ADSL – WHAT'S NEXT???

March 16, 2005

Paul Stinson, Manager

Regulatory Affairs

BELLSOUTH

Listening. Answering.™

INTRODUCTION

- IP Network/Broadband Transport
  - Broadband Adoption
  - Emerging Network/Service Models
- ADSL Technology
  - Network Architecture
  - New Standards
  - Broadband Services
- Regulatory Issues

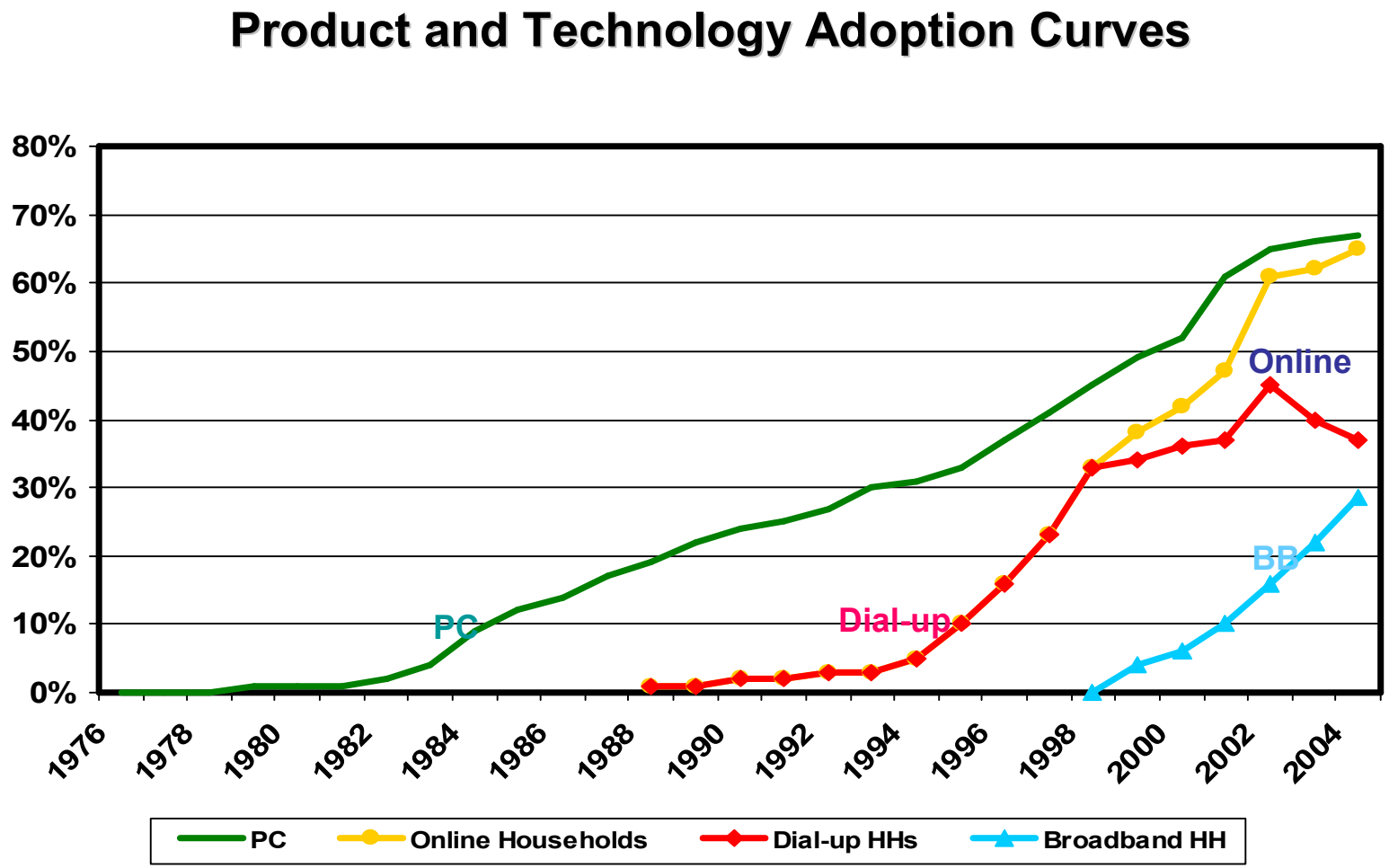
BELLSOUTH
Listening. Answering.™

NETWORK EVOLUTION

- Internet Protocol (IP) is becoming **the** pervasive network protocol
- Wired and Wireless use are exploding
- Broadband is the required transport platform

BELLSOUTH
Listening. Answering.™

Broadband Adoption

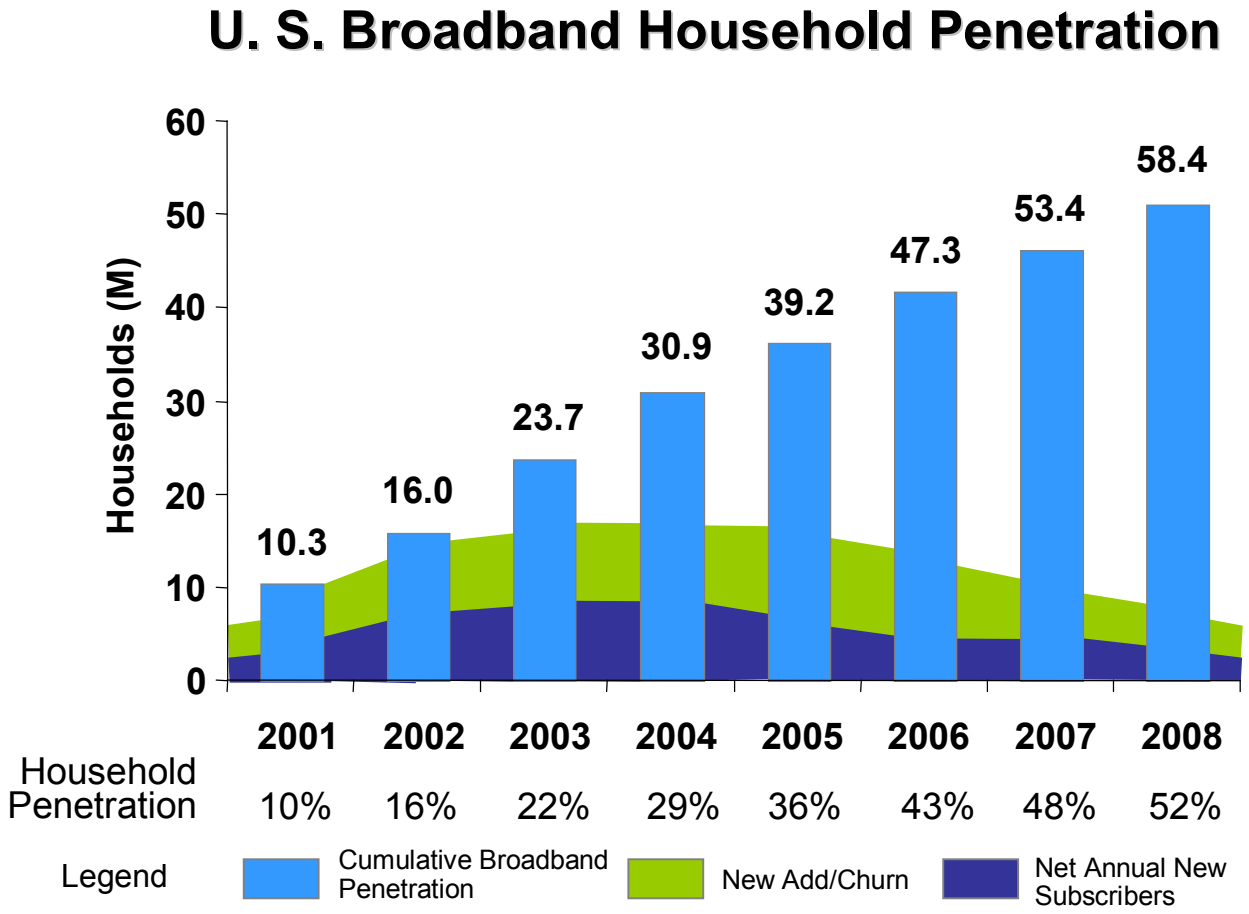


Broadband Has One Of The Fastest Adoption Rates

Sources: Veronis Suhler Stevenson, PQ MediaLLC, icwhen.com, Motion Picture Association of America, National Association of Broadcasters, TV Dimensions, US Bureau of the Census, Wall St Journal, CTIA

