15.7.2.2 autocommit, Commit, and Rollback

In `InnoDB`, all user activity occurs inside a transaction. If `autocommit` mode is enabled, each SQL statement forms a single transaction on its own. By default, MySQL starts the session for each new connection with `autocommit` enabled, so MySQL does a commit after each SQL statement if that statement did not return an error. If a statement returns an error, the commit or rollback behavior depends on the error. See Section 15.21.5, “InnoDB Error Handling”.

A session that has `autocommit` enabled can perform a multiple-statement transaction by starting it with an explicit `START TRANSACTION` or `BEGIN` statement and ending it with a `COMMIT` or `ROLLBACK` statement. See Section 13.3.1, “START TRANSACTION, COMMIT, and ROLLBACK Statements”.

If `autocommit` mode is disabled within a session with `SET autocommit = 0`, the session always has a transaction open. A `COMMIT` or `ROLLBACK` statement ends the current transaction and a new one starts.

If a session that has `autocommit` disabled ends without explicitly committing the final transaction, MySQL rolls back that transaction.

Some statements implicitly end a transaction, as if you had done a `COMMIT` before executing the statement. For details, see Section 13.3.3, “Statements That Cause an Implicit Commit”.

A `COMMIT` means that the changes made in the current transaction are made permanent and become visible to other sessions. A `ROLLBACK` statement, on the other hand, cancels all modifications made by the current transaction. Both `COMMIT` and `ROLLBACK` release all `InnoDB` locks that were set during the current transaction.

Grouping DML Operations with Transactions

By default, connection to the MySQL server begins with autocommit mode enabled, which automatically commits every SQL statement as you execute it. This mode of operation might be unfamiliar if you have experience with other database systems, where it is standard practice to issue a sequence of DML statements and commit them or roll them back all together.

To use multiple-statement transactions, switch autocommit off with the SQL statement `SET autocommit = 0` and end each transaction with `COMMIT` or `ROLLBACK` as appropriate. To leave autocommit on, begin each transaction with `START TRANSACTION` and end it with `COMMIT` or

ROLLBACK. The following example shows two transactions. The first is committed; the second is rolled back.

```
$> mysql test
```

```
mysql> CREATE TABLE customer (a INT, b CHAR (20), INDEX (a));
Query OK, 0 rows affected (0.00 sec)
mysql> -- Do a transaction with autocommit turned on.
mysql> START TRANSACTION;
Query OK, 0 rows affected (0.00 sec)
mysql> INSERT INTO customer VALUES (10, 'Heikki');
Query OK, 1 row affected (0.00 sec)
mysql> COMMIT;
Query OK, 0 rows affected (0.00 sec)
mysql> -- Do another transaction with autocommit turned off.
mysql> SET autocommit=0;
Query OK, 0 rows affected (0.00 sec)
mysql> INSERT INTO customer VALUES (15, 'John');
Query OK, 1 row affected (0.00 sec)
mysql> INSERT INTO customer VALUES (20, 'Paul');
Query OK, 1 row affected (0.00 sec)
mysql> DELETE FROM customer WHERE b = 'Heikki';
Query OK, 1 row affected (0.00 sec)
mysql> -- Now we undo those last 2 inserts and the delete.
mysql> ROLLBACK;
Query OK, 0 rows affected (0.00 sec)
mysql> SELECT * FROM customer;
+------+--------+
| a    | b      |
+------+--------+
|   10 | Heikki |
+------+--------+
1 row in set (0.00 sec)
mysql>
```

Transactions in Client-Side Languages

In APIs such as PHP, Perl DBI, JDBC, ODBC, or the standard C call interface of MySQL, you can send transaction control statements such as `COMMIT` to the MySQL server as strings just like any other SQL statements such as `SELECT` or `INSERT`. Some APIs also offer separate special transaction commit and rollback functions or methods.