

Cloud Computing a Key to Supply Chain Management: Embracing the Cloud Advantage

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ABSTRACT

Cloud-based Supply Chain Management (SCM) is a rapidly evolving approach which uses cloud computing to improve the efficacy and efficiency of supply chain operations. There are numerous methods for managing supply chains, including employing Excel spreadsheets and web-based programmes. These methods are unsecure, ineffectual, and prone to human mistake. By using cloud computing supply chain companies and others can build something better and deliver the best service possible. In this paper, the key factors which will enhance the performance of supply chain by using cloud computing will be discussed. It highlights the advantages of cloud adoption, such as enhanced communication, real-time monitoring, scalability, and cost savings. The primary objective of this study is to examine and emphasise the value of CC (cloud Computing) in SCM (Supply Chain Management). The transformative potential of cloud-based SCM in fostering supply chain optimisation and competitiveness in the digital era is highlighted in this paper.

KEYWORDS: Supply Chain Management (SCM), Cloud Computing (CC), cloud based Supply Chain Management, efficiency, resilience, regulatory compliance

INTRODUCTION

In the digital age, cloud-based supply chain management (SCM) has evolved as a paradigm-shifting strategy that uses cloud computing to alter conventional supply chain operations. From the sourcing of raw materials to the delivery of the finished product, supply chain management includes the coordination and optimisation of activities related to the movement of goods, services, and information. Cloud-based SCM refers to the use of cloud computing platforms and services to improve stakeholder communication, data management, and supply chain procedures. Organisations can access, store, and analyse enormous amounts of supply chain data in real-time, from anywhere, at any time, thanks to the cloud's scalable and adaptable architecture. Organisations can use advanced analytics, machine learning, and artificial intelligence (AI) capabilities to gain insights, identify patterns, and forecast demand accurately by implementing cloud-based SCM solutions. This increases forecasting accuracy and lowers the likelihood of stock outs or overstock situations. Cloud-based SCM has the ability to revolutionise organisations by giving them the tools and capabilities they need to improve supply chain efficiency, agility, and customer happiness while lowering costs and boosting overall performance.

OVERVIEW ON CLOUD COMPUTING

When discussing cloud computing, it is critical to include both software and hardware that cloud providers can provide to their customers. Cloud computing is an information technology service model that can supply computer services via hardware or software and autonomously transmit information to clients. Customers can access cloud-based apps through web browsers, while data and software are stored on servers. Cloud computing is classified into four types: isolated cloud computing, open cloud computing, hybrid cloud computing, and community. The benefit of public computing over supply chain management is that organisations do not have to worry about system upkeep or construction.

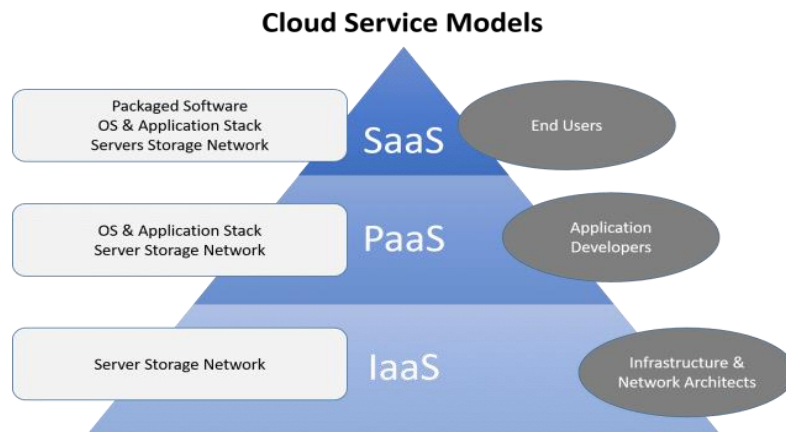


Figure 1- Different types of service providers

Types of Cloud

Public Cloud: In a public cloud, internet users can access computer resources including servers, storage, and applications that are owned and controlled by outside service providers. This kind of cloud is affordable, expandable, and flexible to a great extent. Although resources are segregated and safeguarded for each client, users share the same infrastructure.

