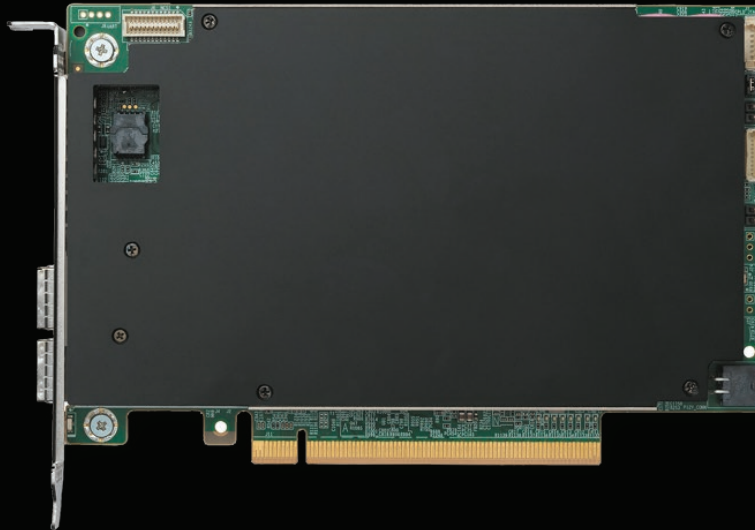


Silicom C5010X Data Center SmartNIC powered by Napatech Link-Virtualization™ Software

2x10/25G

DATA SHEET



Powerful Intel®-based IPU with Napatech software

The Silicom C5010X Data Center SmartNIC is a full-height, half-length 2x10/25GbE SFP28 PCIe card with an Intel® Stratix® 10 DX FPGA and an Intel® Xeon® D SoC. The unique combination of FPGA and full fledged Xeon CPU on a PCI card allows for unique offload capabilities. Coupled with Napatech Link-Virtualization™ software, which provides cutting edge virtualization technology and data processing capabilities, the C5010X is the perfect solution for virtualized cloud, cloud-native or bare-metal server virtualization with tenant isolation within the Intel® Infrastructure Processing Unit (IPU) ecosystem.

Full Open vSwitch (OVS) offload

Using the standard OVS-DPDK distribution, Link-Virtualization software adds powerful hardware acceleration to the virtual switch and megaflow caching - ensuring that only new and unknown flows are resolved in the SoC or host CPU. Offloading the virtual switch to the SmartNIC has several benefits, including:

- freeing up valuable CPU cycles for your critical applications - rather than wasting cycles on infrastructure
- providing deterministic latency and jitter - regardless of packet size and number of flows
- increasing throughput

Furthermore, virtio-net (as opposed to SR-IOV) enables Live Migration of VNFs without being tied to the SmartNIC hardware. In other words, Link-Virtualization provides hardware offload of software equivalent switching - without imposing any restrictions on the system.

Bare Metal for Cloud Service Providers

The C5010X with Link-Virtualization software can also serve as a bare-metal offload SmartNIC with full SDN support - exposing 16 virtio-net and 16 virtio-blk to the host and with full tenant isolation. Cloud Service Providers (CSPs) can deploy the C5010X with Link-Virtualization software to offer customers access to bare-metal servers, while retaining full SDN capabilities of the infrastructure.

Virtual Machine monitoring

Napatech's VM-to-VM monitoring solution provides insight into both N-S and E-W traffic, where packets can be mirrored for analytics, SLA monitoring or regulatory purposes.

Key Features

- OpenStack support
- Full OVS-DPDK offload (with virtIO 1.1 vDPA)
- Bare Metal for CSPs (with virtio-net and virtio-blk)
- Live Migration/Live Backup of running VNFs
- Run infrastructure on a single CPU core or fully offloaded to the C5010X



Open vSwitch

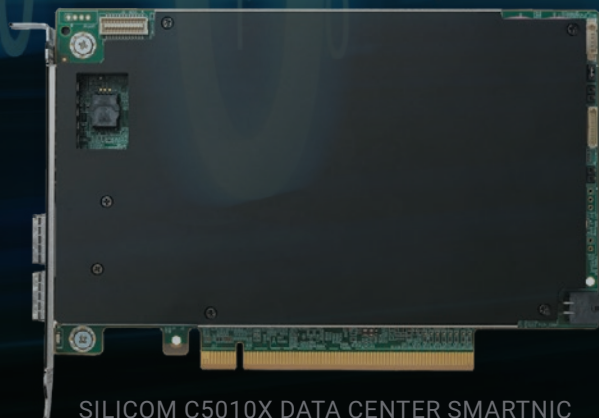


DPDK



OpenStack

Offload the virtual switching function from the host CPU to a programmable SmartNIC running Link-Virtualization software to reduce CAPEX, OPEX and power consumption in edge and cloud data centers



SILICOM C5010X DATA CENTER SMARTNIC

SOLUTION HIGHLIGHTS

Silicom C5010X with Napatech Link-Virtualization™ software

- Intel® Stratix® FPGA and Intel® Xeon-D® SoC
- Dual 25 GbE (2x10/25 Gbps)
- OVS hardware offload for OVS-DPDK with OpenStack support
 - VirtIO 1.1 with vDPA offering Live Migration/Live Backup
- Bare metal with 16 virtio-net and 16 virtio-blk, fully SDN configurable
 - Full tenant isolation

Supported pluggable modules

- SFP+/SFP28 modules with Multimode SR (850 nm), single mode LR (1310 nm), multimode LRM (1310 nm), or DAC (Twinax) and others
- 10GBASE-SR, CR, LR
- 25GBASE-SR, LR

