



HYPERLEDGER
FABRIC

What is Hyperledger Fabric?

- Open source
- Linux Foundation
 - Blockchain
- Customizable



What is Blockchain?

- Peer-to-peer
- Distributed ledger
- Consensus protocol



Concepts

- Identities
- Membership Service Provider (MSP)
 - Policies
 - Peers
 - Ledgers
- Ordering Service
- Smart Contracts and Chaincode
 - Channels



Identities

- Agents
 - Peers, Orderers, Applications, Administrators
- Different roles, different access



Membership Service Provider (MSP)

- Permissions
- Define roles



Policies

- Define consensus protocols



Peers

- Host ledgers
- Host smart contracts/chaincode
 - Belong to organization



Ledgers

- Record of transactions
 - Immutable
 - World State
 - Blockchain



Ordering Service

- Ordering of transactions



Smart Contracts Chaincode

- Enforce consensus policies
 - Chaincodes package smart contracts
 - Update ledger states



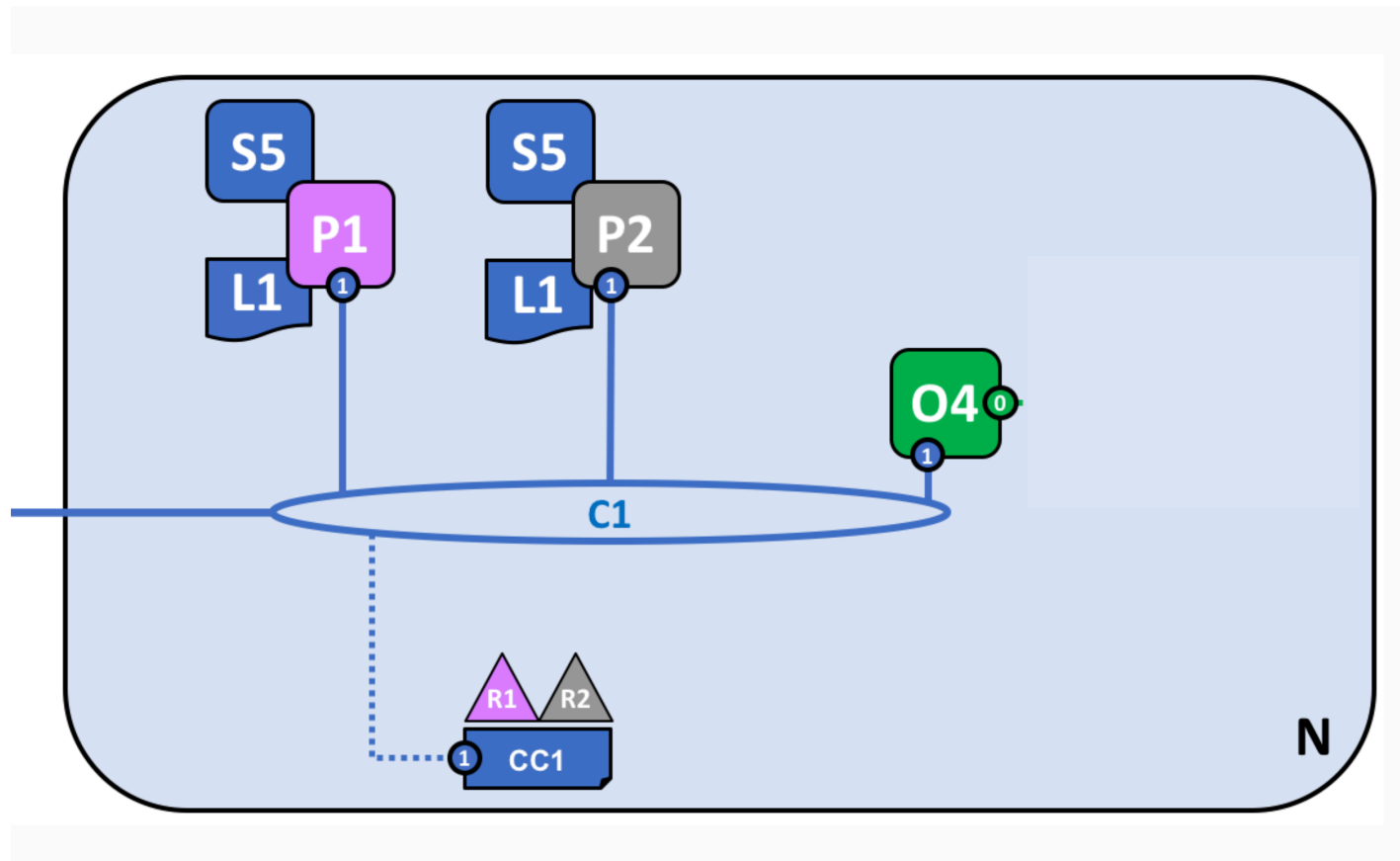
Channels

- Organizations can participate in multiple blockchain networks

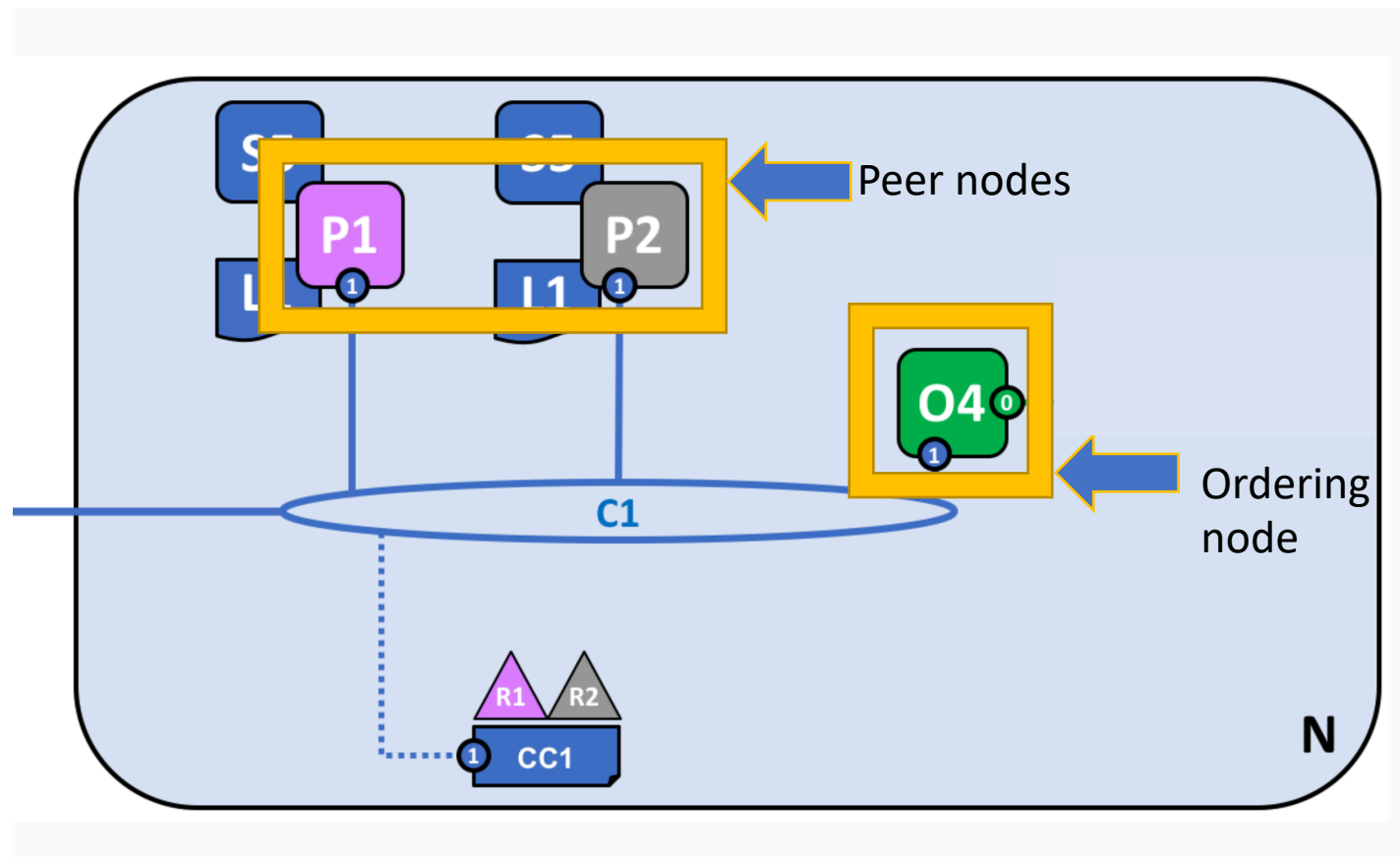




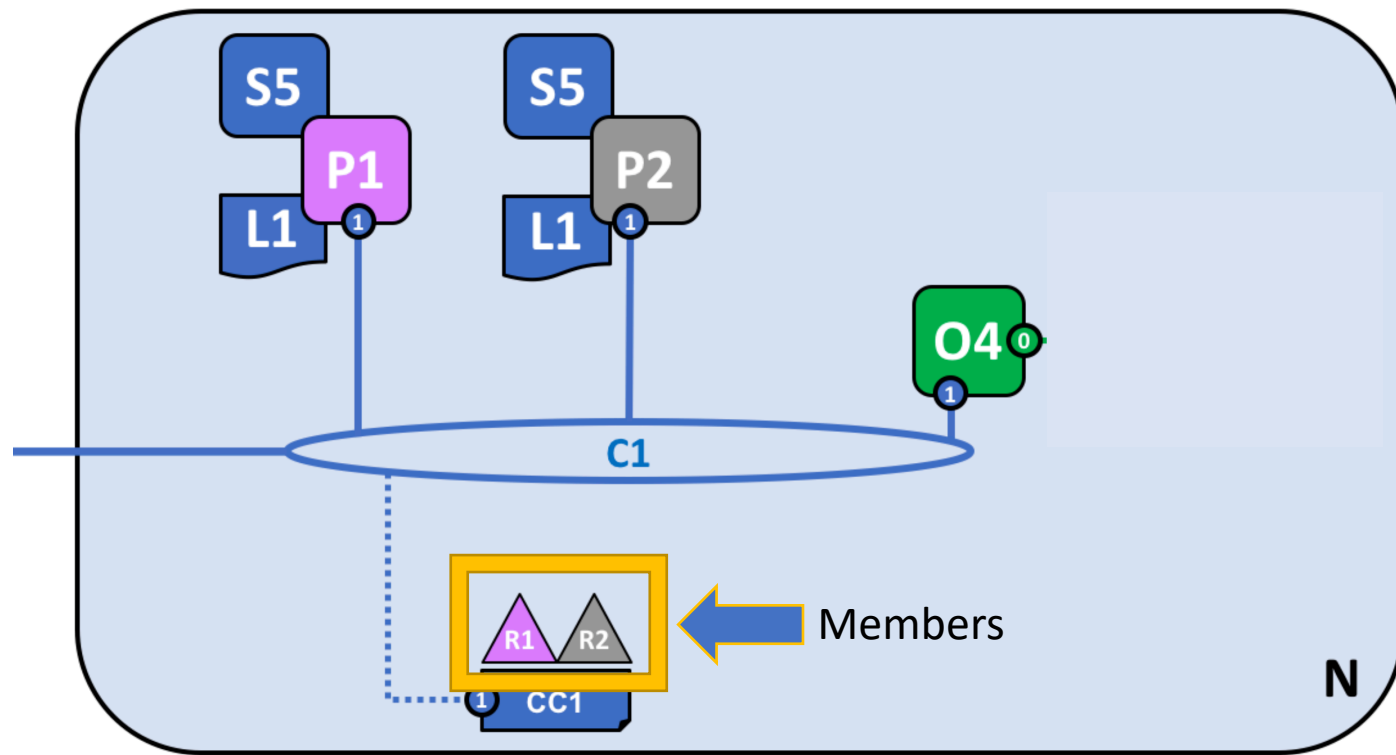
Example network



Example network

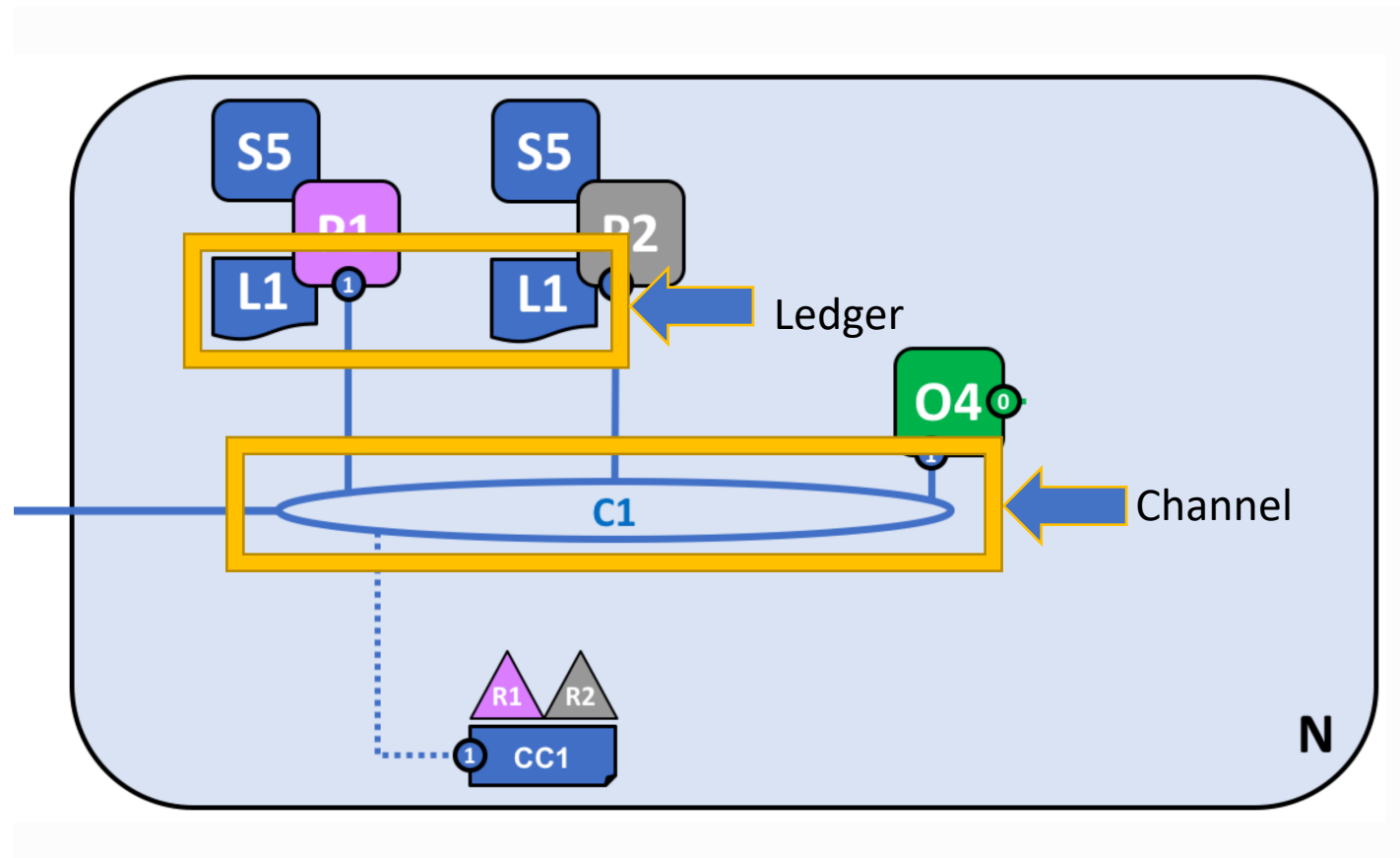


Example network

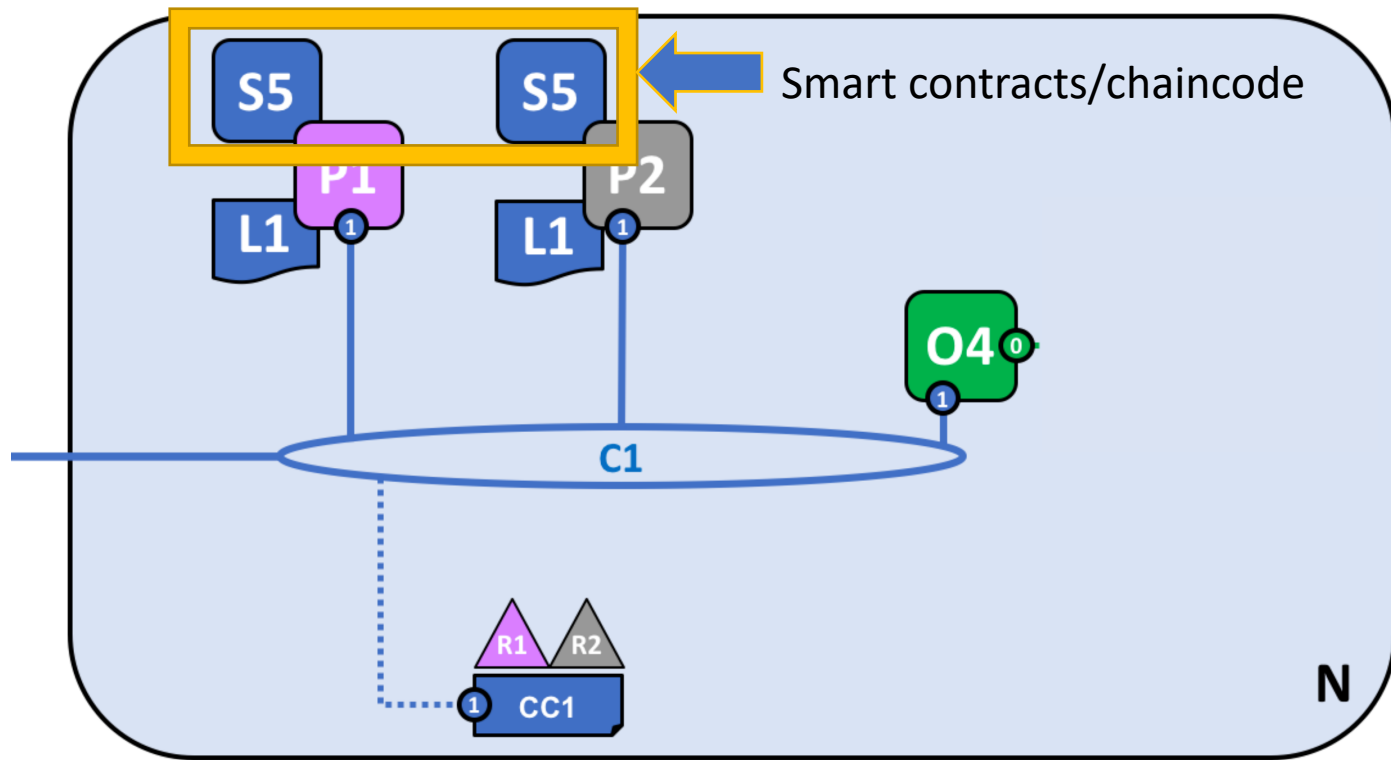




Example network



Example network





Example network

Ledger entry:

```
{"Key": "CAR9", "Record": {"make": "Holden", "model": "Barina", "colour": "brown", "owner": "Shotaro"}}
```

Command used to invoke the chaincode:

```
peer chaincode invoke -o localhost:7050 --ordererTLSHostnameOverride orderer.example.com --tls --cafile  
${PWD}/organizations/ordererOrganizations/example.com/orderers/orderer.example.com/msp/tlscacerts/tlsca.examp  
le.com-cert.pem -C mychannel -n fabcar --peerAddresses localhost:7051 --tlsRootCertFiles  
${PWD}/organizations/peerOrganizations/org1.example.com/peers/peer0.org1.example.com/tls/ca.crt --  
peerAddresses localhost:9051 --tlsRootCertFiles  
${PWD}/organizations/peerOrganizations/org2.example.com/peers/peer0.org2.example.com/tls/ca.crt -c  
'{"function": "changeCarOwner", "Args": ["CAR9", "Dave"]}'
```

The changed ledger entry:

```
{"Key": "CAR9", "Record": {"make": "Holden", "model": "Barina", "colour": "brown", "owner": "Dave"}}
```