

# Standards and Protocol Support



**Note:** The information presented is subject to change without notice.

Alcatel-Lucent assumes no responsibility for inaccuracies contained herein.

## ANCP/L2CP

RFC 5851, *Framework and Requirements for an Access Node Control Mechanism in Broadband Multi-Service Networks*

draft-ietf-ancp-protocol-02, *Protocol for Access Node Control Mechanism in Broadband Networks*

## ATM

AF-ILMI-0065.000, *Integrated Local Management Interface (ILMI) Version 4.0*

AF-PHY-0086.001, *Inverse Multiplexing for ATM (IMA) Specification Version 1.1*

AF-TM-0121.000, *Traffic Management Specification Version 4.1*

AF-TM-0150.00, *Addendum to Traffic Management v4.1 optional minimum desired cell rate indication for UBR*

GR-1113-CORE, *Asynchronous Transfer Mode (ATM) and ATM Adaptation Layer (AAL) Protocols Generic Requirements, Issue 1*

GR-1248-CORE, *Generic Requirements for Operations of ATM Network Elements (NEs), Issue 3*

ITU-T I.432.1, *B-ISDN user-network interface - Physical layer specification: General characteristics (02/99)*

ITU-T I.610, *B-ISDN operation and maintenance principles and functions (11/95)*

RFC 1626, *Default IP MTU for use over ATM AAL5*

RFC 2684, *Multiprotocol Encapsulation over ATM Adaptation Layer 5*

## BGP

RFC 1772, *Application of the Border Gateway Protocol in the Internet*

RFC 1997, *BGP Communities Attribute*

RFC 2385, *Protection of BGP Sessions via the TCP MD5 Signature Option*

RFC 2439, *BGP Route Flap Damping*

RFC 2545, *Use of BGP-4 Multiprotocol Extensions for IPv6 Inter-Domain Routing*

RFC 2858, *Multiprotocol Extensions for BGP-4*

RFC 2918, *Route Refresh Capability for BGP-4*

RFC 3107, *Carrying Label Information in BGP-4*

RFC 3392, *Capabilities Advertisement with BGP-4*

RFC 4271, *A Border Gateway Protocol 4 (BGP-4)*

RFC 4360, *BGP Extended Communities Attribute*

RFC 4364, *BGP/MPLS IP Virtual Private Networks (VPNs)*

RFC 4456, *BGP Route Reflection: An Alternative to Full Mesh Internal BGP (IBGP)*

RFC 4486, *Subcodes for BGP Cease Notification Message*

RFC 4659, *BGP/MPLS IP Virtual Private Network (VPN) Extension for IPv6 VPN*

- RFC 4684, *Constrained Route Distribution for Border Gateway Protocol/MultiProtocol Label Switching (BGP/MPLS) Internet Protocol (IP) Virtual Private Networks (VPNs)*
- RFC 4724, *Graceful Restart Mechanism for BGP (Helper Mode)*
- RFC 4760, *Multiprotocol Extensions for BGP-4*
- RFC 4798, *Connecting IPv6 Islands over IPv4 MPLS Using IPv6 Provider Edge Routers (6PE)*
- RFC 4893, *BGP Support for Four-octet AS Number Space*
- RFC 5004, *Avoid BGP Best Path Transitions from One External to Another*
- RFC 5065, *Autonomous System Confederations for BGP*
- RFC 5291, *Outbound Route Filtering Capability for BGP-4*
- RFC 5575, *Dissemination of Flow Specification Rules*
- RFC 5668, *4-Octet AS Specific BGP Extended Community*
- draft-ietf-idr-add-paths-04, *Advertisement of Multiple Paths in BGP*
- draft-ietf-idr-best-external-03, *Advertisement of the best external route in BGP*

### Circuit Emulation

- MEF-8, *Implementation Agreement for the Emulation of PDH Circuits over Metro Ethernet Networks, October 2004*
- RFC 4553, *Structure-Agnostic Time Division Multiplexing (TDM) over Packet (SAToP)*
- RFC 5086, *Structure-Aware Time Division Multiplexed (TDM) Circuit Emulation Service over Packet Switched Network (CESoPSN)*
- RFC 5287, *Control Protocol Extensions for the Setup of Time-Division Multiplexing (TDM) Pseudowires in MPLS Networks*

### Ethernet

- IEEE 802.1AB, *Station and Media Access Control Connectivity Discovery*
- IEEE 802.1ad, *Provider Bridges*
- IEEE 802.1ag, *Connectivity Fault Management*
- IEEE 802.1ah, *Provider Backbone Bridges*
- IEEE 802.1ak, *Multiple Registration Protocol*
- IEEE 802.1aq, *Shortest Path Bridging*
- IEEE 802.1ax, *Link Aggregation*
- IEEE 802.1D, *MAC Bridges*
- IEEE 802.1p, *Traffic Class Expediting*
- IEEE 802.1Q, *Virtual LANs*
- IEEE 802.1s, *Multiple Spanning Trees*
- IEEE 802.1w, *Rapid Reconfiguration of Spanning Tree*
- IEEE 802.1X, *Port Based Network Access Control*
- IEEE 802.3ab, *1000BASE-T*
- IEEE 802.3ac, *VLAN Tag*
- IEEE 802.3ad, *Link Aggregation*
- IEEE 802.3ae, *10 Gb/s Ethernet*
- IEEE 802.3ah, *Ethernet in the First Mile*
- IEEE 802.3ba, *40 Gb/s and 100 Gb/s Ethernet*
- IEEE 802.3i, *Ethernet*
- IEEE 802.3u, *Fast Ethernet*
- IEEE 802.3x, *Ethernet Flow Control*
- IEEE 802.3z, *Gigabit Ethernet*
- ITU-T G.8031, *Ethernet Linear Protection Switching*
- ITU-T G.8032, *Ethernet Ring Protection Switching*
- ITU-T Y.1731, *OAM functions and mechanisms for Ethernet based networks*

