Oracle® Retail Merchandising System

Operations Guide, Volume 3 - Back End Configuration and Operations
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Oracle® Retail Merchandising System Operations Guide, Volume 3 - Back End Configuration and Operations, Release 14.0

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Preface

This *Retail Merchandising System Operations Guide, Volume 3 - Back End Configuration and Operations* provides critical information about the processing and operating details of Oracle Retail Merchandising System (RMS), including the following:

- System configuration settings
- Technical architecture
- Functional integration dataflow across the enterprise
- Batch processing

Audience

This guide is for:

- Systems administration and operations personnel
- Systems analysts
- Integrators and implementers
- Business analysts who need information about Merchandising System processes and interfaces

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For more information, see the following documents:

- *Oracle® Retail Merchandising System Installation Guide*
- *Oracle® Retail Merchandising System User Guide and Online Help*
- *Oracle® Retail Merchandising System Reports User Guide*
- *Oracle® Retail Trade Management User Guide and Online Help*
- *Oracle® Retail Sales Audit User Guide and Online Help*
- *Oracle® Retail Merchandising Security Guide*
- *Oracle® Retail Merchandising System Data Model*
- *Oracle® Retail Merchandising System Data Access Schema Data Model*
- *Oracle® Retail Merchandising Implementation Guide*
- *Oracle® Retail Merchandising System Custom Flex Attribute Solution Implementation Guide*
- *Oracle® POS Suite/Merchandising Operations Management Implementation Guide*

- *Oracle® Retail Merchandising Batch Schedule*
- *Oracle® Retail Merchandising Data Conversion Operations Guide*
- *Oracle® Retail Enterprise Integration Guide*
- *Oracle® Retail Merchandising System Release Notes*

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- Exact error message received
- Screen shots of each step you take

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Conventions

Navigate: This is a navigate statement. It tells you how to get to the start of the procedure and ends with a screen shot of the starting point and the statement "the Window Name window opens."

```
This is a code sample
    It is used to display examples of code
```

1

Introduction

Welcome to the Oracle Retail Merchandising System Operations Guide, Volume 3 - Back End Configuration and Operations. The guide is designed to inform you about the 'backend' of RMS: data inputs, processes, and outputs. As a member of the Oracle Retail family, RMS provides many benefits of Enterprise Application Integration (EAI).

Contents Covered in this Volume

This volume describes the important features that are necessary to run the Pro*C programs and the RETL programs associated with RMS. Additional RMS configuration, RMS Integration and Operations information is also included in this volume. Topics included are:

- Pro*C Restart and Recovery
- Pro*C Multi-Threading
- Pro*C Array Processing
- Pro*C Input and Output Formats
- RETL Program Overview for the RMS-RPAS Interface
- Internationalization
- Integrating RMS with Store Inventory Management
- Integrating RMS with Oracle E-Business Suite Financials using Oracle Retail Financial Integration
- Understanding Data Access Schema
- Using Oracle Wallet

> **Note:** For setting up Business Intelligence Publisher, see *Oracle Retail Merchandising System Installation Guide*.

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Pro*C Restart and Recovery

RMS has implemented a restart recovery process in most of its batch architecture. The general purpose of restart/recovery is to:

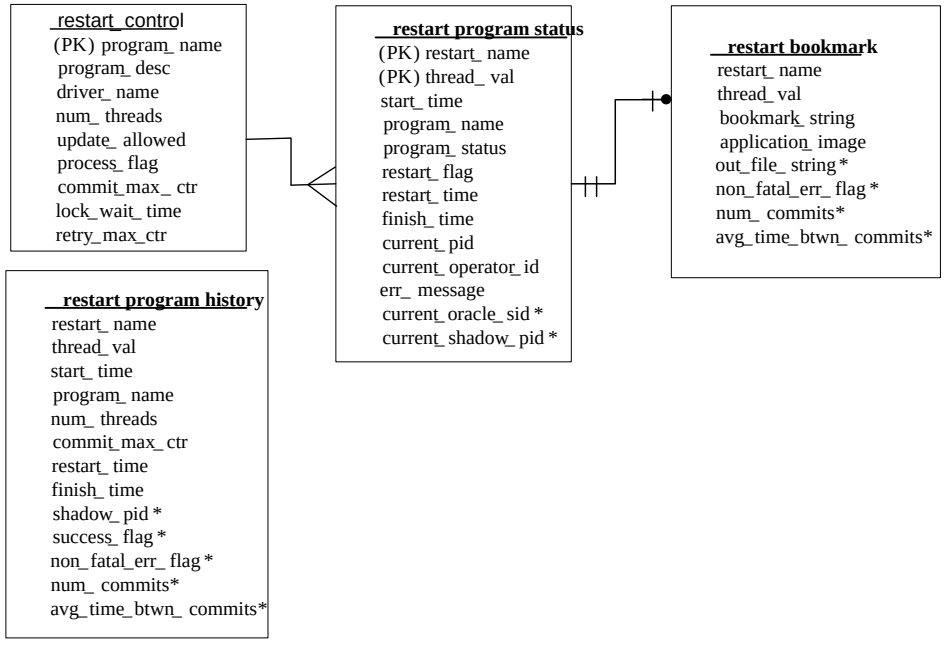
- Recover a halted process from the point of failure.
- Prevent system halts due to large numbers of transactions.
- Allow multiple instances of a given process to be active at the same time.

Further, the RMS restart/recovery tracks batch execution statistics and does not require DBA authority to execute.

The restart capabilities revolve around a program's logical unit of work (LUW). A batch program processes transactions, and commit points are enabled based on the LUW. LUWs consist of a relatively unique transaction key (such as sku/store) and a maximum commit counter. Commit events take place after the number of processed transaction keys meet or exceed the maximum commit counter. For example, after every 10,000 sku/store combinations, a commit occurs. At the time of commit, key data information that is necessary for restart is stored in the restart tables. In the event of a handled or un-handled exception, transactions is rolled back to the last commit point, and upon restart the key information is retrieved from the tables so that processing can continue from the last commit point.

Table of Description and Definition

The RMS restart/recovery process is driven by a set of four tables. These tables are shown in Entity Relationship diagram. For detailed table description, see RESTART_CONTROL, RESTART_PROGRAM_STATUS, RESTART_BOOKMARK and RESTART_PROGRAM_HISTORY.



RMS Restart Recovery Entity Relationships Diagram

Note: The fields with asterisks (*) are only used by new batch programs of release 9.0 or later.

RESTART_CONTROL

The RESTART_CONTROL table is the master table in the restart/recovery table set. One record exists on this table for each batch program that is run with restart/recovery logic in place. The restart/recovery process uses this table to determine:

- Whether the restart/recovery is table-based or file-based.
- The total number of threads used for each batch program.
- The maximum records processed before a commit event takes place.
- The driver for the threading (multi-processing) logic.
- Time to wait for a lock and the number of lock retry.

RESTART_CONTROL			
(PK) PROGRAM_NAME	varchar2	25	Batch program name.
PROGRAM_DESC	varchar2	120	A brief description of the program function.
DRIVER_NAME	varchar2	25	Driver on query, for example, department (non-updatable).
NUM_THREADS	num	10	Number of threads used for current process.
UPDATE_ALLOWED	varchar2	2	Indicates whether user can update thread numbers or if done programmatically.
PROCESS_FLAG	varchar2	1	Indicates whether the process is table-based (T) or file-based (F).
COMMIT_MAX_CTR	num	6	Numeric maximum value for counter before commit occurs.
LOCK_WAIT_TIME	num	6	Contains the number of seconds between the last and the next lock retry.
RETRY_MAX_CTR	num	10	Contains the maximum number of lock retry.

RESTART_PROGRAM_STATUS

The RESTART_PROGRAM_STATUS table is the table that holds record keeping information about current program processes. The number of rows for a program on the status table is equal to its NUM_THREADS value on the RESTART_CONTROL table. The status table is modified during restart/recovery initialization and close logic. For table-based processing, the restart/recovery initialization logic assigns the next available thread to a program based on the program status and restart flag. For file-based processing, the thread value is passed in from the input file name. When a thread is assigned, the PROGRAM_STATUS is updated to prevent the assignment of that thread to another process. Information is logged on the current status of a given thread, as well as record keeping information such as operator and process timing information.

RESTART_PROGRAM_STATUS			
(PK)RESTART_NAME	varchar2	50	Program name
(PK)THREAD_VAL	num	10	Thread counter

RESTART_PROGRAM_STATUS			
START_TIME	date		dd-mon-yy hh:mi:ss
PROGRAM_NAME	varchar2	25	Program name
PROGRAM_STATUS	varchar2	25	Started, aborted, aborted in init, aborted in process, aborted in final, completed, ready for start.
RESTART_FLAG	varchar2	1	Automatically set to 'N' after abnormal end, must be manually set to 'Y' for program to restart.
RESTART_TIME	date		dd-mon-yy hh:mi:ss.
FINISH_TIME	date		dd-mon-yy hh:mi:ss.
CURRENT_PID	num	15	Starting program ID.
CURRENT_OPERATOR_ID	varchar2	20	Operator that started the program.
ERR_MESSAGE	varchar2	255	Record that caused program abort and associated error message.
CURRENT_ORACLE_SID	num	15	Oracle SID for the session associated with the current process.
CURRENT_SHADOW_PID	num	15	O/S process ID for the shadow process associated with the current process. It is used to locate the session trace file when a process is not finished successfully.

RESTART_PROGRAM_HISTORY

The RESTART_PROGRAM_HISTORY table will contain one record for every successfully completed program thread with restart/recovery logic. Upon the successful completion of a program thread, its record on the RESTART_PROGRAM_STATUS table will be inserted into the history table. Table purging will be at user discretion.

RESTART_PROGRAM_HISTORY			
RESTART_NAME	varchar2	50	Program name.
THREAD_VAL	Num	10	Thread counter.
START_TIME	Date		dd-mon-yy hh:mi:ss.
PROGRAM_NAME	varchar2	25	Program name.
NUM_THREADS	Num	10	Number of threads.
COMMIT_MAX_CTR	num	6	Numeric maximum value for counter before commit occurs.
RESTART_TIME	date		dd-mon-yy hh:mi:ss.
FINISH_TIME	date		dd-mon-yy hh:mi:ss.
SHADOW_PID	num	15	O/S process ID for the shadow process associated with the process. It is used to locate the session trace file.

RESTART_PROGRAM_HISTORY			
SUCCESS_FLAG	varchar2	1	Indicates whether the process finished successfully (reserved for future use).
NON_FATAL_ERR_FLAG	varchar2	1	Indicates whether non-fatal errors have occurred for the process.
NUM_COMMITS	num	12	Total number of commits for the process. The possible last commit when restart/recovery is closed is not counted.
AVG_TIME_BTWN_COMMITS	num	12	Accumulated average time between commits for the process. The possible last commit when restart/recovery is closed is not counted.

RESTART_BOOKMARK

When a restart/recovery program thread is active, its state is started or aborted, and a record for it exists on the RESTART_BOOKMARK table. Restart/recovery initialization logic inserts the record into the table for a program thread. The restart/recovery commit process updates the record with the following restart information:

- A concatenated string of key values for table processing
- A file pointer value for file processing
- Application context information such as counters and accumulators

The restart/recovery closing process deletes the program thread record if the program finishes successfully. In the event of a restart, the program thread information on this table will allow the process to begin from the last commit point.

RESTART_BOOKMARK			
(PK) RESTART_NAME	varchar2	50	Program name.
(PK) THREAD_VAL	num	10	Thread counter.
BOOKMARK_STRING	varchar2	255	Character string of key of last committed record.
APPLICATION_IMAGE	varchar2	1000	Application parameters from the last save point.
OUT_FILE_STRING	varchar2	255	Concatenated file pointers (UNIX sometimes refers to these as stream positions) of all the output files from the last commit point of the current process. It is used to return to the right restart point for all the output files during restart process.
NON_FATAL_ERR_FLAG	varchar2	1	Indicates whether non-fatal errors have occurred for the current process.
NUM_COMMITS	num	12	Number of commits for the current process. The possible last commit when restart/recovery is closed is not counted.

AVG_TIME_BTWN_COMMITS	num	12	Average time between commits for the current process. The possible last commit when restart/recovery is closed is not counted.

V_RESTART_<X>

Restart views are used for query-based programs that require multi-threading. Separate views (ex v_restart_dept, and v_restart_store) are created for each threading driver, for example, department or store. A join is made to a view based on threading driver to force the separation of discrete data into particular threads. See the threading discussion for more details.

V_RESTART_<X>		
DRIVER_NAME	varchar2	Example dept, store, region, and others.
NUM_THREADS	number	Total number of threads in set (defined on restart control).
DRIVER_VALUE	number	Numeric value of the driver_name.
THREAD_VAL	number	Thread value defined for driver_value and num_threads combination.

Restart and Recovery Data Model Design

The RESTART_PROGRAM_STATUS and RESTART_BOOKMARK are separate tables. This is because the initialization process needs to fetch all of the rows associated with RESTART_NAME/schema, but will only update one row. The commit process will continually lock a row with a specific RESTART_NAME and THREAD_VAL. The data involved with these two processes is separated into two tables to reduce the number of hangs that could occur due to locked rows. Even if you allow 'dirty reads' on locked rows, a process will still hang if it attempts to do an update on a locked row. The commit process is only interested in a unique row, so if we move the commit process data to a separate table with row level (not page level) locking, there will not be contention issues during the commit. With the separate tables, the initialization process will now see fewer problems with contention because rows will only be locked twice, at the beginning and end of the process.

Physical Set-Up

The restart/recovery process needs to be as robust as possible in the event of database related failure. The costs outweigh the benefits of placing the restart/recovery tables in a separate database. The tables should, however, be setup in a separate, mirrored table space with a separate rollback segment.

Table and File-Based Restart/Recovery

The restart/recovery process works by storing all the data necessary to resume processing from the last commit point. Therefore, the necessary information is updated on the RESTART_BOOKMARK table before the processed data is committed. Query-based and file-based module stores different information on the restart tables, and therefore calls different functions within the restart/recovery API to perform their tasks.

When a program's process is query-based on a module is driven by a driving query that processes the retrieved rows, the information that is stored on the

RESTART_BOOKMARK table is related to the data retrieved in the driving query. If the program fails while processing, the information that is stored on the restart-tables can be used in the conditional where-clause of the driving query to only retrieve data that has yet to be processed since the last commit event.

File-based processing, needs to store the file location at the time of the last commit point. This file's byte location is stored on the RESTART_BOOKMARK table and will be retrieved at the time of a restart. This location information will be used further be used in reopening the file when the data was last committed. Because there is different information being saved to and retrieved from the RESTART_BOOKMARK table for each of the different types of processing, different functions need to be called to perform the restart/recovery logic. The query-based processing calls the RESTART_INIT or RETEK_INIT and RESTART_COMMIT or RETEK_COMMIT functions while the file-based processing calls the RESTART_FILE_INIT and RESTART_FILE_COMMIT functions.

In addition to the differences in API function calls, the batch processing flow of the restart/recovery differs between the files. Table-based restart/recovery needs to use a priming fetch logical flow, while the file-based processing usually reads lines in a batch. Table-based processing requires its structure to ensure that the LUW key has changed before a commit event is allowed to occur, while the file-based processing does not need to evaluate the LUW, which can typically be thought of as the type of transaction being processed by the input file.

The following diagram depicts *table*-based Restart/Recovery program flow:

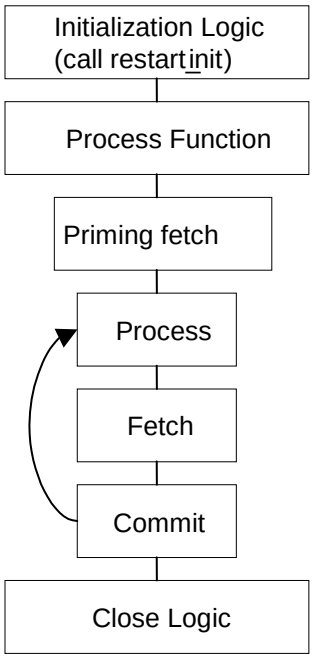
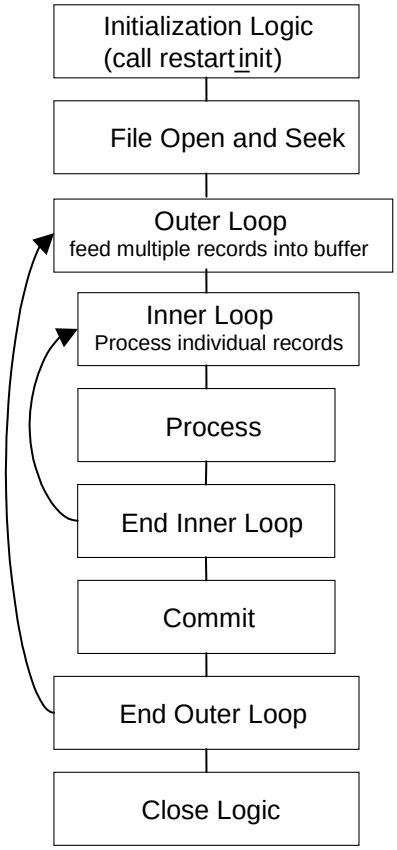


Table-Based Restart/Recovery Program Flow

The following diagram depicts *file*-based Restart/Recovery program flow



File-based Restart/Recovery Program Flow

Initialization logic:

- Variable declarations
- File initialization
- Call restart_init() or restart_file_init() function - determines start or restart logic
- First fetch on driving query

Start logic: initialize counters/accumulators to start values

Restart logic:

- Parse application_image field on bookmark table into counters/accumulators
- Initialize counters/accumulators to values of parsed fields

Process/commit loop:

- Process updates and manipulations
- Fetch new record
- Create varchar from counters/accumulators to pass into application_image field on restart_bookmark table
- Call restart_commit() or restart_file_commit()

Close logic:

- Reset pointers
- Close files/cursors
- Call Restart_close()

API Functional Descriptions

RESTART_INIT

An initialization functions for table-based batch processing.

