

## Preface

The 1st Workshop on Service Assurance with Partial and Intermittent Resources (SAPIR 2004) was the first event in a series introducing the concept of pi-resources and bridging it with the emerging and important field of distributed and heavily shared resources.

The topics concerning this event are driven by a paradigm shift occurring in the last decade in telecommunications and networking considering partial and intermittent resources (pi-resources). The Internet, converged networks, delay-tolerant networks, ad hoc networking, GRID-supporting networks, and satellite communications require a management paradigm shift that takes into account the partial and intermittent availability of resources, including infrastructure (networks, computing, and storage) and service components, in distributed and shared environments.

A resource is called partial (p-resource) when only a subset of conditions for it to function to complete specification is met, yet it is still able to provide a (potentially degraded) service, while an intermittent or sporadic resource (i-resource) will be able to provide a service for limited and potentially unpredictable time intervals only. Partial and intermittent services are relevant in environments characterized by high volatility and fluctuation of available resources, such as those experienced in conjunction with component mobility or ad hoc networking, where the notion of traditional service guarantees is no longer applicable. Other characteristics, such as large transmission delays and storage mechanisms during the routing, require a rethinking of today's paradigms with regards to service assurance and how service guarantees are defined.

Several aspects and challenges in defining, deploying, and maintaining partial and intermittent resources that may collocate with traditional resources have been identified. The pi-resources can support new types of applications, and may require semantics, models, and associated management mechanisms. Most of the currently known paradigms may be revisited in the light of pi-resources.

Pi-resources are present in ad hoc, sensor, and overlay networks, as well as in cooperative and adaptive applications. It is estimated that implications in several areas are unavoidable: (i) on current communication protocols, security, and middleware, (ii) on QoS, and traffic modeling, (iii) on the architecture of network devices and networks, and (iv) in intermittent GRID services and architectures.

Other well-known mechanisms may require certain adaptation: (i) traffic analysis under sporadic data transfer, and (ii) service-level agreement (SLA) for partial and intermittently available behaviors.

Additionally, procedures to identify and discover pi-resources may differ from the classical ones: (i) adaptive time-out discovery mechanisms, (ii) hybrid sequential and parallel processing, and (iii) new semantics of high availability.

The management of pi-resources faces additional challenges when considering (i) context-aware resources, (ii) user behavior, (iii) autonomic pi-components, and (iv) management of mobile pi-resources, including accounting fault/alarm processing, performance evaluation, metering, etc.

For SAPIR 2004, submissions covered topics on bandwidth allocation, policy-based operations, service monitoring, intelligent architectural systems, mobility and wireless, protocol aspects, and performances across heterogeneous domains. The authors made a substantial contribution in highlighting particular aspects related to pi-resources, even though sometimes the linkage was not explicit.

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We hope this first event sets a new path in considering more active research and prototyping in working with pi-resources. We hope that all attendees enjoyed their participation at SAPIR 2004. We also hope that they enjoyed their visit to Fortaleza with its beautiful countryside and its major cultural attractions.

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