

# Application of Operating System Concepts to Coordination in Pervasive Sensing and Computing Systems

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Sixth Annual Workshop on High Performance Embedded Computing  
September 2002

# Report Documentation Page

Form Approved  
OMB No. 0704-0188

Public reporting burden for the collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to a penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.

1. REPORT DATE <b>00 SEP 2002</b>		2. REPORT TYPE <b>N/A</b>		3. DATES COVERED <b>-</b>	
4. TITLE AND SUBTITLE <b>Application of Operating System Concepts to Coordination in Pervasive Sensing and Computing Systems</b>				5a. CONTRACT NUMBER	
				5b. GRANT NUMBER	
				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S)				5d. PROJECT NUMBER	
				5e. TASK NUMBER	
				5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) <b>Information and Telecommunication Technical Center, University of Kansas, Lawrence, Kansas 66045 and Ambient Computing, Inc. Lawrence, KS 66047</b>				8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)				10. SPONSOR/MONITOR'S ACRONYM(S)	
				11. SPONSOR/MONITOR'S REPORT NUMBER(S)	
12. DISTRIBUTION/AVAILABILITY STATEMENT <b>Approved for public release, distribution unlimited</b>					
13. SUPPLEMENTARY NOTES <b>Also see ADM001473 , The original document contains color images.</b>					
14. ABSTRACT					
15. SUBJECT TERMS					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT <b>unclassified</b>	b. ABSTRACT <b>unclassified</b>	c. THIS PAGE <b>unclassified</b>			

# MetaOS Concept

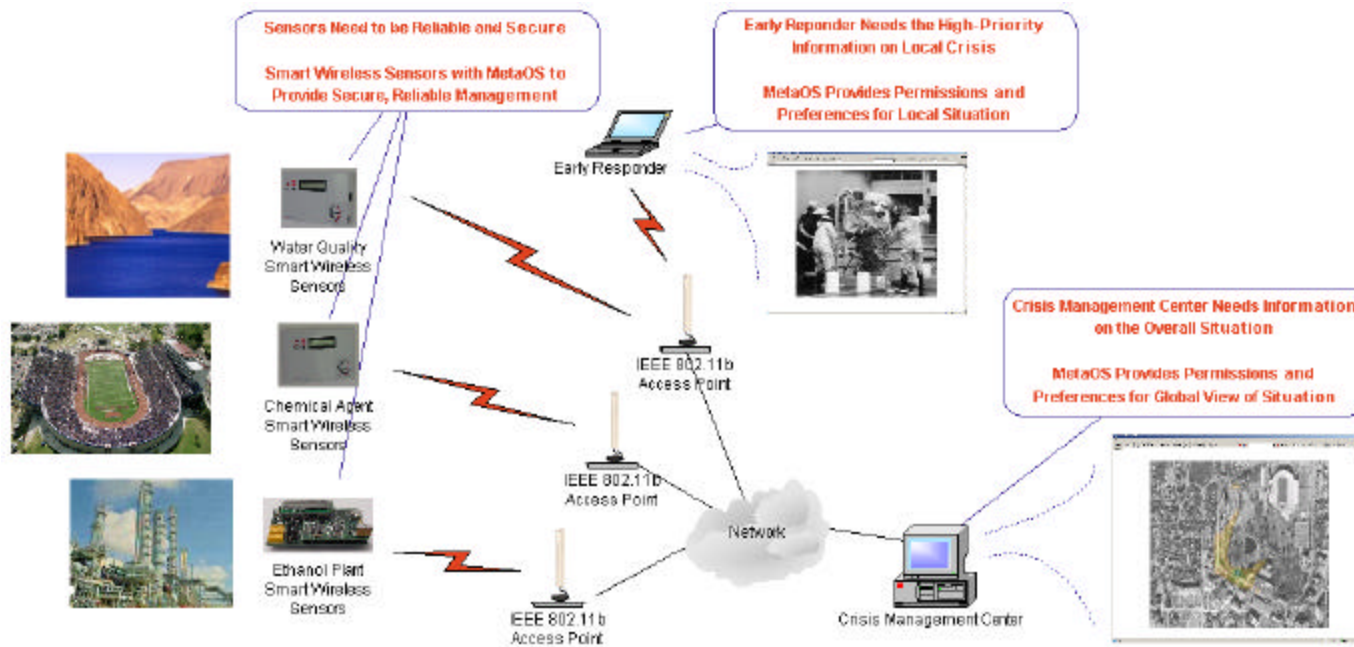
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- MetaOS developed by Ambient Computing to coordinate the function of smart, networked devices
  - Smart networked devices include processing capabilities and sensors
  - MetaOS provides support for preferences, location awareness, & security
- Objective is to ease deployment and use of systems in the many application areas that have heterogeneous devices, contain a non-trivial number of devices, and span multiple locations
- Architecture can facilitate rapid development and deployment of defense and homeland security applications
- Applies operating system approach to groups of distributed, network-embedded devices
  - Smart devices and standalone software is abstracted as resources and peripherals are in traditional operating systems
  - Supports easy deployment of new services by providing common way to integrate and coordinate devices as well as write applications
  - Permissions and user profiles handled as in traditional operating systems



# Security and Homeland Defense

- MetaOS provides capability for sophisticated sensor network management
- Permissions, preferences, and location awareness support different processing and views
- Multiple levels of access to managed resources and intelligence information
- Operators in different locations can customize interface to be most effective
- Operators with different responsibilities can customize views for monitoring, investigation, management
- Allows rapid deployment of new sensor processing applications



# Architecture & Infrastructure

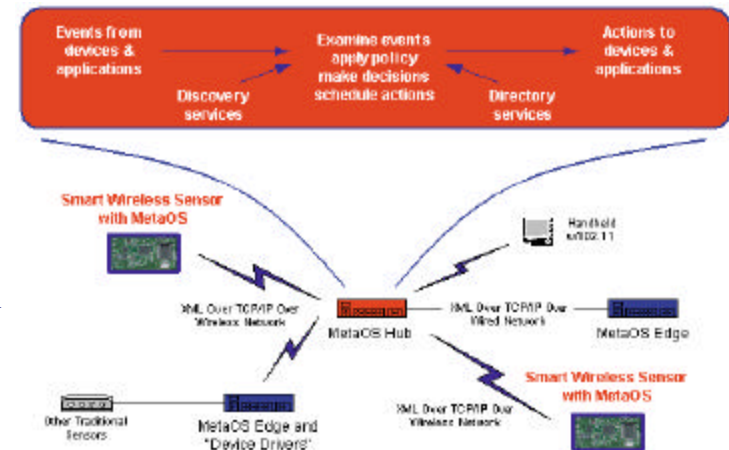
- MetaOS architecture

- Hub (kernel) manages domain, communicates with devices or programs via edge software (device drivers) using publish-subscribe approach
- Hub, edge, and device are typically on different network-connected processors
- XML messages used for various registration, notification, operation, and information tasks
- Applications interact with system devices through hub through a standard interface

- Infrastructure

- Smart wireless devices
  - Tightly integrates embedded & wireless, which qualitatively changes the ability to use networked intelligence by pushing down cost of deployment and use
  - Smart wireless devices allow for deployment of ubiquitous and low-cost sensing capabilities by using standard protocols and embedded chipsets to implement MetaOS-capable devices
- Sensors and Processing
  - Sensors allow new inputs, processing gives intelligence

MetaOS Architecture



Smart Wireless Device

