MySQL Database Service with HeatWave

Easy, secure, with real-time analytics

ORACLE

MySQL™

#1 Open Source Database in Oracle Cloud

Looking to deliver modern applications with high security and increased performance at lower costs?

MySQL Database Service delivers the world's most popular open source database on Oracle cloud at a fraction of the costs of other cloud vendors.

It offers unmatched performance by speeding up MySQL queries by 5400x.

MySQL Database Service is 100% developed, managed, and supported by the MySQL Team.

Combined with HeatWave, it scales to thousands of cores and is 6.8x faster than Amazon Redshift, at 1/2 of the cost.

Powered by Oracle Gen 2 Cloud Infrastructure, MySQL Database Service delivers a secure, cost-effective, and enterprise-grade database service, to help rapidly build innovative applications.

MySQL Database Service is easy to use, secure, and ready for real-time analytics.

Open Source in the Enterprise

The 2020 survey published in The State of Enterprise Open Source report[1] found that among developers and businesses:

- 95% considered enterprise open source important
- 86% associated open source with innovation
- 77% planned to increase their usage of open source

By 2022, according to Gartner's State of the Open-Source DBMS Market Research Report, more than 70% of new in-house applications will be developed on Open Source Database Management Systems (OSDBMS), and 89% of the surveyed organizations reported to already use an OSDBMS.

Open source technologies are often adopted to get applications into production faster. Projects are frequently unfunded or need instant IT approval. Projects start small and solve an immediate need, but over time many evolve into critical applications. Success with the initial use of MySQL generally translates into additional MySQL projects.

As organizations consolidate and standardize on a select few IT technologies, MySQL becomes a strategic part of their technology infrastructure.

[1] Red Hat, February 2020: The State of Enterprise Open Source
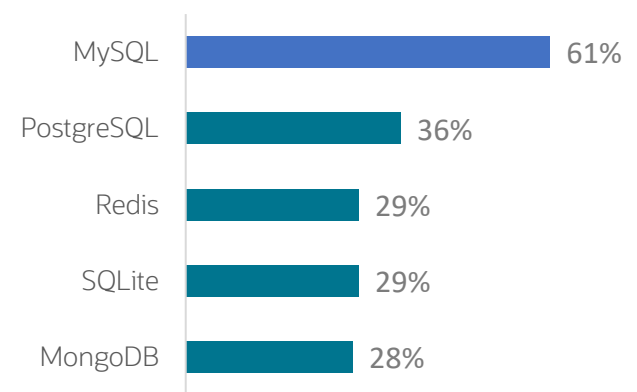
The #1 Choice for Developers

Surveys from Stack Overflow and JetBrains rank MySQL as the most popular database among developers. Its clear leadership position comes with an entire ecosystem of tools and applications that support MySQL, as well as numerous developers and DBAs with an extensive MySQL experience and skills.

Most popular databases (Stack Overflow)[2]

Database	%
MySQL	50%
PostgreSQL	40%
SQLite	32%
MongoDB	27%
MS SQL Server	26%
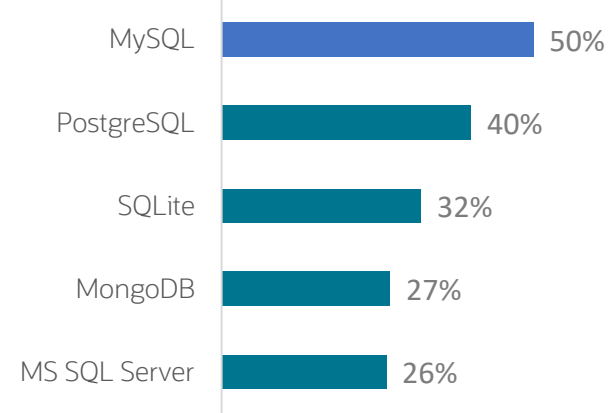
Which databases have you used in the last 12 months? (JetBrains)[3]

Database	%
MySQL	61%
PostgreSQL	36%
Redis	29%
SQLite	29%
MongoDB	28%

[2] Stack Overflow, Stackoverflow survey 2021
[3] JetBrains, The State of Developer Ecosystem 2021

Innovative Enterprises Across Many Industries Run MySQL

Social	eCommerce	Tech	Finance	Manufacturing
facebook	Booking.com	APPDYNAMICS part of Cisco	Bank of America	TESLA
twitter	NETFLIX	GitHub	J.P.Morgan	VW
Linked in	UBER	HubSpot	citi	TOYOTA
WeChat	airbnb	zendesk	Fidelity INVESTMENTS	CAT
Pinterest	淘宝网 Taobao.com	intuit mint	VISA	
	阿里巴巴 Alibaba.com	New Relic	CA	

Growth of Cloud Database Market

DBMS Market Size
$46B

Fastest Growth in a Decade
18%

DBMS Cloud Services
$10B

Cloud Growth
68%
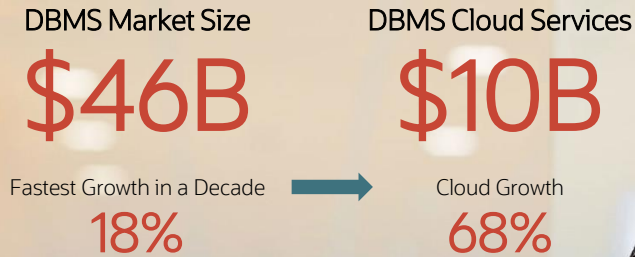
The move to the cloud is the most significant technology shift that organizations will face over the next decade.

Gartner projects the cloud services industry to grow exponentially by 2022.[4] More than $1.3 trillion in IT spending will be directly or indirectly affected by the shift to the cloud. In fact, the market size and growth of the cloud services market is nearly 3x the growth of overall IT services.

For the DBMS market, similar growth rates and shifts in spending are also taking place. Gartner states in its report The Future of Database Management Systems Is Cloud[5] that:

- The overall DBMS Market grew to $46B in 2018. Its 18% increase from 2017 to 2018 represents the fastest growth in a decade.

- $10B of the DBMS market is from DBMS Cloud Services, which accounted for 68% of that growth.

[4] Gartner, October 2019: State of the Open-Source DBMS Market
[5] Gartner, June 2019: The Future of Database Management Systems Is Cloud

Top Investment Priorities for CIOs

1. Data Analytics
2. Security Management
3. Enterprise Applications (cloud-based)
4. Customer Experience Technologies
5. Machine Learning/AI
6. Collaboration Tools
7. Cloud Migrations
8. Application Modernization
9. Infrastructure Consolidation
10. Network Modernization

Data: Your Most Valuable Asset

In today's digital world, data is your organization's most valuable asset.

