ClassiPI™ Software Development Kit PM2329

OVERVIEW

PMC-Sierra's ClassiPI PM2329 is the first member in the ClassiPI™ family of network classification processors optimized for complex packet classification and analysis. The ClassiPI™ family of products enable applications such as server load balancing, URL switching, web caching, application server switching and network service aggregation.

The ClassiPI PM2329 Software Development Kit (SDK) is a development and debug tool for various networking applications that integrate the ClassiPI device.

Using ClassiPI SDK's tools and programming model, the network equipment software designer can implement system application functions, including control plane module operation and data path packet forwarding and filtering. The SDK also facilitates testing and validation of system functionality for a given ClassiPI implementation.

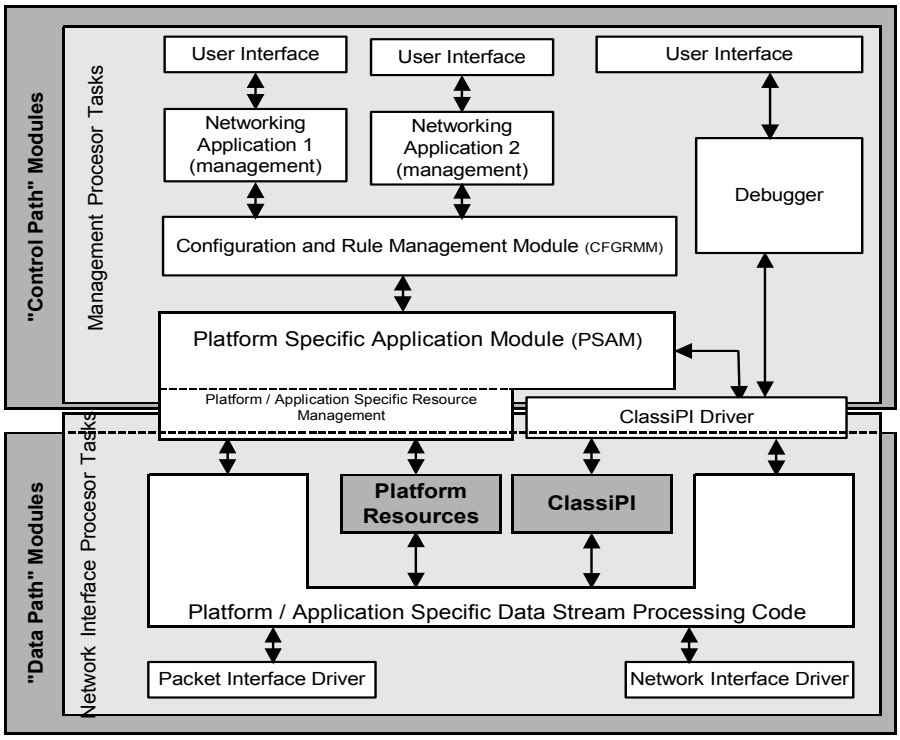
The ClassiPI SDK includes:

- an API model and drivers
- a framework model for various software applications, and
- a means for software development and debugging.

Additionally, using the supplied sample applications, it demonstrates:

- the features and functions of the ClassiPI device, and
- the operation and performance of the ClassiPI device on certain platforms and applications.

CLASSIPI SOFTWARE DEVELOPMENT KIT ARCHITECTURE



CLASSIPI SDK COMPONENTS

The ClassiPI SDK has been ported to various platforms, which include Linux / WinNT PC environment, and some Network Processor platforms.

For the Linux and WinNT PC platform, a software-only mode is possible. In this implementation, the ClassiPI simulator (C-model) is used in a PC/Workstation environment to simulate the ClassiPI functions. This mode is useful before the target hardware platform is ready.

A hardware-based mode of operation, in which the ClassiPI device is integrated with the platform hardware, is available in all the supported platforms. Either a PCI-slot card or a ClassiPI daughter card is available for each supported platform.

The ClassiPI SDK contains the following software modules:

- the Configuration and Rule Management Module (CFGRMM)
- the ClassiPI debugger
- ClassiPI device drivers
- sample applications, including
  - control path software
  - data path code
  - Platform Specific Application Module (PSAM) implementation, and
- the ClassiPI C-model simulator.

CLASSIPI DEBUGGER

The ClassiPI debugger is a stand-alone application that communicates with the ClassiPI simulator or device. The debugger has two user-interface modes.

One implementation provides a command-line interface (CLI) based on a defined command set. Another implementation provides a graphical user-interface (GUI).The debugger allows the following operations:

- Read or write of the ClassiPI local and global register set
- Read or write of the rule database in a variety of formats
- Read or write of the associated ERAM data — statistics and user-defined
- Off-line write of input packet — data stream
- Off-line read of the classification result.

