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DIVArchive Technical Overview

The world leading Content Storage Management
(CSM) software

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KEY FEATURES

- Management of assets as objects containing any number of files (components)

- Random access to any object component or component extract

- Active management of objects through flexible policies governing storage tiers, replication and distribution. Transcoding and restore of objects can be automated

- Support for multiple storage technologies (SAN and NAS disk storage, Tape Libraries, Optical Disk) with open support for other vendors' products.

- Support for Cloud storage tiers with DIVA Cloud for data protection and Oracle Archive Cloud for cold storage.

- Support for checksums with selectable algorithms. Genuine checksums provided by applications ensure end-to-end object integrity verification.

- Direct integration with popular applications for playout automation, Media Asset Management (MAM), Newsroom and Editing.

- Timecode based Partial File Restore for several popular file formats (i.e. wrapper, e.g. MXF OP1a) and video or audio essence (for SD and HD).

- Support for complex objects such as DPX for Cinema.

Oracle DIVArchive is the world's leading and most trusted Content Storage Management software. It enables customers to build scalable solutions for rich media asset storage, management and long-term preservation.

Video broadcast applications, newsroom control systems and post-production environments integrated with DIVArchive can use a consolidated storage infrastructure combining multiple storage technologies. DIVArchive provides an abstraction layer and manages storage tiers, objects lifecycle, technology migration and more, on behalf of these applications. Objects are stored in an open standard format, Archive eXchange Format (an SMPTE standard since September 2014) and therefore readable by any AXF compliant tool.

Storage consolidation optimizes costs and simplifies management. Solutions can scale from single server disk only architectures to large systems combining different storage tiers and technologies, with infinite capacities. The combination of different storage technologies enables to balance response time, performance and cost.

Through the DIVArchive middleware layer, content can be stored, searched and retrieved by multiple applications, multiple devices, locally or remotely. Content migration and transcoding plug-ins facilitate reuse and access from new devices and through new delivery channels.
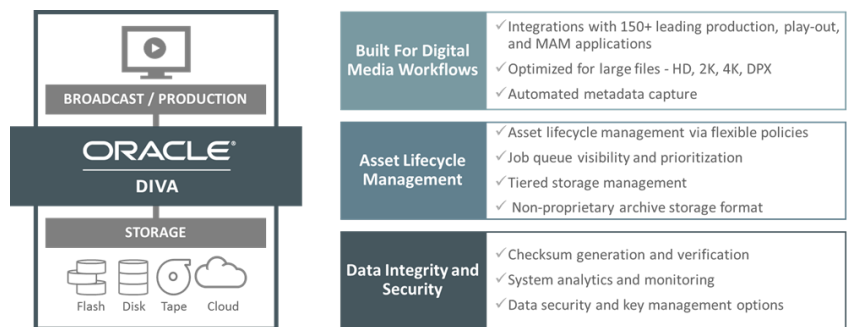
- SMPTE standard Archive and eXchange Format (AXF) used to encapsulate object components, including metadata.
- Collection of usage statistics to enable storage media analysis and capacity planning
- Compliance with Open Archive Information System (OAIS) model.

DIVArchive's main characteristics

DIVArchive provides applications with a transparent management of physical storage. Media management application creates and maintains all descriptive information or metadata describing the video or audio assets, but relies on DIVArchive to maintain, transfer and store the video, audio, or graphic files.

Allowing DIVArchive to manage the physical assets and the underlying storage infrastructure eliminates the need for applications to support and maintain multiple storage devices and technologies and control low-level tasks such as tape de-fragmentation, just to take one example. The DIVArchive solution also adds advanced functionality such as automatic archive replication (protection), connection to remote archives (import or export), creation of distributed archives (disaster recovery), web publishing or automatic software format conversion.

The system provides a layer of abstraction to applications, which only need to request an asset transfer operation and DIVArchive will take care of the rest. The software automatically selects appropriate physical storage and, based on user-defined policies, can trigger migration to other types of storage at defined intervals. This automated process can also include a transcode operation to translate digital file formats as content migrates through the system guaranteeing asset compatibility.

This capability can be used to migrate assets from disk to tape or migrate from one tape generation to a new tape generation as a background task.

In addition to maintaining a catalog of all the assets stored in the repository and abstracting the underlying physical storage devices, another key aspect of the storage management solution is its ability to be controlled by external applications and let these applications set and even change the priority of every task submitted.

DIVArchive's Open Architecture easily integrates in a wide variety of video production, newsroom and broadcasting environments. The fundamental aspects of the DIVArchive architecture are:

» **Scalability.** DIVArchive is able to meet increasing customer needs, through its parallel architecture, which can smoothly and incrementally scale and cope with growing storage capacity and performance (bandwidth) requirements with minimal system disruption if any.

