Network-Attached Secure Disks (NASD)

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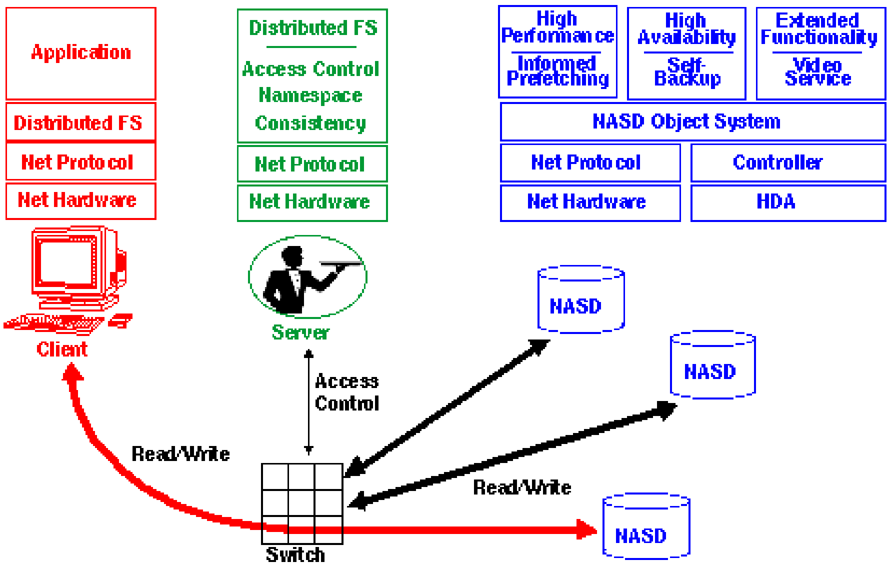
Today's distributed and parallel storage systems will inherit the compelling scalability of the switched networking technologies that are becoming widely available. Our goal is to define the evolutionary path and revolutionary changes that will enable commodity storage components to be the building blocks of high-bandwidth, low-latency, and scalable storage systems.



Our approach, Network-Attached Secure Disks (NASD), comprehensively enhances storage system performance by:

- promoting devices to **first-class network clients** to eliminate intermediate copies and transfer with high bandwidth,
- exploiting increasingly cost-effective **computational power at the device** to offload device-specific optimizations, network access and storage management and to support availability and security services,
- **restructuring the software layering** of file and storage systems to enable offloading to devices and clients and to support diverse high-level file-system functionalities (distributed file systems vs. parallel file systems), and
- increasing the quality of workload information available at devices to enable **self-management and device-specific optimizations**.

We propose to present in the OSDI'96 Work-in-progress session a summary of the NASD project's goals, approaches, insights todate, and future directions. Recent progress includes a taxonomy of feasible network-attached storage architectures and our comparison of two categories in that taxonomy: NASD drives as outlined above and a simple extension of current SCSI drives called NetSCSI. Initial results suggest that NetSCSI may reduce NFS server load marginally and AFS server load by up to 50%, while NASD may reduce NFS server load by up to 90% and AFS server load by up to 75%.