Cisco on Cisco Best Practices Integrating Rich Media Communications with Learning and Content Management Systems

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Overview

This white paper provides an overview of how rich media communications such as live and on-demand streaming video and audio can be associated with and managed by Learning Management System (LMS) and Content Management System (CMS) applications. Based on Cisco Systems® deployment experience, the information presented will answer two commonly asked questions:

- What are some of the sample business scenarios and potential benefits that might be gained by integrating these applications?
- How can these applications be integrated and what are some of the potential integration issues?

Value of Integration

The integration of rich media communications with an LMS or CMS can solve several organizational management and reporting problems commonly associated with e-learning applications

Table 1-1 LMS and CMS feature comparison . Common Situation	LMS	CMS
Need to track content access and provide access history reports	X	
Need to organize content into structured curriculums	X	X
Need to easily find content		X
Need to easily share content among authoring groups		X
Need to provide a managed, content review process		X

Rich media, such as video and audio, when organized and managed through a CMS and LMS allow organizations to better inform and educate their employees, partners and customers. Rich Media provides the viewer with a more complete experience of actually being with the presenter. Additional text, graphics, interactive components and control elements synchronized with video and audio provide a total learning experience. The many advantages include saving time and expenses for employee and partner training and capturing the attention of e-commerce customers.

Content Searching and Data Mining

Until recently, rich media communications could not be organized and searched for in catalogs or curriculums. Using an integrated CMS and LMS, viewers can log-in and search for appropriate rich media materials. The files comprising any rich media presentation, such as audio, video and graphics files, are called “assets.” Each asset is tagged with metadata that describes its content. Not only can viewers search content, but content developers can also search or data mine in a similar fashion to assemble rich media assets into a packaged course or curriculum.

Challenges

Selecting the correct combination of LMS and CMS products for any organization can be challenging. If the organization is small, many vendors offer adequate functionality in easy to use products. A rapidly growing organization must consider the products’ ease of scalability to efficiently keep pace with growth. As complexity increases, application program interfaces (APIs), software development kits (SDKs) and open standards compliance such as sharable content object reference model (SCORM) and others, can help enable growth. Some large enterprises use highly customized applications that add functionality.

