

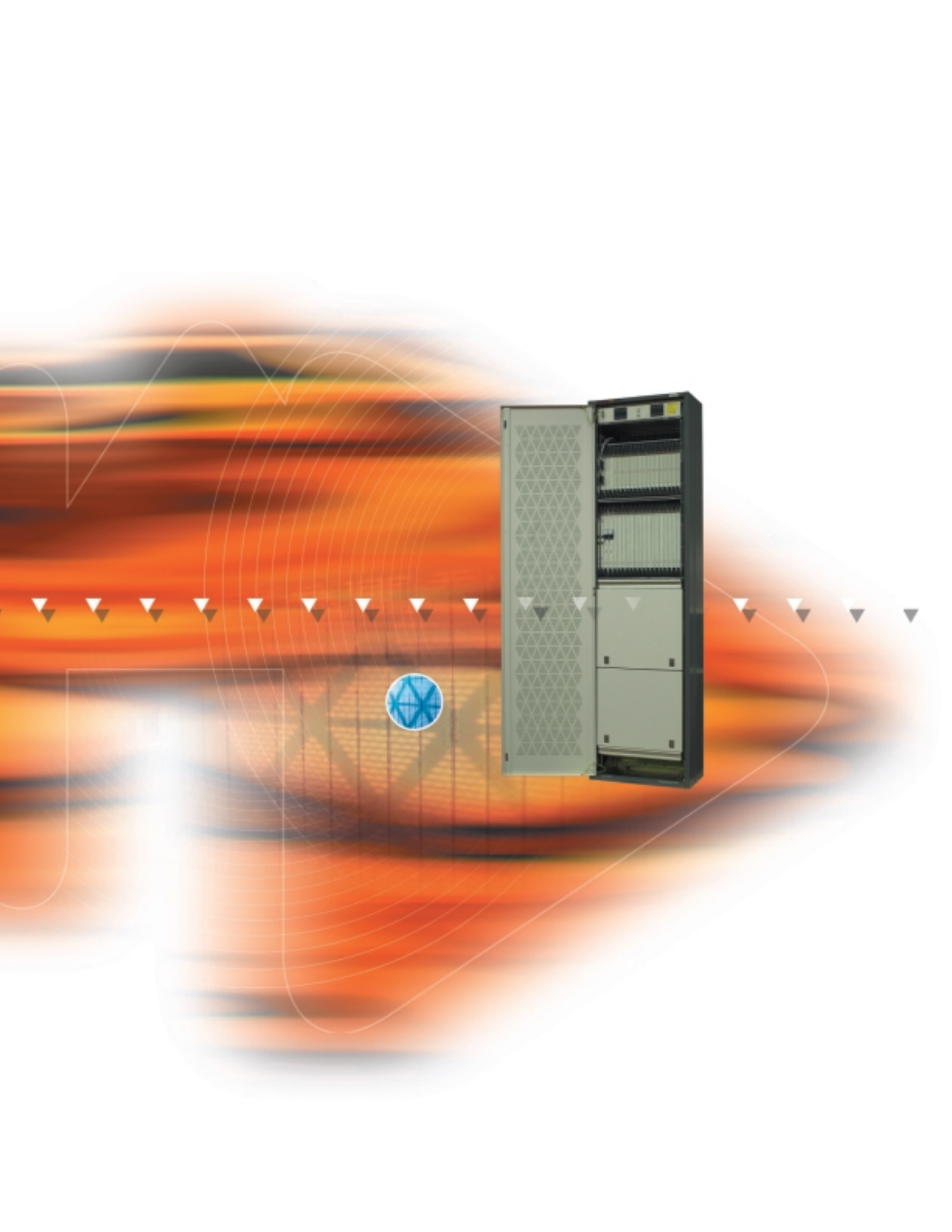
# Alcatel 7300 ASAM

DSL Subscriber Access Platform

(ETSI version)



ARCHITECTS OF AN INTERNET WORLD



# The Alcatel 7300 ASAM

- ▼ **Advanced functionality to deliver a variety of services to business and residential customers**
- ▼ **The industry's best performance, power and density**
- ▼ **The most flexible deployment options to reach more customers**
- ▼ **Seamless integration with the most widely deployed DSL systems in the world**
- ▼ **A forward-thinking design that provides investment protection**

## It's More Than high speed Internet

It takes more than high speed Internet access to attract and retain new customers. Service providers need a broadband platform that runs new, revenue-generating services for both business and residential customers. The Alcatel 7300 ASAM DSL Subscriber Access Platform (ASAM) is that platform.

