

Ascend



MAX 6000 WAN Access Switch

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MAX 6000 Product Presentation

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MAX 6000

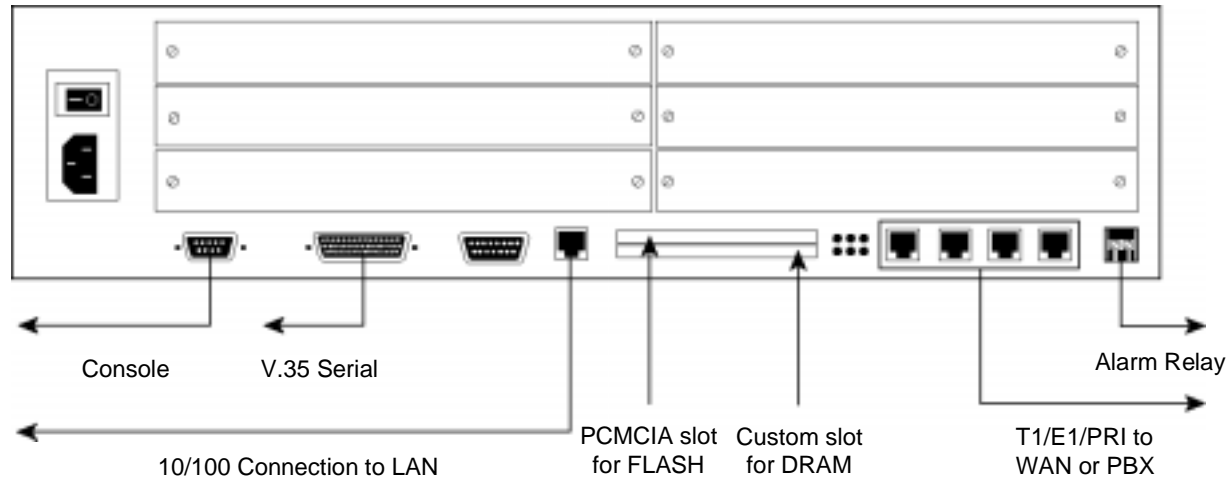
Product Overview

- **Next Generation of MAX 4 T1/E1 Product Family**
 - ◆ Uses proven MAX software (True Access Operating System [TAOS] 6.0)
 - ◆ Uses MAX multi-processor slot cards
- **Enhances Proven MAX Architecture**
 - ◆ Industry Leading Performance
 - ◆ Most Comprehensive Range of Services (TAOS)
 - ◆ Designed for Reliability and Serviceability
 - ◆ Expandable DRAM, Flash Memory & Slot Cards
 - ◆ Software Upgradable protocols and services
 - ◆ Robust Power and Thermal Capacities



MAX 6000

Hardware Interfaces



- **4 T1/E1/PRI**
- **Autosensing 10/100Base-T RJ-45**
- **V.35 serial (up to 8 Mbps)**
- **RS-232 console port**
- **Memory slots**
 - ◆ Custom DRAM (up to 32MB)
 - ◆ PCMCIA FLASH (up to 8MB)
- **6 slots for MAX slot cards**
- **Available in AC or DC**



MAX 6000

Enhanced Performance and Expandability

■ Enhanced System Performance

- ◆ Central processor – latest in Intel i960 processors
- ◆ Multiprocessor architecture with Series56™ Digital Modems
- ◆ High-port density
 - Up to 96 Series56 Digital Modems
 - Up to 120 digital connections (ISDN, Frame Relay)
- ◆ Support for Fast Ethernet (autosensing 10/100BASE-T)
- ◆ Enhanced hardware compression capability

■ Enhanced Memory Expandability

- ◆ 2 MB of FLASH, expandable to 10 MB via PCMCIA slot
- ◆ 16 MB of DRAM, expandable to 48 MB via custom slot

■ Enhanced Heat Dissipation and Power Capacity

- ◆ Improved thermal design increases airflow, lowers temperature
- ◆ Increased capacity power supply



MAX 400X / 6000 HW Comparison

MAX 400X

- 25 MHz i960CF
- 8 MB Shared DRAM
- No private i960 DRAM
- 2 MB Flash Memory
- 1 STAC 9706 compression processor
- No DMA
- 10 BASE-T Half Duplex + AUI
- Hardware Pins
- 64 HDLC Channels

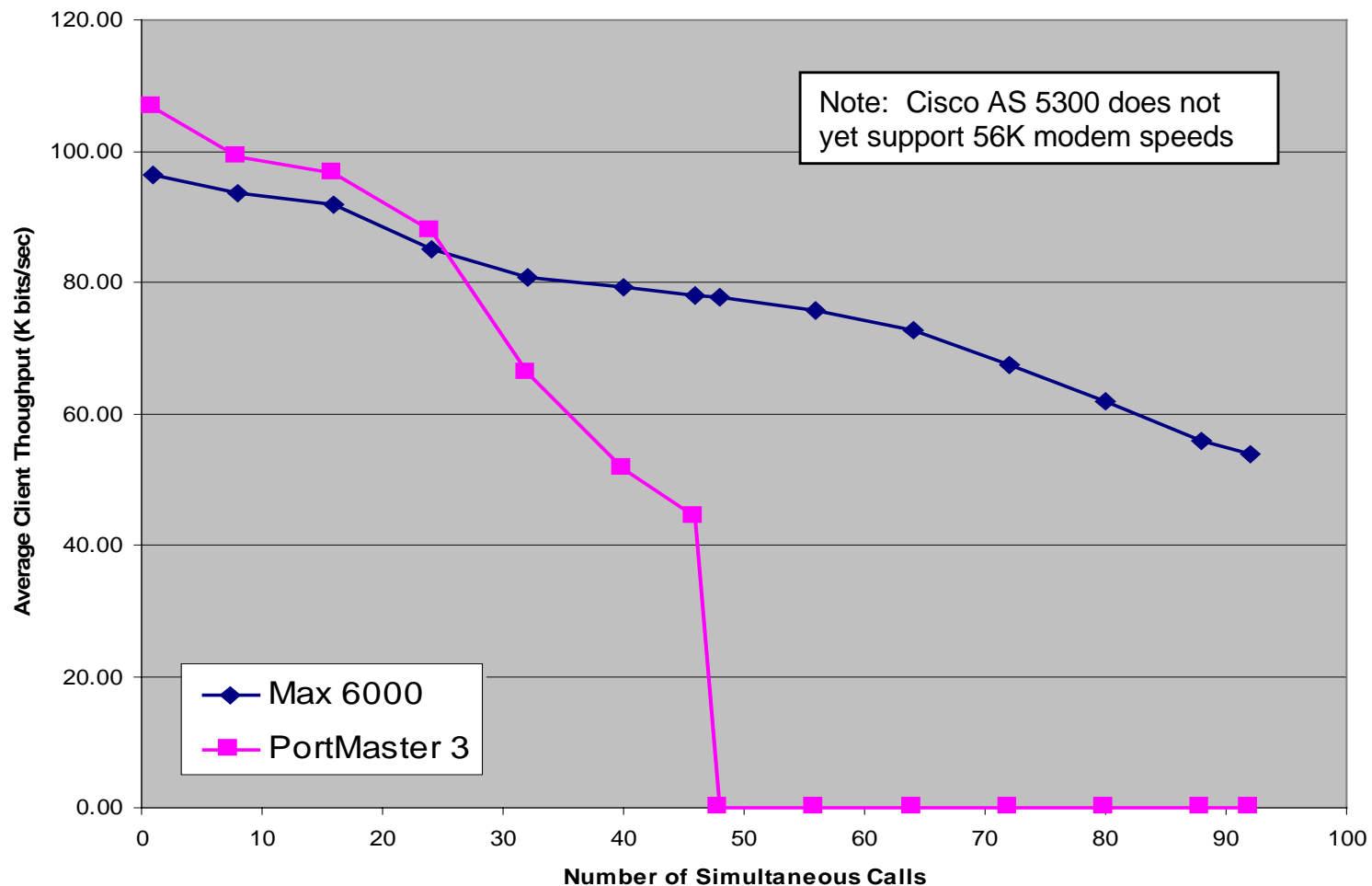
MAX 6000

- 64 MHz i960HD
- 16 to 32 MB Shared DRAM
- 32 MB Private DRAM
- 2 + 8 MB Flash Memory
- 2 HiFn 9711 compression processors
- 4 channel DMA controller
- 10/100 BT Full Duplex, Autosensing, No AUI
- Software controlled settings
- 128 HDLC Channels



MAX 6000 vs Competitors Modem Performance

Access Switch Performance Comparison
(K56 Modems, Text File Transfer, MS-STAC Compression)



