



Ascend Communications

MultiDSL

MultiDSL

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Introduction

▲ DSL - Digital Subscriber Line

▲ Ascend Announces Several DSL Products Using:

- IDSL
- SDSL
- ADSL-CAP
- ADSL-DMT

▲ Market Forces Driving DSL

- High-speed applications require high-speed access
- Need to alleviate voice network congestion
- Existing “local loop” twisted pair of wire

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Business Challenges

▲ International Carriers

- Leverage existing wire in the local loop
- Provide high-speed access
- Relieve congestion on PSTN
- Compete against alternative carriers and network providers

▲ ISPs

- Deliver high-speed IP services
- Differentiate services from competition
- Improve and increase margin – more revenue with high speed services

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Ascend Strategy

- ▲ **Offer DSL solutions on a multiservice COE platform (IDSL, SDSL, ADSL-CAP, ADSL-DMT)**
 - IDSL is an Ascend technological innovation
- ▲ **Provide turn-key solution for provisioning multiple DSL services**
 - Customer Premises Equipment (CPE) : DSLPipe™, Pipeline® and NetWarp™
 - Central Office Equipment (COE) : MAX™ 4000 and MAX TNT™ with multiple DSL line card modules
- ▲ **Remain line code neutral (2B1Q, CAP and DMT)**
- ▲ **Use existing twisted pair of copper wire (Local Loop)**

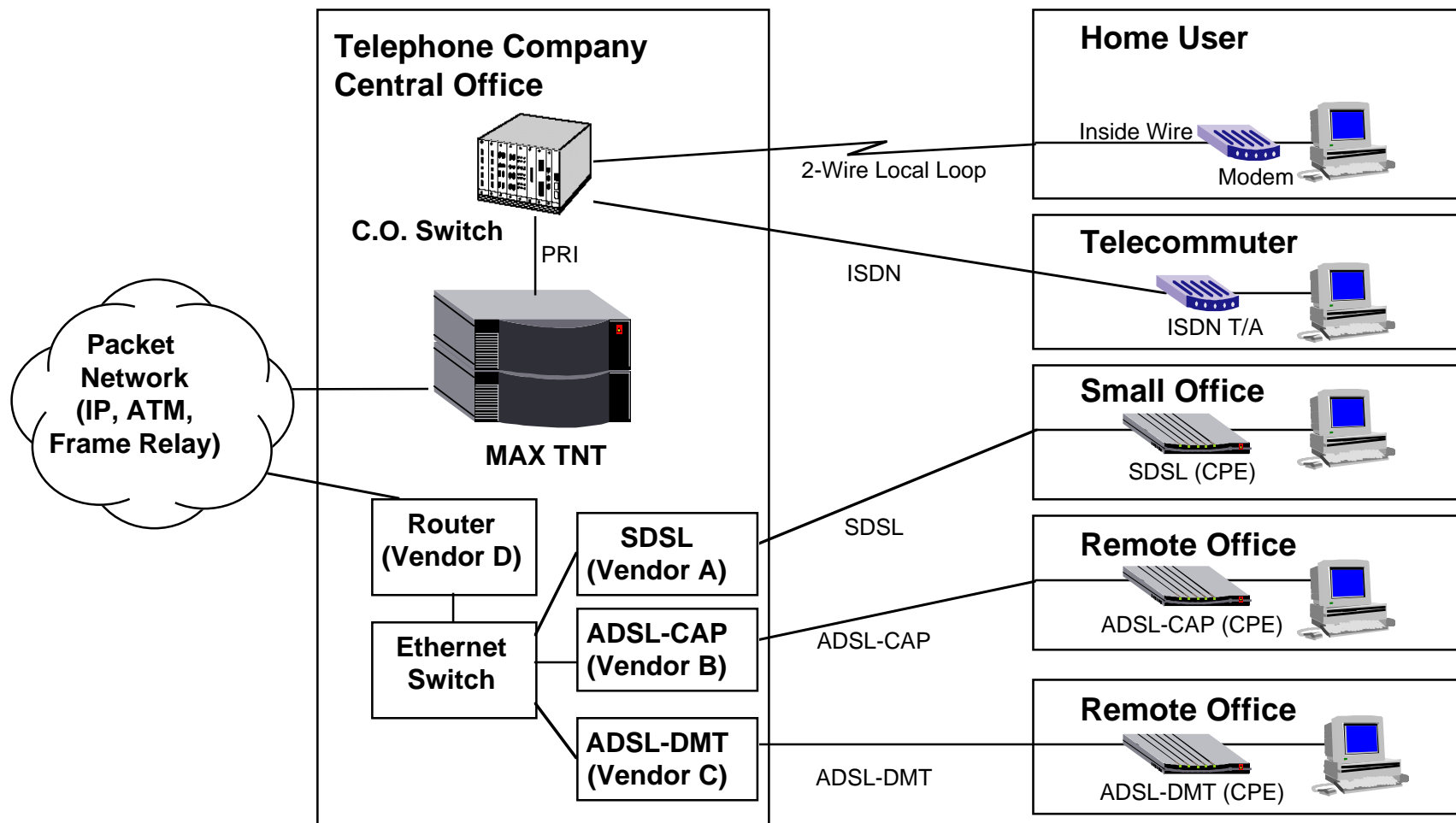
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Benefits

