

# Peer-to-Peer with Centralized Index (P2P-CI) System for Downloading RFCs

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## Design

The system is designed as per the specifications mentioned in the Project document (proj1.pdf). Some of the design questions that were unanswered in the specification for which we made appropriate assumptions are the following

- Data sent between the server and client or client to client is serialized before sending and the serialization technique used is CPickle (inbuilt functionality in Python)
- To provide concurrency at both Server and Client, we are implementing their functionalities as threads, we are also implementing thread locking mechanism to maintain data consistency
- At Client
  - Two threads are implemented, one to server GET requests from other clients and another to provide console interface to User
- At Server
  - One thread is created for each client that connects with the server.
  - The details of the peers are stored as a list - [ [peer, uport], [peer, uport] ]
  - The details of RFC are stored as a list - [ [RFC no, RFC title, hostName],[RFC no, RFC title, hostName].....]
- The specification is not clear about how a client exits the system, so we have assumed that a client can just close the connections and server will catch this as an exception and do the required client deregistration process (remove from database)

## Basic System Testing:

### System under test:

- Server.py running (listening at port 7734, IP address as host machine )
- client1.py running with upload port 65001 and IP as IP of host machine. Client1's RFC directory is rfc folder
- client2.py running with upload port 65002 and IP address as 127.0.0.1. Client2's RFC directory is rfc2 folder

## Test case 1: Both clients connect to server and register by sending their local RFCs .

### At server:

```
Console Console Console
Server.py [C:\Users\Ananthram\windows-build-tools\python27\python.exe]
The server is ready to receive
New peer connected 169.254.212.77 ,peer at port 65001
New peer connected 127.0.0.1 ,peer at port 65002
```

### At Client1

```
Console Console Console
client1.py [C:\Users\Ananthram\windows-build-tools\python27\python.exe]
Connected to server
Registration with server
[65001, [['0001', 'Host Software'], ['0004', 'Network Timetable'], ['0005', 'Decode Encode Language (DEL)'], ['0010', 'DOCUMENTATION CONVENTIONS'], ['0021', 'Network Meeting']], '169.254.212.77']

Enter the mode to enter: 1.P2S 2.P2P |
```

### At Client 2

```
Console Console Console
client2.py [C:\Users\Ananthram\windows-build-tools\python27\python.exe]
Connected to server
Registration with server
[65002, [['0004', 'Network Timetable'], ['0024', 'DOCUMENTATION CONVENTIONS']], '127.0.0.1']

Enter the mode to enter: 1.P2S 2.P2P
```

## Testcase 2 : Peer to server communication , LIST command

### At Client 1

Enter the mode to enter: 1.P2S 2.P2P **P2S**

Enter your input

1.ADD

2.LIST

3.LOOKUP

4.EXIT

**LIST**

Request to server.....

LIST ALL P2P-CI/1.0

Host: 169.254.212.77

Port: 65001

Response from server.....

P2P-CI/1.0 200 OK

RFC 0001 Host Software 169.254.212.77 65001

RFC 0004 Network Timetable 169.254.212.77 65001

RFC 0005 Decode Encode Language (DEL) 169.254.212.77 65001

RFC 0010 DOCUMENTATION CONVENTIONS 169.254.212.77 65001

RFC 0021 Network Meeting 169.254.212.77 65001

RFC 0004 Network Timetable 127.0.0.1 65002

RFC 0024 DOCUMENTATION CONVENTIONS 127.0.0.1 65002

Enter your input

1.ADD

2.LIST

3.LOOKUP

4.EXIT

### TESTCASE 3: Peer to server communication , LOOKUP command

At Client 1, Lookup for RFC 0004 (available) and RFC 0067 (not available)

Enter your input

- 1.ADD
- 2.LIST
- 3.LOOKUP
- 4.EXIT

LOOKUP

Enter the RFC Number:0004

Enter the RFC Title:Network Timetable

Request to server.....

LOOKUP RFC 0004 P2P-CI/1.0

Host: 169.254.212.77

Port: 65001

Title: Network Timetable

Response from server....

P2P-CI/1.0 200 OK

RFC 0004 Network Timetable 169.254.212.77 65001

RFC 0004 Network Timetable 127.0.0.1 65002

Enter your input

- 1.ADD
- 2.LIST
- 3.LOOKUP
- 4.EXIT

LOOKUP

Enter the RFC Number:0067

Enter the RFC Title:Proposed Change to Host/IMP Spec

Request to server.....

LOOKUP RFC 0067 P2P-CI/1.0

Host: 169.254.212.77

Port: 65001

Title: Proposed Change to Host/IMP Spec

Response from server....

