

Oracle missing SCN

Troubleshooting and recovery

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Oracle transaction log

- Contains committed as well as uncommitted records.
- Debezium has to buffer all the records belonging to TX until the TX is committed or rolled back.
- Upon restart Debezium needs to re-read all uncommitted TXs from the beginning.
- **For long running TXs it may require to read old archive files eventually.**



Oracle SCN

- SCN - System Change Number.
- Not unique (many records may have same SCN).
- Multiple redo threads dealing with SCN on Oracle RAC.
- Each DB instance has one redo thread on Oracle RAC.
- XStream stores SCN in the database.



Debezium offset - Oracle connector

- Contains low and high watermark.
- **Low watermark** - position in the log where the oldest uncommitted transaction starts.
- **High watermark** - position in the log of the last committed transaction (for given redo thread).
- On RAC deployment, there are more high watermarks - one for each redo thread.



Debezium offset - Oracle connector

```
{"commit_scn": "2501294:1:06000300a3020000", "snapshot_scn": "2462240", "scn": "2501293"}
```

High watermark

Snapshot SCN

Low watermark

Thread number

Transaction ID

Missing SCN error

- Upon Debezium start, Debezium need to load all uncommitted TX records.
- Debezium starts reading from the start of the oldest uncommitted TX - from **low watermark** stored in the offset.
- If the archive log containing low watermark SCN was removed in the meantime, Debezium would fail with:

```
io.debezium.DebeziumException: Online REDO LOG files or archive log files do not contain the offset scn 2300356. Please perform a new snapshot.  
at io.debezium.connector.oracle.logminer.LogMinerStreamingChangeEventSource.execute(LogMinerStreamingChangeEventSource.java:166)  
at io.debezium.connector.oracle.logminer.LogMinerStreamingChangeEventSource.execute(LogMinerStreamingChangeEventSource.java:62)  
at io.debezium.pipeline.ChangeEventSourceCoordinator.streamEvents(ChangeEventSourceCoordinator.java:272)  
at io.debezium.pipeline.ChangeEventSourceCoordinator.executeChangeEventSources(ChangeEventSourceCoordinator.java:195)  
at io.debezium.pipeline.ChangeEventSourceCoordinator.lambda$start$0(ChangeEventSourceCoordinator.java:138)
```

Common root causes

- Too aggressive rotation policy of redo/archive logs.
- Long running transaction.
- Capturing a low traffic table/database, while there is heavy traffic in other tables/databases.



Remediation of missing SCN error

- Move back rotated archived logs from backup if they are still available. Requires to use RMAN as V\$ARCHIVED_LOG needs to be updated as well.
- If not possible to restore archive log, take a new snapshot.



Preventing missing SCN error

- Prevent long running transactions
 - on the Debezium level user can set [log.mining.transaction.retention.ms](#)
- Adjust log rotation policy
 - log archive retention period should be higher than [log.mining.transaction.retention.ms](#) period
- Set-up [heartbeat.interval.ms](#) and [heartbeat.action.query](#)



Recent SCN and log files related issues

Recently fixed:

- [DBZ-7345](#): IllegalStateException:None of log files contains offset SCN
- [DBZ-7158](#): Checking for gaps in SCN sequence is done per redo thread.
- [DBZ-5350](#): ORA-00310: archived log contains sequence X; sequence Y required
- Minor issues: [DBZ-7425](#), [DBZ-7218](#), [DBZ-6938](#), [DBZ-6869](#)

Under investigation:

- [DBZ-7389](#): Unable to find SCN after Exadata maintenance updates.



Useful resources

- <https://debezium.io/blog/2023/06/29/debezium-oracle-series-part-3/#debugging>



Demo

