Wireless Internet Performance

Within the past 20 years, the Internet has grown from a network primarily used by the academic sector to a sprawling organic web of over a billion computers used by individuals, businesses, and public institutions. As the number of users has increased, so has the demand for bandwidth. This demand has been further exacerbated by the growing use of the Internet for financial transactions, leisure pursuits such as online gaming, and research and reference purposes. Within the last few years, the Internet has also gained popularity as a means of sharing media such as songs, images, or even full-length films. Recent studies suggest that Peer-to-Peer (P2P) applications (e.g. BitTorrent) now account for 50-70% of Internet traffic.

In addition to the escalating load placed on physical networks, use of wireless technologies has led to an even greater volume of traffic. Wireless technologies have proven popular and useful with private users, who appreciate the convenience of being able to access the Internet away from home, and with educational institutions, where the technology can be used to reach greater numbers of students and enhance the learning experience.

Considering these issues, it has become increasingly important to ensure that the transfer of information proceeds as smoothly and free of errors as possible. This transfer is frequently hampered by many factors, including compatibility issues between different networks, varying methods of prioritizing the transmission of discrete packets of information, and different levels of telecommunications infrastructure in various parts of the world.

Dr. Williamson leads a research team of 20 members (faculty, staff, and graduate students) engaged in improving the speed and functionality of the Internet. The Networks Research Group focuses on the design and analysis of networked systems and the communication protocols used within these systems. The types of systems of interest include client-server, peer-to-peer, multimedia, Internet, Web, wireless, and sensor networks. Research techniques employed include analytic, simulation and experimental investigations. In many cases tools are developed to test new algorithms and services, or to capture and analyze network measurement data to better understand existing environments and future ones. Recent projects have included collecting and analyzing Internet traffic from the U of C campus wireless network, classifying Internet traffic by network application, and developing simple traffic engineering rules for cellular data networks.

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