Paper DCS Maniah

by Maniah Maniah

Submission date: 02-Sep-2020 04:29PM (UTC+0700)
Submission ID: 1378134591
File name: Paper_DCS_Maniah.doc (338K)
Word count: 3197
Character count: 17430

Risk Analysis of Cloud Computing in the Logistics Process

1st Maniah
Computer Science Departement, BINUS Graduate Program
Doctor of Computer Science, Bina Nusantara University
Jakarta, Indonesia 11480
maniah@poltekpos.ac.id

2th Shiyami Milwandhari
Program Studi D3 Manajemen Informatika
Politeknik Pos Indonesia
Bandung, Indonesia
shyiami@poltekpos.ac.id

***Abstract*— In the era of the fourth industrial revolution or industry 4.0, one of the foundations is the application of Cloud Computing. Currently, many logistics industries have implemented cloud computing in their logistics processes. Logistic processes are activities carried out to run the logistics business, which are better known as logistic activities, such as integrating supply chains, providing warehousing services, transportation [1]. How big is the risk value faced by business players in the logistics industry who implement cloud computing to support this logistics activity, so it is important to know the risk value of each logistic activity based on the probability and impact risk that exists. This study uses a qualitative approach where the researcher in collecting data, the researcher uses questions that are asked to respondents that are flexible. Respondents who are the object of this research are several companies / industries that have logistics services to support their company's business. The method used in this research is risk analysis based on ISO 31000. The results of this study provide an overview of the risk value in 13 (thirteen) logistic activities, namely: Procurement activities have the highest risk value, and customer service activities have the most risk value lowers (1), while for 11 (eleven) other logistic activities the risk value is medium.**

Keywords—Cloud Computing, logistics activity, Risk Analysis, risk value

I. INTRODUCTION

There are many uses of Cloud Computing in the logistics industry. This is evidenced by the large number of cloud logistics platforms that have been developed [2], digital technology for core operational activities in the logistics process, such as creating a platform for logistics information on a large scale and using RFID, EDI and GPS systems as tools to provide logistics information [3]. We can see this in Table 1, some cloud service providers provide many solutions for the logistics process. In addition, logistics business players can adopt a model that has been developed by [4] as a reference in the use of cloud computing in the logistics business, such as the existence of access rights for users to run applications on the same platform, so as to shorten the response time required by logistics partners as cloud users. According to the World Economic Forum, it shows that digitization in logistics could provide a value of $ 1.5 trillion by 2025[5].

TABLE I. CLOUD SERVICE PROVIDER IN LOGISTIC PROCESS [6]

Cloud Provider(CSPs)	Traditional Services	Solutions on the Cloud
Aliyun (Alibaba)	e-commerce, payment platform	**retailing**, finance, **transportation** video, game, health, political issues
Weiyun (Tencent)	Game, social media	game, video, finance, **e-commerce**, travel, education, political issues, health
Baidu Cloud (Baidu)	Search engine	entertainment, videos, education, political issues, finance, health, game, **retailing**
Huawei Cloud (Huawei)	A mobile device, networking, and telecommunications	connected car, health, **logistics**, meteorological service, finance, **e-commerce**
MeiTuan Cloud (MeiTuan)	Service evaluation, Group on food delivery	restaurant, hotel, **transportation, O2O e-commerce**

The choice of a cloud computing model for e-commerce companies is carried out by assessing the factors associated with cloud-based e-commerce [7], which will have a sustainable impact on the transportation sector which is a typical part of logistics activities [8], and continued digitization in logistics will enhance vertical and horizontal integration among supply chain partners [5]. In order for sustainable digitization in logistics to provide convenience for the industry, it is necessary to anticipate by identifying weak security points in the supply chain, as stated by [1] in his research related to the security risk assessment of Software as a Service (SaaS) applications in multi cloud. Several logistics industries that have implemented cloud computing technology include PT. Pos Indonesia which is used to support the e-commerce process.

In this study, we will analyze the risks in the application of cloud computing technology for logistics activities. The second part will present a qualitative research method, the third part will explain the concept of cloud computing technology and logistics processes. Furthermore, in the fourth part, it discusses the results and discussion, and at the end, the conclusion is presented which includes conclusions and suggestions.

