

Application Note



Voice Services with KEYMILE's MileGate – POTS, ISDN, V5.2 and VoIP Services in Next Generation Networks

MileGate 2500 IP-MSAN provides:

- H.248/MEGACO subscriber media gateway for POTS and ISDN (using SIGTRAN)
- SIP subscriber media gateway for POTS and ISDN
- V5.2 protocol converter
- Scalable and carrier-grade reliability
- Universal POTS line card for different country requirements worldwide
- ISDN line cards support 2B1Q and 4B3T ISDN line coding
- COMBO solution providing simplified POTS/ADSL2plus delivery

Providing Access to Voice Services

IP Multi Service Access platform

The Next Generation Networks (NGN) and IP Multimedia Subsystem (IMS) coupled with an advanced and flexible access solution is the cornerstone for major public telecom operators to deliver new and existing services. With voice services as a basic offering of these operators, the next generation access networks have to support all different implementations of telephony – POTS, ISDN, V5.2 and VoIP.

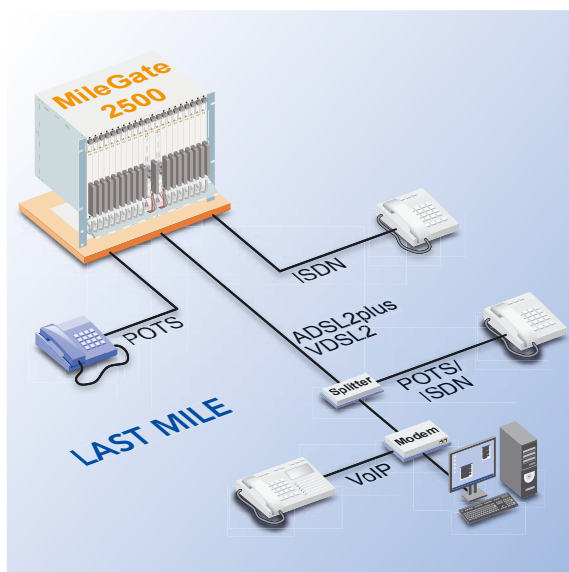


Figure 1: MileGate voice services

MileGate – Deliver carrier-grade Voice in NGN

MileGate excels in delivering voice services in NGN to the last mile. The voice services and functions are part of the MileGate IP-MSAN service delivery that also includes residential broadband, Triple Play and business services.

The MileGate voice solution ensures the deployment of NGN and VoIP technologies without interrupting existing voice services or changing the Last Mile infrastructure. This is a significant advantage of MileGate as operators can introduce new high-speed data services without compromising their existing POTS and ISDN end users.

It is designed to work with today's softswitches using H.248/MEGACO or SIP and industry

leading Class 5 switches using V5.2. This approach is perfectly in tune with today's deployment concepts where most operators still use Class 5 switches but require a smooth migration from TDM to packed base voice services.

Simplify NGN Convergence in Access Network

The principle behind the MileGate voice solution is simple. Voice subscriber line cards offer POTS or ISDN-BA services to end users.

Due to the hybrid TDM/Ethernet backplane and the configurable voice gateway unit MileGate is able to packetise the voice traffic in media streams and signalling streams or convert the voice traffic in a V5.2 interface.

