APPROACH TO IMPLEMENT BLOCKCHAIN IN ORACLE JDEDWARDS ENTERPRISE ONE

Abstract

In an age where data is king, manufacturers must be able to trace their products from the point of origin right up to customer delivery. This includes tracking the condition of the product, an important parameter when it comes to ensuring product compliance with various industry or country-specific norms.

This paper examines why product information and traceability is important and how blockchain can help achieve this. It explains the latest Oracle JDEdwards Enterpriseone feature that supports the creation of blockchain networks within organizations. It also looks at how this can be used effectively by supply chain partners for greater transparency and efficiency.

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Introduction – Blockchain for Supply Chains

Supply chains typically have multiple stakeholders like suppliers, logistics partners, distributors, and retailers, all of whom play key roles in getting the final product to the customer. The product must often be maintained in a specific physical condition across the entire supply chain. For example, in the pharmaceutical industry, drugs must be maintained at a fixed temperature. In the petrochemical industry, crude oil must be strictly monitored to record its volume and density, particularly when it is handled by multiple parties like transporters and retailers.

Therefore, it is critical to constantly track these parameters across the supply chain. This not merely ensures product safety, but also proves useful in other business scenarios such as:

• Product recall

• A particular lot of product failing regulatory requirements

• Legal notice for defective products

• After sales service

Currently, all supply chain management (SCM) stakeholders maintain their own enterprise resource planning (ERP) software to store critical information. This data is passed to the next stakeholder in a traditional manner using interfaces, electronic data interchange (EDI) or emails. This method is enough to track the position of the product in the supply chain; however, it does not provide information about the product across the supply chain.

As a first step, organizations must develop ways to capture such product information. Secondly, they must ensure transparency when sharing such product information in order to facilitate collaborative relationships among stakeholders. This will also provide a tool to verify and validate

parameters without incurring steep costs when managing the business scenarios mentioned earlier.

Given below are some industry-specific examples highlighting the need to track information about products:

- **Food** – In case fresh or packaged pork products need to be recalled from supermarkets on discovering a viral outbreak among pigs in a particular country

- **Automobiles** – In case a product has to be recalled due to a vendor-specific issue, it becomes easy to identify the affected customers and resolve the issue in a shorter time-frame

- **Education** – Track student behavior, skills, performance, and achievements right from school to university, which can then be used by employers, foreign universities and for immigration purposes

- **Pharmaceuticals** – When high-value drugs do not comply with country-specific quality standards, it is easy to track the non-complying parameters of all stakeholders and fix the root cause

- **Real estate** – Maintain records of the lesser and lessee for background verification

Using blockchain in pharmaceutical industry

Fig 1 illustrates how blockchain and Internet of Things (IoT) can be used to track actual parameters like temperature at various stages of drug movement across the pharma supply chain. Each piece of product information constitutes a block that is maintained, tracked and trusted by all parties.

Steps in the blockchain

1. **Create a transaction** – Whenever material flows from one stakeholder to another there is transaction that is mostly recorded in the enterprise application. This may be a work order or purchase order receipt or a bill of lading (BOL). In a blockchain-enabled supply chain, this transaction will also record the parameters that are important to stakeholders. In this case, storage temperature of the drugs will

be recorded using an IoT device that is present in the factory, transport truck or distribution center

2. **Authenticate the transaction** – All stakeholders must agree on a uniform process by which transactions are authenticated and shared among various parties in the supply chain. Authentication is needed to build trust and confidence in the data that is being shared. In this case, all parties must agree to use and maintain industry-standard IoT devices that can record temperature and push the data into the blockchain

3. **Store transactions in a block** – Each transaction and its recorded parameters must be stored in a block. Use hashtags to relate one transaction to another. Information is stored using a cryptographic hash function

