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Analysis of IEEE 802.11 (Wi-Fi)

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Abstract: Wireless Fidelity (Wi-Fi) is a technology that allows electronic devices to connect to a wireless LAN (WLAN) network, mainly using the 2.4 gigahertz (12 cm) UHF and 5 gigahertz (6 cm) SHF ISM radio bands. A WLAN is usually password protected, but may be open, which allows any device within its range to access the resources of the WLAN network. Devices which can use Wi-Fi technology include personal computers, video-game consoles, smartphones, digital cameras, tablet computers, digital audio players and modern printers. Wi-Fi is less secure than wired connections, such as Ethernet, precisely because an intruder does not need a physical connection. It follows the four layer TCP architecture and it has made remote locations more accessible and dropped costs.

Keywords: Ethernet, Console, Range

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1. Introduction:

Wireless Fidelity (Wi-Fi) standard given by the Wi-Fi Alliance to the IEEE 802.11 can also use by its extensions like 80.11a, 802.11b and 802.11b. There are several more extensions are going to be introduced by Wi-Fi (802.11) i.e. 802.11e, 802.11i, 802.11p and 802.11n. Wi-Fi is the transmission of radio signals. In order to define data transmission and manages location independent network access using radio signals on the bases of that we can call it as a packet protocol. The structure of physical/link layer interface of Wi-Fi is similar to Ethernet. The layers above the physical and data link layers include TCP/IP. [1]

2. Architecture

All extensions of 802.11 like (a, b, g, etc) follows five layers TCP model and data link layer is divided into two sub-layers: Media Access Control (MAC): Logical Link Control (LLC).

Five layer TCP Model:

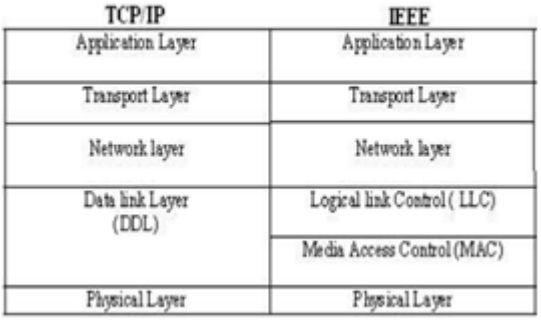

Fig. 1. TCP and IEEE layers model

The two lower layers are specified by IEEE 802 networks: 802.2 – LLC, 802.3 – PHY and MAC, Ethernet, 802.11 – PHY and MAC, Wi-Fi. The primary task of physical layer is to perform encoding scheme, modulation and deals with the transmission of radio signals in actual through space. As we know that physical layer implementation work in particular specific bands means some specific frequency allocated for some specific applications.[2,3].

Medium Access Control (MAC) layer is sub-layer of Data link Layer (DDL). The primary task of said layer is to control the transmission and sometimes it can be used to provide services like mobility management. The format of MAC address of Wi-Fi is similar to the MAC address of Ethernet (802.3) i.e. 6 octets. It uses the CSMA/CA (means to prevent collision before they happen) is similar to the mechanism used in Ethernet (802.3) i.e. CSMA/CD. Both act as a peer-to-peer protocol.[3, 8]

3. Benefits of Wi-Fi

What are the benefits of Wi-Fi over a more traditional wired network? In particular, what are the benefits for an embedded system application? Wifi has the enormous flexibility that a wireless connection brings to an embedded application. The addition of wireless provides more choices for monitoring, control and the dissemination of information. Practically speaking, remote locations become more accessible and costs drop.[1]

The following list summarizes some of the benefits of a Wi-Fi network.

1. **Wireless Ethernet:** Wi-Fi is an Ethernet replacement. Wi-Fi and Ethernet, both IEEE 802 networks, share some core elements.
2. **Extended Access**: The absence of wires and cables extends access to places where wires and cables cannot go or where it is too expensive for them to go.
3. **Cost Reduction**: As mentioned above, the absence of wires and cables brings down cost. This is accomplished by a combination of factors, the relatively low cost of wireless routers, and no need for trenching, drilling and other methods that may be necessary to make physical connections.
4. **Mobility**: Wires tie you down to one location. Going wireless means you have the freedom to change your location without losing your connection.
5. **Flexibility**: Extended access, cost reductions, and mobility create opportunities for new applications as well as the possibility of creative new solutions for legacy applications.

4. Wi-Fi Embedded System Applications

The reach of wireless communication in embedded systems continues to grow. Forrester Research, a company that focuses on the business implications of technology change, has reported that in a few short years, up to 95% of devices

used to access the Internet will be non-PC devices that use an embedded system. There are many applications for embedded devices with a Wi-Fi interface:

- Industrial process and control applications where wired connections are too costly or inconvenient, e.g., continuously moving machinery.
- Emergency applications that require immediate and transitory setup, such as battlefield or disaster situations.
- Mobile applications, such as asset tracking.
- Surveillance cameras (maybe you don't want them easily noticed, cables are difficult to hide).
- Vertical markets like medical, education, and manufacturing.
- Communication with other Wi-Fi devices, like a laptop or a PDA.

5. Conclusion

This paper is all about basic architecture, benefits and Embedded System Applications of WiFi which shows it reduces overall costing with easy access of remote locations. There are numerous applications for embedded systems. In future concentration is required to solve problems like security, Frequency Interference, Power Problem etc. which will enhance the efficiency and usability of WiFi

REFERENCES:

[1] www.oreilynet net.com/wireless/2003/03/21/home-wifi.html

[2] Amit goel & A.K Sharma "Performance issues in Mobile Ad hoc Network", Faculty of Dept. of computer Engineering, YMCAIE, Faridabad.India.

[3] Grunewald, L.Javed,M., and Gu, M. "energy-efficient Data Broadcasting in Mobile Ad-hoc Networks. In. Proc. International Database Engineering and applications Symposium (IDEAS 02), July 2002.