

SAP Customer Activity Repository 2.0

Document History



Caution

Before you start the implementation, make sure you have the latest version of this document. You can find the latest version at the following location: service.sap.com/instguides.

The following table provides an overview of the most important document changes.

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1 Getting Started



Caution

This guide does not replace the daily operations handbook that we recommend customers to create for their specific production operations.

About this Guide

Designing, implementing, and running your SAP applications at peak performance 24 hours a day has never been more vital for your business success than now.

This guide provides a starting point for managing your SAP applications and maintaining and running them optimally. It contains specific information for various tasks and lists the tools that you can use to implement them. This guide also provides references to the documentation required for these tasks, so you will sometimes also need other guides such as the Installation Guide, Security Guide, and SAP Library.

Global Definitions

SAP Application

A SAP application is an SAP software solution that serves a specific business area like ERP, CRM, PLM, SRM, and SCM.

Business Scenario

From a microeconomic perspective, a business scenario is a cycle, which consists of several different interconnected logical processes in time. Typically, a business scenario includes several company departments and involves with other business partners. From a technical point of view, a business scenario needs at least one SAP application (SAP ERP, SAP SCM, or others) for each cycle and possibly other third-party systems. A business scenario is a unit which can be implemented separately and reflects the customer's prospective course of business.

Component

A component is the smallest individual unit considered within the Solution Development Lifecycle; components are separately produced, delivered, installed and maintained.

Important SAP Notes



Caution

Check regularly for updates available for the Application Operations Guide.

Table 1

SAP Note Number	Title	Comment
1719282	POS TLOG Table Partitioning Information	Note describing partitioning of the / POSDW/TLOGF table.

2 Technical System Landscape

The following diagram provides an overview of SAP Customer Activity Repository, illustrating the different components of the repository, optional data replication, as well as the integration with consuming and receiving applications.

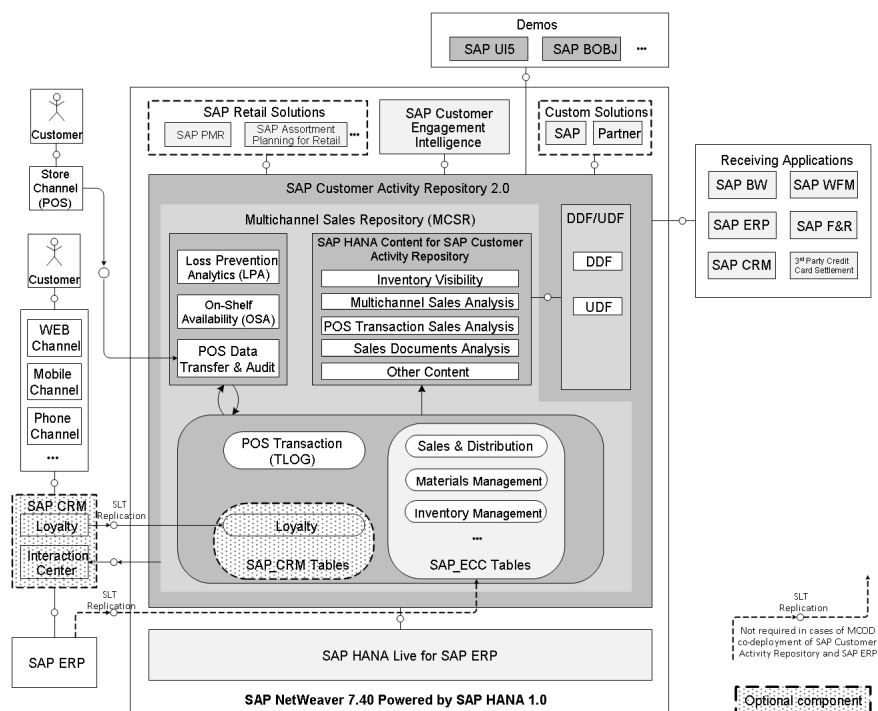


Figure 1: SAP Customer Activity Repository

Related Documentation

The following table lists where you can find more information about the technical system landscape.

Table 2

Guide/Tool	Quick Link on the SAP Service Marketplace (service.sap.com)	Topics
Master Guide	service.sap.com/instguides > <i>Industry Solutions</i> > <i>Industry Solution Guides</i> > <i>SAP for Retail</i> > <i>SAP Customer Activity Repository</i> > <i>SAP Customer Activity Repository 2.0</i> > <i>Common Master Guide</i>	<ul style="list-style-type: none"> Application- and Industry-specific Components such as SAP Financials and SAP Retail Technology Components such as SAP Web Application Server Technical Configuration Scalability High Availability

Guide/Tool	Quick Link on the SAP Service Marketplace (service.sap.com)	Topics
Quick Sizer Tool	► service.sap.com/sizing ► <i>Sizing Guidelines</i> ► <i>Industries</i> ► <i>SAP Customer Activity Repository 2.0</i> ►	Sizing
Security Guide	► service.sap.com/security ► <i>SAP Security Guides</i> ► <i>Industry Solutions</i> ► <i>SAP for Retail</i> ► <i>SAP Customer Activity Repository</i> ► <i>Security Guide - SAP Customer Activity Repository 2.0</i> ►	Security
Administrator's Guide	► service.sap.com/instguides ► <i>Industry Solutions</i> ► <i>Industry Solution Guides</i> ► <i>SAP for Retail</i> ► <i>SAP Customer Activity Repository</i> ► <i>SAP Customer Activity Repository 2.0</i> ► <i>Administrator's Guide, Demand Data Foundation (DDF) 2.0 with Unified Demand Forecast (UDF) on SAP HANA</i> ►	Information about the Demand Data Foundation component of the SAP Customer Activity Repository

3 Monitoring of SAP Customer Activity Repository

Within the management of SAP Technology, monitoring is an essential task. A section has therefore been devoted solely to this subject.

You can find more information about the underlying technology in the SAP NetWeaver Administrator's Guide – Technical Operations Manual in the *SAP Library* under *SAP NetWeaver Library*.

3.1 Alert Monitoring

Proactive, automated monitoring is the basis for ensuring reliable operations for your SAP system environment. SAP provides you with the infrastructure and recommendations needed to set up your alert monitoring to recognize critical situations for SAP Customer Activity Repository as quickly as possible.

i Note

Component-specific monitoring via CCMS is not supported for software components RTLCAR 200 and RTLPOSDM 300. Alternative monitoring possibilities are described below.

Monitoring of SAP HANA

You can monitor SAP HANA through SAP HANA Studio or SAP Solution Manager.

SAP HANA Studio

The System Monitor in SAP HANA Studio provides an overview of SAP HANA systems with information such as the operational state, alerts generated, disk size for data, log and trace, memory used, percentage of CPU being used, and so on. For more detailed monitoring of resource usage and performance for a particular SAP HANA system, please use the Administrator Editor.

For information about the installation and general monitoring and administration of SAP HANA, and about the use of SAP Solution Manager with SAP HANA Studio, see the *Administrator's Guide, SAP HANA Live for SAP Business Suite* on SAP Help Portal at help.sap.com/hba *Master, Installation, Security, Configuration, and Operations Information*.

For more information about monitoring SAP HANA systems using SAP HANA Studio, see the *SAP HANA Administration Guide* on SAP Help Portal at ► help.sap.com/hana_appliance ► *System Administration and Maintenance Information* ► *SAP HANA Administration Guides* ► *SAP HANA Administration Guide* ►.

SAP Solution Manager

SAP Solution Manager can also be used for basic administration and monitoring of SAP HANA systems within SAP landscapes. SAP HANA integrates into existing operations with little effort if SAP Solution Manager is already in use. It is highly recommended to use SAP Solution Manager Release 7.1 SP05 or higher in order to get optimal support for SAP HANA. The monitoring and alerting infrastructure of SAP Solution Manager is based on central agent infrastructure. Pre-configured agents for SAP HANA are delivered by SAP. Once the agents are deployed on SAP HANA and connected to SAP Solution Manager, SAP Solution Manager will receive all alerts of the HANA

Studio. For larger and more complex landscape scenarios, SAP Landscape and Virtualization Manager (LVM) integrates with SAP HANA to allow basic operations like starting and stopping as well as management of dependencies.

For more information about connecting SAP Solution Manager to SAP HANA, see the *SAP HANA Technical Operations Manual* on SAP Help Portal for SAP HANA Appliance Software at help.sap.com/hana_appliance ► *System Administration and Maintenance Information* ► *SAP HANA Technical Operations Manual* ►. See also SAP Service Marketplace at service.sap.com/solman-hana.

For more information about SAP Solution Manager, see SAP Help Portal for Solution Manager at help.sap.com/solutionmanager.

Monitoring of SAP Customer Activity Repository

Monitoring for the POS Data Management component in SAP Customer Activity Repository consists of the following:

- POS DM Application Log
- POS DM Message Log
- Auditor Report
- Trace and Log files (accessed using transaction `SLG1` to log and trace ABAP components)

Monitoring of the SAP Landscape Transformation Replication Server

If you are replicating data from other source systems, monitoring of the SAP Landscape Transformation (LT) Replication Server is essential to ensure data consistency between the source system (for example, SAP ERP) and SAP Customer Activity Repository. The *Configuration and Monitoring Dashboard* (transaction `LTR` in the SLT server) provides users with information that can be used to monitor and identify potential replication issues. The overview screen provides the overall status of the configurations. For each configuration, detailed information is provided, which includes statuses of jobs and connections, statuses of database triggers for tables selected for replication, and statistical information about tables and settings.

As of release DMIS_2010 SP07 on the SAP LT Replication Server, you can use system monitoring capabilities of SAP Solution Manager 7.1 (SP05 or higher) to monitor the status of a configuration and its related schema.

For more information about monitoring load and replication process, see the *Application Operations Guide, Trigger-Based Data Replication Using SAP Landscape Transformation Replication Server* on SAP Help Portal at help.sap.com/hana_appliance ► *System Administration and Maintenance Information* ► *SAP LT for SAP HANA Technical Operations Manual* ►.

3.2 Detailed Monitoring and Tools for Problem and Performance Analysis

The following functions are available within SAP Customer Activity Repository to monitor data flow within the application:

- `/POSDW/LOGS` – POS Data Management Application Log
- `/POSDW/DISPLAY_MESSAGELOG` – POS Data Management Message Log
- `/POSDW/DISPLAY_MODIFICATIONS` – Auditor Report

POS Data Management Application Log

The POS Data Management Application Log collects messages, exceptions, and errors, and displays them in a log. This log provides you with basic header information, a message long text, detailed information, and technical

information. For more information, see SAP Help Portal for SAP NetWeaver at help.sap.com/nw. Choose a release. Under *Application Help*, choose ► *Function-Oriented View* ► *SAP NetWeaver Library: Function-Oriented View* ► *Application Server ABAP* ► *Other Services* ► *Services for Business Users* ► *Application Log - User Guidelines (BC-SRV-BAL)* .

POS Data Management Message Log

The POS Data Management Message Log displays message logs by store and by posting date. You can filter the report by message-related criteria, such as message class or message priority.

Auditor Report

You use the Auditor Report to track manual changes made to POS transactions, as well as to get information about the origin of the transactions, such as the POS Workbench, an IDoc, or a remote function call module.

Trace and Log Files

Trace files and log files are essential for analyzing problems. Transaction `SLG1` is used to log and trace ABAP components. An Application Log consists of a log header and a set of messages. The log header contains general data, such as type, created by/on, and so on. Each log in the database also includes the attributes *Object* and *Subobject*. These attributes are used to describe and classify the application that has written the log.