Private Cloud: A private cloud is only used by one company and may be hosted on-site or by an outside service provider. It offers total command, security, and confidentiality over data and infrastructure. Private clouds are a good fit for businesses with stringent compliance standards, sensitive data, or needs for high-performance computing.

Hybrid Cloud: By combining both public and private cloud environments, a hybrid cloud enables businesses to take use of both. According to shifting demands, the sensitivity of the data, or legal restrictions, it allows the flexibility to scale workloads between the public and private clouds. Data and application interaction between several cloud environments is made possible by hybrid clouds.

Community Cloud: A community cloud is shared by organisations with similar goals, such as those involved in the same sector of the economy or that abide by the same set of rules. It offers a platform for collaboration where businesses may exchange assets, infrastructure expenses, and best practises while preserving confidentiality and anonymity.

Different service models, such as Software as a Service (SaaS), Platform as a Service (PaaS), and Infrastructure as a Service (IaaS), can be matched with various cloud deployment types to customise the level of administration and control offered by the cloud service provider. Based on their needs, financial constraints, and strategic goals, organisations can select the best mix of cloud types and service models.

INTRODUCTION TO SCM

Supply chain management, which covers all procedures that convert raw materials into finished commodities, is the management of the movement of goods and services. It entails the deliberate simplification of a company's supply-side operations in order to maximise customer value and obtain a competitive edge in the market. SCM consists of a number of interconnected components such as customers, suppliers, manufacturers, distributors, and retailers.

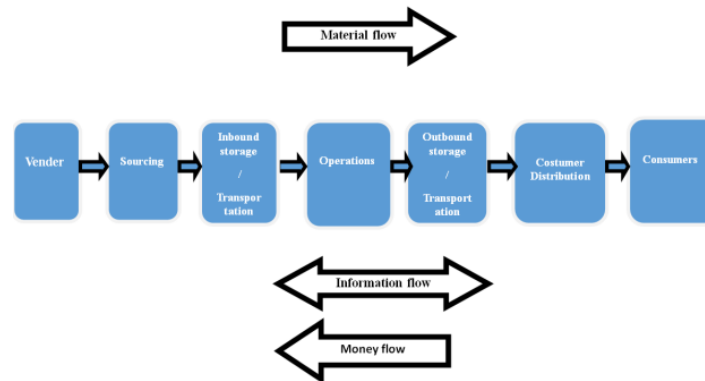


Figure 2- Supply Chain Management: process flow

The essential actions frequently taken in supply chain management are:

Plan- Forecast demand and develop a supply chain strategy.

Source- select vendors, work out agreements, and establish connections.

Make- Arrange for manufacturing, get raw materials, and produce items

Deliver- Create a logistics plan, oversee a warehouse, and complete orders.

Return- Manage reverses logistics and handles product returns.

Monitor- Track performance, examine data, and work to improve things constantly.

These actions include all of the crucial elements in supply chain management, including sourcing, production, delivery, returns, and continuing optimisation monitoring.

INFLUENCE OF CC ON SCM

The topic of supply chain management has seen a tremendous revolution because of cloud computing. The ability of cloud computing to store, process, and distribute data over the internet offers a number of benefits that transform the way supply chains function. Within the supply chain network, this technology has a significant impact on collaboration, visibility, efficiency, scalability, and data analytics. Additionally, cloud computing provides supply chain operations with a level of visibility never before possible. Organisations can get real-time insights into inventory levels, production processes, and shipping statuses by utilising cloud-based supply chain technologies. This insight enables fast response to bottlenecks or disturbances, greater risk management, and proactive decision-making. Stakeholders in the supply chain can measure and monitor key performance indicators (KPIs) to make sure that operations line up with corporate goals.

