2 goals

- To learn how to build a blockchain based solution for a particular problem domain using a product like hyperledger fabric
- To enhance the solution like hyperledger fabric by contributing to its core in form of documentation , testing , etc.

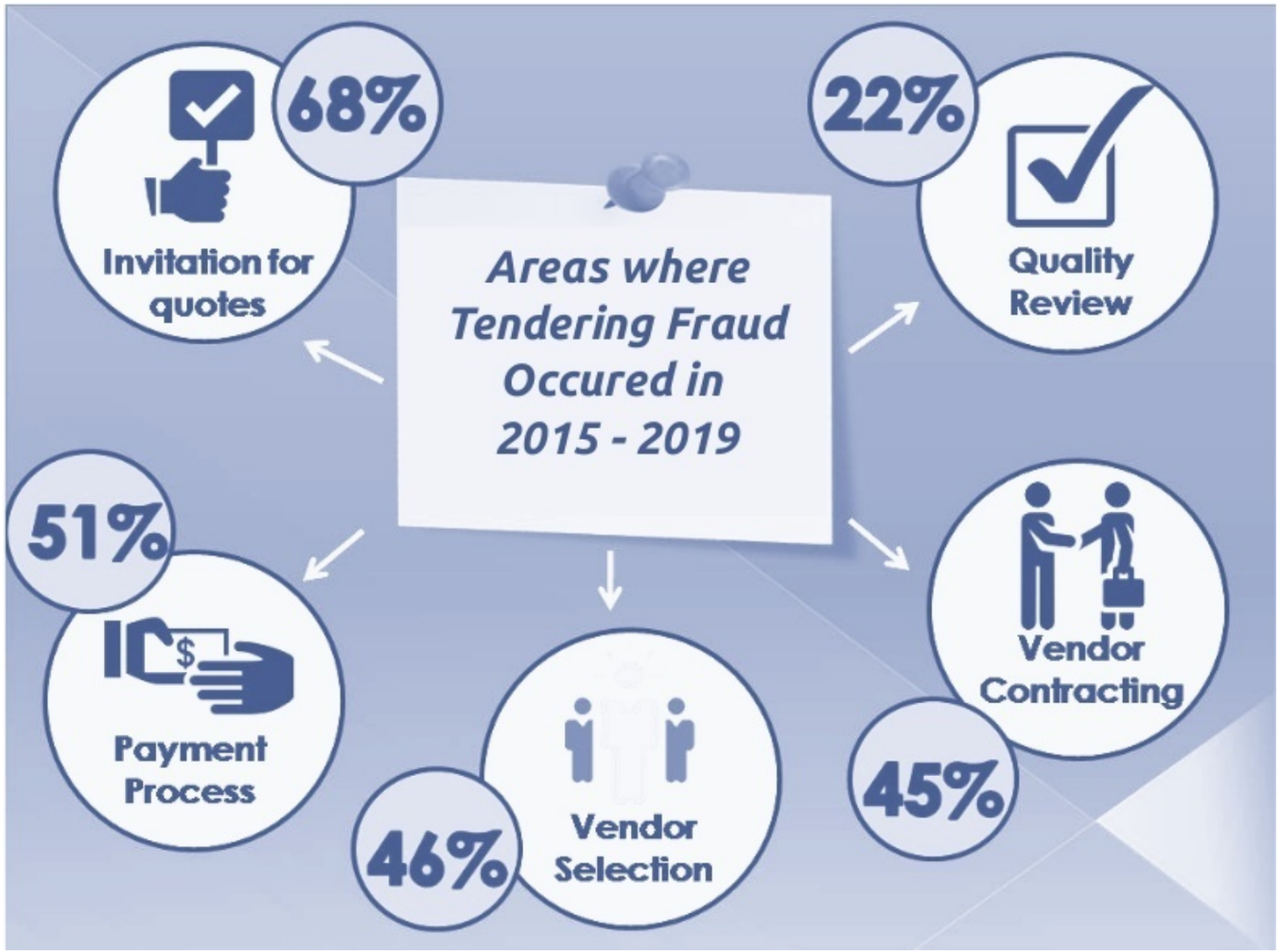
Problem Statement

Procurement corruption–including activities like -
• Bid Rigging
• Shadow Vendors
• Steering of public contracts to politically connected firms

