Alcatel-Lucent 1511 MAX

Transforming Business-Critical Communications

Alcatel·Lucent

As the cornerstone of Alcatel-Lucent's industry-leading 1500 series of business access products, the Alcatel-Lucent 1511 Media Access Cross-Connect (MAX) is redefining the business-critical landscape in both the telecom, as well as in the industry and public sector. Not only does it assure business continuity for segments as diverse as oil and gas, and defense and security, the Alcatel-Lucent 1511 MAX also serves as a cost-effective, future-safe solution for fixed and mobile service providers with leased line and grooming applications, respectively.

New world – New requirements

For most enterprises, just a few seconds of network downtime can seriously impact the bottom line and, just as importantly, security and safety. That's why keeping networks up and running is a basic requirement for conducting business successfully. However, meeting this challenge in the next few years could pose a very difficult challenge as an unprecedented strain will soon be placed on mission-critical infrastructures.

For example, by 2010, air passenger traffic is projected to climb to 2.3 billion — up 44 percent. That means airport operators will need to enhance their existing infrastructure in order to avoid any potential downtime. Indeed, compromising the network when lives are at stake simply isn't an option.

Similarly, energy consumption is expected to rise 65 percent by 2010. For energy producers, handling this demand will require a more robust, durable and efficient infrastructure — one that enables better production controls, continuous monitoring, and built-in redundancy.

Then there's the issue of homeland security. Today's governments need to protect themselves with enhanced surveillance not only along their borders but also in their cities. To do this effectively, what's needed is a world-class platform capable of providing always-on, real-time communications.

With the advent of growing data services transformation, the networking approach is undergoing significant change. Telecom operators providing either fixed or mobile services will need a solution that allows them to move forward with a next-generation infrastructure, while ensuring that they retain all the features and customers from their legacy services.

The Alcatel-Lucent 1511 MAX meets all of these challenges with top-notch efficiency, while mitigating risk with significant reductions in OPEX and CAPEX.

Capitalizing on the Alcatel-Lucent 1511 MAX

End-to-end solution

For new-world, business-critical challenges, Alcatel-Lucent delivers an end-to-end business-critical solution with optical SDH/WDM and IP/MPLS technology for the transport backbone, wireless SDH/PDH/Packet radio technology for the backbone and spurs, and TDM and Ethernet technology for the access network. As the business-critical component of the access network, the 1511 IP mux combines the key functionalities of a time-division access multiplexer and a digital cross-connect with Synchronous Transfer Mode (SDH) and Fast Ethernet functionality in a single system.

Consolidated platform

By integrating these key functionalities, the Alcatel-Lucent 1511 MAX delivers a significant increase in space and power efficiency, capacity and carrier-grade redundancy. With the consolidated platform, network and operational complexity are also reduced, thus lowering CAPEX and OPEX. What's more, as an integrated unit, the 1511 can be cost-effectively and easily deployed in buildings and cabinets.

Diverse traffic types

The Alcatel-Lucent 1511 MAX also provides the necessary cross-connections, transport cards and tributary interfaces for any leased- or private-line network offering services at sub-rates, Nx64 kb/s, 2 Mb/s and Ethernet per subscriber connection. With a wide choice of tributaries including analog 2/4 wire E&M, FXO/FXS, local battery, co-and contra-directional 64 kb/s G.703, low-speed data, high-speed data and IEEE C37.94 teleprotection, utilities and vertical industries are able to support essential mission-critical applications.

Legacy and IP services

The Alcatel-Lucent 1511 MAX also enables fixed and wireless operators to support legacy TDM-based services while migrating their networks toward new IP and Ethernet technologies. That means, with the 1511's broad support of a wide range of old and new interfaces, operators can continue to reap revenue from legacy services such as analog and digital leased lines, while being able to support higher-revenue, IP-based services. Having this option is particularly important now, as voice-related ARPU continues to slide.

