Alcatel-Lucent 1850 TSS-320

TRANSPORT SERVICE SWITCH | RELEASE 3

The Alcatel-Lucent 1850 TSS-320 is a next-generation, Packet-Optical Transport platform that supports any mix of traffic, from all-circuit to all-packet. Its unique universal matrix seamlessly switches packets or circuits in their native format, cost effectively transforming from TDM to packets. With the Alcatel-Lucent 1850 TSS-320, businesses can begin with circuit-based transport and, over time, gradually ramp up packet transport by simply changing line cards. The Alcatel-Lucent 1850 TSS-320 supports current traffic requirements while eliminating the scalability issues encountered when traditional multiservice provisioning platforms are confronted with the high growth of packet-based traffic.

The Alcatel-Lucent 1850 TSS-320 offers the flexibility to split increasing traffic demands among any combination of carrier Ethernet, Transport MPLS (T-MPLS), wavelength division multiplexing (WDM), optical data unit (ODU) and SDH/SONET transport technologies. It offers powerful cross-layer network management and a unified control plane, simplifying operations and reducing the total cost of ownership.

Features

- Unique, universal switch architecture
  - ¬ Switches packets or circuits in their native format
  - ¬ Accommodates any traffic mix, from all-circuit to all-packet
  - ¬ Offers TDM and packet line cards for technology-specific processing
- Fully integrates photonic, optical and data layers
  - ¬ Any transport-technology mix
  - ¬ Carrier Ethernet service through T-MPLS for standards-based connection-oriented packet transport
  - ¬ SONET/SDH Optical Transport Hierarchy (OTH) switching, including HO/LO STS and VC switching
  - ¬ Very Long Haul (VLH)/Ultra Long Haul (ULH) support
  - ¬ ATM pseudo-wire transport and gateway functions
  - ¬ Dense and coarse WDM (DWDM/CWMD)
  - ¬ Transport-oriented operations, OAM and G-MPLS
- Delivers multidegree ROADM functionality
  - ¬ Reconfigurable 44 x 10 G channel DWDM
  - ¬ Wavelength selective switch (WSS) 1 x 9 ports
  - ¬ Mesh capable ROADM up to 8 degrees

Benefits

- Switches any combination of packets and circuits in their native formats using a single platform
- Fully scales packet transport, smoothly progressing from all-circuit to all-packet, allowing service providers to transform networks to packet transport
- Efficiently aggregates and grooms metro and long- haul transport
- Simplifies network planning using ROADM and WDM
- Reduces total cost of ownership and simplifies operations through cross-layer network management and unified control plane
- Supports a broad range of applications, such as triple play services, business Ethernet and mobility backhaul

Technical specifications

Alcatel-Lucent 1850 TSS-320 system 1850 TSS-320 subrack

- 16 slots, 20 Gb/s per slot: 32 half slots, 10 Gb/s per half slot
- Two 320 Gb/s protected switching fabrics
- Two protected controllers
- Protected power supply
- Up to two subracks in a standard ETSI or ANSI rack

Interfaces

- Data cards
  - ¬ 10 x Gigabit Ethernet (GE) packet module, Small Form-Factor Pluggable (SFP)
  - ¬ 10 GE packet module, 10 Gb/s Form-Factor Pluggable (XFP)
  - ¬ Multiservice packet over SONET/SDH (PoS) packet module (portless)
  - ¬ ATM gateway packet module (portless)
- SONET/SDH cards
  - ¬ 1 x OC-192/STM-64: XFP
  - ¬ 4 x OC-48/STM-16: SFP
  - ¬ 8 x OC-3-12/STM-1-4: SFP
  - ¬ 10 x any port card: a data/TDM concentrator: SFP
  - ¬ 1 x optical transport unit (OTU)-2: 10 Gb/s bidirectional transponder, tunable optics
- VLH/ULH cards
  - ¬ 10 Gb/s booster +10 dBm
  - ¬ 10 Gb/s pre-amp +10 dBm
- CWDM cards
  - ¬ CWDM: multiplexer/ demultiplexer (MUX/DEMUX)
  - ¬ CWDM optical add/drop multiplexer (OADM)
  - ¬ CWDM transponder
- Fixed OADM (FOADM) DWDM cards (packs)
  - ¬ 8 channels MUX/DEMUX, L1 band
  - ¬ 8 channels MUX/DEMUX, L2 band
  - ¬ Optical amplifier 22/9 17 dB
  - ¬ 10 G transponder, client and line pluggable: XFP
- ROADM DWDM cards (packs)
  - ¬ Optical protection switch
  - ¬ DWDM ROADM Wavelength Router
  - ¬ DWDM transponder: tunable line optics, XFP client
  - ¬ DWDM MUX/DEMUX
  - ¬ DWDM amplifier

Service level agreement (SLA) management

- Traffic profiles
  - ¬ Bandwidth guaranteed
  - ¬ Regulated: minimum bandwidth guaranteed plus burst
  - ¬ Best effort
- Hitless traffic-profile modification
- Metering
  - ¬ Single Rate Token Bucket: RFC 2697
  - ¬ Dual Rate Token Bucket: RFC 2698
  - ¬ IETF and Metro Ethernet Forum (MEF) Metering, Policing and Marking
  - ¬ Color-blind and color-aware, based on Ethernet priority bits

