A Guide to Video Content Management for Higher Education

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A Guide to Video Content Management for Higher Education

Both Harvard and Oxford Universities have had YouTube Channels since 2005 — providing free access to lectures, seminars, and other educational material. Esteemed institutions have even started to offer accredited remote classes.

The application of video in tertiary (and secondary) education, like all ed-tech innovations, is a controversial subject. But with colleges debating their ability to reopen in the fall, significant strides in remote learning capabilities are going to have to be made rapidly. Although only one component of that shift, video is a critical tool to deploy.

What's more, video plays a critical role in student recruitment and student engagement. It's even important to staff recruitment, alumni programs, internships and more. Video accounts for more than 80% of all internet traffic — the current generation expects video content. Matching those expectations will be increasingly important.

In the long term, accelerating the embrace of remote learning technology may actually be beneficial. Online resources and video lectures have increased access to educational material and encouraged autodidacticism like few innovations have before. And your immediate need to match remote learning demands will help set you up to use video across the board.

For educators, making the right pedagogical choices is front of mind. However, before universities can even get there, they need to confront a myriad of technical and workflow challenges in order to scale their video production and storage capabilities.

What this ebook will deliver

We are not educators — we are experts in video production. This eBook is not about how to effectively deploy video to deliver educational outcomes or attract students to your university. It's about transforming your video content management (VCM) system to match the demands of video-based learning and outreach.

This eBook will look at how secure, cloud-based, multi-user collaboration is possible. We will explore the value of advanced recognition software (object and speech detection) to improve asset ingest, metadata creation and archive transparency. We will explain the new workflow possibilities that the right software investments allow.

We want to set out a strategic vision for the future that will allow educators to easily collaborate with video production staff — a challenge made all the harder by work-from-home (WFH) policies. We want to help you reduce the administrative and technical burdens of producing video content so that educational outcomes can remain at the forefront.

To these ends, our goal here is to empower you to make an informed decision that will benefit the outcomes you are looking to achieve. By making the right short-term investments, you can also reap long-term rewards. There's a lot to cover, so let's get started!

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Video content management vs media asset management

The big shift impacting universities looking to upgrade their video content management (VCM) capabilities is increased access to broadcast–grade media asset management (MAM) tools.

Theoretically, you could call any media storage system 'MAM', and any video management tool 'VCM'. Practically, however, the terms have more specific meanings. With that said, the distinctions between VCM and MAM are arguably semantic. More important is the acknowledgment that the technologies

deployed within video asset management have rapidly evolved, and brought along with them terminology changes.

If you have any background in digital asset management, you'll know that the number of acronyms used doesn't stop here. There is **DAM, PAM, VAM** and more. The definitions that exist aren't strictly followed or universally accepted. However, exploring some of the more common definitions for these terms can help shed light on differences in the market that are actually worth understanding.

Definitions: exploring the alphabet soup

VCM: (Video Content Management) is the long–standing acronym for a CMS (content management system) able to support video assets. Historically, these tools have focused on cataloging finished video assets, but have increasingly integrated production–focused capabilities. However, if there is something that differentiates VCM within this list, it's a low–complexity focus on archive management for organizations with limited video content management needs.

DAM: (Digital Asset Management) might be considered the umbrella term, sometimes used to describe any tool able to assist in the management of digital assets, such as videos, images, text, brand materials etc. DAM is probably the oldest term on the list and (like VCM) focused on the management of finished assets for post-production and archive storage. However, unlike VCM, a DAM is likely only to be optimized for smaller text files and brand material. If you want to give DAM a narrow definition, that isn't a bad place to start.

PAM: (Production Asset Management) is a dedicated term for tools with production–orientated capabilities able to keep track of revisions to frequently edited files. Most of these tools are relatively simple, focused on version tracking and storage interfacing. Because they aren't dedicated to a specific medium (video, images, text etc.), generally speaking, PAM tools don't have additional features that might change how workflows are constructed. They simply make tracking changes easier.

VAM: (Video Asset Management) is a term used to describe DAM or PAM systems purpose–built for video. To a degree, this is the kind of system that we will be discussing here, and also could be categorized as a modern VCM system. However, on its own, the term VAM doesn't actually tell you if the system was built for archive or production purposes. Ultimately, it is not the most commonly used term on this list.

VAM is also sometimes called VDAM **(Video Digital Asset Management)** to acknowledge how VAM systems end up incorporating and managing more than just video assets. But the original focus on video has led to the development of features that let VAM systems stand out.

MAM: (Media Asset Management) is used to describe asset management platforms able to accommodate both video and a wider range of media assets. Realistically, the difference between VAM and MAM is a marketing distinction. The same goes for a comparison between MAM and VCM.

With that said, MAMs (generally) come out of the broadcast industry, and have a greater capability to handle large workflows. Moreover, this market is where the largest technological developments have occurred, and often covers the most advanced software systems available.

If there is a definitional difference, what distinguishes MAM from VCM is the integration of advanced collaboration and automation capabilities, along with the ability to manage larger archive environments and production workflows. Although you can find MAM tools focused on either production or archive environments, the best MAM solutions (as we will get to) can do both.

Do these differences matter? No!

The quick answer is no! Don't pay any attention to any of these terms. There is a lot of crossover between VCM, VAM, VDAM, DAM, MAM and PAM. When it comes down to how the terms are practically used, that crossover is even greater. Arguably, this alphabet soup only exists because of legacy branding decisions. You can't make too many product capability judgments based on the acronym used to describe it.

There are plenty of systems that are called 'MAM' with more video production capabilities than something called 'VAM'. There are some VCMs with more advanced automation capabilities than a MAM. And the way terms get used within a particular office can be influenced by how the tools used label themselves, regardless of how they fit into these broader definitions.

We are going to use MAM throughout this eBook **for the sake of simplicity.** We believe there is a slight benefit to focusing on this term when making a purchasing decision. However, what is important is that you recognize that these differences exist.

When investing in software, you need to tailor your decisions accordingly. If all you need is an archive management tool, there are systems built just for that. If you want something able to supercharge your video production capabilities, there are tools that can do that too. Pick the right one and get the outcome you need at a price point that fits.
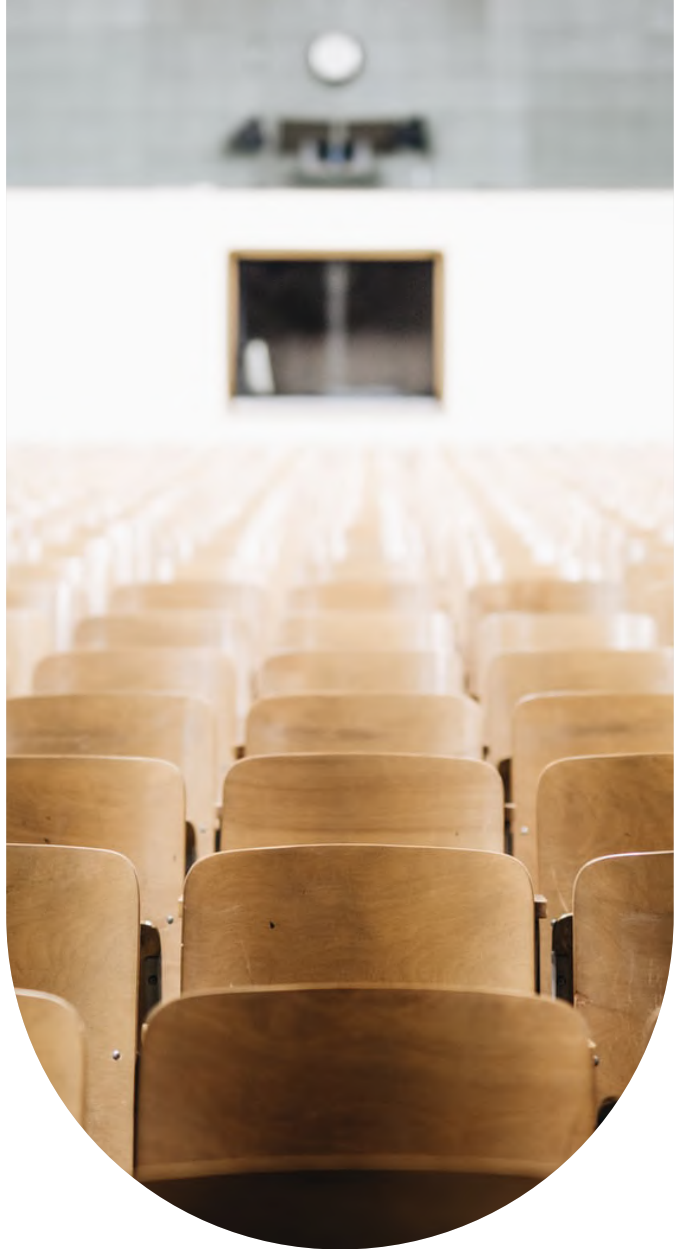
Quality archive (storage) features

Video files are big — really big. A standard PRORES 422 HQ at 1080 and 30fps is around 1.7GB per minute of footage. 4K files, in theory, are four times the size of 1080p. Obviously, there are variables when it comes to specifics, but it's easy to see how these figures can quickly get out of control. The first 8K TVs became commercially available in the US in 2018. It's only a matter of time before that begins to infiltrate more and more video requirements.

