Strategic Appliances:

The Impact of the Digital Home on

The Communications Industries

By David Keeble

A report from the
1999 Las Vegas Consumer Electronics Show

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Strategic Appliances: Themes and Overviews

The Consumer Electronics Show in Las Vegas attracts about 100,000 people during its four-day run. There are thousands of exhibits on many acres of floor space, and scores of sessions, press conferences, and announcements. In a way, the very size of the show is its principal message – this is a big business, and trends emerge here that are important both in terms of markets and social behaviour.

The show is at once very practical and futuristic. Dealers are here looking for new product to move quickly through their stores. They are a useful counterweight to the abundant marketing hype. At the same time "product announcements" are made for devices that are a year or more away, as manufacturers try to establish a position of technical leadership, and concept developers try to attract attention to their ideas in order to license them to manufacturers. The sessions range from "Here's a potential market in ten years" to "Here's how to wire a house right now."

For a Canadian observer, the show is a useful predictor in both dimensions since devices which are consumer realities in the States are often still in our future by eighteen months or so. And since our media and communications industries are so heavily influenced – where not actually integrated – with US industry, the trends for our future are usually the trends for theirs. Economic weather systems tend to move north.

Given the variety and size of the show, themes and trends will depend to some degree on the viewpoint of the observer. That said, in the viewpoint of this observer, there were three themes at this year's show that are definitely worth noting:

- The first is the emphasis on **connectivity**. Most people here saw a potentially huge emerging market in connecting the digital information appliances that consumers are increasingly adopting.

- The second is **the emergence of digital television as a practical reality** as seen in a wide variety of products, from DTV sets and set-top boxes to hard-disk video recorders.

- The third is the **economic model for digital interactive media.** How will people use it? What will they pay for? This discussion, seen from above, is more questions than answers at this stage. Various possible futures were argued passionately in the sessions.

Changing Media Models:

THE DEDICATED RECEIVER MODEL

These three themes are actually elements in a wider vision of media.

Conceptually, 1998 may mark a watershed in our understanding of media, when we moved from a "dedicated receiver" conception of media and their uses to a "dispersed functionality" model.

In the "dedicated receiver" model, the form and uses of media are determined by the abilities of the receiver. That is, a book can be used in certain ways and not others, as can a radio, a television, or a telephone. These are familiar, easily distinguished devices, each of which performs a group of specialized communications functions.

The computer made us nervous about that model. Once the computer became used as a communications tool, we realized that the "receiver" was very flexible. In fact, the receiver was not the hardware at all - it was software. Not only could it change its abilities rapidly, new software receivers – plug-ins – could be downloaded overnight.

In our uncertainty, we began to argue about whether the PC or the TV would be the media receiver of the future. Would the consumers of the future gravitate toward a non-linear, active experience of media, received on the PC? Or would they continue with the passive reception mode that television made dominant in the last half of the twentieth century? Would the two devices converge into one?

The argument developed into a discussion of furniture. Do users want a "lean forward" (interactive) experience or a "lean-backward" (passive) experience? And when they want one of the above, how will we configure the receiver to accommodate it? If all receivers are computers to some degree, do we need to attach keyboards? Hard drives? Wireless mice? High-definition screens? On the walls or in a set?

At this show, that argument was left behind.

THE DISPERSED-FUNCTION MODEL

The current vision of the future in the forward-thinking part of the consumer electronics industry projects that the functionality of both of these dominant appliances (entertaining and informing users) will be broken down and spread through the user's environment onto a variety of stationary, mobile, and hand-held devices. Each of these will perform some subset of functions, with various compromises based on the form factor of the device, its cost, and its ability to connect.

The latter is perhaps most important, because it is assumed that all of these devices will be able to connect to each other, either on specialized localized networks or across that network

of networks, the Internet. Given that assumption, the bandwidth of the connection becomes one key to the capability of the device.

So, in this vision, a telephone does many things – it receives stock quotes and sports scores, it receives and sends email, it browses the Web, it even allows you to make a phone call. But since it has a small screen, and since it may be sharing public cellphone bandwidth, it isn't really used for video entertainment.

Or - you may own a phone that just makes phone calls, while you carry a PIM that performs the other functions, and a portable TV receiver. Or - you only have the mobile TV receiver in the back of your car where you can manage a larger screen, and so on.

In other words, you can split the media functionality we are used to now among a wide variety of devices which may be configured to handle only one function, or which may be configured to handle several. And they are all interconnected, so the flow of information and entertainment can move to you wherever you are – albeit in a thinner, less rich media stream if the appliance has lower-bandwidth connectivity.

IMPLICATIONS OF THE NEW MODEL

If this vision is achieved, will we still think of television as television, web pages as web pages, and newspapers as newspapers? Not likely. Not that these individual media will not survive – the history of media shows that very few are actually completely replaced by the "next big thing"[1] – but that the dominant form of information media will be a stream of digital objects, a scalable mix of text, data, still pictures, audio, and video. The device we are using at the moment will select the elements it is capable of receiving from this scalable stream, and interact or permit response also to the limit of its capabilities.

The huge variety of media appliances that could result to serve this fragmented but interconnected media universe would vary on their capabilities on three dimensions. They will provide:

- A rich or thin media experience delivered to the user
- Greater or lesser portability
- Greater or lesser interactive abilities from the user back to the network

The media provider, faced with uncertainty about the nature of the receiver, will have to configure the information so as to provide complete experiences at all scales. To achieve this flexibility at reasonable cost, standards will have to be established – a theme we will see throughout this discussion.

[1] But their uses change. Radio ceased to be a story-telling medium when television arrived, but continued as an information medium and a companionship medium based on music. The only media I can readily recall that were effectively replaced were the telegram and its successor the teletype, which I recently tried to describe to a disbelieving 30 year old.

Theme 1: The Networked Person in the Connected Universe

A central theme in this vision is that media functions can be spread over a wider geographical space, in order to follow users wherever they may need them.

Work-related information functions follow the user home, to the home office – a part of the digitally networked home. In the home, entertainment signals are moved from room to room, and specialized new functions are added: once again it's proposed that the computer will invade the kitchen to help in food preparation via the "kitchen pad" appliance and the smart refrigerator.

Wherever one can put a screen, it is to be connected to all sources, and perform many functions with the intelligence of the network backing it up. Its use depends on what's in front of it. An office chair, for a "lean-forward" experience? Or a couch, for a "lean-backward" experience?

In the car, information functions are provided by a variety of multimedia devices all interconnected through a standard called IDB.

And wherever there are hand-held devices, descendants of the Palm Pilot and cell phone, they also are expected to have routes to connect to the vast pool of information so that users have immediate access to their messages, however delivered, and also to other data – phone books, stock quotes, sports scores, etc.

CONNECTIVITY AT HOME:

The richest entertainment experiences will be delivered by stationary devices in the home. The manufacturers believe that people will expect to be able to watch television, listen to music and radio, and browse the Web anywhere that they place a screen or speakers, and they will expect to be able to control that experience with their voices or from a touch pad anywhere in the house.

I was positively nostalgic when several people raised the idea of the "kitchen pad", somewhat fancifully placed on the front door of a microwave oven, so that people could access recipes while watching cooking shows on television, and even order the ingredients. As I recall, cataloging recipes was supposed to be one of the main functions of the Apple II and Tandy 100. Perhaps the time has finally come for this "killer app".

Or perhaps not. But while this application may ultimately prove to be marginal, there are plenty of other drivers to encourage connectivity in the home.

The optimists reel off a long list of uses for a home network:

- connecting multiple computers to share data
- home security, for example viewing security monitors or baby monitors from any screen in the house

- sharing high-speed access to the Internet among several devices
- sharing cable connections among all the televisions in the house
- allowing people to control their home lighting, heating, security, stoves and other kitchen appliances, from a remote location over the Internet
- allowing many devices in the house, including portable email, telephones, and hand-held PIMs to access the Internet through the home "gateway"
- connecting audio/video appliances, like camcorders and digital cameras, to each other and to computers
- downloading digital music directly from the Internet to home audio appliances

Those who believe in this vision see a couple of these functions as compelling drivers; the remainder will be add-ons to an existing infrastructure. However, there are competing visions, with different notions of which functions are compelling.

- The big audio/video manufacturers see home entertainment as the driver. They are building IEEE1394 (a.k.a. Firewire, iLink) connectivity into most new digital devices so they can be easily linked together with a single wire and with signals remaining in the digital domain, thereby increasing quality.

- Companies involved in the computer industry see the sharing of computer resources, particularly high-speed Internet access, as the driver. Moving video signals around the house – a very high bandwidth application – is lower on their agenda.

The consensus is that the resulting network must be simple to use, inexpensive, trouble free, high bandwidth and basically invisible to the consumer. The special problem of wiring the home has led to a number of solutions involving “no new wires”.

Supporting Technologies

There are a variety of technologies required to support the home network. None currently meet all of the above criteria.

Some solve the “no new wires” problem by building wireless networks. Two technologies using the 2.5 GHz spectrum were Sharewave and Proxima (described in the next section). The principal problem they must overcome is the electrical “noise” in the home environment from microwave ovens and other appliances, and they use a variety of spread-spectrum and other techniques to accomplish this. The main knock against them is low bandwidth, although the vendors claim new compression techniques to dramatically increase throughput.

While most concede that there is a role for wireless in home networking, if only to connect personal devices into the Net, or to connect the car in the garage into the home net, there are still issues around standards, which the HomeRF group is trying to solve.

Others solve the “no new wires” problem by using the telephone wires already installed in the home, without disrupting telephone service. Again, bandwidth is an issue. The “standardizing” group (HomePNA) has released a spec that goes to 1 Mbps, expecting it to

rise to 11Mbps this year. Proprietary technologies like Avio claim much higher rates, but at the cost of requiring a new phone line for phone service, or installing special adapters. (see next section)

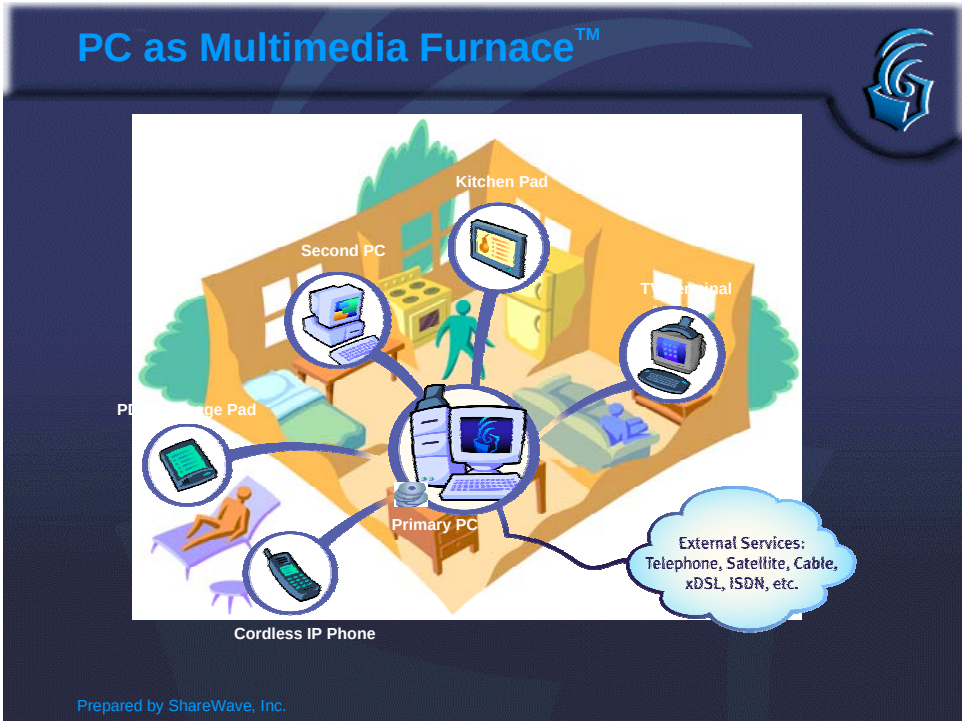
On the horizon, there is an expectation that the power cables in the house will also be used, but no solutions were being offered at the show. The pervasiveness of electrical outlets makes them an attractive alternative.

The IEEE 1394 solutions are not literally "no new wires", of course, but the A/V manufacturers see part of their appeal as being able to replace the many wires that currently connect pieces of A/V equipment. Its big advantage is that 1394 has very high bandwidth, but its use in general home networking is discounted by some who see the relatively low connection distance (about 10 feet) as a big barrier.

Nonetheless, 1394 cards for computers are being built; Eurocom has a notebook with a 1394 connector; and Samsung was connecting their AV equipment to a computer using Internet Protocols over a 1394 network at the show, albeit at very low speeds in their prototype. (see next section)

Beyond the wiring, however, there are also issues about the need for a network "hub" somewhere in the home network. The need arises even in peer-to-peer networks, to

- connect different network topologies together - 1394, wireless, and even legacy home security systems
- share access to a high-speed link outside the home, e.g. a cable modem, ADSL modem, or satellite link



IBM's home networking system has a dedicated hub in it, at a high price compared to most

vendors, but it's also possible that one or more devices on the network could do double duty as the hub - the computer, for example, or the cable set-top box. This slide, from Jim Schraith's presentation (Sharewave) shows one of their possible solutions - the PC as the gateway. How this issue is solved is important because of the concern over who owns the gateway into the home.

Barriers: The Connected Cocoon?

Why would anyone want a home network?

Anyone who has used an office LAN knows that networking can be full of problems, starting with the difficulty and expense of wiring and continuing through problems with compatibility and competition for resources that can slow down access to information or even shut down the network completely. Office networks require frequent attention from expert staff -- who would want this in their home?

Many of the entertainment uses may be "cool", but few seem likely to become essential. Most of them can be performed adequately now with a certain amount of trouble connecting wires, or through dedicated home security networks etc.

Those conference attendees who are involved in actually installing home networks are skeptical that the goal of consumer "invisibility" can be achieved anytime soon: they see an ongoing need for expert maintenance, and consequently a fairly heavy cost for these networks. This cost keeps networking out of the envisioned "consumer" category; for a time it will remain in the "home investment" category.

Driving Connectivity: The Convergence of Home, Office and Mall

That does not mean that home networking will not expand, however. The vendors who are trying to position it as a consumer item may be missing the biggest driver: the penetration of the office environment into the home.

Office work no longer ends at 5 o'clock to begin the following morning at 9. For more and more people, work continues through lunch, into the evening and over the weekends. As a consequence, many workers have computers at home -- and want to have the same facilities at home, e.g. high-speed connections to the Internet, that they have in their offices. Still others have actually moved their offices into their homes and "go to the office" by climbing a flight of stairs.

The drive for personal connectivity is also outside the home. For example, the global nature of business has increased travel. The traveling worker requires a laptop, a cell phone, and a portable organizer to make the most efficient use of their time.

And finally, the accelerating pace of business has created a demand to use every possible hour in order to move business forward rapidly. As John Chambers said in his keynote

address at the convention, "If you miss the market by one quarter, you lose 20% of the market. If you miss it by two quarters, you might as well not enter it at all."

Work is a very significant driver because we place a much higher value on work tools compared to consumer tools. One minute of cell phone usage may cost as much as a month's subscription to a cable television channel – in each case, that's what the market will bear. The penetration of computers into the home has been driven, first of all, by our need to work at home -- and by extension, the need to educate our children so they can improve their income prospects -- not by the need to organize recipes or Christmas card lists.

However, entertainment has piggy-backed on work. The construction of railroads and highways may have been driven by commercial and economic needs, but the personal traveler on vacation was quick to use the infrastructure once it was there.

And let us not forget shopping. The drive to consume is as strong as the drive to entertain ourselves. This year's Christmas retail numbers over the Web have many people excited; now they are concentrating on making Web shopping a richer more rewarding experience.

Assessment: From Hype to Skepticism to Realism

In short, home networking is currently in its "hype" phase. We can expect a following phase in which the difficulties and dilemmas associated with the technology become obvious and discount the hype.

However, as the technology problems are tackled and an early-adopter market driven by work needs develops, estimates of market size and penetration rates will become reasonable. In the long run, we can expect home network infrastructures to become common and ordinary, as more and more people acquire digital appliances and the cost of connecting them approaches the value of connecting them.

I say this because there are compelling drivers for connectivity. Work is one. Personal security is another function that carries a high price tag. People will pay for in-home security, in-car security, and such odd but compelling applications as remote video monitoring of the home or day-care center from work over the Internet, in order to ensure that one's child is well cared for.

As a consumer cost, people will share their entertainment resources throughout the house, whether that means distributing a cable or satellite connection to a variety of sets, or simply being able to listen to their multi-CD player in any room of the house.

My personal opinion is that the comprehensive home network scenario will take ten years to roll out. In the short term, there will be a demand to connect "islands" within the house. Those who buy new audio/video units will get 1394 connectivity built-in, and since it is simple to use, they will use it.

But they are less likely to connect 1394 to their computers. One of the interesting observations of the conference was that about half of all home computer users have their

computer in the same room as the television set, and are thus able to combine passive viewing with interactivity without any complex connections or all-in-one devices. Many of those who make use of the online accompaniments to TV shows from such providers as E! do so in this way. (see Sessions, “Entertainment, News, Sports and Finance”)

A more deliberate demand for the home network infrastructure will come from the multi-computer household. Some analysts see the need to share a relatively expensive high bandwidth connection into the home as the biggest driver. John Todd, of Wedbush Morgan Securities (see Sessions, “Views of the Digital Home”) saw the market for high bandwidth Internet connections -- whether cable, satellite, or XDSL -- growing at exactly the same rate as the market for home networks.

The technical limitations of current home networking technology would also lead one to the conclusion that the "computer islands" will not be readily integrated with the "audio/video islands" due to differences in bandwidth.

However, if we assume that these limitations will be overcome within ten years, so that inexpensive, easy, reliable home networking is available to the consumer, we can look forward to some substantial changes in behavior.

