KEYMILE Product News

UNIS Days
October 2012
Company Introduction

MileGate Platform

- New Product MileGate 2200
- Core and Transmission Units
- xDSL Boards
- Ethernet boards
- Voice Boards
- Legacy Service Boards

LineRunner   CPEs for MileGate and UMUX Platforms

Conclusion
KEYMILE is a strong partner for innovative telecommunications services

- KEYMILE is one of the leading manufacturers of data transmission systems

- KEYMILE products application scope
  - Access networks of public telecommunications providers
  - Telecommunications networks of private companies, e.g. energy suppliers or railway companies

- More than 100 years of experience in telecommunications

- 11 offices worldwide for local sales and services

- Own production facility in Germany

KEYMILE is a strong partner for innovative telecommunications services
KEYMILE specialises in:

- multi-service applications that typically require multiple telecommunication systems
- individual network migration of legacy services to Ethernet/IP
- maximum availability in mission-critical applications
- customised solutions
- innovative and high-quality product development
KEYMILE – Satisfied Customers worldwide

- What we’ve achieved
  - More than 100,000 access elements shipped worldwide
  - More than 17 million ports installed
- Technical leader in the IP-MSAN segment
MileGate Platform
Motivation

- Growing number of small FTTC projects, to close the white spot areas
- Very cost optimised VDSL2 access point for areas with only few subscribers
- Small footprint with highest port-density – 2 HU housing with up to 4 line cards
- Cost optimized core unit (COGE6) in the remote location
- Completely integrated in MileGate platform concept
- MCST/UNEM for management like for local line cards
MileGate 2200 chassis

- 2 HU
- 283 mm deep
- 483 mm wide

19”-rack or wall mounting
FTTE + MileGate 2200

MileGate or aggregation switch in the exchange

remote MileGate 2200
Technical Data of the MileGate 2200

- Components of the solution
  - 2 HU remote housing, outdoor applicable, for four line cards
  - COGE6 as central line card

- Following line cards are supported
  - SUVM6 (48 port VDSL2)
  - SUAD5 (64 port ADSL2plus)
  - SUE16 (24 port active optical Ethernet)

- Same DSLAM functions and management like using subracks 23x0 and 25x0

- 48 V power supply

- Operational temperature range: -20 to +60 °C
Benefits with MileGate 2200

- Cost-efficient solution for areas with only a few subscribers
- Outdoor applicable, can operate in street cabinets
- Identical line cards in MileGate 2200 as in MG 23x0 or 25x0 – same management, same spare parts → no additional training
- Line card can be reused in MileGate subracks if location has to be expanded in the future → no additional stock holding
- Up to 144 VDSL2 subscriber connection in one MG 2200
- Completely integrated in the UNEM management system
- Available Q2/2013
Introducing MileGate Access Platform

- **UNEM**
- **EMS NMS**
- **Micro-DSLAM**

**IP-MSAN**
- 19" / 8 HU / 21 slots
- Any-service-any-slot concept
- 5120 POT lines or 1920 optical Ethernet lines per 19" rack
- Indoor and outdoor

**IP-MSAN**
- 19" / 4 HU / 8 slots
- 32 to 384 POTS lines or from 12 to 168 opt. Ethernet lines per subrack
- Horizontal or upright installation
- Indoor and outdoor

**IP-DSLAM**
- 19" / 2 HU / 4 slots
- 144 xDSL lines or from 16 to 72 opt. Ethernet lines per subrack
- Horizontal installation
- Indoor and outdoor

- FTTB VDSL2 NTU
- 8 VDSL2 ports with 100 Mbps
- Cascading and ring connection
- Fanless operation, no noise

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Core and Transmission Units

- Core Unit COGE3
- SDH STM1/4/16
- Transmission Unit NUSA1
Core Units – COGE3 / COGE4

