Section 1: Single Segment
Last Updated: 4/2/14

For help outside of lab reference:
- **Lab Getting Started Guide**
- **Saving States**
  - to check router configuration on router use: “show run”

1. **Description**

   In this section we will cover how to use the commands *arp* and *ifconfig*. This section will cover material on netmasks, ip addresses, and arp address. We will set up a single switch with 2 Virtual Boxes and 1 VPC hosts attached.

   a. We will configure the arp addresses of each of these machines, then show how we can use arp to differentiate different ip addresses by adding arp entries statically. We will then show that when no entry is provided an ARP request message is sent out.

   b. Quick review on IP subnetting. Show how IP can ping another but a change in subnet can destroy the relation. This helps prep student into thinking about the criss crossed portion in the lab. (subnetting and longest prefix match)

2. **Commands**

   | *ifconfig* | *tcpdump* | *arp [-n | d]* |
   |------------|-----------|---------------|
   | *ping*     |           |               |
3. Configuration
To configure hardware address (mac) on interface eth0 - "ifconfig eth0 hw ether"
To configure the IP address on interface eth0 - ifconfig eth0

<table>
<thead>
<tr>
<th>PC1</th>
<th>PC2</th>
<th>VPC3</th>
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<tbody>
<tr>
<td>● ifconfig eth0 hw ether 00:00:00:00:00:01</td>
<td>● ifconfig eth0 hw ether 00:00:00:00:00:02</td>
<td></td>
</tr>
<tr>
<td>● ifconfig eth0 10.0.0.1/24 up</td>
<td>● ifconfig eth0 10.0.0.2/24 up</td>
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</tbody>
</table>

4. Part A Configuration:
   4.1. PC1: open 2 terminals - 1 with tcpdump, 1 for ping
   4.2. PC1: tcpdump -i eth0
   4.3. PC1: in other terminal send a ping: ping -c2 10.0.0.2
   4.4. PC1: stop tcpdump (Ctrl-C)
   4.5. PC1: arp -a
   Discussion: What has to happen before first ping (echo request)?
   4.6. PC1: arp -d 10.0.0.2
   4.7. PC1: arp -n
   4.8. PC1: arp -s 10.0.0.2 00:00:00:00:00:02
   4.9. PC1: ping -c2 10.0.0.2
   4.10. PC1: arp -n
   4.11. PC1: arp -d 10.0.0.2
   Discussion: What what is different this time? why?
5. **Part B Configuration:**


<p>| | | |</p>
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<tbody>
<tr>
<td><strong>PC1</strong></td>
<td><strong>PC2</strong></td>
<td><strong>VPC1</strong></td>
</tr>
<tr>
<td><code>ifconfig eth0 10.0.0.1/23 up</code></td>
<td><code>ifconfig eth0 10.0.0.2/24 up</code></td>
<td><code>ip 10.0.1.3/23</code></td>
</tr>
</tbody>
</table>

**Discussion:** Will the hosts be able to ping each other? Why or why not?

5.1. PC1: ping -c2 10.0.0.2
5.2. PC1: ping -c2 10.0.1.3
5.3. PC2: `ifconfig eth0 10.0.0.2/23`
5.4. PC2: ping -c2 10.0.1.3
5.5. PC1: `ifconfig eth0 10.0.0.129/24`

**Discussion:** Will PC1 be able to ping PC2 now?

5.6. PC1: ping -c2 10.0.0.2
5.7. PC2: `ifconfig eth0 10.0.0.2/30`