When you look at how these figures impact educational institutions with sprawling and ever growing storage needs, it's easy to understand how things get quickly out of hand. To accommodate the file sizes in video, two things are generally done: deploy compression technology (ideally lossless formats that allow you to restore footage to its original quality) and tiered hardware solutions that allow you to use cheaper (but slower) HDD infrastructure.

Recently, there has been an additional growing emphasis on the cloud, hybrid-cloud systems and 'hyperscaling'. But the basics of storage have remained broadly unchanged — compress files and move them to lower speed storage infrastructure.

When looking at archive solutions, you want to assess the quality of their compression technology and the simplicity of transferring files from production-oriented environments to archive. The future is definitely in the cloud, so investing in cloud-enabled solutions now is a must. Your ability to access the cloud, however, will be impacted by other infrastructure. The quality of your infrastructure more generally is key to a smooth cloud operation and standard archive procedures — the right software will only get you so far.

Video production tool basics

Production challenges are different from archive. You need fast access to a smaller set of high-quality files. Ideally, you want the ability to track versions of files, and sort and catalog versions and clips within a single project.

Your production tools also need to integrate with editors. You don't want to be switching between different applications when searching for clips and making actual edits. A good MAM (or PAM) will integrate directly with the editing tools you want to use. When making a purchasing decision, make a list of the tools you're currently using (be that Adobe Premiere Pro, Avid Media Composer or Final Cut) and compare that with the integrations available.

Production tools should also serve as the first point of ingest into your system. An effective production tool will make that process simple by automatically collecting basic metadata, allowing you to preset where files are saved, and providing automated and manual encoding options.

Dynamic archives: end-to-end video management

When it comes to legacy MAM, DAM and PAM systems, your archive and production environments remain separated. If your video asset demands are limited and you don't need heavy production-focused capabilities, this split can save you from investing in features you won't use. However, that isn't likely why you're reading this eBook.

If you want tools that can deliver improvements to your production process, using separate systems for active management of assets and archive isn't optimal. It forces hard choices about what to archive, drives up storage requirements, and (maybe most importantly) diminishes your ability to access and put to good use archive material.

Equally, a lot of the technology that enables online sharing (or even real-time editing) duplicates many of the compression techniques required for quality archive management software. Attempts to deliver remote access solutions is one reason that you're

starting to see an expansion of dynamic archive systems that deliver end-to-end capabilities.

A theme we'll come back to time and again is centralization of information. As you invest more in video assets, you'll want easy access to that back catalog. Only then will you be able to get the greatest return on your investment for creating videos in the first place.

Although you may want to focus on remote workflows today, if you take one thing away from this eBook, let that be the importance of easily searchable archives that mesh directly with production-orientated tools. That simple change will increase your efficiency as a team, regardless of any other 'cutting edge' solutions you adopt. It's critical to effective WFH strategies. And if you can't get this right, the value of any of those other fancy solutions will be lost. Dynamic archive tools are the litmus test for serious MAM.
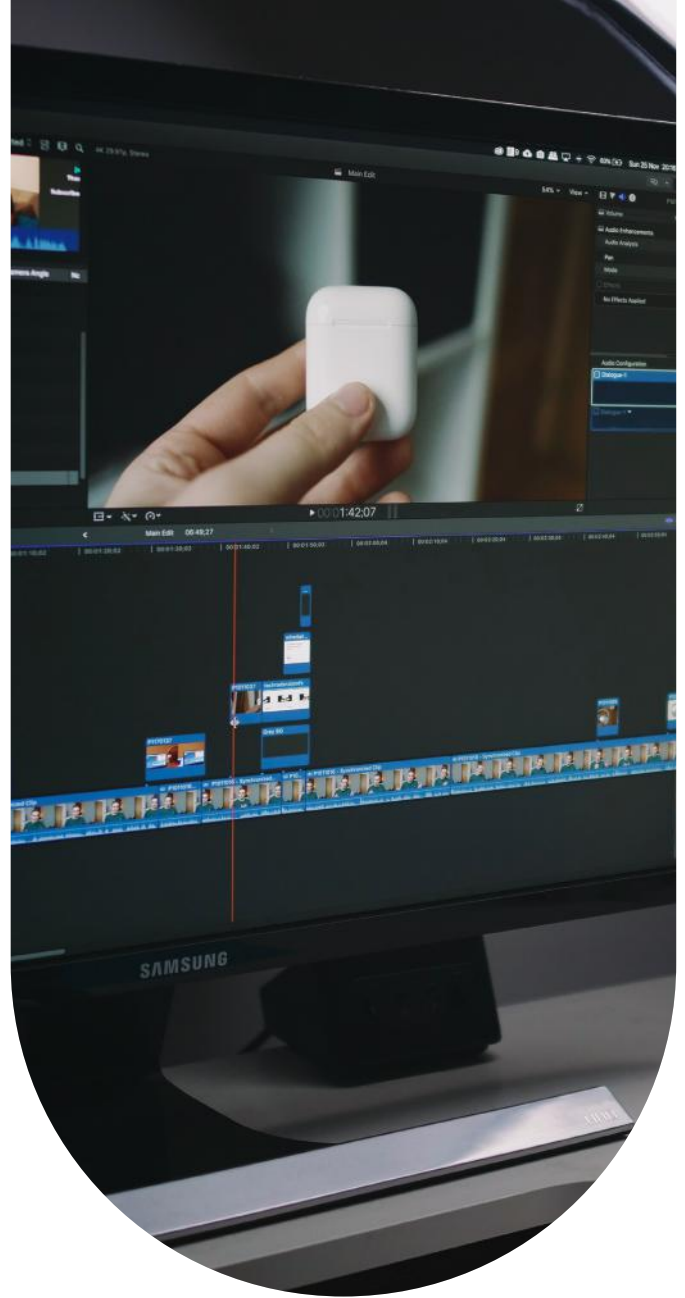
Metadata: mayhem or maestro?

Metadata is the key to a better future, but it can overwhelm you just as easily. Everyone is aware of the move towards 'Big Data' — the data economy and data-driven workflows. When it comes to media asset management, metadata is your 'Big Data'.
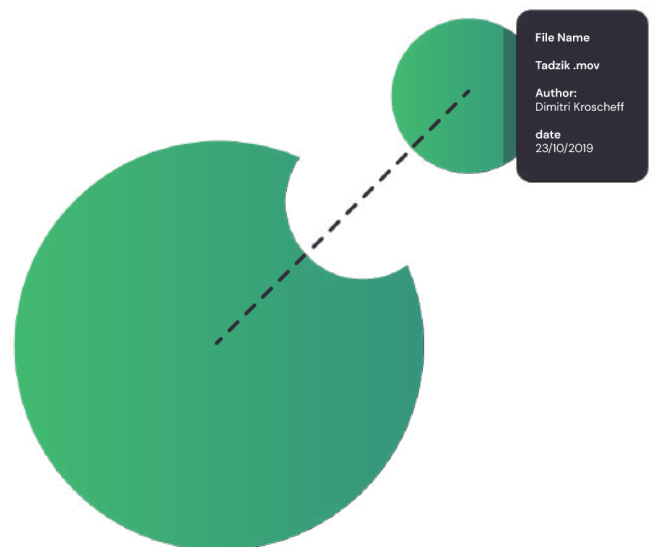
What is metadata?

Just so we're absolutely clear, metadata is data that gives you information about other data. When it comes to MAM, that primary data is the video (or other digital asset) and the metadata is information about that video — date created, date ingested, file name, length, description, etc. Highly-descriptive metadata can go far beyond that, detailing the specifics of what is contained within each clip and subclip –– but more on that later.

Why you want metadata

Metadata lets you understand video files without viewing them, enabling you to search, sort, and catalog assets at speed. The more metadata you have, the more accurate and effective your processes will be.

The right descriptive metadata will allow you to not only select the right clip, but jump to the right spot in that clip in order to get the shot required. For instance, a one-hour video of a lecture could be tagged with sub-clips detailing each section of the lecture, in addition to providing context about the whole.

The value of this information applies to both production assets and access to archived material. It is critical to build metadata creation processes into your workflow at every stage. You also need systems in place to interpret and sort that data to not be overwhelmed by decisions.

The challenge of metadata

The first problem with metadata is creating it. Without tools to help you, metadata has to be created manually. This is obviously undesirable, taking up time and creating a process that is prone to error. To be useful, metadata also needs to be created using standardized terms. This is a huge problem for any system relying on manual inputs.

Some of the most helpful metadata goes beyond the basics of data and time by extending to descriptions of what's contained. For example, tagging footage as "zebra running" during the creation of a nature documentary makes it really easy to find that footage (and compare it to the other similar shots) when the time comes for a shot of a running zebra. Having this kind of descriptive metadata within your archive is also a long term investment, opening the door to easy and effective repurposing of everything in your back catalog.

However, for descriptive metadata to actually be useful, it needs to be uniform. You might label your footage "zebra running", but another media manager could use the tag "running zebra", "zebra", "zebra herd", or something entirely different like "African wildlife". If this occurs, very similar shots will not be grouped together, making them harder to find and compare.

