ACCELERATING ADVANCED ADVERTISING: SUPPORTING EBIF WITH CLOUD-BASED SOLUTIONS

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Abstract

The cable industry faces severe challenges in the race to enable advanced, interactive advertising. Cable-led efforts like Enhanced Binary Interchange Format (EBIF), tru2way and Canoe all offer compelling solutions for advertisers, but cable's fragmented legacy infrastructure, particularly in terms of customer premise equipment (CPE), is preventing these standards from fully satisfying advertisers' current needs for targeted, interactive and dynamic advertising at scale.

To generate significant advanced advertising revenue today, cable providers must embrace tools and technologies that provide advertisers with opportunities to engage viewers that are similar to those that exist on the Web. This paper will examine the cable industry's current advanced advertising challenges and provide information that can help the industry deploy cloud-based solutions that leverage Web technologies and standards.

INTRODUCTION

Advertisers are demanding the ability to deliver Web-style television advertising that's targeted, interactive and dynamic. They want to pinpoint receptive audiences with the right messages, engage them through the point of purchase, and measure viewer activity at every point in the process through new levels of technology development. The cable industry is responding to these needs, but, despite its best efforts, it's running into significant technical challenges.

At best, the cable industry is leaving advanced advertising revenue on the table; at worst, it is losing that revenue to competitors, which are using their support for Web standards to gain the early high ground in advanced video advertising.

Cable's strengths, including its unparalleled subscriber footprint and its superior video delivery infrastructure, remain noteworthy and compelling for advertisers. However, a near-term need exists for cable to muscle more quickly into the nascent advanced advertising area with a platform that both leverages the capabilities of and supports a migration to EBIF.

Solutions are now available that enable operators and advertisers to leverage existing Web platforms such as DoubleClick to support advanced ad delivery. Through the use of a Web-based platform and cloud-based transcoding of Web content to MPEG, cable can quickly gain market share in the advanced advertising space. In addition to offering advertisers access to cable's subscriber base, the best programming and unsurpassed video quality, the operators gain access to an existing advertising ecosystem and would be able to draw on countless advertisers and agencies that would be familiar from Day One with the tools necessary to develop and manage advanced advertising content.

This paper discusses existing challenges to mass cable operator rollouts of advanced advertising, and reviews ways in which operators can capitalize on existing Web

tools and technologies to support their advertising efforts.

ADVANCED ADVERTISING: OPPORTUNITIES AND RISKS FOR CABLE

Traditionally, television advertising has been a passive endeavor for the consumer. Ads, typically 30 seconds in length, are broadcast to all viewers of certain channels or programs, with the hope that one or more target audiences are viewing them. Any calls to action associated with the ad require the user to get up and do something: visit a store, call a phone number, log on to a Web site. However, with the advent of DVR, VOD, sites like Hulu and other products and technologies, many of these linear ads are now being viewed by only a fraction of the audiences they once reached.

As a result, advertisers are now seeking to establish more compelling and personal connections with their target audiences. Today's consumers clearly demand increased choice and control, even over advertising. Younger consumers, in particular, want a more Web-like TV viewing experience.

Advanced television advertising basically mirrors Web advertising, in that it enables the user to participate in much more active and even impulsive activity. These focused and targeted ads are more integrated with the individual's user experience, with the ability to engage the viewer all the way through the "purchase funnel," from introduction to a product to the point of purchase. For example, the viewer can click on the remote for more information, access a microsite devoted to the product or service, talk about the product or service through social networking functionality, and even make a purchase, all from the comfort of the living room couch. Advertisers desire these kinds of interactive ads because, like those on the Web, they can provide interested viewers with additional information, measure viewer activity at multiple points in the process, and deliver those measurements to the advertiser.

Such advanced ads present significant revenue generation possibilities for cable systems operators, as well. Operators uniquely have a broad base of subscribers that can be targeted geographically, demographically or by interest; they provide a video environment that is far more stable and of higher quality than the Web; and they have a broad range of content that is delivered directly to the television, which remains the dominant viewing device in the home.