State-of-the-art management options

For flexibility and ease of use, a variety of management options are also available to manage the Alcatel-Lucent 1511 MAX. The options reflect the latest developments in SNMP-, XML- and HTML-based technologies. One such option is the Alcatel-Lucent 1511 Element Manager (EM), which provides element management for the 1511 MAX in a centralized, cost-effective and user friendly way. The 1511 EM comprises a dedicated software platform from which several operators can simultaneously manage network elements. The 1511 EM can optionally be extended with the Alcatel-Lucent 1511 Network Manager (NM) for end-to-end network management.

Figure 1: The Alcatel-Lucent 1511 MAX Value Flow

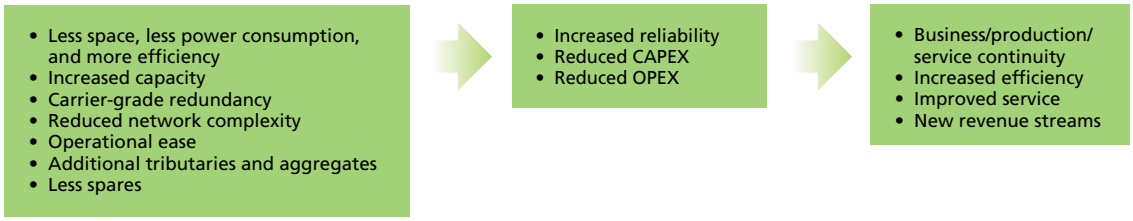


Figure 2: Alcatel-Lucent 1511 MAX – 19-slot version

The Alcatel-Lucent 1511 MAX at work

As a member of the Alcatel-Lucent 1500 series multiservice access portfolio, the Alcatel-Lucent 1511 MAX supports a wide range of applications in both enterprise and service provider networks.

Meeting the challenges of enterprise networks

In private enterprise networks, the Alcatel-Lucent 1511 MAX addresses the business-critical requirements for high reliability and proven technology of a broad range of vertical market segments. Some of these segments include transport, energy, defense and security, digital television and radio broadcasting, as well as government.

Depending upon the requirements of a particular segment, one or more of the following applications is capable of being supported by the Alcatel-Lucent 1511 MAX:

- Teleprotection
- Telemetry and telecontrol
- Supervisory control and data acquisition (SCADA)
- Ethernet-based supervisory control and data acquisition (eSCADA)
- Video surveillance
- Public information display and address systems, and
- Operational telephony and emergency call points.