4. **Share these blocks throughout the supply chain** – As each block captures vital information, it needs to be shared in a transparent manner across all stakeholders. In this case, all parties can monitor the drug storage temperature as it passes through the supply chain
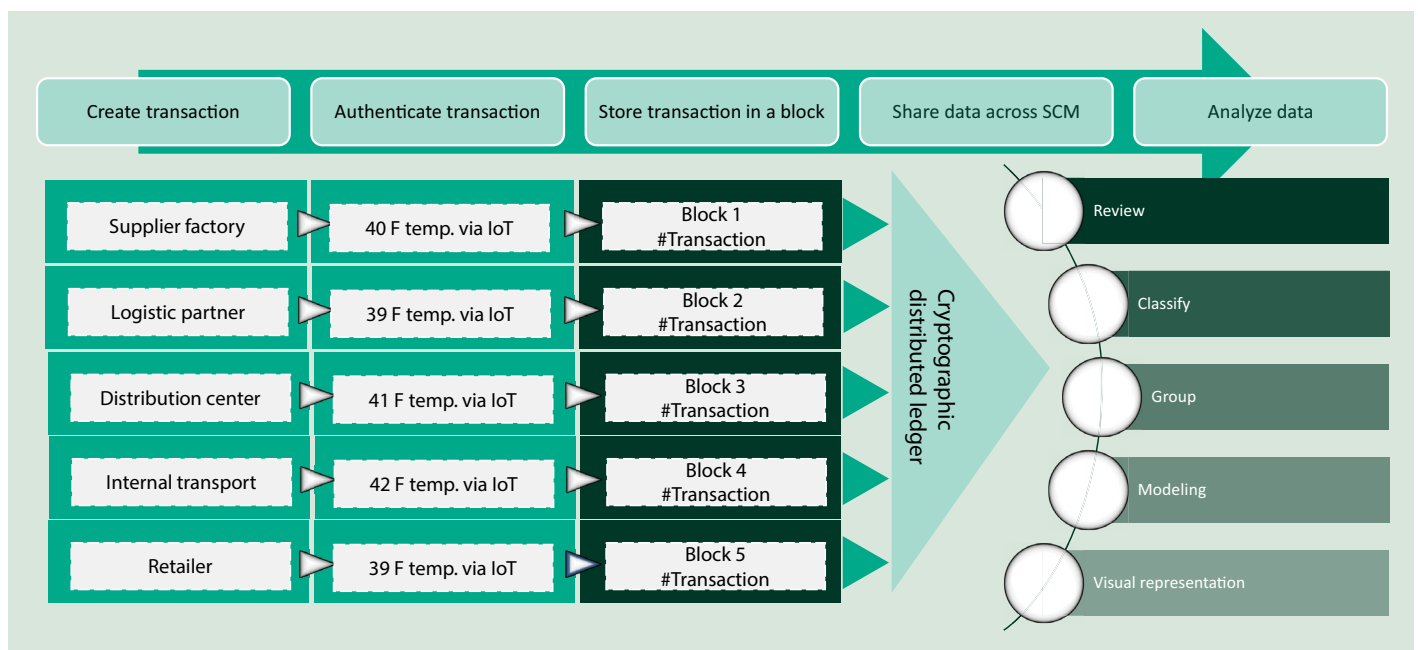

Fig 1: Blockchain can be used in the pharmaceutical supply chain

Oracle JDEdwards EnterpriseOne architecture of blockchain

With latest Oracle JDEdwards EnterpriseOne 9.2 release, corporations can integrate their supply chain with block chain feature. Further Oracle JDEdwards Enterpriseone 9.2 also offers process improvements with the help of Orchestration (to configure business logic and its algorithm) & IOT enabled architecture (to measure real time parameters like temperature, weight, volume) to build Block chain network for corporations which can potentially help them to "enable data transparency and access among relevant supply chain stakeholders while creating a single source of truth. At Infosys Oracle JDEdwards practice, we help our clients to build a solution that will create traceability and transparency in SCM while creating collaboration with their vendors and customers.

Oracle JDEdwards EnterpriseOne 9.2 offers an Orchestrator technology Tool Set Feature which can be used to integrate IOT devices and build a blockchain.

The Oracle Blockchain Platform allows organizations to create private or public blockchain networks. It provides the underlying distributed general ledger technology and related capabilities to build blockchain applications and enterprise networks. The Oracle Blockchain Applications Cloud enables plug-and-play blockchain features such as intelligent track-and-trace that improves authenticity and reduces administration or modules that can track valuable assets. An example here is a logbook that contains vital product descriptors (like drug temperature discussed in Fig 1), transaction details and other parameters that cannot be modified or deleted from the blockchain. This data source helps speed up settlements while preventing fraud/malpractices.

