

OPTION #1: Deploy a Windows Server 2016 Solution for a Small Firm

Liam Bergerson

CSU - Global

ITS405-1

B. Jensen

3/13/22

OPTION #1: Deploy a Windows Server 2016 Solution for a Small Firm

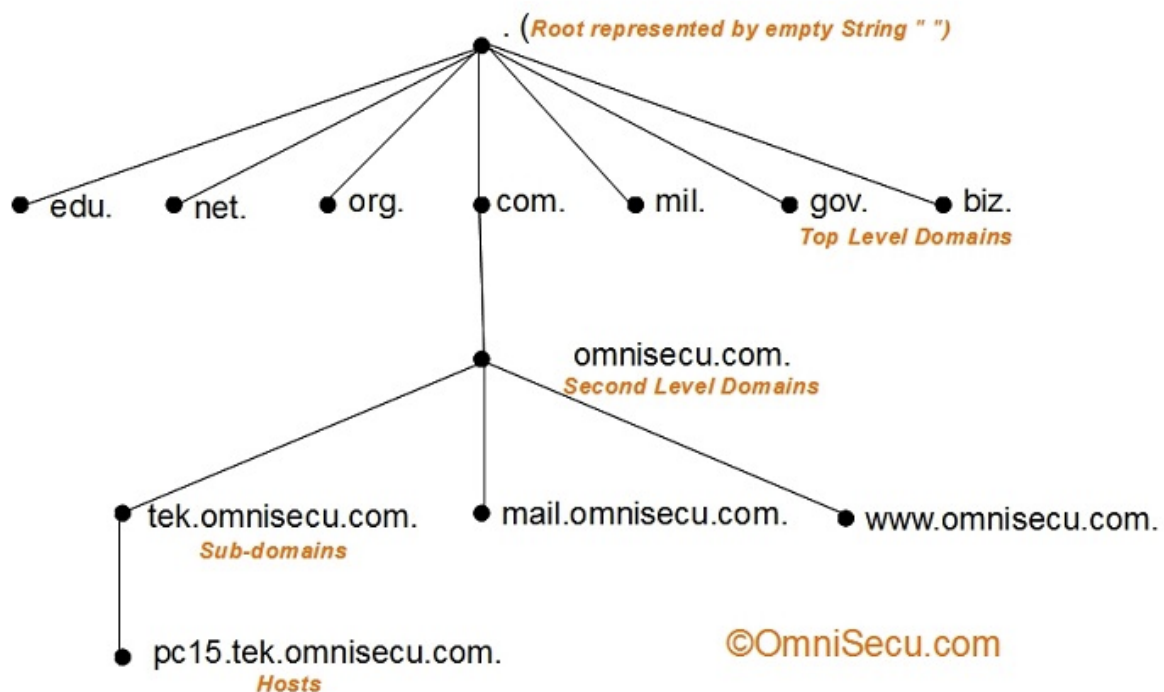
A small firm with a single office of twenty employees wishes to upgrade their server infrastructure from Windows Server 2012 to Windows Server 2016. A comprehensive plan will be made to accommodate these requests. The company also wishes to add a second domain controller. The reason being that when they wish to update the server or restart it, the active directory services are interrupted. This firm also wishes to open a second building that will house around twenty employees with the same server infrastructure.

Deployment and Server Edition

Two servers will be utilized to host their operations. The edition of Windows Server 2016 that will be used for both servers is Windows Server 2016 Standard. The standard edition is for companies that require advanced features and virtualization to a lesser extent (uCertify, 2020). A license for the Standard edition is around \$800 (Strauss, 2020). When first installing Windows Server, server roles that are installed will depend on which of them are chosen. This reduces the overall footprint of the Windows Server. Server core is another option that would automatically eliminate any services that are not needed for certain server roles (Walat, 2017). Server core will not be used on any of the servers because some methods of configuration, such as a graphical user interface, will not be available. Many varieties of configuration will be recommended so employees can choose which configuration method is easiest to understand. The location of the servers will be in the main building, but the second building will have access to the resources in the main building. This prevents resources from being spread out which may affect work efficiency.

