MySQL

Overview

MySQL is an open-source relational database management system. It supports SQL language and offers features like transactions, indexing, and replication. MySQL is widely used for web applications and enterprise solutions due to its performance, reliability, and ease of use. It runs on multiple operating systems, including Windows, Linux, and macOS.

Key Features of MySQL:

- **Performance and Scalability:** Designed to handle high-volume environments with fast read and write operations. It supports partitioning, indexing, and query optimization for better performance.
- **Replication and High Availability:** Offers master-slave and group replication setups, enabling load balancing, redundancy, and failover support to maintain uptime and data consistency.
- **Storage Engines:** Provides support for multiple storage engines, including InnoDB for ACID-compliant transactions and MyISAM for faster read-heavy workloads, giving flexibility in storage design.
- **Security Features:** Includes features like SSL support, role-based access control, user privilege management, and data encryption to secure database access and data integrity.
- **ACID Compliance:** With the InnoDB storage engine, MySQL ensures Atomicity, Consistency, Isolation, and Durability in transactions, which is essential for reliable data management.
- **Cross-Platform Support:** Compatible with all major operating systems, such as Windows, Linux, and macOS, allowing flexible deployment options in different environments.
- **JSON Support:** Provides native JSON data type and functions, enabling semi-structured data handling within relational structures.
- **Ease of Use and Tooling:** Offers tools like MySQL Workbench and integration with phpMyAdmin, making it accessible for both developers and administrators to manage schemas, run queries, and monitor performance.

These features make MySQL a preferred choice for developers and organizations seeking a stable, efficient, and well-supported database system.

How to Connect

Connecting with Node.js

This guide explains how to establish a connection between a Node.js application and a MySQL database using the `mysql2` package. It walks through the necessary setup, configuration, and execution of a simple SQL query.

Variables

Certain parameters must be provided to establish a successful connection to a MySQL database. Below is a breakdown of each required variable, its purpose, and where to find it. Here's what each variable represents:

Variable	Description	Purpose
`USER`	MySQL username, from the Elestio service overview page	Identifies the database user who has permission to access the MySQL database.
`PASSWORD`	MySQL password, from the Elestio service overview page	The authentication key is required for the specified USER to access the database.
`HOST`	Hostname for MySQL connection, from the Elestio service overview page	The address of the server hosting the MySQL database.
`PORT`	Port for MySQL connection, from the Elestio service overview page	The network port used to connect to MySQL. The default port is 3306.
`DATABASE`	Database Name for MySQL connection, from the Elestio service overview page	The name of the database being accessed. A MySQL instance can contain multiple databases.

