

ORACLE

MySQL Heatwave for OLTP

Overview and What is New in the MySQL Database Service

Pre-FOSDEM Days

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Who?



Luís Soares
MySQL Replication Team Lead
Oracle

- Born and raised in Portugal
- Sports: Football, Basket, Karate, Running, Biking
- Physics, Astronomy
- Fault-Tolerance, High Availability, Computers
- Read, Travel, Being with People
- Long time MySQLer

Agenda

- Introduction
- MySQL HeatWave for OLTP
- What is New
- Conclusion
- Feedback?



Introduction

MySQL Heatwave for OLTP

Technology:

- MySQL is very popular, especially on the web.
- MySQL is a natural fit for the cloud.
- MySQL is a reliable database with replication built-in since its early life.

Cloud:

- MySQL integration with Heatwave makes OLTP and OLAP seamless to the end user.
- MySQL Heatwave for OLTP service is available on OCI and elsewhere.
- MySQL in OCI is a managed service with the latest and greatest MySQL developments available to users.



Manual management tasks consume resources

On-premises:

- Database management: provisioning, configuration, backup, HA, patching, security & more
- Operating system management: installation, patching, upgrades...
- Infrastructure management: purchase and maintenance of servers, storage
- Data center management: space, power, cooling, disaster recovery & more

In the cloud with a managed database service:

- Provisioning: right-sizing a database
- Data loading: optimizing load time, memory usage, encoding, data placement
- Query execution: performance tuning, prioritization of queries
- Failure handling: actions to handle an error recovery

MySQL HeatWave for OLTP

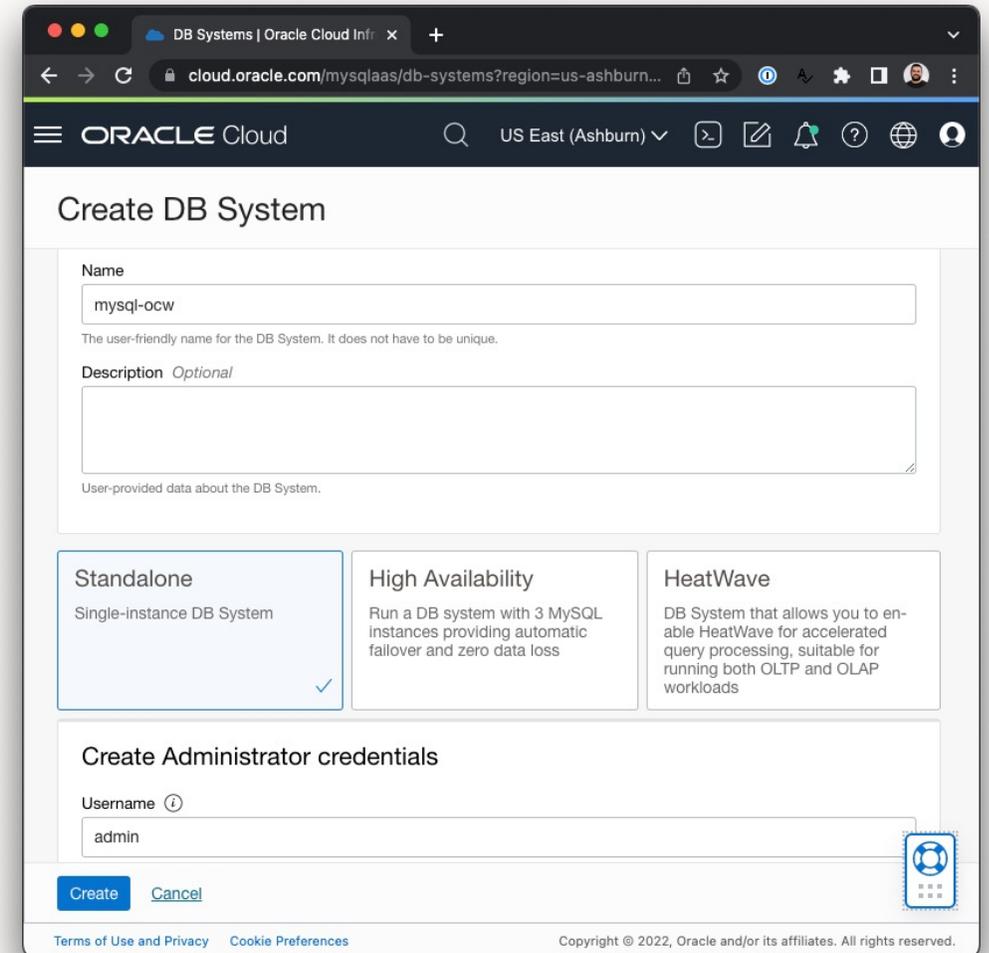
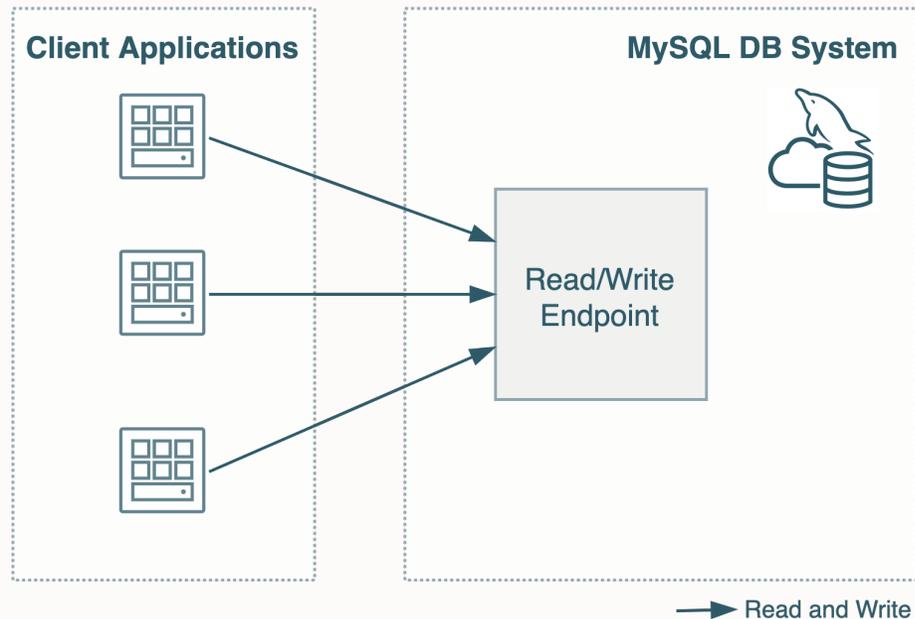
Features

