A.C.2.1

Critically analyze internet server technologies and their performance in terms of modular architecture, core units, basic functionality, request handling mechanisms of multiple clients, performance and access issue of IIS and apache in the form of written report.

Internet server-:

Internet server is a special computer built with the high components and it has work and high load and it is connected to internet throughout the year. User can access to this server throughout the world. These devices rarely switched off for maintenance activity.

Performance-:

The internet server execution is a fundamental issue for regions which advantage a high volume of requesting. Execution is basically affected by the rate of requesting for component HTML pages. The amount of component pages should be kept as low as could sensibly be normal. For instance, brisk APIs for conjuring server activities and putting away can be used to keep the overhead of the server programs creating the dynamic pages as low as could be permitted.

IIS-:

Internet information server is a group of internet server which includes hypertext transfer protocol server. This is one of the popular server forms Microsoft that used to host and internet services provides to ASP.NET and ASP. When request comes from client to server this takes the request from users, process their request like searching and sends the results to users.

Modular architecture-:

The adding or replacing of components without affecting the rest of the system for example if we generally change the keyboard of the computer there will be no affecting to the computer.

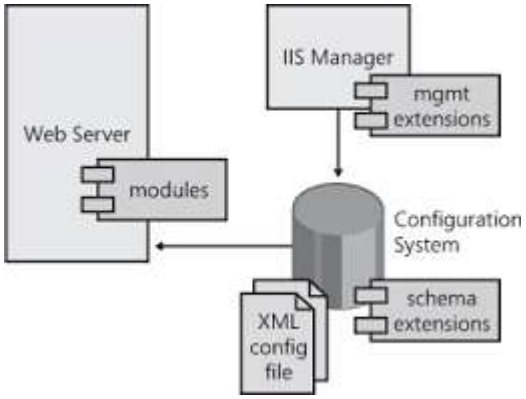


Figure 1 modular architecture

(store 2017)
IIS 7.0 web servers are now managed which able to operate independently of other hardware and software. This can easily add, remove and replace of components. It provides to build server components that can extended and replace existing components. This includes native C++ API as part of installation.

Core units-:

The core units of the IIS is

1. ISAPI (internet server application program interface)-: it is used to receive HTTP request made by the webserver to provide additional functionality for the server such as logging request information and etc. used to reduce band width cost.
2. Application pools-: used to separate the IIs work processes which share the same configuration and application boundaries and it is used to isolate our web application for better security for running without impact of each other.
3. HTTP.sys-: it is the kernel level components of IIS all clients request comes from clients, it makes a queue for each and every request for each individual application pool based on request. IIS automatically register the pools with the HTTP.sys for identifying particular request for processing.

Basic functionality-:

The basic functionality of IIS used to build web application-:

1. Design the structure of web and FTP sites and configure for each your sites and application, we can enable and disable sites
2. Establish and maintain HTTP connections
3. Response is built during process of each request, passes request body through a chain of possible destinations as illustrated in IIS request.

Request handling mechanisms of multiple clients-:

It is used to manage the request like used in HTTP.sys and give response that are coming from clients system and all this runs under the scope of worker process, work process is the application which runs application in IIS.

Performance-:

It has numerous configuration parameters that affect IIS performance.

Click Start**,** point to All Programs, click Administrative Tools, and then click IIS **.**In the Connections pane, click to expand Sites**,** click to select the Web site for which you would like to disable logging, click to select Features View, and then double-click the Logging feature.
Click Disable in the Actions pane to disable logging for this Web site. And it will handle the request and when the details come from the server process go on and sent back the details what he want for example a document.

Access issue-:

Some of the issue we face is

1. We will face 404 error like if we enter the domain it shows error
2. We will face 502 error like it is bad gateway.

Apache-:

It is freely available webserver that is distributed under an open source and it will run in all operating system and it supports different application program like PHP, Python and MYSQL etc.

Modular architecture-:

The adding or replacing of components without affecting the rest of the system for example if we generally change the keyboard of the computer there will be no affecting to the computer.

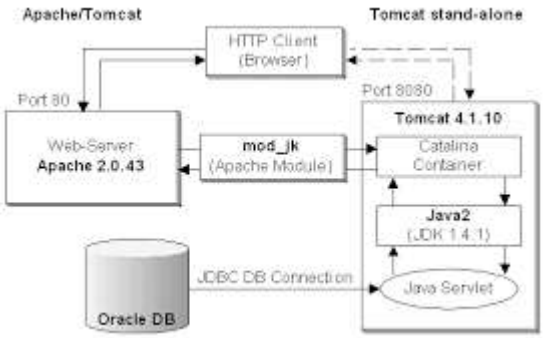


Figure 2 modular architecture

(apache 2013)

Very easy to implement and very easy to add extend its abilities by the adding of different modules. It is an open source HTTP server and handles HTTP requests sent to it and it is able to them.

Core units-:

The core units of apache are-:

1. http_core.c is used to collect the protocols that implement the chain pattern .
2. http_request.c is used to request the message to the client to server.

It is core component which implements the basic functionality of it and it implement number of utility.

Basic functionality-:

It used to control the transmission that is protocol which allow the other IP address with the same or other network and after receiving the request and it explores the headers and applies the rules to the files and takes the action.

Request handling mechanisms of multiple clients-:

Toward default apache server makes special case occurrence for every servlet, though numerous appeal is setting off to An servlet that point each solicitation will transformed over An separate thread, In this way compartment makes An string for every ask for those absolute servlet instance, with the goal your servlet if be thread-safe.

Performance-:

It gives an assortment for Multi preparing Modules, event-hybrid mode, to better match the requests of every specific base. This infers that the decision for right MPM and the right setup will be vital. The place bargains for execution have on a chance to be made, the outline from claiming apache will be to decrease inactivity What's more

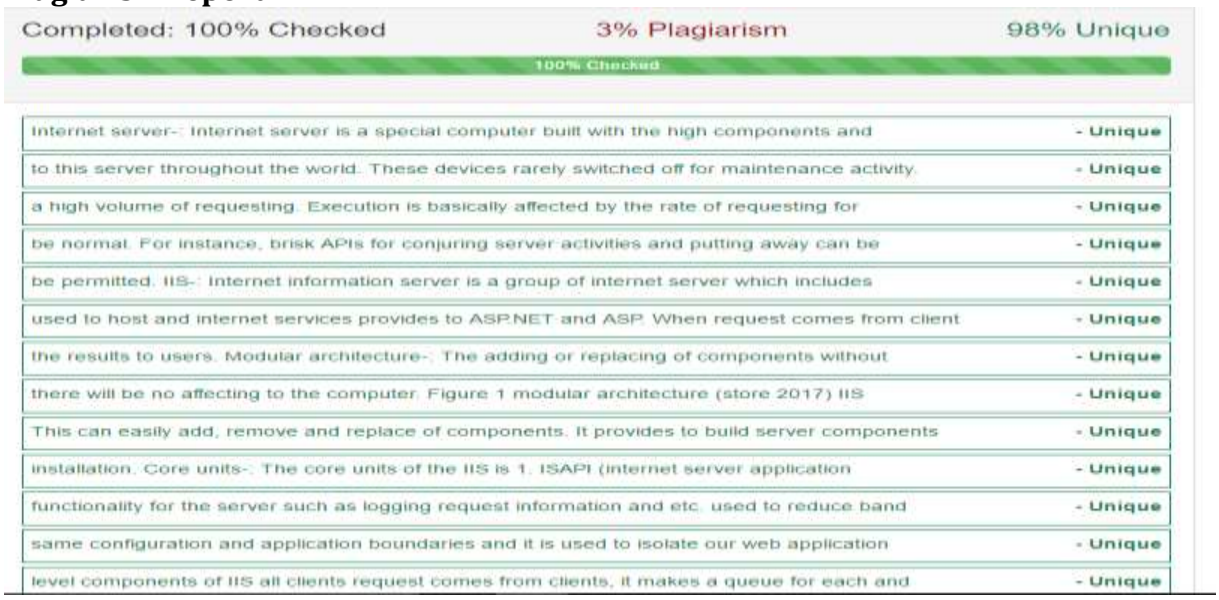
expansion throughput, relative with basically taking care of that's only the tip of the iceberg requests, consequently guaranteeing steady.

