A Move to IMS

SI3000 MSAN
Multi-Service Access Node
Diversity of Access
A Move to IMS
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The modern communications environment dictates the continuous improvement and upgrading of a network’s infrastructure. Attractive, profitable services and the optimization of operating costs demand a constant increase in subscriber-access capacities.

In order to meet the existing and future demands of subscribers, Iskratel has developed a single network-access evolution product - the SI3000 Multi-Service Access Node. The SI3000 MSAN represents the most universal, currently available, subscriber-access deployment option. It makes possible any combination of high-speed, multimedia or voice-service delivery over fixed and wireless connections.

**The Versatility of Network Access Options**

The SI3000 MSAN provides multimedia, data and voice services using various user interfaces. It represents the best choice for the smooth introduction or enhancement of triple-play service offers for residential and business subscribers.

The SI3000 MSAN is compatible with various network configurations. The product works with both legacy PSTN systems and NGN/IMS-oriented IP networks. Its configuration options vary from pure TDM access with TDM network connectivity, through DSL and FTTx broadband access, to wireless access with IP network connectivity.

**Advanced IP-based Architecture**

The SI3000 MSAN uses standardized internal Gigabit and 10 Gigabit Ethernet technology. The result is a high aggregate-traffic throughput and an efficient interconnection of subscriber blades. The internal structure ensures the diversity of access options and the necessary intelligence. Element redundancy and undisturbed operational availability are guaranteed.
Building a Multi-Service Network Today

To design high-capacity metropolitan and suburban access networks, the SI3000 MSAN uses Ethernet technology, fiber, copper and wireless media.

The unified management system provides a complete remote management and supervision system for each and every Iskratel network element. It lowers the cost of provisioning and surveillance by means of comprehensive fault, configuration, accounting, performance, and security management.
FEATURES THAT ADD VALUE

Seamless Migration

The SI3000 MSAN, a member of the SI3000 Access Plane family, is an integrated product for network access, service provisioning and mediation. It is designed as a unique network element for newly built and existing access networks which require upgrades or modernization.

The pure IP-based product is equipped with TDM user interfaces and protocols, gateway functionalities on the network side (E1, IP) and all the necessary intelligence. The connection of the existing PSTN subscribers is straightforward and simple.

The Widest Variety of Subscriber Interfaces

The ability to choose between ADSL2+, VDSL2, SHDSL, Ethernet, Fiber, mobile WiMAX and fixed WiMAX interfaces makes the SI3000 MSAN a truly multi-service access product.

The SI3000 MSAN takes triple-play service delivery seriously. The highest level of end-user experience is ensured with modern protocols and a newly improved line of home gateways.

A new service only requires a new blade.
New service revenue is recognized sooner.
The investment in a new blade is much lower than buying complete products with separate shelf, power supplies, and passive components.
Remote powering of home telephone during emergencies – lifeline service assured.
The same user experience irrespective of call-control type (Call Server or TDM switch).
Can switch POTS-only customers onto IP/MPLS core unobtrusively.
Media gateway allows the use of a single IP/MPLS core network for both voice and data traffic.
One shelf requires less floor space.
Less space means lower rent, taxes, and heating & cooling expenses, especially in remote deployments.
Fewer power supplies mean greater efficiency.
Reduced power consumption means less cooling is required.
A single network element is easier to manage, and requires less training of personnel.
Fewer spares for common equipment, such as power supplies and cables, are needed.
Fewer network elements mean quicker isolation and diagnosis of faults.

Minimized Footprint

The SI3000 MSAN is deployed in only 23 cm deep ETSI housing that allow back-to-back rack placing and installation in compact outdoor cabinets. A POTS blade with 64 subscriber ports, an ADSL2+ blade with 64 subscriber ports and 24 port FE fiber blade are the most dense interface cards currently available on the global market.

