



Video Workflow Management

The Migration to IT-Based Video Operations Presents New Opportunities and Challenges

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Executive Overview

Many of today's video companies have already moved parts of their video operations to an IT-based infrastructure. This migration has typically taken place opportunistically, resulting in "islands" of IT-based workflow existing within a primarily coaxial and tape-based world.

There are several indicators that suggest that this migration will accelerate, with more and more companies moving their entire video operations to a fully IT-based infrastructure. Drivers for the continued migration include:

- The trend within the video industry towards IT centralization to reduce costs and improve operational efficiency
- The desire to take advantage of new revenue opportunities whose multi-channel distribution mechanisms require advanced IT functionality
- The lessening need for specialized video hardware, as software advances catch up with hardware in video operations capabilities

With the increasing move to an IT-centric infrastructure, today's coaxial and tape-based functionality will, in many cases, eventually disappear. However, removing these last-generation remnants will require software tools to manage and design content-centric workflows. But today's digital asset management (DAM) and business process management (BPM) solutions are not adequate for the job.

Fortunately, video workflow management (VWM) software tools now exist with process design and infrastructure management functionality specific to video workflows. VWM solutions typically focus upon *video content-centric* processes, as opposed to *business-centric* processes, and generally integrate most of the major capabilities required for video operations.

This white paper will review the trends and drivers that are shaping the evolution of video operations to primarily IT-based infrastructures. The challenges and opportunities brought about by this shift will be examined, followed by an introduction to the concepts and components of video workflow management. The paper concludes with a brief overview of Telestream Vantage, describing how this new solution is enabling media companies to cost-effectively and efficiently design, automate, and manage the entire IT-based video workflow.

Video Industry Migration to IT

Today: Islands of IT-Based Workflow

Over the last ten years, the video industry has been gradually moving from purely tape and coax-based (i.e., signal-based) video workflows, to IT- or file-based workflows. IT solutions offer significant advantages over older "big iron" infrastructure:

- Ethernet is much cheaper than coaxial cable
- Ethernet switches allow greater flexibility in signal routing

- IT servers are increasing in horsepower and capabilities and decreasing in price
- Software tools are cheaper and more capable than their earlier hardware equivalents

However, very few major video operations are completely IT-based today. Most involve some mix of signal-based and IT-based video workflows, largely because IT-based video infrastructure components are being added incrementally into existing tape and coax-based operations to implement new workflows, to accommodate growth, to replace aging hardware, improve efficiency, or to cut costs.

This mix of IT-based and tape or coaxial-based environments means that within most media organizations, IT infrastructure is generally being used today at the workflow or team level – but not yet at the organizational or industry level. As a result, video operations within an organization tend to have “islands” of IT-based video infrastructure that are linked either by tape, coaxial cable, or through the use of video files which are copied between departments without any unified concept of workflow.

