

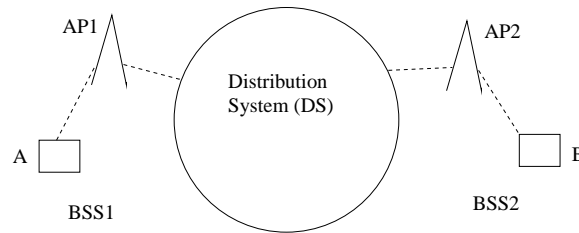
Homework 1

Assigned: Sept. 8, 2015

Due: Sept. 17, 2015

Read the documents on the reading list (major part). Answer the following questions.

1. What are the main arguments for transforming the power grid into Smart Grid based on the DoE document? The DoE document gives examples of current Smart Grid efforts (on pages 33-34). What are the major issues addressed by each project? (You may do some research by reading documents on their websites.)
2. Based on the NIST document, what are the eight priority areas that urgently need standards for interoperability? Describe the conceptual model for Smart Grid proposed by the NIST document.
3. Compare the Meter Portal architecture and the HAN Device Portal architecture for Home Area Networks.
4. Why collision detection is not used in the MAC protocol for IEEE 802.11? How does it solve the problem of possible collisions at the receiving node?
5. Suppose that wireless node A sends a frame to wireless node B using IEEE 802.11 as shown in the following figure. Assume that the MAC addresses of node A , node B , access point $AP1$ and access point $AP2$ are MAC_A , MAC_B , MAC_{AP1} and MAC_{AP2} . Give the four addresses in the frame sent from A to $AP1$, and in the frame sent from $AP2$ to B .



6. What is the main design goal of IEEE 802.15.4/ZigBee? How does the MAC protocol achieve the goal?
7. What are the four types of MAC frames of the IEEE 802.15.4 protocol? How are they used in the protocol?