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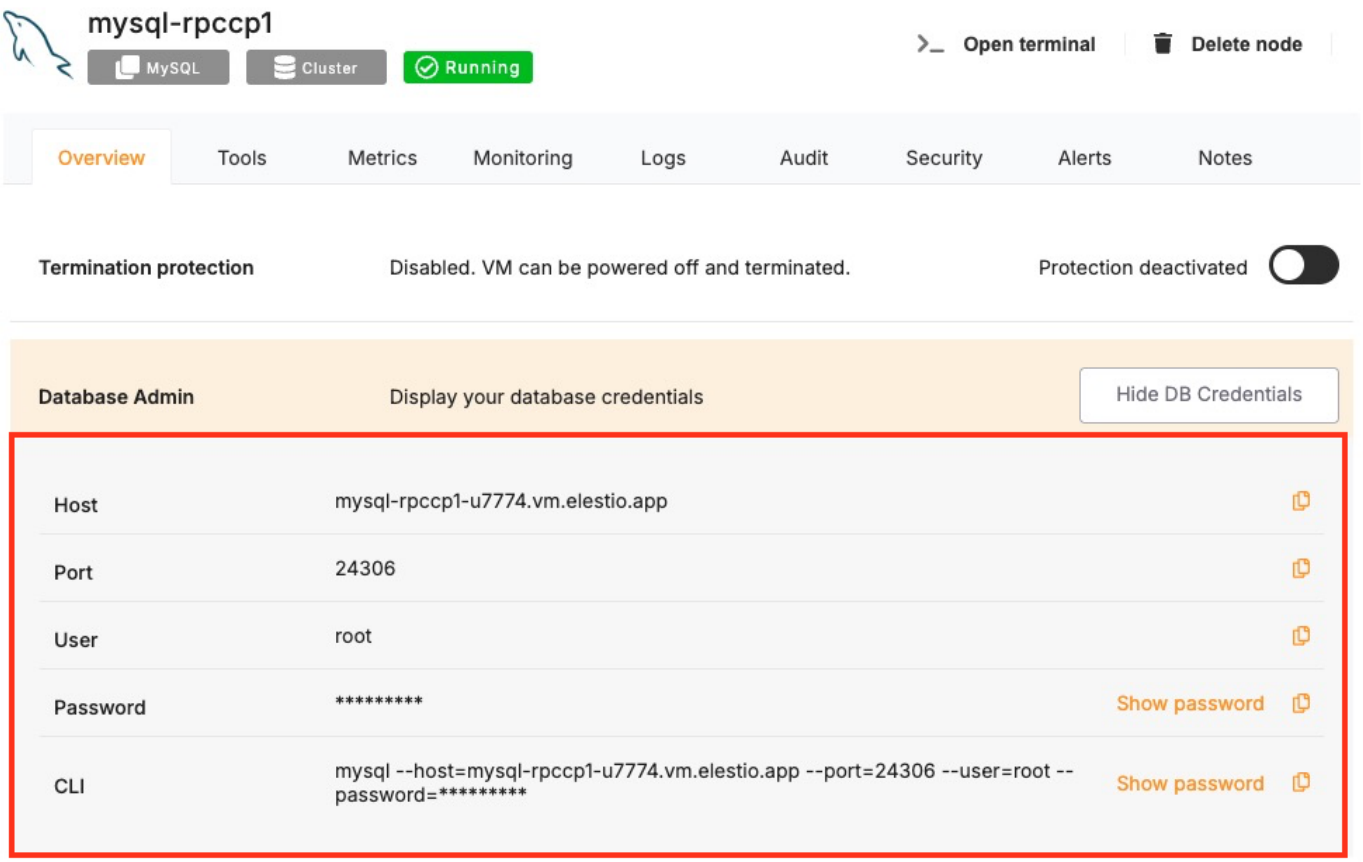

Prerequisites

- **Install Node.js and NPM**
  - Check if Node.js is installed by running: `node -v`
  - If not installed, download it from nodejs.org and install. Additionally, verify npm installation: `npm -v`
- **Install the mysql2 Package**
  - The mysql2 package enables Node.js applications to interact with MySQL. Install it using: `npm install mysql2 --save`

Code

Once all prerequisites are set up, create a new file named `mysql.js` and add the following code:

```
const mysql = require("mysql2");

// Database connection configuration
const config = {
```

```
  host: "HOST",
  user: "USER",
  password: "PASSWORD",
  database: "DATABASE",
  port: PORT,
};

// Create a MySQL connection
const connection = mysql.createConnection(config);

// Connect to the database
connection.connect((err) => {
  if (err) {
    console.error("Connection failed:", err);
    return;
  }
  console.log("Connected to MySQL");

  // Run a test query to check the MySQL version
  connection.query("SELECT VERSION() AS version", (err, results) => {
    if (err) {
      console.error("Query execution failed:", err);
      connection.end();
      return;
    }

    console.log("MySQL Version:", results[0]);

    // Close the database connection
    connection.end((err) => {
      if (err) console.error("Error closing connection:", err);
    });
  });
});
```

To execute the script, open the terminal or command prompt and navigate to the directory where mysql.js is located. Once in the correct directory, run the script with the command:

```
node mysql.js
```

If the connection is successful, the terminal will display output similar to:

Connected to MySQL

MySQL Version: { version: '8.0.41' }

Connecting with Python

This guide explains how to establish a connection between a Python application and a MySQL database using the `mysql-connector-python` package. It walks through the necessary setup, configuration, and execution of a simple SQL query.

