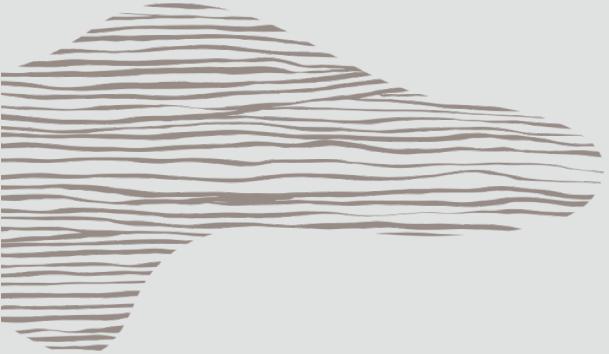


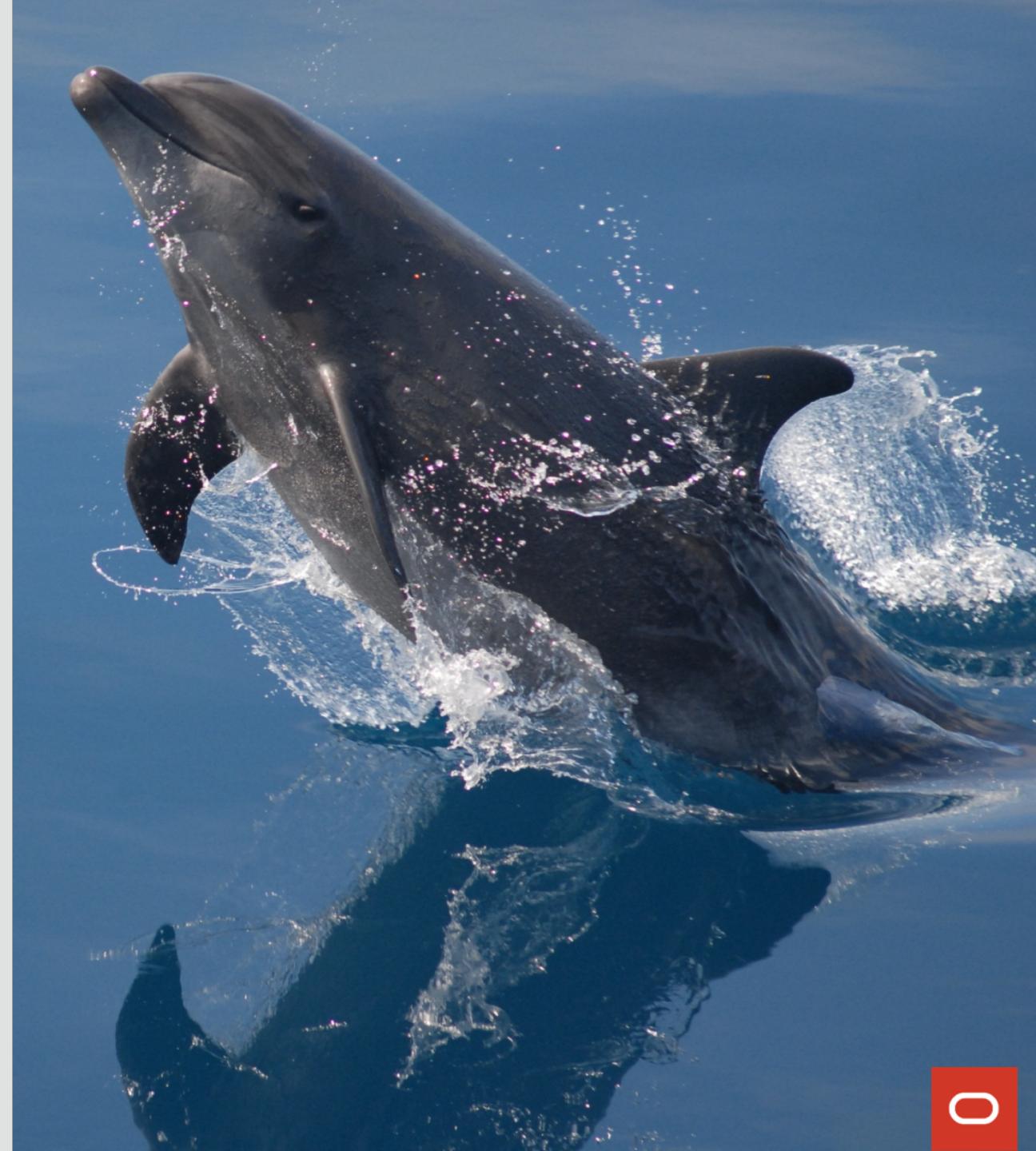
ORACLE



State of the Dolphin

Highlights of MySQL 8.0 technology updates

Hananto Wicaksono
Principal Solutions Engineer, Oracle
Hananto.Wicaksono@oracle.com



Safe harbor statement

The following is intended to outline our general product direction. It is intended for information purposes only, and may not be incorporated into any contract. It is not a commitment to deliver any material, code, or functionality, and should not be relied upon in making purchasing decisions. The development, release, timing, and pricing of any features or functionality described for Oracle's products may change and remains at the sole discretion of Oracle Corporation.

