FLORIDA DEPARTMENT OF TRANSPORTATION
REQUEST FOR INFORMATION (RFI)*

RFI-DOT-14/15-9038-RC RPFD

The Department of Transportation, *ITS Program of the Traffic Engineering and Operations Office*, is requesting the following information from prospective vendors about the commodities and/or contractual services described below.

**Description of commodities/contractual services:**

Copper and optical Layer 2 & 3 Ethernet technologies employing Multi-Protocol Label Switching (MPLS) technology as a means for transporting packet data over a Wide Area Network (WAN).

**Specific Information Requested:**

Please refer to attached document, Exhibit A

**Timeline:**

1. **Question & Answer Period**
   Vendors may submit questions to FDOT until 5:00PM (DST) on April 9, 2015, at which point no other questions will be considered by FDOT.

2. **FDOT Response**
   FDOT will respond to vendors’ questions by 5:00PM (DST) on April 30, 2015, at which point the Q&A period will close.

3. **Vendors’ Response**
   Respondents must submit any/all information (to provide completed responses to the FDOT for this RFI) by 5:00PM (DST) on May 21, 2015.

**Questions and Responses should be E-mailed to:**

david.heupel@dot.state.fl.us and john.glowczewski@dot.state.fl.us

**Contact for this RFI:**

If you have concerns or need clarification, contact david.heupel@dot.state.fl.us

**NOTE:** Responses to this Request for Information (RFI) will be reviewed by the agency for informational purposes, and will not be considered as offers to be accepted by the agency to form a binding contract. Advertisement of any subsequent competitive solicitation that may result from this RFI will be posted on the Florida Vendor Bid System.
Florida Department of Transportation
Statewide Telecommunications Network

Next-Generation Network Upgrade Project

Request for Information on Networking Technology
MULTI-PROTOCOL LABEL SWITCHING

RFI Prepared by:
Florida Department of Transportation
# Contents

Statewide ITS Network Upgrade – Multi-Protocol Label Switching RFI ..................................................3

1. Description ........................................................................................................................................3
   1.1 Background ..................................................................................................................................3
   1.1.1 Existing Applications ...........................................................................................................4
   1.1.2 Current FDOT ITS Statewide Network; ITS WAN, SMS .....................................................5
   1.1.3 Limitations and Constraints ...............................................................................................8

1.2 Requirements ..................................................................................................................................8
   1.2.1 Assumptions ..........................................................................................................................10

1.3 Upgrade Scenarios .........................................................................................................................10
   1.3.1 Upgrade Scenario #1 – The Florida Turnpike Upgrade ..........................................................10
   1.3.2 Upgrade Scenario #2 – Upgrade all Hub Sites and Key Application Sites .......................14

2. Questions for Respondents ..............................................................................................................16

3. Acronyms .........................................................................................................................................17
Statewide ITS Network Upgrade – Multi-Protocol Label Switching RFI

1. Description
The Florida Department of Transportation (FDOT), in support of Intelligent Transportation Systems (ITS), is seeking information to implement a strategy to upgrade the existing FDOT Statewide Telecommunications Network (STN) to a “next generation” statewide ITS network. This strategy is expected to be implemented in a phased approach, which will not encompass the entire state at once. The network upgrades will be implemented in stages as funding becomes available over several years’ time. This RFI is addressing the utilization of Multi-Protocol Label Switching (MPLS) technology. A successful RFI response will involve only MPLS as a design consideration.

The two goals of this RFI are to determine if MPLS is the best strategy for the FDOT, and also to determine the type of phasing plan that will provide the greatest benefit to the FDOT.

The Statewide ITS network provides the backbone for Intelligent Transportation Systems equipment, such as traffic counters, traffic signaling, traffic cameras, dynamic message signs, highway advisory radio, and other such ITS devices. Respondents should note that this network’s purpose is not for telephony, or placing/receiving phone calls.

For this RFI, the FDOT is looking for a strategy from a single respondent covering switching and routing technology where both microwave and fiber optics are used as transport. The FDOT realizes that multiple equipment vendors/manufacturers may be required to build a complex system such as this. The FDOT desires to know about strategic alliances that may be needed, and how transport (microwave and fiber optics) offerings can be integrated into the proposed strategy.

Capital Expense (CAPEX) and Operational Expense (OPEX) budget estimates, including equipment, optional features, software licenses, element managers, spares inventory and ongoing maintenance costs should be included in your response.

