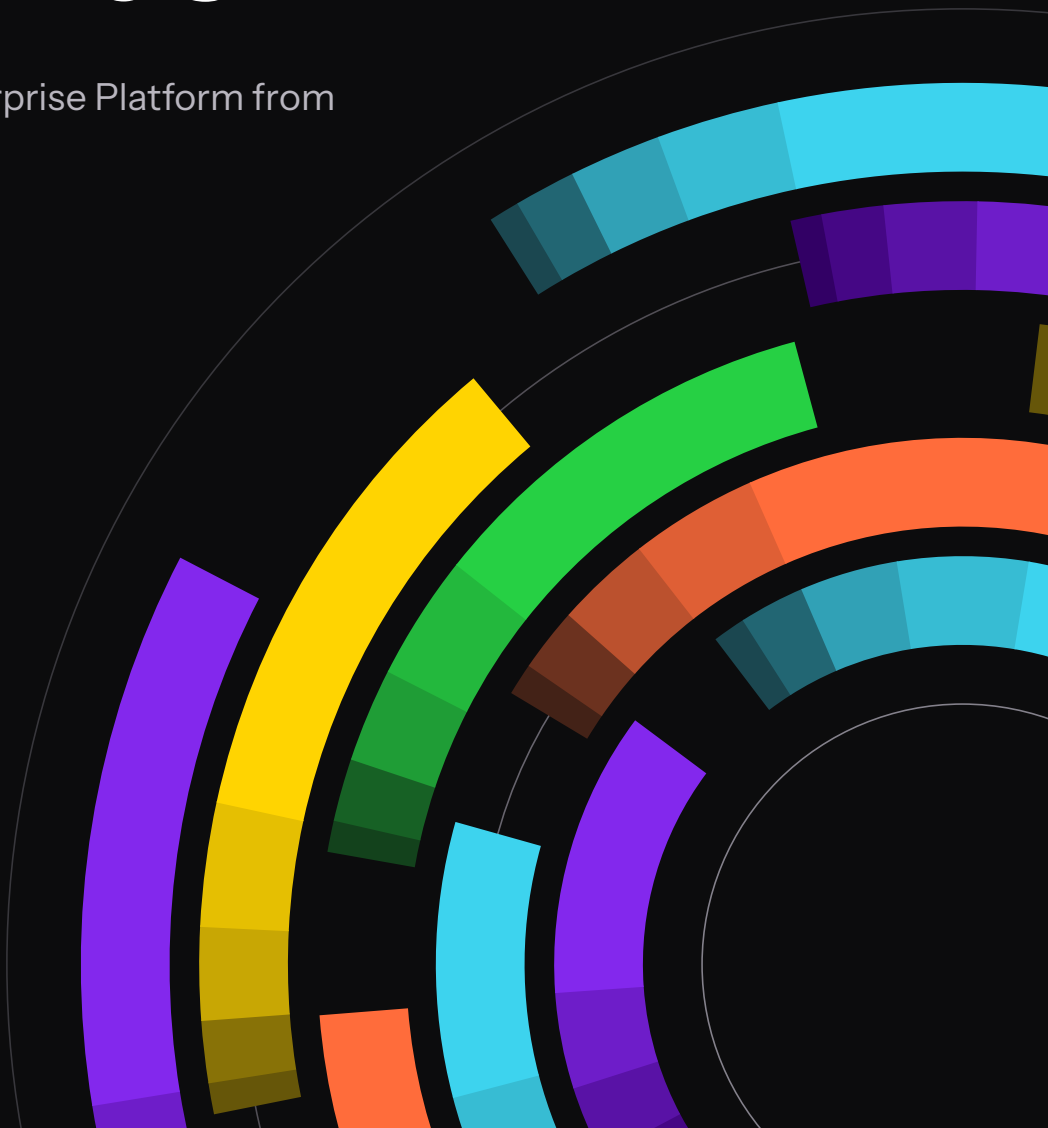
mariaDB

WHITE PAPER

Lower TCO without lowering standards

Migrate to MariaDB Enterprise Platform from Oracle



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01

Lower TCO without lowering standards: migrate to MariaDB Enterprise Platform from Oracle

Built on over 20 years of open source engineering and production use, MariaDB Enterprise Platform is designed for transactional, analytical, semi-structured and/or AI/ML workloads at scale. MariaDB Enterprise Server is the foundation of MariaDB Enterprise Platform, an integrated suite of enterprise-grade products for storing and accessing data. It also includes MariaDB MaxScale, an advanced database proxy; MariaDB Enterprise Cluster, which provides an active-active, multi-master synchronous replication solution; and MariaDB Enterprise Kubernetes Operator, to automate deployment management.

