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Keynote

Mobility Models for Wireless Networks: Challenges, Pitfalls, and Successes

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Abstract:

The performance of any mobile network is highly influenced by the mobility patterns of nodes in the network. In fact mobility behavior is the most important environmental factor that determines performance and influences mobile network design. Thus it is important that we analyze and understand mobility patterns so as to models that

1. develop models that accurately capture the mobility of nodes, while at the same time are amenable to mathematical analysis and/or efficient simulation.
2. characterize mobility so as to design robust algorithms for disseminating information in a mobile environment.

In the past, the wireless networking community relied on simple models such as random waypoint. Although initially widely accepted it was widely misused in simulations leading to fallacious results. This misuse and the growing appreciation that random waypoint is unrealistic has led to significant recent activities focusing on the development of parsimonious and accurate models describing the movement of nodes in mobile wireless networks. These have included efforts to model connectivity within sparse mobile networks associated with people and vehicles. Moreover, analysis of these traces has led to the identification of "communities of nodes" and of critical nodes that act as bridges between these communities.

This talk will provide some of the early history in modeling mobility, including some of the failures described above. The talk will then describe the challenges presented in understanding and modeling mobility along with research opportunities. These will be illustrated by more recent application of a wide range of statistical, analysis, and modeling techniques to account for mobility. The talk will also overview recent activities to develop dissemination algorithms taking advantage of recently discovered characteristics of mobility traces including the presence of communities and central nodes. . The goal of the talk is to provide a better understanding of the issues underlying

the accurate modeling of mobility, recent progress in addressing these issues and the challenges that different approaches place on simulation.

Speaker's Biography:

Don Towsley holds a B.A. in Physics (1971) and a Ph.D. in Computer Science (1975) from University of Texas. He is currently a Distinguished Professor at the University of Massachusetts in the Department of Computer Science. He has held visiting positions at numerous universities and research labs including most recently Microsoft Research Lab, Cambridge, UK and Thomson Research Lab, Paris, France. His research interests include networks and performance evaluation.

He currently serves on the editorial boards of Journal of the ACM and IEEE Journal on Selected Areas in Communications, and previously served as Editor-in-Chief of IEEE/ACM Transactions on Networking, on numerous other editorial boards. He was recently Program Co-chair of INFOCOM 2009 and has served as co-PC Chair of several other conferences.

He has received the 2007 IEEE Koji Kobayashi Award, the 2007 ACM SIGMETRICS Achievement Award, the 2008 ACM SIGCOMM Lifetime Achievement Award, a 2008 SIGCOMM Test-of-Time Paper Award, the 1998 IEEE Communications Society William Bennett Best Paper Award, and numerous conference/workshop best paper awards. Last, he has been elected Fellow of both the ACM and IEEE.