Considering a group of 5 people (X1, X2, X3, X4,X5) , X1 wants to share a file (F1) with others. X1 will apply secret sharing scheme on F1 and create 5 shares (S1, S2, S3, S4, S5). These shares are uploaded in IPFS. The hash that generated by IPFS will be given to the group. Each individual of the group will maintain a chain that stores hash of the share along with the file ID.

**Workflow**

- Split the file into shares
- Add shares to IPFS
- Update the chain
- Retrieve on demand basis

**Split the file into shares**

- By applying the secret sharing scheme (1,3,5) [where file is divided into 5 shares among 3 is required to regenerate the file]
- One among the share is essential
  - ➢ Should not be viewed by anyone except the owner
  - ➢ Reveal on demand
- Other shares can be viewed by anyone

**Add shares to IPFS**

**Updation of chain**

- Each $X_i$ will update the chain with the file ID and IPFS hash of $S_i$

**Retrieve On demand basis**

- When some nodes want to recreate the file the shares need to recombined with essential share

**Queries:**

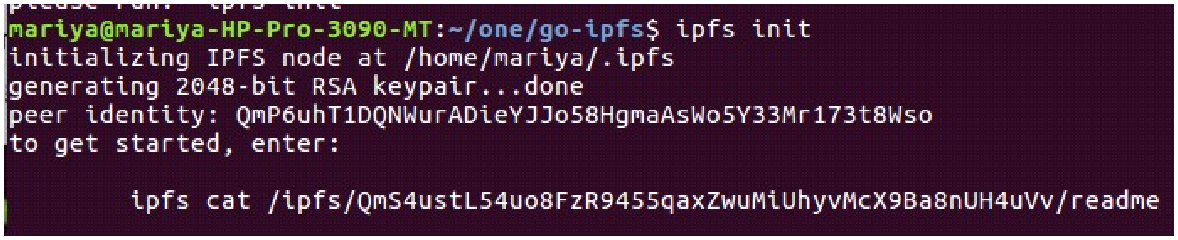
- Is the path traceable using DHT? ( as DHT stores the pointer to the node that stores digital object). If it is traceable, attack ( Content reveal) is possible
- When the node Pinned the digital objects, Unpinned the same, will the content be still available?(........because in IPFS the data lives forever)

**Work Done**

**Step 1:** Installed IPFS in two Systems (consider as node A and Node B) that were in same subnet (Intranet)

**Step 2:** Initiated Daemon – Viewed

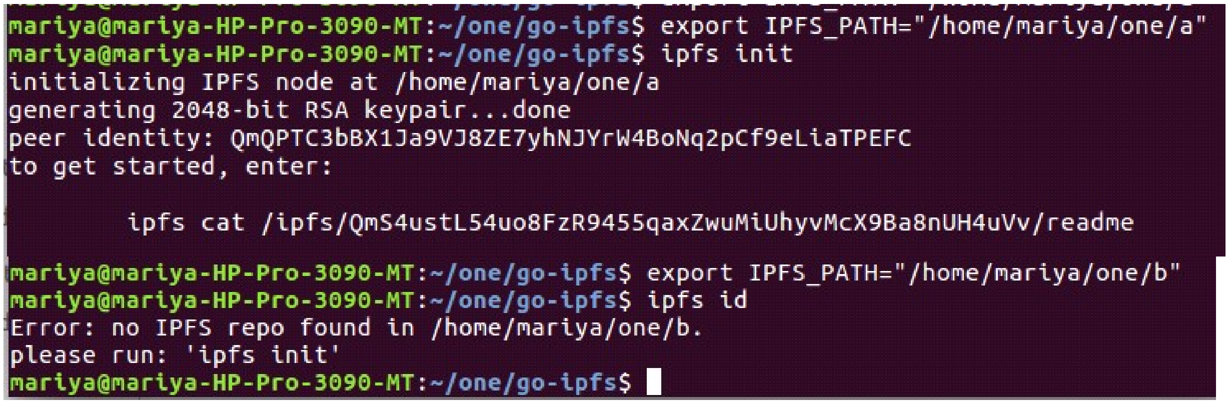
- Peer ID
- Public Key
- Private Key



```
mariya@mariya-HP-Pro-3090-MT:~/one/go-ipfs$ ipfs init
initializing IPFS node at /home/mariya/.ipfs
generating 2048-bit RSA keypair...done
peer identity: QmP6uhT1DQNWurADieYJJo58HgmaAsWo5Y33Mr173t8Wso
to get started, enter:

        ipfs cat /ipfs/QmS4ustL54uo8FzR9455qaxZwuMiUhyvMcX9Ba8nUH4uVv/readme
```