II. Research Methodology

This study uses a qualitative approach where the researcher in collecting data, the researcher uses flexible questions asked of respondents. Respondents who are the object of this research are several companies / industries that have logistics services to support their company's business. The approach used in this study is Guidance provided in ISO 31000 – process [9], but in this study, it is more focused on the Risk Assessment stage, as shown in Figure 1 below:

Fig. 1. *Risk Assessment Process* [9]

Based on Figure 1, the risk assessment process can be carried out in 3 (three) steps, namely:

1. Identification of risks

   Identification of risks to discover, identify and describe risks that can help or prevent the achievement of objectives and various tangible or intangible consequences;

2. Risk analysis

   Risk analysis of the nature and characteristics of risk, including the level of risk, sources of risk, likelihood of consequences, events, scenarios, controls and their effectiveness;

3. Evaluation of risks

   Risk evaluation to support decisions by comparing the results of risk analysis with established risk criteria to determine the significance level of the risk.

III. Cloud Computing and Logistic Process

Cloud Computing

Cloud Computing is a platform that provides a collective server that can provide software, infrastructure, storage, and other resources [10].

There are four cloud models in the use of Cloud Computing: (i) The internal private cloud (On-Premise), the company independently manages its needs and infrastructure; (ii) The external private cloud, a Cloud service provider for a company or group of companies that needs it; (iii) The public cloud, a cloud service provider which is for many companies that need its services; and finally (iv) The hybrid cloud, which is a form of using cloud services which is a combination of The internal private cloud and The public cloud [11], [12]. There are three types of services on the Cloud, namely: (1) Software as a service (SaaS), which is a type of service in the form of an application or software provided by the Cloud where users can use the application to its full potential without having to provide an application storage area; (2) Platform as a service (PaaS), which is a type of service on the Cloud in the form of a Platform that provides various features to develop and run applications with high scalability for its users; (3) Infrastructure as a service (IaaS), which is a type of service on the Cloud that provides complete computing infrastructure resources in the form of servers, storage, networks, data centers where service users can build virtual computers according to their needs [12].

The adoption of cloud computing in a business must of course be tailored to the needs of the business itself, while the strategic stages of implementing cloud computing in a business can be shown in Figure 2 below:

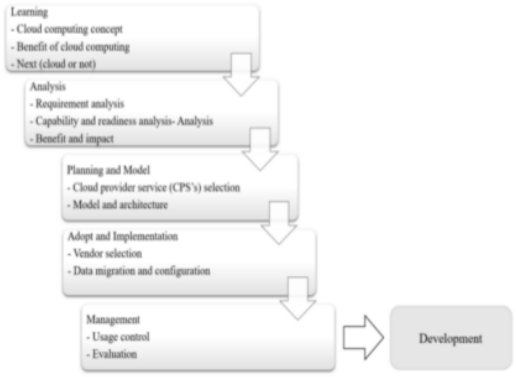

Fig. 2. Cloud Computing Implementation Strategy in Business [13]

Logistic Process

According to Wikipedia, logistics is an art and science, goods, energy, information, and other resources, such as products, services, and people, from production sources to markets with the aim of optimizing the use of capital (https://id.wikipedia.org/).

There are several logistics terms that have been widely used with many names, including: business logistics, channel management, distribution, industrial logistics, logistics management, materials management, physical distribution, rapid response systems, supply chain management, inventory management, as well as having similarity with the management term the flow of goods or materials from the point of origin to the point of consumption, and in some cases even to the point of disposal. Logistics is a key opportunity to increase the company's profitability and competitive performance. To find out in detail how this logistical process is carried out in the company, the following describes logistical activities [14]:

1. Customer service: is the output of a logistics system
2. Demand forecasting: needs based on demand in the future
3. Inventory management: management of the level of inventory required by customers
4. Logistics communication: is the key to the success of logistics management

5. Materials handling: material handling in every process starting from raw materials, semi-finished goods to finished goods
6. Order processing: the process carried out to fulfill customer orders
7. Packaging: is the stage of product packaging in order to fulfill its functions in marketing and logistics
8. Parts and service support: is a form of service to post-sales customers
9. Plant and warehouse site selection: choosing a strategic location as an effort to improve service to customers
10. Procurement: the process of getting goods and services
11. Reverse logistics: return of goods caused by damage, expiration, warranty repairs and others
12. Traffics and transportation: is a stage in product movement
13. Warehousing and storage: the process of storing the product in a place before the product reaches the customer.

