

# Design and Development of Volunteer Management System Based on Low Code Platform

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## ABSTRACT

Aiming at the problem that the voluntary projects released in the university campus cannot be timely delivered to the students, this paper tries to solve this problem by developing a voluntary management system on a low-code platform, and further studies and understands the process of developing the system on a low-code platform through the development process. Mainly from the requirements and technical analysis, structured system analysis and development process, finished product testing problems and reflection of the comprehensive exploration of low-code platform R & D volunteer management system, now the system has been able to solve such problems and formal operation.

**KEYWORDS:** *Low code platform, Voluntary management system, Structured system analysis, Organizational structure, Business process, Data flow*

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## INTRODUCTION

As the main technology of the new generation of content management platform, low-code development platform can support the development of multiple people, while the requirements for developers are also reduced. Not only that, the low-code platform is a collection of tools that visually develop and deliver complete applications. Drag and drop the core of the interface code platform. Instead of using thousands of lines of complex code and syntax, you can use low code to quickly and intuitively build complete applications with user interfaces data, and logic. Faster application delivery with less manual coding. This makes the lower generation not limited to programmers with professional programming ability, and students can also build applications. Once you've built your organization, forms, and processes, you can get it up and running.

### Research background:

The development of this system is based on the situation that students miss the volunteer project due

to the difference in the indirect delivery time of each college and department.

### Demand analysis:

During college life, the number of volunteer hours becomes a requirement for students to complete while studying in school, which can cause many problems for freshmen, such as: how to participate in campus volunteer activities? How many volunteer hours do I need to not affect graduation? When students have more demands for volunteer projects, the school will also have many problems. For example, there is no unified platform for releasing information about volunteer projects in the school, and the information about volunteer projects cannot be delivered to students in a timely and effective manner. Organizations that are responsible for managing the release of volunteer information require many personnel and are difficult to manage.

	Yes	No
Worry about getting volunteer hours	38.46%	61.54%
Whether you can't get the assignment worry	80.00%	20.00%
Whether you are satisfied with the way of releasing volunteer tasks on campus	85.71%	14.29%
Do most of your volunteer work on campus	52.38%	47.62%
Whether you are satisfied with the campus volunteer task	87.91%	12.09%

**Figure 1 Survey of volunteer tasks**

In order to avoid such a situation, I mainly conducted a questionnaire survey on freshmen and sophomores who have a high demand for volunteer hours. On the one hand, I conducted a survey on the difficulty of obtaining volunteer hours; on the other hand, I conducted a survey on the satisfaction degree of obtaining volunteer tasks and the way of obtaining volunteer tasks. The survey results were collected from 91 freshmen and sophomores at Beijing Wuzi University (see Figure 1).

According to the survey results, 38.46% of them are worried about the number of volunteer hours, 80% of these 38.46% are unable to grab the volunteer task, and 85.71% are not satisfied with the way the school volunteer task is released. That is to say, the school does not give students a good experience to receive the task. On this basis, when asked whether they are satisfied with the completion of the volunteer task, the vast majority of people think that the school is doing well in the completion of the task experience, indicating that doing the volunteer task is helpful to them. If we can't solve the problem of obtaining volunteer tasks, it is easy to discourage students from completing volunteer tasks in school. Another survey on the way to receive volunteer tasks shows that 52.38% of students choose to complete volunteer tasks in school. On the one hand, it indicates that there are not many students completing volunteer tasks in school, and difficulties in receiving tasks do affect students completing volunteer tasks in school. On the one hand, the limited number of volunteers on campus can't meet students' demand for volunteer hours. In the recommendations on the Posting of campus volunteer assignments, it is said that there are no volunteer assignments from other colleges, and the staff is already full when they are informed of the assignment; It is also said that the issuance of campus volunteer tasks distinguishes whether to join volunteer organizations, and the volunteer tasks sent out are the priority access within the organization. On this basis, I decided to develop a system on how to better improve the way of obtaining volunteer hours, reduce the lag of messages, and enable students to solve such problems through the volunteer management system that can more quickly grasp the information related to volunteer tasks. Compared with the application of Web Service based on B/S architecture, Eclipse, IntelliJ IDEA and other integrated development environments are needed. I chose a low-code platform for development.

