REST API

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A cheat sheet for REST API principles, methods, and OpenAPI.

Contents

Mental model

REST (Representational State Transfer) is an architectural style for designing networked applications. It treats data and functionality as resources accessed via standard HTTP methods. Clients and servers are decoupled, meaning the server does not store client state between requests.

HTTP methods

Method	Purpose	Idempotent
`GET`	Read a resource	Yes
`POST`	Create a resource	No
`PUT`	Replace a resource	Yes
`PATCH`	Modify a resource	No
`DELETE`	Delete a resource	Yes

Methods map to CRUD operations on resources. Idempotent methods produce the same result whether called once or multiple times, which is crucial for safe retries.

```
POST /users HTTP/1.1
Content-Type: application/json

{"name": "Alice"}
```

> **Gotcha:** `PUT` replaces the entire resource. If you only send one field in a `PUT` request, the server should typically nullify the missing fields. Use `PATCH` for partial updates.

Resource URLs

Pattern	Usage
`/users`	Collection of users
`/users/123`	Specific user
`/users/123/orders`	Orders for a user

URLs should identify resources (nouns), not actions (verbs). Hierarchy indicates relationships.

```
GET /users/123/orders HTTP/1.1
Accept: application/json
```

> **Tip:** Keep URLs predictable. Avoid nested URLs deeper than two levels (e.g., `/users/1/orders/2/items`); instead, use the direct resource if possible.

Status codes

Range	Meaning	Common Examples
`2xx`	Success	`200`, `201`, `204`
`4xx`	Client Error	`400`, `401`, `403`, `404`
`5xx`	Server Error	`500`, `502`, `503`, `504`

Status codes tell the client how the server processed the request. They divide responsibilities: `4xx` means the client must change the request, `5xx` means the server failed.

> **Gotcha:** Returning `200 OK` with an error message in the body defeats standard HTTP caching and makes debugging harder for API consumers. Use appropriate error codes instead.

OpenAPI and Swagger

Term	Description
OpenAPI	The specification standard (YAML/JSON)
Swagger	Tooling ecosystem (UI, codegen)

OpenAPI is a formal specification for describing REST APIs. It defines endpoints, request shapes, and responses in a machine-readable format. Swagger refers to tools that implement this spec.

```yaml
paths:
  /users:
    get:
      summary: List users
      responses:
        '200':
          description: A list of users
```

> **Note:** “Swagger spec” was renamed to “OpenAPI spec” in 2016. Today, you write OpenAPI documents and visualize them with tools like Swagger UI.

Further reading

- Roy Fielding’s Dissertation
- OpenAPI Specification