WDM Solutions

Methods for Optimizing Fiber Capacity
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
**BWDM & CWDM**

**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

**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 CDWM include:

- Passive equipment that uses no electrical power
- Extended Temperature Range (0-70°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 10Gbps 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.
WDM Applications

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, T1/E1, DS3/E3, or any other protocol.

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 Applications

**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.
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 Optics**

**100Base-X/OC-3 CWDM SFP**
- 18 wavelengths from 1270nm to 1610nm
- 80km and 160km options
- Cisco and MSA compatible options

**1000Base-X CWDM SFP**
- 18 wavelengths from 1270nm to 1610nm, 40km, 80km, and 160km options
- Cisco and MSA compatible options

**10G CWDM XFP**
- 18 wavelengths from 1270nm to 1610nm
- 10km, 40km, 70km and 80km options
- Cisco and MSA compatible options

**10G CWDM SFP+**
- 8 wavelengths from 1470nm to 1610nm
- 40km and 80km options
- Cisco and MSA compatible options

**BWDM Optics**

**100Base-X/OC-3 Bidi SFP**
- 1310nm/1550nm and 1510nm/1590nm
- Up to 200km reach
- Cisco and MSA compatible options

**1000Base-X Bidi SFP**
- 1310nm/1490nm, 1310nm/1550nm, and 1510nm/1590nm
- Up to 160km reach
- Cisco and MSA compatible options

**10G Bidi XFP/SFP+**
- 1270nm/1330nm
- Up to 60km
- Cisco and MSA compatible options

For more information on our Bi-Directional Multiplexers, please view our SFP Catalog at transition.com/catalog.
Global Presence

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