Active Directory

The number of domains that will be used is two because there are two sites and each site should have one domain. In this case, the main office will have the main forest, tree structure, and one domain while the other office has the other domain. Having one domain in each building will allow for more efficient and faster connectivity to resources. The DNS Namespace structure is shaped like a tree with the top part being the root and the level below that as the Top Level Domains. The level below that is called the Second Level Domains and those are the business names. Below is a diagram of the DNS Namespace structure for reference.



Note. Adapted from OmniSecu. (n.d.). *DNS Namespace Hierarchy*.

<https://www.omnisecu.com/tcpip/dns-namespace-hierarchy.php>

Read Only Domain Controllers (RODCs) are used usually in branch offices because there is a greater physical security concern and there isn't usually an IT staff

managing the domain controller (uCertify, 2020). Since there are two domains and there is a domain controller for the branch office, a RODC is not needed. Active Directory sites will be configured through the Windows Server 2016 Graphical User Interface. Organizational Units (OUs) will be used to organize user accounts for role-based access. Organizational Units are used to organize objects such as user and computer accounts (uCertify, 2020). Role-based access will restrict access based on the role someone has at a company and will have the minimum amount of privileges required to do his or her job. Organizational Units are perfect for managing these roles. Petri (2009) explains a few requirements that are needed in order to install Active Directory on a Windows Server. A hard drive that is configured in NTFS and has enough space, an admin username and password, an operational DNS server, and a domain name for the display of the company, a Network Interface Card, a network connection, and a properly configured TCP/IP address will be required.

Containers

This company will utilize containers for developing software. Containers are extraordinarily useful for this company because they provide a separate work environment for software developers. They are used to run many isolated applications on one computer (uCertify, 2020). They also boot up very quickly compared to a virtual machine. They are also very portable. If there are developers spread out between the two buildings, containerized applications can be sent from one building to the other so multiple developers can work on the same application.

High Availability

Failover clustering will be used in the servers as a means to provide high availability. Clustering is grouping computers that work together to drastically improve the availability of systems (uCertify, 2020). If one or more of the clusters fail, the other nodes will provide the service. This is a process called failover. All clustering nodes are monitored carefully so that any failed nodes are fixed as soon as possible. In the case that a system fails, the availability will not be affected because other nodes in the cluster will pick up where the system failed and nothing is interrupted. Load balancing will be utilized as well to lower the chances of failover occurring. Load balancing splits the workload of systems so that all systems have an even distribution of tasks (uCertify, 2020). This prevents one system from being overloaded and possibly failing.

Hyper-V

Hyper-V is used to create and manage virtual machines in Windows operating systems (uCertify, 2020). It's essentially running multiple operating systems on a single server. Hyper-V isolates each VM running on the server so that if one VM fails, nothing else will be affected on the server (uCertify, 2020). Hyper-V VMs have all of the components that any other computer would have, processors, memory, storage, and networking. What sets them apart from normal computers is that VMs provide greater flexibility of resources. That means that each component can be configured until it meets the requirements of the end user. Hyper-V also offers migration features that allow movement of VMs from one Hyper-V host to another without suspending any applications. Hyper-V also offers remote connectivity. This allows administrators to access a VM without booting into the operating system to access it. Shielded VMs are

another benefit of Hyper-V. Shielded VMs utilize BitLocker technology that will protect VMs from malware attacks and attempts to tamper the data. Hyper-V VM's will be used as testing environments for developers to test their software. Another method of high availability that will be used along with failover clustering is Hyper-V replica. Hyper-V replica is used to replicate VMs to a different physical site. It's essentially copying the image of the original VM and saving it off somewhere. If the original VM fails for some reason and the data is lost, the VM can be restored using the image that was saved. However, replica images must be created often to ensure that big projects were not deleted.

