

Versatile, multiservice transport switch designed to enable the rapid delivery of new Carrier Ethernet and IP services

Supports all major global interfaces with scalability ranging from 10/100/1000 Mbps to 10Gbps Ethernet, OC-3/12/48/192, STM-1/4/16/64, DS1/E1 and DS3/E3

High-Performance, Carrier-Grade Multiservice Transport Switches

Force10's Traverse® Family of Multiservice Transport Switches delivers new levels of versatility, reliability and performance to metro service edge networks by enabling diverse network operators to increase bandwidth capacity and deliver new carrier Ethernet and IP services more rapidly and efficiently. The NEBS-compliant, carrier-grade Traverse platform provides aggregation, switching and transport of Carrier Ethernet and TDM services from a single shelf. With scalability up to 100 Gbps per shelf, the Traverse is optimized for metro networks and high capacity aggregation sites in central offices, colocation facilities and service hubs.

Versatile, Packet-Optimized Design

The Traverse platform is a versatile system that can be deployed in linear, ring and mesh topologies, and offers a wide variety of service interfaces ranging from 10/100Mbps Fast Ethernet and 1/10Gbps Ethernet and DS1/E1 to STM-64/OC-192. Advanced Layer 2 Ethernet switching and QoS traffic management enable the delivery of Metro Ethernet Forum (MEF) compliant E-Line (site-to-site) and E-LAN (multi site) services required to meet stringent Ethernet service level agreements (SLAs). The Traverse platform's distributed switching architecture reduces costs and speeds time to market for new services by enabling all TDM to all Ethernet services or any mixture of both.

Multiservice Transport Switch Applications

The Traverse platform's versatile design and scalable architecture make it an ideal solution for a range of applications such as Ethernet service delivery and transport, next generation digital cross-connect, and IPTV/triple play service aggregation and transport. As a truly global solution that supports both ANSI and ETSI/ITU-T network environments, the Traverse platform also supports industry-leading international gateway capabilities.

Scalable Architecture

The Traverse product family consists of three shelves: the 20-slot Traverse 2000, the 16-slot Traverse 1600 and the 6-slot Traverse 600.

The differently sized platforms share a common set of interface and switching modules – simplifying ordering and sparing.



Key Features

- Distributed switching architecture enables pay-as-you-grow scalability up to 100Gbps of capacity
- Lowers CapEx by delivering versatile Carrier Ethernet and TDM services from a single shelf
- Reduces OpEx by minimizing space and power requirements in CO and colocation facilities
- Unified network management system to provision Ethernet and TDM services
- Provides carrier class service protection and restoration in less than 50 milliseconds
- Enables delivery of carrier-class, MEF-compliant E-Line and E-LAN Ethernet services
- Supports advanced QoS traffic management to support triple play service aggregation and wireless backhaul
- Global solution supports SONET/SDH conversion for international gateway applications



Specifications: Traverse Multiservice Transport Switches

Ordering Information

ORDER NUMBER	DESCRIPTION
TRA-PDAP	Power Distribution and Alarm Panel (PDAP)
TRA-20S-CH	Traverse 2000 Chassis
TRA-16S-CH	Traverse 1600 Chassis
TRA-6S-CH	Traverse 600 Chassis
General Control Module (GCM)	Provides system control and management, supports 1:1 redundancy
GCM with Integrated Optics	GCM with one integrated OC-48/STM-16 or OC-12/STM-4 interface, supports 1:1 and 1+1 redundancy
VT/TU Switch Module	(Optional module) provides switching at VT1.5/VC-12 granularity, supports 1:1 redundancy

Chassis

Traverse 2000 (T2000)

System Configuration:

20 slots, 2 dedicated for General Control Modules (GCMs)

Shelf Dimensions*:

18.3" (H) x 21.1" (W) x 13.75" (D), 37.5 cm x 53.6 cm x 34.9 cm

Weight:

16 lbs. (7.3 kg) Empty, 60 lbs. (27.2 kg) fully loaded

Power Consumption:

900 Watts Typical (1600 Maximum)

Traverse 1600 (T1600)

System Configuration:

16 slots, 2 dedicated for GCMs

Shelf Dimensions*:

18.3" (H) x 17.25" (W) x 13.75" (D), 37.5 cm x 43.8 cm x 34.9 cm

Weight:

15 lbs. (6.5 kg) Empty, 50 lbs. (22.7 kg) fully loaded

Power Consumption:

700 Watts Typical (1200 Maximum)

Traverse 600 (T600)

System Configuration:

6 slots, 2 dedicated for GCMs

Shelf Dimensions*:

6.3" (H) x 17.25" (W) x 13.75" (D), 16.0 cm x 43.8 cm x 34.9 cm

Weight:

5.4 lbs. (6.8 kg) Empty, 25 lbs. (11.3 kg) fully loaded

Power Consumption:

200 Watts Typical (400 Maximum)

Protection

Carrier Ethernet:

Optional 0:1 or 1:1 equipment or IEEE 802.3 ad link aggregation

Optical (SONET/SDH):

1+1 APS/MSP, UPSR/SNCP, and BLSR/MS-SPRing**

Electrical (TDM/PDH): Optional 1:1 or 1:2

Environmental

Operating Temperature: -5 to +55° C

Humidity: 90% max. non-condensing

Power: Redundant DC inputs, -40 V to -60 V operating range (-48 V nominal)

Service Interfaces/Shelf Density

Traverse chassis:	2000	1600	600
Switched 10 GigE	8	6	—
Switched GigE (1000Base-SX, LX or TX)	80	60	20
Switched 10/100 Fast Ethernet	256	192	64
OC-192/STM-64	9	7	—
OC-48/STM-16	20	14	6
OC-12/STM-4	74	56	20
OC-3/STM-1	290	226	66
DS3/EC-1/E3 Clear Channel	384	288	96
DS3/EC-1 Transmux	192	144	48
DS1 Clear Channel	448	336	112
E1	336	252	84

Functional

Switching Architecture

Distributed switching architecture with a fully meshed, passive backplane. Adding interface modules increases total switch-fabric capacity.

Switching Capacity

Scalable in 2.5, 5 or 10 Gbps increments as modules are added.

Ethernet Switching/Traffic Management

Layer 2 switching per MAC address, VLAN ID, or port

Policing and Rate shaping of Ethernet bandwidth in 1 Mbps increments

Up to 4,096 VLANs (802.1Q customer-tagged), and up to 4,096 Ethernet Virtual Connections (EVCs) using Stacked VLANs (Q-in-Q service provider-tagged) per EoS port

Up to 8 CoS levels with WRED active queue management

Dual rate (CIR/PIR) Policer for guaranteed and oversubscribed service bandwidth profiles

SONET/SDH Switching/Bandwidth Management

Any-port to any-port non-blocking switching, drop and continue, multicast and broadcast at STS-1/3c, VC-3/4, and VT1.5/2, VC-11/12 granularity

Ethernet over SONET/SDH

Supports GFP, High Order and Low Order VCAT, and LCAS

Supported Topologies

Carrier Ethernet: Point-to-point (E-Line), point-to-multipoint and Services (E-Tree), and multipoint-to-multipoint (E-LAN)
SONET/SDH: Ring (UPSR/SNCP and BLSR/MS-SPRing), inter-connected and subtending), point-to-point (terminal), linear add/drop, mesh and hybrid

Timing/Synchronization

Integrated Stratum 3 timing subsystem with primary and secondary synchronization interfaces; also supports internal, line, and loop timing

Optical

Carrier Ethernet

1000Base-SX/LX/TX and 10GBase-LR/ER/ZR options available

Optical (SONET/SDH)

SR/IH, LR/LH, ELR/ELH, VLR/VLH, or VLR-x/VLH-x options available

Regulatory and Standards Compliance

IEEE	802.3ab, 802.3ad, 802.3i, 802.3u, 802.3x, 802.3z, 802.1D, 802.1Q, 802.1w
ANSI	T1.105.03-1996; T1.105.09-1996; T1.105-1995; T1.107
ITU-T	G.691, G.704, G.707, G.708, G.709, G.781, G.783, G.813, G.841, G.957, G.7041, G7042, G7043
ETSI	ETS 300 019-1-3, 019-2-3 (Environmental)
NEBs	Level 3 Certified
Metro Ethernet Forum	Certified compliant with MEF 9 for EPL, EVPL and E-LAN service definitions and MEF 14 for QoS traffic management
Telcordia	GR-253-CORE, GR-63-CORE, GR-1089-CORE, GR-496-CORE, GR-499-CORE, GR-1230-CORE, GR-1244-CORE, GR-1377-CORE, GR-1400-CORE
Safety	CSA C2.22 No. 60950; UL 60950, EN 60950, IEC 60950, EN60825-1EN 60825-2, CE Mark, Class
EMI	FCC Part 15, Class A; EN 300 386

* Height includes fan tray, depth includes cable cover

** BLSR/MS-SPRING is only supported on OC-48/STM-16 and OC-192/STM-64 interfaces.



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