

# Local Failure Detection in Mobile Distributed Systems

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## Abstract

Wireless sensor network (WSN) applications are inherently failure-prone, owing to physical limitations and resource constraints, coupled with harsh deployment environments. Consequently, application designers need to consider faults as a primary design concern during development. *Failure Detectors* are an important building block for constructing fault-tolerant distributed systems. Introduced first by Chandra and Toueg as a way of overcoming the “FLP result”, failure detectors have evolved over the years to be used in a variety of different ways to solve various problems in distributed systems.

Much of the research in the area of failure detection has been focussed on *global failure detection*—every node in a network needs to keep track of the health of every other node. However, there are applications that require only *local failure detection*—the health of only those nodes in the immediate neighborhood are of interest. In the context of local failure detection, there is a new complication: what happens if nodes can move around in the network?

In this talk, I will present the design of  $\diamond\mathcal{P}_\ell^m$ : a local failure detector that can tolerate mobility. Further, I will describe an implementation of this failure detector for wireless sensor networks, along with a discussion of performance and quality of service characteristics.