function *Prepare to Initialize Process Result Table - JOINI*
- Execute writer function *Initialize Process Result Table - WRINI*

3.1.2 BKPF - Accounting Documents Header

This function replicates the data from the ERP system and allows for it to be utilized as a data source for downstream functions.

It contains the following fields:

- *BELNR*: Accounting Document Number
- *BLART*: Document Type
- *BLDAT*: Document Date in the Document
- *BUDAT*: Posting Date in the document
- *BUKRS*: Company Code
- *WAERS*: Currency Key
- *CPUDT*: Date of Entry
- *CPUTM*: Time of Entry
- *GJAHR*: Fiscal Year

- *MANDT*: Client
- *TCODE*: Transaction Code
- *USNAM*: User Name

3.1.3 BSEG - Accounting Documents Items

This function replicates the data from the ERP system and allows for it to be utilized as a data source for downstream functions

It contains the following fields:

- *AUGBL*: Document Number of Clearing Document
- *BELNR*: Accounting Document Number
- *AUGDT*: Clearing Date
- *BSCHL*: Posting Key
- *BUKRS*: Company Code
- *BUZEI*: Number of Line Item Within Accounting Document
- *DMBTR*: Amount in Local Currency
- *GJAHR*: Fiscal Year
- *H_HWAER*: Local Currency
- *KOART*: Account Type
- *LIFNR*: Vendor / Supplier Number
- *MANDT*: Client
- *ZFBDT*: Baseline Date for Due Date Calculation
- *EBELN*: Purchasing Document
- *EBELP*: Purchase Order Item Number

3.1.4 CDHDR – Change Documents Header

This function replicates the data from the ERP system and allows for it to be utilized as a data source for downstream functions.

It contains the following fields:

- *ACT_CHNGNO*: Change Number of the Document Created by This Change
- *MANDT*: Client

- *CHANGENR*: Change Number of Document
- *OBJECTCLAS*: Object Class
- *OBJECTID*: Object ID
- *UDATE*: Change Event Date
- *UTIME*: Change Event Time
- *CHNGIND*: Change Indicator
- *TCODE*: Transaction Code
- *USERNAME*: Name of Person Responsible in Change Document

3.1.5 CDPOS – Change Document Items

This function replicates the data from the ERP system and allows for it to be utilized as a data source for downstream functions.

It contains the following fields:

- *MANDT*: Client
- *CHANGENR*: Change Number of Document
- *FNAME*: Field Name
- *OBJECTCLAS*: Object Class
- *OBJECTID*: Object ID
- *TABKEY*: Changed Table Record Key
- *TABNAME*: Table Name
- *CHNGIND*: Change Indicator
- *VALUE_NEW*: New Value
- *VALUE_OLD*: Old Value

3.1.6 EKKO – Purchasing Documents Header

This function replicates the data from the ERP system and allows for it to be utilized as a data source for downstream functions.

It contains the following fields:

- *AEDAT*: Record Creation Date
- *BUKRS*: Company Code

- **WAERS**: Currency Key
- **EBELN**: Purchasing Document
- **LIFNR**: Vendor / Supplier Number
- **MANDT**: Client
- **STATU**: Status of Purchasing Document
- **ERNAM**: Name of Person Who Created the Object

3.1.7 EKPO – Purchasing Documents Items

This function replicates the data from the ERP system and allows for it to be utilized as a data source for downstream functions.

Fields:

- **AEDAT**: Record Creation Date
- **BANFN**: Purchase Requisition Number
- **BUKRS**: Company Code
- **EBELN**: Purchasing Document
- **EBELP**: Purchase Order Item Number
- **EFFWR**: Effective Value
- **MANDT**: Client
- **MATNR**: Material
- **MEINS**: Order Unit
- **MENGE**: Order Quantity
- **NETPR**: Net Order Price
- **NETWR**: Net Order Value
- **WERKS**: Plant
- **BNFPO**: Item Number of Purchase Requisition

3.1.8 EBAN – Purchase Requisitions

This function replicates the data from the ERP system and allows for it to be utilized as a data source for downstream functions.

It contains the following fields:

- **BANFN**: Purchase Requisition Number
- **BNFPO**: Item Number of Purchase Requisition
- **EBELN**: Purchasing Document
- **EBELP**: Purchase Order Item Number
- **MANDT**: Client
- **BADAT**: Requisition [Request] Date
- **FRGDT**: Purchase Requisition Release Date

3.1.9 LFA1 – Vendor Master Data

This function replicates the data from the ERP system and allows for it to be utilized as a data source to downstream functions.

