ILLINOIS INSTITUTE OF TECHNOLOGY

CS 550: Advanced Operating Systems

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Consistent P2P File Sharing System: Manual

Taught by
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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: **Super-Peer**, located in the `superpeer` 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:

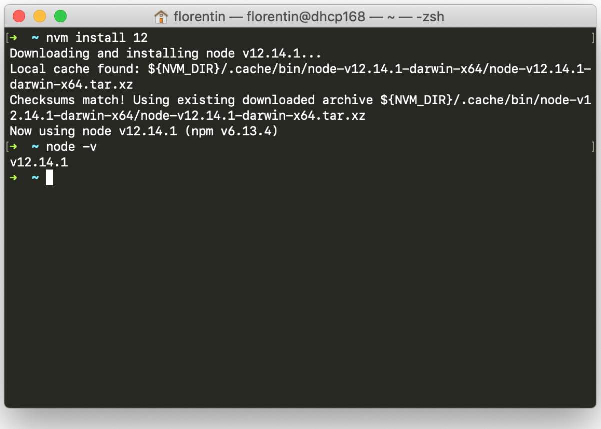
```
curl -o- https://raw.githubusercontent.com/nvm-sh/nvm/v0.35.2/install.sh | bash
```

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
```



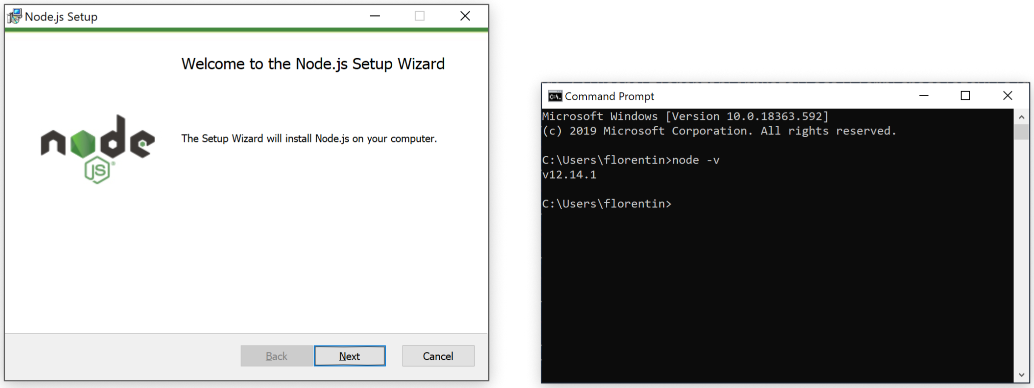
```
➜  ~ nvm install 12
Downloading and installing node v12.14.1...
Local cache found: ${NVM_DIR}/.cache/bin/node-v12.14.1-darwin-x64/node-v12.14.1-
darwin-x64.tar.xz
Checksums match! Using existing downloaded archive ${NVM_DIR}/.cache/bin/node-v1
2.14.1-darwin-x64/node-v12.14.1-darwin-x64.tar.xz
Now using node v12.14.1 (npm v6.13.4)
➜  ~ node -v
v12.14.1
➜  ~
```

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
```



Welcome to the Node.js Setup Wizard

The Setup Wizard will install Node.js on your computer.

```
Microsoft Windows [Version 10.0.18363.592]
(c) 2019 Microsoft Corporation. All rights reserved.

C:\Users\florentin>node -v
v12.14.1

C:\Users\florentin>
```

(a) Node.js Installer (b) Command Prompt

Figure 2: Node.js installation on Windows

3 Installation

To simplify the installation of multiple leaf-nodes and super-peers, we created an installation software. This software is a CLI (command-line interface) script that will generate as many super-peers and leaf-nodes as we want according to either the all-to-all or linear topology.

To use it, you should go to the `installer` folder and open a terminal or a Command Prompt. First, you will need to install the software dependencies by typing this command:

```
npm install
```

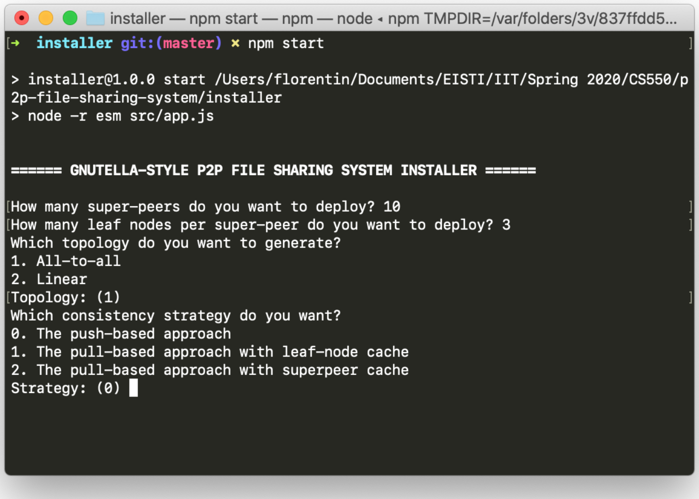
Then, you can start the installer by using the following command:

```
npm start
```

The installer will then ask you the configuration settings that you need. First, enter the number of super-peers that you want to deploy, then the number of leaf-nodes for each super-peer, then choose one of the two topology (all-to-all or linear) and lastly choose the consistency strategy (push-based or pull-based) as well as the TTR (time-to-refresh). The software will then start the installation. You should wait until you see “Bye!”. The generated software are located in the `target` folder in the root folder.

