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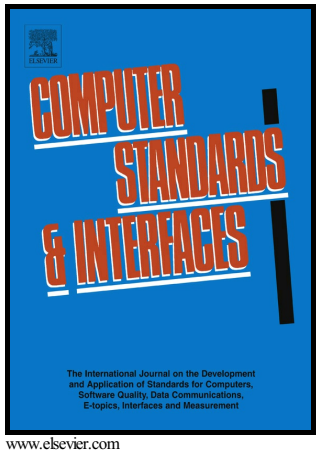

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Elastic systems: Towards cyber-physical ecosystems of People, Processes, and Things

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Abstract

Pervasive mobility and an exponential increase in the number of connected devices are adding to IT complexity. Users are bypassing traditional IT to access cloud-based services. Boundaries between computing systems, people, and things are disappearing. New approaches are required to manage today's and tomorrow's increasingly connected and heterogeneous ecosystems of people, computing processes, and things. We envision *future elastic systems driven by business requirements, integrating computing, people, and things in open dynamic ecosystems in which all entities collaborate towards common goals.*

We introduce elasticity as a means of integrating computing processes, people, and things. We identify the core computing fields enabling future elastic systems: (i) hardware and software reusability, (ii) smart things, (iv) adaptation, and (v) human-based computing. We look at the development of these fields, and identify fundamental properties for building future elastic systems. We further envision a new field of research: *Elastic Computing*. We identify and discuss challenges to be addressed by this field towards realizing future elastic systems: Are existing programming languages and models sufficient for designing and managing future elastic systems? How important are the interactions between people, computers, and things? Can people and things be monitored and controlled like computing resources?

Keywords: elasticity, cloud, IoT, human-based computing

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