Chapter 1

SERVER COMPONENTS

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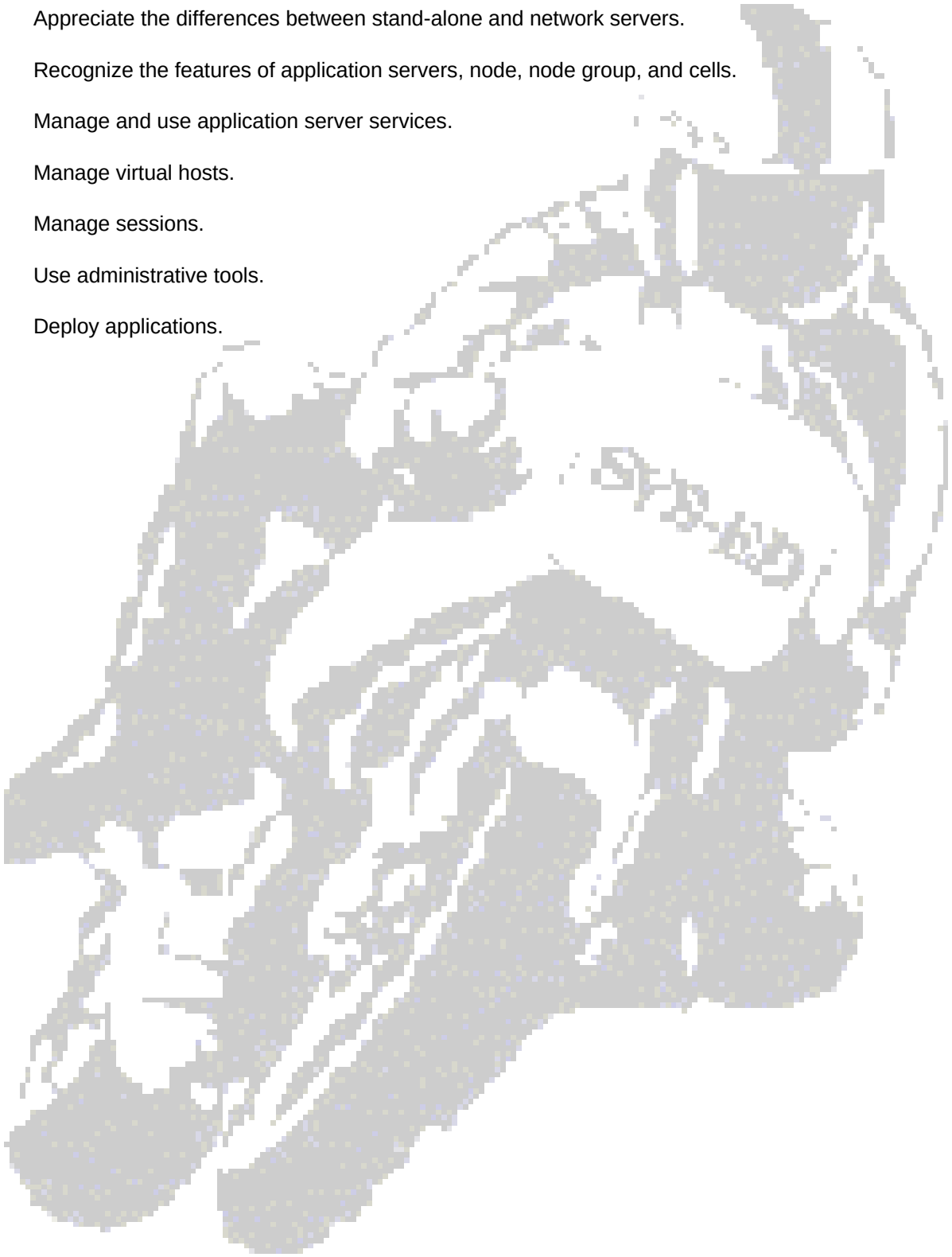
Objectives

You will learn to:

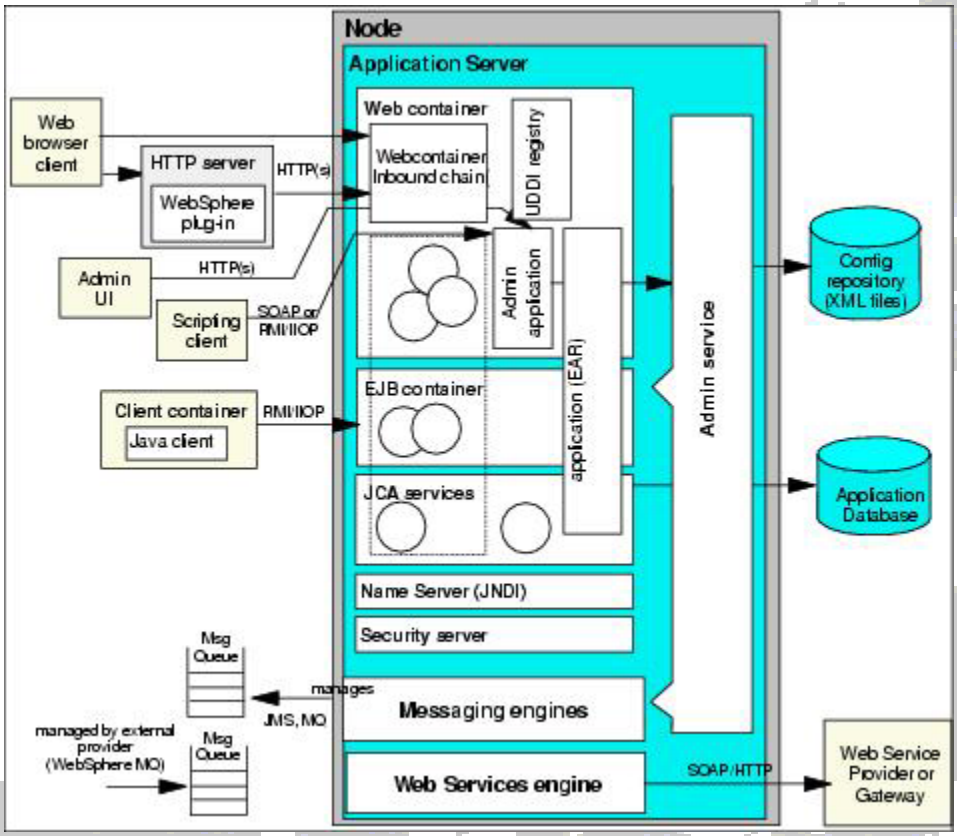
- Appreciate the differences between stand-alone and network servers.
- Recognize the features of application servers, node, node group, and cells.
- Manage and use application server services.
- Manage virtual hosts.
- Manage sessions.
- Use administrative tools.
- Deploy applications.



1 Stand-alone and Network Configuration

With a stand-alone configuration, each application server acts as a unique entity. An application server runs one or more J2EE applications and provides the services for running those applications.

Multiple stand-alone application servers can exist on a machine, either through independent installations of the WebSphere Application Server code or through multiple configuration profiles within one installation.



Network Deployment can be used for building a distributed server configuration. This will enable central administration, workload management, and failover. In this environment, one or more application servers can be integrated into a cell that is managed by a deployment manager.

The application servers can reside on the same machine as the deployment manager or on multiple separate machines. Administration and management are handled centrally from the administration interfaces through the deployment manager.

2 Application Servers, Node, Node Group, and Cells

Application Server	Primary runtime component in all configurations. It is where an application executes. All WebSphere Application Server configurations can have one or more application servers.
Node	Logical grouping of server processes managed by WebSphere and that share common configuration and operation control. A node is associated with one physical installation of WebSphere Application Server. In a stand-alone application server configuration, there is only one node. With Network Deployment, multiple nodes nodes can be configured to manage from one common administration server. In these centralized management configurations, each node has a node agent that works with a deployment manager to manage administration processes.
Node Group	New concept introduced with WebSphere Application Server V6. A node group is a grouping of nodes within a cell that have similar capabilities. A node group validates that the node is capable of performing certain functions before allowing those functions.
Cell	Grouping of nodes into a single administrative domain. In the Base and Express configurations, a cell contains one node. That node might have multiple servers, but the configuration files for each server are stored and maintained individually.

