Hollywood production, post-production and distribution in three to five years: updated observations from the front lines.

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Abstract

The goal of this report is to present a snapshot of the thinking of industry leaders regarding the shape of production, post-production, and distribution in three to five years. The research was done in two phases. Phase I is the major filmed entertainment studio and production company perspective and Phase II is the post-production "supplier" perspective[1]. In Phase I we asked content industry senior executives to project the market for content in three to five years. Then we asked them to speculate on the future of the pre-production and content capture environment, the production and post-production environment, distribution, and archiving. We end Phase I with their thoughts on ideas that could shape business development efforts in the post-production industry. In Phase II we asked senior post production/supplier executives how they see their industry changing in the next three to five years, what barriers exist that could delay those changes, where they see growth opportunities for their business, and what new skills they are developing in-house to take advantage of those opportunities.

A report we conducted one year ago covering the same ground is available upon request at www.vjaconsulting.com.

Phase I: The Studio community

In Phase I we interviewed eighteen senior business and technical executives at the major filmed entertainment studios and production companies (examples of major studios and production companies include Fox, Universal, Lionsgate, Disney, and Warner Bros). All interviews were held with the understanding that no one would be quoted and neither their names nor the names of their companies would be mentioned. Our expectation was that this would yield unfiltered responses.

We have aggregated the responses into summaries that maintain the sense of the response while stripping them of any information that could unambiguously link them to an individual or company source.

[1] We use the term "supplier" and "post-production company" almost interchangeably. This is because some suppliers engage in activities beyond traditional post-production. For simplicity, the reader is encouraged to think of the report as containing three distinct constituents: the content-owner/distributor/producer, the post-production facility and the hardware/software companies that manufacture tools for the former two constituents.

What are the biggest changes you've seen in the past year?

Transition to file-based workflows

There is broader recognition of a trend to file-based workflows and their company efforts around this topic are in various states of implementation.

Some companies are just starting to plan their approach to digital workflows, and there appears to be some resistance to change. There is trepidation of fully embracing changes to existing analog workflows because management and co-workers fear that design parameters have not stabilized.

Other companies have fully embraced a file-based workflow solution. To them, video production as a linear and sequential process is transitioning to non-linear and multipath processes. The perceived value to the multi-path process is enhanced resource efficiency and quicker outcomes.

Interoperability is a key design criterion. Proprietary tools that require special hardware or involve format conversions are giving way to tools that work with internally standardized formats, metadata constructs, and other key parameters. An example of this is secure movement of content files over the Internet. Solutions that require proprietary boxes at both ends are losing market share to tools like *Aspera* and *Signiant* that require no special appliances and can be customized to fit into standing work flow infrastructures.

File-based workflow discussions are motivating a reassessment of traditional post processes in the marketplace. Studios are generally convinced they can (and possibly should) create in-house services that traditional Post houses currently offer. At least one Studio plans to select partners for services and technologies, integrate the partners' technology into the Studio's file based workflow infrastructure, and bring as much of the work as possible in-house. They plan to reassess the 'in-house versus outsourcing' needs on a regular basis.

The market for post-production services has become increasingly competitive. Beyond the usual churn of new companies with specific tools or technologies, companies that previously developed and sold post-production tools are now also offering services based on those tools themselves.

Studios are assessing what they outsource as some processes become commoditized, while others require special skill sets and resources that can quickly become obsolete. Some Studios say that they are using Post houses as much as ever, and getting more for their money. Other Studios say that they are working to bring much of the work in-house. The common thread is that value now lies with the talent to use the tools more than the tools themselves.

Transition from film to digital capture

The transition from film to digital capture has been most dramatic in television production. 100% of one Studio's dramas were shot on film one year ago. Today 95% of the same Studio's television outputs are captured digitally. Mastering television from cut negative is now an anomaly. The rapid transition has been driven in part by Guild issues, especially the disarray and discord within SAG and AFTRA. "SAG and AFTRA have shared jurisdiction over primetime series and the longstanding agreement has been that SAG reps all projects shot on film, while SAG and AFTRA have an equal shot at projects shot electronically. With more primetime skeins shot in high-definition digital formats, AFTRA's electronic purview has greatly expanded in the past year as nearly all primetime pilots went AFTRA." [2]

Feature films are still primarily shot on film with the single outstanding exception being 3D movies. 3D animation motion pictures are created digitally, so by definition are 100% digital capture. Live action 3D motion pictures are mainly digital capture, although some directors chose to capture in 2D on film and then convert the images to 3D (ex. Disney's *G-Force*).

Digital capture is not always cheaper than film when you look at the total production budget. Shooting can be cheaper using digital cameras, but managing the data and metadata, and mastering the content, can be more expensive.

Stereoscopic 3D

Stereoscopic 3D is a hot growth area in both production and distribution. More than one person said that it represents a once in a lifetime business opportunity that could catalyze growth in the entertainment business on multiple fronts. It is clearly driving the deployment of 3D-capable theatrical systems, which benefits the overall digital cinema infrastructure conversion effort.

The 'up charge' for the theatrical 3D experience has been accepted in the marketplace. In the first half of 2009, multiplexes screening the same film in 2D and in 3D saw ticket sales for the 3D version outsell the 2D version on average 2.4 to 1, with some experiencing over 9 to 1.

[2] *Daily Variety* 9/19/09

3D adoption varies among the major global markets. The US and Canadian market is focused on theatrical 3D, with TV and video trailing. Europe is focused on 3D TV content and technology deployment, with theatrical trailing. According to one Studio executive we spoke with, Asia is just beginning to wake up to 3D. Although NHK has been broadcasting 3D content in Japan since 2008, he said, the audience remains small and the availability of content is not driving 3D display sales.

The clear emergence of a market for 3D theatrical content has forced the Studios to rapidly acquire the knowledge and skill sets to deliver Hollywood-quality content. The creative community is learning how to write for and compose in 3D. The creative community, technologists, and craftspeople are all being asked to incorporate the science and art of stereography into their work.

Blu-ray

Blu-ray has gotten better, faster, and more feature-rich. BD-Live, which requires an Internet connection to access enhanced material from the web, is now a necessary feature.

Influence of international / non-US market

One person mentioned the growing impact of non-U.S. markets on Studio decision-making. American Studios have become more globally aware. The international markets account for the majority of box office for theatrical releases far more often now than they did in the past. The greatest revenue growth potential is in international markets. It is far more likely now than in the past for domestic operations to have their decisions influenced by the needs of international markets.

Intellectual Property Rights

There have been significant court rulings and laws passed in many nations in favor of protecting the rights of IP rights holders[3]. So-called "safe harbor' limitations on ISP obligations contained in the DMCA continue to be clarified. Because of this, graduated response to infringements is gaining traction, and the processes of consumer notification and education are maturing.

[3] E.g., the French '3 Strikes' law, which calls for persistent file-sharers to be cut off from the internet.

