

The IP TV Revolution
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Introduction

This paper outlines the critical transition from a media world of analog scarcity (a limited number of broadcast channels) to the coming world of digital abundance where any maker of content (films, music, video games) could have access to the world's audience through a server based on demand media environment. Today, all of the technical innovations needed to rollout this IPTV (Internet Protocol TV) system are in place. What is missing is the information policy initiatives which are being held up by entrenched powers frightened of change. This paper seeks to clarify what the new environment would look like and how the transition to IPTV could aid all of the existing media stakeholders. We believe that the new environment would also enable an explosion of creativity as the distribution bottleneck that has existed for one hundred years of media history could be unlocked.

The Analog to Digital Transition

The realization of a transition from the world of bandwidth scarcity to a new world of media abundance could not have happened without the seminal transition from analog to digital. The import of this can be seen in the chart below.

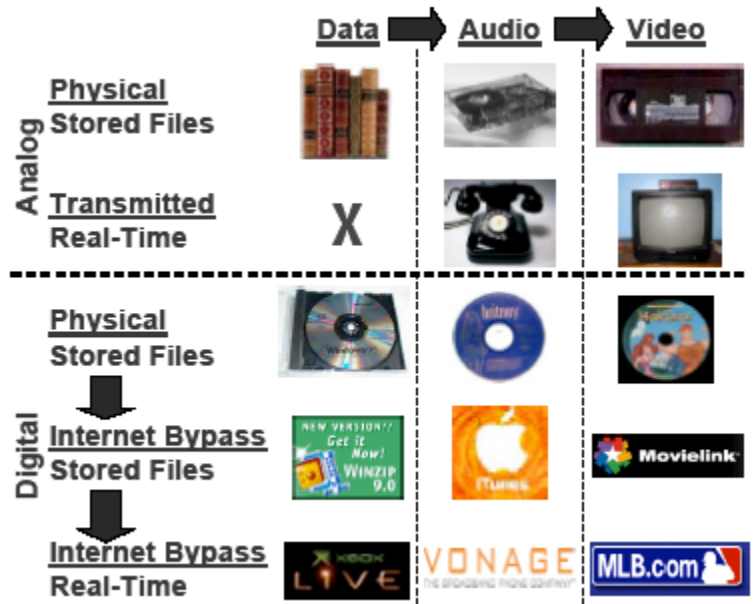


Figure 1-Analog to Digital Transition-Source Sanford Bernstein & Co.

As we move from the analog age of videotape and broadcast TV, the ability of content owners and independent filmmakers and musicians to reach their audiences without needing the distribution power of multi-national media companies has important meaning for the future of an independent media system. To understand the transition to a Media On Demand age enabled by Internet Protocol, it is first necessary to understand the role of the traditional media powers.

Background

Since the invention of radio at the beginning of the 20th century, our mass media has functioned in one way. Programmers looked to advertisers to pay for the cost of the media in return for access to the audience for their marketing campaigns. The rise of great multinational consumer product companies (Procter & Gamble, Unilever, Coca Cola, Ford, Daimler Chrysler, Nestle, Phillip Morris) coincided with the rise of radio and

then television. This relationship was based on the law of scarcity. In order for Proctor and Gamble to grow it had to turn out an increasing number of basic commodity products (soap powder, toothpaste) whose only differentiation was in their marketing. And they quickly found that the only way to differentiate Tide from any other *identical product* was through TV or Radio advertising. In a world of a few commercial broadcast networks that existed on both Radio and TV in every major country, the *scarcity* of prime time advertising slots led to what William Paley (Founder of CBS) characterized as “a license to print money”. For the audience the bargain was simple. You didn’t have to pay for programming as long as you were willing to put up with the commercials. The other part of the bargain was that you paid \$3.00 for a box of Tide, the ingredients of which cost about twenty-three cents, the remainder being marketing, packaging and profit.

This somewhat Faustian bargain worked well for all parties until about ten years ago. It was at this point that the growth of cable and satellite networks and the intrusion of new privatized broadcast networks began to make it very hard for a single television program to aggregate the mass audience needed for a basic commodity consumer product. Whereas in 1980 an average hit show on France’s TF1 could draw 1/3 of the TV audience, today the highest rated program might draw 1/8 of the TV audience. So as the audience got disaggregated, so did the advertising business. A classic example would be MTV. By putting on very cheap programming (they got the videos for free from the record companies), MTV was able to undersell advertising to companies interested in reaching teenagers. This in turn allowed them to create outsized cash flows based on an average audience of about 500,000 viewers for any one program. The risk reward ratio

was so great that between 1990 and 2000 over 220 new niche cable & satellite networks were created.

