Microsoft & Blockchain

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Digitalization scenarios and Blockchain

Changing business models across the world

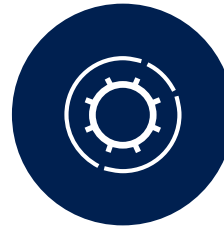### Engage your customers

Fast, Frictionless experience

Customers experience easier onboarding for various services and higher levels of trust in the institutions

Empower your employees

Audit

Compliance

Reduced risks & compliance costs

Optimize your operations

Digitization

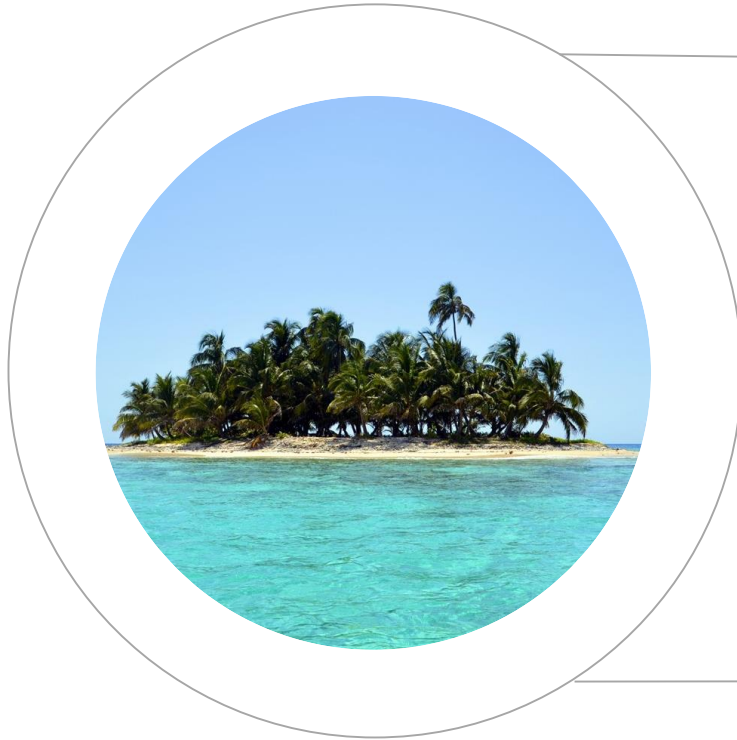Increase efficiency and trust among various institutions

Transform products/business

Transform products/business

New services and Ecosystems

Blockchain wasn't built for enterprise

Ledgers

Ledgers designed for public network lack the performance, confidentiality, and governance capabilities needed for commercial use
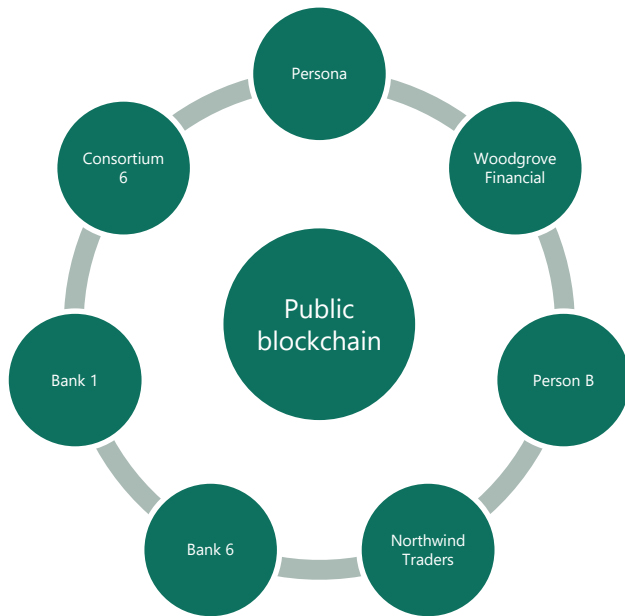
Smart Contracts

Smart contracts were not designed to leverage existing enterprise tools and skill sets

Integration

There are a number of challenges to integrate a blockchain with existing IT architecture

Blockchain | Network Types

Public

- Many, unknown participants
- Writes by all participants
- Reads by all participants
- Consensus by Proof of Work

