User Guide for CS 4504 Project Part 2

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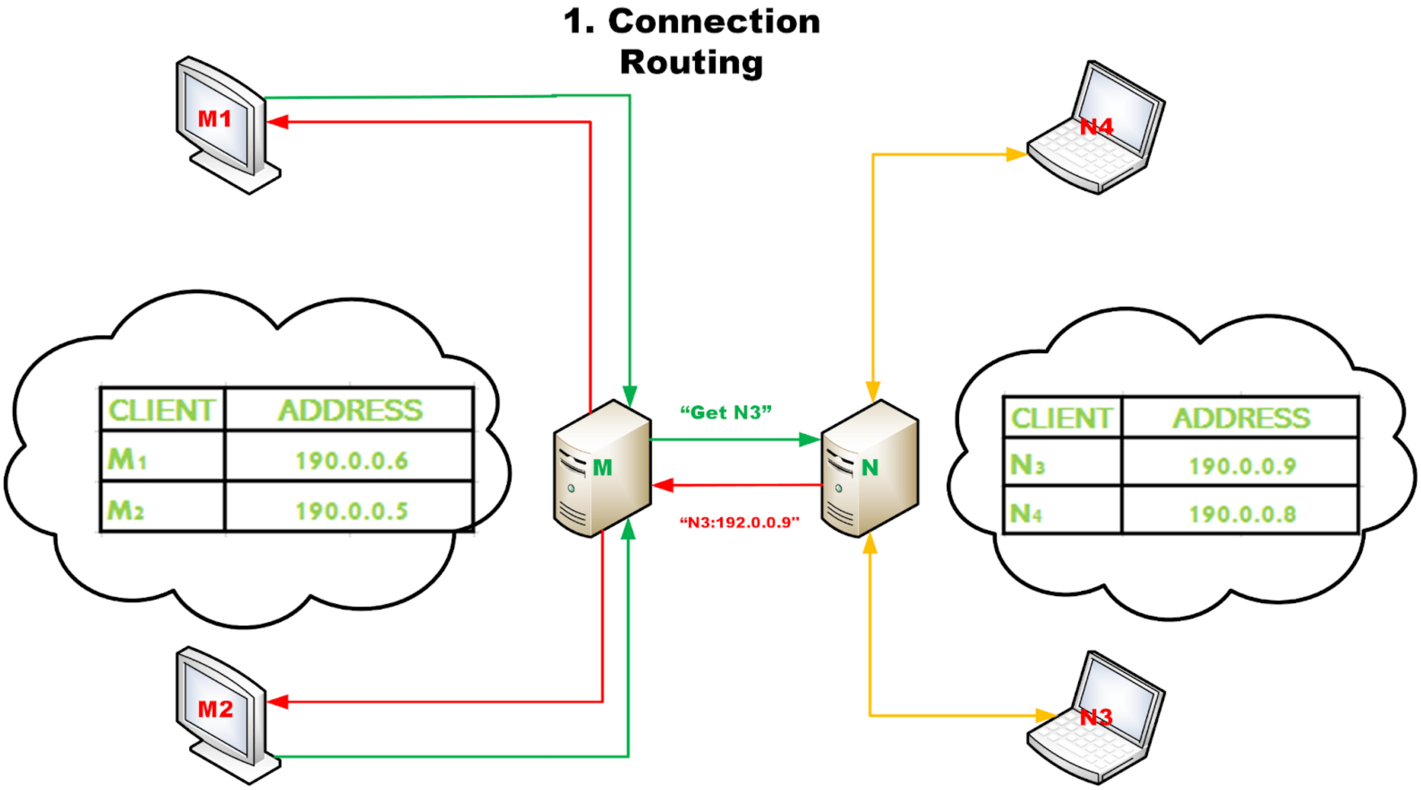
Functionality

