Microsoft advocates new WiFi-NC to make use of white spaces in spectrum

January 9 2012, by Bob Yirka

Image: Wikipedia.

(PhysOrg.com) -- Four years ago, the FCC began allowing limited use of the so-called white spaces in the electromagnetic spectrum that is shared by all wireless devices (in the United States). The white spaces highlighted by the FCC concerned bands of unused space within television broadcasts. Subsequently, Microsoft developed a database, called SenseLess that wireless devices could use to identify such white spaces. Now, Microsoft has gone a step further and is championing a new Wi-Fi standard that makes use of the database it created. Called WiFi-NC, (for narrow-channel) the new standard is based on using groups of radios and receivers simultaneously to make use of many small bands at once.

Led by Krishna Chintalapudi, the team at Microsoft has been working on

creating actual WiFi-NC devices and have come up with something they believe should form the basis of the new network standard. The new devices would work they say, by combining a large group of very low power radios and receivers (which they call transmitterlets and recieverlets) each of which would be temporarily dedicated to one free band in the spectrum. The signals would then be combined to create one full purpose signal and used in what the team calls a compound radio. With such a system, the individual transmitterlets and recieverlets could respond to changes in signal strength or interference by automatically switching to stronger or more reliable bands without any interruption in service.

Not only would such new devices allow Wi-Fi suppliers and users to take advantage of the additional bandwidth, but moving to such a new system wouldn't necessitate throwing out current hardware, as the reception and transmission logic would remain the same. Moving to such a new standard, Microsoft argues, would be both fair and efficient, allowing everyone access to more bandwidth, which is always a concern as more and more devices come to rely on Wi-Fi hardware and software solutions for moving data.

Unfortunately, moving to the new standard requires approval of the FCC , and as yet, it's not clear on whether the agency would be able to adopt the new standard even if it likes the idea, as Congress has restricted its ability to begin auctioning off available white space.

Nonetheless, Microsoft says it will continue to push for the standard, and hopes that it will eventually replace the current Wif-Fi standard altogether.

More information: WiFi-NC : WiFi Over Narrow Channels, research.microsoft.com/apps/pu … fault.aspx?id=157192

Abstract

The quest for higher data rates in WiFi is leading to the development of standards that make use of wide channels (e.g., 40MHz in 802.11n and 80MHz in 802.11ac). In this paper, we argue against this trend of using wider channels, and instead advocate that radios should communicate over multiple narrow channels for efficient and fair spectrum utilization. We propose WiFi-NC, a novel PHY-MAC design that allows radios to use WiFi over multiple narrow channels simultaneously. To enable WiFi-NC, we have developed the compound radio, a single wideband radio that exposes the abstraction of multiple narrow channel radios, each with independent transmission, reception and carrier sensing capabilities. The architecture of WiFi-NC makes it especially suitable for use in whitespaces where free spectrum may be fragmented. Thus, we also develop a frequency band selection algorithm for WiFi-NC making it suitable for use in whitespaces. WiFi-NC has been implemented on an FPGA-based software defined radio platform. Through real experiments and simulations, we demonstrate that WiFi-NC provides better efficiency and fairness in both common WiFi as well as future whitespace scenarios.