The batch process gathers the following information from the restart control tables:

- Total number of threads for a program and thread value assigned to current process.
- Number of records to loop through in driving cursor before commit (LUW).
- Start string - bookmark of last commit to be used for restart or a null string if current process is an initial start and initializes the restart record-keeping (restart_program_status).
- Program status is changed to 'started' for the first available thread.
- Operational information is updated: operator, process, start_time, and bookmarking (restart_bookmark) tables.
- On an initial start, a record is inserted.
- On restart, the start string and application context information from the last commit is retrieved.
- Lock wait time and maximum retry for locking.

RESTART_FILE_INIT

An initialization functions for file-based batch processing. It is called from program modules.

1. The batch process gathers the following information from the restart control tables:
- Number of records to read from file for array processing and for commit cycle.
- File start point- bookmark of last commit to be used for restart or 0 for initial start.
2. The process initializes the restart record-keeping (restart_program_status):
- Program status is changed to 'started' for the current thread.
- Operational information is updated: operator, process, START_TIME.
3. The process initializes the restart bookmarking (restart_bookmark) tables:
- On an initial start, a record is inserted.
- On restart, the file starting point information and application context information from the last commit is retrieved.

RESTART_COMMIT

A function that commits the processed transaction for a given number of driving query fetches. It is called from program modules.

The process updates the RESTART_BOOKMARK start string and application image information if a commit event has taken place:

- The current number of driving query fetches is greater than or equal to the maximum set in the restart_program_status table (and fetched in the restart_init function).
- The bookmark string of the last processed record is greater than or equal to the maximum set in the restart_program_status table (and fetched in the restart_init function).
- The bookmark string increments the counter.
- The bookmark string sets the current string to be the most recently fetched key string.

RESTART_FILE_COMMIT

A function that commits processed transactions after reading a number of lines from a flat file. It is called from program modules.

The process updates the RESTART_BOOKMARK table:

- Start_string is set to the file pointer location in the current read of the flat file.
- Application image is updated with context information.

RESTART_CLOSE

A function that updates the restart tables after program completion.

The process determines whether the program was successful. If the program finished successfully:

- The restart_program_status table is updated with finish information and the status is reset.
- The corresponding record in the RESTART_BOOKMARK table is deleted.
- The restart_program_history table has a copy of the restart_program_status table record inserted into it.
- The restart_program_status is re-initialized.

If the program ends with errors:

- The transactions are rolled back.
- The program_status column on the restart_program_status table is set to 'aborted in *' where * is one of the three main functions in batch: init, process or final.
- The changes are committed.

PARSE_ARRAY_ARGS

This function parses a string into components and places results into multidimensional array. It is only called within API functions and will never be called in program modules.

The process is passes a string to parse, and a pointer to an array of characters.

The first character of the passed string is the delimiter.

RESTART_FILE_WRITE

This function will append output in temporary files to final output files when a commit point is reached. It is called from program modules.

RESTART_CAT

This function contains the logic that appends one file to another. It is only called within the restart/recovery API functions and never called directly in program modules.

Restart Headers and Libraries

The RESTART.H and the STD_ERR.H header files are included in RETEK.H to utilize the restart/recovery functionality.

RESTART.H

This library header file contains constant, macro substitutions, and external global variable definitions as well as restart/recovery functions prototypes.

The global variables that are defined include:

- The thread number assigned to the current process.
- The value of the current process's thread maximum counter:
  - For table-based processing, it is equal to the number of iterations of the driving query before a commit can take place.
  - For file-based processing, it is equal to the number of lines that is read from a flat file and processed using a structured array before a commit can take place.
- The current count of driving query iterations used for table-based processing or the current array index used in file-based processing.
- The name assigned to the program/logical unit of work by the programmer. It is the same as the restart_name column on the restart_program_status, restart_program_history, and RESTART_BOOKMARK tables.

STD_REST.H

This library header file contains standard restart variable declarations that are used in the program modules.

The variable definitions that are included are:

- The concatenated string value of the fetched driving query key that is currently being processed.
- The concatenated string value of the fetched driving query key that will be processed next.
- The error message passed to the restart_close function and updated to restart_program_status.
- Concatenated string of application context information, for example, counters and accumulators.
- The name of the threading driver, for example, department, store, warehouse and others.
- The total number of threads used by this program.
- The pointer to pass to initialization function to retail number of threads value.

Updating Restart Headers and Libraries

Restart/recovery performs the following, among other capabilities:

- Organizes global variables associated with restart recovery.
- Allows the batch developer full control of restart recovery variables parameter passing during initialization.
- Removes temporary write files to speed up the commit process.
- Moves more information and processing from the batch code into the library code.
- Adds more information into the restart recovery tables for tuning purposes.

retek_2.h

This library header file is included by all C code within Retail and serves to centralize system includes, macro defines, globals, function prototypes, and, especially, structs for use in the new restart/recovery library.

The globals used by the old restart/recovery library are all discarded. Instead, each batch program declares variables needed and calls retek_init() to get them populated from restart/recovery tables. Therefore, only the following variables are declared:

- gi_no_commit: flag for NO_COMMIT command line option (used for tuning purposes).
- gi_error_flag: fatal error flag.
- gi_non_fatal_err_flag: non-fatal error flag.

In addition, a rtk_file struct is defined to handle all file interfaces associated with restart/recovery. Operation functions on the file struct are also defined.

```
#define NOT_PAD           1000  /* Flag not to pad thread_val */
#define PAD               1001  /* Flag to pad thread_val at the end */
#define TEMPLATE          1002  /* Flag to pad thread_val using filename template
*/
#define MAX_FILENAME_LEN   50
typedef struct
{
   FILE* fp;                              /* File pointer */
   char  filename[MAX_FILENAME_LEN + 1];  /* Filename */
   int   pad_flag;   /* Flag whether to pad thread_val to filename */
} rtk_file;

int   set_filename(rtk_file* file_struct, char* file_name, int pad_flag);
FILE* get_FILE(rtk_file* file_struct);
int   rtk_print(rtk_file* file_struct, char* format, ...);
int   rtk_seek(rtk_file* file_struct, long offset, int whence);
```

The parameters that retek_init() needs to populate passed using a format known to retek_init(). A struct is defined here for this purpose. An array of parameters of this struct type is needed in each batch program. Other requirements have to be initialized at each batch program.

- The lengths of name, type and sub_type should not exceed the definitions here.
- Type can only be: "int", “uint”, "long", "string", or "rtk_file".
- For type "int", “uint” or "long", use "" as sub_type.
- For type "string", sub_type can only be "S" (start string) unless the string is the thread value or number of threads, in which case use “” as sub_type or "I" (image string).
- For type "rtk_file", sub_type can only be "I" (input) or "O" (output).

```
#define NULL_PARA_NAME        51
#define NULL_PARA_TYPE        21
#define NULL_PARA_SUB_TYPE    2
typedef struct
{
   char name[NULL_PARA_NAME];
   char type[NULL_PARA_TYPE];
   char sub_type[NULL_PARA_SUB_TYPE];
} init_parameter;
```

New Restart/Recovery Functions

Starting from release 9.0, all new batch programs are coded using the new restart/recovery functions. Batch programs using the old restart/recovery API functions are still in use. Therefore, Oracle Retail is currently maintaining two sets of restart/recovery libraries.

INT RETEK_INIT(INT NUM_ARGS, INIT_PARAMETER *PARAMETER, ...)

RETEK_INIT initializes restart/recovery (for both table and file-based):

Pass in NUM_ARGs as the number of elements in the INIT_PARAMETER array, and then the INIT_PARAMETER array, then variables a batch program needs to initialize in

the order and types defined in the INIT_PARAMETER array. Note that all int, uint and long variables need to be passed by reference.

1. Get all global and module level values from databases.
2. Initialize records for RESTART_PROGRAM_STATUS and RESTART_BOOKMARK.
4. Parse out user-specified initialization variables (variable arg list).
3. Return NO_THREAD_AVAILABLE if no qualified record in RESTART_CONTROL or RESTART_PROGRAM_STATUS.
4. Commit work.

INT RETEK_COMMIT(INT NUM_ARGS, ...)

RETEK_COMMIT checks and commits if needed (for both table and file-based):

1. Pass in num_args, then variables for start_STRING first, and those for image string (if needed) second. The num_args is the total number of these two groups. All are string variables and are passed in the same order as in retek_init();
2. Concatenate start_string either from passed in variables (table-based) or from ftell of input file pointers (file-based);
3. Check if commit point is reached (counter check and, if table-based, start string comparison);
4. If reached, concatenated image_string from passed in variables (if needed) and call internal_commit() to get out_file_string and update RESTART_BOOKMARK;
5. If table-based, increment pl_current_count and update ps_cur_string.

INT COMMIT_POINT_REACHED(INT NUM_ARGS, ...)

COMMIT_POINT_REACHED checks if the commit point is reached (for both table- and file-based). The difference between this function and the check in RETEK_COMMIT() is that here the PL_CURRENT_COUNT and PS_CUR_STRING are not updated. This checking function is designed to be used with RETEK_FORCE_COMMIT(), and the logic to ensure integrity of LUW exists in user batch program. It can also be used together with RETEK_COMMIT() for extra processing at the time of commit.

1. Pass in num_args, then all string variables for start_string in the same order as in retek_init(). The num_args is the number of variables for start_string. If no start_string (as in file-based), pass in NULL.
2. For table-based, if pl_curren_count reaches pl_max_counter and if newly concatenated bookmark string is different from ps_cur_string, return 1; otherwise return 0.
3. For file-based, if pl_curren_count reaches pl_max_counter return 1; otherwise return 0.

INT RETEK_FORCE_COMMIT(INT NUM_ARGS, ...)

RETEK_FORCE_COMMIT always commits (for both table and file-based):

1. Pass in num_args, then variables for start_string first, and those for image string (if needed) second. The num_args is the total number of these two groups. All are string variables and are passed in the same order as in retek_init().
2. Concatenate start_string either from passed in variables (table-based) or from ftell of input file pointers (file-based).
3. Concatenated image_string from passed in variables (if needed) and call internal_commit() to get out_file_string and update RESTART_BOOKMARK.
4. If table-based, increment pl_current_count and update ps_cur_string.

INT RETEK_CLOSE(VOID)

RETEK_CLOSE closes restart/recovery (for both table and file-based):

1. If gi_error_flag or NO_COMMIT command line option is TRUE, rollback all database changes.
2. Update RESTART_PROGRAM_STATUS according to gi_error_flag.
3. If no gi_error_flag, insert record into RESTART_PROGRAM_HISTORY with information fetched from RESTART_CONTROL, RESTART_PROGRAM_BOOKMARK and RESTART_PROGRAM_STATUS tables.
4. If no gi_error_flag, delete RESTART_BOOKMARK record.
5. Commit work.
6. Close all opened file streams.

INT RETEK_REFRESH_THREAD(VOID)

You must refresh a program's thread, so that it can be run again.

1. Updates the RESTART_PROGRAM_STATUS record for the current program's PROGRAM_STATUS to be 'ready for start'.
2. Deletes any RESTART_BOOKMARK records for the current program.
3. Commits work.

VOID INCREMENT_CURRENT_COUNT(VOID)

INCREMENT_CURRENT_COUNT increases PL_CURRENT_COUNT by 1.

> **Note:** This is called from GET_RECORD() of intrface.pc for file-based I/O.

INT PARSE_NAME_FOR_THREAD_VAL(CHAR* NAME)

PARSE_NAME_FOR_THREAD_VAL parses thread value from the extension of the specified file name.

INT IS_NEW_START(VOID)

IS_NEW_START checks if current run is a new start; if yes, return 1; otherwise 0.

Query-Based Commit Thresholds

The restart capabilities revolve around a program's logical unit of work (LUW). A batch program processes transactions and enables commit points based on the LUW. An LUW is comprised of a transaction key (such as item-store) and a maximum commit counter. Commit events occur after a given number of transaction keys are processed. At the time of the commit, key data information that is necessary for restart is stored in the restart table. In the event of a handled or un-handled exception, transactions will be rolled back to the last commit point. Upon restart the restart key information will be retrieved from the tables so that processing can resume with the unprocessed data.

3

Pro*C Multi-Threading

Processing multiple instances of a given program can be accomplished through "threading". This requires driving cursors to be separated into discrete segments of data to be processed by different threads. This is accomplished through a stored procedure that separates threading mechanisms (for example, departments or stores) into particular thread given value (for example, department 1001) and the total number of threads for a given process.

File-based processing will not "thread" its processing. The same data file will never be acted upon by multiple processes. Multi-threading is accomplished by dividing the data into separate files using a separate process for each file. The thread value is related to the input file. This is necessary to ensure that the appropriate information can be tied back to the relevant file in the event of a restart.

The store length in RMS is ten digits. Therefore, thread value which is based on the store number must allow ten digits. As the thread value is declared as a 'C' variable of type int (long), the system restricts thread values to nine digits.

This does not mean that you cannot use ten digit store numbers. It means that if you do use ten digit store numbers you cannot use them as thread values.

Threading Description

The use of multiple threads or processes in Oracle Retail batch processing increases efficiency and decrease processing time. The design of the threading process allows maximum flexibility to the end user in defining the number of processes over which a program is divided.

Originally, the threading function was used directly in the driving queries. This was a slow process. Instead of using the function call directly in the driving queries, the designs call for joining driving query tables to a view (for example, v_restart_store) that includes the function.

Threading Function for Query-Based

A stored procedure has been created to determine thread values. Restart_thread_return returns a thread value derived from a numeric driver value, such as department number, and the total number of threads in a given process. Retailers should be able to determine the best algorithm for their design, and if a different means of segmenting data is required, then either the restart_thread_return function can be altered, or a different function can be used in any of the views in which the function is contained.

Currently the restart_thread_return function is a very simple modulus routine:

```
CREATE OR REPLACE FUNCTION RESTART_THREAD_RETURN(in_unit_value  NUMBER,
                          in_total_threads NUMBER)
  RETURN NUMBER IS
  ret_val NUMBER;
BEGIN
  ret_val := MOD(ABS(in_unit_value),in_total_threads) + 1;
  RETURN ret_val;
END;
```

Restarting View for Query-Based

Each restart view will have four elements:

- The name of the threading mechanism, driver_name.
- The total number of threads in a grouping, num_threads.
- The value of the driving mechanism, driver_value.
- The thread value for that given combination of driver_name, num_threads, and driver value, thread_val.

The view will be based on the restart_control table and an information table such as DEPS or STORES. A row will exist in the view for every driver value and every total number of threads value. Therefore, if a retailer were to always use the same number of threads for a given driver (dept, store, etc.), then the view would be relatively small. As an example, if all of a retailer's programs threaded by department have a total of 5 threads, then the view will contain only one value for each department. For example, if there are 10 total departments, 10 rows will exist in v_restart_dept. However, if the retailer wants to have one of the programs to have ten threads, then there will be 2 rows for every department: one for five total threads and one for ten total threads (for example, if 10 total departments, 20 rows will exist in v_restart_dept). Obviously, retailers should be advised to keep the number of total thread values for a thread driver to a minimum to reduce the scope of the table joins of the driving cursor with the view.

Below is an example of how the same driver value can result in differing thread values. This example uses the restart_thread_return function as it currently is written to derive thread values.

Driver_name	num_threads	driver_val	thread_val
DEPT	1	101	1
DEPT	2	101	2
DEPT	3	101	3
DEPT	4	101	2
DEPT	5	101	2
DEPT	6	101	6
DEPT	7	101	4

Below is an example of what a distribution of stores might look like given 10 stores and 5 total threads:

Driver_name	num_threads	driver_val	thread_val
STORE	5	1	2
STORE	5	2	3
STORE	5	3	4
STORE	5	4	5
STORE	5	5	1
STORE	5	6	2
STORE	5	7	3
STORE	5	8	4

Driver_name	num_threads	driver_val	thread_val
STORE	5	9	5
STORE	5	10	1

View syntax:

The following is an example of the syntax needed to create the view for the multi-threading join, created with script (see threading discussion for details on RESTART_THREAD_RETURN function):

```
create or replace view v_restart_store as
 select rc.driver_name driver_name,
     rc.num_threads num_threads,
     s.store driver_value,
     restart_thread_return(s.store, rc.num_threads) thread_val
  from restart_control rc, store s
  where rc.driver_name = 'STORE'
```

There is a different threading scheme used within Oracle Retail Sales Audit (ReSA). Because ReSA needs to run 24 hours a day and seven days a week, there is no batch window. This means that there may be batch programs running at the same time that there are online users. ReSA solved this concurrency problem by creating a locking mechanism for data that is organized by store days. These locks provide a natural threading scheme. Programs that cycle through all of the store day data attempt to lock the store day first. If the lock fails, the program simply goes on to the next store day. This has the affect of automatically balancing the workload between all of the programs executing.

Thread Scheme Maintenance

All program names will be stored on the restart_control table along with a functional description, the query driver (department, store, class, and others) and the user-defined number of threads associated with them. Users should be able to scroll through all programs to view the name, description, and query driver, and if the update_allowed flag is set to true, to modify the number of threads (update is set to true).

File-Based

File-based processing does not truly “multi-thread” and therefore the number of threads defined on restart_control will always be one. However, a restart_program_status record needs to be created for each input file that is to be processed for the program module. Further, the thread value that is assigned must be part of the input file name. The restart_parse_name function included in the program module will parse the thread value from the program name and use that to determine the availability and restart requirements on the RESTART_PROGRAM_STATUS table.

