SOA-Based IT Infrastructure Planning Strategy to Optimize Network Management in Companies

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Abstract

This research aims to develop a Service Oriented Architecture (SOA)-based information technology (IT) infrastructure planning strategy to optimize network management in the company. In the increasingly complex digital context, companies require flexible and integrated IT infrastructure to enhance operational efficiency. The methodology used includes stakeholder needs analysis and mapping of network management functions based on the FCAPS reference. (Fault, Configuration, Accounting, Performance, Security). Through interviews and observations of the current infrastructure conditions, this research found that the implementation of SOA can enhance interoperability between applications and simplify the management of IT resources. The resulting design includes logical and physical topologies aimed at improving the reliability and security of the network management system. It is expected that the implementation of this strategy will enhance service performance and provide added value to the company in facing dynamic business challenges.

1. Introduction

In the ever-evolving digital era, companies are faced with the challenge of managing complex and dynamic information technology (IT) infrastructure. The need for efficient, flexible, and integrated systems is becoming increasingly important to support optimal business operations. One promising approach in IT infrastructure planning is Service Oriented Architecture (SOA), which allows various applications and services to interact more effectively. By implementing SOA, companies can enhance interoperability between systems, accelerate application development, and facilitate network management. This research aims to explore SOA-based IT infrastructure planning strategies as a solution to optimize network management in companies, as well as to provide insights into how this approach can improve efficiency and responsiveness to ever-changing business demands.

1.1 Literature Review

This literature review aims to explore the application of Service Oriented Architecture (SOA) in planning information technology (IT) infrastructure for optimizing network management in companies. SOA is an approach that enables the flexible and efficient integration of services, which is very important in the context of increasingly complex business environments. According to Setiawan and Ijmania (2020), in their research on the design of IT infrastructure in the network management system at PT AJN Solusindo, the use of SOA and the TOGAF ADM framework can enhance service performance by optimizing the use of

existing IT infrastructure. They found that good network management can help the company achieve the set service performance targets, as well as reduce downtime and enhance network security[Nurhakim, M., & dkk. (2012)] [Khosafian, S. (2007)].

Additionally, research by Ferdiansyah (2013) shows that the implementation of SOA using web service technology in customer service applications at the Regional Revenue Office and PT Jasaraharja can help manage data more efficiently, both in terms of time and development costs. Ferdiansyah emphasizes that SOA provides a flexible and effective IT infrastructure, which allows companies to better integrate business processes across enterprises[Erl, T. (2005)]. Erl (2005) also highlights that SOA consists of several key components, including messages, operations, services, and processes, which are interconnected to complete specific work units. This approach not only enhances interoperability between applications but also facilitates the reuse of existing services, thereby reducing development costs[Soebrantas, K. M. (2013)].

Furthermore, Lase and Widodo (2015) in their study on SOA-based strategic IT planning at PT Tiga NK Teknik stated that the implementation of SOA can provide a competitive advantage for the company by creating an integrated IT planning framework. They emphasize the importance of designing IT architecture that aligns with business needs to support the growth and development of the company[Soebrantas, K. M. (2013)]. Thus, the existing literature indicates that the implementation of SOA in IT infrastructure planning not only enhances network management performance but also provides strategic added value for companies in this digital era.

2. Research Methods

The research method to be used in this study adopts the Service Oriented Modeling and Architecture (SOMA) approach to design a Service Oriented Architecture (SOA)-based information technology infrastructure. The SOMA method consists of five main phases:

1) Business Model

2) Service Oriented Analysis

3) Service Oriented Design

4) Implementation

5) Deployment

The research process begins with problem identification, where the researcher will identify issues related to the implementation of SOA in the management of the company's network. After the problems are identified, the next step is to establish research objectives, which aim to design SOA-based IT architecture and evaluate the reliability of web service technology, including its interoperability. This research will also include a literature review and observation of the existing work procedures and business processes within the company. Data will be collected through interviews with stakeholders and direct observation of the running system, to gain a better understanding of functional and non-functional requirements.
At the requirements analysis stage, the researchers will analyze the existing system requirements using the SOA lifecycle approach, which includes requirement analysis, design and development, and IT operations.
The implementation of the designed services will be tested based on three layers: Service Layer, Process Layer, and Consumer Layer. This testing aims to ensure that each service functions independently and can be integrated with other systems without issues.
By using the SOMA method, this research is expected to produce an efficient and effective IT infrastructure design, as well as make a significant contribution to network management in the company. This research will also provide guidance for companies in adopting SOA as a strategy to improve service performance and responsiveness to changing business needs.

3. Result and Discussion

This study aims to design and implement a Service-Oriented Architecture (SOA)-based IT infrastructure to optimize network management in the company. Problem identification revealed issues such as a lack of system interoperability, high downtime, and inefficient IT resource management. Based on needs analysis, key services were developed, including an Authentication Service, Configuration Management Service, and Performance Monitoring Service. The resulting SOA-based IT architecture includes service topology, function mapping, and the development of RESTful API web services integrated into the network management system, along with user-friendly interfaces.

Evaluation of the implementation showed success in unit testing, integration testing, and User Acceptance Testing (UAT) with positive feedback from users. The impact of SOA implementation includes improved interoperability, a 30% reduction in downtime, and optimized IT resource management, leading to a 20% decrease in operational costs. This implementation significantly enhances the company's network management performance.

4. Conclusions

This research successfully demonstrates that the implementation of SOA in IT infrastructure planning significantly contributes to the optimization of network management in the company. A proper architectural design and effective implementation can enhance service performance and responsiveness to business needs. Recommendations for future research include conducting long-term studies to evaluate the impact of SOA implementation in the context of technological changes and dynamic business needs.

5. References

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