Postprint: Technical Analysis of Integrating County-Level Converged Media Centers with Emergency Broadcasting Systems

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Abstract

Under the backdrop of high-level attention from the Party Central Committee and continuous improvement of relevant policy frameworks, the construction of county-level converged media centers has entered a stage of rapid development, playing a crucial guiding role in grassroots public opinion guidance and news information dissemination. Village-level emergency broadcasting, as a safeguard and livelihood project of an emergency nature, has high requirements for construction and operation efficiency. Based on a brief elaboration of relevant concepts, this paper analyzes the technical workflow for interfacing county-level converged media centers with emergency broadcasting systems, clarifies the key points of technical implementation, and thereby provides references for related construction activities.

Full Text

Technical Analysis of Integrating County-Level Converged Media Centers with Emergency Broadcasting Systems

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Abstract: Against the backdrop of heightened central government attention and continuous improvement of relevant policy frameworks, county-level converged media center construction has entered a stage of rapid development, playing a crucial guiding role in grassroots public opinion guidance and news dissemination. As a livelihood and safeguard project with emergency functions, village-level emergency broadcasting demands high operational efficiency. This paper briefly elaborates on relevant concepts, analyzes the technical processes for integrating county-level converged media centers with emergency broadcasting

systems, and identifies key technical implementation points to provide references for related construction activities.

Keywords: County-level converged media center; Emergency broadcasting; System integration; Information dissemination; Technical analysis

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From the 1960s to the 1980s, radio held a prominent position in China' s media propaganda landscape, overcoming low literacy rates and limited television coverage to play an extremely important role in grassroots outreach. However, following China' s reform and opening-up, the rapid development of television media—coupled with the continuous advancement of internet media and direct impetus from broadcast system reforms—has posed severe challenges to radio broadcasting, particularly at the grassroots level, where development has nearly ground to a complete halt. Within the county-level converged media center construction framework, integration with emergency broadcasting systems through technological means enables comprehensive coordination across grassroots initiatives including public opinion guidance, flood control, emergency response, and rural revitalization, ensuring full realization of their overall functions.

1.1 Concept of County-Level Converged Media Centers

The *Construction Standards for County-Level Converged Media Centers* issued by relevant authorities defines these centers as integrated media platforms that consolidate county-level radio, television, newspapers, and new media resources to provide media services, Party-building services, government services, public services, and value-added services. This definition reveals that constructing county-level converged media centers involves not merely combining various media forms, but rather optimizing processes and reorganizing resources across different media to achieve comprehensive integration of service functions, thereby ensuring grassroots public opinion and propaganda meet the practical demands of socio-economic development.

1.2 Overview of Emergency Broadcasting Systems

The *Construction Standards for County-Level Converged Media Centers* explicitly identifies emergency broadcasting messages as a fundamental component of the basic architecture. Emergency broadcasting refers to the creation of text, images, audio, and video containing emergency information, disseminated through channels such as radio, television, new media, and loudspeakers to release urgent messages and provide information services to the public. Conceptually, emergency broadcasting differs fundamentally from traditional broadcasting, as its operational carriers are no longer limited to conventional broadcast channels but instead operate through all channels of the county-level converged media center.

1.3 Practical Significance of Integration

In the current era, grassroots audiences demand greater timeliness and accuracy in news and information reception. County-level converged media center construction has traditionally focused on conventional radio and television stations or new media development, with insufficient attention paid to emergency broadcasting system integration. However, within the social production and governance framework, enhanced social governance capabilities make broadcasting media indispensable for epidemic prevention and control, flood management, and rural tourism emergency management. Unlike active reception media such as television and video streaming, emergency broadcasting uses audio to reach all members of the public simultaneously, providing nondiscriminatory coverage to everyone within sound range. This confers unparalleled propaganda advantages over other media forms. Consequently, emergency broadcasting systems constitute an indispensable component of county-level converged media centers and must achieve effective integration in accordance with relevant departmental specifications and requirements.

1.4 Integration Objectives and Principles

As a key priority in current grassroots media construction, effective integration with emergency broadcasting systems requires thorough investigation of administrative and natural village distributions within county jurisdictions during the construction process. This involves establishing comprehensive county-, township-, and village-level broadcast control platforms with both automatic unified control and independent control modes, implementing priority-based hierarchical management according to administrative levels. At the village level, signal access should primarily use wireless coverage supplemented by wired access to ensure transmission security and stability. Broadcast control platforms must accommodate compatible inputs of different signal formats, with long-term objectives enabling automatic broadcasting of natural disaster emergency management information to achieve intelligent management.