Private
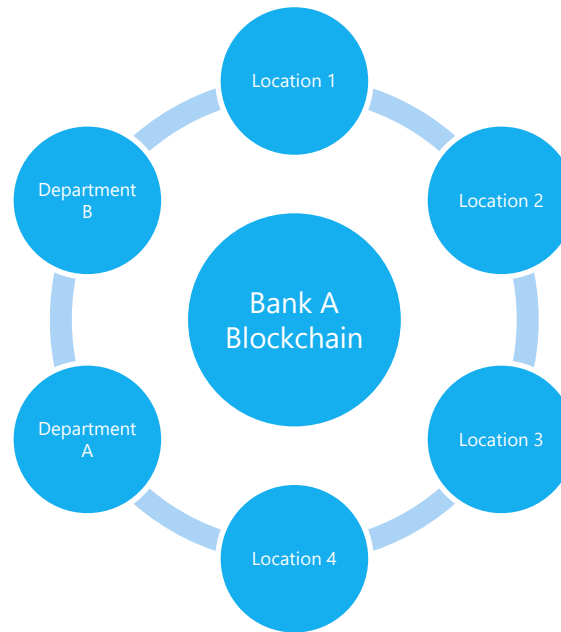
- Known participants from one organization
- Write permissions centralized
- Reads may be public or restricted
- Multiple algorithms for consensus

Consortium
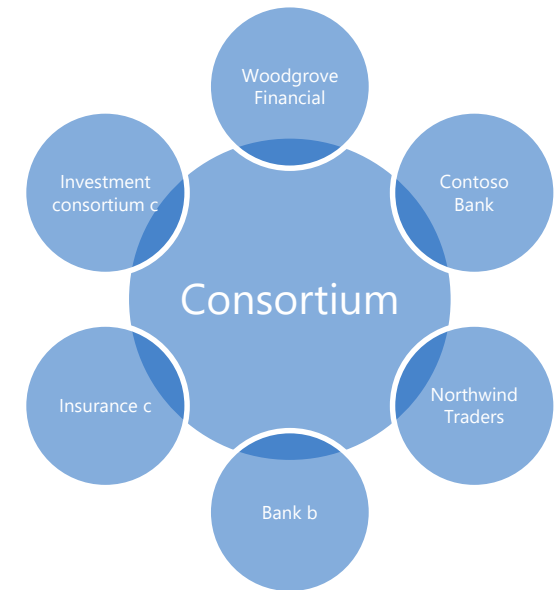
- Known participants from multiple organizations
- Writes require consensus of several participants
- Reads may be public or restricted
- Multiple algorithms for consensus

Strategy | Microsoft's point-of-view

Blockchain on your terms...

The most open cloud for blockchain

The most regions in any public cloud

True hybrid

Product and services offerings

Deep partner bench

integrated with your business...

Identity through AAD and key management through KeyVault, or bring your own

Cryptlets for secure off-chain integration

Azure middleware support

IaaS, PaaS & SaaS roadmap

with enterprise assurance.

Research in security, confidentiality, performance

Compliance certifications planned

Regulatory and standards engagement

4 key questions when starting any blockchain project

Does Blockchain apply to my scenario?

What technology should I build on?

How do I translate workflows into smart contracts?

What does it take to build a distributed app and connect it to my existing infrastructure?

The first question is...

| Does Blockchain apply to my scenario? | What technology should I build on? | How do I translate workflows into smart contracts? | What does it take to build a distributed app and connect it to my existing infrastructure? |

When your project meets certain criteria

Answering a few questions can determine if blockchain is appropriate

Is this a business process that crosses trust boundaries?

Do multiple parties manipulate the same data?

Are there any intermediaries that control the single source of the truth?

Does the process involve low-value, manual verification steps?

Applications have similar patterns, across industries

Asset Transfer

Cross-Organizational Workflow

High-Assurance Audit

Manufacturing

Asset tracking

Real time auction for supplier contracts

Supply chain transparency

Retail

Loyalty tracking

Product provenance

Logistics management

Insurance

Claims Management

MBS/Property Payments

Fraud detection

Automated underwriting

Banking and Capital Markets

Bond Issuance

Trade Finance

Loan Syndication

Post Trade Settlement

Cross Border Payments

Derivatives Trading

KYC/AML

Government

Licensing and ID

Benefits distribution

Aid tracking

Military security

Health

Personalized medicine

Records sharing

Compliance

The second question is...

Does Blockchain apply to my scenario?

What technology should I build on?

How do I translate workflows into smart contracts?

What does it take to build a distributed app and connect it to my existing infrastructure?