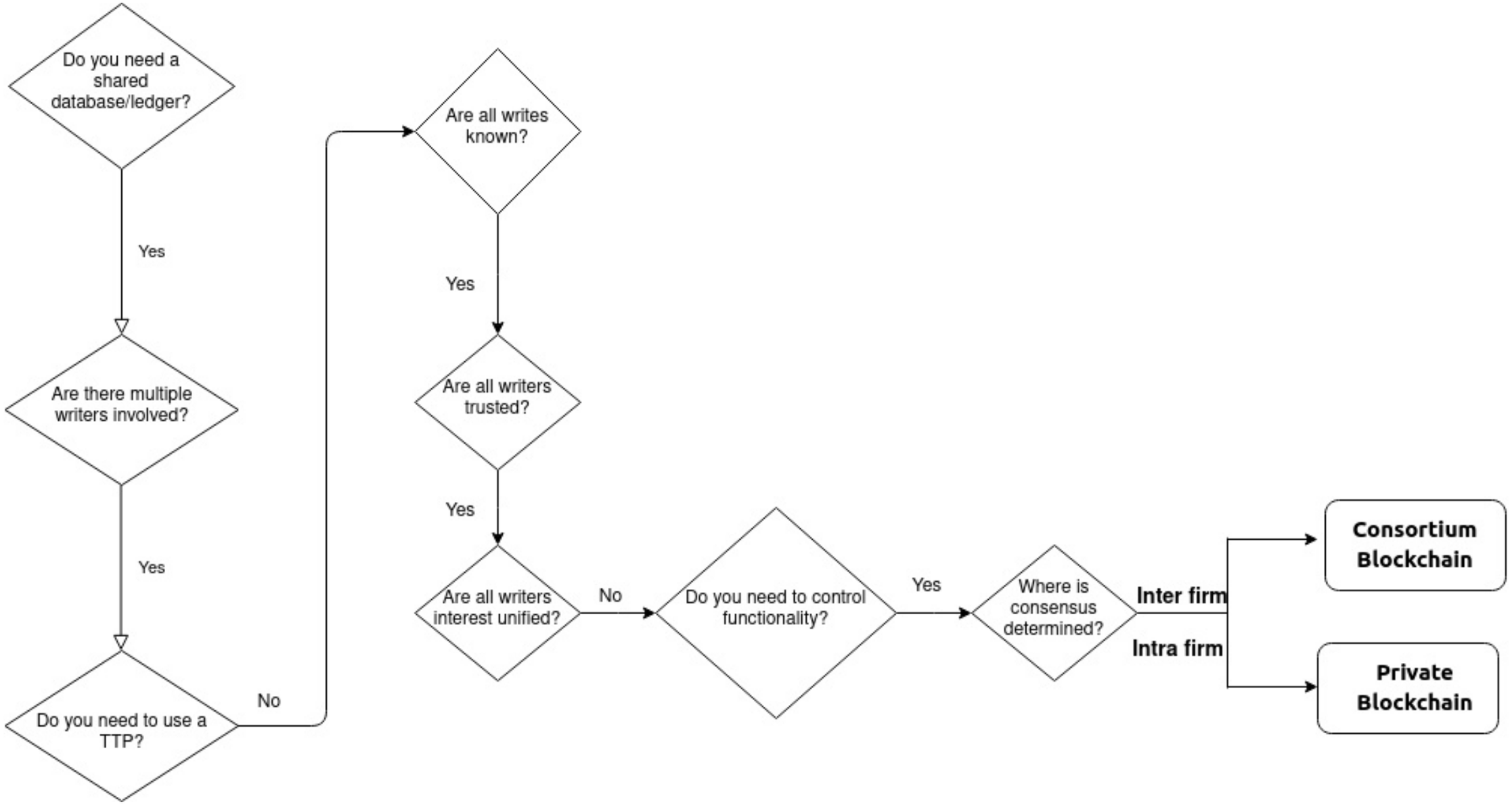
" Procurement corruption is an enormous worldwide problem, costing taxpayers up to trillions of dollars annually."

