TERM-3 Microsoft server Assignment

Module 12 Installation, Storage, and Compute with Windows Server

* ***Install Windows Servers 2016***

1. ***Windows Server 2016 installation requirements***

***Ans.*** *Processor: 3.0GHz 64 Bit Processor*

* *RAM: 8GB RAM*
* *Disk Space: 32 GB*
* *Network: Gigabit (10/100/1000baseT) Ethernet adapter, 1Gbps connection is ideal.*
* *Optical Storage: DVD drive (if installing the OS from DVD media)*

1. ***Describe Windows Server 2016 editions***

***Ans.***

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| ***Edition*** | ***Ideal for...*** | ***Virtualization rights*** | ***Licensing model*** | ***Client Access Licenses*** | ***RAM Limit*** | ***CPU Limit*** | ***Pricing*** |
| ***Essentials*** | *Small businesses with basic IT requirements; very small or no IT department* | *no, one physical* ***or*** *one virtual installation* | *CPU-based* | *CALs not required \* (limited to 25 users / 50 devices)* | *64 GB RAM* | *max. 2 CPUs* | Microsoft Software at Thomas-Krenn  [***MICROSOFT SOFTWARE AT THOMAS-KRENN***](https://www.thomas-krenn.com/en/products/software/microsoft-software.html?utm_source=Wiki&utm_medium=Banner&utm_campaign=Windows%20Server%202016%20Editionsunterschiede) |
| ***Standard*** | *For all companies that require advanced features and virtualize to a lesser extent* | *2 virtual machines \*\** ***or*** *2 Hyper-V Container* | *Core-based* | *CALs required \*\*\** | *24 TB RAM* | *512 Cores* |

1. ***From which menu we can add and remove server roles?***

***Ans.*** *The commands that open the add Roles and Features Wizard and remove Roles and Features Wizard, and let you add or remove roles, role services, and features to servers in your server pool, are in the Manage menu of the Server Manager console, and the Tasks menu of the Roles and Features tile on role or group pages.*

1. ***What is workgroup?***

***Ans.*** *According to Techopedia, a workgroup is a peer-to-peer network setup using Microsoft Windows operating system. It’s a group of computers on a local area network that share common resources and responsibilities. You can easily create a workgroup by connecting two or more PCs without going through a separate server computer.*

1. ***What is domain?***

***Ans.*** *omain Name is an important element in Windows Server that helps to identify and locate computers on a network. Domain Name can be used to identify a specific computer within a network or it can be used to identify a group of computers within a network.*

1. ***What is PowerShell ?***

***Ans.*** *PowerShell is a modern command shell that includes the best features of other popular shells. Unlikemost shells that only accept and return text, PowerShell accepts and returns .NET objects. The shellincludes the following features: 1. Robust command-line history 2. Tab completion and command prediction*

1. ***up gradation v/s migration***

***Ans.******Migration:-*** *Migration is the process of replicating applications from one product in another product,*

***Upgrade:-*** *Upgrade is the process of replacing your existing software with a newer version of the same product.*

1. ***license and activation model***

***Ans****.* ***Licensing:-*** *Licensing is the process of checking whether a software application or feature has a valid license available to it at runtime. Licenses are usually stored on disk as text files (with a .lic extension) with an encoded digital signature to prevent tampering with the parameters that describe the licensees rights. A single license file may contain multiple features and product licenses.*

***Activation:-*** *License Activation” is the process of successfully obtaining and installing a valid license file for a licensed application.*

*Activation is typically done only once – when the application is first installed, but a “phone home” call to the activation server may be made periodically to check whether a user’s activation key is still valid. This technique comes in handy for decommissioned machines, or for lapsed subscriptions.*

1. ***Precaution of up gradation***

***Ans.******1: Always start with a verified data backup***

*Never make any changes to a server, even minor upgrades, before confirming a verified data backup exists. Whenever a server is powered down, there is no guarantee the server will come back online. While rare, I’ve seen servers that were shut down simply to install Windows performance and security patches fail to restart.*

***2: Consider creating an image backup***

*Several manufacturers offer IT professionals disk cloning technologies that simplify recovering servers when failures occur. Some, including* [*Acronis Inc.*](http://www.acronis.com/enterprise/) *and* [*StorageCraft Technology Corp.*](http://www.storagecraft.com/index.php)*, provide a universal restore option that enables recovering a failed server even to a different bare metal chassis. Downtime is drastically reduced. When upgrades go south, disk images can help recover not only data but a server’s complex configuration in a hurry.*