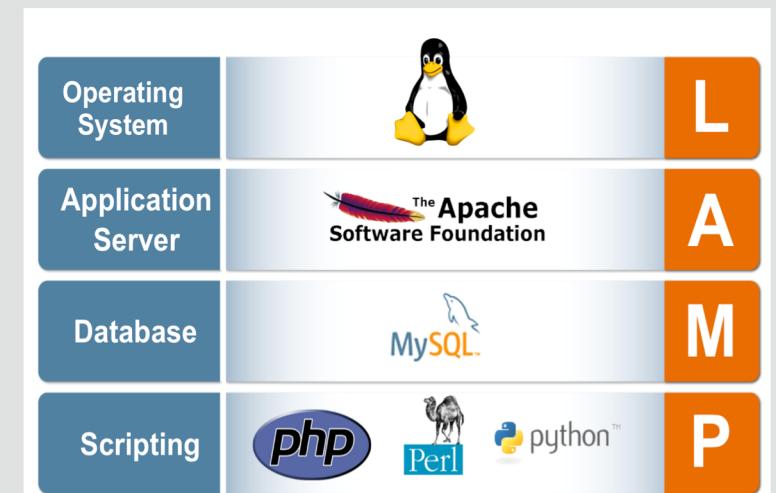




The world's most popular open source database

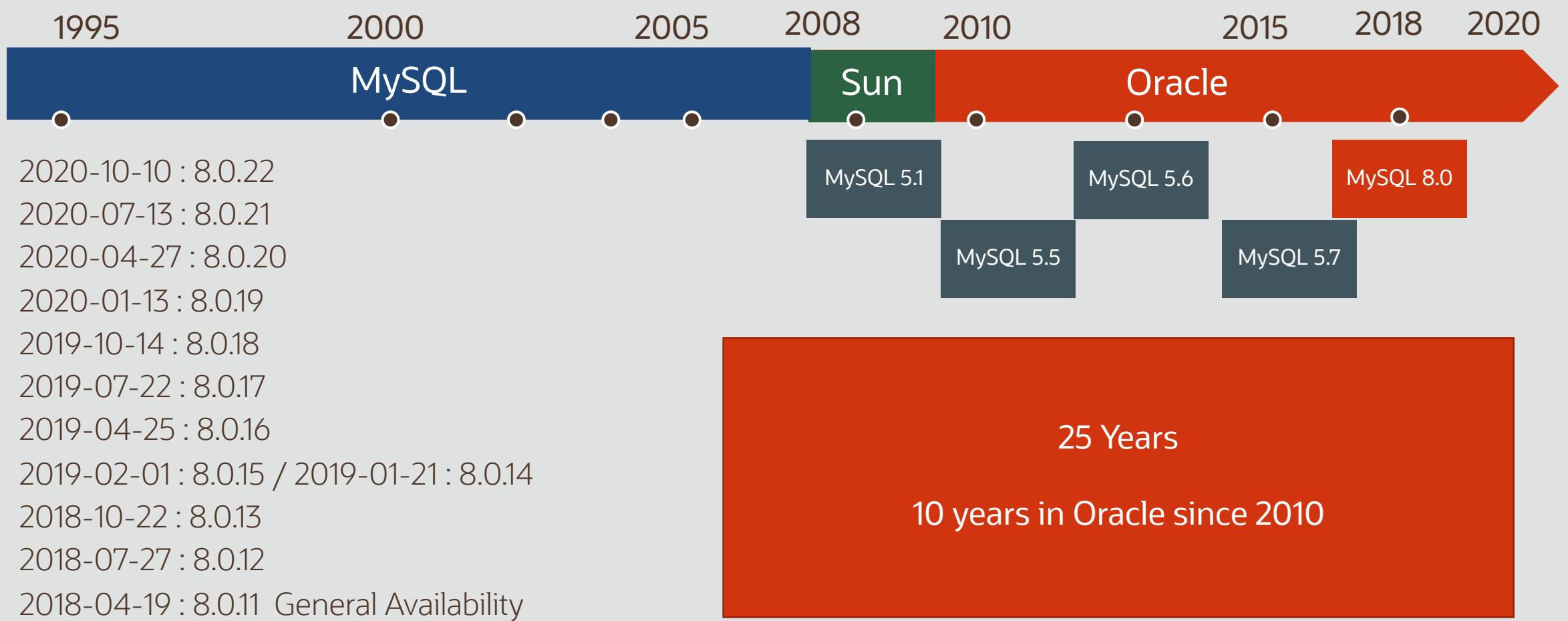
About MySQL

- Most popular open source relational database *
 - Over **15 Millions** of active installations
 - Over **65,000** downloads each day
- Part of the open source **LAMP** stack
 - Leading database for web and cloud applications
- Easy, Flexible, Stable
- Reliable, Performance, Scalable



* Source: <http://db-engines.com/en/ranking>

The Latest Release : MySQL 8.0.22



DB-Engines 2020

Database Ranking

DB-ENGINES

360 systems in ranking, November 2020

Rank			DBMS	Database Model	Score		
Nov 2020	Oct 2020	Nov 2019			Nov 2020	Oct 2020	Nov 2019
1.	1.	1.	Oracle 	Relational, Multi-model 	1345.00	-23.77	+8.93
2.	2.	2.	MySQL 	Relational, Multi-model 	1241.64	-14.74	-24.64
3.	3.	3.	Microsoft SQL Server 	Relational, Multi-model 	1037.64	-5.48	-44.27
4.	4.	4.	PostgreSQL 	Relational, Multi-model 	555.06	+12.66	+63.99
5.	5.	5.	MongoDB 	Document, Multi-model 	453.83	+5.81	+40.64

