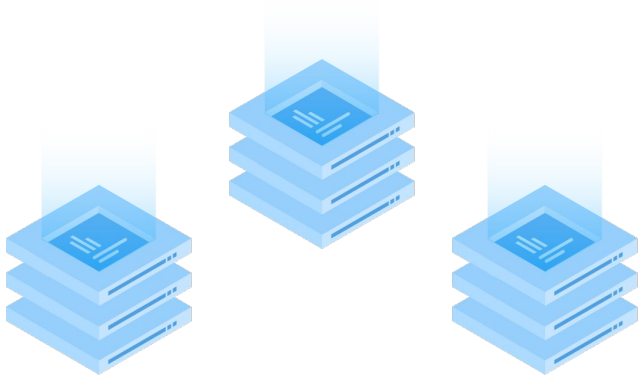
What's new in DM v2.0

Xuecheng Zhang

PingCAP TiDB



About me

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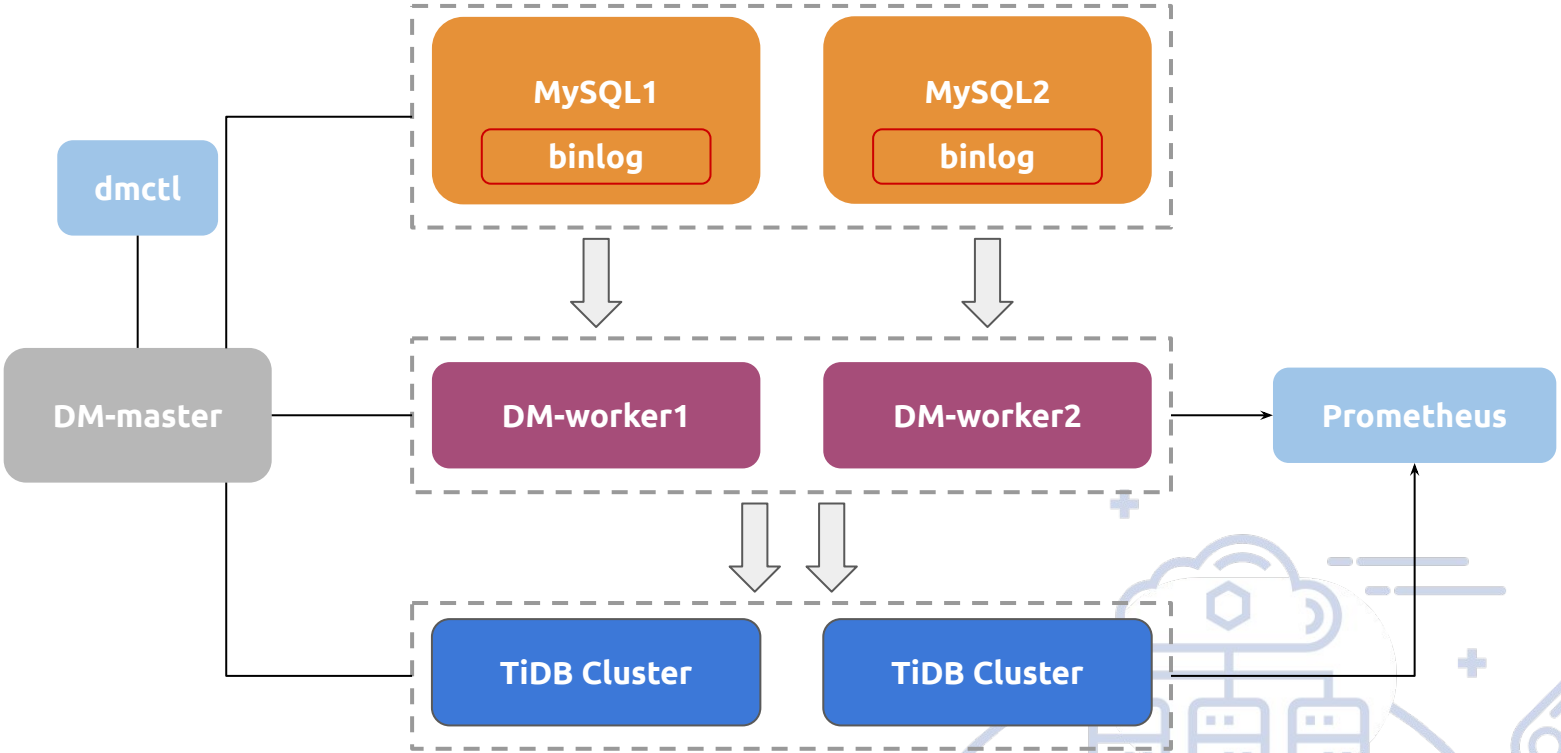
Part I - A brief review of DM 1.0

