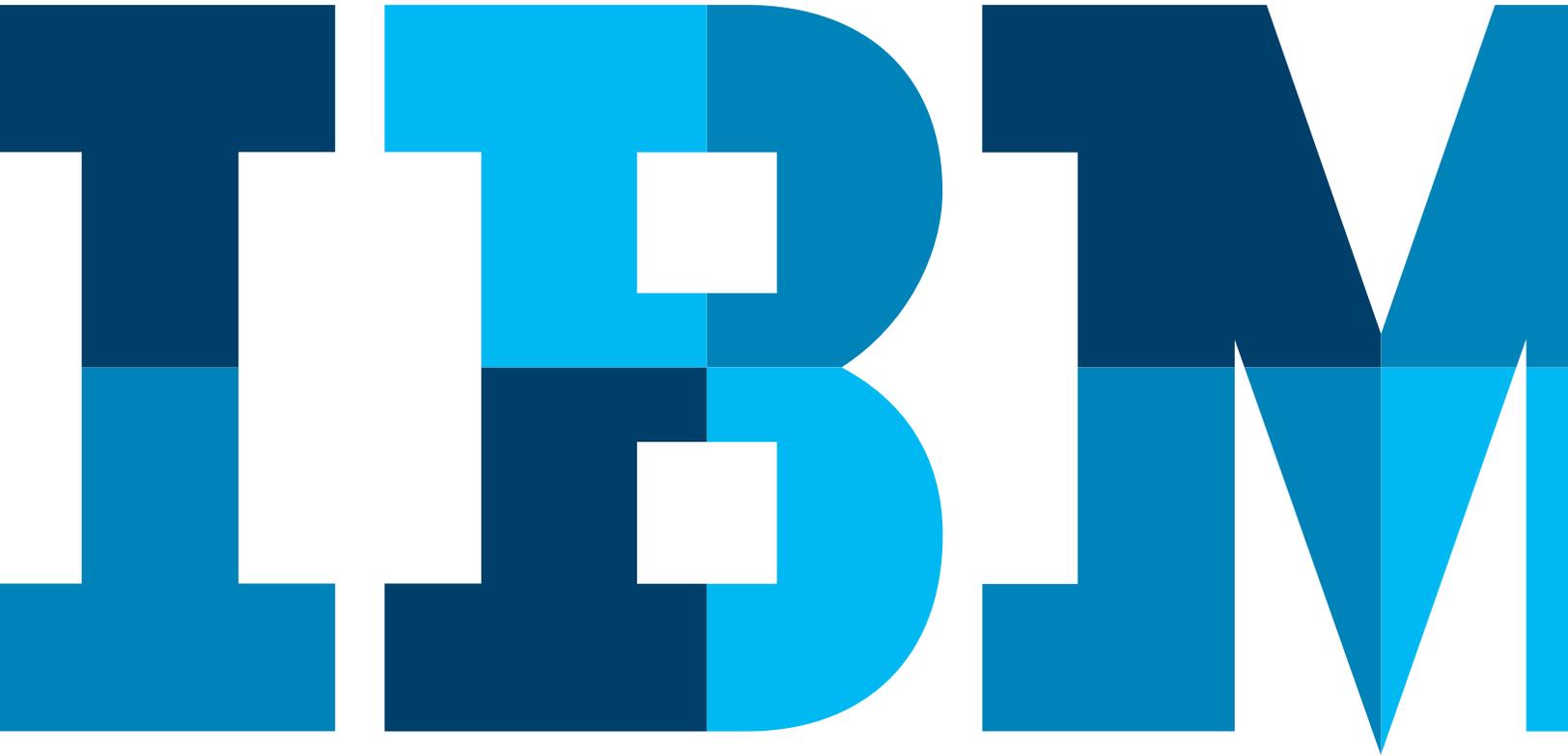


Managing video growth for competitive advantage

Video is the lifeblood of the Telecommunications and Media and Entertainment business. Delivering the right video content—anytime, anywhere, and on any device—drives exceptional customer experience and revenue.



