A Sample Solution for Records Management with Process Choreography

Explore records management concepts

Design and develop a records management application

Use process choreography to control document life cycles

Jan Antos
Mike Kerzee
Therese Sroujian
Budi Darmawan
Bart Jacob

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Preface

This IBM Redbook describes a sample implementation of a complex solution that addresses a key challenge being faced by many enterprises today. Document and record management has always been a difficult (and often manual) process. Enterprises need to address this challenge, not only to make their business, employees, partners, and customers more efficient, but also to comply with ever-increasing regulations.

Addressing these requirements demands a flexible solution that can be integrated with current and future IT systems and applications. It is also critical that it is driven through controllable and automated business processes.

This book describes a sample solution that integrates IBM® DB2® Records Manager, IBM DB2 Content Manager, IBM WebSphere® Application Server Enterprise process choreographer, IBM WebSphere Portal, IBM Tivoli® Directory Server, and other software to provide a prototype solution. Though basic in its function, the solution and the steps to implement it can be used to help architects, IT specialists, and developers get started in creating a solution addressing their enterprise-specific requirements.

The team that wrote this redbook

This redbook was produced by a team of specialists from around the world working at the International Technical Support Organization, Austin Center.

Bart Jacob is a Senior Consulting IT Specialist at IBM Corp., International Technical Support Organization, Austin Center. He has 24 years of experience providing technical support across a variety of IBM products and technologies, including communications, object-oriented software development, and systems management. He has more than 13 years of experience at the ITSO, where he has been writing IBM Redbooks™ and creating and teaching workshops around the world on a variety of topics. He holds a Master's degree in Numerical Analysis from Syracuse University.

Jan Antos is a Senior Analyst/Programmer at Trask solutions s.r.o., an IBM Premium Business Partner in the Czech Republic. He holds a Master's degree in Computer Science from Czech Technical University in Prague, where he currently studies in the Ph.D. program. He has more than five years of IT experience working mainly with the IBM WebSphere family of products, exploiting technologies such as J2EE, WebSphere MQ, Web services, and

Business Process Execution Language for Web Services. He is a Sun Certified Java™ Programmer for the Java 2 Platform and an IBM Certified WebSphere Studio Developer. His areas of expertise include analysis, design, and development of large integration projects for financial institutions.

Budi Darmwan is a Consulting IT Specialist at the International Technical Support Organization, Austin Center. He writes extensively and teaches IBM classes worldwide on all areas of systems management. Before joining the ITSO six years ago, Budi worked in IBM Global Services, Indonesia as a Solution Architect and Lead Services Implementer. His current interests include autonomic computing, business service management, Java programming, and Web security.

Mike Kerzee is an Information Technology Architect in IBM Sales and Distribution's Health Care and Life Sciences solution development organization located in Boulder, Colorado, U.S. He has 17 years of experience in electronic data capture, analysis, and management solutions. Mike holds a degree in biology from Tarleton State University (Texas A&M). His areas of expertise include IBM DB2 Records Manager, IBM DB2 Content Manager, and Web services architecture for delivery of information life-cycle management and regulatory compliance solutions for long-term retention of electronic records. Mike has written and presented extensively about the health care and life sciences information life-cycle management, as well as industry standards for support of electronic data management within the life sciences.

Therese Sroujian is a Business Scenario Designer for the IBM Software Group System House in the IBM Toronto Lab, Canada. She has eight years of experience in software development. She holds a Bachelor of Science degree from York University, Toronto, Canada. Therese has expertise in J2EE development, content management including DB2 Content Manager, DB2 Document Manager, and Lotus® Workplace Web Content Management™, records management including DB2 Records Manager, business processes development and deployment, and portal user interface development using WebSphere Portal. She has written extensively about different product integration topics and has consulted on other IBM Redbooks.

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Part 1

Overview

In this first part of the book, we introduce the business requirement for document and records management within the context of business processes.

Chapter 1, "Introduction" on page 3, provides a broad overview and describes many of the issues that enterprises face today and the elements that might be included in a solution.

Chapter 2, "Solution context and overview" on page 13, provides additional details about a potential solution by looking at various use cases and business processes.

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Introduction

As businesses struggle to compete in a harsh economic climate and an increasingly global economy, there is renewed focus on improving profitability by decreasing costs. Many companies are reviewing their processes in order to get the most from each employee and to ensure that these processes are tightly controlled to meet the needs of an increasingly regulated business environment.

To further complicate matters, businesses are being inundated with all kinds of information: e-mail, letters, faxes, photographs and other images, marketing materials, audio (voice and music), video, documents, spreadsheets, presentations, reports, statements and invoices, and Web content such as HTML, Flash and graphics. As the amount of information increases (some estimate the volume is doubling each year), it becomes more challenging to find and retrieve up-to-date information. The search is problematic due to the many sources of information, business processes, various applications, multiple intranet sites, and individual desktop systems, and just as many formats. If the information is not easily found, it is often unnecessarily re-created. This, in turn, leads to a further proliferation of information with many redundancies and, too often, errors. Thus, the difficulties handling the rising volumes of business information are causing further inefficiencies in critical business processes and, more importantly, undue business risk.

Clearly, it is important to control the management of business information throughout its life cycle, from creation to its destruction. Some of these controls are being mandated by specific rules and regulations, many of which apply

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across industries. The Sarbanes-Oxley Act in the U.S. establishes standards for corporate accountability and penalties for wrongdoing. There is particular emphasis on assertions by senior management that internal controls and procedures for financial reporting ensure complete and accurate information.

Similarly, in the financial industry, various rules such as NASD Rule 2711 and NYSE Rule 472 have also been put in place. These rules outline restrictions on the production of research reports by analysts and include restrictions on who may review or approve reports, the involvement of the compliance department, retention periods for draft and final reports, and disclosure requirements. These and other rules define records and their retention periods.

In general, regardless of the need to comply with specific regulations, it is essential that organizations adopt business information handling capabilities that include:

► Defined processes that can be tracked and audited

► Control over who is allowed access to information and at which stages of its life cycle

► Identification and retention of records

► Guarantees as to authenticity of information and protection against tampering

Many organizations are adopting a strategy to transform the workforce by using technology to enhance employee effectiveness and productivity. This goal is realized by providing employees with new self-service applications, by improving their ability to collaborate not only within individual departments, but across departments and locations, and by providing easier access to existing applications and information. This information is growing exponentially and must be better managed and tightly controlled to reduce risk.

1.1 Problem statement and solution overview

This section highlights some of the key problems that companies often face related to content and records management. Along with the description of each problem, a short description of the key attributes of a solution are also provided. This will lay the groundwork for the design of an overall solution.

There are many problems that highlight the challenges businesses face in an effort to have a more efficient and productive organization and to deal with the increasing volumes of content. We categorize the problems as follows and provide details in the sections that follow:

- ► Employee productivity inhibitors
- ► Information management
- ► Locating information
- ► Business risks

1.1.1 Employee productivity inhibitors

This section describes some of the key employee productivity inhibitors.

Inefficient methods of communication

Affecting all lines of business, this inhibitor makes it difficult to collaborate and operate effectively. Often, costly travel might be required in order to have face-to-face meetings.

A successful solution would facilitate communication, even across multiple sites, and allow employees to collaborate more effectively, increasing productivity and decreasing travel costs.

Dissemination of up-to-date business information

Many organizations find it challenging to disseminate up-to-date information, such as policies, procedures, best practices, and product information. With new regulatory requirements, it is even more critical that information be shard in a timely manner.

The problems associated with the sharing of timely information can affect the ability to make decisions and respond to customers. In addition, it can be more difficult to ensure compliance with policies, procedures, and relevant regulations. Employees are less effective when not following current procedures and best practices.

A solution would make business information more readily available to all employees.

Slow and cumbersome manual procedures

Business processes are often paper intensive and involve cumbersome manual routing of information that, in turn, slows the process. This can be especially true in human resources (HR), administration, and operations departments.

Impacts can include:

► Extended time to complete tasks

► Manual, error-prone routing with potential loss of information

► Difficulties in tracking the state of processes and handling exceptional business situations, such as when the required approver is absent or unavailable

A successful solution would reduce costs by providing employees with self-service capability rather than existing paper-intensive processes, easily define and automate many business processes, automatically route information and notify employees of tasks requiring their attention, allow process progress to be easily tracked, and generate notifications of exceptions so that they can be more efficiently handled.

High rates of employee turnover

High rates of employee turnover affect businesses due to the high cost of replacement and retraining.

An effective solution would provide the ability to find information fast and easily, along with its history, so a new employee is better able to quickly gain necessary expertise. In addition, this could provide opportunities for enhanced employee development.

1.1.2 Information management

This section describes some of the key challenges associated with managing information.

Ensuring authenticity, integrity, and accuracy of information

With current approaches, it is difficult to find necessary information, leading to its re-creation. Often, information is copied and modified. In both cases, redundant and often incorrect information is produced.

Time is wasted attempting to verify that available information is authentic, accurate, and current. This also might limit or prevent a business from assuring compliance with regulations.

A solution would mitigate uncertainty by providing means of easily reviewing and approving information to ensure accuracy. It would maintain a single copy of each piece of content and manage its associated versions. This makes content to be more easily located, thus avoiding recreation, as well as protecting the integrity of the content. A solution should provide the ability to discern invalid or altered content as pertinent to compliance with particular regulations.

Authoring and managing large documents

Large documents consisting of many parts are often created using different methods by several contributors. Typically, a large document is assembled from copies of parts of existing documents. When the parts change, the large document is out-of-date and must be reassembled.　The same parts are often used in several, different larger documents.

Such a process results in slow, often manual, processes to assemble documents. It is difficult to maintain the relationships of the large document to its parts. Multiple copies of document parts are produced during assembly into large documents, thus increasing the overall volume of information. There is often uncertainty about the accuracy of the large document because it might contain an out-of-date copy of a part.

A solution would allow easy authoring of parts and their combination into a large document. It would maintain the relationships between the overall document and the appropriate versions of its parts.

Using business information for multiple purposes

Often the same or similar information is used for different purposes. For instance, product descriptions might appear in internal documents, marketing briefs, and product documentation. However, this information must be formatted differently, and controls must be in place to ensure that only the proper information appears in a particular document.

In many cases, manual processes are currently used that can include cutting and pasting from one document to another. Errors are often introduced when information is copied and modified for reuse.

The relationship of copies to the original source is difficult or impossible to maintain. In this situation, it is difficult to keep information in copies up-to-date when the original information changes.

A solution would allow for the definition of rules for assembling information from parts. It would allow parts to be easily created and maintained by enabling information to be entered and kept separate from the description of its format. Alternatively, information is easily separated out of existing types to allow multiple formats to be applied to it.

High hard-copy documentation costs

Maintaining hard-copy documentation can be a very expensive proposition because it can include:

► Physical storage costs

► Printed document and bill costs

► Manual labor expenses

► Photography costs

A solution would allow documents to be stored, retrieved, and viewed more cost-effectively. As need to access the content decreases, documents are automatically shifted to less expensive storage types.

1.1.3 Locating information

A key challenge facing businesses, due to the increasing volumes of information and information sources, is locating information and expertise.

This can result in lower responsiveness and time wasted searching for information. Ultimately, customer service might be degraded and sales activities hampered.

A solution would provide quick and easy access to enterprise information and expertise. In addition, a solution would provide the ability to search for such information.

This might not only apply to documents. For instance, employee directory entries could provide information about an employee's job and expertise. The directory could be easily searched using this information as search criteria, enabling greater collaboration among employees.

1.1.4 Business risks

This section provides information about some of the critical risks businesses need to manage.

Regulatory compliance

Regulatory compliance can be a driving force for the appropriate management of business content.

Problems can arise due to uncertainty regarding the credibility of information. In addition, possible prosecution, penalties, and punishment for non-compliance can be costly to the business, not only monetarily, but in terms of the firm's reputation.

A solution would:

► Employ procedures and controls designed to ensure the authenticity and integrity of business content

► Provide support for regulatory audits used to substantiate information management practices such as automatically logging steps in processes and tracking modifications and access to business information

► Provide a means of easily capturing and executing business procedures

► Provide automatic notification of activities to those involved in the process

► Allow easy process tracking, including outstanding tasks and completion time

Maintaining proper control over access to information

It is critical to maintain proper control over access to information during its life cycle and ensure that it is not inappropriately modified or deleted. In fact, strict access policies are stipulated by some regulations, and access must be auditable. Current approaches depend on trusting employees to follow proper procedures and manual routing of information at the appropriate stage in the life cycle. Naturally, this is error prone and can result in inappropriate access or modification of documents and the inability to comply with regulations or to attest compliance.

A solution would provide flexible and comprehensive access control mechanisms that are automatically enforced throughout the document life cycle and that are easy to maintain. It would protect published revisions from modification and separate revisions from any versions produced at any point in the life cycle for the next revision. All access should be automatically logged to an audit trail.

Managing retention of records

Records need to be protected from tampering or deletion for specific periods of time, sometimes for years, both for business reasons and, increasingly, to comply with regulations. Records need to be created for many types of content, including documents, e-mail, reports, and statements. In addition, records might need to be held for extended periods, regardless of normal retention periods for that record type, perhaps due to legal action.

Some of the business impacts and requirements related to records retention include:

► Escalating storage costs.

► Records need to be stored securely for the specific period and yet remain easily accessible before being destroyed.

► Records need to be unalterable during the retention period.

With current approaches, especially hard-copy storage, relevant records are difficult and time-consuming to locate in event of litigation, requests for substantiation, regulatory audits, or other investigations. In some cases, records might be irretrievable due to inappropriate destruction or simply lost.

A solution would enable the automatic handling of retention management: storage, accessibility, and destruction at specified times. Retention rules could be defined by record type, but easily overridden for individual records.

Controlling the public perception of the corporate brand

It is important to control the public perception of the corporate brand by ensuring that all published information reflects the desired corporate identity.

If not controlled, brand recognition might be weakened, making marketing activities less effective. Corporate identity is weakened or damaged by inconsistent messages.

A solution would maintain or strengthen a brand by providing sufficient controls such as approval processes on content related to the corporate image. It would also support processes to control the release of information.

1.2 Summary

Virtually all businesses, both in the large enterprise and SMB markets, and across every industry, can take advantage of a solution to address the prevalent problems described here. These companies need to control and manage the production, distribution, and retention of various forms of content, such as e-mail, documents, images, rich media, statements, and invoices, that support their business processes and record business transactions. It is crucial for content to be accurate, authentic, and up-to-date in order to respond to the needs of their customers and business partners.

A solution is particularly appealing to companies with larger numbers of employees. In fact, in this case, the issues around corporate communication and employee collaboration become more problematic. Larger companies tend to have more locations, which means employees are geographically separated.

Large enterprises will enjoy economies of scale when deploying a solution. Relatively fixed implementation costs are spread across a larger user population in such companies.

Users of a solution have varying degrees of sophistication in computer skills and a wide range of experience, so providing a simple and intuitive user interface is important. In addition, with an increasingly global economy, companies need to consider the internationalization of their applications.

The solution described in this book does not provide a complete solution to all of the issues described here. Rather, it demonstrates how various IBM products can be integrated as a basis for such a solution.

The next chapter describes in a little more detail what a solution might include and describes various employee-centric use cases that might apply to any number of enterprises today. Of course, these same concepts could be applied to other use cases involving partners and customers.

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Solution context and overview

This chapter provides a high-level view of an employee workplace solution that addresses some of the requirements described in the previous chapter. Specifically, it addresses some of the requirements related to document and records management within the context of a business process. The bulk of this chapter describes various use cases that are common across many enterprises.

Note: The sample solution described throughout the rest of the book only addresses one of these use cases (and only partially), but the same or similar infrastructure could provide the basis for a more complete solution.

2.1 Solution perspective

An employee workplace is a business-to-employee (B2E) application that integrates corporate information, an employee directory function, and collaborative capabilities with access to administrative and business applications. Document sharing, management, and publishing capabilities are provided, including the appropriate support for document life cycles. In addition, such a solution provides the means to manage and control the life cycle for information to be presented directly in the workplace, known as workplace content management. A retention management capability is provided to handle creating, retaining, and destroying the records of all information pertaining to the transaction of the business. See Figure 2-1.
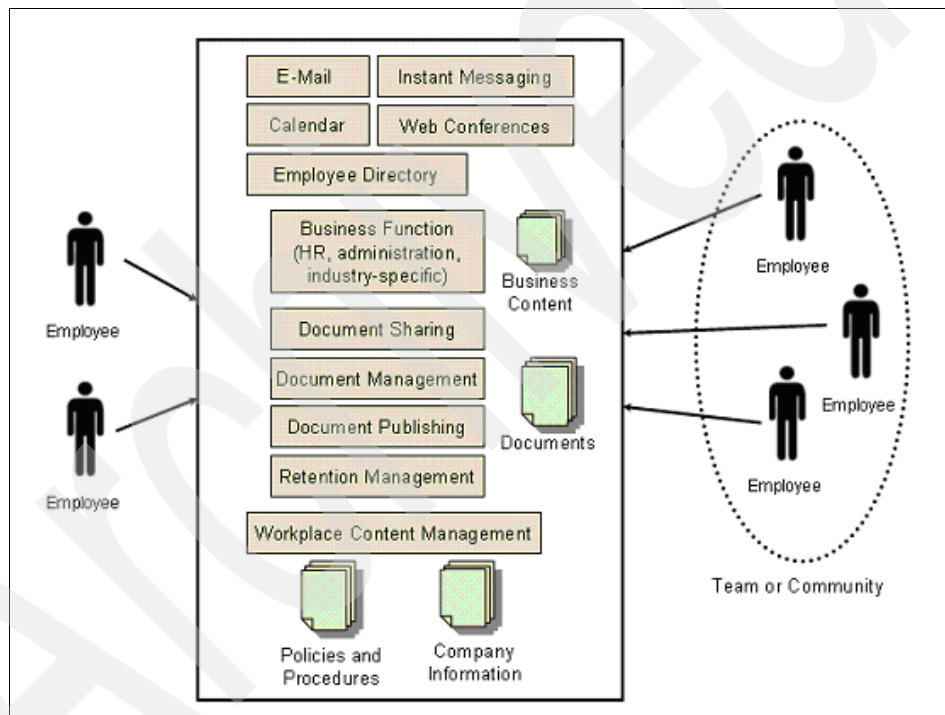
Figure 2-1   Solution overview

2.2 Solution scenarios

The following sections describe various scenarios that illustrate the important end-to-end usage of a records and document management solution integrated with business processes. The goal of this book is to describe the implementation

and deployment of a solution that provides a user experience similar to that portrayed in the scenarios. Keep in mind that the solution described later in this book is limited in scope and meant only to show the basics of how a solution could be developed and deployed and not to provide all of the capabilities described in the following sections.