<table>
<thead>
<tr>
<th>Feature</th>
<th>Benefit</th>
<th>Impact</th>
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<tbody>
<tr>
<td>Multiple services</td>
<td>Faster deployment</td>
<td>A new service only requires a new blade. New service revenue is recognized sooner.</td>
</tr>
<tr>
<td></td>
<td>Cost-effective upgrade</td>
<td>The investment in a new blade is much lower than buying complete products with separate shelf, power supplies, and passive components.</td>
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<tr>
<td>Integrated media gateway</td>
<td>Legacy handset</td>
<td>Remote powering of home telephone during emergencies – lifeline service assured.</td>
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<tr>
<td></td>
<td></td>
<td>The same user experience irrespective of call-control type (Call Server or TDM switch)</td>
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<tr>
<td></td>
<td></td>
<td>Can switch POTS-only customers onto IP/MPLS core unobtrusively.</td>
</tr>
<tr>
<td>Single shelf</td>
<td>Size</td>
<td>Media gateway allows the use of a single IP/MPLS core network for both voice and data traffic.</td>
</tr>
<tr>
<td></td>
<td>Power</td>
<td>One shelf requires less floor space.</td>
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<tr>
<td></td>
<td></td>
<td>Less space means lower rent, taxes, and heating &amp; cooling expenses, especially in remote deployments.</td>
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<td>Fewer power supplies mean greater efficiency.</td>
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<td>Reduced power consumption means less cooling is required.</td>
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<tr>
<td></td>
<td>Network management</td>
<td>A single network element is easier to manage, and requires less training of personnel.</td>
</tr>
<tr>
<td></td>
<td>Spares</td>
<td>Fewer spares for common equipment, such as power supplies and cables, are needed.</td>
</tr>
<tr>
<td></td>
<td>MTTR</td>
<td>Fewer network elements mean quicker isolation and diagnosis of faults.</td>
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Source: Dittbener
Modularity and Scalability
The operator starts with a pure POTS, basic ADSL2+ or VDSL2 web access. In time, any type of user interface can be added or upgraded if needed. When additional subscriber ports are required, the network administrator simply plugs an additional blade into the shelf. Additional functionalities are enabled by installing an appropriate blade or by upgrading an existing one.

Carrier Grade and Application-Optimized Packaging
The SI3000 MSAN is built on an extremely reliable, well tested and proven Iskratel platform (MEA). Space-saving, highly featured 1U, 2U, 4U and 6U ETSI-compatible housings are used for business applications and small, sparsely populated areas. For a central office and densely populated areas the carrier-grade high-density 9U 20-slot shelf is available.

A remote deployment of access nodes is available with outdoor and indoor cabinets. Shorter subscriber loops are easily achievable with an independent, remote power supply enabled, and centrally managed shelters.

Security
The SI3000 MSAN allows a direct and individual approach when dealing with subscriber permission rights. The operator with administrative user rights creates permissions and assigns user privileges at the very level of single network elements and connected subscribers.

Low OPEX
The operating costs are minimized by the unified SI3000 Management System (SI3000 MNS). This system is used to provide a common integrated network-element overview, a simplified (auto) configuration, as well as fault and performance management.

Versatility of Iskratel SI3000 Multi-Service Access Node
Typical ways to deploy the SI3000 MSAN

**Fiber Access:** FTTH switch for Ethernet P2P fiber access

Such a deployment type serves as an access node that offers the highest possible bandwidth and unlimited possibilities for services. The SI3000 MSAN allows FTTH or FTTx deployment scenarios.

**POTS Access:** TDM Access Node

The access node with POTS subscriber and IP network ports bridges the gap between circuit and packet networks. It converges signaling and voice between the TDM network (E1 uplinks, V5.2 signalization) and the NGN (Ethernet uplink, MGCP, H.248, SIP). POTS connections are ready to be easily upgraded with other broadband network/user interfaces.

**DSL Access:** IP DSLAM with full-scale IPTV performance

This application includes redundant GE and 10GE interfaces for highly available, triple-play service delivery using copper connections. The state-of-the-art VDSL2 technology present the final stage in the existing connection utilization.

**WiMAX Access:** Base station for Fixed and Mobile Data Access

The purpose of this deployment type is to connect areas that are too remote or too difficult to reach with traditional wired infrastructures. It acts as a substitute for last-mile broadband access or backhaul for a hotspot and cellular carrier infrastructure. The SI3000 MSAN offers both fixed and mobile WiMAX options.

skratel SI3000 Multi-Service Access Node
SI3000 MSAN in the network
New horizons for Access Technologies
Fiber Access

The complete FTTx concept: 100Mb/s and beyond

Sufficient amount of bandwidth, the ability to offer any known type of telecommunications service and cost-effective network deployment make fiber access the perfect solution for demanding network operators and aggressive telecommunications service providers worldwide.