Current Scenario

The incentive to win major contracts can lead individuals and even companies to engage in corrupt and fraudulent behavior. Staff within the procurement or project management divisions of contracting organizations may be exposed to inappropriate inducements such as bribes and corrupt offerings. Below we have presented Procurement Fraud Statistics.

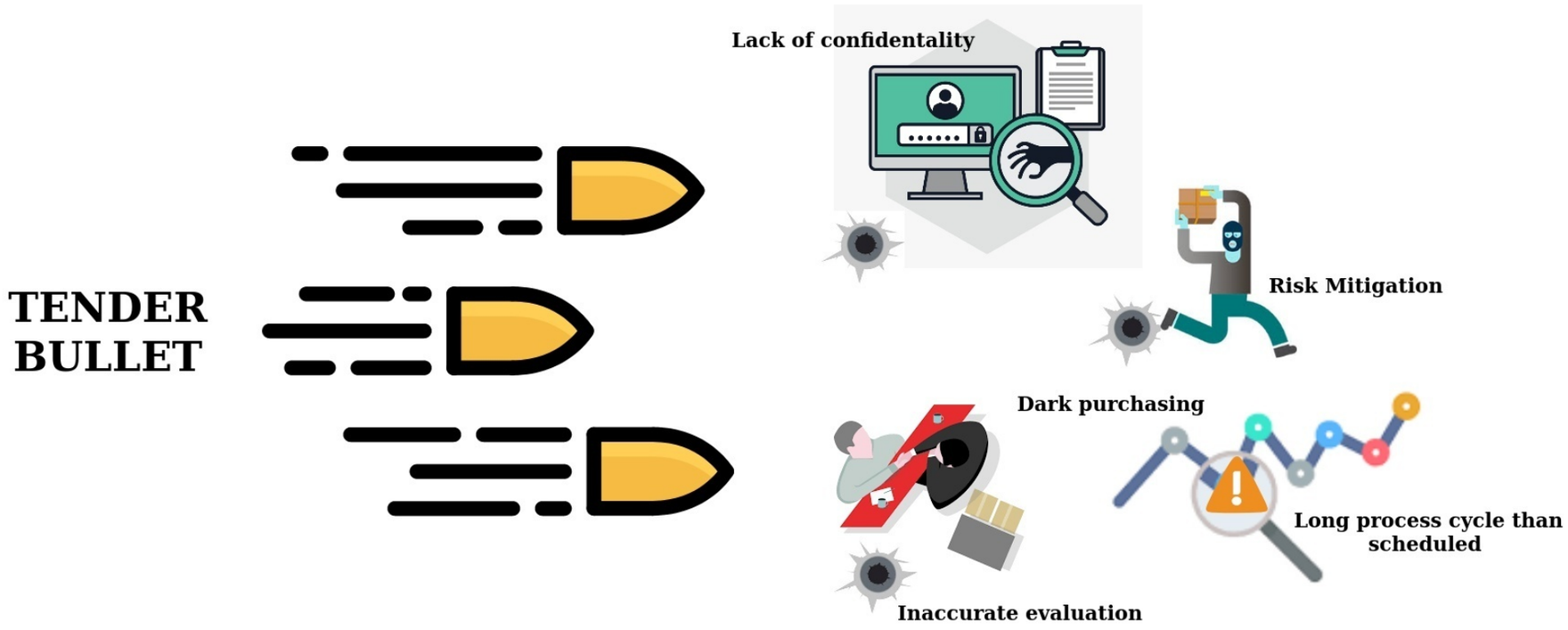


Which Blockchain is suitable (Flow Diagram)



