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.





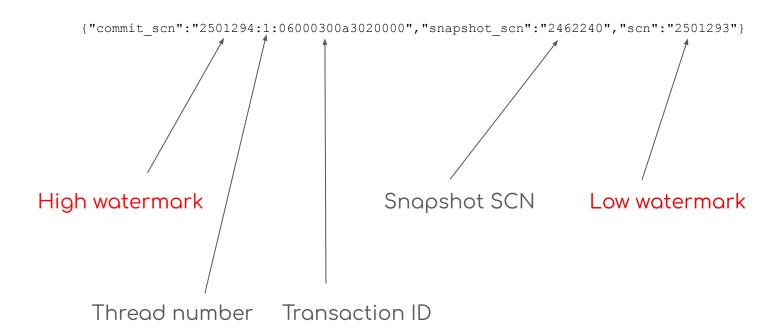
Debezium offset - Oracle connector

- 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





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)

 $\verb|atio.debezium.pipeline.ChangeEventSourceCoordinator.executeChangeEventSourceS(ChangeEventSourceCoordinator.java:195)|$

at io.debezium.pipeline.Change Event Source Coordinator.lambda \$start \$0 (Change Event Source Coordinator.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:

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

Under investigation:

DBZ-7389: Unable to find SCN after Exadata maintenance updates.





Useful resources

 https://debezium.io/blog/2023/06/29/debezium-oracle-seri es-part-3/#debugging





Demo