Due to higher speeds and the ability to converge multiple service streams on a single connection, fiber access brings numerous advantages. The unified delivery of next generation services serves as a contrast to dedicated service connections. Such a consolidation of services provides significant cost savings and greatly reduces network complexities.

Iskratel offers all three ways of deploying fiber access: Fiber-to-the-Home (FTTH), Fiber-to-the-Curb (FTTC) and Fiber-to-the-Building (FTTB).

FTTC
The FTTC approach combines fiber connections with the already existing copper connectivity over DSL technologies.

Using outdoor cabinets (ODU-M), the SI3000 MSAN node is remotely located in densely populated neighborhoods, bringing the fiber as close to the subscribers as possible. FTTC uses the high-performance advantages of fiber and the low costs associated with the available copper wiring.

FTTB
The FTTB option enables the cost-optimized delivery of high-bit-rate services for entire buildings. Fast- and Gigabit Ethernet end-user connections are deployed using UTP cables. In the case of existing copper wiring, the solution uses the VDSL2 or ADSL2+ technology and allows, therefore, comparable connection capacity.

The FTTB deployment includes the use of an indoor cabinet (IDU-M) with power-supply and management interfaces for the optimal performance of the access node.

FTTH
Point-to-point fiber connections are the most appropriate and future-proof access option for today’s and tomorrow’s service-delivery infrastructure options. Optical interfaces provide symmetrical transmission speeds of up to 1 Gb/s to every individual home.

The FTTH approach is recognized as the most future-proof way of providing communication and entertainment services. Due to the standardized elements that are used for such a deployment and the ability to offer CATV services using RF-overlay, the FTTH deployment is becoming an ever more friendly investment option.
DSL Access

The DSL access is designed for the delivery of pure, packet-based, carrier-grade, triple-play services to end users. It combines the IP DSLAM with different, integrated DSL broadband technologies in a single broadband-access platform. The non-blocking broadband access provides multiple GE and 10 GE interfaces for a connection toward the transport network.

In order to provide high-quality multimedia services the broadband-access application supports embedded QoS features, multilayer multicast functionality, and advanced security.

The SI3000 MSAN is based on pure IP technology. Its design allows the connected DSL subscriber to simultaneously stream up to 3 x IPTV subscribers streams on a single port.

Subscribers Anywhere
Subscriber broadband interfaces include the VDSL2, ADSL2+ and SHDSL technologies. These options provide broadband connectivity for users at distances of several 100 m to over 5 km. The interconnection with users is provided by copper pairs. Using DSL technologies, classical base band POTS and ISDN services can be used simultaneously on a single copper pair.

Simultaneous delivery of multiple IPTV streams on any port.
POTS Access

The POTS Access offers highly flexible and cost effective ways to support traditional voice services and provides future-safe transitions to packet-based networks.

The POTS Access integrated into the SI3000 MSAN product is the perfect solution, enabling operators to upgrade their cores to a next-generation IP network, while still keeping their existing infrastructure in place.

As part of a multi-service platform it is ready to be easily upgraded with other network interfaces when needed. Incumbent carriers can offer VoIP and NGN value-added services to existing customers by upgrading the access network without having any impact on the existing TDM infrastructure.

The POTS access consists of two distinct components: the Access Gateway Blade and the POTS Blade.

On the network side, the Access Gateway Blade is connected to the local TDM exchange, equipped with a standard V5.2 interface, whereas subscribers are connected to the POTS Blade using a standard analog interface. Internally, both blades are interconnected using future-proof IP/Ethernet technology, enabling the POTS blade to be controlled by an Iskratel SI3000 Call Server (SI3000 CS) or a third-party softswitch utilizing the MGCP, H.248 / MEGACO or SIP protocols.

- Industry-highest POTS port densities with 7296 POTS ports per 60x60 cm floor space,
- Proven interoperability with third-party softswitches has already been proved,
- Future-safe transitions to packet-based networks.

Telephony for the IP world

As part of a multi-service platform it is ready to be easily upgraded with other network interfaces when needed. Incumbent carriers can offer VoIP and NGN value-added services to existing customers by upgrading the access network without having any impact on the existing TDM infrastructure.
Wide Coverage

While many currently available broadband wireless solutions can only provide line-of-site (LOS) coverage, WiMAX, thanks to its OFDM technology, has been optimized to provide excellent non-line-of-site (NLOS) coverage and long-range transmission in LOS conditions. Combining both LOS and NLOS coverage, WiMAX is the ideal solution for achieving exactly the required coverage in the most economical way.

