

SUMMARY OF Ph.D. DISSERTATION

School School of Science for Open and Environmental Systems	Student Identification Number	SURNAME, First name INOUE, Hiroaki
Title A Multi-Core Processor Platform for Open Embedded Systems		
Abstract <p>Recent proliferation of embedded systems has generated a bold new paradigm, known as open embedded systems. While traditional embedded systems provide only closed base applications (natively-installed software) to users, open embedded systems allow the users to freely execute open applications (additionally-installed software) in order to meet various user requirements, such as user personalization and device coordination.</p> <p>Key to the success of platforms required for open embedded systems is the achievement of both the scalable extension of base applications and the secure execution of open applications. Most existing platforms, however, have focused on either scalable or secure execution, limiting their applicability.</p> <p>This dissertation presents a new secure platform using multi-core processors, which achieves both scalability and security. Four techniques feature the new platform: (1) seamless communication, by which legacy applications designed on a single-core processor make it possible to be executed over multiple processors without any software modifications; (2) secure processor partitioning with hardware support, by which Operating Systems (OSs) required for base and open applications are securely executed on separate processors; (3) asymmetric virtualization, by which many OSs over the number of processors are securely executed under secure processor partitioning; and (4) secure dynamic partitioning, by which the number of processors allocated to individual OSs makes it possible to be dynamically changed under secure processor partitioning.</p>		