MySQL Audit plugins

the missing manual

MySQL Belgium days 2026

Booking.com

Martin Alderete - Principal SRE

martin.alderete@booking.com

$ whoami

- Martin Alderete)

- Principal Site Reliability Engineer at Booking.com

- Database Engineering Team, Application Data Services

- 15+ years of experience in Distributed Systems, System-level Programming and Site Reliability

- Passionate about OSS (also contributor), member of different technical groups

Databases at **Booking** .com

MySQL is our main relational datastore

Single primary for WRITEs, tens or hundreds of replicas for READs
Always deploy across **multiple** regions (> 2)
In general, choose **availability** over consistency [1]

MySQL clusters
> 250

MySQL servers
> 10K

Multi-cloud

Our fleet spans across different platforms:

- Bare-Metal (ServerDB)
- Private Cloud (Openstack)
- Public Cloud (AWS)
  - Self-managed (EC2)
  - Managed (RDS)

Multi-tier Replication

We support two replication mechanisms:

- Semi-sync Replication
- Synchronous (Group) Replication

QPS
100M+

Services
Transactions, Fintech, Payments, Frontend, Customer Support

Ownership

We do **not** own database schemas
We do **not** own table contents
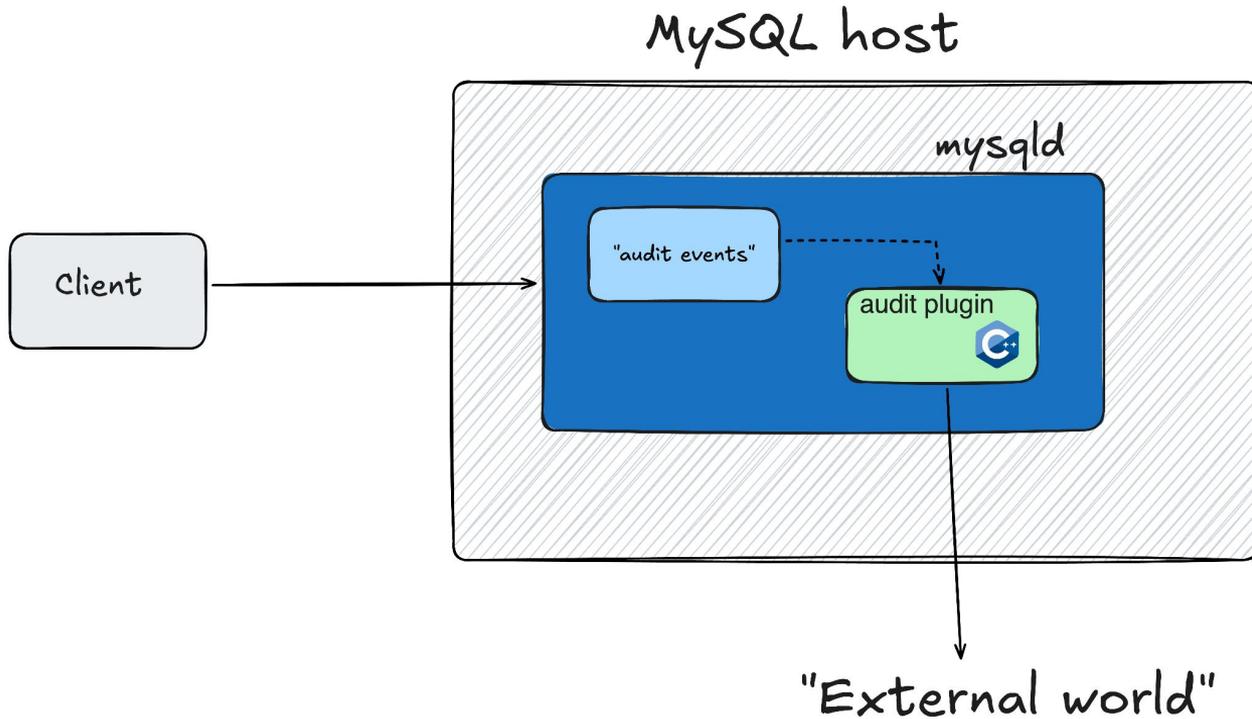We **do** own database infra and tooling

