Network architecture

ONTAP 9

NetApp
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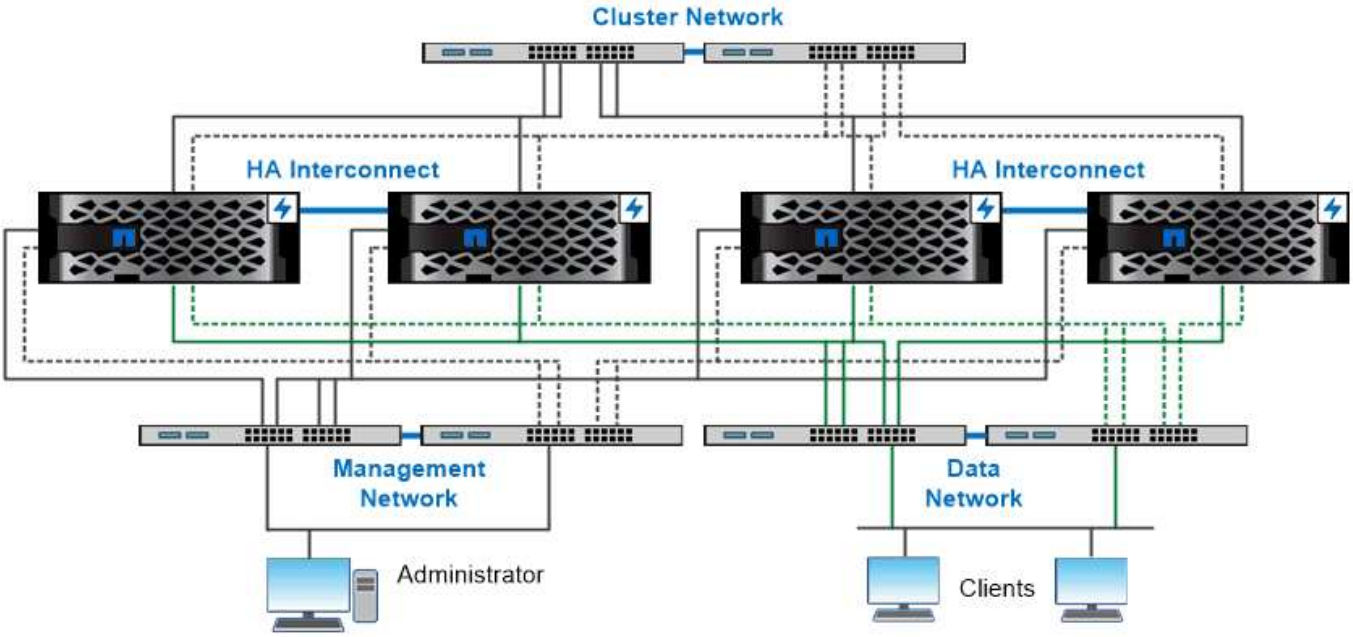
Table of Contents

Network architecture . . . 1
- Network architecture overview . . . 1
- Logical ports . . . 1
- Support for industry-standard network technologies . . . 2
- RDMA overview . . . 3

Network architecture

Network architecture overview

The network architecture for an ONTAP datacenter implementation typically consists of a cluster interconnect, a management network for cluster administration, and a data network. NICs (network interface cards) provide physical ports for Ethernet connections. HBAs (host bus adapters) provide physical ports for FC connections.



The network architecture for an ONTAP datacenter implementation typically consists of a cluster interconnect, a management network for cluster administration, and a data network.

Logical ports

In addition to the physical ports provided on each node, you can use *logical ports* to manage network traffic. Logical ports are interface groups or VLANs.

Interface groups

Interface groups combine multiple physical ports into a single logical “trunk port.” You might want to create an interface group consisting of ports from NICs in different PCI slots to ensure against a slot failure bringing down business-critical traffic.

