

Monetizing Media Through Digital Rights Management

Whitepaper



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Executive Summary

The Internet has increased the number of options to deliver and consume digital media assets for both content owners and consumers. We are in an age where more and more content is being converted into, or stored in digital format. Today, consumers have increased flexibility in selecting from a variety of content service providers, a multitude of devices, and a variety of 'purchase and download' payment options and subscription models. For example, if a consumer prefers to pay for only one song instead of the entire album, content providers need to offer flexibility to consumers while implementing the appropriate payment and billing methods. Also, content owners and delivery channels need to gather more insight about their consumers to create more efficient marketing strategies leveraging delivery data and Web analytics technologies. With the usage of digital media over the Internet becoming increasingly popular, the need to develop efficient mechanisms for its management and distribution is becoming critical to ensuring a successful online business.

Sales processes for digital media content are also changing. For example, if a content owner wants to grow sales of online movies to consumers, they have increased options enabled by technology to monetize their assets. They can enable a consumer to download a movie and watch it once for \$2, or as many times as possible in two days for \$4, or provide unlimited access for \$10. Making the processes and underlying technology transparent to the consumer is critical to ensuring a successful business model. This means that an integrated and easy to use digital delivery and protection system needs to be in place for content owners. In response to this need, Digital Rights Management (DRM) has emerged as a major approach to ensure flexibility and enforcement of digital licenses. DRM secures digital media and defines the rights to determine its usage. The licenses served to consumers enable the digital media playback while upholding the associated rights. Making sense of the variety of DRM options out there and choosing the right approach is a critical business challenge for content owners today.

This document outlines various DRM options for controlling and monetizing digital media assets to help content owners generate maximum revenue from their content. The document will cover the topics of proprietary hardware based solutions, software based solutions and service-based solutions such as Akamai's License Delivery service. Akamai's License Delivery service provides security for digital audio and video content for smooth, scalable distribution of digital media over the Internet using various delivery methods.

Possible Solutions for Monetizing Media

There are three key alternatives for content owners to control content for eventual monetization:

Hardware-based solutions:

- Proprietary content format with vendor hardware
- Vendor hardware player with content distributed only on vendor specified discs or other storage

Software Application-based solution:

- Digital Rights Management (DRM)

Service-based solutions:

- Akamai Access Control
- Akamai Secure Streaming
- Akamai License Delivery for Windows Media® DRM

Hardware-Based Solutions

Proprietary Content Format with Vendor Hardware

One method of preventing consumers from using content illegally is to ensure that the content is encrypted. This normally implies that the content creator stores the content in an unpublished proprietary format and the consumer must purchase a special content reader/player from the content creator. To prohibit consumers from simply purchasing the player (hardware) and exchanging digitized content without paying for it, the vendor can mandate that the device serial number be provided and embedded in some hidden fashion within the content.

Disadvantages to this approach are its lack of flexibility, as well as that the consumer must pay potentially high hardware costs up front, creating additional barriers to adoption.

Vendor Hardware Player with Content Distributed Only on Vendor Specified Discs

In this scenario, the vendor supplies the player, and the digital file (games, audio, or video) is distributed on a proprietary disc. This is similar to the above solution except that the content format may not be proprietary, although the distribution may be.

Software Application-Based Solutions

Another approach to monetizing digital assets involves using a software solution which leverages a DRM application server and a DRM-enabled software player.

DRM is defined as a system for protecting the copyrights of data circulated via the Internet or other digital media by enabling secure distribution and/or disabling illegal distribution of the data. DRM works upon the concept of 'rights' associated with the digital content. DRM involves defining, associating, trading, and monitoring rights of digital files. Typically, a DRM Software application protects intellectual property by either encrypting the data or marking the content with a digital watermark or similar methods. This prevents content from being distributed freely and allows only authorized users to have access.

An end-to-end system based on DRM technology consists of 3 parts:

1. Encryption
2. Business-logic
3. License-delivery

DRM starts with the encryption of the content. Once the content is encrypted, a key is required to unlock the content. The encrypted content can be delivered either through streaming or HTTP download. An end-user who wants to play the content, typically, first needs to visit an e-commerce website and transact with the business-logic process at the website, usually involving one of registration, login, and/or payment. Once this is done, the end-user is issued a license to play the content. The issued license contains:

- (i.) The key for decrypting the file/stream
- (ii.) A set of rights (e.g. play only, play and record, single play, play for 30 days, etc.) custom-created for the particular end-user.

