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Research Article

Design of Local Sharing Algorithm for Enterprise Financial Information Based on User-Defined Protocol

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The financial shared service model now has a technological base thanks to recent advancements in the information technology sector. Cloud computing, big data, and other technologies are included. To some extent, it has produced the current financial shared service model. This service model not only realizes the front-end information input but also ensures the specialization of financial data. The business data provided from the front end may be translated into the financial data required by finance using the enterprise resource planning (ERP) system. It overcomes the drawbacks of the existing financial system while also increasing its operating efficiency. The financial sharing service offers a high level of standardization of financial procedures while simultaneously lowering financial management costs. This allows the enterprise group to handle the financial systems of its subsidiaries in a uniform manner. It promotes the transparency of financial information, improves the overall competitive level of the enterprise group, and creates huge economic benefits for the enterprise group. Therefore, in the current operation stage of enterprises, the method of using the scientific service mode to maximize the economic benefits of enterprises has become an important problem. It is unlikely that understanding how to utilize it appropriately will have an impact on business operations. To ensure that enormous volumes of data are sent in an efficient and reliable manner, Gigabit Ethernet is used for the data transmission interface in this paper. On the one hand, an application layer user-defined protocol is meant to provide data transfer with high efficiency, speed, and reliability, while, on the other hand, on the basis of interface hardware program design, it is proposed to complete the modular design through the packaging of P core. It is the hardware foundation for interface data transfer. Finally, tests to validate its efficiency, speed, and dependability are devised.

1. Introduction

At this stage, mankind has entered the era of the Internet, big data, and cloud platforms. Big data is a larger, more complex data set used especially for new data sources. Enterprises are in dire need to use these new technology means to manage their data resources. Through the comprehensive construction of information platforms, the development of enterprises has been greatly promoted. The economic benefits of enterprises have been improved. In the context of global economic integration, most enterprises focus on the global development of enterprises, constantly establish enterprise subsidiaries, expand the business scope of enterprise groups, and improve their business profits [1]. However, in the process of rapid development of enterprises, enterprises have invested huge capital in the management of their enterprise. With the use of the ERP system, enterprises are allowed to manage vital day-to-day processes such as inventory management, accounting, human resources, and customer relationship management (CRM). In the environment of a market economy, the larger the enterprise, the higher its operating cost. Among them, the enterprise management cost accounts for a large proportion. Among them, enterprise fund management consumes the higher operating cost of the enterprise. The larger the enterprise scale, the more complex its fund flow is, and the more difficult it is to control the fund. The enterprise group does not have a unified financial management system, so it cannot carry out unified management of enterprise funds and scientifically and effectively regulate the fund flow of the enterprise, reduce the cost of enterprise financial management, and further improve the economic benefits of enterprises [2, 3].

Firstly, this paper introduces the definition of financial sharing service, explains the significance and content of fund

management, and studies the benefits of using the financial sharing platform mode in the application of enterprise fund management. It also discusses some fund management problems before ZH Group uses the financial sharing platform and then studies the role of the Financial Sharing Service Center after its establishment and application, starting with the information technology system development and management mode centralization of the financial sharing service mode.

This paper analyzes and introduces from the perspective of the physical layer, application layer, network layer, transmission layer, and data link layer and completes the design of the Ethernet communication interface based on the FPGA custom protocol. It also verifies its basic data transmission, speed, transmission efficiency, and reliability through experimental design.

(i) Firstly, the research is carried out from the perspective of the physical layer. The design of the physical layer mainly analyzes the circuit of the physical chip in the hardware circuit and completes the basic circuit design. The design of hardware circuits is indispensable as the basis of the whole research.

(ii) From the perspective of the MAC layer, network layer, and transmission layer, this paper analyzes and introduces the basic protocol of Gigabit Ethernet data transmission, leads to the protocol design of the application layer, and designs the protocol structure of data transmission frame and command transmission frame, respectively. At the same time, in order to ensure the transmission efficiency of the data frame, the giant frame design is adopted, and the transmission efficiency and precautions of the giant frame are analyzed and introduced.

(iii) From the perspective of user-defined protocol, complete the optimization of data reliability design, and complete the optimization design through data verification and data retransmission. On the basis of user-defined protocol, analyze and introduce the retransmission mechanism, complete the protocol structure design of retransmission protocol, and compare it with the retransmission of TCP protocol. For command frame transmission, the feedback confirmation mechanism is set through the custom protocol to ensure the reliability of command data transmission.

(iv) Starting from the aspects of the network layer, transmission layer, and data link layer, complete the hardware program design. To realize the modular design, complete the IP core packaging according to the structural design mode of "subtotal."

(v) Through the design of relevant tests, the experimental verification of the communication interface is completed, including the standard data length and the basic data transmission function of giant frame data. The test and verification of the transmission speed, transmission efficiency, and transmission reliability of giant frame data are also verified.

