

**ANALYSIS OF OPEN SOURCE DRIVERS  
FOR IEEE 802.11 WLANs**

**ABSTRACT**

*of a thesis*

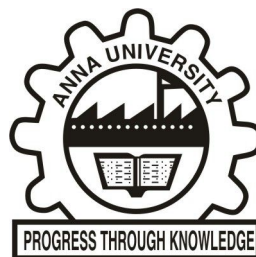
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## **ABSTRACT**

Wireless Local Area Network (WLAN) interfaces are common in personal computing devices such as PDAs, mobile phones, and laptops. IEEE 802.11 is the de facto standard used for WLAN devices. The standard has evolved over the last ten years. The WLAN medium access control (MAC) implementation has also taken shape over the years and open source implementation of WLAN drivers in Linux kernel is an evolving area.

Linux is a popular and stable open source operating system kernel implementation. The Linux kernel has a modular architecture and is comparatively easy to plug new components. The Linux kernel supports a vast category of network interfaces. A few years ago, the WLAN implementation was also added to this mainline kernel development. We discuss the general network implementation, architecture and operation for understanding the complex implementation of WLAN. The WLAN driver implementation in Linux kernel is explained further with a detailed discussion of the structure. The WLAN driver initially evolved from propriety to partially proprietary and then to fully open source over time.

The WLAN implementation in kernel is based on three layers -control plane, protocol stack and hardware driver. The control plane provides the group of functions for management and control of the WLAN interface and the hardware. Current implementation of the WLAN control plane is unified across different vendors, the same way vendors use a single protocol stack implementation. We discuss the control plane and the protocol stack functions for different operations. The detailed step by step operations on the frame in different layers are explained.

The process for different management functions are explained based on the three layers. This explanation traces the functional flow of different management functions from application layer to the hardware. The transmission and reception of data in WLAN with respect to different layers are discussed. The extra functions supported by the WLAN are further discussed.