

# Exploration of Practical Training Case of LAN Construction Course based on Industry Scenario

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**Abstract:** Case teaching method is a new teaching method and concept, which has become one of the popular research contents in colleges and universities. This teaching method uses case demonstration to let students understand the project content and the whole process of the project, so that students can simulate the future work environment in the project, so that they can truly cooperate to complete the acquisition of knowledge and skills, and achieve the effect of knowledge transfer. Through the reform of the project teaching method for the implementation of "Comprehensive Practical Training on LAN Construction" course, this paper explores and studies the characteristics and similarities and differences of LAN construction in various scales and various industry application scenarios, and integrates the limitations among enterprises, schools and students' practical operation to the maximum extent, so as to improve students' professional ability and enhance their professional quality.

**Keywords:** Case teaching; LAN construction; Industry scenario

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## Introduction

Due to the rapid development of information technology, the teaching method of LAN construction course needs innovations. Huawei eNSP virtualization platform has been widely used in teaching, enabling students to experience the network construction process without physical equipment, and playing a positive role in the whole training process. However, the simulation of virtual platform cannot completely replace the actual operation, and students need to master and apply what they learnt through comprehensive case exercises.

Most of the current cases are disconnected from the actual construction scenario, resulting in students' insufficient understanding of the practical application and complexity of LAN. Therefore, it is particularly important to design comprehensive practical training cases that meet the actual needs. Such cases can enable students to deeply understand the specific needs of LAN construction, design a reasonable network topology, and understand the operation of different industries. For example, when designing the LAN of manufacturing enterprises, we need to consider production automation, data collection, remote monitoring and other needs, which not only involves the application of network technology, but also includes the understanding of manufacturing processes. When designing hospital LAN, it is necessary to consider confidentiality of patient information, network connection of medical equipment and emergency communication guarantee.

Through these practical training cases, students can design scientific LAN, and understand related industries, laying the foundation for future employment. The implementation of comprehensive practical training cases can also stimulate students' learning interest and innovative thinking, improve their problem-solving ability, teamwork spirit and project management ability. Practical teaching enables students to combine theoretical knowledge with practical applications to prepare them for their future careers.

## 1. Standard curriculum training objectives

Accurate post ability analysis and curriculum construction objectives are the key to the success of project curriculum construction. Through the investigation and analysis of the job demand, practical work ability demand, curriculum system construction and other aspects of computer major students, the teaching objectives of this course are finally determined as follows:

- a. Effectively complete LAN planning based on network application requirements;
- b. Guide students to use more professional drawing software (tools) to complete the drawing of network topology diagram;
- c. Guide students to effectively compile relevant records of service operation according to different network architectures;
- d. On the basis of correct and effective use of common (commonly used) network security products, scientific and reasonable implementation of some basic network security strategy design, application and management, and as far as possible to meet the needs of enterprises;

e. Guide students to scientifically use network management commands to effectively diagnose network performance and eliminate various existing network faults;

f. Guide students to independently complete the design and implementation of local area networks.

Based on the above training objectives, the "LAN Construction and Management Training" course is guided by practical work tasks and takes the cultivation of innovation ability as the main line, so that students have a comprehensive knowledge and understanding of LAN technology, aims to cultivate students' working ability, that is, the ability to solve practical problems, and train students' LAN construction and management ability. Finally, the students' career development ability can be effectively improved.

## 2. Design and implement comprehensive practical training cases in combination with actual application scenarios

In order to achieve the training goal of LAN construction courses, the design of practical training cases of courses should consider as far as possible the cases with strong comprehensive, distinct application scenarios and obvious differentiation as the cases for students to practice. In this paper, small Internet companies, medium-sized IT companies, large manufacturing companies, government departments, universities, hospitals and residential communities are selected as examples to analyze the similarities and differences of each application scenario, so as to provide reference for the practical training cases of LAN construction courses.

### 2.1 Similarities

Although the requirements for building Lans in different scenarios vary, there are some common core requirements.

a. All scenarios require a solid network infrastructure, including key equipment such as routers, switches, and wireless access points to ensure network connectivity and performance. These devices need to be configured with network size, number of users, data traffic and future growth in mind to meet current and future needs.

b. Security is a key consideration for all Lans. Security measures such as firewalls, VPNs, and access controls must be integrated to protect data from unauthorized access and cyber attacks, and must be regularly updated and maintained to counter cyber threats.

c. Reliability and stability are important aspects of LAN design and are essential to ensure business continuity. Therefore, LAN designs need to include redundancy and failover mechanisms to ensure that services can be quickly restored in the event of a device failure or cyber attack.

d. Scalability is an important feature of LAN design. As businesses grow and technology advances, networks must be able to scale flexibly to support new services, more users, and higher data traffic. This involves not only hardware upgrades, but also software, protocol updates, and network management policy adjustments.

These similarities form the core requirements for building a LAN, and investment and planning in them is needed to ensure the long-term success and sustainability of the network, regardless of the nature and size of the organization. By meeting these essential requirements, organizations can provide their users with a secure, reliable, compliant, and scalable network environment that supports their business goals and strategic growth.

### 2.2 Differences

When building a LAN for different scenarios, each scenario has its own unique needs and challenges, and these differences are particularly evident during the building process. The following is a detailed analysis of the focus and process of the formation of small Internet companies, medium-sized IT companies, large manufacturing companies, government departments, universities, hospitals and residential area networks.

a. Small internet companies prioritize flexibility and cost-effectiveness in LAN setup, focusing on cloud integration and remote solutions to reduce physical infrastructure and maintenance costs, requiring easily scalable and rapidly deployable network designs.

b. Medium-sized IT firms demand high-performance and scalable networks, incorporating multiple subnets, advanced security, and integrating emerging technologies like SD-WAN and cloud services to handle complex projects and data.

c. Large manufacturing companies emphasize industrial automation and IIoT, requiring industrial-grade networking equipment and reliable connections for real-time data processing and production line automation, including special environment-resistant devices.

d. Government departments focus on security and compliance, with strict data encryption, access control, and monitoring due to the sensitivity of the data they handle.

e. University LANs aim for extensive wireless coverage and resource sharing, supporting remote learning and research, requiring robust network designs to accommodate high user density and inter-campus connectivity.

f. Hospitals need LANs that integrate medical devices, ensure patient data confidentiality, and maintain reliability in emergencies, adhering to regulations like HIPAA.

g. Residential communities require LANs with wide coverage and user-friendly access, considering outdoor equipment and simplified connection processes for easy network access. Each sector's LAN setup reflects its unique needs, from rapid deployment and scalability to compliance and user accessibility.

In summary, while all scenarios need to consider the basic elements of the network, each scenario has its own specific needs and challenges, which affect the formation process and focus of the LAN. Understanding these differences is critical to designing and implementing a successful LAN.

### 3. Conclusion

This paper discusses the development of practical training cases of LAN construction courses based on industry scenarios, and emphasizes the importance of case teaching method in improving students' professional ability and professional quality. Through the case teaching method, students can deeply grasp the characteristics and applications of LAN construction in a simulated working environment. The article points out that the needs of LAN vary from industry to industry, but all scenarios need to focus on network infrastructure, security, reliability, compliance, and scalability. Finally, the paper proposes that the assessment of practical training cases should break through the traditional way, and comprehensively evaluate the project implementation process and results of students from multiple dimensions, so as to improve students' learning interest and comprehensive ability.

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