BELLSOUTH
Listening. Answering.™

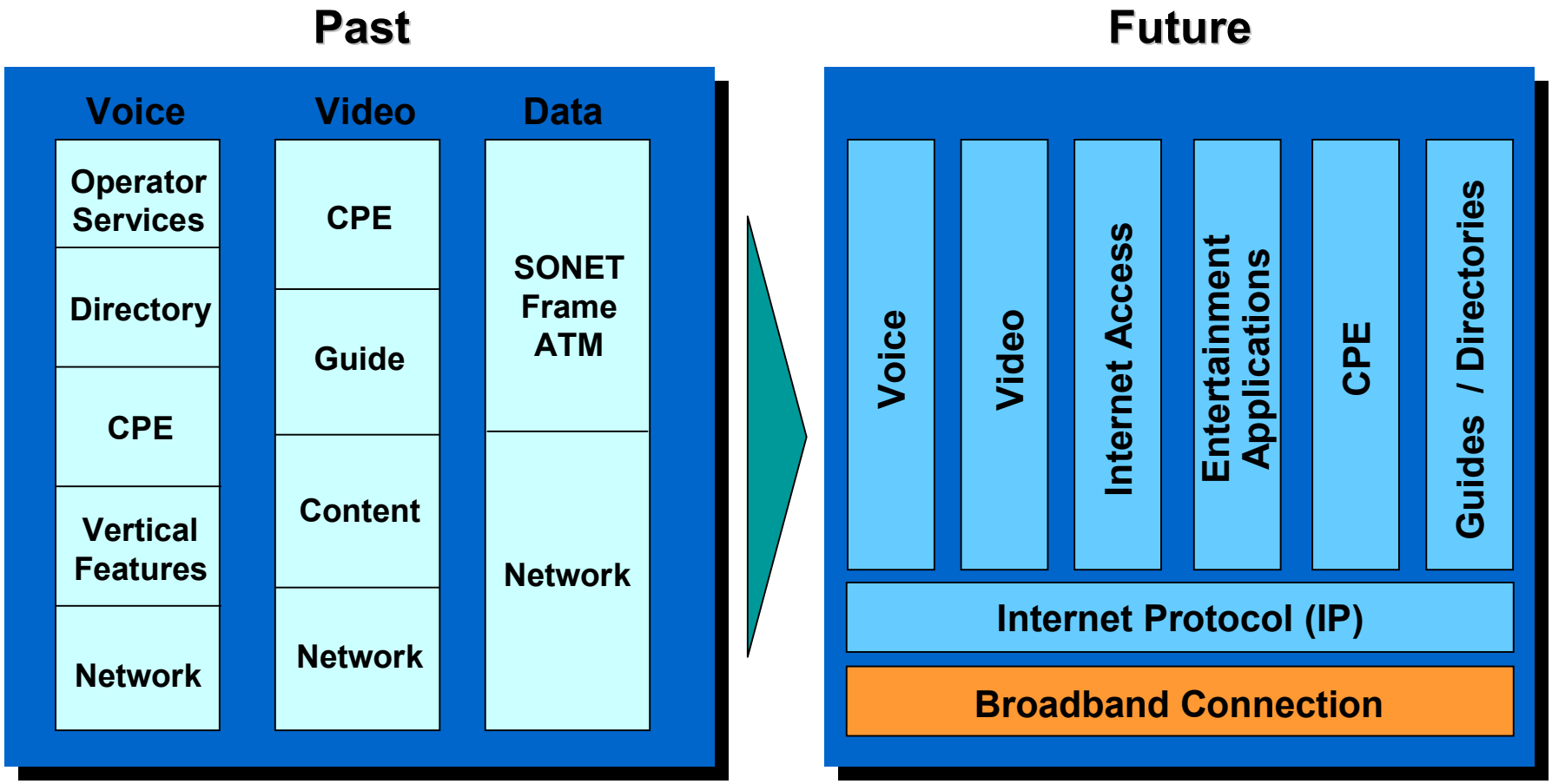
Broadband Adoption



- **Broadband households will triple between 2001 and 2004**
- **Over 1 in 4 U.S. households (29%) will have broadband service by year end 2004**

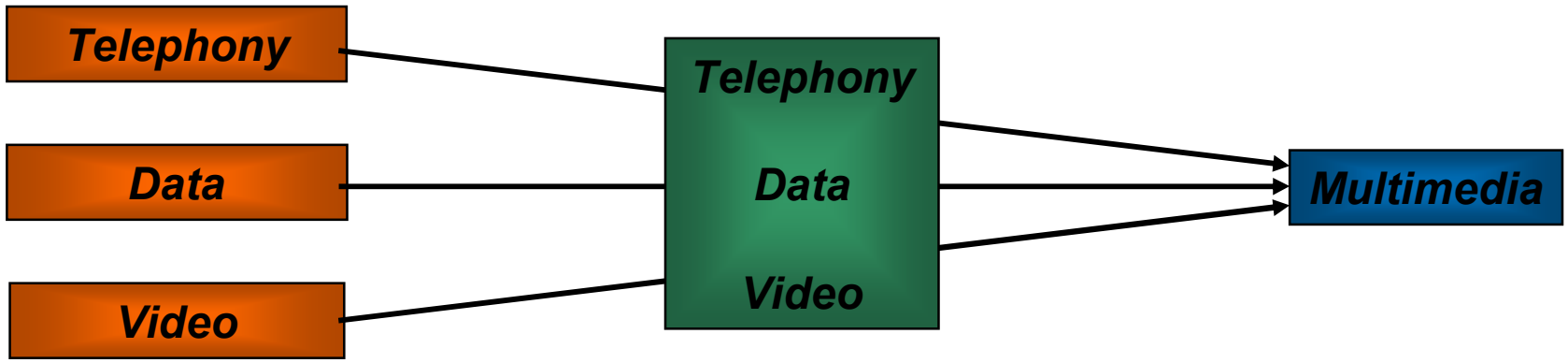
BELLSOUTH
Listening. Answering.™

Emerging Network Model



BELLSOUTH
Listening. Answering.™

Emerging Service Model



A la carte

- Individual service providers
- Multiple bills
- Product discounts
- No packaging or integration

Bundles

- Single service provider (one stop shop)
- One bill
- Package discounts
- No integration

Integration

- Converged platform
- One bill
- Package discounts
- Integrated services
- Additional services

BELLSOUTH
Listening. Answering.™

BROADBAND TECHNOLOGIES

- CATV
- Satellite
- Power line DSL
- WiFi (Wireless)
- Fiber to the ???
- ADSL (Telcos)