#### **Technical feasibility analysis:**

The technical factors involved in the development of this system are as follows.

1. Information system development methods. There are students in the development team who are proficient in low-code platform development techniques and have no problems in information system development methods.
2. Database technology. The development team has experience in application database development,
3. Java development technology. The development team has students who are proficient in Java programming.

#### **Low code platform to develop voluntary management system:**

On the visual design UI interface, users of the low-code platform can use the combination of business formula, form-filling formula and data interface without writing a line of code to draw tables in drag-and-drop mode and develop enterprise-level personalized management software with ERP, WMS, OA, purchase-sales-inventory and other functions that can be changed on demand. After determining the development tools, I set two goals for the development: one is a volunteer task management system for collecting and processing volunteer tasks for volunteers; the other is a volunteer management system for volunteers for storing personal information and updating volunteer participation. According to the definition of its role, each can be extended to its specific functions: the volunteer task management system can be extended to collect the volunteer tasks issued by the school and process the application for volunteer projects. The volunteer management system can be extended to record the personal information of volunteers and update the task information after the completion of the task.

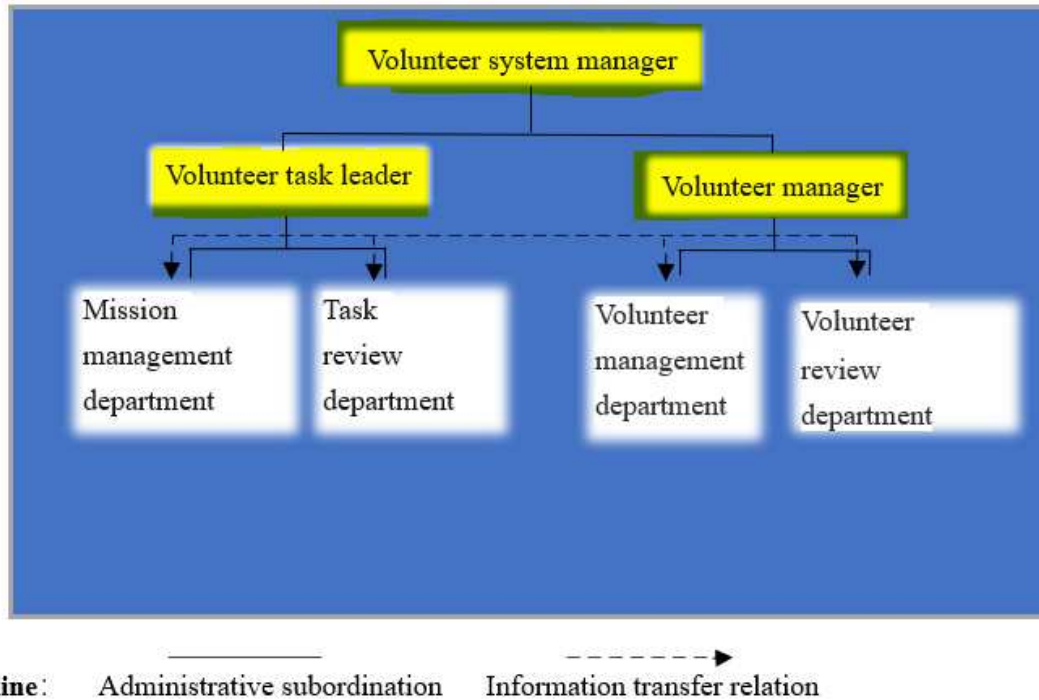
#### **Structured voluntary management system analysis:**

To complete the initial conception of the system, we need to use structured systems analysis. Structured system analysis is the work to be done in the system analysis stage of structured life cycle method. Based on students'

demand for obtaining volunteer tasks and the process of obtaining volunteer tasks, the data processing process of the volunteer management system is analyzed and planned, and the analysis results are expressed through specific chart tools to form a logical model of the volunteer management system. The analysis method is top-down, layer by layer decomposition, using the two basic means of decomposition and abstraction to control the complexity of the system. Its advantage is that it can decompose big problems into small problems and improve the system better. The steps are divided into three steps: organizational structure analysis, business process analysis, and data process analysis.

