

# OpenWorld 2017

## MySQL For Oracle DBAs



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SAN FRANCISCO, CA

Kathy Forte  
Oracle MySQL Solutions  
Architect  
October 2, 2017

# 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, and timing of any features or functionality described for Oracle's products remains at the sole discretion of Oracle.



**Kathy Forte**

MySQL Solutions Architect, Oracle



From <http://noobaid.com>

You are a talented Oracle DBA . Or, you manage a team of talented Oracle DBAs.

Suddenly, you are told:

‘Support these MySQL databases.’



I'm here to help you as  
be as successful with  
MySQL as you are with  
your Oracle database

<http://susancushman.com/mental-health-monday-on-the-other-side-of-worry/keep-calm-and-don-t-worry-85/>

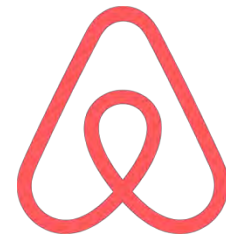
# MySQL for Oracle DBAs : Agenda

- 1 Introduction to MySQL
- 2 DBA Tools
- 3 Replication
- 4 Enterprise Edition
- 5 MySQL Cloud Service

# Introduction to MySQL – What is MySQL?

- The world's most popular open-source database - [www.mysql.com](http://www.mysql.com)
- Open-source RDBMS
  - Beginning: One element of historical LAMP stack (Linux, Apache, MySQL, PHP)

# Web Unicorns Rely on MySQL



airbnb

box



Etsy

LinkedIn



Pinterest

YAHOO!



Booking.com





# MySQL? Oracle?

MySQL is used for websites and with PHP integration.

Oracle is popular for banking, ERP, insurance and finance companies.

# MySQL – Community – Latest Version is 5.7

Extending the relational model with NoSQL for the way you work today

**NOT Only SQL**

*It's about recognizing  
that for some problems  
other storage solutions  
are better suited!*

JSON, Document Store

The community version of MySQL is free to download and use

- <http://www.oracle.com/us/products/mysql/mysqlcommunityserver/overview/index.html>

# MySQL – Next Version – 8.0



<https://walletpcare.wordpress.com/2015/02/24/get-rid-of-your-debt-be-happy/>



- Window Functions or Analytical Functions
- Common Table Expressions (CTEs)
- Atomic Data Definition Language (DDL)

# Terminology

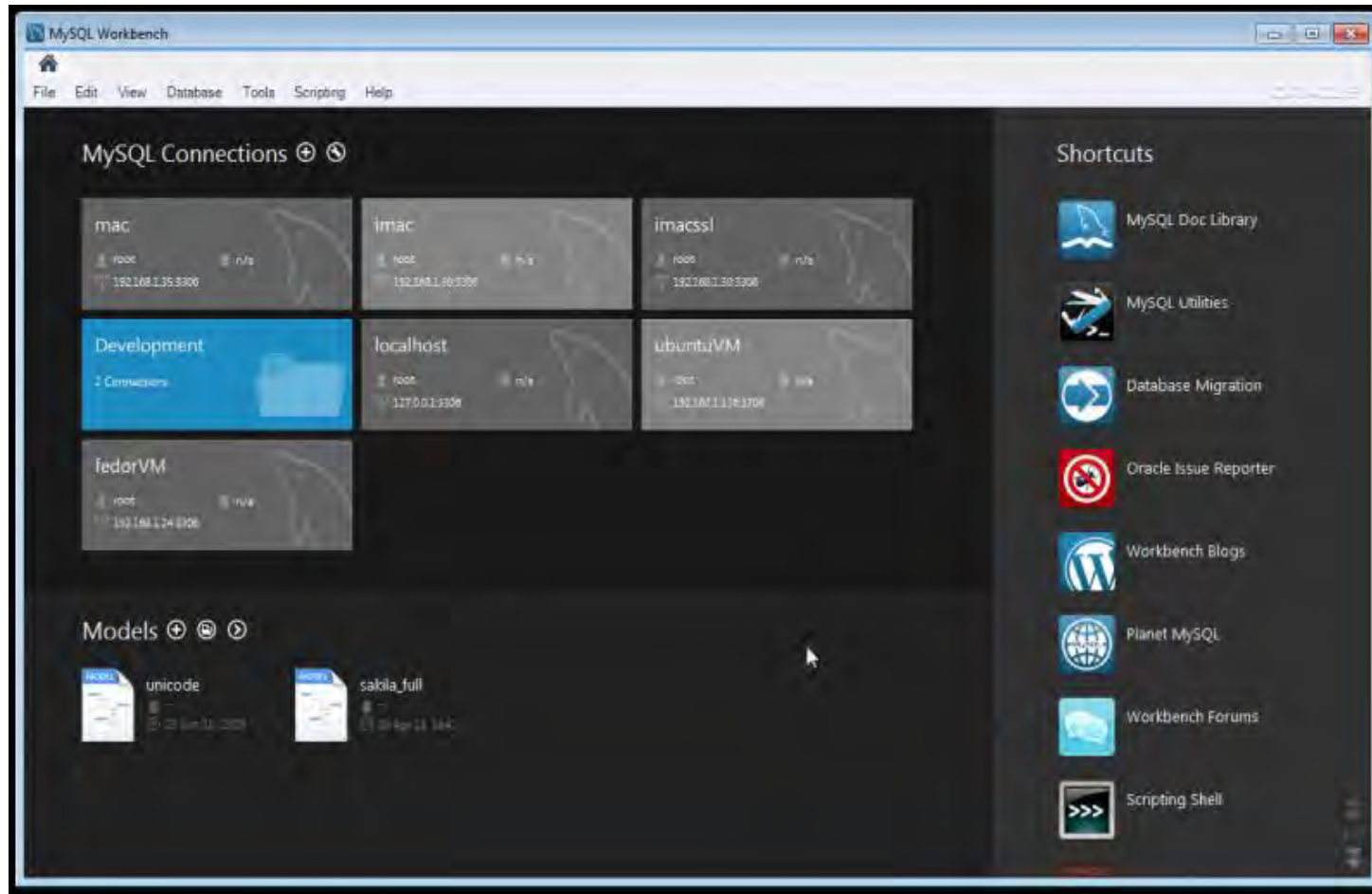
- In MySQL, no schemas as in Oracle
  - users don't own objects
- database = schema (MySQL)
- <http://dev.mysql.com/doc/refman/5.7/en/glossary.html>
- <http://dev.mysql.com/doc/refman/5.7/en/tutorial.html>