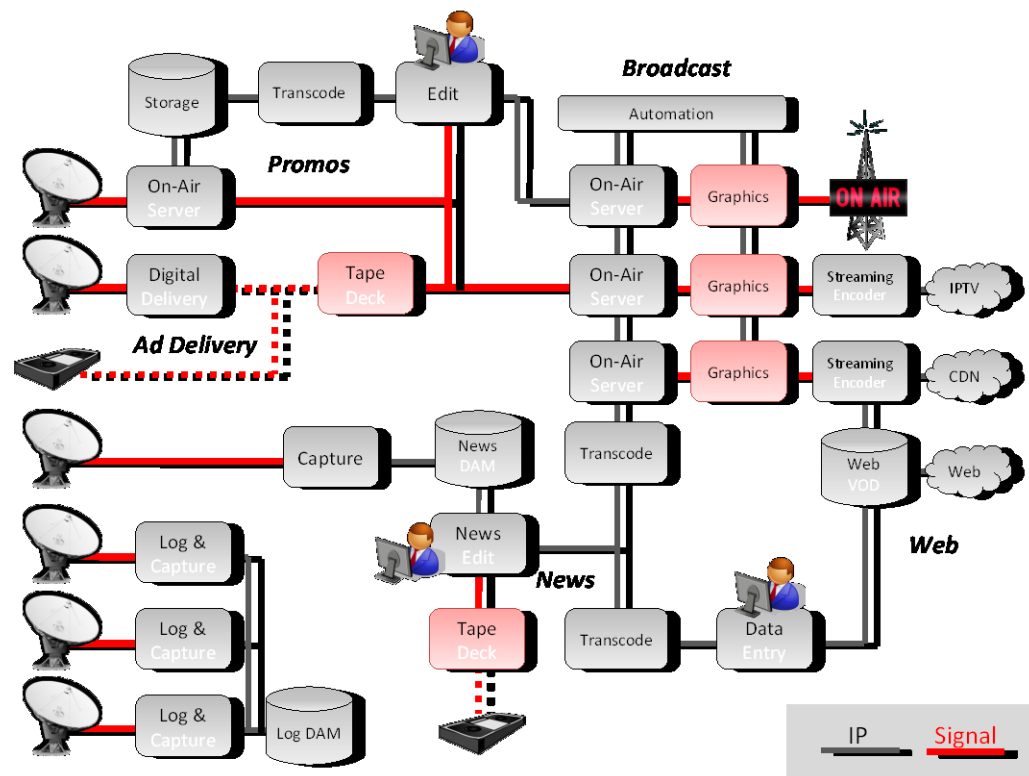


Figure 1. This diagram shows a typical video workflow with a complex mix of signal-based and IT-based infrastructure.

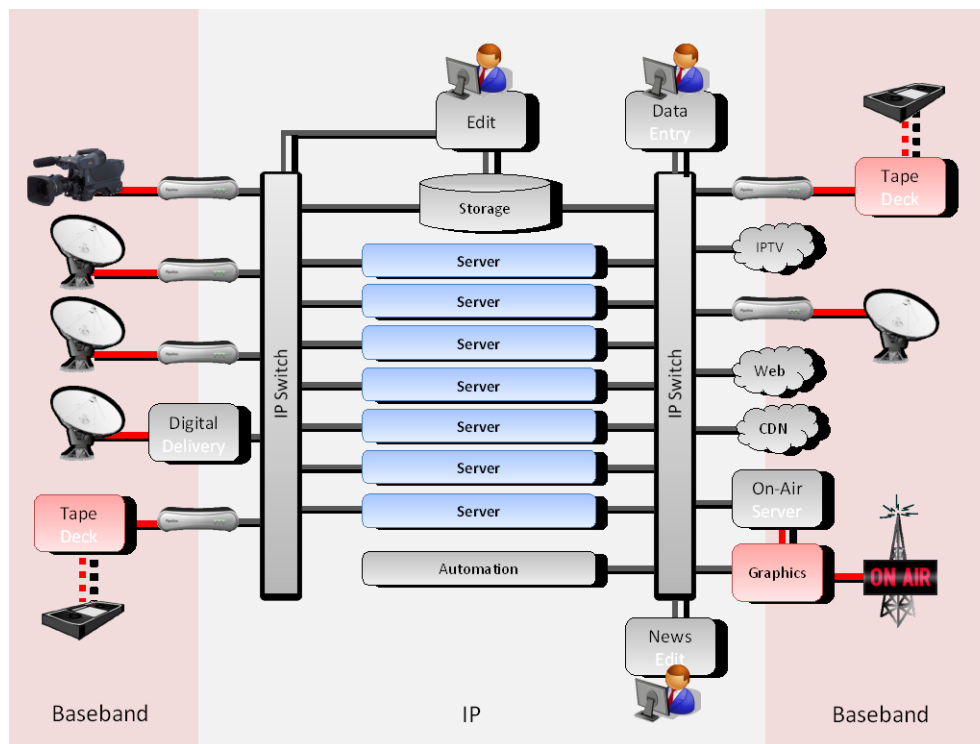


Figure 2. This diagram illustrates an IT-centric, organizational approach to video workflow.

