

STORAGE: THE FUTURE OF CABLE

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Abstract

By definition, all new technologies redefine what can be done in a given medium. Faster processors enable increasingly complex and sophisticated computing activities to take place, at lower and lower cost. Improvements in video/graphics technology enable more colors and greater clarity. Certain key technologies, however, do more than support evolution. They change everything.

This paper will look at the present and projected impact of one such revolutionary technology – storage – on the cable industry. It will examine how storage enables new capabilities beyond DVR. It will posit ways in which the storage-based paradigm can offer operators opportunities to generate new revenues, dramatically enhance consumer relationships, create new leverage with broadcasters and content providers, ensure content and subscriber security and benefit from new advertising models.

EVOLUTION AND REVOLUTION: ADVANCES IN CABLE TECHNOLOGY

Without question, the cable industry is undergoing tremendous change. We've advanced from a few channels to hundreds of channels. Content is becoming increasingly specialized (e.g., sports channels, movie channels, home improvement/decorating channels, etc.).

Image and sound quality continue to improve as transmissions migrate from analog to digital to HDTV. The speed of broadband traffic is also on the rise, as we move from dialup to high-speed cable – to virtually unlimited bandwidth for a variety of data- and video-oriented cable

applications. These advances are evolutionary, as they continue to build on existing technologies and trends.

Other advances are more revolutionary. For example, Video-on-Demand (VOD) and Digital Video Recording (DVR) technologies give consumers unprecedented control over television viewing. Instead of watching TV shows at scheduled times, people can watch whatever they want, whenever they want, with the power to start, stop, pause, rewind and fast forward the action.

Similarly, one must recognize the current trend toward increasingly customized content. Correlative systems can make individualized recommendations based on consumer viewing patterns. For example, if someone records every episode of Survivor, the system might recommend other, similar shows that the viewer might enjoy, enabling consumers to receive specialized programming based on their specific interests, likes and dislikes. These advances are more than mere improvements on what people already know and expect. They completely transform how people think of TV – and they are possible because of revolutionary changes in storage.

STORAGE CHANGES EVERYTHING

The ground-breaking effect of storage technology on consumer capabilities is not new. The computer industry saw a similar shift in what people could – and would expect to – do with computers as storage technology became less expensive and able to fit on a smaller footprint. The industry evolved from mainframe computers that took up entire rooms to “dumb client” environments in which multiple terminals

could tap into individual mainframes. The first PCs were limited by the amount of data that could fit on a floppy drive. When storage technology enabled PCs to incorporate hard drives, however, the capabilities of PCs increased dramatically – as did people’s interest in and need for computers.

First, the hard drive enabled increased personalization of the software environment and the ability to save vast amounts of content. Then, when these storage-empowered computers were connected in a distributed network paradigm via the Internet, people could do even more. Email, the ability to get content and information via Internet downloads, and the ability to buffer content downloaded from the Internet for a more seamless “streaming” experience became the norm.

The effect of storage on the cable environment is quite similar. Storage in the network enables video-on-demand services, including Movies on-demand, Kids programming on-demand, Subscription on-demand (e.g., Starz/Encore on-demand, HBO on-demand, etc.) and Free on-demand (e.g., HGTV on-demand, DIY on-demand, etc.). Currently available to an estimated 16.5 million U.S. homes¹, these types of services give cable subscribers the ability to access specific programs without regard to a pre-defined programming schedule.

Storage in the set-top, of course, enables DVR services, through which viewers can watch what they want, when they want and create personalized libraries of preferred content. Likewise, DVR services enable viewers to control live TV, just as if it were on a DVD recording.

Now widely deployed throughout North America, DVR has proved to be a dramatic success. Consumers love DVR. Research shows that 75% of cable DVR subscribers rate DVR very highly and are willing to pay

monthly fees for the service which are typically \$9.95 monthly in most cable systems.² More significantly, it appears that the people who are embracing DVR services are not those who fit the “early adopter” profile.³ DVR appeals to virtually everyone who tries it.

