

WHAT WILL YOU AND YOUR CHILDREN BE WATCHING IN FIVE YEARS?

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ABSTRACT

Once in a while it is important to take stock of the environment around you, to establish whether your present trajectory will take you where you will need to be to succeed in the future. This paper examines trends that will change the face of the broadcasting industry entirely over the next 5 years.

Scientific-Atlanta's participation in the rollout of digital interactive television services has provided insights into the role of broadband interactive networks, digital storage and the Internet in the evolution of a new way of watching television: Personal TV. High-speed networks with storage capacity for a vast array of television and other entertainment and information content will place the viewer in the programmer's seat, deciding the content and the timing of his entertainment experience.

Significant implications for broadcasting and advertising are examined, along with some of the technology decisions and non-technical hurdles that will need to be overcome for this initiative to succeed.

INTRODUCTION

It's a common problem even in the multi-channel age: with 130 channels there is still nothing worth watching when you want to sit in front of the TV. Over the past five to ten years it seems we have as an industry embraced the sayings "More is better," or "Never mind the quality, feel the width." Looking five years out, technology available today will completely change the face of the television entertainment experience. Viewers will become the programmers of the very near future, interacting with the transmission networks to determine what they want, when they want to watch it. This brave new world we call "Personal TV". This paper will examine the technologies enabling Personal TV, and the implications for the broadcasting and advertising industries, as well as the hurdles to be overcome and the economic decisions to be made.

WILL TELEVISION BE THE KILLER DEVICE?

Convergence has been discussed at length and the debate has often centred around the consumer device - whether the television or the computer will be the gateway for the entertainment and information to the home.

The character of the two devices is quite different. Television is a familiar consumer appliance, which has undergone remarkably little change over the years. It may be found in the living and

entertaining areas of the home, can be turned on and off quickly, enjoys very high market penetration and is undemanding of the viewer - select the channel you want to watch, sit back and enjoy.

The computer is the new kid on the block - harder to use, but providing access to a vast universe of information on demand. More typically found in a study or home office setting, the computer requires a keyboard and mouse to operate it, has a small screen and is accessed by a single family member sitting in an office chair rather than a sofa.

Big bets are being made on both sides of this debate, however based on market research conducted by Scientific-Atlanta and its customers, the television is the most accepted by the viewing public, and seen as the killer device.

TECHNOLOGY TRENDS

Digital home communications terminals (DHCTs), personal video recorders (PVRs) and the Internet are examples of technologies that will play a leading role in the viewing experience of the future.

Digital Home Communications Terminals

OpenCable standard DHCTs, such as Scientific-Atlanta's Explorer 2000[®], are enjoying enormous market acceptance one year after their introduction

in North America. Providing services like true **video on demand**, email from the sofa and e-commerce capabilities, the entertainment experience is greatly enhanced without sacrificing ease of use or waiting time.

Originally expected to achieve 20% penetration on networks equipped for two-way digital, take-up has been around double the expected rate, with more than 1.5 million units installed on over 100 systems to date¹.

Personal Video Recorders

PVRs are set-top devices that incorporate digital storage for several hours of programming. Vastly more convenient to operate than VCRs, PVRs incorporate software which allows the viewer to take control of the **timing** of his normal broadcast television viewing.

ReplayTV and TiVo are amongst the leaders in this emerging category, and the world-wide installed base is anticipated to grow from just under 1 million units in 2001 to more than 8 million in 2003².

Internet

Although never designed for television, the Internet provides a model for **content on demand**. A vast online content library can be accessed by the (skilled) user. A browser interface employing search engines and hyperlinking is used to locate and access the desired information.

DEFINING PERSONAL TV

Attributes of these three technologies help establish a working definition of Personal TV:

"Whatever you want to watch,
when you want to watch it."

Personal TV puts the viewer in control - effectively becoming the programmer in the ultimate case.

An array of potential services can be provided as Personal TV, including services already deployed, such as Video-on-Demand (VOD).

