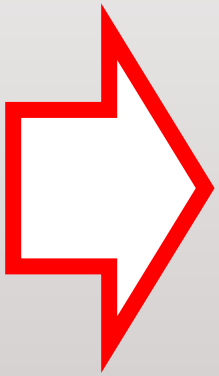
Network Bottlenecks Multiply with NFV
Don't Forget Performance

Kyu-cheol Yeom
Country Manager Korea

6WIND

SPEED MATTERS

The Promise of NFV

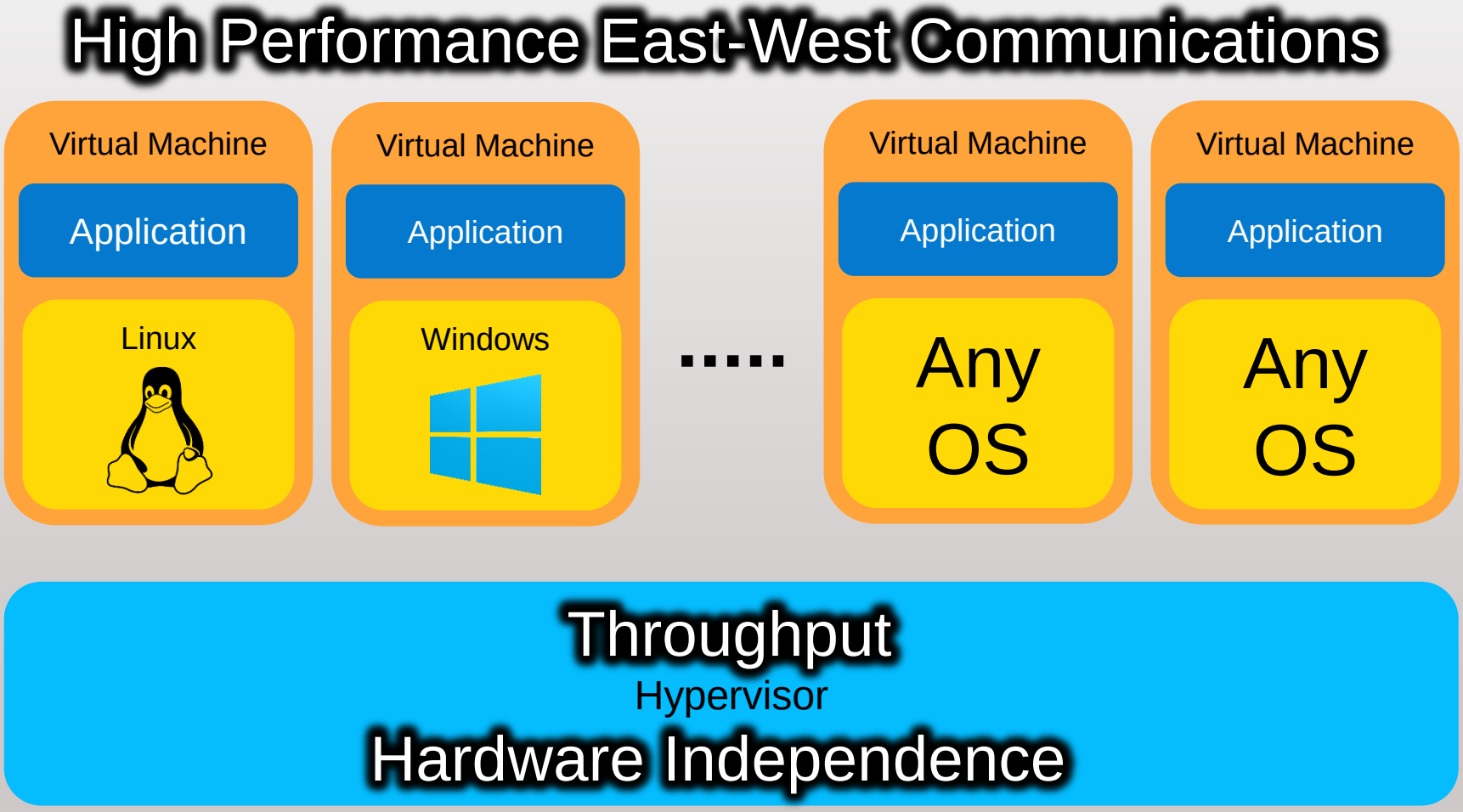


Replace Expensive Network Equipment

Bring Network Performance To Virtualization

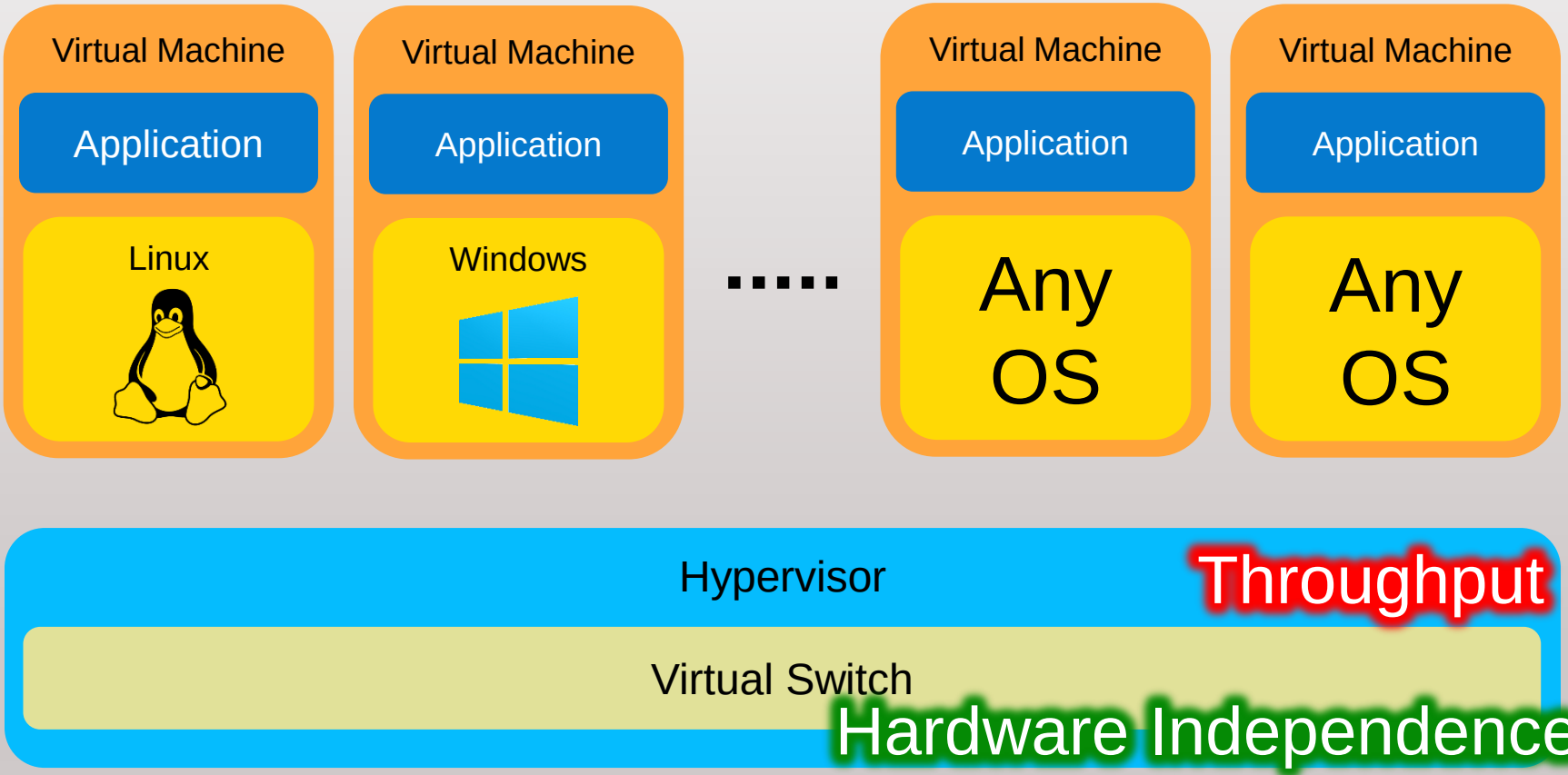
High Performance Data Plane is required to compete with legacy architectures