Deliver on the requests of residential users with streaming video and audio. Meet the business demands for virtual private networking (VPN), virtual office access, and e-commerce. As the global leader in DSL technology, Alcatel's proven products and real experience make broadband services possible. Maximize your share of the digital subscriber line (DSL) market with the 7300 ASAM.

## DSL: Delivering the Power of the Core to the Edge

With more than 50 percent of the global market (more than 10 million ADSL lines shipped), Alcatel ranks Number 1 worldwide in DSL, the most cost-effective solution for delivering value-added applications over the last mile to end customers.

Simply providing network connections is no longer enough. Service providers must also deliver those value-added services that will lead to fast revenue generation: service activation and provisioning, billing, quality of service (QoS) and performance monitoring (for managing service level agreements (SLAs) and maximizing bandwidth utilization).

Alcatel, with its market and technology leadership, provides solutions that are tailored to deliver these new, high demand services.

Our ability to upsell differentiated services gives our customers a whole host of new opportunities to increase revenue.

## What services do customers want?

Customers want streaming multimedia, voice, VPNs, virtual office, high speed Internet access, voice over DSL and a whole host of other services in the future.

DSL enables customers to take advantage of the existing copper base in their geographical footprint and is the most cost-effective solution to offer all these new applications to the mass market. Operators can offer DSL applications as a portfolio of service levels or classes, like an airline distinguishes classes of seating, such as first, business and economy. As a result, hundreds of educational, residential, business and government applications are being enhanced by DSL technology. An increase in bandwidth can generate a wealth of new ideas and applications. Alcatel DSL offers the biggest increase in bandwidth to date. The potential of new applications is tremendous and many are yet to be imagined.

Alcatel provides the infrastructure to deliver these new services by offering a wide range of DSL products from DSLAMs and DLCs to broadband aggregation and customer premises equipment (CPE). With Alcatel's end-to-end DSL solution, DSL connectivity has never been so easy — for everyone.



Alcatel is the leading worldwide supplier of DSL technology with extensive experience in helping service providers succeed in an increasingly competitive environment. This experience was drawn upon to create the 7300 ASAM, the successor to the industry leading Alcatel 1000 ASAM Subscriber Access Multiplexer (ASAM). The 7300 ASAM is designed with the advanced functionality that service providers need to maximize their portion of the broadband access market.

The unprecedented growth in DSL has largely been driven by the demand for high speed Internet access. However, high speed Internet service alone will not adequately differentiate service providers to attract and retain new customers. To effectively compete, service providers need a broadband platform that enables them to offer a range of compelling services to their diverse base of business and residential customers. The 7300 ASAM has the advanced functionality that service providers need to deploy additional revenue-generating services like toll-quality voice over DSL, video services, and VPNs.

## **What is DSL?**

Digital subscriber line (DSL) technology is a copper loop transmission technology that solves the bottleneck problem often associated with delivering network services over the last mile to consumers. DSL technology achieves broadband speeds over the most universal network medium in the world — ordinary telephone wires.

### **DSL is fast.**

Once users experience DSL speeds, they do not want to go back to dialup access. It's that simple.

The ability, then, for service providers to deliver high bandwidth expands their revenue opportunities dramatically.

### **DSL technology allows for an "always-on" service.**

Unlike a dialup connection, there is no logging on and off or waiting for a dial tone. With DSL, the connection is always there, ready for you to use. And DSL doesn't tie up your phone line.

### **DSL bandwidth is dedicated.**

With DSL you're always connected and, unlike with cable access, there's no danger that your connection speed will get watered down as more users log on.

Because it is delivered over existing infrastructure, a DSL buildout only requires limited, incremental investments that can be strategically deployed. Alcatel employs a scalable, high density, integrated multiservice access platform to provide a true end-to-end solution.

### **DSL is reliable and secure.**

Because DSL provides a dedicated connection over your existing telephone line, it has none of the security risks associated with shared bandwidth solutions like cable.

Whether it's ADSL, SHDSL or any other flavor, DSL is easy to implement and coordinate. With carrier class service management features, DSL delivers the power of the core to the edge and beyond. Customers that require fast revenue generation, and yet still want to build a foundation for future growth, can be assured that DSL from Alcatel is the answer.

# The Alcatel DSL Solution

**Alcatel's DSL solution is ideal for both business and residential users. Because DSL uses the existing telephone wires that already connect millions of residential and business consumers, a DSL buildout only requires small, incremental investments that can be strategically deployed. This greatly reduces the risk associated with large capital outlays.**

Alcatel offers a cost-effective, flexible architecture that easily scales to meet the demands of a mass market DSL services rollout. Alcatel takes an end-to-end systems approach to DSL, with proven solutions. Alcatel's DSL solutions allow for the introduction of new network services with a competitive edge — exactly what service providers are looking to offer.

