HP Digital Media Platform: A technology foundation to enable the transition to digital processes and workflows

White paper

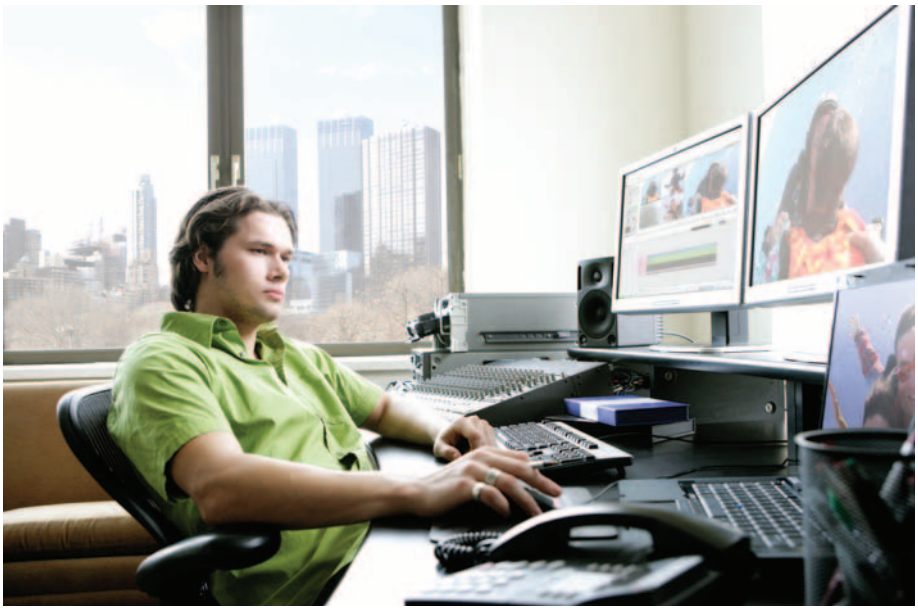

Table of contents

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Executive summary

To compete in today's dynamic markets, companies that create, distribute and sell media and entertainment content need to transition to comprehensive file- and network-based media workflows. The creation of these new workflows is an essential step for companies that want to roll out new business models that capitalize on the opportunities brought by digital technology.

The HP Digital Media Platform provides a comprehensive technology foundation to support file- and network-based media workflows. Drawing on a service-oriented approach, the platform enables the integrated media storage, processing, management and distribution services and solutions that automate the digital supply chain.

This paper examines the Digital Media Platform in both business and technical terms. At a business level, the paper explores the industry challenges that gave rise to the digital media platform, the use cases for the platform and the media workflows that it enables. At a technical level, this paper explores the platform's architecture, technical components and functional capabilities, which work together to enable the digital transformation.

Industry challenges

Revolutionary times

For companies that create, distribute and sell media and entertainment content, these are revolutionary times. Companies face new consumer demands, new competitors and new business processes. Content is being distributed and consumed in new ways. The industry landscape is blanketed with new devices and new methods to store, transport and consume content. All the while, a dramatic convergence is under way, bringing together the IT, broadcast, film, Internet, telecom and consumer electronics industries.

In these dynamic times, new digital services and devices for media distribution and consumption are resulting in a dramatic increase in the volume and variety of content that needs to be stored and distributed. Companies also face fragmented audiences, reduced revenue and increased competition. Consequently, the way that media assets are conceived, created and managed is changing rapidly.

To remain competitive in this converged landscape, companies have to accelerate the move to digital processes. In specific terms, they need to transition to file- and networked-based media workflows that encompass the entire business ecosystem. This is key to gaining the flexibility and responsiveness needed for the future. Yet this transition is a difficult proposition. While the media and entertainment industry has invested heavily in digital technology, many companies are having problems realizing the full value of these investments. One of the hurdles is that many of today's existing digital media solutions are proprietary, point solutions that are poorly integrated with enterprise-wide content and business workflows.

