**Windows Server Assignment**

**Module 1**

**Install Windows Server**

1. To open Server Manager, click the Server Manager icon in the taskbar or select Server Manager in the Start Menu.

-Click Manage in the upper right portion of the screen and click Add Roles and Features to open a wizard.

2.  workgroup is a peer-to-peer windows computer network, where users can use their login credentials only on or her system and not others. It holds a distributed administration wherein each user can manage his machine independently. Most storage is distributed. Each device has its own dedicated storage.

3. Domain is a client/server network where users can log in from any device in the office. Also known as Remote login. It has a centralized administration and all devices can be managed from a centralized device. It prefers centralized storage and all the user’s data is stored at a centralized storage device which can be NAS or SAN.

4. PowerShell is a **cross-platform task automation solution** made up of a command-line shell, a scripting language, and a configuration management framework. PowerShell runs on Windows, Linux, and macOS.

5.Upgradation means to upgrade any version of an OS while migration means to change one platform to another.

6. **License features refer to specific functionalities or capabilities that are included or restricted based on the terms of a software license.** The activation feature is a straightforward functionality present in a license. It can be either enabled or disabled, indicating whether the license supports activation or not.

## 7. Always start with a verified data backup

## Consider creating an image backup

## Don’t make multiple simultaneous change

## Monitor logs closely after making change.

8**.** Smaller disk footprint, which means a smaller attack surface due to a smaller code base.

* Greater stability due to fewer running processes and services than a Full installation.
* Simplified management.
* Reduced maintenance.
* Reduced memory and disk requirements.

9. [Nano Server is a**stripped-down version of Windows Server developed by Microsoft for running cloud applications and containers**](https://www.bing.com/ck/a?!&&p=2eb95273e90e29a6JmltdHM9MTcxMDM3NDQwMCZpZ3VpZD0wZGQ0MjRhNC1lYjYxLTY1NTAtMjU2NS0zN2M0ZWFkMzY0ZmEmaW5zaWQ9NTgzNw&ptn=3&ver=2&hsh=3&fclid=0dd424a4-eb61-6550-2565-37c4ead364fa&psq=What+is+Nano+server&u=a1aHR0cHM6Ly93d3cucGFyYWxsZWxzLmNvbS9ibG9ncy9yYXMvd2luZG93cy1uYW5vLXNlcnZlci8&ntb=1)**.**

10. Nano Server is a lighter and faster, more stable and secure, and less resource-intensive alternative to a full-blown Windows Server installation. It is meant to **streamline DevOps** and is ideal for use in private clouds and datacenters.

11. : Windows Server Core is a minimalistic installation option for Windows Server. It provides a command-line interface without a full graphical desktop environment.

Nano Server is an ultralightweight Windows offering designed primarily for new application development.

**Storage solution**

1. MBR is the traditional partition table that supports older operating systems, while GPT is a new replacement that doesn't have limits on the disk size and number of partitions you can create.

2. VHDX supports up to 64TB of storage capacity, while VHD supports up to 2TB.

* VHDX provides custom metadata, which allows for robust data corruption protection.
* VHDX supports live resizing, which is not supported with VHD virtual disks.
* The logical sector size of VHDX is 4KB, while the sector size of VHD is 512KB.
* VHDX is supported in Windows Server 2012 and higher, while VHD has a long history in Microsoft.

3. SMB, short for Server Message Block, is a client-server communication protocol that provides shared access to network files and resources between nodes on a network.

NFS, short for Network File System, is a file service protocol that enables users to access files on a remote server, making it a distributed file system.

4.[**Sharing permissions determine the type of access others have to the shared folder across the network**](https://www.bing.com/ck/a?!&&p=770cdd36141e3311JmltdHM9MTcxMDM3NDQwMCZpZ3VpZD0wZGQ0MjRhNC1lYjYxLTY1NTAtMjU2NS0zN2M0ZWFkMzY0ZmEmaW5zaWQ9NTc3OQ&ptn=3&ver=2&hsh=3&fclid=0dd424a4-eb61-6550-2565-37c4ead364fa&psq=what+is+sharing+permission&u=a1aHR0cHM6Ly93d3cudGltZXNtb2pvLmNvbS93aGF0LWlzLXRoZS1pbXBvcnRhbmNlLW9mLXBlcm1pc3Npb24taW4tc2hhcmluZy1mb2xkZXIv&ntb=1)**,**

## 5. Windows ntfs permissions

* Full Control: Users can modify, add, move, and delete files, as well as their associated properties and directories.
* Modify: Users can view and modify files and file properties, including deleting and adding files to a directory or.
* Read & Execute: Users can run executable files, including scripts.

