# Analysis and Application of Embedded Real-time Network Communication Technology

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Keywords: embedded network; network communication technology; technology research

**Abstract:** With the continuous development of science and technology and economy, the development of computer network technology in China is becoming more and more rapid, and the demand for science and technology has become more and more high. In recent years, embedded systems have developed very rapidly in China with such advantages as small size, strong application reliability, and strong specificity, and so on, which is gradually adopted by more and more people. But with the continuous application, people have also begun to find out the problems of the system itself, and the new generation of embedded computing system came into being. This paper mainly analyzes and discusses the embedded real-time network communication technology at the present stage.

#### 1. Introduction

Now we are in the era of information diversification and diversification, in order to adapt to the environment faster, how to better apply the communication technology in our life has become the focus of our research. At the present stage, one of the most communication technologies we have applied is the embedded real-time network information technology. In the process of information processing, the use of this method can effectively ensure the real-time and reliability of information and security, but with the continuous development of science and technology how to better apply this system in our life has become our most important task.

#### 2. Requirements of Embedded Real-time Network System

Because the embedded real-time network system has its own reliability, effectiveness, adaptability and change ability, the system is embedded real-time network system. In order to better ensure that the embedded real-time network system can be carried out in a bad and changeable environment. Application, we must ensure that the embedded real-time network system itself can meet the following requirements. [1]

In order to effectively ensure the timeliness of the embedded real-time network system, the first thing to do is to ensure that when the embedded real time network system is produced, the information of multiple distributed subsystems within its own equipment is more carefully coupled to the other systems in general, only in this way to the maximum extent. To improve the timeliness of the embedded real-time network system, and at the same time, it can put forward higher standards for the timeliness of the embedded real-time network system in the continuous development of technology. This requires that the network protocols used in the embedded real-time network system must have certain real time performance. The so-called positive real-time performance is mainly meant that even in the process of using the embedded real-time network system the worst case is encountered, its reflection time is affirmative and definite. In addition, in the course of the actual application of the embedded real-time network system, when the number of network nodes is more relative, or when some nodes meet the timely response of the system, it needs the relevant network protocol to support the tuning of the first level, in order to better give time to the time. The information of the emergent task is transmitted, and the certainty of its own transmission is ensured [2].

For the embedded real-time network system, its own reliability is a very important link for the

application of his users. The reliability of the embedded real-time network system will have a direct impact on the useful power, at the same time, it will also affect the rate of finished product and production efficiency in the process of information transmission. Effectively ensuring the reliability of the embedded real-time network system can dynamically add or delete nodes in the case of bad environment, and when it meets the variable electromagnetic environment, the embedded real-time network system itself has some anti-interference ability, and it can also help the information system to detect the error quickly. Error correction and rapid recovery.

In order to better guarantee the communication effectiveness of the embedded real-time network system, it requires the communication between the subsystems of the embedded real-time network system, and the length of the information itself is very short. The short length of the information required in the embedded real-time network system mainly refers to the embedded real-time network. The information structure adopted in the collection protocol in the system is short frame structure, and the frame head and frame end of the information are short. Only in this way can the communication efficiency and bandwidth utilization effect be effectively improved.

Because of the difference of working environment, in order to better adapt to different working environment and ensure the quality of work, the embedded real-time network system requires a flexible and agile media access protocol which requires the system itself not only to support a variety of different media, such as common coaxial cable, double. The stranded wire and optical cable, and the embedded real-time network system itself can support the inclusion topology, including the star structure, the ring structure, and the bus type structure. At the same time, the embedded real-time network system can be embedded in a variety of media and multiple network topology under some special circumstances. Only in this way can the stability of the embedded real-time network system be guaranteed, and the availability of the embedded real-time network system can be effectively run in some circumstances [4].

Implementation difficulty and cost of embedded real-time network system. Since the embedded real time network system has its own characteristics, more and more people are starting to choose this system at this stage, but the embedded real-time network system generally carries out special planning and special manufacture according to special requests, and the design of embedded real-time network system is designed. In the process of making and manufacturing, the software and hardware of the network system itself needs to be implemented and applied in the actual application process, and the embedded real-time network system can be integrated with the control part of the subsystem. This requirement leads to the commercialization of the related components of the embedded real-time network system. The level is high, but the cost is low.

In order to apply the embedded real-time network system better in our real life, the most important thing is to require the embedded real-time network system itself to be open, only the embedded real-time network system itself has outstanding openness to ensure the value and stability of its application. In the application process of embedded real-time network system, one aspect of the application of the embedded real-time network system needs to ensure that the enterprise's Infranet is effectively connected to the Intranet. The maximization of the implementation of the embedded real-time network system to design an open and transparent interface, and demand the internal capital of the system. The material is very complete. Both the hardware and software in the system can be developed and integrated independently. In addition, the embedded real-time network system also requires that the equipment set is impartial and sensitive only in order to better ensure the openness and stability of the embedded real-time network system [5].

#### 3. Analysis and Application of Embedded Real-time Network Communication Technology

Different from other network communication systems, it has its own unique advantages for embedded real-time network communication system. The main advantage is that the embedded network system can respond to different problems once the environment changes or the system needs to process and change the information data. And the quick solution. And after the complete processing of the problem, the embedded network system will also feedback the results processed to the computer system within a certain time. The application of embedded real-time network communication system in the computer system can effectively ensure that the running process of every software in the computer does not interfere with each other, and as far as possible to ensure that all the work within the computer can be coordinated and effective work.

