Future-proofing Video Production

A technical guide for digital and creative agencies

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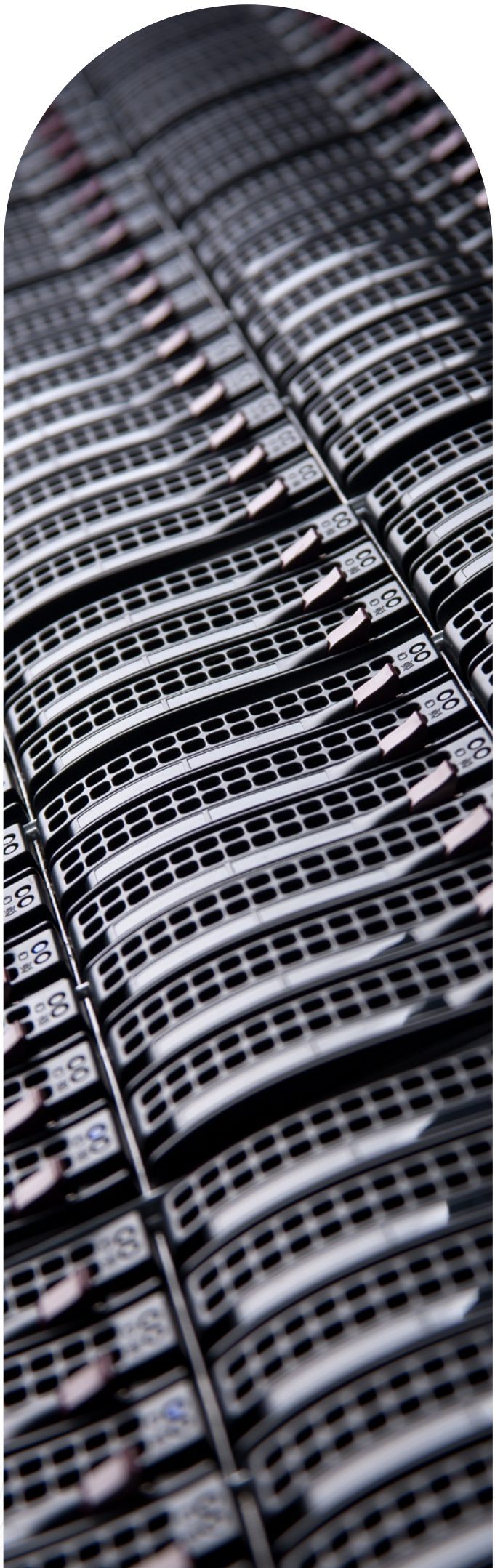
A technical guide for digital and creative agencies



High-quality video takes up a lot of digital space. A standard ProRes 422 HQ file at 1080p and 30fps is around 1.7GB per minute of footage. 4K files are roughly four times the size of 1080p, and 8k is on the way.

To make matters worse, video files are dense. Compared to other media assets, they have a very high 'bitrate'. Together, size and bitrate create issues for file sharing and cloud-based collaboration. It can even create bandwidth issues when accessing large volumes of video on internal systems. This is a major problem for production workflows. However, on a much more basic level, large file sizes simply create issues for storage.

The reality, however, is that video has become an everyday business tool. Clients expect video content, and digital and creative agencies need to deliver. 85% of companies use video in marketing and 75% of employees prefer training videos to written material. With OTT platforms simplifying video distribution, every business is going to want to 'double' as a video production company.

Meeting client video demands isn't solely a technical challenge. 64% of marketers see video as the most difficult content to create. But there are unique technical problems that must be solved in order to scale video production to match demand. And it's going to be your job to figure out how that's done.

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What this eBook will deliver

You probably already have an IT plan for video. What we want to explain here is how to expand that solution. This eBook explains how to grow the video storage and workflow components of your IT systems at a scale that can meet modern client expectations.

We will detail the traditional, cloud and hybrid strategies for video storage. More importantly, we will discuss advanced video and media asset management software that can reduce your storage requirements and unite multi-tiered archive and production environments in a way that will help you work with creative departments — not against them.

Getting ready for video at scale requires addressing IT and workflow optimizations that account for the particularities of video. It means updating your processes dynamically to match your production with the outcomes that you need at any given time. At the heart of that is MAM (media asset management). However, before we get there, we need to build a foundation.

Step 1: Understand compression basics

The fundamental IT issue with video is storage. You need to grow your video storage capabilities. However, if you can compress those video files, the growth task will be simpler.

All video 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 is assessed and how it is assessed. The degree of compression is defined by how much information is removed.

Lossy vs lossless compression

The big distinction in compression is lossy vs lossless. These terms describe two types of compression, one in which the original data can be recovered (lossless), and one where compression permanently degrades quality (lossy). Lossy compression can obviously reduce file sizes further than lossless compression while retaining equivalent playback quality. However, it comes at the cost of permanence.

Common lossy formats are:

- MPEG-4 part 2
- H.263
- H.264
- HEVC (H.265)
- WMV

Common lossless formats are:

- H.264 lossless
- H.265 lossless
- Apple ProRes

What types of compression is best for which job?

Different types of compression are better for different outcomes. For archive, you need to consider what you want to use your footage for in the future. Generally speaking, you want to choose lossless compression for archived footage — giving you the option to restore that file to its original quality and re-use it for different projects. When it comes to 'off-line' editing, and the creation of proxies (something we will come back to in detail) lossy formats are much more useful, simply because of the need to minimize bitrate.

Step 2: Hardware options for video

The IT center of your video production operation is your hardware. You need resources for archive storage. You also need central systems on which editing can take place. For some operations, the actual editing might get outsourced to freelancers using their own computers. However, you still need to make some internal IT investments to manage your system.

Many editors will be using powerful PCs/Macs and perform editing directly on those machines. Others will use local servers instead. Where remote access is concerned, this requires the creation of proxies and conforming those compressed files back to high-resolution. Conforming is one more step that requires computing power.

