Research on the Development of Petroleum Engineering Technology Public Service Market Information System in the New Period

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Abstract. The paper analyses the business process of the oilfield engineering technology public service market information management system through UML modelling. Then, according to the work requirements of the engineering and technical management department staff of the oilfield branch, the performance requirements and functional requirements analysis were carried out. In particular, a detailed analysis of the functional requirements of each sub-function is performed. The experiment verifies that the information system can collect, integrate and analyse the business data reported by each unit in real time and conveniently. It can quickly and accurately form decision-making opinions and management methods, which greatly avoids the process error in the establishment of production capacity. The establishment of the engineering technology public service market information system provides greater power and service.

1. Introduction

The characteristics of the petroleum engineering service system are very obvious. From the professional point of view, the main business is geophysical exploration, drilling, logging and ground engineering, which is for the exploration, development, processing, transportation and other production and construction of oil and gas; from the main body of technological innovation On the top, there are research institutes and petroleum colleges with research and development of new technologies as the mainstay, and regional service companies with application and development of new technologies as the mainstay [1]. So how can we make CNPC's engineering and technical capabilities improve rapidly, and can easily face the challenges of entering the WTO and be in an invincible position? We believe that the key lies in the research and development departments and regional service companies to grasp the key points and timely The land is closely coordinated to transform the advanced and practical new technological achievements into productivity, transform into scale benefits, and improve our technical level, service capability and economic strength. For this paper, a petroleum engineering technology public service market system is established, and it is expected to provide some experience for the establishment of engineering technology public service market information system.

2. Another section of your paper

2.1. Performance Requirements Analysis

(1) Security: Security is the most basic requirement that the system should meet when the system is completed. Due to the open nature of computers, there are many factors that can cause security threats to information management systems, including subjective and objective reasons. If a system ignores the security management content, it will cause the weakness of the computer information management system. A safe system not only guarantees the security of information, but also keeps all information records safely, while ensuring the smooth operation of the system and preventing information leakage and tampering. The main protection measures in terms of security include security configuration of the system, data locking, firewall setting, etc.

(2) Simple and easy to use: The realization of information management is to simplify the management of the staff, realize the paperless office, and facilitate the use of the user is an important principle of the information management system. Therefore, the system interaction interface logic is clear and convenient to use. The understanding of the person. System configuration, installation, use, and post-maintenance should also be simple, with a good deployment interface, and easy to transplant the system.

(3) Stability: When a large number of users access the server at the same time, the amount of data exchanged between the server and the client is huge, and the server will often block and cause collapse, which brings trouble and inconvenience in later maintenance. With the deepening of the application, the expansion of the scale, and the passage of time, the system operation efficiency is low and the stability is degraded. When such problems occur, the normal operation of the system can be restored in time to protect data security and reduce the impact on normal work [2].

(4) Scalability: The scalability of a system is multi-faceted. It covers layers, modules, data models, process modeling, and main menus. The potential value of a system lies in its scalability. For the network-based management information system operation platform, its scalability mainly lies in the expansion of functions, such as increasing the corresponding functional requirements as the company's business expands, which requires the system to design good functional components, including the expansion of the access computer scale.