But although personal, interactive experiences are the order of the day, and would seem to be a good fit for cable, the industry faces a significant challenge in terms of the difficulty of most existing cable set-top boxes to meet this demand. Advertising dollars are already starting to shift to the Web, where targeting and interactivity are more easily achieved. The rise of Internet-connected televisions presents advertisers and CE manufacturers with another chance to deliver "over-the-top" content and advertising to consumers. If cable doesn't respond to the need for interactive advertising, other parties are well-positioned to grab those dollars.

THE CURRENT CABLE ENVIRONMENT

Advertisers want advanced advertising to be part of the normal viewing experience, rather than an "interactive TV" application. There is precedent for this. When an "interactive application" gains consumer traction, it exits the perceived realm of

"interactivity" and becomes part of the "normal" viewing experience. Examples of such interactive applications pioneered by cable include the electronic program guide (EPG) and video on demand (VOD). Both have ceased to be considered "interactive TV" applications, and have passed into the realm of the "normal" viewing experience.

However, applications like EPG and VOD, as "normal" as they are, are still "destination-based." To access VOD, for example, consumers must "go to" a place to find and order titles. The same is true for EPGs, which exist as separate menu destinations. These applications are separate from, not seamlessly integrated with, the normal viewing experience.

Immersive interactive video applications such as advanced advertising strive to bring the desired content "to the viewer," not make the viewer search to find a "destination" in an unnatural way. This "delivering the content to the viewer" (versus "destination-based interactivity") can be found on many video streaming Web sites, such as YouTube, where the activity of viewing any given video stream is augmented by metadata links to several other video assets (as well as non-video applets).

The cable industry, to its credit, is fully aware of the challenges advertisers face with the current subscriber environment. It has created a number of new standards and initiatives designed to provide advertisers the interactivity and targeting they desire, notably EBIF, tru2way and Canoe.

The EBIF specification was created by CableLabs to deploy interactive applications over a two-way video plant to all existing and new digital set-top boxes. The cable industry is working to deploy EBIF nationwide, but that goal has not yet been reached.

With tru2way, application developers can create customized interactive services that can be deployed seamlessly to millions of cable customers. It offers "write once, run everywhere" Java-based programming capability to developers. However, the programs will only run on set-top boxes and other devices that support tru2way. Deployment of such devices is minimal at this time.

Canoe Ventures, backed by prominent operators, is working with CableLabs to develop EBIF templates that advertisers can use to deliver interactive ads to major operators around the country. Canoe also offers backend services that will allow for campaign management and reporting across operators. This effort, however, is still in development.

These activities are promising for the future, and show that cable is working to offer advertisers a national, ubiquitous platform for advanced ad development and provisioning. But although cable continues to devote considerable energy to them, these standards can't effectively deliver advanced advertising today.

Significantly, none of these standards currently can reach all of today's deployed cable set-top boxes. This is due to cable's fragmented infrastructure, characterized by its various models of customer premise equipment and head-ends from multiple manufacturers, and of different ages and capabilities. This infrastructure has grown organically over time among the nation's operators, and has served it well. But this diversity is hampering cable's efforts for a national advanced ad platform.

Let's take a closer look at the issues that are impeding national cable rollouts of advanced ad campaigns.

The Workflow Issue

Cable's ability to provide advanced advertising is hampered by a workflow impediment. It lacks an automated systems infrastructure to connect the "sales order process" with the "creative process" to the "content management and provisioning process" and finally to the "delivery process."

For the traditional multichannel video subscription business, this workflow is well established. In its simplest form, movies and TV shows are produced, licensed to an aggregator (e.g., NBCU), wholesaled to an operator (e.g., Comcast) for distribution, and then retailed to the consumer. The advertising and subscription models are well established for this process.