***3: Don’t make multiple simultaneous changes***

*Most every IT professional understands the importance of minimizing server restarts, so novices are tempted to complete multiple simultaneous upgrades using a single shutdown. But adding disks, replacing memory, installing additional cards, and other tasks should all be performed separately. Why? When things go wrong a day or two later, the process of isolating the change responsible for the error is exponentially more difficult when multiple simultaneous changes were made. If only a single change is introduced, it’s much easier to track the potential culprit.*

***4: Monitor logs closely after making changes***

*Following server upgrades, never assume all is well just because the server booted back into its OS without displaying errors. Monitor log files, error reports, backup operations, and other critical events more closely than ever. Leverage Windows’ internal performance reports or third-party monitoring utilities, such as those from GFI Software’s* [*HoundDog*](http://www.hounddogiseasy.com/index.html) *or Quest Software’s* [*PacketTrap*](http://www.packettrap.com/product/packettrapmsp.aspx?link_loc=h3left)*, to ensure all is performing as intended whenever changes or upgrades are completed.*

***5: Confirm the OS***

*It’s easy to forget the operating system a server is running. This is especially true when a server room isn’t standardized and multiple boxes sport a collection of operating systems. Even veteran administrators, caught within the whirlwind confusion that marks many enterprise IS departments’ days, have tried installing 8GB of RAM on a 32-bit Windows Server 2003 machine. Only by first performing a quick audit (including a quick 32-bit versus 64-bit check) of the system to be upgraded can you confirm the OS is compatible and will be able to use the additional RAM (or other resources) being installed.*

***6: Confirm the chassis supports the upgrade***

*Server hardware is famously inconsistent. Manufacturers frequently change model numbers and product configurations. Whenever installing additional disk controllers, disks, memory, or other components, you can review the manufacturer’s technical specifications online before ordering upgrades. But only by opening the case can you be 100% confident that the actual server deployed within the organization will accommodate the upgrade.*

***7: Don’t assume plug-and-play***

*Whenever installing new hardware, don’t assume the device will plug-and-play well with the server’s operating system (even if the manufacturer states the component is compatible). Before you order upgrades, perform a Google search to learn the experiences other technology professionals encountered when deploying that same component using the same OS. Since the upgrade is being completed on a server, confirm the component is listed on the OS vendor’s hardware compatibility list. It doesn’t hurt to check the server manufacturer’s forums, too, to learn of issues other techs encountered when installing the same device on the same server.*

***8: Optimize performance***

*Be sure to follow up on any upgrades requiring associated software adjustments. For example, just adding memory to Windows servers doesn’t automatically optimize Windows’ performance using the additional RAM. System administrators must also update a server’s virtual memory settings to optimize Windows’ operation following a memory upgrade. Further, when new disks are introduced, the page file may need to be moved to the new disk to gain performance advantages.*

***9: You get what you pay for***

*Certainly, less expensive disks, RAM, power supplies, and other components are always available. But when it comes to servers, it doesn’t pay to cut corners. Only high quality, high availability components should be deployed in servers. While these items may cost marginally more than other (lesser quality) alternatives, the performance and uptime benefits more than offset the additional expense.*

***10: Document changes***

*Surely you’re maintaining log files for each server. Within the documentation for the server just upgraded, update the documentation to note the component that was upgraded, the manufacturer, the vendor and even the order number and serial numbers, if possible. Include warranty and support information as well. The more documentation you have on hand, the easier it will be to isolate and repair issues that arise later.*

1. ***Migration limitation***

***Ans.*** *Too many virtual servers could adversely affect the ability of servers to maintain the required amount of data. Another limitation is the migration. Nowadays, possible migration of virtual servers on one physical machine to another only can be done only if both physical machines are used by the processor of the same manufacturer.*

1. ***What is the advantages of server core***

***Ans.*** *A Server Core installation provides a minimal environment for running specific server roles, which reduces the maintenance and management requirements and the attack surface for those server roles.*

1. ***What is Nano server***

***Ans.*** *Nano Server is a remotely administered server operating system optimized for private clouds and datacenters. It is like Windows Server in Server Core mode, but significantly smaller, has no local logon capability, and only supports 64-bit applications, tools, and agents.*

1. ***Purpose of Nano server***

***Ans.*** *Nano Server is a remotely administered server operating system optimized for private clouds and datacenters. It is similar to Windows Server in Server Core mode, but significantly smaller, has no local logon capability, and only supports 64-bit applications, tools, and agents.*

1. ***Compare GUI v/s core v/s Nano server***

***Ans.*** *Nano Server is essentially a stripped-down version of the full Windows Server OS, as it is headless—it does not have a GUI—and lacks the core server components. It is like the Server Code mode in Windows Server but is even more bare-bones than the former, requiring minimal disk space and supporting only 64-bit applications, drivers and services. As it is meant to deliver applications via the cloud, the Microsoft Windows Installer (MSI) application installation and configuration service are also not present in Nano Server.*

