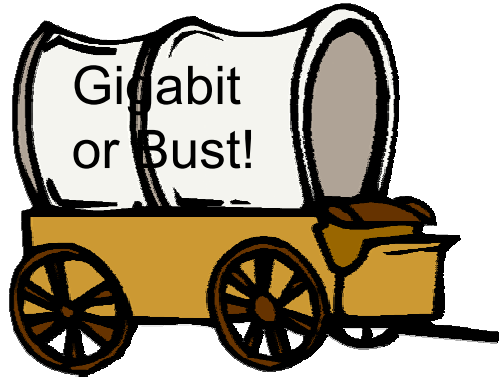


# Milestones on the Road to One Gigabit



2010

1,000 meg

2008

100 meg

2006

10 meg

2004

1 meg



# Hardware Cost Milestones

At end of	Speed of network card in Standard PC	Cost for standalone card for PC	Typical wireless card speed on new laptop	Cost of standalone card for laptop
2001	10-100 meg			
2002	10-100		1 meg (b)	
2003	gigabit		45 meg (g)	
Forecast				
2004	gigabit			
2005				
2006	2 gig			
2007				
2008				
2009	8 gig			
2010				

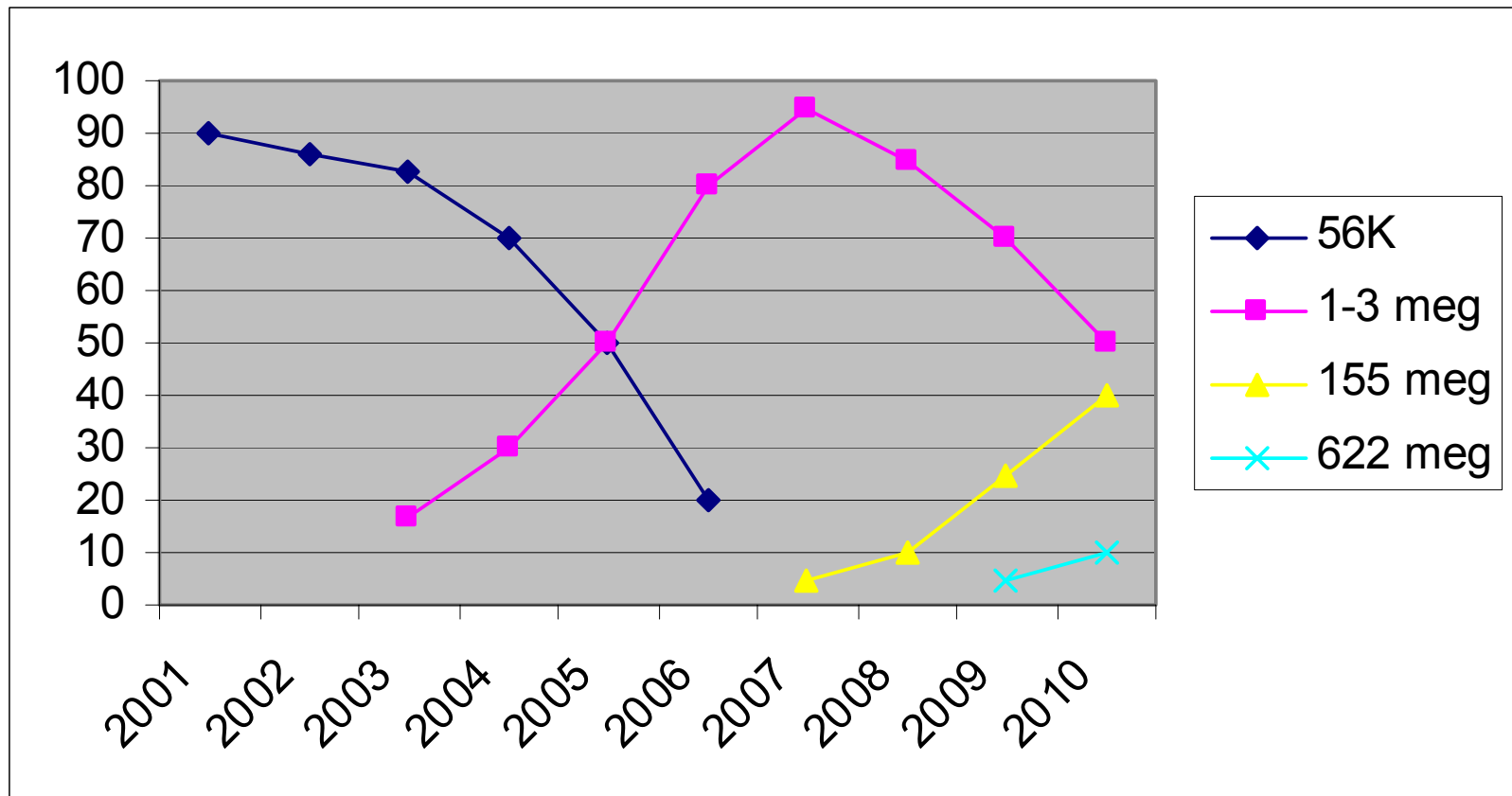
# Connection Cost Milestones

At end of	At least 50% of home Internet users use -	Cost of home Internet connection with ISP services		
2001	56K Dial up	\$12		
2002	56K Dial up	\$12		
2003	56K Dial up	\$12		
Forecast				
2004	1 meg Cable/DSL	\$40		
2005	2 meg Cable/DSL	\$40		
2006				
2007	100 meg			
2008				
2009				
2010	1 gig			