¹ Source: Scientific-Atlanta, Inc.

² Source: Cahners In-Stat Group.

Video-on-Demand

VOD provides viewer-controlled access to cached programs stored in the network (typically at the cable headend). Advanced implementations permit VCR-like control of the VOD stream, including Fast Forward, Rewind and Pause control. Today's VOD systems are primarily used for premium programs, reflecting the need to provision dedicated bandwidth for each VOD stream.

Cached Broadcast

The caching of broadcast services gives the viewer the capability to pause and replay broadcast streams, permitting access to yesterday's content. This is the principle feature of a PVR.

Network based Personal TV goes further, by caching the broadcast content in the network and utilising the VOD capabilities of the network and DHCT. This permits access to programs which were unanticipated by home recorders (whether VCRs or PVRs).

Broadcast-on-Demand

The diversity of content available on the Internet is an indication of the diversity of demand for television programming. Broadcast spectrum (or bandwidth) is a limited resource, so the variety of programming offered in any broadcast system is necessarily constrained so as to appeal to as broad an audience as it is economical to serve.

Obscure programs that may appeal to a few individual viewers should not consume broadcast bandwidth, but may be provided as a feature of a Personal TV service. Examples may be a foreign film, overseas news broadcast or a sporting event between teams that are not locally popular.

Personal Archive

The same infrastructure would support archiving and playing of home movies, bringing the convenience of Personal TV to private television images, and overcoming the problems associated with long-term storage and playback of video tape.

Content-on-Demand

Personal TV will enable viewers to choose a broader selection of content than is available with television. Packaged information services can be cached as data files and streamed out as "virtual" channels for presentation by the DHCT. An

example could be up-to-date weather forecasts for out-of-market cities of interest to travellers. The object-based coding methods employed by the MPEG-4 standard are anticipated to significantly enhance the presentation of information content.

THE CHANGING ROLE OF ADVERTISING

The sectors that will perceive the greatest change are advertising, and advertising-supported broadcasting. Already PVRs have given viewers the ability to skip over advertisements, and time-constrained viewers prefer to spend less time watching their favourite programs.

This presents the advertising industry with an opportunity every bit as great as the threat. Advertising and free-to-air TV will not disappear in the world of Personal TV.

Product placements will become more common as a means of bringing new products to the attention of the public.

Time-shifted advertisements, enabled by PVRs and Personal TV, are beneficial to the advertiser in two ways:

1. If a viewer's personal interests are known, current advertisements relevant to her can be inserted into the program during replay.
2. If a viewer has a purchase in mind, he can access all current relevant advertisements to aid his buying decision, for example a virtual "car purchase" channel could be created as a Personal TV service.

In either case the viewer will have the ability to skip any particular advertisement. Properly targeted advertising is much more likely to be viewed, however, and a viewer who has declared an interest by watching an advertising channel devoted to warm weather vacations is much more valuable to a resort operator than an unqualified viewer of broadcast TV. Ad viewing statistics can also be compiled, providing valuable feedback to agencies and clients.

In any event, there will continue to be viewers seeking entertainment in the form of "free" TV. This is demonstrated by the success of advertiser-supported "free" Internet and telephone services.

The cost of broadcast program production will still be met, primarily by advertising revenue. Personal TV viewers will have the choice of contributing directly to production costs in exchange for avoiding certain advertising (converting broadcast to a form of Pay TV for them), or participating as ad viewers for free. E-commerce technology will

reward ad viewers with micro-credits towards free TV viewing time.

New rate structures will emerge based on the increased value of qualified buyers, since the Personal TV technology will give the operator the ability to collect ratings on an ad-by-ad basis.

TECHNOLOGY DECISIONS

As there is more than one possible technical approach to providing a Personal TV service, certain technical questions will need to be decided:

Network Architecture

Whilst the performance of Silicon doubles every 18 months in accordance with Moore's Law, the growth rates for hard disk storage capacity and optical transmission are growing much faster, as shown in Figure 1. The IP world of silicon-based routers directing traffic to individual users is already under stress as attempts are made to use the Internet for providing broadcast services, a task for which it was not designed.