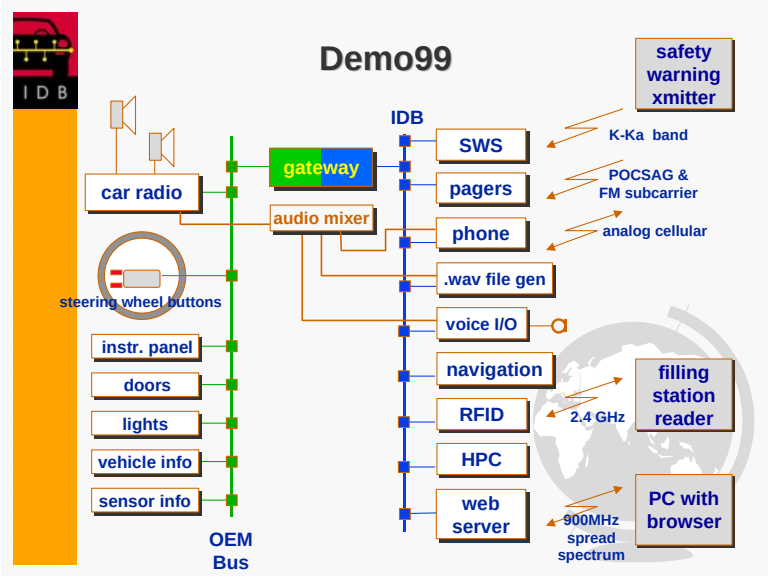
The Audiovox P-44 is a Radio, CD, and TV for the car

CONNECTIVITY IN THE CAR:

There were acres of "wonder cars" at the CES, including devices that network the various parts of an automobile.

The vision of car networks is, again, a multimedia vision, with a variety of devices providing information to a driver and passengers from sources outside the car, including email, movies to screens in the back seat, global positioning, etc.

The diagram at right, from Allan Kirson's (Motorola) presentation, shows the kinds of devices that were contemplated in the IDB demonstration at the show. It shows, on the left, various devices for the car itself, installed by the manufacturer. On the right, connected to the car network by a gateway, are a variety of third-party devices.



My particular favourite is the "filling station reader" – as the car passes a Shell station, it exchanges information with the station's computers over a wireless link. If the car needs fuel, it will advise you that there's a station nearby and you can turn in to fill up.

The Carin 440 radio / navigator gives directions audibly and on-screen.

The ".wav file generator" is there to permit the car to speak to the driver over the radio speakers, while "voice i/o" permits the driver to control the devices by speech.

Another application, not illustrated here, allows the car to communicate with your home network once it's in the garage, so that the manufacturer's maintenance program can query the car about its state over the Internet, and send you an email when servicing is required.

Supporting Technologies

The car network is somewhat opportunistic. That is, the vision of multimedia devices is built on the manufacturer's existing wiring. As more and more of the car itself becomes computerized, manufacturers are using a single wire around the car to connect these devices,

to both control them and allow them to communicate diagnostic information to the driver or mechanic. (See Section “Some Booths on the Show Floor” for a fuller description of IDB)

Barriers

The barrier is the lack of standardization in car networks. Each manufacturer has a proprietary system. The Society of Automotive Engineers (SAE) has designed a standardized data bus, IDB, which interfaces to the proprietary data busses so that devices need only to be built once to connect to any car network. Because of the lead times involved in car manufacturing, this standardization is essential to allow consumer manufacturers to respond to demand.

Assessment: Security will drive drivers; lower cost will drive manufacturers

To me, the most significant developments in consumer car electronics have to do with security and global positioning. The enhanced audio/visual toys, and even the work related tools like email, paging, and telephony, will have less initial impact in terms of consumer acceptance than the security devices.

The Carin 550 navigator has a 5“ screen, GPS, and motion-sensing technology.

The ability of the car to tell the driver where it is and how to get to where it's going will certainly add convenience and peace of mind to travel, and may even do something to improve traffic flow and the driving experience. One class of applications permits the car, in case of accident, to call the nearest police and ambulance services, and even give them the car’s position based on global positioning (GPS) data. This kind of application responds to a much more basic need than the multimedia applications, and is likely to be a stronger driver of adoption of “connectivity” devices.

The network infrastructure itself, however, will be built into more and more cars as time goes on, so eventually we may see all automotive devices with standard interfaces to connect to it. It would be fair to say that this market is driven more by makers than consumers at this point. That is, the car manufacturers are themselves creating networks to connect the various digital devices and controllers within the car in order to simplify their own engineering. Third party consumer manufacturers are working to standardize those networks so that they can easily develop audio, video, navigation and communication devices to work with that network. The concept is, "let's connect everything with one digital wire, rather than 100 special purpose analog wires."

CONNECTIVITY IN THE POCKET: THE PERSONAL NETWORK:

The industry vision includes an expansion in consumer use of portable devices moving in and outside the home. Industry analysts at the show projected that further expansion of the mobile telephony market depends on the provision of additional information services. That is,

- basic cell phone service is becoming a commodity, and margins are low
- replacement buyers will soon outnumber new cell phone buyers
- in this more demanding market, mobile telephony will have to add value through information services that build customer loyalty

Consequently, we've already seen the development of the combined information manager and cell phone, a device that maintains calendars and address books, and can receive and send pager messages and faxes. Future developments will include the ability to access Internet information services through a simple graphical user interface.

The Audiovox hand-held Global Positioning Device

This group of devices may go beyond the obvious into such notions as heart monitors that can communicate with medical services and to provide alerting in case of trouble. There will also be an abundance of smaller and more powerful "notebook computers -- and many devices that fit somewhere between the PIM and notebook, as the personal computer's functionality is dispersed across a variety of more specific hand-held devices.

One change in these devices will be the capacity to link to both home and business networks for easy uploading and downloading of information. In other words, short range wireless connectivity – in addition to the more expensive cellular connectivity – will be needed. Conversely, both home and business networks will need to acquire wireless connectivity to accommodate increasing numbers of these devices.

Barriers

The greatest barriers to the vision of connectivity are cost and form factor. Not only must the devices themselves be inexpensive, the connect time and the cost of services must also be low.

In addition, those who see web browsing as a common portable activity may be disappointed. Neither the small size of the devices nor the situations in which they are commonly needed are conducive to this media behaviour (as we currently understand it.)

Assessment: Info to Go

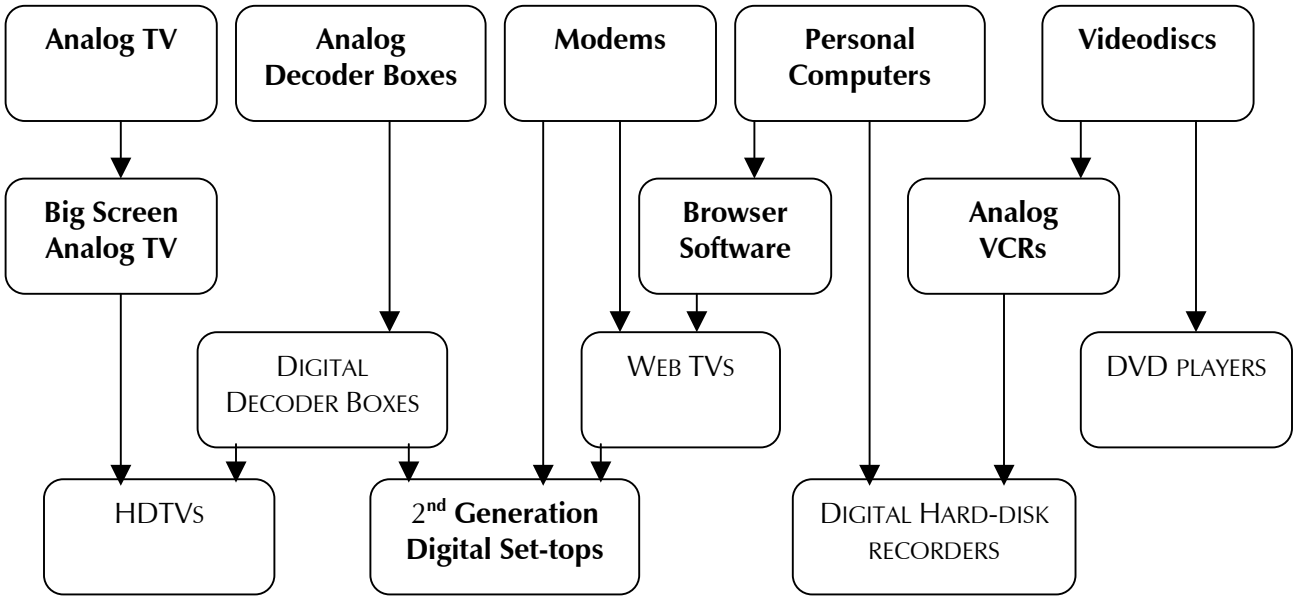
Again, work needs are probably the greatest driver for more extensive connectivity in the pocket. The explosive penetration of cell phones and hand-held personal organizers are clear indication of the need. If their functionality can be improved at low cost, they will be even more popular.

On the other hand, "web browsing" as such may not be a big driver. As we currently understand it, the Web is already too rich an experience for the form factor of hand-held devices. There are various schemes for on-the-fly "thinning" of web page content so that only the essential material is transmitted to the device, however, it is just as likely that we will see an entirely new Internet-based object developed to feed thin lines of information to these devices.

Reducing connectivity costs may come about through 3rd generation wireless, but some part of the need could be met by accessing the digital data streams of television and radio broadcasters (even RDBS on analog FM stations), which are an ideal architecture for delivering commonly-needed data such as general news, stock quotes, and sports scores. An on-demand architecture could also be devised using parts of the cell network in combination with broadcasting, in much the same way as satellite broadcasters use a telephone return line but ship data through the satellite to the PC.

Theme 2: The Reality of Digital TV

It would be inaccurate to claim that the rollout of digital TV is a clear example of the new vision of dispersed media functionality. It clearly is not, because the tools being presented to the consumer are a mix of the old "receiver-determined" model and the new. In fact, these tools show their ancestry clearly. The family tree looks like this:



HDTV sets, in their current form, are an extension of the old model of the all-in-one dedicated receiver, which presents linear entertainment superbly. They have the potential to be much more (integrating many more functions) or to break up their functions into components of decoder and display.

The set-top box is also an integrating device, combining three functionalities into one. As decoder, browser, and modem (and possibly network hub), they are being positioned to be the dominant "gateway" into the consumer's home.

The wild card in the new generation of media tools is the digital hard-disk recorder. A potentially revolutionary device, it performs the job of storing and playing back video entertainment in ways that may change our use of television profoundly - but since much of its functionality is in software, it could do much more.

Even here, the integrating strategy is at work, as both Echostar and DirecTV have announced plans to integrate a hard-disk recorder into premium satellite receivers along with browsing software.

DTV Sets: The Initial Rollout

Strategically, DTV sets were not very newsworthy at the CES. The principal development was that they are now a (rich) consumer reality, not a prototype. They are still very expensive for the most part, though Thomson announced a decoder box at a lower price. With the HD display included, however, receivers will still be in the $7,000 to $9,000 (US) range. Wallscreen displays were also available, though the only HD wallscreen (720p) is still around $25,000.

The headline is that the sets are out there with the dealers and selling, and the broadcasters are indeed getting their towers up and are transmitting. There have been a few glitches, but basically the rollout is going according to plan and the sets appear to be selling at CEMA prediction rates – it's neither a stunning success nor a washout, so far. HBO's provision of HD service via satellite is expected to drive greater acceptance this spring.

The one fly in the ointment was the surfacing of worries that the US chose the wrong transmission standard in 8VSB – that it will not reach enough consumers over-the-air conveniently. There is an element of "told you so" here, since Canadian engineers urged a closer look at OFDM (the transmission technology adopted in Europe) during the standard-setting process, and now touted as a possible answer. (see Sessions "Broadcast Television Roundtable")

In their current form, however, these are still positioned as rich linear media experiences. There is little effort going into using their digital capabilities for interactivity.

Cable Set-Tops

Just the opposite is true of cable set-top boxes. The strategic direction of the cable industry is toward the provision of more interactive services, and the new generation of set-tops is key to that direction. These boxes will contain cable modems, and browser firmware to allow the user to surf from the TV.

This is, of course, causing a stir in the interactive media community. Much work is going into the design of user interfaces, and constructing services that will work well on these boxes, so that they can be sold to the projected new generation of Web users.

The big question is the economic model. It's generally conceded that someday, Web businesses will have to make money – and the cable set-top is seen as a way to finally generate revenue in significant amounts. What the box will do to advertising and eCommerce was the subject of considerable discussion. (see sessions, "Strategies for Broadband and Narrowband Entertainment")

A confusing part of the economic model is that cable boxes are set to become retail items by July 2000 by FCC order. Cable companies will still control the conditional access part of the box, however, and will still control authorization of reception of their services. No one was quite sure whether this development will erode cable's gatekeeper position or not.

HARD-DISK VIDEO RECORDERS: THE END OF PRIME TIME?

Digital video hard-disk recorders were a surprise at the show. While they were anticipated, seeing them and their capabilities firsthand brought a sharper appreciation of the change they may bring to the average person's use of media.

Briefly, these units look like a VCR and sit on top of the box with cable or other reception methods plugged in, and an output to the TV. Because they can both record and play back video at the same time, you can do some surprising things with them.

- You can "pause" live TV on a nice clear still frame while you do something else, and resume watching where you left off. If you want to catch up to "real time", you can triple-speed forward until you're caught up.

- You can look at sports replays as often and as long as you want without losing any action, simply by telling the machine to go back fifteen seconds and play. Since it's still recording, you don't miss anything.

- You can instruct the machine to record shows from a sophisticated program guide (up to 10 hours in the current versions) or you can get it to record shows based on its assessment of your viewing patterns and preferences. You train it by using "thumbs up" and "thumbs down" buttons on the remote. When you sit down to watch TV that evening, it presents you with ten hours of recorded material to your preferences, all of which you can access instantly with no rewinding or fast-forward. (see Section, "Some Booths on the Show Floor" for more)

These devices are already at consumer price points. Plans are in place to build them into set-top boxes and satellite receivers. When you see them in action, they are instantly appealing, because of the control they bring to the television experience.

The driver here is obvious – people still want to watch television, and seek choice hoping that there will be more good shows if they have more channels. To some degree they are disappointed in the quality of what they can watch, and overwhelmed by the number of programs. This machine helps make television choices for you, providing greater control over the experience, including the commercials.

Theme 3: An Economic Model for Interactive Media

The interactive media theme found its expression in discussion and in announcements, rather than in new hardware or software on the floor of the show.

The central problem under discussion was, "what's the business case?" and, "How do we make money at this?"

Much of the discussion centred around the link with television on the one hand, and commerce on the other. That is, a convergence of linear and non-linear media seemed to promise the best results, because:

- The mass audiences of television are seen to be necessary for serious revenue of any kind
- The "buying behaviour" of television watchers is seem to be more conducive to successful eCommerce
- Advertisers are in television now
- Cable's ability to capture the gateway to viewers / consumers is seen as a key asset, forcing content providers of all kinds to come to terms with their dominant position

Perhaps the most interesting discussion centred around what would happen to the economic model for television in the new world. While last year the discussion might have ranged wider over the possibilities of interactive programming, the question, "How do you make money at it?" narrowed the range considerably.

A widespread view was that linear media such as television will also be forced to become interactive. It is not so much that viewers will demand interactivity in the programming although this may happen, but that the economic model for the support of television will be interactive advertising with an eCommerce connection. Simple linear commercials that do not give the viewer an opportunity to buy product will have low value-added.

Equally, while previously many in the interactive community would have said that the spread of high-bandwidth connections to the home was the key to the success of Web media – since high bandwidth is needed for rich media experiences – the developing realization was that high-bandwidth may change the nature of the Web by permitting some companies to gatekeep, and even keep consumers inside a "walled garden" of content.

The Implications of the New Technologies

THE PRINCIPAL MEDIA ECONOMIC MODEL WILL BE BASED INCREASINGLY ON ECOMMERCE.

The spread of the set-top box, with its built-in modem, and the hard-disk video recorder, which makes it easy to avoid commercial advertising, represent a push-pull for television that will erode the value of traditional linear commercials. In order to maintain the value of television's mass audiences to advertisers, TV will be obliged to make use of the interactive possibilities of commercials to extend its model into eCommerce.

THE DEMANDS OF ADVERTISERS FOR MORE EFFECTIVE ADVERTISING WILL BRING ECOMMERCE TO ALL MEDIA

The Web has established that the transactional model works well. Advertising that can only provide image enhancement, and not lead the consumer directly to a purchase, will be seen as having lesser value. But television is still an attractive model for eCommerce because of the perception that TV audiences are more prone to the "impulse buy" than web audiences, whose shopping tends to be more deliberate. Extensive research on the Web may lead to a purchase, but it drives margins down. The ideal buyer, from the manufacturer's point of view, is acting without knowledge of others' prices or quality.

So we will definitely see television ads that allow the consumer to proceed through an interactive process, using only the remote control, to an actual purchase.

Business will change for the carriers as well as for the program providers. Even high-speed connections to the Internet can become a commodity item, so the model will have to continue in the direction of profiting from services, while using the connection as a means to bring large numbers of consumers to the carrier's basket of services.

Both program providers and carriers must continue to try to integrate vertically by allying with one another or buying into the others' business.

THE HARD-DISK REECORDER WILL IMPACT ON THE GATEKEEPER ROLE OF MAIN NETWORKS AND CABLE, AND CHANGE ADVERTISING

Most people felt that both the temptation of set-top box interactivity and the convenience of the hard-disk recorder would result in much more commercial skipping. Some felt that interactivity in commercials would have to be time-limited to avoid overlap into the next commercial's timeslot. Other consequences suggested themselves - would the first commercial in any set sell at a premium? Would total sponsorship – one advertiser per show – be the only viable model?

Of course, if the consumer is equipped with a hard-disk recorder, real-time ceases to mean as much. The viewer could linger on a commercial, use its interactivity fully, and

never miss any program material or even the next commercial - or they could skip all the commercials entirely. In addition, extending the use of the hard disk into data as well as television, could considerably enrich the interactive experience. (See Broadcast.com paragraph in "Show Announcements".)

