

Path Parameters

You can declare path "parameters" or "variables" with the same syntax used by Python format strings:

Python 3.8+

```
from fastapi import FastAPI
app = FastAPI()

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

The value of the path parameter `item_id` will be passed to your function as the argument `item_id`.

So, if you run this example and go to <http://127.0.0.1:8000/items/foo>, you will see a response of:

```
{"item_id": "foo"}
```

Path parameters with types

You can declare the type of a path parameter in the function, using standard Python type annotations:

Python 3.8+

```
from fastapi import FastAPI
app = FastAPI()

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

In this case, `item_id` is declared to be an `int`.

Check

This will give you editor support inside of your function, with error checks, completion, etc.

Data conversion

If you run this example and open your browser at <http://127.0.0.1:8000/items/3>, you will see a response of:

```
{"item_id": 3}
```

Check

Notice that the value your function received (and returned) is `3`, as a Python `int`, not a string `"3"`.

So, with that type declaration, FastAPI gives you automatic request `parsing`.

Data validation

But if you go to the browser at <http://127.0.0.1:8000/items/foo>, you will see a nice HTTP error of:

```
{
  "detail": [
    {
      "type": "int_parsing",
      "loc": [
        "path",
        "item_id"
      ],
      "msg": "Input should be a valid integer, unable to parse string as an integer",
      "input": "foo",
      "url": "https://errors.pydantic.dev/2.1/v/int_parsing"
    }
  ]
}
```

because the path parameter `item_id` had a value of `"foo"`, which is not an `int`.

The same error would appear if you provided a `float` instead of an `int`, as in: <http://127.0.0.1:8000/items/4.2>

Check

So, with the same Python type declaration, FastAPI gives you data validation.

Notice that the error also clearly states exactly the point where the validation didn't pass.

This is incredibly helpful while developing and debugging code that interacts with your API.

Documentation

And when you open your browser at <http://127.0.0.1:8000/docs>, you will see an automatic, interactive, API documentation like:

The screenshot shows the Fast API - Swagger UI documentation page. At the top, it displays "Fast API 0.1.0 OAS3" and a link to "/openapi.json". Below this, the "default" endpoint is selected. The main section shows a "GET /items/{item_id} Read Item Get" operation. Under "Parameters", there is one parameter named "item_id" which is marked as required and of type "integer" (path). A "Try it out" button is available. Under "Responses", there are two entries: a successful response (200) with a "Successful Response" message and a validation error (422) with a "Validation Error" message. Both responses have dropdown menus for "application/json" and "application/x-www-form-urlencoded". Below the responses, there is an "Example Value" button and a "Model" section containing a JSON schema:

```
{  "detail": [    {      "loc": [        "string"      ],      "msg": "string",      "type": "string"    }  ]}
```

Check

Again, just with that same Python type declaration, FastAPI gives you automatic, interactive documentation (integrating Swagger UI).

Notice that the path parameter is declared to be an integer.

Standards-based benefits, alternative documentation

And because the generated schema is from the [OpenAPI](#) standard, there are many compatible tools.

Because of this, FastAPI itself provides an alternative API documentation (using ReDoc), which you can access at <http://127.0.0.1:8000/redoc>:

The screenshot shows the Fast API ReDoc documentation for version 0.1.0. At the top, there's a search bar and a link to "Read Item Get". Below the title "Fast API (0.1.0)" is a button to "Download OpenAPI specification". The main section is titled "Read Item Get". Under "PATH PARAMETERS", there's a parameter "item_id" described as "integer (Item_Id)". In the "Responses" section, there are two entries: "200 Successful Response" (green background) and "422 Validation Error" (pink background). Below this, a "Response samples" section shows a dropdown menu for "GET /items/{item_id}" with tabs for "200" (selected) and "422". The response body is shown as "application/json" with the value "null". There are also "Copy", "Expand all", and "Collapse all" buttons.

The same way, there are many compatible tools. Including code generation tools for many languages.

Pydantic

All the data validation is performed under the hood by [Pydantic](#), so you get all the benefits from it. And you know you are in good hands.

You can use the same type declarations with `str`, `float`, `bool` and many other complex data types.