After the introduction section, the related work section of the research paper has been discussed. In the related work, the research on financial sharing has been discussed deeply. After that, the design idea of the application layer custom protocol has been discussed. Following this, the design of the application layer data frame protocol and the experimental results has been discussed. Lastly, the paper has been concluded.

2. Related Works

Different people around the world have proposed a lot of work on enterprise financial information. The advancement of information technology in recent years has created the technical groundwork for the financial shared service model to a certain extent. This section explains the literature review of the research paper.

2.1. Research on Financial Sharing. Basnyat and Clarence Lao [3] proposed the cooperation strategy of the shared service center. This strategy is mainly used to attribute the business functions of the enterprise to a unified business scope, that is, the business unit. This can realize its own semi-automatic management, reduce enterprise costs, and enhance enterprise operation efficiency. The development of a shared service center is a long-term project which cannot be completed quickly. In this process, we should pay attention to the enterprise's current status and build realistic development strategies based on its own development [4].

Pice [4] stated that the service center has become an important part of the development of enterprises while discussing the shared service center. It can greatly reduce the operating costs of enterprises, improve the operating efficiency of enterprises, and promote the rapid development of enterprises. It becomes important management means in the development process of enterprises at this stage [5]. Gaertner conducted an in-depth study on the concept of the shared service center. He conducted a comprehensive analysis of how the service center promotes the internal transformation of the enterprise. He also evaluated the impact of the transformation on the development of the enterprise. It is considered that a shared service center can play a positive role in promoting the development of the enterprise [6].

According to Zhang Yongji, cost and control are critical in the Financial Shared Service Center. The implementation of the financial shared service model in enterprise operation must be supported by the enterprise. It ensures that the service model can be implemented scientifically and effectively. Only in this way can the financial shared service model truly become the core driving force of enterprise growth. In order to ensure the smooth implementation of the financial shared service model, enterprises should create relevant systems to ensure that the service model can perform its maximum potential [7]. According to the research review of this paper, it can be seen that western developed countries are ahead of China in financial sharing research. In

the process of the continuous development of China's economy, the process of globalization continues to promote development. China's enterprises have expanded all over the world. Many enterprises have established branches all over the world, which requires China's enterprises to quickly establish financial sharing service centers [8]. However, there is still a certain gap between Chinese research and the present enterprise development. Currently, the academic community has made a detailed analysis of the definition, development, construction, and management of the Financial Sharing Center. It has made some achievements in the governance effect, risk control, and financial management of the shared service model. However, it is relatively less involved in the field of fund management [9]. Therefore, it is necessary to further strengthen the research on fund management in the future.

2.2. Research Status of Custom Protocols. The research of custom protocol is often of great significance for practical engineering. To realize reliable long-distance transmission, a protocol is defined in the process of handling the information transmission between the sender and the receiver. The Indian Institute of Engineering Science and Technology introduced a user-defined method based on the original protocol design. This method suggests that the intermediate nodes connected by an entanglement chain and partially performed long-distance transmission on each pair of adjacent nodes are to complete the long-distance transmission of transmitting any GHZ state. To ensure the security and reliability of the authentication system, the Department of Mathematics of the Indian Institute of Technology proposes a user-defined protocol scheme for the traditional client-server authentication protocol. The security authentication scheme is based on biometrics, to ensure the security of server communication. To make the engineering design more suitable for practical application, China has also enhanced it through some custom protocols. The Department of Mathematics, City University of Hong Kong, Kowloon Tong, Hong Kong, proposed a custom scheme design of edge distributed event triggering of multi-agent system, which greatly reduces the useless update of the controller. Shanxi Zhongbei University completed the storage and reading control of the instrument to recognize the control of the communication interface. This process is evaluated through a user-defined protocol design for specific data acquisition and editing devices [10].

The network protocol, like "language" and "text" in life, is an agreement reached by both parties through "negotiation" in advance when network devices' data are exchanged. People use unified standards to collect the only information represented by a certain "language" or "text" and then respond in accordance with the information it contains. Common protocol specifications include TCP protocol, IP protocol, UDP protocol, etc. These protocols are formulated by international organizations. These are the basic protocols for Ethernet data transmission. However, people put forward higher requirements for the data transmission process with the continuous progress of science and technology [11, 12]. This kind of basic protocol cannot meet the requirements. At this time, it is necessary to carry out a user-defined protocol design on the basis of the basic protocol. This results in quick completion of the information "exchange" between the sender and the receiver.