3 Servers

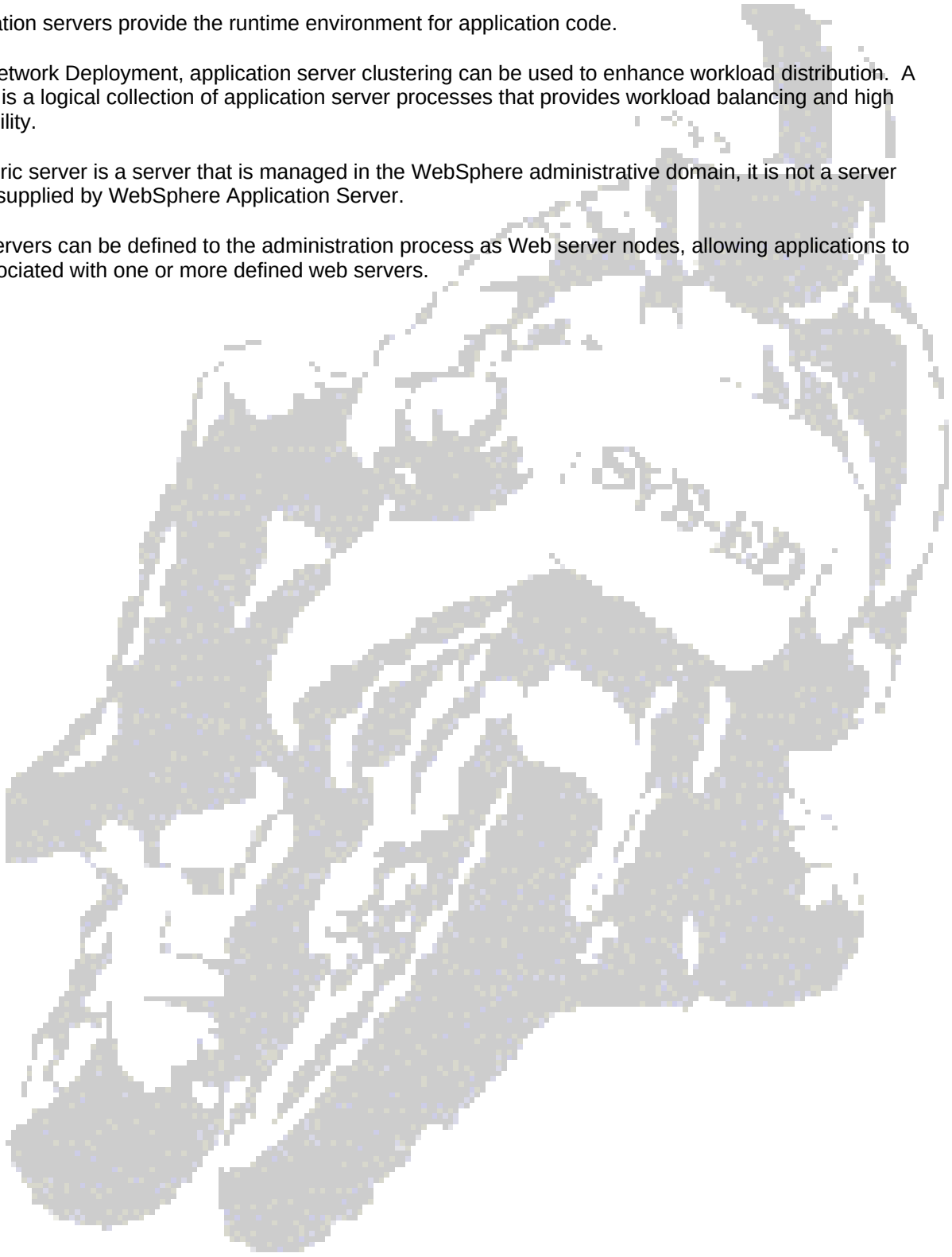
WebSphere Application Server supplies application servers. They provide the functions required to host applications. WebSphere Application Server also provides the ability to define external servers to the administration process.

Application servers provide the runtime environment for application code.

With Network Deployment, application server clustering can be used to enhance workload distribution. A cluster is a logical collection of application server processes that provides workload balancing and high availability.

A generic server is a server that is managed in the WebSphere administrative domain, it is not a server that is supplied by WebSphere Application Server.

Web servers can be defined to the administration process as Web server nodes, allowing applications to be associated with one or more defined web servers.



4 Containers

The J2EE 1.4 specification defines the concept of containers for providing runtime support for applications.

There are two types of containers in the application server implementation:

Web container	Processes HTTP requests, servlets, and JSPs: JavaServer Pages.
EJB container	Processes EJBs: Enterprise JavaBeans.

Each web container provides the following:

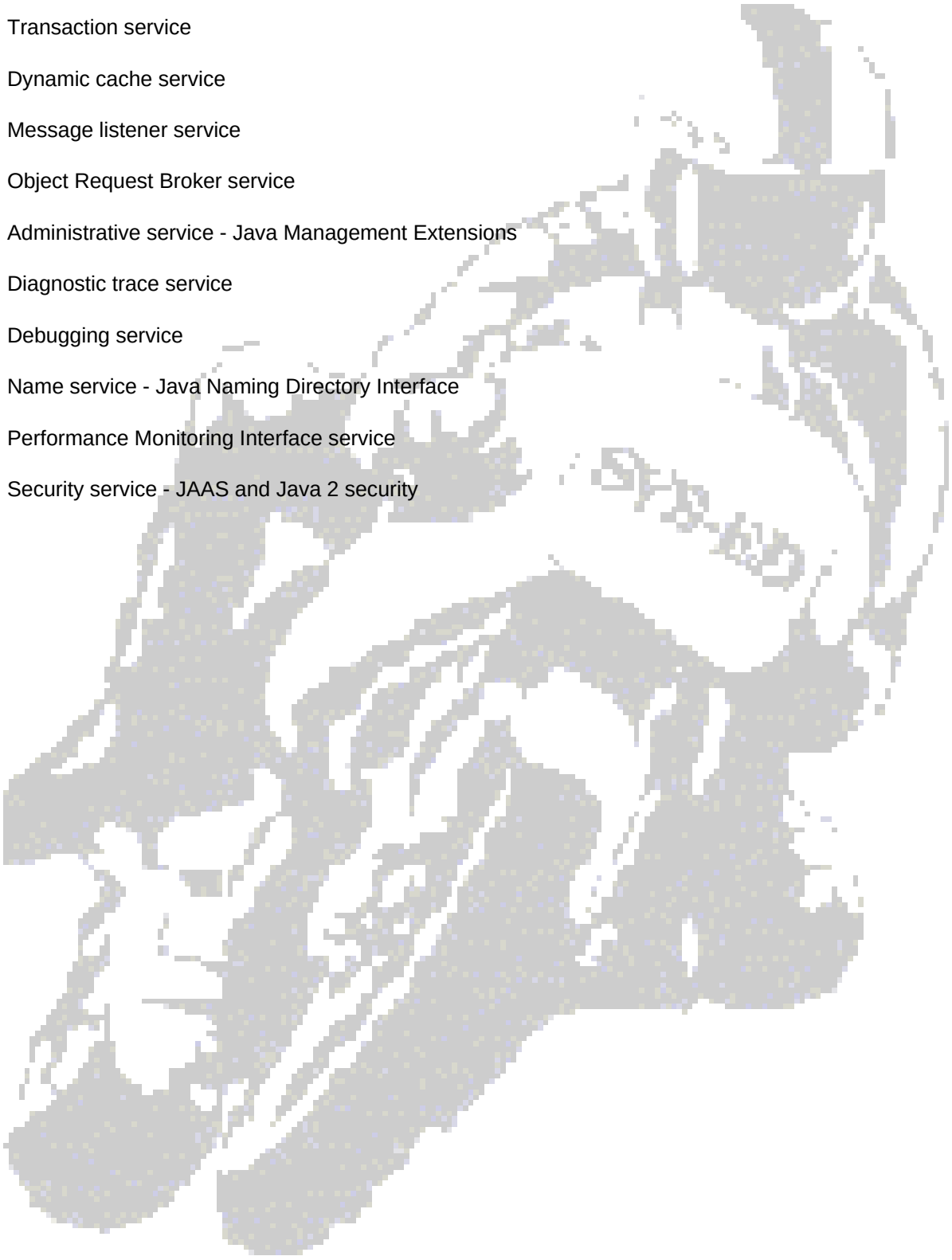
Web container transport chains	Requests are directed to the web container using the web container inbound transport chain.
Servlet processing	When handling servlets, the web container creates a request object and a response object, then invokes the servlet service method.
HTML and other static content processing	Requests for HTML and other static content that are directed to the web container are served by the web container inbound chain.
Session management	Support is provided for the javax.servlet.http.HttpSession interface.
Web services engine	Web services are provided as a set of APIs in cooperation with the J2EE applications.

The EJB - Enterprise JavaBeans container provides all the runtime services that are needed to deploy and manage enterprise beans. It is a server process that handles requests for both session and entity beans.

5 Application Server Services

The application server provides services in addition to the containers:

- J2EE Connector Architecture services
- Transaction service
- Dynamic cache service
- Message listener service
- Object Request Broker service
- Administrative service - Java Management Extensions
- Diagnostic trace service
- Debugging service
- Name service - Java Naming Directory Interface
- Performance Monitoring Interface service
- Security service - JAAS and Java 2 security



6 Virtual Hosts

A virtual host is a configuration that enables a single host machine to resemble multiple host machines.

This configuration allows a single physical machine to support several independently configured and administered applications.

A virtual host:

- is not associated with a particular node.
- is a configuration, rather than a live object; it can be created, but not started or stopped.
- has a logical name and a list of one or more Domain Name Server (DNS) aliases by which it is known.

A DNS alias is the TCP/IP host name and port number that is used to request the servlet;

e.g. example, yourHostName:80.

When a servlet request is made, the server name and port number entered into the browser are compared to a list of all known aliases in an effort to locate the correct virtual host and serve the servlet.

If no match is found, an HTTP 404 error is returned to the browser.