Data is about your customers, employees, and partners. Data is about your IP, mergers and acquisitions, strategy, and sales figures.

The data might be generated by your organization or it might have been entrusted to you, such as PII (Personally Identifiable Information), PCI (Payment Card), or PHI (Personal Health Information) data.

Your data presents a great value for thieves, state-sponsored criminals, and malicious insiders who will do anything to obtain it.

Recent Data Breach Statistics

7.9 billion
records stolen in 2019, up by 33%

1.76 billion
records leaked in January 2020

48%
of breaches are malicious attacks

$3.86 million
average cost of a data breach

7 out of 10
businesses are not prepared to react

$2 trillion
global cost of cybercrime in 2020

Symantec 2019 Internet Security Thread Report, TheBestVPN Cyber Security Statistics 2020

Security and Compliance

Always Up-to-Date with the Latest Security Fixes.
Get the latest MySQL security updates from the MySQL Team to limit your exposure to security vulnerabilities.

Advanced Security Features to Help Meet Regulatory Requirements. Access built-in MySQL security features to comply with governments' data privacy laws and regulatory requirements for GDPR, HIPAA, etc.

Native to Oracle Gen 2 Cloud

MySQL Database Service is designed to work natively with Oracle Gen 2 Cloud.

Leverage the only zero-trust architecture where tenants are isolated from one another. Its core infrastructure includes total encryption, least-privilege identity, access management as well as granular resource and network control.

MySQL Database Service is tightly integrated with Oracle Technologies.

Fully integrated with Oracle technologies such as Oracle Golden Gate, Oracle Data Integrator, Oracle Audit Vault, Oracle Container Engine for Kubernetes, Oracle Analytics Cloud, and more.

A Fully Managed Service

MySQL Database Service is a fully managed service, running on Oracle Gen 2 Cloud Infrastructure. It enables you to:

- Instantly provision MySQL instances and connect to a production ready, pre-configured MySQL database.

- Automate database specific tasks such as configuration, security patching, backup, and monitoring.

- Choose from multiple compute shapes, depending on your application and capacity requirements.

- Provision fast, reliable, and secure cloud storage for all enterprise workloads.

- Set up fast, predictable networking with end-to-end network security, including a Virtual Cloud Network (VCN).

- Monitor the health of your resources, optimize the performance of your applications, and respond to anomalies in real time.

- Access dozens of additional Oracle Cloud Services for a faster transition to the cloud.

- Free up time of developers, DBAs, and DevOps to focus on value added tasks that are core to your business.
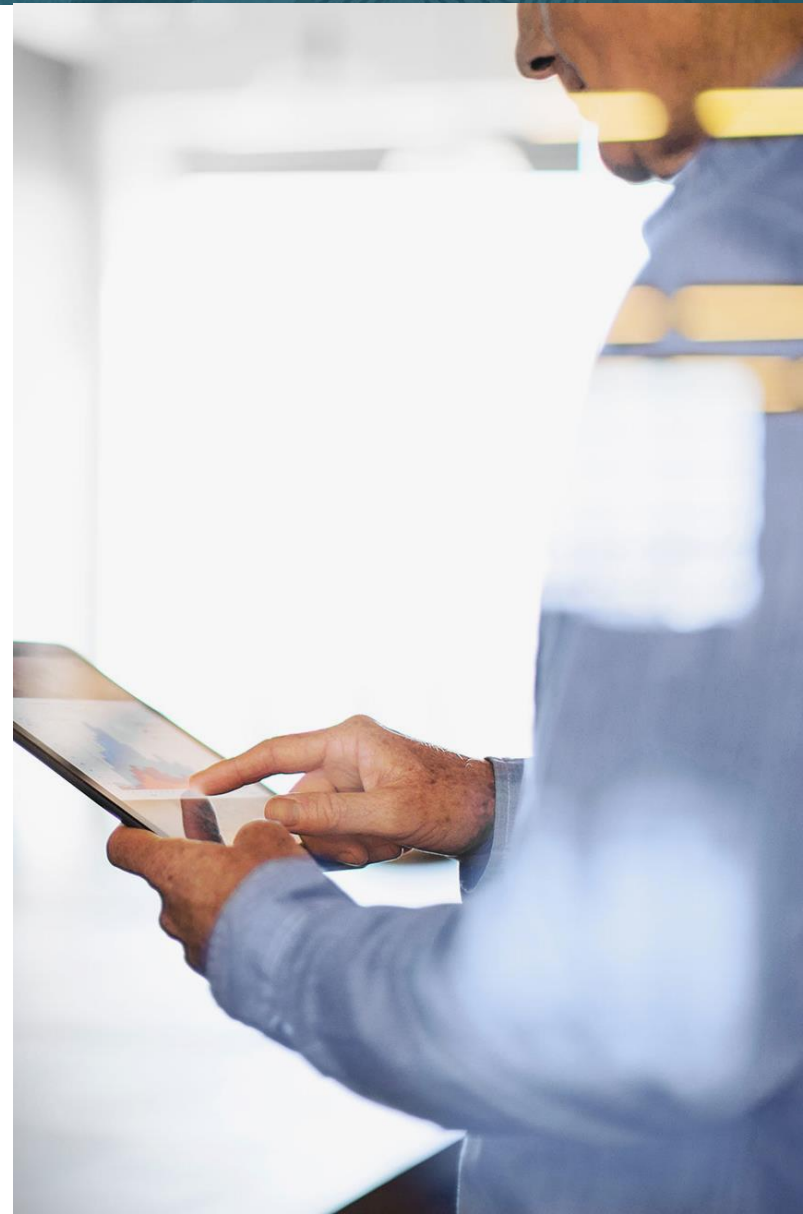
100% Developed, Managed, and Supported by Oracle

● fully managed

● manual

	Automation	MySQL On-Premises	MySQL Database Service
Database	High Availability	●	●
	Backup	●	●
	Security Patch & Upgrade	●	●
	Provision & Configure	●	●
OS	OS Security Patch & Upgrade	●	●
	OS Installation	●	●
Server	Hardware Purchase & Maintenance	●	●
Storage	Storage Purchase & Maintenance	●	●
Data Center	Rack & Space	●	●
	Power, HVAC, Networking	●	●