Table 3: Important Log and Trace Files of POS Data Management (RTLPOSDM) Component

Object	Subobject	Description
/POSDW/PIPE	CHANGE_TASKSTATUS	Task status change
/POSDW/PIPE	CREATETREX	TREX index generation
/POSDW/PIPE	CREDITCARD_MIGRATION	Migration of encryption of credit card numbers
/POSDW/PIPE	DELETE	Delete program
/POSDW/PIPE	DELETE_AGGREGATE	Deletion program for POS aggregates
/POSDW/PIPE	IDOCDISPATCHER	IDoc dispatcher
/POSDW/PIPE	INBOUND_DISPATCHER	Initial processing using queue
/POSDW/PIPE	OUTBOUND_DISPATCHER	Outbound processing for POS aggregates
/POSDW/PIPE	PIPEDISPATCHER	POS dispatcher
/POSDW/PIPE	REFRESH_INDEX	Reconstruction of transaction index
/POSDW/PIPE	REORG_TIBQ	Reorganization of TIBQ
/POSDW/PIPE	STOREDAYCHANGE	POS Data Key change
/POSDW/PIPE	XML_IN	Import POS Transactions as XML file
/POSDW/PIPE	XML_OUT	Export POS Transactions as XML file

Table 4: Important Log and Trace Files of SAP Customer Activity Repository (RTLCAR) Component

Object	Subobject	Description
/POSDW/PIPE	OSADISPATCER	Status of the execution of the On-Shelf Availability Parallel Processing of Alerts report.

For more information, see the SAP Help Portal for SAP NetWeaver at help.sap.com/nw. Choose a release. Under *Application Help*, choose ► *Function-Oriented View* ► *SAP NetWeaver Library: Function-Oriented View* ► *Application Server ABAP* ► *Other Services* ► *Services for Business Users* ► *Application Log – User Guidelines (BC-SRV-BAL)* ►.

Archiving

Archiving of Data Used by SAP Customer Activity Repository

If you replicate data from other source systems to SAP Customer Activity Repository using SLT replication, the replicated data follows the data lifecycle of the source system. As such, when data is archived on the source system, it is deleted from the repository. Similarly, if you access data of other source systems directly from the repository (possible when the repository is co-deployed with the source system on the same SAP HANA database), you do not have access to archived data.

For example, if you archive sales documents in SAP ERP (for example, for performance reasons), these sales documents will no longer be available in SAP Customer Activity Repository. This could affect your reports if you choose to have a short lifecycle of sales documents in SAP ERP. For example, if you archive sales documents after nine months, a year-to-date multichannel sales analysis report in December would miss the sales documents data for most of the first quarter.

For more information on deployment options for SAP Customer Activity Repository, see ► help.sap.com/car ► *Installation and Upgrade Information* ► *Installation Guide* ►.

Data Growth and Data Archiving Monitors

The following are the fastest growing tables in SAP Customer Activity Repository:

Table 5

Technical Name of Table	Description
/POSDW/TLOGF	Transaction Log Flat table
/POSDW/TLOGF_EXT	Transaction Log Extensions table
/POSDW/TIBQ	Inbound Queue for POS Transactions
/POSDW/TIBQ_ADM	Management Records of Inbound Queue for POS Transactions
/POSDW/SOBJL	Source Object Link for POS Transactions
/POSDW/PLOG1S	Processing Log for Small Logs
/POSDW/TSTAT	Areas of Task Status
/POSDW/NAVIX	Navigation Index for Store and Day
/POSDW/AGGR	POS Aggregate

You can use the SAP HANA Studio to identify which tables use the most disk space. To verify the amount of disk space used by a table, do the following:

1. Log on to SAP HANA Studio.
2. Locate the name of your system in the *Navigator* pane.
3. Right-click on your system name and select *Administration* from the context menu.
4. Select the *System Information* tab.
5. Select the *Size of tables on disk* entry.

The tables are displayed with their corresponding disk usage values.

SAP Customer Activity Repository uses the standard archiving and monitoring data archiving tools available in SAP NetWeaver. It does not require any application-specific tools. There are two relevant archiving objects: / POSDW/AGG and / POSDW/TLF.

The following SAP Notes relate to data growth and archiving in SAP Customer Activity Repository:

- [813537](#) (General notes about archiving POS data)
- [625081](#) (Archiving objects and namespace)

For more information about the standard archiving tools, see the SAP Help Portal for SAP NetWeaver at help.sap.com/. Choose a release. Under *Application Help*, choose ► *Function-Oriented View* ► *SAP NetWeaver Library: Function-Oriented View* ► *Solution Lifecycle Management* ► *Data Archiving* ► *Data Archiving in the ABAP Application System* ► *Data Archiving with Archive Development Kit (ADK)* ► *Archive Administration* ►.

Data Load After a Reboot


When you reboot an SAP NetWeaver powered by SAP HANA system, all data that was stored in-memory is lost, and must be reloaded from the permanent persistency layer of the SAP HANA database. After the reboot, the first time you run the SAP Customer Activity Repository application, you may experience significant delays as the application reloads tables such as / POSDW/TLOGF or / POSDW/NAVIX for the first time.

To avoid these delays, it is recommended that you reload all POS Data Management tables with high disk space usage in the following instances:

- Immediately following the reboot of your SAP NetWeaver powered by SAP HANA system
- Prior to launching the SAP Customer Activity Repository application.


First, you must identify which tables use the most memory. See the *Data Growth and Data Archiving Monitors* section above.

Then, for each table, run the following SQL command to load the table from the permanent persistency layer into main memory:

 **Syntax**
load <SAP_SCHEMA>."<TABLE_NAME>" all

where <SAP_SCHEMA> is the name of your SAP HANA database schema and <TABLE_NAME> is the name of the table to load. You can verify the database schema of a particular table in SAP HANA Studio using the same process you use to verify table disk space usage.

You can also create an SQL script that will be automatically executed following an SAP NetWeaver powered by SAP HANA system reboot. You can use the SAP HANA Studio SQL Editor to create this script, or, you can create an ABAP report which will include the following commands:

 **Syntax**
EXEC SQL.
load <SAP_SCHEMA>."<TABLE_NAME1>" all.

```
load <SAP_SCHEMA>."<TABLE_NAME2>" all.
load <SAP_SCHEMA>."<TABLE_NAME3>" all.
...
ENDEXEC.
```

More Information

For detailed monitoring information about the underlying components of SAP Customer Activity Repository, see the following:

Table 6

Reference	Path	Important Sections or Topics (If Applicable)
Technical Operations for SAP NetWeaver	See SAP Help Portal for SAP NetWeaver at help.sap.com/nw . Choose a release. Under <i>Application Help</i> , choose SAP Library > <i>Administration Information</i> > <i>Technical Operations for SAP NetWeaver</i> > <i>Administration of Application Server ABAP</i> > <i>Monitoring and Administration Tools for Application Server ABAP</i> .	<ul style="list-style-type: none"> Statistics, Displaying and Controlling Work Processes (SM50) System Log (SM21) ABAP Dump Analysis
SLT Application Operation Guide	See SAP Help Portal for SAP HANA Appliance Software at help.sap.com/hana_appliance > <i>System Administration and Maintenance Information</i> > <i>SAP LT for SAP HANA Technical Operations Manual</i> .	Changing Load and Replication Procedures
SAP HANA Administration Guide	See SAP Help Portal for SAP HANA Appliance Software at help.sap.com/hana_appliance > <i>System Administration and Maintenance Information</i> > <i>SAP HANA Administration Guides</i> > <i>SAP HANA Administration Guide</i> .	Monitoring SAP HANA Systems

3.3 Detailed Monitoring and Analysis Tools Specific to On-Shelf Availability

The following function is available to monitor the OSA-specific data flow within the application:

- /POSDW/LOGS: SAP POS DM Application Log

The SAP POS DM Application Log collects messages, exceptions and errors, and displays them in a log. This log provides you with basic header information, a message long text, detailed information, and technical information.

For more information, see the SAP Library Help at help.sap.com/nw74/ > *Application Help* > *Function-Oriented View* > *SAP NetWeaver Library: Function-Oriented View* > *Application Server ABAP* > *Other Services* > *Services for Business Users* > *Application Log - User Guidelines (BC-SRV-BAL)* .

Trace and Log Files

Trace files and log files are essential for analyzing problems. The `SIG1` transaction is used to log and trace ABAP components. An application log consists of a log header and a set of messages. The log header contains general data, such as type or created by/on data. Each log in the database also includes the attributes Object and Sub-Object. These attributes are used to describe and classify the application that wrote the log.

Table 7

Object	Sub-Object	Description
/POSDW/PIPE	OSADISPATCHER	Status of the execution of the On-Shelf Availability Parallel Processing of Alerts report.

For more information, see the SAP Library Help at help.sap.com/nw74/ > *Application Help* > *Function-Oriented View* > *SAP NetWeaver Library: Function-Oriented View* > *Application Server ABAP* > *Other Services* > *Services for Business Users* > *Application Log - User Guidelines (BC-SRV-BAL)* .

Cleanup of growing data

OSA computation data is historized, that is stored with the execution date and time and used in the analysis step of On-Shelf Availability processing. Because of growing data amounts, SAP recommends to perform a clean-up in regular intervals. The transaction `/OSA/CLEANUP` deletes OSA computation data from the SAP HANA Database.

In the `/OSA/CLEANUP` transaction, you can specify the following parameters:

- The range of stores for which you want to perform the cleanup
- The date range for which you want to perform the cleanup
- Test mode:
 - If test mode is activated, selected data will be only listed but not deleted
 - If test mode is deactivated, selected data will be deleted
- Detail level of the messages that will be logged during the cleanup

`/OSA/CLEANUP` deletes OSA computation data together with run information from the following OSA tables:

- `/osa/mon_ana`
- `/osa/mon_ana_sum`
- `/osa/ana_conf`
- `/osa/estimat`
- `/osa/est_conf`
- `/osa/iw_pattern`
- `/osa/iwp_conf`
- `/osa/monitoring`
- `/osa/mon_sum`
- `/osa/mon_conf`

The user who executes cleanup needs read and write privileges for the tables that are deleted during cleanup.

Data Growth and Archiving the Monitor Results

The /OSA/STATUSLOG table is the fastest growing OSA table.

Use the SARA transaction to archive the /OSA/STATUSLOG table in regular intervals.

The On-Shelf Availability functionality uses the standard archiving and monitoring data archiving tools available in SAP NetWeaver. It does not require any application-specific tools. The relevant archiving object is /OSA/STATU.

For more information regarding the standard archiving tools, see the SAP Library Help at ► <http://help.sap.com/nw74/> ► *Application Help* ► *Function-Oriented View* ► *SAP NetWeaver Library: Function-Oriented View* ► *Solution Lifecycle Management* ► *Data Archiving* ► *Data Archiving in the ABAP Application System* ► *Data Archiving with Archive Development Kit (ADK)* ► *Archive Administration* ►.

3.4 Data Consistency

SLT Replication

Data can be optionally replicated from SAP ERP and from SAP CRM to SAP Customer Activity Repository. If you replicate data, the information in the replicated tables must be consistent between the source and the target systems.