1. https://en.wikipedia.org/wiki/CAP_theorem / https://en.wikipedia.org/wiki/PACELC_theorem

Agenda

1. Anatomy of a MySQL's plugin

2. Runtime environment

3. The Hot-path

4. Concurrency

5. Observability

6. Demo

7. Takeaways

Anatomy of a MySQL audit plugin

MySQL host

mysqld

Client

"audit events"

audit plugin

"External world"

init()
deinit()
notify()

Runs inside MySQL 🔥
Load once
Called N times

Anatomy of a MySQL audit plugin (code)

```
/*
| Plugin library descriptor
*/
mysql_declare_plugin(audit_user_tables){
    MYSQL_AUDIT_PLUGIN,              /* type
    &mysqldays_descriptor,          /* descr
    "mysqldays",                    /* name
    "Martin Alderete",              /* autho
    "Example plugin for MySQL Belgium days 2
    PLUGIN_LICENSE_GPL,
    mysqldays_plugin_init,   ◄────  /* init
    nullptr,                        /* check
    mysqldays_plugin_deinit, ◄────  /* deini
    0x0001,                         /* versi
    statvars,                       /* statu
    system_variables,               /* syste
    nullptr,                        /* reser
    0,                              /* flags
} mysql_declare_plugin_end;
```

```
/**
@enum mysql_event_class_t

Audit event classes.
*/
typedef enum {
    MYSQL_AUDIT_GENERAL_CLASS = 0,
    MYSQL_AUDIT_CONNECTION_CLASS = 1,
    MYSQL_AUDIT_PARSE_CLASS = 2,
    MYSQL_AUDIT_AUTHORIZATION_CLASS = 3,
    MYSQL_AUDIT_TABLE_ACCESS_CLASS = 4,
    MYSQL_AUDIT_GLOBAL_VARIABLE_CLASS = 5,
    MYSQL_AUDIT_SERVER_STARTUP_CLASS = 6,
    MYSQL_AUDIT_SERVER_SHUTDOWN_CLASS = 7,
    MYSQL_AUDIT_COMMAND_CLASS = 8,
    MYSQL_AUDIT_QUERY_CLASS = 9,
    MYSQL_AUDIT_STORED_PROGRAM_CLASS = 10,
    MYSQL_AUDIT_AUTHENTICATION_CLASS = 11,
    MYSQL_AUDIT_MESSAGE_CLASS = 12,
    /* This item must be last in the list. */
    MYSQL_AUDIT_CLASS_MASK_SIZE
} mysql_event_class_t;
```
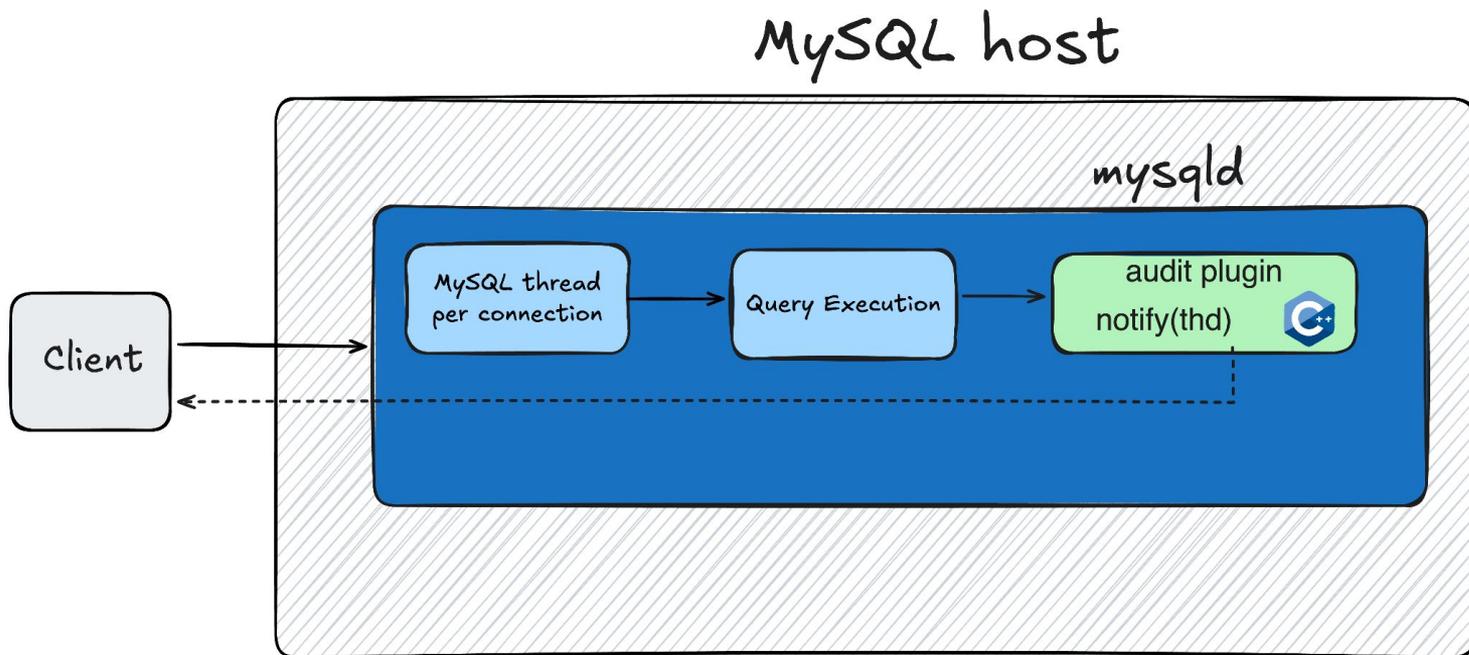
```
descriptor

ysqldays_descriptor = {
CE_VERSION, /* interface version   */
            /* release_thd function */
───────/* notify function      */

/
n */

tion */
ess */
riables */
artup */
utdown */
/
igned long>(MYSQL_AUDIT_QUERY_START), /* query */
ogram */
ation */
```
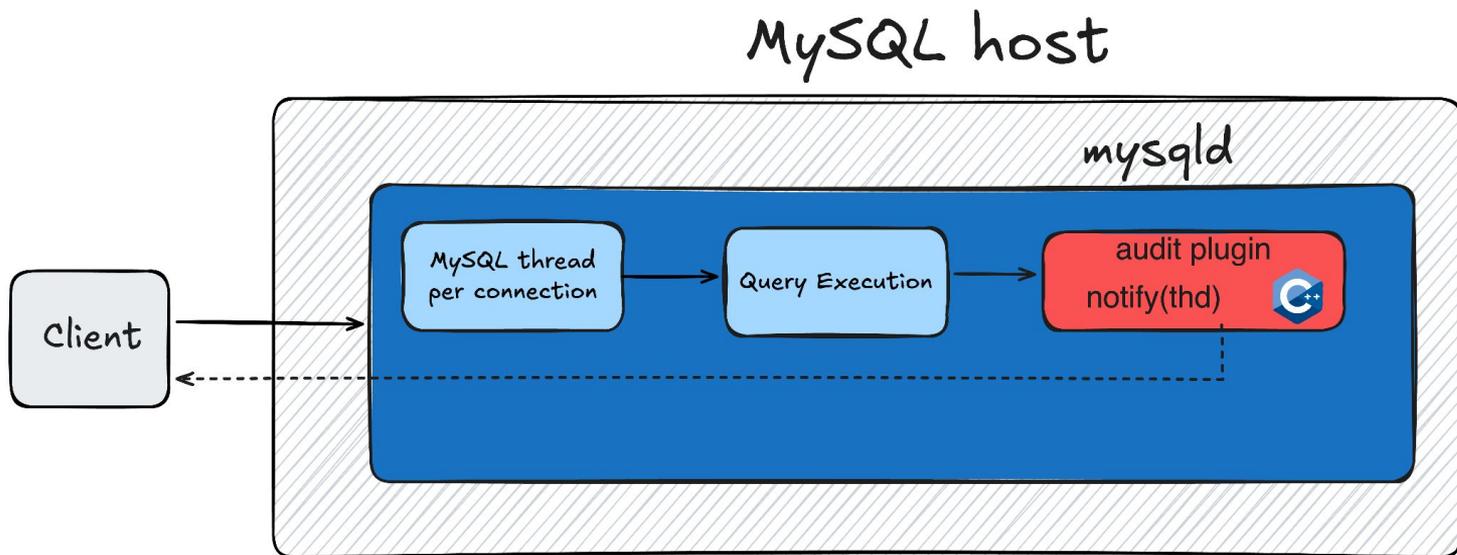
Where does the plugin run?