#### **Analysis and construction of organizational structure:**

Before creating the organizational structure of the system, in addition to understanding the leadership at the vertical level, it is also necessary to understand the various connections of the organization. The organizational construction of the voluntary management system starts from both tasks and personnel, and requires the organization and its relationship (as shown in Figure 2).

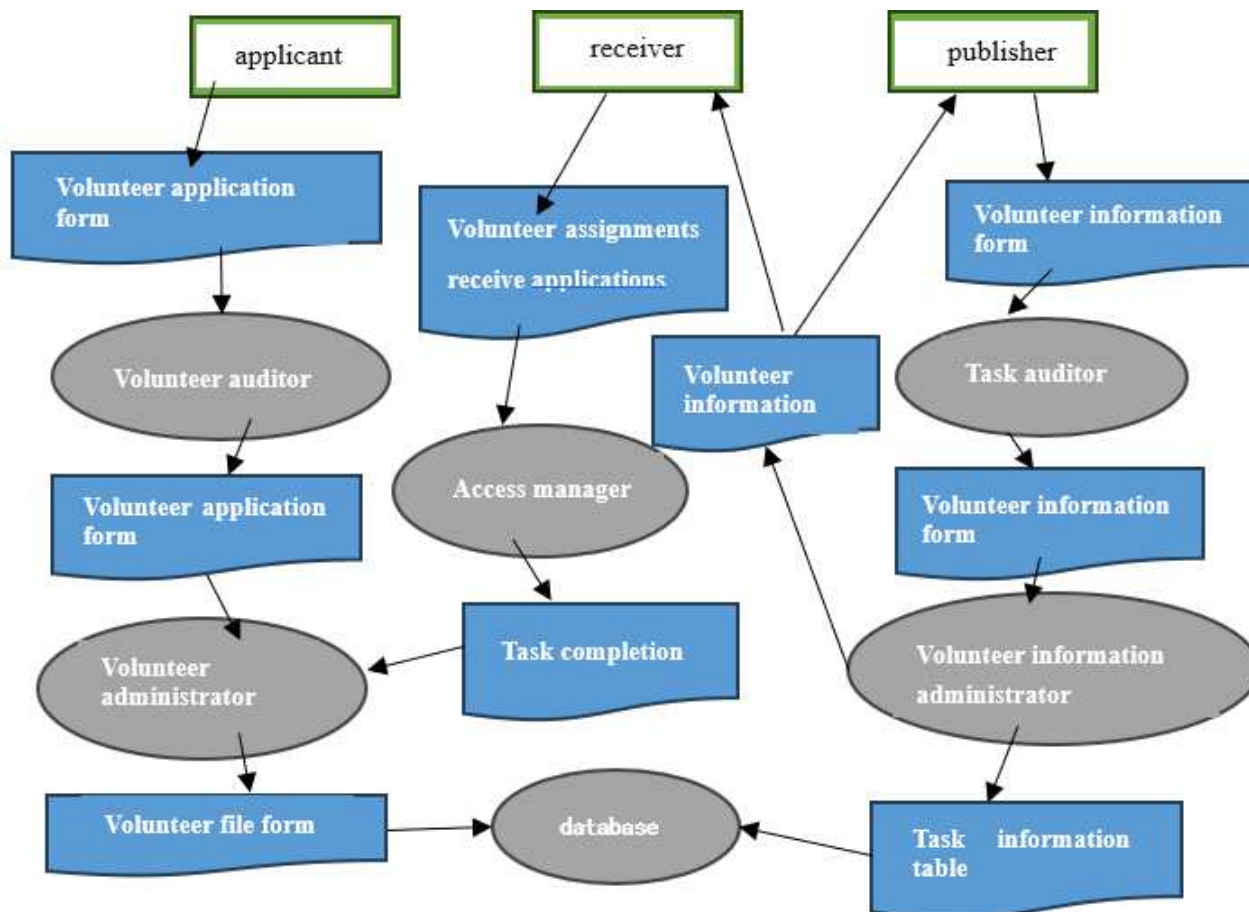


**Figure 2 organizational chart**

Using low code platform to build organizational structure is to establish a binary tree of volunteer management system and volunteer project management and people management, the latter two are left and right nodes. After the establishment is complete, we need to continue to set the child nodes, here can show an advantage of low code development, is the modular package statement, just need you to know the composition of the system. In the case of enterprises, as long as you understand the internal structure of the enterprise, such as what departments, posts, and duties, you can use the low-code platform to quickly build an organizational model according to the functions of the enterprise.