### EVPN

- RFC7432, *BGP MPLS-Based Ethernet VPN*
- draft-ietf-bess-evpn-overlay-01, *A Network Virtualization Overlay Solution using EVPN*
- draft-ietf-bess-evpn-prefix-advertisement-01, *IP Prefix Advertisement in EVPN*

draft-ietf-bess-evpn-vpls-seamless-integ-00, *(PBB-)EVPN Seamless Integration with (PBB-)VPLS*

draft-ietf-l2vpn-pbb-evpn-10, *Provider Backbone Bridging Combined with Ethernet VPN (PBB-EVPN)*

draft-snr-bess-evpn-proxy-arp-nd-00, *Proxy-ARP/ND function in EVPN networks*

## Fast Reroute

RFC 5286, *Basic Specification for IP Fast Reroute: Loop-Free Alternates*

RFC 7490, *Remote Loop-Free Alternate (LFA) Fast Reroute (FRR)*

draft-ietf-rtgwg-lfa-manageability-08, *Operational management of Loop Free Alternates*

draft-kastran-mofir-02, *Multicast only Fast Re-Route*

## Frame Relay

ANSI T1.617 Annex D, *DSS1 - Signalling Specification For Frame Relay Bearer Service*

FRF.1.2, *PVC User-to-Network Interface (UNI) Implementation Agreement*

FRF.12, *Frame Relay Fragmentation Implementation Agreement*

FRF.16.1, *Multilink Frame Relay UNI/NNI Implementation Agreement*

FRF.5, *Frame Relay/ATM PVC Network Interworking Implementation*

FRF2.2, *PVC Network-to-Network Interface (NNI) Implementation Agreement*

ITU-T Q.933 Annex A, *Additional procedures for Permanent Virtual Connection (PVC) status management*

## IP — General

RFC 768, *User Datagram Protocol*

RFC 793, *Transmission Control Protocol*

RFC 854, *TELNET Protocol Specifications*

RFC 951, *Bootstrap Protocol (BOOTP)*

RFC 1034, *Domain Names - Concepts and Facilities*

RFC 1035, *Domain Names - Implementation and Specification*

RFC 1350, *The TFTP Protocol (revision 2)*

RFC 1534, *Interoperation between DHCP and BOOTP*

RFC 1542, *Clarifications and Extensions for the Bootstrap Protocol*

RFC 2131, *Dynamic Host Configuration Protocol*

RFC 2347, *TFTP Option Extension*

RFC 2348, *TFTP Blocksize Option*

RFC 2349, *TFTP Timeout Interval and Transfer Size Options*

RFC 2428, *FTP Extensions for IPv6 and NATs*

RFC 2865, *Remote Authentication Dial In User Service (RADIUS)*

RFC 2866, *RADIUS Accounting*

RFC 2867, *RADIUS Accounting Modifications for Tunnel Protocol Support*

RFC 2868, *RADIUS Attributes for Tunnel Protocol Support*

RFC 3046, *DHCP Relay Agent Information Option (Option 82)*

RFC 3315, *Dynamic Host Configuration Protocol for IPv6 (DHCPv6)*

RFC 3596, *DNS Extensions to Support IP version 6*

RFC 3768, *Virtual Router Redundancy Protocol (VRRP)*

RFC 4250, *The Secure Shell (SSH) Protocol Assigned Numbers*

RFC 4251, *The Secure Shell (SSH) Protocol Architecture*

RFC 4254, *The Secure Shell (SSH) Connection Protocol*

RFC 5880, *Bidirectional Forwarding Detection (BFD)*

RFC 5881, *Bidirectional Forwarding Detection (BFD) IPv4 and IPv6 (Single Hop)*

RFC 5883, *Bidirectional Forwarding Detection (BFD) for Multihop Paths*

RFC 7130, *Bidirectional Forwarding Detection (BFD) on Link Aggregation Group (LAG) Interfaces*  
draft-grant-tacacs-02, *The TACACS+ Protocol*  
draft-ietf-vrrp-unified-spec-02, *Virtual Router Redundancy Protocol Version 3 for IPv4 and IPv6*