BEYOND DVR: HOW STORAGE WILL TRANSFORM CABLE NEXT

Beyond the DVR technology readily available today, storage in the set-top opens the door to even more services and capabilities.

DVR Throughout the Home

Consumers are also making it clear that once they have DVR service on one TV, they want it throughout their home. With that in mind, operators will be able to benefit from services that enable consumers to save content on one set-top, then share that content with multiple televisions in the home. This is similar to the trend we have witnessed in multi-PC homes with home networking in a client-server like architecture to share data. In this case, the DVR essentially turns into a home entertainment server.

While content sharing brings up security issues, a viable system (such as Scientific-Atlanta’s Explorer 8000 Multi-Room DVR system), should store only one copy of any given program recording and use existing wiring in the home. The result simplifies installation and ensures that content can’t be shared between subscribers within a given cable service area.

“Cable Anywhere”

Just as storage in the PC evolved to include CD and DVD recording capabilities, we can expect similar developments in the cable environment to make it possible for people to take the cable programming they

love with them wherever they go. This “Cable Anywhere” concept can create a new distribution model for cable operators. Again, security would need to be ensured so that DVD copies of programming could not be re-copied or distributed. With secure DVD recording capability built into the DVR set-top, however, consumers can be offered the opportunity to own a DVD recording of any program for, say, \$9.99. Likewise, it enables operators to expand the VOD paradigm by following any VOD stream with the opportunity to own the program for only, a small surcharge.

The Personalized TV Environment

Customized Look/Feel. Advanced storage in the set-top enables subscribers to personalize their TV environment for a simplified, highly relevant entertainment experience. Users will be able to build a unified, individual interface, based on subscriber preferences for channels and content, as well as overall look and feel of interactive/information screens. Simply put, users gain the ability to group the functions they want within the interface where those functions are most convenient, much like a programmable remote controls do today for linking disparate audio/visual components together.

Personalized Programming and Targeted Advertising. Advanced content search capabilities would allow a set-top to automatically find programming based on a given genre, actor, director, subject, etc. Such a system would use individual subscriber recording habits and/or information voluntarily given by the subscriber to deliver more relevant programming recommendations than those available on systems today. Similarly, the system could use viewership and other subscriber information to create individual advertising profiles, in which advertising is targeted directly at subscribers who are

likely to want information about a given product or offering.

The Complete Entertainment Experience. A hard drive in the set-top can enable storage of all kinds of content, in addition to cable video programming. Subscribers could “lease” a section of the hard drive to store home videos, family photos, MP3s and games that could be played against other people in the home – or other subscribers in the cable system. Ultimately, the set-top hard drive could house all this, as well as other downloadable applications and programs that have yet to be imagined. In this way, the cable operator enables the family room TV – or every TV – to become a complete, integrated entertainment center for the household.

All of these features and capabilities would be able to be customized, configured and updated remotely by the subscriber.

THE NEW STORAGE PARADIGM CAN HELP OPERATORS

Generate New Revenues from New Services

Clearly, operators can take advantage of new revenues generated by these storage-based services and capabilities. DVR throughout the home is a prime candidate to be a fee-based service. “Cable Anywhere” services fit a per-program model, similar to the iTunes, Rhapsody and Music Match services for MP3 music downloads over the Internet.

Enhance Relationships with Consumers

In the storage-based cable environment, the cable service becomes far more than a pipe for programming. If you are a cable operator, you become the must-have source for trusted, relevant recommendations, as well as all kinds of video entertainment. Moreover, you become the reason why consumers prefer to receive all their

entertainment – including home videos, photos, music, etc. – on the TV. In short: the relationship between the operator and consumer goes from an impersonal consumer-vendor model to a more personalized relationship of greater depth and much greater value.

Create New Leverage with Broadcasters and Content Providers

In the storage-based paradigm, even more than today, it is reasonable to assume that people watch programs more than they watch specific channels. When there is a large, personalized library of programs from which to choose at any given time, the value of a broadcaster or content provider's time slot to the consumer and/or advertiser is diminished. At the same time, the cable operator's value to broadcasters and content providers as the direct connection to the consumer – and that consumer's preferences – goes up. As a result, operators may be able to leverage that consumer relationship and key information about how consumers interact with different programming to drive more favorable relationships with broadcasters and other content providers.