Audience characteristics and Hollywood response

Today's consumers have less patience than in the past. Fads and trends cycle faster and it is harder for anything to get noticed. Marketers must deal with cognitive dissonance and the social equivalent of Attention Deficient Disorder. It takes a serious "buzz-building machine" up front to engineer a profitable product rollout.

Young consumers 'snack' on content and at least one Studio is editing long-form content in order to serve this market of snackers. They engage services that are able to automatically identify (through image recognition) the content of scenes and do an automated first pass selection of scene clip start and stop points. The content is then made available for mash-ups. Other Studios are looking to license clips to consumers and allow mash-ups, but have no formal rollout plans in place. They view it as a potential business, but one that is largely unproven.

Consumer expectations for richer, interactive media experiences are rapidly evolving. As one executive put it, multimedia was "bolted on" to linear TV programming last year. This year, however, concepts are being pitched as multiplatform experiences from the beginning.

Young consumers 'expect the unexpected' from Hollywood and eagerly anticipate the next new thing. The most recent example of this is their rapid embrace of theatrical stereoscopic 3D. People born after 1990 especially look to technology as the answer to everything. New devices and technologies will play an increasingly important role in monetizing content. One executive pointed to a service called *MovieIQ* as an example of the trend[4].

Instant access to information and content is important to consumers. As one executive put it, Gen Y has 'entitlement issues'. They want everything now, and will find the content they seek regardless of the Studio's plans to provide it. 'How and When to provide' is now a more important business question than 'What to provide'. The revenue models to pay for this are evolving, and reusing existing assets is thought to reduce costs. The audience expects connectivity, and this feature must be built into any product or full entertainment experience. Digital workflow has enabled greater sharing of assets both internally and with outside communities.

At least one Studio has embraced their 'inner *YouTube*-ness'. They are placing more emphasis on instant access to content within their organization. Management supports *Twitter* and *Facebook* posts by individual employees.

[4] MovieIQ enables real-time database search of continuously updated information related to a movie while the consumer is watching that movie on an internet-connected Blu-ray device.

Long form content is still important. Consumers are interested in making their own decisions and creating their own entertainment experiences, but there is still a place for a good story. Movies will still be popular in three to five years, but consumption location will likely change. The audience is watching fewer movies in theatres and more at home or on portable devices. Gen-Y is leading a revolutionary new balance between theatre, rental, and buy-to-own.

Elements of Production and Distribution

Previsualization

Pre-visualization (pre-viz) as a pre-production planning tool is used in the same manner as last year, with observable growth in 3D full motion capture and 3D rendering in the pre-viz stage of production.

No one we interviewed has thought of pre-viz as bonus material or a new business development area other than as material for the "work in progress" version of movies[5].

Crews

Crew activities are transitioning. Features are still mostly captured on film, except for 3D which are 100% digital capture versus 3D film capture. As mentioned earlier, TV is now nearly 100% digital capture.

Because of this transition, the roles of individuals on the crew are changing; some traditional tasks are disappearing and new ones are emerging. Crew work is taking on an IT flavor and crew members must be digitally savvy. The need for continuous learning has increased over the past year and some tasks are falling through the digital cracks.. There is no digital capture equivalent of the Script Supervisor, for example, causing digital descriptive information (metadata) to be partially captured or missed altogether. Members of the crew may be called upon to enter metadata on site, and sometimes there is a "data wrangler" on the set to fulfill this task. Film Loaders may end up doing data entry about the lens, camera, and other technical specifications. Other crew members may be given responsibility to enter scene, talent, and performance information. The need and the specifics of these tasks are rapidly evolving, so it is too early to codify who does what or how the task should be done.

A few of the more 'new media' people interviewed mentioned that production teams are now an integrated group of traditional tv professionals

[5] A Previsualization Society was formed on Sept. 29, 2009 consisting of members from the American Society of Cinematographers, the Art Directors Guild and the Visual Effects Society. The Previsualization Society will focus on pre-viz as a production tool.

alongside mobile, app development, social network, and gaming professionals. The integrated teams must create and sustain buzz, even when faced with low audience numbers. Four million viewers is now considered a megahit, so the teams must be mindful of all distribution channels and platforms during and after production. Digital distribution concerns must be built into production activities. Short form content, and even 3D content, extracted from long form content must be planned for.

The creative community on the set will make editing and metadata decisions that are delegated to others to implement. There are no standards or guidelines for who captures descriptive information or how it should be encoded (data dictionary) or managed (digital workflow metadata management). Individual Studios and production companies, as well as industry consortia and organizations, are developing policies for data management, tagging, and metadata that, once formulated, will extend the efficiencies of a file-based workflow upstream to the creative and technical crews in the field.

Image Capture

Nearly all interview subjects agreed that the Digital vs Film capture decision for features is made by the director and other members of the creative community once the production team is assembled. The team members consider technology comfort levels that will help the production and not damage their reputations. Barriers to digital capture are breaking down.

3D is a driving force in the transition to digital capture, because digital capture is the only reasonable approach for effects-driven 3D movies. Although most 3D features are captured digitally, some directors are comfortable enough with technology to capture in 2D and do a 2D-to-3D conversion later (ex. Disney's *G-Force*).

Multi-guild discussions are needed to determine how to advance the digital capture tool set and experience base. Many individuals making movies are open to cooperate and are not threatened by technology. But they would rather do tests outside of productions than test on productions. In keeping with this desired approach, the American Society of Cinematographers (ASC) and the Producers Guild of America (PGA) redid their digital camera test in January 2009 under the leadership of David Stump, chairman of the camera committee.

On-set decisions

Because the cost of digital storage media is miniscule compared to film, much more data is captured and kept during a digital camera shoot. Filmmakers are comfortable leaving digital equipment rolling between takes, and on television shoots, dailies can amount to 5 hours per show per day. Some interview subjects suggested that the director or other on-set personnel may be responsible for deciding what will be saved and, more

importantly, what has no value and will be edited out. One first-pass rule-of-thumb mentioned is "flash to flash" or "clapper to clapper" should be kept. From there, a suggested filter is "circled takes" (i.e. material that is judged good enough to be considered for inclusion in the final work). Circled takes would be digitized from tape and entered into the digital workflow. All other material would be archived on the media it was captured on with minimal metadata attached (e.g. title, episode, production #, but few details).

Everyone is working on policies now for digital capture, storage, and archiving. As one interview subject put it, it is all about DPX (Digital motion Picture eXchange) frames and frame management. Files coming out of the capture device (camera) must be backed up immediately, because those DPX frames ARE the film.

File based workflow

The digital vs. film capture decision is most likely made by the director and other creative community as the production team is assembled. However, as one subject put it, the natural human resistance to change leads people to hold off adopting a new technology or technique until it is in their interest to change. We were reminded that producers employ technology to tell interesting stories and advance the creative vision rather than for the sake of technology itself. For instance, *Oh Brother Where Art Thou* drove Disney to Digital Intermediary (DI) because the director wanted a sepia tone throughout the movie but wanted to retain the green shirts worn by the characters. Later, Disney captured *Pirates of the Caribbean* on film and immediately moved to digital to build out Davy Jones' tentacle beard.

