By Bruce Kasrel

With Josh Bernoff

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OCTOBER 2000

Broadband Content Splits

As infrastructure matures and devices become high-speed-enabled, broadband content will split. Entertainment will be drawn to TVs, while streaming interactive content -- software -- will flow to PCs.

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MARKET OVERVIEW

Broadband Growth Accelerates

Broadband Internet access connections are closing in on 5 million US households. Even as broadband subscribers pursue everyday Internet use, content providers move slowly on creating rich media content.

WHAT IS BROADBAND?

Before we start, let's define a few terms. Forrester defines a broadband connection as:

> *An always-on Internet connection that runs at a speed of 200 Kbps or higher.*

When we talk about broadband content, we mean:

> *Content designed for broadband connections, with audio, video, or downloadable navigation and interactive elements.*

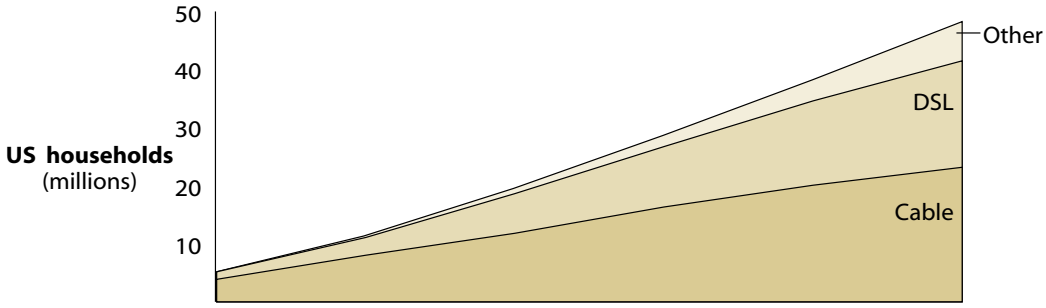
This report analyzes the future of broadband content.

DEPLOYMENT PLAYERS RUSH TO CAPTURE DEMAND

The demand for broadband Internet access is exploding -- between cable modems and digital subscriber line (DSL) service on phone lines, providers hook up an average of 4,000 new customers a day. Jockeying for a share of $2 billion in annual revenues, cablecos like AT&T and telcos like SBC:

- **Ramp up to meet burgeoning demand.** To stave off a parts shortage in early 2000, cable modem manufacturers like Motorola and 3Com tapped second sources for flash memory chips. On the telco side, DSL leader SBC now takes 17,000 orders a week for high-speed service. To keep pace with demand, SBC and other telcos now deploy self-installation programs to eliminate the need for an on-premises visit. With supply kinks worked out, cable and DSL providers will connect 5 million broadband subscribers by the end of 2000 (see Figure 1).
- **Stabilize pricing.** Last year, cable modem service averaged $40 a month, $20 less than DSL service. But Verizon and other DSL providers now match cable prices. With demand still feverish, neither side needs to drop prices further.

Figure 1 US Consumer Broadband Adoption By Delivery Method



	2000	2001	2002	2003	2004	2005
Other*	0.02	0.25	0.86	1.86	3.52	6.54
DSL	1.25	2.96	6.61	10.07	14.06	17.75
Cable	3.74	7.76	11.42	15.81	19.43	22.42
Total (millions)	**5.01**	**10.97**	**18.89**	**27.73**	**37.01**	**46.71**
% of online HH with broadband	9%	18%	29%	41%	52%	64%

*Includes fixed wireless, fiber, and satellite

Source: Forrester Research, Inc.

- **Expand coverage.** Forrester estimates that more than 40 million US homes are passed by a broadband service. Providers like U S West and RCN focus on metropolitan areas like Boston and San Diego (see the September 1, 2000 Forrester Brief "Broadband Misses The Market"). By the end of 2001, all major metropolitan areas will have at least one form of high-speed access; even rural areas will get broadband options from two-way satellite provider Gilat.

Broadband Consumers Embrace The Always-Available Internet

High-speed connections have ingrained the Internet into users' lives; they go online more often and for longer periods than their dial-up counterparts. Broadband users:

- **Focus on utility and frequency.** Compared with dial-ups, broadband users in the consumer survey for Forrester PowerRankings™ were more satisfied with the speed and usability of commerce sites (see Figure 2). In the grocery category, which benefits from regular use, broadband participants rate page loading 9% higher and transaction speed 4% higher than analog respondents.

