Wednesday May 29th 5:40pm-6:05pm

Texas 7

MySQL Shell: The Best DBA tool?

How to Use the MySQL Shell as a Framework for DBAs

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about me - http://about.me/lefred

Who am I ?

Frédéric Descamps

- @lefred
- MySQL Evangelist
- Hacking MySQL since 3.23
- devops believer
- living in Belgium 🇧🇪
- http://lefred.be

a new tool

MySQL Shell

MySQL Shell

The MySQL Shell is an interactive Javascript, Python, or SQL interface supporting development and administration for the MySQL Server and is a component of the MySQL Server. You can use the MySQL Shell to perform data queries and updates as well as various administration operations.

MySQL Shell (2)

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- Traditional Table, JSON, Tab Separated output results formats
- MySQL Standard and X Protocols
- and more...

MySQL Shell and Python

When using the python mode in the Shell, it's possible to use system modules (local).

```
[fred@imac2 workspace] $ mysqlsh
MySQL Shell 8.0.13

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owners.

Type '\help' or '\?' for help; '\quit' to exit.


MySQL  JS  \py
Switching to Python mode...

MySQL  Py  from datetime import datetime
MySQL  Py  datetime.now()
datetime.datetime(2018, 12, 16, 19, 54, 28, 222011)
```

MySQL Shell and Python (2)

Of course this can be any type of modules:

```
MySQL  Py  from isbntools.app import *
MySQL  Py  doc=meta('9781260135442')
MySQL  Py  doc
{
    "Authors": [
        "David Stokes"
    ],
    "ISBN-13": "9781260135442",
    "Language": "en",
    "Publisher": "McGraw-Hill Education",
    "Title": "MySQL And JSON: A Practical Programming Guide",
    "Year": "2018"
}
```

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}
```

we want more !

Extending MySQL Shell

Extending MySQL Shell

Since 8.0.16, you have two different ways to extend the MySQL Shell:

- using the new Reporting Framework (>= 8.0.16)
- create your own modules to extend MySQL Shell

MySQL Shell User-Defined Reports

You can create reports that can be called ( ) one time or constantly refreshed ( ).

Example for checking the :

```
MySQL 8.0.16  localhost:33060+  2019-05-16 15:03:04
JS  \show
Available reports: gr_info, gr_recovery_progress, locks_info, query.

MySQL 8.0.16  localhost:33060+  2019-05-16 15:03:07
JS  \show locks_info
+--------+-----------+-------------------+-----------+---------------+-------------+-----------------------+
| trx_id | thread_id | table             | lock_type | lock_mode     | lock_status | lock_data             |
+--------+-----------+-------------------+-----------+---------------+-------------+-----------------------+
| 17425  | 47        | james.user_events | TABLE     | IX            | GRANTED     | NULL                  |
| 17425  | 47        | james.user_events | RECORD    | X             | GRANTED     | supremum pseudo-record |
| 17425  | 47        | james.user_events | RECORD    | X             | GRANTED     | 8                     |
| 17422  | 48        | james.user_events | TABLE     | IX            | GRANTED     | NULL                  |
| 17422  | 48        | james.user_events | RECORD    | X,REC_NOT_GAP | GRANTED     | 7                     |
+--------+-----------+-------------------+-----------+---------------+-------------+-----------------------+
```

MySQL Shell User-Defined Reports (2)

This is a Python file ( ) installed in :

It contains a definition and a registration:

MySQL Shell User-Defined Reports (3)

More info:

- https://lefred.be/content/using-the-new-mysql-shell-reporting-framework-to-monitor-innodb-cluster/
- https://lefred.be/content/mysql-innodb-cluster-recovery-process-monitoring-with-the-mysql-shell-reporting-framework/

Sources of Examples:

- https://github.com/lefred/mysql-shell-udr
- Pull Requests welcome !

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For calling some long statements or group of operations or sometimes to replace a missing functionality.

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Jesper explained recently how the MySQL Shell could help here see https://mysql.wisborg.dk/2018/12/02/mysql-8-drop-several-stored-events-procedures-or-functions/

Extending MySQL Shell

