

Technological Enablers of the IEEE Wireless Metropolitan Area Network (IEEE 802.16)

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There has been keen interest in the literature recently on the IEEE wireless metropolitan area network (MAN) developed within IEEE 802.16. Through the use of flexible physical layer features and medium access control (MAC) layer mechanisms, this system can be used to deliver broadband voice and data into areas that may have a wide range of population densities, cell radii, propagation environments, and Quality of Service (QoS) requirements. The physical layer provides flexibilities of time or frequency domain duplexing, multiple bandwidths, adjustable subchannelization, scalable OFDM formats, adaptive coded modulation, and advanced antenna system. The IEEE 802.16 MAC layer offers a connection-oriented service to upper layers of the protocol stack. The QoS of each connection takes one of four levels: constant bit rate grant, real time polling, non-real-time polling, and best effort. The MAC layer also offers packing, fragmentation and ARQ. The MAC privacy sublayer performs authentication, key exchange and encryption of MAC packet data units. The MAC Convergence sublayers at the top of the MAC enable Ethernet, ATM, TDM voice and IP (Internet Protocol) services to be offered. This presentation will endeavor to provide a high level overview of the system. It will discuss, from an information theoretic point of view, the key enablers of the system.

Biosketch

Anthony C. K. Soong (S'88-M'91-SM'02) received the B.Sc. degree in animal physiology and physics from the University of Calgary, and the B.Sc. degree in electrical engineering, the M.Sc. degree in biomedical physics and Ph.D. degree in electrical and computer engineering from the University of Alberta. He is currently a principal systems engineer for CDMA Systems at Ericsson Inc. in Boulder, Colorado, USA. He also leads the Ericsson physical layer delegation for the CDMA 2000 standardization body (3GPP2). Prior to joining Ericsson, he was with the systems group in Qualcomm Inc. His research interests are in statistical signal processing, robust statistics, wireless communications, spread spectrum techniques, multicarrier signaling, multiple antenna techniques and physiological signal processing.

Dr. Soong is a senior member of the IEEE. He has published numerous scientific papers and has over 20 patents granted or pending. He has served on the technical program committee of major conferences in the area of communication engineering, as guest editor in the IEEE Communications Magazine and is a technical reviewer for the IEEE Transactions on Communications, IEEE Transactions on Wireless Communications, IEEE Transactions on Vehicular Technology and IEEE Communication Letters.