

Research on the Framework and Platform of Operation and Maintenance Quality Evaluation of Complex Information System

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ABSTRACT

Scientific, standardized and credible complex information system operation and maintenance quality evaluation is an important guarantee for improving the efficiency of system operation and maintenance management. By analysing the research status of service management, and analysing the difficulties and concerns of the current operation and maintenance quality evaluation work, this paper designs the operation and maintenance quality evaluation framework of complex information system, and studies the functional requirements of the operation and maintenance evaluation platform and the key problems to be solved in the platform construction.

Keywords: Operation and maintenance management, quality evaluation, evaluation platform

1. INTRODUCTION

As an important part of system management, the operation and maintenance management of complex information system is an important guarantee for the normal operation of the system, which is related to the performance of the system[1]. Currently, with the widespread use of information technologies such as big data and cloud computing in the system, the technical architecture and operation mode of the information system have undergone significant changes, and the system has become increasingly complex. The operation and maintenance of complex information systems presents the characteristics of extremely large system elements, complex cloud service architecture, on-demand deployment of business requirements, and frequent agile application changes.

1.1. Research of Service Management

IT Service Management (ITSM) is a process-oriented and customer-centric approach. It improves the organization's ability and level of IT service provision and service support by integrating IT services and organizational business[2]. The core concept of ITSM is to ensure the balance between service cost and service quality based on process and customer-centric. As currently recognized ITSM best practice, IT Infrastructure Library (IT Infrastructure Library, ITIL) combines the three elements of process, personnel and technology to provide a set of best practices from planning, R&D, implementation to operation and maintenance for the enterprise's IT construction[3, 4]. The program, now the industry's unified and universal industry standards, is widely used in the IT

management of various government organizations, enterprises and institutions in various countries around the world. However, as far as China is concerned, ITSM is still in the concept promotion stage, and it is still only used in some large enterprises and government agencies [5].

1.2. Difficulties in Current Operation and Maintenance Quality Evaluation

First, the traditional network quality evaluation framework cannot fully reflect the quality of operation and maintenance. The traditional network quality index system is based on the main performance indicators of the scattered network elements, which is limited to the scope of equipment and systems, and it is difficult to fully reflect the end-to-end operation quality of the business and the actual use perception of customers[6]. From the perspective of the network information system, the network is the support, the system is the means, and the information is the core. These three aspects are the basic elements of a complex information system, which need to be integrated to form a system. Therefore, it is necessary to fully study the framework of the operation and maintenance quality evaluation in combination with the specific business supported by the complex information system.

Second, the means to support the quality evaluation of operation and maintenance are not yet perfect. On the one hand, data services have the characteristics of many types, rapid changes, many network elements involved, complex user behavior, significant time burst and spatial aggregation[7]; on the other hand, the operation and maintenance mode and method of big data, cloud computing and other information support platforms in the system technical architecture are a new challenge to the

operation and maintenance personnel. Traditional quality monitoring methods and statistical reports cannot reflect instantaneous fault conditions in a timely manner, and it is difficult to locate faults, which results in insufficient quality evaluation[8].

2. THE FRAMEWORK OF OPERATION AND MAINTENANCE QUALITY EVALUATION FOR COMPLEX INFORMATION SYSTEM

The quality management of complex information system operation and maintenance is divided into carrying out operation quality management activities, analyzing and evaluating system operation and maintenance quality regularly, and proposing adjustment quality improvement plans. Specifically, it mainly includes: establishing and improving a quality management organization; implementing a division of duty and maintenance responsibility system for duty personnel; quantitatively formulating work indicators and maintenance indicators such as service response time, service completion time limit, business completion rate, equipment availability rate, and online rate of important service processes; establishing a quality inspection and supervision mechanism; conducting statistics, analysis and evaluation of system operation quality.

2.1. Focus of Operation and Maintenance Quality Evaluation

One is to focus on whether the service model is efficient. Operation and maintenance professionals are streamlined and frequently rotated. It is necessary to optimize the service model, broaden service channels, better improve user response rate and service efficiency, and achieve reduction and efficiency enhancement;

The second is to pay attention to whether the service evaluation system is complete. It is necessary to provide a service feedback evaluation window, to grasp the user's satisfaction evaluation of the business processing situation, and to be able to generate reports with rich dimensions, complete and accurate information based on user data.

The third is to determine whether the service guarantee operation and maintenance monitoring is comprehensive. It is necessary to realize work order data covering all business acceptance channels, to be able to establish an operation and maintenance monitoring system based on service guarantee work, and to grasp the development of service guarantee work in a comprehensive and real-time manner.

The fourth is to ensure sufficient in-depth data mining. It is necessary to build a knowledge base based on user business data and conduct in-depth mining and use. For example, the user's relevant information can be checked at any time during service reception, and historical business

records can be correlated to assist in providing quality services.

