

How to Improve Integrated Information System by Configuration Management Process Application?

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Abstract. *In the recent years in Croatia, we have witnessed significant changes in organizations that are in the information technology business. They are evolving from simple computer repairing services to organizational units taking much more demanding role of continuous monitoring, tracking and tuning all components of information system in order to ensure uninterrupted operation of business system in customer's service hours. Seeing the significance of monitoring and control of all changes of the IT environment components, and taking into account rapidly increasing complexity of the infrastructure and frequency of changes, IT managers start to searching for a solution for storing records of all IT components, relationships between them and all changes to them, to a centralized database repository.*

To ensure reliability and correctness of data stored in such database, it is necessary to implement Configuration Management Process. Some of the significant improvements, which are the results of the implementation of Configuration Management Process, are: better customer support, more efficient problem solving, faster analysis and implementation of changes, more accurate planning of expenses, better support of service availability and capacity management processes.

The paper shows how to implement Configuration Management Process and what benefits can be expected.

Keywords. IT organization, process, Configuration Item, Configuration Management, Configuration Management Database, ITIL

1 Introduction

IT organizations, to monitor components in their environments, have implemented various applications like Human Resources Application, User Support Application (Help desk), Application for tracking procurement process and automated desktop PCs management system. But to be able to provide effective support to their users in managing and supporting IT services, these applications need to have centralized data repository called Configuration Management Database (CMDB).

CMDB is a repository that contains data about IT components and their dependences, providing an overview of overall IT environment. The quality of data in the database can be maintained only by continuous and regular maintenance; therefore it is necessary to implement a specific process for managing these configurations. When implementing such a process, it is recommendable for companies to use accepted standards and methodologies in order to have common understanding of used terms (like change management, incidents, problems, etc.) with their Business partners, Vendors and users [3].

One of the most commonly used methodologies in the world is ITIL (Information Technology Infrastructure Library). It is been used and recommended by all larger IT companies in the world like Microsoft, HP, IBM and others.

ITIL is a collection of the best practice solutions for IT environment implementation and management. It describes procedures, principles and approach for defining all phases of IT management lifecycle. Originally ITIL was designed to help managing IT infrastructure in British governance institutions and today it is used all over the world as a foundation for IT Service Management standards BS15000 and ISO/IEC20000. Worldwide authorized training organizations are capable of educating people about ITIL best practices so they can be certified after they completed training course. Also, there are a number of ITIL compatible tools for implementation and assessment of process for managing IT services (IT Service Management) [6].

This paper investigates the potential benefits derived from application of Configuration Management process in IT organizations. It gives guidelines for implementing such a process and recommendations for the procedure that will enable up-to-date and accurate data in database. The paper is concluded with a brief summary and some aspects that must be considered for successful and beneficial implementation.

2 Configuration Management process

Configuration Management is a process of analyzing, defining, documenting, testing, accepting in production, controlling and monitoring changes in configurations of all IT infrastructure components. These components are called configuration items, and they include hardware, software, procedure, documentation and people.

Goal of Configuration Management process is to ensure reliable and up-to-date information stored in the Configuration Management Database (CMDB), to be able to use that information as a reliable source of configuration item details, their relations and dependencies.

This process is used to control that all changes in IT infrastructure are correctly updated, including relations between configuration items. Also it is used for tracking status of IT components to ensure that database reflects accurate version of configuration items [9].

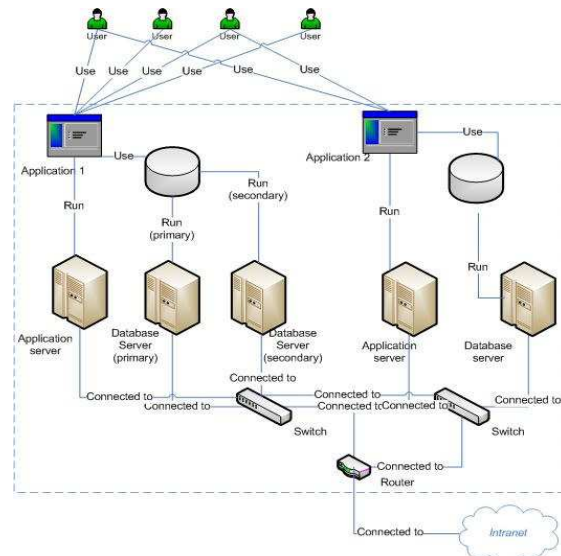


Figure 1. IT environment components and their dependencies

2.1 Benefits of having implemented Configuration Management process

Efficiently implemented Configuration Management Process can provide a valuable source of information required in decision making process.

