IDEA GROUP PUBLISHING ITB11965

701 E. Chocolate Avenue, Suite 200, Hershey PA 17033-1240, USA
Tel: 717/533-8845; Fax 717/533-8661; URL-http://www.idea-group.com

This chapter appears in the book, Building and Managing Enterprise-Wide Portals
by Jana Polgar, Robert Mark Bram, a nd Anton Polgar © 2006, Idea Group Inc.

Chapter XVIII

Grids

Grid Goals

This section describes some of the more important goals of a Grid system. The Grid carries with it many ideas central to other sharing technologies, such as the network operating system (NOS), and cluster computing. A common aim among these technologies is to maintain a single system image. Such a system would run across multiple machines, allowing its users to reasonably think they were using only one machine, when in fact they are accessing resources on any of the connected machines (Biswas, Lazar, Huard, Lim, Mahjoub, Pau, et al., 1998).

Transparency

Transparency is a strong characteristic in a NOS and Grid network. (Biswas et al., 1998) provides useful definitions for two levels of transparency: user transparency, which gives users the illusion of one computer; and application transparency, which gives applications the illusion of one computer. User transparency is easier to achieve because it is software that performs the translation somewhere. Application transparency is harder to achieve because it implies an additional software layer between applications and the operating system unless the operating system itself does the translating, in which case it probably counts as a true single system image. Of course, cluster computing

(Tennenhouse, Smith, Sincoskie, Wetherall, & Minden, 1997) lists eight network operating system transparencies in that a system might address in order to provide the illusion of a single image.

- **Location transparency:** a user does not need to know where a resource is physically stored in order to use it; no resource would have a file prefix consisting of a machine name (even though the resource might need to be addressed by the operating system using the machine name).
- **Namespace transparency:** the same naming conventions (case sensitivity, directory separators, drive identification) must be used to identify all resources on the network operating system.
- **Logon transparency:** a username and password identifies a user for all resources on the network operating system. This is also referred to as single sign on.
- **Replication transparency:** the network operating system may maintain several copies of important resources on multiple machines in the system, but a user will never see more than one.
- **Local/remote access transparency:** access controls and directory services must be handled invisibly so that remote resources can be used in the same way as local resources, for example, the user should not be able to tell the difference between them anyway.
- **Distributed time transparency:** the internal clocks of all machines in the network operating system must be synchronized. This is crucial to the parallel processing of some tasks.
- **Failure transparency:** the user will never know if a network error occurred because the system should be able to recover and use failsafe techniques to make sure the request succeeds.
- **Administration transparency:** there will be just one administration interface, integrated with all local management services.

While the idea of a network operating system has for the most part declined, the ideals live on in the goals for Grid networking. All of these transparencies suit the idea of a Grid network where a user may never be aware that they are even accessing applications and resources on a Grid network as opposed to their local machine or a single server.