The Changing Dynamics of Digital Media Publishing, Live Streaming and Social Interactivity “BRIEF”
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3. Overview Of Emerging Digital Media Ecosystems
   3. Business Challenges

3. US Federal Regulation Timetable for Video Clips Available Online
   4. Digital Media Ecosystem Simplified
   5. The Business Cycle
   5. Leveraging Automation

7. Content Creation, Editing, Production And Workflow Engine Platform
   7. Implementation Strategy
   8. GV STRATUS Brief
   9. Ignite Brief

10. The Four Major Digital Media Workflows

11. The Business Case
   11. Sample Use Case: Mid-Market Local TV Station
   12. Solution (investment)
   12. Staffing Impact on Operating Expense
   12. Revenue Impact on Cash Flow
   12. Summary of Business Case
   13. Performance Over A 5-Year Period (USD)

14. Conclusion
   14. Summary of Benefits
   14. What Opportunities are Addressed
Overview Of Emerging Digital Media Ecosystems

Digital media ecosystems are transitioning at the speed of light to meet consumer demand for video consumption anywhere, anytime and on any device.

This dramatically impacts broadcast media producers and distributors as workflows that were once facility-centric are now expected to seamlessly address and integrate with “Software-as-a-Service” (SaaS) or “Platform-as-a-Service” (PaaS) online cloud-based solutions. Systems for transcoding, targeted advertising, ad decisioning, rights management, social media, content management and online video all need to be considered for content delivery.

There are significant challenges facing broadcasters as they drive both local and network facilities to maximize efficiencies and drive throughput to address the demands of digital media.

Business Challenges

• Making it easy enough to publish video-on-demand assets so that nontechnical journalists and editors can create content and publish it themselves — without the need of engineers or Web publishers who need to be focused on platform management.

• Being assured when publishing video-on-demand assets that all the right content is going to the right destination in the right format, and is properly categorized in a way to maximize monetization. This may not always occur seamlessly without a well-defined workflow platform.

• Maximizing throughput to make sure that websites, apps, social media and syndication sites are populated with quality content that is continuously refreshed to drive more consumer interest and engagement without being slowed down by manual processes.

• Finding ways to drive consumer engagement and interactivity on multiple social media platforms simultaneously, through editorial feedback and polling/voting results before, during and after a live newscast. This can be problematic without a well-defined workflow process.

• Addressing rights management issues for real-time live streaming where embargoed content needs to be replaced dynamically with rights-approved content. This can be a daunting task without adding significant delays or compromises, resulting in black on-air, still images and/or unrelated content insertions that consumers accustomed to broadcast quality find unacceptable.

• Complying with government mandates that all video-on-demand, live streaming and (soon) clip content provide for closed captioning, which places yet another burden on the workflow process. See callout box below.

• Meeting increasing consumer demand for social media interactivity, which requires news directors and producers alike to plan for and execute on ALL social media platforms. This is necessary to compete effectively as well as retain and grow audiences, but has to be implemented with existing resources and easy-to-use production tools.

• Moving past broad-based impression and spot advertising to more advanced hyperlocal client-based targeting methods. Newer advanced workflow tools and processes have to be implemented that can be adopted without impacting on-air operations and programming output.

US Federal Regulation Timetable for Video Clips Available Online

The new rules apply to clips of the same type of programming posted to the originators’ websites or mobile apps. They do not extend to third-party websites or apps.

Compliance deadlines are based on the type of video clip:

Jan. 1, 2016: Applies to “straight-lift” clips, which contain a single excerpt of a captioned television program with the same video and audio that was presented on television.

Jan. 1, 2017: Applies to “montages,” which occur when a single file contains multiple straight lift clips.

July 1, 2017: Applies to video clips of live and near-live television programming, such as news or sporting events.

Distributors will have a grace period of 12 hours after the associated live video programming appears on TV and eight hours after the associated near-live video programming is shown on TV before the clip must be captioned online, “to give distributors flexibility to post time-sensitive clips online without delay.”

The requirements do not apply to video clips posted before the compliance deadline.
Overview Of Emerging Digital Media Ecosystems (cont.)