With film, the workflow from lens to DI is fully standardized and a well-oiled machine. The sequence of the digital work flow, as articulated by one subject, is:

- Principle photography (sometimes including color correction tests on the set that then adjust color look-up tables in the camera)
- Special effects and final conform (editorial decisions that trigger full resolution frame selection)
- Color correction
- Digital intermediary (DI – final answer print)

Policies, practices, and standards for digital tools are not yet built out to the extent that they are for film. This means that many processes today are 'one-offs' with Post houses at some Studios, while others have developed their own in-house methodologies and are working with Post houses to develop conforming processes. As one subject said, when you rip down silos, where does production end and post begin?

The status of file-based workflow solutions at our subjects' companies break down into four groups.

1) The digital workflow is fully in place on the production side.
2) Operations have been phasing in the digital workflow successfully for years, to some degree as part of gearing up for HDTV. Creative activities, such as color timing, editing, restoration, and service company file transfers, are hung off of the server workflow. The infrastructure accommodates runaway production by increased support for non-collocated activities because people want secure access to a host of platforms via the web regardless of physical location.
3) Implementation is nascent but growing with a low percentage of television shows currently managed via a file based workflow system, for instance. Usage of the system will increase as upper management becomes comfortable with it.
4) The system is prototyped or partially functional. Because they do a lot of outsourcing and joint production agreements, the parts of the digital workflow that are core to their operation are in place, but a fully fleshed out workflow is not in place or [in some cases] contemplated.

Standards and practices will emerge as people gain experience with digital tools. All of the subjects mentioned that interoperability is a key design consideration. They are working to build their digital workflow with enough flexibility to accommodate a standard interoperable master format (IMF) if and when one is standardized. One such IMF standardization initiative is being run under the umbrella of the Entertainment Technology Center (ETC) at USC (www.etcenter.org). Other IMF initiatives are underway among individual and allied Studios and their strategic partners.

Metadata management is a critical component of efficient file based workflow implementation. Metadata is 'a mess,' said one subject, and is developing organically, production by production. People are working to mold the learning from these organic processes into standards. One key initiative is the ETC's Metadata Project, which is aggregating multiple schemas and developing a master schema for industry consideration.

More than one subject commented that the distribution side of the Studio workflow will shape the development of metadata. Distribution is where the revenue is, so any infrastructure build-out and metadata solution should serve its needs.

A few subjects mentioned that firm's like Verizon or a Google, which have expertise at managing huge data centers, might be a centralized location for Studio file-based workflow data. Some people made the point that those firms could provide data storage, network connectivity, facilities management, and access tools, at greater reliability and lower cost than a Post house. Others responded that no one would trust them to keep their files secure during production, and that they are not attuned to the unique

needs of a content creation company ('managing movie data is different from managing financial data'). As will be noted later, there may be an opportunity here for an intermediary to leverage the low-cost resources of one of these major data warehouse firms with a front-end interface and tools that meet the needs of the Studios and creative community.

Access to content by the public during production

Although a few subjects said that no effort is being made to accommodate making material accessible for monetization during the production and post-production process, most said that it is being discussed. The greatest concern of those who said 'no' is rights issues. Those who said that it is being discussed wondered if it is a trend. For them, hooks have been built in to the digital workflow that talent can take advantage of if they choose to. One person noted that Bryan Singer blogged during his work on *Superman Returns*. However, pressure to get things done on time and within budget can make it difficult to justify the time spent building audience awareness through work-in-progress community building.

Watermarks

All subjects who commented on watermarks said that watermarks are valuable for forensics during production and post-production. They cited both forms of marks; visible marks to spoil the content, and hidden marks to uniquely mark each file so that leaks can be traced as granularly as possible. In keeping with this goal, more than one subject added that they are working to have vendors acquire watermark embedders and have them embed unique marks when moving content among subcontractors. 'Cutting rooms' – small contracted or subcontracted Post shops - are viewed as potential security risks because they spring up, do their work, and disappear. One subject added, however, that there have been no major leaks in years, and all have been 100% traceable to a facility and person.

Once the content has completed post-production work, watermarks are considered a key component of a complete Digital Rights Management (DRM) strategy. Discrete hidden watermarks are always embedded in new pre-release content and screeners sent to licensees, vendors and service companies, executives, and reviewers. A few subjects said that library content is not watermarked, and that content delivered to the consumer is rarely watermarked.

Most subjects said that they are not thinking of using marks to trigger value-added features. As one executive put it, no one has articulated a proposal for using watermarking to enable value-added services that has the details worked out and a viable business model behind it. The capital outlay for the value-added services must be justified. Asking for a business model imposes a harsh reality on the discussion.

Observations on the future of Post

Money is made from inefficiencies. The transition from film to digital, and the development of file based workflows, is cutting out many old inefficiencies. The traditional use of Post houses is over. Some functions of the lab are moving upstream to the set. Color correction can be done at small effects shops just as easily as at an established Post facility. One Studio outsources some Blu-ray production to a Post house, not because they need the house's expertise and resources, but as a way to stay abreast with what others are doing.

Studios are using outside post-production less and less for pre-distribution services, according to a number of subjects. The advantages of bringing post in-house include lower cost, faster turnaround time, and fewer security and industrial espionage concerns.

Many said that they now rely on outside post services to produce the final film prints, manage and distribute the final Digital Cinema Print (DCP) file and edit, color correct, and finish trailers and related video marketing collateral.

Which outside facilities/vendors to use will involve balancing those that have a strong track record with best practices in place against the lower cost but inherent risk of garage operations. One executive commented that a garage operation may be acceptable if they get a performance bond.

Transcoding

Transcoding and customizing the data and metadata as it moves among services and out to licensees can be a huge work burden. Almost every new partner and content licensee has their own variant on the file and metadata specifications because of the lack of standards. A Studio or Post house will iterate and transcode the same file over and over again to meet custom requests. Some Studios offer an existing iteration that is close to the licensee's needs to the licensee, and if they still want a custom transcode, then the Studios charge extra for the work.

Transcoding can be automated. Warner Bros has publicly announced they are working with *Amberfin* on a high quality, state of the art, JPEG 2000 ingest and automatic transcoding solution[6]. Transcoding for distribution on physical media, where there is a cost for correcting problems (e.g. returned disks), must be Quality Controlled (Q.C.'d) before distribution. Transcoding for digital distribution can skip a visual Q.C. step because it can be patched or repopulated as problems are discovered.

