

Vincent Healy

Vincent.healy@raildeliverygroup.com

Creating a well-structured database schema to manage train operators, stations, and their associated devices requires a clear understanding of the relationships between the different entities. Here's a proposed schema with the main table and separate tables, using foreign keys to maintain data integrity and avoid typos.

Design database for TOC Station Devices

Contents

[Database 2](#_Toc167799159)

[Tables and Schema 3](#_Toc167799160)

[Tables 3](#_Toc167799161)

[Train Operator 3](#_Toc167799162)

[Station 3](#_Toc167799163)

[DeviceType 3](#_Toc167799164)

[Supplier 3](#_Toc167799165)

[StationDevice 4](#_Toc167799166)

[SQL Schema Creation 5](#_Toc167799167)

[Explanation 6](#_Toc167799168)

[Full Script 7](#_Toc167799169)

# Database

Choosing a good database name often involves using a name that clearly represents the purpose of the database. For this scenario, a suitable name could be something like train\_device\_management.

To create the database and set it to be used before creating the tables, you can use the following SQL commands:

CREATE DATABASE train\_device\_management;

USE train\_device\_management;

# Tables and Schema

## Tables

### **Train Operator**

This table will store information about each train operator.

* `operator\_id` (Primary Key)
* `operator\_name` (Unique)
* `contact\_info`
* `created\_at`
* `updated\_at`

### **Station**

This table will store information about each station.

* `station\_id` (Primary Key)
* `station\_name` (Unique)
* `location`
* `operator\_id` (Foreign Key referencing `TrainOperator.operator\_id`)
* `created\_at`
* `updated\_at`

### **DeviceType**

This table will store information about the different types of devices.

* `device\_type\_id` (Primary Key)
* `device\_type\_name` (Unique) (e.g., Ticket Vending Machine, Gate, Platform Validator, Ticket Office Machine)
* `created\_at`
* `updated\_at`

### Supplier

This table will store information about the suppliers of devices.

* `supplier\_id` (Primary Key)
* `supplier\_name` (Unique)
* `contact\_info`
* `created\_at`
* `updated\_at`

### 

### StationDevice

This is the main table that links stations, device types, and suppliers, and keeps track of the number of each device at a station.

* `station\_device\_id` (Primary Key)
* `station\_id` (Foreign Key referencing `Station.station\_id`)
* `device\_type\_id` (Foreign Key referencing `DeviceType.device\_type\_id`)
* `supplier\_id` (Foreign Key referencing `Supplier.supplier\_id`)
* `quantity`
* `created\_at`
* `updated\_at`

## SQL Schema Creation

CREATE TABLE TrainOperator (

operator\_id INT AUTO\_INCREMENT PRIMARY KEY,

operator\_name VARCHAR(255) UNIQUE NOT NULL,

contact\_info TEXT,

created\_at TIMESTAMP DEFAULT CURRENT\_TIMESTAMP,

updated\_at TIMESTAMP DEFAULT CURRENT\_TIMESTAMP ON UPDATE CURRENT\_TIMESTAMP

);

CREATE TABLE Station (

station\_id INT AUTO\_INCREMENT PRIMARY KEY,

station\_name VARCHAR(255) UNIQUE NOT NULL,

location TEXT,

operator\_id INT,

created\_at TIMESTAMP DEFAULT CURRENT\_TIMESTAMP,

updated\_at TIMESTAMP DEFAULT CURRENT\_TIMESTAMP ON UPDATE CURRENT\_TIMESTAMP,

FOREIGN KEY (operator\_id) REFERENCES TrainOperator(operator\_id)

);

CREATE TABLE DeviceType (

device\_type\_id INT AUTO\_INCREMENT PRIMARY KEY,

device\_type\_name VARCHAR(255) UNIQUE NOT NULL,

created\_at TIMESTAMP DEFAULT CURRENT\_TIMESTAMP,

updated\_at TIMESTAMP DEFAULT CURRENT\_TIMESTAMP ON UPDATE CURRENT\_TIMESTAMP

);

CREATE TABLE Supplier (

supplier\_id INT AUTO\_INCREMENT PRIMARY KEY,

supplier\_name VARCHAR(255) UNIQUE NOT NULL,

contact\_info TEXT,

created\_at TIMESTAMP DEFAULT CURRENT\_TIMESTAMP,

updated\_at TIMESTAMP DEFAULT CURRENT\_TIMESTAMP ON UPDATE CURRENT\_TIMESTAMP

);