Performance Requirements for NFV

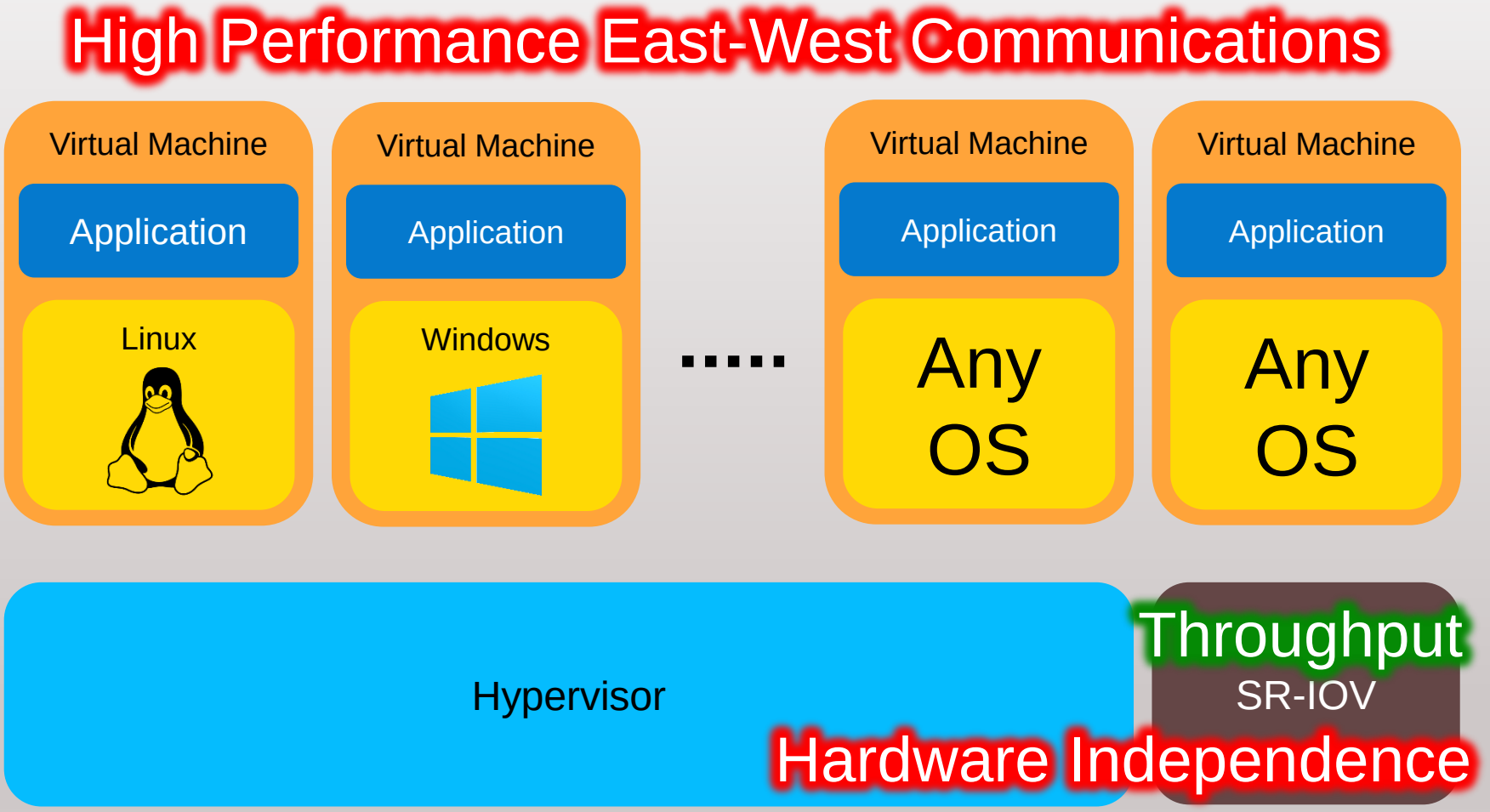


Limitations of Virtual Switching

High Performance East-West Communications

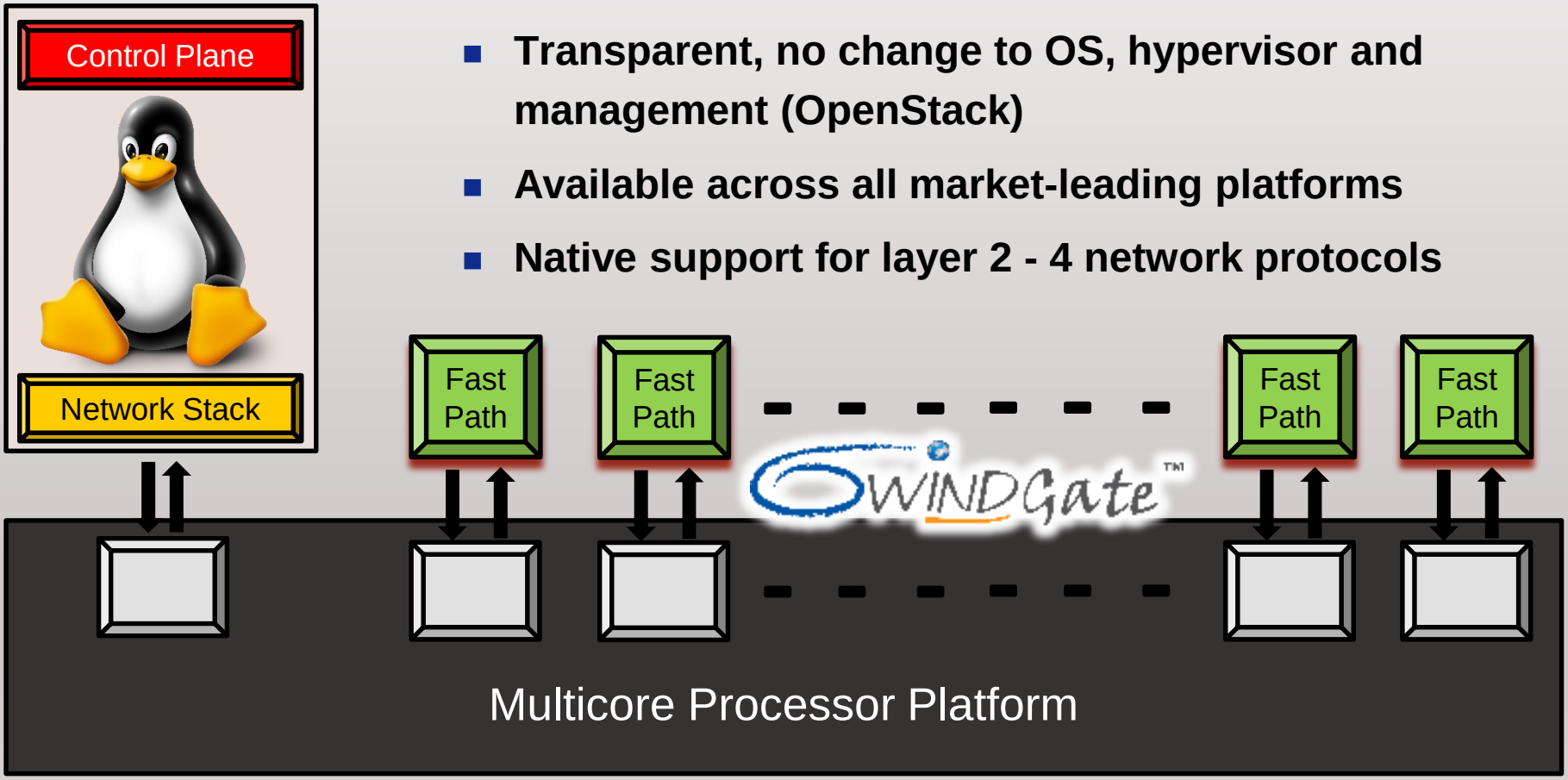


Limitations of Single Root I/O Virtualization (SR-IOV)

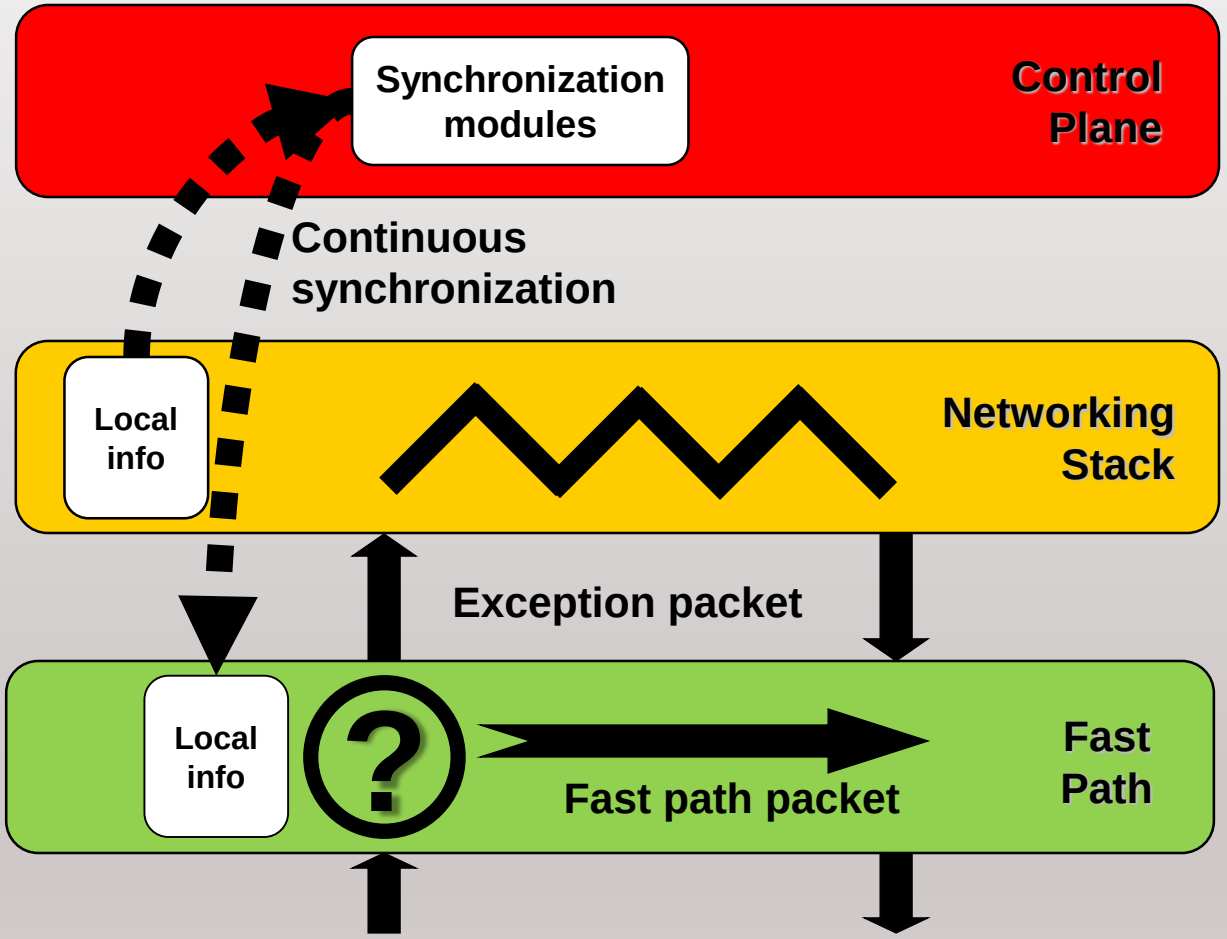


6WINDGate Packet Processing Software: High Performance, Transparency, Portability, Features

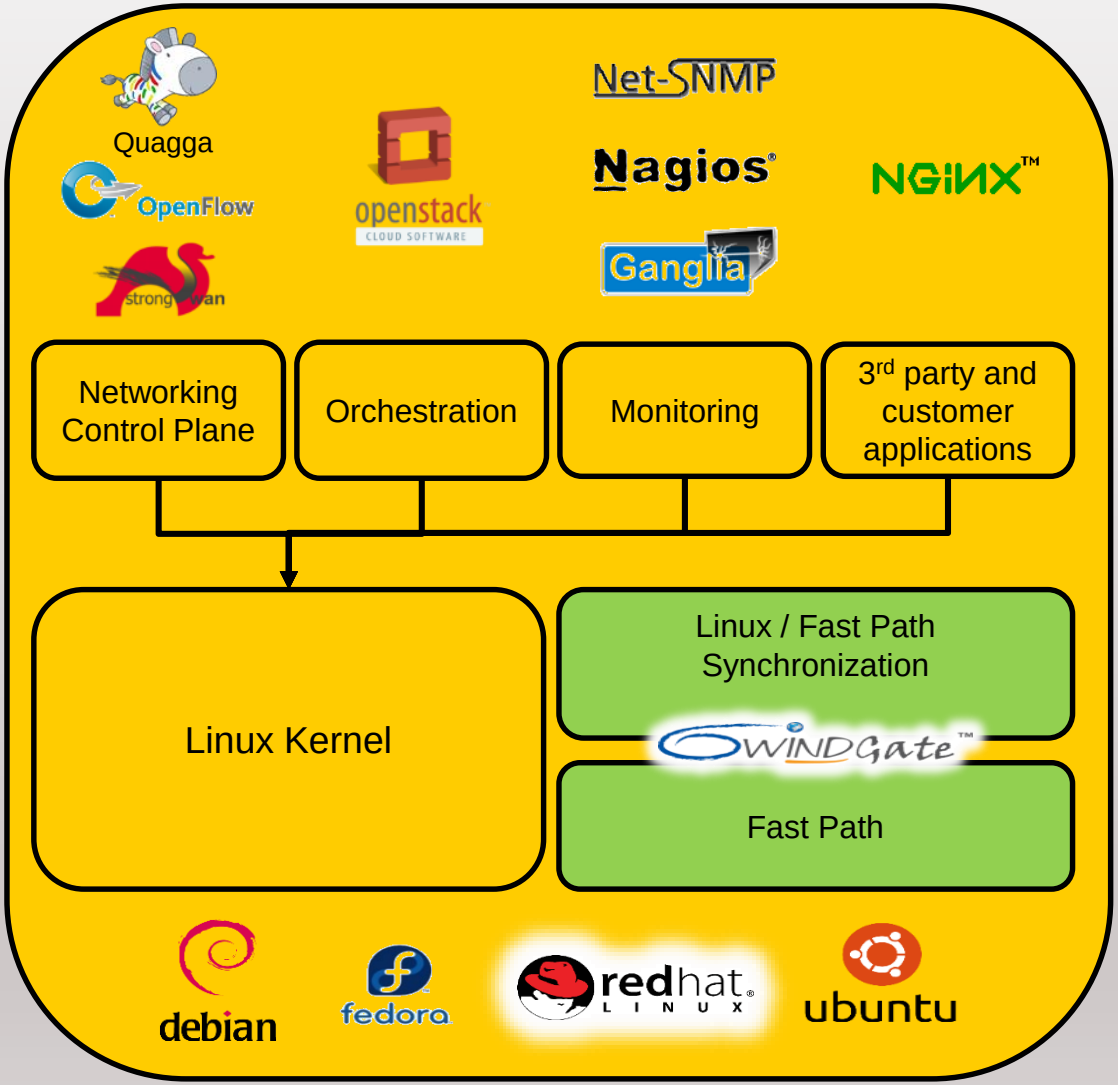
- **Fastest performance on the market; in both physical and virtual environments**
- **Transparent, no change to OS, hypervisor and management (OpenStack)**
- **Available across all market-leading platforms**
- **Native support for layer 2 - 4 network protocols**