Refer to the beginning of this multi-threading section for a discussion of limits on using large (greater than nine digits) thread values.

Query-Based

When the number of threads is modified in the restart_control table, the form must first validate that no records for that program are currently being processed in the restart_program_status_table (that is, all records = 'Completed'). The program must insert or delete rows depending on whether the new thread number is greater than or less than the old thread number. In the event that the new number is less than the previous number, all records for that program_name with a thread number greater than the new thread number will be deleted. If the new number is greater than the old number, new rows will be inserted. A new record is inserted for each RESTART_NAME/THREAD_VAL combination.

For example if the batch program SALDLY has its number of processes changed from 2 to 3, then an additional row (3) will be added to the restart_program_status table. In the same way, if the number of threads was reduced to 1 in this example, rows 2 and 3 would be deleted.

Row	RESTART_NAME	THREAD_VA	program_name
1	SALDLY	1	SALDLY
2	SALDLY	2	SALDLY

RESTART_PROGRAM_STATUS table after insert:

Row	RESTART_NAME	THREAD_VA	program_name
1	SALDLY	1	SALDLY
2	SALDLY	2	SALDLY
3	SALDLY	3	SALDLY

RESTART_PROGRAM_STATUS table after delete:

Row	RESTART_NAME	THREAD_VA	program_name
1	SALDLY	1	SALDLY

Users should also be able to modify the commit_max_ctr column in restart_program_status table. This controls the number of iterations in driving query or the number of lines read from a flat file that determine the logical unit of work (LUW).

Batch Maintenance

Users must be able to view the status of all records in restart_program_status table. This is where the user gets to view error messages from aborted programs, and statistics and histories of batch runs. The only fields that are modified will be program_status and restart_flag. The user should be able to reset the restart_flag to 'Y' from 'N' on records with a status of aborted, started records to aborted in the event of an abend (abnormal termination), and all records in the event of a restore from tape/re-run of all batch.

Scheduling and Initialization of Restart Batch

Before any batch with restart/recovery logic is run, an initialization program must be run to update the status in the restart_program_status table. This program must update the program_status to 'ready for start' wherever a record's program_status is 'completed.' This leaves unchanged all programs that ended unsuccessfully in the last batch run.

Pre-Processing and Post-Processing

Due to the nature of threading algorithm, individual programs needs a pre or a post program run to initialize variables or files before any of the threads have run or to update final data when all the threads are run. The decision was made to create pre-programs and post-programs in these cases rather than let the restart/recovery logic decide whether the currently processed thread is the first thread to start or the last thread to end for a given program.

ksh Driven Batch Programs

For ksh driven batch programs that call PL/SQL for its main processing logic, multi-threading is also supported. An example of this type of batch job is ksh script stockcountupload.ksh calling PL/SQL package CORESVC_STOCK_UPLOAD_SQL. The threading configuration for each program is defined in table RMS_PLSQL_BATCH_CONFIG (instead of RESTART_CONTROL for the ProC programs). Column MAX_CONSURRENT_THREAD holds the maximum number of concurrent threads. MAX_CHUNK_SIZE defines the commit size within each thread, similar to the RESTART_CONTROL.COMMIT_MAX_CTR column.

4

Pro*C Array Processing

Oracle Retail batch architecture uses array processing to improve performance. Instead of processing SQL statements using scalar data, data is grouped into arrays and used as bind variables in SQL statements. This improves performance by reducing the server/client and network traffic.

Array processing is used in selecting, inserting, deleting, and updating statements. Oracle Retail typically does not statically define the array sizes, but uses the restart maximum commit variable as a sizing multiple. The user must remember this when defining the system's maximum commit counters.

Remember, when using array processing in Oracle, it does not allow a single array operation to be performed for more than 32000 records in one step. The Oracle Retail restart/recovery libraries have been updated to define macros for this value: MAX_ORACLE_ARRAY_SIZE.

All batch programs that use array processing need to limit the size of their array operations to MAX_ORACLE_ARRAY_SIZE.

If the commit max counter is used for array processing size, check it after the call to restart_init() and, if necessary, reset it to the maximum value if greater. If retek_init() is used to initialize, check the returned commit max counter and reset it to the maximum size if it is greater. In case of retek_init(), reset the library's internal commit max counter by calling extern int limit_commit_max_ctr(unsigned int new_max_ctr).

If some other variable is used for sizing the array processing, the actual array-processing step must be encapsulated in a calling loop that performs the array operation in sub segments of the total array size where each sub-segment is at most MAX_ORACLE_ARRAY_SIZE large. Currently all Oracle Retail batch programs are implemented in the similar way.

5

Pro*C Input and Output Formats

Oracle Retail batch processing utilizes input from both tables and flat files. Further, the outcome of processing can both modify data structures and write output data. Interfacing Oracle Retail with external systems is the main use of file based I/O.

General Interface Discussion

To simplify the interface requirements, Oracle Retail requires that all in-bound and out-bound file-based transactions adhere to standard file layouts. There are two types of file layouts, detail-only and master-detail, which are described in the sections below.

An interfacing API exists within Oracle Retail to simplify the coding and the maintenance of input files. The API provides functionality to read input from files, ensure file layout integrity, and write and maintain files for rejected transactions.

Standard File Layouts

The RMS interface library supports two standard file layouts; one for master/detail processing, and one for processing detail records only. True sub-details are not supported within the RMS base package interface library functions.

A 5-character identification code or record type identifies all records within an I/O file, regardless of file type. The following includes the valid record type values:

- FHEAD—File Header
- FDETL—File Detail
- FTAIL—File Tail
- THEAD—Transaction Header
- TDETL—Transaction Detail
- TTAIL—Transaction Tail

Each line of the file must begin with the record type code followed by a 10-character record ID.

Detail-Only Files

File layouts have a standard file header record, a detail record for each transaction to be processed, and a file trailer record. Valid record types are FHEAD, FDETL, and FTAIL.

Example:

```
FHEAD0000000001STKU1996010100000019960929
FDETL0000000002SKU100000040000011011
FDETL0000000003SKU100000050003002001
FDETL0000000004SKU100000050003002001
FTAIL0000000050000000003
```

Master and Detail Files

File layouts consists of:

- Standard file header record
- Set of records for each transaction to be processed
- File trailer record.

The transaction set consists of:

- Transaction set header record,
- Transaction set detail for detail within the transaction, and
- Transaction trailer record.

Valid record types are FHEAD, THEAD, TDETL, TTAIL, and FTAIL.

Example:

```
FHEAD0000000001RTV 19960908172000
THEAD000000000200000000000000119960909120200000000003R
TDETL000000000300000000000001000001SKU10000012
TTAIL0000000004000001
THEAD000000000500000000000002199609091202001215720131R
TDETL000000000600000000000002000001UPC400100002667
TDETL000000000700000000000020000021UPC400100002643 0
TTAIL0000000008000002
FTAIL00000000090000000007
```

Record Name	Field Name	Field Type	Default Value	Description
File Header	File Type Record Descriptor	Char(5)	FHEAD	Identifies file record type.
	File Line Identifier	Number(10)	Specified by external system	Line number of the current file.
	File Type Definition	Char(4)	n/a	Identifies transaction type.
	File Create Date	Date	Create date	Date file was written by external system.
Transaction Header	File Type Record Descriptor	Char(5)	THEAD	Identifies file record type.
	File Line Identifier	Number(10)	Specified by external system	Line number of the current file.
	Transaction Set Control Number	Char(14)	Specified by external system	Used to force unique transaction check.
	Transaction Date	Char(14)	Specified by external system	Date the transaction was created in external system.
Transaction Detail	File Type Record Descriptor	Char(5)	TDETL	Identifies file record type.
	File Line Identifier	Number(10)	Specified by external system	Line number of the current file.

Record Name	Field Name	Field Type	Default Value	Description
	Transaction Set Control Number	Char(14)	Specified by external system	Used to force unique transaction check.
	Detail Sequence Number	Char(6)	Specified by external system	Sequential number assigned to detail records within a transaction.
Transaction Trailer	File Type Record Descriptor	Char(5)	TTAIL	Identifies file record type.
	File Line Identifier	Number(10)	Specified by external system	Line number of the current file.
	Transaction Detail Line Count	Number(6)	Sum of detail lines	Sum of the detail lines within a transaction.
File Trailer	File Type Record Descriptor	Char(5)	FTAIL	Identifies file record type.
	File Line Identifier	Number(10)	Specified by external system	Line number of the current file.
	Total Transaction Line Count	Number(10)	Sum of all transaction lines	All lines in file less the file header and trailer records.

Electronic Data Interchange (EDI)

From release 7.0, EDI files used or created in RMS are in a generic format; RMS no longer supports EDI standards. By processing EDI output and input in a generic format, RMS is no longer limited to a single standard, which allows Oracle Retail customers to better utilize any and all standards they choose to use. Translating EDI input and an output file into any format from any format by third-party software is considered industry's best practice.

Formerly, EDI transactions in RMS conformed to ASC X12/VICS (version 3040) and ANA/TRADACOMS standards. Now the EDI transactions are in a format that adheres to RMS file interfacing standard. Both in-bound and out-bound files are written in a fixed field layout with standard file header and trailer records. Transaction information is included in master/detail or detail-only records. The layouts are consistent with interface files used in the RMS.

RMS EDI batch processes write out-bound transaction files into the generic layout format, which is translated by the third-party software into a standard required by each trading partner. The post-translated versions are transmitted to the trading partner. In-bound transactions must be formatted by the trading partner in a predetermined standard, transmitted, and then translated by the Oracle Retail retailer's translation software into the generic file layout. A generic file is used as the input file for RMS EDI batch processing.

It is impractical for Oracle Retail to continue to maintain code that supports any particular EDI standard. There are multiple standards used by vendors and retailers and these standards have have multiple versions. Most retailers are already using software to map and translate EDI transactions into the required standard or version. There are excellent third-party software packages, such as IBM's Sterling Gentra translator, that effectively translate in-bound and out-bound transactions into the necessary formats. The use of third-party translation software is not only the common business practice, but also the best business practice of today's retailer.

6

RETL Program Overview for the RMS-RPAS Interface

This chapter covers information about the Oracle Retail Extract Transform and Load (RETL) program overview for the RMS and the RPAS interface. The RETL architecture is mentioned along with the RETL program overview.

Oracle Retail ETL Architecture

RMS works with the Oracle Retail Extract Transform and Load (RETL) framework. This architecture utilizes a high performance data processing tool that allows database batch processes to take advantage of parallel processing capabilities.

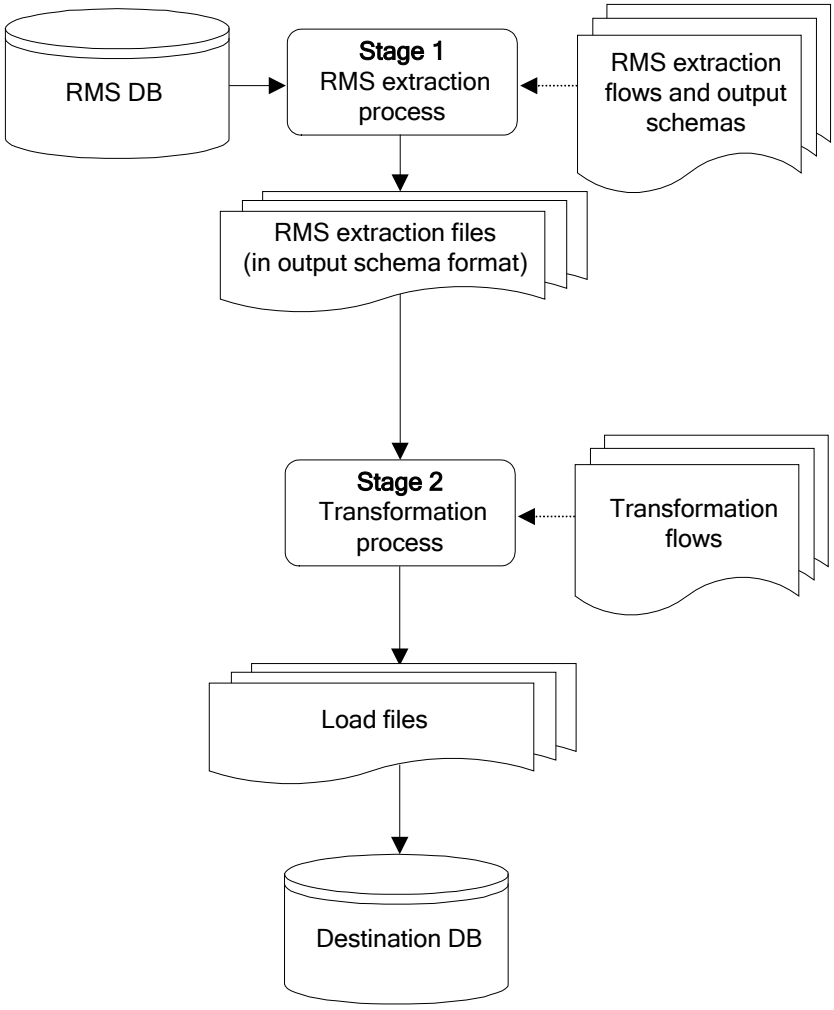
The RETL framework runs and parses through the valid operators composed in XML scripts. For more information on RETL tool, see *RETL Programmer's Guide.*

The figure The two stages of RETL processing illustrates the extraction processing architecture. Instead of managing the change captures as they occur in the source system during the day, the process involves extracting the current data from the source system. The extracted data is output to flat files. These flat files are then available for consumption by products such as RPAS.

The target system has its own way of completing the transformations and loading the necessary data into the system, where it can be used for further processing.. For more information on transformation and loading, see *RPAS documentation*.

The architecture relies upon two distinct stages, shown in the figure The two stages of RETL processing.

- Stage 1: Extraction from the RMS database using well-defined flows specific to the RMS database. The resulting output is comprised of data files written in a well-defined schema file format. This stage includes no destination specific code.
- Stage 2: Introduces a flow specific to the destination. In this case, flows for RPAS are designed to transform the data so that RPAS can import the data properly.



The two stages of RETL processing

RETL Program Overview

This section summarizes the RETL program features utilized in the RMS extractions and loads. Installation information about the RETL tool is available in the latest RETL Programmer's Guide.

Configuration

Version of RETL

Before trying to configure and run RMS RETL, install RETL version 13.0 or later, which is requires RMS RETL to run. For thorough installation procedure, see *RETL Programmer's Guide*.

RETL User and Permissions

The permissions are set up as per the RETL Programmer's Guide. RMS RETL reads and writes data files, you can also create, delete, update and insert into tables. The extraction fails, if it is not set up properly.

Environment Variables

See the RETL Programmer's Guide for RETL environment variables that must be set up for your version of RETL. You will need to set RDF_HOME to your base directory for RMS RETL. This is the top level directory that you select during the installation process. Add `export RDF_HOME=<base directory for RMS RETL> in` .profile.

rmse_rpas_config.env Settings for RPAS

There are several constants that must be set in rmse_rpas_config.env depending upon a retailer's preferences and the local environment. This is summarized in the table below.

Constant Name	Default Value	Alternate Value	Description
DATE_TYPE	vdate	current_date	Determines whether the date used in naming the error, log, and status files is the current date or the VDATE value found in the PERIOD table.
DBNAME	rtkdev01	Depends on installation	The database schema name.
RMS_OWNER	RPASINT	Depends on installation	The username of the RMS database schema owner.
BA_OWNER		Depends on installation	The username of the RMS batch user (not currently used by RMS-RPAS).
CONN_TYPE	thin	oci	The way in which RMS connects to the database.
DBHOST	mspdev17	Depends on installation	The computer hardware node name.
DBPORT	1524	Depends on installation	The port on which the database listener resides.
LOC_ATTRIBUTES_ ACTIVE	False	True	Determines whether rmse_rpas_attributes.ksh is run or not.
PROD_ ATTRIBUTES_ACTIVE	False	True	Determines whether rmse_rpas_attributes.ksh is run or not.
DIFFS_ACTIVE	True	False	Determines whether rmse_rpas_merchhier.ksh generates data files that contain diff allocation information.

Constant Name	Default Value	Alternate Value	Description
ISSUES_ACTIVE	True	False	If set to 'True', rmse_rpas_stock_on_hand also extracts stock at the warehouse level. If set to 'False', rmse_rpas_stock_on_hand extracts stock at the store level only.
LOAD_TYPE	CONVENTIONAL	DIRECT	Data loading method to be used by SQL*Loader (Direct may be faster than conventional).
DB_ENV	ORA	DB2, TERA	Database type (Additional changes to the software may be needed if a database other than Oracle is selected).
NO_OF_CPUS	4	Depends on installation	Used in parallel database query hints to improve performance.
LANGUAGE	en	Various	En = English
RFX_OPTIONS	-c $RDF_HOME/rfx/etc/rfx.conf -s SCHEMAFILE	-c $RDF_HOME/rfx/etc/rfx.conf	Processing speed may be increased for some extractions if the -s SCHEMAFILE option is omitted

You must set up the wallet alias in the rmse_aip_config.env. The wallet and wallet alias creation is required to use programs in a secured mode. The following variables must be setup RETL_WALLET_ALIAS, ORACLE_WALLET_ALIAS, SQLPLUS_LOGON.

Be sure to review the environmental parameters in the rmse_rpas_config.env file before executing batch modules.

Steps to Configure RETL

1. Log in to the UNIX server with a UNIX account that will run the RETL scripts.
2. Change directories to <base_directory>/rfx/etc.
3. Modify the constants from the table above in the rmse_rpas_config.env script as needed.