MySQL is the 2nd most popular database
#1 most popular Open Source database

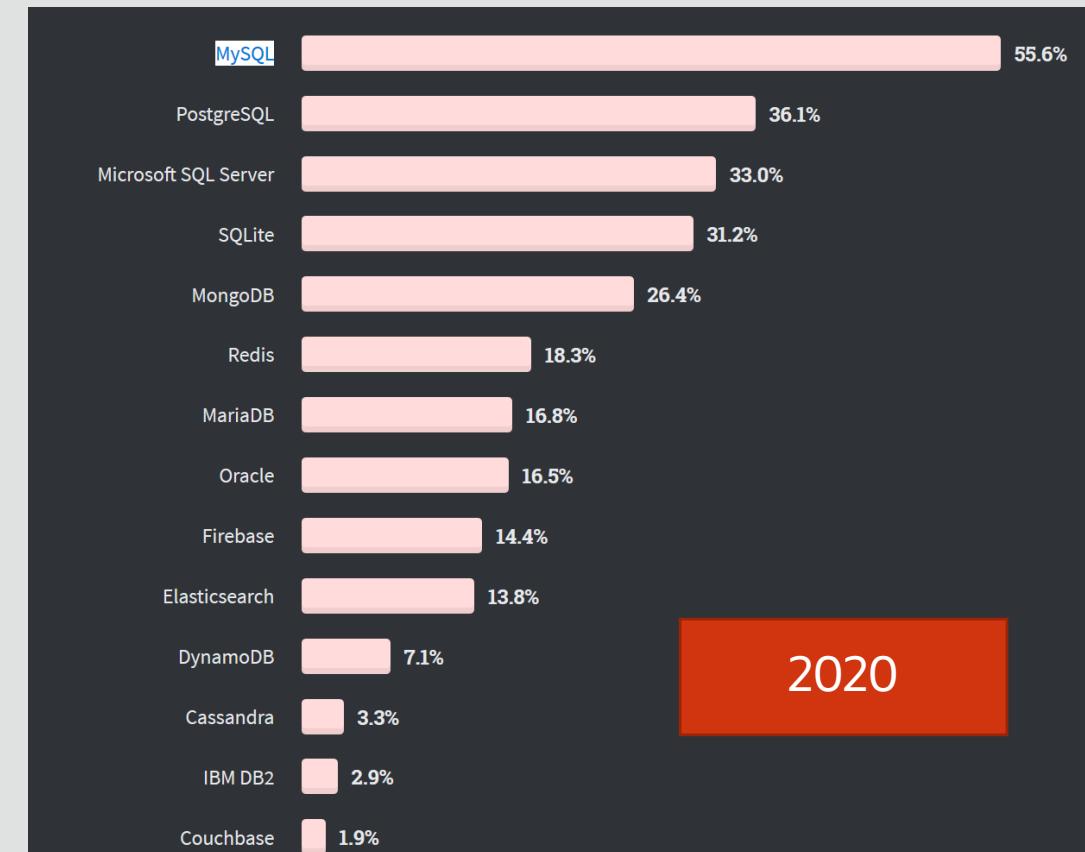
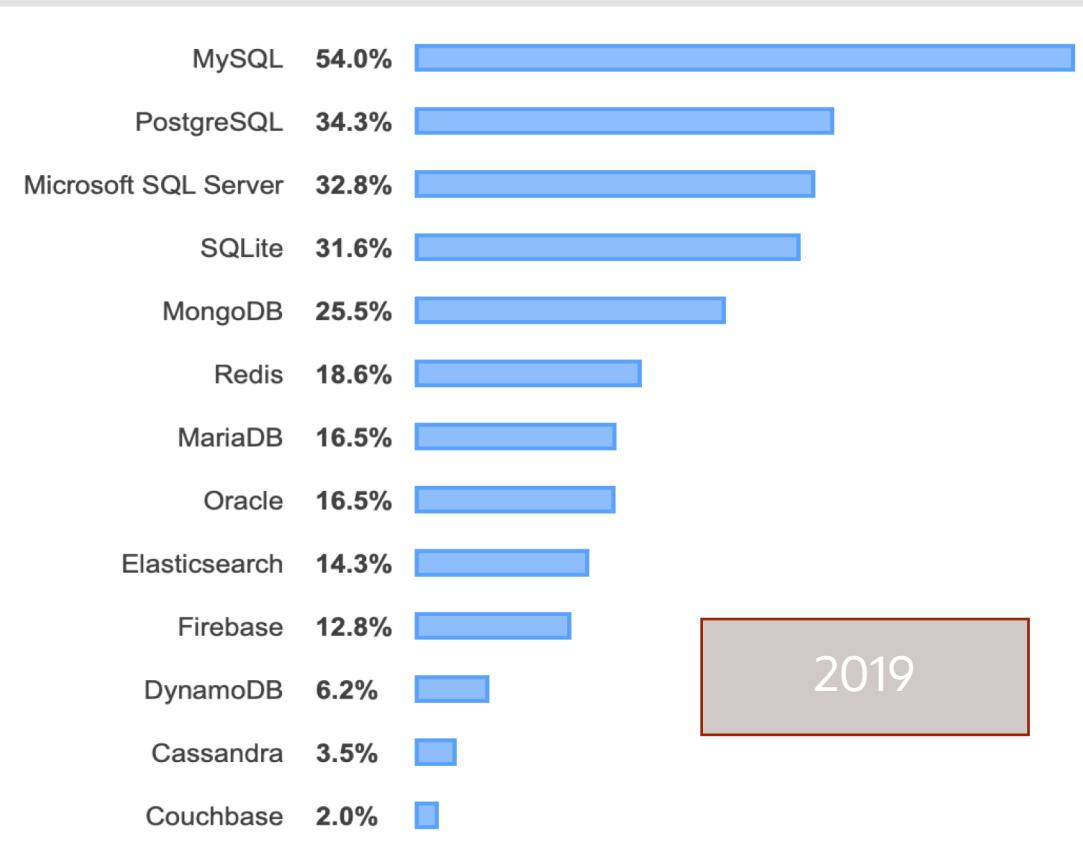