With the progress of the times, people are no longer satisfied with a single data sending and receiving function. They need to control the equipment and complete the corresponding data transmission when needed. They shall not be transmitting data blindly when powered on. In another case, it is used for blindly transmitting data packets without properly marking the data. It is impossible to access the corresponding data when the data are large. Therefore, a user-defined protocol is needed for auxiliary transmission. This paper adopts the way of "basic protocol + user-defined protocol" to complete the design of the data protocol. The custom protocol is mainly implemented in the application layer. The custom protocol is a specific data frame format formulated according to the "negotiation result." At this time, the status of "data" is equivalent to the relationship between "language" and "text." It is the mark of a specific instruction. The specific data correspond to the meaning of specific instruction. After knowing the corresponding meaning of the data only, the tester can analyze the characteristics of the data packet.

The user-defined protocol has many advantages, strong operability, can be modified according to the actual situation, and can be reused, the content of the protocol is clear and accurate, and its data representation meaning is concise and easy to understand. A good user-defined protocol can enhance the stability of the whole system. This paper starts from the perspective of protocol and adopts mega frame technology and data retransmission design to ensure the efficiency and reliability of data transmission.

3. Design Idea of Application Layer Custom Protocol

This paper presents the most important application layer protocols that are currently used in the financial shared service. We discuss them both separately and by comparison, with a focus on the security provided by these protocols. In this section, the problems faced by the protocol design and the suspected results have been discussed. Moreover, the Ethernet data transmission and the custom design protocols have been discussed.

3.1. Problems Solved by Protocol Design and Expected Results. At the beginning of protocol design, we should first clarify the problems to be faced and solved by protocol design. The first problem is how to realize specific functions at a specific time and place. The second problem is how to sort out the received data and how to distinguish the characteristics of the received data. The third problem is how to ensure the transmission efficiency and transmission speed when the amount of received data is particularly large. The fourth problem is how to distinguish between command instructions and data instructions, and how to distinguish between different command instructions. The fifth problem is how to

ensure the correctness of the data transmitted by the sender and receiver. The above five problems are the problems faced in the process of formulating custom agreements [13].

The design of a custom protocol mainly aims at the above problems to complete the protocol formulation. The specific methods are described as follows. Manual control commands are issued so that specific functions can be realized. At the same time, different types of data can be classified. After that, the instructions under different classifications are planned to complete the different instructions for the design of the protocol frame format. Finally, the concept of a giant frame is introduced. This concept is used to ensure transmission efficiency and transmission speed. This process is to ensure the correctness of data transmission in the transmission process of a large amount of data through communication verification, retransmission, and command feedback [14].

After completion of the custom design, the following effects are expected to be achieved. Firstly, according to the judgment of specific words, judge whether the application layer data category of the sender and receiver is valid data or command data. According to different control words, distinguish different command instructions. According to the frame header data and complete data sorting, obtain the characteristics of valid data, and ensure the transmission efficiency and transmission speed of a large amount of data transmission. Ensure the correctness of data transmission. The problems faced in the formulation of the agreement, the design method, and the expected results are shown in Figure 1 [15, 16].

3.2. Ethernet Data Stream Transmission Status. In accordance with the above analysis, the Ethernet data stream transmission direction includes two directions: the transmission of data from the upper computer to the lower computer and the transmission of data from the lower computer to the upper computer [17]. As shown in Figure 2, for the transmission direction of the Ethernet data stream, the upper computer provides commands and organizes the instruction data into a certain data format. It sends it down to the lower computer through the Ethernet transmission interface. The lower computer judges the instruction data and organizes the order data in accordance with a certain format and instructions. It uploads the order data to the host computer through the Ethernet interface. According to the received return data, the host computer decides the next action, thus completing the whole data transmission process. The return order data include command return order and data reply order. The data reply order is a valid data frame, so it corresponds to three types of data in this process.

The "according to a certain data format" mentioned in the above process is the frame organization format of the user-defined protocol. The sending and receiving parties can only complete the command analysis and attribute analysis of data frames according to the frame organization mode after knowing the relevant user-defined frame format in advance.

3.3. Organization and Composition of the Agreement. In the process of interface design, the UDPP protocol is used as the basic protocol for data transmission. The protocol structure is shown in Figure 3. When transmitting each frame of Ethernet data, the frame structure is organized in the way shown in Figure 1. The data frame is organized in the order of Ethernet header, IP header, UDP header, and data.

The Ethernet header is shown in Figure 4. It includes the preamble, MAC address, and network packet protocol type preamble. The main function of the preamble is to synchronize data. The network packet protocol type used in this paper is IP protocol, namely, "0x0800."

The data part, that is, the application layer part, can be designed in a customized way. According to the above design requirements, the data part is divided into two categories, namely, command data and valid data, to effectively distinguish between command statements and valid data statements. Command data are agreement between the sending and receiving sides to the functions to be realized. To complete the communication and transmission between the sending and receiving sides, the functions to be realized are designed in digital forms. Effective data are the data obtained by means of collection and so on. The protocol design of these two types of data is carried out in the form of a user-defined protocol such as the frame structure of the data frame and command frame. The frame structure is organized by means of "negotiation" to better complete the design and implementation of the data interface.

