



REDES DE BANDA ANCHA
Área de Ingeniería Telemática

Equipos PDH y SDH

Area de Ingeniería Telemática
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Redes de Banda Ancha
5º Ingeniería de Telecomunicación



Equipos PDH y SONET/SDH

- CSU/DSU
- Interfaz E1 para Router
- Puerto POS STM-4c para Router
- STM-1/4 Multi-Service Node
- MultiService Platform
- MSPPs



Equipos PDH y SONET/SDH

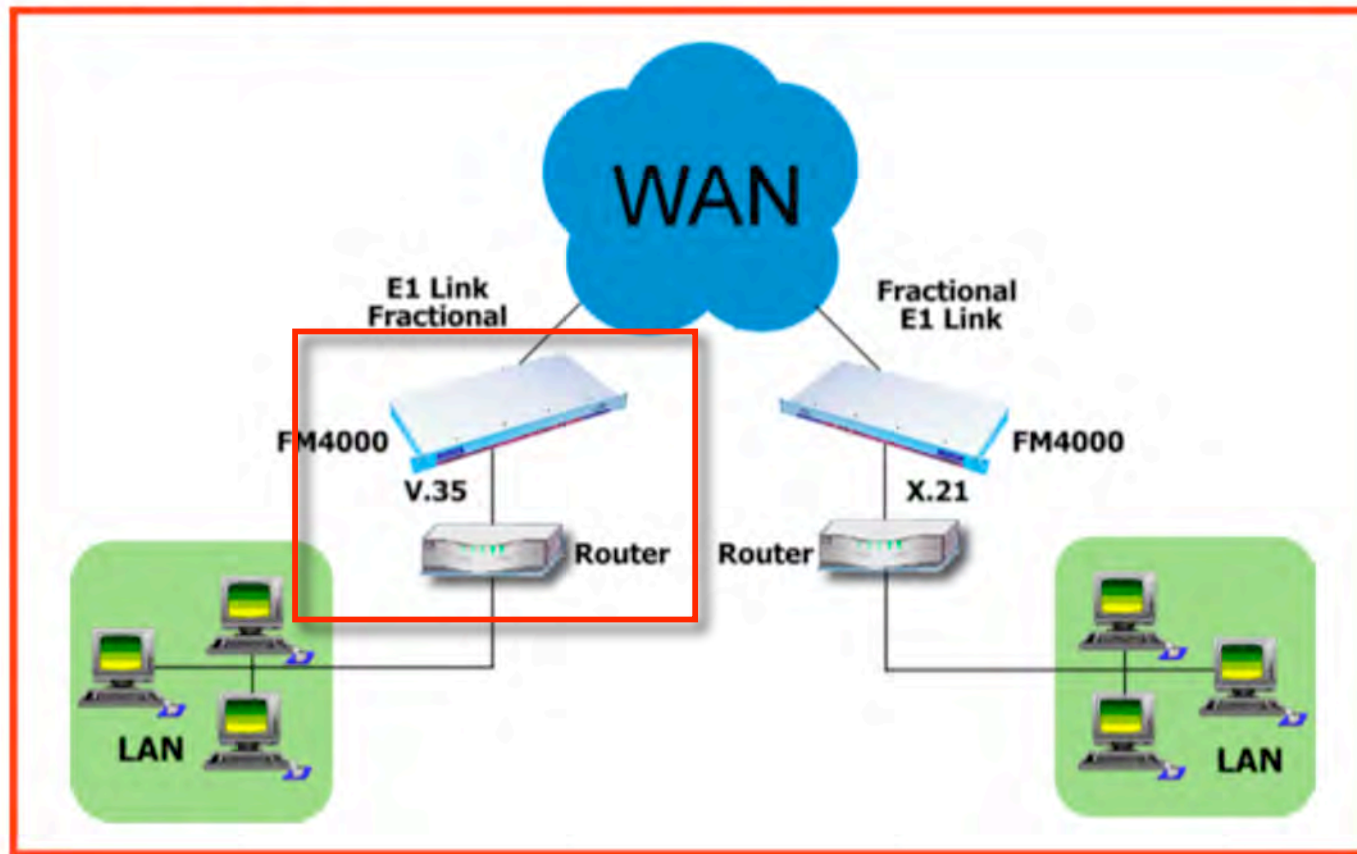
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CSU/DSU

FM4000

Application Diagram



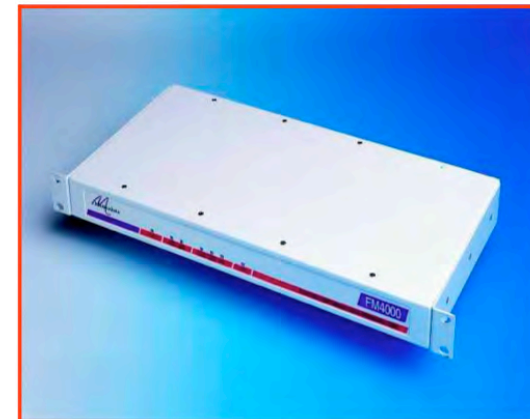


CSU/DSU

FM4000

E1 (n*64k) G.703/G.704
X.21/ V.35 Converter

- High Speed E1 G.703 2.048 Mbps interfacing
- Fractional E1 by allowing n*64Kbps channels
- X.21 or V.35 ports
- External Alarm relay port
- Remote configuration and testing of units across the network
- Comprehensive performance monitoring of both device and line
- Optional SNMP management
- Optional -48 volt DC supply





CSU/DSU

The Metrodata FM4000 DSU is used to interface high performance DTE equipment such as bridges or routers to 2.048 Mbps E1 services. The fractional E1 service is allocated on an n*64Kbps basis. The DTE equipment may present an X.21 or a V.35 interface. FM4000s are used in pairs with one unit at either end of the Wide Area link. Error conditions and usage statistics are gathered and stored by the FM4000. Unit set-up is done via a comprehensive menu system which is accessed via a local or remote terminal. The optional Metrodata LM1100 SNMP Enabler permits management via a LAN using an SNMP system.

About Metrodata

Metrodata are experts in network connectivity solutions. Based near London Heathrow Airport, we are leading designers and manufacturers of high performance communication hardware for the Fixed line, Satellite, Wireless, Systems integration, Service provision and Corporate networking communities.

Metrodata connectivity products provide solutions for interface conversion, interface extension and ATM networking from n*64Kbps through to Sonet/SDH.

Metrodata's sound technical and commercial understanding of international data networking issues ensures that we have the solutions for current and future networking needs. Our continuous development program means that Metrodata solutions are state of the art and provide an economic cost of ownership to our customers.





CSU/DSU

Specifications

Line E1 Interface		Status LED & Diagnostics	
Port	G.703, 75 ohm unbalanced, 120 ohm balanced	Loopbacks	Local loop, Remote loop
Framing	G.704 (CRC4 or No CRC4) or Unframed	BERT	2 ¹⁵ -1 PRBS
Interface	BNC (75 ohm), RJ45 (120 ohm)	Statistics	Per G821, 15min, 24 hour totals
Line coding	HDB3	Major Alarms	LOS, LOF, SQ
Bit rate	2.048 Mbps +/- 50ppm	Minor Alarms	AIS, RAI
Cable length	E1 BNC RG59 = 600m E1 BNC UR202 = 750m E1 RJ45 Belden 8132 = 175m E1 RJ45 Belden 9841 = 300m	Data	DTE Tx Data, DTE Rx Data, DTE fault
		Test	Test via menu, Test LED on front panel
DTE Interface		Compliance & Approvals	
Port	X.21 or V.35	Performance	G.703, G.704., G.706, G.823
Interface	X.21: ISO4903, 15-way D type V.35: ISO2593, 34-way M-rack	BNC version	OTR.001 2DS, BABT# NS/4043I/P/603813
Bit Rate	n*64Kbit/s, n = 1 to 31, or 2.048Mbps	RJ45 version	CTR12, CTR 13, BABT# AA606631
Configuration & Management		Safety	EN41003, EN 60950
Type	Menu driven	EMC	EN55022, EN50082
Access	System console, telnet, SNMP	Statistics	G.821, AT&T 54016:15 min, 24hr totals
Interface	V.24, Ethernet 10baseT via RJ45	Management	RFC1213 (MIB II), RFC1495 (telnet), RFC1157 (SNMP), RFC1406 (DS1/E1), MetroDte MIB (DSU), RFC1215 (Traps)
Security	Access by 2-level password	Environment	
System	Non-volatile set-up	Temp	0 - 50 deg C
Clock modes	Internal, E1 loop or DTE (CCITT cct 113)	Humidity	0 - 95% RH, non-condensing
Power supply		Pressure	86 - 106 KPA
AC Mains	100-250 VAC, 50-400 Hz, 50mA	Packaging	
-48 VDC Supply	-36 to -72 VDC, 200-100mA	Type	1U, 19 inch rackmount
		Dimensions	435 x 213 x 44 mm (W x D x H)



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Interfaz E1 para Router

CISCO ONE AND TWO PORT T1/E1 MULTIFLEX VOICE/WAN INTERFACE CARDS



Flexible multiservice solution supports multiple voice, data and integrated voice/data applications, facilitating the migration from data only or channelized voice and data to packet voice solutions and simplifying deployment, management and sparing.

INTRODUCTION

The Cisco 1 and 2-port T1/E1 Multiflex Voice/WAN Interface Cards (“Multiflex VWICs”) support voice, and data applications in Cisco 2600, 2800, 3600, 3700, and 3800 multiservice routers. The Multiflex VWIC combines WAN Interface Card (WIC) and Voice Interface Card (VIC) functionality to provide unparalleled flexibility, versatility and investment protection through its many uses. Customers who choose to integrate voice and data in multiple steps preserve their investment in a T1/E1 WAN interface since the Multiflex VWIC can be reused in packet voice applications.

The T1/E1 Multiflex Voice/WAN Interface Cards are offered in single and dual port versions which can be used and then re-deployed as network requirements change, thereby addressing several applications:

- *Data*—As a WIC for T1/fractional T1, and E1/fractional E1 applications. The 1- and 2- port E1 versions include models that support unframed G.703. To simplify remote management issues the T1 version integrates a fully managed data service unit/channel service unit (DSU/CSU) and the E1 version includes a fully managed DSU.
- *Packet Voice*—As a VIC for the Digital T1/E1 Packet Voice Trunk Network Module (NM-HDV), IP Communication Voice Network Module (NM-HD-2VE), and IP Communication High-Density Voice Network Module (NM-HDV2) to provide T1 or E1 connections to Private Branch Exchanges (PBXs) and central offices (COs) enabling new services and reducing voice/fax toll charges.
- *Multiplexed Voice/Data*—As a dual port T1 or E1 Drop and Insert Multiplexer with integrated DSU/CSUs, reducing the complexity and number of network components and facilitating a graceful migration to bandwidth efficient packet voice.