Transparent to Operating System

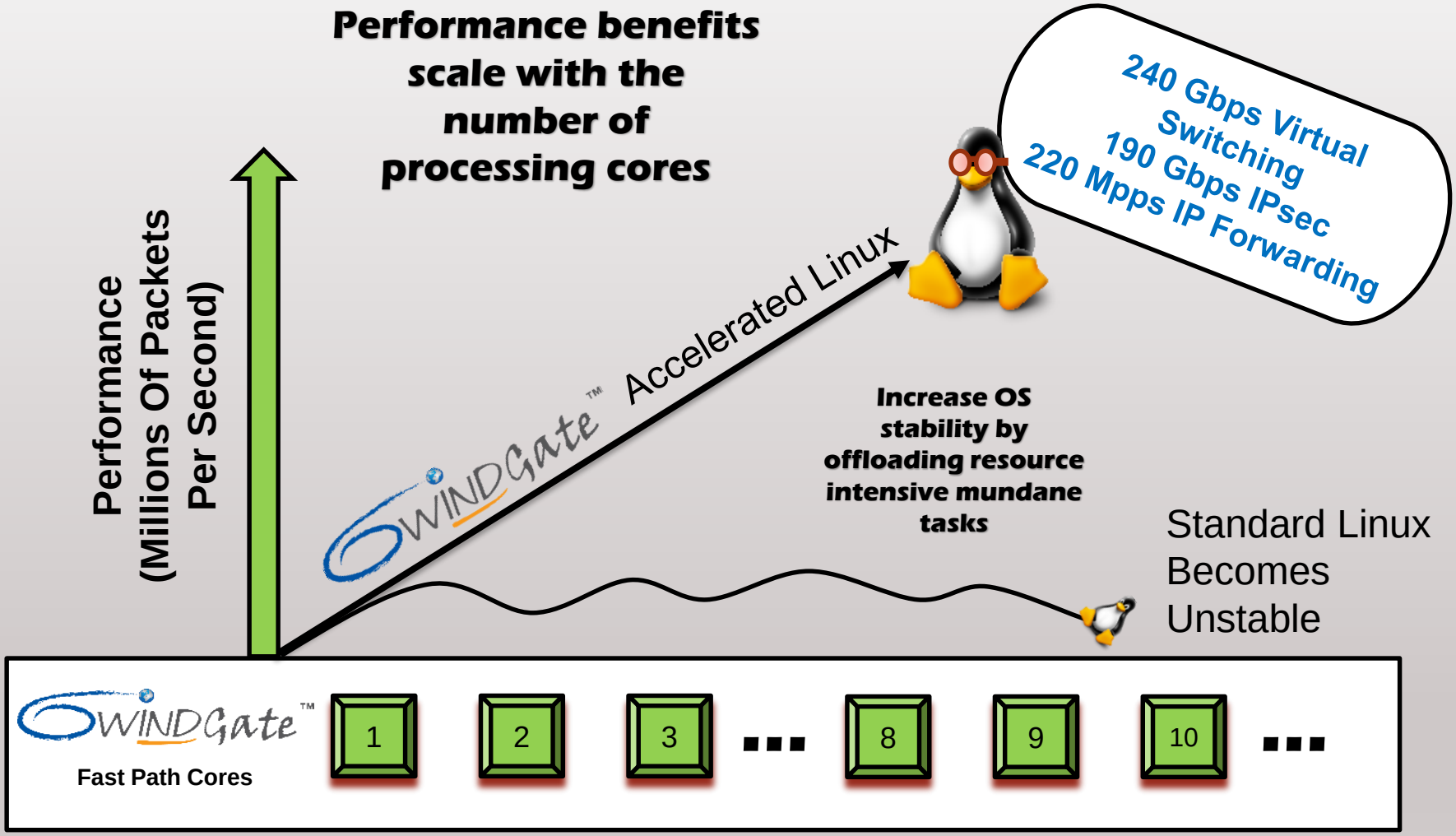


Linux running 6WINDGate is Linux



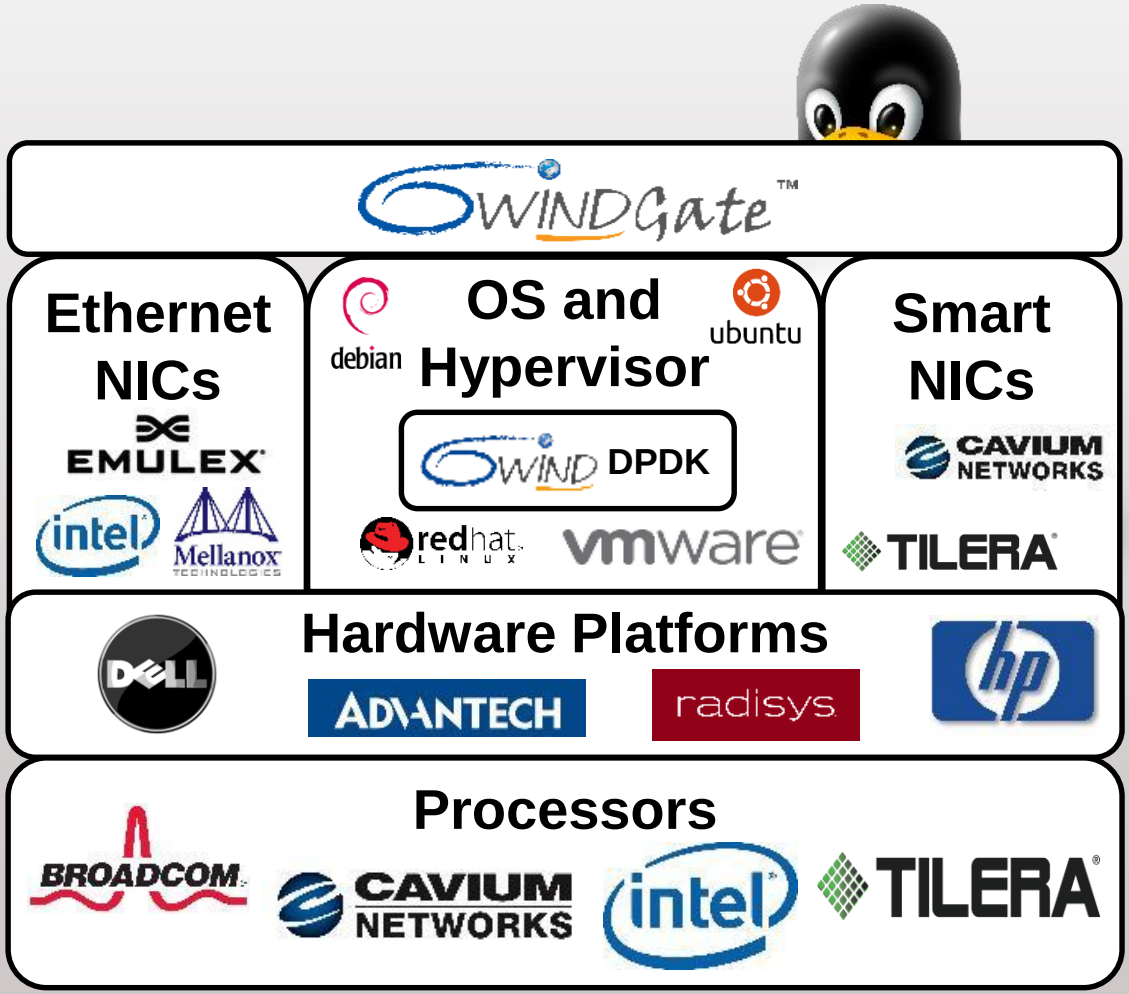
- **Existing Linux applications are not modified**
- **Developing new applications is pure Linux development**
- **Linux distribution/hypervisor is not modified**

6WINDGate Removes Performance Bottlenecks

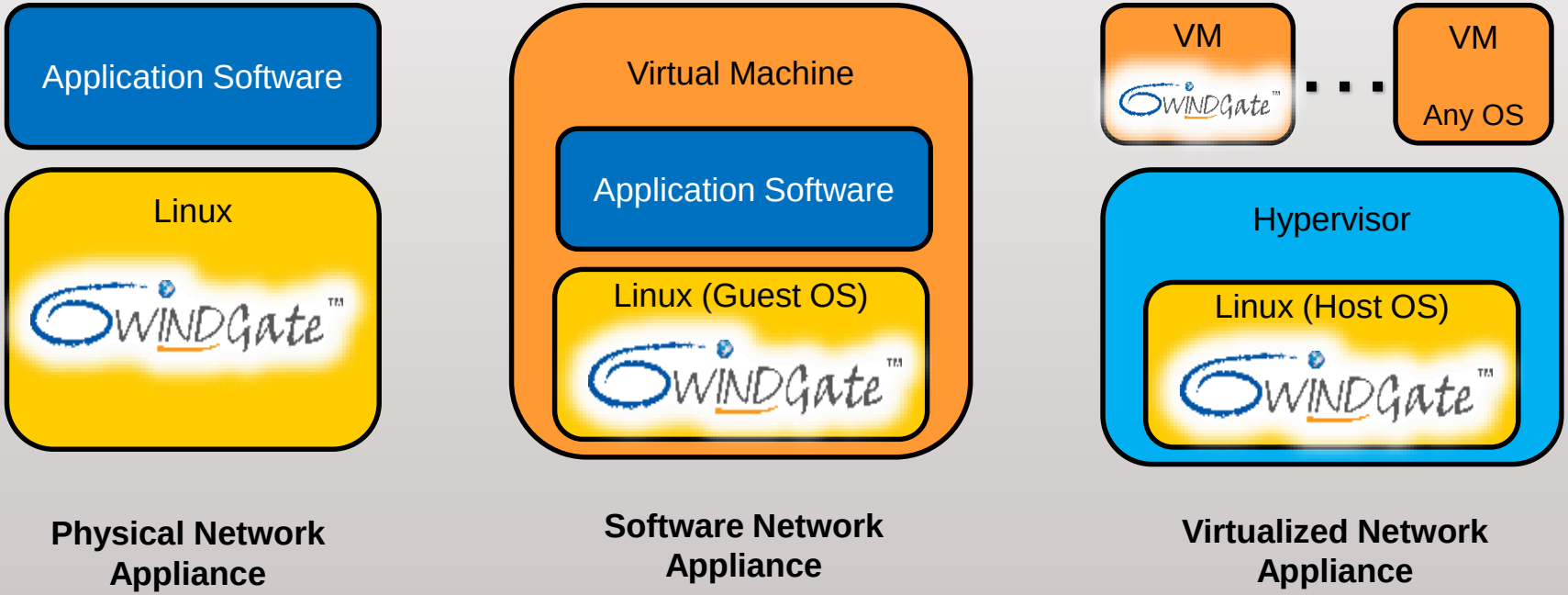


6WIND at the Heart of a Rich and Open Ecosystem

- Transparent operation; no change to OS, hypervisor and management
- Solution available on market-leading processors and software environments
- Incremental path to new architectures thanks to support of a large choice of NICs



