Ascend

Ascend Communications Overview

ASCEND

Ascend Business

Delivering Products and Technologies for building World-Class Service Provider Networks and Enterprise WANs

Strong Synergy: Ascend & Cascade

- **Common customer base. Both have strong relationships to Carriers and ISPs**

- **Shared a common focus on building the New Public Network**

- **Provides core competence in all the technologies required to build the New Public Network**

    - ◆ **Scalable IP switching over ATM/FR backbone with end to end Quality of Service**

    - ◆ **Carrier Class Multi-Access Concentrators with Security, Virtual Private Networking, and Accounting**

    - ◆ **Service Oriented Network Management**

Ascend Communications

- **Headquartered in California**

- **1680 Employees**

- **Quality: ISO 9001**

- **9 R&D Facilities**

- **TAC Centres**
  - *Alameda, USA*
  - *Tokyo, Japan*
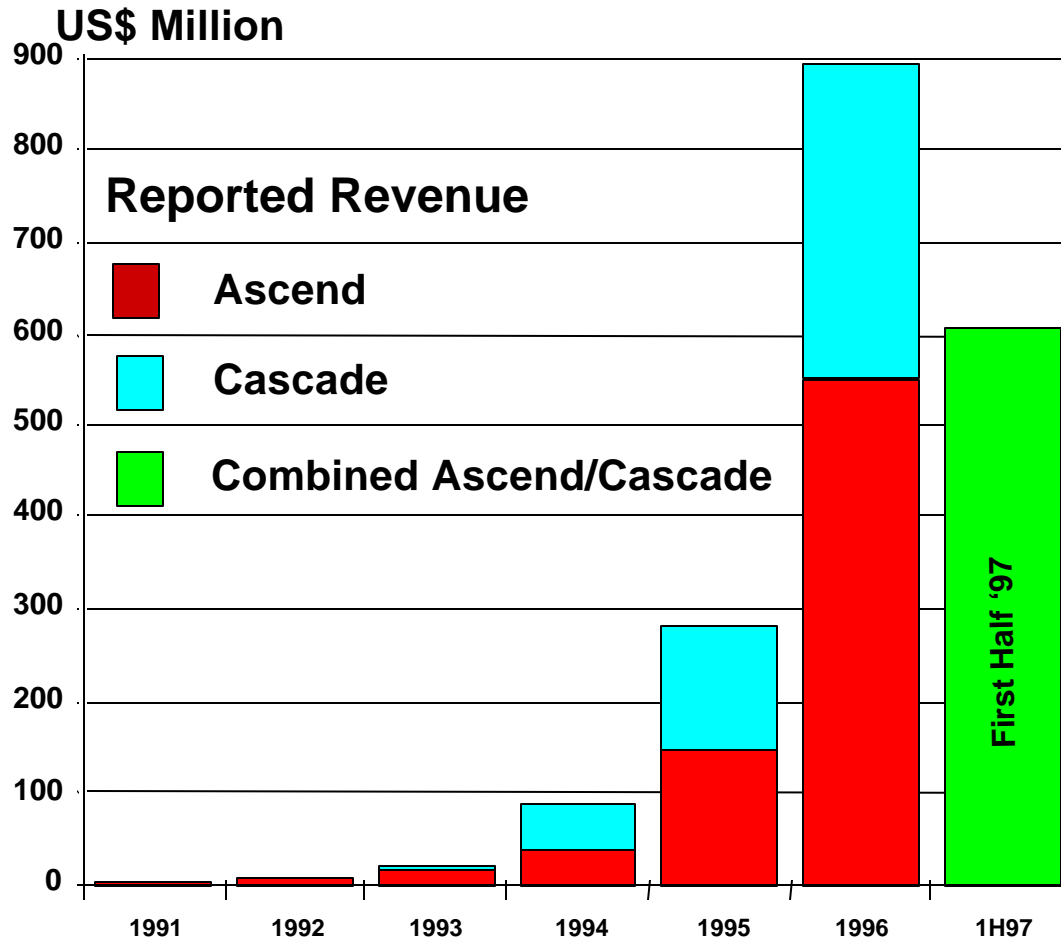 - *Sophia Antipolis, France*
  - *European Repair Depot*

