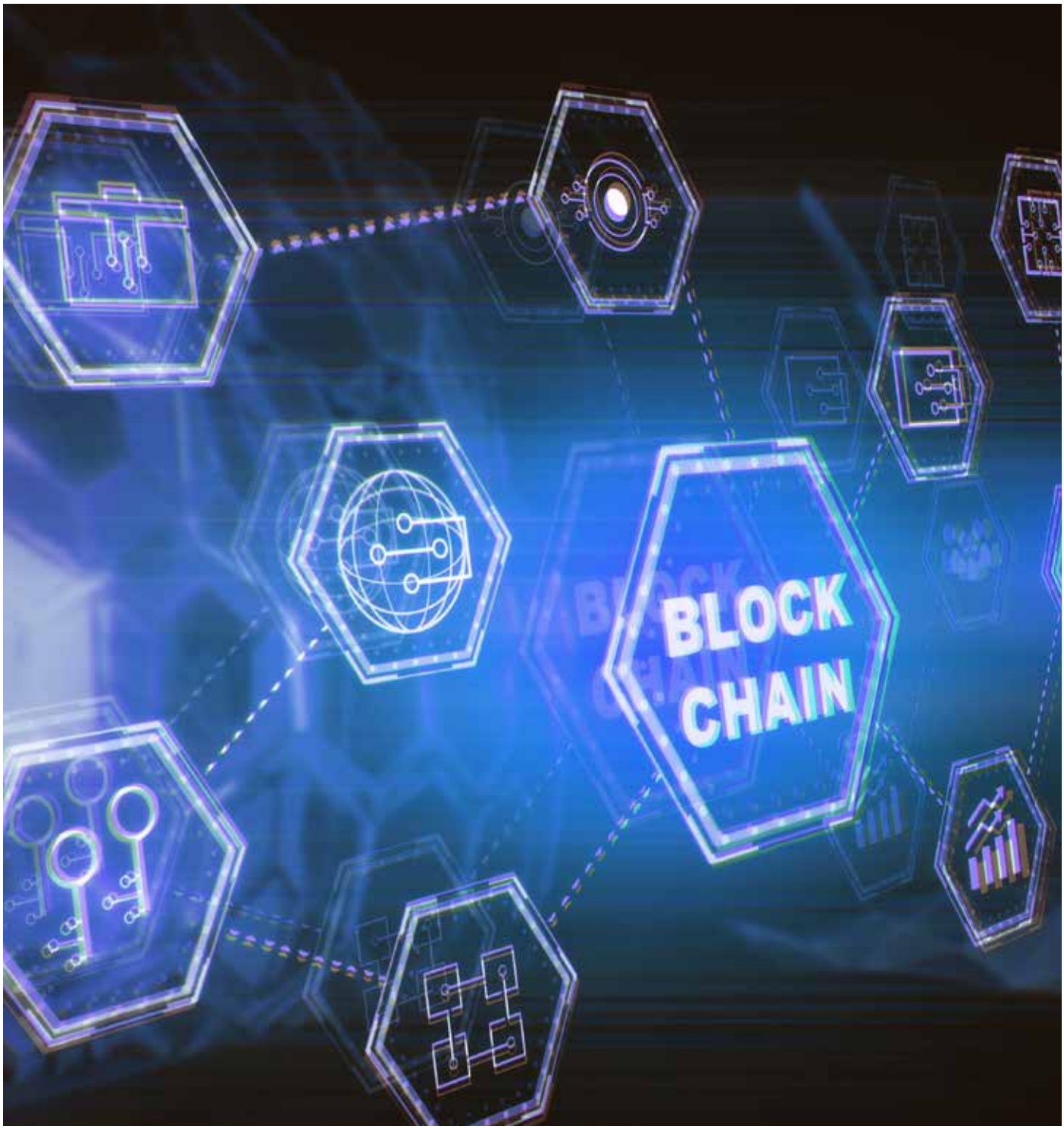
Mphasis
The Next Applied

Blockchain Strategy for BPM Use Cases

Whitepaper by Nidhi Agrawal



Contents

1.
Introduction

Business Process Management (BPM) is the methodology of designing, execution, monitoring and upgrading of business processes. With evolving blockchain (DLT) technology having the potential to radically change the operating environment of inter-organizational processes, there is an absolute need to classify the most practical scenarios to realize blockchain's paybacks, such as increased security, collaboration and cost savings. As the gasping hype around blockchain continues to heighten, many organizations are jumping on the trend without first knowing what real business problems they want it to help solve.