6. A storage pool is **capacity aggregated from disparate physical storage resources in a shared storage environment.**

7. A basic disk is a type of hard drive configuration, available with the Windows operating system.

A disk that has been initialized for dynamic storage is called a dynamic disk.

8. [A simple volume is a part of a disk that can be used as a single drive. A spanned volume is a combination of free space from multiple disks that can be used as one large drive](https://www.bing.com/ck/a?!&&p=b7f186c10da94e9eJmltdHM9MTcxMDM3NDQwMCZpZ3VpZD0wZGQ0MjRhNC1lYjYxLTY1NTAtMjU2NS0zN2M0ZWFkMzY0ZmEmaW5zaWQ9NTc3Nw&ptn=3&ver=2&hsh=3&fclid=0dd424a4-eb61-6550-2565-37c4ead364fa&psq=what+is+simple+volume+%2c+spanned+volume&u=a1aHR0cHM6Ly9jb21tdW5pdHkuaW5mb3NlY2luc3RpdHV0ZS5jb20vZGlzY3Vzc2lvbi81MDE0Ni93aGF0cy10aGUtZGlmZi1vZi1zcGFubmVkLWFuZC1zaW1wbGUtdm9sdW1l&ntb=1).

9. RAID level 0 – Striping

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 superior I/O performance. This performance can be enhanced further by using multiple controllers, ideally one controller per disk.

RAID level 1 – Mirroring

Data are stored twice by writing them to both the data drive (or set of data drives) and a mirror drive (or set of drives). If a drive fails, the controller uses either the data drive or the mirror drive for data recovery and continuous operation

RAID level 5 – Striping with parity

RAID 5 is the most common secure RAID level. It requires at least 3 drives but can work with up to 16. Data blocks are striped across the drives and on one drive a parity checksum of all the block data is written.

RAID level 6 – Striping with double parity

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

RAID level 10 – combining RAID 1 & RAID 0

It is possible to combine the advantages (and disadvantages) of RAID 0 and RAID 1 in one single system. This is a nested or hybrid RAID configuration. It provides security by mirroring all data on secondary drives while using striping across each set of drives to speed up data transfers.

10**.** S**torage Area Network (SAN)**is used for transferring the data between the servers and the storage devices’ fiber channels and switches.

Network attached storage data is identified by file name as well as byte offset. In-Network Attached Storage, the file system is managed by Head units such as CPU and Memory.

**Implement Hyper-V**

1. Virtualization is a process that allows for more efficient use of physical computer hardware and is the foundation of cloud computing.

2. The three main types of virtualization are also discussed in detail: **OS-level virtualization, paravirtualization, and full virtualization**. Finally, the similarities and differences among them are highlighted in terms of security, performance, features, and OS support.

3. Hyper-V is **virtualization software** that, well, virtualizes software. It can not only virtualize operating systems but also entire hardware components, such as hard drives and network switches. Unlike Fusion and Virtualbox, Hyper-V is not limited to the user’s device.

4. **Remote management of Hyper-V** allows you to **manage Hyper-V hosts and virtual machines (VMs) from a different computer.**

5. [Hyper-V Manager is a **free GUI-based management tool for managing virtual environments created in Windows OS**](https://www.bing.com/ck/a?!&&p=bfadcc645ac1affaJmltdHM9MTcxMDM3NDQwMCZpZ3VpZD0wZGQ0MjRhNC1lYjYxLTY1NTAtMjU2NS0zN2M0ZWFkMzY0ZmEmaW5zaWQ9NTg0MA&ptn=3&ver=2&hsh=3&fclid=0dd424a4-eb61-6550-2565-37c4ead364fa&psq=what+is+hyper+v+manager&u=a1aHR0cHM6Ly93d3cubmFraXZvLmNvbS9ibG9nL3doYXQtaXMtaHlwZXItdi1tYW5hZ2VyLWFuZC1ob3ctZG9lcy1pdC13b3JrLw&ntb=1).

