Media Technology Convergence and Innovation: Building a Hybrid Cloud Service Platform (Post-print)

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Abstract

Under the overarching trend of media convergence development, media's process of deep integration is inseparable from technological innovation and support services. Currently, emerging technologies represented by Internet+, big data, cloud computing, virtualization, and others have matured and achieved successful application in other industries. During this critical period of media convergence development, constructing a new technology service system, conducting effective technology planning, and introducing novel technological innovation mechanisms are crucial, and building a hybrid cloud service platform to reduce technology platform construction costs, flexibly respond to technological and business developments, and lower operational costs constitutes the future development trend.

Full Text

Preamble

Media Technology Convergence Innovation: Building a Hybrid Cloud Service Platform

Abstract: In the era of deepening media convergence, technological innovation and supporting services are indispensable for media organizations. Emerging technologies represented by Internet Plus, big data, cloud computing, and virtualization have matured and achieved successful applications across various industries. During this critical period of media convergence development, constructing a new technology service system, conducting proper technology planning, and introducing innovative technological mechanisms are essential. Building a hybrid cloud service platform to reduce construction costs, flexibly respond to technological and business developments, and lower operational expenses represents the future trend.

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1. Technology as a Key Driver of Media Convergence Development

The hybrid cloud model, combining private and public clouds, is gradually becoming the mainstream choice. From the perspective of the current communication system, the deep convergence of traditional and emerging media essentially involves the full utilization of traditional media's superior content resources integrated with mobile interactive technologies, dissemination technologies, big data, and other new technologies in a mutually reinforcing process. However, the lag and conservatism of traditional media in introducing, applying, and innovating with new technologies have severely constrained the depth of convergence for most organizations, resulting in superficial integration and limited effectiveness. Every transformation in media communication methods has been inseparable from technological progress.

Technological innovation has become the most prominent feature of current media convergence development. Internationally, media outlets such as *The New York Times* and *The Guardian* have placed data analysis and application at the core of their business growth. Domestically, central media organizations like People's Daily Online and CCTV.com are actively introducing new technologies to build unified technical platforms that integrate multiple media forms and communication channels, gradually achieving value-added operational services. Cloud services operate at multiple levels, including Infrastructure as a Service (IaaS), Platform as a Service (PaaS), Software as a Service (SaaS), and Data as a Service (DaaS). Public cloud services typically provide multiple selectable hosted cloud access data centers and access points with complete redundancy and disaster recovery capabilities, effectively addressing the need for cross-regional continuous business service capabilities.

From an application requirements perspective, the public cloud solution follows a "private cloud + services" model that lacks sufficient flexibility and customizability. In contrast, the hybrid cloud approach of "local private cloud + public cloud services" effectively balances flexibility, security, and stability requirements. Hybrid cloud represents the general trend, offering greater flexibility and stability than public cloud alone while also addressing content and data security management concerns.

From an operational standpoint, the hybrid cloud approach better supports com-

plex business application scenarios. First, hybrid cloud meets the need for elastic scalability: businesses with the highest security and stability requirements can be deployed on self-built private cloud platforms, while internet-based applications with high elasticity demands and non-sensitive data can be prioritized for deployment on public clouds. Second, hybrid cloud ensures system reliability and good user experience. Public cloud service providers offer abundant hardware environments and bandwidth resources that can be expanded on demand, compensating for the limited resources of private clouds. Third, hybrid cloud enables rapid, low-cost implementation of off-site disaster recovery backup.

2. Maturation and Stabilization of Virtualization and Cloud Technologies

After years of development, virtualization has reached high maturity and achieved incredible success across all enterprises, making it suitable for virtually any organization. The virtualization landscape has stabilized. With the rapid development of cloud computing, cloud services offer scalability, flexibility, rapid response, and low-cost characteristics. User awareness and trust in public cloud services are gradually increasing, with organizations beginning to migrate non-sensitive business applications to public clouds while maintaining self-built private cloud platforms.

Regarding specific hybrid cloud implementation, traditional networks and platforms can be employed for business segments involving security and press publication. However, for early-stage processes such as news topic selection and editorial work, existing cloud platforms can be fully utilized, meeting usage requirements while saving comprehensive self-construction costs and enabling rapid deployment to support business development. For instance, public computing resource services provided by Alibaba Cloud and Azure belong to PaaS and IaaS. Software product services deployed on top of public and private clouds form SaaS applications and services. Those cloud services that can adapt to media convergence development needs, without affecting publication security and reducing costs, can be directly purchased as services. This approach can rapidly address practical problems in innovation and development.

3. The Necessity of Introducing Cloud Services in the Internet Plus Context

The defining characteristic of the internet era is speed. Traditional IT system architecture and planning processes struggle to adapt to the rapid changes of internet development. From the perspective of meeting user demands, technology platforms must achieve rapid deployment and iteration to quickly obtain user feedback, iterate new product forms based on that feedback, improve products and services, or rapidly discontinue products. To adapt to this fast-paced iterative business development model, cloud services represent an inevitable choice.