Caution

You can monitor the processes of the SAP Landscape Transformation (SLT) Replication server using the *Configuration and Monitoring Dashboard*, as specified in the [Alert Monitoring \[page 8\]](#) section. However, the dashboard does not currently provide an automated way to monitor the consistency of replicated tables. When performing SLT replication, you must verify that all the tables required for your SAP Customer Activity Repository implementation, as well as their contents, are being replicated.

More general information about deployment options and data replication into SAP Customer Activity Repository is described under ► help.sap.com/car ► *Installation and Upgrade Information* ► *Installation Guide* ►.

Master Data Checking

The system automatically executes the master data checks that you created in the Customizing for POS Inbound Processing.

The master data checks are processed in the following situations:

- During the inbound processing of POS transactions
- When the editor is started for a particular POS transaction within the POS Workbench
- When tasks are processed

The system checks for POS transaction data and automatically enhances it with further data. If there is no valid master data in the system, the master data check fails and a corresponding error message is displayed. There is no further processing of the affected POS transaction within the task processing.

If all checks and data enhancements are successful, the system continues executing the functions, without interruption, according to the guidelines prescribed by which checks were already performed.

You can also check transaction data when executing processing tasks using rules that you have created in Customizing under ► *POS Inbound Processing* ► *Tasks* ► *Define Rules* ►. Once you have created a rule, you can

execute a specific activity depending on the result you receive. You create rules when you want to process tasks only if certain conditions are met.

ABAP Shared Memory Objects

The POS Data Management component of SAP Customer Activity Repository includes functionality to verify master data in the transactions received from the point-of-sale.

Retrieving master data from database tables through SAP HANA views to perform master data checks for Material, Unit of Measure, and International Article Number (EAN) can result in slower system performance, especially in situations when the number of master data records is high. To improve system performance, the implementation of the master data retrieval uses ABAP shared memory objects to buffer the contents of the master data tables in a shared memory area of the SAP NetWeaver application server. After the initial load of the shared memory objects, instead of going to the database to retrieve the required data, the data is retrieved from the shared memory objects, thereby providing faster data retrieval.

Each version of a shared memory object becomes obsolete 60 minutes after a change lock is released, and the application server performs an automatic refresh from the database.

Shared Objects Area Management (transaction SHMA) is used to display areas for shared objects and their properties.

Shared Objects Monitor (transaction SHMM) provides an overview of the area instances in the shared objects memory of the current application server, and offers selected functions for it.

The following area instances in the shared object memory are relevant for SAP Customer Activity Repository:

Table 8

Shared Memory Object Area	Description
<ul style="list-style-type: none">/POSDW/CL_MATERIAL_BUFFER_AREA/POSDW/CL_MARM_BUFFER_AREA/POSDW/CL_MEAN_BUFFER_AREA	The POS Data Management component of SAP Customer Activity Repository includes functionality to verify master data in the transactions received from the point-of-sale. Master data checks for Material, Unit of Measure, and International Article Number (EAN) retrieve master data from database tables through SAP HANA views. The listed shared memory object allow faster access to this data.
<ul style="list-style-type: none">/POSDW/CL_POSCTRL_BUFFER_AREA	Implementation /POSDW/ANALYTIC_DIST_ENH_IMP of BAdI: POS Transaction Data Distribution to Item Level distributes discount amounts from the transaction header to the transaction line items. This BAdI implementation uses the listed shared memory object to speed up access to SAP HANA view sap.is.retail.ecc.ARTICLEPOSCTRL, which contains information on whether an article is discountable or not.

Additional general information about ABAP shared memory objects can be found in the SAP NetWeaver application help at http://help.sap.com/saphelp_nw70/helpdata/en/df/109b8b4b073b4c82da0f2296c3a974/frameset.htm

Shared Memory Object Size

Every retail business is different, and as such, the amount of master data, such as the number of articles, or unit of measure definitions, is also different. The amount of memory required to buffer this master data at the application server level varies from business to business.

To set the size of shared memory, do the following:

1. Execute transaction RZ11 in your SAP Customer Activity Repository system.
2. Enter **abap/shared_objects_size_MB** as the parameter name and choose *Display*.
3. In the *Maintain Profile Parameters* screen, choose *Change Value* or *Edit > Change Value* (depending on your SAP NetWeaver version).
4. Enter the appropriate shared memory size, in MB, in the *Current Value* field.

We recommend setting the shared memory size to at least 300 MB. Out of this 300 MB, 10-20% is reserved for the internal administration of shared memory.

For more information on troubleshooting shared memory sizing issues, see the following subsection as well as SAP Note [1322182](#).

5. Restart the application server.

Changes to shared memory size only take effect once the application server is restarted.

Troubleshooting Shared Memory Object Issues

Runtime errors that are related to the use of shared memory objects that can occur are as follows:

- **Shared Memory Object Sizing Issues**

Typically, a runtime error caused by a `CX_SHM_OUT_OF_MEMORY` exception, indicates that an insufficient amount of memory is allocated to shared memory.

If your SAP Customer Activity Repository application is terminated as a result of a `CX_SHM_OUT_OF_MEMORY` exception, verify the *Runtime Error Long Text* provided with the runtime error (this can also be accessed using transaction ST22). The long text provides the size of the objects that the application was attempting to load into one of the `/POSDW/CL_*_BUFFER_AREA` shared memory objects. You should increase the size of shared memory, as described in the previous subsection, by at least this amount, plus an additional 10-20% buffer required for administrative activities.

For example, `abap/shared_objects_size_MB` is currently set to 300 MB. Your SAP Customer Activity Repository application produces a runtime error, indicating that 500 MB fails to load into the `/POSDW/CL_MATERIAL_BUFFER_AREA`. You should increase the size of `abap/shared_objects_size_MB` from 300 MB to 850-900 MB and restart the system.

- **Shared Memory Area Initialization Delays**

When SAP Customer Activity Repository performs master data checks to verify material, unit of measure, and International Article Number (EAN) data, the system verifies the data included in the received POS transactions against the data buffered in the shared memory objects (`/POSDW/CL_MATERIAL_BUFFER_AREA`, `/POSDW/CL_MARM_BUFFER_AREA`, `/POSDW/CL_MEAN_BUFFER_AREA`). If the master data check occurs prior to the initialization of the shared memory area, this can result in a runtime error caused by a `CX_SHM_NO_ACTIVE_VERSION` exception.

The time required to initialize the shared memory area (that is, the time required to load master data from the database tables into the dedicated shared memory objects) is controlled by the `SHM_MAXIMUM_PRELOAD_WAIT_TIME` component of the `SETTINGS` parameter used by the `CALL` method of `BAdI /POSDW/SETTINGS`. By default, `SHM_MAXIMUM_PRELOAD_WAIT_TIME` is set to 10 seconds. If you are experiencing runtime errors caused by a `CX_SHM_NO_ACTIVE_VERSION` exception, you may need to increase the value of `SHM_MAXIMUM_PRELOAD_WAIT_TIME` to allow for a longer period to initialize the shared memory area.

For more information, see SAP Note [1965920](#).

4 Management of SAP Customer Activity Repository

SAP provides you with an infrastructure to help your technical support consultants and system administrators effectively manage all SAP components and complete all tasks related to technical administration and operation.

You can find more information about the underlying technology in the Technical Operations Manual in the *SAP Library* under *SAP NetWeaver*.

4.1 Starting and Stopping

Start and Stop Sequences and Tools

Table 9

Software Component	Sequence	Tool	Detailed Description
SAP HANA Database	1	sapstartsrv	See the information about starting and stopping SAP HANA systems in the <i>SAP HANA Administration Guide</i> .
RTLCAR	2	STARTSAP	Log on to the host of your central system as the SAP Administrator. Enter startsap ALL to start the SAP NetWeaver database, ABAP instances, and all other processes.
SAP LT Replication Server (Optional)	3	SAP HANA Studio	Use SAP HANA Studio to start replication of tables required by SAP Customer Activity Repository. See ► help.sap.com/car ► <i>Installation and Upgrade Information</i> ► <i>Installation Guide</i> ► for information on deployment options, which determine whether replication is necessary. If replication is required, this guide also provides information on how to set up

Software Component	Sequence	Tool	Detailed Description
			table replication and which tables need to be replicated. For more information, see the <i>SAP LT Replication Server Operations Guide</i> .
SAP LT Replication Service (Optional)	4	SAP HANA Studio	Use SAP HANA Studio to stop replication of tables required by SAP Customer Activity Repository. For more information, see the <i>SAP LT Replication Server Operations Guide</i> .
RTLCAR	5	STOPSAP	Log onto the host of your central system as the SAP Administrator. Enter stopsap R3 . Note that the R3 switch does not stop the database simultaneously. To do so, use the command stopsap or stopsap ALL .
SAP HANA Database	6	sapstartsrv	See the information about starting and stopping SAP HANA systems in the <i>SAP HANA Administration Guide</i> .

4.2 Software Configuration

This chapter explains which components or scenarios used by this application are configurable and which tools are available for adjusting.

Table 10

Software Component	Configuration Tool(s)	Detailed Description
RTLCAR	SAP Customizing	See the documentation in Customizing for SAP Customer Activity Repository.
RTLPOSDM	SAP Customizing	See the documentation in Customizing for SAP Customer Activity Repository under <i>POS Data Management</i> .
RTLDCFND	SAP Customizing	See the documentation in Customizing for SAP Customer Activity Repository under <i>Retail Multichannel Foundation</i> .

Software Component	Configuration Tool(s)	Detailed Description
RTLDDF	SAP Customizing	See the documentation in Customizing for SAP Customer Activity Repository under <i>Demand Data Foundation</i> .

4.3 Administration Tools

SAP Customer Activity Repository uses the standard SAP NetWeaver administration tools. For more information, see SAP Help Portal for SAP NetWeaver at help.sap.com/nw. Choose a release. Choose ► *System Administration* ► *Technical Operations Manual* ► *Technical Operations for SAP NetWeaver* ► *Administration of SAP NetWeaver Systems* 🔍.

SAP Customer Activity Repository also uses the administration tools available with SAP HANA. For more information, see SAP Help Portal for SAP HANA Appliance software at help.sap.com/hana_appliance. Choose a release. Choose ► *System Administration and Maintenance Information* ► *SAP HANA Technical Operations Manual* 🔍.

4.4 Backup and Restore

You need to back up your system landscape regularly to ensure that you can restore and recover it in case of failure. The backup and restore strategy of your system landscape must not only include your strategy for your SAP system, but it must also be included in your company's overall business requirements and incorporated into your entire process flow.

In addition, the backup and restore strategy must cover disaster recovery processes, such as how to recover from the loss of a data center due to a fire. It is important that your strategy specify that normal data and backup data are stored in separate physical locations, so that both types of data are not lost in case of a disaster.

SAP Customer Activity Repository is based on SAP NetWeaver technology; therefore, the SAP NetWeaver backup procedures can also be used for SAP Customer Activity Repository.

More Information

Table 11

Subject	Path
Backup and recovery processes for ABAP, JAVA, Business Intelligence, or Process Integration	See the Technical Operations Manual for SAP NetWeaver at help.sap.com/nw . Choose a release. Choose ► <i>System Administration and Maintenance Information</i> ► <i>Technical Operations Guide</i> ► <i>Technical Operations Manual for SAP NetWeaver</i> 🔍.