WHICH IN TURN WILL SPREAD ADVERTISING INTO PROGRAMMING - THE AGE OF THE INFOMERCIAL

There was a minority opinion that the average consumer enjoys commercials and would not consistently skip them. (see Sessions: "Mass eCommerce: When every TV is Online") But all agreed that commercials would have to be more appealing to the individual consumer, with greater entertainment value, and greater relevance to the consumer's interests (see below).

In response to the viewers' ability to skip separate commercial messages, some felt that advertisers would drive to embed commercials within programming, that is, expand and improve the strategy of product placement, even adding eCommerce elements to it. Click on this car and learn more about it – click on these shoes and buy them. Like this song? Click and it's yours, downloaded to your Diamond Rio MP3 player. Some people felt this was a fanciful notion – others took it very seriously.

WHO CONTROLS TIME? THE TIMEKEEPER IS THE GATEKEEPER.

This is perhaps the most complex consequence of the hard-disk recorder**. Television, quite literally, sells time – the viewer's time.** Programs are there simply to capture the viewer's attention for a period of time which can then be sold. **If viewers control their own time, this model breaks down.**

And if the hard-disk recorder can succeed in going out and recording material on its own, then its software – and not time or channel placement – creates good television shelf space. It would become the new gatekeeper to the consumer. All programming, offered anytime and on any channel, would have equal access to the consumer – unless the company controlling the database of program descriptions skewed the information to give certain programs an advantage. **Some program providers are already in alliance with the hard-disk recorder manufacturers. More will line up.**

MEDIA POWER MAY COME FROM TRADITIONAL GATEKEEPING - LIMITING ACCESS TO SERVICES, I.E. THE WALLED GARDEN OR THE WILD WEB?

The set-top box, seen without the hard-disk recorder, suggests huge power for the traditional gatekeepers, the cable companies. Many people were concerned that cable would seek to keep uninformed consumers in a walled garden of content and services, where only they or their allies could penetrate.

Others felt that a combination of consumer demand for unfettered web access, regulation and litigation to prevent cable's abuse of its power, and the arrival of set-tops at the retail level would prevent this model from developing fully.

BUT POWER WILL ALSO COME FROM USING DEVICES TO GATHER INFORMATION ABOUT CONSUMER BEHAVIOUR. WHO WILL OWN THE DATA?

Even if the walled garden cannot be created, a huge amount of economic power will accrue to the company that owns the information that these devices can supply about what the consumer is watching, and what the consumer is buying.

The set-top box can track both of these behaviours quite easily, and the TiVo hard-disk recorder, with its thumbs-up and thumbs-down buttons, can go a step farther, since for it to work effectively, it must know the user's television preferences.

This information is worth a lot of money. Advertisers, seeking to make their ads more effective, benefit enormously from knowing who is already interested in their product, what they are watching, and what they are buying. TiVo was quite clear about their intention to use this information – with the viewer's permission, in an "anonymous" way. If approached carefully – "If you let me sell this info, you won't get so many annoying ads, just the ones for products you're interested in. Oh, and did I mention the discount club?" – many people would permit the use of their information.

CONNECTIVITY: AS WE INCREASE OUR ABILITY TO GATHER INFORMATION FROM THE WORLD, IT INCREASES ITS ABILITY TO GATHER INFORMATION FROM US

Data is a two-way street.

Not only can the set-top box and the hard disk recorder tell the world what we are doing, but potentially our home network and even our car. The GPS device that tells us where we are can also tell others where we are. In some cases, we will want it to – in emergencies when we are helpless, for example.

Even the automated "maintenance alert" programs mentioned above have this possibility. Your spouse is away at a convention in Chicago and you receive this email, "Dear Pontiac Owner: your car needs an oil change. Here are the nearest service stations in the greater Miami area."

The individual privacy concern is not so much with hackers breaking into your devices to steal your information as it is with the authorized use of your information. Can a loan agreement permit credit bureaus to access all your transactional information? How far will this be pushed in both the media and transactional worlds? The more devices we have gathering information, the more information we provide about our own behaviour.

CONNECTIVITY CHANGES THE MEDIA MODEL IN ORDER TO REACH DISPERSED DEVICES

Even in the analog world, we know that the form factor of media devices affects the content provided for them, and their uses. Linear storytelling has gravitated toward the richest media experiences – the television set and the movie theatre, which are large stationary devices.

Information and companionship media functions have gravitated toward the small portable devices, radio and print.

CONNECTIVITY WILL DRIVE INFORMATION TOWARD A THINNER, MORE SCALABLE EXPERIENCE

In a world of dispersed and various devices, the media model for information will have to be scalable. That is, the digital media information stream of an information provider will have to be able to cope with small 3x16 character LCD screens, small graphic screens, colour 720 line 16x9 car screens, and full-sized HD sets. They will have to cope with thin cell connections, home networks with various bandwidth rates, and high-speed modems.

This argues not only a new technical infrastructure to the information stream, but a new approach to content, unlike the linear television style or even the hyperlinked Web style. The closest analogy may be the old pyramid style of newspaper writing, in which the story was written with the most important information first, and information of declining importance in succeeding paragraphs, so that the editor could adjust the size of the story by lopping more off the bottom.

HD WILL DRIVE STORYTELLING TOWARD A RICHER EXPERIENCE

At the other end, history would seem to teach that we will go for the richest experience we can afford, given a minimum convenience factor, for entertainment programming – high-definition. This also will have consequences for the content. That is, certain kinds of content that do not work well on television now will work better on high-definition.

WILL DIGITAL TELEVISION BE HIGH-DEF OR HIGH-DATA?

This is a common question, but probably the wrong one, since it does not appear that either will dominate, and to some extent the two will mix. High-data, that is, a highly interactive media experience, is compelling for information-seeking activity; but high-def will be more compelling for storytelling.

It does seem likely, based on current trends, that the dominance of passive media activity in this century will be eroded by a new generation that has grown up with web-surfing. Hours spent watching TV and listening to radio will be transferred to more interactive activity. But high def, and the convenience of the hard-disk recorder, could also give new life to the passive media experience, so the erosion may not be as severe as some would predict.

Connectivity will also have its impact in extending some trends. More screens in the house, connected to a large supply of television and to the Web over the home network would lead to:

- More fragmentation of audience
- Diminishing audience sizes as more services become available and as interactive media activity takes more time away from passive viewing
- The "family viewing unit" will have disappeared except for certain special events

DISPERSED MEDIA FUNCTIONALITY WILL CHANGE TV INFORMATION PROGRAMMING

While television will not lose its dominance in storytelling, it may change its nature in information programming.

As screens multiply in the house, with access to both passive entertainment and active information media, and

As other mobile devices become able to access information, television may have to move away from the linear, rich-experience mode, and become

- More interactive, allowing viewers at any screen to dig deeper on a story, as they would on a web news site
- More scalable, so that viewers on different devices can get at least the basics of the story through data, or data and sound

The real significance of home connectivity may be the spread of high-speed continuous access to the Internet. It is not so much that the Internet will carry video -- although we can expect Internet-delivered content to be a richer media experience, converging with a more interactive television experience. It is more that the Internet's information resources will become usable from small and large appliances throughout the home.

DISPERSED MEDIA FUNCTIONALITY WILL ALSO CHANGE RADIO, ESPECIALLY TO MOBILE AUDIENCES

Radio will not lose its primary roles as a provider of companionship, community connection, and music, but it too may change as an information provider. The primary change will be the migration of survival information – traffic, weather etc. – to data services.

Radio is also the owner of an ideal transmission medium for this kind of data service, since it's both inexpensive and mobile. In the US, data services over RDBS with analog FM will grow. In Canada, digital radio will be the focus.

THE CONSUMER / WORKER / CITIZEN PERSPECTIVE: ADOPTION OR BACKLASH?

As described in the previous section, there are many concerns that are likely to drive adoption of these new technologies, with the consequences discussed above.

- Security, personal, home, and in the car
- The need for access to work-related information, anyplace, anytime
- More convenient media experiences
- Richer media experiences

At the same time, we can expect some backlash. Many people will not be happy about the amount of information they are surrendering, or the continued erosion of personal and family time as a result of work's invasion of personal and family spaces.

It is useful to remember that even in Canada's fairly saturated market for television distribution, approximately one in five television households - 20% - do not subscribe to cable or DTH services. The "unwired universe" will accompany the "connected" universe into the new age – we will not move in lock step toward universal connectivity.

Some Booths on the Show Floor

The IEEE 1394 Pavilion

1394 (a.k.a. Firewire , i.Link - Sony prefers i.Link to 1394 as more friendly. Apparently, they prefer to avoid the term "fire" in connection with consumer hardware.) is used to connect audio, video and control products with a single digital cable, eliminating wires and clutter, and permitting signals to move in the digital domain for better quality. While an accepted standard, there are still important elements, such as copy protection methods, that are not agreed and inhibit adoption.

This booth promoted the technology rather than any manufacturer's particular implementation. It is a standard - i.e. anyone's 1394 device should connect to anyone else's. It should be possible to use one easy-to-understand graphical controller for all devices linked together. "Hot plug and play", i.e. connecting any device at any time, is possible. Devices can connect in any order. All devices are automatically recognized by other devices.

Physically, the cables are thinner than co-ax and slightly thicker than normal audio connections. 1394 could be used as the basis of a generic or general home network but so far no one is implementing it that way, though 1394 cards for computers to exist. The problem here is that the cables can be no more than 10 feet long to sustain the high throughput needed for digital TV, etc. However, major set-top manufacturers, Sony, Panasonic, etc. are building in the Cisco Networks BIOS and a variety of different buses in the set-top box including USB to support general connectivity. It is possible to support Internet protocols over a 1394-based network, but so far the OpenCable initiative has not specified how this can be or should be done. (Samsung had an implementation of IP on their 1394 net.)

A 1394 network is supposed to be no-maintenance but some booth observers with home network installation experience were skeptical that it could be taken out of the audio/visual domain without difficulty. Most people see different network topologies - some wireless - inside the home so we may end up with clusters -- an entertainment cluster, computing cluster, portable device cluster and intelligent appliance cluster -- all linked together via a hub of some kind that interfaces the different network infrastructures.

TiVo (Digital Video Hard-disk Recorder)

TiVo was one of two digital video hard-disk recorders being demonstrated at the show. It's like a VCR in some respects - it will record up to 10 hours, replay the material, fast forward, and play at three different speeds.

It's much better than a VCR however.

It will record and play at the same time, so it can be used to "pause" a live broadcast while you do something else, or replay a highlight from a sports show, and allow you to return to

the show where you left off. A display on the set shows how much has been recorded, and where you are in the playback. When you want to catch up to real-time, you can play at fast speed or jump directly to the real-time position.

In addition to a program guide, which allows you to select programs for future recording, TiVo features a unique feature. "Thumbs Up" and Thumbs down" buttons on the remote control allow you to tell the box whether you like what you're watching and how much you like it. Using enhanced program guide information about the show, the box stores your preferences and will automatically record programs that match them. When you sit down to the TV set, it has stored ten hours of movies or shows that it reckons you will like.

You can look at the start of each program and either view it, save it, or dump it to make space for more. And of course you can record it out to your tape VCR if you wish.

Certain program providers (HBO, CNN) have special relationships with TiVo and provide extra information and promotional material about their shows for the box to display. This info, along with the program guide, is downloaded on the phone line to the box once a day. At the same time, the TiVo can query the box about your viewing preferences. Your personal information stays in your home, but if you give them permission they will anonymously use the information and sell it to other commercial operations.

The box (available April 1999) is priced "under $500 US" plus $10 / month service charges for the program guide data. The first model will record 10 hours, but hard drives can be added and they are shooting for a 40-hour box. Philips and DirecTV will be marketing the unit.

The demo model was taking analog signals and re-encoding them as MPEG at an unknown bit rate. There were few visible artifacts.

The IDB pavilion

A pavilion, sponsored by the SAE (Society of Automotive Engineers), showcased the work of several manufacturers using the IDB bus, a standardized interface to car electronics. It allows third-party manufacturers to create devices to be fitted into many cars.

IDB stands for ITS (Intelligent Transport Systems) Data Bus. Car manufacturers have created digital networks to connect all the devices in their cars -- but these are proprietary. IDB establishes a kind of API so that developers of other devices and applications can connect in a standardized way to any car manufacturer's internal data bus. The association also does verification of devices and software for the bus.

Various devices that could be connected to IDB were on display in a car, including a Web server made by Celltronics. It can connect through various devices (cell modem, wireless modem, satellite modems) to take information from the Internet or your home network and bring it into the vehicle.

An automotive warranty program could then communicate directly to your car through the

Internet and your home network to bring back diagnostic information and advise the owner when maintenance is needed. Mercedes has announced a program like this.

Other applications include

- the robotic fueler that Shell is working on. Shell stations might in fact have a 2.4 GHz wireless network so that as your car drives by the station it acquires information from the car and advises you that you need to fill up.
- GPS
- voice input and output, which plays WAV files through your radio speakers, for example to give you directions
- pagers (either in-car or mobile pagers that you plug into a standardized connection)
- cell phones
- traffic data receivers from local sources, from satellite and
- SWS (a radar detector)
- the multimedia display

The big three auto manufacturers have supported this initiative, GM being the most aggressive. They expect it will be appearing in cars in three years since the IDB has not been firmly established yet.

In the meantime, some manufacturers like Celltronics have developed applications that communicate directly through the gateway into the manufacturers bus, until such time as IDB is developed and deployed. The standardization process will speed up the delivery of product since, as it stands now, manufacturers of third party devices must be working on them well ahead of time in order to meet individual car manufacturer's specifications. Writing to a standardized API will considerably speed the development process.

The demonstration car was not equipped with an RDS radio. However, Matt Little of GM tells me that there is activity to link RDS data into the IDB architecture, notably from Cue. While DAB manufacturers come to the meetings in Europe, they do not seem to be actively involved – at least according to the people at the IDB booth – in generating applications.

IDB is a two-wire token ring bus working at 115 Kbps, (a slow serial bit rate). It is not fast enough to pass signals, only control messages to devices. They are discussing IDBM, a high-bit rate version that might use 1394 or other standards, or an optical cable.

Samsung

In addition to commercially available HDTV sets etc., Samsung was displaying a prototype home network, interesting because it is intended to be a full-fledged network based in 1394.

It's an Internet packet-based network. Each component, whether VCR, CD player or whatever, generates a Web page which is its control interface, displayed on the TV and controlled with the remote. The opening screen showed a list of connected devices. We controlled the digital VCR (a Samsung proprietary format, not WVHS or DVHS.). The browser screen was transparent and allowed the television signal to be seen through it.

This is an Internet system, open to the Internet. Oddly, the TV is the hub – it dynamically allocates IP addresses to the other devices, but all you conceivably could do from the internet into the home net is see the controls of the various devices – so you could, for example, set your home VCR to record while at the office or in the car.
Other home devices could be connected on this network, when ready. The PC in the demonstration was connected with a commercially available Adaptec 1394 card.

Mediawire

(conversation with Keith Crosley, product manager, Avio Digital)

Mediawire is a frame-based network, not a (IP) packet-based network. Consequently, it can dedicate virtual channels to audio and video signal streams and can also carry a stream of normal IP packets, which are transmitted and received synchronously, but look like normal IP packets to the receiver. This allows it to also deliver ISDN and telephony.

It can work through different kinds of wire, and claims a throughput of 88 Mbps. However, as the wire reduces in quality, Mediawire must reduce the distance between nodes. On "Radio Shack" flat telephone wire, it can do 100 feet between nodes, device-to device. The network can support 100 devices for a maximum length of two miles on good wire (it reconstitutes the signal at each node). The frames stay in phase throughout the network so even over two miles audio will remain in phase.

There is no hub needed, it is a peer-to-peer network. While you can use existing telephone wire, the network will not share a wire with an analog telephone. That signal must run on a separate wire, although it could be the spare pair if the house has two-pair telephone cable throughout. They can solve this problem by digitizing the telephone service where it enters the house, moving it through the house as a digital signal, and putting a digital to analog adapter at each handset, or a media wire phone. (app. $60 device.)

While this is a generalized network, its throughput is high enough that it can be used for digital audio and video. A device on the network with sufficient processing power can reconfigure the capacity on the virtual channels to meet demand.

Avio is licensing the Mediawire technology. This was developed at Interval Research, and spun out into a separate company. Product will probably appear in the first or second-quarter of the year 2000.

Compared to 1394, Mediawire:

- is not a standard
- has lower but still pretty high bandwidth
- permits longer cable runs so it can be used as a complete home network
- has lower latency

SHOW ANNOUNCEMENTS

CBS and Time Warner Cable announced an agreement through which Time Warner would carry the DTV signals of CBS owned-and- operated stations "unaltered". The implication is that multicast channels and data enhancements would be passed through to the cable consumer. For now, Time Warner will carry the 8 VSB high-definition signal on its cable systems but the plan is to convert it to 256 QAM in the next six to 12 months. The signal will only be carried on upgraded parts of the cable network: in New York City and Los Angeles, upgraded sections cover approximately 50% of the subscribers. No other agreements have been announced, but the National Cable Television Association used this agreement as a "clear indication that the marketplace will work and there is no need for government-mandated must-carry regulation."

Sarnoff Labs is licensing a DTV receiver design that should allow manufacturers to offer standard definition DTV sets under $1,000. The cost of the electronics will be $400 to $550, and the standard definition display will bring the price up to $1,000. A true high-definition display is still a much costlier item.

EchoStar announced a new satellite receiver that will combine WebTV and an on-board digital video hard drive recorder (8.6 GB) to create "a whole new interactive world for viewers, at a fraction of the cost of buying a computer." The service will include the WebTV plus service, including Internet surfing, electronic program guide, online banking, shopping, email and game playing. The hard disk recorder will allow the viewer to "pause" live video programs for up to 30 minutes, and to record television programming for later playback (available toward the end of 1999). The model 7100 receiver will be offered for $499 including the EchoStar satellite dish, while the WebTV Plus service will be $24.95/month. Echostar has 1.8 million subscribers on its DISH network, while Web TV has nearly 700,000 subscribers. Echostar technologies manufactures DBS equipment for DISH network and various international customers including ExpressVu. In a related announcement Echostar said that its would be adding the interactive "television-style" programming of Pseudo.com to its lineup in the summer of 1999.