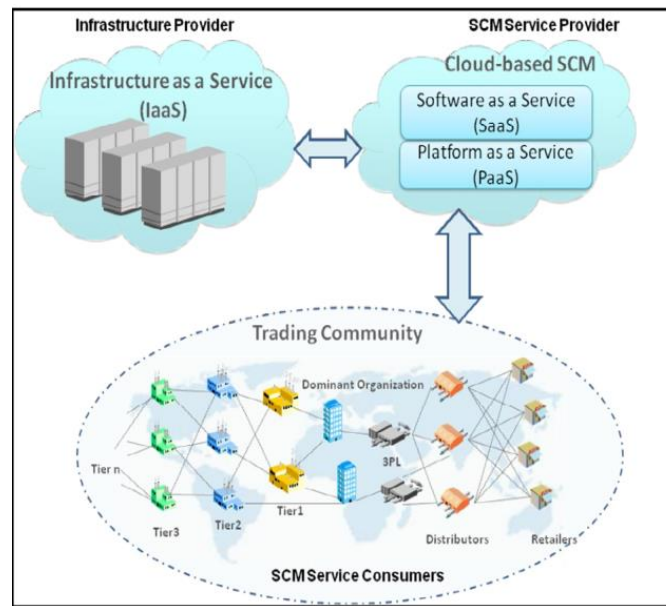


Figure 3 - Overview of Cloud-based SCM

EFFICIENCY IMPROVEMENT OF THE SUPPLY CHAIN THROUGH CLOUD ADOPTION

by giving real-time access to information about demand, production schedules, and inventory levels. Businesses may save money and improve customer satisfaction by optimizing inventory management, reducing stock outs, and avoiding overstocking with cloud-based solutions. Through data-driven insights, the utilization of cloud technology enables precise demand forecasting and planning, improving resource allocation and production scheduling. Along with streamlining logistics and transportation, cloud-based supply chain management improves delivery performance and lowers transportation costs by enabling route optimization and real-time tracking. Adoption of the cloud also encourages supply chain partners to collaborate and communicate, fostering smooth information flow and quick decision-making to further increase efficiency.

IMPROVING SUPPLY CHAIN FLEXIBILITY AND RESILIENCE:

Through real-time data analytics and backup solutions, organizations using cloud technology can quickly adjust to changing market needs and disturbances, such as natural disasters or supplier shortages. Stakeholders can cooperate easily by centralizing data and processes in the cloud, which speeds up decision-making and improves supply chain visibility. With the use of cloud-based supply chain management, businesses can create flexible and robust supply networks that can overcome obstacles and continue to function even during difficult times.

SECURITY AND PRIVACY CONCERNS

Sensitive supply chain data stored in the cloud is more vulnerable to theft of intellectual property, data breaches, and unauthorized access. In order to maintain compliance with industry norms and regulations, organizations must take into account the security precautions and data protection policies of cloud service providers. Furthermore, strong encryption and access control techniques are needed for the cloud-based exchange of sensitive data among supply chain participants in order to guarantee data confidentiality. For cloud-based supply chain management to be secure and to protect the privacy of sensitive data, proactive risk assessments and ongoing monitoring are essential.

INNOVATION AND TIME-TO-MARKET

Innovation and time-to-market are considerably increased in cloud-based supply chain management because to greater cooperation, data accessibility, and simplified procedures. Real-time data exchange among supply chain partners is made possible by cloud technology, enabling streamlined communication and collaboration. This promotes quick decisions and quick responses to market needs and changes. Cloud-based supply chain management saves the time and effort needed to gather and analyze data, resulting in quicker decision-making and more flexible supply chain operations. It does this by giving stakeholders a centralized platform to access vital information. The scalability and flexibility of cloud solutions allow businesses to introduce new products or services more quickly, optimize resource usage, and quickly adjust to changing market conditions, eventually improving their competitiveness in the global market.

GLOBAL ACCESSIBILITY

Access to information, software, and resources by supply chain participants from any location with an internet connection. Cloud-based technologies make it possible for partners and teams who are geographically separated to collaborate and communicate with each other with ease, supporting effective supply chain management across international borders. This accessibility enables worldwide sourcing and distribution by letting enterprises manage their supply chain networks across numerous geographies. Additionally, cloud-based solutions give businesses real-time visibility into supply chain activities, enabling them to centrally and effectively monitor and manage their entire global supply chain. In today's interconnected global marketplace, cloud-based supply chain management encourages agility, reactivity, and efficient decision-making.