6. [Nested virtualization is the ability to run a hypervisor inside of a virtual machine (VM), which itself runs on a hypervisor](https://www.bing.com/ck/a?!&&p=c36f65d9b4e4b9dbJmltdHM9MTcxMDM3NDQwMCZpZ3VpZD0wZGQ0MjRhNC1lYjYxLTY1NTAtMjU2NS0zN2M0ZWFkMzY0ZmEmaW5zaWQ9NTgzNQ&ptn=3&ver=2&hsh=3&fclid=0dd424a4-eb61-6550-2565-37c4ead364fa&psq=what+is+virtual+machine+and+nested+virtualization&u=a1aHR0cHM6Ly93d3cud2Vib3BlZGlhLmNvbS9kZWZpbml0aW9ucy9uZXN0ZWQtdmlydHVhbGl6YXRpb24v&ntb=1).

7. Dynamic memory is a way of allocating memory during the run time of a program, instead of before it starts.

8. In NUMA, where different memory controller is used. Non-uniform Memory Access is faster than uniform Memory Access. Non-uniform Memory Access is applicable for real-time applications and time-critical applications.

9. [**Functions of a virtual machine include**](https://www.bing.com/ck/a?!&&p=6d831b9550f7ab69JmltdHM9MTcxMDM3NDQwMCZpZ3VpZD0wZGQ0MjRhNC1lYjYxLTY1NTAtMjU2NS0zN2M0ZWFkMzY0ZmEmaW5zaWQ9NTc2NA&ptn=3&ver=2&hsh=3&fclid=0dd424a4-eb61-6550-2565-37c4ead364fa&psq=describe+Virtual+Machine+functions&u=a1aHR0cHM6Ly9jbG91ZC5nb29nbGUuY29tL2xlYXJuL3doYXQtaXMtYS12aXJ0dWFsLW1hY2hpbmU&ntb=1):