BELLSOUTH
Listening. Answering.™

ADSL TECHNOLOGY

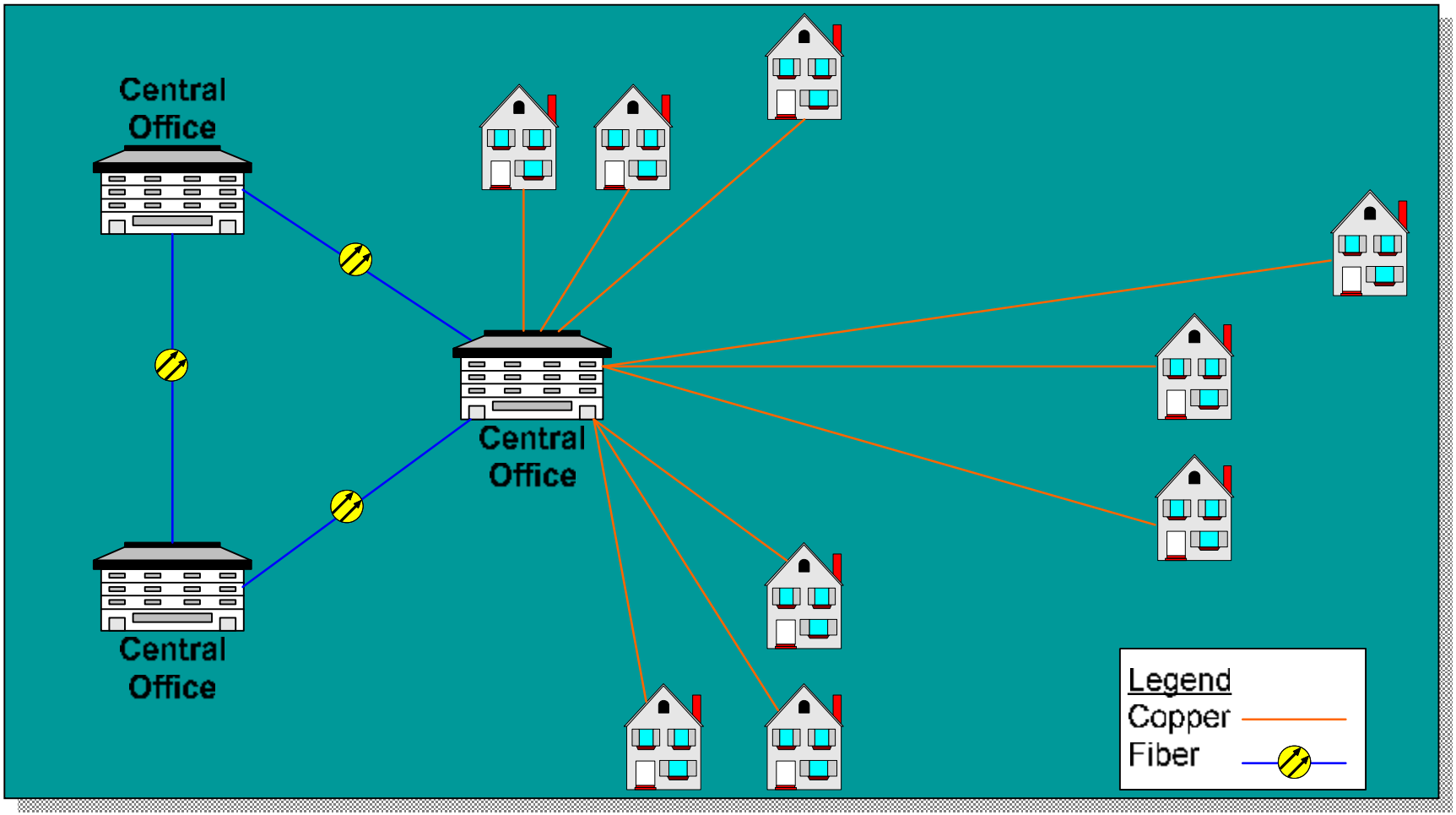
Current Network Architecture

New Standards

Broadband Services

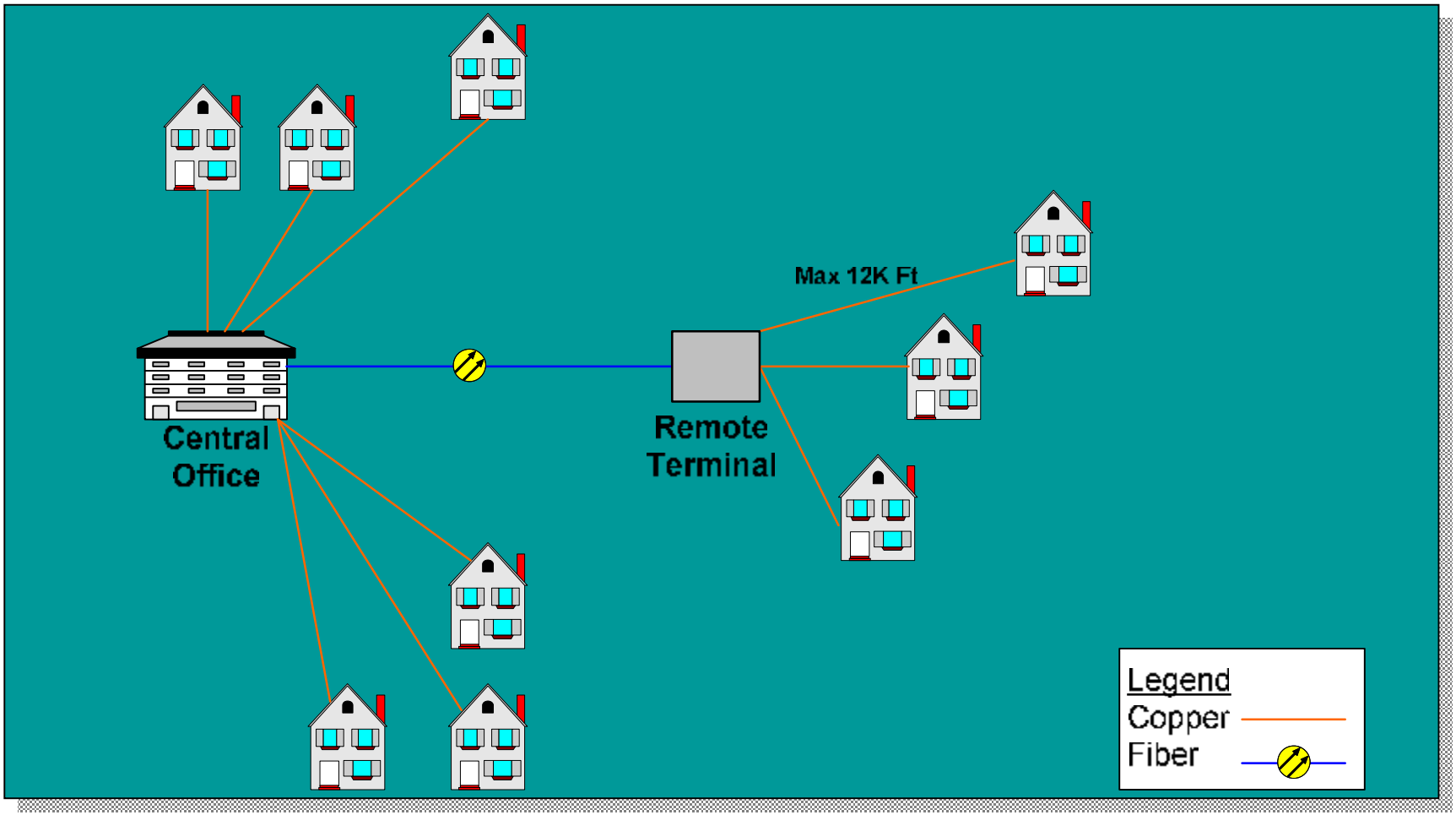
BELLSOUTH
Listening. Answering.™

Network Architecture Early 1980's



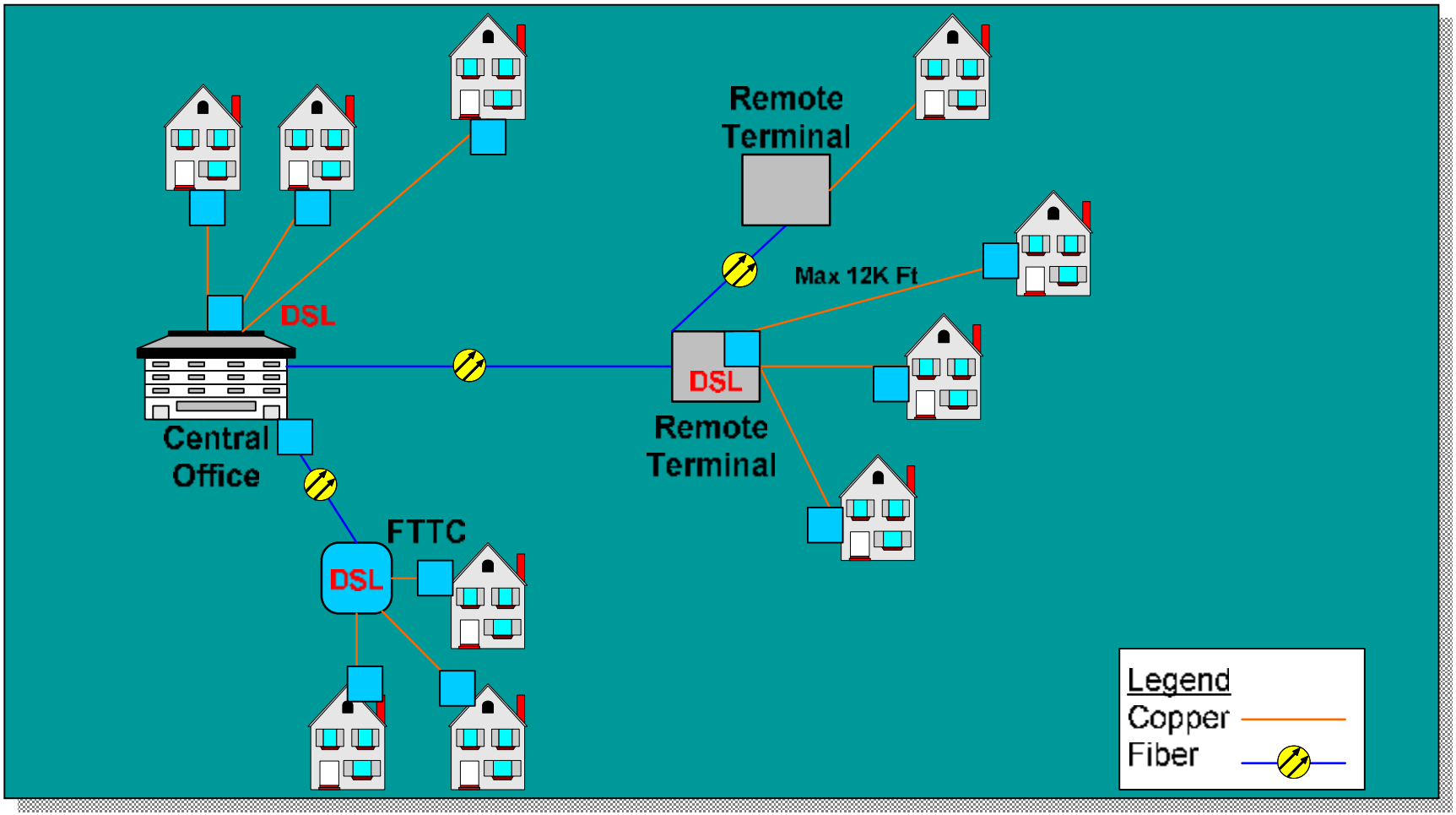
BELLSOUTH
Listening. Answering.™

Network Architecture Late 1980's



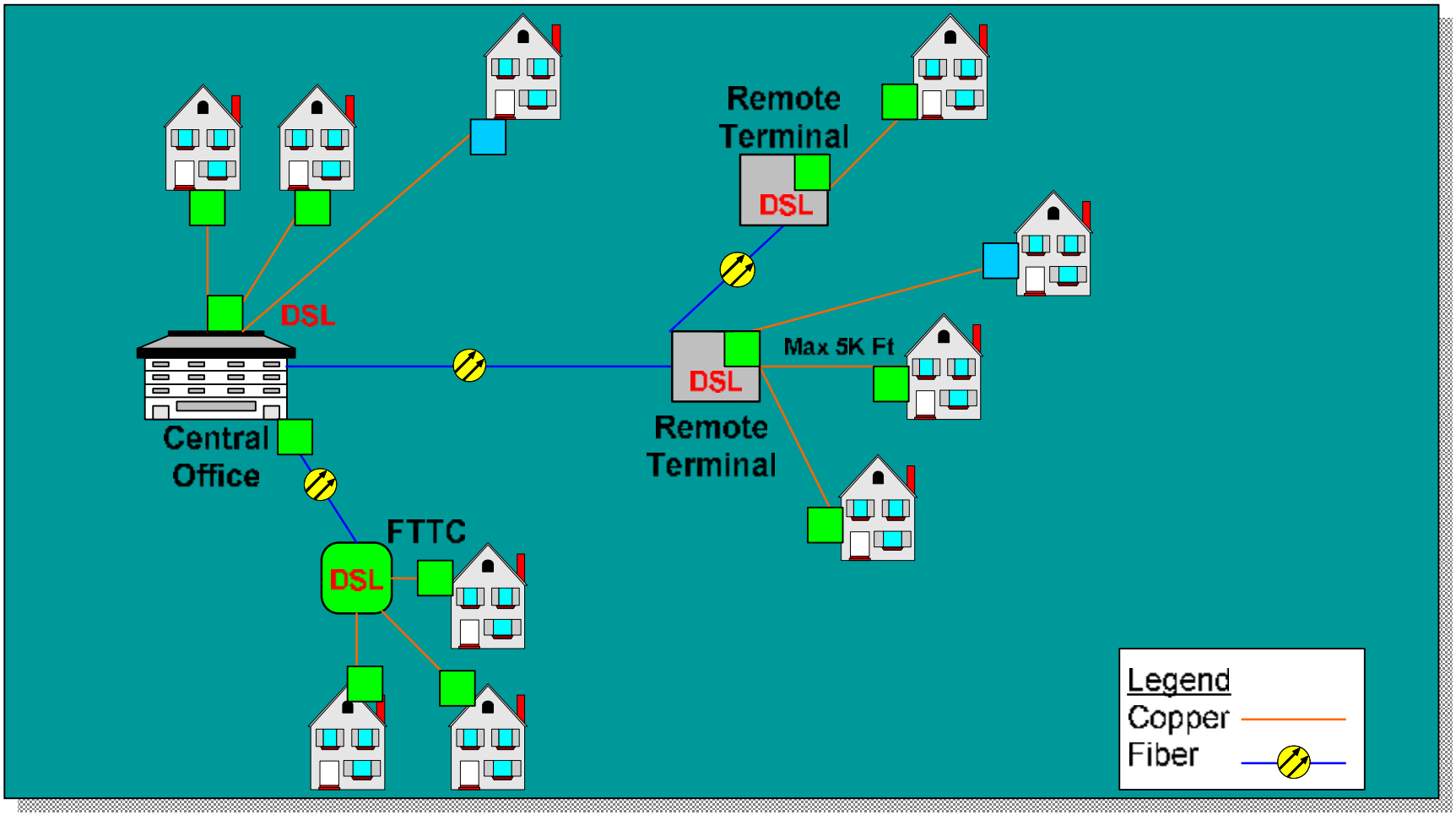
BELLSOUTH
Listening. Answering.™

Network Architecture Late 1990's - DSL



BELLSOUTH
Listening. Answering.™

Network Architecture – Competitive Broadband



BELLSOUTH
Listening. Answering.™

NEW ADSL STANDARDS

- ADSL2 (ITU G.992.3 and G.992.4)