Architecture of DM v1.0



Some Features of DM v1.0

- Table routing
- Block and allow table lists
- Binlog event filter
- DM online-ddl-scheme
- Merge and migrate Data from Sharded Tables

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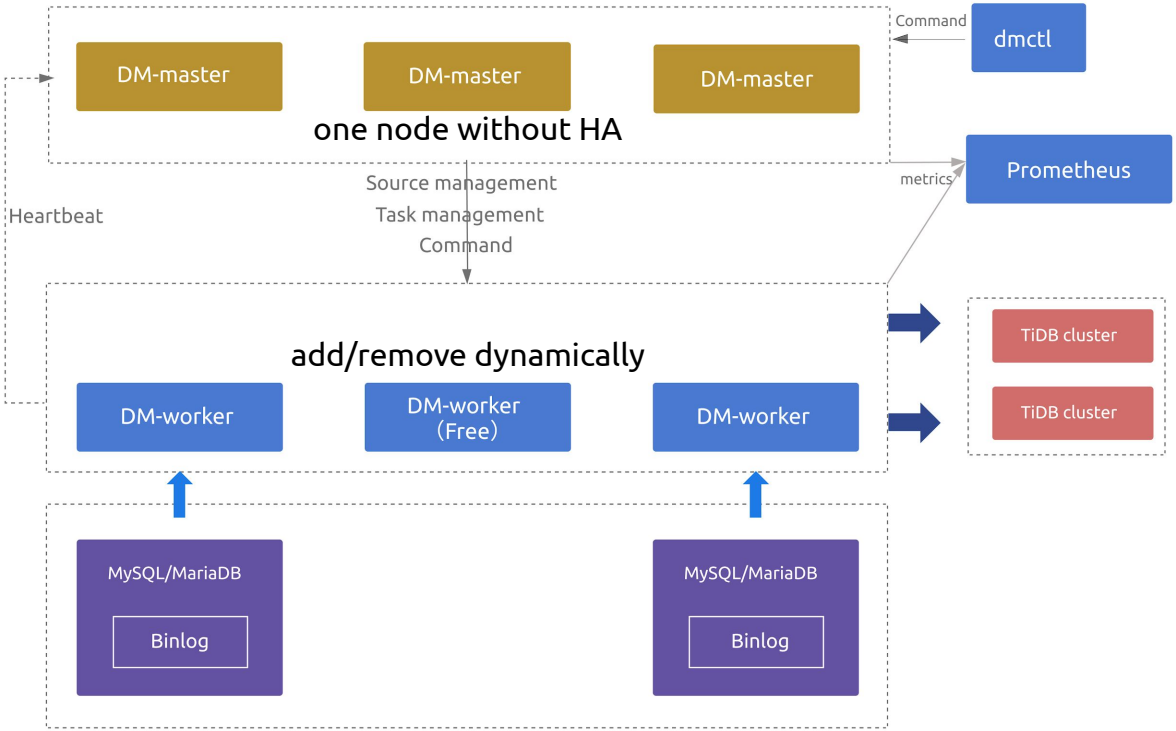
Part II - What's new in DM v2.0