CREATE TABLE StationDevice (

station\_device\_id INT AUTO\_INCREMENT PRIMARY KEY,

station\_id INT,

device\_type\_id INT,

supplier\_id INT,

quantity INT NOT NULL,

created\_at TIMESTAMP DEFAULT CURRENT\_TIMESTAMP,

updated\_at TIMESTAMP DEFAULT CURRENT\_TIMESTAMP ON UPDATE CURRENT\_TIMESTAMP,

FOREIGN KEY (station\_id) REFERENCES Station(station\_id),

FOREIGN KEY (device\_type\_id) REFERENCES DeviceType(device\_type\_id),

FOREIGN KEY (supplier\_id) REFERENCES Supplier(supplier\_id)

);

## Explanation

- **TrainOperator**: Stores each train operator's details. `operator\_id` is the primary key.

- **Station**: Stores details of each station, linked to the `TrainOperator` table through `operator\_id`.

- **DeviceType**: Stores types of devices.

- **Supplier**: Stores suppliers of devices.

- **StationDevice**: Main table that links stations, device types, and suppliers, and keeps track of device quantities.

Each table has `created\_at` and `updated\_at` fields for tracking record creation and updates. The use of foreign keys ensures referential integrity, preventing typos and ensuring consistent data entry.

# Full Script

-- Create the database

CREATE DATABASE train\_device\_management;

-- Use the newly created database

USE train\_device\_management;

-- Create the tables

CREATE TABLE TrainOperator (

operator\_id INT AUTO\_INCREMENT PRIMARY KEY,

operator\_name VARCHAR(255) UNIQUE NOT NULL,

contact\_info TEXT,

created\_at TIMESTAMP DEFAULT CURRENT\_TIMESTAMP,

updated\_at TIMESTAMP DEFAULT CURRENT\_TIMESTAMP ON UPDATE CURRENT\_TIMESTAMP

);

CREATE TABLE Station (

station\_id INT AUTO\_INCREMENT PRIMARY KEY,

station\_name VARCHAR(255) UNIQUE NOT NULL,

location TEXT,

operator\_id INT,

created\_at TIMESTAMP DEFAULT CURRENT\_TIMESTAMP,

updated\_at TIMESTAMP DEFAULT CURRENT\_TIMESTAMP ON UPDATE CURRENT\_TIMESTAMP,

FOREIGN KEY (operator\_id) REFERENCES TrainOperator(operator\_id)

);

CREATE TABLE DeviceType (

device\_type\_id INT AUTO\_INCREMENT PRIMARY KEY,

device\_type\_name VARCHAR(255) UNIQUE NOT NULL,

created\_at TIMESTAMP DEFAULT CURRENT\_TIMESTAMP,

updated\_at TIMESTAMP DEFAULT CURRENT\_TIMESTAMP ON UPDATE CURRENT\_TIMESTAMP

);

CREATE TABLE Supplier (

supplier\_id INT AUTO\_INCREMENT PRIMARY KEY,

supplier\_name VARCHAR(255) UNIQUE NOT NULL,

contact\_info TEXT,

created\_at TIMESTAMP DEFAULT CURRENT\_TIMESTAMP,

updated\_at TIMESTAMP DEFAULT CURRENT\_TIMESTAMP ON UPDATE CURRENT\_TIMESTAMP

);

CREATE TABLE StationDevice (

station\_device\_id INT AUTO\_INCREMENT PRIMARY KEY,

station\_id INT,

device\_type\_id INT,

supplier\_id INT,

quantity INT NOT NULL,

created\_at TIMESTAMP DEFAULT CURRENT\_TIMESTAMP,

updated\_at TIMESTAMP DEFAULT CURRENT\_TIMESTAMP ON UPDATE CURRENT\_TIMESTAMP,

FOREIGN KEY (station\_id) REFERENCES Station(station\_id),

FOREIGN KEY (device\_type\_id) REFERENCES DeviceType(device\_type\_id),

FOREIGN KEY (supplier\_id) REFERENCES Supplier(supplier\_id)

);