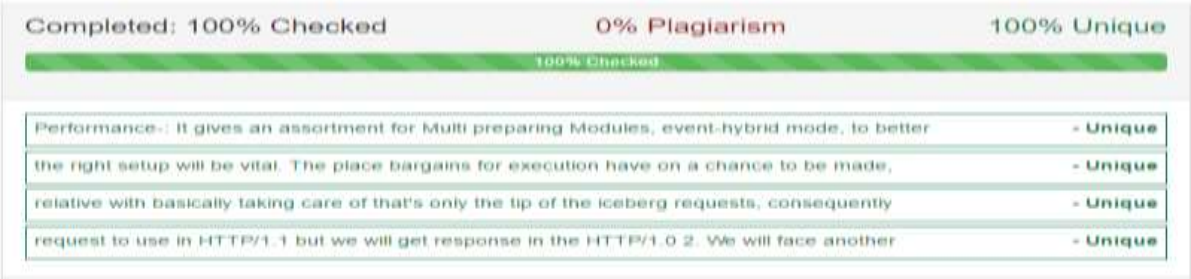
Access issue-:

Some of the access issues we may face here is-:

1. we will request to use in HTTP/1.1 but we will get response in the HTTP/1.0
2. We will face another problem in the configuration file time like if there is change of place in the file.

Plagiarism report-:





A.C.2.2

Explain the various hardware and software components and their cost required for running the internet server in the form of written report.
(Your report should contain the hardware components such as processor, memory, storage devices, network connectivity devices and software components such as Operating system, software related to services.)

Internet server-:

This is a program which uses the hypertext protocols to serve the files which form page for which they request and this is transferred by the http to the client pc.

The components I recommended for internet server-:

Hard ware components-:

1. **Processor**-: It is the brain of the computer and it the component that affects overall system performance and the processor included for server computer.
    - Itanium 2: 1.60GHZ clock speed and include 1-2 processor cores.
    - Xeon: 1.83-2.33GHZ clock speed and include 1-4 processor cores.
    - Pentium D: 2.66-3.6GHZ clock speed and include 2 processor cores.
    - Pentium 4: 2.4-3.6GHZ clock speed and include 1 processor core.

    Some of the server may have more than two slots for connecting more CPU. The Itanium clock speed is more than compared to Xeon and others processor two and the clock speed means the speed of the processor performance. For better performance most of the processor use dual or quad core chips. I will recommends is Itanium 2 with 2 processor cores.

Itanium 2 processor 1.6GHZ and dual core

Figure 3 processor

(flipcart 2017)
Price is **3692/-**

2. **Memory-:** Memory of the server is two much compared two general CPU we can find more types of memory and we should choose right type of memory that support the motherboard and total server capacity of the server depend upon the motherboard and now a days most of the servers supports 12GB of memory and some can support 32GB memory too. I will recommend 128GB memory
    - RAM is also used for storing the data and the server needed the RAM of 1.75 GB to 7GB RAM and I will recommend 128GB RAM

Figure 4RAM with 128GB

Price is **8429/-**
(flipcart 2017)

3. **Storage devices-:** which is used to storage the data in the device it contain two parts they are hard drive
    - Hard drive most the computer uses the drives called IDE these performance is less so for more performance we need to use SCSI drive and SATA is also use in these server. And I will recommend SCSI and SATA cables and ITB

Figure 5 hard drive of SCSI 1TB

Figure 6 SATA cables

(flipcart 2017)
Price of both is **3000/-**

4. **Network connectivity device-:** almost every server has in built network adapters in the motherboard and it is the main part for connecting the server and if it is not their then we should add network adapter card. It has two type of adapter that is one is Ethernet and WIFI, Ethernet is used to connect the Ethernet ports and WIFI is used to connect system wireless and I will recommend the network adapters if it is not there in the motherboard.

Figure 7 Ethernet

Figure 8 WIFI

Price of both is **2500/-**
(flipcart 2017)

Soft wares components-:

1. **Operating system-:** it is the software which is used to run the computer or server we have type of windows OS in that we choose window server 2016 because it the safest software and friendly to use and it is very familiar to us and I will recommend the server 2016.

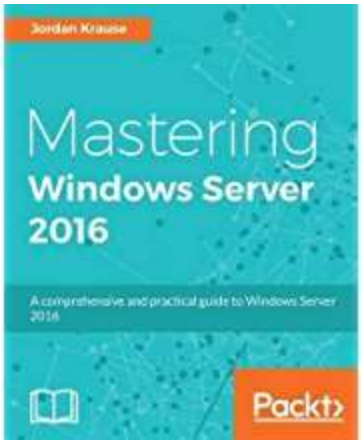


Figure 9 operating system

(flipcart 2017)

The price of this is 1,199/-

2. **Software related to their services-:**

The software related services I will recommend

1. **SQL-:** Supports databases are SQL server 2016 RTM, it is used to store the data and this software is used to store the data in the server.

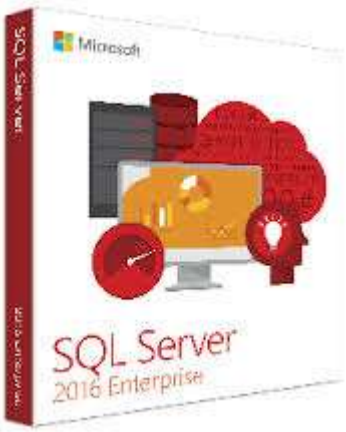


Figure 10 SQL

Price is **2,100/-**
(amozon 2017)

2. **IIS-:** Internet information server is a group of internet server which includes hypertext transfer protocol server.

