

# The Vital Role of Unified Distribution To Ongoing Success in the TV Business

Part 3 of 3

## Consolidation on HTTP Infrastructure Opens Era of Opportunity for MVPDs

*Operators Gain Flexibility Essential to Service Expansion, Addressable Advertising and New Lines of Wholesale Business*

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### Introduction

**A**t a time of unprecedented market upheaval MVPDs can achieve the strategic maneuverability essential to outpacing competitors by adopting a Unified Distribution architecture that extends the capabilities of HTTP distribution technology to legacy and next-gen operations alike.

Now that advances in processing power and intelligence used with fragmented encoding and manifest-based delivery have made it possible for MVPDs to expand the reach of pay TV services beyond the traditional set-top box, there's no reason they should have to continue relying on traditional equipment and processes that impede their ability to compete against more nimble OTT players. As described in Part 1, MVPDs can eliminate the costs, operational burdens and barriers to growth imposed by maintaining two operating environments by implementing fragmented content distribution over a single HTTP-based network infrastructure as the foundation for transporting content across their national, regional and metropolitan backbones.

Practically speaking, this means MVPDs must be able to convert fragmented, HTTP-delivered video to serve a traditional installed STB base for as long as it takes to complete the transition to STBs that are capable of receiving fragmented HTTP video streams. As previously discussed, Imagine Communications has made this possible by introducing the industry's first edge platform suited to performing this task.

Along with incorporating all the dynamic content manipulation capabilities of an advanced HTTP-based platform, Imagine's

Selenio Video Delivery Edge (VDE) supports conversion of content processed through these mechanisms to the UDP-encapsulated MPEG 2 TS mode of transmission used in QAM-based cable pay TV and telco IPTV services. This serves not only to support consolidation of video processing across all screens but also to extend the HTTP-enabled user experience (UX) and monetization options to STB-connected TV sets.

With the new Unified Distribution architecture in place, MVPDs can facilitate pursuit of multiple goals relating to service enhancement and monetization, including:

- Consolidation of video processing and distribution onto a single platform;
- Elimination of proprietary hardware components in favor of advanced software platforms running on COTS (commercial-off-the-shelf) appliances, opening the way to more efficient utilization of resources through virtualization;
- Accelerated, cost-effective migration to all-IP video services;
- Consolidation of cloud DVR, VOD and other time-shifting operations;
- Introduction of UHD and future TV formats;
- Better approaches to replacing regionally blacked out content;
- Revenue expansion through support for their own and broadcasters' addressable advertising initiatives;
- Consolidation of ad opportunities across OTT and linear yielding efficiencies in campaign management and enhancing revenue
- Creation of new B2B business models tied to leveraging the capabilities of VDE-equipped CDNs.

All of this adds up to enabling MVPDs to position themselves for success as monolithic pay TV models rapidly give way to new norms characterized by agility in technology adoption, service innovation and new business development. Seen in this light, there may be nothing more vital to MVPDs' ability to adapt to change than a distribution architecture based on HTTP and fragmented video.

In the discussion that follows we will look at how an HTTP-based infrastructure along

with advancements introduced by Imagine contributes to fulfilling the goals enumerated above. To avoid repetition, where appropriate we will refer the reader to Parts 1 and 2 for deeper background on points made here.

## The Multiple Benefits of Consolidating Video Processing

The consolidation of video processing begins with the initial encoding and packaging of content ingested from outside sources into fragments suited for streaming content in multiple resolutions over HTTP on long-haul fiber networks. As explained at length in Part 1, this in combination with the placement of the Imagine VDE HTTP-to-UDP conversion process at points of local distribution eliminates the need for legacy proprietary encoders, satellite receivers, IRD's, ad splicers, groomers and other purpose-built appliances everywhere in the MVPD's footprint.

With a single transcoding system at the core, each channel and on-demand file is encoded to one or more bitrates conforming to resolution parameters of multiple device types. Content is streamed to local headends, central offices and hubs where software modules running on COTS appliances execute streaming and other functions tailored for each distribution scenario, whether for individual clients on ABR (adaptive bitrate)-enabled devices or for viewers served by legacy STBs. Content processed for legacy TV distribution is fed through the Selenio VDE HTTP-to-UDP gateway for conversion of linear multichannel content to the MPEG TS-over-UDP transport mode now supported by the vast majority of set-tops.

