

Information Technology Services Implementation in Software Laboratory Center Bina Nusantara University

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(Received: 19 Oktober 2016; Revised: 30 Desember 2016; Accepted: 30 Desember 2016)

ABSTRAK

Tujuan dari makalah ini adalah untuk menciptakan gambaran implementasi Layanan Teknologi Informasi (*IT Services*) di *Software Laboratory Center (SLC)*, Universitas Bina Nusantara. Metode yang digunakan adalah penelitian eksplorasi dengan wawancara tidak terstruktur untuk mengekstrak masalah-masalah yang belum ditemukan. Hasilnya adalah beberapa rekomendasi tindakan untuk mengatasi masalah dan gambaran *Information Technology Infrastructure Library (ITIL)* dan *Information Technology Service Management (ITSM)* di SLC. Dapat disimpulkan bahwa ITIL mampu meningkatkan kualitas layanan TI di SLC dengan menyediakan layanan yang lebih konsisten, handal, dan dapat diprediksi.

Kata Kunci: Information Technology Infrastructure Library (ITIL), Information Technology Service Management (ITSM), IT Services

ABSTRACT

The purpose of the paper is to create an overview of Information Technology (IT) Services implementation in Software Laboratory Center (SLC), Bina Nusantara University. Method used was exploratory research with unstructured interview to extract undiscovered problems. The result was some recommendation of actions to overcome the problems and overview of Information Technology Infrastructure Library (ITIL) and Information Technology Service Management (ITSM) implementation in SLC. Can be concluded that ITIL is able to increase the quality of IT services in SLC by providing more consistent, reliable, and predictable services.

Keywords: Information Technology Infrastructure Library (ITIL), Information Technology Service Management (ITSM), IT Services

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Introduction

In this era of globalization, the number of growing or fading companies are always neither increasing nor decreasing. In Indonesia, the number of companies changes dynamically as it can be seen on Figure 1 and Figure 2 (Sulaiman, et.al, [5]). One thing that causes the dynamic number of companies is the ability of company itself to compete and survive in the

business competition. Every company all over the world should have unique ways to stay in existence. One of the unique way is to bring forward the great services to customers.

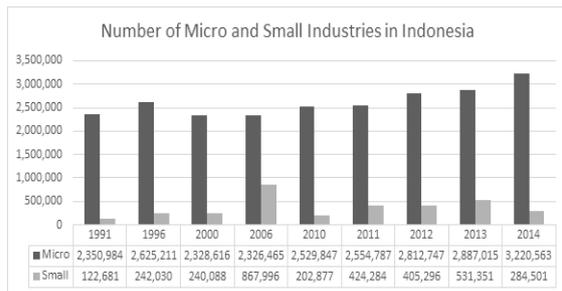


Figure 1. Number of micro and small industries in Indonesia

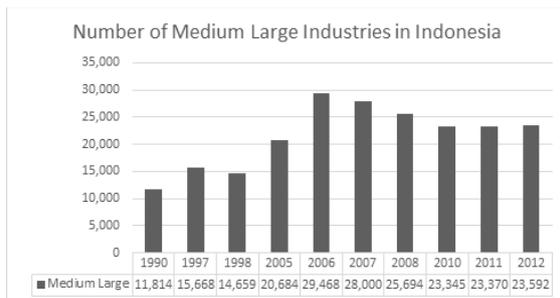


Figure 2. Number of medium large industries in Indonesia

The growth of Information Technology (IT) is interestingly sophisticated as it affects every aspect of modern life from daily to business life. Information Technology (IT) is a powerful tool for companies since it supports companies to compete with the other competitors that have the same field. IT is a media to bring forward the services to customers. IT based companies have to aware of system management that is applied. According to Schiesser [3] system management is actions to identify and integrate many kinds of products and processes in purpose to provide a stable and responsive IT environment. Company has to match the business goal of the company with the action taken to improve services.