**Digital Media Ecosystem Simplified**

The Digital Media Ecosystem, in its simplest form, consists of encoding and transcoding, online ad decisioning and insertion, content management, social media and online video platforms which are all tied into a content delivery network. The illustration below shows the role of each platform as it relates to both VOD video files and live and as-live streaming video, and how they communicate with one another. In addition, note how ad decisioning communicates with the facility-based traffic systems to close the loop in the business cycle.
Overview Of Emerging Digital Media Ecosystems (cont.)

The Business Cycle

As illustrated below, a solution strategy must encompass the business cycle — including content creation, production, advertising, traffic and sales — and that extends beyond the television and/or network facility into the digital ecosystem and back.

Leveraging Automation

Automation is important for four main reasons:

1) It drives efficiencies — lowering operating costs (improves ROI).
2) It drives significantly higher throughput — increasing productivity (improves ROI).
3) It drives consistency — making production less prone to human errors (improves quality of programming).
4) It drives ease of use — permitting content creators, producers and production staff to execute, publish and stream content while allowing the more technical Engineering and IT staffs to focus on systems management and maintenance (optimizes existing staff to limit the need to add more technical staff).
Overview Of Emerging Digital Media Ecosystems (cont.)

Let’s discuss a use case that leverages automation. For example, take one of the key challenges dealing with “embargoed” content. If a local broadcaster is streaming their evening newscast live and one of the segments happens to be a highly restricted clip, they may not have the rights to stream the content. In a typical manual process, it gets flagged for either BLACK, PROMO or STATION ID to be inserted, or the stream is delayed so that the embargoed content void is removed and then the video is restitched to play back as live. In either case, it requires additional tasks, time and is prone to potential errors. If the process breaks down, the online and mobile audiences could be lost altogether, to say nothing of the lost opportunity for targeted advertising. Therefore, in this example, it’s important that the overall workflow management platform not only interface properly with automation, but is also capable of properly executing each workflow task — making sure that the processes are automated, seamless and trouble-free.

Below is a high-level illustration of the various products and platforms within the workflow chain and business cycle to publish and/or stream content to client devices:
Content Creation, Editing, Production And Workflow Engine Platform

Implementation Strategy

Grass Valley’s implementation strategy is focused on addressing the challenges of a changing digital media landscape. The primary objective is to deliver on the four market-driven workflows for multidistribution production and publishing that can seamlessly integrate with all of the key SaaS/PaaS online platforms. This closes the business cycle loop throughout the entire digital ecosystem, from content creation to hyper-client-based targeted advertising, data driven analytics and monetization.
Content Creation, Editing, Production And Workflow Engine Platform (cont.)

GV STRATUS Brief

The core of the Grass Valley strategy is GV STRATUS. This is Grass Valley’s flagship service oriented architecture (SOA) platform that drives content creation, editing, production, video-on-demand (VOD) publishing, live streaming with content replacement today and 24/7 online and mobile digital channels tomorrow.

GV STRATUS is an application framework for nonlinear media production that combines production tools, content management and device control into a single platform designed to support the many different, rapidly changing usage models in broadcast environments. Unlike typical applications, each user works within a unified interface that is customizable to present only the tools needed for their specific task and according to their authorization level.

GV STRATUS is the first practical IT-centric, SOA implementation for the specific needs of broadcasters. An SOA is essentially a collection of shared software services. These services and their corresponding communications with each other must be implemented by passing data in a well-defined, shared format that can coordinate activities between two or more of the services. This approach provides loose coupling to any particular operating system and related platform technologies. Therefore, these services can be more easily combined for use in various applications. In this manner, features can be re-combined in different ways to produce new tools that more closely match the desired workflow of a particular application. Tools can be added or modified to adapt to changing workflows and user requirements.

An SOA also lends itself to the quick delivery of new services. This development agility speeds up the process of delivering new features and toolsets to broadcasters. This service separation aspect means that specific features can be offered independently of updating the larger application framework.

Grass Valley’s approach to SOA has also been developed in a cloud-friendly manner in order to enable distributed access, GV STRATUS Playout running natively in cloud environments.

GV STRATUS also supports a RestFUL API for third-party or broadcaster development.

GV STRATUS - Service Oriented Architecture

The Framework allows addition of other functional modules as needs grow!