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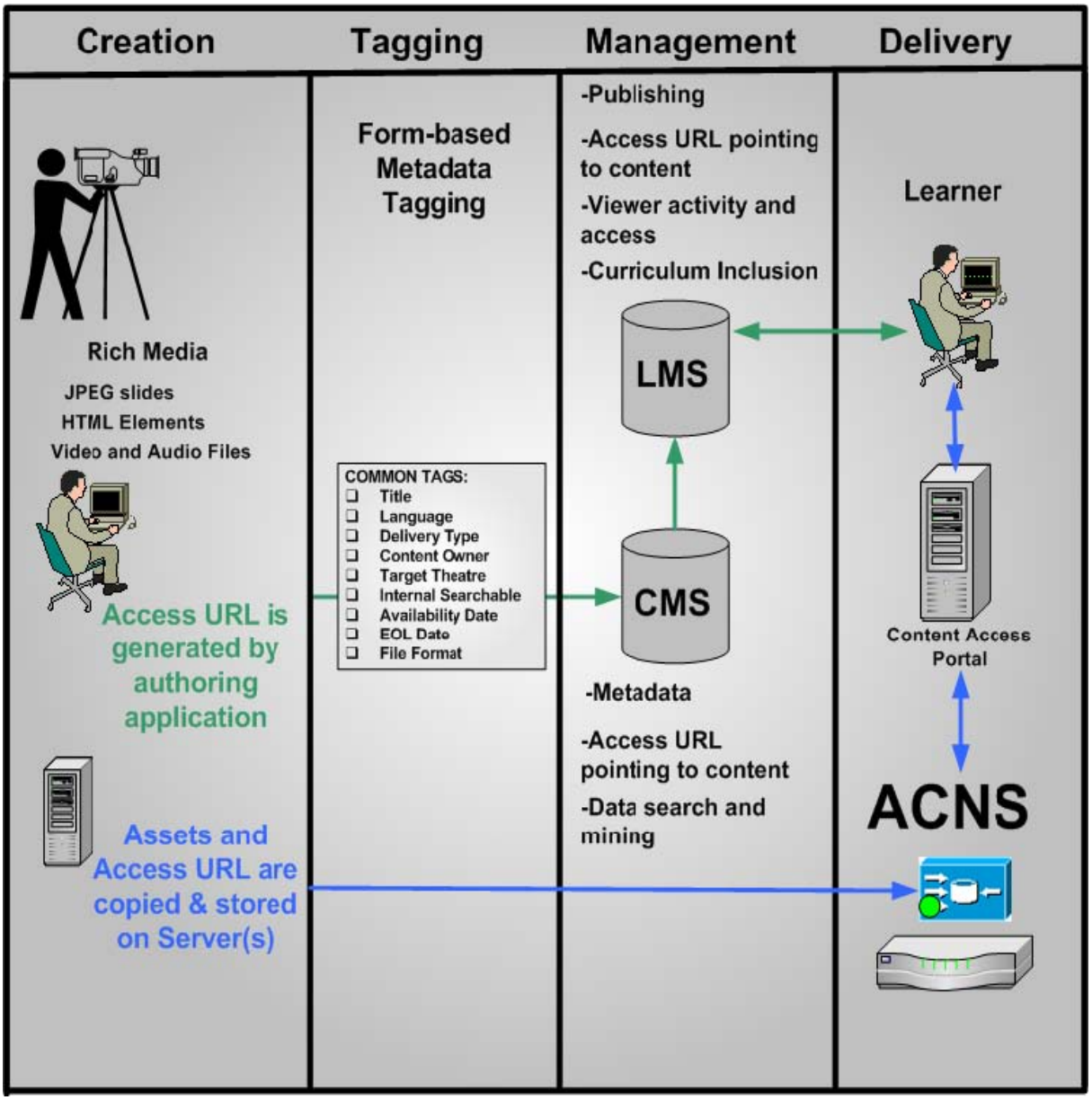
Rich Media Content Life Cycle

The rich media life cycle includes four steps (Figure 1-1):

- Creation
- Tagging
- Management
- Delivery



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Lifecycle Descriptions

Creation

The process begins with content authoring. Rich media content is created and assets are assigned (for example, graphics, video, audio and HTML Elements, etc.). Assets are initially stored on HTML-accessible servers. Content creators use authoring programs from common applications such as Microsoft Power Point to more sophisticated video production systems to produce learning assets. The assets are stored on the originating server and deployed to content engines for efficient delivery to the learner. After an asset is created, the authoring application generates an access URL to be referenced in the management and delivery portions of the overall system.

Tagging

At the center of a CMS application is the concept of metadata tagging. Metadata is literally “data about data.” In other words, metadata describes the content of specific assets. There are many types of metadata tags commonly available in CMS programs. Large enterprises may customize their metadata vocabulary to be more applicable to their unique environment. In practice, only 10 or so tags are commonly used for end-user searches and content mining purposes.

Metadata tags are assigned to rich media assets created in the authoring application via either a standalone form or an application provided by the CMS. A database record is created by a CMS system that commonly contains the following information fields:

. • Title — free text
. • Language — multiselect
. • Delivery Type — single-select
. • Content Owner — free text
. • Target Theatre — multiselect
. • Available Date — calendar select
. • EOL Date — calendar select
. • File Format — multiselect

Metadata provides a common naming structure to help enable learning content description. Once tagged with metadata, content can be systematically distributed, searched and retrieved. Through metadata tagging, content can be data mined by content creators for reuse and searched by viewers for access.

Through metadata tagging, content can be organized into searchable catalogs or curriculum listings. The actual rich media and learning content (assets), as is the case with all content, is located on the origination server. The LMS and CMS applications reference the asset URL, which contains the file location on its server. The delivery function then serves the asset(s) to the viewer.

Management

Management functions are divided between the LMS and the CMS.

