



**HYPERLEDGER**

BLOCKCHAIN TECHNOLOGIES FOR BUSINESS

# Hyperledger Fabric

# Fabric Overview

## Permissioned

Restricting the access to B/c network through cryptographically secure protocols

## Distributed Ledger

Fabric Ledger associated with 2 components:  
Transaction Log  
World State DB(supports Couch and Level)

## Smart Contracts

Invoked by the application external to the network  
Ledgers can only be accessed through chaincodes

## Privacy

Allowing a group of participants in the network to create a separate ledger of transactions

## Consensus

Provides support to  
SOLO, Kafka, SBFT







# Major Fabric Components



**HYPERLEDGER**  
BLOCKCHAIN TECHNOLOGIES FOR BUSINESS

- Peers
- Ordering Service
- Channels
- Organizations
- Fabric CA / Membership Services
- Chaincodes / Smart Contracts

# Peers

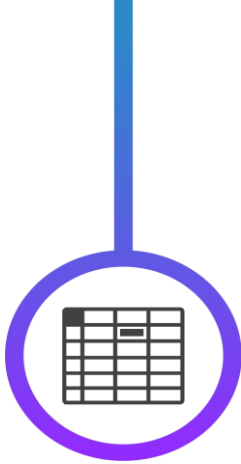
**Endorsing Peers:** Receives transaction proposals from the client side to endorse the transactions. Must have chaincode installed to execute the query

**Committing Peers:** Commits Transactions. Maintains the ledger and state DB. Not necessary to have a chaincode installed

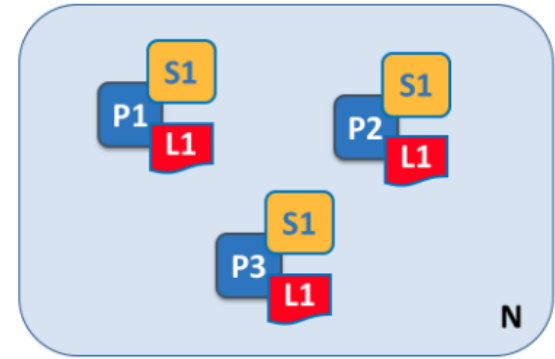
**Ordering Peers:** These are special type of nodes whose key roles are to receive endorsed transactions from sdk , package them into blocks send it to all other peers so that they can validate those transactions and update their ledgers





A photograph of four medical professionals (three men and one woman) in white scrubs standing on a modern hospital balcony with glass railings. One man is holding up a tablet. The image is overlaid with a blue and purple color scheme and a network diagram of nodes and lines in the bottom right corner.

# Peers and Ledgers



A Peer by definition can hosts the **multiple instances** of Ledgers and Smart Contracts



	Blockchain network
	Peer node
	Smart contract (aka chaincode)
	Ledger

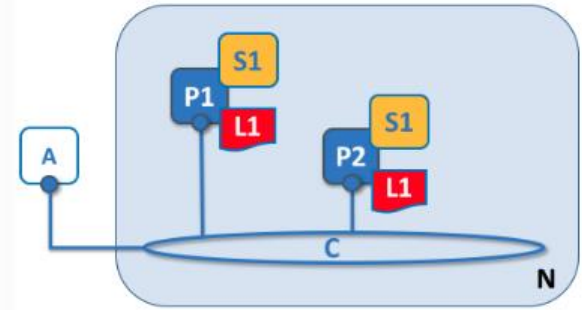











# Channels



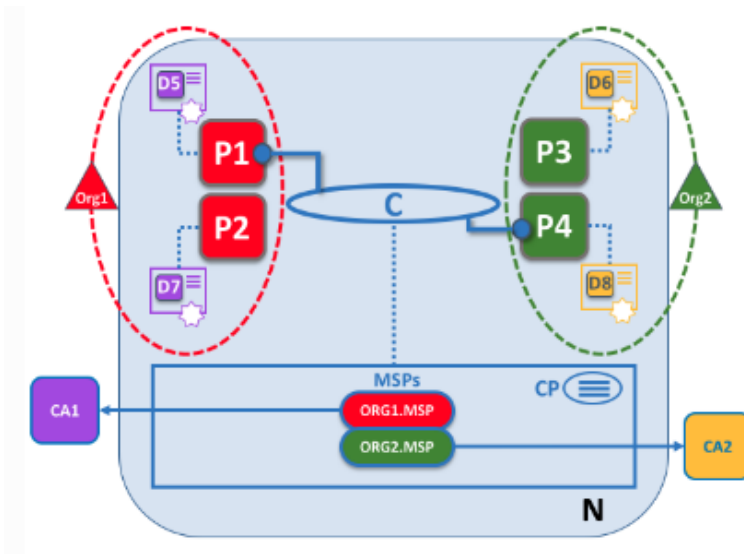
- Channels allow a specific set of peers of zero or more organizations and applications to communicate with each other within a blockchain network
- Each channel in a blockchain network is associated with a unique ledger and is hosted on every peer that has joined it
- Channels provide the possibility of having private networks among the peers



