

# ZABBIX 2020 Conference CHINA

演讲主题

透视MySQL性能 和 排查的方法

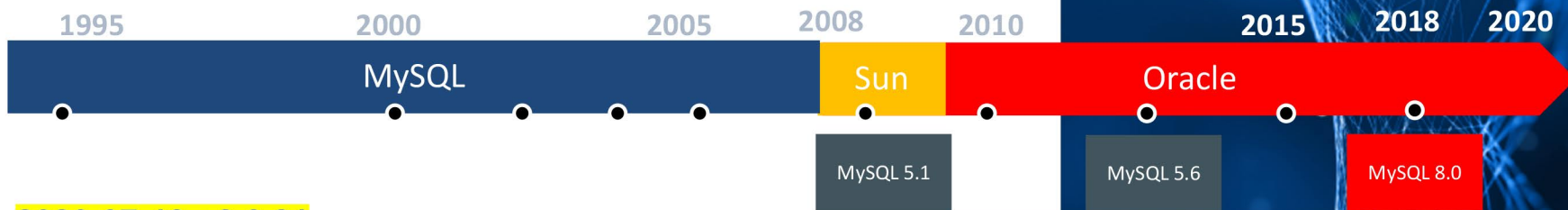
演讲嘉宾

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20200926



# 最新版本： MySQL 8.0.21



**2020-07-13 : 8.0.21**

2020-04-27 : 8.0.20

2020-01-13 : 8.0.19

2019-10-14 : 8.0.18

2019-07-22 : 8.0.17

2019-04-25 : 8.0.16

2019-02-01 : 8.0.15 / 2019-01-21 : 8.0.14

2018-10-22 : 8.0.13

2018-07-27 : 8.0.12

2018-04-19 : 8.0.11 General Availability – 第一个公开发布版本



# MySQL 版本

## MySQL 企业版

- MySQL 5.6
  - Feb-2021 (Extended Support End)
- MySQL 5.7
  - Oct-2020 (Premier Support End)
  - Oct-2023 (Extended Support End)
- MySQL 8.0 (Recommended)
  - More features and Latest!

最新发布：

- 2020-07 : 8.0.21

Release	GA Date	Premier Support End	Extended Support End	Sustaining Support End
MySQL Database 5.0	Oct 2005	Dec 2011	Not Available	Indefinite
MySQL Database 5.1	Dec 2008	Dec 2013	Not Available	Indefinite
MySQL Database 5.5	Dec 2010	Dec 2015	Dec 2018	Indefinite
MySQL Database 5.6	Feb 2013	Feb 2018	Feb 2021	Indefinite
MySQL Database 5.7	Oct 2015	Oct 2020	Oct 2023	Indefinite
MySQL Database 8.0	Apr 2018	Apr 2023	Apr 2026	Indefinite
MySQL Cluster 6	Aug 2007	Mar 2013	Not Available	Indefinite
MySQL Cluster 7.0	Apr 2009	Apr 2014	Not Available	Indefinite
MySQL Cluster 7.1	Apr 2010	Apr 2015	Not Available	Indefinite
MySQL Cluster 7.2	Feb 2012	Feb 2017	Feb 2020	Indefinite
MySQL Cluster 7.3	Jun 2013	Jun 2018	Jun 2021	Indefinite
MySQL Cluster 7.4	Feb 2015	Feb 2020	Feb 2023	Indefinite
MySQL Cluster 7.5	Oct 2016	Oct 2021	Oct 2024	Indefinite
MySQL Cluster 7.6	May 2018	May 2023	May 2026	Indefinite
MySQL Cluster 8.0	Jan 2020	Jan		



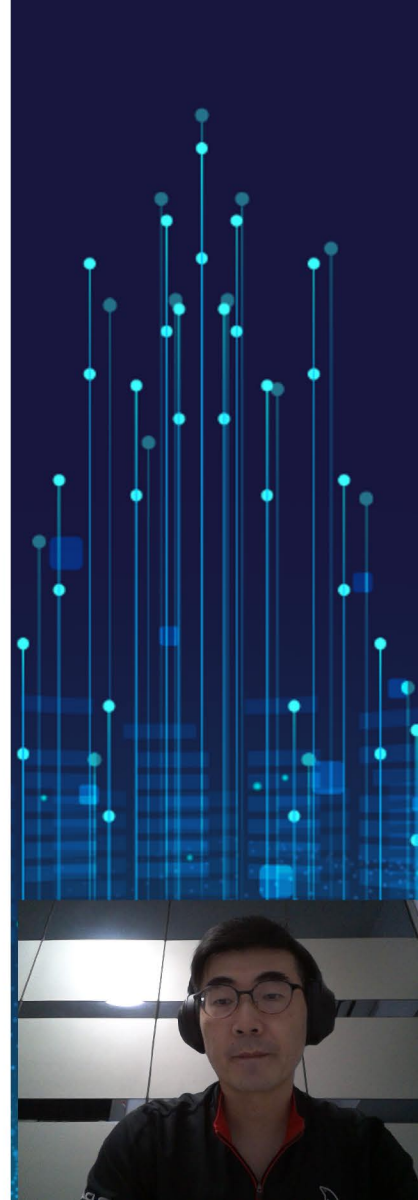
# MySQL 和 Zabbix

## Zabbix使用MySQL作为数据存储库

- # mysql -uroot -p
- mysql> create database zabbix character set utf8 collate utf8\_bin;
- mysql> create user zabbix@localhost identified with **mysql\_native\_password** by 'password';
- mysql> grant all privileges on zabbix.\* to zabbix@localhost;
- mysql> quit;
- zcat /usr/share/doc/zabbix-server-mysql\*/create.sql.gz | mysql -uzabbix -p zabbix

## Zabbix 监控 MySQL

- **Template DB MySQL by Zabbix agent 2 :**  
<https://www.zabbix.com/integrations/mysql#tab:official2>
- For Zabbix version: 5.0
- MySQL, version 5.7, **8.0**





# MySQL 8.0 & Zabbix

## Authentication Plugins

MySQL 8.0 has new default authentication plugin

`cached_sha2_password`

Before 8.0, default authentication plugin as `mysql_native_password`

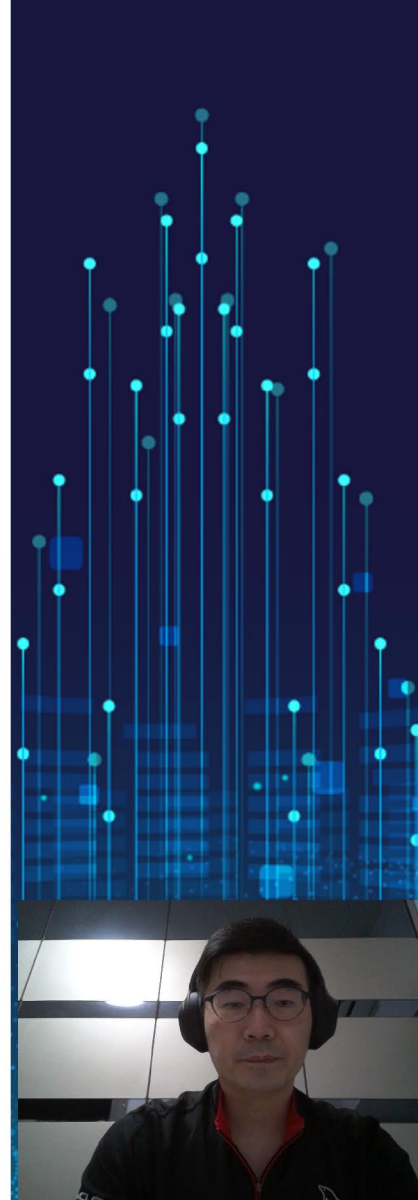
```
CREATE USER <user>@<host>
```

```
IDENTIFIED WITH mysql_native_password BY '<password>'
```

## Reserved words

Certain key words as table name in **old version** of Zabbix

e.g. "groups"