Figure 2 Broadband Users Are More Satisfied With Site Performance

	Average Usability Rating "Speed of pages loading"			Average Transacting Rating "Speed of finding what I want"		
	Broadband users	Dial-up users	+/-	Broadband users	Dial-up users	+/-
Groceries	3.55	3.25	+.30	3.63	3.49	+.14
Computer merchandise	3.42	3.33	+.09	3.55	3.55	0
Clothing	3.40	3.32	+.08	3.50	3.53	-.03
Books	3.55	3.47	+.07	3.73	3.70	+.03
Music	3.41	3.34	+.07	3.56	3.55	+.01
Electronics	3.39	3.35	+.04	3.51	3.51	0
Toys and games	3.37	3.34	+.03	3.56	3.56	-.03
Videos	3.50	3.47	+.03	3.68	3.67	+.01

Ratings vs. expectations: 1 Much worse ← 3 As expected → 5 Much better

Data from February 2000 consumer surveys for Forrester PowerRankings™

Source: Forrester Research, Inc.

- **Gain broadband experience at work.** With high-speed T1 and T3 lines at work, consumers are tuning into broadband content during the business day. Internet streaming site IFILM reports that most of its traffic comes during working hours, even though none of its films are work-related. Sports sites like ESPN.com's interactive golf leader boards, which work best with an always-on connection, get four times as much traffic on weekday afternoons as on weekends.

Media Companies Move Cautiously With Broadband Content

Despite growing numbers of users, media companies' initial enthusiasm for broadband content has been tempered by high production costs and concerns about broadband clutter. Media outlets:

- **Keep broadband off the home page.** Broadband pioneers like Quokka Sports no longer highlight broadband content on their home page and instead put it on special high-speed pages within the site. Others, like ESPN and Yahoo!, delay promoting their high-speed areas as they await more users and new advertising-supported business models for video.

- **Warily watch skyrocketing production and delivery costs.** Content providers like CNN spend $500,000 and up on broadband site production budgets, plus a penny per video stream to high-speed enablers like Akamai and iBEAM. These costs can reach $10,000 a day when a big event like the Concord crash generates millions of downloads. Costs for encoding multimedia content for multiple high-speed data rates can add $400 to every video; at sites like Atom Films, this line item quickly reaches hundreds of thousands of dollars.
- **In some cases, crash and burn.** Specialized content sites like Digital Entertainment Network, Pseudo.com, and Pop.com barely got off the ground before the high production costs and small broadband audience combined for a knockout punch. DEN burned through a whopping $60 million in a year and made a paltry $370,000 in revenues.

ANALYSIS

Broadband Content Splits By Device

Over the next four years, 81 million set-tops and gaming consoles will tap into high-speed data connections. Broadband content will bifurcate, with multimedia-focused entertainment gravitating toward TV screens and intensely interactive applications and software streaming to PCs.