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Executive summary

Video is the most prevalent type of data on the planet and it continues to grow as digital technology evolves. The struggle for Telecommunications, Media and Entertainment (TME) content providers is how and where to store and deliver this much data. The momentum behind video consumption has made content choices, content delivery and quality of experience critical. Tech-savvy consumers want a fluid media experience with platform-agnostic content available on an assortment of devices using a growing variety of distribution channels—and they are willing to change content providers if they don't like their viewing experience.

This changes the nature of competition. Telecommunication organizations that supply both wired and wireless network connectivity are merging with the media and entertainment industry. More competitors are going after the same content consumer, resulting in an unprecedented choice of content distribution models and a corresponding shift in how revenue is generated. In addition, audience demographics are changing. Consumers are so segmented that content distributors now target an audience of one and align the distribution of content assets to individual preferences.

This video content system needs to accommodate all types of content including licensed assets, self-published content, news, sports, business, education and training content. It needs to be scalable to accommodate growth, resilient to ensure ongoing

service upon unexpected hardware failure and secure to manage identities and protect valuable assets. It also needs to support advanced analytics and real-time targeted advertising and campaign management to drive revenue and growth.

This paper will outline key trends impacting the telecommunications, media and entertainment industry and show how IBM is helping content providers select, build and manage video delivery systems that can handle today's workloads, have the flexibility and scalability required to meet new consumer needs, can grow rapidly and can support a variety of revenue-generation opportunities.

Key trends impacting telecommunications, media and entertainment industry

There are several trends disrupting the telecommunications, media and entertainment industry. These include a growing amount of video content, shifting distribution and revenue models and tech-savvy consumers wanting a consistent media experience across devices and audience-of-one segmentation. Each of these is discussed below:

What keeps you up at night?

- How do I manage all this video content and the associated rights?
- How do I keep the content secure?
- How do I meet demand and scale quickly?
- How do I operate with efficiency and flexibility?
- How do I understand—and anticipate—the audiences' preferences and demands?

IBM's Cloud Video solutions can help solve these and many other issues.

Digital video streaming drives exponential growth in content

The vast amount of content created, stored, transported and consumed will continue to grow through 2020, driven in large part by the expansion of video streaming content. Within four years, nearly a million minutes of video content will cross IP networks every second. To put this in perspective, it would take an individual more than five million years to watch the amount of video that will cross global IP networks each month in 2020.

According to PwC, in 2015, video drove more revenue than any other TME sector, generating nearly USD \$420 billion globally in subscription and advertising revenue. Cisco estimates that internet video traffic will grow fourfold from 2015 to 2020, with a compound annual growth rate (CAGR) of 31 percent. Globally, they estimate that IP video traffic will be 82 percent of all consumer internet traffic by 2020.



Much of this growth is being driven by new digital technologies used to create and view videos. Considering that camera image resolution and frame rates are increasing and multi-camera videos are becoming more common, it is not surprising that a single movie at 4K resolution can require several petabytes of raw data storage. As production and digital video techniques improve, experts estimate that by the next decade, total video captured for a single, high-end digital production could be measured in the hundreds of petabytes, approaching one exabyte. So not only is the amount of available content growing, the size of each content asset is also growing.

Simultaneously, businesses are adopting video for several purposes including: corporate communication, collaboration, training, sales enablement, knowledge sharing and management and learning and development. These applications include everything from town hall meetings, video

chats among team members and traditional training videos. Video streaming, webcasting and video conferencing also allow viewers to interact with video in various ways. Videos can be streamed live or recorded and viewed on demand. Market research firm MarketsandMarkets estimates that the global enterprise video market will grow from USD \$16.98 billion in 2015 to USD \$36.84 billion in 2020, at a CAGR of 16.7 percent.

With the emergence of popular video-streaming services that deliver internet video to the TV and other device endpoints, content-delivery networks (CDNs) have prevailed as a dominant method to deliver such content. Internet video-to-TV traffic will be 26 percent of consumer internet video traffic by 2020. Consumer video-on-demand (VoD) traffic will nearly double by 2020 and ultra-high definition (UHD) content will be 20.7 percent of IP VoD traffic in 2020.

The opportunities are significant for TME companies. However, there are questions that must be addressed: How can organizations manage the sheer volume of this much data? Should it be stored on site, in the cloud or both? How is video transported to consumers in a fast, high-quality and reliable manner without incurring buffering interruptions or network performance slowdowns during peak traffic periods? How do companies ensure digital rights management and protect assets?

