Virtual Server

December 10, 2014

1. Rate

Current rate information is available at: http://its.ne.gov/sla/

2. General Overview

A "SAN" Virtual Server is a simply hosted server operating system, known as a "guest" operating system. The "image" or picture of the guest server is stored on a SAN (Storage Area Network) which is a very fast set of hard disk arrays. The guest operating systems are loaded from the SAN into memory on the hosts. For Disaster Recovery purposes, a secondary offsite SAN may be specified in order to duplicate the exact image copy of the guest server using snapshot technology. The guest server, then, can be powered on at the remote site should that become necessary.

The primary advantage of virtual servers is to fully utilize hardware, collectively lower shared power and disk storage costs, facilitate Disaster Recovery, and aid in server management. There are numerous other advantages simply from a technical viewpoint.

A "snapshot" of the server running in memory can be taken before making configuration changes. In case of disastrous or unforeseen results, the snapshot can be rolled back to reverse the process entirely. Also, the ability to clone a known good server image vastly reduces server installation time and costs for multiple servers needed in the future. These are just a few features of this service.

The business value of Virtual Servers for clients is simple: hardware and maintenance costs disappear, standard Operating System licensing costs are included with the service, and the client only pays for the actual disk space allocated to the guest server.

There is no need for the client to oversize either disk or memory of a guest VM server in order to accommodate probable future expansion requirements, as is commonly done with physical servers. Virtual server disk space may be increased or decreased dynamically upon request. An increase in memory can also be implemented, although a guest operating system reboot is required for this feature to take effect. Capacity to add more servers, more processors, and more memory are built into the solution. The host operating systems are clustered to act as one, with problem detection, failover capability, and system resources dynamically assigned.

3. Service Description

Services include:

One (1) named virtual server with a **baseline** standard configuration:
  - Standard 32 or 64 bit Operating system

- o 2 GB RAM
- o One processor

Tiered service dependent upon resources allocated above the standard configuration:

- o Incremental RAM increase
- o Two processors

Security:

Virtual server images reside on OCIO SANs, and the storage is managed by the OCIO. That storage is presented to the clustered host servers which allocate memory, CPU, and network resources to the guest (virtual) servers. From a security point of view, the guest operating system and the host operating system are completely different, and the ability to manage or inspect a guest operating system or a host operating system is also separate. The management of a virtual server, or a group of virtual servers, can be delegated to the client. This includes the ability to use the virtual server console, install operating systems or other software, and view performance graphs. As with any server, virtual or physical, any data which needs to be encrypted should be encrypted at the file system level – this is entirely controlled by the owner of the virtual server. The OCIO storage manager(s), even though they can present data to virtual servers, cannot view that data. Encryption keys are the province of client, and are not known by the host or the OCIO.

Server administrators do not have access to the actual hardware where their virtual servers reside. They still have remote administrative capabilities via Remote Desktop, but hardware access is not permissible. Metrics available within the virtual server operating system are the same as they would be upon a physical machine. Virtual computers are primarily RAM intensive (as opposed to CPU intensive), and applications which require vast amounts of RAM often are not suited to a virtual environment from an economic standpoint, although technically they may be virtualized to meet business needs. There are also a few applications which do indeed press the limits of CPUs, and these are probably also candidates for their own physical servers.

4. Roles and Responsibilities:

The OCIO will be responsible for providing a VM environment necessary to host virtual servers of reasonable size. The OCIO recognizes that there are servers and applications which belong on their own hardware and cannot be reasonably or cost-effectively virtualized. The OCIO has an obligation up front to inform clients when this is so, and will not virtualize servers it deems unsuitable for a VM environment.

The OCIO will provide diagnostics at the VM Host level upon request, and provide information showing a healthy host is providing the environment for any resident virtual server. Such information would include disk, memory, and CPU statistics.

The client will be responsible for the health and maintenance of the guest operating system and the applications which run on that guest operating system. In this respect, the maintainer of the operating system has exactly the same responsibilities for the OS and software that they would have if they were implementing a server on its own hardware.

5. Billing Information:

Current rate information is available at: http://its.ne.gov/sla/. The rate for this service is based upon physical costs and labor to maintain the environment.

The Network Services Division within the Office of the CIO uses a system of Billing Accounts, Job Codes and Work Orders for authorizing work and tracking costs for specific projects. The customer may designate which job code and work order to use or request a new job code and work order. Contact the Office of the CIO for assistance with developing an accounting structure that meets the needs of the agency.

6. Service Hours, Response Times and Escalation:

This is a clustered host environment, fully architected to be a 7x24 hosted environment. This is a "four nines" service – fully 99.99% uptime of the virtual machine environment. This means that guest downtime due to a VM host is typically less than one hour per year.

Maintenance or interruption of the underlying electrical or network components will affect the VMs as they would any other servers. All due diligence is applied to ensure redundant power and network connectivity, including the SAN fiber connectivity through two disparate switches. Primary site diesel power generators, dual network core switches, and redundant VM hosts are all components meant to make this a robust enterprise level service. Capacity planning will ensure that any VM host can be taken down for maintenance without affecting guest operating systems.

An expectation by the NITC and the State Security Officer is that all servers remain fully patched to remedy security issues. While this should not affect the clustered VM hosts, as they can be individually taken offline for maintenance without impact, such patches will affect the guest operating systems which often need reboots after operating system modifications. The OCIO will reboot guest operating systems it manages once per month – or possibly more in the event of a critical security update announced by a vendor. VMs maintained by other agencies should follow a similar pattern in order to maintain a secure server and network environment. Such outages are scheduled for both physical servers and VMs and do not have any bearing on the SAN VM environment or its reliability.

Normal operational functions and requests will be serviced during work hours, 7 A.M. through 6 P.M. These would include creating new virtual servers, adding disk space for servers, etc. Emergency

virtual server procedures and requests are exactly the same as if a physical server were to experience problems. The same emphasis and reporting structure will be followed.

In event of a disaster, a brief outage can be expected as the designated VMs boot up at the DR site.

A monthly graph of CPU utilization is available to verify guest operating system uptime. Other metrics are available upon request, such as graphing memory utilization or showing performance during very specific time.

Support is available 7 x 24 at 402- 471-4636. During regular hours (7am – 6pm) a support call will be routed by the Help Desk to the appropriate team – open systems, networking, security, etc. During off hours the call will go to OCIO Operations personnel, it will be logged, and on-call members of the OCIO will be notified. The on-call staff will identify the problem and the appropriate people necessary to address the issue.

For further information, please contact:
Office of the CIO Help Desk
cio.help@nebraska.gov
402-471-4636 or 800-982-2468