Subject	Path
Backup and restore for SAP systems	See SAP Service Marketplace at service.sap.com/alm-methodologies ► <i>Best Practice Documents</i> ► <i>Backup and Restore for SAP Systems Landscapes</i> ►.
Backing up and recovering the SAP HANA Database	See SAP Help Portal for SAP HANA Appliance Software at help.sap.com/hana_appliance . Choose a release. Choose ► <i>System Administration and Maintenance Information</i> ► <i>SAP HANA Administration Guides</i> ► <i>SAP HANA Administration Guide</i> ►.
Backup and restore for Demand Data Foundation	See <i>Administrator's Guide, Demand Data Foundation (DDF) 2.0 with Unified Demand Forecast (UDF) on SAP HANA</i> at ► service.sap.com/instguides ► <i>Industry Solutions</i> ► <i>Industry Solution Guides</i> ► <i>SAP for Retail</i> ► <i>SAP Customer Activity Repository</i> ► <i>SAP Customer Activity Repository 2.0</i> ►.

4.5 Load Balancing

For information about load balancing, see the following references:

Table 12

Topic	Path
Standard functionality of SAP NetWeaver for logon and load balancing	See SAP Help Portal for SAP NetWeaver at help.sap.com/nw . Choose a release. Under <i>System Administration and Maintenance Information</i> , choose ► <i>Technical Operations Manual for SAP NetWeaver</i> ► <i>Solution Lifecycle Management</i> ► <i>High Availability</i> ► <i>SAP NetWeaver AS ABAP: High Availability</i> ► <i>Unplanned Downtime for SAP NetWeaver AS ABAP</i> ► <i>Service Configuration for Failure Resilience</i> ► <i>Message Server-Based Logon and Load Balancing (Redirection)</i> ►.
Partitioning and scale-out for SAP HANA	See SAP Help Portal for SAP HANA Appliance software at help.sap.com/hana_appliance . Choose a release. Under <i>System Administration and Maintenance Information</i> , choose ► <i>SAP HANA Administration Guides</i> ► <i>SAP HANA Administration Guide</i> ► <i>Scaling for SAP HANA</i> ►.
Partitioning of the / POSDW/TLOGF table	SAP Note 1719282 .
Classify TLOG Tables for SAP Customer Activity Repository Report	See the report documentation (transaction / POSDW/ CLASSIFY_TLOG in your SAP Customer Activity Repository System) and SAP Note 1980718 .

Topic	Path
<p>Optionally, backup and restore for the SAP Landscape Transformation (LT) Replication Server (if you wish to start additional processes in SLT)</p> <div data-bbox="124 465 732 685"> <p>i Note</p> <p>See ► help.sap.com/car ► <i>Installation and Upgrade Information</i> ► <i>Installation Guide</i> ► for information on deployment options, which determine whether replication is necessary.</p> </div>	<p>See SAP Help Portal for SAP HANA Appliance software at help.sap.com/hana_appliance. Choose a release. Under <i>System Administration and Maintenance Information</i>, choose ► <i>SAP HANA Technical Operations Manual</i> ► <i>Administering and Operating SAP HANA Replication Technologies</i> ► <i>Backup and Recovery of SAP HANA Replication Technologies</i> ►.</p>

5 High Availability

SAP Customer Activity Repository is based on SAP HANA and SAP NetWeaver technology; all high availability considerations that apply to SAP HANA and SAP NetWeaver, such as increasing system availability, improving performance, and eliminating unplanned downtime, also apply to SAP Customer Activity Repository.

More Information

Table 13

Topic	Path
General information on high-availability strategies for SAP NetWeaver-based systems	See SAP Help Portal for SAP NetWeaver at help.sap.com/nw . Choose a release. Under <i>Application Help</i> , choose ► <i>Function-Oriented View</i> ► <i>Solution Life Cycle Management</i> ► <i>SAP High Availability</i> .
General information on high availability strategies for SAP HANA based systems	See SAP Help Portal for SAP HANA Appliance software at help.sap.com/hana_appliance . Choose a release. Under <i>System Administration and Maintenance Information</i> , choose ► <i>SAP HANA Technical Operations Manual</i> ► <i>Administering and Operating SAP HANA</i> ► <i>High Availability</i> .

6 Software Change Management

Software Change Management standardizes and automates software distribution, maintenance, and testing procedures for complex software landscapes and multiple software development platforms. These functions support your project teams, development teams, and application support teams.

The goal of Software Change Management is to establish consistent, solution-wide change management that allows for specific maintenance procedures, global rollouts (including localizations), and open integration with third-party products.

This section provides additional information about the most important software components.

6.1 Transport and Change Management

Component Change Management Tools

Table 14

Component	Solution Manager Maintenance Optimizer Integration	Transport Management Tool
RTLCAR	Yes	SAP NetWeaver Transport Organizer
RTLPOSDM	Yes	SAP NetWeaver Transport Organizer
RTLMEFND	Yes	SAP NetWeaver Transport Organizer

6.2 Development Requests and Development Release Management

You use the standard tools and procedures of SAP NetWeaver to transport SAP Customer Activity Repository code extensions or Customizing changes. All such changes are captured by the transport system and are transportable.

More Information

Table 15

Topic	Path
Change and Transport System	See SAP Help Portal for SAP NetWeaver at help.sap.com/nw . Choose a release. Under <i>System Administration and Maintenance Information</i> , choose ► <i>Technical Operations for</i>

Topic	Path
	<i>SAP NetWeaver</i> ► <i>Administration of Application Server ABAP</i> ► <i>Change and Transport System</i> ►.
Change Management for SAP HANA-based systems	See SAP Help Portal for SAP HANA Appliance software at help.sap.com/hana_appliance . Choose a release. Under <i>System Administration and Maintenance Information</i> , choose ► <i>SAP HANA Technical Operations Manual</i> ► <i>Administering and Operating SAP HANA</i> ► <i>Change Management</i> ►.
Manual ABAP on SAP HANA correction process	See SAP Note 1798895 .

6.3 Support Packages and Patch Implementation

We recommend that you implement SAP NetWeaver, SAP HANA and SAP Customer Activity Repository support package stacks, which are sets of support packages and patches for the respective product version that must be used in the given combination. The technology for applying support packages and patches will not change.

You can find detailed information about the availability of SP stacks for SAP Customer Activity Repository on SAP Service Marketplace at service.sap.com/sp-stacks. See the corresponding Release Information Notes (RIN) before you apply any support packages or patches of the selected SP Stack.

Use the Maintenance Optimizer (transaction `DSWP`) in SAP Solution Manager to select, download, and install the needed usages, or software components and required support packages.

More Information

Table 16

Topic	Path
SAP Solution Manager	See SAP Help Portal for SAP Solution Manager at help.sap.com/solutionmanager .
SAP Solution Manager Change Management Maintenance Optimizer	See SAP Service Marketplace at service.sap.com/solman-mopz .
SAP Add-on Installation Tool	See the documentation for transaction <code>SAINT</code> in your SAP system.
Implementation of support packages and possible side effects	See service.sap.com/patches ► <i>SAP Support Packages in detail</i> ►.

7 Troubleshooting

7.1 Troubleshooting Information Specific to On-Shelf Availability

Viewing Back-End Error Messages

Back end error messages are saved in the Gateway system. To access these error messages, perform the following steps:

1. Start transaction `/IWFND/ERROR_LOG`.
2. Select the log entry, and choose *Error Context*.
3. Choose *Application Log*.
4. Note down the error number of each message with the following message text: `This is an external message. Access message text via details`
5. Choose *Detail exists* to view the text of each external error message.

Cleaning Up Gateway Cache

You can clean up the cache on the Gateway server by running transaction `/IWFND/cache_cleanup`. Cleaning up cache on the back end using transaction `/IWBEP/cache_cleanup` is also recommended.

Verifying BAdI Implementations

The On-Shelf Availability functionality requires that the BAdIs found in Customizing under ► *SAP Customizing Implementation Guide* ► *SAP Customer Activity Repository* ► *On-Shelf Availability* ► *Enhancements Using Business Add-Ins* ► have an implementation.

In the case that a BAdI does not have an implementation specific to your business scenario, you can expect the following behavior from the On-Shelf Availability functionality.

Table 17

BAdI Missing Implementation	Result
Process Shelf Status Change Notifications	No error occurs, no on-shelf availability alerts will be reported.
Retrieve Algorithm Detection Time	Runtime error in On-Shelf Availability when executing the OSA algorithm.
Retrieve Department Data	Runtime error in OData Service.
Retrieve Sub-Department Data	Runtime error in On-Shelf Availability when executing the OSA algorithm.
Retrieve Product Data	Runtime error in OData Service.
Retrieve Additional Product Information Data	No error occurs, no additional product information (such as promotion and layout) will be available.

BAdI Missing Implementation	Result
Retrieve Listed Product Data	Runtime error in On-Shelf Availability when executing the OSA algorithm.
Retrieve Product Inventory Data	No error occurs, product inventory information will not be available.
Retrieve Image URL Data	No error occurs, product images will not be available.
Retrieve Store and Factory Calendar Data	Runtime error in OData Service.

Troubleshooting On-Shelf Availability Algorithm Results

The following Customizing settings under ► [SAP Customizing Implementation Guide](#) ► [SAP Customer Activity Repository](#) ► [On-Shelf Availability](#) ► [Initialize On-Shelf Availability Algorithm](#) ► can have the most impact on the results of the OSA algorithm:

- **Level Of Granularity**

This setting impacts on which level the intra-week pattern analyzer step of the OSA algorithm will be executed: on product, sub-department or store level. For example, when the [Level of Granularity](#) is set to 2000, you need transactional information containing 2000 x 2.5 times the number of instances at which the product was sold during the period specified in the [Number of Weeks](#) setting. To run the intra-week pattern analyzer step at the product level, the product must have been sold 5000 times at the store considered by the algorithm. To run the intra-week pattern analyzer step at the sub-department level, products of that sub-department must have been sold 5000 times at the store considered by the algorithm. To run the intra-week pattern analyzer step at the store level, 5000 products must have been sold by the store in the specified [Number of Weeks](#) setting.

- **Minimum Transaction Threshold**

This setting determines which products will be considered when the estimation model step of the OSA algorithm is executed: products included in fewer transactions than specified in the [Minimum Transaction Threshold](#) setting during the period specified in the [Number of Weeks](#) setting will be excluded. For example, if the [Minimum Transaction Threshold](#) setting is 50 and the [Number of Weeks](#) is set to 13, then a product will be excluded by the estimation model if it is sold in fewer than 50 transactions during a 13 week period.

8 Support Desk Management

Support Desk Management enables you to set up an efficient internal support desk for your support organization that seamlessly integrates your end users, internal support employees, partners, and SAP Active Global Support specialists with an efficient problem resolution procedure.

For support desk management, you need the methodology, management procedures, and tools infrastructure to run your internal support organization efficiently.

Remote Support Setup

If you want to use SAP remote services (for example, SAP EarlyWatch or Remote Consulting), or if you would like to permit an SAP support consultant to work directly in your system to make a more precise problem diagnosis, then you need to set up a remote service connection.

Additionally, there exists an ABAP role for read-only access for remote support that is also relevant. This role (`SAP_RCA_SAT_DISP` for ABAP) is available in the STPI plug-in and is generated when a managed system is connected to SAP Solution Manager.

Should any additional application-specific functionality be necessary for use by an SAP support consultant, then an applicable role should be defined providing the appropriate authorization(s) and assigned to the SAP support consultant's user login.