In the late 1990's a second disruptive factor to the classic TV advertising model entered the picture. This was the construction of the worldwide optical fiber backbone. The enthusiasm of the capital markets to supply funding to any entity willing to secure right of way led to a classic oversupply condition the pain of which was shared by both firms and governments. As any shareholder of Cisco, Nortel or Lucent will tell you, there was more than enough pain to be shared. Strategic planners at those three companies as well as many of their competitors and suppliers made one major miscalculation. They looked at the amount of fiber optic cable being delivered in 1999 and 2000 and projected the number of routers, switches, lasers and other gear that would be needed to enable that fiber. They then geared up their production capacity to be able to provide this. And then a curious thing happened. The orders never came. Partially because wave division multiplexing allowed carriers to get as much as 100 x throughput for each strand of fiber and partially because local Broadband connectivity did not continue to grow exponentially, the backbone providers simply left the "dark fiber" in the ground. So the telecom crash hit both the suppliers (Cisco, Nortel, Lucent) and the carriers (Global Crossing, AT&T, British Telecom, France Telecom, etc).

But what was a problem in 2001 becomes an opportunity today. The conversion to an IP-TV platform is possible because although we have already constructed a completely new way for Media to function in the society, we have chosen not to enable it. It is as if we had constructed the Autobahn in the 50's but neglected to build out the on and off ramps. In the last 6 years we have built an Internet Protocol (IP) based broadband

network of such immense capacity that it is safe to say that we will not have to lay another mile of backbone fiber for the next ten years. Qwest, one of the companies that built out the backbone, ran an ad last year where a tired salesman pulls into a motel and asks the clerk if they have movies in the rooms, to which the clerk replies “every movie ever made”. This is not an idle boast. Qwest’s 34 strands of fiber could technically serve up every movie ever made on demand to every hotel room in the U.S. The only problem is that they have only “lit” four strands¹. In order to realize such a dream we have only to imagine for a second, the notion of Universal Broadband. Today most western countries have what is called Universal Telephone service, meaning that every household has the availability of a minimum level of subsidized service. The notion would be to extend this provision to data and video. Although the existing build out of Broadband to the home has been progressing well, with Merrill Lynch estimating 110 million worldwide home broadband subscribers by 2007², a transition to a new system of IP-TV could only be enhanced by more Universal Broadband service.

Assume that by 2008 every home had Universal Broadband with an Ethernet jack in the wall to which you could plug any browser based IP media terminal (Figure 6) connected to a TV monitor with 2 MBPS connectivity capable of receiving streaming



Figure 2 Nevius Media Center Server

¹ Author Interview with Joe Nacchio, CEO of Qwest, November 2000

² Merrill Lynch, *Broadband Report Card*, Oct. 19, 2004

DVD quality video on demand. This system would use the one international set of standards (IP, HTML, MPEG) and would not in anyway be “choosing a winner” from the existing competitive technology and media companies. In addition the ability to use the tradition remote control and a Browser ensure a classic TV ‘Lean-back” experience (Figure 7).

Figure 3-Media Center Control System



In this world anyone who wanted to “Publish” media would have no more trouble than putting up a web site today. They could sell their programming by subscription, “Pay per view” or give it away for free with targeted advertising. They would not have any “gatekeeper” determining who could reach their audience. Many of the worries about Media Concentration would be seen as the old paradigm of “Scarcity” as opposed to the IP world of total abundance. As the web has shown, no classic media company from the

70's and early 80's is a dominant force on the Internet. Yahoo, Google, AOL and Tiscali are all from a new era and make a lie to the notion that the old-line players always win in an open playing field. While it is clear that the marketing power of major media conglomerates like AOL Time Warner or Viacom/CBS would have huge power in the marketplace, it would be the power to persuade, not the power to control. Needless to say such an open system would depend on maintaining a regulatory stance of Network Neutrality as defined by U.S. FCC Chairman Powell's "Four Freedoms of Broadband"³. The EU telecom regulatory bodies have begun to weigh in on this matter and it is perhaps the most critical regulatory issue of our time.

