



Multiservice Access and Aggregation Platform

Total Access® 5000



The Evolution of Network Convergence

Combining Broadband Access and IP/Ethernet Services Delivery

Total Access 5000 At-a-Glance

- Native Ethernet core
- Ethernet, ATM, and TDM network interfaces
- TDM and Voice over IP (VoIP) POTS
- Fiber optic and copper transport built for future, current, and legacy services
- Fully redundant, carrier-class design
- Digital and metallic test access
- Multiple network management capabilities
- Supported by ADTRAN Total Access EMS
- Industry-leading warranty

Service providers are faced with optimizing their existing network infrastructure to support advanced services, enabling not only voice and simple broadband connections to the Internet, but more advanced services such as IPTV and Ethernet. Historically, wireline services have been delivered across disparate networks, each with its own infrastructure and expense. However, the maturation of industry standards related to IP is enabling the convergence of these disparate networks across a unified network architecture. Enabling this convergence can be difficult. Yet, it is clear that service providers must drive toward increased subscriber revenues through the delivery of enhanced broadband services, while simultaneously driving operational cost out of the network. This evolution requires a platform that has the capacity and scalability for advanced services, while also providing a seamless migration path for existing legacy services.

ADTRAN® Total Access® 5000 is designed to help service providers bridge the gap between the existing and the next-generation network. It is a carrier-class multi-service access and aggregation platform that supports both legacy and emerging service interfaces over copper and fiber, which can be easily scaled to support even the most bandwidth-intensive applications. Unlike traditional ATM- and SONET-based platforms, which require enormous overhead and expensive add-ons to deliver emerging services, the Total Access 5000 is built around a pure Ethernet core. All incoming services, regardless of protocol, are handled as Ethernet, creating a native service

delivery model for advanced services without stranding existing legacy services. This allows the Total Access 5000 to economically address multiple network applications with traditional network interfaces for TDM and ATM services. It also addresses advanced capabilities like Ethernet Ring Protection Switching, Resilient Packet Ring, VDSL2, Gigabit Passive Optical Network (GPON), and Active Ethernet.

Environmentally hardened, the Total Access 5000 is designed with the service provider in mind and is equally capable of deployment in central office, remote terminal or remote node locations. Instead of a traditional fixed backplane architecture, the Total Access 5000 provides a truly scalable architecture that is designed to migrate with the network, providing flexible copper and fiber termination options based on network applications. With the simple change of a "I/O module," equipment obsolescence can be avoided and network investments protected with a platform physically capable of scaling to meet the network evolution, not only today—but also tomorrow.



The ADTRAN Total Access 5000

- Increases Revenue
- Decreases Operational Cost
- Improves Efficiency

ADTRAN's customers rely on our ability to address operational challenges associated with business-class service delivery and to utilize existing assets, including equipment, OSS, technician expertise, and established processes and procedures.

Simplifying OSS Integration

Traditional network management has been based on hardware management, either through direct interaction between the Network Element (NE) and the OSS or through an Element Management System (EMS). This approach is well understood, especially in terms of its difficulties in OSS integration costs and complexities.

Reducing Operating Expense

Delivering a robust Carrier Ethernet solution that is easy to manage and troubleshoot is feasible with ADTRAN's Total Access Element Management System (EMS). The EMS provides for efficient and automated operation while reducing operation expenses (OPEX). This SNMP management system is an all-Java application that provides configuration, performance, network assurance, and provisioning functions for ADTRAN's Total Access systems. Total Access EMS is based on the Telecommunications Management Network (TMN) architecture that features open systems and a hardened infrastructure to support high-performance, large-application solutions.

ADTRAN has developed an alternative approach that focuses on service management rather than hardware management. The Advanced Operational Environment, or AOE, provides an abstraction layer between service management and hardware management functions, simplifying OSS integration and maintenance. AOE also provides for the interpretation of data and information through our Decision Support System, or DSS, reducing vast amounts of data to a few simplified and actionable recommendations or insights. Web 2.0-based interfaces provide secure Internet access to specialized tools designed to improve operational efficiencies, such as ServiceCheck, a diagnostic application that provides complete service visibility and analysis with the click of a button. ServiceCheck is one of many functions and services operating within the AOE framework, an environment that ensures sustainability and scalability for the long term.



With the click of a button, easily provision and troubleshoot the network with integrated dashboard functionality.