2.2. Business Data Function Module

According to the long-term analysis of the business process of the oilfield branch, team qualification management, program design management, well control management, supervision and management, settlement management and system management. Each module includes several functions. The platform divides the system into 8 modules for project quality management, data and archive management, as shown in Figure 1. These modules basically cover the main business areas of engineering management. The system provides a relatively complete interface for easy integration with other application systems. Each related data entry interface has a complete data verification function, which can be set by the user according to his own business rules [3].
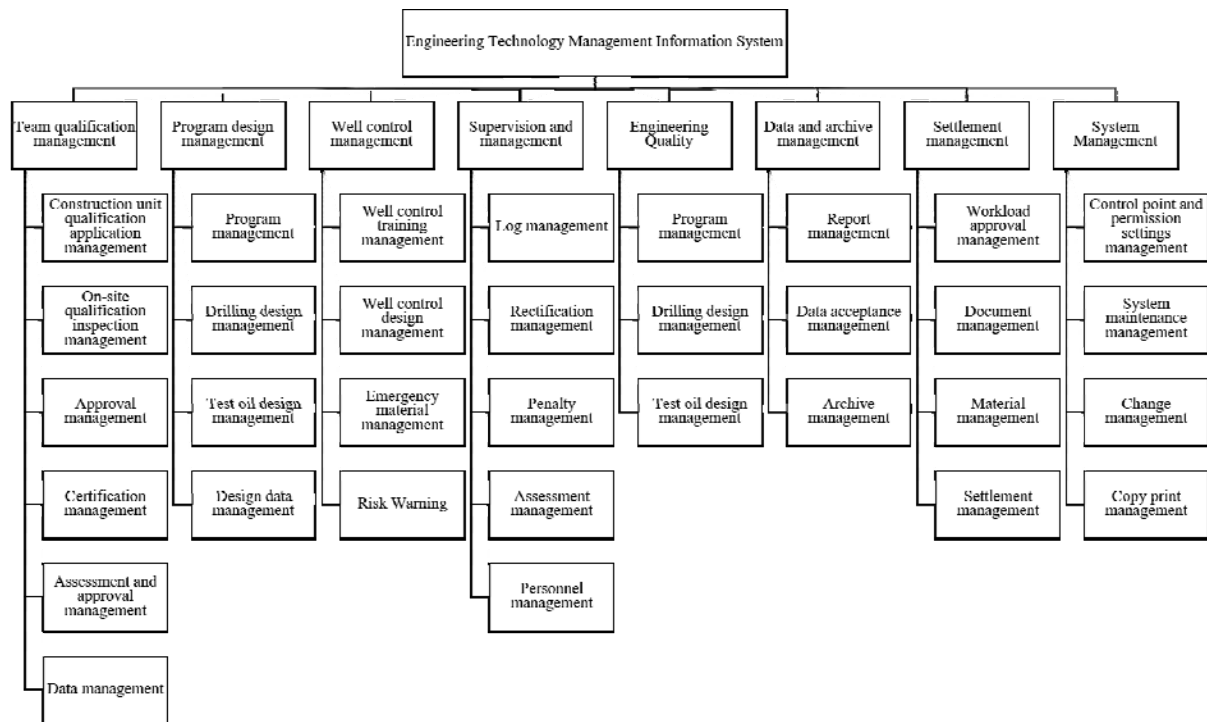
Figure 1. Business module function chart.

2.3. Use Case Modeling of Oilfield Engineering Technology Management Information System
(1) Applicant (entry operator): responsible for inputting business data related to the platform. The business data mainly includes customer information, customer contract information, etc. The operator is responsible for the input of business data, but only adds the business data or the modification request is submitted to the approver.

(2) Approver: The request submitted by the entry operator is approved according to the corresponding discriminant standard. If the approval is passed, the system library table is updated; if the approval is not passed, it is returned. The purpose of the work is to prevent data errors of the official library table from being mishandled by the operator. The approver does not have the authority to add and modify business data and can only approve the request. It should be noted that these two roles must be performed by different employees. This ensures that the modification of the business data in the system database requires the cooperation of the two parties. The authority of one person cannot change the business data of the system. This design adds a layer of insurance to the business data, whether it is the operator's disoperation, or the intention of some employees to maliciously destroy the system data after leaving the company.

(3) System administrator: responsible for the maintenance of all platform participant information, role assignment and authorization, with the highest management operation authority. The addition of the background approver here and the addition of the approver to the staff are for the same consideration, and each data change requires the collaborative completion of two people.

