ARCHITECTURES FOR ADVANCED ADVERTISING – COMMERCIAL DRIVERS AND ENGINEERING SOLUTIONS

Guy Cherry, C-COR Incorporated
Rick Bohrer, Atlas On Demand

Abstract

A key to the future success of the cable industry will be the industry's response to emerging opportunities in advanced advertising. This paper will explore four key technological leverage points expected to exhibit significant change over the next five years. Today's work in each area will be outlined and an attempt will be made to predict the advertising infrastructure required over the course of the next five years.

INTRODUCTION

A key to the future success of the cable industry will be its response to emerging opportunities in advanced advertising. Traditional advertising infrastructure has already seen changes in the first half of this decade brought on by computer technologies, digital delivery, and changing viewer habits. It is our belief that these changes will accelerate in the next five years bringing about a very different relationship between viewers, advertisers and product suppliers.

The cable advertising relationships that will develop over the coming years are likely to mirror, and perhaps improve upon, the relationships that are already in place and supporting the dynamic growth seen today on the Internet. This paper will explore and compare the evolving landscape of the cable advertising infrastructure with that being used in Internet advertising today.

There are at least four significant areas where change has begun to occur. The first and most fundamental is the replacement of pure broadcast delivery with digital pointcasting and narrowcasting (e.g. VOD (Video On Demand) and SDB (Switched Digital Broadcast) services). These technologies allow customized viewer experiences and can allow advertising campaigns to target specific individuals and populations with greater effectiveness. This population targeting is similar to a technique called behavioral targeting being explored today in the Internet advertising community.

A second area of change is the establishment of an "advertising return path" allowing subscriber behaviors, such as purchase history and program viewing history, to be anonymously tracked and used to deliver a more relevant advertising message at the next opportunity. Again note the similarity to Internet advertising where purchase and site-visit history can be used to select advertising that is more relevant and useful to individual subscribers. Note that ad placement decisions are enabled by a return path that delivers very granular data on each ad and each subscriber.

By 2010 the cable advertising industry will require flexible and standardized architectures for leveraging population targeting and return path capabilities. Future back-office architectures must allow any subset of the subscriber population to be targeted and to allow them to respond with purchase requests and viewing preferences in real time. The SCTE DVS (Society of Cable Television Engineers Digital Video

Subcommittee) Working Group on Digital Advertising has generated a number of successful standards supporting digital advertising and is currently working on standards in these key areas.

Note again the similarity to the Internet today where advertisers, portals, web sites, 3rd party ad-servers and analytics providers cooperate to deliver and optimize online advertising campaigns.

These two changes will be complemented by changes on two additional fronts. The third is the shortened timeframe for making ad placement decisions, and a near-immediate ability to update the logic that drives those decisions. The cable architectures being proposed mirror those operating on Internet, and include real-time "Ad Selectors" which are part of the control flow. These ad-decisions will be driven by changes in programming (e.g. "live" events) and by measuring the effectiveness of ads via the return path mentioned above. This shortened timeframe will be yet another key element in future architecture and standardization efforts.

The fourth area considered in this paper is the changing "composition model" for advertising campaigns. The traditional 30 or 60 second "spot" will continue to be augmented by other delivery models such as barkers, scrolling marquees, and other graphical overlays. The capability to follow through with email, phone contacts and pointers to longer-format content is also beginning to play a key role. A coordinated delivery of mixed advertising content, with follow-through, will continue to give advertising campaigns greater leverage.

This paper will explore these four broad architectural areas, will examine the key interoperability points that will benefit from industry standardization, and will compare these to advertising on the Internet today. Today's work in each area will be outlined and an attempt will be made to predict the advertising infrastructure and capabilities needed over the course of the next 5 years.

ADDRESSABILITY AND INTERACTIVITY

Addressability is the ability to direct specific streams to specific sets of viewers. This capability provides a powerful leverage point for advertising systems.

Some cable systems utilize addressability but not an interactive return path. For example, zone-based linear advertising is implemented to address specific sets of ads to specific geographic zones. The intention is to target particular populations with specific advertising campaigns. However, this is a "blind" operation – there is no mechanism to measure the effectiveness or interest level in the advertisements on a zone-by-zone basis.