Ethernet functionality

- Ethernet protocol: 802.3
- Ethernet Media Access Control (MAC) autolearning and aging
- Ethernet-MAC static configuration
- Access Control List (ACL)
- Virtual LAN (VLAN) push, pop, swap: service delimiting
- Ethernet virtual bridging: 802.1Q
- Ethernet provider bridging: 802.1ad
- Q in Q
- Rapid Spanning Tree Protocol (RSTP) and Multiple Spanning Tree Protocol (MSTP)
- Link aggregation
- Jumbo-frame management
- Y.1731/802.1ag OAM: continuity check (CC), link trace (LT), loopback (LB)
- 802.3ah OAM: Ethernet in the first mile (EFM)
- Eight Quality of Service (QoS) classes
- Two levels QoS (per class, per transport service)
- Ethernet flow, Red/Green/Yellow (RGY) counters
- L2 control protocol filtering/tunneling
- MEF 9 and 14 certified: EPL, EVPL and E-LAN

Ethernet traffic classification

- Port
- Ethernet VLAN
- Ethernet priority bits
- IP v4 differentiated services code points (DSCP)
- EtherType
- MPLS Exp bits

Ethernet forwarding criteria

- Port
- Port plus MAC
- Port plus VLAN
- Port plus MAC plus VLAN
- Port plus MAC plus VLAN plus Prio bits
- Unicast traffic
- Multicast traffic
- Broadcast traffic

IGMP functionality

- Internet Group Management Protocol (IGMP) snooping
- IGMP proxy
- IGMP fast leave

ATM functionality

- Pseudo-wire emulation edge to edge (PWE3): ATM-PWE3 gateway
- OC3/STM-1 ATM unchannalized
- ATM virtual path identifier/ virtual channel identifier (VPI/VCI) N:1 mapping with PWE3 static configuration
- ATM QoS, OAM F4, F5: PWE OAM

T-MPLS functionality

- Data plane: T-MPLS, MPLS
- T-MPLS OAM: CV, automatic protection switching (APS), Forward Defect Indication (FDI)
- Tunnel Linear Protection 1:1
- Ethernet line (E-line), Ethernet LAN (E-LAN) and Ethernet Tree (E-Tree)

SONET/SDH functionality

- Cross-connection
- Termination
- Ethernet mapping over SONET/SDH
  - ¬ Generic framing procedure (GFP, G.7041)
- Virtual concatenation
- Link capacity adjustment scheme (LCAS)
- Performance monitoring
- HO and LO capabilities

DWDM functionality

- Node configurations
  - ¬ Terminal
  - ¬ In-line amplifier (ILA)
  - ¬ Optical add-drop multiplexer (OADM)
  - ¬ ROADM
- Network configurations
  - ¬ Point-to-point
  - ¬ Linear
  - ¬ Ring
  - ¬ Mesh with multidegree capability: 2, 4 or 8

Protection

- Ethernet network protection
  - ¬ RSTP: 802.1w
  - ¬ MSTP: 802.1s
  - ¬ Link aggregation
- T-MPLS network protection
  - ¬ Tunnel Linear Protection 1:1
- SONET/SDH network protection
  - ¬ Single- and dual-ended APS 1 + 1
  - ¬ Subnetwork Connection Protocol (SNCP), unidirectional path-switched ring (UPSR)
  - ¬ Multiplex Section-Protection Ring (MSPRING) 2F bidirectional line switching ring (BLSR)
- Equipment protection
  - ¬ Power protection
  - ¬ Controller protection
  - ¬ Universal switch protection

GMPLS control plane

- T-MPLS tunnel setup
- TDM HO path setup

Management

- Alcatel-Lucent 1350 Optical Management System (OMS)
- TL1
- Zero-installation craft (ZIC) terminal
- Simple Network Management Protocol (SNMP)
- Command line interface (CLI)
- Secure Shell (SSH) v2/Secure Socket Layer (SSL) for secure connection

Physical specifications

ANSI

Dimensions: 1850 TSS-320 subrack

- Subrack dimensions
  - ¬ Height: 624 mm (24.6 in.)
  - ¬ Width: 532 mm (20.9 in.)
  - ¬ Depth: 304.8 mm (12.0 in.)/ 355.6 mm (14.0 in.)
- Designed to be installed in a standard ANSI rack
  - ¬ Height: 2.13 m (7 ft)
  - ¬ Width: 660.4 mm (26.0 in.)
  - ¬ Depth: 304.8 mm (12.0 in.)/ 355.6 mm (14.0 in.)

Power and cooling

- Power supply: DC feed (-48 V DC nominal)
- Power supply: -58 V
- Power consumption: up to 3500 W
- Cooling: forced air

Environmental

- Operating temperature: -5°C to +45°C (23°F to 113°F)
- Relative humidity: 0% to 90%, non-condensed

Regulatory compliance

- CE and UL certification
- NEBS level 3
- FCC part 15 class A

ETSI

Dimensions: 1850 TSS-320 subrack

- Subrack dimensions
  - ¬ Height: 624 mm (24.6 in.)
  - ¬ Width: 532 mm (20.9 in.)
  - ¬ Depth: 288 mm (11.3 in.)
- Designed to be installed in a standard ETSI rack
  - ¬ Height: 2.20 m (86.6 in.)
  - ¬ Width: 600 mm (23.6 in.)
  - ¬ Depth: 300 mm (11.8 in.)

Power and cooling

- Power supply: DC feed (-48 V DC nominal)
- Power supply: -65 V
- Power consumption: up to 3500 W
- Cooling: forced air

Environment

- Operating temperature: -5°C to +45°C (23°F to 113°F)
- Relative humidity: 0% to 90%, non-condensed

Regulatory compliance

- CE certification
- Operating conditions: ETS 300 019, Class 3.2
- Storage conditions: ETS 300 019, Class 1.2
- Transportation conditions: ETS 300 019, Class 2.2
- Electrostatic discharge (ESD)/ electromagnetic compatibility (EMC): ETS 300 386 "Telecommunications Center"