



# BLOCKCHAIN FOR BUSINESS

# **BLOCKCHAIN ENABLED BUSINESS PROCESSES**

# CONTENT

1. Introduction and Learning Goals;
2. Recap;
3. Quiz;
4. **Disruptive elements of blockchain;**
5. **Business process management and blockchain;**
6. **Business process lifecycle phases and blockchain;**
7. **Business processes and smart contracts;**
8. **Blockchain business case: Walmart;**
9. Bibliography;
10. Quiz;
11. Self-reflection questions;
12. Further readings.

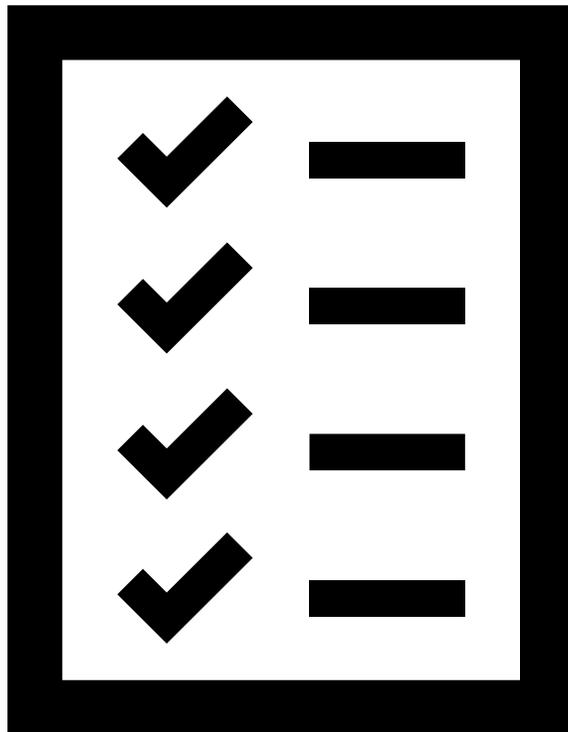


# RECAP



1. What is the relationship between the development of the global marketplace, the demand for company products and services, the need for continuous business optimization, and the novel application of IT?
2. How many examples of paradigmatic changes in business operations or product features do you know? How often we see paradigmatic changes in products or markets?
3. What is the role of IT as a product and/or as business tool in today's market competition?

# QUIZ:



Follow the link to the quiz :

- Moodle block “Blockchain enabled business processes” 

Quiz #1 “The opening quiz”.

