OUR TEAM

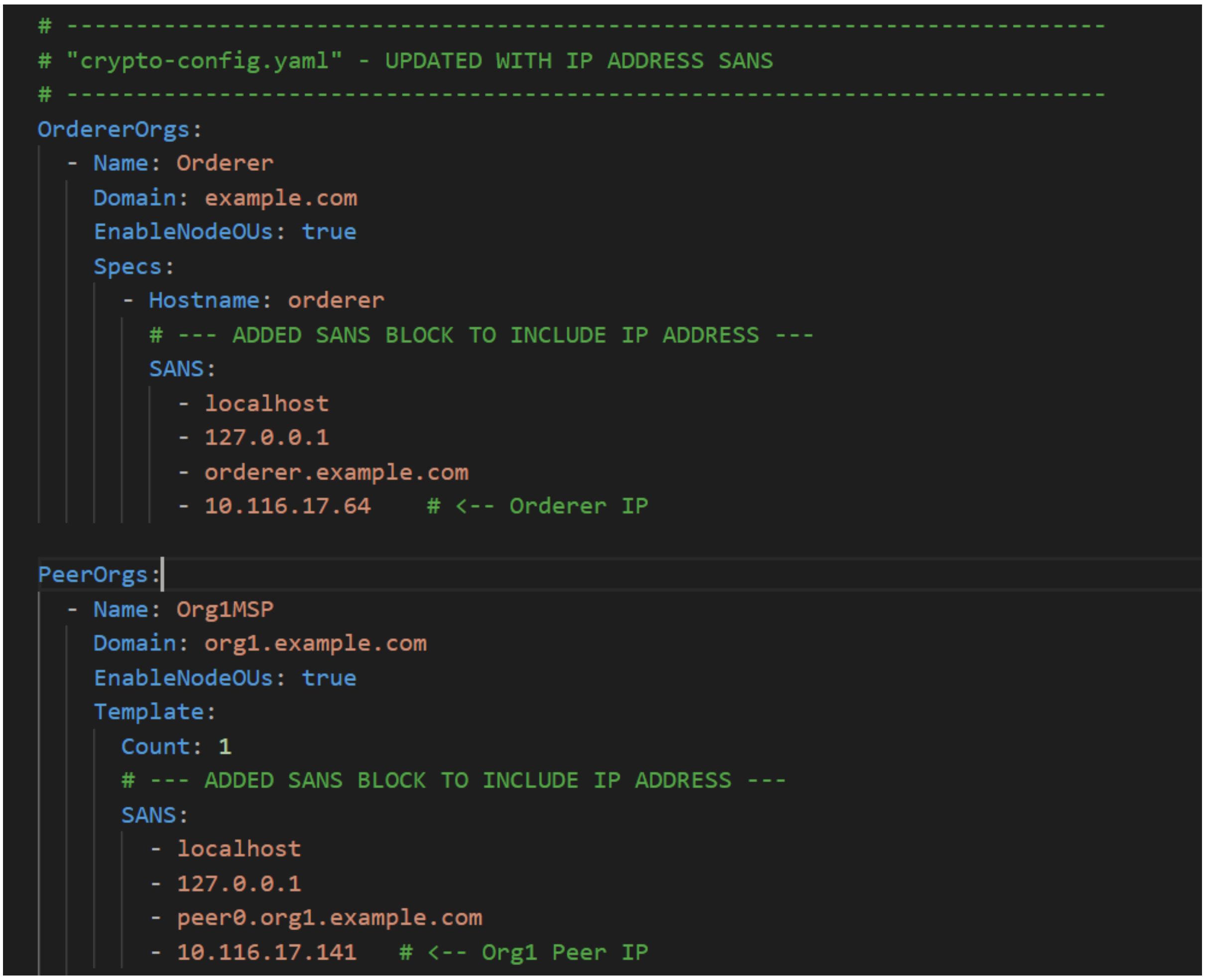
Eshant Gupta (Orderer-IP:10.116.17.64)

Aditya Singh Chandel (Org1-IP:10.116.17.141)