Tomorrow: Migrating the Entire Operation

While the migration to IT thus far has been largely incremental and opportunistic, there are several indicators that suggest the majority of video operations will start to remove these remaining “islands” and bring their entire video operations onto a unified IT environment.

First, much of the remaining coaxial- and tape-based infrastructure exists because specialized video hardware is required. For example, hardware is largely used today to perform tasks such as live graphics insertion or top-quality hardware up-conversion. However, over the last two years, video-processing software – in combination with drastic improvements in generic IT server hardware – has caught up to and even eclipsed its hardware counterpart to accomplish these specialized functions.

For example, software-based up-conversion algorithms now exist that easily match and even exceed their hardware equivalents. Software processing has demonstrated capabilities that were never possible in hardware, both in capability and in speed. Because it is performed in software using files, up-conversion can now be completed much faster than real-time. So the purchasing of specialized hardware will lessen considerably over the next few years, and there will be a definite preference for software-based solutions within video workflows.

Another reason for this conversion to IT-based workflows is the fact that many media companies are starting to consolidate their video operations. What previously was done across multiple geographic locations is now possible from just one site.



Consolidation can provide many benefits to the enterprise, including reduced operational costs and simplified management of all video components. As a result, this consolidation of video operations is being seen across the entire spectrum of cable, broadcast, and new media companies. Major investments are being made in IT-based infrastructure to enable these initiatives. While much of existing IT-based infrastructure was purchased to solve *workflow* problems, these investments are now enabling media companies to redesign their *entire operations* around an IT-centric model.

Finally, lucrative opportunities now exist for broadcasters who can deliver content to a wider variety of digital platforms, including iPhones, the Internet, digital television, and other end-user destinations. However, while video revenue potential is increasing overall, revenue per workflow (and per distribution channel) is generally shrinking.

To maintain or surpass historic revenue levels, content owners are now moving from one or two primary revenue streams to a multi-channel distribution model, where many workflows are required to achieve the same revenue levels as one workflow could just ten years ago. But each additional revenue opportunity imposes different operational requirements, including new playback software or hardware, delivery platforms, video formats, and other customizations.

Media companies who leverage multiple distribution channels and revenue opportunities will generally increase the quantity and complexity of their workflows, posing new problems for operations to overcome. Further, as each workflow has less value, video producers will need to implement workflow automation solutions as much as possible, and aim for a digital infrastructure that is cost-competitive, efficient, extremely flexible, and easily scalable.

Migrating from “Islands” to “The Entire Operation”

Side Effects of IT-Based Video Operations

As the industry migrates to IT-based workflows, several new challenges appear:

- With an increase in the number of workflows, either through consolidation or to maintain revenue levels, it is becoming harder and harder to track the moving parts in a video operation through “over-the-shoulder” methods.
- Many of the moving parts in the workflow are becoming physically invisible, requiring a software management layer to see and effectively manage what is actually going on.
- IT-based infrastructure, by its very nature, allows the easy copying, renaming, and deleting of video files. This makes it very easy for an unmanaged workflow to go out of control, requiring controls to ensure that files are not incorrectly named or misplaced.

As a result of these challenges, successful video operations now require a new approach to process management and workflow automation that goes far beyond what was required in yesterday’s coaxial- and tape-based world.

The Requirements of an “Operation” Instead of an “Island”

Software solutions have been used for decades to solve process management and workflow automation, in manufacturing, finance, and other industries. However, the needs of a video operation – particularly when the entire operation is moving to IT – are just as complex and specialized as any process or workflow in other industries. For example:

- All elements of video operations must be managed. Instead of simply moving video files around, video workflow management solutions must be capable of scheduled capture, streaming, and playback, inline graphics assembly and application, as well as automated editing.
- Workflow solutions must enable the management of high-horsepower, high-availability IT-based video processing services, guaranteeing 24x7 uptime.
- Tools are required to manage non-transactional video operations, such as scheduled capture or playback, and to initiate video processes arising from proprietary file identification and analysis.