Several of these are explored in the next chapters of the tutorial.

Order matters

When creating *path operations*, you can find situations where you have a fixed path.

Like `/users/me`, let's say that it's to get data about the current user.

And then you can also have a path `/users/{user_id}` to get data about a specific user by some user ID.

Because *path operations* are evaluated in order, you need to make sure that the path for `/users/me` is declared before the one for `/users/{user_id}`:

Python 3.8+

```
from fastapi import FastAPI
app = FastAPI()

@app.get("/users/me")
async def read_user_me():
    return {"user_id": "the current user"}
```

```
@app.get("/users/{user_id}")
async def read_user(user_id: str):
    return {"user_id": user_id}
```

Otherwise, the path for `/users/{user_id}` would match also for `/users/me`, "thinking" that it's receiving a parameter `user_id` with a value of `"me"`.

Similarly, you cannot redefine a path operation:

Python 3.8+

```
from fastapi import FastAPI

app = FastAPI()

@app.get("/users")
async def read_users():
    return ["Rick", "Morty"]

@app.get("/users")
async def read_users2():
    return ["Bean", "Elfo"]
```

The first one will always be used since the path matches first.

Predefined values

If you have a *path operation* that receives a *path parameter*, but you want the possible valid *path parameter* values to be predefined, you can use a standard Python `Enum`.

Create an `Enum` class

Import `Enum` and create a sub-class that inherits from `str` and from `Enum`.

By inheriting from `str` the API docs will be able to know that the values must be of type `string` and will be able to render correctly.

Then create class attributes with fixed values, which will be the available valid values:

Python 3.8+

```
from enum import Enum

from fastapi import FastAPI

class ModelName(str, Enum):
    alexnet = "alexnet"
    resnet = "resnet"
    lenet = "lenet"

app = FastAPI()

@app.get("/models/{model_name}")
async def get_model(model_name: ModelName):
    if model_name is ModelName.alexnet:
        return {"model_name": model_name, "message": "Deep Learning FTW!"}

    if model_name.value == "lenet":
        return {"model_name": model_name, "message": "LeCNN all the images"}

    return {"model_name": model_name, "message": "Have some residuals"}
```

Info

Enumerations (or enums) are available in Python since version 3.4.

Tip

If you are wondering, "AlexNet", "ResNet", and "LeNet" are just names of Machine Learning [models](#).

Declare a *path parameter*

Then create a *path parameter* with a type annotation using the enum class you created (`ModelName`):

Python 3.8+

```
from enum import Enum

from fastapi import FastAPI
```

```
class ModelName(str, Enum):
    alexnet = "alexnet"
    resnet = "resnet"
    lenet = "lenet"

app = FastAPI()

@app.get("/models/{model_name}")
async def get_model(model_name: ModelName):
    if model_name is ModelName.alexnet:
        return {"model_name": model_name, "message": "Deep Learning FTW!"}

    if model_name.value == "lenet":
        return {"model_name": model_name, "message": "LeCNN all the images"}

    return {"model_name": model_name, "message": "Have some residuals"}
```

Check the docs

Because the available values for the *path parameter* are predefined, the interactive docs can show them nicely:

The screenshot shows the FastAPI Swagger UI interface. At the top, there's a navigation bar with tabs for 'FastAPI - Swagger UI' and '+'. Below it, the URL is 127.0.0.1:8000/docs#/default/get_model_models__model_name__get. On the left, there's a sidebar with 'FastAPI 0.1.0 OAS3' and a link to '/openapi.json'. The main content area has a title 'default'. Under 'GET /models/{model_name} Get Model', there's a 'Parameters' section. A dropdown menu for 'model_name' is open, showing three options: 'alexnet' (selected), 'resnet', and 'lenet'. Below the dropdown is a large blue 'Execute' button. In the 'Responses' section, there are two entries: '200 Successful Response' and '422 Validation Error'. The '200' entry includes a 'Media type' dropdown set to 'application/json' and a note about controlling the Accept header. The '422' entry also has a 'Media type' dropdown.

Working with Python *enumerations*

The value of the *path parameter* will be an *enumeration member*.