  - Diagnostics, Rate Adaptation
  - Data Rate and Reach
  - Power Management
  - Bonding
  - CVoDSL
- ADSL2+ (ITU G.992.5)
  - Bandwidth Improvement
  - Reach Improvement

BELLSOUTH
Listening. Answering.™

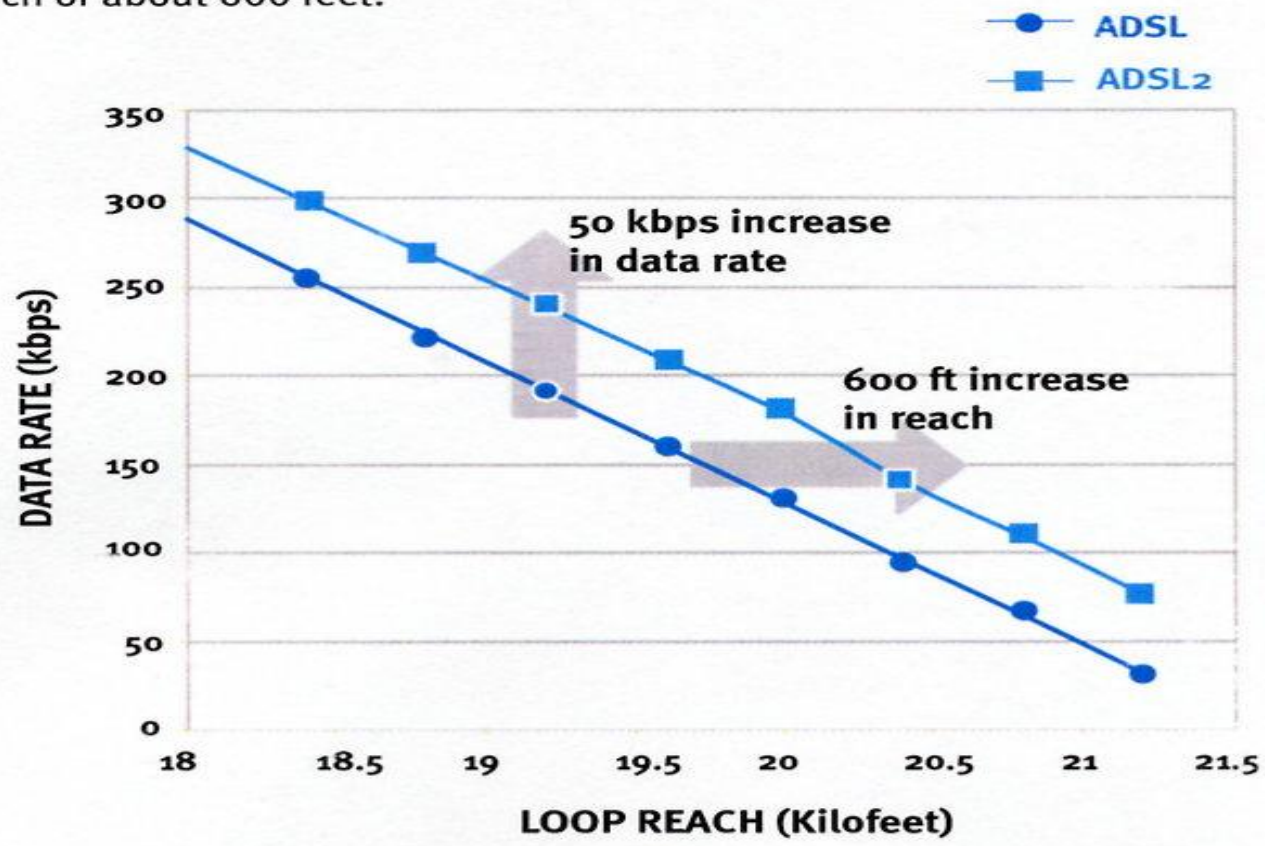
Diagnostics, Rate Adaptation

- Measure noise, attenuation and SNR at both ends of line
- Real-time performance monitoring
- Seamless Rate Adaptation (SRA)
  - Decouples modulation and framing layers
  - Data rate can change without losing framing synch

BELLSOUTH
Listening. Answering.™

DATA RATE AND REACH

Figure 1: ADSL2 systems can deliver an improvement in reach of about 600 feet.