The issued license has the property that it is valid only on the end-user machine to which it is issued. When an end-user attempts to play the DRM protected content, the player first checks the license cache on the machine. If a license is not found, the player attempts to get a license from the storefront URL that is embedded in the content. Once the license is obtained, the player starts playback by decrypting the content. DRM works for both on-demand and live streaming content.

At a high level, the DRM system consists of a player which:

1. Will deduce that the digital media (video or audio) is DRM-enabled
2. If so, will check for the rights associated with the media, and the end-user credentials
3. If these match, will give access to the end-user

The DRM system manages the metadata and digital files of the content with the following basic components:

- Terms and conditions associated with the digital media for its use
- Usage license agreement for consumers to download digital media
- Interfaces for content management and e-commerce billing systems
- Built-in processes to ensure that the digital media is used for only terms and conditions for which the consumer has received it

Some of the popular DRM systems are:

Microsoft Windows Media® DRM

Based upon Windows Media Rights Manager, Microsoft provides a DRM platform to securely deliver content over the Internet in a protected, encrypted file format. Windows Media files can be played on a computer, portable device, or network device using Windows Media Player. Windows Media DRM Software Development Kit (SDK) allows vendors like Akamai to develop a content monetization application.

Real Networks® DRM

Based upon the Helix DRM platform, Real Networks offers Helix DNA, the source code for media creation, delivery and playback, enabling content owners to build media-capable products, intellectual property, and user interfaces. Helix DRM includes a set of products and services enabling business models to support distribution of movies, music and other digital content to millions of media player users. Helix DRM provides secure media packaging, license generation and high-quality content delivery to a trusted media player base across all major platforms to multiple devices. It extends the RealPlayer and Helix Platform open architecture to accommodate the incorporation of a wide range of rights management systems.

Apple DRM

Using FairPlay® DRM, Apple protects digital audio content copyrights. It authorizes a computer or iPod device to play songs that the consumer has purchased. This technology is not available for use by other vendors or solution providers and is used by Apple for distributing iTunes songs.

Options for Businesses to Leverage DRM

Build a proprietary solution, implement and support it

Advantages:

- Provides most flexibility in terms of capabilities

Disadvantages:

- Need to develop technology
- Need to support technology with software upgrades for new functionality and bug fixes
- Need to follow involved process to license technology
- Need resources to deploy and configure technology
- Need resources to support the deployment environment

- Need resources to upgrade and test environment

Obtain 3rd party technology, implement and support it

Advantages:

- No need to develop technology
- No need to support technology

Disadvantages:

- Need to follow involved process to license technology
- Need resources to deploy and configure technology
- Need resources to support the deployment environment
- Need resources to upgrade and test environment

Use a 3rd party service provider solution

Advantages:

- No need to develop technology
- No need to support technology
- No need to follow involved process to license technology
- No need for resources to deploy and configure technology
- No need for resources to support the deployment environment
- No need for resources to upgrade and test environment

Disadvantages:


- Potential functional limitations based on what is supported by service provider
- Potential integration issues if delivery mechanism and DRM technology are through separate providers

Service-Based Solutions

The third approach to managing and monetizing digital content is service based. Third party service providers take the DRM models mentioned in the previous sections and build outsourced services for the content owners. For example, Akamai provides content security and monetization solutions for its customers by offering outsourced services. Companies can be assured of enhanced security for their websites, content and online revenue streams. At the same time, leveraging Akamai reduces the need to invest in security infrastructure and specialized security personnel. Below is an overview of the Akamai service offerings around securing digital media for distribution.

Akamai Access Control Service

Akamai Access Control provides support for high quality, scalable, and secure delivery of digital goods such as virus file updates, software upgrades, games, video, and music files. Secure download helps ensure that only authenticated and authorized users can gain online access to secure content. This service helps content



providers protect valuable content against theft and copyright violations in order to reduce bandwidth costs and increase online revenues.

Akamai Secure Streaming Service

Akamai Secure Streaming provides support for high quality, scalable, and secure delivery of Windows Media®, Real Media®, Apple QuickTime®, and Macromedia Flash® streams to users worldwide, for both live and on-demand. Secure Streaming provides security for streaming media content against theft and copyright violations.

