Abstract

In an infrastructure Basic Service Set (BSS) beacon frames are transmitted periodically by the Access Point (AP) and announce the presence of a wireless network. It mainly consists of network specific information and thus one of its main purposes is the “advertisement” of this information. Based on this information mobile devices can take many decisions, for example, whether to attempt association with the network or not. To facilitate the communication between devices developed by different vendors, IEEE 802.11 standardizes the arrangement of this information in beacon frames. Often it is required to embed non-standard vendor/network specific additional information in the beacon frame. In this paper we show that without disturbing the arrangement of information as per the standard, how the IEEE 802.11-2012 compatible beacon frames can be overloaded with additional non-standard information. Moreover, the 802.11 standard limits the maximum size of the beacon frame. In this perspective we also show that how to send large amount of information in multiple successive beacon frames using the already implemented concept of fragmentation and sequence numbers. The proposed technique is flexible in terms of fields used for embedding the information and maximizes the number of additional non-standard information octets per beacon. The results of its implementation in ns-3 simulator are also shown.
Bit-Stuffing in 802.11 Beacon Frame: Embedding Non-Standard Custom Information

References

- Grunenberger Y., Rousseau F. Virtual Access Points for Transparent Mobility in Wireless LANs. In proceedings of IEEE Wireless Communications and Networking Conference (WCNC) (Sydney, Australia, April 18 - 21, 2010)
- IEEE standard 802.11. Part 11: wireless LAN Medium Access Control (MAC) and Physical Layer specifications, 2007
IEEE standard 802. 11z. Part 11: wireless LAN Medium Access Control (MAC) and Physical Layer specifications - amendment 7: Extensions to Direct-link setup (DLS), 2010.


IEEE standard 802. 11u, Part 11: wireless LAN medium access control (MAC) and physical layer (PHY) specifications – amendment 9: interworking with external networks, 2011

IEEE standard 802. 11s, Part 11: wireless LAN medium access control (MAC) and physical layer (PHY) specifications – amendment 10: mesh networking, 2011


IEEE standard 802. 11. Part 11: wireless LAN Medium Access Control (MAC) and Physical Layer specifications, 2012


Index Terms

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Keywords

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