Technology Overview

So What is Broadband Access?

- High speed connection to the Internet
  - Greater than 128Kbps
  - Always on!
  - Simultaneous up-Link and down-link communication
  - Overcomes Internet frustrations
  - Made possible by digital modems
- Leading broadband access technologies
  - xDSL, cable, satellite, ISDN digital modems




Digital Modem Growth Drivers

- Internet users are demanding more Bandwidth
  - Home networking
    - Internet services such as voice, video & data
      - Streaming video, web browsing, email, MP3 files, VoIP, digitized photographs, Video-on-Demand, online gaming
    - Multiple information appliances having Internet access
    - Online shopping using high resolution images
  - Telecommuters and day extenders
    - Connecting to corporate LAN through the Internet
    - Using Virtual Private Network (VPN) technology
  - Home businesses

Digital Modem Growth Drivers

- Analog modems have hit the wall at 56 Kbps
- Digital modems offer vastly greater bandwidth
  - Satellite: 400 Kbps to 38 Mbps
  - DSL: 1.5 Mbps to 52 Mbps
  - Cable: up to 10Mbps

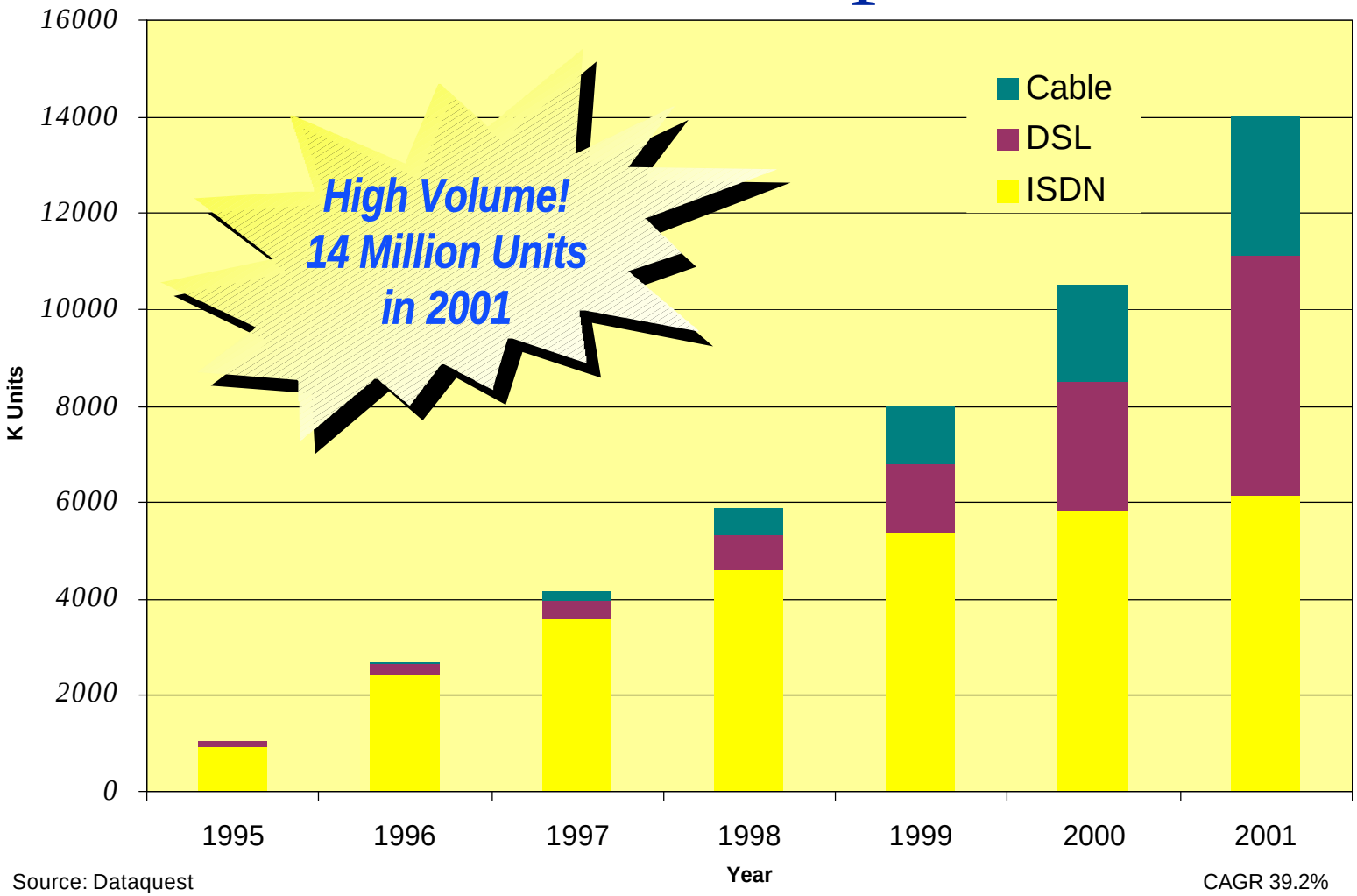
Frustrated Maybe ….

napster

BLOCKBUSTER MOVIES

Average Download Times			
Connection Speed	Web Page (30KBytes)	3 minute Music File (3MBytes)	30 second Video/Movie (50 MBytes)
28.8 kbps	9 seconds	15 minutes	4 hours
56 kbps	4.5 seconds	7.5 minutes	2 hours
ISDN (144 kbps)	2 seconds	3 minutes	55 minutes
DSL/Cable 1.5Mbps)	<1 seconds	15 seconds	5 minutes

Digital Modems - WW Unit Shipments



Source: Dataquest

CAGR 39.2%

Impact on the Internet Household

- Facilitation of work at home
  - Similar high-speed access as work
- Potential to leverage voice
  - PBX service to the work-at-home population over broadband is a substantial value-add
  - Voice over DSL and cable
- Impact of always-on and continuous connectivity
- Benefits to new bandwidth-intensive applications / devices
  - Voice, video, data, music and multimedia
- Lower prices / higher speeds