It contains the following fields:

- **LAND1**: Country / Region
- **LIFNR**: Vendor / Supplier Number
- **MANDT**: Client
- **NAME1**: Vendor Name
- **ORT01**: City

3.1.10 T001 – Company Codes

This function allows the user to select which company codes will be included in the processing by setting the value of field CCSEL to 1.

It contains the following fields:

- **MANDT**: Client
- **BUKRS**: Company Code
- **ORT01**: City
- **LAND1**: Country / Region
- **CCSEL**: Select Company Code

3.1.11 USR02 – Logon Data

This function lists different types of users in WM process and allows for it to be utilized to determine user types.

It contains the following fields:

- *MANDT*: Client
- *BNAME*: Name of User
- *USTYP*: User Type

3.1.12 Process Compliance Rules

This function describes four Compliance Classes - Sequence, Outright, Happy and Allow. Sequence Compliance class means that the order of the process activities is wrong. Outright exists for activities which are not preferable. Happy and Allow are used to indicate if a given *Case ID* follows or not the Happy Path.

It contains the following fields:

- *ACT_PREC*: Preceding Activity ID
- *ACT_ID*: Activity ID
- *ACT_FOLL*: Following Activity ID
- *COMCSS*: Compliance Class
- *COMID*: Compliance ID

3.1.13 Available Company Codes and Run Timestamps for Reporting

This Model Table consists of all available fields in the Join function *Derive Available Companies and Run TS for Reporting – JOCRT*. It is used to select companies and run timestamps to be included in reporting. Data is written into this table by the above-mentioned function, and can be edited through the Query function *Select Company and Run TS for Reporting - QECRT*.

It contains the following fields:

- *BUKRS*: Company Code
- *RUN_TIMESTAMP*: Run Timestamp
- *PRUN_TIMESTAMP*: Timestamp of Last Record Retrieved
- *CCSEL*: Select Company Code
- *MARK_DEL*: Mark for Deletion

CCSEL = '1' means that the company code and run timestamp combination will be used in reporting as the current or 'this' run.

CCSEL = '2' means that the company code and run timestamp combination will be used in reporting as the previous run.

CCSEL = '0' means that the company code and run timestamp combination will not be used in reporting.

MARK_DEL = '1' means that the company code and run timestamp combination is marked for deletion and will be deleted from the *Process Result Table* upon execution of functions *Prepare for Deletion of Selected Process Results Data - JODEL* and *Delete Selected Process Results Data - WRDEL*.

MARK_DEL = '0' means that the company code and run timestamp combination is not marked for deletion.

3.1.14 Process Forecast Data

This model table consists of all available fields in the last Start and End JOPSE function and it is used for simulation purposes.

3.1.15 Automatic Transactions

This function lists all combinations of automatic transaction in the Purchase to Pay process and is used in the determination of the automation rate.

It contains the following fields:

- *USTYP*: User Type
- *TCODE*: Transaction Code
- *AUT_FLAG*: Automation Flag
- *AUTID*: Automation ID

3.2 Data Review and Update

These Query functions are used to provide read data access to all input data and maintenance of data by execution users are defined for the Process Mining calculation.

See the corresponding Model Tables in *Integrate Data Sources* for details about the fields.

3.2.1 Review Accounting Documents Header

This Query function is used to provide read data access to accounting documents header data, which serves as an input for the Process Mining calculation.

See [BKPF - Accounting Documents Header](#) Model Table in Integrate Data Sources for details about the fields.

3.2.2 Review Accounting Documents Items

This Query function is used to provide read data access to accounting Documents item data, which serves as an input for the Process Mining calculation.

See [BSEG - Accounting Documents Items](#) Model Table in Integrate Data Sources for details about the fields.

3.2.3 Review Change Documents Header

This Query function is used to provide read data access to change documents header data, which serves as an input for the Process Mining calculation.

See [CDHDR - Change Documents Header](#) Model Table in Integrate Data Sources for details about the fields.

3.2.4 Review Change Documents Item

This Query function is used to provide read data access to change documents item data, which serves as an input for the Process Mining calculation.

See [CDPOS - Change Documents Item](#) Model Table in Integrate Data Sources for details about the fields.