- **International**
  - Antwerp, Belgium
  - Dubai, UAE
  - Copenhagen, Denmark
  - Frankfurt & Nuremberg, Germany
  - Hong Kong
  - Johannesburg, South Africa
  - Kuala Lumpur, Malaysia
  - London, UK
  - Madrid, Spain
  - Milan, Italy
  - Paris, France
  - Sophia Antipolis, France
  - Stockholm, Sweden
  - Sydney & Melbourne, Australia
  - Tokyo, Japan
  - Seoul, Korea
  - Singapore

...with distribution and support in over 40 countries worldwide

Global Networking Leader
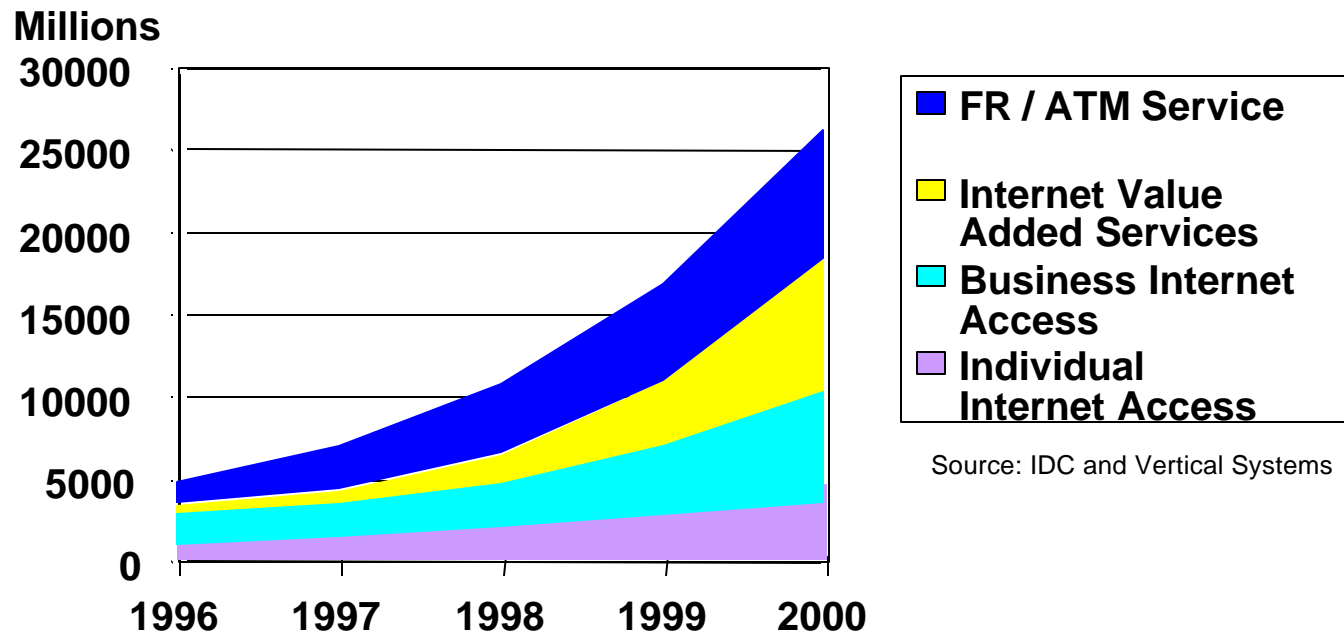
US$ Million

Reported Revenue

- ■ Ascend
- ■ Cascade
- ■ Combined Ascend/Cascade

Chart (revenue in US$ Million by year):

Year	Ascend	Cascade	Combined
1991	~2		
1992	~5		
1993	~15		
1994	~35	~85	
1995	~150	~280	
1996	~550	~890	
1H97			~605 (First Half '97)

(Y-axis: 0, 100, 200, 300, 400, 500, 600, 700, 800, 900)