IV. Results and Discussion

A. Risk Identification

The logistics business is part of the business sector that also utilizes cloud computing technology, where this technology serves to analyze power usage, determine prices, and find out the demand and supply of goods or services needed. Based on the results of data collection through online interviews and survey activities from the company website which is the sample of this study, an overview of the use of cloud computing technology in each company is produced.

PT. Tiki JNE

PT TIKI Jalur Nugraha Ekakurir, commonly known as JNE, continues to expand its network to all major cities in Indonesia and carry out digital transformation in order to provide better service to its consumers. Currently JNE service points have reached more than 6,000 locations and more than 150 JNE locations have been connected to the on-line communication system. JNE chose Oracle Management Cloud to monitor several application innovations, and monitor more than one hundred JNE services such as track and trace 'on express delivery. In addition, JNE has also implemented an autonomous data warehouse cloud technology from Oracle which is equipped with an artificial intelligence (AI) system and a machine learning (ML) system.

PT. Pos Indonesia's

Pos Indonesia has around 24 thousand service points that reach almost all districts and sub-districts / villages, to remote locations in Indonesia. Application of cloud computing at PT. Pos Indonesia's is expected to increase business speed, cost effectiveness, and create a digital business. The cloud enables the transformation of IT and business processes into digital services. Cloud Computing service will be the basis for PT Pos Indonesia's digital business in the future, especially in the E-Commerce era. Regarding data security that is of particular concern and must be continuously monitored including firewalls, anti-virus, multi-factor user authentication, data encryption, and security audits, all of which are guaranteed Cloud services.

Pos Logistic Indonesia's

Pos Logistics Indonesia is a subsidiary of PT. Pos Indonesia's (Persero) which was founded in 2012, previously in 2004 was a Logistics Business Project, then developed into a Strategic Business Unit in 2007. Currently Pos Logistics Indonesia has been able to develop its own business by utilizing the network that is already owned by PT. Indonesian post. Currently, the most dominant logistical activities are warehousing and storage, data resulting from the processing of these activities are stored in cloud computing.

Garuda Indonesia

PT Garuda Indonesia Tbk (GIAA) is a state-owned company that has implemented cloud computing-based information technology to support its business activities. Currently, Garuda Indonesia Group operates 169 aircraft, which has operated 76 routes for domestic and international flights with more than 600 flight frequencies per day. Garuda Indonesia utilizes data on cloud services in various operational activities, such as Passenger Service System (PSS) services, especially reservations, check-in, Garuda Miles (frequent flyer), finance, and scheduling and rotation services for all Garuda Indonesia aircraft and crew. All of these services can be operated both at the head office and in more than 76 branch offices at home and abroad. This is the company's effort to improve its services, especially the acceleration and ease of service to service users.

From the description above, it can be grouped from each company in the logistics service sector to cloud computing services as follows:

TABLE II. Implementation of Cloud Services in The Logistic Process

Logistics service company	Types of Services Using Cloud Computing
PT. Tiki JNE	Track and trace process on express delivery
PT. Pos. Indonlesia	Focus on e-commerce on courier and payment support, in addition to ensuring data security.
Garuda Indonesia	The Passenger Service System (PSS) process, including: reservation, check-in, Garuda Miles (frequent flyer), finance, and scheduling and rotation services
Pos Logistic Indonesia's	the most dominant logistical activities are warehousing and storage, data resulting from the processing of these activities are stored in cloud computing

Based on the results of interviews with users of cloud computing services in the logistics business, out of the 13 (thirteen) logistics activities described above, all logistics activities can be implemented with cloud computing technology, except for Order Processing activities that can be implemented in cloud computing if the packaging process has been completed. using a barcode. The implementation of cloud computing technology in logistics activities is on storing data from the results of the processing

of each activity and can be used to make it easier for users when they need data.

