NETRONOME

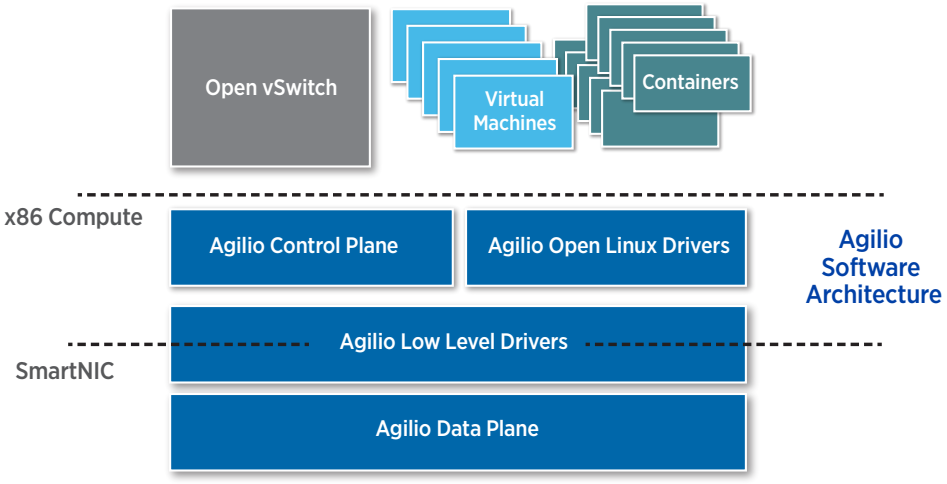
PRODUCT BRIEF

Agilio® OVS Software

OFFLOAD AND ACCELERATE SERVER-BASED NETWORKING

Operators are challenged to do more with their compute resources. There is a constant strive to extract the maximum output per service, application, or virtual machine (VM) while keeping costs as low as possible. Optimizing on dimensions such as networking PPS per CPU cycle, PPS per Watt, and PPS per dollar are critical to the success of a data center. Agilio OVS Software, combined with Agilio SmartNICs, significantly improves server-based networking performance and restores valuable CPU cores by offloading Open vSwitch (OVS) and Linux networking functions to Netronome's family of SmartNICs.

The Agilio solution is a drop-in accelerator for OVS with seamless integration, making it compatible with existing network tools and controllers. Use cases for Agilio include compute nodes for IaaS or SaaS, network functions virtualization (NFV), and non-virtualized service nodes, among others. In these use cases it is common to have a large number of network overlays and/or security policies that are enforced on the server and potentially several thousands of policies per VM. Agilio provides the ability to support very high flow and policy capacities without degradation in performance.



KEY FEATURES

- Full offload of OVS datapath to Agilio SmartNIC
- Connectivity to VMs over SR-IOV and Express Virtio (XVIO)
- Accelerated term/orig of VXLAN, VXLAN-GPE, GTP, NVGRE and NSH tunnels
- Standard host interfaces through Linux netdev and DPDK
- Configuration through standard OVS tools (ovsctl) and protocols (OVSDB, OpenFlow)
- Integration with cloud orchestration, such as OpenStack, through OVS
- Offload for millions of microflows
- Support for 64K rules and policies
- Traditional networking offloads for overlay and underlay packets

BENEFITS

- 5X to 10X improvement in vSwitch performance
- Low CPU consumption: one CPU core for control plane
- Improved VM density and application performance
- High scale for tunnel capacity and security policies
- Leverage pre-existing networking software and automation tools
- Open source drivers

VERSION 2.6.A FEATURES AND SPECIFICATIONS

Open vSwitch Offload	• OVS version 2.6.1 • Offload kernel datapath • Acceleration via Exact Match Flow Cache • Fastpath forwarding of traffic between specified vSwitch vPorts • Transparent offload via OVS fallback and datapath hooks • OVSDB (configuration) • OpenFlow protocol (datapath) • OVS CLI • Optional Local Flow API • Stand-alone or controller modes • OVS statistics • Match-action offload • NVGRE tunnel encap/decap • VXLAN, VXLAN-GPE tunnel encap/decap
Advanced Features	• Load Balancing for up to 32 OF groups to host and to ports • Link Aggregation with LACP • Traffic mirroring at ingress and egress • VM QoS: Rate limiting and network bandwidth guarantees • PXE Boot • OpenStack integration / OOO • OPNFV support • Flow-based egress queue selection • Flow-based traffic metering
Networking I/O	• 60 datapath VFs • 60 netdevs, or 60 DPDK PMD instances • SR-IOV • Express Virtio (XVIO) • VM live migration • L3/L4 RX and TX checksum offloads (inner and outer headers) • NIC stats via Ethtool • Jumbo frame support
Operating Systems	Ubuntu 14.04/16.04, CentOS/RHEL 7.1, Linux Kernels 3.13 – 3.19
Supported Platforms	• Agilio CX dual-port 10GbE SmartNIC • Agilio CX dual-port 25GbE SmartNIC • Agilio CX single/dual-port 40GbE SmartNIC • Agilio LX dual-port 40GbE SmartNIC • Agilio LX single-port 100GbE SmartNIC • PCIe expansion for each of the Agilio LX SmartNICs • 4x10GbE and 10x10GbE breakout cables for 40/100GbE ports

OVS Match Fields

- Tunnel ID
- Tunnel IPv4 Source
- Tunnel IPv4 Destination
- Tunnel Flags
- Tunnel IPv4 TOS
- Tunnel IPv4 TTL
- Input port
- Ethernet source address
- Ethernet destination address
- Ethernet TCI
- Ethernet Type
- MPLS top label stack entry
- IPv4 source address
- IPv4 destination address
- IPv6 source address
- IPv6 destination address
- IPv6 flow label
- IP protocol
- IP TOS
- IP TTL
- IP Fragmentation
- Transport layer SRC
- Transport layer DST
- Transport layer flags

OVS Actions

- Output to port
- Fallback to userspace
- Set tunnel header
  - tun_id, ipv4_src, ipv4_dst, tun_flags, ipv4_tos and ipv4_ttl
- Set ethernet header
  - eth_src and eth_dst
- Set IPv4 header
  - ipv4_src, ipv4_dst, ip_tos and ip_ttl
- Set IPv6 header
  - ipv6_src, ipv6_dst, ip_tos and ip_ttl
- Set TCP header
  - tcp_src and tcp_dst
- Set UDP header
  - udp_src and udp_dst
- Set MPLS header
  - Sets MPLS top label stack entry
- Push VLAN header
- Pop VLAN header
- Push MPLS header
- Pop MPLS header

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