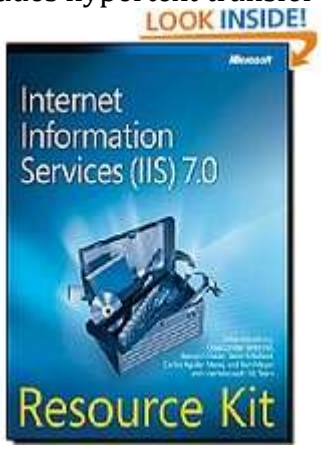


Figure 11 IIS

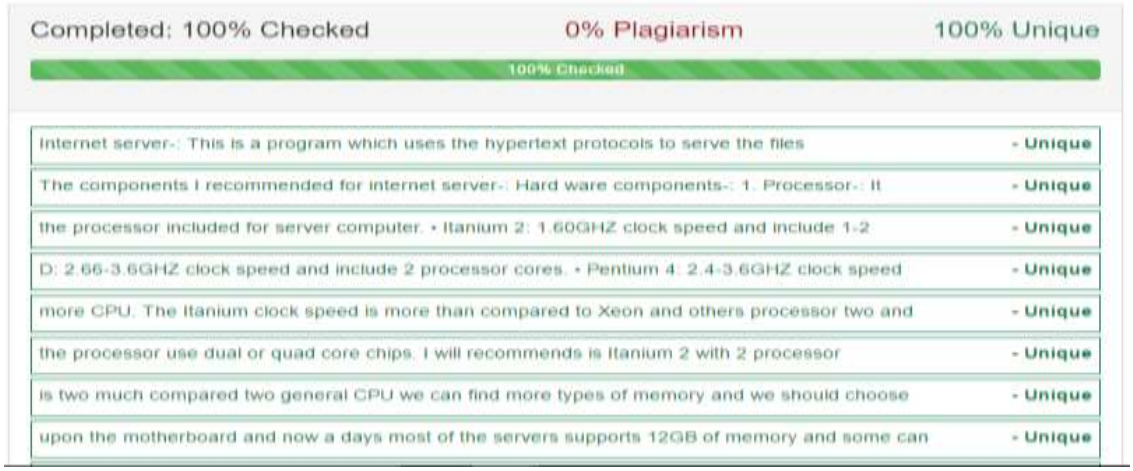
(amozon 2017)
Price is 40,000/-

3. **Apache-:** It is freely available webserver that is distributed under an open source and it will run in all operating system and it supports different application program like PHP, Python and MYSQL etc.

Figure 12 apache software

(apache 2016)
Price is free

Plagiarism report-:



M2

Prepare a detailed written report on selection of web server either Apache web server or IIS webserver for the organization given in the scenario. And also explain the step by step installation process of your chosen web server. Conclude your report with a section explaining difference between Apache web server and IIS web server.
(Your report should contain the screenshot/photographs of installation of web server with caption.)

Choosing IIS-:
I will choose the IIS webserver because the IIS server has the licensed. So it may doesn't cause any problem to the server like errors, virus etc. and this key is provided by the company only. This is supported by the Microsoft for example if any problem arise in the

IIS I can open Microsoft page clear the problem. This provides access to .NET framework and ASPX scripts. This combines with the other Microsoft services like ASP, active directory etc. this is used to give access to internet for the domain which I have created in the server, the used to protect data in the server from the hackers.

Steps-:

1. I have opened the window server and next I have open sever manger, this I would find on the taskbar of the server.

Figure 13 opening server manager

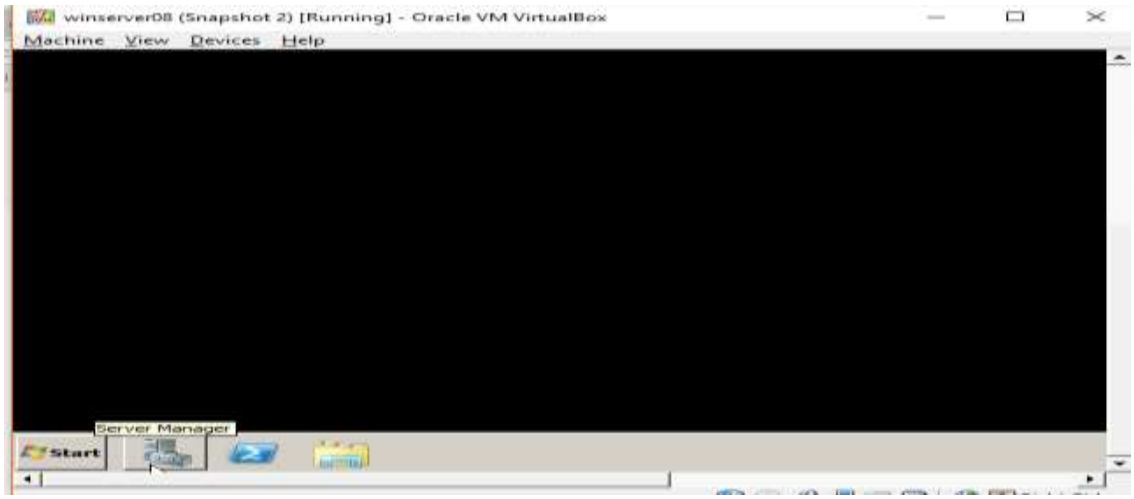


Figure 14 output of opening server

2. Next step I will go to the add roles button, it will find on right of the screen and click the add role button.

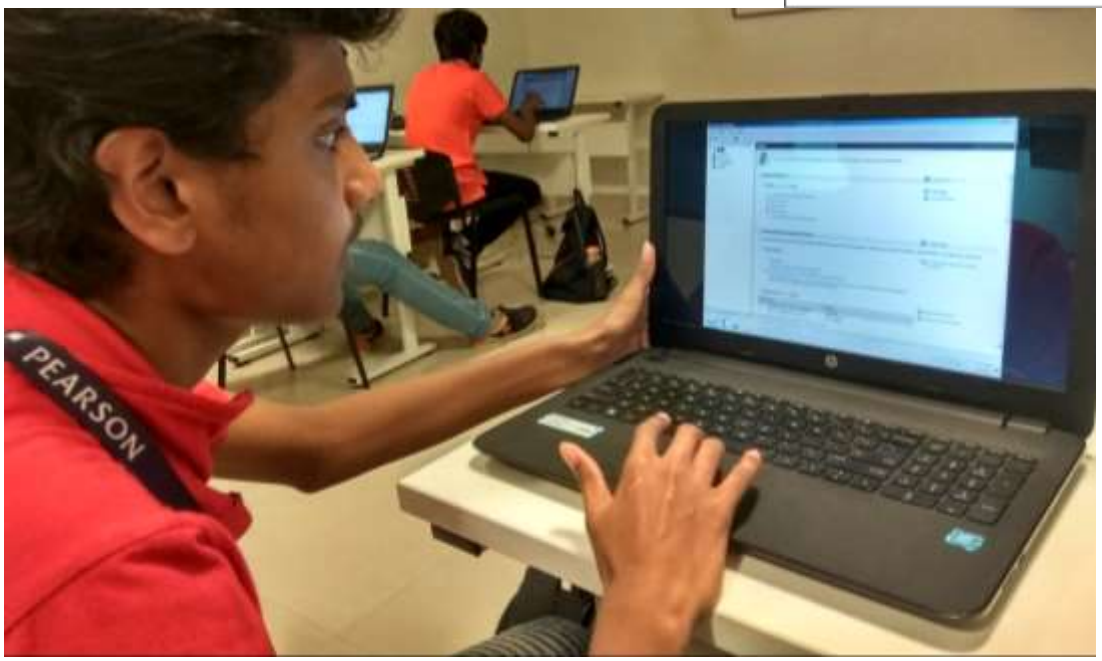


Figure 15 add roles

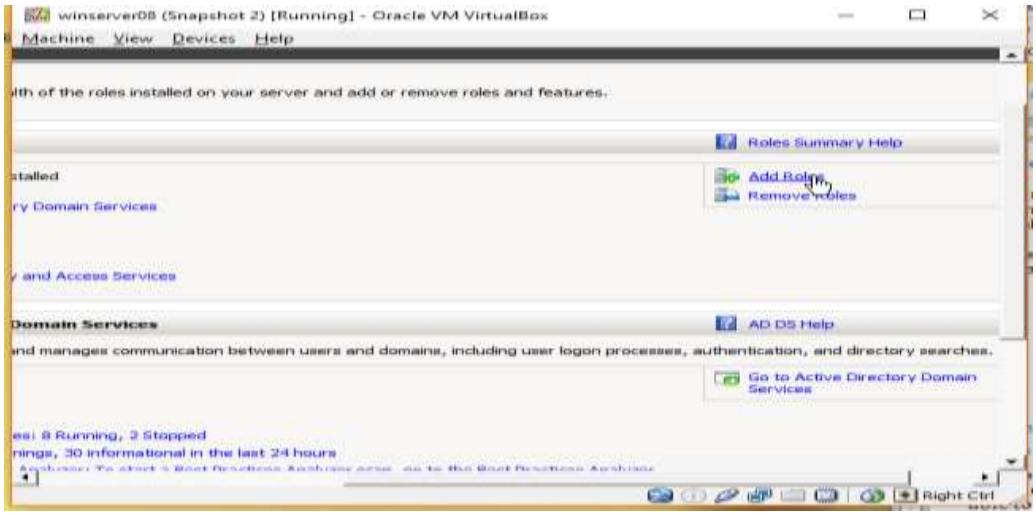


Figure 16 output of add roles

3. Next step I will enable the web server (IIS) from all services in the server and click the next button.

Figure 17 selecting web server

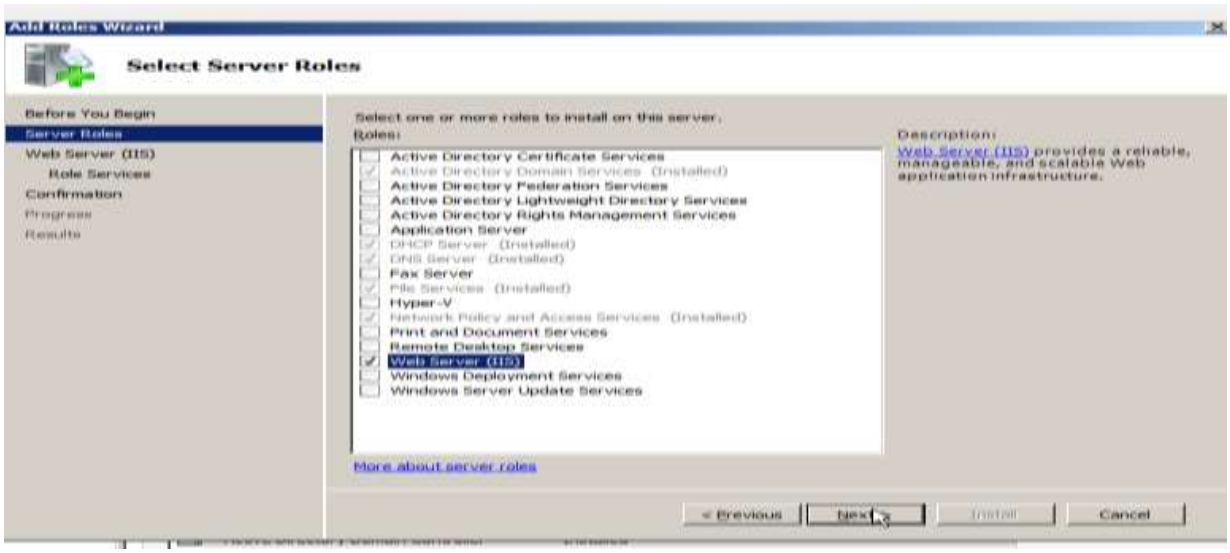


Figure 18 output of selecting service