Variables

Certain parameters must be provided to establish a successful connection to a MySQL database. Below is a breakdown of each required variable, its purpose, and where to find it. Here's what each variable represents:

Variable	Description	Purpose
`USER`	MySQL username, from the Elestio service overview page	Identifies the database user who has permission to access the MySQL database.
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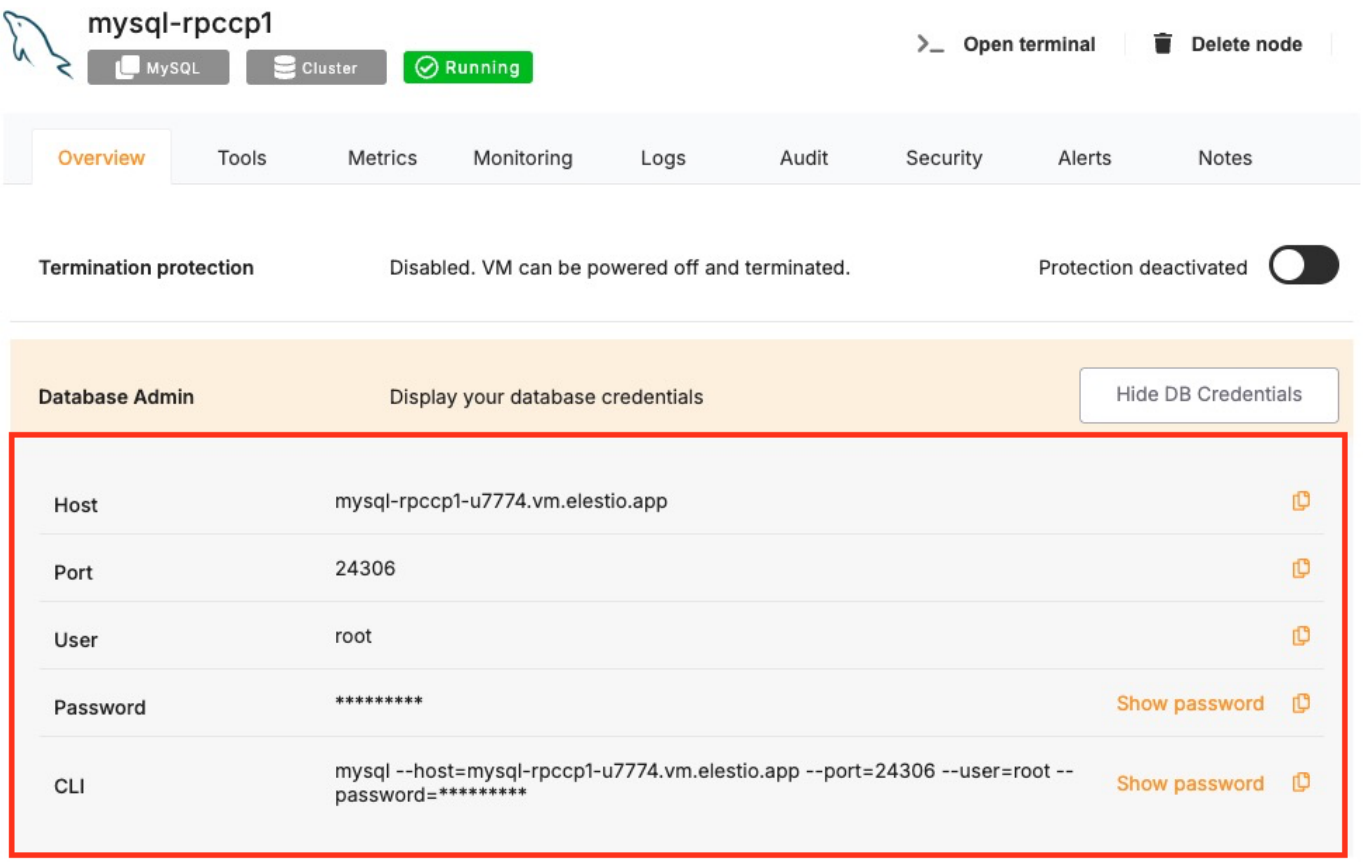

Prerequisites

- **Install Python**
  - Check if Python is installed by running: `python --version`
  - If not installed, download it from python.org and install it.