DB-Engines: Database of the Year 2019



MySQL Developer Popularity

Stack Overflow Developer Survey 2019 and 2020



MySQL is the most popular database with developers
<https://insights.stackoverflow.com/survey/2020>



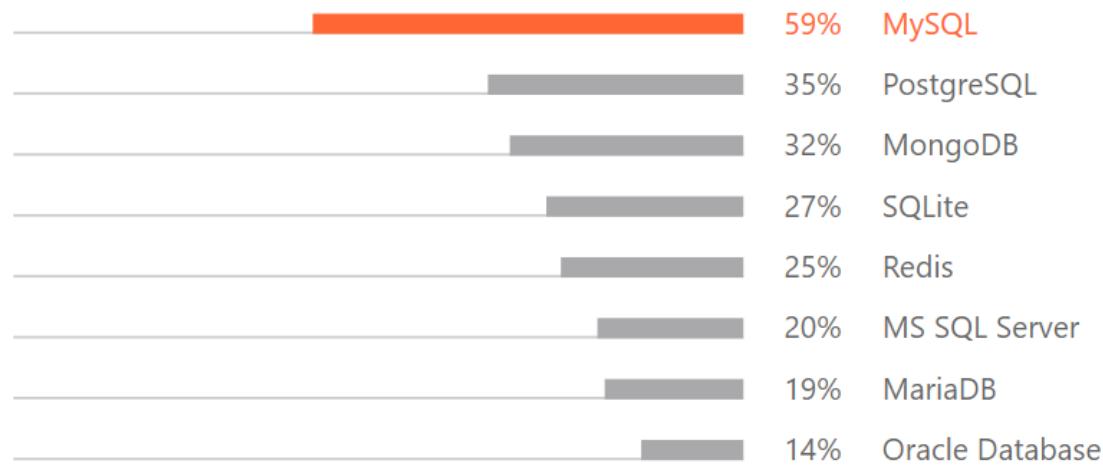
JetBrains Survey 2020

The State of Developer Ecosystem



<https://www.jetbrains.com/lp/devecosystem-2020/databases/>

Which databases have you used in the last 12 months?



MySQL is the most popular database



#1

MySQL is the #1 database for the
web, used by 10 of the top 10
websites



MySQL Powers Web Applications & Enterprise Applications

Web

facebook



Google

YouTube

PayPal

ticketmaster

Booking.com

NETFLIX

eBay

Cloud



SUGARCRM.
THE CLOUD IS OPEN



FSI / Retail



SHINSEI BANK

Bank of America



WELLS
FARGO

CME Group

Walmart

Office DEPOT.
Taking Care of Business

Continental
Airlines

Telco / Govt



Alcatel-Lucent

comcast

Deutsche Post

NYC
.gov
always open



OEM



EMC²



intel

CISCO

MySQL Community & Commercial Editions

- MySQL is dual licensed software (GPL vs Commercial License)
- MySQL Community Edition (FREE) with DB with limited features and no technical support
- MySQL Commercial editions: With Enterprise features, Support, Upgrade and consultative support etc.. in [one price](#)

Community Edition (GPL)



Reference : [MySQL Downloads](#)

Commercial Editions

- Enterprise
- Carrier Grade
- MySQL Database Service



http://www.mysql.com

The screenshot shows the MySQL website homepage with a header bar containing browser controls, a search bar, and a menu icon. Below the header, there are four main service sections:

- MySQL Database Service** (Icon: Cloud):

MySQL Database Service is a fully managed database service to deploy cloud-native applications using the world's most popular open source database. It is 100% developed, managed and supported by the MySQL Team.

[Learn More »](#)
- MySQL Enterprise Edition** (Icon: Database):

The most comprehensive set of advanced features, management tools and technical support to achieve the highest levels of MySQL scalability, security, reliability, and uptime.

[Learn More »](#)
- MySQL for OEM/ISV** (Icon: Application):

Over 2000 ISVs, OEMs, and VARs rely on MySQL as their products' embedded database to make their applications, hardware and appliances more competitive, bring them to market faster, and lower their cost of goods sold.

[Learn More »](#)
- MySQL Cluster CGE** (Icon: Globe):

MySQL Cluster enables users to meet the database challenges of next generation web, cloud, and communications services with uncompromising scalability, uptime and agility.

[Learn More »](#)

