

Opportunistic Networks and Their Privacy and Security Challenges

Leszek Lilien,^{1,2} Zille Huma Kamal,¹ Vijay Bhuse¹ and Ajay Gupta¹

¹WiSe Lab

Western Michigan University
Kalamazoo, MI 49008

²CERIAS

Purdue University
West Lafayette, IN 47907

Abstract: We present and investigate a novel paradigm and a new technology of *opportunistic networks*, or *oppnets*. An oppnet grows from its *seed*—the original set of nodes deployed together at the time of the initial oppnet deployment. The seed grows into a larger network by extending invitations or issuing orders to join the oppnet to other devices, node clusters, or foreign networks that it is able to contact. In this way an oppnet gains new communication, computation, sensing, and other resources. A new node that becomes a full-fledged member, or *helper*, may be allowed to invite external nodes. All helpers collaborate on realizing the goals of their oppnet. They can be employed to execute different kinds of tasks, even though in general they were not designed to become elements of the oppnet that invited them.

We address the critical privacy and security issues as well as other research challenges in oppnets. In particular, we believe that the way privacy is addressed in pervasive computing systems, can make or break them. Oppnets, as a subcategory of such systems, are no exception.

Oppnets can improve existing applications in numerous areas, and create new application niches as yet hard to imagine. Thanks to their inherent adaptability and capacity for leveraging resources, they have a great potential for improving effectiveness and efficiency of emergency response and disaster recovery.