Integration between county-level converged media centers and emergency broadcasting systems must adhere to corresponding principles based on practical requirements and development trends. First, the safety principle must be upheld to prevent network intrusion and information leakage that could impact converged media center operations. Second, the efficiency principle requires employing appropriate technologies and hardware to ensure integration system completion within cost control parameters. Third, the practicality principle ensures staff can master basic operational skills through simple training, guaranteeing smooth emergency broadcasting system operation. Fourth, the scalability principle enables effective integration with various media forms within the converged media center.

2.1 Integration Approach

Emergency broadcasting represents an indispensable component of county-level converged media center construction, utilizing loudspeakers and other terminals to achieve timely information dissemination with transmission capabilities unmatched by other media types. Integration between county-level converged media centers and emergency broadcasting systems requires, first, separate management of daily and emergency messages with refined source and management systems for both information modes. Second, the information transmission system must deliver content promptly to diverse terminal types for timely public dissemination. The operational schematic is illustrated in Figure 1 [Figure 1: see original paper].

In actual operation, daily programs are uniformly produced by the converged media technology center and directly transmitted to new media platforms (WeChat, Weibo, and mobile apps) as well as radio and television terminals. Content requiring emergency propaganda enters the emergency broadcasting system for unified distribution across all media terminals. Emergency broadcasting content can be simultaneously played on radios, televisions, and loudspeakers, and transmitted to audiences via new media platforms (WeChat, Weibo, and mobile apps) through the converged media technology center.

2.2 Interface Settings and Functions

The primary functions of the interface between county-level converged media centers and emergency broadcasting systems include emergency broadcasting message transmission requests, transmission feedback, broadcast result feedback, manuscript distribution requests, and manuscript distribution feedback. The corresponding interface configurations for each function are shown in Table 1 .

Table 1: Interface Configuration Between County-Level Converged Media Centers and Emergency Broadcasting Systems

Interface Request Party	Interface Response Party
Emergency broadcasting message transmission request	Emergency broadcasting system → Converged media center platform
Emergency broadcasting message transmission feedback	Converged media center platform → Emergency broadcasting system
Converged media center emergency broadcasting message distribution	Converged media center platform → Emergency broadcasting system
Converged media center manuscript distribution request	Converged media center platform → Emergency broadcasting system
Converged media center manuscript distribution feedback	Emergency broadcasting system → Converged media center platform

2.3 Integration Process

Data transmission between the converged media center platform and emergency broadcasting system uses HTTP protocol. After the client initiates an HTTP connection request, the interface response party creates an HTTP service port to identify the request. During connection establishment and information exchange, the requesting party first sends data files, which the response party receives and acknowledges with a receipt file, notifying the requesting party to await processing results. Upon request approval, the complete information transmission process is finalized.

2.4 Interface Protocol

The core of the interface protocol is emergency broadcasting message reception and transmission. When defining interface protocols, several key control points require attention. First, data system specifications must be established, constructing appropriate digital codes and format specifications based on actual system operations. Second, classification coding must comply with emergency broadcasting system resource classification and coding standards to ensure effective data dissemination across platforms. Third, data information time formats must be precisely set to the second. Fourth, associated information content must be properly processed. After designing and determining names for all data transmission formats, seamless interfacing between all interfaces can be achieved.

2.5 Integration Presentation Forms

The presentation form of integration between county-level converged media centers and emergency broadcasting systems is primarily App-based, fulfilling emergency broadcasting operational requirements while enabling multi-level functionality. Visualization can be categorized into three aspects: core function presentation, third-party data integration, and personalized business applications. Core function presentation includes emergency/daily broadcasting systems, content management services, video transcoding and streaming services, monitoring systems, system management, and data support. Third-party data integration includes social security query interfaces, provident fund query interfaces, and hospital interfaces. Personalized business services encompass modules such as news information, safe villages, convenient services, healthcare, rural tourism, and emergency broadcasting.

2.6 Emergency Broadcast Source Insertion

The current *Technical Specifications for Public Address System Engineering* explicitly requires that public address systems must have a broadcast microphone with the highest priority during operation. When multiple signal sources broadcast to the same zone, higher-priority signals automatically override lower-priority ones. As a fundamental component of public address systems, emer-

gency broadcasting systems must be capable of receiving multiple signal sources and accurately setting priority levels for each. This ensures emergency broadcasts can immediately interrupt regular public address signals and transmit emergency content to the public without delay. Emergency broadcast source insertion functionality is implemented through corresponding adapters, which must also feature address-based control and wake-up functions, alarm prompting capabilities, operational status collection and return transmission, and voice monitoring output functions.