This paper will help in identifying the use cases where we suggest blockchain strategy for BPM use cases.

2.
Problem Statement

Traditional BPM services managing workflow processes have been around for years. Traditional BMP facilities handled only internal workflows within a single organization. Blockchain technology allows for the formation of a peer-to-peer BPM system that eliminates the vital repository of information and allows multiple companies to exchange information directly with counterparties while promising the integrity of the process. For inculcating blockchain for BPM, first step is to identify the suitable use cases.

3.
Solution

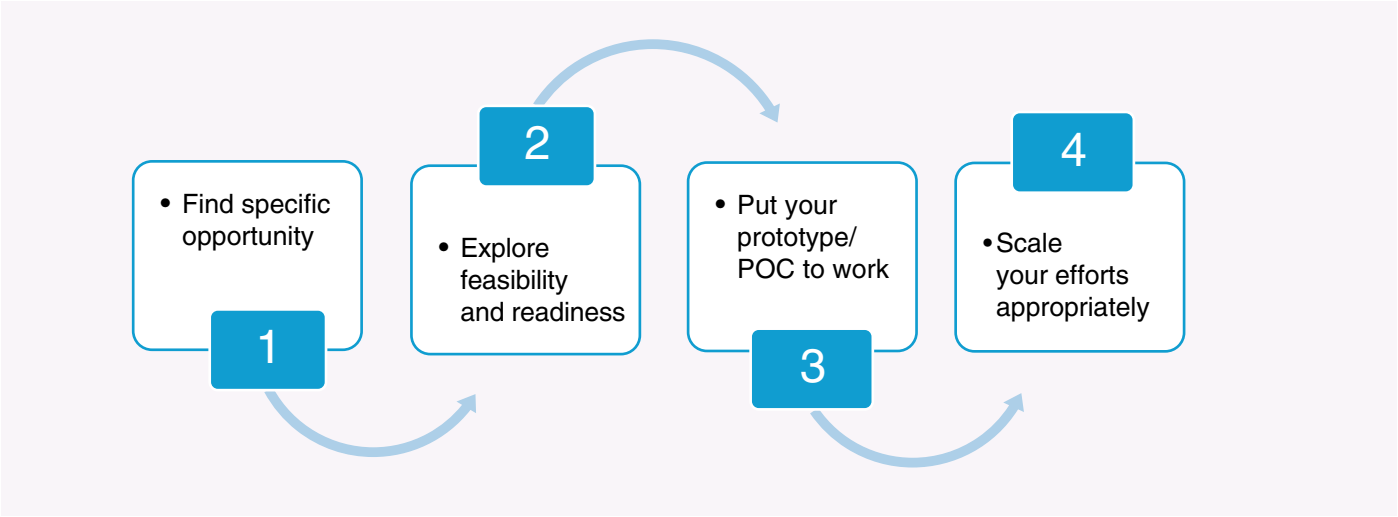
Blockchain has the capability to reinvent Business Process Management. By leveraging smart contracts and the auditability of distributed ledger technologies, blockchain can simplify processes involving multiple parties following specific regulatory rules. In these scenarios, the technology is being used primarily to share documentation, interconnect information, and track different states of transactions. Integration of these systems with existing workflows and back offices provides better prominence among all participants. It is not about pushing everyone to accept a whole new platform. Instead, it is about enabling simple integration of blockchain technologies into BPM solution which can provide improved functionality.