BROADBAND PIPES AND CONTENT GEAR UP FOR THE MASS MARKET

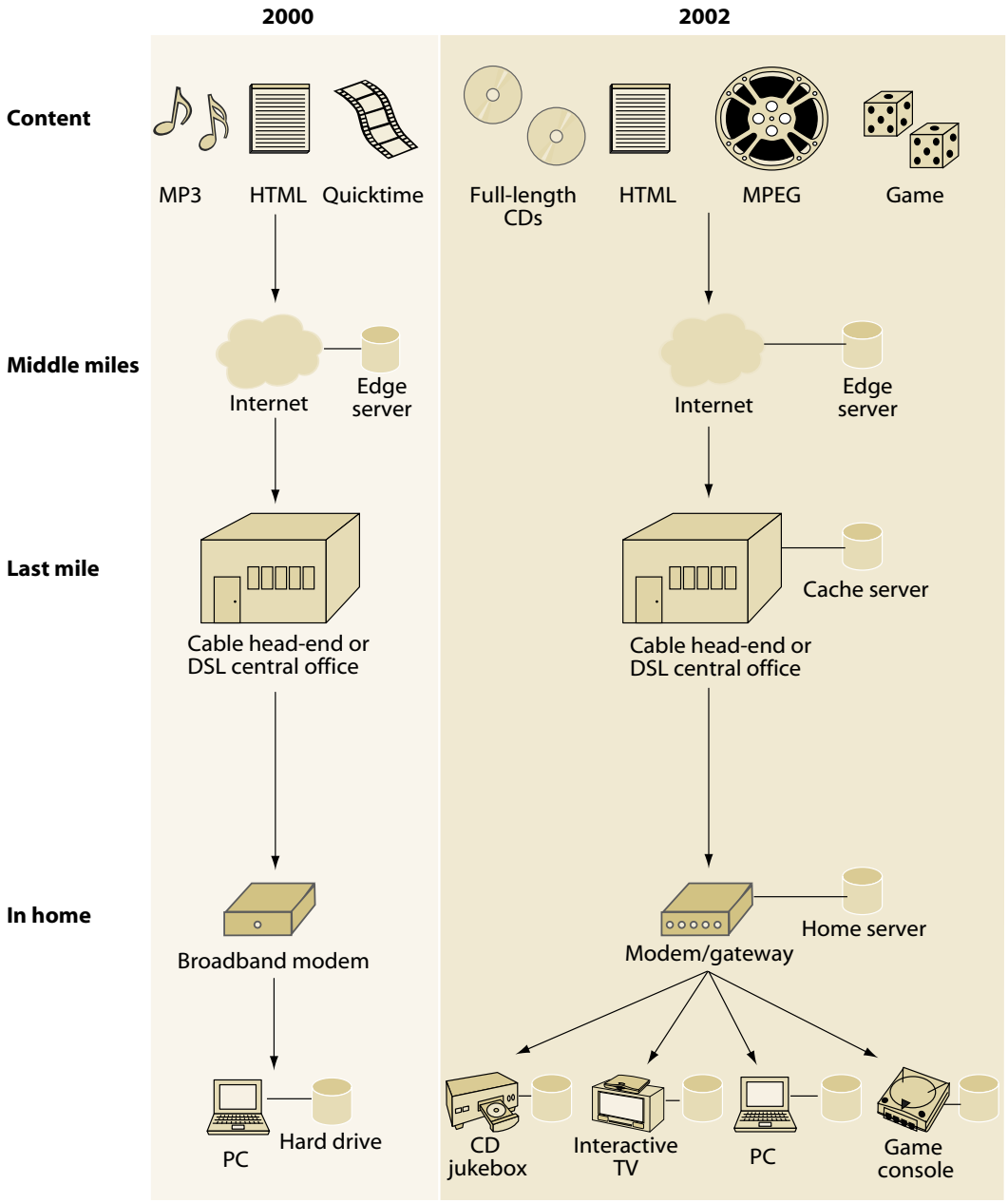
Delivering broadband to millions -- and soon tens of millions -- of consumers will challenge broadband hopefuls. Over the next two years, carriers, consumers, and content providers will struggle to make broadband workable, building a foundation for broadband media on the PC.

Broadband Requires Infrastructure Retrofits

With millions of broadband users downloading masses of content, carriers face a huge bandwidth management challenge. To ensure a satisfactory experience, broadband infrastructure providers will invest throughout the network, not just in the last mile. They will place caches throughout the network, outfitting central offices and head-ends with massive content servers and partnering with edge streaming networks (see Figure 3). To deliver quality service, providers will:

- **Create parallel Internet conduits.** Cable and DSL players have signed up content streaming partners like Akamai and Digital Island to boost content delivery to and from the last mile. Akamai will set up 2,500 servers in head-ends to deliver CNN news footage and movie trailers at speeds of 100 Kbps and up, ensuring that high-speed data customers get what they pay for.
- **Tier their service fees.** The bandwidth competition has begun. DSL leader SBC fired the first shot with TV spots dramatizing how multiple users on a street can degrade cable modem performance. Cable operators will likely respond by guaranteeing Internet throughput of half a megabit per second with node management and cable modem provisioning features. They will package this service at a $10 monthly premium.

Figure 3 Content Moves Closer To The Consumer As Infrastructure Develops



Source: Forrester Research, Inc.

- **Introduce add-on services.** Vendors like ishoni Networks and Broadcom will integrate home network elements into cable modem chipsets, allowing cable and DSL companies to offer inexpensive home network solutions for an additional $5 a month. Operators will use these networks to instantly provision IP-based services like home video conferencing and additional phone lines.

Broadband Consumers Will Emerge

By the end of 2001, 11 million US households will have high-speed Internet access. These consumers will see more multimedia content and develop skills for dealing with audio. The next wave of broadband consumers will:

- **Get hooked on Internet audio.** The first killer application for broadband is audio. The fat and always-on pipe will allow users to download personalized album compilations or stream an out-of-town radio station (see the May 2000 Forrester Report "The Self-serve Audio Evolution"). By 2002, 19 million consumers will use the Internet for music downloading, and one in four will be broadband users.
- **Expect high-powered Web interfaces.** High-speed data will enable content providers to build highly interactive and flexible user interfaces into their Web sites (see the July 2000 Forrester Report "Broadband Transforms Interfaces"). Service providers like MSN will outfit their subscribers with the new MSN Explorer, allowing them to traverse the Web while they watch video clips of the latest MSNBC headlines in the same window.
- **Connect experience-specific devices to broadband conduits.** TV set-top boxes like Motorola's DCT-5000 will feature an interactive TV, program guides, and high-speed Internet access; game consoles like Sony's PlayStation 2 will include a high-speed modem for interactive game playing. Start-up ZapMedia will sell a $599 home entertainment component that can download, store, and play back MP3 and video files via a high-speed connection.

