Enhancing Switched Digital Video for Support of Next-Generation Advertising through Switched Digital Programming

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Abstract

Several years into the development, and a little over a year into the deployment of Switched Digital Video (SDV) technology, is it possible that the cable industry continues to overlook much of SDV's promise? This paper considers a specific aspect of SDV where cable providers have the ability to make significant advances in delivering value to programmers and advertisers, as well as the opportunity to monetize such value. We define this aspect as Switched Digital Programming (SDP).

SDP is characterized by a focus on optimal design of switched digital video systems to deliver programming, not simply channels, in the most bandwidth efficient manner. Existing models of SDV typically consider channel popularity in determining the amount of narrowcast bandwidth that one must dedicate to delivery of the SDV channels. While reliance on channel popularity information is useful in obtaining a rough estimate of SDV sizing, to get a more accurate reading one must consider the actual programs. For example, while Network A might have a general popularity rating, averaged over the week, of six points audience share, it is clear that some programs offered by the network will have much higher audience shares while other programs will have lower audience shares. A similar phenomenon is seen with VOD programs. The relative popularity of a specific program, averaged over its entire license window, is often significantly less than the relative popularity of the same program averaged over a shorter period like the prime time viewing window or the new release window.

In order for SDV to take advantage of specific program knowledge and for SDP to be deployed, several things must happen:

Modeling of SDV narrowcast bandwidth requirements must be redone to make use of program-specific audience measurement data, perhaps from Nielsen Media Research.

SDV systems must be instrumented to generate audience measurement data from real time collection of channel change signaling.

SDV systems must be enhanced to facilitate explicit program joins and leaves, either by a human viewer or by a DVR, so that program-specific audience measurement does not incorporate artificial "channel loitering".

This paper will investigate each of these undertakings in detail and provide statistics from an actual field-trial of SDV in order to build these measurement models.

As a consequence of deploying SDP, programmers will benefit in addition to MSOs. Through the MSOs programmers can obtain accurate, "raw" audience measurement data on which to base program lineup decisions. Moreover, programmers have the potential to deliver multiple network variants, possibly targeted at different demographic profiles, rather than deliver a single "one size fits all" network that tries to satisfy all viewers.

INTRODUCTION

With new advertising models much on the minds of cable industry strategists, it's important that strategic planning respecting use of switched digital video technology take into account the great benefits to be derived from SDV for advertising purposes.

Over the past year the case for development of new advertising models has moved to the industry's front burner amid signs of dissatisfaction from Madison Avenue over ROI performance of television advertising in comparison to advertising on the Internet. Operators recognize cable's VOD and SDV infrastructure opens new opportunities to extend the power of the TV medium to advertisers at levels of addressability and viewership assurance never seen before in TV advertising.

But to fully exploit the advertising benefits of this interactive infrastructure operators may need to go farther than they have to date to ensure the capabilities are in place that will allow addressable advertising to become a major revenue center for the future. This may add marginal costs to SDV infrastructure costs, but these will be more than offset by the contribution a robust new advertising revenue stream makes to the return on the overall investment in that SDV infrastructure.

Presently, planning surrounding implementation of addressable advertising models in video-on-demand and other digital service applications is pursued as a largely separate endeavor from the planning associated with implementation of switched digital broadcast and unicast capabilities. The latter are primarily tied either to bandwidth savings, in the case of switched broadcast, or to time-shifted delivery of broadcast programming in the case of unicast models. But full realization of the revenue-generating and operations-savings potential of SDV in both modes requires that the goals of next-generation advertising be made a vital component of SDV applications planning.

Several considerations enter into an assessment of what must be done to optimize the SDV environment for enhanced advertising, including:

Adjustments in SDV architecture that allow operators to move away from switching based on channel demand as measured over long time segments to a per-program switching capability based on close tracking of recent individual program performance over short time intervals;

Implementation of data-collecting capabilities to enable this SDP paradigm, which will require generation of audience measurement data from real-time collection of channel-change signaling;

Agreement on a process that facilitates system recognition of explicit program joins and leaves by both viewers and DVRs so that program-specific audience measurement does not record "channel loitering" as actual viewing;

Modeling of advertisement placement and the underlying support architecture around demographic profiles as opposed to geographic zoning.