High Availability Architecture



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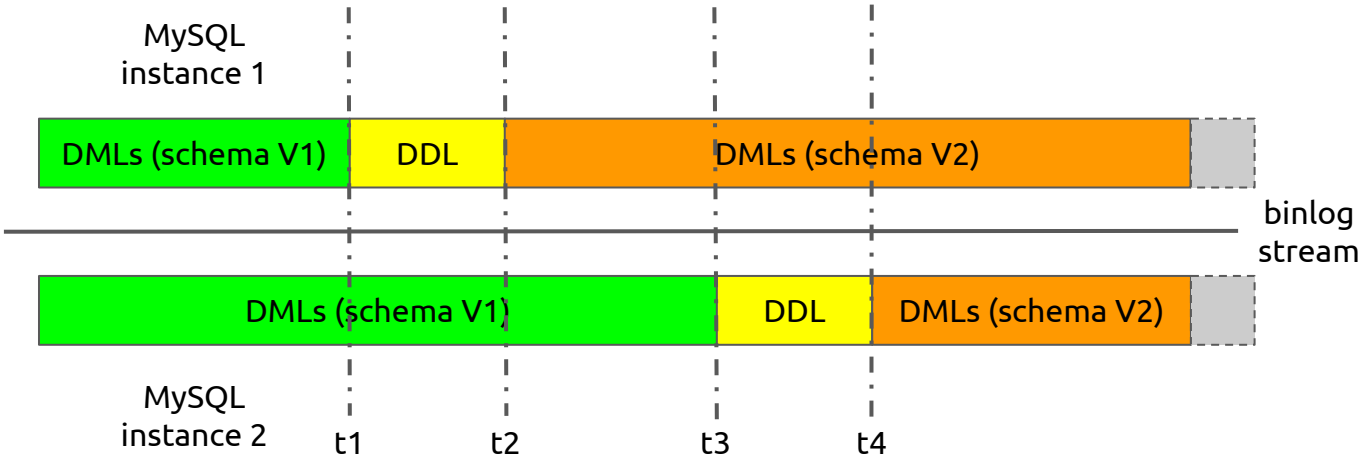
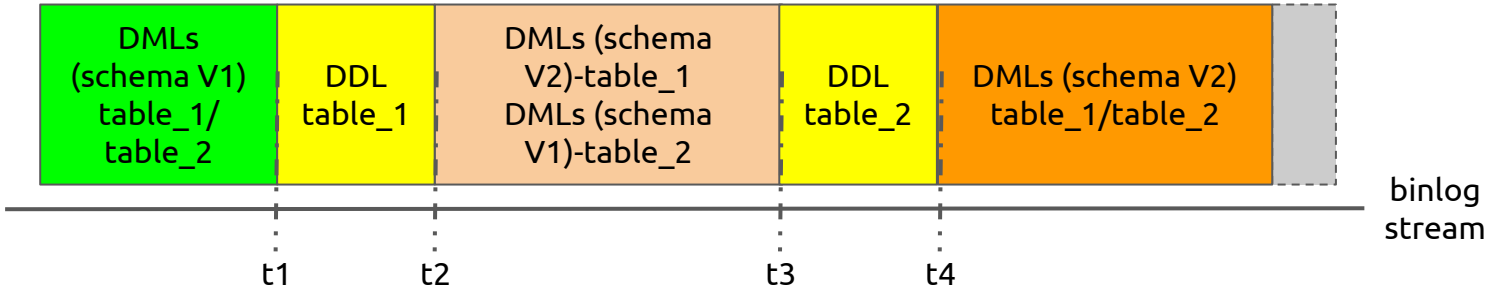
High Availability

- restrictions
  - The full dump & load phases **DO NOT** support HA
    - may be suported via external storage, like AWS S3
  - One DM-worker instance can still only process the migration of **one** upstream MySQL/MariaDB source at a time, #784
    - Number of DM-worker instances **>=** number of upstream instances

