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Brochure

TRANSITION NETWORKS®

WDM Solutions

Methods for Optimizing Fiber Capacity

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Introduction to WDM

Overview

Demands on today's voice, video, and data networks are becoming more complex – requiring more bandwidth and faster transmission rates over ever increasing distances. To meet these demands, network managers are relying more on fiber optics. But the reality that many providers, enterprise corporations, and government entities are facing is that once their available fiber infrastructure is exhausted, laying more fiber is no longer an economical or feasible option. It is essential to find more cost-effective methods to get more out of the existing infrastructure.

Wave Division Multiplexing (WDM) technologies can increase capacity on the existing fiber infrastructure. WDM is a technology which multiplexes multiple optical signals onto a single fiber by using different wavelengths, or colors, of light. By utilizing WDM communication methods, network managers can realize a multiplicative effect in their available fiber's capacity.

Benefits

- Economical solution for relieving fiber exhaustion
- Expand capacity using existing fiber infrastructure
- Passive multiplexing/de-multiplexing is agnostic to speed and protocol
- Plug-and-play installation requires no configuration
- Saves cost over trenching, pulling, or leasing new fiber

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BWDM & DWDM

Bi-Directional Wave Division Multiplexing (BWDM)

BWDM (also referred to as: bidi, simplex, and single strand) is the least expensive WDM solution. While BWDM offers users the greatest cost savings, it is also the most limiting as far as future proofing your network. The benefits of BWDM include:

- Inexpensive
- Requires little or no change to the general network design
- Doubles the capacity of existing fiber routes

Dense Wave Division Multiplexing (DWDM)

DWDM is referred to as “Dense” because it packs wavelengths closer together than WDM (wavelength division multiplexing) and CWDM (coarse wavelength division multiplexing) methods. DWDM is one of the dominant technologies used to utilized for fiber cable applications. It multiplexes a group of wavelengths into and transmits over a single core fiber.

DWDM is used primarily in high-capacity long-haul networks. One of the advantages of DWDM Systems reduced use of fiber cores to transmit and receive high capacity data. With a single core fiber cable, it could be divided into multiple DWDM channels. DWDM makes network expansion easy and with low cost, especially for limited fiber resources and no need for extra fiber but need for additional wavelengths.

CWDM and WDM Applications

Coarse Wave Division Multiplexing (CWDM)

CWDM is a simple and affordable method to maximize existing fiber by decreasing the channel spacing between wavelengths. The benefits of CWDM include:

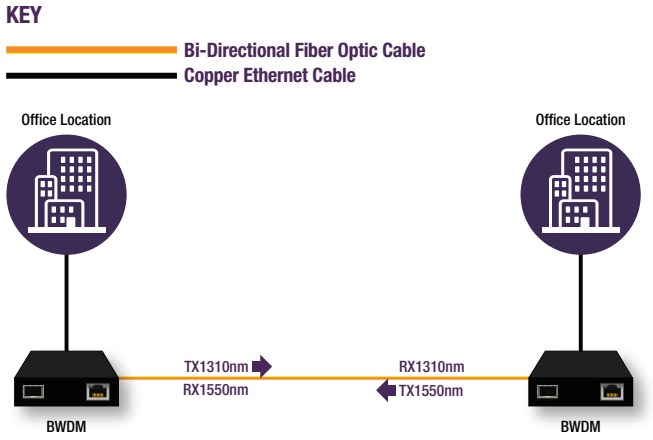
- Passive equipment that uses no electrical power
- Extended Temperature Range (0˚C - 70˚C)
- Lower cost per channel than DWDM
- Scalability to grow fiber capacity with little or no increased cost
- Protocol transparent
- Simple to install and use

Since CWDM is a passive technology, it allows for any protocol to be transported over the link, as long as it is at a specific wavelength (i.e. T1 over fiber at 1570nm transported alongside 10 Gbps Ethernet at 1590nm). Because the multiplexers simply refract light at any network speed, regardless of the protocol being deployed, CWDM can help to future proof the networking infrastructure.

Another benefit to the passive CWDM technology is that no configuration is necessary, which makes CWDM a low-cost and effortless technology to implement. The most complex step in CWDM integration is aligning and connecting the patch cables from the correct wavelength optic to the correct port on the multiplexers on each end of the link.

BWDM

Transition Networks offers a variety of products with bi-directional optics, which accommodate bi-directional SFPs, to double your fiber capacity. Typically a BWDM deployment will use the 1310nm and 1550nm wavelengths. BWDM products are deployed in pairs to ensure the TX and RX of each device are not using the same wavelengths. In the example below, the multiplexers could be Ethernet, DS1 - T1/E1, DS3 - T3/E3, or any other protocol.