```
MySQL  127.0.0.1:33060+  Py  mydba.getProcedures('sys','FUNCTION')
FUNCTION `sys`.`extract_schema_from_file_name`
FUNCTION `sys`.`extract_table_from_file_name`
FUNCTION `sys`.`format_bytes`
FUNCTION `sys`.`format_path`
FUNCTION `sys`.`format_statement`
FUNCTION `sys`.`format_time`
FUNCTION `sys`.`list_add`
FUNCTION `sys`.`list_drop`
FUNCTION `sys`.`ps_is_account_enabled`
FUNCTION `sys`.`ps_is_consumer_enabled`
FUNCTION `sys`.`ps_is_instrument_default_enabled`
FUNCTION `sys`.`ps_is_instrument_default_timed`
FUNCTION `sys`.`ps_is_thread_instrumented`
FUNCTION `sys`.`ps_thread_account`
FUNCTION `sys`.`ps_thread_id`
FUNCTION `sys`.`ps_thread_stack`
FUNCTION `sys`.`ps_thread_trx_info`
FUNCTION `sys`.`quote_identifier`
FUNCTION `sys`.`sys_get_config`
FUNCTION `sys`.`version_major`
FUNCTION `sys`.`version_minor`
FUNCTION `sys`.`version_patch`
Total: 22
```

Extending MySQL Shell

```
[fred@imac2 functions] $ mysqlsh --python root@127.0.0.1
Creating a session to 'root@127.0.0.1'
Fetching schema names for autocompletion... Press ^C to stop.
Your MySQL connection id is 184 (X protocol)
Server version: 8.0.13 MySQL Community Server - GPL
No default schema selected; type \use <schema> to set one.
MySQL Shell 8.0.13

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Type '\help' or '\?' for help; '\quit' to exit.


 MySQL  127.0.0.1:33060+  Py  mydba.getProcedures('test')
PROCEDURE `test`.`helloworld`
Total: 1

 MySQL  127.0.0.1:33060+  Py  mydba.deleteProcedures('test')
DROP PROCEDURE `test`.`helloworld`
Total dropped: 1
```

Extending MySQL Shell

Or for example, retrieve the expiration period of passwords (see https://lefred.be/content/mysql-when-will-the-password-of-my-users-expire/):

```
MySQL  127.0.0.1:33060+  Py  mydba.getPasswordExpiration()
+--------------------------------+--------------------------------+-----------------+
| User                           | Password last change           | Expires in      |
+--------------------------------+--------------------------------+-----------------+
| `fred`@`%`                     | 2018-11-12 21:59:56            | expired         |
| `test`@`%`                     | 2018-12-17 09:58:32            | 20 days         |
| `test2`@`%`                    | 2018-11-10 13:16:44            | expired         |
| `test3`@`%`                    | 2018-10-10 13:16:44            | expired         |
| `root`@`localhost`             | 2018-11-16 23:10:41            | expired         |
+--------------------------------+--------------------------------+-----------------+

MySQL  127.0.0.1:33060+  Py  mydba.getPasswordExpiration(False)
+--------------------------------+--------------------------------+-----------------+
| User                           | Password last change           | Expires in      |
+--------------------------------+--------------------------------+-----------------+
| `test`@`%`                     | 2018-12-17 09:58:32            | 20 days         |
+--------------------------------+--------------------------------+-----------------+
```

Extending MySQL Shell

Another example, retrieve the tables potentially fragmented (see https://lefred.be/content/overview-of-fragmented-mysql-innodb-tables/):

```
MySQL  localhost:33060+  Py  mydba.getFragmentedTables()
+-----------------------------+------------+---------+------------+------------+------------+------------------+
| Table                       | Engine     | # Rows  | Data Size  | Idx Size   | Total Size | Data Free        |
+-----------------------------+------------+---------+------------+------------+------------+------------------+
| sbtest.sbtest1              | InnoDB     |   1.54M |      0.38G |      0.03G |      0.41G | 48.00MB (11.54%) |
+-----------------------------+------------+---------+------------+------------+------------+------------------+
```

Extending MySQL Shell

Recently somebody complained about the complexity of knowing what are the default values of columns when expressions are used (https://forums.mysql.com/read.php?101,670682,670682):

