

PC/TV

The New Mass Medium

Executive Presentation



By Linda Lee Bower
Director of Research
MegaTech Resources

Key Developments



- RealNetworks counts more than 40 million downloads.
- Hundreds of thousands of hours of streaming content available on the Internet.
- TV tuners enable PCs to receive over-the-air broadcasts.
- Microsoft integrating broadcast architecture in Windows
- With WebTV Microsoft gains Internet TV box compatible with Windows CE
- WrlldGate agreements cover 14 million cable households.
- Interactive Channel in 15 million digital cable boxes on order.



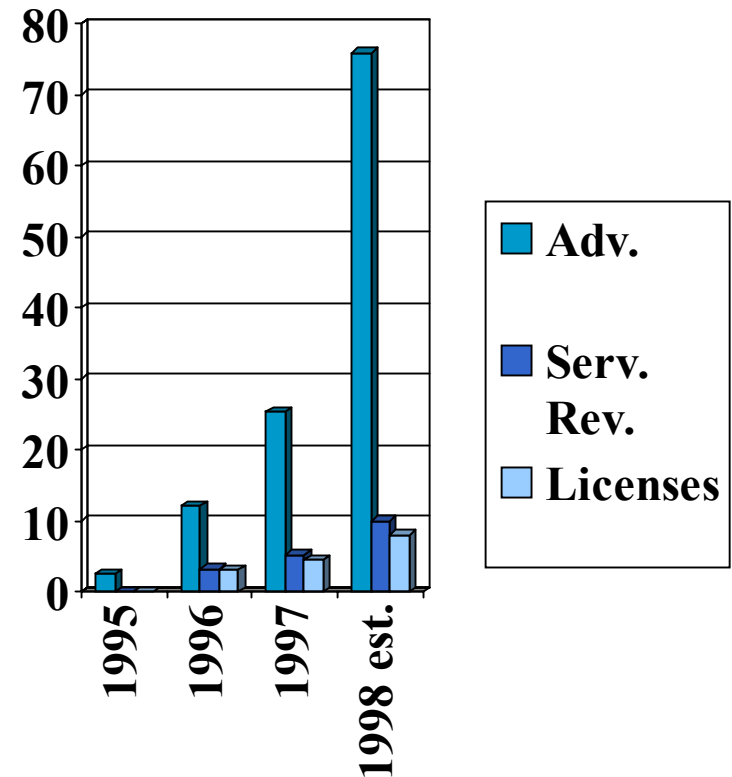
Architectures and Technologies

- Streaming
 - Receiving TV Signals on the PC
 - TV Access to Internet
 - Interactivity
 - The Information Appliance
 - IP Multicast
 - DVD
- RealSystems de facto Standard for Streaming
 - Intericast Rides on VBI
 - Computer Makers Integrate TV Tuner Boards
 - Second-Generation WebTV in High Demand
 - Interactivity translates into cash flow for operators.

Streaming



- RealSystems has porting/marketing agreement with Sun.
- Microsoft bundles RealSystems in Windows
- Vosaic streams live events through Java applet.
- Xing supports full-screen, full-motion digital video.



TV Over PC

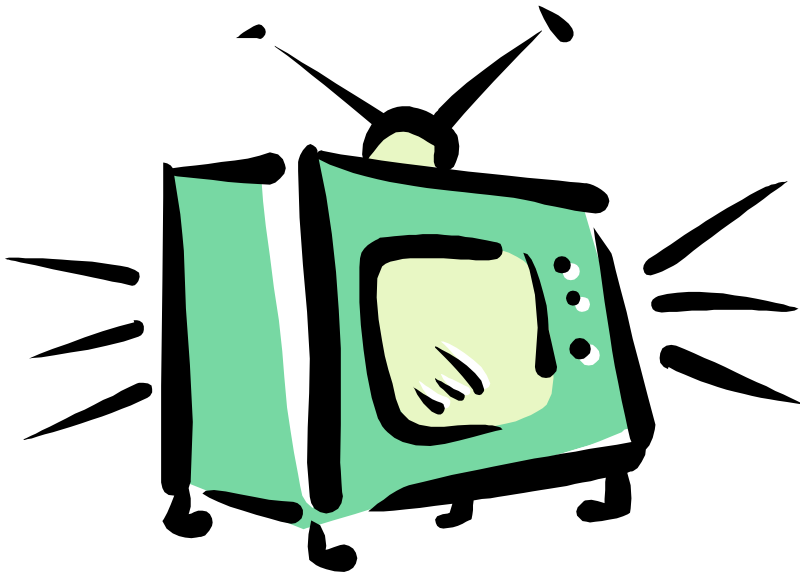
- Intercast rides on VBI.
- WaveTop part of Windows 98 broadcast architecture.
- Gateway 2000 pioneers.
- Hauppauge Wincast/TV receives from any source.
- STB supports visual-centric computer.



A “multimedia system” used to be a computer with a built-in CD-ROM drive. But today, users are discovering that multimedia means much more. It means complex things like built-in sound, digital video, animation, 3D graphics, and even virtual reality on your personal computer.