Diverse content distribution and viewing devices shift revenue allocation

Organizations that depend on advertiser support are finding their revenue and profitability under increasing pressure as audiences continue to evolve and market segments continue to fragment. Simultaneously, digital technology continues to evolve. Content is being viewed on an increasing number of devices, using a growing variety of distribution channels. This is creating new routes to consumers as well as new technology infrastructure challenges for telecommunication, media and entertainment providers.

Companies are finding new ways to produce, distribute and monetize this content, which is restructuring the TME industry. Revenue is typically driven by advertising fees,

subscription fees or both. Many traditional media and entertainment companies have been licensing their libraries of movies and television shows as well as new originals to over-the-top (OTT) streaming services such as Netflix, Amazon and Hulu that deliver film and television content via the internet. Some content creators such as NFL Now, Sesame Street Go and Comic-Con HQ are offering assets directly to consumers—bypassing traditional studios and distribution channels.

As a result, today's consumers have many choices. In addition to vast amounts of available content, they decide how, where and when they want their content delivered. Historically, consumers have had subscriptions for paid TV packages from cable and satellite providers such as U-verse, Comcast, DirecTV or Dish. Today, people can choose from subscription video-on-demand (SVOD) services such as Netflix (where they pay a set amount per month for all the content they can watch [with no advertising]). There are also transactional video-on-demand (TVOD) pay-per-view models where consumers pay only for what they actually watch, as well as advertising video-on-demand (AVOD) models such as Hulu where they pay for all they can watch but with limited advertising.

According to Juniper Research, global revenue for over-the-top video services will reach USD \$32 billion by 2019. This is being driven by growth in established markets such as North America and Western Europe as well as by the emergence of new OTT providers in Asia Pacific. In the United States, 78 percent of consumers subscribe to at least one OTT service. Of these, most have added OTT offerings to their existing pay-TV subscriptions rather than replace them. However, younger demographics such as millennials frequently choose video streaming services instead of pay TV. As a result, advertising revenues are shifting to different distribution models and the companies that operate them.

Customer experience is paramount

Audience demographics are not the only thing changing. Consumers use multiple devices and they want the same media experience with platform-agnostic content available across all their devices. They want to watch shows and movies on their own schedule—streaming in real time, on-demand and using

digital video recorders (DVR) across devices, with enhanced platform integration, social sharing capabilities and personalized recommendations.

Consumers expect to have the same quality, availability and

AUDIENCE OF ONE



experience from their video streaming services as they get from their pay television service and vice versa. In a recent IBM study, 55 percent of U.S. respondents said they primarily use their smart TV, Roku, Apple TV, game console or other connected TV device to watch their favorite streaming service, while 25 percent use tablets or smartphones as their primary viewing device. Unfortunately, 75 percent of SVOD users report experiencing buffering and slow stream starts while viewing, and nearly 1 in 5 consider technical problems so serious they are likely to cancel their service because of it.

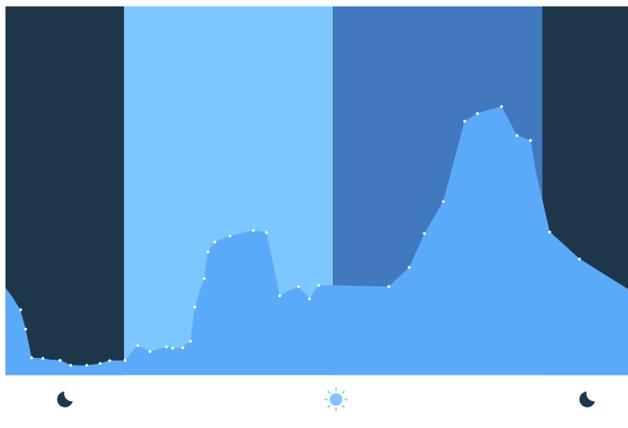
As the number of devices being used to access content grows, the level of support required also increases. According to Cisco, the number of devices connected to IP networks will be three times as high as the global population by 2020. This means that by 2020, every person on the planet will have on average three or more networked devices with which to view content.

However, greater workloads and infrastructure 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 and devices simultaneously is difficult and takes time to build, support and manage.