Functional Modules (Services)

- Channel Panel
- Scheduler
- Navigator
- Asset Display

GV STRATUS Application Framework

GV STRATUS Core Services

- Infrastructure

GV STRATUS Services for VOD, Live Streaming, & Social Media

GV STRATUS is the “Digital Media” workflow engine for Grass Valley products and third-party encoding/transcoding, VOD publishing & live streaming with content replacement management.
Ignite Brief
The GV STRATUS production and workflow platform takes advantage of automated processes to increase VOD publishing throughput and live streaming content replacement. It does so by leveraging the primary ability of control room automation to manage metadata, ancillary events and associated files such as text and images synchronized with the video essence. It also utilizes the ability of automation to accurately define the beginning and end of each and every story or event with its transition point. These capabilities provide the means to mark up within an NRCS embargoed/replacement content, ad breaks, story segmentation with INTRO and TAG station branding, textual and stills accompaniment, categorization and other ID-based metadata for search and monetization. This is accomplished via an ActiveX component in conjunction with GV STRATUS.

Ignite is Grass Valley's automated control room solution for broadcast television and networks. Control room automation is about getting more stories on air with consistently high quality, but with limited staff to offer flexibility in operational choices a broadcaster makes. Ignite provides the primary and most complete link between the control room and the newsroom.

Ignite is a director-assisted, event-driven live production system that ties multiple systems together including the video switcher, audio mixer, routing switcher, video servers, graphics and robotic cameras — to find the perfect balance between manual and automated operations. Linking Ignite with GV STRATUS's nonlinear media production tools and digital media platform (DMP) services makes multidistribution content delivery for the Web and mobile devices not only more efficient, but with higher throughput to help generate alternate revenue streams. This combination also addresses the challenges broadcasters have concerning digital media.
The Four Major Digital Media Workflows

There are four significant digital media workflows to be supported. Here is the basic definition of each:

1) **Pre-production VOD Publishing**: This permits 24/7 publishing of content without having to wait on the traditional linear broadcast schedule. Both user-generated and breaking news can be quickly published out of the newsroom whether it is from raw footage or edited content.

   This workflow leverages pre-defined intelligent watch folders that can be organized by category or publication point. The pre-defined publication profiles that include all technical parameters allow “nontechnical” journalists, editors and/or producers to drop in their content files and have them automatically published to their CMS, social media platform or other point of syndication or forwarded for editorial approval prior to publishing.

2) **Post-production VOD Publishing**: This provides for three to five times faster published content than what can be achieved manually. Every story of a live newscast can be published with INTRO and TAG station branding automatically, with frame-accurate in and out points.

   As the live program or newscast is executed, Ignite’s metadata and knowledge of story begin and end points allows for automated segmentation publishing in real time dramatically increasing VOD publishing versus manual operations.

3) **Live Streaming with Content Replacement**: This workflow addresses important market drivers including the ability to provide unique hyper-client-based targeted advertising and rights management, having everything properly synchronized with closed captioning and social media.

   This workflow allows broadcasters to address:
   - Embargoed content replacement
   - Hyper-client-based targeted advertising
   - Mobile-only content replacement
   - Region-specific content replacement

4) **24/7 Scheduled Streaming Playout with Live Inserts for Mobile TV and Syndicated Web Channels**: This workflow leverages all of the advantages of the three previously stated ones, along with the ability to extend the management of a channel from strictly on-air to add Web and mobile devices with unique programming that addresses the online community.

   Of special interest is “auto-playlist” real-time updates to each channel’s playout schedule. Because stories can be “categorized” in advance, playlists can be automatically updated based on specified rules such as:
   - Automatically update dynamic categories like weather and traffic
   - Automatically update specified categories aligned with the specific channel profile, i.e., “Local Sports Channel” can be updated with any stories or segments classified as “Local Sports”
   - Regional channels can automatically detect through categorization what stories to auto-populate or not based on its rules based profile
   - Stories marked as “embargoed” do NOT get updated within the playlist but will be tagged assuming “replacement content” is available
   - Allow for “live cut-ins” during playout

The following illustration defines the key systems and platforms as components of the workflow:

**NOTE**: MOS metadata that’s defined and processed from GV STRATUS through the NRCS markup process and on to rundown conversion within Ignite for segmentation and messaging, trigger metadata creation that again is processed by GV STRATUS to publish auto-segmented VOD files, while also sending markers to the video server for messaging insertion into the video signal.
The Business Case

Industry and market data show that online advertising by television facilities is still a small percentage of revenues, but it also shows slow but steady growth of about 4 percent annually. As facilities add more video-on-demand, online video revenue is seeing higher growth trends of about 7 percent.

