



Point to Point Protocol (PPP)

EION Open IP Environment Point to Point Protocol is a transparent and portable software module that provides dial-up access over serial lines for the Internet and corporate networks per RFC 1661.

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

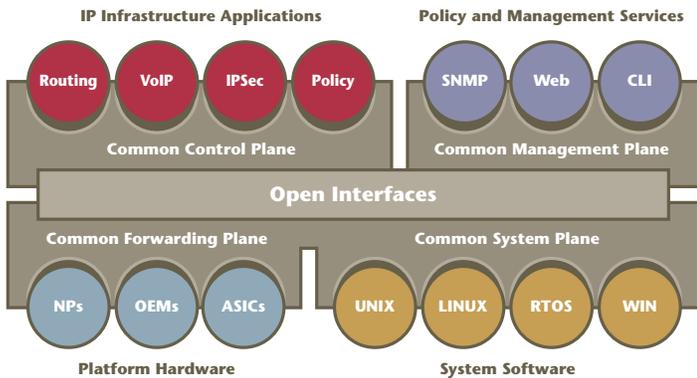
EION Open IP Environment framework consists of four planes: Common Control Plane, Common System Plane, Common Forwarding Plane and Common Management Plane. Each of these planes contains a set of components that are built to use well-defined interfaces.

Open IP Environment PPP module resides within the Open IP Common Control Plane. 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 services.

In addition, PPP also resides in the Common Forwarding Plane and interacts with the Open IP Forwarding Engine (FE) for the processing of PPP packets and then passes the PPP control packets to the PPP code in the Common Control Plane as necessary. Open IP Environment Common Forwarding Plane delivers platform independence and allows advanced flexibility in deploying Open IP Environment on different types of network devices. This plane allows the Common Control and Common Management Plane applications to interact with multiple forwarding engines. These forwarding engines manage the configuration and monitoring status of hardware and software embedded within them, in conjunction with the Forwarding Plane Interface (FPI) and with well defined application programming interfaces (APIs).

PPP Overview

EION Open IP Environment PPP is a portable software module that is a full-duplex, bit-oriented protocol that negotiates a wide variety of operations and options during a session between two communicating end-points.



Open IP Environment PPP is used to encapsulate network layer datagrams over a serial link. PPP allows two communicating entities to negotiate the particular type of network layer protocol such as the Internet Protocol (IP). This module allows two entities to negotiate other types of operations such as compression and authentication procedures. When the negotiation is complete, Open IP Environment PPP is used to carry the network layer protocol data units (PDUs) in the information field of the PPP packet. PPP offers high performance and error-free transmission of user traffic from sender to receiver over a link, by utilizing error checking and handshaking and by defaulting to a no-retransmission operation where the communicating entities can negotiate for retransmission at link establishment time.

Open IP Environment PPP's framing scheme allows support for many networking technologies such as X.25, Frame Relay, ISDN, ATM, AALS and HDLC links, and is independent of the underlying physical medium. For example, PPP works over copper, fiber, microwave or satellite connections.

PPP Interactions

EION Open IP Environment PPP module has been specifically designed to deliver time to market advantages through the built-in forwarding plane interaction with other Open IP Environment modules and planes. The PPP implementation resides in the Common Control Plane and the Common Forwarding Plane.

PPP code in the Common Forwarding Plane interacts with the Forwarding Engine for processing of PPP packets and in turn, passing PPP control packets to the PPP code in the Common Control Plane as necessary. The Common Forwarding Plane PPP code interacts with the Common Control Plane PPP code via the Forwarding Plane Interface.

In addition, PPP's interaction in the Common Control Plane provides this module access to the IPv4 module for interface updates and circuit management functions such as create, delete and update for circuit events, circuit configuration, etc. All multilink PPP processing resides in the Common Control Plane PPP code.

Within the Open IP Environment, the PPP module can be configured to use 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 services 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.