Respondents should also include detailed technical information regarding interconnects, configuration samples, information regarding complexities of adding services/circuits, maintenance, and troubleshooting procedures. See the Questions in Section 2 of this document for specific technical questions the FDOT has regarding an MPLS strategy for our Next Generation Network (NGN).

It is the aim of FDOT to collapse three networks, the ITS WAN, the SMS, and the Turnpike Microwave System into a single, cohesive Statewide ITS Backbone which will create a redundant and resilient backbone to support today’s and future applications and traffic between the regional data centers.

A complete RFI response should include design responses for each of the scenarios in section 1.3, and answer all questions listed in Section 2.

1.1 Background
The FDOT operates a statewide ITS network, comprised of two transports; a statewide microwave system (SMS), and a fiber optic network (ITS WAN). Where fiber currently exists, it is the primary transport for most ITS traffic in the system statewide. Where there is no fiber, and in the event of multiple catastrophic fiber outages, traffic is transported over the SMS.
The primary mission of the statewide ITS network is to enable center-to-center (C2C) communications and interoperability between the FDOT districts' transportation management systems software installed at the FDOT districts' Regional Transportation Management Centers (RTMCs), and to share traffic management data and digital closed-circuit television (CCTV) traffic-camera video between the FDOT districts and other users. It is important to note that the districts autonomously manage their own ITS networks within their respective boundaries. The statewide ITS network transports data between the FDOT's districts, Florida's Turnpike Enterprise (FTE), other FDOT partners, and their respective RTMCs. There are additional applications whose traffic rides on the STN backbone which are listed below.

1.1.1 Existing Applications

Center to Center Applications

Traffic Camera Video
Sunguide Sharing (C2C)
FHP CAD
Managed Lanes Tolling
NOAA
VAS

Radio Applications

47MHz (Voted)
FTE UHF Radio – Road Rangers
ROIP FUTURE
SARNET ROIP (JPS Raytheon NXU-2A) UHF
Future Radio Applications

Field Data Network

RWIS
Intra-district data on the network
Tolls Revenue
Tolls SCADA
FTE ITS
FTE 4-Digit Dialing

Management

NetBoss PENSACOLA, TAMPA, LAKE CITY, PORT ORANGE
Preside
ITSWAN MGMT
Tower infrastructure hard contacts
4-Digit Dialing EOW

Other Applications

SLERS
FirstNet
FCC Monitoring
1.1.2 Current FDOT ITS Statewide Network; ITS WAN, SMS

There are two sub-systems, the Statewide Microwave System (SMS) and the Intelligent Transportation Systems Wide Area Network (ITS WAN). There are currently two Network to Network Interfaces (NNIs) between these two IP networks allowing management and other traffic to communicate between them.

The SMS is a legacy infrastructure comprised of 74 sites built upon 6 GHz time division multiplex (TDM) microwave; specifically, the Harris DVM6-45 and Constellation microwave radios. These radios provide a 45 Mbps backbone via 28 T1s. At certain key sites (“hub” sites) within the system, the microwave radios are configured as terminals providing access to all 28 T1 circuits from each radio. At the remainder of the sites, the radios are configured as repeaters and a maximum of up to 16 T1 circuits (in each direction) is available (some sites have less). All T1 circuits are framed.

Two T1 circuits are dedicated statewide to a DACC/channel bank system that supports the FDOT’s 47 MHz repeater system.

Two T1 circuits are dedicated statewide to a management IP network constructed using Nortel ASN routers that transports SNMP, TL1 and other management traffic between the sites and the network management systems. An additional T1 is dedicated statewide to a field data network utilizing the same Nortel ASN routers, but in a different IP address space. The Field Data Network currently supports the FDOT’s RoIP system and field-based ITS equipment, including video.

In the 74-site SMS, fourteen (14) sites are considered “hub” sites. These sites are equipped with a DS3 multiplexer, which aggregates the unallocated microwave T1 circuits into a fractional, channelized DS3 format that is connected to the Ericsson Passport 15000 ATM switches. The ATM switches utilize this bandwidth to provide Ethernet Virtual LAN Services (EVLS) circuits to the adjacent “hub” site(s) in the microwave network. (See Figure 1.1.2-2 and 1.1.2-3 below). These EVLS circuits support both the field data network, as well as District-to-District applications. It is the intent of the FDOT to pursue the upgrade of the SMS to a hybrid Ethernet and TDM microwave transport strategy to provide native Ethernet connectivity.

