

## Cloud Architectures for the Digital Media Lifecycle

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After many years of fanfare, there is little doubt today that the age of digital media is fully upon us. While in some phases of the cycle of creating and managing digital media – *its lifecycle* – the digital workflow may not yet be fully realized, there is little doubt that even the last holdouts of that lifecycle, such as content capture, are inevitably moving toward full digitization for every technician, artist, editor, or manager.

Digitization has caused an explosion in the amount of content that must be managed, and has forced organizations into the adoption of new processes to better manage new assets – *digital assets* – that have no physicality. Moreover, digitization has forced the adoption of a spectrum of specialized storage technologies, crossing the gamut from high performance capture systems to long term storage for replay or reuse over time periods stretching to decades or longer.

But while we find media organizations pursuing highly specialized primary storage systems for various tasks such as digital editing or rendering, the lifeblood of many organizations is actually made up of the often overlooked longer term storage that supports their digital assets. Such long term storage is a mission critical technology, as it acts as a critical hub for collaboratively accessing, controlling, distributing, and preserving digital assets. Indeed, this secondary tier of storage for digital assets can be the very connectivity that ties together primary processes and overcomes the barriers imposed by expensive, isolated high performance storage silos in the media organization.

In this technology brief on cloud storage and rich media, Taneja Group will examine the evolving use of digital assets in media organizations and the challenges faced from the growing amount of ever larger rich media assets. We'll then turn an eye toward where and how the class of infinitely expandable and highly accessible cloud storage solutions on the market can serve some of the needs of media organizations, and examine where and how to assess their fit. With an eye toward the clear cut use cases in media organizations, we'll also arm the end user with an understanding of the benefits of cloud storage that deserve further TCO analysis in each use case. Our intent: to arm the media user with a clear understanding of how and where to engage the cloud for maximum business benefit.

### Digitizing the Media Asset

The past 10 years has seen an exponential increase in the velocity with which rich

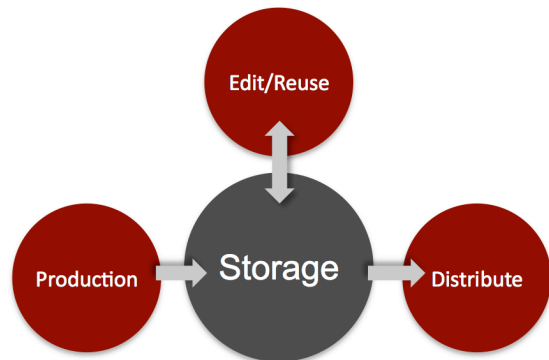
media is growing. Rich media data is not only doubling every few years, but each piece of rich media has become an important and lasting asset. Today, once

rich media is captured or rendered and stored as digital content, it is immediately thrust into an on-going and endless cycle of reuse, where it is time over time re-edited and re-distributed.

At the heart of this increase in reuse has been the ubiquitous shift in rich media practices from working with analog and physical media, to working earlier in the creation process with fully digital media. This fully digital copy – now known as a *digital asset* – can be used to spawn additional copies right and left, and aid users in rapidly modifying those copies with powerful tools. In many cases, the shift to processes like file-based High Definition (HD) video production has relegated the physical tape copy to offline storage nearly as soon as it is created, or has done away with the need for a master tape altogether.

The shift to digital rich media has extended the capabilities of businesses by turning media into a digital asset that can be reused and repurposed, but it has at the same time created technological challenges for the organization. While creation may be more distributed than ever before and involve individuals, small businesses, business partners, and more – at the end of a day the *storage* and care of the digital asset still remains in the hands of a business. Moreover, the use of a digital asset is entirely dependent upon how that asset is stored, and storage now impacts nearly every core work process in the digital media organization. Frequently, that dependence has had an ill effect, creating a barrier to effective use rather than *enabling* effective use of the digital asset.