But beyond the entertainment uses of such a network lies the world of education. Both the current Real Networks and Microsoft IP Video Codecs make it possible to publish video at VHS quality at 500 KBPS and DVD quality at 1.5 MBPS. These tools could enable the most important Distance Learning initiative in history. When MIT announced that it was going to allow people to audit it's courses on the internet, it was but one more sign that the extraordinary institutions of learning in our country are ready to embrace IP based distance learning. Not only can kids catch up on their courses on line, but also the whole world of continuing education for adults would be transformed. The fact that the technology companies of every EU country are always trying to raise the number of foreign technology workers they can employ is symbolic of the inability to retrain our workers for the high paying jobs of today. Universal broadband to the home would enable a platform for Universities and private Training Companies to sell their services to the country as a whole.

³ Freedom to Access Content. Freedom to Use Applications. Freedom to Attach Personal Devices. Freedom to Obtain Service Plan Information

Now the obvious question that arises is: Why would the current Media Powers whose enormous market capitalizations have been built on a world of scarcity ever allow such a world of abundance to come into being? The answer quite simply is that they would make more money. To understand this we must look at the five constituents that control the current media universe: Producers, Advertisers, Distributors, Telecom Suppliers and Talent.

Producers- Producers develop, create, and finance programming. Though many Producers are also distributors (AOL-Time Warner, Viacom, Disney, Bertlesmann) it is important to separate the two roles in order to understand the IP-TV Challenge. As an example, let's take Discovery Networks. Originally begun as the Discovery Channel, their task was to buy existing nature programming from around the world as cheaply as possible and package it for distribution under the Discovery Channel brand. This proved to be quite lucrative as the demographic of educated affluent customers attracted to this programming was being sought by higher end advertisers (Mercedes, Merrill Lynch, etc) who were just beginning to move their ads from high end print publications (Wall Street Journal, New Yorker, Vanity Fair, etc) into television. Needless to say for Mercedes to advertise on a Network sit-com was a total waste of money and so the cheap pricing of Discovery Channel was a relatively efficient buy. However, two things happened from the point of view of Discovery as a Producer that has changed the economics. First they began to run out of programming they could acquire cheaply and therefore had to begin producing their own shows at a much higher cost per hour. Second, as the number of cable distribution channels began to grow (and then explode with satellite and digital cable) Discovery believed it had to defend it's brand against imitators and so grew niche

networks (Animal Planet, Discovery Health), each of which had to be programmed 24 hours a day, seven days a week, 365 days per year.

Today the programming budget for the twelve Discovery Networks is probably in excess of \$1.5 billion per year⁴. Now the audience for this type of programming has not grown by a factor of 24x, so they are basically cannibalizing their own and their advertisers audience. If you extrapolate this out to the universe of almost 300 “Programming Services” on cable or satellite, you can see that the economics of a 500-channel universe will become increasingly tenuous. Discovery alone is responsible for programming 105,000 hours of television per year. Even assuming that half the hours are re-runs, the programming will have to get cheaper each year in order for them to reach break-even on the new networks as there is no way the advertiser will continue to pay higher rates for an increasingly fractured audience (the average Discovery digital channel is reaching less than 80,000 viewers per program).

Contrasting this with our Universal Broadband Network, one could easily see how Discovery could cut by half its programming budget and produce twenty great hours of new “on demand” programming a week with extraordinary production values. The most fanatic viewer of Discovery type programming probably does not have more than ten hours per week to spend watching this type of programming. But if they did, Discovery could cheaply archive every single episode of programming it owns and make those accessible on a pay per view or subscription basis. For the viewer, the programming could be watched when they wanted to watch it, with full VCR-like controls and Discovery could offer a “My Discovery” option that would push pet shows to the pet lover and alligator wrestling to the fans of that genre. Since the object of Discovery’s

⁴ Legg Mason Estimate, July 2004

business is to sell advertising, it could offer the pet food advertiser very targeted opportunities to not only advertise to the specific audience they wanted, but to also sell their product through interactive ads with e-commerce capability. All of the technology to enable this vision currently is in place. More importantly, the costs of streaming the programming are going through a dramatic downswing (figure 8).