Problem Message Handover

To create SAP support messages for your installation, you must specify an application component. For SAP Customer Activity Repository, you can specify one of the following application components:

- `CA-RT-CAR-PIP` — to enter support messages for the POS Data Management component (POS data transfer and audit).
- `CA-RT-CAR-ANA` — to enter support messages for SAP HANA Content delivered with SAP Customer Activity Repository.
- `CA-RT-CAR-INT` — to enter support messages for integration with the DDF/UDF component and the integration between the repository and consuming applications.
- `CA-RT-CAR` — to enter support messages for general issues with SAP Customer Activity Repository that cannot be easily classified into one of the categories above.

9 Appendix

9.1 Transaction Log (TLOG) Data Model and Storage

POS data is captured in a format called a Transaction Log (TLOG). TLOGs capture all the attributes of a store's sales transaction. This information is used to log many attributes about the sale, such as customer information, sales price, discount price, quantities, item descriptions, and much more. Such information is used in backend store systems for sales auditing, reporting, and input in to additional Retail planning applications.

SAP Customer Activity Repository is an application that serves as a central repository for storing TLOG data. In addition to storing and providing many business functions that operate directly on the TLOG data (for example, Sales Audit), SAP Customer Activity Repository also captures and exposes the data in a standard way so that it can be easily consumed by analytical, planning, and other follow-on applications.

Business Transactions

The POS transaction data model is the most important business object in the POS Inbound Processing Engine (PIPE). At the POS, different kinds of business transactions can be recorded by a cash register, for example:

- POS sales
- Cash pay-in/pay-out
- Inventory Adjustments (for example, spoilage or unexpected goods receipt)
- Register closing (for example, count cash amount in the till)
- Statistical events (for example, cash drawer opened, store opening, and cashier log on)

In order to simplify the programming interfaces, the SAP Customer Activity Repository POS transaction data model is based on a generic approach that allows different kinds of POS transactions to be stored in the same database tables. A qualifier, called a `transaction type code`, is used to distinguish which kind of business transaction the POS transaction reflects. For one business transaction, there can be more than one transaction type. For example, a retail transaction can be either a sale or an employee sale, but both are sales transactions.

The figure Business Transaction Types for POS Transactions shows the business transactions that can be used to classify generic POS transactions. Technically, this classification is used to define a subset of segments that can be used by a specific business transaction. For example, a financial transaction may not include any goods movement items because this sub-structure belongs to goods movement transactions only.

Located at the header level of a POS transaction, the business transaction field uses fixed values to indicate the transaction type, as shown in this figure.

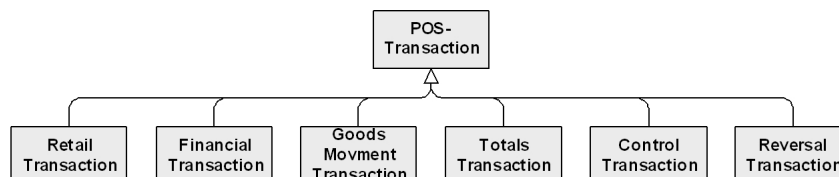


Figure 2: Business Transaction Types for POS Transactions

The following sections describe the relationship of the POS transactions on the segment level. Segments are stored in internal tables. They can contain more than one line. Although it is technically possible to store multiple

lines in all segments, some segments may contain only a single record. In the following sections, the hierarchy of the segments and the cardinality is explained in detail.

Common Segments

Transaction Header

All POS transactions share the same header segment. Some header fields are mandatory and must be filled out in order for SAP Customer Activity Repository to process the data. Some header fields are optional in SAP Customer Activity Repository but are required from a business point of view.

The transaction header contains the following information:

Table 18: Transaction Header Fields

Field Name	Description	Role in SAP Customer Activity Repository	Role at POS	Data Type/Length
Retail Store ID	A unique identifier of the store where the POS transaction was entered. This field usually contains the customer number of the plant in ERP to which the store is assigned.	Key	Key	Char/10
Business Day	The date to which the POS transaction is assigned. In Retail, it is referred to as the business day or posting date. In some cases, the business day is not the actual date on which the transaction transpired but to which it is assigned. For example, in a 24/7 business, a cashier's work shift can be from 23:00 until 03:00 and sales transactions that transpire after 00:00 are assigned to the previous day.	Key	Key	Date
Transaction Index	A counter that uniquely identifies POS transactions for the same store and same business day. This field is available only in SAP	Key	-	Integer/4

Field Name	Description	Role in SAP Customer Activity Repository	Role at POS	Data Type/Length
	Customer Activity Repository and has no representation in the external interfaces or at the POS.			
Transaction Type Code	A four-digit code used to indicate the type of POS transaction.	Mandatory Attribute	Mandatory Attribute	Char/4
Workstation ID	A number that identifies the cash register or machine where the POS transaction was entered.	Optional Attribute	Key	Char/10
Transaction Number	A number used to identify a POS transaction. In SAP Customer Activity Repository, the key fields (store, business day, workstation ID, transaction type code, and transaction number) do not need to be unique because SAP Customer Activity Repository uses a counter at the database level. However, the key field combination must be unique at the POS.	Optional Attribute	Key	Char/20
Begin Time Stamp	The date and time the POS transaction was started. When the cashier enters a new POS transaction, the time is stored in the transaction header. This information is required to put the transactions in sequential order, and is also used to assign	Mandatory Attribute	Mandatory Attribute	Char/14

Field Name	Description	Role in SAP Customer Activity Repository	Role at POS	Data Type/Length
	retail transactions to totals transactions (see Totals Transactions) for the balancing or short/over calculation.			
End Time Stamp	The date and time the POS transaction was completed. This field is mandatory in SAP Customer Activity Repository. It may be filled with the begin time stamp, unless a second time stamp is available. By completing a POS sale, the time stamp is also entered in the transaction header.	Mandatory Attribute	Optional Attribute	Char/14
Department	A number that identifies the department of the store.	Optional Attribute	Optional Attribute	Char/10
Operator ID Qualifier	It is used to identify the cashier who entered the POS transaction or the user who entered the business transaction.	Optional Attribute	Optional Attribute	Char/30
Operator ID	It is used to identify the cashier who entered the POS transaction or the user who entered the business transaction.	Optional Attribute	Optional Attribute	Char/30
Transaction Currency	The transaction currency to which all retail line items are assigned. For retail transactions, this field is optional because all retail transactions in the same store are	Attribute	Optional attribute	Char/5

Field Name	Description	Role in SAP Customer Activity Repository	Role at POS	Data Type/Length
	usually assigned to the same currency, even if the payment can be done in different currencies. The transaction currency can differ from the tender currency. If the transaction currency is not provided, a default currency must be defined in the SAP Customer Activity Repository Customizing. However, for tender totals, the field is mandatory as there can be totals for different currencies.			
Partner ID Qualifier	This field indicates if the transaction is from a customer or business partner.	Optional Attribute	Optional Attribute	Char/1
Partner ID	It is used to store the SAP customer number, SAP personnel number, or a free text value.	Optional Attribute	Optional Attribute	Char/13
Receipt Handling Time	Specifies the time, to the millisecond, required to complete the handling of the receipt.	Optional Attribute	Optional Attribute	Dec/13,3
Register Time	Specifies the time, to the millisecond, required for the registering of the transaction line items.	Optional Attribute	Optional Attribute	Dec/13,3
Tendering Handling Time	Specifies the time, to the millisecond, required to complete the transaction payment (tender).	Optional Attribute	Optional Attribute	Dec/13,3

Field Name	Description	Role in SAP Customer Activity Repository	Role at POS	Data Type/Length
Pause Time	Specifies the time, to the millisecond, that the cash register spends in pause mode between two transactions.	Optional Attribute	Optional Attribute	Dec/13,3
Training Time	Specifies the time, to the millisecond, that the cash register spends in training mode.	Optional Attribute	Optional Attribute	Dec/13,3
Drawer Number Used at POS Client	Specifies the cash drawer identifier used at a POS client.	Optional Attribute	Optional Attribute	Char/10
Customer ID from POS	Specifies the customer identifier.	Optional Attribute	Optional Attribute	Char/16
Customer Age	Specifies the age of the customer.	Optional Attribute	Optional Attribute	Integer/5
Customer Identifier Entry Method	Specifies the method used to enter the customer ID.	Optional Attribute	Optional Attribute	Char/1
Reference to Original Receipt for Retail Store ID	Specifies the retail store identifier of the referenced transaction.	Optional Attribute	Optional Attribute	Char/10
Referenced to Original Receipt for Posting Date	Specifies the posting date of the referenced transaction.	Optional Attribute	Optional Attribute	Date
Reference to Original Receipt for Workstation ID	Specifies the POS number (cash register number) of the referenced transaction.	Optional Attribute	Optional Attribute	Char/10
Reference to Original Receipt for Transaction Number	Specifies the transaction identifier (receipt number) of the referenced transaction.	Optional Attribute	Optional Attribute	Char/20
Reference to Original Receipt for Start Timestamp	Specifies the start timestamp, as appears on the referenced transaction	Optional Attribute	Optional Attribute	Char/14

Field Name	Description	Role in SAP Customer Activity Repository	Role at POS	Data Type/Length
Reference to Original Receipt for Line Item Number	Specifies the original line item number of the referenced transaction.	Optional Attribute	Optional Attribute	Char/10
Reason	Specifies the reason code for referencing data from the original receipt.	Optional Attribute	Optional Attribute	Char/4

Post Void Details

Post void details are included in the header information. Post void details provide two types of information:

- A flag to mark a transaction to be voided
- A reference to another transaction that was voided. Note that this information can only be part of a post void transaction. See Post Void Transactions.

Any POS transaction can be flagged to be voided; therefore the structure for post void details can be used in combination with all business transaction types. However, only post void transactions can contain a reference to a voided transaction.

SAP Customer Activity Repository tasks can be configured to filter out voided transactions automatically.

For more information on post void details, see Post Void Transactions.

Extensions

The POS transaction data model used by SAP Customer Activity Repository includes predefined locations where you can insert extension segments to enhance the standard data model with customer-specific fields.

Extensions can exist on different levels in a transaction, therefore extension segments can occur on the transaction header level, on the item level (for example, retail line item, tender, or goods movement item), or even lower than the item level.

For more information, see Extensibility and Extensions.

Transactional Additional

The transaction additional segment contains information about the entry of the transaction, for example, a transaction reason code or a training transaction indicator.

Retail Transactions

A retail transaction contains the most relevant information about a POS sale, such as retail line items and tender information.

A retail line item reflects a quantity of a single article that was scanned or manually entered at the POS. For each retail line item, there can be discounts, taxes, loyalty information or commission information that applies to it. Depending on the business case or business use, discounts, taxes, and loyalty information may also exist at the transaction level.

Some fields in the retail line item are used very rarely. These are stored in a sub-structure called `retail` `additional`s.

After all items have been entered at the POS, and the customer has paid, the relevant information is stored in the `tender` segment, which stores information about the means of payment. For credit card or debit card payments, there are sub-structures that contain information about the card number, card owner, and the

authorization code sent by the credit card authorization service. If the credit card information is available only in an encrypted format, it is stored in the `secure_bin_data` segment.

Information about the customer, such as age, phone number and, address, can be added at the POS by use of the `customer_details` structure which offers the same kind of enhancement concept as the `extensions` structures (see Extensibility and Extensions).