Program Return Code

RETL programs use a return code to indicate successful completion. If the program successfully runs, a zero (0) is returned. If the program fails, no number is returned.

Program Status Control Files

To prevent a program from running while the same program is already running against the same set of data, the code utilizes a program status control file. At the beginning of each module, rmse_rpas_config.env is run. This script checks for the existence of the program status control file. If the file exists, then a message stating, '`${PROGRAM_NAME} has already started`', is logged and the module exits. If the file does not exist, a program status control file is created and the module executes.

If the module fails at any point, the program status control file is not removed, and the user is responsible for removing the control file before running the module again.

File Naming Conventions

The name and directory of the program status control file is set in the configuration script (rmse_rpas_config.env). The directory defaults to $RDF_HOME/error. The naming convention for the program status control file itself defaults to the following dot separated file name:

- The program name
- 'status'
- The business virtual date for which the module was run

For example, a program status control file for the rmse_rpas_daily_sales.ksh program is named as follows for a batch run on the business virtual date of January 5, 2001:

```
$RDF_HOME/error/rmse_rpas_daily_sales.status.20010105
```

Restart and Recovery

Because RETL processes all records as a set, as opposed to one record at a time, the method for restart and recovery must be different from the method that is used for Pro*C. The restart and recovery process serves the following two purposes:

1. It prevents the loss of data due to program or database failure.
2. It increases performance when restarting after a program or database failure by limiting the amount of reprocessing that needs to occur.

The RMS extract (RMSE) modules extract from a source transaction database or text file and write to a text file. The RMS loads module import data from flat files, performs necessary transformations, and then loads the data into the applicable RMS table.

Most modules use a single RETL flow and do not require the use of restart and recovery. If the extraction process fails for any reason, the problem can be fixed, and the entire process is started again without the loss of data. No RMS to RPAS extraction programs has any restart/recovery capability. The single RMS load program, `rmsl_rpas_forecast.ksh`, takes a text file as its input, and the following choices are available, that enables the program to complete the load in the event of an error:

- Re-run the program with the entire input file.
- Re-run the program with only the input records that were not processed successfully the first time.

Message Logging

Message logs are written daily in a format as described in this section.

Daily Log File

Every RETL program writes a message to the daily log file when it starts and when it finishes. In some cases, progress messages are also written. The name and directory of the daily log file is set in the configuration script (rmse_rpas_config.env). The directory defaults to $RDF_HOME/log. All log files are encoded UTF-8.

The naming convention of the daily log file defaults to the following "dot" separated file name:

- The business virtual date for which the modules are run
- '.log'

For example, the location and the name of the log file for the business virtual date of January 5, 2001 would be the following:

```
$RDF_HOME/log/20010105.log
```

Format

As the following examples illustrate, every message written to a log file has the name of the program, a timestamp, and either an informational or error message. For example:

```
rmse_rpas_item_retail 17:09:07: Program started ...
rmse_rpas_item_retail 17:09:12: Program completed successfully
```

Some error messages are also written to the log file, such as '`No output file specified`'.

Program Error File

In addition to the daily log file, each program also writes its own detailed flow and error messages. Rather than clutter the daily log file with these messages, each program writes out its errors to a separate error file unique to each execution.

If a program finishes unsuccessfully, a message is usually written in the error file that indicates where the problem occurred in the process.

The name and directory of the program error file is set in the applicable configuration file (rmse_rpas_config.env). The directory defaults to $RDF_HOME/error. All errors and *all routine processing messages* for a given program on a given day go into this error file (for example, it contains both the stderr and stdout produced during execution of the program).

The naming convention for the program's error file defaults to the following "dot" separated file name:

- The program name
- The business virtual date for which the module was run

For example, all errors and detailed log information for the `rms_item_master.ksh` program would be placed in the following file for the batch run on the business virtual date of January 5, 2001:

```
$MMHOME/error/rms_item_master.20010105
```

RMSE Reject Files

RMSE extract modules may produce a reject file if they encounter data related problems, such as the inability to find data on required lookup tables. The module tries to process all data and then indicates that records were rejected so that all data problems can be identified in one pass and corrected; then, the module can be re-run to successful completion. If a module does reject records, the reject file is not removed, and the user is responsible for removing the reject file before re-running the module. The records in the reject file consist of the rejected records.

The name and directory of the reject file are defined in the applicable configuration script (rmse_rpas_config.env). The directory defaults to $RDF_HOME/data.

> **Note:** A directory specific to reject files can be created. The rmse_rpas_config.env script would need to be changed to define the reject directory constant such that it would point to that directory.

The naming convention for the reject file defaults to the following "dot" separated file name:

- The program name
- The first filename, if one is specified on the command line
- 'rej'
- The business virtual date for which the module was run

Schema Files Overview

RETL uses schema files to specify the format of incoming or outgoing datasets. The schema file defines each column's data type and format, which is then used within RETL to format/handle the data. For more information about schema files, see the latest RETL Programmer's Guide. Schema file names are hard-coded within each module because they do not change on a day-to-day basis. All schema files end with ".schema" and are placed in the "$RDF_HOME/rfx/schema" directory.

Command Line Parameters

The only programs or scripts that allows the command line parameters (or arguments) are:

- rmse_rpas_config.env script
- pre_rmse_rpas.ksh
- rmse_rpas.ksh programs.

All of the command line parameters for these modules are optional and are described in section rmse_rpas_config.env, the square brackets indicate that the parameter is optional.

rmse_rpas_config.env

Usage: $RDF_HOME/rfx/etc/rmse_rpas_config.env [-t $*] [-r $*] [-s $*] [-v $* | -c $*]

Description of Command Line Options

> **Note:** See the end of this description for an explanation of the need for the '$*' that appears after each command line option.

- `-t`: This option causes rmse_rpas_config.env to skip the initializing of the environment variables that obtains the values from the '.txt' files, except for VDATE which is initialized with the date found in the vdate.txt file. This option is utilized by pre_rmse_rpas.ksh, rmse_rpas.ksh, rdft.ksh and outage.ksh when they call rmse_rpas_config.env.
- `-r:` This option prevents the redirection of all output (stdout and stderr) to the error file. This can be useful during debugging and maintenance. This option can also be utilized by rmse_rpas.ksh, rdft.ksh and outage.ksh when they call rmse_rpas_config.env.
- The `'-t'` and `'-r'` options must be followed by '$*' on the line which invokes this script. This step is necessary in order to preserve the command line arguments or options that may have been present on the command line for the RETL script that invokes this script. However, the '$*' must only appear once if both options are used.
- `-s:` This option causes rmse_rpas_config.env to skip the STATUS_FILE test. This is also useful during maintenance and debugging.
- `-v:` If DATE_TYPE (in rmse_rpas_config.env) is set to 'vdate', this option prevents the normal exit with an error message when the vdate.txt file is empty or non-existent; instead, it uses the current date to derive FILE_DATE. However, if DATE_TYPE is set to 'vdate', and vdate.txt actually does exist and is non-empty, the date in vdate.txt continues to be used even if this option is set. If DATE_TYPE is set to 'current_date', this option has no effect.
- `-c:` This option overrides the DATE_TYPE switch setting and causes the current date to be used to derive FILE_DATE regardless of what DATE_TYPE is set to. This option is utilized by pre_rmse_rpas.ksh when it calls rmse_rpas_config.env, if it is run with the `-c` option on its command line. The `'-c'` option is normally only used when rmse_rpas_config.env is called from pre_rmse_rpas.ksh.
- If only one command line option is used, it must be followed by `'$*'`. But if more than one option is specified, then `'$*'` must be entered on the command line only once after all options have been entered. The `'$*'` is necessary in order to preserve the command line arguments or options (if there are any) that are present on the command line that is used to execute the RETL script which invokes this script.
- If more than one option is specified, options must appear on the command line in the same order as shown on the "Usage" line, above.

pre_rmse_rpas.ksh

- Usage: pre_rmse_rpas.ksh [-c]
- The '-c' option is used to specify what option is to be placed on the rmse_rpas_config.env command line when it is called by this program. It is usually used the first time that pre_rmse_rpas.ksh is run at a new installation or if the state of the vdate.txt file is unknown. This option is passed directly to rmse_rpas_config.env when it is called by pre_rmse_rpas.ksh. No other use is made of this parameter by pre_rmse_rpas.ksh.
- This option causes rmse_rpas_config.env to use the current date to initialize FILE_DATE instead of possibly setting it to VDATE, which is obtained from the vdate.txt file. (FILE_DATE is the date that is used to name the error, log, and status files.)
- The current date is used regardless of how DATE_TYPE is set in rmse_rpas_config.env. By using the '-c' option, there is no need to manually set up the vdate.txt file before running this script.
- The normal mode for pre_rmse_rpas.ksh (without the -c option) is that when it calls rmse_rpas_config.env, FILE_DATE is set to VDATE or the current date, depending on how DATE_TYPE is set in rmse_rpas_config.env. If DATE_TYPE is set to 'vdate', and if the vdate.txt file does not exist or is empty, rmse_rpas_config.env (and this program) exits with an error message.
- The use of this option does not affect what date is used by any of the other RETL scripts that run after this script is done. After pre_rmse_rpas.ksh has run, when the other RETL scripts are run, they call rmse_rpas_config.env with no options on the command line, and their files are named using VDATE or the current date, depending on how DATE_TYPE is set in rmse_rpas_config.env.

rmse_rpas.ksh:

- Usage: rmse_rpas.ksh [-c]
- The presence of the '-c' option causes FILE_DATE in rmse_rpas_config.env to be set to the current date instead of possibly using VDATE (which gets its value from the vdate.txt file), but only when it is called by rmse_rpas.ksh and pre_rmse_rpas.ksh (pre_rmse_rpas.ksh is invoked by rmse_rpas.ksh). It has no effect when other extract programs call rmse_rpas_config.env, at the time that they are invoked by rmse_rpas.ksh. This option is passed directly to rmse_rpas_config.env and pre_rmse_rpas.ksh when they are called by rmse_rpas.ksh. No other use is made of this parameter by rmse_rpas.ksh.

RMSE I/O File Names

Most of the output path/filenames have the format, $DATA_DIR/(RMSE_RPAS_program name).dat. Similarly, the schema format for the records in these files are specified in the file - $SCHEMA_DIR/(RMSE_RPAS_program name).schema.

Typical Run and Debugging Situations

The following examples illustrate typical run and debugging situations for programs. The log, error, etc. file names referenced below assumes that the module is run on the business virtual date of March 9, 2001. For more information on naming convention, see File Naming Conventions section.

For example:

To run rmse_rpas_stores.ksh:

1. Change directories to $RDF_HOME/rfx/src.
2. At a UNIX prompt ($) enter:

```
$rmse_rpas_stores.ksh
```

If the module runs successfully, the following results:

1. **Log file:** Today's log file, 20010309.log, contains the messages "Program started …" and "Program completed successfully" for rmse_rpas_stores.
2. **Data:** The rmse_rpas_stores.dat file exists in the data directory and contains the extracted records.
3. **Schema:** The rmse_rpas_stores.schema file exists in the schema directory and contains the definition of the data file in #2 above.
4. **Error file:** The program's error file, rmse_rpas_stores.20010309, contains the standard RETL flow (ending with "All threads complete" and "Flow ran successfully") and no error messages.
5. **Program status control:** The program status control file, rmse_rpas_stores.status.20010309, will not exist.
6. **Reject file:** The reject file, rmse_rpas_stores.rej.20010309, will not exist.

If the module does *not* run successfully, the following results:

1. **Log file:** Today's log file, 20010309.log, does not contain the "Program completed successfully" message for rmse_rpas_stores.
2. **Data:** The rmse_rpas_stores.dat file may exist in the data directory but may not contain all the extracted records.
3. **Schema:** The rmse_rpas_stores.schema file exists in the schema directory and contains the definition of the data file in #2 above.
4. **Error file:** The program's error file, rmse_rpas_stores.20010309, may contain one or more error messages.
5. **Program status control:** The program status control file, rmse_rpas_stores.status.20010309, exists.
6. **Reject file:** The reject file, rmse_rpas_stores.status.20010309, does not exist because this module does not reject records.

To re-run the module, perform the following actions:

1. Determine and fix the problem causing the error.
2. Remove the program's status control file.
3. Change directories to $RDF_HOME/rfx/src. At a UNIX prompt, enter: $rmse_rpas_stores.ksh

RPAS/AIP Configuration

This section covers information about the configuration of RPAS/AIP. It gives an overview of handling installation and configuration in RMS ETL.

RETL Program Overview for the RMS-Time-Phased Inventory Planning Tool Interface

This section summarizes the RETL program features utilized in the RMS Extractions (RMSE) for the RMS–time-phased inventory planning tool integration. Starting with RMS version 11, the RMS extract for a time-phased inventory planning tool is separate from the RMS extracts for RPAS. In prior RMS version, time-phased inventory planning tool and RPAS had common RETL extracts.

More installation information about the RETL tool is available in the latest RETL Programmer's Guide.

Note: In this section, some examples refer to RETL programs that are not related to RMS or are related to other versions of RMS than this document addresses. Such examples are included for illustration purposes only.

Installation

Select a directory where you would like to install RMS ETL. This directory (also called MMHOME) is the location from which the RMS ETL files are extracted.

The following code tree is utilized for the RETL framework during the extractions, transformations, and loads and is referred to in this documentation.

```
<base directory (MMHOME)>
          /data
          /error
          /log
          /rfx
                 /bookmark
                 /etc
                 /lib
                 /schema
                 /src
```

Configuration

RETL

Before trying to configure and run RMS RETL, install RETL version 13.0 or later, which is required to run RMS ETL. For thorough installation process, see the latest RETL *Programmer's Guide*.

RETL user and permissions

RMS ETL is installed and run as the RETL user. Additionally, the permissions are set up as per the RETL Programmer's Guide. RMS ETL reads data, creates, deletes and updates tables. If these permissions are not set up properly, extractions fail.

Environment Variables

To set up RETL environment variable for the RETL version you have installed, see RETL Programmers Guide. You will need to set MMHOME to your base directory for RMS RETL. This is the top level directory that you selected during the installation process (see the section, 'Installation', above). In your .kshrc, you should add a line such as the following:

```
export MMHOME=<base directory for RMS ETL>
```

rmse_aip_config.env Settings

There variables you must be change depending upon your local settings:

For example:

```
export DBNAME=int9i
export RMS_OWNER=steffej_rms1011
export BA_OWNER=rmsint1011
```

You must set up the wallet alias in the rmse_aip_config.env. The wallet and wallet alias creation is required to use programs in a secured mode. The following variables must be setup RETL_WALLET_ALIAS, ORACLE_WALLET_ALIAS, SQLPLUS_LOGON.

Make sure to review the environmental parameters in the rmse_aip_config.env file file before executing batch modules.

Steps to Configure RETL

1. Login to the UNIX server with a UNIX account that will run the RETL scripts.
2. Change directories to `<base_directory>/rfx/etc`.
3. Modify the rmse_aip_config.env script.

For example:

   a. Change the DBNAME variable to the name of the RMS database.
   b. Change the RMS_OWNER variable to the username of the RMS schema owner.
   c. Change the BA_OWNER variable to the username of the RMSE batch user.

Program Return Code

RETL program uses one return code to indicate successful completion. If the program successfully runs, a zero (0) is returned. If the program fails then, zero is not returned.

Program Status Control Files

To prevent a program from running while the same program is already running against the same set of data, the code utilizes a program status control file. At the beginning of each module, rmse_aip_config.env is run. These files check for the existence of the program status control file. If the file exists, then a message stating, '${PROGRAM_NAME} has already started', is logged and the module exits. If the file does not exist, a program status control file is created and the module executes.

If the module fails at any point, the program status control file is not removed, and the user is responsible for removing the control file before re-running the module.

File Naming Conventions

The naming convention of the program status control file allows a program whose input is a text file to be run multiple times at the same time against different files.

The name and directory of the program status control file is set in the applicable configuration file (rmse_aip_config.env). The directory defaults to $MMHOME/error. The naming convention for the program status control file itself defaults to the following dot separated file name:

- The program name
- 'status'
- The business virtual date for which the module was run

For example, a program status control file for one program is named as follows for the batch run of January 5, 2001:

```
$MMHOME/error/rmse_aip_banded_item.status.20010105
```

Restart and Recovery

Because RETL processes all records as a set, as opposed to one record at a time, the method for restart and recovery must be different from the method that is used for Pro*C. The restart and recovery process serves the following two purposes:

1. It prevents the loss of data due to program or database failure.
2. It increases performance when restarting after a program or database failure by limiting the amount of reprocessing that needs to occur.

The RMS Extract (RMSE) module extracts a source transaction database or text file and writes to a text file. The RMS Load (RMSL) modules import data from flat files, performs transformation if necessary and then loads the data into the applicable RMS tables.

Most modules use a single RETL flow and do not require the use of restart and recovery. If the extraction process fails for any reason, the problem is fixed, and the entire process runs from the beginning without the loss of data. For a module that takes a text file as its input, the following two choices are available that enables the module to be re-run from the beginning:

1. Re-run the module with the entire input file.
2. Re-run the module with only the records that were not processed successfully the first time and concatenate the resulting file with the output file from the first time.

To limit the amount of data that needs to be re-processed, more complicated modules that require the use of multiple RETL flows utilize a bookmark method for restart and recovery. This method allows the module to be restarted at the point of last success and run to completion. The bookmark restart/recovery method incorporates the use of a bookmark flag to indicate which step of the process should be run next. For each step in the process, the bookmark flag is written to and read from a bookmark file.