Ingeneral, the following distinctions can be made:

- **CMS** — A CMS is used by content providers such as instructional designers, developers, editors, reviewers and release teams. The main functions a CMS may provide are tagging, content mining, storage, life-cycle management, workflow control, deployment and reporting. It uses the access URL generated in

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the authoring application to reference assets stored on servers. Enterprise caliber CMS applications such as Interwoven or Documentum, also provide extensive APIs to integrate with LMS and human resource (HR) systems, as well as XML and rich media authoring applications. When used primarily for learning content, a CMS is sometimes called a learning content management system (LCMS).

- **LMS**— An LMS manages learners. It has built-in database reporting that tracks user performance and progress through a variety of training activities or modules. Examples of LMS vendors are Saba, Docent, and Click2learn. LMS systems also create access for learners and publish the URLs of learning content. Lastly, LMS systems organize content into a catalog or curriculum.

The actual delivery of content to learners is done through an intelligent network like the Cisco® Application and Content Networking System (ACNS). Here content that is referenced in the LMS and CMS is pushed from its location on the origination server to the learner through the ACNS infrastructure, which includes one or more content engines.

Delivery

The Cisco ACNS provides content services, routing, distribution, delivery, switching, and delivery network management. It also addresses the need to distribute and receive high-bandwidth, rich media content across the Internet or intranet without performance loss or content delivery delays.

ACNS makes it possible for enterprises to use high-bandwidth content while avoiding strain on the network. It includes at least one content distribution manager (CDM), one or more content engines (CEs), and optionally one or more content routers (CRs). Together, these products help enable:

- A dramatic reduction of network congestion and WAN usage
- Centralized enterprise wide management and distribution of content
- Configuring and monitoring content services using the CDM graphical user interface (GUI), the Cisco Web-based application management tool.

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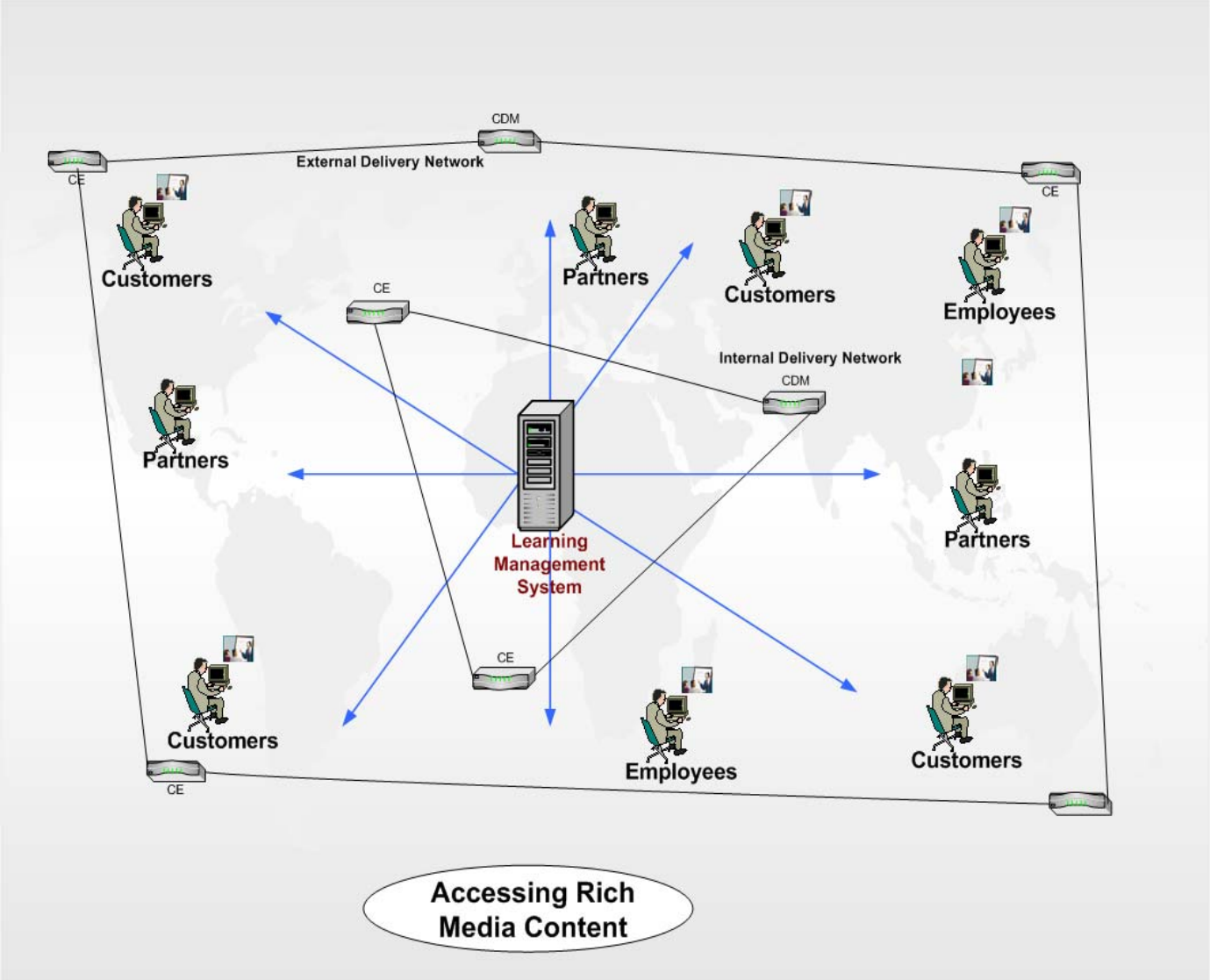
Sample Rich Media Access Architecture

