Import Order CSV Files

Requirements

A process is required to import sales order data into the database.

1. The sales order data is received in CSV format text files.
2. The files are named with the prefix ‘order’ and extension ‘csv’.
3. Each file must have a unique name.
4. The process must be automated to run every hour, and import all new order CSV files received.
5. The data must be validated, and if there are any errors, the entire CSV file must be rejected, moved to an ‘Error’ directory, and all errors reported.
6. A manual procedure is required to fix rejected files.
7. If the data passes validation, load the data into the order tables.
8. Move successfully imported files to a ‘Processed’ archive directory.
9. Delete old error messages relating to the orders that have been successfully imported.

Fixing rejected files

1. Manual intervention is required.
2. An import error report will show the following information for each rejected file:
    a. Filename.
    b. A key value that uniquely identifies the order: Order Reference.
    c. CSV data record (all fields).
    d. An error message identifying the invalid data.
    e. Date and time error reported.
3. Locate the rejected CSV file in the Error directory, via the filename on the error report.
4. Edit the CSV file, and manually correct each error reported.
    a. Order Reference may be altered, but you must check that there are no existing orders with the same reference.
    b. Dates must be in the format DD/MM/YYYY.
    c. Ship Date must be on or later than the Order Date, in the format DD/MM/YYYY.
    d. Customer ID invalid: contact the sales department to either obtain the correct code, or have a new account created.
    e. Product ID invalid: contact the sales department for the correct code.
5. Move the corrected file to the ‘Received’ directory to be re-processed.

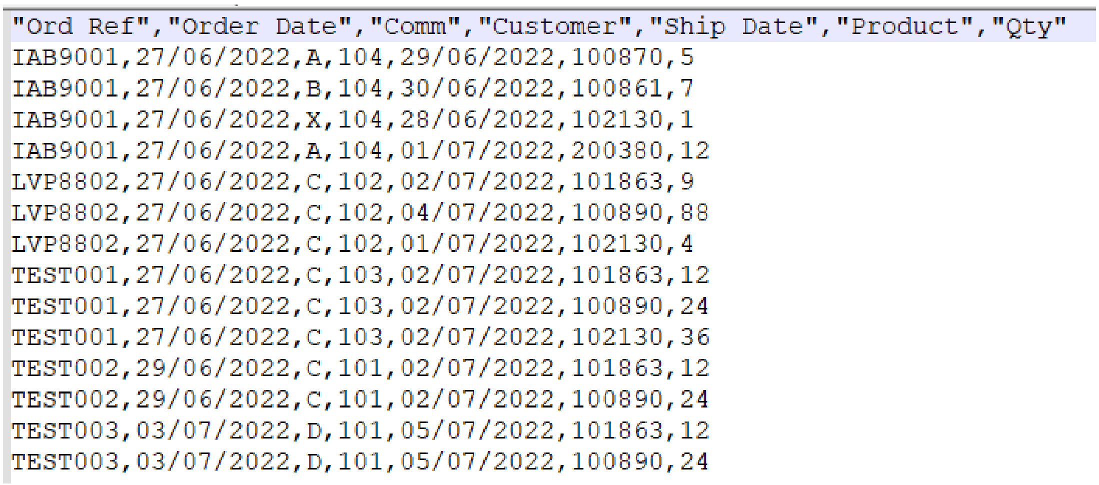
Technical Design

CSV File format

Record Type	Description
Header	Header record with field names in double quotes
Body	Order data records. One record per line of the order.

Field No.	Name	Data Type	Size	Description
1	Ord Ref	Char	10	Order Reference. Maximum length 10 characters. Must be unique per order.
2	Order Date	Date	10	Date format DD/MM/YYYY
3	Commission	Char	1	A to Z, may be null
4	Customer ID	Number	6	Must exist on the Customer table
5	Ship Date	Date	10	Date format DD/MM/YYYY. Must be on or later than the Order Date
6	Product ID	Number	6	Must exist on the Product table
7	Qty	Number	8	Quantity of product ordered. Must be a valid whole number > 0, and <= 99999999.

