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White Paper

StudioCentral™ Library Release 2.2

For IRIX®

Software Products Group

StudioCentral Library Release 2.2 for IRIX is a comprehensive application for managing digital assets—a powerful out-of-the-box digital asset management system combined with a robust development environment. Our revolutionary approach to digital asset management provides software that's easy to install and ready to use on Silicon Graphics® visual workstations and SGI™ Origin™ servers with all the building blocks for a solid asset management infrastructure.

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Digital Assets

What Are They?

Digital assets are a combination of the content of a file and information about the content that include video clips, movie frames, sound files, animations, presentation storyboards, engineering designs—whatever creative professionals can make, store, access, and distribute using a variety of hardware and software. Typically digital assets involve large volumes of complex data in a variety of formats:

- Multimedia projects that, by definition, span technologies, often combining one or more of the following: movie making, video and audio special effects, animation, photography, TV production, broadcasting, and CD-ROM entertainment.

- Digital authoring, rendering, processing, and of files from post-production studios, broadcast production editors, advertising agencies, industrial design houses, and other multimedia industries as they convert from analog to digital. Tools used are often proprietary or use idiosyncratic hardware and software, which has caused an explosion of new and incompatible data formats.

- Streaming media, MPEG frames, JPEG stills, or AIFF-C sound files, which can be very large compared to traditional DBMS data items.

What Can You Do with Them?

Store

Digital assets can be valuable to organizations in many subsequent situations. Storing them for later reuse or even for resale can be worth any associated expense. However, in order to make them more valuable as an asset, it's important that potential users or buyers be able to find and view the assets quickly and easily.

Find

To make the most of digital assets, users must be able to search for and find files in much the same way they use an Internet browser. They should be able to search by a variety of methods and categories. For this reason, the asset descriptions, or metadata, associated with digital files become extremely important.

Share

Managed correctly, digital assets can be shared both internally and externally. They may be shared with another group within an organization, on- or off-site, for reuse, or they might be viewed and sent to a potential buyer to earn sales or licensing fees. In order to maximize the potential value of an asset, it should be available online, viewable and usable by multiple users or groups, and secure.

Play

In order to use, reuse, or sell most digital assets, people have to be able to see and hear them. They should be able to play the assets in real time, stream from a server, and play assets for review without the need for expensive content creation tools. For maximum convenience, they should also be able to locate and open files from the application they're already using.

Digital Asset Management

What Is It?

A digital asset management system is an open framework or platform that supports the acquisition, creation, manipulation, storage, archival, retrieval, transmission, and display of digital assets. By its very nature, a digital asset management system must support all types of digital assets, including images, movies, audio, and text.

A digital asset management system must accommodate different formats such as GIF, JPEG, MPEG, and QuickTime™, as well as different resolutions-high-resolution, video resolution, thumbnails, and previews. The platform should include facilities to integrate with conversion tools for transcoding formats and creating assets with multiple resolutions. And it must also be capable of logically grouping together all format/resolutions of the same asset.

It's helpful to think of digital asset management as a software infrastructure or a "software bus." The ideal digital asset management system provides an end-to-end solution not just for asset management applications that archive, browse, and query digital assets, but also for content creation applications that generate digital content and asset distribution applications that deliver and display multimedia.

Who Uses It?

Digital asset management can be used by many types of organizations. Some of the earliest industry adopters include entertainment, prepress and publishing, government, and education for use in:

- Film/video/post-production
- Defense imaging
- Broadcast archives
- Intelligence gathering
- News production
- Digital libraries
- Rights management
- Web development
- Media archives
- Learning on demand
- Workflow systems
- Digital libraries
- Media commerce
- Game development
- Corporate training

What Do They Use It for?

Content Creation

In the content creation world, a digital asset management system provides a common framework for representing content. The motivation for a common framework stems from the fact that most digital media applications cannot exchange information—i.e., content created by one application cannot be easily used by another.

Interchange formats such as Open Media Framework, or OMF, can facilitate the interoperability of digital content, but users still aren't able to find, query, and use content created in one application while they're in another.

Using a software-bus architecture with a plug-in approach to application integration provides a level of connectivity that cannot be reached when each application stores its contents into filesystems using proprietary formats. And by using an open framework in which metadata is separated from the actual content, and where content descriptions are encapsulated in a standard format, users can achieve a desirable level of interoperability.

