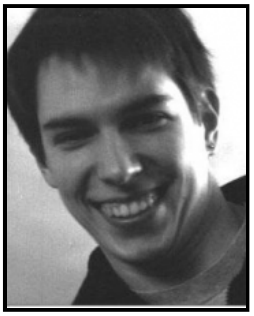

CCT Colloquium Series

Wide-area Overlays of Virtual Workstations (WOW): Simplifying Deployment of Distributed Systems Through Virtualization and Self-organization

Renato J. Figueiredo, University of Florida

Assistant Professor with the Advanced Computing and Information Systems (ACIS) Laboratory

Johnston Hall 338
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Abstract:
Widespread deployment of distributed systems for wide-area computing and collaboration environments is hindered by the heterogeneity of resources and their configurations. At the infrastructure level, compute nodes are configured by local administrators in different ways, and the networks to which they connect are typically constrained by firewalls and network address translators (NATs) which make it difficult to establish bi-directional connectivity among nodes belonging to the same virtual organization (VO). In this talk I will describe techniques based on resource virtualization enabling the creation of WOWs - wide-area overlays of virtual workstations - which present familiar, cluster-like homogeneous environments on top of heterogeneous wide-area physical infrastructures. Specifically, I will describe: (1) techniques which use virtual machine "appliances" as a means of encapsulating entire execution environments (including O/S, applications, libraries, system configuration) into a container which has a narrow, well-defined set of dependences with respect to its hosting environment, and (2) a self-configuring virtual network (IPOP) which encapsulates and routes virtual IP packets over structured peer-to-peer overlays and supports traversal of various NATs and firewalls in a decentralized, autonomous fashion. As an application example of WOWs, I will describe a self-configuring Grid appliance which integrates IPOP and the Condor middleware for high-throughput computing applications (http://grid-appliance.org).

Speaker's Bio:
Renato J. Figueiredo is an Assistant Professor with the Advanced Computing and Information Systems (ACIS) Laboratory, University of Florida. He received the B.S. and M.S. degrees in Electrical Engineering from the University of Campinas in 1994 and 1995, respectively, and the Ph.D. degree in Electrical and Computer Engineering from Purdue University in 2001. From 2001 until 2002 he was with the faculty of the School of Electrical and Computer Engineering, Northwestern University. In 2002 he joined the Department of Electrical and Computer Engineering of the University of Florida. His research interests are in the areas of virtualization, distributed systems, autonomic computing and computer architecture.

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2003 Digital Media Center • Telephone: +1 225/578-5890 • Fax: +1 225/578-8957