*As a Hyper-V host, Nano Server uses key management service to activate its guest VMs. Nano Server support is more active, with update releases expected at least two or three times yearly. Nano Server installations must not be more than two releases behind, and administrators must update servers manually to keep them current.*

*Compared to Server Core or Server with Desktop Experience, Nano Server cannot act as a domain controller for your Active Directory and as a proxy server. It also does not support:*

*Group Policy.*

*Load balancing and failover.*

*Microsoft Endpoint Configuration Manager and System Center Data Protection Manager.*

*Best Practices Analyzer (BPA) cmdlets and BPA integration with Server Manager.*

*Virtual host bus adapters (HBAs).*

*How Has the Role of Windows Nano Server Changed over Time?*

*If you installed Nano Server during its initial release back in 2016, you would only need to configure it post-installation using scripts created in Windows Management Instrumentation (WMI) and PowerShell. Starting with Windows Server, version 1803, released in 2018, Microsoft transitioned Nano Server into a container base image that is even smaller than the original Windows Server 2016 version. To use Nano Server, you now need to run it as a container on another host, such as a Windows Server running on Server Core mode. This is like nesting the server within another server.*

*Other recent changes in Nano Server are in line with Microsoft’s thrust towards using it for cloud deployments. These include:*

*Optimization for .NET Core applications.*

*Non-inclusion of PowerShell Core, .NET Core, and WMI in the container base image, though you can add these packages when building your container.*

*Availability of the updated Nano container in Docker Hub for redeployment purposes.*

*Use of Docker for troubleshooting the container.*

*Support of Nano containers for the Windows IoT Core.*

* ***Practical***

1. ***Install server 2016 GUI***

***Ans.*** *Done in lab.*

1. ***Install server 2016 server core***

***Ans.*** *Done in lab.*

1. ***Assign dual IP address on lan card***

***Ans.*** *Done in lab.*

1. ***Upgrade server 2012 to server 2016***

***Ans.*** *Done in lab.*

1. ***Change computer name***

***Ans.*** *Done in lab.*

1. ***Ans. install nano server***

***Ans.*** *Done in lab.*

1. ***manage and configure a nano server***

***Ans.*** *Done in lab.*

1. ***configure network in nano server***

***Ans.*** *Done in lab.*

1. ***join nano server in domain***

***Ans.*** *Done in lab.*

* ***Storage solution***

1. ***compare GPT and MBR***

***Ans.*** *MBR is the most common format and is compatible with BIOS systems. GPT is a newer type that works with UEFI systems. MBR may accommodate up to four primary or three primary partitions plus one extended partition. GPT can accommodate an infinite number of partitions.*

1. ***different between VHD and VHDX***

***Ans.*** *VHDX has a much larger storage capacity than the older VHD format. It also provides data corruption protection during power failures and optimizes structural alignments of dynamic and differencing disks to prevent performance degradation on new, large-sector physical disks.*

1. ***what is SMB and NFS***

***Ans.*** *Network file system (NFS), server message block (SMB) and common internet file system (CIFS) are all file access storage protocols, used to access files on remote servers and storage servers (such as NAS storage) as if they were local files.*

1. ***what is sharing permission***

***Ans.*** *Simply put, share permissions allow you to control who accesses folders over the network (they will not apply to those users who are accessing locally). In share permissions, you cannot control access to individual subfolders or objects on a share.*

1. ***what is NTFS permission***

***Ans.*** *NTFS permissions are used to manage access to the files and folders that are stored in NTFS file systems. To see what kind of permissions you will be extending when you share a file or folder: Right click on the file/folder. Go to “Properties” Click on the “Security” tab.*

1. ***what is resource ownership***

***Ans.*** *Resource Ownership is the creation of a job match for a consumer, which is consistent with the consumer’s strengths, resources, priorities, concerns, abilities, capabilities, interests, and informed choice, through the purchase of equipment and/or materials creating an opportunity for an individual to be hired by an employer. Through the consumer coming to the business with the equipment and/or materials the consumer is meeting an employer’s unfulfilled business need, creating the potential for a larger customer base, and/or allowing the employer to offer a new service to existing customers.*

1. ***what is storage pool***

***Ans.*** *A storage pool is a collection of physical disks. A storage pool enables storage aggregation, elastic capacity expansion, and delegated administration. From a storage pool, you can create one or more virtual disks. These virtual disks are also referred to as storage spaces.*

1. ***What is basic disk and dynamic disk***

***Ans.*** *A basic disk using the GPT partition style can have up to 128 primary partitions, while dynamic disks will have a single LDM partition as with MBR partitioning. Because basic disks using GPT partitioning do not limit you to four partitions, you do not need to create extended partitions or logical drives.*