- ■ **Spectacular growth over 5 years**
- ■ **>$500,000,000 in cash**
- ■ **Zero Debt**
- ■ **Outstanding Customer Base**

Annualized revenue to exceed US$1,000,000,000

Service Revenues Enabled by Ascend

Millions

Legend:
- **FR / ATM Service**
- **Internet Value Added Services**
- **Business Internet Access**
- **Individual Internet Access**

Source: IDC and Vertical Systems

■ **Business and Individual Internet Access: $3.7B market opportunity in 1997, growing to $13B in 2000**

■ **Internet Value Added Services (excluding internet commerce): a $.33B market opportunity in 1997, growing to $7.7 B in 2000**

■ **Frame Relay and ATM Service: a 1.2 B market opportunity in 1997, growing to $7.6 B in 2000**

Total Public Data Service Revenue Opportunity Is $5.27 billion in 1997, growing to $28.3 billion in 2000
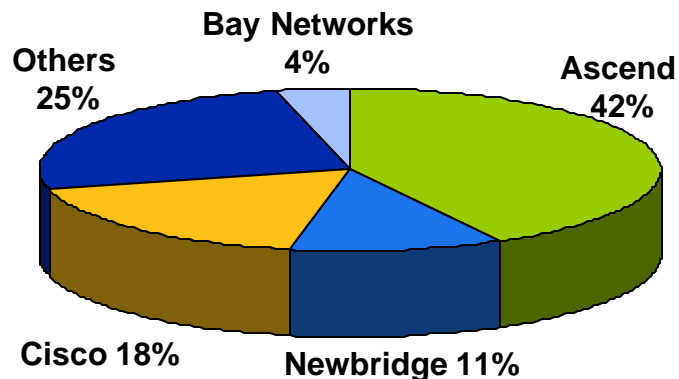
Leading Global Market Share in Access Concentration

Cisco 11.9%

Others 13.9%

USR 23.6%

Ascend 50.6%

Others 17.6%

Cisco 3.4%

USR 16.8%
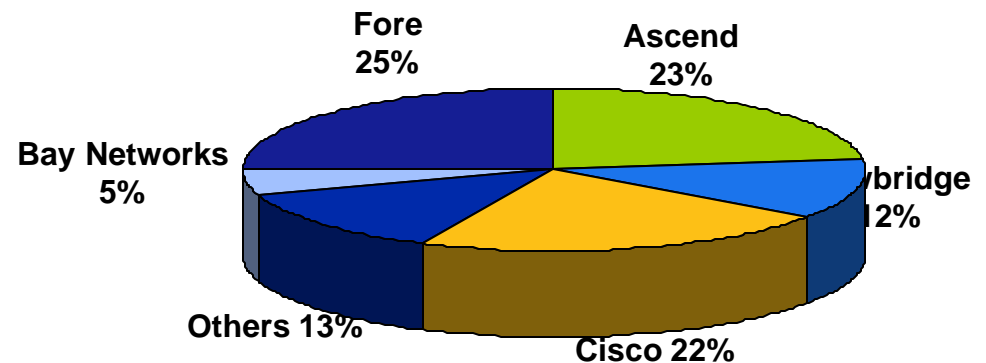
Ascend 62.2%
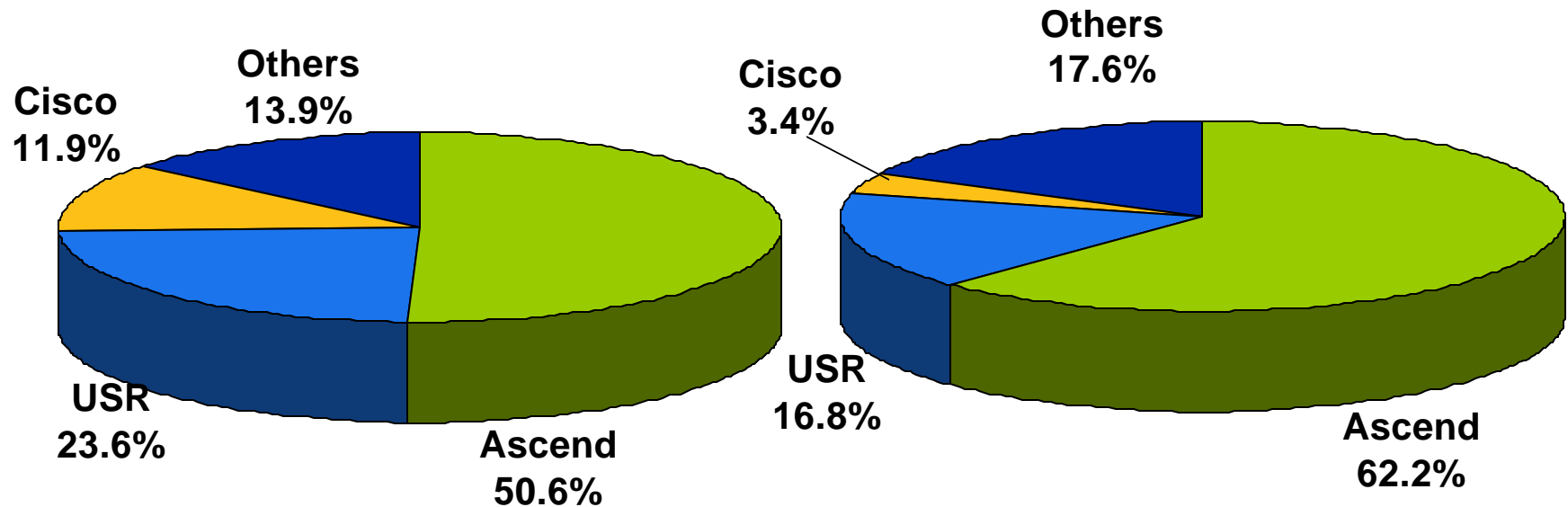
Source: Dell'Oro Group 8/97 Report