A typical media production environment contains multiple products from a variety of vendors. Each of these products supports a single stage in the media supply chain. Yet more often than not, these point solutions are disconnected applications that don't scale across an entire organization. This leads to operational silos and process bottlenecks in media servicing environments. In a painful bit of irony, products that were designed to increase productivity, reduce costs and encourage collaboration at times produce the opposite results.

Legacy issues

While they have achieved some success in moving operations to digital technology, many media and entertainment companies, advertising agencies, retail enterprises and network service providers still struggle with outdated systems and labor-intensive processes for handling much of the content they produce, manage and sell. In essence, they have one foot planted in the historical, static, physical world, while the other searches for stable footing in the new, dynamic world of rich digital media.

The video industry provides a living example of this dilemma as it transitions from tape-based workflows to file-based workflows. For many years, the standard for storage and transport of video has been purpose-specific tapes. The processing of video involves many steps, most conducted digitally and increasingly using software. Each of these steps has a different format for its data. This has led to cumbersome processes that use tape as an intermediate medium. A typical tape processing sequence goes like this: Ingest video to a file, process it, output the video to tape, and then repeat these steps at the next ingest.

The limitations of these legacy processes are obvious. Processes based on video tape (whether analog or digital) are costly in terms of staffing, equipment and time. And beyond those operational issues lies a broader business issue: Companies that rely on tape-based processes are ill positioned to capitalize on the revolutionary changes in distribution that are under way. With processes that hop that back and forth between different generations of technology, it difficult to re-purpose assets and distribute content efficiently across a global network. To compete effectively, industry players now need to have their assets available for monetization in a complex value network.

To make this change, companies need to complement their existing physical storage systems with file- and network-based digital vaults that can streamline the processing and management of content and feed new digital distribution channels. For companies to reduce costs, accelerate the processing and distribution of content, and capitalize on new market opportunities, processes need to become digital—all the way from the studio to the consumer's living room. In light of these challenges, it becomes clear that the industry faces a sweeping transformation.

Enabling the transformation

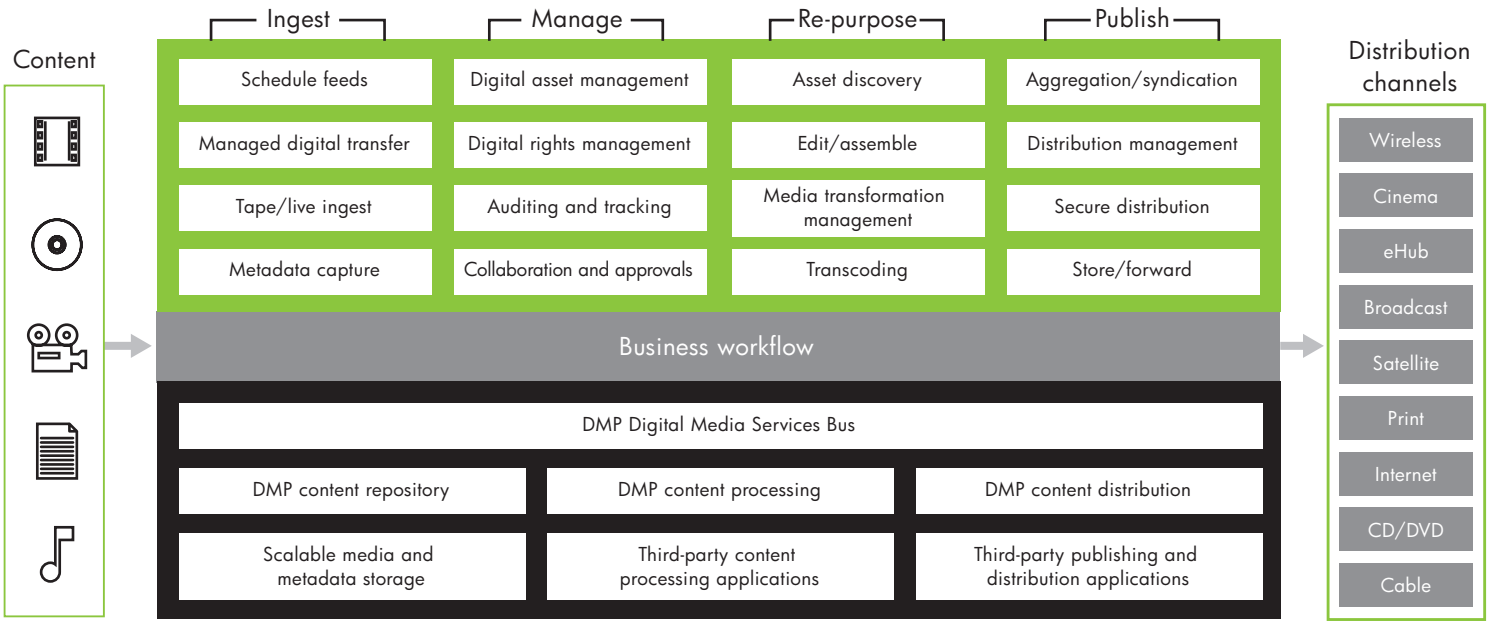
Ultimately, the industry needs to transition to file- and network-based media workflows that encompass the entire digital ecosystem. These new-generation workflows can then be incorporated into an integrated digital media supply chain that enables content owners to launch an electronic sell-through business, distributors to connect content to customers and retailers to sell digital products through all available channels.