1. ***what is simple volume , spanned volume***

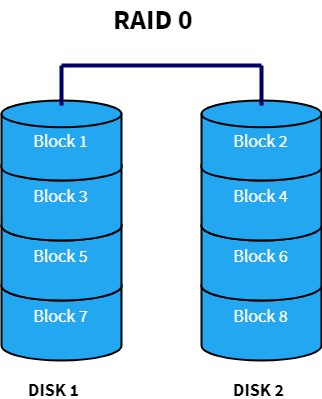
***Ans.*** *Spanned volume is a combination of two or more physical disks with each disk containing a part of the volume. A Simple Volume is a single region on a single physical disk that is used to create and store data.*

1. ***describe RAID 0 , RAID 1 , RAID 5, RAID 6 , RAID 1 0***

***Ans.***  *The RAID level you use affects the exact speed and fault tolerance you can achieve from RAID. It also matters whether you have hardware or software RAID, because software supports fewer levels than hardware-based RAID. There are several popular RAID levels, including RAID 0, RAID 1, RAID 5, RAID 6 and RAID 10. Let us take a deeper look at each of these RAID levels.*

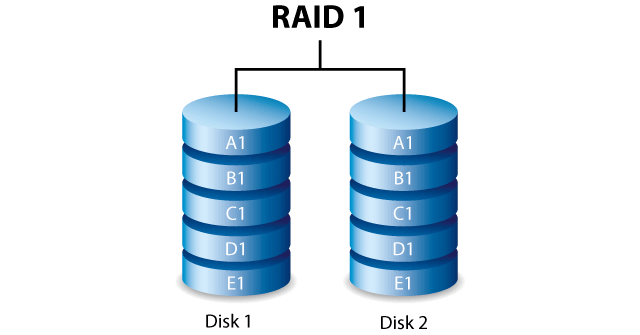
***RAID 0:-***

*In a RAID 0 system, data are split up into blocks that get written across all the drives in the array. By using multiple disks (at least 2) at the same time, this offers fast read and write speeds. All storage capacity can be fully used with no overhead. The downside to RAID 0 is that it is NOT redundant, the loss of any individual disk will cause complete data loss. Thus, it is not recommended to use unless the data has no value to you.*



***RAID 1:-***

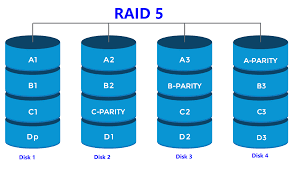
*RAID 1 is a setup of at least two drives that contain the exact same data. If a drive fails, the others will still work. It is recommended for those who need high reliability. An additional benefit of RAID 1 is the high read performance, as data can be read off any of the drives in the array. However, since the data needs to be written to all the drives in the array, the write speed is slower than a RAID 0 array. Also, only capacity of a single drive is available to you*



***RAID 5:-***

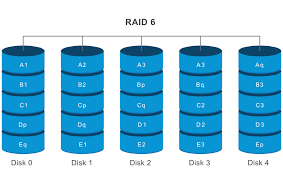
*RAID 5 requires the use of at least 3 drives, striping the data across multiple drives like RAID 0, but also has a “parity” distributed across the drives. In the event of a single drive failure, data is pieced together using the parity information stored on the other drives. There is zero downtime. Read speed is very fast but write speed is somewhat slower due to the parity that has to be calculated. It is ideal for file and application servers that have a limited number of data drives.*

*RAID 5 loses 33 percent of storage space (using three drives) for that parity, but it is still a more cost-effective setup than RAID 1. The most popular RAID 5 configurations use four drives, which lowers the lost storage space to 25 percent. It can work with up to 16 drives.*



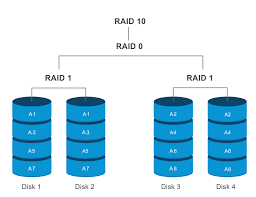
***RAID 6:-***

*RAID 6 is like RAID 5, but the parity data are written to two drives. That means it requires at least 4 drives and can withstand 2 drives dying simultaneously. Read speed is as fast as RAID 5, but write speed is slower than RAID 5 due to the additional parity data that have to be calculated. RAID 6 is a very good option for a standard web server, where most of the transactions are reads. But it is not recommended for a heavy write environment, such as a database server.*