Interfaz E1 para Router

- Reduces training, deployment, management and sparing inventory over single purpose interfaces Maximizes investment protection
- Multifunction support for LAN to LAN routing, multiplexed voice and data, and packetized voice
- Modules shared between Cisco 2600, 2800, 3600, 3700 and Cisco 3800 series
- E1 versions support both balanced and unbalanced modes
- Specific models to support E1 G.703 unframed for utilizing the full 2.048 Mbps (Note: The G.703 models can also be configured for framed mode where they support all the features of the other VWIC models). Improves branch-office network manageability and reliability
- Eliminates costly external third party CSU/DSUs and drop and insert multiplexers
- Simplifies remote network management by allowing a single management tool such as CiscoView or CiscoWorks to support router, CSU/DSU, drop and insert multiplexer

Maximizes system resources

- Increases T1/E1 port density supported on Cisco 2600, 2800, 3600, 3700 and 3800 multiservice access routers - up to 4 T1/E1 with integrated CSU/DSU in a single Network Module slot or up to two T1/E1 connections in a single WIC slot
- Easy Migration to bandwidth efficient packet voice, enabling new services

Customers who choose to integrate voice and data in stages preserve their investment in WAN interfaces. For example, the Multiflex VWIC can support data only applications as a WAN interface, then be re-used to integrate voice and data with the Drop and Insert multiplexer functionality and/or configured to support packetized voice (Voice over IP [VoIP] or Voice over Frame Relay [VoFR]) when in the NM-HDV, NM-HD-2VE, or NM-HDV2.

APPLICATIONS

Packet Voice Solutions: PBX and CO Connectivity

The Multiflex VWICs supply private branch exchange (PBX) and public switched telephone network (PSTN) connectivity for the NM-HDV, NM-HDV-2VE, or NM-HDV2 via digital T1/E1 ports. The NM-HDV, NM-HDV-2VE, and NM-HDV2 support industry standard H.323 based VoIP, industry standards FRF.11 and FRF.12 based VoFR, and AAL5 based VoATM.

Please note that for each of these packet voice applications (VoIP, VoFR, or VoATM), an appropriate WAN interface card is also required.



Interfaz E1 para Router

Data Solutions: 1 and 2-port T1/E1 WIC with Integrated DSU/CSU

The Multiflex VWICs simplify branch office connectivity by integrating the functionality of a router, T1/E1, fractional T1/E1 serial interface with a fully managed DSU/CSU.

When used for “data-only” WAN connectivity, the Multiflex VWICs support numerous functions, including Cisco IOS[®] command line interface initiated loopback control, similar to the popular WIC-1DSU-T1. Additionally the Multiflex VWIC is also offered in a dual port versions, including dual E1 configurations, enabling increased WAN port density in Cisco 26/28/36/37/3800 series multiservice access routers. The E1 VWIC versions include integrated DSUs, while the T1 VWIC versions integrate CSU and DSU functionality, simplifying remote network management.

The 2-port Multiflex VWICs increase configuration flexibility on Cisco multiservice access routers eliminating the need for 2 single-port T1/E1 WAN interface cards. Increasing the T1/E1 port density in a single WIC slot enables applications such as local serial aggregation with the WIC-2T or WIC-2A/S, or ISDN backup with the WIC-1B-S/T or WIC-1B-U.

The VWICs also support a channelized capability where the T1 or E1 service can be flexibly split into two or more fractional channel groups. Thus a single physical port can provide connection to multiple sites. (Note: when choosing this mode only a single port can be supported in each WIC slot.)

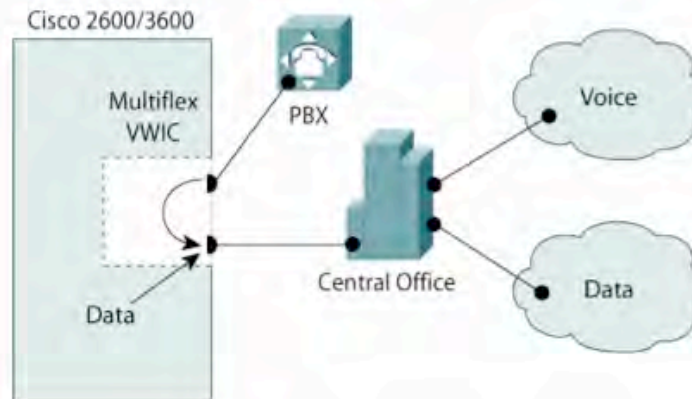
The VWIC-1MFT-G703 and VWIC-2MFT-G703 not only support unframed G.703 but also support all the features of the other VWICs including Drop and Insert on the VWIC-2MFT-G703. Additional flexibility is provided on the VWIC-2MFT-G703 with the capability to configure one port for unframed G.703 while configuring the other for standard framed E1.





Interfaz E1 para Router

Figure 2. Drop and Insert to Share a T1/FT1 or E1/FE1 Service



To illustrate, consider the example of a PBX with a T1 interface that needs to support a maximum of 10 simultaneous calls. With 24 DS0s in a T1 Service (1.544 Mbps) this leaves 14 DS0s or 896 Kbps of bandwidth for data from the router (14 x 64 Kbps). The number of DS0s assigned for PBX calls and the remainder that are available for use with router data are fully configurable (statically, not dynamically). In the case of an E1 service 30 DS0s are available for division between voice and router data.

In this example one port of the 2-port Drop and Insert Multiflex VWIC is connected to the PBX and the other port is connected to the CO. The 10 DS0s from the PBX are TDM switched to the "CO port" and this switching is done on the VWIC itself. The configuration of this TDM switching is flexible so that DS0s on the "PBX port" do not have to be mapped to DS0s with the same timeslots on the "CO port". The remaining 14 DS0s on the VWIC "CO port" terminate through the VWIC's backplane connector on the router as a single aggregate channel group. The 14 DS0s are not individually addressable by the router as a channelized service, but can be split into two or more channel groups. (See Table 2 for specifics.)

The 2-port Drop and Insert Multiflex VWIC is the model included in the 2-port versions of the Digital T1/E1 Packet Voice Trunk Network Module. The term "drop and insert" is normally used when router data (or data from another data device) is multiplexed with voice calls. A more generic term for "drop and insert" is "digital cross connect". Digital cross connecting of voice channels only is supported by the 2-port Drop and Insert Multiflex VWIC when in the NM_HDV, NM-HD-2VE, or NM-HDV2. For example, a single T1 connection from a PBX to the "PBX port" on the VWIC can be divided up between DS0s that go to the NM-HDV for packetized voice (e.g. VoIP), and DS0s that are TDM switched to the "CO port" of the VWIC for standard circuit switched voice connectivity.



Interfaz E1 para Router



SPECIFICATIONS

Product Number	Description
VWIC-1MFT-T1	1-Port RJ-48 Multiflex Trunk-T1
VWIC-2MFT-T1	2-Port RJ-48 Multiflex Trunk-T1
VWIC-2MFT-T1-DI	2-Port RJ-48 Multiflex Trunk-T1 With Drop and Insert
VWIC-1MFT-E1	1-Port RJ-48 Multiflex Trunk-E1

Product Number	Description
VWIC-2MFT-E1	2-Port RJ-48 Multiflex Trunk-E1
VWIC-2MFT-E1-DI	2-Port RJ-48 Multiflex Trunk-E1 With Drop and Insert
VWIC-1MFT-G703	1-Port RJ-48 Multiflex Trunk-E1 G.703
VWIC-2MFT-G703	2-Port RJ-48 Multiflex Trunk-E1 G.703
CAB-E1-RJ45BNC	E1 Cable RJ-45 to Dual BNC (Unbalanced)
CAB-E1-RJ45TWIN	E1 Cable RJ-45 to Twinax (Balanced)



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Puerto POS STM-4c (OC-12c)

The Cisco® I-Flex design combines shared port adapters (SPAs) and SPA interface processors (SIPs), leveraging an extensible design that enables service prioritization for voice, video and data services. Enterprise and service provider customers can take advantage of improved slot economics resulting from modular port adapters that are interchangeable across Cisco routing platforms. The I-Flex design maximizes connectivity options and offers superior service intelligence through programmable interface processors that deliver line-rate performance. I-Flex enhances speed-to-service revenue and provides a rich set of QoS features for premium service delivery while effectively reducing the overall cost of ownership. This data sheet contains the specifications for the Cisco 1-Port OC-12c/STM-4c POS Shared Port Adapter (Cisco 1-Port OC-12 POS SPA; refer to Figure 1).

Figure 1. Cisco 1-Port OC-12 POS SPA with SFP Optics



PRODUCT OVERVIEW

The Cisco 1-Port OC-12 POS SPA is available on high-end Cisco Systems® routing platforms offering the benefits of network scalability with lower initial costs and ease of upgrades. The Cisco SPA/SIP portfolio continues the Cisco focus on investment protection along with consistent feature support, broad interface availability, and the latest technology. The Cisco SPA/SIP portfolio allows different interfaces (packet over SONET/SDH [POS], ATM, Ethernet, etc.) to be deployed on the same interface processor.

The Cisco 1-Port OC-12 POS SPA provides a single Small Form Factor Pluggable (SFP) interface. SFP modules are available in multiple optical reaches from 2 to 80 km.



Puerto POS STM-4c (OC-12c)

Features	Descriptions
Product Compatibility	<ul style="list-style-type: none">• Cisco 7304 Router• Cisco 7600 Series Routers
Port Density per SPA	1 port
Physical Interface	<ul style="list-style-type: none">• OC-12c/STM-4c SFP optics module (refer to optical parameters in Table 2)• Visual status indicators (LEDs):<ul style="list-style-type: none">– SPA status LED– Per-port LEDs<ul style="list-style-type: none">• Carrier and alarm• Active and loopback
Protocols	<ul style="list-style-type: none">• High-Level Data Link Control (HDLC), RFC 2615• Point-to-Point Protocol (PPP), RFC 1662• Frame Relay, RFC 2427• IPv4/IPv6
Features and Functions	<ul style="list-style-type: none">• Synchronization<ul style="list-style-type: none">– Local (internal) or loop timed (recovered from network)– Pointer activity monitoring• Local (diagnostic) and line (network) loopback• Section data communications channel (SDCC)---Platform-dependent feature• Payload mapping<ul style="list-style-type: none">– POS with 1 + X⁴³ self-synchronous scrambler• SONET/SDH compliance<ul style="list-style-type: none">– Telcordia (Bellcore) GR-253-CORE (as applicable)– ANSI T1.105, T1.231– ITU-T G.707, G.957, G.825 (as applicable)• Supported SONET/SDH alarm and signal events<ul style="list-style-type: none">– Signal failure bit error rate (SF-ber)– Signal degrade bit error rate (SD-ber)



Puerto POS STM-4c (OC-12c)

Table 2. OC-12c/STM-4c POS Optical Specifications

SFP Optics	Maximum Distance
Multimode (MM) Short Reach (SR)	Up to 0.25 mi (500 m)
Single-Mode (SM)	Up to 1.2 mi (2 km)
SM Intermediate Reach (IR-1)	Up to 9 mi (15 km)
SM Long Reach (LR-1)	Up to 25 mi (40 km)
SM Extended Reach (LR-2)	Up to 50 mi (80 km)



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STM-1/4 Multi-Service Node

Broadband Optical Connectivity To The Business

Medium/large enterprises and corporates rely more and more on optical connectivity to the Metro network for their mission-critical applications.

