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Powering Supply Chain with Cloud Computing

Cloud computing is a critical enabler in the new digital age, and its ability to provide flexibility, data, and analytics has the potential to drastically alter the operational paradigm of businesses and their supply chains. It enables businesses to reap the full benefits of the revolutionary changes to supply chain networks brought about by important industry developments.

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Editor's Note

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We are living in an era of unprecedented global interdependence, as evidenced by the intricate web of interlinked supply chains we utilize. This network of trade has been a key driver of economic growth for decades.

The global disruptions in recent times have caused significant demand uncertainty and disruptions in the world's supply chains, which have led to delivery delays and a lack of products.

As a result, the cloud's potential was highlighted by the pandemic, with millions of workers around the world coordinating their efforts every day. A cloud computing infrastructure is essential for forward-thinking businesses that want to prepare for the future. When evaluating performance, businesses should not only focus on minimizing expenses, but also on increasing their speed and resilience.

Switching from a disjointed, multi-system, spreadsheet-based supply chain to a fully integrated, cloud-based solution gives demand and supply planning a single source of truth. But, given the nature and size of supply chain organizations, adopting cloud computing and related technologies presents a number of unique challenges.

The benefits of the cloud for supply chain, however, are nearly limitless— real time visibility, higher scalability, intelligence and automation, integration of multiple business platforms, break-neck speed and more sustainable business.

This edition of the Supply Chain & Logistics magazine hopes to present its readers with an elaborate understanding of cloud computing in SCM has continued to rapidly change the way the entire domain operates. Because what is certain is that it will fundamentally alter the economics of supply chain information technology in the years to come and has the immense potential to power various advanced functionalities!

CLOUD ON THE WHEEL

During this past year, the supply chain industry has taken a beating as a result of the coronavirus crisis's complications.

Two-thirds of organizations see the need for a significant shift in their supply chain strategies post-COVID. While about 66 percent agree that they need to change in order to adapt to a new normal. There are, however, a number of new technologies that supply chain professionals are beginning to use due to their numerous advantages.

Among these is Cloud Computing, which has the potential to have a profound impact on the way supply chain works.

What is 'Cloud Computing'?

Cloud Computing, which is often just called "the Cloud," is a broad term that includes many different ways of providing computing services over the Internet as a utility that you pay for as you use it.

Cloud Makes the Process Easy!

From planning and sourcing to manufacturing, logistics, and distribution, cloud-based solutions enable organizations to improve their processes and gain new insights enhancing decision making.

It aids in the development of stronger and more efficient supply chains.

When businesses use the Cloud as their backbone, they gain unprecedented levels of insight into their supply chains, along with improved **scalability**, **resilience**, and **agility**.

Your data is accessible from anywhere with an Internet connection thanks to the Cloud. Editing files on your home computer and then continuing where you left off at work or anywhere else is possible thanks to this feature. For example – a SCM professional can keep tabs of his inventory while he is away from office and order replenishments from his mobile device. The same professional can then carry on from where he left off, when he logs back into his system at work.

Aside from saving money in the long term, the Cloud allows multiple people to collaborate on a single document at the same time.

Cloud can even Curb Global Warming!

Yes, you read that right! Cloud computing can help rein in 'Global Warming'. In addition to business-related aspects, continuous adoption of Cloud Computing could potentially prevent the emission of more than 1 billion metric tons of carbon dioxide (CO_2) till 2024, according to a study by International Data Corporation (IDC).

Legacy Apps vs Cloud Computing

Legacy applications are often used to describe traditional on-premise business software solutions, both custom-built or bundled software.

In legacy apps, when a system is updated, it becomes more vulnerable to interruption. Poor documentation from prior system administrators, as well as a lack of disciplined software development methodologies, may result in an unstable source code that, when updated, can abruptly disrupt the entire system. However, in a rapidly evolving supply chain, old software often handles obsolete business concerns.

Whereas, modern cloud-based solutions are valuable because they are designed from the bottom up to be highly flexible in anticipation of business changes. With the Cloud, customers' business rules can be changed on-demand, new transport event messages can be easily introduced with trading partners, rich reporting and data visualization can be enabled, and other important capabilities that limit legacy systems can also be enabled.

Amid the gamut of technologies available today, Cloud Computing has emerged as a game-changer for Supply Chain Management (SCM) innovation, speed, and efficiency for businesses.

According to a survey conducted by a leading technology giant, cloud adoption in enterprise organizations is over 94%. By 2025, we can expect to see more than 85% of supply chain organizations adopt a cloud-first principle, recognizing that they will be unable to fully execute their digital strategies without adopting cloud-native architectures and technologies.