Choose the ledger technology that meets your needs

Deploy in the topology of your choice

1 **Dev/Test: Enable developers to get started**
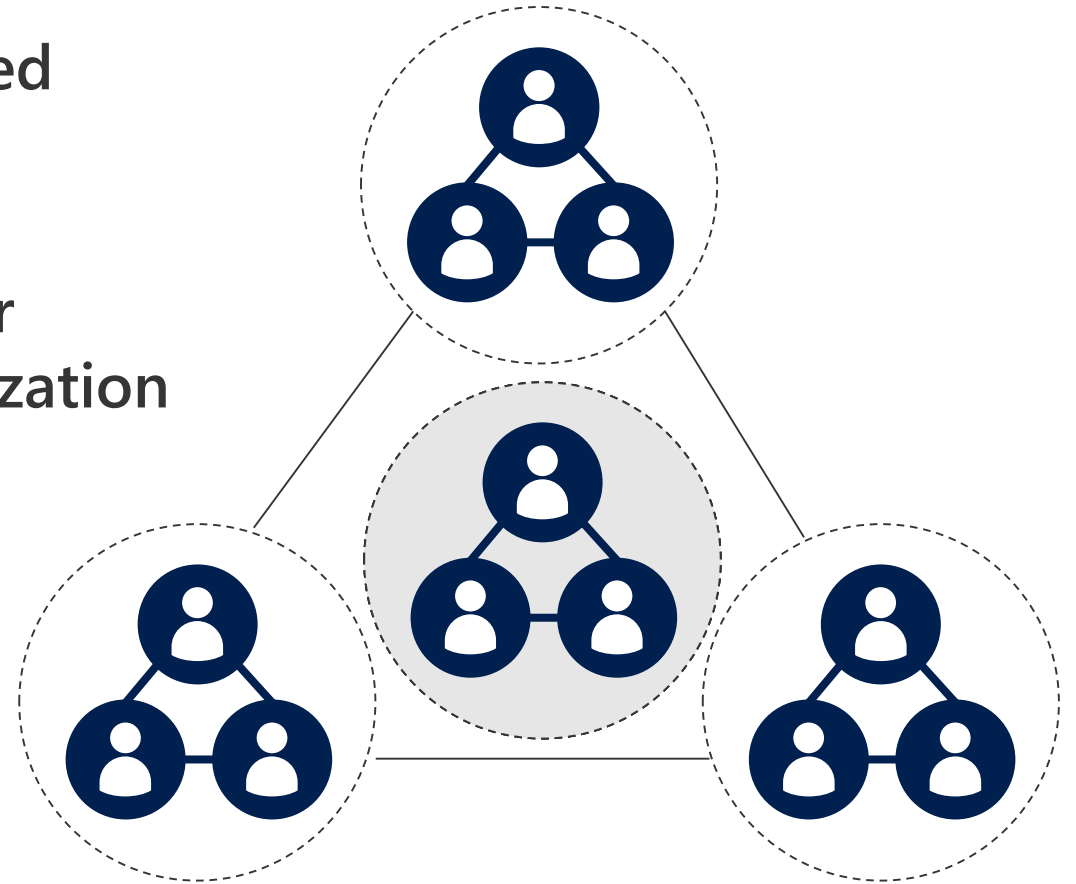Single node (virtual machine)

2 **Single Member: Simulate production for multiple divisions within a single organization**
Multi-node across single region

3 **Multi-member: Collaborate between multiple divisions and organizations**
Multi-node across multiple regions, Azure subscriptions, and/or organizations

The third question is…

Does Blockchain apply to my scenario?

What technology should I build on?

How do I translate workflows into smart contracts?

What does it take to build a distributed app and connect it to my existing infrastructure?

