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Rhymes with "Diploma"

Notes on a Dual-Mode Airport Extreme Network

2008/02/08

Summary: These are followup notes from my attempts to setup a dual-mode Airport Extreme Network. This started at the [Apple Discussion Forum for Airport Extreme](#) but since forums have a way of disappearing over time, I wanted to preserve this somewhere else.

The Problem

I have an AppleTV which is 802.11n-capable. It gets media from my iMac which is 802.11n-capable.

Unfortunately I have these other non-802.11n-capable devices: iPhone, MacBook, and a Powerbook. [Ed: just to clarify, all current MacBooks are 802.11n-capable, but when I wrote this I was using a 1st generation MacBook which was neither capable nor upgradable.]

Which means I was getting very little of the 802.11n-goodness. When I was growing up, "Does Not Work Up To His Potential" was the most devastating of all report-card notes. You could be forgiven for not getting an "A" but you had to at least put in the effort.

The iMac to AppleTV connection is solely for the purposes of pushing large media files, commonly referred to as "Movies" or "TV Shows". For that we need to be living up to our full potential.

So the idea came to me that I had this older Airport Extreme which was 802.11g compatible (now referred to as "Airport Not As Extreme As His Big Brother").

Why not put the 802.11n devices on one network and the 802.11g devices on another? That way you get the maximum performance.

Turns out I'm not the first genius to come up with this idea. In fact it even has a name: a Dual-Band Network. Its name is derived from the fact that it is a network using two bands. Clever, eh?

I received help from Apple Discussion Forum Member [Duane](#) who currently has 21,730 posts online in the forum out of a total of 54,894 "Total Posts" and is considered a "Level 5" with a ranking of 100,940. I don't know what any of that last stuff means, but I'm guessing it means that if you play "Apple Related Trivial Pursuit" with Duane, Duane first kicks your ass and then takes your name. Or do you take names *before* you kick ass? I'm not sure. Duane knows though.

In any case, Duane kindly pointed out that this information could be found in the [Designing AirPort Networks Using AirPort Utility \(PDF\)](#) [henceforth "DANUAU"] document provided by Apple which I had heard of before, and quite possibly even had a copy of somewhere on my hard drive, but had neglected to check because I didn't realize this was a common thing that people wanted to do. My thanks to Duane for not only being super-helpful, but also refraining from using the term RTFM anywhere in his post. He did use the term "Dual-Band" which meant that I now had a good search term to use.