MySQL Enterprise Edition

Security and Data Protection

Scalability and Stability

High Availability



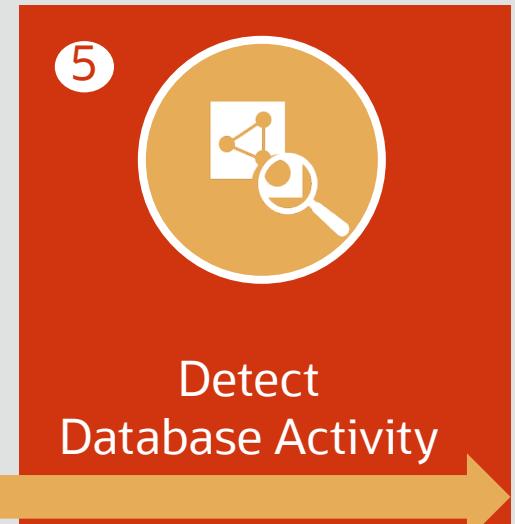
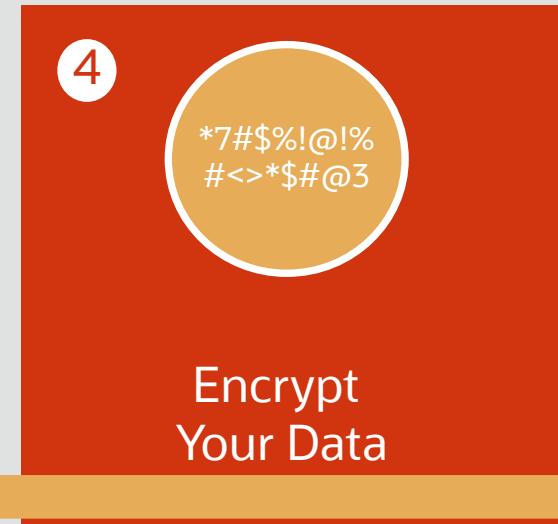
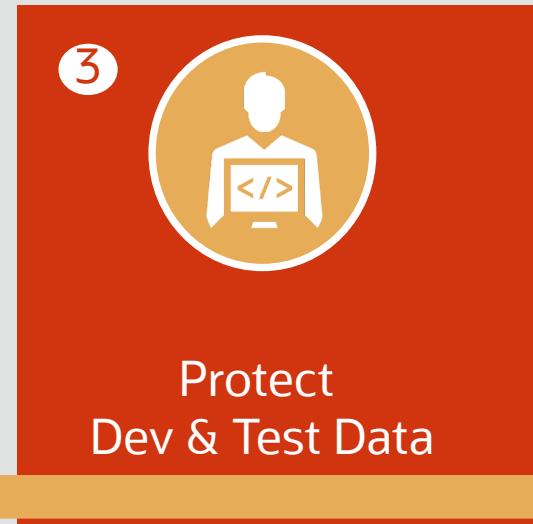
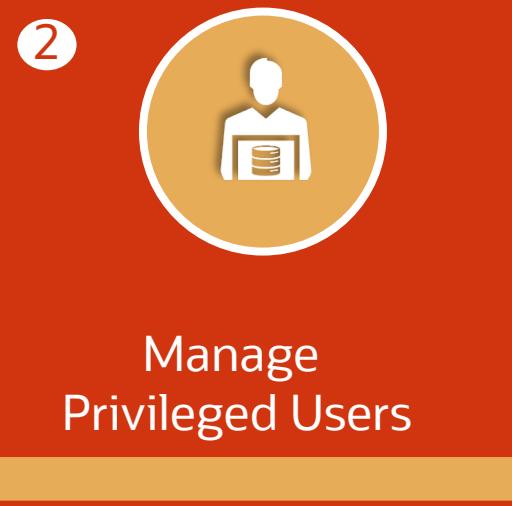
Data Protection

Data Protection Laws & Regulations



5 Steps to Database Regulatory Compliance

① Assess Security Risks: Sensitive Data, Access Privileges, Database Configuration



5 Steps to Database Regulatory Compliance

1

MySQL Enterprise Edition

2



Manage
Privileged Users

3



Protect
Dev & Test Data

4



Encrypt
Your Data

5



Detect
Database Activity



MySQL Enterprise Authentication



MySQL Enterprise Masking
MySQL Enterprise Backup



MySQL Enterprise TDE
MySQL Enterprise Encryption



MySQL Enterprise Audit
MySQL Enterprise Firewall
MySQL Enterprise Monitor

MySQL Enterprise Edition

Advanced Security to Meet Regulatory Compliance

MySQL Enterprise Masking

- De-identify, Anonymize Sensitive Data

MySQL Enterprise TDE

- AES 256 encryption, Key Management

MySQL Enterprise Authentication

- External Authentication Modules

MySQL Enterprise Encryption

- Public/Private Key Cryptography, Asymmetric Encryption

MySQL Enterprise Firewall

- Block SQL Injection Attacks, Intrusion Detection

MySQL Enterprise Audit

- User Activity Auditing, Regulatory Compliance

MySQL Enterprise Monitor

- Monitor Changes in Database Configurations, Users Permissions, Database Schema, Passwords

MySQL Enterprise Backup

- Securing Backups, AES 256 encryption



MySQL Enterprise Edition



Advanced Features

- Scalability
- High Availability
- Authentication
- Audit
- Encryption + TDE
- Firewall



