



## Server Consolidation and Virtualization

### Microsoft® Virtual Server - VMware® Server - Xen - Virtual Iron®

Server virtualization is a powerful, multi-faceted tool for system management. It provides for server consolidation, rapid deployment of applications, dynamically-managed workloads, continuity with legacy operating systems and their applications, and decreased hardware costs. It can increase server availability and efficiency, and facilitate disaster recovery.

#### Leveraging hardware resources

As hardware performance far outstrips the demands of greater numbers of server applications, server virtualization becomes more and more practical. In particular, server memory and processor resources are frequently underutilized, presenting the opportunity for two, three or more applications to be run simultaneously on a single hardware platform. Virtualization enables multiple operating systems to run side-by-side on a single physical machine, thereby more effectively utilizing the processor and memory resources.

#### The performance bottleneck

Virtualization tends to place heavy demands on the storage I/O subsystem. With multiple OSs running concurrently, each with its own page file and application, I/O traffic increases substantially. Disk resources are under greater and greater contention. The I/O subsystem quickly becomes the primary bottleneck to system performance.

#### Host OS role

Most virtualization architectures describe a host or parent operating system which is assigned the role of providing lower-level services to the target or child operating systems. Typically, the host OS is responsible for routing or fulfilling requests for memory, network and storage resources. In most cases, all storage I/O requests - including those initiated by target OSs - are fulfilled by the host OS. Thus, the I/O bottleneck manifests itself in the host OS's storage subsystem.

#### Performance Solutions

Deploying SuperCache 3 on the host operating system, and creating caches in the paths of virtual hard disks significantly improves the performance of the entire system. SuperCache 3 uses memory and processor resources to enhance disk I/O subsystem performance. On virtual servers, SuperCache 3 can yield overall system performance gains of 30 to more than 1000%, depending on the OS and application mix, and system loading.

In addition, the solutions described for individual applications may further enhance I/O performance. In a virtualized environment, these solutions must be applied directly to the indicated server. For example, for database applications, our tempdb bottleneck solution specifies placing the tempdb files on a RAM disk. If the database application is run in a virtual machine, the RAM disk should be created within that virtual machine.