Private Cloud Solution Example

Example of a Private Cloud Implementation.

1. Scenario

A customer has a physical infrastructure of 30 aging servers, these servers all run from their computer room. All the servers have local attach storage i.e. internal hard disk, the total of this disk space amounts to around 3.5 TB of data. The total amount of memory on all the servers totals 125GB; this memory is evenly distributed across all the servers.

2. Solution

virtualDCS proposed to create a VMware vSphere cluster. The benefits of the VMware clusters include:

- High Availability for all servers.
- Load balancing of virtual servers between physical hosts.
- Resilience to failure of any single hardware component.

To manage the virtual infrastructure a vCenter virtual server will be deployed.
**Server Technology**

Based on the current total server memory footprint of 125GB, we believe three servers will support your current server workload and provide approximately 50GB of additional capacity, whilst still achieving N+1 server resiliency. The proposed servers would have the following specification:

- 2 x Intel E5640 2.66GHz Xeon CPU’s.
- 96GB RAM.
- 6 x 1000Mbit/sec NIC Ports.
- Redundant fans and power supplies.
- On-board SD card (ESXi hypervisor boot).

No internal drives will be required as we plan to deploy the servers using VMware ESXi installed onto internal SD cards.

**Storage Technology**

Each physical server in the VMware cluster must be connected to shared storage can be accessed simultaneously. iSCSI SAN’s operate using standard Ethernet switches as the interconnect method. They effectively encapsulate the SCSI commands over the IP network to compatible devices. This can make them cost-effective to implement, manage, and extend.

The current storage requirement based on the information provided is around 3.5TB.

Benefits of such SAN storage solution include:

- High Availability – supporting continued access to data in the event of failure of an entire storage node (using Network RAID 10).
- Performance and Capacity Scalability – additional storage nodes can be added to the cluster to increase both capacity and performance equally.

This storage infrastructure will be configured using Network RAID 10 to give performance and resilience, providing around 6TB of usable storage, which will cover both expandability and snapshot capacity.

**Network Requirement**

Gigabit networking capability will be required between the servers and the SAN. Six 1000Mbit/sec ports are recommended per host. The hosts should be connected to multiple physical switches for resilience in the event of physical switch failure, to support the broadest range of performance and resilience options the switch infrastructure needs to be either stack or chassis based.

virtualDCS propose to provide and configure two 24 port Gigabit switches configured with a dedicated iSCSI vLAN to isolate the iSCSI traffic.

**Reactive Support Virtual Infrastructure**

This standard service provides support to the customer IT team when required. The responsibility for the day-to-day monitoring and management of the virtual infrastructure rests with the IT team. When operational issues arise virtualDCS are available to provide support and troubleshooting assistance.

This service includes:

- Access to virtualDCS technical services team for support.
- Access to virtualDCS consultants for periodic internal IT strategy meetings.
- Managed VMware (vendor) support.
- Quarterly virtual infrastructure health review.
3. The implementation Process

Throughout the implementation, virtualDCS will work with members of the IT team to provide knowledge that they require to support and operate the virtual server infrastructure once the implementation is complete.

Planning and Design Workshop

This workshop is to enable the project team to understand the implementation and agree the design before commencing the installation. Topics that will be covered will include:

- Project timescales and deliverables.
- Validation of Capacity Assumptions
- Roles and responsibilities.
- Physical environment requirements and preparation.
- iSCSI network design and configuration.
- IP network design and configuration.
- Hypervisor configuration.
- Backup architecture and recovery options.
- Virtual Infrastructure administration and management.

virtualDCS has developed a series of best practices through our experience in server virtualisation and our customers are invited to benefit from these.

Physical Server Installation

This involves installing the new servers into the existing computer room facility. The servers will be physically installed into the existing rack and cabled along with cable management and labelling. It is assumed that a member of the IT team will assist with the server installation for knowledge transfer purposes.

Storage Installation and Configuration

This will involve integrating and installing the new SAN storage array in the computer room facility. The storage will be physically installed into the rack and cabled along with cable management and labelling. New Ethernet switches will be deployed and configured by virtualDCS and an isolated iSCSI vLan created to host the storage traffic. The initial configuration will include initialising the storage array, creating disk arrays and configuring host and management access. It is assumed that a member of the customers IT team will assist with the server installation for knowledge transfer purposes.

Virtualisation Software Installation

This will include the installation of the hypervisor software on the physical servers as well as creating the VMware cluster including virtual machine storage and virtual networking configuration. A virtual machine will be created for the new vCenter management server, and vSphere licences will be applied to the three hosts. We will also install and configure the vSphere Update Manager plugins to allow patching of the platform in future.

Management Software Installation

This will include installing the management software on a virtual server plus configuration and demonstration of operations such as:

- Creation of a template virtual machine.
- Deploy a new virtual machine.
- Re-configure a virtual machine.
- Increase the size of a virtual machine disk.
- Put a host into maintenance mode.
- Manage virtual machine snapshots.

Virtual Infrastructure Testing

This will include testing the resilience and hardware monitoring features within the infrastructure. Including testing the impact and recovery from failures such as:

- Server failure.
- Server and storage redundant failure.
- Storage path failover.
- Networking path failover.

Virtual Infrastructure Migration (P2V)

virtualDCS will walk the IT team through a P2V migration of an agreed physical server to the platform once all testing and patching is complete. We will then assist with a second P2V migration performed by the IT team, in order to verify sufficient knowledge transfer has been provided to allow unaided future P2V migrations.

Virtual Infrastructure Configuration Documentation

virtualDCS will produce configuration documentation for the virtual infrastructure including the management server, storage and physical hosts.
4. Pricing

The budgetary prices for such a project are as follows:

- 1 x Mirrored storage system 14.4 TB SAS
- 3 x Physical VM Hosts - Dual Processor Six Core 2.26GHz 96GB RAM 6xGbps NIC
- 2 x 24 port stackable Gbit switch
- VMware vSphere 4.1 Enterprise with Virtual Center

Prices are based on a three year term, using best of breed HP, Dell, and Cisco technologies.

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<tr>
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<th>Reactive Support</th>
<th>Proactive Support</th>
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<tbody>
<tr>
<td>On Site Solution</td>
<td>£3,200</td>
<td>£3,500</td>
</tr>
<tr>
<td>Hosted Solution*</td>
<td>£3,700</td>
<td>£4,000</td>
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* Excludes Connectivity

The Cost of the implementation depends on the amount of work the customer takes on during knowledge transfer, but can be as little £3,000