

SOLUTION DESCRIPTION



Link™ Capture Software



Plus More

Guaranteed Zero Packet Loss with 60% Throughput Improvement

Link™ Capture Software for Intel® Programmable Acceleration Card with Intel Arria® 10 GX FPGA



Open Source



Homegrown IT



Commercial Apps

Managing and securing modern networks is a continuous challenge. As the volumes of data increase from a growing number of devices, there is a need for continuous investment in new and more powerful network management, security and test and measurement solutions.

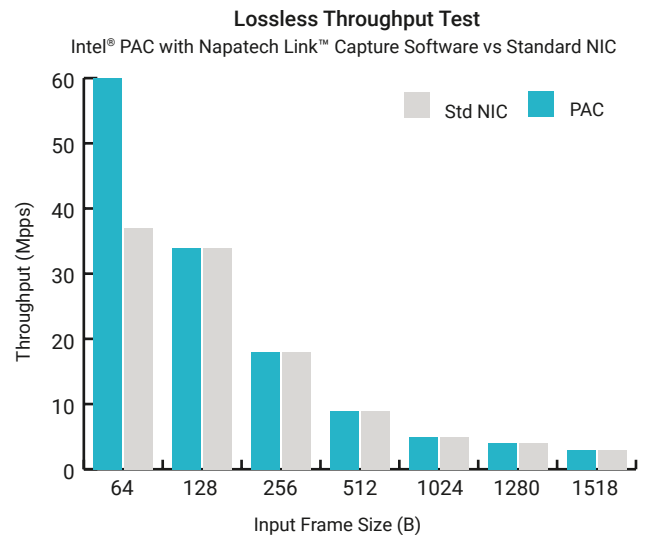
However, IT budgets are not growing at the same rate as data volumes or the number of devices to be connected. It is for this reason that more and more enterprises and government organizations are building their own solutions based on low-cost standard servers. The availability of commercial software as well as open-source software and tools for in-house development are empowering enterprises and government organizations to build more affordable solutions that meet their exact needs and thereby stretch their limited IT budgets.

The challenge of building your own network management, security, or test and measurement solution is that low-cost servers, and in particular standard Network Interface Cards (NICs), are not ideal for these kinds of applications. Issues such as packet loss and non-deterministic performance undermine analysis efforts.

The Napatech Link™ Capture Software for Intel® Programmable Acceleration Card (PAC) with Intel Arria® 10 GX FPGA addresses precisely these issues with a solution that guarantees zero packet loss and deterministic performance under all conditions. This allows enterprises and government organizations to build affordable, yet reliable network management, security and test and measurement solutions based on low-cost servers.

The Intel + Napatech Difference

The Intel® PAC and Napatech Link™ Capture Software solution is designed to ensure that no packets are lost under any circumstances. Packet loss can occur in various ways, such as



The standard NIC provides 61% line rate at 64 bytes compared to full theoretical throughput for the Intel PAC and Napatech Link™ Capture Software solution.

loss due to a lack of capacity on the NIC, PCIe bus congestion, bad memory management, busy CPUs etc. All of these potential sources of packet loss have been taken into consideration, providing a highly reliable solution.

For example, the Intel PAC has on-board buffer memory, which allows delays due to PCIe bus congestion or busy CPUs or even network congestion to be absorbed without losing packets. These are stored in buffer memory and transferred to the application as soon as it is possible.

Outstanding Lossless Performance

Napatech Link™ Capture Software ensures that data is transferred from the Intel PAC to the application using a non-blocking data delivery mechanism that ensures efficient utilization of the PCIe bus and maximum throughput for all packet sizes.

Compared to a standard NIC, the Intel® PAC and Napatech Link™ Capture Software solution provides full theoretical throughput for all packet sizes, also in burst situations, which are common in Ethernet networks.

Turning Acceleration into Value

These performance advantages ultimately allow you to:

- Maximize your server performance by improving CPU utilization
- Minimize your TCO by reducing the number of servers required, thus optimizing rack space, power, cooling and operational expenses
- Diminish your time-to-resolution, thereby enabling greatly increased efficiency

Test Configuration

The outstanding lossless performance improvements were based on a test configuration using a Dell PowerEdge R740 with a standard NIC and the Intel® PAC. Test configuration: dual-socket Dell R740 with Intel® Xeon® Gold 6138 2.0 GHz, 128GB RAM running CentOS 7.5.

Lossless Throughput Tests

The tests were based on the RFC2544 standard for zero packet loss testing with one NIC attached to a single processor and one port assigned per logical core using one queue. For the standard NIC, this resulted in four logical cores and four queues for 4x10G ports, which provides a total throughput of 40G. The i40e DPDK PMD driver was used for the test and the l3fwd DPDK was used as the test application.



Napatech Link™ Capture Software for Intel® PAC

The Intel® Programmable Acceleration Card (PAC) with Intel Arria® 10 GX FPGA is a PCIe-based FPGA accelerator card for data centers supporting both inline and lookaside acceleration.

As the leader in FPGA-based SmartNIC software and hardware, Napatech has made its Link™ Capture Software available as an Acceleration Stack for the Intel PAC.

Napatech's Reconfigurable Computing Platform flexibly offloads, accelerates and secures open, standard, high-volume and low-cost server platforms allowing them to meet the performance requirements for networking, communications and cybersecurity applications.

Napatech helps companies to reimagine their business by bringing hyperscale computing benefits to IT organizations of every size. We enhance open and standard virtualized servers to boost innovation and release valuable computing resources that improve services and increase revenue. Our Reconfigurable Computing Platform™ is based on a broad set of FPGA software for leading IT compute, network and security applications that are supported on a wide array of FPGA hardware designs.

NAPATECH RECONFIGURABLE COMPUTING

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The Intel® PAC is a 4x10G/1x40G card, but offers the same total throughput of 40G on a single port, single core and single queue. For the 4x10G configuration, this is achieved through packet merging in hardware between the four ports in nanosecond precise time stamp order.

The test demonstrated that packet loss occurred for the standard NIC for packet sizes below 128 bytes or at throughput rates higher than 33.78 Mbps. The Intel® PAC and Napatech Link™ Capture Software solution experienced no packet loss.

Key Solution Features

- Guaranteed zero packet loss under all conditions
- Onboard packet buffering during micro-burst or PCI Express bus congestion scenarios
- Advanced host memory buffer management enabling ultra-high CPU cache performance
- Packet classification, match/action filtering and zero-copy forwarding
- Intelligent and flexible load distribution to as many as 64 queues improving CPU cache performance by always delivering the same flows to the same cores