MariaDB Enterprise Platform offers a comprehensive suite of enterprise features comparable to proprietary databases, including Oracle Database compatibility (e.g., PL/SQL compatibility), temporal tables, sharding, point-in-time rollback, transparent data encryption, load balancing, query throttling, multiple replication options and more. This all comes at a much lower total cost of ownership (TCO) than Oracle.

MariaDB Enterprise Platform is used on premises and on public and private cloud infrastructure platforms, serving as a trusted, proven and reliable replacement for proprietary databases. The MariaDB Server component has displaced MySQL as the leading database in Linux distributions, including Red Hat Enterprise Linux (RHEL) and SUSE Linux Enterprise Server (SLES).

02

Total cost of ownership and scaling benefits

MariaDB Enterprise Platform frees companies from the costs, constraints, and complexity of proprietary databases, enabling them to reinvest in what matters most: rapidly developing innovative, customer-facing applications.

Trusted by organizations like DBS Bank, Red Hat, ServiceNow, Virgin Media O2, and Nokia, MariaDB Enterprise Platform meets the same core requirements as proprietary databases, but at a fraction of the cost. DBS Bank saved 90% of its total database cost by migrating mission-critical applications to MariaDB Enterprise Platform.

Many see Oracle as expensive and inflexible, with a high total cost of ownership and rigid licensing policies. Even simple features, such as replication, can require complex licenses for specific functionalities. In contrast, MariaDB Enterprise Platform employs a straightforward licensing model, requiring a support subscription to access all its features.

With MariaDB Enterprise Platform, deployments are easier, faster, and cheaper. There's a choice of data center topologies, allowing for increased CPU and server counts without the need for costly additional features.

MariaDB Enterprise Platform enables architectural consolidation, simplifies deployments, and maintains consistent functionality throughout the ecosystem. With free performance scale-out through hardware and no limitations on additions, it's a cost-effective solution.

Saving money with MariaDB

The following estimates for each database are calculated using published list prices based on a minimal configuration that meets standard enterprise requirements for a database.

After three years running three on-premises servers, each with two 16-core processors:

- The total cost of Oracle is approximately 82% higher than that of MariaDB Enterprise Platform for high availability
- Organizations can save as much as $3.8 million after three years by choosing MariaDB Enterprise Platform

MariaDB Enterprise Platform employs a straightforward subscription-based model that circumvents Oracle's high licensing costs. This also helps to ease audit concerns, as the licensing is greatly simplified and easier to monitor.

Support cost reduction

The cost of MariaDB support is lower than that of Oracle. MariaDB Standard Support is suitable for non-critical applications, while Premium Support is recommended for any application that requires high availability and reliability. Premium Support includes some additional features and faster response times.

Deployment flexibility

MariaDB Enterprise Platform is optimized to run efficiently on commodity hardware or cloud-based infrastructure, resulting in a potential reduction of up to 50% in hardware costs. Running Oracle often requires high-end hardware, such as Oracle Exadata systems, which can cost millions of dollars for purchase and maintenance.

MariaDB Enterprise Platform reduces the pain of vendor lock-in. Unlike Oracle, which often ties its software to specific hardware (such as Exadata) and requires customers to rely on its ecosystem for full functionality, MariaDB Enterprise Platform can run on a variety of platforms – whether commodity hardware, public or private clouds, or different operating systems – without the need for proprietary technology.

This flexibility enables organizations to choose and change their infrastructure without incurring high migration costs or being limited by a single vendor, a common issue with Oracle's more restrictive ecosystem.