Apple Computer

TV Access to Internet



- Microsoft acquires WebTV.
- NetChannel bites the dust.
- Worldgate covers 14 million cable households.
- Uniview makes box and provides service.



Interactive Technologies

Interactive Channel

Delivers pictures, text, graphics and audio in response to subscriber's commands.

60 interactive programs. Adds Internet with Spyglass.

ACTV

Subscribers customize viewing by selecting from multiple options.

Targeting sports programming. Alliance with Fox Sports Net.

Wink

Enhanced Broadcasting gives viewers access to supplemental information.

Adopted in several countries, particularly Japan. Already in 4 million boxes.

The Internet Appliance



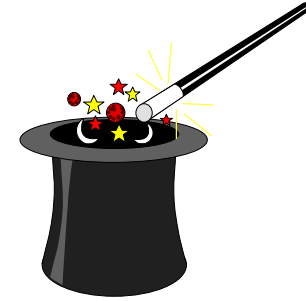
- PlanetWeb integrates Internet into consumer electronic devices.
- Sun seeks to provide Webtone.
- Sun and OpenTV collaborate on advanced design.
- Sony envisions wireless Internet access.

Features of Sun Internet Kit

- Simply turn it on.
- Open standards based.
- TV-centric user interface.
- E-mail through simple user interface.

DVD

- Pioneer sees big market in DVD drives.
- Sony sees high growth.
- Panasonic anticipates widespread acceptance.
- STB technology outputs video to either PC or TV.
- First-year DVD sales strong.



No product category holds more promise than DVD... DVD overcomes old boundaries between audio, video, and computer formats, and enables large-scale data storage.

Pioneer Electronic Corporation

Modes of Delivery



Phone Lines

Vast majority of Internet subscribers currently access via telephone.

Cable

HFC architecture provides high capacity.

Over the Air/VBI

Only subset of Internet resources.

Satellite

Distance insensitive; effective for international traffic; asymmetrical.

Wireless Broadband

LMDS provides capacity of fiber without the wire.

Key Telco Internet Strategies

Ameritech

Partners with Compaq to pre-install ADSL access.

Bell Atlantic

First to deploy ADSL; rollout to 80% of customers by 2000.

BellSouth

Revamped customer gateway to Internet; trialing FastAccess.

GTE

Acquired BBN. Partnership with Snap! Online.

SBC

Introducing web hosting. Trialing FasTrak DSL.

US West

Collaborates with Cisco and Dell to develop PC with built-in ADSL.





Key IXC Internet Strategies

AT&T

Built IP backbone for business.
Closed user groups for security.

MCI

Second round of OC-12 circuits
in core Internet backbone. Java
core element for Web services.

WorldCom

Internet infrastructure is fiber
network, ATM-based in
metropolitan areas.

Sprint

Strategic alliance with EarthLink
to share assets and strengthen
presence.

“in its infancy, the Internet was primarily about information. Today, the ‘Net is primarily about communications.”

-- *Dan Schulman, President, At&T Worldnet*

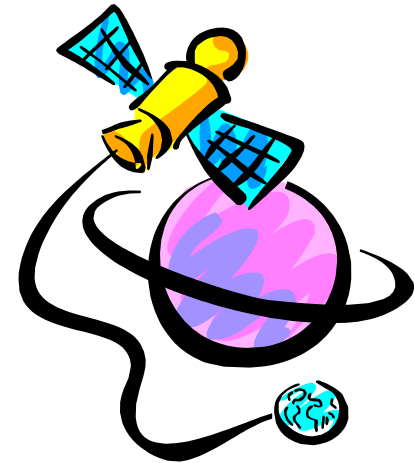
Key Cable Trends



- Implementing HFC infrastructure.
- Transitioning to two-way digital set-top boxes.
- Making investments in and strategic alliances with Internet ventures.
- Moving into the business market.
- Collaborating with Microsoft to create broadband-specific versions of Microsoft products.
- Working with technology companies to develop standard modems to sell to consumers at retail.
- Mergers and acquisitions.

Advantages of Satellite

- Bypass network congestion.
- Multicast applications
- Rapid implementation
- Reliable transmission.
- High-bandwidth applications.
- Asymmetric configurations.
- Distance insensitive solution.



Over the air



Intericast combines over-the-air broadcast with the resources of the Internet.

Intericast content is carried as part of the standard television signal in the vertical blanking interval to PCs.

Channel Surfer TV+FM

- Watch TV in a window
- Listen to radio
- Receive radio data
- Receive free multimedia
- Edit/capture video
- Videoconference.

Content

- 30,000 Web sites have streaming video
- Growing amount of programming exclusive to the Web
- Streaming video a boon to corporate world for training
- E-commerce uses video presentations
- CNNfn averages 30 million hits each month



- ESPN SportsZone first sports site to score a million visitors in a single day
- AOL's online activity in same league as primetime quarterly-hourly audiences of MTV and CNN

Issues and Opportunities

- Any format, any receiver
- Trend to client-server architecture
- Eyeballs on the Internet
- Web joins Nielsen ratings league
- Freedom of Expression

