Collaborative Research: Scalable Software Systems for Large Internet Servers

ABSTRACT
Several applications over the Internet, such as script and cryptographic processing, database management, and multimedia processing, involve processing of secure, computation-intensive, multimedia, and high-bandwidth information. These applications require large-scale scientific computing, reliability, and high-bandwidth at the server nodes. This joint project between two campuses of the University of California (Davis and Riverside) develops a scalable distributed software system architecture, where the major functionalities required in the Internet servers are partitioned, and resources are allocated on the basis of their needs. The amount of computation and architectural requirements of these applications are determined through actual execution on servers. New techniques are developed to handle system-level issues like admission control, functionality distribution, content management, traffic management, and dynamic reconfiguration of resources, inter-process communication, and lightweight I/O. They are implemented on a prototype system, which is built using a combination of the available off-the-shelf components and special-purpose devices. The outcome of the project will impact the development and management of future large-scale Internet servers. The project is conducted in collaboration with researchers at Intel Corporation, and would have a potential for future technology transfer.