The Unified Distribution architecture depends on the fact that the capabilities of today's topline transcoding platforms match and, in many respects, outperform pur-

pose-built hardware systems, which reduces capital and operations costs while delivering benefits that can't be attained by far less agile and scalable systems. The advantages of a unified, state-of-the-art, software-based approach to meeting all transcoding requirements are well illustrated by Imagine's Selenio One™, which is used in legacy as well as multiscreen scenarios to support any mix of MPEG-2, H.264 or HEVC/H.265 outputs with density sufficient to process up to 360 linear channels or 720 ABR streams per 4-RU server.

The platform allows operators to define and redefine allocations of resources on the fly in support of any combination of H.264 and H.265 encodes for ABR and linear distribution. Other functions intrinsic to Selenio One, and to other pay TV-caliber multiscreen transcoding platforms as well, include:

- De-interlacing of NTSC files to progressive mode;
- SCTE-35 awareness:
  - Adding IDR (instantaneous decoder refresh) frames to enable SCTE 35-based ad insertion;
  - ESAM APIs for confirming and conditioning SCTE-35 cues;
- Performing GOP (group of pictures) alignment to facilitate smooth output in the fragmented distribution process;
- Making automatic loudness adjustments;
- Processing and synchronizing ancillary feeds such as closed captioning, picture-in-picture displays and foreign language subtitles.

One of the added benefits of moving to an architecture that relies on a consolidated HTTP-based approach to transcoding is the alleviation of hassles operators face in exploiting the bandwidth-saving capabilities of H.264. By supporting H.264 end-to-end with the initial transcoding process, operators utilizing the VDE can replace MPEG-2 compression

on the last-mile leg with H.264, now that many deployed STBs are H.264 compatible.

This has been hard to do cost effectively in instances where older MPEG-2 encoders and/or MPEG-2 statistical multiplexers must be replaced. As noted in Part 1, the ABR process can natively achieve the bandwidth efficiencies attained by stat-muxing, obviating the need for new multiplexers in the move to H.264.

Moreover, by transcoding and fragmenting content at all points of ingestion, operators can eliminate multiple transcoding steps that occur when newly ingested content is encoded transport over UDP. Along with adding costs, the need for subsequent transcoding as part of processing at regional headends and again for streaming to connected devices via ABR produces degradations and latency that impacts QoS.

## Smoothing Transition to UHD and Future TV Formats

### The Intensifying UHD Imperative

The need to consolidate video processing is especially acute as MVPDs prepare to support transcoding of UHD 4K content. That moment is close at hand, judging from the rising penetration of UHD TV sets and the growing volume of UHD content entering the OTT space (see Figure 1).

Researcher IHS Markit, citing plummeting prices, recently predicted 4K UHD TV household penetration in the U.S. will reach 34 percent in 2019, followed closely by the U.K. at a projected 31 percent penetration.<sup>1</sup> IHS foresees 4K UHD set penetration hitting 25 percent in the European Union by that year, followed by China at 24 percent and Japan at 14 percent.

Most of the 4K sets now on the market are equipped to support at least one of the three major HDR (high dynamic range) formats that provide the viewing experience that CE manufacturers and service providers anticipate will create consumer demand for premium-priced services. For example, as of mid-2016 more than 30 display models had been certified compliant with the Ultra HD Premium format supported by the UHD Alliance, including the entire line of Samsung SUHD TVs, all of LG's 2016 vintage OLED displays, larger Panasonic DX-900 models and many more.<sup>2</sup>

As for UHD content, in the OTT domain Netflix and Amazon have led the way with the addition of HDR-enhanced programming to 4K portfolios they've been building since 2014. Each of these providers said it would offer about 150 hours of HDR UHD content entering 2017.<sup>3</sup>

Other suppliers like Vudu, M-Go and Sony

Figure 1

## Trends in 4K UHD

PROJECTED 4K UHD TV SET PENETRATION IN 2019				
US	UK	EU	China	Japan
34%	30%	25%	24%	14%

Source: IHS Markit

PERCENT OF PROVIDERS WHO BELIEVE:		
	Consumers Will Pay 10-30% More for 4K UHD Services	4K UHD Will Be Widely Adopted by 2020
MVPDs	64%	100%
Broadcasters	73%	100%

Source: SNL Kagan

with its Ultra streaming app are populating the Internet with ever more UHD Premium-formatted options. And YouTube, which over several years has built a sizeable library of 4K content, has brought long-form HDR-enhanced UHD programming into the mix of channels offered on its Red subscription platform.<sup>4</sup>

As the online availability of UHD content continues to ramp up, an even more significant development is the emergence of the first live 4K TV broadcasts in the U.S. and elsewhere, often with commitments to add HDR enhancements in the near future. The debut of live 4K programming in the U.S. occurred with CBS Sports' coverage of the Masters Tournament in 2016 carried by DirecTV.

