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| Answer Sheet | | |
| Hands On - H03 | | |
| NAT and OSPF | | |
| Name | : | Alvaro Austin |
| Student ID | : | 2106752180 |

# 1. [10]Topology Screenshot

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| **Screenshot of the Topology** |
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# 2. [20]IP address Allocation

## Subnetting Distribution using VLSM Method

|  |  |  |  |  |  |  |
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| **Subnet** | **Network Address** | **Slash** | **Subnet Mask** | **First Device IP Address** | **Last Device IP Address** | **Default Gateway** |
| A | 192.168.0.0 | /26 | 255.255.255.192 | 192.168.0.2 | 192.168.0.62 | 192.168.0.1 |
| B | 192.168.0.64 | /27 | 255.255.255.224 | 192.168.0.66 | 192.168.0.94 | 192.168.0.65 |

## IPv4 Address Distribution

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| **Device Name** | **IPv4 Address** | **Subnet Mask** | **Default Gateway** |
| Research Server | 34.16.12.33 | 255.255.224.0 | 34.16.0.1 |
| Faculty Server | 10.5.2.0 | 255.255.248.0 | 10.5.0.1 |
| A.1 | 192.168.0.2 | 255.255.255.192 | 192.168.0.1 |
| A.2 | 192.168.0.3 | 255.255.255.192 | 192.168.0.1 |
| A.3 | 192.168.0.4 | 255.255.255.192 | 192.168.0.1 |
| B.1 | 192.168.0.66 | 255.255.255.224 | 192.168.0.65 |
| B.2 | 192.168.0.67 | 255.255.255.224 | 192.168.0.65 |
| B.3 | 192.168.0.68 | 255.255.255.224 | 192.168.0.65 |

## Screenshots of Configuration for each Device

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| **Faculty Router configuration for Interface Serial 1/0, FA 0/0, and FA 0/1** |
| **Interface Se1/0:**    **Interface Fa0/0:**    **Interface Fa0/1:** |

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| **NAT Router configuration for Interface Serial 1/0, FA 0/0, and FA 0/1** |
| **Interface Se1/0:**    **Interface Fa0/0:**    **Interface Fa0/1:** |

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| **Research Server** |
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| **Faculty Server** |
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| **PC A.1, A.2, and A.3** |
| **PC A.1:**    **PC A.2:**    **PC A.3:** |

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| **PC B.1, B.2, and B.3** |
| **PC B.1:**    **PC B.2:**    **PC B.3:** |

# 3. [30]OSPF Configuration

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| **CLI for Faculty Router** |
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| **CLI for NAT Router** |
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## Connectivity Test

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| **Answers:**   * A.1 to B.1 Test = **success** * B.1 to Research Server = **success** |
| **Proof:**   * **A.1 to B.1 Test (First time failed but the rest successful)**      * **B.1 to Research Test (The same, first one failed, then the rest successful)** |

## OSI Model

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| **OSI Model at Device Research Server** |
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# 4. [20]NAT Configuration

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| **CLI for NAT Router** |
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## Connectivity Test

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| **Answers:**   * A.1 to B.1 Test = **success** * B.1 to Research Server = **success** |
| **Proof:**   * **A.1 to B.1**      * **B.1 to Research Server** |

## OSI Model

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| **OSI Model at Device Research Server** |
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# 5. [10]Connectivity Test

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | A.1 | A.2 | A.3 | B.1 | B.2 | B.3 | Research | Faculty |
| A.1 | ✅ | ✅ | ✅ | ✅ | ✅ | ✅ | ✅ | ✅ |
| A.2 | ✅ | ✅ | ✅ | ✅ | ✅ | ✅ | ✅ | ✅ |
| A.3 | ✅ | ✅ | ✅ | ✅ | ✅ | ✅ | ✅ | ✅ |
| B.1 | ✅ | ✅ | ✅ | ✅ | ✅ | ✅ | ✅ | ✅ |
| B.2 | ✅ | ✅ | ✅ | ✅ | ✅ | ✅ | ✅ | ✅ |
| B.3 | ✅ | ✅ | ✅ | ✅ | ✅ | ✅ | ✅ | ✅ |
| Research | ✅ | ✅ | ✅ | ✅ | ✅ | ✅ | ✅ | ✅ |
| Faculty | ✅ | ✅ | ✅ | ✅ | ✅ | ✅ | ✅ | ✅ |

Give ✅ if connectivity test is successful **or** ❌ if the connectivity test fails. **Or** you may give colors (example: green for success, red for fails).

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| **Proof of Connectivity Test** |
| From A.1 (Row 1):    From A.2 (Row 2):    From A.3 (Row 3):    From B.1 (Row 4):    From B.2 (Row 5):    From B.3 (Row 6):    From Research (Row 7):    From Faculty ( Row 8): |

# 6. [10]Analysis

* In the NAT configuration step, the Serial 1/0 is used for "ip nat inside", and not "ip nat outside". What is the reasoning behind the configuration? What will happen if we switch the "inside" and "outside" of the NAT configuration?

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| **Answers:**  The command of ip nat Inside and ip nat outside is used to connect an interface to private or public, where private means ip nat inside and public for ip nat outside. In this case, the reason Serial 1/0 interface uses ip nat inside is to convert to a public IP address before being sent to Internet. This is needed to be done because NAT Translation is needed for private IP to be translated to public IP for the sake of communication. In this case, Serial 1/0 is to connect the server with local pcs that uses private IP address. For the sake of it, we have to convert that private IP address to public IP address so it can be used to communicate.  If we switch inside and outside, it could cause communication failure between internal and external network. This happened because the process is reversed. At first we used ip nat inside to convert private IP address from local pcs , but if we change it to outside, then it can’t communicate to the Internet. |

* Pay attention to the OSI model on the 3rd and 4th part.
  + Are there any differences? Highlight the differences, if any.
  + Explain why there's any/no differences between both OSI models.

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| **Answers:**  Yes there are differences.  **OSI Model on 3rd part:**    **OSI Model on 4th part:**     1. In Layers:  * 3rd part: * Source IP: 192.168.0.66 * Destination IP: 34.16.12.33 * 4th part: * Source IP: 10.5.0.1 * Destination IP: 34.16.12.33  1. Out Layers:  * 3rd part: * Source IP: 34.16.12.33 * Destination IP: 192.168.0.66 * 4th part: * Source IP: 34.16.12.33 * Destination IP: 10.5.0.1   The difference between OSI models is on NAT that translate private IP address to public IP address. It translates the private IP addresses on 4th part source address to public IP address. |