When it comes to both storage and compute, your options break down between standard on-premises solutions and cloud-based models — or some combination of the two. You need to think about your ability to access both forms of compute and storage power within your system for tasks such as editing, conforming, proxy creation and archive storage.

1 On-premises hardware

The traditional method to store and access all digital files is to use physical arrays that are on-premises or in a data center. Solid on-premises hardware is great, and always look to put to use hardware you already have. However, this is increasingly an insufficient answer on its own. On-premises hardware is expensive, takes up physical space and, perhaps most importantly, is challenging to scale.

Every time you want to expand your existing on-premises hardware, you need to consider vendor choice and how that hardware will integrate into your overall system. You may also need to think about storage vs compute — making sure that you have the server capabilities to manage all of your storage resources. This latter point is one reason for the increasing popularity of 'hyper-converged' storage systems (solutions that merge compute and storage resources within a single box) among companies with large storage requirements.

However, no matter how you scale on-premises hardware, you can never escape the demands of growth. Moreover, any investments you make are permanent. You cannot dynamically scale on-premises IT resources to meet the demands of a specific project without committing to maintain that hardware indefinitely.

On-premises hardware also presents access limitations. Although a NAS (network-attached storage) system can be configured to allow for remote access, this effectively creates a private cloud that relies on the upload speed of the Internet connection where the on-premises hardware is located. On-premises hardware is fast, reliable and secure, but it's not a solution able to meet the demands of modern businesses on its own — much less the requirements of video at scale.

2 Cloud-based power

The cloud has come to play an important role in almost all businesses. Although video production has lagged behind when it comes to cloud adoption, this is changing, and for good reason. Cloud technology is rapidly maturing, and advanced compression tools have reduced some of the bitrate issues limiting access.

Cloud systems offer remote access, easy and dynamic scalability, and straightforward pricing models. But it's important to note that not all 'clouds' are the same.

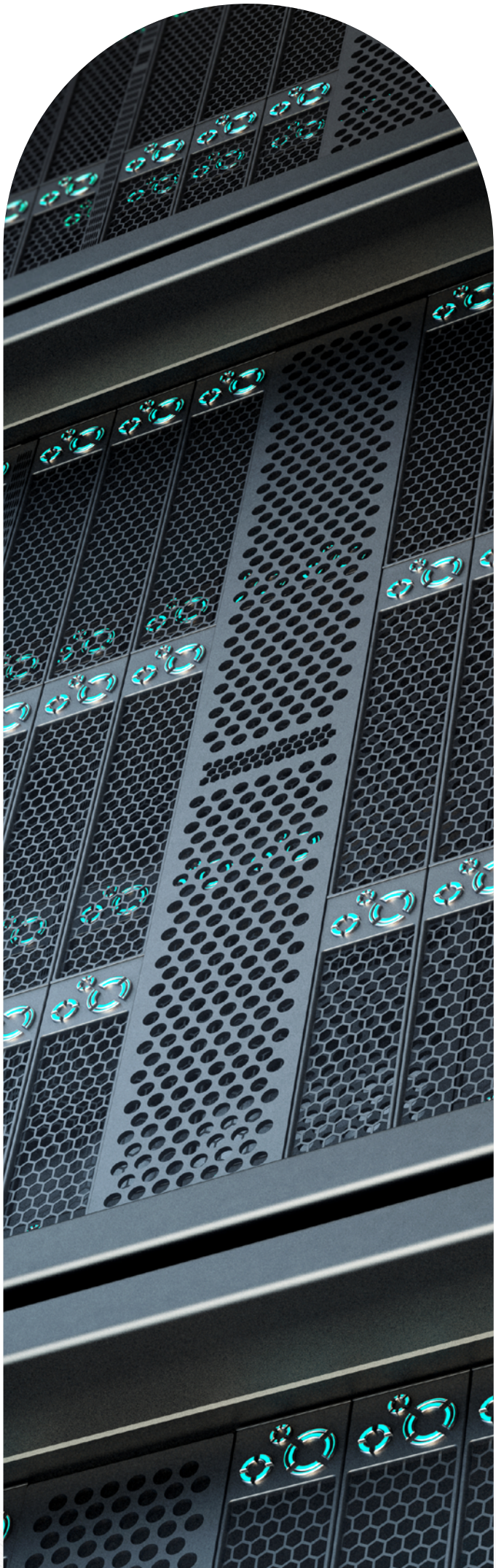
Public vs private clouds: Cloud technology broadly cuts along two distinct lines — public and private clouds. The public cloud is basically the internet. You rent space off of public servers from one of the major providers like Azure or AWS. Critically, this delivers 'dynamic scalability'. With the public cloud, you pay for what you use, providing the ability to seamlessly scale your access to resources when needed.

A private cloud is basically standard hardware configured to allow remote access. Owning the hardware delivers some perceived security and access speed benefits, but brings with it all of the scaling problems of on-premises hardware. What's more, most of the benefits of the private cloud actually stem from misconceptions.

A data center is always going to be more physically secure than an office building, and high-level encryption ensures digital security. A private cloud will deliver faster and more consistent access speeds than the public cloud to workers in the office where the hardware is located. But the opposite is true for remote access. Public cloud providers will have faster and more reliable routes to the internet than your office — even if you invest in the best possible bandwidth package, which you should do if you're taking cloud adoption seriously.

Disaster recovery (DR) and business continuity in the cloud: In addition to scalability, the cloud also brings great DR and business continuity capabilities to any business. Having a remotely accessible and easily scalable secondary computing resource is a primary feature of a DR plan. By distributing your video assets across cloud and on-premises infrastructure, you are naturally more prepared for any technical or physical failure that may befall your organization.

There is value to both the public cloud and private cloud, just like there are benefits to both on-premises hardware and the cloud more generally. But if you want simple scalability, you need to look at the public cloud for answers.



