Preparing to Install LiveCycle® ES2
(Server Cluster)
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About This Document

This document provides the information that is required to prepare to install Adobe LiveCycle ES2 (Enterprise Suite) 9.0 on a JBoss® Application Server, IBM® WebSphere® Application Server, or Oracle® WebLogic Server® clustered environment.

Before you start

Ensure that you have the most current version of the LiveCycle ES2 documentation.

What’s in this document?

This document contains the following types of information:

- All hardware and software requirements and configurations that must be already in place to ensure a successful LiveCycle ES2 installation process
- All tasks that can be performed without LiveCycle ES2 being installed and deployed but are needed for installing or deploying

Who should read this document?

This document provides information for administrators or developers who are responsible for preparing the application and database servers for development, staging, and production environments before installing, configuring, administering, and deploying LiveCycle ES2. The information provided is based on the assumption that anyone reading this document is familiar with JBoss, WebSphere, and Webogic application servers, Red® Hat® Linux®, SUSE™ Linux, Microsoft® Windows®, IBM AIX®, or Sun™ Solaris™ operating systems, Oracle®, IBM DB2®, or SQL Server database servers, and web environments.
Conventions used in this document

This guide uses the following naming conventions for common file paths.

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
<th>Default value</th>
</tr>
</thead>
<tbody>
<tr>
<td>[LiveCycleES2 root]</td>
<td>The installation directory that is used for all LiveCycle ES2 modules. The installation directory contains subdirectories for Adobe LiveCycle Configuration Manager, the LiveCycle ES2 SDK, and each LiveCycle ES2 module installed (along with the product documentation). This directory also includes directories relating to third-party technologies.</td>
<td>Windows: C:\Adobe\Adobe LiveCycle ES2\AIX, Linux, and Solaris: /opt/adobe/adobe_livecycle_es2/</td>
</tr>
<tr>
<td>[appserver root]</td>
<td>The home directory of the application server that runs the LiveCycle ES2 services.</td>
<td>JBoss 4.2.0 or 4.2.1 on Windows: C:\jboss&lt;br&gt;JBoss 4.2.0 or 4.2.1 on Linux and Solaris: /opt/jboss&lt;br&gt;JBoss Enterprise Application Platform 4.3 on Windows: C:\jboss-eap-4.3\jboss-as&lt;br&gt;JBoss Enterprise Application Platform 4.3 on Linux and Solaris: /opt/jboss-eap-4.3\jboss-as&lt;br&gt;WebSphere on Windows: C:\Program Files\IBM\WebSphere\AppServer&lt;br&gt;WebSphere on Linux and Solaris: /opt/IBM/WebSphere/AppServer&lt;br&gt;WebSphere on AIX: /usr/IBM/WebSphere/AppServer, or, /opt/IBM/WebSphere/AppServer&lt;br&gt;WebLogic 10g on Windows: C:\bea\wlserver_10.3&lt;br&gt;WebLogic 11g on Windows: C:\Oracle\Middleware\wlserver_10.3&lt;br&gt;WebLogic 10g on Linux and Solaris: /opt/bea/wlserver_10.3&lt;br&gt;WebLogic 11g on Linux and Solaris: /opt/Oracle/Middleware/wlserver_10.3</td>
</tr>
</tbody>
</table>
Most of the information about directory locations in this document is cross-platform (all file names and paths are case-sensitive on AIX, Linux, and Solaris). Any platform-specific information is indicated as required.

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
<th>Default value</th>
</tr>
</thead>
</table>
| WL_HOME          | The install directory for WebLogic as specified for the WL_HOME environment variable. | WebLogic 10g on Windows: C:\bea\  
WebLogic 11g on Windows: C:\Oracle\Middleware\  
WebLogic 10g on Linux and Solaris: /opt/bea/  
WebLogic 11g on Linux and Solaris: /opt/Oracle/ |
| [appserverdomain] | The domain that you configured on WebLogic. The default domain is called base_domain. | WebLogic 10g on Windows: C:\bea\user_projects\domains\base_domain  
WebLogic 11g on Windows: C:\Oracle\Middleware\user_projects\domains\base_domain  
WebLogic 11g on Linux and Solaris: /opt/Oracle/user_projects/domains/base_domain |
| [dbserver root]  | The location where the LiveCycle ES2 database server is installed.          | Depends on the database type and your specification during installation.        |
### Additional information

The resources in this table can help you learn about LiveCycle ES2.

<table>
<thead>
<tr>
<th>For information about</th>
<th>See</th>
</tr>
</thead>
<tbody>
<tr>
<td>LiveCycle ES2 and the modules in general</td>
<td><a href="http://adobe.com/products/livecycle">LiveCycle ES2 Overview</a></td>
</tr>
<tr>
<td>LiveCycle ES2 terminology</td>
<td><a href="http://adobe.com/products/livecycle">LiveCycle ES2 Glossary</a></td>
</tr>
<tr>
<td>Other services and products that integrate with LiveCycle ES2</td>
<td><a href="http://partners.adobe.com/public/developer/main.html">Adobe LiveCycle ES2 documentation</a></td>
</tr>
<tr>
<td>Other LiveCycle ES2 modules</td>
<td><a href="http://adobe.com/products/livecycle">LiveCycle ES2 Release Notes</a></td>
</tr>
<tr>
<td>All documentation that is available for LiveCycle ES2</td>
<td><a href="http://adobe.com/products/livecycle">LiveCycle Technical Support</a></td>
</tr>
<tr>
<td>LiveCycle ES2 release information and last-minute changes that occur to the product</td>
<td><a href="http://adobe.com/products/livecycle">LiveCycle Technical Support</a></td>
</tr>
<tr>
<td>Patch updates, technical notes, and additional information about this product version</td>
<td><a href="http://adobe.com/products/livecycle">LiveCycle Technical Support</a></td>
</tr>
</tbody>
</table>
1 Introduction to Application Server Clusters

This section describes clustered application servers and the benefits and issues that are associated with setting up clusters.

1.1 About clustering application servers

A cluster is a group of application server instances that run simultaneously, which act like a single system, enabling high availability and load balancing. Within a cluster, multiple server instances can run on the same computer (known as a vertical cluster) or can be located on different computers (known as a horizontal cluster), or they can form a combination of both horizontal and vertical clusters. With clustering, client work can be distributed across several nodes instead of handled by a single application server.

In a clustered configuration, application server instances are server members of the cluster, all of which must have identical application components deployed on them. However, other than the configured applications, cluster members do not have to share any other configuration parameters. For example, you can cluster multiple server instances on one computer, with a single instance on another computer, provided they are all running the same version of application server.

By clustering, you can achieve one or more of the following benefits. How you implement clustering determines which benefits are achieved:

- Failover
- Load balancing
- Scalability
1.1.1 Failover

Failover allows one or more application server instances to act as backup to a failed application server instance and resume processing the task, therefore enabling another application server to carry on processing. However, if an application server fails during a transaction, the backup application server does not recover the state of the failed instance. If a server fails when a user enters data into a form, for example, the data may have to be reentered.

1.1.2 Load balancing

Load balancing is a technique used to distribute work across a number of systems so that no single device is overwhelmed. If one server starts to get congested or overloaded, requests are forwarded to another server that has more capacity.

1.1.2.1 Application server load balancing

Application server load balancing is useful for managing the load between application servers. Application servers can be configured to use a weighted round-robin routing policy that ensures a balanced routing distribution based on the set of server weights that are assigned to the members of a cluster. Configuring all servers in the cluster to have the same weight produces a load distribution in which all servers receive approximately the same number of requests. Weighting some servers more heavily sends more requests to these servers than to those that are weighted less heavily.

Preferred routing configurations can also be configured to ensure, for example, that only cluster members on that node are selected (using the round-robin weight method) and cluster members on remote nodes are selected only if a local server is not available. Application server load balancing is best used when balancing is needed between tiers.

1.1.2.2 Web server load balancing

Web server load balancing is useful for queuing and throttling requests. For the Apache HTTP Server, the most commonly used method for load balancing is Round-Robin DNS.

Round-Robin DNS is a relatively simple method of load balancing, where a domain name system (DNS) server provides a name to address resolution and is always involved when a host name is included in a URL. A Round-Robin DNS server can resolve one single host name into multiple IP addresses such that requests for a single URL (containing a host name) actually reference different web servers. The client requests a name resolution for the host name but, in fact, receives different IP addresses, therefore spreading the load among the web servers. In a simple configuration, the Round-Robin DNS server cycles through the list of available servers.

1.1.3 Scalability and availability

Scalability in a cluster means that an administrator can increase the capacity of the application dynamically to meet the demand without interrupting or negatively impacting service. Clusters allow administrators to remove nodes from a cluster in order to upgrade components, such as memory, or to add nodes to the cluster without bringing down the cluster itself.
1.2 Terminology

Each application server vendor uses specific terminology, which is defined here to avoid confusion.

1.2.1 JBoss

server: Represents an instance of a Java™ virtual machine (JVM™).
cluster: Represents a logical grouping of multiple application servers for administration, application deployment, load balancing, and failover purposes.

1.2.2 WebLogic

server: Represents an instance of a Java™ virtual machine (JVM™).
machine: Represents a physical system running one or more instances of WebLogic Server.
cluster: Represents a logical grouping of multiple application servers within a domain for administration, application deployment, load balancing, and failover purposes.

1.2.3 WebSphere

server: Represents an instance of a Java™ virtual machine (JVM™).
node: Represents a physical system running one or more instances of WebSphere Application Server.
cell: Represents a logical grouping of multiple nodes for administrative purposes.
federation: The process of joining a stand-alone WebSphere node to a WebSphere cell.
cluster: Represents a logical grouping of multiple application servers within a cell for administration, application deployment, load balancing, and failover purposes.

1.3 Clustering LiveCycle ES2

If you install a LiveCycle ES2 component on an application server cluster, here are some things you must know:

- Each application server in the cluster on which you deploy LiveCycle ES2 must have a homogeneous topology (that is, all nodes in the cluster must be configured identically). You can ensure that all modules are configured identically by configuring run-time properties in the single-installation staging area.
- The configuration is deployed by using the single entity approach; all nodes in a cluster are deployed as if deploying to a single node.

Setting up a clustered environment for LiveCycle ES2 involves the tasks that follow.

1.3.1 Clustering LiveCycle ES2 on JBoss

You must perform the following tasks to deploy LiveCycle ES2 on a JBoss Application Server cluster:

1. Prepare the hardware as per your requirements.
2. Install the operating system and update it with all necessary patches and service packs.
3. Install and configure the database server.
4. Install and configure the application server.
5. Install LiveCycle ES2 modules and configure LiveCycle ES2 for deployment.

1.3.2 Clustering LiveCycle ES2 on WebLogic

You must perform the following tasks to deploy LiveCycle ES2 on a WebLogic Server cluster:
1. Prepare the hardware as per your requirements.
2. Install the operating system and update it with all necessary patches and service packs.
3. Install and configure the database server.
4. Install and configure the application server.
5. Install LiveCycle ES2 modules and configure LiveCycle ES2 for deployment.

1.3.3 Clustering LiveCycle ES2 on WebSphere

You must perform the following tasks to deploy LiveCycle ES2 on a WebSphere Application Server cluster:
1. Install WebSphere Application Server Network Deployment software.
2. Install the HTTP Server (IBM HTTP Server).
3. Set up the cluster:
   - Create a deployment server profile and create the Deployment Manager.
   - Create managed application server profiles on all the nodes.
   - Start all servers on all nodes that will become members of the cluster.
   - Federate nodes to the Deployment Manager.
   - Create the cluster.
   - Start the cluster.
   - Configure cluster resources.
4. Deploy applications.
5. Generate the WebSphere HTTP plug-in.
6. Start the HTTP server.

1.4 Supported topologies

The following sections discuss various topologies, both clustered and non-clustered, that you can employ. For additional information about configuring your application server in a cluster, go to one of the following websites, as applicable to your application server:
1.4.1 Combined web, application, and database servers

This topology consists of a web server, an application server, and a database server on the same node. This topology is the simplest one and must be used for development only.

1.4.2 Combined web and application servers with separate database server

This topology can be considered for production in case the load on the user interface (including the web tier) is minimal, with a small number of users.

Combining the web and application servers means that all Enterprise JavaBeans™ (EJB) look-ups are local, and therefore reduces the overhead of doing a remote look-up. Also, this topology reduces the network overhead of a round trip between the web tier and the application tier.

However, with both servers on the same node, if the web tier is compromised, both tiers are compromised. If the web tier experiences a heavy load, the application server processing is affected and vice versa. User response time is usually affected in situations when users need to wait a significant amount of time to get a page back due to all server resources (that is, CPU and/or memory) being consumed by the application server.

1.4.3 Single web server with combined application and database server

The simplest topology that should be considered for a production environment is a web server and combined application server with a database server. Use this topology only if you are sure that your database load will be minimal. In this scenario, the web server is providing a redirection to the application server. The advantages of this topology are low cost, low complexity, and no need for load balancing. The disadvantages of this topology are little redundancy, low scalability, inability to perform updates and upgrades, and possible low performance due to too many CPU processes.

1.4.4 Separate web, application, and database servers

This topology is the most common in production systems because it allows allocation of separate resources to each of the tiers. In this case, the web server acts as a proxy to the web tier on the application server that hosts the web components. This level of indirection provides additional security by securing the application server even if the web server is compromised.

1.4.5 Adding additional web servers

You can add additional web servers for scalability and failover. When using multiple web servers, the WebLogic/WebSphere HTTP plug-in configuration file must be applied to each web server. Failure to do so after introducing a new application will likely cause a “404 File Not Found” error to occur when a user tries to access the web application.
1.4.6 Adding additional application servers

This topology is used in most large-scale production systems where the application servers are clustered to provide high availability and, based on the topology, failover and load balancing.

Clustering application servers has these benefits:

- You can use cheaper hardware configurations and still achieve higher performance
- You can upgrade software on servers without down time
- Provides higher availability (that is, if one server fails, the other nodes in the cluster pick up the processing)
- Provides the ability to leverage load-balancing algorithms on the web server (by using load balancers) as well as on the EJB tier for processing requests

LiveCycle ES2 components are typically CPU-bound. As a result, performance gains are better achieved by adding more application servers than by adding more memory or disk space to an existing server.

1.4.7 Multiple JVMs

Vertical scaling of multiple JVMs offers the following advantages:

**Increased processing power efficiency:** An instance of an application server runs in a single JVM process. However, the inherent concurrency limitations of a JVM process prevent it from fully using the memory and processing power of multi-CPU systems. Creating additional JVM processes provides multiple thread pools, each corresponding to the JVM process that is associated with each application server process. This correspondence avoids concurrency limitations and lets the application server use the full processing power of the computer.

**Load balancing:** Vertical scaling topologies can use the WebLogic Server or WebSphere Application Server workload management facility.

**Process failover:** A vertical scaling topology also provides failover support among application server cluster members. If one application server instance goes offline, the other instances on the computer continue to process client requests.

1.5 Unsupported topologies

The following topologies are not supported for LiveCycle ES2.

**Splitting the web container from the EJB container**

Splitting LiveCycle ES2 servers into presentation/business logic tiers and running them on distributed computers is not supported.

**Geographically distributed configuration**

Many applications locate their systems geographically to help distribute the load and provide an added level of redundancy. LiveCycle ES2 does not support this configuration because LiveCycle ES2 components cannot be pulled apart to run on different hosts; LiveCycle ES2 is deployed as a monolithic application.

Most of the information about directory locations in this document is cross-platform (all file names and paths are case-sensitive on Linux and UNIX). Platform-specific information is indicated as required.
2 System Requirements

2.1 LiveCycle ES2 patch updates

Before you install LiveCycle ES2, ensure that you download any required patch updates, which are located at LiveCycle Technical Support.

2.2 Third-party infrastructure support

2.2.1 Third-party patch support

The third-party reference platforms described in this document represent a specific patch level of third-party infrastructure that was current during the development and release of this version of Adobe LiveCycle ES2.

To review Adobe's policy regarding third-party patch support and software compatibility, see the knowledgebase article Adobe LiveCycle Third-party Patch Support Policy.

2.2.2 Microsoft Windows operating systems

LiveCycle ES2 supports the following Microsoft Windows operating systems:

- Windows Server 2008 Standard and Enterprise Edition R2 (64-bit)
- Windows Server 2008 Standard and Enterprise Edition SP1 and later (64-bit) and VMWare ESX/GSX architectures
- Windows Server 2003 Standard and Enterprise Edition SP2 and later (32-bit and 64-bit)
- Windows Server 2003 R2 Standard SP2 and later (32-bit and 64-bit)
- Windows Server 2003 R2 Enterprise Edition SP2 and later running on 32-bit, 64-bit, and VMWare ESX/GSX architectures

**Note:** LiveCycle ES2 Server is supported in non-production environment on Microsoft Windows XP (SP2 or SP3), Windows Vista (SP1, all flavors, 32-bit and 64-bit), and Windows 7 (32-bit and 64-bit). However, these operating systems are supported for LiveCycle clients and for installing LiveCycle developer tools.

**Note:** LiveCycle Business Activity Monitoring ES2 is not supported on 32-bit systems; deploy Business Activity Monitoring ES2 on a 64-bit system.
2.2.2.1 Windows Server 2008

<table>
<thead>
<tr>
<th>Application server</th>
<th>JDK</th>
<th>OS/JVM architecture</th>
<th>Database</th>
</tr>
</thead>
</table>
| Red Hat JBoss Application Server 4.2.1 and JBoss Enterprise Application Platform 4.3 | Sun JDK 6.0 update 14 or later updates to 6.0 | 64-bit OS and 64-bit JVM | • Microsoft SQL Server 2005 SP3, 2008  
• Oracle 10g, 11g R2 |
| Oracle WebLogic 10g R3 (Standard & Enterprise editions) | Oracle JRockit® Real Time 3.1.2-1.6.0.14 | 64-bit OS and 64-bit JVM | • IBM DB2 9.1 or later versions of 9.x  
• Oracle 10g, 11g R2  
• Microsoft SQL Server 2005 SP3, 2008 |
| *New for 9.0.0.2*  
Oracle WebLogic 11g R1 - 10.3.3 | Oracle JRockit® Real Time 3.1.2-1.6.0.14 | 64-bit OS and 64-bit JVM | • IBM DB2 9.1 or later versions of 9.x  
• Oracle 10g, 11g R2  
• Microsoft SQL Server 2005 SP3, 2008 |
| *New for 9.0.0.2*  
IBM WebSphere 7.0.0.9 (Base and Network Deployment Edition) | WebSphere Java SDK 1.6 SR7 | 64-bit OS and 64-bit JVM | • IBM DB2 9.1 or later versions of 9.x  
• Oracle 10g, 11g R2  
• MS SQL Server 2005 SP3, 2008 |

*Note:* When using PDF Generator ES2 with a 64-bit application server, an additional 32-bit JVM must also be installed.

2.2.2.2 Windows Server 2003

<table>
<thead>
<tr>
<th>Application server</th>
<th>JDK</th>
<th>OS/JVM architecture</th>
<th>Database</th>
</tr>
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</table>
| Red Hat JBoss Application Server 4.2.0 | Sun JDK 5.0 update 11 or later updates to 5.0 | 64-bit OS and 64-bit JVM | • Microsoft SQL Server 2005 SP3, 2008  
• Oracle 10g, 11g R2 |
| Red Hat JBoss Application Server 4.2.1 and JBoss Enterprise Application Platform 4.3 | Sun JDK 6.0 update 14 or later updates to 6.0 | 64-bit OS and 64-bit JVM | • Microsoft SQL Server 2005 SP3, 2008  
• Oracle 10g, 11g R2  
• |
| Oracle WebLogic 10g R3 (Standard & Enterprise editions) | Oracle JRockit® Real Time 3.1.2-1.6.0.14 | 64-bit OS and 64-bit JVM | • IBM DB2 9.1 or later versions of 9.x  
• Oracle 10g, 11g R2  
• Microsoft SQL Server 2005 SP3, 2008 |
2.2.3 Linux operating systems

LiveCycle ES2 supports the following:

- Red Hat Enterprise Linux AP or ES 5 (Intel/AMD 64-bit architectures)
- SUSE Linux Enterprise Server 10.0 and 11.0 (Intel/AMD 64-bit architectures)

**Note:** PDF Generator 3D ES2 is not supported on non-Windows platforms.

**Note:** When using PDF Generator ES2 with a 64-bit application server, an additional 32-bit JVM must also be installed.

**Note:** On Linux operating systems, you must ensure that X Window libraries are installed. This is required for PDF Generator ES2 and Forms ES2. See documentation for your operating system for more information.

### 2.2.3.1 Red Hat Enterprise Linux

**Caution:** Ensure that the cURL, Xorg-x11-apps, and Compat-libstdc++ packages and all dependencies are installed on your Red Hat Linux computer to avoid problems when rendering forms.