## Core Media Processes and the storage challenge



**Figure 1:** Storage is at the center of core media processes.

In our view, there are four fundamental processes at the heart of every media organization. Those processes are illustrated in Figure 1 above, and include Ingest, Edit, Distribution, and Preservation (Storage in the illustration). Each of these processes may have specialized needs for their own storage, and the range of solutions offered up by vendors create a complex technology landscape - including technologies like clustered file systems, scale out NAS, SAN storage arrays, Fibre Channel/SAS/PCIE/InfiniBand networks, transcoding enabled storage systems, tiered storage systems, hierarchical storage management products, tape systems, optical systems, nearline versus offline archiving approaches, file and media transfer or delivery services, MAID, a long list of automation products, and much more.

The processes of media creation and reuse are often high performance or complex and

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may for that reason require highly specialized storage systems. Yet in most cases, these specialized storage systems actually impede an organization's ability to work with media across their multiple processes or repeatedly over time.

For the needs of digital asset management, storage silos can create enormous complexity by obfuscating the total view of assets, and complicating access and management of those assets. Worse yet are archival solutions that create yet another set of tape and disk silos in the archival layer. Even with high degrees of automation, unifying such storage repositories creates points of failure in the management layers, and may introduce unnecessary latencies in accessing data.

While this hasn't been entirely missed in the industry, vendors have been pre-occupied with addressing lucrative specialized needs, and have been slow to address the requirements of each separate media process to access the same media assets. Meanwhile, "business as usual" has simply not realized the challenges that distributed storage silos create in the media organization. Let's look at how typical storage practices impede each of these core processes in the media organization today.

### **A Challenge for Production**

The first phase of a digital asset's lifecycle is plagued with problems introduced from digitization. First, the ingest of digital data requires storage with extreme high performance; second, digital assets consume enormous amounts of this expensive storage; and third, the lack of

physicality now makes assets harder to accurately manage and optimally place on the right type of storage according to how they are being used. In combination with poor solutions for long-term storage – including movement technologies as well as secondary storage that can scale to the size required for large numbers of digital assets – this encourages the use of primary storage pools for all types of digital assets. In turn, digital assets can become trapped on high performance storage silos where they create runaway costs for buying, licensing, and operating primary storage and video production environments that may also include expensive video routers, control rooms, media servers, and more.

### **A Challenge for Editing and Reuse**

Even when organizations resort to drastic measures like retaining digital assets on primary storage systems, they find their challenges do not end with the production phase. The vast majority of rich media can be created by individuals today, and there is now more demand for collaboration and access to media than ever before. For the rich media business, this means there may be more independent contractors and outsourcing business partners than ever before, and the workforce may be more distributed as well. Outside animators may be designing animations and/or technology, or an editor in a far away office may be reviewing footage.

Moreover, with the tremendous amounts of media in use and being reused today, a media-centric business must have a single view of their total asset catalog. The problem is that digital media storage

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systems have not been designed for the patterns of access created by this ecosystem. NAS and SAN solutions that are implemented with the intention of storing large quantities of media run into limited scalability and create isolated silos of content with no good single point of visibility when assets are scattered across different locations, arrays and file systems.

For the global workforce, traditional storage systems even further limit access – traditional storage simply isn't designed for access across locations and/or organizations. The modern media organization is often forced to turn to at-best FTP transmission, or worse yet, physical delivery services for tapes, drives, or optical media. Not only are manageability, speed, and accessibility poor, but there is also little control of digital assets, and the chances for asset loss are significant.

### **A Challenge for Distribution**

Within the business ecosystem enabled by digitization, the digital transmission of media hasn't just changed the process or creation and reuse, but it has also changed how media assets generate revenue. The expectation today is that content can be created or reused in an ever-shortening timeframe, and more importantly, that content will be forever and almost instantaneously available. Moreover, delivery also generates revenue and where revenue is concerned, time is money. The traditional infrastructure that requires repackaging of finished product on tapes, optical media, or disk drives subject to loss introduces latency, cost, and risk into the

business cycle. Yet turning to digital delivery often means less than ideal FTP practices that are dependent upon administration, designated storage locations, additional copy processes, and the performance of a local Internet connection. The traditional storage infrastructure is simply not built for the distribution of final digital media product.