The world is changing at a rapid pace and traditional ERP applications are restricted in their ability to foster deep and transparent partnerships among various SCM partners. With Oracle JDEdwards EnterpriseOne latest feature, companies can instantly implement blockchain, IoT and orchestration across the supply chain for greater efficiency, transparency and safer.

Oracle JDEdwards – An open system for easy integration

Oracle JDEdwards has an open system that allows it to easily connect with new possibilities and supply chain partners through standard integration solutions. The Oracle JDEdwards Application Integration Server and Orchestrator enable all manner of blockchain services to be directly connected to Oracle JDEdwards. All relevant transactions realized through the ERP system can be stored in the blockchain. This information may include where the raw material for a drug is purchased, when and where it is processed, when it is packed/shipped, when it is purchased and by whom, and when the drug is transported to which pharmacy through which carrier. As a result, supply chain partners and consumers get the whole product story.

Designing an enterprise blockchain using Oracle JDEdwards

Application Enabler - The Oracle JDEdwards EnterpriseOne IoT platform includes a Discovery Service which the Oracle IoT Cloud Service can access to view available orchestrations as well as the format and inputs of each orchestration. Oracle JDEdwards applications, combined with a layered architecture

Orchestrator Studio 9.2.4.0 is the latest version, which requires a minimum of EnterpriseOne Tools 9.2.4.0. The Orchestrator Studio 9.2.4.0 is deployed as a component of the Application Interface Services (AIS) server. The standard Server Manager process is used to deploy an AIS server. The Orchestrator Studio 9.2.4.0 does not require the installation and maintenance of a discrete WebLogic Server or ADF environment.

The Orchestrator Studio 9.2.4 is deployed along with the AIS Server 9.2.4.0 and can be accessed by using the AIS server URL. Therefore, the Orchestrator Studio 9.2.4 does not require additional set-up or installation steps. The Oracle JDEdwards EnterpriseOne Orchestrator Studio 9.2.4 is installed on AIS server instance.

Application Layer - The JDEdwards EnterpriseOne Orchestrator Studio and the IoT Orchestrator brings data into Oracle JDEdwards ERP system with ease. The Orchestrator Studio is an intuitive web-based application for developing orchestrations that provide the instructions for transferring device data into transaction-capable data in EnterpriseOne. The IoT Orchestration processes orchestrations as inputs are received by orchestrations in real-time. This real-time data transformation results in optimized operations, nimble responsiveness, clearer analytics, and better regulatory compliance

Data store layer – Date store layer will maintain data with respect to transaction number in a format that it can be made available to specific parties in SCM.