4. Next step is server shows some of the information about IIS server and I have clicked the next button.

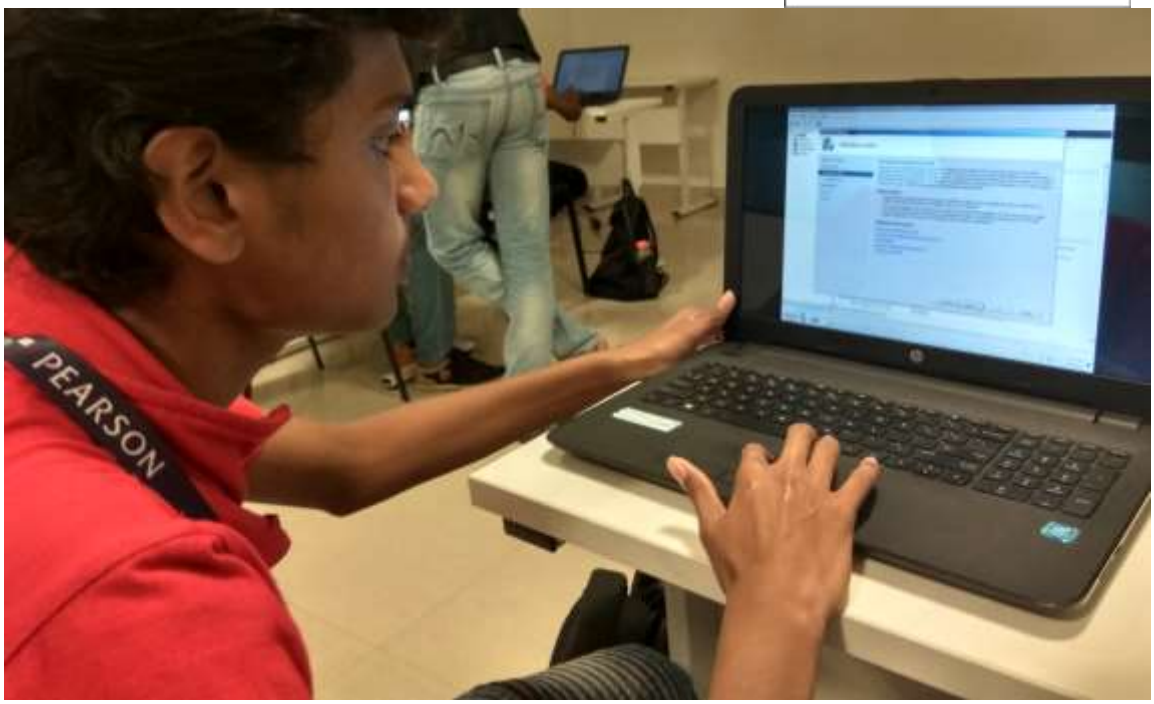


Figure 19 information about IIS

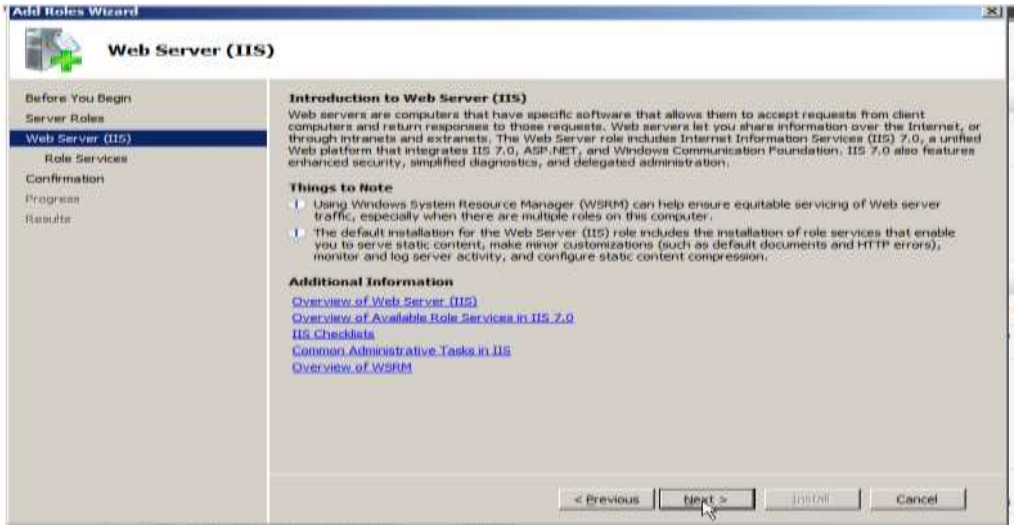


Figure 20 output of information

5. Next step is I have enabled the service in the IIS like for example FTP, IIS management compatibility and application development (includes ASP.NET, ASP and etc.) and I have selected the next button.

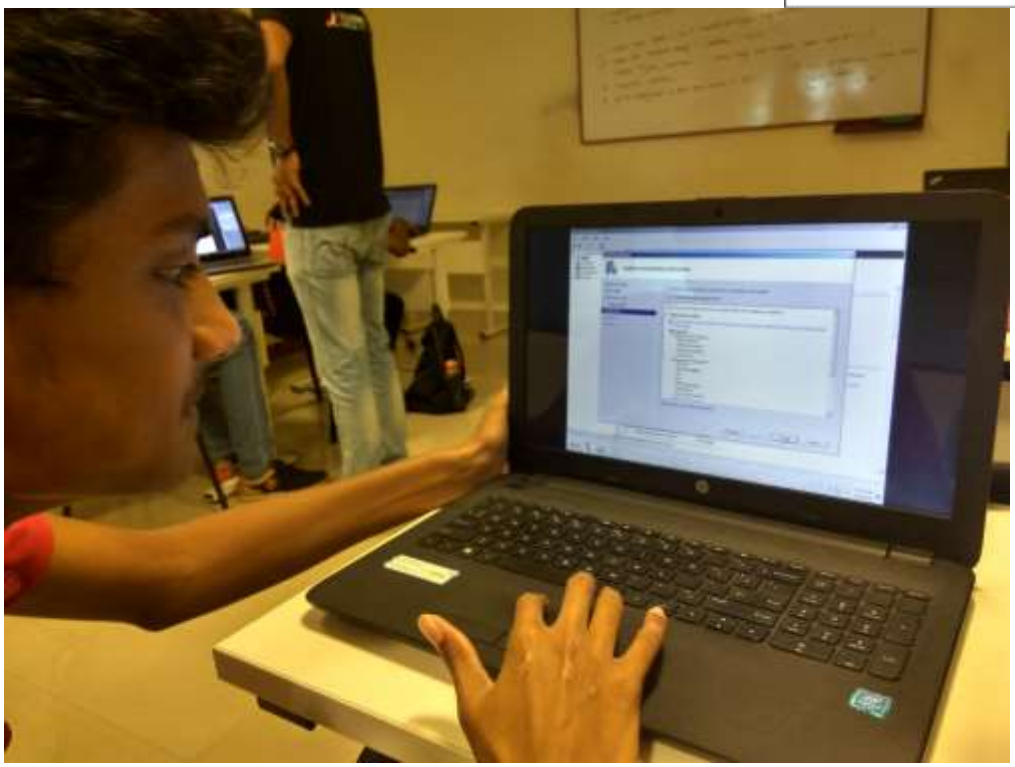


Figure 21 adding role service

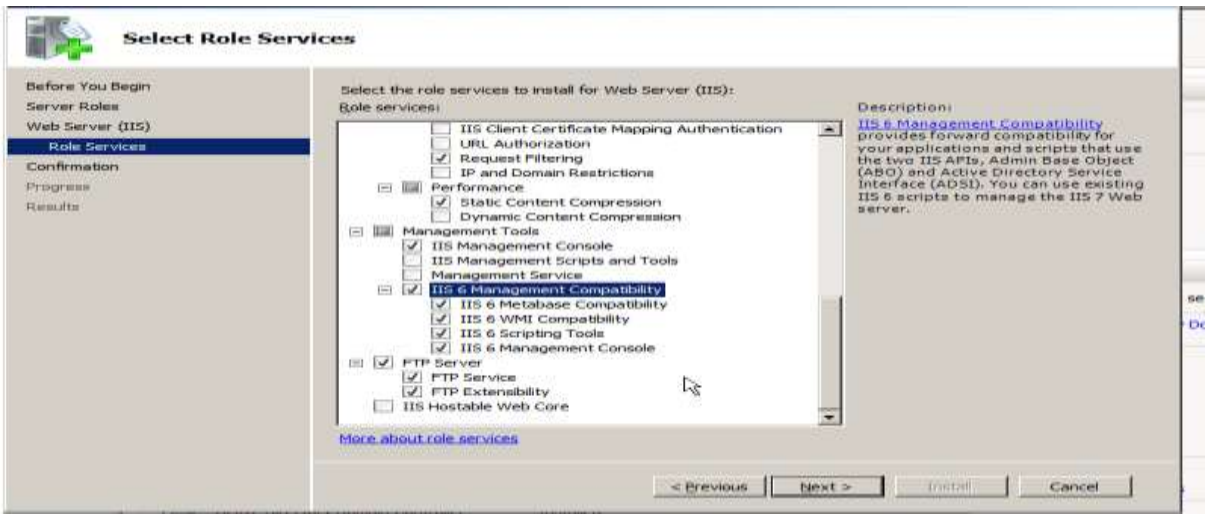


Figure 22 output of add roles

6. Then the server show the information about the service we have selected in the IIS I have to verify the services and I have selected the install button.