Lowered maintenance effort

MariaDB MaxScale, a component of the Enterprise Platform, reduces ongoing maintenance effort by automating key tasks such as query routing, load balancing and failover. In Oracle, maintaining high availability, load balancing and replication often involves complex configurations and regular monitoring, requiring dedicated resources. With MariaDB MaxScale, much of this is automated, reducing the need for constant manual oversight and troubleshooting. Additionally, MaxScale's flexible, modular architecture enables easier scaling and reconfiguration, eliminating the heavy maintenance burden that Oracle typically imposes through its proprietary tools.

MariaDB MaxScale can facilitate seamless upgrades of MariaDB Enterprise Platform databases. It acts as a database proxy, providing features such as connection routing, load balancing and automatic failover, which minimize downtime during upgrades.

MariaDB MaxScale can manage traffic between the application and multiple database nodes, enabling the upgrade of one node at a time while keeping the others available. This ensures that the application remains operational during the upgrade process.

MariaDB Enterprise Platform requires less administrative effort compared to Oracle due to its simpler setup, fewer complex configurations, and user-friendly tools. It automates various tasks, including backups, failovers and query routing, reducing the need for constant manual intervention.

The flexible architecture of MariaDB Enterprise Platform enables easier customization and scaling, allowing administrators to manage and maintain the database with greater ease, without requiring specialized expertise or extensive resources, unlike Oracle's more rigid and resource-intensive environment.

Scalability

MariaDB Enterprise Platform scales both vertically, through optimized hardware, and horizontally, via MariaDB Enterprise Cluster (Powered by Galera). MariaDB Enterprise Cluster is an active-active, multi-master synchronous replication solution for MariaDB Enterprise Platform. In combination with MariaDB MaxScale, this provides high availability, scalability and automated failover for mission-critical transactional workloads. MariaDB Enterprise Cluster provides parallel replication and data consistency across all nodes, automatically managing the identification and removal of failed nodes, as well as recovering and rejoining new nodes.

03

MariaDB Enterprise Platform benefits

MariaDB Enterprise Platform provides features not found in proprietary database platforms. It incorporates open source technologies, with open and transparent development that ensures customers and the community can access everything from test cases and security bugs to a shared product experience with users worldwide. It combines multiple MariaDB products into a single unified platform.

MariaDB Enterprise Server is a hardened, production-grade database that delivers enhanced reliability and stability. It includes Enterprise Audit, which captures detailed connection metadata, query execution details and user activity; Enterprise Backup, to ensure high availability and minimize application downtime with non-blocking physical backup; Enterprise Federation, to access tables in other databases using standard ODBC connection; and HashiCorp Vault, for external key management, separating encryption keys from the database instance.

MariaDB MaxScale delivers enterprise-grade high availability, scalability, security and integration services. MariaDB MaxScale provides transparent proxying to conceal complex database architectures from applications, scale-out load balancing that enables multiple servers to handle traffic, and management of high availability failover in replicated and clustered environments.

MariaDB Enterprise Cluster (Powered by Galera) is an active-active, multi-master synchronous replication solution for MariaDB Enterprise Server. In combination with MariaDB MaxScale, it provides high availability, scalability and automated failover for mission-critical transactional workloads. MariaDB Enterprise Cluster provides parallel replication and data consistency across all nodes, automatically managing the identification and removal of failed nodes, as well as recovering and rejoining new nodes.

MariaDB Enterprise Kubernetes Operator is a powerful solution designed to provision and operate MariaDB Enterprise Platform, including MariaDB Enterprise Server, MaxScale and Enterprise Cluster, seamlessly within Kubernetes environments. Certified by Red Hat, it offers a standardized, efficient and secure way to manage the entire lifecycle of your enterprise database fleet across any cloud or on-premises infrastructure.

MariaDB Cloud (formerly SkySQL) is a fully managed database-as-a-service (DBaaS) that offers two robust architectures: provisioned for consistent performance and serverless for on-demand elastic scaling. Built on the full power of MariaDB Server, the platform delivers mission-critical resilience, integrated AI and multicloud freedom right out of the box. We handle the underlying operational complexity so you can focus on what matters most: building your next great application.