- **Install the `mysql-connector-python` Package**
  - The mysql-connector-python package enables Python applications to interact with MySQL. Install it using: `pip install mysql-connector-python`

Code

Once all prerequisites are set up, create a new file named `mysql_connect.py` and add the following code:

```
import mysql.connector


# Database connection configuration
config = {
```

```
    "host": "HOST",
    "user": "USER",
    "password": "PASSWORD",
    "database": "DATABASE",
    "port": PORT
}

try:
    # Establish the connection
    connection = mysql.connector.connect(**config)
    print("Connected to MySQL")

    # Create a cursor and execute a test query
    cursor = connection.cursor()
    cursor.execute("SELECT VERSION()")

    # Fetch and print the result
    version = cursor.fetchone()
    print("MySQL Version:", version[0])

except mysql.connector.Error as err:
    print("Connection failed:", err)

finally:
    if 'cursor' in locals():
        cursor.close()
    if 'connection' in locals() and connection.is_connected():
        connection.close()
        print("Connection closed")
```

To execute the script, open the terminal or command prompt and navigate to the directory where `mysql_connect.py` is located. Once in the correct directory, run the script with the command:

```
python mysql_connect.py
```

If the connection is successful, the terminal will display output similar to:

```
Connected to MySQL
MySQL Version: 8.0.41
Connection closed
```

Connecting with PHP

This guide explains how to establish a connection between a PHP application and a MySQL database using the mysqli extension. It walks through the necessary setup, configuration, and execution of a simple SQL query.

Variables

Certain parameters must be provided to establish a successful connection to a MySQL database. Below is a breakdown of each required variable, its purpose, and where to find it. Here’s what each variable represents:

Variable	Description	Purpose
USER	MySQL username, from the Elestio service overview page	Identifies the database user who has permission to access the MySQL database.
PASSWORD	MySQL password, from the Elestio service overview page	The authentication key is required for the specified USER to access the database.
HOST	Hostname for MySQL connection, from the Elestio service overview page	The address of the server hosting the MySQL database.
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DATABASE	Database Name for MySQL connection, from the Elestio service overview page	The name of the database being accessed. A MySQL instance can contain multiple databases.

