Over the past two decades, wireless networking has become an enabling technology for ubiquitous computing and inexpensive Internet access. The demand for wireless networking has also increased steadily, including a wider range of applications, larger user populations, and larger network scale. Challenges come from the increasing variety of traffic (such as data, voice and video), service criteria (e.g. QoS/QoE, reliability, security etc.), as well as system requirements (e.g. revenue, fairness, aggregate network performance etc.). Furthermore, wireless networks are less stable, tractable and predictable compared with wired environments, due to physical and management realities. From the physical perspective, the time-varying soft capacity of wireless channels, as well as co-channel and adjacent-channel interference degrades transmission quality and reduces their effective capacity. From the management perspective, uncontrolled resource competition and uneven resource distribution degrades network performance. Although hardware advances are critical to satisfy ever-growing user demands, the efficiency of resource management plays an equally (if not more) important role to push wireless networking to its full potential in terms of satisfying diverse user and system requirements. In this thesis, we propose an effective framework of resource management to reduce the gap between diverse user/system demands and limited delivery capability of wireless networks. Our simulation results demonstrate that this proposed framework of resource management achieves the lowest packet loss rate, best endto-end delay and fairness without compromising network throughput, compared with the state-of-the-art methods. Additionally, our approach is simple in computation and light in overhead.