

Tungsten Cluster Master Class

Basics: Tungsten Replicator – How we Move Your Data

Presented by Chris Parker

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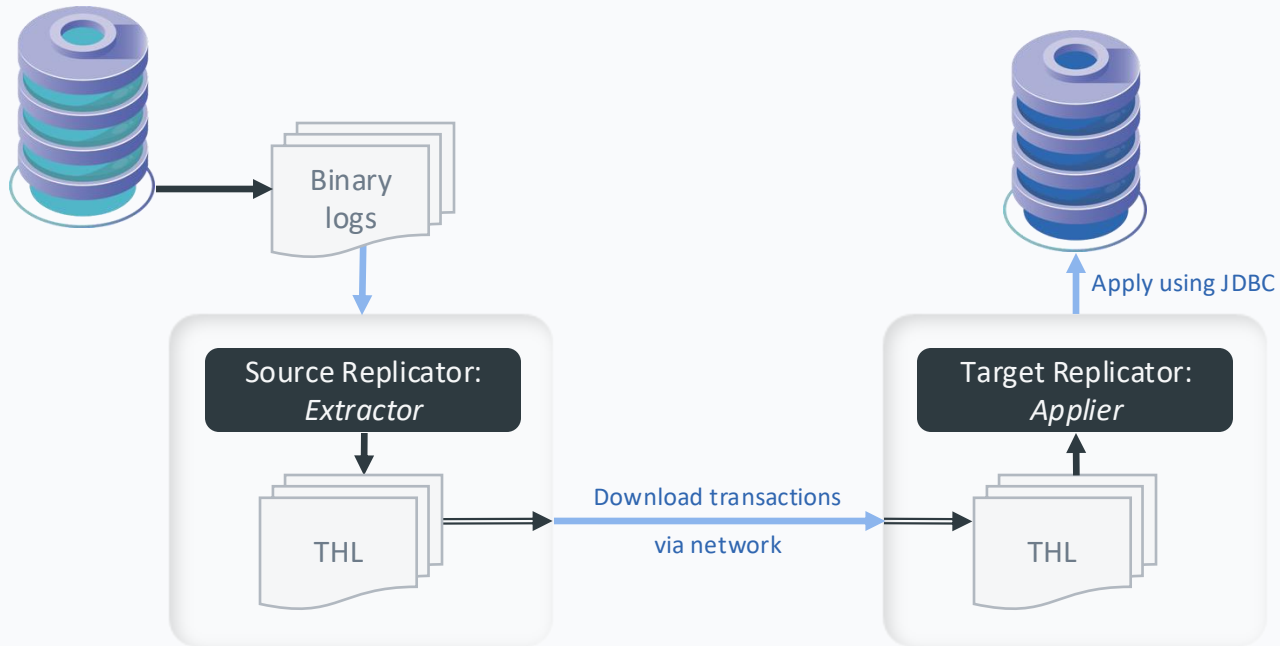
Topics

In this short course, we will

- Take a look at the inner workings of the Replicator
- Understand Replicator Roles & States
- Explore the Replicator Stages

The Replicator

Tungsten Replicator



THL = Events + Metadata

Replicator Roles & States

Tungsten Replicator Roles

`master (extractor)`

A replicator in a "master" role extracts data from a source database (for example, by reading the binary log from a MySQL server) and generates THL. As the extractor, the replicator also serves THL to other replicators over the network connection.

`slave (applier)`

The applier replicator pulls THL from one of more extractors and then applies that data to a target database or environment.

`thl-server`

A thl-server replicator is a special role that extractor replicators in Clusters can be changed to temporarily when a Primary is taken offline. This will allow downstream appliers to download and apply any THL that hasn't yet been processed by the replicator.

`thl-client`

A thl-client replicator is a special role that appliers can be changed to. This will allow the applier replicator to download any THL available from the upstream extractor, but does NOT apply the THL to the target database.

Tungsten Replicator Roles

`thl-applier`

Introduced in v7.0.2

A thl-applier replicator is a special role that applier replicators can be changed to temporarily when a Primary is taken offline. This will allow downstream applier replicators to apply any locally available THL that hasn't yet been processed by the applier.

Tungsten Replicator States

START

The replicator service is starting up and reading the replicator properties configuration file.

ONLINE

The node is currently online and processing events, reading incoming data and applying those changes to the database as required. In this mode the current status and position within the replication stream is recorded and can be monitored. Replication will continue until an error or administrative condition switches the node into the `OFFLINE` state.

OFFLINE: NORMAL

The node has been deliberately placed into the offline mode by an administrator. No replication events are processed and reading or writing to the underlying database does not take place.