Operational Enhancement

- Web-based, iPhone® app friendly
- Service and subscriber-oriented; technology and hardware agnostic
- Incorporates logic system to reduce voluminous element and network data to a few actionable results and recommendations
- Reduces test time, coordination, and analysis to a few minutes

Broadband Access

Fiber—The Ultimate Broadband Solution

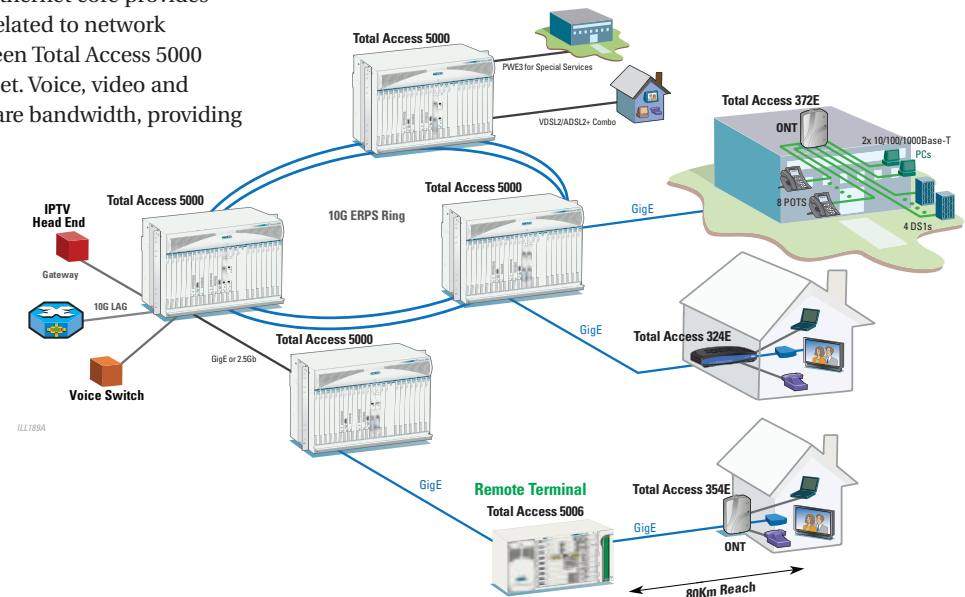
The Total Access 5000 supports broadband service delivery over both copper and fiber architectures. As a copper access platform, the Total Access 5000 can be used for IP or ATM DSLAM applications, as well as for Broadband Loop Carrier applications, facilitating the delivery of both POTS and DSL from central office, remote terminal and remote node locations. Its cost-effective Ethernet architecture allows service providers to deploy 100 percent voice and broadband-capable systems, helping to reduce or eliminate operational expenses, such as truckrolls and circuit reprovisioning.

The Total Access 5000 IP/Ethernet core provides carriers significant benefits related to network convergence. All traffic between Total Access 5000 shelves is carried over Ethernet. Voice, video and data services dynamically share bandwidth, providing

converged packet transport between Total Access 5000 nodes and allowing efficient utilization of the physical transport infrastructure. Integrated Ethernet transport options include support for linear chain, tree and star network architectures over both copper and fiber, as well as standards-compliant protected Ethernet rings over fiber. By enabling this convergence, the traditional barriers associated with multi-service platforms (like separate and dedicated bandwidth for POTS, video and data) are eliminated, providing a more flexible and scalable transport architecture for existing and advanced services.

ADTRAN Solutions for Broadband Access

ADTRAN is an established leader in broadband access. From our contributions in the development of industry standards to our superior customer service and product quality, ADTRAN has always delivered system solutions with flexibility and longevity. Whether it is consumer-market Internet access and HDTV or business-class Ethernet service delivery – there is an ADTRAN system to support your network needs with the value you have come to expect.