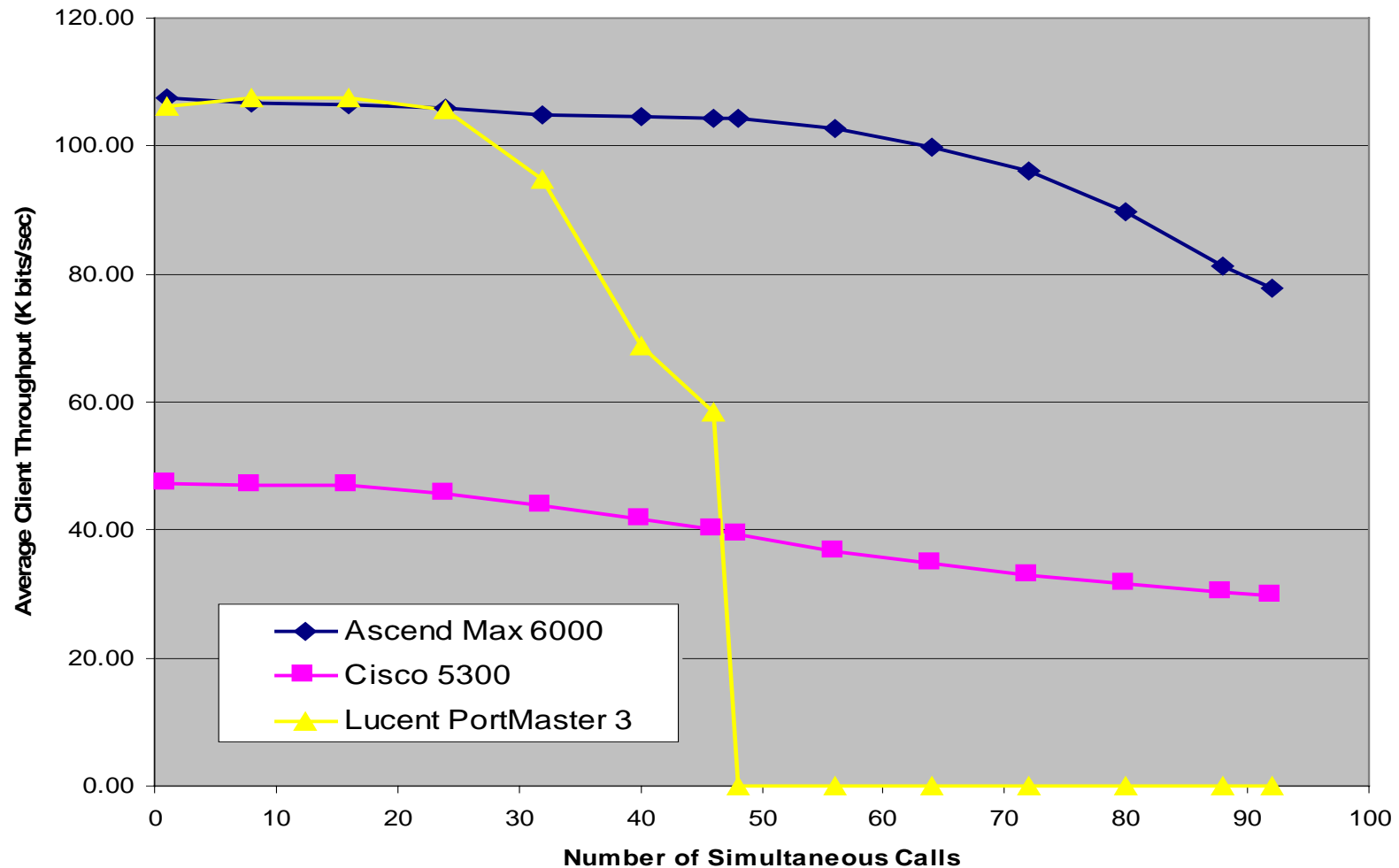
Source: The Tolly Group, Preliminary, Feb 1998



MAX 6000 vs Competitors

ISDN Performance

Access Switch Performance Comparison
(ISDN 56K, Text File Transfer, MS-STAC Compression)



Source: The Tolly Group, Preliminary, Feb 1998



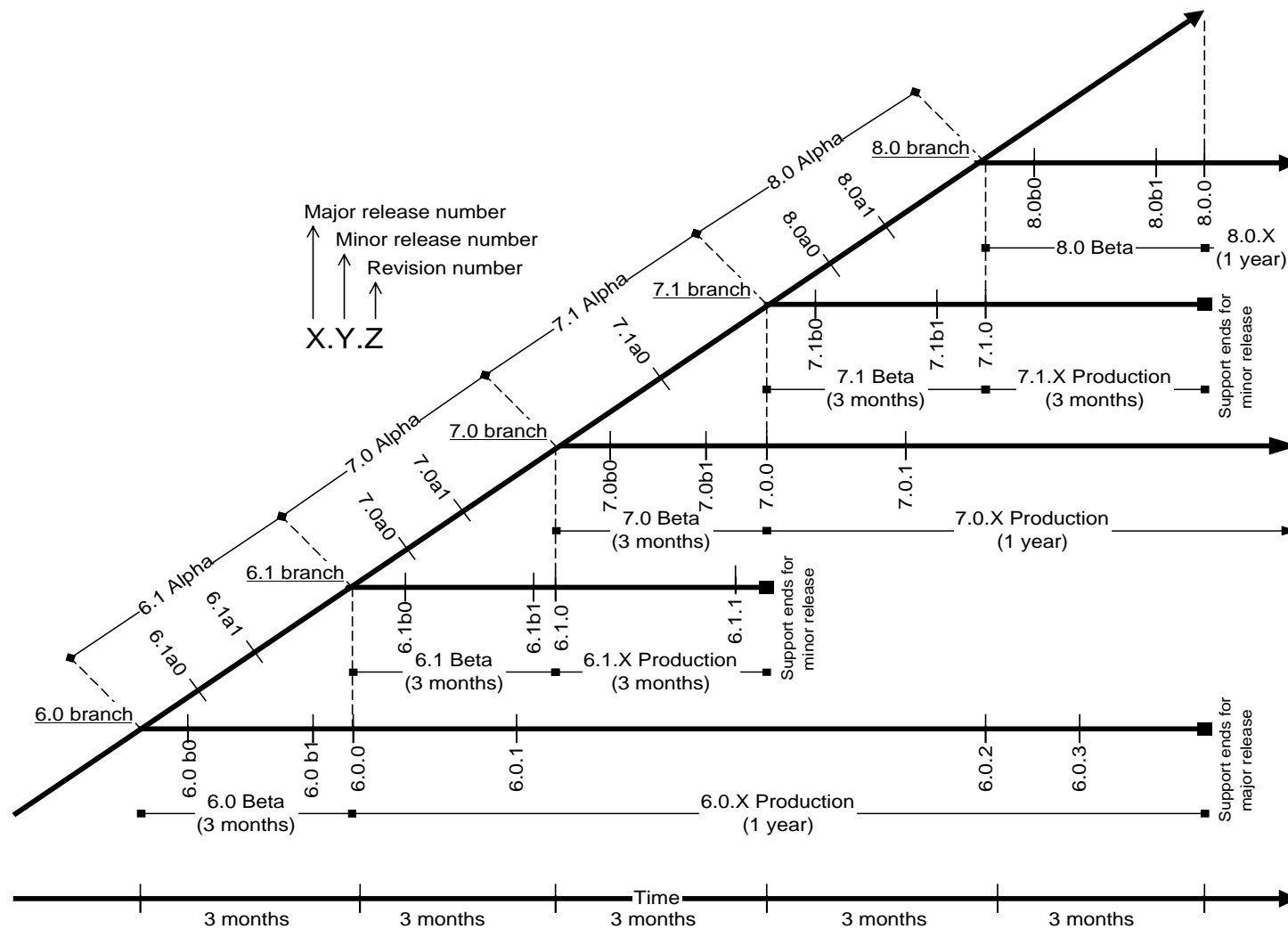
MAX 6000 Hardware

Designed for Reliability & Serviceability

- **100% NEBS Level-3 compliant design**
- **200% power supply capacity of the MAX 400X**
- **Dramatically improved airflow with separate air channel for power supply.**
- **Hot Fail-over Flash boot image**
- **External Flash to internal Flash software download**
- **Components and packages chosen to improve mechanical and thermal durability and reliability**
- **Enclosure can be opened easily without special tools.**



MAX 6000 Software Reliability New Software Development Process





MAX 6000 Memory Expandability

- **Shared DRAM (i960, HiFn's, Ethernet, SCA)**
 - ◆ 16 MB on internal daughter board (standard)
 - ◆ Future expansion possible to 24 and 32 MB
- **Private DRAM (bus for i960 only)**
 - ◆ 32 MB available on proprietary external DRAM card (optional)
 - ◆ Future expansion possible to 128 MB
- **Flash Memory**
 - ◆ 2 MB on system board
 - ◆ 8 MB Flash expansion with optional PC Card
 - ◆ 10 MB total Flash memory



MAX 6000 Line Expandability

Available slot cards

- **Series56 Digital Modems**
 - ◆ Available in 8-, 12- or 16-port densities
 - ◆ Mixed densities allowed
- **V.34 Digital Modems (Available with True Access Operating System [TAOS] 6.0.1)**
 - ◆ Available in 8- or 12-port densities
- **IDSL**
- **BRI (Network Services or Terminal)**
- **IMUX (available with TAOS 6.0.1)**
 - ◆ 2-port IMUX cards for videoconferencing/backup & overflow
 - ◆ 6-port IMUX cards for videoconferencing
- **V.110 (GSM)**
- **Personal Handy-Phone System (Japan PHS)**



MAX 6000

Series56 Digital Modem Cards

- **Digital Modems with Rockwell K56flex Technology**
- **High-performance DSP-based Hierarchical Processing**
 - ◆ Provides multiprocessor architecture
- **Simultaneous 33.6 Kbps and 56 Kbps Access Speeds**
 - ◆ V.42 Error Correction and V.42bis Compression
 - ◆ MNP10 EC for cellular data calls
- **Software Upgradable for Long-Term Hardware Viability**
 - ◆ Software Upgrade to the ITU 56K modem standard (V.90)
 - ◆ Series56 hardware investment protection
- **8-, 12-, 16-port Series56 Modem Cards can be mixed**