Native High Availability
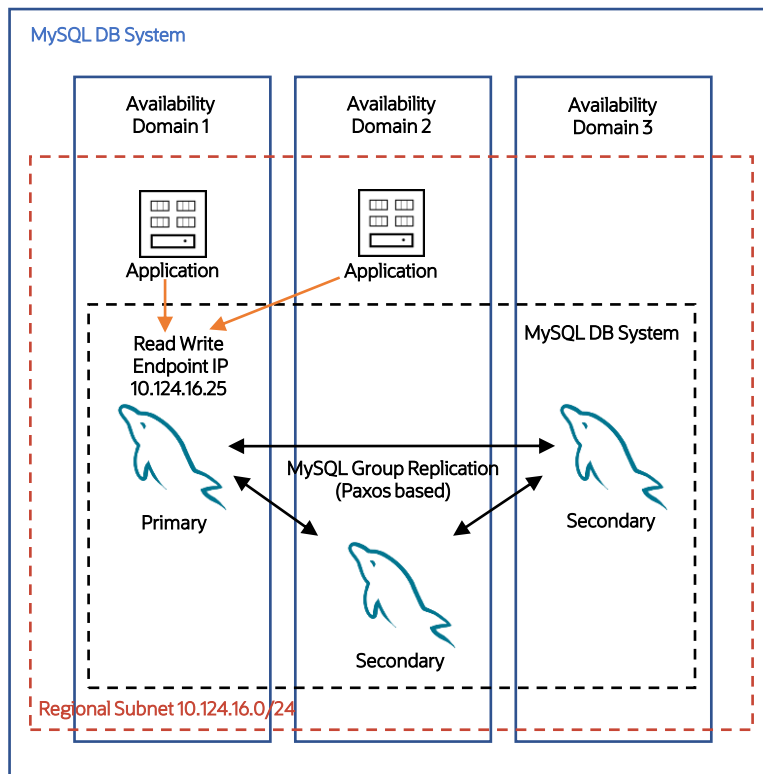
MySQL Database Service uses native MySQL Group Replication for High Availability

Increased uptime

To achieve high availability, the database system must be resilient to many types of failures such as server, network, power, or entire data center. Companies can protect their data and ensure business continuity using native MySQL HA technologies with automatic failover. For ultimate High Availability, MySQL Database Service on OCI optimizes the placement of database instances in different Availability and Fault Domains.

Zero data loss

Built on native MySQL Group Replication, MySQL Database Service HA includes 3 MySQL instances provisioned and spread across different physical locations. One instance is the "primary" instance, accepting the database traffic, while the other "secondary" instances stand ready to take over the database traffic in case of failure, **without any data loss**.

Larry Ellison Introduces MySQL with HeatWave

> " *The world's two most popular databases are the Oracle Autonomous Database and Oracle MySQL," said Oracle Chairman and CTO, Larry Ellison. "The Oracle Database once again delivered solid revenue growth in FY21. And while our Oracle Database business as measured by revenue currently dwarfs our MySQL database business—that is about to change because the latest version of Oracle MySQL has been upgraded to include a revolutionary new ultra-high-performance parallel processing query engine called HeatWave.*
>
> *Independent analysts have tested and confirmed that Oracle MySQL with HeatWave runs 10 to 100 times faster than Amazon's version of MySQL called Aurora. This technological breakthrough is causing several of Amazon's customers to start moving their Aurora workloads to Oracle MySQL. And industry analysts are telling us they are seeing a 10x increase in Oracle Cloud Infrastructure customer inquiries.*
>
> *Both the Oracle Autonomous Database and Oracle MySQL with HeatWave technology have captured the technology high-ground in the cloud database business—and that bodes well for the future of the Oracle Cloud."*

Larry Ellison, Chairman, CTO, Oracle
December 11, 2020

Single MySQL Database for OLTP and OLAP

Customers can run both OLTP and OLAP workloads in MySQL, without the need to move data out of MySQL databases (No ETL), and without requiring any proprietary syntax or change to their applications.

OLTP Applications

- Social
- eCommerce
- FinTech
- SaaS

Oracle MySQL Service

Automatic, Real-time Data Propagation

OLTP — InnoDB

OLAP — HeatWave

OLAP BI & Analytics

- ORACLE Analytics Cloud
- tableau
- Qlik
- looker
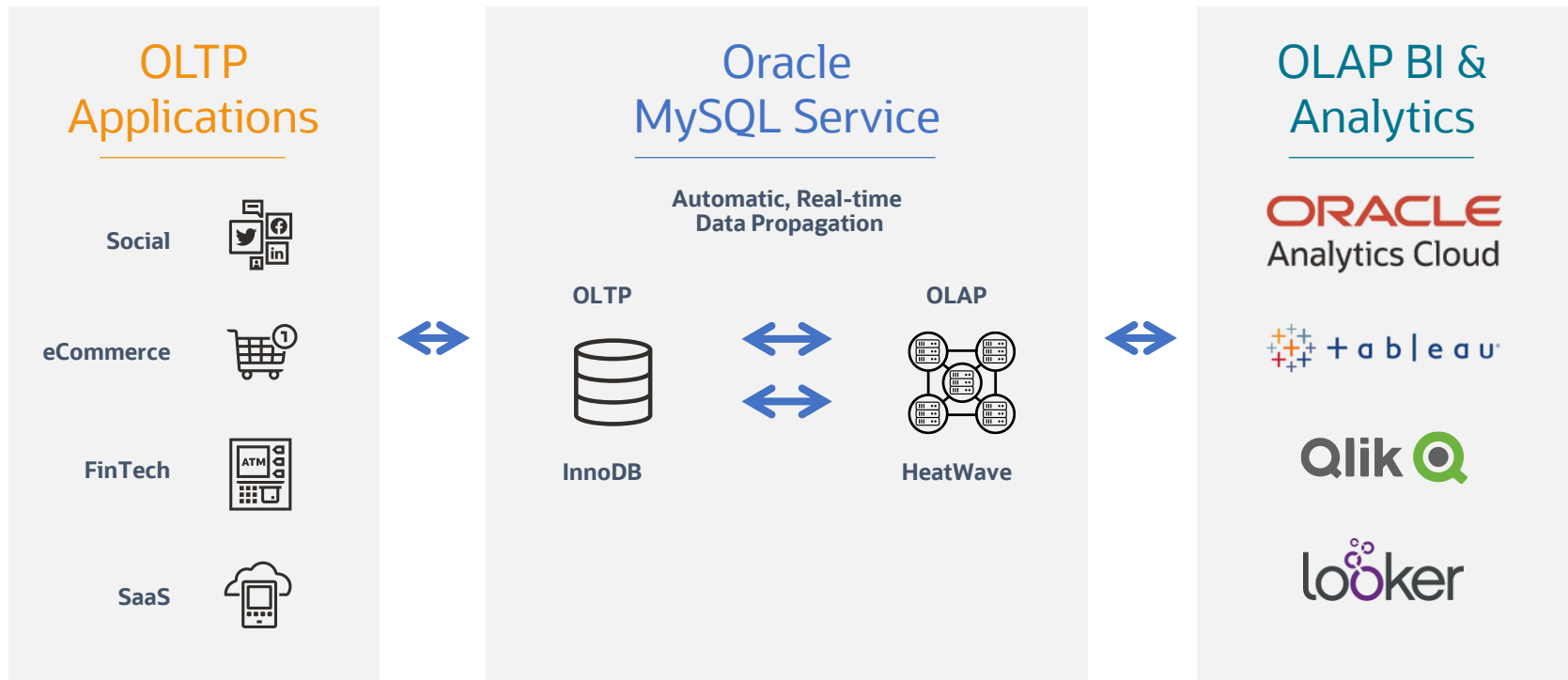
MySQL Autopilot: Machine Learning Based Automation