# How will users connect?

- How will you connect?
  - Like using sql\*plus
  - Mysql command-line client
    - “mysql -u scott -p”
    - Like sqlplus scott/tiger

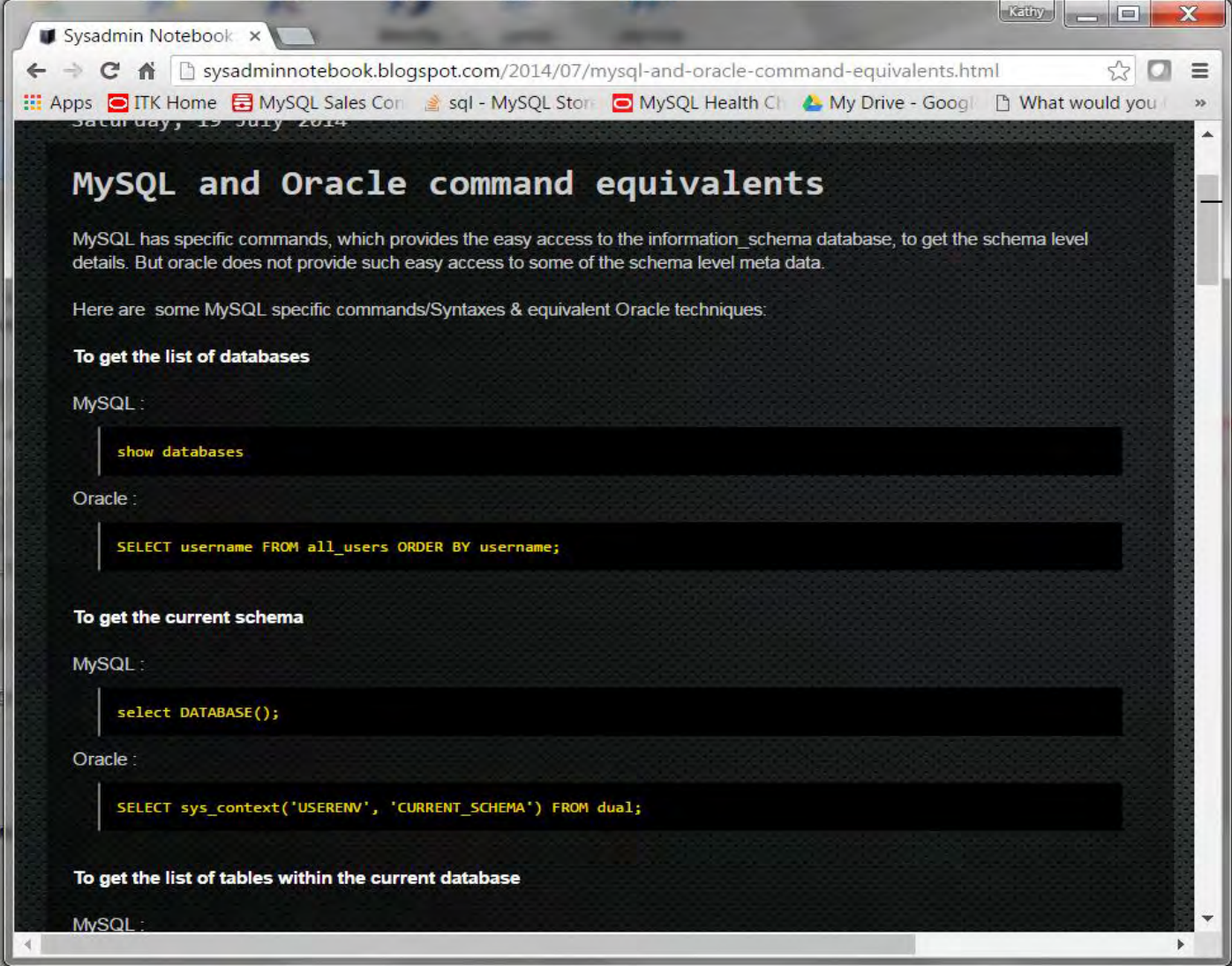
# How will users connect?

- MySQL Workbench



- Development and DBA tools
- <https://www.mysql.com/products/workbench>

# Equivalent commands



The screenshot shows a web browser window titled "Sysadmin Notebook" with the URL [sysadminnotebook.blogspot.com/2014/07/mysql-and-oracle-command-equivalents.html](http://sysadminnotebook.blogspot.com/2014/07/mysql-and-oracle-command-equivalents.html). The page content is as follows:

## MySQL and Oracle command equivalents

MySQL has specific commands, which provides the easy access to the information\_schema database, to get the schema level details. But oracle does not provide such easy access to some of the schema level meta data.

Here are some MySQL specific commands/Syntaxes & equivalent Oracle techniques:

### To get the list of databases

MySQL :

```
show databases
```

Oracle :

```
SELECT username FROM all_users ORDER BY username;
```

### To get the current schema

MySQL :

```
select DATABASE();
```

Oracle :

```
SELECT sys_context('USERENV', 'CURRENT_SCHEMA') FROM dual;
```

### To get the list of tables within the current database

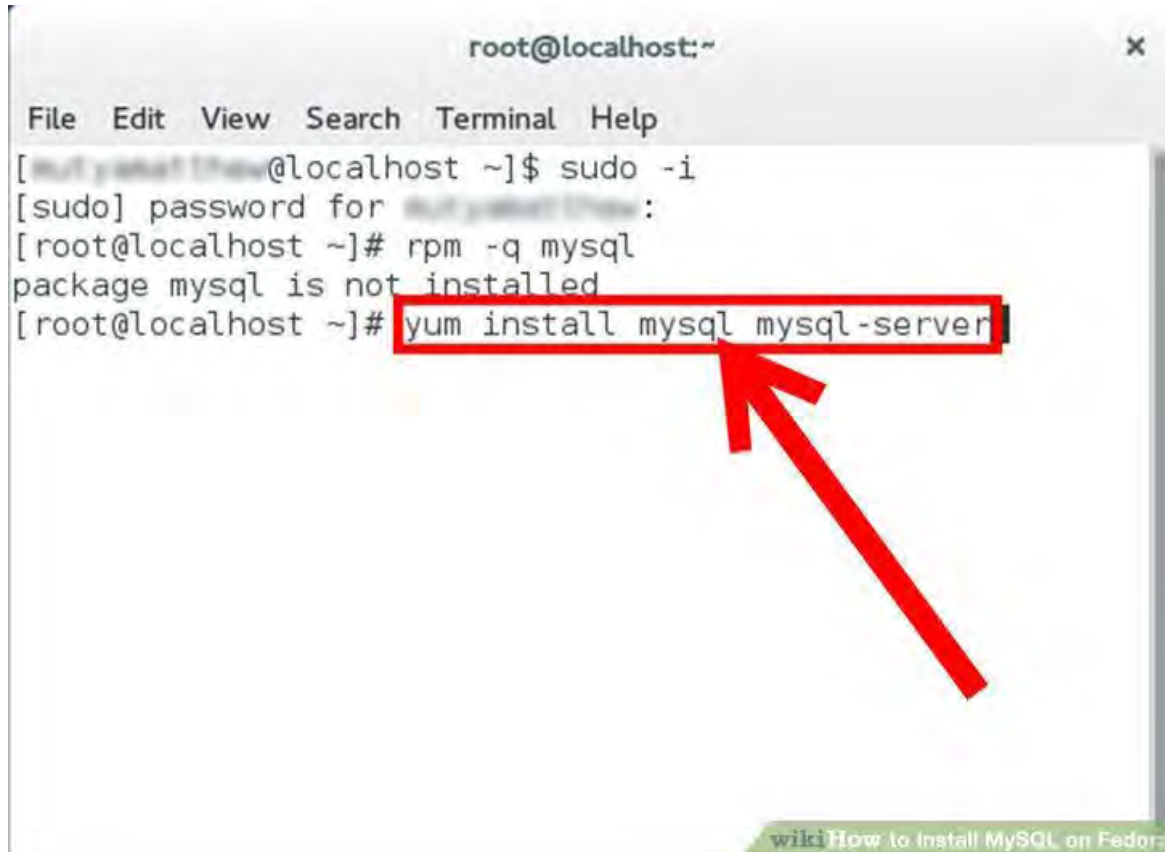
MySQL :

MySQL commands: equivalent  
MySQL  
commands

<http://sysadminnotebook.blogspot.com/2014/07/mysql-and-oracle-command-equivalents.html>

# How to get and install MySQL

- There are many ways...

A terminal window titled 'root@localhost:~' with a menu bar (File, Edit, View, Search, Terminal, Help). The terminal shows the following commands and output:

```
[root@localhost ~]$ sudo -i
[sudo] password for root:
[root@localhost ~]# rpm -q mysql
package mysql is not installed
[root@localhost ~]# yum install mysql mysql-server
```

The command 'yum install mysql mysql-server' is highlighted with a red box, and a red arrow points to it from the bottom right. A small green tab at the bottom of the terminal window reads 'wiki How to install MySQL on Fedora'.

<http://dev.mysql.com/doc/refman/5.7/en/installing.html>

<http://www.wikihow.com/Install-MySQL-on-Fedora>



# MySQL Privileges

- Native MySQL security



<http://www.mysqltutorial.org/mysql-grant.aspx>

- Privileges depend on user, and the host (location) they are connecting from:

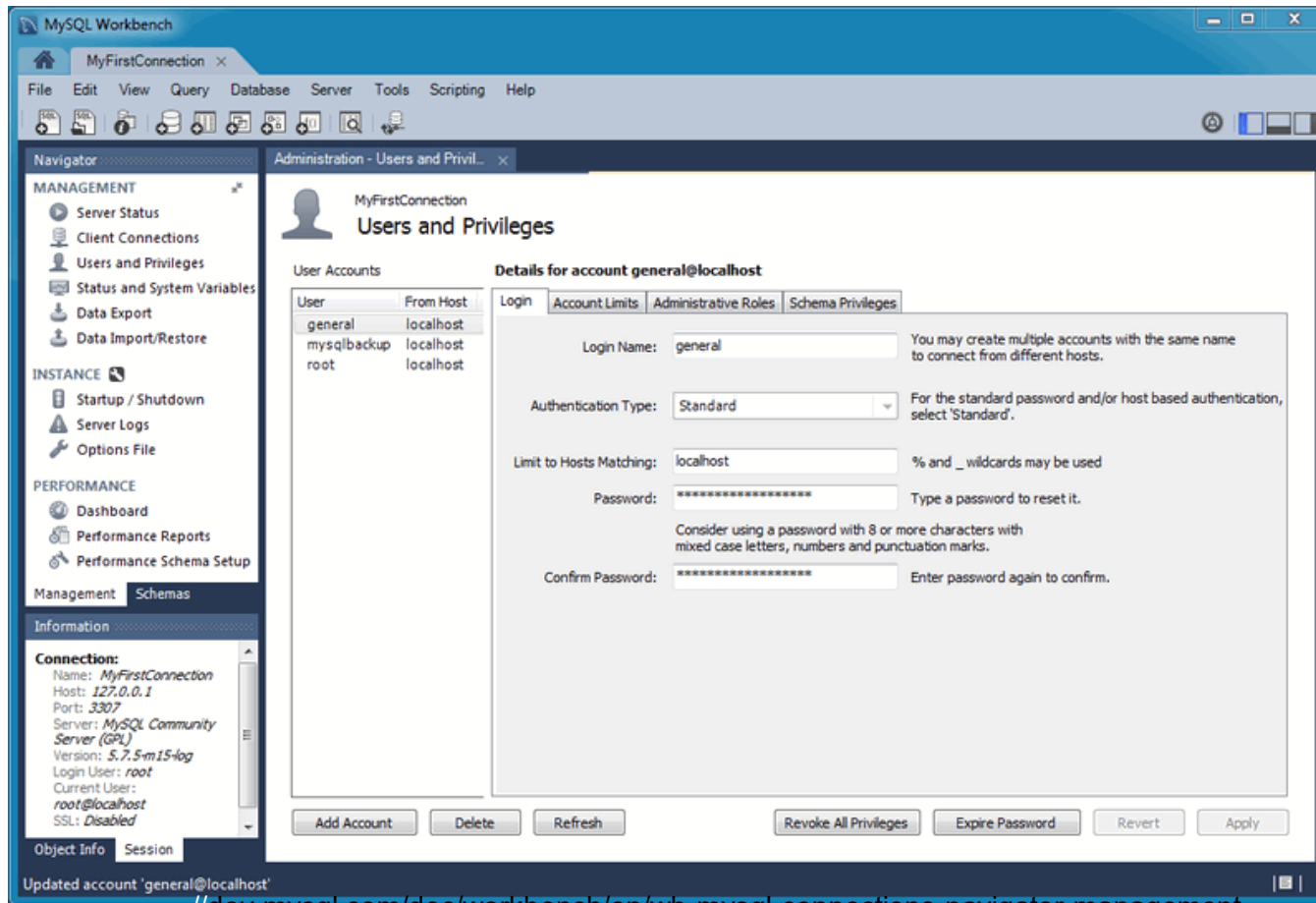
```
CREATE USER 'jeffrey'@'localhost'  
IDENTIFIED BY 'mypass';
```

```
GRANT ALL ON test.t1 TO  
'jeffrey'@'localhost';
```