In addition to the 74 SMS sites, there is a second microwave network, Florida Turnpike Microwave System (FTMS) specific to the Florida Turnpike Enterprise. This network is comprised of 20 sites. This network is strictly a TDM network with no Layer 2 or 3 devices. However; there are a total of 9 sites which are co-located with either the fiber optic ITS WAN and/or SMS sites. During the upgrade project, the Florida Turnpike Microwave System will become part of the statewide ITS backbone.

While the fiber optic (ITS WAN) network is presently being built out, portions of the state are in operation on the network; primarily, the Southern half of the peninsula. The ITS WAN transports are comprised of both long-haul optical CWDM SONET providing up to 2.5 gigabits/second bandwidth, and Layer 3 connectivity to the RTMCs. Conversely, the Statewide Microwave System (SMS) is fully deployed across the state and provides ITS WAN connectivity to key FDOT sites where fiber is not currently present.
Figure 1.1.2-1 - Baseline View of Existing Network(s)

Figure 1.1.2-2 – Typical “Key” Application Site

Legend

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Count</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>Router</td>
</tr>
<tr>
<td>![Symbol Image]</td>
<td>1</td>
<td>Switch</td>
</tr>
<tr>
<td>![Symbol Image]</td>
<td>1</td>
<td>Radio tower</td>
</tr>
<tr>
<td>![Symbol Image]</td>
<td>4</td>
<td>Custom Apps</td>
</tr>
<tr>
<td>![Symbol Image]</td>
<td>2</td>
<td>6 GHz RF Link</td>
</tr>
<tr>
<td>![Symbol Image]</td>
<td>1</td>
<td>Channel Bank</td>
</tr>
</tbody>
</table>

Note: The number of applications at a key application site will vary. There could be only one application, or there could be many.
Figure 1.1.2-3 – Typical “Hub” Site

Figure 1.1.2-4 – Hub Site with Fiber Optic availability
1.1.3 Limitations and Constraints

The FDOT has made a considerable investment in the Statewide Microwave System, and wishes to leverage these assets (real estate, towers, antennas, wave-guide) as a means for providing redundancy for the fiber-optic ITS WAN. However, if the fiber-optic WAN experiences an issue preventing the flow of network traffic, potentially 2.5 gigabits/second (Gbps) will have to traverse a much slower 45 megabits/second (Mbps) microwave link. As the next-generation network will certainly have similar constraints (i.e.: a 10 Gbps fiber backbone coupled with a 300-400 Mbps microwave system), equipment features must be available to groom traffic via class-of-service/quality-of-service, queue prioritization, and other traffic shaping methods.

Network infrastructure equipment (switches, routers, hubs, etc.) in both networks are obsolete, and end-of-life.

The migration plan to a Next Generation Network (NGN) will be undertaken in stages, as funding becomes available, and in key locations where the FDOT has particular business needs to meet.

Therefore, the FDOT seeks to obtain information from respondents about their specific technology offerings, and how they may fit into this unique upgrade scenario.

The purpose of the RFI is to develop a path to the “Next Generation Network” which will combine overlapping sites with a single WAN technology. The Next Generation Network shall leverage legacy TDM microwave sites (until they are phased out), newly upgraded microwave sites (hybrid TDM and Ethernet) and long haul optical technology to collapse the networks into a single cohesive network. The mission remains to support all existing TDM and Ethernet/IP applications and future ones as well.

1.2 Requirements

The strategy recommended by respondents for the Next Generation Network (NGN) must meet the following requirements:

- Intra-domain IP multicast MUST be supported (multicast between next generation and legacy networks must function correctly).

- Multicast Source Discovery Protocol (MSDP) of inter-domain PIM-SM domains (multicast between next generation and legacy networks must function correctly). Multicast traffic can be native via rendezvous point(s), or tunneled from source to destination via a label or service identifier or Virtual Local Area Network (VLAN), as long as traffic from a multicast source reaches its destination efficiently. See drawing below.
- Support Transport T1 (TDM) circuits (i.e., pseudo-wire) either inherent to the system or through use of third-party equipment interfaced to MPLS core.
- Support Ethernet over T1 aggregation (TDM, either inherent to the system or through use of third-party equipment interfaced to MPLS core (e.g.: RAD Rici-16).
- MPLS core must communicate with two OSPF zero (0) domains (SMS management and ITS WAN), and one OSPF ten (10) domain (data).
- MPLS core must communicate with each of the districts who have their own OSPF areas (likely area zero (0)), which currently connects to the ITS WAN backbone at Layer 3 (Center to Center).
- Respondent/Manufacturer must specify routing protocols used between the legacy and next-generation networks (MPLS, OSPF, Static Route).
- Minimum of eight COS/QOS queues for traffic grooming on next generation equipment.
- Wire speed capabilities on all ports, all the time. FDOT does not want to deploy a piece of equipment at any particular site that could become a bottleneck for traffic in the event that the particular site has to process all traffic in the WAN; i.e.: catastrophic fiber outages in several locations force all WAN traffic to traverse through a single site.
• Operations, Administration, and Management (OAM) between next generation and legacy networks (Simple Network Management Protocol [SNMP]); ability to work with external respondents’ “manager of managers” (MOM) applications (such as Harris NetBoss or MegaSys Telenium) for management. Specify any additional applications/hardware/middleware to independently support all hardware devices in the design. FDOT needs to understand what is needed to manage devices, and costs associated with accomplishing a cohesive network management platform.