Broadband Content Gets More Eyeballs And Focus

By 2001, increasing broadband penetration will create greater exposure for high-speed content. Providers embracing broadband as a mass-market phenomenon will ramp up their streaming media production. Forrester expects:

- **Production costs to come under control.** Efforts by the newly formed Content Alliance will help drive production costs down by establishing encoding standards. Streaming management tools from iBEAM and Virage will integrate content syndication and ad insertion, making it easier for content producers like the WWF to go from raw video to Internet broadcasting.

- **Broadband aggregators to gain focus.** Collections of broadband content like Real Networks Gold and icebox already aggregate material as diverse as how-to videos, cartoons, and news headlines. But the generalized portal race is over; little opportunity remains for "broadband portal" hopefuls like Excite@Home. Over the next two years, broadband aggregators will shift their focus to addressing specific segments like business news, sports highlights, or education.
- **Interactive content to be designed for streaming.** CD-ROM and PC software interfaces will be redesigned with streaming in mind. Software houses will partner with companies like Media Station and Into Networks to chunk interactive content, so users can take it in bits and pieces. Software like Reader Rabbit will feature short-story segments, so users can download each element as needed.

BY 2002, BROADBAND CONTENT WILL SPLIT BY DEVICE

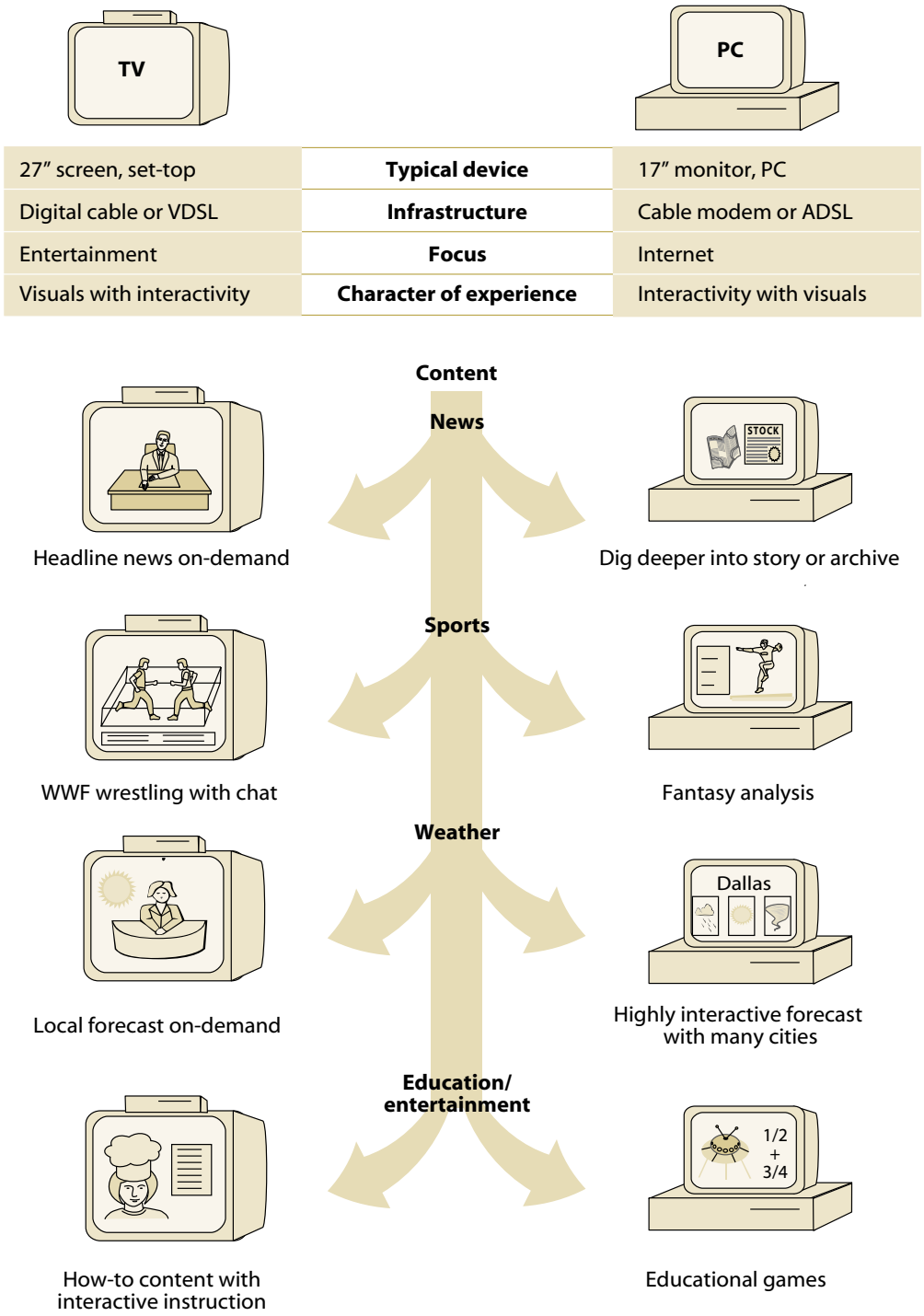
Even as broadband connections and content gain a foothold, a new force will split the content stream -- television. Over the next two years, set-top boxes and game consoles will bring broadband connections to 9 million TV screens. Entertainment content will flow away from uncomfortable PCs in the den, toward comfy couches in front of the living room TV set. PCs will be left for practical, task-oriented activities. Broadband content will split into two streams -- visuals with minimal interactivity on the TV screen and interactive content enhanced with visuals on the PC (see Figure 4).