With the progress in digitization of supply chain being inevitable, let's take a look at the benefits, challenges and possible solutions to the challenges faced while adopting the cloud in supply chain.

TRANSFORMATION THROUGH THE CLOUD

Even though Cloud technology has existed for nearly two decades, supply chain professionals have been reluctant to migrate away from traditional systems. Due to this the industry's transition to cloud computing is still deemed to be in its nascent stages. The move to Cloud, however, is being dominated by numerous information hubs and supplier networks.

Cloud computing is a shot in the arm for many as it enables the close monitoring of a product throughout its lifecycle from one singular platform across devices. Cloud-based supply chain management can also substantially reduce product loss by locating shipments at any stage of transport. It can further enable decision makers to make prompt decisions and communicate effectively if there is a mishap at any stage throughout the value chain.

The perennial issues of supply chain were accelerated and brought to light with the global disruption caused by the pandemic. Managing the costs, fluctuations in demand and the requirement for high resilience were all parts of the rising challenges through the post-pandemic era.

The capabilities of Cloud computing can empower decision-makers to confront these challenges by enabling businesses to process unprecedented volumes and speeds of data from virtually limitless sources across the entire supply chain. It also enables businesses to conduct in-depth analyses of this data and generate crucial insights, enhancing decision making significantly. It further facilitates businesses to reconfigure their work processes in order to gain the agility necessary for dealing with the consequences of whatever the data reveals.

The Cloud provides vast amounts of computing power along with a simple, flexible, and cost-effective data and digital architecture. This empowers leaders to manage service levels and costs, build resilience, and ensure responsible operations.

Benefits of the Cloud

The transition from native traditional management systems to cloud-based systems can be difficult, but it also brings numerous potential advantages such as:

Scalability: Changing business requirements necessitate that existing IT systems be updated to meet those requirements. With cloud services, supply chains can grow without having to overhaul their entire IT ecosystem consisting of various systems from scratch. Off-site computing power provided by cloud providers can keep pace with an organization's rapid growth. chain can arrive at a faster pace without the need for additional staff.

Efficiency: Information management can free up internal resources to focus on higher-value activities, such as research and product development of their core offering, by migrating to the cloud. Innovation and improvement within the supply chain can arrive at a faster pace without the need for additional staff.

Accessibility: Limitations are inherent to physical systems. Employees within the supply chain generally need to be on-site in order to get information, especially when it comes to warehousing. Cloud computing, on the other hand, does the opposite. Everyone from drivers, warehousing staff to the account managers can download all the necessary files in just a few minutes, making it much easier for the supply chain to function seamlessly from any location.

Intelligence & Flexibility: Cloud-based SCM provides greater intelligence than on-premises alternatives. A more streamlined supply chain with higher efficiency and lower costs can be achieved with the help of predictive analytics, which provides actionable insights to power data-driven decisions. In addition, the adaptability of cloud SCM makes it simple to incorporate additional applications.

Optimization: Cloud-based service providers customize their solutions for specific industries, allowing them to speed up the integration and adoption of their services throughout any given company. People in the supply chain management field agree that better communication can speed up the resolution of issues. Product development, market expansion, and delivery times can all be improved, and costs can be reduced as a result of the operating model's increased agility.

Yet, with numerous benefits, there still are challenges that organizations in the supply chain face when adapting to the Cloud.

Overcoming Challenges of Cloud Adoption

Businesses contemplating a move to the cloud frequently encounter common roadblocks to implementation. Security and privacy are the main concerns when it comes to cloud computing in supply chain management. In light of data breaches, privacy concerns, and GDPR (or similar) requirements, countless people are hesitant to use cloud services. Many supply chains have been disrupted or broken for an indeterminate amount of time as a result of the recent global upheaval, but companies that have already adopted cloud-based supply chain management solutions have suffered significantly fewer losses than those that have not. Cloud-based logistics is a major factor because of its transparency and traceability.

Because of the supply chain's inherent volatility and complexity, a new approach is required. For supply chain decision makers, the advantages of cloud infrastructure over traditional on-premises solutions include ncreased flexibility, and faster time to market. For 3PL & 4PL providers, cloud-based supply chain management solutions open a huge market of opportunities with smaller businesses that aren't ready to invest in expensive all-in-one solutions with features they don't really need, which is why cloud-based solutions are preferred.

Migration Stages

When it comes to the supply chain, a move to the cloud does not always entail moving everything. Identifying which solutions and processes should be migrated first and which should be left for later is critical. In a cloud-based supply chain platform, solutions that require a high degree of customization should be moved first, followed by those that are too complex to use all of their functionality all at once.