Compare *enumeration members*

You can compare it with the *enumeration member* in your created enum `ModelName` :

Python 3.8+

```
from enum import Enum

from fastapi import FastAPI

class ModelName(str, Enum):
    alexnet = "alexnet"
    resnet = "resnet"
    lenet = "lenet"

app = FastAPI()

@app.get("/models/{model_name}")
async def get_model(model_name: ModelName):
    if model_name is ModelName.alexnet:
        return {"model_name": model_name, "message": "Deep Learning FTW!"}

    if model_name.value == "lenet":
        return {"model_name": model_name, "message": "LeCNN all the images"}

    return {"model_name": model_name, "message": "Have some residuals"}
```

Get the *enumeration value*

You can get the actual value (a `str` in this case) using `model_name.value`, or in general, `your_enum_member.value`:

Python 3.8+

```
from enum import Enum

from fastapi import FastAPI

class ModelName(str, Enum):
    alexnet = "alexnet"
    resnet = "resnet"
    lenet = "lenet"

app = FastAPI()

@app.get("/models/{model_name}")
async def get_model(model_name: ModelName):
    if model_name is ModelName.alexnet:
        return {"model_name": model_name, "message": "Deep Learning FTW!"}

    if model_name.value == "lenet":
        return {"model_name": model_name, "message": "LeCNN all the images"}

    return {"model_name": model_name, "message": "Have some residuals"}
```

Tip

You could also access the value "lenet" with `ModelName.lenet.value`.

Return *enumeration members*

You can return *enum members* from your *path operation*, even nested in a JSON body (e.g. a `dict`).

They will be converted to their corresponding values (strings in this case) before returning them to the client:

Python 3.8+

```
from enum import Enum

from fastapi import FastAPI

class ModelName(str, Enum):
    alexnet = "alexnet"
    resnet = "resnet"
    lenet = "lenet"

app = FastAPI()

@app.get("/models/{model_name}")
async def get_model(model_name: ModelName):
    if model_name is ModelName.alexnet:
        return {"model_name": model_name, "message": "Deep Learning FTW!"}
```

```
if model_name.value == "lenet":  
    return {"model_name": model_name, "message": "LeCNN all the images"}  
  
return {"model_name": model_name, "message": "Have some residuals"}
```

In your client you will get a JSON response like:

```
{  
    "model_name": "alexnet",  
    "message": "Deep Learning FTW!"  
}
```

Path parameters containing paths

Let's say you have a *path operation* with a path `/files/{file_path}`.

But you need `file_path` itself to contain a *path*, like `home/johndoe/myfile.txt`.

So, the URL for that file would be something like: `/files/home/johndoe/myfile.txt`.

OpenAPI support

OpenAPI doesn't support a way to declare a *path parameter* to contain a *path* inside, as that could lead to scenarios that are difficult to test and define.

Nevertheless, you can still do it in FastAPI, using one of the internal tools from Starlette.

And the docs would still work, although not adding any documentation telling that the parameter should contain a path.

Path convertor

Using an option directly from Starlette you can declare a *path parameter* containing a *path* using a URL like:

```
/files/{file_path:path}
```

In this case, the name of the parameter is `file_path`, and the last part, `:path`, tells it that the parameter should match any *path*.

So, you can use it with:

Python 3.8+

```
from fastapi import FastAPI  
  
app = FastAPI()  
  
@app.get("/files/{file_path:path}")  
async def read_file(file_path: str):  
    return {"file_path": file_path}
```

Tip

You could need the parameter to contain `/home/johndoe/myfile.txt`, with a leading slash (`/`).

In that case, the URL would be: `/files//home/johndoe/myfile.txt`, with a double slash (`//`) between `files` and `home`.

Recap

With FastAPI, by using short, intuitive and standard Python type declarations, you get:

- Editor support: error checks, autocompletion, etc.
- Data "parsing"
- Data validation
- API annotation and automatic documentation

And you only have to declare them once.

That's probably the main visible advantage of FastAPI compared to alternative frameworks (apart from the raw performance).

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<https://fastapi.tiangolo.com/tutorial/path-params/>

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