HYPERLEDGER FABRIC ARCHITECTURE & DESIGN CONSIDERATIONS

Speaker(s): Dharmen Dhulla

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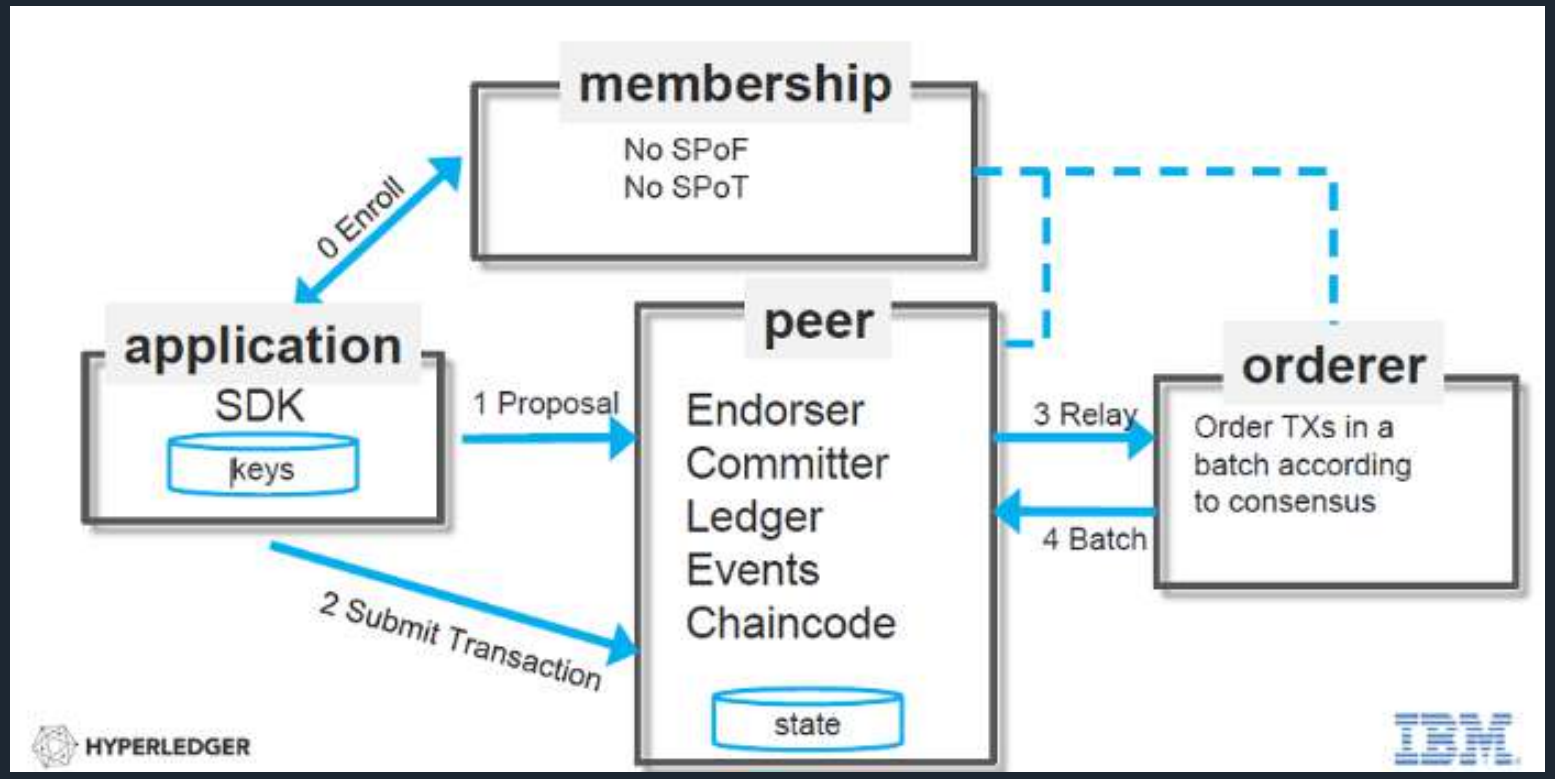
THINKING BREAKTHROUGHS