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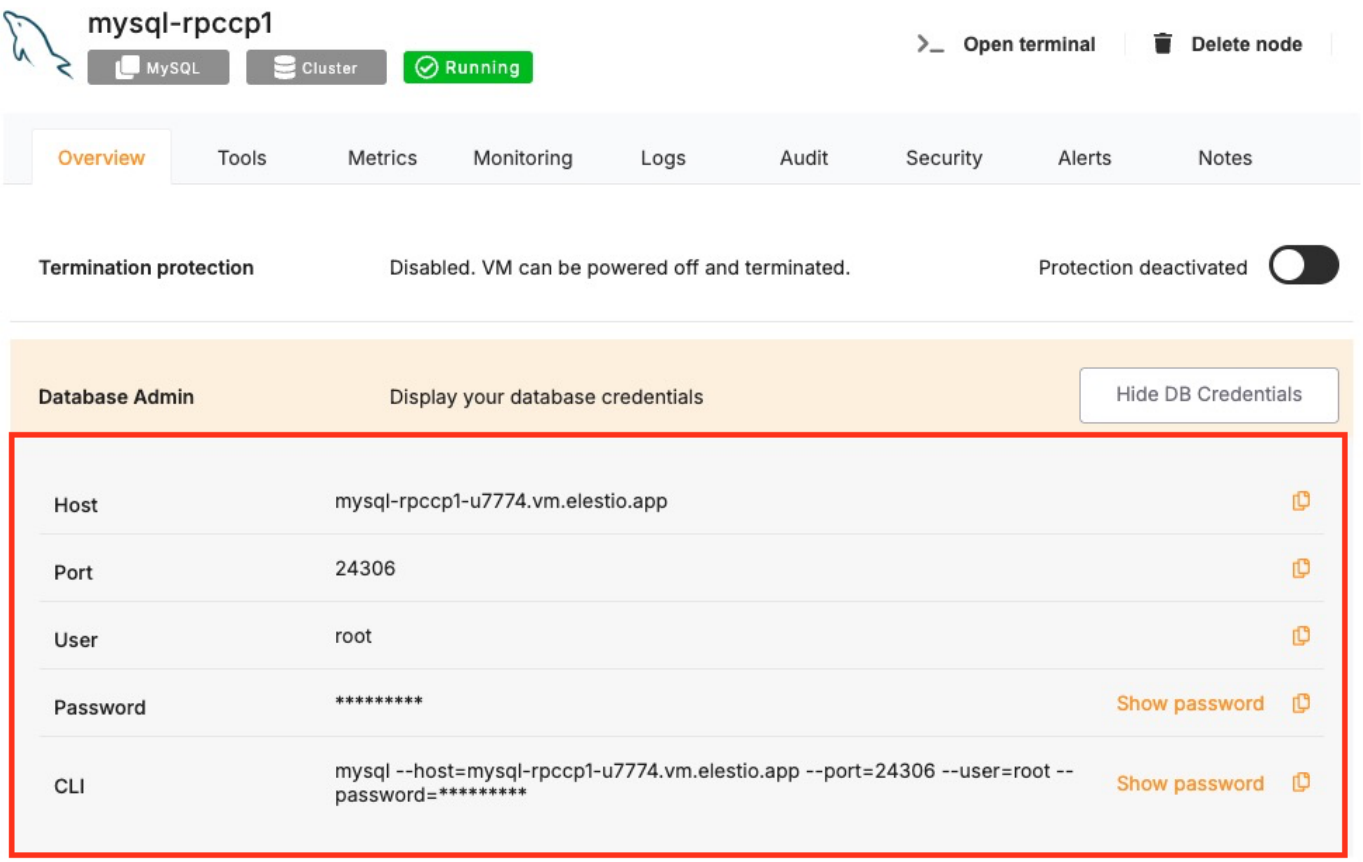

Prerequisites

- **Install PHP**
  - Check if PHP is installed by running: `php -v`
  - If not installed, download it from php.net and install.
  - Make sure the mysqli extension is enabled in your php.ini configuration.

Code

Once all prerequisites are set up, create a new file named `mysql_connect.php` and add the following code:

```
<?php
$host = "HOST";
$user = "USER";
$password = "PASSWORD";
$database = "DATABASE";
$port = PORT;

// Create connection
```

```
$conn = new mysqli($host, $user, $password, $database, $port);

// Check connection
if ($conn->connect_error) {
    die("Connection failed: " . $conn->connect_error);
}
echo "Connected to MySQL<br>";

// Run a test query to check the MySQL version
$result = $conn->query("SELECT VERSION()");

if ($result) {
    $row = $result->fetch_assoc();
    echo "MySQL Version: " . $row["VERSION()"];
    $result->free();
} else {
    echo "Query execution failed: " . $conn->error;
}

// Close connection
$conn->close();
?>
```

To execute the script, run the PHP server in the directory where `mysql_connect.php` is located using:

```
php -S localhost:8000
```

Then, open a browser and go to:

```
http://localhost:8000/mysql_connect.php
```

If the connection is successful, the browser will display output similar to:

```
Connected to MySQL
MySQL Version: 8.0.36
```

Connecting with Go

This guide explains how to establish a connection between a Go application and a MySQL database using the `go-sql-driver/mysql` package. It walks through the necessary setup, configuration, and execution of a simple SQL query.