Many view transcoding as an interim issue. The Interoperable Master File (IMF) project at USC's Entertainment Technology Center and other initiatives within the industry are working to develop a standard that works for the

[6] http://www.amberfin.com/news-events/press-releases/, Sept. 14, 2009

majority of situations and deals. The Interoperable Master File will be a stable bridge between production and distribution that both sides of the workflow, both upstream and downstream, can look to for standards guidance. The IMF will encourage further standardization. As one interviewee said, 'smart people will do smart things.'

In the meantime, private companies and universities are developing universal transcoders, and software that detects the format of the incoming signal. One person commented that there are many ATSC standard HDTV display formats, yet all TVs can handle them. This trancoding issue will disappear either through standardization or through universal transcoders.

Distribution

The activities of production, distribution, and marketing are comingling. Executives view 2009 as the beginning of a period of experimentation with distribution release windows. There is no hesitancy to try new channels and business models, one executive commented, but their value relative to their impact on existing channels must be assessed. Another executive said that everyone is interested in a high price early window sometime between theatrical and other windows, but there is concern that theatre owners won't book the content under those circumstances. Some may try a Blu-ray release earlier than the corresponding DVD release, but they have questions about how it will impact the VOD market. In all of these cases, the discussion centers on how to optimize the return on the marketing effort.

All of our subjects view online distribution as a growth area. Some commented that online distribution would displace piracy by offering legitimate and reliable alternatives for the full linear content. Some executives mentioned that their Studio is already licensing content for widgets, plug-ins, IPTV, and ringtones. (*An interesting anecdote: while over 200 partners are delivering one Studio's content to some form of digital device (not counting cable and satellite companies delivering to set top boxes), Apple accounts for 95% of the revenue from this digital distribution. The rest, including Telco's, are each below 1% of the revenue received from digital distribution. This highlights the importance of finding a solution to the transcoding issue discussed above.)*

It's interesting to note that more than one subject commented that consumers don't understand or care about distribution release windows. Time and convenience are key factors that determine current consumer behavior.

Archiving

What is the problem?

Digital capture has lead to an explosion of data. One subject-matter expert commented that digital capture has a 100:1 shooting ratio (one hundred hours shot for every single hour of editorial material). Dailies can amount to five hours per show per day. Circled takes are digitized from tape and entered into the digital workflow. Non-circled take material is archived on the media it was captured on with minimal metadata attached. LTO and HDCAM SR tapes are stored en mass with minimal indexing. Because there is great variability in the manufacturing and operations of the playback devices, some Studios store the corresponding playback devices with the media to ensure retrievability. Others do not. One Studio has estimated that 800-3000 physical items are sent to the archives for each feature made. An item is defined as anything that can be bar-coded and indexed; film reels, Linear tape Open (LTO) tapes, Electronic Press Kits (EPKs), and other physical media containing digital files.

What should be archived?

This issue is discussed in the 2007 AMPAS report entitled *The Digital Dilemma*, which is available as a free download at http://old.oscars.org/council/digital_dilemma/download.php.

Every Studio executive we spoke with stated that his or her company is still working out their archive strategies and most said that 'everything' is saved (although the definition of 'everything' varies from Studio to Studio). Examples include 'all released International versions of all films, regardless of box office earnings' and 'everything associated with the top 200 highest revenue films at the Studio, because who knows what will be valuable in 15 years'.

Who should decide what to archive?

Studio executives are developing policies and recommendations with an underlying hope that the creative community will do a first-pass filter of what can be discarded. The input of historians, librarians and other archivists should also be considered.

Typical Studio policy includes an economic assessment of the potential revenue from the asset in the future over the cost of maintaining the asset in the archive. As was just noted, no one knows what will have value in the future, so this will likely be a highly subjective assessment based on present-day values and trends.

Because digital capture reduces the economic incentive to stop the camera, an excess of data is captured on-set and decision matrices must be developed to address what to keep and what to discard. Some executives

are engaged in discussions with the American Society of Cinematographers (ASC) regarding 'on-set policies' related to archiving.

One executive commented that the nature and form of new media content is rapidly evolving. They are not thinking about archiving the multimedia digital content. One person mentioned *The Internet Archive* (www.archive.org) as a default short-term archival solution.

How do we archive?

Members of the AMPAS Science and Technology Council are working on this issue with the Library of Congress as the follow-up to *The Digital Dilemma* report. They are developing a case study, using the Digital Cinema Initiative's Standard Test and Evaluation Material reel (STEM), to test their design ideas. The project participant's hope that the ASC, the Producers Guild of America (PGA), and the Directors Guild of America (DGA) will collectively provide thought leadership and test the interconnected approach that AMPAS is working on. Testing by a wide range of stakeholder communities is necessary to identify what truly represents best practice. The working community will only accept the recommendations after a thorough quality assurance screening process. The group expects to release recommendations from this effort in 2010.

Studios are also looking to learn from the mistakes of others. Until archiving technology stabilizes, most said they are saving 35mm separation masters plus the current best digital format available. There is consensus that digital scanning will continue to improve with time; last year's scan will be inferior to next year's scan. Therefore it is important to keep a filmed version in the archive.

One executive described their current practice;

- Sound is archived as analog tracks on magnetic tape
- Image is archived as both YCM separation masters and as DPX files on LTO
- Everything is also recorded and archived on back-up drives

Two different philosophies about what the digital archival file should be were raised;

1) The digital archival element is the working, living service element. When transcoding to newer digital formats and media, the old file is retained, and the new transcode becomes the new digital master file.
2) The digital archive element is of higher quality and higher resolution than the service element. This future-proofs the content without burdening the workflow.

What is the cost of archiving?

One thousand reels of film can be archived in a cold, secure space, with minimal annual maintenance, for a few thousand dollars a year.

Equivalent digital archives can run twenty five to fifty thousand dollars a year for managing the data. The cost is higher because digital archives require regular physical material management and lossless transfers as technology advances, raising the specter of costly and continuous quality assurance. As we noted earlier, some playback devices don't have reliable specifications, so storing the playback devices with model and serial numbers linked to the physical storage media may be necessary, adding to the cost of archiving.

The economics of digital over film appear questionable if the digital archive is viewed as a 'cold' storage area where the content is rarely accessed. The calculus changes if the archive is viewed as a 'warm' storage area that has the explosion of digital content indexed and ready for retrieval with minimal processing at any given time.

Retrieval requires some metadata

Metadata can be treated as either a production or archiving cost, with accounting pros and cons on either side. A few executives mentioned that their Studio is discussing how the process and cost of entering and tracking detailed metadata information should be budgeted.

At least one respondent said that there is currently no tracking of assets for archival and retrieval purposes at their Studio. Content is licensed out and licensees maintain their own master file, versions, dubs, subtitles, etc. These versions *could* be tracked, but the cost is too prohibitive.

Business opportunity

One person commented that *EFILM* can generate more data in a week than *NASA*, and that the volume of movie data output is similar to that of the oil and gas industry. Mining this data is complex and specialized, unlike highly standardized and regulated data such as bank data. *Google, Verizon*, and other massive storage center managers do not understand the needs of the Studios and do not have the economic incentive to address what (for them) is a relatively small market. Therefore, an opportunity exists for a company to partner with a large data center management firm and develop the entertainment industry front-end for archiving and retrieval that is compatible with Studio file-based workflow requirements.