2.2.1 Use case: Analyst research reporting

> **Note:** It is this use case that provides the context for the examples described and implemented in this book.

In the financial industry, a "research report" is an analysis of equity securities of individual companies or industries delivered in written or electronic format that provides a recommendation and reasonably sufficient information for a reader to make an investment decision. The production of such reports is governed by NASD Rule 2711 and NYSE Rule 472 to ensure investor confidence in the integrity of such reports.

Using the employee workplace, an analyst initiates the creation of a new research report. This is the start of the report life cycle. The report life cycle embodies many of the supervisory procedures necessary for regulatory compliance. All research reports for this firm have the same format, and the report consists of several parts, including the research summary, rating or price target, line graph of security's daily closing price, and disclosures.

The analyst carries out the necessary research and produces a draft report. The analyst uses his favorite desktop authoring tool to create the report, but periodically stores the current draft in the employee workplace. When he is ready, he marks all the parts complete and allows the system to prepare the complete draft from its parts. The analyst previews the assembled report and then submits it for review and approval by the supervisory analyst.

The supervisory analyst uses the workplace to view the report. As she reads it, she becomes concerned that some information is not correct. She advises that the draft report be sent to the subject company to verify its factual accuracy. She rejects approval of the report with the reason "needs verification."

The workplace handles the verification process. First, a complete draft report is automatically routed to the legal department for review prior to the submission to the subject company. After the report is approved by the legal department, the system automatically assembles a draft that omits the research summary and rating or target price parts and routes it to the analyst who sends it to the company.

A few days later, the subject company confirms the facts presented in the report. The analyst forwards the response to the supervisory analyst and copies the legal department. The supervisory analyst creates a record for this e-mail so that it will be retained by the system and then reviews the report again. She adds some review comments suggesting some minor edits. More importantly, she recommends changing the rating given recent economic upheaval. She returns the report to the analyst for rework.

The analyst completes all the suggested rework prior to changing the rating. He is aware that to change the rating, authorization from the legal department is required in order to access and modify that part of the report. To start this process, the analyst must submit a justification to the legal department. After the legal department authorizes the change using the workplace, the system automatically updates the access control for that part and notifies the analyst that the change may proceed. The analyst makes the necessary updates to the rating. At this point, the report life cycle causes a record to be created for the draft with the original rating and notes that a record for the final report must be created once published. Each of these records must be retained for three years.

The report is now complete, so the analyst submits the final draft for approval. The supervisory analyst receives the request for approval in the employee workplace and reviews the report. No further changes are necessary, so she submits the report for approval by the legal department.

Upon receiving the request for approval in the workplace, the legal counsel reviews the report and approves it. After the system processes the approval, the research report is ready for distribution. The original Microsoft® Word format is automatically sent to the printer for hard-copy distribution and also automatically converted to HTML and published to the external Web for investors to view.

A year later, the subject company of this research report proceeds with litigation against the financial institution. All records related to transactions with this company must be discovered and their normal retention period suspended. As the case proceeds, records and the associated audit trails are easily retrieved by the legal department for the financial institution, as needed.

2.2.2 Use case: Collaborating on work products

It is time to begin the planning for the fall marketing campaign. The promotions manager creates a new work area for the team to share information relevant to the campaign and develop the various campaign work products such as promotion details. These work products are typical office document types, text documents, spreadsheets, presentations, and some images. The promotions manager invites the members of her promotions team and also members of the extended marketing team to participate in the shared work area. Only members

of her immediate team are able to create materials in the shared work area; others have only read access.

However, before proceeding with the detailed promotion planning and development, the promotions manager needs to review the department budget and the overall marketing objectives. The marketing objectives are available from the brand management team. The promotions manager finds and extracts the information she needs for the fall campaign from the overall plan in the brand management department's work area. She creates a new plan from the appropriate spreadsheet template in the promotions shared work area.

The promotions manager also needs to get her team to prepare for an up-coming promotion planning session. She asks one of her senior marketers to analyze the results from last year's fall campaign. She contacts one of the marketers to obtain and summarize the most recent market trend analysis, including results from any recent focus groups or customer survey activities, and to add this material to the shared work area. Finally, she creates a discussion forum for her team to comment on last year's fall campaign, its successes and failures.

Later that day, one of the marketers opens the invitation to the fall campaign shared work area. This marketer is working to create a summary of recent market research as requested by the promotions manager. Over the next few days, he works on his summary. He is a little uncertain as to how much detail the promotions manager needs. He notices she is online, so he sends her an instant message with the document link and asks her to take a brief look at it. She agrees.

A little later the marketer gets a message from the promotions manager: "The summary looks good. Finish it up and let the team know it is ready for them to use."

The promotions manager has been working on the promotion plan. She needs to send it to the VP of marketing for approval later in the week. She e-mails her senior marketers and asks them to review the spreadsheet and add their comments to the shared work area.

2.2.3 Use case: Meetings

The promotions manager schedules a meeting with the marketers from the promotions team who will work on the fall campaign. They will use the meeting to brainstorm about the activities and promotions to be included. The initial part of the meeting will be a presentation by the promotions manager on the overall brand strategy followed by a discussion of the budget. Many of the marketers are out of the office on any given day, working on aspects of the current summer promotions, so the promotions manager schedules a Web conference so that all

can easily attend. In the Web conference notice, she reminds the team to prepare for the meeting by reviewing the current plan and market research materials in the shared work area.

The promotions team meets at the appointed time. The presentation is shown using the Web conference facilities. After the formal presentation of the brand strategy, the promotions manager opens the spreadsheet with the budget in the shared work area and uses the Web conference facility to share the file. The team is sobered by the constrained budget, but the promotions manager encourages the team to think of some new campaign ideas that are less costly. One of the marketers suggests better use of the company's public Web site for the fall campaign as a means of decreasing publishing and distribution costs. He wants to quickly sketch out some ideas for the team, so the promotions manager makes the marketer moderator, and he opens the shared white board. A lively discussion ensues as the team views the sketch. The promotions manager's assistant records the meeting minutes in the shared work area and notes the various action items. The meeting ends with the team energized and ready to begin generating detailed promotion ideas for the campaign.

2.2.4 Use case: Managing product information

A company is developing a new product. The product development team is responsible for designing, prototyping, and preparing the product for manufacture. As part of this process, the product development team collaborates to produce the approved technical specification for the product. Original CAD drawings are exported as images from the CAD system into the document library and incorporated into the technical specification document authored with Microsoft Word. Performance data is extracted from the final test runs as comma-delimited CSV files and imported into Microsoft Excel to produce the charts needed for the specification. All the pieces are assembled into the desired format and published for internal use. Because the technical specification is used to create other product materials, it is produced and stored in parts in the document library so that it can be easily reused by other organizations in the company.

Senior management determines the availability date for the product. It is now up to the marketing team to prepare for the product launch. The first step in the launch process is to develop the press release announcing the product. All press releases follow a specific process and have a standard format for release to both the Web and the news services. The lead marketer simply initiates the process and fills in the necessary information, including the announce date, to create the release for this product. The release is automatically routed to brand marketing and then the legal department for their approval. The release is automatically formatted and published in the workplace and released to the news service on the announcement date.

Two key aspects of the launch are a glossy product brochure and a detailed product page for the online catalogue. The lead marketer uses the system to request the production of these types of materials and assigns the appropriate members of the team. All product brochures use the same layout and graphics. Similarly, the product page for the online catalogue has a standard Web design. Both these layouts and all the associated graphic designs and other images such as the company logo were developed by the creative department within the marketing organization and are stored in the system. All standard copy for these files, such as the company description and contact information, are also stored in the system and are made available for use in these types of marketing materials. The system automatically assembles these standard, available parts into the proper layout to form the initial draft of the new brochure and product page when the requests for these materials are processed.

The launch materials need product images, so the lead marketer requests that the photographer create a folder of suitable images. The photographer does the photo shoot and uploads the thumbnails and his recommendations for the final product images to the system for review. The lead marketer requests the full size images for the recommended photos and a few others. She asks others on the team to review the images to ensure that they meet the needs of the product launch. Based on the team's comments, she makes her final choices. The selected images are stored in a folder for use by the whole team.

Meanwhile, the copy for the product description to be used in both the brochure and the Web catalogue is drafted and submitted for review and approval. The product specification descriptions come directly from the technical specification published by the product development team prior to the launch.

After all the parts are reviewed and approved, the brochure and product page are assembled by the system and routed to the lead marketer for approval. The next stage is to have the legal department and the compliance office approve the material prior to release to the publisher for printing, for the brochure, and direct publish to the public Web site for the product page.

2.2.5 Use case: Managing information presented in the workplace

All employees depend on the employee workplace to provide them with access to current information about corporate policies and procedures. Regardless of whether an employee is working at home, on the road, or in the office, the workplace provides information when it is needed.

The upcoming introduction of online vacation information and request processing using the workplace means that current manual vacation procedures will become obsolete. A new procedure description needs to be written and published to the

workplace for employees to use. The publication of the new procedure needs to be coordinated with the date of activation of the new online vacation process.

The human resources (HR) manager uses the employee workplace to request a change to the documented vacation processing procedure. A detailed description and rationale are provided in the request. The new procedure needs to be published to the employee workplace the same day as the new vacation processing capability is deployed. The planned deployment date is entered as the publication date. All authoring, review, and approval activities must be completed prior to this date.

All HR procedures have the same format and are presented directly in the workplace user interface for easy and seamless access. Prior to deploying the workplace solution, the HR organization worked with the creative department to design the overall look and feel for the HR section of the workplace and develop the format for corporate procedures and policies. At the same time, the HR organization determined the appropriate life cycle for policies and procedures and defined the review and approval process so that it could be automated. In addition, a record of any existing policy or procedure must be created automatically and retained by the system for two years once it is replaced by a new revision. This information is incorporated into the life-cycle definition.

One of the HR specialists accepts the assignment to revise the vacation processing procedures. She reviews the details of the update request before she begins.

The detailed steps for the new procedure have been documented by the business analyst who worked on the new online capability. The HR specialist uses this information when she creates the documentation for the revised procedure. She simply selects the correct template for this kind of corporate procedure and enters the new information. The workplace interface guarantees that the procedure format complies with corporate HR standards and the visual design of the workplace. While she is working on the new procedure, it is easy for the HR specialist to preview the way it will be presented in the workplace. When completed to her satisfaction, the HR specialist uses the workplace to mark the activity complete. The next step is to verify that the new procedure is accurate and matches the new online vacation processing capability under development.

Another HR specialist is the HR liaison working with development team responsible for a new online vacation processing feature to be made available in the next release of the employee workplace. The vacation processing feature is already deployed in a test environment and is undergoing final system testing. The HR liaison has access to the test environment and is assisting with the user testing of the interface. He attempts to verify the steps in the procedure with the test system. He finds that there is a missing step and rejects the verification activity with detailed comments about the omitted information.

The first HR specialist is notified about the failed procedure verification. She makes the required changes to the documented steps and resubmits the content for verification.

The HR liaison receives the request to verify the corrected procedure. This time, the verification is successful, and the activity is marked complete. The next step is to have the procedure description approved by the HR manager.

The HR manager receives notification that the new vacation processing procedure description is ready for review. She views the new procedure online using the employee workplace. She knows that the procedure steps have already been verified. However, she feels that some additional text is needed to clarify some of the steps and wants to add some references to other HR policies. She submits specific comments with her rejection.

The HR specialist changes the procedure as recommended by the HR manager and resubmits for approval. This time, the HR manager approves the request. The new procedure is made available to employees on the release date of the new online vacation processing facility. A record of the previous revision of the procedure is created and retained for the specified retention period.

2.2.6 Use case: Monthly fund performance report

Each month, the performance team in a financial institution produces a fund performance report. The communications team developed the boilerplate of this report. The performance team decided to create the report from multiple parts: performance results for each fund, market commentary by fund, top 10 holdings, and overall market performance. This enables different roles to contribute to the report and to work in parallel. The overall report and the various constituent parts each have a life cycle that determines creation, review, and approval of each part. Because the monthly fund performance report is made available to the fund customers, the published report is associated with a record and retained for 12 months.

The team lead initiates the process and assigns analysts from the team to the various parts of the report. The reporting process begins with the collection of performance data for each fund. The assigned analyst uses the workplace to access the fund performance database to determine the results and produce performance reports for the last month. The reports are stored as documents so that other members of the team can reference this material. The performance database also produces numeric results that are imported into a graphing tool to plot performance charts of the data. The charts are stored in the repository and will be included in the report. Further analysis is done to determine the top 10 holdings for the month. A standard template is used to present this information as part of the overall report.

Meanwhile, the financial editor on the team produces the section outlining overall market performance. Other analysts on the team prepare market commentaries that relate the performance of each fund to current market trends. The performance data and charts created by other team members are referenced to create the commentary. Often, an analyst searches the collection of stored documents to find past commentaries. The analyst is able to search on different criteria such as a range of publishing dates and the fund or author's name.

When ready, each authoring analyst uses the workplace to submit the draft commentary for peer review by a specific list of analysts and the financial editor. Some of the reviewers are optional, while some, such as the financial editor, are mandatory.

Each peer analyst reviews the report using the workplace, adds their comments, and indicates when their review is complete. The review is open to optional reviewers during the review period, but the review is not completed until all the mandatory reviewers have acknowledged their review is complete. At that point, the authoring analyst reviews and responds to all the comments using the workplace. He reworks the report as necessary. Often, the author uses instant messaging or e-mail to get clarification or to discuss some of the comments during the rework process.

When all the parts of the report are ready, they are assembled into a single report using the template designed by the communications team. The full report is reviewed and approved by the team lead and then submitted for approval to an editor in communications and then the legal department.

Once approved, the report is published on schedule to the Web. The previous months report is removed from the Web, but retained for the specified period of time. The same report content is assembled and formatted for printing and sent to the publisher for production and mailing.

2.2.7 Use case: Application integration

The employee workplace not only provides employees with up-to-date information and the means to communicate with other employees, but it also makes it easy to access any of the various human resources (HR), administrative, and business applications integrated into the system. In particular, the workplace makes it easier and enables employees to more effectively complete the tasks associated with these applications. This case describes such an interaction with an HR application.

The employee logs in to the employee workplace. The corporate headlines are displayed. One is a reminder that all employees intending to take vacation in the next quarter need to submit their vacation request to their supervisor by the end

of the week. The employee decides to request the vacation immediately before he forgets. He opens his personal calendar to check for the correct dates for the week he wants to take off. He marks the vacation in his calendar.

In order to make the vacation request, the employee accesses his personal HR information. The total vacation allotment for the year and vacation time taken is displayed. The employee selects the vacation request form, fills in the date and duration, and submits the request.

The following week, the supervisor logs in to the employee workplace and is reminded to process all vacation requests within three business days. The supervisor accesses the HR section of the workplace. This view is tailored for supervisors and provides access to some HR information for her employees, such as allotted vacation time and remaining days and years of service in addition to any HR requests, including vacation requests.

The supervisor reviews all outstanding requests for her employees. One employee has requested the same week as another employee with more seniority. Due to current business needs, only one employee is able to take vacation at any given time. The supervisor needs to consult with HR to determine how to resolve the conflict. Another employee has exceeded her vacation allotment with her request, so she rejects the request.

The supervisor does not recall her HR specialist's name because she is a recent replacement for the previous specialist who has retired. She searches the directory using the advanced search and enters "HR" in the job responsibility field. Several names are returned from the search, and she quickly locates the HR specialist for her organization.

She checks the current status of this person, but the specialist is not online; she must be at lunch. Instead, she easily creates an e-mail message addressed to the specialist and sends a brief note describing her vacation request problems. She then decides to have lunch herself and marks herself "away" from her desk.

The supervisor returns from lunch. She checks for new mail and finds a note from the HR specialist. She opens it and finds that the policy is to grant the request to the employee with the most service. She notices that the HR specialist is now online. She sends an instant message thanking the HR specialist for the quick response. She then returns to the list of outstanding vacation requests.

