

Harness Abundance the Blockchain Way In Supply Chain Management

Abstract

Much like the financial industry, which has been at the vanguard of blockchain adoption, supply chains across industries have traits that make them especially suited to benefit from the technology. All of them feature a globally spread, multi-layered network of transacting parties; involve transfer of material, money, and data driven by complex commercial contracts; and experience a market-led push for greater transparency and flexibility across inherently opaque value chains. Add to this the 'trust' that blockchain promises across organizational borders, and the case for the technology becomes even stronger.

To recognize this potential, however, each business has to contextualize blockchain technology to the supply chain challenges in its industry. One such business is the cloud services business, whose supply chain involves multiple tiers of manufacturers, distributors, and cloud service providers (CSPs), with each customer

organization contracting multiple CSPs simultaneously to meet its needs across business units and geographies. This forms a high-stakes, low-visibility ecosystem, where the quality, security, availability, and compliance of delivered products and services needs to be constantly validated to ensure the highest end-customer experience.

This paper presents a look into how blockchain can address some of the most difficult challenges in supply chain management; introduces the CSP ecosystem; and dissects it further to detail out the technology's ability to add greater visibility, trust, and control across stakeholder relationships.

Introduction

Today's supply chain is a complex network of product configurations and geographical markets. Over the years, complexities on the supply and demand side have gone up, introducing lags in the flow of information and values. While the lack of transparency impacts quality control across the value chain, effectively lowering customer satisfaction, long and tenuous reconciliations among parties delay flow of funds, locking valuable working capital, and increasing the overall cost of the end product.

Blockchain is a consensus-driven, peer-to-peer network of secure and decentralized nodes forming a distributed ledger, with each node having simultaneous access to transactions updated in the ledger (Figure 1). Immutable transactions,

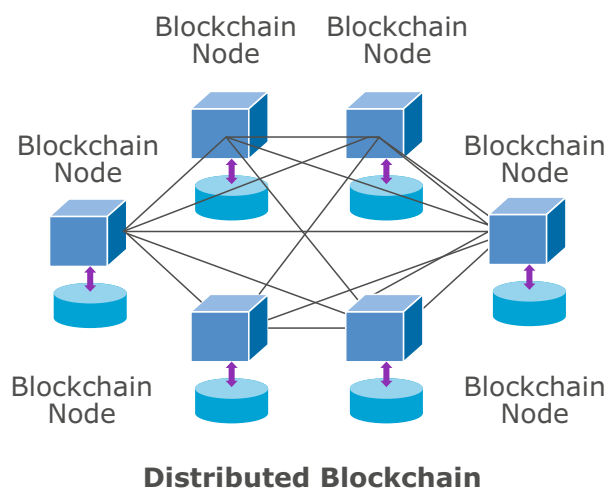


Figure 1: A typical blockchain

updated simultaneously across all nodes, are the central feature enabling the trust principles that are ingrained in Blockchain technology. Transactions are added as blocks to the blockchain, and are governed by smart contracts. A smart contract is a computer algorithm that facilitates, executes, and enforces the negotiation or performance of an agreement without intermediaries.

Some of the early adoption use cases being explored in supply chain management across industries include:

- Streamlining of logistics by integrating tracking, customs, and payments information by postal companies¹
- Curtailment of drug counterfeiting in pharmaceutical supply chains by using blockchain to track raw materials and finished drugs among all stakeholders²

Cut to the Chase: Achieving Security and Compliance in the Cloud Services Supply Chain through Smart Contracts

The ecosystem of a Cloud Service Provider's (CSP) supply chain involves multiple stakeholders with mutual obligations to deliver products/services in time (Figure 2). Achieving security and compliance in such an ecosystem is a matter of contract management.