```
MySQL  localhost:33060+  Py  mydba.getDefaults('test','default_test')
+-------------------------------+-----------------+-------------------------------------------------------+---------------------------+
| ColumnName                    | Type            | Default                                               | Example                   |
+-------------------------------+-----------------+-------------------------------------------------------+---------------------------+
| bi_col_exp                    | bigint          | (8 * 8)                                               | 64                        |
| d_col                         | date            | curdate()                                             | 2018-12-27                |
| d_col_exp                     | date            | (curdate() + 8)                                       | 20181235                  |
| dt_col                        | datetime        | CURRENT_TIMESTAMP                                     | 2018-12-27 09:53:11       |
| enum_col                      | enum            | value1                                                | value1                    |
| int_col                       | int             | 44                                                    | 44                        |
| t_col                         | time            | curtime()                                             | 09:53:11                  |
| vc_col                        | varchar         | test                                                  | test                      |
| vc_col_exp                    | varchar         | concat(_utf8mb4\'test\',_utf8mb4\'test\')             | testtest                  |
+-------------------------------+-----------------+-------------------------------------------------------+---------------------------+
Total: 9
```

Contribute to MySQL Shell DBA Toolkit ?

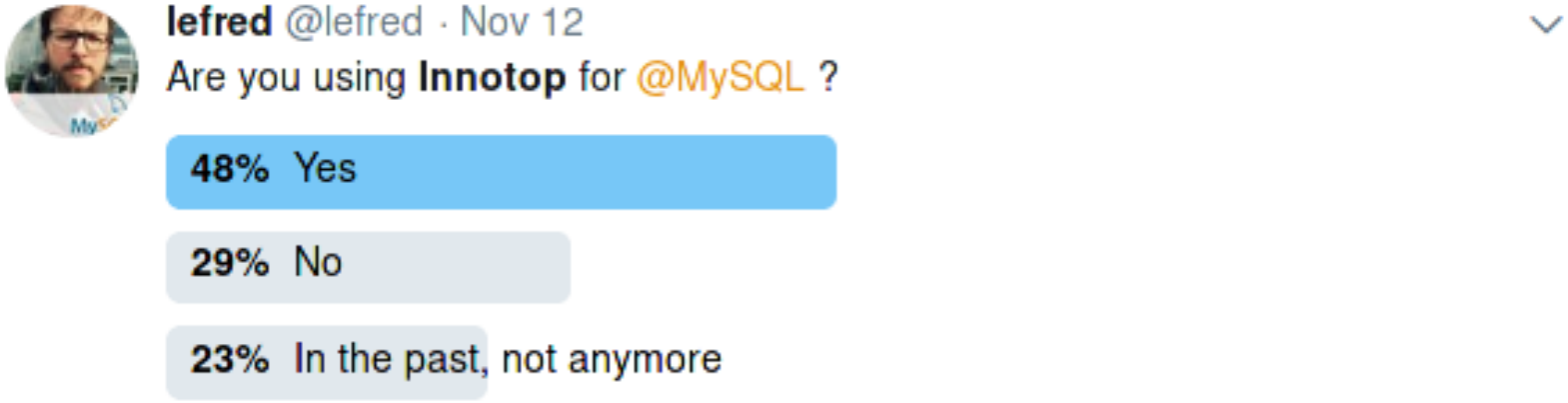
Get the code from https://github.com/lefred/mysql-shell-mydba and Pull Requests are welcome !

we want even more !

Innotop

Innotop

As maintainer of Innotop, after doing so delayed maintenance, I started a poll on Twitter:



Innotop (2)

So Innotop is not dead... but it's very complex to maintain... Perl !

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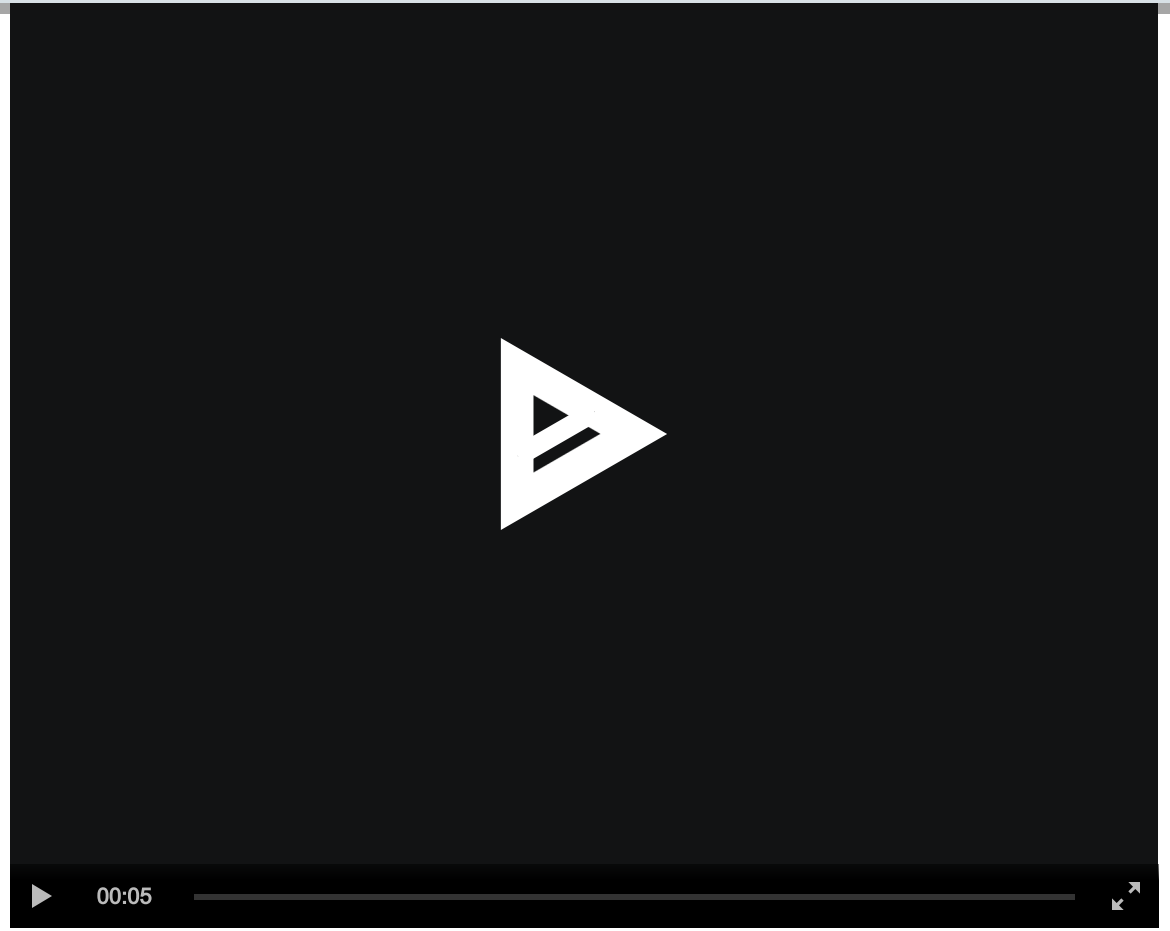
... so and MySQL Shell then ?

Innotop in MySQL Shell

