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1. PRICING SIMULATION COMPONENTS

The SAP Hybris Billing, pricing simulation includes the following components:

- Pricing Simulation Administration
- Pricing Simulation
- Customer Behavior Modeling
- Customer Behavior Modeling Configuration
- Analysis and Analysis Configuration

2. SYSTEM CONFIGURATION

2.1 Work Process Configuration

A pricing simulation is always executed as a background process. Therefore, it is necessary to set up a suitable number of work processes of the batch type on your application server. You have to set an appropriate value for the profile parameter rdisp/wp_no_btc (transaction RZ11). You can also use this parameter to restrict the number of pricing simulations executed in parallel.

2.2 Other System Parameters

Depending on the complexity of the used charge plans the corresponding L-Script could become very large. Therefore Systemparameter “zttta/short_area” should be increased to 32000000 (transaction RZ11).

3. ADMINISTRATION REPORTS

3.1 Reports for Cookie Handling
3.1.1 Select Server-Based Session Cookies
You can use report PSI_SHOW_SERVER_COOKIES to select the server-based session cookie that has been created during runtime.

3.1.2 Delete Erroneous Cookies
You can use report PSI_CLEAN_UP_SERVER_COOKIES to delete erroneous cookies that have reached their expiry date.

3.2 Reports for the Persistence Layer

3.2.1 Search for Persistence Layer Data
You can use report PSI_SHOW_PERSISTENT_LAYER_DATA to search for simulations with specific selection parameters and read them from the persistence layer.

Different types of information are available in the management data for a simulation, such as the start date, the end date, the runtime of a simulation, the number of result sets, and the status about whether a simulation was successful. You can also display the selection parameters, the used tariffs, the application log, and the result of a simulation.

If some of the processed usage events could not be rated due to some errors, the simulation ends with status Completed, but you can find the erroneous usage events here.

3.2.2 Delete Simulations from the Persistence Layer
You can use report PSI_REORG_PERSISTENT_LAYER to delete simulations from the persistence layer using specific selection criteria.

For example, if you want to delete simulations older than three months every night, you can use this report with an according variant.

3.2.3 Update Simulation Status
You can use the report PSI_SIM_STATUS_UPDATE to check whether the current status of a simulation is correct.

If a simulation in progress is aborted, but the status is not updated correctly in the persistence layer from In Progress to Error, the report identifies this situation and sets the Error status.

3.3 Reports for Generation

3.2.1 Generate Database Objects
You can use report PSI_GENERATE_DB_OBJECTS to generate database objects. For more information, see the chapter Generation in this document.

3.2.2 Determine Partition Size
You can use report PSI_PARTITION_SIZE_DETERMINE to identify the optimum partition size in terms of performance.

The system executes this report once during the system set up. Afterwards, it is only necessary to execute this report if the data associated with the simulation changes, for example the number of consumption detail records (CDRs) or the complexity of charge plans.

This report generates the database procedure SAP_CC.PSI_SIMULATE_PRODUCT_x, where x represents the number of the products to be generated simultaneously, for example PSI_SIMULATE_PRODUCT_1, PSI_SIMULATE_PRODUCT_2, and so on.
3.4 Reports for Product Administration

3.4.1 Identify Productive Tariffs

You can use report PSI_PRODUCT_CREATE_EXISTING to identify productive tariffs from the consumption detail records (CDRs) and create them during the system setup.

If you load new CDRs into the system which use tariffs that do not exist, you must execute this report again. When you do so, new tariffs are created and tariffs that no longer exist in the CDRs are assigned to be deleted. They can no longer be used for CDR selection.

3.4.2 Manage Existing Tariffs

You can use report PSI_PRODUCT_ADMIN to manage existing tariffs. You can:

- Compile tariffs
- You can adjust tariffs using actual charge plans in SAP Hybris Billing, charging (SAP CC). You can trigger this, if for example the pricing manager changes a charge plan or periodically with a regular job, for example updating tariffs once a day.

  Note: Changing a charge plan can make it necessary to load SAP CC master data again.

- Activate tariffs
- You can activate inactive tariffs if the pricing manager has no authorization to activate a tariff.
- Delete tariffs
- You can delete tariffs. First, the tariff is assigned a deletion indicator so that it can no longer be used in a simulation. If a tariff is definitely no longer used, you can delete it physically from the database. If you do so, all database procedures are also deleted and adjusted.
- Set tariffs to Inactive
- You can set the Inactive status for tariffs. This can be necessary if an error occurs during activation and the status of a tariff remains as In Generation. When you set the status to Inactive, you can edit the tariff and correct the error.