- Exported the IPFS to different path and viewed
- Modification Observed in above all 3 parameters

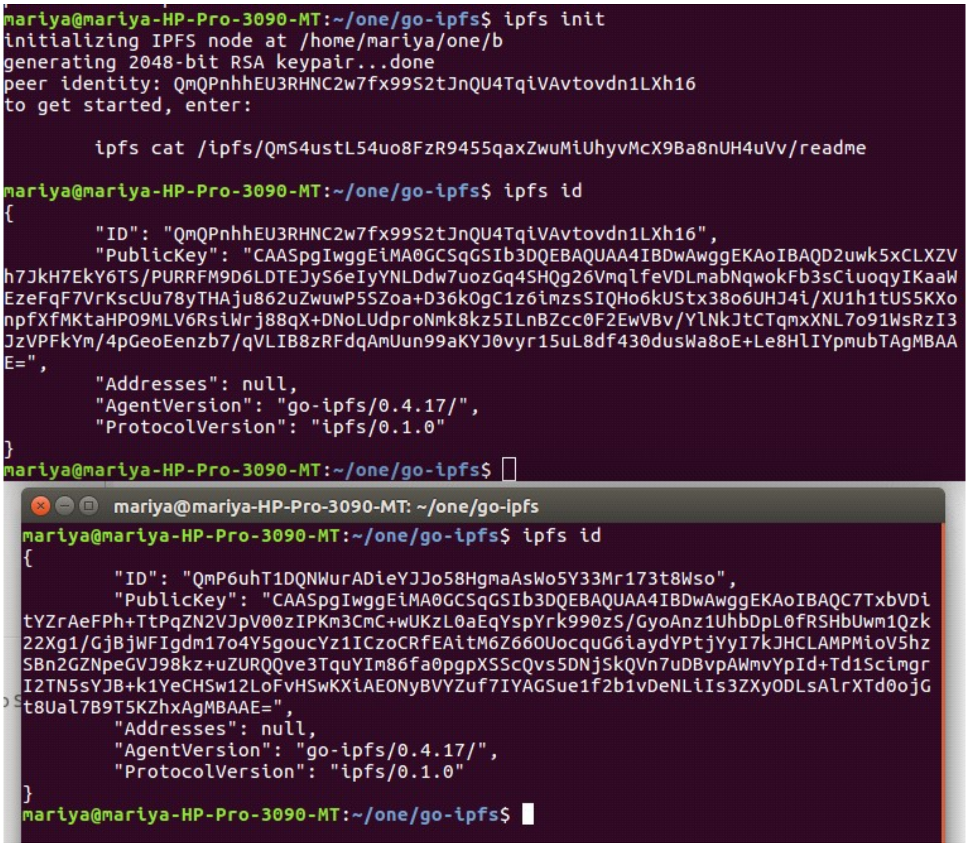


```
mariya@mariya-HP-Pro-3090-MT:~/one/go-ipfs$ export IPFS_PATH="/home/mariya/one/a"
mariya@mariya-HP-Pro-3090-MT:~/one/go-ipfs$ ipfs init
initializing IPFS node at /home/mariya/one/a
generating 2048-bit RSA keypair...done
peer identity: QmQPTC3bBX1Ja9VJ8ZE7yhNJYrW4BoNq2pCf9eLiaTPEFC
to get started, enter:

        ipfs cat /ipfs/QmS4ustL54uo8FzR9455qaxZwuMiUhyvMcX9Ba8nUH4uVv/readme

mariya@mariya-HP-Pro-3090-MT:~/one/go-ipfs$ export IPFS_PATH="/home/mariya/one/b"
mariya@mariya-HP-Pro-3090-MT:~/one/go-ipfs$ ipfs id
Error: no IPFS repo found in /home/mariya/one/b.
please run: 'ipfs init'
mariya@mariya-HP-Pro-3090-MT:~/one/go-ipfs$ 
```