3.4. Selection of Control Word. In the process of user-defined protocol design, the selection of control words is also very important. In this paper, the following points are considered in the selection of control words:

(1) The binary data difference of different command control words shall be as large as possible to avoid the change of command meaning due to the generation of one or several bit error codes.

(2) When selecting control words, try to ensure DC balance; that is, the number of "1" and "0" should be equal as much as possible to avoid DC imbalance

(3) To ensure the normal use of the whole acquisition system and avoid lock loss, try not to have five consecutive 1's or five 0's. Therefore, the selection of control words should be preventive.

(4) The design of the control word shall avoid duplication with the transmission data as far as possible. The probability of duplication with the transmission data can be reduced by increasing the length of the control word.

Several common control words are analyzed, as shown in Table 1. According to the table analysis, the number ratio of several common control words $1'$ and $0'$ is $1:1$, and there is no phenomenon of five consecutive identical data.

4. Design of Application Layer Data Frame Protocol

To improve data utilization, giant frame (jumbo frames) technology is used to complete data packets and giant frames; effective data load is far greater than the 1500-byte

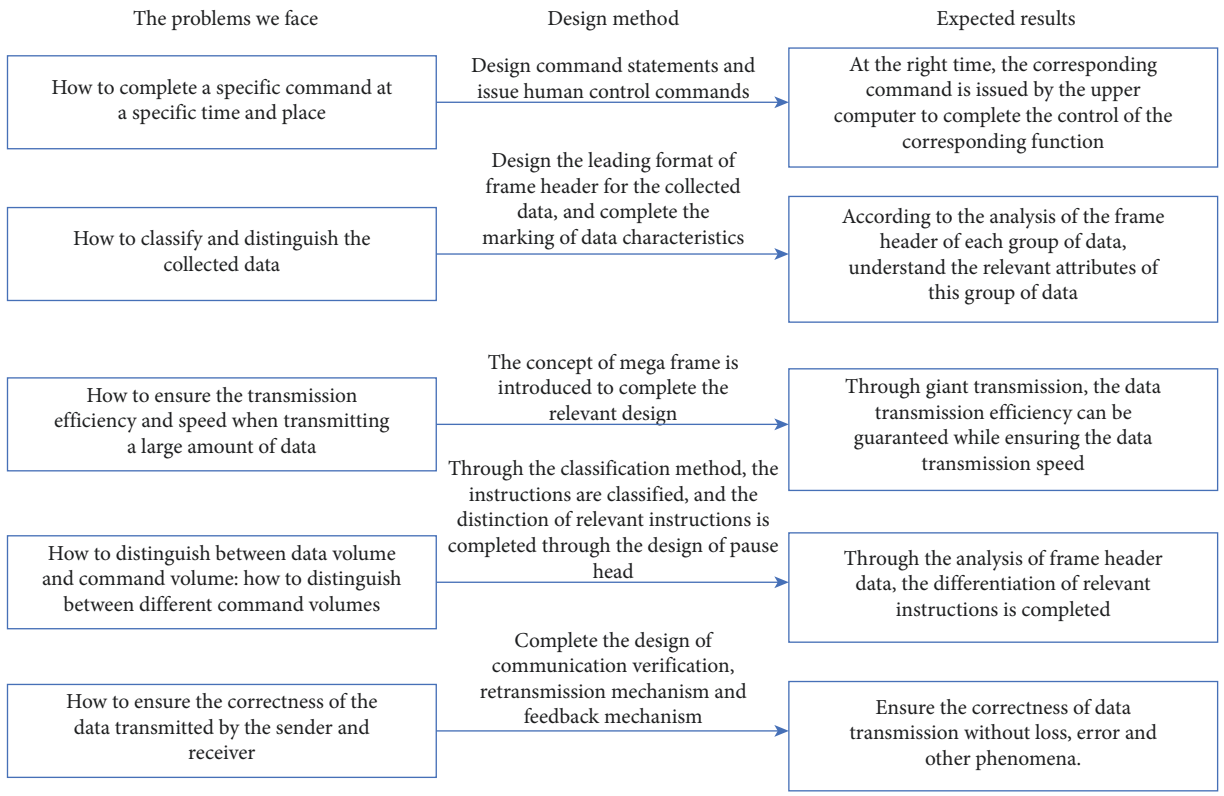

Figure 1: Problems, design methods, and expected results of protocol formulation.

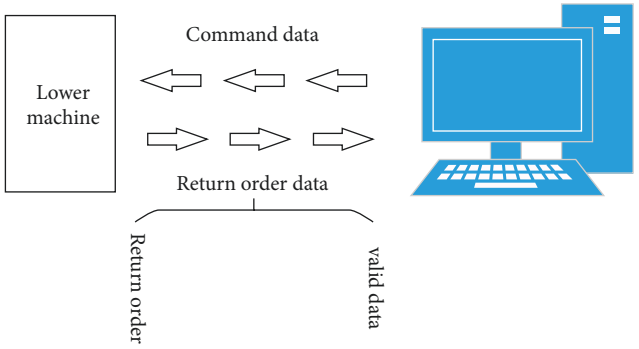

Figure 2: Ethernet data stream transmission direction.