World Wide Market Share
Q2 '97
Async (analog) ports
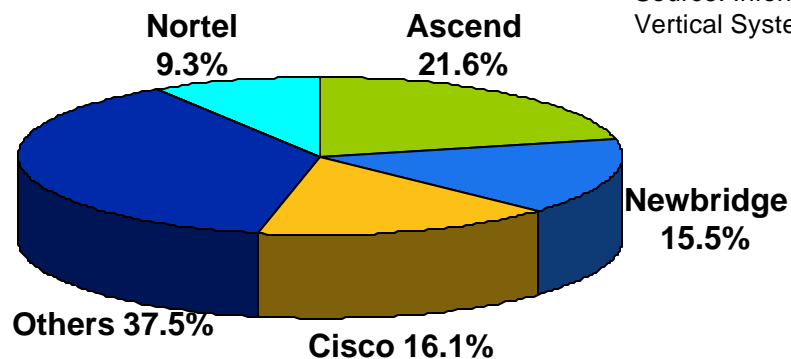
World Wide Market Share
Q2 '97
ISDN PRI ports
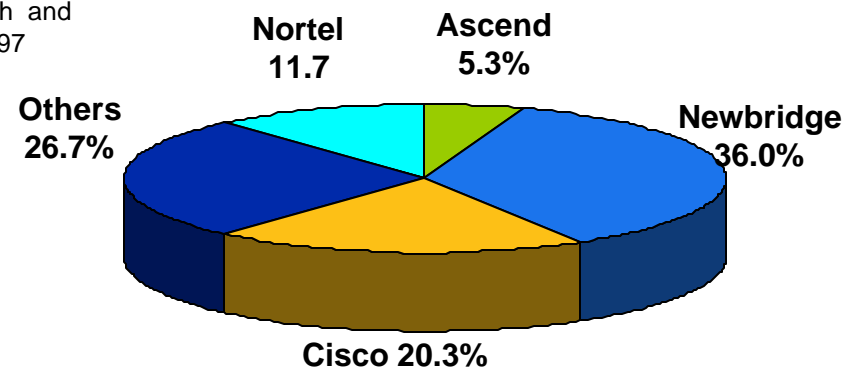
Leading Global Market Share in WAN Backbone Switches