What is needed is a foundation for converting assets into data files, along with descriptive technical and contextual metadata. Metadata tags are key here; they allow content to be easily searched and repurposed, and they facilitate enhanced automation, increased collaboration and production efficiencies. Assets can then be managed automatically as part of a network-based computer system across multiple classes of storage (including cost-effective near-line digital data tape) in response to business level processes and needs.

The first big step in this transition is to get the assets into a comprehensive file- and network-based system that enables new business-driven workflows. This system requires an integrated supply chain management platform that streamlines the flow of media products across the value network. This technology foundation must support end-to-end, digital-network-based storage, processing, management and distribution of video, audio, still images and other digital media assets.

The HP Digital Media Platform (DMP) was designed to serve as this comprehensive underlying technology foundation—a foundation that enables the transition to a digital world.

Figure 1. HP Digital Media Platform overview.
The HP Digital Media Platform includes storage, processing, management and distribution capabilities. It serves as a technology foundation to enable a wide range of applications, solutions and services that are built on top of the platform.



The rise of a new technology platform

Until recently, true integration platforms for content-rich applications did not exist. The available industry offerings were narrowly focused content management systems, not broad integration platforms that can span business processes end to end or extend across the many media companies involved in a media supply chain. Meanwhile, today's more broadly focused integration products—such as enterprise application integration systems and business process management solutions—lack key required capabilities to manage digital media products.

The need for a more comprehensive integration platform for content-rich applications became apparent as large organizations began creating significant amounts of media-rich content and as the cultural divide between the creative industries and the IT sector narrowed. Recognizing this emerging need, HP set course in the year 2000, charging HP Labs, its corporate research and advanced development arm, to create a comprehensive integration platform to automate the digital supply chain. In this initiative, which ultimately gave rise to the HP Digital Media Platform, HP Labs drew on its earlier research and development work with media trading and workflow systems.

The technical strategy for the development of the Digital Media Platform was twofold:

- Using a service-oriented architecture, define an integration framework for content and media solutions. This framework should enable solutions spanning content production, management, repurposing and delivery.
- Architect and develop a platform of digital media services. This platform should provide reliable enterprise services for media storage (including content essence and metadata), processing, and distribution to client applications.

The broader goal for the Digital Media Platform was to provide the media storage and processing services necessary to automate the entire digital supply chain. HP designed the platform to enable digital-network-based storage, processing, management and distribution of video, audio, still images, and other digital media assets. These capabilities help companies distribute content on demand, monetize assets, repurpose content and roll out new business models.

The Digital Media Platform represents an entirely new approach to the technical and business challenges of managing digital media assets across the enterprise. It provides enabling technologies and automated processes that build upon the concept of enterprise application integration to include the management of media assets themselves as well as the workflows, processes and data models of the media industry. The platform is designed to provide a foundation for end-to-end digital media solutions as well as hosted managed services. It allows companies to leverage their investments in legacy applications and media storage to enable broader, more flexible, better integrated solutions for content storage, processing, management and distribution.