Other MAX 6000 Improvements

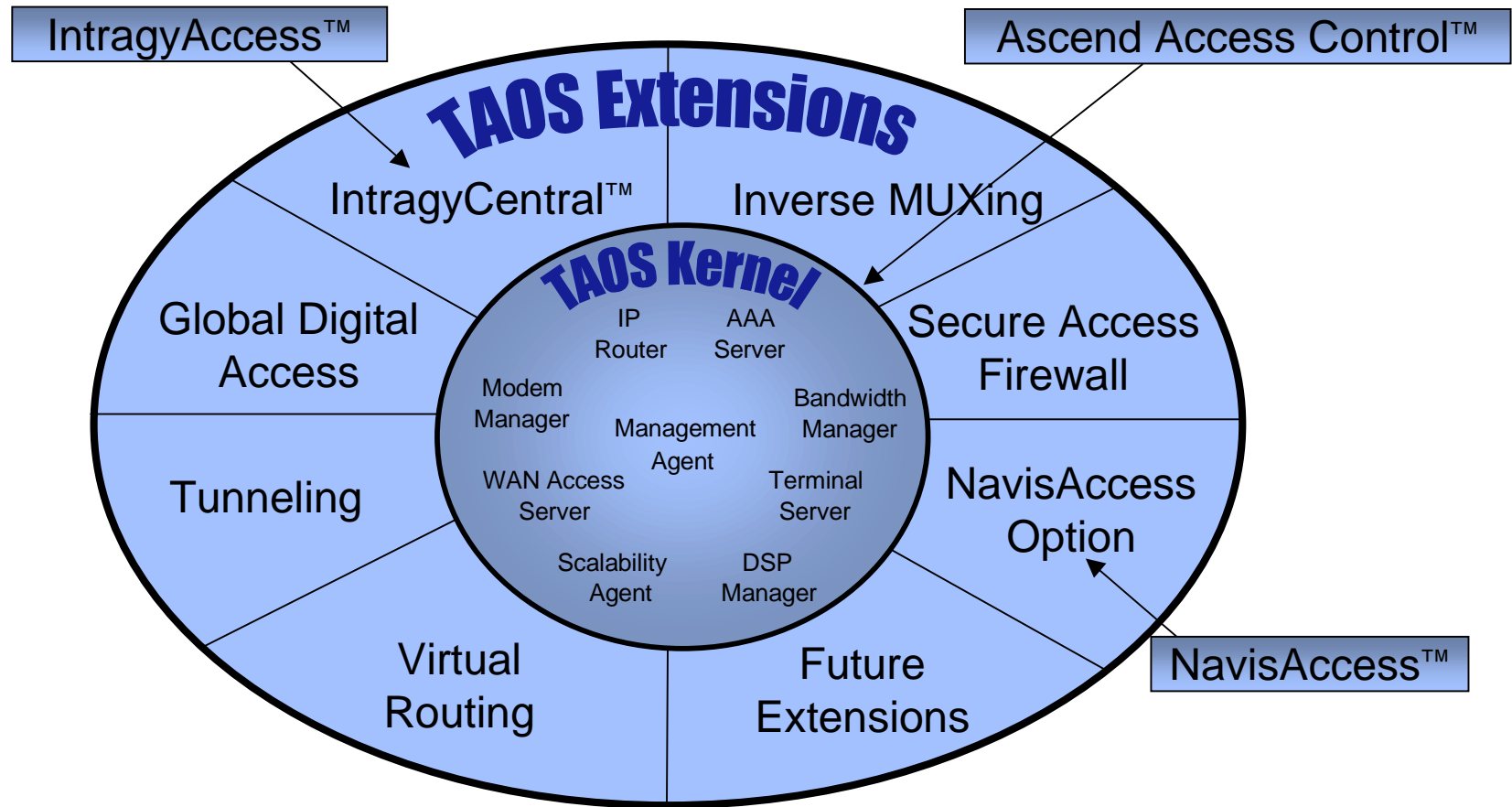
- External PC Card Slots for adding Flash and DRAM
- PRI to T1 Conversion available on all ports
- Faster MAX Stack with 100BASE-T Ethernet



MAX 6000 System Software

Kernel, Extensions, and Applications

True Access Operating Systems (TAOS) 6.0





True Access Operating System (TAOS) 132 New Features

- 9 new Hardware features
- 10 new Line Interface features
- 27 new WAN Access features
- 6 new IP Routing features
- 4 new OSPF Routing features
- 2 new Multicast Forwarding features
- 4 new IPX routing features
- 9 new AppleTalk routing features
- 25 new Authentication and Accounting features
- 19 new Administrative features
- 17 new SNMP features

Note: Please see TAOS 6.0 Release Notes for descriptions of each of these features.



True Access Operating System TAOS 6.0

- **Enterprise Functionality**
 - ◆ Intraggy
- **Virtual Private Networking**
- **Security Options**
 - ◆ Secure Access Firewall
 - ◆ RADIUS and Ascend Access Control
- **Software Options**
 - ◆ Global Digital Access™ 6000
 - ◆ MAX Stack
- **Extensive Management Capability**
 - ◆ NavisAccess
 - ◆ Java-Based Ascend Configurator



Software Bundles

Intragy

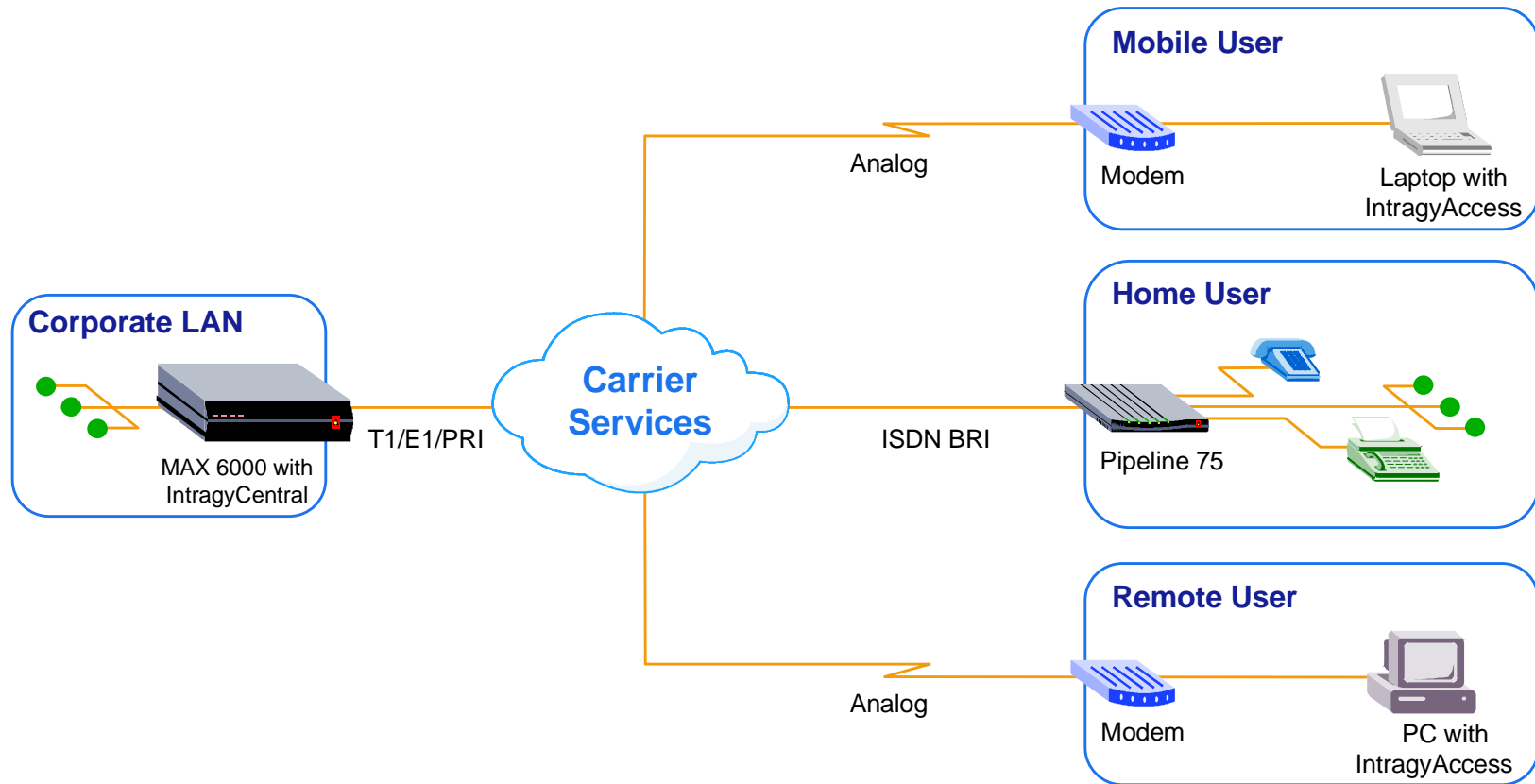
■ Intragy

- ◆ Software solution for corporate multiprotocol environments
- ◆ IntragyCentral
 - Transparent Bridging
 - Multiprotocol Routing
 - ▼ Adds IPX and AppleTalk routing
 - Multiprotocol Access
 - ▼ Adds IPX and AppleTalk Remote Access
 - DeskDial
- ◆ Client Dial Software
 - IntragyAccess