By extending fiber optics to the business, Service Providers' telecommunication infrastructures can effectively support end-customers' business profitability,

ensuring reliable services ranging from voice and data storage replication to high speed Internet Access and Ethernet Virtual Private Networks.

Alcatel 1640 FOX (Fiber Optics eXtension) is an ideal carrier-grade Optical Multi-Service CPE capable of delivering a flexible range of different services – ATM, Ethernet, Voice, TDM – supported by next generation SDH technology. Its is a compact (desktop or wall-mount) and scalable multi-service platform, which enables Service Providers to extend their service offerings and create new revenue opportunities – delivering optical access connectivity for enterprises and large businesses to the Metro.

Alcatel's Optical Multi-Service Nodes (OMSN) provide world-class next generation SDH functionality and capacity through aggregation of broadband multi-protocol traffic patterns.

Designed for metro and backbone applications, the OMSN product family offers telecom carriers and service providers the powerful solution to build intelligent optical networks and achieve the optimal balance between new competitive service offerings and traditional revenue-generating services.

The Alcatel 1640 FOX is the Optical Multi-Service Node addressing Customer Premises applications.





STM-1/4 Multi-Service Node

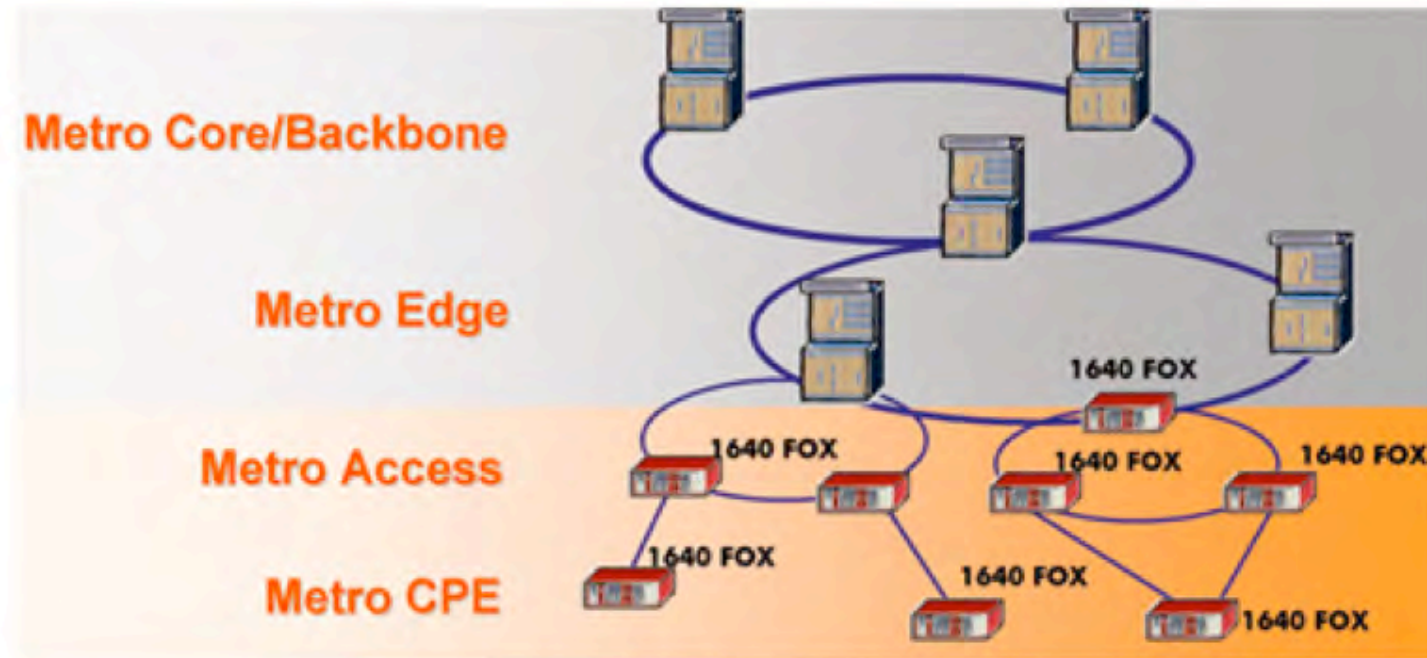


Fig. 1: How Alcatel 1640 FOX fits in the network



STM-1/4 Multi-Service Node

A Compact, Data-Oriented, Multi-Service CPE

Alcatel 1640 FOX is a next-generation synchronous Multi-Service Node designed for carrying optical access services to customer premises over the fiber medium.

Ideally suited for wall-mount or desktop applications, thanks to its symmetrical architecture it can be

configured as Terminal Multiplexer or Add Drop Multiplexer for deployment in spur, ring or meshed metro access network topologies.

Alcatel 1640 FOX provides STM-1 or STM-4 network interfaces for connection to the access network's

central office. It can be equipped with a wide variety of customer interfaces: 2Mbps, 34Mbps, 45Mbps, STM-1 and STM-4 as well as Ethernet 10/100 and Gigabit Ethernet SX/LX interfaces for direct LAN interconnections.

It also supports Packet Ring Edge Aggregator capability, which provides Layer 2 Ethernet/MPLS functions with differentiated QoS.

High-density Support for Large Uplink Capacity

The chassis of the Alcatel 1640 FOX has three card slots. One slot is for a Compact ADM-1 or ADM-4 card, which provides 2 x STM-1 or 2 x STM-4 connectivity to the optical

access network, ideally suited for dual homing and high grade protection

applications. The other two additional slots may host different interfaces – PDH, SDH or Packet – to serve multiple types of customer services, for example:

- > Up to 16 x 2Mbps, 34/45 Mbps
- > Up to 22 x Ethernet 10/100 Mbps
- > Up to 8 x Gigabit Ethernet SX/LX
- > ATM switch or Packet Ring/MPLS switch with elastic bandwidth tuning and traffic policing for diff-QoS

Alcatel 1640 FOX features unmatched performances in terms of both interface density and uplink capacity.

Multi-service optical protected connectivity for large enterprises is achieved – for example – by supporting simultaneously 4 x Ethernet 100Mbps full rate lines, plus 16 x 2Mbps TDM lines, plus one Gigabit Ethernet line, all 1+1 network protected.

Multi-Service Applications

Alcatel 1640 FOX offers to operators the ability to deliver several different types of multi-protocol services and to fit into various network topologies. It can host ISA plug in modules performing Ethernet, MPLS and ATM switching functions.



STM-1/4 Multi-Service Node

The traffic originated and terminated by any customer interface may be directly mapped into SDH Virtual Containers (VCs) and transported transparently across the SDH network, or be processed by the ISA-ATM or Ethernet/MPLS switching modules for optimal aggregation and delivery of broadband data services, such as:

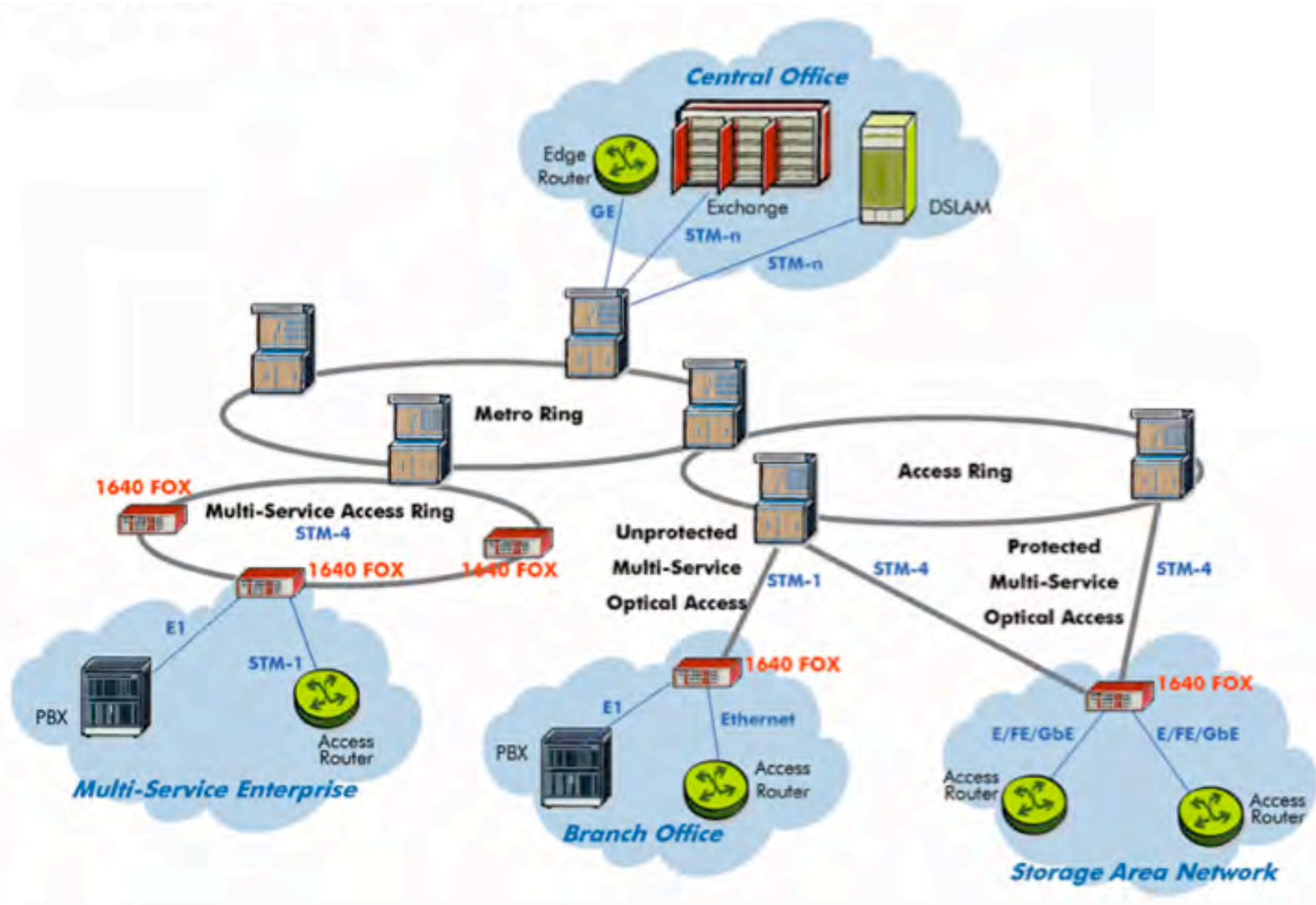
- > Leased Lines Services (PDH, SDH)
- > Voice Services
- > Metro Ethernet Services (Ethernet Private Lines, Ethernet L2-VPN, Internet Access)
- > DSL, LMDS, UMTS aggregation services



Fig. 2: Alcatel 1640 FOX block diagram



STM-1/4 Multi-Service Node





STM-1/4 Multi-Service Node

The Alcatel 1640 FOX can act as an ideal multi-protocol transport device between carrier's and end-customer's networks. Besides, allowing consolidation of different traffic patterns (TDM, ATM, Ethernet, GbE) into either segregated or shared SDH

Virtual Containers (pipes), it performs edge functions such as traffic shaping, policing and QoS guarantees.

