
Editorial

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1 Middleware and architectures for seamless and ubiquitous SBC in distributed systems

Modern computer systems are implemented as distributed architectures. And, the main challenge is an efficient integration of these systems based on different platforms and built with different technologies. The expectations are that the distributed architectures support: seamless ubiquitous communication between systems; as well as reliable, simple, flexible, agile, scalable, and low cost design. However, reality shows complex, costly, unreliable, hard to manage IT environment [Shalom, (2006), 'Space-based architecture and the end of tier-based computing'; Kühn, (2007), 'SpaceBasedComputing.ORG Manifest']. On the other hand, the space-based computing (SBC) exposed as an innovative and powerful concept for the coordination of autonomous processes upon distributed systems and architectures. It is based on the notion of a common, abstract space connecting distributed processing entities over a network. Instead of exchanging messages explicitly between individual processes or performing remote procedure calls, processes communicate and coordinate themselves by simply reading and writing distributed data structures in a shared space. This leads to a decoupling of all participants concerning time, space and reference [Shalom, (2006), 'Space-based architecture and the end of tier-based computing'; Kolodziej and Xhafa,

(2011), 'Supporting situated computing with intelligent multi-agent systems'].

Thus, the goal of this special issue is to bring out the best practices, current research and promising trends in the capable new middleware technologies such as service oriented architectures (SOAs), mobile-, grid-, and cloud-computing, agent technologies, as well as other new approaches towards distributed systems and architectures that they particularly can profit from SBC [Cristea et al., (2011), 'Middleware and architectures for space-based and situated computing'; Kolodziej and Xhafa, (2011), 'Supporting situated computing with intelligent multi-agent systems']. The special issue is composed of selected best papers from AINA-2011 Conference, Singapore, 22–25 March 2011.

2 Content of this issue

We selected six papers, each of which is associated with a certain aspect of this special issue main theme.

The paper authored by Gonzalez and Helvik, 'Characterisation of router and link failure processes in UNINETT's IP backbone network' focuses on providing information about failure and repair processes in an operational network. The authors analyse operational logs from UNINETT's core network in order to obtain

distributions of the time between failures and downtimes of routers and links.

Włodarczyk et al.'s 'Evaluation of some optimisation techniques for semantic query answering on shared-nothing architecture' presents an evaluation of selected optimisation techniques for semantic query answering for large datasets. The author determines also an influence of cluster configuration parameters on the performance of different types of queries.

Demydov et al.'s 'Enterprise distributed service platform – network architecture and topology optimisation' develop a method that allows considering the architecture of any kind of networked systems described by the formalised graphs and their adjacency matrixes. This approach encompasses a categorisation and utilisation of the networked system topological properties. It involves an apriory approximate determination of the basic network design performance features.

In the paper entitled 'Circumstantial-evidence-based effort judgement for web service composition-based SOA implementations', Li et al. propose circumstantial-evidence-based effort judgment as a supplementary to expert judgment to achieve qualitative effort comparison between different implementation schemes of a WSC-based SOA projects.

In the 'Secure live migration of parallel applications using container-based virtual machines', Hacker et al. explore an approach that comprises the use of VM-based live migration to move a process from a failing node to a healthy one to reduce the fault rate experienced by an application. The authors investigate the usage of the virtualisation environment based on OpenVZ to perform live migrations of virtual machines, on which multiprocessor parallel applications are running.

Lastly, the paper authored by Bahrepour et al., 'Use of wireless sensor networks for distributed event detection in disaster management application' suggests the machine-learning (ML) techniques for the distributed event detection in WSNs, and evaluates their performance and applicability for early detection of disasters, specifically residential fires.

The involved papers expose the diversity of the challenges in this particular research area, representing the various aspects of seamless and ubiquitous SBC in distributed systems. And, we believe that this special issue, by bringing in novel insights and ideas, will stimulate and intensify further research in the field.

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