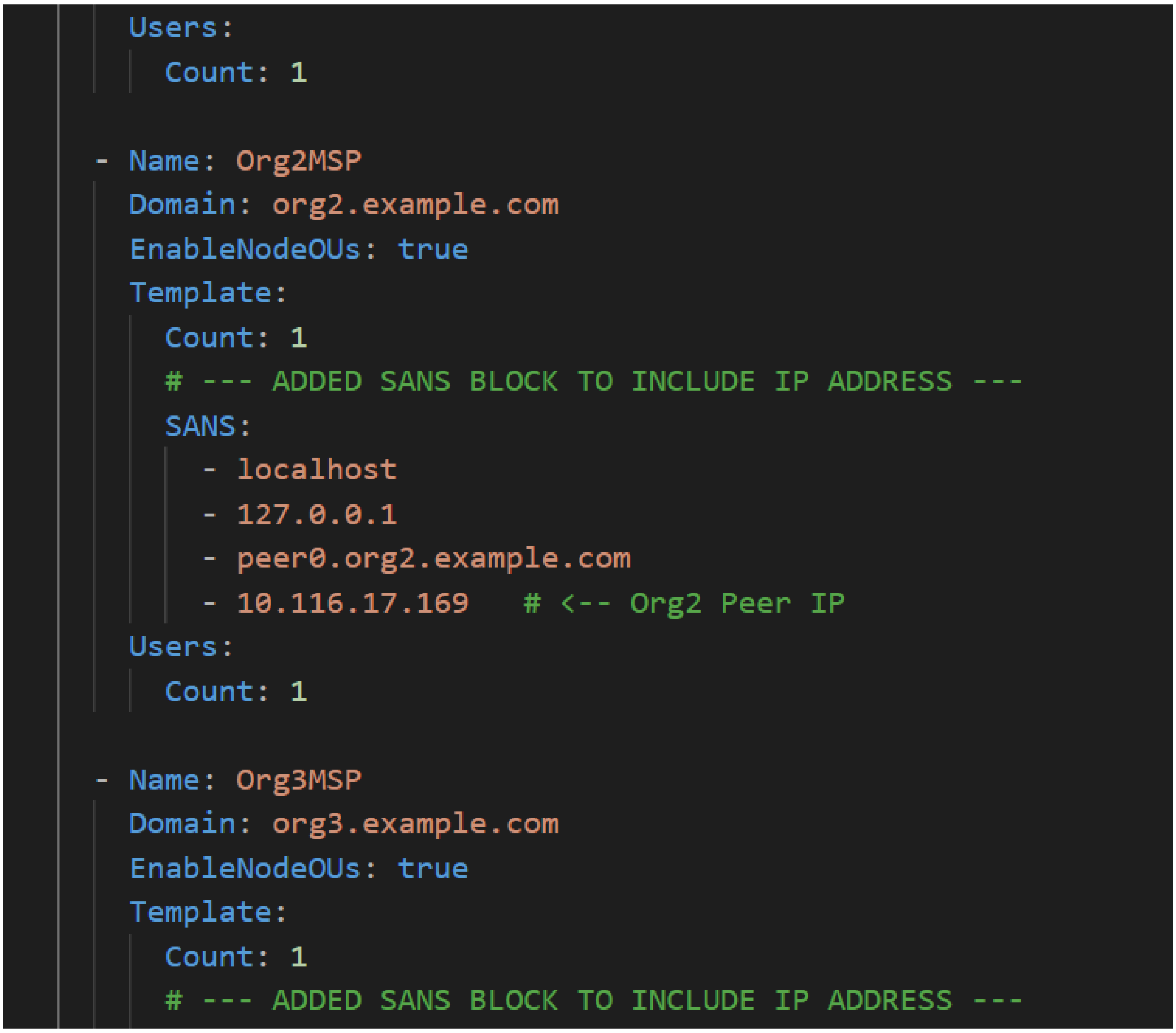
Shresth Sharma (Org2-IP: 10.116.17.169)

Arun Kumar Swami (Org3-IP: 10.116.17.26)

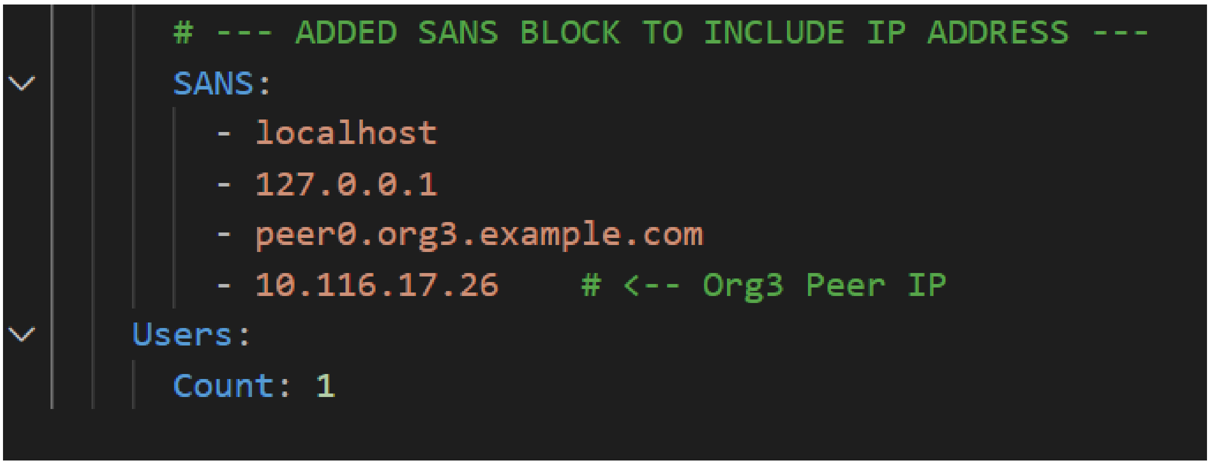
The Network Blueprint



```
# ---------------------------------------------------------------------------
# "crypto-config.yaml" - UPDATED WITH IP ADDRESS SANS
# ---------------------------------------------------------------------------
OrdererOrgs:
  - Name: Orderer
    Domain: example.com
    EnableNodeOUs: true
    Specs:
      - Hostname: orderer
        # --- ADDED SANS BLOCK TO INCLUDE IP ADDRESS ---
        SANS:
          - localhost
          - 127.0.0.1
          - orderer.example.com
          - 10.116.17.64    # <-- Orderer IP

PeerOrgs:
  - Name: Org1MSP
    Domain: org1.example.com
    EnableNodeOUs: true
    Template:
      Count: 1
      # --- ADDED SANS BLOCK TO INCLUDE IP ADDRESS ---
      SANS:
        - localhost
        - 127.0.0.1
        - peer0.org1.example.com
        - 10.116.17.141   # <-- Org1 Peer IP
```