<http://dev.mysql.com/doc/refman/5.7/en/privileges-provided.html>

# MySQL Privileges

- MySQL security



No roles in MySQL (coming in release 8.0)

However, MySQL Workbench simulates roles to easily define privileges

[dev.mysql.com/doc/workbench/en/wb-mysql-connections-navigator-management-users-and-privileges.html](https://dev.mysql.com/doc/workbench/en/wb-mysql-connections-navigator-management-users-and-privileges.html)

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# MySQL DBA Tools



<http://www.iheavy.com/2012/02/26/top-mysql-dba-interview-questions-part-1>

How to administer your MySQL server:

- <https://dev.mysql.com/doc/refman/5.7/en/server-administration.html>
- MySQL Utilities – free tools to simplify many DBA tasks:
  - <https://dev.mysql.com/downloads/utilitis/>

# MySQL Server Administration



mysqldump – a logical backup tool, like Oracle export

<http://dev.mysql.com/doc/refman/5.7/en/mysqldump.html>

<http://www.thegeekstuff.com/2008/09/backup-and-restore-mysql-database-using-mysqldump>

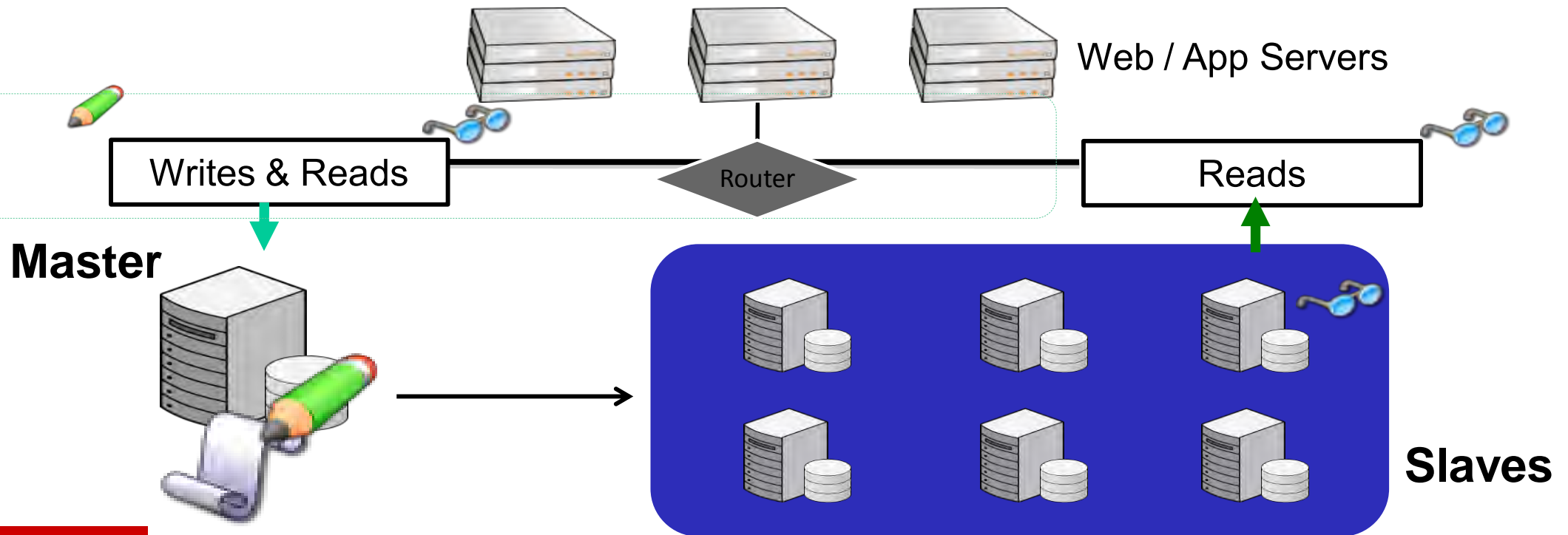
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# Master/Slave Replication: Faster Queries

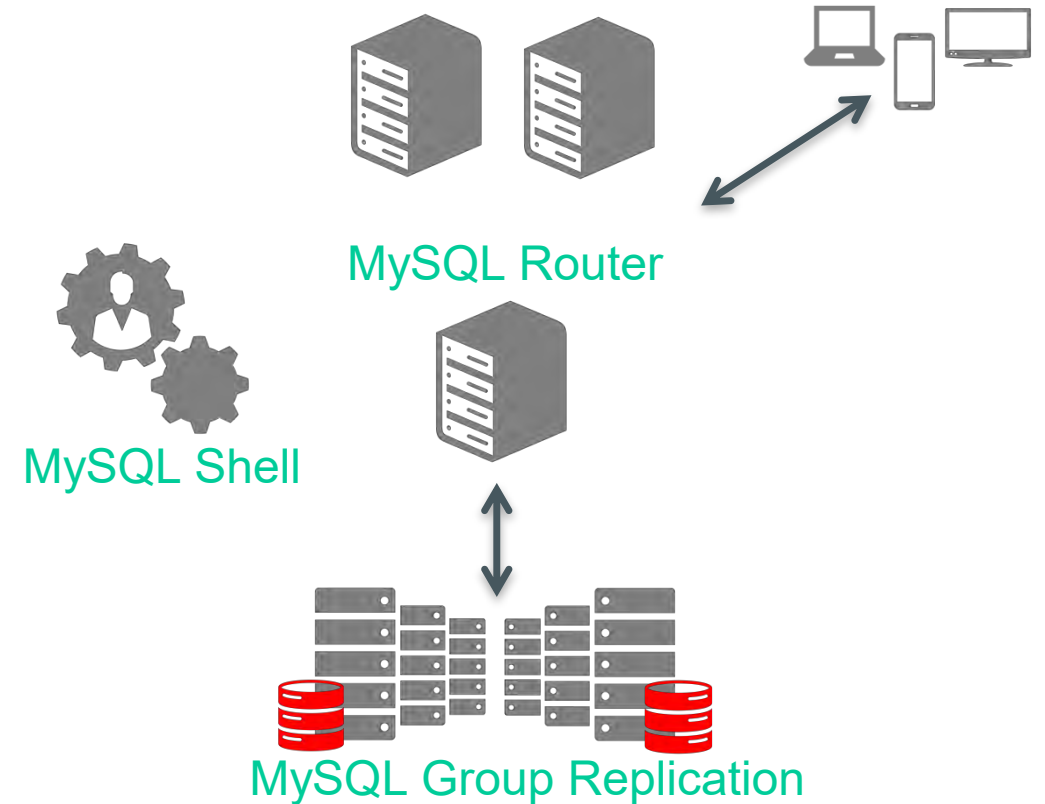
Not only HA but scale out by distributing queries across the servers