Silicon Routing can't keep up

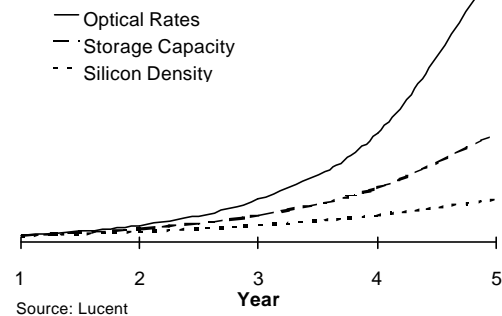


Figure 1 - Technology growth rates compared

High-speed broadband optical networks may offer an alternative or enhancement to the Internet to deliver the performance needed for Personal TV.

Storage Placement

Another choice concerns the placement of storage, which could be at the consumer's home or on the network.

If we assume that MPEG-2 television is broadcast at an average rate of 2.5 Mb/s, then an 18 GB hard disk drive can store 16 hours of programming. If 10,000 digital subscribers on a cable TV network all had 18 GB of storage in their homes, the total amounts to 180 Terabytes (TB). By comparison,

only 100 TB of headend-based storage could store the entire schedule for 500 broadcast channels for a period of 7 days, or 120 channels for a month.

It seems probable that storage will exist in both the home and the network. Viewers will have the choice of acquiring their own storage, or using storage provided by a network operator. This is analogous to the telephone users having the choice of owning an answering machine, or using the voicemail facilities of their service provider.

THE HURDLES ARE NOT ALL TECHNICAL

Potential hurdles exist which could delay or impair the success of Personal TV:

Standards

Development of standards and their adoption by a critical mass of suppliers and operators is seen as a critical step towards achieving scale economies which will make the business model successful.

Licensing

Commercial arrangements between broadcasters and network operators will have to be in place to fairly distribute the revenue streams from the caching of broadcast television.

IPR Protection

Intellectual property rights of content owners will need to be protected against the potential for misuse by individuals of conveniently accessible high quality digital servers.

Viewing Statistics

New methods for reporting viewing statistics will need to be devised and agreed upon between the broadcasting and advertising industries to reflect significant changes in the method of consumption.

Privacy

Individuals may be reluctant to share their buying plans or preferences with operators or advertisers, as is the case in the Internet world today. Privacy policies and standards of behaviour will need to be developed and demonstrated by the industry to foster the confidence of the general public.

BACK TO THE FUTURE

It is 2005, and you and your family are settling down for an evening's viewing. To resolve the inevitable disputes over what should be watched, you activate the browser on your Personal TV system.

You choose a Grand Prix racing car and set off down a virtual highway, passing MPEG-4 objects such as video stores, movie theatres, sports venues, concert halls and shopping malls, looking for something exciting.

A football match in England catches your eye, but you see the game is already in progress. Rather than come in half way through, you restart the game and fast-forward through the periods of inaction until you are watching it live.

The children decide to watch a favourite serial drama, and learn that they missed an episode. They find the missing episode in the broadcast library and watch that first.

Then it's time to head into the virtual travel agency to look for places to go for the summer holidays. Half an hour's browsing of video clips of island vacations tops up the advertising credit "tank" enough to sustain five hours of cruising the broadcast world tomorrow without the intrusion of advertising.

CONCLUSIONS

Existing technology such as broadband interactive networks, digital home communications terminals with built-in digital storage, and network based video file servers will evolve to enable a very personalised viewing experience. The timing and selection of content will be placed in the hands of the television viewer, who will have access to a vastly enhanced variety of content. Advertising will become more targeted and successful as a result of increased viewer interest in the advertisements he chooses to watch.

What you want to watch, when you want to watch it. This is not just a crazy vision – rather a glimpse of a more liveable future.

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