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QOS-AWARE RESIDENTIAL GATEWAY SUPPORTING ZIGBEE-RELATED SERVICES BASED ON A SERVICE-ORIENTED ARCHITECTURE

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Abstract. *Service-oriented architecture (SOA) is one of the IT structures attempting to alleviate the problem of interoperability among complex dissimilar systems. Specific research addressing this issue in multi-network environments is scant. Accordingly, this paper extends our earlier home-based EmQRG application to the more complex demands of a multi-network SOA environment. The presented practical SOA-based embedded QoS-aware residential gateway (SOA-QRG) is capable of integrating diverse components and systems into easily set up and easily upgraded networks which can themselves be embedded into larger networks of similar design. The proposed SOA-QRG system is verified by real experiment. A diverse variety of services are integrated, including multimedia streaming and a wireless location-based service (LBS) network with emergency medical monitor/alarm. One of the primary services of the SOA-QRG is to classify forwarded traffic for optimal use under limited network bandwidth resources. Experimental results confirm that SOA-QRG maintains high standards of multimedia QoS even during network congestion on an experimentally bottlenecked network, at all times maintaining excellent general position monitoring and critical emergency warning behavior. The presented system uses only conventional components and software. It is capable of embedding and being embedded in a broad scale of system, thereby usefully extending contemporary SOA research.*

Keywords: Service-oriented architecture, Location-based service, ZigBee sensor network, Home network

1. **Introduction.** Imagine the scenario in Figure 1. There is a guarded community containing a collection of individual homes. Alternately, we might be considering an access-monitored skyscraper containing a variety of private offices. The guarded community exists in relation to external internet, cellphone services and other large networks. The community itself contains its own network for integration and coordination of its various services, e.g. human-guarded access at the front gate (with cameras recording all visitors), a computer-guarded parking lot (with automatic license plate recognition as a part of the vehicle access procedure), wetness sensors provide automatic watering of the lawn, trees and flowerbeds, automatic control of community exterior lighting according to ambient illumination conditions, a intruder monitoring/alarm system using static motion