Asset Distribution

By providing support for a variety of private and public networks, an asset management system can also serve as a "hub" for multimedia distribution or transfer of the content and metadata describing the content. Multimedia data is especially valuable. The files are not only expensive and difficult to create, some are irreplaceable (live action movie scenes, speeches, time-critical news clips, musical recordings, pay-per-view videos), while the theft of others (e.g., rendering algorithms, modeling engines, broadcast scrambling keys) might reduce competitive advantage. Because of this, mediating access to assets, or access control, is another important aspect of digital asset management. The level of access control provided by database systems

("table-level" access control) falls short because, when such tables are used to store different assets, access must be on a need-to-know basis only.

Effective asset management requires "object-level" access—that is, the ability to define which users or groups have access levels to individual objects. Operational access is also needed to determine which user or group has rights to perform certain operations in a repository. It's also important for asset management to incorporate a common set of methods that support asset and operation-level access control across dissimilar database and filesystems.

Workflow Sharing
Sharing multimedia source material requires a highly integrated data management architecture-one that supports a very large number of objects of various formats, as well as multiple versions of assets to allow concurrent access to the same data. Meeting this requirement poses a problem for many multimedia authoring tools. These tools typically use filesystems to store data. A filesystem provides acceptable storage for a small number of data items, but not for a larger number or for shared data items.

An effective asset management system should provide a set of common, network-accessible repositories for storing objects and should enable a high degree of sharing. A repository broker can support cross-repository access queries, browsing, retrieval, and working with multiple repositories in general. It's also important to provide a versioning system that supports linear versioning as well as branching.

Rights Management
To get the most from digital assets, it's important to be able to record and track the cost of acquisition or creation, any associated rights, and any income derived or expected from the asset. With efficiently configured and managed metadata, this type of information can be linked directly to the digital asset for maximum convenience and efficiency.

Administration
In any system designed for use by multiple people or groups at multiple sites, administration inevitably becomes an issue. Administrators need tools that ensure a secure and reliable installation. System administrators or archivists must also be able to manage users, groups, assets, and asset repositories, as well as check system status and logs from any desktop on the network.

Why Is It Better Than a Plain Database?

Size, incompatible formats, complexity, and multiple formats are some of the reasons that digital assets are more difficult to manage than less dimensional data items. Conventional DBMS solutions, including relational and object-oriented DBMSs, can't provide an environment that allows applications to be interpreted effectively for asset acquisition, asset management, content creation, and asset distribution.

The asset management system adds some of the following features:
- Asset exchanges between applications
- Hierarchical storage management
- Content replication for performance and availability
- Asset source control for versioning and collaboration
- Configurable security for metadata and content
- Metadata extensibility at runtime

StudioCentral Library

What Is It?

The StudioCentral Library environment is the most comprehensive system for managing digital assets-one that's easy to install and use. It offers a rich suite of components that are the building blocks for a solid asset management infrastructure. StudioCentral Library includes server and client software and the StudioCentral software developer kit, which enables users to quickly and easily expand and customize their asset management environment.

StudioCentral Library is a scalable, out-of-the-box system that lets users immediately store, find, share, and play digital assets. It is the only system that allows users to start with a single workstation and grow to multiple workgroups deployed throughout an entire organization. It includes desktop tools with drag-and-drop simplicity that makes it easy to navigate within the StudioCentral Library environment. As an asset management installation grows, the StudioCentral Library environment can maintain