Ethernet frame load regulation set by international organizations. The giant frame is a relatively easy technology to achieve technology, which is mainly applied to the transmission of a large amount of data and is mostly used in Gigabit Ethernet in real life.

Before understanding the giant frame, a preliminary understanding of MTU (maximum transmission unit), the maximum transmission unit transmitted by a network in bytes is the maximum allowable packet size that can be passed through the network. The magnitude of the value of the MTU is proportional to the amount of data in a single packet. An Ethernet packet consists of frames, the actual data being sent, and the network information associated with it. According to the international organization, the maximum Ethernet MTU is 1500 bytes, and the word data load is filled

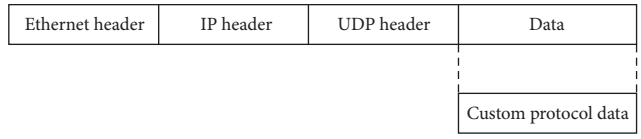

Figure 3: Protocol structure organization.

according to the total number of bytes = Ethernet preamble + frame header delimiter + MAC address + protocol type + filler word + data load. The final calculation result is shown in

$$7 + 1 + 12 + 2 + 4 + 1500 = 1526\ \text{Byte}. \quad (1)$$

Therefore, when transmitting data according to the MTU specified in the international standard, the transmission efficiency of one frame data load is shown in

$$\frac{1500}{1526} \times 100\% = 98.29\%. \quad (2)$$

The transmission efficiency of valid data for each frame is shown in

$$\frac{1500 - 20 - 8}{1526} \times 100\% = 96.46\%. \quad (3)$$

When giant frames are used for data transmission, it is assumed that the load length is 9000 bytes; that is, the transmission efficiency of one frame of data load is as shown in

$$\frac{9000}{9026} \times 100\% = 99.72\%. \quad (4)$$

0 7	8 15	16 23	24 31
Pilot Code 0x55	Pilot Code 0x55	Pilot Code 0x55	Pilot Code 0x55
Pilot Code 0x55	Pilot Code 0x55	Pilot Code 0x55	Frame header delimeter 0xd5
Destination MAC address	Destination MAC address	Destination MAC address	Destination MAC address
Destination MAC address	Destination MAC address	Source MAC address	Source MAC address
Source MAC address	Source MAC address	Source MAC address	Source MAC address
IP network packet protocol 0x0800			

Figure 4: Ethernet header content.

Table 1: Analysis of several common control words.

Control word	Hexadecimal	Binary system	The number of 1	The number of 0	Whether five consecutive identical data appear
EB 90	EB 90	1110101110010000	8	8	No
146F	14 6F	0001010001101111	8	8	No
55AA	55 AA	0101010110101010	8	8	No

The transmission efficiency of effective data of each frame is shown in

$$\frac{9000 - 20 - 8}{9026} \times 100\% = 99.40\%. \quad (5)$$

The above mathematical approach shows that the larger the amount of data per frame, the greater the proportion of effective data. The transmission efficiency of each frame is close to 100% when using 9000 bytes of giant frames. At the same time, when using giant frames for data transmission, the number of data transmission frames can be effectively reduced. It can reduce the header data transmission in the line and increase transmission efficiency. To increase transmission efficiency during huge data transmission, take full advantage of Ethernet transmission speed by using giant frames for data transmission.

The payload is divided into two categories, as previously stated: command frame and data frame. According to the actual requirements, the data volume of the command frame is less, while the data volume of the data frame is large. Therefore, in practical application, the giant frame is mainly used in the transmission process of the data frame.

In practice, the choice of giant frame size has a certain impact on the transmission speed and transmission efficiency and it can be concluded whether the giant frames can be used or not.

(i) *Whether the PC Supports the Transmission of Jumbo Frame Data and Whether There Is a Jumbo Frame Switching Function*. In the current situation, the commonly used PCs include 100 m network PC and Gigabit Network PC. 100 m Ethernet PCs generally support data transmission of 100 m Ethernet, while Gigabit Ethernet PCs can complete the data transmission function of Gigabit Ethernet. Both types of PCs are downward compatible. In general, because Gigabit Ethernet requires a mega frame, the ordinary 100 m network PC lacks a mega frame switch and so cannot use the mega frame function. It is the interface for opening the mega frame function of two PCs. It can be seen that Gigabit Ethernet PC has the option of opening and closing mega frame, while 100 m Ethernet PC does not.

