Content Services in Telecommunications

Building the ultimate content delivery infrastructure

Abstract:

This white paper describes the trends witnessed and anticipated in telecommunications industry in relation to rich media content services and examines the key issues facing operators in implementing a successful content-delivery solution. The paper, in addition, summarizes EMC’s position in response to the above issues and requirements and highlights EMC’s ability to address these needs with its hardware, software and professional services offerings.

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Table of Contents

Executive Summary .............................................................................................................. 4
Increased Bandwidth Potential Creates Revenue Opportunities ................................. 4
Key Issues Facing Content Services Deployments ......................................................... 5
Personalizing the Content Viewing Experience .............................................................. 6
Maintaining Channel Relationships via Accurate Settlement and Asset Protection ................................................................. 6
Carrier-Grade Content-Delivery Networks .................................................................... 6
Interfacing into the Service Delivery Platform ............................................................... 9
Ingesting Multi-Channel Content .................................................................................... 9
Integrating Content Management into Content Storage and Distribution Environments ......................................................................................... 10
Executive Summary

2005 was predicted to be the year of mobile content and this is rapidly coming to pass—159 operators worldwide are offering 3G services. In addition, new broadband content offerings such as IPTV are rapidly taking shape. One common theme prevails: an explosion in the delivery of rich media to a multitude of different devices over a broad range of networks. This opens up tremendous revenue growth opportunities for the network service operators. However, owning a network and having hungry customers is only one piece of the puzzle. Understanding how to create compelling, profitable services is another. The answer is of course, compelling content—timely, relevant, informative, or engaging and easy to find, retrieve, and consume at the user’s convenience. But providing this comes at a cost which needs to be carefully controlled if revenue from these services is ever to turn into profit.

A relationship with the content providers needs to be formed, whether it’s with the original creator or with some form of content aggregator. A commercial and operational framework needs to be in place for this to function smoothly. With no limit to the number of device/network combinations that a consumer is likely to want to utilize, an operator must look to build a content delivery infrastructure that is independent of device and network—a multi-channel content delivery portal. While there may be hunger for content, the tastes and desires of the consumer are rapidly changing. Thus the framework must exhibit the ability to design, deploy, and iterate its offerings at lightning speed. It must inherently be able to tailor its offerings based on the intended customer—understanding both the customer desire and their current capabilities of consuming content. Knowing that the subscriber is using a Nokia 6600 and that they recently bought music by George Michael is equally important.

Making money from content needs be to more than selling airtime for download. Content billing is essential and Digital Rights Management forms an integral component. So what are the key steps in arriving at a compelling content-rich service? Part of the answer is an integrated content delivery infrastructure that can manage content throughout its entire lifecycle. This is a content management solution that can acquire content from multiple content providers, package and promote this content in marketing bundles, and, through sensitivity to the incoming request, optimize that content based on personal preference and device/network characteristics. EMC in conjunction with its partners has created such an integrated content delivery solution based on industry-leading EMC® Documentum® content management software and state-of-the-art EMC information management tools and storage platforms.

Increased Bandwidth Potential Creates Revenue Opportunities

Opportunities opened up by the growth of fixed and Wi-Fi broadband adoption, plus higher bandwidth IP connections to mobile devices, pave the way to providing increasingly compelling services to the customer. Adoption rates of broadband fluctuate globally but counties such as the U.K., which have been slow to roll-out high-speed service, are finally experiencing dramatic growth such as the recent record registrations for mobile football services. 2005 has proved to be a record year for greater adoption of 3G mobile phones and upgraded 2.5G services capable of providing rich content to the user. Telecommunications service providers are counting on a market that Ovum predicts to yield $57B by 2008 to augment their revenues with income from services such as ringtones, games, and sport clips.

This creates an excellent opportunity for the telecommunications industry to increase ARPU (average revenue per user) across fixed and wireless networks. However, device and network technology advancement is only the first step in realizing increased revenues. Several concepts key to driving successful content services include:

- Compelling services are created from compelling content which is timely, accurate, and entertaining/informative.
- Services need to be “aware” of their users—their preferences and their abilities to consume the content.
- The breadth and volume of content presented will grow exponentially as user interaction improves and technology adoption barriers fall.
Given these criteria a fundamental issue that must be overcome is the historically complex and time-consuming operation of acquiring, publishing and distributing large volumes of content. These processes must be automated and made simpler for more content suppliers and operators to participate in the burgeoning content-based services marketplace.

Key Issues Facing Content Services Deployments

Some of the key issues facing service providers who are preparing their networks for content services include:

- Handling channel relationships within the content food chain
- Personalizing the customer’s content viewing experience
- Ensuring accurate and timely revenue settlements with content suppliers
- Creating a secure, carrier-grade content-delivery network
- Optimizing the management of content assets throughout the content lifecycle
- Interfacing into service delivery platforms to keep network customer profiles and device libraries up to date
- Assuring proper procedures for ingesting multi-channel content prior to service initiation
- Integrating content management architectures with network infrastructure storage and data distribution architectures
- The content food chain
- While the technology for consuming content has dramatically changed over the last decade, the fundamentals of providing consumers with a content service are no different from the origins of broadcasting and publishing. At one end of the food chain are the content owners/creators and at the other end are network owners—organizations with a “pipe” directly into the consumer’s life.