The supervisor activates an instant messaging session from the list of vacation requests for the employee whose request conflicts with the more senior employee's request. The supervisor advises the employee that she is rejecting his request and why. As she awaits a reply, she rejects the current request. Instead, she sends another message suggesting that the employee choose the week after the one originally requested. Not only will this resolve the conflict, but

that week has a statutory holiday which means one less vacation day is needed. The employee agrees to the change. Because the conflict is resolved, the supervisor approves the request made by her more senior employee.

2.3 Business processes

Business processes are critical to the smooth and consistent operation of an enterprise. More and more, enterprises are turning to IT solutions to help control business processes that are becoming more and more complex. Within the area of content and records management, business processes can help ensure the proper handling of content and compliance with business policies and regulations.

An important aspect of a business process can include the details of the interaction of business users with the content. Usually, this is known as work flow. Often work flow is determined by the process used to produce and manage the content. The following diagram (Figure 2-2 on page 25) shows a simplified research reporting process similar to the one described in the solution scenario in 2.2.1, "Use case: Analyst research reporting" on page 15. This is an activity-centric view of the document life cycle, from creation through review to publication of the document. Each activity is assigned to a particular role, and the document is assumed to flow through the process.
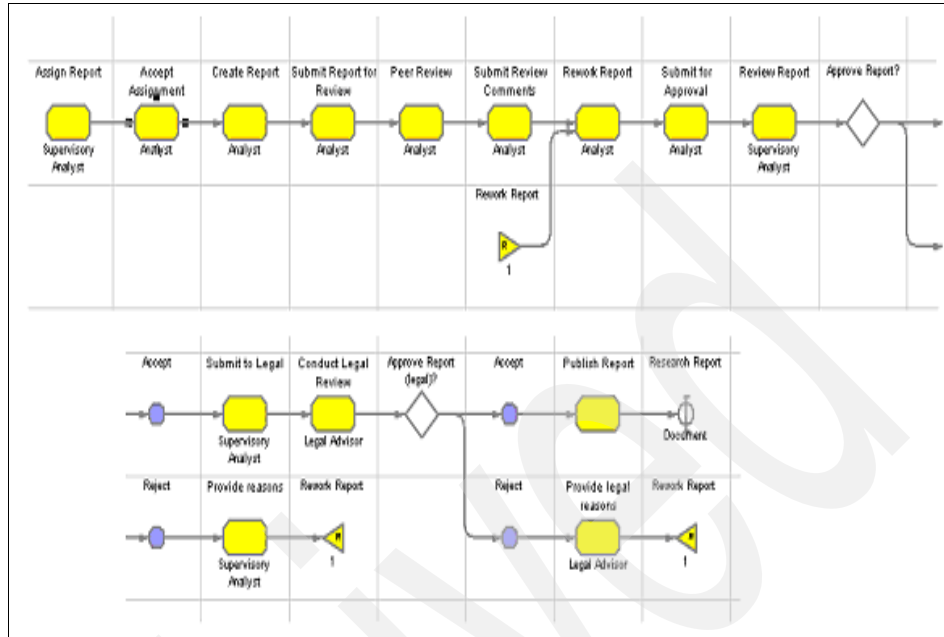
Figure 2-2   Activity-centric view of document life cycle

The process documented in Figure 2-2 is simply an example process in the problem space of this solution. Other processes might need to include activities such as archiving or disposal of documents. For example, after a specified period of time, the original author would be notified to determine if the document is still up-to-date. If not, the author decides whether to archive the original and update to a new version or to dispose of the document. In addition, there might be regulations that stipulate the retention period and time when the document is to be destroyed.

In general, documents and other content all follow a similar life cycle from creation (either by capturing or authoring the content) to eventual publication or distribution. The document is stored so that throughout its active life cycle, it is easily retrieved, viewed, and possibly modified to create new versions. Eventually, the document enters a predominantly inactive period where it is infrequently retrieved. The document might be archived during the latter part of its retention period and finally destroyed when it is no longer needed.

Alternatively, the process is viewed in a document-centric manner, as shown in Figure 2-3 on page 26.
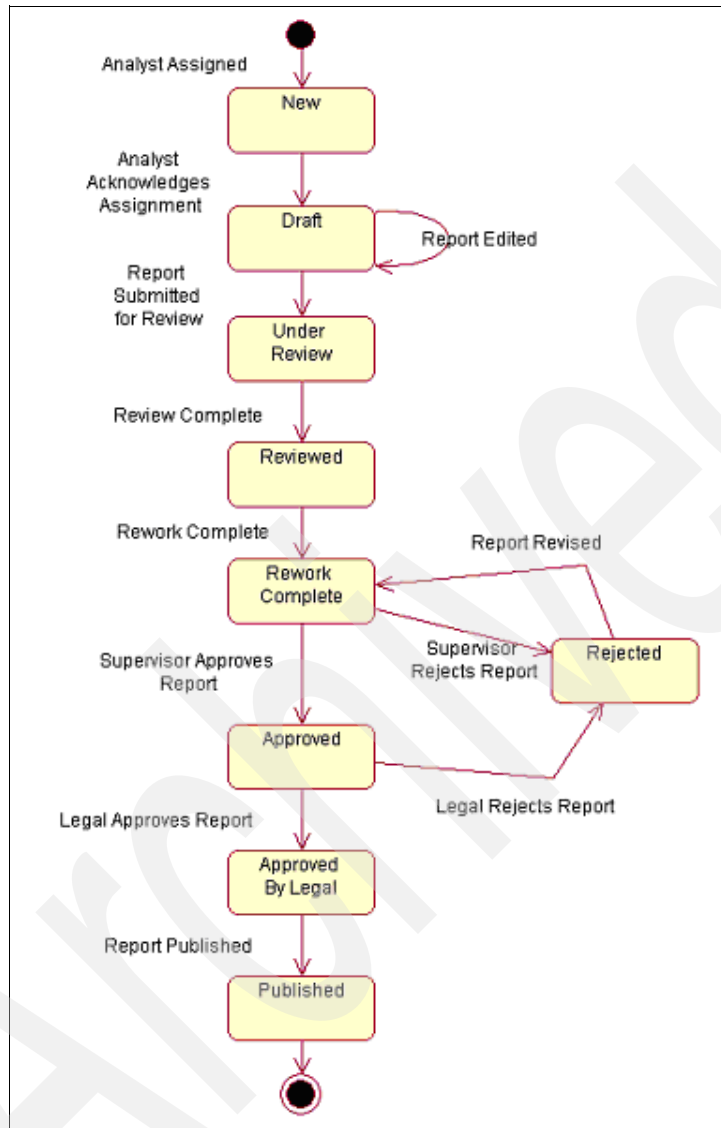
Figure 2-3   Document-centric view of life cycle

The emphasis in this case is on the state of the document rather than the flow or sequence of activities in the business surrounding the document. For each state, actions or activities that transition the document into another state are shown. Figure 2-3 shows the life cycle of an analyst research report as a state diagram.

2.4 Summary

This chapter has described several use case scenarios dealing with the requirement for content and records management. In addition, it provided a brief look at business processes and how they apply to content and records management.

In the rest of this book, we describe an example of a partial solution to the issues described here. Our example focuses on one particular use case, that of the analyst research reporting, as described in 2.2.1, "Use case: Analyst research reporting" on page 15.

We chose this use case as our example, because it includes several key requirements and concepts that could be applied across several of the other use cases, while maintaining a scope that can be covered in the space available.

Although the solution that we describe is only a partial solution, it will help you to understand how various IBM products can be integrated to solve real content and record management problems.

The general design and implementation described in this book provide a proof of concept and proof of technology that can be used as a basis for designing and developing a production solution addressing your business requirements.

We provide step-by-step instructions for installing and configuring a runtime environment that can support our sample application. This environment is not trivial and it is not within the scope of this book to educate you about the details of each and every product involved. It is assumed that you will have experience or access to others with expertise dealing with the individual products and technologies. This book is intended to provide the information you need to create an environment and sample application that can take advantage of the integration of several products and technologies across multiple systems to address records and content management within the context of a business process.

Part 2

Design and development

This part of the book addresses the design and development of a possible solution addressing some of the requirements described in the previous chapters.

Chapter 3, "Architectural decisions" on page 31, describes some of the architectural decisions that were made for our sample solution and introduces the products and environment that make up the solution.

Chapter 4, "Component design and development" on page 51, describes the components that needed to be designed for our sample solution. The source code for the various components is also available for download, as described in Appendix A, "Additional material" on page 367.

Chapter 5, "Development environment" on page 73, describes our development environment and how to set up a similar environment for your own use.

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3

Architectural decisions

This chapter is intended to provide a technical perspective for the architectural considerations explored for the evolution of the solution design.

The architectural decision detail included in this chapter documents important decisions (which implies that choices were available) about any aspect of the architecture, including the structure of the system, the provision and allocation of function, the contextual fitness of the system, and the adherence to standards.

The development of an architecture is understood partly through the record of the important decisions made during its development. A well-documented architecture includes its own justification and evaluation criteria for those places where choices seemed available. The justification and evaluation criteria might be recorded alongside the decision or, at least in part, by reference to more generally applicable principles, policies, and guidelines, which are found in other work products or in external references.

3.1 Overview

Figure 3-1 provides a high-level view of the major components and layers of a complete solution. However, in this book, we focus on the implementation of a prototype for a solution that addresses a specific use case scenario. Still, the overall architecture applies even though the functions required for our scenario will put emphasis on some components more than others.

The following diagram shows the abstract logical subsystems that make up the solution architecture. Note that the terms *component* and *subsystem* are used interchangeably. Both terms refer to a non-trivial logical element of the architecture that encapsulates some behavior and exposes an interface.
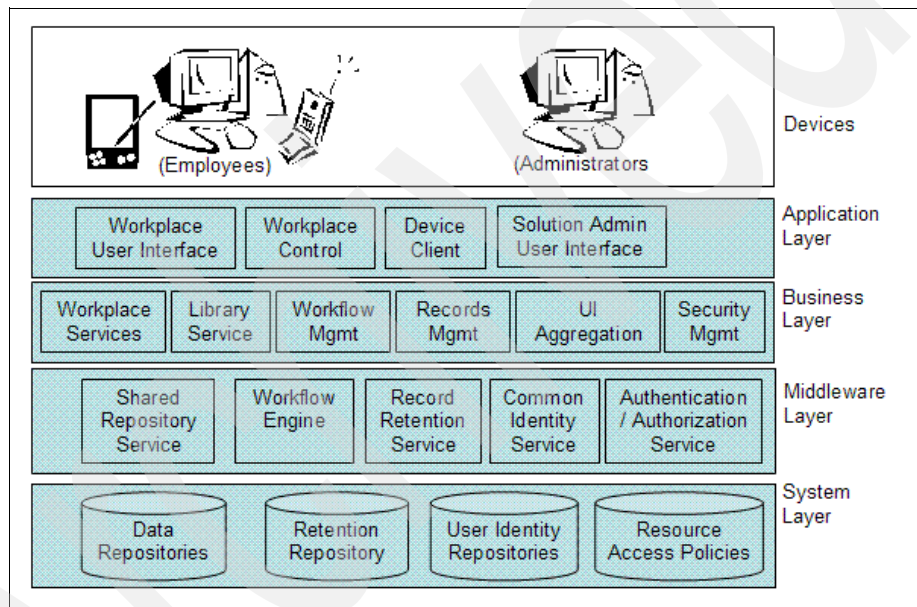
Figure 3-1   High-level architectural view of a solution

In the case of our analyst reporting scenario sample application, we use IBM software products to provide the needed infrastructure and capabilities as described in this chapter.

The user interface is provided by IBM WebSphere Portal. This will provide a single Web browser-based user interface for all users.

IBM Tivoli Directory Server provides an LDAP interface for managing users, groups, and access control.

Management of the content (reports) is handled through IBM DB2 Content Manager.

Records management is enabled through IBM DB2 Records Manager, providing life-cycle management and auditing for the reports stored and accessed through DB2 Content Manager.

Finally, the business process (including the logic to ensure policy compliance) are controlled by IBM WebSphere Business Integration Server Foundation.

3.2 Solution component architectural concepts

This section describes the functional components of our solution. We refer to our solution as information life-cycle management (ILM). You will see the ILM acronym used throughout the rest of this book.

3.2.1 High-level solution overview

The primary components of the ILM solution have been architected to support the business requirements as outlined in 2.2.1, "Use case: Analyst research reporting" on page 15.

These business requirements have been consolidated into functional components, as illustrated in Figure 3-2 on page 34.
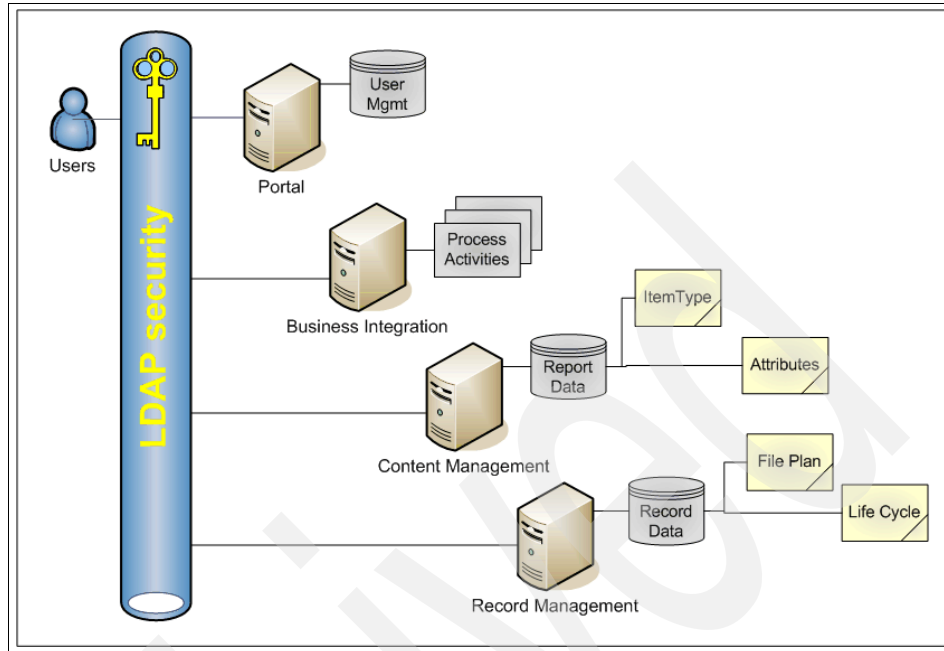
Figure 3-2   Solution functional components

As illustrated in Figure 3-2, the business requirements are supported within the components shown in Table 3-1.

Table 3-1   Solution component definitions

Component	Definition
Users	► System administrators – Define document types based on descriptions provided by employees. – Define types of business information to be presented seamlessly in the workplace user interface and assign a format for presenting the information and form for editing each type. – Monitor and maintain the solution. – Handle solution exceptions and carry out problem determination on reported errors. – Restore operation of the solution in the event of failure. – Perform routine backups of all information and records in the solution. – Restore information to the solution in the event of catastrophic failure.

Component	Definition

	► End users
	  – View corporate policies, procedures, and other business information.
	  – Communicate and collaborate with other employees to produce work products and execute business processes.
	  – Submit business requests. With proper authority, review and approve business requests by other employees.
	  – Define life cycles and associate with different types of business information. Definitions include criteria such as retention period.
	  – Modify life cycles as needed.
	  – Track business information throughout the life cycle and handle exceptional situations such as absence of approver, need to temporarily suspend or the reactivate life cycle, or in certain cases, to terminate the life cycle.
	  – Author documents using the solution and submit them for review and approval.
	  – Review documents authored by other employees, as requested.
	  – Request a new document or assign document creation to another employee.
	  – Approve documents according to document life cycle.
	  – Contribute and preview business information intended for seamless publication to the workplace user interface.
	  – Review and approve business information as requested, according to its life cycle.
	  – Schedule and attend Web conferences. Share documents with other employees.

LDAP security	Provides single sign-on (SSO) across all nodes. LDAP security contains all solution users and provides a detailed directory entry for each employee.
Portal	The portal supports the shared work area feature and provides users with document management capabilities. With this feature, users create, edit, check in, check out, review, approve, share, and publish documents. Documents are automatically versioned when the document is saved to the shared work area. The portal also provides access control to the documents to ensure only those with the proper authority can view or modify documents.
User management	The repository for identification and management of end users. The LDAP administrator uses the repository (along with a common user interface) to create and manage user information.
Business integration	An adaptable infrastructure that makes it easy to update or enhance the solution to meet changing business requirements.

Component	Definition
Process activities	Invocation of service presented either through automated process or human intervention.
Content management	A comprehensive framework for creating, capturing, managing, and distributing unstructured content.
Report data	The repository for indexing, processing, and managing solution data and metadata.
Item types	The high-level index component for definition of a data type. As an example, data types are associated with specific sources, formats, or functions, or all of these. For example, a report might be assigned one item type, while an insurance claim might be assigned another.
Attributes	Attributes are assigned to item types to capture the required and optional metadata information about the data.
Record management	A process for assigning and maintaining retention policy information to specific information assets. Modern usage of records management usually refers to electronic records management automation. However, the discipline of records management has been long established within regulated industries across the globe.
Record data	As content moves into the retention period of its life cycle, it becomes a record. This milestone automatically controls the retention of associated records for the specified period and the destruction of the related content at the end of the period.
File plan	Association of records to a structured data model.
Life cycle	Record life cycles are supported for each record type and controlled by assigning an approved process as each new record is created.