Switched Digital Programming

SDP is a method of using switched digital video systems to deliver programming, not simply channels, in a manner that's optimized for addressable advertising. Implementing switching at this level of granularity gives operators an opportunity to maximize the placement of ads based on the profile of each individual viewer of programs with the lowest viewing levels while making sure the programming with the most appeal

to multiple viewers is always in the broadcast tier.

Existing models of SDV typically determine which programming belongs in the SDV channel cluster on the basis of measurements of network popularity over relatively long periods of times. But while reliance on channel popularity information is useful in obtaining a rough estimate of SDV sizing, to get a more accurate reading one must consider the actual programs.

For example, while Network A might have a general popularity rating, averaged over the week, of six points audience share, it is clear that some programs offered by the network will have much higher audience shares while other programs will have lower audience shares. A similar phenomenon is seen with VOD programs. The relative popularity of a specific program, averaged over its entire license window, is often significantly less than the relative popularity of the same program averaged over a shorter period like the primetime viewing window or the new-release window.

A compilation of SDV data from field experiences based on three different criteria for setting switching priorities illustrates the benefits of SDP. These measurements, as shown in Figures 1, 2 and 3, were taken across a service group consisting of 500 tuners.

Each chart reflects how an 85-channel lineup might be delivered digitally to a 500 tuner user group through a combination of broadcast and SDV multicast. In this model ten channels are allocated to broadcast, leaving the remaining 75 networks to be delivered via SDV based on viewer selections. Studies show that at peak hours the percentage of viewers tuned to SDV averages about 14 percent of the viewing population. In the charts shown here the focus is on the number of unique channels being watched via SDV through the course of the day (shown in purple with the highest peak) and the number of unique tuners that are engaged with SDV-delivered programming.

Ideally, in terms of the benefits of using individually targeted advertising, the operator will want the number of SDV programs being watched to sync precisely with the number of tuners that are viewing those programs. When that happens there is just one viewer per SDV-delivered program.

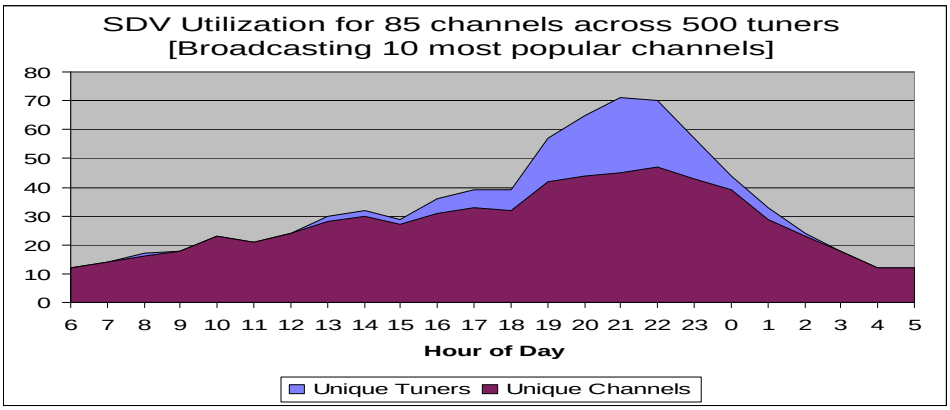

Figure 1 SDV utilization for 85 channels across 500 tuners (broadcasting 10 most popular channels)

Figure 1 assumes the choice of programming to be broadcast over the ten broadcast channels is based on network popularity as reflected in viewership over the course of the entire day. Here, as shown by the blue area of the chart, there are substantially more tuners watching SDV programming than there are programs being delivered in SDV mode, especially at peak hours but also on either side of the peak times. In other words, more than one tuner is tuned to a significant percentage of the SDV programming at these times. In Figure 1 the blue peak in the evening is tallest of the three scenarios, which reflects the fact that there are some popular programs airing in peak hours that are on otherwise less popular networks.