- **COGE3 (available)**
  - Same functionality as COGE1, but with
  - 2 optical uplink ports SFP+
    - 10GbE uplinks via SFP+ usage
    - 1GbE uplinks via SFP usage
  - 3 electrical uplink / subtending ports with RJ45
    - 10Mbit/s, 100Mbit/s, 1Gbit/s speed
  - 1 GbE and 10 GbE link towards redundant COGE3 supported, otherwise 1GbE connections to SUs

- **COGE4 (available Q1/14)**
  - Will be with 2x 40 GbE uplinks and with GbE/10GbE backplane connectors
    - Can use 1GbE or 10GbE to the Service Units
    - Fitting to the 10 GbE chassis MileGate 2510 and MileGate 2310

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MileGate Core Unit Evolution Steps

COGE1: 1GbE uplinks, 1GbE backplane

COGE2: Feature identical with COGE1 - no sales item -

COGE3: COGE1 with 10GbE uplinks and 10GbE to redundant COGE3

COGE4: new switch component to be used

1GbE uplinks
1GbE backplane

2x 10GbE uplinks
1GbE backplane (10GbE to redundant COGE3)

2x 40GbE uplinks
GbE/10GbE backplane

Outlook
MileGate NUSA1 is a SDH/PDH unit with EoS, TDM aggregation and Add/Drop multiplexing in MileGate

NUSA1 provides transport of TDM and Ethernet traffic over SDH STM-16, STM-4 or STM-1

NUSA1 offers different ways for the data connection:

- Access to TDM bus, for interconnection of TDM service units via the backplane
- Access to the GbE star, for interconnection of Ethernet service units via the backplane (with COGE5)
- Front connectors for direct connection of Ethernet equipment
NUSA1 enables the support of TDM SDH transport up to STM-16

All TDM applications can be realised in parallel with the Ethernet applications and transport capabilities of MileGate

NUSA1 allows a smooth migration from SDH networks to Ethernet networks

NUSA1 is part of MileGate Chassis Switching Architecture

NUSA1 supports Layer 2 and Layer 3 switching (RSTP/MSTP)

NUSA1 can be used in the following subracks

- MileGate 2510
- MileGate 2310
Main Features of NUSA1 (1/2)

- **NUSA1** is a powerful one slot solution for provision of several interfaces on the MileGate platform
  - STM-16/STM-4/STM-1 interfaces
  - EoS (Ethernet over SDH)
  - 2 Mbps and n x 64 kbps encapsulation to VC-12 and mapping into STM-16/4/1
  - Transport of management traffic in SDH overhead (DCC channel)
  - Onboard Layer 2 switching of Ethernet traffic

- **Fanless operation supported with a variant of NUSA1**
Main Features of NUSA1 (2/2)

- **NUSA1 provides up to 64 x 2 Mbps TDM backplane connections for**
  - terminated/transparent 2 Mbps user traffic
  - n x 64 kbps user and/or management traffic

- **4 x Ethernet front interfaces for direct EoS services**

- **Several protection mechanisms**
  - 1+1 Equipment protection (EQP), additionally giving the double number of SDH interfaces
  - Multiplex section protection (MSP), combinable with EQP
  - Subnet Connection Protection (SNCP)
  - SETS (Synchronous Equipment Timing Source) equipment protected
  - LCAS (Link Capacity Adjustment Scheme) for EoS transport
Benefits with NUSA1 (1/2)

- NUSA1 allows the coexistence of TDM SDH transport and Ethernet transport in one subrack
  - Allows the operator to benefit from the advantages of packet-based and SDH networks from the same platform
  - Securing the revenues from traditional TDM services
- With NUSA1 network operator can benefit from the advantages of packet networks and can still offer traditional TDM services to their customers
  - E1/X.21/V.35 leased lines
  - TDM PBX connection
  - V5x voice links transport
Benefits with NUSA1 (2/2)

- NUSA1 allows the transport of TDM as well as Ethernet services over SDH
- Only one slot is required to support several services
  - STM-16 aggregates
  - STM-4 aggregates
  - STM-1 aggregates and tributaries
  - EoS (Ethernet over SDH)
- Easy upgrade from STM-1 to STM-4 and STM-16
- NUSA1 can be used in the following subracks
  - MileGate 2510
  - MileGate 2310