The important point is that there are automated systems (encoding, content protection, "billing systems," trafficking systems, royalty payment and settlement) that support this model so these businesses can scale.

With respect to interactive applications, this "workflow" does not currently exist in any uniform, scalable way. The current ecosystem of extant and desired interactive video applications and services relies on a patchwork of business systems and creative tools, all of which are delivered to a heterogeneous population of operators with no "billable event tracking" except by sneaker-net and swivel chair operations. Without the "back-end" tied to the "front-end" via an automated workflow that generates invoices, tracks payments and respects copyrights, it will be very difficult to build a scalable business around a popular interactive application.

A specific example of the workflow conundrum is the notion of the "bound" application, which executes synchronously with a program or advertisement.

Current cable solutions to this problem are still to come. EBIF's strength is its overall potential reach, which could be the entire installed base of digital cable set-tops. The EBIF specification defines the client execution engine and the data formats for sending applications to the client. Such definition is critical and necessary, but for EBIF-based "bound" applications to become mainstream, a necessary scaffolding of workflow must emerge. The purpose of Canoe is to create ubiquitous end-to-end workflow for advertisers, and to shield advertisers from the need to deal with multiple cable operators and their separate workflows. But Canoe implementation remains on the horizon.

Advertisers, however, require workflow scaffolding today. They require a known, easy and repeatable method for creating advertising applications, and for applying quality assurance mechanisms to ensure those applications behave at their best on all set-top boxes. They need data collection to fulfill the application's intent, and to feed any primary or third-party billing mechanisms.

Consider an advanced advertising application that allows the viewer to click on a widget associated with an ad to receive more information on the product. From a workflow perspective, the following requirements are critical:

1) *Creative*: What should the widget look like? Who builds creative for

the campaign, and to which template, and using which authoring tool(s)?

2) *Application provisioning*: Operationally, the interactive application must be provisioned on to the network. Its widget assets must be transferred for playout, and its availability parameters must be fed into the traffic/billing system.
3) *Stewardship*: All ad campaigns follow general and specific rule sets, such as: competing products may not be shown within the same ad pod; time parameters to protect children from inappropriate content, etc.
4) *Data Collection*: After playout, data associated with the spot needs a method to flow into the aggregation engines feeding national and local campaigns.
5) *Billing*: Any additional revenue associated with the interactive spot needs a feed into operator billing systems.
6) *Reporting and Settlement*: Automated mechanisms must be available to operators and advertising constituencies, etc., to create reports both for advertising effectiveness and contract fulfillment purposes.

While efforts such as EBIF and Canoe are underway, the author does not know of any available solutions that will connect the traditional day-to-day business of advertising sales to the operators' broadcast and unicast streaming platforms. Individually and combined, workflow gaps prevent the business from scaling and impede the ability for multichannel video providers to build both local and national advertising revenues.

The Challenge of the Installed Base

Digital cable set-tops, as a category, are beyond their 15th anniversary. Until fairly recently, they've existed as "thin clients" that lag behind the Moore's Law trend of computing devices. Compared to PCs, digital set-tops have long been dismissed as devices lacking sufficient processing power and memory to enable immersive, media-rich applications. In short, what's thick today is thin tomorrow, and, for digital cable boxes, it's always tomorrow.

However, it is not in the best interest of operators to deploy new set-top boxes every year. There is a good reason why there is so much legacy customer premise equipment in the field. It takes a lot of time and money to replace a set-top box. All of those "legacy" boxes in fact have value. They save operators money on truck rolls to deploy new equipment, and they save customers the time of waiting for those trucks to show up with new equipment. As a revenue generating unit for "the bedroom" or other non-living-room locations in a household, it is very hard to justify replacing them system-wide with more advanced boxes.

Because of today's accelerated advances in technology, it would be impractical for operators to roll out new boxes with great frequency. Even the latest and greatest set-top box becomes a "legacy" device within months. Consider that when you roll a new car off a dealer's lot, it immediately becomes a used car. That doesn't make the car any less useful. It would be impractical to "upgrade" a car every six months. The same holds true for set-top boxes.

