ABB

Communication Test between ABB Wireless network and AC800M Controllers

Based on		Project			
Prep.					
Appr.					
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1. Objective

The purpose of this document is to present the communication test results between ABB wireless system and ABB AC800M controllers. The objective is provide communication between servers and controllers through a redundant wireless system, once the main fiber system fails.

2. Used Devices

Device	Description
Radio 6420	ABB Wireless Radio model 6420.
Server	Controllers monitoring system server
Controller	AC800M Controller
ABB Switch	ESP630 switch which connect existent network to wireless network
Cisco Switch	Existent switch which connect client devices locations

3. Concept and Performed Test

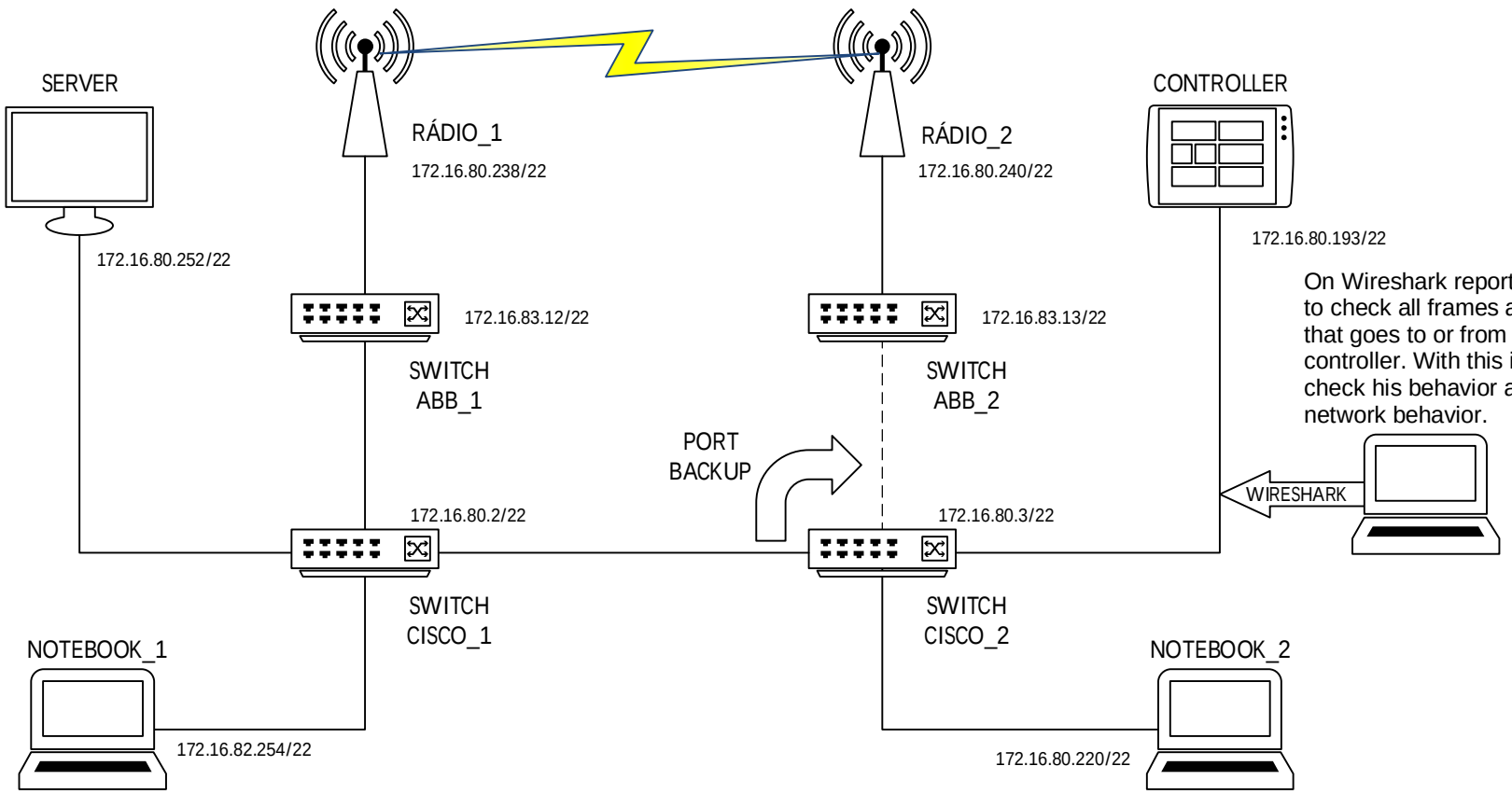
The radios is connected, like the image below to simulate the customer network.

