

# REST API Specifications for Demand Forecasting System

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## Overview

This document outlines the specifications for the REST API that replaces the current Google Firestore implementation. The API will interact with a MariaDB database while maintaining the same data structure and functionality.

## Database Structure

Main Table: `forecast_data`

Primary keys:

- `Year_Month` (DATE) - The month of the forecast
- `Product code` (VARCHAR) - The product identifier

Fields:

- `Product Group` (VARCHAR) - Product group identifier
- `Product description` (VARCHAR) - Description of the product
- `Quantity` (DECIMAL) - Actual quantity
- `new_forecast` (DECIMAL) - New forecast value
- `old_forecast` (DECIMAL) - Previous forecast value
- `old_forecast_error` (VARCHAR) - Error message for old forecast
- `correction_percent` (DECIMAL) - Correction percentage
- `explanation` (TEXT) - Explanation for the forecast
- `new_forecast_manually_adjusted` (DECIMAL) - Manually adjusted forecast value
- `correction_timestamp` (TIMESTAMP) - Timestamp of the correction
- `id` (VARCHAR) - Unique identifier
- `created_at` (TIMESTAMP) - Record creation timestamp
- `updated_at` (TIMESTAMP) - Record last update timestamp

## API Endpoints

### 1. Get Forecast Data

```
GET /api/forecast
```

Query Parameters:

- `Year_Month` (optional) - Filter by specific month (YYYY-MM-DD format)
- `Product code` (optional) - Filter by specific product
- `Product Group` (optional) - Filter by product group

- `start_date` (optional) - Start date for date range
- `end_date` (optional) - End date for date range

Response:

```
{
  "data": [
    {
      "Year_Month": "2024-03-01",
      "Product Group": "GROUP_A",
      "Product code": "PROD_001",
      "Product description": "Sample Product",
      "Quantity": 100.5,
      "new_forecast": 98.2,
      "old_forecast": 95.0,
      "old_forecast_error": null,
      "correction_percent": 3.2,
      "explanation": "Adjusted based on market trends",
      "new_forecast_manually_adjusted": 98.2,
      "correction_timestamp": "2024-03-15T10:00:00Z",
      "id": "forecast_123",
      "created_at": "2024-03-15T10:00:00Z",
      "updated_at": "2024-03-15T10:00:00Z"
    }
  ]
}
```

## 2. Create/Update Forecast

POST /api/forecast

Request Body:

```
{
  "Year_Month": "2024-03-01",
  "Product Group": "GROUP_A",
  "Product code": "PROD_001",
  "Product description": "Sample Product",
  "Quantity": 100.5,
  "new_forecast": 98.2,
  "old_forecast": 95.0,
  "old_forecast_error": null,
  "correction_percent": 3.2,
  "explanation": "Adjusted based on market trends",
  "new_forecast_manually_adjusted": 98.2,
  "correction_timestamp": "2024-03-15T10:00:00Z"
}
```

Response:

```
{
  "success": true,
  "message": "Forecast data saved successfully",
  "data": {
    "Year_Month": "2024-03-01",
    "Product Group": "GROUP_A",
    "Product code": "PROD_001",
    "Product description": "Sample Product",
    "Quantity": 100.5,
    "new_forecast": 98.2,
    "old_forecast": 95.0,
    "old_forecast_error": null,
    "correction_percent": 3.2,
    "explanation": "Adjusted based on market trends",
    "new_forecast_manually_adjusted": 98.2,
    "correction_timestamp": "2024-03-15T10:00:00Z",
    "id": "forecast_123",
    "created_at": "2024-03-15T10:00:00Z",
    "updated_at": "2024-03-15T10:00:00Z"
  }
}
```

### 3. Delete Forecast

```
DELETE /api/forecast
```

Query Parameters:

- **Year\_Month** (required) - Month to delete (YYYY-MM-DD format)
- **Product code** (required) - Product identifier to delete

Response:

```
{
  "success": true,
  "message": "Forecast data deleted successfully"
}
```

## Error Handling

All endpoints will return appropriate HTTP status codes:

- 200: Success
- 400: Bad Request (invalid parameters)

- 404: Not Found
- 500: Internal Server Error

Error Response Format:

```
{
  "error": {
    "code": "ERROR_CODE",
    "message": "Human readable error message"
  }
}
```

## Authentication

The API will use token-based authentication:

- All requests must include an **Authorization** header with a Bearer token
- Token format: **Authorization: Bearer <token>**

## Rate Limiting

- Maximum 100 requests per minute per IP address
- Rate limit headers will be included in responses:
  - **X-RateLimit-Limit**
  - **X-RateLimit-Remaining**
  - **X-RateLimit-Reset**

## Data Validation

- Year\_Month must be in YYYY-MM-DD format
- Product code must be a non-empty string
- Numeric values must be valid decimal numbers
- All required fields must be present in POST requests

## Notes

- The API maintains backward compatibility with the existing Firestore implementation
- All timestamps are in UTC
- The database uses the same schema as the current Firestore implementation
- Primary keys (Year\_Month, Product code) ensure data uniqueness and efficient querying