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Engineering management informationization based on computer information network technology

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Abstract. In order to make the computer information network technology to better serve the project and effectively develop innovation and project management technology, this paper made a research for project management informationization technology based on computer information network. In this paper, C/S three-layer structure was adopted, and the specific requirements of project management was taken as the breakthrough point, the overall framework of the system and the function modules of each part were designed. The results show that the system is applied to the practice of project management, which can effectively save the production cost and achieve the comprehensive management of the time limit, safety and other indicators. Therefore, it is believed that the research in this paper can be used as a reference for the engineering management of computer information network technology.

Key words. Computer, information technology, project management.

1. Introduction

Engineering management information of computer information network technology refers to the computer network, the realization of engineering management information, under the operation of the related system, the project in all aspects of information input, memory, editing and output can be achieved, so as to realize the guiding role of network technology of computer information network in engineering management.

Yin Juan said: "In the computer information network technology project management information, the way of information transmission is the flow of information, the media is a computer network, obviously, this is a very low cost management mode, the communication is not affected by the limit of time and space, it is convenient, safe and secure at the same time [1]."

Ye Guowen put forward: "The engineering management information system

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based on the computer information network technology can keep the sensitivity to the environment at any time, and can make the response actively when the environment changes." Engineering management information can make the project management system with the external environment to build an effective information communication bridge. Flexible means of communication can ensure that the project management project to a variety of categories of resources can be fully used [2]. Haifeng realized that information engineering and management of computer information network technology can achieve the maximization of resource utilization, which can realize the complementary advantages of resources [3]. Because in the project management information system of computer network technology, the project management organization is not limited by space boundaries, they can break the boundaries of the existing departments, integration of resources in the internal and external organizations, so as to make project management more adapt to the needs of the development of the market economy.

In Sheng Xiaoqing's view, "the traditional project management has the limitation in the aspect of data statistics, and the performance is obvious lag. The engineering management information system of computer information network technology can make up for this defect; it can quickly integrate data information through the computer network [4]. This will ultimately achieve the optimization of all aspects of project management, such as cost minimization, quality optimization." In the face of the wave of information, the project management needs to develop its own information management system, to ensure the optimization of the project management effect. Based on the relevant theory, the paper designed the engineering management information system based on the computer information network technology. Using the system dynamic control module, the related project management content was optimized. Based on information technology and related means, and the various elements of the project management to consider, put forward the improvement of the system and the project management module. In the second section, the paper briefly analyzed the development status of engineering management information based on computer information network technology; in the third section, the design and analysis of the project management information system based on computer information network technology was designed and analyzed; in the fourth section, the practical effect of the system was analyzed. Finally, the research process and the results were summarized in the fifth section.

2. State of the art

In project management, the information transmission through the computer network system to each have the same right to know the management, the information transmission has good quality, and it gets to the managers at the same time, so decision-making can be effectively carried out smoothly when we discuss in common [5]. Ni Weihua also said that, in particular, the computer information network technology project management information system through the sub project tracking, coding and other engineering projects for classification and guidance. This achieves the overall control of the project schedule, manpower and procurement and other

aspects [6].

In reality, the development of engineering management information of computer information network technology is not optimistic, in order to achieve the comprehensive development project management information system of computer network based on the technology, there are many issues need to be overcome.

Firstly, the project is widely distributed, not every project has good communication conditions, for example, the remote location that wants to connect with the project management information system of computer network based on technology can only rely on dial-up, and cannot achieve a comprehensive project management information. Secondly, Qi Anbang put forward, at present, our country is in the big environment of engineering management information technology based on computer information network, lacking of a good and orderly development [7]. This means that in all walks of life, a unified standard of information has not formed yet; the result is that each industry need to according to their own actual situation to develop its own software engineering management information system, and increase development costs. Moreover, each industry's information software cannot carry out the information exchange between each other, for the project management information system, it is unfavorable to realize the comprehensive information management.

Thirdly, Liu Erlie pointed out that the project management information system based on computer information network technology, it is difficult to carry out quantitative investment return analysis [8]. The state provides legal protection to the interests of electronic documents, but companies tend to exclude the electronic documents in the core interests involved, so a lot of development benefit managers are not optimistic about the information system engineering management, so as to slow down the pace of the popularity of project management information system [9].