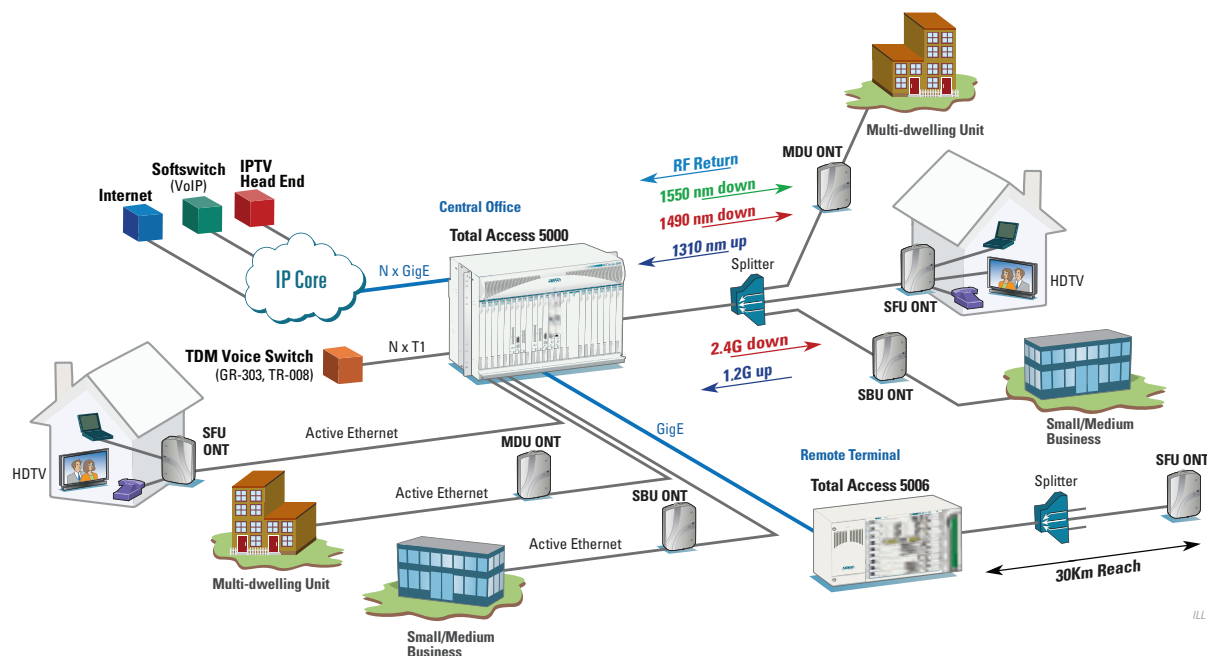


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Fiber To The Premises (FTTP)

As application bandwidths require the migration to fiber infrastructure, the Total Access 5000 provides the flexibility of both 2.5 Gbps GPON and 1 Gbps Active Ethernet access technologies. With a full line of GPON and Active Ethernet Optical Network Terminals (ONTs), ADTRAN's FTTP solutions offer options to meet deployment needs, ranging from single-family residential and multi-dwelling residential to small and medium business customers. ADTRAN's Total Access 5000 multi-service access and aggregation platform enables voice, video and data service delivery over an all-Ethernet access platform capable of delivering FSAN-compliant GPON and Active Ethernet. OLT Modules can be installed in any access slot in the Total Access 5000, enabling FTTP service delivery. GPON services are delivered over a single fiber, up to 30 km, from a central office or remote terminal, providing 2.5 Gbps of bandwidth over the PON. ADTRAN GPON OLT is completely ITU-T G.984 standards-compliant and offers unprecedented bandwidth per subscriber. Active Ethernet services are delivered over single or dual fibers, up to 80 km, from a central office or remote terminal, providing 1 Gbps of bandwidth.

The Total Access Series ONTs work seamlessly with ADTRAN Total Access 5000 Series multi-service access and aggregation platform. With its Ethernet architecture, the Total Access 5000 allows carriers to increase bandwidth while offering differentiated capabilities. Coupled with the Total Access Series ONTs, this provides an end-to-end FTTP deployment strategy that is supported by a common management solution.



- Voice support for GR-303, TR-008, MGCP, and SIP
- Flexible FTTP deployment options
- N x GigE and 10GigE uplink options available
- Full range of ONT solutions are available for business, multi-dwelling, and residential needs
- Deploy copper and fiber access solutions from a single platform

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Broadband Access

Broadband and Triple-Play without FTTP Expense

Wireline carriers are faced with the difficult challenge of transforming their existing networks to provide next-generation services, enabling not only voice and simple broadband connections to the Internet, but newer services like IPTV. The dynamics of these new services are constantly evolving, making it difficult to identify the right network architecture. Although fiber access technologies may provide the ultimate solution for addressing consumer access bandwidth, especially in greenfield deployments, the fact remains that there is a massive embedded base of copper access infrastructure. Technological advances, including VDSL2 and bonded ADSL2+, are enabling ultra-broadband speeds over copper, provided that loop lengths are reduced. ADTRAN's innovative Fiber to the Node (FTTN) broadband access systems dramatically lower the total cost of deployment in a FTTN architecture.

The Total Access 5000 is ideally suited to support Gigabit Ethernet aggregation for FTTN architectures, from either central office or remote terminal locations. As carriers work to shorten copper loop lengths to deploy higher bandwidth services, innovative platforms like the ADTRAN Total Access 1100 Series OSP DSLAMs and Total Access 1200 Series Mini-DSLAMs will enable that deep fiber push. The Total Access 5000 integrated broadband access and Gigabit Ethernet aggregation capabilities provide carriers with a single platform that enables both service delivery and service aggregation, reducing both capital and operational expense.

Migration of the Voice Network

Perhaps as important as the need to drive new revenues through enhanced broadband services, carriers are also faced with having to optimize their networks to drive out cost. The Total Access 5000 allows service providers to optimize their existing voice networks by providing flexible voice options. All voice traffic on the Total Access 5000 is packetized directly on the line cards, allowing service providers to tie into existing TDM voice networks via an integrated packet voice gateway or tie into a softswitch for VoIP-based POTS.

As providers look beyond wireline convergence and begin to move toward a next-generation network architecture, the Total Access 5000 will support a native SIP interface. This allows carriers to deploy the Total Access 5000 into their existing legacy voice infrastructure today with a seamless migration path to a future VoIP core. This SIP interface capability will be critical as carriers move to support an IP Multimedia Subsystems (IMS) network architecture.