```
MySQL Shell | MySQL Community Server - GPL 8.0.13                                    Sunday 16 December 22:04:53

Cmd       Thd  Conn   Pid State          User              Db          Time       Lock Time  Query
Query      47     9 9297  User sleep      root@localhost    sbtest      13.37 s    0 ps       select sleep(120)
Query     171   143 None  Creating sort index mysqlx/worker     sys          41.15 ms   392.00 us  select `pps`.`PROCESSLIST_COM
Execute   181   142 17461 Sending data    root@localhost    sbtest      2.64 ms    12.00 us   SELECT count(k)          FROM ..
Execute   175   136 17461 Sending data    root@localhost    sbtest      2.25 ms    12.00 us   SELECT count(k)          FROM ..
Execute   176   137 17461 statistics      root@localhost    sbtest      2.14 ms    23.00 us   SELECT count(k)          FROM ..
Execute   174   135 17461 init            root@localhost    sbtest      2.03 ms    0 ps       SELECT count(k)          FROM ..
Execute   178   140 17461 statistics      root@localhost    sbtest      1.93 ms    18.00 us   SELECT count(k)          FROM ..
Execute   173   134 17461 statistics      root@localhost    sbtest      1.86 ms    17.00 us   SELECT count(k)          FROM ..
Execute   180   141 17461 Sending data    root@localhost    sbtest      1.70 ms    14.00 us   SELECT count(k)          FROM ..
Execute   177   138 17461 statistics      root@localhost    sbtest      1.68 ms    17.00 us   SELECT count(k)          FROM ..
. 8 OR k BETWEEN 15000 AND 1500545048
```



Innotop in MySQL Shell

How to use it ?

How to use this module in MySQL Shell ?

The module is available on github: https://github.com/lefred/mysql-shell-innotop

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Add in *~/.mysqlsh/mysqlshrc.py*:

does it work everywhere ?

Limitations

Limitations

- requires ncurses

Limitations

- requires ncurses
- works almost exclusively on Gnu/Linux

I want to contribute !

How to write your own extension ?

Creating you own extension

All extensions are a single file located in the **modules** folder:

Skeleton of an extension

Every extension starts the same way and requires some mandatory modules:

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Then you need to specify the shortcuts that calls the functions:

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Then you need to specify the shortcuts that calls the functions:

return: name of the module *(dummy.py)*
stdscr: use the same screen *(and pass it to the function)*

Skeleton of an extension - run()

Thank you !

Any Questions ?

share your 💕 for MySQL on social media using