

Making a packet

Using dense wavelength division multiplexing (dwdm) technology to carry traffic over a fibre using multiple optical wavelengths is not new. What has changed is the bandwidth demand due to growth in broadband traffic and video services in particular. This means new opportunities for chip makers.

Service providers want networks that can be configured dynamically whilst carrying a mix of traffic – such as Ethernet, Sonet/SDH, Fibre Channel and video standards. They also want to better use each wavelength's capacity by packing it efficiently with traffic. And operators want these needs met with platforms that use less floor space and power.

Equipment makers are responding by evolving existing multi service provisioning platforms (mspp) and dwdm boxes, or by developing new optical packet transport (opt) platforms (see box). Chip vendors have seized on these system developments with several recent design announcements.

Galazar's 20Gbit/s MXP2, announced in June, combines service multiplexing and mapping functions. This follows TPACK's announcement in May of its SMARTPACK P-OTN device family that include the 20Gbit/s TPOX3203 that adds optical transport network (OTN, or G.709) features to carrier Ethernet, and the 40Gbit/s TPOX4214 that, in addition, will support Sonet/SDH.

The two designs also differ in that Galazar's is an aspp, whilst TPACK's designs are based on Altera's Stratix fpgas.

Galazar's MXP2 has 11 interfaces that take in client facing signals, multiplexing and mapping them onto two network facing (line side) SFI-4.1 ports: either as an OC-192 Sonet (10Gbit/s) signal or in OTN OTU-2 format. OTU-2 wraps the data into a framing format that includes forward error correction (fec) to boost

Booming bandwidth demand spawns opportunities for packet processor developers.

By Roy Rubenstein.

transmission reach.

The 11 client side interfaces include an SFI-4.1 port, supporting 10G Ethernet/Fibre channel or an OC-192 signal. The remaining 10 ports support combinations of Sonet/SDH, Ethernet and various video and storage protocols, including 4Gbit/s Fibre Channel. To ensure the chip's capacity – dictated by the two 10Gbit/s line side interfaces – is not exceeded, users are given a menu choice as to what client interfaces can still be selected based on the capacity left, says David Kirk, vp of marketing at Galazar Networks.

The MXP2 integrates on chip functionality previously implemented by three ics in other designs: a multi service multiplexer; a Sonet/SDH mapper; and an OTN wrapper. "It [MXP2] also adds support for new services, such as 4Gbit/s Fibre Channel, and new video formats, such as SD-SDI, HD-SDI and even 3G-SDI," Kirk noted.

System vendors are interested in the MXP2 for two applications. One is for mspps

to multiplex traffic before being parceled into OTN frames for transmission; the second is for reconfigurable optical add/drop multiplexer (roadms) applications in dwdm networks, adding and dropping optical signals at a metro node. "Roadms for metro is the biggest pull for us today," said Kirk. "In the last year, interest from the mspp camp has been to support new protocols on their platforms."

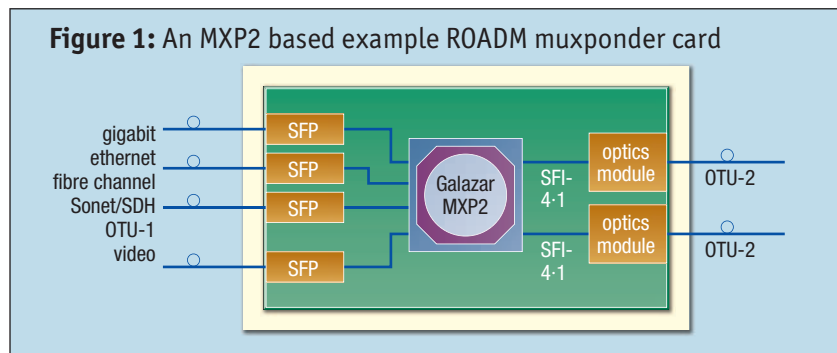
Kirk will not detail design wins, but says the MXP2 is targeted at the main telecom system vendors. "The number one competitor is time," says Kirk who admits that Ciena couldn't wait for the arrival of the MXP2, choosing an fpga design instead. "Given the power, size and cost requirements [Ciena seeks], we have not given up," he said.

Meanwhile, TPACK's SMARTPACK designs also target mspp, dwdm and opt platforms, as well as carrier Ethernet switch platforms. The TPOX 3203 and 4214 are offered as reference designs that vendors can customise. "This market is still under definition," said Daniel Joseph Barry, TPACK's director of marketing.

This is why TPACK favours fpgas: as well as vendors being able to add their own IP and speed time to market, features can easily be changed as market requirements mature.

"Metro is not a high volume market –

Figure 1: An MXP2 based example ROADM muxponder card





OPTICAL NETWORKING PLATFORMS

There are three main optical platform classes vying to dominate the emerging requirement for platforms adept at optical transport and packet processing.

- Multi service provisioning platforms (mspp) started as Sonet/SDH platforms that aggregated a mix of traffic onto a wavelength, then transmitted over the network using separate dwdm equipment. Mspps have added dwdm functionality to perform both functions on one platform.
- DWDM equipment vendors have responded by adding traffic multiplexing associated with mspps. In addition, dwdm platforms have reconfigurable optical add/drop multiplexers that support dynamic networking by adding and dropping wavelengths at a metro node.
- A third, emerging, category is the optical packet transport platform. This combines traditional Sonet/SDH and carrier Ethernet with dwdm. Moreover, it includes a fabric that can switch Sonet/SDH and Ethernet traffic. The platform is designed to enable operators to transition their networks from Sonet/SDH to Ethernet at their own pace without having to replace systems.

target opt platforms. The cross connect enables flexible switching, including routing traffic through a second 4214 connected via a mate interface. The TPOX4214 will be implemented using Stratix IV GX devices.

“[With these devices] we are really looking at new [platform] designs,” said Barry. “To make system design teams rethink in terms of what they would like to



you are talking thousands of pieces,” said Barry. “This makes it hard to make a business case for an assp that hits the [market] sweet spot, especially when a lot of stuff is changing.”

An fpga design also supports the idea of a universal line card. Optics, by its nature, is protocol agnostic. Equipment makers are looking to expand the idea to include a line card’s electronics. Using an fpga, the same card can implement several applications, depending on the fpga profile downloaded. It also raises the prospect of a card’s functionality being changed in the field.

To implement the TPOX3203, TPACK

used its carrier packet engine, comprising a packet processor and traffic manager (see NE, Feb 27, 2007), to which is added an OTN engine that maps Ethernet into a

“Roadms for metro is the biggest pull for us today, (but) the number one competitor is time.” David Kirk, Galazar Networks

10Gbit/s OTU-2 format that includes either a standard fec or an enhanced fec – the latter licensed by TPACK from AMCC.

The 40Gbit/s TPOX4214 adds Sonet/SDH and an OTN cross connect to

do, rather than what an assp can do.” Barry will not detail SMARTPACK design wins, except to say that TPACK supplies eight of the top ten system vendors globally.

As for roadmaps, Galazar will take its MXP2 design in two directions. One – the MXP3 – will increase device bandwidth to 40Gbit/s. Another direction is integrating transmission interfaces within the ic.

TPACK also plans to increase device bandwidth to 80 and 100Gbit/s, but expects to announce an fpga based assp ‘once the market matures and a generic feature set ... becomes evident’.

Galazar is close to having samples of its MXP2, whilst TPACK demonstrated a TPOX3103 prototype in June. First shipments of the 3103 will begin in the coming months, whilst the TPOX4214 will be available in 2009, said Barry. ■

