Network Administration/System Administration Homework #0

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Network Administration Preliminary

True/False

1. False.

Public IP is like the name of a company in the real world. There isn't two companies which have the same name for problems of infringements, that is, there's no two different devices that can have same public IP.

REFERENCE:

(1) HOW AND WHY ALL DEVICES IN YOUR HOME SHARE ONE IP ADDRESS [http://www.howtogeek.com/148664/how-and-why-all-devices-in-your-home-share-one-ip-address/]

(2) 從IPV4將用盡談網路的IP與MAC位址 [http://technews.tw/2014/08/24/hedy-lamarr/]

(3) TWO COMPUTERS HAVE THE SAME IP ADDRESS [http://www.howtogeek.com/195323/do-two-computers-on-the-same-wi-fi-network-have-the-same-ip-address/]

2. True.

MAC address is like an address of a building in real world. So the recipient of a packet will use this unique address to decide where the packet should delivered.

REFERENCE:

(1) 路由器[https://zh.wikipedia.org/wiki/路由器]

(2) MAC ADDRESS[https://en.wikipedia.org/wiki/MAC_address]

3. False.

IP is in layer 3 (Network Layer) whereas TCP (Transport Layer) is in layer 4.

REFERENCE:

(1) OSI MODEL [https://en.wikipedia.org/wiki/OSI_model]

4. False.

Hub is implemented in layer 1 (Physical layer) whereas switch is in layer 2 (Data link layer).

REFERENCE:

(1) NETWORK SWITCH [https://en.wikipedia.org/wiki/Network_switch]

(2) HUB [https://zh.wikipedia.org/wiki/集線器]

5. False.

Routers are implemented in layer 3 of OSI model whereas switch are implemented in layer 2.

REFERENCE:

(1) 路由器 [https://zh.wikipedia.org/wiki/路由器]

6. True

Firewall is a network security system that monitors and controls the incoming and outgoing network traffic based on predetermined security rules.

REFERENCE:

(1) FIREWALL [https://en.wikipedia.org/wiki/Firewall_(computing)]

7. False

A DHCP server is only responsible for giving an end device an IP to use, not in charge of the data passing through.

REFERENCE:

(1) 動態主機設定協定 [https://zh.wikipedia.org/wiki/动态主机设置协议]

(2) 第十二章、網路參數控管者：DHCP伺服器 [http://linux.vbird.org/linux_server/0340dhcp.php#theory_dhcpwork]

8. False

The main function of a gateway is to connect two different segment of network. So if judged as the same segment of the network, the packets will be sent to the destination without going through gateway.

REFERENCE:

(1) GATEWAY意義 [http://bluemuta38.pixnet.net/blog/post/45543389]

(2) 閘道器 [https://zh.wikipedia.org/wiki/网关]

9. False

According to the NAT working process, it will record the two different corresponding IP, the private IP of end device and the public IP of the NAT server, to parse the packet through internal network and external network at the stage of SNAT as well as DNAT. And the private IP is limited, a single NAT server cannot host an arbitrary number of NAT entries.

REFERENCE:

(1) **CLASSMATE:** 宋子維
(2) 備註解釋一下**NAT**功能 **[http://bluemuta38.pixnet.net/blog/post/45543357]**
(3) 什麼是 **NAT [http://linux.vbird.org/linux_server/0250simple_firewall.php#nat_what]**

10. True

DNS server will cache the result of fetching between hostname with domain name and the true IP, and keeping it in a fixed time interval. So if equipped with unlimited memory, DNS server can cache more result and host arbitrary number of DNS entries for there can be different domain name with the same IP.

REFERENCE:

(1) 什麼是 **DNS [http://linux.vbird.org/linux_server/0350dns.php#theory]**
(2) **DNS**和**NAMESERVER**是同一東西嗎？有什麼區別 **[http://zhidao.baidu.com/question/7954914.html]**

Multiple Choice Question

1. c

The OpenVPN security model is based on SSL. And in the TCP/IP model, all encryption and session management is in the Application Layer, so SSL is in the Application Layer in the TCP/IP model. However, in the OSI model it's less defined because encryption is in Layer 6 and session control is in Layer 5. So SSL(Layer 5 or 6) using TCP(Layer 4) may in the other layer. On the other hand, IPsec VPN is based on IPsec protocol, so it’s in the Network Layer of OSI model.

REFERENCE:

(1) **OSI MODEL [https://en.wikipedia.org/wiki/OSI_model]**
(2) **OPENVPN OFFICIAL [https://community.openvpn.net/openvpn/wiki/OverviewOfOpenvpn]**
(3) **OPENVPN [https://zh.wikipedia.org/wiki/OpenVPN]**
(4) **SSL IS ON A TRANSPORT LAYER OR APPLICATION LAYER [http://www.techexams.net/forums/isc-sscp-cissp/101590-ssl-transport-layer-application-layer.html]**
(5) **VPN**介紹 **[http://avp.toko.edu.tw/docs/class/3/VPN%20**虛擬私有網路技術概說**(**窄頻**).pdf]**

2. c

For the valid IP address range is "192.168.0.0 ~ 192.168.255.255". However, "192.168.0.0/14 = 192.168.0.0 ~ 192.171.255.255". Even if canceling the invalid first one and the last one will be "192.168.0.1 ~ 192.171.255.254", which is still not in the valid range.

