

## Request Files

You can define files to be uploaded by the client using `File`.

### Info

To receive uploaded files, first install [python-multipart](#).

Make sure you create a [virtual environment](#), activate it, and then install it, for example:

```
$ pip install python-multipart
```

This is because uploaded files are sent as "form data".

### Import File

Import `File` and `UploadFile` from `fastapi`:

#### Python 3.9+

```
from typing import Annotated
from fastapi import FastAPI, File, UploadFile
app = FastAPI()

@app.post("/files/")
async def create_file(file: Annotated[bytes, File()]):
    return {"file_size": len(file)}

@app.post("/uploadfile/")
async def create_upload_file(file: UploadFile):
    return {"filename": file.filename}
```

#### ► Other versions and variants

#### Python 3.8+

```
from fastapi import FastAPI, File, UploadFile
from typing_extensions import Annotated
app = FastAPI()

@app.post("/files/")
async def create_file(file: Annotated[bytes, File()]):
    return {"file_size": len(file)}

@app.post("/uploadfile/")
async def create_upload_file(file: UploadFile):
    return {"filename": file.filename}
```

#### Python 3.8+ - non-Annotated

##### Tip

Prefer to use the `Annotated` version if possible.

```
from fastapi import FastAPI, File, UploadFile
app = FastAPI()

@app.post("/files/")
async def create_file(file: bytes = File()):
    return {"file_size": len(file)}

@app.post("/uploadfile/")
async def create_upload_file(file: UploadFile):
    return {"filename": file.filename}
```

### Define File Parameters

Create file parameters the same way you would for `Body` or `Form`:

#### Python 3.9+

```
from typing import Annotated
from fastapi import FastAPI, File, UploadFile
app = FastAPI()

@app.post("/files/")
async def create_file(file: Annotated[bytes, File()]):
    return {"file_size": len(file)}

@app.post("/uploadfile/")
async def create_upload_file(file: UploadFile):
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async def create_file(file: Annotated[bytes, File()]):
    return {"file_size": len(file)}

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async def create_upload_file(file: UploadFile):
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    return {"file_size": len(file)}

@app.post("/uploadfile/")
async def create_upload_file(file: UploadFile):
    return {"filename": file.filename}
```

Info

`File` is a class that inherits directly from `Form`.

But remember that when you import `Query`, `Path`, `File` and others from `fastapi`, those are actually functions that return special classes.

Tip

To declare File bodies, you need to use `File`, because otherwise the parameters would be interpreted as query parameters or body (JSON) parameters.

The files will be uploaded as "form data".

If you declare the type of your *path operation function* parameter as `bytes`, FastAPI will read the file for you and you will receive the contents as `bytes`.

Keep in mind that this means that the whole contents will be stored in memory. This will work well for small files.

But there are several cases in which you might benefit from using `UploadFile`.

### File Parameters with `UploadFile`

Define a file parameter with a type of `UploadFile`:

Python 3.9+

```
from typing import Annotated
from fastapi import FastAPI, File, UploadFile
```

```
app = FastAPI()

@app.post("/files/")
async def create_file(file: Annotated[bytes, File()]):
    return {"file_size": len(file)}

@app.post("/uploadfile/")
async def create_upload_file(file: UploadFile):
    return {"filename": file.filename}
```

▶  Other versions and variants

Python 3.8+

```
from fastapi import FastAPI, File, UploadFile
from typing_extensions import Annotated

app = FastAPI()

@app.post("/files/")
async def create_file(file: Annotated[bytes, File()]):
    return {"file_size": len(file)}

@app.post("/uploadfile/")
async def create_upload_file(file: UploadFile):
    return {"filename": file.filename}
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```
from fastapi import FastAPI, File, UploadFile

app = FastAPI()

@app.post("/files/")
async def create_file(file: bytes = File()):
    return {"file_size": len(file)}

@app.post("/uploadfile/")
async def create_upload_file(file: UploadFile):
    return {"filename": file.filename}
```

Using `UploadFile` has several advantages over `bytes`:

- You don't have to use `File()` in the default value of the parameter.
- It uses a "spooled" file:
  - A file stored in memory up to a maximum size limit, and after passing this limit it will be stored in disk.
- This means that it will work well for large files like images, videos, large binaries, etc. without consuming all the memory.
- You can get metadata from the uploaded file.
- It has a `file-like` `async` interface.
- It exposes an actual Python `SpoiledTemporaryFile` object that you can pass directly to other libraries that expect a file-like object.