Agenda

- ❑ Hyperledger Architecture
- ❑ Best Practices for Enterprises
- ❑ Blockchain Platform Offerings
- ❑ The Blockchain Trilemma
- ❑ What is the Scalability Challenge?
- ❑ Common Approaches for Blockchain Scalability

Hyperledger Architecture



Key Concepts
Peers (Endorser, Committer)
Channels
Membership Service Provider
Chaincode
Ledger
Ordering Service
Application SDK

Best Practices for Enterprises

- Secure today does not mean secure tomorrow
- Never store large files on a blockchain
- If you don’t want your data to be public, use a permissioned blockchain
- Create a governance structure for the blockchain
- Decide on performance and scalability requirements
- Analyze blockchain business cases early

Common Aspects

- Who can create transactions?
- Who can view transactions?
- Who can validate transactions?
- Who can create a Block?
- Who will participate in consensus?
- Who can view the contents of a block?

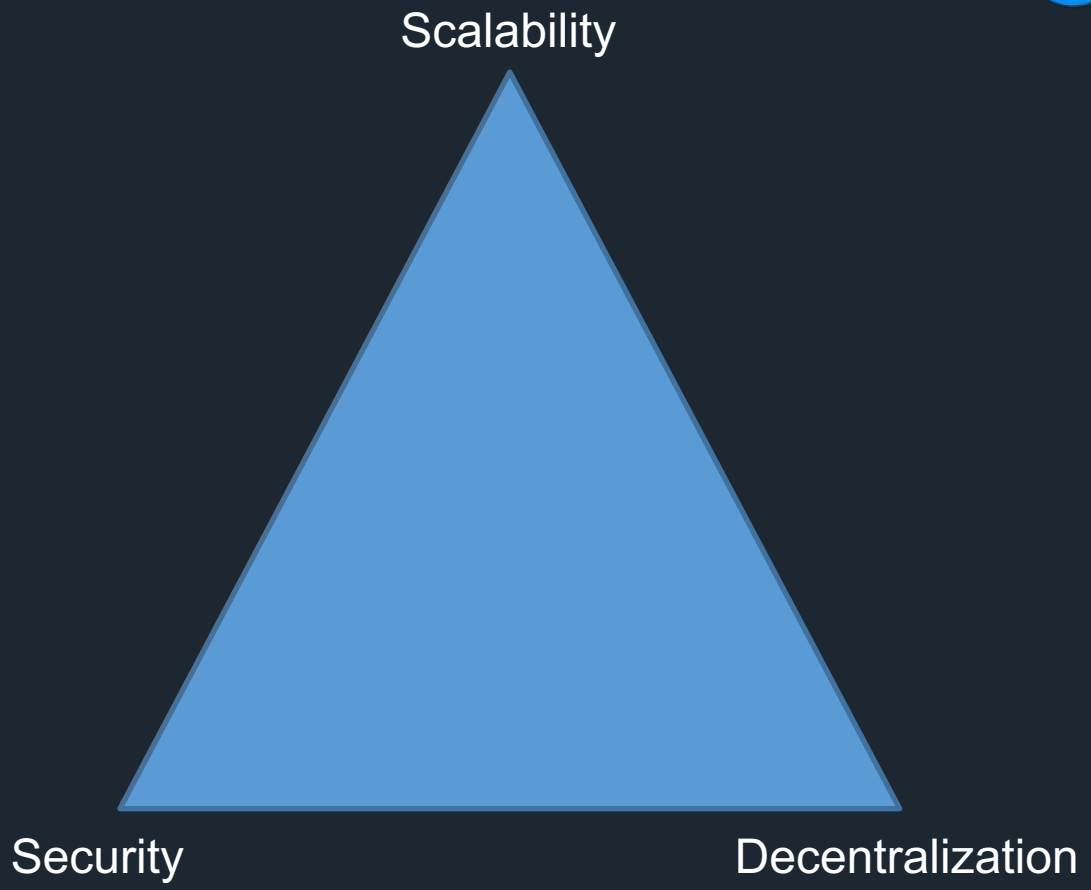
Blockchain Platform Offerings

- Build your network faster and easier with seamless experience
- Operate and govern networks with total control
- Grow distributed networks with ease with newly enabled multi-cloud flexibility
- Data Control - Increasing regulations (e.g. GDPR) and privacy concerns impact how and where data is stored within a blockchain network
- Performance and expertise to help you scale
- Accelerating Throughput in Permissioned Blockchain Networks