3.2.5 Review Vendor Master Data

This Query function is used to provide read data access to vendor master data, which serves as an input for the Process Mining calculation.

See [LFA1 - Vendor Master Data](#) Model Table in Integrate Data Sources for details about the fields.

3.2.6 Review Purchasing Document Header

This Query function is used to provide read data access to purchasing documents header data, which serves as an input for the Process Mining calculation.

See [EKKO - Purchasing Documents Header](#) Model Table in Integrate Data Sources for details about the fields.

3.2.7 Review Purchasing Document Item

This Query function is used to provide read data access to purchasing documents item data, which serves as an input for the Process Mining calculation.

See [EKPO - Purchasing Documents Items](#) Model Table in Integrate Data Sources for details about the fields.

3.2.8 Review Purchase Requisitions

This Query function is used to provide read data access to purchase requisition data, which serves as an input for the Process Mining calculation.

See [EBAN - Purchase Requisitions](#) Model Table in Integrate Data Sources for details about the fields.

3.2.9 Select Company Codes to Process

This Query function is used to provide read data access to company codes data, which serves as an input for the Process Mining calculation.

See [T001 - Company Codes](#) Model Table in Integrate Data Sources for details about the fields.

3.2.10 Select Company and Run TS for Reporting

This Query function is used to provide read/write data access to the available company codes and run timestamps for reporting. It is used primarily to select the company codes and run timestamp combinations that are to be included in the reporting.

See [Available Company Codes and Run Timestamps for Reporting](#) Model Table in Integrate Data Sources for details about the fields.

3.2.11 Review Logon Data

This Query function is used to provide read data access to user logon data, which serves as an input for the Process Mining calculation.

See [USR02 - Logon Data](#) Model Table in Integrate Data Sources for details about the fields.

3.2.12 Update Process Compliance Rules

This Query function is used to provide read and update data access to process compliance rules, which serves as an input for the Process Mining calculation.

See [Process Compliance Rules](#) Model Table in Integrate Data Sources for details about the fields.

3.2.13 Review Process Forecast Data

This Query function is used to provide read data access to process forecast data, which serves as an input for the Process Mining calculation.

See [Process Forecast Data](#) Model Table in Integrate Data Sources for details about the fields.

3.2.14 Update Automatic Transactions

This Query function is used to provide read and update data access to automatic transactions data, which serves as an input for the Process Mining calculation.

See [Automatic Transactions](#) Model Table in Integrate Data Sources for details about the fields.

3.2.15 Review Process Result Table

This Query function is used to provide read data access to the process results data, which serves as an input for the Process Mining calculation.

See [Process Result Table](#) Model Table in Integrate Data Sources for more details.

3.3 Processing

In this section, the core functions of the model are executed.

This stream takes the data from Purchase to Pay and analyzes the process.

The starting point is the company codes selected for processing , which are joined with the accounting documents in *BKPF/BSEG*, the purchasing documents in *EBAN/EKKO/EKPO* and the document changes in *CDHDR/CDPOS*. This data is selected based on the date parameters entered in the *Parameters* section of the *Calculation Unit> Processes> Selections* tab, which limits fetching of data with timestamps between the *I_FROM_DATE* and *I_TO_DATE* range, and matched in order to link together an individual purchasing document with other documents related to it, such as changes and payments.

Key activities are then derived both from the documents and their changes and each document is assigned a unique Case ID. Lines in the final results will represent activities and will be marked by a timestamp and some additional fields such as automation flag and compliance flag. The cases are then grouped based on the concatenation of Activity IDs (ordered based on timestamp) into different variants (unique sequence of activities) which are ranked by frequency of occurrence. KPIs are then calculated to provide some useful information that will help the user to analyze the process.

Input:

- *Process Result Table*
- *BKPF - Accounting Documents Header*
- *BSEG - Accounting Documents Items*
- *CDHDR - Change Documents Header*
- *CDPOS - Change Documents Item*
- *EKKO - Purchasing Documents Header*
- *EKPO - Purchasing Documents Items*
- *EBAN - Purchase Requisitions*
- *LFA1 - Vendor Master Data*
- *T001 - Company Codes*
- *USRO2- Logon Data*
- *Process Compliance Rules*
- *Available Company Codes and Run Timestamps for Reporting*
- *Process Forecast Data*
- *Automatic Transactions*

Functions:

- *Join Company Codes with Process Result Table*
- *Select Data from PO, PR, AP and Change Tables*
- *Derive New Activities*
- *Connect New Derived Activities to Open Cases*
- *Generate Variant IDs*
- *Calculate KPIs*
- *Determine Automation and Compliance*
- *Determine Happy Path*

- *Start and End*
- *Write New Process Results Into Process Result Table*
- *Derive Available Companies and Run TS for Reporting*
- *Write Available Companies and Run TS for Reporting*
- *Select Process Results for Reporting*
- *Prepare for Deletion of Selected Process Results Data*
- *Delete Selected Process Results Data*
- *Prepare to Initialize Process Result Table*
- *Initialize Process Result Table*

This sample content allows full flexibility for the user to execute the following:

- **Initialization of process results data:** This sample content comes pre-loaded with several processing run results (from January 2020 to March 2021). The Process Result Table where this data is stored can be initialized.
- **Deletion of process results data for specific run dates:** Data in the Process Result Table pertaining to specific company code and run timestamp combinations can be deleted.
- **Selection of company codes to process:** This sample content has data for five company codes. User can select which company codes to process via an editable query.
- **Execution of processing for specific date range / run date:** User has complete control of the date range to process as well as the assignment of a run date for each processing run.
- **Derivation of available company code and run timestamp combinations for reporting:** A processing function derives all the available company code and timestamp combinations from the Process Result Table and defaults the two most recent run timestamps per company code. This default selection can be changed via an editable query.
- **Selection of company codes and run timestamp combinations for reporting:** Via an editable query, user can review the two defaulted company code and run timestamps combinations or change them before running the execution function to use the selection for reporting.
- The first thing to do is to supply the necessary date parameters in the *Selections* section of the *Calculation Unit>Processes>Parameters* tab. Data with timestamps on or after the *I_FROM_DATE* and on or before the *I_TO_DATE* will be retrieved from all the input tables. The *I_RUN_TIMESTAMP* parameter has been provided to allow the user to specify the run timestamp.

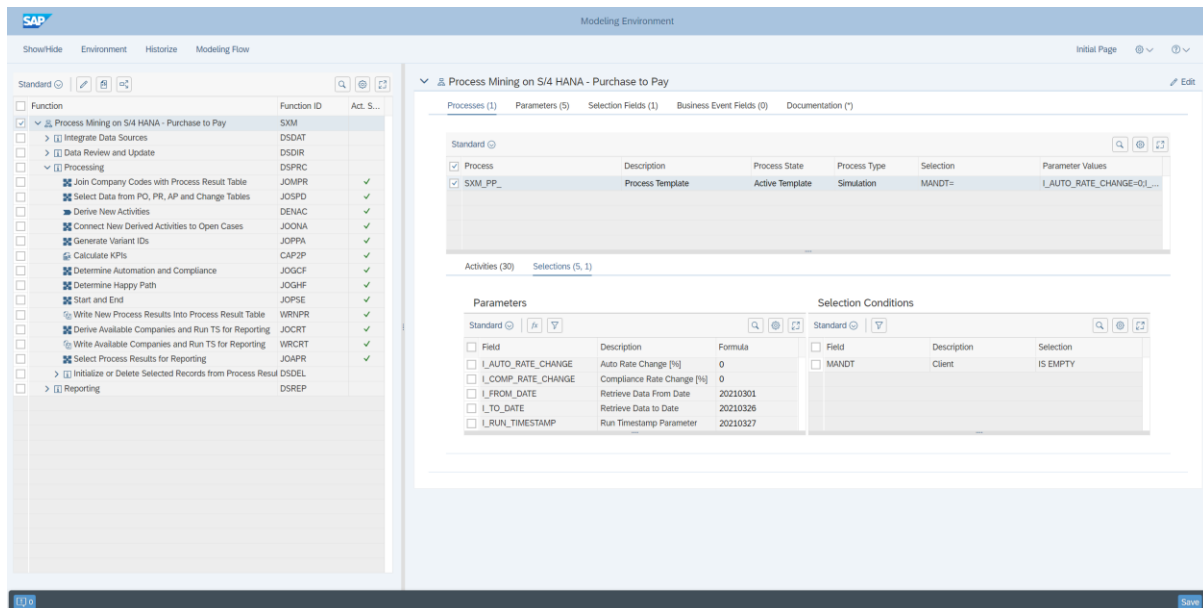


Figure 3: Date Parameters

The user then needs to choose which company codes are to be included for processing. This is done via editable query function *Select Company Codes to Process – QET01*. This content is pre-populated with data for five company codes and all these 5 company codes are selected by default. You can unselect a company code by changing the value of the field *Select Company Code* to '0'.

