Hypervisor Acceleration Software

Product Overview
6WIND Virtual Accelerator is part of the 6WIND vRouter family and provides packet processing acceleration for virtual network infrastructures used in Network Function Virtualization (NFV), Data Center Virtualization or Network Appliance Virtualization use cases. It is ready-to-use software installed on virtualization platforms.

6WIND Virtual Accelerator runs inside the hypervisor domain and removes Linux performance bottlenecks by offloading virtual switching from the Linux networking stack.

Virtualization on COTS Servers
6WIND Virtual Accelerator provides efficient switching to increase virtual infrastructure performance. Testing in live OpenStack environments shows popular Virtual Network Functions (VNFs) can achieve performance boosts of up to 5x and 20 Gbps throughput without SR-IOV or any changes to the application.

By offloading network packet processing to dedicated CPU cores, 6WIND Virtual Accelerator maximizes the number of Virtual Machines (VMs) without affecting individual networking performance requirements. The increased VM density can be applied to additional VNFs such as load balancers, firewalls, etc. to generate new revenue streams on existing servers.

Product Description and Architecture
6WIND Virtual Accelerator boosts virtual networking performance by running its data plane packet processing software on dedicated cores. The data plane software comprises DPDK, a set of poll mode drivers that provide efficient data I/O processing. In addition, 6WIND technology has native multi-queue support to distribute the load across multiple CPU cores. This combination allows 6WIND Virtual Accelerator performance to scale linearly with the number of cores, while Linux OVS is unable to scale.

6WIND Virtual Accelerator does not require any specific configuration and takes advantage of the standard Linux control plane (OVS, routing, etc.) to configure its forwarding tables. It uses a continuous synchronization mechanism that is completely transparent to Linux, so the control plane applications operate without any changes. 6WIND Virtual Accelerator transparently adds statistics regarding packets processed to Linux statistics, so no changes are required to monitoring tools.

Forwarding Performance
• 20 Gbps per core
• Performance scales linearly with number of cores

Highlights
• Increase VM and VNF performance without SR-IOV
• Multiply VM density on Commercial-Off-The-Shelf (COTS) servers
• 1/10/40/100GE support
• Transparent Operation: No change to existing VNFs or VMs or management tools (Linux, KVM, OpenStack, SDN)
• Zero hardware or software dependencies

1 Test Platform: Intel Xeon E5-2690 v3 @ 2.7GHz; test performed by 6WIND in a controlled environment
**Key Features**
- Mature solution for high performance I/O leveraging DPDK, with multi-vendor NIC support
- Accelerated virtual switching (Open vSwitch and Linux bridge) and networking (Overlays, Filtering/NAT, IP Forwarding, IPsec) using the fastest packet processing algorithms
- Preserves standard Linux commands (tcpdump, iptables, IPsec/XFRM, etc.) for ease of deployment and operation
- Supports standard network management tools
- Supports existing workloads through standard Virtio drivers
- Scalable software-based switching enables Service Chaining
- Performance without SR-IOV
- Advanced monitoring through streaming telemetry with time series data base and graphical analytics

**System Requirements**

**CPU**
- Intel x86 Xeon and Atom

**Core count**
- Minimum one and fully customizable

**NICS**
- Intel 1G 82575, 82576, 82580, I210, I211, I350, I354
- Intel 10G/40G 82598, 82599, X520, X540, XL710
- Mellanox 10G/25G/40G/50G/100G CX3, CX4, CX5
- Broadcom NetExtreme E-Series

**Supported Linux distributions**
- Red Hat Enterprise Linux
- Ubuntu
- CentOS

**Supported OpenStack distributions**
- Ubuntu Cloud and RDO

---

**Performance**
- Switching Capacity (OpenStack)
  - Compute Node: 20 Gbps per core
  - Network Node: 40 Gbps per core
- Forwarding: 12 Mpps per core
- VLAN: 10 Mpps per core
- Filtering: 6 Mpps per core

**Features**

**Virtual Switching**
- Open vSwitch (OVS)
- Linux Bridge
- Virtio Host poll mode driver (PMD) allows communication with any workload with Virtio drivers (can be DPDK, Linux or other OS-based)

**L2 and Encapsulations**
- GRE
- VLAN (802.1Q, QinQ)
- VXLAN
- LAG (802.3ad, LACP)
- Ethernet Bridge

**Offloads (for Virtio guest)**
- Checksum offload (IP and TCP/UDP)
- LRO (based on GRO)
- TSO (based on GSO)
  These offloads work on inner headers within tunnels (VLAN, VXLAN, GRE, IPinIP). Virtual Accelerator leverages hardware offloads when supported by the NICS.

**IP Networking**
- IPv4 and IPv6
- VRF
- IPv4 and IPv6 Tunneling
- NAT

**Management/Monitoring**
- Standard Linux networking tools: ovs*, iproute2, iptables, ping, tcpdump, traceroute, telnet
- Syslog
- KPIs/Telemetry (YANG-based)
- SNMP

**Security**
- ACLs (stateless and stateful)
- uRPF
- CP Protection (including rte flow HW support²)

**IP Services**
- DHCP Server/Client/Relay
- DNS Client/Proxy
- NTP

**QoS**
- Rate limiting per interface
- Rate limiting per VRF
- Class-based QoS
  - Classification: ToS/IP/DSCP/CoS
  - Shaping and policing
  - Scheduling: PQ, PB-DWRR

**Pricing**
- Pricing is based on switching capacity: 20G, 50G, 80G, 200G
- Switching capacity = Traffic (uplink and downlink) for each physical NIC plus inter-VM traffic (traffic chaining)

²Near-term Roadmap

---

**6WIND Speed Certified Applications**
- Arbor
- AudioCodes
- f5
- KEMP Technologies
- Loadmaster
- Alteon NG VA
- BIG-IP VE
- vTMS
- vSBC
- vSBC

**6WIND Speed Certified Infrastructure And Platforms**
- Canonical
- CentOS
- Kontron
- Mirantis
- Nuage Networks
- Red Hat
- Ubuntu