PeerRouter

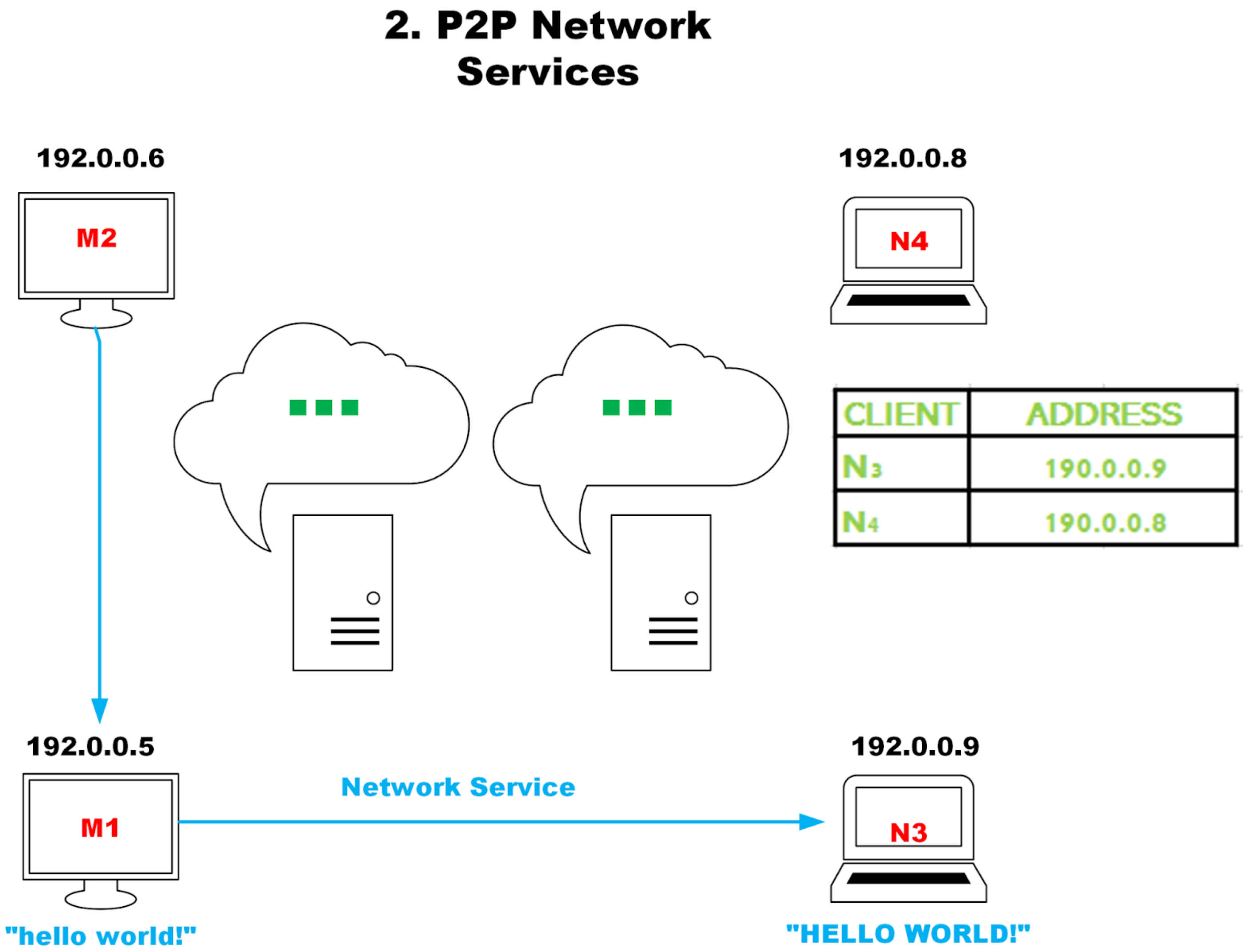


CLIENT	ADDRESS
M1	190.0.0.6
M2	190.0.0.5

CLIENT	ADDRESS
N3	190.0.0.9
N4	190.0.0.8

- The router `M` maintains a directory of "nodes", which are all addressed by an identifier like `M1`.
- Router `M` can resolve requests like `N1` by accessing the router `N`, if one exists.
- Accepts connections via a ServerSocket, and responds to the following commands:
  - `GET [node_id]` – resolves the IP address of the given node identifier and returns it.
  - `REGISTER [port]` – Registers the current client in the directory. Returns the unique identifier assigned.
  - `LIST` – returns a comma-separated list of registered node names, e.g `M1,M2,M3`
  - `LIST [router_prefix]` – connects to the given router name and invokes `LIST` there.