World Wide Internet Frame Relay WAN Switch Vendor Share

- Ascend 42%
- Bay Networks 4%
- Others 25%
- Cisco 18%
- Newbridge 11%

World Wide Internet ATM Vendor Share

- Fore 25%
- Ascend 23%
- Newbridge 12%
- Bay Networks 5%
- Others 13%
- Cisco 22%

Source: Infonetics Research and Vertical Systems Group 1997

World Wide Frame Relay Carrier Swrtch Revenue Market Share

- Nortel 9.3%
- Ascend 21.6%
- Newbridge 15.5%
- Others 37.5%
- Cisco 16.1%

World Wide ATM Carrier Switch Revenue Market Share

- Nortel 11.7
- Ascend 5.3%
- Others 26.7%
- Newbridge 36.0%
- Cisco 20.3%

Representative Customers

The largest carriers, Enterprises and Internet Providers implement Networking Solutions with Ascend

Carriers	Internet Providers	Enterprise
NTT	Microsoft Network (MSN)	Hewlett-Packard
BT	EUNet (Europe)	Dow Jones
France Telecom	UUNet (Global)	Fujitsu
Deutsche Telekom	PSINet (Global)	Banksys
Telefonica de Espana	Netcom (Global)	Volkswagen
Telecom Italia	Demon Internet (UK)	Morgan Stanley
TeleDenmark	T-Online (Germany)	Oracle
Global One	BTNet (UK)	Sun Microsystems
Unisource	Swiss PPT – Blue Window	Mazda Cars
Concert	Oleane (France)	Lever Brothers
Cegetel	Hong Kong Supernet	Dell Computer
Telstra	Pacific Internet (Singapore)	DuPont
KDD	Uninet (Mexico)	Federal Express
AT&T	NTTPC (Japan)	United Bank of Switzerland
MCI	IIJ (Japan)	Visa International
TelMex		