Use cases and benefits

The Digital Media Platform enables digital transformations in the media and entertainment, retail, advertising and network service provider industries, among others. Use cases include the following:

- **A common repository for content post-production**—In the media and entertainment industry, the Digital Media Platform can be used to provide a central repository commonly accessed by all the players involved in the preparation of new programming content for a studio. In this usage model, the platform enables companies to streamline post-production processes and optimize the end-to-end content production workflows within an organization.
- **On-demand product sales**—In retail applications, the Digital Media Platform can support on-demand creation of DVDs and distribution of content via the Internet to set-top boxes and computers. Similarly, the platform can enable retailers to sell content from in-store kiosks. Drawing on the storage, processing, management and distribution capabilities of the Digital Media Platform, retailers can offer consumers a vast library of movie titles without stocking shelves full of DVDs.
- **Network-based content processing services**—Telcos or network service providers can leverage the Digital Media Platform to create content contribution and distribution networks that connect content owners to broadcast distribution platforms. In this usage model, a Telco or network service provider manages multiple, linked DMP repositories as part of providing networked content processing services to internal and external customers.
- **A studio-to-retailer servicing vault**—In media and entertainment, the platform can streamline the distribution of film and television content to small retailers and VOD companies. Companies can use the Digital Media Platform repository to store their entire libraries of media assets in digital formats for quick repurposing and on-demand distribution to partners and customers. The platform allows companies to create content once and distribute it many times in various formats. This makes it possible to reduce time to market for new assets and create new revenue streams for old assets.
- **A media gateway**—The Digital Media Platform can be used to enable standardized, centralized, automated processes for sharing media with downstream processing and distribution partners. In this use case, the platform is deployed as a media gateway that governs the transfer of business information and digital media among processes in multiple enterprises. Studios and their suppliers can use DMP media gateways to enhance cross-vendor program management across the numerous assets entailed in creating, marketing and distributing entertainment products to multiple distribution windows in multiple regions.

The Digital Media Platform can help a company make the transition to digital processes and workflows in a manner that protects existing investments. The platform's open framework allows existing applications to be integrated into new workflows. In this manner, the platform enables operations with one foot in the digital world and one foot in the legacy analog world. This eases a company's transition by enabling staff to work with digital assets using the current applications and processes that they understand for physical fulfillment, while positioning the enterprise for the future.

With the Digital Media Platform, new applications can be added just as easily as existing applications. As new applications are added to an environment, they are added to the workflows. When a new application replaces an old one, the old application simply leaves the environment and the new application takes its place in the workflow. Applications can even span multiple data centers, computing platforms and deployment geographies. This flexibility, which is inherent in the Digital Media Platform, increases business agility.