A large shift is being seen by broadcasters with untargeted banner ad revenue declining, while targeted banner ad revenue is growing very rapidly. Therefore, there is considerable interest in further exploring what revenue results can be attained with online video that includes targeted advertising.

Sample Use Case: Mid-Market Local TV Station

So what about implementing the four different digital workflows addressed previously, leveraging both GV STRATUS and Ignite to take full advantage of automated processes, and thereby increasing throughput anywhere from three to five times of existing manual processes? How does this translate in terms of operational expense savings and increased revenue due to being able to create more inventory? What is the return on investment in terms of payback, internal rate of return, net present value and cash flow?

This example assumes a traditional manually operated television facility, or the replacement of automated solutions that do not address digital media for all four of the workflows.
The Business Case (cont.)

**Solution (investment)**

- GV STRATUS Digital Media Platform
- Ignite Konnect system with 3 M/E K-Frame and Katalyst tactile automation panel
- RS-LDX Robotic Camera Systems
- Grass Valley Project Management Services
- Elemental Technologies Encoding/Transcoding
- Brightcove Ad Insertion & Online Video Platform PM Services
- ExciteM Social Media PM Services

**Staffing Impact on Operating Expense**

In this use case, the staffing impact is 18 resources including production and digital media staff for a facility with full-time employees throughout the morning and evening shifts and part-time employees throughout the weekend shift. Staffing models will vary from location to location and group to group, but the average results will deliver a payback within 20 to 36 months for mid-sized organizations. If a facility is already leveraging automation but not necessarily digital media automation, the impact on staffing will only address digital media headcount and therefore the payback is more likely upward of 36 months.

**Revenue Impact on Cash Flow**

Leveraging automated processes for digital media can provide anywhere from a three to five times productivity improvement on VOD publishing throughout alone. In addition, other ad availability opportunities can be presented via the live streaming and social media process improvements. While this allows broadcasters to provide significantly more video-based assets to drive consumer interest and retention, it is still dependent upon a digital media sales strategy that addresses a combination of local, regional and national opportunities. The strategy is also impacted by pricing elasticity related to time-of-day, hyper-client-based targeting and sponsorships.

<table>
<thead>
<tr>
<th>Summary of Business Case</th>
<th>Modeling Analysis Using 2013 Averages (USD)</th>
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<tbody>
<tr>
<td>System Investment</td>
<td>$779,800</td>
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<td>Annual Recurring Fees for Service Agreements and Services</td>
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<tr>
<td>Annual Labor Savings</td>
<td>$511,597</td>
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<tr>
<td>Annual Digital Video Revenue Improvement</td>
<td>$295,800</td>
</tr>
</tbody>
</table>

While this use case example used older 2013 metrics, if 2014 metrics were to be used, the cash flow improvements would be dramatically better. For example, using 6 percent of total revenue associated with digital media versus 4 percent AND 24 percent of video revenue versus 17 percent alone, could result in an investment return improvement of greater than 10 percent!

Therefore, it's important to analyze the specific facility metrics based on their market size and historical results, then apply the improvement parameters associated with automated processes. Even if a facility is already running with an efficient staffing model, the throughput alone can improve cash flow significantly when closely tied to a focused sales strategy and a plan to address the increased ad availability inventory. For a more precise use case of a specific organization and market, Grass Valley can offer an in-depth consultation.
The Business Case (cont.)

Performance Over A 5-Year Period (USD)
Conclusion

Summary of Benefits

Grass Valley can address the following Digital Media Workflows:

1) Newsroom VOD publishing via preset-driven GV STRATUS watch folders
2) Automated segmentation VOD publishing through Ignite Konnect with GV STRATUS
3) Live streaming with rights management content replacement and hyper-client-based targeted ad insertion via Ignite processing, being managed by GV STRATUS
4) 24/7 Web & mobile TV as-live channels with live inserts for syndication on portals, broadcaster website and/or mobile app and mobile TV

What Opportunities are Addressed

• Closed-captioning government mandates
• Embargoed, mobile specific and regional content replacement
• Hyper-client-based targeted advertising
• Integration with third-party vendors that support multiple formats including the most popular — adaptive bitrate HLS
• The demand for social media integration in broadcaster websites and mobile apps, synchronized companion apps and over-the-air program integration

All workflows and digital media processes are streamlined and automated to maximize efficiency and increased throughput!