3.2.2 User roles and work flow

When designing a solution, the user or users of the solution should be a primary consideration. That is, we need to understand the roles of the various users and what functions each will need to perform and how they will interact with the solution. With this in mind, we define the follow terms:

User   An employee with access to use ILM is referred to as an ILM user.

Shared work area A virtual space that is shared by a collection of ILM users working together on a common project. Employees having access to the shared work area can work with documents and participate in forums associated with the work project.

Supervisor	The supervisor user role is responsible for invoking the process and receiving, reviewing, and approving the work products of the process.
Analyst	The analyst user role is responsible for accepting the assignment, creating the report, and submitting the report for review.
Records administrator	The records administrator user role is responsible for the integrity of the records management system and can perform audits and other related tasks.

All user roles are provided with access to view reports and records.

3.2.3 Security

Maintaining the confidentiality of the business information and restricting access to business processes is a primary concern that should be taken into account for the solution.

Single sign-on

Users accessing the non-public portion of the system will be challenged to prove their identity once per session. An authenticated user is able to access the information and applications and perform business processes (according to access rights) without providing additional verification of identity. A session can be ended at the user's request or it can be ended by the system based on the elapsed time of the session, a non-responsive client, or other criteria as deemed necessary to maintain the integrity of the system's security.

Ease of security administration

Managing a very large number of user identities, passwords, access rights, expiration dates, and so on is difficult. When a security administration task is overlooked or performed incorrectly, the system might be exposed to attack. The system is designed and configured to facilitate the job of administering the system's security aspects (to make the security administrator's job easier and less error prone). The security administrator is able to manage all access control policies from a central location. Rather than managing duplicate identities for a single user of several applications, all applications are configured to recognize shared credentials.

3.2.4 Portal

Our solution uses IBM WebSphere Portal to drive the user interface for our application. In this section, we describe some key concepts related to the user interface.

Shared workplace

The solution provides a single application user interface that provides access to a variety of business services and applications The solution workplace appears to the user as a single application with a consistent look and feel across the underlying services and applications.

Although the workplace user interface is aggregated from a variety of sources, the parts of the user interface are well integrated to give it the appearance of a single application.

The user interface is also designed to support further development for access from a variety of devices, including desktops, Web-enabled cell phones, and hand-held devices. However, our proof-of-concept solution is only enabled for desktop access.

User management

All portal applications are secured for access by registered and authorized LDAP users only.

The user management repository is enabled as a component of the Portal node. However, the deployment of any LDAP (or other) common directory service can be easily supported from a distributed source.

Centralized management of the user repository is provided external to the solution portal interface. The security administrator is provided with access to the IBM Tivoli Directory Server Web Administration Tool for user directory management.

3.2.5 Business integration

The solution provides a Business Process Execution Language (BPEL) standard integration layer using the WebSphere Business Integration Server Foundation process choreographer. This interface enables the solution to combine business processes with Java 2 Platform, Enterprise Edition (J2EE) services deployed within the WebSphere Application Server Enterprise process choreographer, scripting enterprise beans to define the solution work-flow processes.

Process activities

Process activities are derived from the business process model. The business process model is directly related to use case scenario previously referenced in this chapter. Process choreographer activities define the synchronous relationships for each step within the business process model. High-level process activities have been developed to support report creation, report approval, and

report rework. Each of these process activities include human intervention and system-automated activities.

Figure 3-3 provides a view of all process activities required and provided within the solution.
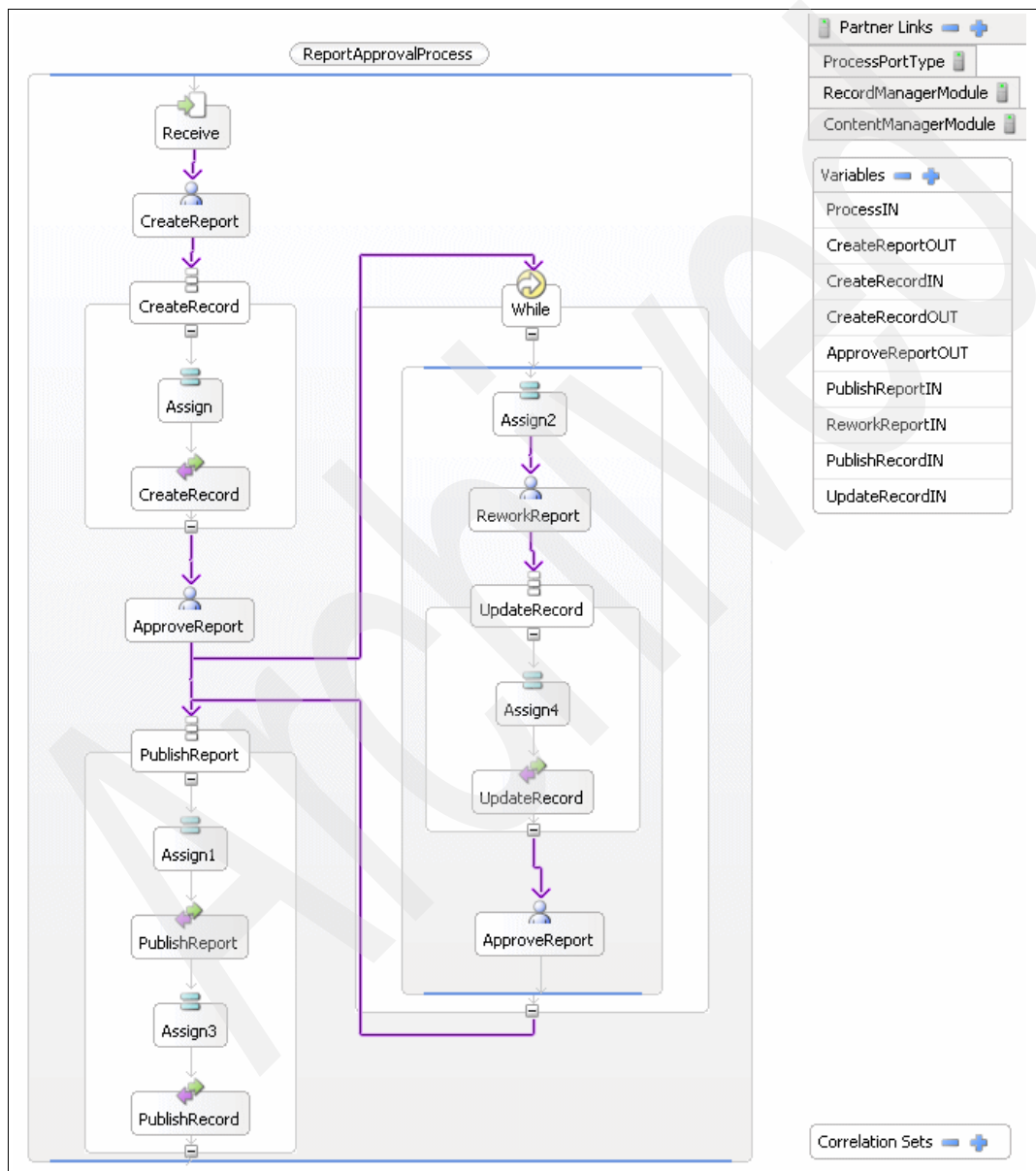
Figure 3-3   Business integration activity model

3.2.6 Content and records management

The content management component is key to this solution. This component addresses the requirements for accurate containment and management of the data and metadata from the time a report is requested until the retention life cycle is exhausted.

Report data

The report data is contained within a content management data model. This data model consists of features to secure the records, constrain record updates, identify the report format, categorize the report, and capture specific required and optional data about the report. The report data is cataloged within a library server and stored within a resource management server. Figure 3-4 illustrates the report data model.
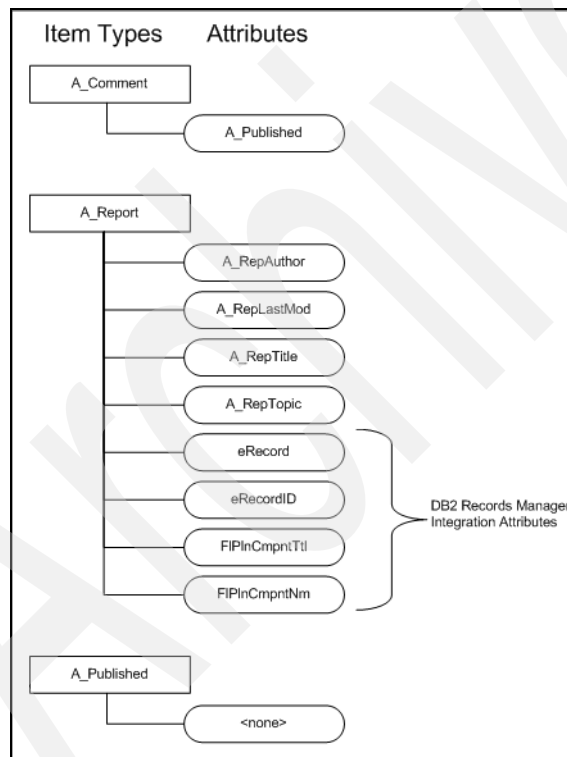
Figure 3-4   DB2 Content Manager data model

Some attributes, as indicated in Figure 3-4, are included specifically for the integration of IBM DB2 Records Manager.

3.3 Information life-cycle management solution

This section explains the major features and components of the application. We divide the discussion into the following two sections:

- ► Solution description
- ► Solution components

3.3.1 Solution description

This section describes the high-level overview of the developed solution for our information life-cycle management sample application. The overall flow of the application enables the users to work with report creation and manage information during the life cycle of the reports.

The solution consists of the following components:

- ► Report life-cycle management
- ► Report repository search and manipulation application
- ► Audit information application

Report life-cycle management is the primary flow of the application, as shown in Figure 3-5 on page 42.

Note: As previously mentioned, this ILM solution is a partial solution for the analyst reporting use case described previously. Figure 3-5 represents the basic business process functions enabled by our implementation of the ILM solution.
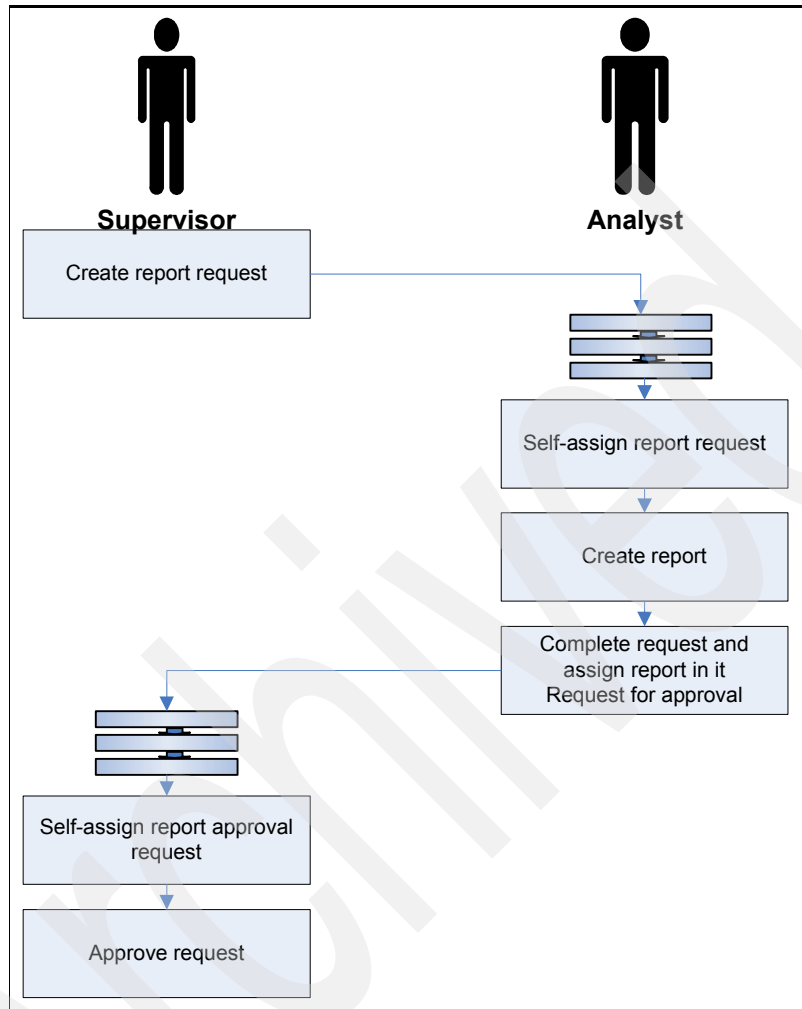
Figure 3-5   High-level flow of application

As shown in Figure 3-5, there are two user roles for the application, the supervisor and analyst:

► The supervisor creates or initiates requests for report creation and then approves or rejects the report when it is finished.

► The analyst is responsible for creating the report.

An extremely important role, although not shown in the figure, is that of the records administrator. This role is responsible for performing audits and ensuring the overall integrity of the records management process.

3.3.2 Solution components

The application is hosted on a WebSphere Portal server. All user access is performed with the WebSphere Portal server using a Web browser. The front-end portions of the application are arranged into separate portal pages with various portlets assigned to them. Figure 3-6 shows the organization of the pages that we use.
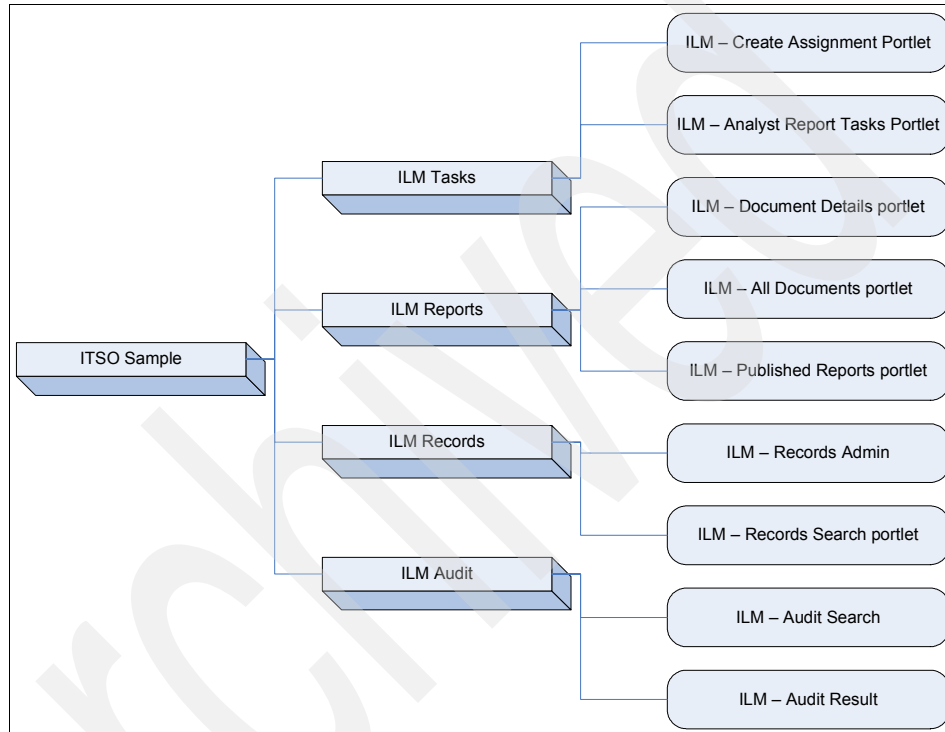
Figure 3-6   Portlet pages organization

The primary menu, seen through a Web browser showing the high-level tasks, can be seen in the WebSphere Portal page shown in Figure 3-7 on page 44.
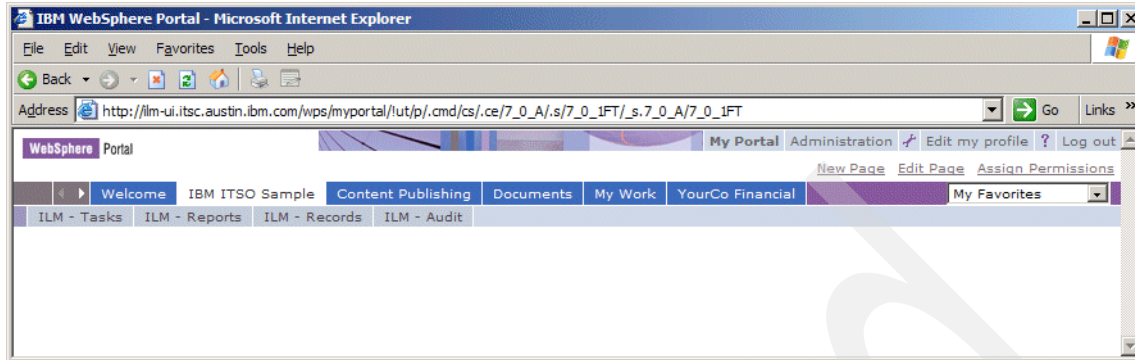
Figure 3-7   WebSphere Portal page

Table 3-2 lists the individual portlets that will be created and their functions.