- Managed Service with latest MySQL
- Easy provisioning & SLA
- Automation via Terraform, CLI, SDK, API
- One click:
 - High Availability
 - Manual, Automatic Backups
 - Point-in-time Recovery
 - Inbound and Outbound Replication
 - OLAP and OLTP together in one database



Database DB System

One-click DB System creation



Backups

Manual or Automatic

- Retention Period
- When to Backup
- Full or Incremental
- Point-in-Time Recovery (only non-HA DB Systems)

Edit Backup Plan

Enable automatic backups
Enables automatic backups. You must also specify a retention period, and select a backup window.

Backup retention period *Optional*
The retention period defines how long to store the backups, in days. ⓘ

7

Enable point in time restore ⓘ
Enables you to restore from a DB system at a point in time.

Select backup window
The backup window start time defines the start of the time period during which your DB system is backed up.

Window start time

06:48 UTC

 [Show backup windows per region](#)



High Availability

RTO and RPO

- Single click High Availability
- Automatic Failover
- Planned Switchover
- Increase Uptime
- Reduce Downtime during a failure event (RTO: Minutes)
- Zero Data Loss during a failure event (RPO: Zero)

Create MySQL DB System

Standalone Single-instance MySQL DB System	High Availability Run 3-node MySQL DB System providing automatic failover and zero data loss ✓
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Switchover

This operation will initiate a switchover from the availability domain containing the primary MySQL instance, **AD-1**, to the selected availability domain containing the desired MySQL instance.