• Isolated management network via labeling and/or VLAN.

• Multi-tenant capabilities (services and/or entities). The next-generation network must be able to support multiple Autonomous System (AS) domains.

• Equipment currently available for sale, and support available for no less than seven years.

• 19-inch two-post rack mountable equipment

• Redundant -48V DC power

1.2.1 Assumptions
The current, legacy microwave system is TDM-based Nxt1. The new microwave system will be an Ethernet and TDM hybrid system. The FDOT expects next generation microwave equipment to provide a minimum of 300 Mbps bandwidth per link (via single or multiple carriers), utilizing the existing tower infrastructure. Construction of new or additional tower sites is not being contemplated.

To facilitate the continued use of the existing microwave infrastructure for some portions of the network for a period of time, the FDOT is also looking for an Ethernet over TDM strategy that can bond multiple T1’s for Ethernet connectivity. Some of these legacy sites may also have fiber connectivity which can be leveraged as on/off ramps and for redundancy.

The FDOT is looking for equipment to provide a minimum of 10 Gbps bandwidth over our fiber optic access. Approximate mileage between sites is provided so that respondents can recommend long-haul optical networking and/or regeneration equipment for furnishing a minimum of 10 Gbps bandwidth via fiber.

Management and alarming systems for next-generation microwave radios, fiber optic equipment, network equipment, and hard contact closure alarms for tower maintenance should function with IP/Ethernet OAM.

1.3 Upgrade Scenarios
1. Turnpike Section Upgrade – Complete upgrade

2. Upgrade all Hub Sites and “key application” sites within the SMS – Leverage fiber optic connectivity where possible.

1.3.1 Upgrade Scenario #1 – The Florida Turnpike Upgrade
The Florida Turnpike currently has a 20 site microwave system based on TDM technology. The Florida Turnpike sites all have fiber optics in and out through them. Currently, ITS WAN has fiber strands allocated from Turnpike fiber to assist ITS Central Office to complete their mission with respect to the statewide ITS network.

Respondents should consider all 20 Turnpike sites as key locations where fiber and microwave networks can be leveraged for redundancy. Respondents should be aware that fiber is the primary path for all applications and data center connections. In the event of a fiber outage, traffic will be shifted to a second or redundant fiber path, if available, and then ultimately traffic engineered over the microwave as a last resort. The FDOT is
seeking respondents to provide a design for an MPLS network using the Turnpike sites with fiber redundancy as the main protection and the microwave system as the secondary protection in the event of a complete fiber outage.

It is important to maintain connectivity between the upgraded Turnpike sites with the remaining legacy networks, to maintain the integrity of the statewide ITS network.

The FDOT would like the respondents to describe the upgrade process and design of the Turnpike region. The design should include the type of equipment recommended at each site, and the modules necessary for connections to the fiber and microwave for redundancy. The respondents should include any third-party equipment that would be needed. The respondent should describe traffic redundancy process. The respondents should describe how the upgraded region would interface and network with the rest of the legacy network. The FDOT will use this information to make assumptions regarding the future upgrade of other geographical regions in a phased approach.

1.3.1.1 Site List

Distances are approximate, straight-line distances between sites for the purposes of determining the proper long-haul optical SFP modules for network devices.