Akamai License Delivery for Windows Media DRM

Akamai has extended Windows Media Digital Rights Manager to develop an outsourced service, Akamai License Delivery, to bring DRM and content distribution into a single, integrated environment. There are no requirements for DRM license delivery servers to implement this service, -- which means lower capex and operating costs for securing and distributing digital media over the Internet.

Akamai License Delivery for Windows Media DRM – An Overview

Akamai provides an outsourced License Delivery service for DRM. It is a core component of Akamai Media Delivery solution that liberates companies from infrastructure costs, provides security for digital media, and allows for revenue generation from digital distribution.

Akamai integrated Microsoft's Windows Media DRM system with its industry leading global distribution platform to provide additional value added DRM services. The combined solution offers the ability to secure and distribute digital media across a single platform. To distribute content over the Internet, Akamai uses a patented, real-time routing intelligence system. This highly-distributed, robust system uses a worldwide set of probes and global traffic managers to make real-time decisions about intelligently routing users' content requests to the best location and best server.

The Akamai License Delivery service is built on the Windows Media DRM standard from Microsoft. It uses the Microsoft Windows Media DRM SDK to protect and securely deliver content for playback on a consumer's device. Because it's based on the Microsoft standard, the Akamai License Delivery Service offers built in flexibility to support a range of business models from single downloads to subscription to physical media delivery. This type of flexibility provides consumers with even greater access to protected audio and video content enabling new business scenarios for content providers to monetize digital assets.

How it Works

Windows Media® Rights Manager packages Windows Media® audio and video files along with additional file-related information from the content provider. It is in encrypted form and requires a key to unlock it. Only an authorized consumer who has obtained a license can unlock and play this packaged file.

The DRM-enabled content, along with Akamai's services for streaming and download provides a comprehensive solution for content owners. The complete Akamai DRM solution allows them to convert their content to cash without losing any possible revenue streams due to illegal copying and other pilferage.

The following diagram describes the Akamai DRM process flow:

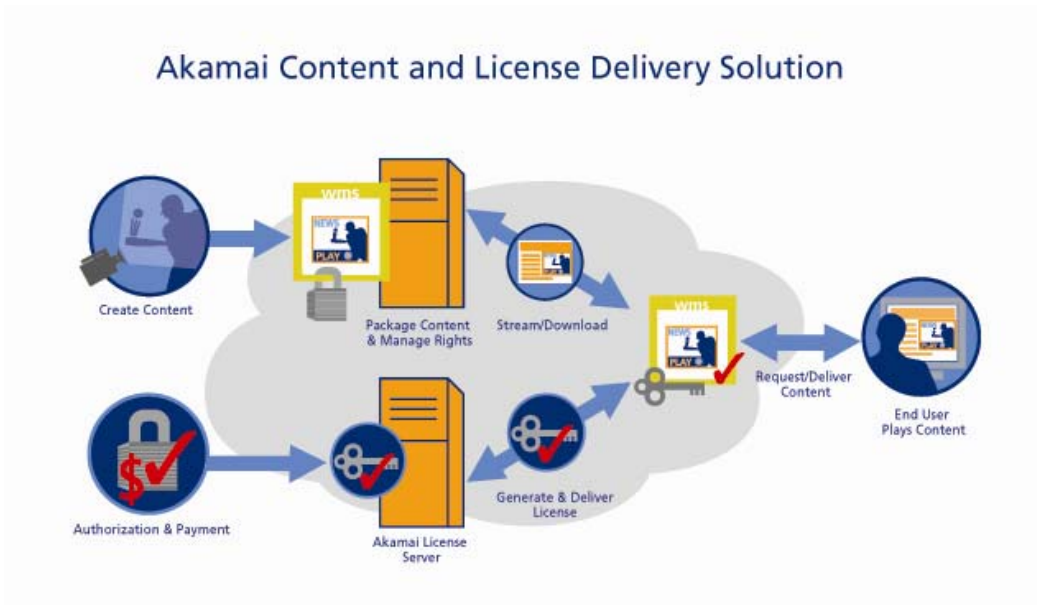


Figure 1: Akamai License Delivery Overview

Components of Akamai License Delivery

The following are the main entities in Akamai License Delivery:

Content owner: Creates and owns the Windows Media® files and assigns rights to the digital media.