# Market Penetration Rates

Percent of Internet Households

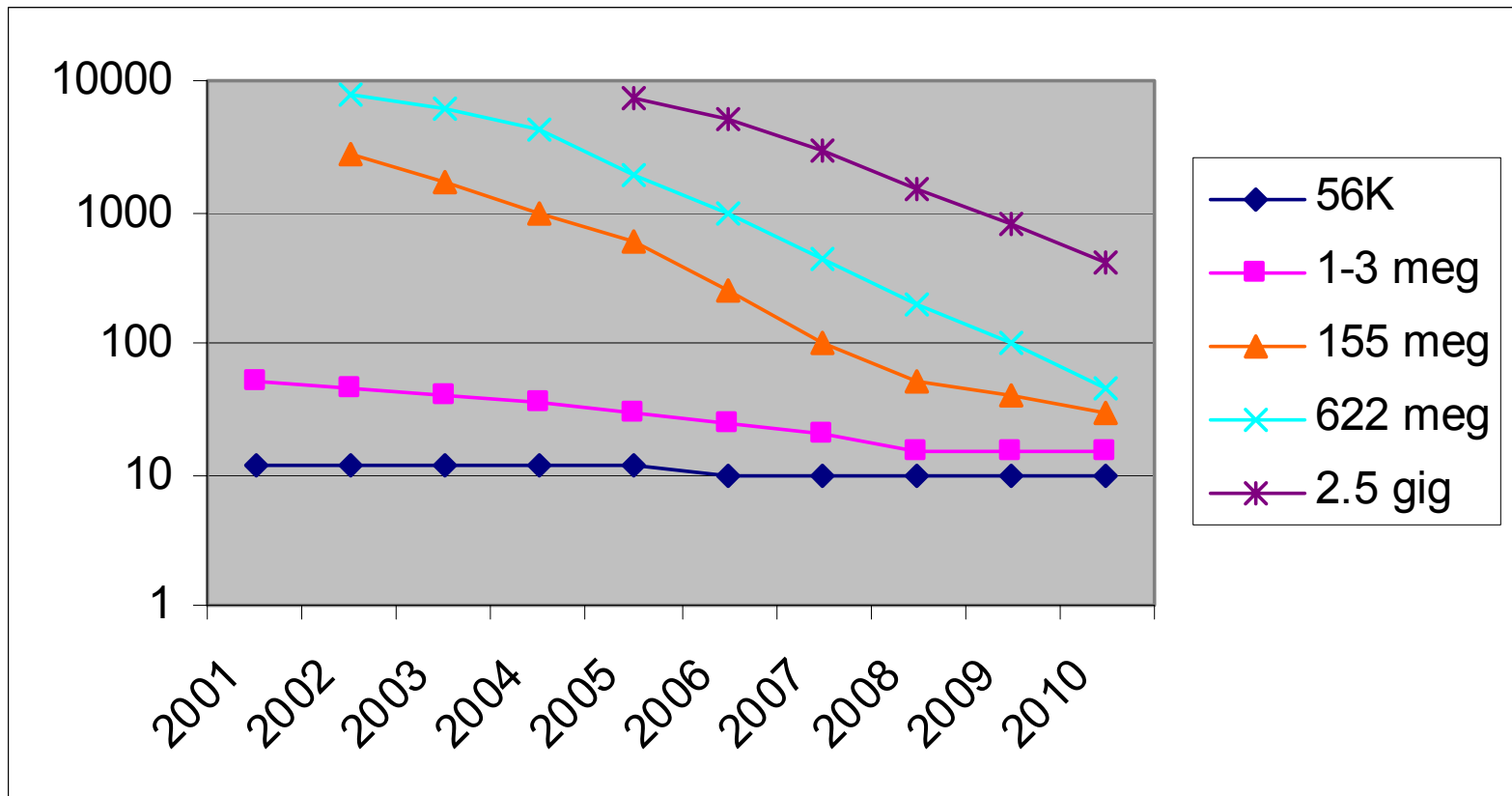
HYPOTHETICAL DATA



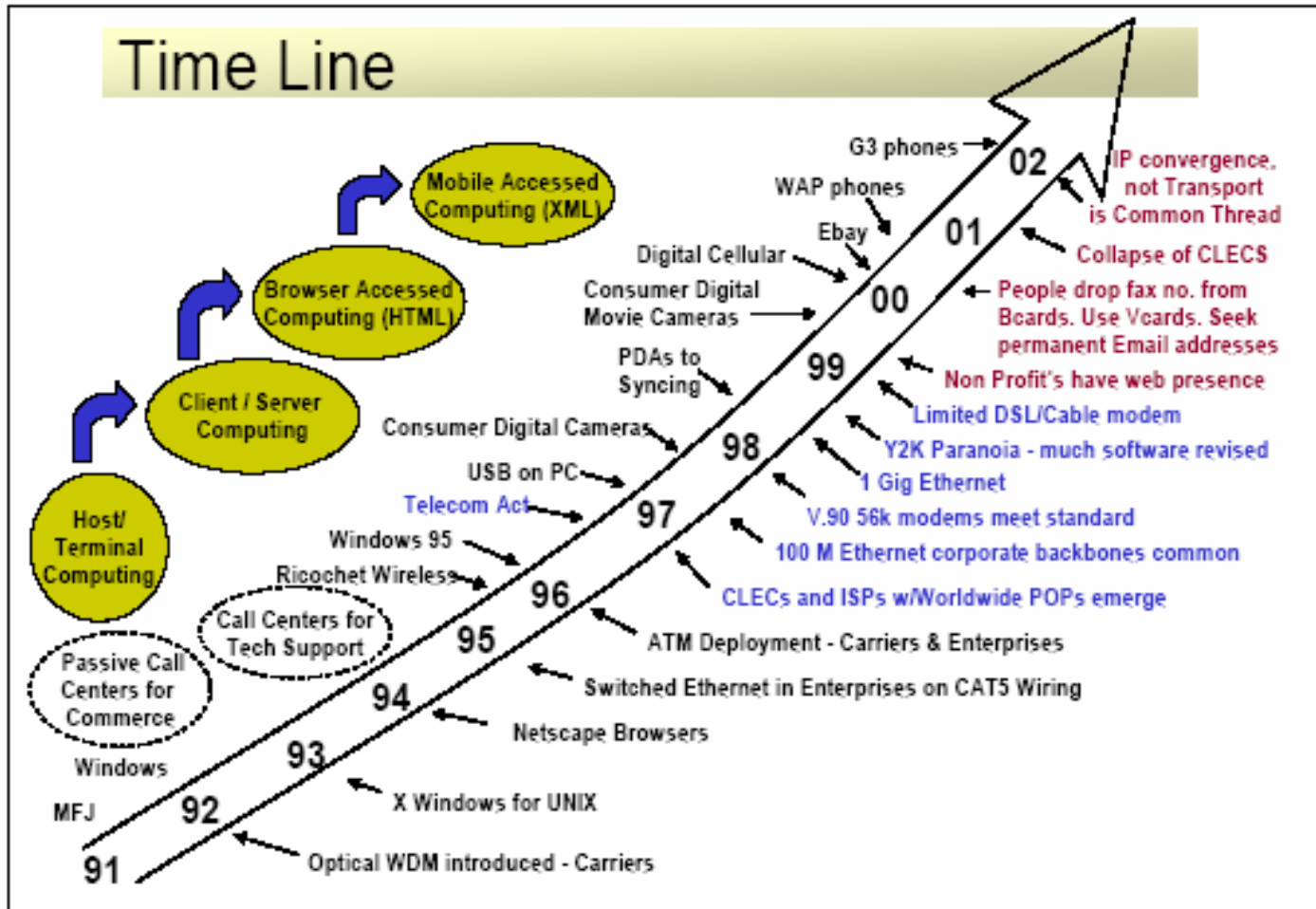
# Connection Costs

Dollars per Month

HYPOTHETICAL DATA



# Retrospective Milestones



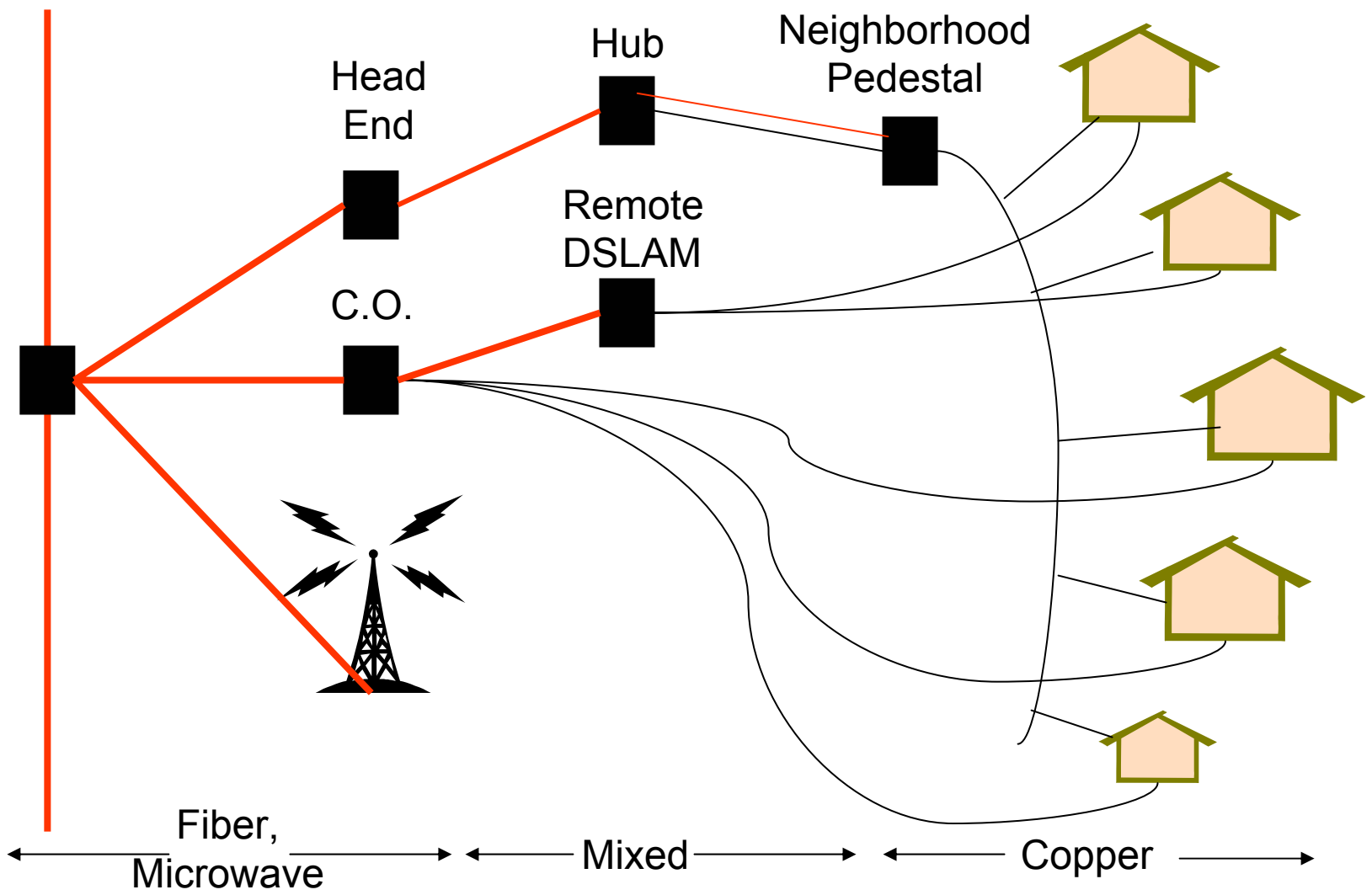
# Content Converts to Digital

	Launch	Widespread Use
Music – CD	1983	1990
Cell Phone – PCS	1995	2000
Video Camera – consumer	1995?	2001?
Movies – DVD	1997	2000
Photography – consumer	1997?	2003