Ensure Content and Subscriber Security

As previously mentioned, services that involve distributed content (i.e., cable programming that can be accessed from multiple set-tops in the home or the "Cable Anywhere" concept), raise security issues. Indeed, such services essentially dictate that the cable operator become a major factor in the protection of content and subscriber information. Therefore, it will be essential that operators employ systems that protect this information. Systems that deliver content sharing in the home must also protect content from being shared between households on the cable network. Set-tops with a built-in DVD recorder must ensure that content is paid for and cannot be re-copied or re-distributed. Engines that gather

information about subscriber viewership must be designed to protect subscriber identity while providing useful information. Take Advantage of New/Different Kinds of Advertising

Clearly, there are good reasons for the advertising community to be opposed to technologies that enable consumers to bypass commercials. At the same time, when people can control their programming, they expect to control it completely. The ability to skip or fast-forward through traditional commercials is hardly the death of advertising. Programmers, broadcasters and cable operators have the opportunity to sell program sponsorship, badging and banner opportunities to advertisers. The industry can expect to see an increase in more sophisticated product placement within programming. Research shows that DVR users exercised the instant replay feature during the Superbowl to replay ads more than plays in the game. With that in mind, advertisers may choose to invest in more creative and engaging ads to be shown during a variety of events and shows.

Perhaps the most significant opportunity for cable operators to have new, more lucrative relationships with advertisers stems from the fact that storage-based capabilities and services give the operator the ability to narrowly and directly target specific subscribers. As such, cable operators can provide opportunities for advertisements that also function as programming (e.g., the BMW ads by famous directors, featuring famous actors). After all, when time-slots are no longer an issue, the length of a show is irrelevant. Will people actively *choose* to watch a three minute ad with adrenaline-pumping action and/or emotion-tearing story-lines? Will people get hooked on ads that tell a serialized story over time? Will people want to watch performances of their favorite actors or learn more about a product for which they've expressed interest? Don't be surprised if the answer is yes.

STORAGE PROVIDES THE OPPORTUNITY

It is important to remember one of the key lessons taught by the computer industry: For the most part, the companies who rapidly and eagerly embraced the complete combination of local storage and distributed connectivity have survived and thrived. Those who ignored these opportunities have not.

It is easy to see that the trend toward storage in a distributed environment is inevitable for cable. Likewise, this trend indicates there are many opportunities for cable operators who embrace the storage-based paradigm. New services and advertising models can generate new revenues. Equally important, however, is the opportunity presented by the deeper relationship between the operator and the subscriber.

It has already been shown that DVR in its most basic form is very “sticky.” Once subscribers have the service, they do not want to give it up. Increase the amount of relevant content that the subscriber can watch, the degree to which different capabilities are integrated into the cable service, and the degree to which people become accustomed to getting “what they want/ when they want/where they want/the way they want it” and the service becomes even more deeply ingrained into the subscriber’s life.

ENDNOTES

¹Kagan World Media, a PRIMEDIA Company, *Broadband Financial Databook 2003*, as cited in National Cable & Telecommunications Association 2003 Year End Industry Overview.

²Leichtman Research Group, *Study of 900 Explorer 8000 households*, November 2003.

³*Business Week Online*, New Analysis, “A Cable Lifeline for DVR Technology,” April 2, 2003. Also *Canada Newswire*, “DVD breakthrough underscores appetite for interactive entertainment,” April 8, 2003. “Forward-looking statements,” as defined in the Private Securities Litigation Reform Act of 1995, may be included in this paper. A variety of factors could cause Scientific-Atlanta’s actual results to differ from the anticipated results expressed in such forward-looking statements. Investors are referred to Scientific-Atlanta’s Cautionary Statements (Exhibit 99.1 to the Company’s most recent Form 10-Q), which statements are incorporated into this paper by reference.