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"Designing a Multi-tiered Networking Architecture for Smart Building Applications"
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ABSTRACT

Based on the findings and experiences from a decade of active research in the low-power wireless sensor networks (WSNs) domain, researchers have successfully deployed and applied wireless sensing systems in various application domains ranging from personal healthcare applications to larger-sized smart environmental applications. This talk introduces our recent efforts to design a wireless sensor network infrastructure suitable for smart building applications. Our smart building application prototype manages a network of three logical tiers which include a set of sensing modules, actuation units, and actuation decision components. Unlike previous WSN systems, the Wireless Sensor and Actuator Network (WSAN) architecture that this talk presents introduces unique challenges such as increased complexity in traffic patterns and wireless traffic load, along with system interoperability issues at various layers of the networking stack. To address these technical challenges, our system utilizes the IETF RoLL working group's recently proposed IPv6 routing protocol for low-power and lossy networks (IETF RPL). This talk introduces the benefits of applying an IPv6-based networking architecture for smart building infrastructures and discusses about some of the interoperability issues introduced by the IETF RPL routing protocol for various traffic patterns.

BIOGRAPHY

JeongGil Ko received his Bachelors in Engineering (B.Eng.) degree in computer science and engineering from Korea University in 2007 where he also worked as an undergraduate research student with Dr. Hyogon Kim at the Wireless Data Communications Laboratory from 2005 to 2007. He received his Master of Science in Engineering (M.S.E.) and Doctor of Philosophy (Ph.D.) degrees in Computer Science from the Johns Hopkins University in 2009 and 2012, respectively. At Johns Hopkins, JeongGil Ko was a member of the Hopkins interNetworking Research Group (HiNRG) led by Dr. Andreas Terzis. In 2010, he was at the Stanford Information Networking Group (SING) with Dr. Philip Levis at Stanford University as a visiting researcher. He is a recipient of the Abel Wolman Fellowship awarded by the Whiting School of Engineering at the Johns Hopkins University in 2007. His research interests are in the general area of developing wireless sensing systems with ambient intelligence for the Internet of Things (IoT) and Cyber Physical Systems (CPS). Since June 2012, JeongGil Ko is with the Electronics and Telecommunications Research Institute (ETRI) in Daejeon, Korea.

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