Auto Provisioning

System Setup

Data Load

MySQL Autopilot
Data driven
Query driven
ML Automation

Failure Handling

Query Execution

Auto Parallel Loading
Auto Data Placement
Auto Encoding

Auto Error Recovery

Auto Scheduling
Auto Change Propagation
Auto Query Time Estimation
Auto Query Plan Improvement
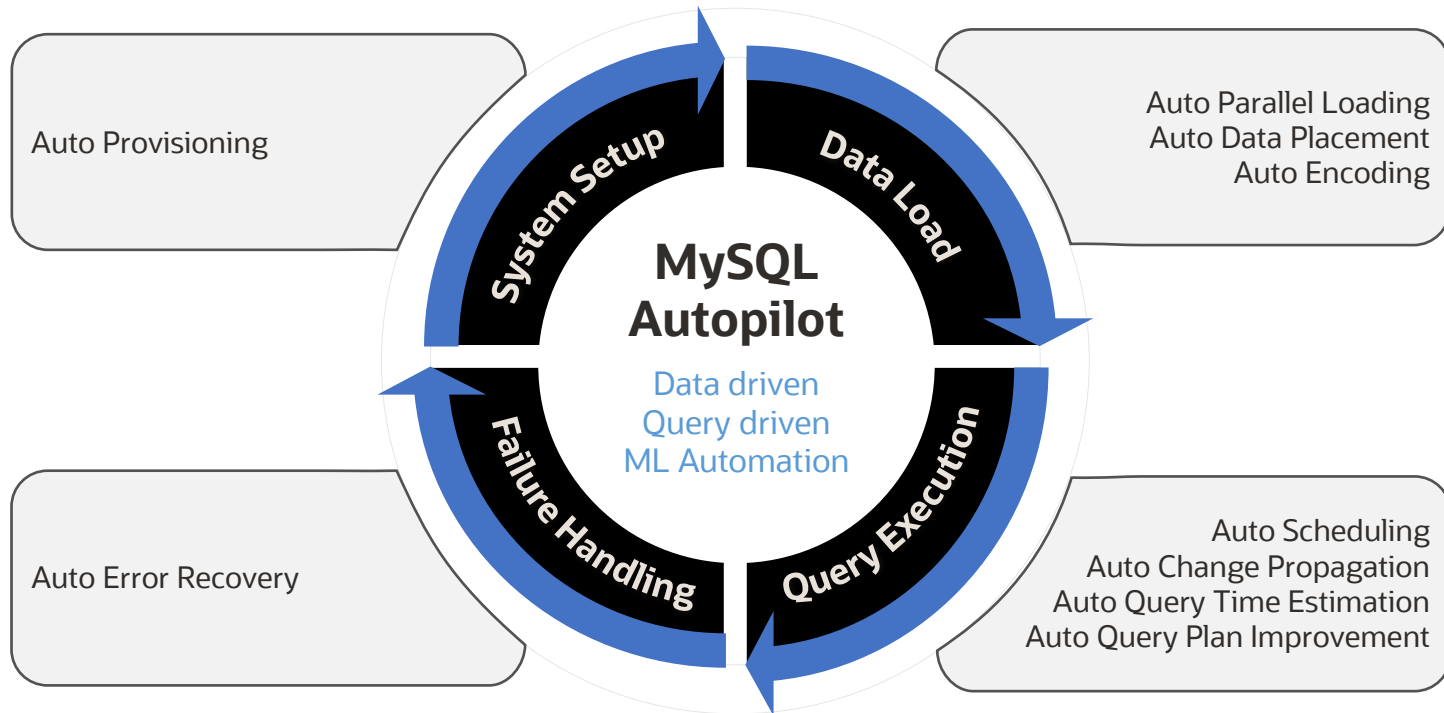
MySQL Autopilot uses advanced machine learning techniques to automate HeatWave which make it easier to use and further improves performance and scalability. No other cloud vendor provides such advanced automation capabilities for their database offerings.

" HeatWave is **10 times faster** than the analytics service of another major cloud vendor. Now there is **no need for ETL**. Compared to MySQL on-premises, HeatWave is **4,000 times faster**."

Tetsuro Ikeda

Manager of Cloud IT Architecture
Service Department
SCSK Corporation

> **"** We successfully migrated our **6TB database** and in-house digital marketing and media management applications from Amazon Aurora to MySQL HeatWave on OCI that **reduced our costs by 60% and improved performance for complex queries by more than 1000x** and overall workloads improved 85%. In addition, we **didn't have to make any changes to our application**, automatic recovery has minimized downtime, and **we can now scale to thousands of cores** because we have an ever-growing need."