From CMDB the following data can be captured:

1. Financial data and data about product policy (e.g. which IT components are currently in use, how many of existing model (version) are there, how long are they active, what are the trends in various product groups, what is the current value of IT components, what IT components can be signed off, and which of them can be upgraded, how much will cost replacement of existing IT components, which licences are used by company, which maintenance contracts have to be renewed, how well is IT infrastructure standardized and so on);
2. information necessary for bug fixing and impact assessment (e.g. what IT components are necessary to perform disaster recovery procedure, what equipment is connected to the network, what IT components are effected by change, which incidents and problems appeared in history and still are not solved, what IT components were purchased in some period from particular vendor etc.)

3. data helpful for service support and billing (e.g. what configurations of IT components are essential for particular services, what IT components are in use and who are their users, what are standard IT components that can be ordered by customers – product catalogue etc.) [10].

2.2 Guidelines for Configuration Process implementation

IT services consist of end-user equipment, servers, network equipment, storage, applications and data. Well defined and interrelated IT services are prerequisites for negotiating Service Level Agreement between IT organizations and users of their services [4].

Worldwide experience has shown that many companies are still using manual processes and in-house developed tools to be able to maintain information about configuration items in various repositories. Often, companies are dividing their IT organization in following areas: Network Management, Storage Management, System Management, Application Management and Database Management. Each of this areas is handling their own data in own repository [1].

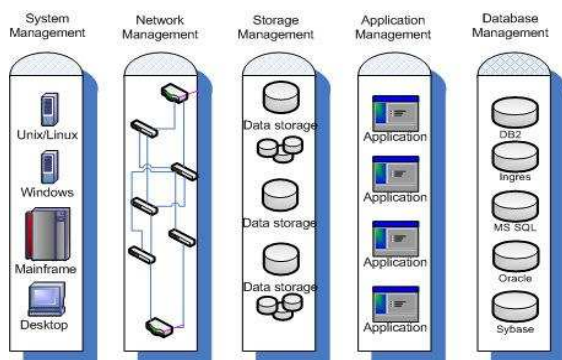


Figure 2. IT organization traditionally divided

This traditional way of managing IT areas cannot be used for monitoring end-to-end services; so infrastructure components have to be connected in services dependency map to get a clear picture from what is each IT service composed.

Fig. 3 shows dependencies between services and components in CMDB. It shows which configuration items are required for specific service. Tracking changes of these relations enables IT organizations to easily determine impact of particular incident on service, generate reports about all components of which the

service is composed and use the data during IT service improvement planning.

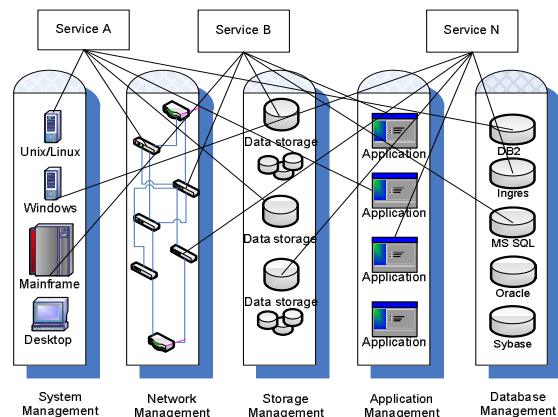


Figure 3. Service components

Dependency map is extremely important because various subjects (companies, business departments, individuals) need various services, but also the same services available in different times. For example, some business departments need service availability from 8-16 hours, while other departments because of their business needs will require service availability from 8-22 hours. To be able to deliver requested availabilities, IT need to have accurate CMDB and established process for updating configuration items that will ensure that all changes, whenever it is possible, will be performed outside of agreed availability timetable [7].

In order to satisfy dynamic nature of their business users needs, companies have to constantly change and adjust applications having in mind that available time for changes on application components is becoming shorter and shorter. Furthermore, applications are becoming more integrated, working on more systems. Responsible persons of this complicated business systems and their IT administrators need to have full overview of IT environment to be able to understand potential impact of changes in one system that could possibly negatively impact other systems.

There are many tools on the market developed for discovering configuration items and their dependencies. Using these tools enables monitoring of all IT infrastructure components: IT office equipment, servers, network components, data storages, applications, operating systems, databases and documents, their relations and automatically connecting them

in IT service dependency map. In companies, these tools are mostly used for Data centre needs and application environment to detect server's and application's components. Although there is a big selection of tools on the market, when making a decision for buying one of them, companies need to check if the tool is able to recognize logical connections between connected objects and any changes on these relations. Most of brand tools for configuration items discovery can be integrated with other IT Service Management tools that have already integrated CMDB.