(ii) *Selection of Size in PC Mega Frame Option*. From the above analysis, it can be seen that in the ideal state, the amount of single-frame data directly depends on the efficiency of the data transmission. The greater the amount of single-frame data in a giant frame, the higher the efficiency of data transmission. However, in practice, when the PC's mega frame function is turned on, the data volume matches the actual mega frame transmission data. The data volume must be selected for data transmission to ensure transmission efficiency while ensuring its transmission speed. This is because the PC will automatically slice it when the 4 K size is selected for the PC mega frame option, but the 9 K data volume is actually selected to complete the transmission. Due to a large amount of data, it will not only increase the transmission time but can also crash the system.

(iii) *Use of Network Switches*. If the switch is used in the process of data transmission, it shall be noticed whether the network switch allows the transmission and the allowable size of giant frames or not. In the process of data transmission, the configuration parameters must be matched to achieve the desired results.

According to the above analysis, some of the experimental analyses were made in the evaluation and analysis of the impact of the jumbo frame setting. The jumbo frame settings of NAS on its transmission speed show that when

using jumbo frame technology, the equipment must be selected first to complete the data transmission when the relevant equipment supports jumbo frame transmission. Secondly, the parameter value must be matched with the actual transmission volume to better verify the transmission speed and transmission efficiency.

The protocol organization of data frames is actually the protocol design of the application layer. The design mainly operates on the application layer. The transmission of data frames is carried out by the transmission mode of giant frames. The transmission of giant frames in the local area network can allow an MTU of 9000 bytes. The data frame protocol structure is organized as shown in Figure 5.

Data Frame Header: data frame start flag, which indicates that the application layer data start from this position. This part of the data has two functions:

(I) It indicates that this frame of data is the data frame.
(II) The data from the start to the flag.

To ensure the reliability of the protocol, take 4 bytes of data and reduce the probability that the effective data are the same as the flag bit. This paper sets it to hexadecimal "0x140x6f0x140x6f."

Data Frame Sending Status. It indicates the data status, that is, whether the data are sent successfully or not. The successful sending is "0x000x00"; otherwise, it is "0x000x01."

Frame Type: It describes the data type of this frame. The protocol data occupy 1 byte of data. It indicates that the frame data are a retransmission frame or a normal frame. The retransmission frame is "0x00," and the non-retransmission frame is "0x01."

Packet Count. It indicates the number of packets in which the data are located. It is counted in ascending order. It occupies a total of 3 bytes.

Frame Count. count the data frames in ascending order, which changes with the change of packet count. When the packet count changes, it will be cleared for a new round of counting. This part occupies 3 bytes.

Data Length. The data length is the total length of a frame of data in the application layer. It occupies a total of 2 bytes.

Effective Data. Effective data are the data collected in the acquisition system.

End of Frame. It is meant by the end of frame flag. It indicates the end of complete and valid data of a frame. In this paper, "0xeb0x90" is taken as the end of the frame flag.

5. Testing and Verification

In this section, different tests on the custom protocols and their results have been carried out. In these tests, the basic data transmission test is discussed. Moreover, the speed and efficiency test of the custom design protocol and Ethernet data transmission are also discussed. Lastly, the reliability test is conducted to test the reliability of the custom protocol.

0-7	8-15	16-23	24-31
Data frame header			
Data frame transmission status		Frame type	Packet count
Packet count		Frame count	
Frame count	Data length		Valid data
Valid data			
Valid data		End of frame	

Figure 5: Organization of data frame protocol structure.

5.1. Basic Data Transmission Test. This design uses Spartan6 FPGA as the main control chip for test and verification, connects the motherboard with the computer for function test, captures data through Wireshark and UDP communication software, and analyzes the test results. It carries out a basic data transmission test on an Ethernet interface and directly uploads data through FPGA. The data length is within the scope of international standards. The load length of one frame of data is 1010 bytes to verify whether its basic data communication function can be realized. After receiving the Ethernet basic protocol header, the PC begins to receive valid data. According to the test results in the figure, this data transmission interface can realize the basic data transmission function. The data received by the PC are shown in Figure 6.

To verify the giant frame data transmission, first, turn on the giant frame transmission switch of the PC. After that, send the data directly through the data port, and verify the giant frame data transmission with 9000 bytes of data. The data captured by Wireshark are uploaded. The valid data length of this frame is 8972 bytes according to the datagram length in the protocol in the following figure.

5.2. Speed and Efficiency Test. The self-addend is continuously sent through the FPGA port, and there is no spare time between frames as far as possible. Set the data length of each frame to 9000 bytes, and observe its time through Wireshark. The results are shown in Figure 7.

After several tests, the data in Table 2 are obtained.

