Node Cycling In and Out

Category: WiRES-X
October 22, 2022
This post addresses a WiRES-X node that constantly leaves and rejoins a room.

This type of problem is almost always the result of a networking issue. When certain networking problem occur the HRI-200 software will wack out (a technical term). Once the software has been wacked out, it will continue to cycle in and out of whatever room it is connected to. Restarting the WiRES-X software usually solves the problem.

Router problems:
1. Turn off UPnP. It should never be used!!!!!!
2. Turn off all quality of service features like those to improve Xbox gaming or VoIP functions. (Yes I know we're using VoIP so you'd think it would help.)
3. In fact turn off everything you don't have to have.
4. Some routers are total crap and need to be rebooted every few weeks.
5. You're not using Wi-Fi are you? Wired is always better than wireless — we should know! Drop-outs in Wi-Fi can cause this issue.
6. Did I mention, turn off everything on the router you don't need?

ISP problems:
1. Something as simple as the ISP dropping your connection for a few minutes in the middle of the night when they're doing maintenance.
2. The ISP just doing a bad job of getting packets to you during prime evening Netflix viewing.
3. The ISP switching your IP address. (I think CenturyLink just does this for the fun of it.)

Computer:

1. Make sure Win10 doesn't put the USB interface to the HRI-200 to sleep. It really, really likes to do this. Just going to the obvious place in the control panel to turn this feature off doesn't really turn it off. See the documents on running Win 7/10 24x7x365 remotely in the Fusion Help section at HamOperator.com.
2. Make sure the computer isn't crap. Cheap computers may not have quite the reliable communication interfaces that we need.
3. Banish all RFI and ground loops. Make sure RF is not getting into the USB interface to the HRI-200. This can cause message errors and really screw things up.
4. Make sure you computer actually has enough power to run the HRI-200 reliably. Get one of those USB power thingies and make sure you have a solid 5VDC under load.

Over the air:
1. Bad data on the WiRES-X network can mess things up. This happens mostly with hotspots that are bridged into the WiRES-X room. On MNWis and a few other networks we've banished this problem by banishing FCS and running YSF server software that banishes bad data from hotspots. So if you have this problem in one room, say AmericaLink and not others, there may be nothing you can do.
2. Yaesu radios that are running really old firmware or have not had the firmware updated correctly (I.e., "I did the main CPU but I'll get around to the DSP later.")

Side note:
The port check should not be relied upon to definitely prove it's working or not working. The test is not exactly the same as actually communicating with the Yaesu list servers and the room server. So it can lie to you with false positives and false negatives. This is because the port check uses the Yaesu servers in Japan to perform the test, not the room server you're trying to connect to. Routing issues can cause one to work whilst the other doesn't.

You may also experience a similar problem if the Yaesu list servers are not able to keep up with the demand or if

maintenance is being done. (When they do maintenance in the wee hours of the morning, that's right in the middle of the day for us.)

Regarding Fusion

Category: Fusion
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Some thoughts about Fusion, digital modes, and the future.

Fusion uses the lower layers of the P-25 architecture. Modulation, transport, framing, etc. The primary differences revolve around what's in the packet. For example: The use of call signs instead of unit IDs. So Fusion shares most of P-25. FWIW, Fusion is also very similar to DMR. The primary difference is that it doesn't use TDMA — jamming two separate channels into the space of one.

P-25, DMR, NXDN(Kenwood), IDAS (Icom), and Fusion use the same vocoder. D* uses a much older and obsolete vocoder.

Fusion and D* have been optimized, although differently, for Amateur Radio. DMR, NXDN, and IDAS have been optimized for commercial services, like taxi cabs. P-25 has been optimized for government services, like police departments.

Fusion was actually designed by Motorola in that period of time that Motorola owned Yaesu. This benefits Fusion since the vocoder and the signal processing firmware are pretty much the same as what Motorola uses in their radios. (Believe me, not all signal processing firmware is designed the same!) Thus, the performance of Fusion is pretty darn good. Add to that an additional layer for FEC provided by Yaesu's modification to

P-25, and the performance of Fusion is better than all the others. (D* is substantially worse than the other protocols.)

What we see from this is that most of the communication industry has evolved around the same technologies even though the systems are not directly compatible with one another. This is why it is so easy for a hotspot to translate between DMR, P-25, NXDN, IDAS, and Fusion. But is this the best we can do?

No. Digital performance could be much better. C4FM already blows away FM with superior range and capability, but it was intentionally limited — to work with FM/PSK transmitters and receivers like those used with FM.

FM is a non-linear system thus it does not transmit all the information it could in the available bandwidth. Linear systems, such as OFDM, can provide higher bit rates lower error rates, better resistance to fading and multipath, amongst other things. The problem is OFDM requires linear amplifiers and thus is not compatible with all the FM/PSK transmitter and receiver designs.

Personally, I'd like to see OFDM as an option for digital's future.

But all digital systems could be made better by some enhancements at the repeater site. The use of multiple, diversity receivers incorporating very low-level discrimination could improve receiver sensitivity by as much as 10 dB. That means HT would perform almost as well as a mobile rig with no changes required of the user. Having multiple diversity receivers at various locations around a city could mean that a low power HT would work virtually anywhere in that city. Sadly, there doesn't seem to be a market for doing such things. (This technology is well understood and used by your cell phone.)

One last note. Several attempts have been made to build multi-

protocol radios incorporating DMR, Fusion, D*, FM, and others into a single unit. Should be simple, right? But we have yet to see such radios on the market. If we did, they wouldn't do Fusion as well as Yaesu, or D* as well as Icom, or DMR as well as Motorola. Why? Protocols are damn hard to get right. They are even harder to get working really, really well where they take into account all the things that can go wrong with data transmission. (Hotspots try to do the conversion, but never work as well as going "native".)

I would argue that the amateur community should focus on those systems designed for Amateur Radio. Ultimately those will be easier to use and better suited for the job. (Police departments and taxi cabs should not use Fusion!) A good user experience is critical if digital, any digital, is to become generally accepted.

One last note: Nothing prevents Icom from building a Fusion radio. Every last little detail about Fusion is public information, particularly since most of it comes from P-25 — for which Icom builds radios. The only proprietary aspects of Yaesu's system are WiRES-X and IMRS.

Purchasing amateur radios that do digital help support the future of digital by encouraging companies to develop more and better digital features. Buying commercial Chinese radios just helps the Chinese economy.