New Devices Connect To Broadband Infrastructure

By 2002, competitive pricing pressure will put high-speed access on the fast track to commodity status, forcing carriers to offset revenue shortfalls with additional services. Cable will exploit its video-centric network to connect set-top boxes and deliver video on-demand (VOD). Telcos will counter with video DSL (VDSL) upgrades to get into the TV delivery business. The result: Consumers will have a host of devices to which broadband experiences can be delivered (see Figure 5).

- **TVs will tap into VOD and other broadband content.** Both cable and DSL providers will use the VOD streaming infrastructure to go beyond Hollywood blockbusters. Providers like Time Warner will deliver audio on-demand (AOD) services to MP3 devices and serve up popular Web-based content from Atom Films and Quokka Sports directly to consumer TVs. Operators will package this premium tier of Internet content with broadcast video fare; by 2003, more than 20 million broadband set-top boxes will connect to broadband content (see Figure 6). In the end, any big-screen, low-interactivity experience will gravitate to the home's primary TV screen.

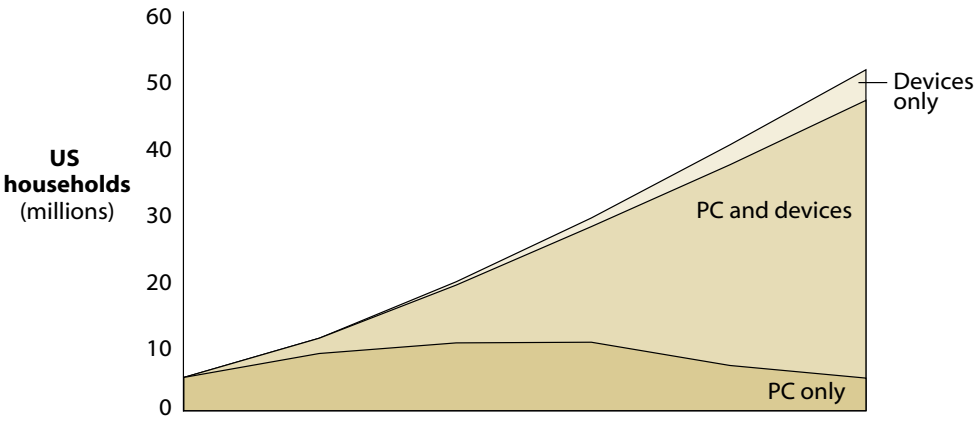
Figure 4 Broadband Content Splits By Device



Source: Forrester Research, Inc.

Figure 5 47 Million Broadband Homes Will Use 191 Million Devices In 2005

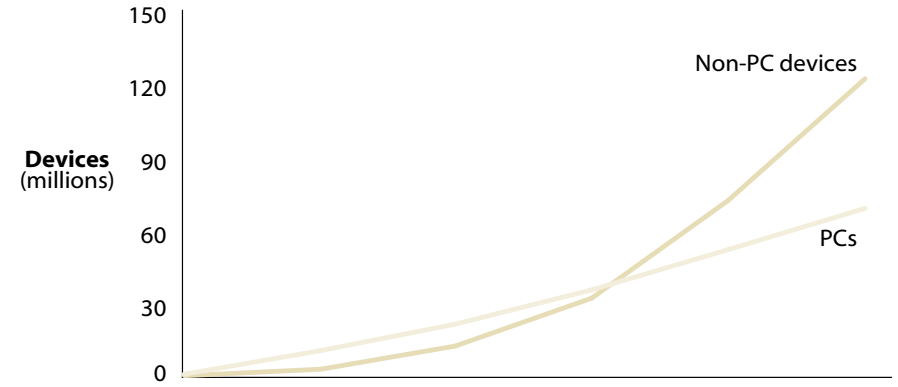
5-1 **Households**



	2000	2001	2002	2003	2004	2005
PC only	5.0	8.6	10.2	10.3	6.8	4.9
PC and devices	0.0	2.3	8.7	17.4	30.2	41.8
Devices only	0.0	0.0	0.5	1.3	3.0	4.6
Total (millions)	**5.0**	**11.1**	**19.3**	**29.0**	**40.0**	**51.4**