- When a new terminal is opened and **IPFS id** is given it will display the **initial ID**



```
mariya@mariya-HP-Pro-3090-MT:~/one/go-ipfs$ ipfs init
initializing IPFS node at /home/mariya/one/b
generating 2048-bit RSA keypair...done
peer identity: QmQPnhhEU3RHNC2w7fx99S2tJnQU4TqiVAvtovdn1LXh16
to get started, enter:

        ipfs cat /ipfs/QmS4ustL54uo8FzR9455qaxZwuMiUhyvMcX9Ba8nUH4uVv/readme

mariya@mariya-HP-Pro-3090-MT:~/one/go-ipfs$ ipfs id
{
        "ID": "QmQPnhhEU3RHNC2w7fx99S2tJnQU4TqiVAvtovdn1LXh16",
        "PublicKey": "CAASpgIwggEiMA0GCSqGSIb3DQEBAQUAA4IBDwAwggEKAoIBAQD2uwk5xCLXZV
h7JkH7EkY6TS/PURRFM9D6LDTEJyS6eIyYNLDdw7uozGq4SHQg26VmqlfeVDLmabNqwokFb3sCiuoqyIKaaW
EzeFqF7VrKscUu78yTHAju862uZwuwP5SZoa+D36kOgC1z6imzsSIQHo6kUStx38o6UHJ4i/XU1h1tUS5KXo
npfXfMKtaHPO9MLV6RsiWrj88qX+DNoLUdproNmk8kz5ILnBZcc0F2EwVBv/YlNkJtCTqmxXNL7o91WsRzI3
JzVPFkYm/4pGeoEenzb7/qVLIB8zRFdqAmUun99aKYJ0vyr15uL8df430dusWa8oE+Le8HlIYpmubTAgMBAA
E=",
        "Addresses": null,
        "AgentVersion": "go-ipfs/0.4.17/",
        "ProtocolVersion": "ipfs/0.1.0"
}
mariya@mariya-HP-Pro-3090-MT:~/one/go-ipfs$
```

```
mariya@mariya-HP-Pro-3090-MT:~/one/go-ipfs$ ipfs id
{
        "ID": "QmP6uhT1DQNWurADieYJJo58HgmaAsWo5Y33Mr173t8Wso",
        "PublicKey": "CAASpgIwggEiMA0GCSqGSIb3DQEBAQUAA4IBDwAwggEKAoIBAQC7TxbVDi
tYZrAeFPh+TtPqZN2VJpV00zIPKm3CmC+wUKzL0aEqYspYrk990zS/GyoAnz1UhbDpL0fRSHbUwm1Qzk
22Xg1/GjBjWFIgdm17o4Y5goucYz1ICzoCRfEAitM6Z66OUocquG6iaydYPtjYyI7kJHCLAMPMioV5hz
SBn2GZNpeGVJ98kz+uZURQQve3TquYIm86fa0pgpXSScQvs5DNjSkQVn7uDBvpAWmvYpId+Td1Scimgr
I2TN5sYJB+k1YeCHSw12LoFvHSwKXiAEONyBVYZuf7IYAGSue1f2b1vDeNLiIs3ZXyODLsAlrXTd0ojG
t8Ual7B9T5KZhxAgMBAAE=",
        "Addresses": null,
        "AgentVersion": "go-ipfs/0.4.17/",
        "ProtocolVersion": "ipfs/0.1.0"
}
mariya@mariya-HP-Pro-3090-MT:~/one/go-ipfs$
```