Variables

Certain parameters must be provided to establish a successful connection to a MySQL database. Below is a breakdown of each required variable, its purpose, and where to find it. Here's what each variable represents:

Variable	Description	Purpose
`USER`	MySQL username, from the Elestio service overview page	Identifies the database user who has permission to access the MySQL database.
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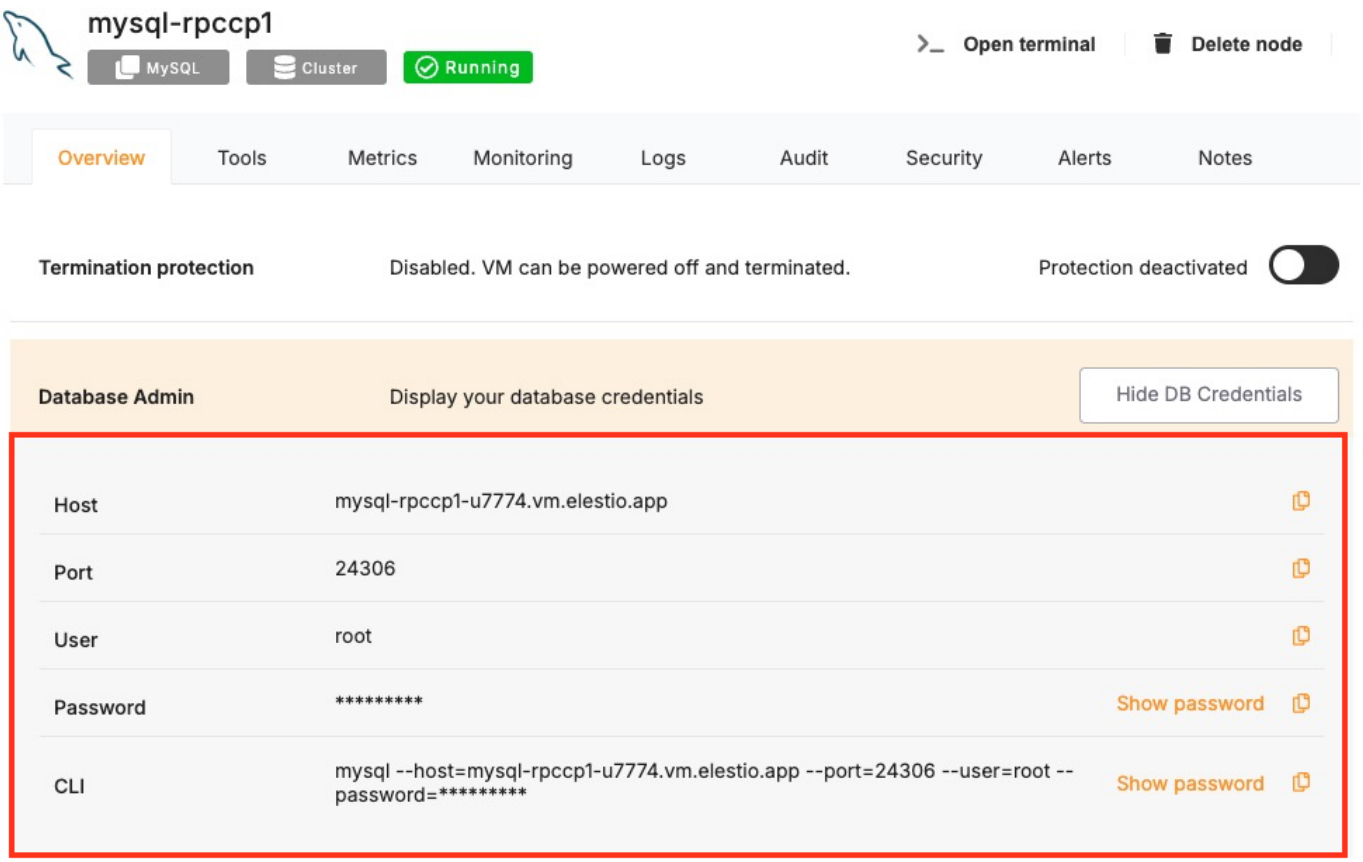

Prerequisites

- **Install Go**
  - Check if Go is installed by running: `go version`
  - If not installed, download it from golang.org and install.