The installed base of digital set-top boxes presents a "lowest common denominator" problem for application development and software version control. Building applications only for high-end boxes reduces potential reach; building applications for all set-top variations reduces the application's attractiveness to the lowest common

denominator of graphics chips, processing power and memory.

These issues of potential reach and the attractiveness of applications are of paramount importance for advertisers, as seen in Figure 1.

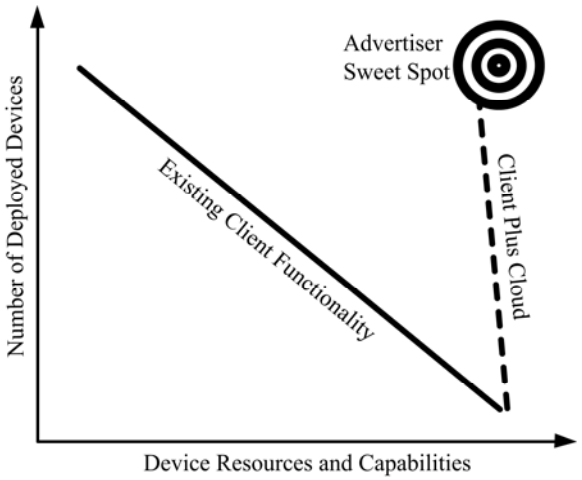

Figure 1 – Functionality Compared to Deployed Boxes

From the perspective of the advertiser, a very small footprint of accessible devices is very hard to target or monetize. With more scale and reach, the advertiser has a greater likelihood of effectively reaching its target audience. At the same time, the better the advertisement looks and functions, the higher the impact the ad will have. Given the deployed base of cable set-top boxes, these two options are mutually exclusive; the more features and functionality a box can offer, the fewer of them there are in the field. Adding cloud rendering and processing to the equation minimizes the device-centric resources from the equation. This is shown with the dotted line. Put another way, operating interactive applications solely upon the limited capabilities of the aggregate set-top base, and without the benefit of network server resources, means the wealth of capabilities in the newest units is eclipsed by the care-and-feeding needs of the oldest units.

The Challenge for the Application Developer

Advanced advertising application developers face prohibitive time and cost outlays in the cable environment. The problem is not unique to advertising applications; developing any software for cable, such as EPG software, requires a substantial round of testing and compliance to ensure that the software works with all of the set-top boxes in deployment.

EBIF development presents a similar challenge. The result is the likely pruning of platform features to the lowest common denominator.

The greatest expense associated with investment in client software technologies often is in targeted development, integration and regression testing across dozens of different CPE platforms—each with its own performance characteristics, graphics display capabilities and consequent impact on the viewer experience. While tru2way, EBIF and other standard client software platforms are certainly a great improvement, they do not solve the pervasive cross-platform compatibility issue.

This is not an issue just for the cable world; even Web browsers have differing capabilities across Macs and PCs, as well as across different OS installations on those devices. It is necessary when developing a robust Web site to test it against all significant browsers in use.

In cable, however, a new release of the GuideWorks-based EPG and VOD menu software package can take between one and two years for development, testing and certification before it is made available to

operators for deployment across a family of set-top boxes.

EBIF is a write-once, run-anywhere platform that provides cable operators with an efficient, lightweight, well-managed set-top environment. It offers interactive applications, graphical overlays and instantaneous responses via an immensely deployed base of existing cable set-top boxes. However, while it opens the door for new kinds of interactivity, EBIF by design was not intended to offer more capabilities than the most basic set-top boxes could handle. It is essentially a generic system that provides some basic capabilities for interactive TV on legacy set-top boxes. In addition, EBIF is not yet ubiquitously deployed.