Choosing a Cloud service is an important part of the migration process and methods like public-private and hybrid are all viable options. Private cloud infrastructures allow for more customization, while public cloud infrastructures force supply chain organizations to pick and choose which cloud solutions they want to deploy.

A multi-cloud approach, which utilizes the technical and cost advantages of various cloud environments like AWS, Microsoft Azure, Google Cloud, and Oracle to adapt infrastructure to a specific client's needs, is another option to consider for cloud supply chains. Although such a cloud strategy is riskier and requires new compliance requirements, companies should be cautious about adopting it because of the integration of different systems.

Conclusion

The adoption of cloud computing is now the norm in a wide range of fields and businesses. It has the potential to open up even more doors for supply chains when used in conjunction with AI, IoT, and other associated technologies. Because of limited resources and fluctuating demand, cloud adoption can be a catalyst.

Cloud computing can save organizations money, time, and effort by reducing the need to build their own IT infrastructure. As a result, organizations, 3PLs, and 4PLs alike are spurred on to form new cloud development partnerships in order to bolster their teams with DevOps and cloud engineering veterans.

Organizations have identified ‘the Cloud’ as an enabler and according to research by a leading technology provider, has suggested that 65% of organizations have declared that cloud computing has helped them reduce time to market. Similar research has added to the growing importance of cloud by suggesting that Cloud computing boosts gross margins and profitability and generates more revenue.

But how does cloud computing accomplish this in a complex and volatile environment in the supply chain sector. Let’s look at Cloud Computing through different phases of the value chain to understand how it aides the development and acceleration of digitization in supply chain.

BUILDING A CLOUD-DRIVEN SUPPLY CHAIN

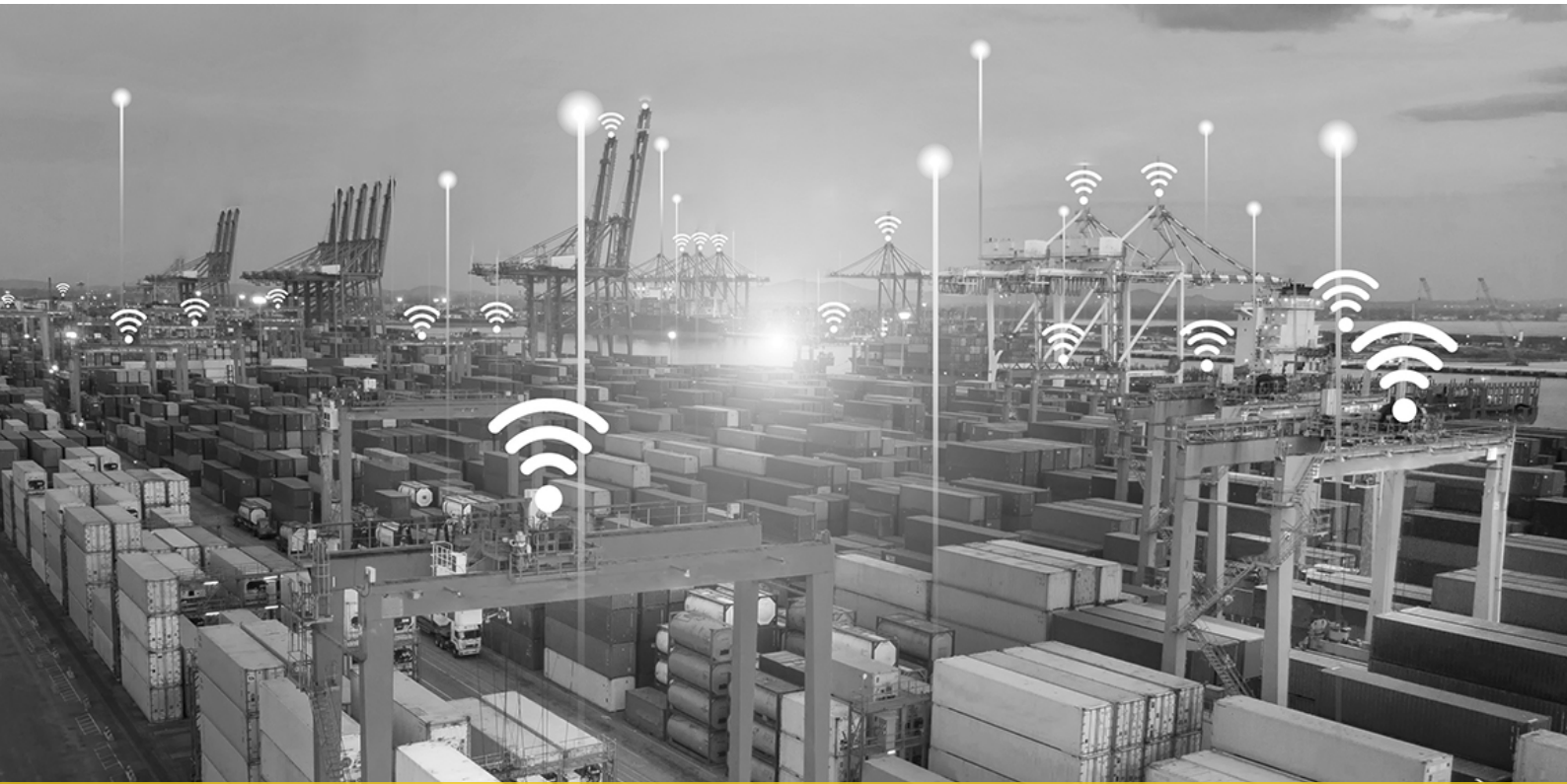
Like most business operations, the supply chain function has been disrupted in recent years by several factors. Given the globalized nature of production and the sourcing of inputs, the global lockdowns and restrictions on the movement of goods proved to be the proverbial stumbling block. However, supply chain professionals are no strangers to disruption, as it is frequently the first function to be affected by natural disasters, trade restrictions, and, more recently, wars.