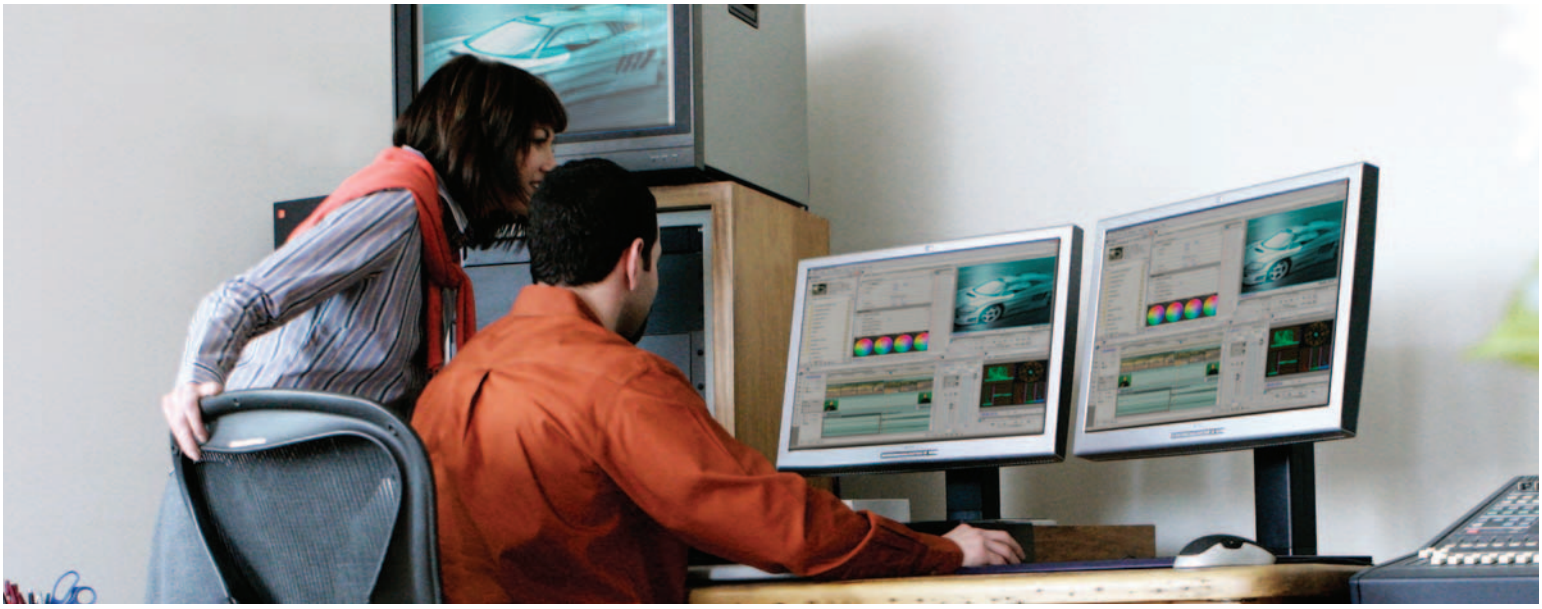
From a higher, business-driven level, the Digital Media Platform provides management with a much sharper view. The platform increases management visibility, discovery and reporting capabilities across assets, processes and media solutions.

The HP Digital Media Platform: functional and technical overview

An enterprise technology foundation

At its heart, the Digital Media Platform provides the IT foundation for media businesses through an enterprise-class services-oriented approach. It is a solution platform for creating enterprise-scale content storage and processing applications. This platform enables end-to-end digital-network-based storage, processing, management and distribution of video, audio, still image and other digital media assets. It serves as an enabling technology that accelerates the deployment of media solutions and services.

Flexibility and adaptability are keystones of the Digital Media Platform. The platform is designed to enable rapid application development and component reuse in an environment that does not force companies to use the proprietary systems of any single vendor. What's more, it provides a flexible foundation that does not impose particular processes on the end user. The Digital Media Platform provides not only the foundation for more flexible enterprise solutions within a single company, but also the foundation for a rich set of managed services that can link multiple companies in an enhanced media supply chain, even companies in a globally distributed environment.



The Digital Media Platform represents a unique approach to managing media, metadata and media workflows. Unlike other approaches to managing media, such as most existing Digital Asset Management (DAM) tools, the DMP does not attempt to package all of its functionality into a single vertically integrated application. Instead, it deliberately unbundles core asset handling functionality (such as media and metadata stores, browse and search capabilities, and asset processing) and presents them as modular services to a range of new and legacy applications

Viewed from this level, the HP Digital Media Platform has a much broader reach than a Digital Asset Management application. Most DAM systems grew out of document management systems. They were not designed from the ground up to manage large media objects, such as 100-gigabyte videos. And they were often designed atop proprietary databases, rather than an open architecture that can share data among diverse applications and services.

The capabilities of the Digital Media Platform build on those of today's common service-oriented architecture (SOA) applications. While it leverages a service-oriented approach, the Digital Media Platform extends the scope of an SOA framework to encompass information and media storage and processing. While SOAs have nothing to say about the media itself, the Digital Media Platform includes the distinct capabilities needed for distributed digital media processes. It does this by providing integrated access to content and media repositories and content processing in a web-service-based SOA environment.