	Today	End-1 Yr	End-2 Yrs	End-5 Yrs
Stream: Megabits/Second	0.300	0.300	0.300	0.300
Cost per Gigabyte	\$1.150	\$0.690	\$0.414	\$0.089
Annual Improvement		(40)%	(40)%	(40)%
Usage Megabits per Hour	1,080	1,080	1,080	1,080
Gigabytes per Hour	0.14	0.14	0.14	0.14
Cost per Hour	\$0.1553	\$0.0932	\$0.0559	\$0.0121
Cost per Streamed Units (\$/ Min.	0.0026	0.0016	0.0009	0.0002
Hours of Usage per Day	8	8	8	8
Hours of Usage per Year	2,920	2,920	2,920	2,920
Streaming Cost per Year @ 8-Hr Day	\$453.33	\$272.00	\$163.20	\$35.25
Streaming Cost per Month	37.78	22.67	13.60	2.94
Sub. Fees for 40 Basic Cable Nets	7.98	8.38	8.80	10.18
Annual Increase in Subscriber Fees		5%	5%	5%
Total Content and Web Transport Costs	\$45.76	\$31.05	\$22.40	\$13.12
Add. Cable Op. EBITDA Margin	35%	35%	35%	35%
Total Charged Consumer	\$61.77	\$41.91	\$30.24	\$17.72

Source: Industry Sources and Bernstein analysis.

Figure 4 –Downward Internet Streaming Costs-Sanford Bernstein & Co.

Advertisers- The movement of Euros away from the broadcast networks to cable and Satellite networks continues, but this year even cable networks have had to lower their rates. The famous maxim by U.S. department store mogul John Wanamaker that “50% of my advertising expenditures are wasted. I just don’t know which 50%” is truer than ever. This problem has been exacerbated by the introduction of the Personal Video Recorder (PVR), originally under the brand name TiVo and now introduced as an add-on to the standard cable set top box. The potential effect of widespread diffusion of PVR’s is quite dramatic (Figure 9) and could lead to a quicker adoption of the IP-TV paradigm.

PVR Negative Impacts	2004E	2005E	2006E	2007E	2008E	2009E	2014E	2016E
PVR Assumptions								
22 PVR Penetration	6%	11%	16%	20%	22%	25%	35%	38%
23 PVRs@ Year-End	7	12	18	22	25	28	42	46
24 Growth of PVRs	103%	85%	50%	22%	14%	12%	6%	4%
PVR Impact Calculations								
25 Pct of Recorded Comms Skipped	70%	70%	70%	70%	70%	70%	70%	70%
26 Pct of Total Comms Skipped in PVR Households	14.81%	15.96%	17.16%	18.40%	19.69%	21.02%	27.43%	29.99%
27 Effective Average Homes Reduced by PVRs	(0.96)	(1.92)	(3.09)	(4.05)	(4.92)	(5.88)	(11.46)	(13.68)
28 Advertising "At Risk" in All PVR HHLDs (\$ mil)	\$(560)	\$(1,172)	\$(2,015)	\$(2,782)	\$(3,587)	\$(4,522)	\$(10,834)	\$(13,980)
29 Pct of TV Advertising "At Risk"	(1)%	(2)%	(3)%	(4)%	(4)%	(5)%	(10)%	(11)%
30 Adding Demographic Premium	125%	125%	125%	125%	125%	125%	110%	110%
31 Adjusted "Ad Risk" in All PVR HHLDs (\$ mil)	\$(700)	\$(1,465)	\$(2,519)	\$(3,478)	\$(4,484)	\$(5,653)	\$(11,917)	\$(15,378)
32 Adjusted Pct of TV Advertising "Ad Risk"	(1)%	(2)%	(4)%	(5)%	(5)%	(6)%	(11)%	(12)%

Source: Bernstein estimates.

Figure 5-PVR Penetration and Commercial Skipping Estimates-Sanford Bernstein & CO

The ability of the Internet to target an audience was seen as a way out of the misplaced advertising trap, but it quickly became clear that the ubiquitous banner ad lacked the basic power of the ad industry: emotion. As banners proliferated, the web surfer simply didn't even see them, much less click through (click-throughs were lower than 1%). A video quality broadband network affords advertisers the Holy Grail; the ability to target like the web combined with the ability to run full screen 30-second commercials that allow interested users to click-through to the e-commerce page of the advertiser. If you are moved by the Gap ad, you can immediately buy the clothes. Furthermore, the ad buyer can specify a demographic target (females, 14-18, in specific zip codes) and only pay for that target. In recent tests with this broadband technology, click through rates on interactive video ads were more than 30%.