***RAID 10:-***

*RAID 10 consists of a minimum for four drives and combine the advantages of RAID 0 and RAID 1 in one single system. It provides security by mirroring all data on secondary drives while using striping across each set of drives to speed up data transfers. This means that RAID 10 can provide the speed of RAID 0 with the redundancy of RAID 1. You can lose any single drive, and possibly even a 2nd drive without losing any data. Just like RAID 1, only half of the total drive capacity is available, but you will see improved read and write performance and also have the fast rebuild time of RAID 1. Compared to large RAID 5 or RAID 6 arrays, this is an expensive way to have redundancy though.*



|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| ***Features*** | ***RAID 0*** | ***RAID 1*** | ***RAID 5*** | ***RAID 6*** | ***RAID 10*** |
| *Minimum number of drives* | *2* | *2* | *3* | *4* | *4* |
| *Fault tolerance* | *None* | *Single-drive failure* | *Single-drive failure* | *Two-drive failure* | *Up to one disk failure in each sub-array* |
| *Read performance* | *High* | *Medium* | *Low* | *Low* | *High* |
| *Write Performance* | *High* | *Medium* | *Low* | *Low* | *Medium* |
| *Capacity utilization* | *100%* | *50%* | *67% – 94%* | *50% – 88%* | *50%* |
| *Typical applications* | *High end workstations, data logging, real-time rendering, very transitory data* | *Operating systems, transaction databases* | *Data warehousing, web serving, archiving* | *Data archive, backup to disk, high availability solutions, servers with large capacity requirements* | *Fast databases, file servers, application servers* |

1. ***describe DAS, NAS and SAN***

***Ans.*** *The three systems also use different storage mechanisms: DAS primarily uses hard-drive storage with sectors, NAS uses shared files, and SAN uses block storage. Different technologies are also used for transmitting data. DAS uses IDE/SCSI, NAS uses TCP/IP and Ethernet, and SAN uses Fibre Channel and IP.*

1. ***what is iscsi initiator and target?***

***Ans.*** *A Network Interface Controller (NIC) on System z® attached to an IP (TCP/IP) network acts as an iSCSI initiator which initiates I/O requests to and receives responses from iSCSI target. In this case the target is Storwize® V7000.*

*iSCSI targets are the devices, which provide the response to iSCSI commands received from the iSCSI initiators over the IP (TCP/IP) Network. On Storwize V7000, one or both of its node Ethernet ports are configured to become iSCSI target.*

*Initiators and targets are given a unique ASCII name with a size of 233 bytes known as iSCSI Qualified Name (IQN). IQN is worldwide unique name which is used to identify each initiator and target.*

1. ***what is data duplication?***

***Ans.*** *Data deduplication is a process that eliminates excessive copies of data and significantly decreases storage capacity requirements.*

*Deduplication can be run as an inline process as the data is being written into the storage system and/or as a background process to eliminate duplicates after the data is written to disk.*

*At NetApp, deduplication is a zero data-loss technology that is run both as an inline process and as a background process to maximize savings. It is run opportunistically as an inline process so that it doesn’t interfere with client operations, and it is run comprehensively in the background to maximize savings. Deduplication is turned on by default, and the system automatically runs it on all volumes and aggregates without any manual intervention.*

*The performance overhead is minimal for deduplication operations, because it runs in a dedicated efficiency domain that is separate from the client read/write domain. It runs behind the scenes, regardless of what application is run or how the data is being accessed (NAS or* [*SAN*](https://www.netapp.com/data-storage/what-is-san-storage-area-network)*).*

*Deduplication savings are maintained as data moves around – when the data is replicated to a DR site, when it’s backed up to a vault, or when it moves between on premises,* [*hybrid cloud*](https://www.netapp.com/hybrid-cloud/what-is-hybrid-cloud)*, and/or public cloud.*

* ***Practical***

1. ***share “data” a folder and give read / write permission to first user***

***Ans.*** *Done in lab.*

1. ***share “data” folder and give read permission to another user***

***Ans.*** *Done in lab.*

1. ***share a “data” folder create a file in that folder and remove inheritance permission and give different ntfs permission to different user***

***Ans.*** *Done in lab.*

1. ***configure RAID 1 and check redundancy***

***Ans.*** *Done in lab.*

1. ***configure RAID 5 and check redundancy***

***Ans.*** *Done in lab.*

1. ***configure iscsi target and iscsi initiator and allocate remote storage***

***Ans.*** *Done in lab.*

1. ***configure data deduplication***

***Ans.*** *Done in lab.*

* ***Implement Hyper-V***

1. ***what is virtualization***

***Ans.*** *Virtualization is a process that allows for more efficient utilization of physical computer hardware and is the foundation of cloud computing.*

1. ***type of virtualization and compare it***

***Ans.*** *Virtualization is the process of creating a virtual version of a physical resource, such as a server, storage device, or network. There are several types of virtualization that are commonly used in computing:*