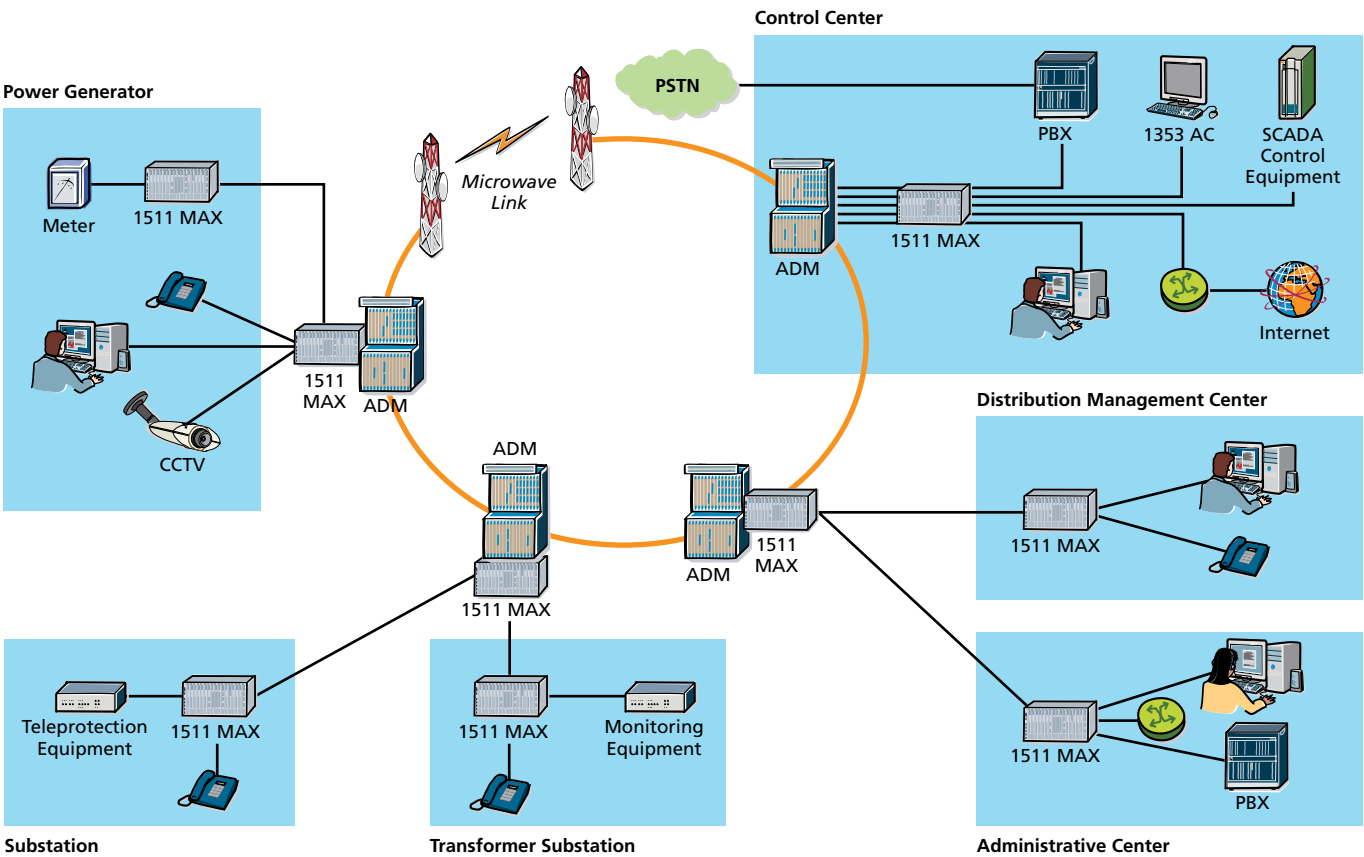
The illustration below describes in some detail a typical application employing the Alcatel-Lucent 1511 MAX in a power utility.

Energy – Power Utility

Utility companies are uniquely positioned to leverage their established rights-of-way (ROW) to accommodate their enterprise network requirements. A key application that addresses the requirements of a utility network and which uses the Alcatel-Lucent 1511 MAX is the digital transmission backbone application depicted in Figure 3.

This type of application is common in utility networks where voice and data circuits from various locations are inserted and dropped along the route. Figure 3 depicts a typical utility network where connectivity between a central site and numerous remote sites is required. Common requirements include voice services, data terminal-to-server connections, telemetry monitoring, teleprotection switching and eSCADA telecontrol. As an access multiplexer, the Alcatel-Lucent 1511 MAX provides access for these applications via the different voice, low/high-speed data and Ethernet tributary interfaces. And, in the power utility operations control center, the 1511 also grooms 64 kb/s timeslots (TS's) from any E1 (input) to any E1 or STM-1 (output). The Alcatel-Lucent 1511 MAX is equally able to broadcast a 64 kb/s TS of an incoming E1 to many TS's of outgoing E1s. Because it is fully protected and has a non-blocking matrix, it is ideally suited for deployment in a centralized location.