MySQL host

Synchronously on the query path!

The Hot Path! 🔥

MySQL host

mysqld

| MySQL thread per connection | → | Query Execution | → | audit plugin notify(thd) |

Client

notify() executes on every audit event ♻️
If the plugin is slow MySQL becomes slow ⏳
If the plugin crashes MySQL crashes 🔥

The Hot Path patterns! ⚡

notify() **MUST BE lightweight** and **non-blocking**

- Defensive programming ✔
- Early returns ✔
- Stack allocations (minimize malloc) ✔
- Async / fire & forget / non-blocking ✔
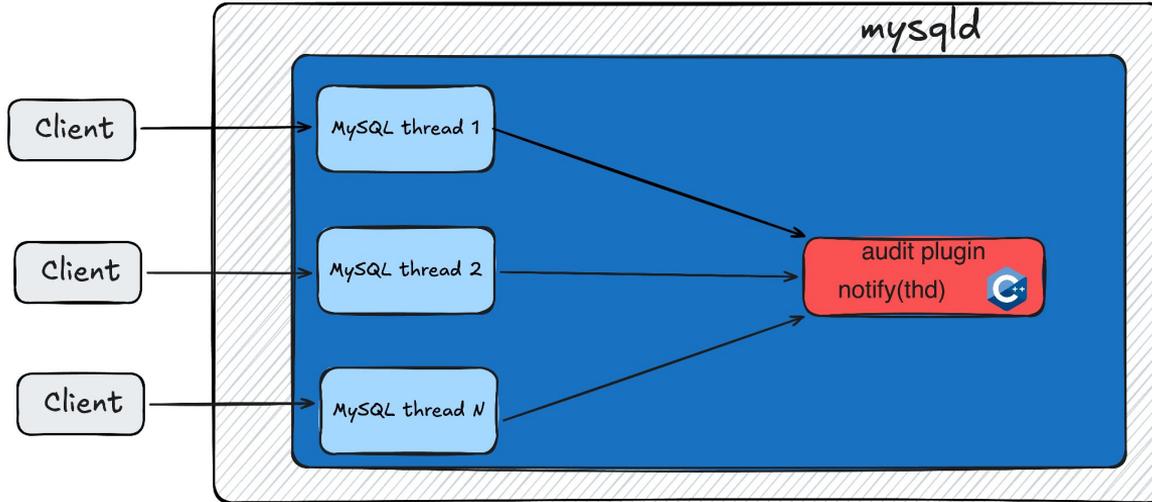- Minimize lock ✔
- Offload work ✔

Each microsecond counts! ⏳

Concurrency Reality 🤯

MySQL host

mysqld

Client → MySQL thread 1

Client → MySQL thread 2
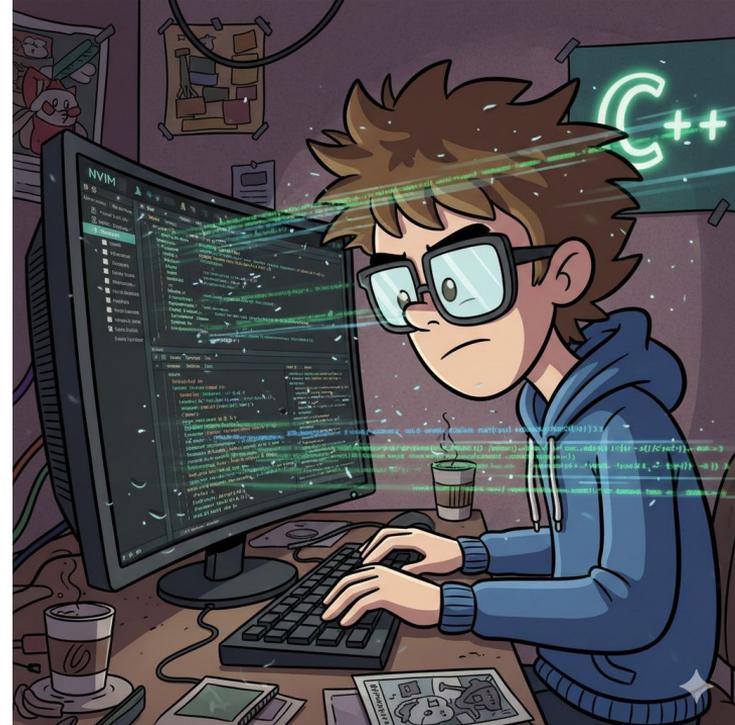
Client → MySQL thread N

