MariaDB 10.3
MySQL with PL/SQL

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https://www.fromdual.com/presentations
MariaDB 10.3 – MySQL with PL/SQL

- Branches and Forks
- MariaDB and Linux Distributions
- Oracle compatibility
- `sql_mode = ORACLE`
- Oracle Style Sequences
- Anonymous PL/SQL
- PL/SQL Package
- How far can we go?
- Gotchas
- Future of MariaDB PL/SQL
- Porting
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! :-(
  - 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 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.

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   ')

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MariaDB 10.3

- An then in MariaDB 10.3:

```sql
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, ...)

Oracle style Sequences

• MariaDB traditional: AUTO_INCREMENT

• Oracle styles Sequences more flexible:

```sql
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
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
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
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;
```
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;
/
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

- Building with Blocks, Steven Feuerstein

- Sample PL/SQL Programs
  - https://docs.oracle.com/cd/A97630_01/appdev.920/a96624/a_samps.htm

- Oracle PL/SQL Sample Code
Gotchas I

- MariaDB Delimiter:

```sql
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
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
- 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