2.2. Design the Framework of the Operation and Maintenance Quality Evaluation

Combining the actual operation and maintenance work of complex information systems and the focus of the operation and maintenance quality evaluation work, the operation and maintenance quality evaluation should be considered from the two dimensions of the user and the operation and maintenance department. On the one hand, it is considered from the perspective of user satisfaction, that is, the quality of service. For system users, users will subjectively evaluate the quality of operation and maintenance based on their experience; on the other hand, consider the performance of the operation and maintenance department and design measurable KPI indicators to accurately evaluate operation and maintenance performance.

Both internal and external indicators of the operation and maintenance evaluation system are based on a core, that is, to provide system users with operation and maintenance services quickly, accurately, effectively and at low cost. In terms of indicator design and evaluation, internal KPI indicators are more specific than external indicators, involving specific system operation and maintenance details. The indicators are highly measurable and can accurately find the degree and standard of operation and maintenance services that need to be improved. For example, the first-level comprehensive index of network service quality is usually used to measure the network performance of IP data packets in the transmission process of the external network and internal network of the system network, and the Ping command or network management system is used to measure. Specifically, it includes secondary indicators such as delay, throughput, and packet loss rate.

External indicators focus on user experience. Considering the operability of external system users to evaluate, the number of indicators should be less than internal indicators, such as reliability, responsiveness, timeliness, and availability. The evaluation of indicators is in the form of scoring, such as the Likert scale[9].

In the specific operation process, two indicators, one in detail and one in the other, provide a basis for the development and continuous improvement of operation and maintenance work. After receiving the evaluation feedback from users, the operation and maintenance department can first roughly analyze the weak part of the service quality and understand the most sensitive factors of users. Then, according to the specific values of the KPI indicators of each process link within the department, the detailed problems are found, and the KPI indicators that need urgent attention and improvement are obtained. At the same time, the department can also comprehensively evaluate operation and maintenance performance according to its own department goals. Only in this way

can the quality of operation and maintenance be improved in a targeted and purposeful manner.

3. OPERATION AND MAINTENANCE QUALITY EVALUATION PLATFORM OF COMPLEX INFORMATION SYSTEM

The operation and maintenance quality evaluation platform of complex information system is a technical platform designed and built for the operation and maintenance quality evaluation under the system operation and maintenance system architecture. Through the platform service evaluation subsystem, users can evaluate the business processing, which is convenient to grasp the user satisfaction in time, and better improve and enhance the quality of operation and maintenance work; Through the platform work order subsystem, collect and sort out massive user demand data and conduct data analysis, which can provide a basis for formulating various operation and maintenance work measures; With the help of the platform and the operation and maintenance monitoring system docking, the operation and maintenance department can effectively complete the monitoring of key KPI operation and maintenance indicators.

3.1. Main Functional Requirements of the Platform

First, it needs to provide online customer service functions, provide service interfaces through the WEB interface, support random assignment of customer service and user designated operation and maintenance personnel for business processing, be able to identify users, associate historical information, and quickly solve user needs; in the process of business dialogue, the system can analyze user questions, match the best alternative answers, support intelligent learning, and similar questions can be automatically associated with corresponding answers.

Second, it needs to provide work order management function. The platform can manage, maintain, and track a series of problems and requests according to the needs of different departments and users, mainly including the functions of work order creation, work order processing, work order reply, query statistics, setting, etc. Work order creation has different channels for users and service support personnel. Work order processing has the function of view and processing. It supports the classification of work orders according to the authority level and batch processing of work orders. Multiple reply channels are set up for work order reply, which can be converted into message reply, view reply message or send offline conversation message. Query statistics can be used to analyze the overall acceptance, processing and response of work orders within the pre selected time range, and can be directly displayed in the form of line chart and bar chart.

Third, it needs to provide service evaluation function. After the completion of the conversation or service, users

can evaluate the service quality satisfaction, analyze the data generated by the operation of the customer service system in a multi-dimensional way, form a customer service work report, and realize the comprehensive evaluation of service guarantee quality.

3.2. Key Issues that need to be Resolved When Building a Platform

3.2.1. Low-latency information exchange

The platform needs to ensure that users and support personnel can get the fastest response when they have a conversation through instant message, work order, etc., and push the message from the server to the client in time. Java Ajax technology can be used to exchange a small amount of data with the server in the background, so that the page can be updated asynchronously.

3.2.2. Work order circulation mechanism

The platform should be able to meet the demand of automatic transfer of work orders in the customer service system. The platform can design two kinds of work order circulation mode: flow trigger and timing trigger. The flow trigger module consists of two parts: trigger condition and execution action. When the work order is created or updated, the flow trigger is automatically matched. At the same time, the timer trigger is designed. The administrator pre-set the trigger conditions and execute the pre-set actions at a fixed time.

3.2.3. Deep data mining

The platform needs to be able to build a knowledge base based on user business data, and carry out in-depth mining for use. For example, we can view the relevant information of users at any time during the service reception, associate the historical business records, and assist in providing high-quality services.

4. CONCLUSION

Through the research of the evaluation framework and the establishment of a quality evaluation platform, the implementation of the quality evaluation of complex information system operation and maintenance can be realized, the accuracy and timeliness of the quality evaluation work can be improved, and the enthusiasm and initiative of the operation and maintenance personnel can be stimulated, and the quality of system operation and maintenance management can be greatly improved.

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