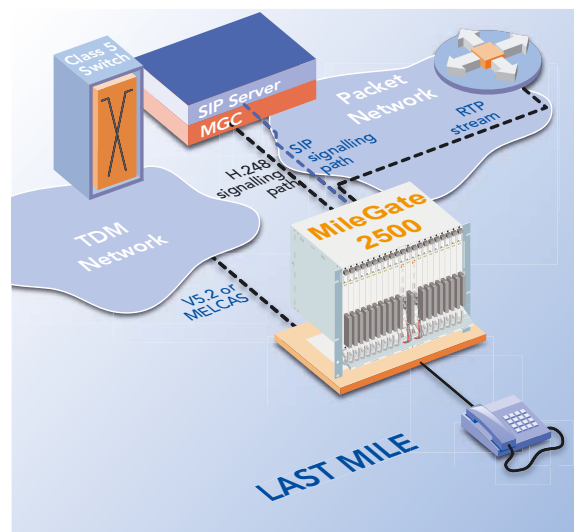


Figure 2: MileGate voice services: Signalling and data

Flexible in Voice Protocols

Recognising the importance of H.248/MEGACO and SIP VoIP protocols in NGN, the MileGate voice solution fulfils both scenarios effectively. The mainstream deployment confirms that H.248/MEGACO and SIP will be the dominant VoIP signalling architecture in the NGN and IMS (IP Multimedia Subsystem) scenarios defined by ETSI-TISPAN.

These two VoIP protocols supported on MileGate play an important role in their respective domains:

- **H.248/MEGACO** – The protocol is widely used in the NGN telephony architecture. It is the preferred protocol between two key components in NGN: the Media Gateway Controller (MGC) and the Media Gateway. NGN telephony is a proven and popular architecture adopted by major public telecom operators.
MileGate plays the role of an access Media Gateway, connecting last mile subscribers to the IP network. It converts POTS signalling to H.248/MEGACO. To ensure reliability transport of ISDN signalling, it uses SIGTRAN protocol. The voice media streams are packetised to RTP (Real Time Protocol) streams. As a result, the signalling and media streams are now ideal for transport over the packet network
- **SIP** – When the service range is dominated by multimedia services, SIP protocol is often the operators' choice. The simplicity and transport media type agnostic characteristics of SIP make it effective in handling multimedia sessions, including voice. It is also a fundamental component in the IMS. The main SIP entities are the user agent and the SIP servers.
MileGate plays the role of a user agent in the SIP architecture. It connects POTS subscribers to the IP network, packetises POTS signalling to SIP and the voice media streams to RTP streams and transports them over the IP network.

To offer a simple and smooth migration from TDM to packet based services the support of the V5.2 protocol is still important.

- **V5.2** – Many operators still use V5.2 exchanges in their network in parallel with the NGN deployment with the plan to migrate the voice services on the NGN platform sooner or later. The V5.2 protocol is used for the connection of an Access Network (AN) to a Local Exchange (LE). The V5.2 protocol provides bearer channel concentration capability within the AN. MileGate plays the role of the AN to convert and concentrate the POTS and ISDN voice traffic in several V5.2 E1's with a concentration ratios of 4:1 or 8:1.

Cost effective Deployment

The MileGate voice architecture ensures the freedom of the operators to migrate easily from V5.2 to H.248/MEGACO or SIP. Operators keep the same POTS and ISDN-BA line cards and can migrate seamlessly from TDM (V5) to VoIP (H.248/MEGACO or SIP) voice service, while the voice gateway unit offers the V5.2, H.248/MEGACO or SIP protocol through optional software downloads

Modules for efficient Voice Solutions

MileGate provides a complete set of modules for tailored voice solutions:

- **SUPM3**: Line card providing 32 POTS interfaces
- **SUPC3**: Line card providing 32 POTS with on-board ADSL filter interfaces
- **SUIQ1**: Line card providing 16 ISDN interfaces (2B1Q)
- **SUIT1**: Line card providing 16 ISDN interfaces (4B3T)
- **LOMI8**: Transmission card providing 8 E1 interfaces (G.703/G.704)
- **PCOM1**: V5.2 Voice Gateway
- **IPSM2**: VoIP Media Gateway (H.248/MEGACO)
- **IPSS2**: VoIP Media Gateway (SIP)

Quality of Service

A key factor in a successful voice application over a packet switched network is Quality of Service (QoS). The VoIP Gateways use Differentiated Services (DiffServ) to provide prioritisation of the VoIP traffic; it marks packets with a particular DiffServ Code Point (DSCP).

The DSCP can be mapped to the decisive QoS label in the packet network, for example the Label Edge Router (LER) in an MPLS networks maps it to the QoS field or the MileGate COGE maps it to the 802.1p prioritisation bits of the Ethernet frames.