PPP Features

EION Open IP Environment PPP module demonstrates the following features:

- Encapsulates multi-protocol datagrams over a data link connection
- Supports Network Control Protocols (NCPs) like the IPCP and the IPXCP (Generic design of NCP reduces the effort involved in implementing additional NCPs)
- Supports Authentication Protocols – Password Authentication Protocol (PAP), Challenge Handshake Authentication Protocol (CHAP) and Microsoft Challenge Handshake Authentication Protocol (MSCHAP) and Extensible Authentication Protocol (EAP)
- Includes several additional features to support typical applications over X.25, Frame Relay VCs, ISDN B-Channels, AAL5, and HDLC links.
- Supports Compression Control Protocol (CCP) and Encryption Control Protocol (ECP).
- Supports Link Quality Monitoring procedures.
- Supports Inverse multiplexing (or Aggregating) multiple PPP links over a single bundle to provide a larger bandwidth pipe.
- Dynamic bandwidth allocation/de-allocation for a multi-link bundle managed by the BAP/BACP protocols.
- Flexible and easy-to-adapt interfaces to higher and lower layers.
- Flexible design resulting in no restrictions on frame sizes.
- PPP module 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 PPP RFC support, please refer to the last page of this product brief.

PPP SNMP Support

The module supports the comprehensive SNMP Management Information Base (MIB) for:

- LCP MIB - RFC 1471
- Security Protocols MIB – RFC 1472
- IPCP MIB – RFC 1473
- BCP MIB – RFC 1474
- Proprietary MIBs for MP, IPXCP, CCP and ECP.

All objects are defined in a high-level description file to allow easy integration with Open IP Environment and third party SNMP agents.

PPP Module Implementation

EION Open IP Environment PPP module is implemented in the “C” programming language and runs as a single thread.

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

RFC and Draft Support

- | | | | |
|------------|---|------------|---|
| • RFC 1144 | TCP/IP Header Compression | • RFC 1638 | PPP Bridging Control Protocol (BCP) |
| • RFC 1321 | MD5 | • RFC 1962 | PPP Compression Control Protocol |
| • RFC 1332 | The PPP Internet Protocol Control Protocol (IPCP) | • RFC 1973 | PPP over Frame Relay |
| • RFC 1334 | PPP Authentication Protocols (PAP) | • RFC 1989 | PPP Link Quality Monitoring |
| • RFC 1471 | LCP MIB | • RFC 1990 | The PPP Multilink Protocol (MP) |
| • RFC 1472 | Security Protocols MIB | • RFC 1994 | PPP Challenge Handshake Authentication Protocol (CHAP) |
| • RFC 1473 | IPCP MIB | • RFC 2125 | The PPP Bandwidth Allocation Protocol (BAP) and the PPP Bandwidth Allocation Control Protocol (BACP). |
| • RFC 1474 | BCP MIB | • RFC 2364 | PPP over AAL5 |
| • RFC 1552 | The PPP IPX Control Protocol (IPXCP) | • RFC 2615 | PPP over Sonet/SDH |
| • RFC 1570 | PPP LCP Extensions | | |
| • RFC 1661 | The Point-to-Point Protocol (PPP) | | |
| • RFC 1662 | PPP in HDLC like framing | | |

EION Inc. Locations Worldwide

United States

EION Inc.
CT Corporation System
101 Federal Street
Boston, MA 02110
United States
Ph: 613-715-9067 x224
email: global_sales@eionsoft.com

Asia Pacific

EION Inc.
Room 1405, 14/F
China Merchants Building
No. 303 Des Voeux Road
Central, Sheung Wan
Hong Kong, SAR, China
Ph: +852 9314 3023
email: asia_sales@eionsoft.com

Canada

EION Inc.
945 Wellington Street
Ottawa, Ontario K1Y 2X5
Canada
Ph: 613-715-9067 x224
Fax: 613-722-0039
email: global_sales@eionsoft.com

Europe, Middle East & Africa

EION Inc.
Claridge House
29 Barnes High Street
London SW13 9LW
UK
Ph: +44 (0)20 8741 5377
email: europe_sales@eionsoft.com