Select the availability domain containing the desired MySQL instance:

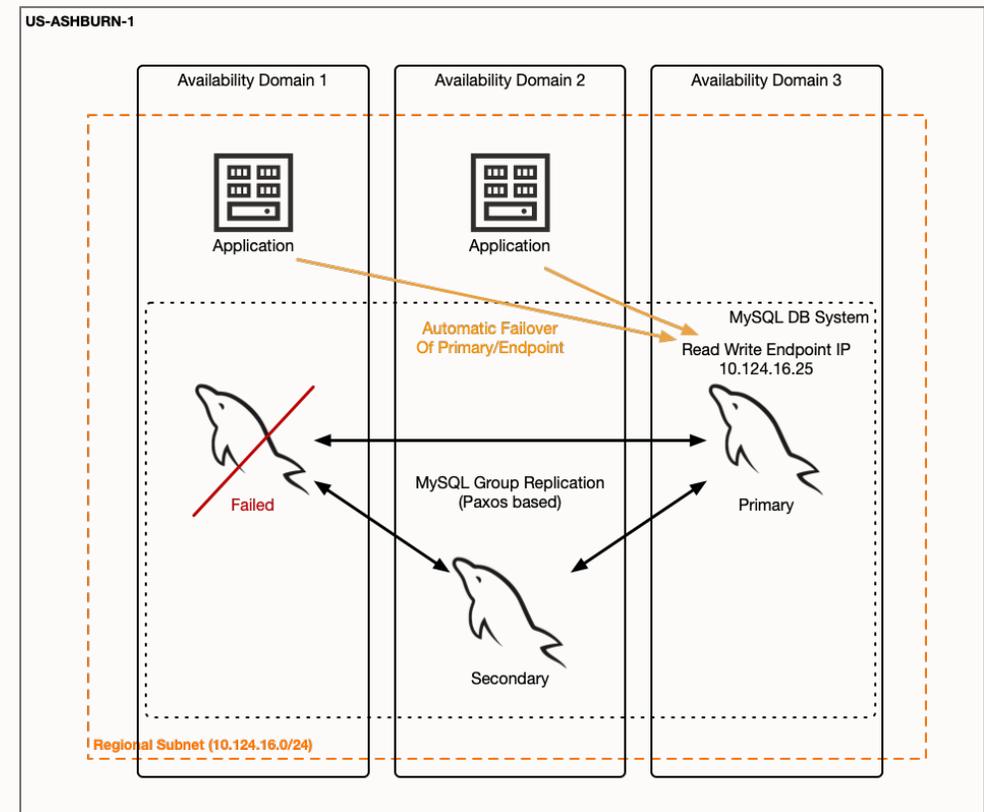
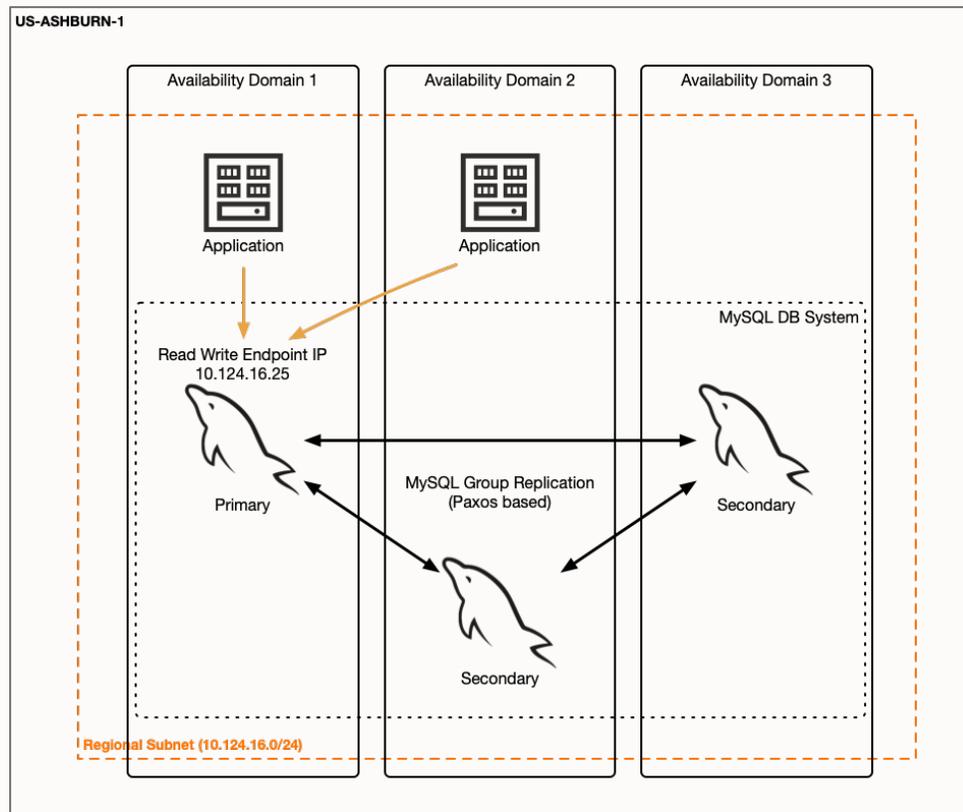
AD-1 Primary	AD-2 Secondary	AD-3 Secondary
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[Switchover](#) [Cancel](#)