MariaDB Cloud streamlines the development of AI applications by integrating high-performance vector search and developer tooling directly into the database. This unified approach eliminates the complexity and cost of a fragmented data stack. It is designed to ensure uptime and resilience. It combines an advanced, self-healing

architecture with intelligent, automated failover, enabling zero-downtime recovery, to protect your database from both small-scale failures and large-scale outages.

Additional capabilities of the platform include:

Multimodal solution for hybrid workflows MariaDB Enterprise Platform delivers a comprehensive, multimodal database that seamlessly integrates transactional (OLTP), analytical (OLAP), mixed (HTAP), AI-driven vector search and semi-structured (JSON) data processing to eliminate silos, accelerate development, and enhance data insights. MariaDB Enterprise Platform reduces complexity, overhead and data synchronization headaches by enabling the management of both relational and analytical data, as well as vector embeddings, in a single, unified environment.

A complete ecosystem of AI features and tools, from our high-performance integrated Vector Embedded Search, to the MariaDB MCP Server that creates a frictionless bridge between your data and large language models (LLMs), MariaDB provides everything you need to build sophisticated retrieval augmented generation (RAG) systems, semantic search and other AI-powered applications without the complexity and cost of a fragmented data stack. It includes framework integrations for LangChain, LangChain.js, Spring AI and LlamaIndex.

Pluggable storage engines included with MariaDB Enterprise Platform enable you to deploy a single stack capable of handling row-based transactional data, write-heavy workloads and columnar data storage.

- Aria – for read-intensive workloads
- InnoDB – for mixed read/write workloads
- MyRocks – for write-intensive workloads
- Spider – for scalability
- ColumnStore – for analytics

Flexible topology built into the architecture. MariaDB Enterprise Platform offers multi-node, virtually synchronous replication that can operate over a wide area network (WAN), in-order parallelized asynchronous replication, semi-synchronous replication to enable failovers with no transaction loss and plain asynchronous replication with flexible data center topologies.

Multi-threaded architecture to scale performance with the number of cores/processors. Thread pooling in MariaDB Enterprise Platform can handle over 200,000 connections, making it suitable for scalable applications with high concurrent usage. There are also techniques for scaling to accommodate large datasets and a high volume of users, including partitioning, compression, read replicas and sharding.

04

Feature parity

MariaDB Enterprise Platform offers comparable features to those found in Oracle. MariaDB Enterprise Platform offers more in some areas, such as pluggable storage engines and flexible cluster solutions. In other areas, Oracle has features that MariaDB Enterprise Platform lacks, such as materialized views. You can decide if a feature is worth the cost by comparing the differences and the TCO.

MariaDB Enterprise Platform and Oracle Database both include:

- ACID compliance, referential integrity, transactions
- Unicode UTF-8
- Transparent data encryption
- Foreign keys
- UNION, INTERSECT, EXCEPT, Joins
- Common Table Expressions (CTE), window functions
- Temporal tables (system versioned, application time-period, bitemporal)
- Cursors, triggers, functions, events, procedures, dynamic SQL, sequences
- Set operators, table value constructors
- User-defined aggregate functions, ordered-set aggregate functions
- Clustering
- Partitioning and sharding
- Backup and restore
- Point-in-time rollback
- Invisible columns, generated or virtual columns
- Columnar storage
- Compression
- Data masking
- Vector search
- Stored procedures
- Workload capture and replay
- Diff router

- Audit logs

Built-in migration compatibility

MariaDB Enterprise Platform streamlines the migration process, offering a compatibility mode for Oracle Database, which reduces migration costs and time. DBAs and developers can continue to apply their Oracle Database knowledge. MariaDB Enterprise Platform supports Oracle PL/SQL, sequences, dynamic SQL (i.e., EXECUTE IMMEDIATE) and packages, and offers direct execution of PL/SQL code with `SQL_MODE=ORACLE`.

The PL/SQL compatibility parser – known as SQL/PL in MariaDB Enterprise Server – facilitates easier migrations from Oracle to MariaDB Enterprise Platform. MariaDB Enterprise Server can understand the Oracle SQL dialect. The ORACLE mode understands approximately 80-90% of PL/SQL procedures, and some of the remaining constructs and library calls can be migrated with minimal manual intervention.