A return path can leverage addressability in many ways. Consider the following examples:

1) Traditional VOD is based on a digital network's ability to pointcast streams in response to individual requests, and this is directly analogous to the delivery of Internet advertising. This allows the targeting of ads based on individual subscriber preferences.

2) Switched Digital Broadcast (SDB) also leverages the presence of a return path allowing bandwidth to be tailored to user channel selection preferences in real time.

In both cases tuning choices are processed by back-office servers that make bandwidth allocation decisions and setup the resulting sessions. At the point where these actions are taken (sometimes referred to as the Session Resource Manager or SRM) advertising decisions can also be made and carried out.

Advertisement decisions can be based on the content selected and/or knowledge about the specific individual. On the Internet, these two types of addressability are referred to as contextual-targeting and behavioral-targeting respectively. There are variations of each. For example, contextual-targeting might be dependent only on the channel or VOD category while behavioral-targeting might be based on population groupings and aggregate statistics. Targeting of this type can be highly effective and is enabled by a return path providing detailed data on each and every interaction between each individual subscriber and each advertisement.

SDB presents interesting opportunities for both contextual targeting and behavioral targeting. Contextual targeting is enhanced due to the greater diversity of channels available. In fact, when bandwidth allows, it may be desirable to manage multiple versions of the same network channel but with different ads targeting different demographics. Behavioral targeting is possible whenever the subscriber count of a SDB channel is one or, possibly, a low number.

Recent studies of Internet ad awareness have shown that behavioral targeting is considerably more effective at making an impression than contextual targeting. One recent study, which tracked eye movement, measured a 50 percent greater impact with behavioral ads than contextual ads after two displays of the ad.

It is likely that many experiments will be attempted in the area of addressable advertising over the next few years. This will necessitate flexible architectures and active standards activities.

Further variations on addressable advertising include:

1) Allowing the user to launch nested sessions to obtain further information. This is called “telescoping”; it provides a direct feedback loop and is reminiscent of the browse dynamics of Internet surfing.

2) Simply tracking subscriber trick play operations can also give an indication of user interest. An example of this type of feedback is described in greater detail in the next section. Again, this is analogous to the Internet where various levels of interactivity are tracked, e.g. an impression, a click, or more engaged interaction with “rich” advertisements.

Addressability and interactivity are the key leverage points for change over the next five years. We will therefore interject an example before discussing the third and fourth axis of change: market dynamics and composition.

AN EXAMPLE

The VOD advertising architecture shown below in Figure 1 supports dynamic addressability.

The key components of the system are:

1) An Ad Execution System (AES) capable of managing sessions composed of

advertisements and on-demand content. The AES can easily modify which ads are shown in which avails and can change these associations dynamically as required by the ADS. The AES is also capable of collecting detailed session data and reporting this data to the ADS.

2) A (possibly remote) Ad Selector (ADS) which communicates with the AES through an early variation of a SCTE/DVS/WG5 draft protocol. The ADS is responsible for all ad selections and placement decisions.

The dynamics of this system can be grouped into three stages as shown in the diagram. The steps labeled A1, A2, and A3 are initialization steps which occur before sessions are launched. Content (both advertisements and entertainment content) must be loaded onto video servers' inventories and must be communicated between ad sales organizations and the delivery system. In addition the ADS must share initialization data with the AES.

Session setup steps are labeled S1 through S5. These steps very closely resemble the classic VOD session-setup steps managed by a Session Resource Manager (SRM). In this extended message flow the SRM either references pre-loaded ad bindings or communicates directly with an ADS to access a set of ads to be pre-pended to the viewer's request.

The exchange labeled P1 denotes the periodic reporting of viewer data from the AES to the ADS(s). This data includes trick-play statistics for all advertisements and can be used by the ADS(s) to intelligently select future ads.

The three principal components shown in Figure 1 closely parallel the current components seen in the field of Internet advertising. In the Internet architecture the Ad Management infrastructure communicates with a web site (as opposed to a Headend) which in turn supports a browser. The interactions labeled A1, A2, A3, and P1 directly analogous. The session setup steps, S1-S5 serve the same function in cable as content delivery on the Internet.