Bina Nusantara (Binus) University is an Indonesian private company that focuses on education. It has six campuses, which are named: Anggrek, Syahdan, Kijang, JWC, AlamSutera, and Bekasi. Binus University has vision to be a world-class university in continuous pursuit of innovation and enterprise. The mission of Binus University is to contribute to the global community through the provision of world-class education by: (1) Recognizing and rewarding the most creative and value-adding talents. (2) Providing a world-class teaching, learning and research experience that fosters excellence in scholarship, innovation and entrepreneurship. (3) Creating outstanding leaders for global community. (4) Conducting professional services with an emphasis on application of knowledge to the society. (5) Improving the quality of life of Indonesians and the international community.

Software Laboratory Center (SLC) is a technical services unit at Binus University that provides software-based practical work for students. The SLC office is located on 6th and 7th floors of the Anggrek Campus, Jakarta Barat. SLC is responsible for providing learning facilities and delivering the practical knowledge of the subject related to software and computer which are being taken by students. Currently, there are more than 150 personnel in SLC including teaching assistants and staffs who are ready to guide the students and help the lecturers to seek and obtain required knowledge and information.

SLC has more than 30 practical work rooms facilitated by 1447 computers in total. To help assistants and staffs focus on the teaching process and providing learning facilities, SLC divided its personnel into several roles, which are: a manager, section heads, subject development officers, teaching assistant development officers, operational officers, subject coordinator staffs, research and development staffs, network administrator staffs, database administrator staffs, teaching assistants, internal admins, and external admins. To provide better learning environment, SLC practical work rooms separated into 9 types.

In SLC, there are so many systems which have been developed and used to support its operational activities for day to day. Unfortunately, the systems are poorly documented and its processes are not well defined, which makes it difficult to match customer requirements with the capabilities of services and performing efficient processes. According to Talla and Valverde [7] to address these problems, many organizations adopted Information Technology Infrastructure Library (ITIL) as a framework for improving the service support processes. IT companies nowadays are focusing on providing a high quality service, not only on technical issues.

SLC also provides more than one platform to learn, currently SLC using Windows operating system and Linux OpenSuse operating system. For the administration, SLC has more than 30 servers with more than 2 variant of platform. SLC also provides storage sharing for staff and teaching to ease them on transferring data to the others.

According to Sebaoui, Lamrini, and Abbadi [4], dependable IT governance is important for companies that expect their information systems (IS) as critical contributions to leverage the global redistribution of resources meet the versatile and volatile customer needs and innovate to face the aggressive competition. The five pillars of IT governance as defined by IT Governance Institute (ITGI) are: IT strategic alignment, IT value delivery, IT risk management, performance measurement, and IT resource management.

Information Technology Service Management (ITSM) is structured processes of a company or organization to plan, deliver, operate, and control the IT services for customer. A good Service Desk improves a company's customer satisfaction by allowing the company to implement their ITSM even business plan (Tang & Todo, [8]).

Information Technology Infrastructure Library (ITIL) supports the implementation of ITSM. ITIL is the most widely accepted approach of ITSM in the world. It can help companies to achieve business effectiveness, economy, and efficiency of information system usage (Sultana, [6]). By applying ITIL, companies are able to go up over the competitors. It focuses on the continual measurement and improvement demand the corporations, coordination, negotiation and communication of multiple stakeholders like the board of directors, the management, each branch, each business department, customers, members of Department of Science and Technology (Xiaozhong, Jian, & Yong, [9]). Implementation ITIL Management can effectively to get the objective evaluation of IT services.

Methods

In this paper, the methodology that used is an exploratory research technique. The methodology investigates a contemporary phenomenon within Software Laboratory Center context as the case study. Exploratory research is used to help identify and clarify the decisions that need to be made (Zikmund, Babin, Carr, & Griffin, [10]). Exploratory can be risky. Therefore, further testing processes is needed.

All employees from each division in Software Laboratory Center (SLC) are going to do an open-ended question interview. An Unstructured approach is implemented to focus on discovering the unknown problems and ideas. Archival records from each division are required as evidence of employees' statements and help researcher to decide the recommended solution to cope the problems.