You need a re-imagined architecture

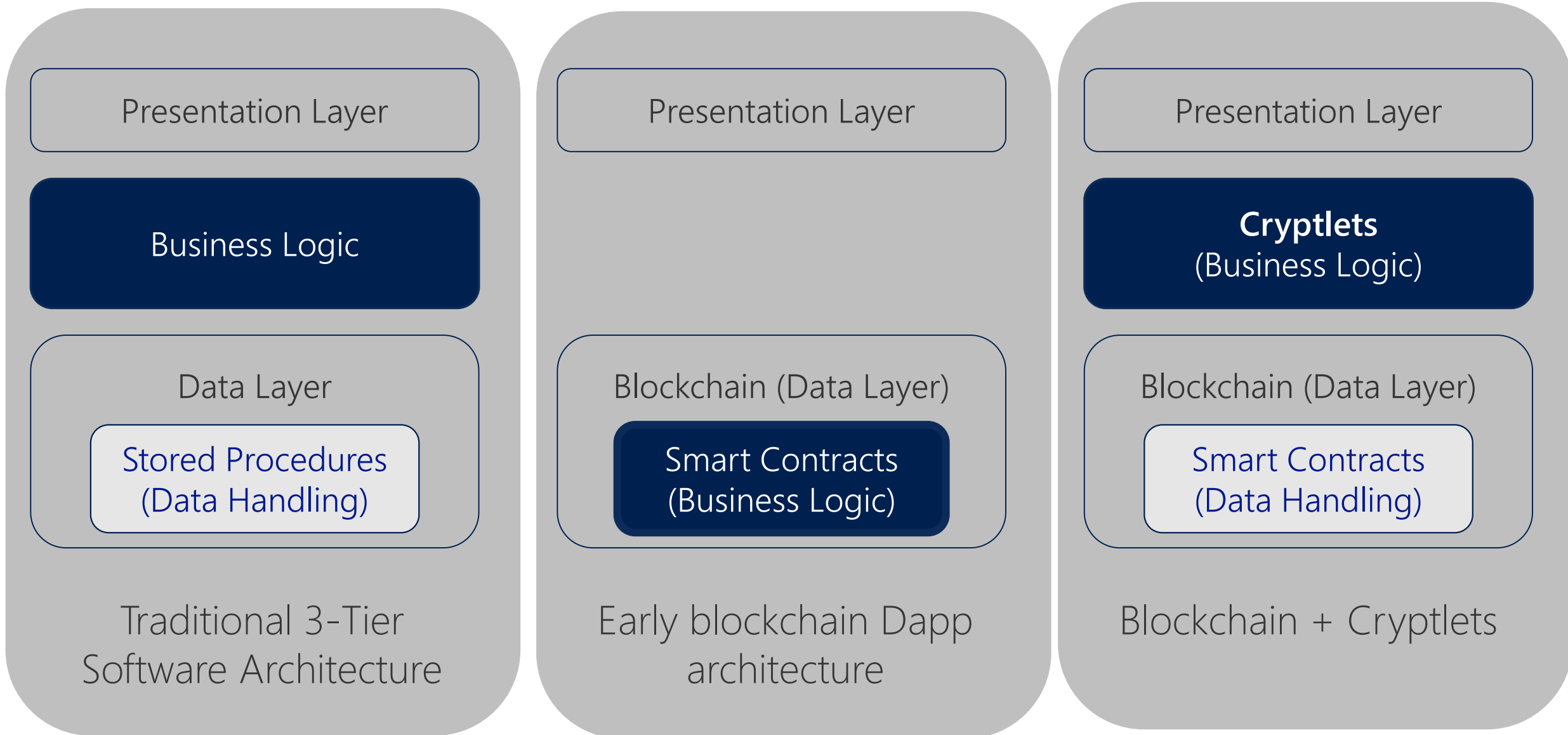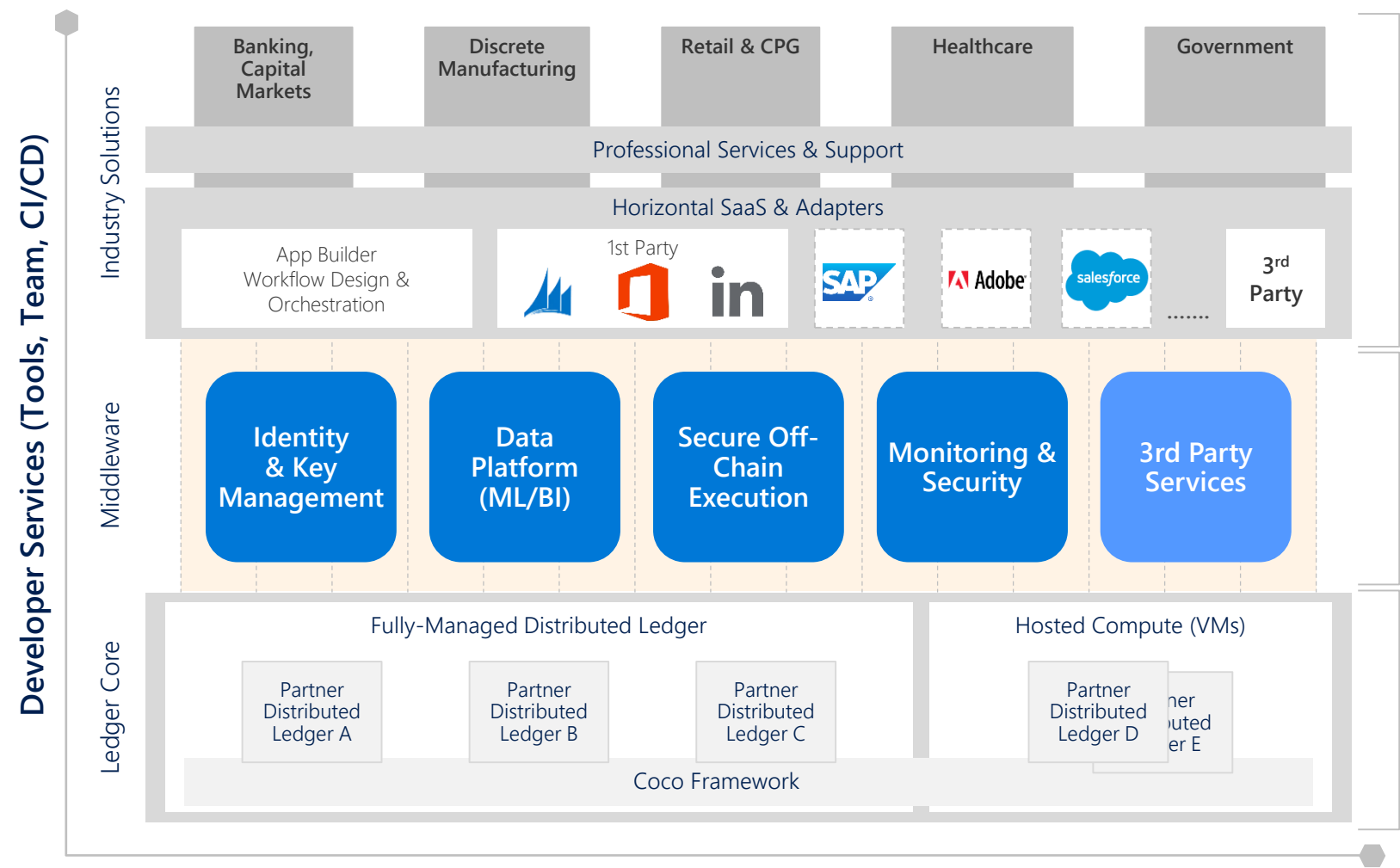| Presentation Layer	Presentation Layer	Presentation Layer
Business Logic		**Cryptlets** (Business Logic)
Data Layer — Stored Procedures (Data Handling)	Blockchain (Data Layer) — Smart Contracts (Business Logic)	Blockchain (Data Layer) — Smart Contracts (Data Handling)
Traditional 3-Tier Software Architecture	Early blockchain Dapp architecture	Blockchain + Cryptlets