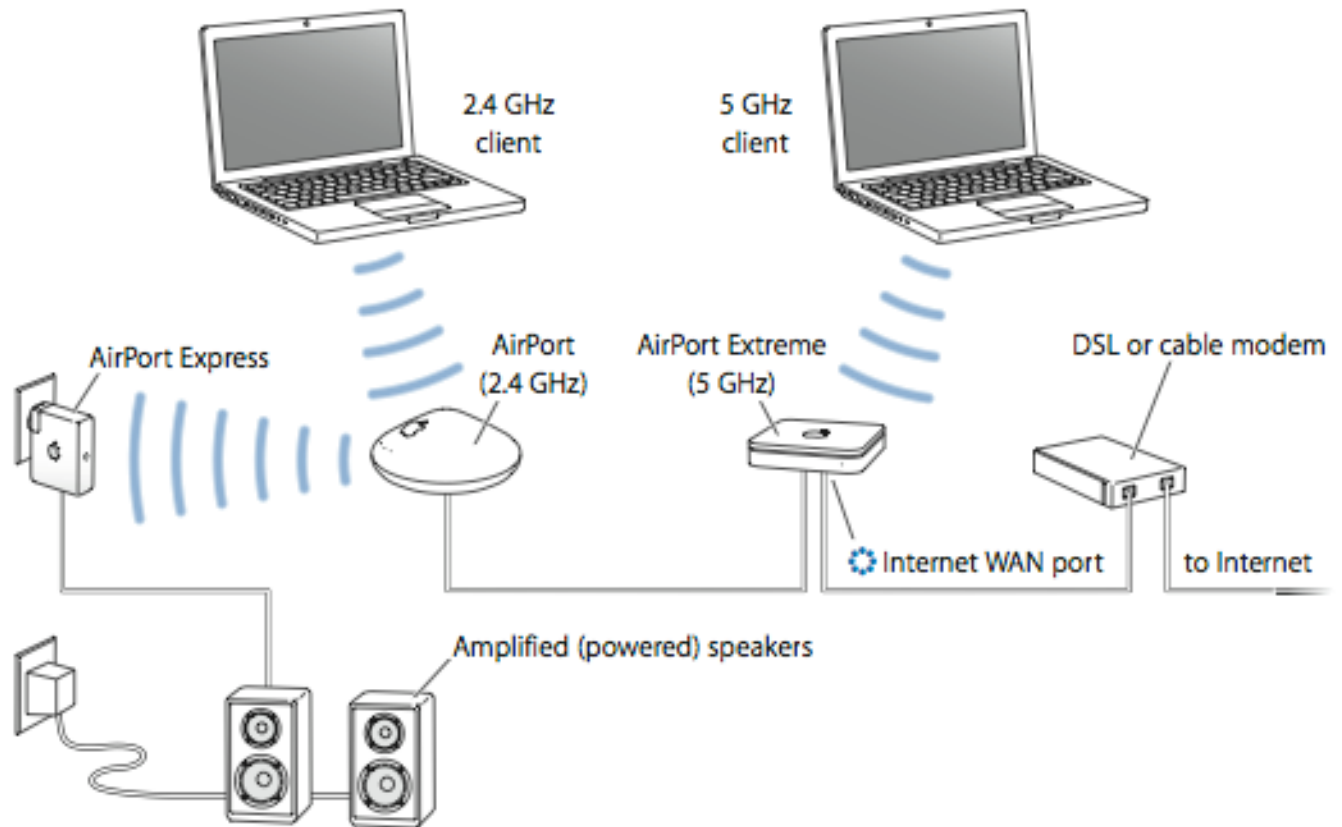
[Update 2009-01-04: The old document "Designing AirPort Networks Using AirPort Utility: Mac + PC" [Designing AirPort Networks Using AirPort Utility.pdf \(local file\)](#) has been superseded by "Designing AirPort Networks Using AirPort Utility: Mac OS X v10.5 + Windows" [Designing AirPort Networks 10.5-Windows.pdf](#). Thanks to a comment by "spaceMan" for drawing my attention to this. Since Apple couldn't be bothered to keep the URL alive and redirect it to the new file, I put local copies here in addition to linking to it above.]

The DANUAU document proved useful in explaining that yes, this can be done, and, in fact, it is fairly simple. Here are the instructions from that document:

Setting up a Dual-Band (2.4 GHz and 5 GHz) Network

You can set up a dual-band network that utilizes both the 2.4 GHz and 5 GHz frequency bands, so client computers using 802.11n wireless cards join the 5 GHz segment of the network, and computers using

802.11b or 802.11g wireless cards join the 2.4 GHz segment.



Setting up a dual-band network:

See “Choosing the Radio Mode” on page 21 for instructions about how to set up your AirPort Extreme 802.11n Base Station in the 5 GHz frequency range. Set up your base station to connect to the Internet based on the type of service you use (DSL or cable modem service, or connecting to an existing Ethernet network that has Internet access). Give your 5 GHz network a name, such as Business 5G, so that 802.11n client computers can join the 5 GHz segment of the network. Connect your 2.4 GHz AirPort Extreme or AirPort Express Base Station to your 802.11n base station using Ethernet. Follow the instructions earlier in this chapter to set up your base station as a bridge. Give the 2.4 GHz segment of your network a different name, such as Business 2.4 so that 802.11b and 802.11g client computers can join the 2.4 GHz segment of the network.

That’s it. That’s all they tell you. Which really didn’t seem like a lot. It also didn’t answer several of my questions, including “Can the 2.4Ghz clients communicate with the 5Ghz clients?” (Yes, they can, once you get it working properly.)