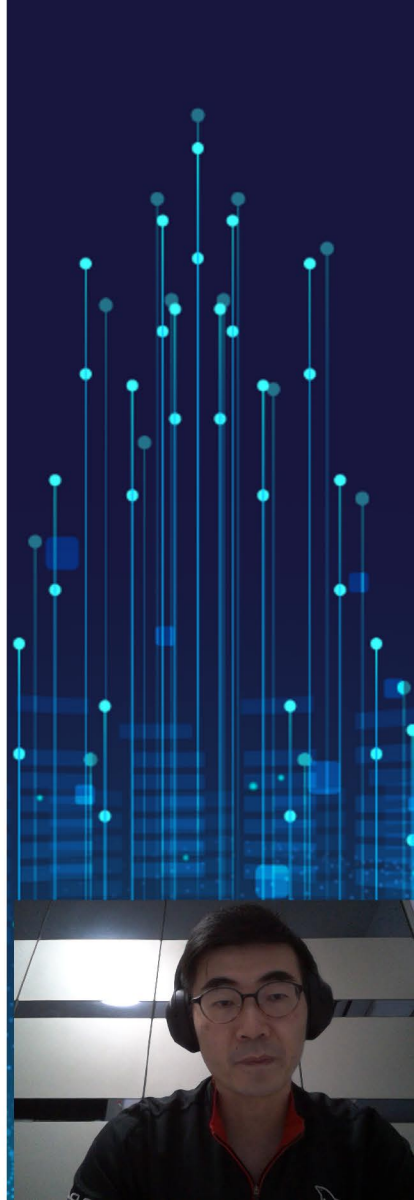
# MySQL 平台

## Zabbix 和 关键业务都需要

- 要有一个稳定数据库平台
- 数据安全
- 高性能

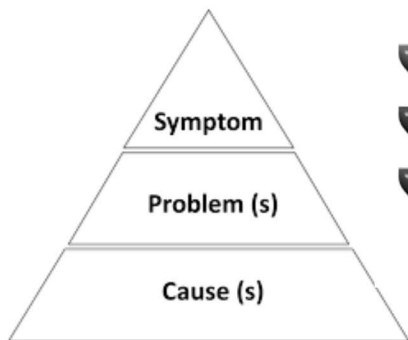
## 今天议题：**透视MySQL性能 & 排查的方法**

- 在哪里可以找到（性能或问题）数据 / 资料  
有什么好工具
- 对MySQL高可用部署上的配置和操作的优化来探讨  
MySQL InnoDB Cluster (MGR) 的配置优化



# 排查问题

问题症状 → 分析



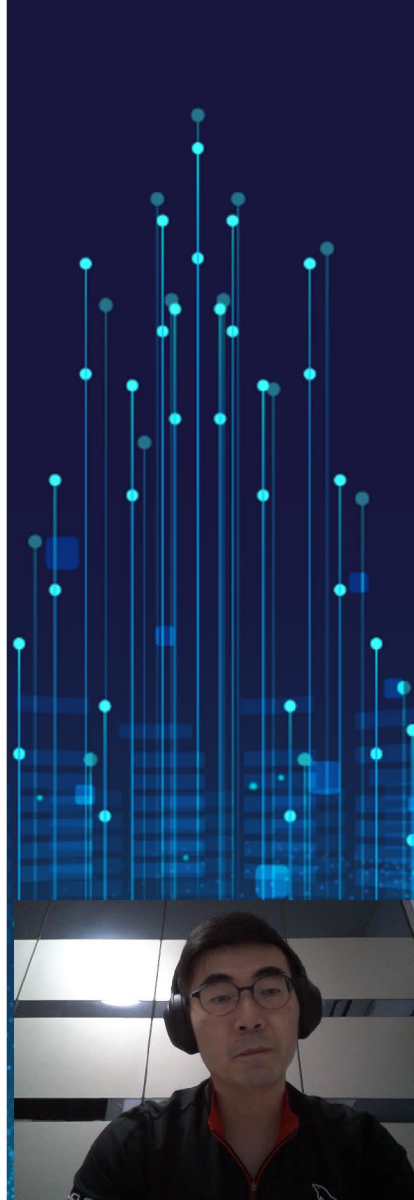
定义，发现，识别，监视

Discovery

Identify

Define

Monitoring....



# 分析工具

日志文件 - <https://dev.mysql.com/doc/refman/8.0/en/server-logs.html>

- 慢查询日志
- Error Log
- General Log
- MySQL Router, application
- AUDIT log\*\*\*

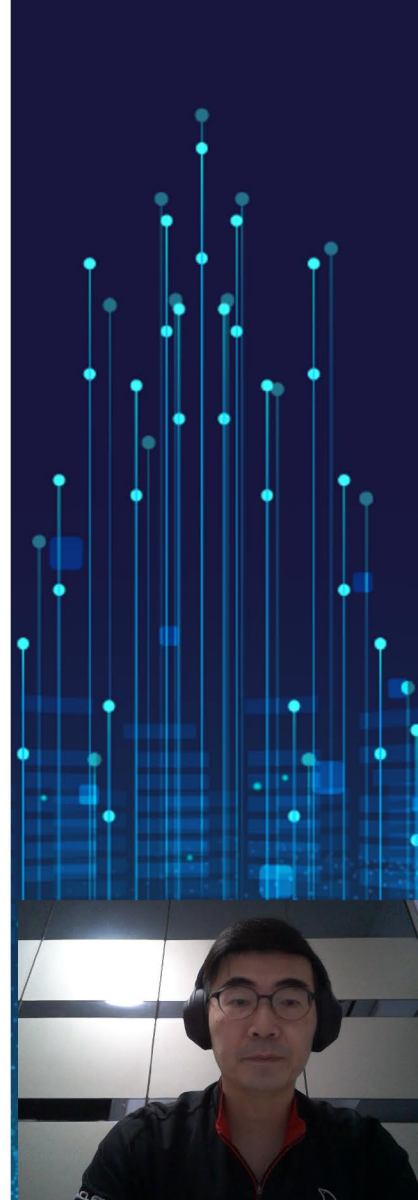
Performance & SYS schema

- sys.diagnostic(...)

SQL Performance → EXPLAIN

- Tabular EXPLAIN
- Structured EXPLAIN (FORMAT=JSON)
- Visual EXPLAIN (**MySQL Workbench**)

MySQL Enterprise Monitor (MEM) \*\*\* MySQL Enterprise Edition





## Error Log

Defined in my.cnf

```
log-error=/var/log/mysqld.log
```

**If NOT DEFINED,**  
standard error as console message



## log\_output

The destination or destinations for **general query log** and **slow query log** output.

Options : [TABLE | **FILE** | NONE ]

If TABLE –

```
SHOW CREATE TABLE mysql.general_log;
```

```
SHOW CREATE TABLE mysql.slow_log;
```



# 日志

## 慢查询日志

- long\_query\_time, min\_examined\_row\_limit, log\_queries\_not\_using\_indexes, log\_slow\_slave\_statements <for replica – by default OFF>, slow\_query\_log[={0|1}],
- slow\_query\_log\_file=file\_name)
- 查看 slow log
  - 内容 (SQL)
    - Query\_time : 执行时间, 以秒为单位。
    - Lock\_time: :锁定的时间 (以秒为单位)
    - Rows\_sent : 行数发送.
    - Rows\_examined : 检查过的行数 (不计算存储内部的处理)
- mysqldumpslow :  
<https://dev.mysql.com/doc/refman/8.0/en/mysqldumpslow.html>

```
# Time: 140905 6:33:11
# User@Host: dbuser[dbname] @ hostname [1.2.3.4]
# Query_time: 0.116250 Lock_time: 0.000035 Rows_sent: 0
Rows_examined: 20878
use dbname;
SET timestamp=1409898791;
...SLOW QUERY HERE...
```



# General Log

<https://dev.mysql.com/doc/refman/8.0/en/query-log.html>

The general query log is a general record of what **mysqld** is doing.

```
--general_log[={0|1}].
```

```
--general_log_file=file_name
```