Disaster Recovery

A Windows Backup Server will be used to backup all data to ensure that nothing is lost. Windows Server Backup is used to create a backup volume and can be restored in the event of a hard drive, or any other, failure (uCertify, 2020). The whole server could be backed up, however, that would take up a lot of space. Certain volumes, files, and folders can be selected to be backed up. Even the system state can be backed up. The main strategy I would recommend is a full server backup once a week and incremental backups every day. Incremental backups only backup files that were changed or created since the last full backup. To save on space due to the large capacity that full backups occupy, previous full backups can be deleted as necessary after another full backup has been confirmed. A third party solution for backup and recovery is not needed. Instead, Redundant Array of Independent Disks (RAID), more specifically RAID 5, will be used instead of a third party application. RAID 1 utilizes disk mirroring to mirror data across two or more disks. If one of the hard drives fails, the other one will still have

the data on it. RAID 5 is also another version of RAID that offers fault tolerance and high availability. RAID 5 differs from RAID 1 in that it stripes data across multiple drives instead of mirroring data. However, RAID 5 has parity data that will recover lost files if a hard drive fails.

Maintenance

This company will utilize Windows Server Update Service (WSUS) by testing upcoming patches to see if they are applicable and patching all systems if they are sufficient. WSUS provides a management console where you can manage and distribute operating system updates (uCertify, 2020). A server could be created to be a WSUS server, also called an upstream server. Using WSUS to manage and distribute patches for Windows Server 2016 through a management console will maintain operational efficiency, fix security vulnerabilities, and maintain stability of the production environment. Microsoft patches release every second Tuesday of every month. All systems will be patched around that time after a test to ensure that systems are not negatively affected.

Monitoring

System monitoring examines how programs and services affect the performance of the server (uCertify, 2020). System monitoring also collects logs that can be later analyzed. This can be an excellent way to predict any performance issues that can be resolved before they affect systems critically. The tools of system monitoring are Performance Monitor and Resource Monitor. Performance Monitor comes installed on Windows Server 2016 by default. It's used to monitor the performance of server components such as processors, memory, network drivers, applications, and services

running on the system (uCertify, 2020). Resource Monitor can be used to quickly view the state of a system. It can also be used to monitor and manage applications and services that use system resources (uCertify, 2020). Another tool that is used in system monitoring is Data Collector Sets. This tool is used to analyze performance of systems over time. It records the output of systems and puts it into a log file that can be later analyzed (Maningo, 2015).

Conclusion

This proposal lays out a plan for server upgrades that will make software development more efficient. Two servers using Windows Server 2016 will be used. Instead of one domain controller, two domain controllers will be used to ensure that active directory services are not interrupted when an update occurs. High availability will be achieved through the use of failover clusters and Hyper-V replicas. Finally, a Windows Backup Server will be used to achieve disaster recovery. A full backup of servers will be done once a week with incremental backups everyday from the point of a full backup.

References

- Maningo, J. (2015, August 12). *Data Collector Sets*. Quickstart. Retrieved March 6, 2022, from <https://www.quickstart.com/blog/data-collector-sets/>
- Petri, D. (2009, May 7). *What Do You Need to Install Active Directory?* Petri IT Knowledgebase. Retrieved March 4, 2022, from https://petri.com/active_directory_installation_requirements
- Strauss, L. (2020, June 20). *How Much Does Windows Server 2016 Cost?* Royal Discount. Retrieved March 3, 2022, from <https://royaldiscount.com/windows-2016-cost/>
- uCertify. (2020). *MCSA Windows Server 2016 study guide: Exam 70-740 & Exam 70-742*
- Walat, T. (2017, October 31). *Windows Server Core*. SearchWindowsServer. Retrieved March 3, 2022, from <https://www.techtarget.com/searchwindowsserver/definition/Server-Core>