



Spanning Tree Protocol (STP)

EION Open IP Environment Spanning Tree Protocol is a portable software module that provides transparent bridging among network elements such as multiservice switches, routers and Internet-enabled devices such as Internet appliances.

Overview

EION Open IP Environment is a portable real-time software suite that IP-enables new and traditional network elements providing high performance interoperability across multiple platforms and products. Open IP Environment is based on a single, open, modular and scalable framework that allows system integrators and developers to incorporate services such as routing, Quality of Service (QoS), security, IP accounting and policy management into any type of device. Open IP Environment is platform and real-time operating system (RTOS) independent and can work on any type of device ranging from high end optical core switches to personal digital assistants (PDAs).

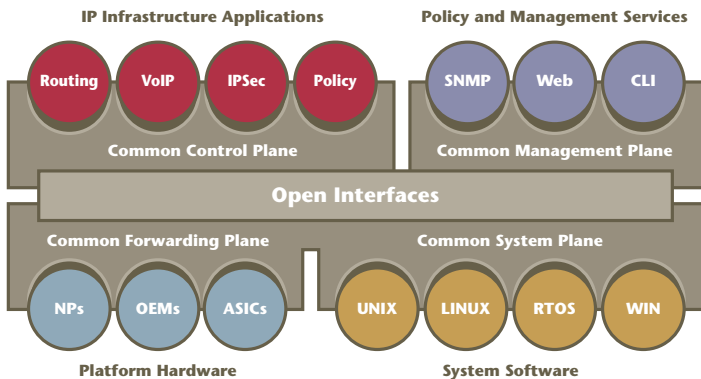
Open IP Environment STP module resides within the Common Control Plane to deliver transparent bridging capabilities to network elements. This plane supports the Open IP Environment Internet Protocol (IP) infrastructure and enables a mix and match approach for adding support for networking protocols and/or services. The control plane holds together the routing protocol applications (RPAs) that deliver network functionality while also providing interchangeable access for all IP-based modules such as OSPF, RIP and IPv4.

Framework Overview

EION Open IP Environment framework consists of four planes: Common Control Plane, Common System Plane, Common Forwarding Plane and Common Management Plane. Each of these planes contains a set of components that are built to use well-defined interfaces.

STP Module Overview

EION Open IP Environment STP module provides all functions necessary for a transparent bridge. This product is a 'bridging only' implementation developed 'from the ground up' by EION.



Open IP Environment STP module includes the spanning tree algorithm, multicast filtering, General Attributes Registration Protocol (GARP) Multicasting Registration Protocol (GMRP), VLAN support and traffic class management.

The bridging process performs all spanning tree functions. Since this processing can be performed at a relatively low priority level, it can be run in process or equivalent context. There is only one bridging process within a node, although the single process can support multiple instances of the spanning tree protocol.

STP Interactions

EION Open IP Environment STP module uses the Open IP Environment's Common System Plane functions such as timers, message queues and thread manager libraries.

The Common Management Plane also provides services to the STP by developing appropriate management code in order to integrate with management capabilities such as SNMP, EION Command Line Interface and/or web-based management.

For more details about other Open IP Environment modules and planes, please refer to the relevant product briefs.

STP Features

EION Open IP Environment STP module demonstrates the following key features by providing all the functions necessary for a transparent bridge:

- Spanning tree algorithm support
- Multicast filtering
- VLAN support
- Traffic class management
- Ported to both "ENDIAN types," CISC and RISC processors and multiple operating systems with very little effort.

For a complete list of Open IP Environment STP Standards and RFC support, please refer to the last page of this product brief.

STP SNMP Support

EION Open IP Environment STP module implements management via SNMP MIB RFC 1493 and RFC 2674. All objects are defined in a high-level description file to allow easy integration with Open IP Environment or third party SNMP agents.

STP Module Implementation

EION Open IP Environment STP module has been implemented in the “C” programming language, however C++ wrappers are also provided. This module runs as a single thread and it has been configured to periodically relinquish control. This permits utilizing of the CPU for other activities in the system.

Through the publication of APIs, the Open IP Environment STP module has been designed for ease of portability and modularity. Open IP Environment provides an architecture to allow you to implement STP within the Open IP Environment framework, or alternatively to adapt the STP module to your specific environment.

Ease of Portability

EION Open IP Environment provides a set of interoperable modules that are available for use in both established and “greenfield” products. The customer has the choice to pick and choose Open IP Environment modules to incorporate into the customer’s established products, preserving the investment in prior development. The customer also has the option to use modules within the Open IP Environment framework to develop a new software base to address going-forward opportunities. It is also possible to compile the software for a variety of target processors. Therefore, protocol composition can be statically changed by modifying the configuration to suit your needs.

Established products typically have a well-developed architecture and an existing suite of applications, and these products will be looking to Open IP Environment for additional capabilities. The portable and modular Open IP Environment components can be integrated into an existing execution environment to work within an existing code base, with minimal modifications to the customer’s environment.

Greenfield products typically require a full suite of applications plus the Open IP Environment framework to provide an appropriate execution environment. The Open IP Environment framework and modules are well-positioned to address such greenfield opportunities.

Benefits

In a market that demands ever-increasing IP support, it is difficult to maintain sufficient in-house expertise in every area. EION Open IP Environment framework and STP module solve this problem by:

- Allowing OEMs to focus on their real value added solutions, not underlying infrastructure
- Reducing the length of time to market via ease of integration of key components such as STP
- Enabling the freedom to choose among different software and hardware platforms
- Enabling ease of portability to traditional and new network enabled devices
- Enabling accelerated development of highly customized IP-enabled products via well documented APIs
- Enabling a pick and choose approach to Open IP Environment modules via a flexible open framework addressing various devices and applications from PDAs to carrier grade optical switches
- Delivering components of the framework that are scalable, modular, and portable that consistently demonstrate high performance attributes
- Delivering standards-based interfaces and common programming languages such as C, C++ and Java to developers, enhancing overall productivity with a small learning curve.
- Delivering configured and managed modules that use one or several of the following management capabilities:
 - EION Command Line Interface
 - Simple Network Management Protocol (SNMP)
 - Web-based management.

EION Open IP Environment STP Feature Summary

RFC and Draft Support

- RFC 1493 Definitions of Managed Objects for Bridges
- RFC 2674 Definitions of Managed Objects for Bridges with Traffic Classes, Multicast Filtering and Virtual LAN Extensions

- IEEE 802.1 D - Information Technology - Telecommunications and Information Exchange between Systems - Local and Metropolitan Area Networks - Common Specifications - Part 3: Media Access Control (MAC) Bridges
- IEEE 802.1 p - Information Technology - Telecommunications and Information Exchange between Systems - Local and Metropolitan Area Networks - Standard for Quality Of Service
- IEEE 802.1 Q - Information Technology - Telecommunications and Information Exchange between Systems - Local and Metropolitan Area Networks - Standard for Virtual Bridged Local Area Networks

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