The second challenge of metadata is analyzing it. Like with all big data projects, the amount of information can quickly overwhelm. Particularly if using automated tools to create metadata, it's critical to have tools available to help you analyze that data and put it to good use. You want to be able to pull reports on the types of footage you have, the types of tags being created and even get suggestions on what to search for.
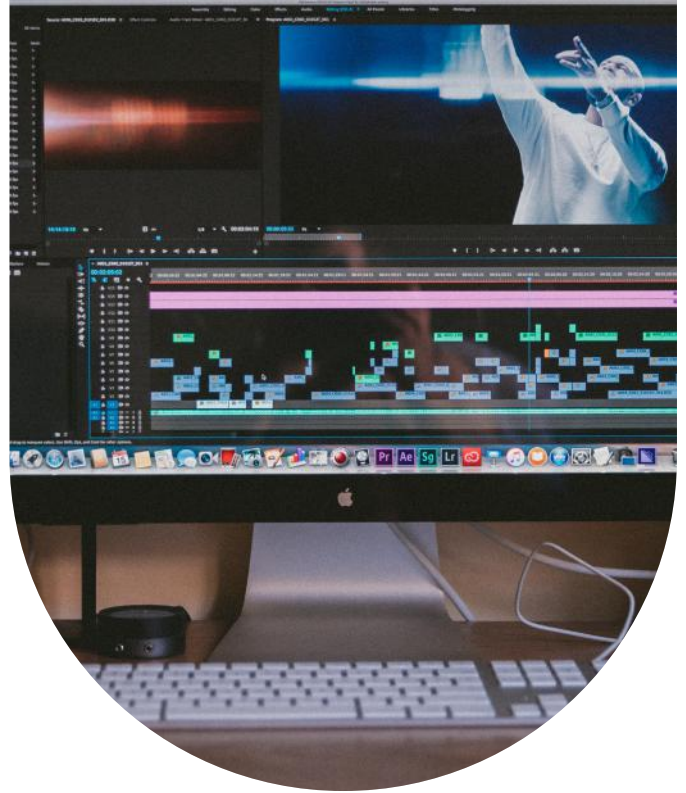
What MAM can deliver to the metadata process

Streamlining metadata ingestion and creation is central to an effective MAM system. The first level of this is the ability to capture all metadata created by the device during ingest. Generally, that means time, date, length, creator, file type and sometimes location. This allows you to populate your system with basic metadata information without having to think about it at all.

MAM systems also help optimize a number of other more advanced metadata assets. The next step up is the use of controlled vocabulary inputs for manual metadata creation. Rather than just allowing media managers to create whatever description they want, they will be invited to select from a range of pre-selected terms. This standardizes how clips are categorized. The more sophisticated of these systems also divorces meaning from word order, allowing you to feel confident in your groupings.

The future of MAM metadata collection, ingestion and analysis pulls together a number of cutting edge technologies to automate the creation of even highly-descriptive metadata. Searchability is on the cusp of getting a significant upgrade, and metadata is at the heart of this transformation. How this is done and how it's enabling new workflows, however, ties directly into how new technology is transforming the possibilities when it comes to media asset management.

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New technology transforming media asset management (MAM)

You shouldn't be surprised to find out that software capabilities have progressed at breakneck speeds in recent years. For a long time, the changes to media asset management have only made the status-quo easier. The leading-edge of MAM is changing business as usual. These are the possibilities we'll explore here.

It's important to note from the top that the real potential of new technology is not simply cost savings. It comes from enabling people to use their time more creatively and add value to the outcome. We want to not only provide guidance on the new capabilities offered by technology, but advice on how to make sure that technology is used to **maximize human potential, not automate away jobs.**

In order to look at this comprehensively, we need to focus on the technologies that have changed. Then, we'll look at the implications for how those evolving technologies impact best practices.

The cloud: for archive and real-time collaboration

Everyone wants to get into the cloud. In 2020, most organizations have some cloud-enabled functions already. But video editing, video production and video storage all lag behind. Sharing video files is a huge problem — literally. Like we said, video files are really big.

As we've addressed, the size of uncompressed video files can quickly become uncontrollable. This is actually one reason getting into the cloud is so desirable. The cloud offers access to massive, scalable storage resources. However, with cloud storage, you're also forced to access those resources through a WAN (wide area network) — the internet.

Even the best internet package available (something your teams should invest in) can never be as fast or reliable as local networks and hardware. This isn't that big of a problem for archive. But trying to run video editing through the cloud without taking proper precautions is asking for failure.

Video files are not only large, they are dense. **Bitrate** is defined as the number of bits per second that can be transmitted along a digital network. The 'bitrate' of a video is the number of bits per second required to stream that video. Compared to other digital assets, each moment of video creates large demands on a network, regardless of how long and large the file is in totality.

The real potential of the cloud goes further than simply sharing. It delivers the promise of real-time, remote collaboration. Theoretically, the cloud could allow video editors the same kind of collaborative control that Google Docs provides to text documents.

To deliver on the cloud-based potential of MAM, two things need to be addressed:

1. MAM needs to confront the issues of **file size** — both in totality and the streaming bitrate required to access and edit files.

2. MAM needs to address **security**. We have not discussed security up until this point. Depending on the nature of the footage, security may or may not be a concern. However, you want a system that you can rely on, and the ability to use the same system for all of your video production needs. Just because some of your footage is destined for the public domain does not mean that security should simply be an afterthought. Getting security right has to be taken seriously to make remote collaboration a reality.

A three-part modern cloud solution: security workflows, proxies, and conform processes

Each problem related to the rapid and secure sharing of video files has been independently solved. We have already mentioned proxies and conforming. When pulled together with encryption in a MAM, it's actually very easy to engage in remote editing. You'd be surprised about how accessible real-time collaborative editing has become with the right technological investments.

01   Secure workflows

Data encryption has really just gotten very, very good. With the rise of online banking, IoT trends connecting more and more devices to the internet, government agencies and big business digitizing their top secret records, and increased pressure from high-profile data breaches, a lot of effort has gone into creating encryption that works.

The introduction of features like two-step user authentication has made old-standards like block ciphers, encrypted keys and symmetric encryption very secure. In fact, up to 90% of all data breaches that do occur are the result of human error, not an actual failure of encryption (or other cybersecurity) protections.

If (or when) quantum computers get made, the reality of true encryption might change. But today, top-quality encryption broadly does its job — it stops people from stealing your data. Keeping your data safe online really is as simple as following good cybersecurity best practices, such as using strong passwords, protecting those passwords, keeping devices secure and setting the right permissions. Properly encrypted data is just as safe online as it is on a hard-drive being transported by a courier. And encrypted data online is far more secure than an unencrypted hard-drive anywhere.

How MAM delivers security built-in

Encryption software can secure your data. The challenge is managing that security within a repeatable process that will not fall prey to human error. You need to be able to set specific levels of access for different users, and track access to your footage. MAM delivers all of these things in a centralized package.

Automation: Removing manual tasks from your video production workflow is one area where MAM shines time and again. When it comes to encrypting files, MAM allows you to set standard, automated protocols that remove the risk that something gets sent unencrypted.

Permissions: With modern MAM solutions, you can easily set permission levels for different users. These are saved, making repeat access simple and secure. You can create preset permission categories to quickly assign new users. You can customize individual access when it's necessary.

Using permissions, you can control who downloads files, who can access edit-histories, and who can make edits in the first place.

Tracking: Keeping your files in one place makes it simple to track access. Like with a Google Doc, MAM systems allow you to easily view who has accessed a file, when they accessed that file, and the changes they made. Tracking improves security and increases visibility over workflows.

Watermarks: Although MAM allows you to control who downloads a file, there is always a risk that editors will use screen capture technology, or just record their screen. However, MAM systems make it easy to introduce unique watermarks that allow you to track any leaks that occur to specific users — if this is deemed necessary.

A MAM outfitted with the right security features will make sharing data safe, and make the processes of ensuring that safety simple. In the cloud, you actually gain more control, more visibility and more security.

02   Proxies ("offline" editing online)

Proxies are size-reduced copies of your high-resolution master files. Working with proxies is known as '**offline editing**', as compared to '**online editing**', which references edits made to masters. Ironically, 'offline editing' is now often done 'online', or enabled through online sharing. However, that's not where it started.

'Offline editing' (creating proxies) originated with an effort to stop source tapes from wearing out through repeated use. With the rise of 4K and increased interest in creating remote workflows, proxies began to play a role in managing the size of digital files and unreasonable demands being placed on in-house computers used for editing.

The value of proxies to cloud editing and storage should be quite obvious — the sharing process is accelerated and the lower bitrates make editing through the internet possible. Combined with improvements to the cloud, good proxies make real-time editing a reality.

What makes a good proxy?

There are good proxies and bad proxies, particularly when it comes to editing. The number one thing that separates a functional proxy from a useless one is **frame accuracy**. Each frame within your proxy needs to be at the exact same timecode as the equivalent frame in your master file. Without this, the conform processes is impossible — the third stage of this cloud editing process.

However, proxies also need to be small. If a proxy isn't condensed enough, it will fail to enable collaborative editing without causing delays or seizing up your system. Lastly, proxies need to be high-resolution enough that effective editing can take place.

