Log Reader Agent failing with error 18768 and 22017

Last updated by | Vitor Tomaz | Jun 8, 2022 at 5:37 AM PDT

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Issue

The customer is receiving the following set of error messages for a Log Reader Agent:

```
Error 20011
The process could not execute 'sp_repldone/sp_replcounters' on 'servername.dnssuffix.database.windows.net'.
(Source: MSSQL_REPL, Error number: MSSQL_REPL20011)

Error 18768
The specified LSN {00000023:000000f8:0003} for repldone log scan occurs before the current start
of replication in the log {00000023:000000f9:0005}.
(Source: MSSQLServer, Error number: 18768)

Error 22037
The process could not set the last distributed transaction.
(Source: MSSQL_REPL, Error number: MSSQL_REPL22017)

Error 22037
The process could not execute 'sp_repldone/sp_replcounters' on 'servername.dnssuffix.database.windows.net'.
(Source: MSSQL_REPL, Error number: MSSQL_REPL22037)
```

Investigation / Analysis

When the Log Reader Agent starts, it is calling `sp_MSget_last_transaction` to retrieve the last-replicated transaction Log Sequence Number (LSN) from the Distribution database. It then uses this LSN as input for a call to sp_repldone to the Publisher database.

It is this initial call that is failing here: the LSN that is read from the Distribution database is older than the replication watermark on the Publisher database.

```
LSN from Distribution database: 00000023:000000f8:0003
LSN from Publisher database:    00000023:000000f9:0005
```

There are two possible causes for this issue:

- Something has moved the replication watermark forward in the Publisher database, e.g. by calling `sp_repldone` explicitly with LSNs that are now missing from Distribution.
- The last replicated transactions have "disappeared" from the Distribution database, for whatever reason. This "disappearance" cannot be explained from the replication side, because the Log Reader first commits in the Distribution database before calling sp_repldone on the Publisher to mark the transaction as replicated.

Further steps to find out more about a potential cause:

- investigate if there were any Managed Instance restarts, failovers, or other primary/secondary role changes at the time when the failure started.
- check with the customer if either Publisher database or Distribution database had been restored shortly before.
- check with the customer if any kind of administrative operation had been done shortly before, e.g. database option change, isolation level change, or similar.
- check with the customer if the Publisher database is also enabled for Change Data Capture (CDC); there are no known issue but replication and CDC share Log Reader functionality, and the issue might have occurred on the CDC side.

Mitigation

Mitigation 1 - sp_repldone - preferred solution

There is nothing you can do to fix this issue without potential data loss for the Subscribers. Very likely not all DML transactions have been replicated from the Publisher to the Subscribers, which might cause further issues later (specifically errors 20598 "row not found", 2601 "cannot insert duplicate key", and 2627: "violation of PRIMARY KEY constraint").

The recommended and preferred solution is to reset the replication transactions on the transaction log (mark them as replicated), and to reinitialize all subscriptions after creating a new snapshot.

You can execute the following command to mark all transactions as replicated:

```
exec sp_repldone @xactid=NULL, @xact_segno=NULL, @numtrans=0, @time=0, @reset=1
```

Mitigation 2 - sp_replrestart - unrecommended workaround

One other possible option might be sp_replrestart. This stored procedure inserts compensating LSNs (no operation) into the published database transaction log until one the compensating LSNs becomes larger than the highest distributed LSN in the Distribution database for this published database. It then inserts this new high LSN into `distribution..MSsrepl_transactions` and executes `sp_repldone` on the published database. Finally it updates the internal structures to mark a new starting point for the Log Reader Agent.

This only resolves the immediate Log Reader Agent failure though - it does not address the potential of missing transactions and later Subscriber failures. It is only recommended if the customer can live with the potential data loss and different data between Publisher and Subscribers.

Ensure that the Log Reader Agent is stopped and that there are no incoming transactions on the published database when `sp_replrestart` is executed.

Public Doc Reference

sp_repldone
sp_replrestart

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