1. ***Server virtualization:*** *Server virtualization involves creating multiple virtual servers on a single physical server. This allows organizations to run multiple applications and operating systems on a single piece of hardware, which can help improve resource utilization and reduce hardware costs.*
2. ***Storage virtualization:*** *Storage virtualization involves creating a virtual storage pool from multiple physical storage devices. This allows organizations to manage their storage resources more efficiently and reduce the complexity of their storage infrastructure.*
3. ***Network virtualization:*** *Network virtualization involves creating virtual networks on top of a physical network infrastructure. This can help organizations improve network security, reduce complexity, and increase flexibility.*
4. ***Desktop virtualization:*** *Desktop virtualization involves creating virtualized versions of desktop environments that can be accessed remotely. This can help organizations improve security, reduce hardware costs, and increase flexibility.*
5. ***Application virtualization:*** *Application virtualization involves creating a virtual version of an application that can be accessed remotely. This can help organizations improve application delivery and reduce the complexity of managing and maintaining applications.*
6. ***Describe hyper v***

***Ans.*** *Hyper-V is Microsoft's hardware virtualization product. It lets you create and run a software version of a computer, called a virtual machine. Each virtual machine acts like a complete computer, running an operating system and programs.*

1. ***what is remote management of hyper v***

***Ans.*** *There are two types of remote management when it comes to Hyper-V. First, you can remotely manage the Windows Server Core installation with the Hyper-V Role installed (Windows itself), and then you can manage the Hyper-V Role and Hyper-V specific actions, configuration, and management.*

1. ***what is hyper v manager***

***Ans.*** *Microsoft Hyper-V Manager is an administrative tool to create, change and delete virtual machines (VMs). An administrator can manage a local Hyper-V host and a limited number of remote hosts from a single Hyper-V Manager tool.*

1. ***what is virtual machine and nested virtualization***

***Ans.*** *Nested virtualization lets you run virtual machine (VM) instances inside of other VMs so you can create your own virtualization environments. To support nested virtualization, Compute Engine adds Intel VT-x instructions to VMs, so when you create a VM, the hypervisor that is already on that VM can run additional VMs.*

1. ***what is dynamic memory***

***Ans.*** *With Hyper-V (V1 & R2), memory is statically assigned to a virtual machine. Meaning you assign memory to a virtual machine and when that virtual machine is turned on, Hyper-V allocates and provides that memory to the virtual machine.*

1. ***what is NUMA***

***Ans.*** *Non-uniform memory access, or NUMA, is a method of configuring a cluster of microprocessors in a multiprocessing system so they can share memory locally.*

1. ***describe Virtual Machine functions***

***Ans.*** *A virtual machine (VM) is a digital version of a physical computer. Virtual machine software can run programs and operating systems, store data, connect to networks, and do other computing functions, and requires maintenance such as updates and system monitoring.*

1. ***describe Hyper v functions***

***Ans. Hardware and software virtualization:*** *Hyper-V virtual machines have all the components of a physical computer, including processors, memory, storage and networking. However, they provide greater flexibility for provisioning computing resources. Each component can be configured in several ways, according to unique end-user requirements.*

***Hyper-V Replica:*** *This feature can be used to replicate VMs to a different physical site to ensure higher availability and quick restoration for disaster recovery. Hyper-V provides application-consistent backups by synchronizing Hyper-V standalone servers and clusters residing at different physical sites.*

***Integration services:*** *These are a customized set of services and drivers that make it easy to use supported guest operating systems on a Hyper-V virtual machine.*

***Migration features:*** *Hyper-V provides a Live Migration feature supporting different types of migrations for moving a virtual machine from one Hyper-V host to another without suspending running applications. Storage migration allows administrators to migrate or distribute a VM’s filesystem (including virtual disk files, configuration files, paging files, etc.) across separate storage locations without downtime. There are other features, like import/export, for facilitating portability.*

***Virtual machine connection:*** *This is Hyper-V’s remote connectivity tool that allows administrators to access a virtual machine hosted on a Hyper-V host remotely without booting the guest operating system. This feature is available for both Windows and Linux.*

***Shielded virtual machines:*** *Hyper-V’s shielded VM feature utilizes BitLocker technology to keep virtual machines secure from malware attacks and data tampering attempts. Secure Boot is another security feature that protects virtual machines against unauthorized access, even from system administrators.*

1. ***what is check point***

***Ans.*** *A checkpoint is a differencing file that captures the state, data and hardware configuration of a VM in operation. Checkpoints establish a known-good or known-working VM snapshot at a given point in time. They can help IT administrators manage and mitigate risk in VM environments.*

1. ***hyper v networking—virtual nic , hyper v switch***

***Ans.*** *Hyper-V Networking. A virtual network adapter (sometimes referred to as a virtual NIC) is a virtualized version of a real network adapter. It connects a physical server to other servers, virtual machines, or other networking devices across a LAN connection in Hyper-V settings.*

*Hyper-V Virtual Switch is a software-based layer-2 Ethernet network switch that is available in Hyper-V Manager when you install the Hyper-V server role. Hyper-V Virtual Switch includes programmatically managed and extensible capabilities to connect VMs to both virtual networks and the physical network.*