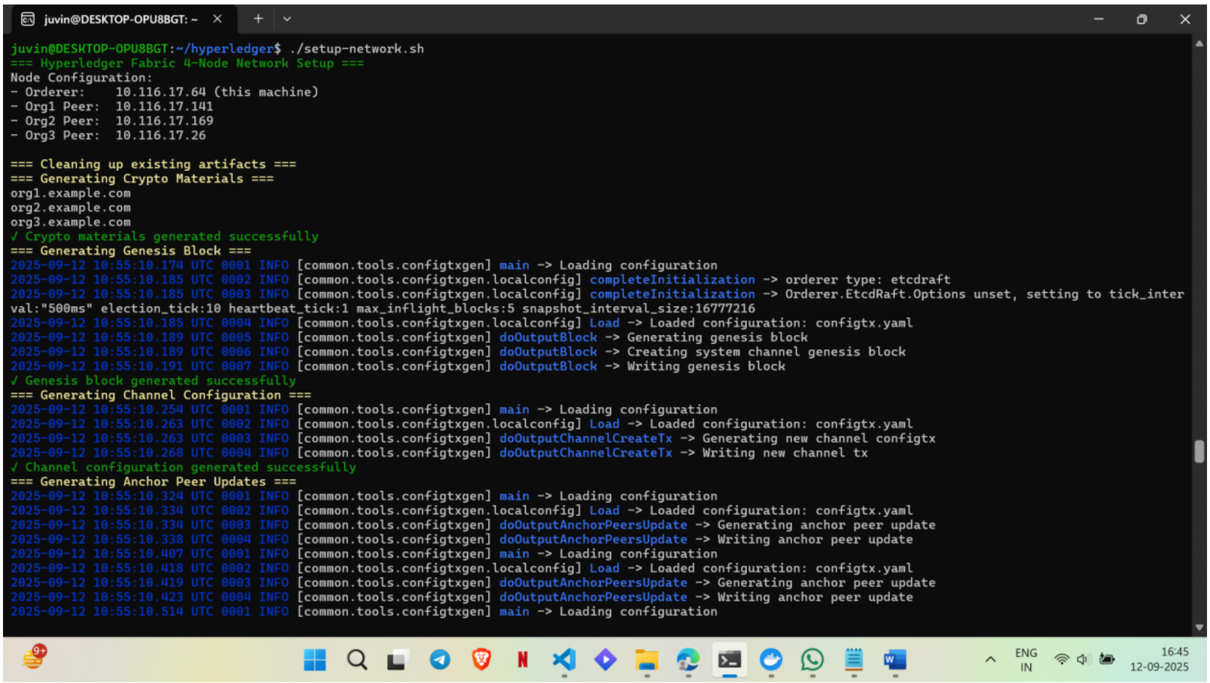


```
    Users:
      Count: 1

  - Name: Org2MSP
    Domain: org2.example.com
    EnableNodeOUs: true
    Template:
      Count: 1
      # --- ADDED SANS BLOCK TO INCLUDE IP ADDRESS ---
      SANS:
        - localhost
        - 127.0.0.1
        - peer0.org2.example.com
        - 10.116.17.169    # <-- Org2 Peer IP
    Users:
      Count: 1

  - Name: Org3MSP
    Domain: org3.example.com
    EnableNodeOUs: true
    Template:
      Count: 1
      # --- ADDED SANS BLOCK TO INCLUDE IP ADDRESS ---
```

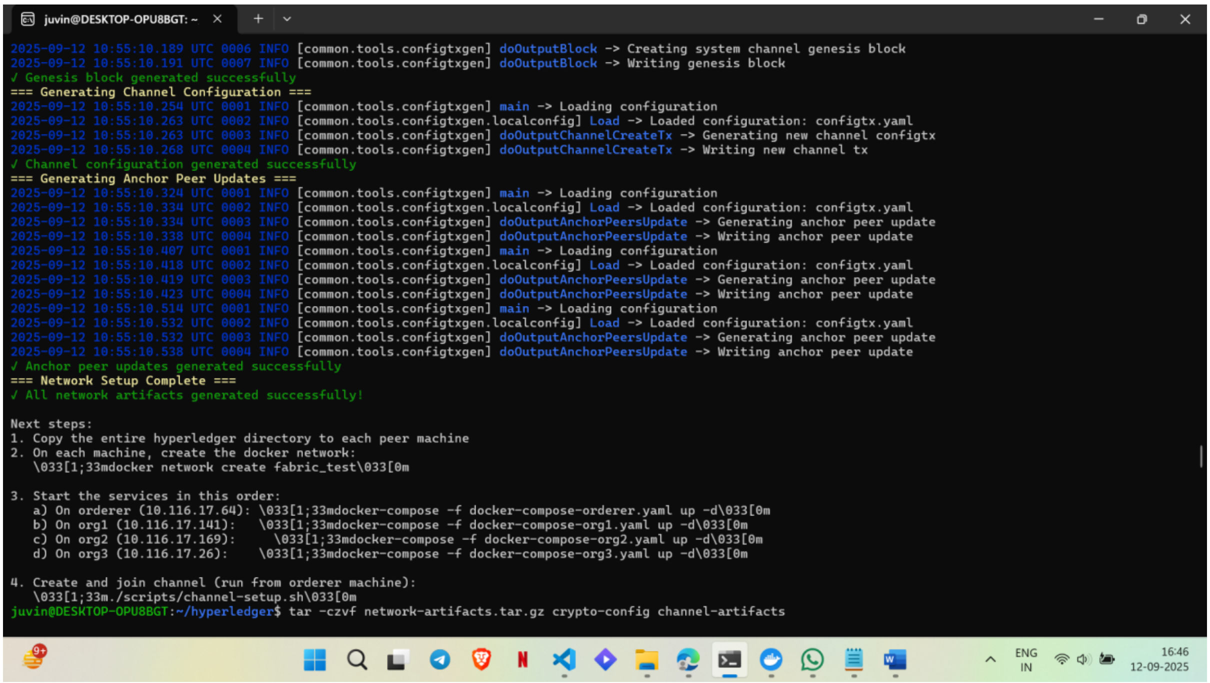


```
      # --- ADDED SANS BLOCK TO INCLUDE IP ADDRESS ---
      SANS:
        - localhost
        - 127.0.0.1
        - peer0.org3.example.com
        - 10.116.17.26     # <-- Org3 Peer IP
    Users:
      Count: 1
```

