NET3900: Assignment 4

These questions are based on Module 4. Submit your answers via Bb by end-of-day Thursday Sept 29, 2016. Always show your calculations or provide explanation for your answers. The marks value for each question follows the question number.

1/1. How does the Access Point discover the IP address of the Local Controller?
The IP first discovers the IP address of the Master Controller.
The Master Controller sends configuration to the Local Controller including the IP address of the Local controller.

2/1. Why does the Access Point Use an Access Tunnel to carry data frames to the Wireless Controller?
Frames arriving to the AP from the wireless stations are in the format of 802.11. Since the frames are carried to the controller over an 802.3 Ethernet (which has different frame format), the 802.11 frames must be carried in a tunnel.

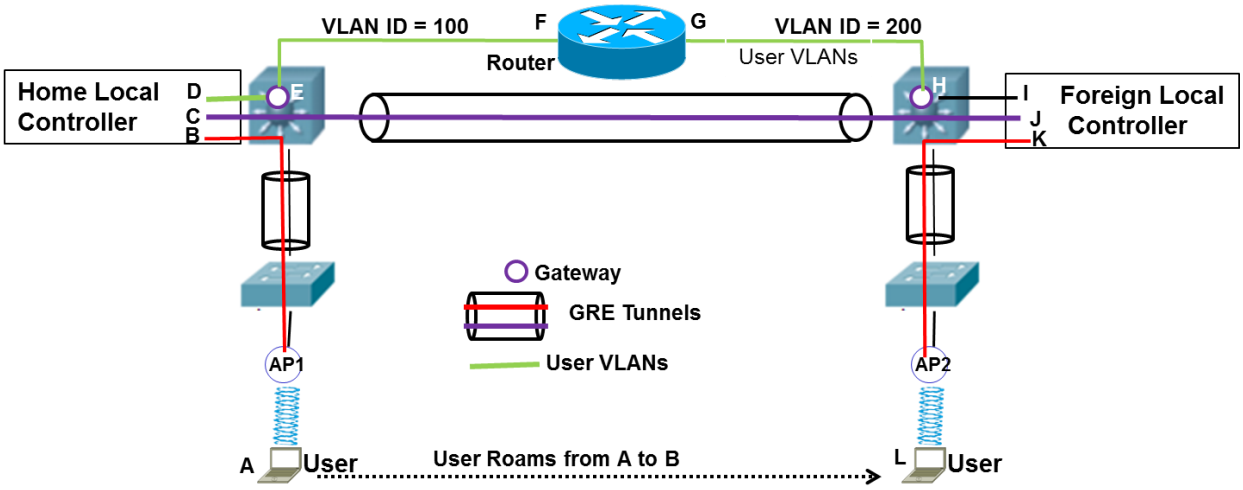
3/2. What is the principle function of the Master Controller and Local Controller?
Master Controller: Single point of Configuration
Local Controller: All wireless traffic is switched via the Local Controller

4/1. What is the purpose of the Mobility Tunnel?
The mobility tunnel is used for Layer 3 Mobility. This means that a wireless station has roamed from an AP on one controller (home) to an AP on another controller (foreign) but the second controller does not have the User VLAN. Therefore a mobility tunnel is used to bring the 802.11 frame from the foreign controller back to the origin controller. At the origin controller the frame is placed on the User VLAN.

5/1. What is the principle network requirement/condition to use Layer 2 roaming?
Layer 2 roaming means that the wireless station has roamed from an AP on one controller to an AP on another controller and the second controller has the required User VLAN configured. Therefore the 802.11 frame can be placed on the VLAN with the use of mobility tunnels.

6/1. How is Local Controller resiliency achieved?
The Access Point sets up a GRE tunnel to two controllers.
The AP communicates with the Primary Controller. When the Controller fails, the AP communicates with the Backup Controller

7/2. A wireless client is associated to AP1 and user VLAN ID = 100. The diagram shows the client roaming from AP1 to AP2. What is the path of wireless frames from the wireless client when associated to AP2 to its user gateway? Use the letters (A to L) to trace out the path.
Path: L,K,J,C,D,E



8/3. When designing Wi-Fi solutions, you need to consider the throughput of both the RF domain and LAN domain. (Throughput here means maximum throughput) Your wireless controller spec indicates that it supports a maximum of 32 Access Points (RF throughput) while the controller throughput is limited to 800 Mbps (LAN throughput). Which resource is more limiting: RF capacity or LAN capacity for the following scenario? Note: Calculate how many APs can really be connected to the controller while meeting the controller throughput.

Your wireless application uses two radios per AP (11a and 11g). The PHY rate for each radio is 120 Mbps with a protocol efficiency of 50%. The RF channel is loaded to 60% of throughput limit to minimize collisions.

1. Calculate the RF throughput T for one radio
T=PHY x Efficiency x Max Channel Load
T = 120 Mbps * 0.5 * 0.6
T = 36 Mbps

2. Calculate the RF throughput for the AP (ie two radios)
T_{AP} = 2 * T = 72 Mbps.

3. Calculate the number of APs supported by the LAN throughput.
N = Controller LAN Throughput / T_{AP}
N = 800 Mbps / 72
N = 11 Access Points