

Dual-machine virtualization of core switches



Overview

Relationship Between Multicore CPUs and vCPUs Simply put, multicore CPUs serve as the physical engines that drive the virtual machines (VMs) in a virtualiz.

Key Takeaways

Dual-machine virtualization allows two physical core switches to operate as a single logical switch, enhancing high availability, scalability, and simplified management. OverviewDual-machine virtualization, exemplified by Cisco StackWise Virtual, enables two physically separate switches to function as a single logical switch. This approach consolidates the control and management planes while maintaining distributed forwarding planes, allowing both switches to actively forward traffic and share configuration and state information.

The virtualized pair appears as a single switch to the network, simplifying topology and reducing the risk of loops.

Key Benefits

High Availability: One switch acts as the active device while the other serves as standby. Stateful Switch Over (SSO) and Non-Stop Forwarding (NSF) ensure seamless failover without traffic disruption. Scalability: Bandwidth is effectively increased as both switches forward traffic locally, and Multi-chassis EtherChannel (MEC) allows link aggregation across the two devices.

Simplified Management: Network administrators manage the pair as a single entity, reducing configuration complexity and operational overhead.

Loop-

Free Topology: The spanning-tree domain treats the virtual pair as a single bridge, preventing Layer 2 loops and improving convergence times. Configuration

Considerations
Inter-Switch Link: A dedicated Ethernet connection, often called the StackWise Virtual Link (SVL), synchronizes state and forwarding information between the two switches.

VLAN and ST

P Alignment: VLAN IDs must be carefully managed to avoid spanning-tree loops.

ST

P root priorities should be configured to align with the virtual switch design. **First Hop Redundancy Protocol (FHRP):** Virtualizing the IP gateway function requires fine-tuning of FHRP timers to ensure rapid failover and alignment with STP priorities. **Multicast Optimization:** Protocol Independent Multicast (PIM) configurations may need adjustment to optimize multicast forwarding across the virtualized pair.

Operational Behavior
Active/Standby Roles: The active switch handles all control plane functions, including management, Layer 2 and Layer 3 protocols, and software updates, while the standby switch mirrors the state. **Distributed Forwarding:** Both switches forward traffic locally. If traffic needs to traverse to the other switch, it is sent over the SVL, ensuring efficient data-plane operation.

Fault Tolerance: In case of a switch failure, the standby immediately assumes the active role, maintaining uninterrupted network services.

Relation to Multicore Virtualization Concepts

The principles of dual-switch virtualization are conceptually similar to multicore CPU virtualization, where physical resources are abstracted to provide logical units for efficient workload distribution. Just as vCPUs allow multiple virtual machines to share physical cores, StackWise Virtual allows two physical switches to share control and forwarding responsibilities while maintaining isolation and redundancy. **Summary**
 Dual-machine virtualization of core switches provides a resilient, scalable, and manageable network architecture.

By treating two physical switches as a single logical entity, organizations can achieve high availability, simplified management, and optimized traffic forwarding, making it ideal for modern campus and data center networks.

Article Content

Relationship Between Multicore CPUs and vCPUs

Simply put, multicore CPUs serve as the physical engines that drive the virtual machines (VMs) in a virtualized environment, while vCPUs operate as the virtual components assigned to

Cisco Catalyst 9000 Platform StackWise Virtual White Paper

Cisco® Catalyst® 9000 platform StackWise® Virtual technology allows the clustering of two physical switches together into a single logical entity. The two switches operate as one; they

Multicore Processing: Virtualization and Data Center

system can be partitioned without being virtualized. For example, in a SoC that allows partitioning but not virtualization, each Ethernet interface can be assigned to a partition but a single Ethernet

How do physical multi-core CPUs relate to vCPUs

When the VM is running vCPU's are actually mapped to real CPU cores where the virtualisation/time-slicing mechanism hands out real CPU processing capability to the VMs as required.

Multicore and Virtualization: An Introduction | CMU Software ...

In this introductory blog post, I lay the foundation for the rest of the series by defining the basic concepts underlying multicore processing and the two main types of virtualization: (1)

CPU Virtualization in vSphere

Processor models might differ in the CPU features they offer, and applications running in the virtual machine can make use of these features. Therefore, it is not possible to use vMotion ® to migrate

Hyper-V Virtual Switch | Microsoft Learn

Hyper-V Virtual Switch includes programmatically managed and extensible capabilities to connect VMs to both virtual networks and the physical network. In addition, Hyper-V Virtual Switch

Application of Switch Virtualization Technology in Network

When I was looking for information on the Internet and wanted to do an experiment with the topology mentioned above, I just found an article that also said how to implement dual-switch virtualization

Virtualization in Multi-Core Processors

Instead of supporting time-sharing jobs on one or a few cores, we can use the abundant cores in a space-sharing, where single-threaded or multithreaded jobs are simultaneously assigned to separate

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Is there such a thing as a virtual switch?

I'm wanting to potentially implement virtual layer 2 and layer 3 switches if there is such a thing. If so, are they just like any virtual appliance and

Cisco Switch Virtualization

The dashed lines are layer 2 links. Spanning tree will block two of these links to create a loop-free topology. Another issue with this topology is that we do have

Cisco Catalyst 9000 Platform StackWise Virtual White Paper

StackWise Virtual physical to logical representation This paper explains the Cisco StackWise Virtual technology, including its benefits and requirements. Cisco Catalyst 9000 platform

Configuring dual network ports for 2 Hyper V servers + management ...

Hello, I'm a nooby with multiple NICs. I have 2 NICs on my server and I'm setting it up as a Server 2016 host with hyper-v and two 2016 server VM guests for a small network with 20

Hyper-V virtualization in Windows Server and Windows

Learn about Hyper-V virtualization technology to run virtual machines, its key features, benefits, and how to get started in Windows Server and Windows. Discover common uses and

Run Hyper-V in a Virtual Machine with Nested Virtualization

Learn how to use nested virtualization to run Hyper-V in a virtual machine and emulate configurations that normally require multiple hosts.

Which is better: Virtualizing or 10G Core Switch?

Virtualization is too slow!" I put in two HP Aruba 2930F switches (JL254A) with 4x SFP+ each, VSF stacked them, then used the remaining SFP+ ports to feed 10Gb dual SFP+ NIC's added

Data Center Switches – Cisco Nexus

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This document is for preliminary research. Verify specifications against current standards, product documentation and project requirements.