4.
Blockchain Components

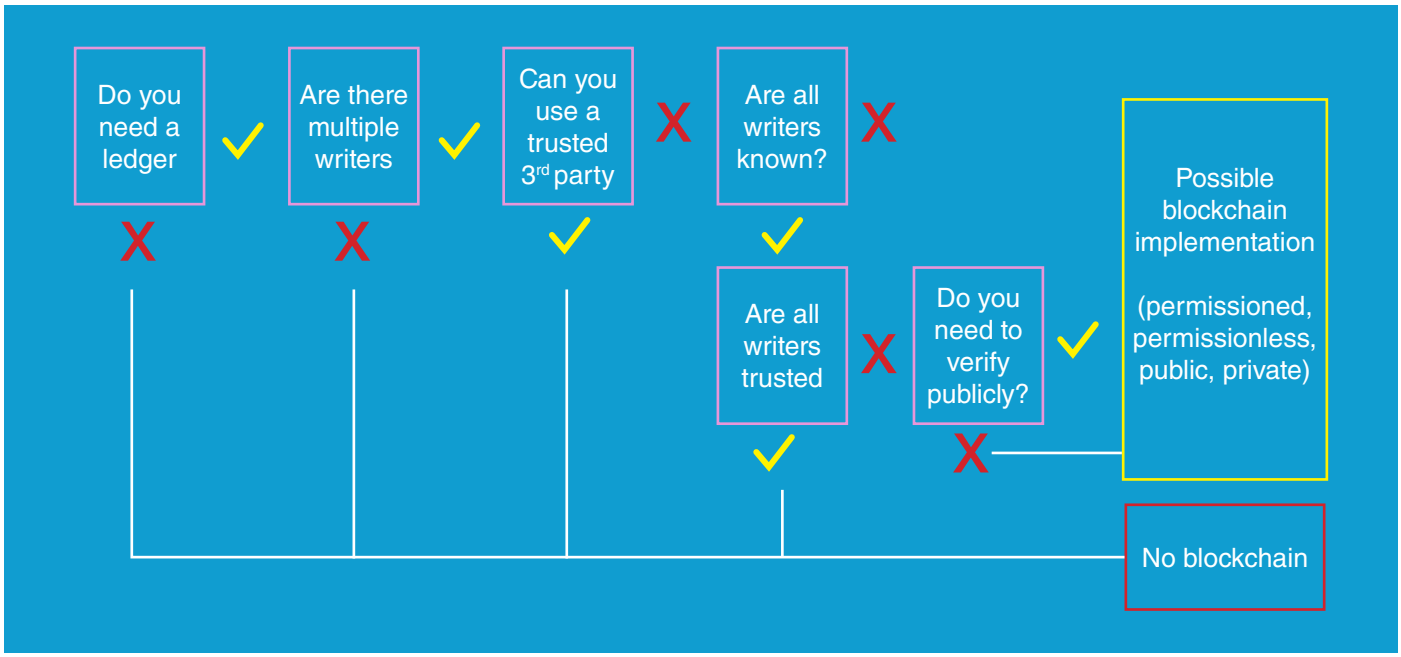
Components	Blockchain for Business
Shared Ledger	Append – only distributed system of records shared across business network
Smart Contract	Business terms embedded in transaction database and executed with transactions
Privacy	Ensuring appropriate visibility; transactions are secure, authenticated and verifiable
Consensus	All parties agree to network verified transaction

5.
Four Steps to Blockchain Enabled Strategy

- **Positive Indicators**
  - Managing contractual relationships
  - Complex business logic
  - Identity is important
  - Transactions need to be private
  - Market approach needed
  - More than two parties
  - Looking to reduce costs
  - Want to improve discoverability
- **Negative Indicators**
  - Need high performance (millisecond transactions)
  - One organization involved (no business network)
  - Looking for a database replacement
  - Looking for message or general transaction processing



6.
Evaluate



7.
What Makes a Good Blockchain Use Case?

Classifying a decent blockchain use case is not always easy! However, there should always be:

1. A business problem that cannot be more efficiently solved with other technologies.
2. A recognizable business network with members, resources and transactions.
3. A need for trust – Consensus, Finality or Provenance.
4. Who are the business network contributors (organizations) involved and what are their parts? If there is no business network involved, then it's not a good use case.
5. Who are the specific people within the organization and what are their job roles? Understand the key users in a business network.
6. What are the main steps in the current workflow and how are these executed by the business network participants?
7. What is the expected benefit of applying blockchain technology to the business problem for each of the network participants?
8. What legacy systems are involved? What grade of integration with the legacy systems is needed?