# *DISRUPTIVE ELEMENTS OF BLOCKCHAIN*



TRANSPARENCY



IMMUTABILITY



CONSENSUS



SECURITY

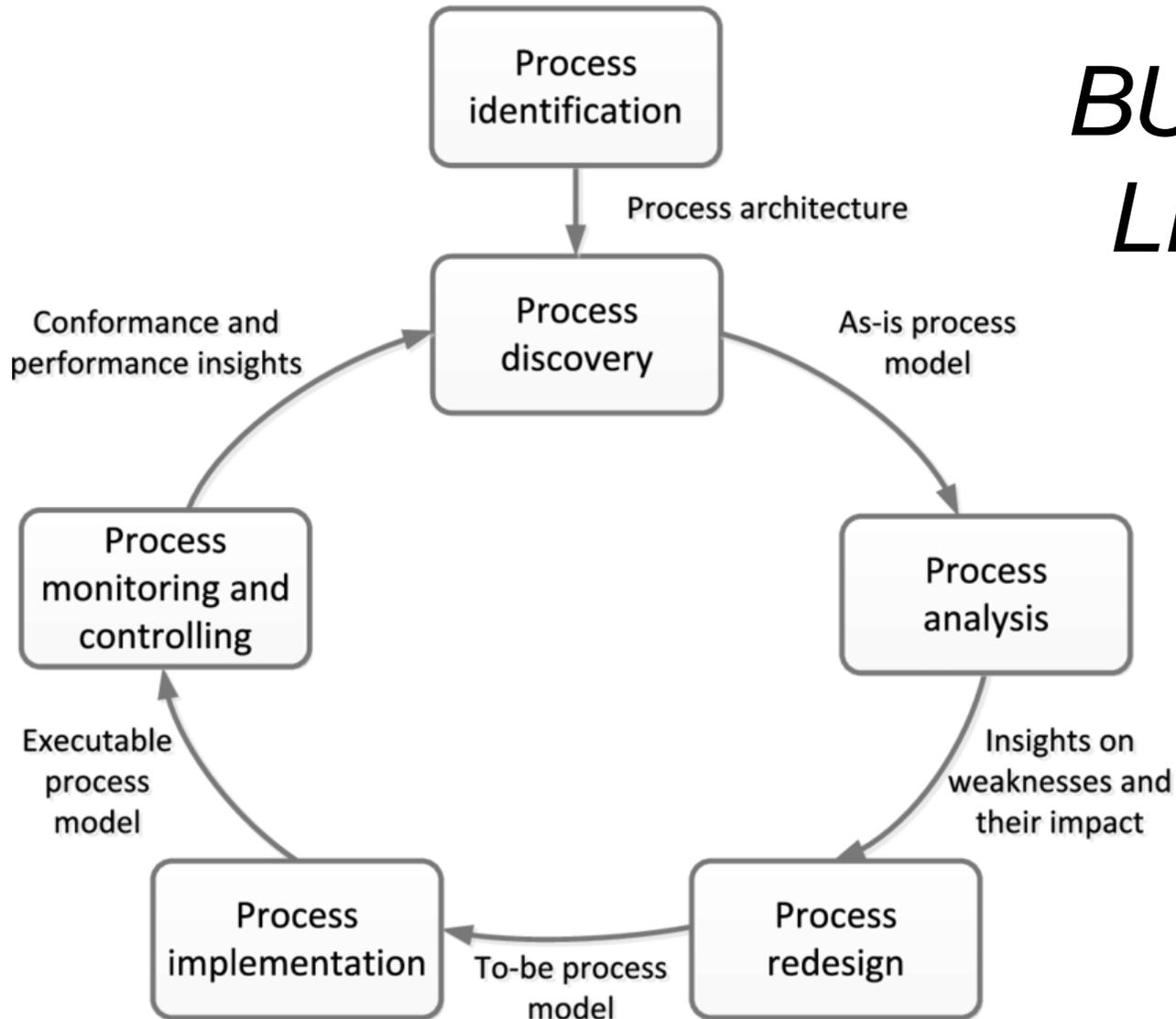


SMART  
CONTRACTS

# *BLOCKCHAIN FOR BUSINESS PROCESS MANAGEMENT*

- Blockchains offer a way to execute processes in a trustworthy manner even in a network without any mutual trust between nodes.
- Large parts of the control flow and business logic of inter-organizational business processes can be compiled from process models into smart contracts which ensure the joint process is correctly executed.
- Trigger components allow connecting these inter-organizational process implementations to Web services and internal process implementations.

# BUSINESS PROCESS LIFECYCLE PHASES AND BLOCKCHAIN



# 1. IDENTIFICATION

- Process identification is concerned with the high-level description and evaluation of a company from a process-oriented perspective.
- Process identification is mostly approached from an inward-looking perspective.
- DISCUSSION: How can a company systematically identify the most suitable processes for blockchains or the most threatened ones?

## 2. *DISCOVERY*

- Process discovery – collection of information about the current way a process operates and its representation in process model.
- DISCUSSION: How can a company discover an overall process from blockchain transactions when these might not be logically related to a process identifier?
- Matching could represent a promising starting point to solve this problem.
- There are also opportunities for reverse engineering business processes, among others, from smart contracts.

# 3. ANALYSIS

- Process analysis refers to obtaining insights into issues related with the way a business process currently operates.
- 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.
- This 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.

# 4. REDESIGN

- Process redesign deals with the systematic improvement of a process.
- DISCUSSION: Where can blockchains be applied for optimizing existing interactions and where can new interaction patterns without a trusted central party be established?
- A promising direction for developing blockchain-appropriate abstractions and heuristics may come from data-aware workflows and diagrams.

# 5. IMPLEMENTATION

- Process implementation refers to the procedure of transforming a to-be model into software components executing the business process.
- DISCUSSION: How can the involved parties make sure that the implementation of blockchain supports their process as desired?
- The property of inhabiting a certain role in a process might itself could be a tradable asset.
- As more and more companies use blockchain, there will be a proliferation of smart contract templates available for use.
- Tools for finding templates appropriate for a given style of collaboration will be essential.

## 6. *EXECUTION*

- Execution refers to the instantiation of individual cases and their information-technological processing.
- During the execution of an instance, messages between participants must be passed as blockchain transactions to the smart contract; resulting messages need to be observed from the blocks in the blockchain.
- The main challenge here involves ensuring correctness and security, especially when monetary assets are transferred.

# 7. MONITORING

- Monitoring process refers to collecting events of process executions, displaying them in an understandable way, and triggering alerts and escalation in cases where undesired behaviour is observed.
- Issues with data fragmentation and encryption.
- 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 obligations of all process stakeholders involved.
- Blockchain technology can be exploited to store the process of data execution and handoffs between process participants.

