Alcatel-Lucent 1850 Transport Service Switch – 5C

RELEASE 4.0

The Alcatel-Lucent 1850 Transport Service Switch – 5C (TSS-5C) is a compact, cost-effective packet-optical transport switch and Ethernet-access demarcation device ideally suited for packet mobile-backhaul and business Carrier Ethernet services. High-availability, mission-critical Ethernet and E-carrier system 1/digital signal 1/ Synchronous Transport Module-1 (E1/DS1/STM-1) services are supported by a comprehensive set of Packet Transport Network (PTN) and Carrier Ethernet features, including Circuit Emulation Services (CESs) and microwave packet radio support for diverse fiber- and microwave-based backhauling applications. The Alcatel-Lucent 1850 TSS-5C extends Multi-Protocol Label Switching-Transport Profile (MPLS-TP) and Transport Multi-Protocol Label Switching (T-MPLS) networking capability to the customer premises and is compliant to MEF standards.

Resiliency and reliability for packet and TDM traffic is assured by multiple network-path and link-protection mechanisms, supported by hardware-based data-plane operations, administration, and maintenance (OA&M). End-to-end OA&M greatly simplifies the task of meeting strict Service Level Agreements (SLA). The challenge of delivering timing to Second-Generation/Third-Generation/ Fourth-Generation (2G/3G/4G) base stations is met by the availability of multiple synchronization options.

Designed for outside-plant deployment, the Alcatel-Lucent 1850 TSS-5C is an excellent converged platform for collecting TDM/packet mobile-backhaul traffic at cell sites. It provides a growth path for exponentially increasing IP traffic.

The Alcatel-Lucent 1850 TSS-5C is equally well equipped for deployment as a network termination unit for demarcation, media-conversion and distance-extension applications as part of a Carrier Ethernet service offering. Its compact, one rack unit (RU) chassis fits in any wiring closet.

Features

- Compact 1 RU chassis
- 9 Gb/s switching fabric
- Ethernet: Fast Ethernet (FE) and Gigabit Ethernet (GE) electrical and optical interfaces
- STM-1 and E1/DS1 interfaces
- Microwave awareness card for integration with the Alcatel-Lucent Microwave Packet Radio (9500 MPR-e)

- MPLS-TP and T-MPLS packet transport networking
- MEF-certified with high reliability and OA&M support
- Circuit emulation over Ethernet with MPLS Pseudowire Emulation Edge to Edge (PWE3)
- E-Line, E-LAN and E-Tree services
- Tunnel-protection mechanisms
- Multiple synchronization options
- Temperature-hardened for outside-plant deployment

Benefits

- Achieves economies of scale using a single platform for mobile backhaul/ transport and Carrier Ethernet services
- Maintains high-margin revenue streams from priority traffic with advanced traffic-management and Quality of Service (QoS) features
- Accelerates network transformation from TDM to PTN architectures
- Reduces capital expenditure (CAPEX) by eliminating the need for overlay networks and multiple equipment types
- Reduces operating expenditure (OPEX) by simplifying operations, training and network-management requirements

Technical specifications

System hardware

- 9 Gb/s switching fabric
- 4 x GE interfaces; Small Form Factor Pluggables (SFPs): 1000 BaseT, SX, LX, ZX, EZX, BX10/20/40, CWDM
- 12 x FE interfaces (electrical)
- Two slots for optional interface modules: Hot-swappable
- Management LAN, console, Management Data Input/Output (MDIO) and station clock ports or external synchronization interfaces
- Power supply: DC or AC
- Fan tray: Hot-swappable

Multiservice module

- 1 x STM-1 channelized CES; SFPs: S-1.1, L-1.1, L-1.2 , electrical
- 16 x E1: 75 Ohm CES
- 1 x GE: SFP

FE module electrical

- 8 x FE: 10/100 BaseT

FE module optical

- 8 x FE; SFPs: FX, LX, BX

DS1/E1 module

- 16 x DS1 (100 Ohm)/E1 (120 Ohm) CES

E1 module

- 16 x E1: 75 Ohm CES

Microwave module

- 2 x GE: SFP or 1000 BaseT for connection to Alcatel-Lucent 9500 MPRe microwave radio outdoor unit (ODU)
- Supplies power to 9500 MPRe

Synchronization

- Synchronous Ethernet (SyncE): ITU-T G.8261/G.8262/Y.1362 with Synchronization Status Messaging (SSM)
- IEEE 1588v2 ordinary, boundary, transparent clocks
- 1588v2 Time of Day (ToD) and 1PPS in/out ports
- Sync in/out ports: 2 MHz, E1

Protection

- 1:1 bidirectional linear tunnel protection: MPLS-TP/T-MPLS
- Dual-homing tunnel protection
- IEEE 802.1AX Link Aggregation