Disaster Recovery

When asked, in an unprompted manner, about their Studio's disaster recovery preparedness plans, all but two respondents couched their answer solely in terms of co-location of the physical media and digital files. Only

two people commented on uninterrupted order fulfillment and no one mentioned pre-emptive asset valuation in anticipation of insurance claims or other business issues that were discussed widely following Universal's vault fire on June 1, 2008.

Interviewees who commented on disaster recovery said that their Studio either had co-location of both physical and digital media in place, or are working on it as part of their overall digital workflow archiving and recovery plan. Most said that, in the worst-case scenario, they would turn to Post houses and licensees for copies of lost assets. A few people said that they address disaster recovery by storing their assets at Post houses, placing the burden and liability on them.

One of the two people who addressed the issue of business interruption said that redundant digital archives are stored within managed storage facilities to protect against fulfillment disruptions. The other said that they are creating their own distributed distribution architecture to protection against interruptions in service, but if everything were lost, they would rely on Post houses for back-ups.

Stereoscopic 3D

Interest in 3D production has increased as the Studios have seen that, for features released in both 2D and 3D, the 3D version with its higher ticket price outsells the 2D version by 2.4 to 1 on average, with the differential going to 9 to 1 or higher at some locations. Some Studios are limiting their 3D production to specific types of films; animation, effects-based features, and established franchises with a following (ex. *Star Wars, Harry Potter*) were mentioned. Most think 3D is a once in a lifetime business opportunity. A few think that 3D will remain a niche market and die a slower death this time than in past cycles.

Impact of 3D on file based workflow

Film production workflows to date have been unique to Studios that are producing 3D content. Pre-production decisions don't necessarily carry through to post-production because there's no standard way to communicate the pre-production 3D information downstream. Pre-visualization and tests are done in the field, but the results don't consistently make it to the post-production team. Many of the interviewee's file-based workflow infrastructures are designed with the flexibility to handle 3D, but the capability is not yet built in. The transition to 3D will require an incremental change in the digital workflow; new plug-ins to enable 3D work, and new skill sets for creatively altering the content. Issues that are delaying implementation include the lack of standards and policies, and the lack of a strong economic incentive - the consumer market.

Distribution issues related to 3D

One Studio mentioned that they have to deliver 30+ versions of 3D digital movies in multiple formats for 3D and Imax, plus 2D versions. On top of the multiple format workloads, they must create ghostbusted and non-ghostbusted versions[7].

2D-to-3D conversion

One person broke 2D-to-3D conversion into three categories;

- Animation: when you have the original executable files and can re-render the film in 3D (ex. Disney/Pixar's *Toy Story I & 2*)
- Animation: when you have the different layers or plates and can reshoot and dimensionalize
- Animation/Live : dimensionalization of either animation or live action from a 2D source. Decisions are made about edges, roundness and infill.

Everyone discussed the conversion of 2D library content into 3D more than the first or second instances above.

There was consensus that 2D-to-3D conversion is cost prohibitive today. Many subjects stated that the current conversion technology does not produce Hollywood-quality results. Given the choice, the Studios will manage the conversion to guarantee quality rather than rely on auto-3D conversion within a CE device. One person commented that professional, labor-intensive 2D-to-3D conversion can have mixed results if people lose sight of the original intent and quality threshold, and allow the conversions to get worse over time.

Business Opportunity

The 2D to 3D conversion business will depend on the development of the overall consumer 3D market, and especially on the potential of a theatrical run of converted films to help offset the conversion cost. Studios will do as much of the preparation work as possible in-house to capture the soft dollars, and will then send the content to an outside service / Post house for the completion work.

At least one executive expressed concern about converting features that are not conceived, shot, and edited with 3D in mind. A straight conversion without edits may not produce an acceptable entertainment experience. Another respondent noted that a large percentage of movies gain zero added entertainment value from 3D conversion.

[7] *Ghostbusting* adjusts the shadowing and color correction for specific 3D display / viewing technologies.

Consumer 3D Experience

Every executive we spoke with commented that 2010 should be a watershed year for 3D technology. The quality of the experience and the price point of the hardware and content will largely determine success in the home market, they said. There will be a large number of displays available at a minimal incremental cost over 2D televisions, motivating consumers to purchase the 3D-enabled displays.

As discussed elsewhere in this report, standards for full interoperability among delivery formats are needed before the consumer market can grow. The consumer must be offered a simple, easily understood purchasing experience as well as a simple and pleasant viewing experience. Auto format detection and appropriate processing in the CE device is a potential solution being developed while the industries wait for 3D delivery standards to emerge. One interviewee commented that cell phone 3D may be a novelty, but big screen 3D TV is a sure business opportunity.

Consumer 3D adoption barriers

The availability of 3D content rather than CE devices will be the driving factor for consumer adoption of 3D. More than one executive said that we'll know in the next six months if it will catch on and what form it will take. Everyone agrees that anaglyph should be avoided. Some respondents view the anaglyph release of *Coraline* as a short-term marketing move and an obstacle to achieving the long-term strategic goal of deploying a quality consumer 3D experience.

The lack of standards at many points in the value chain is hampering both content distribution and consumer adoption. The hardware industry is driving technical decisions faster than the Studios' standardization efforts at the moment. The content industry will respond to meet the platform requirements, but at the expense of their own operational efficiency. Some subjects said that their companies are hesitant to release 3D content into the consumer market before the technical specifications are settled.

Multimedia perspective

One executive mentioned that they are having major discussions about next generation 3D home entertainment. They are considering assembling 3D multimedia production teams.

If you were to start a Post house or related business to support the Studios, and your plan was to sell it at a profit in 3 years, what product or service would you offer?

'There will be massive shake-out and consolidation,' more than one person said. 'Every Studio in town is looking at what post does and exploring how to do it in-house.'

Businesses that one or more executives said they would start

1. **Become the 'agent' for a virtual stable of highly skilled individuals;** effects people, color timers, editors, etc. Focus especially on cutting edge image creation; motion capture, visual effects, CGI, etc.

   Bringing in the top talent is key, because contracting decisions are driven by existing relationships with talent. The respondents value talent over price, turn-around time, and other factors. Plus, the top talent will continue to command a higher price.

2. **Build a B2B distribution and origination service.** Build a large scale, global distribution infrastructure and distribution engine. One executive pointed to *Deluxe*, which has constructed a state-of-the-art Blu-ray and DVD production and electronic distribution infrastructure.

3. **Combined #1 and #2**, high-end post and efficient B2B distribution, but focus on the digital workflow and digital distribution. Many companies claim to do both post-production and distribution, but only do one of them well. Smaller Studios may seek the services of a middle ground company that combines both boutique highly-skilled post and effective B2B distribution and order fulfillment services.

