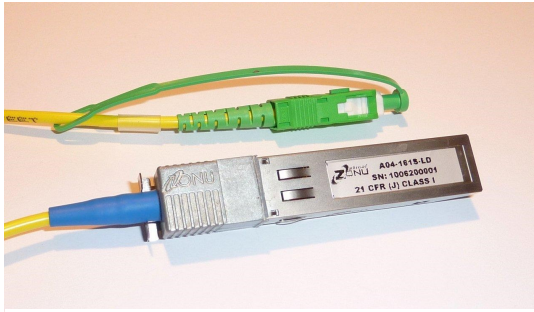




The SFC™ Value Proposition

Improving the Service Provider Bottom Line

Executive Overview from Optical Zonu Corporation



ZonuFx Smart SFC Transceivers

- ✓ Micro-OTDR Fiber Fault Finder™
- ✓ Up to 27 dB Optical Power Budget
- ✓ Full Duplex, Single Wavelength
- ✓ -20°C to +70°C T_{OP}
- ✓ TIA-598-C ZonuColor™ Code
- ✓ Back-to-Back to 40 Km (no "Pad")

Applications

- ✓ Network Security / Maintenance
- ✓ Business Class Service
- ✓ Metro-Ethernet Direct
- ✓ Wireless Backhaul
- ✓ Central Office Cross-Connect
- ✓ Electric Power Utilities

Benefits

- ✓ Edge in Performance
- ✓ Lower Overall Cost
- ✓ Simplified Installation
- ✓ Ease of Maintenance
- ✓ Half the Fiber. Passives, Splices
- ✓ Rapid Response / Improved SLAs

Savings

- ✓ Retain Installed Base of Passives
- ✓ Only Half the New Passives to Buy
- ✓ Consume Fibers One-at-a-Time

Single Fiber, Full Duplex, CWDM (SFC) Technology

Simpler, More Efficient, Complete CWDM Edge Access Network

Standard SFP Transceivers with optional Built-In Micro-OTDR Capabilities

The **ZonuFx** functions as a normal Single Fiber, Full Duplex, CWDM Transceiver, but with the ability to switch into operation as a Micro-OTDR capable of detecting and localizing optical fiber faults.

ZonuFx Smart SFC Transceivers transmit and receive at the same wavelength, which allows them to be used for Optical Fiber Fault Detection and Localization. The **ZonuFx** transmitter can be switched to operate in Micro-OTDR mode where it transmits optical pulses of +13 dBm. The receiver will detect any reflected pulses down to -32 dBm optical power.

Open fiber reflections in a "Blue" UPC Connector Network are about 15 dB in magnitude. The Micro-OTDR Mode (with an optical power detection budget of more than 45 dB) can detect the open fiber fault up to the full reference link distance (including 4-Ch or 8-Ch Mux/Dmux). The **ZonuFx** monitors the time delay between the transmitted and reflected pulses, such that the position of the fault may be accurately determined.

The fault localization accuracy is within 20 meters. This location data is instantly reported to the host switch/router via the **ZonuFx** DDM function. This allows the immediate targeted response necessary to support enhanced Network Security and deliver superior Service Levels.

ZonuFx Smart SFC Transceivers

The SFC/P2P Transceivers at the heart of the **ZonuFx** also provide Full Duplex Transmission of Industry Standard Protocols (IEEE 802 Fast Ethernet, Gigabit Ethernet and CWDM10-Gigabit Ethernet; SONET OC-3/12/48; SDH STM-1/4/16) over a Single Fiber. The **ZonuFx** comes in the industry standard SFP configuration, compatible with Networking gear from all the major OEMs.