<table>
<thead>
<tr>
<th>Application server</th>
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<th>OS/JVM architecture</th>
<th>Database</th>
</tr>
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<tr>
<td>Red Hat JBoss Application Server 4.2.0</td>
<td>Sun JDK 5.0 update 11 or later updates to 5.0</td>
<td>64-bit OS and 64-bit JVM</td>
<td>Oracle 10g, 11g R2</td>
</tr>
<tr>
<td>Red Hat JBoss Application Server 4.2.1 and JBoss Enterprise Application Platform 4.3</td>
<td>Sun JDK 6.0 update 14 or later updates to 6.0</td>
<td>64-bit OS and 64-bit JVM</td>
<td>Oracle 10g, 11g R2</td>
</tr>
</tbody>
</table>
### 2.2.3.2 SUSE Linux

**Note:** Ensure that X Window libraries are installed on your operating system. This is required for PDF Generator ES2 and Forms ES2. See documentation for your operating system for more information.

**Caution:** You must install the glibc-locale-32bit library that ships with SUSE Linux Enterprise Server or LiveCycle ES2 will not generate PDF files. This library file is not installed by default, you must use YaST to install it. (See the SUSE Linux Enterprise Server 10.0 documentation.)

**Note:** If you plan to install LiveCycle ES2 on SUSE Linux 11, you must also install the `libstdc++-libc6.2-2.so.3` libraries. SUSE Linux 11 does not include these libraries by default. For more information, see this Novell Web page. These libraries are required for running Adobe Central Pro Output Server.

<table>
<thead>
<tr>
<th>Application server</th>
<th>JDK</th>
<th>OS/JVM architecture</th>
<th>Database</th>
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<tbody>
<tr>
<td><strong>New for 9.0.0.2</strong> Oracle WebLogic 11g R1 - 10.3.3</td>
<td>Oracle JRockit® Real Time 3.1.2-1.6.0.14</td>
<td>64-bit OS and 64-bit JVM</td>
<td>Oracle 10g, 11g R2</td>
</tr>
<tr>
<td>IBM WebSphere 6.1.0.21 (Base &amp; Network Deployment Edition)</td>
<td>WebSphere Java SDK 1.5 SR8</td>
<td>64-bit OS and 64-bit JVM</td>
<td>IBM DB2 9.1 or later versions of 9.x, Oracle 10g, 11g R2</td>
</tr>
<tr>
<td><strong>New for 9.0.0.2</strong> IBM WebSphere 7.0.0.9 (Base and Network Deployment Edition)</td>
<td>WebSphere Java SDK 1.6 SR7</td>
<td>64-bit OS and 64-bit JVM</td>
<td>IBM DB2 9.1 or later versions of 9.x, Oracle 10g, 11g R2</td>
</tr>
</tbody>
</table>

### 2.2.4 IBM AIX

LiveCycle ES2 supports AIX 5L 5.3 and AIX 6.1 (both 64-bit architecture).
**Note:** PDF Generator 3D ES2 is not supported on non-Windows platforms.

**Note:** Ensure that X Window libraries are installed on your operating system. This is required for PDF Generator ES2 and Forms ES2. See the documentation for your operating system for more information.

**Note:** For a detailed list of the supported platforms, see “Supported software” on page 27.

### 2.2.4.1 AIX 5.3

<table>
<thead>
<tr>
<th>Application server</th>
<th>JDK</th>
<th>OS/JVM architecture</th>
<th>Database</th>
</tr>
</thead>
</table>
| IBM WebSphere 6.1.0.21 (Base and Network Deployment Edition) | WebSphere Java SDK 1.5 SR8 | 64-bit OS and 64-bit JVM | IBM DB2 9.1 or later versions of 9.x  
Oracle 10g, 11g R2 |

**New for 9.0.0.2**

<table>
<thead>
<tr>
<th>Application server</th>
<th>JDK</th>
<th>OS/JVM architecture</th>
<th>Database</th>
</tr>
</thead>
</table>
| IBM WebSphere 7.0.0.9 (Base and Network Deployment Edition) | WebSphere Java SDK 1.6 SR7 | 64-bit OS and 64-bit JVM | IBM DB2 9.1 or later versions of 9.x  
Oracle 10g, 11g R2 |

### 2.2.4.2 AIX 6.1

<table>
<thead>
<tr>
<th>Application server</th>
<th>JDK</th>
<th>OS/JVM architecture</th>
<th>Database</th>
</tr>
</thead>
</table>
| *New for 9.0.0.2*  
IBM WebSphere 7.0.0.9 (Base and Network Deployment Edition) | WebSphere Java SDK 1.6 SR7 | 64-bit OS and 64-bit JVM | IBM DB2 9.1 or later versions of 9.x  
Oracle 10g, 11g R2 |

**Note:** For a detailed list of the supported database editions, see “Supported software” on page 27.

### 2.2.5 Sun Solaris

LiveCycle ES2 supports the Sun Solaris 10 (SPARC® architectures) operating system. See also “Additional requirements for AIX, Linux, and Solaris” on page 23.

**Note:** PDF Generator 3D ES2 is not supported on non-Windows platforms.

**Note:** Ensure that X Window libraries are installed on your operating system. This is required for PDF Generator ES2 and Forms ES2. See the documentation for your operating system for more information.

**Caution:** Do not use the Solaris tar command to extract files or errors (such as missing files) will occur. Download the GNU tar tool and use it to extract all files on a Solaris environment.
**2.3 System requirements**

### 2.3.1 Minimum hardware requirements

This table provides the minimum hardware requirements that LiveCycle ES2 supports.

<table>
<thead>
<tr>
<th>Application server</th>
<th>JDK</th>
<th>OS/JVM architecture</th>
<th>Database</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red Hat JBoss Application Server 4.2.0</td>
<td>Sun JDK 5.0 update 11 or later updates to 5.0</td>
<td>64-bit OS and 64-bit JVM</td>
<td>• Oracle 10g, 11g R2</td>
</tr>
<tr>
<td>Red Hat JBoss Application Server 4.2.1 and JBoss Enterprise Application Platform 4.3</td>
<td>Sun JDK 6.0 update 14 or later updates to 6.0</td>
<td>64-bit OS and 64-bit JVM</td>
<td>• Oracle 10g, 11g R2</td>
</tr>
<tr>
<td>Oracle WebLogic 10g R3 (Standard &amp; Enterprise editions)</td>
<td>Sun JDK 6.0 update 7</td>
<td>64-bit OS and 64-bit JVM</td>
<td>• Oracle 10g, 11g R2</td>
</tr>
<tr>
<td><em>New for 9.0.0.2</em></td>
<td>Sun JDK 6.0 update 14 or later updates to 6.0</td>
<td>64-bit OS and 64-bit JVM</td>
<td>• Oracle 10g, 11g R2</td>
</tr>
<tr>
<td>IBM WebSphere 6.1.0.21 (Base &amp; Network Deployment Edition)</td>
<td>WebSphere Java SDK 1.5 SR8</td>
<td>64-bit OS and 64-bit JVM</td>
<td>• IBM DB2 9.1 or later versions of 9.x</td>
</tr>
<tr>
<td><em>New for 9.0.0.2</em></td>
<td>WebSphere Java SDK 1.6 SR7</td>
<td>64-bit OS and 64-bit JVM</td>
<td>• IBM DB2 9.1 or later versions of 9.x</td>
</tr>
</tbody>
</table>

**Note:** When using PDF Generator ES2 with a 64-bit application server, an additional 32-bit JVM must also be installed. For a detailed list of supported software, see “Supported software” on page 27.
### Adobe LiveCycle ES2

<table>
<thead>
<tr>
<th>Operating system</th>
<th>Minimum hardware requirement</th>
</tr>
</thead>
</table>
| Microsoft Windows Server® 2008 R1/R2 | Intel® Pentium® 4, 2.8 GHz processor or equivalent  
VMWare ESX 3.0 or later  
RAM: 4 GB  
Free disk space: 5.4 GB of temporary space plus 3.4 GB for LiveCycle ES2 |
| Microsoft Windows Server® 2003 Enterprise Edition or Standard Edition SP2 and R2 (32- and 64-bit architectures) | Intel® Pentium® 4, 2.8 GHz processor or equivalent  
VMWare ESX 3.0 or later  
RAM: 3 GB (32-bit) or 4 GB (64-bit)  
Free disk space: 5.4 GB of temporary space plus 3.4 GB for LiveCycle ES2 |
| Sun Solaris 10 | UltraSPARC® IIIi, 1.5 GHz processor  
Solaris Containers (Zones) partitioning  
RAM: 3GB (64-bit OS with 64-bit JVM)  
Free disk space: 5.4 GB of temporary space plus 3.4 GB for LiveCycle ES2 |
| IBM AIX 5L 5.3 | P4 pSeries 615 (Model 6C3) 7029-6C3, 1.2 GHz processor  
LPAR partitioning  
RAM: 3GB (64-bit OS with 64-bit JVM)  
Free disk space: 5.4 GB of temporary space plus 3.4 GB for LiveCycle ES2 |
| SUSE Linux Enterprise Server 10.0 and 11.0 (64-bit edition only) | Dual core, 1 GHz processor  
VMWare ESX 3.0 or later  
RAM: 3GB (64-bit OS with 64-bit JVM)  
Free disk space: 5.4 GB of temporary space plus 3.4 GB for LiveCycle ES2 |
| Red Hat Enterprise Linux AP or ES 5 (64-bit edition only) | Dual core, 1 GHz processor  
VMWare ESX 3.0 or later  
RAM: 3GB (64-bit OS with 64-bit JVM)  
Free disk space: 5.4 GB of temporary space plus 3.4 GB for LiveCycle ES2 |
Note: LiveCycle Business Activity Monitoring ES2 is not supported on 32-bit systems; deploy Business Activity Monitoring ES2 on a 64-bit system. Even though the LiveCycle ES2 installer can install the Business Activity Monitoring ES2 file set on a 32-bit system, it fails during configuration.

2.3.2 Intel x86 compatibility

On supported Windows and UNIX-like environments, LiveCycle ES2 supports Intel and AMD64 compatible chipsets running either 32-bit or 64-bit supported operating systems.

2.3.3 Recommended hardware requirements

For a small production environment:

Intel environments: Pentium 4, 2.8 GHz or greater. Using a dual core processor will further enhance performance.

Sun SPARC environments: UltraSPARC V or later.

IBM AIX environments: Power4 or later

Memory requirements: 3.2 GB of RAM.

2.3.4 Additional requirements for AIX, Linux, and Solaris

Caution: On AIX, Linux, and Solaris operating systems, use binary mode when downloading the installer from Adobe web site.

2.3.4.1 Installing and configuring UTF-8

When installing LiveCycle ES2 on AIX, Linux, or Solaris operating systems, you must install and configure the US English version of UTF-8 locale if it is not already installed. You will need the install media (CDs or DVDs) for the operating system to perform this task.

Note: On Linux platforms, this locale is installed by default and is called en_US.utf8. It can be verified by using the `locale -a` command.

➢ To install UTF-8 on AIX:

1. Verify the US English UTF-8 locale is not installed by typing `locale -a` in a command prompt. Verify that the command output does not contain the entry `EN_US.UTF-8`.

2. Access the AIX SMIT utility (in text mode) by typing `smitty mle_add_lang` at the root in the command prompt.

3. (AIX 5.3 and 6.1) On the screen that appears, select UTF-8 US English (United States) [EN_US] from both the CULTURAL CONVENTION and LANGUAGE TRANSLATION drop-down lists.

   Note: Keep the INPUT DEVICE/DIRECTORY as the default `/dev/cd0` setting.

4. Press Enter to proceed. A message such as the following will appear:
   
   ```
   installp: Device /dev/cd0 not ready for operation.
   Please insert media and press Enter to continue.
   ```

5. Insert the appropriate AIX install disk in the disk drive.
6. When the command is complete, exit the SMIT utility and type `locale -a` to verify that EN_US.UTF-8 is set as the locale.

➤ To install UTF-8 on Solaris 10:

1. Verify the US English UTF-8 locale is not installed by typing `locale -a` in a command prompt. Verify that the command output does not contain the entry `EN_US.UTF-8`.

2. Insert the Solaris install CD #1 in the disk drive and mount it to an appropriate location, for example: `/cdrom/sol_10_807_sparc/s0`

3. Type the following command as root: `localeadm -a nam -d /cdrom/sol_10_807_sparc/s0`

   **Note:** This command installs all locales in the North America (nam) region even if you specify only the en_US.UTF-8 locale.

4. When the command is complete, type `locale -a` to verify that EN_US.UTF-8 is set as the locale.

   **Note:** See this link for FAQs on Solaris locales.

2.3.4.2 Configuring the file limit values on Solaris and Linux

To avoid StuckThread issues on a Solaris or Linux environment, add or increase the rlim values in the `/etc/system` file.

➤ Modify the `rlim` values:

1. **(Linux)** Locate and open the `/etc/security/limits.conf` file.

   **(Solaris)** Locate and open the `/etc/system` file.

2. **(Linux)** Add the following lines to the `/etc/security/limits.conf` file:

   ```
   <app_group> soft nofile 8192
   <app_group> hard nofile 8192
   ```

   Replace `<app_group>` with the user group who will run the application server. You may also replace `<app_group>` with an asterisk (*) to match all users and user groups.

   **(Solaris)** Locate and modify the `rlim` values in the `/etc/system` file as follows:

   ```
   set rlim_fd_cur: The initial (soft) maximum number of file descriptors per process. Set this value to 8192 or more.
   set rlim_fd_max: The hard maximum number of file descriptors per process. Set this value to 8192 or more. (This modification is required only if the default value is lower than 8192). You must have super user privileges to change this value.
   ```

   **Note:** The `rlim_fd_max` value must be equal to or greater than the `rlim_fd_cur` value.

3. Save and close the file.

4. Restart your computer.

➤ Verify the updated settings:

1. Launch a new shell.
2. Type `ulimit -n` and press `Enter`.

3. Verify the value returned matches the `rlim` values you have set.

   If any of the values fail to match the updated settings, ensure you have performed the steps as described and restart your computer.

### 2.3.5 Additional hardware requirement for LiveCycle Content Services ES2

If you are installing LiveCycle Content Services ES2 for use with a DB2 database, you must have a minimum of 2 GB of RAM on the database computer.

### 2.3.6 Recommended hardware requirements for client-side computers

**Workbench ES2**
- Disk space for installation:
  - 1.5 GB for Workbench ES2 only
  - 1.7 GB on a single drive for a full installation of Workbench ES2, Designer ES2, and the samples assembly
  - 400 MB for temporary install directories - 200 MB in the user temp directory and 200 MB in the Windows temporary directory

  **Note:** If all of these locations reside on a single drive, there must be 1.5 GB of space available during installation. The files copied to the temporary directories are deleted when installation is complete.

- Memory for running Workbench ES2: 2 GB of RAM
- Hardware requirement: Intel® Pentium® 4 or AMD equivalent, 1 GHz processor
- Minimum 1024 X 768 pixels or greater monitor resolution with 16-bit color or higher
- TCP/IPv4 or TCP/IPv6 network connection to the LiveCycle ES2 server

  **Note:** You must have Administrative privileges to install Workbench ES2 on Windows. If you are installing using a non-administrator account, the installer will prompt you for the credentials for an appropriate account.

**Designer ES2**
- A minimum of Adobe Reader 9.3, Acrobat 9.3 Pro Extended (recommended) is required to benefit from all the new features in Designer ES2, including the 3D features.
- Adobe Flash Player 9.0 or later.
- (Optional) Flex Builder™ 3.0 or later.
- (Optional) Flex SDK 3.4 (required for customizing form guide components that are shipped with Designer ES2).

  **Note:** Use the Flex SDK 3.4 included with the Designer ES2 installer only. Do not use any version of Flex SDK obtained from the Adobe web site.

  **Note:** For more information, see *Installing Your Development Environment*. 
End-user hardware requirements:

- LiveCycle Workspace ES2: 1 GB of RAM (includes requirements for Adobe Flash and Adobe Reader)
- Adobe Flash Player 9 or later: 512 MB of RAM (1 GB recommended)
- Adobe Reader 8.x or later: 128 MB of RAM (256 MB recommended)

**Note:** For web browser requirements, see “End-user user interface” on page 32.
## 2.3.7 Supported software

<table>
<thead>
<tr>
<th>Required software</th>
<th>Supported version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating system</td>
<td></td>
</tr>
<tr>
<td></td>
<td>● Microsoft Windows</td>
</tr>
<tr>
<td></td>
<td>● Windows Server 2008 Enterprise Edition or Standard Edition SP1 or later (64-bit)</td>
</tr>
<tr>
<td></td>
<td>● Windows Server 2008 R2 Standard Edition or Enterprise Edition</td>
</tr>
<tr>
<td></td>
<td>● Windows Server 2003 Enterprise Edition or Standard Edition SP2 and later (32-bit and 64-bit)</td>
</tr>
<tr>
<td></td>
<td>● Windows Server 2003 R2 Standard Edition SP2 and later (32-bit and 64-bit)</td>
</tr>
<tr>
<td></td>
<td>● Windows Server 2003 R2 Enterprise Edition SP2 and later running on 32-bit, 64-bit, and VMWare ESX/GSX architectures</td>
</tr>
<tr>
<td></td>
<td>● (PDF Generator 3D ES2) Microsoft Windows</td>
</tr>
<tr>
<td></td>
<td>● Windows Server 2008 Enterprise Edition or Standard Edition SP1 or later (64-bit)</td>
</tr>
<tr>
<td></td>
<td>● Windows Server 2008 R2 Standard Edition or Enterprise Edition</td>
</tr>
<tr>
<td></td>
<td>● Windows Server 2003 Enterprise Edition or Standard Edition SP2 and later (32-bit and 64-bit)</td>
</tr>
<tr>
<td></td>
<td>● Windows Server 2003 R2 Standard Edition SP2 and later (32-bit and 64-bit)</td>
</tr>
<tr>
<td></td>
<td>● Windows Server 2003 R2 Enterprise Edition SP2 and later running on 32-bit, 64-bit, and VMWare ESX/GSX architectures</td>
</tr>
<tr>
<td></td>
<td>● (Workbench ES2) Microsoft Windows</td>
</tr>
<tr>
<td></td>
<td>● Windows 7 32-bit and 64-bit (Home Basic, Home Premium, Professional, and Enterprise Editions)</td>
</tr>
<tr>
<td></td>
<td>● Windows Vista 32-bit and 64-bit (Business, Home Basic, Home Premium, and Ultimate editions)</td>
</tr>
<tr>
<td></td>
<td>● Windows XP Professional SP2 and above</td>
</tr>
<tr>
<td></td>
<td>● Windows Server 2003 Enterprise Edition or Standard Edition SP2 and later (32-bit and 64-bit)</td>
</tr>
<tr>
<td></td>
<td>● Windows Server 2003 R2 Standard Edition SP2 and later (32-bit and 64-bit)</td>
</tr>
<tr>
<td></td>
<td>● Windows Server 2008 Enterprise Edition or Standard Edition SP1 or later</td>
</tr>
<tr>
<td></td>
<td>● Windows Server 2008 R2 Standard or Enterprise Edition</td>
</tr>
<tr>
<td></td>
<td>● Sun Solaris 10 (64-bit edition only)</td>
</tr>
<tr>
<td></td>
<td>● IBM AIX 5L 5.3 and 6.1 (64-bit edition only)</td>
</tr>
<tr>
<td></td>
<td>● SUSE Linux Enterprise Server 10.0 (64-bit edition only)</td>
</tr>
<tr>
<td></td>
<td>● SUSE Linux Enterprise Server 11.0 (64-bit edition only)</td>
</tr>
<tr>
<td></td>
<td>● Red Hat Enterprise Linux AP or ES 5 (64-bit edition only)</td>
</tr>
</tbody>
</table>
## Adobe LiveCycle ES2
### Preparing to Install LiveCycle ES2 (Server Cluster)

#### Required software

<table>
<thead>
<tr>
<th>Application server</th>
<th>Supported version</th>
</tr>
</thead>
<tbody>
<tr>
<td>● JBoss Application Server 4.2.0 and 4.2.1</td>
<td></td>
</tr>
<tr>
<td>● JBoss Enterprise Application Platform 4.3</td>
<td></td>
</tr>
<tr>
<td>● IBM WebSphere 6.1.0.21 (Base and Network Deployment Edition)</td>
<td></td>
</tr>
<tr>
<td>● IBM WebSphere 7.0.0.9 (Base &amp; Network Deployment Edition)</td>
<td></td>
</tr>
<tr>
<td>● Oracle WebLogic 10g R3 (Standard and Enterprise editions)</td>
<td></td>
</tr>
<tr>
<td>● Oracle WebLogic 11g R3 - 10.3.3</td>
<td></td>
</tr>
</tbody>
</table>

| Web browser | For a list of web browsers, see "Web browser support" on page 32. |

| JDK | ● JBoss 4.2.1 and JBoss EAP 4.3 on all platforms: Sun Java SE Development Kit (JDK) 6.0 update 14 or later updates to 6.0 or later available at Sun Developer Network. |
|     | ● WebLogic on Windows and Linux: Oracle JRockit® Real Time 3.1.2-1.6.0.14 available from Oracle. |
|     | ● WebLogic on Solaris: Sun Java SE Development Kit (JDK) 6.0 update 7 or later available from Sun Developer Network. Requires the Daylight Savings Time (TZ) update, available at Sun Updater Tool, to be run in North America. |
|     | ● WebSphere 6.1 on all platforms: WebSphere Java SDK 1.5 SR8. |
|     | ● WebSphere 7.0 on all platforms: WebSphere Java SDK 1.6 SR7. |

To use AES 256 encryption with LiveCycle Rights Management ES2, obtain and install the Java Cryptography Extension (JCE) Unlimited Strength Jurisdiction Policy files from the Java SE Downloads.