MAX 6000

IntragyCentral with IntragyAccess

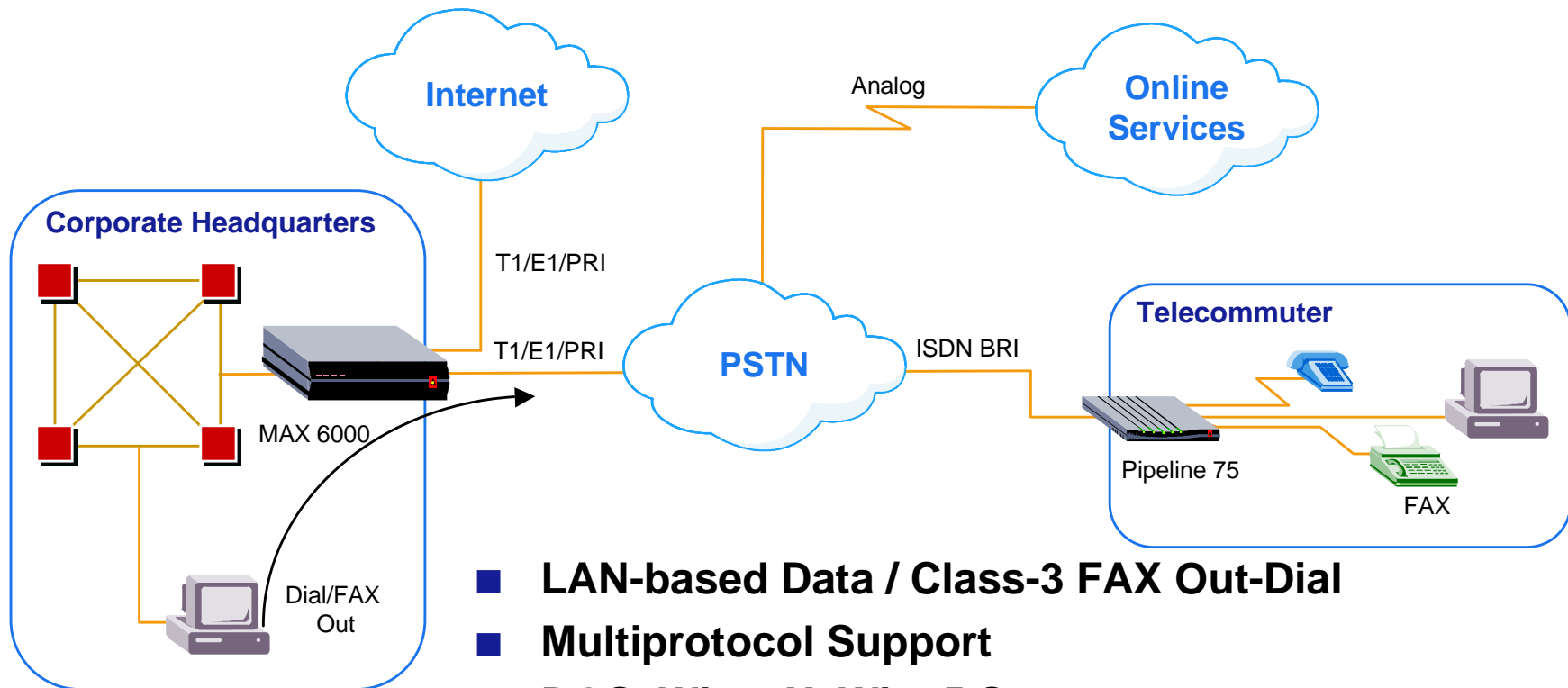


- Seamless access to network resources from remote location
- Award-winning complement of software included



MAX 6000

Intragy - DeskDial



- LAN-based Data / Class-3 FAX Out-Dial
- Multiprotocol Support
- DOS, Win 3.X, Win95 Support
- Easy Installation and Maintenance
- Call Activity Audit Capability



MAX 6000

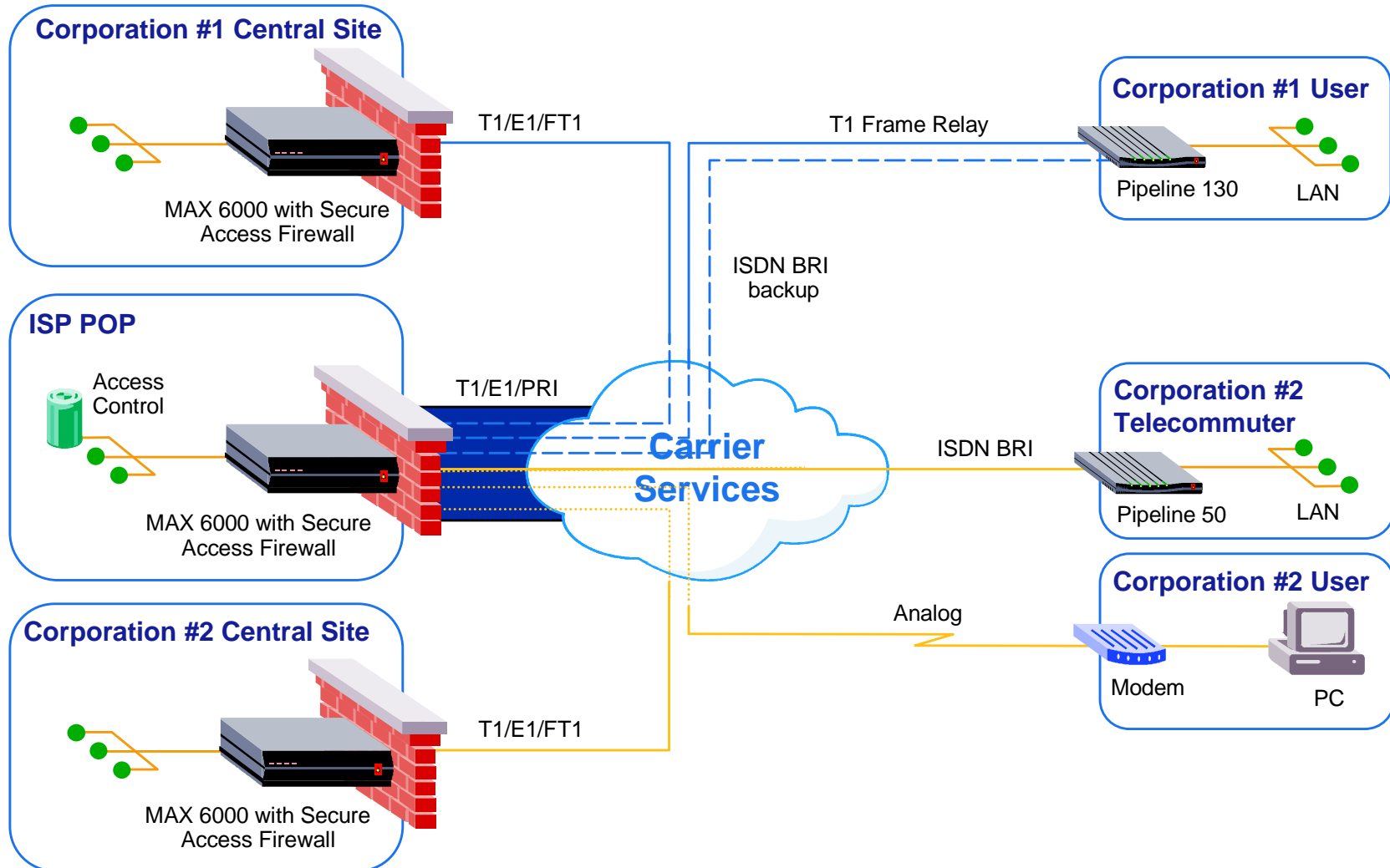
Virtual Private Networking

- **Ascend Tunneling Management Protocol (ATMP)**
 - ◆ GRE tunneling
 - ◆ Mobile-IP
 - ◆ IPX protocol spoofing
- **Frame Relay Direct**
- **Point-to-Point Tunneling Protocol (PPTP)**
- **Layer-2 Tunneling Protocol (L2TP)**
- **Raw TCP tunneling**
- **IP Direct**
- **Extended RADIUS authentication and profile management**



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Virtual Private Networking





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Security

■ Secure Access Firewall

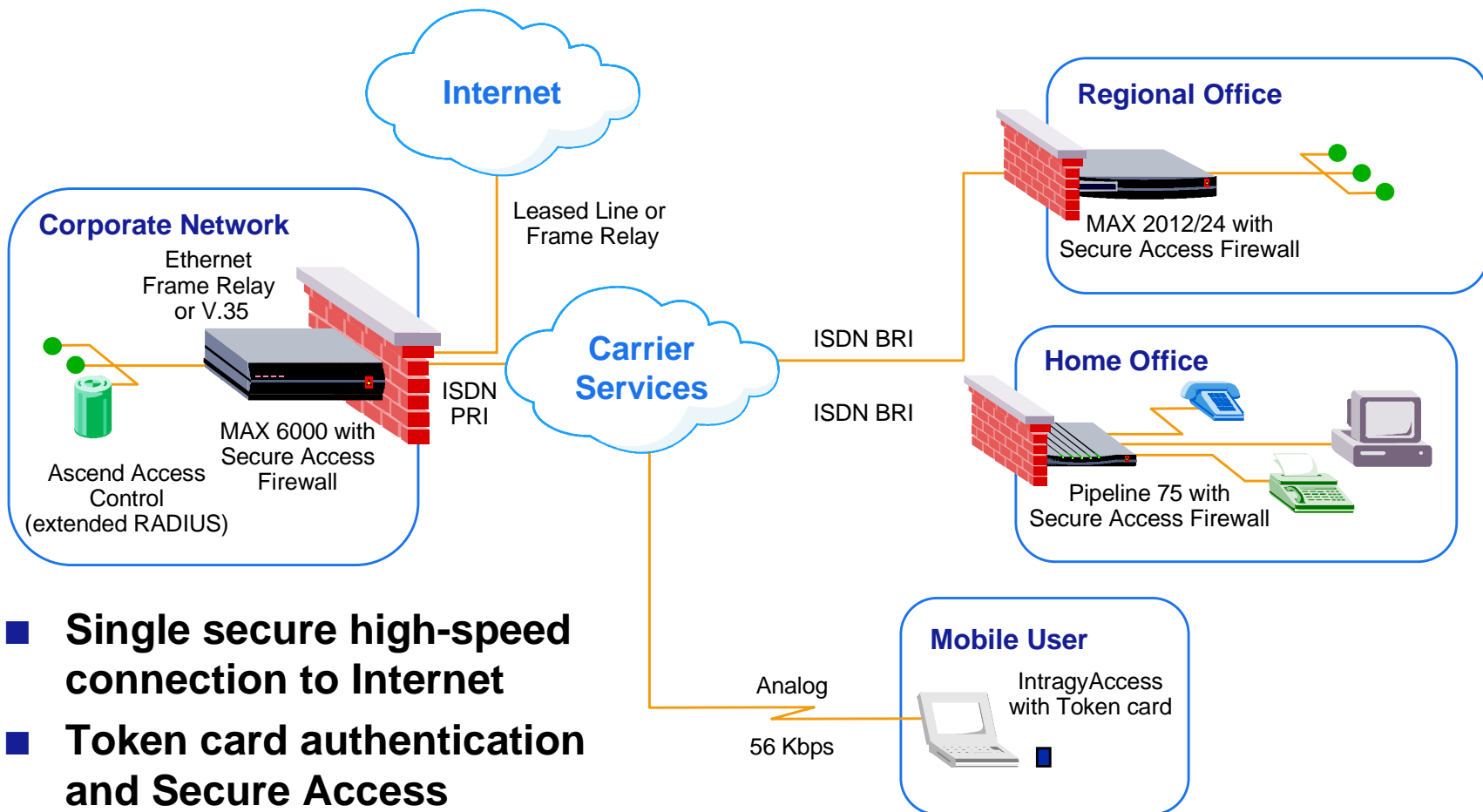
- ◆ Dynamic ICSA-certified “stateful inspection” firewall
- ◆ Explicit permit and deny
- ◆ Rules adapt to type of traffic
 - Network address, host names, UDP, TCP, ICMP, source/destination ports, send/receive direction, TCP session state, time, application port number, etc.
- ◆ Eliminates need for proxy application gateway
- ◆ Secure Access Manager (configuration utility)
- ◆ Comprehensive audit trails for tracking