Distributors- In a new world media order, the role of distributor would change. Today, the six basic conduits for video media are theaters, broadcast TV, cable TV, satellite TV, video rental stores, and broadband IP networks. The classic producer/distributor like AOL Time Warner seeks to market its product through every one of these channels. And in each of these channels there is a third party who can demand a share of the revenue from the transaction.

To begin to understand this new world of IP-TV it will be important to differentiate between Broadband Carriers and Broadcasters. Broadband carriers would be comprised of all DSL providers (FT, BT, Telecom Italia, Deutsche Telekom, etc) all cable providers with upgraded Hybrid Fiber/Coax plants, all ISP's offering Broadband service (AOL, Tiscali, MSN) and all fixed wireless providers. Broadcasters would consist of all over the air TV networks and all Satellite networks. In an IP-TV world the Broadband Carriers would make their money by providing metered service much like your cellular or utility service. Heavy users of streaming media would pay more than light users. Distributors of content could then sell to the Carrier's customer base on an Open Access basis and use the three basic models for payment: monthly subscription, pay per view or ad supported content. Clearly the Broadcasting model would not be able to compete because of lack of a two-way network. However, this transition to IP-TV would be gradual and still the "Event" type of programming like sports or award shows which demands a specific mass audience to be present at a specific time would be a staple of the broadcasting universe for a long time.

Telecom Suppliers- The last few years has seen a steep downturn in the Telecom economy. The obvious reason was that without reasonably priced broadband connectivity in the last mile, no one needed to enable the immense backbone networks that had been built. Companies like Cisco, Nortel, and Lucent saw their market caps fall by 50%. Because much of the last mile Broadband connectivity is controlled by the national telecoms, there was a clear bottleneck in the system. Recent attempts at regulatory relief have proved only partially successful. It is here that the European market must make aggressive moves to keep up in the Broadband economy. Although the necessary fiber

backbone for a Trans-European IP TV system is in place, the local build out of robust broadband capacity to the home is lagging both Asian and the U.S. In the U.S. the huge capital investment by cable companies in hybrid fiber coax has led to their ability to offer 6 MBPS downstream to the home. (Figure 5)