Alcatel 1640 FOX may be connected to any other SDH node located in a central office or in an access ring. In the latter case Alcatel 1640 FOX may connect to the ring either as a spur of a ring node or as a ring node itself.

Bi-directional working on a single fiber is available for metropolitan networks with fiber shortage.

Network Optimization

Corporate connections to network operators' or service providers' Points Of Presence (POPs) are more and more characterized by data traffic, such as LAN switch or access router interconnects.

Alcatel 1640 FOX may be used to deliver IP or ATM backhauling services at variable bit rates, overcoming the rigidity inherent to the discrete tributary bit rates offered by SDH.

When Alcatel 1640 FOX is directly inserted into an access ring node, traffic coming from different clients can be groomed into common SDH Virtual Containers, by means of cell or packet-based statistical multiplexing.

The network operator can then optimize the transport bandwidth utilization for more revenue-generating services, minimize the interconnection costs to external data equipment and ultimately reduce investments for network upgrades.

As most of replaceable units (common parts and traffic cards) are shareable within the Optical Multi- Service Nodes family, Alcatel 1640 FOX

allows carriers to balance the impact of spare holding and personnel training, which results in reduced investments and network operation costs.



STM-1/4 Multi-Service Node

Technical Summary

Applications

- > Terminal Multiplexer and Add Drop Multiplexer in protected or unprotected linear links, rings or meshed networks for multi-service optical access
- > Single fiber working
- > Metro Ethernet services (p2p, L2-VPN, Internet Access)

Interfaces

- > Network interfaces: 2 x STM-1 or 2 x STM-4
- > Customer interfaces (two slots available each):
 - 16 x 2Mbps (ISDN-PRA)
 - 1 x 34Mbps
 - 1 x 45Mbps
 - 2 x STM-1 (S-1.1, L-1.1, L-1.2)
 - 1 x STM-4 (S-4.1, L-4.1, L-4.2, L-4.2JE)
 - 11 x Ethernet 10/100 Base-TX (ISA-Eth plug-in)
 - 4 x Gigabit Ethernet Base-SX/LX (ISA-GbE plug-in)

Connectivity

- > 32x32 STM-1 equivalent full non-blocking SDH matrix (HO/LO) in all configurations
- > Unidirectional, bidirectional, broadcast connections
- > Line and VC loopbacks

Synchronization

- > Internal oscillator ± 4.6 ppm
- > Holdover drift ± 0.37 ppm per day
- > External sources: STM-n/2Mbps ports, 1 external 2MHz/2Mbps output
- > Priority and Quality (SSM) synchronization algorithms

Data Engines (ISA)

- > ISA-ATM: 600Mbps plug-in cell switch with STM-1 access on board; CBR, UBR, UBR+, VBR, GFR traffic contracts; point-to-multipoint from VC-12 up to VC4 payloads; policing and shaping; hard/soft PVCs connections (PNNI); equipment protection 1+1.
- > ISA-PR_EA (Packet Ring Edge Aggregator): 1.6 Gbps plug-in switch with 4 x Ethernet 10/100 Base-TX interfaces or 1 x GE SX/LX on board; Eth/GFP and Eth/MPLS/POS ports VC-12 up to VC-4. MPLS label switch and VLAN-tag forwarding criteria. Packet classification (VLAN 802.1Q, priority 802.1p, IP-DA, IP-TOS, MPLS+exp) and dual rate leaky bucket traffic policing/metering. Integrated L2/L3 forwarding function. Ethernet Virtual Private Line and LAN Services support.
- > ISA-Eth: Rate-adaptive Ethernet 10/100 transport. ITU-T G.7041 GFP mapping on N x VC-12, N x VC-3, VC-4 with in service Bond.
- > ISA-GbE: rate-adaptive Gigabit Ethernet transport (ITU-T G.7041 GFP mapping on 1..4 x VC-4).

Environment

- > Operating condition: ETS 300 019, class 3.2
- > Storage condition: ETS 300 019, class 1.2
- > Transportation condition: ETS 300 019, class 2.2
- > ESD/EMC: ETS 300 386, "Telecommunications Center" CLASS B

Operation

- > CMISE craft terminal through RS232 at 38.4kb/s
- > Network management access through QB3 interface or Qecc G.784
- > Local and remote SW download
- > Remote inventory
- > Housekeeping: 4 inputs + 2 outputs
- > Auxiliary channels: 1 x RS-232, 1 x V.11

Standards

> ITU-T/ETSI

In compliance to latest ITU-T/ETSI standards for SDH equipment

I.113, I.150, I.311, I.321, I.326, I.356, I.357, I.361, I.363.5, I.371, I.432.1, I.432.2, I.610, I.630, I.731, I.732, Q.2110 B-ISDN SAAL, Q.2130 B-ISDN SAAL, Q.2140 B-ISDN SAAL, ETS 300 298-1, ETS 300 298-2, EN 301 163-1-1, EN 301 163-2-1



STM-1/4 Multi-Service Node

Protections

- > Linear MSP single and dual-ended
- > SNCP/I, SNCP/N
- > SNCP Drop & Continue

Monitoring

- > POM (Path Overhead Monitoring) on 100%VCs
- > SUT (Supervisory Unequipped Trail)
- > TCM (Tandem Connection Monitoring)
- > Performance monitoring according to G.784, G.826, G.821
- > Ethernet performance counters

Power

- > Station battery: -48 to -60 V dc
- > Ac mains: optional external AC/DC rectifier inclusive of 2h-battery backup (same cover as transmission chassis)
- > Power consumption: 35 W (typical)

Physical Dimensions

- > Chassis size: 90W x 285H x 313D mm
- > Installation options: Desktop, wall-mount, ETSI rack

> ATM Forum

af-bici-0013.003, af-cs-0127.000, af-nm-0020.000, af-nm-0020.001, af-nm-0095.001, af-phy-0046.000, af-phy-0064.000, af-pnni-0055.000, af-pnni-0066.000, af-pnni-0081.000, af-tm-0121.000, af-uni-0010.002

> IETF

MPLS (Ethernet over MPLS)

> IEEE

IEEE 802.3, IEEE 802.3u, IEEE 802.3x, IEEE 802.3z, 802.1q/p



Equipos PDH y SONET/SDH

- CSU/DSU
- Interfaz E1 para Router
- Puerto POS STM-4c para Router
- STM-1/4 Multi-Service Node
- **MultiService Platform**
- MSPPs



Cisco Multiservice Platform

The Cisco® ONS 15310-CL SONET Multiservice Platform is an economical, 1-rack unit (1RU)-high delivery platform optimized for use as the last network element, at the customer location (CL), in a service provider's network or for use as an end node in enterprise or campus environments. The Cisco ONS 15310-CL takes advantage of the proven technology pioneered by the Cisco ONS 15454, the industry's leading multiservice optical transport platform (Figure 1).

Figure 1

Cisco ONS 15310-CL SONET Multiservice Platform



INTEGRATED OPTICAL NETWORKING

The Cisco ONS 15310-CL efficiently aggregates data, voice, and video services for transport. The platform effectively supports TDM and 10/100-Mbps Ethernet, and it provides integrated data-switching and cross-connect functions. Various data streams can be carried separately or together and transported in a one-for-one dedicated bandwidth mode or in a concentrated mode with no limit on the oversubscription ratio.

With the ability to transparently integrate into SONET networks, and an expansion slot providing the modularity to meet changing network needs, the Cisco ONS 15310-CL helps transform today's TDM-based transport networks into flexible, data-intensive superhighways.

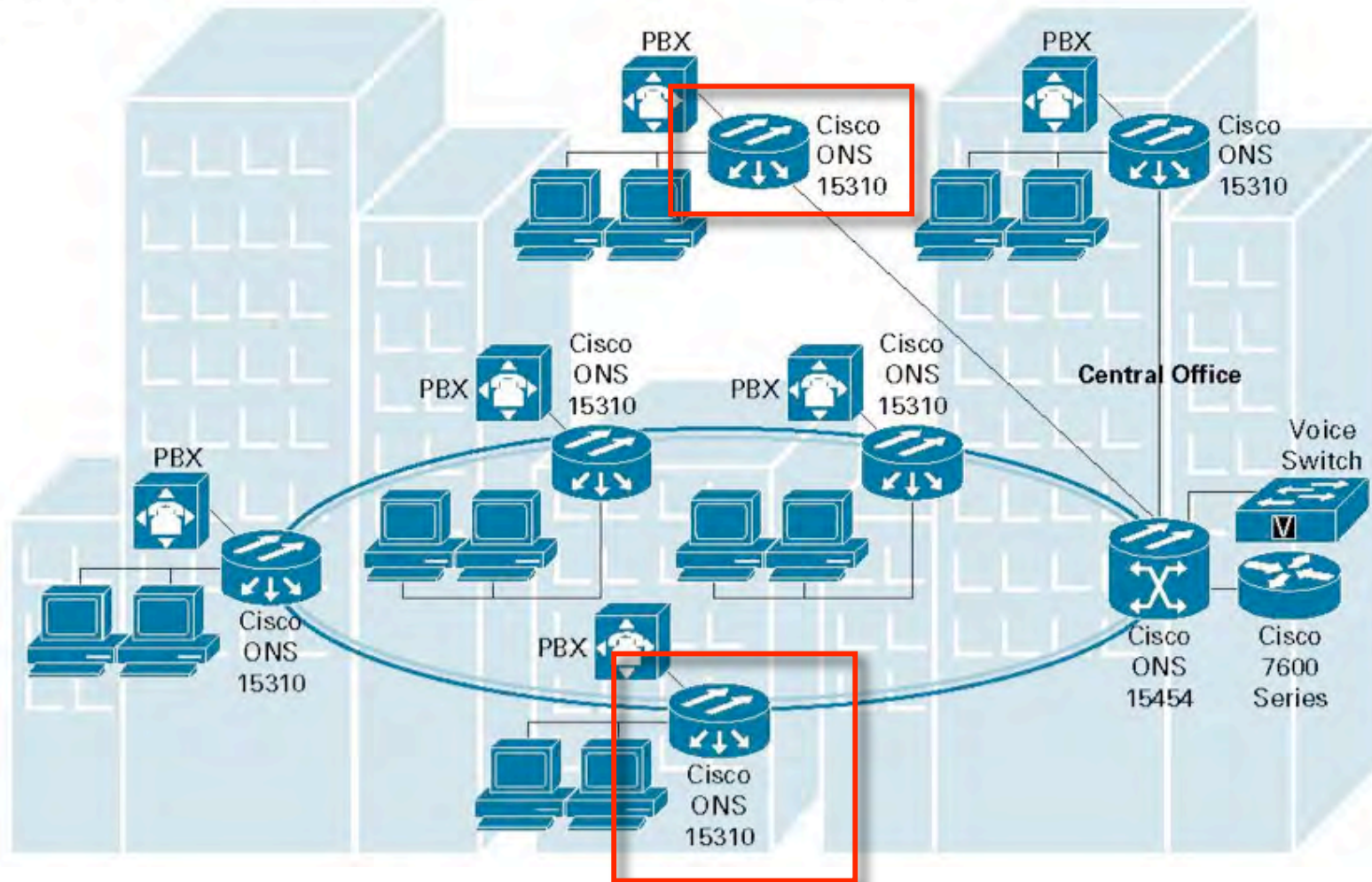
Although many transport products claim to handle today's data and voice traffic, they lack the ability to provide effective bandwidth management for higher-speed IP-based data services. Many of these platforms require significant setup time and are difficult to provision. The Cisco ONS 15310-CL offers optimized bandwidth for high-speed IP-based data services, rapid service provisioning, and multiple optical interfaces through Small Form-Factor Pluggables (SFPs) for flexible SONET networking (Figure 2).