The Blockchain Trilemma

A Blockchain can have at most two of these there properties:

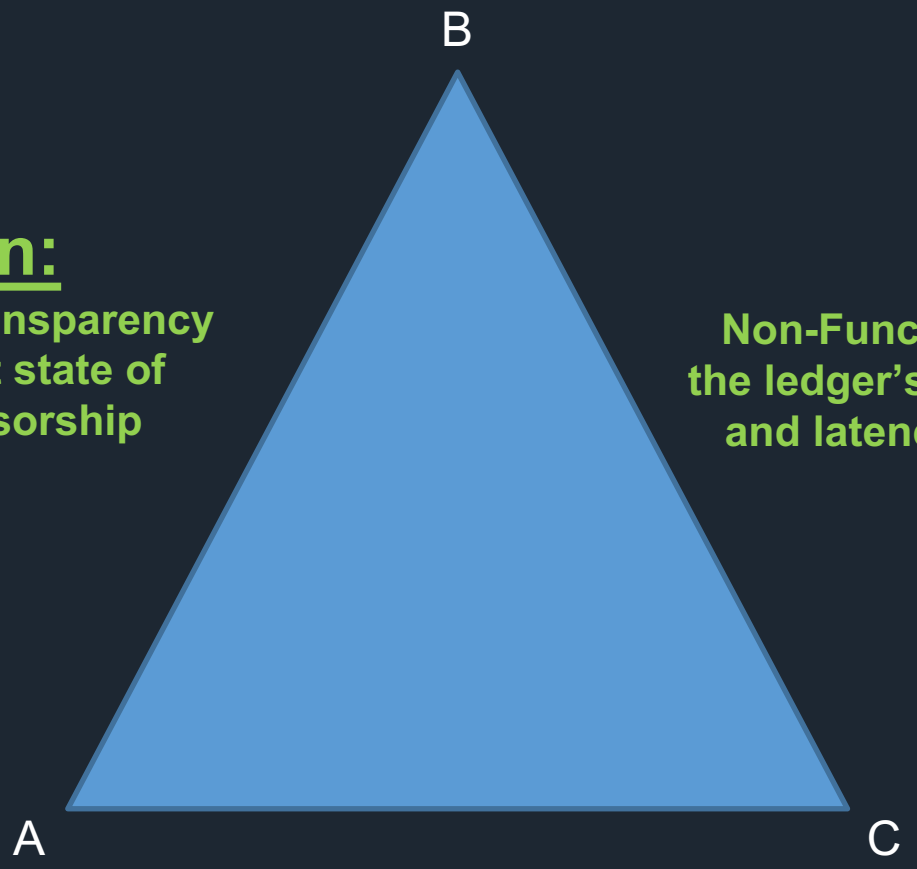
- **Decentralisation**
- **Scalability**
- **Security**



The Blockchain Trilemma – Implications

Decentralisation:

Accessibility, availability and transparency for all participants; consistent state of ledger across all nodes; censorship resistant



Scalability:

Non-Functional requirements related to the ledger's carrying capacity, throughput, and latency of processing transactions

Security:

Ability to maintain ledger integrity against malicious attacks through inbuilt control mechanism