Management Tools

- Monitoring
- Backup
- Development
- Administration
- Migration



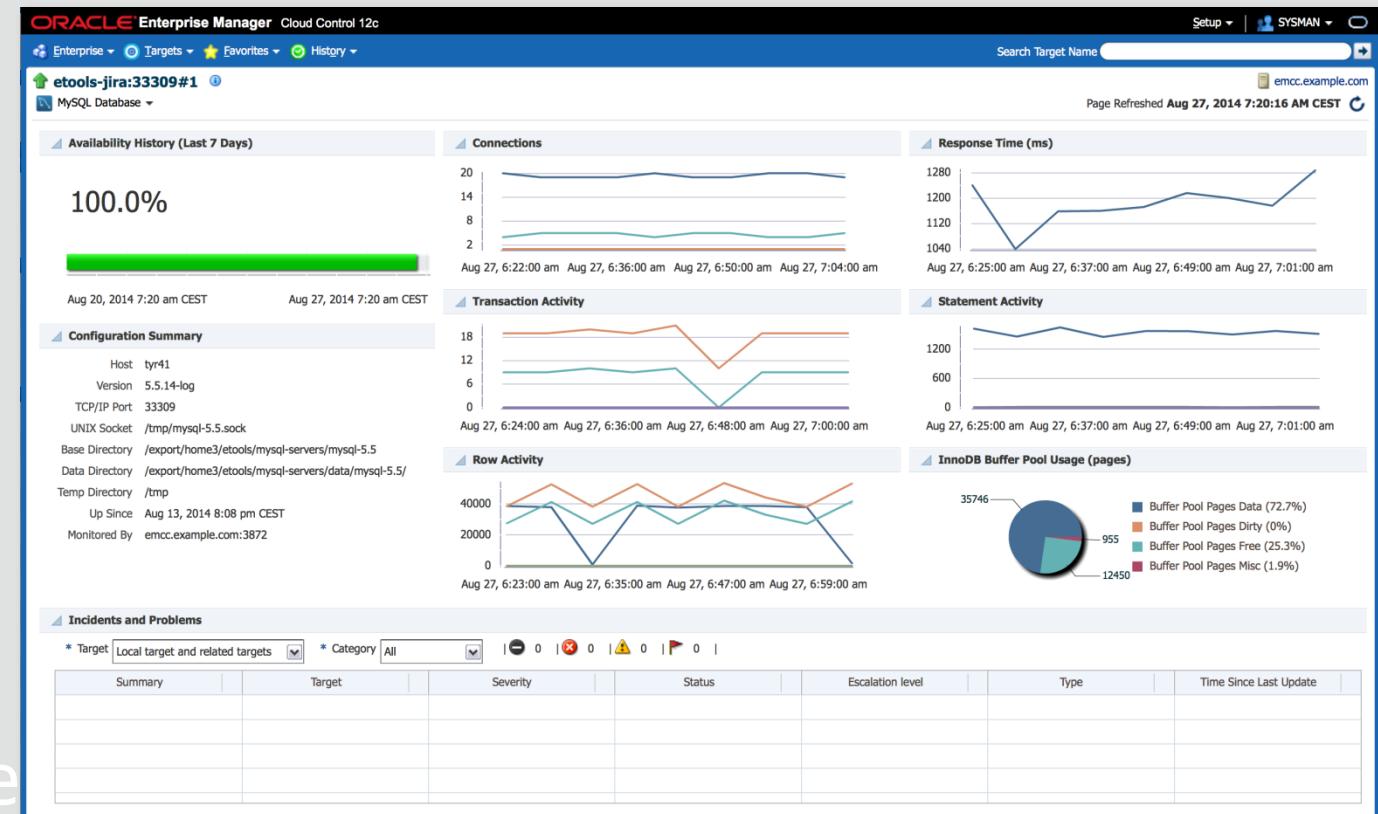
Support

- Technical Support
- Consultative Support
- Oracle Certifications



Oracle Enterprise Manager for MySQL

Availability monitoring
Performance monitoring
Configuration monitoring
All available metrics collected
MySQL auto-detection
MySQL 5.7 / 8.0 Support

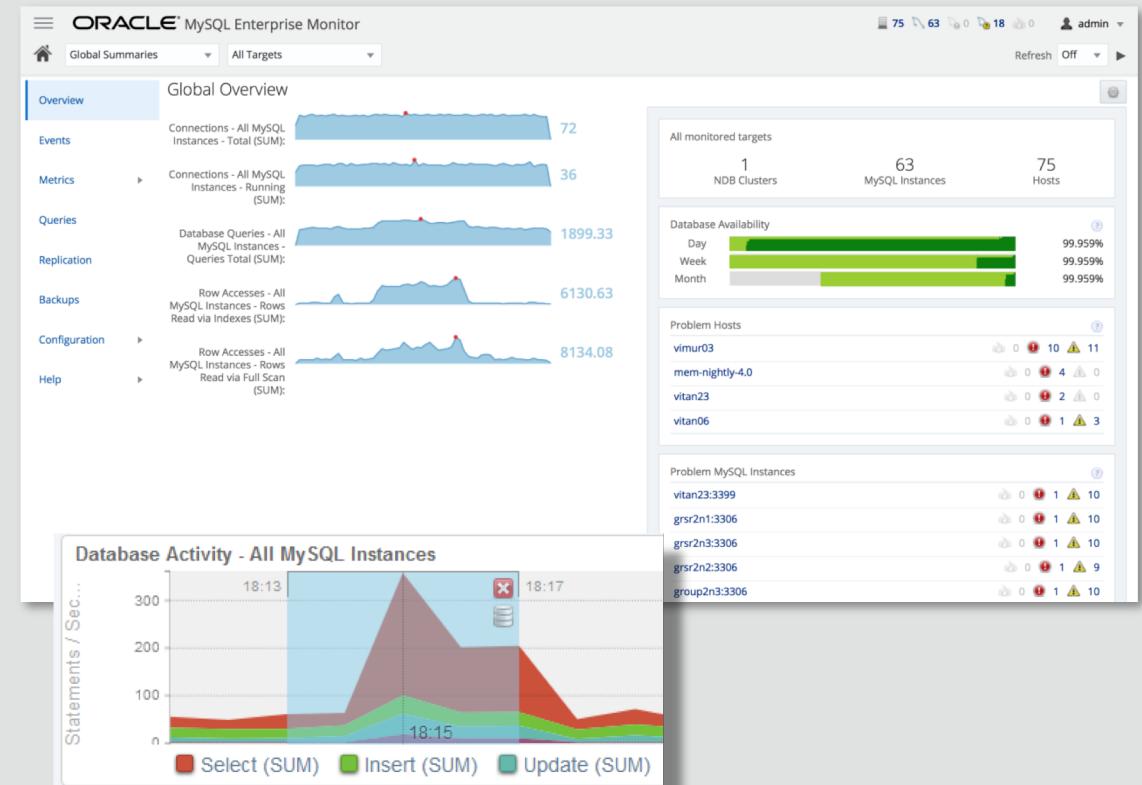


See Availability

ORACLE®
ENTERPRISE MANAGER

MySQL Enterprise Monitor

- Start monitoring MySQL in 10 minutes
- Real-time MySQL performance and availability monitoring
 - Alert / Notification
- Visually find & fix problem queries
 - Charts & Graphs
 - Query Analyzer
- Advisors
 - Scheduled data collection tasks
 - Notification
-