Content packager tool: Encrypts the digital media using Windows Media Rights Manager and packages the digital media with associated metadata.

Rights Manager User Interface: Allows the content owner to define the rights for their Windows Media files as per the needs of their specific business model.

License server: To play a packaged media file, which is in encrypted form, the consumer requires a key to unlock the file and decrypt the content. For this purpose, content owners can use Akamai's license delivery servers that create the license to decrypt the protected digital media. The license is provided once the Web server verifies the consumer's request for accessing the same.

Content distribution: Consumers receive the content through streaming or downloads.

Consumer: Authorized end-users receive the licenses and can play the digital media.

Using the DRM Content Packager

Windows Media files are packaged for secure digital distribution using a 'content packager' application which runs as a client-side application. The application can be easily accessed through a user interface, or as a command-line tool to be integrated and automated in existing environments.

Rights Manager User Interface

Content owners can define the rights that effectively implement the business model they have determined – pay-per-view, fixed number of views, subscription, and free use based on registration. The Rights Manager User Interface within EdgeControl™ Management Portal gives the content owners complete power and flexibility to manage the rights associated with their content.

Providing the License Servers

Akamai provides a set of globally-deployed license servers, which act as clearing centers for generating end-user (consumer) keys. After the content owner authenticates the end-user, it makes a request to Akamai License Server for the license, which is then sent to the end-user. The end-user machine uses the license to extract the key which is then used to decrypt the content. Depending on the business model and consumer experience desired, Akamai License server can issue licenses using the following methods:

Post-Delivery (On-Demand Delivery): In the case of On-Demand Delivery, or download, the license is delivered only when the file is played. When the end-user selects to play the file, the request goes to an

Akamai server and is then delivered to an authorized consumer. This method requires that when the end-user selects to play the digital media, the system should be connected to the Internet for the Akamai License server to deliver the license. See Figure 2 for more details.

How Akamai License Delivery Works (Post-Delivery)

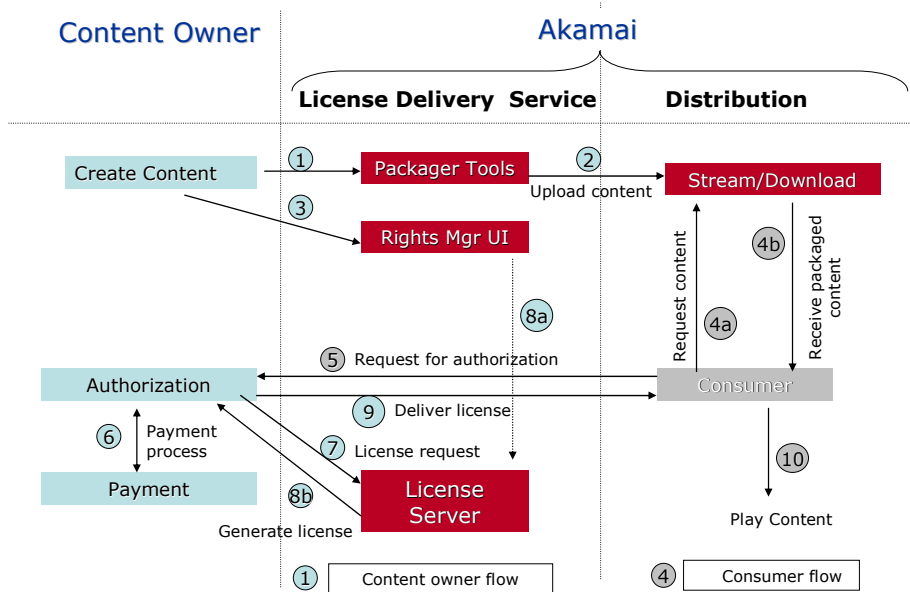


Figure 2: Akamai License Delivery Process Flow (Post-Delivery)

The Post-Delivery steps are:

1. Content owners create the Windows Media® audio or video file or streams. Using the Akamai's Packager Tools, they package the content.
2. The packaged content is uploaded to the Akamai global network for streaming or downloads.
3. They define the rights as per their business model.
4.
 - a. Consumer requests the content over the Web.
 - b. Protected content is streamed or downloaded.
5. When the Windows Media Player tries to play the content, it recognizes that the content is packaged. It goes the License Acquisition URL (typically on content owners' Web server) that the content points to and requests the authorization.
6. The Web server authenticates the consumer and if required, processes the payment.