- ▲ Immediate entry into the DSL market using IDSL
- ▲ Multiservice platform provides smooth migration (IDSL, SDSL, ADSL-CAP, ADSL-DMT, analog and ISDN)
- ▲ End-to-end CPE and COE solutions
- ▲ Delivers high-speed remote access for corporate customers

MultiDSL Strategy

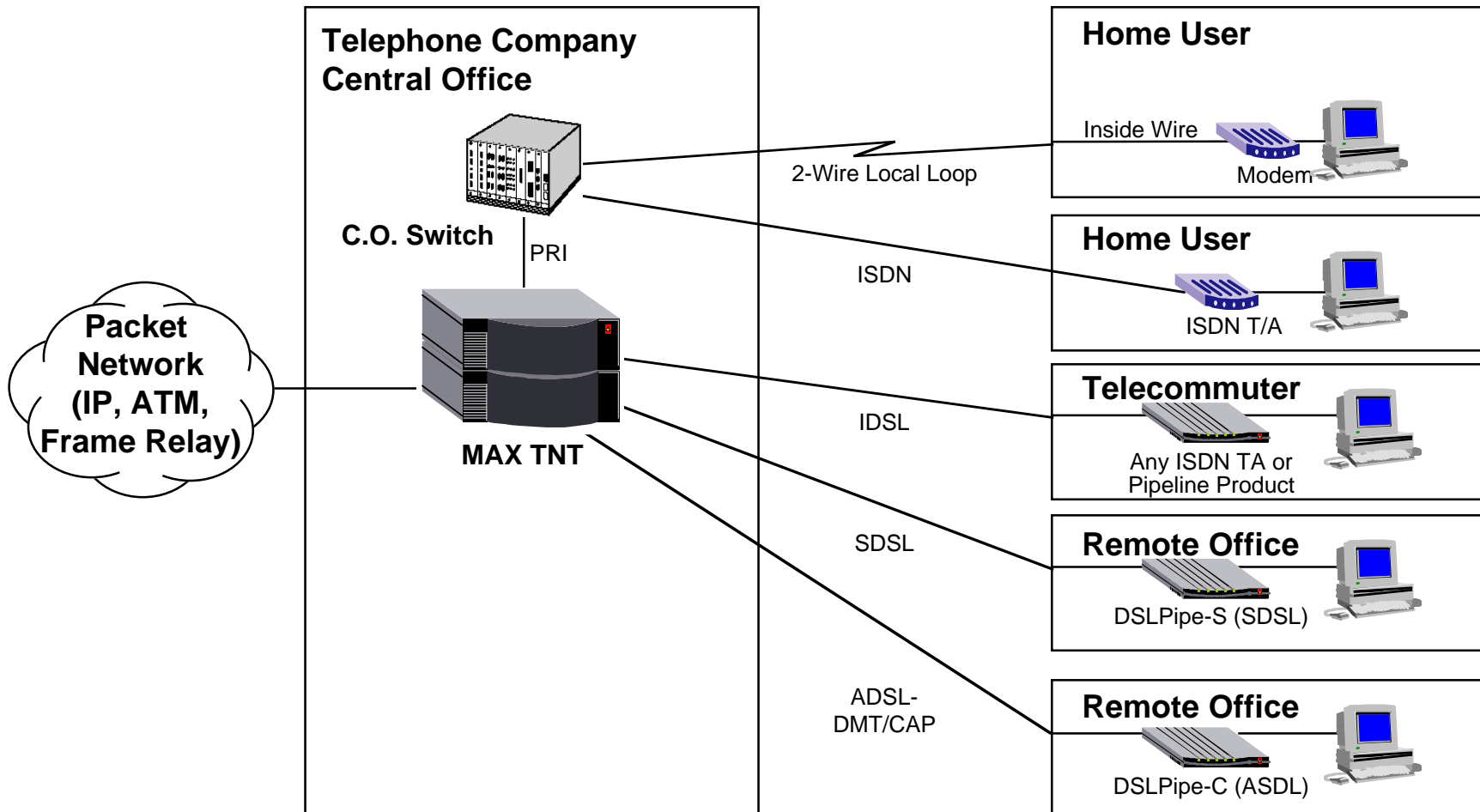
Without Ascend DSL solution



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Ascend Strategy

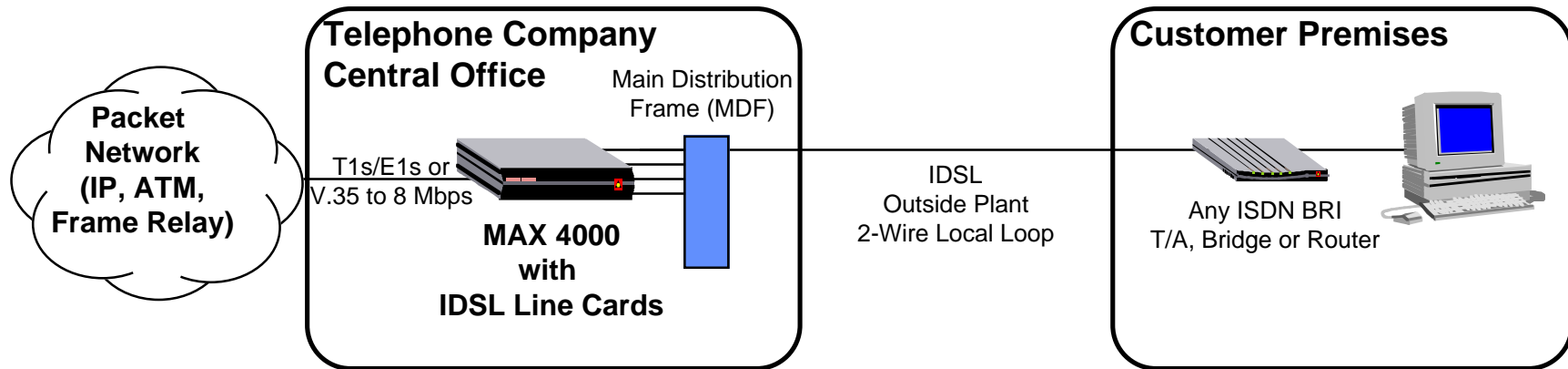
With Ascend DSL solution



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DSL Technologies

