

NerveNet: A Regional-Area Network for Resilient Local Information Sharing and Communications

Masugi Inoue

Wireless Mesh Network Laboratory

Resilient ICT Research Center

National Institute of Information and Communications Technology

Information and communications systems in Japan were badly damaged by the Great Earthquake and Tsunami on March 11, 2011. Their importance as societal infrastructure was recognized strongly. NICT established the Resilient ICT Research Center on April 1, 2012, which pursues research and development of information and communications technology that is resistant to disasters. The center consists of three laboratories: Robust Network Platform Laboratory, Wireless Mesh Network Laboratory, and Information Distribution Platform Laboratory.

After overviewing researches by these labs, my talk will focus on researches on resilient wireless networks, in particular, on NerveNet, which is a regional-area network for resilient local information sharing and communications without the use of the Internet in emergency situations. NerveNet is composed of multiple basestations interconnected each other by a variety of transmission systems with Ethernet interface such as optical/metal Ethernet, WiFi, FWA, and Satellite, configuring a mesh-topological network. Each basestation consists of a LAN switch and a CPU board for controlling the switch, providing packet transmission and applications using distributed database among all the basestations over a mesh network. Compared with existing Internet-depend, tree-topological network systems, NerveNet is tolerant to link disconnections and system failures because of mesh structure, and is able to continue providing applications such as IP phone and message sharing without a connection to the Internet because each basestation has functions like DHCP, DNS, SIP proxy, and handover. 30-basestation-scale testbed has been operated more than one year and a pilot test has started in a town hit by tsunami.