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|  | Module: 13 Networking with Windows Server |  |
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***Installing and configure DNS server***

1. ***Describe DNS operation***

***Ans.*** *DNS acts like a phonebook for the internet. Whenever people type domain names, like Fortinet.com or Yahoo.com, into the address bar of web browsers, the DNS finds the right IP address. The site's IP address is what directs the device to go to the correct place to access the site's data.*

1. ***DNS query—Iterative and Recursive***

***Ans.*** *A recursive DNS lookup is where one DNS server communicates with several other DNS servers to hunt down an IP address and return it to the client. This is in contrast to an iterative DNS query, where the client communicates directly with each DNS server involved in the lookup.*

1. ***what is forward lookup zone and its resource type***

***Ans.*** *Forward Lookup Zones allow the DNS Server to resolve queries where the client sends a name to the DNS Server to request the IP address of the requested host.*

*The forward lookup zone contains A type resource records that can point out an IP address for a given host name.*

1. ***what is reverse lookup zone and its resource type***

***Ans.*** *a reverse lookup zone is an authoritative DNS zone that is used primarily to resolve IP addresses to network resource names. This zone type can be primary, secondary, or Active Directory—integrated.*

1. ***what is conditional forwarder***

***Ans.*** *Adding multiple DNS Servers as Forwarders or Conditional Forwarders allows DNS names to continue to be resolved in the event of failures of the only configured Server, of the underlying network link or the supporting network infrastructure.*

1. ***what is primary zone, secondary zone and stub zone***

***Ans.*** *Primary (Master) DNS zone – holder of the original zone file (all the DNS records for the zone). You can manage a host through this zone. Secondary (Slave) DNS zone – holds a copy of the zone file. You can use them for better performance, for hiding your Primary, for backup and redundancy. Primary (Master) DNS zone – holder of the original zone file (all the DNS records for the zone). You can manage a host through this zone. Secondary (Slave) DNS zone – holds a copy of the zone file. You can use them for better performance, for hiding your Primary, for backup and redundancy.*

1. ***what is active directory integrated zone***

***Ans.*** *AD-integrated DNS zones are stored in directory partitions within Active Directory. These directory partitions replicate along with the rest of AD; therefore, no extra configuration (i.e., zone transfer setup) is required for DNS replication. Further, AD-integrated zones allow the use of secure dynamic updates.*

1. ***primary server, secondary server, cache only server***

***Ans. A primary server*** *is a server that acts as the first source for Domain Name System (DNS) data and responds to queries. It can be contrasted to the* ***secondary server****, which acts like the primary server but does not have the same access to data. Advertisements.* ***A caching-only server****saves data in a cache file until the data expires. Expiration occurs based on a ``time-to-live'' field attached to data received from another server. A caching-only server answers data from its cache if it has the information, or requests it from authoritative servers if it does not.*

1. ***what is aging and scavenging***

***Ans.*** *DNS aging and scavenging are used to automatically clean up dynamic DNS records after a certain period of time. DNS aging and scavenging work in concert. You need to configure both! DNS aging is a zone setting. DNS scavenging is a server setting.*

1. ***What is MX record***

***Ans.*** *A DNS MX record directs email to a mail server. Learn more about mail exchange (MX) records and how they are used in the email sending process.*

* ***Practical***

1. ***install active directory integrated dns***

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

1. ***create secondary dns and zone transfer***

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

1. ***create “A” record***

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

1. ***create alias***

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

1. ***create reverse lookup zone***

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

1. ***make a pointer***

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

1. ***apply conditional forwarder between two different domains***

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

1. ***nslookup command***

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

***DHCP***

1. ***purpose of DHCP***

***Ans.*** *Dynamic Host Configuration Protocol (DHCP) is a network protocol that is used to configure network devices to communicate on an IP network. A DHCP client uses the DHCP protocol to acquire configuration information, such as an IP address, a default route, and one or more DNS server addresses from a DHCP server.*