audit plugin
notify(thd)

Multiple threads can call notify() simultaneously — plugin MUST handle concurrency safely!

Concurrency without Pain ✅

- **Read-only globals**
- **Atomics operations**
- **Avoid locking inside hot path**
- **Prefer lock-free data structures**
- **Async offload for heavy tasks**

Observability matters! 👀

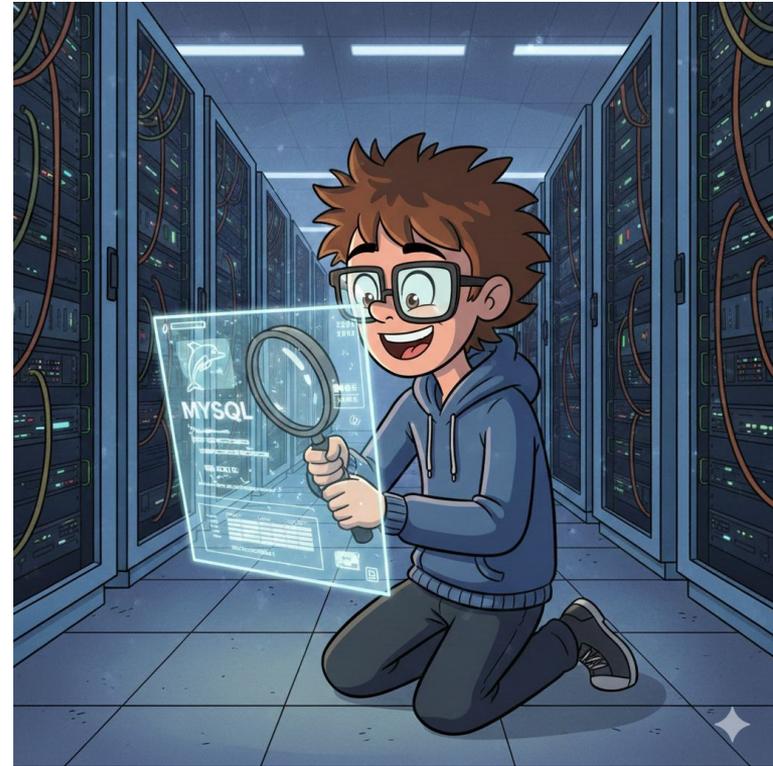**MySQL plugins expose almost no visibility by default**
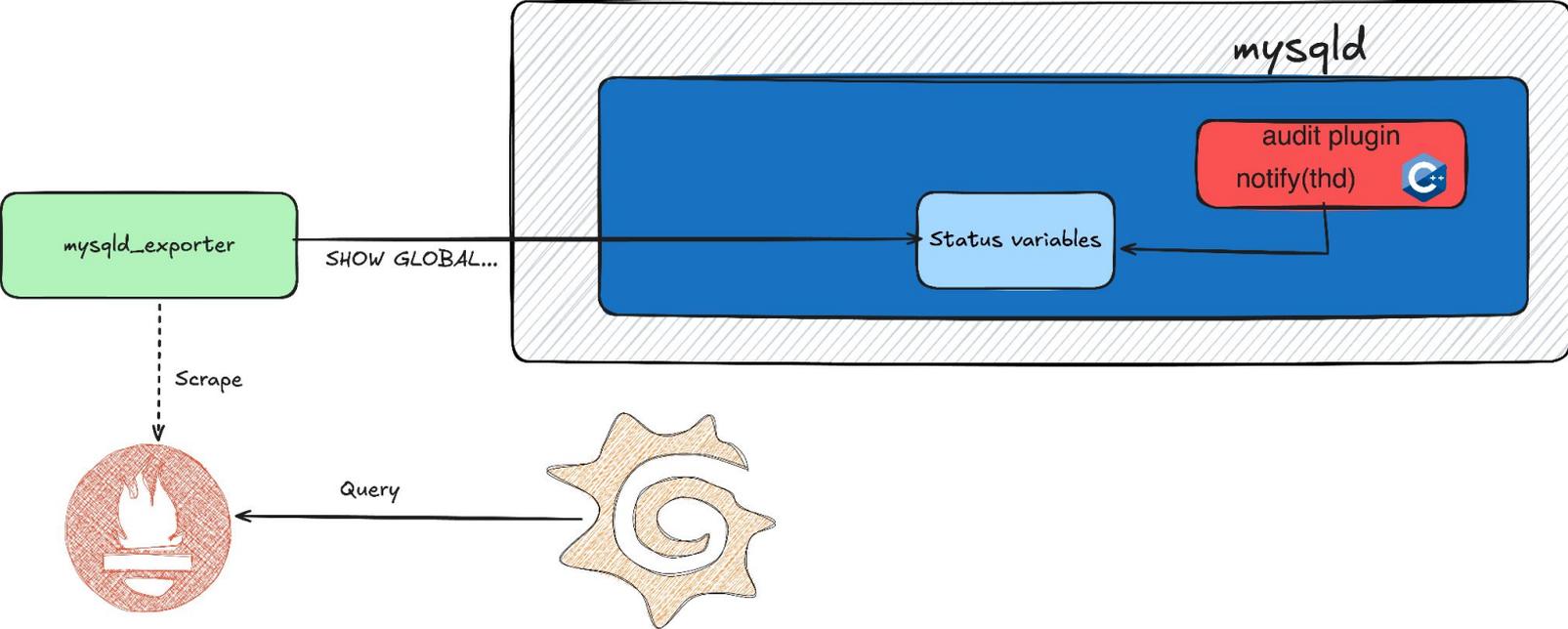
- No metrics
- No errors

