
The Broadband Market Space

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(Slides are available at:

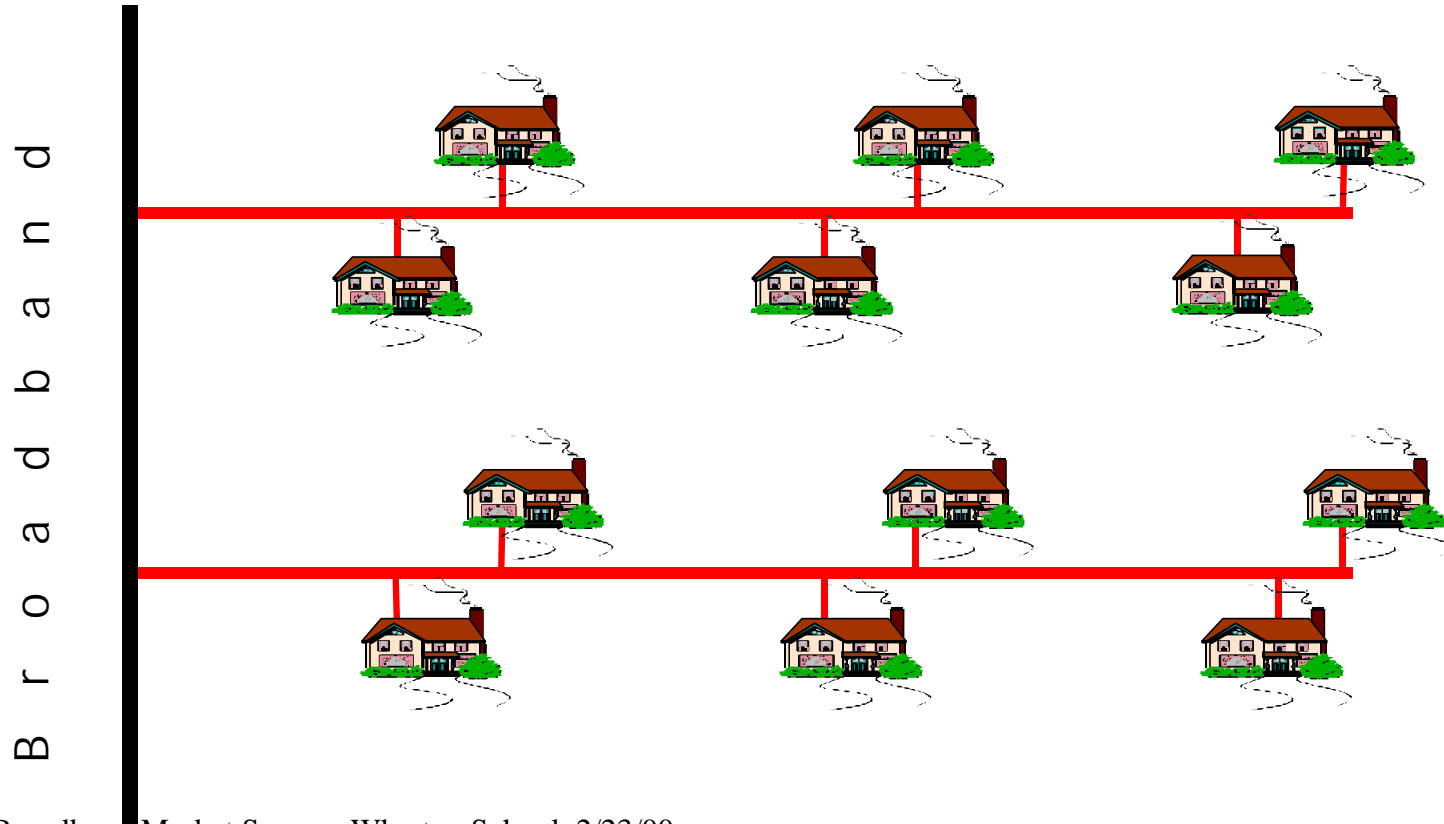
<http://rider.wharton.upenn.edu/~faulhabe/broadbandspace.pdf>)

What's Broadband?

- “Bandwidth” refers to the information capacity of a digital “pipe;” more bandwidth, more bits/second
 - Narrowband = voice telephone: 10Kilobits
 - Broadband = television: 5-10 Megabits
- The Internet backbone is all broadband; huge amounts of information carried daily.
- Businesses and universities usually have broadband; own their own networks, pipes, and servers
 - But may choose to deliver less to the desktop
- Residence customers access the Internet using telephone lines, with <56Kbps
 - Result: the World Wide Wait

Broadband Access

- The Broadband backbones are already out there
- But the “last mile” continues to hold up broadband applications.



Who Cares?