**Note:** These requirements are optional and required only if you need to use Advanced Encryption Standard (AES) 256.

| 32-bit JDK (required for 64-bit application server only) | ● Sun JDK 6 update 14 or later updates to 6.0 available at Sun Developer Network. |

| Database | ● IBM DB2 9.1 or later versions of 9.x(Enterprise Edition) |
|          | ● Microsoft SQL Server 2005 SP3 or 2008 (Standard and Enterprise Edition) |
|          | ● Oracle 10g or 11g R2 (Standard and Enterprise Editions) |

**Note:** LiveCycle ES2 is compliant with the database vendors' compatibility statements. (See the vendors' websites.)
### Database driver
- IBM DB2 9.x driver is required for all supported versions of DB2: db2jcc.jar (version 3.50.152)
- SQL Server JDBC 1.2: sqljdbc.jar for both Microsoft SQL Server 2005 SP3 and Microsoft SQL Server 2008.
- Oracle 10g and 11g R2: ojdbc5.jar (release 11.1.0.6) for JDK 1.5 or ojdbc6.jar (release 11.1.0.6) for JDK 1.6

**Note:** The LiveCycle installation media includes these database drivers in the `{DVD_root}/third_party/db/database` directory.

**Note:** All LiveCycle Business Activity Monitoring ES2 metadata databases use the drivers listed above.

### LDAP server
- Sun ONE 5.1, 5.2, 6.x
- Microsoft Active Directory 2003 and 2008
- Novell® eDirectory 8.7.3
- IBM Tivoli Directory Server 6.0
- IBM Domino Enterprise Server 8.0 and later updates of 8.0

### Email servers
- Lotus Notes/Domino 6/7
- SendMail (included with Red Hat 5)
- Novell GroupWise 6/7

### LiveCycle Data Services ES2
- Adobe Flex® Builder™ 2.0.1 Hot Fix 2 or later
- Adobe Flash Builder 4 or later
  or
- Flex SDK 2.0.1 Hot Fix 2 or later
- Flex is required for these tasks:
  - Using LiveCycle Data Services ES2
  - Customizing form guides in LiveCycle Designer ES2
  - Customizing LiveCycle Workspace ES2
  - Creating Flex applications for LiveCycle Workspace ES2
  - Calling LiveCycle ES2 APIs using Flex
### Required software

<table>
<thead>
<tr>
<th>Required software</th>
<th>Supported version</th>
</tr>
</thead>
<tbody>
<tr>
<td>LiveCycle ES2 connector</td>
<td><strong>Connector for EMC® Documentum®:</strong></td>
</tr>
<tr>
<td></td>
<td>- EMC Documentum Content Server 6.0</td>
</tr>
<tr>
<td></td>
<td>- EMC Documentum Content Server 6.5</td>
</tr>
<tr>
<td></td>
<td>In addition, on your LiveCycle ES2 server, install the version of EMC Documentum Foundation Classes (DFC) that corresponds to your version of Content Server. (See Documentum Foundation Classes Installation Guide available from EMC Documentum.)</td>
</tr>
<tr>
<td></td>
<td><strong>Connector for IBM FileNet:</strong></td>
</tr>
<tr>
<td></td>
<td>- IBM FileNet P8 Content Engine 4.0.x, 4.5 and 5.0</td>
</tr>
<tr>
<td></td>
<td>- IBM FileNet P8 Process Engine 4.0.x, 4.5 and 5.0</td>
</tr>
<tr>
<td></td>
<td><strong>Note:</strong> The version of Process Engine should correspond to the version of your Content Engine (for example, Process Engine 4.0.x for Content Engine 4.0.x).</td>
</tr>
<tr>
<td></td>
<td>In addition, on your LiveCycle ES2 server, install the version of IBM FileNet P8 Content Java API that corresponds to your version of Content Engine (for example, 4.0.x Content Engine Java API or 4.5 Content Engine Java API). (See <strong>Additional requirements for LiveCycle ES2 Connector for IBM FileNet</strong> on page 42.) For a list of the required JAR files, see Content Java API Developer's Guide available from IBM FileNet.</td>
</tr>
<tr>
<td></td>
<td><strong>Connector for IBM Content Manager:</strong></td>
</tr>
<tr>
<td></td>
<td>- IBM Content Manager 8.4 (version 8.4 - 8.4.1.1 only)</td>
</tr>
<tr>
<td></td>
<td>In addition, on your LiveCycle ES2 server, install the version of IBM software that corresponds to your version of IBM Content Manager:</td>
</tr>
<tr>
<td></td>
<td>- DB2 Universal Database Client (not required if IBM Content Manager is on same server as the LiveCycle ES2 server)</td>
</tr>
<tr>
<td></td>
<td>- Information Integrator for Content (II4C) available from IBM</td>
</tr>
<tr>
<td></td>
<td><strong>Note:</strong> IBM Content Manager running on Oracle database is not supported.</td>
</tr>
<tr>
<td></td>
<td><strong>Connector for Microsoft SharePoint:</strong></td>
</tr>
<tr>
<td></td>
<td>- Microsoft SharePoint Server 2007</td>
</tr>
<tr>
<td></td>
<td>- Microsoft SharePoint Server 2010</td>
</tr>
<tr>
<td></td>
<td>In addition, the server running SharePoint Server must have Microsoft .NET Framework 3.5 installed.</td>
</tr>
<tr>
<td>PDF client</td>
<td>- Adobe Acrobat® Professional, Acrobat® Standard, and Acrobat Pro Extended, versions 8.0 to 9.3.</td>
</tr>
<tr>
<td></td>
<td>- Adobe Reader, versions 8.0 to 9.3.</td>
</tr>
<tr>
<td></td>
<td><strong>Note:</strong> For policy protecting a document, you require Acrobat Professional, Acrobat Standard, or Acrobat Pro Extended, versions 8.0 to 9.3.</td>
</tr>
<tr>
<td></td>
<td>Adobe Reader doesn't offer the capabilities to policy-protect documents.</td>
</tr>
<tr>
<td></td>
<td>- Apple® QuickTime 7 Player or Pro (for converting embedded video to PDF multimedia)</td>
</tr>
</tbody>
</table>
Note: LiveCycle Business Activity Monitoring ES2 is not supported on 32-bit systems. You must deploy it on a 64-bit system. Even though the LiveCycle ES2 installer can install the Business Activity Monitoring ES2 file set on a 32-bit system, it fails during configuration.

2.3.8 Installation user account for Windows

When installing on Windows, you must have administrative privileges. If you run the installer using a non-administrator account, enter the credentials of an account that has administrative privileges.

2.3.9 Configuration for 64-bit Windows installations

On 64-bit Windows Server 2008, Windows Vista, or Windows 7, modify the Admin Approval Mode security option as follows:

2. Locate User Account Control: Behavior of the elevation prompt for administrators in Admin Approval Mode and set it to Elevate without prompt.
3. Restart your computer.

Caution: The Windows UAC must remain disabled for PDF Generator ES2 or PDF Generator 3D ES2 to work properly. During the install and configuration process, turning on the UAC with the Elevate without prompt option enabled is sufficient, but the UAC must be completely disabled in order to run PDF Generator ES2 or PDF Generator 3D ES2.

If you are installing and configuring on an evaluation system, you can enable the UAC on the computer after you have deployed to your production computer or uninstalled PDF Generator ES2 or PDF Generator 3D ES2.

➤ Disable the Windows UAC on Vista:
1. To access the System Configuration Utility, go to Start > Run and in the Open: box enter MSCONFIG.
2. Click the Tools tab and scroll down and select Disable UAC.
3. Click Launch to run the command in a new window.
4. When finished, close the command window and close the System Configuration window.
5. Restart your computer.

To enable the UAC again, repeat the steps above and select Enable UAC before clicking Launch.

➤ Disable the Windows UAC on Server 2008 or Windows 7:
2. On the Choose when to be notified about change to your computer screen, move the slider to Never Notify.
3. Click OK.
To enable the UAC again, repeat the steps above and select the Use User Account Control (UAC) to help protect your computer option before restarting the computer.

### 2.3.10 Minimum database user permissions

<table>
<thead>
<tr>
<th>Database</th>
<th>Initialization permissions</th>
<th>Runtime permissions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oracle</td>
<td>CREATE SESSION</td>
<td>CREATE SESSION</td>
</tr>
<tr>
<td></td>
<td>CREATE CLUSTER</td>
<td>UNLIMITED TABLE SPACE (only needed if you do not configure user quotas)</td>
</tr>
<tr>
<td></td>
<td>CREATE TABLE</td>
<td>CREATE TABLE</td>
</tr>
<tr>
<td></td>
<td>CREATE VIEW</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CREATE SEQUENCE</td>
<td></td>
</tr>
<tr>
<td></td>
<td>UNLIMITED TABLE SPACE</td>
<td></td>
</tr>
<tr>
<td>SQL Server - DB level</td>
<td>Create Table</td>
<td>Connect</td>
</tr>
<tr>
<td></td>
<td>Create View</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Connect</td>
<td></td>
</tr>
<tr>
<td>SQL Server - Schema level</td>
<td>Alter</td>
<td>Insert</td>
</tr>
<tr>
<td></td>
<td>Insert</td>
<td>Select</td>
</tr>
<tr>
<td></td>
<td>References</td>
<td>Update</td>
</tr>
<tr>
<td></td>
<td>Select</td>
<td>Delete</td>
</tr>
<tr>
<td>DB2</td>
<td>See “DB2 user account” on page 66 for a complete description.</td>
<td>See “DB2 user account” on page 66 for a complete description.</td>
</tr>
</tbody>
</table>

### 2.3.11 Web browser support

#### 2.3.11.1 End-user user interface

End-user components include these modules:

- LiveCycle Workspace ES2 (Flash Player required)

  **Note:** Adobe Flash Player 9.0.115.0 or later is required for Workspace ES2 or for using form guides in Workspace ES2.

- LiveCycle Reader Extensions ES2 (Flash Player required)

- LiveCycle Rights Management ES2 (Flash Player required)

- LiveCycle PDF Generator ES2 and LiveCycle PDF Generator 3D ES2 (browser only)

- LiveCycle Content Services ES2 (browser only)
## Preparing to Install LiveCycle ES2 (Server Cluster)

### Web browser support

- "or later" includes major revisions. For example, Internet Explorer 6 or later also covers Internet Explorer 7 and 8.
- Workspace ES2 supports Internet Explorer and Firefox on Windows but only Safari 3.0.3 or later on the Mac.
- LiveCycle Forms ES2

<table>
<thead>
<tr>
<th>Operating system</th>
<th>Flash Player</th>
<th>Supported browser</th>
</tr>
</thead>
</table>
| Microsoft Windows 7 | Flash Player 10 | Microsoft Internet Explorer 8  
Firefox 3.0 or later\(^{(1)}\) |
| Microsoft Windows Vista™ | Flash Player 9 or 10 | Microsoft Internet Explorer 7 or later\(^{(1)}\)  
Firefox 3.0 or later\(^{(1)}\) |
| Windows 2000 | Flash Player 9 or 10 | Internet Explorer 6 or later\(^{(1)}\)  
Firefox 3.0 or later\(^{(1)}\) |
| Windows XP | Flash Player 9 or 10 | Internet Explorer 6 or later\(^{(1)}\)  
Firefox 3.0 or later\(^{(1)}\) |
| Windows Server 2008 | Flash Player 10 | Internet Explorer 8  
Firefox 3.0 or later\(^{(1)}\) |
| Windows Server 2003 | Flash Player 9 or 10 | Internet Explorer 6 or later\(^{(1)}\)  
Firefox 3.0 or later\(^{(1)}\) |
| Mac OS X v 10.4.x or 10.5.x (PowerPC) | Flash Player 9 or 10 | Firefox 3.0 or later (not for Workspace ES2)\(^{(1)(2)}\)  
Safari 3.x or 4.x (Workspace ES2 and Content Services ES2 require version 3.0.3 or later) |
| Mac OS X v 10.4.x, 10.5.x., or 10.6.x (Intel) | Flash Player 9 or 10 | Firefox 3.0 or later (not for Workspace ES2)\(^{(1)(2)}\)  
Safari 3.x or 4.x (Workspace ES2 and Content Services ES2 require version 3.0.3 or later) |

\(^{(1)}\)or later includes major revisions. For example, Internet Explorer 6 or later also covers Internet Explorer 7 and 8.

\(^{(2)}\)Workspace ES2 supports Internet Explorer and Firefox on Windows but only Safari 3.0.3 or later on the Mac.

<table>
<thead>
<tr>
<th>Operating system</th>
<th>Flash Player</th>
<th>Supported browser</th>
</tr>
</thead>
</table>
| Microsoft Windows 7 | N/A | Microsoft Internet Explorer 8  
Firefox 3.0 or later\(^{(1)}\)  
Netscape 8.x or later |
| Microsoft Windows Vista™ | N/A | Microsoft Internet Explorer 6 or later\(^{(1)}\)  
Firefox 3.0 or later\(^{(1)}\)  
Netscape 8.x or later |
Preparing to Install LiveCycle ES2 (Server Cluster)

**Web browser support**

- "or later" includes major revisions. For example, Internet Explorer 6 or later also covers Internet Explorer 7 and 8.

**LiveCycle Business Activity Monitoring ES2**

<table>
<thead>
<tr>
<th>Operating system</th>
<th>Flash Player</th>
<th>Supported browser</th>
</tr>
</thead>
</table>
| Windows XP       | N/A          | Microsoft Internet Explorer 6 or later<sup>(1)</sup>  
|                  |              | Firefox 3.0 or later<sup>(1)</sup>  
|                  |              | Netscape 8.x or later |
| Windows Server 2008 | N/A        | Firefox 3.0 or later<sup>(1)</sup> |
| Windows Server 2003 | N/A        | Firefox 3.0 or later<sup>(1)</sup> |
| Linux (Intel)    | N/A          | Firefox 3.0 or later<sup>(1)</sup>  
|                  |              | Netscape 8.x or later |
| Mac OS X v 10.4.x or 10.5.x (PowerPC) | N/A | Safari 3.x or 4.x |
| Mac OS X v 10.4.x, 10.5.x., or 10.6.x (Intel) | N/A | Safari 3.x or 4.x |

<sup>(1)</sup>"or later" includes major revisions. For example, Internet Explorer 6 or later also covers Internet Explorer 7 and 8.

**2.3.11.2 Administrator user interface**

<table>
<thead>
<tr>
<th>Operating system</th>
<th>Flash Player</th>
<th>Supported browser</th>
</tr>
</thead>
<tbody>
<tr>
<td>Microsoft Windows Vista™</td>
<td>Flash Player 9 or 10</td>
<td>Microsoft Internet Explorer 7 or later&lt;sup&gt;(1)&lt;/sup&gt;</td>
</tr>
<tr>
<td>Windows XP</td>
<td>Flash Player 9 or 10</td>
<td>Microsoft Internet Explorer 6 or later&lt;sup&gt;(1)&lt;/sup&gt;</td>
</tr>
<tr>
<td>Windows Server 2000</td>
<td>Flash Player 9 or 10</td>
<td>Microsoft Internet Explorer 6 or later&lt;sup&gt;(1)&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

<sup>(1)</sup>"or later" includes major revisions. For example, Internet Explorer 6 or later also covers Internet Explorer 7 and 8.
Preparing to Install LiveCycle ES2 (Server Cluster)

Adobe LiveCycle ES2
Additional requirements for PDF Generator ES2 and PDF Generator 3D ES2

2.3.11.3 Using Content Services ES2 with Firefox

Due to certain restrictions to how Firefox handles local links beginning with `file:///`, in order to use Content Services ES2 with Firefox you must update your Firefox installation by downloading and installing the plug-in from the following location: http://forge.alfresco.com/projects/firefox-ext/

2.3.12 Additional requirements for PDF Generator ES2 and PDF Generator 3D ES2

- **Note:** PDF Generator 3D ES2 is supported on Windows environments only.
- **Note:** Ensure that X Window libraries are installed on your operating system. This is required for PDF Generator ES2 and Forms ES2. See documentation for your operating system for more information.
- **Note:** You cannot use the Shared Printer Protocol for the `SendToPrinter` API on Windows 2008 machines that have PDF Generator ES2 deployed on them. Use alternate protocols like CIFS or Direct IP.

2.3.12.1 User account for Windows

You must use a user account with administrator privileges for the following tasks:

- Installing Microsoft Office
- Installing PDF Generator ES2 or PDF Generator 3D ES2
- Installing Acrobat 9.3 Professional Extended for PDF Generator ES2 or PDF Generator 3D ES2
- Running the application server process

2.3.12.2 Using 64-bit application servers with PDF Generator

If you are using a 64-bit application server on a system with PDF Generator ES2 or PDF Generator 3D ES2, ensure that a 32-bit Java 6 JDK is installed in addition to the 64-bit one the application server uses. Set the environment variable `JAVA_HOME_32`. This variable is required to point to a 32-bit JDK on systems where a 64-bit application server is in use. The specific path varies based on the installation directory you specified and the operating system you are installing on.

---

<table>
<thead>
<tr>
<th>Operating system</th>
<th>Flash Player</th>
<th>Supported browser</th>
</tr>
</thead>
<tbody>
<tr>
<td>Windows Server 2008</td>
<td>N/A</td>
<td>Internet Explorer 8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Firefox 3.0 or later(1)</td>
</tr>
<tr>
<td>Windows Server 2003</td>
<td>N/A</td>
<td>Internet Explorer 6 or later(1)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Firefox 3.0 or later(1)</td>
</tr>
<tr>
<td>Linux (Intel)</td>
<td>N/A</td>
<td>Firefox 3.0 or later(1)</td>
</tr>
</tbody>
</table>

(1)"or later" includes major revisions. For example, Microsoft Internet Explorer 6 or later also covers Microsoft Internet Explorer 7 and 8.
**Note:** You need to install the 32-bit Sun JDK and configure `JAVA_HOME_32` to point to the directory where it resides. Review Sun Java 6 Release Notes > Supported System Configurations and download the 32-bit version for your operating system, except for AIX.

**Caution:** Ensure that `JAVA_HOME_32` is set only as an environment variable and is not included in the PATH. If `JAVA_HOME_32` is included in the PATH, Java core dumps may appear during EAR deployment or when you restart the server.

➢ To set the Windows `JAVA_HOME_32` variable:

1. Select **Start > Control Panel > System**.
2. Click the **Advanced** tab.
3. Click **Environment Variables** and, under System Variables, click **New**.
4. Enter the environment variable `JAVA_HOME_32`. This directory is the directory that contains the JDK. For example, type the following code:
   ```
   D:\Program Files (x86)\Java\jdk1.6.0_14
   ```

➢ To set the `JAVA_HOME_32` variable on Linux or Solaris:

Set the `JAVA_HOME_32` variable for the supported JDK for Borne and Bash shells as shown in this example:

```
JAVA_HOME_32=/opt/jdk1.6.0_14
export JAVA_HOME_32
```

### 2.3.12.3 Native file conversion software installation

Before you install PDF Generator ES2 or PDF Generator 3D ES2, install the software that supports the file formats for which PDF conversion support is required and manually activate the licenses for the software using the user account that is used for running the application server process.

You must activate one license on each LiveCycle ES2 server of your cluster for each native application that PDF Generator ES2 or PDF Generator 3D ES2 supports. Refer to the individual licensing agreement for each native application that your LiveCycle ES2 deployment will support, and ensure that your LiveCycle ES2 deployment meets the licensing requirements specified. Typically, each LiveCycle ES2 user who will use native application support must also have an activated license on their own computer for the native application.

PDF Generator ES2 or PDF Generator 3D ES2 can be extended to convert these additional file types to PDF files by using the following applications:

- Microsoft Office 2003, 2007 (DOC, XLS, PPT, RTF, TXT, Microsoft Office open XML Formats)
- Microsoft Office Visio 2003, 2007 (VSD)
- Microsoft Publisher 2003, 2007 (PUB)
- Microsoft Project 2003, 2007 (MPP)

**Note:** Native file conversions using AutoCAD for DWG, DXF, and DWF files are supported only on 32-bit environments. Conversions for these file types using Acrobat are supported on both 32-bit and 64-bit platforms.

- Corel WordPerfect 12, X4 (WPD)
Adobe Photoshop® CS2
Adobe FrameMaker® 7.2, 8.0 (FM)
Adobe PageMaker® 7.0 (PMD, PM6, P65, PM)
OpenOffice 2.4.2, 3.1 (ODT, ODP, ODS, ODG, ODF, SXW, SXI, SXC, SXD, SXM).

Note: OpenOffice 3.1 or later must be installed on the server to convert the documents created in version 3.1. OpenOffice 2.4.2 cannot convert documents created in later versions of OpenOffice.

You do not need to install a native software application to convert the following native file formats:
- Print files (PS, PRN, EPS)
- Web files (HTML)
- Image files (JPEG, GIF, BMP, TIFF, PNG)

### 2.3.12.4 Acrobat

PDF Generator ES2 or PDF Generator 3D ES2 requires that Acrobat Pro Extended is installed. You must install Acrobat before you run the LiveCycle ES2 installer.

