



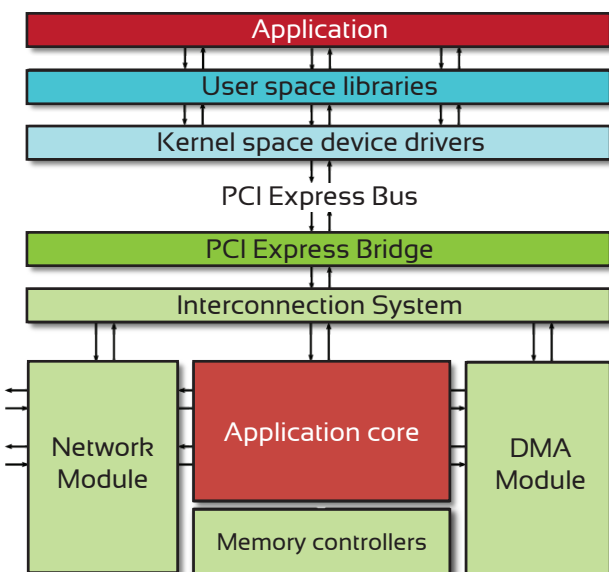
#### INTRODUCTION

The NetCOPE is a framework which enables rapid development of network applications on the FPGA acceleration boards. The framework creates a hardware-independent abstract layer upon specific hardware boards, solves repetitive tasks of network appliances development such as network and host interface communication, and provides generic interface for the embedded application core.

These features enable customers to design their applications in dramatically reduced time and cost as well as to achieve maximal application performance. Furthermore, it makes customer's solution independent of the specific hardware board, network physical interface and host bus system.

#### FRAMEWORK DESCRIPTION

The NetCOPE framework integrates hardware-dependent building blocks (network, PCI blocks) and provides configurable interface to the customer's application core. The elements of the framework are network interface blocks, a flexible on-chip bus architecture with high speed bus master connection to the host software via PCI Express bus and a software driver. Optionally, the framework includes a set of IP cores for easy data manipulation, a set of memory controllers and a set of IP cores for network traffic processing. While NetCOPE resolves time-consuming performance, functional, and timing pattern issues, designers can focus on the embedded application core dramatically reducing costs and time-to-market for FPGA designs.



#### FEATURES

- ▶ **High performance scalable framework**
- ▶ **Rapid development of FPGA applications**
- ▶ **Dramatically reduced development time**
- ▶ **Abstract communication interfaces**
- ▶ **Flexible on-chip bus architecture**
- ▶ **Zero-copy DMA with Linux device drivers**
- ▶ **Support for COMBO cards, NetFPGA-IO G, other cards on demand**

#### INTERFACES

On the hardware side, the communication with network interfaces is performed by the Network interface blocks implementing the Ethernet MAC layer. Incoming packets are forwarded to the application core using Xilinx LocalLink protocol. Communication of the application core towards software is divided into different data channels depending on the requested throughput. DMA channels providing high throughput and resource-saving Local bus. Provided channels are abstract hardware software data pipes. DMA for high-rate payload transfer, Local bus for command & control.

On the software side, the NetCOPE framework includes a set of development tools, a communication library and device drivers with well-defined interfaces. The customer can use both single read and write operations as well as DMA transfers to access the FPGA application core. The device drivers allow fast packet transfers between the application core and software application via packet capture library (PCAP library), standard system network interface (TCP/IP stack) or via application-specific interface (zero copy interface SZE2).

#### APPLICATIONS

- ▶ **Networking and communications: monitoring, IDS/IPS, VoIP analysis, cryptography**
- ▶ **High-performance computation: multimedia, security, bioinformatics, etc.**
- ▶ **Low latency applications: electronic trading**



#### HARDWARE INDEPENDENT ABSTRACT LAYER

Usage of existing hardware platforms is one of the most common approaches to shorten product development. Unfortunately, each vendor provides different customer's solution support. Most of the vendors don't provide a complete design environment including network interface blocks, host bus solution, memory controllers, drivers etc. As a result, customers are obliged to design these parts themselves or to buy and customize an appropriate third party IP cores. Such process is very time-consuming and brings the risk of losing all the effort when a board vendor comes up with new platform with its new specifics.

The NetCOPE platform solves these drawbacks and provides complete design environment to support customer's application. It creates hardware-independent abstraction layer with identical interface for all supported hardware boards. Our customers benefit from this approach as a support of new hardware platforms is added with a limited effort enabling short time-to-market and easy support for many FPGA boards.

#### COMPLETE PCI EXPRESS SOLUTION

Important part of the hardware independent abstract layer is on-chip interconnection system which provides integrated PCI Express solution enabling highperformance hardware-software communication.

The PCI Express subsystem is optimized for throughput while providing very low latency and communication overhead.

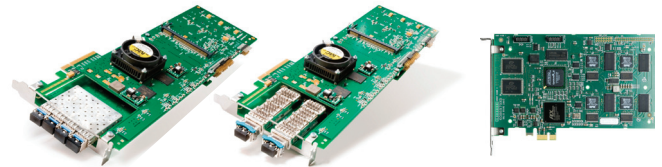
#### OPTIONAL IP CORES

The NetCOPE framework may include a set of IP cores for easy data manipulation (LocalLink tools), a set of memory controllers and a set of IP cores for network traffic processing.

The IP cores for network traffic processing include high precision time-stamping unit, processors for packet analysis, classification and editing, packet queues, pattern matching units and others. Please contact INVEA-TECH for further information about these IP cores.

#### SUPPORTED FPGA BOARDS

The NetCOPE framework is available for all INVEA-TECH COMBO boards and Net FPGA 10 G card. Any other board can be supported upon your request.



COMBO 4x1 GE  
INVEA-TECH

COMBO 2x10 GE  
INVEA-TECH

YOUR CARD  
?

#### FRAMEWORK USAGE

The NetCOPE can be used as a base framework for development of customer's application to reduce its cost and time-to-market. The customer can also submit the whole design to be made by INVEA-TECH as a custommade application. Development service will be handled by 10+ years experienced VHDL and FPGA engineers.

INVEA-TECH also provides continuous support. NetCOPE framework can be further extended to meet specific project requirements.

#### DELIVERABLES

- ▶ Fully synthesizable NetCOPE IP cores
- ▶ VHDL simulation models
- ▶ Complete documentation
- ▶ Synthesis scripts
- ▶ FPGA board drivers and Reference designs
- ▶ Expert technical support
- ▶ Optional IP cores on demand

#### ORDERING INFORMATION



Please contact INVEA-TECH for pricing and additional information about this product.

[www.invea-tech.com](http://www.invea-tech.com)