Ideal for Rural Modernization

WiMAX backhaul allows the SI3000 MSAN feeding application, for areas insufficiently served by a wired infrastructure. Using the SI3000 WiMAX backhaul solution the provider offers advanced services to areas that were excluded because of high infrastructure and building costs.

The Mobile Evolution

Iskratel WiMAX Access is suitable for fixed and mobile subscribers. The introduction of the 16e mobile standard allows the utilization of mobile connectivity according to the infrastructural demands. The complete mobile device and service compatibility significantly lowers OPEX and protects future investments.

Wide Coverage

While many currently available broadband wireless solutions can only provide line-of-site (LOS) coverage, WiMAX, thanks to its OFDM technology, has been optimized to provide excellent non-line-of-site (NLOS) coverage and long-range transmission in LOS conditions. Combining both LOS and NLOS coverage, WiMAX is the ideal solution for achieving exactly the required coverage in the most economical way.

Flexibility

WiMAX access and the SI3000 MSAN product are intended for a number of applications, including last-mile broadband access, Wi-Fi hotspot, and cellular backhaul for a carrier infrastructure or high-speed enterprise connectivity.

WiMAX is designed to provide E1-level bandwidth to businesses and the equivalent of cable/DSL access for home users. It will enable carrier-class solutions to support thousands of users with a single base-station, while providing differentiated service levels.

High-speed mobile internet access and telephony
Speed and Reliability
The SI3000 MSAN features high throughput, reliability and undisturbed availability. The product relies on industry standards and takes advantage of internal Gigabit Ethernet technology for interconnecting the blades in a shelf. The SI3000 MSAN fulfills the ETSI-compliant requirements and features front-only access to meet the demands of carrier-grade equipment for building modern multi-service networks.

Non-Blocking Platform Architecture
The heart of the platform is a non-blocking switching and aggregation matrix blade for external network connections and interconnections among the SI3000 MSAN blades. The aggregation matrix has the capability of up to 176 Gb/s, which makes it capable of carrier-grade Ethernet transport for the delivery of Triple Play services.

The dual-star topology on the multi-service platform provides for the maximum utilization of inter-blade connections and, at the same time, a high level of reliability and availability.

Flow awareness guarantees QoS for voice, video and data services.

Universal Slots for Different Blades
The scalable platform has designated plug-in positions, called slots, for one or two fabric blades and many service blades that provide the flexibility of the SI3000 MSAN’s final configuration. A simple upgrade of the SI3000 MSAN or the replacement of individual blades can be done during the system operation. A high level of redundancy is provided by duplicating the aggregate switch blade in the shelf.

PORT CAPACITIES DEPENDING ON THE ENCLOSURE TYPE:

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<th>MEA 20 duplication</th>
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<th>MEA 6</th>
<th>MEA 3</th>
<th>MEA 1U</th>
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<tbody>
<tr>
<td>No. of slots for blades</td>
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<td>yes</td>
<td>no</td>
</tr>
<tr>
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<td>19</td>
<td>8</td>
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</table>
The Fiber Blade

The fiber blade is designed as a powerful Ethernet point-to-point (E-P2P) FTTH access switch with all the functions required to ensure modern multimedia services for residential and business customers. The built-in multicast intelligence is provided as a support for the most up-to-date video applications, such as IPTV, HDTV and video conference connections.

Secure networking and seamless QoS.
Services and users are separated by means of various VLAN functions; the blades themselves also make it possible to arrange the user traffic of different services via different service VLANs, VPNs or data paths for multiprovider environments. A large majority of the security, QoS, VLAN and IGMP features, as defined by the DSL forum standard TR-101, are implemented in the SI3000 MSAN fiber blades.

The FE Fiber Blade
The FE Fiber Blade features 24 Fast Ethernet point-point single fiber subscriber ports in two variants. The first variant is based on the industry standard optical technology where 24 ports are available in a double slot blade solution. It provides excellent reach with very high symmetrical transmission speeds even in harsh environments (humidity, lightning strikes, electromagnetic interference ...).

The second variant is based on compact SFP (cSFP) modules which double the density of optical ports in the shelf, support diagnostic of optical lines and improve flexibility.