Amit Palshikar

CTO
Red3i

ANALYTICS DASHBOARD

Last Updated: 3 min ago

92%
Data Availability

Evolution	Metric	Actual vs Target	Actual	Target
	Revenue		$3.4M	82.0%
	Profit		$1.2M	108.7%
	Avg. Order Size		$850.3	71.0%
	On Time Delivery		96.0%	96.0%
	New Customers		15432	145.0%
	Cust. Satisfaction		98.3%	109
	Market Share		46.9%	8

Products positioning

Sales per countries

Top 10 products

430

TETRIS·CO

66

MySQL HeatWave reduced our cloud database costs by 50 percent as compared to using a combination of Amazon Aurora and Redshift. We are no longer moving data around so now we have blazing fast, real-real-time insights with no effort. More importantly, scalability has made our expansion plan possible, allowing us to onboard more data and new clients without impact to costs. It's a dream come true."

Pablo Lemos

Co-founder
Tetris.co

FANCOM:

> " We found MySQL HeatWave **improved performance by 10X and significantly dropped our costs after migrating from Amazon Aurora**. We also did not have to modify our application for a great experience."

Kanami Suzuki

Developer
FANCOMI

MySQL Database Service Speeds up Video Gaming

" We ran the analytic workload of the Social Game Infrastructure group with HeatWave without requiring ETL or changing our application. HeatWave is up to 500x faster than our current on-premises MySQL 5.7 instance.**"**

SQUARE ENIX

Masashi Hamahira

Social Game Infrastructure Group
SQUARE ENIX CO., LTD.

Tamara Migrated to MySQL Database Service for Speed and Cost Saving

> **66**
>
> We recently migrated our production workload from another cloud solution to MySQL HeatWave. Doing so reduced our cost by 3x and it also significantly accelerated many of our queries which were taking a long time before. Given the speedup we are observing with HeatWave, we expect that we will be able to enhance our application by writing more complex queries which do not execute in a reasonable amount of time with the other cloud solution."

Chien Hoang

Director of Engineering
Tamara

MySQL with HeatWave vs. Amazon RDS

4TB TPCH

5,400x faster

11 hours

8 seconds

Time (seconds)

40,000

30,000

20,000

10,000

0

GeoMean of Query Run Time

2/3 the cost

$54,393

$34,073

60,000

45,000

30,000

15,000

0

Annual Cost
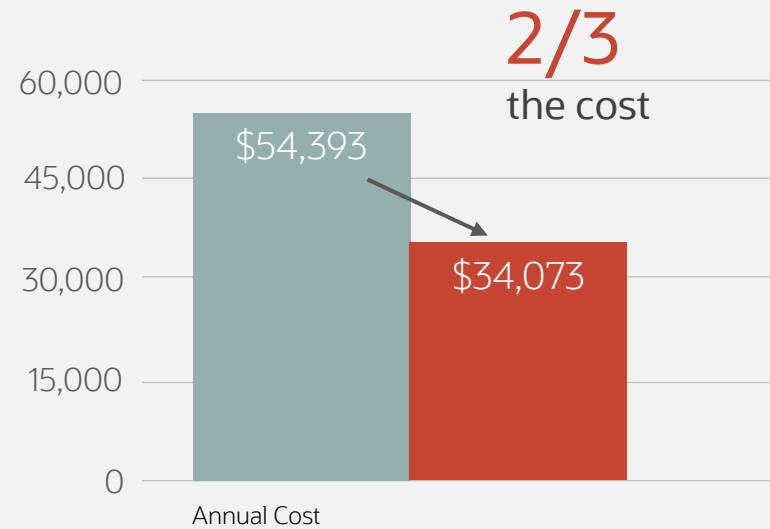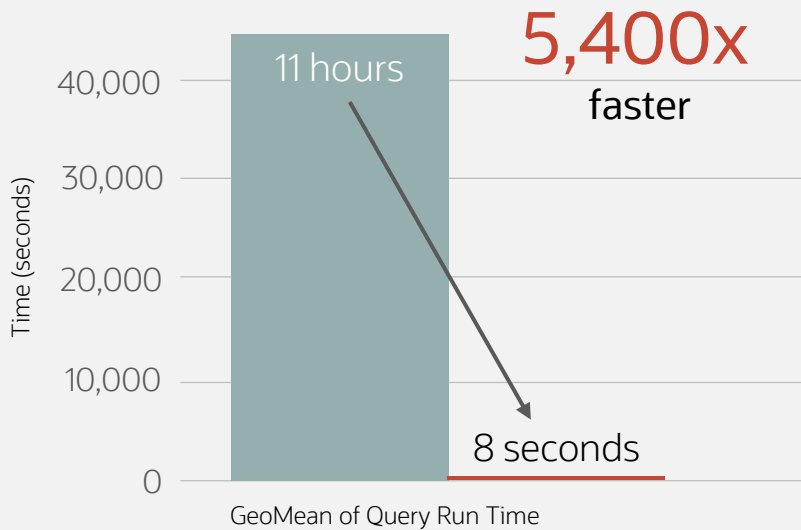
■ RDS (db.r5.24xlarge)

■ MySQL with HeatWave (10 E3 nodes)

