

# Converging Webcasting Technologies

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## TVPC—The Internet and Digital Data Now Starring on TV

Internet content can come to the television through the air or over wires, including schemes that embed data in the broadcast signal or send an over-the-air terrestrial signal via a different frequency, via satellite, and over cable or telephone wires. The systems will employ a set-top box that converts the signal from whatever its distribution format into NTSC, the native format of the U.S. television set.

**Web-TV**, the leading TVPC company now owned by Microsoft, brings Internet content to the television from telephone wires through a set-top modem that dials up a Web-TV server site. Essentially, Web-TV is an ISP that charges about \$400 for its set-top box and \$9.95 a month for service.

**Navio**, a company formed by Netscape to extend the browser's capabilities into many different Internet hardware platforms (including the TV and the screen telephone), merged with Oracle's subsidiary, Network Computer, Inc. (NCI) in May 1997. NCI is a hardware platform that will serve as a low-cost computer or set-top box, but that did not have software. Navio is platform-independent software that was not attached to any particular hardware. The two merged companies will create a viable alternative to Microsoft's Web-TV. The technology will bring Internet data to the television screen from any source, including both wired and wireless distribution technologies.

**Wink Communications** embeds an interactive graphic interface into the over-the-air television signal. A set-top box decodes the data and overlays it on the TV picture. Using a remote control device, the viewer responds to the interactive opportu-

nity. A modem dials up an on-line server which processes the viewer's request and sends information back.

**NetChannel** began as an aggregator of Internet content, organized into "channels" customized to individual preferences. In April, NC acquired ViewCall, which brought an open-standard hardware platform to the content service, including a set-top box and modem capability. The NC product will accept Internet data from any source.

**PlanetWeb** is a platform-independent browser that takes less than 1 MB of space, enabling it to run on low-memory Internet appliances, including television sets and screen telephones. The company plans to market it to hardware manufacturers (OEMs) whose Internet appliances fulfill different design specifications.

**Diba** makes an end-to-end system that includes servers, system software, and consumer hardware and software. Each single-purpose Diba "information appliance" will center around a specific functionality, such as an Internet-TV appliance, an e-mail appliance, a remote-banking appliance, and so forth. About 42 appliances are in development, and can support many different input, processing, output, and storage options, depending on the application. The Diba Internet Set-Top Starter includes a 33.6 Kb/s modem and Ethernet connection, infrared remote control, infrared keyboard, power supply, phone cable, video cable, and left/right audio cable. The processor automatically reformats Web content for maximum readability on the television set.

**NetGem's NetBox** is the European entry. Headquartered in France, the system is similar to other Internet appliances designed to display Web content on TV

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sets. The technology allows full access to the Internet and e-mail services. It is equipped with a navigation joystick and a virtual keyboard. An optional infrared keyboard is also available for text-intensive functions. The box has an x86 processor, a 33.6 modem, a smart card reader, and software that takes less than 1 MB of flash RAM.

**NewCom's WebPal** is very new, and there is little information about it. NewCom has historically made modems and sound cards. Recently, it was acquired by Aura Systems and produced the WebPal. It's a \$500 box that has a 32-bit RISC multimedia processor, 4 MB RAM, 1 MB flash RAM, and a 33.6 modem. The user connects a telephone line, and WebPal puts the data on the television screen using flicker reduction software.

**PCTV—Making the Computer Picture Perfect**

There are several approaches to bringing TV to the PC, each addressing part of the overall problem. The difficulties start with the limitations on bandwidth to deliver television to the PC.

- The first set of solutions use upgraded existing wired infrastructures, including cable modems over cable systems and xDSL technologies over telephone networks.
- A second approach is to use wireless infrastructures. These include piggybacking digital data on unused portions of over-the-air television, brought into the computer via an antenna, or using other airborne systems, such as as satellites and cellular TV services.

Even when the bandwidth problem is solved, the problem of the PC itself remains: The PC is not properly designed for entertainment. Computer companies have addressed this issue and, although the products are now quite expensive, they are only the first generation of product to make it to market.

**InterCast**, Intel's product, sends out data related to an on-the-air television

program in the VBI (vertical blanking interval) of the television broadcast signal. The VBI is the thick black bar that TV viewers can see between pictures when there is vertical roll. InterCast uses 10 of the 21 lines in the VBI, with a combined output of about 9.6 Kb/s. One to three lines are allocated to InterCast for 1 Kb/s to 3 Kb/s of data that brings between 30 Kb/s to 90 Kb/s of data to the desktop. The data comes through an antenna into the computer. The television picture itself also comes into the computer via the antenna and is processed by a \$100 TV card mounted in a slot in the computer. Thus, both TV picture and data are viewed on the computer monitor. Users can access different content through the computer modem if they want to surf other Websites.