### IP — Multicast

RFC 1112, *Host Extensions for IP Multicasting*  
RFC 2236, *Internet Group Management Protocol, Version 2*  
RFC 2375, *IPv6 Multicast Address Assignments*  
RFC 2710, *Multicast Listener Discovery (MLD) for IPv6*  
RFC 3306, *Unicast-Prefix-based IPv6 Multicast Addresses*  
RFC 3376, *Internet Group Management Protocol, Version 3*  
RFC 3446, *Anycast Rendezvous Point (RP) mechanism using Protocol Independent Multicast (PIM) and Multicast Source Discovery Protocol (MSDP)*  
RFC 3590, *Source Address Selection for the Multicast Listener Discovery (MLD) Protocol*  
RFC 3618, *Multicast Source Discovery Protocol (MSDP)*  
RFC 3810, *Multicast Listener Discovery Version 2 (MLDv2) for IPv6*  
RFC 3956, *Embedding the Rendezvous Point (RP) Address in an IPv6 Multicast Address*  
RFC 4601, *Protocol Independent Multicast - Sparse Mode (PIM-SM): Protocol Specification (Revised)*  
RFC 4604, *Using Internet Group Management Protocol Version 3 (IGMPv3) and Multicast Listener Discovery Protocol Version 2 (MLDv2) for Source-Specific Multicast*  
RFC 4607, *Source-Specific Multicast for IP*  
RFC 4608, *Source-Specific Protocol Independent Multicast in 232/8*

RFC 4610, *Anycast-RP Using Protocol Independent Multicast (PIM)*  
RFC 5059, *Bootstrap Router (BSR) Mechanism for Protocol Independent Multicast (PIM)*  
RFC 5384, *The Protocol Independent Multicast (PIM) Join Attribute Format*  
RFC 5496, *The Reverse Path Forwarding (RPF) Vector TLV*  
RFC 6037, *Cisco Systems' Solution for Multicast in MPLS/BGP IP VPNs*  
RFC 6513, *Multicast in MPLS/BGP IP VPNs*  
RFC 6514, *BGP Encodings and Procedures for Multicast in MPLS/IP VPNs*  
RFC 6515, *IPv4 and IPv6 Infrastructure Addresses in BGP Updates for Multicast VPNs*  
RFC 6516, *IPv6 Multicast VPN (MVPN) Support Using PIM Control Plane and Selective Provider Multicast Service Interface (S-PMSI) Join Messages*  
RFC 6625, *Wildcards in Multicast VPN Auto-Discover Routes*  
RFC 6826, *Multipoint LDP In-Band Signaling for Point-to-Multipoint and Multipoint-to-Multipoint Label Switched Path*  
RFC 7246, *Multipoint Label Distribution Protocol In-Band Signaling in a Virtual Routing and Forwarding (VRF) Table Context*  
RFC 7385, *IANA Registry for P-Multicast Service Interface (PMSI) Tunnel Type Code Points*  
draft-dolganow-l3vpn-mvpn-expl-track-00, *Explicit tracking in MPLS/BGP IP VPNs*

### IP — Version 4

RFC 791, *Internet Protocol*  
RFC 792, *Internet Control Message Protocol*  
RFC 826, *An Ethernet Address Resolution Protocol*  
RFC 1519, *Classless Inter-Domain Routing (CIDR): an Address Assignment and Aggregation Strategy*  
RFC 1812, *Requirements for IPv4 Routers*  
RFC 2401, *Security Architecture for Internet Protocol*

RFC 3021, *Using 31-Bit Prefixes on IPv4 Point-to-Point Links*

## IP — Version 6

RFC 1981, *Path MTU Discovery for IP version 6*

RFC 2460, *Internet Protocol, Version 6 (IPv6) Specification*

RFC 2464, *Transmission of IPv6 Packets over Ethernet Networks*

RFC 2529, *Transmission of IPv6 over IPv4 Domains without Explicit Tunnels*

RFC 3587, *IPv6 Global Unicast Address Format*

RFC 3633, *IPv6 Prefix Options for Dynamic Host Configuration Protocol (DHCP) version 6*

RFC 3646, *DNS Configuration options for Dynamic Host Configuration Protocol for IPv6 (DHCPv6)*

RFC 3736, *Stateless Dynamic Host Configuration Protocol (DHCP) Service for IPv6*

RFC 3971, *SEcure Neighbor Discovery (SEND)*

RFC 3972, *Cryptographically Generated Addresses (CGA)*

RFC 4007, *IPv6 Scoped Address Architecture*

RFC 4193, *Unique Local IPv6 Unicast Addresses*

RFC 4291, *Internet Protocol Version 6 (IPv6) Addressing Architecture*

RFC 4443, *Internet Control Message Protocol (ICMPv6) for the Internet Protocol Version 6 (IPv6) Specification*

RFC 4861, *Neighbor Discovery for IP version 6 (IPv6)*

RFC 4862, *IPv6 Stateless Address Autoconfiguration (Router Only)*

RFC 4941, *Privacy Extensions for Stateless Address Autoconfiguration in IPv6*

RFC 5007, *DHCPv6 Leasequery*

RFC 5095, *Deprecation of Type 0 Routing Headers in IPv6*

RFC 5952, *A Recommendation for IPv6 Address Text Representation*

RFC 6106, *IPv6 Router Advertisement Options for DNS Configuration*

RFC 6164, *Using 127-Bit IPv6 Prefixes on Inter-Router Links*

## IPsec

RFC 2401, *Security Architecture for the Internet Protocol*

RFC 2406, *IP Encapsulating Security Payload (ESP)*

RFC 2409, *The Internet Key Exchange (IKE)*

RFC 2560, *X.509 Internet Public Key Infrastructure Online Certificate Status Protocol - OCSP*

RFC 3706, *A Traffic-Based Method of Detecting Dead Internet Key Exchange (IKE) Peers*