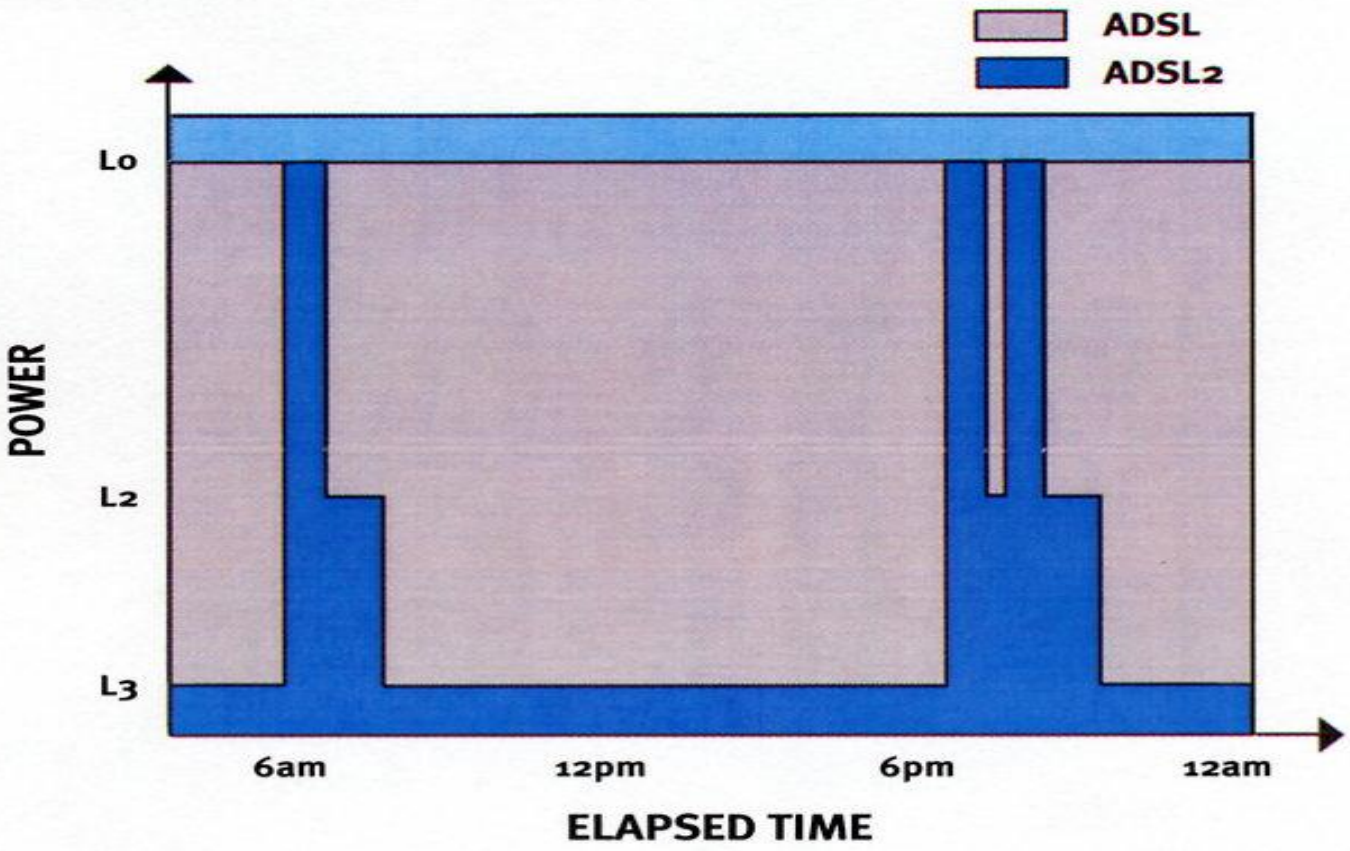


White Paper, ADSL/ADSL2PLUS, DSL Forum

BELLSOUTH
Listening. Answering.™

>> POWER MANAGEMENT

Figure 2: ADSL2's L2 power mode allows a broadband modem to quickly move from L2 to L0 operation and back without bit errors.

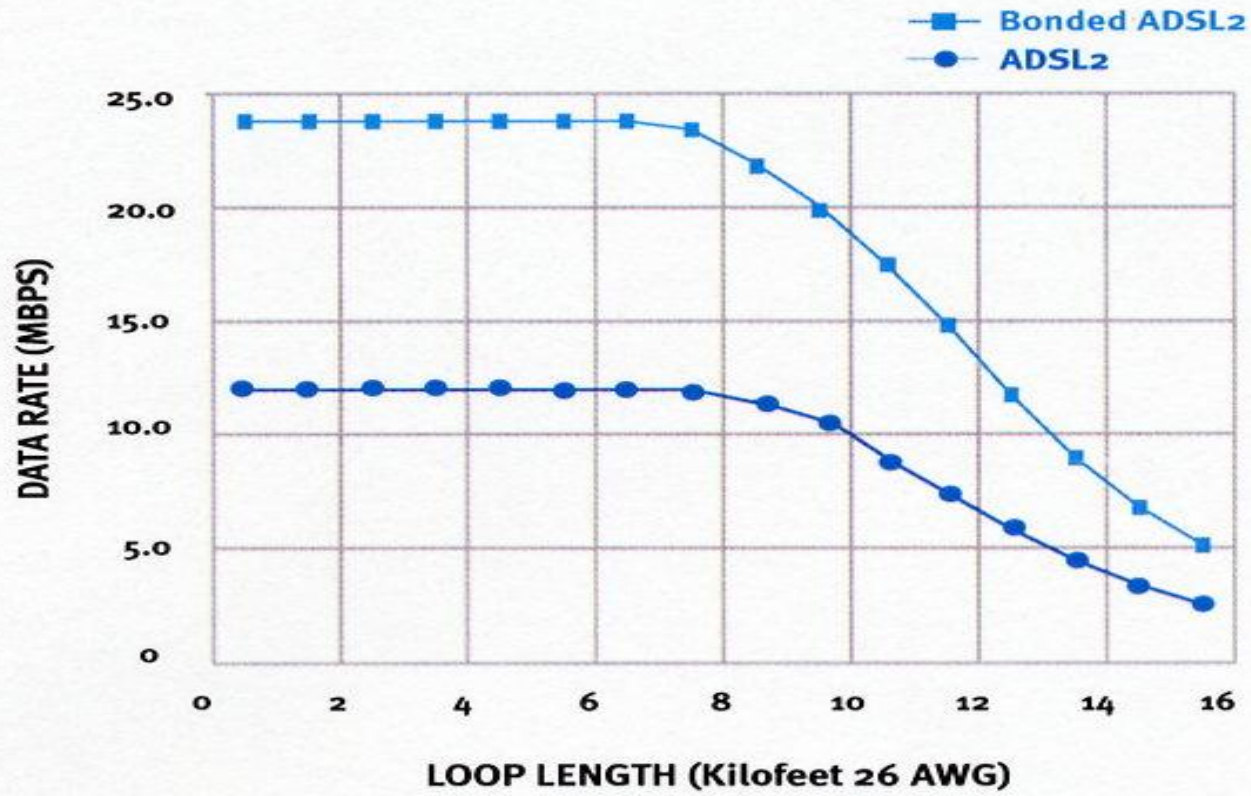


White Paper, ADSL/ADSL2PLUS, DSL Forum

BELLSOUTH
Listening. Answering.™

>> BONDING

Figure 4: Several phone lines can be bonded to multiply data rates.