Because data storage in cloud computing is a public cloud where data use can be done together in one cloud service, this is very vulnerable to data security risks [15], and of course for cloud service users, including the logistics service industry, this will have a risk impact on ongoing logistics activities.

B. Risk Analysis

When applications and data have been migrated to cloud computing, users of cloud services will face various threats in the cloud context [16]. Apart from these threats, there are also risks that are likely to arise in these applications and data.

The risk value can be obtained from the likelihood and impact value of the risk. In order for the risk value to be determined, the value of the probability level and the value of the risk impact must be determined in advance. The probability values and the impact values are shown in Table 3, which were used in previous research by [6].

TABLE III. COMPONEN OF RISK LEVEL [17]

Probability		Impact	
Very high	4	Very high	4
High	3	High	3
Medium	2	Medium	2
Low	1	Low	1
Very low	0	Very low	0

Based on the complexity of the process carried out and the large transaction rates of each existing logistic activity, the level of risk can be determined as follows:

TABLE IV. RISK LEVEL OF LOGISTICS ACTIVITY

Logistics Activity	Probability	Impact	Risk Value
Customer service	Low	Low	1
Demand forecasting	Medium	Medium	4
Logistics communications	Medium	Medium	4
Inventory control	Medium	Medium	4
Material handling	Medium	Medium	4
Order processing	Medium	Medium	4
Parts and service support	Medium	Medium	4
Plant and service support	Medium	Medium	4
Procurement	High	High	16
Packiging	Medium	Medium	4
Reverse logistics	Medium	Medium	4
Traffic and transportation	Medium	Medium	4
Warehousing and storage	Medium	Medium	4

Next, we will calculate the risk value based on the probability and impact of risk [18] of each of these logistical activities using the following formula:

$$r_i = P(ri) * I \quad (1)$$

Where r_i is the risk value for each activity, $P(r_i)$ is the probability value and I is the impact value of the risk contained in each of these logistic activities.

By calculating using the formula above, the risk value of each logistic activity is obtained where the risk value is 16 for Procurement activities, and the lowest risk value is 1 for customer service activities, while for other logistical activities, the risk value is medium for 4. The risk value can be obtained from the likelihood and impact value of the risk. In order for the risk value to be determined, the value of the probability level and the value of the risk impact must be determined in advance. The probability values and the impact values are shown in Table 3, which were used in previous research by.

ACKNOWLEDGMENT

Our sincere gratitude to Polytechnic Pos Indonesia especially LPPM Polytechnic Pos Indonesia with the support to complete this research.

REFERENCES

[1] O. Akinrolabu, S. New, and A. Martin, "Assessing the Security Risks of Multicloud SaaS Applications: A Real-World Case Study," *Proc. - 6th IEEE Int. Conf. Cyber Secur. Cloud Comput. CSCloud 2019 5th IEEE Int. Conf. Edge Comput. Scalable Cloud, EdgeCom 2019*, pp. 81–88, 2019.

[2] L. Yue-qi, "Cloud logistics Sharing Mechanism Based on Cloud Federation," *Seventh Int. Jt. Conf. Comput. Sci. Optim. Cloud*, 2014.

[3] X. Wang, "Analysis on Cloud computing-based Logistics Information Network Mode," *Seventh Int. Conf. Comput. Intell. Secur. Anal.*, pp. 1286–1289, 2011.

[4] S. Dubey and S. Jain, "Cloud Adoption Model in Logistics Solutions : Selection Module," *Int. J. Comput. Sci. Inf. Technol.*, vol. 6, no. 5, pp. 4212–4215, 2015.

[5] Y. Kayikci, "Sustainability impact of digitization in logistics," *Procedia Manuf.*, vol. 21, pp. 782–789, 2018.

[6] S. Chandel, T. Ni, and G. Yang, "Enterprise Cloud : its Growth & Security Challenges in," *2018 5th IEEE Int. Conf. Cyber Secur. Cloud Comput. (CSCloud)/2018 4th IEEE Int. Conf. Edge Comput. Scalable Cloud*, pp. 144–152, 2018.