RFC 3947, *Negotiation of NAT-Traversal in the IKE*

RFC 3948, *UDP Encapsulation of IPsec ESP Packets*

RFC 4210, *Internet X.509 Public Key Infrastructure Certificate Management Protocol (CMP)*

RFC 4211, *Internet X.509 Public Key Infrastructure Certificate Request Message Format (CRMF)*

RFC 5996, *Internet Key Exchange Protocol Version 2 (IKEv2)*

RFC 5998, *An Extension for EAP-Only Authentication in IKEv2*

draft-ietf-ipsec-isakmp-mode-cfg-05, *The ISAKMP Configuration Method*

draft-ietf-ipsec-isakmp-xauth-06, *Extended Authentication within ISAKMP/Oakley (XAUTH)*

## IS-IS

ISO/IEC 10589:2002, Second Edition, Nov. 2002, *Intermediate system to Intermediate system intra-domain routeing information exchange protocol for use in conjunction with the protocol for providing the connectionless-mode Network Service (ISO 8473)*

RFC 1195, *Use of OSI IS-IS for Routing in TCP/IP and Dual Environments*

## Standards and Protocol Support

RFC 2973, *IS-IS Mesh Groups*  
RFC 3359, *Reserved Type, Length and Value (TLV) Codepoints in Intermediate System to Intermediate System*  
RFC 3719, *Recommendations for Interoperable Networks using Intermediate System to Intermediate System (IS-IS)*  
RFC 3787, *Recommendations for Interoperable IP Networks using Intermediate System to Intermediate System (IS-IS)*  
RFC 4971, *Intermediate System to Intermediate System (IS-IS) Extensions for Advertising Router Information*  
RFC 5120, *M-ISIS: Multi Topology (MT) Routing in IS-IS*  
RFC 5130, *A Policy Control Mechanism in IS-IS Using Administrative Tags*  
RFC 5301, *Dynamic Hostname Exchange Mechanism for IS-IS*  
RFC 5302, *Domain-wide Prefix Distribution with Two-Level IS-IS*  
RFC 5303, *Three-Way Handshake for IS-IS Point-to-Point Adjacencies*  
RFC 5304, *IS-IS Cryptographic Authentication*  
RFC 5305, *IS-IS Extensions for Traffic Engineering TE*  
RFC 5306, *Restart Signaling for IS-IS (Helper Mode)*  
RFC 5307, *IS-IS Extensions in Support of Generalized Multi-Protocol Label Switching (GMPLS)*  
RFC 5308, *Routing IPv6 with IS-IS*  
RFC 5309, *Point-to-Point Operation over LAN in Link State Routing Protocols*  
RFC 5310, *IS-IS Generic Cryptographic Authentication*  
RFC 6213, *IS-IS BFD-Enabled TLV*  
RFC 6232, *Purge Originator Identification TLV for IS-IS*  
RFC 6233, *IS-IS Registry Extension for Purges*  
RFC 6329, *IS-IS Extensions Supporting IEEE 802.1aq Shortest Path Bridging*  
draft-ietf-isis-mi-02, *IS-IS Multi-Instance*

draft-ietf-isis-segment-routing-extensions-04, *IS-IS Extensions for Segment Routing*  
draft-kaplan-isis-ext-eth-02, *Extended Ethernet Frame Size Support*

## Management

ianaaddressfamilynumbers-mib, *IANA-ADDRESS-FAMILY-NUMBERS-MIB*  
ianagmplstc-mib, *IANA-GMPLS-TC-MIB*  
ianaiftype-mib, *IANAifType-MIB*  
ianaiprouteprotocol-mib, *IANA-RTPROTO-MIB*  
IEEE8021-CFM-MIB, *IEEE P802.1ag(TM) CFM MIB*  
IEEE8021-PAE-MIB, *IEEE 802.1X MIB*  
IEEE8023-LAG-MIB, *IEEE 802.3ad MIB*  
LLDP-MIB, *IEEE P802.1AB(TM) LLDP MIB*  
SFLOW-MIB, *sFlow MIB Version 1.3 (Draft 5)*  
RFC 1157, *A Simple Network Management Protocol (SNMP)*  
RFC 1215, *A Convention for Defining Traps for use with the SNMP*  
RFC 1724, *RIP Version 2 MIB Extension*  
RFC 2021, *Remote Network Monitoring Management Information Base Version 2 using SMIPv2*  
RFC 2115, *Management Information Base for Frame Relay DTEs Using SMIPv2*  
RFC 2138, *Remote Authentication Dial In User Service (RADIUS)*  
RFC 2206, *RSVP Management Information Base using SMIPv2*  
RFC 2213, *Integrated Services Management Information Base using SMIPv2*  
RFC 2494, *Definitions of Managed Objects for the DS0 and DS0 Bundle Interface Type*  
RFC 2514, *Definitions of Textual Conventions and OBJECT-IDENTITIES for ATM Management*  
RFC 2515, *Definitions of Managed Objects for ATM Management*  
RFC 2571, *An Architecture for Describing SNMP Management Frameworks*