Results and Discussion

In this paper, the discussion consists of problems that occurred in Software Laboratory Center (SLC) Binus University namely: change management, knowledge management, incident management, service desk, storage management and network management respectively. The problems make the possibility of defects occur and inefficiency of work. The recommendations are given to make the possibility of defect occurrences decreased and works become more efficient using ITIL.

The current practice in change management is change of module handling procedure was established to handle new or update of module requirements as shown in Figure 3 and the code implementation activity in Figure 3.

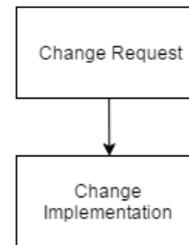


Figure 3. Current practice of change management

However, the current practice of change management is not documented properly and not discussed on the team. Every change request is implemented without considering the consequences. Frequently, the current practice decreases the quality of system performance and making the development team perform meaningless code implementation.

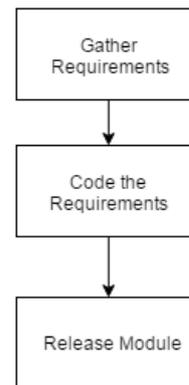


Figure 4. Current Practice of code implementation

The current practice of code implementation is not documented. If changes are needed to be done, it is not discussed on the team. Every individual make their own solution without performing further discussion and documentation with the other team member. It leads to low maintainability and readability of code structure and bad solution may lead to low cohesion and/or high coupling on the code structure.

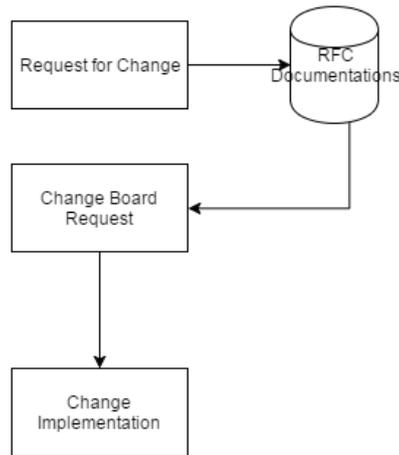


Figure 5. Recommendation for change management

The recommendation for change management is every code implementation needs to be designed appropriately and there are new code structures, it will be documented. After the coding process is done, the code will be reviewed by development team to make sure that the code is following the current design, principles, and best practices before the module is released.

The current practice in change management is knowledge handling procedure was established to handle knowledge sharing process, as shown in Figure 6.

The current practice of knowledge management may have some flaws. Knowledge may vanish because the one who hold the knowledge resigns before able to share the knowledge, or simply can be forgotten by employees because there is no structured documentation. The high turnover rate also often causes the knowledge that gained by staffs in SLC vanished because there is no knowledge management procedure which able the staffs to document their knowledge while they are in SLC.

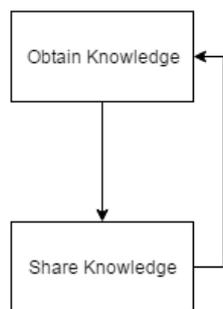


Figure 6. Current practice of knowledge management

The current practice of knowledge management can be a wasting time because the employees who hold the knowledge need to do a meeting for sharing session continuously. There is no readable and centralized documentation that able the new employee to read it by himself/herself for simple knowledge.

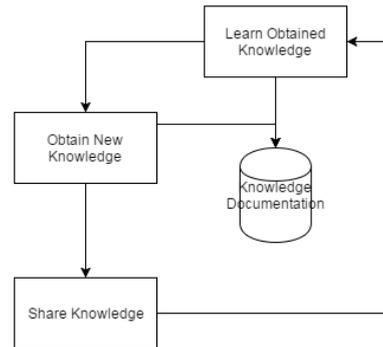


Figure 7. Recommendation for knowledge management

Recommendation for knowledge management is every employee will learn from knowledge database. Every new knowledge owned by the employee will be documented in a knowledge database and will be shared to other employees in a sharing session if needed. With this practice, every knowledge within the company will be retained and can be accessed easily by every staff who needs it. The company must use knowledge management discipline so that the knowledge management can be effective.