Cisco Multiservice Platform

Figure 2

The Cisco ONS 15310-CL Delivers Multiservices On Demand to the Customer Location and Metropolitan Edge





Cisco Multiservice Platform

EVOLUTIONARY SONET TRANSPORT

By extending the metropolitan (metro) edge to customer premises and providing direct high-speed LAN connectivity, the Cisco ONS 15310-CL allows service providers to cost-effectively offer scalable, high-speed data services over their transport networks. For the enterprise, the Cisco ONS 15310-CL offers the efficiency, scalability, and high availability to meet the bandwidth demands of the mission-critical e-business infrastructure. These features are available without implementing new technology or upgrading the existing transport network infrastructure.

This evolutionary platform supports high optical bandwidth and can drop a DS-1 from an OC-3 or OC-12 stream. The Cisco ONS 15310-CL also provides comprehensive STS- and VT-level bandwidth management and integrated data switching.

ACCELERATED NETWORK ECONOMICS

The integrated multiservice optical networking functions of the Cisco ONS 15310-CL dramatically reduce service-delivery costs. Packaged in a 1RU, industrially temperature-hardened Network Equipment Building Standards (NEBS) 3-compliant assembly, the Cisco ONS 15310-CL delivers fast provisioning and low initial cost, while maintaining a small footprint and low operational cost throughout the life of the product.

PROVISIONING AND MANAGING THE CISCO ONS 15310-CL

Each Cisco ONS 15310-CL is equipped with Cisco Transport Controller, a subnetwork craft interface tool that simplifies node control. The Cisco Transport Controller GUI and point-and-click capabilities allow easy node turn-up, autorouted A-to-Z circuit provisioning, and rapid service creation. Cisco Transport Controller provides: element-level control; quick access to operation, administration, maintenance, and provisioning (OAM&P); a Transaction Language One (TL-1) command window; and graphical network topology representations, network conditions, and shelf configurations.

Cisco Transport Manager is the comprehensive element management system for the entire Cisco ONS products, including the Cisco ONS 15310-CL. Integrating fault, configuration, and performance management, Cisco Transport Manager streamlines and strengthens optical network OAM&P. The client-and-server platform easily scales to manage up to 1000 network elements and 100 simultaneous users. Cisco Transport Manager helps service providers quickly identify and correct network problem areas and more rapidly deploy revenue-generating services.



Cisco Multiservice Platform

Chassis

- 1RU-high chassis
- Two SFP optical ports; SFP options follow:
 - OC-3 intermediate reach and long reach
 - OC-12 intermediate reach and long reach
 - Multirate OC-3/OC-12 intermediate reach
- Twenty-one onboard DS-1 interfaces through a straight, 96-pin D-sub connector, with separately orderable cable with separate 64-pin transmit (Tx) and receive (Rx) connectors at customer side
- Three onboard DS-3 or EC-1 (electrical STS) per-port provisionable interfaces through a mini-BNC connector, with separately orderable mini-BNC-to-standard BNC conversion cable
- Flexible expansion port
- Integrated single-system cross-connect, timing, control, and DS-n service architecture
- 19- and 23-inch rack-mount and wall-mount options
- Alarm input/output contacts (3/2) port, Building Integrated Timing Supply (BITS) input/output (1/1) port, external LAN management port, local and craft management port, and user-data-channel (UDC) port-all with RJ-45 connectors
- Single-feed AC power or dual-feed DC power factory versions



Cisco Multiservice Platform

Configurations

- Point-to-point terminal
- Add/drop multiplexer
- Two-fiber unidirectional-path switched ring (UPSR)
- Path-protected mesh network (PPMN)

System Timing

- Internal Reference -SONET Minimum Clock (SMC) ± 20 parts per million (PPM) compliant with Telcordia GR-253-CORE
- Holdover stability: 3.7×10^{-7} per day, including temperature (<255 slips in first 24 hours)
- Line timed from any OC-n port
- External BITS

Software

- SONET, DS-3/EC-1, and DS-1
- UPSR, PPMN, 1 + 1, 1 + 0, bidirectional, and unidirectional
- Complete equipment and facility maintenance
- Complete performance monitoring per GR-499, GR-253, and GR-820
- Full Ethernet switching capability
- Protection-channel access (Telcordia GR-1230-CORE)
- Terminal and facility loopbacks



Equipos PDH y SONET/SDH

- CSU/DSU
- Interfaz E1 para Router
- Puerto POS STM-4c para Router
- STM-1/4 Multi-Service Node
- MultiService Platform
- **MSPPs**



Cisco MSPP

The Cisco® ONS 15310-MA is a **Multiservice Provisioning Platform (MSPP) that switches packet and TDM traffic, and interfaces to both circuit-based and Ethernet/MPLS backbone networks. Together with the Cisco ONS 15310-CL, Cisco ONS 15454, and Cisco ONS 15600, the Cisco ONS 15310-MA provides an end-to-end solution for multiservice transport over SONET networks.**

Product Overview

The Cisco ONS 15310-MA (Figure 1) is a carrier-class MSPP that efficiently switches Ethernet and TDM traffic for use in metropolitan and regional optical networks. Its flexibility and scalability allow it to **support 1.5-Mbps to 2.5-Gbps TDM, as well as 10/100/1000-Mbps Ethernet interfaces.** The Cisco ONS 15310-MA can aggregate traffic at a central office or collect services at the customer premises. At a central office, it can groom traffic from multiple customer-located network elements, such as the Cisco ONS 15310-CL, Cisco Catalyst® 3750 Series Switch, or another Cisco ONS 15310-MA for distribution to other networks or handoff to specialized networking devices, such as a Cisco 7600 Series Router, a high-capacity digital cross-connect (DXC), or a Class 5 telephone switch. At the customer premises, the Cisco ONS 15310-MA can collect high-density and high-capacity traffic from medium-sized and large businesses, or from several customers in a multitenant location.

Figure 1

Cisco ONS 15310-MA Multiservice Platform





Cisco MSPP

Carrier-Class Compact MSPP

In a very compact chassis (two systems fit side by side in six rack units [RUs]), the Cisco ONS 15310-MA provides six slots for hot-swappable traffic interfaces. High-density electrical (up to 168 DS-1), Ethernet (up to 32 10/100BASE-T), or optical interfaces can be terminated in this small footprint to optimize use of expensive real estate at the central office or remote terminal cabinet. A centralized two-stage 20-Gbps STS and 5-Gbps VT1.5-TDM cross-connect can switch SONET encapsulated traffic from any tributary port onto any optical interface.

All Cisco ONS 15310-MA common equipment, including processor, cross-connect, timing, and power supply, can be optionally duplicated for 99.999% reliability. Protection for TDM electrical as well as optical interfaces is also possible. Unidirectional-path switched ring (UPSR) and 1+1 automatic protection switching (APS) can be configured for greater fault tolerance in the optical network. The Cisco ONS 15310-MA is NEBS Level 3, FCC, and UL compliant, and supports industrial temperature ranges, making it fully qualified for deployment in central offices, customer locations, or remote terminals.

Applications

The flexibility of the Cisco ONS 15310-MA gives it superior versatility. Its true multilayer Ethernet-over-SONET transport capabilities allow service providers to more efficiently add support for next-generation, packet-based services to their existing infrastructure while limiting capital and operational expenditures and increasing speed of service delivery. Interoperability with the Cisco ONS 15310-CL, Cisco ONS 15454, and Cisco ONS 15600 provides a robust network solution that can deliver economical, scaleable, and cost-effective services on demand. The versatility and reliability of the Cisco ONS 15310-MA make it the optimal choice for a wide variety of applications, some of which are listed in the following sections.



Cisco MSPP

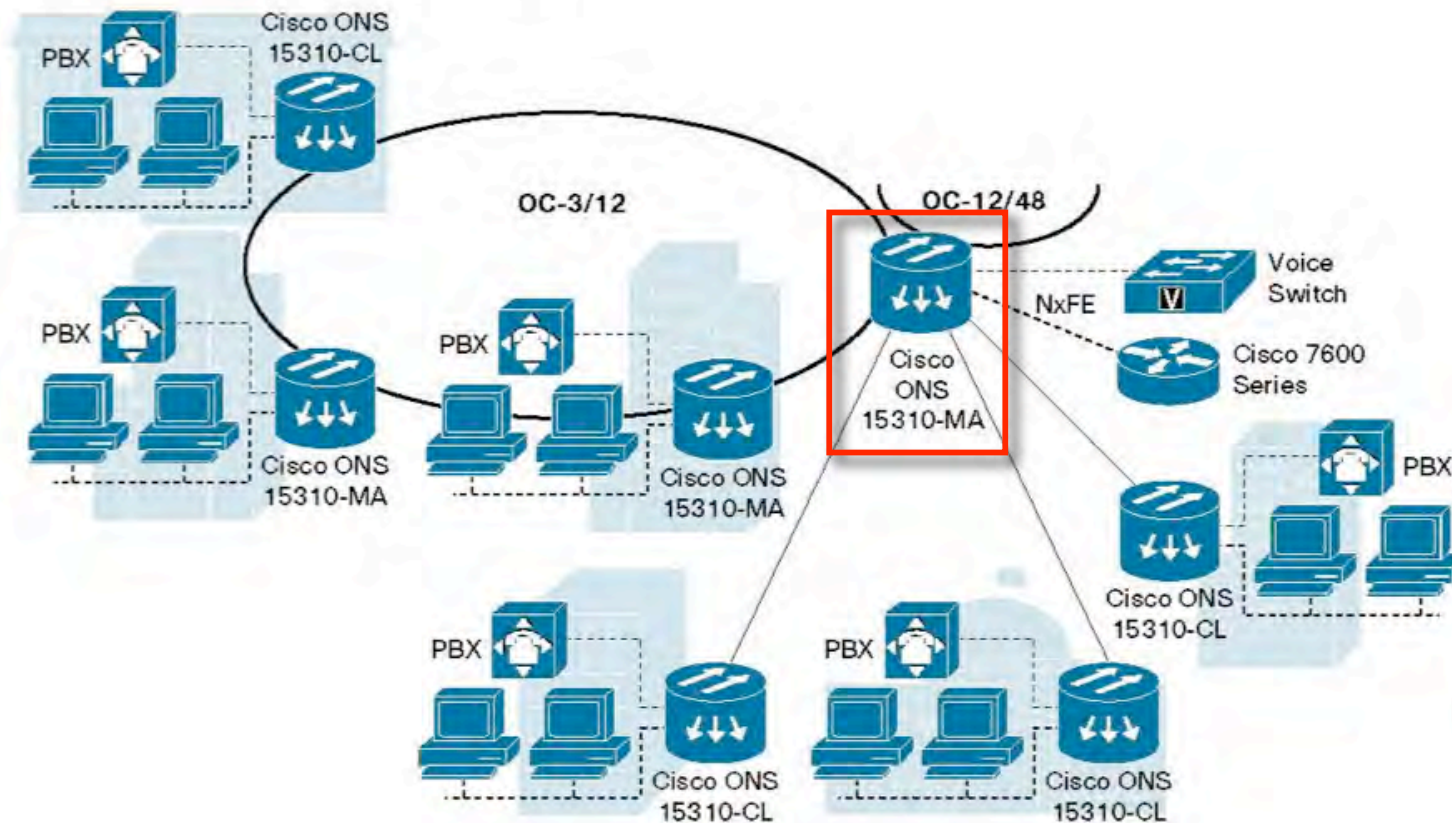
Metro Access Aggregation

The Cisco ONS 15310-MA can serve as the first point of aggregation for customer access equipment that delivers services directly to the customer site. Flexible Small Form-Factor Pluggable (SFP)-based optical interface modules can terminate OC-3 or OC-12 collector rings.

