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囧...执行analyze table意外导致waiting for table flush



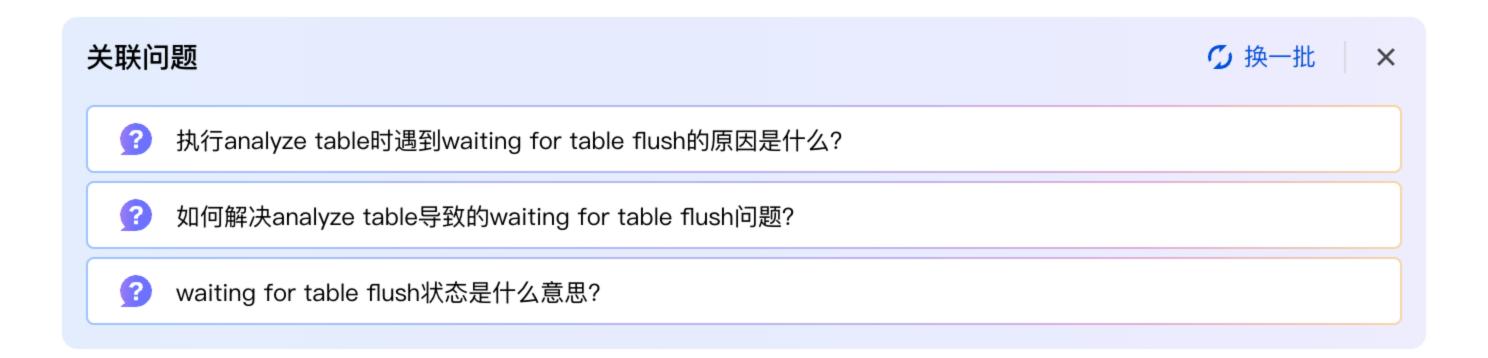
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◆ 运行总次数: 1

代码可运行



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一、问题描述

问题现场如下:

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https://www.jianshu.com/p/b141585cd844

以前记录的文章中的案例2,但是其实并不一样,这里是由于analyze table语句造成的。

复现过程非常简单(必须是社区版本,我使用的8.0.21),如下:

session 1

```
javascript 运行次数: 0

1 | mysql> select sleep(1000) from test.e01; (要有几条数据)
2 | 这条语句肯定结束不了
```

session 2

session 3

```
javascript 运行次数: 0

1 | mysql> select * from test.e01;
2 | # 被堵塞了
```

此时堵塞的情形就是Waiting for table flush

二、analyze触发了什么

analyze table 除了更新我们的统计数据,实际上最后做了一个操作如下(栈):

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这里判断了是否当前table share正在使用,如果正在使用(很显然我们这个table share是不能直接释放的,因为有select一直持有它),那么将share版本的设置为0(share->clear_version()。

实际上这个版本由全局变量refresh_version初始化),目的在于下次如果有使用表定义的时候需要重新打开 table share。

然后释放了当前没有使用的table cache(类型TDC_RT_REMOVE_UNUSED)。

三、再次访问表堵塞

当再次访问表的时候(open_table),会去判断如下是否有老的table share存在,如果存在则需要等待释放:

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```
🌣 AI代码解释
        运行次数: 0
                                                                  \odot
javascript
     share_found:
       if (!(flags & MYSQL_OPEN_IGNORE_FLUSH)) {
         if (share->has_old_version()) {
 4
            release_table_share(share);
 5
 6
           wait_result =
                tdc_wait_for_old_version(thd, table_list->db, table_list->table_n
 8
 9
                                          ot_ctx->get_timeout(), deadlock_weight);
```

首先如果存在判断是否存在的老版本,判断是通过table share的版本和当前全局版本refresh_version进行比对。

前面我们知道这里table share的版本已经设置为0,因此这里必然进入release_table_share环节,然后等待持有者的释放(案例窗口1的select查询),然后再次获取table share。

等待栈如下:

```
笲 AI代码解释
                                                                 \odot
javascript
        运行次数: 0
     (gdb) bt
         tdc_wait_for_old_version (thd=0x7ffed8094550, db=0x7ffed802e5c0 "test".
         at /opt/mysql/mysql-8.0.21/sql/sql_base.cc:2705
         0x0000000003671d7e in open_table (thd=0x7ffed8094550, table_list=0x7ffe
     #1
 5
         0x0000000003675c36 in open_and_process_table (thd=0x7ffed8094550, lex=0
     #2
 6
         has_prelocking_list=false, ot_ctx=0x7fff600cf1a0) at /opt/mysql/mysql-8
         0x0000000003677102 in open_tables (thd=0x7ffed8094550, start=0x7fff600c
         at /opt/mysql/mysql-8.0.21/sql/sql_base.cc:5664
 8
 9
     #4
         0x0000000003678993 in open_tables_for_query (thd=0x7ffed8094550, tables
```

四、Percona修复该问题

Percona在上文中已经提到问题如下:

This happens because before the fix, ANALYZE TABLE worked as follows:

- 1. Opens table statistics: concurrent DML operations (INSERT/UPDATE/DELETE/SELECT) are allowed
- 2. Updates table statistics: concurrent DML operations are allowed
- 3. Update finished
- 4. Invalidates table entry in the table definition cache: concurrent DML operations are forbidden
 - 1. What happens here is ANALYZE TABLE marks the currently open table share instances as invalid. This does not affect running queries: they will complete as usual. But all incoming queries will not start until they can re-open table share instance. And this will not happen until all currently running queries

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complete.

5. Invalidates query cache: concurrent DML operations are forbidden

Last two operations are usually fast, but they cannot finish if another query touched either the table share instance or acquired query cache mutex. And, in its turn, it cannot allow for incoming queries to start.

一个关键的修改点如下

官方版本:

```
// Row is ended below.
01031:
01032:
01033:
           if (table->table)
01034:
01035:
             if (table->table->s->tmp_table)
01036:
01037:
01038:
                 If the table was not opened successfully, do not try to get
01039:
                 status information. (Bug#47633)
01040:
01041:
               if (open_for_modify && !open_error)
01042:
                 table->table->file->info(HA_STATUS_CONST);
01043:
01044:
             else if (open_for_modify || fatal_error)
01045:
01046:
               tdc_remove_table(thd, TDC_RT_REMOVE_UNUSED,
01047:
                                table->db, table->table_name, FALSE);
01048:
               /*
01049:
                 May be something modified. Consequently, we have to
01050:
                 invalidate the query cache.
01051:
01052:
               table->table= 0;
01053:
                                                        // For query cache
01054:
               query_cache.invalidate(thd, table, FALSE);
01055:
01056:
             else
01057:
               /*
01058:
                 Reset which partitions that should be processed
01059:
                 if ALTER TABLE t ANALYZE/CHECK/.. PARTITION ..
01060:
                 CACHE INDEX/LOAD INDEX for specified partitions
01061:
01062:
               if (table->table->part_info &&
01063:
                   lex->alter_info.flags & Alter_info::ALTER_ADMIN_PARTITION)
01064:
01065:
                 set_all_part_state(table->table->part_info, PART_NORMAL);
01066:
01067:
```

Percona版本:

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```
039:
040:
         if (table->table)
041:
042:
           const bool skip_flush=
043:
             (operator_func == &handler::ha_analyze)
044:
             && (table->table->file->ha_table_flags() & HA_ONLINE_ANALYZE);
045:
           if (table->table->s->tmp_table)
046:
047:
048:
               If the table was not opened successfully, do not try to get
049:
               status information. (Bug#47633)
050:
051:
             if (open_for_modify && !open_error)
052:
               table->table->file->info(HA_STATUS_CONST);
0531
854
           else if ((!skip_flush && open_for_modify) || fatal_error)
0951
056:
             tdc_remove_table(thd, TDC_RT_REMOVE_UNUSED,
057:
                              table->db, table->table name, FALSE);
058:
059:
               May be something modified. Consequently, we have to
060:
061:
               invalidate the query cache.
062:
             table->table= 0;
                                                      // For query cache
063:
             query_cache.invalidate(thd, table, FALSE);
064:
065:
066:
           else
067:
             /*
068:
```

如此修改后analyze不会进入tdc_remove_table函数,那么table share的版本不会设置为0。因此如果使用官方版本小心本问题。

最后说下,官方版本测试到8.0.21依旧存在这个问题,而Percona已经修复了,详情见下

https://www.percona.com/blog/2018/03/27/analyze-table-is-no-longer-a-blocking-operation/

全文完。

Enjoy MySQL®:)

https

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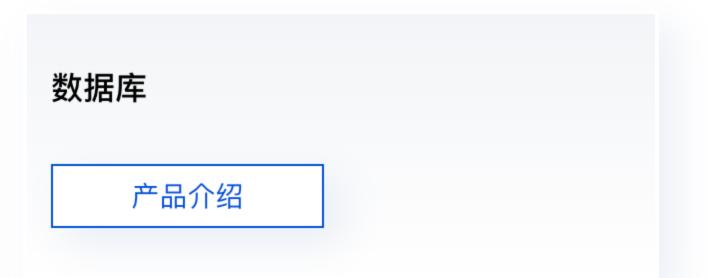
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