## **Delivering a variety of services ...**

The 7300 ASAM supports multiple standards-based types of DSL, including ADSL (full rate and G.Lite) and G.shdsl, giving the service provider the ability to deliver the right service to a diverse potential customer base. Residential and small business customers want a DSL service that can run on top of their existing plain old telephone service (POTS) or ISDN service.

Not only does the 7300 ASAM offer multiple service classes, it also supports multi-QoS per line, allowing for the simultaneous delivery of delay sensitive and delay tolerant data on a single DSL line. This feature allows service providers to offer each customer multiple services with the appropriate delivery guarantees.

The 7300 ASAM is built around an ATM architecture that supports a variety of ATM service classes including constant bit rate (CBR), undefined bit rate (UBR and UBR+), variable bit rate (VBR), and guaranteed frame rate (GFR). This allows service providers exceptional flexibility in service offerings that can range from low-cost, low-priority residential services to premium business access with large bandwidth requirements, such as LAN-to-LAN, VPN, streaming video, and audio — all with guaranteed performance.

## **ADSL**

Asymmetric DSL (ADSL) is the most common form of DSL. Most of the ADSL bandwidth is devoted to the downstream direction, sending data to the user. ADSL generates downstream speeds of up to 8 Mb/s and upstream speeds of up to 800 kb/s.

With the accelerated growth in the deployment of DSL, standardization and spectral compatibility are becoming increasingly important. Alcatel develops standards-based DSL products to help eliminate spectrum interference in loop bundles and guarantees the best possible performance and improved interoperability.

The 7300 ASAM supports splitterless full rate ADSL and G.Lite to hold down deployment costs and to make consumer installation "plug and play". The multimode ADSL line card supports all ADSL standards and can automatically detect the standard being used by the end user's modem. This broad standards support allows the 7300 ASAM to operate with a wide range of industry standard CPE from a variety of vendors.

## **ADSL for ISDN and POTS**

Alcatel's ADSL solutions for ISDN and POTS offer providers mature ADSL equipment fully compliant with existing standards. Using Alcatel's fourth generation DynaMiTE ADSL chipset, Alcatel offers a high performance solution suitable for mass market DSL deployment. Alcatel's solution combines the density, low power consumption, and network management capabilities providers need with the ability to incrementally upgrade their systems while maintaining their existing installed base.

Alcatel's ADSL solutions for ISDN and POTS have advantages for both providers and their customers. Customers can keep their existing ISDN or POTS infrastructures, while expanding their IT infrastructure with an additional broadband service. For small-to-medium enterprises (SMEs), Alcatel's ADSL solutions for ISDN and POTS will generate added value and decrease communication costs. For providers, ADSL for ISDN and POTS extends their ADSL service coverage by allowing them to offer the same DSL services to both POTS and ISDN customers.

### **Symmetrical DSL**

G.shdsl, a symmetrical technology, provides a way to meet the needs of small and medium-sized businesses. Symmetric high speed DSL (SHDSL) can be an alternative to the traditional (and expensive) E1 service, especially with applications that require high upstream bandwidths like video conferencing and WAN networking. With supported symmetrical data rates of up to 1.5 Mb/s and 2.3 Mb/s respectively, G.shdsl offers all the bandwidth of the legacy services and more. G.shdsl is the emerging ETSI and ITU-T standard for single pair high bit rate DSL (HDSL). This standard will complement the ANSI HDSL-2 standard, providing for other services beyond fixed rate T1 or E1 provisioning.

Based on the ITU-T G.shdsl standard, Alcatel G.shdsl provides a spectrum-friendly symmetrical service. When used with ADSL lines in the same loop bundle, there is no performance interference for either service.

### **G.Lite**

G.Lite (also known as DSL-Lite and splitterless ADSL) is similar to ADSL, offering lower speeds without the need for POTS splitters at the customer premises. The benefits of simple installation and a lower cost of implementation are considered to offset the potential drawback of reduced speed, which is limited to 1.5 Mb/s downstream and 384 kb/s upstream.