1. ***What is the DORA process?***

***Ans.*** *Broadcast-based DORA (Discover, Offer, Request, Acknowledgement). This process consists of the following steps: The DHCP client sends a DHCP Discover broadcast request to all available DHCP servers within range. A DHCP Offer broadcast response is received from the DHCP server, offering an available IP address lease.*

1. ***What is an authorized DHCP server?***

***Ans.*** *An authorized DHCP server is a server that has been given permission to lease IP addresses to DHCP clients on a network. DHCP gives administrators the ability to centrally manage and automatically assign IP addresses to devices on the same subnet.*

1. ***describe scope, lease duration, DHCP option, exclude address***

***Ans.*** *A* ***scope*** *is a consecutive range of IP addresses that a DHCP server can draw on to fulfill an IP address request from a DHCP client. By defining one or more scopes on your DHCP server, the server can manage the distribution and assignment of IP addresses to DHCP clients.* ***The DHCP Lease Time****, an important part of the DHCP settings. But what is it, how long should you set it or can you leave it on the default settings? In this article, I will explain how it works and what the recommended settings are for your network.* ***Excluded Addresses****. By default, the DHCP server assumes that all pool addresses in a pool may be assigned to clients. A single IP address or a range of IP addresses can be excluded. The excluded addresses are excluded from all DHCP pools.*

1. ***What is a reservation?***

***Ans.*** *When you use DHCP IP reservation, you're telling your Wi-Fi network to assign the same IP address to a specific device whenever that device connects to your network.*

1. ***What is dhcp relay agent?***

***Ans.*** *DHCP is a client server protocol that automatically provides IP hosts with IP addresses and other related configuration information. A DHCP relay (agent) is a host that forwards DHCP packets between clients and servers that are not on the same physical subnet.*

1. ***describe ipconfig command***

***Ans.*** *ipconfig (standing for "Internet Protocol configuration") is a console application program of some computer operating systems that displays all current TCP/IP network configuration values and refreshes Dynamic Host Configuration Protocol (DHCP) and Domain Name System (DNS) settings.*

* ***Practical***

1. ***install dhcp sever and make authorize***

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

1. ***create a scope and check on client by ipconfig***

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

1. ***dhcp database and take backup***

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

1. ***dhcp failover***

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

1. ***dhcp relay agent***

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

1. ***dhcp filter***

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

1. ***dhcp reservation***

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

***IPAM***

1. ***what is IPAM and purpose of IPAM***

***Ans.*** *IP Address Management (IPAM) is an integrated suite of tools to enable end-to-end planning, deploying, managing and monitoring of your IP address infrastructure, with a rich user experience.*

*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.*

1. ***why do we need dedicated server***

***Ans.*** *Dedicated servers provide more reliability and stability than the shared hosting. It makes sure that you are not sharing your space with any other malicious software or a potential spammer. Dedicated server leads to enhanced security, this is the reason it is essential for companies taking transactions over FTP or SSL.*

1. ***policy for ipam sever***

***Ans.***

1. ***which service monitor and manage by IPAM***

***Ans.*** *The IPAM server will communicate with managed servers using an RPC or WMI interface. IPAM monitors domain controllers and NPS servers for IP address tracking purposes. In addition to monitoring functions, several DHCP server and scope properties can be configured from the IPAM console.*

* ***Practical***

1. ***Install IPAM***

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

1. ***configure IPAM with six steps***

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

1. ***create dhcp scope using IPAM 4 create DNS zone***

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

1. ***check monitoring of service’s Remote connectivity and***

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

***VPN***

1. ***What is VPN?***

***Ans.*** *VPN stands for "Virtual Private Network" and describes the opportunity to establish a protected network connection when using public networks.*

1. ***type of VPN***

#### ***Ans.*** *1. Remote Access VPN* *2. Site to Site VPN* *3. Cloud VPN* *4. Mobile VPN* *5. SSL VPN* *6. PPTP (Point-to-Point Tunneling Protocol) VPN* *7. L2TP (Layer 2 Tunneling Protocol) VPN* *8. OpenVPN*

1. ***tunneling protocol***

***Ans.*** *In computer networks, a tunneling protocol is a communication protocol which allows for the movement of data from one network to another.*