Media, entertainment and telecommunications providers need to deliver the content consumers crave in a high-quality, non-interrupted fashion to ensure a positive customer experience that will enhance loyalty and improve customer relationships. As live-streaming grows in importance and prevalence, content providers must have the technology to handle massive spikes in viewer traffic at any given time to prevent site crashes and streaming disruptions. Likewise, they must safeguard against single points of failure in video delivery systems that could cause widespread service interruptions. They must also be able to provide content across a wide variety of devices. Data analytics can help TME providers to better understand viewing habits and plan for peak demand and device preferences.

STREAMING DAILY USAGE



Audience-of-one segmentation needs advanced analytics

In the race to capture share in today's increasingly crowded market and compete for audience attention, it is imperative that content providers understand their viewers' needs, concerns and expectations. This requires advanced analytics capabilities.

During 2016, there were a record breaking 455 new episodes for viewing each week. Because each customer cannot consume all available content, TME providers need to understand which viewers are consuming which types of content, which assets are most popular and at what point viewers drop out—among many other attributes. Understanding audience preferences and content performance metrics enables TME providers to make educated decisions about content acquisition and production while allowing them to personalize the user experience to each individual's habits and preferences.

Content distributors now need to target an audience of one and customize the packaging and distribution of content assets to accommodate individual preferences. By targeting specific content to an audience of one, organizations can better manage how vast amounts of content are stored and transported. They can also offer more targeted advertising options as specific types of products and services typically appeal to specific audience demographics who watch certain types of content. To drive subscription and advertising revenue, telecommunication, media and entertainment organizations need advanced data analytics to better target content to receptive consumers.

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

To match the services provided by over-the-top (OTT) content providers, media, entertainment and telecommunication providers need robust content delivery systems. These systems should make it faster, easier and more profitable to deliver any media content, whether live or recorded, to any device with anytime and anywhere convenience. They must also be high-performance video processing and storage systems that combine 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. 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. TME providers should look for a system that offers these critical benefits:

- **Scalability** to reach consumers wherever they are around the globe, whenever they want and to do so in a way that meets demand peaks and flexes when demand is lower.
- **Resiliency** to assure 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.
- **Analytics** to perform detailed segmentation which can be used to better choose which programming and channels to offer subscribers. This can also help providers better understand their customers' usage patterns, preferences and even gain personality insights. A high-performance video processing and storage system can help expand the intelligence and insight gathered from subscribers' content selection, use and preferences to make smarter decisions about programming.
- **Real-time targeted advertising and campaign management** to allow real-time, unicast and per-user targeted advertising insertion for both linear and nonlinear content in the compressed domain. Predictive analytics can help TME 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. A content delivery 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.

IBM has a portfolio of cloud-based video solutions that can deliver on these market requirements

IBM collaborates with telecommunications, media and entertainment clients, bringing together business insight, advanced research and powerful technologies to help give them a distinct advantage in today's rapidly changing video

environment. IBM can help service providers deliver differentiated experiences that are more relevant and increase customer value. IBM works with clients around the world and has a video solutions portfolio for DVR, OTT and streaming delivered via the cloud in any of the three required ways enterprises demand: Public, Private (also called on-premise) or Hybrid.

The following market challenges can be answered with public cloud solutions from the IBM Cloud Video Business Unit:

- **Live events:** Live video enhances streaming experiences, bringing a sense of excitement, connection and immediacy. IBM Cloud Video offers placement capabilities that can serve the live video in an ad unit on targeted websites to provide an in-the-moment dynamic for high-profile events and speakers that help to draw huge audiences. It is interactive and provides tight integration with social tools and chat functionality.
- **Multiscreen streaming:** Today, mobile consumers expect to have access to content at the tips of their fingers, regardless of timing, location or bandwidth. As consumers increasingly look to connected devices for video content, the IBM Cloud Video Multiscreen Streaming solution enables you to interact and meet this demand, whether live or on demand, while opening new revenue streams. This solution unites powerful content management capabilities with robust catalog management and subscriber administration functionality, providing a single platform to manage and administer all components of an OTT streaming service.
- **Corporate communications:** Forming connections and humanizing company leadership is more important than ever. Video can help reinvigorate communications, connect employers to employees and engage personnel with the company's mission. Implementing video into your corporate communications strategy delivers company messages in a way employees are used to, which helps boost productivity.