The Edge Access Network Solution

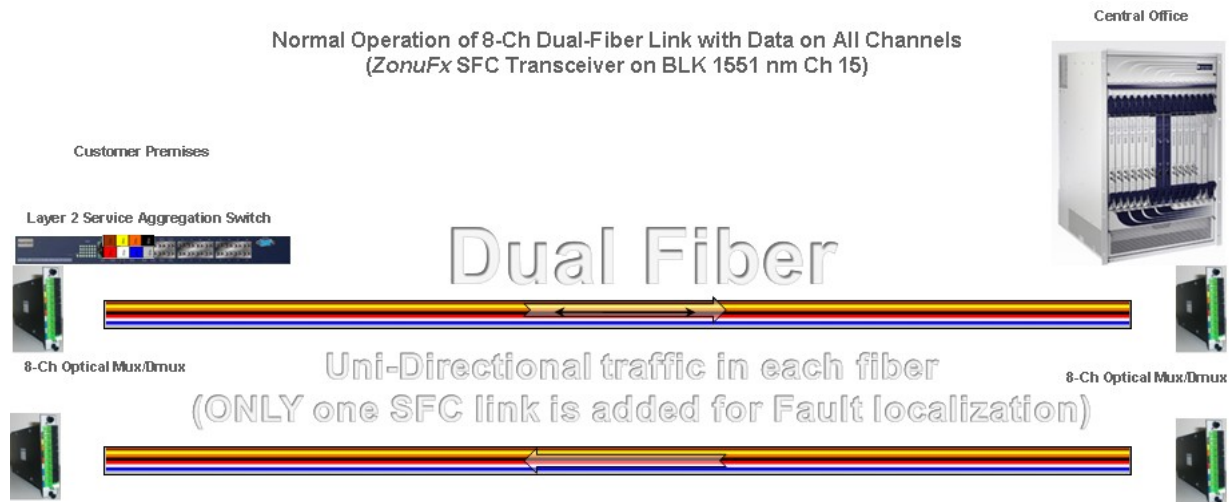
SFC is the Edge Access Network Solution for delivery of Fiber Optic Commercial Data Services in "Fiber-Starved" HFC and other Telecommunications Networks. OZC provides SFC Technology with a complete line of Products for Business Class Commercial Services. SFC Technology **DOUBLES** Optical Fiber Capacity (compared to legacy CWDM implementations) and delivers Operational Benefits to Improve the Service Provider's ROI, over both the short and long terms.

Cost-Effective Deployment

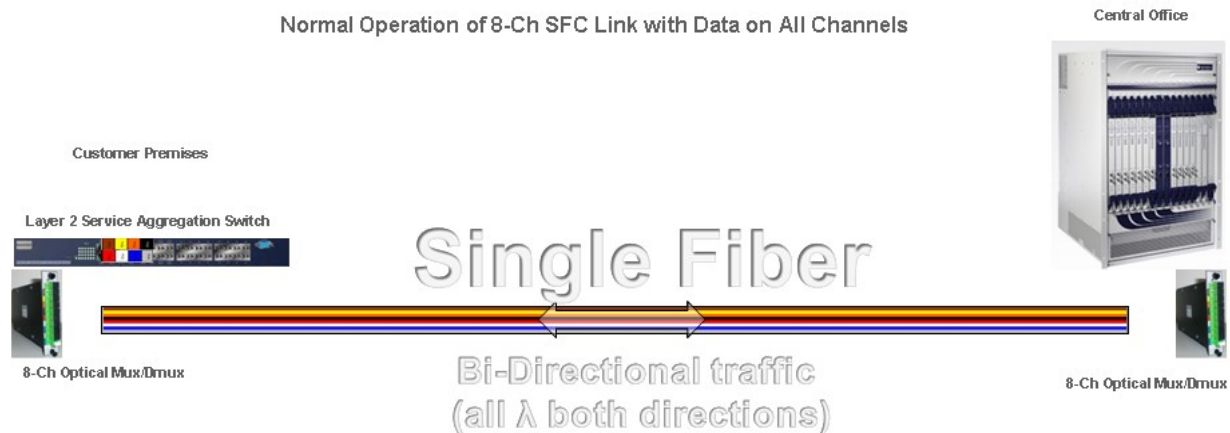
The **ZonuFx** need only occupy one ITU Channel on a CWDM "bundle" of wavelengths. For example, a single BLK 1551 nm ZonuFx monitors the entire CWDM "bundle", since all of the CWDM "colors" propagate down the same physical optical fiber. Also, the **ZonuFx** need only be at one end of the link for the Micro-OTDR to do its job. It might be located just in the Headend, Hub or CO.

SFC Value Proposition: Half the Fiber, Half the Cost!

Perhaps the easiest way to see the Cost Benefit of SFC compared to legacy Two-Fiber CWDM systems is to compare the approaches side-by-side for a rudimentary Hub/CO to CPE link. First we have the legacy Two-Fiber system with all eight (8) CWDM Channels occupied.



Next we illustrate the functionally equivalent SFC Link.



The most obvious difference is that SFC uses Half the Fiber and Half the Passives.

