

Postprint on the Synergistic Effects of Integrating Computer Network Security and IP-based Broadcast Control Security Technologies

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Abstract

With the continuous development of society and the gradual maturation of computer network technology in China, computer network technology has been progressively applied to all facets of production and daily life. Concurrently, the development pace of IP broadcast control technology in our nation is accelerating. To ensure that this technology can more effectively and stably enrich public production and life, the imperative of enhancing its security cannot be overlooked. Promoting the integrated development of computer network security technology and IP-based broadcast control security technology, and achieving the effective integration of computer network security technology applications with IP broadcast control technology applications, can further enhance the security and stability of IP broadcast control technology applications, thereby establishing a solid developmental foundation and providing robust momentum for the healthy advancement of China's digital network television industry.

Full Text

The Promoting Effect of Integrating Computer Network Security Technology and Broadcast Control IP Security Technology

Abstract: With the continuous development of society and the gradual maturation of computer network technology in China, network technology has been increasingly applied to all aspects of people's production and daily life. Concurrently, the development pace of IP broadcast control technology in our country is accelerating. To ensure that this technology can enrich public production and life in a better and more stable manner, effective enhancement of its security cannot be overlooked. Conducting research on the promoting effect of integrating computer network security technology with broadcast control IP security

technology, and achieving effective combination of these two applications, can further enhance the security and stability of broadcast IP technology applications, laying a solid foundation and providing strong impetus for the healthy development of China's network television and digital industries.

Keywords: Computer Network; Security Technology; Broadcast Control IP Security Technology; Integrated Development

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Introduction

As national economic construction progresses and science and technology continue to advance, China has gradually entered the information age. Against this backdrop, network applications have penetrated millions of households, making positive contributions to people's daily lives and rendering network security issues critically important. In this new century of developmental convergence, ensuring the secure development of internet information and integrating broadcast control IP security technology has become essential for making positive contributions to improving people's quality of life. Meanwhile, in this era of information development, the media industry has expanded unprecedentedly. As people demand more from cultural life, traditional broadcasting faces certain limitations. Addressing these challenges by resolving issues such as audio instability and poor sound quality in traditional broadcasting necessitates the application of broadcast control IP technology [2]. However, this technology still has certain problems, as it cannot effectively guarantee accurate signal reception or promote optimal transmission effects. Therefore, it must be combined with computer network security technology to ensure better sound quality during program broadcasting, provide audiences with improved listening experiences, facilitate system maintenance, and guarantee long-term effective operation—all of which play a positive role in further advancing China's economic and cultural development.

1. Basic Concepts of Broadcast Control IP Security Technology

Broadcast control IP technology refers to broadcasting technology that employs TCP/IP network protocols, while broadcast control IP security technology encompasses the security measures adopted during the transmission of audio signals in standard IP format. The effective application of broadcast control IP security technology can resolve problems such as poor audio quality, insufficient maintenance management, and lack of interactivity in broadcast program transmission. As illustrated in [Figure 1: see original paper], the primary components of broadcast control IP security technology application include source system

technology, core switching technology, multiplexing and scrambling technology, and core switching technology.

2. Significance of Integrating Computer Network Security Technology and Broadcast Control IP Security Technology

The integration of computer network security technology and broadcast control IP security technology holds profound significance for China's digital television industry. The effective application of broadcast control IP technology has enabled remarkable development in China's digital television sector. Combining computer network IP technology with broadcast control IP security technology can effectively reduce signal instability during digital television program transmission and further enhance the overall stability and quality of digital radio and television broadcasting in China.

3. Research on the Promoting Effect of Integration

Based on the basic concepts of broadcast control IP security technology, the application advantages and characteristics of computer network security technology, and the specific development needs of China's digital television broadcasting industry, the research content can be summarized into the following key points:

3.1 Effective Integration with Broadcast Control IP Automatic Detection To achieve effective integration of computer network security technology with IP automatic detection systems, it is essential to promote their combination during operational implementation, which constitutes the primary task for ensuring integration efficiency. In specific operations, front-end signal sources must first be integrated within a region or provincial capital, combining various system signal sources to facilitate the reception of dual-path signal sources for most programs during broadcasting. Simultaneously, central and regional programs should be distinguished, with embedded detection and switching integrated devices introduced for important television programs. Such equipment can effectively achieve switching between primary and backup program sources, implementing PID millisecond-level switching and enabling automatic detection and switching for code streams or individual PID broadband states [1]. For central programs, such as subscription-based content, signals can be interfered with to enable automatic detection and switching, providing audiences with enhanced broadcast security experiences, achieving autonomous services, improving listener satisfaction, and facilitating the efficient advancement of national broadcasting programs.

