

Overview

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Overview of VIC Configuration Guide

A Cisco UCS network adapter can be installed to provide options for I/O consolidation and virtualization support. This guide contains configuration details on RDMA over Converged Ethernet version 2 (RoCEv2) , NDIS Poll Mode, and Single Root I/O Virtualization (SR-IOV).

RDMA Over Converged Ethernet (RoCE) v2

RDMA over Converged Ethernet version 2, or RoCEv2, is an IP-based RDMA protocol that allows RoCEv2 packets to be routed across Layer 3 networks.

RoCEv2 enables direct memory access over the network by encapsulating InfiniBand transport packets over Ethernet using UDP/IP. The RoCEv2 protocol runs over either UDP/IPv4 or UDP/IPv6. UDP destination port 4791 is reserved for RoCEv2. Because RoCEv2 packets are routable, the protocol is sometimes referred to as Routable RoCE.

RoCEv2 is supported on the Windows, Linux, and ESXi Operating Systems.

NDIS Poll Mode for Windows

Network Driver Interface Specification (NDIS) Poll Mode is an advanced traffic processing mechanism designed to optimize how the operating system manages network data. NDIS Poll Mode allows the operating system to control how network traffic is processed, providing improvements over older methods that relied on Deferred Procedure Calls (DPCs). By using the NDIS layer, the operating system manages network processing directly, which enhances performance, stability, and efficiency, especially during periods of heavy network activity.

NFS Over RDMA

Network File System (NFS) over Remote Direct Memory Access (RDMA) optimizes network storage performance by allowing the NFS protocol to operate over high-speed, RDMA-capable fabrics. By bypassing traditional network stack processing, this feature significantly reduces Central Processing Unit (CPU) overhead, thereby enhancing overall system efficiency.

Single Root I/O Virtualization

Single Root I/O Virtualization (SR-IOV) allows multiple VMs running a variety of guest operating systems to share a single PCIe network adapter within a host server. SR-IOV allows a VM to move data directly to and from the network adapter, bypassing the hypervisor for increased network throughput and lower server CPU burden. Recent x86 server processors include chipset enhancements, such as Intel VT-x technology, that facilitate direct memory transfers and other operations required by SR-IOV.

The SR-IOV specification defines two device types:

- Physical Function (PF)—Essentially a static vNIC, a PF is a full PCIe device that includes SR-IOV capabilities. PFs are discovered, managed, and configured as normal PCIe devices. A single PF can provide management and configuration for a set of virtual functions (VFs).
- Virtual Function (VF)—A VF is a full or lightweight virtual PCIe device that provides at least the necessary resources for data movements. A VF is not managed directly but is derived from and managed through a PF. One or more VFs can be assigned to a VM.

SR-IOV is defined and maintained by the Peripheral Component Interconnect Special Interest Group (PCI-SIG), an industry organization that is chartered to develop and manage the PCI standard.