### **VDSL**

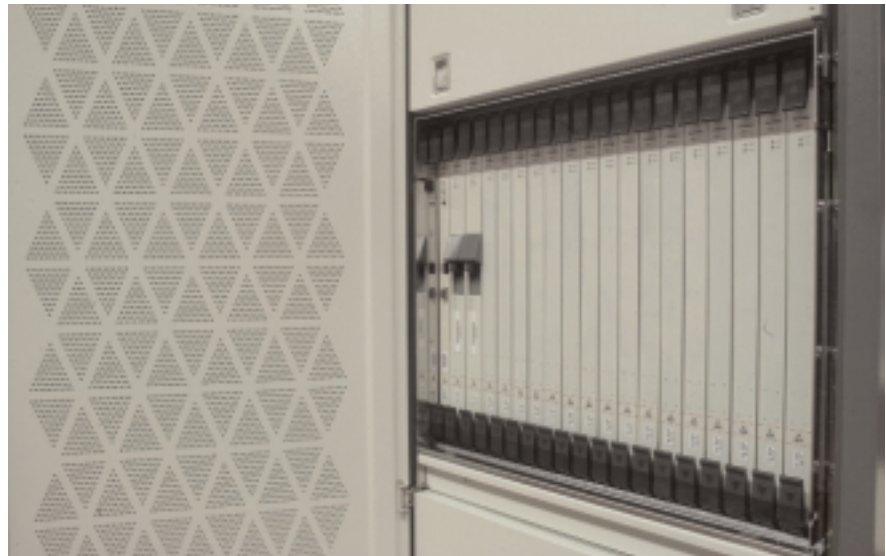
One of the hottest areas of DSL development is very high speed DSL (VDSL). VDSL holds the promise of increased data rates over relatively short distances. Trials have produced speeds between 51 and 55 Mb/s using lines of up to 300 meters (1,000 feet). More bandwidth will result in the delivery of a new wave of services, including interactive TV, video on demand, and high definition TV.

### **Voice over DSL**

Around the world, service providers are clamoring for voice over DSL (VoDSL) technology. It offers new revenue opportunities beyond high speed Internet access and can be deployed easily and cost-effectively using the existing DSL infrastructure.

Multiple voice and data channels are prioritized, multiplexed, and transported over a DSL connection to a gateway interface, which provides connectivity between the data network and the public switched telephone network (PSTN). Features such as multi-QoS allow the 7300 ASAM to deliver toll-quality VoDSL and Internet access on the same DSL line and ensure that the voice traffic receives priority.

The 7300 ASAM offers both an integrated and a standalone VoDSL solution.



**Alcatel 7300 ASAM**

### **Integrated Voice: Achieving maximum interoperability**

The integrated VoDSL solution consists of a gateway card inserted in the 7300 ASAM shelf. The VoDSL signal is then transmitted via V5.2 to the PSTN.

The 7300 ASAM with integrated VoDSL allows operators to offer bundled multi-line telephone and high speed data services over a single DSL line to a variety of customers, going from high-end residential customers to small and medium-sized businesses. It allows operators to leverage the investments already made in local exchanges, ATM switches and DSL access multiplexers (DSLAMs) — without having to change the end user equipment already in place.

In a minimum/typical configuration, the 7300 ASAM delivers the capability of handling eight E1 interfaces, or 240 simultaneous calls to the voice network. The system can be extended to eight cards (or 64 E1) 1,920 active calls, allowing up to 8,000 business phones (1 to 4) or 20,000 residential phones (1 to 10) to connect. Embedded digital signal processors (DSPs) implement the voice compression technique for optimal bandwidth usage.

The 7300 ASAM with integrated VoDSL guarantees true transparent PSTN (analog voice, digital voice, fax, and modem) and ISDN services for the end user, offering high quality voice services and all value-added local exchange features. In addition, offering voice services over DSL leverages the operators' existing operational support systems (OSSs) and ways of doing voice business.

### **A Standalone Solution: The best of two worlds**

When V5.2 traffic has to be concentrated on one or a limited number of points in the network, Alcatel offers a standalone gateway, the Alcatel 7310 Loop Voice Gateway (LVG).

The 7310 LVG is at the heart of a converged voice and data world. Together with an integrated access device (IAD), the 7310 LVG merges a QoS-based broadband data access network with voice networking, allowing for high revenue-generating services.

The Alcatel VoDSL scalable hardware architecture allows service providers to envisage a "pay as you grow" strategy. A single gateway card handles eight E1 interfaces or 240 simultaneous calls toward the local exchange. The system can be extended up to eight cards or 1,920 active calls, allowing connection for up to 8,000 business phones or 20,000 residential phones.

Both the standalone and the integrated solution support the ETSI V5.2 PSTN interface standards.

### **DSL video services**

The 7300 ASAM is ready for video applications on various end user platforms (PC and TV). It has been deployed at various places to provide advanced video-on-demand services, but can be used as well for cost-optimized video broadcast because of the built-in multicasting functionality. Alcatel has created an end-to-end standard-based solution for video services, such as personal video, e-commerce, broadcast TV, and video on demand (VoD).



