Cloud Adoption Model in Logistics Solutions: Selection Module

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Abstract: Logistics Information system acts on operational process, information flows and interaction with a variety of logistics partners. Logistics Company uses central information system which have problem to distribute the information with better performance for logistics management. In this paper we present CAM Cloud Adoption Model and SM Selection Module on cloud computing for achieving the collaboration among the logistics partners to implement the logistics management.

Keywords: **Logistics Information System, Cloud Adoption Model (CAM), Selection Module (SM) and Cloud**

1. INTRODUCTION

Logistics information system handles the whole system's processes and coordinates all the components of logistics operations like planning and coordination and operation. Planning and coordination defines nature and location of customers that supply chain operations seek top match to planned product and services and promotions. The purpose of operation is to exchange information between supply chains members involved in product distribution. The activities of operation are order management, procurement, where order management is accurate entry and qualification of customer orders and procurement is concerned with the information necessary to complete purchase order preparation, modification and release while ensuring overall supplier compliance [1]. When the modern technologies and techniques are used with lots of software solution into Logistics Company, the correct information, correct location and correct time becomes priority for distribution among the logistics partners. Cloud computing provide advanced software systems to provide high quality information with accurate time and accurate location [2].

There is issue when information is shared, the generated information should be in accurate and reliable form at the different locations. There are some observations, first is, the reason should be found for decreasing information accuracy and incompleteness. Second is, find out the better methods of operations for information sharing which affects on relationship between the logistics partners and users. Third is, find out the cost and time reducing approaches for information sharing.

This paper investigates the impact and opportunities of cloud computing to establish the logistics information system. We present CAM to establish the several modules for logistics information system framework and SM to determine the opportunities of cloud computing for enhancing the information structure for logistics information system.

2. CAM FRAMEWORK FOR LOGISTICS

The framework of CAM defines the process of modernization of distribution network between the logistics processes and modules of cloud computing. The operations of logistics information system have multiple priorities like online collaboration, information sharing, and lower cost and accurate distribution of information with lower latency. CAM handles these operations by providing a separate measure for adoption module. This allows the logistics partners and users to evaluate module of CAM for capturing the adoption of cloud computing in each and every separately module. In the large company the scope of adoption of cloud computing is broad used in order to achieve the goal of efficient operations of logistics [3]. The logistics operations are:

- Online Collaboration: This operation supports collaboration between the logistics partners and users for tracking and tracing the information about business process on internet. It also acts as a mediator between the logistics partners and cloud based modules selected to manage the distribution of information among the logistics users.
- Information sharing: This operation has multiple processes like order information, exchanging order information, sharing operational information and sharing strategic information.
- Lower Cost: This operation handles the numbers of logistics partners and users online who come in contact for sale and purchase including better selection, convenience, cost and time saving. Online processes unchain the users from physically to and shopping in traditional stores, which is cost and time saving process too.
- Accurate Distribution & Lower latency: This operation distributes information in accurate form for different locations of logistics partners and users and lower latency.

The framework of CAM is designed on cloud computing which have collection of multiple strategic approaches through the multiple modules like selection, manage, design, implement and evaluate. These modules are generated to find out the result which gives the impact of cloud computing for different operation of logistics [3]. The modules are:
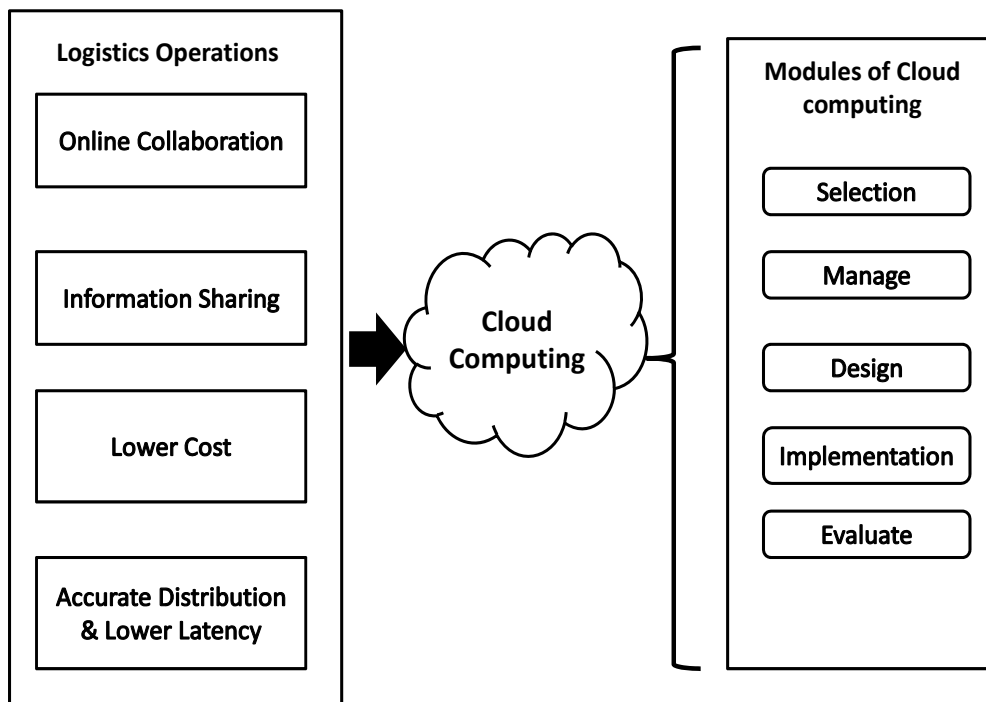
Figure 1. Framework of CAM (Cloud Adoption Model) for Logistics