The ABB mesh wireless system provide Ethernet communication to the local devices which can be connected through the SSIS (wireless) or Ethernet cable on WIC port (WIC (Wired Client Interface).

On the existent network, the controllers connected to the existent switches, will be also connected, to the wireless system through the WIC ports. These ports will provide the communication in case of fiber failure.

The RNRP protocol, check the network, to prevent loops and also “help” on controllers communication. Due to their characteristics, which use multicast to communicate, the ABB wireless system was configured to allow this kind of communication. Beside this, on CISCO switches, the communication ports connected to the fiber and radio, was configured as port backup, to allow the communication on one port or another, not accepting both on the same time, which can bring a loop to the RNRP.

On the diagram we have the basic setup and devices connections.



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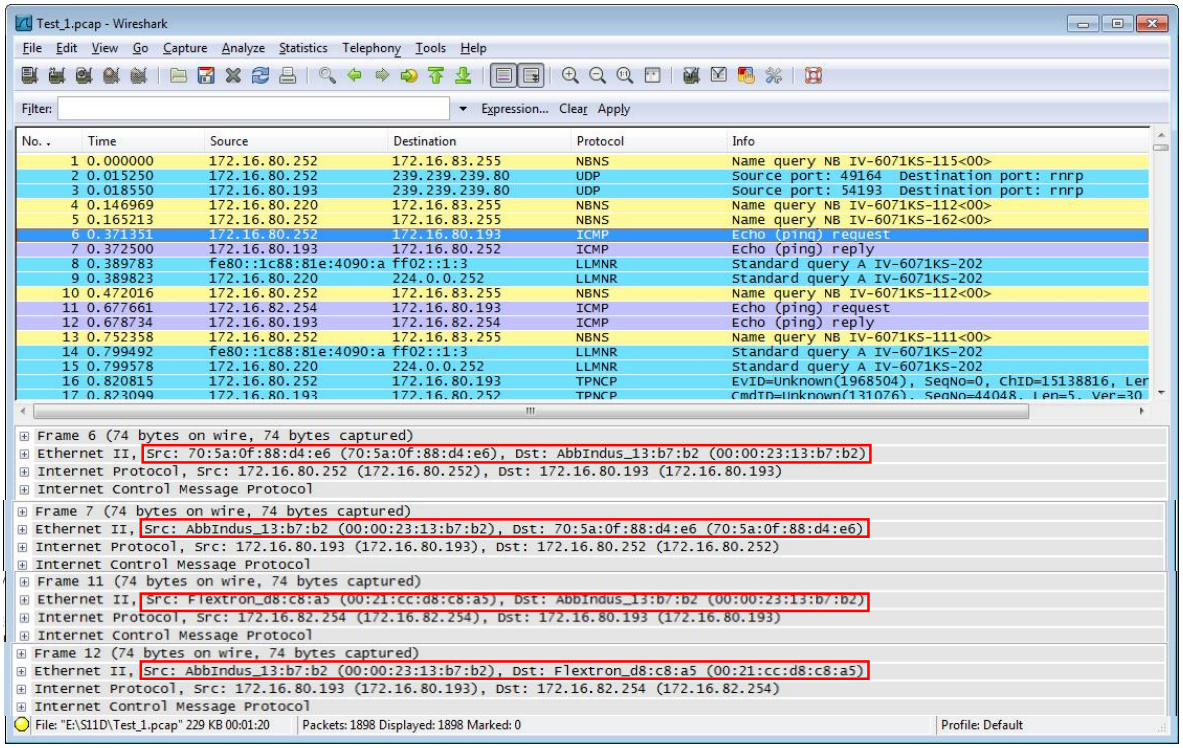
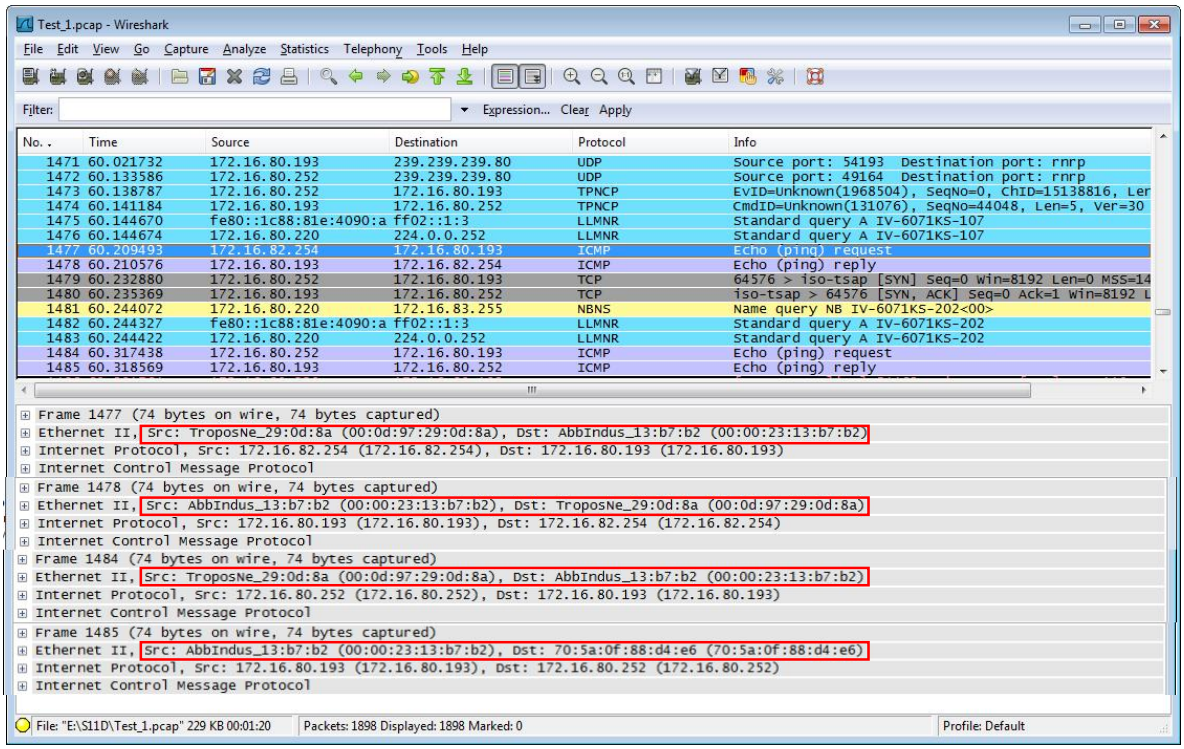
It is possible to see that after shift between fiber to wireless, the RNRP frame is received and transmitted on controller. The ICMP (ping) frame is received on controller, but this kind of frame which comes from the server, aren't updated on controller's ARP table after switching the path from the fiber to wireless.