P2P-CI/1.0 404 Not Found

Enter your input

- 1.ADD
- 2.LIST
- 3.LOOKUP
- 4.EXIT

#### TESTCASE 4: Peer to server communication , ADD command

Adding RFC 97 from client 1 and checking the updated RFC List at server by using the LIST command from Client 1

Enter your input

1.ADD  
2.LIST  
3.LOOKUP  
4.EXIT

ADD

Enter the RFC Number:0097

Enter the RFC Title: FIRST CUT AT A PROPOSED TELNET PROTOCOL

Request to server.....

ADD RFC 0097 P2P-CI/1.0

Host: 169.254.212.77

Port: 65001

Title: FIRST CUT AT A PROPOSED TELNET PROTOCOL

Response from server....

P2P-CI/1.0 200 OK

RFC 0097 FIRST CUT AT A PROPOSED TELNET PROTOCOL 169.254.212.77 65001

Enter your input

1.ADD  
2.LIST  
3.LOOKUP  
4.EXIT

LIST

Request to server.....

LIST ALL P2P-CI/1.0

Host: 169.254.212.77

Port: 65001

Response from server....

P2P-CI/1.0 200 OK

RFC 0001 Host Software 169.254.212.77 65001

RFC 0004 Network Timetable 169.254.212.77 65001

RFC 0005 Decode Encode Language (DEL) 169.254.212.77 65001

RFC 0010 DOCUMENTATION CONVENTIONS 169.254.212.77 65001

RFC 0021 Network Meeting 169.254.212.77 65001

RFC 0004 Network Timetable 127.0.0.1 65002

RFC 0024 DOCUMENTATION CONVENTIONS 127.0.0.1 65002

RFC 0097 FIRST CUT AT A PROPOSED TELNET PROTOCOL 169.254.212.77 65001

Enter your input

1.ADD  
2.LIST  
3.LOOKUP  
4.EXIT



## TESTCASE 5: Peer to Peer communication , GET command

Getting RFC 5 from Client1 to Client2

At Client 2 directory:

| oard                                 | Organize             | New           | Open | Select |
|--------------------------------------|----------------------|---------------|------|--------|
| > Ananthram > workspace > P2P > rfc2 |                      |               |      |        |
| <input type="checkbox"/> Name        | Date modified        | Type          | Size |        |
| 0004_Network Timetable.txt           | 4/15/2017 8:06 PM    | Text Document | 7 KB |        |
| 0024_DOCUMENTATION CONVENTIONS.txt   | 4/15/2017 12:06 A... | Text Document | 5 KB |        |

No RFC 0005

```
client2.py [C:\Users\Ananthram\windows-build-tools\python27\python.exe]
3.LOOKUP
4.EXIT
EXIT
Enter the mode to enter:  1.P2S    2.P2P  P2P
Enter your input
1.GET
2.EXIT
GET
Enter Client IP: 169.254.212.77
Enter Client port: 65001
Enter the RFC Number: 0005
Enter the RFC Name: Decode Encode Language (DEL)
Request to server.....
GET RFC 0005 P2P-CI/1.0
Host: 127.0.0.1
OS: Windows

Response from server....
P2P-CI/1.0 200 OK
Date: Sun, 16 Apr 2017 00:16:54 Eastern Daylight Time
OS: Windows
Last-Modified: Sat Apr 16 14:02:02 2016
Content-Length: 27583
Content-Type: text/text

Network Working Group                                4691
RFC-5                                                  Jeff Rulifson
                                                         June 2, 1969

RFC 5 Printed

:DEL, 02/06/69 1010:58 JFR ; .DSN=1; .LSP=0; ['=] AND NOT SP ; ['?];
```

After RFC 0005 Now available at Client2 directory

| > Ananthram > workspace > P2P > rfc2  |                      |               |       |  |
|---------------------------------------|----------------------|---------------|-------|--|
| <input type="checkbox"/> Name         | Date modified        | Type          | Size  |  |
| 0004_Network Timetable.txt            | 4/15/2017 8:06 PM    | Text Document | 7 KB  |  |
| 0005_Decode Encode Language (DEL).txt | 4/16/2017 12:16 A... | Text Document | 28 KB |  |
| 0024_DOCUMENTATION CONVENTIONS.txt    | 4/15/2017 12:06 A... | Text Document | 5 KB  |  |