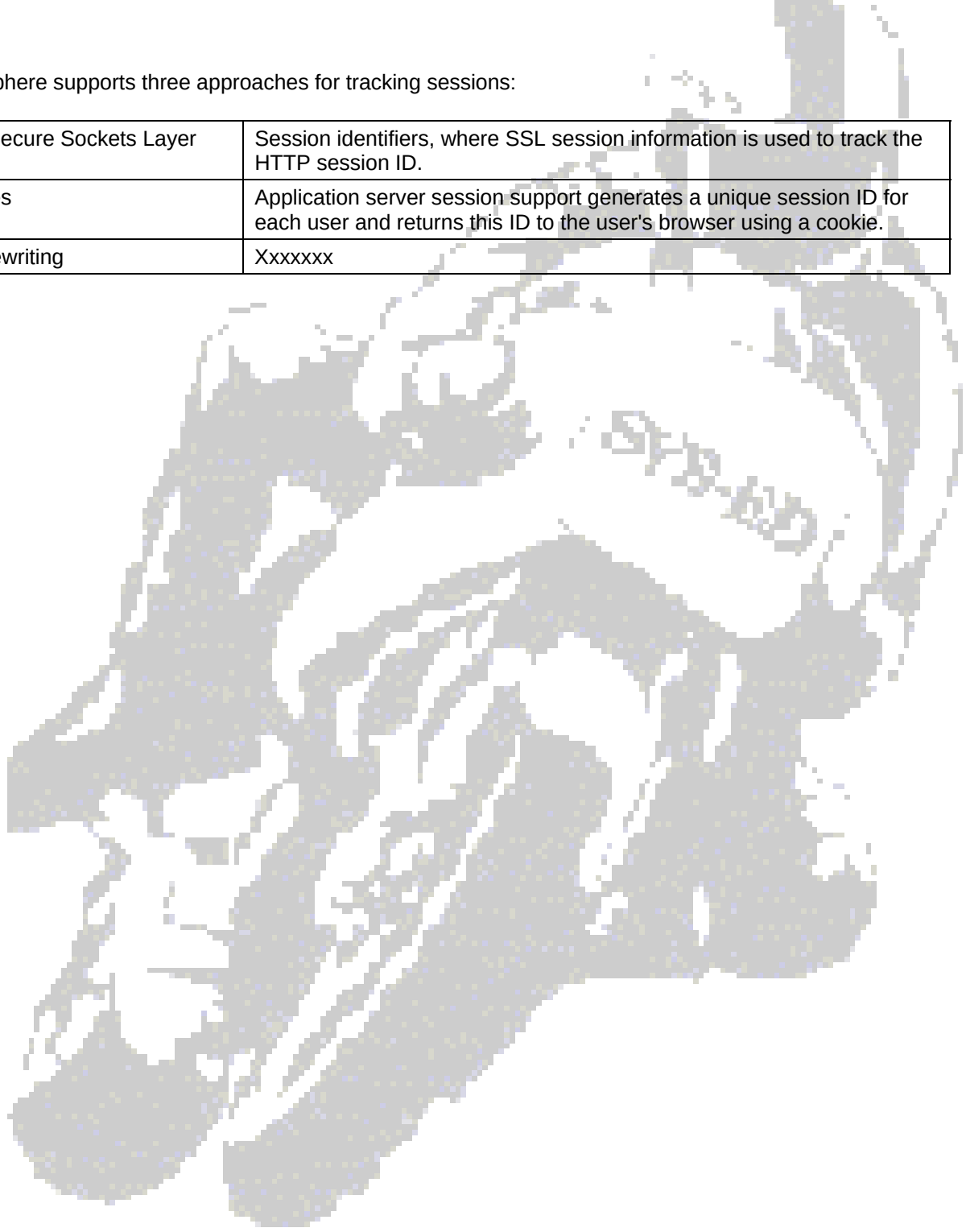
7 Session Management

In many Web applications, users dynamically collect data as they move through the site based on a series of selections on the pages that they visit.

Where the user goes and what the application displays can depend on what the user has chosen previously from the site. In order to maintain this data, the application stores it in a session.

WebSphere supports three approaches for tracking sessions:

SSL: Secure Sockets Layer	Session identifiers, where SSL session information is used to track the HTTP session ID.
Cookies	Application server session support generates a unique session ID for each user and returns this ID to the user's browser using a cookie.
URL rewriting	Xxxxxxx