Running programs and operating systems

Storing data

Connecting to networks

Providing a substitute for a real machine

10. [Hyper-V is a hardware virtualization product by Microsoft](https://www.bing.com/ck/a?!&&p=d89d7ce20ad77f6bJmltdHM9MTcxMDM3NDQwMCZpZ3VpZD0wZGQ0MjRhNC1lYjYxLTY1NTAtMjU2NS0zN2M0ZWFkMzY0ZmEmaW5zaWQ9NTc2MQ&ptn=3&ver=2&hsh=3&fclid=0dd424a4-eb61-6550-2565-37c4ead364fa&psq=describe+Hyper+v+functions&u=a1aHR0cHM6Ly9sZWFybi5taWNyb3NvZnQuY29tL2VuLXVzL3ZpcnR1YWxpemF0aW9uL2h5cGVyLXYtb24td2luZG93cy9hYm91dC8&ntb=1)[1](https://www.bing.com/ck/a?!&&p=305bf5825492e248JmltdHM9MTcxMDM3NDQwMCZpZ3VpZD0wZGQ0MjRhNC1lYjYxLTY1NTAtMjU2NS0zN2M0ZWFkMzY0ZmEmaW5zaWQ9NTc2Mg&ptn=3&ver=2&hsh=3&fclid=0dd424a4-eb61-6550-2565-37c4ead364fa&psq=describe+Hyper+v+functions&u=a1aHR0cHM6Ly9sZWFybi5taWNyb3NvZnQuY29tL2VuLXVzL3ZpcnR1YWxpemF0aW9uL2h5cGVyLXYtb24td2luZG93cy9hYm91dC8&ntb=1)[2](https://www.bing.com/ck/a?!&&p=29b22fc279ddae45JmltdHM9MTcxMDM3NDQwMCZpZ3VpZD0wZGQ0MjRhNC1lYjYxLTY1NTAtMjU2NS0zN2M0ZWFkMzY0ZmEmaW5zaWQ9NTc2Mw&ptn=3&ver=2&hsh=3&fclid=0dd424a4-eb61-6550-2565-37c4ead364fa&psq=describe+Hyper+v+functions&u=a1aHR0cHM6Ly9sZWFybi5taWNyb3NvZnQuY29tL2VuLXVzL3dpbmRvd3Mtc2VydmVyL3ZpcnR1YWxpemF0aW9uL2h5cGVyLXYvaHlwZXItdi10ZWNobm9sb2d5LW92ZXJ2aWV3&ntb=1)[3](https://www.bing.com/ck/a?!&&p=6603f09fcf5330a0JmltdHM9MTcxMDM3NDQwMCZpZ3VpZD0wZGQ0MjRhNC1lYjYxLTY1NTAtMjU2NS0zN2M0ZWFkMzY0ZmEmaW5zaWQ9NTc2NA&ptn=3&ver=2&hsh=3&fclid=0dd424a4-eb61-6550-2565-37c4ead364fa&psq=describe+Hyper+v+functions&u=a1aHR0cHM6Ly93d3cuY2xvdWR3YXJkcy5uZXQvaHlwZXItdi8&ntb=1). [It enables running virtualized computer systems on top of a physical host](https://www.bing.com/ck/a?!&&p=e72849fe286f0776JmltdHM9MTcxMDM3NDQwMCZpZ3VpZD0wZGQ0MjRhNC1lYjYxLTY1NTAtMjU2NS0zN2M0ZWFkMzY0ZmEmaW5zaWQ9NTc2NQ&ptn=3&ver=2&hsh=3&fclid=0dd424a4-eb61-6550-2565-37c4ead364fa&psq=describe+Hyper+v+functions&u=a1aHR0cHM6Ly9sZWFybi5taWNyb3NvZnQuY29tL2VuLXVzL3ZpcnR1YWxpemF0aW9uL2h5cGVyLXYtb24td2luZG93cy8&ntb=1)[4](https://www.bing.com/ck/a?!&&p=63f27b98dc16c367JmltdHM9MTcxMDM3NDQwMCZpZ3VpZD0wZGQ0MjRhNC1lYjYxLTY1NTAtMjU2NS0zN2M0ZWFkMzY0ZmEmaW5zaWQ9NTc2Ng&ptn=3&ver=2&hsh=3&fclid=0dd424a4-eb61-6550-2565-37c4ead364fa&psq=describe+Hyper+v+functions&u=a1aHR0cHM6Ly9sZWFybi5taWNyb3NvZnQuY29tL2VuLXVzL3ZpcnR1YWxpemF0aW9uL2h5cGVyLXYtb24td2luZG93cy8&ntb=1). [Each virtual machine created using Hyper-V acts like a complete computer, running an operating system and programs](https://www.bing.com/ck/a?!&&p=50c17740d4f6a8edJmltdHM9MTcxMDM3NDQwMCZpZ3VpZD0wZGQ0MjRhNC1lYjYxLTY1NTAtMjU2NS0zN2M0ZWFkMzY0ZmEmaW5zaWQ9NTc2Nw&ptn=3&ver=2&hsh=3&fclid=0dd424a4-eb61-6550-2565-37c4ead364fa&psq=describe+Hyper+v+functions&u=a1aHR0cHM6Ly9sZWFybi5taWNyb3NvZnQuY29tL2VuLXVzL3dpbmRvd3Mtc2VydmVyL3ZpcnR1YWxpemF0aW9uL2h5cGVyLXYvaHlwZXItdi10ZWNobm9sb2d5LW92ZXJ2aWV3&ntb=1).

11. Checkpoint is an **internal process that writes all dirty pages** (modified pages) from Buffer Cache to Physical disk, apart from this it also writes the log records from log buffer to physical file. Writing of Dirty pages from buffer cache to data file is also known as Hardening of dirty pages.

**Windows containers**

1**.** Containers are a form of operating system virtualization. A single container might be used to run anything from a small microservice or software process to a larger application.

2. Docker is a set of [platform as a service](https://en.wikipedia.org/wiki/Platform_as_a_service) (PaaS) products that use [OS-level virtualization](https://en.wikipedia.org/wiki/OS-level_virtualization) to deliver software in packages called [containers](https://en.wikipedia.org/wiki/Container_(virtualization)).

3. [Hyper-V Containers and Windows Containers are two types of container models in Windows Server 2016. While Hyper-V Containers isolate each container via a lightweight VM, Windows Containers offer isolation through namespace and process isolation. Windows Containers share a kernel with the container host and all the containers running on the host](https://www.bing.com/ck/a?!&&p=b8fb90416ef0d444JmltdHM9MTcxMDM3NDQwMCZpZ3VpZD0wZGQ0MjRhNC1lYjYxLTY1NTAtMjU2NS0zN2M0ZWFkMzY0ZmEmaW5zaWQ9NTgzMg&ptn=3&ver=2&hsh=3&fclid=0dd424a4-eb61-6550-2565-37c4ead364fa&psq=hyper+v+containers+and+windows+containers&u=a1aHR0cHM6Ly93d3cud2Vib3BlZGlhLmNvbS9kZWZpbml0aW9ucy9oeXBlci12LWNvbnRhaW5lcnMv&ntb=1).