1. ***hyper v storage---vhd ,vhdx , fixed size, dynamic expanding***

***Ans.******VHD:-*** *VHD Set files are a new shared Virtual Disk model for guest clusters in Windows Server 2016. VHD Set files support online resizing of shared virtual disks, support Hyper-V Replica, and can be included in application-consistent checkpoints. VHD Set files use a new VHD file type, . VHDS.*

***VHDX:-*** *A Hyper V virtual hard disk (VHDX) is a disk image file format used to create a virtual hard disk (VHD) within Windows Server 2012-based virtualization environments. VHDX enables creating and provisioning virtual/logical disk storage space to virtual machines.*

***Fixed-size:-*** *A fixed-size VHD simply takes up the entire space that is allotted to it during VM creation. The VHD size does not change when data is created or deleted. For example, if you create a 127 GB fixed VHD, then it means 127 GB disk space of the host storage will be dedicated for this VHD alone*

***Dynamically:-*** *Dynamically expanding disks are initially conservative of disk space, but their continual growth can cause them to be highly fragmented, negatively affecting performance*

* ***Practical***

1. ***install hyper v and configure a virtual switch***

***Ans.*** *Done in lab.*

1. ***install virtual machine and install windows 10***

***Ans.*** *Done in lab.*

1. ***create a checkpoint***

***And.*** *Done in lab.*

1. ***P4 create a virtual hdd (vhd) and attach to virtual machine***

***Ans.*** *Done in lab.*

* ***Windows containers***

1. ***describe containers***

***Ans.*** *Containers are technology for packaging and running Windows and Linux applications across diverse environments on-premises and in the cloud. Containers provide a lightweight, isolated environment that makes apps easier to develop, deploy, and manage.*

1. ***What is a docker?***

***Ans.*** *In order to package, deliver and manage Windows container images, you need to download and install Docker on Windows Server 2016. Docker Swarm, supported by Windows Server, provides orchestration features that help with cluster creation and workload scheduling. After you install Docker, you'll need to configure it for Windows, a process that includes selecting secured connections and setting disk paths.*

*One key advantage of Docker on Windows is support for container image automation. You can use container images for continuous integration cycles because they're stored as code and can be quickly recreated when need be. You can also download and install a module to extend PowerShell to manage Docker Engine; just make sure you have the latest versions of both Windows and PowerShell before you do so.*

1. ***hyper v containers and windows containers***

***Ans.*** *Although Windows Server containers and Hyper-V containers do the same thing and are managed the same way, the level of isolation they provide is different. Windows Server containers share the underlying OS kernel, which makes them smaller than VMs because they don't each need a copy of the OS. Security can be a concern, however, because if one container is compromised, the OS and all of the other containers could be at risk.*

*Hyper-V containers and their dependencies reside in Hyper-V VMs and provide an additional layer of isolation. For reference, Hyper-V containers and Hyper-V VMs have different use cases. Containers are typically used for* [*microservices*](https://www.techtarget.com/searchapparchitecture/definition/microservices) *and stateless applications because they are deposable by design and, as such, don't store persistent data. Hyper-V VMs, typically equipped with virtual hard disks, are better suited to mission-critical applications.*

* ***Practical***

1. ***Install windows container***

***Ans.*** *Done in lab.*

1. ***Install container in core server***

***Ans.*** *Done in lab.*

1. ***install container in nano server***

***Ans.*** *Done in lab.*

* ***High availability***

1. ***hyper v live migration***

***Ans.*** *Live migration is a Hyper-V feature in Windows Server. It allows you to transparently move running Virtual Machines from one Hyper-V host to another without perceived downtime. The primary benefit of live migration is flexibility; running Virtual Machines are not tied to a single host machine.*

1. ***what is high availability?***

***Ans.*** *High availability is a characteristic of a system which aims to ensure an agreed level of operational performance, usually uptime, for a higher than normal period. Modernization has resulted in an increased reliance on these systems.*

1. ***what is cluster, quorum and witness?***

***Ans.*** *The cluster quorum is the majority of voting nodes in the active cluster membership plus a witness vote. A quorum witness can be a designated disk witness or a designated file share witness. No majority (disk witness only) No nodes have votes. Only a disk witness has a vote.*

1. ***describe cluster storage***

***Ans.*** *Clustered storage is the use of two or more storage servers working together to increase performance, capacity, or reliability.*

1. ***What is NLB?***

***Ans.*** *Network load balancing (NLB) is the ability to balance traffic across two or more WAN links without using complex routing protocols like BGP.*