Specifically regarding hybrid cloud implementation, for processes involving business security and press publication, traditional networks and platforms can be adopted. For early-stage processes such as news topic selection and editorial work, existing cloud platforms can be fully utilized, meeting usage requirements while saving comprehensive self-construction costs and enabling rapid deployment to support business development.

4. Hybrid Cloud Technology Platform Planning for Media Convergence

The Internet Plus industrial revolution, driven by technology and service innovation, has injected and strengthened technological genes into content-centric media organizations. This requires comprehensive innovation and systematic planning across technology platform architecture, product concepts, new technology applications, talent team building, organizational structure, and incentive systems.

Media convergence aims to ultimately transform readers into users, achieving a user-centered interactive model. It involves creating content and information service platforms where readers, enterprises, and government functional departments at all levels are all users. Through media convergence, organizations can achieve a transformation from pure content to service, fulfilling public opinion guidance and service integration. The goal of media convergence is comprehensive integration of technology, content, processes, and business management to achieve breakthroughs in business models.

Technological innovation in the media convergence process should continuously support and drive content production, dissemination, and operations through technology introduction, integration, and innovation. The media convergence content and information service platform should connect journalists, planning and editorial processes, traditional and new media publishing links, user interaction, and communication feedback evaluation throughout the entire workflow. Technology planning and innovation in media convergence should not blindly pursue the latest technologies but should be based on insights into media convergence development trends, demand analysis, and user interactive experience to better serve media convergence development.

The construction of local private clouds represents the optimal choice for current platform development, including server virtualization and cloud desktops that can dynamically adjust various resources to improve resource utilization efficiency.

Regarding public clouds, based on media convergence application scenarios and combined with process and system boundary divisions, hybrid cloud services can be introduced step-by-step and hierarchically. The first step can involve experimenting with IaaS infrastructure cloud services such as cloud hosting and cloud storage while establishing data synchronization mechanisms with local private clouds. Based on this foundation, SaaS-level public cloud services including data

services and application services can be gradually introduced according to application needs, such as internet big data aggregation, communication analysis aggregation, and collection and production tools. As the security and reliability of public clouds continue to improve, locally deployed applications can be gradually migrated to public clouds with data backed up in local private clouds.

The future path of media convergence is driven by media content innovation plus technological innovation. Achieving network and system-level interconnectivity and collaborative development to jointly complete the technical support for media convergence business is essential.

5. Analysis of Advantages in Introducing Cloud Services

The genuine demands of traditional media at the technical level are flexibility, efficiency, and low cost. The greatest characteristic of systems and services on the cloud is that they no longer require construction or purchasing software and servers for deployment. Instead, they can be directly applied for and used on a pay-per-use basis, rather than requiring one-time purchase payments. Businesses can pay for just one month of usage if needed. From a scale perspective, small initial business scale is not a problem—services can start with one or two devices and later scale up to dozens of devices as the business grows, offering considerable flexibility. Options are also available for internet bandwidth and security protection.

Specifically, based on the characteristics of media convergence, adopting cloud services offers the following advantages and benefits:

1. **Speed and Efficiency.** Media convergence applications must be fast in the internet era. The construction of all convergence applications is extremely rapid. The required operational environment can be quickly built in a short time, compared to the conventional procurement, deployment, and installation process that typically requires 2-3 months.

2. **Flexibility.** Cloud services provide highly flexible IT resources, including host CPU, memory, storage, bandwidth, etc.

3. **Simplicity and Convenience.** Direct service adoption rather than asset acquisition facilitates financial processing while being convenient, fast, and enabling unified resource management.

4. **Low Cost.** Costs are not incurred as one-time expenditures but transformed into low-investment leasing models. In the early stages when business has not yet taken off, large investments are not required, eliminating the pressure of one-time investments. Small investments can be made to continuously trial business applications. If the application performs well, additional investment can be made to scale up. If the business is not suitable, it can be reduced without significant impact. This approach actually saves and protects investments.

5. **Maintenance-Free.** Considerable savings can be achieved in hidden costs such as technical personnel and operations and maintenance investments. Since professional IT technical personnel costs are relatively high, hidden cost investments in this area are also substantial. By introducing cloud services, maintenance can essentially be eliminated, allowing technical personnel to save substantial time for system planning and service improvement.

In summary, introducing hybrid cloud in traditional media can address several issues. First, it leverages the speed, flexibility, and pay-per-use characteristics of public clouds to obtain infrastructure environments at low cost. Second, it rationally utilizes existing IT resources without wasting previous investments. Third, it addresses sudden growth in internet-based business and enables cross-regional services. Fourth, it achieves off-site disaster recovery to improve business and data security reliability.

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