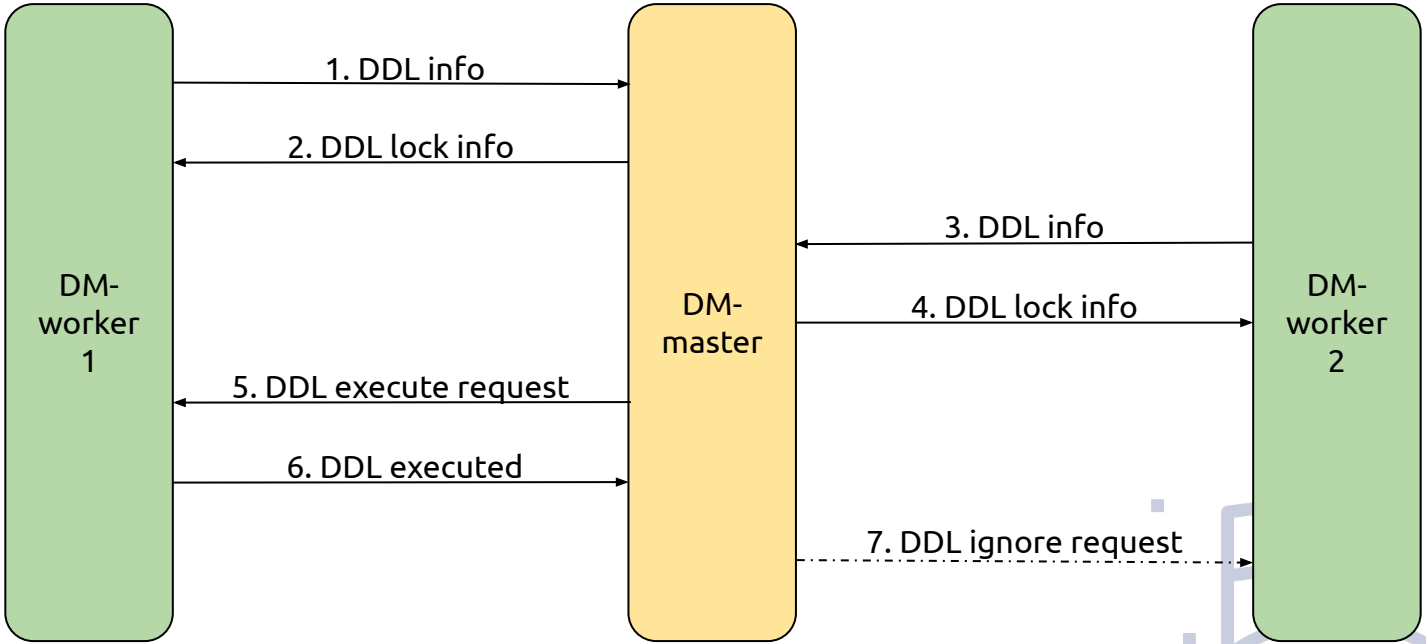
Shard DDL (multiple MySQL instances)



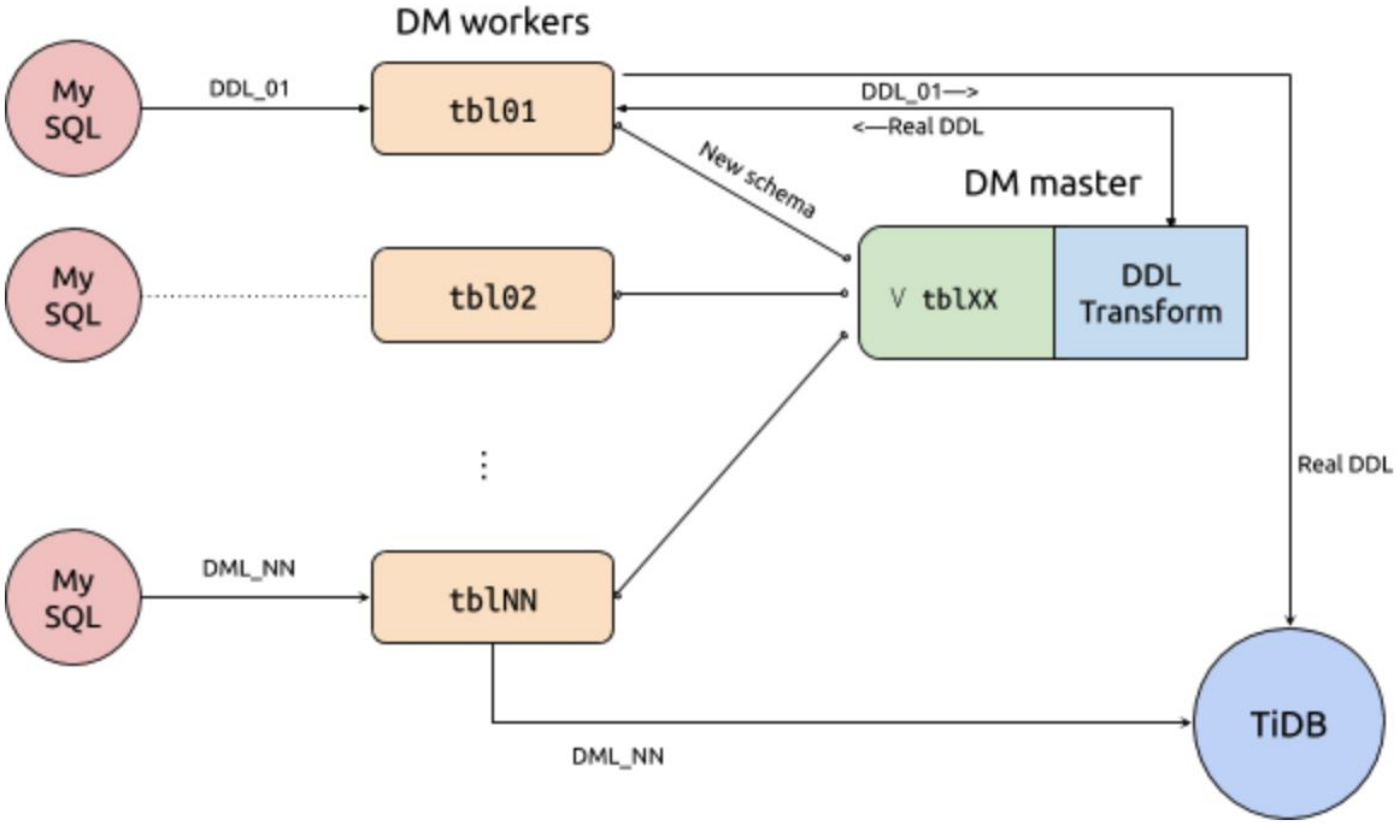
Shard DDL (single MySQL instance)