1. ***authentication protocol***

***Ans.*** *1. Internet Protocol Security (IPsec)*

*2.Layer 2 Tunneling Protocol (L2TP)*

*3.Point–to–Point Tunneling Protocol (PPTP)*

*4.SSL and TLS*

*5.Secure Shell (SSH)*

*6.SSTP (Secure Socket Tunneling Protocol)*

*7.IKEv2 (Internet Key Exchange version 2)*

*8.OpenVPN*

*9.Wire Guard*

1. ***what is routing***

***Ans.*** *Network routing is the process of selecting a path across one or more networks. The principles of routing can apply to any type of network, from telephone networks to public transportation. In packet-switching networks, such as the Internet, routing selects the paths for* [*Internet Protocol (IP)*](https://www.cloudflare.com/learning/ddos/glossary/internet-protocol/) *packets to travel from their origin to their destination. These Internet routing decisions are made by specialized pieces of network hardware called* [*routers*](https://www.cloudflare.com/learning/network-layer/what-is-a-router/)*.*

* ***Practical***

1. ***install routing and remote access***

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

1. ***configure LAN routing***

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

1. ***configure vpn connection (VPN client)***

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

***Network policy server***

1. ***what is Radius server***

***Ans.*** *The RADIUS (Remote Authentication Dial-In User Service) client-server protocol enables remote access servers to communicate with a central server.*

1. ***What is authentication, authorization and accounting?***

***Ans. Authentication –***  
*The process by which it can be identified that the user, which wants to access the network resources, valid or not by asking some credentials such as username and password. Common methods are to put authentication on console port, AUX port, or vty lines.*

*As network administrators, we can control how a user is authenticated if someone wants to access the network. Some of these methods include using the local database of that device (router) or sending authentication requests to an external server like the ACS server. To specify the method to be used for authentication, a default or customized authentication method list is used.*

***Authorization –***   
*It provides capabilities to enforce policies on network resources after the user has gained access to the network resources through authentication. After the authentication is successful, authorization can be used to determine what resources the user is allowed to access and the operations that can be performed.*

*For example, if a junior network engineer (who should not access all the resources) wants to access the device then the administrator can create a view that will allow commands only to be executed by the user (the commands that are allowed in the method list). The administrator can use the authorization method list to specify how the user is authorized to network resources, i.e., through a local database or ACS server.*

***Accounting –***   
*It provides means of monitoring and capturing the events done by the user while accessing the network resources. It even monitors how long the user has access to the network. The administrator can create an accounting method list to specify what should be accounted for and to whom the accounting records should be sent.*

1. ***RADIUS server operation method and radius client***

***Ans.*** *A RADIUS Client (or Network Access Server) is a networking device (like a VPN concentrator, router, switch) that is used to authenticate users. A RADIUS Server is a background process that runs on a UNIX or Windows server. It lets you maintain user profiles in a central database.*

1. ***RADIUS port number***

***Ans.*** *The default port for RADIUS accounting is 1813.*

1. ***What are network policies (NPS)?***

***Ans.*** *Network Policy Server (NPS) uses network policies and the dial-in properties of user accounts to determine whether a connection request is authorized to connect to the network. You can use this procedure to configure a new network policy in either the NPS console or the Remote Access console.*

* ***Practical***

1. ***P1 configure RADIUS for wireless client***

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

1. ***configure NPS for remote access***

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

***IPv4 addressing and IPv6 addressing***

1. ***What is Ip address? And type of Ip address***

***Ans.*** *An IP address allows computers to send and receive data over the internet. Most IP addresses are purely numerical, but as internet usage grows, letters have been added to some addresses. There are four different types of IP addresses: public, private, static, and dynamic.*

1. ***class of Ip address***

***Ans.*** *Currently there are three classes of TCP/IP networks. Each class uses the 32-bit IP address space differently, providing more or fewer bits for the network part of the address.* ***These classes are class A, class B, and class C****.*