Generating Network Artifacts



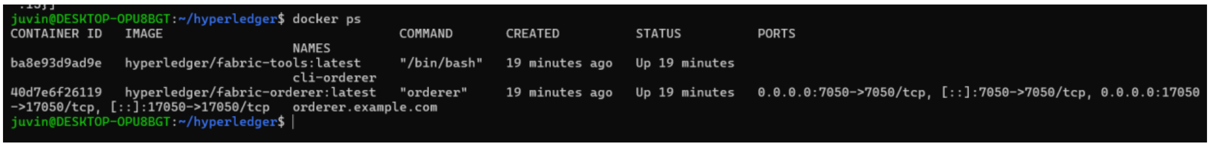
```
juvin@DESKTOP-OPU8BGT:~/hyperledger$ ./setup-network.sh
=== Hyperledger Fabric 4-Node Network Setup ===
Node Configuration:
- Orderer:    10.116.17.64 (this machine)
- Org1 Peer:  10.116.17.141
- Org2 Peer:  10.116.17.169
- Org3 Peer:  10.116.17.26

=== Cleaning up existing artifacts ===
=== Generating Crypto Materials ===
org1.example.com
org2.example.com
org3.example.com
✓ Crypto materials generated successfully
=== Generating Genesis Block ===
2025-09-12 10:55:10.174 UTC 0001 INFO [common.tools.configtxgen] main -> Loading configuration
2025-09-12 10:55:10.185 UTC 0002 INFO [common.tools.configtxgen.localconfig] completeInitialization -> orderer type: etcdraft
2025-09-12 10:55:10.185 UTC 0003 INFO [common.tools.configtxgen.localconfig] completeInitialization -> Orderer.EtcdRaft.Options unset, setting to tick_inter
val:"500ms" election_tick:10 heartbeat_tick:1 max_inflight_blocks:5 snapshot_interval_size:16777216
2025-09-12 10:55:10.185 UTC 0004 INFO [common.tools.configtxgen.localconfig] Load -> Loaded configuration: configtx.yaml
2025-09-12 10:55:10.189 UTC 0005 INFO [common.tools.configtxgen] doOutputBlock -> Generating genesis block
2025-09-12 10:55:10.189 UTC 0006 INFO [common.tools.configtxgen] doOutputBlock -> Creating system channel genesis block
2025-09-12 10:55:10.191 UTC 0007 INFO [common.tools.configtxgen] doOutputBlock -> Writing genesis block
✓ Genesis block generated successfully
=== Generating Channel Configuration ===
2025-09-12 10:55:10.254 UTC 0001 INFO [common.tools.configtxgen] main -> Loading configuration
2025-09-12 10:55:10.263 UTC 0002 INFO [common.tools.configtxgen.localconfig] Load -> Loaded configuration: configtx.yaml
2025-09-12 10:55:10.263 UTC 0003 INFO [common.tools.configtxgen] doOutputChannelCreateTx -> Generating new channel configtx
2025-09-12 10:55:10.268 UTC 0004 INFO [common.tools.configtxgen] doOutputChannelCreateTx -> Writing new channel tx
✓ Channel configuration generated successfully
=== Generating Anchor Peer Updates ===
2025-09-12 10:55:10.324 UTC 0001 INFO [common.tools.configtxgen] main -> Loading configuration
2025-09-12 10:55:10.334 UTC 0002 INFO [common.tools.configtxgen.localconfig] Load -> Loaded configuration: configtx.yaml
2025-09-12 10:55:10.334 UTC 0003 INFO [common.tools.configtxgen] doOutputAnchorPeersUpdate -> Generating anchor peer update
2025-09-12 10:55:10.338 UTC 0004 INFO [common.tools.configtxgen] doOutputAnchorPeersUpdate -> Writing anchor peer update
2025-09-12 10:55:10.407 UTC 0001 INFO [common.tools.configtxgen] main -> Loading configuration
2025-09-12 10:55:10.418 UTC 0002 INFO [common.tools.configtxgen.localconfig] Load -> Loaded configuration: configtx.yaml
2025-09-12 10:55:10.419 UTC 0003 INFO [common.tools.configtxgen] doOutputAnchorPeersUpdate -> Generating anchor peer update
2025-09-12 10:55:10.423 UTC 0004 INFO [common.tools.configtxgen] doOutputAnchorPeersUpdate -> Writing anchor peer update
2025-09-12 10:55:10.514 UTC 0001 INFO [common.tools.configtxgen] main -> Loading configuration
```



