



MAX TNT

The Lucent MAX TNT® is the most widely deployed carrier-class, remote access switch in the world. It offers market-proven reliability, ongoing commitment to industry standards, and industry-leading flexibility. It has now evolved to become a full multiservice access switch and media gateway, gaining capabilities from the development of the Lucent next-generation APX 8000™ remote access switch. With the MAX TNT remote access switch, Internet service providers (ISPs), new and established carriers, international public telephone companies, Internet telephony service providers (ITSPs), and large corporations can reliably introduce and expand their remote-access and voice service capacity with benefits such as competitive services, cost-effectiveness, and space savings.

The MAX TNT remote access switch is powered by the Lucent True Access™ Operating System (TAOS), the most feature-rich operating system in the remote access switch industry. TAOS software enables service providers to deploy the MAX TNT platform for a wide range of voice and data remote access services, and its large base of supported protocols integrates seamlessly into existing network environments. Network managers can customize their network infrastructures according to specific application and bandwidth requirements.

MAX TNT Overview

The MAX TNT is optimized for seamless integration of dial, voice-over-IP (VoIP), fax-over-IP,

virtual private networks (VPNs), and other IP services. The switch's high-performance architecture combines scalable hardware design with redundancy, multiservice software, and comprehensive management capabilities to create one of the most highly evolved access platforms in the industry today. With a port density that is second only to the Lucent APX 8000 Multiservice Access Switch, and a groundbreaking "universal port" capability, the MAX TNT switch is ideally suited for a wide variety of applications. It enables carriers, ISPs, ITSPs, and corporations to capitalize on fast-growing high-density dial-access applications, while equipping them to expand into emerging markets, such as IP telephony.

Key Benefits

- Implement multiservice digital signal processors (DSPs)—common hardware supports multiple applications
- Gain higher densities with the MultiDSP 96-port module—dial up to 960 ports (10 modules) per chassis
- Boost VoIP capacity with the new MultiDSP 48-port module and gain up to 672 VoIP ports (14 modules) per chassis (IPDC or H.323)
- Achieve toll-quality voice that meets the G.711 standard
- Provide remote access and voice services when ready

Software Summary

Because downtime is not an option for any network, the MAX TNT remote access switch is designed for continuous operation. It offers a full range of management features that enable network managers to administer and maintain system performance without interrupting user operations. Additionally, many server- and client-based software applications can be deployed along with TAOS for MAX TNT platform management and services. This combination of software features makes the MAX TNT remote access switch unbeatable in deployment and management.

TAOS-based software features supported on the MAX TNT platform:



- Multiprotocol routing (TCP/IP)
- MultiVoice™ architecture VoIP (H.323, IPDC controlled solutions, and voice codecs)
- Multiple VoIP services—long distance, 1010 dial-around, and prepaid and post-paid calling cards—all on the same server
- Bandwidth-on-demand—Multilink Protocol (MP), Multilink Protocol Plus (MP+), and Bandwidth Allocation Control Protocol (BACP)
- Security including Password Authentication Protocol (PAP), Challenge Authentication Protocol (CHAP), RADIUS
- Virtual private networking (L2TP, ATMP, and IPSec)
- High-speed Ethernet (100 BaseT)
- ATM and frame relay (switched virtual circuits)
- Management—NavisAccess™ Network Management System, Simple Network Management Protocol (SNMP) MIBs, Telnet, and local console
- Remotely downloadable operating system and configuration via built-in flash RAM
- Transparent modem
- Virtual routing (IP-over-IP)

Server- and client-based management and services software available for the MAX TNT platform:

- NavisAccess network and device management server and client
- NavisRadius™ user authentication, accounting, billing, and services control
- IPDC for Signaling System 7 (SS7) networks

Hardware Summary

Although the MAX TNT platform is generally used to terminate up to a channelized DS3 (672 sessions), it can manage up to 960 concurrent data modem sessions per chassis (E1 configurations). The scalable backplane architecture, comprised of three individual, purpose-built buses—cell, TDM, and packet—make advancements in technology easy to implement. The base MAX TNT system hardware consists of a chassis, 16 open slots, a shelf controller, and up to two redundant, load-balancing power supplies. Installing various modules into the open slots enhances this base system. The MAX TNT platform is NEBS Level-3 compliant.