■ RADIUS and Ascend Access Control (extended RADIUS)



MAX 6000

Security Options - Corporate Internet Gateway



- **Single secure high-speed connection to Internet**
- **Token card authentication and Secure Access Firewall and Extended RADIUS Capabilities**



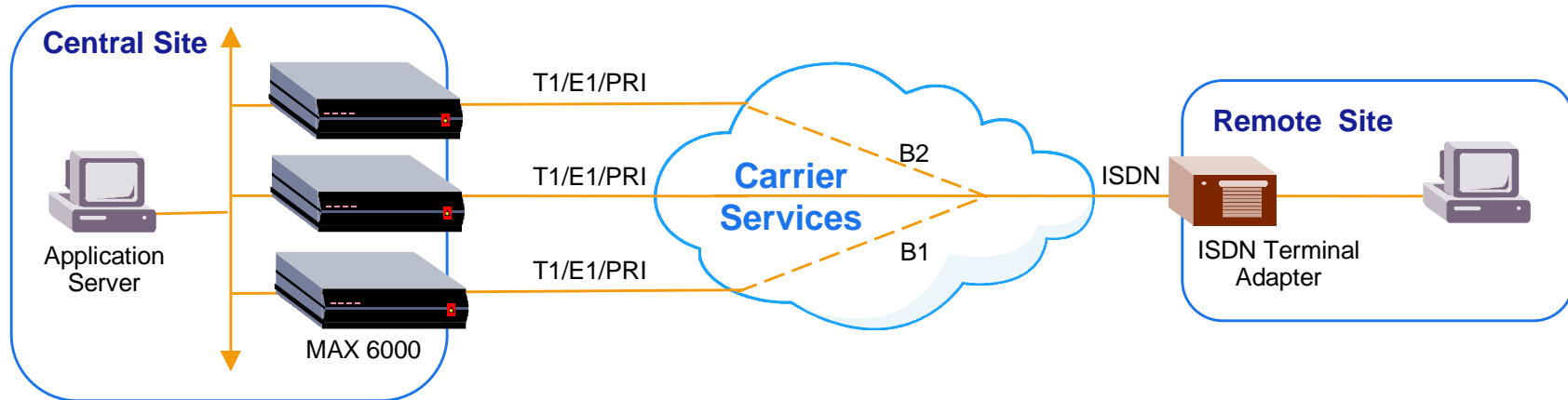
Global Digital Access 6000

- **Software solution allows variety of access connectivity**
- **Digital Access**
 - ◆ 56/64 Kbps B-channels for ISDN
 - ◆ 56/64 Kbps Frame Relay
 - ◆ Up to 120 remote sessions
- **ISDN PRI signaling**
 - ◆ Enables PRI signaling for T1/E1 ports
- **Frame Relay support**
 - ◆ Up to 4096 PVCs with RADIUS authentication



MAX 6000

High Performance MAX Stack



- **Multiple MAX system operating as single logical unit**
- **Shared-resource operation**
 - ◆ Shared IP pools
 - ◆ MP, MP+ and BACP calls span stack
 - ◆ Single virtual Network Access Switch
 - ◆ Scalable architecture using software
- **Higher MAX Stack performance over 100BASE-T**



Ascend Management

Extensive Management Capabilities

■ **Java-Based Ascend Configurator**

- ◆ Installation and configuration utility

■ **NavisAccess**

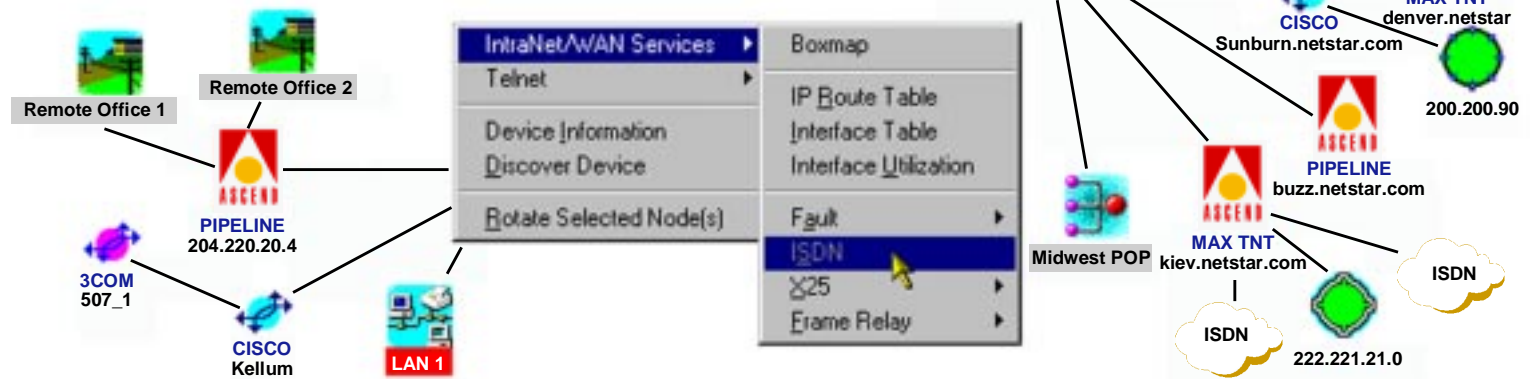
- ◆ Discovery and Mapping
- ◆ Element Management
- ◆ Summary View
- ◆ Configuration Management
- ◆ Fault Management
- ◆ Performance Management
- ◆ Capacity Planning
- ◆ Security and Accounting



NavisAccess

Discovery and Mapping

- Utilizes HPOV discovery and mapping
- Augments HPOV with multi-layer hierarchical map
 - ◆ Network Layer: IP
 - ◆ Link Layer: Frame Relay, ISDN
 - ◆ Physical Layer: DS1, E1, PRI, BRI, xDSL
- Application access via map