This was preceded by a spate of live 4K broadcasts elsewhere, including productions of NHL and NBA games in Canada and multiple soccer telecasts by BT Sport in Europe.<sup>5</sup> In the U.S. the Masters coverage in 4K has been followed by 4K broadcasts of NFL games, Major League Baseball games, some Summer Olympics events (on a delayed basis) and other high-profile sports.

So far, MVPD distribution of 4K UHD content in the U.S. has been limited with only DirecTV going so far as to allocate multiple TV channels to the format. But it's clear MVPDs everywhere will soon be laying plans for 4K UHD service launches if they aren't already.

A recent global survey conducted by SNL Kagan found that 64 percent of MVPDs and 73 percent of content producers among nearly 500 respondents believe consumers will be willing to pay 10 to 30 percent more on their subscriptions for access to 4K UHD content.<sup>6</sup> Ninety-six percent of all respondents believe 4K UHD TV services will be widely adopted by 2020.

### ***The Practical Way Forward***

Owing to the high bitrate required by 4K, which at 4 times HD increases by another 15 percent with the addition of metadata conveying HDR parameters, operators will have to implement either H.265 or some other next-generation codec to deliver the service with some degree of bandwidth efficiency. While H.265 can be implemented in software on existing COTS appliances, the transition to 4K would require all new equipment in hardware-based encoding scenarios.

Moreover, it's likely that as UHD service moves into the mainstream, MVPDs will limit use of legacy QAM and IPTV-based distribution and transition to ABR distribution in order to optimize bandwidth. For cable

operators, avoiding use of more QAMs to support simultaneous transmission of pay TV channels in UHD is also an important cost consideration.

Reliance on the consolidated transcoding strategy also makes it easier for operators to accommodate new security requirements that the advent of UHD is bringing into play for the licensing of high-value premium content, including HD as well as UHD. As discussed in Part 1, these new requirements, mapped to specifications in MovieLabs' Enhanced Content Protection recommendations, entail implementation of forensic watermarking and other measures that are best accommodated within the unitary software-based video processing environment.

### ***Preparing for Virtual Reality***

Another high bandwidth content category that may need to be accommodated within the consolidated software-based processing framework in the years ahead is virtual reality. While VR won't be top of mind for some time to come, current developments pointing to improvements in head gear, better production technology and growing volumes of content suggest VR service will be on MVPDs' agendas at some point.

Goldman Sachs Group recently predicted an \$80-billion global market for VR and AR (augmented reality) will emerge by 2025 with \$45 billion generated from hardware sales and the remainder from various applications categories, including \$7.4 billion from live event and episodic entertainment in addition to \$11.6 billion from games.<sup>7</sup>

### **The Cost-Effective Approach to IP Migration**

The impetus UHD and, eventually VR, will lend to MVPDs' migration to IP-based TV services points up another major benefit of moving sooner than later to a Unified Distribution architecture. Leveraging the new architecture with support from the Selenio VDE platform to maintain the flow of content to legacy STBs, operators will be able to transfer customers incrementally to all-IP pay TV as they are persuaded to upgrade to new service tiers.

Along with higher tier services offering UHD options there are many other service strategies that can be applied to induce subscriber migration. These don't necessarily need to be higher-priced service options.

For example, operators may want to offer the convenience of a whole-home cloud DVR service as part of all-IP service while continu-

ing to rely on DVR-equipped STBs with the legacy service. Similarly, a highly versatile bring-your-own device IoT service bundled with IP-based TV service might introduce cost efficiencies that allow operators to offer a much more functionally rich connected-home service at lower costs than can be done with today's shrink-wrapped smart home services and STB-centered pay TV.

The point is that even as implementation of the VDE platform in conjunction with the HTTP-based architecture enables extensions of some of the ABR processing benefits to content flowing to the STB, operators can leverage those same processing functions in combination with the cloud and other IP-based capabilities to spur migration away from legacy STBs. With the new architecture in place, operators can easily support the switchover to IP on a per-customer basis.