- Why does anyone want this?
- “Always on;” broadband means never having to dial
- Browsing the web becomes like flipping pages in a book; graphics download almost instantly.
- Viewing video clips
 - RealPlayer, Disney.com, [z.com](#), Ani DiFranco,
 - Not like TV, but lots better than narrowband
- What’s the future of broadband content?
 - Today’s choice: 500 Kbps for \$40/month
 - In two years: 1.5 Mbps
 - In five years: 5-10 Mbps (movie quality)

Why isn't this here now?

- Very large infrastructure investment; the promise of interactive broadband is huge but iffy.
- But there is infrastructure...in fact, two: cable TV and telephone!
 - Until recently, cable strapped with
 - Huge debt
 - One-way entertainment mindset
 - Until recently, telephone strapped with
 - Public utility mindset
 - “It’s the regulator’s fault!”
- AT&T purchase of TCI (1999): offer local telephony and broadband local access.
 - Huge investments to upgrade cable facilities to digital of largest cable firm in US
 - 1999: announced plans to acquire Media One, third largest in US

Is it only cable modems?

- DSL (Digital Subscriber Line)
 - Telephone technology that increases the bandwidth of the telephone line to 640 Kbps (up to 7.1 Mbps)
 - Not all lines DSL-capable; must be upgraded
 - Telephone companies have used a “slow follower” strategy: have responded to cable plans to go Internet with DSL rollouts
- Full Fiber
 - RCN and others deploying fiber to the home, offering TV, Internet, and phone service in one 5-10 Mbps digital pipe.
 - “Cherry-picking;” not generally available
- Broadband Wireless
 - Lots of talk, for now
- Broadband now about 6% online market; should be about 50% of online market in 5 years. Narrowband here to stay

The Vertical Chain - Narrowband

Content Providers: [entertainment](#), [shopping](#), [travel](#), chat, ...

Portals ([Yahoo](#), [Snap](#), AOL)

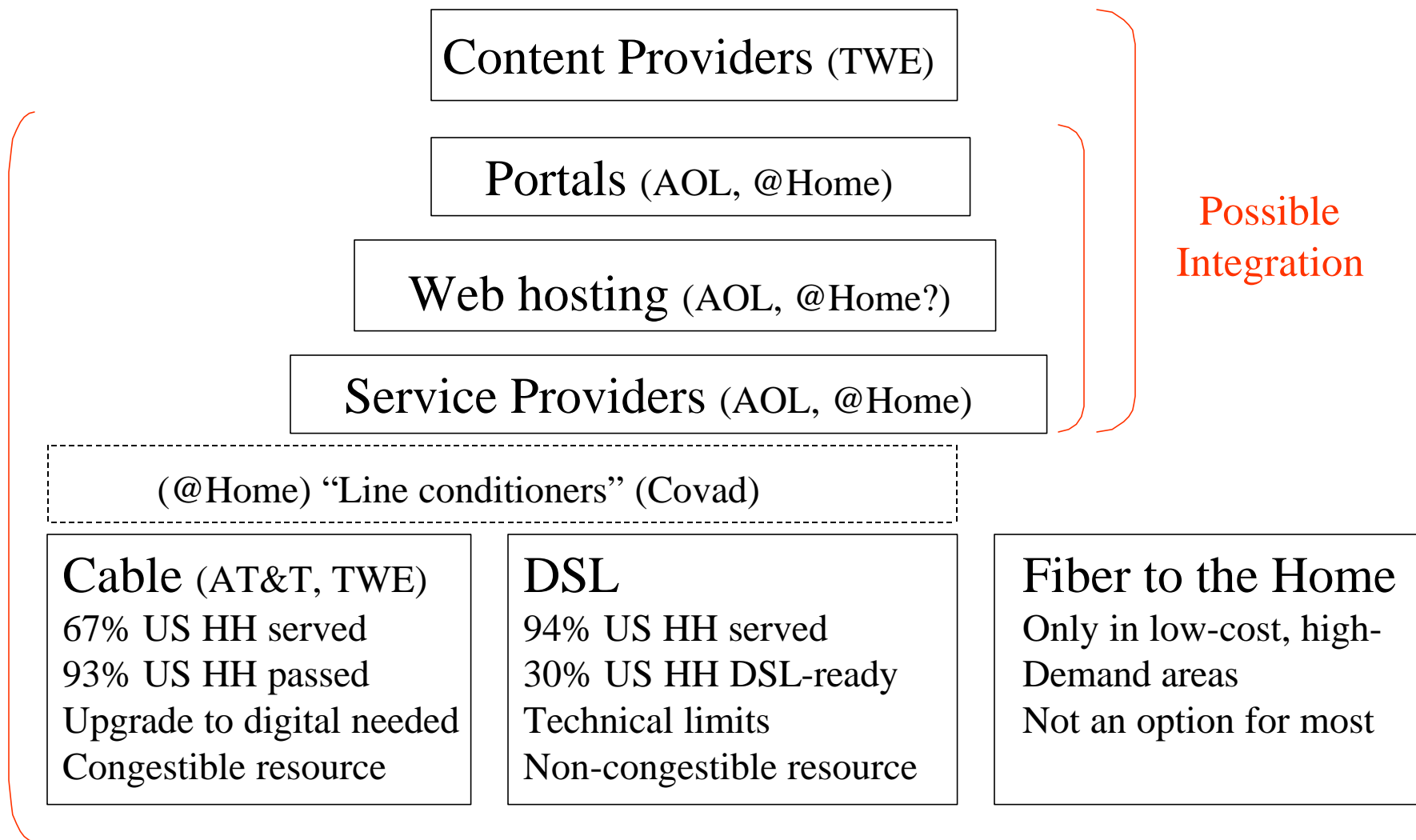
Web hosting ([Akamai](#))

