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Coming Next: Gigabit Wi-Fi

John Cox, Network World

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Saturday, September 13, 2008 1:05 PM PDT

The IEEE working group that is putting the finishing touches on the 802.11n 100Mbps wireless LAN standard is about to launch a new project, for a 1Gbps WLAN standard.

That would mean gigabit Wi-Fi.

Last year, group members formed the Very High Throughput (VHT) Study Group to explore changes to the 802.11 WLAN standard to support gigabit capacity. The study group is looking at doing so in two frequency bands, high-frequency 60GHz for relatively short ranges and under-6GHz for ranges similar to that today's WLANs in the 5GHz band, 802.11a and 11n.

At a meeting last week in Hawaii, the study group has been finalizing a proposal calling for creation of a new, as yet unnamed task group to carry forward the work of crafting a standard. That proposal must be accepted by the 802.11 Working Group, which oversees the entire WLAN standard.

"The basic idea right now, and that's subject to change, is that the 'maximum mandatory mode' on a single link would be [at least] 500Mbps," says Tushar Moorti, director of systems architecture for chip maker Broadcom's WLAN Business Unit. "But the further requirement is that [an access point] device that supports VHT would be able to sustain multiple links, so the aggregate would be over 1Gbps."

Currently, WLAN products based on the draft 2 802.11n standard typically are providing throughput of 130M to 150Mbps, sometimes as much as 170Mbps. (Compare [enterprise WLAN products](#).)

"I think we'll see a [VHT] standard in two years, and WLAN products with more than 1 gigabit per second within three years," says Craig Mathias, principal for wireless consultancy Farpoint Group. "That is absolutely phenomenal."

That may be optimistic. One version of the IEEE proposal suggests a completion target date of 2012-13 for the standard. But a lot of big players have been active in the study group so far: Atheros, Broadcom, Intel, Marvell, Motorola and Nortel.

"It's the next-generation technology for wireless LAN, in the same sense that 11n was the follow-on to 11a/b/g," says Broadcom's Moorti.

According to the proposal, VHT "will allow a corporate or home user to roam from high-throughput dense cells to wider area networks in a seamless manner, while maintaining full support for the installed base security, management, diagnostics and backbone infrastructure." VHT will also be backward compatible with the full range of existing and emerging 802.11 standards, such as 11i for security, and 11s for mesh networking.

There are existing gigabit wireless Ethernet radios, notably from vendors like [BridgeWave](#) and [DragonWave](#), which are used mainly for point-to-point links over several miles and for backhauling cellular traffic. But they aren't used to build wireless LANs.

High-capacity wireless links in the 60GHz band got a lot of attention early this year at the giant Consumer Electronics Show in Las Vegas, some of it with wireless products based on SiBeam's [multigigabit wireless](#)

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[chip](#), which streams up to 4Gbps at up to 30 feet.

The VHT group has been considering the two frequency bands, for different reasons and possibly for different purposes. The group could even propose developing the standard for both, treating them as complementary, Moorti says.

That makes sense to interested observers like Proxim Wireless. "At this point, we're not sure whether or not the 60 Ghz band will provide enough range to support enterprise WLANs, but it is certainly worth exploring," says Ajit Jha, WLAN Product Manager at Proxim Wireless. "The 6 Ghz band is also worth exploring, since it provides the key benefit of backwards compatibility with existing 802.11 a/b/g/n WLANs."

The 60GHz band has a lot of unused spectrum available, and the VHT advocates like it because it's well-suited for very high speed, single links. But because of the high frequency, the signal doesn't penetrate easily through walls and other obstacles, so the applications are likely to span very short distances, such as one or two rooms in a home or office, for example. "This technology is very nascent," Moorti says.

"It used to require all kinds of exotic silicon, but now you can do this in CMOS," says Mathias. "But because of the problem of radio propagation, you have to be very directional, and you need sophisticated antenna arrays."

The under-6GHz band has less available spectrum, so VHT advocates are looking at an array of methods, from advanced digital processing to more mature antenna technology, to dramatically boost throughput beyond 11n, Moorti says. "The under-6GHz band is about multi-user technology to improve overall network performance," he says.

One technique being considered is parallelizing data transmissions between a VHT access point and its associated clients. Today's access points share limited throughput and work with associated clients in serial fashion, Moorti says. Without parallel transmissions, even a VHT access point supporting 500Mbps would still be limited by that inherent serial transmission. "[But] if you can parallelize those guys, and send to them at the same time, each user gets the full 500Mbps," Moorti says. "All the traffic would flow at the full rate."

The VHT Study Group has already been in talks with the 802.15.3c task group, which focuses on wireless personal-area networks, and is also considering the 60GHz band. Some accounts portray the discussion as a real or at least potential conflict. Moorti sees the discussion as a sensible, early attempt to start resolving potential coexistence issues between the two technologies. "From what I understand, things are progressing," he says. "I don't see any problems that would prevent either group from moving forward."

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No, but they're still higher than the previous generation's speed.


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If it w as up to you w e'd still be at dial-up under 20kps.

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Dialup, not hardly. I just think w hen a product has an advertised performance, it should meet that performance. It's easy to call a LAN Gigabit speed, but in reality it'll never reach that speed. For one reason, no hard drive made w ill send or receive data at Gigabit speed. Same for wireless. Wireless G is advertised as 54 Mb/s. Anyone can test transfer speed from one device to another via wireless G, and realize that the data is transferred at now here near that speed. Same for wireless N. In this case it's not the hard drive, it's the wireless speed itself. It just won't happen.

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