Achieving Availability and Reliability in Wireless Sensor Networks Applications

Amirhosein Taherkordi, Majid Alkaee Taleghan, Mohsen Sharifi

Computer Engineering Department
Iran University of Science and Technology
Email: {taherkordi, alkaee}@comp.iust.ac.ir, msharifi@iust.ac.ir

Abstract

The widespread use of wireless sensor networks applications has raised the need for their development and deployment on the basis of a particular architecture which respects the specific characteristics and constraints of wireless sensor networks. The two significant quality factors that should be taken into account in developing wireless sensor networks applications are ‘availability’ and ‘reliability’ of application services. In this paper, we propose a middleware layer mechanism for satisfying these two factors. We use the publish/subscribe scheme as a middleware service to address the requirements of sensor network applications. This scheme has so far been deployed mostly in mobile environments but not in sensor networks. In this paper, we propose an event-based middleware service that is specifically designed for wireless sensor networks in which a group of sensor nodes form a cluster and a replicated publish/subscribe service is run on each cluster head. We show how our middleware addresses fault-tolerance and also how the replicated services in cluster nodes increase the availability and reliability of the middleware.

Keywords
wireless sensor networks, middleware, event-driven, availability, reliability