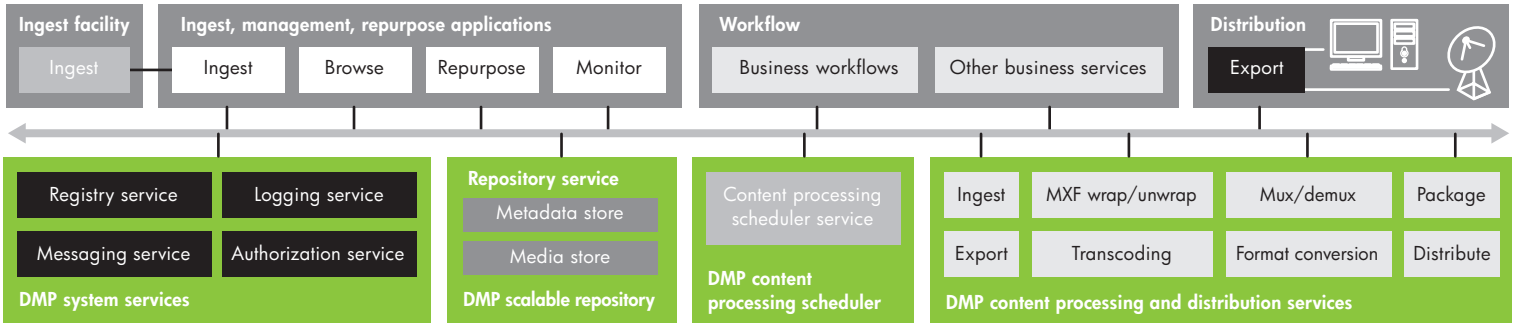
A service-oriented architecture

The Digital Media Platform encourages the decomposition of content solutions into sets of modular, reusable components. Each component is manifest as a web service with a well-defined, networked interface; reusable components allow development costs to be shared across a number of content solutions. The Digital Media Platform thus provides a service-oriented integration framework that presents a standard set of abstractions for the integration of third-party content management and content processing products into scalable content processing solutions.

SOA is a rapidly emerging software integration model. An SOA is characterized by an abstract or virtual layer between an organization's IT resources (servers, systems, operating systems and applications) and its business processes. In an SOA-based solution, the basic functionality of complex software applications, including legacy systems, is exposed as groups of services that correspond to real business activities and processes. During solution development these business processes are studied, decomposed into their component tasks, and mapped to existing applications.

The key to the SOA solution approach is that as each service is designed, it may be combined with other services to form a composite or virtual application that is free from the constraints of the traditional, packaged software applications that were tied to single servers, systems or platforms. These service components may then be reused and recombined to support other business processes within the organization or even across an industry, and thus may enable a level of application and business process integration that was not possible with previous integration models.

Figure 2. HP Digital Media Platform functional components.
The HP Digital Media Platform includes a core web services bus, digital media repositories, asset processing and distribution capabilities, and external application integration features.



Content processing applications in particular present special integration challenges, making it difficult for an organization to leverage expensive, content-focused components over many business processes. The Digital Media Platform provides the platform necessary to bring the advantages of SOA to content-rich applications.

Functional components

Functional components of the Digital Media Platform include a core web services bus, digital media repositories, asset processing and distribution capabilities, a media application component library, and external application integration features.

Digital media services bus

The Digital Media Platform is based on a web-services architecture, whereby various media solutions are composed from constituent services. DMP System Services are those that enable the basic construction of any web-services-oriented application. This includes services that provide standard mechanisms for service registration and discovery as well as messaging capabilities—both point-to-point and topic-based (i.e. publish/subscribe). HP also provides Digital Media Platform system security and service logging/audit capabilities. Future versions of the platform will feature enhanced system management capabilities as well as increased fine-grained access control.

Taken together, the Digital Media Platform's System Services form an interoperable digital media services bus, over which a variety of content services, other business services and applications can communicate and work together. Content services include standard repository, asset processing and asset distribution services.

Digital media repositories

HP Digital Media Platform defines a consistent interface for services to interact with Digital Media Platform repositories. These repositories can either host digital assets or provide views over legacy data sources (for example, an existing digital asset management system, a legacy work-order processing database, or even a file system used by legacy applications). The repositories are implemented as services by the Digital Media Platform.