### **A Challenge for Preservation**

Finally, the constraints of traditional storage also compel media organizations to either do too little or too much to appropriately protect the massive quantities of digital data they are creating. If organizations are relying on specialized storage systems and the silos they create to store long term assets, data protection and disaster recovery practices can be complex, involving multiple technologies and systems such as backup disk, tape libraries, backup software suites, snapshot tools, replication technologies, and more. Even worse, these technologies may vary by storage system.

Moreover, organizations turning to larger secondary storage systems for digital assets, digital data that runs into terabytes or petabytes, and such large storage capacities may create digital integrity challenges. At these data set sizes, data corruption issues such as digital bit-rot – either through the loss of magnetic orientation or substrate deterioration - may go completely unrecognized until trying to reuse data. The risks for both data corruption and data loss exponentially increase as the size of storage systems increase, and practices for protecting data integrity at scale – including multiple copies, per copy check-summing,

periodic verification, and more – can create enormous complexity. The bottom line: the challenges surrounding preservation can disrupt or halt the core business practices in the digital media organization, and potentially even destroy important assets.

### **Storage is the process hub**

As is clear from an examination of these processes, the common lack of a comprehensive approach to long-term storage and collaboration can create significant disruption in the heart of every media business. In the digital age, digital asset storage has become the hub of each of the media organization's processes, and traditional storage has not been built for the media organization.

Perhaps in part from this realization, we have repeatedly seen media organizations begin to realize the challenges surrounding digital assets, and take a hard look at solutions in the market that seem to be any type of match for their multi-faceted needs. While we've watched many potential solutions vetted, one technology that has gained increasing traction has been cloud storage. In many cases, this has been a result of collaboration challenges bubbling to the surface in the face of increasingly larger projects, and the cloud has been a natural place to look for collaboration solutions. In other cases, cloud solutions have come on the radar due to the compelling economics they offer in contrast to ever-escalating and out of control primary storage costs. In other cases, the cloud has gained attention because it is one of the few solutions that

can store and protect the quantity and size of digital assets in use today in a single master repository. Without a doubt, there are other paths that lead to the consideration of media storage in the cloud as well.

With this in mind, let's take a brief look at how some users are considering the cloud for integration with their media systems, and then look at how the characteristics of the cloud are meeting up with digital media work processes.

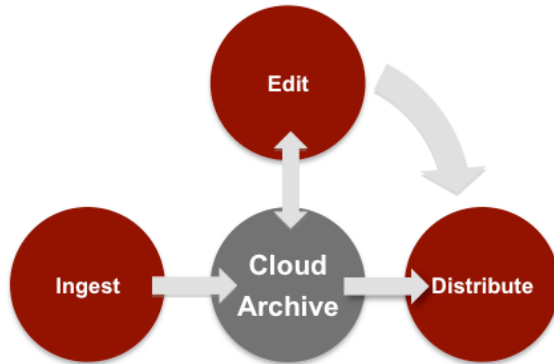
### **Cloud Architecture for Media**

From our discussions with emerging users of the cloud, we see a clear architecture evolving for how cloud is integrated with other storage systems in a media organization. The cloud offers the media organization access to an almost infinitely scalable repository, but it remains at its core a remote repository. For this reason, we see early adopters creating a tiered, hub and spoke storage solution in their data centers. At the hub is a massive cloud storage repository, and every special purpose storage system in the organization is connected to this master hub.

In reality, this has always been the best practice for the media organization – assets should be stored on a centralized master repository, and then copied to production systems as required. This secondary asset storage pool can be a key enabler, or a key debilitator for the processes in the digital media organization. But dealing with the storage challenges in this secondary "hub" has long been a challenge. The cloud for the

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first time provides access to a single repository that can scale without running into limits, while requiring minimal management effort.



**Figure 2:** Media organizations are turning the cloud into a central hub acting as the master digital asset archive. Assets in turn are temporarily transferred to specialized storage systems as each core media process takes place.

In the past, it may not have been practical to consider a solution across the internet as the sole master repository for media, but enterprise cloud approaches today are augmenting their accessibility with a localized gateway appliance. That appliance typically has the look, feel, and responsiveness (within the boundaries of local cache) of a traditional NAS server. Moreover, automation and asset management tools today are built to work with standard NAS protocols (NFS, CIFS) and make integrating cloud appliances easy.

