



# **MariaDB 10.3 MySQL with PL/SQL**

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**<https://www.fromdual.com/presentations>**



# About FromDual GmbH

[www.fromdual.com](http://www.fromdual.com)



**Support**



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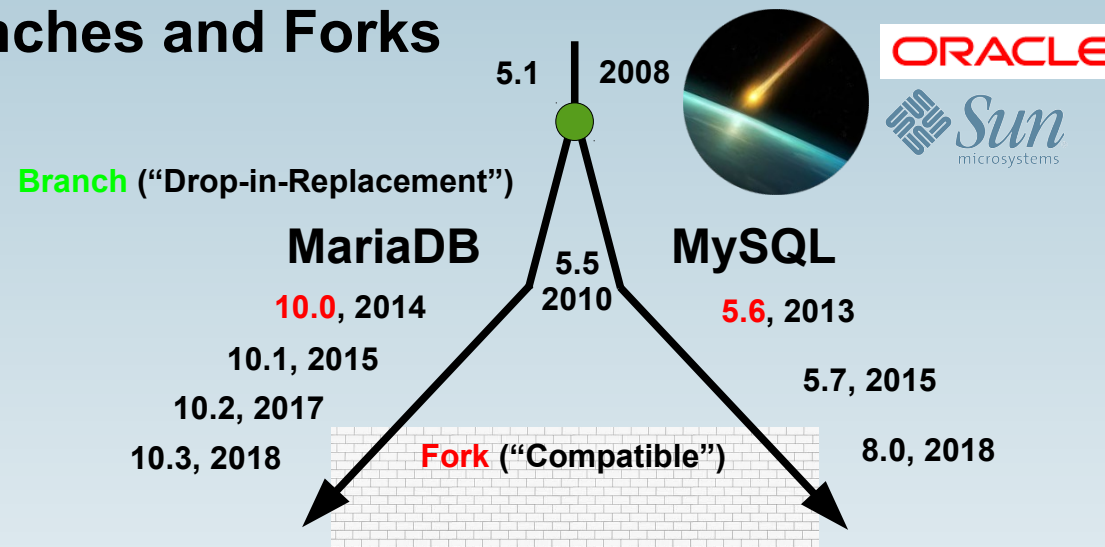
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# Branches and Forks

- MariaDB and MySQL are Open Source (GPL v2)
  - This means everybody is allowed to DiY
  - → Branches and Forks



- Who uses a MariaDB/MySQL in here?
  - Chaos will happen! :-)
  - See Sybase ASE vs. MicroSoft SQL Server (1995(v6.0)-2005)
  - Examples: Replication, Protocol X, SE: MariaDB CS, etc., Window Functions, Virtual Columns, JSON, CTE, ...



# MariaDB and Linux Distros

- **Redhat/CentOS:**
  - 6 → MySQL 5.1,
  - 7 → **MariaDB 5.5**
- **Ubuntu:**
  - 14.04 → MySQL 5.5,
  - 16.04 → **MySQL 5.7,**
  - 18.04 → **MySQL 5.7 (MariaDB 10.1)**
- **Debian:**
  - 8 → MySQL 5.5,
  - 9 → **MariaDB 10.1**
- **SuSE SLE / OpenSuSE:**
  - 11 SP2/3 → MySQL 5.1,
  - 12 → **MariaDB 10.0**
  - **Leap 42.3 → MariaDB 10.0, Leap 15.0, → MariaDB 10.2 Tumbleweed → MariaDB 10.2**

# MariaDB vs. Oracle

Home > Features > Data Features

## MariaDB ups the stakes in database war with Oracle

More than two years into the job, MariaDB CEO Michael Howard has ambitious plans for the open source database company, many of which hinge on convincing Oracle customers to switch sides



Scott Carey  
March 5, 2018

The open source database company MariaDB is aggressively courting Oracle customers, offering more portability and ease of migration to help enterprises make the switch.

MariaDB was developed by some of the original developers of the MySQL relational database, including Michael "Monty" Widenius, who jumped ship after MySQL was acquired by Oracle. It has always been developed as an open source 'drop in' replacement for MySQL.



MariaDB CEO Michael Howard

Michael Howard, who worked at Oracle for four years between 1996-2000, has been CEO of MariaDB since December 2015.