**Query 1:** Is the peer ID is unique

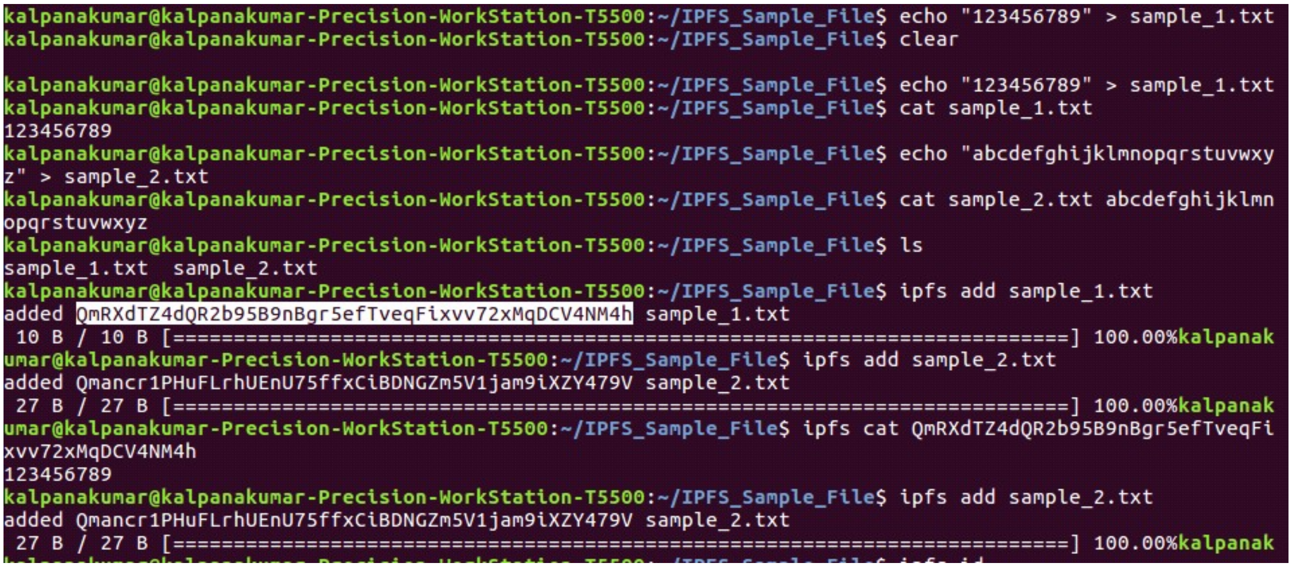
Yes, Peer ID is unique for the system/ Node. Though multiple export action performed finally when we tried to retrieve IPFS ID, the initial value is displayed ( peer id generated at the time of initial installation)