3 Hybrid architecture

Cloud technology should play a role in any IT solution built to work at scale. For some agencies wholly dependent on remote workers, the cloud might deliver everything that's needed. But the pure power and speed of on-premises hardware mean that it will likely retain a relevant role for many workflows, particularly when you factor in the bitrate demands of video editing, conforming and processing.

With that said, the right software control tools will not only allow you to create and stream proxies compressed down to 2% of their original size *(something we will return to in the next step)*, but also conform and process those files in the cloud. In some cases, this can be better than using local hardware as even local networks can get clogged up with traffic if users are accessing locally stored high-res files.

Regardless, the point of hybrid architecture is to unite on-premises hardware, private clouds and public clouds within a single solution — allowing you to tier your storage and access, utilizing the best tool for each job.

If you are serious about video, a hybrid solution is the best option. It will allow you to scale on-demand, access high-performance hardware when required, and flexibly deliver remote access when needed. It also delivers integrated disaster recovery/business continuity options.

The problem with a hybrid approach is controlling how your assets are tiered. Without software that can simply control your system, you're likely to create significant administrative burdens transferring assets between different resources. This is why, in addition to the hardware, you need to take your software investments seriously.

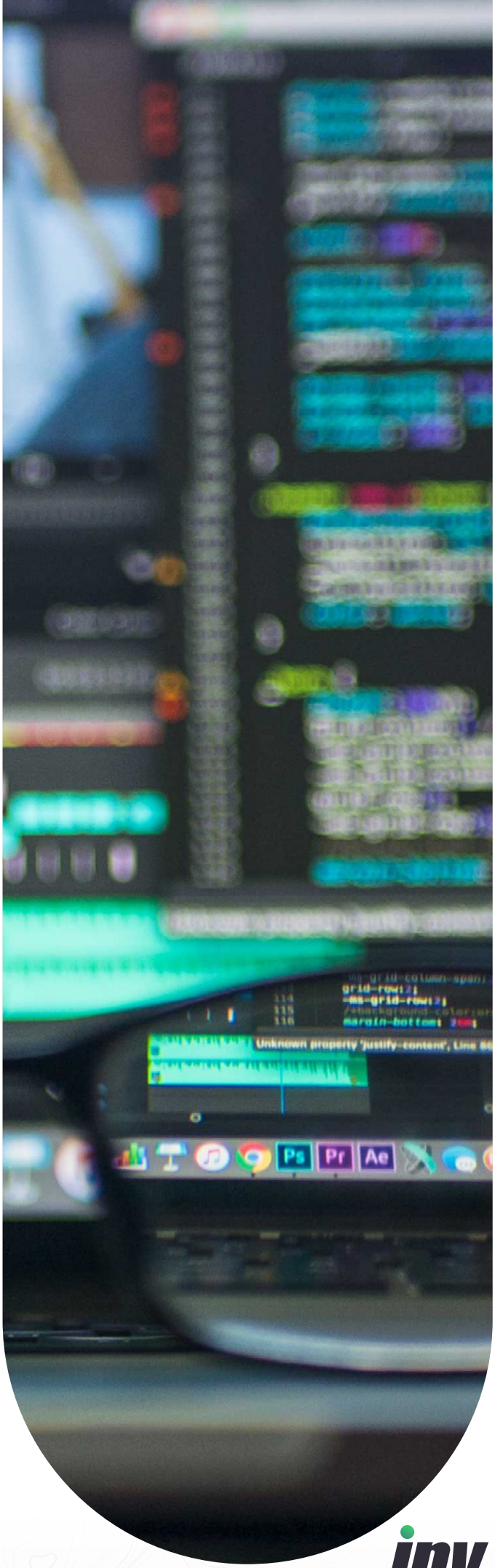
Step 3: Invest in Media Asset Management (MAM)

If you want to master video, you need MAM.
So, what is MAM?

MAM covers a number of software systems built to manage video, and other media files. Evolving out of older DAM (digital asset management) tools, MAM solutions have been updated with purpose-built features for handling video, and other large, modern media assets. A good MAM solution will not only make it simpler for you to manage and centralize a distributed and hybrid storage system, it delivers new workflow and production capabilities.

In reality, there are a wide range of software solutions on the market called VAM, DAM, MAM, PAM, CAM and a whole host of additional acronyms. There are significant differences when it comes to functionality. However, these differences are not uniformly captured by what the software is called.

When it comes to picking software tools that can help you manage video production at scale, what's important is looking at what those tools can deliver. That covers three broad areas:



1 Centralized access to video assets

A good MAM tool will help you centralize access to your video assets. That doesn't necessarily mean centralizing where those assets are stored (that could be a disaster recovery nightmare), it means centralizing how you access a distributed network of video assets. Generally, this is delivered through a web browser or integrated features within editing tools, such as a Panel within Adobe Premiere Pro or After Effects.

For more basic MAM tools, centralized access will be limited in focus to either archive or production environments. This is helpful (it's why these older tools were developed in the first place), but using separate systems for active management of assets and archives isn't optimal. It forces you to make hard choices about what to archive, drives up storage requirements and costs, and diminishes your ability to access and put to good use archive material.

The leading-edge of MAM creates dynamic archives — an interface that merges both production and archive environments — allowing access to whatever material is needed. Centralizing all of your video assets not only makes it easier to control and access files stored across a hybrid storage environment, it changes the kinds of strategies that can be deployed in production. For example, it becomes far easier to repurpose archived footage in new productions. For IT teams, this means less troubleshooting and better visibility over storage and bandwidth demands.

2 Managing Metadata

One out of every ten hours spent at work by editors and other creatives is wasted looking for assets. Even if creatives have the perfect material for their project, using it is not an option if it can't be found. Metadata is the key to video asset organization.

Metadata is simply *data about data*; that is to say, information (data) about files (data). Video file metadata can include tags regarding content as well as length, date created, etc. Creating simple systems for archive managers to input this information is a technical challenge IT teams must address. MAM alleviates the need to build bespoke systems by delivering a single interface that helps with metadata creation in a couple of ways.