The FE Fiber Blade provides the rich functionality needed in intelligent services access networks. Eight egress queues per port enable the differentiated and future proof management of up to eight service types.

The optical interfaces provide symmetrical transmission speeds.
The VDSL2 Blade

To accommodate the bandwidth requirements of Triple Play and interactive services, service providers are extending fiber deeper into the access network. Typically, this is not a pure FTTH solution but a hybrid approach whereby fiber is fed to a remote access node, shortening the copper connection to the home.

This approach leverages the existing copper infrastructure and bridges the bandwidth gap between fiber and copper, while avoiding the cost and time of deploying fiber all the way to the premises. It is anticipated that remote DSLAMs will support multimode operation with different types of subscribers. One the most important is be VDSL2.

The VDSL2 Blade features 32 VDSL2 subscriber ports. Using highly flexible network processor, it offers advanced network functionalities. With its fully standard compliant and state-of-the-art VDSL2 technology it is ideal solution for connecting residential home and corporate users.

The latest VDSL2 technology gives up to 150 Mb/s aggregated data rate on short lines. Multimegabit service is available even on longer lines well above 3,5 km. ADSL2+ fallback enables coexistence of VDSL2 and ADSL2+ service.

Retransmission is the latest and extremely effective technique in case of the most severe impulse noise problems, and thereby assures smooth IPTV service even on very low quality copper pairs.

<table>
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<th>Profile</th>
<th>down</th>
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<td>56 Mb/s</td>
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</tr>
<tr>
<td>12a</td>
<td>57 Mb/s</td>
<td>32 Mb/s</td>
<td>YES</td>
</tr>
<tr>
<td>12b</td>
<td>57 Mb/s</td>
<td>32 Mb/s</td>
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</tr>
<tr>
<td>17a</td>
<td>100 Mb/s</td>
<td>50 Mb/s</td>
<td>YES</td>
</tr>
</tbody>
</table>
The ADSL2+ Blade

ADSL2+ blades provide a high-bit-rate connectivity service in order to build the foundations for all the other multimedia services and support an operator’s plans to deliver services to its end customers. Each blade enables the separation of services and users by means of different VLAN functions. It also distributes the user traffic generated by different services to different service VLANs or data paths.

Seamless QoS
The quality-of-service mechanism is based on VLAN. Multiple service queues and scheduling mechanisms are defined to provide prioritization of delay-sensitive traffic, forwarding of mission critical data and to exclude the starvation of handling low-priority services. Manipulating QoS parameters inside Ethernet packets (in compliance with IEEE 802.1p), the blades enable simultaneous high-quality triple-play services.

Splitters
The splitters combine the ADSL2+/VDSL2 signals and the POTS or ISDN signals for common transmission over a physical DSL and split signals to terminate them on the relevant subscriber boards. They use filters for different line impedances and modulation technologies. The combo-splitters are also provided, to enable a simultaneous POTS or ISDN service. They are provided in two forms: as a board variant or as specially designed single-circuit low filters designed for the MDF unit.

An ADSL2+ blade with 64 universal ADSL2+ ports enables the replacement or upgrading of POTS or ISDN telephone access with multi-service broadband access. Different types of ADSL are supported (ADSL, ADSL2 and ADSL2+, Annex A, B, L and M), as are the appropriate splitters.

Strong Multicast Support
The ADSL2+ blade provides the necessary processing power for multicast signaling and the replication of multicast traffic to the allocated user port. The support of advanced services, such as IPTV, is guaranteed.

Industry-highest densities
With 1216 ADSL2+ ports per shelf (MEA 20) and 7296 ADSL2+ ports per two ETSI racks, and a floor space of 60x60cm, the Iskratel ADSL2+ Blade offers the highest available subscriber density on the market.
The SHDSL Blade

The SHDSL blade with 32 ports enables the use of a copper pair for symmetrical broadband access, primarily for business customers and the connection of remote, compact SI3000 MSAN nodes over copper.

The SHDSL blade is well suited for interconnection of smaller branch offices where fiber access is either not available or uneconomical.

Remote LAN access is typically used by telecommuters and in the SOHO environment to access the corporate network.

This technology is also applicable to campus locations to interconnect between buildings such as hospitals, universities, and airports. In these applications, data packets are exchanged symmetrically in both directions.