Behind the scenes, the installer software performs the following actions:

1. Duplicate the `superpeer` folder for each super-peer
2. Duplicate the `peer` folder for each leaf-node
3. Generate the encryption key for each leaf-node and put the public key in the super-peer folder
4. Install all the dependencies
5. Generate the configuration file for each super-peer and leaf-node (containing the server ports, list of leaf-nodes and list of neighbors based on the selected topology)


installer — npm start — npm — node ◂ npm TMPDIR=/var/folders/3v/837ffdd5...

```
[➜  installer git:(master) ✗ npm start

> installer@1.0.0 start /Users/florentin/Documents/EISTI/IIT/Spring 2020/CS550/p
2p-file-sharing-system/installer
> node -r esm src/app.js


====== GNUTELLA-STYLE P2P FILE SHARING SYSTEM INSTALLER ======

[How many super-peers do you want to deploy? 10
[How many leaf nodes per super-peer do you want to deploy? 3
Which topology do you want to generate?
1. All-to-all
2. Linear
[Topology: (1)
Which consistency strategy do you want?
0. The push-based approach
1. The pull-based approach with leaf-node cache
2. The pull-based approach with superpeer cache
Strategy: (0)
```

Figure 3: Usage of the installer software

4 Usage

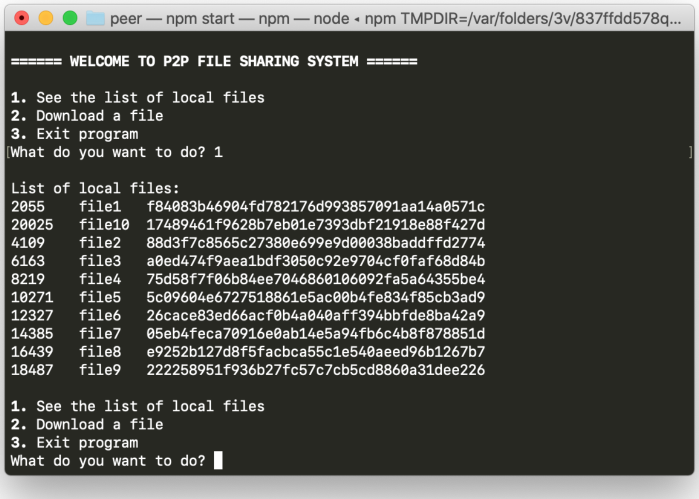
4.1 Super-Peer

Once the **Super-Peer** 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 **Super-Peer** software is running and that you specified the right port in `config.json`.
Press `cmd + C` to quit the software.


peer — npm start — npm — node ◂ npm TMPDIR=/var/folders/3v/837ffdd578q...

```
====== WELCOME TO P2P FILE SHARING SYSTEM ======

1. See the list of local files
2. Download a file
3. Exit program
What do you want to do? 1

List of local files:
2055    file1   f84083b46904fd782176d993857091aa14a0571c
20025   file10  17489461f9628b7eb01e7393dbf21918e88f427d
4109    file2   88d3f7c8565c27380e699e9d00038baddffd2774
6163    file3   a0ed474f9aea1bdf3050c92e9704cf0faf68d84b
8219    file4   75d58f7f06b84ee7046860106092fa5a64355be4
10271   file5   5c09604e6727518861e5ac00b4fe834f85cb3ad9
12327   file6   26cace83ed66acf0b4a040aff394bbfde8ba42a9
14385   file7   05eb4feca70916e0ab14e5a94fb6c4b8f878851d
16439   file8   e9252b127d8f5facbca55c1e540aeed96b1267b7
18487   file9   222258951f936b27fc57c7cb5cd8860a31dee226

1. See the list of local files
2. Download a file
3. Exit program
What do you want to do? 
```

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. Use the installer software to generate two super-peers with one leaf-node each. Please refer to section 3 for more details.
2. Go to $P1$'s folder: `cd target/leafnode00`.
3. Remove `file10` from $P1$'s `share` folder: `rm share/file10`
4. Open a new terminal and go to $P2$'s folder: `cd target/leafnode10`.
5. Remove all the files from $P2$'s `share` folder except `file10`: `rm share/file[1-9]`.
6. Start each super-peer (`superpeer0` and `superpeer1`) in a new terminal.
7. Start $P1$ and $P2$ in the terminals you previously opened. 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.