DirecTV announced plans to offer Wink interactive enhanced broadcasts free of charge to its 4.46 million subscribers. It also announced an alliance with Philips electronics and TiVo which will match or, according to some observers, exceed the capabilities of Echostar's hard-disk digital video recorder. This recorder will allow the viewer to "pause" live TV programming, and store their program preferences so that the recorder will automatically record programming that matches user tastes as well as programs chosen by the user from the program guide. Wink-enabled set-top boxes are expected in the second quarter of 1999. High-definition programming will be expanded with pay-per-view movies from New Line Cinema starting in May. High-definition set-tops for DirecTV are expected by mid-year.

Columbia TriStar Interactive, the interactive division of Sony Pictures, announced new services for hand-held devices. Most of the services are simply promotion for movies but the

upcoming "the Daily Dose" from Soap City will send daily soap opera updates. The service will work with Palm Pilot and Windows CE devices by downloading information whenever the device is synchronized with the host computer. Lynda Keeler of Columbia TriStar noted, "as mobile computing involves into wireless delivery of Web content, we expect this process to be even easier for the consumer."

AT&T has been awarded a contract from @Home network to create a new backbone that will give @Home the capacity to support five million broadband users. This move is seen as part of a push from @Home to meet the demand for high-speed connections to the Internet over the next ten years.

Over the holiday season, @Home carried special interactive advertising for Kraft, which allowed Internet users to view video commercials, download recipes and access holiday fun ideas from the Interactive Kitchen website. In a section called the Kraft/Second Harvest initiative, families learned how to get involved in helping the hungry in their community. Kraft has been a leading proponent of targeted and interactive advertising to build one-to-one relationships with consumers.

America Online announced that it has selected CBS News to be the exclusive provider of broadcast news on AOL and CompuServe and the premier provider on AOL.com. CBS News will have a major presence throughout AOL-related services. CBS has committed to extensive on-air promotion within each of its news broadcasts, and to the active involvement of its personalities in production and promotion of AOL live chat events. The two companies will share advertising revenue generated through CBS News programming. A recent study commissioned by AOL indicated that 75% of users go online to get news. America Online and CompuServe together have approximately 16 million members.

AOL also announced a pact with Bell Atlantic to bring Bell Atlantic's Infospeed service to AOL subscribers. Bell's Atlantic's implementation of DSL, using standard residential phone lines, is said to transmit online content at 640 Kbps -- permitting improvement in Internet video performance, although this bit rate is far short of the MPEG2 bit rates used in DBS and digital cable set-top boxes.

Cisco Systems, General Instrument Corp., and AT&T announced their intention to develop and trial a seamless, end-to-end IP solution that would allow AT&T to offer voice, video, and data services over the network now being deployed by AT&T and TCI. John Chambers, CEO of Cisco Systems, said, "By combining broadband Internet home and video services over a single cable line, we're taking a major step towards implementing the future integrated data, voice and video telecommunications on a mass-market scale." The primary gateway to this network would be the GI DCT-5000+ plus advanced consumer digital set-top box, which contains a cable modem, broadband telephony interface and digital video tuner and decoder. Cisco also announced that a coalition of 33 telephone companies, cable companies, ISPs and consumer electronic companies will support their strategy to extend high-speed Internet services and products to the consumer market.

In a pre-CES announcement, eight consumer electronic companies agreed to establish a licensing program to permit easy interoperability of their digital audio-video appliances. The

program, be called HAVi (home audio -- video interoperability), would be Java-based and would provide hot plug-and-playing connectivity so that, one manufacturer's DVD player, for example, could be controlled from an interface on the television set of another manufacturer. This program would fill in gaps in the IEEE1394 digital interface, and could be a major step forward for home networking. The eight companies are Sony, Thomson, Sharp, Philips, Toshiba, Hitachi, Matsushita, and Grundig.

Many of the same companies were included in the Sun Microsystems announcement that key consumer electronics companies would be involved in the development of a Java TV application programming interface. The Java TV API (the first draft is expected by end of the first quarter, 1999) is intended to allow manufacturers to introduce new product without fearing obsolescence -- since new features can be enabled from downloadable software working with Java. Software developers will also benefit since they will not need to rewrite their programs to get them to run on many different set-top boxes, digital televisions, and other AV devices.

An interesting post-show announcement came from Broadcast.com, who plan to offer a box capable of receiving and storing large amounts of data from the DTV signals of over-the-air broadcasters next to the user's television set. The box would contain the functionality of a computer and a massive hard drive, so that the user could use the TV set to access various kinds of interactive data. The box sounds like a combination of the WebTV/Replay/Echostar or Wink/TiVO/DirecTV idea, but with less emphasis on television and more on data.

NEW PRODUCTS AT CES

(a listing of a small number of new products from the thousands introduced at the show, chosen because they show new features or significant movement in the market. Performance is as claimed by the manufacturer.)

Category: DTV

Name: RCA DTC100 set-top decoder
Maker: Thomson
Price: $649
Features: A set-top box that receives ATSC high-definition and standard signals from antennas or from DirecTV, for output to current television sets or new HD sets, at a price that can't be beat.
Available: shipping.

Name: DTV/DBS set-top
Maker: Philips
Features: Like the Thomson DirecTV unit, this Philips ATSC digital receiver will also decode Echostar DBS and HDTV broadcasts.
Available: 3Q 1999

Name:HD-DVD-Divx player
Maker: Thomson
Features: the first high-definition DTV player.
Available: prototype only, introduction in 2000

Name: PDP-501MC flat-panel plasma display
Maker: Pioneer
Price: $25,000
Features: A 50" 16x9 high-definition (1280x768) plasma display at a premium price. Other plasma displays, in the 40 in. range, are usually 480 lines maximum.
Available: shipping.

Category: Television

Name: Replay TV
Maker: Replay Networks Inc.
Features: A digital video hard-disk recorder/player. Permits user to "pause" live television, easily record series programs or programs chosen from program guide; 6 hours current capacity
Available:1Q 1999
Contact: www.replaytv.com, 1-800-266-1301

Name:TiVo
Maker: Philips (under licence)
Price: “under $500” plus $10 monthly service fee
Features: A digital video hard-disk recorder/player. Permits user to "pause" live television and will record programs automatically based on the user’s preferences and information about the programs; 10 hours current capacity (see Some Booths on the Show Floor)
Available: 1999

Name: 360-degree television
Maker: E.S.P. electronics
Price: $40,000
Features: A television set which allows viewers all around the display to see a “heads-on" view of the 19 in. image.
Available: Collector’s edition now shipping

Name: GR-DVL9500 camcorder
Maker: JVC
Features: Progressive scan (480x500) camcorder with high speed recording mode (120 images/second) permitting

smooth slow motion playback. Capacity 100,000 frames of video or 600 still pictures on single Mini-DV cassette.10x optical and 200x digital zoom. Digital stereo audio. Connectivity comes from i.Link (IEEE1394) connection to other Firewire devices or JLIP terminal which connects to the serial port of a PC running Windows.

Name: NewsGuide
Maker: Thomson
Features: A new feature of RCA and ProScan TVs with Gemstar Guide plus+ program guides, to provide news-on-demand.

Name: TVGuardian, the “foul language filter”
Maker: Principle Solutions
Price: 149.95
Features: Monitors closed-captioning of movies or TV series and mutes audio when offensive word is found.
Contact: 800-967-7884

Category: New Media

Name: Cyberworld
Maker: Cyberworld
Features: Development software to create 3-D way of environments that work in low bandwidth conditions. Compatible with Explorer and Netscape; modular system allows creation of large environments through Link modules.
Available: shipping
Contact: 905-502-9690, www.cyberworldcorp.com

Name: Device Mail 1.0; Device Mosaic 3.1; Micro-server 2.0
Maker: Spyglass, Inc.
Features: Embeddable thin email, browser, and server technologies created by Spyglass for Internet-connected small devices.
Available: shipping

Category: Mobile Electronics

Maker: Alpine
Price: $1,200
Features: DVD player which plays CDs and video in car.
Available: Summer, 1999

Name: Command Audio
Maker: Thomson
Features: Radio add-on service which monitors and records programming selected by user, then plays it back at the user's convenience.

Name: AVIC-505
Maker: Pioneer
Price: $2,000 with display
Features: a route guidance navigation system built around GPS with speaker-independent voice recognition.
Available: early 1999

Name: TME-M750
Maker: Alpine
Features: Television tuner with 16x9 screen; part of Alpine's mobile theater system, which is part of their mobile multimedia integrated system platform, including navigation, email and Internet access, audio, video, emergency alerting (Mayday system) etc.

Name: AutoPC
Maker: Clarion
Features: "In-dash personal assistant", voice activated, email, GPS directions, news, traffic, weather, address book, CD, radio, and cell-phone.
Available: shipping
Contact:1-800-GO-CLARION, www.autopc.com

Category: Personal Devices

Name: PC-Unite
Maker: Casio
Price: $199
Features: A watch which downloads appointments and contacts from Microsoft Outlook through IR port on PCs.
Available: Feb. 1999

Name: GPS watch
Maker: Casio
Features: Combination watch and GPS device, 5.2 oz., battery life 10 hours.
Available: 3Q, 1999

Name: Walkabout Quest
Maker: Dictaphone
Price: $449
Features: Digital voice recorder with 40 minutes recording time, that sends voice email messages based on contact list when the device used in PC docking station.
Available: December

Name: Telmail
Maker: Sharp
Price $150, plus $9.95/month for Pocketmail service
Features: Hand-held email appliance with PIM features that can send email through analog phones by holding the device up to the handset.
Available: shipping

Name: HC-E100 Portable email device
Maker: JVC
Price: $129.95 plus Pocketmail service at $9.95/month
Features: Hand-held email and backs fax device that communicates through analog telephones by holding the device up to the handset. Can send to any email-enabled pager.
Available: shipping

Name: NavTalk
Maker: Garmin
Price: $625 plus monthly rates for assistance programs
Features: A full featured GPS device and wireless telephone. Users can buy "first assist" service at $8.95/month which gives one button access to emergency services using GPS location. For additional $11.95/month, program will use GPS to give directions.
Available: shipping

Name: Bébé Sounds
Maker: Unisar
Price: $29.99
Features: Amplifier, headset, and recording cable for listening to baby within mother's womb.

Name: Memory Stick
Maker: Sony
Price: $29.95 for 4MB; $39.95 for 8MB; $99.95 for 4MB with PC card adapter
Features: Portable digital data storage in very small form factor; used in cameras VCRs, and computers. Allows user to easily transfer images to PC. Supported by many camera manufacturers.
Available: shipping

Name: Concertmaster
Maker: Baldwin
Features: Acoustic midi-controlled player grand piano with internal hard drive, pre-loaded with 20 hours of performances. Floppy disk and CD input allow music to be played from many sources and to be recorded from the piano. Baldwin notes possibility of CDs that combine normal video and audio with midi track to create “play-along” performances.
Available: shipping

Category : Telephony

Name: Long Distance Manager Telephone
Maker: Uniden America
Features: gets lowest price on long distance calls by automatically searching competitive long distance suppliers.
Available: Spring 99

Name: Internet Screenphone 2840
make : Alcatel
Price:?
Features : Colour browser-enabled telephone with advanced telephony features.
Contact: www.alcatel.com

Category : Audio

Name: JVC KD-MX3000 CD/MD Player/ Receiver
Maker: JVC
Price: $749.95
Features: Plays both mini-discs and compact discs.
Contact: Barbara Brown 973-331-1070

Name: MD-C2 Mini system
Maker: Sharp
Price: $499.95
Features: One-touch dubbing from 3 CDs to 3 mini-discs.
Available: made 1999
Contact: www.Sharp-USA.com

Name: PD-R555RW
Maker: Pioneer
Price: $835
Features: Records CDs from audio sources.
Contact: Chris Walker, 310-952-2401 cwalker@pioneer-usa.com

Name: CDR765
Maker: Philips
Features: Automatically copies CDs at 2x recording speed.

Name:TuneBase 100
Maker:Escient
Price:$2,500
Features: Auto-builds database of CD information on Sony, Pioneer, and Denon mega-changers, by identifying discs and downloading information via modem from Escient's Website.
Available: January, 1999

Name: Super Audio CD
Maker: Sony etc.
Features: New CD audio format that promises 100 kHz response through new recording and disc manufacturing techniques. Super CD disks will play on current CD players, but at old frequency response rates.

Category: Computers

Name: Clio
Maker:Vadem
Price: $999
Features: Pen-based 3 lb. 11"x 8 " notebook computer with 9.4" color display. Runs Windows CE with bundled Microsoft office software.
Available: shipping

Category: Connectivity

Name: Leapfrog Wavemaster, Homenetwork
Maker: Terk systems
Price: $179.95 for 1 transmitter and 1 receiver
Features: Uses wireless 2.4 GHz signals or the home's telephone wiring to transmit video/audio signals from VCRs, CD and DVD players to other receivers in the home.
Contact: www.terk.com

The Seminars and Sessions

This section of the report consists of précis reporting of what was said in a number of interesting conference sessions. The words and opinions expressed are those of the participants, although I may interpolate a note in square brackets [like these] from time to time. Participants' presentations are summarized in my words, which draw on but are not identical to the participants' words for the sake of brevity. Actual quotes, where used, are indicated with quotation marks.

As in all other parts of this document, product performance is "as described" by the participants. I have not attempted to verify their claims. All prices are in US dollars and the market is the U.S. market unless otherwise specified.

David Keeble

Views on the Digital Home – The TV Hub, Computer Hub, Telecommunications Hub

Panelists:
John Todd, V.P. Research, Wedbush Morgan Securities
Jim Schraith, President and CEO, Sharewave
Mark Carpenter, Director of Internet and Home Networking, Compaq
Paul Chapple, Business Development Manager, Spyglass
Alec Saunders, Product Manager, Microsoft

CES intro: The Digital Hollywood conference kicks off with an all-day workshop which will address the key concepts in establishing the home as a media center - focusing on three primary technologies as the core hubs: telecommunications, the computer and the television. These are the concepts behind the mantra-of-the-moment known as "convergence." While each technology will not move forward along a completely distinct road or even make irrelevant the other, there are fundamentally different mind-sets and market strategies at work.

John Todd

Foresees a growing market in home networks, developing in parallel with the market for high-speed Internet access. In fact these two markets are closely linked, as one of the primary user needs driving home networking is the desire to share access to the Net among several computers and other digital devices.

He cited projections that had the high speed access market growing to 22% of Internet households by 2001, the bulk of which (2.9M households) was through cable modems, with 760K HH using DSL technologies. He foresaw a new kind of ISP, which would be pipe-agnostic, using whatever worked best as they grew to understand how the market segmented, and cited AT&T/MCI as a possible forerunner.

His own projections of the home network market were close to others' estimates of the market for high speed access, which he regarded as reasonable since the two markets are so closely linked.

	1998	1999	2000	2001
Market size in $M	**15**	**256**	**1,100**	**2,300**
In Households	**22,000**	**400,000**	**2,100,000**	**4,600,000**
North American Internet Households				
	25,000,000	**29,000,000**	**32,000,000**	**35,000,000**
% of North American Internet Households with a home network				
	.09%	**1.4%**	**6.6%**	**13.1%**

The current driver for this market is the need to share resources and information in the home. In the future the driver will be the proliferation of other information devices.

Prerequisites to develop the market were lower equipment prices – down to the home consumer level – and "no new wires", meant both literally and as a metaphor for simplicity of operation.

The key piece of equipment is the **home digital network hub**, which will tie all appliances together, integrate the various pipes into the house from outside (cable, telco, satellite) and supply the user control interface. He saw several possible models for the hub: a PC, a set-top box, or even an off-premises control point. 1999 will be a watershed year, as the two markets become integrated by the availability of hubs to serve as the residential gateway.

Jim Schraith, Sharewave

Sharewave is an ingredient technology supplier of wireless networking solutions, whose technology will be incorporated in various suppliers' devices.

Under the banner of "no new wires", he sees their technology playing an important part in home networking, but believes that other kinds of connection will be needed in the home. While he sees the Internet PC driving the need for connectivity, he believes that other information devices - handhelds, "kitchen pads", etc. - being equally important. He cited an IDC projection that showed 50 million information appliance units (with the potential for connectivity) being sold by 2001, a growth rate exceeding PCs.

In addition to ease of use and affordability as prerequisites for the growth of this market, he added versatility and reconfigurability. Since furniture moves, connected devices must also be able to easily move. The user may even need to move the whole network to another home. [This by contrast to others who suggested that the network should be considered an asset belonging to the home.] Security, so that one's neighbours could not know what you were accessing inside or outside the house, was also a major concern.

The Sharewave solution can now deliver 4Mbps of connectivity at $100 per connected node. By late 99 they hope to deliver 11 Mbps. It uses a wavelet-based compression scheme with a claimed 300 Mbps of effective throughput, and can thus handle the movement of video and audio signals - several at a time - through the house.

Mark Carpenter, Compaq

Compaq itself had just announced the shipping of a Wintel computer with built-in networking abilities for the home user, but this presentation was concerned with the work of HomePNA, (HomePNA.org) a 38-member industry consortium "**to ensure the adoption of a single unified phone-line networking standard** and to facilitate a range of interoperable home networking standards."

Again, "no new wires": this scheme uses existing house phone wiring, so that devices can be networked by hooking them up to the phone jacks, without disrupting telephone traffic. [All speakers in this panel agreed on the necessity of hiding the technology from the consumer, and all were optimistic about the prospects of achieving this aim with new equipment. Off-line conversations with people who actually install home networks now were less optimistic.]

The HomePNA solution now achieved operates at 1 Mbps over existing phone wires within the home, at a cost that is only $15 more per node than an Ethernet solution. They hope to announce a 10/1 Mbps solution (i.e. capable of 10 but able to integrate slower devices) in 1999. At the current rate, moving video around the house will not be possible, but their focus will move there in 1999. Several consortium members have already announced product.