Revenue: $$$ Gain
OPEX: Save $$$

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xDSL Boards

- VDSL2 Boards SUV11/SUVM6/SUV31
- ADSL2+ Boards SUAD5
Introduction SUVM6/SUV11/SUV31

- The flexible line cards provide high-speed VDSL2 services in MileGate

- One line card provides

  - SUVM6/SUV11: 48 ports VDSL2 with 8, 12, 17 MHz profiles, Profile 30 for 24 Ports (available)
  - SUV31: 96 ports VDSL2 with 8, 12, 17 MHz profiles, Profile 30 for 48 Ports, 2 Slot unit with vectoring unit on board (available Q2/13)
  - all variants are switchable via software

- Highest bandwidth via copper cables

- The line cards are optimised for

  - High-speed residential Triple Play applications
  - FTTC (Fibre-to-the-Curb): VDSL2 out of a street cabinet
  - FTTB (Fibre-to-the-Building): In-house VDSL2
  - Symmetrical broadband business services
Main Features of SUVM6/SUV11 (1/2)

- **Support of a wide set of bandplans and profiles**
  - For high bandwidth (17 MHz profiles) to long reach (8 MHz and 12 MHz profiles)
  - Very high bandwidth with 30 MHz profile
  - Symmetrical or asymmetrical transmission (profiles/bandplans)
  - Profile auto selection support

- **ADSL/2/2plus fallback mode with automatic detection if VDSL2 or ADSL/2/plus CPE is connected**

- **Various line test functions**
  - SELT (Single Ended Line Test)
  - DELT (Double Ended Line Test)
  - MELT (Metallic Line Test) – only with SUVM6
Main Features of SUVM6/SUV11 (2/2)

- VLAN and QoS functions for secure data transmission and precise scheduling
- Enables (even multiple) IPTV in high definition due to highest bandwidth and multicast function
- State of the art design – very low power consumption
- Compatible with standard CPEs
- Compatible VDSL2 splitter available
**VDSL2 Line Cards SUVM6/SUV11 – Main Differences**

<table>
<thead>
<tr>
<th>Feature</th>
<th>SUVM6</th>
<th>SUV11/SUV31</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of VDSL2 ports with 8 / 12 / 17 MHz profile</td>
<td>48</td>
<td>48/96</td>
</tr>
<tr>
<td>Number of VDSL2 ports with 30 MHz profile</td>
<td>24</td>
<td>24/48</td>
</tr>
<tr>
<td>Access to Ethernet-Star</td>
<td>1 GbE</td>
<td>1 GbE/10 GbE</td>
</tr>
<tr>
<td>VDSL via POTS/ISDN</td>
<td>ISDN</td>
<td>POTS</td>
</tr>
<tr>
<td>ADSL fallback mode</td>
<td>Yes, Annex B</td>
<td>Yes, Annex A</td>
</tr>
<tr>
<td>Usable in MileGate subracks 2500R1/2500R2/2510/2300/2310</td>
<td>+/+/+/+/+</td>
<td>−+/+/+/+</td>
</tr>
<tr>
<td>MELT line test</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Vectoring ready</td>
<td>Yes (external board)</td>
<td>Yes, external board/ SUV31 on board</td>
</tr>
</tbody>
</table>
SUVM6/SUV11 – FTTC very high-speed Access for Triple Play with MileGate 23x0

Very small footprint/high density

METRO/REGIONAL NETWORK

ACCESS

METRO Node

Internet

Soft Switch

Video Server

VDSL2 CPE

Telephony

Splitter

Broadband Internet

SUBSCRIBER

VOICE

INTERNET

VIDEO

Very high-speed Access for Triple Play with MileGate 23x0
Benefits with VDSL2 in MileGate