- Selection: This module is based on cloud infrastructure and architecture to respond quickly to user's request. It also provides better situations like user friendly, reliability, accuracy, cost effectiveness and better performance.
- Manage: This module manages business priorities and requirements and set the operational performance to ensure that changes and improvement are implemented as required to adopt the cloud environment.
- Design: This module is based on cloud administrator services like operations, information sharing, procedures tracking, reporting and develops collaboration strategies between the logistics partners.
- Implement: This module controls opportunities, communication, and maintenance, technical support and engineering terms to develop, implement and maintain new logistics technologies based on cloud computing.
- Evaluate: This module calculates the security parameters, corporate policy, regulations, lows and measures program and recommended improvement and report of better performance.

Above modules are used on cloud computing for logistics. Each module contains itself vast and complex to implement because it needs its own requirement. In our research we are working only on the select module which provides the better performance and cost and time effective service.

3. FRAMEWORK OF SM IN CLOUD COMPUTING

Selection Module (SM) makes in such way that selected infrastructure is very efficient in terms of better performance and cost effectiveness. This module generates five types of operations on cloud:

3.1 Cloud Services & Selection Services: Cloud computing have three basic types of services: Infrastructure as a Service (IaaS), Platform as a Service (PaaS) and Software as a Service (SaaS). IaaS has clusters, virtualization. CPUs, memory, storage and networks. PaaS makes application interfaces (APIs) and controls server hosting processes. SaaS offeres software delivery approaches which provides access to software and its functions as web based service [4]. Cloud computing also has service providers that develop and deliver services to outside users. Cloud Computing has also service level agreement SLA which serves service between the user and the provider. SLA defines agreement on non functional requirement between provider and users [5]. There are three categories of cloud first is public cloud which can be accesses by any subscriber on internet and access cloud space, second is private which is used for specific group or company and third is hybrid cloud which is the combination of public and private.

3.2 Migration Costs: Migration cost is generated to assign incoming user's requests to servers and each user has SLA which specifies constraints on performance and quality of service (QoS) that it receives from the system [6]. Migration in IaaS is fully depended on virtual machines

with installment of operating system and other software for successfully accomplishing the workload of the applications. In SaaS, end users have small and no control over the deployment then only potential migration involves importing of information from the system. In PaaS, cloud provider deals migration cost for the configuration of the software and hardware [7]. The steps of cost migration includes:

3.2.1. Discovery and analytics: This is first step which analyzes the existing applications suitable or not for migration to the cloud.

3.2.2. Map: The second step includes planning for selecting the type of software stack and applications in cloud environment.

3.2.3. Provision: This step provides actual creation of cloud environment in which the migrated applications will operate or not.

3.2.4. Migration: This step defines movement of applications, software configuration and setting of machines to provide support to that applications.

3.2.5. Remediate & Test: This step declares the application is migrated or not to verify function as expected and also ensure that performance is acceptable.

3.3 Elasticity: It is the degree at which a system is able to adapt to workload changes, automation of resources on demand as possible. Elasticity follows some point to check [8]:

3.3.1. Automatic Scaling: It checks which process is used for automatic scaling.

3.3.2. Elasticity Dimensions: It defines set of resources scaled as part of adaptation process.

3.3.3. Resource Scaling Units: It checks the amount of allocated resources.

3.3.4. Scalability Bounds: It checks the upper bound on the amount of allocated resources.

3.4 Security threats: Cloud computing has multiple users from different streams who are moved on cloud. For them security is major issue [9]. According to the Gartner [10], there are seven major security issues:

3.4.1. Privileged user access: Sensitive data is processes outside and inside which creates risk because outsourced services bypass the physical, personnel and logical controls over in house program.

3.4.2. Regulatory compliance: users are responsible for their data security and integrity when it is held by a service provider [11].

3.4.3. Data Location: Users use the cloud without knowing that where is their data hosted. To manage distributed data is more difficult for users who have their data in local machine.