High Availability

Automatic Application Failover



Inbound and Outbound Replication

Hybrid Deployments and Migrations

Hybrid deployments

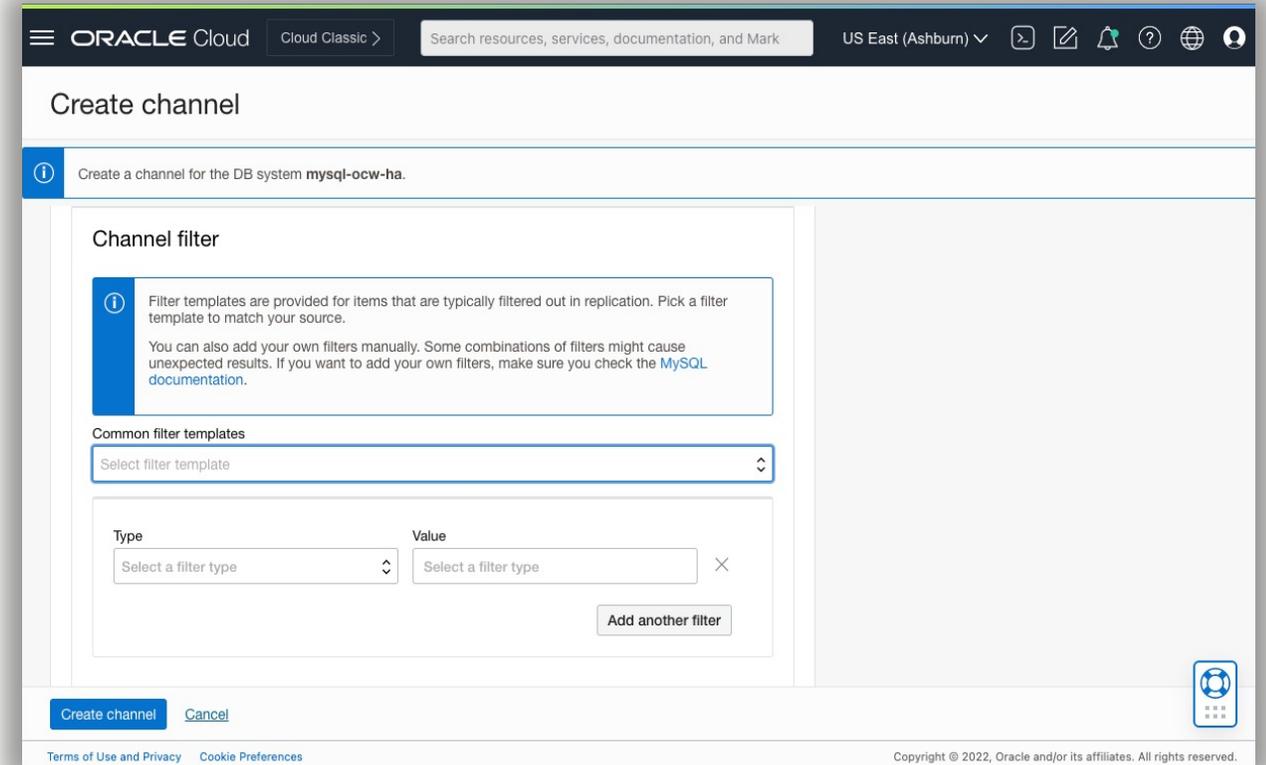
- On-premise and multi-cloud
- OCI as your main site
- OCI as your Disaster Recovery site
- OCI for capacity bursting
- HeatWave for Analytics