3. Methodology

3.1. Database technology

Database technology plays an important role in the process of engineering management information. This technique is based on the database as the research object, storage, editing, deletion and management of the data. Database system is developed based on database technology [10, 11]. The database system based on computer network technology can realize the integration and utilization of a large number of data conveniently and quickly. At the same time, for users, they can access the database system to obtain an effective data resources. Developed in the database system based on database management system, the system aims at the building, updating and querying data, it is between the user and the operating system, and its nature is software for the management of data [12].

In order to achieve the purpose of optimization algorithms library, database management system designed in this paper is mainly aimed at the project integration management, according to strict standards, advanced information technology, providing relevant resources of information engineering management allows users to find easily, enables the system to be standardized [13]. The system can achieve the

optimal allocation of resources; through the optimization algorithm library it can accurately calculate the project cost, schedule, and so on.

In addition, the system supports the network collaborative work, therefore, in the system the user can operate this system at the same time, it is helpful for improving work efficiency, and ensure the consistency of the data information. Based on this database management system, it can be used for engineering management in the design of the construction project. Figure 1 is the construction plan of the construction process [14].

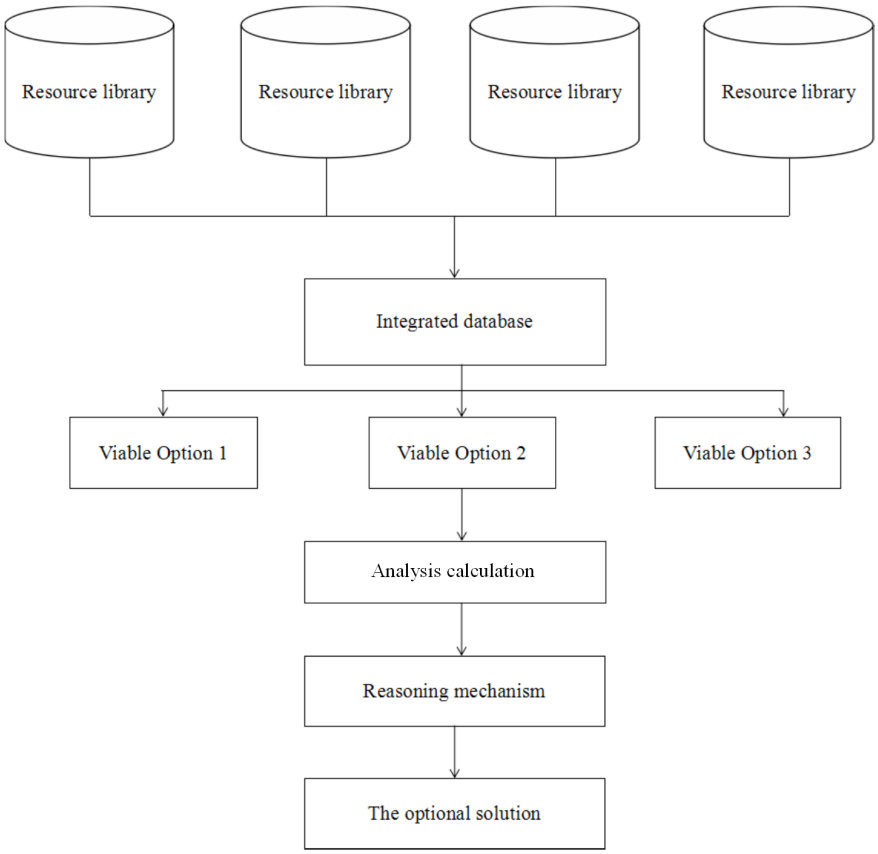

Fig. 1. Generating process of engineering construction plan

3.2. Engineering management information system architecture

Project management information related to the various business organizations, in different times, all kinds of engineering management information system construction is different, lack of interactivity between them, and even the technical standards are not consistent, the types of production is also a wide variety, so realizing the integration of engineering management information system is bound to face a lot

of challenges, the cost of the development will be too high [15]. Considering all aspects, it is not necessary to build a special integration scheme. We can build an integrated public platform, which can maximize the use of existing different types of engineering management information systems, saving capital while achieving the efficient operation of the system. We are using the SARI four tiers structure, including services and applications, resources and infrastructure in four areas.