Normal behavior:



Both MAC-address (source and destination) are right. i.e.: The source on frame 6 is the destination on frame 7 as the source on frame 7 is the destination on frame 6. The same occurs between frame 11 and 12.

After switching fiber to wireless behavior:



As on the last image, we can see that the behavior is the same between the frames 1477 and 1478, but on frames 1484 and 1485, this didn't occur. The controller (IP 172.16.80.193) receive a frame with the Tropos... source MAC (IP 172.16.80.252 from the server), but, when it answer to the server, it didn't send it with the same MAC just received before, but send it to the MAC 70:5A:0F… (Source MAC from the server before the switching to wireless), what means that the device didn't updated their own ARP table to the address in evidence.

Due to the characteristics of the radios, the frames are "routed" inside the radio, transparently to the user, because it can use a L2 network, as on a switch. However, as on the radio, the frames are routed, there is a MAC change when the frames pass through the radios, as it is expected with this kind of protocol. Because of this, the ARP tables on the devices is updated after some time, as the destinations are not found. After this, the device have their communication reestablished through the other possible path. This is a normal and expected behavior, working with Ethernet networks.

On the specific case of the controller, it keeps on its ARP table, the entry between the last MAC and server IP, it had when working through the fiber. On this way, the controller don't update its ARP table, even receiving frames from the server, with the same IP address but with a new MAC-address.

If we disconnect the communication cable from the controller and after a time like 30 seconds, we reconnect it or even doing a shutdown / no shutdown on the switch port, which has the same effect, the controller, looks like cleans its ARP table and re-learn its connection, allowing it to communicate through the wireless.

What is strange is that on the opposite way, switching from the wireless to fiber, the controller updates its ARP table, but in the other hand, this does not occurs.

These behaviors can be analyzed looking the wireshark files collected during the tests.

REVISÃO

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