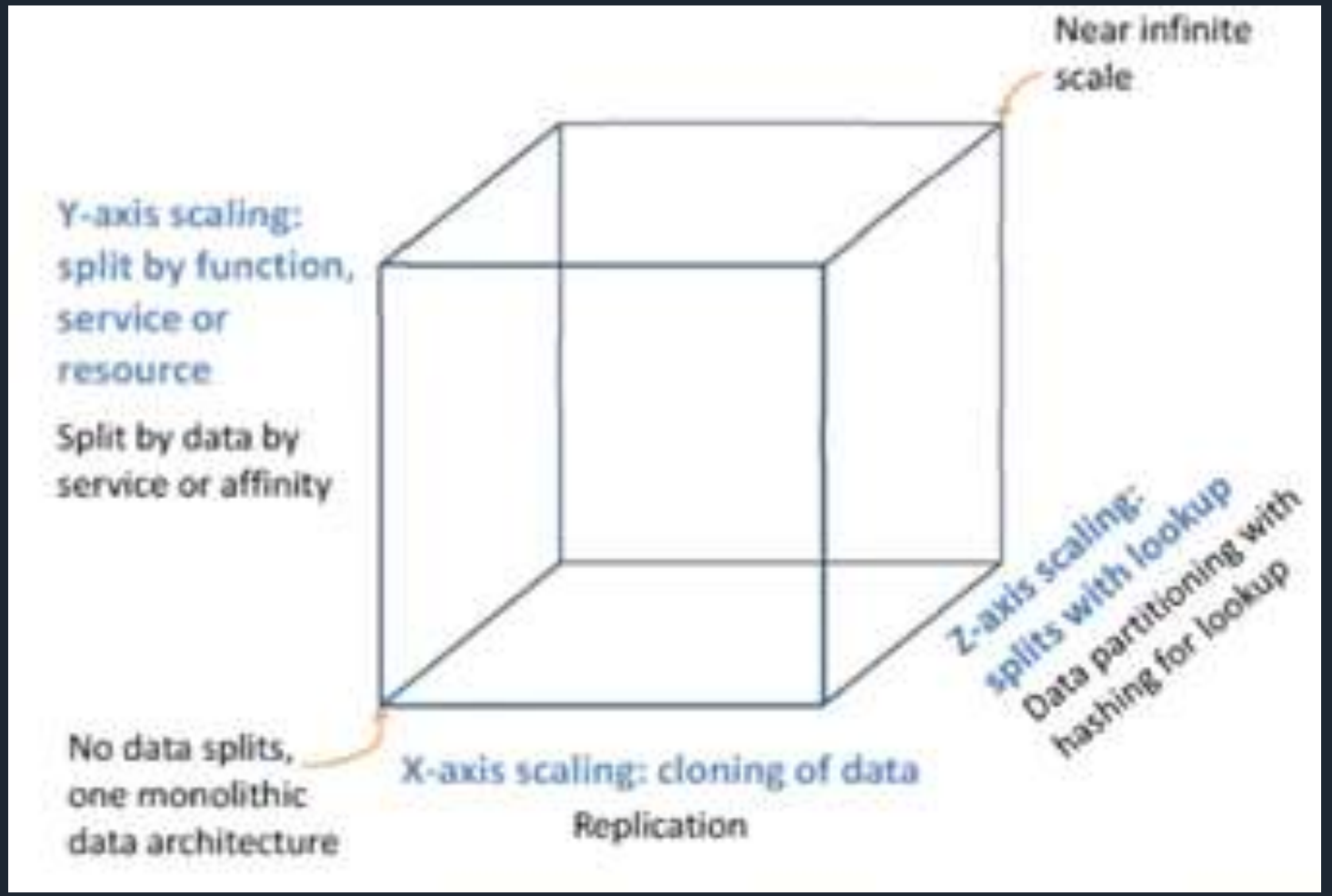
What is the Scalability Challenge?

Currently, all Blockchain consensus protocol that are actively in use have an important limitation: every fully participating node in the network must process every transaction.