Blockchain layer- Blockchain layer will maintain integrity of data and it will also connect various data based on business requirement like based on chronology of events.
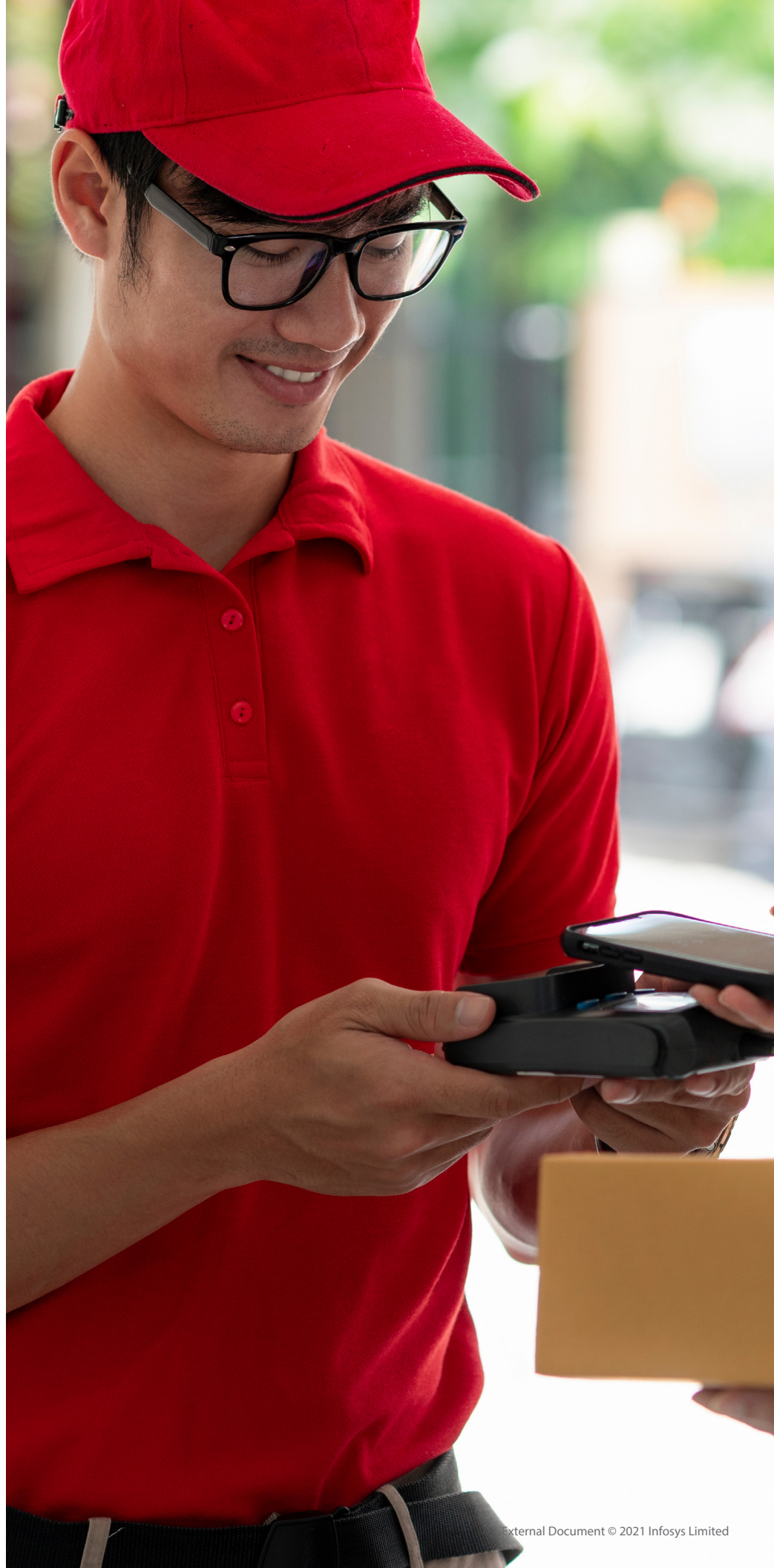
There are five major pillars to be considered when implementing blockchain in Oracle JDEdwards:

1. Authorized access to information (private or public) – Since all supply chain stakeholders are sharing sensitive information, it is critical to restrict how information is accessed. This involves authorizing access to specific information for a specific stakeholder instead of sharing all information with all stakeholders. The information captured within a supply chain blockchain is competitive and requires deep collaboration and trust among all parties

2. Transparency through decentralization – Whenever transaction happens on Blockchain it will be permanently captured in ledger. This unchangeable information makes it Transparent. This authentic information can be view by any stakeholders without any alteration makes it decentralized.

3. Immutability and data integrity – As data is cryptographically stored, there is no way to tamper with data, making it immutable and trustworthy

4. Scalability – The solution should be capable of handling a large number of transactions and capturing a large volume of information in each transaction