3. System architecture
The system will be designed based on the J2EE multi-layer architecture, using the Struts2 framework to implement the MVC mechanism. At the same time, combined with many excellent component technologies in the J2EE architecture, such as: Hibernate framework for packaging database connection operations and reverse control Spring framework, making the whole system development easier and more convenient [4]. The foreground presentation layer is implemented by combining JSP and HTML. The control layer uses the Struts2 framework action package to perform request jump control and page data acquisition and implements the business logic control of the system with the

help of the core controller Filter. Finally, the database access layer uses the Hibernate framework technology, spring framework technology and model package (entity class) and service package (DAO class and DAOImpI interface) for database persistence layer operations.

Developing a project with an MVC pattern architecture will have to take considerable time to consider how to apply the MVC pattern to the application, and because the model and view are strictly separated, this also brings some difficulties to debugging the application. Every component needs to be thoroughly tested before it can be used. The components used in the architecture and implementation of the system are shown in Figure 2:
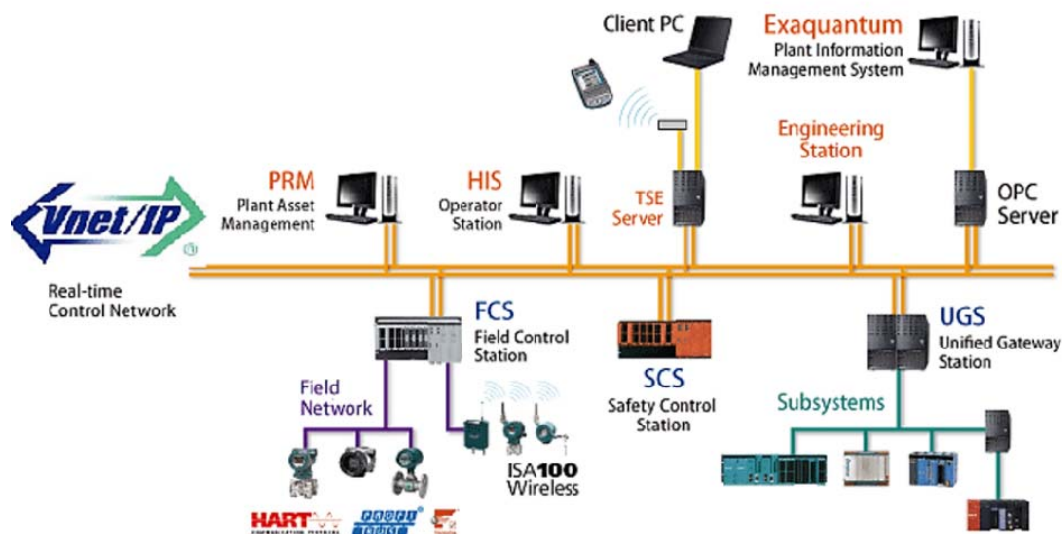
Figure 2. Petroleum Engineering Technology Information System Architecture.

4. Detailed definition of each function module

4.1. Design of team qualification management module
The module is responsible for the construction unit to make qualification declaration on the Internet. After review by the relevant business personnel of the Engineering Technology Management Department, it is approved by the supervisor. Finally, it is approved by the responsible person of the department, and the qualified information is published online.

4.2. Design of the scheme design management module
(1) Input data: serial number, well number, design unit, designer, design date, technical person in charge of design unit, date, remarks and related accessories. (2) Treatment method: The relevant design personnel of the design unit submit the engineering design book to the reviewer of the design unit for review. (3) Output data: Input data after review. (4) Output format: engineering design. (5) Use role description: related business personnel.

4.3. Design of Well Control Management Module
(1) Input data: serial number, project group, well number, well, belonging block, well depth (meter) (design, drill), horizon (target layer, drilled layer), construction team (unit name, team) No.), working conditions, date, danger description (overflow, kick, toxic and harmful gas), processing results, remarks. (2) Processing method: add, delete, modify, and view information. (3) Output data: Input data after review. (4) Output format: Drilling well control risk information table. (5) Use role description: four levels of users (related business personnel).