**High availability**

1. [A high availability server is a system that is designed to remain continuously functional, even when issues occur](https://www.bing.com/ck/a?!&&p=459fab1233f9be37JmltdHM9MTcxMDM3NDQwMCZpZ3VpZD0wZGQ0MjRhNC1lYjYxLTY1NTAtMjU2NS0zN2M0ZWFkMzY0ZmEmaW5zaWQ9NTg1MA&ptn=3&ver=2&hsh=3&fclid=0dd424a4-eb61-6550-2565-37c4ead364fa&psq=what+is+high+availability+server&u=a1aHR0cHM6Ly93d3cucXVhZGJyaWRnZS5jb20va25vd2xlZGdlLWNlbnRlci9oaWdoLWF2YWlsYWJpbGl0eS1zZXJ2ZXJz&ntb=1).

2. [A cluster on computer storage is a way of combining multiple storage devices or controllers to increase their performance, capacity, or reliability.](https://www.bing.com/ck/a?!&&p=b3085e22c931c25cJmltdHM9MTcxMDM3NDQwMCZpZ3VpZD0wZGQ0MjRhNC1lYjYxLTY1NTAtMjU2NS0zN2M0ZWFkMzY0ZmEmaW5zaWQ9NTc4OA&ptn=3&ver=2&hsh=3&fclid=0dd424a4-eb61-6550-2565-37c4ead364fa&psq=describe+cluster+storage&u=a1aHR0cHM6Ly93d3cudGVjaHRhcmdldC5jb20vc2VhcmNoc3RvcmFnZS9tYWdhemluZUNvbnRlbnQvVGhlLWJlbmVmaXRzLW9mLWNsdXN0ZXJlZC1zdG9yYWdl&ntb=1)

3. A**Network Load Balancer** functions at the**fourth layer of the** Open**Systems Interconnection (OSI)**model. It can handle millions of requests per second. After the load balancer receives a connection request.

4. A node may be a virtual or physical machine, depending on the cluster. Each node is managed by the control plane and contains the services necessary to run Pods. Typically you have several nodes in a cluster; in a learning or resource-limited environment, you might have only one node.

**Maintain and monitor server**

1.  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.

2. The act of backing up your data in the case of a loss and putting up secure mechanisms that allow you to recover your data, as a result, this process is known as data backup and recovery. It copies and preserves data in order to keep it available in the event of data loss or damage types of backup are:

### **Full backup**

### **Differential Backup**

### **Mirror Backup**

### **Incremental Backup**

3. **Incremental Backup**

Developing backup is backup of all progressions made since last backup. With expanding backup, full backup happens first and following backup runs progressions produced using last backup.

**Differential Backup**

Differential backup is backup of all progressions made since last full backup. With differential backup, full backup is done first and resulting backup runs progressions produced using last full backup.

4. [A full server backup is a backup method that copies and stores all data in its entirety](https://www.bing.com/ck/a?!&&p=e0d4ba73832bcd6cJmltdHM9MTcxMDM3NDQwMCZpZ3VpZD0wZGQ0MjRhNC1lYjYxLTY1NTAtMjU2NS0zN2M0ZWFkMzY0ZmEmaW5zaWQ9NTc2MQ&ptn=3&ver=2&hsh=3&fclid=0dd424a4-eb61-6550-2565-37c4ead364fa&psq=what+is+full+server+backup&u=a1aHR0cHM6Ly93d3cubmluamFvbmUuY29tL2Jsb2cvd2hhdC1pcy1hLWZ1bGwtc2VydmVyLWJhY2t1cC8&ntb=1).

5. Performance Monitor, also known as the System Monitor, is a system monitoring program introduced in [Windows NT](https://www.minitool.com/lib/windows-nt.html) 3. The Performance Monitor Windows 10 monitors various activities on a computer such as CPT or memory usage.