The perfect Solution for traditional Voice and IP Voice

Whether operators are looking to provide traditional voice services (POTS & ISDN-BA) or IP voice services (via DSL CPE), the MileGate delivers.

Two main network scenarios with the MileGate voice solution are:

Traditional Voice Solution

If MileGate is used as a V5.2 concentrator (see figure 3):

1. MileGate delivers POTS/ISDN-BA (SUPx3/SUIx1) services to the subscriber.
2. MileGate concentrate POTS and ISDN to the V5.2 protocol (PCOM1).
3. MileGate transport the concentrated voice traffic via E1 (LOMI8) to the local exchange.

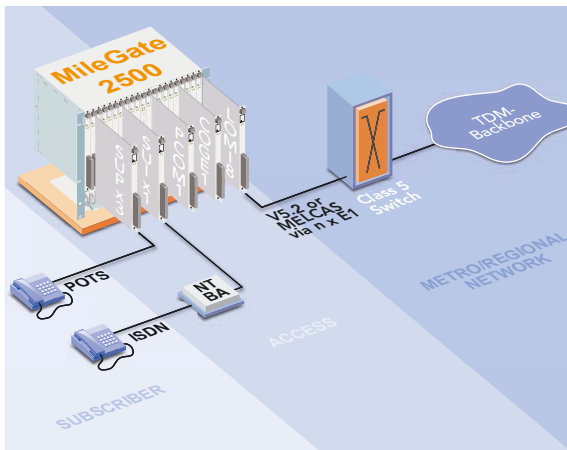


Figure 3: Legacy voice services via 5.2 with MileGate

If MileGate is used as a VoIP Gateway (see figure 4):

1. MileGate delivers POTS/ISDN-BA (SUPx3/SUIxQ1) services to the end user.
2. MileGate converts POTS signalling to NGN signalling (H.248/ MEGACO with IPSSM2 – SIP with IPSS2).
3. MileGate packetises 64k voice media to RTP stream.
4. Signalling and media are transported over IP network.

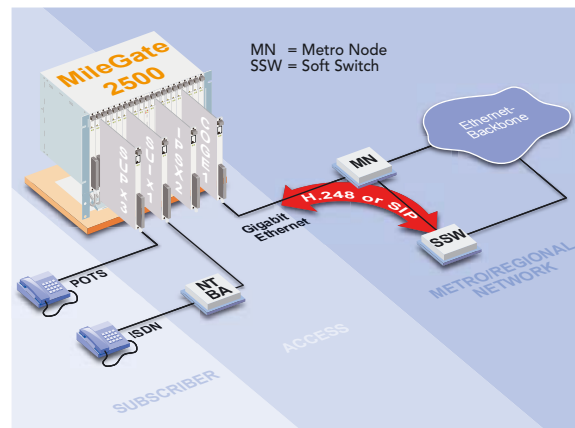


Figure 4: Migration of legacy voice services

IP Voice Solution

If MileGate is used as an IP DSLAM:

1. MileGate delivers DSL connectivity (ADSL2plus or VDSL2) that carries VoIP traffic, together with other broadband services.
2. MileGate transports the SIP signalling and VoIP RTP stream transparently.
3. No translation of media stream or H.248/ MEGACO/SIP signaling on the MileGate.