In addition, the Total Access 5000 plays host to the Total Access 1124P, which is a small form factor outside-plant DSLAM that can be installed virtually anywhere, allowing the service provider to shorten loops and increase broadband speeds and services. The Total Access 5000 provides the gateway that connects the Total Access 1124P to a TDM voice switch. The Total Access 1124P may also be configured to use native SIP and communicate directly to a softswitch. Together, the Total Access 5000 and Total Access 1124P provide the ability to cost-effectively migrate networks to next-generation integrated broadband services, increase revenue and decrease overall service cost.

ADTRAN is the world leader in outside plant DSL deployments.

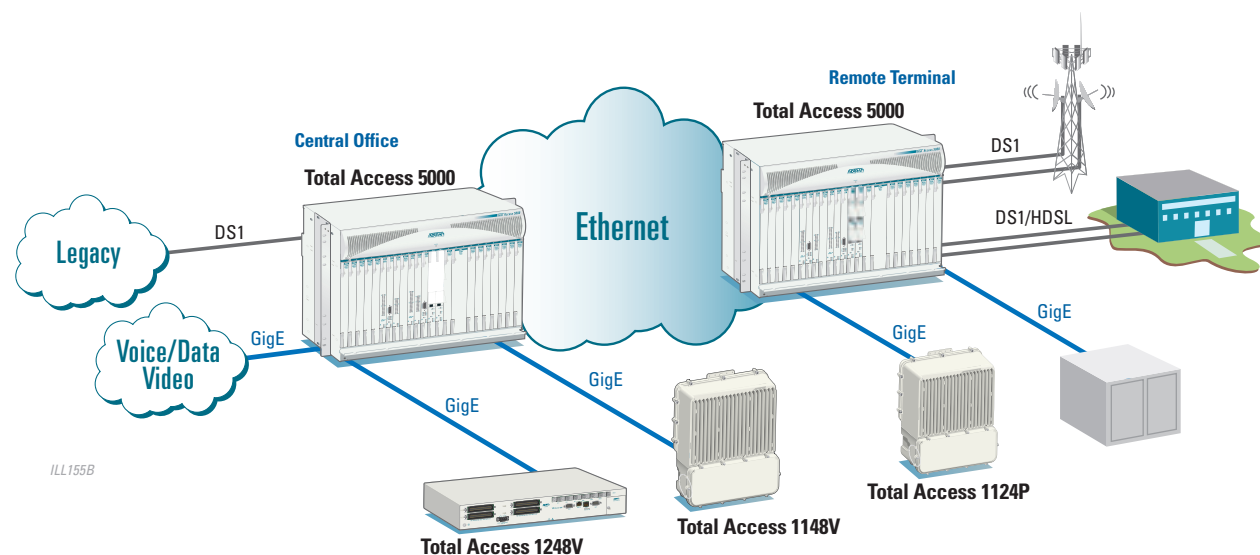
Deploying fiber deeper in the network, while leveraging existing copper infrastructure, is a cost-effective strategy to boost subscriber bandwidth. ADTRAN's outside plant FTTN portfolio is field-proven, easy to deploy and reduces the investment required to support ultra-broadband services.

ADTRAN is an established leader in broadband access. From our contribution in the development of industry standards to our superior customer service and product quality, ADTRAN has always delivered system solutions with flexibility and longevity.

Changing the Broadband Business Case

As service providers continue to address the deployment of triple-play services, ADTRAN FTTN solutions will play a key role in shortening copper loops to enable their delivery. The flexibility and innovative design of these systems allows service providers to use them to economically address both legacy and next-generation services, while providing a migration path toward a converged network architecture.

- Aggregation of networked products like the Total Access 1124P provides the ability to have an integrated POTS and broadband solution that gets closer to the customer to increase speed and service potential
- Enables wireline carriers to cost-effectively reduce loop lengths in order to maximize the performance of VDSL and ADSL2+ access technologies
- The advantage of the Total Access 1248V is its ability to be deployed inside a cabinet or hut and deliver 48 VDSL2 ports
- The Total Access 1148V provides 48 VDSL2 ports and can be mounted virtually anywhere—on a pole, in a pedestal, or on the side of a cabinet



ADTRAN's Total Access 5000 enables service providers to migrate from legacy infrastructure to a next-generation network and immediately roll out revenue-generating services to their customer base of business and residential customers.

Broadband Access

Extending the Life of Existing ATM DSL Networks

As service providers position to deploy new rapid-growth services, such as metro Ethernet access and triple-play broadband services, they are faced with the challenge of building out a network to support new services without affecting revenue-generating legacy services. Some providers opt to cap legacy end-customer ATM services. Some providers opt to deploy parallel networks, bearing significant cost to maintain both. The Total Access 5000 provides the option to transition to an IP/Ethernet infrastructure without the wholesale capping of ATM services or the expense of parallel networks. The migration to an all IP/Ethernet network allows service providers to realize significant cost savings by leveraging lower-cost standardized interfaces.