Table 3-2   Portlets and their functions

Portlet	Function
CreateAssignment	This portlet is used by a supervisor to create a new report creation activity (report request).
AnalystReportTasks	This is a list of unassigned report activities. For the analyst, this list represents the newly created report requests or rejected reports; while for supervisors, this list represents the completed activity waiting for approval.
DocumentDetails	This portlet shows the content details of the report that is selected in the All Documents portlet.
AllDocuments	This portlet lists all reports that are created by the user.
PublishedReports	This portlet shows all published reports or content of a specific report when it is selected from the list.
RecordsAdmin	This portlet allows manipulation of a single record from the record management system. The record here is the report document ID shown in the All Documents list.
RecordsSearch	This portlet enables searching and listing a set of records from the record management tools.
AuditSearch	This portlet enables searching of specific audit information from the record management tools.
AuditResult	This portlet displays the result of the AuditSearch portlet.

In 3.4, "Planning and solution deployment topology" on page 45, we describe and explain the physical topology on which our solution will be deployed. Here, as shown in Figure 3-8, you can see how these portlets communicate to back-end servers. The communications are performed using IIOP protocol between IBM WebSphere Application Server processes.
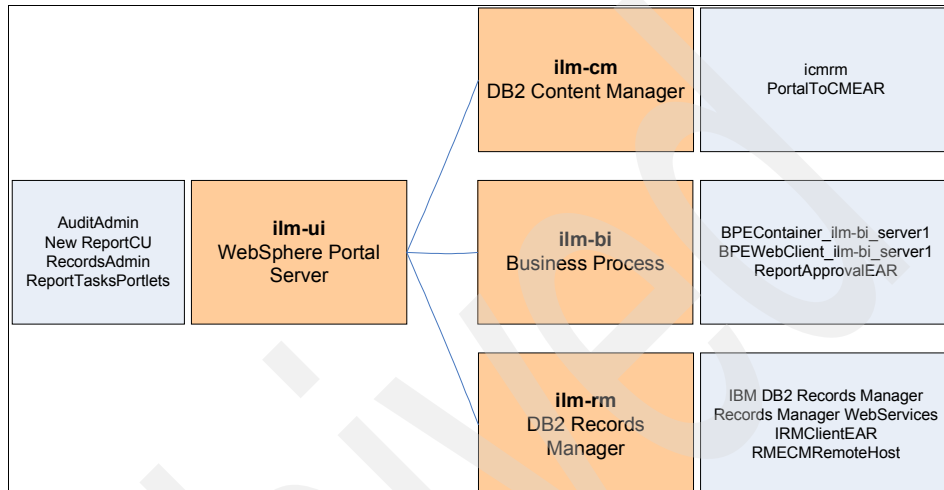
Figure 3-8   Server communication

3.3.3 Process choreography components

As shown in Figure 3-8, the Business Integration node (ilm-bi) runs a module called ReportApproval.ear. This is a J2EE enterprise application module that drives the report approval process. The report approval provides the process choreography to ensure that the business process is adhered to and the proper steps are taken before a report is published and throughout its life cycle. The logic implemented through the other modules already discussed, such as the portals, are choreographed by this module to ensure that steps are taken and completed in the proper order.

3.4 Planning and solution deployment topology

This section describes the solution nodes used to deploy the ILM proof of technology. Along with a description for the chosen topologies, this section describes the software packages and levels implemented.

3.4.1 Solution topology

The runtime environment implementation topology (as illustrated in Figure 3-9) was chosen to optimize distributed workload and to ensure compliance for software package version and fix pack level support.
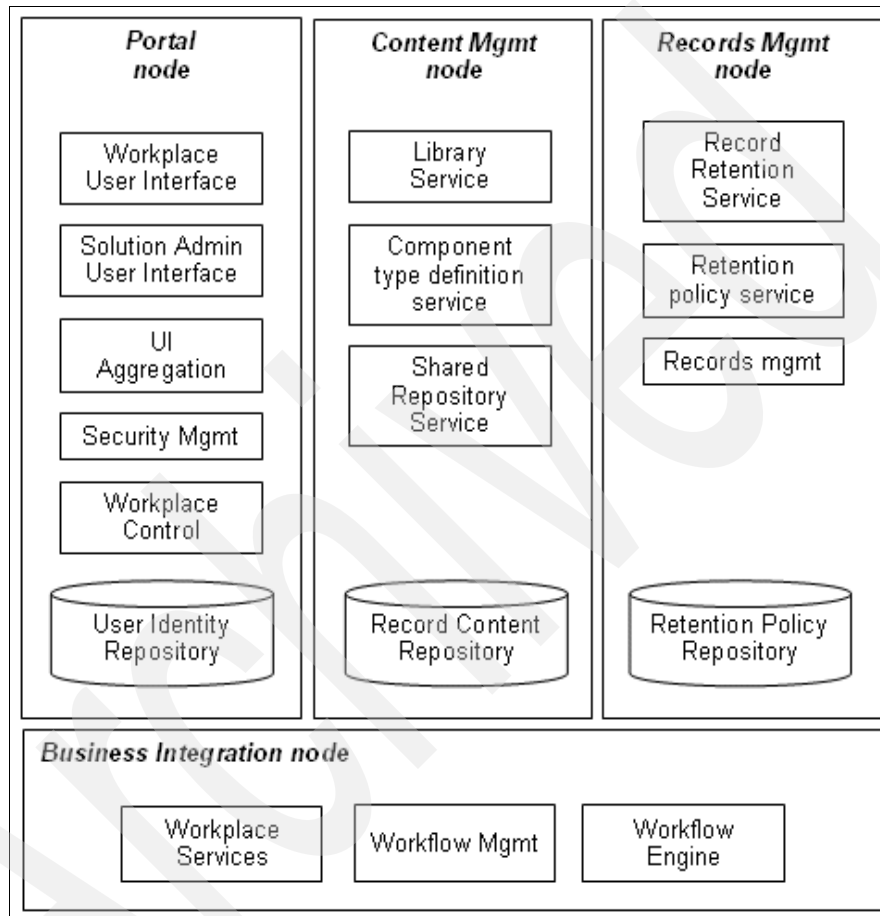
Figure 3-9   Sample solution architectural topology

As shown in Figure 3-9, the complete topology includes four server nodes. These nodes are defined as:

► Portal node: Authentication, presentation, and solution administration (node name ilm-ui)

► Content Management node: Record repository (node name ilm-cm)

► Records Management node: Retention policy assignment and management (node name ilm-rm)

► Business Integration node: Process choreography runtime (node name ilm-bi)

3.4.2 Node prerequisites

For information about specific product requirements, installation, and configuration, refer to the IBM product guides located at the following Web sites:

► DB2 UDB for UNIX® and Microsoft Windows® library

   http://www.ibm.com/software/data/db2/udb/support/manualsv8.html

► WebSphere technical library

   http://www.ibm.com/software/websphere/technical/

► DB2 Content Manager for Multiplatforms library

   http://www.ibm.com/software/data/cm/cmgr/mp/library.html

Hardware platforms used for this solution

We used the following hardware configurations in the ILM solution proof of technology:

► Portal node

   IBM ThinkCentre™ M50

   – 1 CPU, Intel® Pentium® IV 3.0 GHz

   – 1024 MB main memory

   – 76 GB DASD

► Content Management node

   IBM NetVista™ R8U

   – 1 CPU, Intel Pentium IV 2.4 GHz

   – 1524 MB main memory

   – 36 GB DASD

► Records Management node

   IBM NetVista R8U

   – 1 CPU, Intel Pentium IV 2.4 GHz

   – 1524 MB main memory

   – 36 GB DASD

► Business Integration node

   IBM ThinkCentre M50

   – 1 CPU, Intel Pentium 3.0 GHz

– 2000 GB main memory

– 76 GB DASD

Software platforms used for this solution

At the time of this writing, the software platforms and product levels shown in Table 3-3 through Table 3-6 on page 49 were determined to be the most current available levels consistent with IBM product support.

Table 3-3   Portal node software details

Vendor	Product name	Version	Fix pack level
IBM	DB2 Enterprise Server Edition	8.1.4.428	
IBM	Global Security Toolkit (GSKit)	7.0.1.16	
IBM	HTTP Server	1.3.26.2	
IBM	Tivoli Directory Client	5.2	
IBM	Tivoli Directory Server	5.2	
IBM	Tivoli Directory Server Web Administration	5.2	
IBM	WebSphere Application Server Enterprise Edition	5.0.2.3	
IBM	WebSphere Portal for Multiplatforms	5.0.2.1	
Microsoft	Windows 2000 server	4.0	4

Table 3-4   Business Integration node software details

Vendor	Product name	Version	Fix pack level
IBM	WebSphere Business Integration Server Foundation	5.1.1	
Microsoft	Windows 2000 Server	4.0	4

Table 3-5   Content Management node software details

Vendor	Product name	Version	Fix pack level
IBM	DB2 Content Manager Client for Windows	8.2.6	6
IBM	DB2 Content Manager eClient	8.2.6	6

Vendor	Product name	Version	Fix pack level
IBM	DB2 Content Manager Library Server	8.2.6	6
IBM	DB2 Content Manager Resource Manager	8.2.6	6
IBM	DB2 Enterprise Integration Portal	8.2.6	6
IBM	DB2 Enterprise Server Edition	8.1.4.428	4a
IBM	HTTP Server	1.3.26.2	
IBM	Net Search Extender	8.1.4	
IBM	DB2 Records Manager Enabler	3.1.2	
IBM	WebSphere Application Server Enterprise Edition	5.0.2	
Microsoft	MSXML Parser	4.0	
Microsoft	SOAP Toolkit	3.0	
Microsoft	Visual C++	6.0	
Microsoft	Windows 2000 Server	4.0	4

Table 3-6   Records Management node software details

Vendor	Product name	Version	Fix pack level
IBM	DB2 Content Manager Client for Windows	8.2.6	6
IBM	DB2 Enterprise Integration Portal	8.2.6	6
IBM	DB2 Enterprise Server Edition	8.1.4.428	4a
IBM	HTTP Server	1.3.26.2	
IBM	DB2 Records Manager Enabler	3.1.2	
IBM	WebSphere Application Server Standard	5.0.2	
Microsoft	Windows 2000 Server	4.0	4

Software downloads from IBM

In addition to the software included with IBM WebSphere Portal Extend for
Multiplatforms V5.0.2 and IBM DB2 Content Manager for Multiplatforms V8.2, the
installation procedures found in this chapter provide instructions about how to

download and install more recent fix packs and fixes for WebSphere Portal and DB2 Content Manager than are included in the CD distributions.

Software installation paths

Table 3-7 lists the software installation paths used to implement the Portal node and Content Management node. We chose to use short names for the paths to reduce the number of characters included in the Windows environment PATH and CLASSPATH variables. In addition, this can avoid problems with spaces in the path on the Content Management node. Lastly, we shortened the paths for easier access from the command line.

Table 3-7   Software installation paths

Software package	System path
DB2 Content Manager Client	C:\IBM\CMclient\
DB2 Content Manager eClient	C:\IBM\eClient\
DB2 Content Manager Library Server	C:\IBM\CM\
DB2 Content Manager Resource Manager	C:\IBM\CM\
DB2 Enterprise Information Portal (EIP)	C:\IBM\EIP
DB2 UDB	C:\IBM\SQLLIB\
DB2 Records Manager	C:\IBM\RecordsManager\
IBM HTTP Server	C:\IBM\HTTPServer\
DB2 Records Manager Enabler	C:\IBM\RMenabler\
Tivoli Directory Server	C:\IBM\TDS\
WebSphere Application Server	C:\IBM\WebSphere\AppServer\
WebSphere Portal	C:\IBM\WebSphere\PortalServer\

3.5 Summary

This chapter has provided a high-level view of the architecture and products involved in the ILM solution. In the next chapter, we describe the design and development of the portlets and other components required for the solution.

4

Component design and development

This chapter provides a description of the high-level component design of the information life-cycle management (ILM) solution concept. The contents of this chapter provide the resulting component design, as described in Chapter 3, "Architectural decisions" on page 31.

In this chapter, we describe the architectural components, system constraints, and subsystem interactions.

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4.1 Solution technology

This section provides a brief overview of the technology and components that make up the solution. We divide the discussion into:

► Portlet application concepts
► Enterprise JavaBeans (EJB) concepts

4.1.1 Portlet application concepts

A portlet application is a Java-based application running on a WebSphere Portal server engine. Users interact with portlets through a Web browser. Each portlet occupies an area in the Web browser window that acts much like a standard application window on your desktop. A portlet is typically implemented as shown in Figure 4-1.
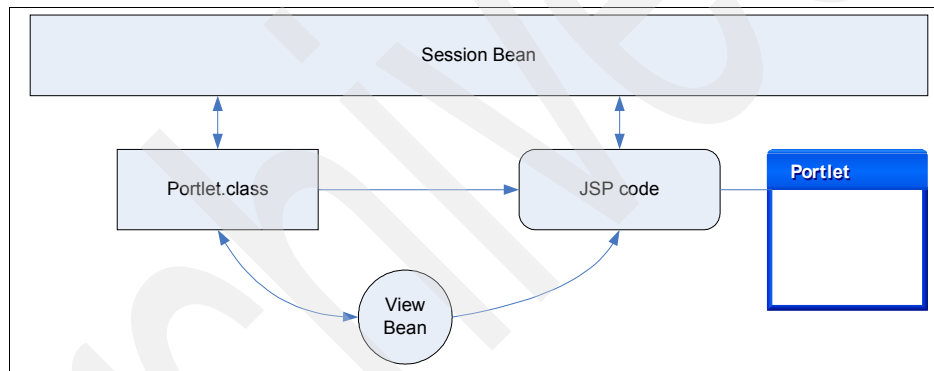
Figure 4-1   Portlet structure

As shown in Figure 4-1, the components of a portlet are:

Portlet class   This is the main application code that the portlet runs on the portal server.

JSP code   This is the actual JavaServer Page (JSP) code that will generate the HTML to render how the portlet will look when viewed in a browser.

View bean   A Java bean that contains information passed from the portlet to the JavaServer Page. There is typically a view bean created for each page render request.

Session bean	A Java bean that contains session information about the portlet, including portlet state, persistent connection information, environment variables, and other information that needs to be preserved across page displays.

For the portlet itself, the main structure of a portlet Java class code is shown in Figure 4-2.

Figure 4-2   Portlet code structure

As shown in Figure 4-2, a portlet Java class is subclassed from the PortletAdapter class and handles events. Events are handled using an interface such as ActionListener or MessageListener. An ActionListener interface typically listens to button actions or other actions associated with the user interface, while a MessageListener interface receives messages from other portlets.

The portlet has the following attributes:

JSP names	The JSP files are defined as static final variables, such as VIEW_JSP. This will be called in the doView method using a call such as: `getPortletConfig().getContext().include(VIEW_JSP), request,reponse`
View bean	This is the bean class name of the view bean.
Session bean	This is the bean class name of the session bean.
Action strings	These are string attributes that indicate specific actions that can be invoked from the portlet.

The portlet has the following primary methods that must be implemented:

init   This method is called to initialize the portlet.

doView   This method is called every time the portlet's Web page is reloaded.

actionPerformed   This method defined by the ActionListener interface. It is called when an action button is selected.

getSessionBean   This method is called to request a reference to a session bean, typically from the doView method.

Let us discuss these methods in more detail.

Initializing the portlet

The initialization of the portlet is typically very simple; it just calls the superclass initialization. You can also include any other initialization logic that you might require. Example 4-1 shows sample initialization method code.

Example 4-1   Sample init method

```
public void init(PortletConfig portletConfig) throws UnavailableException {
    super.init(portletConfig);
    // your initialization code can go here
}
```

Getting the session bean

Session beans contain the persistent storage for the portlet during a session. Example 4-2 shows sample code.

Example 4-2   Sample getSessionBean method

```
private PortletSessionBean getSessionBean(PortletRequest request)
throws Exception {
    PortletSession session = request.getPortletSession();
    if (session == null) return null
    PortletSessionBean sessionBean =
        (PortletSessionBean)session.getAttribute(SESSION_BEAN);
    if (sessionBean == null) {
        sessionBean = new PortletSessionBean();
        session.setAttribute(SESSION_BEAN, sessionBean);
    }
    return sessionBean;
}
```

As shown in Example 4-2, the logic is as follows:

1. Get the current portlet session.

2. If there is no portlet session, return a null object.

3. From the portlet session object, the session bean is stored in the SESSION_BEAN attribute.

4. If the SESSION_BEAN attribute is null, that means that the session bean has not been created. Create a new session bean and assign it to the SESSION_BEAN attribute.

5. Return the session bean.

A session bean conforms to the JavaBeans specifications. It is a Java class that supports an easily reused component model. It supports a set of properties and events, along with the methods to get and set properties and to trigger events. In the portlet environment, we typically care only about the properties of a bean as a means to store information. Example 4-3 shows a typical session bean implementation with one property called state.

Example 4-3   Sample session bean

```
public class PortletSessionBean {
    private String state;

    public PortletSessionBean()
    throws NamingException, RemoteException, CreateException {
        state = new String("INITIAL");
    }

    public String getState() { return state; }
    public void setState(String s) { state = s; }
}
```

In Example 4-3, the constructor of the session bean typically provides initialization values for the properties. Each property (except read-only properties) has get and set methods associated with it. All property manipulation must be performed through these methods, thus the private attribute of the property itself.

