Smarter content delivery

Rewriting the rules of video storage, processing and distribution

Highlights

- The streaming of on-demand and time-shifted content is growing, placing the pay TV industry under pressure to diversify services and develop new models for delivering content.
- A high-performance video management and delivery system that can provide anytime, anywhere content through multiple channels and devices, using sophisticated processing and storage technologies.

Executive summary

Traditional TV viewing among 18 - 24-year-olds in the fourth quarter of 2013 was down by 3.9 percent year-over-year.[1] In fact, pay TV providers posted a net loss of 104,000 subscribers the same year, which is the first time the pay TV industry has ever lost subscribers year-over-year.[2] The loss represents just about 0.1 percent of all subscribers, but it highlights the pressure the industry is under to diversify services and develop new models for delivering content.

The problem isn't viewers watching less content, it's that consumers are less likely to be watching on traditional television sets at the network scheduled times. Media fragmentation is changing the way people consume content. The streaming of on-demand and time-shifted content is growing. The average consumer can experience and interact with media and entertainment content in a diverse number of ways, including smartphone, laptop, tablet and Internet-connected HDTV. Tech-savvy consumers want a fluid media experience with platform-agnostic content available on a variety of devices. They want to watch shows and movies on their own schedule—streaming in real-time, on-demand, using digital video recorder (DVR) video across devices, with enhanced platform integration, social sharing capabilities and personalized recommendations.

This trend creates several challenges for the media and entertainment industry and communications service providers. They need to be able to build and maintain a video delivery system that can generate revenue, monitor digital rights management, and handle the growing demand for content, including licensed assets, self-published content, news, sports, and educational and training content. To remain competitive, they need to capture market share by providing anytime, anywhere content through multiple delivery channels, processing and storage technologies, and sophisticated viewing devices.

However, greater workloads and backend systems for new services require a tremendous investment in separate server farms dedicated to storage, processing, streaming and other functions. Connecting and managing these disparate network environments while delivering popular and time-shifted content to millions of users simultaneously is difficult and takes time to build, support and manage.

What will it take to deliver content anytime, anywhere and to any device?

To match the services provided by over-the-top (OTT) content providers, media and entertainment and communication service providers need a system that makes it faster, easier and more profitable to deliver any media content, whether live or recorded, to any device with anytime and anywhere convenience. They need a high-performance video processing and storage system that combines computing systems, sophisticated analytics and powerful management software, along with innovative clustered storage and video processing. This requires an entirely new way to integrate siloed systems. And it requires data analytics, which offer the opportunity to drive revenue higher through real-time ad insertion, precise subscriber targeting, campaign management and churn prediction.

Service providers should look for a system that offers these critical benefits:

- **Scalability** to eliminate complicated networking used to connect disparate server farms dedicated to storage, streaming, transcoding and other functions that can help providers and distributors grow quickly, simply by adding hardware. Transcoding and mobile intellectual property content delivery should be performed without a separate IT infrastructure.
- **Resiliency** to enable the use of video striping so there is no single point of failure. The system architecture should compensate for unexpected hardware failure automatically without impacting the service.
- **Security-rich environment** to manage identities. Authentication and cross-platform encryption should also be supported.

Build a video delivery system that can handle today's workloads

A video processing and storage system should be able to perform virtually any task required to deliver content to users. Nonlinear and time-shifted streaming should be straightforward. Service providers should look for a media delivery platform that enables real-time ingest, storage and streaming from a single, highly versatile cluster with all physical storage units logically unified into a single large volume. In a high-performance system, incoming video streams are divided into smaller chunks and striped across the cluster. A streaming engine can read these smaller chunks and reassemble the video for streaming, complete with on-the-fly trick modes like fast forward, rewind and pause. Each part of the video is stored in a different part of the cluster so there is no single point of failure.