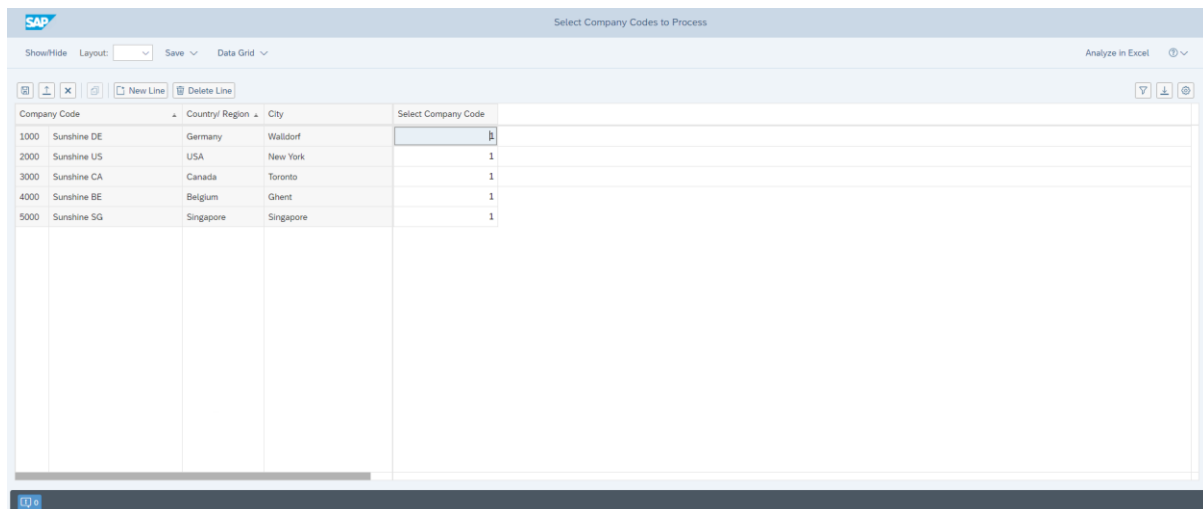


Figure 4: Editable query Select Company Codes to Process

3.3.1 Join Company Codes with Process Result Table

This join function is used to select the company codes to be included in the processing (based on the *T001 - Company Codes* table) and determine the most recent timestamp of records retrieved for each company code selected (based on *Process Result Table*). This allows the next function to only retrieve data with timestamps after the most recent timestamp of records retrieved.

3.3.2 Select Data from PO, PR, AP and Change Tables

This This join function retrieves data from the relevant tables to be used as basis for deriving process activities. Insert records for purchase requisitions, purchase orders, invoice booking and invoice payments, as well as Change records for purchase requisitions and purchase orders are retrieved from CDHDR - Change Documents Header and CDPOS - Change Documents Item.

Additional relevant data to be used in processing and reporting are retrieved from the following tables:

- EBAN - Purchase Requisitions
- EKKO - Purchasing Documents Header and EKPO - Purchasing Documents Items
- BKPF - Accounting Documents Header and BSEG - Accounting Documents Items
- USR02 - Logon Data is used to derive the user type based on the user ID of each transaction record retrieved. The user type will be used in a later function as part of the condition for setting the automation flag.

Field Transaction Type TTYPE is set to the following to help in identification of records when reviewing results:

- R for Purchase Requisitions Insert documents
- P for Purchase Orders Insert documents
- A for Accounting Documents (invoice booking and payment)
- C for Purchase Requisition and Purchase Order Change documents

3.3.3 Derive New Activities

This Derivation function is used to derive basic activities for each document.

Each line coming from previous function *Select Data from PO, PR, AP and Change Tables - JOSPD* corresponds to a single document line from which one or more activity can be derived. Most common activities are the creation of the purchase requisition and purchase order. Each rule in this function defines an activity.

3.3.4 Connect New Derived Activities to Open Cases

This join function collects new derived activities from previous function *Derive New Activities - DENAC* and activities of open cases from the most recent run in the Process Result Table.

3.3.5 Generate Variant IDs

This Join function is used to derive the Variant ID, based on the results of *Connect New Derived Activities to Open Cases - JOONA* function.