8.
Blockchain Technology and the BPM Lifecycle

In this section, we will discuss blockchain in relevance to the BPM lifecycle including the following phases: identification, discovery, analysis, redesign, implementation, execution, monitoring, and adaptation. Using the BPM lifecycle as a framework of reference allows us to discuss many incremental changes that blockchain might provide.

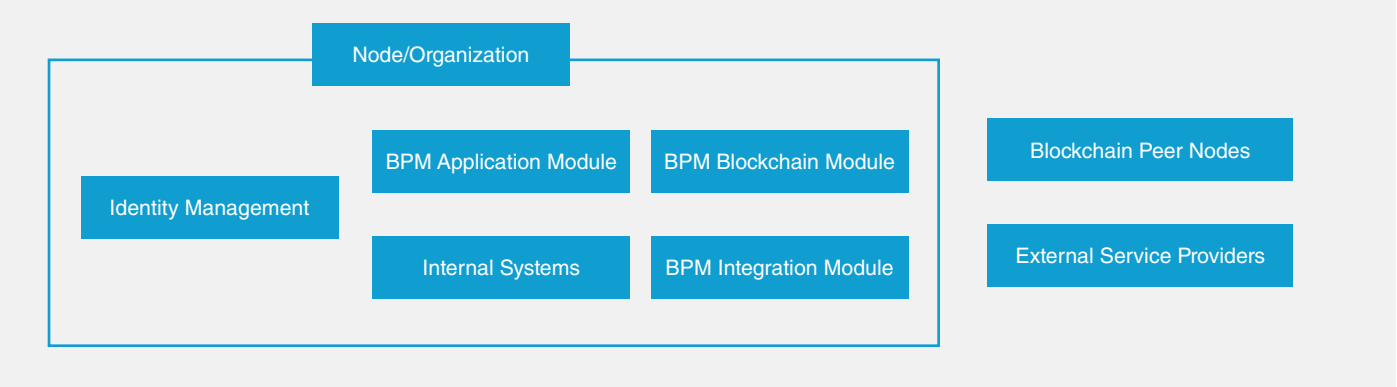
Identification	Process identification is concerned with the high-level description and assessment of a company from a process-oriented standpoint, thus connecting strategic position with process improvement. Currently, identification is mostly approached from a narrow perspective. Blockchain technology adds another relevant viewpoint for evaluating high-level processes in terms of the implied strong points, weaknesses, prospects, and threats. Because blockchains have like-mindedness with the support of inter-organizational processes, process identification may need to encompass not only the needs of one organization, but broader known and even unknown allies.
Discovery	Process discovery refers to the group of information about the current way a process operates and its depiction as an as-is process model. Currently, methods for process discovery are largely based on interviews, walkthroughs and documentation analysis, complemented with automated process discovery techniques over non-encrypted event logs generated by process-aware information systems. Blockchain technology defines new challenges for process discovery techniques: the information may be fragmented and encrypted; accounts and keys can change frequently; and payload data may be stored partly on-chain and partly off-chain.
Analysis	Process analysis refers to obtaining visions into issues relating to the way a business process currently functions. Currently, the analysis of processes mostly builds on data that is available inside of organizations or from insights shared by internal and external process stakeholders. Records of processes executed on the blockchain yield valuable information that can help to assess the case load, durations, frequencies of paths, parties involved, and correlations between unencrypted data items. These pieces of information can be used to discover processes, detect deviations, and conduct root cause analysis, ranging from small groups of companies to an entire industry at large. The question is which effort is required to bring the available blockchain transaction data into a format that permits such analysis.
Redesign	Process redesign deals with the systematic improvement of a process. Currently, approaches like redesign heuristics are built on the assumption that there are frequent patterns of how a process can be improved. Blockchain technology offers novel ways of improving specific business processes or resolving specific glitches. For instance, instead of involving executor to release a payment if an agreed condition is met, a buyer and a seller of a house might agree on a smart contract instead. The question is where blockchains can be applied for optimizing existing communications and where new communication patterns without a reliable chief party can be established, potentially drawing on insights from related investigation on Web service interaction.