Modules are hot-swappable and include:

- 48 and 96 MultiDSP and Series 56™ Digital Modem modules
- Hybrid access module

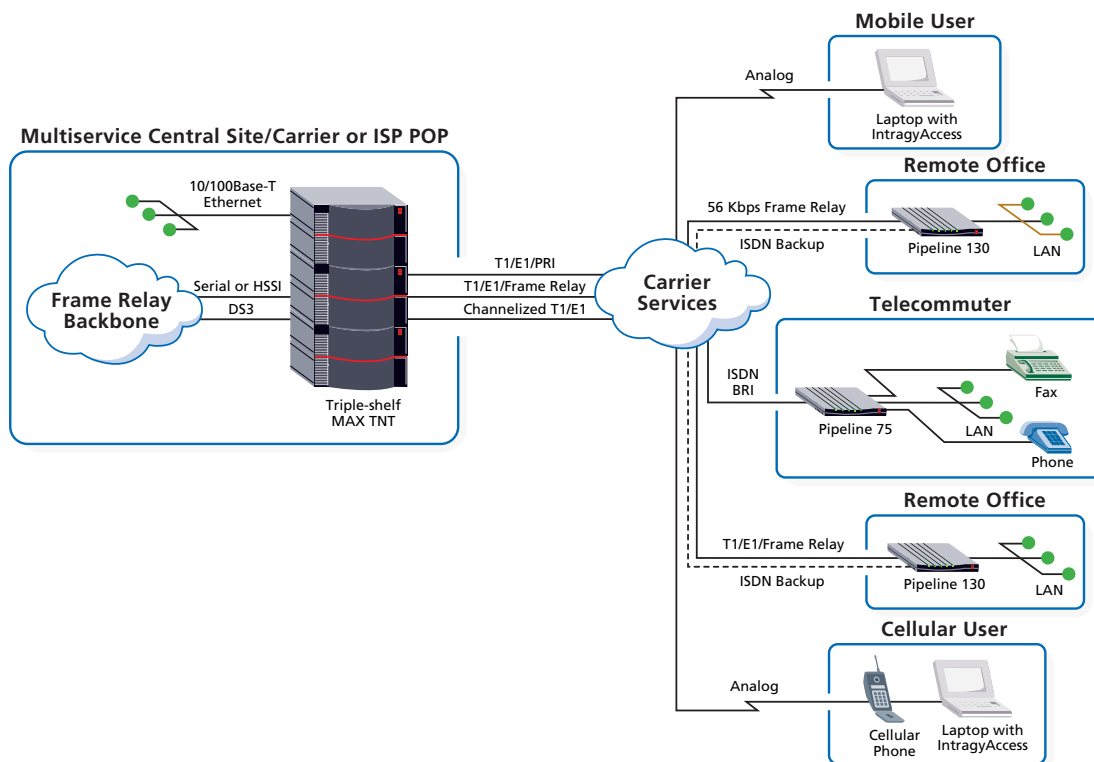
- FrameLine module
- Frame relay, ATM, and Ethernet modules
- Channelized T1, E1, and T3 modules

Software Solutions

High-speed digital modems enhance call performance and reduce operating costs. Integrated high-speed digital modems provide full access to analog callers who dial into the MAX TNT switch over digital access lines such as channelized T1/E1, channelized T3, or primary rate interface (PRI). The MultiDSP modules ensure reliability and eliminate the high operating costs inherent to analog modem technology.

- 96-port and 48-port MultiDSP modules
- Up to 960 modem/ISDN sessions per chassis
- Serial async data
- V.90, K56flex, V.34, V.FC, V.32bis, V.32, V.22, and V.22bis, V.21, Bell 212A, and Bell 103
- V.42bis and MNP5 data compression
- Fax modem send and receive rates up to 14.4 Kbps (Group 3) with DeskDial software
- V.33, V.29, V.27 ter, V.21 channel 2, and V.17
- MNP10-EC for cellular connections
- Remote downloadable modem firmware

Accessing Multiple Services on the Backbone Network



The MAX TNT allows ISPs to support a dynamic mix of access types including analog, ISDN and Frame Relay for up to 720 concurrent sessions. The MAX TNT supports 150 T1/E1 Frame Relay connections, including support for channelized DS3 WAN access.

Transport options seamlessly connect remote offices and dial-up users with backbone network services. The MAX TNT switch gives users the following options for connecting into a local or remote backbone network:

- Ethernet (AUI, 10 Base T, and 100 BaseT)
- Frame relay over V.35 serial port (up to 8 Mbps/port)
- Unchannelized T1/E1 ports with integral CSU

Multiprotocol routing and terminal server functions ensure network interoperability

Designed specifically for switching WAN connections, the MAX TNT platform supports the most widely used routing protocols for remote access. This robust support for standard protocols ensures efficient connectivity for remote users accessing corporate intranets and the Internet.

