Internetwork Packet Exchange (IPX)

EION Open IP Environment Internetwork Packet Exchange software module is a NetWare communications protocol used to route messages from one node to another.

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).

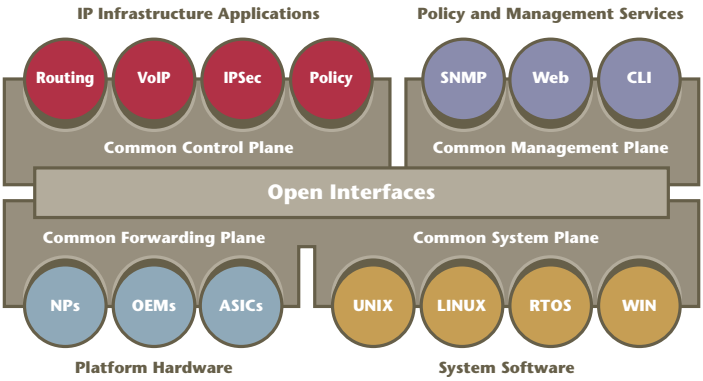
Framework Overview

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 IPX module resides within the Common Control Plane to provide forwarding of IPX packets, IPX RTM via RIP and service location using the SAP protocol. The Common Control 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.

IPX Module Overview

EION Open IP Environment IPX software module is a NetWare communications protocol used to route messages from one node to another. IPX packets include network addresses and can be routed from one network to another. An Open IP Environment IPX packet can occasionally get lost when crossing networks, thus IPX does not guarantee delivery of a complete message. Either the application has to provide that control or NetWare's SPX protocol must be used.



The router environment invokes engine operation by calling the IPX forwarding function for each received IPX packet.

This function examines the destination address and determines whether to forward the packet or send it to a local client. If the packet is to be forwarded, the engine will provide the next hop data link address and circuit.

If the packet is destined to a local client, it can be either processed in line or queued for later processing. Queuing decouples forwarding from route maintenance and allows forwarding to run at interrupt or high priority process level while route maintenance runs independently. Forwarding can also be distributed across processors.

IPX Interactions

EION Open IP Environment IPX 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 IPX 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 on other Open IP Environment planes and modules, please refer to the relevant product briefs.

IPX Features

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

IPX Functions

- IPX
- RIP
- SAP
- Broadcast and Point to Point Models
- IPX Ping
- Configurable Timers
- Static Route and Services

OTHER

- Multi-Processor Architecture Support
- Full SNMP Support
- Operating System Independent
- Straightforward Porting
- Continuing Support

IPX SNMP Support

EION Open IP Environment IPX module implements management via Novell's MIB as specified in the NLSP specification. All objects are defined in a high-level description file to allow easy integration with Open IP Environment or third party SNMP agents.

IPX Module Implementation

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