- **Ingest automation:** The process of capturing and storing video files so that they can be easily identified and located is called 'ingestion'. Without the right software, metadata must be created manually. This takes up an employee's time and allows a lot of opportunity for error. MAM completely automates the creation of basic metadata tags (time, length, source, etc.). This removes any chance for error while drastically accelerating the ingest process.

- **Advanced metadata standardization:** The most useful metadata goes beyond date and time. By creating descriptive tags regarding files ("man smiling" or "child running", for example), creatives have searchable information that can help them find the file needed, exactly when it's needed. This information can be applied to every clip, subclip, frame or groups of frames, providing maximum searchability between clips and within single clips. The problem here is uniformity and time.

  Descriptive metadata tags are only really useful if they are consistent. But this is very hard to achieve with manual processes. For example, different media managers might tag that shot of a "man smiling" in a number of different ways — "smiling man" or "man grinning", or something entirely different like "happy office worker". This will make it far harder to find these shots, and compare them with all other like-for-like shots in your archive, or even achieve production material.

  MAM helps mitigate these errors in two different ways. The more basic solution is to prompt media managers with a number of standardized descriptive tags based on their original manual input. This makes sure that all comparable shots can be found using the same language. However, this does very little to minimize the time required to create this descriptive metadata.

- **Advanced detection technology:** The most advanced MAM tools use object detection and natural voice recognition to take metadata creation and searchability to a new level. Rather than relying on manual inputs, this kind of detection technology can scan video files and create dozens of highly descriptive metadata tags. The speed at which this can be done is even able to accommodate live recordings, simplifying the processes so much that accurate metadata tags can be created in near real-time.

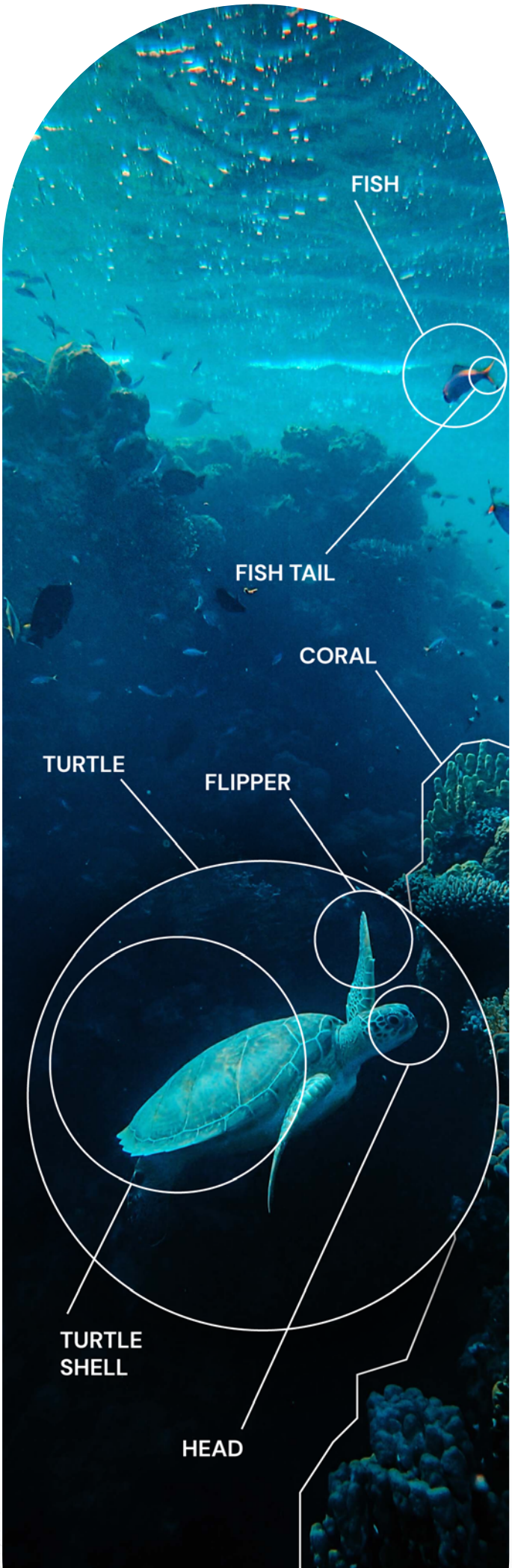
Rather than relying on editors parsing a few descriptive keywords, the level of specificity delivered by this kind of ingestion process allows for true searchable transparency. It becomes possible to search archive material very similarly to how “Ctrl+F” allows you to search text documents.

Users can search for things like "brick building with fire escape", "two people with a cat", "dark-haired girl smiling", "microwave in background". Every line of dialogue in a video can be automatically transcribed and included in its metadata, so searching for clips of people saying specific things becomes a piece of cake. Users can also search using eCommerce-style faceted search filters. Finally, by using facial recognition software, it becomes possible to search your assets for specific people.