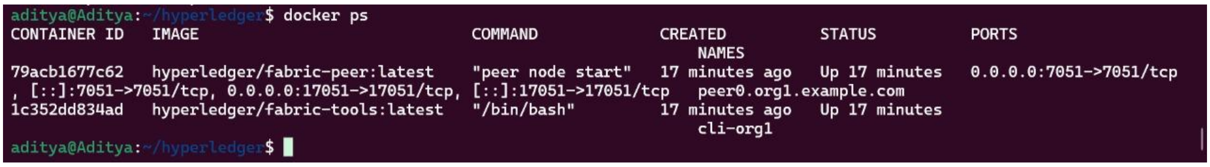
```
2025-09-12 10:55:10.189 UTC 0006 INFO [common.tools.configtxgen] doOutputBlock -> Creating system channel genesis block
2025-09-12 10:55:10.191 UTC 0007 INFO [common.tools.configtxgen] doOutputBlock -> Writing genesis block
✓ Genesis block generated successfully
=== Generating Channel Configuration ===
2025-09-12 10:55:10.254 UTC 0001 INFO [common.tools.configtxgen] main -> Loading configuration
2025-09-12 10:55:10.263 UTC 0002 INFO [common.tools.configtxgen.localconfig] Load -> Loaded configuration: configtx.yaml
2025-09-12 10:55:10.263 UTC 0003 INFO [common.tools.configtxgen] doOutputChannelCreateTx -> Generating new channel configtx
2025-09-12 10:55:10.268 UTC 0004 INFO [common.tools.configtxgen] doOutputChannelCreateTx -> Writing new channel tx
✓ Channel configuration generated successfully
=== Generating Anchor Peer Updates ===
2025-09-12 10:55:10.324 UTC 0001 INFO [common.tools.configtxgen] main -> Loading configuration
2025-09-12 10:55:10.334 UTC 0002 INFO [common.tools.configtxgen.localconfig] Load -> Loaded configuration: configtx.yaml
2025-09-12 10:55:10.334 UTC 0003 INFO [common.tools.configtxgen] doOutputAnchorPeersUpdate -> Generating anchor peer update
2025-09-12 10:55:10.338 UTC 0004 INFO [common.tools.configtxgen] doOutputAnchorPeersUpdate -> Writing anchor peer update
2025-09-12 10:55:10.407 UTC 0001 INFO [common.tools.configtxgen] main -> Loading configuration
2025-09-12 10:55:10.418 UTC 0002 INFO [common.tools.configtxgen.localconfig] Load -> Loaded configuration: configtx.yaml
2025-09-12 10:55:10.419 UTC 0003 INFO [common.tools.configtxgen] doOutputAnchorPeersUpdate -> Generating anchor peer update
2025-09-12 10:55:10.423 UTC 0004 INFO [common.tools.configtxgen] doOutputAnchorPeersUpdate -> Writing anchor peer update
2025-09-12 10:55:10.514 UTC 0001 INFO [common.tools.configtxgen] main -> Loading configuration
2025-09-12 10:55:10.532 UTC 0002 INFO [common.tools.configtxgen.localconfig] Load -> Loaded configuration: configtx.yaml
2025-09-12 10:55:10.532 UTC 0003 INFO [common.tools.configtxgen] doOutputAnchorPeersUpdate -> Generating anchor peer update
2025-09-12 10:55:10.538 UTC 0004 INFO [common.tools.configtxgen] doOutputAnchorPeersUpdate -> Writing anchor peer update
✓ Anchor peer updates generated successfully
=== Network Setup Complete ===
✓ All network artifacts generated successfully!

Next steps:
1. Copy the entire hyperledger directory to each peer machine
2. On each machine, create the docker network:
   \033[1;33mdocker network create fabric_test\033[0m

3. Start the services in this order:
   a) On orderer (10.116.17.64): \033[1;33mdocker-compose -f docker-compose-orderer.yaml up -d\033[0m
   b) On org1 (10.116.17.141):   \033[1;33mdocker-compose -f docker-compose-org1.yaml up -d\033[0m
   c) On org2 (10.116.17.169):     \033[1;33mdocker-compose -f docker-compose-org2.yaml up -d\033[0m
   d) On org3 (10.116.17.26):    \033[1;33mdocker-compose -f docker-compose-org3.yaml up -d\033[0m

4. Create and join channel (run from orderer machine):
   \033[1;33m./scripts/channel-setup.sh\033[0m
juvin@DESKTOP-OPU8BGT:~/hyperledger$ tar -czvf network-artifacts.tar.gz crypto-config channel-artifacts
```

The Distributed Network is Live

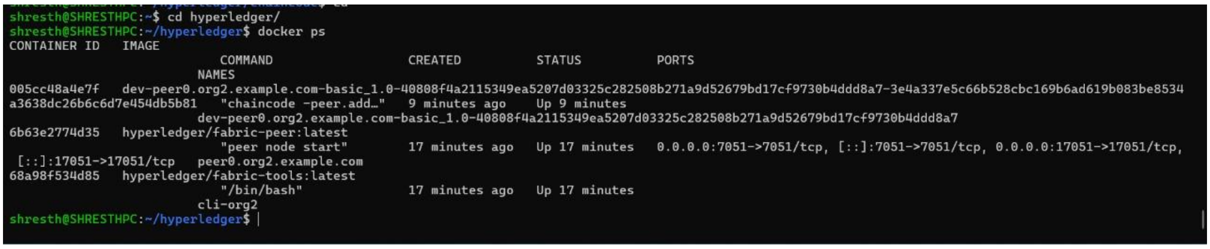
Our Docker Containers



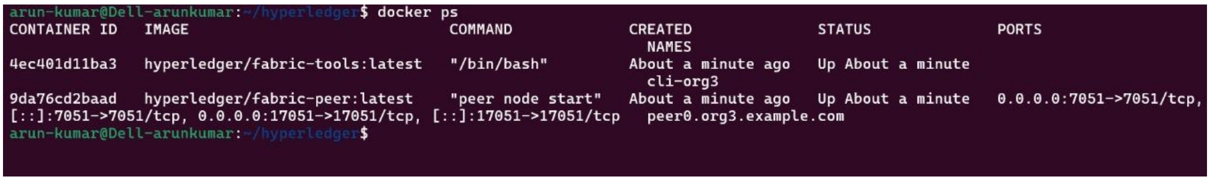
```
juvin@DESKTOP-OPU8BGT:~/hyperledger$ docker ps
CONTAINER ID   IMAGE                              COMMAND        CREATED          STATUS          PORTS
                                   NAMES
ba8e93d9ad9e   hyperledger/fabric-tools:latest     "/bin/bash"    19 minutes ago   Up 19 minutes
                                   cli-orderer
40d7e6f26119   hyperledger/fabric-orderer:latest   "orderer"      19 minutes ago   Up 19 minutes   0.0.0.0:7050->7050/tcp, [::]:7050->7050/tcp, 0.0.0.0:17050
->17050/tcp, [::]:17050->17050/tcp   orderer.example.com
juvin@DESKTOP-OPU8BGT:~/hyperledger$ |
```



```
aditya@Aditya:~/hyperledger$ docker ps
CONTAINER ID   IMAGE                             COMMAND             CREATED          STATUS          PORTS
                                                                        NAMES
79acb1677c62   hyperledger/fabric-peer:latest    "peer node start"   17 minutes ago   Up 17 minutes   0.0.0.0:7051->7051/tcp
, [::]:7051->7051/tcp, 0.0.0.0:17051->17051/tcp, [::]:17051->17051/tcp   peer0.org1.example.com
1c352dd834ad   hyperledger/fabric-tools:latest   "/bin/bash"         17 minutes ago   Up 17 minutes
                                                                        cli-org1
aditya@Aditya:~/hyperledger$ █
```