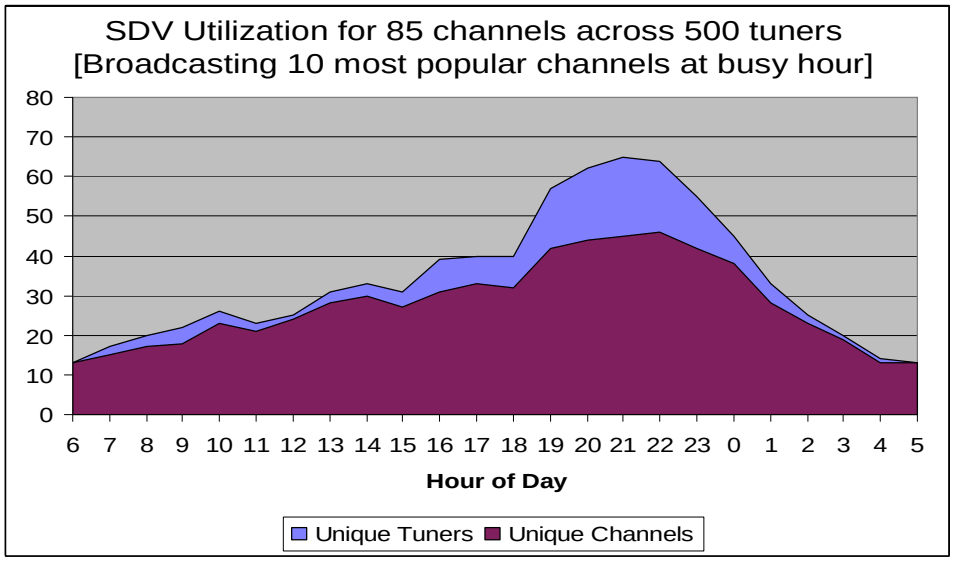

Figure 2 SDV utilization for 85 channels across 500 tuners (broadcasting 10 most popular channels at busy hour)

Figure 2 shows SDV utilization when the ten broadcast channels are chosen based on network popularity measured at the peak busy hour. This lowers the number of multiple tuners per SDV channel at peak but spreads the distribution of multiple SDV turners across the entire day. This pattern results because there are some networks that are very popular over the course of the day but don't necessarily have the most popular programs on air during peak hours.

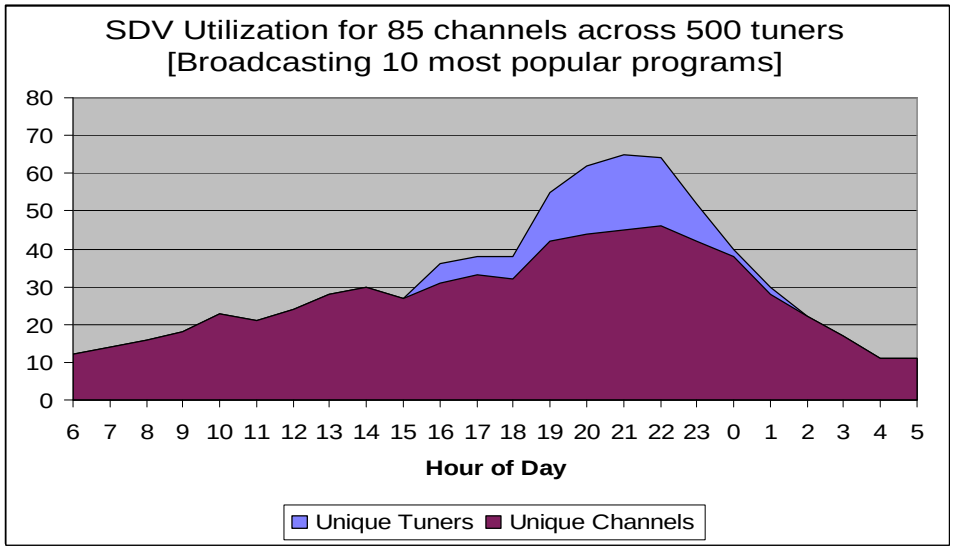

Figure 3 SDV utilization for 85 channels across 500 tuners (broadcasting 10 most popular programs)

Figure 3 shows SDV utilization when the ten most popular programs are broadcast based on program popularity measured at each hour of the day. This results in the most effective use of SDV for advertising purposes.