There is no need to migrate SQL/PL logic to SQL/PSM or to an application layer when migrating from Oracle to MariaDB.

`Oracle` mode is also used to ensure that traditional MariaDB SQL/PSM syntax works as before. This compatibility parser addresses syntactic differences between SQL/PSM and SQL/PL. The compatibility parser is not simply a translator but an equal parser to the native SQL/PSM. There should be no performance differences between running a statement in SQL/PL or SQL/PSM in MariaDB Enterprise Server.

SQL/PSM-based stored functions can still be used alongside and within SQL/PL queries and functions, as well as the reverse. This allows the migration team to leave Oracle SQL code unchanged as much as possible by just taking over the existing code. Modifications are done only as necessary.

SQL/PL becomes part of the new MariaDB-based application and is never phased out. This represents a significant reduction in effort and cost.

Other compatibility features of MariaDB Enterprise Platform include Oracle-compatible packages and stored functions, and data type synonyms such as:

- `VARCHAR2`, a synonym to `VARCHAR`
- `NUMBER`, a synonym to `DECIMAL`
- `DATE` (with time portion), a synonym to `DATETIME`
- `RAW`, a synonym to `VARBINARY`
- `CLOB`, a synonym to `LONGTEXT`
- `BLOB`, a synonym to `LONGBLOB`

There are some Oracle data types, such as `BFILE`, that MariaDB does not support. This is where the developer or DBA would consider alternative implementations, such as moving to a `VARCHAR` with a file or URL pointer instead of defining it as a **BFILE**, or using a `BLOB`.

For an in-depth examination of data type compatibility, see Appendix A.

Infrastructure

MariaDB Enterprise Platform delivers functionality that can be used to replace a range of Oracle components:

MARIADB ENTERPRISE PLATFORM	ORACLE DATABASE
MariaDB Enterprise Cluster (Powered by Galera)	Oracle Real Application Clusters (RAC)
MariaDB MaxScale - automatic failover	Oracle Active Data Guard
MariaDB MaxScale - workload capture and replay	Oracle Application Continuity
MariaDB MaxScale - dynamic data masking	Oracle Advanced Security - data masking
MariaDB Enterprise Server - backup and restore	Oracle Recovery Manager (RMAN)
MariaDB Enterprise Server - temporal tables	Oracle Flashback Query/Versions Query
MariaDB Enterprise Server - flashback	Oracle Flashback Database/Table
MariaDB Enterprise Server - partitioning	Oracle Partitioning
MariaDB Enterprise Server - sharding	Oracle Sharding
MariaDB Enterprise Server - table, column, log compression	Oracle Advanced Compression
MariaDB Enterprise Server - transparent data encryption	Oracle Advanced Security - encryption
MariaDB Enterprise Server - ColumnStore	Oracle Database In-Memory - Column Store
MariaDB Enterprise Server - SQL/PL - Oracle compatible	Oracle PL/SQL

05

Migration methodology

MariaDB brings proven expertise to help you modernize from legacy database systems to the MariaDB Enterprise Platform. Our specialists possess a deep understanding of the platform, encompassing PL/SQL compatibility and advanced enterprise features, thereby ensuring a well-defined upgrade path. With dedicated migration roles, a coordinated team effort and proven practices, we strive to provide a successful migration outcome.

The success of a database migration depends on company-wide alignment and participation. Engaging all key stakeholders throughout the upgrade process is essential. These include legacy and MariaDB DBAs, project managers (PMs), system administrators, application developers, product owners and quality assurance (QA) teams. Equally important are business stakeholders and executive leadership, whose support ensures strategic alignment and organizational readiness for the transition.

Applications that utilize well-documented database interfaces, such as Oracle with Java, C++ or PHP, and for which the source code is available, are strong candidates for migration. Likewise, vendor-neutral and commercial off-the-shelf (COTS) applications with clearly documented interfaces, database driver support, and compatibility with MySQL or MariaDB are also well-suited for migration to the MariaDB Enterprise Platform.

The process to upgrade to MariaDB Enterprise Platform involves the following steps.