1. ***public Ip address and private Ip address***

***Ans.*** *Public IP address is provided by the Internet Service Provider (ISP). A public IP address is a one-of-a-kind numeric code that is never repeated by other devices, whereas a private IP address is a non-unique numeric code that can be reused by other private network devices.*

1. ***what is static Ip address, dhcp and APIPA***

***Ans.*** *Static IP addresses are configured manually, directly on the client. Reserved IP addresses are leased from the DHCP server, but the given client will always receive the same IP address. The DHCP service identifies the client by MAC address, as seen below.*

*Automatic Private IP Addressing (APIPA) is a feature in operating systems (such as Windows) that enables computers to automatically self-configure an IP address and subnet mask when their DHCP server isn't reachable. The IP address range for APIPA is 169.254. 0.1-169.254. 255.254, with the subnet mask of 255.255.*

1. ***What is ipv6 address?***

***Ans.*** *An IPv6 address is 128 bits in length and consists of eight, 16-bit fields, with each field bounded by a colon. Each field must contain a hexadecimal number, in contrast to the dotted-decimal notation of IPv4 addresses.*

1. ***ipv6 dhcp process***

***Ans.*** *The client sends a Request message to a specific DHCPv6 server to request IP addresses and configuration parameters. The DHCPv6 server responds with a Reply message that contains the IP addresses and configuration parameters. You can view statistics about the IPv6 messages on the Dashboard.1*

1. ***What is NAT?***

***Ans.*** *To access the Internet, one public IP address is needed, but we can use a private IP address in our private network. The idea of NAT is to allow multiple devices to access the Internet through a single public address. To achieve this, the translation of a private IP address to a public IP address is required. Network Address Translation (NAT) is a process in which one or more local IP addresses is translated into one or more Global IP addresses and vice versa to provide Internet access to the local hosts. Also, it does the translation of port numbers i.e., masks the port number of the host with another port number, in the packet that will be routed to the destination. It then makes the corresponding entries of IP address and port number in the NAT table. NAT generally operates on a router or firewall.*

1. ***What is the gateway address?***

***Ans.*** *A gateway is a connecting device (node) that can connect two networks that employ different transmission protocols. A piece of hardware responsible for accepting, analyzing, and transmitting data packets to other networks. Transmit traffic from one network to another.*

1. ***What is a loopback address?***

***Ans.*** *A loopback address is a distinct reserved* [*IP address*](https://www.geeksforgeeks.org/what-is-an-ip-address/) *range that starts from 127.0.0.0 ends at 127.255.255.255 though 127.255.255.255 is the broadcast address for 127.0.0.0/8. The loopback addresses are built into the IP domain system, enabling devices to transmit and receive the data packets. The loopback address 127.0.0.1 is generally known as localhost.*

[*TCP/IP protocol*](https://www.geeksforgeeks.org/tcp-ip-in-computer-networking/) *manages all the loopback addresses in the operating system. It mocks the TCP/IP server or TCP/IP client on the same system. These loopback addresses are always accessible so that the user can use them anytime for troubleshooting TCP/IP.*

*Whenever a protocol or program sends any data from a computer with any loopback IP address, that traffic is processed by a TCP/IP protocol stack within itself, i.e., without transmitting it to the network. That is, if a user is pinging a loopback address, they’ll get the reply from the same TCP/IP stack running on their computer. So, all the data transmitted to any of the loopback addresses as the destination address will not pop up on the network.*

*127.0.0.1 is the most commonly used loopback address; generally, 127.0.0.1 and localhost are functionally similar, i.e., the loopback address 127.0.0.1 and the hostname localhost; are internally mapped. Though, other loopback addresses are also accessible and can be used.*

1. ***different type of ipv6 address***

***Ans.*** *The three types of IPv6 addresses are: unicast, anycast, and multicast. Unicast addresses identify a single interface.*

1. ***ipv6 tunneling***

***Ans.*** *What is IPv6 Tunneling? IPv6 Tunneling is a mechanism for encapsulating IPv4 and IPv6 packets inside IPv6 packets. It is used to form a virtual point-to-point link between two IPv6 nodes. IPv6 Tunnels are stateless and have no knowledge of the configuration or even existence of the remote tunnel endpoint.*