7. Once authentication (and payment processing) is complete, the Web server requests the license from Akamai's license server using a secure request mechanism.
8.
 - a. The license server has access to metadata description about the rights created earlier.
 - b. The license server generates the license and sends it back to the Web server.
9. The Web server then delivers the license to the consumer's machine.
10. The Windows Media® Player uses the license to decrypt the content and plays it as per the associated rights.

Pre-Delivery: For live streaming scenarios, Pre-Delivery is available where the license is delivered as soon as the end-user subscribes for the content. The end-user is now authorized to play the file at their leisure, without further processing. See Figure 3 for more details. The key difference from Post-Delivery lies in steps 9a and 9b indicating that content is streamed or downloaded *after* the license has been served.

How Akamai License Delivery Works (Pre-Delivery)

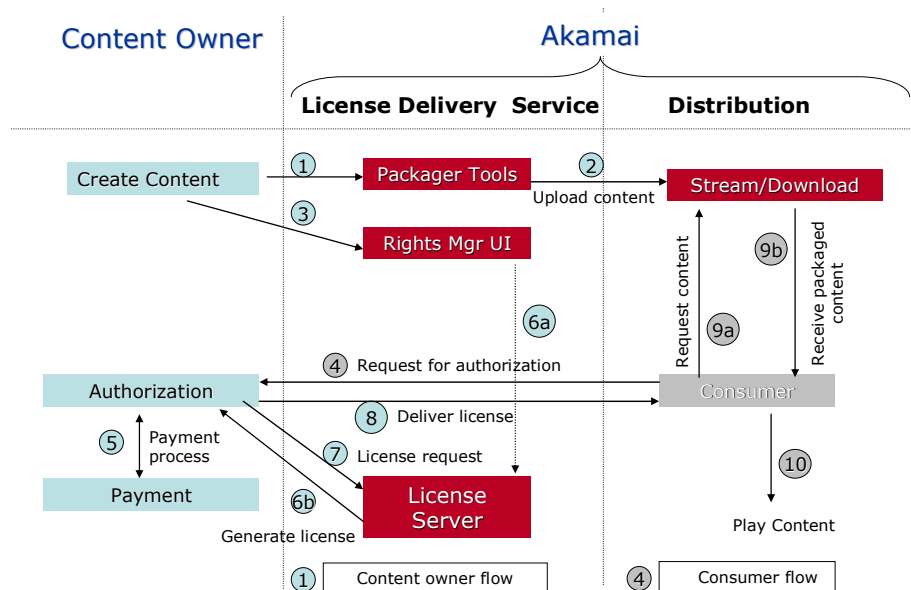


Figure 3: Akamai License Delivery Process Flow (Pre-Delivery)

Note: Refer to the [Customer Scenarios](#) section for more details about license delivery.

Distribution of Digital Media

Akamai offers the following options for distributing packaged digital media:

Live Streaming: For live events, a captured signal can be encoded into the Windows Media® format and encrypted with Windows Media DRM through the Windows Media Encoder in a single step and then delivered over the Akamai network. Based upon the location of the end-user request, the optimally available server responds and delivers the live stream content if the authenticity of the end-user is verified. Both pre- and post-delivery methods are supported. However, license pre-delivery is particularly well-suited for live streaming so that the viewers are not required to wait for payment processing at the time of the event.

On-Demand Streaming: The packaged files can be made available for on-demand viewing. Both pre- and post-delivery methods are suitable for business models based on on-demand streaming. In pre-delivery, the user will be authenticated first, then delivered the license, and finally be mapped to the optimal Akamai server for on-demand streaming. In post-delivery, when the users attempt to stream the file, they are directed to registration and/or payment processing, and can then view the stream. Streaming is a popular viewing method because after the authentication and license delivery process, the content can be viewed instantly without any waiting period.

Download: If a business model is based on downloads instead of streaming, the packaged files can be distributed using Akamai's Download service. Users will need to download the files to their computers before they can be played. In the pre-delivery method, the license is served along with the packaged file and no Internet connection is required to view the file. This option is particularly useful in bandwidth-constrained markets.

