

Applications and Prospects of Broadcasting Fiber to the Home (FTTH) Technology: Post-print

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Abstract

With the continuous advancement of science and technology, China's information technology has witnessed notable improvements. In a society undergoing diversified information development, Internet usage among the populace continues to escalate, with numerous users opting for residential broadband installation. This trend proves highly advantageous for the technological advancement of Broadcasting and Television Fiber to the Home (FTTH). Given its extensive customer base and its status as a comparatively advanced technology that satisfies diverse user requirements, Broadcasting and Television FTTH technology enjoys highly favorable development prospects.

Full Text

Application and Prospects of Broadcasting and Television Fiber to the Home (FTTH) Technology

Abstract: With continuous scientific and technological progress, China's information technology has achieved significant advancement. In today's information-diversified society, internet usage continues to grow, with many users choosing to install broadband at home, creating favorable conditions for the development of broadcasting and television FTTH technology. With its broad customer base and advanced technical capabilities that meet diverse user needs, FTTH technology demonstrates excellent prospects for development.

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1. Basic Concepts and Characteristics of FTTH

1.1 Basic Concepts

As society continues to progress and public understanding deepens, fiber-to-the-home (FTTH) technology has gained widespread acceptance. This technology essentially employs a single optical fiber line to connect network services directly to individual households, operating on a principle similar to electrical lighting installation. All network transmission occurs through this fiber cable, offering significantly faster speeds compared to previous technologies. FTTH provides users with more stable network signals while simplifying installation procedures and substantially reducing deployment time—particularly advantageous in today's fast-paced society. The technology's minimal environmental requirements also facilitate future maintenance efforts. China continues to refine and advance FTTH technology to enhance its performance characteristics and contribute to future network development.

1.2 Characteristics of FTTH

Currently, the broadcasting and television two-way network transformation market is experiencing unprecedented growth, with diverse and varied transformation schemes. Although EOC technology has certain advantages and has become the preferred choice in some areas for two-way network transformation, with the introduction of national broadband initiatives, broadcasting and television FTTH technology demonstrates strong foresight and advantages, offering more convenient and intelligent usage methods. This paper studies the application prospects of broadcasting and television FTTH technology, hoping to contribute to its development in China.

FTTH technology offers significant advantages. First, it can achieve a nearly passive optical network, avoiding many complex and cumbersome tasks. Second, its substantial bandwidth is highly attractive to users, particularly as it eliminates long-distance limitations, enabling operators to implement superior configurations that attract large user bases. As constraints continue to diminish, FTTH technology facilitates better promotion of related services while reducing problems compared to previous technologies. Ongoing development and improvement will further enhance its capabilities in the future.

2. Specific Applications of Broadcasting and Television FTTH Technology

2.1 Design Optimization for FTTH Implementation

In designing broadcasting and television FTTH systems, improving overall planning quality is essential. This requires clear definition of signal pathways: digital

frontends in central machine rooms must transmit through various devices to optical fiber rooms, then deliver signals to individual households through secondary amplification and fiber splitting. Rural machine rooms require secondary splitting and amplification to ensure stable signal reception quality for users. To achieve this fundamental objective, township-level distribution units must further amplify signals through tertiary amplification. Notably, switch deployment represents a critical engineering focus throughout this process. Actual signal transmission flows through these devices and precision optical module circuits to terminal equipment. Users can choose between wired Ethernet or built-in WiFi connections, though this selection may affect actual signal transmission quality. Analyzing optical cable transmission design reveals two functional categories: trunk cables and distribution cables. Trunk cables provide overall network planning, thereby reducing operational costs. Additionally, bandwidth capacity varies for each PON port, allowing users to select appropriate speeds based on actual needs (typically 1Gbps suffices for most users).

2.2 Application in Residential Communities

Current broadcasting and television FTTH technology faces limitations in many residential communities, particularly regarding access methods. Passive optical network connections encounter numerous difficulties, making active network approaches necessary for effective implementation. This technology eliminates the need for dedicated community machine rooms, reducing costs while enabling computer-based broadband connections. New customer onboarding is convenient and unrestricted.

2.3 Network Design for Residential Communities

To meet residential users' bandwidth requirements, many communities have deployed community-level machine rooms. Analysis reveals that most such rooms employ optical cable network splitting methods. However, not all communities require dedicated machine rooms when developing related services—this decision requires comprehensive evaluation by community management based on actual conditions. Generally, communities with fewer than 600 households do not necessitate machine room construction.

3. Development Strategies for FTTH Technology

3.1 Development of New Services

Currently, FTTH technology represents the preferred choice for many broadband access users, indicating excellent development potential. However, as markets continuously evolve, broadcasting and television FTTH technology must adapt accordingly to remain competitive. Relying solely on passive market promotion renders development efforts ineffective. To successfully promote FTTH technology, relevant departments must proactively understand customer needs

and formulate improved promotion strategies aligned with their own development objectives.

3.2 Need for National Support

As an emerging technology, broadcasting and television FTTH possesses vast application potential. If fully developed, it could catalyze nationwide technological transformation. However, without national support and assistance, its development will encounter significant challenges. To better advance and expand FTTH technology's prospects, relevant enterprises should seek government support while developing their own technical capabilities. Government departments can guide development enterprises to construct FTTH infrastructure in new residential areas, thereby facilitating residents' needs. FTTH technology can connect the global community of the future and boasts a broad customer base, making it an imperative of our era that deserves vigorous promotion, application, and reform. Through the preceding discussion, we have recognized FTTH technology's numerous advantages. Nevertheless, China's broadcasting and television FTTH technology still exhibits many deficiencies requiring further development to ensure a broader future.

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