EchoPeerServer



CLIENT	ADDRESS
N_3	190.0.0.9
N_4	190.0.0.8

- One possible implementation of the abstract PeerServer class.
- Registers self with the specified router, and awaits connections.
- When a client connects and sends data, echo it back, converted to uppercase.

EchoPeerClient

- One possible implementation of the abstract PeerClient class.
- Transmits a file line-by-line, and prints the server's response.
  - `java pdc.util.EchoPeerClient [node_id] [filename]`
  - `[node_id]` (e.g. `M1`) is the PeerServer instance to connect to
  - `[filename]` is the file to echo. To read stdin, use `-`.

Configuration

These programs are configured based on environmental variables. These variables are loaded from the following sources, in order of priority.

1. A text file called `.env` in the PWD
2. Variables defined using `/usr/bin/env` or in the local shell environment
3. System variables

PeerRouter program

- `ROUTER_PREFIX` – A character (ex. 'M') which identifies this router, and the nodes connected to it. If this is a letter, it must be uppercase. Nodes connected to the router M will have an identifier like `M1`.
- `ROUTER_PORT` – The port on which this router will run.
- `FRIEND_ROUTERS` (optional) – The other routers which this router can connect to in order to resolve node names. A comma-separated list of routers in the format `N:hostname:6667,O:hostname:6668`.

PeerClient programs

- `ROUTER_HOSTNAME` – The hostname of the router to connect to
- `ROUTER_PORT` – The port of the router to connect to

To deploy

1. Clone the project repository:

   ```
   git clone https://github.com/Mgooch2/ParallelDistrib_Project.git
   cd ParallelDistrib_Project
   ```

2. Compile the Java classes

   ```
   javac @classes
   ```

3. On one or more systems, set up a peer router…

   1. For each router instance, configure `.env` with a prefix and a port, like so:

      ```
      ROUTER_PREFIX=M
      ROUTER_PORT=6666
      ```

      ```
      ROUTER_PREFIX=N
      ROUTER_PORT=6667
      ```

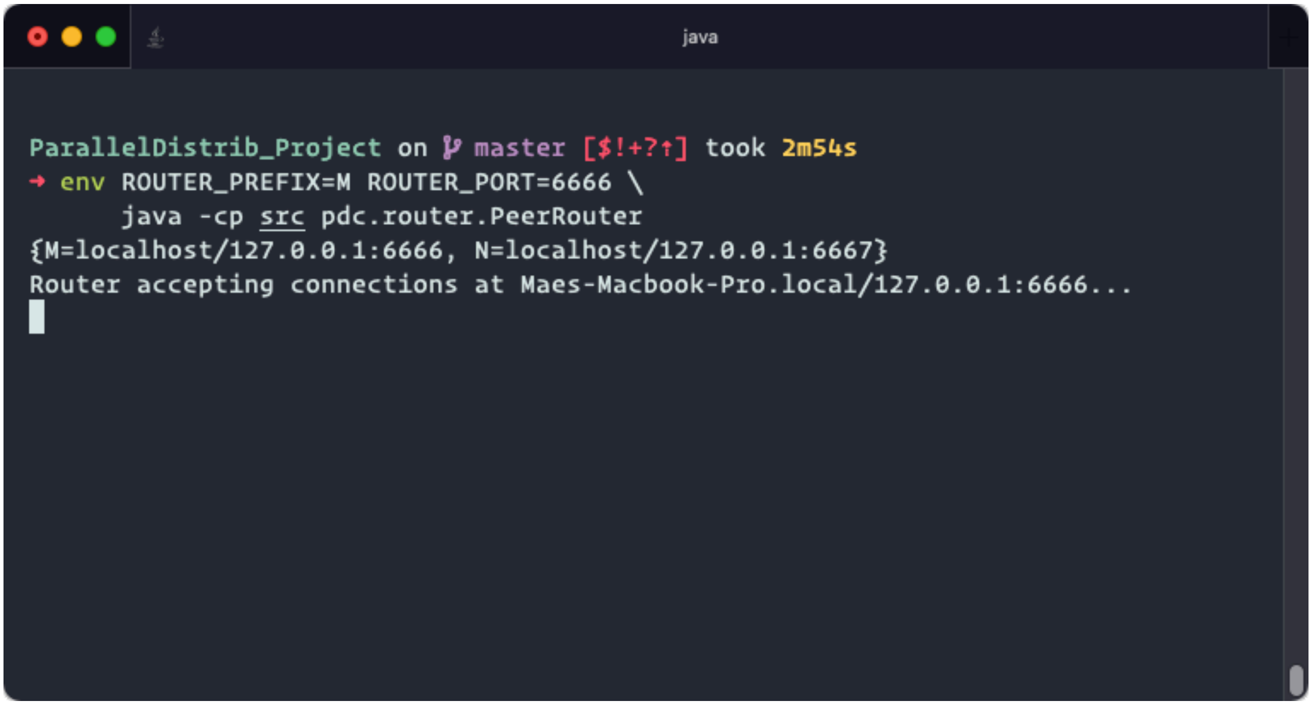
      ```
      ROUTER_PREFIX=O
      ROUTER_PORT=6668
      ```