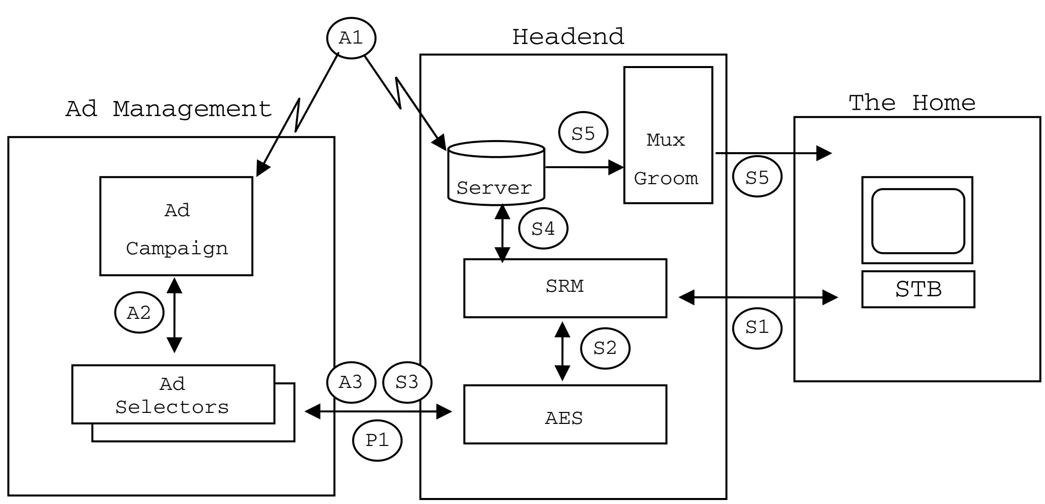

Figure 1. Adaptive VOD Advertising Example

Note that the ADS must be aware of the set of avails and advertisements available to it at all times (communication labeled A2 in the diagram). In the early implementations these sets can be static and downloaded manually into the ADS and VOD server. However as these systems become more sophisticated market dynamics will require standard APIs for coordinating the changing sets of avails and advertisements.

In this system subscribers have full trick-play control of the content including the advertisements. Thus subscribers can fast-forward through ads or rewind to watch an ad again. Each of these user actions, however, is noted and the interaction can be measured for each advertisement. As on the Internet, these interaction metrics can then be used to adjust future ad selections for the individual.

This architecture can support advertising placement ranging from basic to advanced:

1) Initial systems user bumper ads placed before or after user selected on demand content. Bumper ad selection can be entirely content-based or, with the right system capabilities, can change rapidly based on knowledge of the actual subscriber at session setup time.

2) Interstitials ads are a possible future addition to this architecture. It is not clear, however, whether interstitials will be a welcome or useful advertising tool for movie content. Interstitials will be needed, however, for other types of content such as sports events.

3) There are a variety of ideas and open questions for handling pause, resume and trick-play operations. When resuming a session subscribers can be shown the same ads or updated ads. These may be displayed at the resume point or only at the original avail points. Other policy decisions include behavior after a rewind and fast-forward: should the system show the same ads or replace the originals?

MARKET DYNAMICS

As discussed in the previous section there are many ways to organize addressability and two-way control traffic. As leverage points are established that show signs of a solid return on investment, a dynamic supply and demand scenario is likely to emerge.

Again, we can look to the Internet as an example of the kind of market dynamics that are possible with an effective feedback loop. Internet ads are measured for impact and swapped out quickly if deemed ineffective. In cable it can take weeks to swap out an ad; on the Internet it takes minutes.

Effective and near-immediate feedback on the Internet allows campaigns to be scrutinized, altered and optimized quickly, resulting in campaigns whose effectiveness increases throughout execution of the campaign.

Changes to a campaign on the Internet are often accompanied by a renegotiation of rates between the buyers and sellers of inventory. The near-immediate feedback provides concrete information on which mutually beneficial pricing can be negotiated.

Standards bodies may play a significant role in this area. Automated measuring, modifying, and the re-pricing of ads may all benefit from uniform data formats and APIs.

COMPOSITION

The advertising architecture described in the above example is designed to be flexible in terms of the selection and placement of ads. However it does not address the changing visual composition of television ads.

Digital delivery of compressed video and audio also allows the delivery of supporting data streams. As envisioned when MPEG 2 was standardized, these streams can be used to send enhancements to the standard video display.