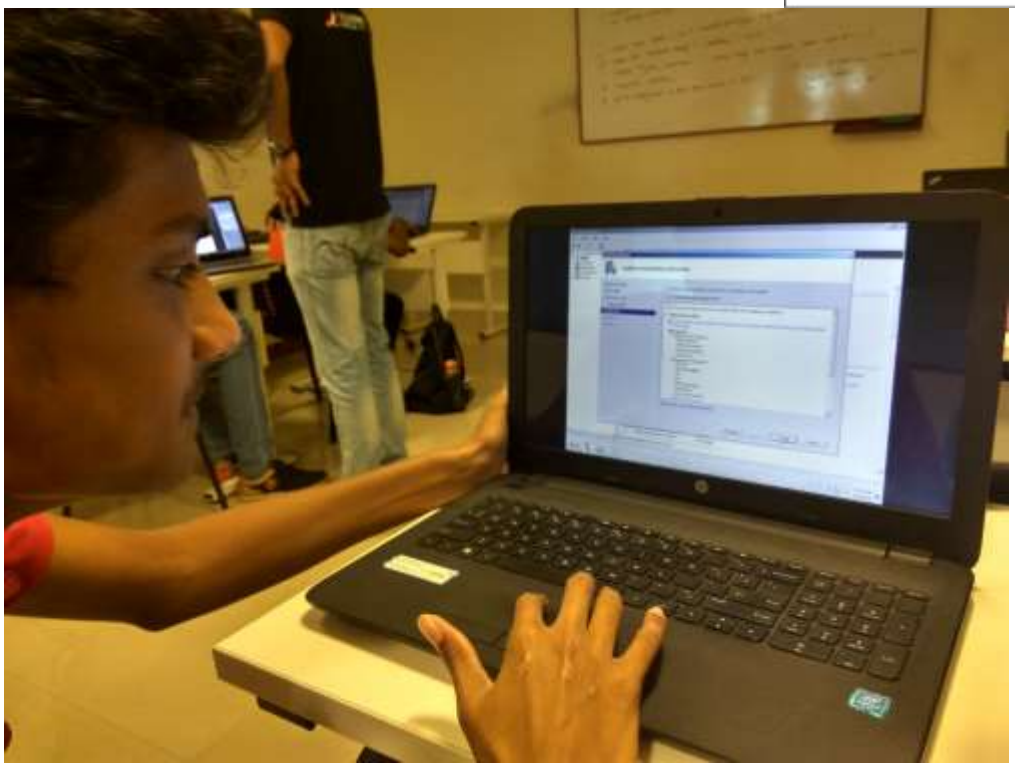


Figure 23 IIS verification.

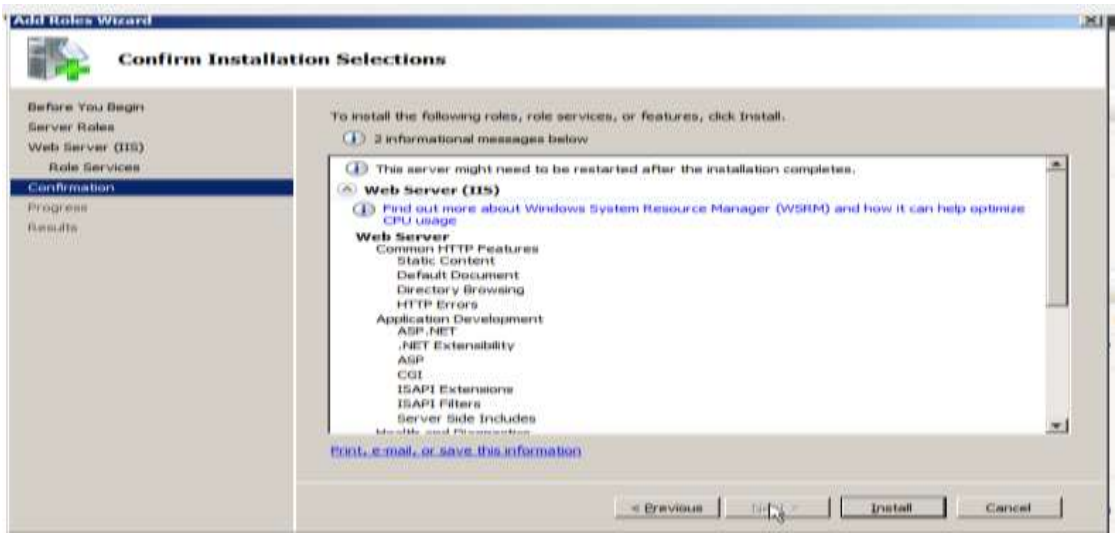


Figure 24 output of IIS verification

7. Then the installation of the IIS will goon and finally i can see the close button on the screen I have selected that close button.

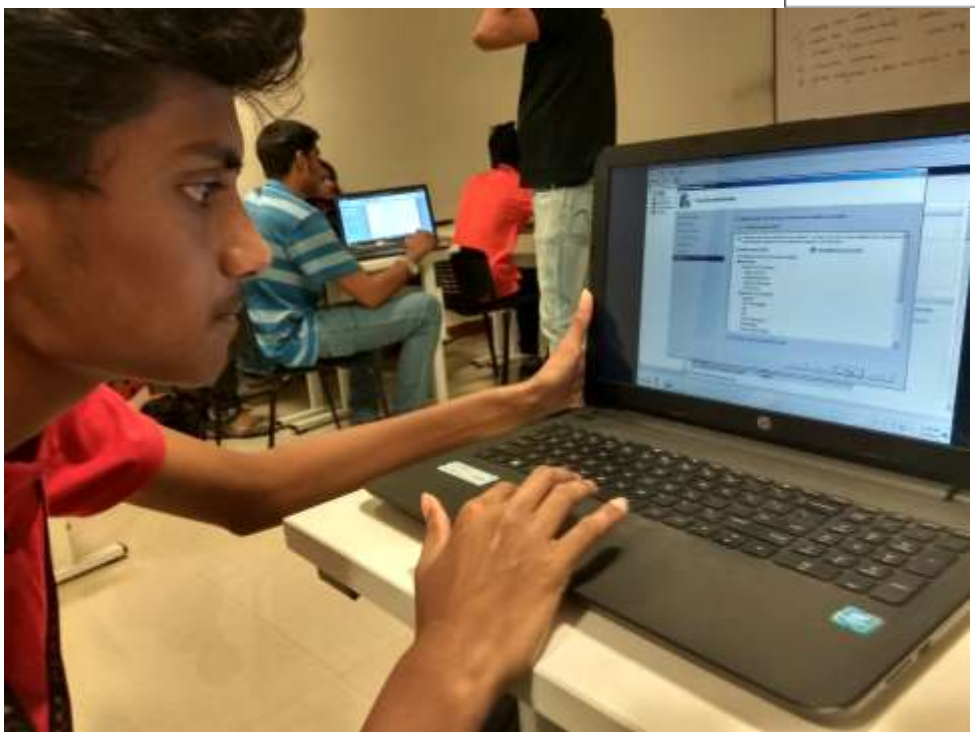


Figure 25 successful installation of IIS

8. Then the IIS server is installed I have opened the explorer and enter the domain name then I have seen the page which means the server is installed properly.