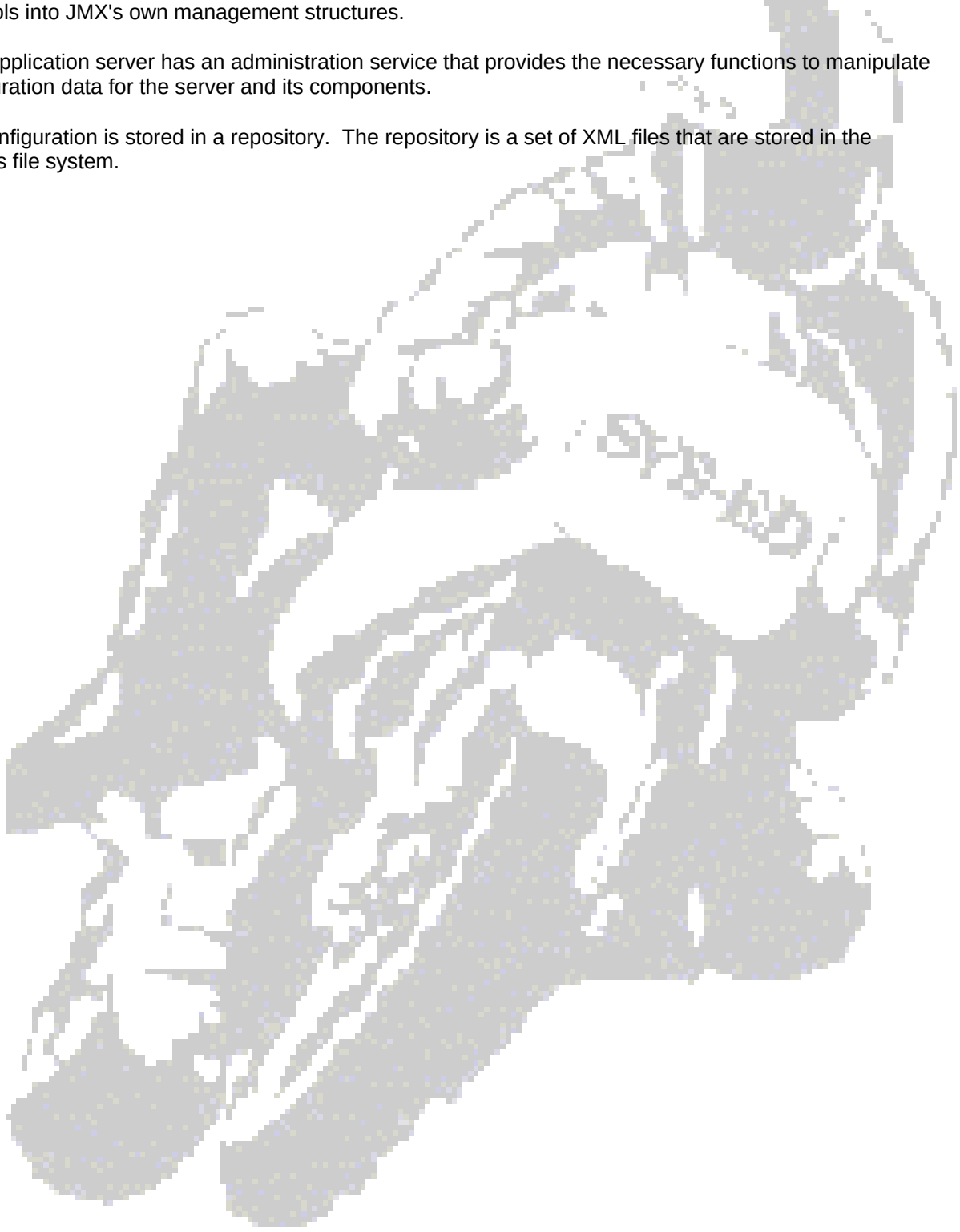
8 Administration

WebSphere Application Server's administration model is based on the Java Management Extensions (JMX) framework.

JMX provides the capability to wrap hardware and software resources in Java and expose them in a distributed environment. It also provides a mapping framework for integrating existing management protocols into JMX's own management structures.

Each application server has an administration service that provides the necessary functions to manipulate configuration data for the server and its components.

The configuration is stored in a repository. The repository is a set of XML files that are stored in the server's file system.



9 Administration Tools

9.1 Administrative Console

The administrative console is a Web-based interface that provides configuration and operation capability. The administrator connects to the application using a Web browser client. Users assigned to different administration roles can manage the application server and certain components and services using this interface.

9.2 Commands

WebSphere Application Server provides a set of commands in the <server_install>/bin directory that provides the capability for performing a subset of administrative functions.

Example:

The startServer command can be used for starting an application server.

9.3 Scripting Client

The wsadmin scripting client provides additional flexibility for the Web-based administration application, allowing administration to use the command-line interface. The scripting client not only expedites administration, but also automates the administration of multiple application servers and nodes using scripts.

The scripting client uses the Bean Scripting Framework, which allows a variety of scripting languages for configuration and control.

WebSphere Application Server V6 supports two languages: jacl and jython (or jpython).