Implementation	Process implementation refers to the procedure of renovating a to-be model into software components executing the business process. Currently, business processes are often executed using process-aware information systems or business process management systems inside single organizations. In this context, the question is how the involved parties can make sure that the implementation that they deploy on the blockchain supports their process as desired. Blockchains are especially helpful in inter-organizational settings, where it is not possible to control and monitor a complete process in a centralized fashion because of organizational borders. To verify that contracts between choreography stakeholders have been fulfilled, a trust basis, which is not under control of a specific party, needs to be established. Blockchains may serve to establish this kind of trust between stakeholders.
Execution	Execution refers to the instantiation of individual cases and their information-technological processing. Currently, such execution is simplified by process-aware information systems or business process management systems. For the actual execution of a process deployed on a blockchain following the method of, several differences with the tradition always exist. During the execution of an instance, messages between participants need to be passed as blockchain transactions to the smart contract; resulting messages need to be observed from the blocks in the blockchain. Both can be achieved by integrating blockchain technology directly with existing enterprise systems or using dedicated integration components.
Monitoring	Process monitoring refers to collecting events of process executions, displaying them in a logical way, and triggering alerts and escalation in cases where undesired behavior is observed. Currently, such process execution data is verified by systems that support process execution. First, we face issues in terms of data fragmentation and encryption as in the analysis phase. For example, the data on the blockchain unaided will likely not be adequate to monitor the process, but require integration with local off-chain data. Once such drawing in place, the global view of the process can be monitored autonomously by each involved party. This provides a suitable basis for incessant conformance and compliance checking and monitoring of service-level contracts. Second, based on monitoring data exchanged via the blockchain, it is possible to verify if a process instance meets the original process model and the contractual duties of all involved process participants. For this, blockchain technology can be exploited to store the process execution data and handoffs between process members.
Adaptation and Evolution	Runtime version refers to the notion of changing the process during execution. In traditional approaches, this can for instance be attained by allowing members in a process to change the model during its execution. Interacting associates might take a self-justifying stance in order to sidestep certain types of adaptation. Blockchain can be used to impose conformance with the model, so that members can rely on the combined model being followed.