**Alcatel 7310 Loop Voice Gateway**

# ... On High Quality Equipment

Having shipped more than 10 million ADSL lines, and owning more than 50 percent of the worldwide market share, there is no doubt that Alcatel is the world leader in DSL solutions. We got that way by getting to the market quickly with the best products and solutions.

## Central office equipment

Alcatel's central office equipment is designed with the advanced functionality you need to maximize your share of the broadband access market.

The ASAM products are multiservice access nodes that allow service providers to support both current services, as well as new and future IP-based services.

The platforms used to deliver the dynamic Alcatel DSL solution include:

- ▼ Alcatel 7300 ASAM DSL Subscriber Access Platform (ASAM) and Alcatel 7300 ASAM DSL Remote Access Platform (RAM), enabling mass deployment of revenue-generating broadband services for both business and residential customers
- ▼ Alcatel 7404 Broadband Access Server (BAS) and the Alcatel 7410 Access Server (AS) provide a scalable and flexible solution for internetworking DSLAMs and an Internet backbone router. Using Ethernet or, MPLS, these products aggregate subscriber traffic from multiple DSLAMs and provide transparency to any DSL technology type
- ▼ Alcatel 7670 Routing Switch Platform (RSP) providing a multi-protocol platform designed for the core of next generation networks

## Best performance

Alcatel DSL line cards consistently have the industry's best rate and reach performance on POTS and ISDN lines, as proven in extensive customer field tests. The new generation ADSL line card utilizes Alcatel's leading discrete multi-tone (DMT)-based technology and supports multi-mode ADSL, allowing it to automatically work with full rate or G.Lite CPE. Splitterless functionality is supported in both full rate and G.Lite technologies so there is no need for a centralized splitter or requisite truck roll. The line cards also support dynamic bit rate updates, ensuring the consumer the highest performance available. Their flexible design allows enhancements and functional changes to be implemented through software upgrades.

## Multi-level redundancy

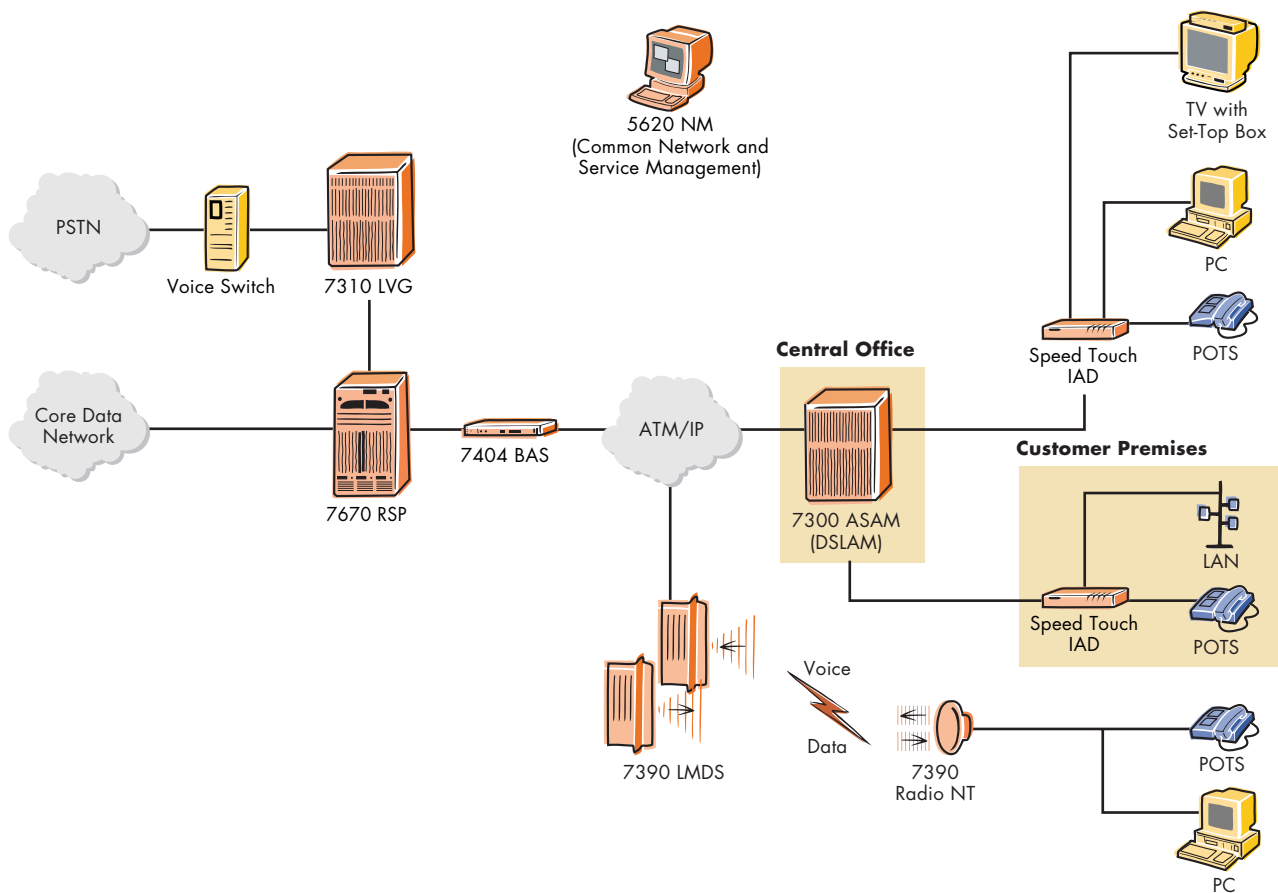
Avoiding single points of failure is a major requirement of high volume service enabling products like the 7300 ASAM. The 7300 ASAM's architecture fulfills this requirement by delivering multi-level redundancy, allowing service providers to deliver the performance that their customers demand. The ATM network termination for each system can be equipped in a 1+1 redundant configuration, guaranteeing instant switchover in case of failure. The internal ATM system fabric, central processor, and memory can also be duplicated to assure permanent service availability and enable SLAs.

