Practical Assignment 1
SAT5980
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IPFS Network Management and Gateway API:

This project involves setting up a private IPFS (InterPlanetary File System) network and developing middleware and a gateway application to interact with it. The private IPFS network serves as the underlying infrastructure for decentralized databases and other applications, while the middleware encapsulates IPFS's RPC functions and the gateway provides a web service API for users.

Files Description:

gateway_client.py

A Python client that interacts with the Flask gateway server. It includes methods to upload and download files to and from the IPFS network through the server.
Usage:

```
upload_response = upload_to_gateway('/path/to/file.txt')
file_hash = upload_response['Hash']
download_from_gateway(file_hash)
```

gateway_server.py

A Flask server application that handles HTTP requests to upload and download files. It serves as the gateway between the client and the IPFS network.
Run:

```
python gateway_server.py
```

ipfs_middleware.py

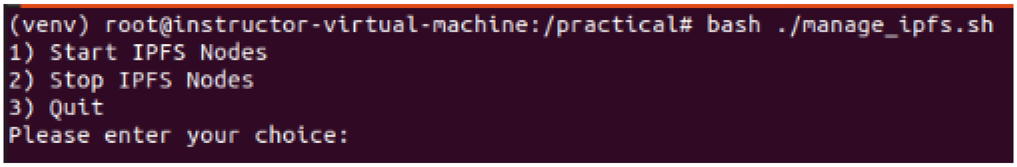
A Python class IPFSMiddleware that provides the functionality to upload a file to IPFS and download a file from IPFS. This class is used by the Flask server.

manage_ipfs.sh

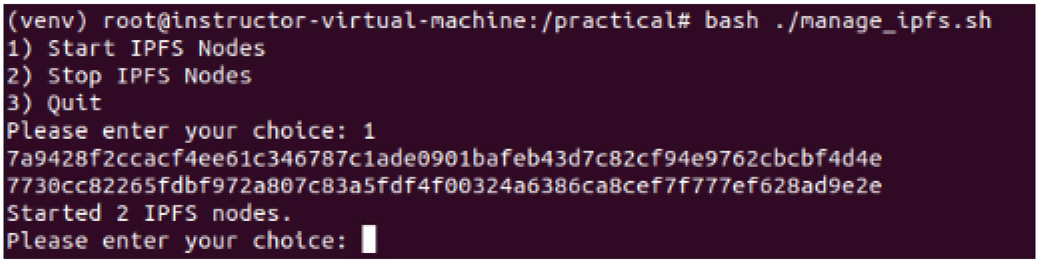
A bash script to manage the IPFS Docker nodes in the private network. It provides options to start and stop multiple IPFS nodes.
Run:

```
./manage_ipfs.sh
```

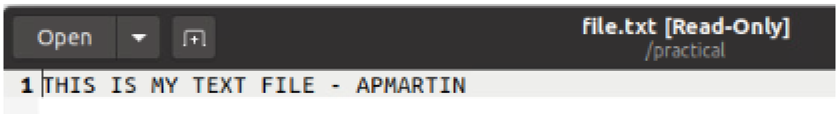
Screenshot Examples:



```
(venv) root@instructor-virtual-machine:/practical# bash ./manage_ipfs.sh
1) Start IPFS Nodes
2) Stop IPFS Nodes
3) Quit
Please enter your choice:
```