9.
Blockchain Node

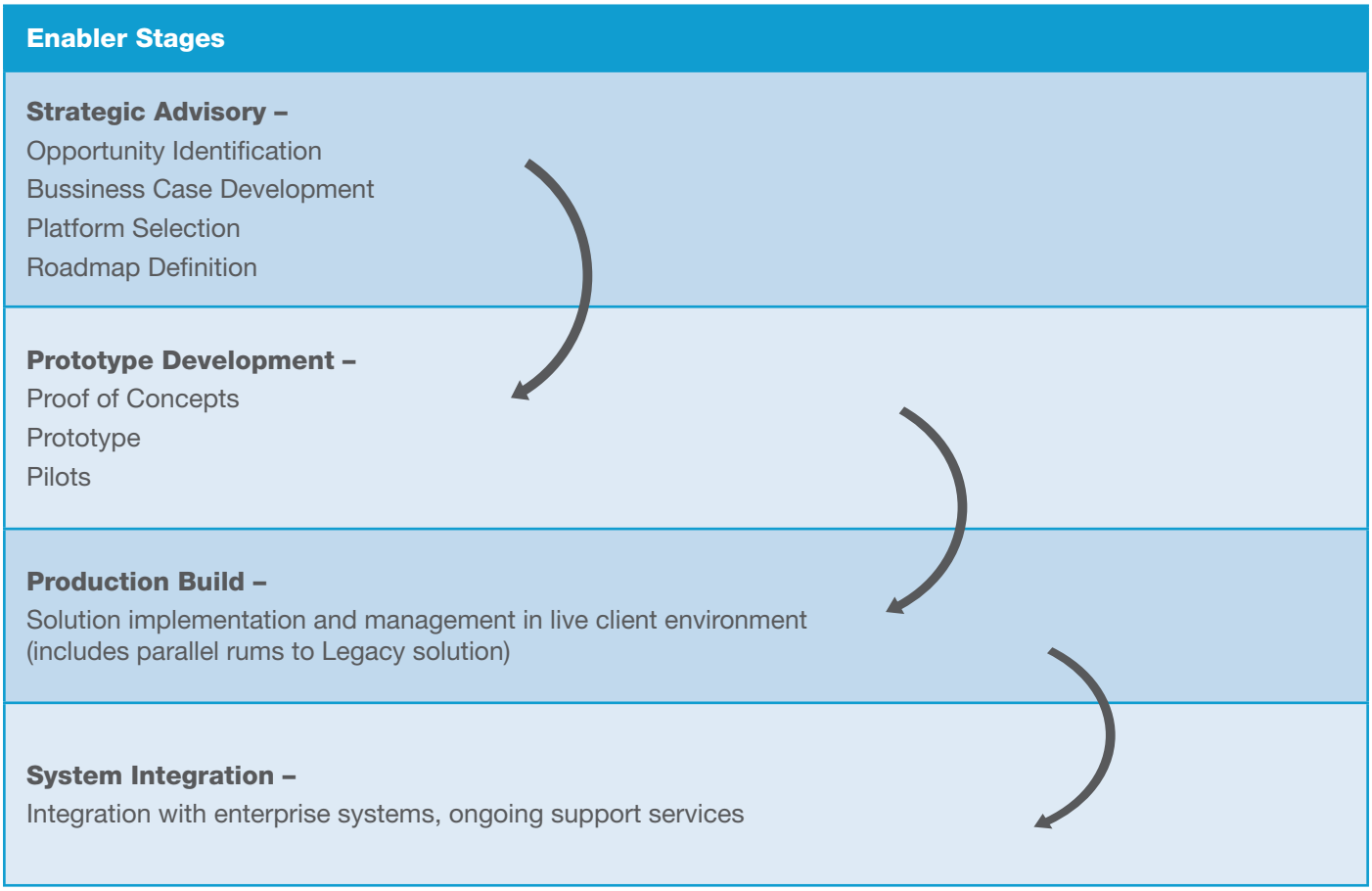
Each Node in an organization participates as Member or a Founder node.

Diagram below depicts the set of services and components that need to interact within each such node.



10.
Blockchain Enablers

The end-to-end blockchain services value chain for enterprise use cases has below enablers stages.



11.
Seven Design Principles of Sustainable Blockchain Business Network

1. Providing network participants control of their business.
2. Establishment for an extensible business network - Flexibility in association.
3. Permissioned but protected network - Protecting competitive data.
4. Open access and collaborative global network - Collective innovation.
5. Scalability - Transaction processing and data encryption processing.
6. Security - New security challenges of shared business network.
7. Coexisting with existing systems of records and transaction systems.

12.
Major Business Domain

Financial	Trading Deal origination Pos for new securities Equities Fixed income Derivatives trading Total Return Swaps (TRS) 2nd Generation Derivatives The race to a zero-middle office Collateral management Settlements Payments Transferring of value Know Your Client (KYC) Anti-money laundering Client and product reference data Crowdfunding Peer-to-peer lending Compliance reporting Trade reporting and risk visualizations Betting and prediction markets

Insurance	Claims filings MBS/Property payments Claims processing and admin Fraud prediction Telematics and ratings <Telematics is an interdisciplinary field that encompasses telecommunications, vehicular technologies and computer science.>
Media	Digital rights management Game monetization Art authentication Purchase and usage monitoring Ticket purchases Fan tracking Ad click fraud reduction Resell of authentic assets Real-time auction and ad placements
Computer Science	Micronization of work (pay for algorithms, tweets, ad clicks, etc.) Expanse of marketplace Disbursement of work Direct to developer payments API platform plays Notarization and certifications P2P storage and computing sharing DNS
Medical	Records sharing Prescription sharing Compliance Personalized medicines DNA sequencing
Asset Titles	Diamonds Designer brands Car leasing and sales Home mortgages and payments Land title ownerships Digital assets records