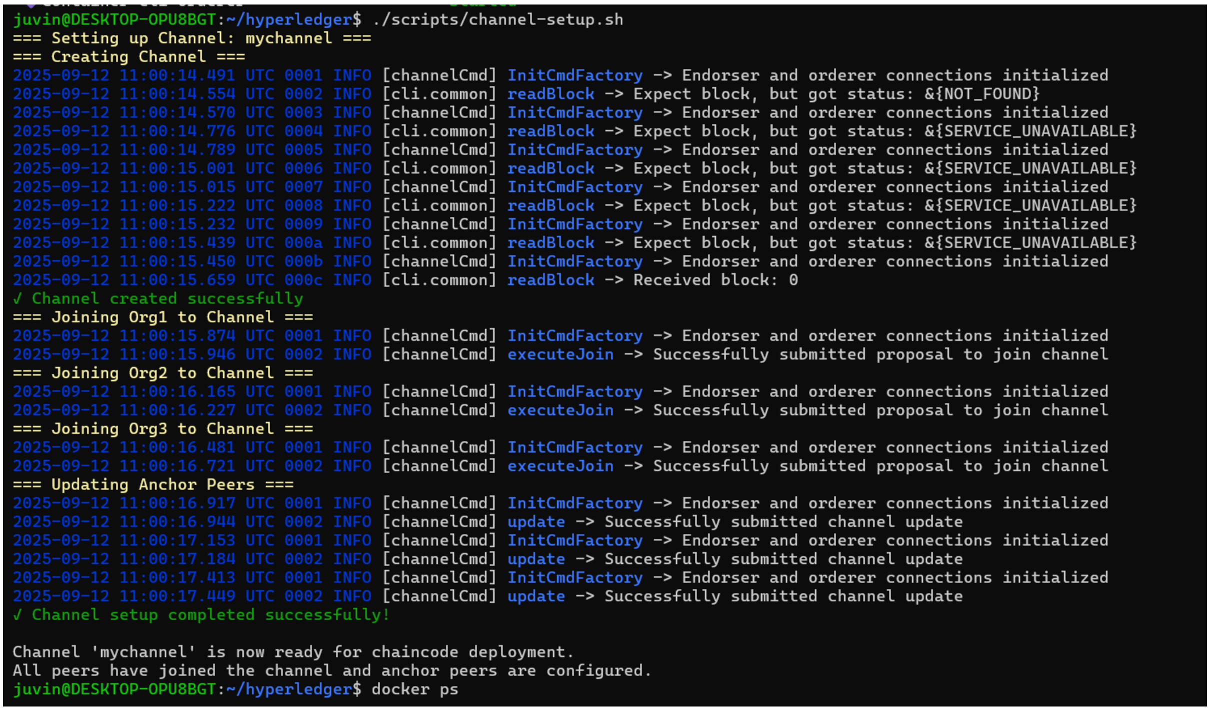


```
shresth@SHRESTHPC:~$ cd hyperledger/
shresth@SHRESTHPC:~/hyperledger$ docker ps
CONTAINER ID   IMAGE
                              COMMAND                    CREATED          STATUS          PORTS
                         NAMES
005cc48a4e7f   dev-peer0.org2.example.com-basic_1.0-40808f4a2115349ea5207d03325c282508b271a9d52679bd17cf9730b4ddd8a7-3e4a337e5c66b528cbc169b6ad619b083be8534
a3638dc26b6c6d7e454db5b81   "chaincode -peer.add…"   9 minutes ago    Up 9 minutes
                         dev-peer0.org2.example.com-basic_1.0-40808f4a2115349ea5207d03325c282508b271a9d52679bd17cf9730b4ddd8a7
6b63e2774d35   hyperledger/fabric-peer:latest
                              "peer node start"          17 minutes ago   Up 17 minutes   0.0.0.0:7051->7051/tcp, [::]:7051->7051/tcp, 0.0.0.0:17051->17051/tcp,
 [::]:17051->17051/tcp   peer0.org2.example.com
68a98f534d85   hyperledger/fabric-tools:latest
                              "/bin/bash"                17 minutes ago   Up 17 minutes
                         cli-org2
shresth@SHRESTHPC:~/hyperledger$ |
```



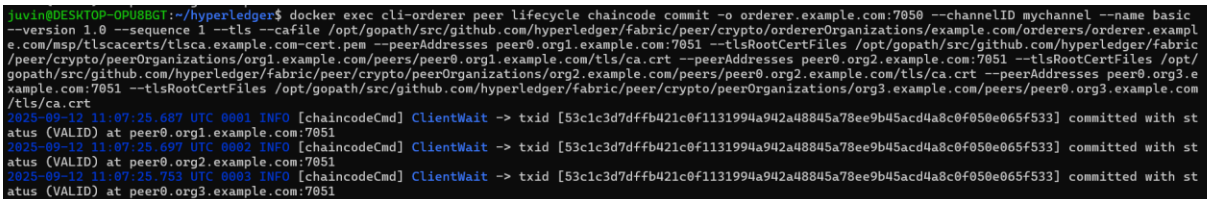
```
arun-kumar@Dell-arunkumar:~/hyperledger$ docker ps
CONTAINER ID   IMAGE                             COMMAND             CREATED              STATUS                PORTS
                                                                       NAMES
4ec401d11ba3   hyperledger/fabric-tools:latest   "/bin/bash"         About a minute ago   Up About a minute
                                                                       cli-org3
9da76cd2baad   hyperledger/fabric-peer:latest    "peer node start"   About a minute ago   Up About a minute   0.0.0.0:7051->7051/tcp,
[::]:7051->7051/tcp, 0.0.0.0:17051->17051/tcp, [::]:17051->17051/tcp   peer0.org3.example.com
arun-kumar@Dell-arunkumar:~/hyperledger$
```