	Current	Worst	Subject	Topic
+/-	!	!	mylab.localdomain, mylab.localdomain:3306	Root Account Without Password
+/-	!	!	mylab.localdomain, mylab.localdomain:3306	Server Has Accounts Without A Password
+/-	✓	!	mylab.localdomain, mylab.localdomain:3306	Average Statement Execution Time Excess...
+/-	✓	!	mylab.localdomain, mylab.localdomain:3306	SQL Statement Generates Errors or Warnings
+/-	!	!	mylab.localdomain, mylab.localdomain:3306	Server Has Anonymous Accounts
+/-	✓	!	mylab.localdomain, mylab.localdomain:3306	MySQL Instance Is Experiencing A Query P...
+/-	⚠	⚠	mylab.localdomain, mylab.localdomain:3306	InnoDB Log Buffer Flushed To Disk After Ea...
+/-	⚠	⚠	mylab.localdomain, mylab.localdomain:3306	User Has Rights To Database That Does Not...

Enterprise Monitor: Query Analyzer

Real-time query performance

Visual correlation graphs

Find & fix expensive queries

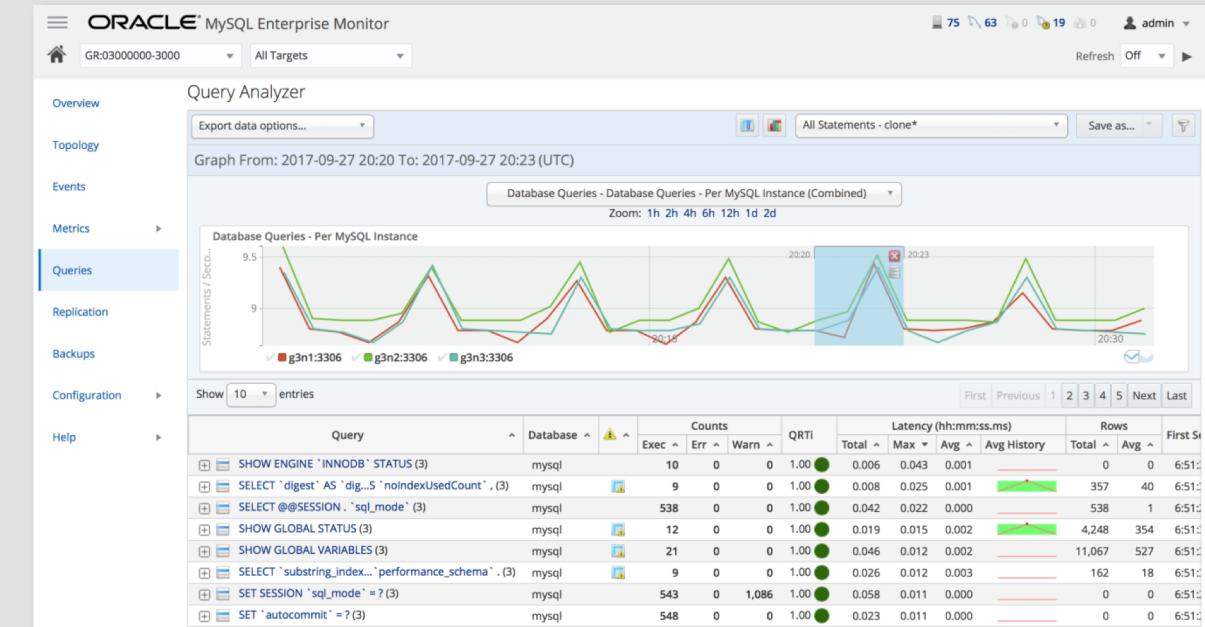
Detailed query statistics

Query Response Time index (QRTi)

“Quality of Service” (QoS) measurement for each query

QoS measurement for a server, group, or every instance

Single metric for query performance



“With the MySQL Query Analyzer, we were able to identify and analyze problematic SQL code, and triple our database performance. More importantly, we were able to accomplish this in three days, rather than taking weeks.”

Keith Souhrada
Software Development Engineer
Big Fish Games

Enterprise Monitor: Replication Dashboard

Master/Slave and Group Replication

Auto-discovers replication topology

- High level overviews of all instances

- User centric views on individual sets

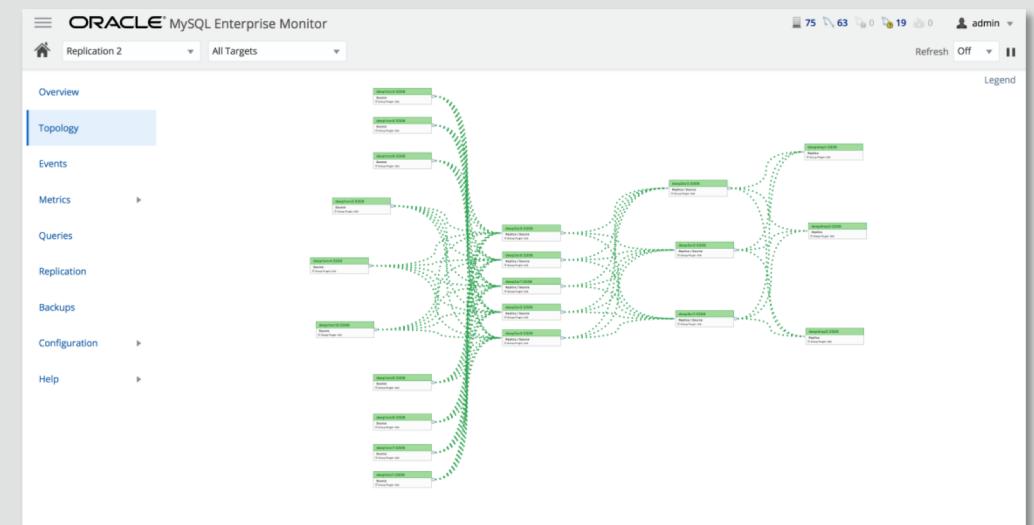
Performance monitoring

Replication advisors

Best practice replication advice

"I use the MySQL Enterprise Monitor every day to monitor and keep tabs on our MySQL databases. Quick one stop shopping for keeping tabs on them."