The LiveCycle ES2 installer sets the `Acrobat_PATH` environment variable automatically. If you need to set it manually, see “Setting environment variables” in the *Installing and Deploying LiveCycle ES2* guide for your application server. You will need to restart the application server.

Note: The environment variable `Acrobat_PATH` is case-sensitive.

To use AES 256 encryption in LiveCycle Encryption service to encrypt a PDF document, you must obtain and install the Java Cryptography Extension (JCE) Unlimited Strength Jurisdiction Policy files. For example, for Sun JDK, download JCE files from [Java SE Downloads](https://developers.sun.com/jdk). After downloading the policy file, replace the existing `local_policy.jar` and `US_export_policy.jar` files under `[JAVA_HOME]/jre/lib/security` folder with the downloaded JAR files.

Note: On a 64-bit Windows server using LiveCyle Turnkey installation, copy the downloaded JAR files under `[LiveCycleES2 root]/Java/jdk1.6.0_14/jre/lib/security`.

Note: Depending on the JDK that you use, download the required JAR files from either Sun or IBM website.

### 2.3.12.5 QuickTime 7

PDF Generator ES2 requires that QuickTime 7 (Player or Pro) is installed if you want to convert video embedded in files, such as PowerPoint presentations to PDF multimedia files. This application is available from the [Apple Downloads](https://www.apple.com/mac/download-center/) site.

### 2.3.12.6 Setting Windows environment variables

You must set the environment variables in Windows if you plan to create PDF documents from applications such as FrameMaker, Photoshop, PageMaker, and WordPerfect.

The names of these environment variables are listed here:
- `FrameMaker_PATH`
Adobe LiveCycle ES2  Preparing to Install LiveCycle ES2 (Server Cluster)  Additional requirements for PDF Generator ES2 and PDF Generator 3D ES2  38

1. Notepad_PATH (This should be left blank)
2. OpenOffice_PATH
3. PageMaker_PATH
4. Photoshop_PATH
5. WordPerfect_PATH
6. Acrobat_PATH

These environment variables are optional and need to be set only if you plan to use the corresponding application to convert PDF files through PDF Generator ES2 or PDF Generator 3D ES2. The value of the environment variable should contain the absolute path of the executable that is used to start the corresponding application.

For example, the variable FrameMaker_PATH may contain the value \Program Files\Adobe\FrameMaker7.2\FrameMaker.exe. However, OpenOffice_PATH is different from others. This variable must be set to the OpenOffice installation folder (instead of the path to the executable). A typical value of OpenOffice_PATH on Windows would be \Program Files\OpenOffice.org 3.0\.

Paths for Microsoft Office applications such as Word, PowerPoint, Excel, Visio, and Project or for AutoCAD are not required. The Generate PDF service starts these applications automatically if they are installed on the server.

**Note:** The Acrobat_PATH environment variable is case-sensitive.

➤ **To set the Windows environment variables:**

1. Select Start > Control Panel > System.
2. Click the Advanced tab.
3. Click Environment Variables and, under System Variables, click New.
4. Enter the environment variable name you need to set (for example, FrameMaker_PATH). This directory is the directory that contains the executable file. For example, type the following code:
   
   C:\Program Files\Adobe\FrameMaker7.2\FrameMaker.exe

**2.3.12.7 Network Printer Client installation**

PDF Generator ES2 includes the Network Printer Client installer for installation of the PDF Generator ES2 Internet printer. After the installation is completed, a PDF Generator ES2 printer is added to the list of existing printers on the clients computer. This printer can then be used to send documents for conversion to PDF. For more information about installing the Network Printer Client, see Installing and Deploying LiveCycle ES2 document for your application server.

**Note:** The PDF Generator ES2 Network Printer Client is only supported on the following 32-bit Windows platforms: Windows XP, Windows 2000, Windows Server 2003, Windows Vista.

**2.3.12.8 Service Control Manager command line tool**

Before you complete an automatic installation of PDF Generator ES2 on Windows, ensure that the Service Control Manager command line tool, sc.exe, is installed in the Windows environment. Some Windows servers do not have this software preinstalled. By default, the sc.exe file is installed in the C:\Windows\system32 directory. Most OS installations have this tool installed. If you do not have the tool
installed, it is available in the Windows Resource Kit for your specific version of Windows. To confirm that the tool is installed on your server, type `sc.exe` from a command prompt. The tools usage is returned.

### 2.3.12.9 Headless mode configuration

If you are running PDF Generator ES2 in a headless mode environment (that is, on a server without a monitor, keyboard, or mouse), the x11 libraries must be installed. Some flavors of Linux do not install these libraries by default; therefore, you must obtain the libraries and install them manually. For more information, see the Help system for your operating system.

### 2.3.12.10 Enabling multi-threaded file conversions

By default, PDF Generator ES2 can convert only one OpenOffice, Microsoft Word, or PowerPoint document at a time. If you enable multi-threaded conversions, PDF Generator ES2 can convert more than one of the documents concurrently by launching multiple instances of OpenOffice or PDFMaker (which is used to perform the Word and PowerPoint conversions).

**Note:** Multi-threaded file conversions are not supported with Microsoft Word 2003 and PowerPoint 2003. In addition, Microsoft Excel (both 2003 and 2007 versions) are not supported. To enable multi-threaded file conversions, upgrade to Microsoft Word 2007 and PowerPoint 2007.

Each instance of OpenOffice or PDFMaker is launched using a separate user account. Each user account that you add must be a valid user with administrative privileges on the LiveCycle ES2 server computer. In a clustered environment, the same set of users must be valid for all nodes of the cluster.

On Windows platforms, you must add the right to replace the process-level token. (See “Granting the Replace a process level token privilege (Windows only)” on page 40.)

On 64-bit Windows, the Windows UAC must be disabled. (See “Configuration for 64-bit Windows installations” on page 31).

On all platforms, you must also configure the user permissions. (See “Multi-user support for PDF Generator ES2” on page 40.) When adding users for OpenOffice, Microsoft Word, or Microsoft PowerPoint on Windows 2003 or 2008, or for OpenOffice on Linux or Solaris, dismiss the initial activation dialogs for all users.

After your LiveCycle ES2 server is configured, you must add LiveCycle ES2 user accounts in LiveCycle Administration Console and on AIX, Linux, or Solaris platforms, turn off password prompting. See the “Configuring user accounts for multi-threaded file conversions” in the *Installing and Deploying LiveCycle ES2* guide for your application server.

### Additional configuration required for OpenOffice on Linux or Solaris

1. Add entries for additional users (other than the administrator who runs the LiveCycle ES2 server) in the `/etc/sudoers` file. For example, if you are running LiveCycle ES2 as a user named lcadm and a server named myhost, and you want to impersonate user1 and user2, add the following entries to `/etc/sudoers`:

   ```
   lcadm myhost=(user1) NOPASSWD: ALL
   lcadm myhost=(user2) NOPASSWD: ALL
   ```

   This configuration enables `lcadm` to run any command on host `myhost` as ‘user1’ or ‘user2’ without prompting for password.
2. Allow all the users that you added via Add a user account to make connections to the LiveCycle ES2 server. For example, to allow a local user named user1 the permission of making the connection to the LiveCycle ES2 server, use the following command:

   xhost +local:user1@

   For more details, refer to xhost command documentation.

3. Restart the server.

2.3.12.11 Multi-user support for PDF Generator ES2

To enable multi-user support for Native files and OpenOffice files on a Windows environment, a minimum of three users with the following permissions must be added. On a AIX, Linux, or Solaris platform, create at least one user.

<table>
<thead>
<tr>
<th>Platform</th>
<th>User permissions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Windows 2008 Server</td>
<td>Users with administrative privileges and UAC disabled</td>
</tr>
<tr>
<td>Windows 2003 Server</td>
<td>Users with administrative privileges</td>
</tr>
<tr>
<td>AIX, Linux, and Solaris</td>
<td>Users with sudo privileges</td>
</tr>
</tbody>
</table>

**Note:** For clusters, the users you create must have the above permissions on all nodes.

When you add users for PDF Generator ES2 native conversions, you must grant the user running the application server with the *Replace a process level token* privilege. See “Granting the *Replace a process level token* privilege (Windows only)” on page 40.

2.3.12.12 Granting the *Replace a process level token* privilege (Windows only)

User accounts that are used to start the application server from a command prompt and not as a Windows service requires the *Replace a process level token* privilege. This setting is required for PDF Generator ES2.

➤ **To grant the *Replace a process level token* privilege:**

1. Click Start > Run, and then type `gpedit.msc`.


3. Click *Add User or Group*, add the Windows user account that is used to open the command prompt from which the application server is started.

4. Restart Windows, and then start the application server.

2.3.13 Additional requirements for Connector for IBM Content Manager

LiveCycle ES2 Connector for IBM Content Manager requires the following software installed (both available from the IBM website):
Adobe LiveCycle ES2
Preparing to Install LiveCycle ES2 (Server Cluster)  Additional requirements for Connector for IBM Content Manager  41

● DB2 Universal Database Client
● IBM Information Integrator for Content (II4C)

See “Post-Deployment Activities” chapter in the Installing and Deploying LiveCycle ES2 document for your application server.

➤ To configure the connection for a single IBM Content Manager datastore:

1. Start the DB2 Configuration Assistant.
2. Click Selected > Add Database Using Wizard.
3. Select Manually Configure a Connection to a Database and click Next.
4. Select TCP/IP and click Next.
5. Specify the following TCP/IP communication options and then click Next:
   ● In the Host Name box, type the host name of the server hosting DB2 Content Manager.
   ● Leave the Service Name box empty.
   ● In the Port Number box, type the port number. The default DB2 Content Manager port number is 50000.
6. In the Database Name box, type the IBM Content Manager datastore name and, in the Database Alias box, type the alias name for the datastore and then click Next.
7. Click Next to accept the default data source settings.
8. In the Operating System list, select the operating system you are using and then click Next.
9. Specify the following system options and then click Next:
   ● In the System Name box, type the server name hosting DB2. If you click Discover, DB2 Content Manager searches for the system name you specified and, if the system is not found, all of the DB2 instances are listed.
   ● In the Host Name box, type the name of the host, or click View Details to show the domain and IP address of the system you named in the previous step.
   ● In the Operating System list, select the operating system (Windows, Linux, or AIX) on which you deployed DB2 Content Manager.
11. In the Test Connection dialog box, test the connection as required.

➤ To configure connections for multiple IBM Content Manager datastores:

1. Configure the initial connection by following the steps in “To configure the connection for a single IBM Content Manager datastore:” on page 41.
2. Add additional database connections by modifying the cmbicmsrvs.ini file (the file that stores the datastore information) as follows:
   ● From a command prompt window, change the directory to [II4C home]/bin (for example, C:\Program Files\db2cmv8\ on Windows or /opt/IBM/db2cmv8 on AIX, Linux, or Solaris).
Preparing to Install LiveCycle ES2 (Server Cluster)  Additional requirements for LiveCycle ES2 Connector for IBM FileNet

- Run the cmbenv81.bat (Windows) or cmbenv81.sh (AIX, Linux, or Solaris) file to set the environment and the classpath for the Java Utilities of II4C.
- Change the directory to \[II4C working directory\]/cmgmt/connectors where \[II4C working directory\] is one of the following paths:
  - (Windows) C:/Program Files/db2cmov8
  - (Linux, AIX) /home/ibmcmadm
  - (Solaris) /export/home/ibmcmadm
- Run the command `java com.ibm.mm.sdk.util.cmbsrvsicm -a add -s <library server database name> -sm <database schema name>`, where `<library server database name>` is the same as Database Alias configured in step 6 above.

**Note:** The following procedure allows users without DB2 rights to share the connection credentials through the cmbicmenv.ini file.

➤ **To configure a multiuser connection to the IBM Content Manager datastore:**

1. From a command prompt window, change the directory to \[II4C home\]/bin (for example, C:\Program Files\db2cmov8 on Windows or /opt/IBM/db2cmov8 on AIX, Linux, or Solaris).
2. Run the cmbenv81.bat (Windows) or cmbenv81.sh (AIX, Linux, or Solaris) file to set the environment and the classpath for the Java Utilities of II4C.
3. Change the directory to \[II4C working directory\]/cmgmt/connectors, where \[II4C working directory\] is one of the following paths:
   - (Windows) C:/Program Files/db2cmov8
   - (Linux, AIX) /home/ibmcmadm
   - (Solaris) /export/home/ibmcmadm
4. Run the command `java com.ibm.mm.sdk.util.cmbenvicm -a add -s <library server database name> -u <database user ID> -p <database password>`, where `<library server database name>` is the same as Database alias configured in step 6 above.

### 2.3.14 Additional requirements for LiveCycle ES2 Connector for IBM FileNet

These requirements are optional and required only if you are installing Connector for IBM FileNet.

**IBM FileNet 4.0**

If LiveCycle ES2 is connecting to IBM FileNet 4.0 Content Engine, you must install the Content Engine Java Client. Use the IBM FileNet 4.0 content server installer located by default in C:\Program Files\FileNet\Content Engine. Select only the Java client component on the component selection screen.

For IBM FileNet 4.0 Process Engine settings, copy the pe.jar file from the Process Engine directory to the computer that will host LiveCycle ES2. Create the directory C:\FileNetPE\files and copy the pe.jar file there. The Process Engine client install directory is now C:\FileNetPE.
IBM FileNet 4.5

If LiveCycle ES2 is connecting to IBM FileNet 4.5 Content Engine, you must install the Content Engine client located by default in C:\Program Files\FileNet. During installation, select at least one of the components from Application Engine or Process Engine on the component selection screen.

For IBM FileNet 4.5 Process Engine, you must install the IBM FileNet 4.5 Process Engine Client located by default in C:\Program Files\FileNet\BPMClient. During installation, select the Other option on the component selection screen.

IBM FileNet 5.0

If LiveCycle ES2 is connecting to IBM FileNet 5.0 Content Engine, you must install the Content Engine client located by default in C:\Program Files\FileNet. During installation, select at least one of the components from Application Engine or Process Engine on the component selection screen.

For IBM FileNet 5.0 Process Engine, you must install the IBM FileNet 5.0 Process Engine Client located by default in C:\Program Files\FileNet\BPMClient. During installation, select the Other option on the component selection screen.

2.4 LDAP configuration

This configuration is optional and required only if you are using an LDAP directory to authenticate users. When you upgrade LiveCycle Policy Server 7.x or Rights Management ES LDAP configuration settings are automatically migrated.

If you do not have an existing LDAP server and database, install and configure your LDAP server and database according to the vendor’s documentation. For a list of supported LDAP servers, see “Supported software” on page 27. Make note of the LDAP administrator name and password to use during the LiveCycle ES2 configuration process. Configure LiveCycle ES2 to connect with the LDAP database after you install and deploy your LiveCycle ES2 services. This configuration is done by using the User Manager service. See the Installing and Deploying LiveCycle ES2 document for your application server.

2.5 Global document storage directory

The global document storage (GDS) directory is used to store long-lived files that are used within a process as well as critical LiveCycle ES2 product components. The lifetime of long-lived files is intended to span multiple restarts of a LiveCycle ES2 system, and can span days and even years. These files may include PDF files, policies, or form templates. Long-lived files are a critical part of the overall state of many LiveCycle ES2 deployments. If some or all long-lived documents are lost or corrupted, the LiveCycle ES2 server may become unstable. Input documents for asynchronous job invocation are also stored in the GDS directory and must be available in order to process requests.

You can also use the document storage in LiveCycle ES2 database. See LiveCycle ES2 Administration Help for details.

2.5.1 Planning and creating the global document storage directory

You should plan the location, size, access rights, and security aspects of your GDS directory in advance. See the following sections:

● “Location of the global document storage directory” on page 44
Prepare to Install LiveCycle ES2 (Server Cluster)

Location of the Global Document Storage Directory

Create a shared file system for the GDS directory on any computer that is accessible by each node in the LiveCycle ES2 cluster, and ensure that all nodes of the cluster have read and write permissions for the directory.

You must create the GDS directory before you initialize the LiveCycle ES2 database.

2.5.2 Location of the Global Document Storage Directory

You configure the location of your GDS directory with LiveCycle Configuration Manager after you install LiveCycle ES2. The GDS directory you specify should be highly available and should have low access time to enhance performance. If the GDS directory is on a shared network drive, it is recommended that you specify the location as `\computer_name\GDS`.

You must specify the shared directory that you create for GDS. You cannot use the default location in a cluster environment.

If you must change the GDS directory location after completing the installation (see LiveCycle ES2 Administration Help), you should plan an appropriate location for the GDS directory.

**Caution:** Module deployment will fail on Windows if the GDS directory is at the drive root (for example, D:`\`). For GDS, you must make sure that the directory is not located at the root of the drive but is located in a subdirectory. For example, the directory should be D:`\GDS` and not simply D:`\`

2.5.3 Sizing Factors for the Global Document Storage Directory

The size of the shared directory depends on expected LiveCycle ES2 usage factors for the deployment. You should allocate a minimum of 10 GB of disk space for the GDS directory, but the following factors also affect the sizing:

- The typical volume of documents that LiveCycle ES2 processes. Processing high volumes of documents requires a larger GDS directory.
- The typical size of documents that LiveCycle ES2 processes. Processing large documents requires a larger shared GDS directory.
- The complexity of documents that LiveCycle ES2 processes. Processing complex documents (such as documents that are processed by multiple LiveCycle ES2 services or are processed by different members of the cluster) requires a larger GDS directory.

2.5.4 Securing the Global Document Storage Directory

Access to the GDS directory must be secure. The long-lived documents in this directory may contain sensitive user information, such as information that requires special credentials when accessed by using the LiveCycle ES2 SDK or user interfaces.

Use a security method that is appropriate to your operating system. It is recommended that only the operating system account that is used to run the application server has read and write access to this directory.
Note: Incorrectly deleting files or directories from the GDS directory can render the LiveCycle ES2 installation inoperative.

2.5.5 Backing up the global document storage directory

The global document storage directory should be backed up to allow administrators to restore LiveCycle ES2 in case of failure.

If the global document storage directory becomes unavailable or is lost due to failure, LiveCycle ES2 will not run until the GDS directory and database are restored by a consistent back up or LiveCycle ES2 is reinitialized with a new installation.

If you use the LiveCycle ES2 database for document storage, backup of GDS happens along with the database backup. See LiveCycle ES2 Administration Help for details.

2.6 LiveCycle Business Activity Monitoring ES2 requirements

Note: Business Activity Monitoring ES2 (BAM) is not supported on 32-bit systems. Even though you can install BAM fileset with LiveCycle ES2 on a 32-bit system, you must deploy BAM on a 64-bit system.

2.6.1 Basic requirements

2.6.1.1 Dedicated JVM

Business Activity Monitoring ES2 requires a dedicated JVM. If you are deploying LiveCycle ES2 and Business Activity Monitoring ES2 on the same computer, be aware that Business Activity Monitoring ES2 must run on a dedicated JVM. This requires that Business Activity Monitoring ES2 is deployed separately from LiveCycle ES2 as follows:

- If deployed on JBoss, the two applications must be deployed on two completely separate JBoss implementations.
- If deployed on WebLogic or WebSphere, the two applications must be deployed on completely separate server definitions.

2.6.1.2 Client memory

The client computer that accesses Business Activity Monitoring ES2 should have a minimum of 512 MB RAM (1 GB is recommended).

2.6.1.3 Web browser

Business Activity Monitoring ES2 is tested for Microsoft Internet Explorer 6.0 (with patch 828750) or later browser for accessing BAM Workbench and BAM Dashboard. Firefox is not supported.

Note: You must also install Adobe Flash, version 9.0.115.0 or later.

Note: If your implementation of Business Activity Monitoring ES2 is running in an Asian language, you must configure the browser for the appropriate language support. See the documentation for Internet Explorer or Windows.
2.6.1.4 Mail Server

Business Activity Monitoring ES2 requires a running Simple Mail Transfer Protocol (SMTP) email server for delivering email notifications. The server is external to Business Activity Monitoring ES2 and is managed by your email system administrator. Contact that administrator to set up an account specifically for Business Activity Monitoring ES2. You need an account and password for sending mail, an address to use in the From address field, and the name of the email server host.

2.6.2 Creating the Business Activity Monitoring ES2 databases

There are two databases required to use the Business Activity Monitoring ES2 functionality: a metadata database and a geography database.

Create a Business Activity Monitoring ES2 metadata database to store the definitions of the process metrics that BAM Server monitors. It also stores the details of any alerts and object run-time data that are persisted to disk.

Because Business Activity Monitoring ES2 metadata can grow large, allocate at least 50 MB for the BAM Server metadata database. For production deployments, allocate at least 200 MB.

BAM Server can require specific settings for some aspects of the BAM Server metadata database configuration. The settings depend on the type of application server that is hosting BAM Server and the type of database server that is used to store the BAM Server metadata.

Also, create a Business Activity Monitoring ES2 geography database to support Geography Maps, which is required for using Geography charts in the dashboard. The size of the geography database depends on the number of geography code entries being accessed. 100 MB - 150 MB is the recommendation.

You need to create a user account that BAM Server can use to connect to the BAM Server metadata and geography databases. For database permissions, see "Minimum database user permissions" on page 32. For all other database settings, use the configurations described for a LiveCycle ES2 database. See “Creating the LiveCycle ES2 Database” on page 60 for your database type.