4.4. Design of supervisory management module
(1) Input data: serial number, supervision unit, qualification level, date, remarks, expiration date. (2) Processing method: add, delete, modify, and check the information of the supervisory unit. (3) Output data: Input data after review. (4) Output format: information table. (5) Use role description: Level 4 users (business people).

4.5. Design of Engineering Quality Management Module
(1) Input data: serial number, cementing team, well number, design time, remarks, attachments. (2) Treatment method: The cementing team proposes the construction design and submits it to the project team for review. (3) Output data: Input data after review. (4) Output format: Construction design review form. (5) Use role description: five-level users (ceiling team).

4.6. Design of data and archive management module
(1) Input data: query conditions such as serial number, title, introduction, remarks, unit, maintainer, maintenance date, etc. (2) Processing method: According to the input statistical conditions, the data that meets the query conditions is queried. (3) Output data: query results (data). (4) Output format: information table. (5) Use role description: four-level users (business personnel).

4.7. Design of settlement management module
(1) Input data: serial number, construction unit, contract system generation number, construction unit, settlement payment number, well number, well depth total (m), settlement well body total, total footage, total amount, total subsidy, take Total core footage, total core cost, total deduction of project team, total penalty documents, total deduction of deductions, total deductions, and total settlement amount. (2) Treatment method: The business personnel select the construction unit and the construction unit, and after listing, list the relevant well information of the construction unit. After the settlement well information is determined and determined, the well information that has been settled is displayed in the settlement well area. The system automatically summarizes the basic situation of the settlement unit of the construction unit and fills in the corresponding input data of the drilling settlement. (3) Output data: Input data after review [5]. (4) Output format: Drilling engineering settlement data sheet. (5) Use role description: Level 3 users (department manager).

## 5. Realization of Oilfield Engineering Technology Management Information System

5.1. Design of the rights management module
There are three main methods for system rights management: mandatory access control, autonomous access control, and role-based access control. A stable operating platform must be able to handle the changes in the daily work patterns, such as the internal staff's job mobilization and business process changes. These happen from time to time, and the platform needs to have complex authorization change capabilities. The role-based access control method effectively overcomes this drawback, reduces management overhead, and also separates system administrators from the specific implementation mechanisms of access control. The platform uses a role-based access control method.

The participants of this module are the background administrator and the background approver. The background administrator logs in the system and assigns roles and permissions to the platform users. The interface that assigns permissions to the role will list all the permissions for the background administrator to select; the background administrator can query the account information of all platform users and modify their permissions. As with the business data module processing, all tasks require proofreading by the background approver to ensure that the information is correct. The process of this module is the same as the processing order of business data, and the flowchart is not shown here.

