

2.7 The Delivery Transaction

The Delivery business transaction consists of processing a batch of 10 new (not yet delivered) orders. Each order is processed (delivered) in full within the scope of a read-write database transaction. The number of orders delivered as a group (or batched) within the same database transaction is implementation specific. The business transaction, comprised of one or more (up to 10) database transactions, has a low frequency of execution and must complete within a relaxed response time requirement.

The Delivery transaction is intended to be executed in deferred mode through a queuing mechanism, rather than interactively, with terminal response indicating transaction completion. The result of the deferred execution is recorded into a result file.

2.7.1 Input Data Generation

2.7.1.1 For any given terminal, the home warehouse number (W_ID) is constant over the whole measurement interval.

2.7.1.2 The carrier number (O_CARRIER_ID) is randomly selected within [1 .. 10].

2.7.1.3 The delivery date (OL_DELIVERY_D) is generated within the SUT by using the current system date and time.

2.7.2 Deferred Execution

2.7.2.1 Unlike the other transactions in this benchmark, the Delivery transaction must be executed in deferred mode. This mode of execution is primarily characterized by queuing the transaction for deferred execution, returning control to the originating terminal independently from the completion of the transaction, and recording execution information into a result file.

2.7.2.2 Deferred execution of the Delivery transaction must adhere to the following rules:

1. The business transaction is queued for deferred execution as a result of entering the last input character.
2. The deferred execution of the business transaction must follow the profile defined in Clause 2.7.4 with the input data defined in Clause 2.7.1 as entered through the input/ output screen and communicated to the deferred execution queue.
3. At least 90% of the business transactions must complete within 80 seconds of their being queued for execution.
4. Upon completion of the business transaction, the following information must have been recorded into a result file:
 - The time at which the business transaction was queued.
 - The warehouse number (W_ID) and the carrier number (O_CARRIER_ID) associated with the business transaction.
 - The district number (D_ID) and the order number (O_ID) of each order delivered by the business transaction.
 - The time at which the business transaction completed.

2.7.2.3 The **result file** associated with the deferred execution of the Delivery business transaction is only for the purpose of recording information about that transaction and is not relevant to the business function being performed. The result file must adhere to the following rules:

1. All events must be completed before the related information is recorded (e.g., the recording of a district and order number must be done after the database transaction, within which this order was delivered, has been committed);
2. No ACID property is required (e.g., the recording of a district and order number is not required to be atomic with the actual delivery of that order) as the result file is used for benchmarking purposes only.
3. During the measurement interval the result file must be located either on a durable medium (see clause 3.5.1) or in the internal memory of the SUT. In this last case, the result file must be transferred onto a durable medium after the last measurement interval of the test run (see Clause 5.5).

2.7.3 Terminal I/O

2.7.3.1 For each transaction the originating terminal must display the following input/ output screen with all input and output fields cleared (with either spaces or zeros) except for the Warehouse field which has not changed and must display the fixed W_ID value associated with that terminal.

	1	2	3	4
	1234567890	1234567890	1234567890	1234567890
1	Warehouse: 9999			
2	Carrier Number: 99			
3	Execution Status: XXXXXXXXXXXXXXXXXXXXXXXXXXXX			
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
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2.7.3.2 The emulated user must enter, in the appropriate input field of the input/ output screen, the required input data which is organized as one distinct field: O_CARRIER_ID.

2.7.3.3 The emulated terminal must display, in the appropriate output field of the input/ output screen, all input data and the output data which results from the queuing of the transaction. The following fields are displayed: W_ID, O_CARRIER_ID, and the status message "Delivery has been queued".

2.7.3.4 The following table summarizes the terminal I/ O requirements for the Delivery transaction:

	Enter	Display Row/ Column	Coordinates
Non-repeating Group		W_ID	2/ 12
	O_CARRIER_ID	O_CARRIER_ID	4/ 17
		"Delivery has been queued"	6/ 19

2.7.3.5 For general terminal I/ O requirements, see Clause 2.2.

2.7.4 Transaction Profile

2.7.4.1 The deferred execution of the Delivery transaction delivers one outstanding order (average items-per-order = 10) for each one of the 10 districts of the selected warehouse using one or more (up to 10) database transactions. Delivering each order is done in the following steps:

1. Process the order, comprised of:
 - 1 row selection with data retrieval,
 - (1 + items-per-order) row selections with data retrieval and update.
2. Update the customer's balance, comprised of:
 - 1 row selections with data update.
3. Remove the order from the new-order list, comprised of:
 - 1 row deletion.

Comment: This business transaction can be done within a single database transaction or broken down into up to 10 database transactions to allow the test sponsor the flexibility to implement the business transaction with the most efficient number of database transactions.

Note: The above summary is provided for information only. The actual requirement is defined by the detailed transaction profile below.

2.7.4.2 For a given warehouse number (W_ID), for each of the 10 districts_(D_W_ID , D_ID) within that warehouse, and for a given carrier number (O_CARRIER_ID):

- The input data (see Clause 2.7.3.2) are retrieved from the deferred execution queue.
- A database transaction is started unless a database transaction is already active from being started as part of the delivery of a previous order (i.e., more than one order is delivered within the same database transaction).
- The row in the NEW-ORDER table with matching NO_W_ID (equals W_ID) and NO_D_ID (equals D_ID) and with the lowest NO_O_ID value is selected. This is the oldest undelivered order of that district. NO_O_ID, the order number, is retrieved. If no matching row is found, then the delivery of an order for this district is skipped. The condition in which no outstanding order is present at a given district must be handled by skipping the delivery of an order for that district only and resuming the delivery of an order from all remaining districts of the selected warehouse. If this condition occurs in more than 1%, or in more than one, whichever is greater, of the business transactions, it must be reported. The result file must be organized in such a way that the percentage of skipped deliveries and skipped districts can be determined.

- The selected row in the NEW-ORDER table is deleted.
- The row in the ORDER table with matching O_W_ID (equals W_ID), O_D_ID (equals D_ID), and O_ID (equals NO_O_ID) is selected, O_C_ID, the customer number, is retrieved, and O_CARRIER_ID is updated.
- All rows in the ORDER-LINE table with matching OL_W_ID (equals O_W_ID), OL_D_ID (equals O_D_ID), and OL_O_ID (equals O_ID) are selected. All OL_DELIVERY_D, the delivery dates, are updated to the current system time as returned by the operating system and the sum of all OL_AMOUNT is retrieved.
- The row in the CUSTOMER table with matching C_W_ID (equals W_ID), C_D_ID (equals D_ID), and C_ID (equals O_C_ID) is selected and C_BALANCE is increased by the sum of all order-line amounts (OL_AMOUNT) previously retrieved. C_DELIVERY_CNT is incremented by 1.
- The database transaction is committed unless more orders will be delivered within this database transaction.
- Information about the delivered order (see Clause 2.7.2.2) is recorded into the result file (see Clause 2.7.2.3).