If the SDV system is agile, always moving the most popular programs at any given time to the broadcast QAM and switching the rest, the blue area is mitigated at peak and throughout the day. This increases the percentage of time that just one viewer is watching each SDV-delivered program. Thus, while SDV multicast is being used in this example, the operator is maximizing the amount of programming that is effectively being delivered as if it were unicast.

SDP and Advertising

As demonstrated by Figure 3, SDP ensures that there's a big chunk of the day where each tuner is on a unique program, which means those unique programs are available for ad insertions based on demographic profiles that provide a more granular focus for advertising than is the case with geographic- or zone-based ad insertion. Niche programming is thus optimized for setting higher CPM (cost per thousand) avails on either side of the two
or three busy hours than would be the case in the other scenarios.

The concept of demographic profile-based advertising can be an important driver behind operators' planning for use of SDV, especially if SDP capabilities are factored in to maximize the addressable advertising opportunities. One illustration of the benefits of using SDV to support an advertising model based on demographic profiling can be found in a large metro interconnect scenario where, today, the niche programming lineup is determined on a zoned geographic basis.

Consider, for example, a hypothetical metro interconnect where there may be 80 zones, each of which is served by 100 niche channels matched to the zone profile. In this scenario, to support addressable advertising just on a zone basis in effect requires the interconnect to be equipped to insert ads individually on what amounts to the equivalent of 8,000 channels.

The use of SDV technology in conjunction with demographically determined ad insertion greatly reduces the insertion scale requirements while creating a much better means of matching ads to viewers, thereby raising the CPM value of such advertising. For example, assume there are eight defined demographic profiles for advertising purposes and that, on average, each of the 80 niche channels (or programs in the case of SDP) on view at any given time might need to be transmitted in four streams to accommodate the demographic profiles of viewers tuned to that programming across the entire interconnect region. (Some programming might have just one demographic viewing profile, while others might have more than four, but this can be assumed to be the average.)

In this case, the number of channels the insertion system must be able to serve goes down drastically. With four channels required per niche channel, the interconnect needs to be able to insert ads into just 400 channels to cover the entire region. Thus, a far more advantageous degree of addressability is achieved in a far more manageable insertion environment.

Improving Accuracy of Viewing Data

Introducing the idea of SDP has important implications for how program viewing is monitored and for the collection of data that can be extremely useful not only to managing bandwidth and determining viewer profiles, but also to fulfilling advertisers' needs for accurate information about ad viewership. To ensure SDP insertion is responsive to the fast-paced changes in audience viewing preferences, the system requires a very agile feedback loop that regularly delivers audience information across all channels.

Currently available data collection and management systems provide operators the means to gather and categorize such information into useful components for operations, ad insertion and advertiser performance analysis applications. But it's essential that the monitoring be applied across broadcast as well as narrowcast QAMs to create the full picture of program performance and ad viewing that a SDP system requires.

Moreover, from an operational perspective, generating reports that look at SDV and broadcast holistically is essential to capacity planning, knowing what switch requirements are, when nodes should be split, etc. With an agile, comprehensive feedback platform, operators will be able to look at programming in 30-minute intervals, take the measure of shifts in popularity and determine which programs to move in and out of the broadcast tier.

The compilation of data for advertisers' purposes as well as for accurate measurement of true viewing patterns on a per-program basis will require that DVR tuners be monitored with an understanding of which recorded programs are actually watched and whether ads are skipped. Existing data management systems allow operators to collect such information and verify the amount of time spent watching recorded programming and the ads.

Supporting SDP also requires a valid measure of when a TV tuned to programming is actually being watched. Such information would also contribute

greatly to the advertiser's understanding of program and ad performance. But obtaining this information would require implementation of a mechanism that would require consumers to proactively signal when they are joining or leaving a program.

For example, the user interface could be programmed to put a message on screen after each program asking the viewer to indicate whether the next selected program is going to be watched. If the answer is no or there is no response, the system could switch the screen to a barker channel until the viewer signals a program request.

Does the need for accurate viewing information merit implementing a "lean-forward" requirement that is intrusive to traditional viewing behavior? One can argue that the time has come to recognize the potential of advertising as a major contributor to revenue growth going forward. As competition intensifies downward pressure on subscription prices and as addressable advertising provides cable operators a way to offer much greater value to advertisers, there is reason to expect the balance between ad and subscription revenues will shift toward a greater share on the advertising side.

