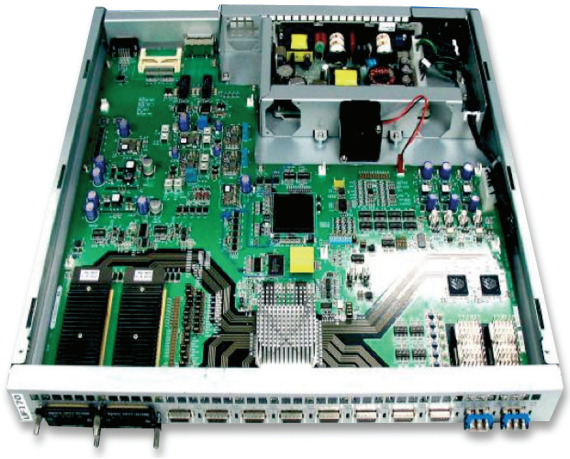
FACTSHEET
NETWORKING ASSP SOLUTIONS

FUJITSU

Networking ASSP solutions: convergence of TDM and packet switched networks in the Metro area



The reference board featuring Fujitsu's MB8AA3021 10GE switch

Description

One of the main challenges in today's telecom network designs is the smooth migration from a TDM-based network to a Packet-Switched Network (PSN). A key driver for this migration is to create a homogeneous network that uses packet technology in the core backbone, metro and access networks. This single network will provide major commercial benefits due to reduced capital and operational expenditures.

With the evolution of technology and the convergence of networks, it will become standard practice to transmit and switch data in packets in a next-generation network (NGN). Migration to NGNs, however, will be a gradual process. The existing PDH and SDH networks supporting basic voice service for PSTNs will continue to exist.

To effect a smooth change, the old and new technologies need to operate side by side. Fujitsu Semiconductor Europe, together with strategic partner AimValley, provide first-class silicon, software and support to enable system developers and operators to implement these changes in today's evolving Metro networks.

CES Circuit Emulation Services

- TDM over Packet solution for E1/DS1
- SAToP: unstructured agnostic payload transport
- CESoPSN: transport of fractional E1/DS1
- SAToP or CESoPSN transport mode selectable per channel
- Programmable TDM payload size per packet
- Clock recovery mode selection per channel: adaptive or differential mode
- Clock reference selection from TDM ports, local reference clock or PHY clock
- Jitter and wander compliant to G.823, G.824 and G.8261 for traffic interfaces
- Network synchronisation compliant to G.813 and Stratum 3, when combined with HTG
- Programmable maximum latency per port
- Packet re-sequencing and missing packet detection with TDM frame replication

MB87M2181 Ethernet over SDH/SONET

- System-on-chip for SDH/SONET and data applications
- Interfaces:
  - 4 x Multi-rate STM-1/OC-3, STM- 4/OC-12
  - 4 x E1/DS1 and TC-bus
  - 4 x 10/100/1G Ethernet
- Synchronisation E1/DS1
- VC-4/STS1 and VC-12/VC-3/VT-1.5 cross-connects
- 4 virtual concatenation groups with LCAS and differential delay compensation
- GFP, LAPS and PPP mapping of Ethernet frames
- SDH/SONET/Ethernet performance monitoring and alarming
- Flow control, rate control
- Integrated timing functions, HDLC controller

MB87M3550 WiMAX 802.16-2004

- WiMAX IEEE 802.16-2004 compliant baseband
- High performance OFDM (256FFT, 64QAM) based transmission
- Metropolitan orientation, later improved mobility (16e)
- One device to support SS and BS
- Data encryption in hardware
- LMAC provided as firmware

MB8AA3021 10G Ethernet switch

- 400+ Gbps of non-blocking, low latency switching capacity
- 20-port of 10 Gigabit Ethernet with integrated
  - XAUI/CX4 PHY for backplane applications
  - SFP+/XFI compatible PHY for optical modules
  - Adaptive on-chip equalisation
- 2-port of Gigabit Ethernet for management
- On chip management-engine
- Class of Service classification capability
- Committed and Peak Information Metering for traffic shaping
- Full featured software support