One respondent described the environment as overtly competitive and price sensitive. Revenues are down and the shift away from DVD and BD sell-through is putting downward pressure on prices paid to create and finish the content. Delivering picture and sound quality that provides a pristine experience at a competitive price on behalf of the client is the minimum for survival. This same respondent suggested starting a full-service multimedia content post-production finishing and distribution house that would:

- Author pristine video and audio content at a competitive price

- Offer to manage connectivity (ex.: The connected aspects of BD Live)
- Transcode content for any distribution path
- Offer streaming and VOD services

4. **Verify and QC digital daily files.** Right now there is inadequate verification that what was shot during the day was captured and stored properly in a digital file. There could be an image quality, data integrity, and data/metadata conformance verification role for Post houses.

5. **Efficiently and accurately tag assets, handle metadata, and help optimize access to clips within linear content.** Tagging and accessing clips involves search, content recognition, and other tools and automated operations that facilitate monetization. There is tremendous value in indexing the data in ways that enable very rapid time-to-market.

6. **Offer back-up processing power.** One Studio executive said that their company expects to need more rendering capability during busy periods than they have, so render farms would be a good area. Another noted that Intel is about to announce a chip that could move the industry to real time rendering.

7. **Focus on Digital Asset Management (DAM) technology and services.** One subject would build it, work out the kinks, and offer it for sale to the larger Post houses as a necessary addition to their full service offering.

8. **Build a business around quality control verification of the transcoding work of others.**

9. **Film restoration and digital file recovery and clean-up.** Offer high quality, cost-effective restoration work for repurposing and reissuing content in addition to traditional film restoration and digital file recovery and clean-up.

10. **Archiving.** Offer a storage, archive management, and retrieval service for both physical and digital assets.

In addition to these ideas, the oft-stated general strategic response to the question was: *identify the holes in the emerging digital infrastructure and develop solutions that address them.* Research all of the pieces that are uncorrelated, and develop the bridges that will connect them. Developing the 3D elements of the digital workflow is one such opportunity.

Businesses that *some* executives mentioned they would not start

A) **Digital distribution.** It is already too competitive.
B) Anything to do with **transcoding**
C) **Creative services**; color timing, editing, etc. Those activities are becoming commoditized.
D) **Restoration work**. There are too many companies already doing it.

The fact that some executives would not start a business in an area that others recommend illustrates the difference in strategies and approaches to file-based workflows and business development among the Studios.

One New Media scenario

One executive with a new media focus laid out this scenario for a start-up.

First, look at Sony's minisode experience and Kingdom Comics motion comics experience. They added primitive motion to comic book frames and licensing them for cable distribution. Now run with this idea. Leverage major brands and create campaigns of truly interactive pieces around those brands. Develop theatrical, TV, online, motion comics, and other creative content around the brands, like Mofilm (www.mofilm.com) does with Frito Lay and others. Illeana Douglas tried this a few years ago, before the market was ready, with a web-based sitcom premised on her living in an Ikea store. Show runners would monitor multiple initiatives and when one hits, pump a lot of money and marketing into it to develop it as a valuable property.

Intellectual Property is THE meaningful concept. There are no barriers to entry on the platform and tool side. Platforms are just enablers. Franchises can be repurposed over a long time. The online community, including pro-sumers, will invent and create around you. Let the audience embrace and use your IP. This will cause a spike in attention and a short market life, but will also produce big audiences and profits.

?Ahc?t ??

After we completed the Phase I interviews and aggregated the responses to the "If you were to start a Post house…." question, VJA developed the following survey to gather broader feedback.

> *If you were to start a company to serve the needs of the Studios with the idea of selling the company at a profit in 3 years, which of these products or services would you offer?*
>
> 1. *A community of high-end editors, effects artists, colorists, and other talent that you pitch to and manage for potential clients (ex. A virtual service bureau). Yes?/No?*
> 2. *A B2B content fulfillment infrastructure. Yes?/No?*
> 3. *A service to verify the quality of the data in dailies (content integrity, metadata accuracy and completeness, etc.). Yes?/No?*
> 4. *A service to identify and prepare clips for monetization from longer form content. Yes?/No?*
> 5. *Processing power and workstations to handle Studio overflow situations. Yes?/No?*
> 6. *A Digital Asset Management service optimized for creative content. Yes?/No?*
> 7. *A service to quality control the transcoding work of others (content integrity, metadata accuracy and completeness, etc.). Yes?/No?*
> 8. *A film restoration and digital file recovery and clean-up service. Yes?/No?*
> 9. *A Storage and archive management service. Yes?/No?*

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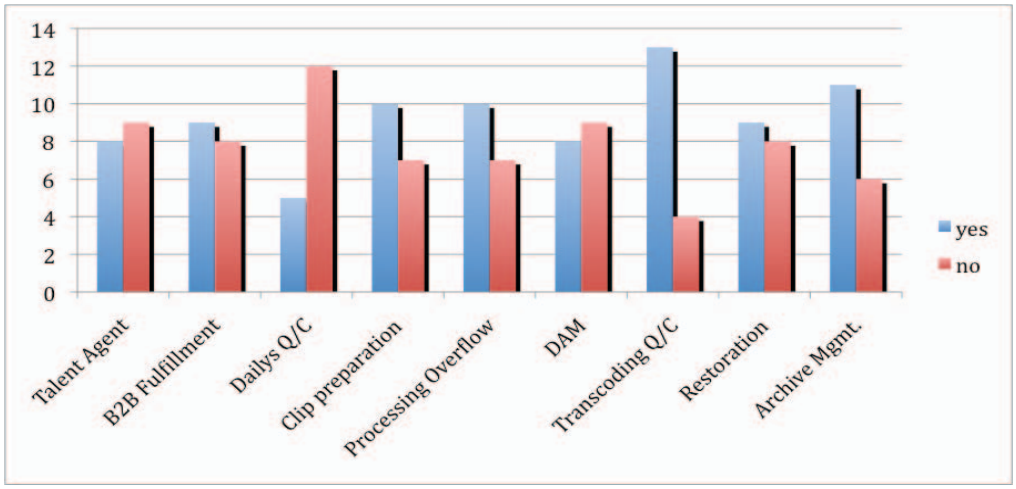
VJA emailed the survey to forty (40) Studio executives, VP-level and above, who are involved in their Studio's production and post-production decision-making process from the technical and business perspective. The recipients had six days to respond and 43% of the sample (17 people) opted in.

The chart shows the responses in the order in which the 1-9 questions were asked, left-to-right.



Verifying the quality of transcodes is the clear favorite among these subject-matter experts. *Content storage and archive management* came in second, and *verifying the quality of dailies* came in last.

The comments that accompanied the responses are anonymized and *italicized* below.