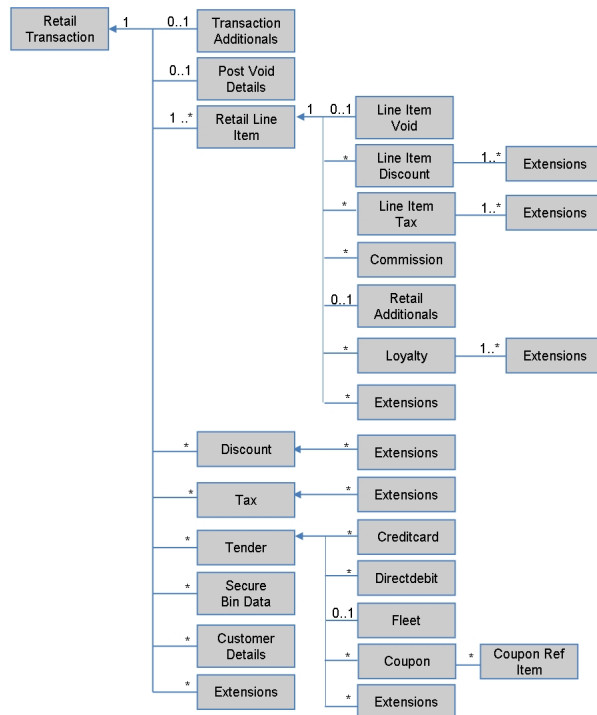


Figure 3: Structure of a Retail Transaction

Totals Transactions

Totals transactions are used to process aggregated information for different kinds of POS transactions such as:

- Retail Totals: Aggregated retail amount and number of items for each retail type code
- Tax Totals: Aggregated tax amount and number of items for each tax type code
- Discount Totals: Aggregated reduction amount and number of items for each discount type code
- Tender Totals: Aggregated tender amount, number of items, actual amount, short amount, over amount, removed amount, and other details for each type code
- Cashier Totals: Aggregated statistical information for loss prevention purposes, for example, the number of retail transactions with a value of zero, the number of cash drawer openings, and other details

At the end of a day or a cashier shift, the cash register can send a summary record that contains these different kinds of totals.

The summary information has different purposes:

- Technical Balancing: Identifies missing or duplicate detailed information by comparing the summary records and POS transactions
- Short/Over Processing: Identifies differences between the actual amount and the expected tender amount (especially cash) at a workstation or cashier level, and sends the differences to financials
- Loss Prevention: Identifies fraudulent activities at the POS by use of statistical patterns, especially the cashier totals

Technically, it is possible to include different kinds of totals in the same totals transaction.

As a rule, the two time stamps that are part of the transaction header are used to identify the time interval for which the totals have been calculated. If the attributes at the header level, such as operator ID or workstation ID (see Transaction Header) are filled, the summary information is associated to a specific cashier or cash register. Otherwise they are valid for all cashiers or workstations.

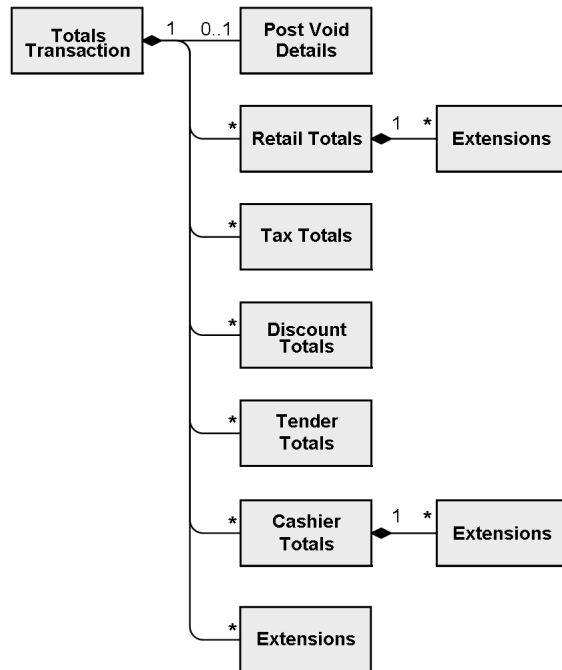


Figure 4: Structure of a Totals Transaction

Goods Movements

Goods movement transactions are used to enter goods movements at the POS. They can be entered for reasons such as:

- Spoilage: In this case, the quantity of goods available for sale is decreased and has to be adjusted in inventory management
- Transfer posting: Goods can be transferred from one store to another without any kind of settlement
- Reserve goods: A customer can call and ask to reserve an article for pickup the next day. If this transaction is to be reflected in the inventory account, the article can be transferred from the stock at hand to the reserved stock.

The goods movement transaction consists of a transaction header and a number of goods movement items, reflecting the inventory-related movement at the article level.

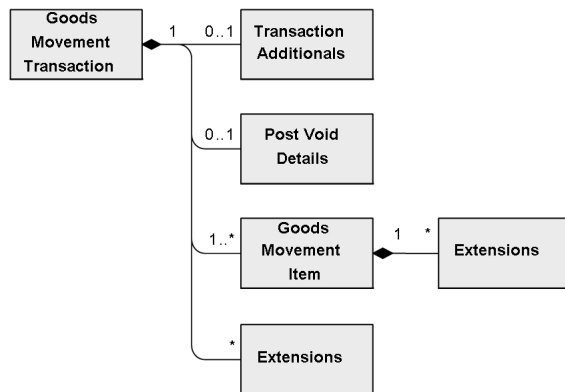


Figure 5: Structure of a Goods Movement Transaction

Financial Movements

Financial movements represent financial transactions with or without an impact on the cash amount at the POS, such as:

- Cash removals or deposits: Money is removed from the cash register, for example, as a deposit it is brought to the bank, or new change is paid-in. In these cases, the financial amount is moved within the company.
- Pay-In and Pay-Out Transactions: For example, money is paid-in for services, wages, or a pay-in for a customer, or paid-out for wages. In these cases, the financial amount is moved out of or into the company.

The financial transaction consists of a `transaction` header and a financial movement item, which contains an amount of money to be booked on a certain account.

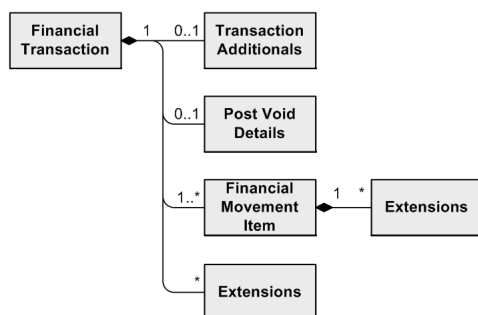


Figure 6: Structure of a Financial Movement Transaction

Control Transactions

Control transactions represent events that are tracked for statistical reasons only or to document certain processes, such as:

- Cashier Logon/Logoff or Logon Attempt: For loss prevention purposes, data about the time when a cashier logged on and off a cash register is collected
- Open Register/Close Register: For loss prevention purposes, data about the time when a cash drawer was opened without a corresponding sales transaction is collected
- Repeat Printout: Records when a cashier prints out for a second time
- Store Opening: The time the store opens
- Suspend/Retrieve Transaction: For detecting fraud patterns, data about suspended transactions is collected

A control transaction consists of a transaction header. It is classified by a transaction type code and a timestamp. If more information needs to be transferred, an extension segment can be used.

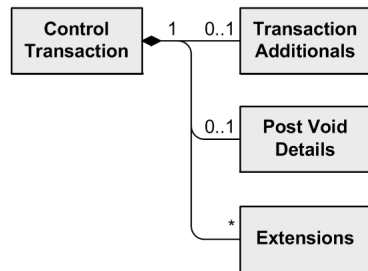


Figure 7: Structure of a Control Transaction

Post Void Transactions

A post void transaction represents the reversal of a POS transaction that was previously processed. For several business reasons and in unusual cases, it can be necessary to cancel an entire POS transaction, for example, if a POS sale has been completed but the customer is not able to pay, or a goods movement was booked by mistake.

There are two possible post void scenarios:

1. The original POS transaction has already been processed in the back-end system.

In a trickle-feed scenario, POS transactions are sent to SAP Customer Activity Repository many times during the day. In this case, the original POS transaction has already been processed and can no longer be marked as a voided transaction at the cash register.

2. The original POS transaction has not yet been transferred to the back-end system.

Because sales transactions are uploaded only once a day, the cash register will automatically flag the original POS transaction to be voided. In this case, no post void transaction is necessary because the original sale can be flagged as a voided sales transaction.

In the second case, the post void transactions need to be transferred to SAP Customer Activity Repository because the cash register has already marked the original transaction to be “invalid”. If this is technically not possible or if the first case applies, the reversal processing needs to be done in SAP Customer Activity Repository.

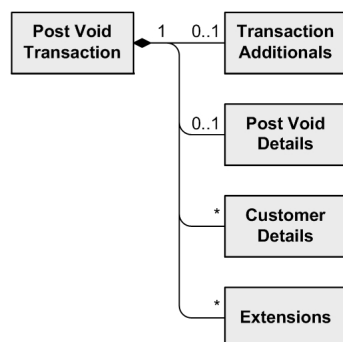


Figure 8: Post Void Transactions

POS Transaction Tables (/POSDW/TLOGF)

In SAP Customer Activity Repository, POS transactions are stored in one table, the /POSDW/TLOGF table. This table has the following characteristics:

- Persisted only in the SAP HANA database
- No BLOB fields
- Column-based

- Can store up to two years of non-aggregated POS transaction data. Note that the amount of data stored is deployment-specific and is determined by the customer.

/POSDW/TLOGF Table

In the SAP Customer Activity Repository application layer, /POSDW/TRANSACTION_INT structure is the internal representation of the POS transaction data.

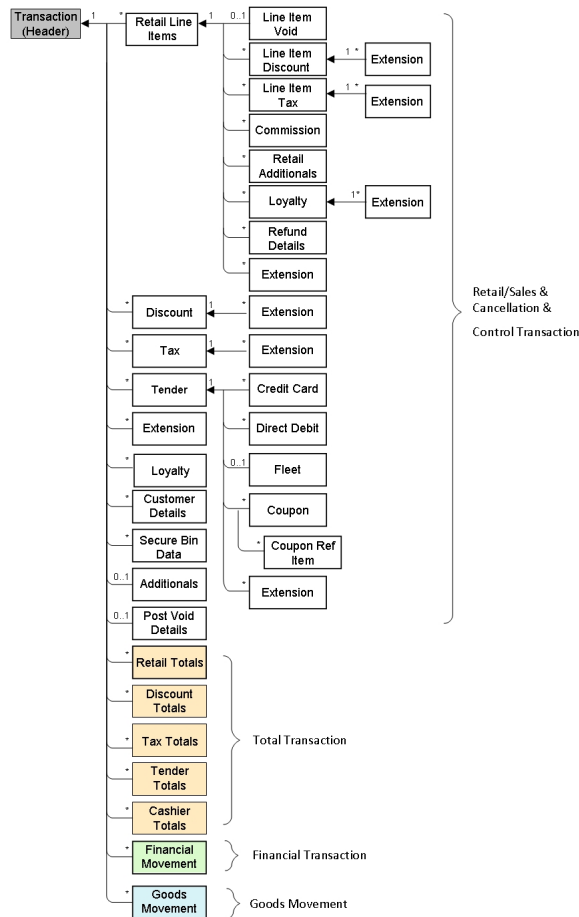


Figure 9: POS Transaction Structure

In the database layer, the POS transaction data is stored in the /POSDW/TLOGF table.

The /POSDW/TLOGF table is a column-based, flattened version of the /POSDW TRANSACTION_INT structure, where all the fields of the structure are stored in one table.