# 8. ADAPTATION AND EVOLUTION

- Adaptation refers to the concept of changing the process during execution.
- Blockchain can be used to enforce conformance with the model, so that participants can rely on the joint model being followed.
- If smart contracts enforce the process, there are also problems arising in relation to evolution: new smart contracts need to be deployed to reflect changes to a new version of the process model. Porting running instances from an old version to a new one would require effective coordination mechanisms involving all participants.

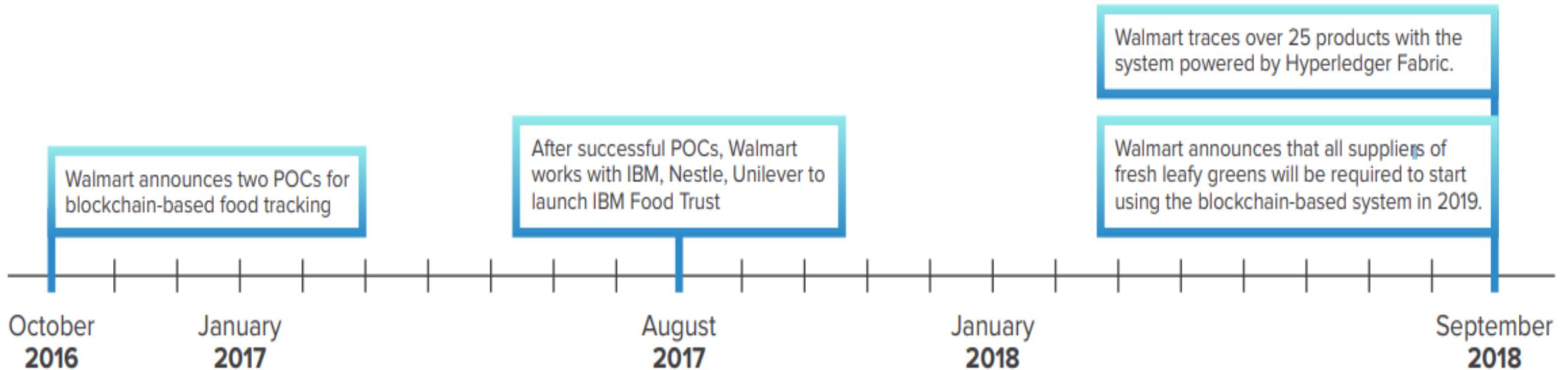
# *SMART CONTRACTS AND BUSINESS PROCESSES*

- Smart contracts can be used to implement business collaborations in general and inter-organizational business processes.
- Business processes are subject to rules on how to respond to specific conditions. For example – the buyer ordering 500 items from a vendor. If the vendor does not deliver items within two weeks, the buyer might be entitled to receive a penalty payment. Such business rules can be expressed by smart contracts.

# *BLOCKCHAIN BUSINESS CASE:* **Walmart** Save money. Live better.

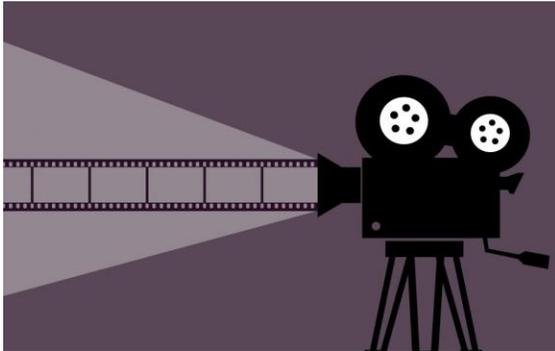
- By eliminating the middleman, or data gatekeeper, blockchain allows companies to quickly and easily trace products and transactions all the way back to their roots.
- Walmart successfully decreased the time it takes to trace food from store shelves to the farm from seven days to 2.2 seconds using a blockchain.
- Access: [https://www.hyperledger.org/wp-content/uploads/2019/02/Hyperledger\\_CaseStudy\\_Walmart\\_Printable\\_V4.pdf](https://www.hyperledger.org/wp-content/uploads/2019/02/Hyperledger_CaseStudy_Walmart_Printable_V4.pdf)