The Oracle DIVArchive content storage management solution provides more than just storage and arcghiving capabilities. It offers secure accessibility to content by every application and person involved in the workflow, anywhere in the world.
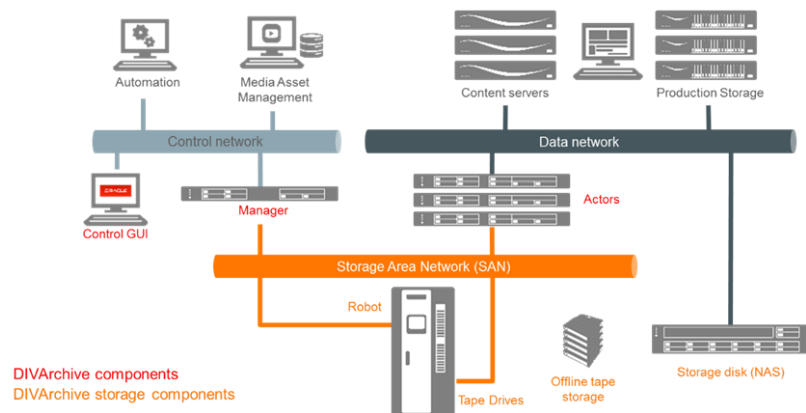
Get your content working for you with the following content storage management products:

» Oracle DIVA Cloud service.

» Oracle DIVAnet.

» Oracle DIVAdirector.

» **Reliability.** Each hardware component used in a DIVArchive solution is configured with RAID protected hot swap hard drives, redundant power supplies and network adapters in order to minimize downtime of every component.

» **High Availability.** Operation of the archive solution must be tolerant to storage device failures. Device 1+1 and N+1 redundancy together with automatic fail-over or cluster technologies are used to address the most stringent reliability requirements.

» **Maintainability.** No system downtime is required when replacing or servicing components such as tape drives, disks or data movers. Any component can be disabled temporarily with the graphical management interface until replacement or repair.

» **Asset Protection.** The DIVArchive solution focuses on data integrity and protection assets. All object information (e.g. checksums, provenance etc.) and configuration data is stored in an enterprise-level Oracle database engine guaranteeing robustness and security. Object metadata is also encapsulated in the AXF container and stored on the storage media.

» **Centralized Administration.** Although distributed in nature, DIVArchive can be monitored from an SNMP management system and can be configured and controlled from remote workstations through its Java based intuitive Graphical User Interface.

DIVArchive Components & Architecture

A system built with DIVArchive combines multiple distributed software modules, which may run on a single server, or on multiple servers for increased system bandwidth and reliability. DIVArchive components communicate with each other through a TCP/IP control network.
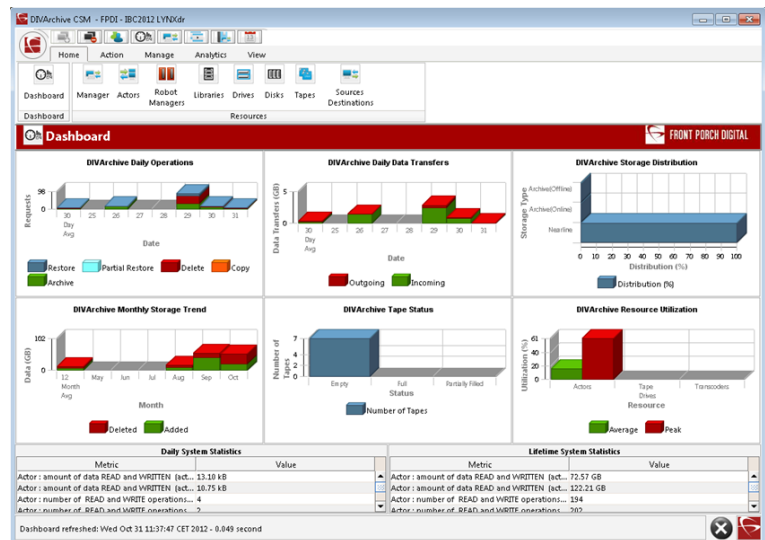

The minimum DIVArchive components include:

» *DIVArchive Manager.* This is the central component of the architecture in charge of the execution and prioritization of all archive requests and the dynamic allocation of servers or storage resources. It maintains an object catalog in its Oracle database and is the interface point for Automation and Media Asset Management applications.

» *DIVArchive Actor.* The DIVArchive Actor is responsible for all data transfers (archive, restore, copy, etc.), under the control of the DIVArchive Manager. Adding

more DIVArchive Actors to a DIVArchive system enables parallel transfers and increases total system throughput and resilience.