Because today’s IT-based islands typically only move video files around, the above requirements often only surface when an entire *operation* attempts to migrate to an IT-based video workflow environment. Fortunately, software solutions now exist that can manage the requirements of the entire operation from the top down, meeting the full breadth of today’s video operational needs.

The Continued Need for Human Interaction

It is important to note that some of the steps in the video workflow will continue to require human intervention for decision making and artistic choices in video editing. IT-based workflow management solutions can automate and streamline most of the steps in the video workflow – but they are not intended to completely replace humans in the lifecycle of the video. These new workflow management solutions can free operators from the repetitive aspects of video production, providing them with more time to focus on the creative and customer-targeting aspects of the business.

Understanding Video Workflow Management

What Is Video Workflow Management?

“Video workflow” refers to all of the steps required in the creation, repurposing, finishing, and delivery of video content. In addition to all of its formal steps and processes, video workflow also includes decision making steps that occur as these processes are executed. Video Workflow Management solutions allow the design, management and automation of video workflows.

Effective Video Workflow Management solutions should include the following capabilities:

- The design and automation of content-centric processes, which include steps unique to video operations such as capture from signal, transcoding, automated editing, metadata transformation, integration with editing, on-air, and ad insertion systems, and integration with video distribution channels

- The ability to translate information *about* video content into actions to *transform* video content
- The ability to pass video-specific information, such as captions, between steps in a video process
- The ability to integrate with third-party video systems and use their file systems and metadata models in workflow design

Video Workflow Management solutions typically focus on *content-centric* processes, meaning that the processes typically start executing when content becomes available to the process. This is in contrast with *business-centric* processes, which may involve content as a small part of the process, but typically will start executing when a client requires a business outcome.

For example, consider the case where an advertising client may submit a request to review an order. Responding to the client request might involve checking an order database, summarizing order information, sending an email to the client – primarily a *business-centric* process. In contrast, consider the automation of the analysis, preparation and delivery of video ad content, which is typically done when the content becomes available. In this case, the process is *content-centric* – it is initiated by the arrival of content, and process steps largely revolve around the content itself.

Video Workflow System Components

The transition to IT-based infrastructure will offer content creators and distributors the opportunity to leverage powerful software tools that can make video workflow management much more efficient and cost-effective. However, workflow management is useless without the ability to manage all of the essential components, such as:

- IT hardware infrastructure: Ethernet and Ethernet switches, IT servers, and storage
- Transformational software: Transcoding software, metadata transformation software
- Human interfaces: Metadata entry/operator interface software, editing software
- Assembly/Repurposing Software: Automated editing software, automated graphics software
- Delivery software: Web/IPTV/mobile streaming software
- Management software: Workflow design/management software, asset management software
- Decision-making software: Process control software, video analysis software
- Interoperability: Signal-to-IT and IT-to-signal hardware, legacy interfaces for acquisition/delivery
- Terrestrial distribution hardware: Traditional playout servers / ad insertion servers

Video workflow management solutions must incorporate all of the above components if they are to successfully address the full breadth of today's video operational needs.

Integration with Legacy Infrastructure

For most companies, the evolution to an entirely IT-based workflow will not occur overnight. It will happen first in individual workflows, and then slowly grow to include the entire operation as opportunities to save money, streamline operations, or address new markets present themselves. This means that for at least another five years, interoperability with legacy tape-based operations will remain a key requirement for most new video operation deployments.

Comparison to Traditional Process Management Systems

Within video operations where IT-based islands are the norm, either digital asset management (DAM) or business process management (BPM) software solutions are occasionally used to manage simple video workflows. However, as organizations move to IT-based workflows for the entire operation, these systems are generally unable to provide the full capabilities of a video workflow management system.