3.2 Effective Integration with Broadcast Control IP Dual-Path Broadcasting Promoting broadcast control IP dual-path broadcasting represents crucial content in broadcast programs. To achieve integration between computer network security technology and broadcast control IP technology, effective

combination must also be facilitated during dual-path broadcasting operations. In specific implementation, staff must first clarify their work content and then optimize and adjust the overall design based on their development situation and the actual needs of the public, ensuring that broadcasts can meet audience listening requirements while maintaining normal transmission and promoting long-term effectiveness. Second, regional or provincial-level main front-end signal sources must be processed, primarily focusing on dual-path reception and switching through millisecond-level automatic detection switching equipment to achieve 1+1 redundant backup in dual-path broadcasting equipment and facilitate second-level switching. This will enable rapid reception of broadcast programs, improve broadcast audio quality and efficiency, and promote the healthy development of the industry.

3.3 Improving Efficiency of Broadcast Control IP Fault Detection

Work To promote effective integration of computer network technology and broadcast control IP technology, combination must be facilitated across all aspects, with specific work efficiency improved, particularly in fault detection operations. In implementation, fault detection should be strengthened through regular detection activities, practical implementation, shift-based personnel arrangements, and promotion of responsibility systems [3]. Once operational or integration failures occur, accountability can be established, thereby enhancing staff awareness of detection work importance. Equipment should then be configured to enable automatic inspection processes at various county-level sub-front-ends through certain network dual-links, full-area wavelength division, and other means, targeting AB dual-path signals from the main front-end and facilitating millisecond-level switching. While improving work efficiency, staff must conduct real-time inspections of the entire broadcasting system, investigating single-point failure risks in system front-ends and sub-front-ends to ensure normal system operation and provide audiences with optimal viewing and listening experiences [4].

3.4 Effective Handling of Broadcast Control IP Emergency Faults

Concurrently, advance preparation of solution strategies for handling emergency faults should be promoted to ensure effective integration of computer network security and broadcast control IP technology systems. Such emergency plans primarily address situations where main signals in regional front-ends frequently fail or equipment cannot operate normally, adversely affecting broadcast transmission and limiting the integration efficiency of network security technology and broadcast control IP technology. Therefore, fault handling capabilities are essential. In practical operations, signals should first be cut off and switched to backup signal broadcasting, followed by troubleshooting failures one by one to avoid broadcast interruptions that could affect audience service experiences, thereby promoting uninterrupted broadcast programs and advancing industry development [5].

3.5 Applying Computer Network Security Technology for Daily Maintenance of Broadcast Control IP In the process of integrating computer network security technology with broadcast control IP, strengthening daily maintenance work is indispensable. This constitutes the key to ensuring long-term application of the technology and serves as an important basis for improving work efficiency, thereby guaranteeing effective integration performance. In specific operations, staff must regularly optimize operating systems, supplement deficiencies, and ensure timely identification of existing problems while conducting regular inspections and maintenance of application equipment to ensure long-term operation [6]. During maintenance, staff should first switch signals to avoid broadcast interruptions, which not only improves audience listening experiences but also facilitates real-time detection and maintenance of sub-front-end and main-front-end system equipment, promoting industry development progress.

Conclusion

Conducting comprehensive research on the promoting effect of integrating computer network security technology and broadcast control IP security technology requires first clarifying the basic concepts of broadcast control IP security technology and the significance of this integration. Only then can the promoting effects be effectively identified and fully realized in the specific implementation of digital television broadcasting work, truly achieving the technological, stable, and comprehensive development of China's digital television broadcasting industry.

References

- [1] Qin Yuanhui, Zhang Weizhi, Luo Xiangyu. Design and Implementation of IP Broadcast Control Platform[J]. Audio-Video, 2015(06): 203-204.
- [2] Huang Xinqiang. Design and Implementation of Video-on-Demand System Based on IP and CATV Dual Network Convergence[D]. Graduate School of Chinese Academy of Sciences, 2017.
- [3] Sichuan IP TV Integrated Broadcast Control Sub-platform and Main Platform Interconnection Achieves Commercial Capability[J]. China Cable TV, 2014(03): 241.
- [4] Zang Hao, Wu Haidong, Cui Yi. Establishment of Content Broadcast Control Aggregation Platform for Cultural Export Needs Based on Dongyixun All-IP Link System[J]. Communication World, 2017(18): 5-6.
- [5] Reporter Huang Xin. China Builds IP TV Integrated Broadcast Control Platform[N]. Economic Daily, 2016-12-03(008).
- [6] Xiao Chen. Impact of AoIP Technology on Future Technical Architecture of Broadcast Control[J]. Electroacoustic Technology, 2017(02): 74-79.

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