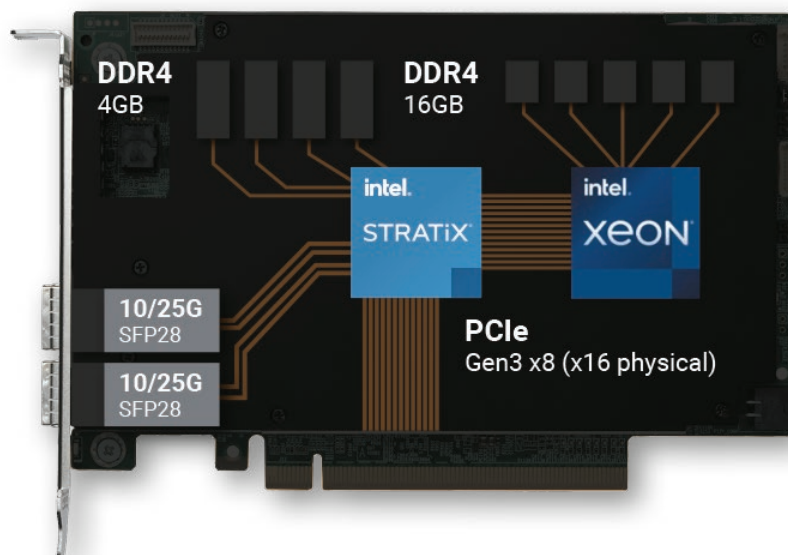
Open vSwitch (OVS) features:

- Full OVS-DPDK hardware offload (OVS 2.12/DPDK 18.11)
 - 130 Mpps switching performance @ 64B
 - 100 Gbps switching capacity
- OpenStack support
- VirtIO
 - Fully accelerated VirtIO 1.1 with vDPA
 - Transparent VirtIO 0.95/1.0 support
- OVS statistics

- VM-to-VM mirroring for analytics, SLA monitoring, regulatory compliance
- Non-degrading HW Megaflow cache for tracking billions of flows
- Extensive and configurable match processing for L2-4 packet headers
- VLAN/VXLAN encapsulation/decapsulation
- Q-in-Q
- RSS load balancing
- Link aggregation (active/active and active/passive)
- Jumbo frame support
- Quality of Service (QoS)
- IPv4/v6
- Hardware QoS
- RHEL 8/CentOS 8 and Ubuntu Server LTS support

Bare-metal features:

- Infrastructure-as-a-Service (IaaS)
- 16 virtio-net physical functions
- 16 virtio-blk physical functions (NVMeoF/RDMA OFED)
- Configurable via SDN
- Full tenant isolation from infrastructure
- Enables bare-metal servers for customers (with SDN flexibility)
- OS/hypervisor supporting virtio-net/virtio-blk can be used



Silicom C5010X is designed with an Intel® Stratix® FPGA and an Intel® Xeon-D® SoC and powered by Napatech Link-Virtualization software

HARDWARE SPECIFICATIONS

Silicom C5010X Data Center SmartNIC

- Based on the Intel® IPU C5000X-PL platform
- Hardware by Silicom
- FPGA and Link-Virtualization™ software by Napatech

Network Interface

- IEEE 802.3 10GE, 25GE
- Physical interface: 2 x SFP28 slots
- Supports SFP+/SFP28 modules with Multimode SR (850 nm), single mode LR (1310 nm), multimode LRM (1310 nm), or Direct Attached Copper (Twinax) and others

Other Interfaces

- Host: PCIe Gen3 x 8 (x16 physical), NCSI RBT, Support for SMBUS
- SoC: PCIe Gen3 x 8, USB NIC, UART

SoC

- Intel® Xeon® D-1612
- 64-bit quad-core x86 @ 1.5 GHz / 8 threads / 6 MB cache

FPGA

- Intel® Stratix® 10 DX 1100
- Quad-core 64-bit Arm® Cortex®-A53 embedded processor @ 1.5 GHz

Configuration

- Configuration flash can be made to support multiple boot images for automatic fallback to fail safe

On-board Memory

- 16 GB DDR ECC (SoC)
- 4 GB DDR (FPGA)
- User configurable space in flash RAM for permanent storage
- Configuration flash RAM for boot images

Additional Board Support

- FPGA controlled Link and Activity LED for each port (2 for each SFP28)
- Board status LEDs
- FPGA Reset via host I2C

Management

- SoC boot options: PXE, SATA
- SoC control interfaces: USB, UART, network

Networking

- A configurable packet processor IP core
- Extensive configuration API
- Packet forwarding and bridging across network, main host and SoC
- Parsing, match and action operations
- Bandwidth rate limit

Hardware (General)

- Full height, ½ length (111.15 x 167.65 mm with bracket)
- Weight (excl. pluggable modules): 350 g
- MTBF: > 300.000 hours (est.)

Power

- 75 W (max.)
- Passive cooling
- Power and temperature monitoring via SMBus/I2C

Environment

- Storage temperature: -30 °C to 70 °C (-22 °F to 158 °F)
- Operating temperature (card inlet): 0 °C to 55 °C (30 °F to 130 °F)
- Operating humidity: 20% to 80%
- Altitude: < 2,000 m
- Airflow: 2.5 m/s @ 35 °C inlet

Regulatory Approvals and Compliances

- RoHS, FCC, CE

Orderable port speed configurations

Product	Data Rate
NTC5010X-2x10/25	2x10/25 Gbps