### Lowest power consumption

Power consumption is an important consideration when selecting equipment, as it will inevitably dictate the quantity that can be deployed in a central office. Additionally, power consumption and related items like cabling, battery backup, and cooling represent a significant share of the overall capital and operational costs of a telecom infrastructure. Even

though the ADSL line density of the 7300 ASAM has increased significantly, power consumption per line has been reduced by 50 percent. At an average of 1.6 watts per ADSL line, the 7300 ASAM delivers the lowest power consumption in the industry. This is good news for providers who are faced with power consumption limitations.

This decreased power consumption allows providers to increase the number of switches in the CO, while using less power. This results in reduced costs and an improved bottom line.



## Deployment Flexibility

- ▼ A 7300 ASAM family can contain as few as 12 DSL lines (evolving to 24/48 ports) or as many as 2,304 lines, sharing a common network interface. This number can go up to 5,000 by subtending shelves.
- ▼ Remote access multiplexers (RAMs and Mini-RAMs) can be subtended off a 7300 ASAM to extend the reach of DSL to remote customers and to increase the number of customers served by a single network interface. Outdoor solutions are available.
- ▼ A broad range of network interfaces are available, including 4 x E1 IMA, E3, and STM-1.
- ▼ Temperature hardened, enabling deployment of equipment in environments with temperature extremes.
- ▼ Small footprint for deployment in space-constrained environments.
- ▼ Support for SVCs and PVCs.

### Unprecedented scalability

In a fast growing mass market like DSL, the first provider to the customer wins. The 7300 ASAM delivers maximum scalability for small to large system deployments that allow service providers to reach more of their potential DSL customers, whether they are served by a CO or by remote facilities. The operator can quickly achieve ubiquitous geographic coverage with small systems and subsequently extend the capacity of these systems at the pace of growing customer demand.

The system is temperature hardened so that it can be reliably deployed in extreme temperature environments or in office buildings. These capabilities, along with the multiple DSL types, mean that service providers can service more customers and have more flexibility to meet their demands.

### SVC and PVC support

The 7300 ASAM supports permanent virtual circuit (PVC) connections provisioned by the network operator, and switched virtual circuit (SVC) connections set up and managed by the user application when needed.

Advantages include greater user flexibility in accessing multiple applications offered by various content providers, while network operators gain traffic capacity and simplified provisioning.

# The World's Most Widely Deployed System

Alcatel has the largest installed base of DSLAMs and DLCs in the world. With so many in use, Alcatel designed the 7300 ASAM to be seamlessly integrated with these systems.

Service providers can mix the 7300 ASAM shelves with legacy shelves (such as the Alcatel 1000 ASAM) to create a single system that delivers enhanced functionality while preserving their past investment. Beyond hardware interconnectivity and software consistency, the systems also share a single management system simplifying the integration of the new ASAM into their network.