# Oracle compatibility

- Preparations for Oracle compatibility in MariaDB 10.2:
- Oracle-style EXECUTE IMMEDIATE
  - `SET @debug = 1;`  
`EXECUTE IMMEDIATE CONCAT(IF(@debug,`  
`'EXPLAIN ', ' '), 'SELECT * FROM dual');`
- Number of supported decimals in DECIMAL from 30 to 38 (Oracle style)
  - `DECIMAL(65, 38)`
- Adding NOPAD collations (`'a' != 'a'`)

# MariaDB 10.3

- An then in MariaDB 10.3:

```
SET GLOBAL sql_mode = ORACLE;
```

- Sponsored by a big Asian Bank!



# Switch between styles

- MariaDB traditional style
- MariaDB SQL/PSM
  - ANSI Stored Procedures/Functions support
  - Similar to DB2?
- How to switch?

```
SET SESSION sql_mode = ORACLE;
```

```
SET GLOBAL sql_mode = ORACLE;
```

```
my.cnf
```

```
[mysqld]  
sql_mode = ORACLE
```



# MariaDB 10.3

- Oracle style Sequences
  - **INTERSECT** and **EXCEPT** (vs. **UNION**)
  - **sql\_mode = ORACLE**
    - supports PL/SQL language subset
  - **ROW** data type
  - **PL/SQL PACKAGE** support
  - Oracle/SQL basic data types (**VARCHAR2**, ...)
- 
- [https://mariadb.com/kb/en/library/sql\\_modeoracle-from-mariadb-103/](https://mariadb.com/kb/en/library/sql_modeoracle-from-mariadb-103/)

# Oracle style Sequences

- MariaDB traditional: `AUTO_INCREMENT`
- Oracle styles Sequences more flexible:

```
SQL> SELECT @@sql_mode AS sql_mode;
+-----+
| @@sql_mode |
+-----+
| ...,ORACLE,... |
+-----+
```

```
SQL> CREATE SEQUENCE demo_seq
      INCREMENT BY 3
      MINVALUE = 8
      MAXVALUE = 99
      START with 10
      ENGINE = InnoDB
      COMMENT = 'Demo Sequence';
```

# Using Sequences

- **Using Sequences:**

```
SQL> INSERT INTO test
VALUES (demo_seq.nextval, 'Some data', NULL);

SQL> SELECT lastval(demo_seq);

SQL> SELECT setval(demo_seq, 42);
```

- **Altering Sequences**

- **ALTER SEQUENCE, DROP SEQUENCE**

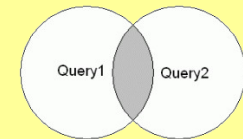
- **Oracle Docu:**

- [https://docs.oracle.com/cd/B19306\\_01/server.102/b14200/statements\\_6015.htm](https://docs.oracle.com/cd/B19306_01/server.102/b14200/statements_6015.htm)

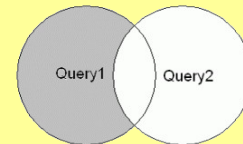
# INTERSECT and EXCEPT

- ANSI standard compliant Set Operations

```
SQL> SELECT first_name, last_name FROM user
EXCEPT
SELECT first_name, last_name FROM customer;
```



```
SQL> SELECT first_name, last_name FROM user
INTERSECT
SELECT first_name, last_name FROM customer;
```



- Oracle MINUS (= EXCEPT) is NOT supported!
- Feature Request: MDEV-17170

# Anonymous PL/SQL Block

```
SQL> SELECT @@session.sql_mode INTO @old_sql_mode;
SQL> SET SESSION sql_mode=ORACLE;

SQL> DELIMITER /

SQL> BEGIN
SQL>     SELECT 'MariaDB anonymous PL/SQL block!';
SQL> END;
SQL> /

SQL> DELIMITER ;
SQL> SET SESSION sql_mode=@old_sql_mode;
```

# MariaDB PL/SQL Procedure

```
CREATE OR REPLACE PROCEDURE hello AS
BEGIN
  DECLARE
    vString VARCHAR2(255) := NULL;
  BEGIN
    SELECT 'Hello world!' INTO vString FROM dual;
    SELECT vString;
  END;
END hello;
/

BEGIN
  hello();
END;
/
```

# MariaDB PL/SQL Function

```
CREATE OR REPLACE FUNCTION hello
RETURN VARCHAR2 DETERMINISTIC AS
BEGIN
  DECLARE
    vString VARCHAR2(255) := NULL;
  BEGIN
    SELECT 'Hello world!' INTO vString FROM dual;
    RETURN vString;
  END;
END hello;
/

DECLARE
  vString VARCHAR(255) := NULL;
BEGIN
  vString := hello(); SELECT vString;
END;
/
```