[7] O. Sohaib, M. Naderpour, W. Hussain, and L. Martinez, "Cloud computing model selection for e-commerce enterprises using a new 2-tuple fuzzy linguistic decision-making method," *Comput. Ind. Eng.*, vol. 132, no. April, pp. 47–58, 2019.

[8] K. Nowicka, "Cloud Computing in Sustainable Mobility," *Transp. Res. Procedia*, vol. 14, pp. 4070–4079, 2016.

[9] R. P. Guide, "A Risk Practitioners Guide to ISO 31000 : 2018," *Rev. 2018 version ISO 31000 risk Manag. Guidel. Comment. use this Stand. by risk Prof.*, 2018.

[10] P. Gupta and C. Gupta, "Evaluating the Failures of Data Centers in Cloud Computing," *Int. J. Comput. Appl.*, vol. 108, no. 4, pp. 29–34, 2014.

[11] M. Nada, B. Youssef, B. Brahim, and R. Boubker, "Survey: Risk assessment models for cloud computing: evaluation criteria," vol. 1, pp. 3–7, 2017.

[12] A. Rot, “Selected Issues of IT Risk Management in the Cloud Computing Model . Theory and Practice,” no. Imcic, pp. 89–94, 2017.

[13] A. Andriani, “Pemanfaatan Cloud Computing Dalam Pengembangan Bisnis.” Seminar Nasional Teknologi Informasi dan Multimedia 2013STMIK AMIKOM Yogyakarta, 19 Januari 2013, pp. 13–18, 2013.

[14] Setijadi, “Aktivitas-Aktivitas Logistik,” 2014.

[15] D. Zhe, W. Qinghong, S. U. Naizheng, and Z. Yuhan, “Study on Data Security Policy Based On Cloud Storage,” pp. 145–149, 2017.

[16] Maniah, E. Abdurachman, F. L. Gaol, and B. Soewito, “Survey on threats and risks in the cloud computing environment,” *Procedia Comput. Sci.*, vol. 161, pp. 1325–1332, 2019.

[17] E. Cayirci, A. Garaga, A. S. De Oliveira, and Y. Roudier, “Open Access A risk assessment model for selecting cloud service providers,” *J. Cloud Comput. Adv. Syst. Appl.*, pp. 1–12, 2016.

[18] I. Shareeful, S. Fenz, E. Weippl, and H. Mouratidis, “A Risk Management Framework for Cloud Migration Decision Support,” *J. Risk Financ. Manag.*, 2017.

Paper DCS Maniah

ORIGINALITY REPORT

13%	6%	5%	9%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	Submitted to Universidad Catolica San Antonio de Murcia Student Paper	3%
2	Sonali Chandel, Tian-Yi Ni, Geng Yang. "Enterprise Cloud: Its Growth & Security Challenges in China", 2018 5th IEEE International Conference on Cyber Security and Cloud Computing (CSCloud)/2018 4th IEEE International Conference on Edge Computing and Scalable Cloud (EdgeCom), 2018 Publication	3%
3	Osama Sohaib, Mohsen Naderpour, Walayat Hussain, Luis Martinez. "Cloud computing model selection for e-commerce enterprises using a new 2-tuple fuzzy linguistic decision-making method", Computers & Industrial Engineering, 2019 Publication	1%
4	Submitted to ILSC - Sydney Student Paper	1%

5	Submitted to South African National War College Student Paper	1%
6	Submitted to Aviation Management College Student Paper	1%
7	www.securitysolutionsmedia.com Internet Source	1%
8	Submitted to Kwame Nkrumah University of Science and Technology Student Paper	1%
9	www.maroondah.vic.gov.au Internet Source	1%
10	Submitted to Binus University International Student Paper	1%

Exclude quotes	On	Exclude matches	< 1%
Exclude bibliography	On		

Paper DCS Maniah

GRADEMARK REPORT

FINAL GRADE

/0

GENERAL COMMENTS

Instructor

PAGE 1

PAGE 2

PAGE 3

PAGE 4

PAGE 5