OFFLINE: ERROR

The node has entered the offline state because of an error. No replication events are processed and reading or writing to the underlying database does not take place.

GOING-OFFLINE

The replicator is processing any outstanding events or transactions that were in progress when the node was switched offline. When these transactions are complete, and the resources in use (memory, network connections) have been closed down, the replicator will switch to the `OFFLINE: NORMAL` state. This state may also be seen in a node where auto-enable is disabled after a start or restart operation.

Tungsten Replicator States

GOING-ONLINE:PROVISIONING

The replicator is currently reading provisioning information from the primary database before entering the `ONLINE` state.

GOING-ONLINE:RESTORING

The replicator is preparing to go online and is currently restoring data from a backup.

GOING-ONLINE:SYNCHRONIZING

The replicator is preparing to go online and is currently preparing to process any outstanding events from the incoming event stream. This mode occurs when an applier has been switched online after maintenance. If this state persists it can be an indication of a network outage between the applier and the extractor.

ONLINE:DEGRADED

This status will be seen on an extractor and is indicative of the replicator losing connectivity to the source database that it is extracting from. The replicator will continue to extract entries from the binary log that have not yet been processed. After extracting all log entries, the replicator will proceed to the `ONLINE:DEGRADED-BINLOG-FULLY-READ` state.

ONLINE:DEGRADED-BINLOG-FULLY-READ

This status will be seen on an extractor replicator following the `ONLINE:DEGRADED` state and indicates that the replicator has completed reading all binlog entries. In a clustering environment, it indicates to the cluster that failover can now proceed.

Replicator Stages

Tungsten Replicator Stages

Extractor

Each stage passes through:

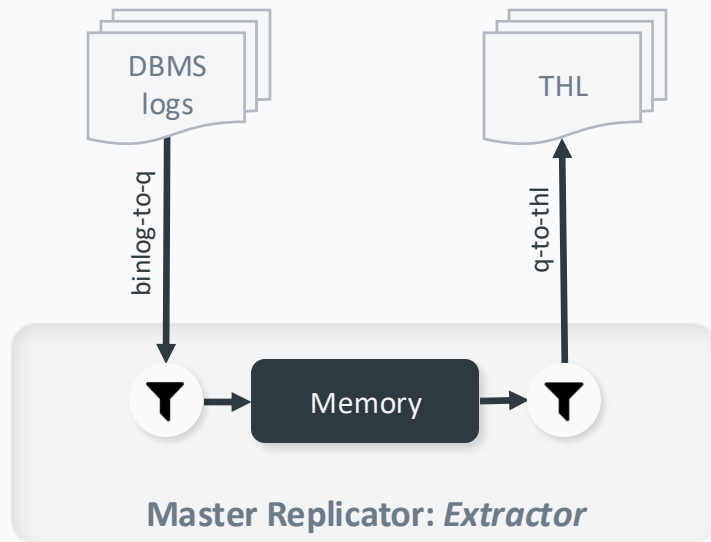


`binlog-to-q`

Handles extraction of transactions from binary log and places into in-memory queue

`q-to-thl`

Takes transactions from in-memory queue and writes down to disk into thl log file



Tungsten Replicator Stages

Applier

`remote-to-thl`

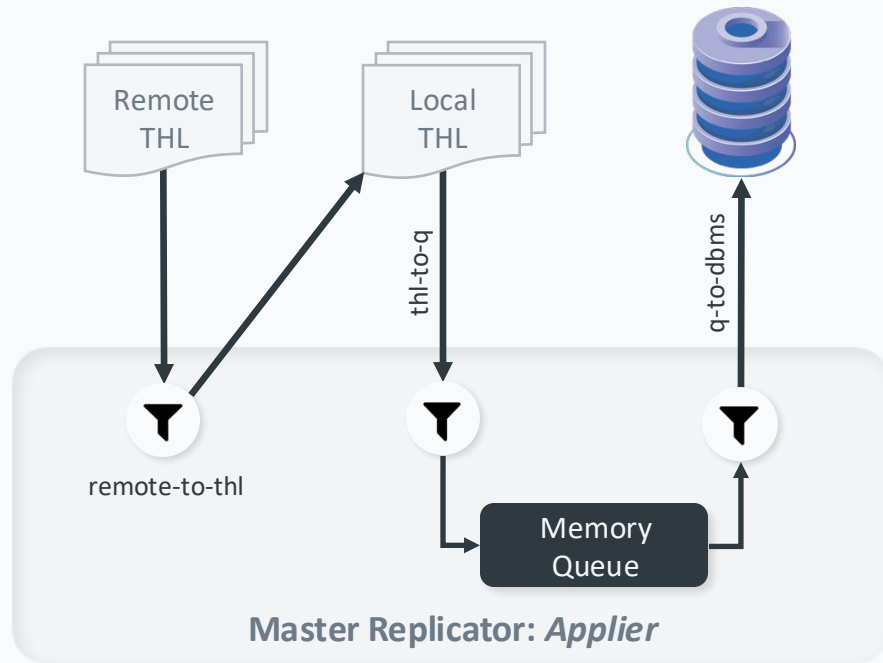
Streams thl log files across network socket, from configured source. Writes out THL to local disk.