Migration of ATM DSL to Ethernet

The Total Access 5000 has the ability to help maximize the lifecycle of an existing carrier ATM DSLAM base by providing a simplified migration path to a next-generation IP/Ethernet core infrastructure. In a traditional high-speed Internet infrastructure, DSL services are provided via ATM-based DSLAMs. This traditional network architecture transports subscriber traffic around the network via an ATM-switched infrastructure. One of the challenges to migrating to a next-generation IP/Ethernet core is the large embedded base of ATM DSLAMs that terminate subscriber traffic in the existing network.

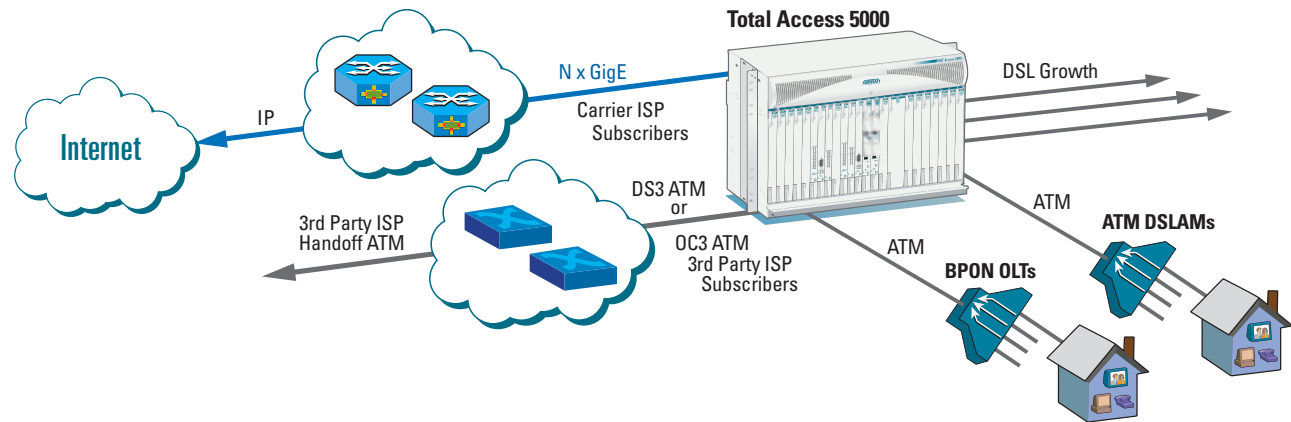
The Total Access 5000 allows the ubiquitous migration of existing ATM DSL traffic (regardless of vendor) via integrated ATM line modules. Incoming traffic from ATM DSLAMs can be groomed at the virtual circuit level, allowing traffic to be interworked to Ethernet for delivery to the new IP/Ethernet core or simply switched upstream as intact ATM cells. This ubiquitous migration to an Ethernet core network can be done without impacting any of the existing ATM DSLAMs, greatly reducing the operational and capital expenses associated with delivering high-speed Internet services.

The integrated broadband access and Gigabit Ethernet aggregation capabilities of the Total Access 5000 provide carriers with a single platform that enables both service delivery and service aggregation, reducing both capital and operational expenses.

Evolving the ATM Network

ADTRAN Total Access 5000/5006 is the key to solving the puzzle of ATM to Ethernet migration for residential services. Along with the ability to aggregate ATM DS3, OC-3 and T1 IMA in a pure ATM application, the Total Access 5000 provides the ability to interwork incoming ATM traffic from existing ATM DSLAMs and switch it to an Ethernet network via N x GigE interfaces.

- Maximize product lifecycle of existing legacy ATM DSLAMs
 - ◆ leverage already-installed base
 - ◆ maximize return on investment
- Provide ubiquitous migration strategy to next-generation IP/Ethernet core
 - ◆ same for all vendors — DSL or BPON
 - ◆ low impact to existing network
- Edge aggregation and interworking
 - ◆ minimize impact on existing inter-office transport
 - ◆ allow higher-speed service offerings



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IP/Ethernet Services Delivery

