

EXTREME DISTRIBUTED SYSTEMS: FROM LARGE SCALE TO COMPLEXITY

A SPECIAL ISSUE OF
SPRINGER COMPUTING



Springer



EXTREME DISTRIBUTED SYSTEMS: FROM LARGE SCALE TO COMPLEXITY

Modern distributed systems may nowadays consist of hundreds of thousands of computers, ranging from high-end powerful machines to low-end resource-constrained wireless devices. We label them as extreme distributed systems, as they push scalability and complexity well beyond traditional scenarios.

Such extreme distributed systems are often still organized along traditional lines with more or less hierarchical, centralized control planes. However, things are changing and increasingly more fully decentralized organizations are emerging, as witnessed by, for example, peer-to-peer systems. Decentralized organizations often combine local decision-making with dissemination of information in order to improve the decision-making process, exemplified by many epidemic-based and other bio-inspired approaches. In this light, we are witnessing that the design of a distributed system is fully integrated with the design of application-level algorithms.

As a next step, we envisage that system and algorithm design will go hand-in-hand by means of a partly bottom-up approach in which computing elements are glued together into a full-fledged system that can scale beyond imagination.

This new kind of systems exhibits emergent complex behavior where self-organization, optimization, and adaptation on-the-fly are inherent properties. This poses unprecedented challenges for the design and management of such systems.

For this special issue of Springer Computing, we are seeking original contributions in the field of extreme distributed systems, where decentralization is used as the fundamental approach to reach unprecedented scales, towards millions or even billions of elements.

Topics of interest include, but are not limited to:

- decentralized algorithms for extreme distributed systems
- epidemic-based systems design
- fully decentralized bio-inspired algorithms
- peer-to-peer systems
- wireless networks
- scalable decentralized algorithms for self-organization, adaptation, and optimization
- programming models for extreme distributed systems
- design and engineering techniques for extreme distributed systems

Submissions should be uploaded to www.comp.edmgr.com and marked under the category select article type: SI: Extreme distributed system

IMPORTANT DATES

Abstract submission: 01 November 2011
Submission deadline: 15 November 2011
Notification: 01 February 2012

ORGANIZERS

Maarten van Steen VU University Amsterdam
Gusz Eiben VU University Amsterdam