As illustrated by these examples, the Unified Distribution architecture, by providing a ready foundation for moving customers to IP pay TV, gives operators a framework for focusing service development resources on cloud-based technology. This frees them from having to sink more investment into the legacy STB-based operations environment as they pursue strategies essential to building competitive strength in a fast-evolving marketplace.

### **Consolidating Support for On-Demand Content Operations**

Another important area of consolidation enabled by HTTP-based architecture revolves around efficient operation of time- and place-shifting applications, including the aforementioned cloud DVR service, legacy VOD, short-term Catch Up and Start Over, pause/rewind trick play and seamless shifting of content in live viewing situations from one device to another. Each application category can be executed at lower cost with greater precision within an ABR-optimized framework.

It's also important to note that storage capacity consumed by fragmented content wherever it resides can be minimized through use of the just-in-time packaging enabled by components like Imagine's Telurio Packager™. This eliminates the need to store content in multiple streaming formats.

The full potential of an ABR-based approach to accommodating storage of content for all these time-shift applications can be realized under guidance of an advanced workflow system that can automate and orchestrate

ingest and retrieval for each application across the hierarchy of available storage resources, from CDN caches to origin servers to NAS (network-attached storage) and SAN (storage area network) hard drive and tape-based resources. For example, holistic use of storage resources is one of the many aspects of MVPDs' asset management operations supported by Imagine's Zenium™ pure microservices technology.

## Building New Revenue Streams and Better UX

### Adding Addressability To In-House Ad Sales

Reliance on an HTTP-based Unified Distribution architecture also opens a wealth of new revenue-generating opportunities for MVPDs, starting with their in-house ad sales operations. The roles that manifest manipulation and other elements of a dynamic advertising infrastructure can play in supporting addressable advertising were discussed at length in Part 2. Here we focus on how those capabilities can be applied to meet the needs of MVPDs.

### Linear Programming Advertising Strategies

One opportunity lies with the ability to drive new revenue through support for addressable advertising in linear programming. Here, as is the case with broadcasters' use of addressability in national ad sales, the degree of ad targeting granularity in local avails with linear broadcast programming is based on whether content is received on personal devices or via STB-connected TV sets.

Leveraging the Selenio VDE, operators can more readily target linear programming ads on the basis of the geographical areas represented by each service group. Moreover, this can be done in software in a cloud environment with software-defined networking, meaning that the inflexibility of fixed-network, hardware-based splicers that perform this role today is eliminated. At the same time, operators can model more targeted ad sales around the unicast streams going out to viewers accessing content on personal devices.

### Expanding Ad Addressability in Time-Shift Scenarios

Another significant opportunity can be found in the application of addressable advertising to content accessed from cloud DVR storage, which represents an extension of the dynamic advertising capabilities MVPDs have long supported in legacy VOD opera-

tions. In fact, discussions about use of cloud DVR mechanisms to support dynamic ad placements have proven to be an impetus to programmers' willingness to license content for cloud DVR.<sup>8</sup> As is the case with VOD, insofar as distribution of content to cloud DVR users is unicast, the parameters defining how ads are targeted can be applied with equal granularity across the legacy and ABR distribution feeds.

All of these addressable advertising operations can be consolidated onto COTS appliances by an advanced advertising platform that applies manifest manipulation across all content streams. Imagine's Unified Distribution solution is a case in point that has the added benefit of enabling dynamic ad insertion in legacy pay TV streams. Operators can leverage SCTE-130 and IAB VAST protocols in communications with ad decision servers to direct dynamic ad insertion from ad servers at whatever level of personalized targeting makes sense for any given usage scenario.

### Other Benefits Related to Ad Platform Consolidation

The consolidated platform, used in conjunction with an advanced cloud DVR platform, also allows operators to apply ad-skipping policies commonly used with VOD and cloud DVR and, in the process, move those policies into the connected device domain. Implementation of ad tracking by Nielsen over 3-day and 7-day windows following the original broadcast has contributed to programmers' licensing of content to MVPDs' free VOD offerings, where fast forwarding over ads is typically not allowed. It's reasonable to assume that non-skipping policies imposed with cloud DVR, possibly in conjunction with offering subscribers a choice between a version of cloud DVR where ad skipping is prevented and a subscription service allowing ad skipping, would increase programmers' incentives to support more liberal licensing policies for this service as well.