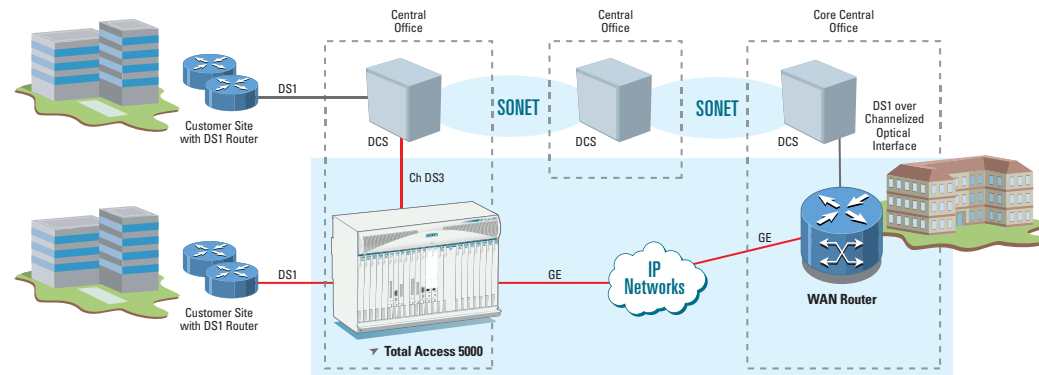
Lowering the Cost to Deploy Business Services

In an effort to reduce the operational costs related to multiple access methods and to manage legacy infrastructure costs while preserving CPE investment, service providers have proliferated the CO and remote co-locations with protocol interworking equipment. This equipment increases network complexity and poses a growing operational expense due to the multiple platforms and processes required to roll out and migrate services from TDM to IP. Providers that choose to leverage centralized protocol termination incur high transport costs to backhaul legacy services via SONET/TDM core for termination on expensive TDM interfaces on core switch/routing equipment. ADTRAN's Total Access 5000 allows consolidation to an all-Ethernet backhaul architecture, while providing access options to meet a provider's service portfolio.

The demand for legacy business services continues, with strong growth for IP circuits. As operators shift core infrastructure to Ethernet, the Total Access 5000 is an ideal solution to optimize operational costs while maintaining existing deployment of legacy customer premise equipment.

Legacy Business Service Migration

The Total Access 5000 provides legacy business service migration to increase the service provider's Return on Investment (ROI) and add service flexibility when migrating from a TDM-based network to Ethernet-based networks. In a traditional TDM network, service providers use TDM transport to get to the edge of a network where they pull off PPP, Multi-Link PPP or Frame Relay T1s and provide them directly to business customers. TDM transport requires nailed-up bandwidth, whether it is being used or not, which causes these transport networks to be inefficient. In addition, TDM transport generally requires more capital than Ethernet networks. The Total Access 5000 allows the service provider to aggregate PPP, MLPPP and Frame Relay services at the edge and interwork this traffic to Ethernet to allow for efficient, cost-effective transport. In addition, Carrier Ethernet services can be delivered from the same Total Access 5000, enabling unrivaled flexibility.

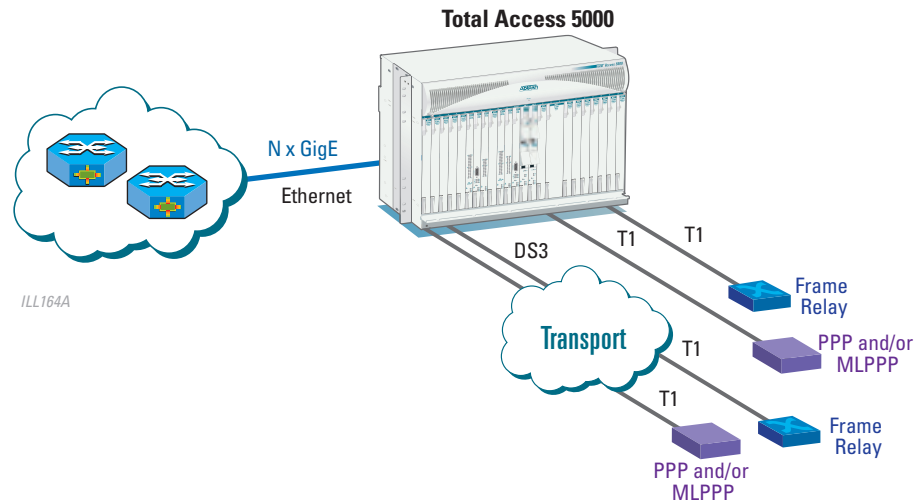


This robust packet network architecture allows service providers to use the Total Access 5000 to economically address both legacy and next-generation services while providing a seamless migration path toward a converged network architecture.

Effectively Migrating Legacy Services to Ethernet

As carriers increasingly migrate to an all-Ethernet/IP infrastructure, they often turn to expensive multi-service edge routers to provide service to legacy-based business service solutions. There are alternatives to this solution for serving TDM-based networks. ADTRAN's Total Access 5000/5006 suite of business service migration equipment serves as a pivotal component of an effective migration strategy, moving protocol termination to the access edge and effectively utilizing core infrastructure build out.

- A ubiquitous migration strategy to the IP/Ethernet core
 - ◆ Low impact to existing network
 - ◆ Improve efficiency of Ethernet interface utilization
- Edge protocol termination and internetworking
 - ◆ Consolidate inter-office transport
 - ◆ Leverage installed base of CPE



Carrier Ethernet over TDM and Ethernet over Copper allows service providers to deliver services to any business that is serviced by TDM and DSL services today.