Functional overview
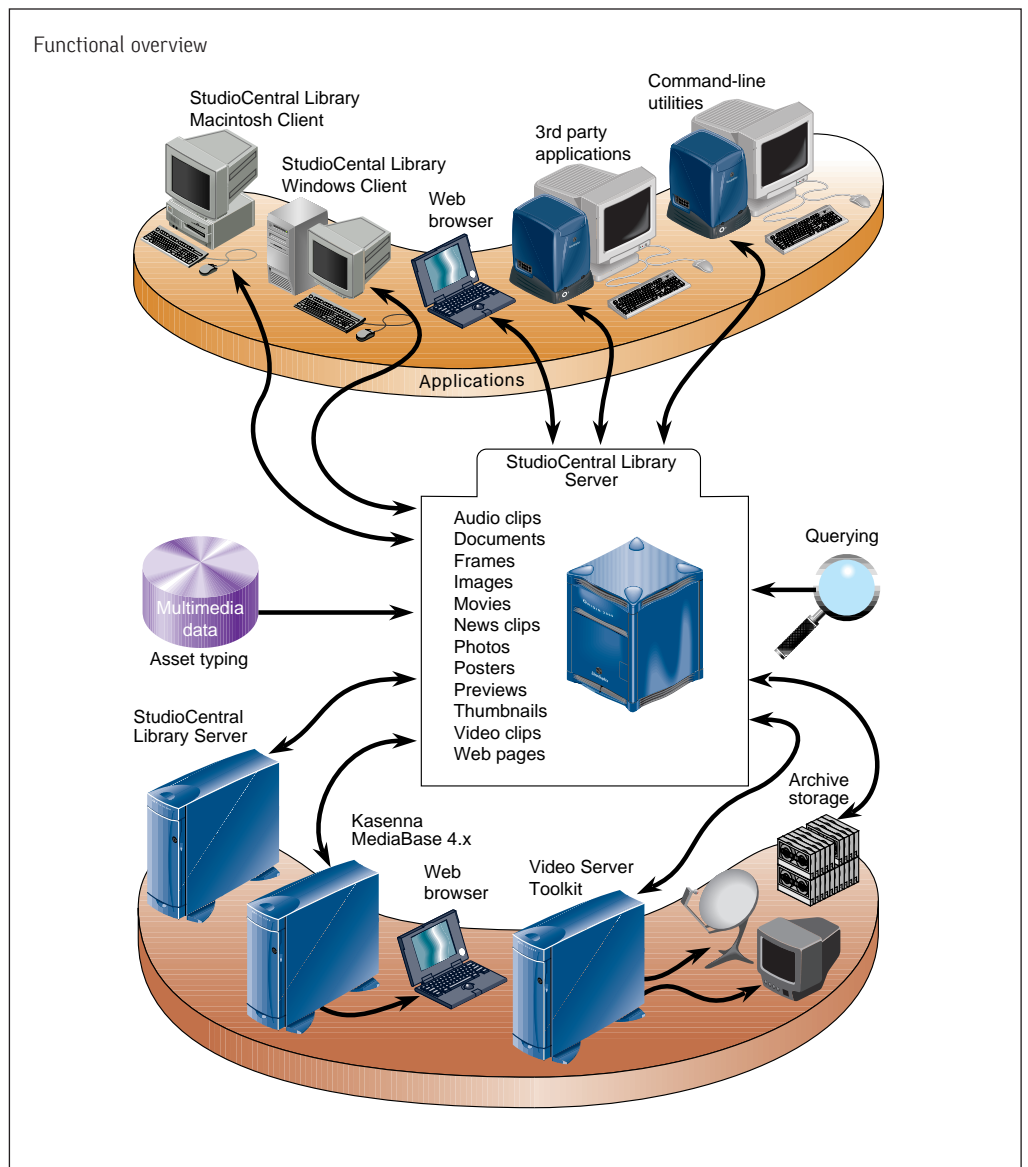
multiple repositories distributed throughout the network. These repositories can be secured or shared between workgroups, allowing administrators to manage and transfer assets between repositories.

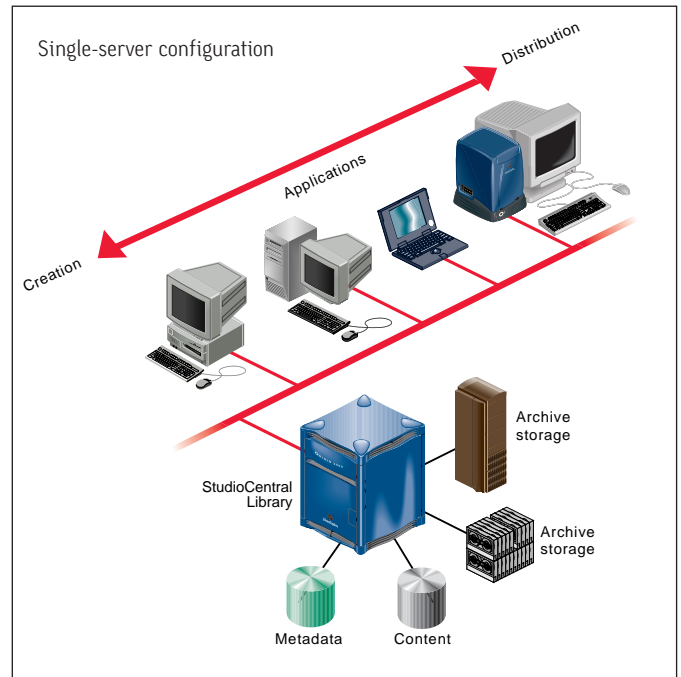### StudioCentral Library—Desktop Clients

The StudioCentral Windows® client and StudioCentral Macintosh® client are applications that run on Windows NT®, Windows 95 and 98, and Apple® Macintosh computers. These applications are used to store, query, view, and manage digital assets.