Getting the balance between quality and size right is central to your success in the cloud. Your MAM should help you deliver this outcome — not make it harder. Aim for a bitrate **between 2Mbps and 8Mbps.** Lower than 2Mbps and the quality will be too poor. Higher than 8Mbps and you will create latency issues.

Creating good proxies (Part 1): resolution and frame rate

Resolution and frame rate set the bar for the bitrate you'll be able to achieve. A low resolution, low frame rate video compressed down to 2Mbps will look a lot better than a high resolution, high frame rate video compressed down to the same. So, should you engage with compression at all?

The simple answer is yes, of course. There are limits to frame rate and resolution reduction. To create a proxy that's effective, the frame rate needs to remain high enough that accurate cuts can be made. If you start to edge below **24 fps (frames per second)**, you risk sloppy cuts.

Reducing resolution is also a mixed bag. If an editor can only see a clip in reduced resolution, some artistic aspects of the shot might be missed, and the wrong decisions made. Reducing resolutions from 'full HD' **(1080p) down to 1280x720 (720p) or 'standard HD'** is a good starting point.

If you want to go one step further into 'SD' (720x576 and 720 x480), you can reduce sizes further, but at the cost of clarity. Any reductions beyond this point in resolution are likely to hinder the editing process.

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Creating good proxies (Part 2): compression

The next stage is to deploy a number of compression techniques to your video file. A good MAM will deliver automated compression presets. If done right, compression can help **you reduce file sizes by up to 98%.**

All compression effectively works the same way. An algorithm assesses the video and deletes (or minimizes) data that is deemed unnecessary/redundant. Different types of compression are defined by what's assessed and how it's assessed. Although there are a lot of elements to compression, there are really only two key points you need to understand:

1. Intraframe compression
   vs interframe compression
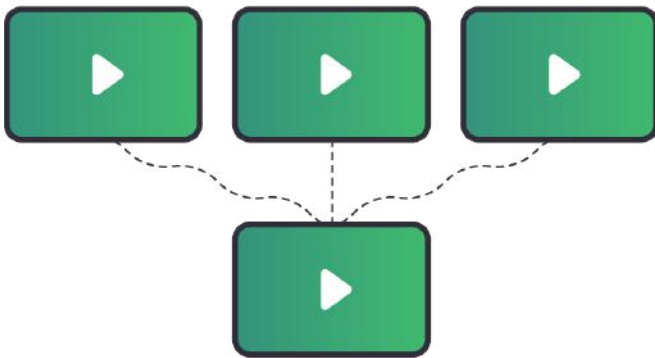
When it comes to how compression techniques are applied across a video clip, there are two main options: intraframe compression and interframe compression.

a. **Intraframe compression** focuses on compression within single frames. Each frame is separated into individual sections and those sections are analyzed for similarities. Where static images are found (a black background for example), that data is condensed.

b. **Interframe compression** takes this same idea of identifying similarities and applies it across the entire video. Rather than assessing frames individually, the video is assessed in totality. Areas in any given frame that are deemed to replicate aspects of a previous frame are deleted. This delivers the ability to achieve a far greater reduction in bitrate without negatively impacting the viewing experience.

To get files sizes and bitrates low enough to enable effective cloud-based editing, you need to use interframe compression. However, interframe compression is a little more complex than one single type of format.

The most advanced forms of interframe compression maximize outcomes by storing frames out of order, and then re-order those frames as they emerge from the codec. This works for streaming, and is common in end deliverables destined to be hosted online. It's also a great choice for archived material.

Re-ordering frames, however, creates problems for editors. Unlike watching a video, editing requires lots of stops and starts. With advanced interframe compression, a large number of unordered frames must be identified and loaded to compile footage everytime the playback location is changed. Although this kind of compression delivers the best 'on-paper' results, the effective bitrate encountered by editors jumping around a clip to find that 'exact' right shot is far higher.

Counterintuitively, the best compression choice for cloud-based editing is older forms of interframe compression. These take the same 'cumulative' approach to compression, but keep frames 'in order'. This delivers more compression than intraframe technology, but reduces the loading costs of repeatedly changing playback locations.

Our recommendation: When it comes to creating proxies for editing, we recommend you use interframe compression. But you need to make sure that the type of intraframe compression you use keeps frame-order constants, otherwise you will run into loading delays that will undermine your entire operation.

2.   Codecs

When it comes to how you actually interact with compression, you will primarily pick codecs. 'Codec' is often confused as a synonym for 'file type'. A portmanteau of coder–decoder, the codec is actually the process by which your file is stored and then interpreted by a device.

File types (e.g. AVI, MP4, MKV) are really the wrapper — containing metadata, along with the video and audio streams of a file, each of which is represented in a codec.

Codecs dictate the type and extent of compression applied. You then have additional control over that compression through setting the bitrate. When it comes to cloud editing, one of the best codecs to use is **H.264.** This is a very common codec used in MP4; it's efficient, small and retains high quality, allowing for both lossless and lossy compression. **MPEG–4** is another common streaming codec, very similar to H.264, although older and slightly less efficient.

For 4K footage, **HEVC (aka H.265)** is increasingly the go–to choice. An updated version of H.264 specifically designed for 4K and Blu-ray, HEVC is commonly used in video capture. When creating proxies, you will likely want to reduce the resolution down from 4K, so it's unlikely you'll actually want to use HEVC codecs for remote editing. But it's an option worth knowing about, and is great for export or local editing.

The other two common codecs, **DivX** and **MPEG–2** are both designed to maximize video quality. Neither are common for streaming videos because of the large file sizes produced. However, both are good choices for local editing and deliverable export formats.
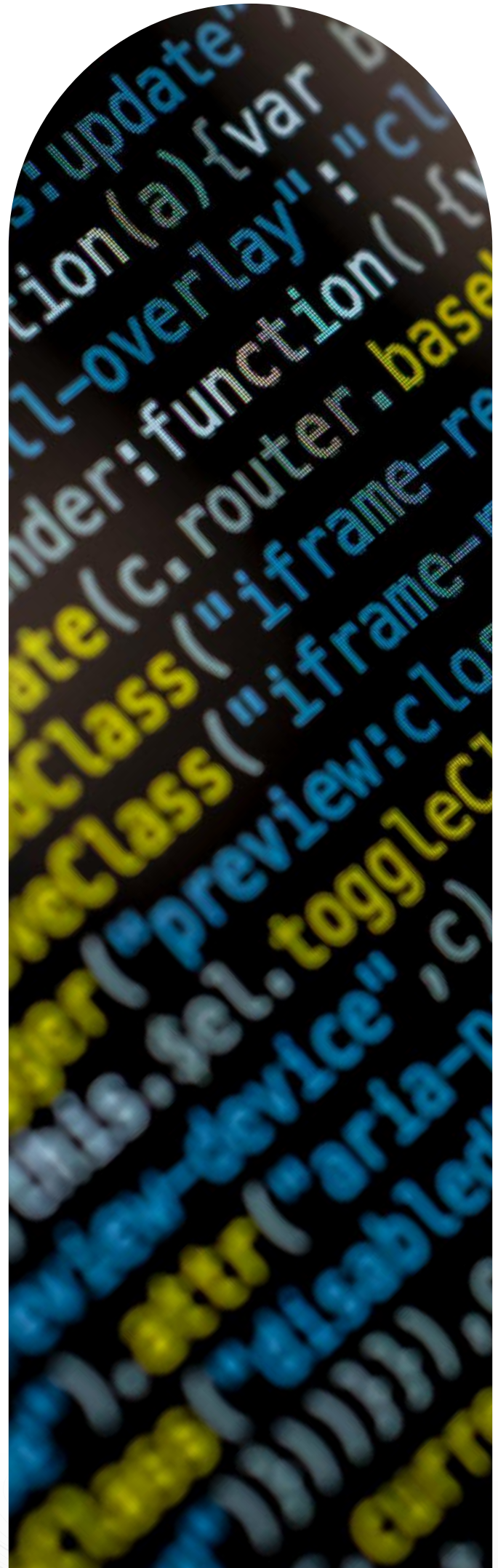
Proxy best practices in MAM

What you want out of your MAM is the ability to automate the creation of proxies, and dive into manual alternation when desirable. If you have to manually set the action for each proxy, that will slow down your process. Equally, if you aren't able to make changes in order to accommodate specific circumstances, that's no good either.

The outcome you really need is the ability to accommodate a range of cloud connections, product viable proxies, and be confident that every proxy you produce will have the exact frame accuracy.

03   Conform and export

When you conform a video, you take an 'offline' (proxy) edit and make it 'high-res'. Stated simply, this is done by taking the timecodes from an offline edit and applying that to the corresponding point in the source footage — creating an exact duplicate edit at full resolution.

The reliance on timecodes is why **frame accuracy** is the defining feature of a useful proxy. Because frame rate reductions are often part of the proxy creation process, every frame in the master doesn't need to be present in a proxy to effectively execute a conform process. However, each frame that exists in the proxy does need to be at the exact same time-stamped location as it exists in the master.

