along with the expected error code. On the replica, if the same error occurs, that is the expected result and replication continues. Otherwise, replication stops.

- Logging stored function invocations rather than the statements executed by a function has a security implication for replication, which arises from two factors:
  - It is possible for a function to follow different execution paths on source and replica servers.
  - Statements executed on a replica are processed by the replica's applier thread. Unless you implement replication privilege checks, which are available from MySQL 8.0.18 (see Section 17.3.3, "Replication Privilege Checks"), the applier thread has full privileges.

  The implication is that although a user must have the `CREATE ROUTINE` privilege to create a function, the user can write a function containing a dangerous statement that executes only on the replica where it is processed by a thread that has full privileges. For example, if the source and replica servers have server ID values of 1 and 2, respectively, a user on the source server could create and invoke an unsafe function `unsafe_func()` as follows:

```
mysql> delimiter //
mysql> CREATE FUNCTION unsafe_func () RETURNS INT
    -> BEGIN
    ->   IF @@server_id=2 THEN dangerous_statement; END IF;
    ->   RETURN 1;
    -> END;
    -> //
mysql> delimiter ;
mysql> INSERT INTO t VALUES(unsafe_func());
```

  The `CREATE FUNCTION` and `INSERT` statements are written to the binary log, so the replica executes them. Because the replica's applier thread has full privileges, it executes the dangerous statement. Thus, the function invocation has different effects on the source and replica and is not replication-safe.

  To guard against this danger for servers that have binary logging enabled, stored function creators must have the `SUPER` privilege, in addition to the usual `CREATE ROUTINE` privilege that is required. Similarly, to use `ALTER FUNCTION`, you must have the `SUPER` privilege in addition to the `ALTER ROUTINE` privilege. Without the `SUPER` privilege, an error occurs:

```
ERROR 1419 (HY000): You do not have the SUPER privilege and
binary logging is enabled (you *might* want to use the less safe
log_bin_trust_function_creators variable)
```

  If you do not want to require function creators to have the `SUPER` privilege (for example, if all users with the `CREATE ROUTINE` privilege on your system are experienced application developers), set the global `log_bin_trust_function_creators` system variable to 1. You can also set this variable at server startup. If binary logging is not enabled, `log_bin_trust_function_creators` does not apply. `SUPER` is not required for function creation unless, as described previously, the `DEFINER` value in the function definition requires it.

- The use of replication privilege checks where available (from MySQL 8.0.18) is recommended whatever choice you make about privileges for function creators. Replication privilege checks can be set up to ensure that only expected and relevant operations are authorized for the replication channel. For instructions to do this, see Section 17.3.3, "Replication Privilege Checks".
- If a function that performs updates is nondeterministic, it is not repeatable. This can have two undesirable effects:
  - It causes a replica to differ from the source.
  - Restored data does not match the original data.