Figure 3: Alcatel-Lucent 1511 MAX Power Utility Application



Meeting the challenges of fixed and mobile operators

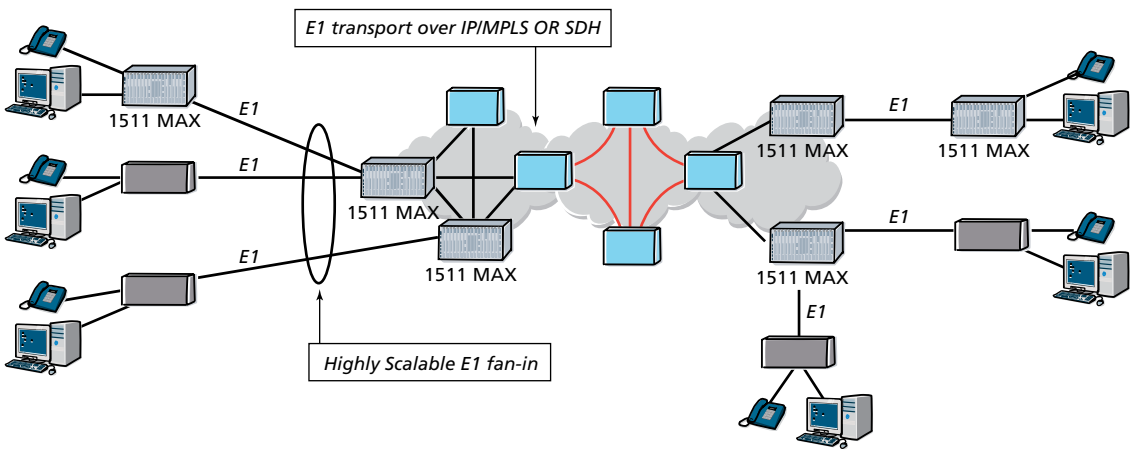
Alcatel-Lucent 1511 MAX is also particularly well suited to supporting applications for both fixed and mobile carriers.

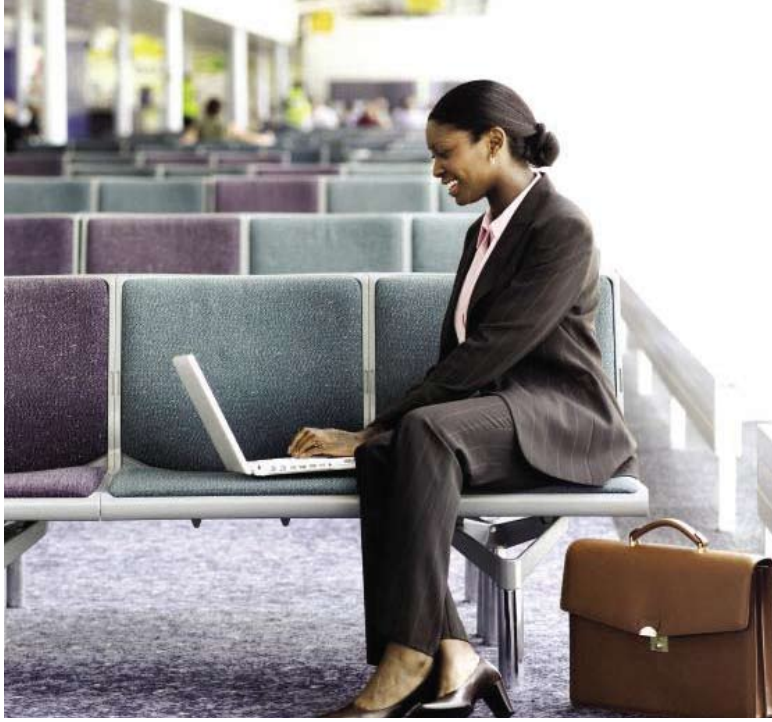
Private line/Leased line

For fixed carriers, one of the main applications of the Alcatel-Lucent 1511 MAX is private line/leased-line services. This service enables the operator to offer customers customer premises equipment connected to the network to backhaul data from the remote site to the headquarters. Often, this is used for LAN-to-LAN or LAN-to-host connections where the remote site is accessing database information, headquarters-controlled applications, as well as the Internet. The Alcatel-Lucent 1511 MAX business access multiplexer can be used in voice, data, or integrated voice and data networking, and may be deployed in point-to-point, point-to-network, and point-to-multipoint topologies.