(columns may not total due to rounding)

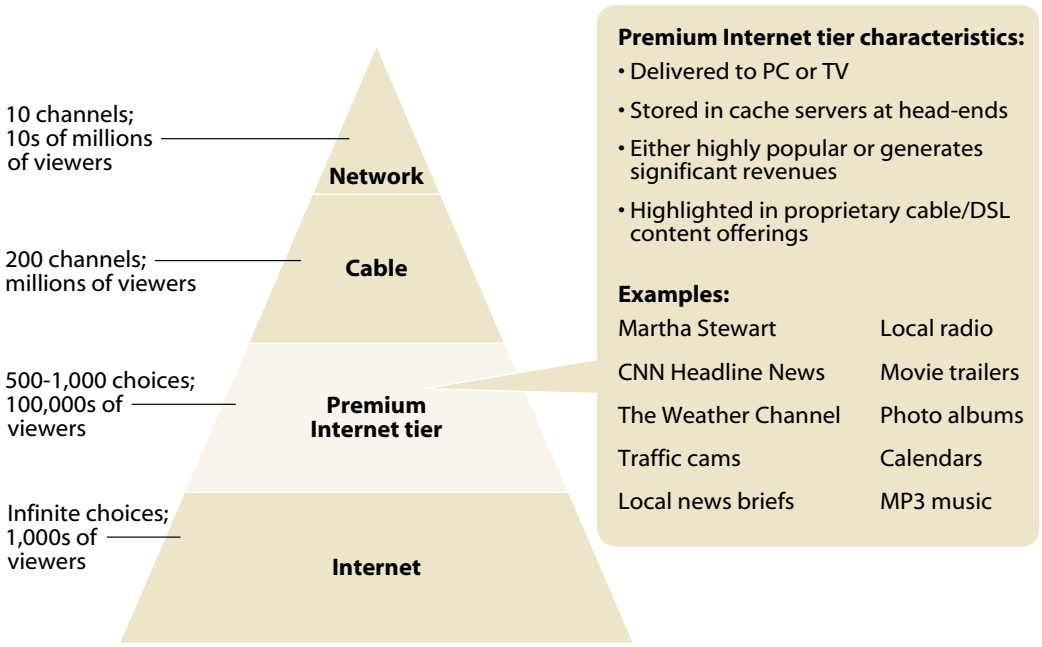
5-2 **Devices**



	2000	2001	2002	2003	2004	2005
PCs	6.17	15.17	25.19	38.23	53.51	69.22
Non-PC devices	0.01	2.69	12.19	31.89	71.95	122.01
Total (millions)	**6.18**	**17.86**	**37.38**	**70.12**	**125.46**	**191.23**
PCs as a % of BB devices	100%	85%	67%	55%	43%	36%

Source: Forrester Research, Inc.

Figure 6 The New Premium Content Tier Combines TV And The Net



Source: Forrester Research, Inc.

- **Game consoles will link players through high-speed hookups.** By 2003, 16 million gaming consoles will sport high-speed connections. Consumers will use their broadband connections to play interactive games with friends and neighbors, and carriers will establish local servers to download the latest hot title (see the August 2000 Forrester Report "Pervasive Gaming Goes Mainstream").
- **PCs will focus on creation, not consumption.** With 38 million broadband PCs in use in 2003, computers will still be the most widely connected broadband device. But as other devices siphon multimedia content, consumers will use PCs only for complex, highly interactive tasks. After assembling photo albums on the PC, consumers will distribute them to devices like Ceiva Logic's Internet picture frame.
- **In-home infrastructure will get more connectivity and storage.** By 2003, 7 million broadband homes will have a home network. Gateways in broadband modems and digital set-top boxes will feature networking solutions for consumer electronics gear like home theater components. Nearly all of these devices will include hard drives, creating a multigigabyte in-home storage network.