- **Install the MySQL Driver**
  - Use the following command to install the go-sql-driver/mysql driver: `go get -u github.com/go-sql-driver/mysql`

Code

Once all prerequisites are set up, create a new file named `mysql_connect.go` and add the following code:

```
package main

import (
"database/sql"
"fmt"
```

```
	"log"

	_ "github.com/go-sql-driver/mysql"
)

func main() {
	user := "USER"
	password := "PASSWORD"
	host := "HOST"
	port := "PORT"
	database := "DATABASE"

	// Construct DSN (Data Source Name)
	dsn := fmt.Sprintf("%s:%s@tcp(%s:%s)/%s", user, password, host, port, database)

	// Open a connection
	db, err := sql.Open("mysql", dsn)
	if err != nil {
		log.Fatalf("Connection failed: %v", err)
	}
	defer db.Close()

	// Ping to verify connection
	if err := db.Ping(); err != nil {
		log.Fatalf("Ping failed: %v", err)
	}
	fmt.Println("Connected to MySQL")

	// Run a test query to check the MySQL version
	var version string
	err = db.QueryRow("SELECT VERSION()").Scan(&version)
	if err != nil {
		log.Fatalf("Query execution failed: %v", err)
	}
	fmt.Printf("MySQL Version: %s\n", version)
}
```

To execute the script, open the terminal and navigate to the directory where `mysql_connect.go` is located. Once in the correct directory, run the script with the commands:

```
go mod init example.com/mysqlconnect
go run mysql_connect.go
```

If the connection is successful, the terminal will display output similar to:

```
Connected to MySQL
MySQL Version: 8.0.36
```

Connecting with Java

This guide explains how to establish a connection between a Java application and a MySQL database using the `mysql-connector-j` JDBC driver. It walks through the necessary setup, configuration, and execution of a simple SQL query.

