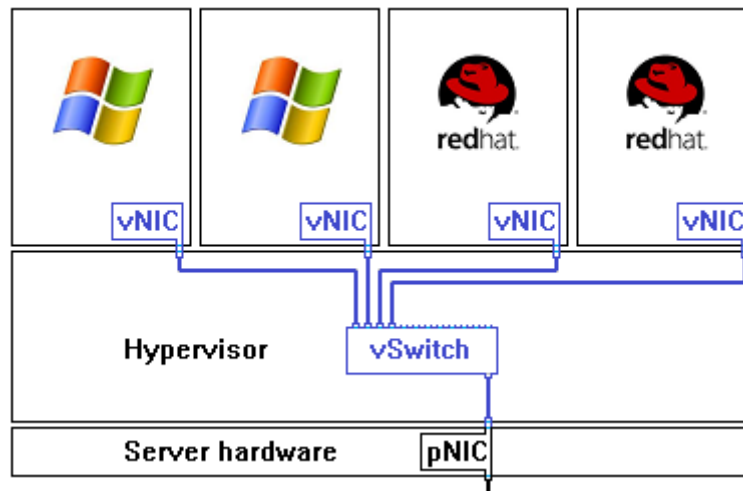


VIRTUAL SWITCHING – A SHORT INTRODUCTION

Virtual switching plays an important role in the data center, so I'm going to give a brief overview of the different products. What is virtual switching? Well, a physical server these days usually has a hypervisor as operating system, which has only one function: virtualizing other operating systems to virtual machines that are running on top of the hypervisor. These virtual machines can be Windows, Linux, Solaris, or even other operating systems. These virtual machines need network connectivity. For that, they share one or more physical network interface cards on the server, commonly called a pNIC. To regulate this network traffic, a virtual switch, called a vSwitch, runs in software on the hypervisor and connects these pNICs with the virtual network interface cards of the virtual machines, called vNICs. So it looks like this:



The blue parts are done in software, only the last part, the pNIC, is physical.

There are three big players in the hypervisor market: Citrix with XenServer, Microsoft with Hyper-V and VMware with ESXi or vSphere. Each has their own implementation of a virtual switch.

Apart from that, Cisco has a Nexus 1000 virtual switch.

Citrix Xenserver

I have no experience with XenServer and so far I've found little information on it. A virtual switch that can be used is Open vSwitch, an open source product which runs on Xen and Virtualbox. I'm not sure if this is the only virtual switch that XenServer supports. Open vSwitch supports a variety of features you would expect from a switch: trunking, 802.1q VLAN tags, link aggregation (LACP), tunneling protocols, SwitchPort ANalyser (SPAN), IPv6, basic QoS. I could not find anything in regard to Spanning Tree Protocol support, so I'm uncertain what will happen if a loop is created to a server with multiple pNICs and no link aggregation configured.

Microsoft's Hyper-V

Again, I have little real world experience with Hyper-V, and details are not clear, but the virtual switch supports the mandatory 802.1q VLAN tags and trunking. Advanced spanning-tree support is missing as far as I can tell, you can't manipulate it. I've found no information on link aggregation support. It's a very simple switch compared to the other products. There's one advantage though: you can run the Routing and Remote Access role on the Windows Server and do layer 3 routing for the VMs, which offers some possibilities for NAT and separate subnets without the need of a separate router. It's a shame Microsoft decided to no longer support OSPF on their Windows Server 2008, as this might have been a great addition to it, making a vRouter possible. RIPv2 should still work.

VMware's ESXi and vSphere

The vSwitch developed by VMware is, in my opinion, very good for basic deployment. It supports 802.1q VLAN tags and trunking. It does not support spanning-tree but incoming spanning-tree frames are discarded instead of forwarded. Any frames entering through the pNICs that have the source MAC of one of the virtual machines are dropped. Broadcasts are sent out through only one pNIC. These mechanisms prevent loops from forming in the network. Link aggregation is present but only a static EtherChannel can be formed, which requires some additional planning. QoS is not supported, and no layer 3 functions either.

Nexus 1000 virtual switch

I'm adding the NX1000V to this list, as it is currently one of the few products on the market that can be used as a vSwitch instead of the default hypervisor vSwitch. Currently there's only support for vSphere, but Cisco announced that there will be support for the Windows Server 8, too.

The NX1000V is supposed to support anything that's possible with a physical Nexus switch. So compared to the default vSwitch used, it will add support for LACP, QoS, Private VLANs, access control lists, SNMP, SPAN, and so on.

With the ongoing virtualisation of data centers, virtual switching is an emerging market. For those of you interested in it, it's worth looking into.

Source : <http://reggle.wordpress.com/2011/09/20/virtual-switching-a-short-introduction/>