**Query 2:** Replace the config file and verify the peer ID is over written or not

**Step 3:** Added files to IPFS and viewed

•once a file is added, hash is generated and displayed

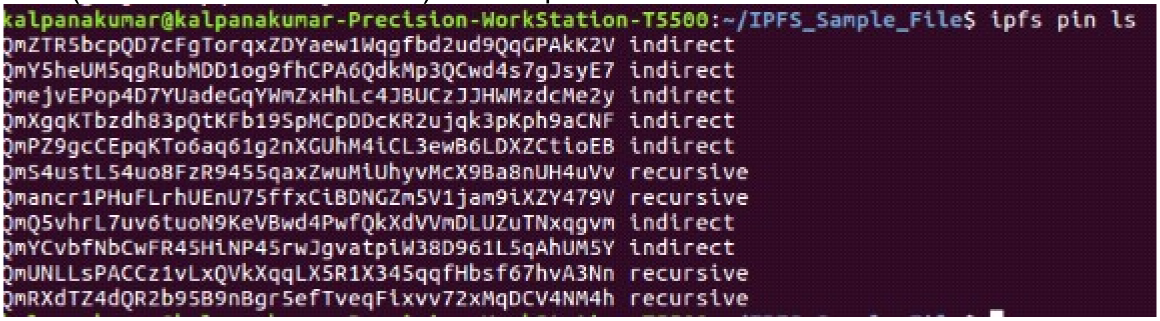
•Hash is used for retrieving



```
kalpanakumar@kalpanakumar-Precision-WorkStation-T5500:~/IPFS_Sample_File$ echo "123456789" > sample_1.txt
kalpanakumar@kalpanakumar-Precision-WorkStation-T5500:~/IPFS_Sample_File$ clear

kalpanakumar@kalpanakumar-Precision-WorkStation-T5500:~/IPFS_Sample_File$ echo "123456789" > sample_1.txt
kalpanakumar@kalpanakumar-Precision-WorkStation-T5500:~/IPFS_Sample_File$ cat sample_1.txt
123456789
kalpanakumar@kalpanakumar-Precision-WorkStation-T5500:~/IPFS_Sample_File$ echo "abcdefghijklmnopqrstuvwxy
z" > sample_2.txt
kalpanakumar@kalpanakumar-Precision-WorkStation-T5500:~/IPFS_Sample_File$ cat sample_2.txt abcdefghijklmn
opqrstuvwxyz
kalpanakumar@kalpanakumar-Precision-WorkStation-T5500:~/IPFS_Sample_File$ ls
sample_1.txt  sample_2.txt
kalpanakumar@kalpanakumar-Precision-WorkStation-T5500:~/IPFS_Sample_File$ ipfs add sample_1.txt
added QmRXdTZ4dQR2b95B9nBgr5efTveqFixvv72xMqDCV4NM4h sample_1.txt
 10 B / 10 B [===========================================================================] 100.00%kalpanak
umar@kalpanakumar-Precision-WorkStation-T5500:~/IPFS_Sample_File$ ipfs add sample_2.txt
added Qmancr1PHuFLrhUEnU75ffxCiBDNGZm5V1jam9iXZY479V sample_2.txt
 27 B / 27 B [===========================================================================] 100.00%kalpanak
umar@kalpanakumar-Precision-WorkStation-T5500:~/IPFS_Sample_File$ ipfs cat QmRXdTZ4dQR2b95B9nBgr5efTveqFi
xvv72xMqDCV4NM4h
123456789
kalpanakumar@kalpanakumar-Precision-WorkStation-T5500:~/IPFS_Sample_File$ ipfs add sample_2.txt
added Qmancr1PHuFLrhUEnU75ffxCiBDNGZm5V1jam9iXZY479V sample_2.txt
 27 B / 27 B [===========================================================================] 100.00%kalpanak
```

- Pin ( **recursive and indirect**) and Unpin the file



```
kalpanakumar@kalpanakumar-Precision-WorkStation-T5500:~/IPFS_Sample_File$ ipfs pin ls
QmZTR5bcpQD7cFgTorqxZDYaew1Wqgfbd2ud9QqGPAkK2V indirect
QmY5heUM5qgRubMDD1og9fhCPA6QdkMp3QCwd4s7gJsyE7 indirect
QmejvEPop4D7YUadeGqYWmZxHhLc4JBUCzJJHWMzdcMe2y indirect
QmXgqKTbzdh83pQtKFb19SpMCpDDcKR2ujqk3pKph9aCNF indirect
QmPZ9gcCEpqKTo6aq61g2nXGUhM4iCL3ewB6LDXZCtioEB indirect
QmS4ustL54uo8FzR9455qaxZwuMiUhyvMcX9Ba8nUH4uVv recursive
Qmancr1PHuFLrhUEnU75ffxCiBDNGZm5V1jam9iXZY479V recursive
QmQ5vhrL7uv6tuoN9KeVBwd4PwfQkXdVVmDLUZuTNxqgvm indirect
QmYCvbfNbCwFR45HiNP45rwJgvatpiW38D961L5qAhUM5Y indirect
QmUNLLsPACCz1vLxQVkXqqLX5R1X345qqfHbsf67hvA3Nn recursive
QmRXdTZ4dQR2b95B9nBgr5efTveqFixvv72xMqDCV4NM4h recursive
```

**Query 3:** When a node is down/ disconnected from network, will be able to get the content pinned by that node?

Yes, it is possible to retrieve the content