Augmented with easy accessibility, we see customers turn to the cloud as this master repository where digital assets are moved and accessed for further editing, collaboration, or even download by business partners. By feeding all data

directly into this repository, the media organization can have more flexible and far ranging access to all assets than ever before, and simultaneously get easy growth and management on a pay-as-you-grow basis. At the end of the day, the cloud can be a much more accessible and capable solution and enable an organization with a single storage hub for digital media asset storage and interaction.

**Designing the Cloud Connection**

We frequently encounter end users struggling to assess what traffic demands cloud storage will create for their organization, and wondering whether they can obtain and afford the connectivity necessary to make cloud do what they want.

For many of these customers, the days of limited and expensive Time Division Multiplexing (TDM) and optical circuits are nearly over, but they may not realize it. While all technologies have dropped in prices over the past few years, some metropolitan area technologies like Metropolitan Optical Ethernet (MOE) have driven wide area and internet connection costs from 100's of dollars for each megabit of speed down to 10's of dollars per month. If used heavily, those costs can translate to only fractions of a penny per gigabyte of data transferred during a month.

Consequently, it is now practical to consider even the extremes of gigabit connections and in turn enable the business to transfer terabytes of data on a daily basis. Even when organizations are not considering large amounts of data change on a monthly basis, they may have large transfer

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demands in a single twenty-four hour period that can be cost effectively supported with such large connections. With the right cloud provider – capable of supporting high ingest rates – the cloud customer can perform the transfer of terabytes of data in a 24-hour period without fear of locally creating bottlenecks.

As media organizations evaluate the cloud, they should consider three dimensions of connectivity:

**Peak Transfer Rates.** First what are the maximum transfer sizes and rates required for collaboration or other key business processes? A rule of thumb is that each 1mbps of bandwidth can easily transfer 10GB of data per day.

**Worst Case Transfer Demands.** Secondly, consider the worst case transfer requirements if a total copy of large data sets is required. Perhaps this represents the last minute demands of a key business partner, or a total re-download of the cloud storage system in the case of a local disaster.

**Average data change.** Finally, evaluate average data access patterns—how existing data is updated or altered, and how much new data is created over a specific time period. More than likely, designing for the other two criteria first will mean you have more than sufficient bandwidth for this on-going, and less visible, rate of data change.

### Controlling Cloud Costs

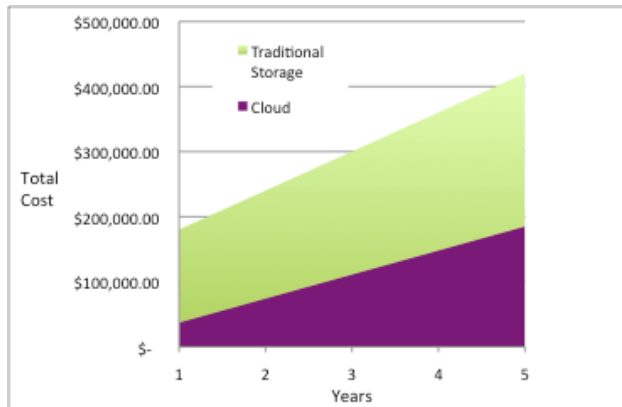
Once bandwidth requirements and costs are identified, we finally find users attempting

to estimate what their total on-going costs will be for cloud storage, often without first engaging a trusted partner who could shed light on typical cost drivers. Frankly, there are several factors such end users often overlook:

1. Although cloud incurs more regular on-going costs (monthly), the simplicity of management compared to traditional storage can in many cases almost or completely offset these costs, without even considering the capital costs of traditional storage equipment.
2. The hosted nature of cloud storage may similarly offset other recurring and often unrecognized operational costs found in traditional storage, such as on-going maintenance and licensing costs, power and cooling costs, and the value of data center floorspace.
3. Cloud storage can make key advanced data integrity and collaboration capabilities available to media organizations with the economies of scale available in the cloud, and the cost of these capabilities will likely come much cheaper than locally building similar technology.
4. Finally, cloud storage cannot be compared byte for byte with data center storage, as cloud storage is paid for on an as-used basis, whereas NAS systems are typically tremendously underutilized. Consequently, cloud storage should be priced by the “managed gigabyte”, while traditional storage will need to be significantly over-provisioned to address growth, performance, data protection, and real versus raw capacity issues. We often see organizations running NAS systems at

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45% to 55% utilization rates in an attempt to avoid encountering scalability limits that would trigger a complex migration exercise.