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

MySQL with HeatWave vs. Amazon Aurora

4TB TPCH

>1,400x faster

Time (seconds)	
8,000	2.5 hours
6,000	
4,000	
2,000	
0	6.3 seconds

GeoMean of Query Run Time

1/2 the cost

60.000	$67,336
45.000	
30.000	$34,073
15.000	
0	

Annual Cost

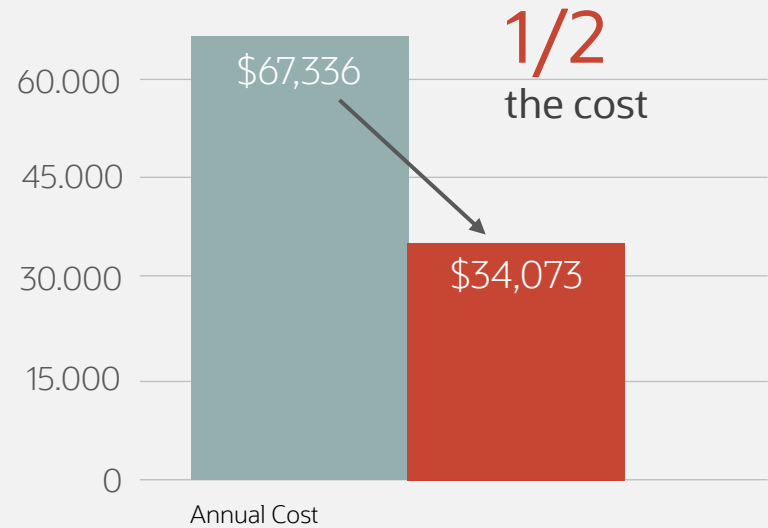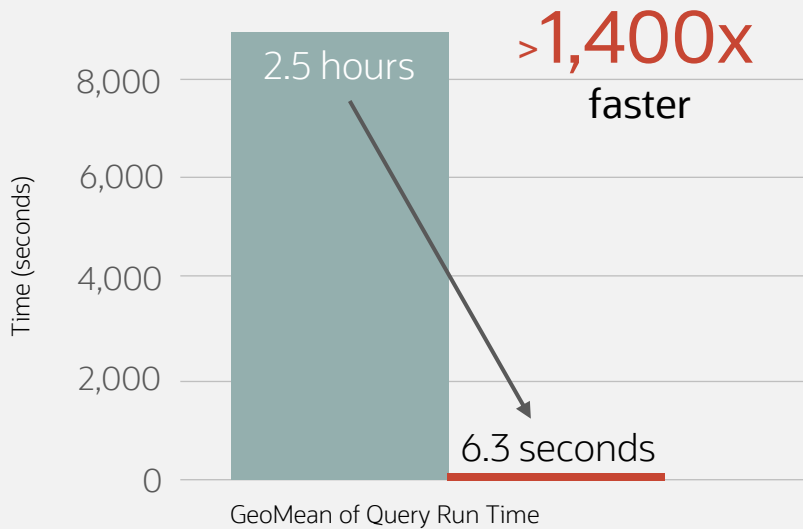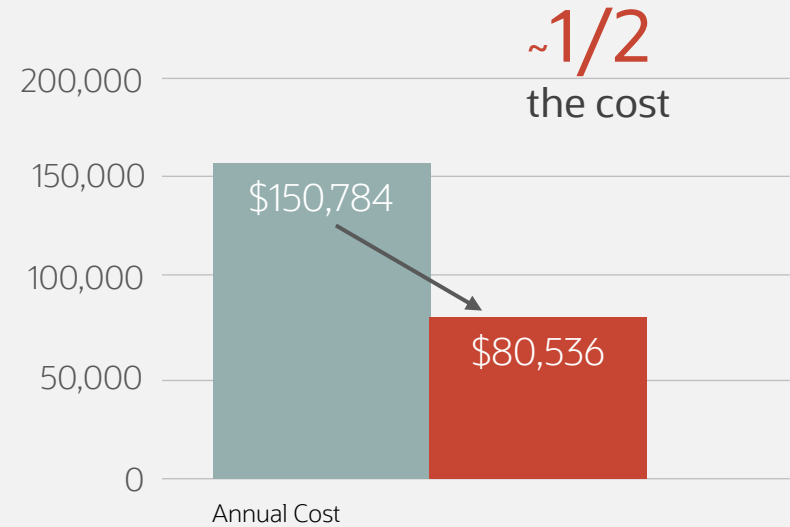■ Aurora (db.r5.24xlarge)

■ MySQL with HeatWave (10 E3 nodes)

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

MySQL with HeatWave vs. Amazon Redshift AQUA

10TB TPCH

>6.8x faster

~1/2 the cost

Redshift time: 2,380 seconds
MySQL with HeatWave time: 346 seconds

Redshift Annual Cost: $150,784
MySQL with HeatWave Annual Cost: $80,536

Time (seconds) axis: 0, 500, 1,000, 1,500, 2,000

GeoMean of Query Run Time

Cost axis: 0, 50,000, 100,000, 150,000, 200,000

Annual Cost

■ Redshift (8 nodes of RA3.4xlarge)
■ MySQL with HeatWave (25 E3 nodes)

* Benchmark queries are derived from the TPC-H benchmark, but results are not comparable to published TPC-H benchmark results since they do not comply with the TPC-H specification.
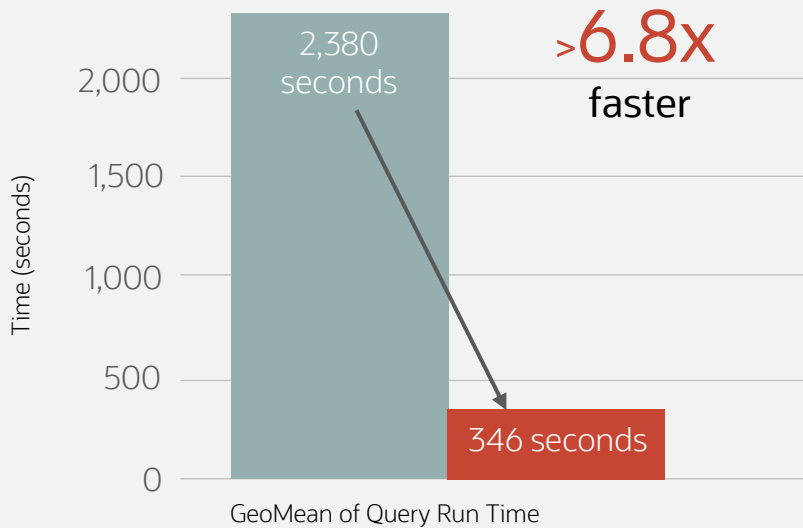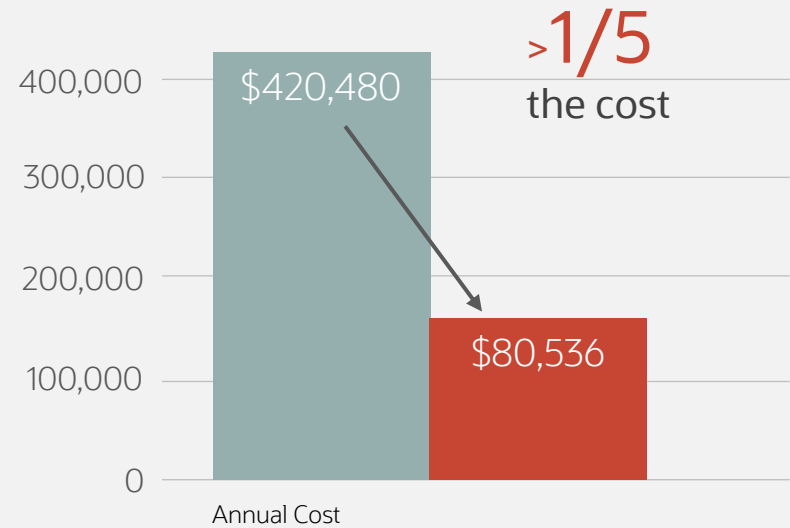
MySQL with HeatWave vs. Snowflake