Government	Voting Vehicle registrations WIC, Vet, SS, benefits distribution Licensing and identification Copyrights
Identity	Personal Objects Families of objects Digital assets Multifactor auth Refugee tracking Education and badging Purchase and review tracking Employer and employee reviews
IOT	Devices to devices payments Device directories Operations (e.g. waterflow) Grid monitoring Smart home and office management Cross company maintenance market
Payments	Micropayments (apps, 402) B2B international remittance Tax filing and collections Rethinking wallets and banks
Consumer	Digital rewards Uber, Airbnb, Apple pay P2p selling, Craigslist Cross company, brand, loyalty tracking
Supply Chain	Dynamic ag commodities pricing Real-time auction for supply delivery Pharmaceutical tracking and purity Agriculture food authentication Shipping and logistic management

13.
Blockchain Use Cases

Areas	Use Cases
Digital Currency	E-commerce Global payments Remittance P2P lending Microfinance
Record Keeping	Healthcare Title records Ownership Voting Intellectual property
Securities	Equity Private markets Debt Crowdfunding Derivatives
Smart Contracts	Digital rights Wagers Escrow

14.
Challenges and Limitations

Immutability	A blockchain is odd only list. Once data is added, it can't be removed. Perhaps not a good fit when updating/deleting data is needed.
Data Storage	Databases are often used to store large amount of data (images, dots, apps, etc.). However, blockchain is designed for small pockets of data. If data storage is needed, blockchain may not be the good fit, or a hybrid solution is needed.
Talking about blockchain	The act of explaining blockchain to public officials and civil servants is difficult. Delinking blockchain from Bitcoin and discussing how it can improve efficiency and strengthen mission effectiveness can help.
Costs	Higher short-term costs associated with still emerging technology prevent its widespread use. Blockchain as a service product is starting to be offered that can allow for experimentations.
Blockers	People often flag issues such as energy consumption and scalability as blockchain blockers. However, many of these are irrelevant to government (i.e., only apply to Proof of Work consensus on permissionless /public blockchain).
Coding and Governance Model	Blockchain is known for eliminating the need for central authority, but this is not entirely true. It must be coded and governed by those entrusted with key roles. Governments must build a technical knowledge base to ensure these decisions are made well (even if the actual coding is outsourced).

15.
Conclusion

By identifying the blockchain strategy for BPM Product like Pega, appian, etc., use cases for solution, futuristic application design can be created. In this paper, we described what we believe are the main new trials and chances of blockchain technology for business process management. This leads to instructions for research happenings to explore both challenges and opportunities.

Author

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Nidhi Agarwal is Group Manager, Business Process Management (BPM) at Mphasis and comes with 15+ years of IT experience spanning BPM practice leadership, project and program management, service delivery, development and consulting. Nidhi manages Pre Sales, Go To Market, Account Mining, Alliances, Collateral Starter Kits, Knowledge Management for the BPM Practise. She is also responsible for New Logo Wins, generating revenues from IP/solutions/ T&A, and operational responsibilities include Revenue Forecasting, Bench Management etc.

On the technology and skills front, Nidhi is an expert in Pega RULES Process Commander, Pega Collection for Financial services, Project Management Framework, Pega Decision Management, Pega Customer Service Framework, Smart Investigate for Payments; she is trained in Robotic Process Automation (RPA) and Robotic Desktop Automation (RDA), Microsoft Visio, Scrum & Agile methodologies, BPM product evaluation, DevOps, Docker and Testing Based Development.

About Mphasis

Mphasis (BSE: 526299; NSE: MPHASIS) applies next-generation technology to help enterprises transform businesses globally. Customer centricity is foundational to Mphasis and is reflected in the Mphasis' Front2Back™ Transformation approach. Front2Back™ uses the exponential power of cloud and cognitive to provide hyper-personalized ($C = X2C^{2}_{TM} = 1$) digital experience to clients and their end customers. Mphasis' Service Transformation approach helps 'shrink the core' through the application of digital technologies across legacy environments within an enterprise, enabling businesses to stay ahead in a changing world. Mphasis' core reference architectures and tools, speed and innovation with domain expertise and specialization are key to building strong relationships with marquee clients. To know more, please visit www.mphasis.com

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