The *Variant ID* field is created using string aggregation of *Activity IDs*, ordered by *Timestamp* and *Activity ID* and grouped on *Case ID* level. A hash value is then produced for each unique value. Then the *Variant ID* is joined back (via Left Outer Join) to the original input table. The join predicate is the *Case ID* for both joins.

3.3.6 Calculate KPIs

This Calculation function takes the results of join function *Generate Variant IDs - JOPPA* and calculates several Key Performance Indicators (KPIs) in two rules.

3.3.7 Determine Automation and Compliance

This function generates automation / compliance flag in every record and user type / violation type for automation / non-compliance in each record.

There are two types of violation, sequence and outright. Sequence violation means that activity sequence represents violation and outright violation that existence of activity by itself represents violation. Non-compliant records have *Compliance flag* set to '0', else are set to '1'.

There are also two types of users, dialog (type A and S) and batch (type B, C and L). Dialog user means that the tagged activity has been processed manually and batch user means that the tagged activity has been processed automatically. Automatically processed records have *Automation flag* set to '1', otherwise, it is set to '0'.

3.3.8 Determine Happy Path

This function generates *Happy Path Flag* for every record. Records following the happy path sequence have this flag value set to '1', otherwise, it is set to '0'.

3.3.9 Start and End

This function creates a start and end activity for each case ID. Some additional KPIs are also calculated and additional characteristics are derived in this function to ensure that results will be ready for use in reporting.

3.3.10 Write New Process Results into Process Result Table

This function writes the results of the *Start and End - JOPSE* function into the *Process Result Table*.

3.3.11 Derive Available Companies and Run TS for Reporting

This function derives all the available company code and run timestamp combinations from the *Process Result Table* and defaults the value of '1' (most recent) and '2' (second most recent) to the two most recent run timestamps per company code. The assumption is that the user will most likely be interested in comparing the results of the two most recent runs. If the user wishes to change these default selections, it can be done via the query function *Select Company and Run TS for Reporting - QECRT*.

IMPORTANT: This join function needs to be run after running function *Write New Process Results into Process Result Table – WRNPR* to ensure that the two most recent run timestamps per company code are selected for reporting based on updated data in the *Process Result Table*.

3.3.12 Write Available Companies and Run TS for Reporting

This function writes the results of the *Derive Available Companies and Run TS for Reporting - JOCRT* function into the *Available Company Codes and Run Timestamps for Reporting*.

3.3.13 Select Process Results for Reporting

This function selects records from the *Process Result Table* based on selected company codes and timestamps from the *Available Company Codes and Run Timestamps for Reporting* table (CCSEL field = 1 and 2) and combines them with records from the *Process Forecast Data* table. The results of this function will be the input of all query functions used for reporting.

IMPORTANT: Before running this function, ensure that the *Available Company Codes and Run Timestamps for Reporting* table had been updated with the selected company codes and run timestamp combinations.

3.3.14 Prepare for Deletion of Selected Process Results Data

By joining the *Process Result Table* with the *Available Company Codes and Run Timestamps for Reporting* table, this function identifies the data in the *Process Result Table* to be deleted, through the use of the field *MARK_DEL (Mark for Deletion)*. All records with *MARK_DEL* = '1' are then excluded in

the final results. The marked records will only be deleted from the *Process Result Table* once the result of this function is written via the next function *Delete Selected Process Results Data - WRDEL*.

3.3.15 Delete Selected Process Results Data

This writer function deletes all the data the Process Result Table and inserts the results of the *Prepare for Deletion of Selected Process Results Data - JODEL* into it.

3.3.16 Prepare to Initialize Process Result Table

This function retains only the initial records (*Process Status = INIT*) in the *Process Result Table* in its results. All the other records will only be deleted from the *Process Result Table* once the result of this function is written via the next function *Initialize Process Result Table - WRINI*.

3.3.17 Initialize Process Result Table

This writer function deletes all the data the Process Result Table and inserts the results of the *Prepare to Initialize Process Result Table - JOINI* into it.

3.4 Reporting

In this section all query functions which can be used in the review of results by execution users are defined.

In the process, these review and reporting activities happen after execution of the processing functions.

