Enabling Cloud Services Based On High Performance East-West VM Communications

The new generation of servers based on increasingly powerful processors and high speed Ethernet technologies enables Cloud Providers to embed a larger number of workloads per server. While increasing in numbers, workloads are also evolving.

The first generation of cloud infrastructures successfully integrated virtualized workloads such as Web servers or Microsoft Exchange servers behind external and dedicated network equipment such as routers, firewalls or load balancers. To support these applications, cloud infrastructures were optimized for North-South communications, i.e. traffic between the VMs and the physical network.

The closer integration of virtualized networking functions and applications for the new generation of cloud infrastructures also relies on high performance East-West communications, i.e. between VMs.

This, combined with an increased number of VMs, requires a new networking software architecture to support both North-South and East-West traffic in a high performance and cost effective way.

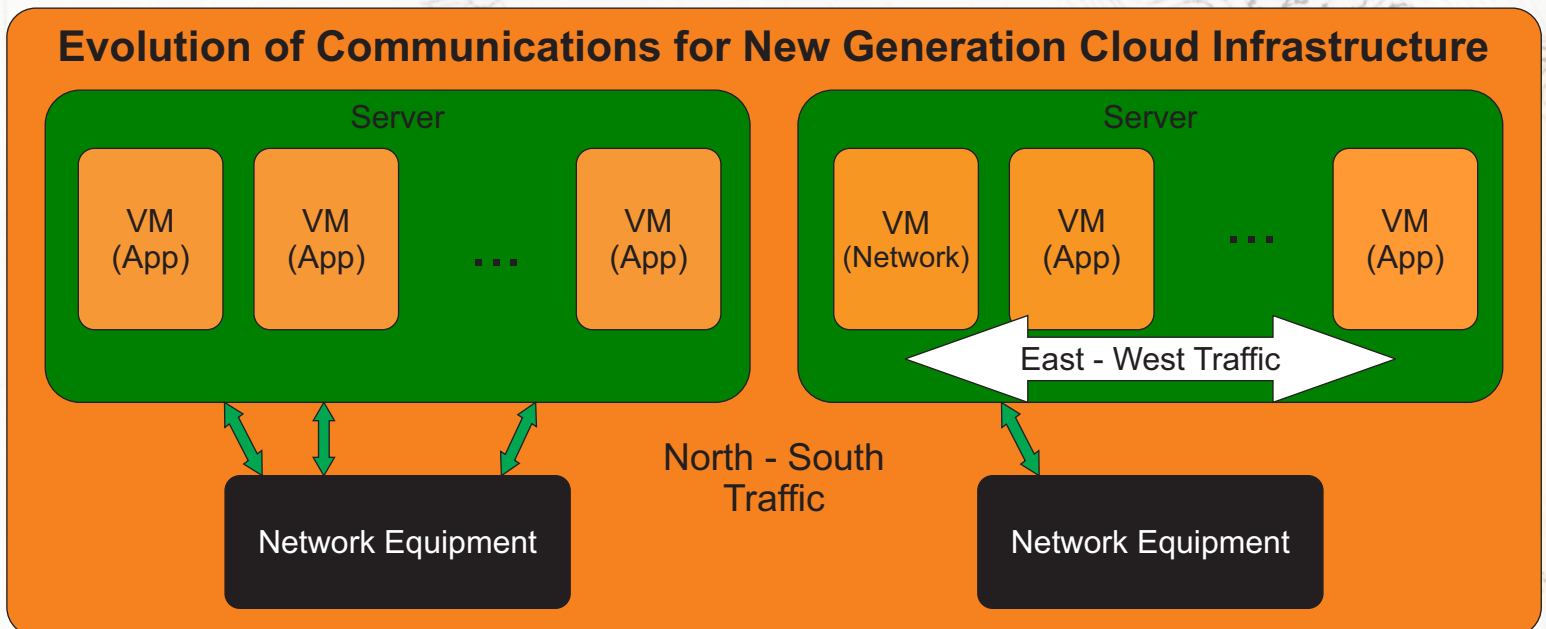The 6WINDGate software solution for Cloud Providers

transparently solves networking performance bottlenecks to enable a higher density of VMs with high performance North-South and East-West traffic, on a single server.

Since the first shipment of its 6WINDGate™ packet processing software in 2007, 6WIND has been selected by many Network Equipment Providers to unlock hidden infrastructure performance for commercial off-the-shelf (COTS) hardware.