The prolonged impact of the pandemic has been severe, and supply chains will likely remain fluid for the foreseeable future. Lessons learned from previous instances, and the adoption of technologies such as Cloud computing have provided insight into the next generation of cloud-centric supply chain management.

Cloud computing enables businesses to reap substantial benefits from pivotal market trends redefining conventional supply chain networks by utilizing data analytics, mobile applications, and social media.

Cloud computing can improve supply chain responsiveness to disruptions like volatility, which has amplified. Cloud computing can help supply chains unlock the value of data. Cloud-based solutions allow companies to use internal and external data to generate actionable insights, making supply chain networks smart.

A complete supply chain ecosystem comprises numerous suppliers, manufacturers, logistics providers, last-mile delivery partners, and supply chain experts that help brands string together an agile and sustainable supply chain. This article will highlight how Cloud computing powers these processes through the lens of a 3PL and 4PL provider, enabling manufacturers to concentrate on their core offerings.



Cloud Computing in 3PL processes

A third-party logistics or 3PL organization majorly looking into warehouse management, logistics and fulfillment. With the help of Cloud-enabled services, we see how a 3PL can digitize the supply chain.

Warehouse management

The field of warehouse management deals with the procedures and practices necessary to keep a warehouse running smoothly. The term Cloud-based warehouse management system (WMS) refers to a logistics facility with SaaS-based warehouse management software. It is accessible from any device with an internet connection, as its interface is entirely web-based. External servers are used to run and store program data, eliminating the need for the company to maintain any hardware on-site. This cloud-based module is quickly surpassing on-premise models where the system is installed on a server that is hosted and located within the organization. A Cloud-based WMS primarily looks into Inventory Control, Picking, and Goods Management functions.

Inventory Control functions: By closely monitoring all goods movements, a cloud-based WMS provides businesses with stringent inventory control. The cloud-based system stocks data in real-time and a code is assigned to each unit load by the software. Thus, the location of each SKU and the available quantities are always known, ensuring complete stock control and flow of goods, fully allowing traceability while being synced to the PoS systems in both online and offline modes. In a multi-facility scenario, a cloud-based warehouse management system facilitates multi-location inventory management by integrating and synchronizing data on a product's various SKUs throughout its different stages.

Picking Functions: Order processing is one of the most complex tasks. However, a cloud-based warehouse management system can ensure its effective execution. A cloud-enabled WMS creates a picking strategy and guides the operators through its implementation. It further enables 'pick path optimization' by establishing the most effective picking routes, reducing operator travel, and streamlining work. It also helps facilities cross-docking by organizing orders consisting of only 1SKU while also helping to pick multiple SKUs per order, typically for e-commerce logistics. The WMS is compatible with various picking aids, including pick-to-light and pick-by-voice. The primary advantage of a cloud-based warehouse management application when it comes to picking is its efficiency. A WMS embedded in the cloud reduces errors, reduces costs, enhances customer service, and enhances the well-being of workers.