The Channel is Ready



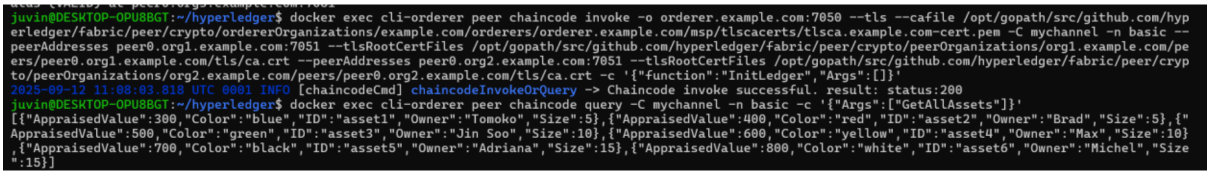
```
juvin@DESKTOP-OPU8BGT:~/hyperledger$ ./scripts/channel-setup.sh
=== Setting up Channel: mychannel ===
=== Creating Channel ===
2025-09-12 11:00:14.491 UTC 0001 INFO [channelCmd] InitCmdFactory -> Endorser and orderer connections initialized
2025-09-12 11:00:14.554 UTC 0002 INFO [cli.common] readBlock -> Expect block, but got status: &{NOT_FOUND}
2025-09-12 11:00:14.570 UTC 0003 INFO [channelCmd] InitCmdFactory -> Endorser and orderer connections initialized
2025-09-12 11:00:14.776 UTC 0004 INFO [cli.common] readBlock -> Expect block, but got status: &{SERVICE_UNAVAILABLE}
2025-09-12 11:00:14.789 UTC 0005 INFO [channelCmd] InitCmdFactory -> Endorser and orderer connections initialized
2025-09-12 11:00:15.001 UTC 0006 INFO [cli.common] readBlock -> Expect block, but got status: &{SERVICE_UNAVAILABLE}
2025-09-12 11:00:15.015 UTC 0007 INFO [channelCmd] InitCmdFactory -> Endorser and orderer connections initialized
2025-09-12 11:00:15.222 UTC 0008 INFO [cli.common] readBlock -> Expect block, but got status: &{SERVICE_UNAVAILABLE}
2025-09-12 11:00:15.232 UTC 0009 INFO [channelCmd] InitCmdFactory -> Endorser and orderer connections initialized
2025-09-12 11:00:15.439 UTC 000a INFO [cli.common] readBlock -> Expect block, but got status: &{SERVICE_UNAVAILABLE}
2025-09-12 11:00:15.450 UTC 000b INFO [channelCmd] InitCmdFactory -> Endorser and orderer connections initialized
2025-09-12 11:00:15.659 UTC 000c INFO [cli.common] readBlock -> Received block: 0
✓ Channel created successfully
=== Joining Org1 to Channel ===
2025-09-12 11:00:15.874 UTC 0001 INFO [channelCmd] InitCmdFactory -> Endorser and orderer connections initialized
2025-09-12 11:00:15.946 UTC 0002 INFO [channelCmd] executeJoin -> Successfully submitted proposal to join channel
=== Joining Org2 to Channel ===
2025-09-12 11:00:16.165 UTC 0001 INFO [channelCmd] InitCmdFactory -> Endorser and orderer connections initialized
2025-09-12 11:00:16.227 UTC 0002 INFO [channelCmd] executeJoin -> Successfully submitted proposal to join channel
=== Joining Org3 to Channel ===
2025-09-12 11:00:16.481 UTC 0001 INFO [channelCmd] InitCmdFactory -> Endorser and orderer connections initialized
2025-09-12 11:00:16.721 UTC 0002 INFO [channelCmd] executeJoin -> Successfully submitted proposal to join channel
=== Updating Anchor Peers ===
2025-09-12 11:00:16.917 UTC 0001 INFO [channelCmd] InitCmdFactory -> Endorser and orderer connections initialized
2025-09-12 11:00:16.944 UTC 0002 INFO [channelCmd] update -> Successfully submitted channel update
2025-09-12 11:00:17.153 UTC 0001 INFO [channelCmd] InitCmdFactory -> Endorser and orderer connections initialized
2025-09-12 11:00:17.184 UTC 0002 INFO [channelCmd] update -> Successfully submitted channel update
2025-09-12 11:00:17.413 UTC 0001 INFO [channelCmd] InitCmdFactory -> Endorser and orderer connections initialized
2025-09-12 11:00:17.449 UTC 0002 INFO [channelCmd] update -> Successfully submitted channel update
✓ Channel setup completed successfully!

Channel 'mychannel' is now ready for chaincode deployment.
All peers have joined the channel and anchor peers are configured.
juvin@DESKTOP-OPU8BGT:~/hyperledger$ docker ps
```