2.6.3 JBoss requirements for BAM

Metadata and geography databases:

<table>
<thead>
<tr>
<th>Database</th>
<th>JDBC driver</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oracle</td>
<td>● Oracle thin driver (ojdbc6.jar) release 11.1.0.6</td>
</tr>
<tr>
<td></td>
<td><strong>Note:</strong> Use the Oracle 10g JDBC driver for both configurations.</td>
</tr>
<tr>
<td>MS SQL Server</td>
<td>● sqljdbc.jar (version 1.2)</td>
</tr>
<tr>
<td></td>
<td><strong>Note:</strong> Use SQL Server JDBC Driver 1.2 for both Microsoft SQL Server 2005</td>
</tr>
<tr>
<td></td>
<td>SP3 and Microsoft SQL Server 2008.</td>
</tr>
<tr>
<td></td>
<td><strong>Note:</strong> Ensure that the version 2000 drivers are not in the classpath.</td>
</tr>
</tbody>
</table>
2.6.4 WebLogic requirements for BAM

Metadata and geography databases:

<table>
<thead>
<tr>
<th>Database</th>
<th>JDBC driver</th>
</tr>
</thead>
<tbody>
<tr>
<td>IBM DB2</td>
<td>db2jcc.jar (version 3.50.152)</td>
</tr>
<tr>
<td>MS SQL Server</td>
<td>sqjdbc2c.jar (version 1.2)</td>
</tr>
</tbody>
</table>

**Note:** Use SQL Server JDBC Driver 1.2 for both Microsoft SQL Server 2005 SP3 and Microsoft SQL Server 2008.

**Note:** Ensure that the version 2000 drivers are not in the classpath.

<table>
<thead>
<tr>
<th>Database</th>
<th>JDBC driver</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oracle</td>
<td>Oracle thin driver (ojdbc6.jar) release 11.1.0.6</td>
</tr>
</tbody>
</table>

**Note:** Use the Oracle 10g JDBC driver for both configurations.

2.6.5 WebSphere requirements for BAM

Metadata and geography databases:

<table>
<thead>
<tr>
<th>Database</th>
<th>JDBC driver</th>
</tr>
</thead>
<tbody>
<tr>
<td>IBM DB2</td>
<td>db2jcc.jar (version 3.50.152)</td>
</tr>
<tr>
<td>MS SQL Server</td>
<td>sqjdbc2c.jar (version 1.2)</td>
</tr>
</tbody>
</table>

**Note:** Use SQL Server JDBC Driver 1.2 for both Microsoft SQL Server 2005 SP3 and Microsoft SQL Server 2008.

<table>
<thead>
<tr>
<th>Database</th>
<th>JDBC driver</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oracle</td>
<td>Oracle thin driver (ojdbc6.jar for JDK 1.6 or ojdbc5.jar for JDK 1.5) release 11.1.0.6</td>
</tr>
</tbody>
</table>

**Note:** Use the Oracle 10g JDBC driver for both configurations.
2.7 Synchronizing clock times

You must ensure that all computers in a horizontal cluster synchronize their clock times regularly. Your LiveCycle ES2 installation may encounter problems if the node times differ by more than a few seconds.

Apply the standard time synchronization practices employed by your network to all computers of the LiveCycle ES2 cluster.

2.8 Installation considerations

2.8.1 Disabling Virus scans (Windows only)

To improve the speed of the installation, disable any on-access virus scanning software for the duration of the installation.

2.8.2 Installing from network drives

It is recommended that you install LiveCycle ES2 only from the installation media or a local disk drive. Attempting to install the software over a network results in considerable delays in starting and installing. It is also likely that installing from a network drive will add to the length of the directory path, which will cause the LiveCycle ES2 installer to prevent the installation from proceeding.

2.8.3 Using LiveCycle ES2 with a Luna HSM cluster

When using a SafeNet Luna ethernet-attached Hardware Security Module (HSM) cluster, you must ensure HAOnly mode is enabled on the device.

➢ To enable HAOnly mode on the Luna device

1. Use the vtl tool shipped with the Luna client to determine if HAOnly mode is enabled. Type:
   
   vtl haAdmin -HAOnly -show

2. 1) If HAOnly mode is not enabled, type:
   
   vtl haAdmin -HAOnly -enable

2.8.4 Manual use of Acrobat restricted

If you installed the PDF Generator ES2 or PDF Generator 3D ES2 for native document conversion, use of the bundled Acrobat installation is restricted to the Generate PDF and Generate 3D PDF services and is not licensed for any other use.

2.8.5 Temporary directory

LiveCycle ES2 requires a temporary directory to store documents that are larger than the maximum inline size set for document objects. For detailed information on how you can improve the performance of your LiveCycle ES2 server by specifying an appropriate value for this setting, see this blog.

(AIX, Linux, and Solaris only) If a non-root user is running the application server, the user must have full permissions on the specified temporary directory.
**Horizontal cluster:** The location of the temporary directory can be either unique or shared for a horizontal cluster. Create a unique temporary directory on each node of the cluster to eliminate network traffic to a shared drive or directory.

**Vertical cluster:** Create a shared temporary directory. Typically, the shared folder is on the same local system as the vertical cluster.

In addition to the shared temporary folder, each server creates its unique subdirectories to store temporary data. The subdirectory name is based on the corresponding server name.

*(JBoss Only)* To ensure each JBoss instance has a different name, manually modify the `-Dadobeidp.serverName=<servername>` JVM argument. The default value is server1.

**Note:** If you do not create the temporary directory, the default system-configured location is used.

**Caution:** Future upgrades might fail if you specify a shared network directory as the temporary directory.

### 2.8.6 LiveCycle ES2 IPv6 support

LiveCycle ES2 includes IPv6 support. The default configurations defined in the installation documentation for LiveCycle ES2 set IPv4 as the default IP protocol because this protocol has the most compatibility with third-party infrastructure.

Do not enable IPv6 unless your deployment must use it. The number of supported platform configurations is reduced when enabling IPv6 support with LiveCycle ES2. You should verify that all third-party software, hardware, and networks that you plan to use have IPv6 support before you attempt to enable IPv6.

**Note:** If you are enabling CIFS in an IPv6 environment, you must explicitly enable IPv6 configuration after you configure your LiveCycle ES2 installation using LiveCycle Configuration Manager. See “Enabling CIFS in IPv6 mode” in the guide for your application server.

#### 2.8.6.1 Supported IPv6 configurations

Not all infrastructure components support IPv6. For example, the Oracle database do not support IPv6. However, you can still use these databases by configuring the connection between the application server and the databases with IPv4, and the remaining communications over IPv6.

- Databases that support IPv6: Microsoft SQL Server 2005 and 2008, DB2 9.1 or later versions of 9.x
- Databases that do not support IPv6: Oracle 10g, 11g R2
- Application servers that support IPv6: JBoss 4.2.0, 4.2.1, JBoss EAP 4.3; WebLogic 10g R3 and 11g R1; WebSphere 7.0.0.9.

#### 2.8.6.2 IPv6 implementation guidelines

When you use IPv6 implementation either partially or fully, keep the following points in mind:

- After installing LiveCycle ES2, do not use the option to start the LiveCycle Configuration Manager directly from the LiveCycle ES2 installer. Instead, navigate to the `LiveCycle ES2 root\configurationManager\bin\IPv6` directory, and run the IPv6-specific script `ConfigurationManager_IPV6.bat` or `ConfigurationManager_IPV6.sh` to launch the LiveCycle Configuration Manager.
- If you have chosen to validate the application server configuration using the LiveCycle Configuration Manager, the validation will fail after you enable IPv6 for the application server. You can ignore this
error message during the process. After you restart the application server in the IPv6 mode, the application server can connect to the database.

- \textit{(WebLogic only)} You need to enable IPv6 for the managed servers only. The Admin Server can continue to run on IPv4, and can be accessed with its IPv4 address. However, the managed server that you have started in IPv6 environment can only be accessed through its IPv6 address or a hostname resolved through DNS.

- \textit{(WebLogic only)} Even if you are running LiveCycle Configuration Manager on the same computer that hosts the application server, you must provide the listen address of the managed server for bootstrapping and deploying LiveCycle ES2 modules. This listen address must be the DNS name that resolves to IPv6 address of the computer.

- To have a pure IPv6 communication with the database server, modify both EDC_DS and IDP_DS connection settings to use the hostname of the database which resolves to a numeric IPv6 address.

- \textit{(Cluster installation only)} If you are installing LiveCycle ES2 on to a server cluster, you must map the numeric IPv6 addresses of each cluster node to the computer’s host name in DNS or in the \texttt{hosts} file on each cluster node. The \texttt{hosts} file is located at:
  - Solaris: /etc/inet/ipnodes
  - Windows: C:\Windows\system32\drivers\etc\hosts
  - Linux:/etc/hosts

- \textit{(JBoss turnkey installation and JBoss for BAM)} Edit the following files:
  - \texttt{[LiveCycle ES2 root]\jboss\bin\run.bat}: Change -Djava.net.preferIPv4Stack=true to -Djava.net.preferIPv6Stack=true
  - \texttt{[LiveCycle ES2 root]\jboss\bin\service.bat}: Replace - b 0.0.0.0 with -b <hostname resolved to IPv6 address>

- Many software components such as database drivers do not completely support numeric IPv6 addresses. So, it is recommended that you use a DNS-resolved hostname instead of numeric IPv6 addresses.

- In an IPv6 environment, if you are using Microsoft SQL Server, you should specify the database server IP address in the following format. Note that in this string, \texttt{;serverName} is a keyword, and so must not be replaced with the actual server name.

  \texttt{jdbc:sqlserver://;serverName=IPv6\ address;portNumber=\ port;databaseName=\ db\ name}

  Here, instead of the numeric IPv6 address, you can specify the hostname of the SQL Server database.

\textbf{2.8.6.3 Configuring IPv6 for JBoss}

1. Unzip the bundled JBoss.

2. Modify \texttt{adobe-ds.xml} and the database-specific data source configuration file to connect to the LiveCycle ES2 database.

3. Modify the \texttt{login-config.xml} file to connect to the LiveCycle ES2 database.

4. Modify the following files to enable IPv6:
Preparing to Install LiveCycle ES2 (Server Cluster)

LiveCycle ES2 IPv6 support

Adobe LiveCycle ES2

System Requirements

2.8.6.4 Configuring IPv6 for WebLogic

1. Install LiveCycle ES2 using the installer.

2. Do not launch the LiveCycle Configuration Manager when the installer finishes. Launch LiveCycle Configuration Manager by invoking the

   [LiveCycleES2 root]\configurationManager\bin\IPv6\ConfigurationManager_IPv6.bat or

   ConfigurationManager_IPv6.sh script.

3. Select the options to configure LiveCycle EARs, WebLogic application server, and verify the application server settings using LiveCycle Configuration Manager.

   Note: You will get an error message that the LiveCycle Configuration Manager validation of data source has failed. This is because the application server is not yet started in the IPv6 mode, and the data source is now configured in the IPv6 mode. You can ignore this warning at this stage.

4. From the WebLogic Server Administration Console, change the application Server Start arguments of the managed server to enable IPv6.

   ● (Clustering only) Add the following lines:

   -Djava.net.preferIPv4Stack=false
   -Djava.net.preferIPv6Stack=true
   -Djava.net.preferIPv6Addresses=true

5. Change the listen address of the managed server to enable it using IPv6 address.

   ● In the WebLogic Server Administration Console, select Environment > Servers > [Managed Server Name] Configuration tab.
In the Listen Address field, enter the hostname of the computer. Ensure that this hostname resolves to the IPv6 address of this computer.

6. Save the changes, and then restart the managed server.

7. Launch LiveCycle Configuration Manager by invoking the `LiveCycleES2 root\configurationManager\bin\IPv6\ConfigurationManager_IPv6.bat` or `ConfigurationManager_IPv6.sh` script.

8. In the LiveCycle Configuration Manager, select the steps to deploy EAR files, bootstrap, deploy LiveCycle ES2 modules.

9. Enter the same hostname as provided in the listen address field of the managed server.

**Note:** Even if you are running LiveCycle Configuration Manager on the same computer, you must provide the listen address of the managed server for bootstrapping and deploying LiveCycle ES2 modules.

### 2.8.6.5 Configuring IPv6 for WebSphere

1. Install LiveCycle ES2 using the installer script. After the installation is complete, do not start the LiveCycle Configuration Manager when the installer prompts.

2. Navigate to the `LiveCycleES2 root\configurationManager\bin\IPv6` directory, and run the IPv6-specific script (`ConfigurationManager_IPv6.bat` or `ConfigurationManager_IPv6.sh`) to launch LCM.

3. Use the LiveCycle Configuration Manager options to configure EAR and the application server.

4. Follow the steps in the LiveCycle Configuration Manager to configure the application server. While configuring database, provide hostname of database that is mapped to IPv6 address.

5. Validate the application server configuration by LiveCycle Configuration Manager. Ignore the warning if data source validation fails. You can validate data sources from WebSphere Administrative Console.

6. On the WebSphere Administrative Console, navigate to the page where JAVA_OPTIONS are specified and do the following tasks:
   - Change `-Djava.net.preferIPv4Stack=true` to `-Djava.net.preferIPv6Stack=true`.
   - Add the `-Djava.net.preferIPv6Addresses=true` argument.

7. Manually deploy the EAR files to WebSphere Application Server by using WebSphere Administrative Console. Configured EAR files are available at `LiveCycleES2 root\configurationManager\export` folder.

8. Restart WebSphere Application Server.

9. Navigate to the `LiveCycleES2 root\configurationManager\bin\IPv6` directory, and run `ConfigurationManager_IPv6.bat` or `ConfigurationManager_IPv6.sh` to launch LiveCycle Configuration Manager.

10. In the LiveCycle Configuration Manager, select the options to bootstrap and deploy LiveCycle ES2 modules. Provide the appserver give hostname that is mapped to IPv6 address.

**Note:** After you start the application server in an IPv6 environment, (with the flag `-Djava.net.preferIPv6Stack=true`), you can access it only through its IPv6 address or hostname mapped to IPv6 address.
2.9 Server configuration for enabling CIFS

To enable file access to Content Services ES2 as a network folder for Windows clients of LiveCycle ES2, you need to enable Common Internet File System (CIFS) in Content Services ES2. Perform the following steps before you can enable CIFS:

- “Creating a virtual interface (AIX, Linux, and Solaris only)” on page 53
- “Configuring Windows Server for CIFS” on page 53

**Note:** If you are enabling CIFS in an IPv6 environment, you must explicitly enable IPv6 configuration after you configure your LiveCycle ES2 installation using LiveCycle Configuration Manager. See “Enabling CIFS in IPv6 mode” in the guide for your application server.

2.9.1 Creating a virtual interface (AIX, Linux, and Solaris only)

If you want to enable CIFS on LiveCycle ES2 deployed on AIX, Linux, or Solaris platform, you must create a virtual interface and assign it an IP address on the server that runs LiveCycle ES2. This is required because the CIFS protocol uses the same ports that are used by Samba service on AIX, Linux, or Solaris computers. You specify this virtual IP address as the alternate IP address when you enable CIFS using the LiveCycle Configuration Manager.

If your LiveCycle ES2 implementation is on IPv6, you should create virtual IPv6 interfaces on the CIFS server. The interfaces that you create should be within the same network as the CIFS clients. See the documentation related to your operating system for more information.

**Note:** You should add the virtual interface that you create to the /etc/hosts file to make them persist across reboots.

2.9.2 Configuring Windows Server for CIFS

You will need to manually configure the Windows Server 2003 and 2008 computers that host LiveCycle ES2 to enable CIFS on them. When CIFS is enabled, users can access the Content Services ES2 repository as a network folder and perform various file operations on their local file system. In LiveCycle Content Services ES2, CIFS is supported for enterprise domain users with ActiveDirectory as their directory provider.

**Note:** Ensure that the CIFS server has a static IP address for Java-based CIFS implementation. For Windows native implementation, a static IP address is not required.

On Windows computers, you need to do the following:

- “Enable NetBIOS over TCP/IP” on page 53
- “Add additional IP address” on page 54
- “Disable SMB over NetBIOS registry (Windows 2003 only)” on page 54
- “Disable File and Printer Sharing (Windows 2008 only)” on page 54

2.9.2.1 Enable NetBIOS over TCP/IP

You need to enable NetBIOS over TCP/IP so that clients connecting to the LiveCycle ES2 server can have their requests resolved for the server host name.
1. In the **Local Area Connection Properties** dialog box, on the **General** tab, select **Internet Protocol**, and then click **Properties**.

2. In the **General** tab of the **Internet Protocol (TCP/IP) Properties** dialog box, ensure that the server has a static IP address. Click **Advanced**.

3. In the **Advanced TCP/IP Settings** dialog box, select the **WINS** tab and select **Enable NetBIOS over TCP/IP**.

### 2.9.2.2 Add additional IP address

**Note:** This step is required only for Java-based CIFS implementation.

1. In the **Local Area Connection Properties** dialog box, on the **General** tab, select **Internet Protocol**, and then click **Properties**.

2. In the **General** tab of the **Internet Protocol (TCP/IP) Properties** dialog box, ensure that the server has a static IP address. Click **Advanced**.

3. In the **Advanced TCP/IP Settings** dialog box, select the **IP Settings** tab and click **Add**.

4. Specify a static IP address and click **Add**.

### 2.9.2.3 Disable SMB over NetBIOS registry (Windows 2003 only)

You must disable SMB over NetBIOS by editing the Windows registry.

1. In the Windows Registry Editor, navigate to `HKEY_LOCAL_MACHINE > SYSTEM > CurrentControlSet > Services > NetBT > Parameters`.

2. Set the DWORD `SMBDeviceEnabled` to 0. If it is not present, add a new DWORD value with name `SMBDeviceEnabled` and set it to 0.

### 2.9.2.4 Disable File and Printer Sharing (Windows 2008 only)

**Caution:** After you disable file and printer sharing with this step, you will not be able to access the server directly using Windows file sharing protocol. This computer will not display in the Windows network view.

- Go to Network Settings and deselect **File and Printer Sharing for Microsoft Clients** and click **Apply**.

### 2.10 Processes with document form variables and digital signatures

If you are upgrading from a previous version of LiveCycle and changing your LiveCycle ES2 server, you may disrupt any processes that use the document form variable or digital signatures. This is because these forms are rendered only once, setting the submit URL. Changing the server breaks the certificate.

Choose the solution that is most appropriate for your LiveCycle ES2 environment from the following solutions:

**Solution 1:** Complete all processes that use a form document variable before you upgrade or move to the remote server. Use this method if you maintain legacy LiveCycle servers after the upgrade. This
approach also eliminates the need for throw-away work to be done to manage the redirection of the form submissions. This method is not practical if you have many outstanding processes.

**Solution 2:** If the server being upgraded is not being decommissioned, a reverse proxy approach is preferable. With this method, you maintain the reverse proxy on the old system until all the migrated processes are completed.

**Solution 3:** You can use the Apache mod_rewrite module to modify the embedded URLs in each form as they are delivered to the client.

**Note:** If your LiveCycle implementation is on IPv6, clients using EJB invocation for PDF creation report exceptions. This is a known issue attributed to Sun JDK 6. See http://bugs.sun.com/bugdatabase/view_bug.do?bug_id=6230761 for details.
2.11 LiveCycle ES2 Central Migration Bridge

The LiveCycle ES2 Central Migration Bridge service helps you to migrate existing applications from your Adobe Central Pro Output Server or Web Output Pak products to work with the LiveCycle ES2 Output service. The Central Migration Bridge service allows you to use your current IFD/MDF templates, data transformation scripts, and DAT files in a LiveCycle ES2 environment as part of an overall migration strategy.

**Note:** The Central Migration Bridge is useful only if you have existing Central Pro applications to migrate.

**Authorized use of Central Migration Bridge**

To use the Central Migration Bridge service, you must have a valid license for Adobe Central Pro Output Server 5.7 or an executed Adobe Central Pro Output Server 5.7 migration agreement. To install Central Pro Output Server 5.7, use your existing media and existing product authorization code (PAC). Your PAC is for a specific operating system platform; if this differs from the operating system platform on which you are installing LiveCycle ES2, you will need to acquire a PAC for that operating system. Contact your Adobe representative for more information regarding migration, executing a migration agreement, or acquiring Central Pro Output Server 5.7 media or PAC.

**Installation considerations**

The Central Migration Bridge service interacts directly with the Central Pro (version 5.7) executable files. You must have Central Pro installed on the same server as LiveCycle ES2, but it is not a prerequisite to installing LiveCycle ES2 (that is, it can be installed before or after LiveCycle ES2). Consult the Central Pro documentation set for installation instructions.

**Caution:** Do not start Central Pro or change its properties to run automatically.

On Windows, the Central Pro service *Adobe Central Output Server* is installed as a manual service. Do not run the service or change its properties to run automatically.

On AIX, Linux, or Solaris, do not start the Central Pro daemon *jfdaemon*. If you edited the start-up script of your computer to launch *jfdaemon* when restarting the computer, change the script to prevent the daemon from being launched automatically. (See the Central Pro installation documentation.) Do not start Central from the command line by launching the *jfserver* process.

**Note:** The LiveCycle ES2 User that invokes the Central Migration Bridge service must have access rights to the Central Pro install directory as well as execute permissions on the Central Pro executable files.