» *DIVArchive API*. This component allows applications, such as Media Asset Management or Broadcast Automation systems, to submit requests to the DIVArchive Manager. A library of functions is provided for installation on the system hosting the application. C++, Java and Web Services API are available.

» *DIVArchive Control GUI.* The DIVArchive GUI enables monitoring and control of the entire DIVArchive system. It can run on any laptop or desktop supporting Java.

» **Storage Plan Manager (SPM).** This component takes care of object lifecycle. It generally runs on the same server as the DIVArchive Manager and executes actions such as creating additional object instances on different storage media or purging disk storage based on watermarks and object attributes (e.g. age, size, last access date). In addition, the SPM can initiate automated transcoding of a video and creation of a new object in a different format, or initiate a restore automatically. The DIVArchive Manager base license includes support for two (2) Storage Plans (workflows).

NOTE: DIVArchive system configurations can interface with selected third-party transcoding software. Transcoding software can reside either on DIVArchive Actors or on external transcoder farms.

Main features

» *Objects.* An *object* is the entity (the asset) managed by DIVArchive and contains any set of files; typically video, audio and header files, which have been transferred from, ingest servers into the archiving system. Objects are identified by a *name* and *category*, which, combined, represent the unique *object* identifier in the archive.

» *Media.* DIVArchive allows storing objects (e.g. rushes, promos, news clips) on a different physical media (e.g. tape group or disk array).

» *Object Instance*s. Multiple copies of a single *object*, called *instances*, can be created within a DIVArchive system. Each copy can belong to a different *media* (e.g. one instance on a disk array for immediate access and one instance on data tape for long-term preservation). The system automatically selects the most

appropriate *instance* of the *object* during a restore operation, which is typically the one with the shortest access time.
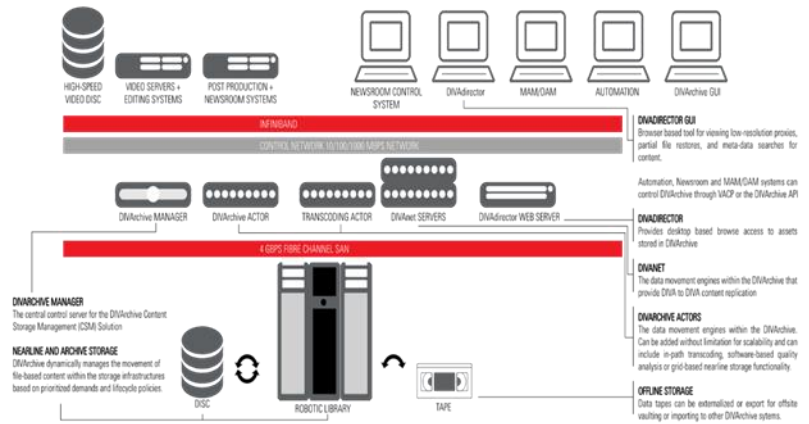
» **In Band Metadata.** The DIVArchive system provides the ability to store user metadata with the objects being archived. Such metadata is encapsulated in the AXF container.

» **Externalized Storage.** DIVArchive manages offline storage, allowing data tape or optical media to be ejected from the library, while continuing to track these externalized objects. The media must be inserted back when objects are requested.

» **Flow Control.** DIVArchive can be configured to throttle down the data transfers to protect video servers or editing stations and control system bandwidth usage.

» **Direct or Cache Transfers.** DIVArchive manages the data transfers to/from the video servers and storage resources in both direct and cache modes, depending on the option selected. Direct mode saves transfer time but requires homogeneous bandwidth between the servers and the tape drives while cache mode requires local cache storage but allows more flexibility on throughput.

» **Spanning.** When the size of an object is larger than the storage media (in case of removable storage such as data tape or optical disk cartridge), DIVArchive automatically splits the object onto multiple storage media. When retrieved, DIVArchive recomposes the object in its original form automatically.

» **Metasource.** DIVArchive automatically manages load balancing and failover between several Source/Destinations or several connectivity points (e.g. IP addresses) of the same Source/Destination. This feature is particularly important for connection workgroup environments or scale out NAS solutions as it supports multiple redundant paths to shared storage.

» **Tape Defragmentation.** Tape fragmentation inevitably occurs when objects are deleted from tape. With DIVArchive, defragmentation can be started manually or configured to run automatically as a low priority process to reclaim space on storage media.

» **SNMP Agent.** DIVArchive SNMP (Simple Network Management Protocol) agent provides status and traps to SNMP Management software for global system monitoring and proactive fault tracking.

» **VACP.** Harris/Louth VACP (Video Archive Control Protocol) is used by broadcast automation system to control asset movement into and out of the DIVArchive system.