- SUVxy is a line card that supports all FTTx applications that use partially copper
  - FTTE
    ADSL2plus can be provided out of a central office with ADSL fallback mode or VDSL2 with 8 and 12 MHz Profiles
  - FTTC
    VDSL2 out of a street cabinet can be provided with 17 MHz profile
  - FTTB
    Highest bandwidth via in-house cabling can be provided with profile 30 MHz

- Saves investment and allows to differentiate customer services (low cost ADSL and prime VDSL2) at the same time
- Smooth migration – start with ADSL and upgrade later to VDSL2 without new investments
Introduction SUAD5

- SUAD5 is high density ADSL2plus line card for MileGate
- SUAD5 offers 64 ADSL2plus ports (ADSL2 and ADSL is also supported)
- The line cards is optimised for
  - high-speed broadband access and
  - Triple Play applications
- SUAD5 is supported by the following subracks
  - MileGate 2510/2500
  - MileGate 2310/2300
Main Features of SUAD5

- Highest bandwidth with up to 27 Mbps on a single copper pair
- Support of pair bonding with up to 54 Mbps on two copper pairs *
- Up to 1280 ADSL2plus ports per subrack
- Upstream and downstream power backoff and also operator definable PSDs
- QoS functions for secure data transmission and precise scheduling
- Enables (even multiple) IPTV in high definition due to highest bandwidth and multicast function
- State of the art design – very low power consumption
- Compatible with standard CPEs

* Per ESW Update in Release 2
SUAD5 – High-speed Access for Triple Play

Optimised for Triple Play
High bandwidth, Multicast and QoS

October 2012
Page 36
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Ethernet Boards

- Opt. Ethernet Boards SUEN3, SUEN4
- Opt. Ethernet Boards SUE12, SUE16
- Ethernet Switch Board SUE18
Opt. Ethernet board SUEN3/SUEN4

- SUEN3/SUEN4 are tailored for Fiber-to-the-Home applications
- SUEN3/SUEN4 comes with 24 SFF-based (Small Form Factor) 100/1000 Base-BX interfaces
- SUEN3 comes with a RF overlay for analogue or digital CATV over the same fibre
- SUEN3/SUEN4 provides single fibre operation: only one fibre required per subscriber
- SUEN3/SUEN4 are suitable for indoor and outdoor operation
- SUEN3/SUEN4 can be operated in the following subracks
  - MileGate 2500
  - MileGate 2300
Opt. Ethernet board SUEN3/SUEN4

- SUEN3/SUEN4 offer a very high port-density of up to 480 ports fit in one MileGate 2500
- SUEN3/SUEN4 with the high port-density are ideal for the large-scale provisioning of optical Ethernet connections up to the subscriber (FTTH)
- Provision of Triple Play services (broadband Internet, VoIP and IPTV)
- Very low power consumption
- SUEN3 provides traditional CATV signals and Triple Play simultaneous
- With SUEN3 no additional equipment is necessary for CATV thanks to the on-board wavelength multiplexer
- Available today
FTTH Network with MileGate and SUEN4

ACCESS

SUBSCRIBER

POTS or ISDN Telephony

FTTH CPE

S0 or POTS

4 x Ethernet

IPTV

Set Top Box

Optical Ethernet

Up to 480 Ports per 8 HU Subrack

METRO/REGIONAL NETWORK

SUEN4: FTTH optical Ethernet line card

GbE

Core Network

METRO Node

October 2012
Page 41
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FTTH Network with MileGate and SUEN3

ACCESS

Up to 480 Ports per 8 HU Subrack

SUBSCRIBER

POTS or ISDN Telephony

FTTH CPE

4 x Ethernet

CATV (Coax)

METRO/REGIONAL NETWORK

Optical Amplifier

SUEN3: FTTH optical Ethernet line card with CATV overlay

4 x Ethernet

Optical Ethernet

GbE

Cable TV Signal

Core Network

METRO Node

CATV Transmitter

October 2012 I Page 42 © KEYMILE
Introduction SUE12

- SUE12 is tailored for advanced Ethernet services like:
  - Connections in dedicated networks
  - Business customer connection
  - FTTB (Fibre-to-the-Building) applications