Displaying the portlet
When a page containing the portlet is displayed, refreshed, or updated, the doView method is called. Example 4-4 on page 56 shows the typical logic of this method.

Example 4-4   Sample doView method

```
public void doView(PortletRequest request, PortletResponse response)
throws PortletException IOException {
    PortletSessionBean sessionBean = getSessionBean();
    if (sessionBean==null) {
        response.getWriter.println("<B>No Portlet session</B>");
        return;
    }
    PortletViewBean viewBean = new PortletViewBean();
    request.setAttribute(VIEW_BEAN, viewBean);
    viewBean.setAttr1("My Test Value");
    // include any other logic affecting the view
    getPortletConfig().getContext().include(VIEW_JSP, request, response);
}
```

As shown in Example 4-4, the portlet's doView method contains the following logic:

1. Establish the session bean. If the session bean is null, it means that the portal is not initialized. See "Getting the session bean" on page 54.

2. Create a new view bean to be passed to the JSP through the request object. Set the attributes of the view bean to the values that you want passed to the the JSP.

3. Load the JSP.

Similar to the session bean, the view bean is also a JavaBeans-compliant object. It typically contains a set of properties and the get and set methods to manipulate them.

The JSP will access the view bean to access attributes and data that will be used to render the HTML for the page.

Rendering the page

The page display of a portlet is performed using a JavaServer Page (JSP). It is typically an HTML file that has Java code interleaved in the comments. The Java code in the JSP can call the request object to access the session bean and the view bean of the portlet. A JSP does not have access to the portlet itself, only the bean objects.

A sample JSP that shows a message (including the value of attribute) and an OK button is shown in Example 4-5 on page 57.

Example 4-5   Sample JSP code

```
<%@ page session="false" contentType="text/html" import="java.util.*"%>
<%@ taglib uri="/WEB-INF/tld/portlet.tld" prefix="portletAPI" %>
<portletAPI:init/>


<%
   PortletViewBean viewBean =
      (PortletViewBean)portletRequest.getAttribute(Portlet.VIEW_BEAN);
%>

<DIV style="margin: 12px; margin-bottom: 36px">
<CENTER>
<b> Hello world. </b> The value of Attr1 is: <% =viewBean.getAttr1()%>
<FORM method="POST" action="FORM_ACTION1">
    <INPUT class="wpsButtonText" name="OkButton" value="OK" type="submit"/>
</FORM>

</CENTER>
</DIV>
```

The JSP code in Example 4-5, along with the portlet methods such as that shown in Example 4-4 on page 56, will render the content in a portlet area of a Web page. Figure 4-3 shows the content.
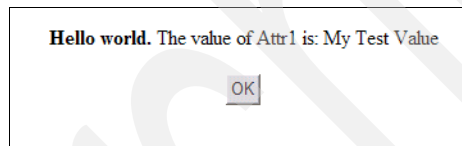
Figure 4-3   Hello World portlet content

Running an action

An action is triggered when a user clicks a link or a button. This invokes the actionPerformed method. The action is sent in the actionEvent object. You can retrieve the action text using the getActionString method.

> **Note:** Although the structure and behavior is similar to the ActionListener interface from the Java Swing specification, the implementation is different. There are some important differences in the behavior of these two ActionListener classes.

Example 4-6 on page 58 shows a typical actionPerformed method.

Example 4-6   Sample actionPerfomed method

```
public void actionPerformed (ActionEvent event) throws PortletException {
    String actionString = event.getActionString();
    PortletSessionBean sessionBean = getSessionBean(event.getRequest());

    if (actionString.equals(FORM_ACTION1)) {
       // run some actions
    } else if (actionString.equals(FORM_ACTION2) {
       // run other actions
    } else {
    }
}
```

As seen in Example 4-6, the actionPerformed method usually deals with the action string and the session bean. Based on these two objects, you can decide what action to take within the logic of the method.

4.1.2 Enterprise JavaBeans (EJB) concepts

Enterprise JavaBeans (EJB) enable the creation and access of a remote Java bean running on another J2EE server through an Internet Inter-ORB Protocol (IIOP) or Java Remote Method Invocation (RMI) interface. The mechanism is typically invoked by creating a request client locally that communicates with a remote EJB server. Figure 4-4 shows this mechanism.
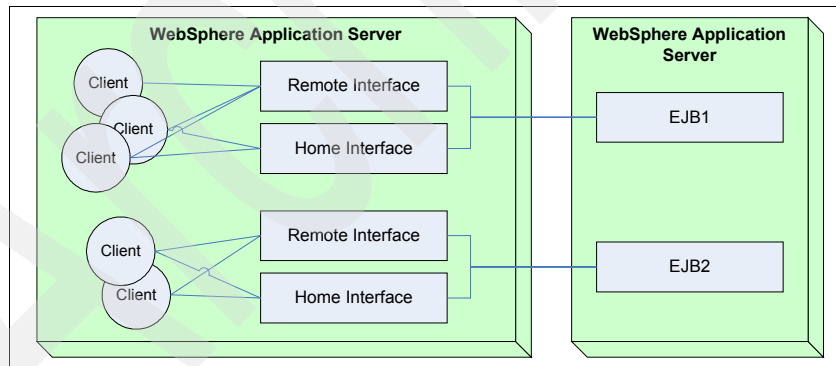
Figure 4-4   Enterprise JavaBean concept

A typical code snippet to establish a connection is shown in Example 4-7 on page 59.

Example 4-7   Code for connecting to a remote EJB

```
Properties  env = new Properties() ;
env.put(javax.naming.Context.PROVIDER_URL,"iiop://EJBserver");
env.put(javax.naming.Context.INITIAL_CONTEXT_FACTORY,
        "com.ibm.websphere.naming.WsnInitialContextFactory");
InitialContext ctx = new InitialContext(env) ;
Object obj = ctx.lookup("ejb/com/ibm/EJBObjHome");
EJBObjHome lHome;
lHome = (EJBObjHome) PortableRemoteObject.narrow(obj,EJBObjHome.class);
EJBObj ejb = lHome.create();
ejb.init();
```

As shown in Example 4-7, the logic is as follows:

1. Create an environment with the target EJB server and context factory. For WebSphere, com.ibm.websphere.naming.WsnInitialContextFactory is the context factory for an EJB.

2. Create an initial access context using the environment. The context is used to locate the home object for the EJB.

3. When the home object is allocated through the network, the local EJB client is created and initialized for use.

Subsequent calls to the EJB object can then be performed to access the remote EJB application.

DB2 Content Manager interface

The DB2 Content Manager interface (Content Manager for short) is implemented using the PortalToCM EJB application. The source for this EJB implementation is the sample ILM application available for download. Authentication to the back-end WebSphere Application Server is performed using the Common Security Interoperability (CSI) authentication protocol as defined by the Object Management Group (OMG).

The code in the following Java files use the EJB interface to DB2 Content Manager:

► From the New ReportCU project:

   – DocumentDetailsSessionBean.java
   – AllDocumentsSessionBean.java
   – PublishedDocumentsSessionBean.java

► From the ReportTasksPortlets project: ContentManagerModule.java

> **Note:** Source code modules such as those just described are available for download as described in Appendix A, "Additional material" on page 367. We provide descriptions of each of these modules in later sections of this chapter and details about using these modules within your development environment are described in Chapter 5, "Development environment" on page 73.

Business Integration interface

The Business Integration interface is implemented using the BusinessProcess EJB application. Authentication to the back-end WebSphere Application Server is performed using CSI.

The BusinessProcessModule.java code in the ReportsTasksPortlets project uses the EJB interface to the process choreographer.

DB2 Records Manager interface

The DB2 Records Manager interface (Records Manager for short) is implemented using the standard Records Manager API. The mechanism to access the Records Manager facility has additional steps to invoke a login object after acquiring the home object.

A code snippet handling the Records Manager login is shown in Example 4-8.

Example 4-8   Records Manager EJB interface

```
Properties env = new Properties();
env.put(Context.PROVIDER_URL, "iiop://ilm-rm.itsc.austin.ibm.com");
InitialContext ctx = new InitialContext(env);
Object obj = ctx.lookup("recordmanager/ejb/facade/LoginManagerEJB");
LoginManagerEJBHome lHome = (LoginManagerEJBHome)
    PortableRemoteObject.narrow(obj, LoginManagerEJBHome.class);
LoginManagerEJB lEJB = lHome.create();
ClientControllerEJB client = lEJB.login("ICMADMIN",
    "password",
    "recordmanager/jdbc/db2/RecMan",
    "", "en");
```

Because of the requirement of using a user ID and password in the API, we chose to store the user ID and password in a properties file. This file in the module is accessed and stored using the RMInfo Java class.

The code in the following Java files use the interface to DB2 Records Manager:

► From the RecordsAdmin project: RecordsSearchPortlet.java

► From the AuditAdmin project: AuditResult.java

4.2 Solution details

This section describes the specific modules that we created for the sample ILM solution. We do not explain the source code for each module in detail. Most of the source logic is relatively straightforward Java code, and it is expected that you can follow the logic by looking at the source. The WebSphere Studio Application Developer window in Figure 4-5 shows the various modules in the Project Navigator frame.
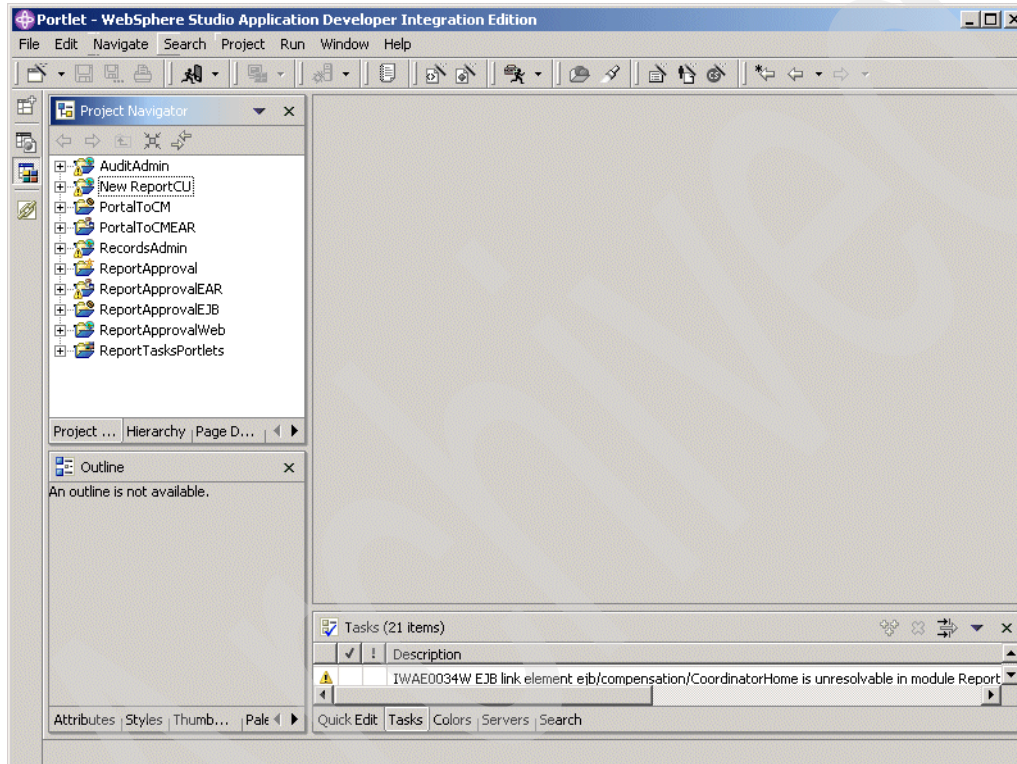
Figure 4-5   WebSphere Studio Application Developer window

The sample application is mainly implemented with the modules shown in Table 4-1 on page 62.

Table 4-1   Modules used to implement sample application

Project name	Type	Content
AuditAdmin	Portlet	AuditSearch AuditResult
New ReportCU	Portlet	DocumentDetails AllDocuments PublishedReports
RecordsAdmin	Portlet	RecordsAdmin RecordsSearch
ReportTasksPortlet	Portlet	CreateAssignment AnalystReportTasks
PortalToCM	EJB	EJB for IIOP interface to DB2 Content Manager
PortalToCMEAR	J2EE	Deployment descriptor
ReportApproval	EJB	Report approval process definition
ReportApprovalEJB	EJB	EJB for ReportApproval
ReportApprovalEAR	J2EE	Deployment descriptor
ReportApprovalWeb	War	Web page that will host portlets

Now, let us discuss each of these modules in more detail.

4.2.1 AuditAdmin portlet

The AuditAdmin portlet object deals with the auditing records in Records Manager. Figure 4-6 on page 63 shows the overall content of the project.
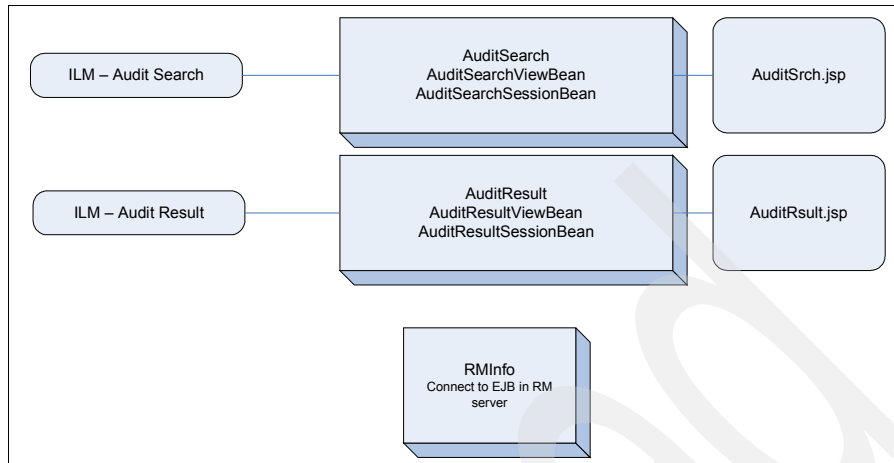
Figure 4-6   Content of the AuditAdmin project

Figure 4-7 on page 64 shows the audit record search page.

Figure 4-7   ILM - Audit page

AuditSearch portlet

The AuditSearch portlet provides an entry form for search arguments to the DB2 Records Manager audit entries. When a user clicks the **Submit** button, a query string is constructed and sent to the AuditResult portlet.

AuditResult portlet

Upon receiving a message from the AuditSearch portlet, the AuditResult portlet invokes the clientConnectorEJB to access DB2 Records Manager. The search result is then put into the view bean and displayed as a table with AuditRsult.jsp.

4.2.2 New ReportCU project

The New ReportCU project deals with report creation and listing. It has the primary components shown in Figure 4-8 on page 65.
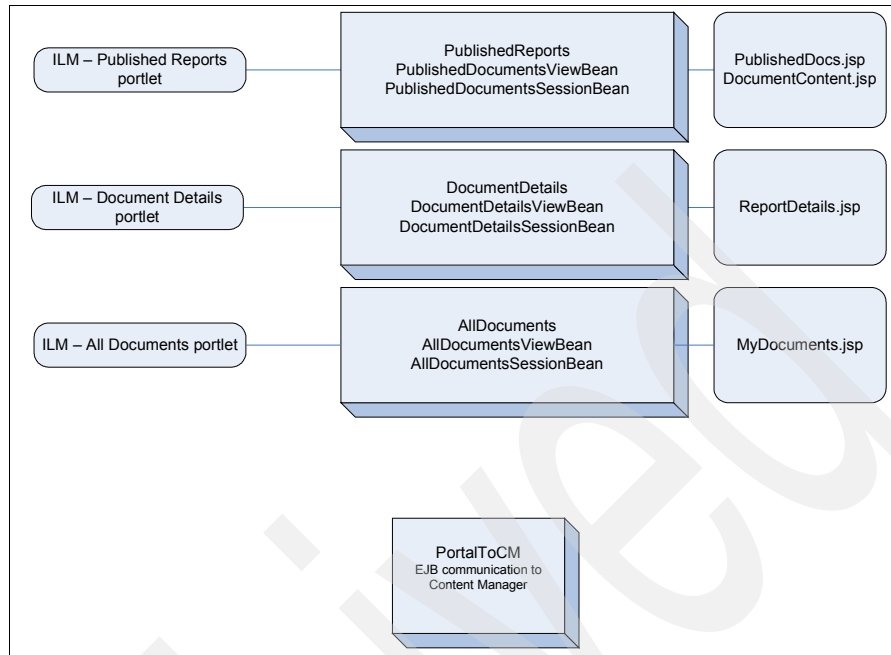
Figure 4-8   Content of the New ReportCU project

The display of the ILM - Reports page is shown in Figure 4-9. The report page shown, only contains a single report, but more typically this page would shown many reports.
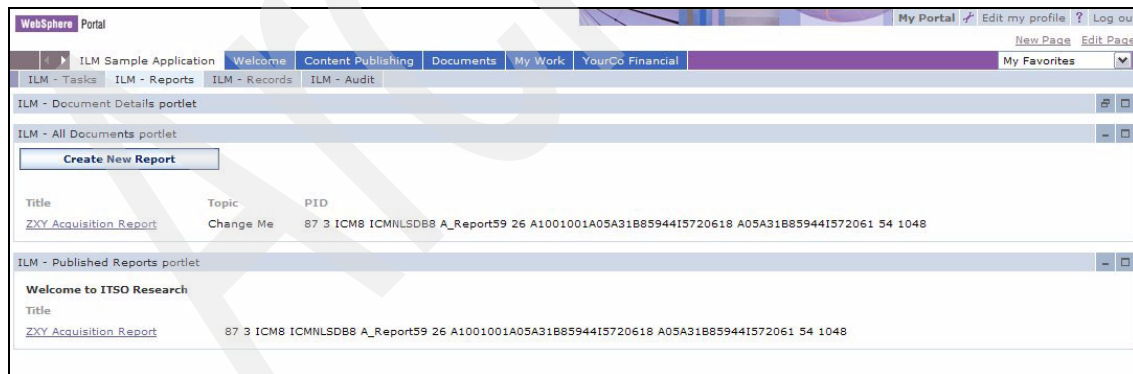
Figure 4-9   ILM - Reports page

When a document is selected from the AllDocuments portlet, the DocumentDetails portlet looks similar to the one shown in Figure 4-10 on page 66.