Service layer is an important part of the whole system. It provides information for the application system interface, at the same time, the user can timely and effective communicate between the organization and partners. The function of the service layer is to rely on the high level of public service platform. In this platform, it can be used for remote applications, such as knowledge management, office automation, and so on. The service enterprise bus is also an important part of the service layer. It is mainly responsible for the interface integration of the application layer system, as shown in Fig. 2.

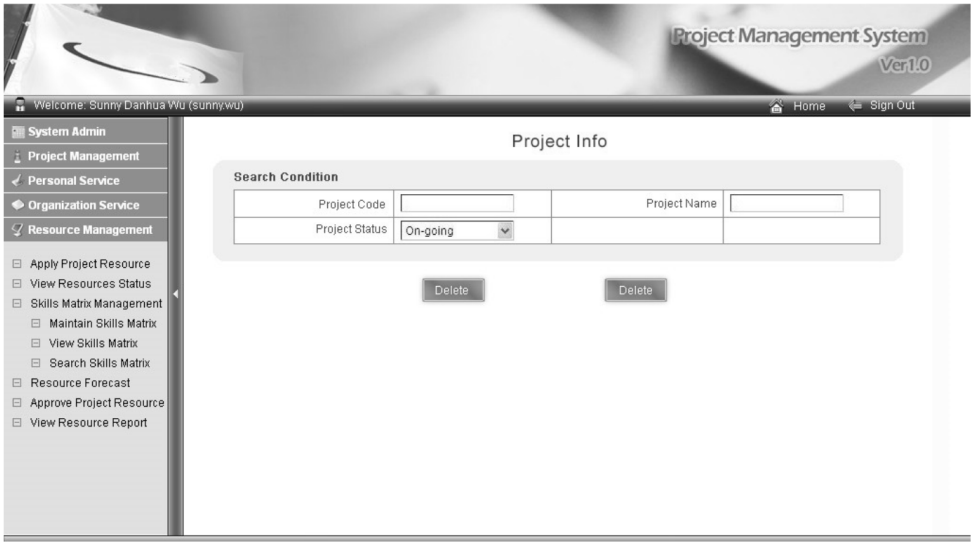

Fig. 2. Management interface of application system

Application layer plays an important role in the flexible operation of the whole system. The structure of the system is relatively loose, but it can be used in the system, so it can be regarded as a collection of application system. Application layer ensures that the system can be operated in accordance with the specific business of the specific disposal, the expansion of the system of flexible space.

The main business of the resource layer is the macro control of the data in the project management, the database operation interface as shown in Fig. 3. In particular, it is in charge of maintaining the good operation of the database, it carries on the dynamic maintenance to the data warehouse, guarantees the database storage, the memory, the extraction function validity. Among them, there is a very close relationship between the operation of the database and the management of the data warehouse. Resource layer must focus on the two things; they will achieve the

logical interoperability and resource sharing.