Television – broadcast DTV	1998	
Television – satellite	?	?
Television – cable	2001	2003
Radio – satellite	2001	
Telephone – backbone	?	?
Telephone – VoIP	2002	
Telephone – WiFi	2004	
Movies - theater		

# Other milestones?

- Employment in tech jobs?
- Teleworkers?
- Distance learners?

# Pushing Fiber into the Neighborhood



## The Digital Hierarchy (US practice)

Signal Level	Digital Bit Rate	Voice Circuits	Carrier System
DS0	64 Kbps	1	(none)
DS1	1.544 Mbps	24	T-1
DS1C	3.152 Mbps	48	T-1C
DS2	6.312 Mbps	96	T-2
DS3	44.736 Mbps	672	T-3
OC1	51.84 Mbps	672	OC1
DS3D	135 Mbps	2016	T-3D
OC3	155.52 Mbps	2016	OC3
OC12	622.08 Mbps	8064	OC12
OC24	1.244 Gbps	16,128	OC24
OC48	2.488 Gbps	32,256	OC48
OC192	9.952 Gbps	129,024	OC192
OC256	13.271 Gbps	172,032	OC256
OC768	39.813 Gbps	516,096	OC768
OC3072	159.252 Gbps	2,064,384	OC3072

# Home broadband use in the U.S. is lagging the world.

Percent of Home Web Surfers with Using Broadband