> **Note:** If the fix for the problem causing the failure requires changing data in the source table or file, then the bookmark file must be removed and the process must be re-run from the beginning in order to extract the changed data.

Message Logging

Message logs are written daily in a format described in this section.

Daily Log File

Every RETL program writes a message to the daily log file when it starts and when it finishes. The name and directory of the daily log file is set in the configuration file (rmse_aip_config.env). The directory defaults to $MMHOME/log. All log files are encoded UTF-8.

The naming convention of the daily log file defaults to the following "dot" separated file name:

- The business virtual date for which the modules are run
- '.log'

For example, the location and the name of the log file for the business virtual date of January 5, 2001 would be the following:

```
$MMHOME/log/20010105.log
```

Format

As the following examples illustrate, every message written to a log file has the name of the program, a timestamp, and either an informational or error message:

```
aipt_item 17:07:43: Program started ...
aipt_item 17:07:50: Program completed successfully
rmse_aip_item_master 17:08:53: Program started ...
rmse_aip_item_master 17:08:59: Program completed successfully
rmse_item_retail 17:09:07: Program started ...
rmse_item_retail 17:09:12: Program completed successfully
```

If a program finishes unsuccessfully, an error file is usually written that indicates where the problem occurred in the process. There are some error messages written to the log file, such as 'No output file specified', that require no further explanation written to the error file.

Program Error File

In addition to the daily log file, each program also writes its own detail flow and error messages. Rather than clutter the daily log file with these messages, each program writes out its errors to a separate error file unique to each execution.

The name and directory of the program error file is set in the applicable configuration file (rmse_aip_config.env). The directory defaults to $MMHOME/error. All errors and *all routine processing messages* for a given program on a given day go into this error file (for example, it will contain both the stderr and stdout from the call to RETL). All error files are encoded UTF-8.

The naming convention for the program's error file defaults to the following "dot" separated file name:

- The program name
- The business virtual date for which the module was run

For example, all errors and detail log information for the `rms_aip_item_master` program would be placed in the following file for the batch run of January 5, 2001:

```
$MMHOME/error/rms_aip_item_master.20010105
```

RMSE and Transformation Reject Files

RMSE extract and transformation modules may produce a reject file if they encounter data related problems, such as the inability to find data on required lookup tables. The module tries to process all data and then indicates that records were rejected so that all data problems can be identified in one pass and corrected; then, the module can be re-run to successful completion. If a module does reject records, the reject file is not removed, and the user is responsible for removing the reject file before re-running the module.

The record in the reject file contains an error message and key information from the rejected record. The following example illustrates a record that is rejected due to problems within the currency conversion library:

```
Currency Conversion Failed|101721472|20010309
```

The following example illustrates a record that is rejected due to problems looking up information on a source table:

```
Unable to find item_master record for Item|101721472
```

The name and directory of the reject file is set in the applicable configuration file (rmse_config.env or config.env). The directory defaults to $MMHOME/data.

> **Note:** A directory specific to reject files can be created. The rmse_config.env and/or config.env file would need to be changed to point to that directory.

The naming convention for the reject file defaults to the following "dot" separated file name:

- The program name
- The first filename, if one is specified on the command line
- 'rej'
- The business virtual date for which the module was run

For example, all rejected records for the `slsildmex` program would be placed in the following file for the batch run of January 5, 2001:

```
$MMHOME/data/slsildmex.slsildmdm.txt.rej.20010105
```

Schema Files Overview

RETL uses schema files to specify the format of incoming or outgoing datasets. The schema file defines each column's data type and format, which is then used within RETL to format/handle the data. For more information about schema files, see the latest RETL Programmer's Guide. Schema file names are hard-coded within each module since they do not change on a day-to-day basis. All schema files end with ".schema" and are placed in the "rfx/schema" directory.

Command Line Parameters

In order for each RETL module to run, the input/output data file paths and names may need to be passed in at the UNIX command line.

RMSE and Transformation

Most RMSE and transformation modules do not require the passing in of any parameters. The output path/filename defaults to $DATA_DIR/(RMSE and transfer program name).dat. Similarly, the schema format for the records in these files are specified in the file - $SCHEMA_DIR/(RMSE program name).schema

Scripts that need Parameter to Run

The scripts below are run on a full snapshot basis. The parameter is F (for full snapshot).

- rmse_aip_store_cur_inventory.ksh
- rmse_aip_wh_cur_inventory.ksh

Typical Run and Debugging Situations

The following examples illustrate typical run and debugging situations for types of programs. The log, error, and other file names referenced below assume that the module is run on the business virtual date of March 9, 2001. See the previously described naming conventions for the location of each file.

For example:

To run rmse_aip_store.ksh:

1. Change directories to $MMHOME/rfx/src.
2. At a UNIX prompt enter:

```
%rmse_aip_store.ksh
```

If the module runs successfully, the following results:

- **Log file:** Today's log file, 20010309.log, contains the messages "Program started …" and "Program completed successfully" for rmse_aip_store.
- **Data:** The rmse_aip_store.dat file exists in the data directory and contains the extracted records.
- **Schema:** The rmse_aip_store.schema file exists in the schema directory and contains the definition of the data file in #2 above.
- **Error file:** The program's error file, rmse_aip_store.20010309, contains the standard RETL flow (ending with "All threads complete" and "Flow ran successfully") and no additional error messages.
- **Program status control:** The program status control file, rmse_aip_store.status.20010309, does not exist.
- **Reject file:** The reject file, rmse_aip_store.rej.20010309, does not exist because this module does not reject records.

- If the module does *not* run successfully, the following results:
- **Log file:** Today's log file, 20010309.log, does not contain the "Program completed successfully" message for rmse_stores.
- **Data:** The rmse_aip_store.dat file may exist in the data directory but may not contain all the extracted records.
- **Schema:** The rmse_aip_store.schema file exists in the schema directory and contains the definition of the data file in #2 above.
- **Error file:** The program's error file, rmse_aip_store.20010309, may contain an error message.
- **Program status control:** The program status control file, rmse_aip_store.status.20010309, exists.
- **Reject file:** The reject file, rmse_aip_store.status.20010309, does not exist because this module does not reject records.

To re-run the module, perform the following actions:

1. Determine and fix the problem causing the error.
2. Remove the program's status control file.
3. Change directories to $MMHOME/rfx/src. At a UNIX prompt, enter: %rmse_aip_store.ksh

7

Internationalization

Internationalization is the process of creating software that can be translated more easily. Changes to the code are not specific to any particular market. RMS is internationalized to support multiple languages.

This section describes configuration settings and features of the software that ensure that the base application can handle multiple languages.

Translation

Translation is the process of interpreting and adapting text from one language into another. Although the code itself is not translated, components of the application that are translated may include the following:

- Graphical user interface (GUI)
- Error messages
- Reports

The following components are not translated:

- Documentation (online help, release notes, installation guide, user guide, operations guide)
- Batch programs and messages
- Log files
- Configuration tools
- Demonstration data
- Training materials

The user interface for RMS is translated into:

- Chinese (simplified)
- Chinese (traditional)
- Croatian
- Dutch
- French
- German
- Greek
- Hungarian
- Italian
- Japanese
- Korean
- Polish
- Portuguese (Brazilian)
- Russian
- Spanish
- Swedish
- Turkish

RMS User Interface Language Display Settings

You can select a preferred language through the RMS UI or the database on the USER_ATTRIB table. The selected language is connected to your ID in RMS and the translated strings are displayed in the selected language. RMS has a fail/safe mechanism built into the code. If the preferred language is not found, then RMS rolls back to English language display of the UI label.

Note: A retailer has the three options regarding internationalization when installing the application. See the *RMS Installation Guide* for the procedures related to each.

- English and multiple secondary languages
- Translated language (fully translated non-English installation). No secondary languages are installed when your primary language is one other than English.
- Install a translated language as the primary language. Obtain the whitepapers, which allows you to install English as a secondary language.

Multiple Languages in one RMS Forms Session

RMS allows for multiple application servers to point to a single instance of forms and database. This is specific to users who want to have a multi-lingual install of RMS and have two URLs, each with a separate NLS_LANG session setting. This helps to facilitate secondary user language sessions as some UI elements are displayed in the language of the NLS_LANG session of the application server.

To set up multiple URLs:

1. Copy URL information in formsweb.cfg.
   a. Change the URL (the part in square brackets) to something new.
   b. Change the .env file reference to a new file (to be created in step 2).
2. Copy the current .env file to the new name created in step 1.
3. Modify the new .env file by setting NLS_LANG to the new value.

Key RMS Tables Related to Internationalization

Several tables handle displayable text that can also be translated.

If the retailer creates a new form, a new menu, or a new object on a form, then the retailer has to populate these tables with the corresponding information. If the retailer customizes the information in any of the tables FORM_ELEMENTS, FORM_ELEMENTS_LANGS, MENU_ELEMENTS, or MENU_ELEMENTS_LANGS, the base_ind field in customized records must contain 'N'.

FORM_ELEMENTS

This table is used for screen display and holds the master list of items for all forms whose labels/prompts are translated. This information will always be in English. The BASE_IND=Y means that the item is part of the base Oracle Retail code set. BASE_IND =N indicates that the item was added as part of retailer customization.

FORM_ELEMENTS_LANGS

This table is used for screen display. This table holds translated values for labels/prompts on forms. This information will be in a language that is defined on the lang column of the user_attrib table. All users see data from this table, as the retailer may customize the text of a given field. The access key for a button is defined by filling in the LANG_ACCESS_KEY/LANG_LABEL_PROMPT field. At run time, that character will be marked in the string, and function as the access key. Any time the retailer changes the LANG_ACCESS_KEY/LANG_LABEL_PROMPT or LANG_ACCESS_KEY/LANG_LABEL_PROMPT, the BASE_IND should be updated to N because it is not part of the base language translations provided by Oracle Retail.

MENU_ELEMENTS

This table is used for screen display. This table holds the master list for all menus whose items are translated. This information will always be in English. The access key for a menu option is defined by using the ampersand (&) before the character that is the access key in the default description. The BASE_IND=Y means that the item is part of the base Oracle Retail code set. BASE_IND=N indicates that the item was added as part of retailer customization.

MENU_ELEMENTS_LANGS

This table is used for screen display. This table holds the values for all menus whose items are translated. This information will be in a language that is defined on the lang table. Even English language users see data from this table, as the retailer may customize the text of a given menu option. Any time the retailer changes the LANG_LABEL, the BASE_IND should be updated to N because it is not part of the base language translations provided by Oracle Retail.

FORM_MENU_LINK

This table is used for screen display. This table holds the intersection of form and menu files, mapping each form to the menu that it displays.

CODE_DETAIL_TRANS

This table holds non-primary language descriptions of code types defined on the CODE_DETAIL table. The retailer has a multi-language option. The column CODE_DESC on the tables CODE_DETAIL and CODE_DETAIL_TRANS have been increased to 250 bytes. (They were 40 in previous versions of RMS).

UOM_LANG

This table contains translations for the UOM_CLASS table. The column UOM_TRANS holds translations of the abbreviations of the units of measure. UOM_DESC_TRANS holds translated descriptions.

8

Integrating RMS with Store Inventory Management

Overview

Oracle Retail Store Inventory Management (ORSIM or SIM) is a Java based application with multitier architecture. SIM assists store operation, tracking item and item inventory with all the integrated systems.

SIM helps store personnel in performing the following in-store operations:

- Receiving merchandise from the warehouse or directly from the vendor.
- Replenishing and order stock.
- Requesting and implementing price changes.
- Managing physical inventories and performing stock count.
- Lookup for the detailed information about merchandise items, suppliers, containers, and customer orders.
- Transferring or returning stock.

SIM function includes administration, shipping, receiving, inventory management, lookups and reporting.

The administration function is performed either by the SIM administrator or the Manager. The function includes:

- Setup and technical maintenance of SIM.
- Security setup to define SIM users and their roles.
- Setup and maintenance of serial numbers that are Unique Identification Numbers (UIN) based.

The usage of serial numbers for item is an optional feature.

The inventory management function helps to maintain an accurate perpetual store Inventory for the Stock Counts, Sequencing, Pick Lists, Item Requests, Store Orders, Price Changes, and Ticketing.

The inventory management system provides detailed information about inventory items, suppliers, containers and customer orders which are created in RMS. You can check for the related information in parallel. For example, when you are checking for an item, the supplier information of the item can also be viewed.

Using inventory management, you can perform lookup along with the other SIM tasks. For example, lookup for an item while preparing an item request or lookup for a supplier information when preparing the store order.

SIM includes many standard reports, which can be customized as per your requirement. SIM uses Oracle BI Publisher as an interface for the SIM reports. The SIM reports are custom designed as per the organizational requirement. The BI Publisher interface is also customized to organize and present the reports available to the SIM users.

All the location, item and supplier information are created in RMS whether it is ranged or not ranged to a store, flows to SIM using the RIB Adapter.

Supplier

Supplier is created in RMS. The details of the supplier are sent to SIM through RIB.

RIB Validation: After successful execution of the batches, check for the stores in the RIB.

- VENDOR_PUBLISHER in RIB-RMS
- VENDOR_SUBSCRIBER in RIB-SIM

When RIB message shows as succeeded, the vendor will be available in the SIM.

Merchandise Hierarchy

Merchandise hierarchy includes Department, Class, and Sub-Class which are created in RMS. After they are created successfully in RMS, the details are sent to SIM through RIB.

RIB Validation: After successful execution of the batches, check for the stores in the RIB.

- MERCHHIER_PUBLISHER in RIB-RMS
- MERCHHIER_SUBSCRIBER in RIB-SIM

When RIB message shows as succeeded, the Department, Class and Subclass is available in SIM.

Warehouse

When a warehouse is created in the RMS, the details of warehouse are sent to SIM through RIB.

RIB Validation: After successful execution of the batches, check for the stores in the RIB.

- WH_PUBLISHER in RIB-RMS
- WH_SUBSCRIBER in RIB-SIM

When RIB message shows as succeeded, warehouse will be available in SIM.

SIM Store

The SIM Store function allows you to set operating parameters for stores managed with SIM. The Store is created in RMS and flows to SIM application.

RIB Validation: After successful creation of the stores, check for the stores message in the RIB.

- STORES_PUBLISHER in RIB-RMS
- STORE_SUBSCRIBER in RIB-SIM

When RIB message shows as succeeded, the store is available in SIM.

Inventory Adjustment Reason

You can add, change, and delete reason codes used for inventory adjustments. In addition to showing the reasons for inventory adjustments, the reason code specifies how inventory adjustments affect stock on hand, unavailable inventory, or customer order reserve inventory.

Note: The Reason Codes created in SIM must be mapped to the RMS Inventory Adjustment Reason Codes.

Adding Inventory Adjustment Reason in SIM

To add an Inventory Adjustment Reason in SIM:

1. Navigate and select **Admin** > **Setup** > **Inv. Adj. Reason**. >The Inventory Adjustment Reason Maintenance window opens.
2. Click **Add**.
3. Enter ID: 123.
4. Description: Test Inventory Reason Code.
5. The UI must be check.
6. Select **Stock on Hand** from the Disposition dropdown list.
7. Click **Done**.
8. Validate the database in the INV_ADJUSTMENT_REASON table.
9. When the Inventory reason code is set up in SIM, it must be mapped to RMS.

Mapping Inventory Adjustment Reason in RMS

To map Inventory Adjustment Reasons in RMS:

1. Navigate and select **Control** > **Setup** > **Inventory Adjustment Reason** >**Edit**.
2. Click **Add**. The next available line is enabled.
3. Enter the details as entered in SIM, enter ID: **123**.
4. Description: Test Inventory Reason Code.
5. Click **OK** to save your changes and close the window.

Database Validation

Functionality	SIM Table	RMS Table
Inventory Adjustment Reason	INV_ADJUSTMENT_REASON	INV_ADJ_REASON

Diff ID

To create a Diff ID in RMS, navigate and select **Items > Diffs > Diff Group/Diff IDs**.

RIB Validation: Validate the details in RIB.

- Diffs Publisher in RIB-RMS
- Diffs Subscriber in RIB-SIM

When the Diff ID is available in both publisher and subscriber, it will be available in SIM.

Item With/Without UIN And Item Locations

You can create the item with diff or without diff in RMS. To create you must navigate and select **Item> Items**. Select the items to be created in RMS. If you have associated the stores to the item, then you can validate the item availability in SIM.

RIB Validation: Validate the details in RIB.

- Items Publisher (for item) and ItemLoc Publisher (For location) in RIB-RMS.
- Items Subscriber and ItemLoc Subscriber in RIB-SIM.
- When the item and location are available in publisher and subscriber, it will be available in SIM.

Database Validation

Functionality	SIM Table	RMS Table
Item	ITEM	ITEM_MASTER
Country of Manufacture	SUPPLIER_ITEM_MANUFACTURE	ITEM_SUPP_MANU_COUNTRY
Item Supplier Relationship	SUPPLIER_ITEM	ITEM_SUPPLIER
Item Supplier Relationship	SUPPLIER_ITEM_COUNTRY	ITEM_SUPP_COUNTRY
Item Location Relationship	STORE_SEQUENCE_ITEM	ITEM_LOC

SIM GUI Item Look up

To view SIM GUI item lookup:

1. Login to SIM and select the associated store.
2. Navigate and select **Lookups** > **Item Lookup**.
3. Enter the item created in RMS and search.
4. You get the details with the diff (optional) available in the Merchandise Hierarchy block.

Transactions

There are different types of transactions created and maintained in SIM.

- Purchase Order
- Transfer
- Return to Warehouse
- Return to Vendor
- Store Order
- Inventory Adjustment
- Stock Count
- Price Change

Purchase Order

To create a purchase order in RMS for a store you must navigate and select **Ordering>Orders**. When the order is created and submitted, approve the Purchase Order (PO). The order details is be sent to SIM successfully.