**LiveCycle ES2 turnkey installations**

If you are installing and configuring a LiveCycle ES2 turnkey environment using Express mode, the Central Migration Bridge service will be installed and configured by default - you will not be prompted for any input.

**Note:** Ensure that the Adobe Central Pro product is installed in the default directory.

**LiveCycle ES2 custom installations**

If you are installing and configuring LiveCycle ES2 using the Custom mode (Partial turnkey or Manual), LiveCycle Configuration Manager will prompt you to include Central Migration Bridge in the deployment.
By default, the service will use the default Central Pro installation path. If Central Pro is installed in a different location, update the [Central Install Dir] configuration for the Central Migration Bridge Service by going to LiveCycle Administration Console.

**Note:** In a clustered environment, you must install Central Pro on each node of the cluster.

When you have finished installing LiveCycle ES2, if Central Pro is not installed in the default location, do the following steps to point LiveCycle ES2 to the correct directory:

1. Log in to LiveCycle Administration Console.

2. Click **Services > Applications and Services > Service Management**.

3. Click the **Central Migration Bridge:1.0** service.

4. Type the correct path to the Central Pro install directory.

5. Click **Save**.

**Note:** This configuration can also be made in Workbench ES2. (See *Creating LiveCycle ES2 Processes* or *Creating LiveCycle ES2.5 Processes*, as applicable.)
This chapter describes how to do the following tasks:

- Obtain the Adobe LiveCycle Reader Extensions ES2 Rights credential
- Obtain digital certificates for use with Adobe LiveCycle Digital Signatures ES2

### 3.1 Obtaining the Reader Extensions ES2 Rights credential

The LiveCycle Reader Extensions ES2 Rights credential is a digital certificate that is specific to Reader Extensions ES2 that enables Adobe Reader usage rights to be activated in PDF documents. If the credential is not installed, Reader Extensions ES2 users cannot apply usage rights to documents. You cannot use a standard digital certificate for this function; you must use the dedicated Rights credential.

The Rights credential extends the usage rights of each PDF file that Reader Extensions ES2 processes. It is a critical part of the software licensing and should be stored carefully in a secure environment.

The following types of Rights credentials are available:

- **Customer Evaluation**: A credential with a short validity period that is provided to customers who want to evaluate Reader Extensions ES2. Usage rights applied to documents using this credential expire when the credential expires. This type of credential is valid only for two to three months.

- **Production**: A credential with a long validity period that is provided to customers who purchased the full product. Production credentials are unique to each customer but can be installed on multiple systems.

The Rights credential is delivered as a digital certificate that contains the public key, the private key, and the password used to access the credential.

If your organization orders an evaluation version of Reader Extensions ES2, you receive an evaluation Rights credential from the sales representative you ordered the product from or from the website where you downloaded the evaluation product.

If your organization purchases a production version of Reader Extensions ES2, the production Rights credential is delivered by Electronic Software Download (ESD). A production Rights credential is unique to your organization and can enable the specific usage rights that you require.

If you obtained Reader Extensions ES2 through a partner or software provider who integrated Reader Extensions ES2 into their software, the Rights credential is provided to you by that partner who, in turn, receives this credential from Adobe.

**Note:** The Rights credential cannot be used for typical document signing or assertion of identity. For these applications, you can use a self-sign certificate or acquire an identity certificate from a Certificate Authority (CA).
3.2 Obtaining digital certificates for use with Digital Signatures ES2

Digital certificates are required for use with Digital Signatures ES2. Although you can configure and manage digital certificates after you install and configure LiveCycle ES2, obtaining them before you install ensures that you are ready to use LiveCycle ES2 when it is deployed.

Digital certificates are obtained from a Certificate Authority (CA) and sent to you by email or over the web as a certificate file. This certificate file contains the public keys (also called certificates) and references to private keys (also called credentials) that are used for encrypting and signing documents. Certificates do not contain actual private keys; instead, they contain a reference to the identity of the user who keeps the private keys securely stored in an encrypted file or HSM.

You can use Internet Explorer (Windows) or OpenSSL (AIX, Linux, and Solaris) to export PFX, P12, and CER files for certificates that are stored in any compatible certificate store that is available on your computer. PFX files can be exported only as the certificate store or the credential itself permits. CER files that hold the public key that corresponds to a credential can also be exported from PFX files by using either Internet Explorer or OpenSSL.

Note: You can configure and manage certificates, credentials, and Certification Revocation Lists (CRLs) for use with LiveCycle ES2 by using Trust Store Management, which is accessible through the web-based LiveCycle Administration Console. (See LiveCycle Administration Console Help.)

The CRL distribution point describes where you can download the CRL that corresponds to a particular CER or PFX file.

The following file types are supported:

- **Certificates**: DER-encoded X509v3 and base64-encoded certificate (.cer) files. Certificates that verify the trust.xml file can be either DER-encoded or base64-encoded.
- **Credentials**: RSA and DSA credentials up to 4096 bits in standard PKCS12 format (.pfx and .p12 files).
- **CRLs**: Base64-encoded and DER-encoded CRL files.

Maintaining the security of private keys (credentials) is critical to ensuring the stability of sensitive information. A physical storage device, often called a Hardware Security Module (HSM), typically provides the maximum level of security for private keys. If you do not use a physical device, it is important to store highly sensitive private keys and certificates in encrypted files in a safe place.

Digital Signatures ES2 supports the industry-standard PKCS #11 interface to communicate with HSMs. An HSM vendor can provide the resources and tools that you need to install and configure an HSM storage system.
This section describes how to set up the database for use with LiveCycle ES2.

The database will contain these elements:
- LiveCycle ES2 services
- LiveCycle ES2 run-time configurations
- LiveCycle ES2 process data
- Customer process definitions and templates
- Application server managed data

Before you create the database, you must ensure that you read the pre-installation requirements and have the required software installed. (See “System Requirements” on page 16.)

If this is the first installation of LiveCycle ES2, you must create an empty database. All the tables required to support LiveCycle ES2 are created when you initialize the LiveCycle ES2 database using LiveCycle Configuration Manager. (See the Installing and Deploying LiveCycle ES2 document for your application server.)

For information about creating the LiveCycle ES2 Business Activity Monitoring ES2 (BAM) metadata and geography databases for LiveCycle Process Management ES2, see the Installing and Deploying LiveCycle ES2 document for your application server.

4.1 Database configuration requirements

This section describes special tables, indexes, and other properties that are required in the LiveCycle ES2 database that are not configured by LiveCycle Configuration Manager.

4.2 Creating an Oracle database

If you prefer not to use the default database that was created when you installed Oracle 10g or Oracle 11g R2, create a new database by using the Database Configuration Assistant tool. LiveCycle ES2 supports Oracle 10g and Oracle 11g R2 on WebLogic, WebSphere, and JBoss application servers.

If you install Business Activity Monitoring ES2, you must first create the metadata and geography databases. See “Creating the Business Activity Monitoring ES2 databases” on page 46.

**Note:** You can use the Transaction Processing or General Purpose templates while configuring an Oracle database instance for LiveCycle ES2. If you wish to use the Custom Database template for configuring a database instance, the minimum set of database components you must include are Oracle JVM and Enterprise Manager Repository.

Do the following when you create your Oracle database:
- Set the initial database size to a minimum of 500 MB. Increase this initial size if you are deploying LiveCycle Content Services ES2.
Create user quotas to allow the database to grow to accommodate persistent data from LiveCycle ES2 applications.

Enable support for UTF-8 encoding.

Set Database Character Set to Unicode (AL32UTF8), and the National Character Set is AL16UTF16 (Unicode UTF-16 universal character set).

Set NLS_LENGTH_SEMANTICS to BYTE (if required). The database initialization fails if you set any other value.

You must install Oracle using Transaction Processing and set the connection mode for the server to Dedicated Processing.

If you are deploying Content Services ES2, set the block size of your Oracle database to 16k. Modify the db_block_size value in the initSID.ora file located in your Oracle install directory.

Note: This value depends on your operating system. For Windows platforms, the range is 2k-16k.

4.2.1 User account and rights

Create a new user account on the database and assign it the following system privileges:

- CREATE SEQUENCE
- CREATE VIEW
- UNLIMITED TABLESPACE
- CREATE TABLE
- CREATE CLUSTER
- CREATE SESSION

Caution: (WebLogic only) When using WebLogic and an Oracle database, ensure that the database user name does not have a number as the first character, nor a hyphen (-) within the user name. Otherwise, the database does not bootstrap properly.

For deployments on AIX, Linux, or Solaris, the user name must not exceed 8 characters; on Windows, it must not exceed 12 characters.

You need the following information when you configure the data source on the application server:

- SID (Service ID)
- User name and password of the Oracle user account
- Host name or IP address of the database server
- Oracle LISTENER port number (default is 1521)

For information about using Oracle 10g or Oracle 11g R2, see the appropriate user documentation.

4.3 Creating a SQL Server database

You can create a SQL Server database that LiveCycle ES2 will use to store run-time and configuration data. For information about creating a SQL Server database, refer to the SQL Server documentation.

Create a SQL Server database, and create a user account and assign it DB_OWNER privileges for use when configuring the data source on the application server. For information about creating the database and user, see the SQL Server documentation.

You need the following information when you configure the data source on the application server:

- Database name
- User name and password of the SQL Server user account
- Host name or IP address of database server
- SQL Server port number

### 4.3.1 Installing the SQL Server database driver

**Note:** If you have not done so already, download the SQL Server JDBC Driver 1.2 (for all platforms) from the Microsoft Download Center location on the Microsoft website. Ensure that you install the SQL Server database driver on the server where you plan to install LiveCycle ES2.

Follow the instructions on the website for downloading and installing the driver. Make a note of the directory location where you install the driver on your system.

**Note:** Use SQL Server JDBC Driver 1.2 for both Microsoft SQL Server 2005 SP3 and Microsoft SQL Server 2008.

### 4.3.2 Setting up SQL Server for LiveCycle ES2

Before you create the LiveCycle ES2 database, optimize SQL Server by changing these settings.

#### 4.3.2.1 Increasing memory

The default SQL Server settings do not aggressively allocate memory. This situation significantly affects performance on most deployments of a SQL Server database.

**Note:** This section is recommended but optional.

➤ **To increase the memory for SQL Server:**

1. Using Microsoft SQL Server Management Studio, connect to the database server where you will host the LiveCycle ES2 database.
2. Right-click the database server connection and select **Properties**.
3. Select the **Memory** page and enter a size in the **Minimum Server Memory (in MB)** box that is equal to the size of the free memory on the server.
4. Restart the SQL Server database.

#### 4.3.2.2 Setting processor priority

On dedicated database servers, which are recommended for production installations of LiveCycle ES2, the SQL Server process is configured so that it does not consume too much of the system CPU resources.

**Note:** This section is recommended but optional.
To set the processor priority:

1. Using Microsoft SQL Server Management Studio, connect to the database server where you will host the LiveCycle ES2 database.
2. Right-click the database server connection and select Properties.
3. Select the Processors page and select Boost SQL Server Priority.
4. Restart the SQL Server database.

4.3.2.3 Increasing the recovery interval

This setting specifies the amount of time the deployment waits for recovery after a crash. The SQL Server default setting is one minute. Increasing this setting to a larger value improves performance because it causes the server to write changes from the database log to the database files less frequently. This setting does not compromise the transactional behavior; however, it does affect the size of the log file that is replayed on startup.

Note: This section is recommended but optional.

To increase the recovery interval:

1. Using Microsoft SQL Server Management Studio, connect to the database server where you will host the LiveCycle ES2 database.
2. Right-click the database connection and select Properties.
3. Select the Database Settings page and type 5 in the Recovery Interval (Minutes) box.
4. Restart the SQL Server database.

4.3.2.4 Integrated security

Note: This is an optional configuration.

If you are using SQL Server integrated security, you can set your SQL Server database to Mixed Mode or Windows Authentication Mode. However, if you are using Windows Authentication Mode, you must configure integrated security on Windows to establish a trusted connection with SQL Server.

- For JBoss, see “Configure Integrated Security on Windows” on page 86.
- For WebLogic, see the Configuring SQL Server database connectivity section in Installing and Deploying LiveCycle ES2 for WebLogic.
- For WebSphere, see the Configuring the SQL Server data source section in Installing and Deploying LiveCycle ES2 for WebSphere.

Note: Windows Authentication Mode is not supported for partial turnkey installation. LiveCycle Configuration Manager fails to validate the database connection. Therefore, for partial turnkey installation, the authentication type must be set to SQL Server.

4.3.3 Sizing your SQL Server database

The default database sizes that SQL Server provides are too small for LiveCycle ES2. Even if the database is set to auto-grow, unintended effects can occur, such as reduced performance when the database grows or
the growth begins to fragment the disk. It is best to preallocate the database size at creation to reflect your deployment requirements:

**Medium size deployments:** Environments where the LDAP directory has approximately 100,000 users and 10,000 groups. Set Database Data Initial Size to 1 GB, and set autogrowth to 250 MB.

**Large size deployments:** Environments where the LDAP directory has approximately 350,000 users and more than 10,000 groups. Set Database Data Initial Size to 2 GB, and set autogrowth to 1 GB.

**Note:** Database growth is always restricted to a certain size. Administrators should monitor the resource usage of the LiveCycle ES2 database to ensure that it does not lose its restricted space or the space available on the disks where the database resides.

### 4.3.4 Creating the LiveCycle ES2 database user, schema, and login

You are now ready to create the LiveCycle ES2 database user, schema, and login.

**Caution:** Ensure that you use the SQL_Latin1_General_CP1_CI_AS collation (or the Japanese_CI_AS collation if your database will run in a Japanese environment) when you create the database instance for LiveCycle ES2. Any other collation may cause your database initialization to fail. The collation for your LiveCycle ES2 database instance can be different from the collation used when creating the SQL Server database.

To create the LiveCycle ES2 database:

1. Using Microsoft SQL Server Management Studio, click **Server**, and then right-click **Database** and select **New Database**.

2. Enter the database name of your choice.

   **Note:** The database name is very important, and the name chosen must be consistently used in the following procedures where a reference to `database_name` exists.

3. (**SQL Server 2005 Only**) Ensure that **Use Full-Text Indexing** is deselected.

4. In the **Database Data Initial Size MB** box, enter the appropriate value:
   - For small development or small production systems, specify 200 MB.
   - For larger systems, see "Sizing your SQL Server database" on page 63.

5. In the **Database Data Autogrowth** box, enter 50%.

6. In the **Database Log Initial Size** box, enter the appropriate value:
   - For small development or small production systems, specify 20 MB.
   - For larger systems, see “Sizing your SQL Server database” on page 63.

7. In the **Database Log Autogrowth** box, enter 50%.

8. Click **OK** to create the database.

#### 4.3.4.1 Creating the LiveCycle ES2 user in SQL Server

In the following procedure, `/database_name` represents the name you specified when you created your database, and `/database_username` represents the name you must specify for the new user.
To create the LiveCycle ES2 user:

1. Using Microsoft SQL Server Management Studio, connect to the database server where you created the LiveCycle ES2 database.

2. Click **Server > Security**, and then right-click **Logins** and select **New Login**.

3. Enter the login name `[database_username]`, and then select **SQL Server Authentication** and type a new password.

4. Ensure that **Enforce Password Expiration, User must change password on next login** is also deselected.

5. Leave the default database as **Master**, and click **OK**.

6. Click **Server > Databases > [database_name] > Security**, and then right-click **Schemas** and select **New Schema**.

7. In the **Schema Name** box, type `[database_username]`, and click **OK**.

8. Click **Server > Databases > [database_name] > Security**, and then right-click **Users** and select **New User**.

9. In the New User dialog box, type the login name and user name `[database_username]`.

10. Set the default schema to `[database_username]`.

    **Note:** The schema name should be the same as the `[database_username]`.

11. In the Schemas Owned By This User area, select the schema `[database_username]`.

12. In the Database Role Membership area, select `db_owner`.

**4.3.4.2 Associating the LiveCycle ES2 user with the database**

After you create the LiveCycle ES2 user, associate it with the LiveCycle ES2 database.

To associate the LiveCycle ES2 user with the database:

1. Click **Security > Logins**, and then right-click `[database_username]` and select **Properties**.

2. In Login Properties, on the General page, set the user’s default database to `[database_name]`.

3. Select the **User Mapping** page and, in the Users Mapped To This Login section, verify that `[database_name]` is selected, **User** is set to `[database_username]`, and **Default Schema** is set to `[database_username]`.

4. Ensure that `[database_name]` is selected in the Users Mapped To This Login table, and ensure that `db_owner` and `public` are selected in the Database Role Membership For `[database_name]` table and then click **OK**.

**4.3.4.3 Setting the isolation level for the LiveCycle ES2 database**

LiveCycle ES2 requires a specific isolation level to manage deadlocking when long-running transactions occur at the same time as numerous shorter reads.
To set the isolation level:

1. Click Databases, and then right-click \( \text{[database\_name]} \) and select New Query.
   
   **Note:** \( \text{[database\_name]} \) represents the name you specified when you created your database.

2. In the Query panel, type the following text:

   ```sql
   ALTER DATABASE \( \text{[database\_name]} \) SET READ_COMMITTED_SNAPSHOT ON
   GO
   ```

3. Click Execute. A response is displayed in the messages panel.

### 4.4 Creating a DB2 database

Create a DB2 database by running one of the scripts provided in this section. The script is tuned for a system that will use 1 GB of memory for the database. If your system has less memory dedicated for the database, see the appropriate DB2 documentation for details about configuring your system settings. LiveCycle ES2 supports DB2 with WebSphere 6.1, WebSphere 7.0, and WebLogic.

You need the following information when you configure the data source on the application server:

- Database name
- User name and password of the DB2 user account
- Host name or IP address of the database server
- DB2 port number

#### 4.4.1 DB2 user account

LiveCycle ES2 requires a dedicated system database account. If the account is the schema owner no other privileges are required. The schema owner can alter, create and drop any object in the schema. If the account is not the schema owner then the ALTERIN, CREATEIN AND DROPIN schema privileges are required. The user will also have to belong to the DB2USERS group.

The DB2 user account needs to have schema owner rights to create tables both at product installation time and system runtime. The application server may add further requirements to the database user and schema due to its internal use of the database.

For information about creating a user account, see the DB2 documentation.

For deployments on AIX, Linux, or Solaris, the user name must not exceed 8 characters; on Windows, it must not exceed 12 characters.

To create a DB2 database:

1. **(Content Services ES2 not included)** On the computer that hosts DB2, create a new text file that includes the following DB2 script for your database version:

   **Note:** The following text contains formatting characters for line breaks. When you copy this text to a location outside this document, remove the formatting characters.
**DB2 9.1**

create database dbname using codeset utf-8 territory default;
connect to dbname;
CREATE BUFFERPOOL BP8K SIZE 50000 PAGESIZE 8192 NOT EXTENDED STORAGE;
connect reset;
connect to dbname;
CREATE TEMPORARY TABLESPACE DBNAME_TEMP_8K IN DATABASE PARTITION GROUP
IBMTEMPGROUP PAGESIZE 8192 MANAGED BY SYSTEM USING
('DB2_root\DBNAME_TEMP') EXTENTSIZ 32 PREFETCHSIZE 16 BUFFERPOOL BP8K;
CREATE REGULAR TABLESPACE DBNAME_DATA_8K IN DATABASE PARTITION GROUP
IBMDEFAULTGROUP PAGESIZE 8192 MANAGED BY DATABASE USING
(FILE'DB2_root\DBNAME_DATA'9000) EXTENTSIZ 16 PREFETCHSIZE 16
BUFFERPOOL BP8K;
commit work;
connect reset;
connect to dbname;
alter bufferpool ibmdefaultbp immediate size 96000;
alter bufferpool bp8k immediate size 32000;
commit work;
connect reset;
update db cfg for dbname using dbheap 4000;
update db cfg for dbname using logbufsz 2048;
update db cfg for dbname using locklist 2000;
update db cfg for dbname using chngpgs_thres 40;
update db cfg for dbname using logfilsiz 4000;
deactivate database dbname;
activate database dbname;

**DB2 9.5**

create database dbname using codeset utf-8 territory default;
connect to dbname;
CREATE BUFFERPOOL "BP8K" SIZE 50000 PAGESIZE 8192;
connect reset;
connect to dbname;
CREATE TEMPORARY TABLESPACE DBNAME_TEMP_8K IN DATABASE PARTITION GROUP
IBMTEMPGROUP PAGESIZE 8192 MANAGED BY SYSTEM USING
('DB2_root\DBNAME_TEMP') EXTENTSIZ 32 PREFETCHSIZE 16 BUFFERPOOL BP8K;
CREATE REGULAR TABLESPACE DBNAME_DATA_8K IN DATABASE PARTITION GROUP
IBMDEFAULTGROUP PAGESIZE 8192 MANAGED BY DATABASE USING
(FILE'DB2_root\DBNAME_DATA'9000) EXTENTSIZ 16 PREFETCHSIZE 16 BUFFERPOOL
BP8K;
commit work;
connect reset;
connect to dbname;
alter bufferpool ibmdefaultbp immediate size 96000;
alter bufferpool bp8k immediate size 32000;
commit work;
connect reset;
update db cfg for dbname using dbheap 4000;
update db cfg for dbname using logbufsz 2048;
update db cfg for dbname using locklist 2000;
update db cfg for dbname using chngpgs_thres 40;
update db cfg for dbname using logfilsiz 4000;
deactivate database dbname;
activate database dbname;

2. **(Content Services ES2 included)** If you are using Content Services ES2 with any of the other LiveCycle ES2 modules, use the following DB2 script for your database version:

   **Note:** The following text contains formatting characters for line breaks. When you copy this text to a location outside this document, remove the formatting characters.