Variables

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Variable	Description	Purpose
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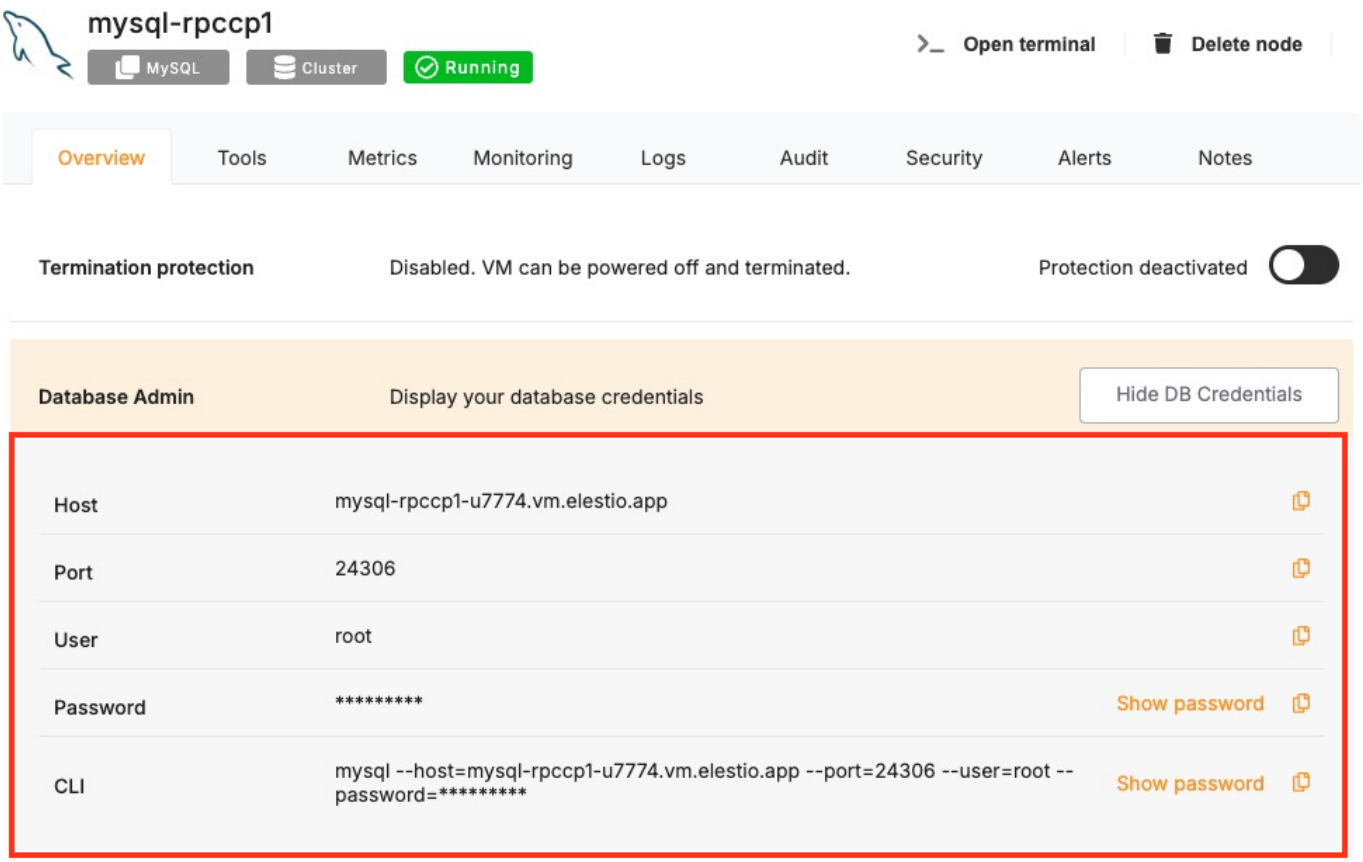

Prerequisites

- **Install Java**
  - Check if Java is installed by running: `java -version`.
  - If not installed, download it from oracle.com or install OpenJDK.
- **Install MySQL Connector/J**
  - Download the latest version `mysql-connector-j` from the official MySQL site.

Code

Once all prerequisites are set up, create a new file named `MySQLConnect.java` and add the following code:

```
import java.sql.*;
import java.util.*;

public class MySQLConnect {
    public static void main(String[] args) {
```

```
        Map<String, String> config = new HashMap<>();
        for (int i = 0; i < args.length - 1; i += 2)
            config.put(args[i], args[i + 1]);

        String url = String.format("jdbc:mysql://%s:%s/%s?useSSL=true",
                config.get("-host"), config.get("-port"), config.get("-database"));

        try {
            Class.forName("com.mysql.cj.jdbc.Driver");
            try (Connection conn = DriverManager.getConnection(url, config.get("-username"), config.get("-
password"));
                 Statement stmt = conn.createStatement();
                 ResultSet rs = stmt.executeQuery("SELECT VERSION()")) {
                System.out.println("Connected to MySQL");
                if (rs.next()) System.out.println("MySQL Version: " + rs.getString(1));
            }
        } catch (Exception e) {
            System.err.println("Connection error: " + e.getMessage());
        }
    }
}
```

To compile and run the Java program, use the following commands in your terminal:

```
javac MySQLConnect.java && java -cp mysql-connector-j-9.3.0.jar:. MySQLConnect -host HOST -port PORT -
database DATABASE -username avnadmin -password PASSWORD
```

If the connection is successful, the terminal will display output similar to:

```
Connected to MySQL
MySQL Version: 8.0.41
```

How-To Guides

Database Migration

Cluster Management