IEEE P802.11  
Wireless LANs

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Dual Band AP Tutorial Simulation | | | | | |
| Date: 2014-03-18 | | | | | |
| Author(s): | | | | | |
| Name | Affiliation | Address | Phone | email |
| Rick Murphy | vLogic | 7800 Miller Dr., Frederick, CO, 80504 |  | rmurphy@wirelesstrainingsolutions.com |
| Mark Hamilton | Spectralink, Corp | 2560 55th St  Boulder, CO 80301 USA | +1-303-441-7553 | mark.hamilton@spectralink.com |
|  |  |  |  |  |

Abstract

This document presents two HTML5 animated simulations of a dual-band AP, and the AP forwarding process.

Note that the simulation files themselves must be handled separately and in parallel, and placed in the same folder/directory as this file, for the embedded links here to function properly.

**Linked simulations (HTML5)**

Linked here and included in the package, find the “Frame Prism” simulation authored by Rick Murphy of vLogic. This was viewed and discussed in Dallas, and has been updated based on comments received.

Note that these are HTML5 animations, and require an HTML5 compatible web browser in order to view the simulation. See below for more information.

The link below will open Version 2.4, which shows the decision steps going on inside the “Distribution System” /”DS Processing” portion:

[**802.11 Frame Prism\_v2.4.htm**](802.11%20Frame%20Prism_v2.4.htm)

And just below here, is Version 3.0, which hides those details:

[**802.11 Frame Prism\_v3.0.htm**](802.11%20Frame%20Prism_v3.0.htm)

Comments from Rick on these versions:

Since the DS logic shown in v2.4 is based only on my assumptions, I felt it may not be appropriate for general publication such as inclusion as an appendix or inline graphic within the main standard document.  For that reason I wanted to include a version that hid this processing.  But, I thought it may still be useful to keep a version that exposed some ideas about how the DS might work to spark discussions in the Task Groups and especially for viewing in the Architecture meetings.  Those are the reasons for having two separate versions.  To sum up, 2.x versions will contain DS logic and 3.x versions will not.

**Instructions for the simulation (be sure to run in Full Screen mode, if necessary):**

The Dual-band AP Prism simulation is offered as a means to help visualize frames received from an antenna at the bottom of the image and subsequent processing up the protocol stack as it may appear within a generic dual-band access point that contains three physical interfaces. The three interfaces are (1) 5 GHz radio and protocol stack, (2) 2.4 GHz radio and protocol stack, and (3) 802.3 Ethernet portal and protocol stack.

After opening the DAP Prism simulation the viewer will see a three-sided object divided vertically by gray-scale shading. The strata represent various logical layers contained within an AP. Along the bottom of the simulation are four active buttons which allow the viewer to choose from four common case studies of 802.11 frame travel and processing.

Case 1

By selecting the first button (DA = This BSSID) the program will simulate frame processing for an 802.11 frame that has been received from the air interface and contains a Destination Address for that matches the BSSID of this AP radio. An example of this type of situation may include a management message sent from a non-AP STA to the AP. Local processing of the frame, with no forwarding is demonstrated.

Case 1 Comments:

Case 2

By selecting the second button (DA = This BSS) the program will simulate frame processing for an 802.11 frame that has been received from the air interface and contains a Destination Address that matches a non-AP STA that resides within this Basic Service Set (BSS). An example of this scenario may included a unicast data frame intended for another non-AP STA. Frame processing includes finding a positive match in the Association Table, reprocessing the MSDU, into a new MPDU, and forwarding the new frame back out the same interface on which the original frame was received.

Case 2 Comments:

Case 3

By selecting the third button (DA = Adjoining BSS) the program will simulate frame processing for an 802.11 frame that has been received from the air interface and contains a Destination Address that is not contained within its Association Table. As such the frame is forwarded to the Distribution System (DS) for further processing. For the purposes of this simulation an informational example of DS processing whereby the frame is copied to both adjoining interfaces is shown. In this example, the matching DA is found within the Association Table of the 2.4 GHz interface and subsequent frame processing for transmission through that radio is shown. An example of this situation may include a unicast data frame transmitted to a non-AP STA that is associated to the co-located BSS.

Case 3 Comments:

Case 4

By selecting the fourth button (DA = Adjoining LAN) the program will simulate frame processing for an 802.11 frame that has been received from the air interface and contains a Destination Address that is not contained within its Association Table. As such the frame is forwarded to the Distribution System (DS) for further processing. For the purposes of this simulation an informational example of DS processing whereby the frame is copied to both adjoining interfaces is shown. In this example, the matching DA is found within the Switch/Bridge Table of the 802.3 Ethernet Portal interface and subsequent frame processing for transmission onto the wired LAN is shown. An example of this situation may include a unicast data frame transmitted to a non-802.11 STA that is reachable through the co-located 802.3 Portal.

Case 4 Comments:

Additional Controls

Once any of the case studies have been selected a new set of four buttons will appear along the bottom of the simulation. The purpose of these buttons is as follows.

Step Backward

The first button (Step Backward) allows the viewer to pause the simulation and then step back one click at a time.

Continue

The second button (Continue) resumes the simulation from the point where it was paused.

Restart

The third button (Restart) returns the simulation to the initial state allowing the viewer to select a different case study.

Step Forward

The fourth button allows the viewer to pause the simulation and then step forward one click at a time.

Comments and suggestions for this work may be sent to Rick Murphy (rmurphy@wirelesstrainingsolutions.com).