Unlike ADSL2+, SHDSL technology can achieve higher rates at longer distances, and it also supports the use of signal repeaters. This enables users outside the range of ADSL to be offered a DSL service, where in the past this service could not be provided.
The POTS Blade

The POTS blade provides 64 ports of standard-loop service for residential and business subscribers. By supporting all the voice features needed, the POTS blade bridges the gap between circuit and packet networks. It is controlled by a TDM switch over V5.2 on an Access Gateway blade or a softswitch by means of the MGCP, H.248, SIP protocols.

The POTS blade is the perfect solution, enabling operators to upgrade their cores to a next-generation IP network, while still keeping the existing subscriber infrastructure in place.

The blade supports audio codecs: G.711 (A-law and μ-law), G.723.1, G.726 and G.729 A / AB, which are selected as requested during the operation. It also supports a number of fax and data codecs: G.711 (A-law, 64 kb/s), G.711 (μ-law, 64 kb/s), and FAX T.38.

The voice packets' length (RTP) to be encoded with a particular encoder can be set via the SI3000 MNS.

During voice transmission, two mechanisms for providing the quality of service (QoS) are taken into account: the priority mechanisms in conformance with IEEE 802.1Q/p and DiffServ.

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**Industry-Highest Densities**

With 1216 POTS ports per shelf (MEA 20) and 7296 POTS ports per two ETSI racks, and a floor space of 60x60cm, the Iskratel POTS blade offers the highest densities on the market.

The POTS blade is field proven and ensures seamless interworking with the SI3000 Call Server from day one. Its interoperability with third-party softswitches has already been proven.
The POTS/ADSL2+ Combo Blade

The Combo blade includes 48 combined POTS and DSL ports. The blade’s architecture delivers both traditional voice and new broadband data services on every line without compromising line densities or requiring one type of service to be traded off against the other.

Since both DSL and POTS interfaces already reside on every line, there is no need for physical intervention or reconfiguration at the access node. Instead, by juggling with the allocation of system resources to get the right mix of POTS and DSL capacity, carriers can simply administer the required services through software commands in a remote management system.
The WiMAX Blade

Service-area range of up to 50 km

WiMAX blade provides broadband wireless connectivity to fixed, nomadic and mobile users within a service-area range of up to 50 km. It is a carrier-class platform that delivers high bandwidth to support business and residential users with broadband-type connectivity with a single base-station.

Full Coverage
The blade is based on top-notch technologies such as OFDM modulation, which also guarantees system performance in LOS and NLOS deployment conditions (i.e., the urban environment). The main components of the WiMAX architecture are the Subscriber Station (ST) and the Base-Station (BS), which are managed by the MN in the same way as other SI3000 products.

Mobility Evolution
The SI3000 WiMAX deployment architecture supports the use of fixed 802.16d and mobile 802.16e WiMAX subscriber stations. The Iskratel way of WiMAX deployment proposes the coexistence of both technologies and the future evolution of mobile-multimedia service delivery. The use of .16d and .16e technologies represents a route to fully mobile 4G network solutions.

Complementary to Wireline Connectivity
Because of its architecture, interfaces, and simple network integration, it is designed to deliver high-quality voice and high-speed internet access, including streaming data services. This solution represents a cost-effective, wireless complementary solution to wired xDSL systems. The SI3000 MSAN WiMAX solution delivers broadband services to residential users, SOHO and SME with high performance and low costs for coverage and high spectral efficiency for capacity.
The Access Blade is provided with 16 E1 2-Mbit/s ports for connection to the TDM switching circuit. Its function is to divert the voice traffic of IP subscribers toward a conventional TDM exchange in the TDM network.

The blade comprises a media gateway and a signaling gateway. The media gateway provides the conversion of TDM media strings to a digital audio stream of data packets (RTP) and vice versa.

The signaling gateway provides the conversion of V5.2 signaling to IP signaling (MGCP, NCS, and H.323) used for subscriber control. It is connected to the TDM network via 16 E1 links and to the IP subscriber network via 2 GE interfaces.

The blade is scalable and allows gradual implementation steps by 8 or 16 2 Mb/s links, up to a total of 16 2 Mb/s links.
The 10G Ethernet Switch Blade is the central blade for SI3000 MSAN. With its two 10 GE and four GE Combo modular network interfaces it is a Carrier Class and future safe Ethernet switching and aggregation platform for MSAN blades and external network elements, with advanced network functionalities. It offers both extremely high bandwidths and flexibility in building various network topologies like subtending or Ethernet rings.