Figure 4-10   ILM - Document Details portlet

PublishedReport portlet

The PublishedReport portlet displays the list of reports from DB2 Content Manager that has been published. When you select the record ID of the report, the portlet switches to a DocumentDetails portlet view that shows the content of the report.

AllDocuments portlet

The AllDocuments portlet searches DB2 Content Manager for draft reports that are owned by the logged-in user ID. It shows the result in a tabular format using MyDocuments.jsp. You can either create a new report that stores a new entry in DB2 Content Manager or select an existing report.

Selecting an existing report sends a message to the DocumentDetails portlet to show the title and body of the report.

DocumentDetails portlet

The DocumentDetails portlet displays the title and body of a report document. There are two supported actions, update of title and update of body.

4.2.3 RecordsAdmin project

The RecordsAdmin project manages records from DB2 Records Manager. Figure 4-11 on page 67 shows its contents.
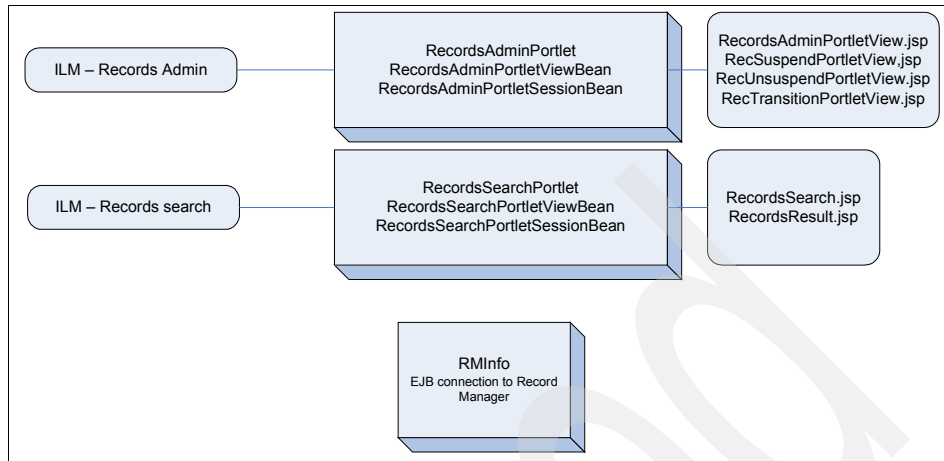
Figure 4-11   Content of the RecordsAdmin project

Figure 4-12 shows the display page for the record administration.
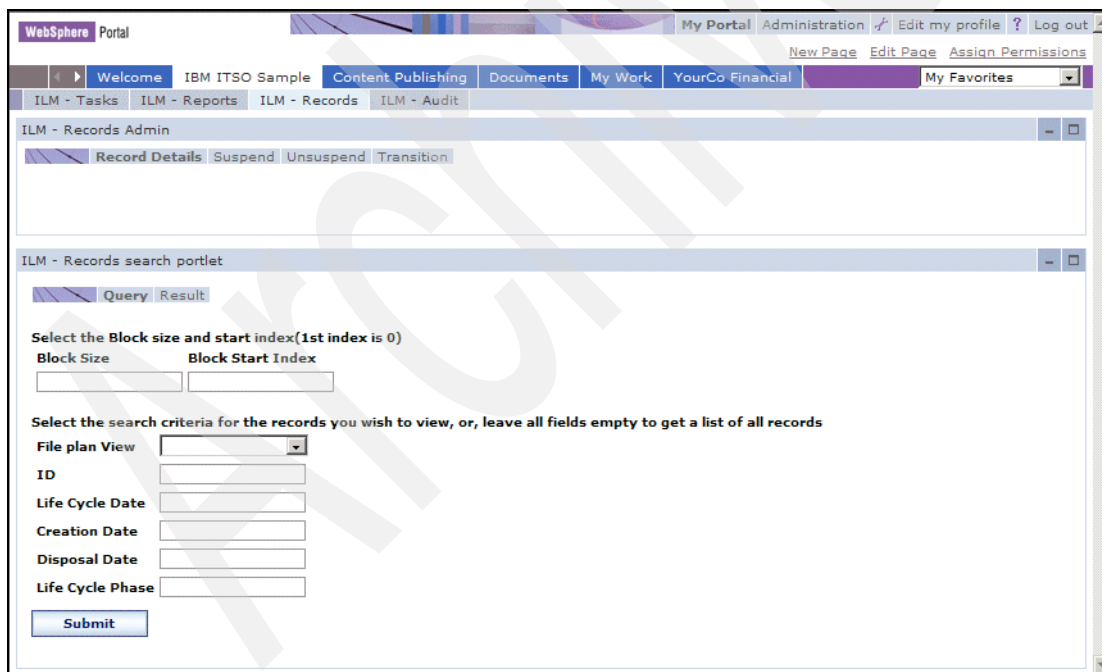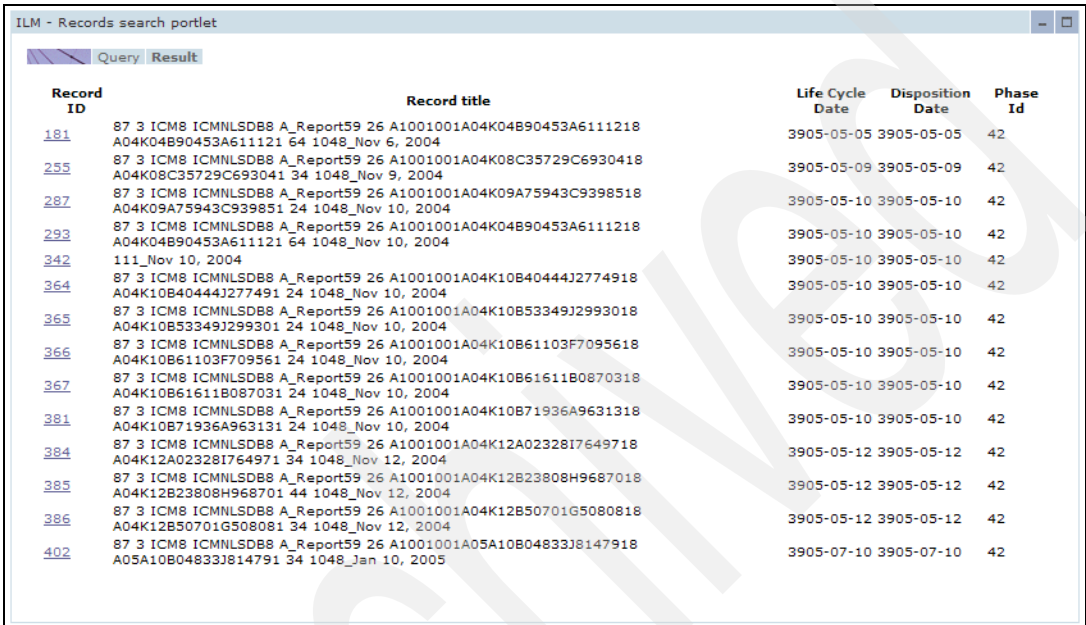
Figure 4-12   Record manipulation portlets

RecordsSearch portlet

When a query has been submitted, the RecordsSearch portlet lists the reports in a tabular format, as shown in Figure 4-13. (The layout and contents of the portlet as shown in the figure could be improved for readability and easier usage. Our goal is to show the basic concepts of how records information can be displayed in a portal, not to spend time on portlet interface and content design.)

Figure 4-13   Records search result

The record title corresponds to the report ID field shown in Figure 4-9 on page 65. When a record is selected, a message is sent to the RecordsAdmin portlet to display it.

RecordsAdmin portlet

Figure 4-14 on page 69 shows the display of a record.
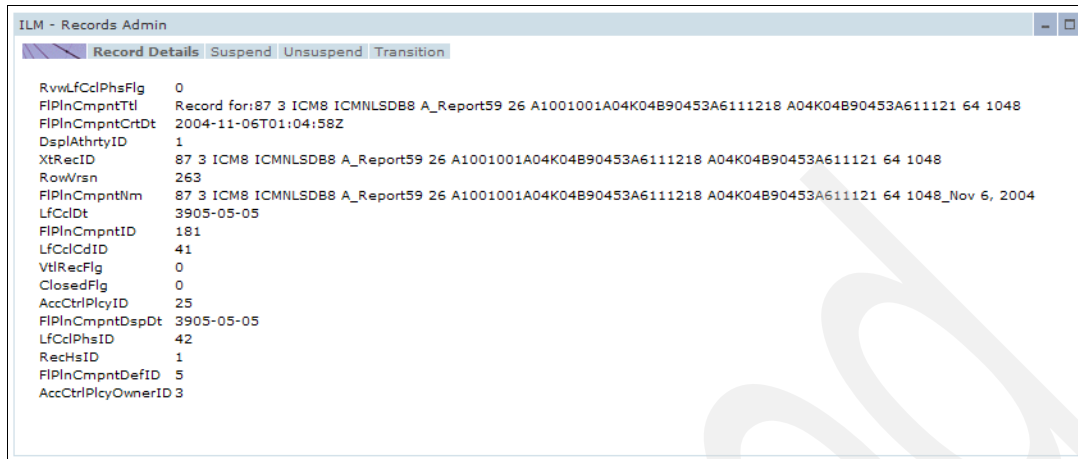
Figure 4-14   Records Admin display

In this portlet, you can open the details of a record, suspend or unsuspend a record, and perform a transition of a record.

4.2.4 ReportTasks portlet

The ReportTasks portlet provides the content of the ILM - Tasks page. The functional content of the project is shown in Figure 4-15.
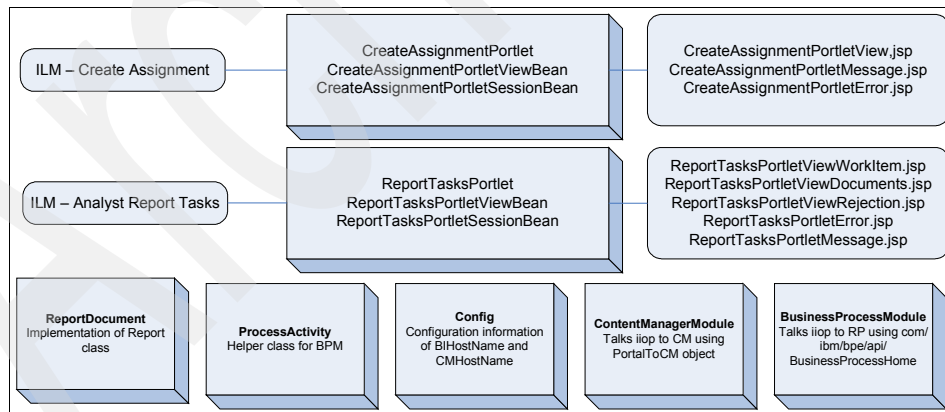
Figure 4-15   Contents of the ReportTasksPortlet project

The Web page interface of the tasks is shown in Figure 4-16 on page 70.
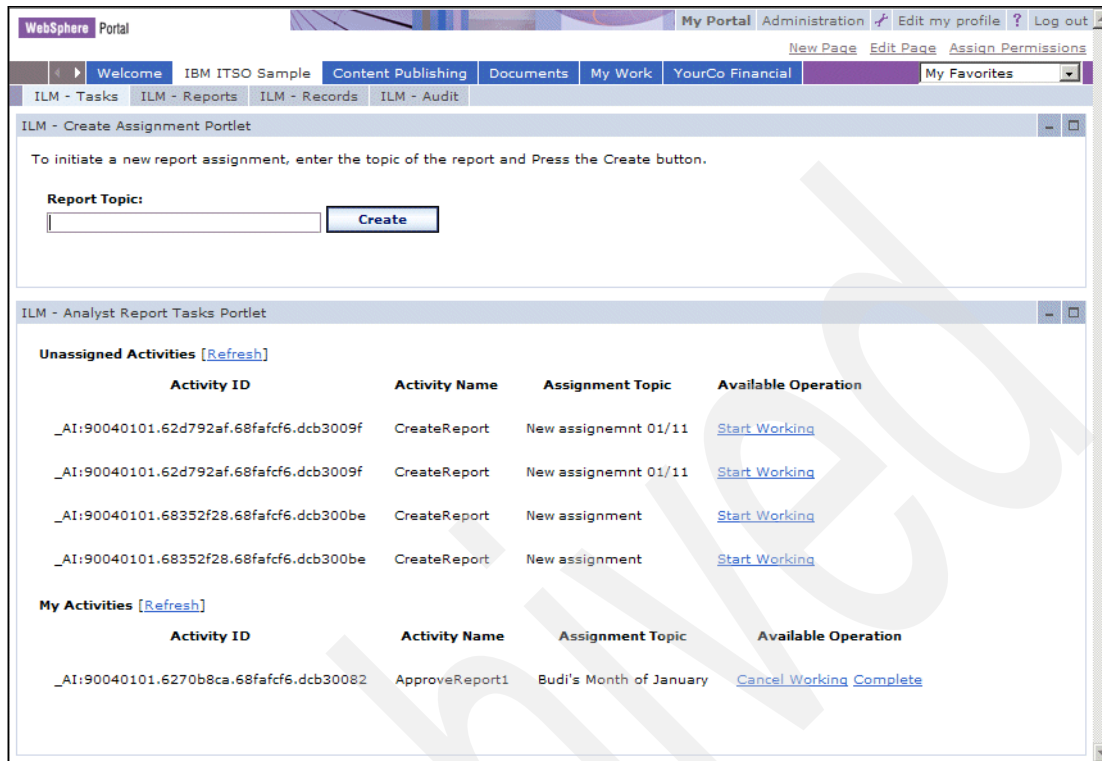
Figure 4-16   ILM - Tasks page

Create Assignment portlet

This portlet creates a new assignment process in the process choreographer. It then shows a message indicating the result, whether the creation is successful or not.

Analyst ReportTasks portlet

Over the life cycle of the assignment, the entry is shown in the work queue in this portlet. You can take an unassigned activity or work on an activity that you have self-assigned.

This portlet also enables you to complete an activity. Depending on your role, you can:

► An an analyst, correlate a report to the activity

► An a supervisor, approve or reject the report activity

4.2.5 PortalToCM project

The PortalToCM project is an EJB project. This and the associated enterprise archive (EAR) project called PortalToCMEAR make up the application to be deployed to the Content Management node. The PortalToCM JAR file is also needed by the modules that need access to DB2 Content Manager.

The PortalToCM JAR file contains the PortalToCM EJB that is deployed on the same WebSphere Application Server where Content Manager is deployed.

The PortalToCM EJB has a number of utility methods that can be called by any application requiring those methods.

Examples of these methods are the createReport() and saveBody() methods, which create a new report in Content Manager and update the body of an existing report in Content Manager, respectively.

This EJB is used by the portlets in the New Report CU project and the portlets in the ReportTasks portlet project and the ReportApproval project.

4.2.6 ReportApproval project

The ReportApproval project is structured as shown in Figure 4-17.
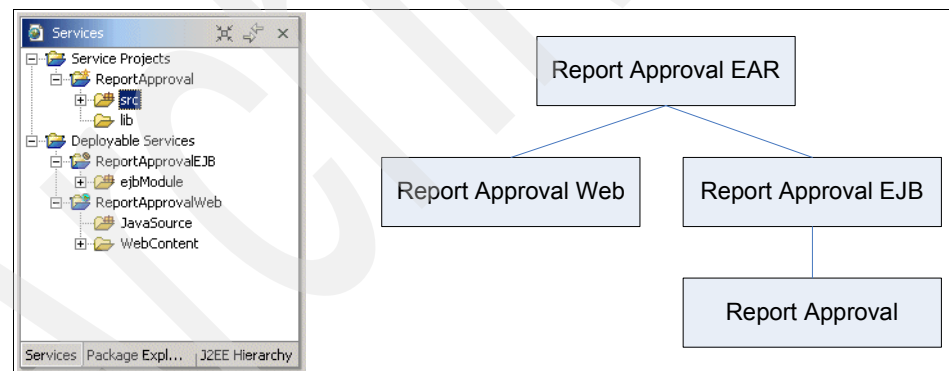
Figure 4-17   ReportApproval module

The ReportApproval project is a Business Integration service project. This project contains all the files needed to build the flow of activities that the report assignment goes through when a new report assignment is initiated.