Live Migrations

- Minimize downtime

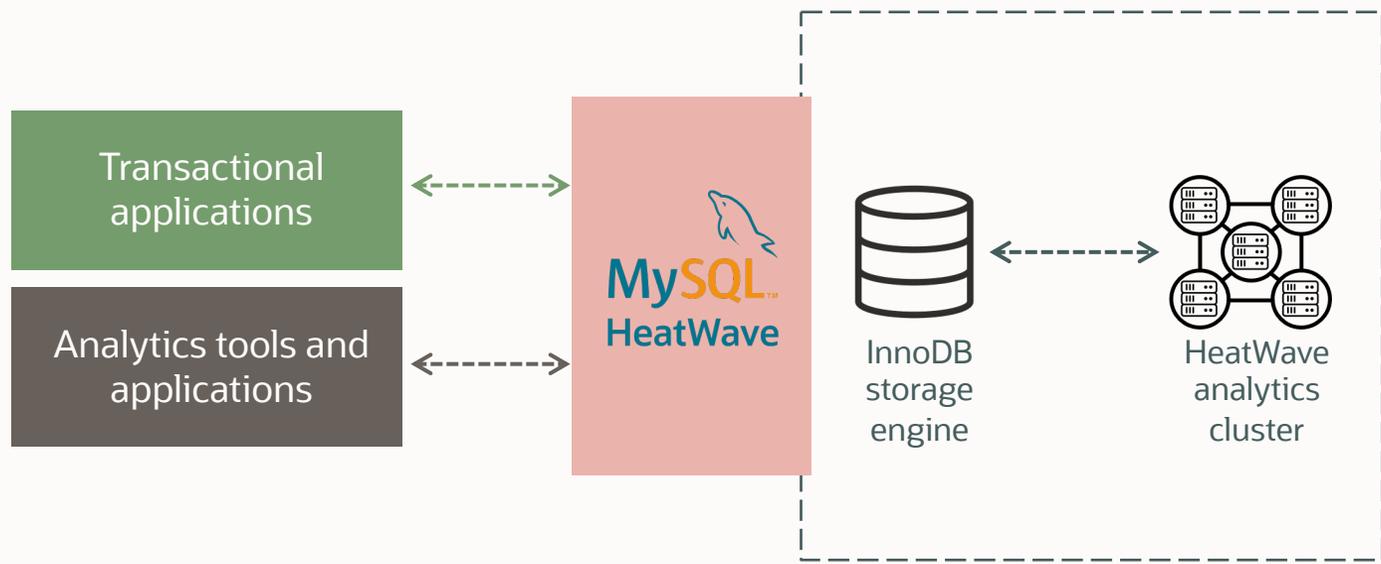
Cross-region replication

- DB System to DB System



OLTP and OLAP Together: MySQL HeatWave

One database is better than two



One service for OLTP & OLAP

No ETL duplication

Unmatched performance, at a fraction of the cost

Real-time analytics

Improved security

Applications work without changes

1 > 2 with MySQL HeatWave



What is New?