- *Most Common Variants*
- *Automation Trend*
- *Automation Trend [Side-by-Side Simulation]*
- *Process Compliance*
- *Process Compliance [Side-by-Side Simulation]*
- *3-Way Match*
- *Right First Time*
- *Throughput Days of Case*
- *Throughput Days of Case [Side-by-Side Simulation]*
- *Purchase to Pay Results*
- *Purchase to Pay Results [Side-by-Side Simulation]*
- *Happy Path Rate*

Note that no specific chart types are maintained, so they use the default “Column” chart type, but this type can be changed by end users on-the-fly and saved as default layout.

3.4.1 Most Common Variants

This report ranks the variants (specific sequence of activities) according to their frequency of occurrence. It shows for each variant the number of cases, total value, average activity duration (days) and average variant duration (days).

The following fields are preconfigured in this report:

- *Number of Cases*
- *Value*
- *Duration [Days]*
- *Duration [Days] of Case*
- *Activity Average Duration [Days]*
- *Variant Average Duration [Days]*
- *Variant Rank by Frequency*
- *Select Company Code for Reporting*

Some dimensions are available as free characteristics which can be added anytime to help with analysis, such as:

- *Activity ID*
- *Case ID*
- *Country*
- *Company Code*
- *City*
- *Event Date*
- *Variant ID*
- *Activity Sequence*
- *Scenario*

3.4.2 Automation Trend

This report shows the percentage of activities that are automated. This is best presented as a 100% column or bar chart.

The following fields are preconfigured in this report:

- *Automation Rate*
- *Manual Rate*
- *Select Company Code for Reporting*
- *Period*

Some dimensions are available as free characteristics which can be added anytime to help with analysis, such as:

- *Company Code*
- *Plant*
- *Country*
- *Activity ID*
- *Case ID*
- *City*
- *Event Date*
- *Scenario*
- *Run Timestamp*

3.4.3 Automation Trend [Side-by-Side Simulation]

This report shows the percentage of activities that are automated. This is best presented as a 100% column or bar chart.

The following fields are preconfigured in this report:

- *Automation Rate*
- *Manual Rate*
- *Period*

Some dimensions are available as free characteristics which can be added anytime to help with analysis, such as:

- *Company Code*
- *Plant*
- *Country*
- *Activity ID*
- *Case ID*
- *City*
- *Event Date*
- *Scenario*

3.4.4 Process Compliance

This report shows the percentage of activities that are compliant. This is best presented as a 100% column or bar chart.

The following fields are preconfigured in this report:

- *Compliance Rate [%]*
- *Non-Compliance [%]*

- *Select Company Code for Reporting*
- *Period*

Some dimensions are available as free characteristics which can be added anytime to help with analysis, such as:

- *Activity ID*
- *Company Code*
- *Material*
- *Plant*
- *Country/Region*
- *City*
- *Case ID*
- *Scenario*
- *Run Timestamp*

3.4.5 Process Compliance [Side-by-Side Simulation]

This report shows the percentage of activities that are compliant. This is best presented as a 100% column or bar chart.

The following fields are preconfigured in this report:

- *Compliance Rate*
- *Non-Compliance Rate*
- *Period*

Some dimensions are available as free characteristics which can be added anytime to help with analysis, such as:

- *Material*
- *Plant*
- *Company Code*
- *Vendor/Supplier Number*
- *Country*
- *City*
- *Quarter*
- *Activity ID*
- *Case ID*
- *Event Date*
- *Scenario*

3.4.6 3-Way Match

This report shows the percentage of purchase orders processed that have achieved the 3-Way Match (matching purchase order, goods receipt and invoice receipt). The 3-Way Match is considered as best practice in Purchase to Pay processing because payment of invoices can be done safely without need for further checks, as authorization to purchase as well as confirmation of goods receipt were already done prior to receiving the invoice. This is best presented as a 100% column or bar chart.

The following fields are preconfigured in this report:

- *3-Way Match Rate*
- *No 3-Way Match Rate*
- *Select Company Code for Reporting*
- *Period*

Some dimensions are available as free characteristics which can be added anytime to help with analysis, such as:

- *Activity ID*
- *Material*
- *Company Code*
- *Vendor/Supplier Number*
- *Country*
- *City*
- *Quarter*
- *Plant*
- *Event Date*
- *Scenario*

3.4.7 Right First Time

This report shows the percentage of activities that are done right the first time (for example, no subsequent changes made). This is best presented as a 100% column or bar chart.