One site (Site T) in the Turnpike microwave system, is also an SMS “Hub” site, as well as an ITS WAN site.
Site A
Microwave Hub Site: No
Site has Fiber Optics: Yes
Distance from Site B: 18.5 miles
Distance from Site C: 16.8 miles
Site H
Site has Fiber Optics: Yes
Distance from Site G: 13.75 miles
Distance from Site I: 17.3 miles

Site B
Site has Fiber Optics: Yes
Distance from Site A: 18.5 miles
Distance from Site C: 16.8 miles
Site I
Site has Fiber Optics: No
Distance from Site H: 17.3 miles
Distance from Site J: 19 miles

Site C
Site has Fiber Optics: Yes
Distance from Site B: 16.8 miles
Distance from Site D: 4 miles
Distance to Site E for Microwave Link: 12.36 miles
Site J
Site has Fiber Optics: Yes
Distance from Site I: 19 miles
Distance from Site K: 7.5 miles

Site D
Site has Fiber Optics: Yes
Site has no microwave tower
Distance from Site C: 4 miles
Distance from Site E: 8.36 miles
Site K
Site has Fiber Optics: Yes
Distance from Site J: 7.5 miles
Distance from Site L: 10.9 miles

Site E
Site has Fiber Optics: Yes
Distance from Site D: 8.36 miles
Distance from Site F: 24.3 miles
Distance to Site C for Microwave Link: 12.36 miles
Site L
Site has Fiber Optics: Yes
Distance from Site K: 10.9 miles
Distance from Site M: 17.7 miles

Site F
Site has Fiber Optics: Yes
Distance from Site E: 24.3 miles
Distance from Site G: 22.1 miles
Site M
Site has Fiber Optics: Yes
Distance from Site L: 17.7 miles
Distance from Site N: 15.7 miles

Site G
Site has Fiber Optics: No
Distance from Site F: 22.1 miles
Distance from Site H: 13.75 miles
Site N
Site has Fiber Optics: Yes
Distance from Site M: 15.7 miles
Distance from Site O: 5.5 miles
Site O
Site has Fiber Optics: Yes
Distance from Site N: 5.5 miles
Distance from Site P: 12.4 miles

Site P
Site has Fiber Optics: Yes
Distance from Site O: 12.4 miles
Distance from Site Q: 14.3 miles

Site Q
Site has Fiber Optics: Yes
Distance from Site P: 12.4 miles
Distance from Site R: 8.28 miles

Site R
Site has Fiber Optics: Yes
Distance from Site Q: 8.28 miles
Distance from Site S: 19.4 miles

Site S
Site has Fiber Optics: Yes
Distance from Site R: 19.4 miles
Distance from Site T: 18.5 miles

Site T
SMS Microwave Hub Site: Yes
Site has Fiber Optics: Yes
Distance from Site S: 18.5 miles
1.3.2 Upgrade Scenario #2 - Upgrade all Hub Sites and Key Application Sites

In this upgrade scenario, FDOT is looking for a proposed strategy(ies) to leverage the existing legacy microwave system while deploying updated MPLS equipment to build a foundation for the next-generation network.

It is the desire of the FDOT, in this scenario, to replace each of the Ericsson Passport 15000s located at the hub sites with an MPLS product. The Ericsson Passport 15000’s interface to the legacy microwave system is via a channelized, fractional DS3. The FDOT is requesting that the respondents provide options for leveraging the available SMS bandwidth for the MPLS network. Note that the DS3 multiplexers can be eliminated if direct access to the 24 channelized T1 circuits is desired.
It is also the desire of the FDOT to replace legacy routers at “key” application sites (see Figure 1.1.1.1-2) to provide MPLS services at the site by leveraging the available capacity of the SMS. Key Application sites include all sites that require intra-network multicast capability. However, these locations do not have access to the full 28xT1 bandwidth of the microwave system; but, they may have access to the fiber optic network. A maximum of 16 T1 circuits via the SMS, in each direction is available, 2-3 T1 circuits are dedicated to the channel bank system and 3 T1 circuits are dedicated to the legacy router network. These 5-6 T1 circuits are shared with other sites and therefore cannot be reallocated without upgrading all sites located between two hub sites. Of the remaining 9-10 T1 circuits, each of these T1s reallocated to provide transport to a “key” application site comes from the T1 circuits connecting the hub sites. That is, if the capacity of the fractional, channelized DS3 between two hub sites is 24 T1 and 8 T1s are reallocated to serve a “key” application site located between the two hub sites, the fractional, channelized DS3 capacity is reduced to 16 T1. Based upon the application requirements, the bandwidth requirement at the “key” application sites are relatively low at this time (~3Mbps), however, the flexibility of reallocating more T1s for transport is desired if a solution exists that does not detract from the capacity between hub sites (i.e., MPLS traffic can efficiently and fully utilize both the hub-to-hub route and the hub-to-key site-to-hub site route).