The fourth question is...

Does Blockchain apply to my scenario?

What technology should I build on?

How do I translate workflows into smart contracts?

What does it take to build a distributed app and connect it to my existing infrastructure?

An enterprise-friendly platform

Developer Services (Tools, Team, CI/CD)

Industry Solutions

Banking, Capital Markets	Discrete Manufacturing	Retail & CPG	Healthcare	Government

Professional Services & Support

Horizontal SaaS & Adapters

App Builder Workflow Design & Orchestration | 1st Party | SAP | Adobe | salesforce .... | 3rd Party

Middleware

Identity & Key Management	Data Platform (ML/BI)	Secure Off-Chain Execution	Monitoring & Security	3rd Party Services

Ledger Core

Fully-Managed Distributed Ledger

Partner Distributed Ledger A | Partner Distributed Ledger B | Partner Distributed Ledger C

Hosted Compute (VMs)

Partner Distributed Ledger D | Partner Distributed Ledger E

Coco Framework

Azure & Azure Stack – Blockchain resource provider

Connect to existing apps and workflows

Coordinate with relevant tools

Fully managed enterprise ledgers

Blockchain deployment templates

Build Blockchain network from scratch: 3 weeks

1. Review blockchain protocol specific network documentation
2. Determine topology for a consortium network
3. Map topology to IT resources
4. Manually deploy
5. Configure blockchain clients via Linux BASH scripts to support private network (peering, isolate mining nodes, etc.)
6. Configure other blockchain protocol properties (consensus algorithms, max peers, etc.)
7. Trial and error to make above steps work
8. Configure IT networks and firewall ports to permit blockchain protocol traffic
9. Test, debug, and repeat

Deploy Blockchain network in Azure: 17 minutes

1. Activate Azure subscription
2. Search Azure Marketplace for desired blockchain
3. Click on blockchain image of choice
4. Provide 10 user parameters (number of consortium members, number of blockchain VMs, admin usernames and passwords, etc.)
5. Deploy and wait 15 minutes (+/- depending of nodes selected)

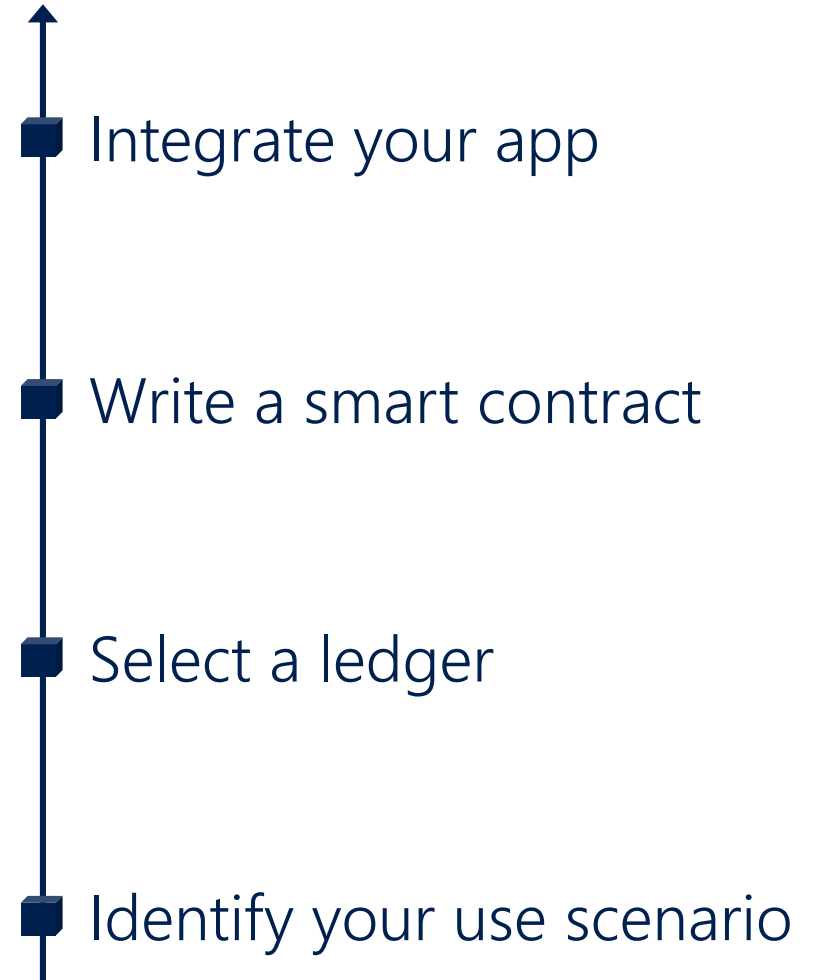# Microsoft is committed to your blockchain journey

Blockchain **on your terms**

Integrated with your business

With **enterprise assurance**

Integrate your app

Write a smart contract

Select a ledger

Identify your use scenario

Microsoft can support in the area of blockchain

Level	Description		Support
Level 4 **1%**	• In Production • High level of expertise	→	• Accelerator Briefing • Consortium Support • Engineering Engagement
Level 3 **4%**	• Scenarios well defined • Production Pilot	→	• Briefing • Strategy / Arch Workshop • DA Engagement • Consulting Delivery (24-30w)
Level 2 **15%**	• Potential Scenario Identified • Need some help with POC	→	• Briefing • Strategy / Arch Workshop • DA Engagement • Consulting Delivery (8-12w)
Level 1 **80%**	• No Blockchain experience or use cases	→	• Briefing • Strategy / Arch Workshop • Technical Training • Lab Setup • Hackathon