ADVANCED ANALYTICS AND PREDICTIVE INSIGHTS

It uses cloud computing power to evaluate enormous volumes of supply chain data in cloud-based supply chain management. Businesses are able to make data-driven decisions, streamline supply chain procedures, and increase overall efficiency thanks to these analytics tools and machine learning algorithms. Predictive insights assist estimate demand patterns, identify potential interruptions, and optimize inventory levels to cut costs and prevent stock outs by evaluating historical and real-time data. Cloud-based solutions give organizations the computing power and storage they need to undertake complex analytics activities, allowing them to swiftly and effectively gather insightful information. By empowering firms to proactively solve supply chain difficulties, improve planning accuracy, and respond to changing market conditions, this data-driven approach helps them gain a competitive edge in the world of supply chains.

REGULATORY COMPLIANCE

It is the act of handling and keeping sensitive supply chain data on the cloud while abiding by all applicable laws, rules, and industry standards. To prevent unwanted access and data breaches, businesses must confirm that the cloud service providers they use have strong security protocols, data encryption, and access controls. When handling customer and supplier information, compliance with data protection and privacy requirements, such as GDPR or HIPAA, is essential. To keep customers' trust and stay out of trouble with the law, cloud-based supply chain management should also be in line with industry-specific compliance standards. Regular reviews and monitoring of cloud security procedures aid in

ensuring ongoing compliance and reducing any dangers that could arise from the processing and storage of data.

DISCUSSION

The market for supply chain management applications is already significantly impacted by CC, and adoption is anticipated to increase. Supply chain management (SCM) software application providers, such as those in e-procurement, warehouse management, transportation management, supply chain planning, and business intelligence & analytics, either already offer "software as a service" (cloud-based) solutions or are outlining a clear transition plan as more customers demand them. Tasks are delegated to a combination of connections, programs, and services that are accessed through a network under the CC computing paradigm. The term "cloud" refers to this system of servers and links as a whole. Over the past two years, there has been a huge increase in the demand for CC services. SCM Cloud offers a set of services that provide SCM functions to any cloud user in an efficient, scalable, reliable and secure way [8]

According to [2], The IBM Yun (Chinese for "cloud") pilot project in China enables companies to choose and use cloud services. Without requiring input from a person, the platform distributes storage, server, and network resources dynamically. With more than 10 million consumers, the Wang Fu Jing department store, one of China's biggest retailers, has implemented cloud computing in supply-chain management. It employs this technology to communicate information with its network of retail outlets and carry out business-to-business e-commerce.

CC has been viewed as a chance for small businesses to share the same services as larger ones and to benefit from their capacity for open communication and the management of external operations. Additionally, this enables businesses to lower the total cost of ownership for supply chain collaboration [1].

CONCLUSION

This research paper concludes by summarizing the key findings and emphasizing the significance of cloud-based supply chain management, and it emphasizes the need of cloud-based supply chain management in the current dynamic corporate environment. It highlights the transformative potential of cloud technology in boosting supply chain productivity, resiliency, and cooperation and invites companies to investigate its adoption to gain a competitive edge.

Utilizing a C-SCM enables supply chain-wide knowledge acquisition, decision-making, reaction, and optimization. There are many benefits to proposed C-SCM over traditional SCM systems. The most promising one is real-time, end-to-end supply chain visibility, which forms the basis for demand sensitivity and a number of other capabilities.

C-SCM can enhance inter organizational cooperation. Infrastructure, applications, processes, partner relationships, and cost structure all have increased adaptability. Real-time data can be collected on a variety of exceptions, disruption concerns, and business trends. A real-time reaction is possible with the knowledge learning capability. Several business processes can benefit from C-SCM, especially for activities like logistics management, purchase management, collaborative planning, forecasting, and replenishment that are widely dispersed or demand intensive partner engagement, etc.

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