## **Broadband aggregation**

Alcatel's Broadband Aggregation Solution can aggregate DSL connections from multiple DSLAMs, allowing the access providers to rapidly scale new services. Part of this solution is the Alcatel 7404 BAS, a tunnel created for each connection from the DSLAM to the ISP network. Without the 7404 BAS, there is excessive overhead on the ATM switches because they have to set up and take down each circuit as the connections are made and dropped.

The 7404 BAS solves this problem.

Carrier class solutions must support tens of thousands of PVCs. Yet, the typical backbone routers that have linked points of presence to ISPs can only handle up to 256 PVCs.

The Alcatel 7404 BAS, the Alcatel 7410 AS, and the Alcatel 5735 Service Management Center (SMC) are part of a complete broadband access solution that efficiently handles aggregate connections.



# ... Under Advanced Network Supervision

**Alcatel's integrated network management system manages networks end to end using a single network management umbrella. With a system able to manage one million endpoints and up to 5,000 nodes in a single domain, we are the clear leader in network management.**

The management platform used to deliver the flexible Alcatel DSL solution includes:

- ▼ Alcatel 5620 Network Manager (NM), providing seamless, end-to-end network management for Alcatel DSL solutions.
- ▼ Alcatel 5740 Service Subscription Manager (SSM), addressing the requirement for a scalable and efficient DSL service model.
- ▼ Alcatel 5730 VPN Service manager (VSM), allowing service providers to offer multi-service VPNs to business customers.
- ▼ Alcatel 5520 SNMP Element Manager (SNMP EM), providing local element management of Alcatel nodes on an individual basis, remote element management of third party nodes on a network-wide basis, and management of access products for non-network nodal devices.
- ▼ Alcatel 5523 NG-AWS Element Manager (NG-AWS), providing centralized network management to the distributed ADSL components (ASAM, Mini-RAM and ADSL CPE). This management system supports full configuration, performance and fault management, and thus provides excellent supervision of the various network elements.

The 5620 NM plays a key role in managing the ASAM network infrastructure through instant detection of service degradation and permanent collection of relevant performance data. It provides all the necessary functions for doing an end-to-end management of your network. The 5620 NM is fully integrated with other products in the management family and is open for integration with peer network management systems, as well as best-of-breed, complementary third party application products.

## **Flowthrough provisioning**

To capture market share and maintain customer satisfaction, service providers must deliver timely, error-free provisioning. The 5740 SSM enables smooth DSL service integration in the overall provisioning process.

Service providers with an OSS in place may want to extend it with DSL-specific functions. The Alcatel broadband access solution provides you with end-to-end provisioning, depending on your needs.

## **Interoperability**

Alcatel is fully committed to network-wide interoperability and is actively involved in standardization and interoperability initiatives. Alcatel frequently participates in plugfests (live demonstrations of plug and play product interoperability) and interoperability testing via internal and third-party labs. This strategy enables compatibility with a wide range of CPE and helps to ensure the continued successful deployment for service providers and consumers.

# ... Designed for the Future

**Access is the biggest problem facing the Internet today. The growing demand for access has produced bottlenecks and traffic jams, which are slowing the Internet down. ADSL high speed Internet breaks through the bottlenecks to ensure that all customers have quick and reliable access to Internet content.**

Although DSL technologies provide huge advances in bandwidth and performance, consumers will require more bandwidth as new services evolve. The 7300 ASAM is designed with this in mind, so that a service provider's investment today can deliver new services into the future, with equipment investment protection.

- ▼ A 6 Gb/s backplane allows the 7300 ASAM to deliver exponentially more bandwidth so that service providers can continue to meet the requirements of their customers.
- ▼ Upgradeable software keeps the system current with new features and functionality.
- ▼ New network interface cards will provide faster connections to the core network and give service providers direct access to local content.
- ▼ New DSL line cards, including VDSL, can utilize this capacity to deliver bandwidth in excess of 50 Mb/s to each customer.
- ▼ Each DSL line supports multi-QoS so service providers can simultaneously deliver delay tolerant and delay sensitive content, such as voice and video, to the same customer.
- ▼ The 7300 ASAM will evolve to have multiple high capacity video feeder interfaces allowing for hundreds of video channels. Based on these video feeder interfaces and optimized broadcast solutions, end users will be offered a choice of broadcast and on-demand services, with more flexibility than any other competing technology like cable and satellite.
- ▼ Designed to enable the full digital loop (FDL).

