ILLINOIS INSTITUTE OF TECHNOLOGY

CS 550: Advanced Operating Systems

Work realized by

Florentin Bekier
Rémi Blaise

P2P File Sharing System: Manual

Taught by
Dr. Zhiling Lan

Master of Computer Science, Spring 2020

Contents

1   Introduction

This document will guide you through the installation and usage of our project. As detailed in the Design Document, this project contains two different software: **Index**, located in the `index` folder, and **Peer**, located in the `peer` folder. Please follow the following steps for each of the software.

2   Prerequisites

Both software are developed using Node.js (version 12.14.1). Therefore, you will need to have it installed on your computer to use them. If you don't have Node.js installed yet, follow the following steps:

2.1   Mac and Linux users

First, install `nvm` (Node Version Manager) by running the following command in a terminal:
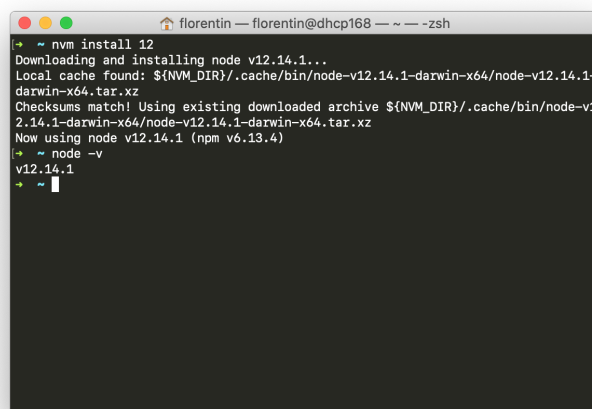
```
curl -o- https://raw.githubusercontent.com/nvm-sh/nvm/v0.35.2/install.sh | bash
```

This command should install `nvm` on your machine. Now you need to install the right version of Node.js. Close and reopen your terminal and type this command:

```
nvm install 12
```

Now you should have Node.js installed. You can check that Node.js is running with the right version using this command:
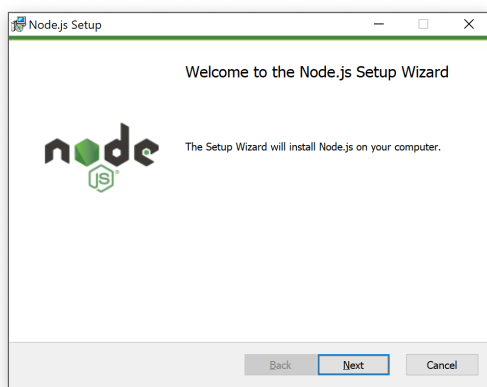
```
node -v
```


Figure 1: Node.js installation on macOS

2.2   Windows users
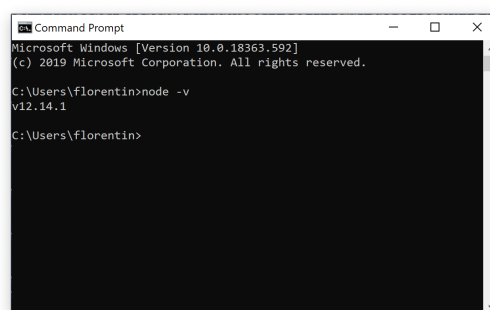
Download the Node.js Installer for 32 bits or 64 bits and execute it to install Node.js. **Make sure to check the box asking to install all the necessary tools**.

When the installation is finished, open a new Command Prompt window and run the following command to check that Node.js is running with the right version:

```
node -v
```


(a) Node.js Installer

(b) Command Prompt

Figure 2: Node.js installation on Windows

3   Installation

The installation process is identical for both the **Index** and **Peer** software. First, you should go to the software folder (`index` or `peer`) and open a terminal or a Command Prompt. Then, you will need to install the software dependencies by typing this command:

```
npm install
```

You will also need to set up the software by creating a config file. Duplicate the file `config.json.dist` and rename the duplicate to `config.json`. Edit this file to configure the software as needed (you will especially need to change the `port` and `indexPort` keys).

The Index configuration file has the following keys:

- `port`: The port this server will be listening on

- `keyStorageDir`: Directory to store the client public keys, requires write access

- `enableSignatureChecks`: Enable peer identity checks, recommended

- `logAllDatabase`: Display the full content of the database after each non-idempotent request. Not recommended for performance.