The Ethernet switch provides up to 4 GE and 2 10 GE interfaces.

IP Multicast and Advanced QoS Support
The 10G Ethernet switch blade provides advanced network security-enabling services. It ensures subscriber privacy and prevents coincidental or malicious attacks.

The built-in multicast intelligence is available as a support for the most up-to-date video applications, such as IPTV, HDTV and videoconference connections. It enables the management and reduction of multicast signaling information and the replication of video streams on a dedicated path.

In redundant configurations of the SI3000 MSAN, the 10G Ethernet Switch uses EAPS resiliency protocol for large ring network topologies.

Benefits:
- 32k MAC table
- EAPS: sub 50 ms resilience in large ring solutions
- shelf management
- support for advanced multicast features
PACKAGING OPTIONS

Scalability and seamless integration

The SI3000 MSAN is available in seven different sizes/shelves, each provided with the most up-to-date cooling technology and centralized supervision, which ensures the appropriate temperature of a fully equipped shelf during operation. Each shelf is provided with a shelf-management system that ensures different parameter measurements, configuration of the system functions and the appropriate temperature of a fully equipped shelf during operation.

**Central Office (CO)**
The scalable MEA platform has designated plug-in positions for the fabric and service blades that provide the flexibility of the final node configuration. Simple upgrading of the different MSAN product applications and the replacement of individual blades can be done during the system operation. The redundancy and the fully exploited capacities (fully equipped) can be achieved within the same shelf, which places the multi-service platform among the leading systems in the world.

**CO SI3000 MSAN packaging options:**
- MEA 20 - 9U packaging with 20 plug-in positions for ETSI rack mounting
- MEA 10D - 6U packaging with doubled Ethernet Switch for 19” and ETSI rack mounting
- MEA 10 - 6U packaging with 10 plug-in positions for 19” and ETSI rack mounting
- MEA 10 Wall - wall-mounted shelf, with 10 plug-in positions
- MEA 6 - 4U packaging with 6 plug-in positions for 19” and ETSI rack mounting
- MEA 3 - 2U packaging with 3 plug-in positions for 19” and ETSI rack mounting
- MEA 1U - with 1 plug-in position for stand-alone and 19” rack mounting

**Closer to the Customer**
A smaller shelf can be deployed closer to the user, thus providing higher-bandwidth-demanding services to a wider area. During the deployment of a high-bandwidth connection between the CO and the remote MSAN some copper pairs can become freely available.
CABINETS

Outdoor Unit Medium (ODU-M)
The compact Iskratel Outdoor Shelter (ODU-M) is designed for the optimal and cost-efficient building of rural, suburban and urban networks.

The advantage of the ODU-M shelter is that it fits with all the equipment required for undisturbed and autonomous operation. The shelter excels in terms of its extremely low power consumption, small mounting space, maximized capacity and very easy maintenance.

The ODU-M shelter accommodates a battery-supported power-supply system, an integrated distribution frame, a heat exchanger and elements for the protection and management of the system operation. All the system elements are managed by a central SI3000 MNS management node.

Small Outdoor Unit (ODU-S)
The ODU-S shelter represents a very cost-optimized (half the prices of ODU-M) sheltering solution with only 45 cm of depth, full vandal resistance, a steel construction and 24-hour battery support for the POTS subscriber lines.

A fully equipped ODU-S shelter connects up to 128 VDSL2, 192 ADSL2+ or 576 POTS subscribers.

Indoor Unit Medium (IDU-M)
The indoor cabinet for broadband applications protects the remotely located SI3000 MSAN nodes that are placed in multitenant buildings or other locations near the subscribers.

The IDU-M is an ideal solution when shortening the end-user connections. Various FTTB deployment scenarios represent an economically optimized way of spreading the highly capable subscriber connections.

A single indoor shelter supports the connection of up to 216 VDSL2 or Fast Ethernet, 240 ADSL2+ or 384 POTS subscribers. Every IDU-M shelter is centrally managed, equipped with a 24-hour battery-power feed backup for POTS lifeline and is compatible with Iskratel’s remote power-supply system.