Here are the steps:

Step 1) Hookup Extreme-N to Internet connection (cable, DSL, whatever) on the WAN/Internet Port. This is probably the simplest step since most likely you have done it already with whatever network setup you have.

Step 2) Setup a 5G Wireless Network. This is fairly, except that in my case the Extreme-N base station had previously been setup as an WDS base station, and I had to change the **Wireless Mode** to “Create a wireless network” before “Radio Mode” would show the option for “802.11n Only (5 Ghz)” would even show up. Also note: Using 5G means that the Channel selection is automatic, so you don’t have to choose from the 1-11 range that you have been used to. This answered the question for me as to whether the Extreme-G Airport Extreme should be setup as the same channel or a different one.

Step 3) Make Sure “Connection Sharing” is set to “Share a public IP address” under the “Internet” settings. It probably already is, but double check.

Step 4) Plug the Extreme-G into one of the Extreme-N LAN Ethernet Ports. You can tell the LAN ports from the WAN port on the Extreme-N by the fact that there are 3 LAN ports and they all have the same hieroglyphic symbol over them (This is an improvement over the Extreme-G model, which has one LAN port and one WAN port, meaning that I am never sure which is which. Sure Apple could have labeled them WAN and LAN but what fun would that be when they could use symbols instead?!?)

This is where it gets tricky. Or could get tricky if you don’t read carefully.

When is a network not a network? When it’s two networks. Except it’s not.

Step 5) Configure the Extreme-G to setup another wireless network.

I went into this process thinking that I was setting up two different networks.... which I am... but only sorta.

Technically this is called a “dual-band network:” Note the singular: “network.” This is one network which has two bands (G and N). I would have realized this sooner if I had read the DANUAU more carefully, because it clearly states that these are

instructions for “Setting up a dual-band network” and Duane had said “It is commonly referred to as a dual-band network”

Think of it this way: you are building a highway which has a fast lane (N) and a slow lane (G).

I also found this confusing because I’ve been used to dealing with setting up WDS networks where it is one big network with several access points. However, to get the 5Ghz option for the Extreme-N, I had to change that to “Create a Wireless Network” as mentioned above.

(It was also confusing because I could not, at first, get the Extreme-G to be G-only. I had to set it to B/G and then Apply Changes and then go in and change it to G-Only.)

At this point I had two working networks. Computers on both networks could access the Internet.

They could not, however, communicate with each other (file or screen sharing).

I went into Airport Utility and realized that the Extreme-N was setup as a 192.168.x.x network and the Extreme-G was setup as a 10.x.x.x network. So I changed the Extreme-G to also be in the 192.168.x.x range.

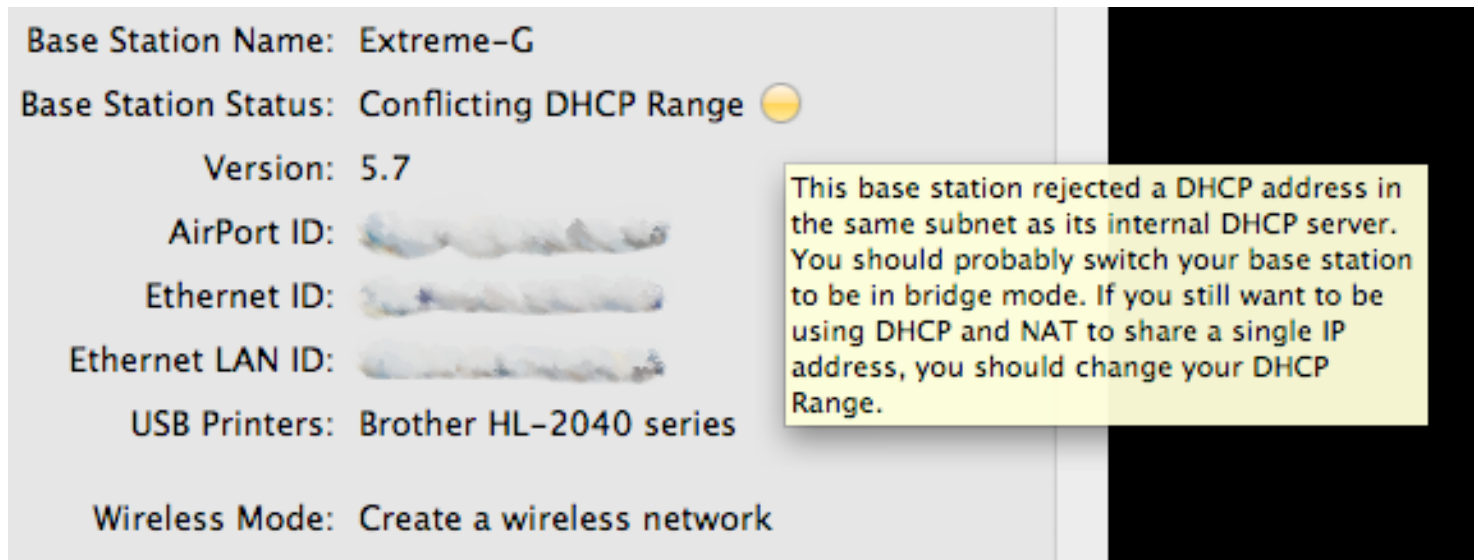
My next brilliant idea was that I would have the Extreme-N give out IPs in the range 192.168.1.100 – 192.168.1.199 and have the Extreme-G give out IPs in the range 192.168.1.200 – 192.168.1.250. Brilliant!