- **Exploring**
  - Evaluate scope and feasibility
  - Define value proposition
  - Select approach
  - Develop proof of concept with success criteria
- **Architecting**
  - Define system design
  - Identify integration requirements
  - Develop the migration strategy and operating practices
- **Migrating**
  - Deploy architectures
  - Convert schemas and migrate data
  - Develop automation runbooks
  - Initiate quality testing and assurance process

- **Integrating**
  - Integrate applications
  - Optimize and calibrate performance
  - Enhance security posture
  - Ensure production readiness preparation
- **Operating**
  - Deploy to production
  - Complete smooth handoff to operations
  - Develop long-term optimization strategy

The exploration phase establishes the foundation for a cost-optimized, strategically guided migration that aligns with transformation objectives. It includes a review of the application portfolio, alignment with IT strategy, consideration of open source versus proprietary technologies, and the development of a business case aligned with organizational goals.

With alignment from the exploration phase, the architecture phase focuses on prioritizing applications and defining the migration approach, which can be achieved through lift-and-shift, replatforming or restructuring. Functional and non-functional requirements are established, and a high-level solution architecture is developed. This phase also includes effort estimation.

The migration phase executes the planned transition from Oracle to MariaDB Enterprise Platform, involving the conversion of schema and database code, as well as the migration of data via snapshots, change data capture (CDC) or a hybrid approach. Application interfaces (JDBC, ODBC, OCI and .NET) and embedded SQL are re-platformed accordingly. Supporting components, including reports, utilities and scripts, are transitioned in a similar manner. Comprehensive testing and quality assurance ensure the completeness, consistency and performance of the new environment.

The integration phase validates and optimizes the new environment, involving comprehensive data, functional and performance validation, as well as integration across applications and with all upstream/downstream systems. Security configurations are rigorously verified, and performance is tuned to ensure production readiness and alignment with operational requirements.

The operation phase deploys the validated and optimized MariaDB Enterprise Platform to production, enabling Oracle decommissioning. This final stage involves comprehensive tuning (database, query, application), CDC completion, and verification of high availability, disaster recovery and security. A go/no-go assessment precedes cutover, supported by rollback planning and a long-term strategy for continuous optimization and operational stability.

Migration roles

Multiple stakeholders are involved in the migration process. These stakeholders fulfill the following roles:

- **Oracle DBA** – Whether the Oracle DBA will be involved in administering the new database, their expertise in how the Oracle system operates is invaluable. Moreover, they will be intimately involved in the project if replication is used for data migration or a gradual cutover.
- **MariaDB DBA** – While every database has specific features and processes, the Oracle DBA often ends up being the MariaDB DBA. If this is not the case, it helps to have the MariaDB DBA work closely with the Oracle DBA. MariaDB offers training for Oracle DBAs who want to learn more about the MariaDB Enterprise Platform.
- **Project Manager** – Maintains the schedule, manages tasks, and tracks risks.
- **SysAdmin** – Ensures system configuration and DevOps practices are followed.
- **Application Developer** – Ensures the correct database connector is used, the ORM is configured, and any necessary code changes are made.
- **Product Owner** – Validates that the system meets the needs of the business.
- **QA** – Tests that the application works correctly, the system meets performance requirements, and the migrated data is correct.

On many teams, the same person may hold multiple roles. Frequently, DBAs also serve as system administrators, and some project owners assume the role of project managers. What is crucial is to ensure that all stakeholders are aware of the process and their respective roles within it.

06

Next steps

Now that you know how MariaDB Enterprise Platform stacks up against Oracle Database, and the basic migration process, it's time to take the next step to move away from your old proprietary database.

Contact us! Whether you'd like help retraining your Oracle DBAs or want to learn about database migration services, we're here to ensure your success.

To learn more about how to initiate a migration from Oracle Database to MariaDB Enterprise Platform and how it can benefit your organization, check out our Oracle to MariaDB Migration page.

About MariaDB

MariaDB seeks to eliminate the constraints and complexity of proprietary databases, enabling organizations to reinvest in what matters most – rapidly developing innovative, customer-facing applications. Enterprises can depend on a single complete database for all their needs, that can be deployed in minutes for transactional, analytical and hybrid use cases. Trusted by organizations such as Deutsche Bank, DBS Bank, Red Hat, ServiceNow and Samsung – MariaDB delivers customer value without the financial burden of legacy database providers. For more information, please visit mariadb.com.