In the process of designing the embedded network system, in order to better ensure the timeliness and reliability of the embedded network system in the process of designing the embedded network system, we must ensure that the information between the systems can be coupled, so it is necessary to ensure the uniform distribution in the process of the system information equipment. At the same time, only in this way can we ensure that the embedded network system runs with timeliness. In the process of applying the embedded network system, the network protocol needs to effectively control the real-time performance of the network, and can apply the response of the embedded network system to keep higher requirements for the time of the application. In addition to the time necessary for the application of embedded network system, the embedded network system needs to handle the network nodes correctly. These nodes require that the system should have a timely response and have high requirements for the embedded network system, which is precisely because of the high requirements for the system. In order to better ensure the accuracy of the information transmission of the embedded network system in the process of information transmission. For embedded network system to achieve timeliness and reliability is complementary to each other, in the process of design can not be ignored any one, only in this way to better ensure the stability of the embedded network system. The reliability of embedded network system will directly affect the useful power, yield and production efficiency of communication system. Unlike other communication systems, for embedded network systems, if the environment is running in the environment relative to bad conditions, such as the electromagnetic instability in the area, the local magnetic field is constantly changing. In this case, the embedded real-time network system will play its own anti dry. The function of disturbance, and timely check out the problem, in a certain case, will take relevant technical measures to help the system itself to restore normal. Because the embedded network system has the timeliness and reliability in its operation, it can effectively help the failure of the system quickly removed and restore the normal running state as soon as possible [6].

In the process of running the embedded real-time network system, the subsystem of the embedded real-time network system needs to transmit the effective information to the embedded real-time network system continuously. The length of the information itself is relatively short, so that the short frame structure of its own information can be used to make it possible to make use of the characteristics of the short frame structure of its own information. The bandwidth can be effectively utilized, so that the communication efficiency of the embedded real-time network system can be effectively improved. For any communication system, the validity and real time of communication are the most important. Especially at the present stage, we are in a big environment with high speed of information development. If we can not guarantee the real time and effectiveness of the communication system, it is very bad for the people to use. The embedded real-time network system has real time and effectiveness in the process of using it. It can ensure the speed of information transmission while ensuring information security. Only by ensuring the speed of information transmission and ensuring the security of information can truly guarantee the communication effectiveness of the information itself. In many cases, the purpose of our application of embedded real-time network system is to ensure that information can be more secure and more stable in the channel and communication, which is the communication effect of information. There is a great demand for force.

In order to better ensure the efficiency of the embedded real-time network system in the process of running, then the design of embedded real-time network system needs to design an open network operation environment, only in this way can the efficiency of the embedded real-time network system run better. In the process of applying the embedded real-time network system, the embedded real-time network can be linked through the enterprise with the Internet, which can effectively ensure that all the management items in the enterprise can be applied to the management platform of the embedded real-time network system, and can be used in various enterprises. Management facilities are effectively controlled. In addition, in the process of communication, the application of embedded real-time network system can also effectively present the required data on the display interface, including the software and hardware of the embedded real-time network system, which can be effectively integrated according to the needs of the user, or to stand in the system. Open up. The embedded network communication technology system itself belongs to the LAN, which also leads to the research process of embedded real-time network system. Some researchers think that the embedded real-time network communication system which we applied in real life is based on the original data link layer of the system. It is divided into two sublayers, that is to say, we divide the embedded real-time network system into the medium access control sublayer and the logical link control sublayer in the actual application process. For these two different sublayers, when the application medium access the sublayer, it is accomplished mainly through the interface hardware and access protocol, unlike the medium access sublayer. To implement and run the logical link control sublayer, it needs to be implemented by software. Therefore, to truly ensure the normal operation of the embedded real-time network communication technology system, it is necessary to pay attention to the most reasonable construction of the two sub layer access protocol

## 4. Conclusion

According to the above, we can know that in order to make a better use of the market in the field of information technology today, we need to take a scientific and effective way of information technology management. At the present stage, in our country, in order to better apply embedded network communication technology, we must continue to innovate and face the possible problems to solve actively. Only better to solve these problems can we promote the application of embedded network communication technology to develop better, and use embedded network communication at the same time. In the process of technology, we should also pay attention to practicality, so that we can better promote the modernization of China's network technology.

## References

[1] Kurtin P S, Hausmans J P H M, Bekooij M J G. Combining Offsets with Precedence Constraints to Improve Temporal Analysis of Cyclic Real-Time Streaming Applications[C]// Real-Time and Embedded Technology and Applications Symposium. IEEE, 2016:1-12.

[2] Kunert K, Jonsson M, Böhm A, et al. Providing efficient support for real-time guarantees in a fibre-optic AWG-based network for embedded systems[J]. Optical Switching & Networking, 2017, 24:47-56.

[3] Becker M, Nikolic B, Dasari D, et al. Partitioning and Analysis of the Network-on-Chip on a COTS Many-Core Platform[C]// Real-Time and Embedded Technology and Applications Symposium. IEEE, 2017.

[4] Ismail D, Rahman M, Modekurthy V P, et al. Work-in-Progress: Utilization Based Schedulability Analysis for Wireless Sensor-Actuator Networks[C]// Real-Time and Embedded Technology and Applications Symposium. IEEE, 2017:137-140.

[5] Kashif H, Patel H. Buffer Space Allocation for Real-Time Priority-Aware Networks[C]// Real-Time and Embedded Technology and Applications Symposium. IEEE, 2016:1-12.

[6] Brau G, Navet N, Hugues J. Heterogeneous models and analyses in the design of real-time embedded systems - an avionic case-study[C]// International Conference on Real-Time Networks and Systems. ACM, 2017:168-177.