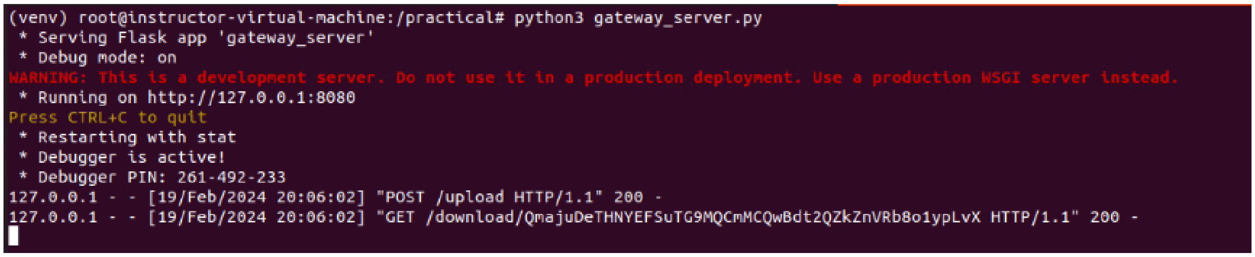


```
(venv) root@instructor-virtual-machine:/practical# bash ./manage_ipfs.sh
1) Start IPFS Nodes
2) Stop IPFS Nodes
3) Quit
Please enter your choice: 1
7a9428f2ccacf4ee61c346787c1ade0901bafeb43d7c82cf94e9762cbcbf4d4e
7730cc82265fdbf972a807c83a5fdf4f00324a6386ca8cef7f777ef628ad9e2e
Started 2 IPFS nodes.
Please enter your choice: 
```

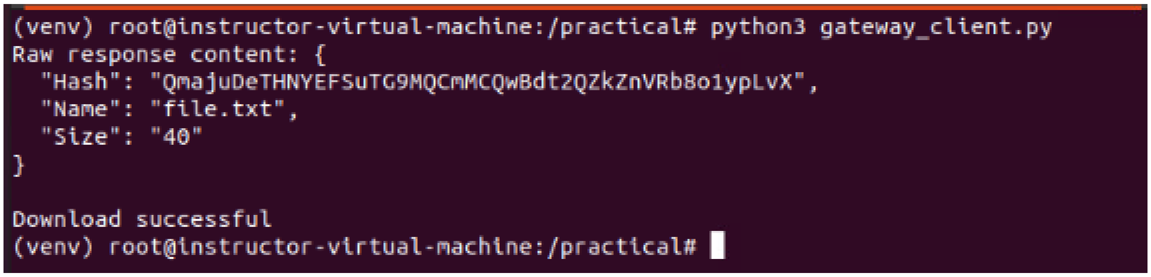


file.txt [Read-Only]
/practical

```
1 THIS IS MY TEXT FILE - APMARTIN
```

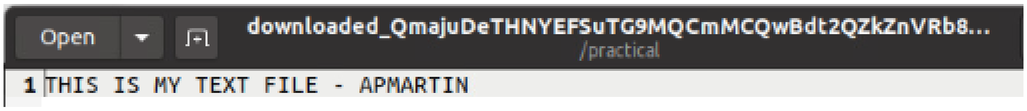


```
(venv) root@instructor-virtual-machine:/practical# python3 gateway_server.py
 * Serving Flask app 'gateway_server'
 * Debug mode: on
WARNING: This is a development server. Do not use it in a production deployment. Use a production WSGI server instead.
 * Running on http://127.0.0.1:8080
Press CTRL+C to quit
 * Restarting with stat
 * Debugger is active!
 * Debugger PIN: 261-492-233
127.0.0.1 - - [19/Feb/2024 20:06:02] "POST /upload HTTP/1.1" 200 -
127.0.0.1 - - [19/Feb/2024 20:06:02] "GET /download/QmajuDeTHNYEFSuTG9MQCmMCQwBdt2QZkZnVRb8o1ypLvX HTTP/1.1" 200 -
```



```
(venv) root@instructor-virtual-machine:/practical# python3 gateway_client.py
Raw response content: {
  "Hash": "QmajuDeTHNYEFSuTG9MQCmMCQwBdt2QZkZnVRb8o1ypLvX",
  "Name": "file.txt",
  "Size": "40"
}

Download successful
(venv) root@instructor-virtual-machine:/practical# 
```



downloaded_QmajuDeTHNYEFSuTG9MQCmMCQwBdt2QZkZnVRb8...
/practical

```
1 THIS IS MY TEXT FILE - APMARTIN
```