- RFC 2572, *Message Processing and Dispatching for the Simple Network Management Protocol (SNMP)*
- RFC 2573, *SNMP Applications*
- RFC 2574, *User-based Security Model (USM) for version 3 of the Simple Network Management Protocol (SNMPv3)*
- RFC 2575, *View-based Access Control Model (VACM) for the Simple Network Management Protocol (SNMP)*
- RFC 2578, *Structure of Management Information Version 2 (SMIv2)*
- RFC 2579, *Textual Conventions for SMIv2*
- RFC 2787, *Definitions of Managed Objects for the Virtual Router Redundancy Protocol*
- RFC 2819, *Remote Network Monitoring Management Information Base*
- RFC 2856, *Textual Conventions for Additional High Capacity Data Types*
- RFC 2863, *The Interfaces Group MIB*
- RFC 2864, *The Inverted Stack Table Extension to the Interfaces Group MIB*
- RFC 2933, *Internet Group Management Protocol MIB*
- RFC 3014, *Notification Log MIB*
- RFC 3164, *The BSD syslog Protocol*
- RFC 3165, *Definitions of Managed Objects for the Delegation of Management Scripts*
- RFC 3231, *Definitions of Managed Objects for Scheduling Management Operations*
- RFC 3273, *Remote Network Monitoring Management Information Base for High Capacity Networks*
- RFC 3419, *Textual Conventions for Transport Addresses*
- RFC 3498, *Definitions of Managed Objects for Synchronous Optical Network (SONET) Linear Automatic Protection Switching (APS) Architectures*
- RFC 3584, *Coexistence between Version 1, Version 2, and Version 3 of the Internet-standard Network Management Framework*
- RFC 3592, *Definitions of Managed Objects for the Synchronous Optical Network/Synchronous Digital Hierarchy (SONET/SDH) Interface Type*
- RFC 3593, *Textual Conventions for MIB Modules Using Performance History Based on 15 Minute Intervals*
- RFC 3635, *Definitions of Managed Objects for the Ethernet-like Interface Types*
- RFC 3637, *Definitions of Managed Objects for the Ethernet WAN Interface Sublayer*
- RFC 3826, *The Advanced Encryption Standard (AES) Cipher Algorithm in the SNMP User-based Security Model*
- RFC 3877, *Alarm Management Information Base (MIB)*
- RFC 3895, *Definitions of Managed Objects for the DS1, E1, DS2, and E2 Interface Types*
- RFC 3896, *Definitions of Managed Objects for the DS3/E3 Interface Type*
- RFC 4001, *Textual Conventions for Internet Network Addresses*
- RFC 4022, *Management Information Base for the Transmission Control Protocol (TCP)*
- RFC 4113, *Management Information Base for the User Datagram Protocol (UDP)*
- RFC 4220, *Traffic Engineering Link Management Information Base*
- RFC 4292, *IP Forwarding Table MIB*
- RFC 4293, *Management Information Base for the Internet Protocol (IP)*
- RFC 4631, *Link Management Protocol (LMP) Management Information Base (MIB)*
- RFC 4878, *Definitions and Managed Objects for Operations, Administration, and Maintenance (OAM) Functions on Ethernet-Like Interfaces*
- RFC 5101, *Specification of the IP Flow Information Export (IPFIX) Protocol for the Exchange of IP Traffic Flow Information*
- RFC 6241, *Network Configuration Protocol (NETCONF)*

- RFC 6242, *Using the NETCONF Protocol over Secure Shell (SSH)*
- draft-ietf-snmppv3-update-mib-05, *Management Information Base (MIB) for the Simple Network Management Protocol (SNMP)*
- draft-ietf-idr-bgp4-mib-05, *Definitions of Managed Objects for the Fourth Version of Border Gateway Protocol (BGP-4)*
- draft-ietf-isis-wg-mib-06, *Management Information Base for Intermediate System to Intermediate System (IS-IS)*
- draft-ietf-mboned-msdp-mib-01, *Multicast Source Discovery protocol MIB*
- draft-ietf-mppls-ldp-mib-07, *Definitions of Managed Objects for the Multiprotocol Label Switching, Label Distribution Protocol (LDP)*
- draft-ietf-mppls-lsr-mib-06, *Multiprotocol Label Switching (MPLS) Label Switching Router (LSR) Management Information Base Using SMIPv2*
- draft-ietf-mppls-te-mib-04, *Multiprotocol Label Switching (MPLS) Traffic Engineering Management Information Base*
- draft-ietf-ospf-mib-update-08, *OSPF Version 2 Management Information Base*

### **MPLS — General**

- RFC 3031, *Multiprotocol Label Switching Architecture*
- RFC 3032, *MPLS Label Stack Encoding*
- RFC 3443, *Time To Live (TTL) Processing in Multiprotocol Label Switching (MPLS) Networks*
- RFC 4023, *Encapsulating MPLS in IP or Generic Routing Encapsulation (GRE)*
- RFC 4182, *Removing a Restriction on the use of MPLS Explicit NULL*
- RFC 5332, *MPLS Multicast Encapsulations*

### **MPLS — GMPLS**

- RFC 3471, *Generalized Multi-Protocol Label Switching (GMPLS) Signaling Functional Description*
- RFC 3473, *Generalized Multi-Protocol Label Switching (GMPLS) Signaling Resource ReserVation Protocol-Traffic Engineering (RSVP-TE) Extensions*
- RFC 4204, *Link Management Protocol (LMP)*
- RFC 4208, *Generalized Multiprotocol Label Switching (GMPLS) User-Network Interface (UNI): Resource ReserVation Protocol-Traffic Engineering (RSVP-TE) Support for the Overlay Model*
- RFC 4872, *RSVP-TE Extensions in Support of End-to-End Generalized Multi-Protocol Label Switching (GMPLS) Recovery*
- draft-ietf-ccamp-rsvp-te-srlg-collect-04, *RSVP-TE Extensions for Collecting SRLG Information*