The DVB MHP and OpenCable OCAP efforts have focused on new client mechanisms for enhanced ads. The OpenCable initiative has also defined the Enhanced TV or ETV specifications for use on existing, or "legacy", boxes.

There is still a fundamental question of whether viewers will actively engage when presented with interactive options. By comparison the Internet is based on user interaction and regarded as a "lean forward" medium. Entertainment television may require more subtle invitations to "click back".

At an architectural or system level there is little doubt that web-based display technologies based on HTML will eventually prevail. Web-based tools offer all of the interactivity and connectivity required for future content guides and service interfaces.

This is not to say the television will grow into a lean-forward or browse-based medium; instead it is likely that the Internet toolset will be used to support a new usage model – call it the "lean-back Internet".

STANDARDIZATION EFFORTS

Given the range of possibilities for building advanced advertising systems there is an industry need for a flexible architectures, data formats, and component interfaces.

The SCTE Digital Video Subcommittee (DVS) has supported standardization in the area of Digital Program Insertion (DPI) since 1998. Figure 2 is a high-level block

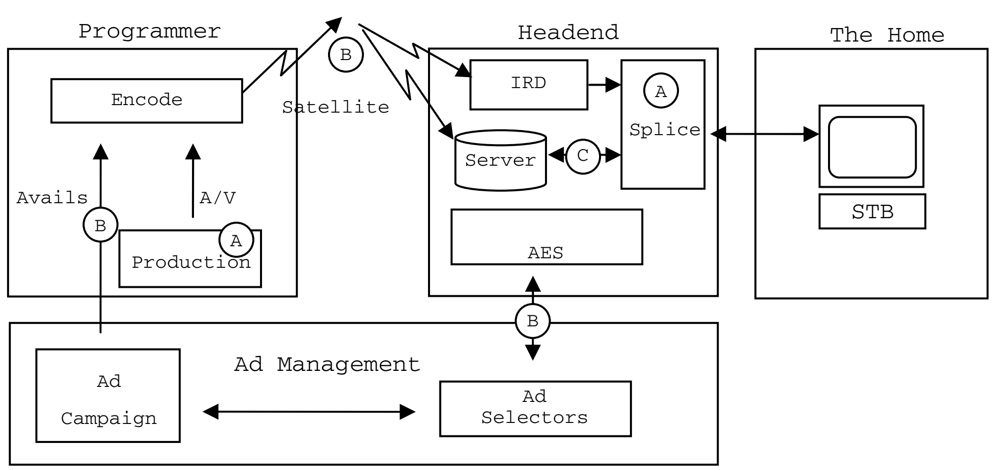

Figure 2. System Block Diagram for Standardization

diagram showing the data and control flows for advanced advertising systems.

The committee's initial work centered on the precise structure needed at the MPEG layer to insure clean splices (labeled A). This was followed closely by a standard (SCTE 35) to identify "splice points" (i.e. avail boundaries) in a network feed (B). A realization followed, however, that digital splicer vendors were emerging separately from ad server vendors; thus, a standard API between a generic video server and splicer would ensure interoperability while allowing competition among splicer vendors (C). With these standards in place, a first wave of digital ad insertion products emerged for inserting ads in digital broadcast feeds.

To accommodate the advertising directions described in this paper new work has begun in a number of key areas. These include:

1) Communication between the AES and ADS components to support dynamic ad decisions.

2) The standardization of metadata in the network feed that identifies the content (called program identification fields). This metadata can be monitored to so that ad placement can rapidly react to schedule changes. For example a sports event might run beyond its scheduled time; with program id metadata in place, additional high-priced sports ads can still be placed.

3) Standards and technologies to support client based advertising (CBA). CBA refers to architectures that rely on the STB to select and present ads that are either already resident on the STB disk or simultaneously available on other frequencies.

Future work may address data formats and APIs for managing the dynamic and automated pricing decisions as well as the ad composition changes discussed above.

CONCLUSION

Cable advertising is changing in fundamental ways. This change will be fueled by opportunities for increased revenue. It will require considerable experimentation at the system level and may benefit from continued standards efforts.

Throughout this period many lessons can be learned from the converging efforts in the field of Internet advertising. In fact it is likely that that end of this era will be marked by a technology convergence with IP and web-based technologies.