For example, DAM systems are often excellent at managing and tracking the *storage* of content and metadata, but they are not typically strong in the design of *content-centric* processes. Further, while they can often automate simple workflows that just copy files, they do not typically extend into managing 24/7 failsafe IT systems, nor do most of them reliably handle scheduled playout, capture, streaming, and graphics operations.

Similarly, where BPM systems are excellent for designing overall *business-centric* processes, they are not generally suited for designing *video content-centric* processes. In cases where a video file can be treated as simply another file, simple workflows can be modeled effectively. However, most BPM systems do not understand video-specific data types (such as timecode), cannot pass information reliably between steps in a process (generally a requirement for video processes, where the results of content- or metadata-analysis may be used to treat the video), and are generally not suited for non-transactional operations such as streaming or scheduled capture. Further, very few can understand the proprietary file formats and protocols required to interface with legacy video systems – making them unsuitable for companies where the migration to a full IT-based infrastructure will not happen overnight.

In short, video workflow management software provides a full suite of tools for creating and managing *content-centric* video workflows – tools and capabilities that are not available in other process or content management systems.

The Telestream Approach

Telestream has invested heavily in all of the technologies that are important for the evolution of video operations. Web streaming, IT-based capture and streaming, transcoding, video file analysis, metadata transformation, and enterprise-grade video workflow management are all core technologies that Telestream has under its roof.

As the industry leader in video system interoperability solutions, Telestream has developed the core competency of ensuring that all of its technologies interface with virtually every distribution channel, editing system, on-air or ad insertion server, asset management system, and almost any other video technology on the planet. The

Telestream approach recognizes that video operations cannot move entirely to IT overnight, and provides the ability to blend both tape-based and IT-based workflows, enabling media companies to evolve to a digital environment whenever it makes sense, without ever requiring a complete overhaul of existing video infrastructure.

Telestream Vantage

Telestream Vantage enables media companies to design, automate, and manage the entire digital video workflow. This fully integrated family of products provides the ability to tie together all workflow capabilities seamlessly, flexibly, and cost-effectively. Vantage makes it possible for media companies to design and manage virtually any video process required, regardless of format or delivery option.

Vantage was built from the ground up on a future-proof platform that provides flexible integration with existing systems. Web service interfaces can be used to access Vantage video processing capability as part of a larger external process; alternatively Vantage can be the primary driver of a workflow, and can leverage outside web services to trigger external transactions as appropriate. This enables a whole new level of integration between business process management solutions and Vantage's video workflow management solution.

Summary

The evolution from tape and signal-based video workflows to IT-based environments continues to make significant progress. Now, with the availability of powerful new digital workflow solutions, media companies can successfully make the transition from "islands" of IT-based video workflows, to fully IT-centric video operations.

What Telestream did for transcoding automation, it is now doing for the rest of the digital workflow. Telestream's new, fully integrated and wide open Vantage infrastructure offers media companies tremendous flexibility, control, visibility, scalability, empowerment, and an unshackled workflow. It streamlines all video process operations to create efficiencies across the entire video workflow lifecycle.

About Telestream

Telestream provides world-class live and on-demand digital video tools and workflow solutions that allow consumers and businesses to transform video on the desktop and across the enterprise. Many of the world's most demanding media and entertainment companies such as CBS, BBC, CNN, FOX, CBC, Comcast, Direct TV, Time Warner, MTV, Discovery, and Lifetime, as well as a growing number of users in a broad range of business environments, rely on Telestream products to streamline operations, reach broader audiences and generate more revenue from their media.

These companies choose to work with Telestream as they know they will get a trusted and highly skilled technical partner. Telestream prides itself on taking a true consultancy approach to customer relationships and is known for providing unparalleled customer service and support.

Telestream products span the entire digital media lifecycle, including capture and ingest; live and on-demand encoding and transcoding; playout, delivery, and live streaming; as well as management and automation of the entire workflow. For more information, please visit www.telestream.net