What can a plugin expose? 👀

SHOW GLOBAL LIKE 'my_plugin_%';

- **Global status variables**
  - Simple Counters
  - Cheap to increment / non-blocking
  - Cheap to expose
  - No Push / No network

Going to production!

mysqld

audit plugin
notify(thd)

mysqld_exporter

SHOW GLOBAL...

Status variables

Scrape

Query

Pull-based metrics flow for safe observability

14

Demo time! 🎬

Let's go LIVE 🤞

Demo setup! 🧰🎬

```yaml
services:
  devenv-8.4.6:
    platform: linux/amd64

  mysql8.4:
    platform: linux/amd64
    image: mysql:8.4.6

  mysqld_exporter:
    platform: linux/amd64
    image: quay.io/prometheus/mysqld-exporter
    links:
      - mysql8.4

  prometheus:
    image: prom/prometheus:v3.8.1
    links:
      - mysqld_exporter

  grafana:
    platform: linux/amd64
    image: grafana/grafana
```

mysqld_exporter — SHOW GLOBAL... → mysqld

devenv

Scrape

Query
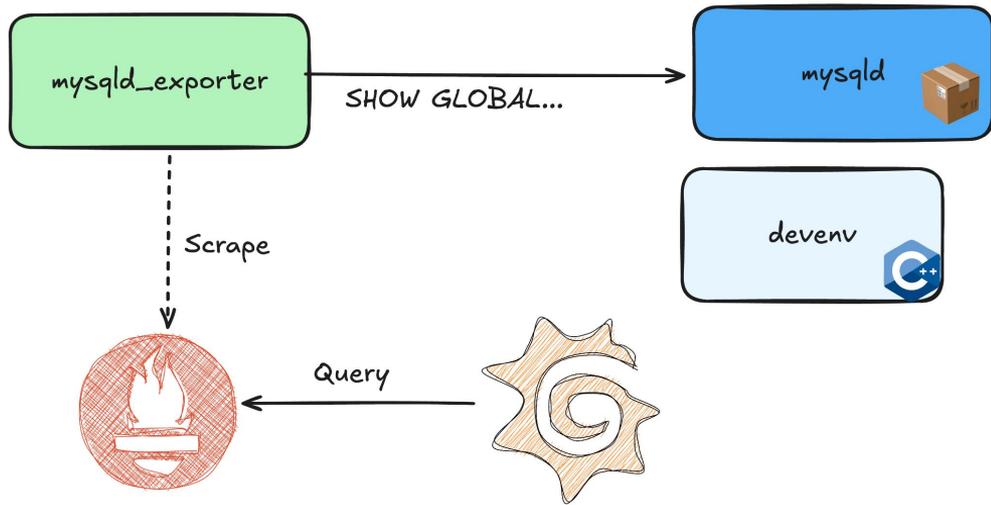
When plugins go wrong 💥

```
2026-01-29T00:58:50.100648Z 0 [System] [MY-010931] [Server] /usr/sbin/mysqld: ready for connections. Version: '8.4.6'  socket: '/var/run/mysqld/mysqld.sock'  port: 3306  MySQL Community S
erver - GPL.
2026-01-29T00:58:50.101168Z 0 [System] [MY-011323] [Server] X Plugin ready for connections. Bind-address: '::' port: 33060, socket: /var/run/mysqld/mysqlx.sock
2026-01-29T00:58:51.798592Z 9 [ERROR] [MY-000000] [Server] Plugin mysqldays reported: 'Im about to crash mysqld!'
2026-01-29T00:58:51Z UTC - mysqld got signal 11 ;
Signal SIGSEGV (Address not mapped to object) at address 0x0
Most likely, you have hit a bug, but this error can also be caused by malfunctioning hardware.
BuildID[sha1]=0d785fe97d9ab7838fcd9648862a50fbd9b30bdc
Thread pointer: 0x7fff50000b60