#### **Business process analysis and construction:**

If we analyze the problem in terms of function, the system will have some independence from the changes in the organization, so we can draw a list of the business functions of the system (Figure 3). The purpose of doing so is to make us understand the organizational structure at the same time, have a general understanding of the various business functions attached to the organizational structure, and also have an overall understanding of the cross-management, the depth of the various levels of the cross-part and various unreasonable phenomena.

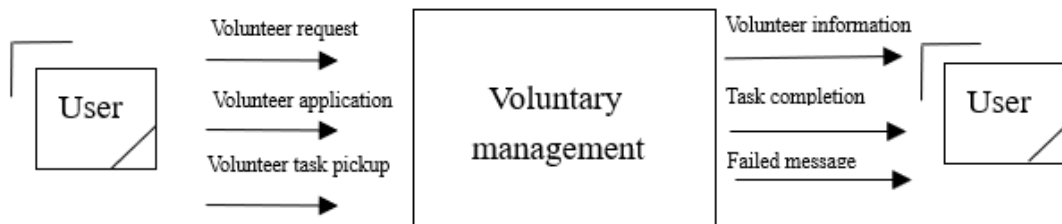


**Figure 3 Business flow chart of volunteer management system**

After the business is clear, you will have a clearer understanding when you set up the voluntary management process through the low-code platform. When the system organization structure is completed, it is necessary to set up the process. The process is the step that the designer hopes to complete a certain system function and realize the system. The process of low code is realized through the form, which is essentially the flow process of the form, and the enterprise goal is finally realized by dealing with various links of the form.