Simply put, it will be prohibitively expensive and time-consuming to deliver the levels of interactivity and functionality that advertisers require into the wide variety of digital set-top boxes currently in the field. While EBIF, tru2way and Canoe are worthwhile endeavors for cable, there is a need for a server-based, or cloud-based, solution to enhance those advanced advertising efforts. The idea is to push as much programming, application logic and processing into the network cloud as possible, and communicate with digital set-top boxes through simple MPEG streams, for example.

THE CLOUD-BASED ADVANCED ADVERTISING SOLUTION

The language of the computing "cloud" is typically associated with the Internet, even though the term itself pre-dates the Internet by at least two decades, when computer scientists recognized the need to share processing workload over clustered computers. Cloud computing has become a staple of the Web world, with applications such as Web-based email, YouTube and countless others removing the burden from client devices and leveraging the power (and storage capabilities) of the cloud.

Now that we live in a fully digital television world, the cloud concept applies just as much to TV, as we're essentially dealing with data and nothing more. The cloud TV concept can remove workflow gaps and bridge the application and media processing requirements between head-ends and set-tops. A cloud approach also enables developers of advanced advertising applications to use familiar, Web-based development tools that are similar to or the same as those used to provide interactivity within a Web site.

Server-side functionality, such as large-scale data manipulations (for example, deep keyword searches on hundreds of thousands or millions of records), recommendation engines and ad decision engines, already exist for Web applications. These technologies can be applied as-is to the cable infrastructure. Familiar client authoring functionality, such as DHTML, JavaScript, CSS, Ajax and JSON, can be used in existing deployments by moving much or all of the "client" processing into the cloud.

EBIF at the Core of Advanced Advertising

EBIF is specifically designed to enhance broadcast video with prompts ("call to action" graphics) that entice the user to engage with what they are watching in new ways. This ability to embed interactivity in layers is key to the advanced advertising initiative. The base layer is the broadcast advertisement itself: If a user does not have EBIF capabilities, this is all that is seen. The second layer is the "call-to-action" graphic, which the User Agent blends on top of the broadcast video advertisement according to

the instructions in the bound application, as exemplified in Figure 1.

Figure 1 – Call to Action Overlay

Once the user has responded to the call-to-action, there are various possible next steps for the advertiser. A common option at the core of the Canoe initiative is the RFI (Request For Information). Leveraging the customer's personal information on file with the cable company, a brochure, coupon or other information is mailed to the subscriber's physical address.

Enhancing this basic RFI functionality with cloud-based services can offer tremendous increased impact and opportunities for engagement to the advertiser. Given a simple construct such as cookies, an advertisement can offer different screens or other options if the consumer has already clicked on the RFI in the past, for example. Using simple asynchronous client-server communications (akin to AJAX on the Web), an EBIF application can leverage server-side database repositories to display a tremendous amount of information in small chunks, without overtaxing the available client memory.

Adding MPEG to EBIF

Existing EBIF User Agents have been designed to support simple telescoping functionality as seen in Figure 3. An EBIF application can switch away from a broadcast stream to a unicast stream based on triggers typically caused by the user. The