Ideation

Title of our solution is **Tender Bullet** : Blockchain Powered Procurement System
Combatting procurement issues in a systematic and structured approach

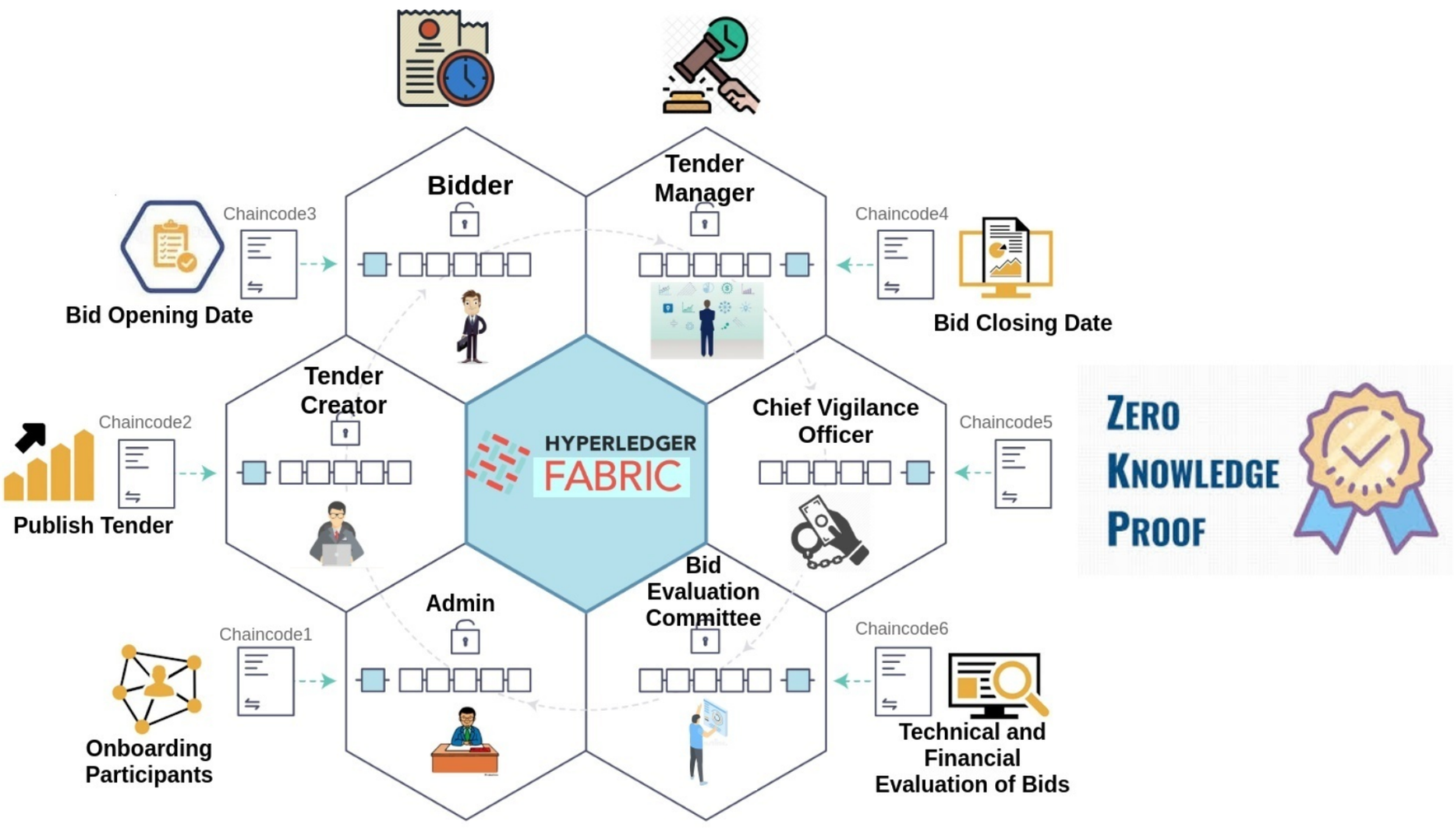


Permissioned Blockchain technology can disrupt corrupt processes & more importantly provide huge operational benefits in terms of speed, security and decreased workload by facilitating the exchange of information.The following outlines how blockchain technology can bring value to key procurement processes -

- Improved validation and authentication
- Reshaped invoice processing
- Accelerated settlements
- Reduced money laundering risk