Pessimistic shard DDL (supported in DM v1.0)



Optimistic shard DDL



Contrast of shard DDL modes

Pessimistic mode	**Optimistic mode**
Sharded tables that executes DDL **suspend DML** migration	Sharded tables that executes DDL **continue** DML migration
The DDL **execution order** and **statements** of each sharded table must be the same	Each sharded table only needs to keep the table **schema compatible** with each other
The DDL is migrated to the downstream after the **entire shard group** is consistent	The DDL of each sharded table **immediately** affects the downstream
Wrong DDL operations can be **intercepted** after the detection	Wrong DDL operations will be migrated to the downstream, which may cause **inconsistency** between the upstream and downstream data before the detection

Optimistic shard DDL

- There are still many restrictions
  - If restrictions are violated, downstream data may be **corrupted**
- Scenarios that can be additionally supported
  - Gray upgrade for the table schema
  - More columns exist in the downstream table

Usability improvements

- TiUP for DM v2.0
  - Import and upgrade v1.0 cluster deployed using DM-Ansible

```
➜  ~ tiup list dm-master
Available versions for dm-master:
Version      Installed  Release                    Platforms
-------      ---------  -------                    ---------
nightly                 2020-11-04T11:57:17+08:00  linux/amd64,linux/arm64
v2.0.0-rc               2020-08-21T17:49:08+08:00  linux/amd64,linux/arm64
v2.0.0-rc.2             2020-09-01T20:51:29+08:00  linux/amd64,linux/arm64
v2.0.0                  2020-10-30T16:10:58+08:00  linux/amd64,linux/arm64
```

Usability improvements

- More reasonable architecture
  - scale in, scale out and rolling upgrade easier
    - `tiup dm scale-in prod-cluster -N 172.16.5.140:8262`
    - `tiup dm scale-out prod-cluster scale.yaml`
    - `tiup dm upgrade prod-cluster v2.0.1`

Usability improvements

- Friendly to AWS Aurora and cloud based RDS
  - Ensure the eventual consistency of data even without privilege for **FTWRL** via automatically enabled `safe-mode`
  - Tolerate specified previleges in AWS Aurora for pre-checking

Usability improvements

- Better error handling mechanism
  - One-step processing (handle-error) of errors encountered
    - confused in v1.0 for sql-skip/sql-replace and binlog event filter
  - “Workaround” in query-status tells you how to handle errors

    ```
    "Workaround": "Please use `list-member --master` to confirm whether the DM-master cluster is healthy"
    ```
  - Clearer error messages

Usability improvements

- Less config items
  - automatic configuration of sql_mode based on the global sql_mode of upstream and downstream databases and sql_mode in binlog events
  - automatic configuration of the max_allowed_packet from DM to the downstream TiDB, based on the global max_allowed_packet value of the downstream TiDB
  - ...

More Features

- MySQL 8.0 support (experimental)
- TLS support
- GTID support for binlog replcation unit (sync)

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Part III - What's missing in DM v2.0.*0*

Missing features

- See ROADMAP
  - One DM-worker instance for multiple upstream sources
  - Online replication checksum
  - ...

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