Determining the Broadband Content And Device Match

By 2003, PCs will comprise only half of broadband devices -- TVs and game consoles will dominate the other half. Current providers will need to focus their broadband content on one device or the other. TVs will need multimedia-heavy content. For TV screens, providers should:

- **Build portals based on a program guide.** With Internet media and video available on digital set-tops, consumers will need a powerful guide to sort through the abundant choices. Broadband portals like Excite@Home and Snap will add TV listings and integrate popular Web content into the programming grid. To compete, entertainment-focused services like TiVo and ReplayTV should use their suggestion engines to capture videos from Internet sites like CNET and MP3.com and list them alongside stored audio and video programming.
- **Keep commerce simple, or offload it to other devices.** "Walled garden" TV commerce efforts from AT&T and Charter will feature only a small selection of merchandise from video-centric partners like Martha Stewart and MTV. Sales will focus on high-volume content like kitchen gadgets and compilation CDs; for the whole product catalog, consumers will be directed to the PC Web site.

By 2005, PCs will only represent a third of all broadband devices. But 70 million high-speed-enabled computers will still need their own separate content. Focusing on the PC's strengths in interactivity and commerce, providers should:

- **Turn software into a service.** Software will become the biggest staple of PC-based broadband content and will generate nearly a billion dollars in streaming revenue by 2005. Consumers will look to download programs as needed -- like TurboTax on April 13. If users of a word processor need a French dictionary for a document, they will stream it off of the cable head-end server and pay the operator a few dimes. Cheaper versions of popular packages like Microsoft Office and Quicken will include 15-second video ads as high-speed providers use existing streaming ad-insertion engines to give away ad-supported software.
- **Keep video to a minimum on the PC.** eCommerce sites like The Home Depot and Amazon.com will focus on streamlining the sales experience and will feature only a smattering of video content. Videos on the site will be short and appear only when they can demonstrate key selling features. Customers who need longer clips, like the consumer who buys a new power tool, will request that the video be downloaded to their set-top box.

ACTION

Content owners should strike deals that reflect video length.

Broadcast networks like NBC know that their content will be watched mostly on TVs and should make deals to ensure its inclusion in VOD servers. Briefer content collectors Atom Films and IFILM should package their short-form content into related groupings, ensuring its placement on cable and DSL video streaming engines. Companies like PRIMEDIA with thousands of short videos, by contrast, should license them to Web sites as commerce sweeteners or illustrative examples.

PC portals -- run screaming from streaming.

With set-top-based portals helping consumers navigate rich media content on TVs, PC portals like Yahoo! will need to focus on convenience instead of multimedia glitz. Users should be able to download interfaces to make search faster and give them quick summaries of news stories. What little multimedia content PC sites feature should be a single rich media advertisement; it will stand out on the page and command higher CPMs.

Software syndication infects sites.

Financial sites like CNBC.com and DLJ*direct* should stream parts of financial software packages like Quicken for more detailed portfolio analysis. National Geographic could provide Adobe PhotoDeluxe, giving visitors the ability to paste themselves into an African safari album.

Cable must extend video content deals.

Cable operators have the broadband edge -- they can deliver popular video via MPEG streaming and niche videos with Internet streaming. Beyond video relationships, they should extend deals with content providers like ESPN and Disney to also include delivery of related interactive experiences like sports games and follow-up learning exercises. DSL players like SBC and Verizon must make similar deals to gain access to basic TV content, so they can offer packages of video and interactivity.

WHAT IT MEANS

The broadband content split widens the open access debate.

Today's argument for opening up cable modem pipes to competitive Internet providers will expand to include access to the head-end cache servers and VOD servers. Access players like EarthLink and MSN will argue that without access to these services, they will be unable to offer consumers multimedia and interactive services comparable to that of cable operators. Forrester doesn't see open access legislation reaching this far; as a result, cablecos like AT&T and Cablevision will continue to take the lion's share of broadband subscribers.

The home gateway becomes the IP traffic cop.

The home gateway will become the primary routing device for interactive and multimedia data coming into the home. Content will get parceled off to various devices based on their specific capabilities. Cable and DSL carriers will want to keep a stranglehold on this gateway to prevent consumers from distributing content to unauthorized devices. Cable companies will build monitoring features into the gateway and shut off any suspicious-looking traffic from homes that seem to be distributing the same video file over and over.

Those skilled at combining TV and interactivity will cash in.

eCommerce integrators that excel at the design side of interactivity, like Sapient and Zefer, must extend those skill sets to multimedia aspects like TV production. They will need to hire Hollywood producers who can help their clients' Web sites make the transition to the set-top environ. On the TV side, top TV news talent will not only seek the best footage but also metatag their stories so they can be easily flagged by set-top program guides.

Consumers get a kickback from Akamai and a backyard POP.