MAX 6000

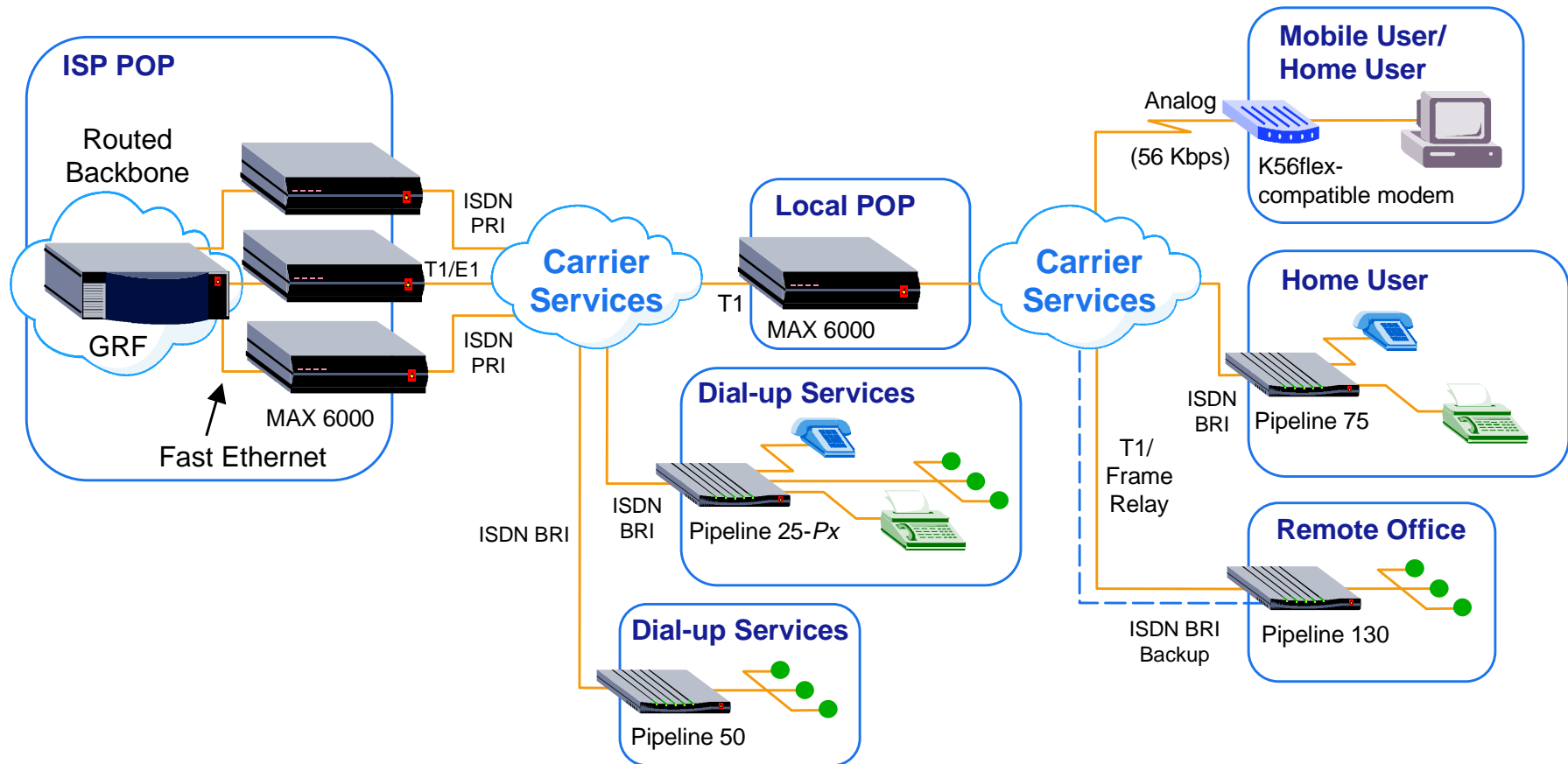
Target Applications

- **Fully-featured WAN Access Switches for:**
 - ◆ Carrier and Internet Service Provider POPs
 - ◆ Corporate remote and Internet access
- **Ideal Platform for ISPs and Carriers**
 - ◆ Low entry price with high-end feature set
 - ◆ Easy set-up using Java-Based Ascend Configurator
 - ◆ Extensive network design flexibility as network grows
 - ◆ Extensive POP management with multi-vendor support
- **Well-suited for Corporate and Business Applications**
 - ◆ Multiprotocol access and multiprotocol routing support
 - ◆ Extensive access functionality / flexibility
 - ◆ Network management with performance analysis tools



MAX 6000 Application

ISP POP Concentration

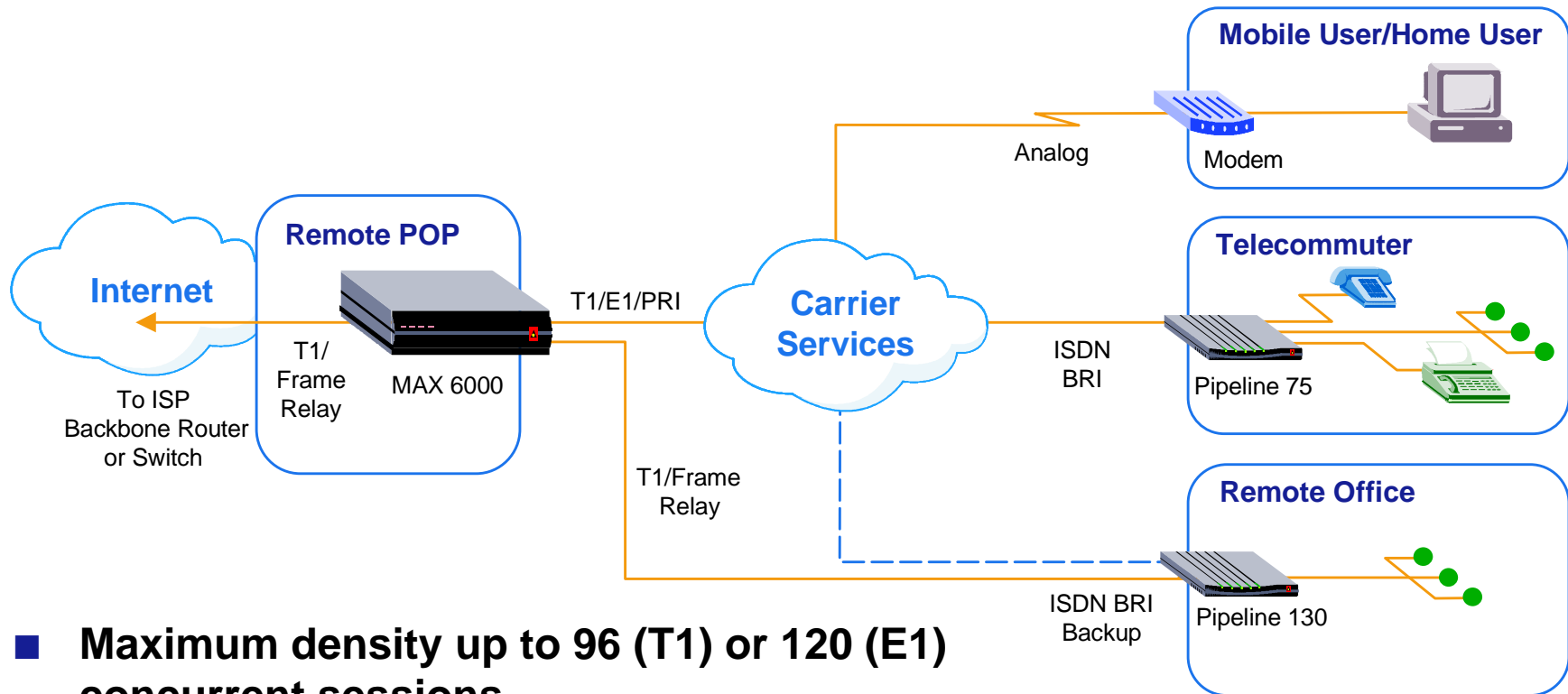


- Provide dialed and leased services
- Concentration of local POPs
- High-density session terminations
- Redundant networking



MAX 6000 Application

ISP Remote POP

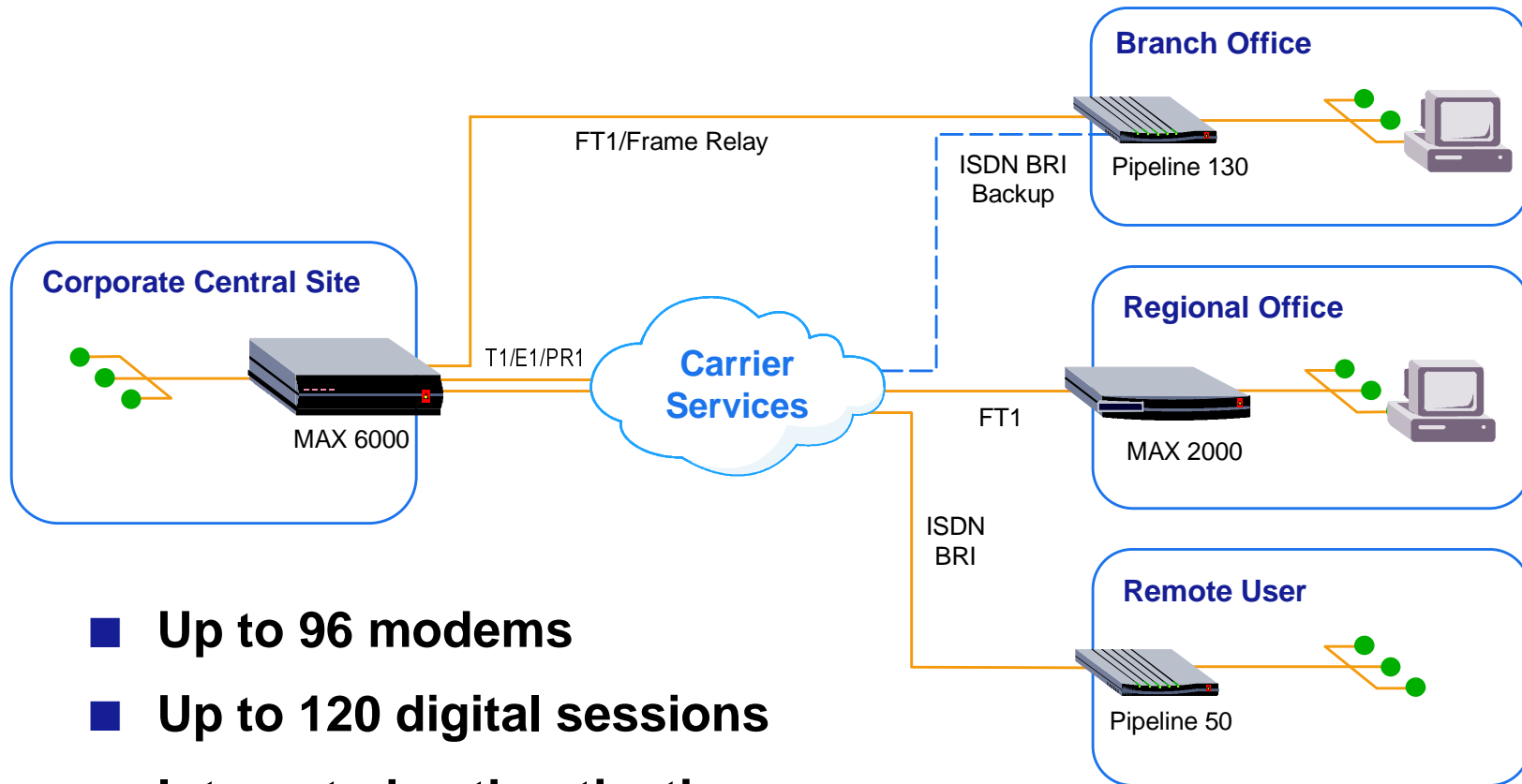


- **Maximum density up to 96 (T1) or 120 (E1) concurrent sessions**
- **Provide dialed and leased services**
- **Analog and digital sessions**
- **K56flex / V.34 modems, ISDN and Frame Relay**