**What makes a good conform tools?**

Ultimately, there are no special tricks to the conform process — it's as simple as the description. Good conform tools are automated, requiring few (if any) manual inputs when transforming a proxy back to high-res. They are also accurate, creating exact replicas within your master files.

The only thing that can really go wrong with executing a conform is the creation of lots of manual tasks. The real thing to worry about is the quality (and frame accuracy) of your proxies. What you want is a simple click and go process. This is something most quality MAM systems will deliver.

Conform and then export

Once you create a video, you will obviously want to distribute it — this means exporting. You could do this manually. However, modern MAM systems allow you to merge the export and conform process into a single automated procedure. This is even a feature that remote editors can be enabled to undertake if they are provided sufficient security clearance.

Regardless of permissions, what modern MAM delivers is the ability to receive a proxy, conform that proxy and then export that file in a one-click procedure. Using presets for different jobs, tedious manual choices are simply removed. It's critical to effective WFH strategies. Some MAM tools even allow you to upload directly to online platforms in a single step.

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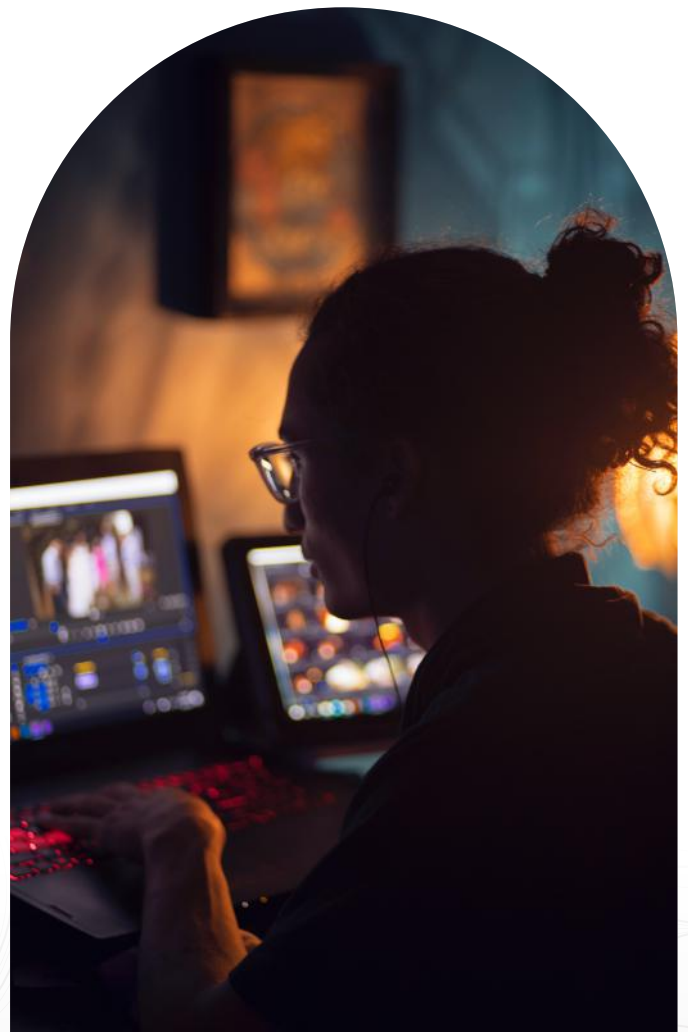
Where should you store your masters?

When working with the cloud, you have two choices: keep your master files in local, on-premise storage and only upload proxies into the cloud, or completely commit to cloud storage. A lot of organizations are embracing something of a mixture of the two.

Cloud storage

The great thing about the cloud, other than remote access, is the score of resources available. With the dramatic demands of video storage, the cloud is an appealing solution for all of your video storage requirements — particularly the giant, master video files. With the right cloud computing contract, this can be a cheaper storage solution and is also generally simpler, removing the need to continue to make investments in on-premise storage solutions.

Local storage

The problem with keeping your master files in the cloud is access speed. All of the rendering processes and conform operations you undertake will have to be done in the cloud, which limits speed. If you keep your masters local, you'll simply have to download compressed proxies onto your main system in order to undertake conform processes at maximum speed — along with any additional on-premise edits and post-production changes like color grading.

Hybrid storage

For a lot of organizations, the best solution is to keep master copies of active projects in on-premise hardware, and use the cloud for lossless compressed archive storage. This allows for all the benefits of both solutions, freeing up on-premise storage from the ever-growing demands of archive storage, but accessing its speed where it counts.

Ultimately, the best solution for you will be impacted by your existing hardware investments and your most common use cases. Getting advice directly from a MAM vendor will likely allow you to make sure you put their product to use best, for the needs that you have.

How the cloud
transforms workflows

The challenges of remote editing and file sharing have resulted in the relatively comical practice of sharing video files by hand — hiring a courier to transfer a hard-drive between studios. This is not a practical solution for the 21st century, and it's not a practical solution to the current situation.


Remote editing

The obvious change delivered by cloud-enabled workflows is remote editing. This is critical to managing WFH employees and is an outcome that any organization engaged in video production needs to resolve immediately. However, it brings longer-term benefits as well.

Remote access makes it far easier to bring onboard the video production staff you need. That could be in terms of freelancers hired for single high-production projects, or part-time editors, animators, sound-designers and more, for regular production cycles. It will also help you recruit and retain full-time staff.

The modern workforce was already coming to expect work from home and remote working opportunities. High-skilled workers are in a better position to make these demands, and increasingly make job choices based on 'lifestyle' enablement, not simply salary figures. 90% of workers say flexible work arrangements would improve morale, and 41% say that they would take a pay cut for a job that cares more about their health and wellbeing.

The cloud changes your options for improving staff retention and finding the best talent. You can enable people to work around their own lives and hire from a pool of talent that extends around the globe.
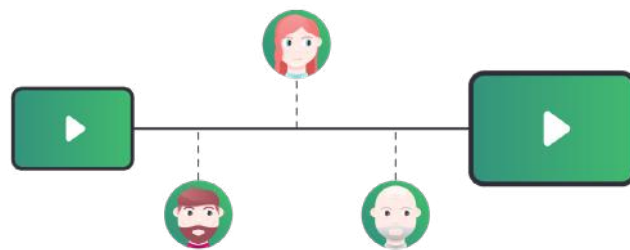
Integrated review process

Educators, by and large, aren't video production experts. However, they are the ones creating the bedrock of educational content. The ability to allow remote access to files not only allow you to bring on remote video production experts, it makes it far simpler to enable collaboration between those experts and your educational staff. Cloud-based editing means that educator expertise can be drawn on during production, rather than afterwards.

Fundamentally, the cloud changes who you can work with and where they work. But it also presents the possibility of changing how people work. When working with freelancers, the simple and dynamic approval processes created by cloud-based collaborative tools open the possibilities for new in-house roles. Rather than creating video content in-house, you could hire a new 'editor'.

In-house teams can use their expertise to review and work with outside resources to create the perfect outcome, at a far greater scale. It might become possible to repurpose elements of a lecture for a shorter video, or add animations or other high-production elements into a standard lecture. You can get educator feedback on production earlier on in projects without creating administrative problems or multiple 'sources-of-truth'. Projects can be completed faster with fewer reworks. Ultimately, you are enabled to be much more flexible, creative and focused on education.
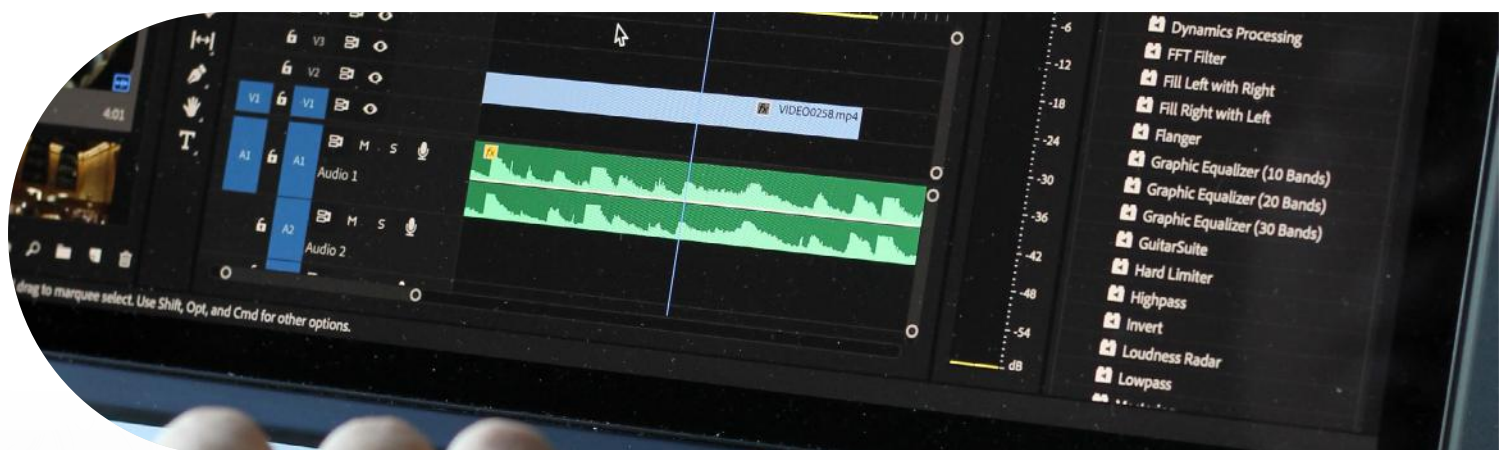
Collaborative, real-time editing

The possibilities for collaboration go beyond approval and review to real-time, remote collaboration. Rather than editors working alone and being forced to share file versions when looking to get help, teams of editors can all access the same proxy. Removing the need to make sure that every file shared is the most up to date version takes collaboration to a whole new level. There is less administrative burden with better collaboration.