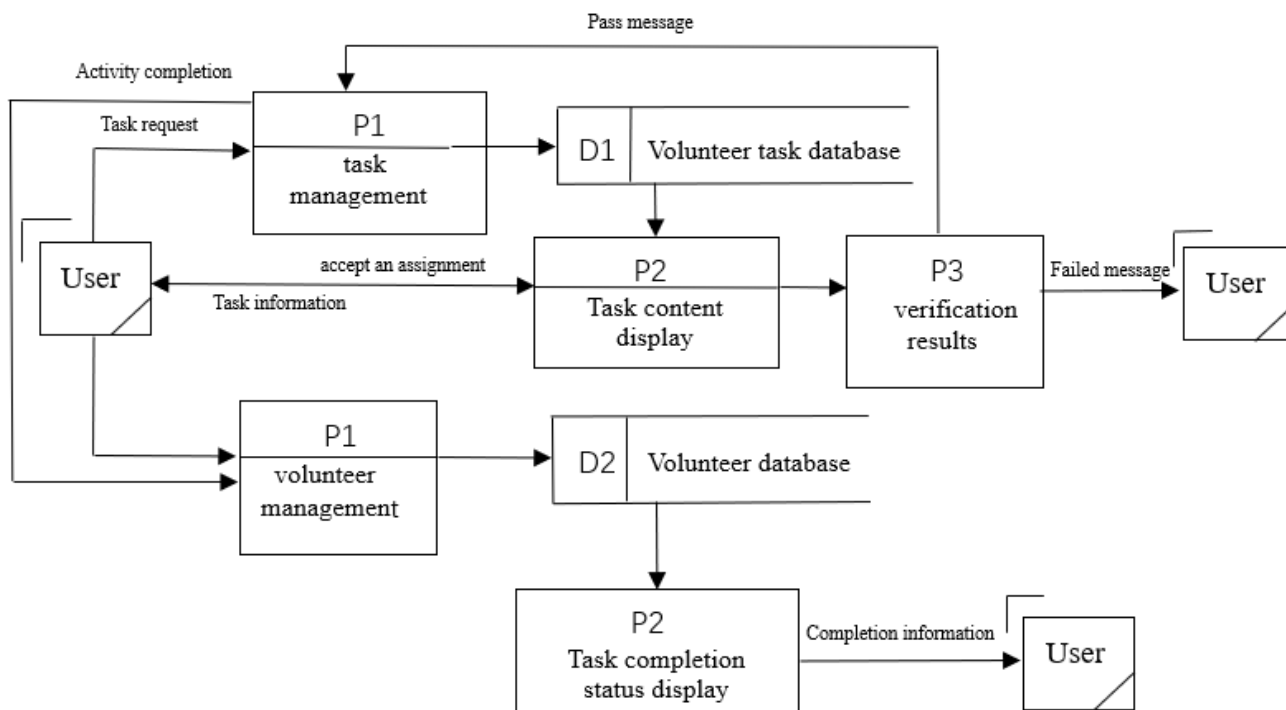
**Data flow diagram construction:**

Data flow diagram is a graphical system model that models an information system as input, processing, output, and data storage from the point of view of the system. We can analyze the system information flow from the top down through the data flow chart; Computer-processed parts can be drawn on the diagram; Further data analysis based on logical storage can transition to database design; Determine the storage mode according to the data flow direction; Corresponding to a processing process, the corresponding description language can be used to express the processing method and transition to the program design. (As shown in Figures 4 and 5)



**Figure 4 Top-level data flow diagram of the volunteer management system**





**Figure 5 Flowchart of the first voluntary management system**

The drawing of flow charts is to reduce complexity, ensure consistent complexity and balance, and focus on logical processing models. The reduction of complexity lies in always grasping the requirements of the overall goals and functions of the system, and breaking down complex problems into small problems within a certain range. The guarantee of complexity and balance is that the decomposed small problems or sub-problems are added without changing the original functionality. To focus on logic is to reduce the description of the concrete implementation.

### Construction of volunteer task management module:

According to the volunteer task system described above, if you want to complete the volunteer information entry function, you need to make a process form for releasing volunteer task applications, and the construction method is to select the required form information by dragging and dropping. The producer needs to know what type of data is to fill in the form and what kind of filling effect the data wants to achieve. For example, the name should be selected as text in the selection of data type, but the method of drop-down selection is to let the fillers fill in it, then the candidate should be selected when selecting the data type, and the enumeration of the name of the required person should be created and bound. In this way, the data field of the required person will appear when filling out the form. After the completion of the form, it is necessary to set up the process, take the volunteer project application as an example, if you want to release a volunteer project, it is necessary to fill in the application form of the volunteer project, and send it to the internal management of the system after the internal person in charge of the review and approval of the system can display the information of the volunteer project, this is the process of the form. It is much easier for me to set the flow of the table after