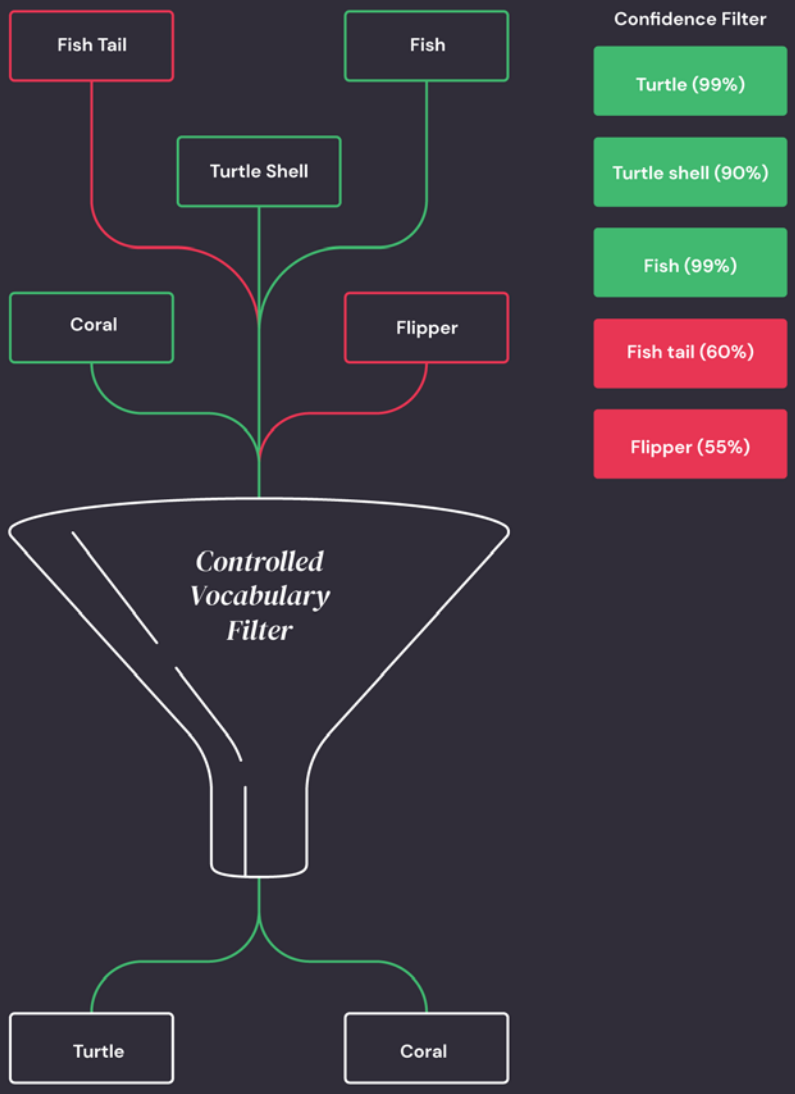
Object detection is a still-evolving technology — generally only able to achieve 65%- 80% accuracy. Presently, in order to ensure accuracy, these tags have to be cross-checked by media managers. On its own, this can create a problem. AI-enabled MAM will add tags to each and every frame. Using standard frame-rates, that’s up to 214,000 tags per hour of footage.

Advanced MAM will group sequential frames with matching tags together and present them as a single result, rather than each frame being its own result. Combined with the use of controlled vocabulary filters, this dramatically reduces review volumes. The next step is to deploy confidence filters so that media managers are only presented with a list of uncertain tags to check — preventing a ‘data deluge’.

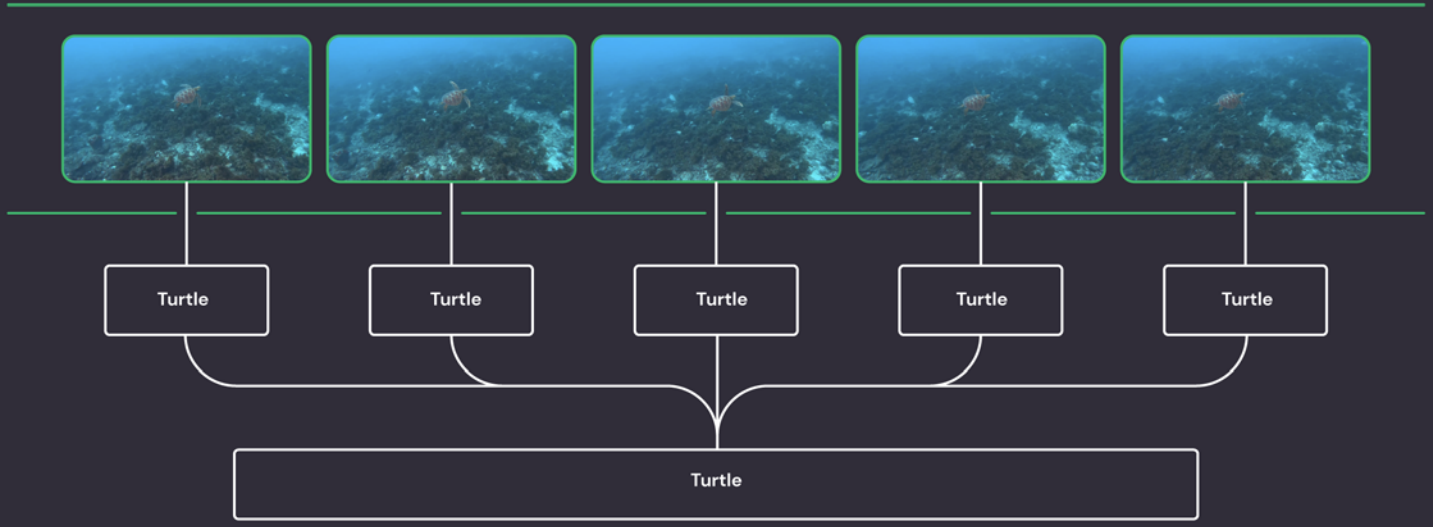
With confidence filters, AI-enhanced tools allow for the rapid creation of highly descriptive metadata tags. The speed at which tags can be created and checked even makes it possible to retrospectively apply this technology to archived material. Enabled by AI, huge volumes of data can be categorized, and human productivity maximized.



How VAM can filter advanced metadata results



Grouping sequential frames as single assets



3 Streamlined and secure collaboration

A huge technical challenge for video production is collaboration. Even sharing video files can be a big task. The size of most video files means that they can't be sent as email attachments, and require the use of dedicated file-sharing services. But this isn't the best solution for a number of reasons. It can be insecure and it creates additional administrative steps — exporting and uploading, and the creation of multiple copies of the same files. Lastly, it doesn't deliver real-time collaboration.

The size and density of video files is prohibitive to simple cloud deployments. Meticulous proxy creation and compression is required. Access to a dynamic archive is the first step to making this process more efficient. Access to descriptive metadata tags can transform your organizational strategies. But the last big hurdle that MAM can help you overcome is file-sharing and remote collaboration. A good MAM system can turn this challenge into an opportunity by creating simple workflows that are easy to manage and cloud compliant with very little customization required.

