Virtual Server

Network Services-Open Systems
March, 2019

Rate

Per Month per Guest Server
Virtual Machine – up to 2 GB RAM = $70.00
Additional 1 GB RAM increments = $15.00
Maximum 32 GB RAM per VM in current environment
Additional 1 CPU increments (above 4 CPUs) maximum of 8 CPUs = $30.00

General Overview

A "SAN" Virtual Server is simply a hosted server operating system, known as a "guest" operating system. The environment is similar in function to older virtual environments, such as MVS logical partitions, HP/UX virtual partitions, or Solaris zones, except that the Intel/AMD platform is supported and implemented. Almost all operating systems which can run on Intel/AMD hardware can be virtualized and run in this environment.
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 server administrator can have the OCIO take a "snapshot" of the server running in memory before making configuration changes. In case of disastrous or unforeseen results, the snapshot can be rolled back by the OCIO 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 dynamically upon request. An increase in memory can also be implemented, although a guest operating system reboot may be 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.

Limitations:
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 are probably not suited to a virtual environment from an economic standpoint, even though technically they could be virtualized. 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.

Service Details

This Service includes:

- Setup and removal
- One (1) named virtual server with a baseline standard configuration:
    - 64 bit Intel based Operating system
    - Standard 42 Gigabyte OS Partition – base size included. Additional storage is billed at the SAN Storage published rate.
    - 2 GB RAM
    - Two processors
- Tiered service dependent upon resources allocated above the standard configuration:
    - Incremental RAM increase (surcharge of $15 for each Gigabyte increment)
    - Incremental CPU increase (surcharge of $30 for each CPU over four, up to eight)

This Service does not include:

- Restores, drive expansions, requested snapshots
- Working on the operating system during the server's life cycle
- Installation of applications
- Troubleshooting application problems
- Configuration changes after the initial installation

Experience has shown vendors typically specify excessive server "requirements" they do not pay for. Actual server resources should be allocated by real world usage, not paper specifications. Resource allocation of VMs will be automated according to performance measurements, and OCIO billing will reflect actual resource usage. In short, there are savings to be realized by efficiently sizing servers according to need – savings

passed to the customer and, by extension, the taxpayers. Conversely, there are fewer instances when virtual servers are undersized, and adjustments to those servers will also need to be made.

Roles and Responsibilities

The OCIO will provide 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 to inform clients when this is so, and will not virtualize servers it deems unsuitable for a VM environment.

The client will be responsible for the applications which run on a virtual server, and any licensing of those applications.

Requesting Service

To order the service, contact the Office of the CIO Service Desk (402- 471-4636) or CIO.help@nebraska.gov).

Or, submit a Service Request via the Service Portal: https://serviceportal.ne.gov)

The following information will be needed when ordering the service:

- Requesting Agency
- Account Name
- Email Address
- Job Code and Work Order Number

Service Expectations, Hours, Availability and Reliability

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. This should not affect the clustered VM hosts as they can be individually taken offline for maintenance without impact, but patches will affect the virtual server operating systems as they will 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.

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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.
Recent performance metrics are available upon request. Performance data becomes less granular for older data, and eventually the oldest data is purged altogether to keep database size and query response reasonable.

Cost and Billing Information

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

For further information, please contact:

The Office of the CIO Service Desk

Request this Service: https://serviceportal.ne.gov

cio.help@nebraska.gov

402-471-4636 or 800-982-2468