6WINDGate Deployment Options

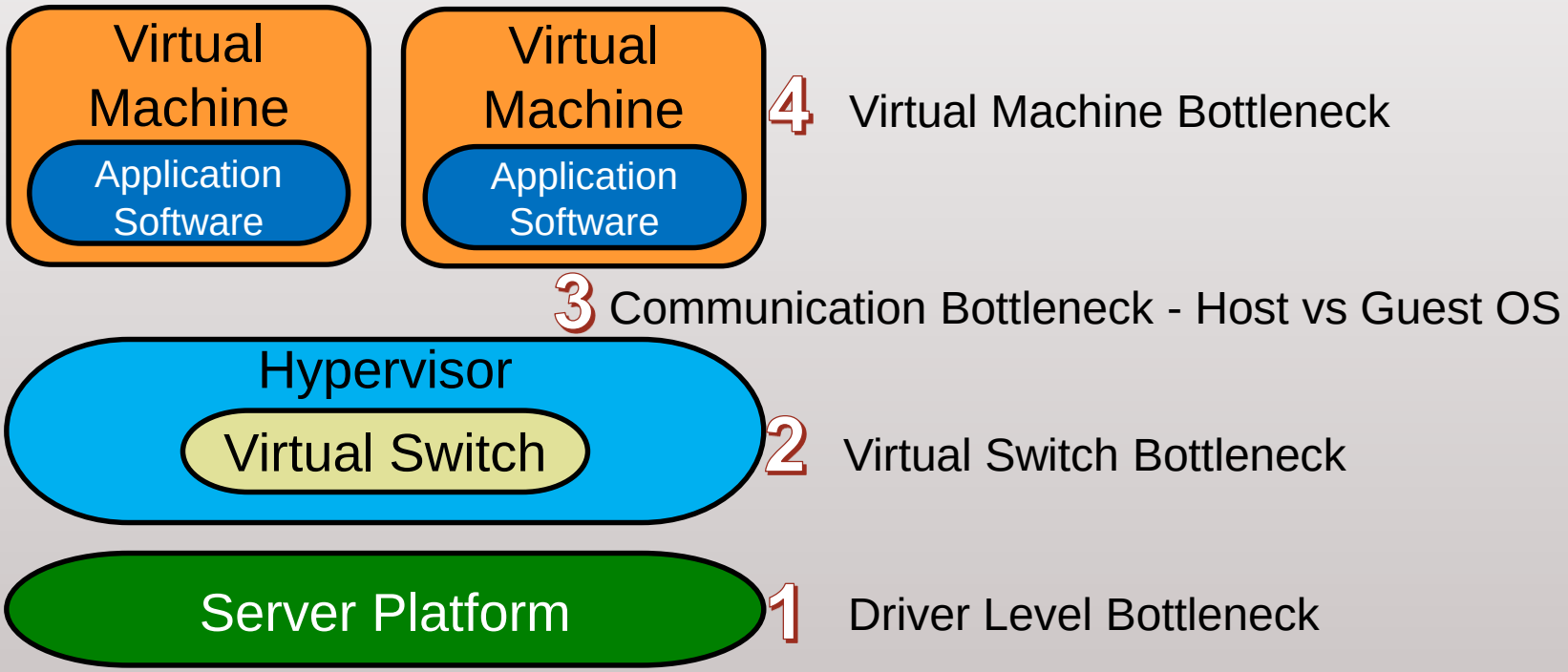


Physical Network Appliance

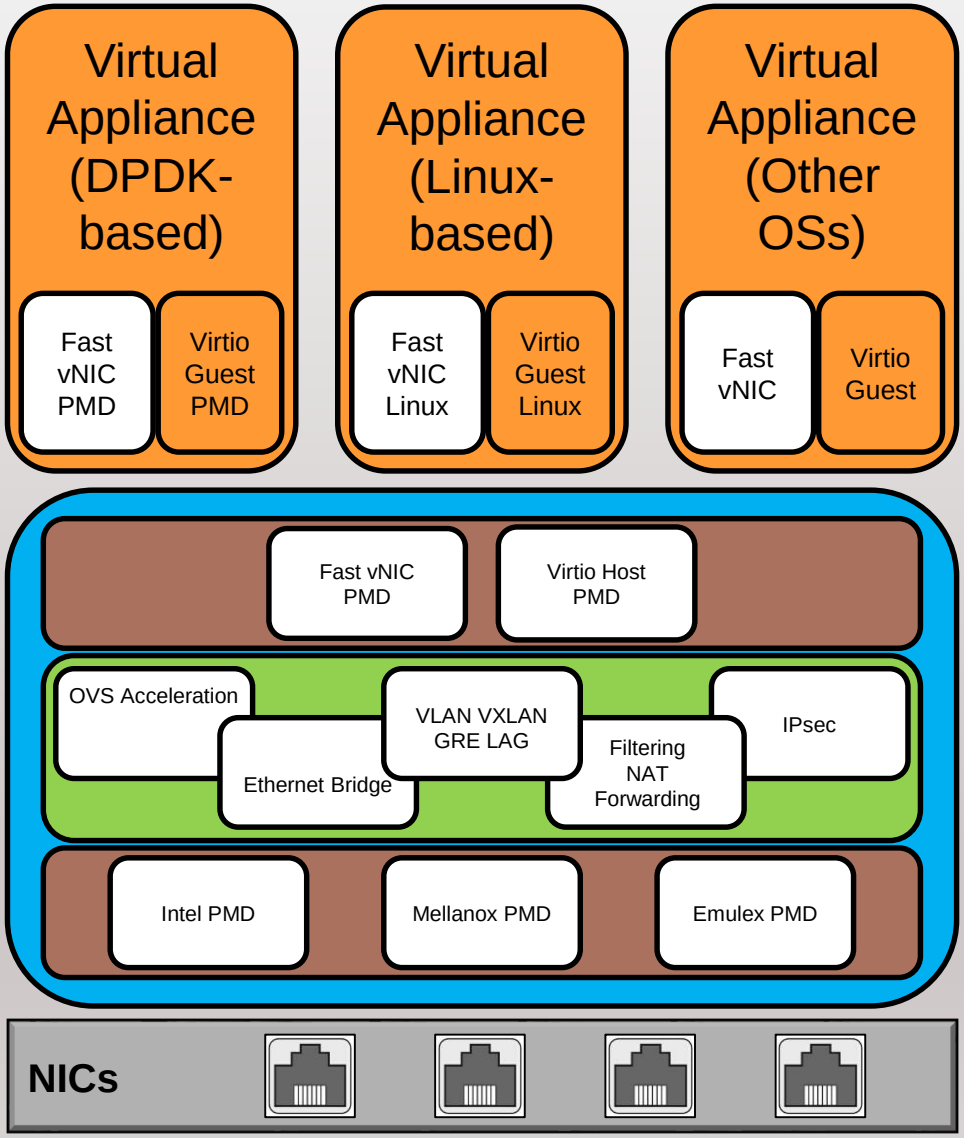
Software Network Appliance

Virtualized Network Appliance

Typical Performance Bottlenecks



6WINDGate Brings Networking Performance to Virtualized Architectures



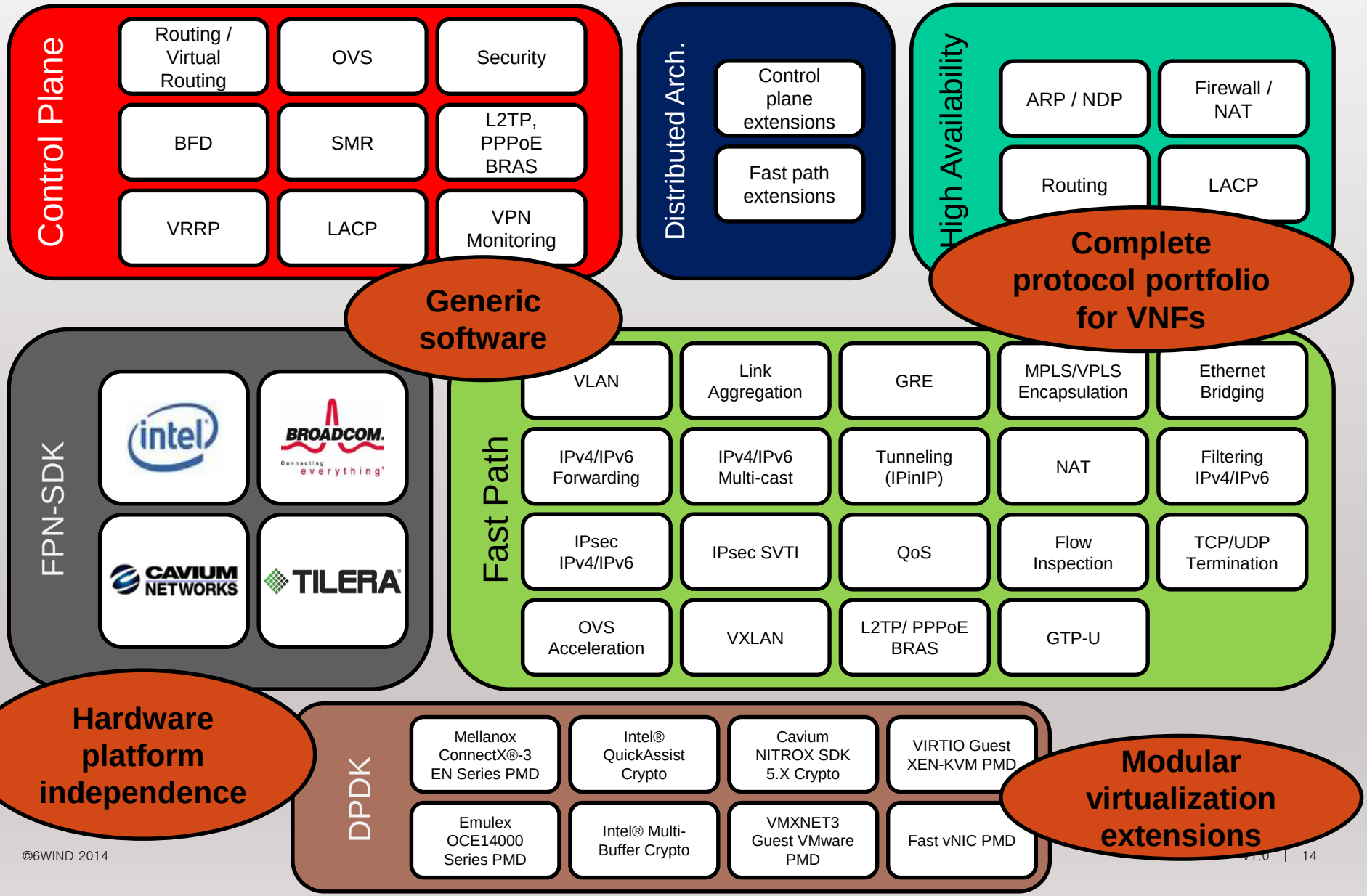
Drivers for Virtual Appliance

- **6WIND drivers for high performance communications**
- **Standard drivers for existing Virtual Appliances**
- **Extensible for all OSs**