MAX 6000 Application

Corporate Remote Access

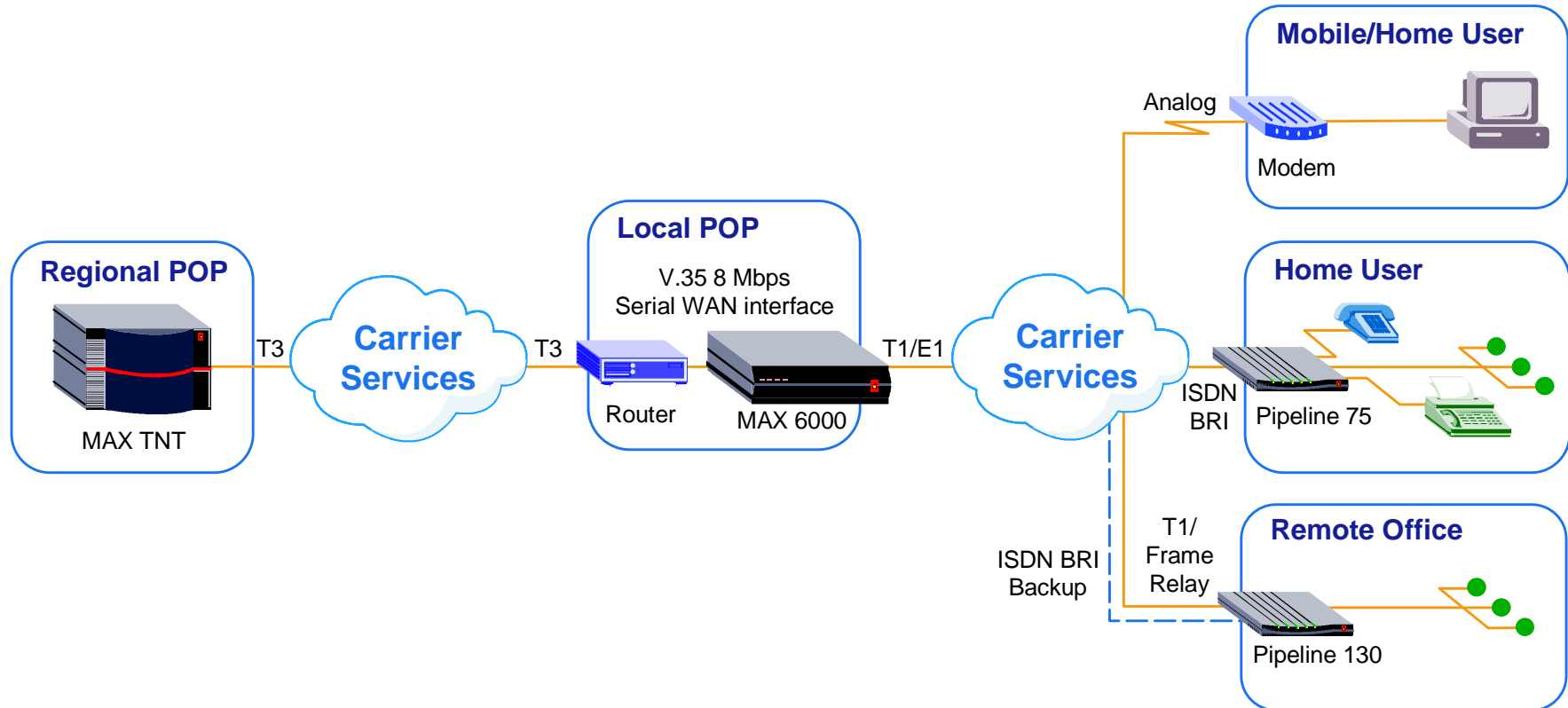


- Up to 96 modems
- Up to 120 digital sessions
- Integrated authentication
- Multiprotocol access