1. **Talent Agent:** *A) I would staff for this on a project-by-project basis, and primarily maintain a business development person. B) My concern, as a potential client of this start-up, is that it would drive the cost of talent and labor higher.*

2. **B2B Fulfillment:** *A) This is a critical need. B) Yes, as a cloud computing service, unless a Telco, Cisco, Google, or other major firm focused on massive data storage resources decides to market full-force to the entertainment industry.*

3. **Dailies Q/C:** *A) Good idea, but how would it fit into the digital workflow? B) This should be part of any Dailies service, and not a separate function or charge.*

4. **Clip Preparation:** *A)* Starting this businesses *would really depend on the unique value of the service and the business model. B) Yes, but data security is a key factor. The Studios must be comfortable that the new venture understands current security guidelines and can ensure the safety of their content. C) Yes, and I would include metadata logging and delivering the metadata with the clips to downstream markets. D) It would need to be a very sophisticated and time sensitive process.*

5. **Processing Overflow:** *A) Yes, but I would coordinate with potential clients as much as possible so I wasn't building excess capacity. The goal is to not over-extend, since I plan to sell in 3 years.*

6. **DAM:** *A) This is part of B2B fulfillment rather than a separate service. B) It is all about content security. Security measures need to be the focus of the operations and a key element of any client pitch. Studios will hesitate to use a third party DAM service unless the vendor is familiar and well established. C) Yes, as a cloud computing service, unless a Telco, Cisco, Google, or other major firm focused on massive data storage resources decides to market full-force to the entertainment industry.*

7. **Transcoding Q/C:** *A) This is clearly needed, but can it make money? B) This is a real opportunity if it is cost competitive. C) Yes, as a cloud computing service, unless a Telco, Cisco, Google, or other major firm focused on massive data storage resources decides to market full-force to the entertainment industry.*

8. **Restoration:** *A) No, too many people already doing it. B) Definitely yes. C) I would focus on digital file recovery services.*

9. **Archive Management:** *A) There is an urgent need, but it costs a fortune. B) I am skeptical that standards will emerge. C) Banks only need to save data for 7 years, so machines aren't designed to work for the '100 years' that the entertainment industry needs in an archival solution. D) I would not trust a start-up to store my data. E) Yes, and I would tie it to fulfillment services. F) I would not trust this to a Google or Verizon. How you use the assets is what matters, not how cheaply you can store them. G) Yes, as a cloud computing service, unless a Telco, Cisco, Google, or other major firm focused on massive data storage resources decides to market full-force to the entertainment industry*

The results of this survey are purely anecdotal. The methodology is not defensible as market research, but based on the experience level of the respondents, it is a good indication of how the participants view the opportunities.

Phase II – The Post Production Community

In Phase II we interviewed six senior business and technical executives at major post-production supplier companies. As in Phase I, we conducted all interviews with the promise that no one would be quoted and neither their names nor the names of their companies would be mentioned. As in Phase I, this approach yielded unfiltered responses from senior-level individuals who are able to comment on the "big picture" in an informed manner.

The Post executives were asked counterpoint questions to those we asked the Studio executives. We asked how they see their industry changing in the next three to five years, what barriers exist that could delay those changes, where they see growth opportunities for their business, and what new skills they are developing in-house to take advantage of those opportunities.

What are the biggest changes you've seen in the past year?

Client management

Clients are increasingly new media savvy, but are decreasingly grounded in established media technical issues and concerns. Technology and workflows in the consumer space have gotten ahead of the economics and workflows of the post- production industry. New clients falsely assume that workflows and processes mirror the simplicity of their home video editing and YouTube experiences.

File based workflows have not advanced to the point where they produce the time and cost savings that clients expect. This makes customer relations both harder and much more important. Today's clients often do not understand the ramifications of their requests and Post houses are being asked to do more for less in a more flexible way.

File based workflow

Rapid deployment of file based workflows and acceptance of prosumer products that integrate into those workflows have impacted operations throughout the value chain. Having a file based workflow now has a 'coolness factor,' so even if it does not simplify processes, Post houses must

implement one and develop bridges between their in-house and their clients' workflows.

On the tool side, it is now acceptable to use prosumer tools as an alternative to the high-end, professional counterparts. So, for example, it is okay to use Final Cut Studio for color correction.

A recognized byproduct of the move to file based workflows is a blurring of the line between roles traditionally assigned to production and Post.

Digital capture

The amount of digital capture overall is way up. One executive commented that television producers and directors no longer care about the film-versus-tape capture decision. Digital capture impacts post activities from pre-production through post-production and archiving. Post houses must deal with big files, rapidly growing tape storage obligations, emerging and evolving tools and employee skills.

Also, day-and-date releases have added new strains on Post house resources. Projects have shorter timelines than in the past; impacting staffing and capital investment decisions. To paraphrase one subject, 'clients rely on us to make everything come together at the last minute, even when elements are missing from the order!'

What is your company's file-based workflow status?

The executives we interviewed said either that they have a fully end-to-end file-based workflow in place and are tuning the details, or that they are moving to a file-based workflow in a calm and rational manner. The executives view the transition as a competitive and economic necessity that will help their company (as well as their clients) survive.

The lack of interchange standards introduces inefficiencies between clients and their suppliers. The Post houses transcode the clients' files into the in-house workflow format when they do not conform. The Post houses do their work and then transcode their output to the client-specified format(s). Studio and Post executives alike are seeking standards to eliminate these inefficiencies and cut costs.

More than one subject mentioned that, while they output a digital intermediate in a tapeless manner for the clients' digital cinema and home video master, they output on tape for distribution to broadcasters. Many broadcasters are not equipped to receive digital files. This is possibly because broadcasters do not want the content licensors to see how they are processing the content within their own operations. Broadcasters will increasingly have to balance operational inefficiencies against the cost of technical audits.

What is the role of pre-visualization (pre-viz)?

Pre-vis is very useful in selling a project and then developing a substantial amount of the creative vision before production starts. It allows more of the creative work to move upstream from production to pre-production, especially for effects planning and motion capture.

Pre-vis will seriously take off when it is fully integrated into the digital workflow. Today, pre-viz technology is ahead of most Post houses' ability to fully capture and utilize the data as reference information in their workflow processes.

The "dark side" of pre-viz is that it could constrain creativity later on in the process. Creatives are expected to tweak and change the visualization during production.

How has your involvement with shooting crews changed over the last year?

Answers went to the two extremes, reflecting the differences in individual Post house business models:

a) We are involved in everything from equipment set-up to on-set operations; and,
b) We don't get involved with the crews.

Metadata on the set

Clients do not worry about encoding metadata during the shoot, even though it could potentially benefit the entire downstream workflow and save time and money. Digital capture is cheap (in production), but adding the metadata component on the set can significantly increase the cost. Some technical metadata, such as color decision lists, can be captured automatically and passed on to the workflow. But in general, metadata entry and management takes time and money, and clients currently feel that it 'handicaps' the production process.