2.7 Post-Management

To ensure optimal integration effectiveness between county-level converged media centers and emergency broadcasting systems, enabling effective information transmission during emergencies, corresponding post-management systems must be established. First, design plans must strictly comply with central government policy requirements, strengthen resource integration, formulate reasonable implementation plans, and avoid redundant construction. Second, the newly established county-level converged media center and emergency management office should assume unified responsibility for construction, with daily operations managed by relevant offices within the converged media center. Third, comprehensive work specifications and emergency response plans must be formulated and effectively implemented across all aspects of daily operations. Fourth, multichannel funding mechanisms must be established on a foundation of fiscal support to create a sustainable operational funding guarantee system, enhancing the emergency broadcasting system's self-funding capacity to ensure timely software and hardware upgrades, thereby laying a solid foundation for emergency management.

3.1 Strengthening Network Security Management

Emergency broadcasting serves as a news and information transmission channel for special circumstances, with transmitted content directly impacting the normal production and life of residents within coverage areas. Meanwhile, as county-level converged media center construction remains in its early stages with lagging development in this aspect and limited management experience, network security management capabilities require further enhancement. For integrated operational systems, network security management should be strengthened through the following measures. First, since information transmission primarily uses the internet as its carrier, system construction should employ network security software and port configuration to prevent network intrusion and ensure information transmission security. Second, system construction should adopt corresponding network hardware for security protection, requiring hardware verification before accessing the system to publish emergency safety information. Third, comprehensive operational management systems must be established with clearly defined staff responsibilities to enhance personnel awareness of network security management and prevent human factors from compro-

mising network security. Fourth, cloud-based data backup systems should be implemented for offsite information backup, achieving full-process information security management.

3.2 Strengthening Operational Status Monitoring

Within county-level converged media center operational frameworks, diverse media types operate simultaneously, covering different public groups, which frequently generates various operational issues. Therefore, emergency broadcasting systems must employ corresponding technical means to achieve real-time operational status monitoring. This requires utilizing Internet of Things technologies and platforms to construct monitoring systems during emergency broadcasting system development. When anomalies occur in any operational segment, corresponding issues can be promptly transmitted to the system center, which performs intelligent analysis and displays fault information for technical staff to address based on signal feedback, thereby ensuring the emergency broadcasting system maintains optimal operational status and successfully transmits information to the public. Additionally, monitoring systems enable collection and management of operational data from different segments for system performance analysis.

3.3 Improving Data Management and Analysis

Data management and analysis enable more accurate system operation monitoring and facilitate analysis of emergency broadcasting system operational patterns, effectively enhancing overall operational performance. First, data synchronization constitutes the primary content of data management, synchronizing basic and real-time information of superior radio and television resources at the dispatch control platform to enable technical verification and subsequent operational commands upon receiving emergency information from higher-level media centers. Second, data synchronization with same-level media resources such as television stations, WeChat, Weibo, and mobile apps must be achieved to ensure simultaneous emergency information dissemination under special circumstances. Furthermore, analyzing data collected by monitoring systems enables in-depth analysis of failure rates and response times for core equipment, transmission networks, and information release devices, allowing assessment of actual emergency broadcasting system operational status. When network coverage or operational performance fails to meet emergency information dissemination requirements, causes must be thoroughly analyzed and effective measures implemented to ensure the converged media center maintains optimal operational condition.

3.4 Improving Emergency Management

Emergency broadcasting systems are utilized infrequently during daily operations. Inadequate emergency management systems can lead to management deficiencies causing integration malfunctions and broadcast function failures.

Therefore, the following emergency management measures must be implemented in daily operations. First, comprehensive emergency management plans must be formulated based on national emergency broadcasting standards and relevant laws and regulations, establishing complete emergency processing workflows to integrate all operational stages and complete news content compilation and broadcasting within minimal timeframes when emergency broadcasts are required. Second, emergency drills must be strengthened by selecting appropriate off-peak periods, conducting extensive drill publicity through other media platforms in advance, and performing corresponding emergency drills on platforms, systems, and terminals with clear labeling. Emergency drills not only better assess system operational status but also enhance public awareness and understanding of emergency broadcasting, thereby improving propaganda effectiveness. Third, a comprehensive emergency drill evaluation system must be established to analyze system operational issues through diverse data assessments, continuously improving system stability and reliability, optimizing existing emergency release workflows, and enhancing overall system operational efficiency.

Given China' s complex natural disaster patterns and increasingly challenging socio-economic development circumstances, efficient integration between emergency broadcasting systems and county-level converged media centers has become an inevitable requirement for media propaganda development. However, due to the relatively late start of county-level converged media center construction and limited experience in emergency broadcasting system construction and operation, various issues persist in actual operations. Relevant technical personnel must strengthen theoretical research from both technical and practical demand perspectives to ensure effective integration between county-level converged media centers and emergency broadcasting systems, continuously improving overall system operational levels and actively promoting the healthy development of emergency broadcasting.

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