For example, multiple Cisco ONS 15310-CL platforms can be aggregated on a Cisco ONS 15310-MA at an end-office or small central office (Figure 2). Customer traffic can then be groomed for transport over an optical uplink, or terminated onto colocated networking devices – such as a Cisco 7600 Series Router or a Class-5 switch – using tributary interface ports.

Figure 2

The Cisco ONS 15310-MA as a Multiservice Aggregation Device





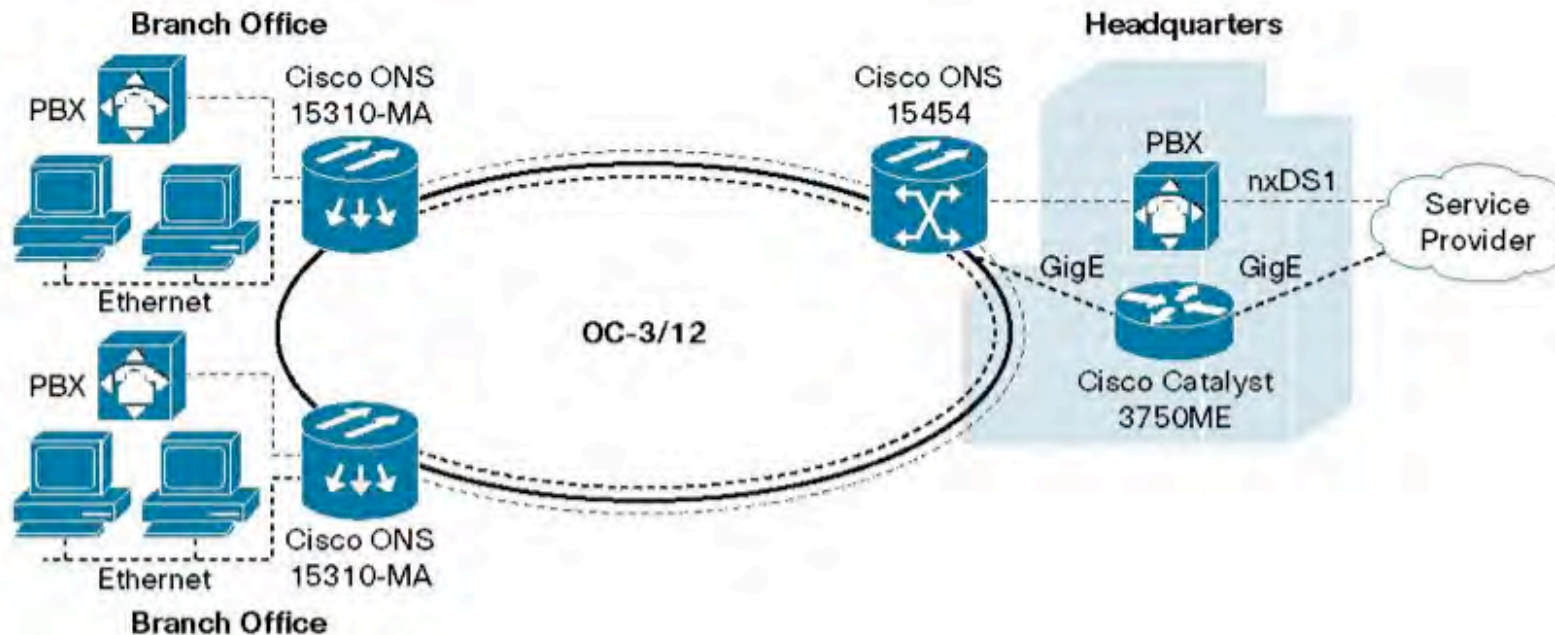
Cisco MSPP

Customer Access Platform

Service providers can collect voice and data services using the Cisco ONS 15310-MA at the customer location. Its carrier-class features, such as redundant common equipment and facility protection, allow it to support 99.999% availability requirements, making it specifically valuable for supporting the most demanding service-level agreements (SLA). Its compact form factor makes it easy to deploy in enterprise customer communication closets, which are typically space-constrained.

Enterprise Networks and Managed Services

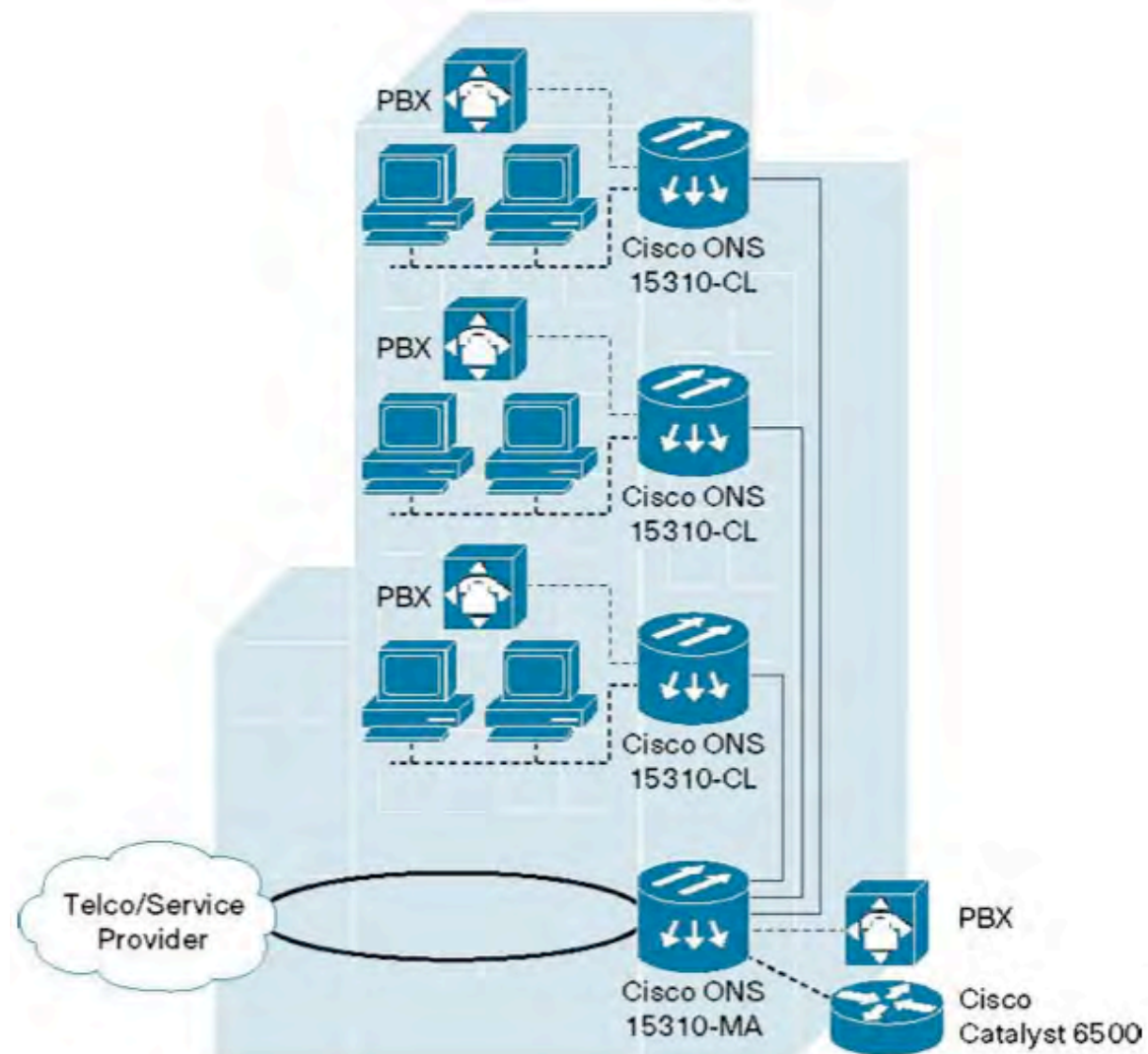
The Cisco ONS Family of products can also serve as an optical transport platform for an enterprise-owned network or a managed service. A Cisco ONS 15310-MA located at the headquarters or main building of an office, university, or government campus, for example, can aggregate Ethernet and TDM traffic from multiple remote sites. Other Cisco ONS 15310-MA or Cisco ONS 15310-CL units can be used in these remote locations to connect to private branch exchange (PBX) systems and LANs. The hub unit would simultaneously interface with the service provider to receive bandwidth for switched voice or data services, Internet access, or a wide-area extension of the VPN (Figure 4).





Cisco MSPP

A similar application takes place in high-rise buildings where the Cisco ONS 15310-MA can serve as a hub to distribute traffic through an optical backbone to Cisco ONS 15310-CL or other Cisco ONS 15310-MA devices in different floors (Figure 5).





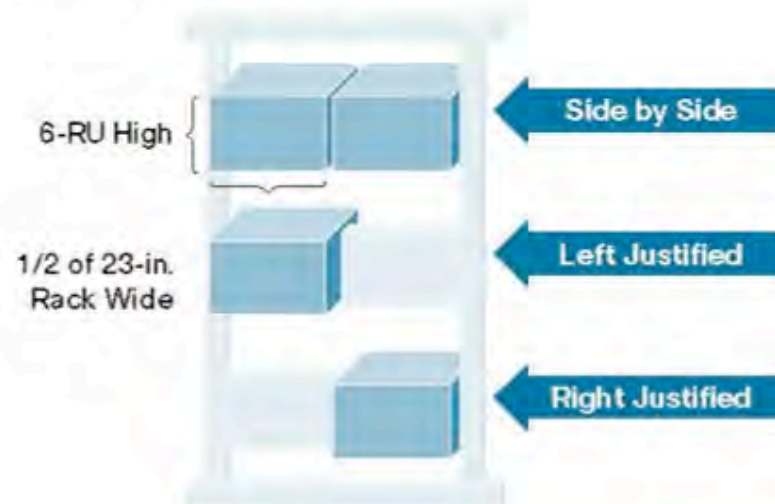
Cisco MSPP

Small Footprint

At only 6-RU high, the Cisco ONS 15310-MA provides unprecedented service density in its compact form factor (Figure 6). Two systems can fit side-by-side in a standard 23-inch rack. The small footprint increases network design flexibility, allowing service providers to deploy a powerful MSPP in small cabinets where space is limited, and deliver higher-bandwidth services in remote locations. It also helps service providers conserve space in central offices. Finally, as a customer access platform, the Cisco ONS 15310-MA can be more easily deployed in telecommunications closets of enterprise customers, resulting in more cost-effective and faster service activation.