In addition to these digital distribution methods, content can also be distributed using CDs and other physical media. In this case, packaged files are saved on the physical media and distributed in a conventional manner. When users attempt to play a file, they are taken to the content owner's Web site for further processing, which may include registration, authentication, or payment.

Payment Model for the Digital Media

Unlike physical media, distributing digital media over the Internet provides flexibility to both content owners and consumers for accessing and playing content. Content owners can select from different payment methods as per their business model. They also manage the authentication and payment processing. Some of the more popular payment models include:

Pay-per-view: Allows a consumer to be charged each time a file is played.

Subscription: Allows a subscription-based consumer to play a file during the period of subscription, without any interference from the DRM system.

Registration-based: Allows a consumer to register for content, typically for an unspecified period, in exchange for providing contact information and other details. This model typically is free.

Benefits of the Akamai License Delivery

Akamai's services allow companies to cost-effectively achieve a level of scale, quality, security, reliability, and delivery efficiency which is difficult to do on their own. Content providers can concentrate on their core business instead of building and managing costly IT infrastructure. In addition to benefits derived from Windows Media® DRM, the Akamai License Delivery service comes with various salient features that offer content owners even more value.

Security

Built upon Windows Media DRM this service uses a wide range of cryptographic and anti-piracy techniques to protect digital media. Windows Media Rights Manager, the technology that packages files and issues licenses, encrypts a given media file with a full-strength encryption algorithm. This algorithm is based on published ciphers that have withstood the scrutiny of the cryptographic community. No decryption key is contained in the Windows Media format file container. Decrypting an isolated Windows Media file would require breaking strong cryptographic algorithms. Akamai Professional Services can assist with implementation in an environment to ensure that the final solution has the right level of security from end-to-end.

Comprehensive Solution

Akamai provides not only license delivery, but a comprehensive delivery solution that includes packaging tools, rights management, content delivery via streaming or download, reporting, and the ability to integrate with content owner's existing authentication and payment processing systems.

Auditing

Akamai License Delivery service tracks and records every request made to the system. This is used for billing, reconciliation, and auditing for misuse. Requests are recorded in extended W3C logging format and can be downloaded for further analysis.

Content Targeting

Akamai License Delivery service provides flexibility to distribute digital media based upon the consumer's location. This allows for complete viewership control based upon a company's requirements. Access restrictions can be set based on location, end-user IP, time of day, and other factors. This makes the Web site a more effective selling tool whether customers are seeking to improve their marketing and sales efforts or comply with regulatory requirements.

Rights Management

Windows Media® DRM provides a rich set of content rights. These rights can be changed and re-associated with the media anytime. The system does not need to be reset for these updates to occur.

Scalability

Akamai has a massively scalable network that can handle content and license delivery for DRM-enabled media. The Windows Media DRM is also highly scalable as it has been implemented using COM-based objects.

Web-Based Interface

Akamai provides a Web-based interface which is not only intuitive, but also includes templates enabling users to easily add new rules. This interface is integrated with Akamai's Web-based management portal, EdgeControl™, which manages all of Akamai's services. EdgeControl provides network service monitoring, site monitoring, usage reporting, and content management. Real-time and historical information is available about client location, performance, usage, packet loss, cache hit rates, site availability, and many other service dimensions. Proactive alerts are also provided in order to help proactively handle potential Web site issues.

Reduced Infrastructure

Akamai Media Delivery reduces the infrastructure burden for content owners and allows them to focus on content creation. The service requires the customer to have digital content, an Internet connection with a Web browser, and just one machine to run the packaging tools. This means that the customer is not required to purchase software, hardware, or software licenses for content and license delivery. This drastically reduces the capex and operating costs.

Customer Scenarios

Scenario 1: Movie Downloads

Customer Profile

Online Movie Retailer

Customer Requirement

- Consumers can download and play movies from the online movie retailer's Web site.
- Payment is pay-per-view based.
- If files are transferred to another machine or user, the file remains protected and the pay-per-view model is still preserved.

Akamai Solution

The Akamai License Delivery service integrated with the Download delivery provides the solution. The content owner (the online movie retailer) subscribes to Akamai services, applies appropriate rights for the movies, and enables the digital media DRM before it is distributed. Akamai License Delivery service works with the Web site to charge the consumer each time a movie is downloaded.