### **MPLS — LDP**

- RFC 3037, *LDP Applicability*
- RFC 3478, *Graceful Restart Mechanism for Label Distribution Protocol (Helper Mode)*
- RFC 5036, *LDP Specification*
- RFC 5283, *LDP Extension for Inter-Area Label Switched Paths (LSPs)*
- RFC 5443, *LDP IGP Synchronization*
- RFC 5561, *LDP Capabilities*
- RFC 6388, *Label Distribution Protocol Extensions for Point-to-Multipoint and Multipoint-to-Multipoint Label Switched Paths*
- RFC 6826, *Multipoint LDP in-band signaling for Point-to-Multipoint and Multipoint-to-Multipoint Label Switched Paths*
- draft-ietf-mppls-ldp-ip-pw-capability-09, *Controlling State Advertisements Of Non-negotiated LDP Applications*
- draft-ietf-mppls-ldp-ipv6-15, *Updates to LDP for IPv6*



draft-pdutta-mpls-ldp-adj-capability-00, *LDP Adjacency Capabilities*  
 draft-pdutta-mpls-ldp-v2-00, *LDP Version 2*  
 draft-pdutta-mpls-multi-ldp-instance-00, *Multiple LDP Instances*  
 draft-pdutta-mpls-tldp-hello-reduce-04, *Targeted LDP Hello Reduction*

## MPLS — MPLS-TP

RFC 5586, *MPLS Generic Associated Channel*  
 RFC 5921, *A Framework for MPLS in Transport Networks*  
 RFC 5960, *MPLS Transport Profile Data Plane Architecture*  
 RFC 6370, *MPLS Transport Profile (MPLS-TP) Identifiers*  
 RFC 6378, *MPLS Transport Profile (MPLS-TP) Linear Protection*  
 RFC 6426, *MPLS On-Demand Connectivity and Route Tracing*  
 RFC 6428, *Proactive Connectivity Verification, Continuity Check and Remote Defect indication for MPLS Transport Profile*  
 RFC 6478, *Pseudowire Status for Static Pseudowires*  
 RFC 7213, *MPLS Transport Profile (MPLS-TP) Next-Hop Ethernet Addressing*

## MPLS — OAM

RFC 4379, *Detecting Multi-Protocol Label Switched (MPLS) Data Plane Failures*  
 RFC 6424, *Mechanism for Performing Label Switched Path Ping (LSP Ping) over MPLS Tunnels*  
 RFC 6425, *Detecting Data Plane Failures in Point-to-Multipoint Multiprotocol Label Switching (MPLS) - Extensions to LSP Ping*

## MPLS — RSVP-TE

RFC 2702, *Requirements for Traffic Engineering over MPLS*

RFC 2747, *RSVP Cryptographic Authentication*  
 RFC 2961, *RSVP Refresh Overhead Reduction Extensions*  
 RFC 3097, *RSVP Cryptographic Authentication -- Updated Message Type Value*  
 RFC 3209, *RSVP-TE: Extensions to RSVP for LSP Tunnels*  
 RFC 3473, *Generalized Multi-Protocol Label Switching (GMPLS) Signaling Resource ReserVation Protocol-Traffic Engineering (RSVP-TE) Extensions (IF\_ID RSVP\_HOP Object With Unnumbered Interfaces and RSVP-TE Graceful Restart Helper Procedures)*  
 RFC 3477, *Signalling Unnumbered Links in Resource ReSerVation Protocol - Traffic Engineering (RSVP-TE)*  
 RFC 3564, *Requirements for Support of Differentiated Services-aware MPLS Traffic Engineering*  
 RFC 3906, *Calculating Interior Gateway Protocol (IGP) Routes Over Traffic Engineering Tunnels*  
 RFC 4090, *Fast Reroute Extensions to RSVP-TE for LSP Tunnels*  
 RFC 4124, *Protocol Extensions for Support of DiffServ-aware MPLS Traffic Engineering*  
 RFC 4125, *Maximum Allocation Bandwidth Constraints Model for DiffServ-aware MPLS Traffic Engineering*  
 RFC 4127, *Russian Dolls Bandwidth Constraints Model for DiffServ-aware MPLS Traffic Engineering*  
 RFC 4561, *Definition of a Record Route Object (RRO) Node-Id Sub-Object*  
 RFC 4875, *Extensions to Resource Reservation Protocol - Traffic Engineering (RSVP-TE) for Point-to-Multipoint TE Label Switched Paths (LSPs)*  
 RFC 4950, *ICMP Extensions for Multiprotocol Label Switching*  
 RFC 5151, *Inter-Domain MPLS and GMPLS Traffic Engineering -- Resource Reservation Protocol-Traffic Engineering (RSVP-TE) Extensions*  
 RFC 5712, *MPLS Traffic Engineering Soft Preemption*

## Standards and Protocol Support

RFC 5817, *Graceful Shutdown in MPLS and Generalized MPLS Traffic Engineering Networks*

draft-newton-mpls-te-dynamic-overbooking-00, *A Diffserv-TE Implementation Model to dynamically change booking factors during failure events*