Ethernet

- 32,000 move, add and change (MAC) table
- MEF Ethernet services: E-Line, E-LAN, E-Tree
- Jumbo frames
- Auto-negotiation, flow control, MDIX
- Port laser shutdown
- Port mirroring: ingress/egress
- L2 control protocol filtering/ tunneling
- L2 Access Control Lists (ACL)
- Multiple classification options: Port, VLAN ID (VID), Priority Code Point (PCP), MAC destination address (DA)/source address (SA), IPv4 differentiated services code points (DSCP)
- Eight QoS classes
- Strict priority, weighted round robin (WRR) scheduling
- Tail-drop
- Ingress two-rate three-color metering/ policing RFC2698/ MEF10.1
- Class-based queuing
- Egress shaping per port/queue
- Anti-Denial of Service (DoS) attacks
- MPLS label push/pop/swap operations, label edge router (LER) or label switch router (LSR)

PWE3/TDM CES

- Related RFCs: 4553, 4446, 4197, 3985, 3916
- E1/DS1 pseudowires: Structure-Agnostic TDM over Packet (SAToP)
- E-Line services
- 1024 bidirectional tunnels
- 1024 bidirectional pseudowires
- Carrier Access Code (CAC) resource check
- 1+1 multiplex section protection (MSP) for STM-1 interface
- E1 port loopback
- TDM CES timing modes: TDM loop line, E- Line (SyncE or adaptive or differential packet timing), external, free-running
- ITU-T G.705 Plesiochronous Digital Hierarchy (PDH) alarms and Performance Monitoring (PM) counters for E1 physical ports

Ethernet OA&M

- IEEE 802.3ah: Ethernet in the First Mile (EFM)
- ITU-T Y.1731/IEEE802.1ag/MEF Ethernet Service OA&M: CC, LB, LT, AIS, CSF
- ITU-T Y.1731 proactive: Ethernet loss measurement (ETH-LM), one- and two-way Ethernet delay measurement (ETH-DM)
- ITU-T Y.1731 on-demand: ETH-LM, one- and two-way ETH-DM, synthetic
- MEF S-OA&M
- Port/Ethernet Virtual Connection (EVC) loopback
- IEEE 802.3ah link OAM
- PM: Port counters, Threshold Crossing Alert (TCA), Remote Monitoring (RMON) IETF RFC 2819, flow counters, per EVC and tunnel availability and SLA counters (Y.1563)
- Lower-order path termination (LPT) and Link Loss Carry Forward (LLCF)

MPLS-TP/T-MPLS OA&M

- G.8114 Tunnel OAM Proactive: CV, APS, FDI, RDI, Synt LM DualEnd, two-way DM
- G.8114 Tunnel OAM on demand: LB on Maintenance End Point (MEP), one- and two-way DM
- IETF draft-bhh-mpls-tp-oam-y1731 proactive: CCM, APS, AIS, RDI, Synt LM, two-way DM
- IETF draft-bhh-mpls-tp-oam-y1731 Tunnel OAM on demand: Loopback (LB) on MEP, one- and two-way DM

Management

- Alcatel-Lucent 1350 Optical Management System (OMS)
- Web browser interface zero-installation craft (ZIC)
- Command-line interface (CLI)
- TL1, Simple Network Management Protocol (SNMP) v2/v3
- Secure Shell (SSH), Secure Socket Layer (SSL)
- Remote software download by Secure Shell File Transfer Protocol (SFTP)
- Ethernet in-band management: Virtual LAN (VLAN)
- IP routing (intermediate system-to-intermediate system [IS-IS]) over in-band management channels
- Remote Access Dial-In User Server (RADIUS) authentication

Dimensions and weight

- Height: 43.6 mm (1.73 in.) – 1 RU
- Width: 442 mm (17.40 in.)
- Depth: 213.2 mm (8.35 in.)
- Weight: Maximum 4.4 kg (9.7 lb)
- Wall-mount and rack-mount kits (19 in., 23 in., ETSI)

Power

- DC: redundant -48 V DC to -60 V DC or +24 V DC to -48 V DC
- Single AC: 90 V DC to 264 V AC
- Current drain: 3 A maximum at +24 V DC, 1 A maximum at 90 V AC
- Power consumption: 45 W typical, 80 W maximum (without microwave)

Environmental

- Model M4O12FEB compliant to GR-3108 Class 2
  - ¬ Operating temperature: -40°C to +65°C (-40°F to +149°F)
  - ¬ Humidity: 5% to 85%, non-condensing
- Model M4O12FEK compliant to ETSI 300 019 Class 3.2
  - ¬ Operating temperature: -5°C to +45°C
  - ¬ Humidity: 5% to 95%, non-condensing

Regulatory and standards compliance

- CE mark: EN 300 386
- ES 201468
- IEC 60825-1, 60825-2
- EN 60950-1
- EN 55022 Class A: Radiated and conducted emissions
- EN 61000-4-2, -3, -4, -5, and -6
- ETSI 300-019 Storage, Class 1.2; Transportation, Class 2.3; Opera¬tional, Class 3.2
- ITU-T K.21
- MEF 9, 14, 18 certified

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