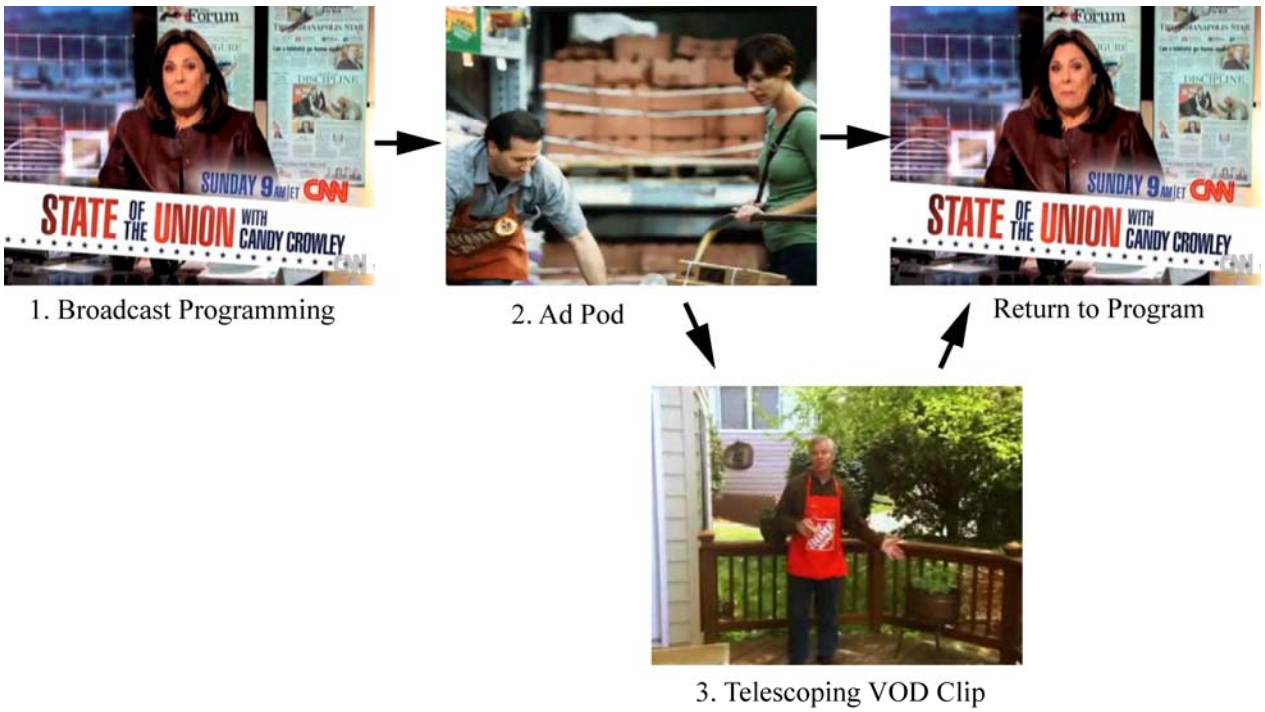

Figure 3 - Telescoping Ad

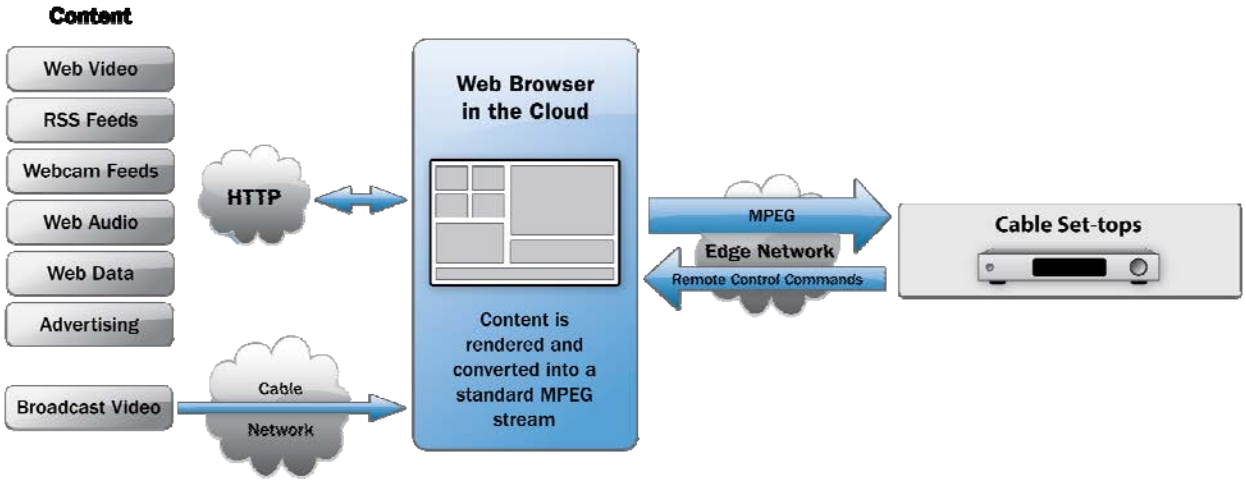

Figure 4 – Web Browser in the Cloud

EBIF application persists during this stream switch, providing a seamless application lifecycle and allowing the EBIF application to send commands and control messages to the server that is generating the unicast stream. In its simplest form, this allows for an advertisement to play a longer video for users who express interest via a call to action on-screen during a broadcast advertisement.