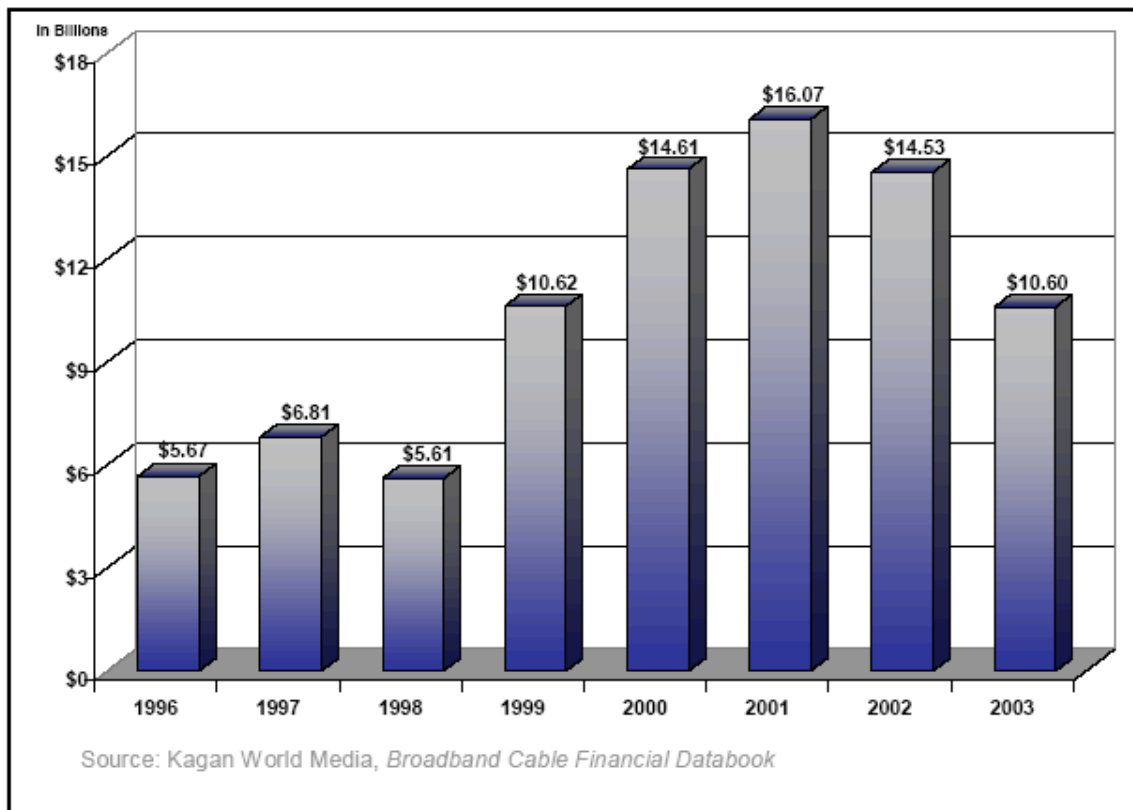


Figure 6-U.S. Cable Capital Expenditures

The recent announcements by both by U.S. carriers SBC and Verizon to build out their fiber to the home networks also presage a real boost to the IP-TV vision. By unlocking the bottleneck, thereby creating a need to enable the immense dark fiber

backbone, the European Telecom Economy could be put back on solid footing and a potentially fatal blow to the regions economic health could be avoided.

Talent- It is one of the great ironies of the age of media consolidation that giants like Fox, Time Warner and Canal + promote themselves as “Brands”. In the world of entertainment, the artist is the brand. The navigation metaphor of Apple’s I-Tunes, a digital music service that has sold 54 million downloads in one year acknowledged this reality. All you needed to do was type in the name of the artist. It is actually impossible to search by record company “brand”. Further empowering the notion of the artist’s primacy is the arrival of powerful new inexpensive digital tools for both music and video production. This production doesn’t have to be as expensive as it is and the true artist will work for much less if he or she has a real stake in the gross earning power of their work.

So how would the arrival of Universal Broadband help foster a new artistic renaissance in the culture? If the world of distribution scarcity has built a wasteful media economy, it would stand to reason that a world of abundant, cheap digital technology and distribution might help the true artist escape the current media “Hit” economics. If the only things being financed are aimed at the mass audience that appeal to the raunchiest lowest common denominator, then the artist with a different perspective has a hard time getting financed. This realization is leading some in the entertainment business to realize that the tyranny of the 80-20 rule could be broken. Chris Anderson of Wired Magazine has described a new selling model called “The Long Tail”, in which on-line retailers are finding that even the most obscure content sells at an acceptable level on line. Although the average large record store might have a total of 40,000 individual songs in it’s racks,

the digital music service Rhapsody currently has over 500,000 (Figure 6) and song number 499,999 sells well enough to pay for itself.