- **Proxies and conforming:** Proxies are highly-compressed copies of master files that are time stamped with exact frame accuracy to the master. This means that after a proxy is edited, a high-resolution version of the new edit can be automatically generated from the master through a process called conforming.

  Using proxies allows you to deploy lossy compression, reducing master file sizes by up to 98%, but still then transfer all edits made back to high-resolution. If you want to engage in real-time cloud editing, this is an absolute necessity.

  The creation and management of proxies can become complex and require a lot of administrative attention. With several different copies being created and used, it's essential to keep track of what changes are made and make sure people are working with the right versions. MAM platforms automate such tracking.

  Using advanced MAM software, proxies can be created and conformed automatically, making it far simpler to use them and ensuring accuracy to the exact frame rate of the master. MAM enables easy cloud sharing and also offers version tracking, so everyone stays on the same page. Advanced MAM can then conform those proxies in the cloud, reducing strain on your on-premises infrastructure.

- **Security:** Footage being leaked or "stolen" is an obvious concern for video production companies. But it can be of equal concern in advertising, and leaked internal comms videos can create embarrassment. You need to make sure that the video production system you set up is secure. MAM can help you deliver that from a technical and process basis.

  The most basic level of security is encryption. Most modern MAM systems provide the option to encrypt all data transfers and even your archive material. However, 90% of data breaches are about human error — not technical failures. MAM can help you here as well.

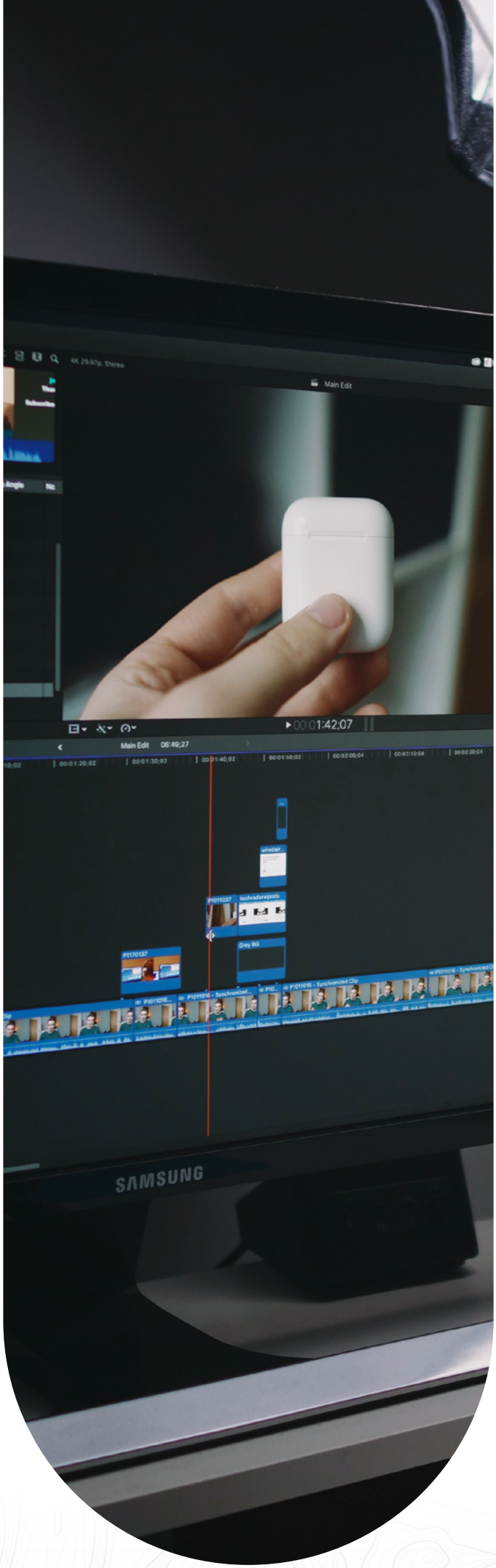
  A properly outfitted MAM system provides visibility overall users' access and offers automated permissions controls. You can create preset levels of access, then customize individual users' access when needed. MAM software can prevent users from downloading files, and also provides watermarks to prevent screen capture — unique watermarks engineered to indicate the specific individual responsible for the breach, if one occurs.

Investing in the right MAM tool

The goal of MAM is to augment and improve the entire video production and archive process. The actual act of editing won't occur within a MAM. However, quality MAM solutions integrate directly into editing suites like Adobe Premiere Pro, Avid Media Composer or Final Cut.

One critical thing you should investigate when looking into MAM tools is how they will mesh with your editing software of choice. There is significant value in a solution that can integrate directly, allowing your editors to stay in the creative flow — maintaining access to proxies and the advanced search and automation capabilities provided by a MAM without ever leaving the interface they are used to using. This will make the difference between a hard to deploy project and smooth rollout.

Moreover, the important thing to consider when investigating MAM systems are the features that you need. From our perspective, the real starting point for an advanced MAM system is a dynamic archive that merges both production and archive environments. Without that, many of the benefits of advanced production and ingest tools (like object detection) are limited. From there, it's important to consider the kinds of workflows that your teams want, and how other elements of MAM can help you deliver those outcomes.



Step 4: Build a workflow

Workflow processes will likely remain the central responsibility of creative teams. However, when looking to harness the storage and collaborative benefits of MAM, they are critical to organizational buy-in. Understanding how these hardware and software tools impact the creative processes other departments can deploy will help.

The simple truth is that the right hardware and software resources are the bedrock of your video production system. But workflows transform that technical investment into real outcomes.

Streamlining is key. An effective video management strategy should maximize your access to resources and make growing your video teams as easy as possible. You should look to improve your ability to collaborate over distance, empower your staff to work where they want, and automate administrative tasks.