80% of applications have this use case – facebook, Twitter



# MySQL InnoDB Cluster

*“High Availability becomes a core first class feature of MySQL!”*





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# MySQL 5.7 Enterprise Edition



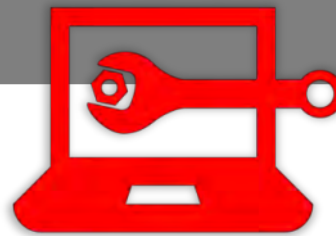
## Advanced Features

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



## Management Tools

- Monitoring
- Backup
- Development
- Administration
- Migration



## Support

- Technical Support
- Consultative Support
- Oracle Certifications



# MySQL Enterprise Edition 5.7: Security

## Features

- MySQL Enterprise **Firewall**
  - Block any SQL Injection Attacks
- MySQL Enterprise **TDE**
  - Data-at-Rest Encryption
  - MySQL KeyRing (works with Oracle Key Vault)
- MySQL Enterprise **Audit**
  - User Activity Auditing, Regulatory Compliance
- MySQL Enterprise **Authentication**
  - External Authentication Modules
    - Microsoft AD, Linux PAMs

## Enterprise Tools

- MySQL Enterprise **Monitor**
  - Changes in Database Configurations, Users Permissions, Database Schema, Passwords
- MySQL Enterprise **Backup**
  - Securing Backups, AES 256 encryption



More information available at :