Attempting backtrace. You can use the following information to find out
where mysqld died. If you see no messages after this, something went
terribly wrong...
stack_bottom = 7fffe811fb80 thread_stack 0x100000
 #0 0xc2d290 <unknown>
 #1 0x7ffffea36bef <unknown>
 #2 0xeeb3b0 <unknown>
 #3 0x7ffff003932c mysqldays_notify at plugin/mysqldays/mysqldays.cc:165
 #4 0x1da5f50 <unknown>
 #5 0x1da6ced <unknown>
 #6 0xa84288 <unknown>
 #7 0xc2d30b <unknown>
 #8 0xc2f9e5 <unknown>
 #9 0xadcfaa <unknown>
#10 0xae0c10 <unknown>
#11 0xae2d3e <unknown>
#12 0xae39f9 <unknown>
#13 0xc2ecee <unknown>
#14 0x1c17f81 <unknown>
#15 0x7ffffea821a9 <unknown>
#16 0x7ffffeb065b3 <unknown>
#17 0xffffffffffffffff <unknown>
```

My log!

My code!

A NULL pointer in an audit plugin can crash MySQL
https://bugs.mysql.com/bug.php?id=113992

Audit plugins run in the hot path

Treat **notify()** as production-critical code: fast, non-blocking, and predictable.

Plugins are multi-threaded by nature

Even if they look simple, every MySQL connection can call your plugin concurrently.

Observability must be designed in

Without status variables, you are flying blind in production.

Safety beats perfection

Prefer dropping data over blocking queries or crashing MySQL.

"A good audit plugin should be invisible – until you need it."

Questions?

Thank you!

martin.alderete@booking.com

Booking.com

https://jobs.booking.com/booking/jobs

Links

Demo code

- [mysql_belgium_days_2026](#)

MySQL source

- [sql/sql_plugin.cc](#)
- [sql/sql_audit.cc](#)
- [include/mysql/plugin_audit.h](#)

Talks from Booking

- [Reliable Operations and Rapid Development with MySQL](#)
- [Running MySQL on Three Different Platforms](#)
- [Sailing the Database Seas: Applying SRE Scale](#)
- and more…