Changes, they use to say, are the only constant in life. Everything changes rapidly around us, and more and more key to survival is the ability to rapidly adapt to changes. This consideration applies to many aspects of our lives. Strangely enough, this nearly self-evident truth is not always considered by computer scientists and engineers with the seriousness that it calls for. Often the systems our societies depend upon are built in such a way as to result too inflexible and intolerant to changes. The deployment of such systems in environments where change is the rule rather than the exception leads to situations where quality-of-service and quality-of-experience are strongly and negatively affected.

The ambition and mission of IJARAS is, on the one hand, putting this problem on the foreground so as to enhance the awareness of its relevance to the welfare of our societies. Complementary to this, we aim to provide worldwide readership to novel effective techniques to design, develop and maintain adaptive-and-dependable systems, i.e. software and devices that are prepared to continue the optimal distribution of their service despite the occurrence of potentially significant and sudden changes or faults in their infrastructure and surrounding environment.

What we consider to be the most distinguishing character of this new publication – and, with Aristotle’s words, its specific difference with respect to other publications also focusing on adaptive systems – lies in its cornerstone: IJARAS builds upon a privileged research direction – a thesis, which can be concisely enunciated as follows: There is an urgent need to learn how to structure our computer services as systems that are prepared to re-optimize in view of changes both exogenous (environmental) and endogenous (pertaining internal assets). Such need is drastically reverberating through several domains, and in so doing several seemingly unrelated research domains such as cross-layer adaptation for mobile devices and business process re-engineering can be regarded as special cases of a larger theory of systems. This vision paves the way to cross-fertilization; and through that, a journal like ours may become a useful means to steer novel ideas and inject new research directions. It is our ambition to carefully structure the article offer so as to foster this process, which as a side effect would lay the basis to establishing the significance of IJARAS for the scientific and industrial users’ communities.

In such a challenging endeavor we are glad to be accompanied by several renowned scientists who kindly accepted to join us as members of the IJARAS’ Editorial Board – this message is also to express our gratitude for their kind availability.

Another reason to thank our Editorial Board is definitely their contribution to this inaugural issue in the form of five invited articles. The common denominator of these articles is quite in line with the finalities of IJARAS: It is the starting point that reality is changing more rapidly than ever before, and that it is only fitting that the computer systems that we appoint at the knobs of our services be ready to match those changes.

The first article of this issue is *Resilient and Timely Event Dissemination in Publish/Subscribe Middleware*, by Christian Esposito and Domenico Cotroneo.
The authors’ vision here is that worst case analyses do not make much sense anymore: Truly effective approaches call not for upper bounds; instead, they require a precise characterization of the allocation of resources over time. Unwanted emergent behaviors can only be avoided if the systems are built with “a finer-grain control of the redundancy degree” (Esposito and Cotroneo), that is, with the redundancy degree adaptively tailored to the current environmental state. Being able to do so without impacting on real-time requirements is a hard challenge, especially for future ultra-large-scale systems.

A similar viewpoint can be found in Adaptive Modeling of Routing Algorithms for Wireless Sensor Networks, by Marcello Cinque and Catello di Martino: Static choices simply do not match reality anymore! For instance, a static fault model implies that our data integrity provisions will have a fixed range of admissible events to address and tolerate. Static assumptions on failure semantics – the way the target hardware components behave in case of failure – do not match a reality where failures depend on the adopted technology and even on the particular component being employed. This also creates a hidden dependence on the target hardware platform. As researchers and practitioners we are expected to provide society with an effective (and in particular cost-effective) response to this matter of facts. Such a response is given by methods, tools, and architectures, for systems able to cope with this high variability of internal and external conditions. All classes of tools shall require proper rethinking. One such example is the adaptive simulation framework introduced in this article, where the Authors explicitly state how “to make feasible the thorough and realistic simulation of routing algorithms for WSNs, change management has to be taken into account.”

Our third article, Technological and Educational Challenges of Resilient Computing by Luca Simoncini, considers the urgent requirements for dependability and security of large, ever changing, ubiquitous and pervasive systems. Scalable resilience is the key ingredient to be able to tame the ever growing complexity of such systems. Professor Simoncini’s contribution provides us first with a clear understanding of the concept of resilience, then with his vision on challenges towards scalable resilience. As the title says, not only technology is considered, but also how to “deal with the challenge of preparing persons able to cope with the problem of designing, evaluating and operating” truly resilient computing systems. In particular, the article introduces an MSc Curriculum in Resilient Computing developed in the framework of the European Network of Excellence “ReSIST”.

In Towards Adaptive and Scalable Context-Aware Middleware, Antonio Corradi, Mario Fanelli, and Luca Foschini provide us with a practical example of scalable resilience – a context-aware middleware making use of a distributed hierarchical architecture. Such system adaptively bridges together different wireless infrastructures exploiting all available communication opportunities in order to guarantee system resilience to infrastructure faults. A thorough performance analysis is also described, and results prove the ability of the system to reach its intended design goals.

This issue’s last article, Web Distributed Computing Systems: Implementation and Modeling, by Fabio Boldrin, Chiara Taddia, and Gianluca Mazzini, proposes an adaptive extension of the master-slave design pattern that makes use of Internet browsers as computing platform. The abundant resources available on the Internet can in this case provide the foundation for low-cost high-performance resilient computing. Building upon concepts such as SETI@Home, the system proposed in this article is applied to the factorization of a large integer and the computation of the correlation between genetic samples.

A complex new world is ahead of us, and we can only guess what new challenges will need to be tackled; but we believe the proper course of action to match those challenges and their complexity is given by a new philosophy for system development. We conjecture that key ingredients of such philosophy will be adaptability, resiliency, and autonomicity. In this framework it is of paramount important to increase the awareness of this new state of things, and we are proud to have the chance to make of IJARAS an effective means to do so and “spread the news” about up-to-date steps in this exciting research direction.

Vincenzo De Florio
PATS research group
University of Antwerp & IBBT
Editor-in-chief