MAX 6000 Application

Frame Relay Backhaul via V.35 Interface

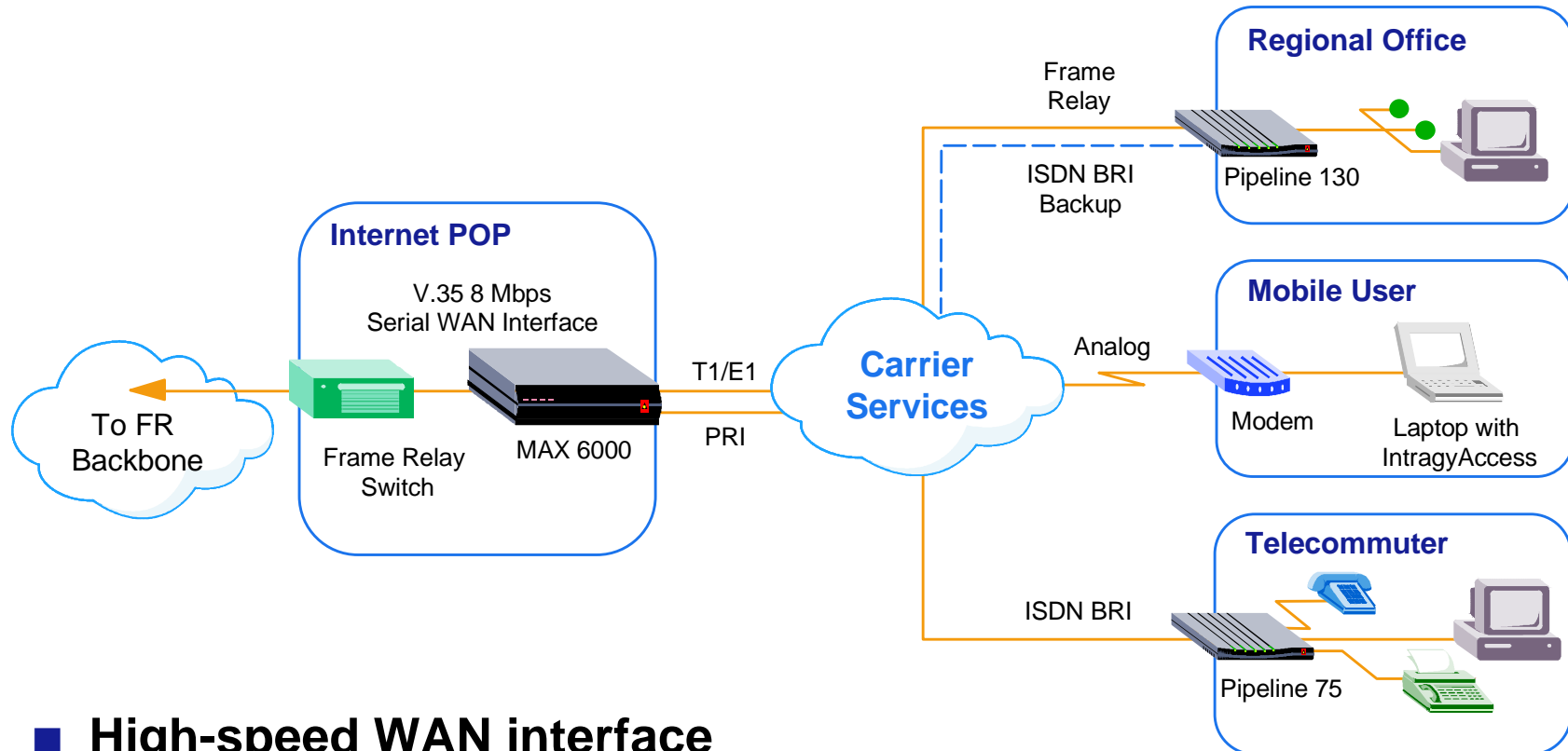


■ 8 Mbps Serial WAN Interface



MAX 6000 Application

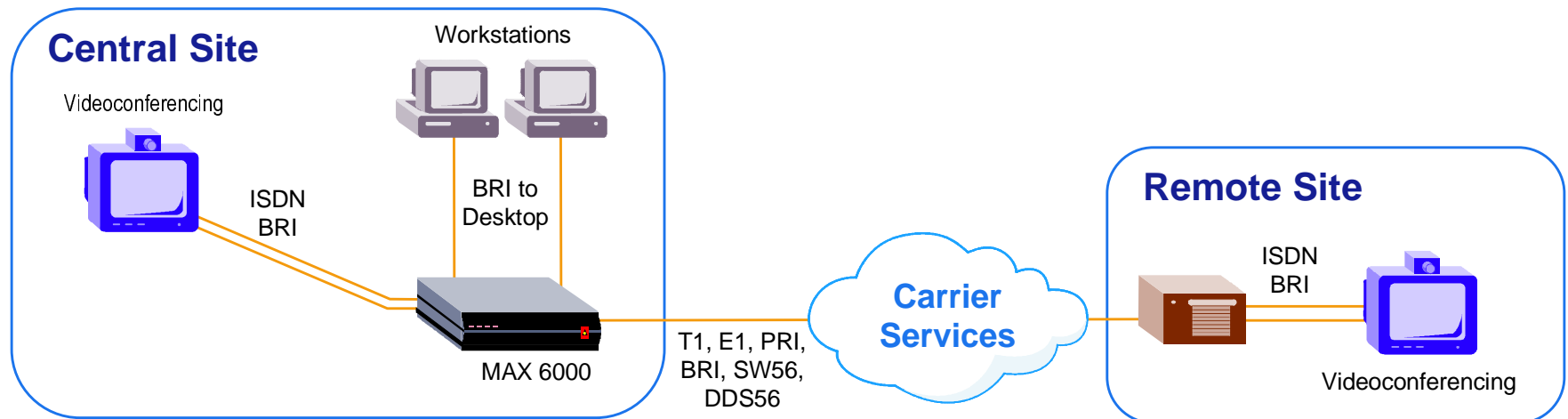
Frame Relay Switching



- High-speed WAN interface
- UNI and NNI standard



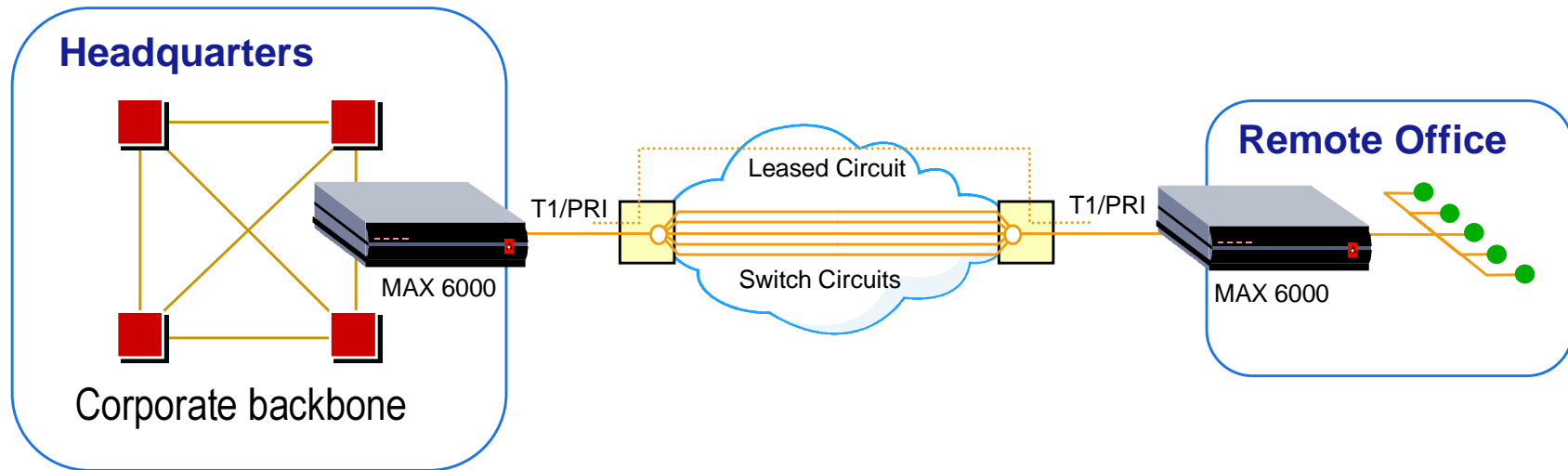
MAX 6000 Application Videoconferencing





MAX 6000 Application

Backup and Overflow





MAX 6000

Protocol Support

■ Routed LAN protocols

- ◆ TCP/IP via RIP, RIP2, OSPF
- ◆ AppleTalk and IPX (optional with Intragy)

■ Bridged LAN Protocols

- ◆ All (optional with Intragy)

■ WAN Protocols

- ◆ PPP, SLIP, C-SLIP, Async PPP, Sync PPP, X.25 PAD, X.25 over B-channel, V.110, V.120, D4 framing (T1/E1), G703/732 framing (R1), Frame Relay PVC, PPP-FR gateway, Frame Relay NNI, ISDN signaling (with Global Digital Access 6000), ARA (optional with Intragy)

■ Modem support

- ◆ K56flex, V.34, MNP 10-EC, MNP, V.42bis, fax modem dial out to 14.4 Kbps



MAX 6000

Protocol Support (continued)

■ Bandwidth management

- ◆ Multilink PPP (MP), Multilink Protocol Plus™ (MP+), Bandwidth Allocation Control Protocol (BACP), TCP header compression, data compression (Ascend/Microsoft/STAC V9)

■ Security

- ◆ RADIUS, Ascend Access Control (optional), Secure Access Firewall (optional), TACACS, TACACS+, Password Authentication Protocol (PAP), Challenge Authentication Protocol (CHAP), token card, Calling Line ID (CLID), packet filtering, SNMP, console management (VT-100), PPP callback, user authentication

■ Virtual Private Networking (Optional)

- ◆ Ascend Tunneling Management Protocol (ATMP), Point-to-Point Tunneling Protocol (PPTP), Layer-2 Tunneling Protocol (L2TP)



MAX 6000

Protocol Support (continued)

■ Intragy (Optional)

- ◆ Transparent Bridging
- ◆ Multiprotocol Routing: Adds routing support for IPX and AppleTalk
- ◆ Multiprotocol Access: Async IPX with local spoofing, AppleTalk Remote Access 1.0 & 2.0
- ◆ DeskDial
- ◆ IntragyAccess

■ Management

- ◆ NavisAccess, Java-Based Ascend Configurator, Telnet, NASI, SNMP MIB-2, PPP LQM, Frame Relay Annex D, Frame Relay ITU Annex A, Frame Relay ANSI Annex D



MAX 6000

Product Structure

MAX 6000 Chassis	Model Number	North American List Price	International List Price
Four T1/E1 WAN Access Switch chassis with six slots. AC or DC power cable and documentation included.			
T1 chassis with AC power supply	MX60-4T1-AC	\$11,040	\$11,040
T1 chassis with DC power supply	MX60-4T1-DC	\$12,040	\$12,040
E1 chassis with AC power supply	MX60-4E1-AC	N/A	\$11,040
E1 chassis with DC power supply	MX60-4E1-DC	N/A	\$12,040
Redundant Power Chassis with:			
T1 version with two AC power supplies	MX60-4T1-2AC	\$16,040	\$16,040
E1 version with two AC power supplies	MX60-4E1-2AC	N/A	\$16,040
T1 version with two DC power supplies	MX60-4T1-2DC	\$17,040	\$17,040
E1 version with two DC power supplies	MX60-4E1-2DC	N/A	\$17,040



MAX 6000

Product Structure (continued)

MAX 6000 Slot Cards		Model Number	North American List Price	International List Price
Series56 Digital Modem Slot cards K56flex and V.34 Digital Modems	8-port slot card (up to six per chassis)	MX-SL-8MOD-S56	\$4,400	\$4,400
	12-port slot card (up to six per chassis)	MX-SL-12MOD-S56	\$5,700	\$5,700
	16-port slot card (up to six per chassis)	MX-SL-16MOD-S56	\$6,800	\$6,800
DSL Slot cards	Eight-port IDSL slot card	MX-SL-IDSL8	\$3,000	\$3,000
ISDN BRI Slot cards Eight-port BRI "S/T" slot cards in two varieties	For connection to network services	MX-SL-8BRIN	\$4,500	\$4,500
	For ISDN data terminal equipment (with local switching)	MX-SL-8BRIT	\$4,500	\$4,500
Inverse Multiplexing (IMUX) Slot cards IMUX slot cards with V.35/RS-449/X.21 DTE interfaces. Includes software required for video (RS-366, Ascend Inverse Multiplexing (AIM), X.21, and BONDING) and backup and overflow (V.25bis and DBA).	2-port IMUX card (video and/or backup and overflow)	MX-SL-2IMUX	\$6,750	\$6,750
	6-port IMUX card (video)	MX-SL-6IMUX	\$8,750	\$8,750
	6-port IMUX card for PictureTel videoconferencing	MX-SL-6IMUX-PT	\$8,750	\$8,750
Personal Handy-Phone System	16-port slot card for Japanese PHS system	MXHP-SL-DSP16	N/A	\$10,000
V.110 Slot cards	Eight-port V.110 slot card for GSM mobile users	MX-SL-8V110	N/A	\$6,000



MAX 6000

Product Structure (continued)

MAX 6000 Software Options		Model Number	North American List Price	International List Price
Virtual Private Network (VPN)	Enables support for ATMP, PPTP, and L2TP.	MX60-SO-VPN	\$1,500	\$1,500
IntragyAccess	Enables Bridging, Multiprotocol Routing for Novell/IPX and AppleTalk, AppleTalk RemoteConnect Support, MAXDial, and MAXLink Pro.	MX60-SO-RNS	\$4,000	\$4,000
Global Digital Access 6000	ISDN PRI signaling, Frame Relay support, and digital access for up to 120 channels.			
	With domestic ISDN PRI signaling	MX60-SP-HA	\$3,000	N/A
	With INS1500 ISDN PRI signaling	MX60-SP-HA-INS	N/A	\$3,500
	With R2 ISDN PRI signaling	MX60-SP-HA-R2	N/A	\$3,500
	With multinational ISDN PRI signaling	MX60-SP-HA-IX	N/A	\$3,500
Secure Access Firewall	Enables integrated dynamic firewall capability. Includes system software, Secure Access Manager and documentation.			
	Standard Secure Access Firewall	MX60-SO-ASA	\$4,000	\$4,000
	Shrink-wrapped version (mainly for stocking distribution)	MX60-SWUP-ASA	\$4,000	\$4,000
NavisAccess (Network Management System)	Application			
	HP OpenView 4.1 (on HP UX 10.x and Solaris 2.5)	[new]	\$4,995	\$4,995
	Stand-alone for Solaris 2.5	[new]	\$2,995	\$2,995
	Stand-alone for Windows NT 4.0	[new]	\$995	\$995
	MAX 6000 chassis agents			
	Basic Agent	N/A	Free	Free
	Advanced Agent (extended MIB capability)	[new]	[new price]	[new price]
	Navis Access Options			
	Reporting and Capacity Planning	[new]	\$3,995	\$3,995
	Multi-vendor support	[new]	\$4,995	\$4,995
Ascend Access Control	Enables extended RADIUS support.	AAC-CD	\$3,000	\$3,000



MAX 6000

Product Structure (continued)

MAX 6000 Options		Model Number	North American List Price	International List Price
Memory Cards	8MB PCMCIA FLASH memory cards	MX60-FLASH-8MB	\$1,500	\$1,500
	32MB custom DRAM memory cards	MX60-DRAM-32MB	\$2,500	\$2,500
CD Companion	CD-ROM containing client software for MAX Java Configurator, DeskDial, IntragryAccess, Secure Access Manager, Access Control demo, and NavisAccess demo	MX-CDROM	\$20	\$20
Documentation kits	Hardcopy documentation	MX60-DOC	\$75	\$75
Warranty and customer support options	Extended warranty	CS-EXT-MAXBND	\$920	\$920
	Basic support	CS-BAS-MAXBND	\$1,380	\$1,380
	Premium support	CS-PREM-MAXBND	\$1,720	\$1,720



MAX 6000

Product Summary

- **Enhanced Performance with New Architecture**
 - ◆ Faster processing
 - ◆ Expandable memory
- **Supports MAX Slot Cards and Software**
 - ◆ Same configuration and management as MAX products
 - ◆ Increased density of modem support
- **Robust Software Functionality**
 - ◆ Virtual Private Networking
 - ◆ Multiprotocol support
 - ◆ Extensive connectivity
- **Integrated Security**
- **Comprehensive Management**



<http://www.ascend.com>