1. ***importance of network in Failover and NLB***

***Ans.*** *Failover is a backup operational mode that automatically switches to a standby database, server or network if the primary system fails, or is shut down for servicing. Failover is an extremely important function for critical systems that require always-on accessibility.*

*The NLB does not inspect an incoming HTTP request, for example. Therefore, the NLB has much less work to do than an ALB. As a result, the NLB needs significantly less time to forward an incoming request. So when performance is crucial to your workload, you should consider using an NLB to reduce latency.*

1. ***describe node in cluster and its operation***

***Ans.*** *A cluster node is a Microsoft Windows Server system that has a working installation of the Cluster service. By definition, a node is always considered to be a member of a cluster; a node that ceases to be a member of a cluster ceases to be a node.*

*A cluster operating system is a combination of hardware and software clusters. The hardware clusters help in sharing high-performance disks between all the computer systems or the nodes. Whereas the software cluster ensures and manages the working of all the systems together.*

* ***Practical***

1. ***Install and configure failover cluster for hyper v***

***Ans.*** *Done in lab.*

1. ***install and configure NLB for web server***

***Ans.*** *Done in lab.*

* ***Maintain and monitor server***

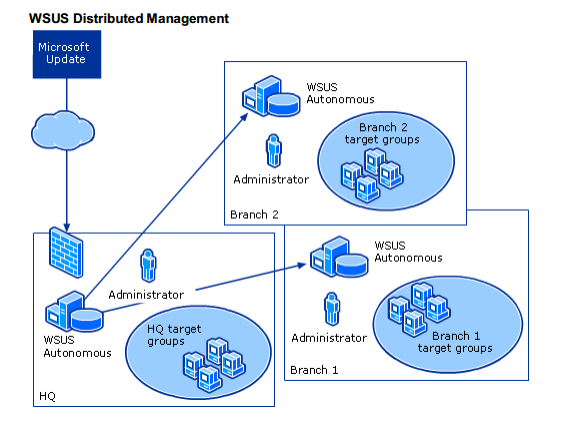
1. ***need of updates***

***Ans.*** *Along with other updates like dot-releases to (or complete overhauls of) an operating system, patches are part of essential preventative maintenance necessary to keep machines up-to-date, stable, and safe from malware and other threats. As we're sure you know, the security angle is especially important.*

1. ***what is WSUS and importance of WSUS***

***Ans.*** *WSUS is also known as Windows Server Update Services, and its first version is called Server Update Services (SUS). It helps distribute updates, fixes, and other types of releases available from Microsoft Update. You can use WSUS to reliably and securely manage, distribute, and install updates for Microsoft products in an organization's IT network.*

1. *WSUS* ***architecture***

***Ans.***

1. ***4synchronization of update, product and classification 5 wsus group***

***Ans.***

1. ***wsus port number and wsus policy***

***Ans. Wsus port number is 80.*** *In an Active Directory environment, you can use Group Policy to define how computers and users can interact with Windows Update to obtain automatic updates from Windows Server Update Services (WSUS). This article refers to these computers and users as WSUS clients.*

1. ***what is backup and restore 8 type of backup***

***Ans.*** *Backup and Restore is the primary backup component of Windows Vista and Windows 7. It can create file and folder backups, as well as system images backups, to be used for recovery in the event of data corruption, hard disk drive failure, or malware infection.*

1. *Full backup*
2. *differential*
3. *Incremental*
4. *Mirror backup*
5. *Smart backup*
6. *copy backup*
7. ***difference between incremental and differential backup***

***Ans.*** *The difference in incremental vs. differential backup is that, while an incremental backup only includes the data that has changed since the previous backup, a differential backup contains all of the data that has changed since the last full backup.*

1. ***what is full server backup***

***Ans.*** *A full backup is the process of creating one or more copies of all organizational data files in a single backup operation to protect them. Before the full backup process, a data protection specialist such as a backup administrator designates the files to be duplicated — or all files are copied.*

1. ***what is use of performance monitor***

***Ans.*** *The Microsoft Windows Performance Monitor is a tool that administrators can use to examine how programs running on their computers affect the computer's performance. The tool can be used in real time and also be used to collect information in a log to analyze the data at a later time.*

* ***Practical***

1. ***install and configure wsus server***

***Ans.*** *Done in lab.*

1. ***apply update to particular client group through wsus***

***Ans.*** *Done in lab.*

1. ***Take customize backup of data***

***Ans.*** *Done in lab.*

1. ***restore backup original location and also another location***

***Ans.*** *Done in lab.*

1. ***backup schedule and check it.***

***Ans.*** *Done in lab.*

1. ***take full backup***

***Ans.*** *Done in lab.*

1. ***performance monitor of current process***

***Ans.*** *Done in lab.*

1. ***performance monitor of cpu, memory***

***Ans.*** *Done in lab.*