Knowledge management is a discipline of identify, record, evaluate, capture, and share organizational knowledge as an assets. The knowledge assets include databases, documents, policies, procedures, and experiences, whether as individual or as company (Duhon, [1]). Nonaka and Takeuchi version of Knowledge management cycle is a model of knowledge management that focuses on conversion process of knowledge, called knowledge spiral (Nonaka& Takeuchi, [2]).

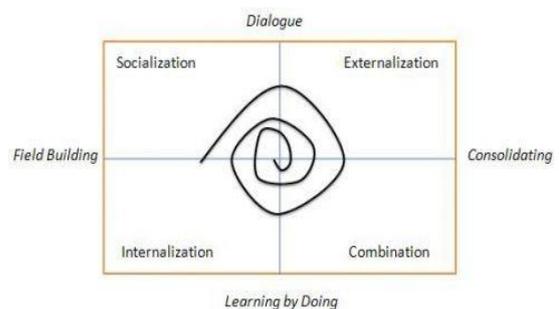


Figure 8. Nonaka and Takeuchi knowledge spiral

Tacit knowledge is the kind of knowledge that is still in person, difficult to transfer to another person by verbal. Explicit knowledge is the kind of knowledge that is ready to be articulated, codified, accessed, and verbalized. Most forms of explicit knowledge can be stored in certain media. Socialization is the first phase in the knowledge spiral. Works on tacit-to-tacit. In this tacit knowledge is shared via social interaction. Externalization is the second phase in the knowledge

spiral. Works on tacit-to-explicit. In this phase, individual transform tacit into explicit as analogies, concepts, hypotheses, or model. Combination is the third phase in the knowledge spiral. Works on explicit-to-explicit. In this phase, knowledge is combined to form new knowledge that is more complex and useful. Internalization is the fourth phase in the knowledge spiral. Works on explicit-to-tacit. In this phase, combined knowledge is implemented by each individual that already learn the knowledge. The implementation makes new experience and becomes new tacit knowledge that is ready to convert from the first phase.

The incident handling procedure wash established to handle incidents as shown in Figure 9.

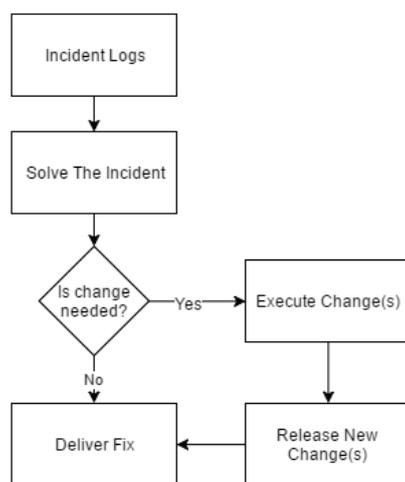


Figure 9. Current practice of incident management

The current practice of incident management aims to restore the service to the customer as quickly as possible, rather than trying to find the permanent solution. The incident may be fixed, but the details of the incident never be recorded. Therefore, the incident may occur again and it becomes problem whose solution never be found. Recurrence incidents can increase the likelihood of impact on the other areas in SLC.

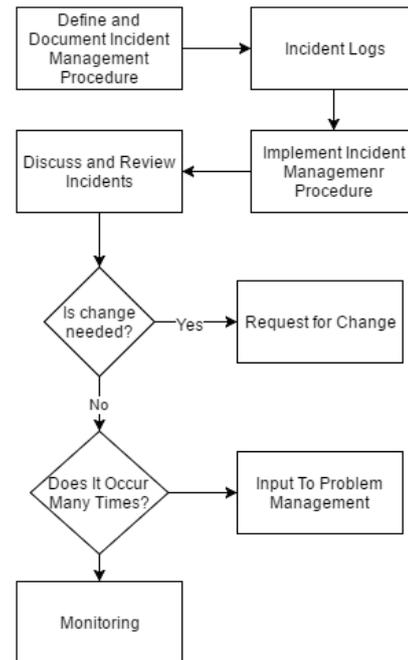


Figure 10. Recommendation for incident management

First of all, SLC needs to define and document the incident management procedure. The objective of incident management is to restore service to the customer as quickly as possible with the least possible impact on either the business or the user, at a cost-effective price (Tang & Todo, 2013, p. 193). Furthermore, the goal is to find the permanent solution of the incident.