-Wes Homer,
Sr System and Network
Administrator  InsideView®



Enterprise Monitor: Best Practice Advisors

Scheduled Tasks to collect data

Analyze and Alert/Notification | Graphing

Enforce MySQL best practices (like Health Check)

14 Advisor categories & 250+ Advisors

Threshold-based alerts

Exponential moving averages

Rate change detection

Expert problem resolution advice

Advisors	
Edit Selected Advisors Disable Selected Advisors Create Advisor Import/Export	
Administration	Configured: 26 of 26
Agent	Configured: 3 of 3
Availability	Configured: 6 of 6
Backup	Configured: 5 of 5
Cluster	Configured: 10 of 10
Graphing	Configured: 87 of 87
Memory Usage	Configured: 6 of 6
Monitoring and Support Services	Configured: 5 of 5
Operating System	Configured: 5 of 5
Performance	Configured: 23 of 23
Query Analysis	Configured: 4 of 4
Replication	Configured: 13 of 13
Schema	Configured: 17 of 17
Security	Configured: 26 of 26

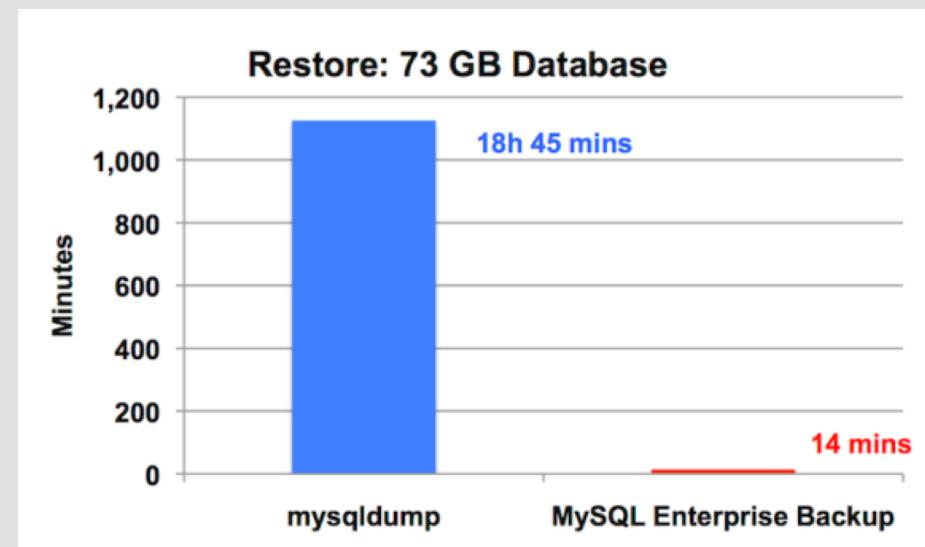
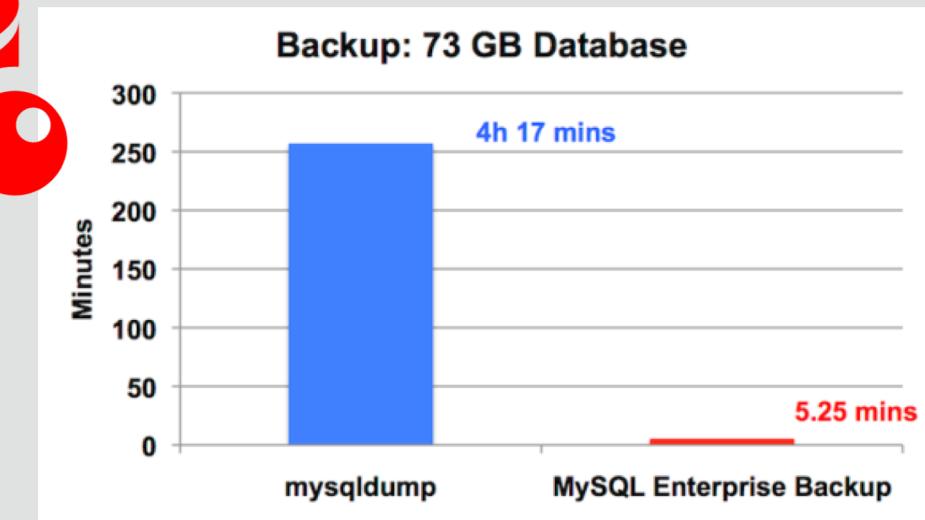
"I definitely recommend the MySQL Enterprise Monitor to DBAs who don't have a ton of MySQL experience. It makes monitoring MySQL security, performance and availability very easy to understand and to act on."

Sandi Barr
Sr. Software Engineer
Schneider Electric



Data Protection

- MySQL Enterprise backup
 - Online Backup & Fast backup & Fast Recovery
 - Full & Incremental, Compressed, Encrypted Backup
- MySQL Enterprise TDE
 - Data at Rest Encryption
- MySQL Enterprise Audit
 - Compliance and filtering what you want to audit
- MySQL Enterprise Firewall
 - Learn SQL pattern and build Allow List
 - Block SQL from not registered in Allow List



A person is visible from the chest up, wearing a yellow and black horizontally striped shirt. The background is a plain, light gray.

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