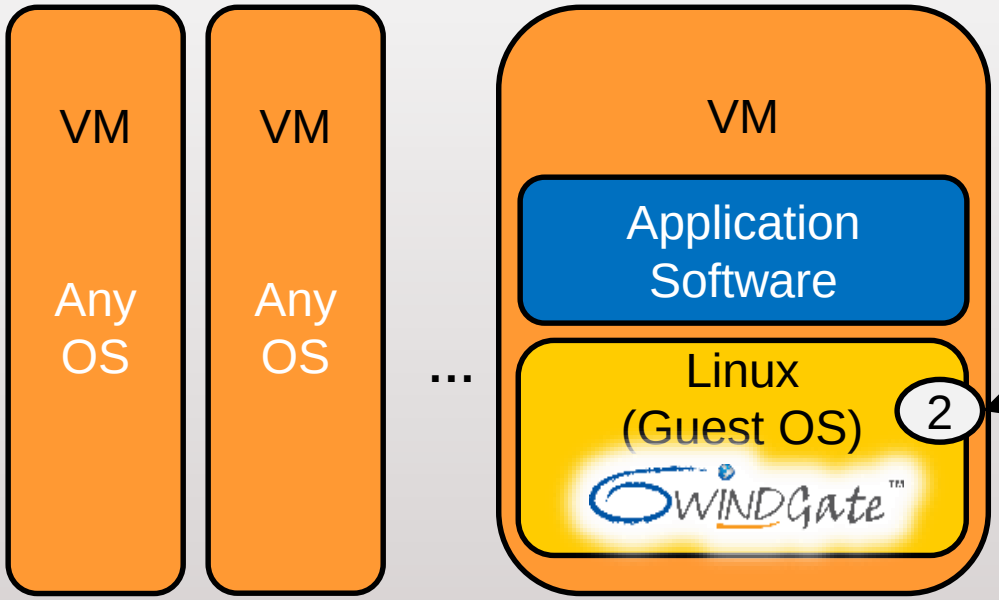
Virtual Acceleration

- **6WIND drivers for high performance communications**
- **Accelerated virtual switch and bridging**
- **Extended network services**
- **Dpdk.org with multi-vendor NIC support**

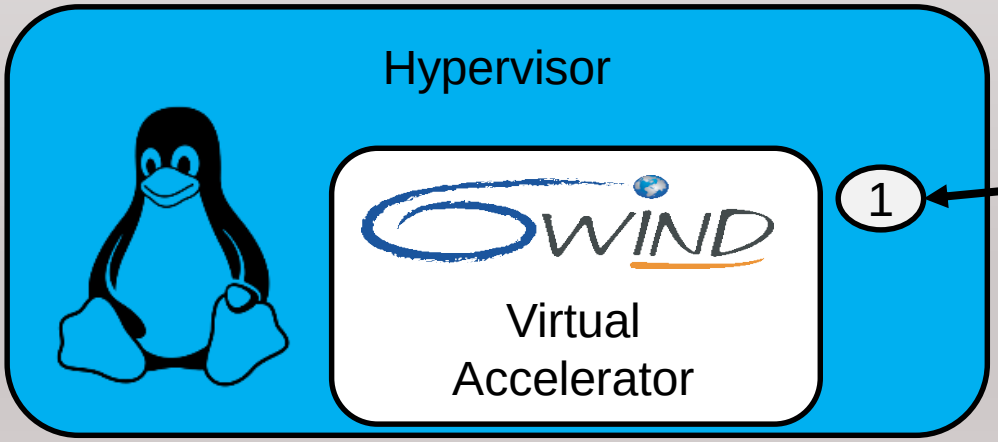
6WINDGate Module List for High Performance VNFs



6WINDGate NFV Solution

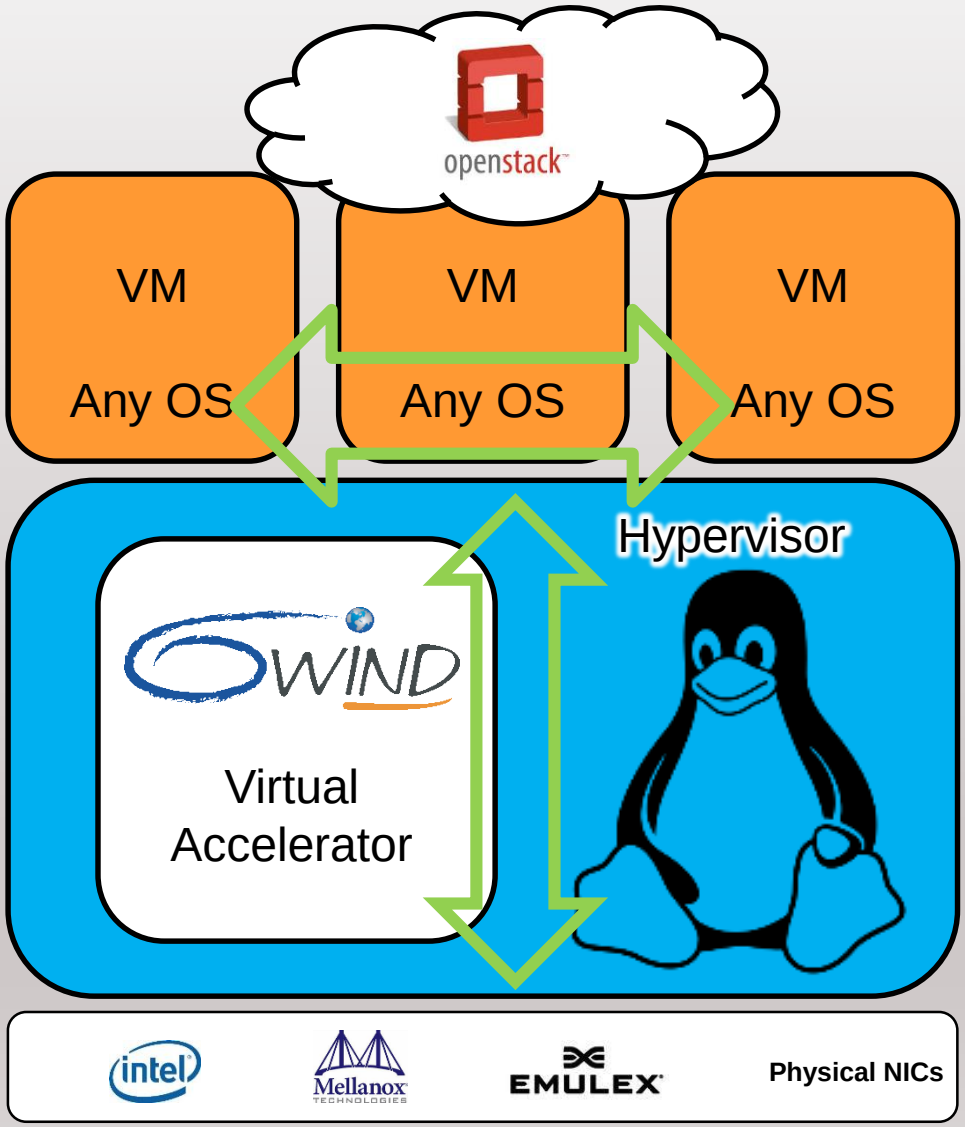


6WINDGate networking data plane technology to develop high performance Virtual Network Functions (VNFs).



6WIND Virtual Accelerator for NFV Infrastructure (NFVI) based on virtual switch acceleration.

1. 6WIND Virtual Accelerator for NFVI



5 Transparent OpenStack orchestration support

4 High bandwidth for VM performance, density and communications

3 Complete virtual networking infrastructure and multi-tenancy

2 Support for Open vSwitch and Linux Bridge with no modifications

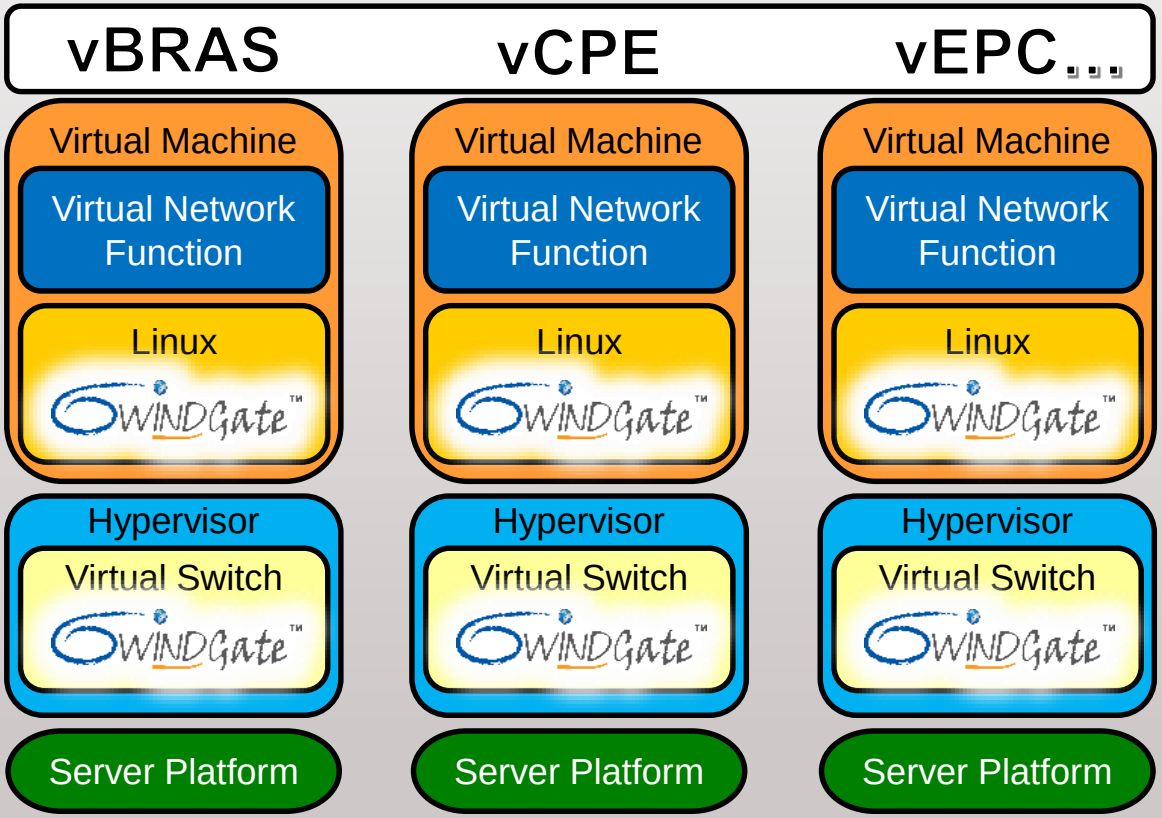
1 Network hardware independence for seamless hardware upgrades