Smart Contract Deployed



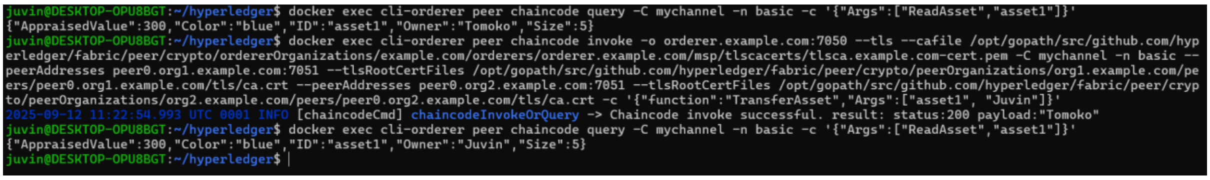
```
juvin@DESKTOP-OPU8BGT:~/hyperledger$ docker exec cli-orderer peer lifecycle chaincode commit -o orderer.example.com:7050 --channelID mychannel --name basic
--version 1.0 --sequence 1 --tls --cafile /opt/gopath/src/github.com/hyperledger/fabric/peer/crypto/ordererOrganizations/example.com/orderers/orderer.exampl
e.com/msp/tlscacerts/tlsca.example.com-cert.pem --peerAddresses peer0.org1.example.com:7051 --tlsRootCertFiles /opt/gopath/src/github.com/hyperledger/fabric
/peer/crypto/peerOrganizations/org1.example.com/peers/peer0.org1.example.com/tls/ca.crt --peerAddresses peer0.org2.example.com:7051 --tlsRootCertFiles /opt/
gopath/src/github.com/hyperledger/fabric/peer/crypto/peerOrganizations/org2.example.com/peers/peer0.org2.example.com/tls/ca.crt --peerAddresses peer0.org3.e
xample.com:7051 --tlsRootCertFiles /opt/gopath/src/github.com/hyperledger/fabric/peer/crypto/peerOrganizations/org3.example.com/peers/peer0.org3.example.com
/tls/ca.crt
2025-09-12 11:07:25.687 UTC 0001 INFO [chaincodeCmd] ClientWait -> txid [53c1c3d7dffb421c0f1131994a942a48845a78ee9b45acd4a8c0f050e065f533] committed with st
atus (VALID) at peer0.org1.example.com:7051
2025-09-12 11:07:25.697 UTC 0002 INFO [chaincodeCmd] ClientWait -> txid [53c1c3d7dffb421c0f1131994a942a48845a78ee9b45acd4a8c0f050e065f533] committed with st
atus (VALID) at peer0.org2.example.com:7051
2025-09-12 11:07:25.753 UTC 0003 INFO [chaincodeCmd] ClientWait -> txid [53c1c3d7dffb421c0f1131994a942a48845a78ee9b45acd4a8c0f050e065f533] committed with st
atus (VALID) at peer0.org3.example.com:7051
```

The Final Proof of a Working Ledger



```
juvin@DESKTOP-OPU8BGT:~/hyperledger$ docker exec cli-orderer peer chaincode invoke -o orderer.example.com:7050 --tls --cafile /opt/gopath/src/github.com/hyp
erledger/fabric/peer/crypto/ordererOrganizations/example.com/orderers/orderer.example.com/msp/tlscacerts/tlsca.example.com-cert.pem -C mychannel -n basic --
peerAddresses peer0.org1.example.com:7051 --tlsRootCertFiles /opt/gopath/src/github.com/hyperledger/fabric/peer/crypto/peerOrganizations/org1.example.com/pe
ers/peer0.org1.example.com/tls/ca.crt --peerAddresses peer0.org2.example.com:7051 --tlsRootCertFiles /opt/gopath/src/github.com/hyperledger/fabric/peer/cryp
to/peerOrganizations/org2.example.com/peers/peer0.org2.example.com/tls/ca.crt -c '{"function":"InitLedger","Args":[]}'
2025-09-12 11:08:03.818 UTC 0001 INFO [chaincodeCmd] chaincodeInvokeOrQuery -> Chaincode invoke successful. result: status:200
juvin@DESKTOP-OPU8BGT:~/hyperledger$ docker exec cli-orderer peer chaincode query -C mychannel -n basic -c '{"Args":["GetAllAssets"]}'
[{"AppraisedValue":300,"Color":"blue","ID":"asset1","Owner":"Tomoko","Size":5},{"AppraisedValue":400,"Color":"red","ID":"asset2","Owner":"Brad","Size":5},{"
AppraisedValue":500,"Color":"green","ID":"asset3","Owner":"Jin Soo","Size":10},{"AppraisedValue":600,"Color":"yellow","ID":"asset4","Owner":"Max","Size":10}
,{"AppraisedValue":700,"Color":"black","ID":"asset5","Owner":"Adriana","Size":15},{"AppraisedValue":800,"Color":"white","ID":"asset6","Owner":"Michel","Size
":15}]
```

Demonstrating an Asset Transfer on the Ledger



```
juvin@DESKTOP-OPU8BGT:~/hyperledger$ docker exec cli-orderer peer chaincode query -C mychannel -n basic -c '{"Args":["ReadAsset","asset1"]}'
{"AppraisedValue":300,"Color":"blue","ID":"asset1","Owner":"Tomoko","Size":5}
juvin@DESKTOP-OPU8BGT:~/hyperledger$ docker exec cli-orderer peer chaincode invoke -o orderer.example.com:7050 --tls --cafile /opt/gopath/src/github.com/hyp
erledger/fabric/peer/crypto/ordererOrganizations/example.com/orderers/orderer.example.com/msp/tlscacerts/tlsca.example.com-cert.pem -C mychannel -n basic --
peerAddresses peer0.org1.example.com:7051 --tlsRootCertFiles /opt/gopath/src/github.com/hyperledger/fabric/peer/crypto/peerOrganizations/org1.example.com/pe
ers/peer0.org1.example.com/tls/ca.crt --peerAddresses peer0.org2.example.com:7051 --tlsRootCertFiles /opt/gopath/src/github.com/hyperledger/fabric/peer/cryp
to/peerOrganizations/org2.example.com/peers/peer0.org2.example.com/tls/ca.crt -c '{"function":"TransferAsset","Args":["asset1", "Juvin"]}'
2025-09-12 11:22:54.993 UTC 0001 INFO [chaincodeCmd] chaincodeInvokeOrQuery -> Chaincode invoke successful. result: status:200 payload:"Tomoko"
juvin@DESKTOP-OPU8BGT:~/hyperledger$ docker exec cli-orderer peer chaincode query -C mychannel -n basic -c '{"Args":["ReadAsset","asset1"]}'
{"AppraisedValue":300,"Color":"blue","ID":"asset1","Owner":"Juvin","Size":5}
juvin@DESKTOP-OPU8BGT:~/hyperledger$
```