Read Scale-Out

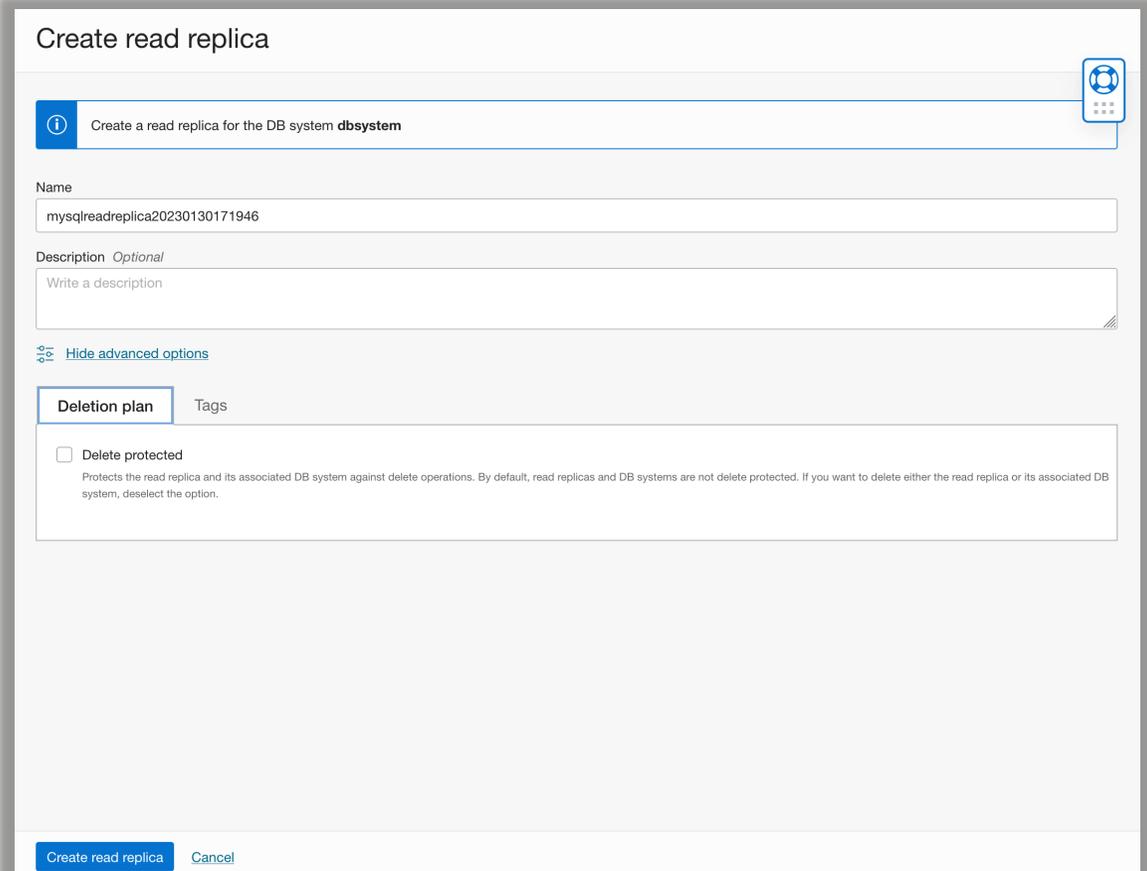


Managed Read Replicas

Grow and Shrink Read Capacity Seamlessly

High performance by scaling your reads.

- A single click creates a Read Replica
 - Provision
 - Launch
 - Setup Replication
 - Monitor and Manage
- Read Replicas are associated with a DB System
 - RO endpoints in the DB System
 - Up to 18 max per DB System
 - Requires a shape of 4 OCPUs or larger
 - CLI, SDK and Terraform support



The screenshot shows a 'Create read replica' form. At the top, it says 'Create a read replica for the DB system **dbsystem**'. Below this, there is a 'Name' field with the value 'mysqlreadreplica20230130171946'. A 'Description' field is optional and contains the placeholder text 'Write a description'. There are two tabs: 'Deletion plan' (selected) and 'Tags'. Under the 'Deletion plan' tab, there is a checkbox for 'Delete protected' which is currently unchecked. A small text block below the checkbox explains that this option protects the read replica and its associated DB system against delete operations. At the bottom of the form, there are two buttons: 'Create read replica' and 'Cancel'.



Load Balancer

Use Your Replicas Efficiently

When using Read Replicas a Load Balancer Endpoint is automatically provisioned in your DB System.

- Managed by the service
- Materializes as a Read-Only endpoint
- Round robins traffic across Read Replicas
- Manages Read Replica backends automatically

Endpoints

Endpoint	State	Modes	Type	Hostname	Address	MySQL Port	MySQL X Protocol Port
Read replica load balancer	● Active	READ	Load balancer	-	100.101.74.228	3306	33060
mysqlreadreplica20230130171946	● Active	READ	Read replica	-	100.101.74.146	3306	33060
DB system primary	● Active	READ, WRITE	Primary DB system	-	100.101.74.80	3306	33060