RIB Validation: When the purchase order is create, make sure to verify the order number for the following:

- ORDER_PUBLISHER in RIB-RMS
- ORDER_SUBSCRIBER in RIB-SIM

Receiving the Order in SIM

The Purchase Order is received with different combinations as given below:

1. Receive with Exact Quantity.
2. Under Receive Quantity.
3. Over Receive Quantity.
4. Receive with Damage Quantity.
5. PO On The FLY – In this scenario, the Purchase Order is created in SIM and not RMS. This can be done based on the item and supplier's detail, when we have the details in SIM a PO is displayed.

Transfers

Transfer implies to movement of goods from one location to another. Accordingly to SIM, transfer is either store to store transfer or warehouse to store transfer. Transfers can be generated in SIM also.

Store To Store Transfer

The Store to Store transfer is created for the movement of goods from Store A to Store B.

RIB Validation

- Verify the Stock Order/Transfer in Transfer_Publisher in RIB-RMS.
- Verify the Stock Order/Transfer in StockOrder_Subscriber in RIB-SIM.

Transfer Receiving

To receive a transfer, select the receiving store in the SIM login form. For dispatching transfer from store to store:

1. Login to the correct **FROM** store.
2. Navigate and select > **Shipping/Receiving** > **Transfers**.
3. Double-click the record and update the quantity column with the unit which needs to be transferred. The transfer functionality supports both overage and underage.
4. Click **Dispatch** and accept the warnings.

RIB Validation: When the dispatch is completed, a message is sent to RMS.

- ASNOUT_PUBLISHER in RIB SIM
- ASNOUT_SUBSCRIBER in RIB RMS

To receive the transfer from store to store:

1. Login to the correct **TO** store.
2. Navigate and select **Shipping/Receiving** > **Transfers**.
3. Double-click the record and updates the quantity column with the unit which needs to be transferred. The transfer functionality supports overage and underage.
4. Click **Receive All** and accept the warning.

RIB Validation: When the receiving is done, a message is sent to RMS. Verify the order number in:

- Receiving_Publisher in RIB-SIM
- Receiving _Subscriber in RIB-RMS

RMS Database Validation

- Stock on Hand gets updated in ITEM_LOC_SOH table in RMS. Received quantity is deducted from FROM store and added in TO store.
- Tran code 37 and 38 is posted in TRAN_DATA table.

Warehouse To Store Transfer

In this case of transfer, the goods are moved from warehouse to another store. The user must login to the receiving store to receive the transfer. Before receiving in SIM, the transfer must to be shipped from the corresponding warehouse.

To receive the transfer from Warehouse to Store:

1. Login to the correct **TO** store.
2. Navigate and select **Shipping/Receiving** > **Warehouse Delivery**.
3. Double-click the container ID which has received from Warehouse.
4. Edit quantities or record damages.
5. Click **Receive**. The status changes to Received.
6. Click **Confirm** and accept the warning message.

RIB Validation: When the transfer is received, a message is sent to RMS. Verify the order number in:

- Receiving_Publisher in RIB-SIM
- Receiving _Subscriber in RIB-RMS

RMS Database Validation

- Stock on Hand gets updated in ITEM_LOC_SOH table in RMS. Received quantity is deducted from FROM Warehouse and added in TO store.
- Tran code 30 and 32 is posted in TRAN_DATA table.

SIM Database Validation

- STORE_ITEM_STOCK is increased in SOH for the store.

Transfer On The Fly

You can create the transfers from one store to another. No other transfers are possible.

1. Navigate and select Shipping/**Receiving** > **Transfer** > **Create Transfer**.
2. Select **Transfer To store** from the dropdown.
3. Enter the item and shipped quantity.
4. Click **BOL** and select the pickup date.
5. Click **Dispatch** and accept the warning message.

To receive the transfer on the FLY:

1. The user must login to the correct TO store.
2. Navigate and select **Shipping/Receiving** > **Transfers**.
3. Double-click on the record and updates the quantity column with the units which needs to be transferred. The transfer functionality supports overage and underage.
4. Click **Receive All** and accept the warning in the pop up.
6. Click **Done** to save changes and confirm the transfer.

RIB Validation: When receiving is done, message is sent to RMS. Verify the order number in:

- Receiving_Publisher in RIB-SIM
- Receiving _Subscriber in RIB-RMS

RMS Database Validation

- Stock on Hand is updated in ITEM_LOC_SOH table in RMS. The received quantity is deducted from FROM store and added in TO store.
- Tran code 30, 32 and 22 is posted in TRAN_DATA table.

Note:

- The Reason Codes created in SIM must be mapped to the RMS Inventory Adjustment Reason Codes.
- If the external ID is a number and the user is external it implies that the transfer is generated in RMS.
- If a transfer request is initiated in SIM this message is not published in RMS or any other integrated application.
- A transfer handles damaged quantities which in turn are put in the non-sellable bucket in RMS.
- Negative receiving though cannot be done nor can be transferred.
- We can also receive multiple times against the same transfer for the expected quantity. This action will be allowed as long as the transfer is open and not restricted by expected quantity.
- While transferring we can also add items which were not part of the original transfer but we cannot remove the original item while we transfer as long as we have stock on hand.
- Non ranged items can also be part of the transfer. These are items which are not ranged to that particular location but it is ranged by raising the transfer.

Return to Warehouse

You can create, edit, and dispatch returns from the store to a company-owned warehouse, or directly to a vendor. If there is unavailable stock for a returned item, you have an option to use items from unavailable stock for the return. A completed (dispatched) return decreases available Stock on Hand.

The store to warehouse transfer is created in RMS, which is displayed as a return to warehouse in SIM. A similar transfer is created in SIM.

Note: Unless the return is dispatched from SIM, WMS cannot see the transaction.

Creating Return to Warehouse in SIM

To create a return to Warehouse in SIM:

1. Select the correct store from the dropdown in the Login page.
2. Navigate and select **Shipping/Receiving** > **Returns**.
3. Click **Create**.
4. In the Return Type field, select **Warehouse** from the dropdown.
5. Enter warehouse, inventory status, authorization number, item details, reason to return and quantity.
6. Click **Dispatch**.

7. Click **Done** to save the changes.

RIB Validation: After dispatch is cleared, a message is sent to RMS.

Verify the order number in:

- RTV_Publisher in RIB-SIM
- RTV _Subscriber in RIB-RMS

A transfer (RTW) is created in RMS with **APPROVED** status.

RMS/SIM Database Validation

- Stock on Hand gets updated in ITEM_LOC_SOH table in RMS. Inventory must be reduced from SIM and RMS by correct quantity.
- Tran code 30 and 32 is posted in TRAN_DATA table.

Creating Return to Warehouse in RMS

When initiated by RMS, a warehouse to store transfer is created in RMS, and is returned back to warehouse then it is called Return to Warehouse.

RMS functionality includes, create a transfer, return to warehouse in RMS and APPROVE it.

RIB Validation: When the dispatch is completed, a message is sent to RMS.

- RTV_Publisher in RIB-RMS
- RTV _Subscriber in RIB-SIM
- Transfer_Publisher in RIB-RMS

Dispatching in SIM

To dispatch to SIM:

1. Select the correct store from the login form.
2. Navigate and select **Shipping/Receiving** > **Returns**.
3. Select the transfer you need to return. The user ID will be external along with the external ID number which indicates that the transfer originated in ORMS.
4. Double-click on the **Record**.
5. Update the quantity column with the unit which needs to be returned.
6. Click **Dispatch** and accept the warning message.

RIB Validation: When the dispatch is completed, a message is sent to RMS.

- RTV_Publisher in RIB-SIM.
- RTV _Subscriber in RIB-RMS

RMS/SIM Database Validation:

- Stock on Hand is updated in ITEM_LOC_SOH table in RMS. Inventory should be reduced from SIM and RMS by correct quantity.
- Tran code 30 and 32 is posted in TRAN_DATA table.

Return to Vendor

Return to vendor can be created both in SIM and ORMS

Initiating SIM in RTV

To initiate SIM in RTV:

1. Select the correct store from the dropdown in the login page.
2. Navigate and select **Main menu** > **Shipping/Receiving** > **Returns**.

3. Click **Create**.
4. In the Return Type field, select **Supplier** from the dropdown.
5. Enter supplier, authorization number, item details, reason to return and quantity.
6. Click **Dispatch**.

RIB Validation: When the dispatch is done, message is sent to RMS

- RTV_Publisher in RIB-SIM
- RTV _Subscriber in RIB-RMS

A transfer (RTV) is created in ORMS.

- RMS/SIM Database Validation

Stock on hand gets updated in ITEM_LOC_SOH table in RMS (Inventory should be reduced from SIM and RMS by correct quantity)

- Tran code 24 is posted in TRAN_DATA table

Initiating RMS in RTV

When a Return to vendor along with a mass return transfer is created in ORMS, and is returned back to vendor then it is called Return to Vendor.

Steps for creating Returns in SIM

1. Select the correct store from the login form.
2. Navigate and select **Main menu** > **Shipping/Receiving** > **Returns**.
3. Select the transfer you need to return. (The user ID will be external along with the external ID number which indicates that the transfer originated in RMS).
4. Double-click on the record which needs to be returned.
5. Update the quantity column with the units which need to be returned.
6. Click **Dispatch** and accept the warning message.

RIB Validation: When dispatch is completed, message is sent to RMS

- RTV_PUBLISHER in RIB-SIM
- RTV _SUBSCRIBER in RIB-RMS

RMS/SIM Database Validation

Stock on hand gets updated in ITEM_LOC_SOH table in RMS (Inventory should be reduced from SIM and RMS by correct quantity). Tran code 24 is posted in TRAN_DATA table

Store Orders

Store ordering allows to View, Create, Modify, and Approve orders to a supplier or Transfer requests from a warehouse. Use store-level ordering to order items that are not set up for automatic replenishment, when items run short or demand increases.

Creating a Store Order

Create a store orders to replenish items for which you have the authority to place orders from the store.

1. Login to SIM with the correct store.
2. Navigate and select **Inv Mgmt** > **Store Orders**.
3. Click **Create Order**.
4. Specify a delivery date range.
5. Enter Item number, quantity, and UOM.

6. Click **Done**. Order is created in Pending Status.

Approving a Store Order

1. Login to the SIM with the correct store.
2. Navigate and select **Inv Mgmt** > **Store Orders**.
3. Double-click on the store order to be approved.
4. Specify a delivery date range.
5. Click **Approve**. Order status is changed to Approved Status.

Database Validation

Functionality	SIM Table	RMS Table
Store Order	PRINT_STORE_ORDER_ITEM	STORE_ORDER
	PRINT_STORE_ORDER	N/A

Inventory Adjustment

Inventory adjustments that you enter in SIM are supplied to the merchandising system to adjust stock levels and maintain perpetual inventory. Inventory adjustments increment or decrement inventory levels such as Stock on Hand and unavailable inventory.

Each inventory adjustment contains a reason code that determines the disposition of the inventory being adjusted. For example, inventory removed for repair is added to the unavailable inventory and the Stock on Hand is decreased. When the items are returned to inventory, unavailable inventory is decreased and the Stock on Hand is increased.

1. Login to SIM with the store where you need to do the inventory adjustment.
2. Navigate and select **Inv Mgmt** > **Inventory Adjustment**.
3. Click **Create**.
4. Enter the item number in the Item field.
5. Update the UOM, Quantity, and Reason.
6. Click **Done**.

Enter UINs for an Inventory Adjustment

If an item requires a serial number type UIN, the Quantity field is disabled on the Inventory Adjustment Detail window.

1. Double-click the **UIN Qty** field.
2. Click **Add**.
3. Enter valid number in the in the Unique Identification Number (UIN) field.
4. Click Save to return to the Inventory Adjustment Detail window.

RIB Validation: When the Inventory adjustment is completed in SIM, a message is sent to ORMS to update the inventory stock. Message flows through RIB

- InvAdjust_Publisher in RIB-SIM
- InvAdjust_Subscriber in RIB-RMS

SIM TABLES Validation:

- INV_ADJUSTMENT: STORE_ID, ITEM_ID, QUANTITY

RMS DATABASE Validation

- INV_ADJ: ITEM, ADJ_QTY, LOCATION
- INV_STATUS_QTY : ITEM, QTY

Stock Count

Stock counts are the principal tools to ensure that the perpetual inventory for a store remains accurate. For maximum flexibility in performing stock counts, SIM allows these types of stock counts:

- Unit

Unit stock counts are scheduled counts that update the RMS and SIM inventory positions, but only for the physical count values. These counts are performed on regular schedules.

- Unit and Amount

  A Unit and Amount count is an annual count that can be used to adjust the financial systems in a corporate merchandising system, in addition to updating inventory positions in SIM.

- Problem Line

Problem Line stock counts are similar to Unit counts. Problem Line product groups use.

  Pre-defined criteria to the identify problem items. For example, you might use a Problem Line count for all of the items that have negative Stock on Hand values.

- Ad hoc

  An ad hoc stock count is an unscheduled stock count that is initiated on a handheld device. An ad hoc count is similar to a Unit count, but the items are not pre-assigned and there is no schedule.

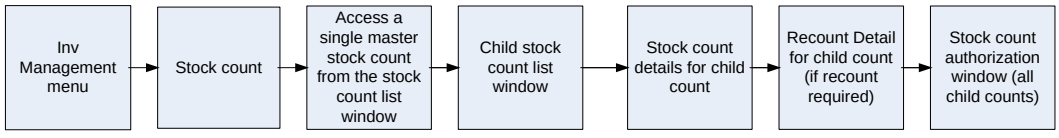
Each stock count must be generated, except for ad hoc stock count type. To generate a stock count, you must first create a product group and schedule. Product groups can include a particular inventory item or entire segments of the inventory hierarchy, including all items in a store.

Stock Counting Process

The general process to conduct a stock count in SIM is as follows:

1. Create the stock count product group.
2. Schedule the stock count.
3. Perform a stock count using both or any of the hand held devices or a personal computer.
4. Recount discrepant items, depending on whether the product group requires a recount.
5. Review the count information and authorize the count quantities.
6. For Unit and Amount counts, export the stock count results to the merchandising system to update Stock on Hand.

The following diagram illustrates the general process flow.



General Process Flow

Executing a Stock Count

The steps to execute a stock count from start to finish are as follows:

1. Take a Snapshot.
2. Enter Stock Count Results.

3. Enter Recount Results.
4. Complete a Child Stock Count.
5. Authorize a Stock Count.

RIB Validations: When the Stock Count is schedule, a message flows to ORMS using RIB as interface:

- STKCOUNTSCH_PUBLISHER in RIB-SIM
- STKCOUNTSCH_SUBSCRIBER in RIB-RMS

Price Change

Using the Price Change function, you can request price changes for items at your store. Price changes are set in the pricing system. The pricing system might be in Oracle Retail Price Management (RPM) or another application.

You can request price changes only for items for which you can control prices. This is controlled by an indicator at the store (location) level. Your price change requests are submitted to the pricing system, where they may be approved or rejected. After a price change is approved in the pricing system, a price change event is sent from the pricing system to SIM.

A price change request that is approved in the pricing system creates a pricing event that is sent back to SIM. For an approved price change, you can print labels and tickets for the re-priced items.

Creating Price Change

You can request price changes for those items for which you are allowed to make pricing changes at the store (location) level. For these items, you can request changes to retail, promotion, or clearance pricing.

The request is sent to the pricing system, where it may be approved or rejected. Your price change requests are checked for possible conflicts. You cannot request price changes for items involved in complex promotions (such as buy one, get one free). You cannot request multiple price changes on the same day. Your request may be rejected if it conflicts with any other pricing events.

To create price change and promotions in SIM:

1. Navigate and select **Inv Mgmt** > **Price Change**.
2. Enter search criteria to limit the price change requests that you want displayed, and click **Search**.
3. Click **Create**.
4. Enter Item, start date, price change description and new price.
5. For clearance or promotion, select end date.
6. Click **Done** and accept the warning message.

RIB Validations: When the price is completed, a message is sent to ORPM using RIB as interface.

- PRCCHGREQ_PUBLISHER in RIB-SIM

SIM DATABASE VALIDATION

- ITEM_PRICE : ID_ITM, EFFECTIVE_DATE, UNIT_RETAIL, STATUS.

9

Integrating RMS with Oracle E-Business Suite Financials using Oracle Retail Financial Integration

This chapter describes the integration between Oracle Retail systems and Oracle E-Business Suite Financials (including Oracle General Ledger and Oracle Payables), as developed and supported by Oracle Retail Financial Integration (ORFI).

When the option to integrate is chosen, the selected information is shared between the systems. Integration and validation services are in place to ensure the shared data matches.

> **Note:** This chapter addresses the points within Oracle Retail systems that are essential to integration. For more information about the entire integration process, including mapping to Oracle E-Business Suite data and settings, see the ORFI documents, *Oracle Retail Financial Integration for Oracle Retail Merchandising Suite* and *Oracle E-Business Suite Financials - Implementation Guide.* For more information about Web services, see the following chapters in the *Oracle Retail Merchandising System Operations Guide, Volume 2*: "Service Provider Implementations API Designs" and "Web Services."

Participating Applications

The following Oracle Retail applications are included in the integration covered by this chapter:

- Oracle Retail Merchandising System (RMS)
- Oracle Retail Sales Audit (ReSA)
- Oracle Retail Invoice Matching (ReIM)
- Oracle Retail Integration Bus (RIB)

Assumptions and Dependencies

- The option to integrate must be selected during initial set up of the RMS system.
- ReIM accesses RMS to determine if integration is active. The RMS set up must be done before integrating with REIM.
- The URLs for the RFI Web services that are necessary for this integration are maintained in the RMS_RETAIL_SERVICE_REPORT_URL table and in the ReIM integration.properties file.
- Real time account validation is done only when the financial integration with Oracle E-Business Suite is ON.