StudioCentral Library—Server

Metadata and content are stored in the IRIX server. Multiple versions of the same asset can be stored within the same server, so users can track revisions made to the asset. Metadata is stored in industry-standard databases, allowing users to search the descriptive information for assets that match certain criteria without having to read the content. The content can be stored in a variety of devices, including archive storage such as tape, enabling efficient use of the more expensive online storage.

An Out-of-the-Box Solution

StudioCentral Library provides the functionality to support all types of digital assets such as text, images, audio, and video. Whether users need to browse an archive of 2D or 3D images and video or track the production of a 3D animation, 30-second commercial, or feature film, StudioCentral Library offers a secure, centralized, and integrated framework for storing, managing, and viewing data.

Single-server configuration

Distribution

Applications

Creation

Archive storage

StudioCentral Library

Archive storage

Metadata   Content

StudioCentral Library enhances existing database technologies and provides an environment tuned to manage digital assets. This environment provides asset versioning, security, and access to content servers and hierarchical storage management systems and includes a common software interface for sharing assets across applications and repositories. This enables users to quickly retrieve and reuse assets more efficiently.

In addition, the comprehensive StudioCentral Library method of separating the actual digital content from the asset information, or metadata, offers users the benefit of combining industrial-strength databases with the speed and scalability of standard filesystems.

StudioCentral Library gives users the functionality they need now and in the future in a simple, scalable environment that lets them store, share, find, and play digital assets from a single workstation to multiple workgroups and throughout an entire organization.

Features and Benefits

For Content Creators

Content creators using StudioCentral Library will focus on content creation, not asset administration. With easy-to-use desktop tools, media assets can be checked in with a simple drag and drop or a save command from a content creation application.

Digital assets can also be stored in StudioCentral Library by having it monitor the StudioCentral Library inbox directory so that new or modified files in the directory are automatically brought into StudioCentral Library. For example, a user can have StudioCentral Library monitor the inbox directory into which Adobe® Photoshop® images are stored. Each time the user stores a new image in the inbox directory, the image is automatically stored in StudioCentral Library, enabling the user to check in assets without leaving the Photoshop application.

Once assets are stored in StudioCentral Library, the client application can be used to search for assets that match specified criteria and then view them on the desktop. For example, the user might want to search for all Photoshop assets created by a specific user on a given date.

Because StudioCentral Library client applications are integrated with other native desktop applications, assets can also be dragged and dropped between StudioCentral and other applications.

Access to a variety of content servers, including filesystems, streaming video and audio servers, hierarchical storage management systems, and other storage devices, makes it quick and easy to find and play the file the user needs. Automatic cataloging and thumbnail generation for common media formats let content creators preview files without having to play the entire file.

For Archivists

For archivists or asset administrators, StudioCentral Library offers administration tools and services to manage StudioCentral Library repositories from anywhere on a network.

Once an asset is checked into StudioCentral Library, it is cataloged. During this asset typing process, a range of information is extracted and used to populate the asset's metadata. After storage in the server, assets can be queried by specific search criteria, browsed, and viewed either in thumbnail or in full. They can also be simultaneously checked out by another user, sent to a video server for playout, transferred to another StudioCentral system, or moved to an archive system.

Extensive data modeling for defining asset metadata attributes and a versioning feature keep track of changes made to assets as they evolve.

For Developers

For developers, StudioCentral Library includes developer tools as well as services for administering and managing media assets. The StudioCentral Library environment is designed to support all types of digital media production and management including content creation, acquisition, cataloging, and workflow routing. It can be extended from the ground up. The architecture allows the use of various database products from vendors such as Informix and Oracle for metadata storage and queries. Users can take advantage of a variety of content storage systems such as ADIC AMASS storage server, and SGI Data Migration Facility (DMF) for archival. Use fast filesystems such as SGI XFS™ for real-time access. Publish using tools like Oracle® Video Servers and Kasenna MediaBase 4.x* for IRIX.