The ClassiPI debugger provides visibility to the registers and other internal hardware resources of ClassiPI under a given system application.

CONFIGURATION AND RULE MANAGEMENT MODULE (CFGRMM)

The CFGRMM provides a variety of functions for management of the rule database and its partitions in the ClassiPI device. These include:

- various device initializations and configurations
- creating/deleting rule database partitions
- composing policy rules
- adding/deleting policy rules.

The CFGRMM module provides a function-call library and a simple API for high-level policy management. The API hides specifics of ClassiPI hardware programming. This allows the user to work without in-depth knowledge of ClassiPI hardware.

The CFGRMM interface allows the creation of new policies and search spaces, called partitions in ClassiPI terminology. The CFGRMM library performs insertion or deletion of rules and manipulation of related data structures and captures the characteristics of the policy and search spaces, for example longest prefix, priority and multiple matches.

The CFGRMM code keeps a copy of the state of the ClassiPI device it controls. This can be used for consistency checks and local access to ClassiPI static data structures. It requires a set of functions, defined in the Platform Specific Application Module (PSAM) to be implemented on the target platform. Sample applications for PSAM implementations are included in the SDK.

PLATFORM SPECIFIC APPLICATION MODULE (PSAM)

The PSAM is a set of functions that needs to be implemented on a platform that adopts the ClassiPI classification engine. The PSAM defines the low-level programming interface required to properly access the ClassiPI device in a specific platform. The CFGRMM is designed to use PSAM functions to access the ClassiPI device. The PSAM is not normally directly visible to the higher-level application software.

The portion of the PSAM that performs the ClassiPI access uses the ClassiPI driver on the specific platform. Sample code that implements the PSAM under supported platforms is supplied to OEM developers.

CLASSIPI DRIVER

The ClassiPI driver acts as the lowest level interface between the ClassiPI simulator or device and the upper layers of management software. The ClassiPI driver defines simple routines specific to ClassiPI accesses. The debugger and PSAM use the driver when accessing the ClassiPI. Porting to new platforms may require changes to the driver code.

SAMPLE APPLICATIONS

The following sample applications are available in the ClassiPI SDK package:

- String Search — packet scanning for short and long patterns (PC only).
- Regular Expression — packet scanning for regular expressions for content processing (PC only).
- IP Routing — simple forwarding based on CIDR IP addresses.
- L3-L7 Filtering — packet filtering based on Layer 3 through Layer 7 content policy rules, with a GUI.

The ClassiPI SDK sample software applications highlight the capabilities of the ClassiPI device and present a groundwork model for software implementation of the target network application function on a specific equipment platform that utilizes the ClassiPI as a content classification processor.

The sample applications generally consist of the control path code and the data path code. Specific to the network functions, for example routing, the corresponding management code for each sample application is implemented under the supported environment.

The source code for the sample applications is provided to enable OEM developers to understand how to use the SDK and become familiar with ClassiPI capabilities. OEM developers can modify the code to implement their networking applications.

CLASSIPI SIMULATOR

The ClassiPI simulator is a software implementation (C-model) of the ClassiPI hardware. It presents a programming interface rendering the chip's register set through which reads and writes can be issued by a software agent.

The simulator is a standalone PC/Workstation application that communicates via a socket interface. The structure and the programming interface of the ClassiPI simulator is designed such that it can easily be replaced with a ClassiPI ASIC-based platform with minimal changes to the management code.

CLASSIPI ASIC CARD

For each supported platform, a circuit board that implements the ClassiPI ASIC device is available. Based on the platform resources, the circuit board either plugs into a PCI slot or an SSRAM bus receptacle. A driver is supplied to allow control and packet classification transactions with the device.

CLASSIPI SDK PLATFORM SPECIFICATIONS

Supported Control Plane Platform		Supported Data Plane Platform		ClassiPI Form			
				Simulator		ASIC	
OS	Control & Management Processor	Hardware	Network Interface Processor	Type	Form	Type	Form
Linux	x86	PC	x86	Software	Binary File	Hardware	PCI Slot Card
WinNT	x86	PC	x86	Software	Binary File	Hardware	PCI Slot Card
VxWorks	MIPS	Vitesse HDS	IQ2000			Hardware	Daughter Card
VxWorks	PowerPC	Motorola/ CPort CDS	C5			Hardware	Daughter Card
Linux	StrongARM	Intel IXEB	IXP1200			Hardware	PCI Slot Card

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