   2. Find the hostname of each router. On each router, set the `FRIEND_ROUTERS` value like so:

      ```
      FRIEND_ROUTERS=M:[hostname_m]:6666,N:[hostname_n]:6667,O:[hostname_o]:6668
      ```

   3. Invoke the PeerRouter program using the command:

      ```
      java -cp src pdc.router.PeerRouter
      ```

      ```
      ParallelDistrib_Project on master [$!+?↑] took 2m54s
      ➜ env ROUTER_PREFIX=M ROUTER_PORT=6666 \
            java -cp src pdc.router.PeerRouter
      {M=localhost/127.0.0.1:6666, N=localhost/127.0.0.1:6667}
      Router accepting connections at Maes-Macbook-Pro.local/127.0.0.1:6666...
      ```

4. On another system, set up instance of EchoPeerServer...

   1. Configure `.env` to connect to one of the routers.

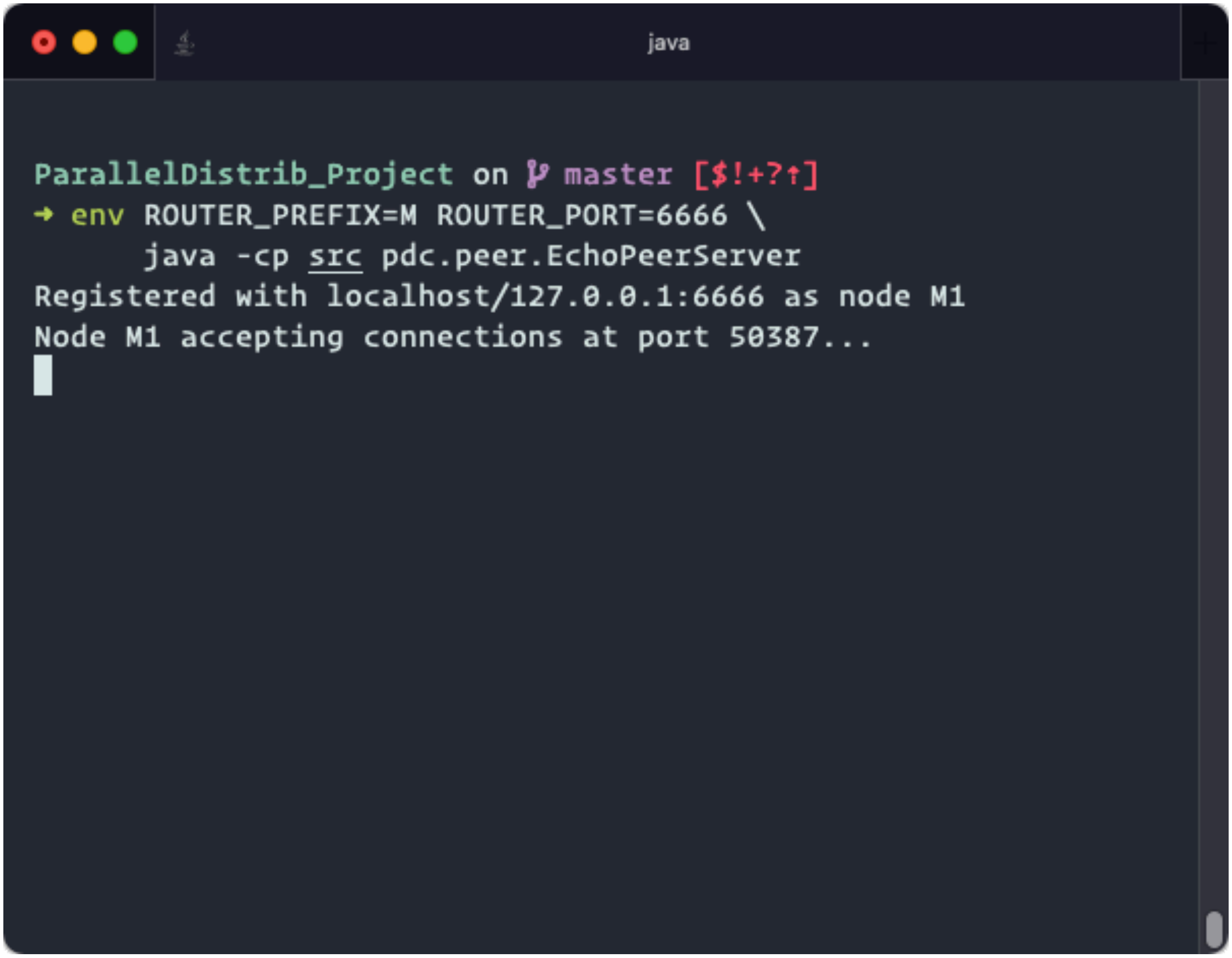
      ```
      ROUTER_HOSTNAME=[hostname_m]
      ROUTER_PORT=6666
      ```

