

# Automatic Configuration of Services for Security, Bandwidth, Throughput, and Availability

Garret Swart\*

University College Cork  
Cork, Ireland  
g.swart@cs.ucc.ie

Benjamin Aziz

University College Cork  
Cork, Ireland  
b.aziz@cs.ucc.ie

Simon Foley

University College Cork  
Cork, Ireland  
s.foley@cs.ucc.ie

John Herbert

University College Cork  
Cork, Ireland  
j.herbert@cs.ucc.ie

## ABSTRACT

The process of efficiently deploying a complex system of services on a complex network of servers is tedious and error prone, with many properties to check and many possibilities to examine. Automated tools are needed to turn this into a humanly tractable problem. We present a precise model of a service-oriented computing system that allows many important configuration properties to be defined and optimized for, including throughput, network bandwidth, security and availability. We transform this model into a system of constraints that can then be solved using mathematical and constraint programming yielding an optimal system configuration that meets all the stated requirements. We have implemented this in OPL and have used it to generate optimal configurations for realistic systems with tens of services running on hundreds of servers communicating on multiple subnets.