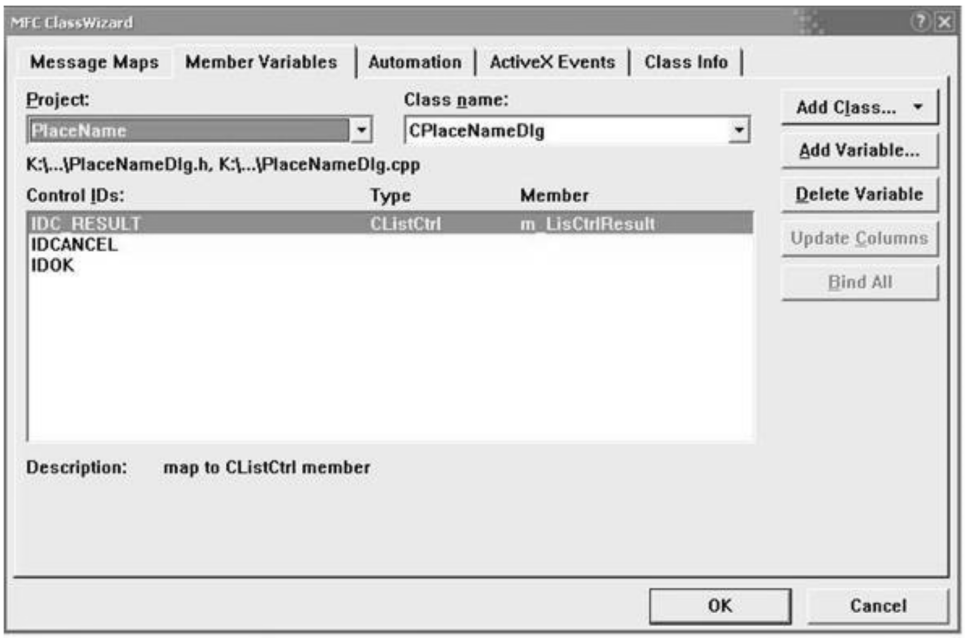

Fig. 3. Database operation interface

The infrastructure layer is the structure layer which provides the foundation support for the other structures in the engineering management information system. Infrastructure layer has two aspects, one is the network; one is the public equipment. The network also involves the wireless network and wired network, some special network is also included, as it is also related to the network and is closely related to the various types of equipment, whether the hardware or software equipment are contained in it. With the development of IP technology, the sharing platform of infrastructure can make communication equipment, automatic recognition and other devices can no longer rely on a specific network to carry out data transmission between each other. Therefore, these devices do not have to be a specialized system of monopoly, but in a wide variety of information systems for information transmission and business support.

4. Result analysis and discussion

4.1. General structure analysis

The advantages of the four layers structure of SARI is very obvious, it can realize the information resource sharing, let the global project management as the starting point, the spirit of integration and sharing ideas of all kinds of business within the system provide support and diversified services. Generally speaking, the advantages

of the SARI four layers structure are shown in three aspects, such as service unification, data sharing and application integration, as shown in Table 1. The integration of these benefits depends on the level of infrastructure, in the past it is just a simple interconnection, and now through the unified planning of the infrastructure to achieve network integration based on IP protocol, simplifies the network, so as to improve the efficiency of communication.

The advantages of SARI 4-layer structure are:

- Service unification
- Data sharing
- Application integration

Firstly, The unity of service, the unified service can simplify the communication channel, which is helpful to maintain the communication efficiency of the organization, in all kinds of applications, we must through the browser interface, which is the unity of all kinds of application system interface after the operation of the effect, thus, cross organizational interaction can be in an orderly and efficient state.

Secondly, data sharing, SARI four layers structure is the establishment of a unified mechanism of data storage and data backup mechanism and data disaster recovery mechanism, on the one hand, it is the logic of the database resources, on the other hand, the network resources and the network associated with the basic design of hardware, such as the physical focus. So the data can be shared.

Thirdly, application integration, on the one hand it is based on data integration. On one hand, it is based on message integration. The consequence of the application integration is that the system can maintain its independence while ensuring the effective interaction between the systems.

Generally speaking, SARI four layers structure can effectively provide services for engineering management information. In the actual operation process, it is needed to improve the dispersion mode into the mode of coexistence of dispersion and concentration. There is a need to improve the business process, in order to provide a unified service, independent business processes must be established, its premise is that it will be related to the application of information technology to organize the integration of the organization. Similarly, project managers also need to form a unified standard for systems integration, in order to regulate the technical standards among the various organizations, such as its own standards, it is needed to establish a network protocol, the storage standard selection criteria, software and hardware equipment specification interface standard and so on. In general standards, the selection of the norms of national standards, organizational standards, and so on, for the establishment of a single standard system, the above two aspects are indispensable.

In addition, the implementation of SARI four layers structure of the information system project management also cannot do without a unified technical support system, unified technical support system can be said to be a prerequisite for the realization of the four layers structure of SARI information system project management, such as the construction and maintenance of infrastructure. Unified technical support system is responsible for regular training of users; it is also responsible for the maintenance of infrastructure related to all kinds of hardware facilities, software

facilities and network and guarantee the stability of the network system. Unified technical support system also includes the construction team, training of information technology related personnel, strengthen the management of human resources within the team, so that every member of the team can play their own a bit, can share resources, has technology innovation; At the same time, we also need to train a team of lecturers to provide the support of human resources for regular customer training.