# 什么是 Performance Schema & SYS Schema

## MySQL Performance Schema

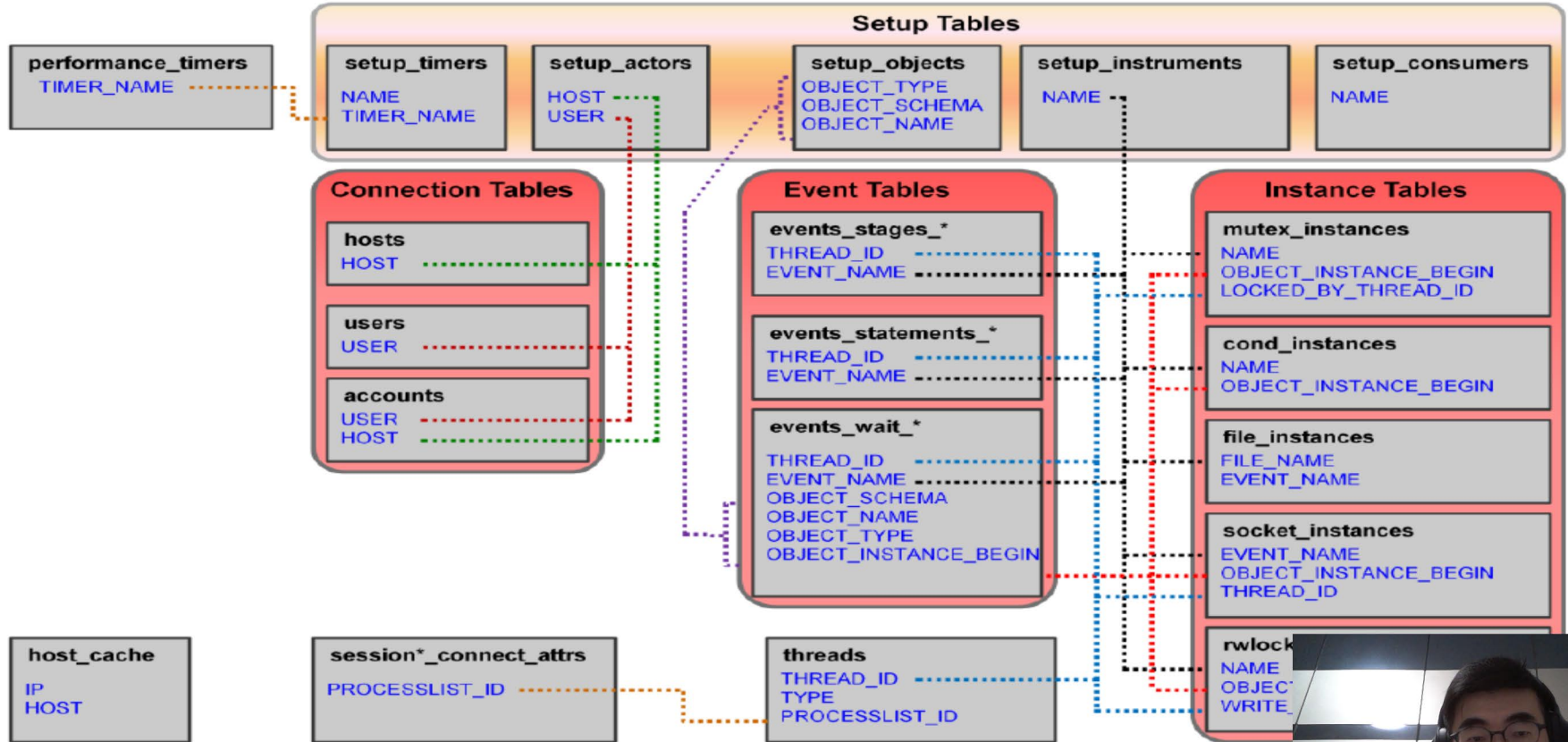
- 原始数据-运行时详细和统计数据  
(在代码级别按工具收集数据)
- 使用PERFORMANCE\_SCHEMA存储引擎实现
- 内存数据

## SYS Schema

- Views 视图-可读性高
- Stored Proc ...
  - `CALL sys.ps_truncate_all_tables(FALSE);`
  - `CALL sys.diagnostics(..)`



# MySQL Performance\_schema Database



# setup tables

HOST	USER	ROLE	ENABLED	HISTORY
%	%	%	YES	YES
NULL	NULL			

setup\_actor

NAME	ENABLED	TIMED	PROPERTIES	VOLATILITY	DOCUMENTATION
wait/synch/mutex/pfs/LOCK_pfs_share_list	NO	NO	singleton	1	Components can provide
wait/synch/mutex/sql/TC_LOG_MMAP::LOCK_tc	NO	NO		0	NULL
wait/synch/mutex/sql/MYSQL_BIN_LOG::LOCK_binlog	NO	NO		0	NULL
wait/synch/mutex/sql/MYSQL_BIN_LOG::LOCK_binlog	NO	NO		0	NULL
wait/synch/mutex/sql/MYSQL_BIN_LOG::LOCK_binlog	NO	NO		0	NULL
wait/synch/mutex/sql/MYSQL_BIN_LOG::LOCK_binlog	NO	NO		0	NULL
wait/synch/mutex/sql/MYSQL_BIN_LOG::LOCK_binlog	NO	NO		0	NULL
wait/synch/mutex/sql/MYSQL_BIN_LOG::LOCK_binlog	NO	NO		0	NULL

setup\_instruments

OBJECT_TYPE	OBJECT_SCHEMA	OBJECT_NAME	ENABLED	TIMED
EVENT	mysql	%	NO	NO
EVENT	performance_schema	%	NO	NO
EVENT	information_schema	%	NO	NO
EVENT	%	%	YES	YES
FUNCTION	mysql	%	NO	NO
FUNCTION	performance_schema	%	NO	NO
FUNCTION	information_schema	%	NO	NO
FUNCTION	%	%	YES	YES
PROCEDURE	mysql	%	NO	NO
PROCEDURE	performance_schema	%	NO	NO
PROCEDURE	information_schema	%	NO	NO
PROCEDURE	%	%	YES	YES
TABLE	mysql	%	NO	NO
TABLE	performance_schema	%	NO	NO
TABLE	information_schema	%	NO	NO
TABLE	%	%	YES	YES
TRIGGER	mysql	%	NO	NO
TRIGGER	performance_schema	%	NO	NO
TRIGGER	information_schema	%	NO	NO
TRIGGER	%	%	YES	YES
NULL	NULL	NULL	NULL	NULL

setup\_objects

NAME	ENABLED	HISTORY	PROPERTIES	VOLATILITY	DOC
thread/performance_schema/setup	YES	YES	singleton	0	NULL
thread/sql/con_named_pipes	YES	YES	singleton	0	NULL
thread/sql/con_shared_mem	YES	YES	singleton	0	NULL
thread/sql/con_sockets	YES	YES	singleton	0	NULL
thread/sql/shutdown_restart	YES	YES	singleton	0	NULL
thread/sql/bootstrap	YES	YES	singleton	0	NULL
thread/sql/manager	YES	YES	singleton	0	NULL
thread/sql/main	YES	YES	singleton	0	NULL
thread/sql/one_connection	YES	YES	user	0	NULL
thread/sql/signal_handler	YES	YES	singleton	0	NULL
thread/sql/compress_gtid_table	YES	YES	singleton	0	NULL
thread/sql/parser_service	YES	YES	singleton	0	NULL
thread/sql/admin_interface	YES	YES	user	0	NULL
thread/mysys/thread_timer_notifier	YES	YES	singleton	0	NULL
thread/sql/event_scheduler	YES	YES	singleton	0	NULL
thread/sql/event_worker	YES	YES		0	NULL