**DB2 9.1**

```sql
create database dbname using codeset utf-8 territory default;
connect to dbname;
CREATE BUFFERPOOL BP8K SIZE 50000 PAGESIZE 8192 NOT EXTENDED STORAGE;
CREATE BUFFERPOOL BP32K SIZE 4000 PAGESIZE 32768 NOT EXTENDED STORAGE;
connect reset;
connect to dbname;
CREATE TEMPORARY TABLESPACE DBNAME_TEMP_8K IN DATABASE PARTITION GROUP
IBMTEMPGROUP PAGESIZE 8192 MANAGED BY SYSTEM USING
('DB2_root\DBNAME_TEMP')
EXTENTSZE 32 PREFETCHSIZE 16 BUFFERPOOL BP8K;
CREATE REGULAR TABLESPACE DBNAME_DATA_8K IN DATABASE PARTITION GROUP
IBMDEFAULTGROUP PAGESIZE 8192 MANAGED BY DATABASE USING
(FILE'DB2_root\DBNAME_DATA'64000) EXTENTSZE 16 PREFETCHSIZE 16
BUFFERPOOL BP8K;
commit work;
connect reset;
connect to dbname;
CREATE TEMPORARY TABLESPACE DBNAME_TEMP_32K IN DATABASE PARTITION GROUP
IBMTEMPGROUP PAGESIZE 32768 MANAGED BY SYSTEM USING
('DB2_root\DBNAME32k_TEMP') EXTENTSZE 32 PREFETCHSIZE 16 BUFFERPOOL
BP32K;
CREATE REGULAR TABLESPACE DBNAME_DATA_32K IN DATABASE PARTITION GROUP
IBMDEFAULTGROUP PAGESIZE 32768 MANAGED BY DATABASE USING
(FILE'DB2_root\DBNAME32k_DATA'9000) EXTENTSZE 16 PREFETCHSIZE 16
BUFFERPOOL BP32K;
alter bufferpool ibmdefaultbp immediate size 96000;
alter bufferpool bp8k immediate size 32000;
commit work;
connect reset;
update db cfg for dbname using dbheap 4000;
update db cfg for dbname using logbufsz 2048;
update db cfg for dbname using locklist 2000;
update db cfg for dbname using chngpgs_thresh 40;
update db cfg for dbname using logfilsiz 4000;
deactivate database dbname;
activate database dbname;
```

**DB2 9.5**

```sql
create database dbname using codeset utf-8 territory default;
connect to dbname;
CREATE BUFFERPOOL BP8K SIZE 50000 PAGESIZE 8192;
CREATE BUFFERPOOL BP32K SIZE 500 PAGESIZE 32768;
CREATE TEMPORARY TABLESPACE dbname_TEMP_8K IN DATABASE PARTITION GROUP
IBMTEMPGROUP PAGESIZE 8192 MANAGED BY SYSTEM USING
('DB2_root\dbname8_TEMP') EXTENTSZE 32 PREFETCHSIZE 16 BUFFERPOOL BP8K;
```
CREATE REGULAR TABLESPACE dbname_DATA_8K IN DATABASE PARTITION GROUP
IBMDEFAULTGROUP PAGESIZE 8192 MANAGED BY DATABASE USING
(FILE'DB2_root\dbname8_DATA'9000) EXTENTSIZE 16 PREFETCHSIZE 16
BUFFERPOOL BP8K;
CREATE TEMPORARY TABLESPACE dbname_TEMP_32K IN DATABASE PARTITION GROUP
IBMENTEMPGROUP PAGESIZE 32768 MANAGED BY SYSTEM USING
('DB2_root\dbname32_TEMP') EXTENTSIZE 32 PREFETCHSIZE 16 BUFFERPOOL
BP32K;
CREATE REGULAR TABLESPACE dbname_DATA_32K IN DATABASE PARTITION GROUP
IBMDEFAULTGROUP PAGESIZE 32768 MANAGED BY DATABASE USING
(FILE'DB2_root\dbname32_DATA\9000) EXTENTSIZE 16 PREFETCHSIZE 16
BUFFERPOOL BP32K;
alter bufferpool ibmdefaultbp immediate size 96000;
alter bufferpool BP8K immediate size 32000;
commit work;
connect reset;
update db cfg for dbname using dbheap 4000;
update db cfg for dbname using logbufsz 2048;
update db cfg for dbname using locklist 2000;
update db cfg for dbname using chngpgs_thresh 40;
update db cfg for dbname using logfilsiz 4000;
deactivate database dbname;
activate database dbname;

3. Make the following changes to the script:
   - Replace the instances of dbname and DBNAME with the name you want for the LiveCycle ES2 database.
   - If you are creating multiple database instances on the same host, create an uniquely named buffer pool (for example, BP8K_1) for each database instance, using a buffer pool size such that all will not exceed 10% of total physical memory. For example, on a machine with 1GB of physical memory, the total buffer pool size should not exceed 100MB (“SIZE 100000”)
   - Replace DB2_root with the path to the root directory where DB2 is installed.
   - Ensure that no commands include line breaks and each command is terminated by a semicolon (;).
   - Change 9000 in the following line based on your database size:
     (FILE'DB2_root\DBNAME_DATA\9000)
     This number specifies the minimum number of pages required to initialize the database. You can also change this number by using the DB2 administration tools after you initialize the database.

4. Save the text file in a location that DB2 Command Line Processor can access.

5. Open a DB2 command prompt and type the following command to run the script:
   db2 -tf <path_to_script_file>/<script_file_name>

The DB2 database must be configured for concurrent use.

➤ To configure DB2 for concurrent usage:

1. Open the DB2 Control Center:
   - (Windows) Select Start > Programs > IBM DB2 > General Administration Tools > Control Center.
   - (AIX, Linux, and Solaris) From a command prompt, enter the command db2jcc.
2. In the DB2 Control Center object tree, click All Databases.

3. Right-click the database created for LiveCycle ES2 products and click Configuration Advisor.

4. Follow the steps in the Configuration Advisor wizard and set the following properties:

<table>
<thead>
<tr>
<th>DB2 Property</th>
<th>Required Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Workload type</td>
<td>Mixed</td>
</tr>
<tr>
<td>Average number of SQL transactions</td>
<td>Less than 10</td>
</tr>
<tr>
<td>Database Administration Priority</td>
<td>Faster transaction performance</td>
</tr>
<tr>
<td>Populated Database</td>
<td>Set according to the current state of the database instance. The instance is not</td>
</tr>
<tr>
<td></td>
<td>populated if it has not yet been initialized by the LiveCycle Configuration Manager.</td>
</tr>
<tr>
<td>Isolation Level</td>
<td>Cursor Stability</td>
</tr>
</tbody>
</table>

5. Click Finish.

➤ To add a user to the new database:

1. Log in to the IBM Control Center.

2. Click [database_name] > User and Group Objects > DB Users.

3. Select Add User and select the user.

4. Under Authorities, select Connect to database, Create tables, and Database administration authority, and then select Apply.

5. Click OK.

4.4.2 Additional DB2 requirements for LiveCycle Content Services ES2

The script described in step 2 in "To create a DB2 database:" on page 66 creates an additional DB2 database page size and sets it to 32 KB. If LiveCycle Content Services ES2 is not being deployed, the default DB2 database page size of 8 KB is acceptable.

4.4.2.1 Configuring multiple DB2 schemas

When configuring Content Services ES2 to run using multiple schemas on a single DB2 database instance, Content Services ES2 deployment will succeed on the first node but fail on all subsequent nodes. DB2 is case-sensitive and expects to receive values in uppercase letters. To avoid this problem, you must add the following JVM argument to your application server:

-Dhibernate.default_schema=<schema_name>

Note: <schema_name> must be replaced by the schema name in uppercase letters.
Appendix - Manually Configuring JBoss

This appendix describes the configuration that is required for the default JBoss application server that you can download from the Internet. This option should be considered for advanced installations only. Advanced knowledge of JBoss is typically required.

Topics in this chapter relate to JBoss versions 4.2.0 and 4.2.1. Steps specific to versions are indicated accordingly.


This chapter uses the following conventions.

<table>
<thead>
<tr>
<th>Name</th>
<th>Default value</th>
</tr>
</thead>
<tbody>
<tr>
<td>(\text{appserver root})</td>
<td>(JBoss 4.2.0 or 4.2.1 on Windows): C:\jboss</td>
</tr>
<tr>
<td></td>
<td>(JBoss 4.2.0 or 4.2.1 on Linux and Solaris): /opt/jboss</td>
</tr>
<tr>
<td></td>
<td>(JBoss EAP 4.3 on Windows): C:\jboss-eap-4.3\jboss-as</td>
</tr>
<tr>
<td></td>
<td>(JBoss EAP 4.3 on Linux and Solaris): /opt/jboss-eap-4.3/jboss-as</td>
</tr>
</tbody>
</table>

A.1 Installing the JDK for JBoss

Download and install one of the following Sun JDK versions from www.java.sun.com according to your JBoss version.

- (JBoss 4.2.0) Sun JDK 5.0 update 11 or later updates to 5.0
- (JBoss 4.2.1 or JBoss EAP 4.3 on all platforms) Sun JDK 6.0 update 14 or later updates to 6.0

Create or set the JAVA_HOME environment variable to point to the location where the JDK is installed.

A.1.1 Set the JAVA_HOME environment variable (Windows)

1. Select **Start > Control Panel > System**.
2. Click the **Advanced** tab.
3. Click **Environment Variables** and, under System Variables, click **New**.
4. In the **New System Variable** box, type JAVA_HOME as the variable name and enter the directory where you installed the JDK. This directory is the directory that contains the /bin subdirectory. For example, type the following path:

   C:\Program Files\Java\jdk1.6.0_14
A.1.2 Set the PATH environment variable (Windows)

5. Select **Start > Control Panel > System**.

6. Click the **Advanced** tab and click **Environment Variables**.

7. In the System Variables area, select the **PATH** variable and then click **Edit**.

8. Append the following text to the beginning of the variable value:

   %JAVA_HOME%\bin;

   **Note:** Verify that the last entry of the PATH environment variable has no trailing slash (\) otherwise the WebLogic server instance will fail on start-up. Remove the slash if it exists and save your modification.

A.1.3 Set the JAVA_HOME environment variable (Linux and Solaris)

- Set the **JAVA_HOME** variable for Borne and Bash shells as shown in the following example:

  JAVA_HOME=/usr/java
  export JAVA_HOME

A.1.4 Set the PATH environment variable (Linux and Solaris)

- Set the **PATH** variable for Borne and Bash as shown in the following example:

  PATH=$JAVA_HOME/bin:$PATH
  export PATH

A.1.5 Verify JAVA_HOME environment variable setting (Windows, Linux, or Solaris)

(Optional) Open a command prompt and run the following command:

```
java -version
```

You should receive a response that begins with Java version 1.6.0_14 (or later version of 1.6.0).

A.2 Manually installing JBoss

If you are manually configuring JBoss for running LiveCycle ES2, download and unpack JBoss Application Server.

A.2.1 Download JBoss

1. Go to the **JBoss Application Server Download** site.

2. Locate the **4.2.0** or **4.2.1** entry and click the **Download** link beside it.

3. On the download page, in the list of files, click the appropriate file for your operating system:

   - (Windows) jboss-4.2.0.GA.zip or jboss-4.2.1.GA.zip
   - (Linux) jboss-4.2.0.GA-src.tar.gz or jboss-4.2.1.GA-src.tar.gz
4. After the download is complete, extract the file to the directory of your choice on your server.

A.3 Starting and stopping JBoss

Several procedures in this appendix require you to stop and start the instance of JBoss where you want to deploy the product.

---

**Note:** These procedures apply to both the Adobe-preconfigured JBoss and the manually installed JBoss software.

A.3.1 Start JBoss

1. From a command prompt, navigate to \[appserver root\]/bin.

2. Start the application server by typing the following command:
   - (Windows) run.bat -c [config] -b [server_IP_Address]
   - (Linux and Solaris) ./run.sh -c [config] -b [server_IP_Address]
   where \[config\] is the configuration required for your database and \[server_IP_Address\] is the actual IP address of the server. For example:
   - Using Adobe-preconfigured JBoss:
     - (Windows) run.bat -c lc <database name> cl -b [server_IP_Address]
     - (Linux and Solaris) ./run.sh -c lc <database name> cl -b [server_IP_Address]
   - Using manually configured JBoss:
     - (Windows) run.bat -c all -b [server_IP_Address]
     - (Linux and Solaris) ./run.sh -c all -b [server_IP_Address]

A.3.2 Stop JBoss

1. From a command prompt, navigate to \[appserver root\]/bin.

2. Stop the application server by typing the following command:
   - (Windows) shutdown.bat -s <server name>:<jndi -port>
   - (Linux and Solaris) ./shutdown.sh -s <server name>:<jndi -port>

A.4 Modifying the JBoss configuration

The JBoss Application Server is configured using various XML configuration files. JBoss must be shut down before editing any of these configuration files. If JBoss is running and these files are changed, JBoss will probably crash. JBoss also has a few configuration files that are formatted as .property files. You must ensure that the .property files are saved as UNIX text files on Linux or Solaris if you edit these files on Windows environments at any time.

A.4.1 Modify the JBoss configuration

Perform the following steps to modify the JBoss configuration to customize JBoss for LiveCycle ES2.
● Update the jacorb.properties file
● Update the quartz.jar and commons-collections.jar libraries
● Modify the EAR and WAR file class-loading isolation
● Disable the JavaServer Faces (JSF) libraries (JBoss 4.2.0 only)
● Modify the run.bat file (for Windows)
● Modify run.conf
● Modify run.sh (for Linux and Solaris, 64-bit only)
● Modify log4J.xml
● Remove the JMX Console and Web Console
● Modify the jmx-invoker-service.xml file so that authenticated users are not required

➤ Update the jacorb.properties file
1. Open the [appserver root]/server/all/conf/jacorb.properties file in a text editor.
2. Locate the jacorb.poa.thread_pool_max setting and change the value to 16.

➤ Update the quartz.jar library (JBoss 4.2.0 only)
1. Navigate to the [appserver root]/jboss_4.2.0/patches directory.
2. Copy the quartz.jar file from this directory to the [appserver root]/server/all/lib directory.

➤ Modify EAR file class-loading isolation
1. Open the [appserver root]/server/all/conf/jboss-service.xml file in an editor.
2. Locate <attribute name="CallByValue"> and change the value to true.
3. Save and close the file.
4. Open the [appserver root]/server/all/deploy/ear-deployer.xml file in an editor.
5. Locate <attribute name="Isolated"> and change the value to true.
6. Locate <attribute name="CallByValue"> and change the value to true.
7. Save and close the file.

➤ Disable the JSF libraries
1. Navigate to the [appserver root]/server/all/deploy/jboss-web.deployer directory and delete the jsf-libs subdirectory and all its files.
2. Comment out or remove the following entries from [appserver root]/server/all/deploy/jboss-web.deployer/conf/web.xml if they aren't already commented out:

```xml
<!-- Comment/Remove this -->
<!-- Configures JSF for a web application if the javax.faces.webapp.FacesServlet is declared -->
<!-- in web.xml. -->
```
<!--
  <listener-
  <listener-class>org.jboss.web.jsf.integration.config.JBossJSFConfigureListen
  </listener-class>
  </listener-
  <!-- Comment/Remove this -->
  <!-- Listens to all web app lifecycle events so that @PreDestroy can be
  called on -->
  <!-- JSF managed beans that go out of scope. You can comment this out if you
  don't use JSF or you don't use annotations on your managed beans. -->
  <!--
  <listener>
  <listener-class>com.sun.faces.application.WebappLifecycleListener</listener-
  class>
  </listener-
  -->
  <!--
  <init-param>
  <description>JSF standard tlds</description>
  <param-name>tagLibJar0</param-name>
  <param-value>jsf-libs/jsf-impl.jar</param-value>
  </init-param>
  -->

➤ Modify the run.bat file (Windows only)

1. Open the [appserver root]/bin/run.bat file in an editor.

2. Modify the line immediately following `rem Setup JBoss specific properties to set encoding to UTF-8:`
   
   ```bash
   set JAVA_OPTS=%JAVA_OPTS% -Dadobeidp.serverName=server1
   -Dfile.encoding=utf8 -Dprogram.name=%PROGNAME%
   ```
   
   **Note:** Ensure that no line breaks appear in this new line.

3. Modify the line immediately following `rem Sun JVM memory allocation pool parameters to read as follows:`
   
   - **(32-bit Windows)**
     ```bash
     set JAVA_OPTS=%JAVA_OPTS% -XX:MaxPermSize=256m -Xms1024m
     -Xmx1024m -Djava.net.preferIPv4Stack=true
     ```
   - **(64-bit Windows)**
     ```bash
     set JAVA_OPTS=%JAVA_OPTS% -XX:MaxPermSize=512m -Xms1024m
     -Xmx1792m -Djava.net.preferIPv4Stack=true
     ```

4. (Optional) Modify JBoss Application Server to run in IPv6 mode as follows:
   
   - Locate and modify `-Djava.net.preferIPv4Stack=false`
   - Insert the string `-Djava.net.preferIPv6Stack=true`
Note: If the application server log contains the following error on startup, remove the value for the IPv6 stack and set the IPV4 value back to true:

```
13:37:44,488 WARN [HANamingService] Failed to start AutomaticDiscovery
java.net.SocketException: bad argument for IP_MULTICAST_IF: address not bound to any interface at java.net.PlainDatagramSocketImpl.socketSetOption(Native Method)
at java.net.PlainDatagramSocketImpl.socketSetOption(PlainDatagramSocketImpl.java:260)
```

5. Save and close the file.

➤ Modify the run.sh file (JBoss with Solaris 10, Red Hat 5.0, 64-bit only)

Solaris and Linux JDKs from Sun require an additional argument to use 64-bit features. Without this configuration change, the Sun JDK defaults to 32-bit support only.

Note: If you're running JBoss as a non-root user, use `-Djava.io.tmpdir="location"` to set the location of the temporary directory to a directory to which you have access.

1. Open the `(appserver root)/bin/run.sh` file in an editor.

2. Locate the following line:

   `JAVA_OPTS=$JAVA_OPTS -XX:PermSize=256m -XX:MaxPermSize=256m -Xms1024m -Xmx1024m`

   Note: The `JAVA_OPTS` arguments may be present in the run.conf file instead of the run.sh file. Locate these arguments in both file, and then make the required changes.

3. Change the `-XX:MaxPermSize=256m` and the `-Xmx1024m` arguments as follows:

   `JAVA_OPTS=%JAVA_OPTS% -XX:PermSize=256m -XX:MaxPermSize=512m -Xms1024m -Xmx1792m`

4. Add the following statement just after the JAVA_OPTS assignment statement in the file to set encoding to UTF-8:

   `JAVA_OPTS="$JAVA_OPTS -d64 -Dadobeidp.serverName=server1 -Dfile.encoding=utf8 -Dprogram.name=$PROGNAME`

   Note: Ensure that this entry appears as a single line in the run.sh file.

5. (Optional) Modify JBoss Application Server to run in IPv6 mode as follows:
   - Locate and modify `-Djava.net.preferIPv4Stack=false`
   - Add `-Djava.net.preferIPv6Stack=true`

   Note: If the application server log contains the following error on startup, remove the value for the IPv6 stack and set the IPv4 value back to true:

   ```
   13:37:44,488 WARN [HANamingService] Failed to start AutomaticDiscovery
   java.net.SocketException: bad argument for IP_MULTICAST_IF: address not bound to any interface at java.net.PlainDatagramSocketImpl.socketSetOption(Native Method)
   ```

6. Save and close the file.

➤ Modify the run.conf file

1. Open the `(appserver root)/bin/run.conf` file in an editor.
2. Locate `JAVA_OPTS=-server -Xms128m -Xmx128m` and modify it to read as follows for 32-bit operating systems:

   `JAVA_OPTS=-server -XX:MaxPermSize=256m -Xms1024m -Xmx1024m`  
   -Dsun.rmi.dgc.client.gcInterval=3600000  
   -Dsun.rmi.dgc.server.gcInterval=3600000

   For 64-bit operating systems, modify the line to read as follows:

   `JAVA_OPTS=-server -d64 -XX:MaxPermSize=512m -Xms1024m -Xmx1792m`  
   -Dsun.rmi.dgc.client.gcInterval=3600000  
   -Dsun.rmi.dgc.server.gcInterval=3600000

3. *(Linux only)* You must also add the "-Djava.net.preferIPv4Stack=true" flag to `JAVA_OPTS` to remove the warning "[HANamingService] Failed to start AutomaticDiscovery".