Figure 6

The Small Form Factor Allows for Flexible Rack-Mounting Options





Cisco MSPP

Carrier Ethernet-over-SONET Transport

The Cisco ONS 15310-MA can be equipped with Ethernet cards to facilitate the delivery of carrier-class, private-line Ethernet and Fast Ethernet services. Virtual Concatenation (VCAT), Link Capacity Adjustment Scheme (LCAS), standard encapsulation, and SONET sub-50-millisecond (ms) resiliency schemes are used to deliver these point-to-point data services efficiently and in conjunction with the traditional TDM service-delivery requirements.

The Cisco ONS 15310 CE-Series 8-Port 10/100 Carrier Ethernet Card can be installed in a Cisco ONS 15310-CL or Cisco ONS 15310-MA for Layer 1 Ethernet-over-SONET applications. The Cisco ONS 15310 CE-Series provides port-mapped services and interoperability with the Carrier Ethernet cards supported on the Cisco ONS 15454, delivering Ethernet and Fast Ethernet solutions that span access and metropolitan-area networks.

Multilayer Ethernet-over-SONET Transport

Traditional Ethernet-over-SONET services consist of simple Layer 1 mapping of Ethernet frames into SONET for transport between two endpoints where SONET protection mechanisms are used to deliver sub-50-ms resiliencies. Consequently, bandwidth must be reserved for both working and protected traffic, resulting in underutilization of available bandwidth. Furthermore, services such as voice over IP (VoIP), digital videoconferencing, surveillance, and VPNs all require interconnectivity between multiple end locations. Using the traditional Ethernet-over-SONET point-to-point model, these solutions become very complicated and highly inefficient.

Switched Ethernet uses statistical multiplexing, which supports oversubscription and better usage of Ethernet networks. Resilient Packet Ring (RPR) enables efficient multipoint services, with spatial reuse of bandwidth and sub-50-ms, Layer 2 ring-based protection. Using switched Ethernet and RPR results in a more robust, efficient solution that economically addresses the needs of today's advanced services requirements.

The Cisco ONS 15310 ML-Series 8-Port 10/100 Ethernet Card is a Layer 2-switched services card that can be installed in the Cisco ONS 15310-CL or Cisco ONS 15310-MA. The card interoperates with the Cisco ONS 15454 ML-Series data cards on the Cisco ONS 15454, delivering Ethernet and Fast Ethernet solutions that span access and metropolitan-area networks.



Cisco MSPP

Card Type	Description
Control, Timing, Cross-Connect, and Optics (CTX)	
Data communications channel (DCC)	IP and OSI DCC
Card protection	Unprotected, 1:1 protected
Cross-connect	480 x 480 synchronous transport signal level 1 (STS-1), 2128 x 2128 VT1.5
Optical ports	<ul style="list-style-type: none"> • 2 SFP optics ports per card • Cisco qualified OC-3, OC-12, OC-48 and multirate SFPs supported • Linear 1+1 APS or UPSR networking

Interface or Card Type	No. of Ports per Card (Tx/Rx)	Protection	Shelf Port Density (Maximum)
Electrical Interfaces (SONET/ANSI)			
DS-1/DS-3/EC-1 High Density	84 DS-1; 3 DS-3/EC-1	0:1, 1:1	168 DS-1; 6 DS-3/EC-1 (protected)
DS-1/DS-3/EC-1 Low Density	28 DS-1; 3 DS-3/EC-1	0:1, 1:1	56 DS-1; 6 DS-3/EC-1 (protected)
CE-Series 10/100 Ethernet Card	8	0:1	32
ML-Series 10/100 Ethernet Card	8	0:1	32



Cisco MSPP

Protection Options

- SONET
 - Unidirectional Path Switched Ring (UPSR) – Telcordia GR-1400-CORE
 - 1 + 1 automatic protection switching (APS) – Telcordia GR-253-CORE
- Data
 - Resilient Packet Ring (RPR)
 - Spanning Tree Protocol and Rapid Spanning Tree Protocol (RSTP)

Node Configurations

- Terminal
- Linear add/drop multiplexer (ADM)
- Regenerator
- Ring



Cisco MSPP

Data Features

- Layer 1 Ethernet features
 - MEF9 certified EPL service
 - Sub-50-ms SONET protection and restoration of transport circuits
 - Low-latency transport
 - Transparent to Layer 2 bridging, switching, Ethernet MAC protocols (such as Cisco EtherChannel[®] technology, 802.1x, Cisco Discovery Protocol, VLAN Trunking Protocol [VTP], Spanning Tree Protocol), and VLAN (802.1Q and QinQ)
 - Ethernet link functions: autonegotiation, link-speed autosense, full and half duplex, flow control (802.3x)
 - Packet prioritization based on IP type of service (ToS) or 802.1P
 - Maximum packet size supported: 1548 bytes
 - Link integrity
- Layer 2 Ethernet features
 - MEF9 certified EVPL and ELAN service
 - RPR
 - Ethernet bridging (802.1D)
 - Ethernet Priority (802.1P)
 - Spanning Tree Protocol (802.1D), Rapid Spanning Tree Protocol (802.1w)
 - VLANs (802.1Q and 802.1Q in 802.1Q)
 - Point-to-point, point-to-multipoint, or RPR
 - Dedicated or shared bandwidth
 - Fast Ethernet EtherChannel technology (link aggregation)
 - Flexible packet classification – dual leaky bucket supporting committed information rate (CIR) and peak information rate (PIR) models



Cisco MSPP

- Per-class queuing with Weighted Deficit Round Robin (WDRR) scheduling
- Priority marking for end-to-end QoS support
- Layer 3 Ethernet features
 - Static routing
 - IP-aware QoS (IP ToS/IP DSCP)
 - IP SLA monitoring
- Other
 - General Framing Procedure (GFP)
 - Virtual Concatenation (high-order [HO] and low-order [LO] VCAT)
 - Link Capacity Adjustment Scheme (LCAS)



Siemens MSPP



Highlights at a glance

The SURPASS hiT 70xx series enables true multi-service provisioning and meets the needs of tomorrow's converged networks. It is a cost-effective platform that covers the whole range of network applications required for the regional and metro core. SURPASS hiT 7070 has been optimized for both packet and traditional TDM traffic.

Key features

- Non-blocking 160G@VC-4 and nx10G@VC-12 switching granularity
- Integrated packet fabrics (Ethernet, RPR)
- Multi-service platform: 2M, 34/45M, 155M, STM-1/4/16/64, 40G, 10/100BT, GbE, 10 GbE
- GFP (Generic Framing Procedure) mapping, LCAS and support of virtual concatenation for optimal scalability of Ethernet services
- Support of concatenated services (VC-4-4c, VC-4-16c, VC-4-64c)
- A variety of STM-64 interfaces, including WDM variants
- Extensive protection mechanisms (SNCP, MSP, BSHR, hardware) including RPR traffic steering



Siemens MSPP

Major benefits for carriers

- Increased revenue from new services
- Significant OPEX and CAPEX reductions
- Seamless integration into the existing network infrastructure
- Full integration into Siemens' best-in-class network management system (TNMS)

Increased revenues from new services

SURPASS hiT 7070 gives carriers a unique competitive advantage by transporting flexible Ethernet services using reliable SDH technology. Ethernet services can be offered with carrier-grade quality as well as best effort service. SURPASS hiT 7070, maximizes the revenue to be gained from existing capacity and opens new revenue streams, while keeping investments low.

Significant operational and investment cost reductions

SURPASS hiT 7070 is highly scalable: It allows the operator to start with a basic configuration at lowest price and cost-efficiently upgrade the system in-service step by step. Not only is the bandwidth scalable, but also the number and type of services, bringing all the flexibility the

carriers need in today's telecommunication market. It prepares the operator's networks for future requirements, allows business-driven growth and assures early time-to-market.

Seamless integration into the existing network infrastructure

SURPASS hiT 7070 protects the installed SDH investment and maintains the operator's TDM services and revenue.

Full integration into Siemens TNMS

SURPASS hiT 7070 is fully integrated into Siemens' best-in-class TNMS network management system, which provides end-to-end administration, performance monitoring for the converged next generation SDH network, improving operating efficiency and simplifying network operations.

Technological advantages

SURPASS hiT 7070 can be deployed as an UHC feeder, a terminal or add-drop multiplexer, a local cross-connect or a multi-ring. It also offers:

- Flexible and scalable links through use of GFP and LCAS

- Multipoint-to-multipoint connections and aggregation via an integrated Layer 2 switch to build VLAN's
- RPR for metro access where ring topologies dominate
- Cost-efficient Metro WDM and DWDM backbone feeding
- Carrier services such as TDM leased lines, VLAN, VPN application, SAN and clear channels