3.5 Additional Reports

3.5.1 Enrich Table SAP_CC.CDR

You can use report PSI_DATA_LOAD_AND_ENRICH to enrich the table SAP_CC.CDR with specific data that is necessary for the CDR-selection. You must always execute this report when new CDRs are loaded into the system.

3.5.2 Delete CDR Records

You can use report PSI_CDR_DELETION to delete CDRs that are no longer needed from database table SAP_CC.CDR.

3.5.3 Statistical Information on Simulations

You can use report PSI_SHOW_RATED_CDR_HISTORY to display statistical information about executed simulations, such as the runtime, the number of CDRs in the system, the number of evaluated CDRs in the system, or the number of result sets.
3.5.4 Creating / Changing Data Providers

During system setup the delivered data providers are created in the logon language. If you need the texts of the data provider in a different delivered language you have to logon in that language and execute report PSI_CREATE_ANA_DEF for all data providers.

3.5.5 Load data from SAP CC

If you set up a data replication to SAP CC either using SAP HANA Smart Data Access or a cross schema read, you can load the data using report PSI_DATA_LOAD_VIRTUAL_TABLES. This report deletes all entries in the replication tables and loads everything again from SAP CC system.

3.5.6 Load data from SAP CI

If you set up a data replication to SAP CI either using SAP HANA Smart Data Access or a cross schema read to replicate consumption items, you can load the data using report PSI_DATA_LOAD_CIDS. This report can execute a full upload or you can trigger an initial load with delta replication.

3.5.7 Calculation of SAPUI5 Application Index

You can use report /UI5/APP_INDEX_CALCULATE to recalculate the application indexes for all SAPUI5 applications.

4. MONITORING

4.1 Technical Simulation Indicators

Administrators can use the UI5 application to quickly see an overview of the most important figures, such as the response time or the data volume. To start this application from the Fiori launchpad, you must be assigned to the SAP_PSI_ADMIN business role.

4.2 Application Log

The application log contains detailed information about simulations or generations that have been executed. Start the application log using transaction SLG1. Messages about the pricing simulation belong to the object PSI. The following sub-objects exist:

- ANALYSIS_DEF: Messages about analysis data provider
- ATTRIBUTE: Messages occurred in attribute characteristics maintenance
- BEHAVIOR_MODEL: Messages occurred in customer behavior model maintenance
- COMPONENT: Messages occurred in service components maintenance
- DATA_GENERATION: Messages occurred during data generation for a customer behavior model
- GENERATION: Messages about generation of database procedures
- QUERY: Messages occurred in the query designer
- SEGMENT_MODEL: Messages occurred during segment model maintenance
- SIMULATION: Messages occurred during execution of a simulation
- USAGE_PARAM: Messages occurred during usage parameter maintenance
- USAGE_PERIOD: Messages occurred during usage period maintenance

4.3 Batch Jobs

For long running processes, the system generates the following batch jobs:

- PSI_DATA_GENERATION: Generation of usage events for a customer behavior model
- PSI_DATA_GEN_DELETE: Deletion of generated usage events for a customer behavior model
• PSI_SIMULATION: Execution of a simulation
• PSI_TARIFF_ACTIVATION: Activation of a tariff

5. GENERATION
5.1 Overview

All HANA objects (database tables, views, table types, procedures, etc.) are generated, either during system setup or if any changes are made in Customizing, impact the generated objects. All objects are generated in the database schema SAP_CC.

Since many database procedures are dependent on client-specific Customizing, such as defined tariffs or scenarios, the generated database procedures use the client as a suffix. This means that the same set of procedures are generated for each client used. There are only a few procedures that do not use the client as a suffix. These are procedures which are not dependent on any Customizing and can be shared between the clients.

Database procedures are generated with following naming conventions:

• PSI*L*<tariff ID>_ <client>
  L-Scripts related to a tariff and containing the compiled pricing logic.
• PSI_USAGE_GENERATION_<service_component_ID>_ <client>:
  L-Scripts related to the usage generation of a service component.
• PSI_ACTIVATION_<client> and PSI_PRICE_PLAN_<client>
  'L-Wrapper' procedures calling the corresponding L-Script according to the simulated tariff.
• PSI_CIDS*<client>
  All procedures related to data replication from SAP CI. For each consumption item class an own procedure exists.
• PSI_QUERY_SELECTION*<client>
  All procedures related to query processing.
• PSI_SIMULATE_PRODUCT*<client>
  All procedures related to the rating process. Each rating scenario has its own procedure.
• PSI_SIMULATE_RESULT_AGGREGATE*<client>:
  Procedures related to the aggregation of a simulation result. For each aggregation group in Customizing exists an own procedure.
• PSI_USAGE_GENERATION_L_WRAPPER_<client>:
  Wrapper procedure which calls the corresponding L-Script for usage generation, depending on the service component.
• PSI*
  All other procedures relevant to the pricing simulation.

