

# CALL FOR PAPERS

IEEE Journal on Emerging and Selected Topics in Circuits and Systems (JETCAS),  
Special Issue on:

**\*Low-Power, Reliable, and Secure Solutions for Realization of Internet of Things\***

Rapid advancement of networking technologies together with extreme miniaturization of computing and communication devices enable a host of new and exciting applications and services that connect the physical and the computational worlds. In the future, digital sensing, communication, and processing capabilities will be ubiquitously embedded into everyday objects, turning them into the Internet of Things (IoT, or machine-to-machine, M2M). In this new paradigm, smart devices will collect data, relay the information or context to each another, and process the information collaboratively using cloud computing and similar technologies.

This special issue aims to provide a timely discussion on the technical trends and challenges of circuits and systems on Internet of Things. For example, in the future, enormous numbers of sensors will be deployed. The cost of servicing such sensors will be a major concern. Hence, one challenge is to deploy and maintain sensors with minimal or even zero effort. It is often almost impossible to replace sensor batteries once they are in the field. Therefore, another challenge is low power sensor design, or designs which do not require a battery change over the lifetime of the sensor. To be more specific, this requires energy-efficient sensor designs. Therefore, one research area is to design low-power sensing unit. Highly accurate sensor modules often consume great amount of power. One alternative is to use an array of low-accuracy modules with lower power consumption, and then use data fusion to create high-accuracy information. After the collected data is processed, the information must be transmitted to the backend server. While the power of digital circuits scales reasonably with Moore's Law, the power of analog circuits does not scale well. Therefore, analog circuits in wireless communication will consume relatively larger amount of power than digital circuits. Design of low-power transmitter circuits should also be considered. To prolong the battery life of the sensor, we can harvest energy from the ambient environment from sources such as lights, heat, vibration, or radio frequency.

Additionally, none of us likes to expose our personal or confidential information to the public. We also don't want people to provide false information that changes the proper action of the system. Therefore, another challenge is data security and privacy. Furthermore, one of the key components that will increase the adoption rate and breadth of IoT across multiple vertical markets is have a configurable design that supports intelligent devices management. It will be helpful for the system to detect, diagnose, decide, and defuse faulty components with self-configuration, self-optimization, self-healing, and self-protection capabilities. Moreover, in the future, the amount of data generated by machines will be orders of magnitude greater than that generated by humans. Analysis of data and its context will play a key role. As devices become more computationally capable, intelligent computation may easily be distributed between the sensors and the backend servers. Data may be analyzed and fused in sensors before arriving at the data center to save energy and bandwidth.

In order to deploy end-to-end solutions for intelligent/secure interaction among connected devices, IoT requires research from multiple disciplines. In this special issue, we would like to include topics in, but are not limited to below areas:

- Low-power/low-cost/reliable/secure circuits for intelligent sensory subsystems
  - Sensing technologies

- In-situ processing
- Crypto and security
- RF and base-band design (TX/RX)
- Efficient energy harvesting circuits
- Self-configuration, self-optimization, self-healing, and self-protection designs
- Realization of optimized and scalable IoT systems
  - System security and manageability
  - Optimal resource allocation and computation partition from the sensors to the cloud
  - Analytic model that can process immense amount of heterogeneous data into proper context
  - Design examples of smart services and applications

### Submission Procedure:

Prospective authors should submit PDF versions of their papers following the instructions provided on the JETCAS web-site: <http://jetcas.polito.it> Please note a new procedure is implemented for this special issue for the ease of editorial work. Before **Aug 1**, the authors are kindly asked to submit the draft abstract and the tentative list of references. Subsequently, the authors are asked to submit their manuscript before **Aug 15**. Failure to follow this procedure might result in substantial delay in the review process, which could in turn exclude the manuscript from the special issue.

Moreover, the final manuscript without authors' biography should be submitted using the IEEE single-space, two-column format. The template files for LaTeX and Word are available for download from <http://www.ieee.org/pubs/authors.html>. The manuscripts must be 10 pages or less. Submitted manuscripts with larger number of pages will be rejected automatically without being reviewed.

Finally, the relationship to **internet of things** should be explained clearly in the submission.

### Important Dates:

- **Deadline for Abstract Submission: Aug 1, 2012**
- Deadline for Manuscript Submission: Aug 15, 2012
- First decision: Oct 1, 2012
- First revision due: Nov 1, 2012
- Final decision: Dec 15, 2012
- Accepted Manuscript Due: Jan 8, 2013
- Target publication Date: March 2013

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