API → Communication Contract between a **client** and a **server**
HTTP → Defines how **communication** happens

FastAPI

FastAPI

→ Accepts HTTP requests

→ Understand HTTP rules

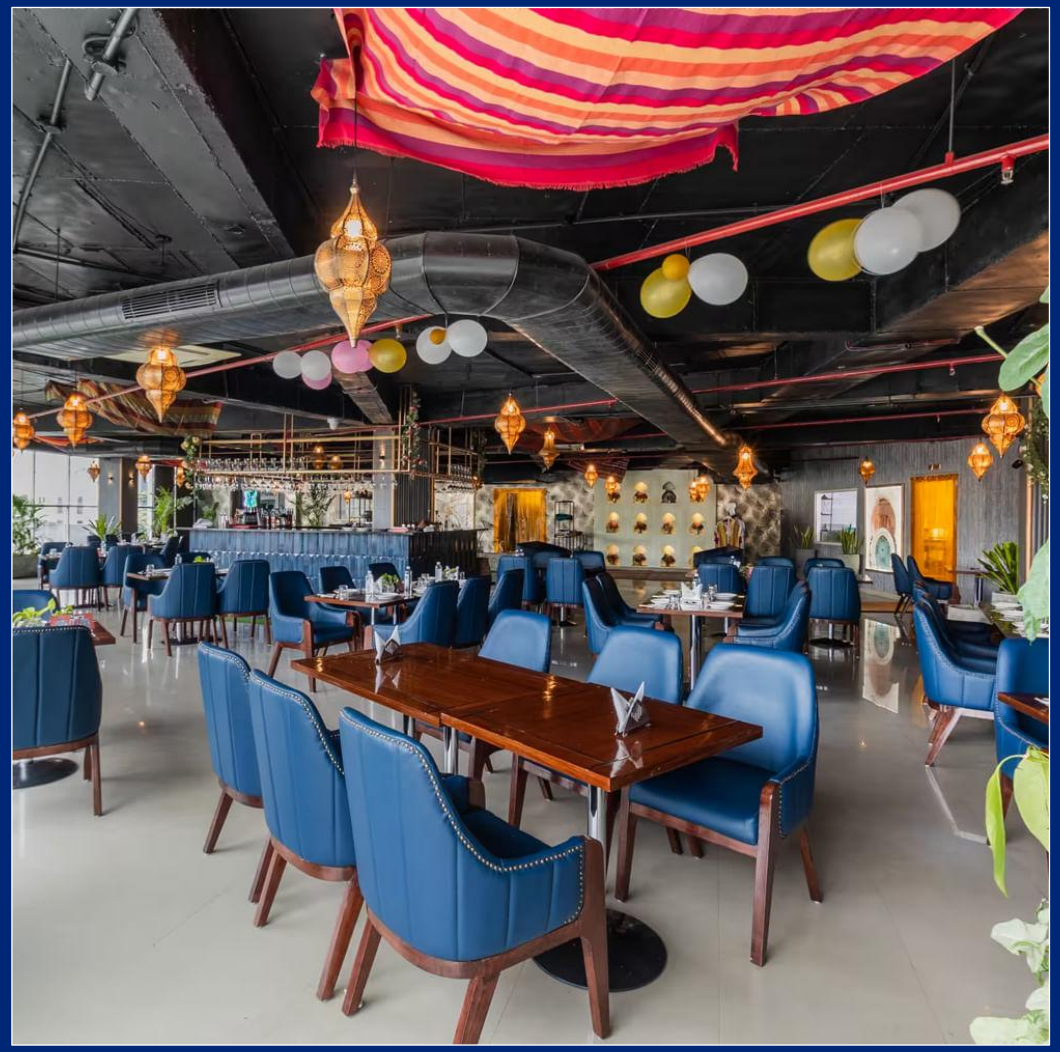
→ Validate input

→ Call Backend Logic

→ Return HTTP responses

Real World Analogy

Restaurant



1. Customer → Client
2. Menu → API
3. Waiter → API Server (FastAPI)
4. Kitchen → Backend Logic (Server)
5. Food → Response

What is FastAPI ?

API Server | Open-source Python Framework for creating web APIs
Build on Starlette

- Modern Python features like Type Hints. → `name: str`
- Build on Starlette → Runs on ASGI (Asynchronous Server Gateway Interface)
- Uses Pydantic → for data validation

Why FastAPI ?

Its is blasting fast – one of the fastest python frameworks

- Very fast on part with Node.js or Go
- Fewer Bugs
- Very less Code

→ NETFLIX Uber Microsoft

FastAPI Capabilities

- Maps URLs and HTTP methods directly to Python functions

  GET /users?

- Path, Query, Headers, Cookies or JSON bodies

- Automatically convert the value returned by your path operation function to a response

  - JSON response as default

  - Als return HTML, Plain text or file streams

Automatic Superpowers

- Automatic Data validation
- Interactive docs
  - /docs
  - /redoc
- Authorization and Database connections.
- Clean and Scalable.

FastAPI

→ Accepts HTTP requests

→ Understand HTTP rules

→ Validate input

→ Call Backend Logic

→ Return HTTP responses

Next |  Hello World to FastAPI

Hello World !