-Vitalik Buterin

- This gives the blockchain a high amount of security because of how much validation goes into each block
- At the same time it means that an entire blockchain is only as fast as its individual nodes
- Consistency vs Latency

Scale Cube from Art of Scalability



Common Approaches for Blockchain Scalability

Off-Chain Computations	Side Channels
Sharding Protocols	New Consensus Protocols

Advanced Tools

- Trusted Execution Environments
  - Intel SGX
  - Containers / Dockers
- Fully Homomorphic Encryption
- Zero-Knowledge Proofs

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SIMPLIFYING BUSINESS

HYPERLEDGER

BLOCKCHAIN TECHNOLOGIES FOR BUSINESS

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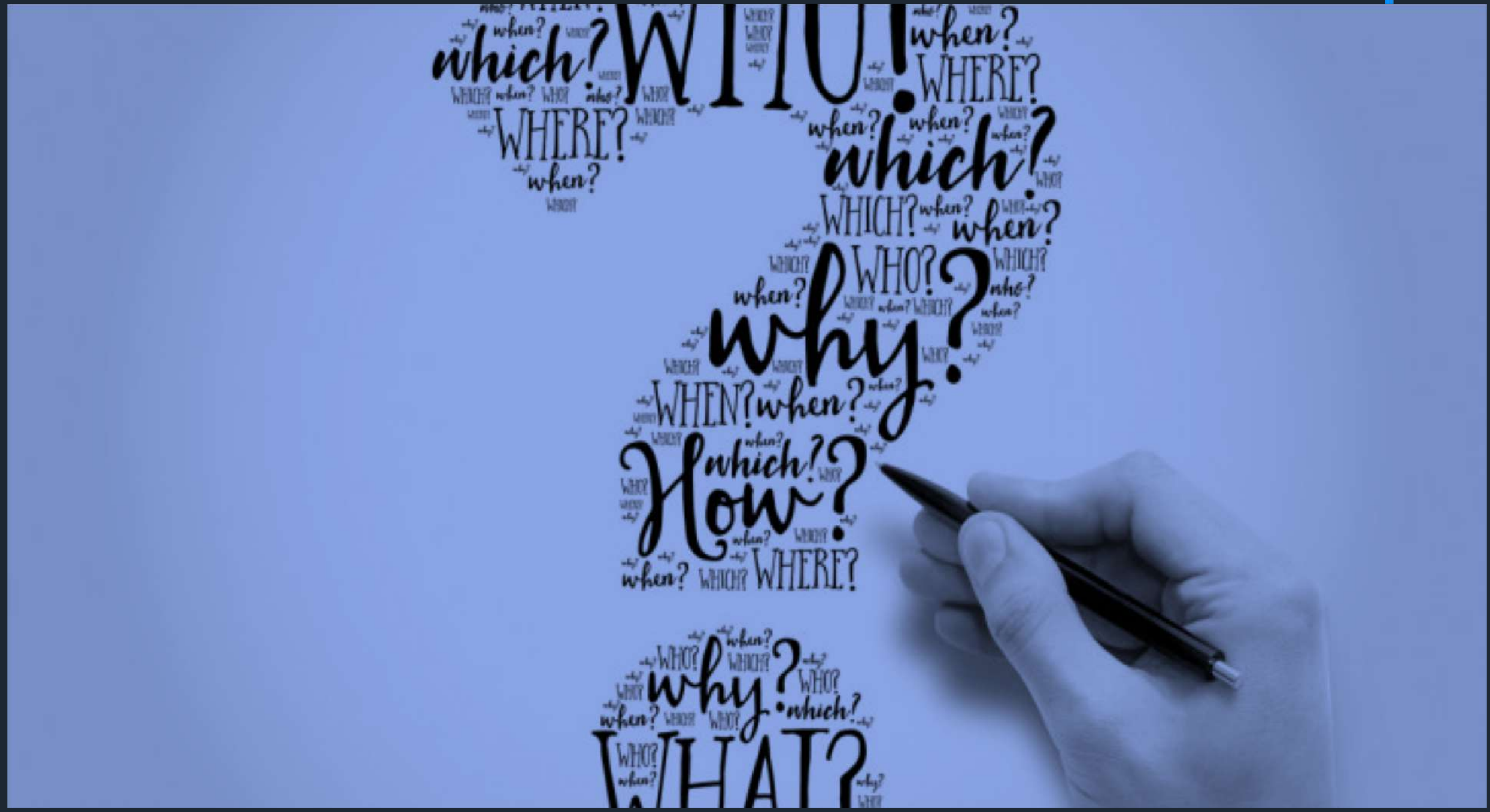
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