2. 6WINDGate for High Performance VNFs

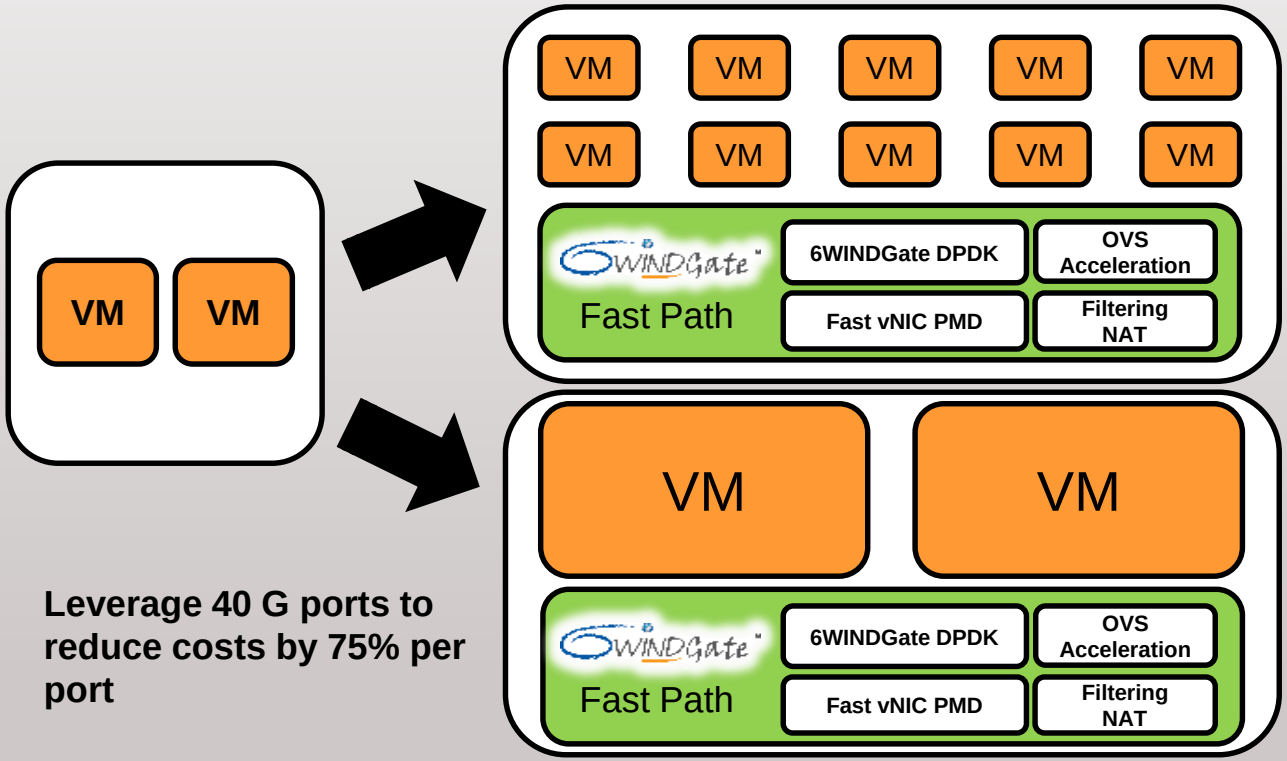
- **High performance Layer 2 – 4 packet processing software for generic servers providing over 10x network performance vs. standard software architecture**
- **Extends Data Plane Development Kit (DPDK) with support for multi-vendor NICs and crypto acceleration**
- **Transparently accelerates Linux and virtualized networks**
- **No impact on management**
- **Applications: vRouter, vBRAS, vEPC, vCPE, vIPsec Gateways…**

Service Provider Use Case:
6WINDGate Enables the Cost- Effective Transition to NFV

- **Virtualization of core functions**
- **Centralization of access functions in the core**
- **Equivalent performance for physical and virtual implementations**
- **¼ cost vs physical equipment**



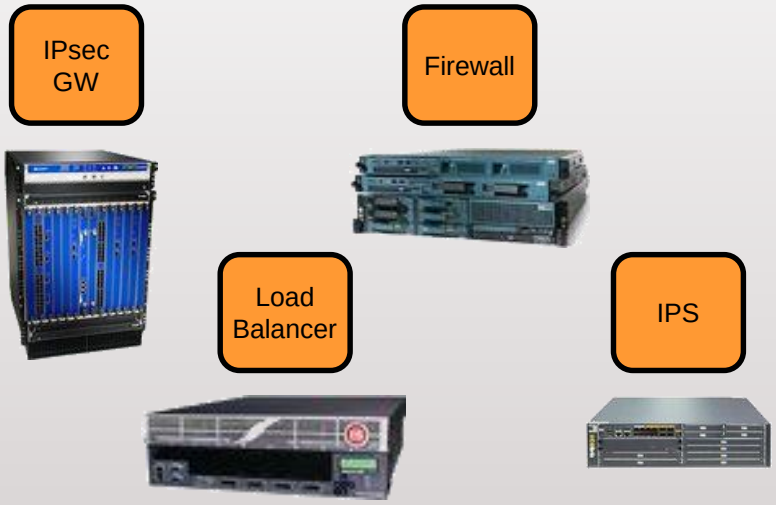
Cloud Provider Use Case:
6WINDGate Reduces VM TCO and Enables New Services



Leverage 40 G ports to reduce costs by 75% per port

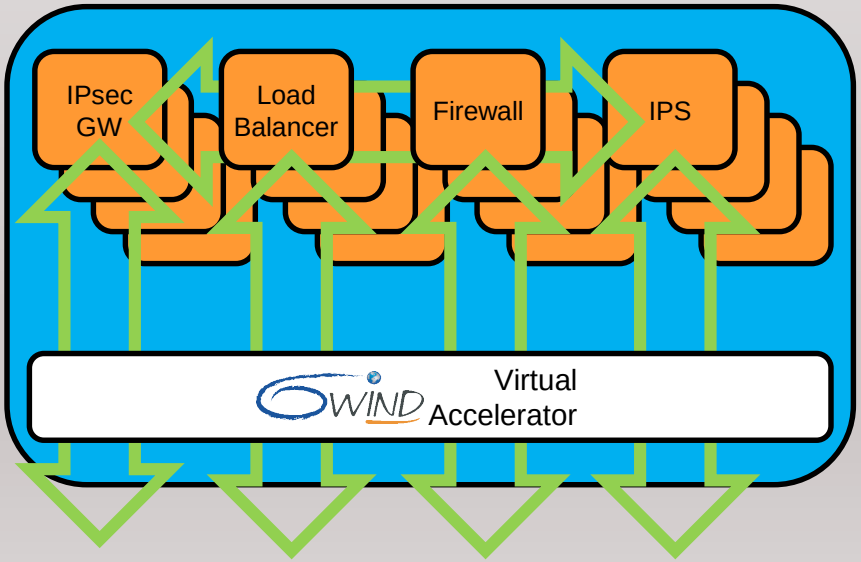
- **Increase VM density**
- **Increase individual VM performance**
- **Enable new services**
- **No impact on management**

Enterprise Use Case: Appliance Virtualization

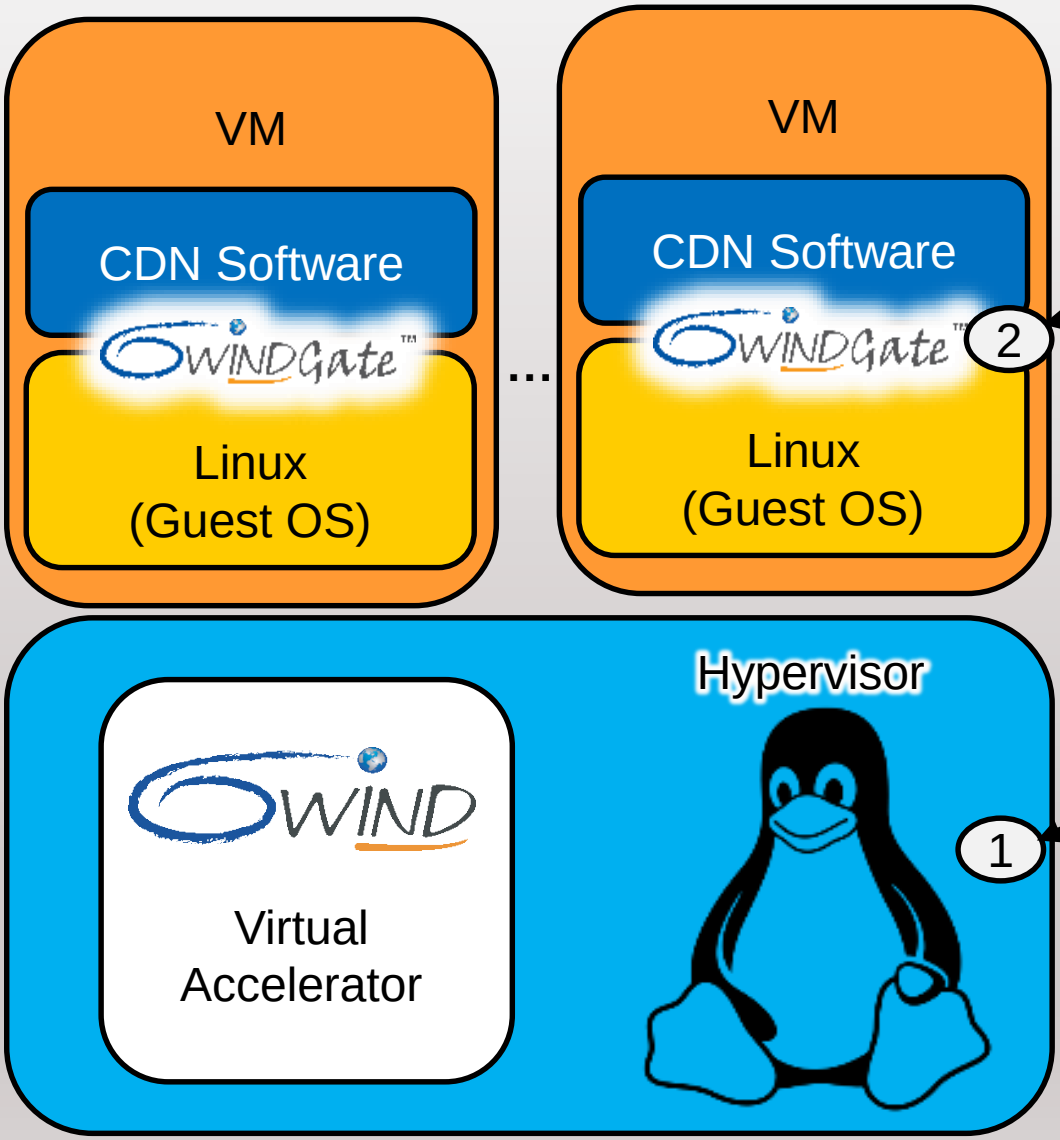


- **Appliances are based on specialized architectures**
  - Rigid
  - High development costs
  - Long time-to-market

