



Forwarding Plane Interface (FPI)

EION Open IP Environment Forwarding Plane Interface is a portable software module that acts as an access point for all Open IP Environment control and management protocols that interact with the Open IP Environment Forwarding Engine (FE) or a third-party forwarding engine.

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).

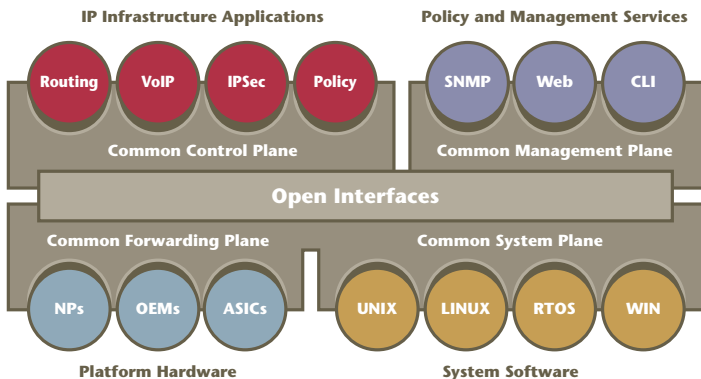
Open IP Environment FPI module and a forwarding engine together comprise the Open IP Environment Common Forwarding Plane. The forwarding engine forwards IPv4 packets. The FPI hides the forwarding engine's implementation-specific details from the Open IP Environment protocol modules and applications.

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.

FPI Overview

EION Open IP Environment FPI is a module that acts as the access point for all Open IP Environment protocols and applications that interact with a forwarding engine. It is implemented in a combination of "C" and "C++" programming languages and runs as a single thread.



The FPI consists of a front-end Application Programming Interface (API), a back-end API and several FPI libraries. These well defined interfaces and libraries hide the details of each specific forwarding engine implementation from the other Open IP Environment modules to facilitate seamless and easy integration of any third-party forwarding engine into the Open IP Environment framework.

The FPI front-end API is an object-oriented API written in C++, which allows data to be passed between Open IP Environment modules and the forwarding engine. It is designed with an input-output facility to Open IP Environment applications that exchange Protocol Data Units (PDUs) with the forwarding engine.

The FPI back-end API provides a set of C functions that define the interface into the forwarding engine. These functions transfer data between Open IP Environment protocols and the forwarding engine. The internal code for each backend API function must be customized for each forwarding engine implementation, i.e. for each operating system.

The FPI libraries provide functions that may be called by other Open IP Environment modules. These include:

- FPI Unicast Library
- FPI Multicast Library
- FPI Differentiated Services (DiffServ) Library
- FPI Point to Point Protocol (PPP) Library

FPI Interactions

EION Open IP Environment FPI improves time to market by hiding forwarding engine implementation details from the Open IP Environment Common Control Plane and Common Management Plane modules. Modules that the forwarding engine interacts with through the FPI are:

- Unicast Routing Table Manager (U-RTM)
- Multicast Routing Table Manager (M-RTM)
- Virtual Router Redundancy Protocol (VRRP)
- Intermediate System to Intermediate System (IS-IS) protocol
- Slow path part of the IPv4 package in the Common Control Plane
- Common Open Policy Service Provisioning (COPS-PR)

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

FPI Module Features

EION Open IP Environment FPI module demonstrates the following key features:

- Defines application programming interfaces (APIs) for interaction with IPv4, Differentiated Services QoS, U-RTM, M-RTM, VRRP, IS-IS, PPP, and COPS-PR
- Supports interaction with Open IP Environment Common Control Plane and Common Management Plane for configuration of software and hardware
- Enables porting to any third-party platform that provides packet capture and output facilities as well as input handlers and output drivers for Ethernet cards

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

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 FPI 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 FPI
- 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.

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