Service Provider ([Mindspring](#), AOL, PennNet)

Infrastructure ([telco](#))

Some
integration

Vertical Chain - Broadband



Where's the Action?

- Cable model is proprietary/exclusive
 - Cable always chose content for customers, now wants to choose your SP, maybe portal
- Telephone model is “common carrier”
 - legally bound from controlling content. DSL open to all SPs, so no integration of infrastructure and SP
- AOL model is integrated SP/portal, create “community”
 - AOL has 40% of online population
 - Likely to change as users become more sophisticated? *I think not*
- SP market likely to move in AOL direction
 - More proprietary content
 - Portal integration (JVs, homegrown, acquisitions)
 - Less competitive market
- ***True for both narrowband and broadband***

Other Opportunities?

- Web hosting
 - Provide server site for content providers close to customers; reduces network congestion bottleneck
 - Competing with SPs who work favorable deals with content providers
 - Should be viable business
- Speciality portals
 - Yahoo, Snap are generalized mass-market portals (“first screen”)
 - Likely to be a market for specialty portals/communities to supplement mass-market portals
 - Bicyclist.com
 - Swap/sell specialized tools/equipment/collectibles
 - Chat with like-minded enthusiasts
- “Line conditioners” will be absorbed into infrastructure

But What Is Broadband Content?

- “streaming video” is what they say...
 - But nobody is going to watch movies on the Internet!
 - *Hello! We already have a way to watch movies!*
- Is there a market for short video clips (at 640 Kbps)?
 - Trailer for the next Disney movie
 - Fan websites (music & tour videos)
 - News and sports (CNN, Weather Channel, ZDNet)
- Is there a market for video at 1.5 Mbps?
 - Shopping enhancements
 - Look at appliances, autos, etc. from several (user-selected) views
 - Short promo clips
 - Informational
 - Encarta Online

But What's the Killer App?

- So far, none. But it's shape is clear:
- **INTERACTIVE VIDEO**
- Gamers
 - Online realtime Doom II
 - Bandwidth-intensive; probably requires 5-10 Mbps
 - 20% of online market
- True interactive shopping
 - Use avatars of your exact size and shape to “try on” clothes, see different views of “yourself”
 - Real estate/vacation resort 3D walkthroughs
 - 3D simulations of using a product, driving a car, etc.
- These applications require very high bandwidth; must wait until fiber to the home a reality

What About Wireless?

- Handheld wireless Internet devices are The Next Big Thing
 - Europe (2 years ahead of US) plans 3G wireless @ 10 Mbps by 2004
 - Are we moving away from the PC as the Internet access device?
 - So far, WebTV has not been a winner
 - Could we see specialized devices for specialized uses? Perhaps
- Fixed-base antennas vs. satellite
 - Satellite a touchy technology, especially send/receive. LEO satellites (required for interactive communication) have a variety of technical issues
 - Fixed-base has some line-of-sight restrictions (can it go through buildings?), at least partially solvable
- But the Big Issue is: ***WHAT IS THE ACCESS DEVICE?***
- Handhelds are inherently very narrowband devices; how will they handle broadband content? Answer: ***they won't***
- Solve this problem and your fortune is made!

Conclusion

- Broadband is the next step in the evolution of the Internet
- It is at the confluence of telecommunications and computing; neither of these industries understands a thing about the other
- So opportunities abound! In the Valley of the Blind, the One-Eyed Man is King
- There will be much jockeying for position between the content providers and the infrastructure firms
 - Acquisitions, JVs, vertical integration
 - But content and conduit guys should not integrate (this always sounds like a great thing to do, but it never is)
- Find the killer app for Broadband and you will be the next Bill Gates!