Flattening the TLOG Data Model into /POSDW/TLOGF

As described in the previous sections, POS transactions are stored as a tree structure in /POSDW/TRANSACTION_INT. The root node of a POS transaction contains header information such as transaction type and transaction number. The header fields are common to all POS business transaction types. In addition to the header fields, there are tables in the data structure that represent information from different business transaction types.

In order to transform this tree structure into a flat table (that is, a table that contains no additional tables), the approach is similar to the approach previously used by SAP POS DM 1.0 to supply BW DataSources: a record qualifier attribute is introduced for each row. This is not the same record qualifier that was used for POS analytics.

Although similar, the /POSDW/RECORDQUALIFIERID data element is specific to the /POSDW/TLOGF table. For more information, see SAP Note [811393](#).

For a flattened TLOG data model (/POSDW/TLOGF), the following record qualifiers are used:

Table 19: Record Qualifiers

Record Qualifier	Description
1	Transaction Header
2	Post Void Details
3	Additional
4	Customer Details
5	Retail Line Item
6	Discount
7	Discount Extension
8	Tax
9	Tax Extension
10	Line Item Void
11	Line Item Discount
12	Line Item Discount Extension
13	Line Item Tax
14	Line Item Tax Extension
15	Line Item Commission
16	Line Item Extensions
17	Line Item Retail Additional
18	Line Item Loyalty
19	Line Item Loyalty Extension
20	Line Item Refund Details
21	Tender
22	Financial Movement
23	Goods Movement
24	Goods Movement Extension
25	Extension
26	Loyalty
27	Loyalty Extension
29	Financial Movement Extension
30	Tender Credit Card

Record Qualifier	Description
31	Tender Direct Debit
32	Tender Fleet
33	Tender Extension
34	Retail Totals
35	Tax Totals
36	Tender Totals
37	Cashier Totals
38	Cashier Totals Extension
39	Discount Totals
40	Tender Coupon

Extensibility and Extensions

As comprehensive as the SAP Customer Activity Repository POS transaction data model is, you can enhance it if you need to store non-standard data directly in each transaction record. For example, you can store comments that a cashier enters about a particular POS transaction directly in the POS transaction log. There are no standard fields to store cashier comments in the TLOG data model, therefore you use an extension segment.

Extension segments support customer-specific fields by storing them without having to alter the table definition. The extension segment concept also provides customers with the flexibility to store and process the extensions together with the rest of the transaction.

Extensions and the Internal TLOG Structure (/POSDW/TRANSACTION INT)

The SAP Customer Activity Repository POS transaction data model handles customer enhancements and extensions by including tables of name-value pairs (/POSDW/TT_EXTENSIONS with line type /POSDW/EXTENSIONS) at predefined locations as extension segments.

Structure /POSDW/EXTENSIONS	Customer Enhancements
Include structure /POSDW/EXTENSIONS_FI	Customer Enhancements
Include structure /POSDW/EXTENSIONS_FD	Customer Enhancements - Database Fields
FIELDGROUP	/POSDW/FIELDGROUP Field Group CHAR 5
FIELDNAME	/POSDW/FIELDNAME Field Name CHAR 10
FIELDVALUE	/POSDW/FIELDVALUE Field Value CHAR 40
Include structure /POSDW/EXTENSIONS_FU	User Interface Data: Customer Extension

Figure 10: /POSDW/EXTENSIONS Structure

These extensions exist on different levels: there are extension segments at the header level, at the item level (such as retail line items, tender movement items or goods movement items), and at lower levels. The field names can be grouped in order to reproduce data structures.

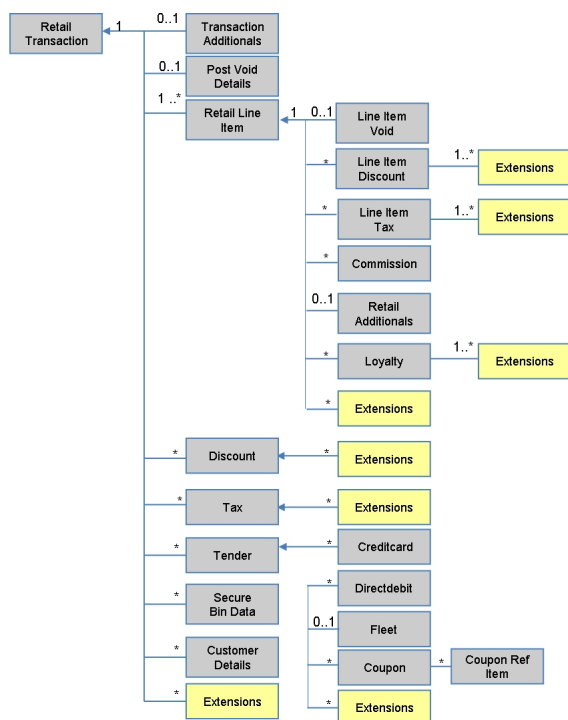


Figure 11: Extension Level Details

Extensions and the Physical Data Storage

By default, customer extensions are carried through and stored in the `/POSDW/TLOGF` table as a name-value pair, but using dedicated extension record qualifiers.

For example, if a transaction header includes the cashier's comment for the transaction, a record (with a record qualifier 25) is inserted in the `/POSDW/TLOGF` table, and this record includes the extensions information as a name-value pair. `FIELDGROUP` can be set to `COMNT` (comments), `FIELDNAME` to `CASHIER` (another value could be `MANAGER`) and `FIELDVALUE` can store the comment, for example, "Customer was happy about sale on jeans".

In the `/POSDW/TLOGF` table, you would see the following:

Data Browser: Table /POSDW/TLOGF Select Entries 200										
<div><div><div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div><div>Check Table...</div></div></div></div>										
Table: /POSDW/TLOGF										
Displayed Fields: 17 of 240 Fixed Columns: 5 List Width: 0250										
MANDT	RETAILSTOREID	BUSINESSDAYDATE	TRANSINDEX	ROWKEY	PARENTKEY	RECORDQUALIFIER	TRANSTYPECODE	FIELDGROUP	FIELDNAME	FIELDVALUE
100	R100	01.10.2012	1	0	0	1	1001	COMNT	CASHIER	Customer was happy about sale on jeans

Figure 12: Example in `/POSDW/TLOGF` table

Storing Extension Segments in a Separate Table

If you have a large number of extensions, they can significantly increase the size of the `/POSDW/TLOGF` table, and potentially slow down database operations on the table.

To speed up database operations on the `/POSDW/TLOGF` table, you can store extension segments in a dedicated table (`/POSDW/TLOGF_EXT`) by enabling the *Store Extensions in Separate Table* option in the *Define General Settings* Customizing activity.

The setting of the *Store Extensions in Separate Table* option affects how POS transaction data is stored in the database. This option should be set after consultation with a SAP Customer Activity Repository administrator, and you should not change the selected setting of the *Store Extensions in Separate Table* option needlessly.

Only transactions processed after the *Store Extensions in Separate Table* option is enabled will have their extension segments stored in the `/POSDW/TLOGF_EXT` table. For all the POS transactions already stored in the `/`

POSDW/TLOGF table, you must run the **Transfer POS Transaction Extension Segments Report** (transaction / POSDW/REFE) to move the extension segments from the / POSDW/TLOGF table to the / POSDW/TLOGF_EXT table.

If you have been storing extension segments in the / POSDW/TLOGF_EXT table, you can use the **Transfer POS Transaction Extension Segments Report** to move the extension segments back to the / POSDW/TLOGF table.

Note that the actual persistence location of extension segments (/ POSDW/TLOGF or / POSDW/TLOGF_EXT) has no impact on the inclusion of these extension segments in their corresponding transaction records during task processing, display in the POS Workbench or analysis.

9.2 TLOG API

The following function modules are used to perform standard CRUD operations on the / POSDW/TLOGF table:

- / POSDW/READ_TLOG
- / POSDW/WRITE_TLOG
- / POSDW/SEARCH_TLOG

These function modules are part of the / POSDW/TLOG_API function groups that reside in ► / POSDW/STRUC ► / POSDW/PIPE ► / POSDW/DATABASE ►.

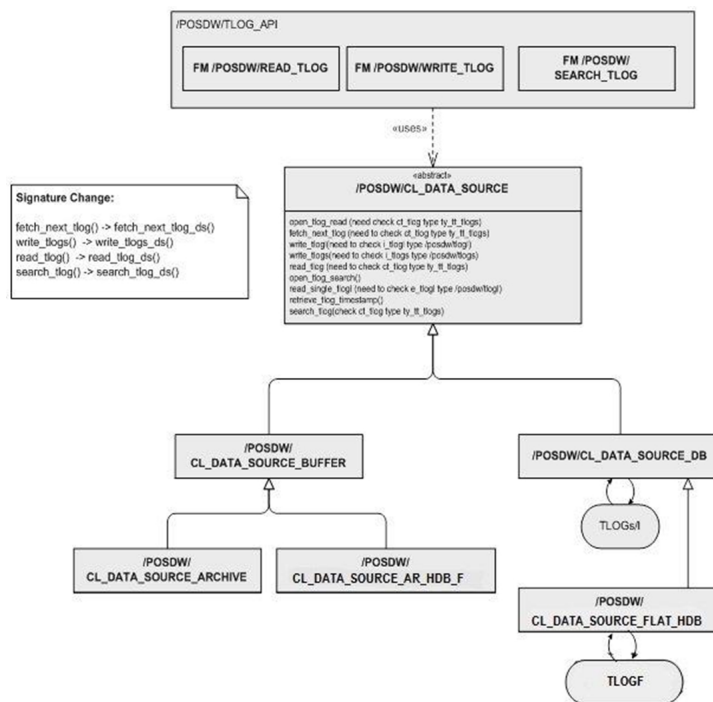


Figure 13: Structure of TLOG_API

The following APIs are used to perform standard CRUD operations on the / POSDW/TLOGF table:

Table 20: APIs used for the /POSDW/TLOGF Table

Name	Type	Description
/POSDW/READ_TLOG	Function Module	This function module reads the POS transactions from the POS transaction database.
/POSDW/SEARCH_TLOG	Function Module	This function module searches the POS transaction database for records matching the selection criteria.
/POSDW/WRITE_TLOG	Function Module	This function module writes the POS transactions to the POS transaction database. Existing records with the same key are overwritten.
/POSDW/CL_DATA_SOURCE_FLAT_HDB	Class	Represents the Data Access Object used to perform basic table CRUD operations.