In truth, this level of freedom is untested waters. We don't know the extent to which real, global collaboration can change video production. What is critical, however, is to embrace these possibilities. In situations where normal logistics are pushed to the extreme, such as filming in a remote place or editing live events, the benefits of bringing in additional support are even greater.

It's clear that the cloud will increase efficiency and enable flexible video creation, on-demand. Enable your teams to take advantage of these workflow changes and experiment.

Permissions and centralized security

Although there are security concerns with the cloud, a quality MAM system actually improves security outcomes. As we have addressed, automating cybersecurity removes the risk of human error.

Keeping everything in the cloud centralizes data. Rather than having your files spread out across any number of hard-drives, they are kept in one place. Your masters might reside on-premise, but every proxy file used by editors is centrally stored (and encrypted) on the cloud.

Cloud-enabled MAMs allow you to set permission access to files, creating tiers with different levels of access and customized permissions when needed. This allows you to standardize who has access to what, who can download what, who can make edits and who can only view files. This kind of flexible and centralized control with standardized encryption is exactly what you need to enable modern workflows without compromising security.

Object recognition and natural speech detection

Where MAM starts to seem 'space age' is in pulling together some of the cutting edge 'sense simulator' tools such as speech recognition and objection detection to aid archive management and production workflows.

There have been tremendous advancements in the ability of machines to sort through minute patterns and match them with known criteria. It isn't perfect, but it's getting there. With speech detection, for example, clean audio clips can be transcribed with near 90% accuracy using completely automated processes.

Object detection is a less mature technology, but advancing rapidly. Just like with speech recognition, large tech industries from Google to Amazon are spending billions to get it right. Depending on the type of images being classified and the specific algorithm, object recognition software accuracy ranges from 65%– 80%, with many use cases sitting solidly around 70%.

A promise of true searchability

What's so exciting about object recognition and speech detection when applied within the MAM context is the level of transparent searchability they offer to video. Together, they effectively allow you to treat a primary video file as metadata, providing the most descriptive metadata imaginable.

For example, you could search for "yellow vase in the background", "people saying hello", "buildings with a fire escape". The limits of search are only confined to your imagination, not the descriptive metadata tags previously applied. When partnered with facial recognition software, you can even search for specific people — famous or not.

Theoretically, there are no limits to how recognition technology can be applied. Practically, there's still room for improvement. Particularly object detection, which has a way to go before it can operate entirely independently of human oversight.

Integrations with cutting edge partners

MAM tools that deploy speech and object recognition tools generally partner with leading–edge providers. This might include plugins with AWS Transcriber or Microsoft Video Indexer. Increasingly, this also includes pairing with facial recognition software to take object detection to another level.

The benefit of doing this through a MAM, rather than independently, is the ability to seamlessly integrate these tools into your editing. From a workflow perspective, you never have to leave the editor and a large number of automation features (for ingest and metadata creation) are delivered.

With MAM, everything is kept in one place, simplified and augmented with the other cataloging and search capabilities offered by your MAM, as well as making it easy to grab those files and work on them immediately.

How detection technologies change workflows

The value of speech recognition and object detection come down to efficiency. They improve the metadata creation process and make production workflows more efficient as a result. 1 in 10 hours spent at work by editors and other creative professionals is wasted looking for material. Robust metadata reduces that waste. Truly searchable archives delivered using sense technologies remove it entirely.

Ingest and active projects

The most basic (and robust) use case for both natural speech recognition and object detection is augmenting metadata creation during ingest. Descriptive metadata tags can be promoted, rather than created from scratch. The technology can scan the clip and offer several descriptive tags based on the images and sounds that the media manager simply has to approve.

Using technology to aid metadata creation not only accelerates the process, it also enriches the metadata and creates standardized terms. You get better results faster which will improve the searchability for your projects from day one. Editors will have an easier time finding the clips they need, and that same data remains to add value to your archive.
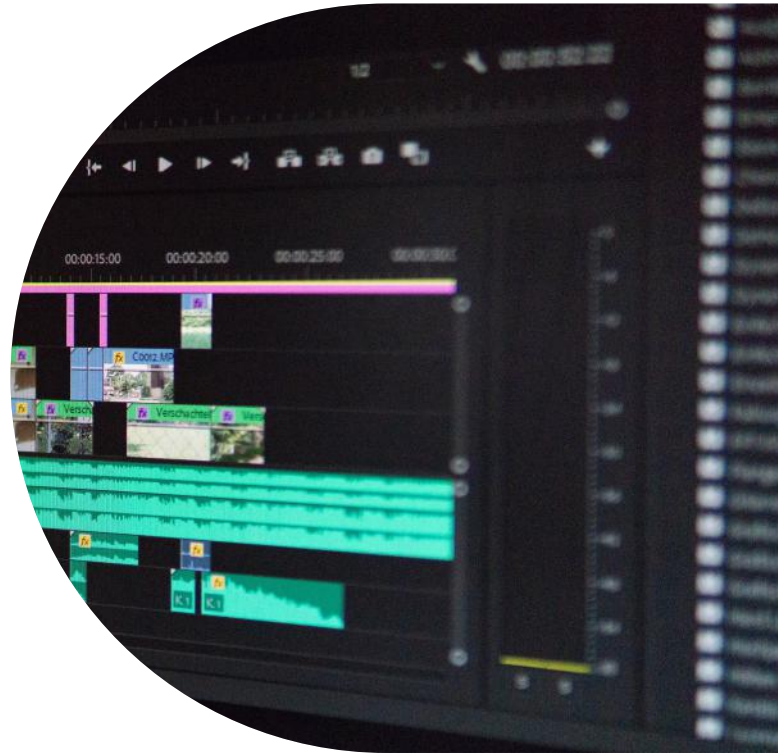
Archive management and re-use

Where transparent searchability really changes things is in how you're able to relate to your archive. Imagine knowing the exact specifics of every single shot in your back catalog and being able to search through it like 'Ctrl+F' delivers to text documents.

Efficiency is valuable, but there are also possibilities to add value. Improved visibility over archives opens the door to simple and fast repurposing. In many organizations with huge archives, no one even knows what footage they have. Stock footage can be purchased or new footage created for a project when your team already has access to an equivalent shot in archive.

The lingering value of archive transparency is the ability to increase the long-term value of any video created. This is particularly useful for educational institutions that are likely to produce a lot of standard educational material, but possess limited numbers of graphics or other supporting video content. The ability to quickly and efficiently access archived material makes producing high-quality educational footage far easier.

Archive access also simplifies your ability to cross-pollinate resources between educational, marketing, and outreach material. Again, this will allow you to boost the quality of everything you produce by repurpose high-quality assets wherever they are applicable.

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Automated captioning

Closed captioning is an important part of many video productions. Closed captions help with SEO (search engine optimization). Search engines rely on text crawling to assess the relevance of posts to search terms — not yet introducing the object and speech recognition technology discussed here. By providing search engines text, they are better able to assess the relevance of your video and will rank it higher.

More importantly for educational institutions, closed captioning improves accessibility, and allows them to meet regulatory standards. Efficient creation of closed captions will also allow you to reach audiences that are interested in watching videos without sound — something that is very common on social media.

The problem with closed captions is that they are time consuming and expensive to create using standard methods. Professional transcriptionists will take about 4 minutes to transcribe 1 minute of audio, so it's easy to see how that adds up.

MAM tools with inbuilt speech recognition basically come with a closed captioning system built in. The task changes to simply cleaning up the few mistakes left by the algorithm, rather than creating captions from scratch. You don't even need to use an additional program. Like everything with a quality MAM, capabilities are at your fingertips.

What kind of outcome can you really expect today?

Right now, the technology delivers about 80% of the potential promised by truly searchable archives. Getting 100% accuracy still requires human confirmation that the technology has provided the right metadata tags. However, the efficiency and detail delivered to the metadata creation process by speech and object recognition gets you really close. For archives ingested using recognition technology, you get effective transparent searchability.

Recognition technology also delivers a shortcut to better understand any archive. Although it will take time, these tools are the most effective available method for improving back catalog metadata. If you want to increase your ability to repurpose archived material and drive general workflow efficiency, getting a MAM solution equipped with object and speech recognition should be a top priority.

AI-enhanced analytics

AI is a buzzword. A bunch of things we've discussed up to this point technically count as AI or 'machine learning'. Any algorithm that uses data about results to improve future decision making can technically be classified as AI.

The reason we're using the term AI here is to talk about possibilities for far more advanced capabilities. A huge challenge with metadata (and data more generally) is trying to figure out what to look at. The more data we have, the more time we spend sifting through it and not getting anything done.