   2. Invoke the EchoPeerServer program using the command:

      ```
      java -cp src pdc.router.EchoPeerServer
      ```

      This will launch a server instance on an arbitrary port.

    3. Make note of the unique ID (e.g. M1) which is assigned to this server instance.



```
ParallelDistrib_Project on master [$!+?↑]
➜ env ROUTER_PREFIX=M ROUTER_PORT=6666 \
      java -cp src pdc.peer.EchoPeerServer
Registered with localhost/127.0.0.1:6666 as node M1
Node M1 accepting connections at port 50387...
```

5. On another system, set up instance of EchoPeerClient...

    1. Configure `.env` as in step 4.1

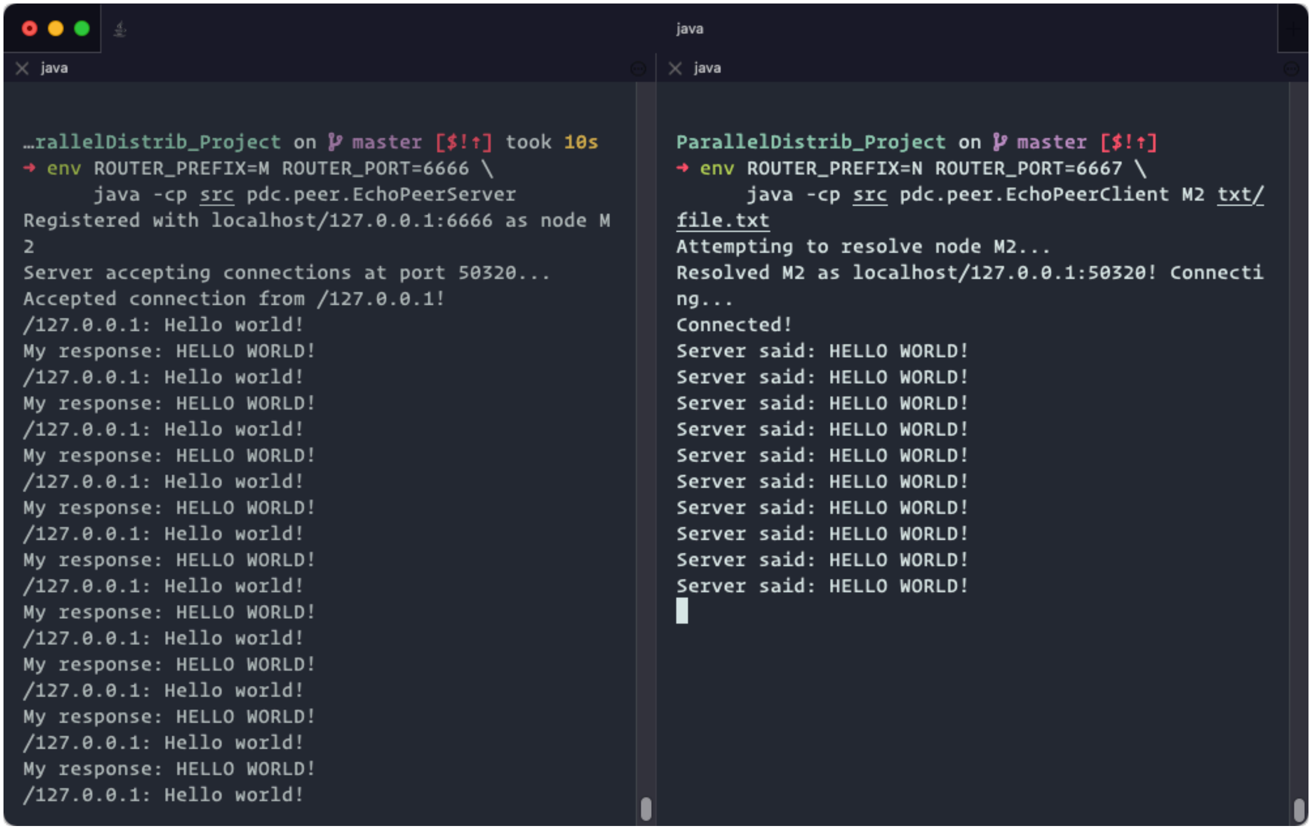
    2. Create some input file, e.g file.txt:

    ```
    Hello world!
    Hello world!
    Hello world! ...
    ```

    3. Invoke the EchoPeerClient program using the command, where `M1` is the server to connect to, and `file.txt` is the file to echo. To read stdin, use `-`.

    ```
    java -cp src pdc.router.EchoPeerServer M1 file.txt
    ```

The client will access the router to resolve the server's IP address, open a connection, then send the text, which will be echoed back in uppercase.



```
…rallelDistrib_Project on master [$!↑] took 10s
➜ env ROUTER_PREFIX=M ROUTER_PORT=6666 \