Goods Management Functions: Cloud-based warehouse management software facilitates product control throughout receiving and shipping procedures. The WMS coordinates with the ERP system to ensure error-free product receipt. It receives stock entry orders and manages the docking area. The WMS can create labels for the unit load when stock data is entered. A cloud-based warehouse management system can be parameterized to assign each unit load a location. This depends on stock turnover, production batch, expiration date, etc. Finally, to simplify order dispatch management, shipping orders can also be generated with the help of a cloud system. It's not just the on-ground operations that the cloud aids. It also plays a significant role in logistics and helps supply chain professionals tackle problems that may arise through the transportation phase of the supply chain.

Transportation Management

Transportation management systems are used mainly by companies that ship, move, and receive goods regularly. This includes Manufacturers, Distributors, Ecommerce companies, Retail businesses, (3PL and 4PL) companies, and logistics service providers (LSPs) Any business can plan, execute, and optimize the physical movement of goods with the help of a TMS.

Like other cloud-based solutions, a transportation management system hosted in the cloud offers numerous advantages to businesses, including lower total cost of ownership and a faster return on investment (ROI). A cloud-based TMS offers additional advantages such as quicker deployments, fewer hours required for training and installation, automatic updates with the latest features, and enhanced security from an IT perspective.

Organizations can monitor data from various IoT devices and sensors by hosting multiple applications within the cloud, making real-time monitoring easy. Cloud-based applications can also help organizations provide accurate and well-informed recommendations, such as alternate delivery routes during heavy traffic. With cloud computing in the picture, remote temperature monitoring in the cold chain can also be possible.

The following are a few of the logistics-related management capabilities provided by cloud computing and data storage:

- Managing the transportation and assignment of trucks and other vehicles.
- New order sequencing and prioritization.
- Eliminating delays by automatically generating or updating supply or shipping routes.
- Completing compliance documents, invoices, and receipts automatically.

It's not just the operations. The cloud can also influence how supply chain strategies are created by industry experts and professionals. Among various processes to which the cloud can lend strength, it further fortifies the decision-making processes. A fourth-party logistics or 4PL provider goes beyond the traditional 3PL and manages the entire supply chain single-handedly. Its broader responsibilities include providing statistical insights, technology, and infrastructure.

Demand Planning and Forecasting

Forecasting and planning are the most essential functions of supply chain management. Predicting future sales enables modifying processes and expanding departments to ensure supply meets demand.

Demand planning and forecasting are two areas where the presence of cloud computing has started to become crucial. The cloud collects and organizes data from disparate sources to create a more comprehensive understanding of present and future circumstances.

These possible sources include:

1. **Wholesale suppliers**
2. **Online sales portals**
3. **Retail locations**
4. **Customer service channels**

The cloud combines disparate data sources, allowing logistics experts to conduct in-depth analyses and make reliable predictions based on historical data and current market conditions.

Organizations, particularly in the pharmaceuticals and food industry, can reliably stock shelves across the country with essential and seasonal raw materials all year round, thanks to cloud-based data analysis.

Procurement and Sourcing

Some businesses must maintain relationships with hundreds or thousands of finished products or raw materials suppliers. The cloud enables digitization of the sourcing and procurement processes.

The possible advantages include:

Allows for more rapid two-way communication.

Creates a centralized data repository making it possible to cut down on duplication and waste.

Makes it possible to switch suppliers automatically in response to fluctuating demand and current stock.

Invoices, custody documents, and databases are all generated mechanically to ensure traceability regulations are met.

The key to a successful supply chain ecosystem is easy access to all the necessary information and documentation, which can be achieved through cloud computing.

Some businesses may require speed, efficiency, and organization to facilitate reverse-factoring and other cash-flow-improving financing options the cloud provides for coordination and finance within their supply chain.

Managing Equipment maintenance and repairs

Through cloud computing, supply chain companies can integrate their physical infrastructure into a single, easily managed platform. Structures, utilities, and equipment like forklifts and conveyors fall under this category.

To detect leaks, pressure drops, and temperature or vibration anomalies, cloud-based maintenance platforms use hardware sensors and software intelligence.

There are numerous cases of businesses increasing their return on investment (ROI) through adopting technology, including in the chemical sector and other parts of the supply chain. For how much the machinery cost, this is a significant benefit. Eliminating product defects brought on by malfunctioning machinery is an added bonus.

Conclusion

Modern supply chains require companies to be globally competitive, agile, flexible, and adaptive to meet consumer demand and manage supply-and-demand complexities in a volatile market.

To achieve digital transformation in the supply chain and transform it into a dynamic, automated solution that provides visibility, control, and integration with all stakeholders across the ecosystem, cloud-based technology solutions are an excellent option.

More and more businesses are turning to cloud-based technology solutions for help with the analysis, measurement, and monitoring of business activities to better meet the needs of their clientele.