### UploadFile

`UploadFile` has the following attributes:

- `filename`: A `str` with the original file name that was uploaded (e.g. `myimage.jpg`).
- `content_type`: A `str` with the content type (MIME type / media type) (e.g. `image/jpeg`).
- `file`: A `SpoiledTemporaryFile` (a `file-like` object). This is the actual Python file object that you can pass directly to other functions or libraries that expect a "file-like" object.

`UploadFile` has the following `async` methods. They all call the corresponding file methods underneath (using the internal `SpoiledTemporaryFile`).

- `write(data)`: Writes `data` (`str` or `bytes`) to the file.
- `read(size)`: Reads `size` (`int`) bytes/characters of the file.
- `seek(offset)`: Goes to the byte position `offset` (`int`) in the file.
  - E.g., `await myfile.seek(0)` would go to the start of the file.
  - This is especially useful if you run `await myfile.read()` once and then need to read the contents again.
- `close()`: Closes the file.

As all these methods are `async` methods, you need to "await" them.

For example, inside of an `async path operation function` you can get the contents with:

```
contents = await myfile.read()
```

If you are inside of a normal `def path operation function`, you can access the `UploadFile.file` directly, for example:

```
contents = myfile.file.read()
```

#### async Technical Details

When you use the `async` methods, FastAPI runs the file methods in a threadpool and awaits for them.

#### Starlette Technical Details

FastAPI's `UploadFile` inherits directly from Starlette's `UploadFile`, but adds some necessary parts to make it compatible with Pydantic and the other parts of FastAPI.

#### What is "Form Data"

The way HTML forms (`<form></form>`) sends the data to the server normally uses a "special" encoding for that data, it's different from JSON.

FastAPI will make sure to read that data from the right place instead of JSON.

#### Technical Details

Data from forms is normally encoded using the "media type" `application/x-www-form-urlencoded` when it doesn't include files.

But when the form includes files, it is encoded as `multipart/form-data`. If you use `File`, FastAPI will know it has to get the files from the correct part of the body.

If you want to read more about these encodings and form fields, head to the [MDN web docs for POST](#).

#### Warning

You can declare multiple `File` and `Form` parameters in a `path operation`, but you can't also declare `Body` fields that you expect to receive as JSON, as the request will have the body encoded using `multipart/form-data` instead of `application/json`.

This is not a limitation of FastAPI, it's part of the HTTP protocol.

#### Optional File Upload

You can make a file optional by using standard type annotations and setting a default value of `None`:

##### Python 3.10+

```
from typing import Annotated
from fastapi import FastAPI, File, UploadFile
app = FastAPI()

@app.post("/files/")
async def create_file(file: Annotated[bytes | None, File()] = None):
    if not file:
        return {"message": "No file sent"}
    else:
        return {"file_size": len(file)}

@app.post("/uploadfile/")
async def create_upload_file(file: UploadFile | None = None):
    if not file:
        return {"message": "No upload file sent"}
    else:
        return {"filename": file.filename}
```

##### ► Other versions and variants

##### Python 3.9+

```
from typing import Annotated, Union
from fastapi import FastAPI, File, UploadFile
app = FastAPI()

@app.post("/files/")
async def create_file(file: Annotated[Union[bytes, None], File()] = None):
    if not file:
        return {"message": "No file sent"}
```

```
        else:
            return {"file_size": len(file)}

@app.post("/uploadfile/")
async def create_upload_file(file: Union[UploadFile, None] = None):
    if not file:
        return {"message": "No upload file sent"}
    else:
        return {"filename": file.filename}
```

### Python 3.8+

```
from typing import Union

from fastapi import FastAPI, File, UploadFile
from typing_extensions import Annotated

app = FastAPI()

@app.post("/files/")
async def create_file(file: Annotated[Union[bytes, None], File()] = None):
    if not file:
        return {"message": "No file sent"}
    else:
        return {"file_size": len(file)}

@app.post("/uploadfile/")
async def create_upload_file(file: Union[UploadFile, None] = None):
    if not file:
        return {"message": "No upload file sent"}
    else:
        return {"filename": file.filename}
```

### Python 3.10+ - non-Annotated

**Tip**

Prefer to use the `Annotated` version if possible.

```
from fastapi import FastAPI, File, UploadFile

app = FastAPI()

@app.post("/files/")
async def create_file(file: bytes | None = File(default=None)):
    if not file:
        return {"message": "No file sent"}
    else:
        return {"file_size": len(file)}

@app.post("/uploadfile/")
async def create_upload_file(file: UploadFile | None = None):
    if not file:
        return {"message": "No upload file sent"}
    else:
        return {"filename": file.filename}
```