It is also desired to eliminate the legacy routers, if feasible, at the hub site. As the legacy routers are T1-based, this requires a strategy that will interface the MPLS product to T1 circuits from routers at the adjacent sites.

Finally, the FDOT desires options for transporting the TDM-based traffic from the DACC / channel bank system over the MPLS network.

Describe how your strategy can replace the Ericsson Passport 15000 ATM switches using the channelized fractional DS3s as transport for MPLS traffic.

Describe how your MPLS strategy would integrate with legacy routers at the remaining SMS sites. Could the routers at the hub sites be replaced with an MPLS product?

Describe how your strategy will differ between key application sites with physical access to the fiber optic network, versus those key application sites without direct access to the fiber network.

The FDOT would like the Respondent to describe the upgrade process and design of specific sites throughout the statewide network. The design should include the type of equipment recommended at each site, and the modules necessary for connections to the fiber and microwave for redundancy. The respondents should include any third-party equipment that would be needed. The respondents should describe how the upgraded region would interface and network with the rest of the legacy network. The FDOT will use this information to make assumptions regarding the future upgrade of other key sites in the phased approach.
2. Questions for Respondents
Include answers to questions by repeating the question, and the stating answer.

1. Does your strategy meet all the requirements listed in section 1.2? Respond to each bullet point in section 1.2. Explain variances or work-arounds for equipment that does/will not meet the listed requirements.

2. For the four different site types (hub site, legacy remote site, key application site, any site type with co-located fiber optic access) – provide a line item equipment configuration.

3. In budget estimates, provide any equipment and/or software/license costs (build-out, tiered) for the network element manager.

4. How does your strategy route traffic between MPLS domains and an OSPF domain(s)?

5. With regard to Upgrade Scenario 2: Describe how your strategy can replace the Ericsson Passport 15000 ATM switches using the channelized fractional DS3s as transport for MPLS traffic.

6. Describe the throughput the FDOT should expect from a 24-T1 transport of MPLS traffic.

7. What is the minimum quantity of T1s needed to support MPLS traffic for a “key” application site with a 3 Mbps throughput requirement?

8. With regard to Upgrade Scenario 2: Describe how your MPLS strategy would integrate with legacy routers at the remaining SMS sites. Could the routers at the hub sites be replaced with an MPLS product?
9. Could the routers at the “key” application sites be replaced with an MPLS product?

10. Do your products support end-to-end payload encryption? Please describe any encryption capabilities of your products.

11. What are the advantages and disadvantages to deploying a MPLS strategy instead of maintaining an all Layer-3 network?

12. What are the advantages and disadvantages to deploying a MPLS strategy instead of deploying a Layer 2 Shortest Path Bridging (SPB) strategy, or staying with the current Layer 3 OSPF design?

3. Acronyms

List of acronyms used within this document:

- RFI – Request for Information
- FDOT – Florida Department of Transportation
- FTE – Florida’s Turnpike Enterprise
- ITS – Intelligent Transportation Systems
- SMS – Statewide Microwave System
- STN – Statewide Telecommunications Network
- ITS WAN – Intelligent Transportation Systems Wide Area Network
- MPLS – Multi-Protocol Label Switching
- SPB – Shortest Path Bridging
- LAN – Local Area Network
- NMS – Network Management System
- OAM – Operations, Administration & Management
- MOM – Manager of Managers
- NEM – Network Element Manager
- OSPF – Open Shortest Path First
- PIM – Protocol-Independent Multicast
- PIM-SM – Protocol-Independent Multicast Sparse Mode
- RP – Rendezvous Point
- EVLS – Ethernet Virtual LAN Service
- ISIS – Intermediate System to Intermediate System
- ISID – ISIS Service Identifier
- VLAN – Virtual Local Area Network
- ATM – Asynchronous Transfer Mode
- TDM – Time Division Multiplexed
- RF – Radio Frequency
- SLERS – Statewide Law Enforcement Radio System
- RoIP – Radio over Internet Protocol
- EOW – Engineering Order Wire
- FCC – Federal Communications Commission
- FHP CAD – Florida Highway Patrol Computer Aided Dispatch
- NOAA – National Oceanographic and Atmospheric Administration
VAS – Video Aggregation Service
CWDM – Coarse Wave Division Multiplexed
DWDM – Dense Wave Division Multiplexed
SFP – Small Form-factor Pluggable