A technologically-empowered workflow will let you do more with fewer people and access the best talent across the globe. It's important to remember that matching volume demands of a modern video strategy is only the first step. Creating quality video requires having the time and resources to invest in creativity.

There are four key elements that need to be considered when looking to achieve a workflow that can operate at scale:

1 Remote access and freelancers

The modern workforce is increasingly uninterested in being stuck in the office. High-skilled employees expect opportunities to work from home. What's more, the best talent may not reside within an easy commute distance of your offices. In order to get the best editors and creative minds for your video projects, you need to offer them flexibility. If technical teams aren't driving this discussion, it will be demanded of you.

Cloud-sharing delivers the remote access you need to expand where you let in-house staff work and who you can bring on to your team. It also allows much more flexibility to engage with freelancers. This lets creative departments bring onboard talented individuals that might not be needed all of the time, broadening video production skill sets on-demand.

Freelancers aren't always cheaper on a day-to-day basis. But they do allow access to talent which might not be affordable full-time. On a more on-going basis, freelancers and full-time remote staff let you keep down costs in other ways — removing the overheads of office space and equipment.

What is needed: There is a workflow solution, but it's one fueled by technology. You need technology to create smooth and seamless remote access of video files. You also have to make sure that this is all done securely. That means MAM and quality broadband. You need the ability to track access, apply watermarks and set permissions. You need an automated way to create proxies and conform edits back to masters. That provides the groundwork to build processes and systems around the hiring of freelancers and delivers options for work-space flexibility to your in-house teams.

2 Streamlined collaboration and experimentation

Video production is a creative process. Creativity blossoms when experimentation is allowed. It also benefits from more than one perspective. You want to create the technical bedrock of a video production environment in which experimentation and collaboration is encouraged and maximized.

What is needed: True collaboration requires cloud-based editing. The answer here is actually very similar to what will allow you to engage with freelancers. It means investing in a MAM tool that can automate the creation of proxies and automate the processes required for real-time editing.

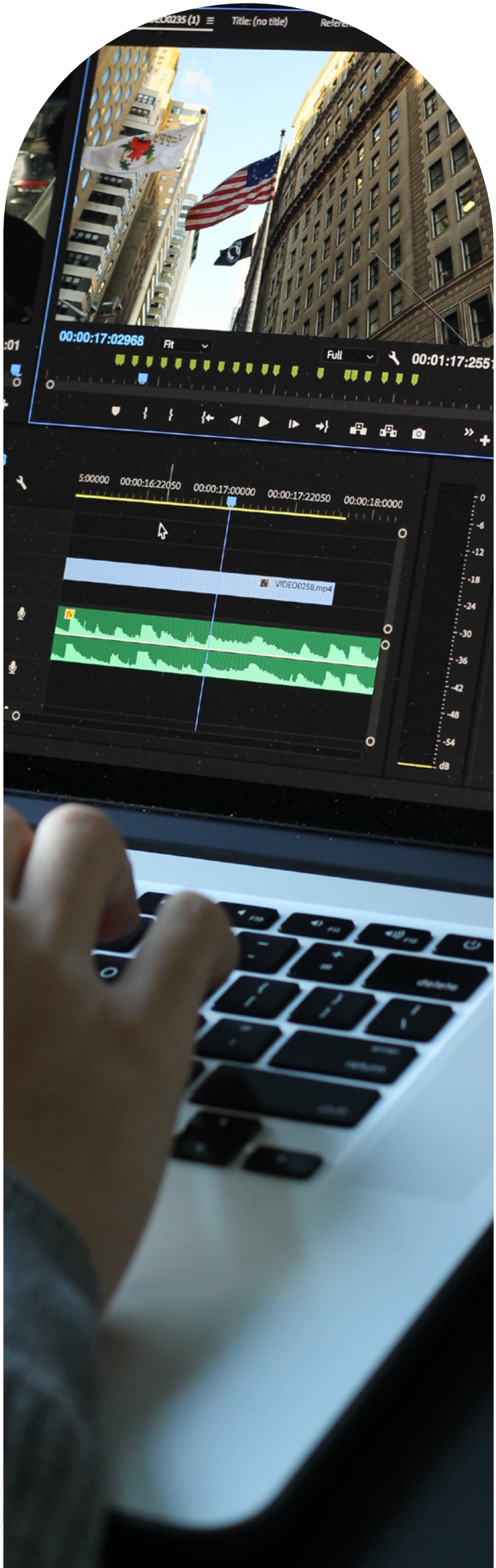
Simple file sharing solutions can help with collaboration. But they don't create a single file that can be remotely accessed by multiple users. That means true collaboration is still out of reach, and it means the creation of a number of administrative steps that damages efficiency. It becomes necessary to keep track of a wide number of file versions, each of which takes up more space on your system.

3 Repurposing of assets

The larger your archive of video assets, the more likely it is that creative will be able to reuse or repurpose material, rather than paying for new material. Some footage you have can be used again and again, and this can even help make your brand more recognizable. Critically, it also cuts down on storage requirements.

What is needed: Being able to monetize archives and put them to good use again and again comes down to metadata, archive access and cultural incentives. Metadata is key to understanding what you have. Without detailed and descriptive metadata, you will never be able to find the right clip and put it to use. You need detailed ingest processes that capture and record metadata in systematic and uniform ways. Ideally, you want advanced MAM software that can deploy object detection and voice recognition to maximize the searchability of your archive.

MAM also delivers archive accessibility. If creatives want to seamlessly search for and reuse archive assets, you want them right at your fingertips within a production environment. That means dynamic archives that centralize both production and archive environments.



