

AUTOMATIC CONFIGURATION OF COMPONENT-BASED DISTRIBUTED SYSTEMS

Fabio Kon, Ph.D.
Department of Computer Science
University of Illinois at Urbana-Champaign, 2000
Roy H. Campbell, Advisor

Recent developments in component technology enable the construction of complex software systems by assembling off-the-shelf components. However, it is still difficult to develop efficient, reliable, and dynamically configurable component-based systems. Components are often developed by different groups with different methodologies. Unspecified dependencies and behavior lead to unexpected failures.

This thesis demonstrates that the explicit representation of inter-component dependence is fundamental for the development of efficient, configurable, and reliable component-based systems. This provides a common ground for supporting fault-tolerance and automating dynamic configuration to facilitate system management and maintenance.

In this thesis, we present a generic architecture for managing dependencies in distributed component systems, describe a concrete implementation of this architecture, and discuss how it can be used to support automatic configuration. The architecture is divided in three parts: the Automatic Configuration Service, the component configurator framework, and the reconfiguration agents framework.

We describe the deployment of the architecture in centralized and distributed systems and present detailed experimental results.