The following fields are preconfigured in this report:

- *Right First Time Rate*
- *With Subsequent Changes*
- *Select Company Code for Reporting*
- *Quarter*

Some dimensions are available as free characteristics which can be added anytime to help with analysis, such as:

- *Activity ID*
- *Material*
- *Company Code*

- *Vendor/Supplier Number*
- *Country*
- *City*
- *Plant*
- *Period*
- *Event Date*
- *Scenario*

3.4.8 Throughput Days of Case

This report shows the total Throughput Days of Case during each period. This is best presented as a bar chart.

The following fields are preconfigured in this report:

- *Throughput [Days] of Case*
- *Throughput [Days]*
- *Select Company Code for Reporting*
- *Period*

Some dimensions are available as free characteristics which can be added anytime to help with analysis, such as:

- *Activity ID*
- *Vendor/Supplier Number*
- *Case ID*
- *Scenario*

3.4.9 Throughput Days of Case [Side-by-Side Simulation]

This report shows the total Throughput Days of Case during each period. This is best presented as a bar chart.

The following fields are preconfigured in this report:

- *Throughput [Days] of Case*
- *Throughput [Days]*
- *Period*

Some dimensions are available as free characteristics which can be added anytime to help with analysis, such as:

- *Activity ID*
- *Vendor/Supplier Number*
- *Case ID*
- *Scenario*

3.4.10 Purchase to Pay Results

This report shows the results of process mining for Purchase to Pay module. This is best presented as a data grid.

The following fields are preconfigured in this report:

- *Purchase Order Value*
- *Select Company Code for Reporting*
- *Quantity*
- *Throughput [Days]*
- *Throughput [Days] of Case*
- *Activity Frequency*
- *Variant Frequency*
- *3-Way Match Rate*
- *No 3-Way Match Rate*
- *Automation Rate*
- *Manual Rate*
- *Compliance Rate*
- *Non-Compliance*
- *Right First Time Rate*
- *With Subsequent Changes*
- *Happy Path Rate*
- *Case ID*
- *Run Timestamp*
- *Timestamp of Last Record Retrieved*
- *Activity Sequence*
- *Activity ID*
- *Automation Flag*
- *Compliance Flag*
- *Right First Time Flag*
- *3-Way Match Flag*

Some dimensions are available as free characteristics which can be added anytime to help with analysis, such as:

- *Country*
- *Company Code*
- *Vendor/Supplier Number*
- *Material*
- *Following Activity ID*
- *Preceding Activity ID*
- *Plant*
- *Event Timestamp (YYYY-MM-DD hh24:mm:ss)*
- *Variant ID*
- *Unit*

- *Currency*
- *Quarter*
- *Period*
- *Variant Rank by Frequency*
- *City*
- *Event Date*
- *Scenario*
- *Process Data Status*

3.4.11 Purchase to Pay Results [Side-by-Side Simulation]

This report shows the results of process mining for Purchase to Pay module. This is best presented as a data grid.

The following fields are preconfigured in this report:

- *Purchase Order Value*
- *Quantity*
- *Throughput [Days]*
- *Throughput [Days] of Case*
- *Activity Frequency*
- *Variant Frequency*
- *3-Way Match Rate*
- *No 3-Way Match Rate*
- *Automation Rate*
- *Manual Rate*
- *Compliance Rate*
- *Non-Compliance*
- *Right First Time Rate*
- *With Subsequent Changes*
- *Happy Path Rate*
- *Case ID*
- *Activity Sequence*
- *Activity ID*
- *Automation Flag*
- *Compliance Flag*
- *Right First Time Flag*
- *3-Way Match Flag*

Some dimensions are available as free characteristics which can be added anytime to help with analysis, such as:

- *Country*
- *Company Code*

- *Vendor/Supplier Number*
- *Material*
- *Following Activity ID*
- *Preceding Activity ID*
- *Plant*
- *Event Timestamp (YYYY-MM-DD hh24:mm:ss)*
- *Variant ID*
- *Unit*
- *Currency*
- *Quarter*
- *Period*
- *Variant Rank by Frequency*
- *City*
- *Event Date*
- *Scenario*

3.4.12 Happy Path Rate

This report shows the Happy Path behavior. This is best presented as a 100% column or bar chart.

The following fields are preconfigured in this report:

- *Followed the Happy Path*
- *Have not followed the Happy Path*
- *Select Company Code for Reporting*
- *Period*

Some dimensions are available as free characteristics which can be added anytime to help with analysis, such as:

- *Activity ID*
- *Scenario*
- *Company Code*
- *Vendor*
- *Country/Region*

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