- Routing Information Protocol (RIP), RIP2, and Open Shortest Path First (OSPF) routing protocols
- TCP/IP
- Point-to-Point Protocol (PPP), Serial Line Internet Protocol (SLIP), and Compressed SLIP (CSLIP) terminal service
- Telnet
- Dynamic IP address assignment

- V.120 asynchronous rate adaption
- X.3, X.28, and X.29 packet assembler/disassembler (PAD) functionality
- VoIP support: H.323 and Internet Protocol Device Control (IPDC)

Differentiated VoIP TAOS features

- Phone-to-phone H.323 operations
- PC-to-phone and phone-to-PC
- MultiVoice solution support for high-performance H.323 V2 stack
- NavisAccess 5.0 Network Management System support
- IPDC protocol support for SS7 signaled networks
- Transparent modem-over-VoIP and real-time fax (T.38)
- Support for G.711, G.729A voice codecs
- Multiple voice services on the same system
- Programmable call flows
- Support for a variety of trunking and signaling options, including T1/E1/T3, PRI, channel associated signaling (CAS), R2, and Feature Group D
- Extensive list of more than 60 features enabling voice and fax services

Bandwidth-on-demand maximizes performance and decreases costs

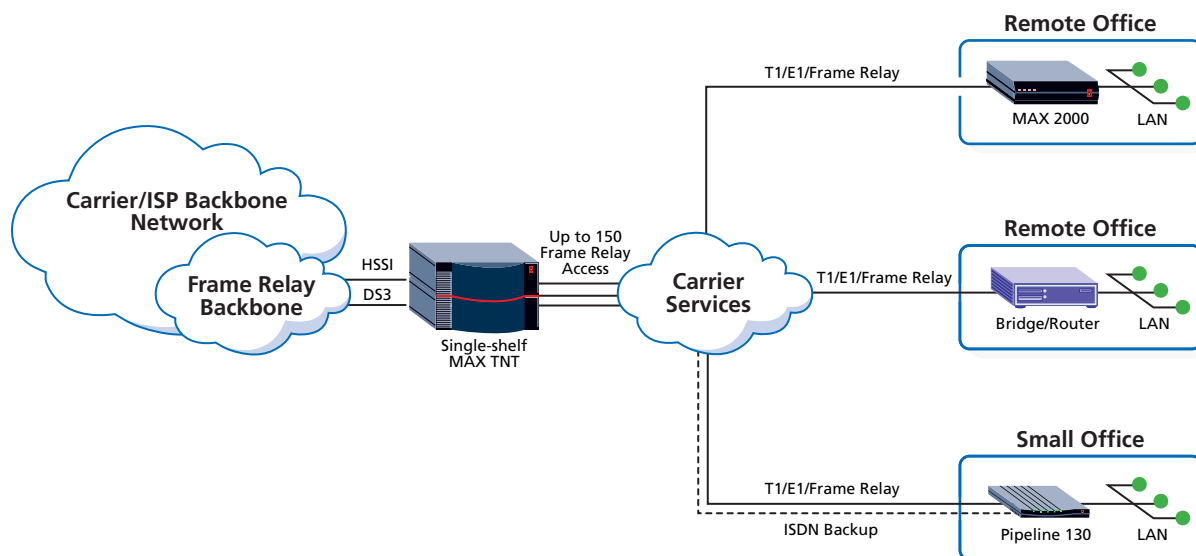
Dial-up connections are automatically set up and torn down for transparent client-server computing across the WAN. Dynamic Bandwidth Allocation™ technology aggregates multiple calls for greater bandwidth and lower costs.

- Dial-on-demand bandwidth, based on packet address
- Bandwidth increased or decreased during an active session
- 56 Kbps to 4 Mbps selectable bandwidth per call
- Bandwidth control options: manually, automatically, or by time-of-day profile
- Support for MP and MP+ protocols
- Industry-standard STAC hardware compression
- RFC 1144 TCP header compression

Comprehensive security for iron-clad remote networking

Support for standard user-authentication systems fits into service providers' current network security architectures. Networked, server-based authentication makes it easy to manage large-scale remote access applications from a central site.

Backbone Frame Relay Network Access Using FrameLine/T1/E1 Technology



The MAX TNT concentrates up to 150 T1/E1 Frame Relay access lines into a high-speed DS3 network port on the ISP's Frame Relay backbone network. Up to 4094 PVCs per port can be supported.

- PAP, CHAP, and MS-CHAP
- Lucent NavisRadius authentication, authorization, and accounting (AAA) server
- Encrypted token card security
- Callback (digital connections)
- Calling line ID (CLID)
- Password-protected terminal server access
- Transmit-and-receive packet filtering

Virtual private network VPN services for advanced network build-out

The VPN software option lets users create a logical or virtual network over a single physical network. ISPs, carriers, and large corporations use VPNs to ensure secure and private networks over a shared IP network. VPNs take advantage of the shared media to deliver lower-cost remote networking, single-network management, and network simplicity. Users can implement VPNs using one of the following technologies:

- Frame relay direct
- IP Direct
- Ascend Tunnel Management Protocol (ATMP)
- Point-to-Point Tunneling Protocol (PPTP)
- Layer-2 Tunneling Protocol (L2TP), LAC functionality

- IP Security (IPSec)
- Virtual routing (VR)
- IP-over-IP (IP-IP)

Integrated management features provide end-to-end network control

All functions of the MAX TNT remote access switch can be managed through a choice of interface, either locally or remotely, using graphical configuration software.