- Greater trust among stakeholders
- Strong audit trail
- Greater security of transactions

Blockchain Implementation

Hyperledger Fabric is an enterprise grade, Private, Permissioned & distributed ledger.



3 Major Components of Hyperledger Fabric mapped to procurement scenario

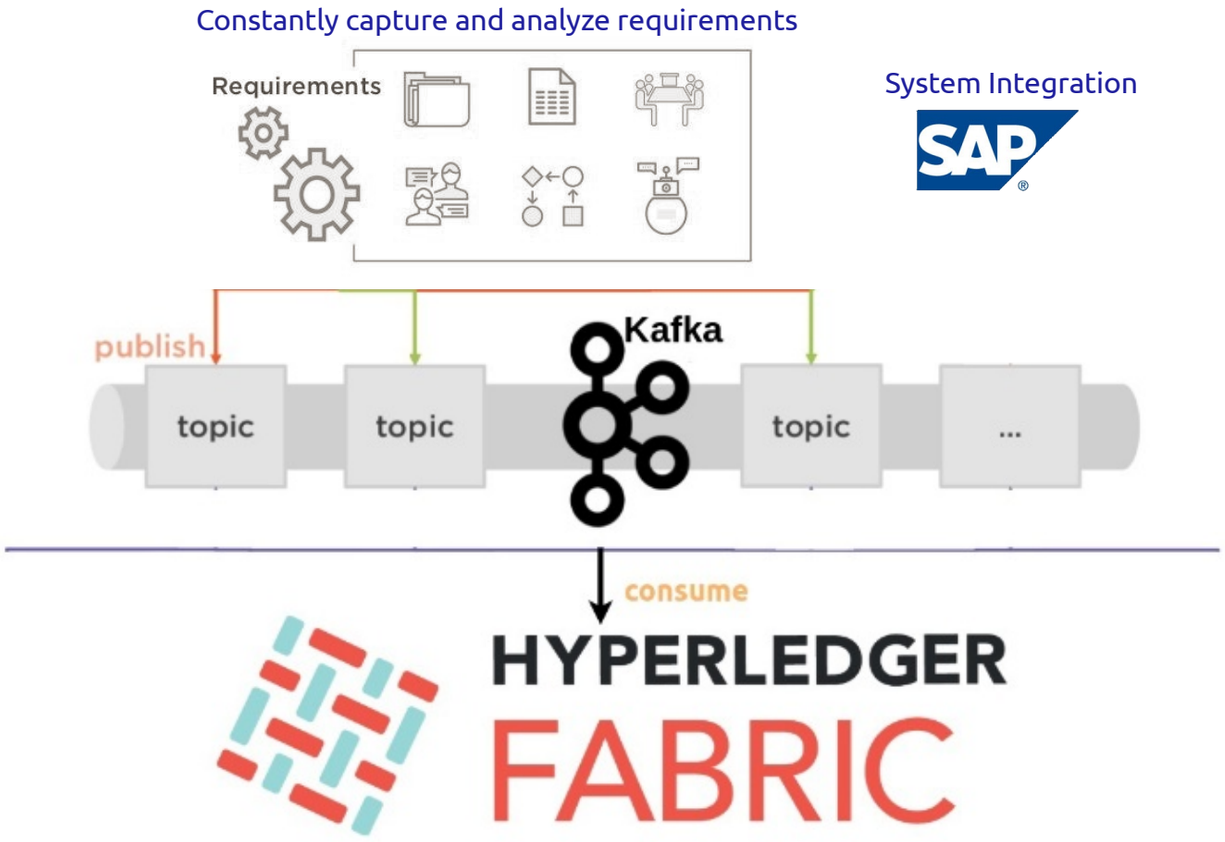
PARTICIPANTS	ASSETS	TRANSACTION
TENDER CREATOR	*APPROVAL LETTER*	*CREATING A TENDER*
BIDDER	*GST REGISTRATION CERTIFICATE*	*PLACING A BID*
TENDER MANAGER	*IDENTIFICATION ID*	*EMPANELMENT OF VENDOR*
BID EVALUATION COMMITTE	*AWARD OF SIGNATURE*	*SELECTING THE BEST BID*
CHIEF VIGILANCE OFFICER (CVO)	*UNIQUE IDENTIFICATION NUMBER*	*VERIFICATION OF BID*