HP Digital Media Platform supports repository implementations with a range of capabilities. Some repositories may support only basic functions, such as asset creation, indexing, querying, updating, retrieval and deletion. More capable repositories may support extended functionality, such as versioning, extensible data typing and validation, and transactional updates. As part of the Digital Media Platform, HP provides a repository for use with large-scale, production-quality video and audio assets.

External application integration

HP Digital Media Platform facilitates the integration of legacy applications, best-of-breed digital media components and custom software that may be required in a digital media solution.

This can be accomplished in a variety of ways. Approaches include:

- Wrapping third-party content processing and distribution products as DMP Content Services (using an HP software development kit) for functional extensibility;
- Wrapping existing stores of content to present a common DMP Repository Service interface to enable reuse of existing assets across diverse business processes;
- Integrating via the DMP web services interfaces with industry-standard (e.g. BPEL-compliant) business workflow systems and other enterprise business services. Current DMP business workflow partners include Active Endpoints.

Asset processing and distribution
The Digital Media Platform includes powerful capabilities to flexibly process and distribute digital assets. Content processing and distribution applications are provided by third-party vendors. The DMP wraps these components so that they can be utilized and automated by the applications and services supported by the platform.

Examples of content processing include ingest processing, transcoding, watermarking, EDL conform, derivative creation, and metadata extraction. HP's current content processing partners include Telestream, Digital Rapids, and Snell & Wilcox for encoding/transcoding; Manzanita Systems for video multiplexing/demultiplexing; and MOG Solutions for MXF wrapping and unwrapping.

Examples of distribution include moving and copying assets to different internal or external endpoints using various distribution protocols and services. HP's current content distribution partners include SmartJog, a global network service provider for secure digital content delivery between TV and motion picture distributors and international post production/dubbing facilities; and Aspera Software, which provides fast file transfer software optimized for transferring very large digital files quickly.

This is just the beginning, however. HP is continually adding new third-party components to its content processing and distribution capabilities

End-to-end media solutions and workflows

The HP Digital Media Platform was built to be open, extensible and dynamic. It delivers its highest value when it serves as the foundation for a larger network of media services connected via a single interoperable media framework.

The platform supports a wide range of both new and existing media solutions and services. Its modular, services-oriented architecture allows easy integration of legacy application and components. HP also provides a rich set of media application components to speed development of entirely new digital media business applications and workflows on top of the core DMP platform. HP delivers these custom solutions via HP Consulting and Integration teams or its approved system integration partners.

The Digital Media Platform enables companies to create a flow of media and related metadata that can link internal divisions within the same company. It can also be used in broader global deployments to facilitate fluid media workflows across the digital content value chain.

The platform allows the creation of media flows that cut across multiple companies, geographies or even industries. It can connect content creators (studios), content service providers (post-production companies), content distributors (broadcasters, Telcos, portals, cable companies, retail outlets), and content consumers. For network operators, the platform can enable the deployment of global distribution networks that simplify the process of getting content across borders without customs delays.

This broader deployment of the Digital Media Platform is enabled by the ability to integrate diverse enterprise-scale content storage and processing applications and services from third parties. In this role, the Digital Media Platform provides capabilities that are analogous to those of an enterprise application integration (EAI) framework.

To further extend the reach of the Digital Media Platform, HP works closely with ISVs to provide content processing applications that can be incorporated into the platform environment. These activities help accelerate the development and deployment of digital content applications.

In addition, many new and legacy media applications can be built on top of or integrated into the platform to unify islands of existing media functionality and disjointed media workflows. The Digital Media Platform, for example, could be used to create links to existing workflows or business data sources.

While it is built for the challenges of complex, enterprise-level deployments, the Digital Media Platform can also facilitate more targeted applications and services. It can support standalone digital media solutions as well as services delivered under an application service provider (ASP) model.

Media application component library

To support the creation of new solutions using the Digital Media Platform, as well as to facilitate the integration of legacy applications, HP provides a library of media application software components and data models. These pre-developed components greatly shrink the time required to create new media applications a nd solutions.