Sample CSV Data



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"Ord Ref","Order Date","Comm","Customer","Ship Date","Product","Qty"
IAB9001,27/06/2022,A,104,29/06/2022,100870,5
IAB9001,27/06/2022,B,104,30/06/2022,100861,7
IAB9001,27/06/2022,X,104,28/06/2022,102130,1
IAB9001,27/06/2022,A,104,01/07/2022,200380,12
LVP8802,27/06/2022,C,102,02/07/2022,101863,9
LVP8802,27/06/2022,C,102,04/07/2022,100890,88
LVP8802,27/06/2022,C,102,01/07/2022,102130,4
TEST001,27/06/2022,C,103,02/07/2022,101863,12
TEST001,27/06/2022,C,103,02/07/2022,100890,24
TEST001,27/06/2022,C,103,02/07/2022,102130,36
TEST002,29/06/2022,C,101,02/07/2022,101863,12
TEST002,29/06/2022,C,101,02/07/2022,100890,24
TEST003,03/07/2022,D,101,05/07/2022,101863,12
TEST003,03/07/2022,D,101,05/07/2022,100890,24
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Directories

Directory Name	Description
DATA_IN\received	CSV files received here
DATA_IN	Move files here for processing
DATA_IN_PROCESSED	Successfully imported files moved here
DATA_IN_ERROR	If errors found during validation move CSV file here

Modules

Program Name	Description
IMPORT_ORDER.BAT	DOS Batch script. Finds order CSV files. Moves file to DATA_IN. Runs SQL*Plus script IMPORT_ORDER.SQL to process data.
IMPORT_ORDER.SQL	SQL script calls a package function to validate the CSV data
IMPORT.ORD_IMP	PL/SQL package function. Validates the CSV data, reports errors in IMPORTERROR table. If no errors, loads order into database, moves CSV file to DATA_IN_PROCESSED.

IMPORT_ORDER.BAT

DOS Batch script.

Search the received directory for CSV files containing order data.
For each CSV file found with the name ‘order*.csv’:

Copy the CSV file to the DATA_IN import directory.

Run PL/SQL: execute script IMPORT_ORDER.SQL passing filename.

Delete the CSV file from the received directory.

IMPORT_ORDER.SQL

Call PL/SQL package function **IMPORT.ORD_IMP** passing filename.

IMPORT.ORD_IMP

1. Call the package function UTIL_FILE.LOAD_CSV to load order data from a CSV file into the IMPORTCSV staging table.
    a. The load_csv function returns an integer FILEID, which identifies the group of records loaded from the CSV file into the staging table.
2. If the file was not found, report error and stop processing.
3. Validate the data in IMPORTCSV matching FILEID.
    a. Set column KEY_VALUE in table IMPORTCSV to a unique value, that identifies each order, in this case it will be the first field in the CSV file, ORDREF.
    b. Record all validation errors found in the IMPORTERROR table, including the KEY_VALUE column.
4. If data fails validation:
    a. Delete the data from the IMPORTCSV staging table.
    b. Move the CSV file to the error directory.
    c. Stop processing, exit with an error status.
5. If data passes validation:
    a. Insert data into the ORD and ITEM tables.
    b. Delete old error messages from the IMPORTERROR table for the orders successfully imported, using the KEY_VALUE column of IMPORTCSV.
    c. Delete the data from the IMPORTCSV staging table.
    d. Move the CSV file to the processed directory.
    e. Exit with a success status.

PL/SQL Functions and Procedures

The package function ORD_VALID will need to be created. The other functions/procedures already exist, for use as described.