Alec Saunders, Intelligent Appliances Division, Microsoft

He saw home network adoption being driven by basic human needs: quality of life, personal security, community, privacy. The second of these focussed on the home security aspect of these networks, which appears to be quite important. Both are current security applications: alarm systems, fire systems, intercoms, or more futuristic ideas like being able to "see" into the house while at work. This seems to be a driver of the need for home connectivity.

He sees Internet connectivity, in the form of a minimum IP capability, as well within the reach of most portable intelligent devices at low cost.

Paul Chapple, Spyglass

Spyglass concentrates on non-PC Internet products. With a marketing background, Chapple challenged the panel to think harder about the actual consumer demand that might be met by home networks. He suggested that the need for low-cost might be exaggerated, but the need for versatility, so that the home hub actually did a lot of things for a lot of different people, was key. He cited an example of a home security system marketed several years ago that was good, but came in at too low a cost for the consumer who really cared about home security to believe it would be effective.

[Notes on the Session - DK]

These panelists see a future in which the functionality of the PC fragments into other appliances, some of which are dispersed around the home or move with the user. These appliances also have new functions - they are better appliances - based on their new smarts. The existence of these multiple appliances creates a need to share information between them.

They did not speak about the trend to home offices and working at home, which is certainly one driver of a demand for higher connectivity and for higher end solutions, as people are willing to spend more for work-related equipment than for entertainment.

Even without that factor, the panel agreed that the increasing number of digital devices in the home drives connectivity, as people want them to share scarce resources in order to avoid duplication or eliminate contention. The primary example was the connection into the home, whether high bandwidth or 56K, printers, satellite connections, files that are on one of several computers etc. So the home needs to be digitally networked in order to share resources and data among various devices that people use.

John Todd's view was that the broadband market was the driver, linked to the home net market and the need to share this link would drive the need for home networks and a gateway hub.

The part that wasn't at all clear was where video and audio signals fit into the networks. The TV or a set-top box is connected in all the diagrams, but Marc Carpenter (Compaq) made the point that the greatest initiatives right now - the ones they see having the greatest consumer penetration – are doing so under the "no new wires" scenario. He's not proposing to move video and audio around the house. And yet some people feel this is important. Others don't.

The panel had little discussion of the IEE-1394 Firewire connection standard which is hot in the consumer A/V industry. When asked, Schrait said that Sharewave's equipment could be made to interface with 1394, and Carpenter suggested that the use of 1394 would be limited to hooking up AV devices within a room. So there may be a divergence of vision on what means will be employed for connectivity.

Strategies for Broadband and Narrowband Entertainment

Panelists:
Host: Keith Kocho, Digital Renaissance
Kevin Wall, Vice-Chairman, iXL Worldwide
Allan MacLennan, SVP of Strategic Development, Media Station
Ross Rubin, Group Director Telecom and Technology, Jupiter Communications
Kevin Lynch, VP and GM Web Publishing, Macromedia
Joey Hougham, Technology Manager Broadcast Products Group, Intel

CES intro: The entertainment industry is in the enviable position of having a multitude of mediums through which to reach its audience and because of the enormous success of the Internet - even in its narrowband form. The wait for 500 channels and unlimited-bandwidth becomes a secondary question while evolving an aggressive marketing and programming position in the current space. While some companies may view narrowband options as an extension of their marketing department - chat sessions with the stars of TV shows or Internet treasure hunts to promote the opening of a film - the fact is that every media entity, from news shows to comedies, dramatic series and feature films must find their appropriate compliment in the multi-million user narrowband environment as well as secure a firm understanding and strategy for its role in the emerging broadband world. In this workshop, experts will examine exactly how these options are evolving. The intent is to better understand how to address the massive narrowband audience while at the same time tight-rope the leading edge of broadband.

General Notes:

This panel had an approach that suggested that convergence of program material would be limited in the near future. That is, TV and the Web would continue to be very different media. High-quality, full-motion video on the Internet was not a fundamental factor for them – based on their mutual understanding that the spread of high-speed connections to the home would be quite slow [There are many competing projections].

They urged the audience to implement an approach for content on different platforms that was scalable - designed to the capabilities of the receiving appliance and the bandwidth connectivity it typically has – and they saw the 56K bottleneck continuing for a long time for Web based delivery.

There was some discussion of the nature of the future economic model: eCommerce based, subscription and/or ads. They acknowledged lots of disagreement, but most panelists felt that TV would be based primarily on advertising with an eCommerce component, and on subscription revenue.

Ross Rubin, Jupiter Communications

He noted that the Web audience was becoming more mainstream as online access spreads. But these consumers are unsatisfied with the quality and speed of the Web experience. He

felt that ISPs were overperforming on bundled pricing - beyond what the consumer wants - and underperforming on high-bandwidth solutions.

High-bandwidth solutions will be dominated, in Jupiter's projections, by cable modems (2:1 over DSL) but all high-bandwidth solutions will be only 20% of US households by 2002.

When they come, digital TV and broadband access will provide two fat pipes into the home. Digital TV will give program providers the chance to enhance the TV experience in ways that are different from the Web. A "Utilivision" strategy is recommended in which the enhancements are those that consumers say they will find most useful. These include sharper picture, better sound, etc. but high on their list are program guides, email, ticker information on sports and stocks, etc.

Scalable interactivity will be needed for the new audience, which will not be couch potatoes. ECommerce will be different for the TV model, since TV viewers are still prospects for the impulse buy, [as with home shopping channels] while Web surfers' buying behaviour is more deliberate.

Dedicated Web developers should not wait for video to be possible but use the vector animation tools available to enrich the experience today, like Flash.

Kevin Lynch, Macromedia

He addressed his advice to Web developers, recommending that they use tools to enhance experiences that are scalable to different devices including handhelds, TVs, and display telephones, so that the broadest numbers of users are reached with the minimum amount of programming time. While clearly the low-end devices would see much less, he felt that the tool should provide "graceful degradation" of the images, rather than simple failure. [Macromedia makes Flash, which fits these criteria.]

He then demonstrated a number of interesting sites and technologies, including Eye4U, Beatnik (a kind of superior midi, or "vector audio"), and the "You Don't Know Jack" online game, a good example of a rich experience through a narrow pipe.

Kevin Wall, iXL

He spoke at length about digital (enhanced) television and what its tendencies and capabilities would be. He believed that the industry would move through a period of great chaos toward an economic model that could be successful in the marketplace, warning that the current free spending on the Web could not last since investors would eventually close down this period of speculative investment.

His model posited a situation in which cable and program providers, operating through the set-top box, would provide enhanced television with interactive capabilities, many of which would be used to enhance the eCommerce potential of interactive advertising within a linear program.

For programmers, the economic model will require many compromises in the non-linear content to make it fit with the linear content. Specifically, he spoke about trying hard to limit the user's time to interact with ads so that it would not interfere with the reception of the next commercial. In general, cable, the controller of the set top box, would be doing its best to keep the user inside their walled garden of services and content, and away from general web-surfing. He went so far as to predict a decline in channel surfing as attractive, interactive enhancements keep the user tuned to the channel.

The program providers would also have an interest in keeping the user attached to the program, but in a more general sense would have serious conflicts with cable over who should share in the revenue from the user's behaviour, whether it's using the interactive ads or actually buying something. It's the broadcaster's program, but cableco's technology that provides the interactivity. [He did not speak about the possibility of a standardized "retail" set-top box, and the implications this would have for cable's control.]

In any case, the period of making the model work would be a period of great opportunity for some, and a "high bodycount" among those who fail to adapt to the new reality as a "dysfunctional" industry goes through a major transition,.

He demonstrated a set-top box interface that IXL had been prototyping, and showed some of its possible uses for advertising:

- Selling tickets to a concert based on a Janet Jackson tour ad - in which the cable company's server used its knowledge of where the user lived to offer the closest local concert on the tour;
- an NFL game in which the user was offered a chance to subscribe to a sports "ticker" based on the cableco knowing that he regularly watched sports, and
- a VISA ad in which the user received a card application, sent to his/her TV on demand.

The interface allowed the user to "bookmark" interesting interactive content whereupon it was stored in a virtual channel for later access. In this model, web sites and regular TV stations are all assigned numbered channels so they can be accessed easily through the remote. "Grabbing" the content was needed to keep the user moving at the speed of the linear program so they would not miss the next ad.

[Other technology shown at CES (TiVo, Replay) allows the TV set to store some minutes of incoming TV so that the user can pause or do something else without missing anything, but that functionality was not part of this model, based on current set-top box features.]

[All of this assumes that the cableco will be able to collect user behaviour information and use it for its own commercial purposes. The panel did not discuss the privacy and possible regulatory issues.]

Joey Hougham, Intel

He sees a period in which TV watching becomes less a family event and more personal, in which the viewer has more control, can use the available interactivity to create a more immersive experience.

The Internet is not yet suited for mass audiences - it can't handle the loads, so the broadcast pipe will continue to be the appropriate delivery medium for mass experiences. However, broadcast interactivity, in spite of some good work, hasn't taken off because of a lack of standards. ATVEF (Advanced TV Enhancement Forum) is trying to set standards for interactive content. The first specification is about to come out.

Web developers shouldn't bite off the high-bandwidth challenge yet.

Alan MacLennan, Media Station

There will be step-by-step migration of behaviour towards convergence of Web and TV, but both will survive as independent media. The needs for information, entertainment and relaxation are different and enduring. They don't necessarily converge on one device because technology makes it possible.

He made the comment [intriguing but not followed up in discussion] that "Studies show that interactivity does not enhance the experience when the user enjoys what they are watching", but also cited heavy response to interactive ads during the Super Bowl. [This may not have been a contradiction.]

50% of those with both TVs and PCs have them both in the same room and have them both on at the same time. [Several people quoted this statistic without sourcing it - or discussing its meaning very much.]

There are opportunities to get rich this time around. One is real narrowcasting. It's what consumers want.

Advertising: must be sales generating, eCommerce engaged, and provide real brand enhancement. He showed a Suzuki ad in which the viewer could choose a model of bike and "ride it" – see its front panel in front of them while moving down a road (still graphic over video).

If you want to get rich this time, he said, look at the ideas of companies that went bankrupt in interactive video in the last few years. Many good ideas were just too early for the market.

Questions:

The panel was asked, how long until there are standards for interactive broadband programming. Kevin Wall replied that the opportunities are now, before that happens. Rob Rubin of Jupiter said it won't ever happen, that the world moves too fast. Kevin Lynch of Macromedia agreed - with a software receiver that just keeps on changing.

Entertainment, News, Sports and Finance - The TV/Internet Hybrid Champs

CES Intro: All roads point toward a home entertainment environment with a combined television and Internet presence, call it a TV/PC, a TV with Internet/Computer capabilities - whether the box is in the den, the bedroom or the family room - the major TV programmers are already putting their muscle to work. They are establishing themselves in the narrowband programming world while setting the stage for the roll-out of broadband. Each of our panelists come from a company with both a broadcast television and Internet presence. With millions of viewers to please on each front, their experience is like an-experiment-in-progress and will determine much of how their industry will proceed into the future.

Patricia E. Vance, Senior Vice President and General Manager, ABC Internet Group
Merrill Brown, Editor-in-Chief, MSNBC on the Internet
Mike Levy, CEO, CBS Sportsline
Miguel Garcia, CNN Interactive
Jeremy Verba, President, E! Online
Matt Farber, Senior Vice President Programming, MTV Networks
Alex Alben, Vice President Entertainment, RealNetworks, Moderator

General comments

The moderator attempted, early on, to push on the "video on the Internet" question, probing to see how much of a hybrid really exists at this time, and what part video plays in their strategic plans. The panelists described practical approaches in keeping with organizations that are trying to fill a need and produce economic returns; for the most part, they deferred all futuristic questions and dealt with current realities, in which video has a significant but somewhat limited role.

Somewhat surprisingly, many of these organizations described their audience as using the Web and TV simultaneously. [That is, the integration of the two media is being done, not by the technology, but by the user, who puts them both in the same room and uses them together. Is this a continuing viable model? He suggests that the need to deliver video over the Net may not be strong for media companies that have a video channel into the home through other means.]

The session was conducted as a Q&A.

Q. How does video fit into your strategic plans?

E!Online: showed promo videos for several video-related parts of their site, including live coverage of the "red carpet" entrance to the Oscars, and a site where they promote movies and even allow the user to buy a ticket. Video is important but our users are in the 28-56k realm, so its use is limited.

MSNBC: moving toward greater integration with TV. They will bring NBC nightly news into the site using Win98 video delivery platform.

ABC Online: Described a strategy in which video on the site itself was unimportant compared to linking the use of the computer to a TV program, with the user using both appliances simultaneously. Ten million people have the computer in the same room as the TV and use both together. The result is much cross-promotion in an ordinary way but also a huge chat room during the Academy awards, etc.

CBS Sportsline has 5,000 video clips on site. But they also have many users who are watching TV simultaneously. They follow other games' play-by-play (in text) and get real-time updates on their teams in the fantasy leagues. The goal is to make Sportsline a "have-to" component of sports viewing. They see a large future role for video:

- People will use it to watch games that are not on TV, not to replace TV viewing. Olympic preliminaries, etc.
- Highlights on demand
- Custom sports shows
- Extra features not on-air: press conferences etc.
- Extra data: follow play-by-play of games in text form while watch something else
- Sports tickers as a crawl on enhanced TV

He noted that CBS did not get the Internet broadcast rights for NFL games - in spite of a $4B price tag for their part of the deal. The League reserved them. [Others also raised rights as a crucial issue in use of video.]

MTV sees audio/video as crucial. Their goal this year is to produce the first real hybrid live/online live show, in which being online is an integral part of the show, without which it isn't a complete experience. It's risky, but again, they have an audience of simultaneous TV/Internet users.

CNN Online has been "too successful" in drawing online users to their site with event video. "Maxed out too often." Their goal is to reduce the cost of online video production in order to create profit margins, by driving integration back up into the content chain with better content management. Part of the effort is involvement in ATVEF, to create standards that will reduce the cost of using many formats for video - Realplayer, netshow, etc.

Q. Looking at figures like two million people using Realplayer in a 24-hour period, is there a danger in being event-driven in content terms? Many big events "spike" usage and overload servers.

E!Online: It's just a function of current technology. The spikes help attract sponsors but can hurt the steady business until technology improves.
MSNBC: Video usage is miniscule compared to overall site usage. Not significant.
ABC: We're getting better at managing spikes but still get caught sometimes.
MTV: News is spiky, but other genres aren't.

Sportsline: Sports can be very spiky. The first two days of the NCAA basketball tournament are huge (25M pages views compared to usual 3M) because of the number of teams involved. But that's what drives revenue.

Q. Will IP Multicasting (a technology that reduces the load of video/audio on the Net) make big strides in 1999?

CNN: It would be very helpful but it takes many parties co-operating to make it work.
Sportsline: Nothing much we can do about it, but the parent companies are making the investment.

Q. What are the challenges in making a traditional media brand viable on the InterNet?

MTV: You need a good understanding - separate expertise - in the meaning of the brand on traditional media and the expectations of Internet users - and then you need to put those two together to understand the differences that will occur in the Internet brand. You need permission from the parent brand to make the changes needed to meet the Internet needs.
Sportsline had a brand before it made its deal with CBS. It's worked out well for both, and they're duplicating the success with Marketwatch.
ABC Online has many brands: ABC, Infoseek/Go and many unique Web brands. We reach a higher demo than ABC TV so it expands the base for ABC which benefits in the long run. Each of the sub-brands must keep its identity but be part of the larger network. We're on Palmpilot, Alta Vista too - you have to be everywhere to win.
MSNBC: There are lots of different approaches. Sometimes I don't see the parent companies attitude at all in successful online operations. We had to evolve a different style because more was available to us on the Web. Sub-brands and personalities will emerge over the next few years within web services.
E!Online started as a separate organization. The content has to make sense online and the parent company's stuff doesn't always.

Q. Will cable and telcos be able to restrict their subscribers to a limited choice of content?

MSNBC: Some subscribers may choose that option - the "walled garden" of content for lower cost. It's like the current cable "gatekeeper" model and it's a legitimate economic model, but it presents a danger to content providers.
CNN: There is a lot of work going on to standardize the set-top and make it available at the retail level from many manufacturers. So there will be a spectrum of consumer choice, technologically.

Q. What are you doing to exploit global markets?

MTV: Although it's technically easy, there are problems around the content. Even our parent, MTV, is regionally subdivided. So how do you take advantage of that? The rights/content challenge will be the greatest, because the music industry itself is regionally divided, in terms of who they promote, the release dates of recorded product, rights, etc.

Broadcast Television Roundtable - A DTV Programming Strategic Understanding

CES: The broadcast industry, from the station operator and broadcast network to the television set manufacturer and the television programmer faces the enormous task of transitioning into a DTV world. Each has a different set of problems and challenges and each will be delivering product and services on a unique and individually determined schedule. In this roundtable, our representatives, who come from the different segments of the industry will share their perspectives on the implementation of DTV, its scope and capabilities and on the timeline of deployment.

Lisa Wiersma, Director of Development, Tribune Companies
Nat Ostroff, V.P. for New Technology, Sinclair Broadcast Group
Jerry Butler, Director for DTV, PBS Public Broadcasting Service
M. Michael D'Amore, VP Business & Technology Development, Philips Digital Video Systems
Robert M. (Bob) Zitter, Senior Vice President, Technology Operations, HBO
David Rosen, President, Praxis, Moderator

In this session, the moderator asked the panelists to assume it was the year 2007, after the second terrestrial channel has been released, and, from that future perspective, comment on how their business has changed since 1999. What is the nature of programming? What hurdles have they overcome?

Tribune:

We will still be in local broadcasting and publishing but we will have expanded. Our programming will be high-definition, but we will also add multiplex services because compression will be better: classified advertising, local news, weather, and entertainment. We'll have enhanced content and new targeted advertising. We'll have to develop a new attitude to television with high-definition. Partnerships will be key. We will have to develop a completely digital news gathering operation.

PBS:

High-definition will be an integral part of our mission to educate, entertain and inform. Our concerts, performances and science programming will all be high-definition. Multi-casting will also be important, and datacasting will be integral.

Sinclair:

In 2006, the consumer electronics industry has pushed for high margin high-definition receivers, while broadcasters have paid $70 billion to build the high-definition infrastructure but without a business case to pay for it.