Figure 4 depicts a typical leased-line network requiring business site connectivity. Common requirements include dedicated voice services, data services, and remote LAN connectivity. Bandwidths among the various locations are leased from telecom carriers. The E1's are transported over an SDH or IP/MPLS after packetization.

Figure 4. Alcatel-Lucent 1511 MAX Leased Line Application



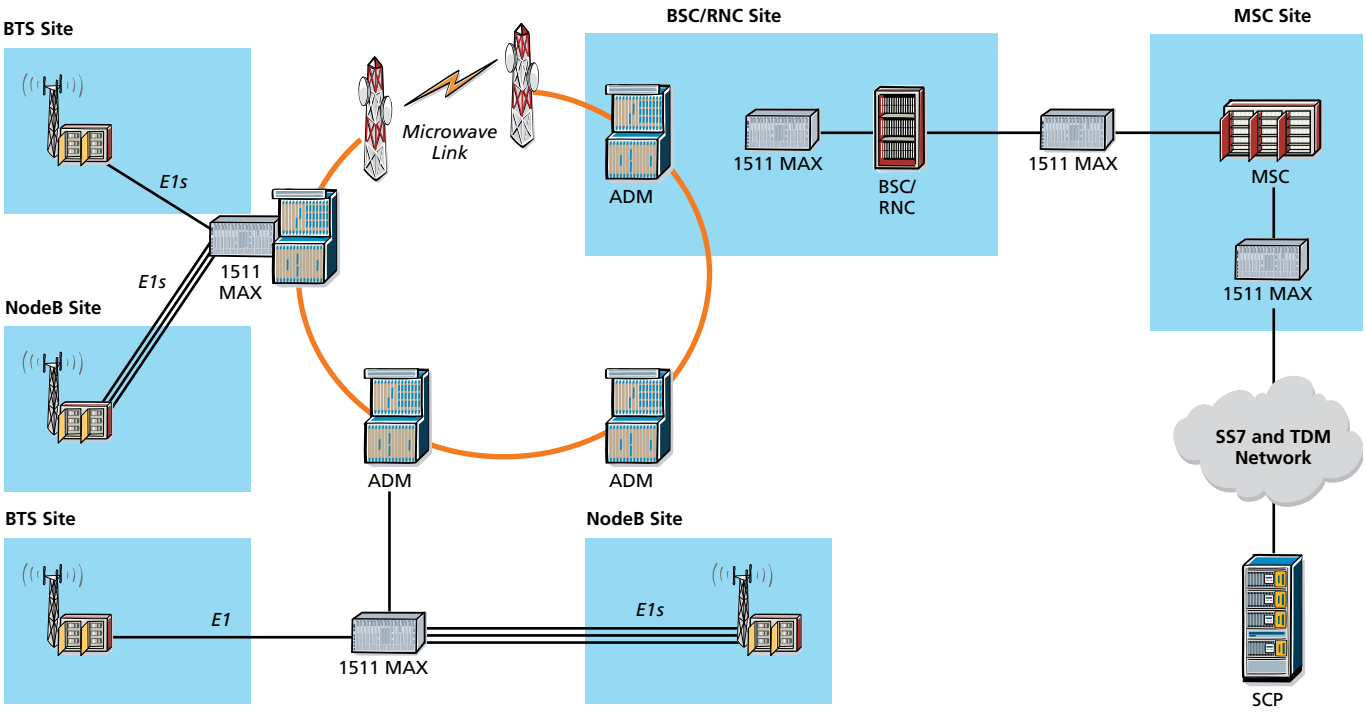


Mobile aggregation networks

The Alcatel-Lucent 1511 MAX also offers the opportunity to take advantage of the aggregation network support requirements of mobile networks.