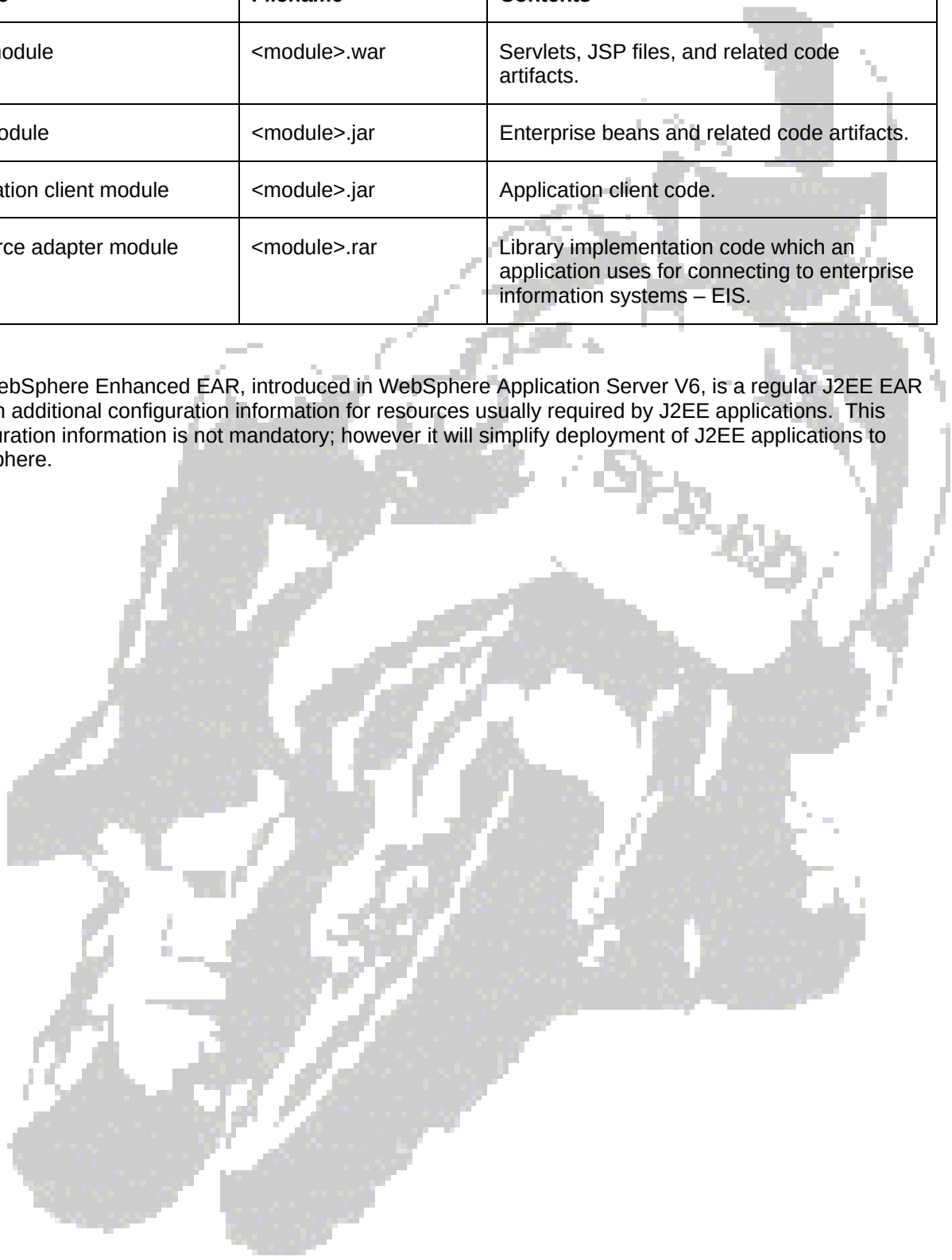
The Network Deployment package allows multiple servers and nodes to be administered from a central location. This centralized administration utilizes a central deployment manager that handles the administration process and distributes the updated configuration to the node agent for each node.

10 Application Packaging

J2EE applications are packaged into EAR files for deployment to one or more application servers.

Module	**Filename**	**Contents**
Web module	<module>.war	Servlets, JSP files, and related code artifacts.
EJB module	<module>.jar	Enterprise beans and related code artifacts.
Application client module	<module>.jar	Application client code.
Resource adapter module	<module>.rar	Library implementation code which an application uses for connecting to enterprise information systems – EIS.

The WebSphere Enhanced EAR, introduced in WebSphere Application Server V6, is a regular J2EE EAR file with additional configuration information for resources usually required by J2EE applications. This configuration information is not mandatory; however it will simplify deployment of J2EE applications to WebSphere.