Smart Contracts / Chaincodes for Procurement System

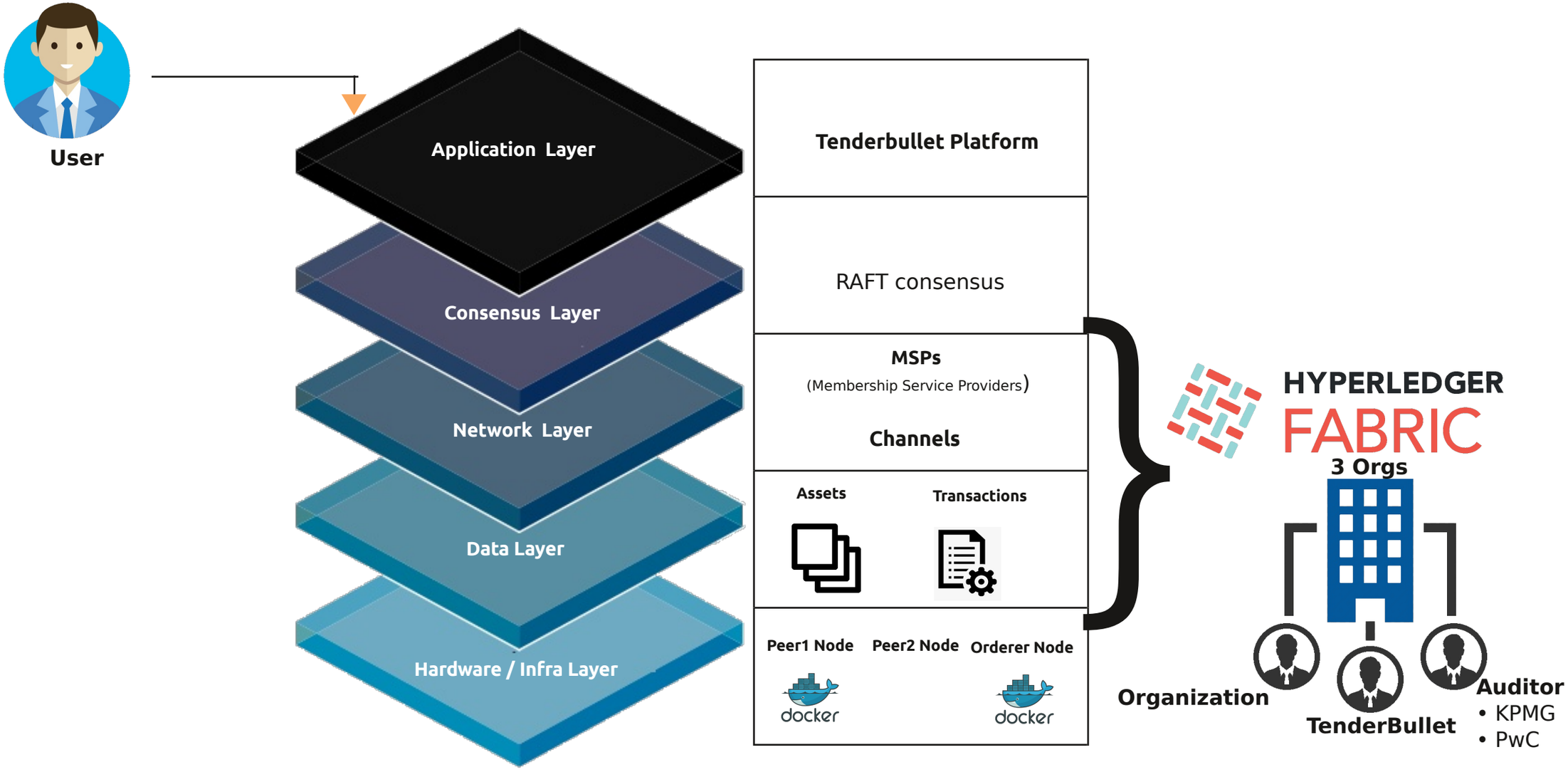
- **BIDDER**
  uploadBidderLicence();
  bidSpecifications();
- **BID EVALUATION COMMITTEE**
  getAssignedExperts();
  evaluateFiancialBid();
  evaluateTechnicalBid();
- **TENDER MANAGER**
  viewSubmittedTenders();
  setTenderClosingDate();
  setTenderOpeningDate();
- **TENDER PUBLISHER**
  publishTender();
  getActiveBidders();
  setTenderAmount();
  setTenderSpecifications();
- **AUDITOR/CHIEF VIGILANCE OFFICER**
  getFinalBidders();
  reviewTenderActivity();
  getOfflinePaymentStatus();