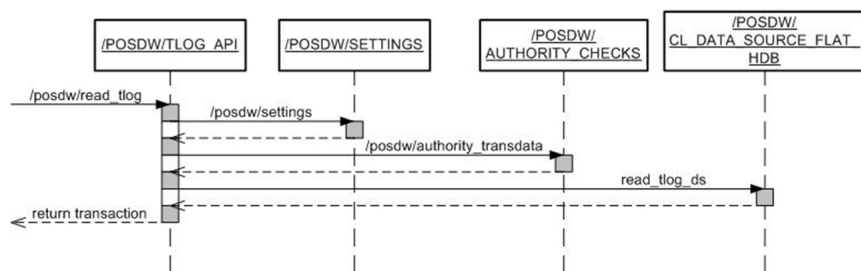


Figure 14: Sequence Diagram for /POSDW/READ_TLOG Operation

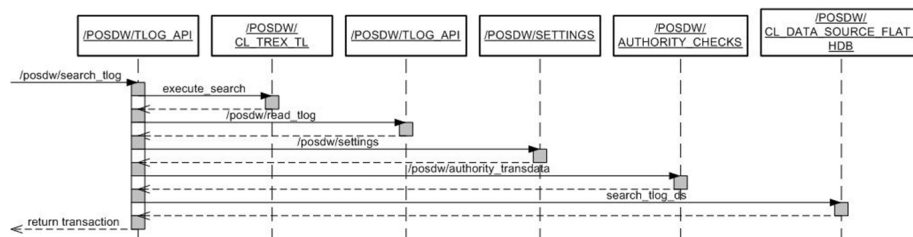


Figure 15: Sequence Diagram for POSDW/SEARCH_TLOG Operation

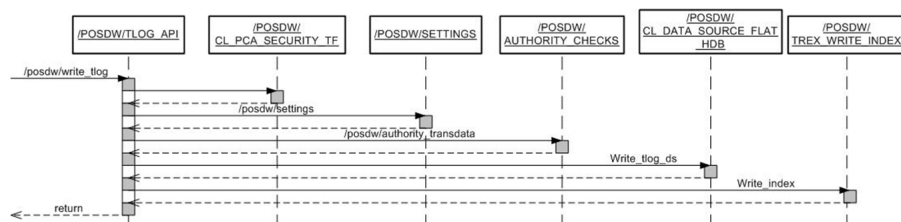


Figure 16: Sequence Diagram for /POSDW/WRITE_TLOG Operation

Enhanced Fields

Enhanced fields are not stored in the `/POSDW/TLOGF` table. They are populated during the transaction checks and processing.

The only exceptions to this are the `MATERIALNUMBER` and the `MERCHANDISECAT` fields at the line item level. These enhanced fields are stored in the database because they are required by consuming applications.

Analytic Fields

Additional fields were added to the `/POSDW/TLOGF` for analytic purposes and to improve the performance of the queries built on top of the new TLOG data model.

The following table provides information about the analytic fields of the `/POSDW/TLOGF`:

Table 21: `/POSDW/TLOGF` Analytic Fields

Field	Level	Purpose
TRANSCOUNTER	Header	Fixed value (1) used for counter based queries
BEGINDATE	Header	Transaction Date
BEGINTIME	Header	Transaction Begin Time
CALYEAR	Header	Transaction Year
CALMONTH	Header	Transaction Month
CALDAY	Header	Transaction Day
CALHOUR	Header	Transaction Hour
CALWEEK	Header	Transaction Week
TAXINC	Item	Amount of included taxes
TAXEXC	Item	Amount of excluded taxes
ITEMDISC	Item	Amount of item discounts
DISTDISC	Item	Amount of distributed discounts from the header level
DISTTAX	Item	Amount of distributed taxes from the header level
DISTTENDER	Item	Amount of distributed tender from the header level
DISTTAXEXC	Item	Amount of distributed excluded taxes from the header level
DISTVOID	Item	Amount of distributed voids from the header level
TASK_CANCELED	Item	Indicator for Canceled Task, distributed from the header level
RETL_ITEM_CAT	Item	Article category
RETL_ITEM_SCAT	Item	Article subcategory

Field	Level	Purpose
RETAILDEBITFLAG	Item	Flag indicating whether the line item is of a debit type

Entity Relationships

In SAP POS Data Management component of SAP Customer Activity Repository, combined semantic keys are used as primary keys.

To ensure the uniqueness of every record, a child entity inherits its primary key from its parent. It then defines an additional field that is part of its own primary key.

Parent/child relationships are maintained using these semantic keys. Because a semantic key for a child is a combination of its parent's primary key and an extra field, the child primary key already contains its parent's primary key.

Extensibility

The extension mechanism used in SAP Customer Activity Repository is described in the Extensibility and Extensions section.

Structures

This following table provides information about the structures used in SAP Customer Activity Repository:

Table 22: Structures of SAP POS Data Management Component in SAP Customer Activity Repository

Structure Name	Component	Component Type	Description
/POSDW/ HEADER_ANALYTICS	TRANSCOUNTER	/POSDW/CONSTCOUNTER	Header Analytics data fields
	BEGINDATE	/POSDW/BEGINDATE	
	BEGINTIME	/POSDW/BEGINTIME	
	CALYEAR	/POSDW/CALYEAR	
	CALMONTH	/POSDW/CALMONTH	
	CALDAY	/POSDW/CALDAY	
	CALHOUR	/POSDW/CALHOUR	
	CALWEEK	/POSDW/CALWEEK	
/POSDW/ITEM_ANALYTICS	TAXINC	/POSDW/TAXAMOUNT	Header Analytics data fields
	ITEMDISC	/POSDW/ REDUCTIONAMOUNT	
/POSDW/ITEM_DIST	DISTDISC	/POSDW/DISTDISC	Item Distributed data fields
	DISTTAX	/POSDW/DISTTAX	
	DISTTENDER	/POSDW/DISTTENDER	
/POSDW/ ITEM_DISTRIBUTED	.INCLUDE	/POSDW/ RETAILLINEITEM_FK	Item line item with distribution fields
	.INCLUDE	/POSDW/ITEM_DIST	

Table Types

The following table types are used in the SAP POS Data Management component of SAP Customer Activity Repository.

Table 23: Table Types of SAP POS Data Management Component in SAP Customer Activity Repository

Name	Line Type	Description
/POSDW/TT_TLOGF	/POSDW/TLOGF	/POSDW/TLOGF table type
/POSDW/TT_TLOGF_EXT	/POSDW/TLOGF_EXT	/POSDW/TLOGF_EXT table type
/POSDW/TT_TLOGF_CONTROL	/POSDW/TLOGF_CONTROL	Table type for control analytics
/POSDW/TT_ITEM_DISTRIBUTED	/POSDW/ITEM_DISTRIBUTED	Table of item distributed fields
/POSDW/TT_CUSTOMIZING_BUFFER	/POSDW/CUSTOMIZING_BUFFER	Customizing buffer table type

A Reference

A.1 The Main SAP Documentation Types

The following is an overview of the **most important** documentation types that you need in the various phases in the life cycle of SAP software.

Cross-Phase Documentation

SAPterm is SAP's terminology database. It contains SAP-specific vocabulary in over 30 languages, as well as many glossary entries in English and German.

- Target group:
 - Relevant for all target groups
- Current version:
 - On SAP Help Portal at help.sap.com > *Glossary* >
 - In the SAP system in transaction `STERM`

SAP Library is a collection of documentation for SAP software covering functions and processes.

- Target group:
 - Consultants
 - System administrators
 - Project teams for implementations or upgrades
- Current version:
 - On SAP Help Portal at help.sap.com (also available as documentation DVD)

The **security guide** describes the settings for a medium security level and offers suggestions for raising security levels. A collective security guide is available for SAP NetWeaver. This document contains general guidelines and suggestions. SAP applications have a security guide of their own.

- Target group:
 - System administrators
 - Technology consultants
 - Solution consultants
- Current version:
 - On SAP Service Marketplace at service.sap.com/securityguide

Implementation

The **master guide** is the starting point for implementing an SAP solution. It lists the required installable units for each business or IT scenario. It provides scenario-specific descriptions of preparation, execution, and follow-up of an implementation. It also provides references to other documents, such as installation guides, the technical infrastructure guide and SAP Notes.

- Target group:
 - Technology consultants

- Project teams for implementations
- Current version:
 - On SAP Service Marketplace at service.sap.com/instguides

The **installation guide** describes the technical implementation of an installable unit, taking into account the combinations of operating systems and databases. It does not describe any business-related configuration.

- Target group:
 - Technology consultants
 - Project teams for implementations
- Current version:
 - On SAP Service Marketplace at service.sap.com/instguides

Configuration Documentation in SAP Solution Manager – SAP Solution Manager is a life-cycle platform. One of its main functions is the configuration of business scenarios, business processes, and implementable steps. It contains Customizing activities, transactions, and so on, as well as documentation.

- Target group:
 - Technology consultants
 - Solution consultants
 - Project teams for implementations
- Current version:
 - In SAP Solution Manager

The **Implementation Guide (IMG)** is a tool for configuring (Customizing) a single SAP system. The Customizing activities and their documentation are structured from a functional perspective. (In order to configure a whole system landscape from a process-oriented perspective, SAP Solution Manager, which refers to the relevant Customizing activities in the individual SAP systems, is used.)

- Target group:
 - Solution consultants
 - Project teams for implementations or upgrades
- Current version:
 - In the SAP menu of the SAP system under ► [Tools](#) ► [Customizing](#) ► [IMG](#) ►

Production Operation

The **technical operations manual** is the starting point for operating a system that runs on SAP NetWeaver, and precedes the application operations guides of SAP Business Suite. The manual refers users to the tools and documentation that are needed to carry out various tasks, such as monitoring, backup/restore, master data maintenance, transports, and tests.

- Target group:
 - System administrators
- Current version:
 - On SAP Service Marketplace at service.sap.com/instguides

The **application operations guide** is used for operating an SAP application once all tasks in the technical operations manual have been completed. It refers users to the tools and documentation that are needed to carry out the various operations-related tasks.

- Target group:
 - System administrators

- Technology consultants
- Solution consultants
- Current version:
 - On SAP Service Marketplace at service.sap.com/instguides

Upgrade

The **upgrade master guide** is the starting point for upgrading the business scenarios and processes of an SAP solution. It provides scenario-specific descriptions of preparation, execution, and follow-up of an upgrade. It also refers to other documents, such as upgrade guides and SAP Notes.

- Target group:
 - Technology consultants
 - Project teams for upgrades
- Current version:
 - On SAP Service Marketplace at service.sap.com/instguides

The **upgrade guide** describes the technical upgrade of an installable unit, taking into account the combinations of operating systems and databases. It does not describe any business-related configuration.

- Target group:
 - Technology consultants
 - Project teams for upgrades
- Current version:
 - On SAP Service Marketplace at service.sap.com/instguides

Release notes are documents that contain short descriptions of new features in a particular release or changes to existing features since the previous release. Release notes about ABAP developments are the technical prerequisite for generating delta and upgrade Customizing in the Implementation Guide (IMG).

- Target group:
 - Consultants
 - Project teams for upgrades
- Current version:
 - On SAP Service Marketplace at service.sap.com/releasenotes
 - In the SAP menu of the SAP system under ► *Help* ► *Release Notes* ► (only ABAP developments)

Typographic Conventions

Table 24

Example	Description
<Example>	Angle brackets indicate that you replace these words or characters with appropriate entries to make entries in the system, for example, "Enter your <User Name>".
► Example ► Example ▢	Arrows separating the parts of a navigation path, for example, menu options
Example	Emphasized words or expressions
Example	Words or characters that you enter in the system exactly as they appear in the documentation
www.sap.com	Textual cross-references to an internet address
/example	Quicklinks added to the internet address of a homepage to enable quick access to specific content on the Web
123456	Hyperlink to an SAP Note, for example, SAP Note 123456
<i>Example</i>	<ul style="list-style-type: none"> Words or characters quoted from the screen. These include field labels, screen titles, pushbutton labels, menu names, and menu options. Cross-references to other documentation or published works
Example	<ul style="list-style-type: none"> Output on the screen following a user action, for example, messages Source code or syntax quoted directly from a program File and directory names and their paths, names of variables and parameters, and names of installation, upgrade, and database tools
EXAMPLE	Technical names of system objects. These include report names, program names, transaction codes, database table names, and key concepts of a programming language when they are surrounded by body text, for example, SELECT and INCLUDE
EXAMPLE	Keys on the keyboard

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