Main components of rich media access architecture are the delivery networks accessed through LMS.



- Using a browser interface, the client simply accesses content via the LMS that supplies one access URL behind the user interface.
- Whether internal or external, the intelligent delivery network will transparently serve streaming content to the client in the most efficient manner with the highest quality of service (QoS) available to the clients locale and network connectivity

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Conclusion

To achieve coherent life cycle management of rich media content LMS and CMS must be integrated, or obtained as components of a single unified product. The later may accommodate small organizations, but large enterprises tend to find they outgrow these point solutions rapidly.

Metadata, descriptive information of content assets, is a key component in smoothly integrating applications. The highest value metadata is obtained from the content provider, thus the production system must be integrated to facilitate effective metadata inclusion. Metadata information is used in content mining, life cycle management and to autocreate offerings in LMS catalogs.

Authoring and CMS applications provide rich media content and all other learning assets to the intelligent content delivery network, which transparently serves the client with the best quality of service.

While there may be challenges associated with integrating applications, the end result is a scalable enterprise wide solution that provides the highest business benefits of learning and communications.

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Useful Terms

Term	Definition
Rich Media	Files such as streaming video and audio
Asset	Electronic representations of media and/or learning content that can be delivered to a Web client
CMS/LCMS	A CMS is used by content providers such as instructional designers, developers, editors, reviewers, and release teams. The main functions a CMS may provide are tagging, content mining, storage, life-cycle management, workflow control, deployment and reporting. It uses the access URL generated in the authoring application to reference assets stored on servers. Enterprise caliber CMS applications, such as Interwoven or Documentum, also provide extensive APIs to integrate with LMS and HR systems, as well as XML and rich media authoring applications. When used primarily for learning content, a CMS is sometimes called a learning content management system (LCMS).
Delivery Network	An intelligent content network that provides content services, routing, distribution, delivery, switching, and delivery network management. It also addresses the need to distribute and receive high-bandwidth, rich media content across the Internet or intranet without performance loss or content delivery delays. Transparent to the user, rich content is automatically streamed from the content engine that will provide the best quality of service (QoS) to their location.
LMS	An LMS manages learners via built-in database reporting that tracks user performance and progress through a variety of training activities or modules. LMS systems also create access for learners and publish the URLs of learning content. Lastly, LMS systems organize content into a catalog or curriculum.
Metadata	Literally: data about data. Metadata describe the content pieces (assets and learning objects) as well as provide search features on said assets and objects.
Shared Content Object (SCO)	A collection of assets making up a whole piece of defined instructional material.
Shareable Content Object Reference Model (SCORM)	A recognized e-learning standard for learning content reusability, accessibility, and interoperability.

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