07

Appendix A: Data types

Working around unsupported data types

While the data types found in most applications are available in MariaDB Enterprise Platform, some specific types, such as `BFILE`, are not. In these cases, the DBA or developer can consider alternative implementations, such as moving to a `VARCHAR` with a file or URL pointer, or storing the data in a BLOB within the database instead of using a `BFILE`.

Floating and fixed point data types

MariaDB Enterprise Platform has many one-to-one mappings with legacy database data types. A consideration coming from Oracle is the difference between `NUMBER` and `INT` or `NUMBER` and numeric float `DOUBLE`. Some types are accurate, and some are float, and may be imprecise to a certain level of decimals, depending on either the legacy database or MariaDB's implementation.

Floating and fixed point data types

MARIADB ENTERPRISE PLATFORM	ORACLE DATABASE
DECIMAL(p,s), DEC(p,s)	DECIMAL(p,s), DEC(p,s)
DOUBLE PRECISION	DOUBLE PRECISION
DOUBLE	FLOAT(p)
FLOAT or REAL	BINARY_FLOAT
INT	INTEGER, INT
TINYINT	NUMBER(p,0), NUMBER(p), 1 ⩽ p < 3
SMALLINT	NUMBER(p,0), NUMBER(p), 3 ⩽ p < 5
INT	NUMBER(p,0), NUMBER(p), 5 ⩽ p < 9
BIGINT	NUMBER(p,0), NUMBER(p), 9 ⩽ p < 19
DECIMAL(p)	NUMBER(p,0), NUMBER(p), 19 ⩽ p < 38
DECIMAL(p,s)	NUMBER(p,s), s > 0
DOUBLE	NUMBER, NUMBER(*)
NUMERIC(p,s)	NUMERIC(p,s)

MARIADB ENTERPRISE PLATFORM	ORACLE
DOUBLE	REAL
DOUBLE	BINARY_DOUBLE
DECIMAL(38)	SMALLINT

String data types

A mapping of string types is provided in the table below. `CHAR(256)` or `VARCHAR(256)` are usually stored on page in engines such as InnoDB. When there are larger text columns, they may also be stored off page, and this has some indexing, storage and performance implications that should be considered carefully.

MARIADB ENTERPRISE PLATFORM	ORACLE DATABASE
CHAR(n), CHARACTER(n)	CHAR(n), CHARACTER(n), n < 256
VARCHAR(n), TEXT, MEDIUMTEXT, LONGTEXT	CHAR(n), CHARACTER(n), n > 255
LONGTEXT	CLOB
VARCHAR(30)	INTERVAL YEAR(p) TO MONTH
VARCHAR(30)	INTERVAL DAY(p) TO SECOND(s)
LONGTEXT	LONG
NCHAR(n)	NCHAR(n), n < 256
NCHAR VARYING(n)	NCHAR(n), n > 255
NVARCHAR(max), LONGTEXT	NCLOB
NVARCHAR(n)	NVARCHAR2(n)
CHAR(18)	ROWID
VARCHAR(n)	UROWID(n)
VARCHAR(n)	VARCHAR(n), VARCHAR2(n)
LONGTEXT	XMLTYPE

Date and time data types

When using `DATE` and `TIME` data types, be aware that `TIMESTAMP` with time zone or `DATE` with time zone may exist in the source database. From MariaDB Server 10.3 and above, the `DATE` data type can store time as well – this is specifically for Oracle compatibility.