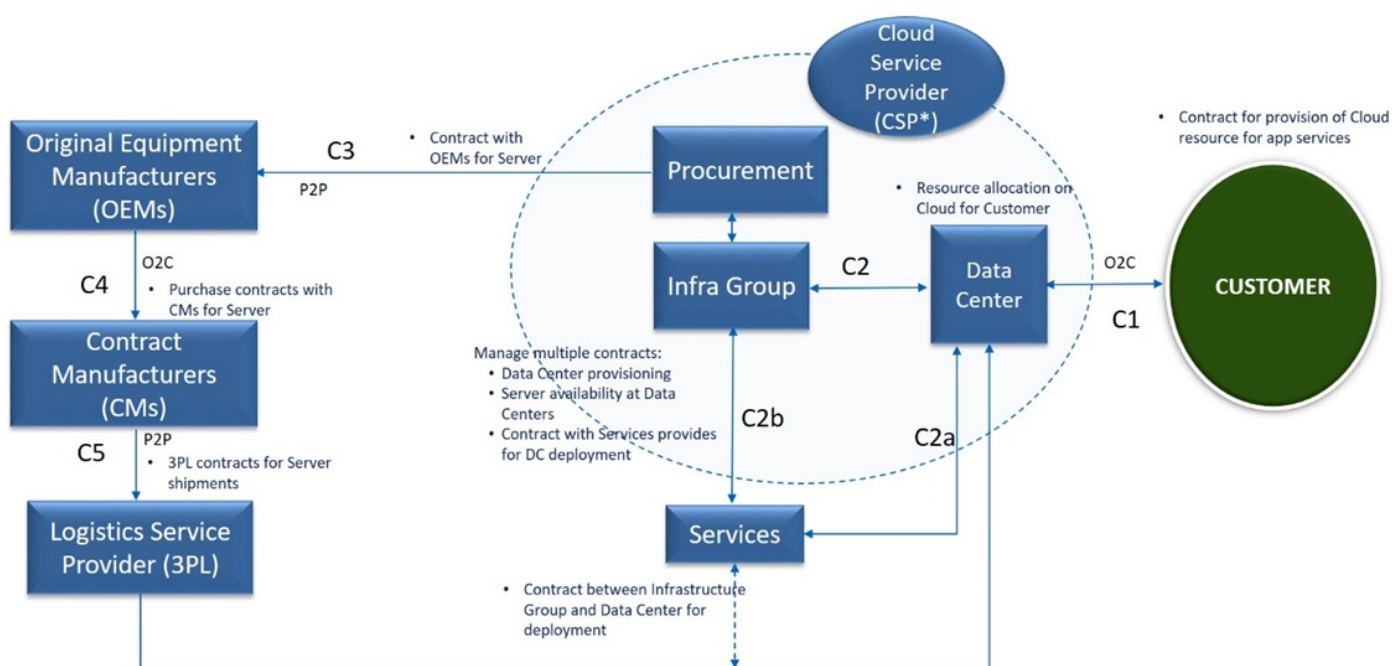


Figure 2: Stakeholders and contract instances in a typical CSP supply chain

Legend

Cloud providers are sometimes referred to as Cloud Service Providers, or CSPs. A CSP is a company that offers some component of cloud computing – typically, Platform as a Service (PaaS), Software as a Service (SaaS), or Infrastructure as a Service (IaaS) – to other businesses or individuals.

O2C (Order2Cash) is a set of business processes that involve receiving and fulfilling customer requests for goods or services.

P2P (Procure2Pay) is a set of business processes for obtaining and managing the raw materials needed for manufacturing a product or providing a service.

It is important for service providers to abide by the contractual clauses in a cloud service, such as ensuring data security and regulatory compliance, meeting service-level agreements (SLAs), and preventing inappropriate access. Despite established regulatory and security policies, however, challenges around ensuring 'trustless' contract compliance still exist. As the number and type of cloud services increase, there tends to be greater misalignment between CSPs, their vendors, and end customers, especially with respect to ensuring visibility, reliability, security, ownership, and regulatory compliance. While the intermediaries provide oversight and management services, the complexities and high overheads of such oversight persist.

Blockchain comes to the rescue to mitigate these challenges. A CSP supply chain blockchain would provide a decentralized, borderless, industry-standard, secure, and interoperable services management platform for cloud providers as well as customer organizations. Some of the key areas of application would be as follows.

Visibility and Quality Control across the Supply Chain:

Cloud supply chain players at various levels hide/inflate figures such as revenue or demand-supply forecasts to project success and stability in this highly competitive business. This increases CSPs' effort and cost of inspecting the materials (servers, chips, etc.) shipped by the manufacturer due to inadequate access to process control charts. With blockchain, CSPs can have direct access to all process-related data at the manufacturer's end. Blockchain will also allow CSPs to know their suppliers beyond tier 1 manufacturers, giving them greater control over the quality of services delivered to customer organizations.

Availability and SLA Compliance of Services: Cloud services determine the end customer experience of organizations, making their reliability and availability crucial. A typical cloud storage SLA specifies precise levels of service – say, 98% uptime – and the recourse or compensation that the user is entitled to, should the provider fail to provide the services as described. However, in some cases, the fine print in such agreements may discount outages of less than ten minutes, which may be too long for some businesses. Validating such contract compliances on an ongoing basis can be resource-intensive, and can instead be automated through smart contracts on blockchains.

Interoperable Services Management: Blockchain will allow customer organizations to consolidate their oversight and control over all their cloud contracts, automating contract management, and significantly enhancing governance and security. Identity and access management on the cloud, another area of concern for companies, is also strengthened with superior levels of security and validation through blockchain-enabled digital identity using public key infrastructure.

Security: Today, security is one of the mandates when it comes to cloud services. One of blockchain's defining characteristics is its use of cryptographic protection, acknowledged as being superior to other technologies. Also, transactions once validated by the consensus mechanism are virtually tamper-proof, and cannot be modified without leaving evidence of the same. These features go a long way in enabling stakeholders to collaborate in a trusted environment.

Blockchain can thus help establish a connected CSP supply chain, an ideal business ecosystem where transactions happen only with consensus, and contracts are executed without intermediaries. It will foster straight-through processing without any bias/prejudice, thereby significantly reducing operational spend and helping commoditize the industry. Finally, it will incentivize the stakeholders in the blockchain by automating trust and ensuring peer-to-peer connect. This ability to leverage the business ecosystems for mutual benefit makes enterprises no longer think in silos. It also eliminates scarcity of information, allowing enterprises to embrace risk and hence harness the abundance of the ecosystem, and thereby strengthening their sustenance in the current paradigm of Business 4.0. Such a connected ecosystem inherently delivers exponential value to consumers.

Conclusion

The bulk of the spadework in adopting blockchain today lies in internalizing it to industries and parsing it to specific business functions. While there are enough technology-focused start-ups working to develop industry and function protocols, the real effectiveness lies in bringing in-depth domain knowledge to the task.

Businesses are likely to find themselves propelled into adoption by allied and competitive forces, and a deeper understanding of blockchain and its underlying distributed ledgers will help them make more rewarding choices. It is clearly time to adopt blockchain in one's own supply chains, preferably through strategic (technology) partners who can help identify and implement business cases with greater value addition and network impact.

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