- Partners must be set up as suppliers in Oracle E-Business Suite and manually set up in RMS using the RMS Supplier ID. The RMS supplier ID generated when the Oracle E-Business Suite supplier is interfaced with Oracle Retail. The RMS supplier generated as part of this process is not used.
- Payment terms and freight terms are manually maintained.

Data Setup

Integration of Oracle Retail applications and Oracle E-Business Suite Financials relies on synchronization of essential data, such as currency exchange rates and suppliers. Through careful discussions, the users of both systems determine the common codes and descriptions that will best serve their business needs.

When an agreement is reached, this information is set up and maintained. Depending on the volume, some shared information is set up in Oracle Retail applications or in Oracle E-Business Suite and electronically transferred to other systems. Otherwise, shared information is set up manually within each system, and the users of both systems must ensure that the code and the description match.

Setting up and Configuring the RMS Data

This section describes setup considerations for RMS data.

RMS System Options

As part of the RMS system options setup, set the following options as indicated:

1. The SYSTEM_OPTION indicates that the Oracle Retail system is integrated with a financial system:

- FINANCIAL_AP=A

2. A value of A indicates that the financial system to which RMS is interfaced is Oracle E-Business Suite through Oracle Retail Financial Integration (ORFI).

- GL_ROLL_UP can be D/S/C
- SUPPLIER_SITES_IND = Y
- ORG_UNIT_IND = Y

Organization Units

Use the Organizational Unit window (**RMS Start Menu** > **Control** > **Setup** > **Org Unit** >**Edit**) to define organizational units in RMS that match those being setup in Oracle E-Business Suite. When an organizational unit is entered in RMS, the valid organizational units are those associated with the Set Of Books (SOB) used for the general ledger interface.

Currency Exchange Rates

Currency exchange rate is used to translate the monetary value of one currency in terms of another. Depending on business needs, a Currency Exchange Rate Type of Operational or Consolidation is selected for use in all transactions.

This value is set up manually in RMS and mapped to Oracle E-Business Suite through the Currency Exchange Type mapping window. Currency Exchange Rate data is owned by Oracle General Ledger and updates are sent to Oracle Retail applications.

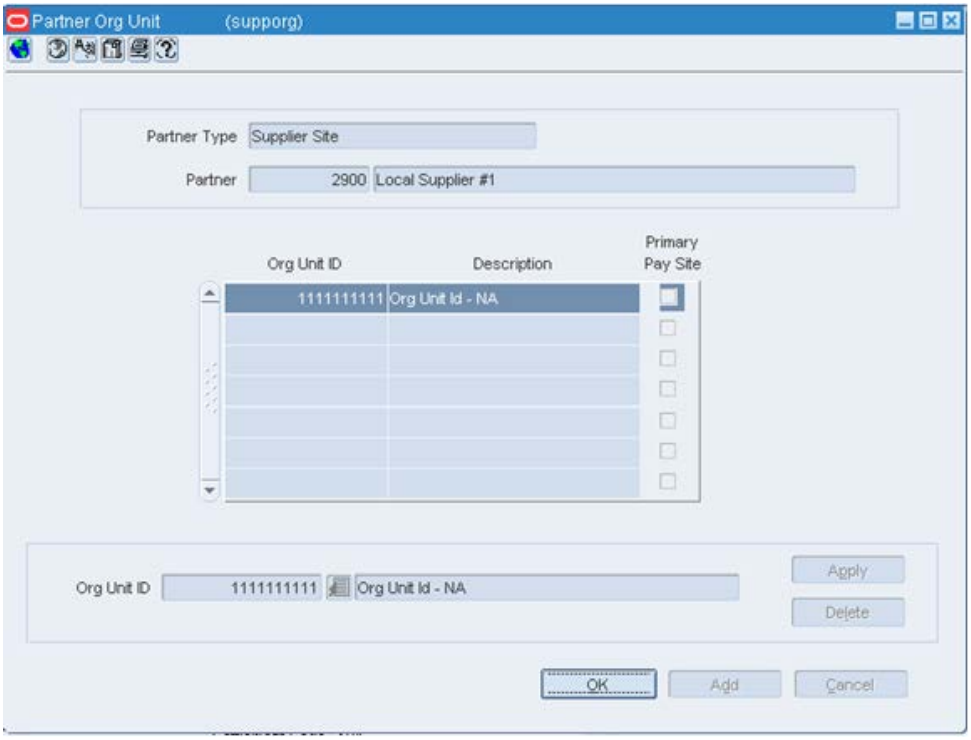
1. Determine the Exchange Type being sent by Oracle General Ledger (for example, Consolidation or Operational) that you want RMS to use.

2. Update the FIF_CURRENCY_XREF for mapping the external exchange type being sent by Oracle General Ledger with RMS Exchange Type. For example, for Consolidation and Operational exchange types, the FIF_CURRENCY_XREF table holds the following entries:

FIF_EXCHANGE_TYPE	RMS_EXCHANGE_TYPE
C	C
O	O

Supplier Address Types

Within RMS, supplier information (such as Order From and Remit To addresses) is used for generating the purchase orders. Oracle Payables uses supplier information for payment generation. It is important that this information is synchronized.



Partner Org Unit

Suppliers are created in Oracle Payables and exported to RMS. When FINANCIAL_AP is set to A, suppliers cannot be created using the RMS forms. However, if a supplier exists in RMS, all data values for the supplier (except supplier name and status) are updated using the RMS forms. The association of supplier sites to organization units is accessed only in view mode through RMS forms. One supplier site per supplier and organization unit combination can be marked as primary payment site.

Where SYSTEM_OPTIONS.FINANCIAL_AP is A, disable auto generate supplier/partner numbers and associated check boxes.

Note: Supplier information is created, updated and inactivated only in Oracle Payables. This information is transferred from Oracle Payables to the participating Oracle Retail applications, where additional retail-specific attributes are maintained.

Country Codes

When country codes are defined and seeded in RMS, ensure that country codes are mapped to Oracle E-Business Suite country codes through RFI DVM mapping. The following is an example of RFI DVM Mapping (Table RFI_XREF_DVM, available in RFI schema in Retail.

EXT_SYSTEM_ID	COMMON_ID	RETL_ID
USA	700	US
CAN	701	CA

Financial Calendar

The financial calendar within Oracle Retail systems is manually set up and maintained separately from the Oracle General Ledger financial calendar.

Freight Terms

A freight term is an agreement between the retailer and a supplier regarding transportation charges for goods delivered by the supplier. Freight terms are used by RMS as purchase orders are generated.

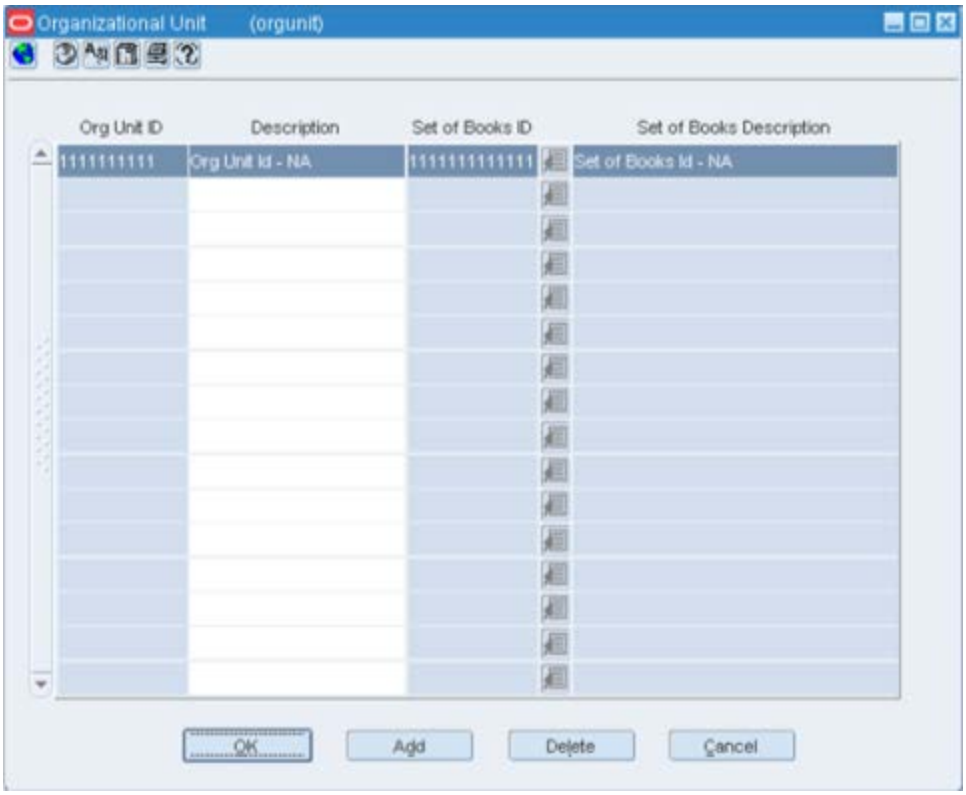
Within the RMS system, freight terms are set up and maintained manually. They are also maintained in Oracle Payables.

Payment Terms and Currency Exchange Rates

Currency, exchange rates are created and updated in Oracle General Ledger and exported to RMS. Changes to Retail currency exchange rates are not propagated to Oracle General Ledger. Payment terms, however, are manually set up and maintained in each system.

Oracle E-Business Suite Financials Units and Site IDs

The data concepts of Org Units and Site IDs in RMS mirror the data maintained in Oracle E-Business Suite. RMS forms are used to manage and view Oracle Org Units and Site IDs. The RMS windows for Store and Warehouse maintenance allow for the association of each store and warehouse with an Org Unit. The following is an example of the Organizational Unit form:



Organizational Unit

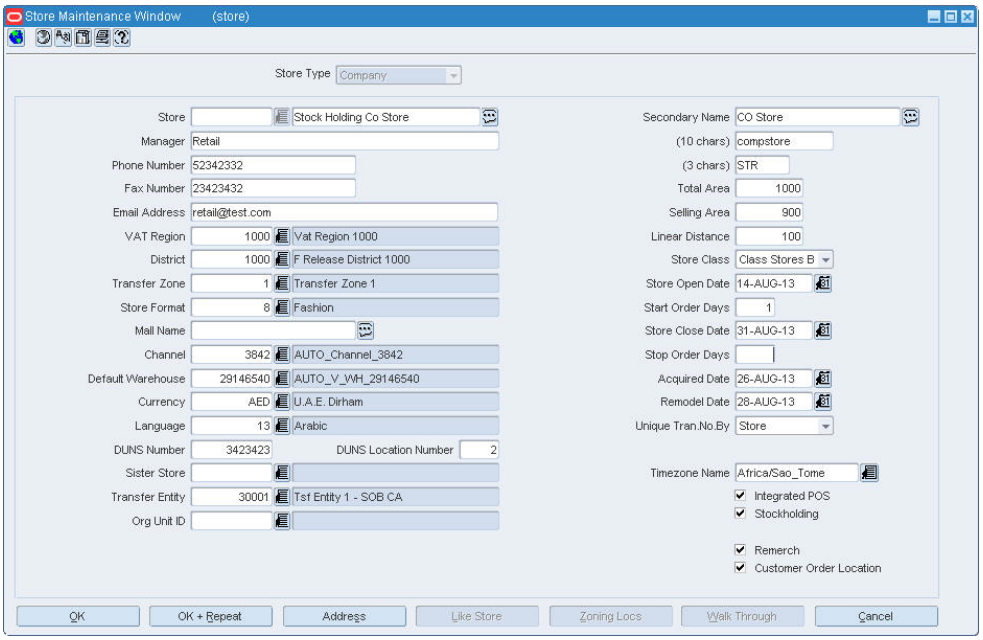
Store and Warehouse Maintenance

The organizational unit is found in the Store Maintenance and Warehouse forms, which allow the Oracle E-Business Suite operating unit to be associated with the Store or Warehouse.

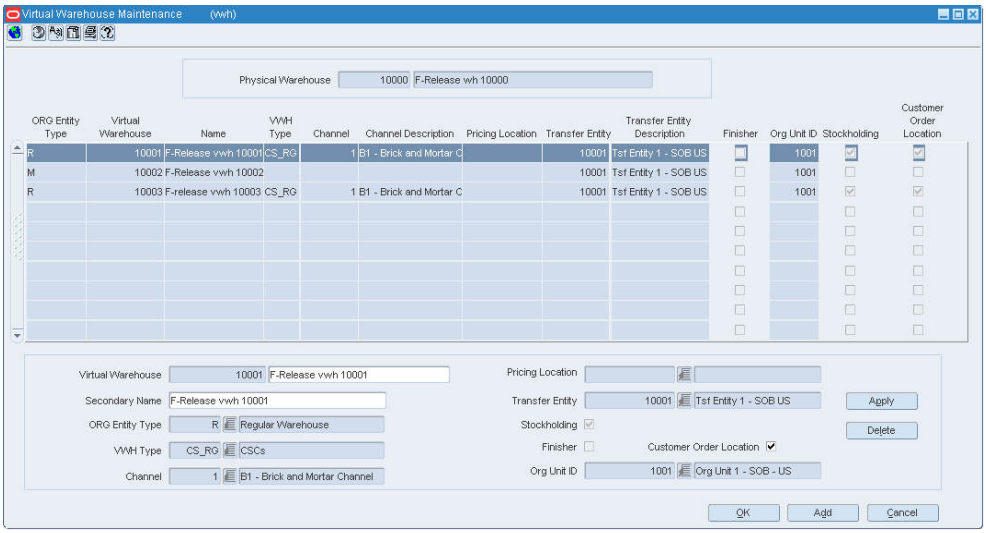
- When RMS is set up for multi-channel operation, the organizational unit is set up at the virtual warehouse level.

Financial sales audit and inventory information is identified through interface routines and posted to the appropriate general ledger accounts. An organizational unit must be designated for each Store and Warehouse location in the RMS.

The following are examples of the Store Maintenance and Warehouse Maintenance forms:



Store Maintenance Window



Virtual Warehouse Maintenance

RMS General Ledger Setup

For RMS and ReSA, manual setup is required for validating the chart of accounts. Valid chart of accounts are created and stored in general ledger cross reference tables. Once the validation is completed, transaction data is assigned to specific account codes.

Ongoing maintenance of the chart of accounts information (such as adding, changing, or deleting chart of accounts) requires re-validation. In this regard, Oracle General Ledger is the system of record, as it is used to verify the chart of accounts used by Oracle Retail applications. When these applications send a chart of accounts for validation, Oracle General Ledgers issues a message with:

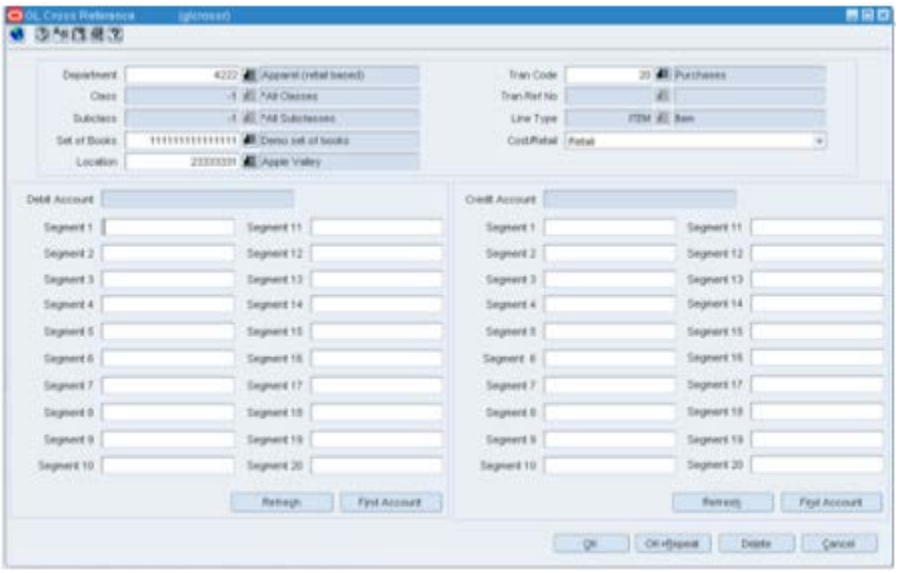
- Valid or invalid status
- Response date
- Chart of accounts

The RMS table FIF_GL_SETUP, stores the Oracle E-Business Suite Set of Books IDs to post financial information. This table must be setup manually after Set of Books IDs are determined. Where a system indicator Multiple Set of Books ID is set to N, FIF_GL_SETUP must hold a single Set of Books (SOB) record.

The Set of Books IDs is associated with the chart of accounts when setting up general ledger cross-reference.