Ascend Redefines Carrier-Class

Scalability

Reliability

Innovation

Management

Performance
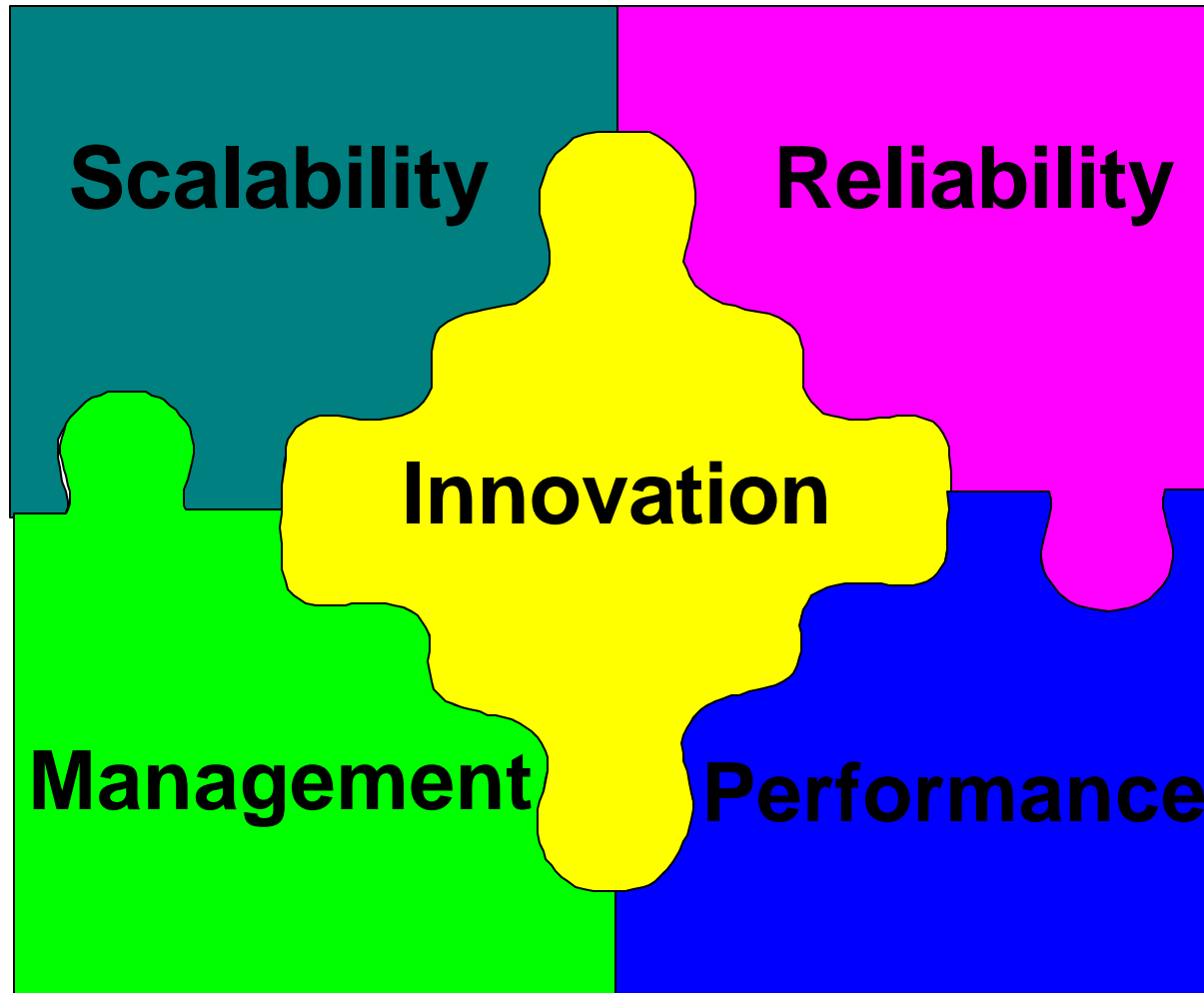
Ascend's Complete Product Portfolio

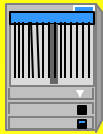| Provisioning Server	Fault Management	Billing Management	Event Management	Bulk Statistics	CNM

← CMIP   NAVIS™ - Managed Networks   API →
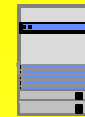
Core Switching