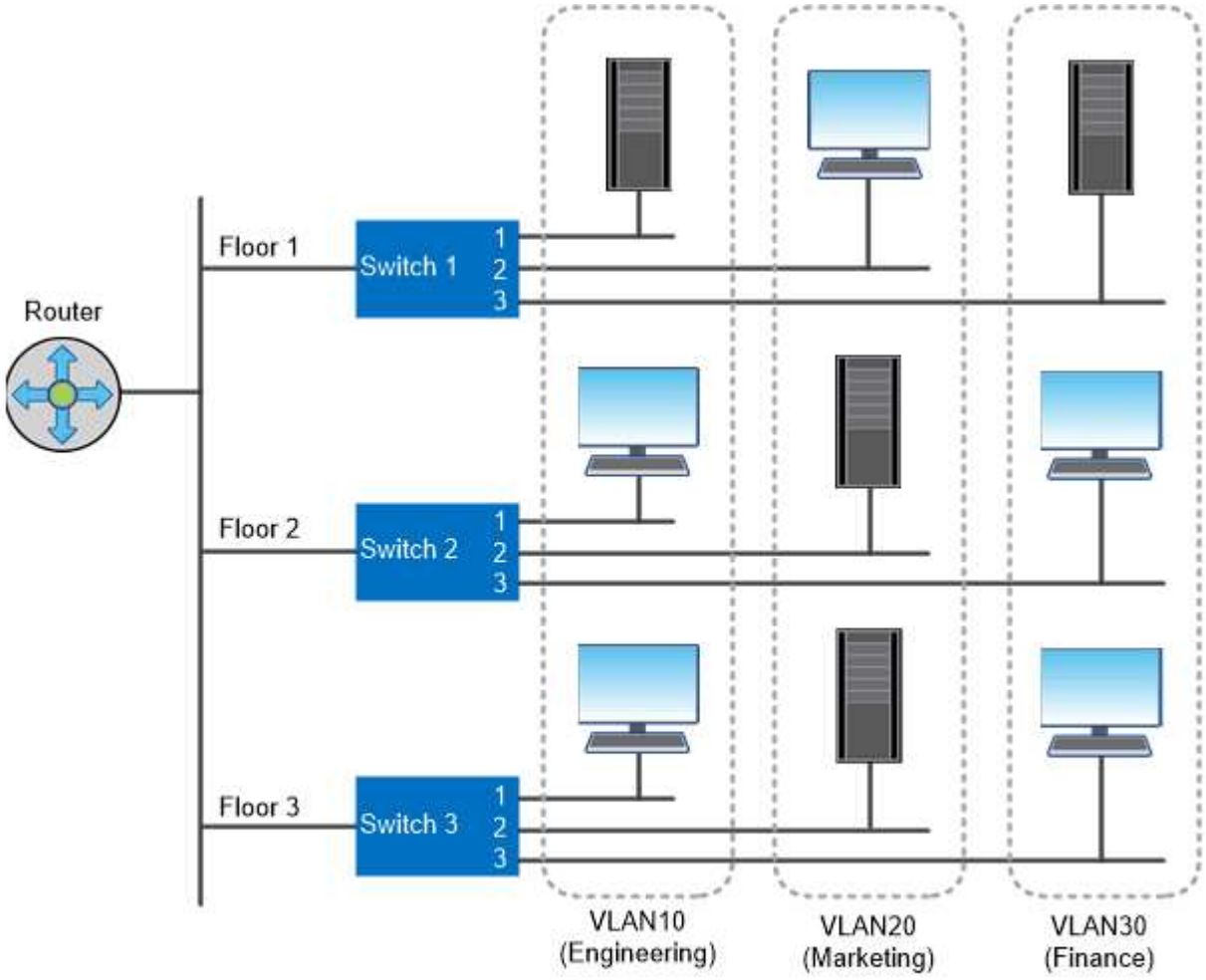
An interface group can be single-mode, multimode, or dynamic multimode. Each mode offers differing levels of fault tolerance. You can use either type of multimode interface group to load-balance network traffic.

VLANs

VLANs separate traffic from a network port (which could be an interface group) into logical segments defined on a switch port basis, rather than on physical boundaries. The *end-stations* belonging to a VLAN are related

by function or application.

You might group end-stations by department, such as Engineering and Marketing, or by project, such as release1 and release2. Because physical proximity of the end-stations is irrelevant in a VLAN, the end-stations can be geographically remote.



You can use VLANs to segregate traffic by department.

Support for industry-standard network technologies

ONTAP supports all major industry-standard network technologies. Key technologies include IPspaces, DNS load balancing, and SNMP traps.

Broadcast domains, failover groups, and subnets are described in NAS path failover.

IPspaces

You can use an *IPspace* to create a distinct IP address space for each virtual data server in a cluster. Doing so enables clients in administratively separate network domains to access cluster data while using overlapping IP addresses from the same IP address subnet range.

A service provider, for example, could configure different IPspaces for tenants using the same IP addresses to access a cluster.

DNS load balancing

You can use *DNS load balancing* to distribute user network traffic across available ports. A DNS server dynamically selects a network interface for traffic based on the number of clients that are mounted on the interface.

SNMP traps

You can use *SNMP traps* to check periodically for operational thresholds or failures. SNMP traps capture system monitoring information sent asynchronously from an SNMP agent to an SNMP manager.

FIPS compliance

ONTAP is compliant with the Federal Information Processing Standards (FIPS) 140-2 for all SSL connections. You can turn on and off SSL FIPS mode, set SSL protocols globally, and turn off any weak ciphers such as RC4.

RDMA overview

If you have latency sensitive or high-bandwidth workloads, you may want to take advantage of ONTAP's Read Direct Memory Access (RDMA) offerings. RDMA allows data to be copied directly between storage system memory and host system memory, circumventing CPU interruptions and overhead.

Beginning with ONTAP 9.10.1, you can configure NFS over RDMA to enable the use of NVIDIA GPUDirect Storage for GPU-accelerated workloads on hosts with supported NVIDIA GPUs.

ONTAP 9.10.1 also introduces RDMA cluster interconnect for ONTAP users with an A400 or ASA400 storage system with Pensando cluster NICs. RDMA cluster interconnect reduces latency, decreases failover times, and accelerates communication between nodes in a cluster. Given the appropriate storage system set up, no additional configuration is needed.