ISDN Digital Subscriber Line (IDSL)

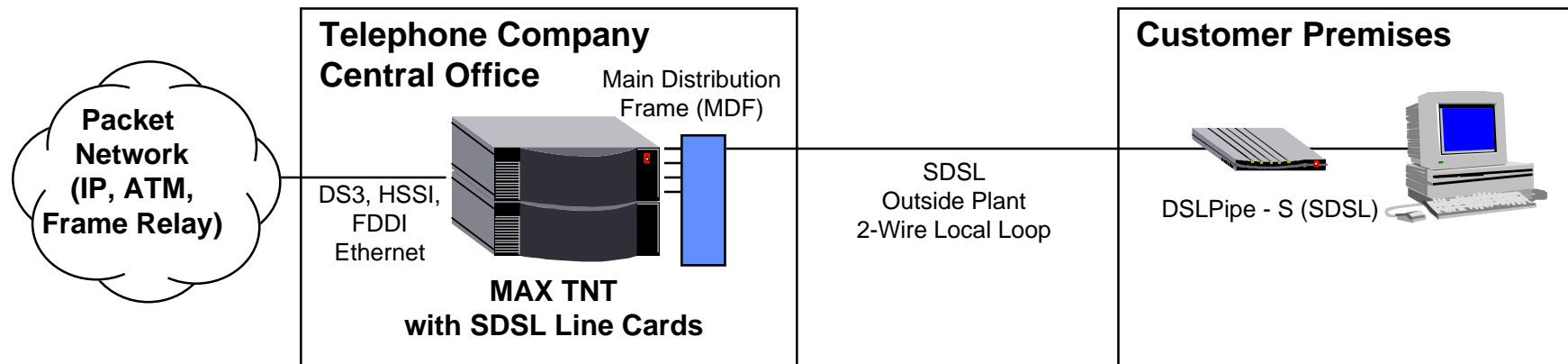


- ▲ **IDSL – Technological innovation from Ascend**
- ▲ **128 Kbps symmetric data rate**
- ▲ **Single pair local loop to 18,000 ft.**
- ▲ **Line monitoring and diagnostics**
- ▲ **Compatible with any ISDN BRI T/A, bridge or router**
- ▲ **2B1Q line code for transparent operation through “U” loop repeaters and Digital Loop Carrier Systems (DLCs)**

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DSL Technologies

Symmetric Digital Subscriber Line (SDSL)