## Looking Forward

Alcatel is committed to making increased bandwidth a reality and is focused on several areas of development:

- ▼ Very high density, enhanced performance, standards-based DSL interface cards using next generation silicon (up to 48 ports)
- ▼ Single shelf OC-12/STM-4 DSLAMs
- ▼ Very high speed DSL (VDSL) services to deliver next generation high definition television (HDTV) and other video applications
- ▼ Support for a passive optical network (PON) solution (also known as fibre to the home)
- ▼ An integrated solution for loop qualification, test access and restoration
- ▼ Integrated IP functionality

# Proven Experience

## Features of the 7300 ASAM

- ▼ **Advanced features**
- ▼ **Multiple ATM QoS classes**
- ▼ **ATM multicasting**
- ▼ **Highly scalable**
- ▼ **Multiple DSL types**
- ▼ **VoDSL support**
- ▼ **High density**
- ▼ **SVC switching**
- ▼ **Multiple network interfaces**
- ▼ **Lowest power consumption**
- ▼ **Redundancy**
- ▼ **Temperature hardened**
- ▼ **Integrated test access**
- ▼ **Carrier class ETSI/NEBS equipment**
- ▼ **BRAS functionality**
- ▼ **Ethernet management port**
- ▼ **Video ready**

As the telephony and data worlds merge, it is vital to preserve the carrier class standard that our customers expect. Alcatel is a pioneer of carrier class DSL technology and has designed and manufactured state-of-the-art chips since 1993, and DSL systems for almost as long. Unlike most vendors, Alcatel's experience extends beyond the integration of technology into a system, and includes the creation of the technology itself. This depth of experience has allowed Alcatel to successfully deploy more DSL systems than any other vendor in the world and has facilitated the creation of the all-new 7300 ASAM.

Alcatel's commitment to help service providers successfully deploy DSL has never been stronger. Alcatel's vision for high speed access has never been clearer. Alcatel, Architects of an Internet World.



For more information on Alcatel's DSL products, visit [www.alcatel.com/dsl](http://www.alcatel.com/dsl)

## Technical Summary

### System Capacity

- ▼ Up to 384 lines per 2.2 m (7.22 ft.) rack with splitters
- ▼ Up to 2,304 DSL lines per network interface
- ▼ Up to 5,000 DSL lines per network interface through subtending
- ▼ NEBS Level 3 compliant per rack

### ATM Network Interface Cards

- ▼ STM-1 (155 Mb/s)
- ▼ E3 (34 Mb/s)
- ▼ 4 x E1 IMA (4 x 1.5 Mb/s)
- ▼ Up to 96 MB on-board memory
- ▼ Optional 1+1 redundancy (APS/EPS)

### Line Interface Cards

- ▼ ADSL - Multi-standard auto-detect ADSL
  - ITU-T G.dmt
  - ITU-T G.Lite
  - ANSI T1.413
  - POTS and ISDN
  - 12 lines per board
- ▼ ITU-T G.shdsl/ETSI SDSL
  - 12 lines per board
- ▼ Passive splitter types:
  - TBR21
  - 600  $\Omega$  resistive
  - Complex impedance
  - ISDN

### ATM Service Characteristics

- ▼ Supported ATM QoS classes
  - UBR
  - UBR+
  - CBR
  - rt-VBR/nrt-VBR
  - GFR
- ▼ Multi-QoS per line
- ▼ Up to 12,000 connections (PVC/SVC) per system
- ▼ Up to 16 connections (VCs) per line

### Physical Specifications

#### **Central office equipment**

- ▼ ETSI dimensions:
  - Standard 220 cm (86.61 in.) racks
  - Up to 3 standard-density 48-line shelves
    - 60 cm (23.62 in.) x
    - 30 cm (11.81 in.) x
    - 49 cm (19.29 in.)
  - Up to 2 high-density 192-line shelves
    - 60 cm (23.62 in.) x
    - 30 cm (11.81 in.) x
    - 95 cm (37.40 in.)
- ▼ Up to 12 shelves on a single network interface
- ▼ Supports back-to-back equipment practice

#### **Remote Equipment**

- ▼ Dual level multiplexing architecture via remote ASAMs
- ▼ Connection to host via 4 x E1 IMA
- ▼ 48-line and 192-line shelves, temperature hardened
- ▼ 24-line Mini-RAM for 48.26 cm (19 in.)/ETSI rack

### Other Characteristics

- ▼ Test bus for metallic line test
  - Soft connection of individual DSL lines
  - Connector for external test equipment
- ▼ Alcatel 4th generation ADSL chipset
  - 4-line ADSL chip
  - Enhanced ATM chip

### Power

- ▼ Average power consumption: 1.6 watts per ADSL line

For more information: [www.alcatel.com/dsl](http://www.alcatel.com/dsl)

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