5.2. User Login Module Implementation

Like the information management system generally based on the network environment, the oilfield engineering technology management information system must query the authority from the corresponding database according to the user input login name when the user logs in to the platform, and then traverse the operation of the user. On the interface. The main process is shown in Figure 3:
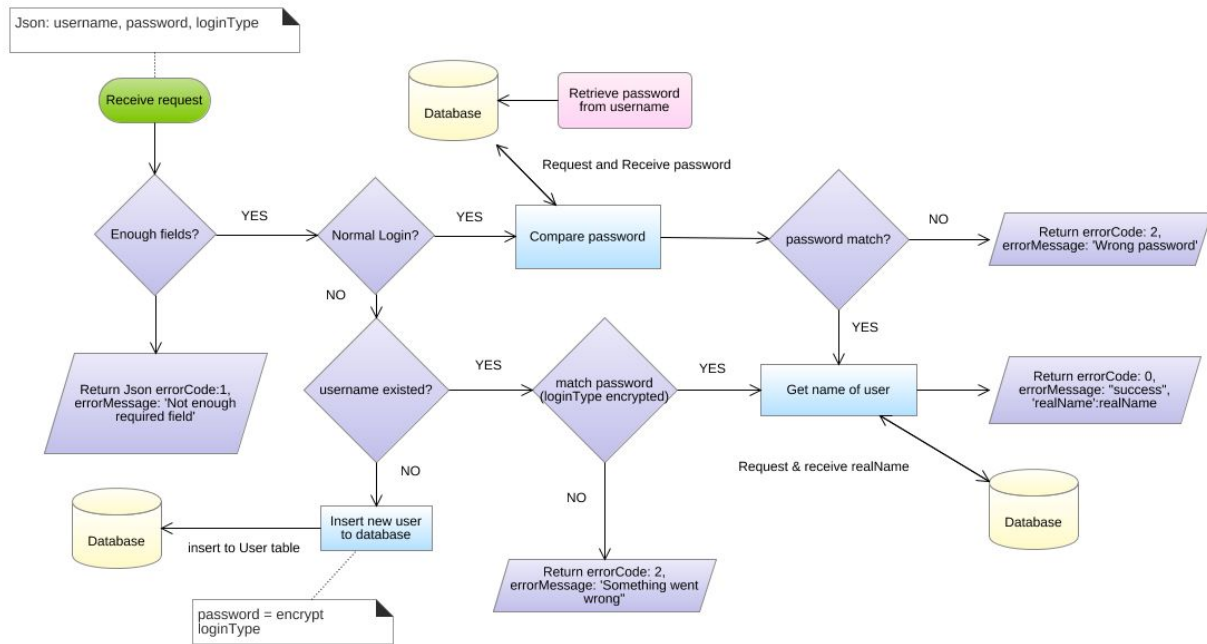
Figure 3. User login procedure.

When generating the user page, the permission of the currently logged-in user is taken out from the dialog object, and the traversal is displayed. A navigation tree is generated according to the data in the object of the conversation, and the tree contains all the operations that the currently logged-in user can operate. The link to the resource, the login system of the different privileged users, and the main interface seen are also different. After querying and displaying the implementation details of the permission navigation tree, the user needs to query and save the role group ID of the user after the login is successful, and then implement a method to query the URLs of all the rights owned by the role group according to the role group ID, and save Go to the Session. The system user can modify the permission information, including the name and URL, according to the actual situation in the management background, but the URLs to be written in the deployment file are consistent. The background action will query the permissions of the user's own role according to the user name:

List <Role Privilege> role Privileges=user Manager. Find (QUERY_ LISTBYUSER, Collections. Singleton Map ("user", (Object) user. Get Id ())).

5.3. Implementation of the business data module

Each job entered into the operator must be approved by the approver before it can take effect. The main content of the approval is proofreading [6]. After the proofreading, there will be three results: return the data to the temporary table and add a new data to the official form. Update the relevant data in the official table. When the examiner performs the proofreading work and finds that the input operator's work is wrong, the data will be returned. This is because the system will pop up a prompt dialog box asking the approver to record the reason for the approval failure, and as the data. One of the properties is passed back to the temporary table for the operator to view.

6. Conclusion

Based on the current situation of engineering technology management, this paper summarizes the reasons that hinder the macroscopic and real-time nature of engineering technology management. With computer network technology, digital and network management of engineering technology management business has been carried out, which has improved the dynamics of various management tasks. Real-time, use timely feedback, collect business data, quickly generate various analysis charts, intuitively reflect the progress of various businesses and safe production, and use business process reengineering to reorganize the overall business work of the engineering and technical department. Linking and integrating engineering technology management work into a whole, each business is verified and mutually based, and the real situation of management content is restored from each index to the maximum extent. The research results solve the problem that the oilfield management department is away from the production site. The understanding of on-site difficulties and management lags, and through the workflow technology, cross-local, cross-department business declaration and approval work through the network, solving the traditional business declaration and approval work for a long time, high additional cost Problem that favors the B/S and J2EE frameworks, making The business personnel can carry out the engineering technology management business with a variety of networks and a variety of terminal devices, and get rid of the harsh on-site environment and fail to timely report data difficulties.

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