**WavePhore**, like InterCast, transmits data in the VBI of the broadcast television signal. The VBI contains 21 lines; the first nine lines are used to tune the field, leaving lines 10 through 21 to transmit information. Line 21 is used by closed-captioning services for the hearing impaired, leaving lines 10 through 20 for WavePhore transmission. The company is able to send approximately 150 Kb/s using these 10 lines. In addition, WavePhore is able to send information in unused portions of the active television signal through in-band technology. The combination allows WavePhore to send about 500 Kb/s of information. In July 1997, WavePhore contracted with ADS Channel Surfer to bring PC add-in cards to users' computers. This technology allows users to switch between TV, cable, or Internet video. They can also receive WavePhore data at the same time.

**DirecPC** is a service that delivers data to desktop PCs at a rate of about 400 Kb/s. When the service was introduced in 1996, users needed both a DirecTV and DirecPC dish; however, in July 1997, the DIRECDuo created a 21-inch hybrid dish that receives both types of signals. The price is high at \$899 to \$999, plus installation. In addition, the user pays \$40 a month for a 6 P.M.-6 A.M. plan or \$130/month for the 6 A.M.-6 P.M. plan. Downloading information during off hours

incurs a per-megabyte fee. Finally, for a return link, the user needs a modem and telephone return line to an Internet service provider.

**Datacast** is a new service that sends out information in the vestigial side band (VSB) portion of the television signal. The broadcast television signal is composed of a carrier wave, sidebands on both sides of the carrier wave, and a separate FM audio signal. The information in the sidebands is duplicated, so one side, the vestigial sideband, is redundant and is eliminated. The Datacast technology uses the lower portion of the VSB to carry an additional signal that is completely independent from either the FM video or the AM audio signals. The system will transmit about 600 Kb/s without interfering with the television picture. A television station can add the Datacast capacity to their existing transmitters for about \$40,000, allowing them to enter the digital signal business for a nominal investment. The signal goes to a small antenna and into users' computers, where the information is stored on the hard drive. The data rate does not permit live, full-screen, full-motion video at television quality, so Datacast plans to store the data on the hard drive and replay the video from there so that station owners can maintain TV quality.

Originally designed to operate as a "cellular" television service, **CellularVision** decided to enter the Internet service provider business in mid-1996. The system was beta tested in late 1996 and deployed in 1997. LMDS (local multipoint distribution service) operates in the very high 28 GHz portion of the spectrum. The signal is robust over short distances, so this service works especially well in areas where population is dense. The user has a six-inch antenna, a high-speed modem, and a CV controller. The return link is through the telephone lines over a regular modem to an Internet service provider. The cost of the service is about \$49.00 per month, plus telephone and ISP charges.


**The Entertainment PC**—The first step in using the PC as a device to support entertainment is to reconfigure it from a

"lean forward" screen, like the computer monitor, to a "lean back" screen, like the television set. Intel is working with several different manufacturers to design what it calls "interactive PC theaters." Intel says they will have extra-large monitors, Web access, and wireless peripherals that work from around the room. IBM, Compaq, Gateway, and NetTV are all planning to introduce products to meet this elementary need.

Microsoft supports the **PC '98 System**. It would feature a 200-MHz Pentium-class MMX processor, built-in TV capability, a port for digital satellite reception, a DVD-ROM player, a high-speed connection to a video camera, a FireWire port, InterCast reception, a wireless keyboard, and a large display. A universal serial bus will connect speakers, keyboards, and printers. Microsoft is also packaging content for enhanced TV viewing, including Big Ticket, Ministry of Film, New Digital System, Rysler Entertainment, and the Sci-Fi Channel.

Compaq now builds a \$5,000 **PC Theater** PCTV that draws a small group of enthusiast buyers. However, the company plans to build a new lower-priced version that would receive digital television signals and interactive services.

Gateway 2000 manufactures its **Destination** series system. The company intends to develop less-expensive versions of the PCTVs that now cost between \$2,800 and \$5,000. Destination currently connects to a 31-inch Mitsubishi monitor and lets you hook up your own amplifier and speakers. The least expensive model has a 120 MHz processor, a wireless keyboard, 16 MB RAM, a 1.2 GB hard drive, and a 6X CD-ROM drive.

NetTV's **Worldvision** 2900 has a 29-, 33-, or 37-inch Thomson monitor that supports up to 1,024 × 768 resolution and accepts both analog and digital signals. It also allows the capture of snapshots from the TV display. The model also has built-in stereo speakers. The least expensive Worldvision has a 100 MHz Pentium processor, infrared keyboard, 8 MB RAM, 1 GB hard drive, and a four-speed CD-ROM, and costs \$2,995. 

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The PC is not designed for entertainment, although computer companies have begun to address this issue.

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