RMS General Ledger Cross Reference

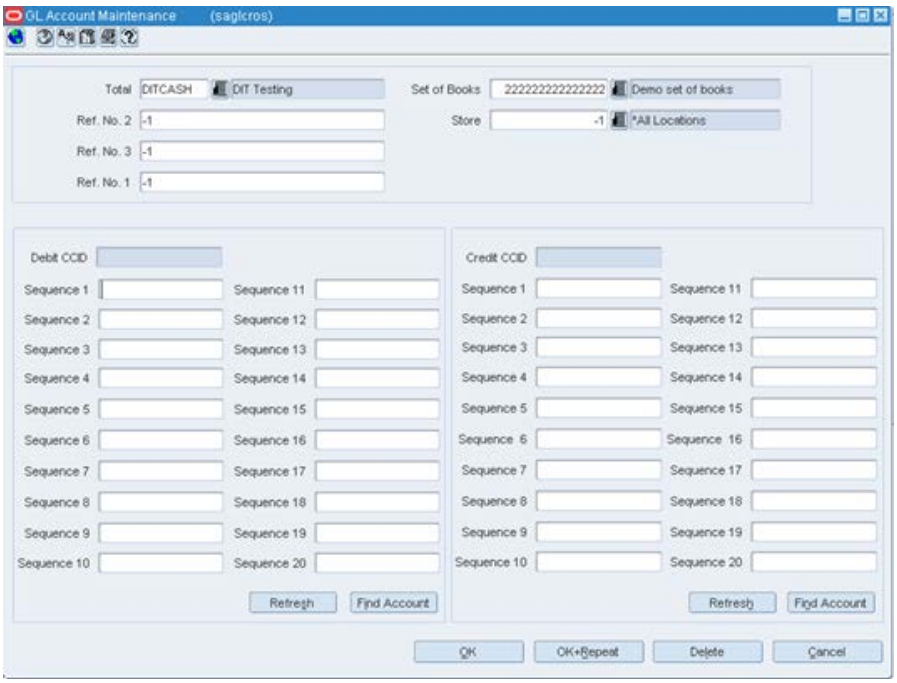
Select **RMS Start Menu > Finance> GL Cross Reference.** The General Ledger Search window opens. Map Chart of Accounts to department, Class, Subclass, Set Of Books, location, and transaction codes using the GL cross reference form in RMS.



GL Cross Reference

ReSA General Ledger Cross Reference

Select **ReSA** main menu > **Action** > **Sales Audit** > **Control** > **Setup** > **GL Account Maintenance**. The General Ledger Search Form window opens. Where SYSTEM_OPTIONS.FINANCIAL_AP is A, the form requires the entry of valid segment combinations.



GL Account Maintenance

Setting up and Configuring the ReIM Data

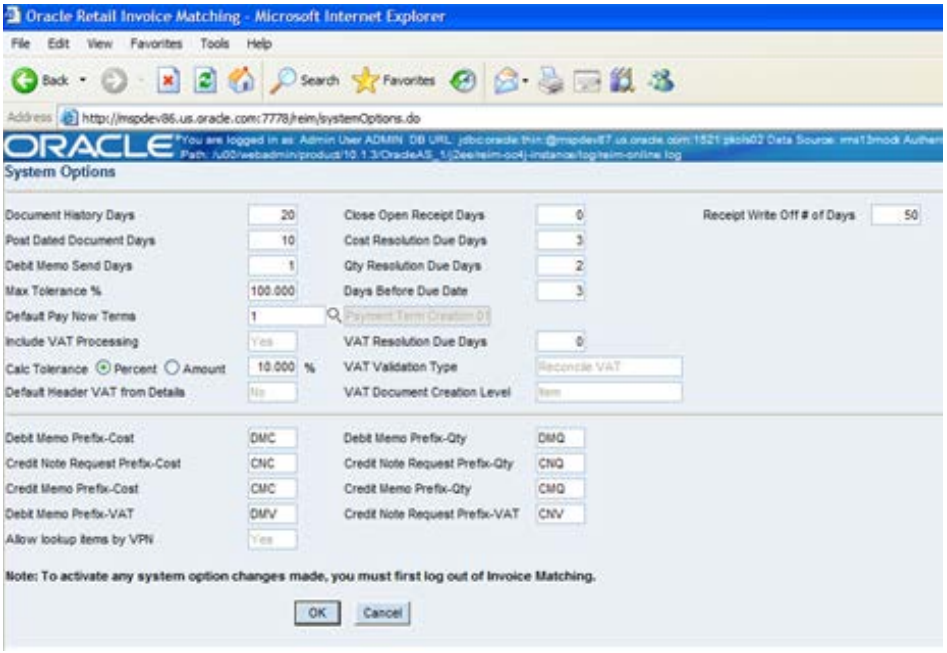
This section describes setup considerations for ReIM data.

System Options

As part of the RMS system options setup script, set the following options as indicated:

- FINANCIAL_AP =A

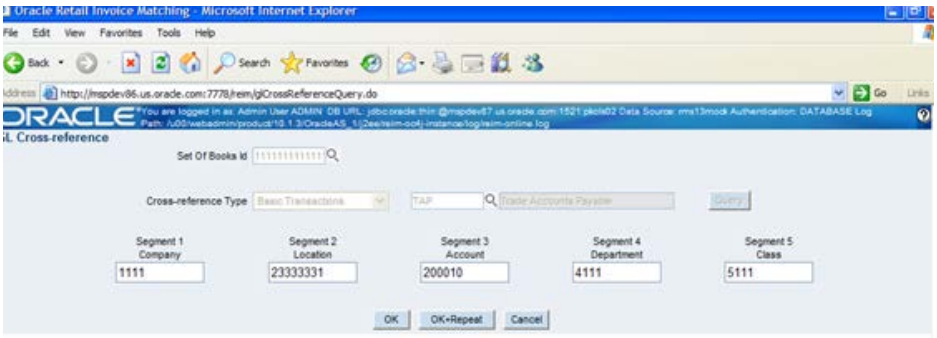
As part of the ReIM system options setup script, DEFAULT_PAY_NOW_TERMS must be updated with the default term ID.



System Options

Chart of Accounts Setup

The chart of accounts is set up manually in Oracle Retail applications and in Oracle General Ledger. All account combinations are set up in each Set Of Books. The following is an example of the GL Cross Reference screen:



GL Cross-reference

> **Note:** The Chart of accounts is updated in Oracle Retail applications only after the account is validated through Oracle General Ledger.

Segment Mapping

The retailer determines how many segments are populated. Up to 20 account segments can be specified. The following is an example of how segments are mapped between the ReIM transaction table and Oracle General Ledger:

ReIM Segments	Oracle General Ledger Chart of Accounts
Segment 1	PRODUCT
Segment 2	ACCOUNT
Segment 3	ALTACCT
Segment 4	OPERATING_UNIT
Segment 5	FUND_CODE
Segment 6	DEPTID
Segment 7	PROGRAM_CODE
Segment 8	CLASS_FLD
Segment 9	BUDGET_REF
Segment 10	BUSINESS_UNIT_PC
Segment 11	PROJECT_ID
Segment 12	ACTIVITY_ID
Segment 13	RESOURCE_TYPE
Segment 14	RESOURCE_CATEGORY
Segment 15	RESOURCE_SUB_CAT
Segment 16	CHARTFIELD1
Segment 17	CHARTFIELD2
Segment 18	CHARTFIELD3
Segment 19	AFFILIATE
Segment 20	AFFILIATE_INTRA1

If any one of the values in the 20 segments does not match the Oracle General Ledger, the account combination is considered as invalid. The following error message is issued to the user: "Account combination is invalid in the financial system."

Segments 1 and 2 may be set up as dynamic at the Location level, or Segments 4 and 5 can be dynamic at the Department and Class level respectively. Segments defined as dynamic are allowed to be null for certain types of Basic Transaction or Reason Code cross-reference types. When a segment is null, the segment is assigned dynamically when transactions are posted. (Non-dynamic segments cannot be blank.) Validation applies to the segment combination, not to individual segments.

Note: For Tran code TAP, each segment must have a value regardless of whether the segment is dynamic.

Running the Initial Load from Oracle E-Business Suite Financials

The initial load for ReIM is run by Oracle E-Business Suite and includes the following information:

- Suppliers
- Currency Rates

> **Note:** The view, mv_currency_conversion_rates should be refreshed once the initial loads of currencies from Oracle General Ledger are loaded to ReIM.

integration.properties File Setup

To accommodate integration, the integration.properties file within ReIM must be updated with the appropriate URLs for the account validation and drill forward Web services, as listed below:

```
#webservice WSDL URL for drill forward
webservice.financial.drill.forward.wsdl=@webservice.drill.forward.wsdl@
 webservice.financial.drill.forward.url.targetnamespace=
webservice.financial.drill.forward.targetsystem=
#webservice WSDL URL for account validation
webservice.financial.account.validation=@webservice.account.validation@

webservice.financial.account.validation.namespace=http://www.oracle.com/retail/fin
/integration/services/GlAccountValidationService/v1

webservice.financial.account.validation.local.code=GlAccountValidationService
#webservice username and password for account validation
webservice.financial.account.validation.username=@webservice.account.validation.us
ername@
webservice.financial.account.validation.password=@webservice.account.validation.pa
ssword
@
```

Reports are created by Business Intelligence Publisher for the following:

The URL for each report must be updated in the table, RETAIL_SERVICE_REPORT_URL. The following table provides sample URLs.

ReIM Transactional Maintenance

Integration to Oracle General Ledger includes a number of transactions, as described below.

Calculation of TRANS_AMOUNT

The TRANS_AMOUNT field in the IM_FINANCIAL_STAGE table stores the value of the journal entry to be posted to Oracle General Ledger. (The currency for the calculated amount is the currency assigned to the transaction.) The TRANS_AMOUNT value is calculated as follows:

Row Description	DEBIT_CREDIT_IND	TRANS_AMOUNT Value
Normal	Debit	Transaction Amount
Normal	Credit	(-1) * Transaction Amount
VAT	Debit	Transaction Amount * VAT Rate
VAT	Credit	(-1) * Transaction Amount * VAT Rate

Note: Transaction Amount is taken from the database column, IM_FINANCIALS_STAGE.AMOUNT.

Generation of Outgoing Data

A staging table accommodates the outgoing transfer of data. The reference key assigned to each document or receipt is used to find data on this table

From	To	Transactions
ReIM	Oracle Payables	Invoices Debit Memos Credit Memos Credit Notes
ReIM	Oracle General Ledger	General Ledger accounting entries resulting from the Invoice Matching process, including: Pre-paid invoices Receipt Write-offs
RMS	Oracle General Ledger	Accounting entry data (potentially very high volume)
ReSA	Oracle General Ledger	Accounting entry data (potentially very high volume)

Validation of Accounts When Posting Financial Entries

Valid chart of accounts are stored in the ReIM table, IM_VALID_ACCOUNTS, which includes the Set of Books ID (sob_id) and 20 segments. An ORFI Web service validates accounts against the Oracle General Ledger. Valid accounts are posted to IM_VALID_ACCOUNTS; invalid accounts are posted to IM_POSTING_DOC_ERROR. The following steps describe the validation process:

1. The ReIM system invokes the validation Web service to validate the chart of accounts. (A URL for the ORFI Web service is configured in the integration.properties file.)
2. The posting batch job checks the accounts to be posted against the IM_VALID_ACCOUNTS table.
3. If the chart of accounts is in the table, the transaction is posted to staging tables.
4. If the chart of account does not exist in the table, a collection of accounts is built. These collected accounts are validated against the Oracle General Ledger, and a status is returned.
    - If the status of the collected accounts is valid, the accounts are inserted in the IM_VALID_ACCOUNTS table, and the transactions are posted to the staging tables.
    - If the status of the accounts is NOT valid, the entire collection is flagged as errors, and transactions are posted to IM_POSTING_DOC_ERROR.

Note: ReIM completes the first level of account validation and posts the transaction to staging tables. It is assumed the second level of account validation is done at the end of the extraction process (where transactions are moved from ReIM staging tables to Oracle General Ledger). If account validation fails at this point, Oracle General Ledger must change the account information before transactions are loaded to Oracle General Ledger, and the chart of accounts must be re-validated in ReIM.

Maintenance of Valid Accounts

As account information is changed in the Oracle General Ledger, Retail must re-validate the locally stored chart of accounts. Oracle General Ledger will not propagate chart of account changes to Retail. The AccountPurge Batch can clear all valid accounts in the IM_VALID_ACCOUNTS table or only those that are considered updates in Oracle E-Business Suite.

Usage

```
AccountPurge userid/password PURGE [ALL | <Accounts>]
```

Where:

- The argument is a combination of user ID and password.
- The argument is the word PURGE.
- The argument is either ALL or specific accounts to be deleted from the local table.

10

Understanding Data Access Schema

The Data Access Schema (DAS) is a new schema that allows third party applications to access RMS owned data. A subset of the data mastered by RMS is replicated to a new database schema. This replicated data is in a READ ONLY format. The DAS is an optional function; where the base RMS does not require DAS. However, you may want to install DAS for the following reasons:

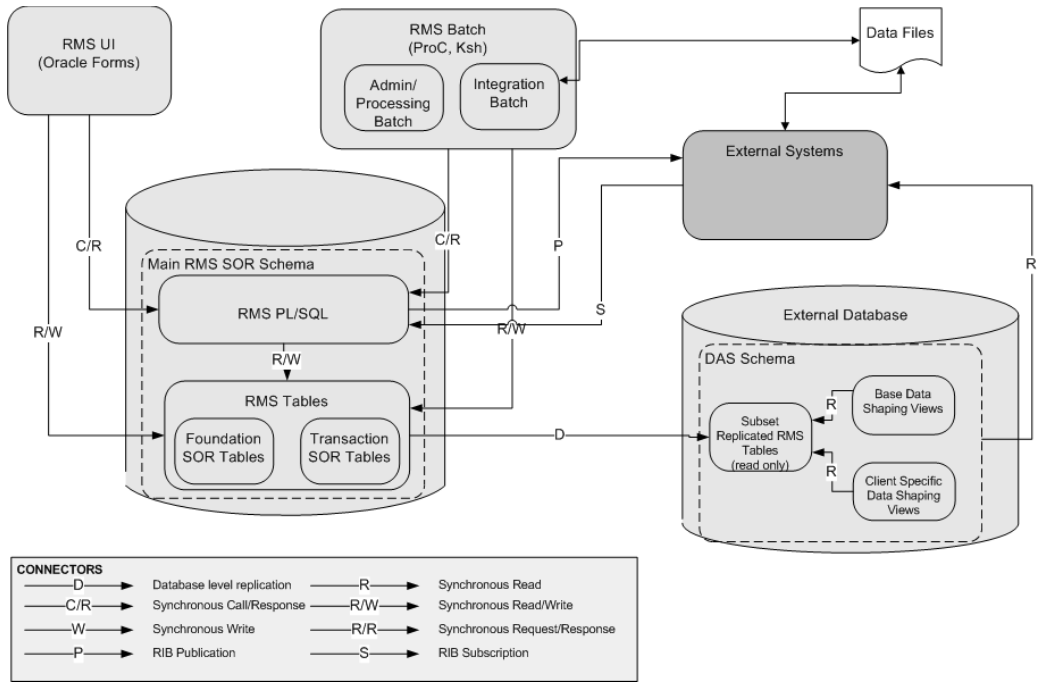
- Accelerate integration with some of the third party systems.
- Insulate core RMS processes from the resource demands for the third party systems.
- Provide downstream applications with data 24x7, instead of a predetermined time for the batch cycle that extracts RMS data.
- Perform custom operational reporting without impacting the core RMS operations.
- Use out of box integration with Merchandise Financial Planning's (MFP) PoViewer micro application.

Views are layered on top of the replicated data to shape it in a less RMS specific terms.

Oracle recommends that DAS be deployed in a separate database instance on a separate hardware. This insulates the operations and performance of RMS from all demands made of DAS by other systems.

For more information on DAS, see the *Oracle Retail Merchandising System Data Access Schema Developer's Guide* and the *Oracle Retail Merchandising System Data Access Schema Data Model*.

The process flow diagram of a DAS system:

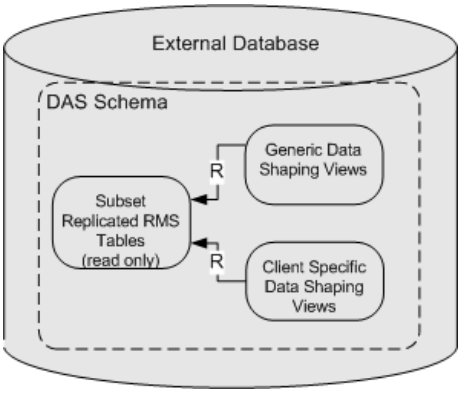


DAS Process Flow

DAS Views

DAS contains replicated tables and parallel layers of views. The two parallel layers of views are:

- Generic Data Shaping View
- Client Specific Data Shaping View



DAS Views

The Generic Data Shaping View makes RMS owned data more understandable to external systems by both flattening and exploding some of the concepts in RMS.

The client specific data shaping views presents data for specific downstream client applications. You can add additional client specific data shaping views to execute queries that are important to manage the DAS integrations with the third party systems.

You are encouraged to use the DAS for downstream, custom integration batch, and query service integrations. The following are the advantages of using DAS instead of the core RMS system of record tables:

- DAS insulates core RMS processing from the resource demands of third party systems.
- DAS allows constant access to data that of a RMS batch cycle which is processed once in a day, restricting the access of data or a real time query that is slower when processing demands of high point of RMS batch cycles.
- Custom client specific data shaping views can accelerate the development of custom integrations.

11

Using Oracle Wallet

RMS Batch programs runs using wallet alias as the first parameter to the batch command line arguments. This is enabled to prevent the security concerns around exposing database user ID and password while running the batch programs.

The wallet creation steps are described in the RMS Installation Guide. The wallet and wallet alias creation are a required in order to use batch programs in secured mode.

If we assume wallet alias is “dvols29_rms01batch”;

Usage:

```
./dtesys $UP
```

(where UP will be set during installation to the wallet alias, that is: $UP=/@dvols29_rms01batch)

or

```
./dtesys /@dvols29_rms01batch (wallet alias)
```

RMS/RPAS and RMS/AIP RETL scripts uses Oracle Wallet. Defined Oracle Wallet is referenced in rmse_config.env, rmse_aip_config.env and rmse_rpas_config.env files