### NAT

RFC 5382, *NAT Behavioral Requirements for TCP*

RFC 5508, *NAT Behavioral Requirements for ICMP*

RFC 6146, *Stateful NAT64: Network Address and Protocol Translation from IPv6 Clients to IPv4 Servers*

RFC 6333, *Dual-Stack Lite Broadband Deployments Following IPv4 Exhaustion*

RFC 6334, *Dynamic Host Configuration Protocol for IPv6 (DHCPv6) Option for Dual-Stack Lite*

RFC 6888, *Common Requirements For Carrier-Grade NATs (CGNs)*

### OpenFlow

ONF *OpenFlow Switch Specification Version 1.3.1* (OpenFlow-hybrid switches)

### OSPF

RFC 1586, *Guidelines for Running OSPF Over Frame Relay Networks*

RFC 1765, *OSPF Database Overflow*

RFC 2328, *OSPF Version 2*

RFC 3101, *The OSPF Not-So-Stubby Area (NSSA) Option*

RFC 3509, *Alternative Implementations of OSPF Area Border Routers*

RFC 3623, *Graceful OSPF Restart Graceful OSPF Restart (Helper Mode)*

RFC 3630, *Traffic Engineering (TE) Extensions to OSPF Version 2*

RFC 4203, *OSPF Extensions in Support of Generalized Multi-Protocol Label Switching (GMPLS)*

RFC 4222, *Prioritized Treatment of Specific OSPF Version 2 Packets and Congestion Avoidance*

RFC 4552, *Authentication/Confidentiality for OSPFv3*

RFC 4576, *Using a Link State Advertisement (LSA) Options Bit to Prevent Looping in BGP/MPLS IP Virtual Private Networks (VPNs)*

RFC 4577, *OSPF as the Provider/Customer Edge Protocol for BGP/MPLS IP Virtual Private Networks (VPNs)*

RFC 4970, *Extensions to OSPF for Advertising Optional Router Capabilities*

RFC 5185, *OSPF Multi-Area Adjacency*

RFC 5187, *OSPFv3 Graceful Restart (Helper Mode)*

RFC 5243, *OSPF Database Exchange Summary List Optimization*

RFC 5250, *The OSPF Opaque LSA Option*

RFC 5309, *Point-to-Point Operation over LAN in Link State Routing Protocols*

RFC 5340, *OSPF for IPv6*

RFC 5709, *OSPFv2 HMAC-SHA Cryptographic Authentication*

RFC 5838, *Support of Address Families in OSPFv3*

RFC 6987, *OSPF Stub Router Advertisement*

draft-ietf-ospf-prefix-link-attr-06, *OSPFv2 Prefix/Link Attribute Advertisement*

draft-ietf-ospf-segment-routing-extensions-04, *OSPF Extensions for Segment Routing*

### Policy Management and Credit Control

3GPP TS 29.212, *Policy and Charging Control (PCC) over Gx/Sd Reference Point (Release 11 and Release 12) Gx support as it applies to wireline environment (BNG)*

RFC 3588, *Diameter Base Protocol*

RFC 4006, *Diameter Credit-Control Application*

**PPP**

- RFC 1332, *The PPP Internet Protocol Control Protocol (IPCP)*
- RFC 1377, *The PPP OSI Network Layer Control Protocol (OSINLCP)*
- RFC 1661, *The Point-to-Point Protocol (PPP)*
- RFC 1662, *PPP in HDLC-like Framing*
- RFC 1877, *PPP Internet Protocol Control Protocol Extensions for Name Server Addresses*
- RFC 1989, *PPP Link Quality Monitoring*
- RFC 1990, *The PPP Multilink Protocol (MP)*
- RFC 1994, *PPP Challenge Handshake Authentication Protocol (CHAP)*
- RFC 2153, *PPP Vendor Extensions*
- RFC 2516, *A Method for Transmitting PPP Over Ethernet (PPPoE)*
- RFC 2615, *PPP over SONET/SDH*
- RFC 2661, *Layer Two Tunneling Protocol "L2TP"*
- RFC 2686, *The Multi-Class Extension to Multi-Link PPP*
- RFC 2878, *PPP Bridging Control Protocol (BCP)*
- RFC 4951, *Fail Over Extensions for Layer 2 Tunneling Protocol (L2TP) "failover"*
- RFC 5072, *IP Version 6 over PPP*

**Pseudowire**

- MFA Forum 9.0.0, *The Use of Virtual trunks for ATM/MPLS Control Plane Interworking*
- MFA Forum 12.0.0, *Multiservice Interworking - Ethernet over MPLS*
- MFA Forum 13.0.0, *Fault Management for Multiservice Interworking v1.0*
- MFA Forum 16.0.0, *Multiservice Interworking - IP over MPLS*
- RFC 3916, *Requirements for Pseudo- Wire Emulation Edge-to-Edge (PWE3)*
- RFC 3985, *Pseudo Wire Emulation Edge-to-Edge (PWE3)*