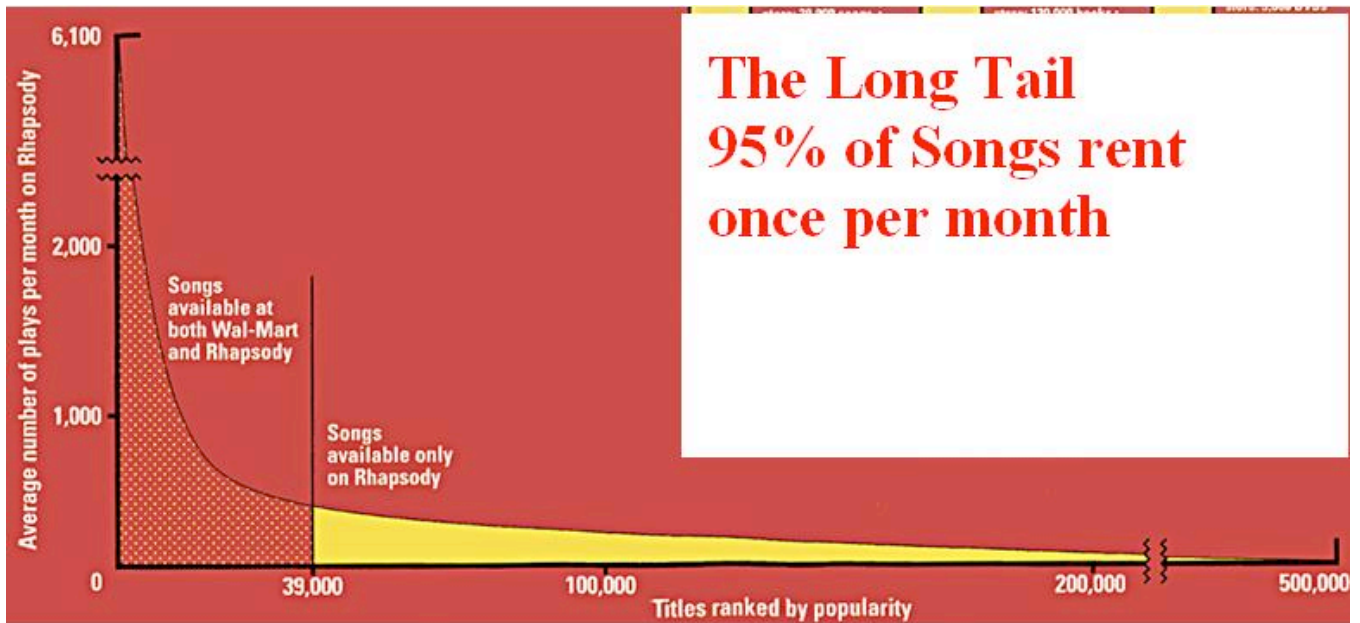


Figure 7-Monthly Download Performance of Rhapsody-Source-Wired Magazine

Is IP-TV a pipe dream? Some Mobius-shaped fantasy? By year-end 2005 there will be 40 million homes in the EU with Broadband.(Figure 7) An additional 5 million college students have access to broadband at their University. Moving the signal from the PC to the TV will evolve over the next 12 months as new set top boxes, game consoles and wireless home networks proliferate. What is needed is the combination of political will and the vision to realize that the educational and cultural needs of the country will be enhanced by the widespread deployment of IP-TV.

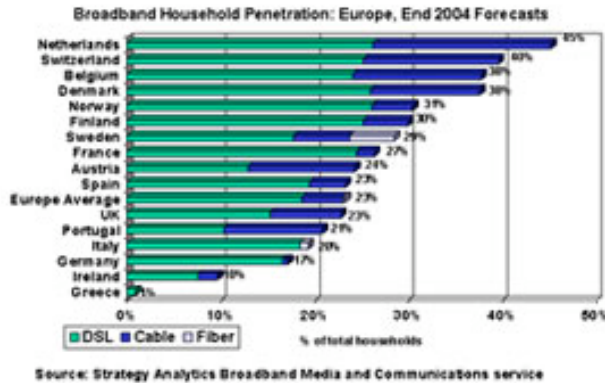


Figure 8-European Broadband Penetration

We are in the Media Interregnum. In the past lies the failed orthodoxy of the domination of all media by a few major corporations, subjecting artists, citizens, politicians, marketers and the technology economy to their will. In the future lies a Renaissance of media, entertainment and learning fueling a new technology growth economy that will lift our minds and our spirits and keep our economic growth on track in the process. This radical change in the media landscape will not arrive without some serious turf battles between owners of content and owners of “pipe”. Cable and Telephone companies will naturally migrate towards a “walled garden” approach to Broadband, hoping to preserve their “gatekeeper” status between content owners and their customers. Already in the U.S. the cable companies have gotten the FCC to reclassify broadband to an Information service from its previous classification as a Telecommunications service. This is not a trivial difference. Telecommunications services have a “common carrier” component, preventing the owner of the network from discriminating in any way. As the Center for Digital Democracy states, “The principle of nondiscriminatory communication has long governed our telephone system and the Internet itself, allowing any party to transmit any message to any other party without

interference by the network operator. This principle of free expression should be maintained for broadband as well. High-speed Internet users should be allowed unimpeded communications with any network device, use of any lawful service, and transmission of any data". In order to move into a new world of IP-TV that will be the preferred platform for all of the constituencies of the digital age, the EU can take the lead to preserve the open nature of Broadband Internet and usher in a new age of IP TV.