*Kasenna MediaBase 4.x technology was developed by SGI and is now marketed and sold by Kasenna, Inc.

In addition to login and password controls, StudioCentral foundation classes support individual, group, and object access control lists. An Asset Transfer Service (ATS) protocol provides a simple way to retrieve and store StudioCentral assets and enables developers to write applications without having to use the full StudioCentral application programming interface (API).

Features

StudioCentral Library's features include:

- Manual and automatic catalog
- Batch catalog
- Flexible and configurable datamodels for user-defined metadata
- Desktop-integrated clients for Windows NT, Windows 95 and 98, and Mac® OS 8 and above
- Drag and drop support for Windows NT, Windows 95 and 98, and Mac OS 8 and above
- Versioning support
- Thumbnail generation
- Automatic media cataloging
- Simple and advanced query
- User-defined views via stored queries
- User and group security
- Secured and sharable queries
- Browse and preview via helper applications
- Migration Manager services for migrating content and metadata between remote StudioCentral Library repositories
- Kasenna MediaBase 4.x player support
- SGI Video Server Toolkit support
- C++ APIs for customizing and extending metadata and content services
- Enhanced ATS network facility for building lightweight client applications

Client

- PC: Windows 95 and 98, Windows NT 4.0, 32MB RAM, 64MB for Windows NT, 10MB free disk space
- Macintosh: Mac OS 8 and above, 32MB RAM, 500Kb free disk space

Server

IRIX 6.5 and above, 64MB RAM per processor, 250MB disk space for the StudioCentral server, 200MB for metadata, and 500MB for content

Developer Support

- C++ client API support for Windows NT, Windows 95 and 98, and IRIX 6.5
- Enhanced ATS support for any network-based client operating system, including Windows NT, Windows 95 and 98, Macintosh, and Java™

Database Support

- Oracle 8.0.4.3
- Informix® 7.3.4.1, OnLine Dynamic Server™

Content Servers

- Kasenna MediaBase 4.x
- ADIC AMASS
- SGI Data Migration Facility (DMF)
- SGI XFS filesystem

Glossary

Access control: the API function that manages access to StudioCentral Library assets. For example, access control is used to give end users permission to access assets created by an administrator.

Asset: unit of storage in a digital asset management system. Each asset consists of descriptive information such as the title and duration; digital media data, if the asset has content; and an index, if required by the content format. For example, each text file, movie, commercial, trailer, thumbnail, and so on, stored in an archive system, is an asset.

Asset typing: the process by which an asset's type is determined, its content file is read, and metadata attributes based on the asset type or thumbnails may be automatically generated.

Attribute: a single piece of an asset's metadata information. Metadata consists of system attributes, which are defined by StudioCentral Library and exist in all assets, and datamodel attributes, which extend the attributes associated with an asset.

Check in: to add a new asset to StudioCentral Library you must check it in. At check-in time, StudioCentral Library automatically assigns the asset a unique identifier in order to locate it in the repository and secures it in the database. Each time a user retrieves the asset and checks it back in, StudioCentral Library creates another, more recent, version of the asset.

Check out: to modify an asset, it must be checked out of the StudioCentral Library repository. StudioCentral Library issues users a "working copy" of the asset and locks the "real" file to prohibit changes by other users.

Content: digital media such as text files, video clips, movie frames, sound files, animation cels, presentations, and engineering designs.

Content servers: media data storage for content such as XFS, Kasenna MediaBase 4.x, and Oracle Video Server.

Database key: software interface that provides integration between StudioCentral Library and databases.

Datamodel: a data structure that defines metadata attributes; it's used for modeling data.

Digital assets: multimedia object composed of two parts: content and metadata.

Kasenna MediaBase 4.x: most popular intranet video server and intelligent media server software for delivering high-quality MPEG-1, MPEG-2, and H.263 RealVideo and RealAudio streams to Web clients using IP or native ATM networks.

Metadata: information that describes a digital asset.

Preview: a smaller version of an asset's content.

Query: the process by which users search an asset management server for assets that satisfy given criteria.

Repository: a storage area for digital assets. Each repository consists of one database for storing metadata and one or more content servers for storing the actual digital assets.

Thumbnail: a pictorial representation of the asset.

Transcoding: the process of translating the content of an asset from one digital format to another.

StudioCentral Library: The SGI digital asset management environment.

Version: a subsequent generation of an asset.

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