setup\_threads

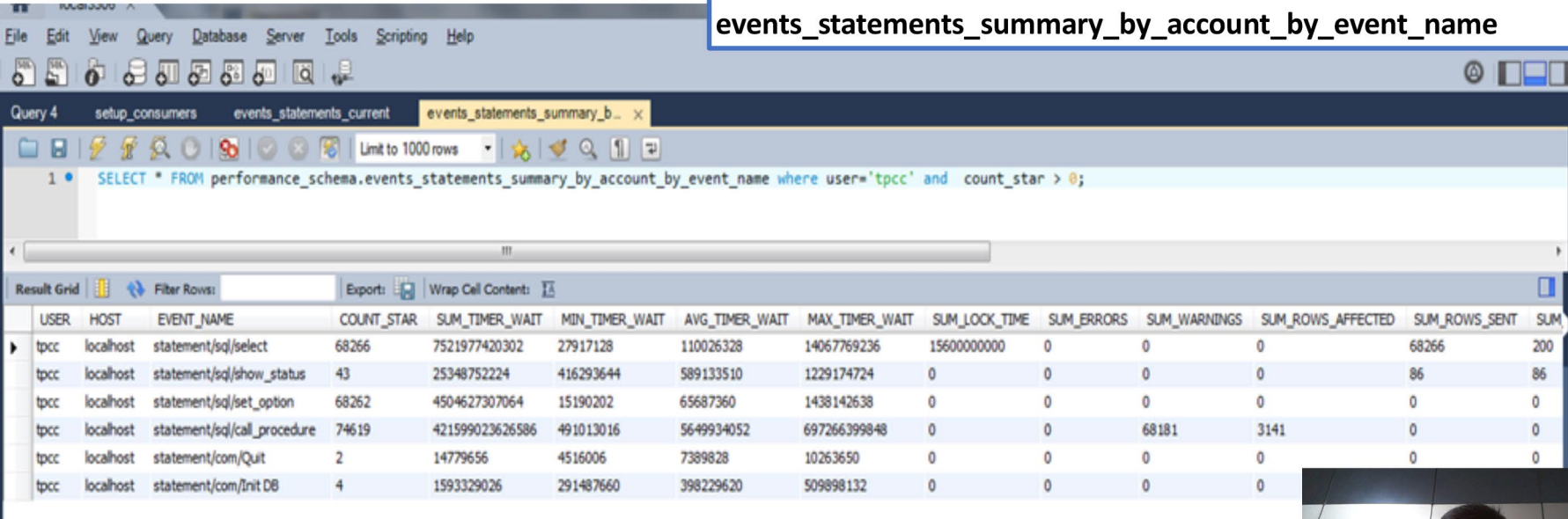
NAME	ENABLED
events_stages_current	NO
events_stages_history	NO
events_stages_history_long	NO
events_statements_current	YES
events_statements_history	YES
events_transactions_current	YES
events_transactions_history	YES
events_transactions_history_long	NO
events_waits_current	NO
events_waits_history	NO
events_waits_history_long	NO
global	
thread	
statement	
NULL	

setup\_consumers



# 按帐户的语句摘要(e.g. 'tpcc')

Table :  
events\_statements\_summary\_by\_account\_by\_event\_name



The screenshot shows a MySQL query tool interface. The query executed is: `SELECT * FROM performance_schema.events_statements_summary_by_account_by_event_name where user='tpcc' and count_star > 0;`. The result grid displays the following data:

USER	HOST	EVENT_NAME	COUNT_STAR	SUM_TIMER_WAIT	MIN_TIMER_WAIT	AVG_TIMER_WAIT	MAX_TIMER_WAIT	SUM_LOCK_TIME	SUM_ERRORS	SUM_WARNINGS	SUM_ROWS_AFFECTED	SUM_ROWS_SENT	SUM...
tpcc	localhost	statement/sql/select	68266	7521977420302	27917128	110026328	14067769236	15600000000	0	0	0	68266	200
tpcc	localhost	statement/sql/show_status	43	25348752224	416293644	589133510	1229174724	0	0	0	0	86	86
tpcc	localhost	statement/sql/set_option	68262	4504627307064	15190202	65687360	1438142638	0	0	0	0	0	0
tpcc	localhost	statement/sql/call_procedure	74619	421599023626586	491013016	5649934052	697266399848	0	0	68181	3141	0	0
tpcc	localhost	statement/com/Quit	2	14779656	4516006	7389828	10263650	0	0	0	0	0	0
tpcc	localhost	statement/com/Init DB	4	1593329026	291487660	398229620	509898132	0	0	0	0	0	0





## 为什么SQL需要1.40秒才能运行

```
mysql> select s_i_id, s_quantity from stock where s_quantity > 100;  
Empty set (1.40 sec)  
  
mysql>
```



# 為什麼SQL需要這麼長時間...

```
mysql> select s_i_id, s_quantity from stock where s_quantity > 100;  
Empty set (1.48 sec)  
  
mysql>
```

```
SELECT sql_text, (timer_end - timer_start)/1000000000000, rows_sent, rows_examined f  
FROM performance_schema.events_statements_history_long where rows_examined > 0;
```

sql_text	(timer_end - timer_start)/1000000000000	rows_sent	rows_examined
select c_id, c_first, c_middle, c_last from customer where c_last = 'ma'	0.3055	0	150000
select s_i_id, s_quantity from stock where s_quantity > 100	1.3985	0	500000
show global status where Variable_name = 'Handler_commit' or Variable_name = '...	0.0008	2	2
show global status where Variable_name = 'Handler_commit' or Variable_name = '...	0.0004	2	2



MySQL Workbench

102-3306 x

File Edit View Query Database Server Tools Scripting Help

Navigator

SCHEMAS

Filter objects

performance\_schema

sys

Tables

Views

- host\_summary
- host\_summary\_by\_file\_io
- host\_summary\_by\_file\_io\_type
- host\_summary\_by\_stages
- host\_summary\_by\_statement\_latency
- host\_summary\_by\_statement\_type
- innodb\_buffer\_stats\_by\_schema
- innodb\_buffer\_stats\_by\_table
- io\_by\_thread\_by\_latency
- io\_global\_by\_file\_by\_bytes
- io\_global\_by\_file\_by\_latency
- io\_global\_by\_wait\_by\_bytes
- io\_global\_by\_wait\_by\_latency
- latest\_file\_io
- processlist
- ps\_check\_lost\_instrumentation

Management Schemas

Information

View: io\_global\_by\_file\_by\_bytes

Columns:

- file varchar(260)
- count\_read bigint(20) UN
- total\_read varchar(16)
- avg\_read varchar(16)
- count\_write bigint(20) UN
- total\_written varchar(16)
- avg\_write varchar(16)
- total varchar(16)
- write\_pct decimal(25, 2)

Object Info Session

ock\_instances table\_io\_waits\_summary\_by\_ta... host\_summary host\_summary\_by\_file\_io host\_summary\_by\_statement\_la... io\_by\_thread\_by\_latency io\_glob

Limit to 1000 rows

1 • SELECT \* FROM sys.io\_global\_by\_file\_by\_bytes where file like '%tpcc%';


Result Grid

file	count_read	total_read	avg_read	count_write	total_written	avg_write	total	write_pct
@@datadir/tpcc/stock.ibd	135193	2.06 GiB	16.00 KiB	179576	2.91 GiB	17.01 KiB	4.98 GiB	58.54
▶ @@datadir/tpcc/customer.ibd	90219	1.38 GiB	16.00 KiB	38627	713.27 MiB	18.91 KiB	2.07 GiB	33.60
@@datadir/tpcc/order_line.ibd	4668	72.94 MiB	16.00 KiB	15362	416.73 MiB	27.78 KiB	489.67 MiB	85.10
@@datadir/tpcc/orders.ibd	4439	69.36 MiB	16.00 KiB	9104	170.00 MiB	19.12 KiB	239.36 MiB	71.02
@@datadir/tpcc/item.ibd	7007	109.48 MiB	16.00 KiB	656	26.50 MiB	41.37 KiB	135.98 MiB	19.49
@@datadir/tpcc/history.ibd	31	496.00 KiB	16.00 KiB	1325	41.88 MiB	32.36 KiB	42.36 MiB	98.86
@@datadir/tpcc/new_order.ibd	48	768.00 KiB	16.00 KiB	1986	40.39 MiB	20.83 KiB	41.14 MiB	98.18
@@datadir/tpcc/district.ibd	7	112.00 KiB	16.00 KiB	40	704.00 KiB	17.60 KiB	816.00 KiB	86.27
@@datadir/tpcc/warehouse.ibd	3	48.00 KiB	16.00 KiB	39	688.00 KiB	17.64 KiB	736.00 KiB	93.48
@@datadir/tpcc/customer.frm	22	6.14 KiB	286 bytes	57	6.04 KiB	109 bytes	12.19 KiB	49.60
@@datadir/tpcc/stock.frm	22	4.35 KiB	202 bytes	49	5.45 KiB	114 bytes	9.79 KiB	55.62
@@datadir/tpcc/district.frm	22	2.90 KiB	135 bytes	37	4.96 KiB	137 bytes	7.86 KiB	63.13
@@datadir/tpcc/order_line.frm	22	2.88 KiB	134 bytes	35	4.96 KiB	145 bytes	7.83 KiB	63.28
@@datadir/tpcc/warehouse.frm	22	2.61 KiB	122 bytes	33	4.87 KiB	151 bytes	7.48 KiB	65.08
@@datadir/tpcc/orders.frm	22	2.58 KiB	120 bytes	31	4.86 KiB	160 bytes	7.44 KiB	65.20
@@datadir/tpcc/history.frm	22	2.32 KiB	108 bytes	31	4.77 KiB	158 bytes	7.09 KiB	65.20
@@datadir/tpcc/item.frm	22	2.15 KiB	100 bytes	25	4.71 KiB	193 bytes	6.86 KiB	65.20
@@datadir/tpcc/new_order.frm	22	1.79 KiB	84 bytes	21	4.59 KiB	224 bytes	6.39 KiB	65.20
@@datadir/tpcc/district.frm	0	0 bytes	0 bytes	1	65 bytes	65 bytes	65 bytes	65.20

