**OS Architecture:** An **operating system** is software that acts as an interface between the user and the computer hardware and controls the execution of all kinds of programs. A monolithic **OS** is an **operating system architecture** where the entire **operating system** is working in kernel space and is alone in supervisor mode.

**Process management: Process** managements involve the execution of various tasks such as creation of **processes**, scheduling of **processes**, **management** of deadlock, and termination of **processes**. It is responsibility of **operating system** to manage all the running **processes** of the **system**

**Memory Management:** Memory management is the functionality of an operating system which handles or manages primary memory and moves processes back and forth between main memory and disk during execution. Memory management keeps track of each and every memory location, regardless of either it is allocated to some process or it is free.

**Scheduling:** The process scheduling is the activity of the process manager that handles the removal of the running process from the CPU and the selection of another process on the basis of a particular strategy.

Process scheduling is an essential part of Multiprogramming operating systems. Such operating systems allow more than one process to be loaded into the executable memory at a time and the loaded process shares the CPU using time multiplexing.

**File System:** A file is a collection of related information that is recorded on secondary storage. Or file is a collection of logically related entities. From user’s perspective a file is the smallest allotment of logical secondary storage.

**Intro to windows server:** Microsoft **Windows Server** OS (operating system) is a series of enterprise-class **server** operating systems designed to share services with multiple users and provide extensive administrative control of data storage, applications and corporate networks.

**Installation of windows server 2016:**

* Place the Windows Server 2016 DVD (or the USB) installation media and boot from it
* At the first screen, choose your**Language**, **Time & currency format** and the **Keyboard or input method** and click **Next**.
* Then press **Install now**.
* Choose the appropriate Server 2016 version, according to your needs and click**Next**.

Note: The Windows Server 2016 (Desktop Experience) installation includes the Windows 10 GUI and the Server Manager.

* **Accept** the **License terms** and click **Next**.
* Provided that it is a new installation, choose **Custom: Install Windows**.
* Then select the disk to install the OS and click **Next**.
* At this point you can press the New button, in order to give a specific disk space in GB for the OS.
* Let Windows setup to copy the required files and to finish the installation.
* After a few restarts you'll be prompted to specify a password for the (standard) Administrator account. Type a complicated password (composed of uppercase, lowercase, symbol and numbers) and click **Next**.
* When prompted, press **Ctrl** +**Alt** + **Delete**, type the Administrator password and press**Enter**to login to your new server.
* After login, Server Manager will start automatically. Proceed to configure your new server.

Link: <https://www.youtube.com/watch?v=kca9NuLAuFI>s

**Basic configuration of windows server**

|  |  |
| --- | --- |
| CPU: | 1.4 GHz 64-bit processor |
| RAM: | 512 MB ECC (Error Correcting Code) without Desktop Experience installation & 2GB  with Desktop Experience installation. |
| Disk space: | 32 GB (Computers with more than 16 GB of RAM will require more disk space for paging, hibernation, and dump files). \*  \* Ideally use a disk with at least 80-100GB disk space. |
| Network adapter: | 1x Ethernet capable of at least gigabit throughput. |
| Other requirements: | UEFI 2.3.1c-based system & Firmware that supports secure boot. Trusted Platform Module if you want to use the BitLocker Drive Encryption. Internet access. |

**DHCP:** Stands for "Dynamic Host Configuration Protocol." **DHCP** is a protocol that automatically assigns a unique IP address to each device that connects to a network. With **DHCP**, there is no need to manually assign IP addresses to new devices. Therefore, no user configuration is necessary to connect to a DCHP-based network.

Link: <https://www.youtube.com/watch?v=y3rkiXYeH1M>

**DNS:** The Domain Name System (DNS) is the phonebook of the Internet. Humans access information online through domain names, like nytimes.com or espn.com. Web browsers interact through Internet Protocol (IP) addresses. DNS translates domain names to IP addresses so browsers can load Internet resources

Link: <https://www.youtube.com/watch?v=P6KEXb1pIFg>

**Active Directory user and group:** The main objects which need to be managed in **Active Directory** are **users**, computers, and **groups**. The **user** object contains information about the individual including password and logon credentials. **Groups** are primarily used for the purpose of managing and securing **groups** of **users**, computers and other **groups**.