- SNMP MIBs
- NavisAccess network management software for extensive and complete control of all devices, components, and services.
- Password-protected Telnet remote management
- Local management via VT-100 terminal
- PPP Link Quality Monitoring (LQM)
- Annex A and Annex D (ANSI) frame relay link monitoring (LMI)
- Flash memory for easy software download
- ISDN event log and Syslog support
- Command line interface

Frame relay software

Optional frame relay software integrates incoming frame relay traffic, from Lucent Pipeline and other frame relay access devices, with analog and digital dial-in traffic.

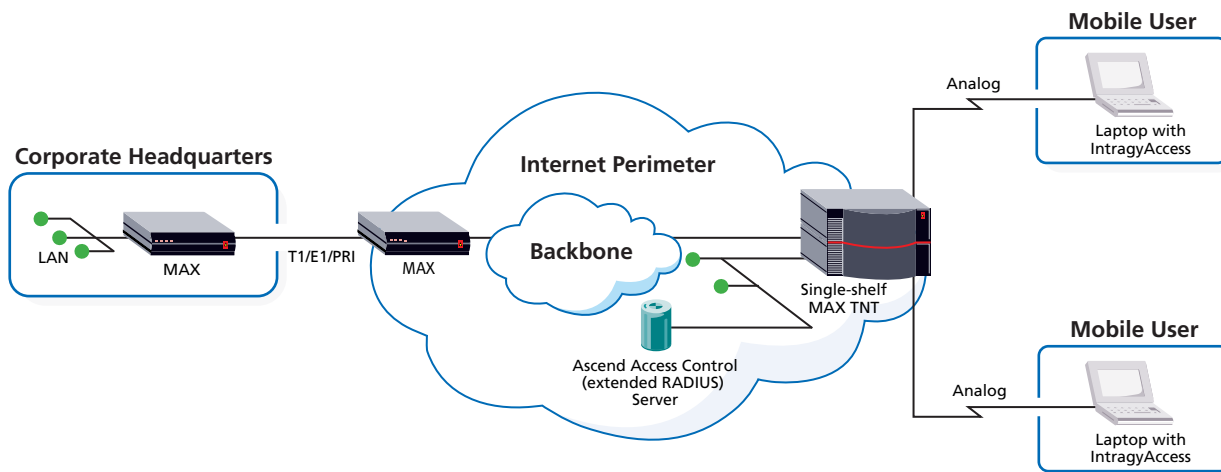
- Routing to multiple frame relay permanent virtual circuits (PVCs) over single or multiple interfaces
- Dial-in PPP-to-frame relay gateway function, with PVC selected on a per-user basis
- RFC 1490 encapsulation
- ANSI Annex D and ITU Annex A management
- PVC switching

ISDN software

Optional ISDN signaling software supports incoming ISDN signaling from Lucent Pipeline® and MAX™ products, as well as other ISDN access devices. The ISDN signaling supports ISDN connections for digital services dial-in traffic.

- PRI with integrated channel service unit (CSU) (T1/E1)
- PRI-to-T1 signaling conversion
- D4-to-extended service frame (ESF) conversion
- D-channel multiplexing
- Frame relay-over-ISDN B-channels
- X.25-over-ISDN B-channels
- CLID
- Signaling homologation in more than 30 countries worldwide

Connecting to a Corporate Backbone Using Virtual Private Networking



Mobile users create a VPN across the public backbone network to make secure connections to corporate resources.

Channelized WAN Protocol Support

Options available for most channelized WAN modules for the MAX TNT switch include both inband and out-of-band signaling sources.

Inband:

- Robbed-bit signaling, including wink-start, loop-start, ground-start, and ink-start
- R1 and R2

Out-of-band:

- ISDN PRI/PRA
- Non-facility associated signaling (NFAS) with a maximum of 20 PRIs per NFAS group, unlimited groups
- SS7-controlled networks

Hardware Solutions

The modular hardware architecture of the MAX TNT continues to scale up in density and performance to meet user demands. Today, the 16 available expansion slots can support up to 960 simultaneous digital modem (data only) calls and up to 672 simultaneous VoIP (voice and data modem) calls, in addition to high-density ISDN and 56/64 Kbps frame relay sessions. By combining new high-performance hardware capabilities into a single solution, the MAX TNT switch can maximize network capacity while reducing operations and infrastructure costs.