When establishing CMDB as well as during update of data model, it is necessary to make a decision which parts of IT infrastructure will be controlled with a Configuration Management process. It has to be analyzed which IT services contribute to daily user's business activities and is it really necessary to monitor each element of infrastructure such as keyboard, mouse, fax machine, copy machine, phone etc.

CMDB scope could be hardware and software but also documentation like Service Level agreements, procedures, manuals, technical specifications, organization charts, employees and planned projects. Like any other configuration items, documentation will persist everywhere, but in configuration database there will be also data about its version, date of creation, author and other information.

Often, large companies have more than one CMDB that are interconnected using particular key. When connecting more CMDBs, it is necessary to decide what data is held in which database ensuring that there is no overlapping so that the same data is not updated in more than one place. For example, one tool for configuration item discovery can track devices using their Internet Protocol address, other tool can track devices using their Host name, and third tool can track this same device using Media Access Control Address. CMDB must be able to recognize and synchronize data from these 3 tools, ensuring that every discovered component is recognized as one configuration item with different attributes, and not as three different components [5].

When establishing CMDB, it is very important to decide about level of details for each configuration item. As much levels CMDB has, number of relations between configurations items will increase. This is the reason why

request for levels and relations must be balanced as well as available resources and amount of work required for keeping them up-to-date.

2.3 Configuration Management Procedure that will enable up-to-date and accurate data in database

In the process of designing Configuration Management, procedure that will ensure up-to-date and accurate data in CMDB has to be defined.

Procedure has to enable receiving requests for changes on IT services, entering requests in database, entering data about all performed activities/changes and informing initiator about performed changes. For this purpose it is recommendable to design a form that will ease the work of initiator and persons that approve, receive and perform requested change [8].

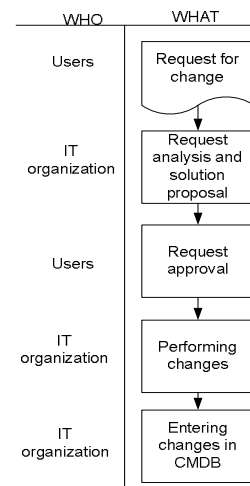


Figure 4. Configuration Management procedure

In Fig. 4 are shown main steps in Configuration Management procedure: request for change, request analysis, request approval, performing change and entering change into CMDB.

Request for changes has to be verified in order to ensure that requested change on service is technically feasible and worthwhile, and that all information in form is complete and correct.

During request analysis companies should estimate its influence on other configuration items, the amount of work required to perform the changes (man/days), the cost of changes, how urgently the change is required and so on.

After analysis is done from IT organization side, Change initiator have to be informed about analysis results (is the change request accepted, how many man/days is required for performing change, what is the cost of change and when will be delivered to customer).

If the initiator has no objections on analysis results, the work on the change is started. After change is finished, IT organization has to document the change. Change has to be entered in CMDB in a way that data about configuration items that are affected with the change are updated.

Depending on organization size and needs, Change Control Procedure can be carried out electronically in spreadsheets or tools for IT services management.

3 Conclusion

Due to increased complexity of IT infrastructure and increasing frequency of required changes to the infrastructure, companies are looking for a way to efficiently and effectively manage their assets. Usually it results in starting a project for Configuration Management.

Configuration Management process enables companies better control of their IT assets so in long term, by implementing this process the company will save money. Data acquired from CMDB can be used for infrastructure capacity and efficiency planning. Also, companies can easily manage their IT architectures and plan optimizations of existing capacities. Furthermore, the database is also useful in supporting end users, especially in large companies, as a source of information about end users, assets and services they use. Using CMDB, IT organizations can easily calculate the costs of complete services, and what price is profitable for providing these services.

It is not easy to implement this process, mostly because companies don't know where to draw the line and what to track in CMDB. Usually they are going in too much detail what is later to hard to maintain. There is also resistance to changes; often employees found new procedures too complicated since previously they had to update only their own datasheets, and now they have to follow the procedure and learn to work in a new tool.

Because of these reasons, company's management has to be familiar with all the advantages and possible problems. They need to strongly support the proper implementation and operation of Configuration Management process. Any deviation has to be discovered and solved on time. Excerpt this, one or more persons have to be designated to take a role of Configuration Manager. This person has three major responsibilities: implement process, communicate with employees in order to get familiar with importance of this process and educate them, as well as organize IT infrastructure audits and report to the management.

It is not easy to implement Configuration management process, but if all crisis are successfully overcome, IT organization will have countless possibilities for improving their integrated information services.

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