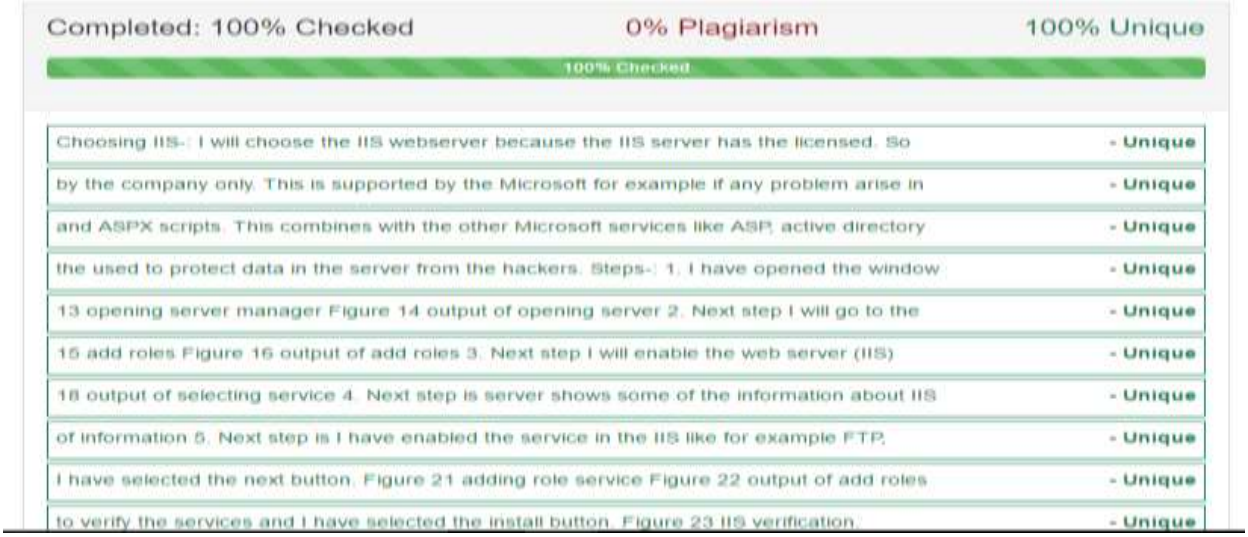
Figure 26 output

Figure 27 output

Difference between apache server and webserver-:

IIS server	Apache server
1. IIS is packaged with windows like the license and many more is given by the windows only.	Apache is free which means it is not packaged with windows or any other, license and another is done by itself.
2. IIS runs only in windows like if we want run IIS in another OS then will show some errors.	Apache can run in any kind of OS like Linux, apple and UNIX etc.
3. Any problem occurs in the IIS, we can access the dedicated staff who will give answer to the problem.	Any problem occur the apache, we can get the solution from the community to solve the problem.
4. IIS support only some of the application program like PHP, .net framework and ASPX script.	Apache supports different application program like PHP, Python and MYSQL etc.
5. IIS security is excellent and performance in webserver is good.	Apache security is good and performance of the webserver is better.
6. The cost of the IIS is free but we should require the license or bundled with windows.	It is completely free of cost to download and does require any license purchase.
7. The development is closed and proprietary, they should attach with windows.	The development is open source and they will not attach with any other OS because it supports every OS.
8. It supports HTTP, FTPS and FTP etc. service in the operating system of windows.	It supports only HTTP service in any operating system including windows to.
9. It has good modular architecture like hard ware and software components.	It does not have good modular architecture like hardware and software components.
10. It used in many companies because it has good security measures.	It does not used in many companies because it has less security measures.

Plagiarism report-:



D3

Do research on recently released windows server 2016 and prepare a detailed written report on their new features and their services. And also make comparison between windows server 2008 and windows server 2016. Conclude your report with a section explaining different hardware and software requirement of running an windows server 2016 with their costs.

Window server 2016-:

It is the server operating system which was introduced by the Microsoft by the name of windows this is the software which is developed at the time of windows 10 and 2016 server is the latest version of server operating system and it was released on September 26 2016.

Figure 28 window server 2016

(2016 2017)

New features and their services-:

The new features of the server included in the server are-:

1. **Nano -:**

   It boasts smaller installation footprint than window server graphical user interface (GUI) GUI is installation option. Nano is included in latest windows server. It bares –metal OS means far updates and reboots are necessary, it reduces the attacks than compared to the server GUI, it so small that data can be easily ported between servers and data centers and physical sites and it hosts most common server workloads including hyper-V host.

2. **Containers-:**

   This allows isolating application and services in an agile or easy to administer way. Window server 2016 offers two different types of containerized windows instance they are -:

   - Windows server container is type of container intended for low trust loads and containers running on the same server can share their files.
   - Hyper-V container this are high trust workload and it is a super isolated containerized server instance which is completely isolated from the containers and potentially form the host server.

3. **Linux secure boot-:**

   It is secure boot part of unified firm interface (UEFI) specification that protects the server startup environment against injection of rootkits or other boot-time malwares. If we want to create the Linux based generation to hyper-V VM because the Linux based drivers part are not trusted for device storage. The UEFI present in the server may fail and stops working. But now a days window server and azure engineering teams make more secure and introduced in the Linux VMs under hyper-V in 2016 server with not problems in it.

4. **REFS-:**

   Resilient file system has been improved in the server 2016 with the high performance and high resiliency files system for use with the storage spaces and hyper-V workloads.

5. **Storage spaces direct-:**

   It is the features that make more affordable for administrator to create the data in the storage disk. In the latest version storage space is high to store the data.

6. **ADFS v4-:**

Active directory federation service (ADFS) supports based on the identity claims. Claims-based identity is crucial thanks to the need for single-sign on (SSO) between on-premises Active Directory and various cloud-based services. And in latest version support for Open ID Connect-based authentication, multi-factor authentication (MFA), and what Microsoft calls "hybrid conditional access."

7. **Nested virtualization-:**

It is the capability of virtual machine to itself host virtual machines and window server has now ability to perform this service.

8. **Hyper-V hot –add virtual hardware-:**

Hyper-V Server has allowed us to add virtual hardware or adjust the allocated RAM to a virtual machine. However, those changes historically required that we first power down the VM. In Windows Server 2016, we can now "hot add" virtual hardware while VMs are online and running. I was able to add an additional virtual network interface card (NIC) to my running Hyper-V virtual machine.