Agility & adaptability of Solution

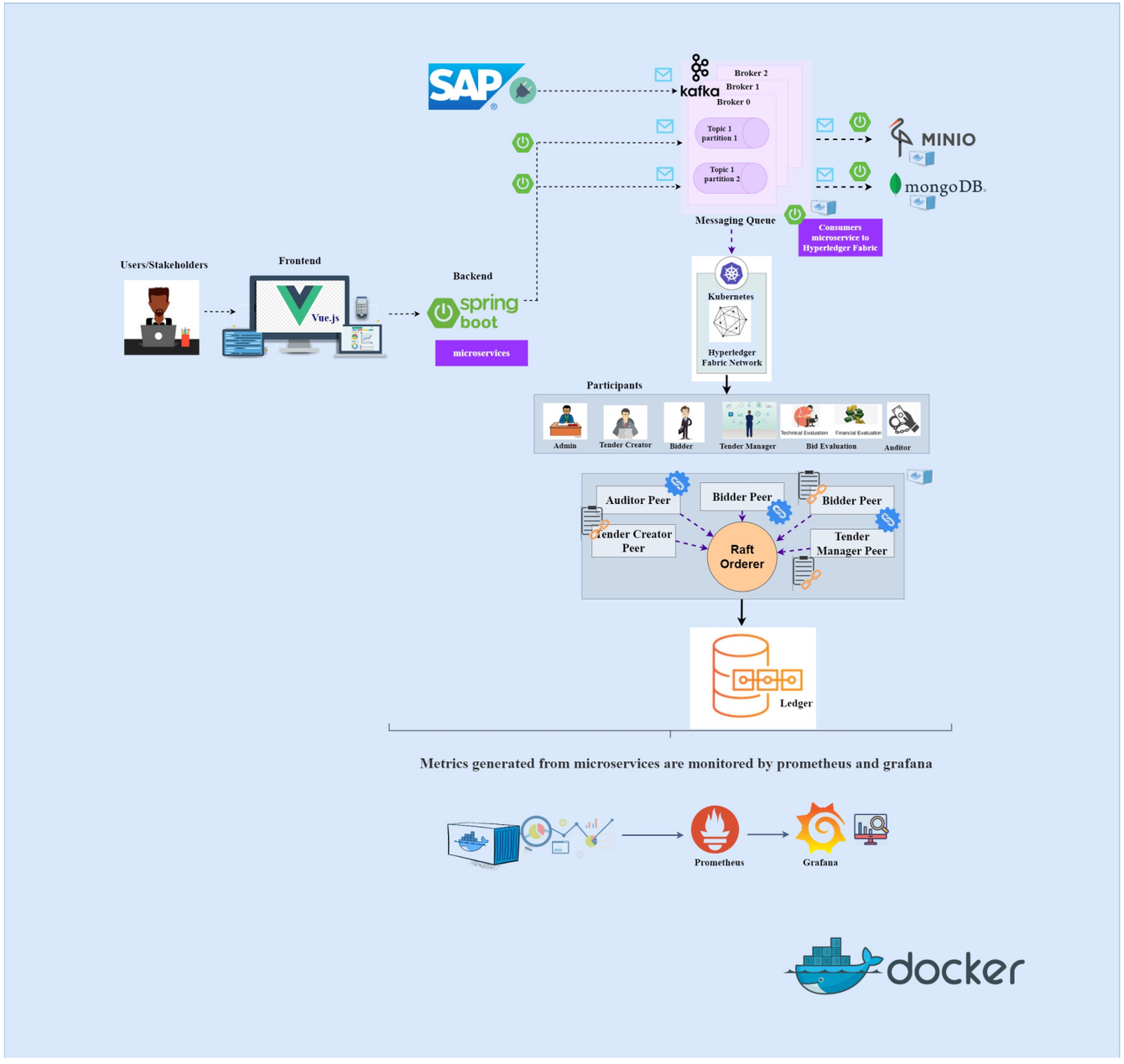
Decoupling of core infrastucture from domain {user stories / workflows}



Blockchain layers mapped to solution



Technical Architecture Diagram



Hyperledger Fabric : The 10,000 foot view

- Create the Network
- Start the Hyperledger Fabric CLI
- Create a Peer Node
- Create a Channel
- Run Chaincode
- Security : Data Protection
  - Encryption at Rest
  - Encryption at Transit
- Authentication and Access Control using LDAP