# WALLMART CASE STUDY



# DISCUSSION QUESTIONS:

Watch a video: 02:58



<https://www.youtube.com/watch?v=SV0KXBxSoio>

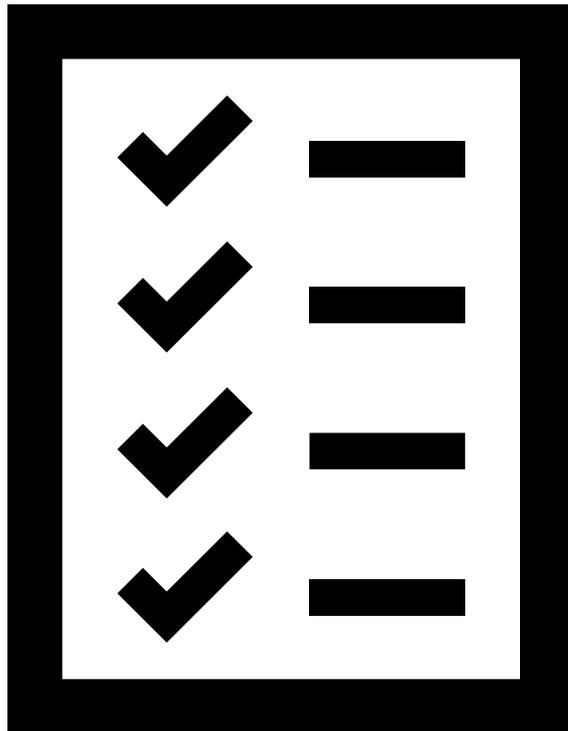
Walmart's food safety solution using IBM Food Trust built on the IBM Blockchain Platform

1. Remember podcast “IBM’s Jerry Cuomo On Everything From Blockchain Security To Hyperledger To The Internet Of Things” (access: <https://unchainedpodcast.com/ibms-jerry-cuomo-on-everything-from-blockchain-security-to-hyperledger-to-the-internet-of-things/>) (from 17:00). How did IBM manage “to sell blockchain” to Walmart?
2. Why blockchain technologies were chosen by Walmart?
3. What processes blockchain technologies are improving / optimizing?
4. What other industries could benefit from blockchain-enabled processes? How?

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3. Hyperledger „Case Study: How Walmart brought unprecedented transparency to the food supply chain with Hyperledger Fabric“. Access: [https://www.hyperledger.org/wp-content/uploads/2019/02/Hyperledger\\_CaseStudy\\_Walmart\\_Printable\\_V4.pdf](https://www.hyperledger.org/wp-content/uploads/2019/02/Hyperledger_CaseStudy_Walmart_Printable_V4.pdf)
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5. Weber, I., Xu, X., Riveret, R., Governatori, G., Ponomarev, A., Mendling, J. (2016) “Untrusted Business Process Monitoring and Execution Using Blockchain”. In Business Process Management - 14th International Conference, BPM 2016, Rio de Janeiro, Brazil. Proceedings (Lecture Notes in Computer Science), Vol. 9850. Springer, 329–347. Access: [https://www.researchgate.net/publication/303996559\\_Untrusted\\_Business\\_Process\\_Monitoring\\_and\\_Execution\\_Using\\_Blockchain](https://www.researchgate.net/publication/303996559_Untrusted_Business_Process_Monitoring_and_Execution_Using_Blockchain)

# QUIZ:



Follow the link to the quiz :

- Moodle block “Blockchain enabled business processes” 

Quiz #2 “The closing quiz”.

# *SELF-REFLECTION QUESTIONS:*

1. How can blockchain technologies enable business processes?
2. How can blockchain technologies improve business process lifecycle?
3. What are the pros and cons of deploying blockchain solutions to support/enable business processes?

# *FURTHER READINGS:*

1. Mendling, J., et al. (2018) „Blockchains for Business Process Management - Challenges and Opportunities“. ACM Transactions on Management Information Systems, Vol. 9.  
Access:  
[https://www.infosys.tuwien.ac.at/Staff/sd/papers/Zeitschriftenartikel\\_2018\\_S\\_Dustdar\\_Blockchains.pdf](https://www.infosys.tuwien.ac.at/Staff/sd/papers/Zeitschriftenartikel_2018_S_Dustdar_Blockchains.pdf)
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[https://www.researchgate.net/publication/303996559\\_Untrusted\\_Business\\_Process\\_Monitoring\\_and\\_Execution\\_Using\\_Blockchain](https://www.researchgate.net/publication/303996559_Untrusted_Business_Process_Monitoring_and_Execution_Using_Blockchain)

# VIDEO

- 1. Walmart's food safety solution using IBM Food Trust built on the IBM Blockchain Platform (2:56) <https://www.youtube.com/watch?v=SV0KXBxSoio>