I have a clear understanding of the form process. For example, when I first developed the form, I did not know what impact the wrong choice of text type would have on the form process. After continuous testing, I could correctly choose the text type by understanding its principle. In order to show the content of volunteer tasks more intuitively to users, I added a non-flow file table when making the form, hoping to replace the table presented to users with a file table, and the file table will be used as the presentation of volunteer task information of the system. To do this, associate the file table data with the application form data and set the portal display to display only the file table. The function of association is to communicate data, and the data on the application form can be displayed as long as the associated data is clicked on the file table. Much easier to build than traditional code. Now that the volunteer management system has the ability to process project applications and store project information, the next step is to process volunteer project applications. Need to make a process form, do not need to have a table format, you can just type a sentence "the project application has been submitted, please wait patiently for the result." Then the form is created and triggered with the application form of the volunteer project, so that the ability to process the

application of the volunteer project is also equipped. The actual process is that the publisher publishes the volunteer project application in the system, and then posts it to the system portal after internal review. After seeing the content requirements of the project on the portal, the volunteer makes an application, and can participate in the volunteer project after approval. With the combination of the two, the voluntary project management system module is constructed.

### **The construction of volunteer management module:**

The construction of the volunteer management system is similar to the construction of the volunteer project management system. It is also necessary to make the flow form of the volunteer application and the non-flow form of the volunteer file, and realize its functions through the relationship between the two forms and the process of processing the form. The application form is equivalent to entering the volunteer identity information into the system, and the file form is entering the input information into the system. According to the envisaged function, I hope that the volunteer management system can record the personal information of volunteers and update the situation of volunteers participating in volunteer projects. The former has been achieved through the volunteer project management, the latter needs to link the project name in the volunteer project application form with the activity participation in the volunteer file form, so that the project name can be displayed on the activity participation in the file form. In this way, the information storage and activity participation of volunteers are updated, and the volunteer management system module is completed.

### **Voluntary management system practical test:**

After completing the construction of the two subsystem modules, the volunteer management system can try to run. In the actual test process, the user's personal information should be entered into the volunteer management system first, and then the simulated applicant should send the volunteer project information. When the volunteer information is found at the front desk and the application is sent, the "project application has been submitted, please wait patiently for the result." At the same time, the personal profile activity participation has the activity name. A problem that arises here is that the project will automatically default to completion after the project is picked up. If this problem cannot be solved, it will appear that the task is not participated in. To

solve this problem, I chose to add an association condition to the project name that should be associated after the project's due date. This allows information about the volunteer project to be entered into the volunteer file at the end of the project. In fact, the most ideal solution is to confirm the completion of the volunteers before entering the file, but the low-code platform can't judge whether to participate in and complete the project, and can only be handed over to the manual solution, which will increase the labor cost of the system.

### **Research and development problems and reflections:**

During the development process, I encountered many problems, such as: the low-code platform for users to use the interface does not meet my vision; How can I make the system have the four capabilities that I initially identified; The use of associations and triggers in form relationships; How to limit the number of volunteers to participate in volunteer projects and so on. Many of the problems have been solved as I have progressed through development. The four capabilities are the system functions that I have detailed; Association means that a table can be used on another table after filling in the data without filling in, and trigger is the touch publication that appears after filling in a table and clicking send; Limit the number of people this can't be solved by the system at present, only the system administrator. As for the limit of the number of volunteers selected, my initial idea was to screen all the volunteers who chose the volunteer task on a first-come, first-served basis. Later, I thought that such problems should be solved at the beginning, and the inventory should be displayed in real time just like selling goods, so as not to disappoint students' expectations.

### **Peroration:**

Through the use of low-code platform to develop a voluntary management system, I learned that the system developed by the low-code platform has great limitations. On the one hand, its functions are realized through form delivery and the connection between various forms. On the one hand, the approval between forms is the responsibility of the internal administrator of the system, and a little restriction on filling out the form may use personnel. This will waste a lot of manpower on the management of the system, but the low-code platform has obvious advantages in terms of the low developer threshold, short development cycle and simple operation of the development process.