	Blockchain Network		Ledger
	Channel		Application
	Peer		Principal PA (e.g. A, P1) communicates via channel C.
	Chaincode		



# Organizations and MSP's



<b>N</b>	Blockchain Network	<b>P</b>	Peer
<b>C</b>	Channel	<b>Org</b>	Organization
<b>I</b>	Identity	<b>PA</b>	Principal PA (e.g. P1,P4) communicates via channel C.
<b>CP</b>	Channel policy	<b>C</b>	
<b>CA</b>	Certificate Authority	<b>MSP</b>	Membership Service Provider
		Organization R owns application A1 and peers P1, P2.	
	Channel C subject to policy CP.		Channel policy CP contains MSPs: MSP1 and MSP2.
		MSP1 selects the Certificate Authority CA1 to provide certificates for it.	

- Each and every peer in the network is assigned a digital certificate by an administrator from its owning organization(unique)
- The mapping of peer identity to organization is provided by a component called a *Membership Service Provider* (MSP) which is associated with a Fabric CA server

## INTERNET

Your Internet ID: monopoly@host.yab.com

### Getting Files

- [A] Find Files on the Net (Archie)
- [F] Get Files from the Net (FTP)
- [Y] File Transfers for Net Account

### Entertainment

- [M] MUDs (Games)
- [I] Internet Teleconference (IRC)
- [J] Tintin Interface for MUDs

### Miscellaneous

- [B] Unix Shell Access (BASH)
- [T] Connect to Other Sites (Telnet)
- [S] SLIP - Graphical Interface
- [P] PPP - Point-to-Point Protocol

### Finding Information

- [G] Search for Information (Gopher)
- [W] Hypertext Search (WWW)
- [Q] Query About Someone (Finger)

### Messages

- [E] Internet E-Mail
- [U] Internet Message Areas (Usenet)
- [D] Detailed Reference Text

- [H] Help Using Internet Functions
- [K] If You're Stuck at "Password"
- [C] How To Configure SLIP Access

# Transaction Flow

Your Choice (A,B,C,D,E,F,G,H,I,J,K,M,P,Q,S,T,U,W,Y or X)? :

(N)onstop, (Q)uit, (C)ontinue?