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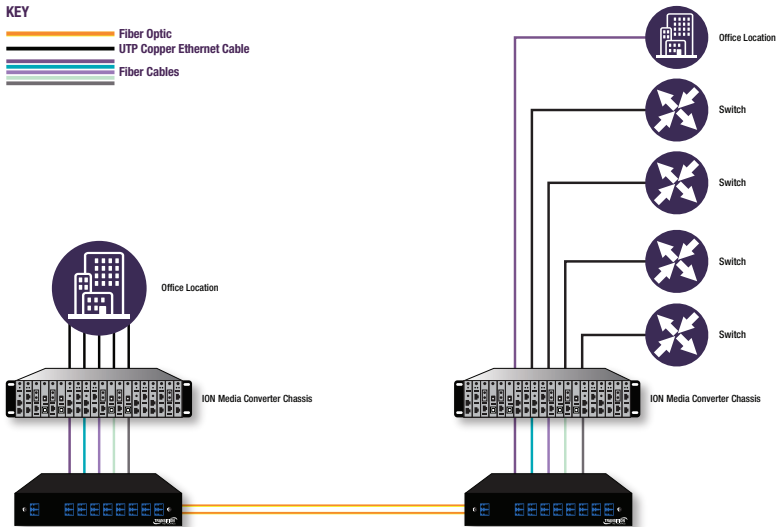
CWDM Applications

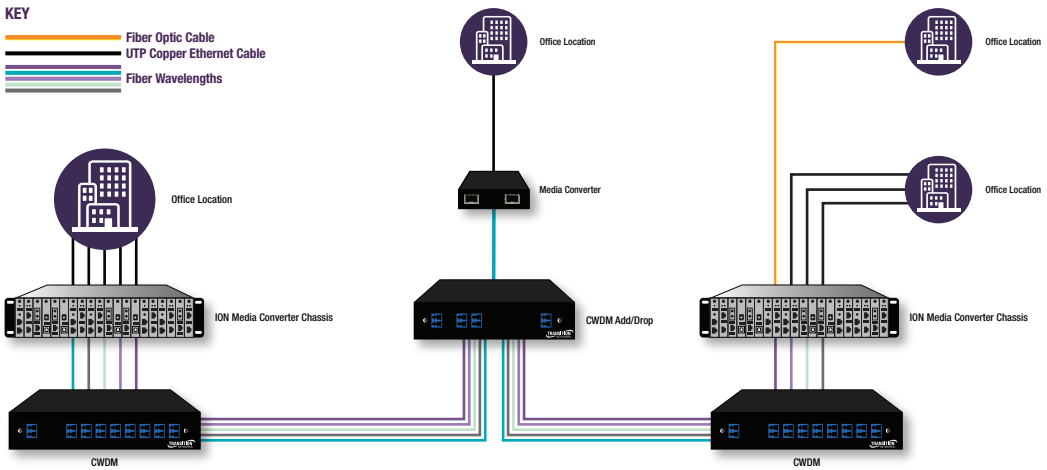
CWDM Mux / Demux

Using CWDM multiplexing technology paired with wavelength specific optics in Transition Networks' fiber optic devices and switching products allows you to realize the full benefit of CWDM technology. The modular approach that Transition Networks takes toward CWDM deployments makes scaling a project to fit your exact needs easy and affordable. Transition Networks also offers products that optimize standard fixed optic wavelengths on existing products by converting them to the appropriate CWDM "color" or wavelength.



CWDM Add/Drop Modules

Optical add/drop modules provide a means to insert or remove a single wavelength of light from a fully multiplexed group. Add/drop technology allows for intermediate locations to easily access the common fiber segment linking all the network nodes together. Wavelengths that are not specifically added or dropped simply pass through the add/drop module and continue on to the next network node. Additional add/drop modules can be added in the event that more than one intermediate location exists or if multiple wavelengths are required at one location.



Ordering Information

Transition Networks' CWDM devices are available in two main configurations: Optical Add/Drop Multiplexer (OADM) modules and Multiplexer/Demultiplexer (Mux/Demux) modules. Each module is a pluggable card that slides into a one rack unit (1RU) chassis which accommodates 2 modules and mounts into a 19" equipment rack.