Watermarks

Post houses are doing nothing with watermarks, other than maintaining the watermarks embedded by the Studios throughout their processes to the best of their ability. One executive mentioned that Studios are slowly acknowledging that the largest piracy problem is not within the Post house community. Another noted that the Studios are sending mixed signals. They claim that security is critical, but they push back on additional fees to cover the time and equipment required to uniquely mark content as it moves in and between the Post house and its subcontractors.

Stereoscopic 3D

What have you done to prepare for 3D?

The responses clearly reflect business development direction. One executive said 'nothing; our clients have not expressed any interest, so we are not acquiring the resources to work on 3D projects yet.' Most said that they are gaining experience working on 3D films, and 3D is integrated into their digital workflow. At least one Post house even offers a system for on-set viewing of 3D dailies.

Creating a 3D digital cinema master is now straightforward, but the home video 3D process is still evolving. It's likely that the Blu-ray Disc Alliance's decisions on the image resolution and feature set of consumer 3D video will have an impact.

Although there has not been much 3D commercial work to date, the majority of subjects expect a surge in 2010 as the CE industry markets 3D TVs to US consumers.

One executive noted that clients don't pay much more for 3D work, but 3D can be two or three times the workload of counterpart 2D processes.

2D-to-3D conversion

Given the many impressive demos being shown by vendors around Hollywood, everyone agreed that 2D-to-3D conversion is a potential business opportunity at some time in the future. The companies developing the conversion tools have prepared most 2D-to-3D conversions to date. Once the tools stabilize; once first-pass conversion becomes a commodity process to be fine tuned after-the-fact by professionals; and once the price comes down, then Post houses will consider offering the service. For now, everyone is willing to leave the activity to the tool developers.

Echoing the Studio executives' comments in Phase I of this report, the Post executives stressed that the price of conversion needs to come down. Re-mastering content for 2D high definition can cost $100k, while re-mastering for 3D can cost millions. While the 3D consumer market is taking shape, only conversions with theatrical release potential can justify the conversion cost.

The bottom line is that the technology is not mature enough for Post houses to offer 2D-to-3D conversion as a regular service in the foreseeable future.

How does transcoding content for distribution fit into your business plan?

Transcoding is a huge area of business growth, with some reporting over a 75% increase in volume over last year. This is attributed to the increasing number of digital distribution deals being signed, coupled with the lack of

format standards. As the Studio executives mentioned, every licensee wants custom transcodes to meet their unique internal workflow specifications.

In the short term transcoding will be a critical business area for Post houses, but everyone expects a shake out to occur. One subject expects standards to emerge in 4-5 years, possibly as part of wider standards that emerge for bridges among implemented file-based workflows. Work that solely involves transcoding will diminish as tapeless workflow standards gain broad acceptance. However, in the opinion of one executive, the transcoding and fulfillment business is sustainable even if the process becomes automated.

Archiving digital assets

There are enough questions about digital storage to sustain the current archiving strategy of film plus digital master for the foreseeable future. Spinning disks and data tape are the best solution for 5-10 year archives, said one interviewee, but film is the only proven media for 50+ year archives, as well as the only economically sound approach.

Regarding archiving policies, companies can only afford to archive what has value. Some Studio executives say that their Studios will save everything, but that policy will rapidly become economically unsustainable. The archiving process can involve restoration, cleaning, transfer and preparation of the asset and metadata. Policies and filters will be forced onto the archiving decision process to keep costs manageable. A lot of 'old stuff' will disappear because the content will have no perceived future value. There is a long history of this happening in Hollywood. Archiving will have to be commoditized, many said. It must be automated and low cost in order to preserve the most material.

How prepared are you to maintain order-fulfillment and other operations, should a disaster strike?

One surprising first response was that terms negotiated by the Studios in their client agreements are an obstacle to their ability to maintain operations in the event of a disaster. Some contracts require the Post house to keep all client assets on the premises, so they cannot establish remote hot sites and back ups.

Cloud storage was mentioned as a possible solution, but it introduces process, security, and bandwidth issues in addition to the contract language restriction.

Disaster recovery as a business opportunity

Several Studios and other potential clients circulated proposal requests for disaster recovery projects in the wake of the fire at NBC-Universal in 2008. The economic downturn put most of them on hold, but Post executives expect these projects to be budgeted again for 2010. The design and implementation of disaster recovery programs will likely emerge as business opportunities in the second half of 2010 or in 2011.

Echoing an idea expressed during the Studio executive interviews, at least one Post executive is considering partnering with a massive data management company to accept the intermediary role (ex. Hewlett Packard, Google).

How do your clients' time and dollar allocation for Post activities compare to 10 years ago?

All budgets have shrunk. Rate compression is everywhere. Clients expect more for less. They push flexibility in the post process to the limits of what the post houses can economically provide, and they want instant turn-around.

The high-end editors, effects artists and colorists still command a premium because of their personal relationships with clients. But even if the high-end talent is available at the post house, Studios are looking for bundled services and people at a single low price with the expectation of fast turn-around.

If you were to start a company to serve the needs of the Studios with the idea of selling the company at a profit in 3 years, what products or services would you offer?

1. **Fully bundled monetization service:** Enable monetization of Studio content through ads and subscription by providing an end-to-end fulfillment and tracking system. One executive noted that online ad spending just surpassed traditional print and broadcast ad spending in the UK. Create a platform that feeds content to TVs, Web, game consoles, web-enabled devices, etc. Offer a full complement of features and services to make it as attractive as possible to clients; such as encode/transcode, distribution, digital rights management (DRM), analytics, ad insertion, usage tracking, and consumer behavior

data collection. Offer the content rights holders an intermediary service to content aggregators. Focus on underserved international markets, then broaden the reach of the service as operations become more efficient and the service catches on.

2. **B2B fulfillment:** Offer transcoding, transport and delivery to network affiliates and other B2B (business-to-business) clients. Stress high quality internationalization services; versioning, language dubbing, etc.

3. **Visual effects:** Given the growing near-term importance of effects in Hollywood production and the short horizon time before selling this start-up, one executive would start a visual effects house. Have a strong 3D component to pursue the anticipated market demand.

Businesses that the executives would NOT start include telecine and high-end, low-value creative pieces such as color timing, 4K mastering, and creative sound services.

Closing thoughts

This report is not designed to uncover game-changing ideas that are not already widely identified within the industry. All of the ideas articulated by the executives are either incremental to last year's report or ideas that the entire industry is working on. In order to uncover game-changing ideas, we would need to interview subjects from the start-up community, unrelated industries working on related problems, and the media futurist and social anthropology communities. That could be the basis for a separate sponsored study.

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Since 2003, **Von Johnson & Associates, Inc. (VJA)** has assisted multinational and local companies with strategic planning, marketing and implementation of their technology solutions for the entertainment industry. Current clientele include Tornante Animation, Dreamer Corporation, MGM and Roundabout Entertainment.