# Simplifying the network passively

**Francis Nedvidek, Chief Executive Officer (CEO) of Cube Optics and Sven Krüger head of marketing and sales to Carriers and Network Operators discuss the advantages of the company's Simplified, passive WDM access networks**

**Dr. Francis Nedvidek, CEO**

*Francis Nedvidek, the company 's Chief Executive Officer (CEO), oversees all marketing, sales and business development activities. His career progression boasts over two decades of experience spanning technology innovation, product and market development and general management roles. Prior to joining CUBO, Dr. Nedvidek held senior positions with corporations in Canada, the USA and Europe including the Raytheon subsidiary ELCAN Optical Technologies, Leica, Black & Decker, the Electrical Division of von Roll ISOLA and the SOMOS Consulting Group. Dr. Nedvidek holds a Ph.D. in Laser Physics and M.E.Sc. and B.E.Sc. degrees in Electrical and Electronic Engineering. Dr. Nedvidek also holds a P. Eng. Designation.*

**Sven Krüger, Director Marketing & Carrier Sales**

*Sven Krüger is responsible for marketing and sales to Carriers and Network Operators at CUBO. Before joining Cube Optics as a member of the founding team, he worked as a technology consultant for the IRC of the European Commission, and prior to that at the Institute for Microtechnology Mainz in research and development of integrated optical components. He holds a Master degree in Physics.*

**Q: How do you simplify passive WDM access networks?**

**A:** We see a shift from managed active WDM system solutions towards un-managed passive solutions. Passive WDM relies on standard SFP or GBIC CWDM transceiver which are directly plugged into switches, routers and DSLAMs and are then multiplexed with passive modules onto fibre. The approach is far simpler than proprietary solutions comprising SFP / GBIC transceivers with the multiplex/demultiplex functions integrated into a system providing many other features such as media conversion, additional O-E-O conversion, QoS monitoring and environmental alarms and network management.

**Q: There are other options, why have you gone for the use of standard CWDM pluggable transceivers (like GBIC or SFP) in combination with a passive WDM system?**

**A:** Because this is the simplest set-up to achieve the goal of increasing network capacity. It is not only simple but also highly effective: installation can be accomplished literally in minutes; CAPEX is very modest; no additional power or software is needed making OPEX practically zero; but, transport capacity and network architecture options remain unrestricted.

Why complicate things by bringing in more expensive active solutions adding additional overhead and proprietary operating systems? Even the need to convert between non-standard CWDM grids to the ITU CWDM standard disappears. The CWDM function is transparent and completely compatible and interoperable with whatever is connected upstream or downstream.

**Q: Does this approach provide sufficient options and flexibility in the architecture?**

**A:** According to our experience and the opinions of leading competitive Carriers, YES! It is a very flexible metro access network solution in terms of: transport bandwidth - up 18 times at 4.25Gb/s; protocols - Fiber Channel, Ethernet or SDH/Sonet; and architecture - point-to-point, point-to-multipoint, hubs & spokes and their variations.

**Q: What advantages does this approach have for simplicity in areas such as reducing the necessary network monitoring, the installation and planning and the training of the operators.**

**A:** The advantages are many: First, less equipment having simpler set-ups and requiring no additional software, monitoring or SNMP etc. permits faster and less involved planning. Secondly, operator training is not required and the very low risk of failure in the field results in very low field maintenance and consequently no significant OPEX. The sole parameter to keep in mind, and then only while planning the layout, are link losses and their effects on the overall network power budget.

**Q: What about acquisition and through life costs vis a vis managed active WDM System?**

**A:** With passive WDM solutions less hardware needs to be installed which by design is far less complex, resulting in CAPEX costing 50% or less compared with that of active managed system scenarios. Since the equipment by nature is install and forget, OPEX is essentially reduced to zero.

**Q: Do you think operators fully appreciate the passive approach? Is there more work to be done convincing them of this approach**

**A:** The word is certainly out. Many operators are currently operating networks with passive CWDM installed and many have plans to install passive equipment in 2006. However, many carriers and ISPs have yet to learn of the approach. An interesting observation is that the trend to deploy passive WDM is not related to the size of the individual operator. Our customers range from trans-nationals with several thousand units deployed to small ISPs covering as few as 3 locations.

**Q: What are this approach's limitations. What is the type of user who doesn't need an active WDM System and what is the type of user that needs to continue with an active WDM System approach?**

**A:** We have seen, in practice, that the fraction of operators preferring not to deploy a passive approach is the minority. The simplified passive approach comes naturally to competitive operators serving essentially residential customers via DSLAMs and any operator transporting several services, protocols or media traffic transparent passive WDM solutions. A passive solution is not suitable in networks where media conversion is necessary or where wavelengths other than the ITU WDM wavelength standard are established and will continue to be utilised.

**Q: Can you give me an example of a customer you've partnered with, the solution delivered and the new services now being offered?**

**A:** The first example we are free to mention is how Neuf Telecom / Cegetel in France set-up access networks in the 15 biggest cities in France. They went into approximately 3000 co-locations in less than 10 weeks. In this case, access networks are being used to deliver DSL traffic to residential customers. Neuf is concentrating on DSL connections and delivers Triple Play services over their network.

The second example relates to our co-operation with Telefonica in Germany. Here, Telefonica does not sell to residential customers but rather plans to triple its existing network serving enterprise customers and other carriers.

Finally, connected to the above example are a number of competitive German ISPs who are customers of Telefonica. These ISPs use Telefonica's infrastructure to serve their clients.

**Q: Not all parts of a network will need to be updated, how does the system meet the need to improve the network segments at a time?**

**A:** Passive WDM may be installed between any two nodes, typically the co-location and point-of-presence or co-location and OLT. Typically, WDM capacity may be added in four wavelength increments to give capacity upgrades of 4, 8, 12 and 16 times. The modular systems that Cube Optics offers allows four wavelength modules to be added into the 19-inch rack-mountable enclosure as needed. The transceivers at each end of the link may be added as individual wavelengths are lit according to capacity demands.

**Q: Cube Optics was founded with the goal of producing low cost CWDM and other types of passive optical networking - any plans to expand that goal?**

**A:** In fact, we have already expanded our goals in two important ways. First, we manufacture complete optical heads for industrial sensor, medical diagnostics and test and measurement OEMs. This requires the integration of active sources, very sensitive detectors and temperature stabilization within a self-contained pluggable sub-assemble. Second, we have married our miniature passive WDM optics with detectors, transimpedance amplifiers and limiting amplifiers to yield a four channel 10 Gb/s circuit board mountable ROSA for datacom/telecom applications and suitable, for example, for LX-4 transceivers and line cards.

**Q: Active solutions are better optimised to deal with different protocols and media in "every" location. Are passive solutions likely to offer inroads into this area anytime soon?**

**A:** The beauty of passive solutions is that they are transparent. They deal with anything that comes through the fibre without the need for electrical power, adjustment or maintenance. Since the solution works at the optical layer, it is protocol agnostic. The latest advances for our passive products is our new line of rugged components. These components are designed to address the special wavelengths and operating conditions of FTTX and HFC applications. Important here is: operates over a very wide temperature range, needs no power, is virtually deploy and forget and inherently high volumes with low cost.

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