There are two possible futures. In the first, the technology for adaptive equalization has not improved. **Consequently over the air reception of DTV signals using 8VSB has not been accepted by consumers, because it is very subject to multipath interference without a directional antenna.** If we can't reach them with simple non-directional antennas, we don't have an HDTV broadcasting system. So, by 2006, the analog channels have not been turned off, there is no cable carriage, there is very slow takeup of HDTV, and no good OTA reception. As a result, broadcasters have made few investments in the absence of the business model. The 200 markets outside the top 25 remain uneconomic for HDTV.

In the second future, improvements in adaptive equalization have enabled good over the air reception. This, in turn, has forced cable to carry HDTV. DTV consumer products have started to take off due to low-cost receivers from the computer industry, and standard definition wide screen sets using multiplexing. Some simple portable digital devices use the enhanced signal to distribute business and consumer data.

What this means is that if adaptive equalization doesn't improve, we're telling the consumers to get a rotating antenna. They won't do it. So we may have to revisit the choice of 8VSB and look again at COFDM.

HBO:

By 2007 large screen HDTV sets will cost what analog large screen sets cost today, but with much better picture and sound. 70% to 80% of the population will not pay to get more choices of programming: they'll buy for high-definition. HBO will have been digital for 16 years. The near-VOD approach that we take now will be closer to real video on demand because there will be more storage capacity close to the home. By then we'll have found the right way to integrate the Internet and television and will have easy ways for the consumer to receive enhanced programming. **The Internet will be able to carry high-quality full motion video, but cable and satellite will continue to be more economic for long form content like movies and television shows.**

Hurdles: We'll need to bring the price of storage and bandwidth down. We'll have to make signals secure so copyright can be protected.

Philips:

If broadcasters need COFDM, we'll supply it. By 2007, we'll have two-way networking that will give us narrowcasting and real television enhancements. The Internet will be able to handle video entertainment. Currently the bandwidth can't handle television bit rates. Extrapolating 10 years, we'll get full video interactivity to the home as municipalities get involved in installing high bandwidth networks.

We will probably see large flat panel displays in the home, accessing video from servers on demand over the Internet. **Operators will be able to tell what the viewer is watching. Philips is focusing on developing the Internet into a broadcasting channel** with a group inside the Philips Digital Video Services business unit. Our vision is “television anywhere.” People will get their hometown programming over the Internet from anywhere in the world.

The Computer and Internet Home Appliance: the Entertainment, Information and Communications Tool.

CES intro: The model of the computer industry being in direct competition with the television manufacturer for the "Digital Home" market is not precisely the economic model which has emerged. This is not a zero-sum equation. For a number of reasons, the universe of the enhanced TV/set-top box will likely explode just as the home computer keeps on increasing its power and reach. In this session we hear from computer industry representatives as they project the home computer into a "home appliance" playing its role on the entertainment, information and communications front along with a wide variety of home office and mobile functions.

Bill Keating, Web TV Networks
David Lind, Network Computer Inc.
Bud Tribble, Sun Microsystems,
Mary Walker, IBM personal systems group
Jim Louderback, ZDTV (moderator)

WebTV: Just announced a deal with Echostar that brings together WebTV in a satellite receiver with an 8.6 GB hard drive, (Replay) CD audio etc. We also have a deal with Scientific Atlanta to be on their Explorer 2000.

Network Computer Inc.: Our service is similar to WebTV. We're dedicated to standards (HTML, Java) Our service is in Japan now. We have seen a logjam in US cable. In six months, we'll see US cable operators pick their technology and service options; using Explorer 2000 at first, and next year GI will be in the market as well.

Sun: We play in this space through manufacturing Java and network servers for the Internet. We're taking Java to set-tops, to Web phones, to pagers, and automobiles. Java runs on Explorer 2000, running Intertainer, a video-on-demand application. Expect to see Java as a programming platform on all kinds of devices, whatever operating system they're running. This will allow developers to port their software and content to many platforms and devices.

IBM: the home infrastructure doesn't exist yet. The wire could be anything, in our view. IBM Home Director Professional allows the user to move services throughout the house. We're trying to make it easy; information appliances will be hampered otherwise. New information appliances are needed to drive the market. They will eventually communicate to the Internet through the home gateway, possibly a cable modem.

Question: Do people want to use the Internet from their television sets?

WebTV: Yes. Our subscribers use WebTV to enhance TV but they also surf the Internet twice as much as PC users. There are two groups: active Internet users watch very little TV anymore, unless it relates to their community; the other group uses email and more television. The first group use Web TV for the Internet not for better TV. Even though we promote the new appliance, Web Plus, and its interactivity many people still buy the Web

classic.
Network computer: Our sample size is a bit smaller, but our users go after particular applications: mail, program guides, messaging.

Question: Is it better to enhance TV or sell the Internet?

Network computer: Enhancing the essence of the appliance is the way to go.
Web TV: We're not shifting from Internet to enhanced TV. There is space for an Internet-only device for a long time. We've only recently launched the Better TV campaign so it's a little early to gauge response to enhanced TV.
IBM: People will not use TV to surf the Web. The explosion in Net usage will be through other dedicated devices throughout the home.

Question: I develop interactive advertising using all these technologies, but I find clients are not interested because no one is watching.

Network Computer: It's a chicken and egg problem but people will come. WebTV has to be sold under cost. The services will go to people who fund the interactivity.
WebTV: It will be hard to see it until we are in a world of bandwidth abundance.

Question: how long until we reach 15 million high bandwidth households?
IBM: 5-10 years.
Sun: 2-3 years.
Network Computer: 3-4 years.
Web TV: 2-3 years.

Question: Will people watch television on their PCs?

Sun: No, but they will listen to music.
Web TV: At first I said no, but now I think people will do that.
IBM: That's not the right division. We'll have one screen, with different appliances connected to it.
Network computer: That vision is a long way off.
Sun: We will see disaggregation of appliances into bits that are connected around the home. The question is how will people administer that: Genie is our product for plus and play networking.

Question: Are applications compliant to the Advanced Television Enhancement Forum on the air now?
WebTV: Just trials.
Network Computer: ATVEF is useful in the short term - Java is long term.

Question: Why doesn't Web TV support Java?
Sun: Both of us are working with TCI in set-top box content development. We can integrate Java.

Question: When will WebTV support Java?
WebTV: We have been seeing a trend toward it, but it's too big for our RAM. We will be moving it up the priority list.

Question: Do you anticipate that every room in the house will be Internet accessible?

IBM: Yes. In the future, people will assume that whatever appliance they bring home should be able to plug into the Internet in some way.
NCI: The home, the car, wearable appliances. The ubiquitous network will go outside the house. We'll need solid back-end stuff to make this reliable.
Sun: Yes, but there will be a need for a hub somewhere in the house. It could be an existing device like the PC or the set-top box, or a new device.

Question: How can you develop applications so they look good on every appliance?

IBM: There is no easy way today. Our home director application puts the user interface on the TV. But that took a lot of work.
Web TV: We have done a lot of style work, and use intelligent filtering. Some sites look good on the TV and the PC, but the smaller devices are harder.
Network Computer: We have made progress in three years. 95% of sites look good, using XML, style sheets, etc..
Sun: We have developed pluggable user interfaces, so that programs change to match the device. It's interesting that this work also applies to accessibility for the disabled.

Question: What will the big winner applications be?

IBM: Internet sharing, distribution of entertainment in the house.
Sun: AOL.
WebTV: Community-based applications, like the buddy list on television.

Question: Will you be supporting non-screen based applications?
IBM: We do it now. Security, lighting, appliances and so on. Unfortunately, all current systems are proprietary, so we built a box that would talk to them all.

CES Plenary Keynote, John Chambers, President and CEO, Cisco Systems

Our vision: Internet networks are rolling out so fast that they will create revolutionary social change. Currencies will disappear, education will change dramatically, and we will see the death of time and distance as everything will be connected.

The Internet is rolling out six times faster than the telephone, and four times faster than the PC. Change on the Internet should be measured in "dog years": seven years of change for every normal year of human time.

Ecommerce will go to $1.1 trillion by 2002. Devices will go in two directions: some will get a lot of functions, others will become very simple. Internet shopping has moved from PCs to clothes and this Christmas to toys. Business Week projects that by 2002, 30% of cars will be sold over the Internet. The Internet is a much better shopping experience, much faster.

(He demonstrated a connected living room in which the phone, the television, computer, cable modem, the air conditioning, the lighting, the blinds, the security system, a player piano and a player violin were all connected and controlled through commands coming over the Internet.)

Business strategies: Do not compete with your partners. Most partnerships do not work. You need to do multiple transactions, with short-term wins and long-term wins, with enough transactions to add up to the 50: 50 balance. We are closely integrated with our partners: we run our systems inside their plants to raise and lower supply to meet our demand.

We must get high-speed connections to the home. We must work together on common standards if we are to move the technology to levels where consumers can use and understand it. Time-to-market on innovation is a key advantage. If you miss the market by one quarter, it costs you 20% share; miss the market by two quarters and you shouldn't bother to go into it.

Technology will bring about personal and social changes. These interconnected devices can be used to

- locate children
- see your children over video in the day-care center
- keep your photographs and other mementos secure
- pull down music from the Internet
- monitor devices like heart monitors so your doctor knows if you are in trouble
- provide global positioning on many appliances like telephones and pagers

Education will change as well. Some countries are connecting every home, not just every school, to obtain a competitive advantage in education. This is a good example of business working with government. We believe the advantage will go to countries that give Internet access to everyone.

Webcasting - Audio and Video Broadcasting on the Internet

CES Intro: The Internet may not be TV or radio, but don't tell that to millions of computer users who every day are listening to their favorite talk show, football game, news show and health report. For people who think that the Internet is static and just not ready for prime time, the information which will be discussed in this workshop will set them straight. Audio on the Internet is already excellent at 28.8 and the technology that delivers audio on the Internet is improving all the time. In this session, the entire concept of audio and video on the Internet will be broken down; including the types of programming on-the-air now and how that is expected to grow, as well as focusing in on the types of technology needed for delivery of live and archived shows. Our speakers are the companies responsible for making audio and video possible.

RealNetworks, speaker did not identify himself (this session from audiotape)
Brad Porteus, Vice President of Marketing and Business Development, Imagine Radio
Martin Tobias, Minister of Order and Reason, encoding.com
Mellie Price, Vice President, Business to Business Div., Human Code
Richard Titus, Managing Director, Razorfish Los Angeles
Michael Weiss, Vice President, Webradio.com, a division of Geo Interactive

RealNetworks:

Up to 75% of our audience may still be on slow connections up to 2002 - a real world limitation of about 20k. This gets us fairly good audio and video in a reduced size. Audiences are growing, but we'll still have to work on quality, and how to work within the limits. Using a technique called SMILE, we can some different things down the pipe, and get a little bit more of it. He demo'ed CMP Techweb Today, their daily presentation using streaming JPGs, postage stamp video, bits of text coming down the streaming channel.

The questions: How do we make money on this and how do we keep people coming back so that we establish the business models?

Porteus, Imagine Radio:

Radio on the Internet is repurposed traditional content. Radio for the Internet is creating audio content specifically to leveraging the Internet's unique capabilities:

- International reach
- no spectrum limitations - unlimited choice and diversity, niche content has a real opportunity
- One-to-one distribution. Multicasting is 3-5 years away, with a one-to-many connection

With the ability to deliver specific content to individual listeners based on their preferences, Imagine Radio delivers tools to help listeners build their own virtual radio stations and share them with other people around the world. It's still meant still to be a background medium, so you have to leave 8kbps on the connection free for people to do other things. It's prohibitively expensive to create content for every taste, so we let the listener do it.

Broadcast companies have discovered a limited number of successful formats, and there's a myth that people have no other interests. Lots of available music, so there's no content shortage and we're trying to fuel that by letting people build their own.

We can compare your preferences with others and suggest music you might like. We also have a set of streams that we build. But we find that people who create their own are more likely to listen longer and come back more often. Since people can skip ahead to the next song, people are doing more risk-taking.

How does this make money?

Audio advertising. Synchronized multimedia audience contact ; SMAC. Since people train themselves to ignore repeated ads, we immerse ads into the programming in such a way that listeners only hear the ads a limited number of times, rather than endless repeats. Our ads are also a call to action - people can buy right away.

You need a windows mediaplayer plug-in - 42 million people have one.

Weiss: webradio.com (of Geo Interactive)

Geo's core is expertise in compression algorithms. We've offered low-price web development tools that allow everyone to put video and audio on the website. We now have java-based technology, announcing it under the Webradio name.

The Home Front Study by Odyssey Research reports that only 25% of Internet users at home have actually used Real Network's player in the last six months and only 7% have used Netshow. Since our technology is based on Java, like the browsers, we'll be able to deliver 3x to 12x the audience reach. The next step in web broadcasting is reach, and forcing them to download a player limits the reach. For consumers, the Internet is about choice and control.

Current streaming technology seems to be aimed at radio stations. Arbitron (US radio measurement bureau) will soon be including the Net audience in station ratings. 6% of all Americans, 19% of on-line users, are using radio on the internet. **Arbitron says that we will see a huge shift in radio due to new media – they think every radio station in North America will be webcasting in two or three years.**

Richard Titus, Razorfish

We are a facilitator and an enabler in this area, rather than a content provider.

Webcasting is a bigger item than we see now. Convergence - AOL/CBS are partnering; and so on. Don't know where it will end up, but bandwidth, processors, and cost of storage are quickly becoming commoditized, and getting faster, cheaper and quicker.
[He then went into a long ad for Razorfish, which is an Internet consulting company that helps companies re-invent themselves digitally. Clients include the brokerage Charles Schwab which now does 60% of their business on the Net.]

Razorfish has built some interesting technology, including the "Sniffer". This operates on a web page - it looks at the user's machine at first login, sees what plug-ins are installed, and custom-tailors the video and audio to match their machine's abilities.

Their CBS project uses dynamic HTML generation to create pages that show the affiliate as well as providing network branding. TVN has many customers for a range of movie content, directly or through cable and satellite providers. They built a system that allows consumers to look into their content and preview it over the Internet and place an order which then is fulfilled through the provider they use. The next stage will be to deliver the movie over the Internet - not possible now.

Price, Human Code

They have worked in transitioning business and education content to the Internet. My job is to figure out how to make money on this. Human Code is a 130-employee company, with 3+ divisions: consumer products - CD-Roms; business solution consulting division; and a learning technology division + production units that feed all three. They've developed many things, distance learning, an Ecatalog network, many-to-many gaming for Shockwave etc.

Our approach is to build the infrastructure in a company to make the media product. Places we can make this work: talking book over the Internet, business training - e.g. java training for employees can be done for hundreds per employee rather than thousands.

Models for Profits? We say the "consumer will drive the market." But there's no advertising driving the consumer. The business model right now - which people don't want to hear - is loss centre. That is, reduce expense – it's more effective to use media streaming in the marketing, PR and training spaces than in streaming something to the consumer that has no dollar amounts behind it.

Ecommerce is one workable model. Subscriptions do work for some business content - white papers etc. Tuition for education. [He demo'ed an eCommerce site based on a mall model. The user populates their own mall - and they stream ads to them based on their stores. They can click to the buy, etc.] Seems to work well and be popular with consumers.

Tobias, Encoding.com

Until recently there weren't any service houses to encode large quantities of analog content to many formats - when you know what you want but want the site built. We do that, and we also supply software to fix the problems that arise. Blurb: latest technology, can create any kind of compressed video or audio you want. Seattle, San Francisco, San Diego the usual marquee clients.

How are people paying for webcasting? Advertising.
What is it? Mostly repurposed audio and video - "shovelcasting".

Forrester Research says there are three things wrong with webcasting. It's a cost centre, it's difficult to find and enjoy, and the business model is banner advertising.

In 1999, we'll see an increase in the quality of experience in Webcasting. With the G2 technology from RealNetworks, the number of bits required is going down, while the connection speed is up. A richer experience. Content owners will have to support content for the highest bit rates as well as for the low. Will make it more difficult to provide content.

A new inventory of ad vehicles will also arrive - audio ads on Imagine Radio, text crawls on webcast video. Ads will shift from banners to platform specific sponsorship opportunities. Webcasting has increased the average length of stay on a site; so we'll see more tie-ins in 1999 that convert that length of stay into some kind of revenue.

Companies that may have hundreds of thousands of hours of content see a big problem in putting it on the Net. Not just the encoding but the tracking of usage, getting payment, etc. How do I support syndication through a third parties? I may have different rules for different syndicators - not supported today but we'll be doing something in that area.

In 1999, we'll see easy ways to share audio and video with other people on the Web. That will drive technology improvements, more than CNN on the Net will. In 1999, neither multicasting or broadband will come to save the day. There will be another 500,000 @Home subs but there will be hordes of dialups.

Service houses will do well, including rights clearance houses. Hotmail will do well. Advertisers will get new tools and do well, and the networks will get some new revenue streams.

Question & Answer

Q: Is streaming media just irrelevant because of the size of the audiences?
Weiss: It is becoming easier to get.
Porteus: We're all here on a promise. Internet advertising is actually coming up to projections made three years ago. It will be over $5 billion in 2000. Small innovative companies can be seen in the same space as monster companies. AOL has a market cap higher than all three TV networks. This is an exciting place to be.
Price: You might not make money right now but there's certainly models for saving it. It will take time. Right now the expertise is too limited - when it's more cost-effective to acquire a company than to recruit then there's an imbalance. But it is moving forward.
Martin: If they are looking the other way, that's great. But the independents won't last; once the studios and the majors wake up to there being money there, watch out.
Razorfish: The portal play of CBS and AOL indicates that they are aware and in the game, which is why Broadcast.com's stock is so high.

Q. Inaudible:
Porteus, Imagine radio: We've had over 100,000 people come to our website and build their own radio stations. Whether you're an individual or a corporation that wants to create an audio accompaniment to your own webpage.

Weiss, Webradio. We're not going to be content providers, but we'll syndicate and provide turnkey solutions. We'll compete with Broadcast.com.

