

Networking Assignment

by Robert James Lucas

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Network Services

Observation Tasks

12/20/2017

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Important Notice!

This is only the observation work. The screenshot work will be sent to Tim Bashford via email.

Worksheet 1

Question 1: Identify the benefits of Type 1 Hypervisor software services and briefly evaluate some suitable products.

There are two types of hypervisors, the Type 1's and Type 2's. This project uses the Type 1 version, which runs on top of the hardware. More often than not it possesses greater efficiency than the Type 2. Servers that employ the use of Type 1 hypervisors usually have only one purpose, possessing no other functions [1]. The Type 1 runs directly with the hardware, and thus does not need an 'intermediary device' [2].

Question 2: Define the role of Routers in the Network Architecture, what types can be used?

Routers are designed with the intention of creating easy paths between networks. Routers are responsible for sending 'packets' from one IP Address to another by connecting Network Cards. The routers 'route' traffic by using the fastest routes whenever they can. They usually use the fastest routes first, by assessing the metric value of said routes. The lowest value is always used first [3].

There are two types of routing, one is hardware and the other is software. Hardware is a highly focused router type, as it mainly focuses on routing, while software routing is far more varied in its functions. Given that the current network is simple and is only used to communicate with each other the hardware router seems to be the better choice.

Question 3: Identify and discuss the usage of common Routing Protocols, what are the associated benefits of using Routing Protocols?

Routing protocols use routing algorithms to find the ideal 'network data transfer and communication paths between network nodes' [4]. There are two types of routing protocols, static and dynamic. With static one needs to manually enter the routing information, i.e. the networks that aren't connected directly. Dynamic routing protocols need only the addresses of directly connected networks, and will learn the addresses of the unconnected networks using update packet [5].

Question 4: Define the role of Routing Tables, what are they. Breakdown and analyse the information a Routing Table provides us with.

Routing tables are what routers consult when sending a package. They contain a list of all of the known network routes and when one network forwards a package to another network, they consult the routing table first for the direction and then send the package to the specified network [6].

Routing tables will always use the best route possible, and as such they usually acquire the route that is the exact match they are searching for. If this is not the case then they will seek out the

closest possible match. An example would be if a computer wanted to send data to 192.168.22.8 but doesn't discover such an entry on the routing table, but instead finds 192.168.22.7 and 192.168.22.2, then the first IP Address will take priority as it is a closer match than the [7].

Question 5: What is the Subnet Mask, what is the significance of this in the Routing Table?

Subnet masks are second addresses alongside used alongside the normal IP Address. IP Addresses on their own are not fixed values, therefore more information is required in order for the routing system to make the correct decision. Enter the subnet mask, which consists of a 32-bit number, in most cases it is 255.255.255.000 [8]. Joining a subnet mask with an IP Address separates the IP Address into a Network Address and a Host Address [9].

Say for example one has an IP Address of 192.168.333.123, and the subnet mask of 255.255.255.000. The IP address is separated into 192.168.333.0 and 000.000.000.123. Say now that a packet with a 192.168.333.123 destination address arrives on the 192.168.333.0 subnet, the computer will receive and process the packet.

Worksheet 2

Question 1: Describe (using appropriate illustrations) how the ARP process operates in Networking Contexts?

ARP's are used in order to map IP Addresses to a physical computer with said IP Address. It does this by sending information to a gateway which acts as the entrance point to a network. The gateway will use the IP Address to find the MAC Address of the computer, usually by looking up the address on an 'ARP Cache' until it find the corresponding address. Once it does this is done the information is relayed through the gateway to the computer in question [10].

Bear in mind this doesn't always work as expected, as sometimes the Cache doesn't possess the correct address, whereupon the ARP sends out a 'request packet' to other computers connected to the network to see if any of them have the IP Address the ARP is searching for. If this is so, then the data is sent through and the cache is updated [11].

Question 2: What is Packet Filtering? In our context, why is Packet Filtering termed 'IP Packet' Filtering? Why would you use Packet Filtering in your Network? What are the perceived benefits?

Packet Filtering, also known as Static Filtering [12] is the first level of the basic firewall. It watches IP datagrams and examines them, decoding their information and identifying where they must go. Depending on what the information is the filter will either allow access or stop the datagram [13].

The information sent is goes through two filters before it can be sent to the network it needs to go to. These are called input and output filters. Input filters define what types of incoming packets the router is allowed to process, while output filters define what information the router is allowed to send. Should there be an issue with one of the filters on a data packet, it creates what is called a contradictory filter [14].

Question 3: Why is it possible for contradictory filters to occur when you use packet filtering? Give an example of a Contradictory Filter:

The main reason it is possible for contradictory filters to occur is that one can configure the input and output filters on the router. Because of this it is possible for the input and output to contradict one another. An example would be when an input filter allows the incoming traffic to be received by the router, but the output filter will not allow said traffic to be sent to the network it needs to go to because the filter interfaces do not match up [14].

<https://technet.microsoft.com/en-gb/library/cc957881.aspx>

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Networking Assignment

GRADEMARK REPORT

FINAL GRADE

GENERAL COMMENTS

Instructor

48/100

PAGE 1

PAGE 2

PAGE 3



Comment 1

An intermediary operating system - not a device

QM

Contraction

Don't use contractions in academic writing. E.g. you should use "do not" instead of "doesn't".

PAGE 4



Comment 2

Be careful with both plurals and apostrophes.

QM

Contraction

Don't use contractions in academic writing. E.g. you should use "do not" instead of "doesn't".

PAGE 5

PAGE 6

GRADING FORM: SMU GENERIC_GJ

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RESEARCH-INFORMED LITERATURE

 A good number of sources used, though pretty much exclusively from the web, many being non-authoritative. Some web sources can be acceptable - e.g. you've used TechNet in a fair few places. Microsoft can be considered authoritative, though not necessarily objective on their technologies - fine to cite, though caution must be taken when talking about anything potentially subjective.

4.5

KNOWLEDGE AND UNDERSTANDING

 Some good knowledge and understanding evident in the completed work - unfortunately, as you're no doubt aware, worksheets 3 and 4 are missing their observational tasks, while worksheet 5 is omitted entirely, this majorly limiting the mark in a number of sections. Had the remaining worksheets been completed to the same standard, you would've earned a very good mark for this work overall.

4

ANALYSIS

 Again, some evidence of analysis, with some synthesis of material - but the lack of completed observational tasks is the key limiting factor in this section.

4

PRACTICAL APPLICATION AND DEP.

 Good work on the worksheets generally - a fairly robust understanding of the work undertaken. It would've been nice to include a final screenshot of the site displayed in a web page using the DNS

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name, but it appears to've been completed to a high standard regardless.

SKILLS FOR PROFESSIONAL PRAC.



A fairly well-written document, nicely presented. Be careful to use formal grammar (avoid contractions).

6.5