Figure 1. The Content Food Chain

The new world of IP-based content delivery opens new opportunities. To handle this market requirement, two new categories of organization have recently appeared:

- Content aggregators—organizations that attain limited rights to content from multiple content owners and package and combine this content for new and emerging distribution channels.
- Content Service Providers—focused on providing content delivery platforms independent from any network. These companies specialize in creating an infrastructure that can support many channels and look to run their service over multiple service provider networks.
Because network service providers are dependent upon content aggregators and service providers they must cultivate a more symbiotic relationship than has existing in the past. The collaboration of content providers and service providers/network operators has been hampered over the last five years. Each side fears the other’s long-term intentions to expand their areas of core competency. At the same time, however, each realizes that it will be impossible to realize the full potential of this market without use of the tangible assets the other has. Operators have relationships with their subscribers and content providers have a treasure trove of compelling assets (music, games, video, etc.), but have no direct relationship to the customer.

One of the factors contributing to the “stand-off” has been the difficulty in engaging each other and ultimately working in a manner that is consistent with each party’s core business approach. Creating the operational infrastructure to make this collaboration work should accelerate the “symbiotic” relationship. IT architectures need to be created in which content providers can seamlessly “stream” content into the service provider’s network with a minimal need for manual intervention in order to prepare it for service delivery. Such an infrastructure should allow the content suppliers to approve the transformation of their assets for delivery on non-traditional devices prior to distribution.

**Personalizing the Content Viewing Experience**

The market for content-rich services is highly volatile and subject to change—especially services catering to youth and entertainment interests. Service providers need to rapidly react to their customer demand. Opportunities to sell content disappear as quickly as they appear. It’s essential that content can be sourced, manipulated, formatted, and made available in extremely short lifecycles. To maximize assets’ shelf life and synchronize the timely delivery of current content, a network must be able to:

- Optimize the quality of service for each particular device, network, and service plan.
- Provide content-service developers a single integrated authoring environment with multi-media tools so that the look and feel of the service can be reviewed before roll-out
- Automate manually intensive workflow-oriented tasks such as content ingestion and publication.

**Maintaining Channel Relationships via Accurate Settlement and Asset Protection**

Providing compelling content is only one element of the money making equation in the content services market. Knowing how to price, deliver, and bill the customer for its consumption is equally important. Content assets need to have pricing models applied to them which are easily understood by consumers. In addition, content suppliers need to be assured that their copyrights are protected. The content delivery network has to incorporate steps to control usage of the content assets in such a way that it does not compromise the ability to proliferate legitimate consumption and ultimately turn the customers away from the content. Digital Rights Management solutions need to be sensitively woven into the content billing strategy of the operation. DRM strategies can open up many new innovative consumption models such as rental (time-based access) or a “personal license.”

**Carrier-Grade Content-Delivery Networks**

The introduction of broadband technologies, both fixed and wireless, has driven the boom in content services. However, issues like network latency and contention still present major hurdles in the delivery of rich media to the consumer. When planning services such as IPTV or mobile video, operators must deploy intelligent content management methods to optimize the consumer experience. Marrying the latest technologies in storage, content caching, and transport to the service providers’ networks enables the underlying content of any service to be intelligently located in order to optimize the overall performance of the service. This may require replicating and caching large content items such as video programming far down into the delivery network and building in procedures for content replication and retrieval.
Managing the Lifecycle of Content Assets

The way to maximize the investment in a service delivery platform is to underpin it with a solid content management strategy capable of handling content throughout its entire lifetime—from stages prior to creation through publication (“going live”) to final obsolescence (archival or deletion). During this time, content will undergo many manipulations and relocations. Therefore, a solid management system is needed to handle the many formats and volumes of rich media assets that can be delivered over service-provider networks.

Architecturally, the content management strategy should adhere to one fundamental design concept—that there is, at any time, only a subset of all content being managed actually available to the subscriber. In other words, there is an “internal” content repository and a “live” content repository. The characteristics and required features and functionality differ around these two repositories quite significantly. The internal content repository (which may be located at the content aggregator or service provider) is like a “factory” and has potentially hundreds of internal users accessing it. There is a very broad set of functions available to these users which enable them to prepare and process content ready to be published to the live repository.

In contrast, the live repository (i.e., the service provider’s content portal) is like the “retail outlet” in which millions of consumers can access a limited set of content items. The live repository is optimized for speed of access—thus functionality is more limited.
The key elements that should be visible in any content management system include:

**Content Capture**—Content ingestion tools that can handle the acquisition of any content type (text, image, audio, video, XML, code, HTML) and associated metadata (data describing the content). Ideally the ingestion mechanism should offer:

- A content-provider portal to allow third-party content providers to “push” content into the platform.
- Generic automated content-feed handling based on defined data and format specifications.
- Pre-built “content connectors” for major content providers—custom interfaces for providers such as music studios who have pre-built automated content-feed definitions.