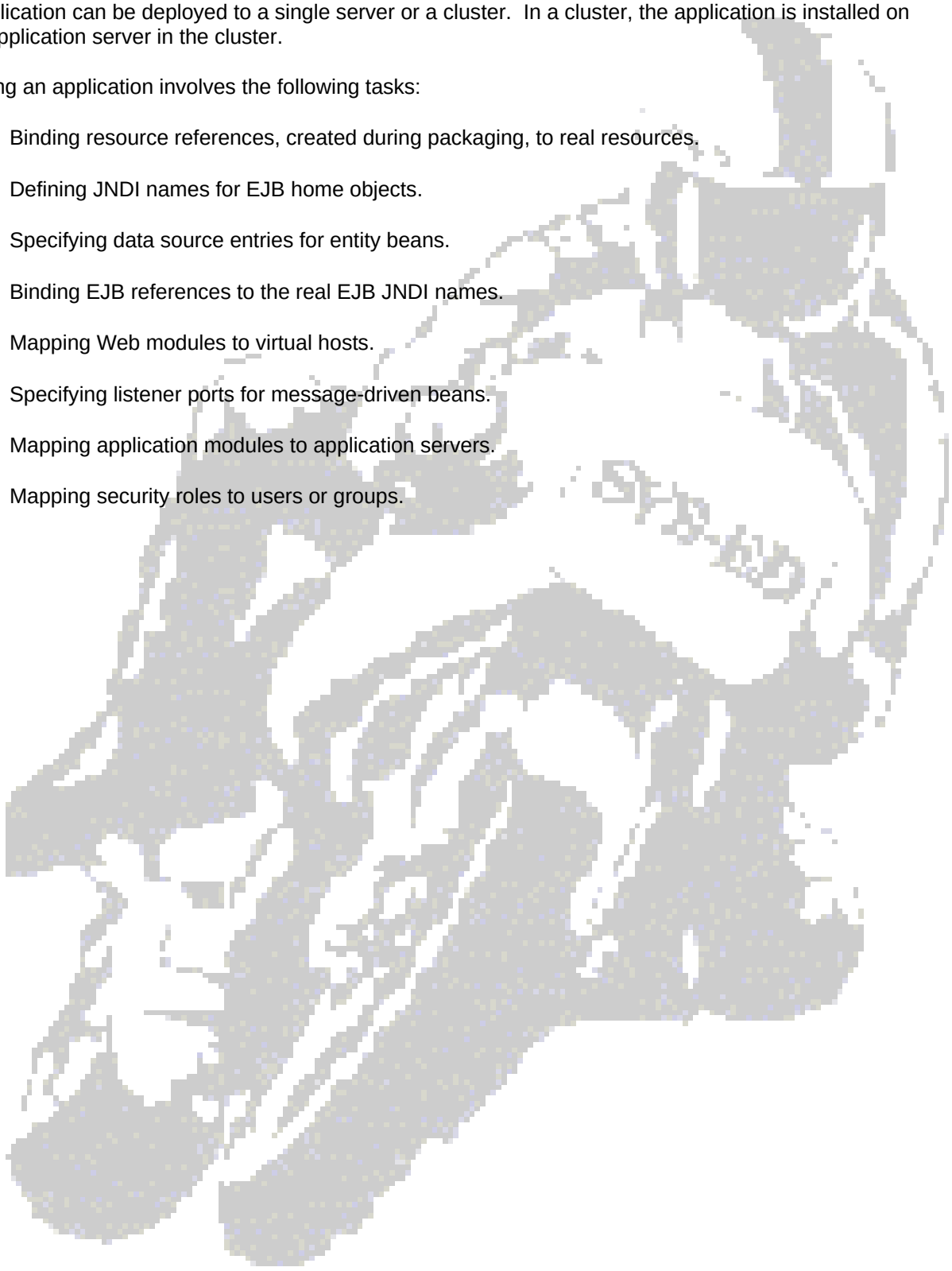
11 Application Deployment

Applications are installed on application servers using the administrative console or the wsadmin scripting interface.

An application can be deployed to a single server or a cluster. In a cluster, the application is installed on each application server in the cluster.

Installing an application involves the following tasks:

- Binding resource references, created during packaging, to real resources.
- Defining JNDI names for EJB home objects.
- Specifying data source entries for entity beans.
- Binding EJB references to the real EJB JNDI names.
- Mapping Web modules to virtual hosts.
- Specifying listener ports for message-driven beans.
- Mapping application modules to application servers.
- Mapping security roles to users or groups.



12 System Management

Several improvements have been made to the system management features of WebSphere Application Server V6:

Mixed cell support	Provides for the migrating of an existing WebSphere Application Server V5 Network Deployment environment to V6. By migrating the Deployment Manager to V6 as the initial step, V5 application servers can continue to be run to run until they are migrated.
Configuration Archiving	Allows for the creation of a complete or partial archive of an existing WebSphere Application Server configuration. This archive is portable and can be used to create new configurations based on the archive.
Defining a WebSphere Application Server V6 instance by a profile	Allows for the configuration of multiple runtimes with one set of install libraries.
Defining external web servers as managed servers	Provides the capability to start and stop the web server and automatically push the plug-in configuration to it. This requires a node agent to be installed on the machine. It is typically used when the web server is behind a firewall.
Administrative console has been updated	Panels have been added to facilitate the new V6 features such as service integration, the integrated UDDI Registry and Web Services Gateway, and the new web server options.
Navigation has been reworked	This serves to reduce the number of clicks required to reach most configuration settings.
Tivoli Performance View Monitor	Has also been integrated into the administrative console.