**Figure 3:** Illustration of comparative costs over 5 years of purchasing and operating a typical 10 TB NAS solution (priced at \$10/GB) versus cloud storage for 6TB of data (60% utilization of the NAS system). Costs assume 100% transfer monthly with over-provisioned metropolitan Ethernet bandwidth at 1gbps that would support a full data set transfer in less than 24 hours. Costs do not consider secondary traditional storage costs that are offset by cloud, including time and effort associated with moving and sending digital assets during reuse or distribution.

While end users should keep these cost offsetting factors in mind, best in class cloud storage providers today are typically charging for storage by the daily average of stored data, and the amount of data transferred to and from hosted storage. For archival storage that has a lower rate of change, this can easily factor out to low single digit costs per gigabyte a year (we have found users experiencing pricing from \$2.50 to \$4/GB). While this goes up with data transfer rates, even with aggressive

annual transfer rates these costs will typically not approach the total costs of traditional storage system ownership.

Even organizations significantly over-provisioning bandwidth to move large files rapidly can reap significant savings over owning and operating traditional storage as a digital asset repository.

### Unleashing Media Processes

With an understanding of the four core digital media processes that interact with digital asset storage in mind, we'll again turn an eye toward examining what the cloud can do for the media organization, with an eye toward how the cloud can impact storage and operational costs for the media organization. Let's look at each process in turn:

#### Cloud for Improving Ingest Practices

The cloud can easily be used as a best-in-class long-term storage tier for digital assets after the time of creation. When this is combined with a cloud gateway appliance that looks like a local NAS server, data can be easily tiered off of production systems using the standard protocol support available in automation and management tools, or simply by manual process. But doing this to a single cloud repository that is infinitely scalable significantly simplifies the process when compared to traditional storage approaches that must keep space constraints in mind, likely rely on complexity and latency introduced by tape or tertiary tiers of storage behind the secondary tier, and that may consist of

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multiple archive silos. Let's look at the specific benefits, and challenges solved:

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***Challenges addressed***

The productive use of a secondary tier of storage can reduce the over provisioning of primary storage.

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***Cost Dimensions***

The cloud characteristics that enable more effective digital asset storage tiering – including the local presentation of an infinitely scalable NAS appliance – create a number of cost efficiencies in the storage behind the production process.

- Reducing the demand or misuse of primary storage systems reduces operational costs, including power, cooling, maintenance, and licensing.
- Reducing the demand or misuse of primary storage systems also reduces the time and effort associated with managing and monitoring primary storage, as well as the intense effort required to periodically migrate data as equipment upgrades happen.
- Since the majority of storage upgrade or replacement projects are driven by capacity demands, reducing the demand for primary storage will make existing systems last longer, and lower the total cost of ownership for expensive production systems.
- Immediately tiering data to the cloud after production can position data for immediate future reuse, while also reducing significant time and effort the organization may currently expend on copying or moving digital data for the next steps in the media process. This

savings increases with the size and geographic distribution of an organization, as larger organizations require more media handling for distribution to work teams.

**Cloud for Improving Editing/Reuse**

The cloud's world-wide accessibility is purpose-built for "follow the sun" work processes, and businesses with globally distributed employees and partners. The right cloud solutions can cache or redistribute content based on typical access patterns, and make sure data stored in the cloud is optimally placed for high speed download. The cloud's ubiquitous accessibility – only an internet connection is needed – means data stored in the cloud can be dynamically configured for access by anyone at a moment's notice. In a media industry surrounded by demands for collaboration and digital asset reuse, the cloud can be a key enabler that breaks down the barriers and management overhead imposed by traditional storage systems, corporate firewalls, and complex data sharing processes. Simultaneously, cloud technologies built for ease of administration and rapid configuration or removal of access can make shared data more secure and better managed.

