

Declarative Cloud Computing

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MAP-i Thesis Proposal

1 Context

Declarative Networking, as described in [LCGG09], is a programming paradigm that enables a developer to concisely specify distributed protocols and services in a high level declarative language that is then compiled into an *executable workflow*. The declarative nature of the approach leads developers to focus on the semantics of the services abstracting most of the networking complexities that are then handled by an underlying dataflow framework that executes the specifications.

Declarative networking proposals are still in their early stages and both the expressiveness of the specification languages as well as the concepts supported by the executing framework are still lacking in several important aspects. These include the ability to express and deal with coordination primitives and non-functional guarantees that are fundamental when dealing with large complex distributed systems.

2 Objectives

The main goal of this work is to further develop the expressiveness of current declarative networking languages (such as Overlog [LCH⁺05]) and the corresponding execution framework aiming at making it a suitable alternative for the development of protocols and services in Cloud Computing environments. The challenges of the novel declarative approach and the feasibility of established distributed computing primitives need to be understood and assessed in the light of the complexity, scale and dynamics of these environments.

References

- [LCGG09] B Loo, T Condie, M Garofalakis, and D Gay. Declarative networking. *Journal of the ACM*, Jan 2009.
- [LCH⁺05] BT Loo, T Condie, JM Hellerstein, P Maniatis, T Roscoe, and I Stoica. Implementing declarative overlays. *ACM SIGOPS Operating Systems Review*, 39(5):90, 2005.