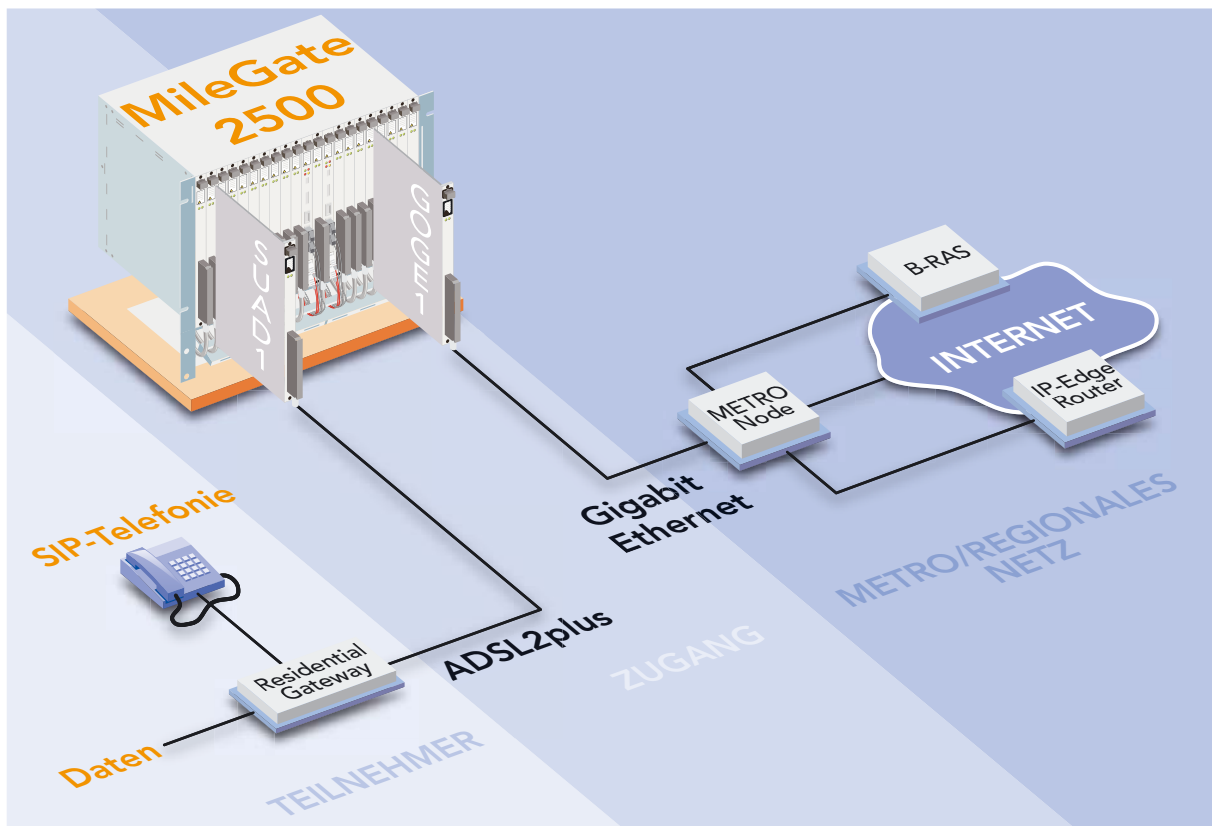


Figure 5: Voice over DSL solution with MileGate

COMBO Solution makes Things easier

The COMBO solution on the MileGate is another deployment method that suits operators who generally deliver both, POTS and ADSL services on each provided DSL line. It offers a scalable and easy delivery of POTS and ADSL/2/2plus services to end users with simple and flexible installation.

Equipped with on-board filters, the solution simplifies the wiring at the DSLAM locations, saves port usage on the DDF (Digital Distribution Frame) and eliminates the external CO splitter installation. Moreover, it provides full flexibility of service deployment in both COMBO and single service. Operators also have the complete freedom to choose the corresponding Protocol/Media Gateway unit to uplink their voice traffic.

Maximising your Service Potential

Whether you are looking to offer POTS, ADSL or bundled services to your residential customers, MileGate and its service units provide an ideal architecture. Besides this both Residential and Business services are delivered from the same MileGate platform.

Carrier-Grade Solution

MileGate is toughened for outdoor applications and features redundant power supply and control cards to ensure carrier grade performance.

Management System

The management of the MileGate and its various types of services is centralised under the umbrella of the MCST/UNEM system. By having one element manager for all types of services, operators save costs and can accelerate the provisioning process.