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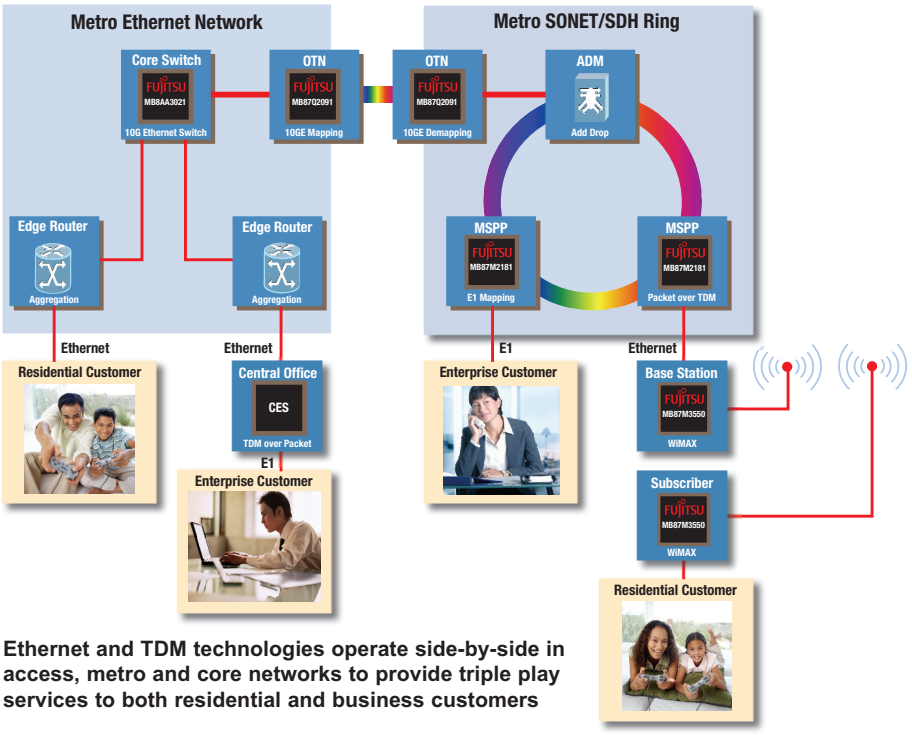
Applications

Video is one emerging application area driving Metro Ethernet service deployment, with providers' business customers starting to plan desktop video-conferencing and collaborative multimedia applications, for example. Service providers are also looking to the rapidly growing web-based video and interactive TV consumer market, including applications such as online gaming. Online gaming is therefore becoming an increasingly important service, second only to IPTV, for residential customers.



Ethernet and TDM technologies operate side-by-side in access, metro and core networks to provide triple play services to both residential and business customers

The application diagram above shows two Metro networks, representing two different cities with different examples of user traffic on the access side: a new packet-based service such as online gaming from residential customers and a traditional TDM-based service like the one used by an enterprise to connect two different locations using private leased lines. Both kinds of traffic need to access Metro networks, travel across them and reach their final destination at the customer premises.

Data traffic generated by the residential online player on the left is connected to the Edge Router of the Ethernet MAN; this router collects lower-rate data coming from users and service providers.

The Enterprise customer on the left uses private leased lines based on E1 interfaces. These TDM streams are mapped into Ethernet frames using a CES Circuit Emulation Service device located in the Central Office and then are transmitted across the Metro Ethernet Network.

The different data streams are tagged and classified according to traffic profiles matching the service level agreements.Subsequently, they are aggregated into a 10G Ethernet stream and transmitted to the core switch, where the Fujitsu MB8AA3021 10Gb/s Ethernet switch provides high capacity connections in a fully meshed topology.

From here, a long-haul optical connection transmits the data from one Metro network to the other. This link is made using the Fujitsu MB87Q2091, a device which maps 10G client signals, either Ethernet or SONET/SDH, into a common OTN (Optical Transport Network) format.

On the right-hand side, to connect the data stream coming from the second residential online player to the Metro optical ring, the Fujitsu MB87M3550 WiMAX chipset is used for both base-station and customer premises equipment to provide the subscriber with a broadband wireless connection. Packets are then mapped into the SONET/SDH transport protocol using Fujitsu's MB87M2181 Ethernet over SONET/SDH device inside a Multiservice Provisioning Platform (MSPP).

The right-hand side enterprise customer's E1 traffic is transmitted to the MSPP where it is then mapped into SONET/SDH format using another MB87M2181 device to access the Metro ring.

The data streams travel along the optical ring divided into different time slots and reach the OTN equipment, where another MB87Q2091 device maps it into the OTN protocol to connect the two cities.

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