When the data length of each frame is 9000 bytes, the effective data length is 8972 bytes. According to Table 2, the average data transmission speed of jumbo frame Ethernet is calculated as follows. When processed to the PC through the Ethernet interface, the average transmission speed of the data load can reach 960 Mbps. The computing procedure is illustrated in

$$8972 \times 8 \times \frac{1}{3}\left(\frac{200}{0.00895622} + \frac{2000}{0.08585600} + \frac{20000}{0.85843200}\right) \approx 960 \text{ Mbps}. \quad (6)$$

When huge frame data are transmitted, due to a large amount of data transmission, the transmission time is long, but its transmission speed can reach 960 Mbps. Next, the transmission efficiency is calculated and analyzed.

Taking the transmission of 100 frames of data as an example, after experimental measurement, when the data

```
0000  ff ff ff ff ff ff fe ed  be ef 05 06 08 00 45 00
0010  03 f2 00 00 00 00 80 11  74 ef c0 a8 01 64 ff ff
0020  ff ff 78 56 34 12 03 de  00 00 00 00 00 00 02 be
0030  00 01 02 03 04 05 06 07  08 09 0a 0b 0c 0d 0e 0f
0040  10 11 12 13 14 15 16 17  18 19 1a 1b 1c 1d 1e 1f
0050  20 21 22 23 24 25 26 27  28 29 2a 2b 2c 2d 2e 2f
0060  30 31 32 33 34 35 36 37  38 39 3a 3b 3c 3d 3e 3f
0070  40 41 42 43 44 45 46 47  48 49 4a 4b 4c 4d 4e 4f
0080  50 51 52 53 54 55 56 57  58 59 Sa 5b 5c 5d 5e Sf
0090  60 61 62 63 64 65 66 67  68 69 6a 6b 6c 6d 6e 6f
00a0  70 71 72 73 74 75 76 77  78 79 7a 7b 7c 7d 7e 7f
00b0  80 81 82 83 84 85 86 87  88 89 8a 8b 8c 8d 8e 8f
00c0  90 91 92 93 94 95 96 97  98 99 9a 9b 9c 9d 9e 9f
```

Figure 6: Interface IP core communication result diagram.

```
97  0.00725400 192.168.1.100     255.255.255.255      UDP
98  0.00732800 192.168.1.100     255.255.255.255      UDP
99  0.00740200 192.168.1.100     255.255.255.255      UDP
100 0.00747600 192.168.1.100     255.255.255.255      UDP
```

Figure 7: Giant frame, 100 frame data transmission time capture.

Table 2: Data transmission schedule.

Grab the frame number frame	200	2000	20000
Data length per frame/byte (s)	0.00895622	0.08585600	0.85843200

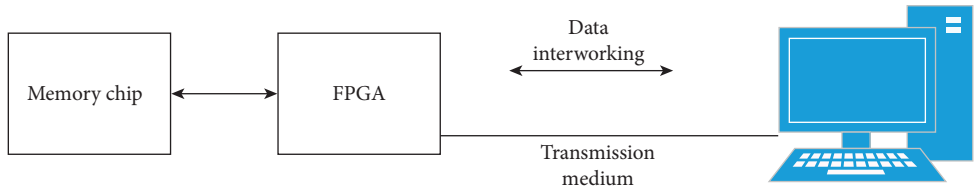

Figure 8: Reliability test platform.

```
0000  fe ed be ef 05 06 ff ff  ff ff ff ff 08 00 45 00
0010  00 50 00 00 00 00 80 11  78 91 ff ff ff ff c0 a8
0020  01 64 34 12 78 56 00 3c  00 00 55 cc 08 d1 4b 00
0030  00 02 00 00 10 01 2e 04  ff ff ff ff ff ff ff ff
```

Figure 9: Retransmission command.

load of one frame is 1010 b, the transmission time is 0.000868 s. The transmission efficiency of the two data transmission modes is calculated and compared. The data length of each frame is the total length of the IP protocol header, UDP protocol header, and valid data. When the data length of each frame is 1010 bytes, the effective data length is as follows (equation (7)). Similarly, when the data length of each frame is 9000 bytes, the effective data length is as follows (equation (8)). Then, when transmitting 100 frames of data, the effective data transmitted by a single frame of 1010 bytes are as follows (equation (9)). The effective data transmitted per second is as follows (equation (10)). The effective data transmitted by a single frame of 9000 bytes are as follows (equation (11)). The transmission efficiency is as follows (equation (12)).

$$1010 - 28 = 982\ \text{Byte}, \tag{7}$$

$$9000 - 28 = 8972\ \text{Byte}, \tag{8}$$

$$982 \times 100 = 98200\ \text{Byte}, \tag{9}$$

$$8972 \times 100 = 897200\ \text{Byte}, \tag{10}$$

$$\frac{98200}{0.00086800} \approx 1.131 \times 10^8\ \text{Byte}, \tag{11}$$

$$\frac{897200}{0.00747600} \approx 1.200 \times 10^8\ \text{Byte}. \tag{12}$$

Compared with equations (11) and (12) when giant frames are used for data transmission. It can be clearly seen that the effective data transmitted per second are much more than that of frame data of normal size. This is mainly due to the existence of Ethernet protocol header.

