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Solution Brief: Top 10 reasons to use HeatWave MySQL for MySQL Community Edition users

Improve MySQL performance, enhance data security, and get real-time analytics without ETL

Introduction

MySQL is the world's most popular open source database. While its performance, reliability, and ease of use are well recognized, using MySQL Community Edition can present several challenges for organizations. In this brief, we will review those challenges, and subsequently consider how HeatWave MySQL helps address them.

Challenges of using MySQL Community Edition—on-premises or in the cloud

Bottom-up adoption (as opposed to top-down adoption mandated by management) is very typical for MySQL, and IT managers can often be surprised by the extent to which MySQL is used within their organization.

Indeed, developers or analysts facing an ad-hoc need frequently choose to build an application based on MySQL—an open source database renowned for its performance, reliability, and ease of use that enables them to quickly get the job done. While such applications are typically not critical to the organization initially, this may change rapidly: as more and more people discover their value, rely on them, and possibly expand their scope, many applications built on MySQL become critical to one or more departments. Several questions tend to surface at that point, such as:

- How is data protected? A crucial point considering that 60% of data breaches are due to unapplied patches.
- Do we comply with regulatory requirements?
- What is our High Availability setup?
- What is our backup policy?
- Can we get immediate professional technical support if needed?
- How do we ensure performance and scalability as the application/the number of users expands?
- Who's responsible for the administration of the database(s) and what happens if this person leaves?

Performance and scalability are often not optimized, and applications may run older MySQL versions, without the latest features.

Organizations face those common issues whether MySQL Community Edition is deployed on-premises or self-managed in the cloud, for example running on Amazon EC2.

Additionally, MySQL is optimized for transactional applications but is usually slow at running analytics queries. As a result, organizations using MySQL Community Edition for OLTP typically need to move all their data to separate analytics databases via complex and time-consuming extract, transform, load (ETL) processes. These further increases costs; security and compliance risks also increase as data moves between data stores; and business leaders don't get real-time analytics as the data is typically already stale by the time it's available for use in the separate analytics database.

MySQL Community Edition users run into the same issues when they want to build and train machine learning models or use Generative AI with their MySQL data as they need to move/ETL data from their MySQL Database to separate ML and/or Generative AI offerings.

In the next section, we will review how Oracle HeatWave MySQL helps IT managers address those issues.

Top 10 reasons to use HeatWave MySQL for MySQL Community Edition users

1. **HeatWave MySQL is a fully managed cloud service**:
   You can increase productivity and reduce risks by automating tasks such as high-availability management, patching, upgrades, and backup with a fully managed database service. MySQL security patches are automatically applied to limit exposure to security vulnerabilities.

2. **The only MySQL cloud service built, managed, and supported by the MySQL team**:
   Developers can deliver modern, cloud-native database applications with immediate access to the latest features from the MySQL team, while other services may lag significantly behind. Technical support is delivered 24/7 by MySQL experts, who have direct access to the MySQL development engineers.

3. **The only service built on MySQL Enterprise Edition**:
   Advanced features for encryption, data masking, authentication, and a database firewall let you implement additional security measures to protect data throughout its lifecycle and help comply with regulatory requirements. In most other MySQL cloud services, those features are not built into the database and need to be implemented at the application level.

4. **100% compatible with MySQL on-premises deployments:**
   You can seamlessly migrate to HeatWave MySQL without changes to existing applications. Compatibility also helps prevents risks of vendor lock-in, which could happen with other non-compatible or proprietary MySQL-based cloud services only available in the vendor's public cloud.

5. **One cloud service for transactions and real-time analytics**:
   You can improve MySQL query performance by orders of magnitude and get real-time analytics on your transactional data—without the complexity, latency, risks, and cost of extract, transform, and load (ETL) duplication to a separate analytics database. Analytics queries access the most current information as updates from transactions automatically replicate in real time to the HeatWave analytics cluster. There's no need to index the data before running analytics queries.

