



Intermediate System to Intermediate System (IS-IS)

EION Open IP Environment Intermediate System to Intermediate System is an International Standards Organization (ISO) protocol that provides dynamic routing between routers. IS-IS is a link-state interior gateway protocol (IGP) and is compliant with ISO 10589 and generates IP routes as per RFC 1195.

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).

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.

Open IP Environment IS-IS module resides within the Common Control Plane to deliver high performance, interoperable and dynamic routing between routers. 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, BGP, RIP and IPv4.

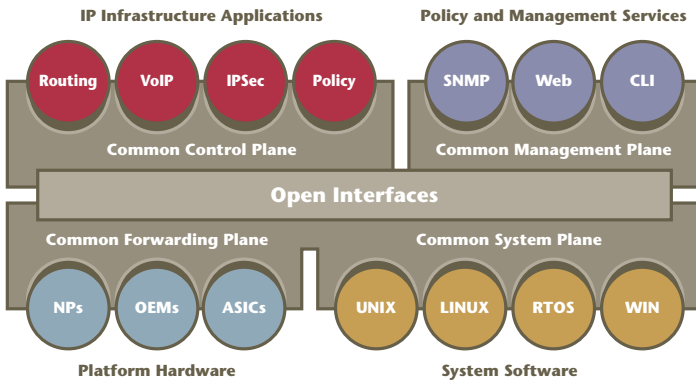
The Routing Table Manager (RTM) is an Open IP Environment component within the Common Control Plane that maintains the unicast routing table and is responsible for the process of redistributing routes to the various RPAs. The RTM receives information from the Open IP Environment OSPF module and sends the "best" routes to the forwarding engine located within the Open IP Environment Common Forwarding Plane.

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IS-IS Interactions

EION Open IP Environment IS-IS module has been specifically designed to deliver time to market advantages through the built-in control-plane interaction with other Open IP Environment modules, such as the RTM and other RPAs.



Open IP Environment IS-IS software module describes the main body of intra-domain routing requirements. Sub-functions include update and decision. Update creates and maintains a set of Link State Protocol Data Units (PDUs), which describe the state, and cost of every link in a domain. It also maintains a set of adjacencies, or neighbor devices, including end systems and other routers. Decision creates multiple routing databases of next hops on the shortest path to a destination.

Open IP Environment IS-IS module specifies a two level routing hierarchy. Level 1 routes packets within an area and level 2 routes packets between areas. The engine supports both levels plus the level 2 only mode on a per port basis. In addition, an address prefix routing mechanism is provided to allow routing to an external domain. Generated IP routes can also be distributed to and from other IP routing protocols as per industry standard route maps.

Within the Open IP Environment, the IS-IS module uses the Open IP Environment's Common System Plane functions such as timers, message queues, memory manager and thread manager libraries. This module also uses the services of the Common Management Plane by developing appropriate management code in order to integrate with management capabilities, including nodal and network management.

Finally, the IS-IS module seamlessly integrates with the Open IP Environment or third party forwarding engine to access the forwarding engine's APIs to forward PDUs. PDUs are forwarded through a network interface based on a forwarding table that provides the best route to the packet destination.

Furthermore, the modularity and portability of the Open IP Environment IS-IS module permits interaction with third party RPAs through well-defined application programming interfaces (APIs) that enhances its overall interoperability.

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

IS-IS Features

EION Open IP IS-IS module demonstrates the following key features:

- Level 1 and Level 2 routing (intra and inter-area)
- Support for all four routing metrics
- Manual and automatic adjacencies
- Prefix area routing to access external domains
- Load sharing among equal cost paths
- Subnetwork dependent convergence functions
- Configurable timer support
- RFC 1195 (Use of OSI IS-IS for routing in TCP/IP and Dual Environments)
- IS-IS has been ported using a number of compilers to ENDIAN types, CISC and RISC processors and a number of operating systems.

For a complete list of Open IP Environment IS-IS RFCs, Standards and Draft support please refer to the last page of this product brief.

IS-IS SNMP Support

The Open IP Environment IS-IS module implements management via SNMP as specified in an IS-IS MIB as per draft-ietf-isis-wg-mib-03.txt. All objects are defined in a high level description file to allow easy integration with Open IP Environment or third party SNMP agents.

IS-IS Module Implementation

EION Open IP Environment IS-IS module is 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 IS-IS module has been designed for ease of portability and modularity. Open IP Environment provides an architecture to allow you to implement IS-IS within the Open IP Environment framework, or alternatively to adapt the IS-IS 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 IS-IS 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 IS-IS
- 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 IS-IS Feature Summary

RFC and Draft Support

- RFC 1195 Use of OSI IS-IS for routing in TCP/IP and Dual Environments
- ISO 8473 ESIS
- ISO 10589 ISIS
(2nd edition)
- draft-ietf-isis-wg-mib-03.txt - IS-IS-MIB

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