6WINDGate Solution For High Performance East-West Communications

6WINDGate's solution for Cloud Providers is designed around an open, high-performance software switch on top of Data Plane Development Kit (DPDK).

6WINDGate is high performance Layer 2 – 4 packet processing software for generic servers and extends DPDK with support for multi-vendor NICs and crypto-accelerators. Based on its fast path architecture, 6WINDGate transparently accelerates Linux and virtualized network environments to provide 10x network performance improvements compared to standard software architectures. As an example, 6WINDGate Open vSwitch (OVS) acceleration provides over 10x

Evolution of Communications for New Generation Cloud Infrastructure

Packet Processing Software * Outpace The Competition

The Fast vNIC driver can enable a 30 Gbps full duplex Service Chain encompassing three VMs on a single processor socket. This is not possible with hardware switching (i.e. SR-IOV with an external switch, RDMA, or embedded switch on the NIC) because this use case would require installing six 40G NICs on a single processor socket, which is currently not available. The root cause for the six 40G NICs requirement is that the aggregate bandwidth of PCI Express is a maximum of 50 Gbps full duplex.

Beyond pure switching capabilities, 6WINDGate also provides enhanced networking services such as L3 forwarding, virtual routing, firewalling and more to deliver network infrastructure services that can reduce external expensive network equipment.

As one of the market's largest data plane portfolios, 6WINDGate provides the following features for high performance network infrastructures:

- High capacity for encapsulation protocols such as VLAN, VxLAN and more
- High performance and scalable IPv4 and IPv6 forwarding supporting over 10 Mpps per core on Intel platforms
- Virtual routing support for a large number of instances
- High performance IPsec stack to sustain more than 190 Gbps of encrypted traffic on a single Intel server
- High performance and capacity firewall
- Accelerated TCP/UDP stack that enables building stateful firewalls, DPI, web servers supporting millions of concurrent sessions and session setup rates above 1 million sessions per second

performance improvement for North-South communications without any modification to OVS or its management. In other words, 6WINDGate's OVS acceleration solution saves processing cores for switching traffic and maximizes the number of cores available to application workloads.
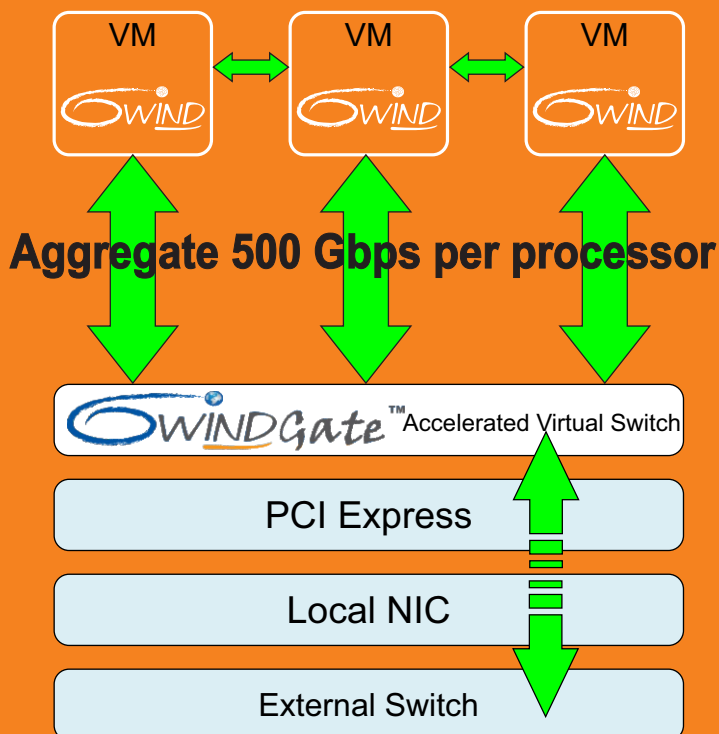
To improve East-West communications between VMs, 6WINDGate also implements a fast communication channel using a specific communication driver called Fast vNIC. The Fast vNIC driver enables a direct and ultra-low latency communication path between VMs that bypasses the virtual switch. The aggregate bandwidth of all VM-VM communications combined can be up to 500 Gbps on a single processor socket.

High Performance East-West Communications With 6WINDGate

Hardware independent virtual switching

500 Gbps bandwidth at low latency

No external limit to number of chained VMs