# MariaDB PL/SQL Package

```
CREATE OR REPLACE PACKAGE hello AS
  PROCEDURE helloWorldProcedure(pString VARCHAR2);
  FUNCTION helloWorldFunction(pString VARCHAR2) RETURN VARCHAR2;
END hello;
/
CREATE OR REPLACE PACKAGE BODY hello AS

  PROCEDURE helloWorldProcedure(pString VARCHAR2) AS
  BEGIN
    SELECT 'Hello Procedure!' INTO vString FROM dual;
    SELECT vString;
  END;

  FUNCTION helloWorldFunction(pString VARCHAR2) RETURN VARCHAR2 AS
  BEGIN
    SELECT 'Hello Function!' INTO vString FROM dual;
    return vString;
  END;
BEGIN
  SELECT 'Package initialiser, called only once per connection!';
END hello;
/
```



# How far can we go?

- **Oracle Database SQL Reference**
  - [https://docs.oracle.com/cd/B19306\\_01/server.102/b14200/statements\\_6015.htm](https://docs.oracle.com/cd/B19306_01/server.102/b14200/statements_6015.htm)
- **Building with Blocks, Steven Feuerstein**
  - <https://blogs.oracle.com/oraclemagazine/building-with-blocks>
- **Sample PL/SQL Programs**
  - [https://docs.oracle.com/cd/A97630\\_01/appdev.920/a96624/a\\_samps.htm](https://docs.oracle.com/cd/A97630_01/appdev.920/a96624/a_samps.htm)
- **Oracle PL/SQL Sample Code**
  - <https://www.oracle.com/technetwork/indexes/samplecode/plsql-sample-522110.html>

# Gotchas I

- MariaDB Delimiter:

```
SQL> DELIMITER /

SQL> BEGIN
SQL>     SELECT 'MariaDB anonymous PL/SQL block!';
SQL> END;
SQL> /

SQL> DELIMITER ;
```

- Global Synonyms are missing!
  - Feature request: MDEV-16482
- Oracle Packages are missing (dbms\_output, dbms\_utility, ...)
  - FromDual started porting them...
  - Needs Synonyms!

# Gotchas II

- **Constant declaration is missing**
  - Feature request: MDEV-16476
- **MINUS as alias to EXCEPT is missing**
  - Feature request: MDEV-17170
- **DUAL Table behaves different**
  - Feature request: MDEV-16427
- **EXCEPTION not implemented yet.**
- **SYSDATE is unknown function**

# Gotchas III

```
CREATE FUNCTION get_bal(acc_no IN NUMBER)
  RETURN NUMBER
  IS acc_bal NUMBER(11,2);
BEGIN
  SELECT order_total
  INTO acc_bal
  FROM orders
  WHERE customer_id = acc_no;
  RETURN(acc_bal);
END;
```

/

```
ERROR 1064 (42000): You have an error in your SQL syntax;
check the manual that corresponds to your MariaDB server
version for the right syntax to use near 'IN NUMBER)
```

MDEV-17762

# Future of MariaDB PL/SQL

- **Roadmap / Plans for MariaDB 10.4**
  - <https://mariadb.com/kb/en/library/plans-for-mariadb-104/>
- **Oracle compatibility Stage 2 (MDEV-10872)**
  - <https://jira.mariadb.org/browse/MDEV-10872>
  - <https://jira.mariadb.org/browse/MDEV-10764>
- **CONNECT BY**
  - **Alias for Window Functions**
- **MariaDB 10.4.0 (alpha) is out**
  - **November 9, 2018**



# Porting to MariaDB PL/SQL

- One of our customers ported already...
  - All PL/SQL code to Perl. :-)
- Large Asian bank sponsored the feature
  - So we can assume they are using it and ported their code to MariaDB PL/SQL
- FromDual helps porting...! :-)
- **Select Hello World FromDual with MariaDB PL/SQL:**  
<https://fromdual.com/select-hello-world-fromdual-with-mariadb-pl-sql>

# Q & A



**Questions ?**

**Discussion?**

**We have time for some face-to-face talks...**

- **FromDual provides neutral and independent:**
  - **Consulting**
  - **Training**
  - **Remote-DBA**
  - **Support for MariaDB, Galera Cluster and MySQL**