- **6WIND Virtual Accelerator enables flexibility brought by virtualization and removes Linux networking performance bottlenecks on standard servers**



6WIND NFV Solution for vCDN



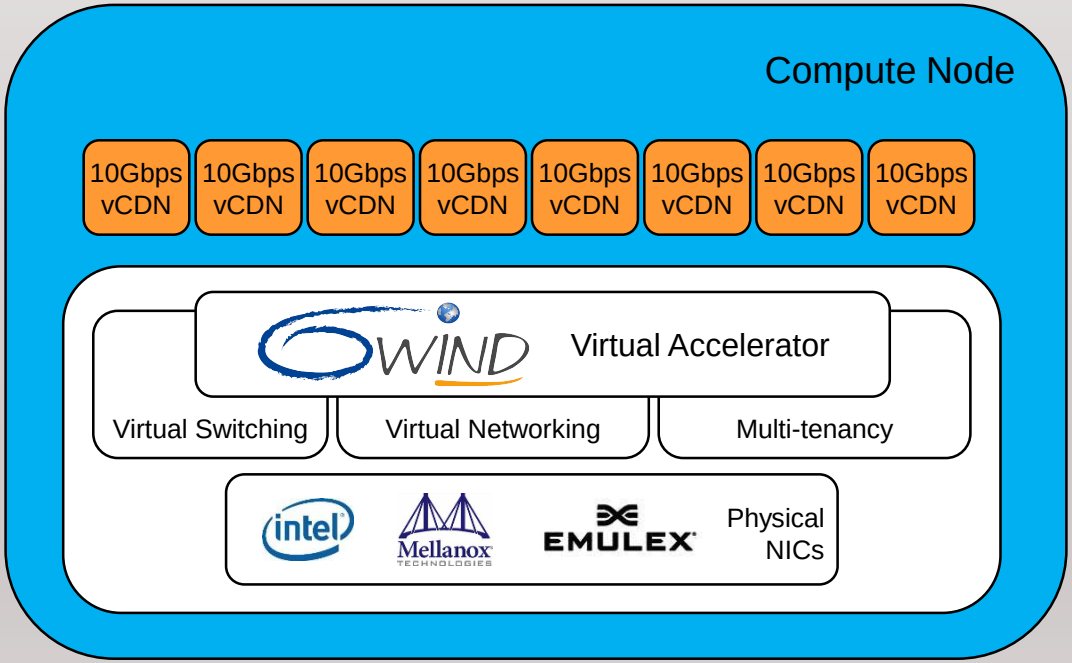
6WINDGate TCP stack to develop high performance vCDN applications.

6WIND Virtual Accelerator for NFV Infrastructure (NFVI).

openstack™

vCDN with 6WIND Virtual Accelerator + 6WINDGate TCP

Virtualize and free computing resources for
- Statistics
- Quality Of Experience Monitoring



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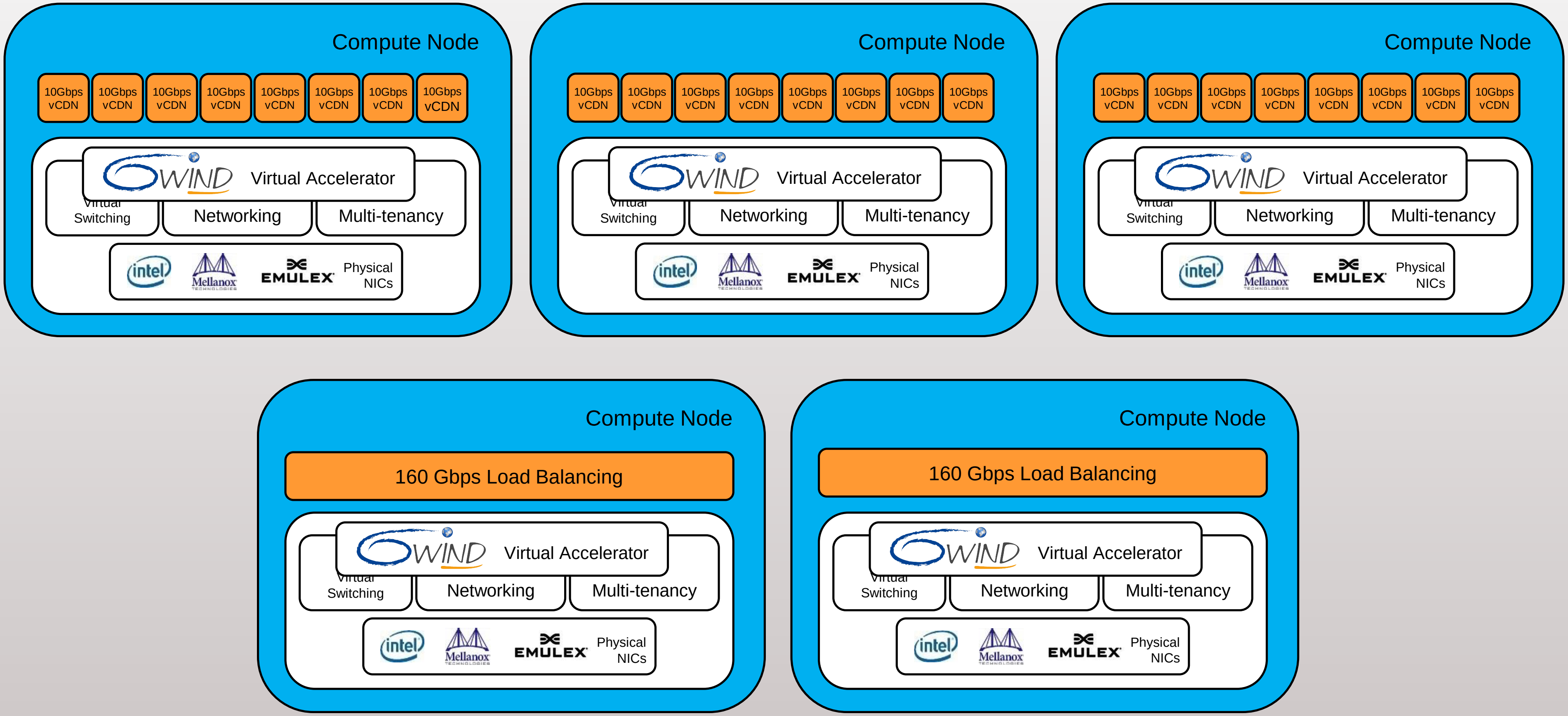
Fully Virtualized vCDN

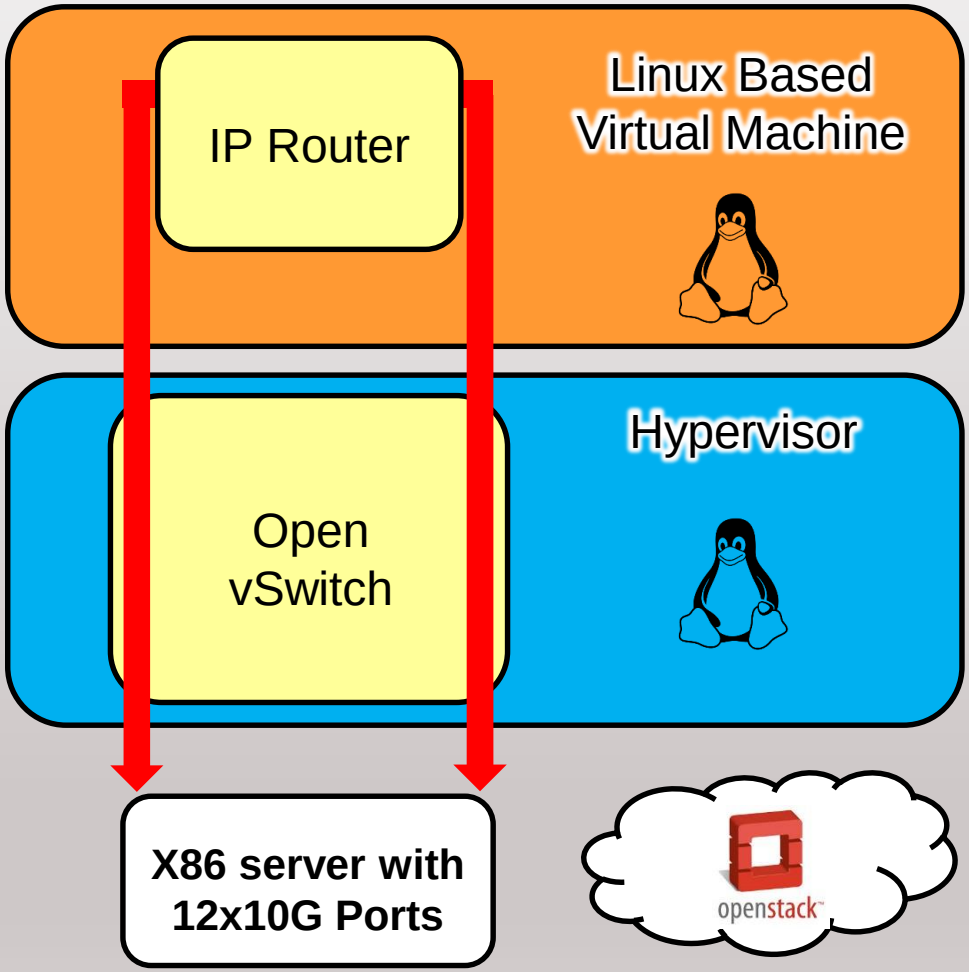


- Reduce capital expense
- Scale networking architectures
- Accelerate service creation

