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## Postprint: Discussion on Private Cloud Platform Construction for the Press

**Authors:** Zhang Hao

**Date:** 2023-10-08T00:00:00+00:00

### Abstract

Private cloud, also known as internal cloud or corporate cloud, is a cloud environment built for exclusive use by a single organization, providing the most effective control over data, security, and service quality. This architecture resides within the internal control scope of an enterprise data center, with proprietary resources as its core attribute. This paper discusses the construction of a private cloud platform for newspaper media groups based on the author's experience, addressing long-t...

### Full Text

#### Preamble: Private Cloud for Newspaper Media Groups

Private cloud, also known as internal cloud or corporate cloud, is a cloud environment built for exclusive use by a single organization, providing the most effective control over data, security, and service quality. This architecture resides within the internal control scope of an enterprise data center, with proprietary resources as its core attribute. This paper discusses the construction of a private cloud platform for newspaper media groups based on the author's experience, addressing long-term development needs through a phased, incremental approach to planning and implementation. The objective is to establish a core infrastructure resource pool for internal information systems while introducing management and control nodes to achieve comprehensive resource management and control.

### 1. Current State of Newspaper Media Information Systems

Newspaper media organizations each have their own administrative frameworks and business process standards, which correspond to distinct information system architectures and physical operating environments. While these internal infrastructure environments currently support various application systems, many

newspaper media organizations face a common dilemma as their scale and application scope expand along with increasing informatization: multiple disparate systems built by different vendors become difficult or impossible to upgrade over time, significantly hindering organizational development. Some groups have attempted to address this by replacing systems or developing upgrades internally, but the resulting cost increases place substantial pressure on both development trends and information system operations. Resolving these challenges while accommodating the localized production attributes and security requirements of newspaper media has become a key objective for IT professionals in this sector.

## 2. The Private Cloud Solution

For newspaper media organizations, private cloud environments transform the traditional infrastructure resource provision model into a service-oriented approach, enabling applications to obtain necessary resources and services on demand while enhancing operational stability and reliability. Organizations may either build private clouds independently or procure, deploy, and construct them through cloud service providers, depending on their IT capabilities. This process involves system architecture planning, environment installation, basic application configuration, infrastructure operations, and corresponding adjustments to application services and configuration models to ensure stable operation of information systems.

## 3. Private Cloud Architecture Design

The private cloud architecture implemented by the author's organization follows a "Infrastructure Platform + Virtualization Platform + Cloud Management Platform" model. This design serves as a critical foundational support platform for the group's infrastructure resource construction, considering long-term development needs through incremental refinement.

### 3.1 Infrastructure Platform

Evolved from virtualization technology, private cloud infrastructure enables functional pooling of resources. After comparing hyper-converged and traditional virtualization models against technical characteristics, in-house expertise, and construction costs, the organization adopted a traditional architecture based on actual resource conditions. This approach utilizes x86 servers as compute nodes and distributed storage technology for storage resources, minimizing redundant investment while maximizing resource utilization and ensuring long-term technical stability.

### 3.2 Service Platform (Virtualization Platform)

Following comparative evaluation of virtualization solutions and technical testing to understand underlying principles, the organization selected the most suitable technology based on its existing environment and technical capabilities.

The platform was enhanced with various service function modules, upgrading the traditional virtualization framework into a comprehensive private cloud service platform. This implementation features load balancing, active-active application architectures, and integrated network security management functions including distributed firewalls and security policy groups, delivering cloud service capabilities characterized by hardware virtualization, centralized resource management, and elastic resource scheduling.

### 3.3 Management Platform

The private cloud management platform oversees service operations and centralized resource management. After evaluating multiple vendor solutions and considering management requirements for diverse virtualization environments—including various VMware versions, Microsoft Hyper-V, Alibaba Cloud, and physical servers—the organization deployed a proprietary cloud management platform. This system automates the entire lifecycle from resource application, approval, and deployment to operations, monitoring, alerting, and reporting, while implementing user permission and resource scope controls to ensure efficient platform operation. The platform also standardizes and unifies allocated resources based on usage patterns, monitors resource consumption, and optimizes allocation through data analysis to demonstrate management value.

## 4. Lessons from Private Cloud Implementation

The private cloud deployment at the author's organization has yielded several benefits. First, it consolidates existing hardware resources (servers, storage, network) into unified resource pools managed through a self-service platform, maximizing utilization and reducing procurement costs while eliminating the problem of unmaintained multi-vendor systems. Second, the self-service portal enables automated resource provisioning through standardized, process-driven services, providing cost calculation, usage analysis, and daily reporting for rapid, economical response to business demands. Third, a unified security management platform implements network segmentation and isolation at the private cloud foundation, ensuring security separation between applications and comprehensive protection for information systems. Currently, the platform supports five core production systems and over twenty R&D testing and pre-release environments.

### 4.1 Converged Infrastructure Planning

Private cloud investment need not be entirely new; organizations can integrate existing information system infrastructure by testing compatibility among current storage, servers, and network hardware before scaling up. Most private cloud vendors offer converged infrastructure solutions, making rational infrastructure planning a core consideration.

## 4.2 Security and Availability Considerations

Private clouds are not inherently secure by virtue of being private. Robust security requires comprehensive strategies, regular audits, and planning. Physical isolation remains the most convenient and effective security measure. In highly shared cloud environments, proper security zone partitioning and policy planning are critical and must be incorporated from the initial design phase.

## 4.3 High Virtualization and Resource Sharing Requirements

A key private cloud element is achieving high resource sharing, which presents technical and architectural challenges. High virtualization—encompassing not just server but also network, storage, and desktop virtualization—enables this sharing. Organizations must therefore assess their readiness in terms of architecture, technical expertise, personnel, and foundation before deployment.

## 4.4 Evaluating Elasticity and Scalability

A fundamental cloud characteristic is enabling on-demand, efficient resource utilization. Deploying private cloud requires careful assessment of true elasticity and scalability needs, as many existing server and storage architectures lack the extensibility required for private cloud demands. Realistic evaluation of elastic requirements is crucial before deployment.

## 4.5 Building an Integrated Data Utilization System

Content has become the core asset of newspaper media, making cloud data center construction largely about content integration. At the information system level, content equals data and resources, with nearly all business-related content being datafiable. This data is complex and heterogeneous, requiring processing, analysis, archiving, integration, and governance to extract value. Building a private cloud presents challenges for IT management departments, requiring high-level technical control and specialized operational knowledge. However, the benefits are substantial, particularly in convenience, controllability, security, and timeliness.

*Author Affiliation: Information Security and Operations Center, Zhejiang Daily Press Group*

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

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