» **Checksums.** DIVArchive offers true end-to-end checksum functionality for full path content certification and verification with support for multiple checksum types (MD5, SHA1, etc.).

» **OTU (Object Transfer Utility).** OTU can be accessed via the DIVArchive GUI and allows easy "Drag and Drop" operations to move content in or out the archive system. The user is presented with a simple list of assets stored in DIVArchive as well as connected video servers (or other supported device) and can request the archive or restore of any asset presented.

» **DIVAprotect.** Monitors digital archive storage infrastructure and presents the archive administrator with information regarding the performance history of drives and media composing the archive system. It informs operator about media or tape drive degradation before it results in reduced performance or, even worse, catastrophic data loss.

» **DIVAgrid.** An alternative disk storage solution. DIVAgrid leverages DIVArchive distributed architecture to provide scalable, load balanced and inexpensive disk storage using DIVArchive Actors local RAID5 disk array.

- » *Multiple Parallel Restore*. This option enables the restoration of a single object to multiple destinations simultaneously. Typically, this feature is used for mirrored transmission servers, so that the automation can restore an asset to a main and backup video server with a single request.

- » *Web services interface*. The DIVArchive Web Services (*WS*) API (*SOAP* and REST) provides flexible, scalable and powerful interactions with the DIVArchive System using the WS standards.

- » *Archive Exchange Format (AXF) support*. AXF is an open container format to store or transport objects on any type of operating system, file system or storage media (data tape, spinning disk, flash, optical media, or other storage technology now and into the future).

- » *Drop Folder Monitoring.* Drop Folder Monitoring (DFM) allows users or 3rd-party applications to deliver content to be archived by simply copying related file(s) to a specific directory or FTP server. With DFM each time a new file, or set of files, is detected DIVArchive automatically archives the file(s) and creates the related DIVArchive object according to the rules set in the drop folder configuration.

- » *Complex object (e.g. DPX asset)*. A complex object in DIVArchive has more than 10,000 files (configurable) and up to 1 million files and 10,000 folders. It is used, for example, to archive assets in DPX format. DPX partial restore and "files and folders" partial restore are included in the base license.

DIVArchive options

- » *Partial Restore.* In News or Post-Production environments, the ability to retrieve only a desired portion of a clip (e.g. 5 minutes) is critical. The DIVArchive system allows for any control system to pass time-code (or byte referenced) start and end positions for the required portion of the original asset and only that portion of the original asset will be restored. This is an invaluable feature for content repurposing and content restoration to post-production editing environments.

- » *Storage Plan Manager –* This optional feature is required when more than two (2) Storage Plans (workflows) are needed.

- » *Additional Archive Robotic System*. This option allows DIVArchive to manage multiple Automated Tape Libraries under the same system. Storage libraries can be added for capacity expansion, redundancy or Disaster Recovery purposes.

- » *Avid Connectivity*. DIVArchive supports connectivity to Avid NLEs or shared storage via Avid Transfer Engines or Interplay Archive Manager and Archive Provider. The archive can be controlled from Avid Media Asset Management (MAM) or Production Asset Management (PAM). Partial restore is available for both environments.

- » *DIVAnet is* allows the connection of a multiple DIVArchive systems. Each DIVAnet site can be configured to bi-directionally replicate all content or selective content using the advanced lifecycle strategies available via Storage Plan Manager (SPM). If WAN linkage between two sites is lost, each site will continue to operate independently; content can be reconciled once the network connection is repaired.

- » *Media Import/Export* allows operators to eject storage media from a Data Library System and import it into another separate DIVArchive system. When exporting media (as opposed to externalizing it) the associated DIVArchive metadata is exported in an XML file. When the tape is imported into the remote system, the related metadata is used to update the target DIVArchive database. As soon as the tapes are inserted into any robotic tape library, the assets stored on the imported media are immediately available to media applications and their users.

- » *DIVArchive Manager redundancy options:*

» ***Manager Failover***. All database information is replicated on a regular basis on a separate server hosting the DIVA Manager software. Activation of the backup Manager requires human intervention.

» ***DIVArchive Manager Cluster***. DIVArchive managers run on a Windows cluster environment. Failover between active and inactive managers is automatic in case of failure.

» ***Application Filtering***. Provides the ability to apply access rules based on application identification (client). Filters specify which resources (object categories, media name, source-destination servers) and which operations (archive, restore, delete, etc.) are available to the application connected to the Archive Manager.

» ***DIVAdirector***. An easy to deploy and easy to use media asset management system. DIVAdirector provides a permission based web browser that enables complete access to the file based content stored by DIVArchive. Users can search and browse archived content. Its dynamic metadata engine allows simple definition and modification of the metadata model.

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