



Command Line Interface (CLI)

EION CLI is a portable and industry-familiar-user interface for configuration, administration and management for Open IP Environment.

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).

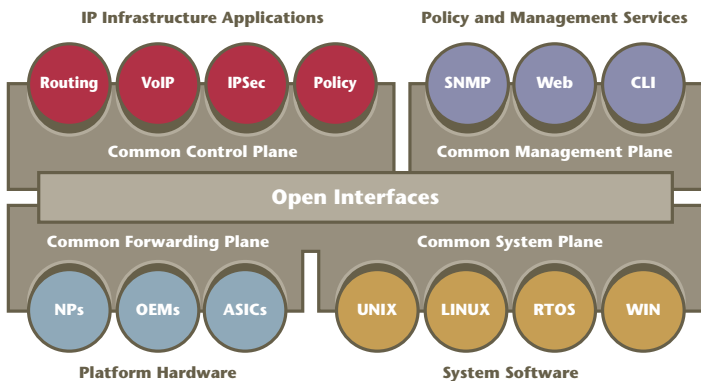
Framework Overview

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.

EION Command Line Interface resides in the Common Management Plane and is organized in a logical grouping of system management capabilities. This plane also supports the Simple Network Management Protocol (SNMP) and an HTTP interface for web-based management and connectivity to web-based applications. All management applications implemented in the Common Management Plane seamlessly manage the IP protocol applications in the 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/or services.

CLI Overview

EION CLI is an industry familiar command line interface delivering a command set for a common user interface for device management for the Open IP Environment Framework and across other third party products. With an industry familiar user interface, the learning curve is substantially decreased that results in overall reduction of the cost of operations and administration. In addition, EION CLI ultimately reduces the cost of ownership for customers who are integrating Open IP Environment technology into devices for an Internet enabled world.



Furthermore, EION CLI can be used to leverage a common code base across products to reduce time to market and improve R&D effectiveness since it is designed with multi-platform versatility to work on Windows 95, WinNT4.0, SOLARIS 2.5 – 2.7, and VxWorks¹.

EION CLI is bundled with a complete set of components, which include the following:

- CLI Visual Editor (CLIVE)
- CLI Auto-Generator
- CLI Command Repository
- CLI Parser
- CLI Test Interface

All of these high performance components are described in full detail in the following sections to provide you with a full high quality user interface.

CLI Visual Editor (CLIVE)

CLI Visual Editor (known as CLIVE) is used to develop and access CLI commands. CLIVE is a tool designed to show and build commands for network devices in an accessible format. The interface provides a graphical representation of trees and symbols that represent

nodes. CLIVE allows users to view and edit the command structure.

CLIVE Features

CLIVE demonstrates the following key features:

- Standardized Toolbar functionality - New / Open / Save / Save As / Close Features
- Print Tree feature
- Error checking rules built in at all levels
- Compare capabilities
- Extensive search function
- Encourages concurrent multiple file development with merge capabilities
- Multiple Node Copy / Paste Node functionality
- Callback Design at Command and Parameter node levels
- Show Syntax feature provides a formatted view of the command
- Integration with the optional Command Repository plug-in provides the user the ability to maintain all documentation information encapsulated within the command itself.
- Option to enter commands via syntax

CLI Parser

CLI Parser is a run-time framework that provides a management interface to the device. CLI Parser takes input from different sources, for example a console or telnet session, and uses parsing tables generated by the CLI Auto-Generator to invoke the appropriate callback functions. Commands are interpreted by the CLI Parser, which makes calls to device-specific functions that implement the commands.

CLI Parser features

CLI Parser demonstrates the following key features:

- 16 concurrent Telnet sessions
- Customize the development environment per Parser Flags
- Over 40 different APIs to massage the command structure
- Full Running Configuration API Suite
- Industry-familiar editor behavior – Shortcut key strokes
- Automatic Callback generation
- Built-in system timers
- Large suite of customized APIs
- Scripting
- Execute scripts after control is passed to the parser

¹ VxWorks is compatible with CLI Parser only.

CLI Command Repository

CLI Command Repository is an optional plug-in for the CLI Visual Editor (CLIVE) that is used to store command sets. The Command Repository allows application developers to view tree structures inside a command set, as well as to reference associated command descriptions. Application developers can also search the Command Repository to locate existing commands that can be re-used in a planned command set. The Command Repository is especially valuable for use with large command sets or when multiple groups require access to a command set.

Process for creating a command set

1. Start from scratch or select a starting command set from the CLI Command Repository.
2. Edit the command set as required using the CLI Visual Editor (CLIVE)
3. Generate the parsing table using the CLI Auto-Generator
4. Compile and link the parsing table with the CLI Parser
5. The command set is now complete.

CLI Command Repository Features

CLI Command Repository demonstrates the following key features:

- Oracle Database 8.1.6 is the back end.
- GUI design for the Command Repository includes a Windows-like Toolbar and Buttons
- Search functionality will search by numerous command-specific attributes.
- Full modes or multiple commands can be exported or imported at the click of a button.
- Version control allows the development groups to customize their own version scheme
- Search Results can be sorted by column.
- Includes option to save the tree to a text file.

CLI Auto-Generator Overview

CLI Auto-Generator is included with the CLI Visual Editor (CLIVE). The CLI Auto-Generator takes the output of the CLI Visual Editor and converts it to a C/C++ parsing table. The parsing table is compiled and linked in with the CLI Parser.

CLI Auto-Generator features

CLI Auto-Generator demonstrates the following key features:

- Windows and Solaris platform-based.

- Ability to Generate to a Common Directory or a default Directory Structure
- Generate a custom prefix / suffix options
- Generate C or C++ structures
- Ability to execute at the command line

CLI Test Interface

CLI Test Interface connects to a data-networking device to allow developers to test command sets and APIs before installing them on the device. Developers create scripts that contain the command set to be tested using any text editor, and then execute the scripts by means of the CLI Test Interface.

CLI Test Interface features

CLI Test Interface demonstrates the following key features:

- End to end automated testing of the command line capabilities
- Non-intrusive – Great for measuring performance since the engine does not run on the target.
- Platform Independence – Executable from Windows and Solaris
- “Show Working Examples” embedded with the tool
- Multiple Telnet sessions / Mixed APIs capabilities.

EION CLI Interactions

EION CLI resides on the Open IP Environment Common Management Plane. The Common Management Plane implements all the management applications such as CLI, SNMP and Web based Management for the seamless management of IP protocol applications that reside in the Common Control Plane.

EION CLI uses the services of the Common Control Plane through its instrumentation code that is embedded in the Common Management Plane. The Common Control Plane holds all protocols such as RPS, VRRP, U-RTM, OSPF, RIP, BGP-4, and IPv4² that can be integrated with EION CLI for configuration, management and monitoring.

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

² RPS, VRRP, U-RTM, OSPF, RIP, BGP-4, and IPv4 modules are already configured with a command set that uses EION CLI management functionalities. In that case, the customer only needs to purchase the EION CLI Parser.

CLI Implementation

EION CLI is implemented in the “C” programming language and is designed with multi-threaded functionality. High performance is enhanced via effective utilization of CPU under certain network trafficking scenarios, implemented and controlled by the network administrators through empowering EION CLI. For example, the configuration of EION CLI is designed to periodically relinquish control, permitting the utilization of the CPU for other activities in the system.

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