Designed with the future in mind

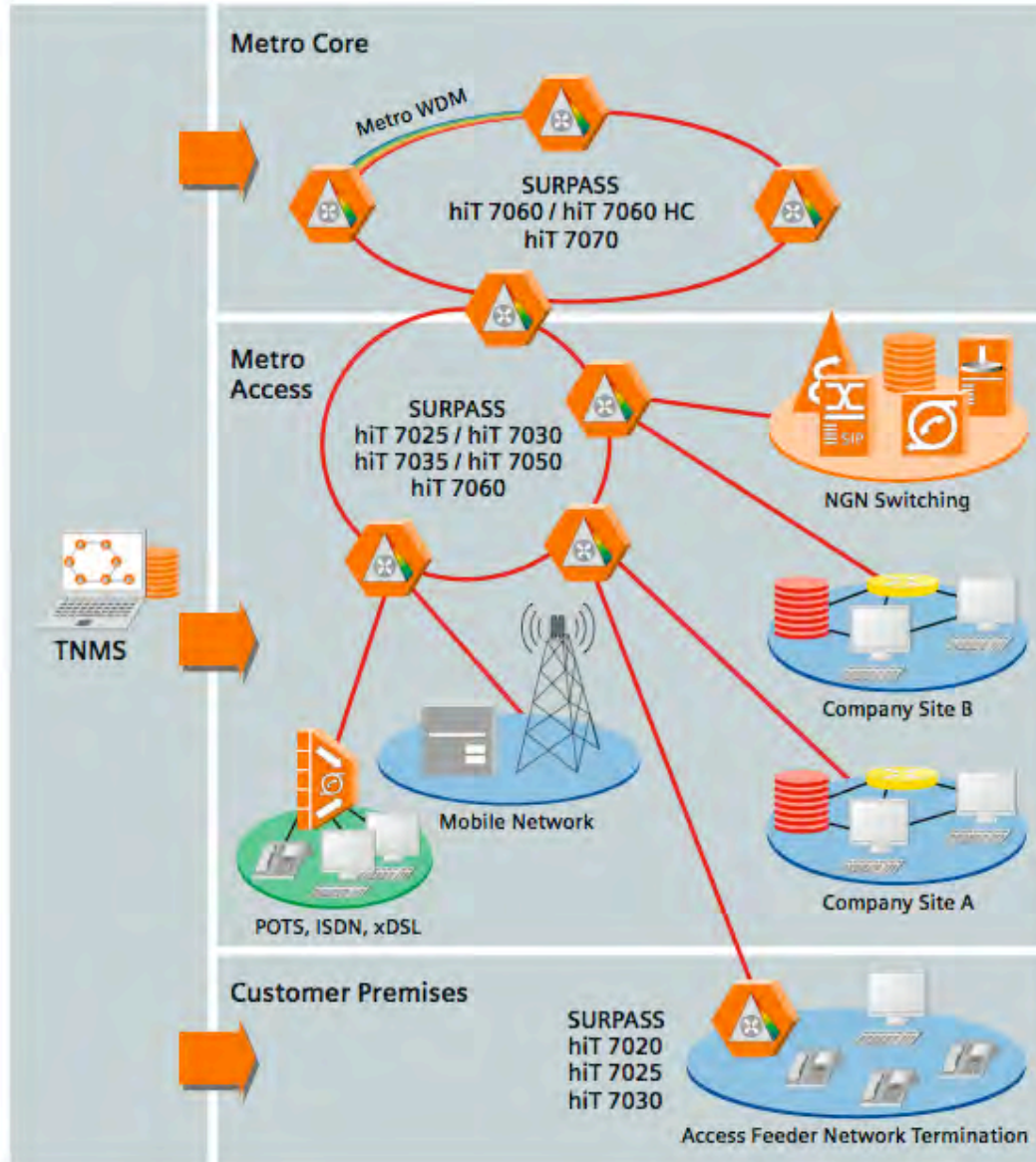
SURPASS hiT 7070 allows carriers to scale into the future by upgrading their switching matrix capacity and line rates. Moreover, it features trend technologies like Ethernet Layer 2, RPR and ASON.

Abbreviations

ASON	Automatic Switched Optical Network
LCAS	Link Capacity Adjustment Scheme
MSP	Multiplex Section Protection
MS-SPRing	Multi-Section Protection Ring
RPR	Resilient Packet Ring
SNCP	Sub-Network Connection Protection



Siemens MSPP



SURPASS hiT 7070 helps carriers significantly cut costs, increase revenue through more efficient and new service delivery, and quickly adapt to customers' demands. This makes SURPASS hiT 7070 a key investment for profitable and future-proof metropolitan networks.

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Orion Telecom MSPP

Introduction

The VCL100MC-1 Multi-Service Provisioning Platform (MSPP) is a compact, leading edge, and yet practical bandwidth provisioning equipment designed to meet low or medium capacity bandwidth service demands. This unique product is part of a family of Multi-Service Provisioning Platform and Access Nodes from Orion. As with all products in Orion's family, the VCL100MC-1 MSPP also supports end-to-end provisioning and management of voice and data services across all the segments of the optical network - from the customer premises to the core. It combines innovative optical networking



software with the intelligence of SDH to deliver a flexible solution to today's service providers. The VCL100MC-1 can be configured as Terminal Multiplexers (TMUX) or Add-Drop Multiplexers (ADM), with mix-and-match tributary interfaces at E1, E3, DS3 or 10/100 Mbps Ethernet service interfaces. The product has a built in non-blocking cross-connect at VC-3 and VC-12 granularity for efficient traffic grooming. In view of the growing demand for packet services, VCL100MC-1 provides rate controlled 10/100 Base-T interfaces to carry inter-office traffic from corporate LANs, campus networks, or from Internet Service Providers.



Orion Telecom MSPP

Features

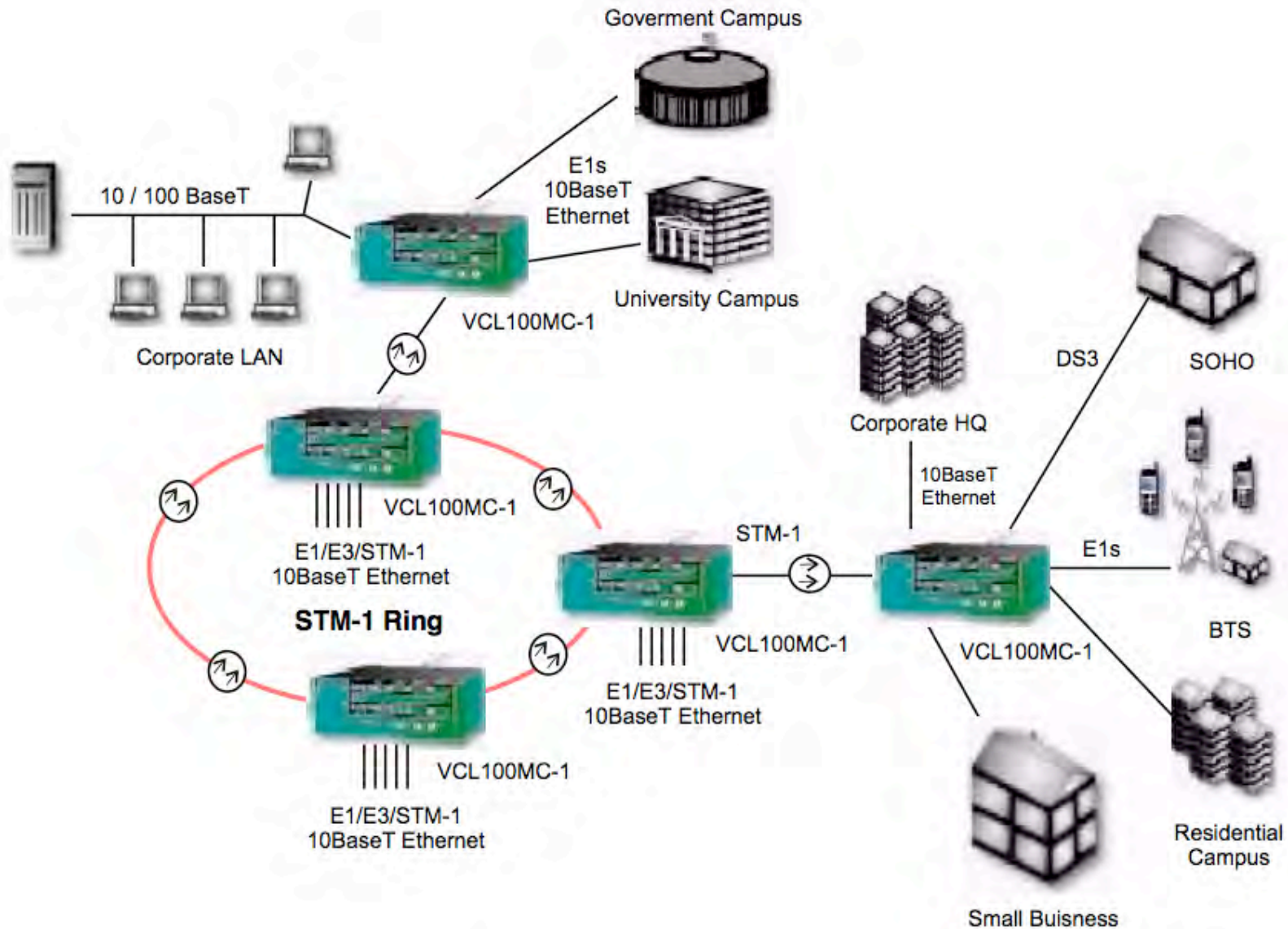
- E1/DS1, E3/DS3
- Multiple tributary slots
- Low priced Terminal Multiplexer and Add- Drop Multiplexer
- 3U chassis - available in rack mounting option
- Integrated multi-service delivery
- Direct Ethernet-to- SDH / SONET mapping using built-in 10/100 Base-T Interfaces
- Linear and ring topologies
- Multi-level protection schemes - Unprotected, MSP, SNCP
- Advanced networking software with support for open standards such as OSPF

Advantages

- Flexibility and modularity in tributary configurations
- Can be placed in customer premises or PoP's with space constraints.
- Compact size
- Provision both voice and data services from the same platform. Efficient use of transport bandwidth by supporting per-port rate adaptive Ethernet services.
- Enables creation of point-to-point Transparent LAN services or Virtual Private Network Services
- Topology support to cater to customer network scenarios
- Carrier-grade protection schemes enable you to cater to differing customer protection requirements.
- Enables automatic topology discovery, shared mesh restoration and Point-and-Click Provisioning (PNCP).
- User friendly GUI based Network Element Software for local and remote provisioning



Orion Telecom MSPP





Orion Telecom MSPP

Technical Specifications

Network Topology

- Linear, Ring, Mesh

Network Element Configurations

- Terminal Multiplexer (TMUX)
- Add-Drop Multiplexer (ADM)

Aggregate Interfaces

- 2 X STM-1e/o
- S1.1, L1.1, L1.2 (ITU-T G.957 compliant)
- Optical (1+1) Redundancy in Terminal Multiplexer Mode.

Tributary Interfaces

- E1/DS1, E3/DS3
- STM-1o
- STM-1e/E4
- 10 Base-T/100 Base-TX Ethernet

Cross Connect

- 252 X 252 VC-12
- Fully non blocking
- Line to Line, Line to Tributary, Tributary to Line, Tributary to Tributary

Maintenance

- Higher-order and Lower-order POH, all SDH level performance monitoring (as per ITU-T G.826 and ITU-T G.784)
- Software downloads

Network Management

- Element Management System: VCLNES, supports full FCAPS functionality.
- RS-232 port for craft interface
- In-band control supported using SONET/SDH Overhead bytes.
- E1 management channel support with drop facility

Power Supply

- -48V DC nominal, -36V to -60V DC
- Power consumption: 35W (without Ethernet Interfaces)

Timing & Synchronization

- Timing & Synchronization of System (as per ITU-T G. 813)

- Internal and External Timing interfaces – Two E1 BITS interfaces (as per ITU-T G.703)
- Internal oscillator capable of supplying a ITU-T G.813 compliant Stratum-3 SEC
- Support of SSM byte

Order wire support, Alarms and User data Channel

- E1/E2 bytes used for Express order wire (Omnibus/ Selective calling facilities)
- Five potential-free outputs and two potential-free inputs
- F1 byte for user data channel

Physical Dimensions

- Dimensions (H X W X D): 132 mm x 435 mm x 220 mm

Environmental

- Operating Temperature: 0° to 50° C
- Relative Humidity: 10% to 90%, non-condensing