Your first FastAPI code

Hello World!

main.py

```python
from fastapi import FastAPI

app = FastAPI()

@app.get("/")
async def home():
        return {"message": "Hello World"}
```

Creates Application Object

GET request

Return JSON response

```
>>> uvicorn main:app --reload
```

Filename

Application Object variable name

Path

An API Endpoint

Path

API endpoint, create it using decorators

→ Path give you complete control over how your API routes requests. They are building blocks of scalable, maintainable, and reliable APIs.

main.py

```python
from fastapi import FastAPI

app = FastAPI()

@app.get("/items")
async def get_items():
        return {“items": [“item 1”,
                          “item 2”,
                          “item 3”
                         ]
                }
```

Path/URL path

```
http GET http://127.0.0.1:8000/items

Response:
{“items": [“item 1”, “item 2”, “item 3”]}
```

Path

API endpoint, create it using decorators
→ These kind of path are dynamic variable path. Where variables embedding directly into the URL.

main.py

```python
from fastapi import FastAPI

app = FastAPI()

@app.get("/items/{item_id}")
async def get_items(item_id: int):
        return {"item_id": item_id}
```

Dynamic Path/URL path

Pydantic Data Validation

```
http GET http://127.0.0.1:8000/items/42

Response:
{"item_id": 42}
```

```
http GET http://127.0.0.1:8000/items/abc

Response: INVALID Path Parameter
```

Path

Route order is Important

Correct Order

main.py

```python
from fastapi import FastAPI

app = FastAPI()

@app.get("/items/me")
async def get_me():
        return {"items":"me"}

@app.get("/items/{item_id}")
async def get_items(item_id: int):
        return {"item_id": item_id}
```

```
http GET http://127.0.0.1:8000/items/42

Response:
{“item_id": 42}
```

Incorrect Order

main.py

```python
from fastapi import FastAPI

app = FastAPI()

@app.get("/items/{item_id}")
async def get_items(item_id: int):
        return {"item_id": item_id}

@app.get("/items/me")
async def get_me():
        return {"items":"me"}
```

```
http GET http://127.0.0.1:8000/items/me

Response: Invalid Request
```

APIRoute

An API Endpoint

APIRoute

FastAPI Python framework used to structure, organize, and manage API routes (path operations) in a modular way

APIRouter is used to:

- Organize routes into multiple files
- Build modular applications
- Improve scalability
- Follow production-level architecture

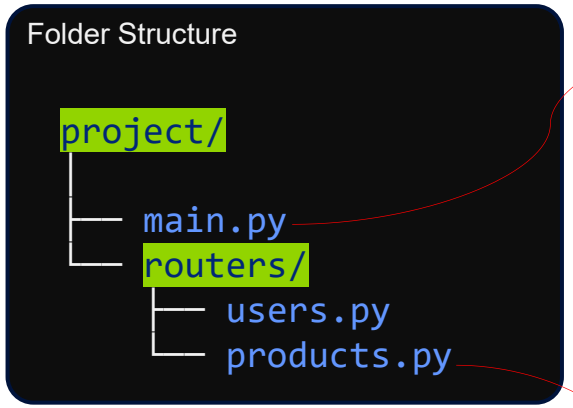
Instead of putting all routes in main.py, we divide them into logical modules like:

- users.py
- products.py
- orders.py

APIRoute

FastAPI Python framework used to structure, organize, and manage API routes (path operations) in a modular way

Folder Structure



main.py

```python
from fastapi import FastAPI, APIRouter
from routers import products

app = FastAPI()

app.include_router(products.router, prefix="/products", tags=[“Products"])
```

products.py

```python
from fastapi import APIRouter

router = APIrouter()

@router.get("/products")
async def get_products():
        return {"message": "Products"}
```

Query Operations

Performing data filter process

Automatic Documentation

Swagger UI

Automatic Documentation

FastAPI automatically generates automatic documentation without writing extra code 😎

- Interactive API documentation
- Request & response schema
- Validation details
- Example testing interface

Swagger UI → Interactive Documentation

- By default, FastAPI provides documentation using **Swagger UI.**

```
http://127.0.0.1:8000/docs
```

Templates

Rendering HTML

Templates

Rendering HTML Pages with FastAPI

- Return HTML pages instead of JSON
- Build forms, dashboards, login pages etc
- Render dynamic data inside HTML

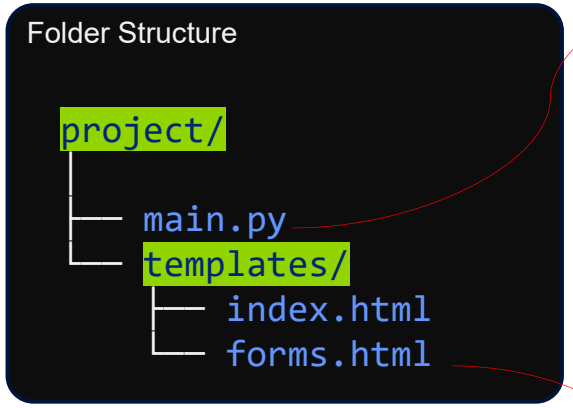
Template Engine → Jinja2

```
pip install jinja2
       (or)
poetry add jinja2
```

Templates

folder structure and import metionds

Folder Structure



main.py

```python
from fastapi import FastAPI, Request
from fastapi.response import HTMLResponse
from fastapi.templating import Jinja2Templates

app = FastAPI()

templates = Jinja2Templates(directory = “templates")
```

main.py

```python
@app.get("/", response_class = HTMLResponse)
async def home(request: Request):
        users_data = [“User1”, “User2”, “User3”]

        return templates.TemplateResponse(
                “index.html”,
                {
                        “request”: request,
                        “users”: users_data
                }
        )
```

MongoDB in FastAPI

Integrating FastAPI with NoSQL Database

Query Operations

FastAPI Python framework used to structure, organize, and manage API routes (path operations) in a modular way

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