The IBM Cloud Video platform empowers HR and

company leadership by offering flexibility for quick setups, such as a built-in webcam or even a mobile app, alongside professional setups, with external equipment. Employees can engage content both on premise and off premise, with full support for viewing on mobile devices along with content security to restrict access to intended parties.

- **Workflow and distribution:** IBM Cloud Video delivers powerful multiscreen video logistics capabilities to simplify content management and distribution, enabling providers to maximize operational efficiencies and take advantage of additional monetization opportunities like C3 and D4+ windows. The multiscreen monetization solution manages and implements all aspects of content preparation from postproduction to delivery, including content ingest, multi-platform transcoding, sophisticated metadata management and preparation for dynamic advertising, packaging, scheduling and distribution. In addition, intelligent workflow tools can be configured for manual or automatic publishing from any ingest source to any end destination.
- **Marketing:** One of the biggest barriers to understanding how your videos are actually performing is the inability to track and measure their use. Video, like any marketing asset, must be managed and measured to ensure that 1) you are using the assets effectively and 2) you can tie their use to specific campaigns and measurable goals.

IBM Cloud Video provides tools to ensure key metrics like viewing times and completion rates are captured, thereby helping to determine how consumers absorb video content and what effect it can have on buying behavior. As a result, the analytics captured around viewing sessions are critical.

In addition, the IBM Video Grid™ private-cloud solution enables cloud-based DVR capabilities:

- **Cloud-based DVR:** Cloud computing DVR offers lower costs for storage, encoding and other video processing functions and can exploit fast file-transfer capabilities. Centralized storage of DVR content takes advantage of existing set-top boxes without hardware upgrades. Cloud

computing DVR helps TME providers create new converged consumer experiences that bring fixed and mobile assets together to work synergistically and create sticky services. This enables TME providers to offer add-on services that make a product experience more valuable, which leads to increased subscriber loyalty.

The IBM Video Grid™ private cloud solution provides a cloud computing-based DVR to deliver increased marketing flexibility, create new services dynamically, increase average revenue per user and reduce churn. The IBM Video Grid™ solution provides an on-premise, 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™ 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.

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. The solution is architected with 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.

The IBM Video Grid™ is designed with cognitive capabilities and leverages a framework built on open standards and APIs. This gives organizations access to a large portfolio of industry tools like encoders and transcoders. It also provides API access to additional value added services like analytics and media services as well as easy integration with back office systems.

Across all the use cases above, enhanced by insights and analytics from IBM cognitive solutions, the IBM Cloud Video platform can provide 360-degree views into viewer habits and behavior. Content protection and digital rights management are also provided to ensure valuable assets are protected. The IBM Cloud Video platform provides availability and reliability on an international scale with comprehensive security across

data, content and the physical environment. With proven and unparalleled reliability and real-time scalability, IBM Cloud Video helps enable new opportunities to leverage and monetize video to enhance business goals.

Solutions for a hybrid cloud environment

IBM can craft a hybrid solution using elements of our public and private Video Cloud solution portfolio to meet your unique needs. This enables you to quickly and easily scale as needed while leveraging investments in existing infrastructures. If you're starting with on-premise solutions, but are looking to move to the cloud to reduce storage costs, perhaps it makes sense to keep origin storage on premise but move your workflow to the cloud. Or perhaps you're concerned about managing spikes in demand? With IBM, it's easy to keep your on-premise solution but manage bursting in the cloud to better scale for peak demand periods.

Regardless of where you're starting, IBM has you covered. Our video delivery solutions can be tailored to meet various configurations for any video requirements, such as the following examples:

IBM Cloud Video Solutions

- Private: Private instance of content in the cloud
- Hybrid: Origin storage on premise with workflow in the cloud
- Public: Sharing of storage resources but content is secured and private

IBM Video Grid™ solution

- Private: On-premise solution
- Hybrid: On-premise solution with bursting into the cloud to scale for peak demand
- Public: Using cloud platform as a service

Canadian Broadcasting delivers multiscreen streaming

The Canadian Broadcasting Corporation (CBC) provides Canadian-based, ad-supported streaming services. They have a growing content library with more than 600 titles (over 400 hours) including items such as CBC-TV, digital originals, documentaries and children's programming.

