Point In Time Restore failing because of replication

Last updated by | Holger Linke | Apr 7, 2022 at 8:42 AM PDT

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Issue

The customer is trying to point-in-time restore (PITR) a database on their Managed Instance. This is failing with an error similar to this:

```
Msg 3724 - Cannot %S_MSG the %S_MSG '%.*ls' because it is being used for replication.
-- for example:
Cannot drop the procedure 'dbo.sp_MSdel_dbotablename' because it is being used for replication
Cannot drop the table 'dbo.MS<name_of_system_table>' because it is being used for replication.
```

The objects specified in the error message are referring to SQL Server system objects, usually related to Transactional Replication.

Analysis

Two details are important for this scenario:

1. The source database for the PITR is part of a Transactional Replication topology. It is acting as a Subscriber to a publication, but is also a Publisher by itself, thus republishing the data that it is receiving through replication.
2. When the customer has created the publication on the Subscriber database, they made the mistake of publishing some of the replication system objects.

The PITR is creating a new database on the MI; it is not replacing the existing source database. At the end of the operation, the restore process detects that the name of the new database is different from the source database. This triggers a cleanup step to remove any replication system objects from the database, because they are not needed here.

But because the replication system objects are marked with the "Published" attribute, they cannot be deleted by the cleanup procedure. This is then failing the restore operation.

Mitigation

In on-premise SQL Server, you would restore the database and set the KEEP_REPLICATION option to avoid the cleanup step. But this option is not available for a Point-in-Time Restore on MI.

On Managed Instance, the easiest and safest solution is to:

- Un-publish these system object articles, removing them from the publication.
- Then attempt a new restore, specifying a point in time that is after the articles were removed.

If this is not possible for the customer, then you need to open an IcM and get help from the product group. A possible life site mitigation might be to add trace flag #3101 `TRCFLG_RETAIL_DMPDB_SuppressReplicationFixup` to the Managed Instance (does not require a restart of the instance). Another option might be by providing value `RestoreOverride=dword:00000001` for registry key `HKLM\SOFTWARE\Microsoft\MSSQLServer\Replication`. Either option would skip the call to `sp_restoredbreplication` and keep replication objects and attributes in place. But as said, this requires PG involvement.

After restore, the first thing the customer should do is to re-enable and then disable replication on the restored database to clean up metadata. For example:

```
exec sp_replicationdboption @dbname = N'<databasename>', @optname = N'publish', @value = N'true');
exec sp_removedbreplication @dbname = N'<databasename>';
```

More Information

Each object that is published in Transactional Replication receives the "Published" attribute. This attribute probibits the article's source object from being dropped; you first have to drop the article definition before you can drop the source object.

When you restore a published database to a different server or into a different database name, all replication settings, metadata, and system objects are removed at the end of the operation.

In this specific case however, the system objects mentioned in the error message are also published and pinned with the "Published" bit, Thus they cannot be dropped and the restore operation fails.

Public Documentation Reference

- Restore of Replicated Database fails with "Cannot drop the table because it is being used for replication."
- Restoring Databases Involved in Replication
  > Replication supports restoring replicated databases to the same server and database from which the backup was created.
  > If you restore a backup of a replicated database to another server or database, replication settings cannot be preserved.

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