

Team Releases Tools for Secure Cloud Computing

Research Center Seeking Ways to Maintain Integrity of Shared Resources

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UT Dallas researchers have released software tools intended to help make cloud computing the standard way much computing is done.

Cloud computing is a model for providing on-demand Internet-based access to a shared pool of computing resources, including networks, storage and applications. It's meant to make it as simple to obtain an array of electronic data resources as it is to get electricity itself.

"In order to use electricity, we do not maintain electricity generators at home, instead we get the electricity on demand from the grid when we need it," said Dr. Bhavani Thuraisingham, director of the University's [Cyber Security Research Center](#). "The cloud computing paradigm tries to achieve the same result for computing."

One of the top goals is to promote information sharing.

"In order to make correct decisions in many critical tasks, information from different sources needs to be shared," said Dr. Murat Kantarcioglu, director of the University's Data Security and Privacy Lab. "For homeland security purposes, for example, intelligence, law enforcement and border patrol reports need to be shared and analyzed. Secure information clouds can provide a cost-effective solution to meeting such information-sharing needs."

Studies show that the biggest obstacle to wide adoption of cloud computing is concern about the security of sensitive data, so security has been one of the team's top priorities.

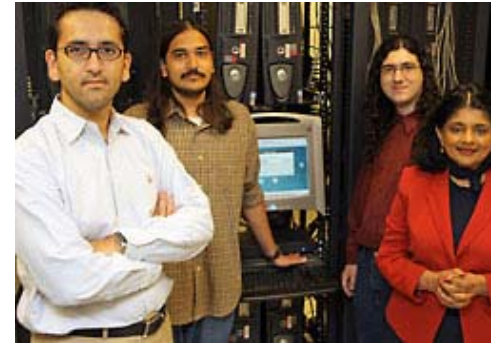
"In building a cloud, we are using a number of open source tools, including Apache's Hadoop distributed file system, Google's Mapreduce and the University of Cambridge's XEN Virtual Machine monitor," Thuraisingham said. "These three tools provide the infrastructure, and we are building security features on top of this infrastructure."

The first release of the UT Dallas team's cloud-computing resources feature a [repository](#) consisting of a collection of tools that provide secure query processing capabilities, preventing unauthorized access to sensitive data. Tools are also being developed to add security to data storage services by storing sensitive data in encrypted format.

Demonstration of the tools is already under way with the UT Dallas team's partners at [King's College London](#) and [the University of Insubria](#) in Italy. Each party will submit data and policies to the cloud computing environment that's been created, and the team's tools will enable participants to securely query and share data.

An innovative layered framework is at the heart of the work. It consists of a network layer, an infrastructure layer, a storage layer and a data layer. The secure cloud computing environment the UT Dallas team is building will provide computing and analysis capabilities, enabling a request to be addressed by integrating, processing and analyzing vast amounts of textual, video and audio data.

The work is based on [a project being done for the Air Force Office of Scientific Research](#), and one of the next steps is to expand efforts to include the departments of Defense, Justice and Homeland Security as well as intelligence



Several members of the cloud computing team (from left): Dr. Murat Kantarcioglu, graduate students Vaibhav Khadilkar and Jonathan Evans, and Dr. Bhavani Thuraisingham.

agencies and corporations to further develop secure cloud computing, Thuraisingham said.

In addition to Thuraisingham and Kantarcioglu, the UT Dallas cloud computing team includes Dr. Latifur Khan, director of the University's Data Mining Lab, and Dr. Kevin Hamlen, director of the Systems and Language Security Lab.

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