Four Types of APIs

Public

APIs anyone can use. They're open to all and allow developers to build cool stuff using shared services.

Private

Used only within a company to make things work smoothly for their teams and systems.

Partner

Shared with specific business partners to work together better.

Composite

Bundles multiple API requests into one, making things faster and simpler.

HTTP Methods and Communication Protocols

- **REST**: Simple and common way to communicate.
- **SOAP**: A more strict and structured way to send data.
- **JMS**: Used for messaging between systems.
- **UDDI**: A directory to find web services.

Core Parts of an HTTP Request

- **Method**: Action to take, like GET or POST.
- **URI**: The address where the resource is found.
- **Headers**: Extra info like your login details.

- **Body**: Data you send (optional).
- **HTTP Version**: The protocol version being used.

Common HTTP Methods

- **GET**: Fetch information.
- **POST**: Send new data.
- **PUT**: Add or replace data.
- **DELETE**: Remove data.
- **PATCH**: Make a small update.

What Do URI and Headers Do?

- **URI**: Like a website link, it tells where to find the resource.
- **Headers**: Add extra details, like who you are or what type of data you're sending.

How Web APIs Are Built

- Use **HTTP** to talk to clients.
- Use **XML/JSON** to share data.
- Keep addresses simple with **URI**.
- Use **Stateless Transfer** to keep things light and scalable.

Steps in API Testing

1. **Setup**: Get things ready.
2. **Execution**: Run the tests.
3. **Verification**: Check if it worked.
4. **Reporting**: Write down what happened.
5. **Cleanup**: Put things back to normal.

Types of API Testing

- **Functional Testing**: Check if it does what it should.
- **UI Testing**: See if the user interface works with it.
- **Security Testing**: Look for vulnerabilities.
- **Penetration Testing**: Simulate an attack.
- **Fuzz Testing**: Send random data to see what breaks.
- **Load Testing**: Test how it handles heavy use.
- **Runtime Testing**: Check stability during use.
- **Validation Testing**: Make sure the response is correct.

What Is Contract Testing?

- Ensures both sides (API provider and user) agree on inputs and outputs.
- **Compatibility**: API gives the expected data and format.
- **Integrity**: Changes don't mess up current users.

What Is Fuzz Testing?

- Sending random or weird data to the API to find weaknesses.

- Helps find vulnerabilities and security problems.

What to Check in API Testing

- Is the data correct?
- Does it follow the rules (schema validation)?
- Are the HTTP status codes right?
- Is the data type and order correct?
- Are permissions and timeouts working?
- Do errors return proper codes?
- Does it handle performance and security well?

Best Ways to Test an API

- Use good documentation tools like:
    - Swagger
    - Miredot
    - Flatdoc
    - API Blueprint
    - RestDoc
    - Web Services API specs

Why Use Versioning?

- Makes it easier to update without breaking old features.
- Lets you run multiple versions so users can switch gradually.