📊 API Performance Testing with JMeter – Step-by-Step Guide

Scenario : Analyze API performance with JMeter

Test url – ResReq.in

💼 Prerequisites

- **JMeter installed** on your system (Download from https://jmeter.apache.org)
- **Java JDK** installed and configured
- Basic understanding of HTTP methods and API endpoints

🔍 Objective

To analyze the performance of ReqRes.in API endpoints (e.g., `GET /api/users`, `POST /api/users`) under different load conditions using JMeter.

🪜 Step-by-Step Instructions

Step 1: Launch JMeter

- Navigate to the JMeter installation folder.
- Run `jmeter.bat` (Windows) or `jmeter.sh` (Mac/Linux).

Step 2: Create a Test Plan

- Right-click on **Test Plan** → Add → Threads (Users) → **Thread Group**
- Configure:
    - **Number of Threads (users)**: e.g., 50
    - **Ramp-Up Period**: e.g., 10 seconds
    - **Loop Count**: e.g., 5

Step 3: Add HTTP Request Defaults

- Right-click on **Thread Group** → Add → Config Element → **HTTP Request Defaults**
- Set:
    - **Server Name or IP**: `reqres.in`
    - **Protocol**: `https`
    - **Port**: leave blank (default HTTPS)

Step 4: Add HTTP Sampler (API Request)

- Right-click on **Thread Group** → Add → Sampler → **HTTP Request**
- Configure:
    - **Method**: `GET`, `POST`, `PUT`, etc.
    - **Path**: e.g., `/api/users?page=2`
    - For POST/PUT, add **Body Data** with JSON payload

Step 5: Add Headers

- Right-click on **Thread Group** → Add → Config Element → **HTTP Header Manager**
- Add:
    - `Content-Type: application/json`

Step 6: Add Listeners (Results & Reports)

- Right-click on **Thread Group** → Add → Listener → Choose any:
    - **View Results Tree**
    - **Summary Report**
    - **Aggregate Report**
    - **Response Time Graph**

Step 7: Run the Test

- Click the green **Start** button (▶)
- Monitor results in real-time via listeners

Step 8: Analyze Results

- **Throughput**: Number of requests per second
- **Average Response Time**: Time taken per request
- **Error %**: Failed requests

- **Latency**: Delay before response starts

Step 9: Export Results

- Right-click on listener → Save Table Data → Export as `.csv`
- Use Excel or visualization tools for deeper analysis

📌 Tips for Better Analysis

- Test with varying thread counts (10, 50, 100, 500) to simulate load
- Use **Assertions** to validate response codes and payloads
- Add **Timers** to simulate real-world user pacing
- Use **CSV Data Set Config** for dynamic test data

✅ Sample API Endpoints to Test

Method	Endpoint	Description
GET	`/api/users?page=2`	List users
POST	`/api/users`	Create user
PUT	`/api/users/2`	Update user
DELETE	`/api/users/2`	Delete user