Showing 3 Items < 1 of 1 >



Inbound Replication Filters



Inbound Replication Filters

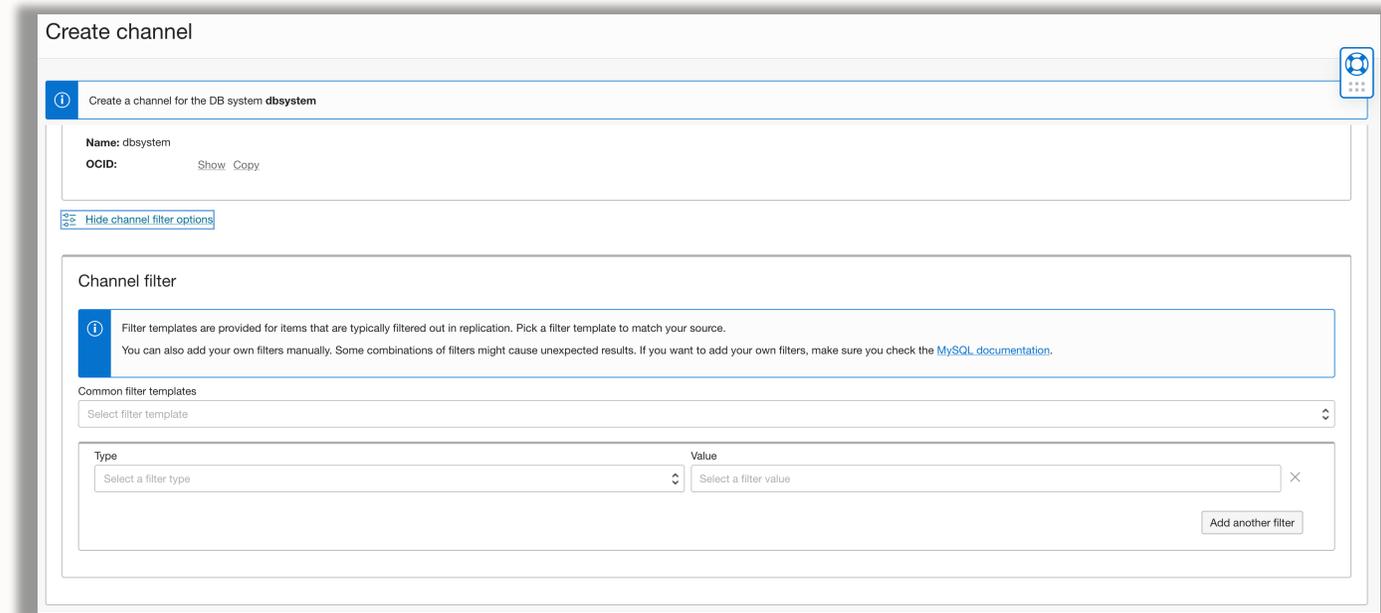
Ignore Some of the Changes But Not Others

While migrating one may need to filter some traffic out from the replication stream.

- Ignoring a schema that will remain on premise
- Ignoring custom system objects from other cloud providers

Noteworthy:

- Supports MySQL replication filters
- Console contains handy filter templates
- CLI, SDK and Terraform support



The screenshot shows the 'Create channel' interface in a cloud console. At the top, it says 'Create a channel for the DB system **dbssystem**'. Below this, the 'Name' is 'dbssystem' and the 'OCID' is visible with 'Show' and 'Copy' links. A 'Hide channel filter options' link is present. The 'Channel filter' section contains an information box stating: 'Filter templates are provided for items that are typically filtered out in replication. Pick a filter template to match your source. You can also add your own filters manually. Some combinations of filters might cause unexpected results. If you want to add your own filters, make sure you check the [MySQL documentation](#).' Below this is a 'Common filter templates' dropdown menu. At the bottom, there is a table with two columns: 'Type' and 'Value'. The 'Type' column has a dropdown menu with 'Select a filter type' and a search icon. The 'Value' column has a dropdown menu with 'Select a filter value' and a search icon. An 'Add another filter' button is located at the bottom right of the filter section.



Inbound Replication and Sources without GTIDs



Sources Without Global Transaction Identifiers

Global Transaction Identifiers (GTIDs)

- Powerful framework for handling and managing one or more replication streams

Old deployments or MySQL forks do not have or use GTIDs

- Hard and cumbersome to migrate

The MySQL Database Service at OCI provides migration support in those cases too:

- Automatic generation of transaction identifiers
- No need for intermediate steps/infrastructure
- Connects to the source and pulls changes, nothing else.

Create channel

Create a channel for the DB system **dbsystem**

Replication positioning

Source GTID settings

- Source can use GTID auto-positioning (recommended)
System variable `gtid_mode=ON` set on source.
- Source cannot use GTID auto-positioning
System variable `gtid_mode=OFF, OFF_PERMISSIVE` or `ON_PERMISSIVE`.

Target DB system

Configure the target DB system.



Conclusion

Conclusions

MySQL Database Service offers:

- The most up to date MySQL, delivered by the MySQL team
- OLTP and OLAP in one database
- The technology you know, feels right at home for a traditional MySQL user
- Straightforward and simple for a new adopters
- Integrated with other Oracle services
- Powerful and secure infrastructure – The Oracle Cloud Infrastructure



Thank You!

Feedback?