Significantly, there appears to be consumer support for price-differentiated options relating to ad viewing in the IP streaming domain. Deloitte in a 2015 "Digital Democracy Survey," said 62 percent of surveyed U.S. consumers expressed a willingness to view advertising in streamed video programming in conjunction with a subscription cost reduction.<sup>9</sup> Conversely, Accenture found in a global consumer survey that consumers in general were willing to pay for a better viewing experience with streamed video that allows ad skipping.<sup>10</sup>

## Personalized UX and Other Benefits of Content Manipulation

Beyond the cost-saving and advertising benefits to be attained with implementation of the Unified Distribution architecture, MVPDs can utilize the manifest manipulation and packaging capabilities along with the HTTP-to-UDP VDE gateway to address other needs and opportunities. Applications can be targeted at the individual level on unicast streams to personal devices and at the more general service group level over connections to legacy STBs.

For example, operators can facilitate adherence to blackout policies imposed with sporting events in various regions or address language differences in specific population areas by using the HTTP manifest manipulation and packaging system to deliver substitute programming or language subtitles to affected areas. As with the elimination of proprietary hardware used in advertising, manifest manipulation replaces the splicers used with blacked-out program substitution.

Content distribution rights, especially in the case of sporting events, often differ between distribution modes. For instance, an operator may have the rights for distributing a car race across its linear platform, but not its OTT platform. Having a common blackout management program enabled by Unified Distribution allows the operator to manage the complexities of blackout across their entire distribution footprint via one common platform.

More generally, Unified Distribution affords operators the flexibility to support personalization of the UX by automatically directing targeting of personalized recommendations and other features based on individual and group interests or by enabling users to select from menus of personalized options. Operator can also apply these capabilities to target subscribers with upsell offers suited to individual tastes.

Research shows there's considerable upside to be found in personalizing UX. For example, in a recent global survey of 2,000 U.S. consumers conducted by 451 Research Group, 55 percent of respondents said they value the ability to control and personalize their own content and viewing experiences.<sup>11</sup> Forty-nine percent across all age brackets and 54 percent in the 18-34 Millennial category indicated they expect their pay TV providers to use the data they collect to provide custom-tailored service offerings and customer support.

Just how essential personalization will

be to drawing customers in the years ahead is reflected in a survey by Vanson Bourne. Polling 4,200 youths in the 15-18 age bracket in ten countries, the researchers found an unprecedented level of personal identity with online engagement among teens coming of age behind the millennial generation.<sup>12</sup> Notably, while most respondents said they personally identify with providers like Google, Facebook, Apple and WhatsApp, only 12 percent indicated they believe their ISPs “understand their lifestyles.”

## A New Perspective on Wholesale Business Opportunities

Beyond all the benefits discussed so far, MVPDs who implement advanced HTTP-based edge platforms as described above have an opportunity to drive significant new revenue with launch of B2B businesses that can address content producers’ needs for advanced advertising support and CDN services. With these capabilities operators can turn the competitive challenges posed by the OTT video explosion to great advantage.

## Supporting Programmers’ Addressable Advertising Initiatives

MVPDs can extend their support for addressable advertising beyond their own needs by using the VDE-equipped edge infrastructure to support content producers’ advanced advertising goals. Indeed, the consolidated ABR-based ad insertion system puts operators in a position they’ve long sought in their dealings with programmers and their advertisers.

The opportunity has evolved over time to where, today, there’s tremendous demand among broadcasters, as describe in Part 2, for an addressable advertising paradigm suited to both multiscreen and set-top clients that unifies ad campaigns and performance metrics across all viewing experiences. In the legacy broadcast domain, MVPDs can make it possible for programmers to sell ads based on geographic and demographic audience segmentations that accommodate the mass audience metrics of the TV business.

At the same time, operators can provide broadcasters support for the more granular targeting capabilities that the manifest manipulation process makes available for ad placement in programming viewed on personal devices. Adding to the appeal of such offerings, operators have an opportunity to monetize their data-collecting capabilities with advanced analytics that can help clientele define and reach targeted groups, validate

performance to ad buyers and track effectiveness by matching personalized ad exposure data with other data sources that register consumers’ purchasing decisions.

## Meeting Demand for Better CDN Services

Another major new business opportunity for network service providers stems from surging global demand for CDN services tuned to content publishers’ use of the Internet to distribute premium video. Premium video represents a relatively new category in the Web traffic profiles handled by CDN providers, who have long been equipped to accommodate short-form video but frequently are not able to provide the quality of performance support required for premium video.