Benefits and Return on Investment (ROI)

- Akamai License Delivery service, along with the Download service, provides the necessary customer infrastructure to allow customers to distribute the DRM-enabled Windows Media® content reducing up front investment costs and speeding time to market.
- EdgeControl™ portal provides detailed reports, access to logs and management tools for easy access to business intelligence.
- Pay-per-view payment model provides flexibility for consumers and offers additional ways to monetize content.

Scenario 2: Streaming Music

Customer Profile:

Online Music Provider

Customer Requirement

- Consumers can select songs from the online music provider's Web site, which are then streamed to them. This means that the songs are played instantly without the need to wait for downloads from the Web site.
- Payment is subscription-based. A consumer subscribes for a specified time period by paying a specified charge and is allowed to play and listen to any song during that period.
- Download option is not provided.

Akamai Solution

The Akamai License Delivery service integrated with Akamai Streaming allows the customer to apply appropriate rights to each song before they are distributed.

Benefits and Return on Investment (ROI)

- Akamai License Delivery service along with the Streaming service allows customers to stream the DRM-enabled Windows Media® content. No license delivery server infrastructure is required from the customer's side reducing up front investment costs and speeding time to market.
- Subscription-based payment model provides flexibility for consumers and offers additional ways to monetize content.
- EdgeControl™ portal provides detailed reports, access to logs and management tools for easy access to business intelligence.

Scenario 3: Subscription

Customer Profile

Music Streaming Web site

The business allows subscribed consumers to listen to music of their choice, any number of times, and within subscription period. The consumer can either download the music onto their PC, or play it from the Web site. The Web site also allows premium consumers to copy music onto a CD. For unsubscribed or new consumers, the Web site promotes the music by allowing consumers to listen to short music clips.

Customer Requirement

- Unsubscribed consumers are allowed to play music for a short period of time.
- Subscribed consumers are able to play music from the Web site or download songs onto their PCs. They are not permitted to copy music onto a CD.
- Premium consumers are allowed to copy music onto a CD.

Akamai Solution

The Web site requires the Akamai License Delivery service to be integrated with both Akamai Streaming and Akamai Media Download.

Benefits and Return on Investment (ROI)

- Akamai License Delivery service, along with the Streaming and Download services, lets content owners provide various purchasing options to the consumer resulting in a more efficient method of generating revenue from the online content.
- Minimal infrastructure requirements improve profitability and reduce time to market.
- EdgeControl™ portal provides detailed reports, access to logs and management tools for easy access to business intelligence.

Scenario 4: E-learning

Customer Profile

Management Institution

The organization conducts both classroom and online courses for students. All courses are available online. Regular classroom students can access courses without paying for any charges. However, students who have subscribed for online courses only are required to pay for each course before accessing it.

Customer Requirement

- Download is required to access content.
- Whenever students try to access online courses, they are required to provide personal information to identify themselves.
- Regular classroom students are allowed to download a course without further processing.
- Online students are required to pay once for an online course before downloading it. Once they have paid for a course, there is no restriction on how frequently they download a course.



Akamai Solution

The Akamai License Delivery service integrated with Akamai Media Download offers a comprehensive solution. There is no monetization of content required for regular classroom students. However content security remains a requirement to prevent access from unauthorized individuals. The license delivery requires basic information from the students. For online students, the payment method is subscription based and the license is pre-delivered requiring that it is delivered before the content is downloaded. Once the license is delivered, there is no restriction upon the usage of the content.

Benefits and Return on Investment (ROI)

- Service based offering provides license and content delivery infrastructure reducing costs and enabling educational institutions to distribute courses online.
- EdgeControl™ portal provides detailed reports, access to logs and management tools for easy access to business intelligence.
- Subscription-based payment model offers flexible and easy solution for online courseware distribution

About Akamai

Akamai® is the leading global service provider for accelerating content and business processes online. More than 1,200 organizations have formed trusted relationships with Akamai, improving their revenue and reducing costs by maximizing the performance of their online businesses. Leveraging the Akamai EdgePlatform, these organizations gain business advantage today, and have the foundation for the emerging Web solutions of tomorrow. Akamai is "The Trusted Choice for Online Business." For more information, visit www.akamai.com.



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