Patrick Griffin
STS.035: History of Computing
Reading Response Week 11

Visions of the Future: Grid versus Trusted Computing

Recently, IBM and others have promoted a new wave of computing, in which multitudes of computers are combined into a single system image, allowing the users of the system to run programs distributed over many machines or uniformly access files distributed throughout the world. This "grid computing" view envisions processor cycles rented out over the network, so that computing power becomes a utility, much like water or electricity. Meanwhile, many corporations also promote "trusted computing", which allows remote computers to verify the execution of some program on a local machine. While both these schemes have the Internet at their heart, the two systems have very different goals for the ultimate interaction between individuals and their computers.

Grid computing provides mechanisms for unifying many computers into a single, more manageable system. Perhaps the most important grid project to date is the release of the Globus toolkit (Waldrop p.33), which provides many of the utilities and protocols needed to manage such a large system. Released as an open source project, Globus has become the basis of most grid computing systems. Difficulties remain, for instance allocating programs to the machines that best meet their requirements is a major challenge for protein folding simulators (Johnson 3), but grid computing is on its way to providing a uniform computer image to all users, with programs and resources accessible to all users.

Trusted computing provides mechanisms for verifying program execution on a single machine. It authenticates program code over the network, guaranteeing that the program running on the local machine is authorized by some remote authority. The applications of trusted computing are many, including virus protection and digital rights management. In fact, the ability to trust a particular computer to execute a certain program appropriately is critical to grid computing. However, companies focusing on trusted computing tend to see it as a mechanism for customizing software to individual machines, such that a particular program or piece of data can only be used on a particular machine. Used in this fashion, trusted computing allows software and media companies to reduce piracy by individually certifying each copy of the program or media. Thus, we see a distinction between the goals of grid and trusted computing – the promoters of grid computing have promoted an open system with each node having the same user-visible interface as any other, whereas the promoters of trusted computing hope to manage a network by making each end-user computer different.

While the technologies involved in these two visions are essentially the same – computing enhanced by information distribution via the Internet – the goals of their creators lead to two different social visions. Grid computing envisions a world of information flowing over globally accessible resources. Security must be assured, of course, but the dream is to allow, for instance, environmentalists to run the same simulations as the policy makers deciding on a development project (Waldrop p. 7). Grid

computing, then envisions a world in which humans interact with a global computer "grid" instead of individual, isolated machines. Trusted computing would also allow information to be spread over a network with security guarantees, but its promoters focus on using the technology to limit program execution to a single machine. Such characteristics would be useful, for instance, in guaranteeing that individuals purchase a new copy of a program for each computer it runs on, or for preventing free-for-all piracy of specially-coded digital music files. However, this vision leads to a different computer-user dynamic than grid computing: instead of uniform access to everyone, programs can now be coded to run only on particular machines, while still allowing them to be transmitted via the network. Thus, whereas grid computing seeks to share computing resources on a global scale, many promoters of trusted computing hope to localize resources such that they can be used "securely" in spite of the network.

The social consequences of either of these models have yet to be seen. A eutopian view of grid computing envisions data and computational resources shared for public consumption. A negativist view of trusted computing sees computers and their software localized so that only a particular machine can access data, with obvious difficulties for historical preservation and the creation of public domain information. In reality, some mix between the two technological visions will develop – grid computing cannot mature unless users trust it, and trusted computing need not only be used for restricting information, as in its current planned application to software licensing and digital rights management.

Bibliography

Johnson, George. “Supercomputing ‘@Home’ Is Paying Off.” The New York Times (23 April 2003): F1.

Waldrop, M. Mitchell. “Grid Computing.” Technology Review (May 2002): 31-37.

Trusted Computing Platform Alliance. http://trustedcomputing.org April 2004