CBC needed a video platform to support their strategy of building an audience in an aggressively competitive environment. They wanted to expand their streaming video capabilities and be able to rapidly scale to accommodate huge volumes of additional digital content. They wanted a partner that understood what it means for a broadcaster to be digital. They also wanted flexible video technology, a depth of experience in digital workflow and the ability to leverage their existing infrastructure. CBC turned to IBM.

With support from IBM Cloud Video, CBC now features geo-fencing capabilities, enhanced accessibility including closed captioning and described video, complete search-and-discover functionality and management of an enhanced user experience. For the initial launch, CBC chose to support Android devices and has now added support for additional platforms such as iOS devices, Google's Chromecast and Apple's AirPlay. With just a few clicks, fans can enjoy popular original dramas like the espionage thriller "The Romeo Section" and the comedy series "22 Minutes" on devices of their choosing using a web browser.

Conclusion

Growing video content and a rapidly evolving business model brings many challenges for telecommunications, media and entertainment providers. Consumer demand for new delivery channels and better video to new and smarter devices, as well as an on-demand appetite is forcing the TME industry to evolve more quickly than ever. IBM can help TME providers select, build and manage 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 can support a variety of revenue generation opportunities.

IBM can help TME providers deliver differentiated experiences that are more relevant and increase customer value. We bring business insight, advanced research and powerful technologies to the media, entertainment and telecommunication 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 media and TME providers build 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.

About IBM Cloud Video Unit

Created in January 2016, IBM Cloud Video brings together innovations from IBM's R&D labs with the cloud video platform capabilities of Clearleap and Ustream. Through the unit, IBM delivers a powerful portfolio of video services that spans open API development, digital and visual analytics, simplified management and consistent delivery across global industries. IBM Cloud Video supports top media and enterprise companies with reliable video-on-demand and streaming services.

For more information on IBM Cloud Video, please visit ibm.com/cloud-computing/solutions/video.

Find out more about IBM in the Telecommunications, Media & Entertainment Industry
ibm.com/industries/telecom-media-entertainment

Endnotes

1. <http://www.cisco.com/c/en/us/solutions/collateral/service-provider/visual-networking-index-vni/complete-white-paper-c11-481360.html>
2. <http://www.strategyand.pwc.com/perspectives/2016-entertainment-media-industry-trends>
3. Cisco, “Cisco Visual Networking Index: Forecast and Methodology, 2015–2020 White Paper,” 2015.
4. [https://www.storagevisions.com/Press%20Releases/Media and Entertainment Report-080215.htm](https://www.storagevisions.com/Press%20Releases/Media%20and%20Entertainment%20Report-080215.htm)
5. “An Era of Growth: The Cross-Platform Report.” The Nielsen Company. (March, 2014)
6. Hollywood Reporter, “Proof of “Too Much TV”? The Full List of 1,400-Plus Primetime Series That Aired Last Year,” January 27, 2016, Lesley Goldberg, <http://www.hollywoodreporter.com/live-feed/proof-tv-full-list-1400-859851>.
7. Adbrands, “CBS,” http://www.adbrands.net/us/cbs_us.htm.
8. <http://www.telecompetitor.com/ott-video-revenue-forecast-to-reach-32-billion-in-2019/>
9. IBM, “Everybody Wants to Rule the Streaming World: How Advanced Data & Analytics Alleviate Video Streaming Pain Points,” April, 2016.
10. Leichtman, Bruce, “Major Multi-Channel Video Providers Lost About 105,000 Subscribers in 2013,” Leichtman Research Group, Inc., March 14, 2014.
11. Consumer Reports, “How to save money on triple-play cable services: Navigate the changing world of TV, Internet, and home phone service—and save money doing it.” March 2014, LBE12347.
12. Strategy& “2016 Entertainment & Media Industry Trends” 2016, Deborah Bothun and Christopher A. H. Vollmer, <http://www.strategyand.pwc.com/trends/2016-entertainment-media-industry-trends>
13. Phys.org, “New record for US original television series in 2016” December 22, 2016, <http://phys.org/news/2016-12-television-series.html>



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