io\_global\_by\_file\_by\_bytes 2 x

Output

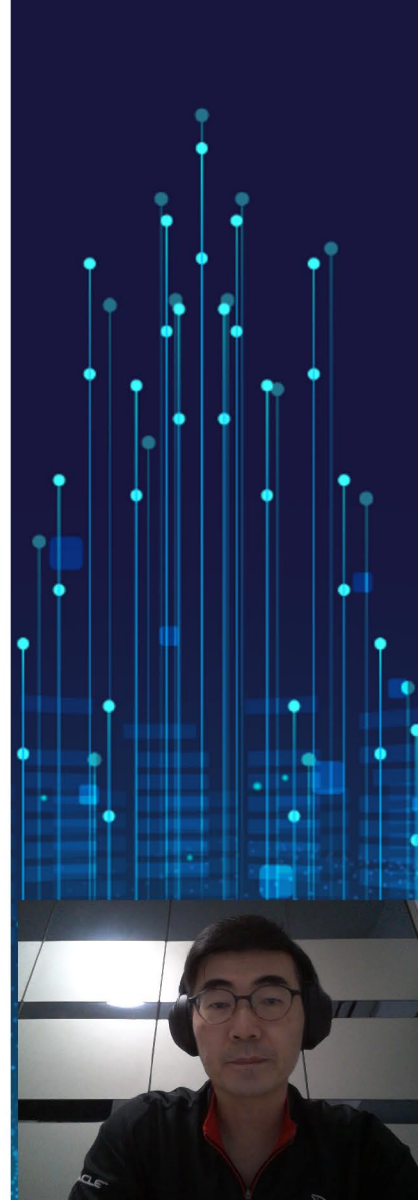
Action Output



# MySQL Workbench

The screenshot displays the MySQL Workbench interface for a local3316 instance. The left sidebar contains navigation menus for MANAGEMENT, INSTANCE, PERFORMANCE, and MYSQL ENTERPRISE. The PERFORMANCE menu is expanded, and 'Performance Reports' is highlighted. The main window shows the 'Performance Reports' section with a tree view on the left and a 'Statement Analysis' table on the right. The table lists various SQL queries with their execution statistics.

Query	Full Table S...	Executed (#)	Errors (#)	Warnings (#)	Total Time
SHOW SESSION VARIABLES LIKE ?	*	13	0	0	5633
SELECT ( 'cat' , 'name' COLLATE 'utf8_tolower_ci'...	*	1	0	0	1504
SHOW PLUGINS	*	1	0	0	1004
SHOW GLOBAL STATUS	*	2	0	0	788
SELECT 'cs' , 'name' AS 'CHARACTER_SET_NAME'...	*	5	0	0	500
SHOW SESSION STATUS LIKE ?	*	2	0	0	467
SHOW VARIABLES	*	2	0	0	458
SELECT 'col' , 'name' AS 'COLLATION_NAME' , 'cs...	*	1	0	0	310
SELECT ( 'cat' , 'name' COLLATE 'utf8_tolower_ci'...	*	1	0	0	252
SELECT ? AS 'sys_version' , 'version' ( ) AS 'mysql...	*	2	0	0	158
SET 'autocommit' = ?	*	6	0	0	117
SELECT CURRENT_USER ( )	*	5	0	0	98
SELECT @@ 'skip_networking' , @@ 'skip_name_resol...	*	1	0	0	63
SET NAMES ?	*	4	0	0	58
SHOW 'CONNECTION_ID' ( )	*	2	0	0	53
SHOW GRANTS	*	2	0	0	54
SELECT @@ 'performance_schema'	*	2	0	0	33
SET CHARACTER SET 'utf8'	*	2	0	0	29
SET NAMES 'utf8'	*	2	0	2	27
SHOW ENGINES	*	1	0	0	26
SET 'SQL_SAFE_UPDATES' = ?	*	1	0	0	14





# sys.diagnostics(..)

```
diagnostics.allow_i_s_tables, @sys.diagnostics.allow_i_s_tables
```

```
diagnostics.include_raw, @sys.diagnostics.include_raw
```

```
statement_truncate_len, @sys.statement_truncate_len
```

```
1  mysql> tee diag.out;  
2  mysql> CALL sys.diagnostics(120, 30, 'current');  
3  mysql> notee;
```



# sys.diagnostics(..) 环境报告

```
mysql> set @sys.diagnostics.allow_i_s_tables='on';  
Query OK, 0 rows affected (0.00 sec)
```

```
mysql> call sys.diagnostics(120,30,'full');
```

```
+-----+  
| summary |  
+-----+  
| Disabled 1 thread |  
+-----+  
1 row in set (0.01 sec)
```

```
+-----+-----+  
| Name | Value |  
+-----+-----+  
| Hostname | virtual-41.localhost |  
| Port | 3316 |  
| Socket | /home/mysql/data/31a/mysql.sock |  
| Datadir | /home/mysql/data/31a/ |  
| Server UUID | 5166c922-8b5d-11e9-bf47-0800271b198a |  
+-----+-----+  
| MySQL Version | 8.0.16-commercial |  
| Sys Schema Version | 2.0.0 |  
| Version Comment | MySQL Enterprise Server - Commercial |  
| Version Compile OS | e17 |  
| Version Compile Machine | x86_64 |  
+-----+-----+  
| UTC Time | 2019-06-10 08:58:54 |  
| Local Time | 2019-06-10 16:58:54 |  
| Time Zone | SYSTEM |  
| System Time Zone | HKT |  
| Time Zone Offset | 08:00:00 |  
+-----+-----+  
17 rows in set (0.03 sec)
```

## Global Variables

```
+-----+-----+  
| Variable_name | value |  
+-----+-----+  
| autocommit | ON |  
| automatic_sp_privileges | ON |  
| wait_timeout | 28800 |  
+-----+-----+  
444 rows in set (0.02 sec)
```



# Sys.Diagnostics (...)

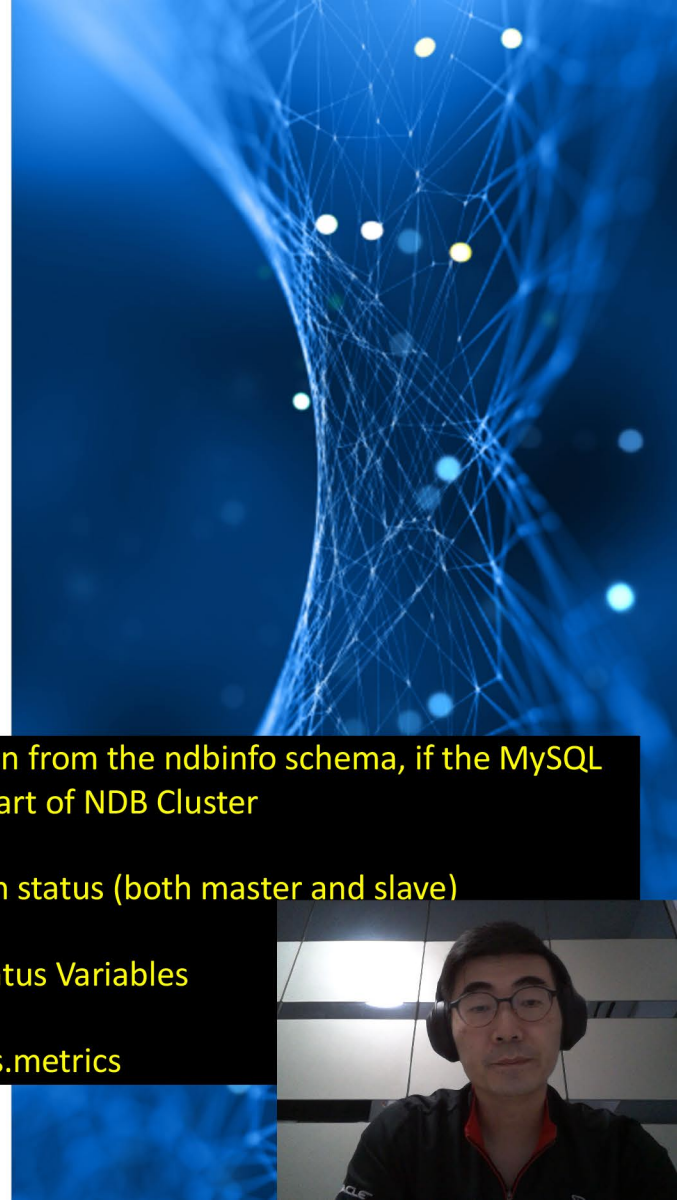
Environment Info

InnoDB Engine Status

Information from the metrics view e.g.