4. Save and close the file.

   ▶ Modify the log4j.xml file to increase the logging level from DEBUG to INFO

1. Open the `[appserver root]/server/all/conf/jboss-log4j.xml` file in an editor.

2. Locate the following text in the `FILE` appender section and add the line that appears in bold:

   ```xml
   <appender name="FILE" class="org.jboss.logging.appender.DailyRollingFileAppender">
     <errorHandler class="org.jboss.logging.util.OnlyOnceErrorHandler"/>
     <param name="File" value="${jboss.server.home.dir}/log/cluster.log"/>
     <param name="Threshold" value="INFO"/>
     <param name="Append" value="false"/>
   </appender>
   ```

3. Locate the following text in the `CONSOLE` appender section:

   ```xml
   <appender name="CONSOLE" class="org.apache.log4j.ConsoleAppender">
     <errorHandler class="org.jboss.logging.util.OnlyOnceErrorHandler"/>
     <param name="Target" value="System.out"/>
     <param name="Threshold" value="INFO"/>
   </appender>
   ```

   Modify the last line to read as follows:

   ```xml
   <param name="Threshold" value="WARN"/>
   ```

4. Locate the Limit categories section and add the following:

   ```xml
   <category name="com.adobe">
     <priority value="INFO"/>
   </category>
   <category name="org.apache.xml.security.signature.Reference">
     <priority value="WARN"/>
   </category>
   <category name="org.alfresco">
     <priority value="WARN"/>
   </category>
   <category name="org.alfresco.repo.policy">
     <priority value="WARN"/>
   </category>
   <category name="org.springframework">
     <priority value="WARN"/>
   </category>
   <category name="org.hibernate">
     <priority value="WARN"/>
   </category>
   ```
5. Save and close the file.

➤ **Remove the JMX Console and Web Console**

To remove the default insecure web pages from JBoss, delete the following directories:

```
[appserver root]/server/all/deploy/jmx-console.war
[appserver root]/server/all/deploy/management
```

➤ **Modify the jmx-invoker-service.xml file**

1. Navigate to the [appserver root]/server/all/deploy directory and open the jmx-invoker-service.xml file in a text editor.

2. Ensure that the following lines are commented out in the `invoke` section:

```
<interceptor code="org.jboss.jmx.connector.invoker.AuthenticationInterceptor"
  securityDomain="java:/jaas/jmx-console"/>
```

3. Save and close the file.

➤ **Modify the jbossjta-properties.xml file:**

1. Ensure that transaction management works as expected by locating the jbossjta-properties.xml file in the [appserver root]/server/all/conf directory and opening the file in an editor.

2. Locate and modify the properties element as follows (modification in bold). Add the property in bold if it doesn’t already exist in the jbossjta-properties.xml file.

```
<properties depends="arjuna" name="jta">
  <property name="com.arjuna.ats.jta.allowMultipleLastResources" value="true"/>
  <!-- ... other properties ... -->
</properties>
```

3. Save and close the file.

*Note:* For more information, see the JBoss article 11443 at [http://www.jboss.org/community/docs/DOC-11443](http://www.jboss.org/community/docs/DOC-11443).
A.4.2 Changing the hibernate option (Content Services ES2 only)

If you are deploying Content Services ES2 on a manually-configured JBoss environment, you must change hibernate to use the CGLIB bytecode provider instead of JAVASSIST otherwise Content Services ES2 will fail to deploy.

➤ Modify the hibernate bytecode provider

1. Locate and open the persistence.properties file:

   \[JBoss_HOME\]/server/all/deploy/ejb3.deployer/META-INF/

2. Locate and modify the hibernate.bytecode.provider value to cglib.

3. Save and close the file.

A.5 LiveCycle ES2 database connectivity

To configure the LiveCycle ES2 database connectivity, you must complete the following tasks:

- Configure the LiveCycle ES2 data source.
- Configure JBoss to use your database as the default data source.

You must install database drivers to the installation directories of the application server. Drivers are required to enable LiveCycle Configuration Manager and the application server to connect to the LiveCycle ES2 database. Install the drivers for the type of database that you use for the database.

You must configure the data source to connect to the database. For JBoss, you can configure an Oracle, or SQL Server data source.

Note: Before proceeding with the following tasks, ensure that JBoss is not running.

A.5.1 Configuring Oracle for manually installed JBoss

To enable JBoss to connect to the Oracle database that stores LiveCycle ES2 data, you must complete the following tasks if you are manually deploying LiveCycle ES2:

- Obtain and copy the Oracle JDBC driver to the instance of JBoss where you will deploy LiveCycle ES2.
- Create a data source file and deploy it to the instance of JBoss where you will deploy LiveCycle ES2.

A.5.1.1 Install the Oracle 11g R2 database driver

Copy the ojdbc5.jar for JDK 1.5 and ojdbc6.jar for JDK 1.6 driver file from the [LiveCycleES2 root]/lib/db/oracle directory to the [appserver root]/server/all/lib directory. You can also download the Oracle 11g R2 Release 1(11.1.0.6 Thin) driver from the [JDBC Driver Downloads](http://www.oracle.com/technetwork/database/odbc/downloads/index.html) site.
A.5.1.2 Edit adobe-ds.xml file

1. Copy the adobe-ds.xml file from the [DVD_root]/third_party/datasources/lc_oracle/deploy directory to the [appserver root]/server/all/deploy directory.

2. Open the adobe-ds.xml file in a text editor and locate this line:

   `<connection-url>jdbc:oracle:thin:@localhost:1521:adobe</connection-url>
   <driver-class>oracle.jdbc.driver.OracleDriver</driver-class>
   <user-name>adobe</user-name>
   <password>adobe</password>

3. Replace the following values with values that are specific to your database:
   - **localhost**: The name, IP address, or fully-qualified path of the computer that hosts the database. The default is localhost.
   - **1521**: The port used to access the database. The default port is 1521.
   - **adobe**: Change the default value, adobe, with your database SID.

4. In the lines that follow the `<connection-url>` settings, locate the `user-name` and `password` settings and replace the default values with the user name and password that the application server uses to access your database.

5. *(Only for Oracle RAC)* Replace the connection URL mentioned in step 2 with the following connection URL:

   ```xml
   jdbc:oracle:thin:@(DESCRIPTION=(ENABLE=broken) (ADDRESS_LIST=(ADDRESS=(PROTOCOL=TCP) (HOST=yourhost1) (PORT=1521)) (ADDRESS=(PROTOCOL=TCP) (HOST=yourhost2) (PORT=1521)) (LOAD_BALANCE=on) (FAILOVER=on)) (CONNECT_DATA=(SERVER=dedicated) (SERVICE_NAME=service.yourcompany.com) (FAILOVER_MODE=(TYPE=session) (METHOD=basic) (RETRIES=10) (DELAY=3))))
   ```

   **Note:** Ensure that this entry appears as a single line in the adobe-ds.xml file.

6. *(Only for Oracle RAC)* Replace the following text from the connection URL in step 5 with values that are specific to your database:
   - **yourhost1**: The name, IP address, or fully-qualified domain name of the first node in the cluster that hosts the database.
   - **yourhost2**: The name, IP address, or fully-qualified domain name of the second node in the cluster that hosts the database.

   **Note:** The cluster hosting the database could have \( n \) nodes. yourhost1 and yourhost2 are examples in the case of a two-node cluster.

   - **service.yourcompany.com**: The service name for the Oracle RAC database.

7. Modify the minimum and maximum values for the data source connections:
   - **IDP_DS**:
     ```xml
     <min-pool-size>1</min-pool-size>
     <max-pool-size>30</max-pool-size>
     ```
   - **EDC_DS**:
     ```xml
     <min-pool-size>1</min-pool-size>
     <max-pool-size>20</max-pool-size>
     ```
Note: If your LiveCycle ES2 server handles heavy load, increase the number of maximum JDBC connections to ensure that all jobs are processed. In such cases, increase `<max-pool-size>` to 50 or more for both IDP_DS and EDC_DS.

8. Save the file.

A.5.1.3 Set Oracle as the data source

If you are running LiveCycle ES2 with a Oracle database, you must set Oracle to be the default data source for JBoss. This procedure assumes that the Oracle JDBC driver is installed in the `appserver root/server/all/lib` directory.

1. Navigate to the `appserver root/server/all/deploy` directory and delete the hsqldb-ds.xml file.

2. Copy the oracle-ds.xml file from the `appserver root/docs/examples/jca` directory to the `appserver root/server/all/deploy` directory.

3. Open the `appserver root/server/all/deploy/oracle-ds.xml` file in a text editor and modify the `<local-tx-datasource>` element with your Oracle connection settings:

   ```xml
   <jndi-name>OracleDS</jndi-name>
   <connection-url>jdbc:oracle:thin:@youroraclehost:1521:yoursid</connection-url>
   <driver-class>oracle.jdbc.driver.OracleDriver</driver-class>
   <user-name>x</user-name>
   <password>y</password>
   ```

4. Replace the bold values with values that are specific to your database:

   - **OracleDS**: Change this value to `DefaultDS`.
   - **youroraclehost**: Replace this value with the host name of your Oracle server.
   - **1521**: If Oracle is not using the default port, replace this value with the appropriate port number.
   - **yoursid**: Replace this value with your Oracle System Identifier.

5. In the lines that follow the `<connection-url>` settings, locate the `<user-name>` and `<password>` settings and replace the default values with the user name and password that the application server uses to access your database.

6. *(Only for Oracle RAC)* Replace the connection settings mentioned in step 3 with the following connection URL:

   ```sql
   jdbc:oracle:thin:@(DESCRIPTION=(ENABLE=broken) (ADDRESS_LIST=(ADDRESS=(PROTOCOL=TCP) (HOST=yourhost1) (PORT=1521)) (ADDRESS=(PROTOCOL=TCP) (HOST=yourhost2) (PORT=1521)) (LOAD_BALANCE=on) (FAILOVER=on)) (CONNECT_DATA=(SERVER=dedicated) (SERVICE_NAME=service.yourcompany.com) (FAILOVER_MODE=(TYPE=session) (METHOD=basic) (RETRIES=10) (DELAY=3))))
   ```

   **Note:** Ensure that this entry appears as a single line in the oracle-ds.xml file.

7. *(Only for Oracle RAC)* Replace the following text from the connection URL in step 6 with values that are specific to your database:

   - **yourhost1**: The name, IP address, or fully-qualified domain name of the first node in the cluster that hosts the database.
● yourhost2: The name, IP address, or fully-qualified domain name of the second node in the cluster that hosts the database.

**Note:** The cluster hosting the database could have $n$ nodes. yourhost1 and yourhost2 are examples in the case of a two-node cluster.

● service.yourcompany.com: The service name for the Oracle RAC database.

8. Save and close the file.

A.5.1.4 Edit the standardjbosscmp-jdbc.xml file

1. Open the [appserver root]/server/all/conf/standardjbosscmp-jdbc.xml file and change the following elements (not necessarily on consecutive lines):

```xml
<!-- optional since 4.0 -->
<datasource-mapping>Hypersonic SQL</datasource-mapping>
<fk-constraint>false</fk-constraint>
```

● Remove the text <!-- optional since 4.0 and the trailing --> comment tag from the <datasource-mapping> tag to uncomment it.

● Replace Hypersonic SQL with Oracle10g in the <datasource-mapping> element.

The final <datasource-mapping> tag will look like the following line:

```xml
<datasource-mapping>Oracle10g</datasource-mapping>
```

**Note:** The Oracle database version that you specify in [appserver root]/server/all/deploy/oracle-ds.xml and [appserver root]/server/all/conf/standardjbosscmp-jdbc.xml must match.

● Replace false in the <fk-constraint> with true.

2. Save and close the file.

A.5.1.5 Edit the login-config.xml file

1. Open the [appserver root]/server/all/conf/login-config.xml file in a text editor and add the following text within the <policy> element:

```xml
<application-policy name = "OracleDbRealm">
  <authentication>
    <login-module code = "org.jboss.resource.security.ConfiguredIdentityLoginModule" flag = "required">
      <module-option name = "principal">adobe</module-option>
      <module-option name = "userName">adobe</module-option>
      <module-option name = "password">adobe</module-option>
      <module-option name = "managedConnectionFactoryName">jboss.jca:service=LocalTxCM,name=DefaultDS</module-option>
    </login-module>
  </authentication>
</application-policy>
```

2. Replace the bold text with values that are specific to your database:

**Note:** For Oracle RAC, replace adobe with the service name specific to your database.

3. Save and close the file.
4. Start JBoss.

A.5.2 Configuring SQL Server

To enable JBoss to connect to the SQL Server database that stores LiveCycle ES2 data, you must complete the following tasks:

- Obtain and copy the SQL Server JDBC driver files to the instance of JBoss where you will deploy LiveCycle ES2.
- Create a SQL Server data source file and deploy it to the instance of JBoss where you will deploy LiveCycle ES2, such as \[appserver_root\]/server/all/deploy.
- Encrypt the password in the data source files (\adobe-ds.xml\ and \mssql-ds.xml\) and the \login-config.xml\ file using one of the methods described at [http://community.jboss.org/wiki/EncryptingDataSourcePasswords](http://community.jboss.org/wiki/EncryptingDataSourcePasswords). You can also use the instructions available on [http://blogs.adobe.com/livecycle/2009/10/livecycle_-_encrypting_clearte.html](http://blogs.adobe.com/livecycle/2009/10/livecycle_-_encrypting_clearte.html).

### A.5.2.1 Configuring the SQL Server data source

Before you configure the SQL Server data source, you must have the LiveCycle ES2 database created on SQL Server. (See “Creating a SQL Server database” on page 61.)

### A.5.2.2 Install the SQL database driver for JBoss

1. Obtain the SQL Server JDBC 1.2 database driver from the Microsoft website.
   
   **Note:** Use SQL Server JDBC Driver 1.2 for both Microsoft SQL Server 2005 SP3 and Microsoft SQL Server 2008.

2. (Windows) Download the *.exe file and run it, and then extract the files to a temporary directory (referred to as the \[SQL_root\] directory in the remainder of this section).

3. (Linux) Extract the *.tar.gz files to a temporary directory (referred to as the \[SQL_root\] directory in the remainder of this section).

4. Copy the sqljdbc.jar file from the \[SQL_root\]/sqljdbc_1.2/enu directory to the \[appserver root\]/server/all/lib directory.

5. Delete the mysql-connector-java-3.1.12-bin.jar file located in the \[appserver root\]/server/all/lib directory.

### A.5.2.3 Edit adobe-ds.xml file

1. Copy the adobe-ds.xml file from the \[DVD_root\]/third_party/datasources/lc_sqlserver/deploy directory to the \[appserver root\]/server/all/deploy directory.

2. Open the adobe-ds.xml file in a text editor and modify the \<local-tx-datasource>\ element with your SQL Server connection settings:

   \<connection-url>jdbc:sqlserver://localhost:1433;DatabaseName=adobe</connection-url>
   <driver-class>com.microsoft.sqlserver.jdbc.SQLServerDriver</driver-class>
   \<user-name>adobe</user-name>
   \<password>adobe</password>
3. Replace the following values with values that are specific to your database:
   - **localhost**: The name, IP address, or fully-qualified path of the computer that hosts the database. The default is localhost.
   - **1433**: The port used to access the database.
   - **adobe**: The name of the database that stores the LiveCycle ES2 data. You will need to update the default value, adobe, with your database name.

4. Change the `<driver-class>` element as follows:
   `<driver-class>com.microsoft.sqlserver.jdbc.SQLServerDriver</driver-class>`

5. In the lines that follow the `<driver-class>` settings, locate the `user-name` and `password` settings and replace the default values with the user name and password that the application server uses to access your database. Modify the minimum and maximum values for the data source connections:
   - **IDP_DS**:
     `<min-pool-size>1</min-pool-size>`
     `<max-pool-size>30</max-pool-size>`
   - **EDC_DS**:
     `<min-pool-size>1</min-pool-size>`
     `<max-pool-size>20</max-pool-size>`

   **Note:** If your LiveCycle ES2 server handles heavy load, increase the number of maximum JDBC connections to ensure that all jobs are processed. In such cases, increase `<max-pool-size>` to 50 or more for both IDP_DS and EDC_DS.

6. Save the file.

A.5.2.4 Edit the mssql-ds.xml file

1. Navigate to the `[appserver root]/server/all/deploy` directory and delete the hsqldb-ds.xml file.

2. Navigate to the `[appserver root]/docs/examples/jca` directory and copy the mssql-ds.xml file to the `[appserver root]/server/all/deploy` directory.

3. Open the mssql-ds.xml file in a text editor and change the `<local-tx-datasource>` element with your SQL Server connection settings (not necessarily on consecutive lines):

   `<jndi-name>MSQSLDS</jndi-name>`
   `<datasource-mapping>MS SQLSERVER2000</datasource-mapping>`
   `<connection-url>jdbc:sqlserver://localhost:1433;DatabaseName=MyDatabase</connection-url>`
   `<driver-class>com.microsoft.sqlserver.jdbc.SQLServerDriver</driver-class>`
   `<user-name>x</user-name>`
   `<password>y</password>`

   - The `<jndi-name>` element to `DefaultDS`
   - The `<datasource-mapping>` element to `MS SQLSERVER2000`
   - The Database name `MyDatabase` to your database name
   - The `<user-name>` element to your user name
   - The `<password>` element to your password
Note: The `<datasource-mapping>` element should point to MS SQLSERVER2000, even if you are using MS SQL Server 2005.

4. Save and close the file.

A.5.2.5 Edit the standardjbosscmp-jdbc.xml file

1. Open the `[appserver root]/server/all/conf/standardjbosscmp-jdbc.xml` file and change the following elements (not necessarily on consecutive lines):

```
<!-- optional since 4.0 <datasource-mapping>Hypersonic SQL -->
<fk-constraint>false</fk-constraint>
```

- Remove the text `<!-- optional since 4.0 and the trailing -->` comment tag from the `<datasource-mapping>` tag to uncomment it.
- Replace Hypersonic SQL with MS SQLSERVER2000 in the `<datasource-mapping>` element.

The final `<datasource-mapping>` tag will look like the following line:

```
<datasource-mapping>MS SQLSERVER2000</datasource-mapping>
```

Note: The `<datasource-mapping>` element should point to MS SQLSERVER2000, even if you are using MS SQL Server 2005.

- Replace `false` in the `<fk-constraint>` with `true`.

2. Save and close the file.

A.5.2.6 Edit the login-config.xml file

1. Open the `[appserver root]/server/all/conf/login-config.xml` file in a text editor and add the following lines within the `<policy>` element:

```
<application-policy name = "MSSQLDbRealm">
  <authentication>
    <login-module code = "org.jboss.resource.security.ConfiguredIdentityLoginModule" flag = "required">
      <module-option name = "principal">adobe</module-option>
      <module-option name = "userName">adobe</module-option>
      <module-option name = "password">adobe</module-option>
      <module-option name = "managedConnectionFactoryName">jboss.jca:service=LocalTxCM,name=DefaultDS</module-option>
    </login-module>
  </authentication>
</application-policy>
```

2. Replace the bold values with values that are specific to your database:

3. Save and close the file.
A.5.2.7 Configure Integrated Security on Windows

1. Modify the adobe-ds.xml and mssql-ds.xml files, located in [appserver root]\server\all\deploy, to add integratedSecurity=true to the connection URL, as shown in this example:

   <connection-url>jdbc:sqlserver://<serverhost>:<port>;
databaseName=<dbname>;integratedSecurity=<true></connection-url>

2. Add the sqljdbc_auth.dll file to the Windows systems path (C:\Windows) on the computer that is running JBoss. The sqljdbc_auth.dll file is located with the Microsoft SQL JDBC 1.2 driver installation (default is [install dir]/sqljdbc_1.2/enu/auth/x86 for 32-bit operating systems and [install dir]/sqljdbc_1.2/enu/auth/x64 for 64-bit operating systems).

3. Open the properties for the JBoss for Adobe LiveCycle service and click the Log On tab.

4. Select This Account and type the value of a valid user account. This change is not required if you are running JBoss from the command line.

5. Change SQL Server Security from Mixed mode to Windows Authentication only.
Appendix - Increasing the Deployer heap size for WebSphere

You must increase the heap size in the ejbdeploy.bat/sh script to avoid time-out errors.

➤ **AIX, Linux, or Solaris**

1. Go to the [appserver root]/deploytool/itp/ directory and open ejbdeploy.sh for editing.

2. *(Solaris only)* In the SunOS section, find the EJBDEPLOY_JVM_OPTIONS attribute and change the value of the -XX:PermSize option to 256m, and ensure that the value of the -Xverify option is none.

3. Change the heap size in the $JAVA_CMD\ section to the following value:
   -Xms256m -Xmx512m

4. Save and close the file.

➤ **Windows**

1. Go to [appserver root]/deploytool/itp and open the ejbdeploy.bat file in a text editor.

2. Find the line beginning with %JAVA_HOME% and then find the argument -Xmx.

3. Change the argument to -Xmx512M.

4. Save and close the file.

➤ **Increase MaxPermSize (WebSphere on Solaris):**

1. Log in to the WebSphere Administrative Console.

2. In the navigation tree of the WebSphere Administrative Console, do one of the following:
   - *(WebSphere 6.1)* Click Servers > Application Servers and, in the right pane, click the server name.
   - *(WebSphere 7.0)* Click Servers > Server Types > WebSphere Application servers and, in the right pane, click the server name.


5. In the Generic JVM Arguments, enter the MaxPermSize parameter as -XX:MaxPermSize=512m.

6. Click OK or Apply.

7. In the Messages box, click Save directly to master configuration, and then restart the application server.