This library encompasses:

- A common software library that integrates industry-pervasive applications from independent software vendors (ISVs) and component manufacturers
- An application service library that implements common application-level services, such as search/browse functions and metadata management
- Common asset processing operation adaptors
- Common asset distribution operation adaptors
- A simple graphical user interface that exposes core platform capabilities so they can be used out of the box
- Data models for common digital media assets and application-level design patterns

Platform capabilities and characteristics

Technical characteristics

Distinguishing technical capabilities and characteristics of the HP Digital Media Platform include the following:

An open platform based on web services—The Digital Media Platform was designed with open technologies. The DMP web services have well-defined WSDL/SOAP interfaces. DMP services can be deployed in industry-standard application servers (such as BEA WebLogic, JBOSS and Microsoft® IIS), and run over Linux or Microsoft® Windows® operating systems. Applications can be developed using a variety of languages and operating systems and seamlessly integrated via web services.

Horizontal scalability—The Digital Media Platform was designed for horizontal scalability. When more resources are added, the platform incorporates them into the system. All necessary application information is stored where all systems can access and utilize it.

Application integration—The platform was designed to integrate many different types of applications into a single system with a common storage repository and a common content processing, security and management paradigm.

Workflow automation—The Digital Media Platform provides an environment for the integration of independent applications into a unified workflow.

Integrated storage management—The platform's repository contains a policy engine that can be used to automate tasks. This policy engine could be used, for instance, to automatically back up files when they are created and move files to a tape-based archive.

Highly scalable storage—The repository can scale across many different storage arrays and tape libraries. This allows companies to add storage capacity and bandwidth as it is needed.

Integration of legacy applications—The Digital Media Platform was designed to integrate all types of applications, even existing applications without a well-developed API.

Integration of new applications—Since the platform can accommodate virtually any operating system platform, new and emerging applications can be integrated alongside your current applications.

Metadata repository—The platform's repository stores metadata along with assets and supports search across all types of metadata. It can easily incorporate additional business, technical or process metadata used primarily within one area but required across the enterprise. Since this information is not held within one application, it can be made available to all of the applications that are integrated into common workflows.

Comprehensive security—The Digital Media Platform holds all assets in a repository that is accessed through a security layer. This helps protect content assets. Only authorized users can browse assets. Higher levels of security can be set for the actual use of assets.

Benefits summary

The unique technical capabilities and characteristics of the Digital Media Platform allow companies to achieve important business benefits. Among other benefits, the Digital Media Platform helps companies:

- **Increase the value of assets**—With the Digital Media Platform and its central repository at work, assets are available to be packaged and sold.
- **Gain flexibility**—When on the Digital Media Platform, assets can be repurposed on demand for new channels.
- **Gain an extensible solution**—In an emerging market for digital media products, companies need to know that their IT systems can be extended to deliver new digital products for new channels in the future
- **Accelerate time to market**—The Digital Media Platform allows companies to bring new media products and promotional programs to market in less time.
- **Reduce the cost of processes**—By providing application integration and workflows, the platform encourages greater automation of processes. Automation can help increase utilization of resources and accelerate content processing
- **Streamline partner integration**—The Digital Media Platform allows companies to work more closely with value chain partners, suppliers and service providers. In this role, the platform serves as a framework for inter-company integration.
- **Enhance security**—When assets are stored in digital formats and central repositories, companies can more easily streamline and strengthen security approaches.

Looking ahead

HP continues to invest heavily in the Digital Media Platform and its underlying service framework architecture. Today HP is working to enhance the platform's scalability, manageability and security features and to add new functionalities. These efforts include contributions from both HP Labs and product R&D to enhance and support the platform in customer environments. Future enhancements will involve ongoing work to integrate additional third-party media processing products into the platform environment, increasingly fine-grained security, and improved scalability and resilience across all services.

To learn more about the HP Digital Media Platform and its uses in current and planned deployments, contact an HP account executive or visit **www.hp.com/go/entertainment**.

To learn more, please visit: www.hp.com/go/entertainment

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