- Queries with Runtime in 95th Percentile
- Overall host\_summary\_by\_file\_io\_type
- Overall host\_summary\_by\_statement\_type
- Overall host\_summary\_by\_statement\_type
- Overall io\_by\_thread\_by\_latency
- Overall io\_global\_by\_file\_by\_bytes
- Overall io\_global\_by\_file\_by\_latency
- Overall io\_global\_by\_wait\_by\_bytes
- Overall schema\_index\_statistics
- Overall schema\_table\_statistics

- Information from the ndbinfo schema, if the MySQL server is part of NDB Cluster
- Replication status (both master and slave)
- Delta – Status Variables
- Delta – Sys.metrics



## 收集数据的好习惯 sys.diagnostics ( ... )

向SUPPORT提交报告时 寻求帮助

检查数据是否可以分发数据！  
有没有敏感数据？

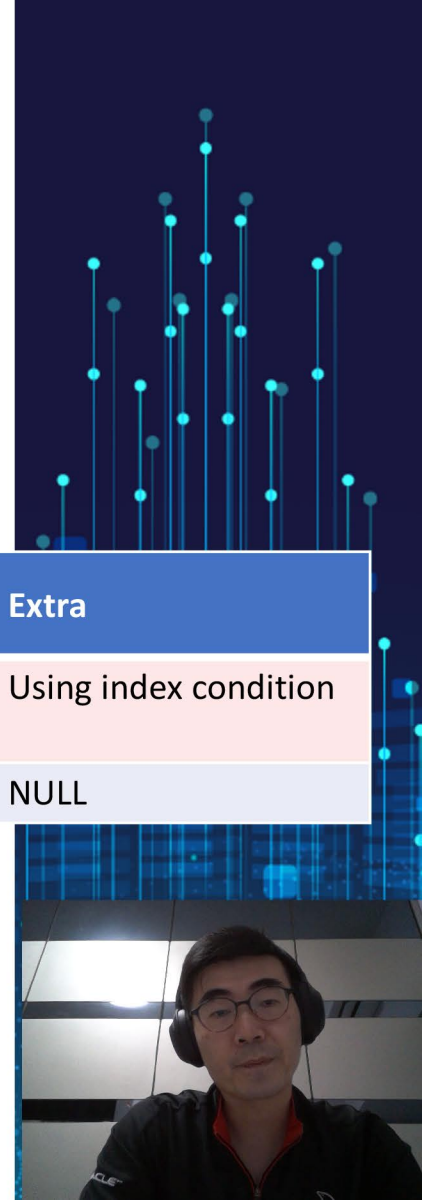




# EXPLAIN 【了解查询计划】

```
EXPLAIN SELECT * FROM t1 JOIN t2 ON t1.a = t2.a WHERE b > 10 AND c > 10;
```

id	select_type	table	partitions	type	possible keys	key	key len	ref	rows	filtered	Extra
1	SIMPLE	t1	NULL	range	PRIMARY, idx1	idx1	4	NULL	12	33.33	Using index condition
2	SIMPLE	t2	NULL	ref	idx2	idx2	4	t1.a	1	100.00	NULL



# 更多的信息- EXPLAIN

FORMAT=JSON

```
EXPLAIN FORMAT=JSON SELECT * FROM t1, t2
WHERE t1.a=t2.a AND t2.a=9 AND (NOT (t1.a > 10 OR t2.b >3) OR (t1.b=t2.b+7 AND t2.b =5));
```

## EXPLAIN

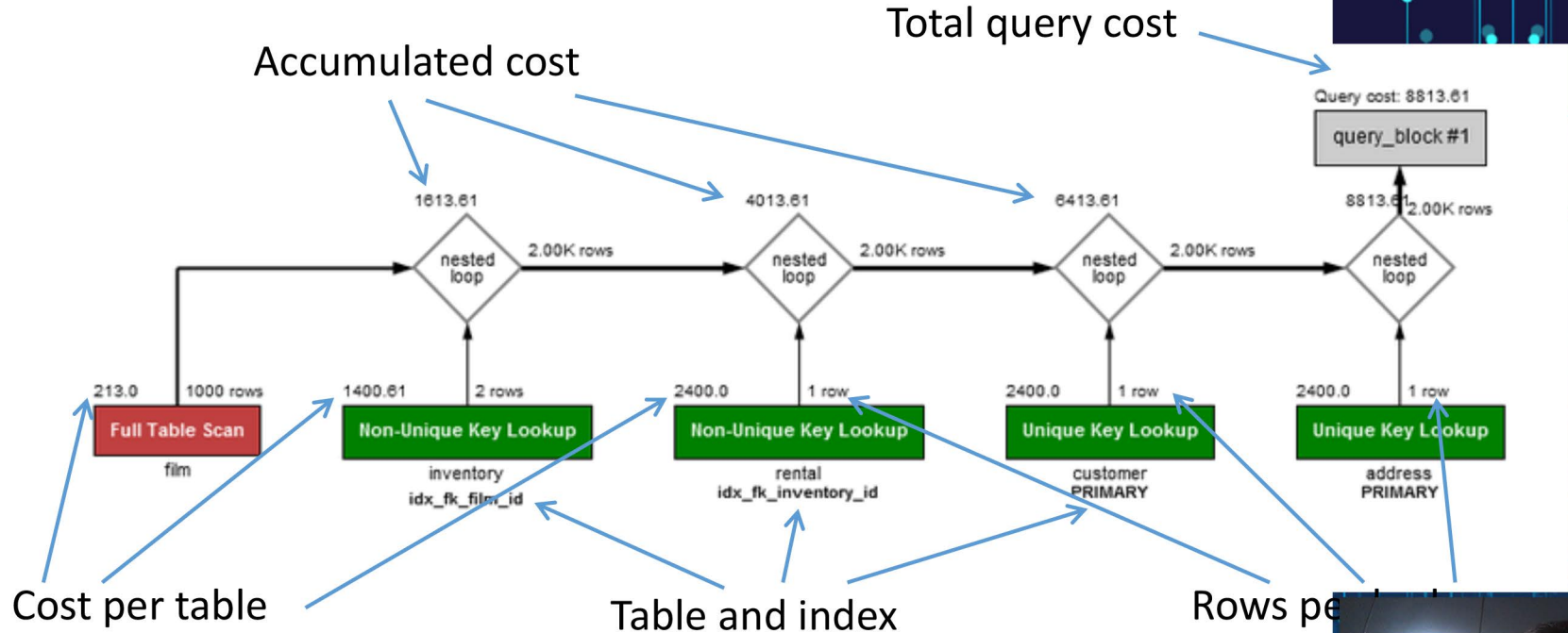
```
{
  "query_block": {
    "select_id": 1,
    "nested_loop": [
      {
        "table": {
          "table_name": "t1",
          "access_type": "ALL",
          "rows": 10,
          "filtered": 100,
          "attached_condition": "(t1.a = 9)"
        } /* table */
      },

```

```
{
  "table": {
    "table_name": "t2",
    "access_type": "ALL",
    "rows": 10,
    "filtered": 100,
    "using_join_buffer": "Block Nested Loop",
    "attached_condition": "((t2.a = 9) and ((t2.b <= 3) or ((t2.b =
5) and (t1.b = 12))))"
  } /* table */
} /* nested_loop */
} /* query_block */
}
```