The comparison between window server 2016 and window server 2008-:

Serial number and name	Server 2008	Server 2016
1. Security	The security in this server is very less for example it does not have remote credential and device and give limit support to the windows defender.	The security in this server is very high compared to other server and it has not limit control for the windows defender.
2. Server management tools	It has limited server management tool for which it becomes problem to manage the server when in case of emergency. It is the gateway which is required to enable the Microsoft azure portal and server.	It has full access to the server management tool which helps the consumer in case of emergency.
3. Network controller	It have no access to network controller like for example if someone want to automate the configure of network infrastructure instead of manual configuration of network devices and services.	It has fully access to the network controller.
4. Duplicate data	It cannot remove the duplicate data that enter in the server	It can remove the duplicate data from the server.
5. Server containers	It does not have server containers in the server	It has server containers in the server for example windows and hyper-V

6. Linux service	It has limited service for Linux secure boot	It supports the Linux service boot.
7. Direct access	Direct access by VPN is good in this server.	Direct access become well in this server than compared to 2008 and 2012.
8. IIS	IIS is old in this server it may cause some trouble to the user.	IIS is latest in this server it is also does cause any trouble to the user.
9. Remote credential	It does not have remote credential guard in the server	It has remote credential guard in the server. Which to protect the server very much.
10. Nano server	It does not have Nano server technology in the server.	It has Nano server technology in the server which has the GUI installation option in the server.

The requirements needed for windows server 2016-:

Hard wares-:

1. **Processor -:**

   Processor performance not only depends up on the clock frequency of the processor cores and size of processor cache.

   Minimum-:

   - 1.4GHZ 64-bit processor.
   - Compatible with x64 set.
   - Support NX and DEP.
   - Supports CMPXCHG16b, LAHF/SAHF.
   - Supports second level address translations.

Figure 29 processor

Price is **3673/-**
(amozon 2017)

2. **RAM-:**

Minimum-:

- 512 MB (2GB for server with desktop)
- Error correcting code technology.

Maximum -:

- 24GB

Figure 30 RAM

Price is **9150/-**
(amozon 2017)

3. **Storage and disk space-:**

It should need minimum disk space of 32GB and additional 4GB for GUI and maximum of 100GB for second drive.

Figure 31 hard drive

Price is **10,075/-**
(amozon 2017)

4. **Network adapter-:**

Minimum-:

- a gigabit Ethernet adapter with 1Gbps
- needs PCI express compliant
- supports pre-boot execution environment (PXE)

Figure 32 network adapter

Price is **185/-**
(amozon 2017)

5. keyboard and mouse

Figure 33 key board and mouse

Price is **1,028/-**
(amozon 2017)

6. DVD drive (if you to install the operating system from DVD media)

Figure 34 DVD drive

Price is **1,599/-**

(amozon 2017)

7. Graphic device and monitor capable of higher resolution (1024 * 168)

Figure 35 graphic device

Price is **349/-**
(amozon 2017)

Soft wares-:

4. The operating system of the computer should be window server 2016 standard.

Figure 36 windows server 2016

Price is **1,199/-**
(amozon 2017)

5. Supports databases are SQL server 2016 RTM

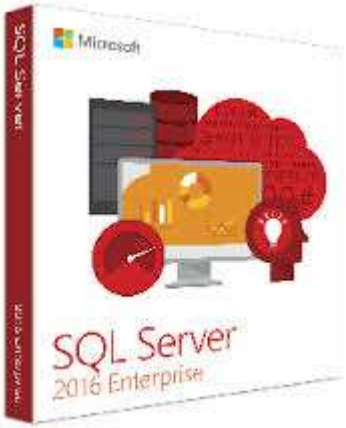


Figure 37 SQL server

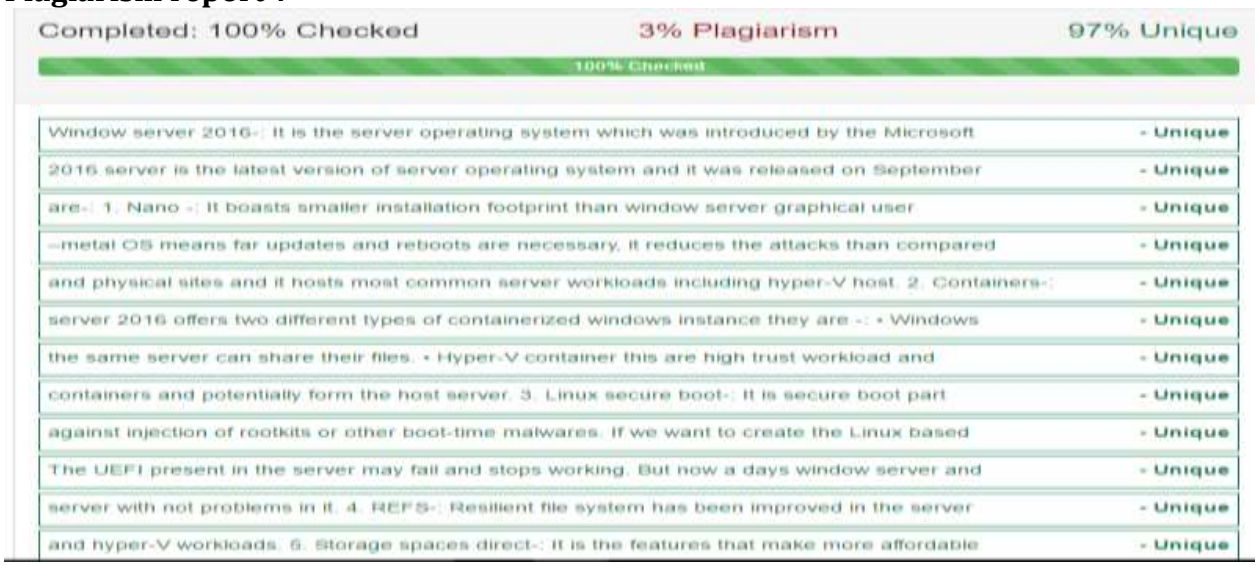
Price is **2,100/-**
(amozon 2017)

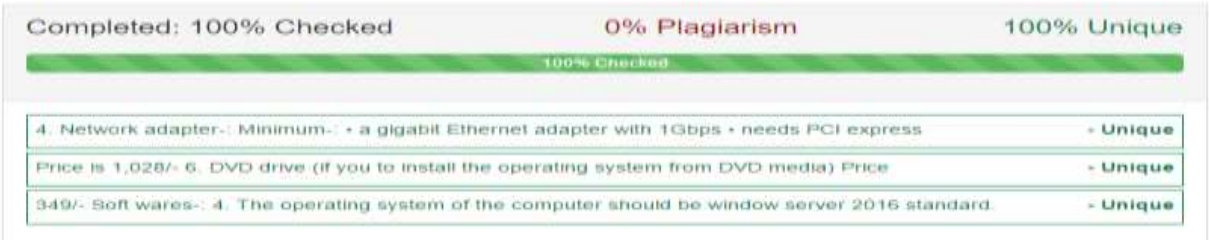
6. Google chrome

Figure 38 internet

Price is Free

Plagiarism report-:





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