`thl-to-q`

Reads transactions from thl and places into in-memory queue

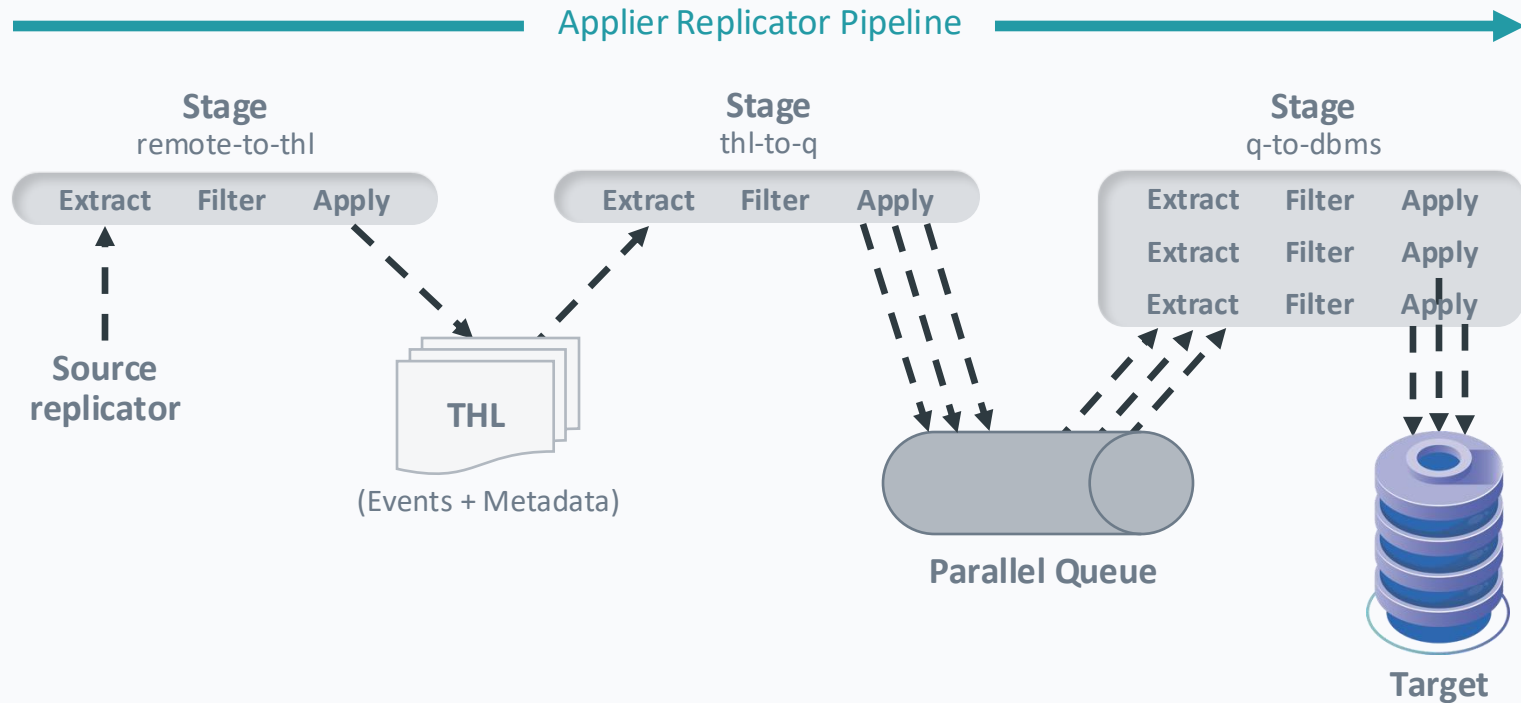
`q-to-dbms`

Reads transactions from in-memory queue and writes out to target database



Tungsten Replicator Stages

Parallel Apply



Summary

What we have learnt today

- How the Replicator Works
- Reviewed the Replicator States
- Discussed the Replicator Stages

Thank you for listening

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