openstack™

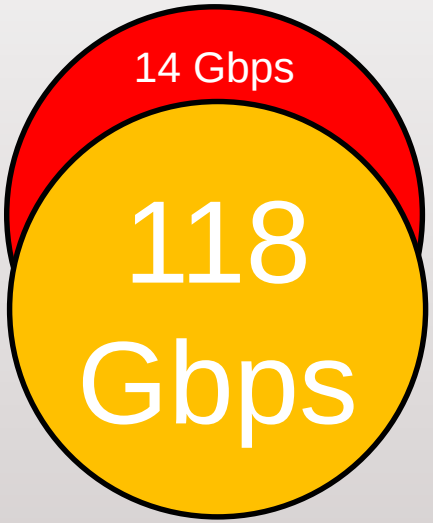
Test 1:
Linux Open vSwitch and Linux VM

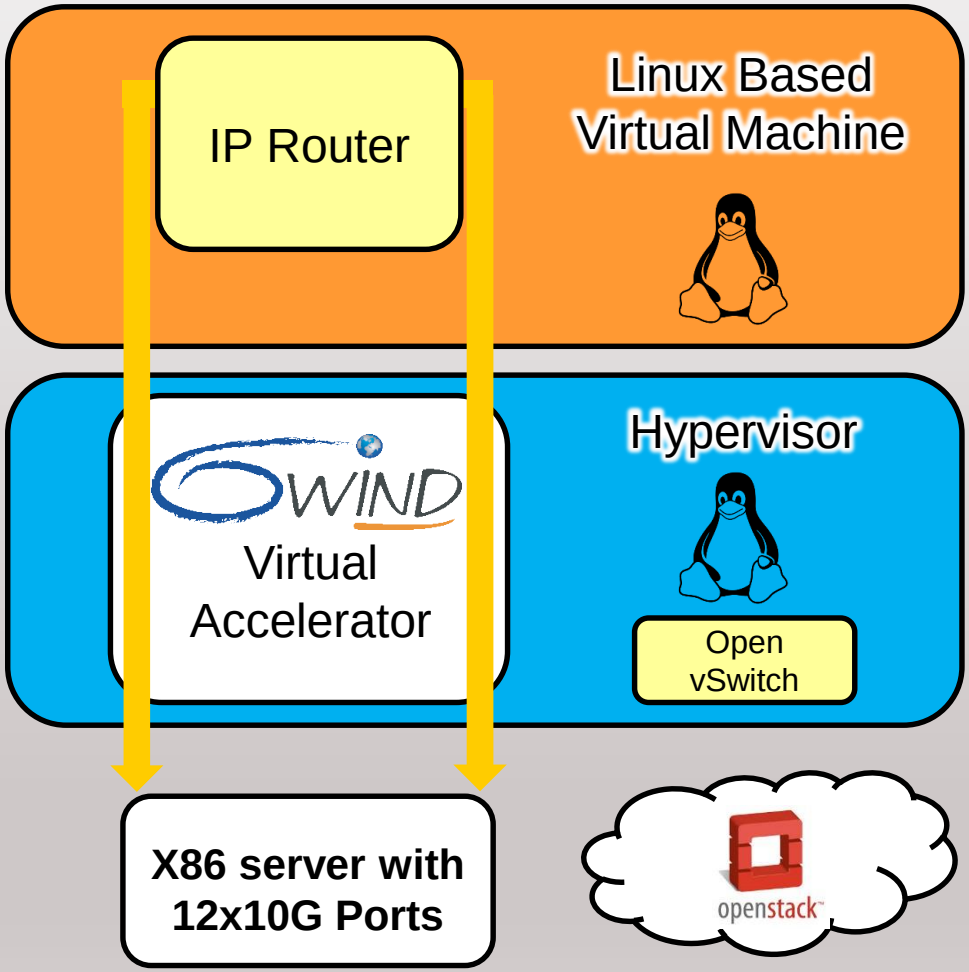
14 Gbps



Limited Bandwidth To Linux Based Virtual Machines

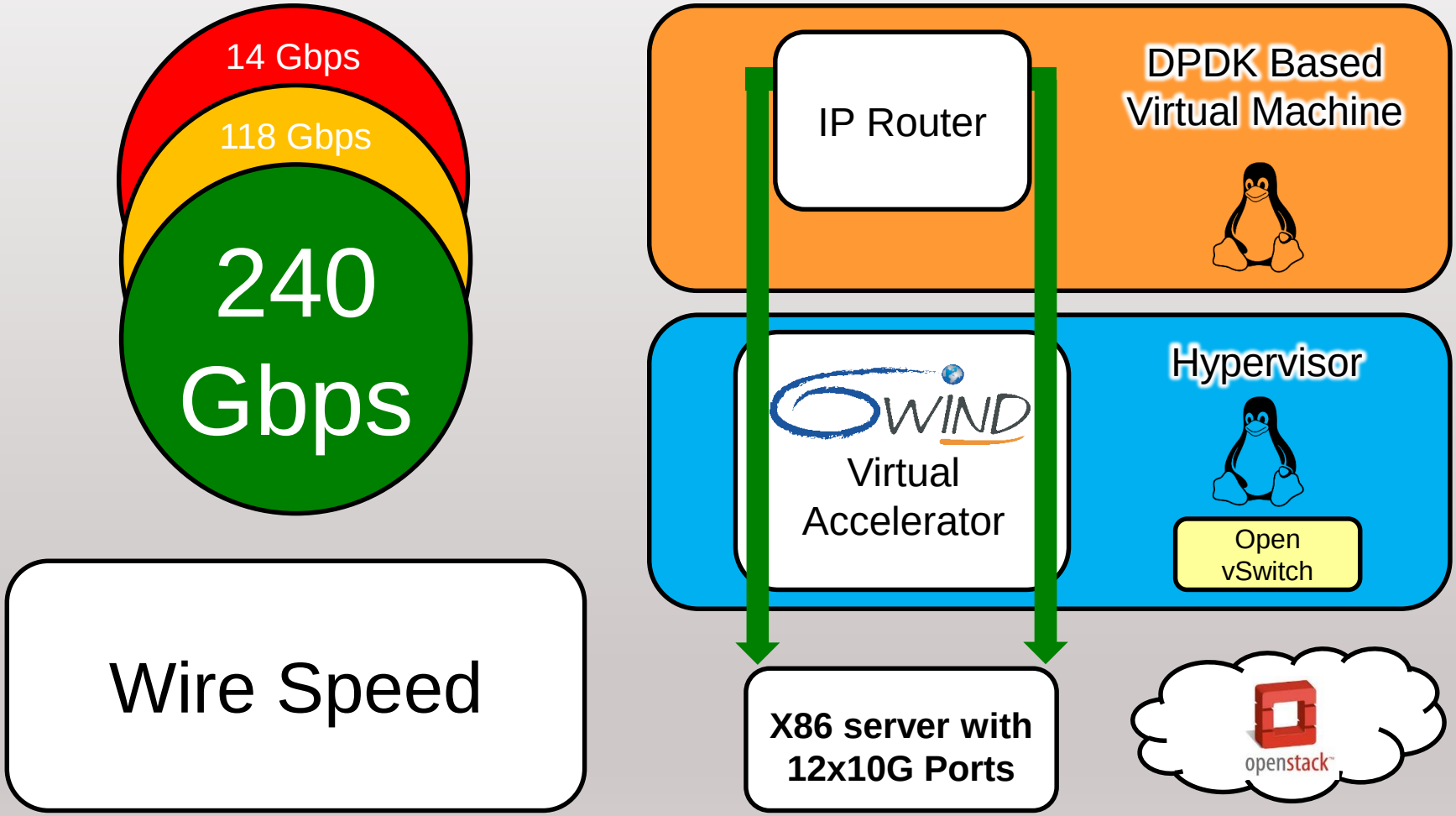
Test 2:
6WIND Virtual Accelerator + Linux VM





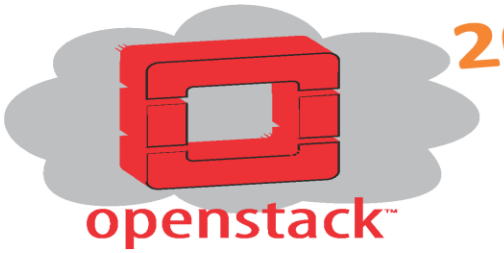
8X Bandwidth Increase

Test 3:
6WIND Virtual Accelerator + DPDK VM



6WIND : SPEED MATTERS

SPEED SERIES



200+ Gbps **Turbo Router**

100+ Gbps **Turbo IPsec**

200+ Gbps **Virtual Accelerator**

6WIND **Turbo Router**

6WIND **Turbo IPsec**

VM

Any OS

6WIND **Virtual Accelerator**

Hypervisor

EMULEX intel Mellanox TECHNOLOGIES Physical NICs

Simple Integration for VMs

High Bandwidth for VM Performance

Accelerated Open vSwitch or Linux Bridging

Network Hardware Independence

Our Products

<table>
<tr><th>Product</th><th>Usage</th><th>Source code</th><th>A la carte</th><th>Customizable</th></tr>
<tr><td>6WINDGate</td><td>Customers create their own networking product after customizing the source code and adding their own developments</td><td>Yes</td><td>Yes</td><td>Yes</td></tr>
<tr><td>DPDK Boost</td><td rowspan="2">Customers develop their own DPDK or TCP applications using provided APIs</td><td rowspan="2">APIs only</td><td rowspan="4">No, module list is predefined</td><td rowspan="4">No</td></tr>
<tr><td>TCP Boost</td></tr>
<tr><td>Virtual Accelerator</td><td rowspan="2">Ready-to-use network function that does not require any additional development</td><td rowspan="2">None</td></tr>
<tr><td>Turbo Appliances</td></tr>
</table>

WIND SPEED MATTERS

Turbo Boost Linux

The OEM Advantage

WINDGate™

Packet Processing Software

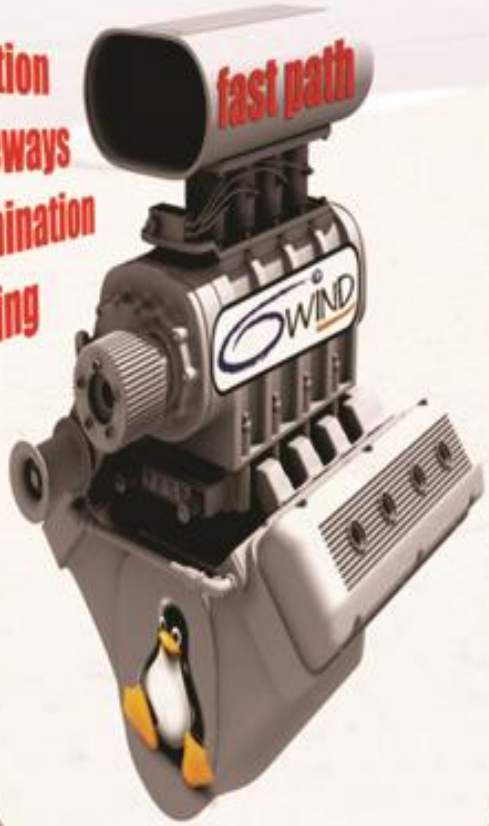
Up To 10X Network Performance

Increase Data Plane Performance

No Change To Linux Environments

Portable Across All Major Platforms

Support Extensive Set Of Protocols



L2-L4 Acceleration

IPsec VPN Gateways

TCP / UDP Termination

Virtual Switching

Intel® DPDK

And More...

Unlock Hidden Performance

Reduce Time-To-Market

Enable Transition To SDN / NFV

Thank you !

kcyeom@6wind.com