REFERENCE:

(1) 專用網路 [https://zh.wikipedia.org/wiki/专用网络]

(2) FREE ONLINE SUBNET CALCULATOR [https://www.adminsub.net/ipv4-subnet-calculator/]

(3) SUBNET CALCULATOR (OPEN SOURCE) [http://www.jacek-dom.net/software/subnet-calc/]

3. c

192.168.0.0/23 = 192.168.0.0 ~ 192.168.1.255, and canceling the first one and the last one is 192.168.0.1 ~ 192.168.1.254.

4. a

There must be a NAT server to map private IP to public IP. If the situation be device A want to connect to device B in the different segment of network from A. For device A can use its gateway (=the router) connects to the router, and the router can connects to device B by B's gateway (=the router).But by private IP, not public IP.

5. c

According to the Amazon website.

REFERENCE:

(1) CISCO WS-C2960S-48LPS-L 2960S SERIES 48 PORT SWITCH [http://www.amazon.com/Cisco-WS-C2960S-48LPS-L-2960S-Series-Switch/dp/B006ON61Z0]

6. b

Increasing the wireless signal strength of each AP will increase the clash between them.

REFERENCE:

(1) WI-FI [https://zh.wikipedia.org/wiki/Wi-Fi]

(2) 為何我的無線訊號強度這麼微弱？ [http://windows.microsoft.com/zh-tw/windows7/why-is-my-wireless-signal-strength-so-low]

(3) 無線網路的連線速度很慢怎麼辦 [http://www.techbang.com/posts/22965-wireless-network-connection-is-very-slow-to-do-pchome228-drj]

7. b

DHCP snooping is a security feature that acts like a firewall between untrusted hosts and trusted DHCP servers.

REFERENCE:

(1) **DHCP SNOOPING [http://www.cisco.com/c/en/us/td/docs/switches/lan/catalyst6500/ios/12-2SX/configuration/guide/book/snoodhcp.html]**
(2) **DHCP SNOOPING [https://en.wikipedia.org/wiki/DHCP_snooping]**
(3) **位址解析協定 [https://zh.wikipedia.org/wiki/地址解析协议]**
(4) **ARP欺騙 [https://zh.wikipedia.org/wiki/ARP欺騙]**
(5) **DNS SPOOFING [https://en.wikipedia.org/wiki/DNS_spoofing]**
(6) **DNS 放大攻擊簡介與防制 [http://www.cc.ntu.edu.tw/chinese/epaper/0028/20140320_2808.html]**
(7) **DNS AMPLIFICATION ATTACK [http://whatis.techtarget.com/definition/DNS-amplification-attack]**
(8) **DNS AMPLIFICATION [https://www.incapsula.com/ddos/attack-glossary/dns-amplification.html]**

8. c

If a person want to protecting personal identity and location, he may use VPN to connect to proxy servers to achieve. So it can not fully achieved only by using a VPN.

REFERENCE:

(1) **VPN概說 [http://avp.toko.edu.tw/docs/class/3/VPN%20虛擬私有網路技術概說(窄頻).pdf]**
(2) **什麼是 VPN？ [https://technet.microsoft.com/zh-tw/library/cc731954%28v=ws.10%29.aspx?f=255&MSPPError=-2147217396]**
(3) **VPN [https://en.wikipedia.org/wiki/Virtual_private_network#Networking_limitations]**

System Administration Preliminary

Word Puzzle

1. passwd

2. cat olaf

3. echo $PATH

4. chmod +x legislator.sh

5. apt-get install gcc

6. chsh

7. rm -rf kmt

8. zip -r hw.zip hw

9. head -n 12 elsa

10. cp nico bili

11. mkdir -p taiwan/taipei

12. mv google alphabet

13.grep -v info log

14.ssh bbsu@ppt.cc

15. cd ../..

16. chmod 755 run.sh

REFERENCE:

(1) CHANGE SHELL [http://unix.stackexchange.com/questions/1373/how-do-i-switch-from-an-unknown-shell-to-bash]

(2) PRINT NTH LINES OF TEXT FILE [http://www.cyberciti.biz/faq/linux-display-first-ten-lines-1-10-with-numbers-command/print-nth-line-of-file/]

(3) NEGATIVE MATCHING USING GREP [http://stackoverflow.com/questions/3548453/negative-matching-using-grep-match-lines-that-do-not-contain-foo]

(4) RECURSIVE MKDIR [http://unix.stackexchange.com/questions/49263/recursive-mkdir]

Common Words

First, I withdraw the string that fit the condition mentioned in the question in both files and output them into two output files. Then I withdraw the the strings in the first output files line by line then check if it's in the second output files. If yes, then print out. If no, then print nothing. After that, I delete the two output files I made to make clean.

REFERENCE:

(1) CLASSMATE: 李鈺昇、宋子維

(2) 鳥哥的**LINUX**私房菜**-**認識與學習**BASH [http://linux.vbird.org/linux_basic/0320bash.php]**

(3) 鳥哥的**LINUX**私房菜**-**正規表示法與文件格式化處理 **[http://linux.vbird.org/linux_basic/0330regularex.php]**

(4) 鳥哥的**LINUX**私房菜**-**學習 **SHELL SCRIPTS [http://linux.vbird.org/linux_basic/0340bashshell-scripts.php]**

(5) TR COMMAND [http://www.thegeekstuff.com/2012/12/linux-tr-command/]

(6) HOW TO READ A FILE INTO A VARIABLE IN SHELL? [http://stackoverflow.com/questions/7427262/how-to-read-a-file-into-a-variable-in-shell]

(7) AWK [http://www.grymoire.com/Unix/Awk.html#uh-4]