

NSF Industry-University Collaborative Center for Autonomic Computing (CAC)

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Mission

The mission of this newly established Center is to advance the knowledge of how to design and engineer autonomic computing systems, i.e. systems capable of self-configuring, self-healing, self-protecting and self-optimizing the operations of their resources and services in order to achieve desired behaviors. The goals of the center are the following:

- To function as a multidisciplinary center of excellence in autonomic computing research fostering long-term collaborative partnerships amongst industry, academe, and government;
- To discover, share and leverage synergies of concepts, technologies and resources needed by industry-relevant autonomic computing research in collaboration with CAC partners;
- To educate a diverse body of students on the interdisciplinary field of autonomic computing;
- To accelerate the creation and transfer of knowledge and technology for autonomic computing into industry and commercial products.

Overview of Research Activities

The technical scope of the Center's activities includes design and evaluation methods, algorithms, architectures, software, mathematical foundations and benchmarks for autonomic computing and networking systems. Solutions are studied for different levels of both centralized and distributed systems, including the hardware, networks, storage, virtualization, middleware, services and information layers. The following are concrete examples of industry-relevant technical challenges that the CAC is addressing in the context of autonomic IT infrastructures:

- Automatic management of power and energy consumption
- Predictive modeling of quality-of-service of IT resources and applications
- Dynamic resource provisioning and scheduling of computer resources
- Specification and enforcement of service-level agreements and policies
- Virtualized data center management
- Virtual machine management in Grid-computing systems
- Virtual network management in Grid-computing systems
- Virtual storage and file systems
- Real-time computing in virtualized environments
- Automatic system repair and protection
- Automation of system management operations
- Autonomic network defense system
- Autonomic overlay networks
- Event analysis and anomaly detection
- Self-organizing virtual infrastructures
- Context-aware routing in self-organizing networks

Other Areas of Interest for Collaboration

The CAC welcomes opportunities for collaboration with centers engaged in experimental computer systems research, reconfigurable computing and embedded systems.