ATM
GX 550
CBX 500

IP
GRF Family

Frame Relay
B-STDX Family

Service Access
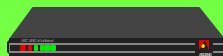
ATM
SA 600
SA100

Frame Relay/ISDN/PSTN
Max TNT

Max Family

Remote Access

ISDN / Inverse Multiplexing
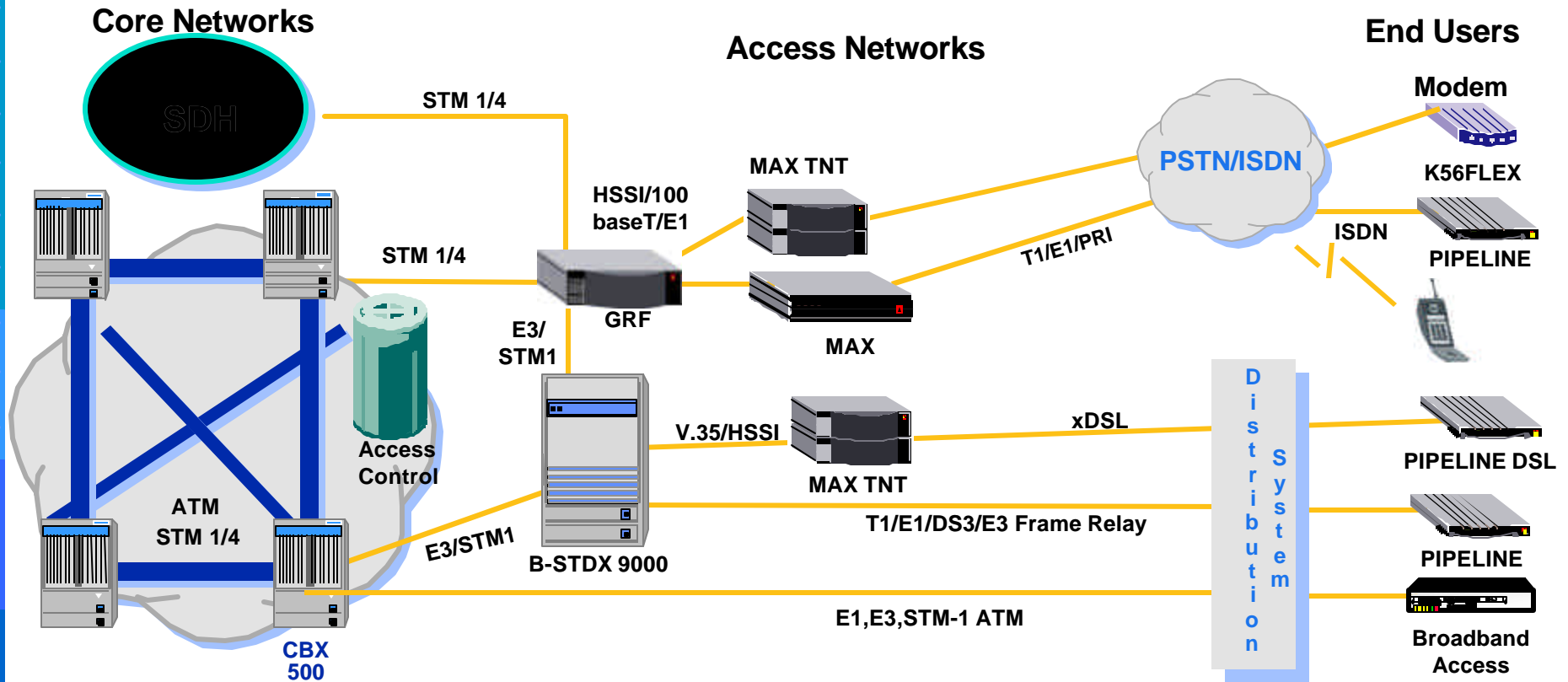Multiband MAX

ISDN / Frame Relay
Pipeline Family

Multi-DSL
DSL Pipeline

SECURITY   SECURE ACESS   ACESS CONTROL

Scaleable End to End Solution for the New Public Network

ASCEND

Core Networks

SDH

STM 1/4

STM 1/4

ATM
STM 1/4

Access
Control

E3/
STM1

E3/STM1

CBX
500

B-STDX 9000

Access Networks

HSSI/100
baseT/E1

GRF

MAX TNT

MAX

V.35/HSSI

MAX TNT

Distribution System

End Users

Modem

PSTN/ISDN

K56FLEX

T1/E1/PRI

ISDN

PIPELINE

xDSL

PIPELINE DSL

T1/E1/DS3/E3 Frame Relay

PIPELINE

E1,E3,STM-1 ATM

Broadband
Access

Ascend Provides End-to-End Solution with Multiservice Platform, Embedded QoS and Multiple Security Levels