## TESTCASE 6: Client Disconnect scenario, RFCs deleted from server RFC Index

```
Console Console Console
<terminated> client1.py [C:\Users\Ananthram\windows-build-tools\python27\python.exe]
Connected to server
Registration with server
[65001, [['0001', 'Host Software'], ['0004', 'Network Timetable'], ['0005', 'Decode Encode Language (DEL)']]
Enter the mode to enter: 1.P2S 2.P2P Exception in thread Thread-1:
Traceback (most recent call last):
  File "C:\Users\Ananthram\windows-build-tools\python27\lib\threading.py", line 801, in bootstrap
    self.run()
  File "C:\Users\Ananthram\workspace\P2P\client1.py", line 116, in run
    usr_ip_mode = raw_input('Enter the mode to enter: 1.P2S 2.P2P ')
  File "C:\Users\Ananthram\p2\pool\plugins\org.python.pydev 5.6.0.201703221358\pysrc\pydev_sitecustomize.py", line 100, in __init__
    ret = original_raw_input(prompt)
EOFError: EOF when reading a line
```

```
Console Console Console
Server.py [C:\Users\Ananthram\windows-build-tools\python27\python.exe]
[The server is ready to receive
New peer connected 169.254.212.77 ,peer at port 65001
New peer connected 127.0.0.1 ,peer at port 65002
Received from client [['LIST', 'ALL', 'P2P-CI/1.0'], ['Host:', '127.0.0.1'], ['Port:', 65002]]
Now printing P2P-CI/1.0 200 OK
RFC 0001 Host Software 169.254.212.77 65001
RFC 0004 Network Timetable 169.254.212.77 65001
RFC 0005 Decode Encode Language (DEL) 169.254.212.77 65001
RFC 0010 DOCUMENTATION CONVENTIONS 169.254.212.77 65001
RFC 0021 Network Meeting 169.254.212.77 65001
RFC 0004 Network Timetable 127.0.0.1 65002
RFC 0005 Decode Encode Language (DEL) 127.0.0.1 65002
RFC 0024 DOCUMENTATION CONVENTIONS 127.0.0.1 65002

PeerList [['169.254.212.77', 65001], ['127.0.0.1', 65002]]
socket error....closing socket....deleting peer
[['0004', 'Network Timetable', '127.0.0.1'], ['0005', 'Decode Encode Language (DEL)', '127.0.0.1']]
New RFC LIST [['0004', 'Network Timetable', '127.0.0.1'], ['0005', 'Decode Encode Language (DEL)', '127.0.0.1']]
New Peers list [['127.0.0.1', 65002]]
Received from client [['LIST', 'ALL', 'P2P-CI/1.0'], ['Host:', '127.0.0.1'], ['Port:', 65002]]
Now printing P2P-CI/1.0 200 OK
RFC 0004 Network Timetable 127.0.0.1 65002
RFC 0005 Decode Encode Language (DEL) 127.0.0.1 65002
RFC 0024 DOCUMENTATION CONVENTIONS 127.0.0.1 65002

PeerList [['127.0.0.1', 65002]]
```

Since Client 2 is still connected to the server, LIST at Client 2 does not list Client 1 RFCs now

```
Enter your input
1.ADD
2.LIST
3.LOOKUP
4.EXIT
```

client2.py [C:\Users\Ananthram\windows-build-tools\python27\python.exe]

```
4.EXIT
```

```
LIST
```

```
Request to server.....
```

```
LIST ALL P2P-CI/1.0
```

```
Host: 127.0.0.1
```

```
Port: 65002
```

```
Response from server....
```

```
P2P-CI/1.0 200 OK
```

```
RFC 0001 Host Software 169.254.212.77 65001
```

```
RFC 0004 Network Timetable 169.254.212.77 65001
```

```
RFC 0005 Decode Encode Language (DEL) 169.254.212.77 65001
```

```
RFC 0010 DOCUMENTATION CONVENTIONS 169.254.212.77 65001
```

```
RFC 0021 Network Meeting 169.254.212.77 65001
```

```
RFC 0004 Network Timetable 127.0.0.1 65002
```

```
RFC 0005 Decode Encode Language (DEL) 127.0.0.1 65002
```

```
RFC 0024 DOCUMENTATION CONVENTIONS 127.0.0.1 65002
```

```
Enter your input
```

```
1.ADD
```

```
2.LIST
```

```
3.LOOKUP
```

```
4.EXIT
```

```
LIST
```

```
Request to server.....
```

```
LIST ALL P2P-CI/1.0
```

```
Host: 127.0.0.1
```

```
Port: 65002
```

**We see that Client 1 RFC's are not listed when LIST command is used at Client 2**

```
Response from server....
```

```
P2P-CI/1.0 200 OK
```

```
RFC 0004 Network Timetable 127.0.0.1 65002
```

```
RFC 0005 Decode Encode Language (DEL) 127.0.0.1 65002
```

```
RFC 0024 DOCUMENTATION CONVENTIONS 127.0.0.1 65002
```