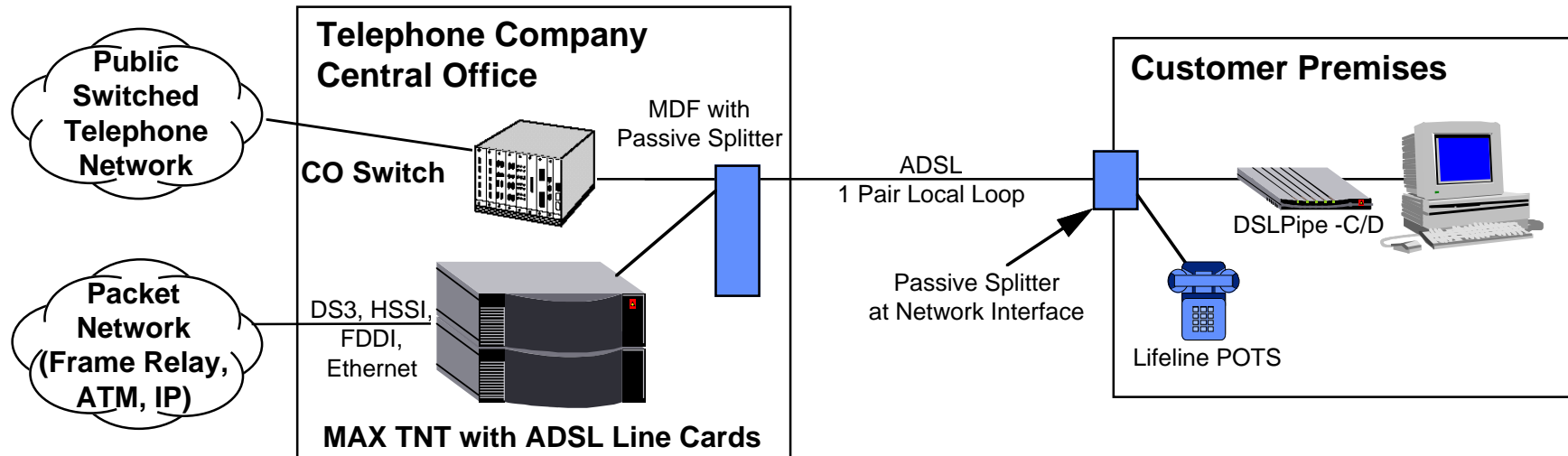


- ▲ 768 Kbps symmetric data rate
- ▲ Single pair local loop to 12,000 ft.
- ▲ Line monitoring and diagnostics
- ▲ CPE provides Ethernet interface
- ▲ 2B1Q line coding

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DSL Technologies

Asymmetric Digital Subscriber Line (ADSL)



▲ CAP - Single Pair, 18,000 ft. Loop

- 64 Kbps Upstream
- 1.54 Mbps Downstream

▲ CAP - Single Pair, 12,000 ft. Loop

- 640 Kbps Upstream
- 6.14 Mbps Downstream

▲ Lifeline POTS

▲ DMT - Single Pair, 18,000 ft. Loop

- 176 Kbps Upstream
- 1.54 Mbps Downstream

▲ DMT - Single Pair, 12,000 ft. Loop

- 640 Kbps Upstream
- 6.14 Mbps Downstream

▲ Lifeline POTS

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Product Features

▲ Leverages advanced software functionality of MAX family

- Routing support for IP and IPX
- Frame Relay PVC concentration
- Ascend Secure Access™ Firewall
- Authentication security such as Ascend Access Control™, RADIUS, TACACS+, TACACS and Token-cards
- Accounting and billing features
- Virtual Private Network Features
 - Frame Relay and IP Direct
 - Point-to-Point Tunneling Protocol (PPTP)
 - Ascend Tunnel Management Protocol (ATMP)

▲ Network management system

- Comprehensive SNMP MIB II implementation
- Platform available 2H '97

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Product & Availability

▲ Central Office Equipment

- MAX 4000
 - IDSL Line Card (8 Port) Available Now
- MAX TNT
 - IDSL Line Card (12 Port) Early 2Q 1997
 - SDSL Line Card (16 Port) 2Q 1997
 - ADSL-CAP Line Card (6 Port) 2Q 1997
 - ADSL-DMT Line Card (4 Port) Late 2Q 1997

▲ Customer Premises Equipment

- Pipeline and NetWarp (IDSL) Available Now
- DSLPipe family
 - DSLPipe - S (SDSL) 2Q 1997
 - DSLPipe - C (ADSL-CAP) Now
 - DSLPipe - D (ADSL-DMT) Late 2Q 1997

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Summary

- ▲ Ascend introduces MultiDSL family of DSL products
- ▲ MultiDSL allows immediate DSL deployment via IDSL
- ▲ Allows smooth migration to ADSL speeds without “forklift upgrade” of COE
- ▲ Turnkey solution allows implementation of Internet access and Intranet applications immediately