

EXAMPLE 2

[0547] The use of a component integration engine of the present invention in system administration will now be described.

[0548] A user connects to or communicate with component integration engine through user access points. A user access point is simply a component that understands how to interpret a request from the user and forward that request to the component integration engine. The component integration engine provides two primary user access points: the CommandServiceServlet and the CommandSocketService.

[0549] The CommandServiceServlet component accepts requests made using the HTTP protocol (web page submissions). The CommandSocketService accepts incoming socket connections. The component integration engine allows new user access points to be created for any other type of incoming connection. Future user access points might include named pipes, email requests, or remote method invocation.

[0550] In order for a user to access a service, it must be made available. The component integration engine server separates services for logical and security reasons. The primary separation is the virtual host. A virtual host is a grouping of services and resources made available for a particular group of users. A virtual host splits one physical computer into multiple virtual computers each of which displays different resources and services to its users. In order to access the resources in a virtual host, a user must be granted permission to use the virtual host.

[0551] As illustrated in FIG. 35, in the present example, there are two virtual hosts. The internal host contains services and resources useful to employees of the company. These services and resources are not available to users in the second virtual host. The second virtual host includes services for partner businesses and people browsing the company web site.

[0552] The secondary separation is the service context. A service context is a logical grouping of services available for a particular group of users within a virtual host. While all users in a virtual host have access to the shared components of that virtual host, the services available are determined by the service context. In this way the administrator can control what types of services each group of users is capable of performing. For example, marketing services can be restricted to users in the marketing service context while human resource services can be restricted to users in the human resource service context. Examples of service contexts are illustrated in FIG. 36. In FIG. 36, the Marketing Service, HR Service and Inventory service contexts are classified as functional service contexts and the Database Service, Email Service and File Service contexts are classified as Technical service contexts.

[0553] In order to access the services in a service context, a user must be granted permission to use the service, the service context containing that service, and the virtual host containing that service context.

[0554] Components are made available to the user through managers in the virtual host. A manager is a group of shared components of the same type. Components provide access to resources like file systems, databases, or email servers.

Managed components can also perform specific tasks like multithreading, object customization, or conversion of objects to XML. Each manager has a name used to describe the type of components it manages. Each component in a manager is also given a name for retrieval. Applications retrieve resources by knowing the type of component and the name of the component.

[0555] Sharing components improves scalability by reducing processing related to instantiation, configuration, and destruction. In most cases, shared components are created and configured only once (at startup) and are destroyed only once (at shutdown). These components can be reused thousands of times before shutdown and may even be used by multiple users at the same time.

[0556] Sharing components also formally separates administrative tasks from development tasks. Shared component configuration and maintenance are the responsibility of the administrator. Rather than writing configuration information directly into application code, developers ask the administrator to setup a shared component. Developers and administrators agree upon the name for a specific resource. Developers use the manager to retrieve a component of the correct type. Administrators select and configure the best component for filling that role.

[0557] As an example, the marketing email server may be managed by the email_server manager and stored under the name "marketing." The developer creates a program for sending emails to every customer in the marketing database and uses the email server with the name "marketing." The administrator configures an email component optimized for the Microsoft Exchange Server used for marketing. Later, if the administrator replaces the current email server with a Lotus Notes email server, no changes are required in any application. Instead, the administrator simply configures a Lotus Notes email component and stores it under the "marketing" name.

[0558] A service is a task performed on the server on behalf of a user. This section describes several different types of services. All services are required to have a name and a description and support start, stop, suspend, and resume operations. The start operation tells a service to prepare itself for use and begin responding to requests. The stop operation tells a service to stop responding to requests and allows the service an opportunity to release resources. The suspend operation tells a service to stop responding to requests but does not require the release of resources. The resume operation tells the service to begin responding to requests again and can only be used on a service in a suspended state.

[0559] A threaded service is a service that is always running and performing its task even if no user is connected. These types of services are useful for long-running tasks and background activities that do not necessarily require user interaction. Examples include scheduling events, performance monitoring, and batch processing.

[0560] A socket service is a service that accepts network connections on a specific port, following a specific protocol. A socket service interprets the data sent over the network connection and responds accordingly. It sends data back over the network connection in the correct format for the protocol. Examples include POP3 and SMTP servers for