After documenting the incident management procedure, the documentation must be communicated to all of the stakeholders. Once an incident occurs, the procedures must be followed according to the documentation. Incident management may produce an output in which the output can be requested for change management or input to the problem management team if the incident occurs many times.

A service desk was established to allow user to reports any problems or incidents as shown in Figure 11.

The application is using netware server. Netware server is an operating system that provides many services such as storage sharing, communication media and restoration system. Netware server architecture is separated into two parts, the sys drive and data drive. Sys drive is the operating system drive which means it contains script, configuration, application installed and user activity log. Data drive is a place where data are being stored. It can be lecturer data, other division data and student data.

This service desk is not available when user needs to report problem or incident. If the server for report application is down, user cannot report problem or

incident. Furthermore, if a part of the server exceeded the limit, server cannot give all services it has.

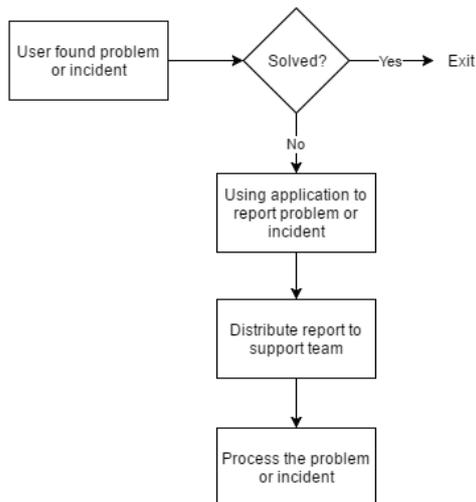


Figure 11. Current practice of service desk

Separate the usage of storage and communication media into different server by creating a chatting web application. By using this solution, storage server workload will be lower than combining storage and communication media into one server. If storage server is full, it won't interrupt the communication media because it is already in the different server. Furthermore, the infrastructure will become better too, since the server can be used only for storage and the other server is only for the application.

Storage sharing was established to ease the lecturer to share materials for student without using external disk and student can submit their assignment through the shared storage. Network Administrator of SLC is responsible keep the storage available whenever it is needed. The current practice is shown in Figure 12.

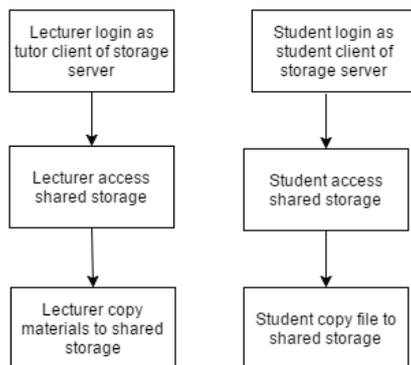


Figure 12. Current practice of storage management

The shared storage uses network server. Network server is an operating system that provides many services such as storage sharing, communication media and restoration system. Network server architecture is separated into two parts, the sys drive and data drive. Sys

drive is the operating system drive which means it contains script, configuration, application installed and user activity log. Data drive is a place where data are being stored. The data can be lecturer data, data from the other division and student data.

If the server downs, user cannot use the shared storage. A large amount of user can produce a massive dump files in server. The dump files here can be the activity log files and caches. If a part of the server exceeded the limit, server cannot give all of services it has.

Separate the storage into an Active Directory so there will be a storage used for storage sharing. Disable the server to produce dump file. Active Directory is a directory service that developed for Windows operating system. By using this solution, the storage server will be centralized in a different server. This service also can help to manage the storage easily, we can keep the storage availability by controlling the sharing files using service that is provided by Active Directory.