      java -cp src pdc.peer.EchoPeerServer
Registered with localhost/127.0.0.1:6666 as node M
2
Server accepting connections at port 50320...
Accepted connection from /127.0.0.1!
/127.0.0.1: Hello world!
My response: HELLO WORLD!
/127.0.0.1: Hello world!
My response: HELLO WORLD!
/127.0.0.1: Hello world!
My response: HELLO WORLD!
/127.0.0.1: Hello world!
My response: HELLO WORLD!
/127.0.0.1: Hello world!
My response: HELLO WORLD!
/127.0.0.1: Hello world!
My response: HELLO WORLD!
/127.0.0.1: Hello world!
My response: HELLO WORLD!
/127.0.0.1: Hello world!
My response: HELLO WORLD!
/127.0.0.1: Hello world!
My response: HELLO WORLD!
/127.0.0.1: Hello world!
```

```
ParallelDistrib_Project on master [$!↑]
➜ env ROUTER_PREFIX=N ROUTER_PORT=6667 \
      java -cp src pdc.peer.EchoPeerClient M2 txt/
file.txt
Attempting to resolve node M2...
Resolved M2 as localhost/127.0.0.1:50320! Connecti
ng...
Connected!
Server said: HELLO WORLD!
Server said: HELLO WORLD!
Server said: HELLO WORLD!
Server said: HELLO WORLD!
Server said: HELLO WORLD!
Server said: HELLO WORLD!
Server said: HELLO WORLD!
Server said: HELLO WORLD!
Server said: HELLO WORLD!
Server said: HELLO WORLD!
```

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