# Visual EXPLAIN (MySQL Workbench)

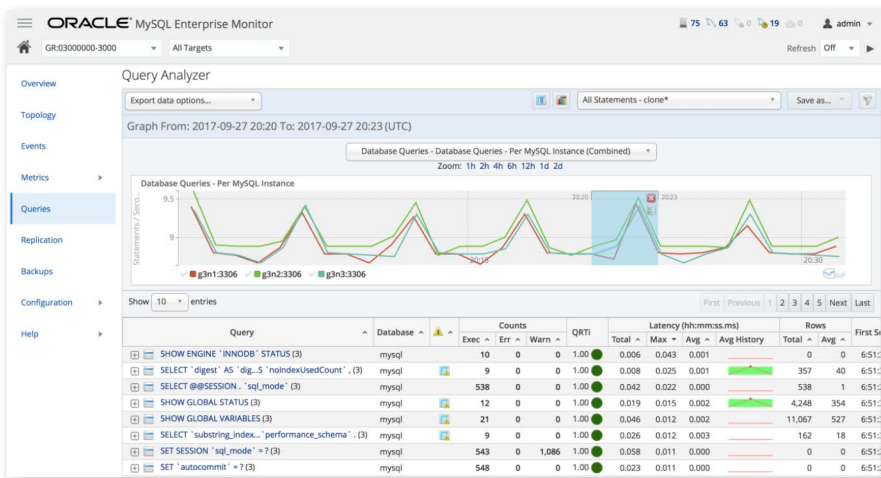


# Enterprise Monitor: Query Analyzer

MySQL 企业版 提供

MySQL ENTERPRISE MONITOR

语句分析器 可以帮助了解 SQL 性能和 排查



MySQL Query Analyzer, we were able to identify problematic SQL code, and triple our performance. More importantly, we were able to do this in three days, rather than taking

development Engineer  
es





# Enterprise Monitor: 简单的演示

The screenshot displays the Oracle MySQL Enterprise Monitor interface. The top navigation bar includes 'Dashboards', 'Events', 'Query Analyzer', and 'Reports & Graphs'. A dropdown menu is open under 'Dashboards', showing 'Overview', 'Replication', and 'MySQL Instances'. The main content area is divided into several sections:

- Database Availability:** Shows availability percentages for Day (73%), Week (71%), and Month (74%).
- Graphs:** Contains three charts: 'Connections - All MySQL Instances' (Total and Running connections), 'Database Activity - All MySQL Instances' (Statement counts for Select, Insert, Update, Replace, Delete, Call), and 'Query Response Time Index' (QRTI).
- Current Problem MySQL Instances:** A table listing instances with their status and severity levels.
- Current Problem Hosts:** A table listing hosts with their status and severity levels.
- Current Emergency & Critical Events:** A table listing events with their subjects, topics, times, and actions.

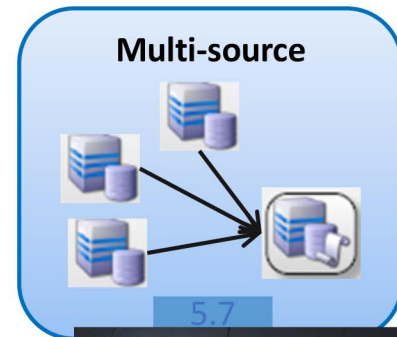
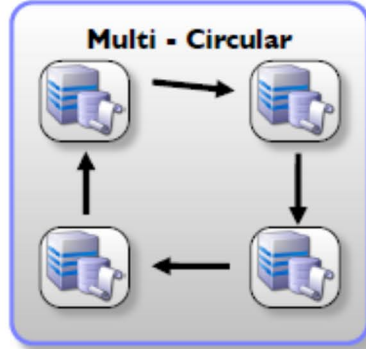
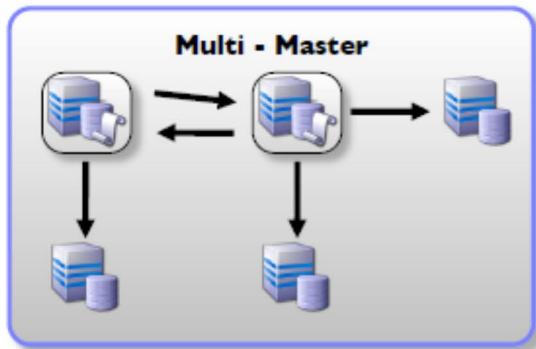
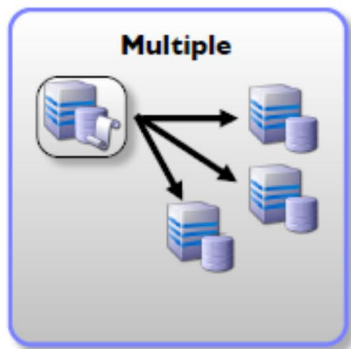
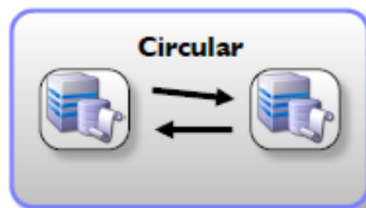
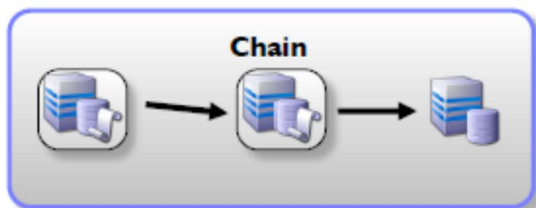
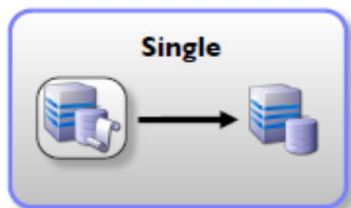
ID	Status	Emergency	Critical	Warning
mylab localdo...	Up	0	2	7
mylab localdo...	Up	0	4	12
hanode4-3306	Up	0	3	13
mylab localdo...	Up	0	3	12
hanode2-3306	Up	0	1	18