Name		**Description**
IMPORT.ORD_VALID		Validate the order data in the CSV file, report errors
IMPORT.DELETE_ERROR	*	Delete old error messages for orders that have been successfully imported
IMPORT.IMPORT_ERROR	*	Record validation error message on IMPORTERROR table
UTIL_FILE.LOAD_CSV	*	Load CSV file data into the IMPORTCSV table
UTIL_FILE.DELETE_CSV	*	Delete rows from IMPORTCSV for each CSV file that has been processed
UTIL_FILE.RENAME_FILE	*	Rename the CSV file by moving it to directory DATA_IN_PROCESSED if order imported, or DATA_IN_ERROR if it failed validation
UTIL_STRING.GET_FIELD	*	Extract Nth field from a delimited string (the CSV record)
UTIL_ADMIN.LOG_MESSAGE	*	Record errors in the application log table APPLOG
ORDERRP.CURRENTPRICE	*	Finds the current price for the specified product

Note that the above functions and procedures marked with * are generic, and can be re-used when creating additional data import processes.

Validation

A function is required to validate the CSV data in the staging table column IMPORTCSV.CSV_REC. Record all validation errors in the IMPORTERROR table.

Field Number	Description	Data Type	Validation Rule
1	Ord Ref (Key Value)	Char	Length <= 10 characters. Must not already exist on Ord (duplicate ORDREF)
2	Order Date	Date	Valid date format DD/MM/YYYY
3	Comm Plan	Char	Must be a single character
4	Customer ID	Number	Must find row on Customer with matching CUSTID
5	Ship Date	Date	Valid date format DD/MM/YYYY. Must be on, or a later date than Order Date
6	Product ID	Number	Must find row on Product with matching PRODID
7	Quantity	Number	0 to 99999999

Tables

Table Name	Select	Insert	Update	Delete
APPLOG		X		
IMPORTCSV	X	X	X	X
IMPORTERROR		X		X
ORD	X	X	X	
ITEM		X		
PRODUCT	X			
PRICE	X			
CUSTOMER	X			

IMPORTCSV

Description: Staging table, data from each CSV file is loaded into this table to be validated

Column	Data Type	Size	Comments
RECID	NUMBER	28	Unique sequential primary index
FILEID	NUMBER	28	Unique ID for each CSV file
FILENAME	VARCHAR2	255	CSV filename
CSV_REC	VARCHAR2	4000	CSV data record
KEY_VALUE	VARCHAR2	30	ORDREF, first field of CSV_REC identifies each order to be imported. Update this column during validation.

IMPORTERROR

Description: Report all import validation errors in this table, which will be used to generate an error report. A row will be inserted on this table for each field that is invalid.

Column	Data Type	Size	Comments
RECID	NUMBER	28	Unique sequential primary index
FILENAME	VARCHAR2	255	CSV filename
ERROR_DATA	VARCHAR2	4000	CSV record that has failed validation
ERROR_MESSAGE	VARCHAR2	1000	Error message identifying invalid field
ERROR_TIME	TIMESTAMP	6	Date and Time error logged
USER_NAME	VARCHAR2	128	Database user who ran import process
KEY_VALUE	VARCHAR2	30	ORDREF, first field of CSV_REC identifies each order to be imported
IMPORT_SQLERRM	VARCHAR2	1000	SQLERRM error message

ORD

Insert at change of Ord Ref (Key Value)

Column	Maps to CSV field	Notes
ORDID	N/A	Generate next value from ORDID_SEQ
ORDREF	Field 1	
ORDERDATE	Field 2	
COMMPLAN	Field 3	
CUSTID	Field 4	
SHIPDATE	Field 5	
TOTAL		Calculated as total of ITEM.ITEMTOT for each order

ITEM

Insert for each row on IMPORTCSV

Column	Maps to CSV field	Notes
ORDID	N/A	Generate next value from ORDID_SEQ
ITEMID	N/A	Reset to 1 at change of ORDREF, increment by 1 for each ITEM row inserted
PRODID	Field 6	
ACTUALPRICE		Find on PRICE. PRODID = Field 6, STARTDATE on or before current date, ENDDATE on or after current date
QTY	Field 7	
ITEMTOT		= QTY * ACTUALPRICE