Business Primer :

The Basics of Virtualization Performance

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This business primer looks at the implications of adopting virtualization upon the physical hardware used, giving information on how issues are overcome using VMWare technologies.

Introduction

Servers are most commonly required to run a dedicated application, such as email or an accounting package. While this traditional approach to creating a an infrastructure may help ensure the smooth operation of the application, it uses just a small percentage of the total resources available from the machine.

Compare this with a virtualized approach, which runs several applications at the same time on a single server by hosting them inside their own virtual machine. This allows the full performance of the server to be fully utilized.

Availability

A virtual machines residing on the same physical server share the hardware resources while remaining isolated from each other – almost as if they are separate machines in their own right. This ensures that any fault occurring in one virtual machine would not affect another, keeping your applications available for use by staff.

If the host machine develops a fault, VMware is able to migrate a live application to another server automatically with no service interruption. This feature is a huge advantage over traditional server deployments in terms of disaster recovery particularly when you also consider the ability for VMWare to dynamically allocate resources based on policy.

Resource Allocation

A virtual machine solution from VMWare virtualizes four vital hardware resources: memory, storage, processor and network, allocating and balancing them according to application needs. This of course does bring performance implications, which are detailed below:

Memory Performance

Memory is an important factor when considering how many virtual machines can be sited in one server. Applications still require memory to run correctly, and in addition VMWare will also require a portion to operate.

VMware technologies are configured to require only a small memory overhead along with the virtual machines

being sited, and use advanced memory management mechanisms such as RAM over-commitment and transparent page sharing to expand or contract memory allocation to each virtual machine automatically as application loads increase and decrease. This dynamic balancing of memory allows for higher levels of server consolidation than is possible with traditional static virtual memory.

Storage And Performance

Virtual machines use virtualized operating systems, applications and data, and so will require the disk space in which to perform reliably. A group of virtual machines in one server can therefore have an impact on hard drive performance, both due to drive space allocation and the need to serve information to users.

VMware solutions overcome this issue with VMware vStorage VMFS, which presents virtual machines with concurrent access to shared data stores. This consolidation of storage reduces potential latency and increases throughput, providing the foundation for features including live migration and consolidated backup.

CPUs And Performance

Virtualizing a CPU brings a varying level of overhead, depending on a number of factors factors. Processor-intensive applications will have an impact on CPU performance, slowing down the application in action.

VMware solutions are able to balance processor loads and utilize the full performance evelope of multi-cores and multi-processor configurations. This provides the ability to run processor-intensive applications such as databases and e-mail servers on virtual machines without suffering a reduction in application performance.

Performance Implications for Networking

As with networking sizing and performance considerations in a traditional environment, virtual infrastructure will have a similar workload.

VMware provides the ideal platform for secure, high-speed networking between virtual machines on a physical server, and supports network topologies that would otherwise require additional investment in hardware. It's also possible to network virtual machines across physical servers, as each virtual machine has an individual IP address and can accommodate up to four virtual network interface cards.

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