### Python 3.8+ - non-Annotated

**Tip**

Prefer to use the `Annotated` version if possible.

```
from typing import Union

from fastapi import FastAPI, File, UploadFile

app = FastAPI()

@app.post("/files/")
async def create_file(file: Union[bytes, None] = File(default=None)):
    if not file:
        return {"message": "No file sent"}
    else:
        return {"file_size": len(file)}

@app.post("/uploadfile/")
async def create_upload_file(file: Union[UploadFile, None] = None):
    if not file:
```

```
    return {"message": "No upload file sent"}
else:
    return {"filename": file.filename}
```

## UploadFile with Additional Metadata

You can also use `File()` with `UploadFile`, for example, to set additional metadata:

### Python 3.9+

```
from typing import Annotated
from fastapi import FastAPI, File, UploadFile
app = FastAPI()

@app.post("/files/")
async def create_file(file: Annotated[bytes, File(description="A file read as bytes")]):
    return {"file_size": len(file)}

@app.post("/uploadfile/")
async def create_upload_file(
    file: Annotated[UploadFile, File(description="A file read as UploadFile")],
):
    return {"filename": file.filename}
```

### ► Other versions and variants

### Python 3.8+

```
from fastapi import FastAPI, File, UploadFile
from typing_extensions import Annotated
app = FastAPI()

@app.post("/files/")
async def create_file(file: Annotated[bytes, File(description="A file read as bytes")]):
    return {"file_size": len(file)}

@app.post("/uploadfile/")
async def create_upload_file(
    file: Annotated[UploadFile, File(description="A file read as UploadFile")],
):
    return {"filename": file.filename}
```

### Python 3.8+ - non-Annotated

#### Tip

Prefer to use the `Annotated` version if possible.

```
from fastapi import FastAPI, File, UploadFile
app = FastAPI()

@app.post("/files/")
async def create_file(file: bytes = File(description="A file read as bytes")):
    return {"file_size": len(file)}

@app.post("/uploadfile/")
async def create_upload_file(
    file: UploadFile = File(description="A file read as UploadFile"),
):
    return {"filename": file.filename}
```

## Multiple File Uploads

It's possible to upload several files at the same time.

They would be associated to the same "form field" sent using "form data".

To use that, declare a list of `bytes` or `UploadFile`:

### Python 3.9+

```
from typing import Annotated
```

```
from fastapi import FastAPI, File, UploadFile
from fastapi.responses import HTMLResponse

app = FastAPI()

@app.post("/files/")
async def create_files(files: Annotated[list[bytes], File()]):
    return {"file_sizes": [len(file) for file in files]}

@app.post("/uploadfiles/")
async def create_upload_files(files: list[UploadFile]):
    return {"filenames": [file.filename for file in files]}

@app.get("/")
async def main():
    content = """
<body>
<form action="/files/" enctype="multipart/form-data" method="post">
<input name="files" type="file" multiple>
<input type="submit">
</form>
<form action="/uploadfiles/" enctype="multipart/form-data" method="post">
<input name="files" type="file" multiple>
<input type="submit">
</form>
</body>
"""
    return HTMLResponse(content=content)
```

▶ 📱 Other versions and variants

Python 3.8+

```
from typing import List

from fastapi import FastAPI, File, UploadFile
from fastapi.responses import HTMLResponse
from typing_extensions import Annotated

app = FastAPI()

@app.post("/files/")
async def create_files(files: Annotated[List[bytes], File()]):
    return {"file_sizes": [len(file) for file in files]}

@app.post("/uploadfiles/")
async def create_upload_files(files: List[UploadFile]):
    return {"filenames": [file.filename for file in files]}

@app.get("/")
async def main():
    content = """
<body>
<form action="/files/" enctype="multipart/form-data" method="post">
<input name="files" type="file" multiple>
<input type="submit">
</form>
<form action="/uploadfiles/" enctype="multipart/form-data" method="post">
<input name="files" type="file" multiple>
<input type="submit">
</form>
</body>
"""
    return HTMLResponse(content=content)
```

Python 3.9+ - non-Annotated

Tip

Prefer to use the `Annotated` version if possible.

```
from fastapi import FastAPI, File, UploadFile
from fastapi.responses import HTMLResponse

app = FastAPI()

@app.post("/files/")
async def create_files(files: list[bytes] = File()):
    return {"file_sizes": [len(file) for file in files]}

@app.post("/uploadfiles/")
```

```
async def create_upload_files(files: list[UploadFile]):
    return {"filenames": [file.filename for file in files]}

@app.get("/")
async def main():
    content = """
<body>
<form action="/files/" enctype="multipart/form-data" method="post">
<input name="files" type="file" multiple>
<input type="submit">
</form>
<form action="/uploadfiles/" enctype="multipart/form-data" method="post">
<input name="files" type="file" multiple>
<input type="submit">
</form>
</body>
"""
    return HTMLResponse(content=content)
```