10TB TPCH

GeoMean of Query Run Time
- Snowflake (Xlarge Cluster): 2,350 seconds
- MySQL with HeatWave (25 E3 nodes): 346 seconds
- >6.8x faster

Annual Cost
- Snowflake (Xlarge Cluster): $420,480
- MySQL with HeatWave (25 E3 nodes): $80,536
- >1/5 the cost

Legend:
- ■ Snowflake (Xlarge Cluster)
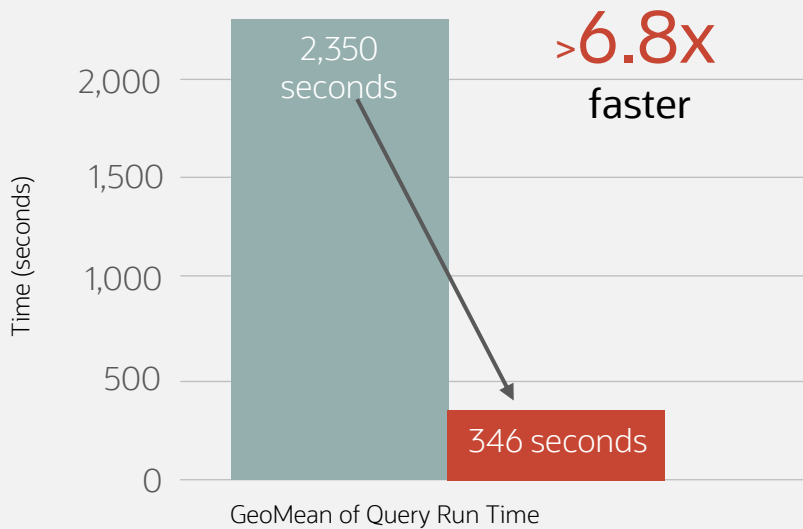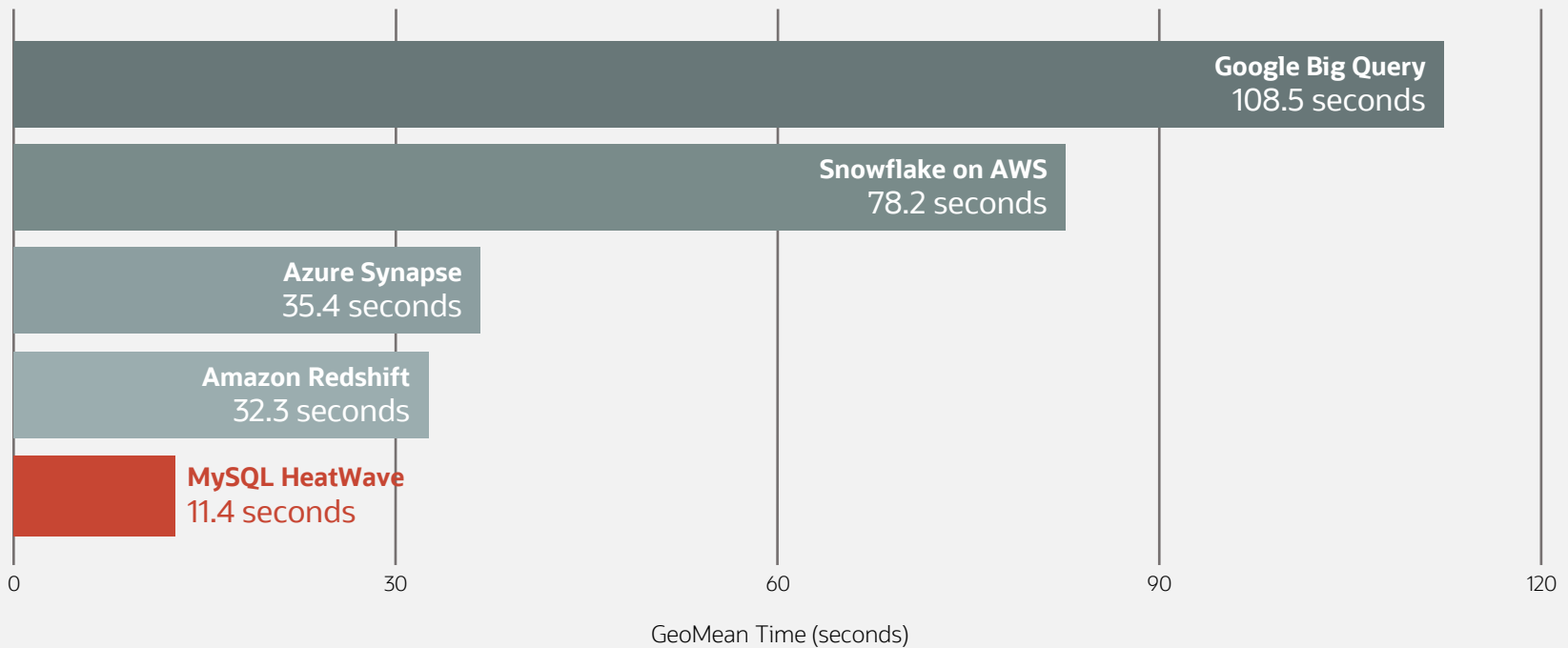- ■ MySQL with HeatWave (25 E3 nodes)

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

Performance Comparison

PERFORMANCE BENCHMARK [30 TB TPCH]

HeatWave is faster than all competitive database services.