Figure 5 illustrates how, in a 2G and/or 3G mobile network, the Alcatel-Lucent 1511 MAX is used to consolidate and groom voice and data traffic from many base transceiver station (BTS) or radio network controller (RNC) sites onto an aggregate E1 or STM-1 for transport to the mobile switching center (MSC). The Alcatel-Lucent 1511 MAX has a fully interconnected, non-blocking switching matrix that allows connection of incoming, underutilized BTS E1 lines to be switched to any time slots on the aggregate E1 going to the MSC.

Figure 5. Alcatel-Lucent 1511 MAX Aggregation in a 2G and/or3G Mobile Network



Equally, in railway environments, traffic from GSM-R (a railway variant of GSM for their operational needs) base stations can be groomed to aggregate E1's or STM-1's. In other industry and public sector segments, such as public safety, airports, oil and gas, metros, harbors, etc. traffic from TETRA, push-to-talk or maritime mobile radio base stations is equally groomed.

Table 1. Features and Benefits of the Alcatel-Lucent 1511 MAX

FEATURES	BENEFITS
• Full support for analog and digital voice and legacy data interfaces, including: ¬ voice: E&M, FXS (LGS), FXO (LGE), MRD (LB), GEN-GEN and Loop-GEN ¬ data: V.35, V.36, X.21, RS-232, RS-449 and RS-485, FE1, E1 ¬ teleprotection: IEEE C37.94 • Modular resource cards allow for voice, data and Ethernet multiplexing • Support 10/100Base Ethernet services (optical/electrical) • Support STM-1 155 Mb/s (optical/electrical)	• Voice, data, Ethernet and video convergence in a single product • Flexibility to accommodate every need
• Data interfaces can support sub-rate and super-rate data at varying speeds from 50 b/s to 2 Mb/s • Scalable and high capacity: STM-1, E1, optical and copper line system interfaces can be accommodated in the same platform • Multiservice, multi-technology platform that delivers advanced services for global carrier and enterprise customers, including TDM, xDSL, IP, and other services	• Cost savings through network consolidation • Cost savings through multiplexing and grooming
• Enables customer networks to take up emerging technologies, such as IP, through integration or network consolidation, as opposed to migration • Easy migration to higher speed interfaces for an existing installed base	• Protection of infrastructure investment while supporting network evolution
• Fully managed by the Alcatel-Lucent 1511 Element Manager or by the 1511 Network Manager, which provide user-friendly support for end-to-end installation and maintenance • Easy-to-use GUI means operations are consistent across nodes and services, for faster service delivery • Continuous synchronization with the network • Solves problems before customers even know about them through proactive management	• Simplified and cost effective, end-to-end operation
• Redundancy at controller, power, EPS, APS and path protect level • Field-proven performance with greater than 99.999 percent availability — letting service providers offer low-risk service level guarantees • The most successful digital overlay and business access platform ever built	• Increased reliability
• Alcatel-Lucent 1511 MAX aggregates multiservice traffic, eliminating the need for multiple leased lines • Alcatel-Lucent 1511 MAX is a key element for network optimization	• Higher value

Why Alcatel-Lucent?

Alcatel-Lucent simplifies and communications networks to easily and efficiently accommodate increasing complex communications environments and their need for zero downtime. It understands that business-critical solutions need to address complex customer environments, and that enterprises require reliable, redundant and secure connectivity, as well as the integration of new and legacy applications.

With support for all new and legacy interfaces, and support for all access media, including DSL, fiber and traditional NxE1 copper in the first mile, Alcatel-Lucent provides, together with the industry-leading 1511 MAX, the most future safe and cost-effective solution to customers.

By bringing its extensive cross-industry knowledge, complete portfolio of services, strong partner research, innovation and application ecosystem to our customers' challenges, Alcatel-Lucent offers the most reliable business-critical solutions today.

Industry Knowledge + Technology-Driven Outcomes = Targeted Solutions

- Global market leadership with breadth and depth of expertise
- Product and technology foundation based on carrier-class scale security and reliability
- Rapid delivery of turnkey, by a committed partner
- End-to-end solutions built on global experience

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