IP/Ethernet Services Delivery Enabling Ethernet to Every Customer

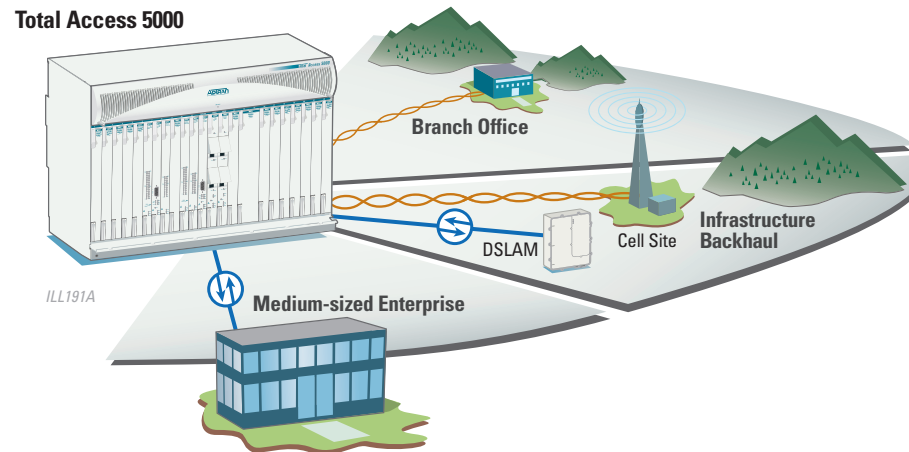
Carrier Ethernet, designed to scale and span a world-wide reach, offers service providers a variety of ways to deploy a ubiquitous network. Extending the reach of the local area network, this readily available solution is easily implemented over the existing TDM, fiber optics and copper infrastructure.

This solution is ideal for providing broadband services to campus deployments or enabling ubiquitous, secure access to a medical network. The inherent quality of service and easy integration of Carrier Ethernet to an all-IP network enable customer confidence in secure, performance-enhanced transmission of mission-critical data.

Enhancing Existing Networks

The central component of the ADTRAN Carrier Ethernet solution is at the core of the product suite, the Total Access 5000. The Total Access 5000 acts as an Ethernet aggregator that can deliver Carrier Ethernet services over Active Ethernet (such as EoF), bonded service rate copper loops (including e.SHDSL, ADSL2+, or VDSL2) or bonded extended reach leased line access (such as Carrier Ethernet over TDM (EoTDM)) while, at the same time, aggregating legacy TDM and ATM interfaces. EoTDM delivery over leased line can be accomplished via ultra-efficient Ethernet in the First Mile (EFM) over T1 or E1.

MEF



Carrier Ethernet is not just about adding flexible bandwidth—it is about executing on new IT strategies:

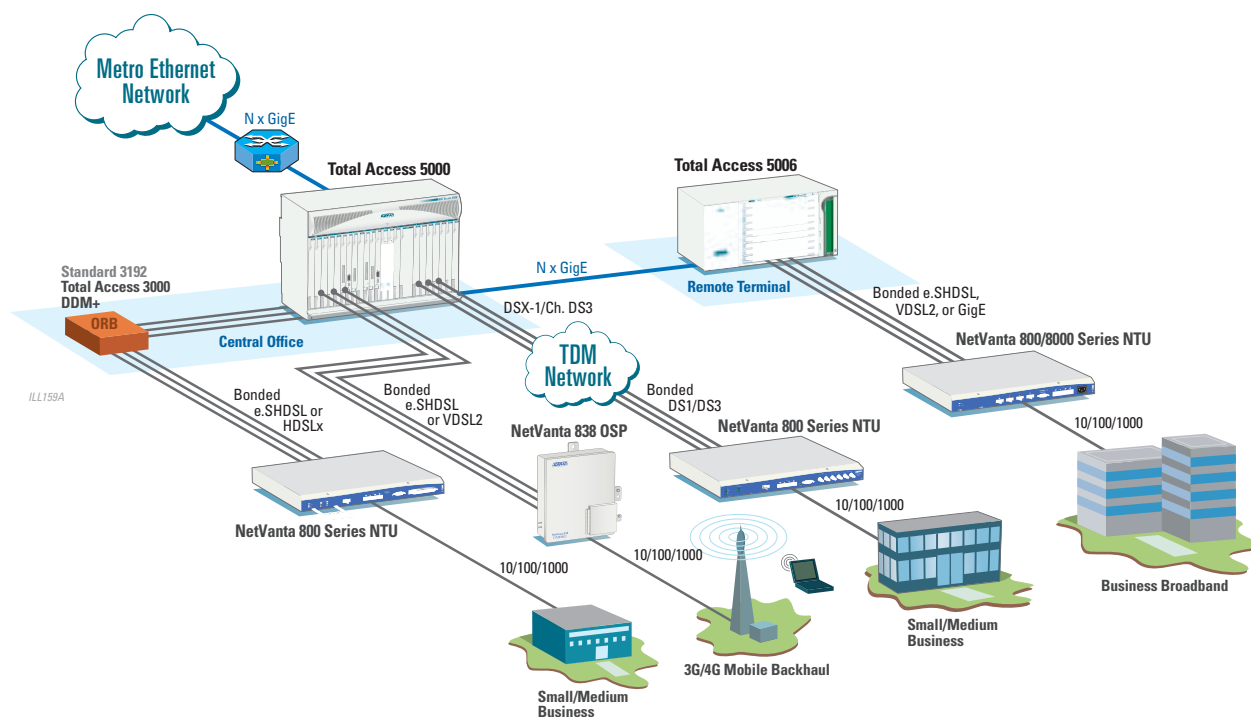
- Mission-critical/Real-time Services
- Data Center/ Server Consolidation
- Remote Access/LAN Extension
- Video & Web Conferencing/Tele-learning
- Business Continuity/Disaster Recovery
- Mobile Backhaul