3.4.4. Data segregation: Encryption and decryption covers security issue but it could not ensure to be perfect solution for it.

3.4.5. Recovery: If some problem is occurred on cloud server, user's data can be destroyed because most of the users don't get permission to third party companies to control their data. This problem can create impasse in security.

3.4.6. Investigation support: Cloud services are mostly difficult to investigate because several users are be co related and spread across set of data centers.

3.4.7. Long term viability: The cloud provider will never go broke by large company with new policies, but users must be ensured about their data will remain available even after such an event.

3 CLOUD COMPUTING : BUSINESS PERSPECTIVE IN THE CONTEXT OF LOGISTICS

Cloud computing acts as a tool of innovation in different forms. It is a modern translator from large tabulated machines and main frame computing which offers distributed computing and decentralized data centers to personal computer and handheld devices [12]. Logistics business needs timely access to foreign-related logistics information to understand the logistics dynamical domestic and international, and conduct cross border logistics business interaction. Therefore, logistics information platform is very necessary, which is an important for the development of the logistics information platform. The logistics information platform builds a unified platform for network data processing and business systems connecting domestic and foreign platforms, thus making the domestic logistics companies joint track with foreign logistics platforms, realizing data exchange; providing accurate, rapid and comprehensive domestic and international logistics information and other related value- added business services; developing inter-regional co- operation of logistics, which will be play a significant role in promoting multi faceted, multi-level and wide- ranging cooperation and exchanges on domestic logistics enterprises and foreign enterprises [13]. At large scale of Logistics Company provides global services which are distributed at different geographical location of world. Cloud computing gives the centralized resources sharing among all logistics partners. For example using private cloud system a supplier setup a vendor portal and this portal allows other individual to access information by using their log id and password. In private cloud, information sharing will be done in secure manner. Cloud provides reconfiguration closely associated with scalability and reliability. By using these services logistics can be implemented and can shrink their using services of SaaS and IaaS.

4 ADOPTION OF CLOUD COMPUTING IN LOGISTICS

Cloud computing involves virtualization, distributed computing, networking and web services. Cloud computing can be defined as parallel and distributed computing consisting of a collection of interconnected and virtualized computers that are dynamically provisioned and presented as one or more unified computing resources based on service-level agreements established through negotiation between the service provider and users [14]. Cloud consists of several elements such as users, data center and distributed servers. It includes fault tolerance, high availability, scalability, and flexibility, reduced overhead for users, reduced cost of ownership. The main advantage of cloud-based systems is their simplification. Cloud

eliminates the compatibility problem using same platform access and provides easy connection to every part of supply chain. It enables supply chain information collaboration between partners in one supply chain system. The logistics partners can enter and added in the collaborative environment of cloud using member id and password. After that all users have authorized to operate simple process and application in the same platform, which reduced response time of logistics partners.

Another benefit of cloud is visibility which provides timely connectivity along multiple logistics participants. Therefore, visibility is a key issue for logistics partners as it not only helps such companies to coordinate their operations and manage many different customers but also allows the customer network to have a transparent view of the entire system. Cloud-based systems are able to provide real time visibility of inventory and shipments and improve information tracking in accurate form. By using cloud computing, companies can control their system capacity more accurately. In periods where demand is high, companies need enough capacity in order to be able to face this increasing demand. Consequently using common on-premises systems, they should have their own database for the whole year in order to respond to the excessive demand just for a short period. However, with the advent of cloud technology, companies where given the opportunity to adjust their capacity automatically according to their needs and scale their computing power depending on demand fluctuations.

4. EFFECT OF CAM AND SM IN LOGISTICS

Cloud computing provides renting of IT service on demand support to logistics companies for their business processes. The new part of IT sourcing is totally managed by the cloud service providers. The user only rents the service in a pay use system. If Logistics Company has already expanded IT hardware and software, it can select to their potential move on certain cloud services. Companies must look into the benefits before selecting the cloud services. CAM provides several benefits for logistics information system:

1. Fast Speed Response: Cloud provides logistics companies to respond fast to any updates required and back end operations being managed by cloud vendors.
2. Latest Updating: Cloud service providers update latest software version most often in a year without any cost to users.
3. Easily CAM adoption: logistics partners easily access cloud applications on logistics web portals, anytime, anywhere without any need arising for training.

CONCLUSIONS

The purpose of developing CAM is to increase profits and high level operations of logistics. By using CAM, Logistics Company presents many benefits in terms of scalability, efficiency, cost effectiveness, time saving and environmental benefits. Thus, companies looking forward to aforesaid benefits must adopt CAM and select the strategies of SM module to give an efficient infrastructure and architecture to re-evaluate and improve logistics information system by creating benchmarking efforts in cloud computing enabled SCM.

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