This leads to a natural cost advantage for SFC that scales linearly with the growth of the Network (i.e the addition of more CWDM Channels). The Two-Fiber system will always need twice the number of Passives and twice the number of Optical Fibers. The added cost of these "extra" elements will always make the Two-Fiber approach more costly, even if the Two-Fiber Transceivers themselves are of a lower price variety.

So, how might the costs for these two approaches compare for this same basic application?

The following Table shows such a comparison two ways. First, assuming that you are not down to your last Optical Fiber, that is, you do not need to install a new Optical Fiber cable trunk. Next, assuming that you are down to your last Optical Fiber and you must install a new Optical Fiber cable trunk...unless you deploy SFC.

SFC consumes Optical Fiber one strand at a time...not in pairs.

With SFC you may deploy up to another 8 to 10 CWDM Channels (read "Customers") just by adding the needed SFC components and not adding any new Optical Fiber.

Basic Hub/CO to CPE Two-Fiber Link versus SFC Link Cost Comparison

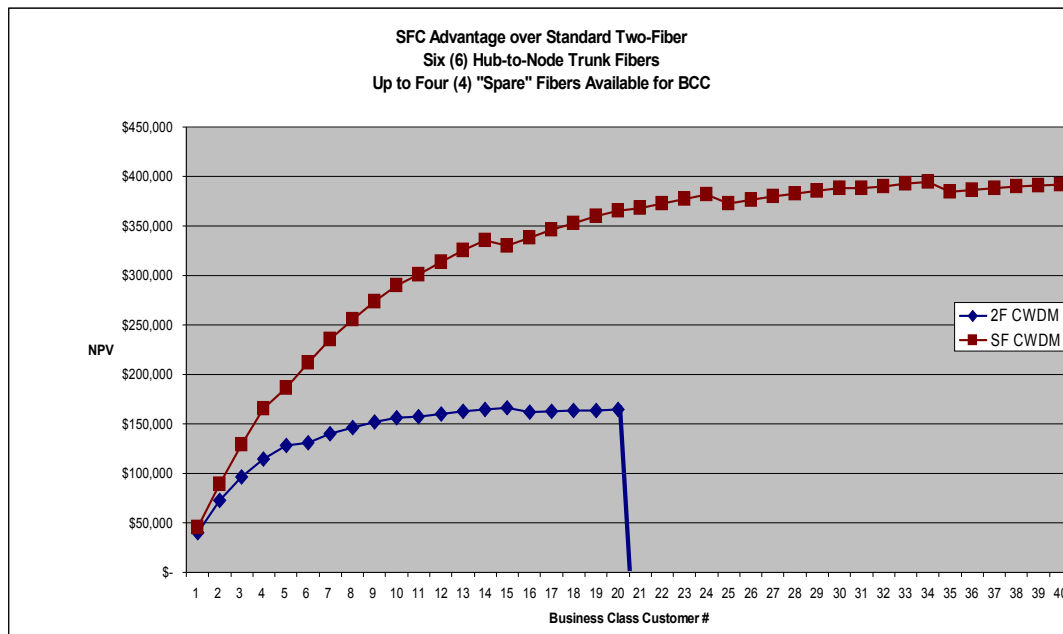
Two-Fiber					SFC					SFC Advantage	
Location	Item	Q	P	EP	Location	Item	Q	P	EP	Delta	%
Hub/CO	SFP Transceiver	1	\$ 250	\$ 250	Hub/CO	SFC Transceiver	1	\$ 500	\$ 500	\$ (250)	-100.0%
Hub/CO	8-Ch Optical Mux	1	\$ 750	\$ 750	Hub/CO	8-Ch Optical Mux/Dmux	1	\$ 750	\$ 750	\$ -	0.0%
Hub/CO	8-Ch Optical Dmux	1	\$ 750	\$ 750	Hub/CO	None	-	\$ -	\$ -	\$ 750	100.0%
Hub/CO	Subtotal	3		\$ 1,750	Hub/CO	Subtotal	2		\$ 1,250	\$ 500	28.6%
Cable Plant	Optical Fiber - Km	50	\$ 12,000	\$ 600,000	Cable Plant	Optical Fiber - Km	-	\$ 12,000	\$ -	\$ 600,000	100.0%
CPE	SFP Transceiver	1	\$ 250	\$ 250	CPE	SFC Transceiver	1	\$ 500	\$ 500	\$ (250)	-100.0%
CPE	8-Ch Optical Mux	1	\$ 750	\$ 750	CPE	8-Ch Optical Mux/Dmux	1	\$ 750	\$ 750	\$ -	0.0%
CPE	8-Ch Optical Dmux	1	\$ 750	\$ 750	CPE	None	-	\$ -	\$ -	\$ 750	100.0%
CPE	Subtotal	3		\$ 1,750	CPE	Subtotal	2		\$ 1,250	\$ 500	28.6%
Total	Excluding Fiber			\$ 3,500	Total	Excluding Fiber			\$ 2,500	\$ 1,000	28.6%
Total	Including Fiber			\$ 603,500	Total	Including Fiber			\$ 2,500	\$ 601,000	99.6%