The 960-Port MAX TNT

The 960-Port MAX TNT platform is also offered as a 960-port system for E1 (international) configurations for data calls only (not voice). To support this configuration, a single chassis will require ten 96-port MultiDSP modules, along with egress modules now available.

- MultiDSP module: support for analog modem, ISDN, VoIP, V.110, and PHS
- Digital modem module: support for analog modem and ISDN users
- Analog modem module
- Hybrid access module: support for ISDN, switched digital, and Nx56/64K channelized frame relay
- FrameLine module: support for unchannelized T1/E1, fractional T1/E1, and E1 frame relay
- Channelized T1/E1
- Channelized DS3
- STM-0 module for Japanese market
- Ethernet module

Modular architecture ensures scalability and protects investment

Network service providers and carriers can add MultiDSP, hybrid access, and FrameLine modules to support multiple concurrent connections to a central site, carrier, or an Internet point of presence (POP). Expansion modules along with enhanced software capabilities help users build high-density, multiservice network infrastructures as well as VPNs. By adding the appropriate modules, users can install the MAX TNT platform into an existing network environment, protecting their investments in hardware and software.

96-Port MultiDSP Module

This module supports 96 remote access dial-up ports (V.90 modem and ISDN) for the MAX TNT and APX 8000 access products. It also supports the V.110 rate adaptation protocol for Global System for Mobile cellular phone users; and for users dialing in on both digital and analog lines, it supports ISDN and all the standard modem modes: V.90, K56flex, V.34, V.32bis, V.32, V.22bis, V.22, and below.

TAOS software supports multiservice (any port, any service) features on this module, including VoIP and Personal Handyphone System (PHS) support. It requires channelized T1/E1 (inband or out-of-band) or channelized T3 modules.

48-Port MultiDSP Module

This module supports 48 ports for data (V.90 modem and ISDN), VoIP V.110, and PHS. When used in Lucent VoIP gateways, MultiVoice for the APX 8000 and MAX TNT platforms, this module allows ordinary telephones to connect to other telephones using a public or private packet network. These capabilities provide an immediate and affordable way to introduce real-time voice communications to traditional IP backbone networks. It requires channelized T1/E1 or channelized T3 modules.

Hybrid Access Modules

Hybrid access provides users with integrated remote networking support for digital sessions through ISDN and frame relay. These sessions can be accessed with any network device that works with ISDN or frame relay, such as terminal adapters (TAs), frame relay access devices (FRADs), and any Pipeline or MAX product.

System Components

Item	Port Density
Single-shelf system	—
Three-shelf system	—
Redundant power supply	—
Channelized T1 module	8 ports
Unchannelized T1/E1 module	10 ports
DS3 channelized module	1 port
DS3 unchannelized module	1 port
Channelized E1 module	8 ports
Digital Modem module	48 ports
Hybrid Access module	192 channels
10 Mbps Ethernet module	4 ports
100 Mbps Ethernet module	1 port plus 4 ports
with 10 Mbps Ethernet module	
Serial WAN module	4 ports
HSSI WAN module	1 port
FrameLine module	10 ports
Frame Relay Starter Bundle	10 ports and Frame Relay software option
Analog Modem module	36 ports

WAN Interface Modules

WAN interface modules connect remote access lines from the public network into the MAX TNT switch. These modules support a dynamic mix of interfaces to optimize design for each service and tariff environment. Channelized interfaces allow high-speed multiplexed circuits to deliver many connections over a single interface while unchannelized interfaces are used for full-rate, leased-line connections. The WAN Interface modules include:

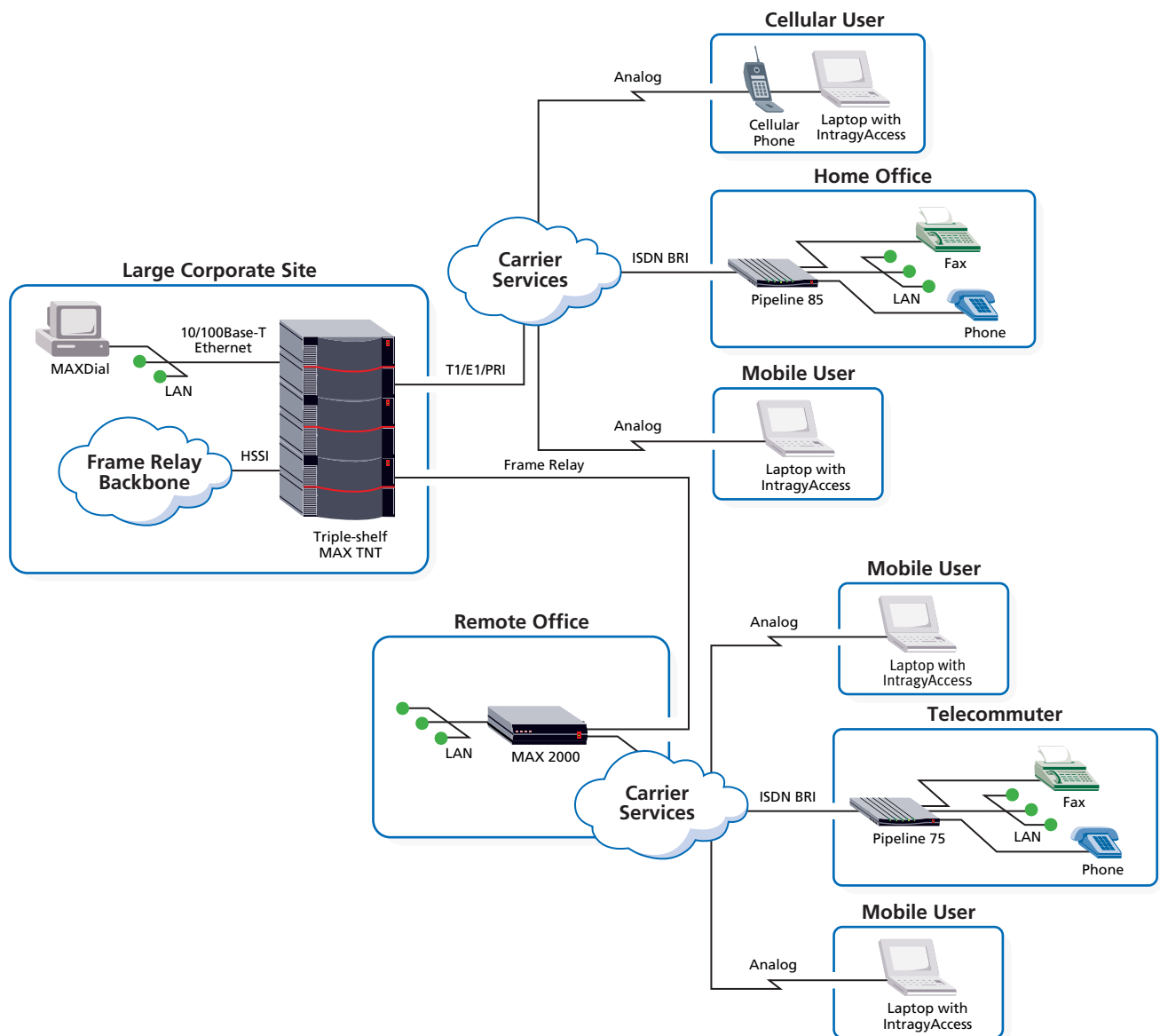
FrameLine Module

The FrameLine module supports up to 10 T1/E1 frame relay user ports—and switches them into a backbone network. Each user port features a built-in channel service unit/data service unit (CSU/DSU). One MAX TNT chassis supports up to 150 leased T1/E1 user ports.

ATM DS3 Modules

This module concentrates traffic from multiple lines and sends it directly to an ATM network, allowing carriers, competitive local exchange carriers (CLECs), and other service providers to offer end users faster access to more services without expensive hardware add-ons or lengthy software conversion. The ATM DS3 modules enable direct connection to ATM switches, providing scalability to higher WAN transmission rates. The MAX TNT, DSLTNT™, and APX 8000 platforms support these modules.

Corporate Telecommuting and Remote Access with MAXLink and MAXDial



The MAX TNT allows corporate users to connect to a single high-density platform that supports 720 remote connections and up to 150 T1/E1 Frame Relay connections. Up to 720 of the remote connections can be analog or cellular modem users.