<http://www.mysql.com/products/enterprise/>

# Tools: MySQL Enterprise Monitor

ORACLE MySQL Enterprise Monitor

Dashboards ▾ Events Query Analyzer Reports & Graphs ▾ Refresh: Off

All group - Graphs for last 1 hour (GMT) Edit

**Database Statistics**

Database Availability

Day	99.965%
Week	99.965%
Month	99.965%

**Graphs**

Connections - All MySQL Instances

Database Activity - All MySQL Instances

Query Response Time Index

**Current Problem MySQL Instances**

ID	Status	Emergency	Critical	Warning
mysqlab2-my...	Up	0	1	10

Showing 1 to 1 of 1 entries

**Current Problem Hosts**

ID	Status	Emergency	Critical	Warning
mysqlab2-my...	Up	0	1	0

Showing 1 to 1 of 1 entries

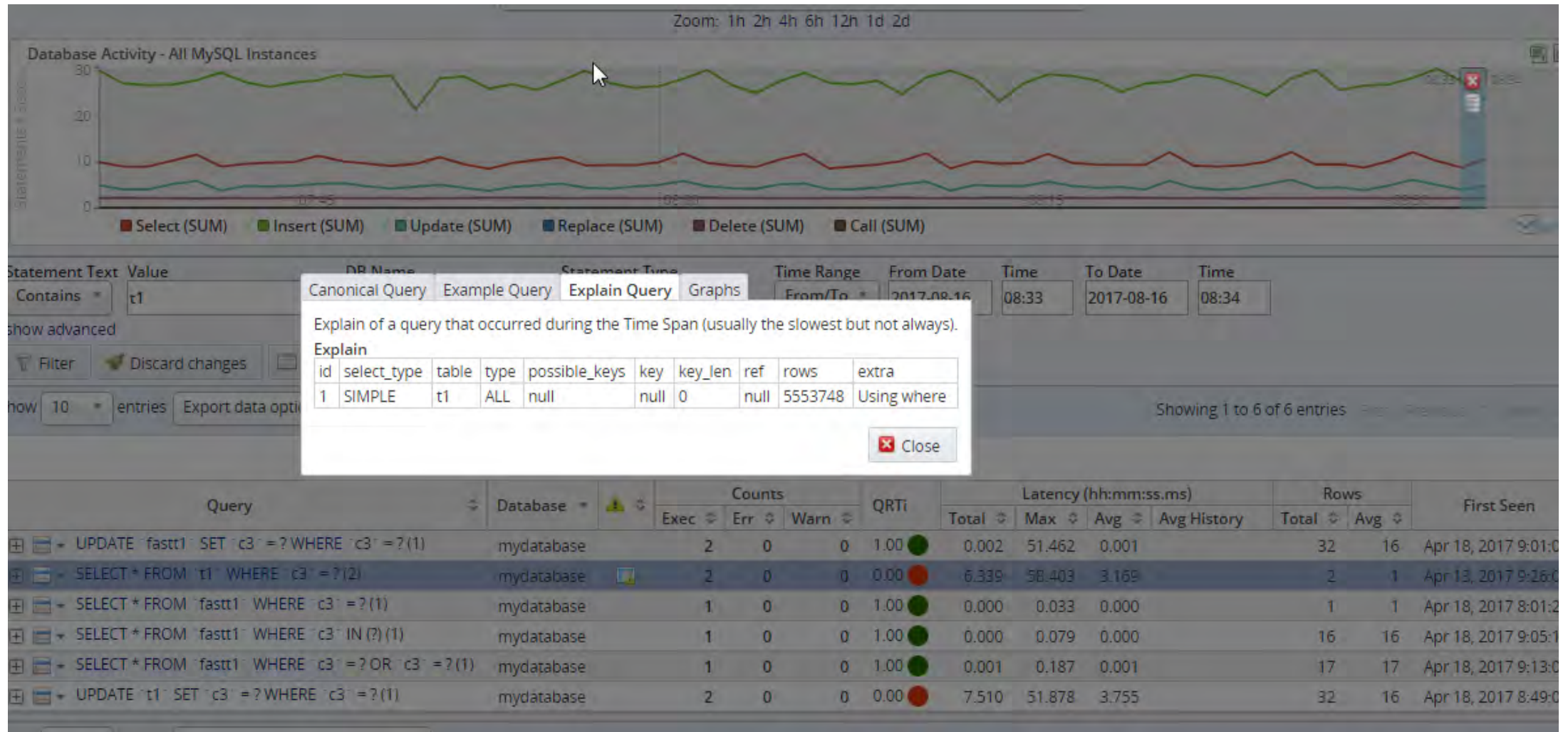
**Current Emergency & Critical Events**

Show 5 entries

Subject	Topic	Time	Actions
mysqlab2-mysql-1, /u01/transl...	Filesystem /u01/translog (/dev...	about a minute ago	✖
mysqlab2-mysql-1, mysqlab2-...	The Enterprise Audit Log Plugi...	about a minute ago	✖

Showing 1 to 2 of 2 entries

# Tools: MySQL Enterprise Monitor



# Oracle Enterprise Manager (OEM) plugin for MySQL

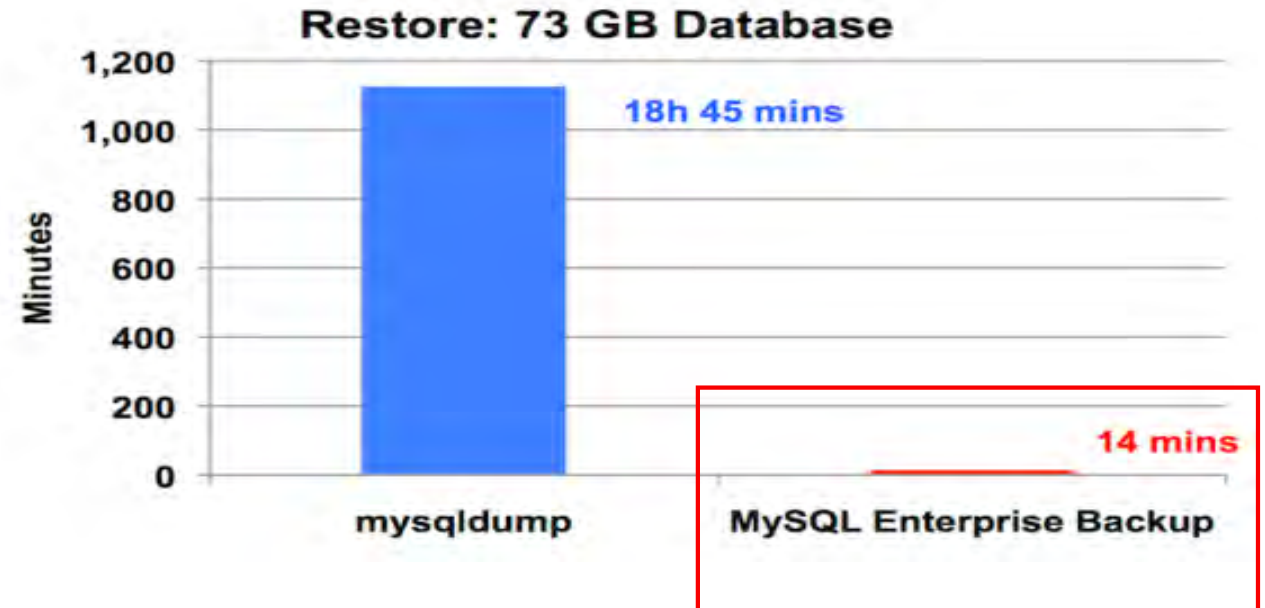
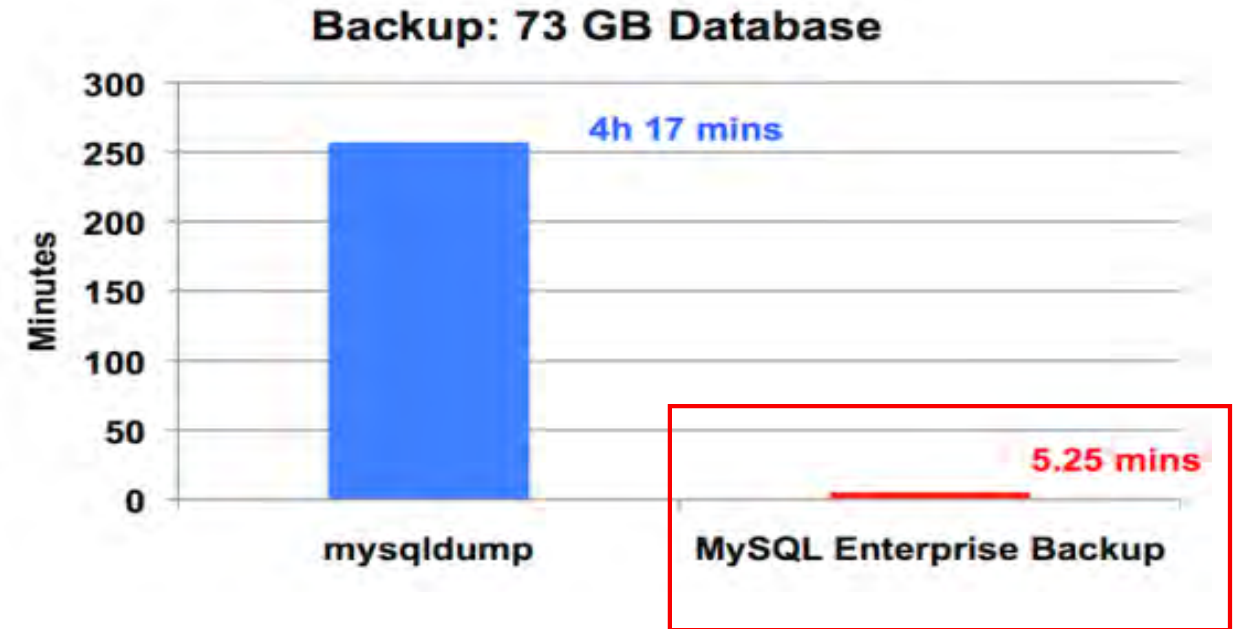
The screenshot displays the Oracle Enterprise Manager Cloud Control 13c interface. The main dashboard includes several key sections:

- Enterprise Summary:** Overview of All Targets (1508). Status: 1188 targets with status. 67% (793) are Up, 20% (235) are Down, 13% (155) are Unknown, and 5% (5) are Under Maintenance. Incidents: 17 updated in the last 24 hours, 196 updated in the last 7 days.
- Inventory and Usage:** Pie chart showing the distribution of targets across various categories like Database In, Cluster Data, Pluggable D, etc.
- Compliance Summary:** Frameworks, Standards, and Targets. Shows compliance scores for various standards, such as Security Technical Implementation Guide (STIG) for Oracle Database (14%) and Oracle VM Manager secure configuration compliance (66%).
- Navigation Menu:** A dropdown menu is open, listing various target types: All Targets, Groups, Systems, Services, Hosts, Databases, Middleware, Business Applications, Composite Applications, Fusion Applications, Siebel, Exadata, Exalogic, and Exalytics.



# MySQL Enterprise Backup

- Faster than mysqldump
- Online, non-locking backup and recovery
  - Complete MySQL instance backup (data and config)
  - Partial backup and restore



# MySQL Enterprise **Support**

- Large MySQL engineering and support organization
- Backed by the MySQL developers
- World-class support, in 29 languages
- Hot fixes & maintenance releases
- 24x7x365
- Consultative support



Get immediate help for any MySQL issue, plus expert advice



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- 1 Introduction to MySQL
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- 5 **MySQL Cloud Service**

# Database Administration

## Full Control and Automated Management



Full Control with  
Shell Access



Support ALL MySQL  
Enterprise Edition  
Features

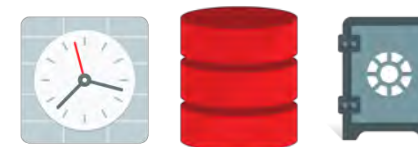
# AND



Self-service  
Provisioning



Automated  
DBA and Patching



Backup/Recovery  
plus HA\* & DR\*

# Benefits of MySQL Cloud Service: Extra Tools: SSH Access

**Oracle Cloud Exclusive Feature - Tune your MySQL server exactly as you like – change any my.cnf parameters**

Log into Your MySQL Cloud Service Instance

```
ssh -i private-key-file opc@10.22.126.290
*****
*                               Welcome to                               *
*                               MySQL Cloud Service                       *
*                               by                                         *
*                               Oracle                                     *
*                               If you are an unauthorized user please disconnect IMMEDIATELY *
*****
***** MySQL Information *****
* Status:  RUNNING                                                       *
* Version:  5.7.13                                                       *
*****
***** Storage Volume Information *****
* Volume      Used      Use%      Available  Size      Mounted on *
* MySQLlog    7.6G  -----  41%        11G      20G      /u01/translog *
* backup      420M  --  1%        47G      50G      /u01/backup *
* bin         2.8G  -----  31%        6.5G     9.8G     /u01/bin *
* data        346M  --  2%        23G      25G     /u01/data *
```

# Benefits of MySQL Cloud Service: **Simplified User Interface** for the Oracle DBA



No need to learn all of the  
MySQL commands

From <http://therapyeverywhere.com/schedule-online-counseling-appointments/>

# Integration with Oracle Cloud Environment

## Application Development

- Pre-integrated with **Application Container Cloud Service** for fast and seamless application development

## Data Integration

- Offload query & live reporting workloads to MySQL Cloud Service using **GoldenGate Cloud Service**
- Integrated with **Data Integrator Cloud Service** for data warehousing and business intelligence

## Unified Management

- **Oracle Enterprise Manager** – Manage your entire Oracle environment through a “single pane of glass”

## Storage Management

- Pre-integrated with **Storage Cloud Service** for backup, snapshot storage

# MySQL Cloud Service – Integrated with Oracle Cloud

The screenshot displays the Oracle Cloud My Services dashboard. At the top, the navigation bar includes the Oracle logo, 'ORACLE CLOUD My Services', and user information. The main header shows 'Dashboard' and a 'Customize Dashboard' button. Below this, the 'ACCOUNT MANAGEMENT' section features a 'View My Orders' card with a 'My Orders' button. The 'CLOUD SERVICES' section is set to the 'mysqlng' identity domain and includes a 'Create Instance' button. A blue status bar at the top of the service grid shows resource usage: '0 of 6 OCPU\_GP Remaining', '125 of 500 BLOCK\_S... Remaining', and '2 of 5 EIPs Remaining'. The service grid contains several tiles: 'developer57812 Developer', 'Database' (0 instances), 'SOA', 'Compute Instances', 'Database Backup', 'Storage', 'MySQL Cloud Service' (Instances), 'Application Container' (0 instances), and 'Java' (0 instances). Red boxes highlight the 'Database' and 'MySQL Cloud Service' tiles. A context menu is open over the 'MySQL Cloud Service' tile, showing 'View Details' and 'Open Service Console' options.

# The Only Public Cloud Offering MySQL Enterprise Edition



# Security & Compliance

## Multi-layered Security Protects Your Data At Rest and In Transfer

MySQL Enterprise Edition

Enterprise Audit

User Activity Auditing, Regulatory Compliance

Enterprise Authentication

External Authentication Modules

Enterprise TDE\*

Transparent Data Encryption

Enterprise Firewall

Block SQL Injection Attacks

Oracle Cloud

Access Rules

Control network traffic to/from instance

IP Networks

Isolate instances by creating multiple IP networks

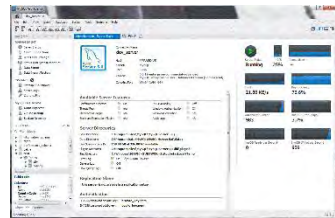


# Enterprise Grade Management Tools

## Multiple Options to Improve Productivity



Oracle Cloud Console



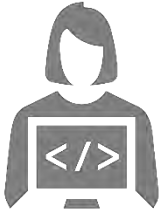
MySQL Tools



- **Oracle Cloud Console** - A web-based console for managing all of your Oracle Cloud Services
- **MySQL Enterprise Edition Management Tools** - Use familiar tools such as MySQL Enterprise Monitor and MySQL Workbench to manage and monitor performance and availability of all your MySQL instances
- **Oracle Enterprise Manager** – Manage your entire Oracle environment through a “single pane of glass”
- **REST API** – Simple API for managing MySQL instances programmatically
- **CLI** – Easy to use command line for script-savvy administrators