REMOTE POWER SUPPLY
The Iskratel Remote Power System is designed for powering remotely located network elements over twisted pairs (RFT). Such a solution utilizes already available abundant pairs and is therefore a cost- and time-optimized way of supplying the power. Remotely powered access nodes are an ideal solution for suburban and rural areas.

SELECTIVE POWER CONTROL™
The power-supply system includes a cost-saving option for lifeline support in cases of electrical blackouts. If an electrical blackout happens, the batteries power only the narrowband (voice telephony) interfaces, and unnecessary data connections are shut down. By using this mechanism, the lifetime of the batteries is significantly prolonged.
The SI3000 Management System (SI3000 MNS) provides operators and network administrators with a unified, powerful, scalable management system that enables them to have cost effectively realized the control over thousands of network elements from a central location.

The SI3000 MNS consists of a set of applications that share a unified graphical user interface and are accessible from the top-level application, the Management Center:

- **The Management Center** provides operators with a user-friendly, highly customizable, graphically oriented and permissions-based environment. Furthermore, it supports inventory management, central security policy management, topology data maintenance, and common maintenance operations. As already mentioned, the Management Center allows access.

- **Network Element Managers** provides basic Fault, Configuration, Accounting, Performance and Security (FCAPS) Management functionality for all types of managed network elements.

- The provisioning is greatly simplified with a built-in Auto-Configuration Server (ACS). Using ACS, operators gain the benefits of the automatic configuration of installed network elements, automated software upgrades, faster element replacements, all contributing to a significant reduction of operating costs. The ACS for all SI3000 MSAN blades is compliant with the DSL Forum’s TR-069 specification.

- **The Fault Manager** is a dedicated alarm surveillance application that enables hierarchically structured views of the managed network, including the graphical presentation of the statuses of managed elements. The Fault Monitor provides a centralized alarm life-cycle support, reporting mechanisms, on- and offline analysis of events in the network and fully-featured alarm handling.

- **The Performance and Quality Manager** deals with the aspects of performance data collection, analysis and presentation. It provides alerts for crossed thresholds set for particular performance variables, online statistics and history analyses. The application prepares technical and executive reports, the mediation of quality-of-service measurements and trend analyses.

**Central management database**

The centralized architecture of the supervision and administration of the network elements using the SI3000 MNS enables access to all the management functionalities without the need to know where the actual subscribers and other resources are physically located. SI3000 MNS enables a homogenous view of all the network elements of the same version as it were just one network element. Mass provisioning enables the operator to apply actions on multiple network elements, and wizards are available for the most frequent and complex operations.
Northbound and southbound integration
The SI3000 MNS supports northbound integration with Operations Support Systems (OSS) for fault and inventory management, service provisioning and network assurance and Business Support Systems (BSS) for billing and customer care.

Third-party network elements can be also integrated into the SI3000 MNS using the mechanisms provided for the southbound NE integration.

Scalable Deployment
The SI3000 MNS can be installed on cost-effective HW platforms according to the requirements for a particular network-management installation. To manage a small network the SI3000 MNS is installed on a single server platform. A very large network requires SI3000 MNS distributed installation in a multi-blade server hardware architecture. Cluster operation is available for a fault-tolerant or disaster-tolerant management and monitoring solution.

Highlights of the SI3000 MNS
- Centralized supervision and management of Iskratel and third-party network elements,
- Supported integration with Operations Support Systems (OSSs) and Business Support Systems (BSSs),
- Unified graphical user interface among all families of Network Elements,
- Mass provisioning and wizard-based operations,
- Auto-configuration server (ACS) functionality,
- Multi-user management environment,
- Expandable system capacities,
- Reduced OPEX.
Iskratel develops integrated telecommunications solutions for the information society. With 60 years of experience in telecommunications it ranks among the important high-tech companies in the world.

The company provides integrated telecommunications solutions for fixed and mobile telephony, next generation networks, and management systems for telephone networks. Bringing together experience and intellectual capital with creativity and innovation makes it possible for Iskratel to successfully build conventional telecommunications networks and next generation networks and, recently, to upgrade existing systems to IMS technology.

Iskratel’s SI3000 brand portfolio consists of three main product families:
- SI3000 Access Plane product family
- SI3000 Control Plane product family
- SI3000 Application Plane product family

OUR EXPERIENCE - YOUR SUCCESS