Link: <https://www.youtube.com/watch?v=57-lqHJuZnA>

**DNS Active Directory:** DNS and Active Directory. **Domain** Name System (DNS) is a name resolution method that is used to resolve host names to IP addresses. It is used on TCP/IP networks and across the internet. DNS is a namespace. Active Directory is built on DNS.

Link: <https://www.youtube.com/watch?v=2b65IWn1FP0>

**DHCP Active Directory:** It is a service that where the **DHCP** client requests an IP address from the **DHCP** server so that the client computer doesn't need to be manually configured with an IP address. **AD**: **Active directory** is a catalogue that keeps record of objects such as computer, user accounts, printers, servers.

Link: <https://www.youtube.com/watch?v=p9HsbQ8T6Hc>

**Hyper-v:** Hypervisor is a hardware virtualization technique that allows multiple guest operating systems (OS) to run on a single host system at the same time.

Link: <https://www.youtube.com/watch?v=wGZrhKhj0Fk>

**Remote desktop setup:** select Start > Settings > System > **Remote Desktop**, and turn on Enable **Remote Desktop**. Use **Remote Desktop** to connect to the PC you **set up**.

Link: <https://www.youtube.com/watch?v=n9sPlXhcQZI>

**WDS setup:** Open the powershell and run the command Server Manager Cmd -install **WDS**. Click on Start, click on Administrative Tools, click on **Windows Deployment Services**. On the **WDS** console, expand Servers, right click on the **WDS** server and click on **Configure** Server. Read the requirements once before you click next.

Link; <https://www.youtube.com/watch?v=07L9L_TkrAc>

**Group Policy Management** :The **Group Policy Management** Console (GPMC) is a built-in Windows administration tool that enables administrators to **manage Group Policy** in an Active Directory forest and obtain data for troubleshooting **Group Policy**. You can find the **Group Policy Management** Console in the Tools menu of Microsoft Windows Server **Manager**.

Link: <https://www.youtube.com/watch?v=57-lqHJuZnA>

**Server Setup:** determines how the user is connected to the server. Here is a list of commonly used server setups, with a short description of each

* Everything On One Server
* Separate Database Server
* Load Balancer (Reverse Proxy)
* HTTP Accelerator (Caching Reverse Proxy)
* Master-Slave Database Replication

**Link:** <https://www.youtube.com/watch?v=e50WPYLVbaY>

**IPAM**: (IP Address Management) is the administration of DNS and DHCP, which are the network services that assign and resolve IP addresses to machines in a TCP/IP network. Simply put, **IPAM** is a means of planning, tracking, and managing the Internet Protocol address space used in a network.

Link <https://www.youtube.com/watch?v=3GBW3hq2jsc>:

**ADCS: Active Directory** Certificate Services (**AD** CS) is an **Active Directory** tool that lets administrators customize services in order to issue and manage public key certificates. ... Network Device Enrolment Service -lets network devices without domain accounts retrieve certificates.

Link: <https://www.youtube.com/watch?v=g4gF1SVsL6w>

**Remote Access: Remote access** is the ability to **access** a computer or a network **remotely** through a network connection. **Remote access** enables users to **access** the systems they need when they are not physically able to connect directly; in other words, users **access** systems **remotely** by using a telecommunications or internet connection.

Link: <https://www.youtube.com/watch?v=G1juAyU7WEI>

**VPN:** A virtual private network (VPN) gives you online privacy and anonymity by creating a private network from a public internet connection. VPNs mask your internet protocol (IP) address so your online actions are virtually untraceable.

Link: <https://www.youtube.com/watch?v=m_wwqspLJSM>

**PowerShell**: PowerShell is a task-based command-line shell and scripting language built on . NET. PowerShell helps system administrators and power-users rapidly automate tasks that manage operating systems (Linux, mac OS, and Windows) and processes. PowerShell commands let you manage computers from the command line.

# How to use PowerShell Web Access in Windows Server 2016

Link: <https://www.youtube.com/watch?v=5Tm5WRUnu-s>

**ISCSI**: stands for Internet Small Computer Systems Interface. **ISCSI** is a transport layer protocol that works on top of the Transport Control Protocol (TCP). It enables block-level SCSI data transport between the **ISCSI** initiator and the storage target over TCP/IP networks.

Link: <https://www.youtube.com/watch?v=Iq7Ea_alDJY>

**FAILOVER CLUSTER:** A failover cluster is a group of computer servers that are configured to provide continual access with no downtime or an absolute minimum of downtime.