Google Big Query
108.5 seconds

Snowflake on AWS
78.2 seconds

Azure Synapse
35.4 seconds

Amazon Redshift
32.3 seconds

MySQL HeatWave
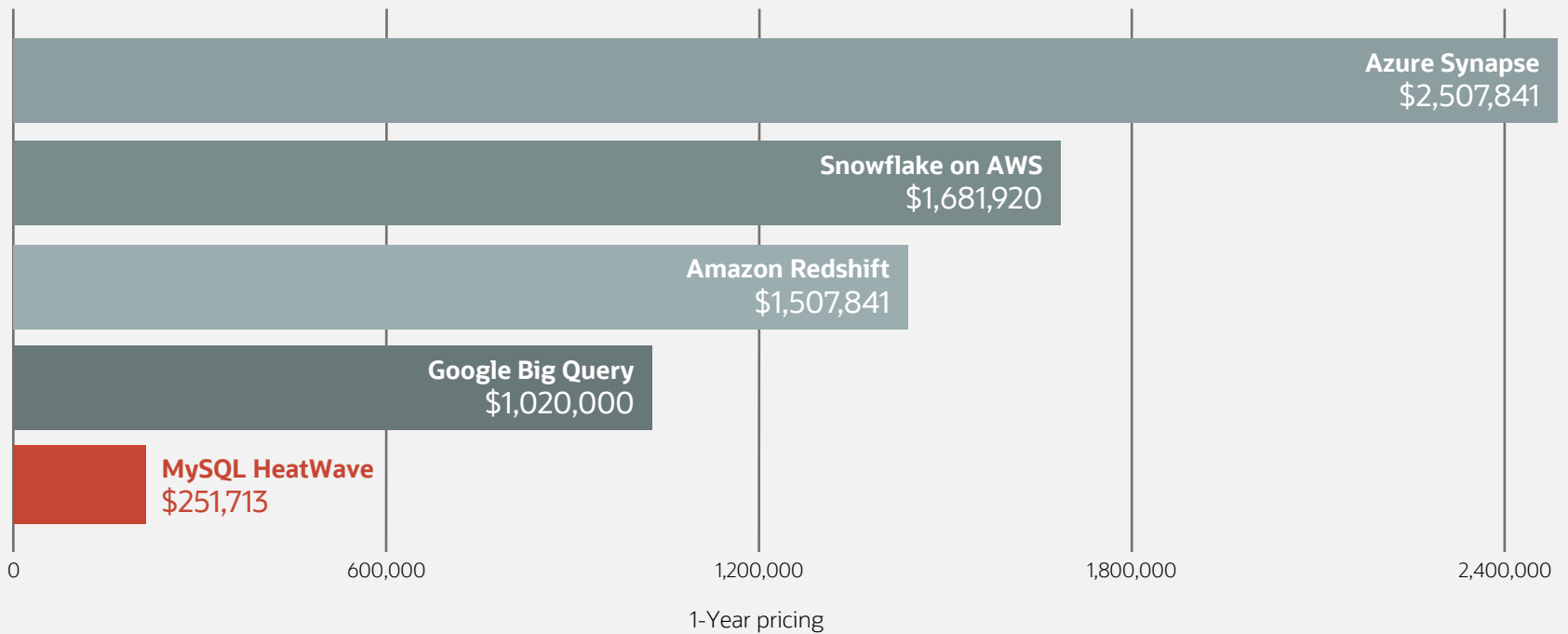11.4 seconds

GeoMean Time (seconds)

3rd party numbers derived from GigaOm report of October 2020.
* Benchmark queries are derived from the TPC-H benchmark, but results are not comparable to published TPC-H benchmark results since they do not comply with the TPC-H specification.

Price Comparison

PRICE BENCHMARK [30 TB TPCH]

HeatWave is far better priced than all competitive database services.

Azure Synapse
$2,507,841

Snowflake on AWS
$1,681,920

Amazon Redshift
$1,507,841

Google Big Query
$1,020,000

MySQL HeatWave
$251,713

0   600,000   1,200,000   1,800,000   2,400,000

1-Year pricing

3rd party numbers derived from GigaOm report of October 2020.
Using PAYG pricing for Snowflake. Other prices are based on 1-year pricing.
* Benchmark queries are derived from the TPC-H benchmark, but results are not comparable to published TPC-H benchmark results since they do not comply with the TPC-H specification.

Benefits Across the Organization

Developer

- Provision database instances in minutes to get apps into production faster

- Focus on development, not infrastructure or database administration

- Get the latest MySQL features to develop modern applications and scale these applications according to your needs

DBA

- Improve productivity with a fully managed database cloud service

- Get the latest updates, security fixes, and features from the MySQL Team

- Manage and monitor the entire environment using a single pane of glass

VP of IT

- Reduce database total cost of ownership by 3x with MySQL Database Service

- Make real-time decisions with HeatWave

- Protect data and help ensure regulatory compliance with advanced security features

Ready for the Enterprise

Move workloads to the cloud. Move MySQL workloads to the cloud to not only free resources, but also improve security, so you can focus on your core business.

Develop new cloud native applications. Develop modern, cloud-native, MySQL-based applications fast while improving business agility.

Deliver real-time data analytics. Make faster business decisions. HeatWave accelerates MySQL query performance by 5400x. It uniquely eliminates the complexity and risk of having to use separate databases for OLTP and OLAP workloads.

Leverage hybrid cloud deployment flexibility. MySQL Database Service is 100% compatible with on-premises MySQL, giving you complete flexibility between on-premises, cloud, or a hybrid model.

Power SaaS applications. ISVs can scale their SaaS applications globally by leveraging Oracle Cloud Infrastructure and MySQL Database Service.

100% Supported by the MySQL Team

Get the highest level of MySQL expertise

MySQL Support together with Oracle Premier Support and the industry's most experienced MySQL Engineers provide a unified support solution for both cloud infrastructure and MySQL. It includes:

- 24/7 production support in 29 languages
- Unlimited support incidents
- Knowledge base and maintenance releases
- Bug fixes, patches, and updates
- MySQL consultative support

No other cloud vendor can deliver such comprehensive support for the MySQL database.

Conclusion

You already know that MySQL powers the leading eCommerce and SaaS companies. You also know that MySQL has a well-earned reputation for being easy to use, highly scalable, and cost-effective.

You've experienced the pain and cost of managing your database instances on your own infrastructure. Data security is very important to you, so you have decided to move your applications to a cloud model with a fully managed and secure service.

Next, you have to choose the right cloud platform for your business.

Unlike proprietary forks of MySQL available in other cloud services, Oracle MySQL Database Service is the only cloud service that is 100% compatible with on-premises MySQL for a seamless transition to cloud and hybrid deployments.

It is the only cloud service 100% developed, managed, and supported by the MySQL Team.

HeatWave enables you to run both OLTP and OLAP workloads in MySQL with no ETL. There is no need to move data out of MySQL, no proprietary syntax, and no change to the applications.

In addition, the Oracle Gen 2 Cloud infrastructure delivers a highly secure and integrated cloud environment.

The very competitively priced MySQL Database Service with HeatWave on Oracle Gen 2 Cloud will enable your business to easily deploy modern applications globally with a secure, managed, and supported cloud service from the MySQL Team at a fraction of the cost of Amazon RDS/Redshift/Aurora and Snowflake.

Start using it now!

Start Now

Connect with us

MySQL