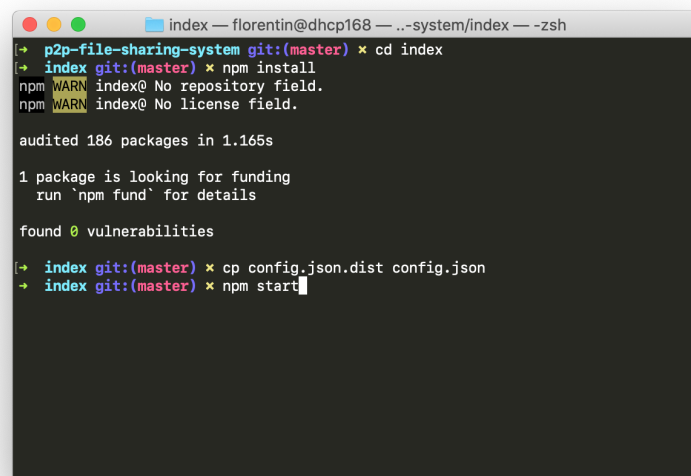The Peer configuration file has the following keys:

- `indexHost`: The hostname of the Index server

- `indexPort`: The port of the Index server

- `port`: The port this server will be listening on

- `sharedDir`: Directory containing the files to share to other peers

- `keyStorageDir`: Directory to store the client public keys, requires write access

For the Peer only, you need to generate your keys:

```
npm run generate-keys
```

You should now be ready to start the software! You can do it by using the following command:

```
npm start
```


Figure 3: Example installation steps for Index

Don't forget to follow this procedure for both software.

Note that you can also emulate different peers on the same computer simply by duplicating the `peer` folder and starting the duplicate. You will need to choose a different port for each peer.

If you copy the `peer` folder, make sure to remove the `peerId` key in `config.json`. Otherwise the two peers will be considered identical!

4   Usage

4.1   Index

Once the **Index** software is configured and started, there is nothing more to do. Don't close the terminal window. You will be able to see several logs information in the terminal.
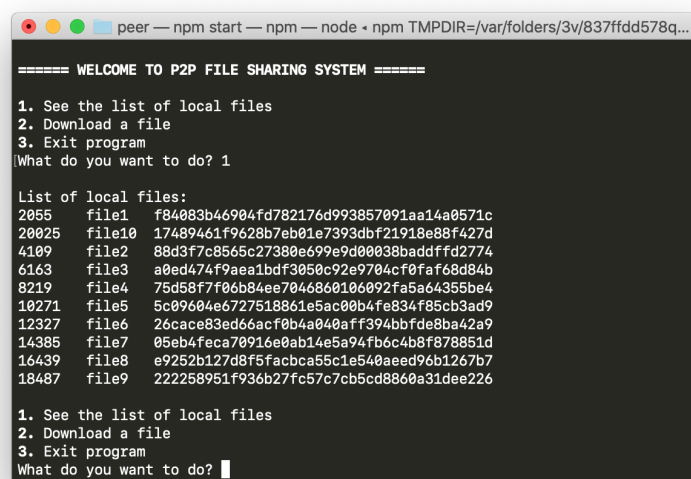Press `cmd + C` to quit the software.

4.2   Peer

When you launch the **Peer** software, a CLI (command-line interface) will appear. You will be able to see the list of files shared or to download a file. Enter the command number to select your choice and press Enter to validate. Once an operation is finished, you will come back to the main menu.
If you get server errors when you start the software, make sure that the **Index** software is running and that you specified the right port in `config.json`.
Press `cmd + C` to quit the software.

Figure 4: Peer software

5   Test case

The goal of this test case is to download a file from one peer ($P2$) to another ($P1$). In the end, you will have reproduced the output file (`out.txt`).

1. Execute the following commands in the root folder to create the second peer $P2$. Please refer to section 3 for more details.

```
cp -r peer peer2
cd peer2
cp config.json.dist config.json
npm run generate-keys
```

2. Edit the `config.json` file and change the port value to be different from the other peer (to `8070` for example). Remove the `peerId` key if present.

3. Remove all the files from $P2$'s `share` folder except `file10`: `rm share/file[1-9]`.

4. Open a new terminal and execute the following commands in the root folder to configure $P1$:

```
cd peer
cp config.json.dist config.json
npm run generate-keys
```

5. Remove `file10` from $P1$'s `share` folder: `rm share/file10`

6. Open a new terminal to configure and start the Index software (please refer to section 3).

7. Start $P2$ and $P1$ in different terminals. For the next steps, we will only use $P1$.

8. Enter `1` to see the list of local files. You should see 9 files.

9. Enter `2` to download a file.

10. Type `file10` as the file name.

11. Enter `1` to download the file.

12. Enter `1` to see the list of local files. You should now see 10 files as we downloaded a new one.

13. Enter `3` to exit the program.