Assuming low priced Two-Fiber Transceivers are being compared to SFC Transceivers priced at a premium (arbitrarily set to 2x the Two-Fiber price to make the point), the SFC system still offers nearly a 30% cost savings compared to the Two-Fiber Link. If a new Optical Fiber cable trunk needs to be installed...well, there is no comparison (at \$12,000 per Km for new cable installation). SFC is the way to go!

Overall Value

Since SFC consumes optical fibers one-at-a-time (as opposed to Two-Fiber CWDM systems which must consume fibers in pairs), SFC allows MSOs to "discover" new sources of revenue, even in the most fiber-constrained capacity situations. As illustrated in the chart below, SFC continues to support new Business Class Customer connections, and the cash flows that they generate, even when there is only a single Hub-to-Node Trunk Fiber remaining available.

When two-fiber Suppliers are out of Fiber and ideas, Optical Zonu, with SFC, still delivers up to ten (10) full GbE/SONET Business Class Customers, even on your last remaining Optical Fiber, thus "discovering" new sources of revenue from your "hidden" Optical Fiber assets.



When it comes to Overall Value, there is no comparison. SFC wins every time.

SFC is the Ultimate CWDM

CWDM is universally considered among the most cost-effective of Optical Access Network designs. SFC delivers a greater number of GbE streams per fiber than any other CWDM solution.

Because fewer Components are used in the SFC Network, the MTTF for the Cable Plant is inherently higher (twice), and the FIT Rate is inherently lower (half), than that of competing standard two fiber, or two wavelength, CWDM systems.

At the system level, SFC beats traditional CWDM every time based on traffic per fiber, and when reliability (MTTF or FIT) is considered, it is not even close. Overall, material costs are HALF that of competing CWDM systems: half the Optical Fiber, half the Splices, half the Connectors and half the Passives. Due to its Single Wavelength per Channel nature, SFC allows reduced inventory costs with half the SKUs compared to traditional CWDM systems.

The technology underpinning SFC is not limited to CWDM and, in fact, will be deployed as part of the new 10G DWDM Core Network architecture, essentially "supercharging" the growth capacity of the network.

How does SFC compare on the parameters most important to Service Providers and MSOs?

Service Provider / MSO Wants	Home Run	PON	CWDM	SFC
Protect Embedded Investment	-	-	+	+
Provide Native IP/Ethernet Connectivity	+	+	+	+
Seamless Integration into SNMP	+	0	0	+
Utilize Standard Configurations	+	+	+	+
Max Density, Flexibility; Min Space; Power	-	+	0	+
Simple Provisioning; Management	0	0	0	+
Positive Cash Flow - "Pay As You Grow"	-	-	+	+
Hubbed, Meshed, P2P Connectivity	+	0	+	+
Reduce Fiber Usage; Recover Fibers	-	+	-	+
Reduce Construction Costs	-	-	0	+
Maximize ROI for Competitive Business Class	-	-	+	+
Overall Relative Service Provider / MSO Rating	-2	0	+5	+11

SFC comes out on top every time!

Optical Zonu Corporation 15028 Delano Street, Van Nuys, CA 91411-2016 T: 818.780.9701 www.opticalzonu.com

Optical Zonu Corp.
HQ and Technical Center
T: 818 780 9701 x23
F: 818 780 9739
info@opticalzonu.com

Optical Zonu Corp.
Americas Region Sales
T: 512 261 0024
M: 512 750 5768
artieb@opticalzonu.com

Optical Zonu Corp.
East Coast Office
T: 302 658 0250
M: 302 650 9795
mjhartmann@opticalzonu.com

Optical Zonu Europe
Europe Region Sales
T: +44 1359 298 198
M: +44 7949 025 966
djenkins@opticalzonu.com


Gain the SFC Edge!
Fast Fiber Fault Finder