"One HeatWave MySQL database is simpler than two from AWS plus all the associated ETL tools and data movers—that's a fact, not an opinion."
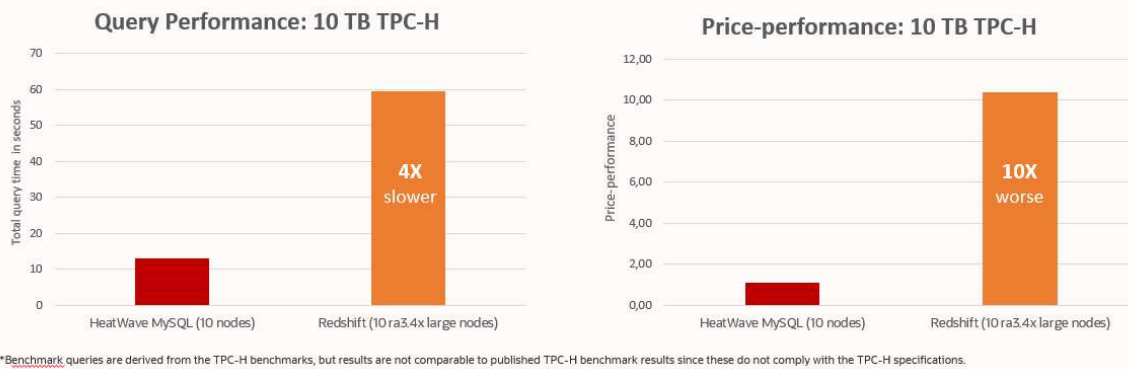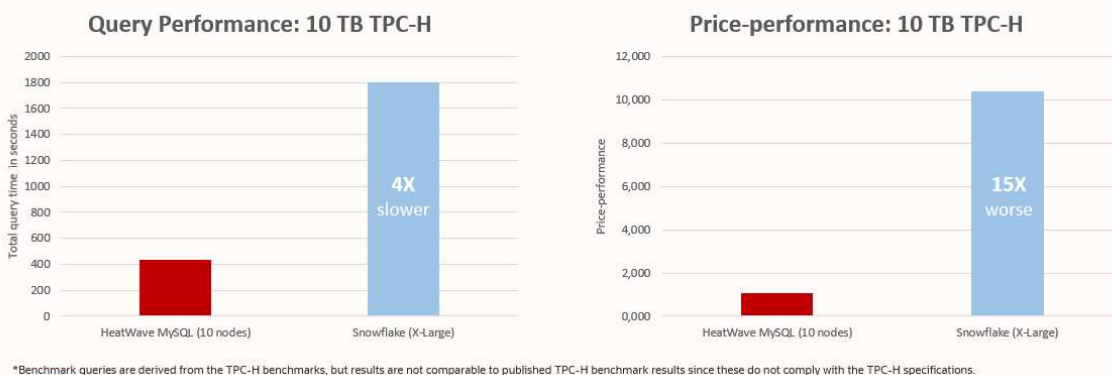
Bob Evans
Founder, Cloud Wars

6. **Unmatched performance and price-performance**:
   As demonstrated by TPC-H benchmarks, HeatWave MySQL is 4X faster than Amazon Redshift with 10X better price-performance, 4X faster than Snowflake with 15X better price-performance, and 1,400X faster than Amazon Aurora with 2,200X better price-performance.

HeatWave MySQL vs. Amazon Redshift

Query Performance: 10 TB TPC-H

Total query time in seconds

70
60
50
40
30
20
10
0

HeatWave MySQL (10 nodes)   Redshift (10 ra3.4x large nodes)

4X slower

Price-performance: 10 TB TPC-H

Price-performance

12,00
10,00
8,00
6,00
4,00
2,00
0,00

HeatWave MySQL (10 nodes)   Redshift (10 ra3.4x large nodes)

10X worse

*Benchmark queries are derived from the TPC-H benchmarks, but results are not comparable to published TPC-H benchmark results since these do not comply with the TPC-H specifications.

HeatWave MySQL vs. Snowflake

Query Performance: 10 TB TPC-H

Total query time in seconds

2000
1800
1600
1400
1200
1000
800
600
400
200
0

HeatWave MySQL (10 nodes)   Snowflake (X-Large)

4X slower

Price-performance: 10 TB TPC-H

Price-performance

12,000
10,000
8,000
6,000
4,000
2,000
0,000

HeatWave MySQL (10 nodes)   Snowflake (X-Large)

15X worse

*Benchmark queries are derived from the TPC-H benchmarks, but results are not comparable to published TPC-H benchmark results since these do not comply with the TPC-H specifications.

Most real-world applications have a mix of OLTP and complex OLAP queries. For such workloads, HeatWave MySQL is much faster and costs a fraction of Amazon Aurora. Using the industry standard CH-benCHmark on a 100 GB data set for OLAP queries, Amazon Aurora is 18X slower, provides 110X less throughput, and is 35% more expensive than HeatWave MySQL.

"We successfully migrated our 6 TB database from Amazon Aurora to HeatWave MySQL, which reduced our costs by 60% and improved performance for complex queries by more than 1,000X."

Amit Palshikar
Cofounder and CTO, Red3i

7. **Machine learning–powered automation**:
   HeatWave Autopilot provides workload-aware, machine learning–powered automation. It improves performance and scalability without requiring database tuning expertise, increases the productivity of developers and DBAs, and helps eliminate human errors. HeatWave Autopilot automates many of the most important and often challenging aspects of achieving high query performance at scale—including provisioning, data loading, query execution, and failure handling. It also provides capabilities for OLTP workloads, such as indexing that automatically determines the indexes that customers should create or drop from their tables to optimize OLTP throughput.