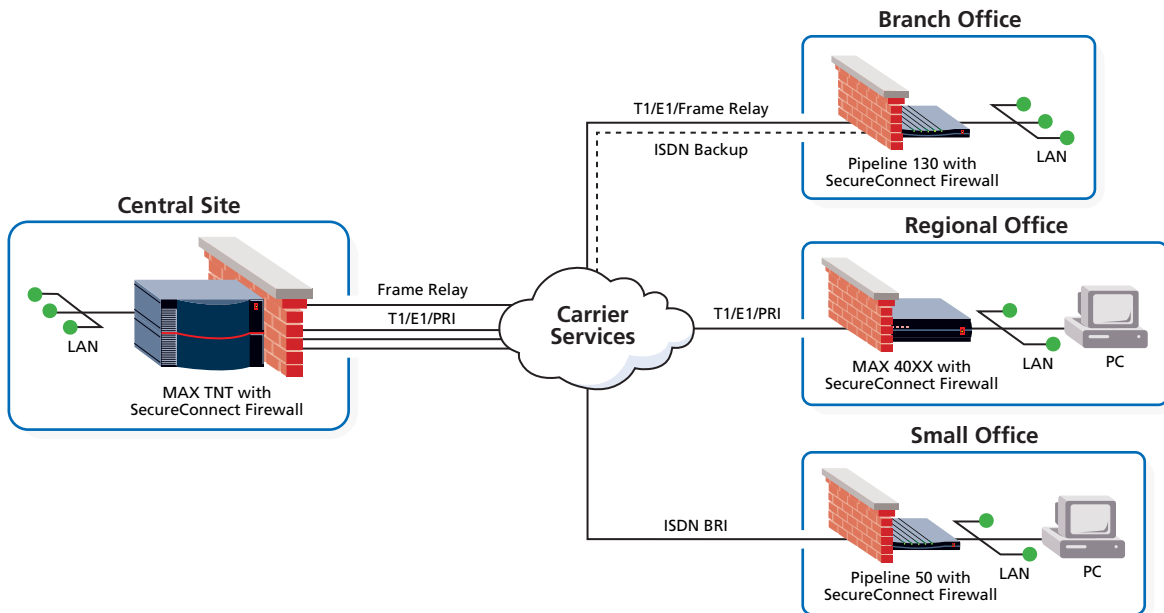
STM-0 Module for Japanese Market

Each STM-0 module has a single port that can support up to 28 virtual T1s, with up to 672 simultaneous DS0 sessions. It is specifically targeted for the Japanese market. It supports STM-0 (NRZ) frame format and VC3, TUG-2, VC-11, and Handling Group signaling.

Ethernet Interface Modules

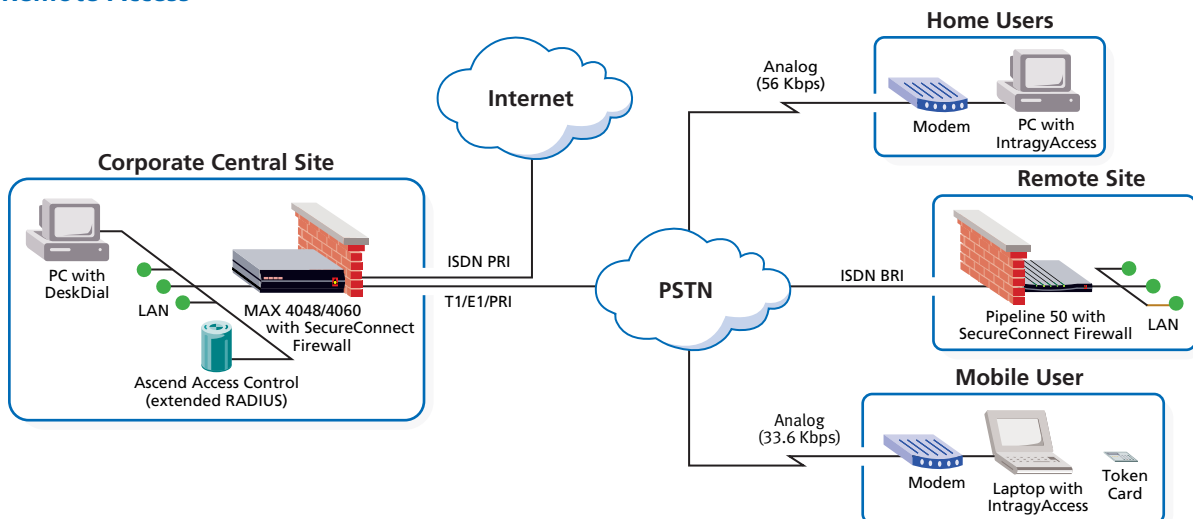
The Ethernet modules deliver high-speed remote connections into switched or routed backbone networks. They permit diverse routing, load balancing, and redundancy.

Securing Remote Locations and the Central Site with Integrated SecureConnect Firewall