Hard drives will be virtually everywhere in consumer's homes circa 2005, easing content delivery. Homes with excess capacity will get paid by edge networks like Akamai to help accelerate their neighbors' content streaming performance. Real-estate listings will include total home server capacity as homebuyers demand space for all their content, as well as their physical belongings.

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RELATED MATERIAL

Companies Interviewed For This Report

3Com
www.3com.com

Akamai Technologies
www.akamai.com

America Online
www.aol.com

Atom Films
www.atomfilms.com

AT&T
www.att.com

BroadJump
www.broadjump.com

Cable News Network
www.cnn.com

Cisco Systems
www.cisco.com

Comcast
www.comcast.com

Cox Communications
www.cox.com

EA.com
www.ea.com

ESPN Internet Ventures
www.espn.go.com

Excite@Home
www.excite@home.com

Gateway
www.gateway.com

Gilat Satellite Networks
www.gilat.com

Gotham Broadband
www.gothambroadband.com

IFILM
www.ifilm.com

Into Networks
www.intonetworks.com

Intuit
www.intuit.com

L.L.Bean
www.llbean.com

Media Station
www.mediastation.com

Microsoft
www.microsoft.com

Motorola
www.motorola.com

MSNBC
www.msnbc.com

Napster
www.napster.com

OpenTV
www.opentv.com

POPcast Communications
www.popcast.com

Quokka Sports
www.quokka.com

RCN Telecom Services
www.rcn.com

SBC Communications
www.sbc.com

Time Warner
www.timewarner.com

Vicinium Systems
www.vicinium.com

Winfire
www.winfire.com

ZapMedia
www.zapmedia.com

Related Research

October 6, 2000 Forrester Brief “Consumer Broadband Hits Hypergrowth In 2001”
September 1, 2000 Forrester Brief “Broadband Misses The Market”
August 2000 Forrester Report “Pervasive Gaming Goes Mainstream”
July 2000 Forrester Report “Broadband Transforms Interfaces”
July 2000 Forrester Report “Smarter Television”
May 2000 Forrester Report “The Self-serve Audio Evolution”
March 2000 Forrester Report “Beyond Broadband”
March 2000 Forrester Report “Deconstructing Media”

GRAPEVINE

Broadband content will come from a higher power.
The popular TV evangelist Reverend Robert H. Schuller and his Crystal Cathedral Ministries partnered with Choice Caster to stream portions of his religious services. Instead of his "Hour of Power" on TV, Schuller hopes to deliver PC-based parishioners a bite-sized "Minute of Motivation." It won't be long before Schuller can stream full-length services, and with the NFL simulcasting its games, the Sunday battle between church and football will be fought right on consumers' set-top boxes. Forrester's prediction: NFL in a rout.

The personal Olympics.
Viewers' TV experience of the next Olympiad could be completely different, if our experience with a Replay PVR is any indication. Instead of wading through NBC's profiles and sports we're not interested in, like diving, we zeroed in on gymnastics. We skipped the tense close-ups as competitors awaited their scores, but we did our own instant replays of vaults and floor routines. By 2004, with 34 million PVR users in the US, viewers will tune in to specific Olympic sports like water polo or pole vaulting -- plucking them off NBC's MSNBC or CNBC feeds, or even off its Internet feed -- rather than having to slug through hours of coverage they don't care about. NBC had better prepare some product placement and highly targeted advertising strategies for these games, because you can bet advertisers won't be paying millions to place ads that viewers are skipping anyway.

The Digital Entertainment Network, entertaining at last.
There's nothing to draw attention to an Internet sector like a little spectacular failure. Thus it was for broadband content when DEN, the Digital Entertainment Network, closed up shop in July after reportedly spending more than $60 million in venture capital. Some of that spending set a new bar for startup excess: a $1.1 million salary for CEO Marc Collins-Rector (DEN's President David Neuman pulled in $800,000), two company cars (vintage 1969 Lincoln Continentals), and gilded picture frames for office artwork. Even in Hollywood, startups would do well to spend on strategy, marketing, and content, not executive perks.

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QUICK VIEW

As infrastructure matures and devices become high-speed-enabled, broadband content will split. Entertainment will be drawn to TVs, while streaming interactive content -- software -- will flow to PCs.

INTERVIEWS

- Broadband infrastructure overcomes initial hurdles.
- Content providers bury rich media.

ANALYSIS

- 191 million devices will connect via broadband in 2005.
- By 2005, PCs will account for 36% of all broadband devices.
- Broadband content will split; multimedia will flow to set-top boxes and software to PCs.

ACTION

- Portals should focus on improved navigation, not video aggregation.

WHAT IT MEANS

- The open access debate goes deeper.

ACTION

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