Q. Are we moving toward narrowcasting or broadcasting?
Razorfish: Both. We did a major campaign to drive viewers toward Psi Factor during sweeps week, which showed a 1.2 increase in ratings.
Price: Narrowcast is here now, but it will be an evolutionary process, both will stick around.
Weiss: It's like home video in the seventies and eighties: the flyfishing tapes are still out there but the big winners have been the studios with the movies that people want to watch.
Price: There are niches where people want to lead themselves and there are niches where they want to be led.
Weiss: The CD-Rom industry didn't live up to its hype because not many people wanted to go home and kill aliens on a screen.
Porteus: The lines will blur as people personalize television.

Q. Will digital television have an impact?
Razorfish: Yes, the TV is the most ubiquitous appliance.
Martin Tobias, encoding.com: You have three lines coming into your house, telephone, cable and power. You'll get two experiences from the two platforms, TV and PC. When I sit to be entertained I don't want interactivity even if I can get it. If the TV can get data from the PC, I may do that, but I'm in a different network. You'll never get the interactivity and the one-to-one over a broadcast network.

Q. Talking about the platforms, one of the problems with IP Multicast is that you can't monitor how many people are watching like you can with straight IP. The cable boxes, on the other hand, never turn off and are always monitoring everything you watch - which is kind of a pernicious thing in itself. AOL is kind of the Internet, but it's really a walled garden of content. With the cable modems, are you worried that it might be hard to find Imagine Radio?
Imagine Radio: No. I think we'll have wireless IP technolgoy so everyone will be able to get Imagine Radio in your car or any car. Right now people are hearing us at work on a T1 line.

Q. I'm worried that the unsophisticated person will buy a cable modem and never see the Internet, only the walled garden.
Imagine Radio: The web is too big now - AOL users are starting to find it. You can't shut people out.
Razorfish: But whoever owns the connectivity device will have an incentive to control the content, especially since they are being sold at a loss in order to sell services. Even Gateway has an ISP that you get when you buy a gateway PC. If all those people are smart they will allow connectivity outside. Also people like Imagine Radio will try to make deals with the people who own the gateway.
Price: There's a dogfight that has yet to play out around exclusivity of content.
Imagine: I'm seeing a more sophisticated user. For a while no one knew how to change their default homepage and Netscape had a lot of visits, But consumers are getting smarter.
Razorfish: People do "real estate" deals [deals with portals] because it gives you location and convenience. On the Net, once you know the retailer, you don't need the portal that gave you the first exposure.

Q. One of the advantages to streaming over other web applications is that it doesn't get lost when you surf - you can keep it with you in the background and keep the listener connected.
Imagine Radio. Yes, but research shows that people rarely listen to a site for more than ten minutes at a time. We do concerts on one site that may keep people hooked up for hours at a time, but the bands won't let us advertise on those streams. Forester says we have to hook them for longer, or create a richer more immersive advertising experience - an oxymoron. It's one of the things we will work on this year.

Q. When you create a rich experience, people are there for the duration. Even in TV they don't surf away for the commercials.
Razorfish: How do you create a rich immersive interactive experience? Doesn't exist right now.
Price: With gaming, people will stay on forever. Trapping someone in front of a computer to listen to music is different. They have much more choice and distraction than in a car.

Q. Do you think the form of the content needs to change in the future?
Razorfish: Yes, like the sharing of personal videos. It's economically unfeasible to electronically distribute that content today. But Seinfeld is so well distributed you don't need the Web.
Imagine Radio: Yes, like the press conference after the game. It's interesting but not going to be on the TV. But Internet webcasting will not survive as a "cool thing", it must be a stepping stone to something else.
Price: The broadcasting model of trapping eyeballs etc. is not welcomed by the Internet audience. Do consumers want to be trapped? We're having to answer that question.
Razorfish: TV didn't kill radio, Internet will not kill radio. The power is to do something that hasn't been done before. In terms of advertising, people are not taking advantage of the one-to-one capabilities of the Internet. And when they do, it yields huge results. Urban Decay was the most successful cosmetic company on the net last year because it is a product you can't go to Macy's to buy.
A: The problem with the Internet is that people want to be active: they've had their coffee and their hand is on the mouse and they won't sit still. What we have to figure out is how to keep them clicking within our experience.

Q: Inaudible.
Price: The consumer is willing to accept marketing materials over the Net if they are relevant to that consumer. It doesn't matter what box delivers it.
Razorfish: We're building most of the browsers for these set-top boxes and I can tell you that streaming media has little to do with why they are there. It's to do something that you can't do with television. Viewers can't buy anything while they're watching, but that's the capability that people are focussed on. A hotel chain is building a browser into its movie box and making deals with Amazon so that people can buy at night and get books delivered to their hotel room the next day.

Satellite TV: The Year Ahead

Moderator: Bob Scherman, Satellite Business News
Eddy Hartenstein, DirectTV
Karl Vogel, PrimeStar
Stan Hubbard, USSB
Charlie Jurgen, Echostar Communications

CES Intro: 1998 was one of best years in the short history of DBS. This panel of executives will examine the factors surrounding sales in 1998, discuss the role DBS will play in the launch of HDTV and see how the local broadcast issue will impact 1999 sales.

Overview of Statistics:
Current Market Share:
Echostar 18%; C band 18%; PrimeStar 21%; DirecTV 42%

Market share within DBS
DirecTV 51.6%; PrimeStar 26.1%; Echostar 22.3%

Projections for 1999:
PrimeStar: 200,000 net new homes in medium power business
DirecTV: 1,300,000 new homes
Echostar: 1,000,000 million net new homes

New Factors: Sales for this year will be impacted by a shutdown of local signals as a result of the injunction in the court case in Miami. That has the potential to impact sales on an ongoing basis. Also, the Echostar and News Corp. deal to acquire the 110 degree satellite frequencies, and DirecTV and U.S.S.B. consolidation with be complete by the second quarter.

In December 1998 more satellite receivers were sold on gross basis than any other month in history: 500,000 new sales. A very strong 1998 in terms of new sales: a record year.

Comments:

Hubbard: these projections are quite low.
PrimeStar: we'll beat that 200,000 number.
DirecTV: we can do that number.

Issues:
DirecTV: Our leadership role in interactive products will keep us up to the challenge of competing with cable.
EchoStar: Digital cable hasn't had a significant impact on the satellite business yet. If the price points are right it will have an impact in the future.
Hubbard: DBS continues to be driven by choice and quality. People are becoming aware that it is the true cable alternative.

PrimeStar: A strong economy is the biggest factor. Legislation allowing satellite to compete local-local with cable is imperative. And after those, it's the innovations that we're seeing at the show where we give consumers something beyond what they get with cable today. Our venture with WebTV to put equipment in a satellite receiver like a VCR will bring new people into the marketplace. High-definition television, later in the year, will bring people to satellite. People who spend $10,000 for HDTV are all going to want a satellite dish. The one negative is the impending cutoff by the end of February of many of our subscribers. The impact will be bad, but we will work to minimize it.

Q: What will the impact of the cutoff be?

DirecTV: I don't know what the impact will be. We'll do our best in the face of an uninformed situation. We've always thought the best solution is a national one. There has to be a comprehensive look at the Satellite Viewers Act to get rid of the ridiculous provisions in there today. We want a simple, "Give me your address and I will tell you if you qualify for distant signal" approach but it's got to be on a reasonable basis. Not one where the Grade B contour is the definition

Echostar: The best solution is a local antenna, obviously, but that only works for half the homes in America. We have to provide a solution for every customer so they can get the channels they watch: an off-air antenna is still the best but if they can't use one we need an alternative.

Hubbard: I think the " white area" of the nation is about 8% to 12%. None of us believe that cable will pass the digital signals from local (DTV) stations. Consumers will need antennas. We will have more local programming: antennas will be more important. Delivering local by satellite is not very feasible.

Primestar: Providing local signals is a market share play. If there are better uses for the capacity (extra signals) than local, it won't work.

DirecTV: If the local broadcasters multiply their signals with DTV, there won't be any satellite solution. That's why the off-air antenna is the best solution.

Echostar: If it's what the consumer wants that's what we will do. Lots of them don't get good local signals.

Hubbard: We haven't argued against satellite carriage of local signals, as USSB, but as Hubbard we have been very clear that this is a copyright issue. We own the ABC copyright in our market and we should be able to say when someone else can bring the programming into our market. Fifteen years ago HBO and Showtime put scrambling on the signals to protect their copyright and we think it's the same thing.

Question: Does anyone want to talk about the discussion that there is an impending deal between PrimeStar and DirecTV? [date of discussion Jan 10]
PrimeStar: We're far from dead with a billion and a half dollars worth of revenue. We want to maximize our assets. We're looking to recapitalize the company and we're looking at

alternatives. (PrimeStar is owned by consortium of cable companies, TCI, Cox, US West, Compcats and US West.) No one is making money in the satellite industry yet so there are capital issues throughout the industry.

Question: Can the satellite industry support three separate DBS services?

DirecTV: we've done very well so far. We're knocking on the door of actually making money: EBITDA and cash flow positive in the second quarter of this year. The USSB transaction does not affect the cash flow for the earnings break even points for us. In the long run, it adds $900 million of revenue to our top line. In the first year, there may be $100 million of savings so it's a good proposition.

Echostar: We were EBITDA positive in the first three quarters of this year. We have made a tender offer on all outstanding debt of billion of half dollars, if the bondholders tender they'll make a good return if not will have to refinance that debt, hopefully at lower interest rates.

Hubbard: I think there is room for three companies. We'll beat each other up as much as we can, but the real target is cable customers.

PrimeStar: There is clearly room for three: price points for cable and other factors play in. As an industry, we've beaten the projections, we are reinvesting our cash flow in our companies, the consumer markets and the financial markets have supported three: there's no reason to think it can't continue.

Q: But the general trend is in consolidation. Do you see more ahead?

DirecTV: We have no plans right now, but we're always looking at ways to increase penetration.

Q: Stan, why did you decide to move ahead with the deal now?

Hubbard: In a perfect world we would have stayed independent. But the business is now so mainstream that we had to create a position where the consumer coming in the store could see a clear alternative to cable. Financially, it was a good time for the deal, and we're determined, and so are all our employees, to turn over the company to DirecTV in better shape than they bought it. Once we've done that and our employees are taken care of I'll sit down to see where we can go in terms of building new businesses.

Echostar: I'm sorry to see the Hubbards leave the industry. The deal looks to be good for both companies. DirecTV will be a tougher competitor.

Q: What about interactive channels?

DirecTV: We have the 7.5% deal with Thomson on multimedia, we've announced a deal with Philips, TIVO and Wink on interactive; there will be a lot more to come.

Echostar: We have an interactive deal with WebTV. [and Replay]

Q: Will DirecTV offer HBO in high-definition?

DirecTV: We have a channel of high-definition now and HBO will be our second. As we go forward and the sets roll out, we'll come to other agreements. If we have a million HD sets out there by the end of the year, you'll see more channels sooner.

Q: What's the one thing people should look for in satellite TV in 1999?

Echostar: New legislation, white areas are the first thing
Hubbard: New consumer understanding.
PrimeStar: Positive cash flow.
DirecTV: World peace.

Digital TV Meets the Internet Summit

CES Intro: For the first time, it is becoming clear that the Internet is about to become a significant part of the consumer electronics industry. At its heart it is becoming part of TV, music, radio, photography and telephone. The key is digital and mass accessibility. This session will focus on the way this will all come together and take shape.

Panel:
Steve Perlman, WebTV
John Taplin, Intertainer
Thom Kozik, Wavetop
Allison Dawlor, Alan Brody co-hosts

Alan Brody:

When it started the Internet was a practical version of what interactive TV will become. It's like El Nino: we heard about it for years but now it's happening. eTV is enhanced TV, set-top boxes. This convergence won't drive off the brick and mortar companies but enhance them if the retailers understand it.

This will be driven by broadband. We don't know what appliances and devices will work but if we bring Internet together with television, it will create the biggest market of this century. Imagine the explosiveness of Internet share values applied to the biggest entertainment medium in the world.

Stephen Perlman, Web TV:

We've learned some things by being the first providers to bring the Internet into the living room. Viewing distance, about five feet in the living room, is good for entertainment but not for spreadsheets. A different audience joins the Web from five feet away. We have about 700,000 subscribers, 1.5 million Americans using Web TV (because 2.2 people use each set). We grew 500,000 subs in 1998, and are in 11,000 retail locations including Wal-Mart and Kmart.

Web TV users are like TV users, not PC users, with an average age of 43, about 50/50 male and female, and they use Web TV very heavily - once a day on average.

Despite the predictions, people do like to interact with their TVs, so it's a matter of having good content. One very positive development is the creation of ATVEF, the Advanced Television Enhancement Forum, which is creating a standard for interactive TV based on HTML. Everyone can build their applications on the standard. WebTV plus is the first appliance built on it.

We also have a new system working through Echostar based on ATVEF. The model 7100 Echostar receiver is the first Internet receiver with a satellite connection, fully integrated with added features, available spring 1999. It includes an 8.6 GB disk drive [Replay] that gives

you to features like pausing live TV, seeing replays, recording shows, and recording speculatively.

We can also download video games onto the disk in a few seconds and play them. In 2008 the smallest drive you can buy will be a terabyte drive costing about $60, which will let you record a lot of television. It's all integrated to your VCR as well.

As we develop, we will be doing things like downloading our home page from the satellite every night, and over time, certain large objects like video files on an allied news page coming down at 500 K. We also cycle and pre-load sports ticker, TV listings, and stock ticker information so users have it all the time, whether they are logged in or not. There is also a chat room attached to each program where viewers can discuss what they are seeing.

The possibilities are endless. The whole notion of prime time will change when we have thousands of hours of recording capability and shows can be down-loaded in advance. TiVo and Replay are doing very similar things.

John Taplin, Intertainer:

Intertainer is a broadband service delivered over high-speed modems and now the SA Explorer 2000 cable set-top box. The company is funded by Sony, Intel, NBC, Comcast and US West. We're into market trials now.

We believe in a Java-based standard delivered over any device. It has an intelligent agent, profiled separately to each member of the family, that suggests content you might like. You can see movie trailers, rate them, and when you buy, you have a 24-hour licence to watch it: allowing you to pause, rewind etc.

Interactivity also covers advertising: as in the Gap ad we created where the viewer can click on and buy any of the clothing. This encourages impulse buying. Bringing advertising and interactivity together are crucial part of the future.

In the music section you can scroll up and down a hundred different formats. You can check pricing information and buy the album directly. If someone goes into any commerce section of the service we'll aim commercials at them depending on their choice of area. When icons pop-up they can check out the product, put it in the shopping cart, and make their final purchase decision at the end of the session. In a cooking show they can pause at any point, check the recipe, and buy something.

Producers don't want you to go off on the Web while their program continues, so we arrange to pause the program while you use the interactive tools. There's many ways to use these tools and we hope people will develop the interactivity and deeper content possible.

Brody:

PC users want convergence too and what's out there, like Broadcast.com, is not very effective. The audio suppliers have done a good job, and perhaps we're going to see video also created to accompany people while they work.

Thom Kozik, Wavetop (from Wavephore Corporation)

We carry any kind of content through any kind of network. We use 14 FM sideband stations, a big satellite footprint carrying Skytel paging. We also datacast on the VBI in analog TV signals with PBS across the US.

We can rent space on our data carriage platform. We broadcast content continuously on the VBI into the cache on the PC. Wavetop is embedded in Windows 98; Intel's Intercast is also built on our product. If you purchase a computer from Sony, Dell, Compaq or Gateway with the TV tuner card our software is in the box.

Our model works because broadband will take time to roll out. ADSL will be slow getting there and cable modem subscribers experience slowdowns as soon as they become popular in a neighbourhood. There will also be many users still on dial-up, so to use broadcast signals to get into those systems makes a lot of sense.

Jupiter will tell you that there are two million broadcast-ready PCs out there now, ramping up to 20 million by 2000, due to reductions in the price of the card. We'll see every PC being able to receive this information. [DTV-ready PC cards have already been announced.] So lots of Internet information can be sent directly to devices, both PCs and hand-held, from broadcast towers.

As a service, Wavetop is an advertising supported product, targeted at home PC users. One of the interesting features of our network is that we can select and sell regional areas, unlike the Internet where regional selection is very difficult. That also applies to program content where we can supersede the national broadcast with local information.

We download tons of information into your PC. We'll broadcast a gigabyte a day by the end of 1999: you can choose to keep it or delete it. We have a broadcast schedule: every Thursday receive the latest games, every Monday you receive the latest Windows utilities.

In the normal Internet experience there are many delays in watching a video segment. Getting it instantly changes the user's perspective. Most Internet eCommerce experiences are limited too. All of the merchandising used carefully in mail-order catalogs is thrown away on Internet with these tiny thumbnails to the lowest common denominator of 28.8 connections. WaveTop changes that: the consumer gets a full-screen detailed shopping experience.

Question: The mobile devices and applications issue?

WaveTop: It's important for us to reach these devices with our information. We would filter, scale down on hand-held devices.

Question: Will Web TV have an Internet like phone service?

Web TV: There's no reason why not. We haven't focused on it because of household connection issues. An infrared handset would be helpful.

Question: Where do you see your products in the context of high bandwidth satellite connections?

Intertainer: If anyone can provide 1.5 Mbps we are fine with it.

WaveTop: Consumers can never get enough bandwidth. If they get more they demand more, so if we see widespread high bandwidth connections consumers will want video chat rooms, and so on. Our approach is to broadcast all the essential data that lots of people will want, which frees up capacity for interactivity.

Web TV: If it works we'd like to use it. We would tailor our product to work with that means of transport.

Question: Will the pause feature of Web TV play havoc with the advertising?

Web TV: The interactive commercial that can lead directly to purchase is much more attractive. When you can target the audience it will work well.

Intertainer: We're seeing glimpses of the future. Advertising will change. Targeting is more efficient and less annoying to the consumer. But people are sensitive to their privacy. They don't like information about them being tracked, so you have to be careful to get permission and if you don't get it, send them a generic ad.