5. Security – The solution should support the implementation of complex permission settings for participants and third parties
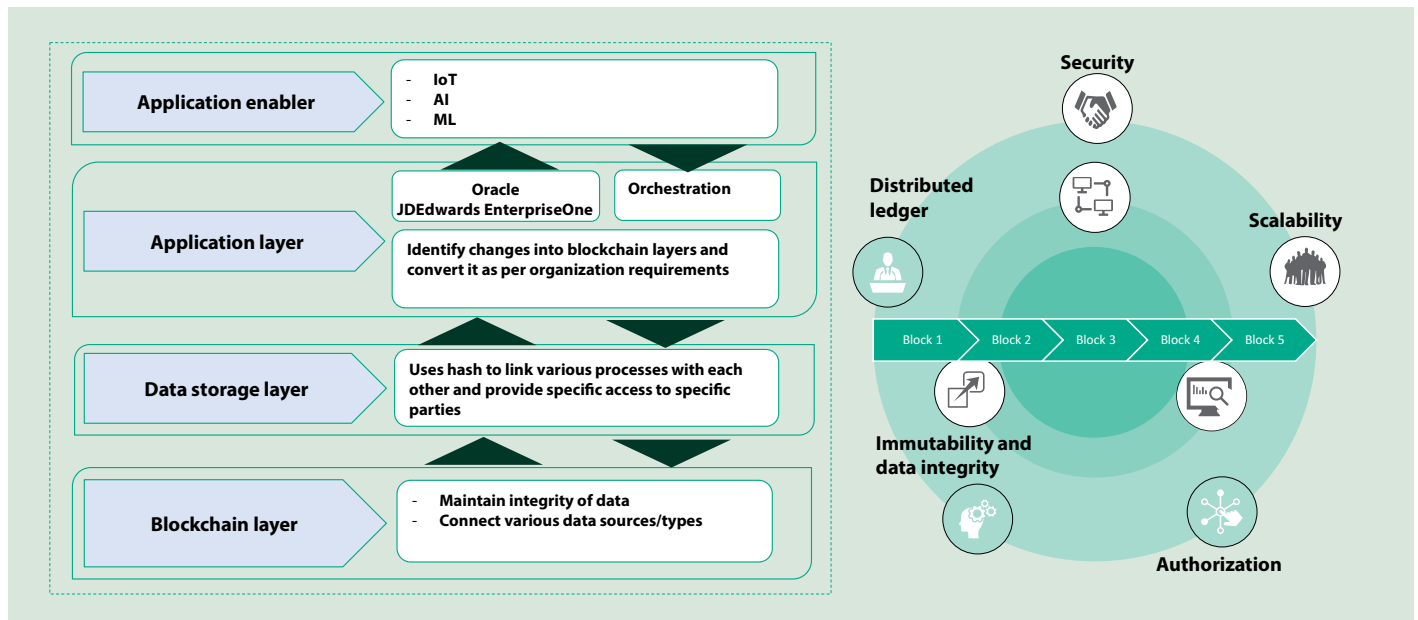

Fig 2: Enterprise-level blockchain architecture within the Oracle JD Edwards

Conclusion

With the latest Oracle JDEdwards EnterpriseOne 9.2 release, corporations can integrate blockchain into their supply chain processes for greater efficiency and transparency. The latest feature offers process improvements through Orchestration that can easily configure business logic and algorithms. IoT-enabled architecture is also supported to capture real time parameters like temperature, weight, volume. These features help enterprises capture and track information about products across the supply chain in a single source of truth. The Infosys Oracle JDEdwards practice leverages the Oracle Blockchain Platform as well as JDEdwards to build robust blockchain solutions that drive traceability and transparency in SCM for effective collaboration among all stakeholders.

About the Author

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Ajay is a Lead Consultant and Solution Architect at the Infosys-JDEdwards Practice. He has 15 years of IT consulting and core operational experience in managing various clients across US, Europe and Asia. His previous roles included working with MNCs to manage core operations, product planning and distribution activities. He has published papers for international conferences across US and Europe on topics related to ERP-JDEdwards, supply chain and transportation. Ajay leverages his domain expertise to articulate ERP solutions using the latest technologies while meeting client requirements.

Acknowledgment

References

- https://www.jdedwardserp.com/media/1624/5-advantages-blockchain.pdf

- https://www.oracle.com/corporate/pressrelease/oow18-oracle-blockchain-apps-cloud-102318.html

- https://www.hyperledger.org/blog/2019/04/18/__trashed

- https://www.oracle.com/applications/jd-edwards-enterpriseone/feature-internet-of-things.html

- https://docs.oracle.com/cd/E53430_01/EOTOT/design_orchestration.htm#EOTOT128

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