Menu: <Ctrl R-Shift>

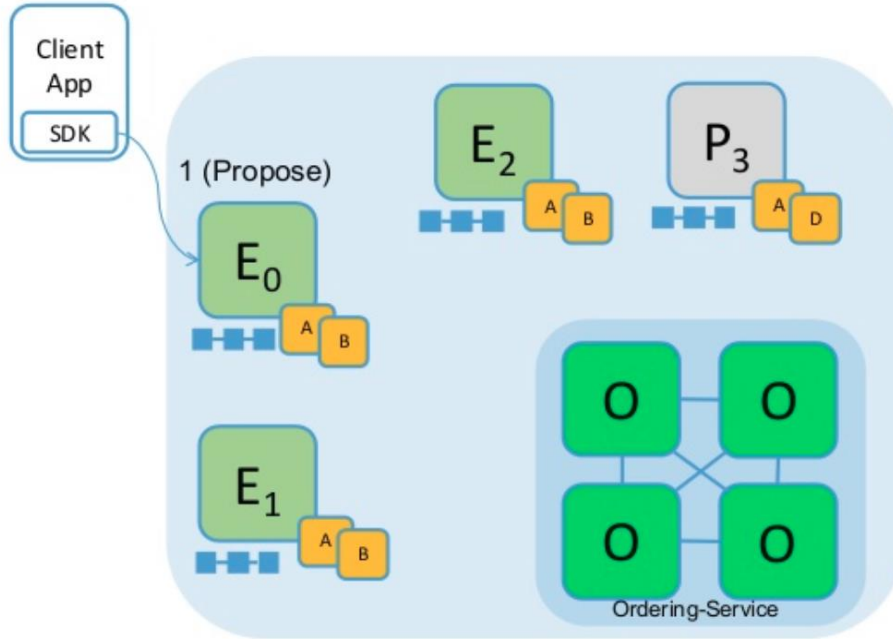
2400 8N1

VT100

Online

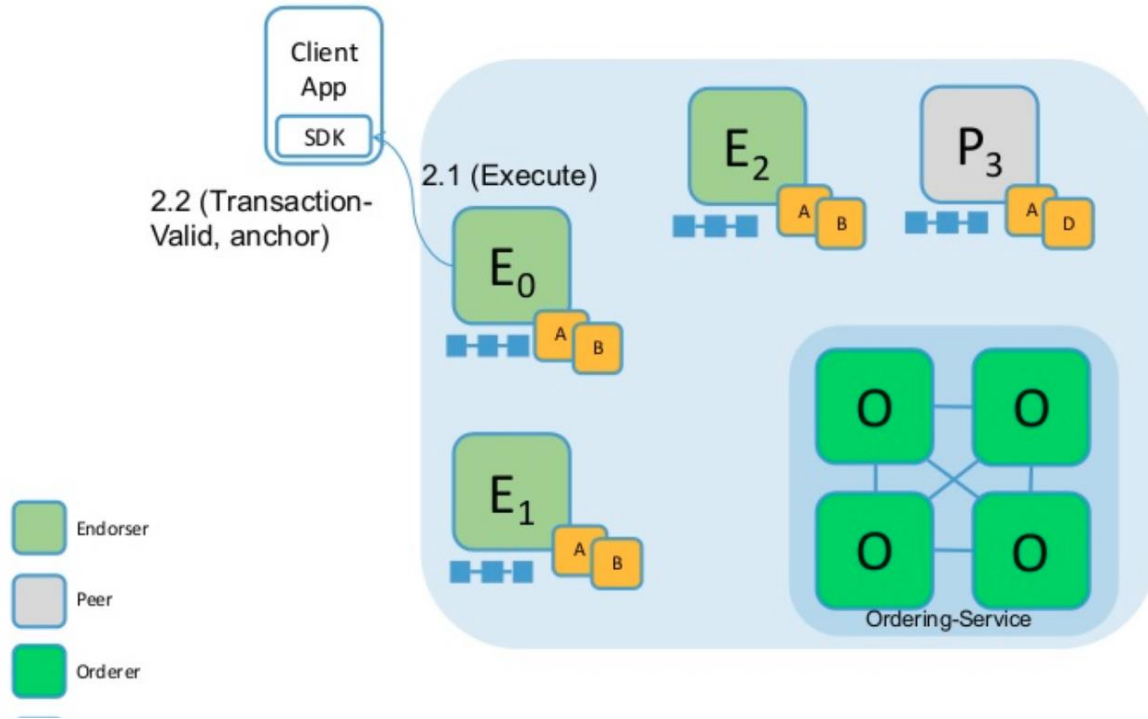


# Propose

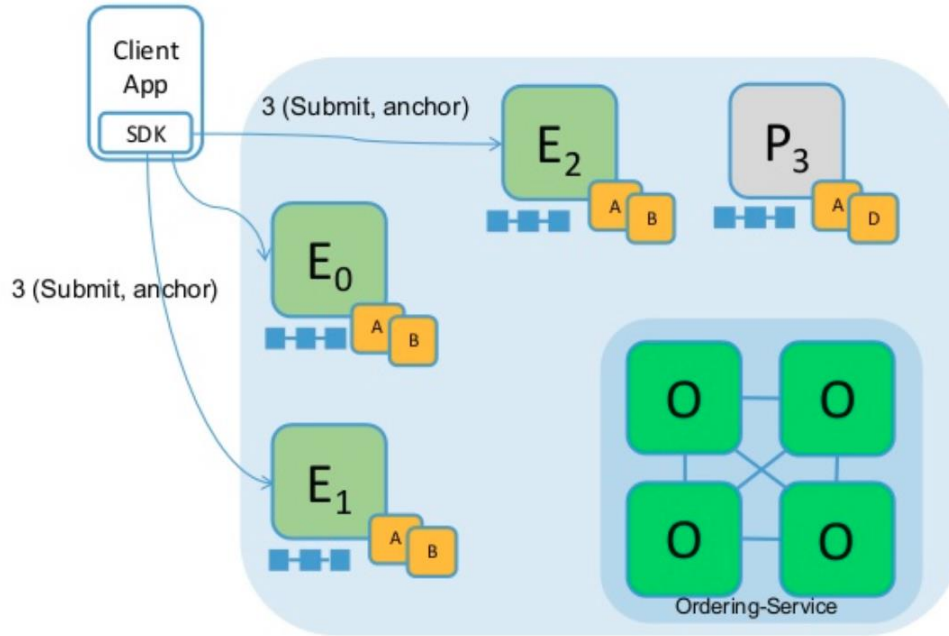


Client app submitting a transaction proposal to the endorsing peer  $E_0$

# Execute

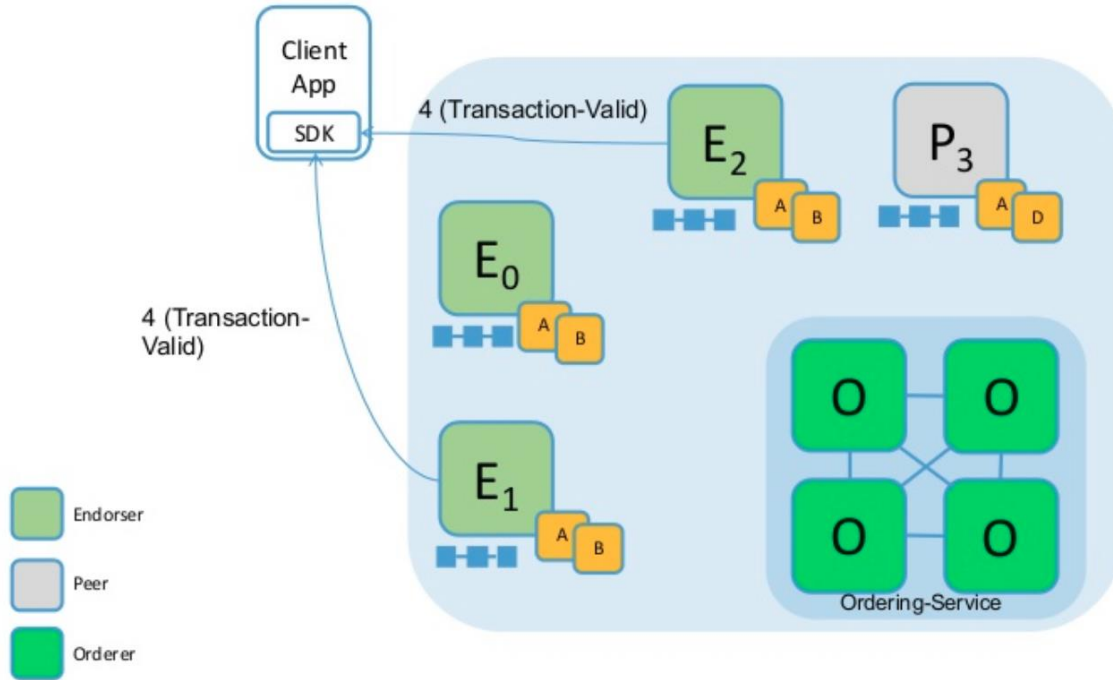


# Submit



Client app requesting further endorsements as per the endorsement policy defined