In addition to each client used, an ABAP class/1PSI/CL_SIMULATION_AMD_P_<client> is generated, which is used as an entry point for the simulation and is the connection between ABAP and the HANA database procedures.

Besides the database tables used for the replicated SAP CC master data, an own database table SAP_CC_.SIM_RESULT_<sim_uuid> is generated for each simulation to persist the simulation result.
5.2 System Setup

When starting the system setup in Customizing under SAP Convergent Pricing Simulation → Start Generation for System Setup (report PSI_SYSTEM_SETUP), the system generates the following objects:

- All database tables required in the schema SAP_CC
- All database views required in the schema SAP_CC
- All table types required in the schema SAP_CC
- All synonyms for database tables, views and table types
- All procedures required in the schema SAP_CC starting with PSI*
- ABAP class /1PSI/CL_SIMULATION_AMDP_<client>

5.3 Report PSI_GENERATE_DB_OBJECTS

You can use this report to trigger new generation of specific parts of the HANA database procedures, such as:

- Client-dependent procedures
  If you select this option, all database procedures PSI* and the ABAP class /1PSI/CL_SIMULATION_AMDP_<client> are generated. You can use this option if you executed a system setup in another client, which generated all client-independent objects, such as database tables, and so on, and now you want to use the pricing simulation in an additional client. You also use this option if you changed some of the default fields in the Customizing activity Custom Default Values for Pricing Simulation and an error occurred during the automatic generation when saving the data in the Customizing activity.
- Template program
  You can enter a template program here that contains the SQL script that is executed on the HANA database to create HANA objects. You should only use this option once you have received confirmation from SAP.
- L-wrapper procedures
  You can use this option to generate the two L-wrapper procedures PSI_ACTIVATION_<client> and PSI_PRICE_PLAN_<client>.
- Rating scenarios
  You can use this option to generate all procedures PSI_SIMULATE_PRODUCT*_<client> that are relevant to the rating process. You can use this option, for example, when a new rating scenario is added in Customizing. This generation can also be triggered directly from the Customizing activity Define Rating Scenarios by choosing Generate Database Procedures.
- Result queries
  You can use this option to generate all procedures PSI_QUERY_SELECTION*_<client> that are relevant to the query process.
- Read Simulation Result
  You can use this option to generate procedure PSI_SIMULATION_RESULT_GET, which reads the simulation result from the simulation specific database table.
- Aggregate simulation result
  You can use this option to generate all procedures PSI_SIMULATE_RESULT_AGGREGATE*_<client> that are relevant for the simulation result aggregation. You can use this option, for example, when a new
aggregation group is added in Customizing. This generation can also be triggered directly from the Customizing activity Define Aggregation Groups by choosing Generate Database Procedures.

- **Service Components**
  You can generate all procedures related to the usage generation for a service component. These are the procedures PSIL_USAGE_GENERATION* and PSI_USAGE_GENERATION*.

- **Simulation Result Table**
  You can use this option to delete and recreate all existing database tables _SIM_RESULT_<sim_uuid>. This is only necessary if the structure of theses tables was changed. When using this option all existing simulation results are lost.

- **Virtual Tables CC**
  You can use this option to create all virtual tables needed for Smart Data Access to replicate master data from SAP CC. Normally this is triggered directly from customizing when changing the settings for a source system.

- **Procedures for CI Integration**
  You can create all procedures PSI_CIDS* which are related to SAP CI data replication.

- **Virtual Tables CI**
  You can use this option to create all virtual tables needed for Smart Data Access to replicate consumption items from SAP CI.

### 5.4 Tariff Activation

When a tariff is activated, the price logic is compiled in the SAP CC system and stored as an L-procedure PSIL*<tariff ID>_<client> in the HANA database. If the tariff was not yet included in the L-Wrapper, these two procedures are also generated so that the new tariff is included in the L-wrapper and can be used for a simulation. If an error occurs during activation, you can use the report PSI_PRODUCT_ADMIN to recompile or activate a tariff. For more information, see the chapter *Manage Existing Tariffs*. 
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