8. A wider set of integrated HeatWave capabilities:

HeatWave provides automated, integrated, and secure generative AI and machine learning in one cloud service for transactions and lakehouse scale analytics. When using HeatWave MySQL, you can also take advantage of all the other built-in HeatWave capabilities, at no additional cost.
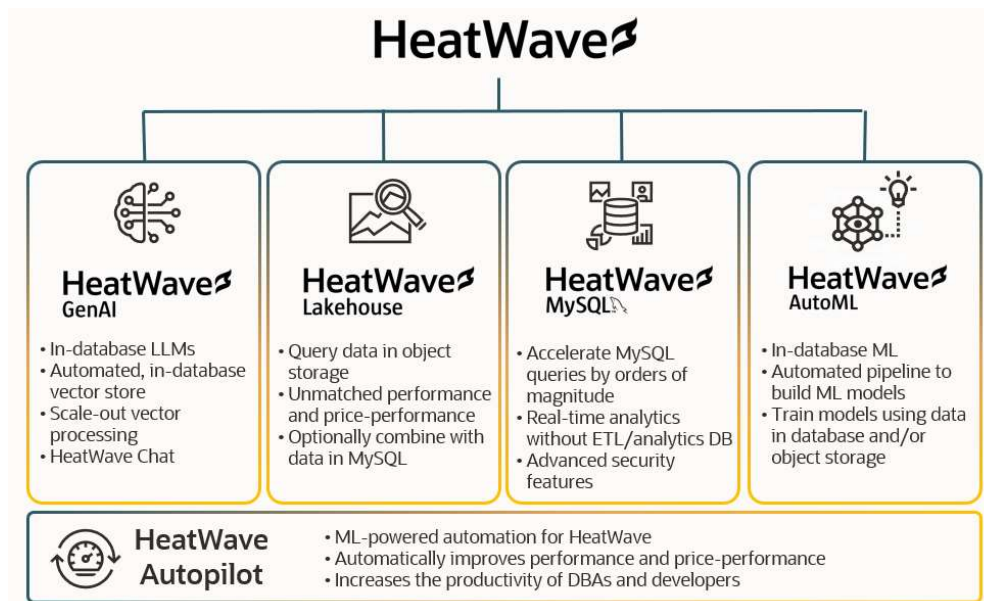
- **HeatWave GenAI** provides integrated, automated, and secure generative AI with in-database large language models (LLMs); an automated, in-database vector store; scale-out vector processing; and the ability to have contextual conversations in natural language—letting you take advantage of generative AI without AI expertise and data movement.
- **HeatWave Lakehouse** lets you query data in object storage in a variety of file formats such as CSV, Parquet, Avro, JSON, and exports from other databases with unmatched performance and price-performance, and optionally combine it with transactional data in MySQL Database to run analytics across all your data. Data in object storage is not copied to the MySQL Database since query processing is done entirely within the HeatWave engine, so you can take advantage of HeatWave Lakehouse for non-MySQL workloads as well as MySQL-compatible workloads.
- **HeatWave AutoML** lets you build, train, and explain machine learning models without ML expertise and data movement, using data stored either in MySQL Database or object storage. HeatWave AutoML automates the machine learning pipeline, including algorithm selection, intelligent data sampling for model training, feature selection, and hyperparameter optimization. It supports anomaly detection, forecasting, classification, regression, and recommender system tasks.

9. Available in multiple public clouds and your data center

You can deploy HeatWave MySQL natively on Oracle Cloud Infrastructure (OCI) and Amazon Web Service (AWS), and on Microsoft Azure via the Oracle interconnect for Azure. You can replicate data from on-premises OLTP applications to HeatWave MySQL to get near real-time analytics without ETL. You can also use HeatWave MySQL in your data center with OCI Dedicated Region.

10. HeatWave MySQL migration program

The migration program allows you to confidently migrate to HeatWave MySQL using a proven end-to-end approach. You get access to free step-by-step guides outlining best practices to migrate from various sources, technical training resources, as well as expert guidance from Oracle engineers and Oracle partners. You can even request free migration help from an Oracle MySQL expert.

Conclusion

Running MySQL Community Edition has helped countless organizations solve their immediate business needs. However, it also creates several challenges as described in this document. HeatWave MySQL helps you address those common challenges. You can reduce security risks, increase application performance and availability, and improve the productivity of developers and DBAs. HeatWave MySQL enables you to get real-time analytics on your transactional data—without the complexity, latency, risks, and cost of extract, transform, and load (ETL) duplication to a separate analytics database. You also get access, at no additional cost, to integrated capabilities allowing you to query data in object storage and to take advantage of Generative AI and machine learning without expertise or data movement. We would be happy to help you evaluate how you could benefit from HeatWave; don't hesitate to contact an Oracle representative or an Oracle partner.

Resources

- Learn more about HeatWave MySQL
- HeatWave MySQL migration program
- Request a free HeatWave MySQL workshop
- Try HeatWave MySQL for free

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