Except it wouldn’t work.

Airport Utility wouldn’t let me do it, telling me that: “The DHCP range you have entered conflicts with the WAN IP address of your base station” (which was 192.168.1.199). I tried restarting the Extreme-G. Which worked.

Except that now it wouldn’t get *any* IP.

Now some of you have already figured out what is wrong, but I had no idea. But Airport Utility told me when I hovered the little yellow “There Is Something Wrong” button:



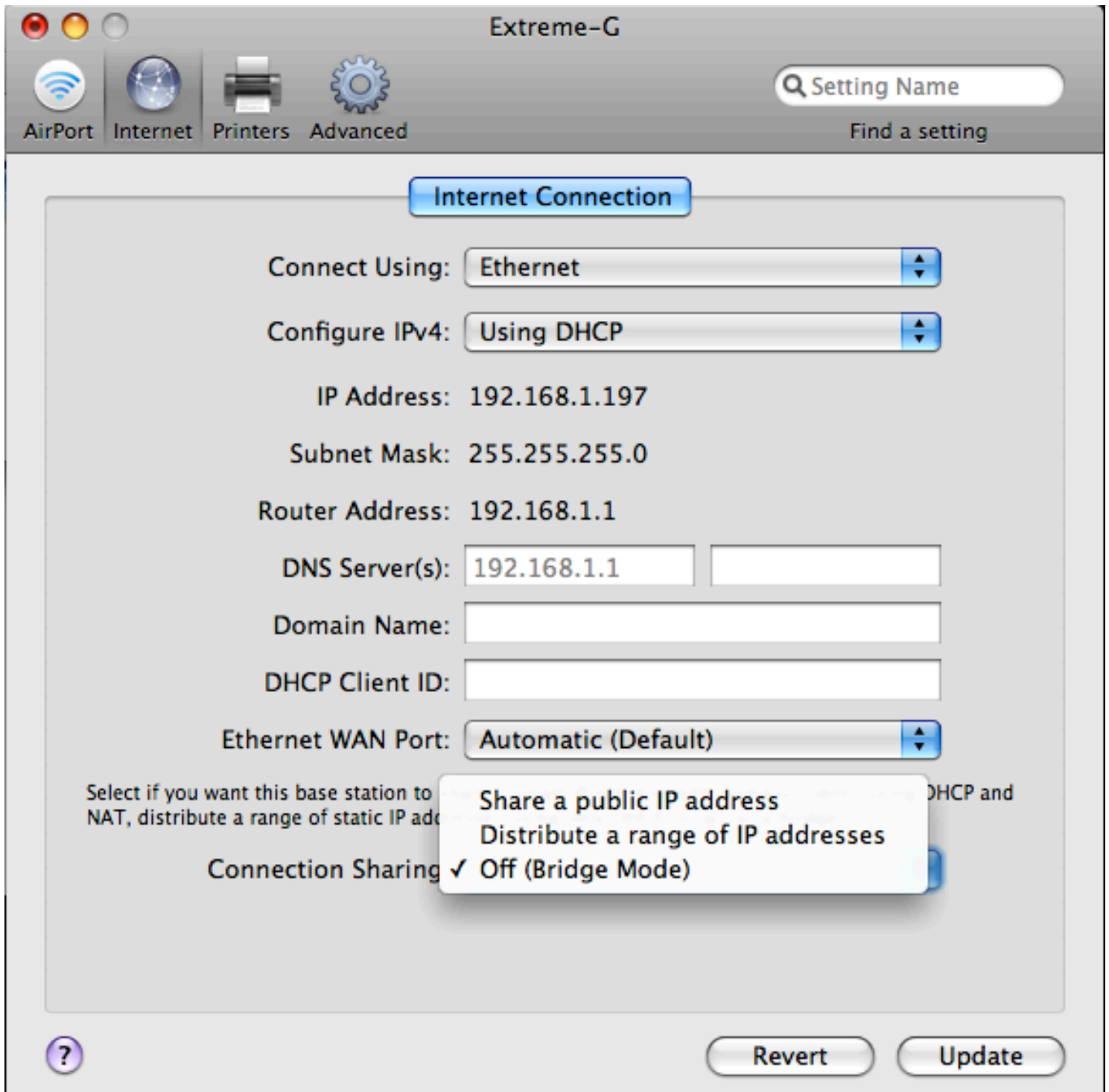
Now that might be the most helpful error message that I've ever seen. Not only did they tell me what was wrong, they told me how to fix it. The key line is