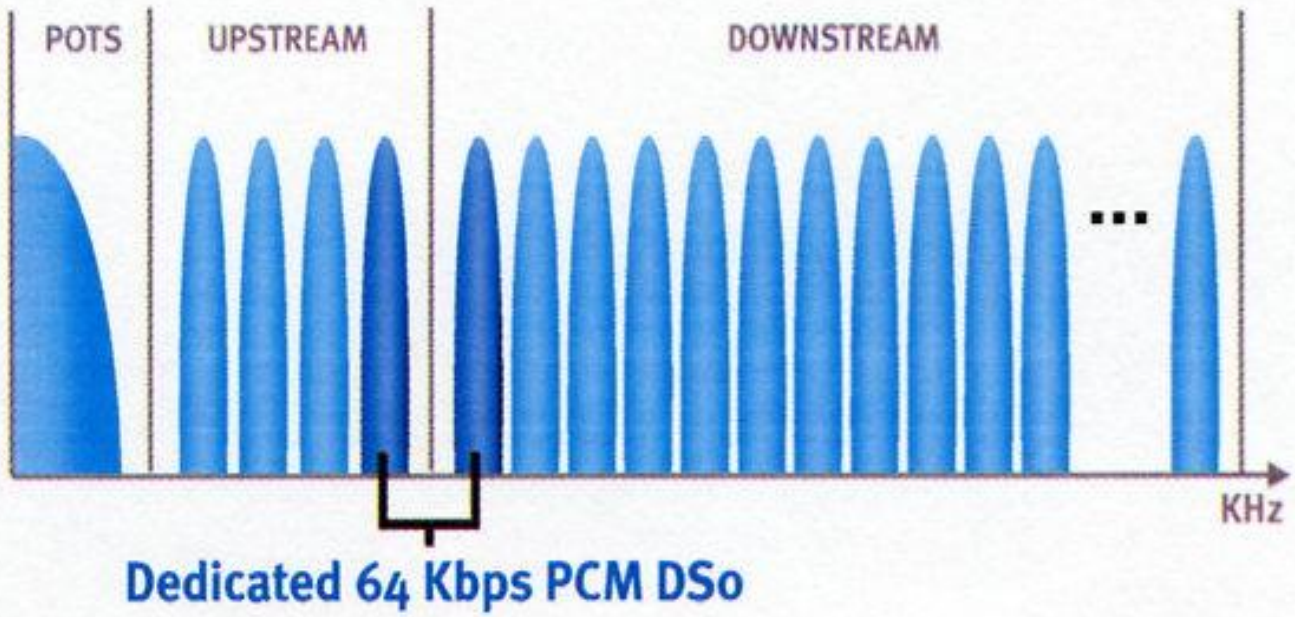


White Paper, ADSL/ADSL2PLUS, DSL Forum

BELLSOUTH
Listening. Answering.™

>> IMPROVED VOICE OVER DSL

Figure 5: CVoDSL dedicates channels of physical layer bandwidth to carry TDM voice lines.

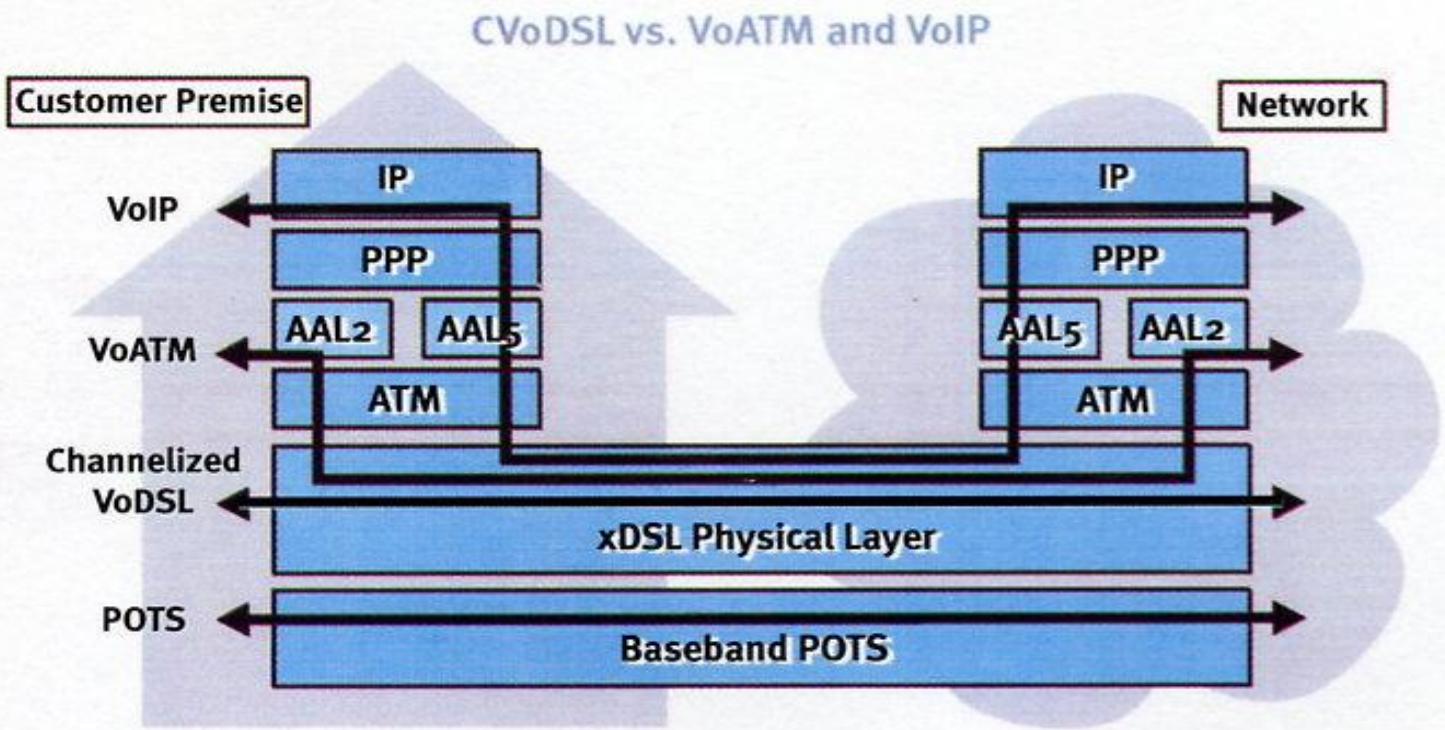


White Paper, ADSL/ADSL2PLUS, DSL Forum

BELLSOUTH
Listening. Answering.™

IMPROVED VOICE OVER DSL

Figure 6: CVoDSL does not packetize voice data, as VoIP and VoATM do.