**Metadata Management**—A fully configurable object model that enables content and metadata to be intuitively managed with no predefined limits to number of custom metadata fields or limits on metadata types, thus enabling content to be searched and retrieved based on any item of metadata defined in the model.

**Security and Controlled User Access**—The ability to segment the repository into secure and strictly controlled areas so that content managers can access only those areas they have been authorized to access.

**Content Workflow and Lifecycle Management**—Because large volumes of content have a tendency to change constantly, a workflow engine for design of templates through which incoming content can be processed including exception handling and reporting is required.

**Editorial Production and Review**—Integration with a palette of content editing and previewing tools such as Adobe Photoshop and Premiere, Macromedia Dreamweaver and Flash, XML authoring tools such as XMetal and Microsoft Office. Intelligent content handling will ensure any changes made to content items will result in content being re-approved and, based on rules, republished to the live content site.

**Search and Retrieval Engines** for internal users and end-user consumers. Techniques such as full-text indexing and thematic searching help optimize content access.

**Content Rendering** for managing multiple forms of the same content. While content providers may in some cases pre-render (or transform) content for multi-delivery options, often the service providers will need the ability to transform content themselves and (because of the multiple formats in use) may need to deploy multiple media transformation tools.
Content Protection after Publication - Digital Rights Management—A DRM engine should be available to the content processing platform in order to “seal” content prior to publishing into the live environment. Due to the volatile nature of current DRM standards and technology, care should be taken not to “hardcode” a DRM technology too quickly into the content management system but rather use a “plug-and-play” approach.

Content Usage Rights and Contracts Management—Ensuring the application of contractual rights to content as agreed to in business arrangements with content providers. Often content is provided against a defined set of “publication” rights such as fixed time periods, channel restrictions, or guidelines on “alterations.” Content metadata can link content objects to business processes which manage the contractual limits of the asset.

Content Publication to the Consumer Portal—The process of moving content through its lifecycle from approval stage into publication into the “live” content portal. In addition, the content management environment must take care that removal of content isn’t overlooked when contractual limits are reached or content is refreshed.

Content Distribution—The ability to physically move or copy content to other locations. The system must support the concept of “virtual” content repositories in a “hub-and-spoke” configuration to allow content to be seamlessly replicated into the delivery network in “satellite” repositories which are synchronized back to the master live site.

Interfacing into the Service Delivery Platform
The content management system has to be able to both determine the nature of the device requesting a particular content object and, on the fly, deliver the most optimized experience—both in terms of page structure and underlying content. It is thus essential that the content management system be integrated with network operations and business support systems for customer portal branding, service provisioning, billing, and CRM functions.

For the optimal presentation of content assets, the most essential integration is with the service delivery portal. In effect, the live content repository is embedded within the portal environment. Since any service is based on the portal design coupled with the underlying content, it’s paramount that the portal development and content management platforms are highly integrated.

Ingesting Multi-Channel Content
EMC’s multi-layered approach to content management offers customers a comprehensive platform to manage content throughout its lifecycle. The EMC Documentum product line is a portfolio of enterprise-class content and digital asset management applications that has been developed to manage multimedia content repositories capable of handling every content type that will be delivered by service providers. Whether it is broadcast quality video, Java games, or simple text items, EMC Documentum will manage the entire catalogue of content.

EMC Documentum is uniquely positioned to support the requirements of content delivery as defined earlier. It provides out-of-the-box functionality to enable:

- Content ingest (automated feed and content-provider portal).
- Extensible metadata modeling and management.
- Content transformations via a media services plug-in architecture.
- Secure content stores and access control.
- GUI-based workflow and lifecycle engine.
- Content publishing tools and integrated content caching.
- Editing and preview tool integration.
- Out-of-the-box portal integration with BEA WebLogic Portal and Application Server.
- Extensive set of APIs including J2EE and .Net.
Integrating Content Management into Content Storage and Distribution Environments

At a lower infrastructure level, storage network platforms and software provide state-of-the-art content distribution and file/data management capabilities to optimize the management of content objects including their retrieval and delivery across the operator’s network. A product such as EMC OnCourse™ provides one-to-many or many-to-one content aggregation and distribution. Coupling content repositories and BSS/OSS-related storage repositories to the service provider’s physical network access methods (fiber, copper, wireless) enables the IT suppliers to play a crucial role in the management and transfer of rich-media content files to consumers.

As content moves through its lifecycle, usage characteristics change dramatically. Keeping the entire content repository “online” on the highest performing storage arrays is inefficient and non-optimal. An information lifecycle management approach can help manage the replication and retrieval of millions of content objects as they age and change in value over time.

Figure 4. Storage Infrastructure Platforms and Software Play a Vital Role in Content Services Delivery

Hierarchical storage management software products such as EMC AVALONidm™, provide policies for content storage placement, replication, and synchronization of multiple file instances for improved access and availability to distributed content repositories within the network. EMC AVALONidm and OnCourse, plus EMC data replication and management tools, make an ideal underpinning for content management and delivery in the service provider’s environment.