CWDM SFP Modules				
Fast Ethernet		**Fiber Type**	**Compatability**	**Distance**
100Base-FX/OC-3 single mode (LC) with DMI	TN-SFP-OC3S8-Cxx Series	SM	MSA	80KM
Gigabit Ethernet				
1000Base-LX/Fiber Channel 1x single mode (LC) with DMI	TN-SFP-LX8-Cxxx Series	SM	MSA	80KM
1000Base-LX/ZX Fiber Channel single mode (LC) with DMI	TN-CWDM-SFP-1xx0 Series	SM	Cisco	80KM
Gigabit Ethernet / 10 Gigabit Ethernet				
10GBase-ZR/1000Base-ZX, SFP+ with DMI single mode (LC)	TN-10GSFP-LR8M-Cxx Series	SM	MSA	80KM
10 Gigabit Ethernet				
10GBase-LR/LW/10G Fiber Channel, SFP+ with DMI single mode (LC)	TN-CWDM-10G-1xx0-40 Series	SM	Cisco	40KM
10GBase-LR/LW/10G Fiber Channel, SFP+ with DMI single mode (LC)	TN-CWDM-10G-1xx0-80 Series	SM	Cisco	80KM

DWDM SFP Modules				
10 Gigabit Ethernet				
10GBase-ER/ZR or 1000Base-LX/ZX, SFP+ With DMI Single Mode (LC)	TN-10GSFP-LRxM-Dxx Series	SM	MSA	40KM - 80KM

CWDM Mux/Demux		
Add/Drop Mux		**Channels**
1 Channel with E/W lines	CWDM-A2A8xxLCR-B Series	1
Mux/Demux		
4 Channel + OSC Duplex LC	CWDM-M551LCR-B	4
8 Channel + OSC Duplex LC	CWDM-M947LCR-B	8
16 Channel + OSC Duplex LC	CWDM-M1631LCR-B	16
Acessory *sold separately		
19" Rack Mount Chassis, 1RU High, holds 2 CWDM Modules	CWDM-MB19R2	

For more information on our WDM Products, please view our SFP & CWDM Mux/Demux Catalog at transition.com/catalog.

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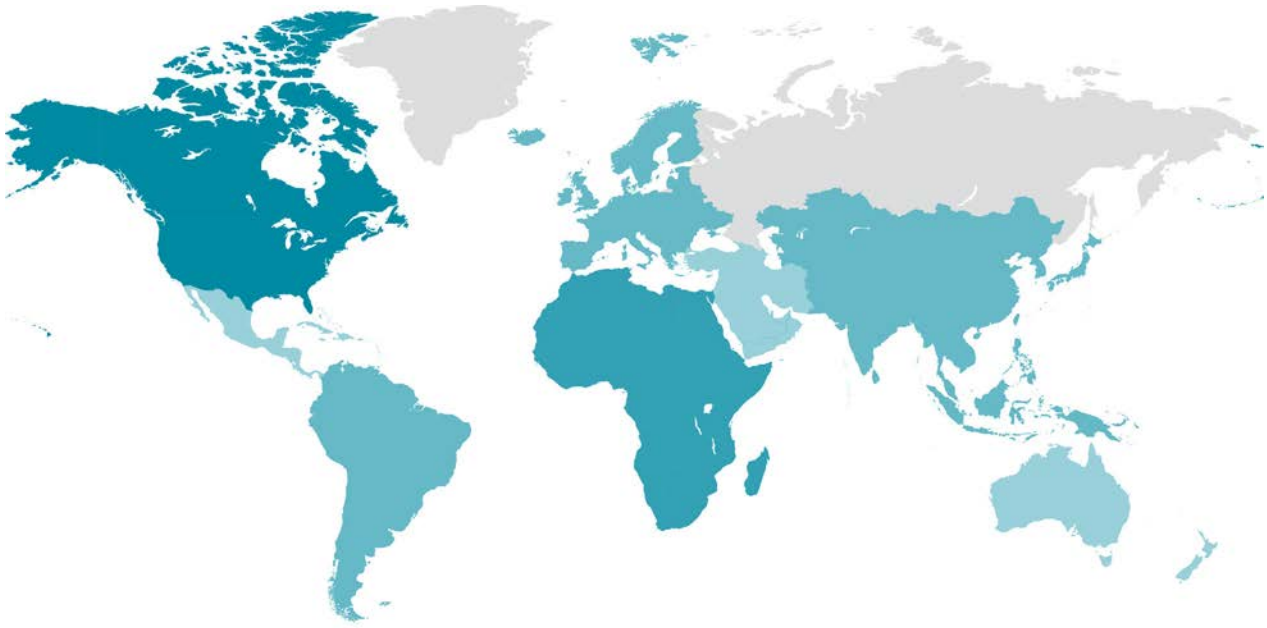

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