- Monitoring using Prometheus & Grafana

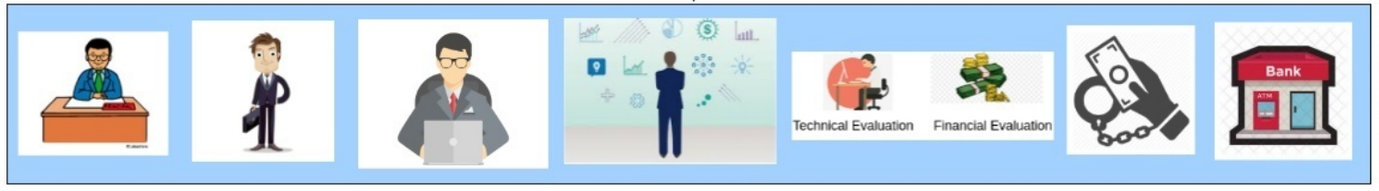
Tentative Adoption Strategy

Company wide single Blockchain cell

Blockchain Cell

PROCUREMENT

Department whose procurement is to be taken into blockchain



Activities

Training of employees

Transactions to be recorded on blockchain across the organization

- Onboarding of Stakeholders
- Administration of Bids
- Bidding Process
- Financial Transcations
- Management of Tenders
- Evaluation of Bids
- Audit of Bids