4.2. Application effect analysis

System is based on information technology as a means; each database is established in the project management, for example: the construction process, the construction of the library, and so on. In the concrete construction process, production personnel can use different databases for different permutations and combinations, by comparing the pros and cons of each of the different programs to achieve the best use of resources to maximize the use of the program, in order to achieve the comprehensive management of the system in terms of cost, schedule, construction period, quality and safety, and other aspects. The system provides managers with a network diagram that can automatically generate construction time scales, the network diagram is not fixed, rigid, it can according to the needs of users for different time periods of access to provide needs for users, a variety of construction network plans for the development of the project at different stages, and these pictures will not be restricted by the format, it is convenient to change the construction plan, compared with the traditional method, it can save a large part of the drawings, and achieve a fundamental resource saving. The system can provide great convenience for flexible adjustment of construction plan, it can carry on macro statistics to the resources on the whole, carry on the overall plan to the field material, and use the database to carry on the computation and the analysis to the field material storage area, so it can assist the construction of the general planning of the timely adjustment.

The ultimate goal of the system platform is to provide computer technical support for the project management decision makers, the system platform has achieved the national engineering construction standard strictly, it can take control of the process, strictly abide by the safety and quality management system, it has achieved the progress of effective tracking, and the project management information in the progress of the project, cost, quality, safety, and the full range of construction requirements. System in the process of information management platform and engineering management information management platform, it has met the national standards and regional standards, has provided data support to the engineering management information system. The majority of the project managers, owners, and design units of all users are able to achieve smoothly communication on the platform of the system; it can ensure the equivalence of information. Among various departments, they not only maintain their independence and flexibility, but also through the system platform to carry out effective circulation of information, it saves time greatly, it can be said that the system is worth promoting.

The development of engineering management system based on integration and

decentralization has played a good role in the practical application of a certain project. In fact, it greatly saves the production cost of the project, because in the initial project construction, through the system various construction schemes are compared to select the most realistic quality program. In the process of construction, it is also able to use the system platform to carry out the adjustment of the plan, and ensure the progress of the project. Making use of the database to make the production organizer according to the field condition, the corresponding countermeasures are introduced, this maximized the subjective initiative, and finally realized the plan to shorten the construction period by 25 %, through the organization of production, so that the direct cost reduced by 10 %, the indirect cost reduced by 20 %, see Fig. 4. The project is currently listed as a national demonstration project.

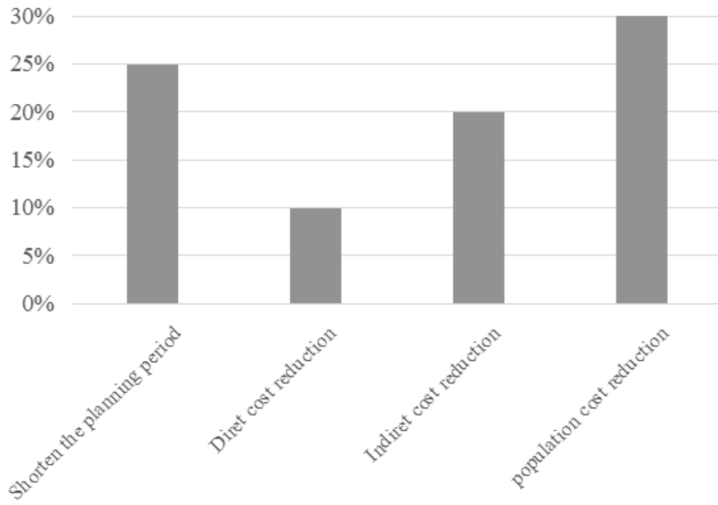

Fig. 4. The effectiveness of the system platform

5. Conclusion

In summary, in this paper, the theory of computer network technology was analyzed, combined with China's current situation of the development of information engineering and management of computer information based on network technology, the feasible plan of project management information system based on the technology of computer information network was put forward. Considering the limitations of the traditional C/S structure, in this paper, the four layers structure of SARI based on computer information network technology engineering management information system was adopted. The system is related to the interface, data and so on, it can provide effective technical support for project management. It is a combination of integration and decentralization, in which the integrated management information system is to save Inter Organizational and Inter Organizational communication costs

to provide an important resource support. Integrated project management information system of computer network technology has a long way to go, so in this paper the present situation of the whole project management cannot be made a qualitative leap, therefore, the future work will focus on deepening the integration of the project management information system based on computer information network technology, so that the computer information technology can provide better service for the project management.

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