For example, operators are already considering the possibility that by giving viewers the option to view advertising as an alternative to paying full price for premium on-demand programming they could expand the audience for such programming and thereby derive higher revenues through the CPM rates charged for the ads. The opt-in potential of advertising-support strategies could be applied to the SDP model as well, where consumers who express a willingness to signal their viewing intentions would be given a discount on their subscription price. The percentage of viewers willing to do this would likely be large enough to comprise a valid statistical base for advertisers to use in judging ad performance on a per-program basis.

All of these contributions to an enhanced data-collecting capability for purposes of supporting SDP will provide operators the ability to deliver the improved advertising performance analysis advertisers are looking for. Exploiting these capabilities will require coordination of efforts between technology and advertising departments and a high-level strategic commitment to the potential of next-generation advertising in cable.

Cable operators will need to proactively pursue the support of audience measurement entities such as Nielsen to ensure the records are compiled in a consistent manner endorsed by the advertising industry. Programmers will have to be persuaded that the pain of delivering the "truth" about ad performance, which is to say, valid performance data that accounts for ad skipping and channel loitering, is well worth the benefits to be gained from providing advertisers the ROI they are looking for. Fortunately, this may not be too hard a sell at a moment when the risks to not delivering more accurate performance data are already apparent in the growing share of ad dollars going to the Internet.

The Advertising-Optimized SDP Architecture

All the functionalities of an advertising-optimized SDP infrastructure are available for implementation by cable operators, should they decide to make advertising revenue acceleration a core driver to SDV and data management planning.

The essential requirements are: traditional silos be eliminated through coordinated management of broadcast and narrowcast QAMs; VOD and SDV resources must be managed from a single platform, and advertising and applications policy

management must be applied across all applications.

A unified session resource management system ties all this together. It is responsive to command flows from both the VOD client on the set-top and the program selection process within the electronic programming guide. When the subscriber requests a program, whether from the VOD or the SDV side, the system identifies the specific server or switch interface, instigates the subscriber join controls for SDV multicast, registers the bandwidth requirements for a VOD or SDV session and identifies the path through the access network for delivery to the set-top box.

In instances where core and edge QAMs serve to modulate bit streams onto RF frequencies that have been allocated to a specific server group, the unified bandwidth management system selects the appropriate QAM module for content delivery. And, by tracking bandwidth utilization across the QAM and server arrays, it performs the load balancing essential to preventing bandwidth bottlenecks in the distribution system.

Moreover the unified platform provides the resource management control mechanisms that are essential to executing interactive applications requiring transmission of specialized data content to a particular set-top. For example, in an advertising application where a viewer is requesting transmission of a long-form version of an ad, the SRM sets the bandwidth requirements and duration for the session by coordinating bandwidth allocations through the policy server and appropriate edge QAM to allow the expanded ad to be transmitted to the viewer.

By eliminating the platform silos between advertising, SDV and on-demand content, the unified platform also allows operators to stream content and advertising to any device - mobile, IPTV, PC or television - from a single server. With the switching architecture in place to support SDP, this device-specific, user-specific capability puts operators on course to meet market requirements as they unfold for years to come.

Summary

The importance of SDV to advertising can't be overstated at this moment of turmoil in the TV advertising domain. Advertisers are looking for ways to overcome the low returns on TV advertising as audiences fragment around niche programming, avoid advertising through use of DVR technology and spend ever more time away from the TV and on the Web. Advertisers not only seek greater efficiency in reaching desired audience segments; they want better information concerning the performance of their
ads.

Cable operators can greatly expand the value of SDV for advertising purposes by developing a Switched Digital Programming capability that ties in with a full accounting of viewer behavior across broadcast, SDV, VOD and DVR segments. Demographic profiling can be used rather than simple zone segmentation to allow advertisers to reach the people they want to reach within each program.

Highly accurate accounting of individual programming and ad viewership enabled by a comprehensive data-collection and management system allows operators to provide advertisers an unprecedented level of assurance as to the return on their ad dollars. The network and back-office components are available to support the new advertising paradigm. Operators who make advertising requirements a key consideration in their use of SDV and on-demand infrastructure will be well positioned to make advertising an ever larger contributor to their revenue stream.