Supersession: The DTV Report

Moderator(s): **Gary Shapiro, CEMA;**
Joel Brinkley, The New York Times
Susan Ness, Commissioner, FCC

CES Intro: Two months following the initial roll-out of digital television, manufacturers, retailers and broadcast executives will provide an update on consumer acceptance, broadcaster and program status and set availability

Tom Campbell, Dow Stereo/Video
Joe Flaherty, Senior VP Technology, CBS
Stanley Hubbard, USSB
Saul Shapiro, VP Technology, ABC
Terry Shockley, Shockley Communications
Peter Smith, VP technology, NBC

[This session contained little new information, so what follows are highlights.]

- Over 40 stations, not the 24 expected , are on-air. Satellite is providing high-definition aggressively. The CBS / Time Warner agreement shows some hope for cable carriage. Nonetheless DTV transition is expected to be a slow and lengthy process. Issues of carriage, copy protection, and interconnection must all be solved.

- The networks did not describe aggressive plans for high-definition, and as far as I could tell, nothing beyond what had already been announced.

- Tom Campbell, the retailer on the panel was excited about high-definition. He has been moving sets rapidly. CEMA reported that 13,176 sets have been shipped to dealers so far. [At that rate, they should make their projection of 150,000 sets in 1999.]

- Campbell also reported concerns about the amount of high-definition programming available, and customers' questions about pay-per-view. He was nonetheless confident that HDTV would sell as the ultimate statement of affluence.

<u>Susan Ness of the FCC</u>

- She repeated the support she had stated a year earlier for the broadcasters position rate cable**. She insists that we complete digital signal and all of its features should get through to the consumer, unaltered by the cable operator.**

- While she still sees issues, such as copy protection solutions and affordability, she has been encouraged by the work on the 1394 agreement and on the specifications for cable ready sets.

[Ness's statement is significant. If the FCC rules that cable operators must carry the whole

digital signal of the television operator, then they will be able to do less gatekeeping on digital enhancements to television, such as interactive advertising. If they can strip data out and replace it, then all interactive ads are under their control. Interactive advertising is only effective if they are also providing a return path for the users' responses … an issue that has not been fully joined. Presumably, retail cable boxes will pass through responses under the broadcasters' control with no interference from the carrier.]

Manufacturers panel:

Frank DeMartin, Sharp
Peter Fannon, Panasonic
Jeffrey Gannon, Zenith
Robert Minkhorst, Phillips
Steve Nickerson, Toshiba
Mark Knox, Samsung
Jim Palumbo, Sony
Gilbert Ravelette, Thomson

- Shapiro asked the manufacturer panelists what percentage of **digital** sets sold in 1999 would be standard definition v. high definition. Their response was that at least two thirds of all digital sets sold would be HDTV sets. [This reflects the high-end early adopter market.]

- Optimism was the keynote of this panel. Each manufacturer confirmed that they were meeting demands that they considered quite strong.

- HBO's offering of a high-definition signal in two months time was the most positive programming step they could see. However Sharp noted that cable was still crucial for the long-term. Panasonic agreed and noted that they were all ready for a more rapid production schedule once cable was clearly committed. Toshiba noted that not all cable was uncooperative. Others noted that the success of over the air was the basis of the whole system since 98 million households are reached by over the air networks.

- The manufacturers were reticent to define success in terms of HDTV sales in 1999. They cited other objectives, such as maintaining total set sales including analog, eliminating customer confusion and improving awareness, and resolving the 1394 conditional access issue.

- All were skeptical that analog would be turned off in 2006. They are advising their customers and dealers that this is not an issue they should be overly concerned with.

- The session ended on a positive note from Panasonic's Fannon, who believed that HDTV rollout will surprise people by being faster than they think. He cited advertiser interest in HDTV as a new driver.

Mass E-Commerce: When Every TV is Online

CES Intro: E-Commerce has already become the most promising area of the Internet in the business-to-business and technology product buying. What happens when major brand names meet with the convenience of universal Internet shopping? How will consumers really respond? What are the business models to launch? Come to this session to find out the answers to these questions.

Panel:

Alison Dawlor,
Alan Brody co-hosts:
Gary Arlen, Arlen Communications
Phillip Swann, TV Online
Mike Ramsay, TIVO

Brody:

ECommerce has had a huge effect on the valuations of websites. But the experience is not what we anticipated. We learned early that once people went online they expected huge choice in one place - you had to have a warehouse to succeed, like Amazon.com did with books.

Onsale and Ebay show how expectations are upset. Who ever thought that auctioning would be a big deal? Internet users want to be active; they are having a huge impact on the stock market. [because they behave differently from "brokered" transactions.] When every TV is online that demand for involvement will bring up even greater differences.

Gary Arlen:

Says we're entering an era of electronic everything. Email, emalls, ebilling, etailing, epayments. But cybershopping is still shopping - we're trying to improve on the store experience. Partly by developing communities of interest, getting advice. Shopping is entertainment - a social process. How do we maintain that? Can we get the same product mix as a mall?

ECommerce requires many new models: new approaches to presentation and to customer support. Advertisers changed their attitudes too, at first seeing it as a cost-per-thousnad model, then moving to a percentage of transaction.

Reality check: we had a big Xmas online season, and online may reach $13 billion for the entire year, but overall annual US retail sales reach $2.6 trillion. Walmart alone sells $118 billion a year.

What do customers want: convenience, bargains, shopbots to get best price. So what's the killer ecommerce app? Our goal is to make it easy to fill the "must-do" rather than the

discretionary activities. Price-based commodity shopping will be a problem because it lowers margins. And we have to keep choice up.

The 5 Ds have replaced the three Cs of teleshopping: control, convenience and cost are now distribution, display (how we show it) databases, delivery (fulfillment, returns) dollars (how do you handle the back room, credit, payments etc.)

How to succeed: Be there with something really new. Create a conducive environment for your product - use affinity groups. Reinvent distribution channels. Who will win? Brands, specialist products in a good category, certain media products that can bring audiences, be eye-catching.

Mike Ramsay, TIVO.

Describes TIVO (pronounced TEE-voh, and described in the "Some Booths on the Show Floor" section of this report)

TIVO is a digital video recorder with some interesting applications. It records and plays back simultaneously, so the user can "pause" live television and pick up where they left off or fast forward to come back to real time. It also records programs for you, based on their match to your expressed preferences - which you describe by giving programs a "thumbs up" on the remote button. Consequently it can potentially target commercials based on expressed preferences, but it also allows one to fast forward through commercials.

TIVO has preferential deals with some suppliers based on which they create "network showcases". These provide more in depth information on some programs. [At the moment they have no Canadian showcase partners.]

Philip Swann, publisher of TV Online, formerly published Satellite Direct magazine.

#1 thing that people are looking for in an Internet interactive TV device is more choices. In our first issue we talk a lot about how you can purchase on-line; we believe that entertainment will drive interactive TV. If you can bridge the well-known TV model you will have a winner - "Entertainment is going to be the bridge to eCommerce and it's going to be the bridge to the Internet on television."

Panels' Favourite eCommerce applications: Amazon, auctions, Waiters on wheels.

Q: What does it cost networks to be a TIVO showcase?

TIVO: No monetary exchange; the networks pay to create the additional information needed for the showcase. We could do a deal based on percentage of sales where that's applicable. Excited by the possibilities of eCommerce on TIVO platform - it's a more passive buying experience.

Brody: Not about entertainment. I say it's about providing bandwidth and product. The best that's out there, and TIVO has manipulated the TV experience to improve it without changing it.

On the Internet, products that empower people succeed. Ebay enables people to sell stuff to each pother. It's got collectibles, computer products, etc. They also sell books on how to sell products on eBay, which makes people think they can make money on it. Will people move from Coke ads to buying Coke shares on the TV?

Dawlor: The product goes along with the cult of celebrity, draws in famous people in every range.

Swann: TIVO will succeed because it's based on entertainment. Ebay is entertainment in the "shopping as entertainment" sense. If you link entertainment to interactive or Internet it will be a big winner.

Arlen: Buying shares of Coke is a business for eTrade, or Schwab or Merrill-Lynch, not for Coke. We're inventing a new business, but we have to put it in terms of business we know but that will change. The real convergence is in applications - advertising embedded in the program.

Philip Swann: It triggers the impulse buy - like moving from a music video to clicking and buying it.

TIVO: Right now the download is too complicated. Creates the gap between online and TV.

Swann: You could do that now with Wink etc.

Brody: Using MP3 you can do that now and capture it on the equivalent of the Walkman - a product that is a child of this environment. Could be extended to other media as well - movies, TV etc.

Q. TIVO is giving us the opportunity to skip all commercials, which attacks the whole basis of TV economics. You have to extend the eCommerce model to stay alive, by embedding advertising in the program itself.

Swann: Gets very complicated to regulate truth in advertising when editorial and ads are combined. Can't touch it under first amendment rights.

Dawlor: The National Infomerical Marketing Association was formed in response to that federal pressure. Now they're renamed the National Electronic Retailing Association.

Arlen: Remember the "puffy shirt" episode of Seinfeld? They could have sold a bunch of those with this capability.

TIVO: We've been sensitive to the possibility of skipping commercials and haven't made it easy but it's possible. The advertisers understand that this is going to happen. They will

respond with more attractive ads, and ads that are targeted to each viewer's interests. They will change the experience to give the user the choice of ads and how deep they go into them. They'll find a way to spend their ad budgets creatively in the TV environment.

Dawlor: There will also be a progression down the product chain, especially with children's programming. We've seen M&M and Pillsbury doughboy dolls just like we've seen the Power Rangers go through dolls all the way to Broadway.

Brody: Commercial skipping is not a big problem, because people like ads. In the early 80s the ad business was terrified of the channel changer, of people zapping away from commercials, but it never happened. And ads changed. More creative and entertaining now than they used to be. Half the Madison Ave. agencies are owned by British companies because they were used to the entertainment based ads.

Swann: The Superbowl ads are a good lesson - often more entertaining than the game.

Q. What kind of eCommerce software would you recommend for people who want to sell online?

Brody: Icat sells a catalog package that allows you to create an instant online catalog. ISPs offer authentication and credit card processing. Interworld is used by Cybershop.

Dawlor: Egobox is really good.

Q: Will we see eCommerce pricing models vary based on demand management?

A: Yes. We see that even now on infomercials , where the price drops during the program.

Future Trends and Market Forecasts in Wireless

Moderator(s): **Peter Nighswander, The Strategis Group**
Rhona Jobe, Geoworks
Roger Snyder, Unwired Planet

CES Intro: This session will cover the necessary and vital scope of information analyzing the present and future market trends of the wireless industry. Statistics and future opportunities including challenges also will be discussed, such as multiple services, pricing points and re-defining the service end of the industry. The Carrier/Operators are trying to go beyond traditional voice and move toward wireless email and Internet applications. Find out where the capability and potential for wireless is heading.

Peter Nighswander, the Strategis Group

- Subscriber growth for wireless email is promising, rising from 8.4 million subscribers in 1998 to a projected 47.3 million in 2003 (US only).
- Wireless Internet growth is still a few years away. He projects growth from 200,000 subscribers in 1998 to ramp up slowly to 600,000 in 2001 and then rise steeply to 2.2 million by 2003.
- The wireless industry as a whole is projected to grow from 55 million users now to 133 million by 2003. He sees 1999 to 2003 as an industry consolidation and growth period.

Rhona Jobe, Geoworks:

(Geoworks supplies platforms, services and consulting to wireless OS manufacturers and carriers. Their real-time operating system is in the Nokia 9000 handset and their services include Interface plus, news, sports, and weather, for carriers' services.)

Enhanced mobile phones are in the middle range between standard cell phones and wireless PIMs. They can use bitmapped screens to provide value-added Internet services, such as email, paging, and data services, as well as voice. She estimates the growth in the enhanced services market to go from the current 32.5 million users to 206.5 million by 2003; from $3 billion to $25 billion in services over that time.

She attributed low take rates of existing services to complicated user interfaces: while 21% of cell phone users take call waiting, 14-19% take voice mail, and only 2-5% take short message services.

Enhanced services are vital for carriers, however, because they increase customer loyalty in a market where replacement purchases will soon exceed new purchases of cell phones. Replacement purchasers are more demanding and sophisticated but will be less inclined to switch carriers if they have invested in data services.

She projected replacement purchases to grow from 42.3 million in 1998 to 150 million in 2003, while new purchases grow from 76 million in 1998 to only 81 million in 2003.

To drive the enhanced services market, phones need a compelling user interface: flexible, graphical, intuitive and engaging. These interfaces will also provide opportunities for branding as well as the data that the consumer seeks.

Roger Snyder, Unwired Planet:

He outlined four trends in the wireless market:
- prices are low enough that cell phones are consumer devices
- the demographics of cell phone ownership are changing
- basic service is becoming a commodity
- the revenue per user is lower, so wireless companies need new services to sell

This places new demands on the provider:
- pre-paid service to expand the market
- making the product simpler to deal with the consumer not the business user

Both consumer problems and carrier problems must be addressed:
- consumers have too many devices: palm pilots, pagers, cell phones etc.
- features other than voice are difficult to use
- carriers find customers expensive to care for
- there is heavy churn among customers
- every handset is a different experience

In the future, every handset will contain a micro-browser to receive timely information: traffic, voice notification, email, pager messages, etc. The customer will be able to look up their own billing and rate information. These features will increase loyalty because the customers email, address book, and calendar are in the phone. These capabilities will create new vertical applications such as real estate listings, dispatch applications, transportation information, and the ability to act on messages receive.

WAP (Wireless Application Protocol) is working to create new browser standards. Unwired Planet's business is to provide the server at the carrier network, with intelligent filters to extract the relevant data from existing Web pages and send that to these small devices. If the content provider uses WML, the standard markup language designed by WAP, then their pages will display well on small devices. 3 x 12 character displays with two soft keys are the minimum specifications for WML. 20 handset manufacturers and 3,500 developers are part of WAP, including Ericsson, Motorola, Nokia and Unwired Planet. Over 70 companies are now pledged to use WML.

For this market to develop we must have phones with good screens at price points below $150. The existence of the standard will allow carriers to differentiate and innovate.

Question: If the price to the consumer must be driven down, who will pay for all the new services?
Answer: Costs for customer service will also go down as a result of automation. In banks, the transaction with a teller costs $1.27, while and ATM machine transaction costs 15 cents. Similar economies will work here.

In addition, customers are willing to pay for new services if they are valuable. And finally, the developing business models for the Internet can also apply here, such as taking a split on any transaction.

The "Walled Garden" model may also apply. Wireless Knowledge is another solution: but it is just a pipe to the Internet; it doesn't help the carrier build affinity to the customer. AT&T Wireless follows the cable model, by providing customers with collected content: airline schedules, Bloomberg financial, etc.

Question: When will we see color interfaces on small devices?

The battery is the limitation. They are getting better but color demands much more juice. The handheld form factor is also a limit, as is bandwidth.

Phone manufacturers will want to tailor their user interface for themselves. Windows CE is too heavy and expensive for these $150 phones. 3G will create the next generation of high-speed wireless IP applications, but not anytime soon.

Accessing New Profits: Set-Top Converter Boxes Hit Retail

Moderator: **Matthew York, SmarTV**
Panelist(s):
Don Dulchinos, CableLabs
Ken Klaer, Scientific-Atlanta
Tim Lindenfeber, Broadcom Inc
Jack Chaney, Samsung

CES Intro: In 1998, the FCC gave retailers the opportunity to sell cable converter boxes for the first time, providing consumer electronics dealers a new profit vehicle. How does this product fit into the retail mix? How should it be demonstrated and merchandized? This session will introduce retailers to this exciting new category and offer tips on how to sell a product most consumers traditionally rent.

CableLabs:

The first part of his presentation dealt with decisions and standards developed by CableLabs. These included Data Over Cable Service Interface Specification (DOCSIS), packet cable, and various open cable decisions, including POD, the point of deployment module which will allow security features to move onto a smart card, enabling cable converter boxes to become retail devices; decisions on multiple operating systems which will allow software to be written easily for cable boxes; and aspects of the 1394 specification.

We now have the situation where cable and consumer electronics are in peaceful coexistence. We have interoperability, now we will move into certification of cable modems.

The clear theme of this show is home networking with non-traditional devices. We are interested in enabling every service over cable, and we believe that lots of media functionality will migrate to other devices in the house.

We have now deployed digital video in over one million homes.

Scientific Atlanta:

Scientific Atlanta is a $1.2 billion a year company providing equipment to the satellite business, the transmission business, and the cable subscriber. In the future, we will focus on service, not technology. **There will be no more proprietary boxes in the cable industry**. The current consolidated networks are becoming interconnected and two-way. Now they can provide voice and data as well.

Phases of service arrival from set-top boxes:
1. More channels
2. Video on demand
3. Email and chat

- Internet browsing
- electronic commerce

- high speed data to the PC
- addressable advertising

4. IP telephony

By July 1999, you have to be able to separate conditional access as a function in order to allow retail boxes. This is underway: we are in development of this module. We'll now have competition. How soon? It depends on network improvements and other factors but July 2000 is the retail deadline.

Broadcom Inc:

Broadcom is a developer of integrated circuits to enable broadband communication over cable, phone line, and wireless. We sell to General Instruments, Scientific Atlanta, 3Com, Motorola, Cisco Systems, Nortel etc. formation is to be the leading supplier of silicone for broadband digital transmission. We're involved in XDSL, cable modems, DBS, MMDS etc. We can now deliver 52 Mbps over telephone wire. [he did not indicate over what distance.]

We're trying to put the entire system on chip. We are well on the way to a single chip cable modem (except RF tuner), and the same for the set-top box.

Samsung:

We are the fifth largest TV supplier in the world. We plan to be selling a cable box next year.

The cable modem is one of the most significant precursors to digital service delivery, but it requires networks. Samsung is pushing on home networking, developing a "home-wide web". Lexmark, Motorola, and Visa are involved.

Question: What prices will retail boxes be introduced at?

Broadcom: The low end set-top box, like an analog box, could be between $100 and $200. The high-end box, including the cable modem and advanced graphics to allow program guides and enhanced television, could be at the $300 level. The box may have to be subsidized by services, as is the case with DBS. Bank of America is expected to subsidize the TCI box in return for having their logo on the screen when the box turns on.