

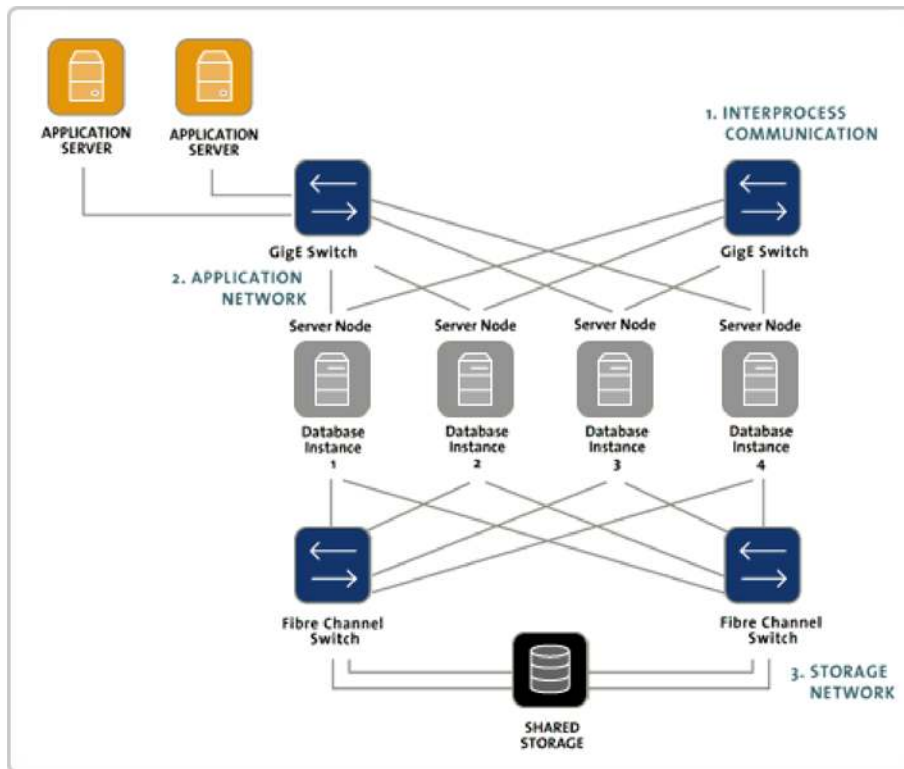
DATABASE CLUSTERS

Scale distribution databases to meet their full potential.

IMPROVE DATABASE PERFORMANCE

Clustered databases such as Oracle or IBM DB2 promise customers better scalability and higher availability on industry-standard hardware. Unfortunately, with existing interconnect technology, those promises have remained largely unrealized. Burdened by low bandwidth, high latency, and overhead, the traditional interconnects have prevented distributed databases from scaling to meet their full potential.

The Cisco SFS Series server switching portfolio is a new network infrastructure designed specifically for clustered applications such as databases. This intelligent fabric accelerates database server speed to 10 Gbps and reduces latency significantly, resulting in better performance with much lower cost while enabling plug-and-play interoperability with existing systems and databases.



CLUSTERED DATABASE CHALLENGE AREAS

The Problem

There are three major sources limitations in today's clustered database deployment:

- 1. Interprocess Communication:** Communication scalability between the database nodes in a cluster is limited by slow interprocess communication resulting from low bandwidth, high latency, and CPU overhead. This restricts the number of servers that can be effectively clustered with adequate performance.
- 2. Application Network:** Communication performance between the application tier and the database tier is limited by CPU overhead on database and application servers due to TCP/IP and operating system overhead, which results in significant wasted capacity.
- 3. Storage Network:** Physical I/O capacity limits scalability for connecting database servers to their storage resources. Today, to support interprocess communications, application-tier interconnect, and storage interconnect--each with redundancy--requires six network interface cards, occupying six PCI slots. As server nodes move to smaller packaging such as 1U servers, there are typically not enough I/O slots left to support all the interconnects.

The Solution

Cisco offers a single solution with a 10Gbps, low-latency fabric to address each of these needs:

- **Remote Direct Memory Access (RDMA):** Servers can write data directly between each other's memory spaces, bypassing operating-system and TCP overhead. This results in much higher bandwidth and lower latency, improving speed of communication between nodes, such as a distributed lock manager or time to scan tables in parallel. This dramatically improves scalability and performance on existing platforms.
- **Centralized TCP Offload:** Cisco provides TCP offload for the entire database infrastructure. Using a transparent protocol with existing socket APIs, communications between clients and servers bypass operating-system and protocol overhead, which frees significant CPU cycles across the network, which can be applied to more important business needs.
- **Unified Fabric:** Because you can simultaneously use the underlying fabric for networking, interprocess communication, and storage, you can reduce the number of host adapters to just one, including the redundant second port. By creating virtual storage and network adapters in each server, you can aggregate and load balance traffic across virtual interfaces, providing for peak loads and improving high availability.

Expected Results

The Cisco solution allows IT managers to scale industry-standard components, achieving the performance of high-end proprietary servers with the economy of industry-standard servers. Rather than over-build and waste resources, data centers can be built so they are scalable. The ability to scale granularly can significantly reduce management costs. Data centers can achieve equivalent application performance with fewer CPUs at a significant cost savings.

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