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***Challenges addressed***

Traditional storage systems are challenging to configure for changing patterns of access, are poorly accessible outside of a local network, and lack the scalability to store all of an organizations digital assets for in a single system. Global data accessibility can be a key component of enabling a global

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workforce without excessive time and effort spent on collaboration processes.

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***Cost Dimensions***

Organizations reviewing how the collaborative nature of the cloud enables their editing and reuse processes should consider these cost factors:

- Traditional approaches to digital asset storage typically require significant time and effort for the recall and transmission of data for collaboration. Typically, tape archives may need to be recalled, duplicated, and manually shipped, or complex systems put into place for the electronic transmission of data to business partners. Moreover, these manual processes may introduce significant delays that incur additional costs. The cloud is out-of-the-box ready to provide world-wide collaboration with minimal time and effort, and with the right implementation, can significantly reduce delays as well.
- In the process of traditional data sharing and transmission, organizations often face significant and/or unrecognized risk of data loss for both intellectual property and valuable finished product. While intellectual property loss can be addressed with complex data protection processes, piracy or misuse associated with finished product often has fewer clear solutions. World-class security, access management, and encryption practices from cloud providers can offer effective solutions for both issues.

**Cloud for Improving Distribution**

Flexible access in the cloud extends the usefulness of a cloud-based digital asset repository to the distribution of final product as well. While the cloud will not at any point in the near future displace traditional Content Distribution Networks (CDNs), a well-integrated cloud can provide immediate access to any master digital asset, and easy configuration means the media organization can control that access with the same or better levels of surety that they receive when shipping media via FedEx. Moreover, the cloud can extend distribution capabilities in “long tail” models, where content is accessed repeatedly over a longer period of time. This can let the media organization consider new business models with customer organizations who may not themselves be able to store content over such a long period of time, or develop other services around repeated access and reuse. With the cloud the media organization is able to extend access to their master repository to business partners or customers in innovative ways, and do away with the hassle of creating more copies and managing specialized storage systems.

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***Challenges addressed***

The Cloud altogether removes the need for manual packaging and delivery of media, or secondary external access / file transfer systems that require their own management. Moreover, the cloud provides a platform for external services and innovation that would take enormous internal efforts to match.

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***Cost Dimensions***

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When considering how the cloud augments existing business processes, media organizations should simultaneously assess the costs associated with working around the limitations of traditional storage as well as the capabilities introduced by a more extensible and accessible platform. Unrecognized cost elements of existing practices may include:

- The cost of packaging and distributing final product to business partners.
- The costs of managing internal systems for electronic delivery.
- The future costs of developing outward facing services for more innovative access to digital assets that may be demanded by customers using such capabilities from competitors.

### **Cloud for Improving Preservation**

Finally and not to be overlooked, for the media industry cloud storage has an especially compelling set of capabilities around data preservation that is simply unmatched by any out-of-the-box solution on the market. Issues like data integrity and data protection simply cannot be well managed at the storage capacities that many media organizations must consider when thinking about the scale required for their full catalog of digital assets. The cloud is the only way that enterprises smaller than the largest in the world can deliver these levels of availability, data protection, and data integrity.

### ***Challenges addressed***

In an electronic age, managing data integrity is more difficult than ever, and many organizations have far from best

practices today. With continued growth in digital assets, more practices will have to be employed for assuring data integrity. Moreover, with increasing demands for digital access and delivery, outage free availability and continuous disaster preparedness is a growing and costly demand for the media organization.

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### ***Cost Dimensions***

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For digital asset preservation, which is the very lifeblood of the digital media organization, recognizing the value of cloud capabilities requires a look at costs that fall outside of the existing practices of most organizations. Why? Most organizations simply are not executing the full range of best practices that are becoming more critical as the importance of digital assets grows. These practices include:

- The time and effort associated with deep data integrity management to avoid issues occurring from media substrate deterioration, physical system failure, or magnetic orientation loss. This make take home grown practices and software to routinely validate data and recover from loss of integrity.
- The time and effort associated with rigorous physical system testing, as well as the monitoring and planning for physical system obsolescence (an on-going challenge with tape subsystems), and the execution of periodic media migrations.
- The time and effort required for digital media asset management system configuration as storage system migrations take place.