# MySQL Cloud Service: Recommended Use Cases

Dev/Test



New "Born in the Cloud" MySQL Applications

Lift & Shift: Migrate Existing MySQL Applications



Hybrid Cloud Deployments

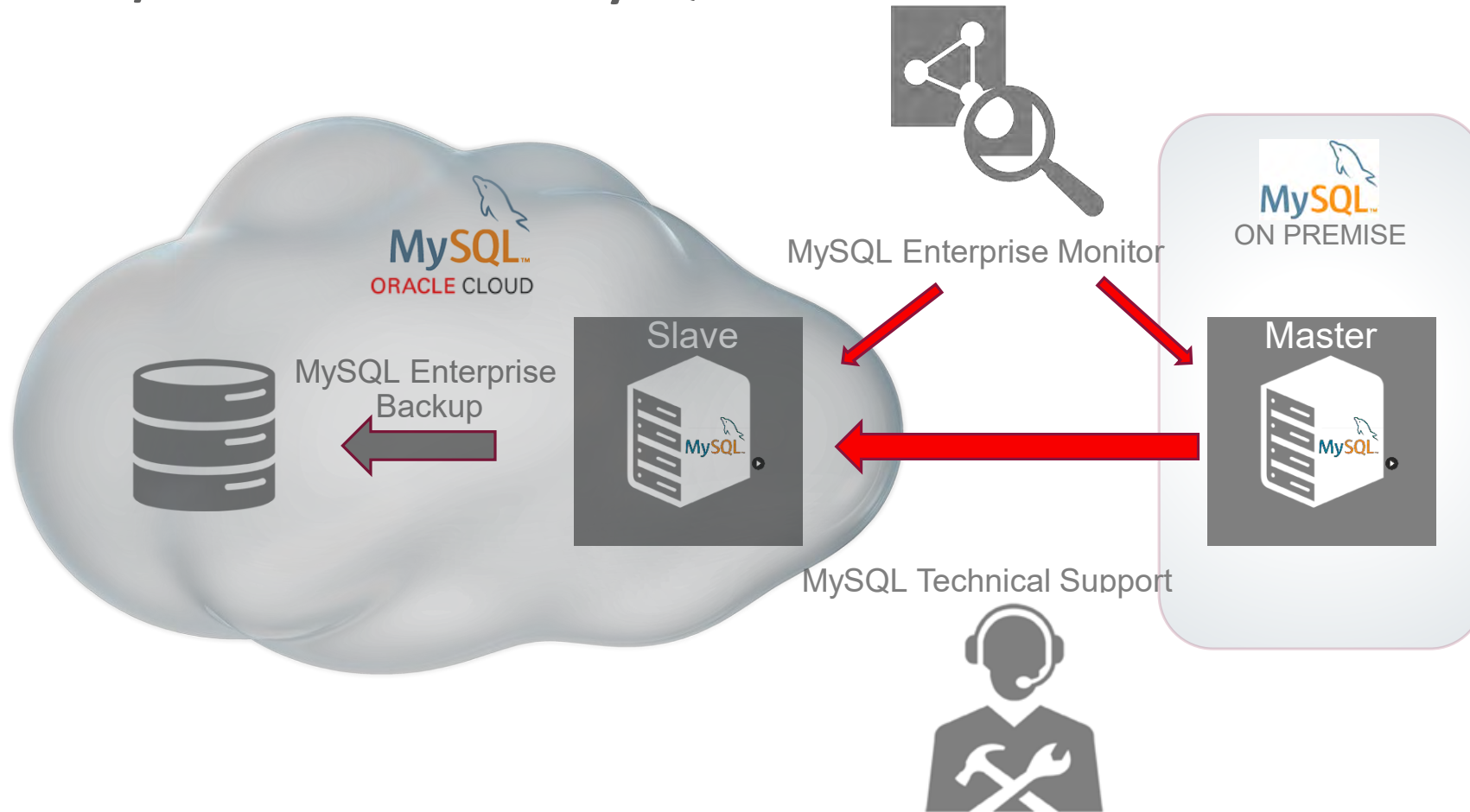


Disaster Recovery



# MySQL Enterprise Edition

A Complete HA/DR Solution with MySQL Cloud Service



# MySQL Cloud Service: Real World Use Cases

## Disaster Recovery

**Our Disaster Recovery Plan  
Goes Something Like This...**



<https://www.pinterest.com/pin/480970435182638702/>

# Oracle Premier Support

You have a one-stop support shop for

- Oracle cloud infrastructure
- Oracle Linux (on VM)
- MySQL related issues

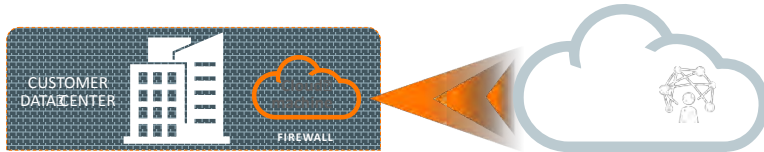
Only cloud vendor giving MySQL support as part of cloud service



# Flexible Deployment Options

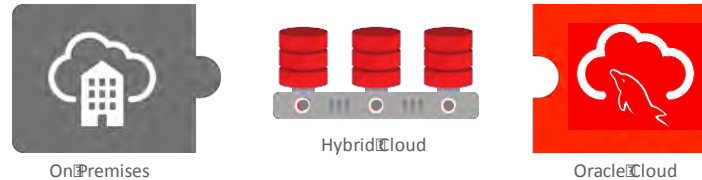
Same Standards, Same Software, Unified Management

## Oracle Cloud Machine



- Oracle Cloud operated and **delivered as a service** behind your firewall
- **Same** MySQL Cloud Service technology, same updates as Oracle Cloud
- **Conforms** to regulatory, privacy, legal and business requirements

## Hybrid



- **Move workloads** between on-premises and Oracle Cloud
- **Keep control** over business-critical systems
- Oracle MySQL monitoring tools for **unified management**

## Oracle Cloud



- **Migrate** existing MySQL applications
- **Build** cloud native MySQL applications
- **Same** programming language support as on-premise