Assume that the same amount of effective data transmitted is 500 MB. The giant frame needs to transmit 58436

```
0000  ff ff ff ff ff ff fe ed  be ef 05 06 08 00 45 00
0010  23 28 00 00 00 00 80 11  55 b9 c0 a8 01 64 ff ff
0020  ff ff 78 56 34 12 23 14  00 00 14 6f 14 6f 00 00
0030  00 00 00 02 00 00 10 23  0c 01 02 03 04 05 06 07
0040  08 09 0a 0b 0c 0d 0e 0f  10 11 12 13 14 15 16 17
0050  18 19 1a 1b 1c 1d 1e 1f  20 21 22 23 24 25 26 27
0060  28 29 2a 2b 2c 2d 2e 2f  30 31 32 33 34 35 36 37
0070  38 39 3a 3b 3c 3d 3e 3f  40 41 42 43 44 45 46 47
0080  48 49 4a 4b 4c 4d 4e 4f  50 51 52 53 54 55 56 57
0090  58 59 5a 5b 5c 5d 5e 5f  60 61 62 63 64 65 66 67
00a0  68 69 6a 6b 6c 6d 6e 6f  70 71 72 73 74 75 76 77
00b0  78 79 7a 7b 7c 7d 7e 7f  80 81 82 83 84 85 86 87
00c0  88 89 8a 8b 8c 8d 8e 8f  90 91 92 93 94 95 96 97
```

Figure 10: Retransmission data frame.

packets of data, and the nongiant frame, that is, the data packet with a data load of 1010 b, needs to transmit 533898 packets of data. It can be clearly seen that when the same amount of effective data is transmitted, the number of packets transmitted by the giant frame will be less than that of the standard frame. Therefore, the header data in all data will also be reduced, and the proportion of header data, that is, invalid data, will be reduced. The additional overhead of processing headers by the device is reduced.

According to the above analysis, when giant frames are used to complete data transmission, the speed of transmitting Ethernet data can reach 960 Mbps, and its transmission efficiency is much higher than that of standard length packets.

5.3. Reliability Testing. The reliability test is conducted for the above interfaces. During the reliability test, the above "filling number" method is no longer used for processing. The storage chip is used for data transmission, and the structure shown in Figure 8 is used for the reliability test.

To facilitate the later data analysis, the memory chip sends the self-addend as the effective data. It analyzes the continuity of frame count and self-addend. It also observes its loss and bit error. External interference is applied many times during the test to put the whole system in an unstable state. The retransmission command of the upper computer is successfully issued by observing the command data. Simultaneously, judge whether the lower computer correctly completes the retransmission instruction to accomplish the retransmission of the specified data frame. In Figure 9, the retransmission command frame captured by the software is displayed. The command content is "55 cc 08 d1 4b 00 00 02 00 00 00 12 e0 41." According to the command content analysis, it is necessary to retransmit the 16th frame data in package 2. The retransmission data packet and its user-defined protocol header content "14 6f 14 6f 00 00 00 00 00 02 00 00 10 23 0c" are shown in Figure 10. In terms of data frame protocol organization format, these frame data are a retransmission data frame. If the packet count of the data frame is two, and the frame count is 16, then the system can realize the retransmission operation.

After the retransmission mechanism is implemented, the packet count of the received data and the continuity of the frame count are analyzed and judged many times. It is found that the data error bit is 0 bit, and the frame count is continuous at the same time. Therefore, the reliability of data transmission is high.

6. Conclusion

Under the rapid development of information technology, these technologies, such as "cloud computing" and "big data," have created the technical groundwork for the financial shared service model. With the continuous development of the business of ZH Group, there has been a lot of cumbersome and repetitive basic work. The scattered fund management model used in the past will cause a waste of human resources and cannot ensure the safety of enterprise fund management. This will eventually disperse the energy of business personnel and make them unable to focus on the core business of the enterprise. This makes the enterprises face the pressure of low efficiency and high cost. These rapid changes have eventually made a need for the financial shared service model. Under the fierce market competition, it is bound to greatly reduce the core competitiveness of enterprises. Therefore, enterprises need to minimize financial risks and maximize cost savings. In the context of the vigorous development of the sharing platform, the financial sharing service model has emerged. In order to follow up on the development of the times, ZH Group has also built a financial sharing platform. The platform can be used to transparently manage the financial information of the branch, optimize the management process, and promote the sharing of management mode and resources. In addition, it reduces the waste of human resources and capital resources. It also ensures that the staff of the enterprise can realize the efficient operation of the enterprise as a whole. It can reduce financial risks and promote the development of enterprises.

Data Availability

The data used to support the findings of this study are available from the corresponding author upon request.

Conflicts of Interest

The author declares that he has no conflicts of interest.

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