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##### Tip

Prefer to use the `Annotated` version if possible.

```
from typing import List

from fastapi import FastAPI, File, UploadFile
from fastapi.responses import HTMLResponse

app = FastAPI()

@app.post("/files/")
async def create_files(files: List[bytes] = File()):
    return {"file_sizes": [len(file) for file in files]}

@app.post("/uploadfiles/")
async def create_upload_files(files: List[UploadFile]):
    return {"filenames": [file.filename for file in files]}

@app.get("/")
async def main():
    content = """
<body>
<form action="/files/" enctype="multipart/form-data" method="post">
<input name="files" type="file" multiple>
<input type="submit">
</form>
<form action="/uploadfiles/" enctype="multipart/form-data" method="post">
<input name="files" type="file" multiple>
<input type="submit">
</form>
</body>
"""
    return HTMLResponse(content=content)
```

You will receive, as declared, a list of bytes or `UploadFile`s.

##### Technical Details

You could also use `from starlette.responses import HTMLResponse`.

FastAPI provides the same `starlette.responses` as `fastapi.responses` just as a convenience for you, the developer. But most of the available responses come directly from Starlette.

#### Multiple File Uploads with Additional Metadata

And the same way as before, you can use `File()` to set additional parameters, even for `UploadFile`:

#### Python 3.9+

```
from typing import Annotated

from fastapi import FastAPI, File, UploadFile
from fastapi.responses import HTMLResponse

app = FastAPI()

@app.post("/files/")
async def create_files(
    files: Annotated[list[bytes], File(description="Multiple files as bytes")],
):
    return {"file_sizes": [len(file) for file in files]}
```

```
@app.post("/uploadfiles/")
async def create_upload_files(
    files: Annotated[
        List[UploadFile], File(description="Multiple files as UploadFile")
    ],
):
    return {"filenames": [file.filename for file in files]}

@app.get("/")
async def main():
    content = """
<body>
<form action="/files/" enctype="multipart/form-data" method="post">
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"""
    return HTMLResponse(content=content)
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## ► 📱 Other versions and variants

## Python 3.8+

```
from typing import List

from fastapi import FastAPI, File, UploadFile
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from typing_extensions import Annotated

app = FastAPI()

@app.post("/files/")
async def create_files(
    files: Annotated[List[bytes], File(description="Multiple files as bytes")],
):
    return {"file_sizes": [len(file) for file in files]}

@app.post("/uploadfiles/")
async def create_upload_files(
    files: Annotated[
        List[UploadFile], File(description="Multiple files as UploadFile")
    ],
):
    return {"filenames": [file.filename for file in files]}

@app.get("/")
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from fastapi import FastAPI, File, UploadFile
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app = FastAPI()

@app.post("/files/")
async def create_files(
    files: list[bytes] = File(description="Multiple files as bytes"),
):
    return {"file_sizes": [len(file) for file in files]}
```

```
@app.post("/uploadfiles/")
async def create_upload_files(
    files: list[UploadFile] = File(description="Multiple files as UploadFile"),
):
    return {"filenames": [file.filename for file in files]}

@app.get("/")
async def main():
    content = """
<body>
<form action="/files/" enctype="multipart/form-data" method="post">
<input name="files" type="file" multiple>
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</form>
<form action="/uploadfiles/" enctype="multipart/form-data" method="post">
<input name="files" type="file" multiple>
<input type="submit">
</form>
</body>
"""
    return HTMLResponse(content=content)
```

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```
from typing import List

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app = FastAPI()

@app.post("/files/")
async def create_files(
    files: List[bytes] = File(description="Multiple files as bytes"),
):
    return {"file_sizes": [len(file) for file in files]}

@app.post("/uploadfiles/")
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    files: List[UploadFile] = File(description="Multiple files as UploadFile"),
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</form>
<form action="/uploadfiles/" enctype="multipart/form-data" method="post">
<input name="files" type="file" multiple>
<input type="submit">
</form>
</body>
"""
    return HTMLResponse(content=content)
```

#### Recap

Use `File`, `bytes`, and `UploadFile` to declare files to be uploaded in the request, sent as form data.

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<https://fastapi.tiangolo.com/tutorial/request-files/>

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