Link: <https://www.youtube.com/watch?v=NCRmenUXUv4>

**Software defined networking:** (**SDN**) is an approach to using open protocols, such as OpenFlow, to apply globally aware software control at the edges of the network to access network switches and routers that typically would use closed and proprietary firmware.

**Windows Containers**: **Windows Containers** provide application isolation through process and namespace isolation technology by sharing a kernel with the **container** host and all other **containers** running on the host.

Link: <https://www.google.com/url?q=https://www.youtube.com/watch%3Fv%3DLamGR5Wd-kI&sa=U&ved=2ahUKEwjs2c3WtdDnAhUg_XMBHc_7BBsQtwIwA3oECAkQAQ&usg=AOvVaw3i6pnwsimNtsDEo7ZYQU-C>

**Active Directory Federation Services:** (**ADFS**) is a Single Sign-On (SSO) solution created by Microsoft. As a component of Windows Server operating systems, it provides users with authenticated access to applications that are not capable of using Integrated Windows Authentication (IWA) through Active Directory (AD).

Link: <https://www.google.com/url?q=https://www.youtube.com/watch%3Fv%3DfIToYazJ4Ig&sa=U&ved=2ahUKEwiapujJtNDnAhUBxDgGHRANBFIQtwIwD3oECAMQAQ&usg=AOvVaw3gCrcJxvajErBET6DYF0zh>

**Wireless application protocol:** (**WAP**) is a communications protocol that is used for wireless data access through most mobile wireless networks. **WAP** enhances wireless specification interoperability and facilitates instant connectivity between interactive wireless devices (such as mobile phones) and the Internet.

Link: <https://www.google.com/url?q=https://www.youtube.com/watch%3Fv%3DRZLh8F-tWJc&sa=U&ved=2ahUKEwjG68KGtNDnAhVu4jgGHWxLDN0QtwIwAnoECAQQAQ&usg=AOvVaw3ocaA3Jdem-_3KgpLTo0fE>

**DHCP SERVER**: A **DHCP Server** is a network **server** that automatically provides and assigns IP addresses, default gateways and other network parameters to client devices. It relies on the standard protocol known as Dynamic Host Configuration Protocol or **DHCP** to respond to broadcast queries by clients.

Link: <https://www.google.com/url?q=https://www.youtube.com/watch%3Fv%3Dy3rkiXYeH1M&sa=U&ved=2ahUKEwirmoSjs9DnAhVKfisKHTDvD6oQtwIwAnoECAgQAQ&usg=AOvVaw1Lce0e9Y1dOtkC4Hbw9Bor>

**VNC**: (virtual network computing) is a technology that enables remote desktop sharing, a form of remote access on computer networks. **VNC** is **used to** view the visual desktop display of another computer and control that computer over a network connection.

Link: <https://www.google.com/url?q=https://www.youtube.com/watch%3Fv%3DEWkrqqnOgdo&sa=U&ved=2ahUKEwi5nLG5stDnAhV3xjgGHaN1DPwQtwIwAHoECAYQAQ&usg=AOvVaw0xN9U6polwXDWOZ1zOK2Oe>

**NPS:** Network Policy Server (**NPS**) is the **Microsoft** implementation of a Remote Authentication Dial-in User Service (RADIUS) server and proxy. It is the successor of Internet Authentication Service (IAS).Server Data Objects API can be used to manipulate the network policy configuration on a computer that runs **NPS** or IAS.

Link:<https://www.google.com/url?q=https://docs.microsoft.com/en-us/windows-server/networking/technologies/nps/nps-manage-install&sa=U&ved=2ahUKEwijtZOhsNDnAhUJwjgGHRspBxUQFjADegQICBAB&usg=AOvVaw3S_J_vNJDyi8vD-HPeWBAM>

**Windows Network Load Balancing:** (**NLB**) is an optional component of **Windows** Server. It load balances network traffic, sent to a cluster virtual IP address, among multiple servers in a cluster. It requires Microsoft Clustering to be used.

Link: <https://www.google.com/url?q=https://newhelptech.wordpress.com/2018/10/01/step-by-step-how-to-implement-configure-network-load-balancing-in-windows-server-2016/&sa=U&ved=2ahUKEwjyruHkodDnAhVYzDgGHSvmBTYQFjABegQIChAB&usg=AOvVaw0d_OKnTaWGGl-jBf5wDdWJ>