- SUE12 supports 12 SFP ports for optical and electrical Ethernet with 100/1000 Mbps with Digital Diagnostic Monitoring (DDM) support

- SUE12 supports a future-proof point-to-point network architecture

- SUE12 is suitable for in-door and outdoor operation with specification surpassing industry requirements

- SUE12 can be operated in the following subracks:
  - MileGate 2510/2500R1B
  - MileGate 2310/2300
Main Features of SUE12

- SUE12 offers a high port-density of 240 Ethernet ports per MileGate 2500/2510 ideal for the large-scale deployment reducing CAPEX.
- SUE12 with SFPs enables a pay-as-your-grow solution.
- Dual star 10 GbE backplane access for high data throughput.
- Advanced Ethernet and switching functionality.
- IPv6 ready.
- SUE12 is hardware-ready for synchronous Ethernet.
- Very low power consumption with advanced power saving mode.
Introduction SUE16

- SUE16 is tailored Fiber-to-the-Home (FTTH) and Fiber-to-the-Building (FTTB) applications
- SUE16 provides high-speed Triple Play services (broadband Internet, VoIP and IPTV)
- SUE16 supports a future-proof point-to-point network architecture
- SUE16 provides 24 cSFP ports with 100/1000Base-BX10
- SUE16 is suitable for in-door and outdoor operation with specification surpassing industry requirements
- SUE16 can be operated in the following subracks
  - MileGate 2510/2500 R1B
  - MileGate 2310/2300
Main Features of SUE16

- SUE16 offers a very high port-density of 480 ports per MileGate 2500/2510 ideal for the large-scale deployment reducing CAPEX
- SUE16 with cSFPs enables a pay-as-your-grow solution
- Dual star 10 GbE backplane access for high data throughput
- Advanced Ethernet and Switching functionality
- IPv6 ready hardware
- Very low power consumption with advanced power saving mode
SUE18 – 24-Port Electrical Gigabit Ethernet Line Card
- 10/100/1000 Mbps (RJ45)
- 2 slot wide unit
- Wire-speed GbE on all ports
- 24Gbps switching capacity
- 1GbE/10GbE backplane support
- SUEN8 supported by the following subracks
  - MileGate 2500 R2, MileGate 2510
  - MileGate 2300, MileGate 2310
- Available
Voice Boards

- POTS Board SUPM5
- POTS Board SUPC5
The line cards provides analogue telephone (POTS) services in MileGate.

Two versions are available
- SUPM5 (64 ports)
- SUPC5 (64 ports with onboard splitter)

The line cards can be installed in following subracks
- MileGate 2500/2510
- MileGate 2300/2310

The line cards are used for
- TDM POTS services.
- TDM POTS services in combination with NGN broadband services (Triple Play).
POTS Board SUPM5/SUPC5

- **SUPM5/SUPC6**
  - Up to 1200 POTS(FXS) interfaces per subrack
  - Support of hot swapping
  - Enhanced line test functions
  - BORSCHT functionality: Battery feed, Overvoltage protection, Ringing injection, Supervision, Codec, Hybrid, Testing
  - Voice impedances configurable for different countries and applications.

- **NGN ready in combination with the KEYMILE’s VoIP Media Gateways**

- **Available today**
POTS Board SUPM5/SUPC5 – TDM Voice via V5.2 Links

- SUPx4: 48 x POTS
- PCOM2: V5.2 protocol converter
- 864 subscribers
- LOMI8: 8 E1 Ports

Diagram:
- MileGate 2500
- SUPx4
- PCOM2
- LOMI8
- POTS Telephony
- SUBSCRIBER
- TDM Network
- ACCESS
- METRO/REGIONAL NETWORK

October 2012
Page 53
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SUPC5 – POTS and ADSL2plus Services via H.248 or SIP Voice Media Gateway