Scalable End to End Solution for the Enterprise

ASCEND

Branch Office
Pipeline 130

Mobile Users With Web Browser

Analog

Enterprise HQ

Navis NMS

PRI

E1-R2

PSTN/ISDN or Internet

Teleworker
Pipeline 75

BRI

LAN

MAX with Secure Access Firewall

Ascend Access Control

Public/Private Frame Relay Network

Extranet Partner

Pipeline 85

Regional Office
Pipeline 220

Frame Relay
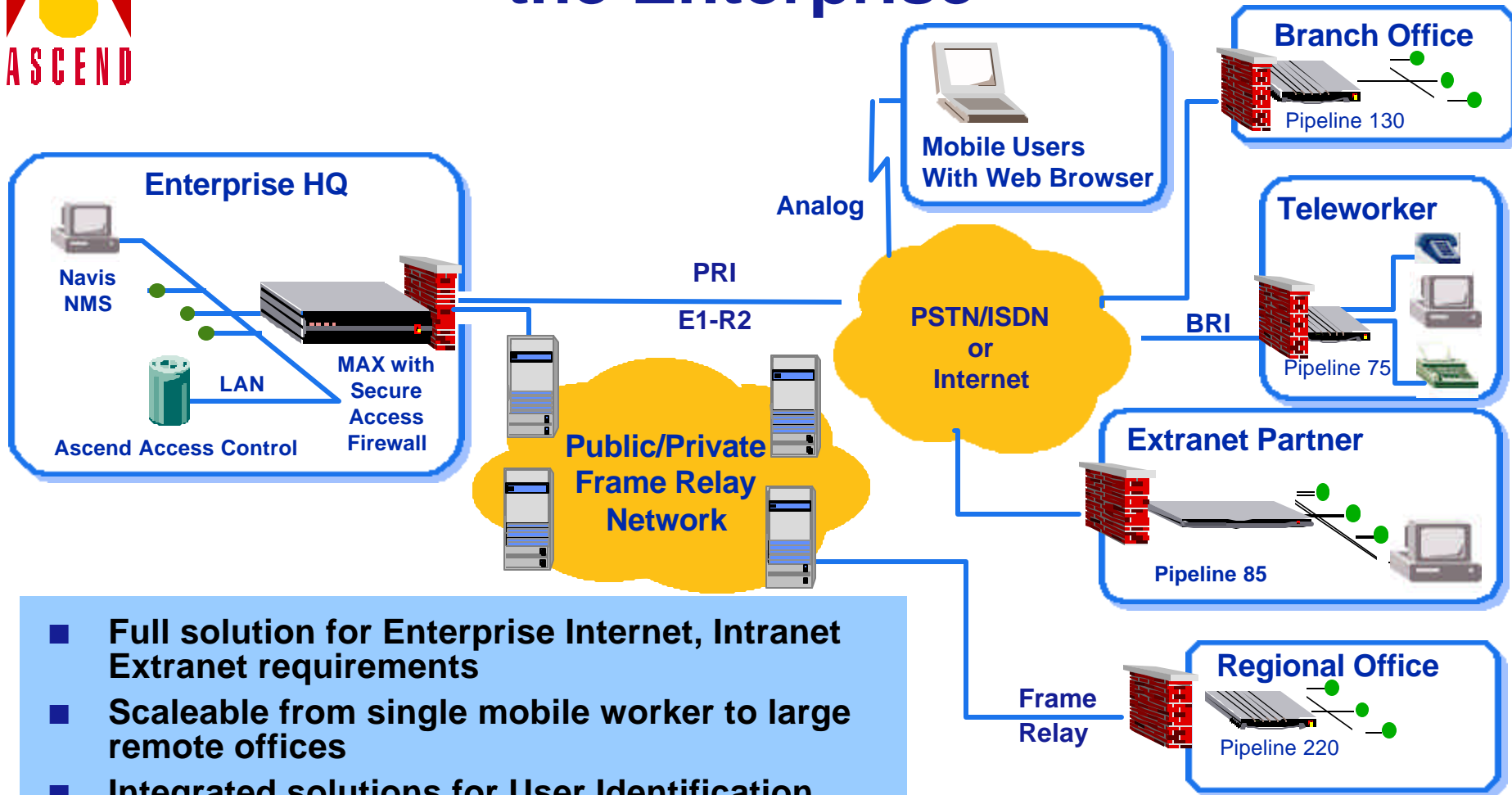
- Full solution for Enterprise Internet, Intranet Extranet requirements
- Scaleable from single mobile worker to large remote offices
- Integrated solutions for User Identification, authentication, authorization and integrated local and remote Firewalls
- Build lease options for Enterprise Core Frame or ATM network

Ascend - The Right Choice

- **Strong Financial Position**

- **Global ability to partner**

- **Technology Leader in Networking Solution for**

  - ◆ Carrier Networks

  - ◆ Internet Service Providers

  - ◆ Enterprise Intranet and Extranet Networks

- **Leadership Through Customer Focus and Time to Market**