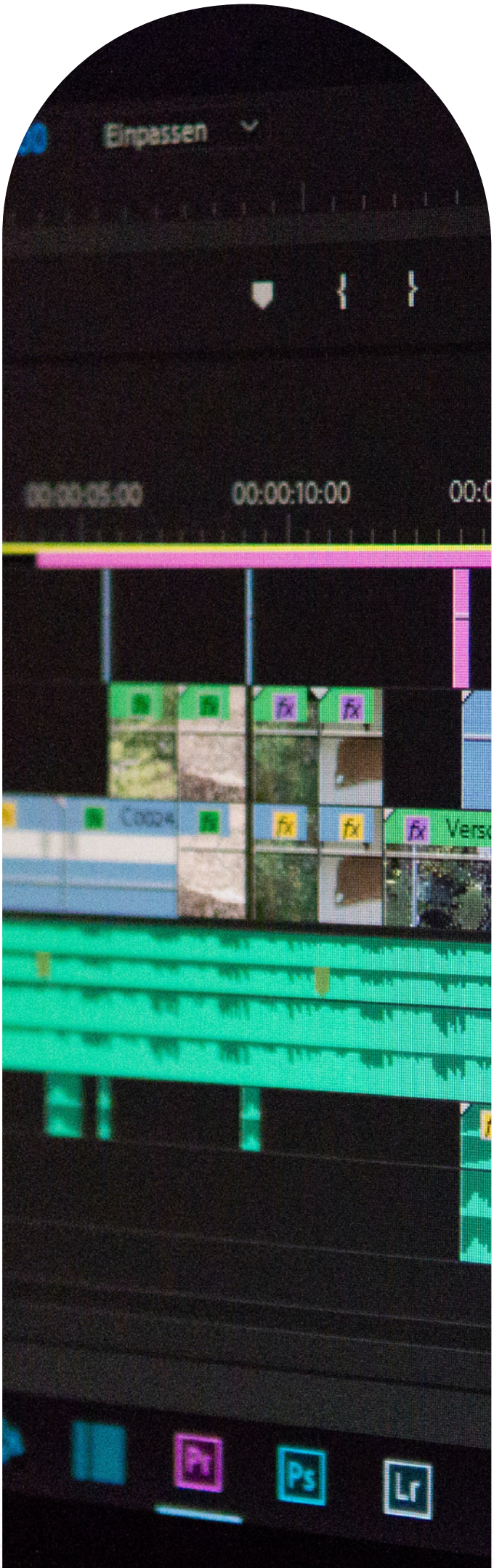
4 Efficiency and automation

The more elements of your workflow that can be automated, the less there is to go wrong. Automation also helps improve the creativity and quality of outcomes. However, strictly from a technical perspective, workflow automation removes moving parts and reduces troubleshooting — when done right.

If you want to make it quick and easy to share projects, remove manual steps in ingest, reduce the number of copies created and simplify communication. By doing this, you'll reduce costs, increase how effective people are and free them to focus on adding value where it's most needed.

What is needed: Technology sits at the heart of automation. The cultural elements hinge on making sure that the technology is used to its maximum potential. It's important to make sure that cloud-based collaborative systems are fully utilized once built. But, your goal should be making sure that the framework is robust and secure.

Centralizing your access to assets is, again, key to simplicity. The less movement between different environments, the more efficient the system. Deploy technology to automate ingest, metadata creation and more. Make sure tools integrate wherever possible and deliver end-to-end simplicity. A good MAM is really the central element of this kind of efficient, streamlined workflow that will really let you scale your operations when needed.

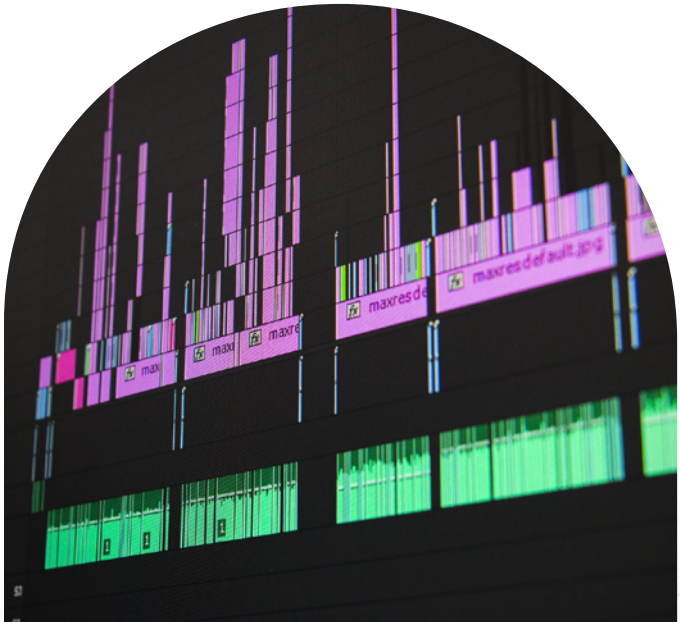


Uniting creative and technical outcomes

Effective video strategies for digital and creative agencies aren't limited to technical solutions. It's critical to merge creative and technical assets into a unified system that works towards a single goal — effective delivery of assets that meet client demands and can help them grow their business.

Scaling your traditional and cloud-based infrastructure and investing in network connectivity are the foundations of your video production system. But the unifying glue of that system is media asset management software. MAM allows you to automatically tier storage, optimize compression, reduce required resources and simplify workflows. It delivers tools that simplify and grow technical capabilities while improving creative outcomes.

The centralization of that information is essential for a frictionless system. As you invest more in video assets, you'll want easy access to that back catalog. It's hard to overstate the importance of easily searchable archives that mesh directly with production-orientated tools. That single solution will increase your efficiency as a team, whether or not you adopt any other cutting edge tools — and without it, the value of those tools will be lost.



The future of video strategy is about complementary investments. Every element of the video production process requires creative input and technical foundations. If those tools remain separate, the entire system will be filled with redundancies.

Quality MAM systems deliver everything under one roof. From archive and production control, right through to distribution and publishing. The key to scaling your video production system is making the right software choices that maximize your hardware efficiency and workflow simplicity. With the right tools and people at your disposal, your company will be set up to scale no matter how much the demand for video grows. And if one thing is certain, it's that the demand will grow!

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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!

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