Design and Application Analysis of Television Station Program Production Network System (Postprint)

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Abstract

China' s development and construction have been remarkably rapid, and with the advancement of electronic technology, people' s lives have become increasingly enriched. Currently, the development and application of various electronic devices are progressing swiftly, while the public' s escalating demands for television program quality have posed significant challenges to the television industry. For television programs, production must be conducted through network systems or related software to enhance program quality. This paper investigates case studies of television station program production network system design and application, providing recommendations for television stations to improve their program production.

Full Text

Preamble

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Abstract: With rapid national development and advances in electronic technology, people' s lives have become increasingly enriched. The swift development and application of various electronic devices have led to higher demands for television program quality, posing significant challenges to the broadcasting industry. Television program production now requires network systems and related software to enhance program quality. This paper examines case studies in the design and application of television station program production network systems, offering recommendations for improving program production.

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With technological development, traditional television programs have been significantly impacted, and audience demands for quality continue to rise. Previous television program production systems can no longer adapt to current requirements, making system improvement essential. Regular system updates to enhance television program production quality not only expand a station' s influence but also ensure its healthy development, carrying significant importance.

1. Network System Data and Business Process Design

Television programs hold a crucial position in the broadcasting industry' s development, yet they face tremendous impact from technological advancement. This is largely attributable to relatively low production effectiveness and quality, though primarily driven by rising audience expectations [1]. With network development, people' s horizons have broadened and visual experience has become increasingly important, leading to elevated demands. To adapt to these developmental needs, television station reform is essential [2]. By integrating current network technologies for information dissemination and network system design, stations can significantly benefit and effectively improve television program production efficiency.

Network systems can improve the television program production environment, standardize production workflows, and facilitate management. New network systems enable comprehensive, convenient, rapid, and shared information collection while further standardizing processes.

2. Application of Network System Design in TV Program Production

In television station program production, network systems consist of three major components: network management systems, core storage systems, and non-linear editing systems [3].

Among these, the core storage system represents the central link in network system design. This system requires debugging of core equipment to ensure optimal working conditions [4]. First, equipment must demonstrate extremely high reliability and sufficient storage capacity. Additionally, equipment must possess excellent compatibility, enabling the creation of RAID arrays and LUN allocation, which effectively improves equipment efficiency. As for non-linear editing systems, they hold a vital position in television program production.

Equipment used in these systems must support multiple image formats such as HDV and MXF, enabling effective editing of diverse formats and significantly improving production efficiency. This also enriches video material effects, providing audiences with better visual experiences that satisfy relevant demands. Current system equipment can be controlled through third-party special effects software and supports Alpha animation, enabling effective file rendering. These capabilities substantially reduce processing time and greatly facilitate production. Regarding network management system equipment, it must be compatible with network systems to ensure smoother, more convenient operations. Currently, the Auto.NET production network management system is widely used, enabling comprehensive management and supervision of television programs while effectively improving production efficiency and security levels. This system can effectively screen program information and store data, ensuring safer program broadcasting and smoother television transmission.

3.1 Selection of Core Storage Equipment

Core storage equipment is crucial for network systems, as reliable equipment ensures normal system operation. According to relevant research, the U-EDIT800 demonstrates excellent performance. Through snapshot technology application, it reduces data space occupancy and improves storage efficiency while enabling more accurate data analysis that facilitates reallocation. This equipment uses a dual-controller chassis with internal switching to improve connection effectiveness and data transmission quality.

3.2 Selection of Non-linear Editing Systems

This system plays an important role in program compilation. Relevant research indicates that the X-edit system demonstrates good adaptability, and its application in network systems can improve program production. It also satisfies relevant selection criteria. First is the system' s online editing time—it requires professional timeline editing functions to achieve infinite zooming goals, enabling effective material editing, improving dynamic image transformation effects, and offering unrestricted undo operations that enhance operational fault tolerance. This allows arbitrary modifications and recovery of unsatisfactory effects, improving production effectiveness. Additionally, special effects production can effectively stimulate audience perception, requiring strong special effects capabilities. Operation through certain software can improve production quality and enable effective material processing. Moreover, its operating speed should not be affected by network conditions, allowing rapid content response.

3.3 Selection of Network Management Systems

Network management systems possess numerous functions, such as user management, program production workflow management, and program code management. Integrating these functions can satisfy corresponding demands and

positively impact station development. This system can reasonably and effectively screen data and determine manuscript priorities, making the connection between programs and manuscripts more suitable and effectively improving program production quality.

4. TV Station Networking Objectives and System Structure

This refers to network material sharing, primarily through media management systems, which can enhance the application of valuable materials and facilitate retrieval work. Furthermore, it clarifies program production structures and processes, enabling simultaneous sharing of production resources during operations. Under digital frameworks, programs can achieve tapeless broadcasting, enabling various forms of external network communication and exchange. Television stations can construct video networks encompassing program editing, media assets, management, web television broadcasting, and studio broadcasting systems. Based on network transmission, this integrates management, production, and broadcasting. Networking objectives can improve television station program production efficiency and effectively reduce production costs, exerting profound influence on all processes of television program production and broadcasting.

5. Design of TV Program Production Network Security Systems

The design and construction of network security systems is crucial, as television broadcast program security is closely related to network system security. Improved television station program security levels depend on network security system design, which must also maintain stability to enable error detection and correction in program production. Additionally, establishing corresponding emergency plans is important to effectively enhance problem-response capabilities. Network security system design can reference four aspects: system data, system modules, system equipment, and system connection pathways, with corresponding defense measures developed for each to effectively improve security levels. Furthermore, relevant personnel can conduct security design for related software and equipment in network systems, such as system storage areas, switches, servers, and databases. Reliability improvement is also crucial. In network system design, network equipment and security system design are important. To effectively ensure television station program production efficiency, corresponding auxiliary functions can be established, including program material upload and download, acquisition, special packaging, editing, subtitling, and special effects design. These functions enable smoother network system design and better operation of each link.

6. Non-linear Program Production Networks

The development of video networks depends on non-linear program production networks, which can collect various materials, upload and store them via network, then process and migrate data for broadcasting. It involves key technologies in program production engineering, such as MPEG-2 mainstream compression technology, Ethernet, dual-network structures, and virtual network storage technology. Integrating these technologies with media asset management as the core to construct network management software systems can make television program production and management more effective. Among these, data compression is frequently applied in network transmission and must follow certain principles. First, there are specific requirements for signal quality to ensure its integrity.

Note: Figure translations are in progress. See original paper for figures.