Universal Ethernet Service Delivery

Single Platform, Common OAM&P, Full Coverage

The Total Access 5000/5006 Carrier Ethernet Access Platforms and the NetVanta 800/8000 family of intelligent Network Termination Units (NTU) allow service providers the ability to address a larger market by utilizing existing copper business services infrastructure to deliver Carrier or Metro Ethernet services. ADTRAN simplifies the delivery of Ethernet service by providing the same customer and operations look and feel, regardless of whether fiber, copper or TDM is used to access the customer premises.

- Increased addressable market for Ethernet services by using existing copper access
- Assured service quality through the separation and protection of critical voice and data circuits
- Reduced Total Cost of Ownership (TCO) by using a single, centralized service delivery platform
- Streamlined sales cycles; faster time to launch new services
- Simplified Ethernet installation and upgrade via common maintenance and trouble-shooting processes



Total Access 1100 Series FTTN

Enables wireline carriers to cost-effectively reduce loop lengths in order to maximize the performance of VDSL2 and ADSL2+ access technologies.



NetVanta 818 and NetVanta 873

Used for EoTDM network termination, bonding together DS1 or E1 and DS3 circuits, respectively.



NetVanta 832 and NetVanta 838

Used for EoCu network termination, bonding together up to two or eight e.SHDSL pair respectively (four-pair option also available).



NetVanta 832T, NetVanta 834T and NetVanta 838T Cost-effective EoCu network termination, bonding together up to two, four or eight e.SHDSL pair respectively. AC local powered.



A Leading Global Provider of Networking and Communications Equipment

The ADTRAN Advantage

ADTRAN, Inc. is a leading global provider of networking and communications equipment, with industry-leading warranties and services for a portfolio of over 1,700 solutions. With products for both Carrier and enterprise markets, ADTRAN is uniquely positioned to provide complete end-to-end solutions that produce the greatest network efficiency and lowest possible costs. ADTRAN products are made available through a network of domestic and international value added resellers and distributors.

ADTRAN's Carrier-class solution and service offerings are present in many segments of the global telecommunications industry, and, specifically, in the areas of Ethernet and Internet Protocol (IP) based networks. Service providers use ADTRAN equipment to connect central offices or remote terminals directly to the subscriber's terminating equipment. ADTRAN's Carrier Networks Division offers a broad portfolio of products including Broadband access platforms, FTTN sealed OSP DSLAMs, ATM/TDM aggregation equipment, fibre access platforms, fibre add/drop multiplexers, M13/STS-1 multiplexers, SHDSL and ADSL technologies, and narrowband access platforms.



ADTRAN Total Access 5000 Cabinet Solutions Available



NetVanta 8044

Ethernet over Fiber Termination with four 10/100/1000Base-T as well as four Gigabit interfaces via SFPs.



NetVanta 8044M

Unique Modular Ethernet over Fiber Network termination allowing service providers to provide Ethernet and TDM services over Fiber and other alternative access methods such as EoCu and GPON.



ADTRAN solutions extend LAN applications, voice, video, data, and Internet access across an all-Ethernet, end-to-end network.

NetVanta 6330 Series

IP Business Gateways offer SHDSL, T1 EFM and Ethernet connectivity options, while supporting VoIP, routing, firewall, VPN and TDM voice services.



NetVanta 6310

Modular IP Business Gateway with integrated Ethernet, PRI/PRA—T1/E1 ports as well as SHDSL, T1, and analog connectivity options.



Carrier Ethernet Routers

Modular Access Routers for 20-100 Mbps of Carrier Ethernet with integrated router, firewall and VPN capabilities.



End-to-end Connectivity

Extending services to the desktop allows providers to deploy ADTRAN solutions for their broadband, Carrier Ethernet, wireless, and internetworking needs.