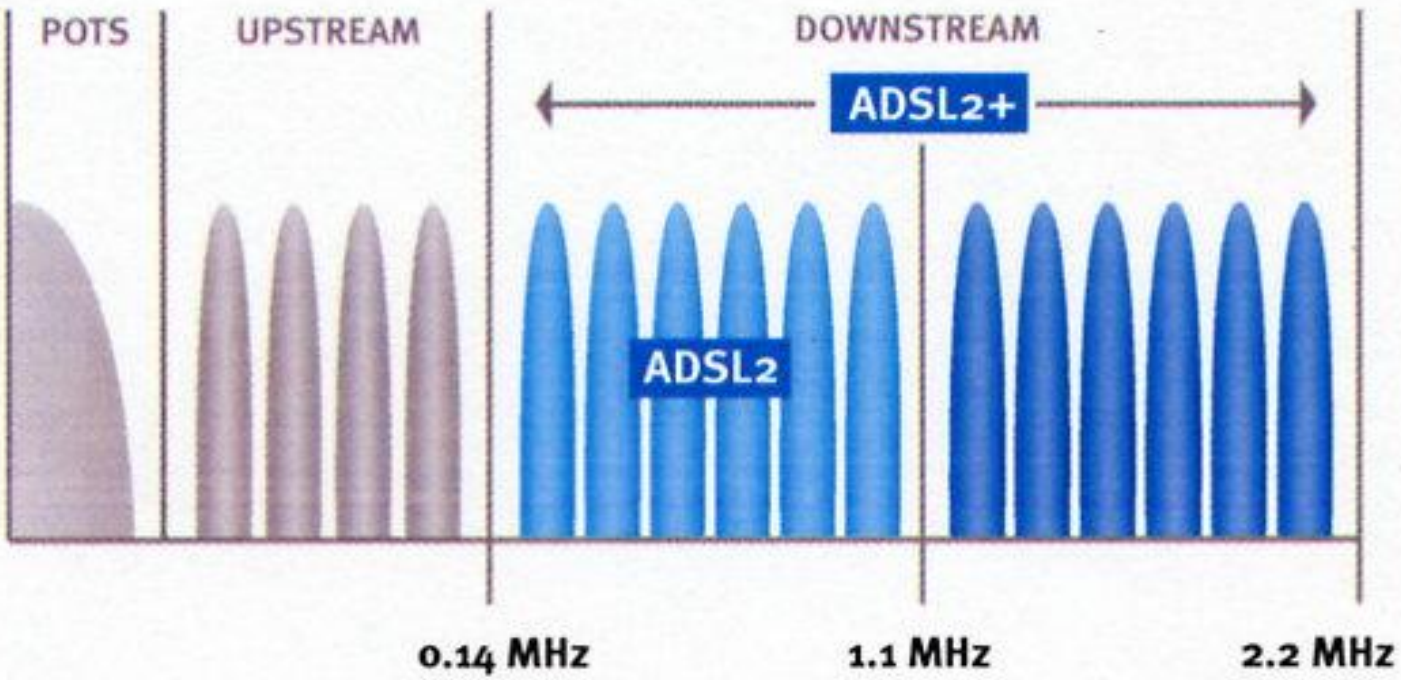


White Paper, ADSL/ADSL2PLUS, DSL Forum

BELLSOUTH
Listening. Answering.™

>> BANDWIDTH IMPROVEMENT

Figure 7: ADSL2+ doubles the bandwidth used to carry data.



White Paper, ADSL/ADSL2PLUS, DSL Forum

BELLSOUTH
Listening. Answering.™

IMPROVED REACH

White Paper, ADSL/ADSL2PLUS, DSL Forum

BELLSOUTH
Listening. Answering.™

BROADBAND SERVICES

- The “Triple Play”
  - High-Speed Internet Access
  - VoIP
  - IPTV, Multimedia
- “Bundled” to “Integrated” Services

BELLSOUTH
Listening. Answering.™

>> BELLSOUTH ANNOUNCEMENT

BellSouth Working with Microsoft in Testing Delivery of Video Services via High-Speed Internet Connections

January 6, 2005

BellSouth today announced a technical trial of Microsoft® TV Internet Protocol Television (IPTV) Edition software platform, tapping the advancing capabilities of the company's next generation broadband network. BellSouth's fiber-rich broadband network will increasingly serve as the primary platform used to deliver cutting-edge voice, video and data services to customers.

BELLSOUTH
Listening. Answering.™

>> BELLSOUTH ANNOUNCEMENT

BellSouth selects Alcatel and Redback platforms for next generation broadband network

February 15, 2005

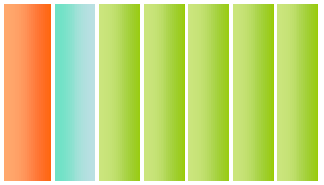
The company has selected Alcatel's 7330 DSLAM and Redback's SmartEdge® 800 Service Gateway as part of its next generation broadband rollout.

BellSouth's network upgrade will enable the company to deliver more than 12Mbps of bandwidth over a single copper telephone line and more than 24Mbps over a bonded pair of lines. Today, BellSouth passes more than one million homes with fiber-to-the-curb and has more than 5.2 million miles of fiber within its network. Approximately 50 percent of BellSouth's customers are served by a combination of fiber and short copper loops.

BELLSOUTH
Listening. Answering.™

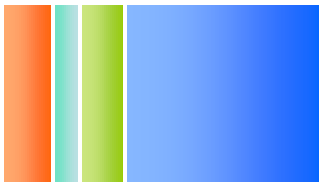
>> THE NEED FOR SPEED. . .

Data 2.7 Mbps
5x Standard Definition TV
Overhead 1.8 Mbps



DSL2+ 12 Mbps Floor

Data 725 Kbps
1x Standard Definition TV
1x High Definition TV
Overhead 1.8 Mbps



DSL2+ 12 Mbps Floor

Data 1.5 Mbps
2x Standard Definition TV
2x High Definition TV
Overhead 3.5 Mbps

DSL2+ 24 Mbps Floor

BELLSOUTH
Listening. Answering.™

REGULATORY ISSUES

- Legacy Regulation
- Dominant vs. Non-Dominant Carrier Status
- State vs. Federal Regulation
- Other Issues
  - Universal Service Fund
  - CALEA
  - E-911
  - Regulation on New Services
- BellSouth's Position

BELLSOUTH
Listening. Answering.™

LEGACY REGULATION

Telco Legacy Regulation

- Computer Inquiry & ONA requirements
- State regulations
- Dominance requirements
- Imputation requirements
- Affiliate Transaction rules
- Cross subsidy
- 272 Non-discrimination requirements
- Unbundling requirements
- Inter-carrier compensation rules
- USF
- Accounting (Part 32 & 64)
- Telecom tax rates

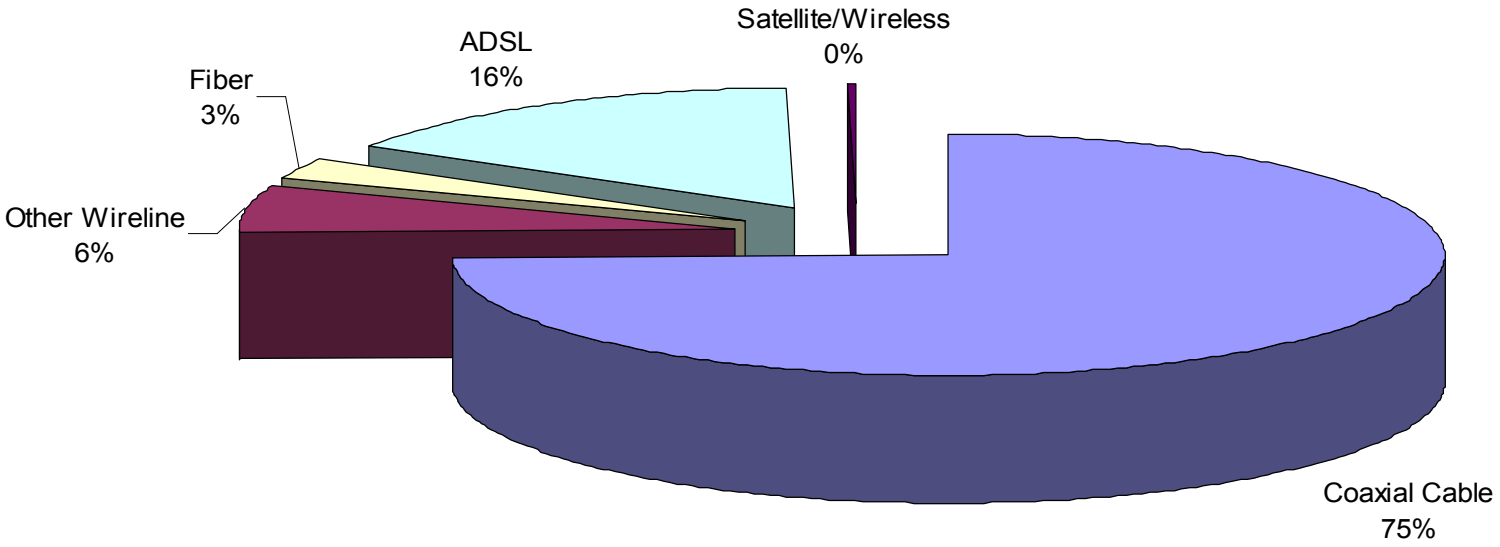
IP Technology Requires Legislation To Ensure Neither Set of Legacy Regulation Rules Apply to the New Technology

Cable Legacy Regulation

- Franchise requirements
- Local build out requirements
- Franchise fees
- Local Public Education & Government (PEG) requirements
- Technical & channel system requirements
- INET obligations
- Customer service standards & Technical Performance Standards
- Level playing field
- Must carry & retransmission consent
- Federal commercial leased access requirement
- Plug & play
- Accounting (Part 76)