“You should probably switch your base station to be in bridge mode”

When I went back and re-read the DANUAU, it had clearly told me this already: “Follow the instructions earlier in this chapter to set up your base station as a bridge.”

I had simply missed it.

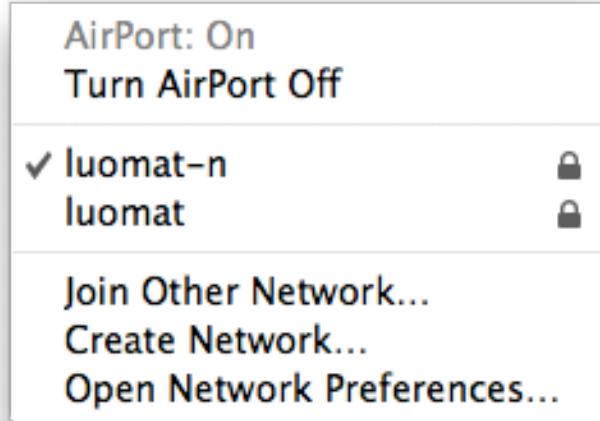
A few moments of clicking around in the configuration settings for the **Extreme-G** led me to the Internet tab (which probably really ought to be called “Networking” but that’s a minor quibble) and at the bottom there are options for “Connection Sharing” where “Share a Public IP Address” is the default but “Off (Bridge Mode)” is also available.



Now this is easier to understand if you remember that this is A Dual-Band Network (singular). You are not setting up Dual-Band Networks (plural). The Extreme-G is set to “Create a Wireless Network” in “Wireless Mode” (as is the Extreme-N) but it is operating as a single network.

File and Screen Sharing works. Everyone has Internet access. Life is good.

Update: Someone asked if both of the networks appear in the menu bar WiFi dropdown. Indeed they do:



Update 2009-01-04: Macworld has recently run two articles which might be of interest: [When AirPort is not enough](#) and [Buyer's Guide: Wi-Fi Routers](#) which gives you options besides what Apple offers.

Update 2009-07-06: the newest [Airport Extreme](#) can do dual-band without the need for a second unit, but there are still a lot of the old Airport Extreme units around, so I hope this article will continue to be useful. Also of note: as of this writing, the only “G” devices in our household are the iPhones.

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