MySQL is a high-performance, open-source Relational Database Management System (RDBMS).[1] As of 2025, it has evolved significantly with the **MySQL 9.x Innovation** and **8.4 LTS** releases, incorporating modern features like AI-native data types and server-side JavaScript.[2]

Below are the key features categorized by their impact on development and operations.

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1. Modern & AI-Ready Capabilities[3]

MySQL has moved beyond traditional text and numbers to support modern application needs.[4]

- **Vector Data Type:** New in MySQL 9, this allows you to store and perform similarity searches on multidimensional vectors—essential for **AI, LLMs, and recommendation engines**.[5]

- **JavaScript Stored Programs:** You can now write stored procedures and functions using JavaScript (via the Multilingual Engine/MLE), allowing developers to use a familiar language for database logic.[6]

- **JSON Support:** Robust document store capabilities allow you to work with "NoSQL" data while maintaining the benefits of a relational database.

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2. Performance & Scalability

MySQL is famous for its speed, especially in read-heavy environments like web applications.[7]

- **Storage Engine Pluggability:** You can choose different engines for different tables.[8] **InnoDB** is the default for transactional (ACID) integrity, while **MyISAM** or **Memory** engines can be used for specific speed requirements.[9]

- **Indexing:** Support for B-Tree, Hash, and Full-text indexes ensures fast data retrieval even with millions of rows.[10]

- **HeatWave (Cloud):** An in-memory query accelerator that can speed up MySQL performance by orders of magnitude for analytics and machine learning without changing your code.

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3. High Availability & Replication

MySQL ensures your data is always accessible and safe from server failures.[11]

- **Group Replication:** Provides built-in high availability by synchronizing data across a group of servers, ensuring that if one goes down, another takes over automatically.[12]

- **Primary-Replica Replication:** Allows you to scale read operations by distributing them across multiple "replica" servers.[13]

- **Automatic Backups:** Enhanced tools like mysqldump now include user accounts and permissions, making migrations and recoveries more seamless.[14]

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4. Security & Compliance

Security is a core focus, especially with the 2025 updates to authentication and encryption.

- **Role-Based Access Control (RBAC):** Define specific roles (e.g., DataViewer, Admin) and assign them to users to ensure the principle of least privilege.
- **Data Masking & De-identification:** Helps protect sensitive data (like credit card numbers) from being seen by unauthorized users or in test environments.
- **End-to-End Encryption:** Supports SSL/TLS for data in transit and "Transparent Data Encryption" (TDE) for data at rest.[15]

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5. Ease of Use & Connectivity

- **Cross-Platform Support:** Runs on Linux, Windows, macOS, and major cloud platforms (AWS, Google Cloud, Azure).[16]

- **Wide Language Support:** Native connectors exist for almost every major programming language, including Python, Java, PHP, Node.js, and C++.
- **Standard SQL Compliance:** While it adds many unique features, it adheres closely to standard SQL, making it easy for developers to transition from other systems.

Feature Summary

Feature Category	Key Highlight

AI/ML	Native VECTOR type for semantic search.
Logic	JavaScript-based stored procedures.
Speed	InnoDB buffer pool and query optimization.
Safety	ACID compliance and Group Replication.
Cloud	HeatWave for 100x faster analytics.

Would you like to see a specific code example for one of these features, such as how to use the new **Vector** type for an AI project?