Video and audio searchability does improve visibility over archives, opening the possibility to access and repurpose old material like never before. This is certainly faster than trying to sift through an extensive archive and watch everything to find something useful. But that old solution was so impractical, no one ever tried to do it.

The risk with searchable archives (and improved metadata more generally) is getting trapped looking for things when you don't really know what you're looking for. What, however, if a machine could do that thinking for you?

Knowing what to search for: theme detection

The most basic step up from standard object and speech detection is theme detection. Here, the computer takes cues from lighting, speech, camera movement and more to assign a theme variable to a shot. These can range from things like "dark", "calm", "comedic", "serious", "fast" and "tense", to "family", "corporate", "hipster" and more. Advanced systems will let you provide presets and guidance videos. The system then 'learns' from how you react to its suggestions — like predictive text, but on a whole other level.

Theme detection opens search and suggestions up to a far wider range of possibilities. Rather than knowing exactly what you want to look for, creatives just need to know the 'type' of things they're looking for. This brings even greater efficiency and archive transparency, allowing for agile video development and creative decision making augmented by computer guided intelligence.

Computer generated content

In 2018, the BBC conducted an experiment. They let loose an AI bot on their BBC 4 archive and told it to assess everything for "BBC Four-ness". Then, they let the machine curate its own piece of content that 'it' felt represented BBC 4.

The resultant documentary is an interesting watch. What the AI created clearly shows that this technology is a work in progress — with cuts that seem to switch between unrelated clips. However, the cuts all occur at points in time where 'a cut' felt natural.

Again, this kind of technology cannot replace human decision making, it can only free up humans to focus on the creative details. Rather than searching through endless files, an AI can deliver a handful of related clips to be finessed and turned into something great. This kind of collaboration can allow current video teams to more effectively meet the growing demands for video content. The right MAM solution will integrate these capabilities right inside your editing suite.

End-to-end integration

Although it's not truly a new technology, one of the biggest changes to modern MAM is uniting a large number of features and capabilities within a single system. Rather than being forced to use one tool for production management and another for archive control, improved archive and production capabilities are delivered as a single package — what we previously called a 'dynamic archive'.

This unification of end-to-end integration across the entire supply chain is now going even further. The flexibility of APIs makes it simple for vendors to bring in outside capabilities and deliver improved import, export and in-app features across a wide spectrum. The object recognition capabilities, for example, are primarily delivered this way.

Social media exporting

End-to-end MAM systems also allow for features like direct export to different social media platforms like YouTube, Vimeo, Facebook and Instagram. If you plan on using your video content for these purposes, this provides a significant efficiency increase.

Simplification

Ultimately, the functionality of single access control makes everything simpler. It also often improves collective functionality. The best example of this is the power of object and speech recognition tools to bring visibility to archives and improve the ingest and production process. Even if you had the tools to perform all these tasks separately, the ability to do it all without switching applications is vital.

Security

Centralisation and end-to-end delivery also improves security. Keeping everything in the same place removes the risk of rogue copies getting into the wrong hands. Cloud-enabled MAM systems, as we have discussed, can flexibly allocate permission settings. With everything in one place, you remain in control, you retain visibility and tracking is made simple.

Matching infrastructure with workflows

To this point, we have talked a lot about the software capabilities of modern MAM solutions. However, software does not operate in a vacuum — it depends on hardware to function. Even if you're not in charge of making IT infrastructure investments for your organization, it's worth thinking about these requirements before running headlong into any software purchase.

Networks and the cloud

The biggest blunder that any organisations can make when looking to transition to cloud–enabled workflows is not making the necessary network upgrades to support the increased traffic. When you move into the cloud, everything going through the cloud runs over your internet connection. Don't create a bottleneck!

To get an estimate of how cloud–enabled editing will impact your network bandwidth, you should look at the average bitrate of your current video editing projects and then correct that figure based on how much you plan on improving your compression capabilities. Then, think about how many projects you run simultaneously at the moment and how your plans will expand that number.

Analyzing your current requirements will arm you with a realistic figure that you can cross-check with the technical teams within your organization. Likely, those people will be better equipped to guide the decision making process — but a little information will let you make sure no corners are being cut. You don't want to cause the breakdown of your video production workflow because you oversaw a move into the cloud without the right network upgrades.

Improving storage

You'll likely get pushback requesting new IT investments, be that network upgrades, storage investments or simply a software purchase. What you need to keep in mind, and what you need to remind decision makers of, are the efficiency savings that will be created.

Top of your mind will be the workflow improvements to your editing and creative teams, and the ability to more flexibly engage with a remote workforce. You might want to emphasize the improved ability to repurpose archive material. However, what your IT will care about most is storage.

Using optimized compression technology will decrease storage requirements in the long run. Access to the cloud will lower archive costs and remove the need to invest in more on–premise hardware. Network upgrades will improve your organization's overall ability to function in the cloud. Make sure to contrast these points with the cost of any required network upgrades.

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Matching workflows with outcomes

Technology cannot deliver anything on its own. To get outcomes, you need to update processes to match technology. If you gain cloud-enabled editing capabilities, for example, but don't update your remote working policy or encourage editors to collaborate, nothing will be gained.

Technology is a tool, not a solution. This goes for any IT investment. If you invest in MAM with the expectation that it will solve all of your problems, you're setting yourself up for failure.

Plan for outcomes

Getting a MAM investment right comes back to the basics of 'digital transformation' — think about the outcomes that you want to create. That means starting with a list of the things you want to improve. Although right now, that list might simply be 'get our WFH operation off the ground', longer-term, that list could include:

- Enabling remote working
- Engaging with freelancers
- Creating a permissions system within workflows
- Improving staff retention
- Improving ingest speed
- Creating more detailed metadata
- Increasing overall video production efficiency
- Increasing overall video output
- Improving video quality
- Allowing for more creative projects
- More effectively repurposing archive material
- Increasing visibility over projects

Use our list as a starting point and add to it. Then, rank your list based on priority and make sure that the investments you make align with those goals. Then, make sure that every step of executing the project gives that outcome the best chance possible for success.

Think about training and culture first

Key to a successful rollout is training. You should think about training before going ahead with a change. That means creating a protocol that outlines how you'll introduce existing staff to new technology, and enable an update to processes. Get input from your teams and use it.

You should prioritize your process updates to align with your outcome priorities. For example, if introducing improved metadata creation and searchability in archive data is more important than collaborative editing, focus on that first. Once that change has been made and adopted across your organization, move on to the next outcome.

Let people experiment

Although it's important to have a plan, no plan is flawless. Many of the technologies discussed in this eBook are new. There's no 'set-in-stone' blueprint for what the potential for object recognition or cloud-based editing can deliver to video production.

Media asset management is in a time of transformation. You need to be open to change and let the best and brightest in your organization experiment with new possibilities.

The central thing to keep in mind is that **nothing will change if the way you work stays the same.** If you explore different workflow possibilities, you're on the right course. Don't get so bogged down in planning that you don't get out there and try new things! But make sure that you have outcomes in mind, whatever you do.

A *media asset management checklist*

Upgrading your media asset management capabilities is not as simple as going out and buying the first MAM solution you see. When it comes to software, one big question is: off-the-shelf or bespoke? A lot of MAM vendors offer options, letting you get something quick and cheap, or tailored to your exact needs. Long-term, a bespoke solution is likely the best choice for any large-scale operation. However, time may be of the essence.

If you need a solution today, what you should look for are cloud-based MAM tools that have off-the-shelf functionality. However, your long-term goal should be a more bespoke offering. Ideally, find a provider that can deliver you immediate access and remote workflow capabilities within an ecosystem along with the long-term capability to build a tailored solution.

If you have more time on your hands, start by thinking about the outcomes you need. Then look to match those with software capabilities. Make sure that your IT infrastructure can manage the improvements you plan to make. Lastly, make sure you have a plan to update processes to actually deliver on the outcome you set out to achieve. With all that in place, it's time to experiment and explore.

However, the very first thing you should ask yourself is:

Do I actually need MAM?

After talking about how great MAM is, this might seem like an odd place to start. But, it's a very important question. "Is this necessary?" should be the first thing to think about when investing in any technology.

In truth, you can get a lot of the functionality described in this eBook without MAM or VAM, or DAM. For example, by simply applying the proxy setting suggestions laid out here with the cloud-editing

features built into Adobe, you'll be able to access basic collaboration features and remote access. Equally, diligent manual metadata creation can deliver searchability not far off what object and speech recognition provide automatically.

If you have a small team and are just getting started, think wisely about your first investments. If it comes down to a choice between hiring a great editor (or educator), or investing in a cutting edge MAM solution, choose the person. However, getting started with the right technology early will make it easier to grow.

This eBook has been about exploring the capabilities available in MAM. This checklist will help you focus on the capabilities that are important to you, so you can make the right decision. If you do upgrade your technology, you need to upgrade with outcomes in mind.

01   Centralization and end-to-end delivery

A big thematic change in media asset management is simply the centralization of tools and capabilities. This comes back to the point we made right at the beginning about the relative youth of this market — digital video hasn't been around that long and the tools for optimizing its developments are only just coming into their own.