Additional Benefits of a Remote Browser

Using enhanced streaming servers in the network cloud, this basic telescoping functionality allows for advanced graphics and video capabilities to be added to any EBIF application. As seen in Figure 4, the enhanced streaming server is running what is essentially a specialized Web browser in the cloud.

Once there is a framework that allows basic Web browser functionality across all set-top boxes, the door is open for leveraging tools and expertise that have been developed and polished over the last decade or more. Cable companies using client-side browsers as well as streaming-server browsers are already capable of leveraging some very powerful tools. It has been shown that DoubleClick, Atlas and other ad campaign management suites are already able to manage, track and report on interactive ad campaigns running on all deployed cable set-top boxes. It has also been shown that Omniture and similarly powerful tracking and reporting solutions are able to be used in advertising campaigns across existing cable deployments. All of these examples are using existing Web solutions without modification, and with standard commercial agreements in place.

Brand Appearance in EBIF

Another immediate benefit to using this specialized streaming server is that it is capable of rendering images in the entire MPEG-2 color space; more than 16 million colors are available at once, with minor limitations due to chrominance sharing between adjacent pixels. Compare this to EBIF graphics allowed in the most widely supported baseline specification (including the Motorola DCT-2000), which allows 16 colors on screen at a given time, and the Cisco (Scientific-Atlanta) SA-2000, which allows 256 colors on screen at a time. The immediate benefit to an advertiser that is protective of its brand appearance is clear, and because these cloud-based graphics are not dependent on the client functionality, the same brand image appears identically on a

Motorola DCT-2000, SA-2000 and all other deployed set-top boxes.

The Power of Video in Advertising

Beyond simple brand appearance, there is remarkable power and clear benefit to embedding rich video into an ad. It is abundantly clear why so much advertising money is spent on video when compared to static (newspaper, Web banner ads) and audio (radio): The response through brand awareness and feedback is measurable. To an advertiser spending money on television, the expectation is that there will be a large video-based component to its advertisement. When a standard advertisement is enhanced with EBIF, some simple graphics and text are available. Adding telescoping allows for a single long-form video to play on demand. Adding cloud-based streaming suddenly makes a broad range of video and video-centric effects available to the advertiser, for example: multiple video windows playing at once; or allowing the original broadcast video to play in a thumbnail in the corner while the telescoping video plays in a larger window. Many more are possible. Because the rendering of the user interface takes place in the cloud, any existing set-top box can provide this type of interface and brandable real-estate, all leveraging EBIF as the gateway and flexible servers placed in the cloud.

CONCLUSION

A cloud-based approach offers cable operators greater flexibility and implementation of advanced advertising now, the ability to grab market share against competition as quickly as possible, and a solid foundation for the future. It also combines the mass audience of all two-way cable boxes with the features and functionality that advertisers need to meet their brand and marketing requirements.

The cloud approach leverages EBIF's capabilities and supports migration to EBIF, while addressing today's urgent problems head on. It leverages cable's strengths of an unrivaled subscriber footprint and superior video delivery. By using existing Web standards to support advanced advertising delivery, with the ability to transcode Web content to MPEG, it allows cable to lock in immediately to the existing pre-roll ecosystem for advanced advertising, as advertisers and agencies are already intimately familiar with Web content development and management tools. Ideally, a mix of cloud and client-server approaches is optimal.