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- The time, effort, and system cost associated with the multi-tentacled approach to protecting digital assets on traditional storage that includes multiple physical storage systems, off-

site storage, replication technologies, and the frequent recall, restoration, and duplication of media on any one of multiple storage systems.

	<b>Costs</b>	<b>Capabilities</b>
<b>Production</b>	+	...
<b>Edit/Re-use</b>	+	+
<b>Distribution</b>	+	+
<b>Preservation</b>	...	+
		- Negative Impact
		... No Impact
		+ Improves

**Figure 4:** The net impact of cloud storage on core media processes.

### Focus on Nirvanix

In our opinion, choosing a trusted partner is more important in the cloud than in any other domain of information technology. While generations of hosted infrastructure technologies have come and gone, cloud storage is rapidly becoming a wide spread and widely used technology that appears charted for a course as a long term, key technology in nearly every shape and kind of business. Moreover, today's cloud technologies are marked by a distinct set of capabilities around extensibility and access, ease of management, optimal placement of data for best possible access around the globe, and extreme data integrity levels. Since their founding, Nirvanix has consistently demonstrated technological leadership in each of these dimensions.

With a targeted specialization in the media industry, and cloud storage industry

leadership in developing successful customer implementations, Nirvanix is bringing key capabilities of their Storage Delivery Network and Internet Media File System to bear. These capabilities include:

- Best in class responsiveness and service levels from the Storage Delivery Network that are delivered through strategic selection of best in class data centers and internet trunking sites.
- The innovation behind the Nirvanix Internet Media File System that has the back-end intelligence and proactive multi-data center caching to optimally place data around the globe for optimal performance no matter where data is requested from.
- APIs and management capabilities that have set the bar in the market for other services and made Nirvanix an ideal platform for the development of additional 3rd party or homegrown

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services, including the likes of today's existing thumbnail generation, transcoding, and other "in the network" services.

- The market first in cloud appliance-gateways, which today is available as the Nirvanix CloudNAS software that can be installed on any server to create an NFS/CIFS/FTP accessible, caching local gateway to the cloud.

### **Taneja Group Opinion**

The fact of the matter is that completely unified storage for the media organization will remain a pipedream for some time to come. The perpetually increasing capabilities of digital video, including today's 4K HD video streams, are consuming disk capacity and performance at gigabyte per second rates per user. At such high performance demands, isolating the contention created by multiple users or uncontrolled processes can often only be done with isolated storage systems.

In turn, we see the media organization adopting a split approach to storage – primary performance-oriented systems, potentially in multiple special purpose pools, and a secondary unified pool of storage that can act as a media library. But a single unified system for long term storage – a system that ideally can support collaboration, global access, distribution, and even extension to new digital business models – has been an on-going challenge to the media industry.

In our view, the cloud is poised to change this with dramatic effect in the media industry, as well as every other industry faced with demands for long-term, on-going storage and access to important intellectual property. In contrast to users who may be entertaining ways to store data that is a nagging afterthought – the long unopened excel spreadsheets and miscellaneous music files that creep onto the traditional corporate network – users that are faced with enormous sets of important data can find a significantly greater value proposition in the cloud.

While every service relationship should be vetted carefully and planned for accordingly, by turning to trusted and vetted cloud providers, like Nirvanix, we're confident that media organizations will resolve the sticky issues facing their storage practices, and simultaneously open the door to a considerable set of new business capabilities.

In the tradition of many outsourcing arrangements, some businesses will inevitably turn to the cloud to "continue business as usual, but cheaper." Other businesses will realize the potential of the cloud to revolutionize the ease and efficiency with which they do business, while simultaneously providing a foundation for new business. In the media industry, the cloud clearly carries capabilities for the latter.

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