

## Innovative Ethernet transport solutions enabling cost efficient Cable TV/MSO Backhaul

### Short facts about Transmode:

Transmode is a leading provider of optical networking solutions for transport of data, voice and video traffic, based on CWDM and DWDM technology (Coarse/Dense Wavelength Division Multiplexing).

Our customer base consists of more than 230 network operators, service providers, large enterprises and public institutions across Europe, the Americas and Asia.

Transmode has recently gained recognition from existing customers and independent analysts for its knowledge in optical networking and reliability as well as good product quality.



*What are the challenges and opportunities in building Cable TV/MSO Backhaul networks?* A quick answer is hard to get. Each network is a little bit different from the others, is based on its own business model and has its own set of services to carry. However, based on input from our customers the most frequent issues and challenges are:

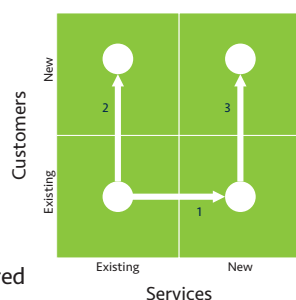
- Capacity in metro networks must be increased in a cost efficient way
- Flexibility is needed in the transport network to allow an easy and cost efficient growth, both in network size and in functionality
- Transport networks need more “intelligence” in order to support service differentiation and eventually expand the revenue base

The rationale behind the above topics will naturally differ from network to network, and be dependent on both technical and business oriented factors.

Here, Transmode’s transport solution has one of its major strengths; it has the flexibility and scalability it takes to build a backhaul network, cost efficiently, and preserving your existing investment. Let’s take a look at how this can be beneficial in Cable TV/MSO Backhaul networks.

Some factors which we anticipate will influence the way Cable TV/MSO Backhaul networks will be built in both near and far future are:

- The migration to Docsis 3.0 and the bandwidth explosion this will bring
- The need to offer new services to existing customers, and to offer both existing and new services to new customers, see matrix to right
- The competition from alternatives such as FTTH access networks forces new bandwidth hungry services to be offered



- The need to fit the business case challenge. For example scalability is an important factor that influences the deployment of Business services vs Residential services
- The need for a transport layer that does more than just transport. To support tasks in the transport layer that normally requires larger investments becomes vital for many Cable TV/MSO operators

### How can a Transmode solution help you?

Transmode’s solution offers transport of all types of traffic, e.g. Gigabit Ethernet, SDH/SONET and Video. Our solution is based on WDM technology, provides cost efficient capacity increase, is scalable and offers integration with Ethernet.

### Cost efficient capacity increase

Making the best use of optical infrastructure is crucial, and the ability to transport ever increasing amounts of data on the previously deployed optical fiber is a challenge in itself. Transmode’s solution focuses on cost efficient increase in network capacity, and for this we have developed the intelligent WDM (iWDM™) concept.

### Reducing cost with iWDM

The unique way of transporting large amounts of traffic that iWDM enables offers unmatched advantages in network economics, both in OPEX savings and low CAPEX. The seamless mix of CWDM and DWDM as well as the single fiber and fiber pair configurations that iWDM enables, bring valuable scalability and pay-as-you-grow advantages. Furthermore, reconfigurable hardware and dynamic networking using the integrated ROADMs provide vital benefits in flexibility and cost efficiency.

iWDM is also essential in Transmode’s offer of combined Layer 1 and Layer 2 functionality. This helps Cable TV/MSO operators design a converged transport and Ethernet layered network and allow the most economic transport of multiple services.

### Low Power Design

The compact network design which characterizes Transmode's solution results in small footprint and less space required in the central office locations. This combined with the fact that our Gigabit Ethernet backhaul solution has one of the industry's lowest power consumptions it directly minimizes the power costs of the network and at the same time maximizes the consideration for the environment.



### Open and standardized network management system

Transmode's Network Management system (TNM) is a cost efficient management system with open and standardized northbound interface for the easy integration with existing OSS/BSS systems. TNM provides the FCAPS functionality needed to operate an optical end-to-end network.

## Multi dimensional scalability for unlimited network growth

In order to allow network growth, scalability is crucial, not only for expanding the network geographically, but also functionally. The transport network must be flexible enough to cater for traffic types other than those it was originally built for. Also - the business case of targeting a business segment is different from the one targeting a residential segment. For example, a residential segment is probably less capable of carrying its own costs compared to a business segment. This requires a stepwise build out of the network, and the ability to reach as much of the addressable market as possible.

### Scalable distance

In a Transmode network scalability is offered in multiple dimensions. When it comes to reach, everything from 1-1000km is available, supporting all network applications from metro access to regional backhaul.

### Adjustable to traffic formats

As mentioned above, different traffic formats need to be transported. Transmode's Multi-Service Muxponder does exactly this. It allows the transparent transport of SDH/SONET, Gigabit Ethernet and SAN formats in one card, ideal for metro access applications where compact design, small footprint and low power consumption are essential. This allows full flexibility when offering services like triple or even quadruple-play services and also mobile services such as telephony and mobile broadband.

### Scalable capacity

Flexibility in terms of capacity is vital in order to cater for the different amounts of bandwidth that need to be carried in different types of networks. Why pay for more than is needed?

With the granular line rates and multiple Transponder/Muxponder options, Transmode's WDM solution will match the capacity you need. Transmode's solution supports all services from 100 MB to 10 G with line rates at 2.5G, 4G and 10G on both CWDM and DWDM technology.

### Scalable chassis

To let investment grow as business grows, Transmode offers three different chassis, featuring 10 rack units (U), 3U and 1U options, each one capable of housing any traffic card in the product portfolio. Again, Transmode gives the option of starting small scale with low cost and then to expand into larger, more feature-rich networks.

## A simpler Ethernet transport network with the flexibility needed supporting service differentiation

Through combining integrated Ethernet switching functionality with Ethernet transport functionality, the capabilities of a metro network are expanded with features that are vital for ongoing business development. Transmode's solution and its Ethernet and Ethernet aware capabilities create essential values in the way it enables cost efficient Ethernet functionality in a combined Ethernet and transport network. This combined network offers operators with a low-cost method of capitalizing on the added flexibility it brings.

It enables CableTV/MSO operators to use the Ethernet transport network as a platform to support service expansion as well as to increase the service penetration rate. Service differentiation, Service Level Agreements (SLA) monitoring, and QoS enabling are examples of functionality that becomes available in the Ethernet transport network at a fraction of the cost compared with gaining this functionality from separated transport and Ethernet layers.

Furthermore, with one central management system covering both the Ethernet and the transport network, and the benefits of Transmode's innovative transport solution, an easier and more cost efficient way of supporting Ethernet services is gained.

## We have helped many CableTV/MSO operators to be successful - how can we help you?

Transmode has an installed base of over 230 customers, including some of the most well-reputed CableTV/MSO operators in the market.

Our care and consideration for our customers' business situation and wellbeing have given us worldwide recognition and made us receive best in class customer satisfaction index - CSI index of 81.

Please contact us today and discuss how we can help you get the most out of *your* optical network!

Don't hesitate, contact us today, see webpage: [www.transmode.com/contact](http://www.transmode.com/contact) for contact details per region.

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