Compared to a local DVR approach, cloud computing DVR brings increased marketing flexibility to create new services dynamically, increase average revenue per user and reduce churn. This is because cloud computing offers lower costs for storage, encoding and other video processing functions and can exploit fast file-transfer capabilities. A system using cloud computing DVR is a critical point of differentiation for service providers offering the quad play bundle, as consumers see bundled services as presenting a greater value proposition.[3] Cloud computing DVR also helps service providers create new converged consumer experiences that can bring fixed and mobile assets together to work synergistically and create sticky services—add-on services that make a product experience valuable—which can lead to increased subscriber loyalty.

Take the guesswork out of choosing programming

Service providers have to be very deliberate in choosing which channels and programming packages to offer subscribers. Programming is expensive and unpopular channels don't deliver the views needed to support advertising. Service providers should look for a system that offers the ability to perform detailed segmentation which can be used to support pilot programming or trials before distribution to broader audiences. With analytical capabilities, network programmers can better choose programming. They can know, for example, that the BET Network is the most recorded channel in the area or know the zip code that has the most recordings of hockey games or deliver programming to specific groups based on their preferences. A high-performance video processing and storage system can help expand the intelligence and insight gathered from subscribers' recordings of television shows and live broadcasts to make smarter decisions about programming.

Real-time targeted advertising and campaign management

A smarter system should allow real-time, unicast and per-user targeted advertising insertion for both linear and nonlinear content in the compressed domain. Predictive analytics can help service providers understand what types of ads interest the subscriber. It can also determine which device is most used by the subscriber and where to direct advertising dollars or initiate campaigns. For example, with a smarter system, service providers could identify subscribers that regularly record boxing programs on ESPN or similar channels and deliver advertising for pay-per-view boxing events. Or they could identify subscribers to a particular channel, such as the Independent Film Channel for example, and suggest other premium channels, such as the Sundance Film Channel, with similar programming that would likely interest the subscriber. And if a subscriber records a TV program in January, but doesn't watch it until July, the now outdated ads could be seamlessly replaced in real-time with new ones. A smarter system could also be used for network management and capacity planning to determine which areas and demographics are most likely to subscribe to a new enhanced service.

Applications for handling today's workloads

The IBM solution to these media and communications service provider challenges is IBM Video Grid™, a flexible video building block, built on a low-cost commodity server and storage system with integrated element management and a node provisioning system. IBM Video Grid offers:

Remote storage DVR: Centralized storage of DVR content takes advantage of existing set-top boxes without hardware upgrades. IBM Video Grid enables multi-room remote storage digital video record (RS-DVR) capabilities by turning each existing non-DVR set-top box already in the home into a virtual DVR. Using existing set-top boxes can provide cost reductions and reduce truck roll rates for service calls.

Personal digital locker: Using the same infrastructure as the remote storage DVR, this application allows service providers to offer UltraViolet-type services. Subscribers can upload and store personal digital file content such as music, photos, videos and documents into the cloud, then retrieve files using any device.

Master video library: As compression and video streaming standards change, service providers need an infrastructure that will enable them to maintain original master copies of licensed content from various sources. Ingestion of a master copy, or "gold copy," used to create playable copies of content in long-tail video server (LTVS) and edge video-on-demand (VOD), enables streaming and real-time ad insertion without decoding and re-encoding the content, even while a VOD stream is in session. The master video library application can help reduce costs by enabling ingestion in a single format to be delivered to the video ecosystem, and by reducing capital equipment costs for transcoding and delivery. It can also help service providers generate revenue through targeted and real-time advertising across devices.

Long-tail video server: As service providers deploy large storage vaults, it becomes cost prohibitive to cache the entire library at the network edge. By creating a central video library, distributors can eliminate the need to replicate entire libraries at multiple head-ends. Instead, IBM Video Grid makes it possible to keep the top 20 percent of content at the edge and push the other 80 percent when subscribers request it. This can help content providers offer an entire VOD library of more than 100,000 hours of content direct to subscribers. This also reduces costs for redundant storage.

VOD and edge VOD: IBM Video Grid tightly integrates storage and video processing functions, allowing higher performance in a smaller form factor that reduces overall capital and operational expenses.

Logically unified storage units: Each part of the video is stored in a different part of the cluster so there is no single point of failure; a single rack can ingest or play up to 67,000 concurrent H.264 standard definition video streams.