- RFC 4385, *Pseudo Wire Emulation Edge-to-Edge (PWE3) Control Word for Use over an MPLS PSN*
- RFC 4446, *IANA Allocations for Pseudowire Edge to Edge Emulation (PWE3)*
- RFC 4447, *Pseudowire Setup and Maintenance Using the Label Distribution Protocol (LDP)*
- RFC 4448, *Encapsulation Methods for Transport of Ethernet over MPLS Networks*
- RFC 4619, *Encapsulation Methods for Transport of Frame Relay over Multiprotocol Label Switching (MPLS) Networks*
- RFC 4717, *Encapsulation Methods for Transport Asynchronous Transfer Mode (ATM) over MPLS Networks*
- RFC 4816, *Pseudowire Emulation Edge-to-Edge (PWE3) Asynchronous Transfer Mode (ATM) Transparent Cell Transport Service*
- RFC 5085, *Pseudowire Virtual Circuit Connectivity Verification (VCCV): A Control Channel for Pseudowires*
- RFC 5659, *An Architecture for Multi-Segment Pseudowire Emulation Edge-to-Edge*
- RFC 5885, *Bidirectional Forwarding Detection (BFD) for the Pseudowire Virtual Circuit Connectivity Verification (VCCV)*
- RFC 6073, *Segmented Pseudowire*
- RFC 6310, *Pseudowire (PW) Operations, Administration, and Maintenance (OAM) Message Mapping*
- RFC 6391, *Flow-Aware Transport of Pseudowires over an MPLS Packet Switched Network*
- RFC 6575, *Address Resolution Protocol (ARP) Mediation for IP Interworking of Layer 2 VPNs*
- RFC 6718, *Pseudowire Redundancy*
- RFC 6829, *Label Switched Path (LSP) Ping for Pseudowire Forwarding Equivalence Classes (FECs) Advertised over IPv6*
- RFC 6870, *Pseudowire Preferential Forwarding Status bit*

- RFC 7023, *MPLS and Ethernet Operations, Administration, and Maintenance (OAM) Interworking*
- RFC 7267, *Dynamic Placement of Multi-Segment Pseudowires*
- draft-ietf-l2vpn-vpws-iw-oam-04, *OAM Procedures for VPWS Interworking*

### Quality of Service

- RFC 2430, *A Provider Architecture for Differentiated Services and Traffic Engineering (PASTE)*
- RFC 2474, *Definition of the Differentiated Services Field (DS Field) in the IPv4 and IPv6 Headers*
- RFC 3260, *New Terminology and Clarifications for DiffServ*
- RFC 2598, *An Expedited Forwarding PHB*
- RFC 3140, *Per Hop Behavior Identification Codes*

### RIP

- RFC 1058, *Routing Information Protocol*
- RFC 2080, *RIPng for IPv6*
- RFC 2082, *RIP-2 MD5 Authentication*
- RFC 2453, *RIP Version 2*

### SONET/SDH

- ITU-G.841, *Types and Characteristics of SDH Networks Protection Architecture, issued in October 1998 and as augmented by Corrigendum 1, issued in July 2002*

### Timing

- GR-1244-CORE, *Clocks for the Synchronized Network: Common Generic Criteria, Issue 3, May 2005*
- GR-253-CORE, *SONET Transport Systems: Common Generic Criteria. Issue 3, September 2000*

- IEEE 1588-2008, *IEEE Standard for a Precision Clock Synchronization Protocol for Networked Measurement and Control Systems*
- ITU-T G.781, *Synchronization layer functions, issued 09/2008*
- ITU-T G.813, *Timing characteristics of SDH equipment slave clocks (SEC), issued 03/2003*
- ITU-T G.8261, *Timing and synchronization aspects in packet networks, issued 04/2008*
- ITU-T G.8262, *Timing characteristics of synchronous Ethernet equipment slave clock (EEC), issued 08/2007*
- ITU-T G.8264, *Distribution of timing information through packet networks, issued 10/2008*
- ITU-T G.8265.1, *Precision time protocol telecom profile for frequency synchronization, issued 10/2010*
- ITU-T G.8275.1, *Precision time protocol telecom profile for phase/time synchronization with full timing support from the network, issued 07/2014*
- RFC 5905, *Network Time Protocol Version 4: Protocol and Algorithms Specification*

### Voice and Video Performance

- ETSI TS 101 329-5 Annex E, *QoS Measurement for VoIP - Method for determining an Equipment Impairment Factor using Passive Monitoring*
- ITU-T G.1020 Appendix I, *Performance Parameter Definitions for Quality of Speech and other Voiceband Applications Utilizing IP Networks - Mean Absolute Packet Delay Variation & Markov Models*
- ITU-T G.107, *The E Model - A computational model for use in planning*
- ITU-T P.564, *Conformance testing for voice over IP transmission quality assessment models*
- RFC 3550 Appendix A.8, *RTP: A Transport Protocol for Real-Time Applications (Estimating the Interarrival Jitter)*

## VPLS

- RFC 4761, *Virtual Private LAN Service (VPLS) Using BGP for Auto-Discovery and Signaling*
- RFC 4762, *Virtual Private LAN Service (VPLS) Using Label Distribution Protocol (LDP) Signaling*
- RFC 5501, *Requirements for Multicast Support in Virtual Private LAN Services*
- RFC 6074, *Provisioning, Auto-Discovery, and Signaling in Layer 2 Virtual Private Networks (L2VPNs)*
- RFC 7041, *Extensions to the Virtual Private LAN Service (VPLS) Provider Edge (PE) Model for Provider Backbone Bridging*
- RFC 7117, *Multicast in Virtual Private LAN Service (VPLS)*