Temporal data types

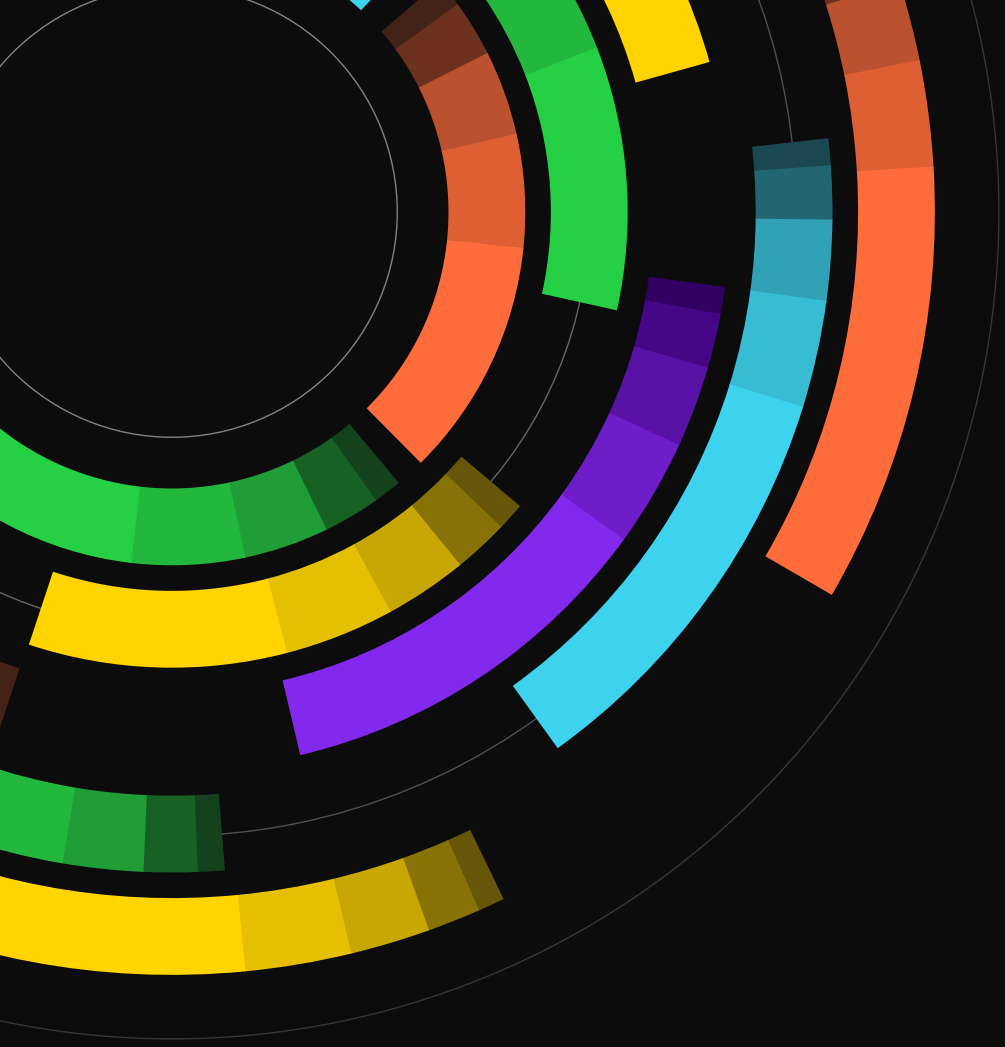
MARIADB ENTERPRISE PLATFORM	ORACLE DATABASE
DATETIME, DATE	DATE
DATETIME(p)	TIMESTAMP(p)

Binary data types

There are also `BINARY` data types, and the 256-byte rule applies here, just as with the string data types. A few features need to be implemented differently. When examining a compressed `BLOB`, the table can now be compressed using InnoDB row or page compression.

Binary data types

MARIADB ENTERPRISE PLATFORM	ORACLE DATABASE
VARCHAR(255)	BFILE
LONGTEXT	CLOB
LONGBLOB	LONG RAW
NCHAR(n)	NCHAR(n), n < 256
NVARCHAR(n)	NCHAR(n), n > 255
NCHAR VARYING(n)	NCHAR VARYING(n)
NVARCHAR(max), LONGTEXT	NCLOB
NUMERIC(p,s)	NUMERIC(p,s)
NVARCHAR(n)	NVARCHAR2(n)
BINARY(n)	RAW(n), n < 256
VARBINARY(n)	RAW(n), n > 255
VARCHAR(n)	UROWID(n)
VARCHAR(n)	VARCHAR(n), VCHAR2(n)
LONGTEXT	XMLTYPE



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