Network service is one of important things in SLC, bad network service will affect so many field in SLC including the learning process. Currently, SLC is using several tools to monitor network condition but not the comprehensive ones. The current tools cannot monitor network condition in a real time. Furthermore, there are many network hardwares which are already old. SLC uses both cat5 and cat6 cable. The topology implemented is the star and tree topology. In the term of ease of the maintenance, SLC network uses VLAN to restrict and divide the local connection. SLC has 1 layer 3 switch, 9 layer 2 manageable switches, 88 layer 2 unmanageable switch and 17 mikrotik routers. The current practice of topology is shown in Figure 13.

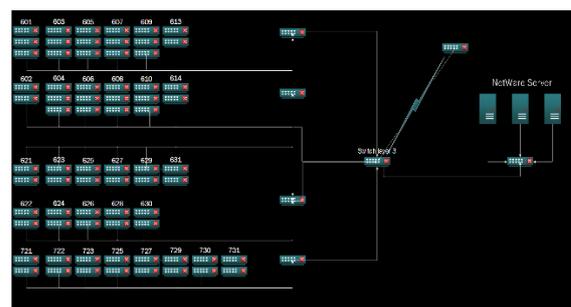


Figure 13. Current practice of topology

With a huge network infrastructure, SLC cannot monitor network resources by real time. This problem will make the Network Administrator confuse on making the decision whether they need to upgrade, change to new one, or need to provide redundant.

Based on the problem described, SLC implements a tool named cacti that able to monitor

network condition by real time and flexible. This tool provides feature to export the recorded resource usage. By using this tool, SLC can make decision whether they need to upgrade, change to new one, or need to provide redundant.

Conclusions

Based on the results of analyzing the IT services implementation at Software Laboratory Center (SLC), it can be concluded that there are some problems in the practice of IT services implementation at SLC. The current procedure of IT services at SLC is not standardized and not based on the best practice such as ITIL. The major problems faced by SLC in the practice of IT services are: (1) Change for requests are not properly documented and often implemented without being discussed further for the impact; (2) There are no standardized procedure for code implementation which causes low maintainability and readability of code structures; (3) Knowledge in SLC may vanish since the knowledge is not appropriately distributed and there are no structured documentation; (4) There are no incident management procedures to restore services with the least possible impact and permanent solution; (5) The current usage of storage is not efficient. The server for application and communication media is not separated so when the server down, user cannot report to the service desk since it is on the same server; (6) the separation of shared storages is not efficient. When the server down, users cannot access the shared storage; (7) with the huge network infrastructure, SLC cannot monitor network resources by real time.

ITIL framework is one of ITSM best practices which consists of a well evaluated, explored, and maintained set of guidelines. By implementing ITIL, a company can effectively manage and get the objective evaluation of IT services. If the ITIL management is implemented in SLC, it can help to solve the existing problems. Several ITIL managements which can solve the problems in SLC are: (1) Change management: every change request will be documented as RFC documents. The RFC will be discussed further with all of stakeholders before deciding whether changes must be implemented or not; (2) Knowledge management: every knowledge in SLC will be documented in knowledge database and will be shared to other employees so they can learn the knowledge; (3) Incident management: incident management will help SLC to recover services if incident occurs with the least possible impact and finding the permanent solution; (4) Service desk management: by implementing the service desk management, user can report to service desk if incident occurs; (5) Storage management: by implementing storage management, the usage of storage will be more efficient since storage for sharing will be specially separated; (6) Network management: by implementing network management, it

will able the network administrator to monitor network condition by real time and flexible.

There are still many ITIL managements which can be implemented to improve the quality of IT services implementation in SLC. The processes of ITIL need to be done not only for solving the current problems, but for future problems as well. In the future, the problem management may be implemented in SLC since the incident management may produce output that will become input for problem management. Furthermore, the Service Level Agreement (SLA), Operational Level Agreement (OLA), demands, capacity, and other metrics must be measured and monitored. Continual service improvement is needed to be done to maintain the value for customer through the continual evaluation and improvement of IT services.

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