SUPC4: 48 x POTS with integrated Filter
IPSx2: H.248 or SIP 912 subscribers

POTS-Telephony

Online-Gaming

ADSL modem

Splitter

STB

Gigabit Ethernet

H.248 or SIP

Voice

Core Network

METRO/REGIONAL NETWORK

ACCESS

METRO Node

Soft Switch

Core Network
MILEGATE FUNCTIONAL UNITS
MileGate 2510/2500 & 2310/2300 – Functional Units Overview (1/2)

**MileGate 2011**
FTTB Micro-DSLAM
8 VDSL2 Ports

**SUVD3/SUVM4**
VDSL2
32 Ports

**SUVD6/SUVM6**
VDSL2
48 Ports

**VECT1**
System Level Vectoring
192 VDSL2 Lines

**COGE3**
10 GbE Uplink Core Unit

**SUPM4/SUPC4**
POTS
48 Ports

**SUPM/SUPC5**
POTS
64 Ports

**SUIQ1/SUIT1**
ISDN 2B1Q or 4B3T
16 Ports

**SUAD3/4**
ADSL2+plus
48 Ports

**SUAD5**
ADSL2+plus
64 Ports

**IPSM3**
VoIP Media Gateway
H.248/MEGACO

**IPSS3**
VoIP Media Gateway
SIP

**PCOM2**
V5.1/V5.2
Converter

Please click the unit to get more information.

**MileGate 2011**
FTTB Micro-DSLAM
8 VDSL2 Ports

**SUVD3/SUVM4**
VDSL2
32 Ports

**SUVD6/SUVM6**
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**COGE3**
10 GbE Uplink Core Unit

**SUPM4/SUPC4**
POTS
48 Ports

**SUPM/SUPC5**
POTS
64 Ports

**SUIQ1/SUIT1**
ISDN 2B1Q or 4B3T
16 Ports

**SUAD3/4**
ADSL2+plus
48 Ports

**SUAD5**
ADSL2+plus
64 Ports

**IPSM3**
VoIP Media Gateway
H.248/MEGACO

**IPSS3**
VoIP Media Gateway
SIP

**PCOM2**
V5.1/V5.2
Converter
MileGate 2510/2500 & 2310/2300 – Functional Units Overview (2/2)

Please click the unit to get more information

- **STIM1**
  - SHDSL TDM
  - 8 Ports

- **SUSD1**
  - SHDSL ATM
  - 32 Ports

- **SUEN3/4**
  - optical Ethernet
  - 24 Ports with/without CATV Overlay

- **SUE16**
  - optical Ethernet
  - 24 Ports with cSFPs

- **CEOP1**
  - CEoP Unit
  - 8 Ports

- **ETAG1**
  - Ethernet Aggregation
  - 16 x 2M

- **LOMI8**
  - E1 G.703
  - 8 Ports

- **SUSE1**
  - SHDSL EFM
  - 32 Ports

- **SUE12**
  - optical Ethernet
  - 12 Ports with SFPs

- **SUE18**
  - electrical Ethernet
  - 24 Ports

- **SYN4M**
  - SDH Uplink
  - STM-1/4

- **NUSA1**
  - SDH Uplink
  - STM-1/4/16

**Key Milestones**

- **SHDSL**
- **ETHERNET**
- **SDH**
- **BUSINESS DATA**
Conclusion

- Multimedia capabilities including multicast for IPTV
- Smooth migration of legacy services to All-IP
- Voice media gateways for POTS and ISDN via SIP or H.248
- Multi-Service flexibility with a great variety of DSL and voice interfaces
- FTTx network architectures
- High-speed broadband services
- Extensive QoS and protection functions
- Residential and business services delivered from one node
- Small footprint, high port density, robust
- Can be used in street cabinets (outdoors)
- Scalable from a few up to thousands of subscribers

Revenue: $$$ increase

OPEX: decrease $$$

October 2012 | Page 59 © KEYMILE
KEYMILE as a specialist is the strong partner for customized multi-service access systems. We offer innovative and high quality solutions for a variety of telecommunication services.
Thank You very much for your attention 😊

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