* ***Practical***

1. ***configure ipv6 address manually and test with ping***

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

1. ***IPv6 address automatically***

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

1. ***ping utility***

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

1. ***ipconfig***

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

1. ***tracert / traceroute***

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

1. ***dhcpv6***

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

***DFS***

1. ***What is DFS? And purpose of DFS***

***Ans.*** *The Distributed File System (DFS) functions provide the ability to logically group shares on multiple servers and to transparently link shares into a single hierarchical namespace. DFS organizes shared resources on a network in a treelike structure.*

1. ***Define DFS namespace and DFS replication***

***Ans.*** *DFS Namespaces and DFS Replication are a part of the File and Storage Services role. The management tools for DFS (DFS Management, the DFS Namespaces module for Windows PowerShell, and command-line tools) are installed separately as part of the Remote Server Administration Tools.*

1. ***What is folder target?***

***Ans.*** *A folder target is the Universal Naming Convention (UNC) path of a shared folder or another namespace that is associated with a folder in a namespace. Adding multiple folder targets increases the availability of the folder in the namespace.*

* ***Practical***

1. ***install DFS namespace and replication***

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

1. ***configure common namespace***

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

1. ***configure replication and check***

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

1. ***configure branch cache***

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

***Advance Network***

1. ***What is SDN?***

***Ans.*** *Software-Defined Networking (SDN) is an approach to networking that uses software-based controllers or application programming interfaces (APIs) to communicate with underlying hardware infrastructure and direct traffic on a network. This model differs from that of traditional networks, which use dedicated hardware devices (i.e., routers and switches) to control network traffic. SDN can create and control a virtual network – or control a traditional hardware – via software.*

1. ***What is SCVMM?***

***Ans.*** *System Center Virtual Machine Manager (SCVMM) forms part of Microsoft's* [*System Center*](https://en.wikipedia.org/wiki/System_Center) *line of* [*virtual machine*](https://en.wikipedia.org/wiki/Virtual_machine) *management and reporting tools, alongside previously established tools such as* [*System Center Operations Manager*](https://en.wikipedia.org/wiki/System_Center_Operations_Manager) *and* [*System Center Configuration Manager*](https://en.wikipedia.org/wiki/System_Center_Configuration_Manager)*. SCVMM is designed for management of large numbers of Virtual Servers based on* [*Microsoft Virtual Server*](https://en.wikipedia.org/wiki/Microsoft_Virtual_Server) *and* [*Hyper-V*](https://en.wikipedia.org/wiki/Hyper-V)*, and was released for enterprise customers in October 2007.*[*[1]*](https://en.wikipedia.org/wiki/System_Center_Virtual_Machine_Manager#cite_note-1) *A standalone version for small and medium business customers is available.*

*System Center Virtual Machine Manager enables increased physical server utilization by making possible simple and fast consolidation on virtual infrastructure. This is supported by consolidation candidate identification, fast* [*Physical-to-Virtual*](https://en.wikipedia.org/wiki/Physical-to-Virtual) *(P2V) migration and intelligent workload placement based on performance data and user defined business policies (NOTE: P2V Migration capability was removed in SCVMM 2012r2). VMM enables rapid provisioning of new virtual machines by the administrator and end users using a self-service provisioning tool. Finally, VMM provides the central management console to manage all the building blocks of a virtualized data center.*

*Microsoft System Center 2016 Virtual Machine Manager was released in September 2016. This product enables the deployment and management of a virtualized, software-defined datacenter with a comprehensive solution for networking, storage, computing, and security.*

*Microsoft System Center 2019 Virtual Machine Manager was released in March 2019. It added features in the areas of Azure integration, computing, networking, security and storage.*

*The latest release is* [*Microsoft System Center 2022 Virtual Machine Manager UR1*](https://learn.microsoft.com/en-us/system-center/vmm/whats-new-in-vmm?view=sc-vmm-2022)*, which was released on November 15, 2022. It added features in the areas of support for Azure Stack HCI clusters 22H2, VMware ESXI 7.0, SQL Server 2022.*