Overall, global IP video traffic is on course to grow at a 26 percent CAGR over the next few years, reaching a level representing 82 percent of all consumer Internet traffic by 2020, according to predictions from the latest Visual Network Index compiled by Cisco Systems.<sup>13</sup> By that time Internet video-to-TV traffic will represent 26 percent of consumer video traffic, marking a 3.6-fold increase from 2015, the report says.

Estimates vary as to the size of the video segment of the CDN market, and researchers tend not to distinguish between premium long-form and other types of video in their calculations. But all agree that video in all its forms represents the largest and fastest growing share of the global CDN market.

The Cisco VNI report predicts CDNs will be used to support nearly two-thirds of all Internet video traffic by 2020, up from 45 percent in 2015. In 2017, the global CDN market for video will top \$4 billion, according to Frost & Sullivan.<sup>14</sup> Research and Markets predicts a 28 percent CAGR through 2021 for what it calls the cloud CDN market, which is to say, the public CDN sector where the lion’s share of traffic is devoted to video.<sup>15</sup> At that rate the global market will top \$5.8 billion in 2021, the researcher says.

MVPDs, many of which are already equipped with advanced CDN technology serving their own needs to support internal TV Everywhere and VOD traffic, are in a strong position to capitalize on demand in the video CDN market. One advantage they have over typical CDN suppliers is the closer proximity of their headends, central offices and hubs to end users.

Broadcasters pursuing DTC (direct-to-consumer) models, OTT subscription bundlers and traditional SVOD providers want to deliver the best possible user experience to connected big-screen TVs, which is already hard to do

with 1080p transmissions and will get a lot harder as UHD comes into play. Regardless of resolution format, reducing the size of CDN service groups will make an ever-greater difference as the volume of OTT video competing for bandwidth increases.

Moreover, while CDN technology has traditionally been associated with local caching of on-demand content, CDNs with the ability to terminate IP multicast streams can greatly reduce the amount of bandwidth providers have to consume in delivering live content over the Internet and though peering points to local distribution networks. MVPDs’ video-optimized CDNs can provide this service with the added QoS benefit that comes with closer proximity to end users

It’s also important to note that another element to the monetization potential of MVPD CDNs lies with their ability to support distribution of ABR-streamed OTT content to legacy STBs with use of the Selenio VDE. This opens the opportunity to forge new business arrangements that will allow OTT providers to reach pay TV subscribers through legacy STBs. This could significantly raise the appeal of MVPD services, given that 52 percent of U.S. pay TV subscribers also subscribe to at least one OTT service, according to Parks Associates.<sup>16</sup>

## Conclusion


MVPDs can greatly enhance their ability to compete and drive new revenues in the tumultuous premium video marketplace with adoption of a Unified Distribution architecture. Utilizing the HTTP-to-UDP conversion capabilities of Imagine Communications’ Selenio Video Delivery Edge, they can aggressively pursue consolidation of operations, service expansion, IP migration and monetization in the IP domain while delivering the benefits of HTTP-based functionalities to legacy pay TV subscribers.

With implementation of a Unified Distribution infrastructure, MVPDs will be able to dispense with use of purpose-built transcoding, statistical multiplexing, ad splicing and other proprietary hardware, thereby expediting migration to software-based solutions running on COTS appliances. Consolidation of transcoding and other video processing functions onto a single platform is especially important at a moment when operators must determine how they will support the next-generation encoding required for UHD services.

Using the real-time content substitution capabilities of HTTP manifest manipulation, MVPDs can support addressable advertising across all screens for their own internal ad sales operations. And they can mount new

B2B initiatives offering addressable advertising support for their programming affiliates.

As MVPDs apply the advances of Unified Distribution technology to their own operations, they will be implementing next-generation CDNs across their local points of distribution, opening an opportunity to offer video-optimized CDN services to OTT distributors of every description. In so doing, they will be able to satisfy surging demand for CDNs with the processing power and proximity to end users that make it possible to deliver TV-caliber content over the Internet.

For all these reasons and more, the Unified Distribution architecture enabled by Imagine's HTTP-optimized solutions can serve as the foundation that frees MVPDs to take full advantage of the fast-moving trends that are reshaping premium video services. Seen in this light, network operators are well positioned to remain the dominant force in pay TV for years to come. 

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