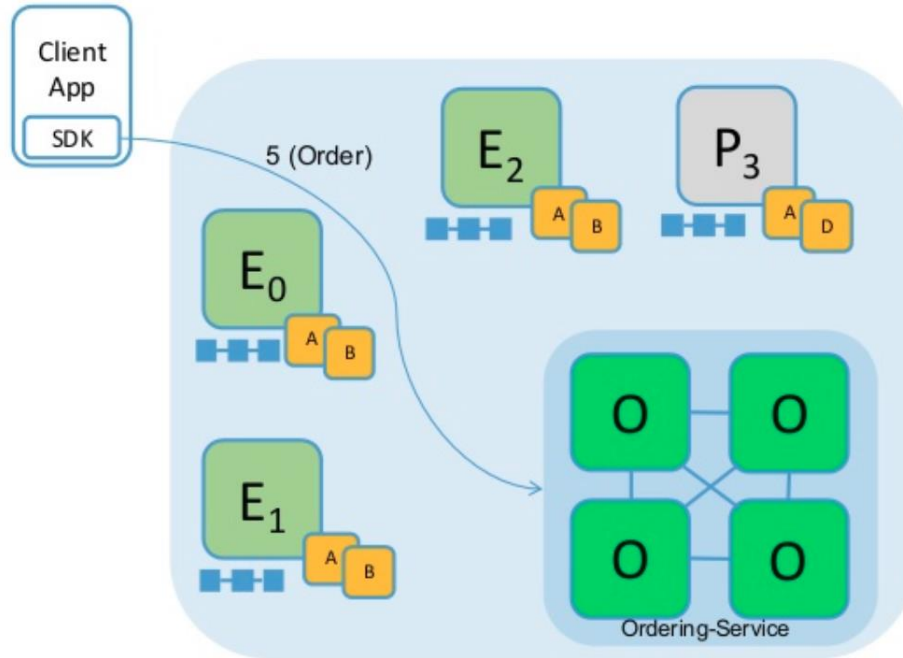
# Endorse



Digitally signed  
endorsements sent to the  
client app

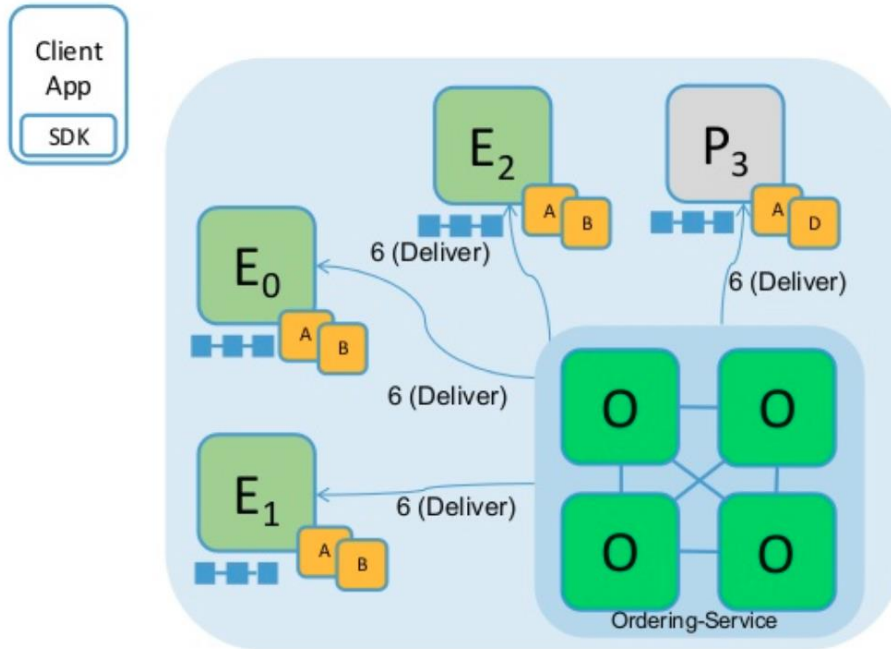


# Order

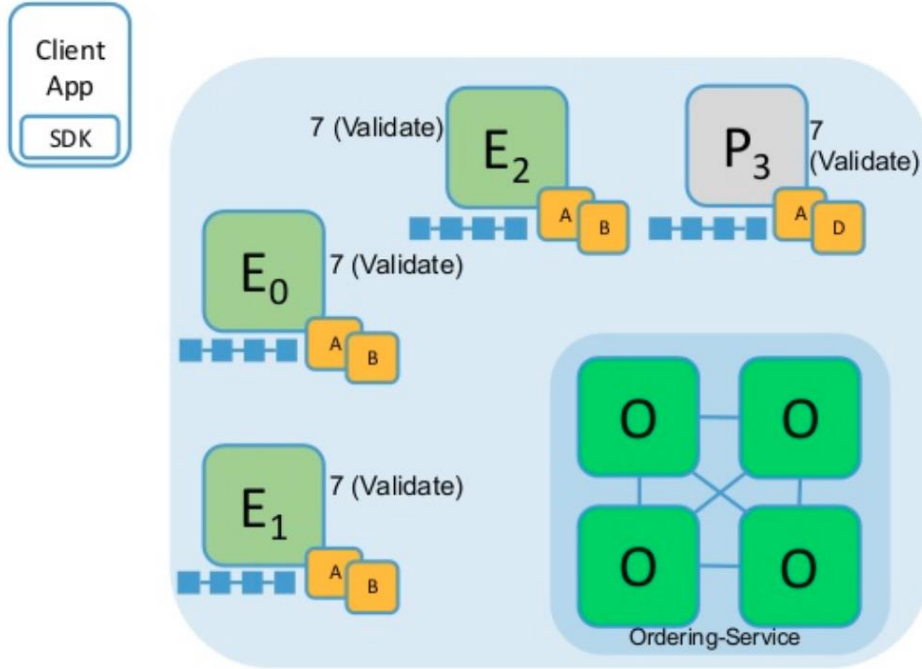


Client app submitting the transaction along with endorsements to the ordering service

# Deliver



# Validate



Peers validate the received block and make updates to their respective ledgers

The image shows a person's hands typing on a laptop keyboard. The entire scene is overlaid with a semi-transparent green filter. In the top-left corner, there is a network diagram consisting of four yellow circular nodes connected by yellow lines. The word "Demo" is written in white, bold, sans-serif font in the center-right area of the image.

**Demo**