ID	Status	Emergency	Critical	Warning
mylab localdo...	Up	0	2	0

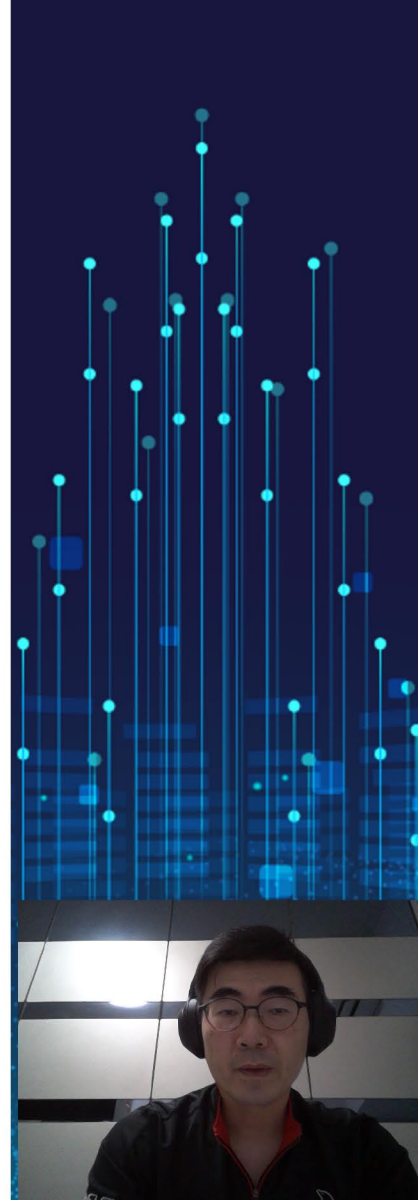
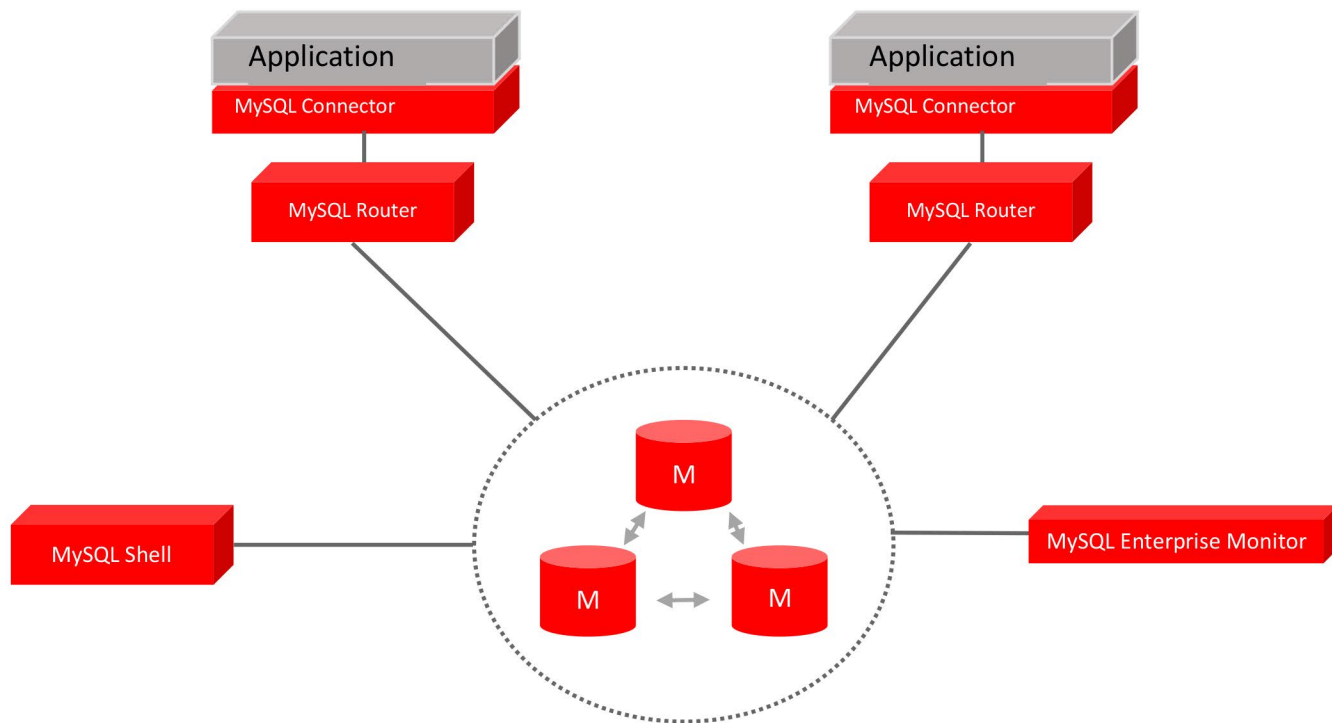
Subject	Topic	Time	Actions
mylab localdomain, mylab localdo...	SQL Statement Generates Error...	less than a minute ago	✗
hanode4-3306, [com.mysql.etc]...	SQL Statement Generates Error...	less than a minute ago	✗
mylab localdomain, mylab localdo...	Table Cache Not Optimal	less than a minute ago	✗
mylab localdomain, /mnt/nd (/dev...	Free Space Getting Low On Fil...	about a minute ago	✗
mylab localdomain, mylab localdo...	Average Statement Execution T...	2 minutes ago	✗
mylab localdomain	CPU I/O Wait Usage Excessive: ...	2 minutes ago	✗
mylab localdomain, mylab localdo...	Root Account Without Password	2 minutes ago	✗
mylab localdomain, mylab localdo...	Root Account Without Password	2 minutes ago	✗
mylab localdomain, mylab localdo...	Indexes Not Being Used Efficient...	7 minutes ago	✗
hanode2-3306	Indexes Not Being Used Efficient...	7 minutes ago	✗
hanode3-3306	Indexes Not Being Used Efficient...	7 minutes ago	✗
hanode4-3306	Indexes Not Being Used Efficient...	7 minutes ago	✗
mylab localdomain, mylab localdo...	Server Has Accounts Without A ...	7 minutes ago	✗
mylab localdomain, mylab localdo...	Server Has Accounts Without A ...	7 minutes ago	✗
mylab localdomain, mylab localdo...	Server Has Anonymous Accounts	7 minutes ago	✗
mylab localdomain, mylab localdo...	Server Has Anonymous Accounts	7 minutes ago	✗



# MySQL 高可用部署 - 复制



# MySQL InnoDB Cluster: 架构



Single Primary InnoDB Cluster 1

Worker: OFF

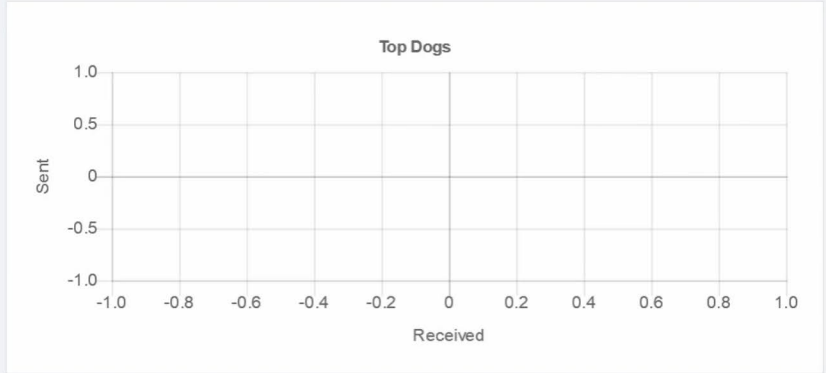
Balance

Fees

Users

Trans

Sender	Receiver	Amount	Fee
--------	----------	--------	-----



127.0.0.1 (Port: 3310), Online

127.0.0.1 (Port: 3320), Online

127.0.0.1 (Port: 3330), Online

127.0.0.1 (Port: 3340), Online





# MySQL 复制有关的配置

MySQL Server – Persisted Variables	From	Change to
slave-parallel-type	DATABASE	LOGICAL_CLOCK
slave-parallel-workers	not defined	e.g. 2 threads or more
slave_preserve_commit_order	not defined	ON
binlog-format		ROW
gtid-mode		Turn ON
enforce-gtid-consistency		
log-slave-updates		
master-info-repository		TABLE
relay-log-info-repository		
transaction-write-set-extraction		XXHASH64



# 复制性能 – 没有PRIMARY KEY

没有主键的表数据 – 大量 ( 1M 行)

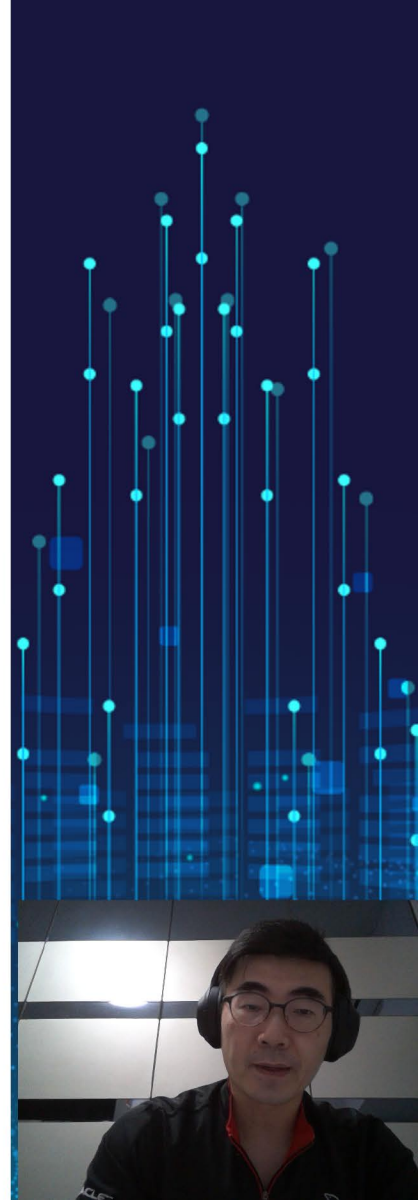
操作: 删除1K行

时间: 2 分钟

复制副本–RBR [Row-based-replication]

1k行 x 2分钟 要 2000分钟

**解决方法: Primary Key!!!**



# 总结

为Zabbix 和 关键系统 提供 一个稳定和高性能的数据库

性能和故障排查的工具

Performance and SYS Schema

MySQL Workbench

MySQL Enterprise Monitor

MySQL 高可用部署和优化

复制优化

MySQL InnoDB Cluster



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Conference  
CHINA

THANK YOU 😊