Quality MAM systems deliver everything under one roof. That means archive and production control, right through to distribution and publishing. Look for tools that allow you to search your back catalog and integrate directly with editing software, provide version tracking, and lastly publish straight to OTT platforms. This will increase security, provide efficiency and increase the efficacy of every feature — lowering total cost of ownership and creating added value.

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02 Cloud-enabled: security and sharing

The cloud is critical for modernizing your approach to video, and meeting the demands for WFH workflows. It will also help your video production teams and education specialists collaborate to produce the quality videos that you need to deliver to students. When it comes to getting the best people, retaining them on staff and flexibly delivering video on-demand, nothing is more important than the cloud.

The cloud allows you the freedom to implement remote working policies. It closes the gap with distant filming locations. Perhaps most importantly, the cloud enables collaboration, creating new possibilities to unleash creativity. You need to make sure that any MAM system you invest in is cloud-capable, delivering the kind of proxies needed to engage in real-time editing, and the encryption and permission settings to do so securely.

03 Built with metadata in mind

Metadata brings clarity and visibility to the spiraling number of video assets being created. Without accurate metadata, production slows to a crawl, time is wasted looking for assets, and you'll struggle to access and repurpose archive material.

A central capability of MAM is to make metadata creation simple, and improve your ability to search and sort assets around metadata criteria. First, that means automating basic metadata collection at ingest. Second, it means features that standardize and prompt the creation of descriptive metadata which will provide real visibility.

If you want to be on the leading-edge of what metadata makes possible, you need to invest in object and speech detection technology. This is where the future of metadata resides, and accessing this technology today provides extensive possibilities for streamlining processes and improving visibility over video assets of all kinds.

04 Automated and analytical

To keep up with the ever increasing demands of video production and asset management, you're going to need help. That means automation. Particularly when it comes to metadata, you can just as easily drown in information as find the gems that will supercharge your productivity.

MAM tools should make your life easier by providing analytic insights, helping you to focus on the right things. They should also remove manual tasks. Metadata creation is an important element of that. But it starts with far more basic automation.

You want tools that make the creation of proxies simple, and automatically conform proxies back to high resolution. You want automated presets that allow you to set group access permissions, without having to do that again every time you start a new project. The more manual tasks your MAM takes away, the more you can focus on creating great educational content.

05 Forward focused

This is a time of change. Software capabilities have transformed workflow possibilities — but that change is far from done. When it comes to analytics, object detection and automation, the bar has only just been set. How that technology will change and adapt over the next ten years is still to be seen.

You want to look for vendors that acknowledge that MAM is a work in progress. Be wary of anyone proclaiming 'the end of history'. Technology will change, so you want to be in a place to change as well.

![ipv logo]

MAM delivers educators the ability to focus on education

This is an exciting time in video. The rapid evolution in channels for distribution means there has never been greater demand for video content. Technology sits at the center of your practical ability to deliver. It also allows you to optimize the creative capabilities of your team, and avoid wasting time on administrative tasks.

The current need to accommodate remote learning and remote workflows may have focused you on the need to upgrade your video production capabilities. But the value of MAM goes further, and thinking long-term is in your best interest.

MAM sits at the intersection of a whole host of technologies focused on improving video creation and storage. It allows for the simple re-purposing of archive material, creative review of finished projects, and the streamlining of collaborative processes. It becomes far easier to engage on all fronts and embrace the true creative potential of the medium.

To help educational institutions meet the demands of the current circumstances, we have developed a quick-deploy version of our MAM software that can get your operation into the cloud in a little as 36 hours. Although not the only solution on the market, CuratorNow is one of the most advanced systems available — able to provide everything discussed here, and upgradable to a fully bespoke standard Curator package when you have more time to plan.

Your success deploying video starts with technology but goes far beyond it. Ultimately, you need to make the right creative choices and encourage a culture that is willing to experiment and learn. Video's role in education is still evolving. The challenges of remote learning are only starting to be explored, and the ability to use video to increase student engagement and retention isn't fully understood.

In order to deliver the quality outcomes that students deserve, educators need the flexibility to experiment and freedom to focus on learning, not administration. The right MAM tool will help bridge the gap between education specialists and video production experts — allowing your institution to creatively address the challenges of today and set the standard for the future.
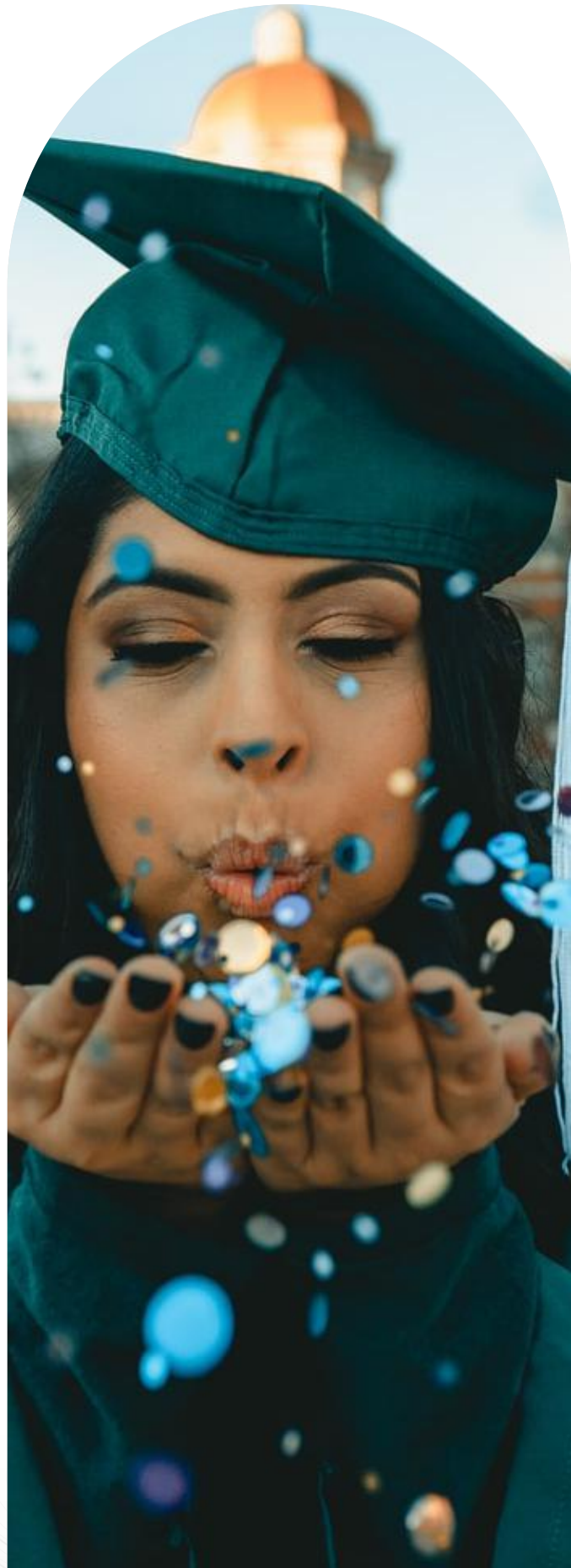
Set your creative teams free to work from home, now.
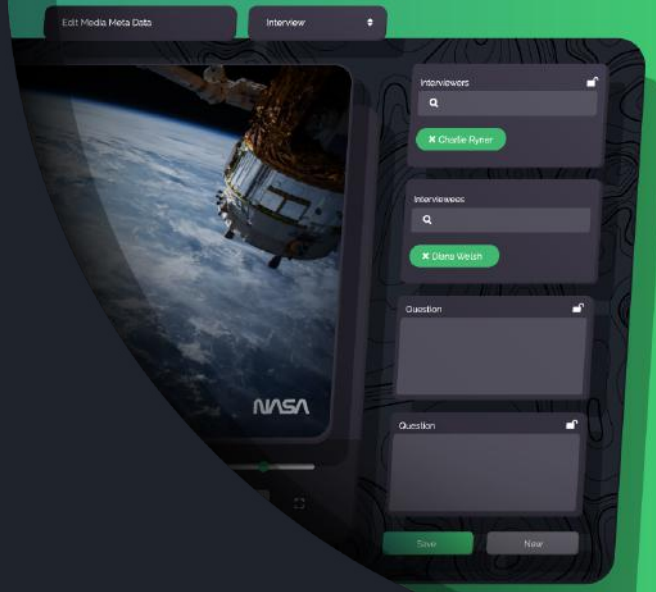
CuratorNow: A complete, rapid-deployment remote editing studio for professional video editors and producers enabling the continued creation of content your business needs from home as global events force a change in the way people have to work.

See CuratorNow, Now!

About IPV & Curator

At IPV, we are committed to creating simple, secure and analytics-enhanced video production workflows. Curator is our flagship media asset management solution, bringing dynamic archive control, cloud-enabled collaboration and partnerships with leading-edge detection technology.

Curator delivers asset visibility, centralized security and automated ingest. End-to-end integrations mean that Curator works with your editing software and can upload straight to OTT. With secure collaboration built-in, Curator can transform your video production and archive management. We are serious about video — Curator is the content platform trusted by the best in the world … and beyond!