BELLSOUTH
Listening. Answering.™

ADVANCE SERVICE LINES, JUNE 2004

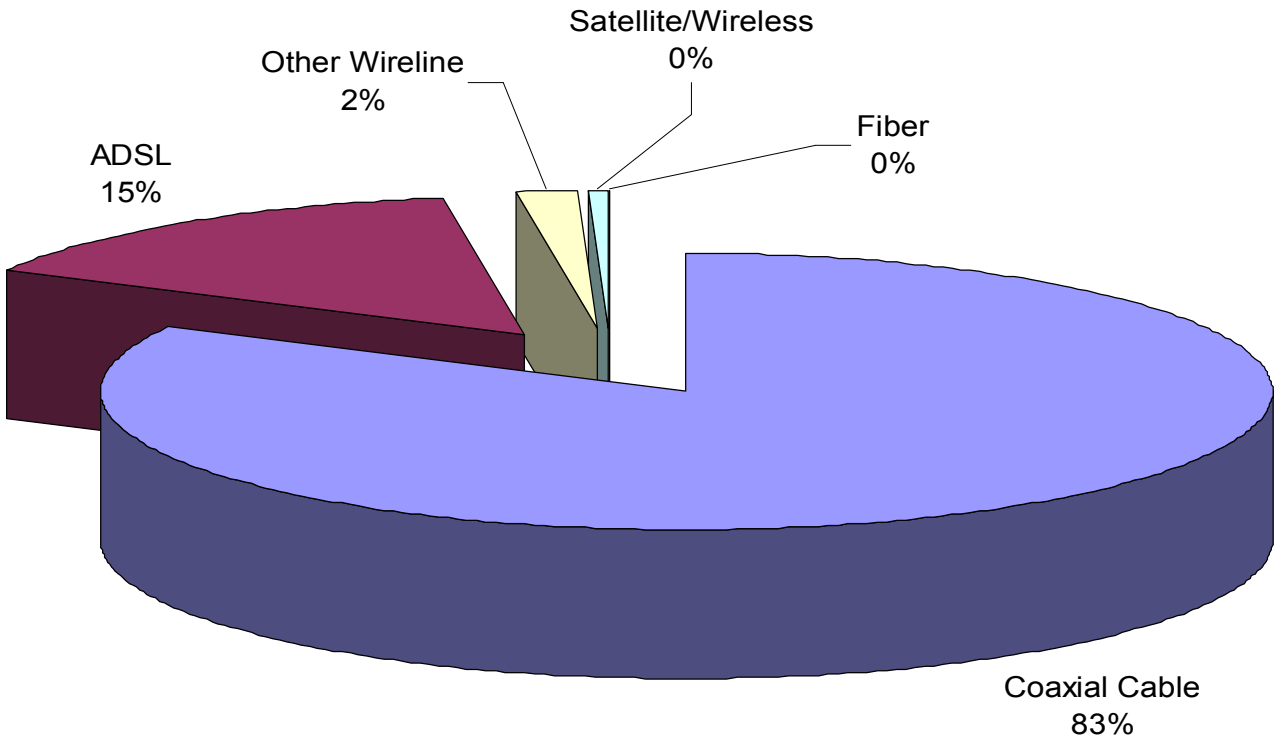


FCC Data on High Speed Internet Access Lines

Released December 2004

BELLSOUTH
Listening. Answering.™

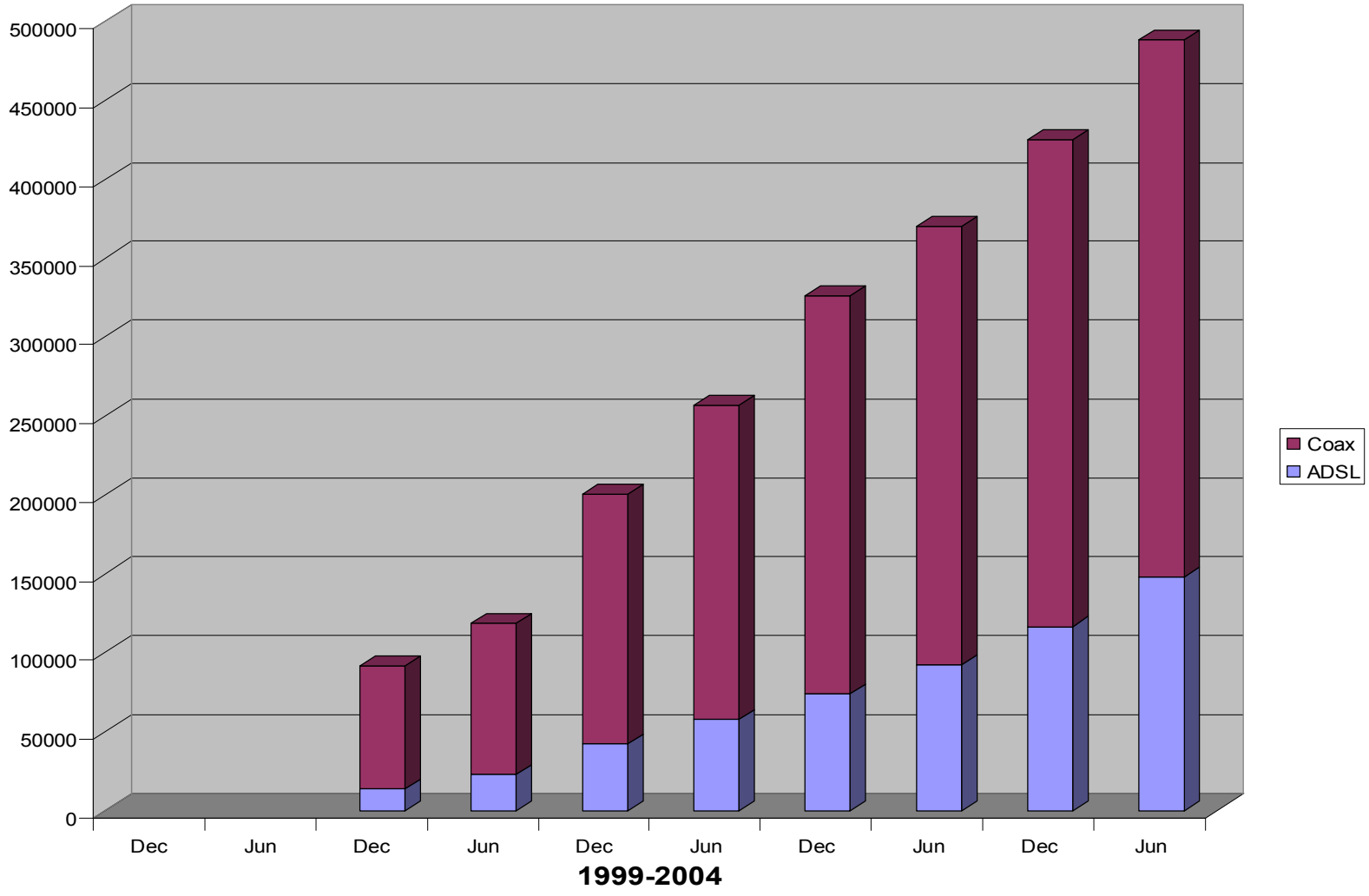
RESIDENCE/SMALL BUSINESS ADVANCE SERVICE LINES, JUNE 2004



FCC Data on High Speed Internet Access Lines
Released December 2004

BELLSOUTH
Listening. Answering.™

High-Speed Lines in Tennessee



FCC Data on High Speed Internet Access Lines
Released December 2004

BELLSOUTH
Listening. Answering.™

STATE vs. FEDERAL REGULATION

- FCC has the lead
  - Proposed Rulemaking, WC 04-36
- FCC Preemption of Minnesota PUC
  - MPUC had ruled Vonage subject to state regulation (VoIP)
  - FCC overruled MPUC, WC 03-211
- State rulings on unbundling requirements

BELLSOUTH
Listening. Answering.™

OTHER ISSUES

- Universal Service Fund
  - Who should support?
- CALEA
  - Who must comply?
  - National Security concerns
- E-911
  - Who must provide?
  - Public safety concerns

BELLSOUTH
Listening. Answering.™

BELLSOUTH'S BROADBAND POSITION

- All consumer broadband markets should be open to competition
- All providers should operate under harmonized regulation
- Consumer broadband services can
  - Enhance quality of life
  - Promote economic development, job creation, international competitiveness

BELLSOUTH
Listening. Answering.™

BELLSOUTH'S BROADBAND POSITION

- Advancements in national IP infrastructure will enhance public welfare through:
  - Telemedicine
  - Distance learning
  - Remote medical services
  - Health information

BELLSOUTH
Listening. Answering.™

BELLSOUTH'S BROADBAND POSITION

- Government regulations that affect high-speed internet access should promote investment and innovation in all technical platforms.

BELLSOUTH
Listening. Answering.™

National Telecom Laws

- Consumer controlled marketplace;
- Ensure innovation advances vital social concerns;
- Regain America's Broadband Competitiveness; and
- Modernize US Telecom Policy

BELLSOUTH
Listening. Answering.™

USTA CAMPAIGN

BELLSOUTH
Listening. Answering.™

USTA CAMPAIGN

BELLSOUTH
Listening. Answering.™

>> FOR FURTHER INFORMATION…

- www.dslforum.com
- www.thefuturefaster.com

BELLSOUTH
Listening. Answering.™