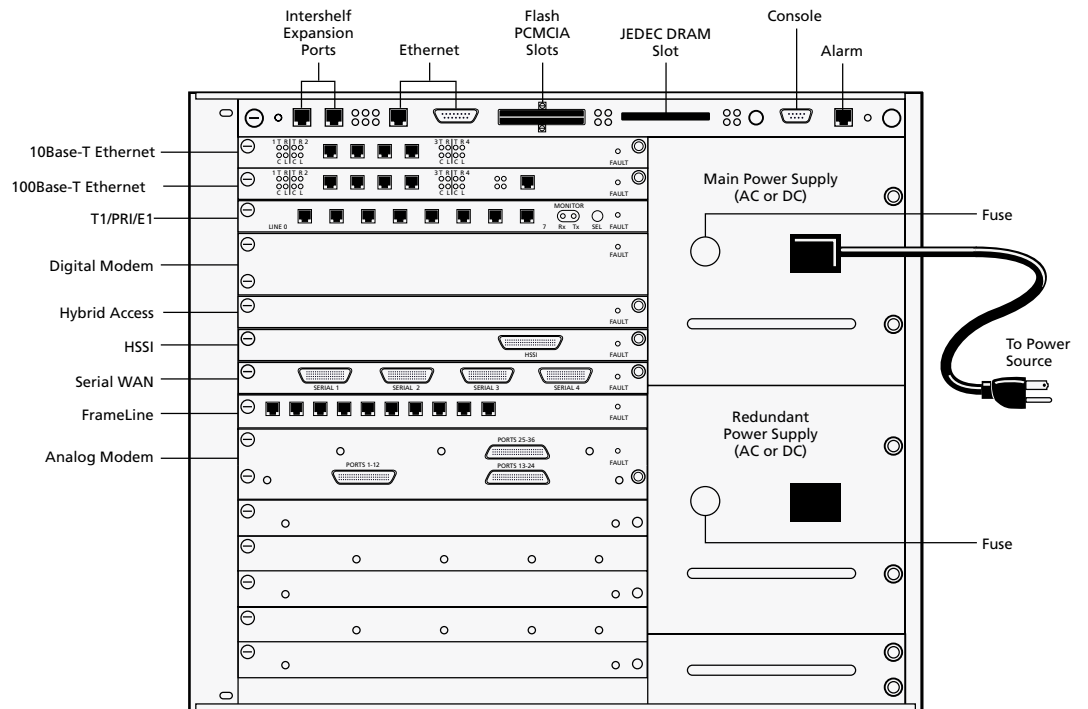
The MAX TNT, with integrated SecureConnect Firewall, delivers iron-clad security for connecting to a central site.

Corporate Remote Access



Corporations can offer remote offices and remote users SecureConnect to the corporate headquarters using the MAX 4048 and 4060 with SecureConnect Firewall.

MAX TNT Back Panel Options



Hardware Specifications

Height

14 in. x 17.4 in. x 11.5 in.
(35.6 cm x 44.2 cm x 29.2 cm)

Weight

130 lbs., with 672 modems (single power supply)
27.2 lbs. empty (no power supplies)

LAN Interface

Ethernet 10 BaseT, 100 BaseT

WAN Interfaces

DS3, T1/E1, Serial (V.35, RS449, X.21)
ATM DS3, STM-0 for Japan only

Software Upgrade

Via built-in flash RAM, remote downloadable

Power Requirements

950 watts, 47-63 Hz, 90-240 VAC,
-40 to -60 VDC

Operating Requirements

Temperature:
32-104°F (0-40°C)
Altitude:
0-14,800 ft. (0-4500 meters)
Relative Humidity:
0-90% (noncondensing)

Safety Certifications

CSA 950, NTRL/UL 1950,
TUV EN 60 950
EMI/RF
FCC Part 68, FCC Part 15, E55081-1,
N50082-1, EN55022

Software Specifications

Network Protocols Supported

TCP/IP

Routing Protocols Supported

RIP, RIP2, OSPF, IGMP multicast forwarding

LAN Protocols Supported

Ethernet 10 BaseT, 100 BaseT

WAN Protocols Supported

PPP, ARAP, SLIP, C-SLIP, Async PPP, Sync PPP, HDLC, ARA, X.25 PAD, X.25 over B-channel, V.120, D4 framing (T1/E1), G703/732 framing (R1), R2, frame relay PVC, Hybrid Access, PPP-FR gateway, FR NNI, ATM (UNI and NNI)

VoIP Protocols Supported

H.323, IPDC

Modem

V.90, K56flex, V.34, MNP5, V.42bis, fax modem send up to 14.4 Kbps

Bandwidth Management

Multilink PPP, Multilink Protocol Plus, TCP header compression, data compression Lucent /Microsoft/STAC V9)

Security

Lucent NavisRadius, PAP, CHAP, token card, CLID, packet filtering, SNMP, console management (VT-100), PPP callback, user authentication

Management

NavisAccess network management, console management software (runs on Windows 95 and Windows 3.x) Telnet, NASL, SNMP II, PPP LQM, frame relay ITU Annex A, frame relay ANSI
Annex D
Client Software
IntragyAccess software
DeskDial client software

To learn more, contact your Lucent Technologies Representative, Authorized Reseller, or Sales Agent. Or, visit our Web site. www.lucent.com

Specifications subject to change without notice.