Centralized content distribution: With a national content ingestion center, video can be streamed to regional head-end systems, enabling single streams to ad zones and significantly reducing capital equipment requirements.

Smarter home: With IBM Video Grid, subscribers can control virtually all aspects of their home, from appliances to heating, cooling, security and lighting, from their device. Connected with smarter home for alarm detection and security cam streaming, a subscriber's home security system can provide notifications of events such as an intruder alert, fire alarm or doorbell ring. The event is sent through an IBM Worklight® notification mechanism which pushes the event to the subscriber's device. A security application is started automatically to handle the event. For example, when someone presses the doorbell, streaming video is sent from the front door camera to the subscriber's device.

Rights management: It used to be that when providers received content, they'd also get a contract outlining when they could play the content and make it available to their subscribers. With IBM Video Grid, rights management and royalty payments are automated, removing the middle man. This enables service providers to become their own content aggregators.

IBM Worklight: Helps extend business content to mobile devices. It is designed to provide an open, comprehensive platform to build, run and manage HTML5, hybrid and native mobile apps.

Client reference: A cable TV company in North America

A North American cable company with more than six million subscribers found that the economics of installing and supporting DVRs were not profitable. Like any computer, the DVR set-top boxes require installation, occasional maintenance service and—eventually—replacement. The average life span of an in-home unit is 36 months and the cost of the device plus support services is estimated at the equivalent of USD250 to USD300. A single service call to upgrade a device could result in a loss for the cable provider based on the monthly service charge. Yet the company could not cease offering DVRs. It sought a solution that would lower the costs of installing and supporting DVR equipment on the consumer's premise, lower the costs of managing the devices using a centralized approach to data storage and enable enhanced services that would help it retain and attract subscribers.

A first-of-its-kind DVR-in-the-cloud solution introduced to subscribers of this cable company offers hundreds of hours of recorded programming, the ability to record or playback 10 channels at once and stream to multiple devices within the home. Combining individual viewing preferences with demographic and geographic data, the cable company gains entirely new insights into viewing habits to support better informed decisions about which channels and channel packages to offer subscribers. The company can also stream highly targeted advertising and marketing messages to viewers based on their device and viewing habits. For example, subscribers that record mostly sporting events can receive targeted offers for pay-per-view boxing, while subscribers that record music channels can receive pay-per-view concert offers.

The new service offering that the cable company is able to deliver to customers now offers virtually unlimited storage of television shows, live broadcasts and premium subscription content. For the cable company, the enhanced DVR offering, made possible using a cloud-based streaming and storage solution built on IBM technologies, is delivering reduced operational expenses, increased revenue from advertising and new subscriptions, and provides unprecedented insights into viewing habits and preferences. Most important, the solution is providing game-changing strategic advantage for the cable company in an extremely competitive environment.

Conclusion

A rapidly evolving business model brings many challenges for service providers. Consumer demand for new delivery channels, to new and smarter devices, and an on-command appetite is forcing the industry to evolve more quickly than ever. IBM Video Grid can help service providers build a video delivery system that can handle today's workloads, has the flexibility and scalability required to meet new consumer needs, can grow rapidly and support a variety of revenue generation opportunities.

IBM can help service providers deliver differentiated experiences that are more relevant and increase customer value. We bring business insight, advanced research and powerful technologies to the communication and media and entertainment industries. IBM is ideally positioned to engage industry clients to develop deeper customer insights, formulate revenue and business model change, and optimize and revitalize core operations to fuel innovation. We help service providers build smarter solutions that address a rapidly changing market through capabilities that help build an agile digital supply chain to quickly bring new products and services to market, meet the increasing demands of the digitally-savvy customer, and pursue cost savings and new revenue opportunities.

For more information

To learn more about smarter content distribution solutions from IBM, please contact your IBM representative or IBM Business Partner, or visit the following websites:

- **ibm.com**/media
- **ibm.com**/communications

About the authors

Steve Canepa, IBM Global General Manager, Media and Entertainment
Michael Clanton, IBM Global Leader, Cable and Service Provider Video Solutions

IBM Corporation
Route 100
Somers, NY 10589

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