In our sample, the report is created separately using the New ReportCU portlets. The ReportApproval work flow depends on the ReportsTask portlet to facilitate the selection of an already created report to associate with the completed assignment.

To view the different activities properties, open the file in WebSphere Studio Application Developer Integration Edition using the BPEL editor. (See Chapter 5, "Development environment" on page 73, for more information about the development environment and WebSphere Studio Application Developer Integration Developer.)

This project is deployed to the WebSphere Business Integration Server Foundation server and work-flow instances are started in our sample application using the Business Process API from the CreateAssignment portlet.

4.3 Summary

This chapter described the various components of our sample information life-cycle management application and the role of each component. The source code is available for download, as described in Appendix A, "Additional material" on page 367.

We have not provided line-by-line descriptions of the source code, because most of the implementations are straightforward, and we assume that you will be able to interpret the code and adapt it to your specific requirements.

In the next chapter, we describe our specific development environment and provide instructions about how to install and configure a similar environment and import the sample source code.

5

Development environment

This chapter describes the installation and set up of our development
environment, including the WebSphere Studio Application Developer Integration
Edition and IBM Portal Toolkit.

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5.1 Install the development node

This section describes how to set up a running development environment capable of developing business processes, portlets, and other J2EE components for our sample application. This section consists of the following topics:

► Install Microsoft Windows operating system

► Install IBM WebSphere Studio Application Developer Integration Edition V5.1.1

► Install IBM Portal Toolkit V5.0.2.3

5.1.1 Install Microsoft Windows operating system

Our development environment was based on a Windows environment. The supported versions of Windows for the WebSphere Studio Application Developer Integration Edition V5.1.1 include Windows 2000 Professional SP2 or later, or Windows XP Professional SP1 or later.

5.1.2 Install IBM WebSphere Studio Application Developer Integration Edition V5.1.1

We installed the IBM WebSphere Studio Application Developer Integration Edition V5.1.1 from the disk images. You might have the installation disks on CD. In that case, it will be necessary for you to switch the CDs during the installation. If you decide to install from disk images, you have to copy each disk image into directories named disk*x* (that is, disk1, disk2, and so on) for the installer application to find the next disk image during the installation. Failing to do so will result in requests to enter the directory for each disk image manually.

In addition, the fix pack installation (which follows the IBM WebSphere Studio Application Developer Integration Edition V5.1.1 installation) requires that you have the installation images in the IBMWSAppDevIE-5.1.1 directory. Therefore, your disk images should be in the IBMWSAppDevIE-5.1.1\disk1, IBMWSAppDevIE-5.1.1\disk2, and so on directories.

To install IBM WebSphere Studio Application Developer Integration Edition V5.1.1 for Windows, complete the following steps:

1. Go to the directory where you downloaded and unpacked the installation images. Select the Disk1 directory. It is c:\install\IBMWSAppDevIE-5.1.1\disk1 in our example.

2. Start the installer by running `launchpad.exe`.

3. Click **Install IBM WebSphere Studio Application Developer Integration Edition** from the main installation page. Note that it takes a few minutes for the Install Shield to prepare the JVM.

4. When the Welcome to the InstallShield Wizard for IBM WebSphere Studio Application Developer Integration Edition V5.1.1 window opens, click **Next**.

5. When the Software License Agreement window opens, review the terms, and if in agreement, select **I accept the terms in the license agreement**, and then click **Next**.

6. When the Location to Install window opens, we entered `C:\IBM\WSADIE511` and then clicked **Next**.

> **Tip:** Do not use the default installation path proposed by the WebSphere Studio Application Developer installer (C:\Program Files\IBM\WebSphere Studio\Application Developer\v5.1). The path for the IBM Portal Toolkit must not contain periods (.) or dollar sign symbols ($).

7. When the select features window opens, we selected the features as shown in Figure 5-1 on page 76, and then clicked **Next**:

   – Select **Integrated Development Environment (required)**.
   This option is selected automatically (cannot be cleared).
   – Select **Integrated Test Environments**.
   This option is selected automatically (cannot be cleared).
   – Select **WebSphere Business Integration Server Foundation 5.1.1 (required)**.
   This option is selected automatically (cannot be cleared). This will be the default test environment for the business processes.
   – Select **WebSphere Application Server V5.0.2**.
   This will be the default test environment for the portlets.
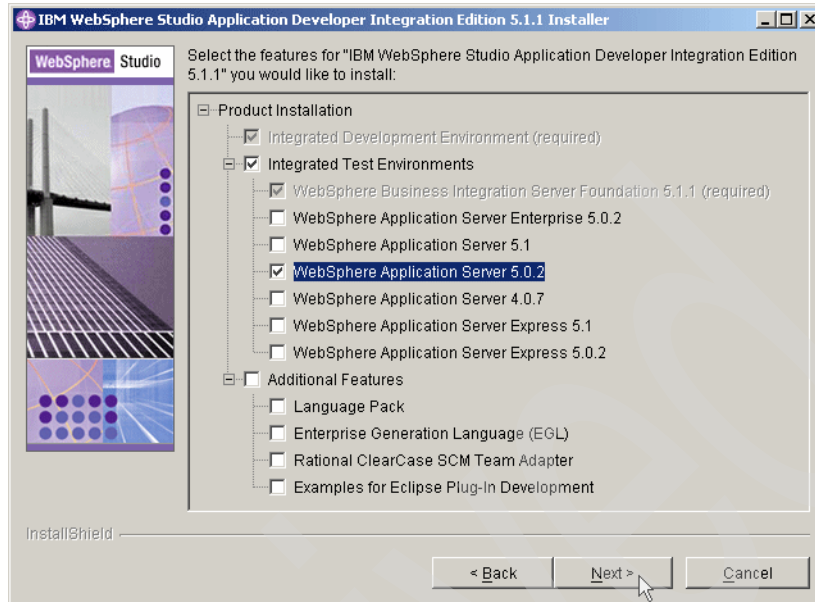
Figure 5-1   Feature selection for installation

8. When the Installation Summary window opens, review the information and then click **Next** to begin copying files.

9. When the installation is complete, you should see a message stating, `The InstallShield Wizard has successfully installed IBM WebSphere Studio Application Developer Integration Edition V5.1.1`. Click **Finish**.

10. When the WebSphere Studio Installation Launchpad main window opens, click **Install Embedded messaging client and server**. If you closed the Launchpad window during the installation, you will need to run `launchpad.exe` again.

11. In the Welcome window, click **Next**.

12. In the Software License Agreement window, review the terms, and if in agreement, select **I accept the terms in the license agreement**, and then click **Next**.

13. In the Location to Install window, we entered `C:\IBM\WebSphereMQ` and then clicked **Next**.

14. In the Installation Summary window, review the information and then click **Next** to begin copying files.

15. When the installation is complete, you should see a message stating, `The InstallShield Wizard has successfully installed embedded messaging server and client`. Click **Finish**.

16. When the WebSphere Studio Installation Launchpad main window opens, click **Exit**.

17. Verify that WebSphere Studio Application Developer V5.1.1 installed correctly:

    a. Start WebSphere Studio Application Developer Integration Edition by clicking **Start → Programs → IBM WebSphere Studio → Application Developer Integration Edition 5.1.1**.

    b. When you start WebSphere Studio the first time, you will be prompted for the workspace directory. Do the following and then click **OK**:

       • Change the default location for the workspace to a shorter directory name (for example, c:\workspaces\workspace1).
       • Clear the Use this workspace as the default and do not show this dialog box again option.

       Note: It is desirable to select different workspaces (directories) at startup. For this reason, we recommend that you do not select the **Use this workspace as the default and do not show this dialog box again** option.

    c. Close WebSphere Studio Application Developer.

5.1.3 Install IBM Portal Toolkit V5.0.2.3

IBM Portal Toolkit V5.0.2.3 requires that some fix packs and fixes are installed for IBM WebSphere Studio Application Developer Integration Edition V5.1.1 prior to the toolkit installation. To install IBM Portal Toolkit V5.0.2.3, you need to perform the following high-level tasks:

1. Prepare the required fix packs and fixes for the WebSphere Studio Application Developer test environment

2. Install the IBM Portal Toolkit V5.0.2.3

3. Verify the IBM Portal Toolkit V5.0.2.3 installation

Prepare the required fix packs and fixes for the WebSphere Studio Application Developer test environment

To prepare the required fix packs and fixes, complete the following steps:

1. From a command prompt, run the following commands:

```
cd C:\install\PortalToolkit5023\WTE_setup\was_image
setup_was_image C:\install
```

Where:

– C:\install\PTK5023 is the directory where you have the installable image of IBM Portal Toolkit V5.0.2.3.

– C:\install is the directory where you have the installable image of IBM WebSphere Studio Application Developer Integration Edition V5.1.1. If it is, for example, C:\install\IBMWSAppDevIE-5.1.1, you enter `C:\install`.

  If you are installing from CDs, it would be, for example, `D:`, where D is the CD drive. Note: "D:\" is invalid. It should be "`D:`".

The C:\install\PortalToolkit5023\WTE_setup\was_image directory should then list these files:

– b_was5_win_compressed_0
– b_was5_win_compressed_1
– b_was5_win_compressed_2
– b_wssd_core_win_compressedFile
– setup_was_image.bat
– setup_was_image.html

2. Take your IBM WebSphere Portal V5.0 CD2 installation disk and copy the files from the wps directory to the C:\install\PortalToolkit5023\WTE_setup\wps directory.

The C:\install\PortalToolkit5023\WTE_setup\wps directory should then list these files and directories:

– install.bat
– install.sh
– install400.bat
– installresponse.txt
– migration
– setup_wps.html
– uninstallresponse.txt
– version.txt
– wps5_dev_install.txt
– wpsinstall.jar

3. Download the IBM WebSphere Application Server V5.0.2 Cumulative Fix 3. For instructions, see 6.9.1, "Download and unpack WebSphere Application Server V5.0.2 Cumulative Fix 3" on page 116. Unpack the was502_cf3_win.zip file into the C:\install\PortalToolkit5023\WTE_setup\was502_cf3 directory.

The C:\install\PortalToolkit5023\WTE_setup\was502_cf3 directory should then list these files and directories:

– docs
– earLauncher

- fixpacks
- installer.jar
- lib
- setup_was502_cf3.html
- updateSilent.bat
- updateWizard.bat
- version.properties

4. Download the 1.3.1 Java SDK, Java Tech Edition for WebSphere Application Server V5 in PQ81989_win.jar file from the following location:

   ```
   ftp://ftp.software.ibm.com/software/websphere/appserv/support/fixes/PQ81989
   /PQ81989_win.jar
   ```

   Copy it to the C:\install\PortalToolkit5023\WTE_setup\j9_fix directory. If this link does not work, try searching the WebSphere Application Server Support site, available at:

   ```
   http://www.ibm.com/software/webservers/appserv/was/support/
   ```

   The C:\install\PortalToolkit5023\WTE_setup\j9_fix directory should then list these files:

   - PQ81989_win.jar
   - setup_j9_fix.html

5. Download the IBM WebSphere Application Server V5.0.2.3 Fixes. For instructions, see 6.10.1, "Download and unpack Application Server V5.0.2.3 Fixes" on page 118. Unpack the WAS5023CumulativeWindows.zip file into the C:\install\PortalToolkit5023\WTE_setup\was5023_fixes directory.

   The C:\install\PortalToolkit5023\WTE_setup\was5023_fixes directory should then list these files and directories:

   - docs
   - earLauncher
   - efixes
   - installer.jar
   - lib
   - setup_was5023_fixes.html
   - sums
   - updateSilent.bat
   - updateWizard.bat
   - utils
   - version.properties

6. Download the IBM WebSphere Portal V5.0 Fix Pack 2. For instructions, see 6.6.1, "Download and unpack WebSphere Portal V5.0 Fix Pack 2" on page 108. Unpack the Fixpack2.zip file into the C:\install\PortalToolkit5023\WTE_setup\wp_ptf_502 directory.

The C:\install\PortalToolkit5023\WTE_setup\wp_ptf_502 directory should then list these files and directories:

– bin
– doc
– earLauncher
– lib
– PortalUpdateInstaller.jar
– readmefirst.html
– setup_wp_ptf_502.html
– tasks
– updatePortal.bat
– updatePortal.sh
– wpcp
– WPCP_PTF_502.jar
– WP_PTF_502.jar

7. Download the IBM WebSphere Portal V5.0.2 Cumulative Fix 1. For instructions, see 6.11.1, "Download and unpack Portal V5.0.2 Cumulative Fix 1" on page 121.

Copy the WP_PTF_5021.jar file into the C:\install\PortalToolkit5023\WTE_setup\wp_ptf_5021 directory.

Then, unpack the PortalUpdateInstaller.zip file to the same directory.

The C:\install\PortalToolkit5023\WTE_setup\wp_ptf_5021 directory should then list these files and directories:

– bin
– doc
– earLauncher
– lib
– PortalUpdateInstaller.jar
– setup_wp_ptf_5021.html
– tasks
– updatePortal.bat
– updatePortal.sh
– WP_PTF_5021.jar

Install the IBM Portal Toolkit V5.0.2.3

If you have prepared all the fix packs and fixes needed for the installation (listed in previous section), you can now proceed to install IBM Portal Toolkit V5.0.2.3:

1. Make sure that WebSphere Studio Application Developer is not running.

2. Run the installation program by launching
   `C:\install\PortalToolkit5023\setup.exe`.

3. On the Welcome page, click **Next**.

4. When the Software License Agreement window opens, review the terms, and if in agreement, select **I accept the terms in the license agreement**, and then click **Next**.

5. In the Component Selection window, select **Portal Toolkit V5.0.2.3** and **WebSphere Portal V5.0 for Test Environment** and click **Next**.

6. When the Installation Summary for Portal Toolkit window opens, review the information and then click **Next** to begin copying files.

7. When the Installation Summary for WebSphere Portal V5.0 for Test Environment window opens, click **Next** again.

8. When the installation completes, click **Finish**.

9. Start WebSphere Studio Application Developer Integration Edition by clicking **Start** → **Programs** → **IBM WebSphere Studio** → **Application Developer Integration Edition 5.1.1**.

10. You will see the Configuration Changes panel. Select the pending configuration change that is displayed and click **Finish**.

11. When the update completes, you will be prompted to restart the workbench. Click **Yes** to restart.

Verify the IBM Portal Toolkit V5.0.2.3 installation

To verify the local debug configuration, complete the following steps:

1. From the menu in WebSphere Studio Application Developer Integration Edition application, click **File** → **New** → **Other** → **Server** → **Server and Server Configuration**. A wizard will start.

2. In the wizard window, enter server name `TestServer01`. In Server type, expand **WebSphere Portal version 5.0**. Select **Test Environment** and click **Finish**.

3. In the Servers view, right-click the **TestServer01** server and click **Start**.

4. Verify that the server starts successfully. In the Servers view, its status should be Started, and in the console you should, see following message: `Server WebSphere_Portal open for e-business.` (The message is *not* on the last line of the output.)

5.2 Import the source code

There is a sample code file available with this book. See Appendix A, "Additional material" on page 367 for information regarding downloading the files and accessing the source code and other modules.

This sample code contains a sample workspace ready to be used in IBM WebSphere Studio Application Developer Integration Edition V5.1.1 with IBM Portal Toolkit V5.0.2.3 installed.

To import the source code, complete the following steps:

1. Unpack the workspace.zip file to a local directory on your development node. We suggest that you use a short path without any special characters, for example, C:\workspace\ILMSample.

2. Then, start WebSphere Studio Application Developer by clicking **Start** → **Programs** → **IBM WebSphere Studio** → **Application Developer Integration Edition 5.1.1**.

3. When the WebSphere Studio window opens, click **Browse** and navigate to the directory where you have unpacked the sample workspace. In our case, it is C:\workspaces\ILM.

4. Click **OK**. WebSphere Studio Application Developer will start.

5. You should see the workspace with all the projects. We recommend that you right-click all the projects and force the refresh and then the complete rebuild.

The projects that you will have in WebSphere Studio Application Developer are shown in Figure 5-2.
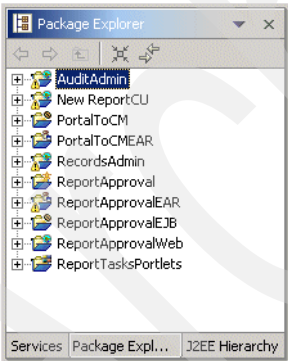
Figure 5-2   Projects view

Table 5-1 on page 83 also lists the projects.

Table 5-1   Project list

Project name	Type
AuditAdmin	Portlet
New ReportCU	Portlet
PortalToCM	EJB
PortalToCMEAR	J2EE
RecordsAdmin	Portlet
ReportApproval	Java
ReportApprovalEAR	J2EE
ReportApprovalEJB	EJB
ReportApprovalWeb	Web
ReportsTasksPortlet	Portlet

A typical portal project consists of the following areas:

► Java source folder

   – Java files arranged by package (code developed for this solution is in the
     Java package com.ibm.itso.ilm.*).
   – Property files.

► Web Content folder

   – META-INF, which contains the Manifest.MF file.
   – WEB-INF, which contains the configuration XML files (such as portlet.xml
     and web.xml) and Java classes.
   – JSP files.

► JAR files that are referenced as external libraries

The sample is shown in Figure 5-3 on page 84 for the RecordsAdmin project.
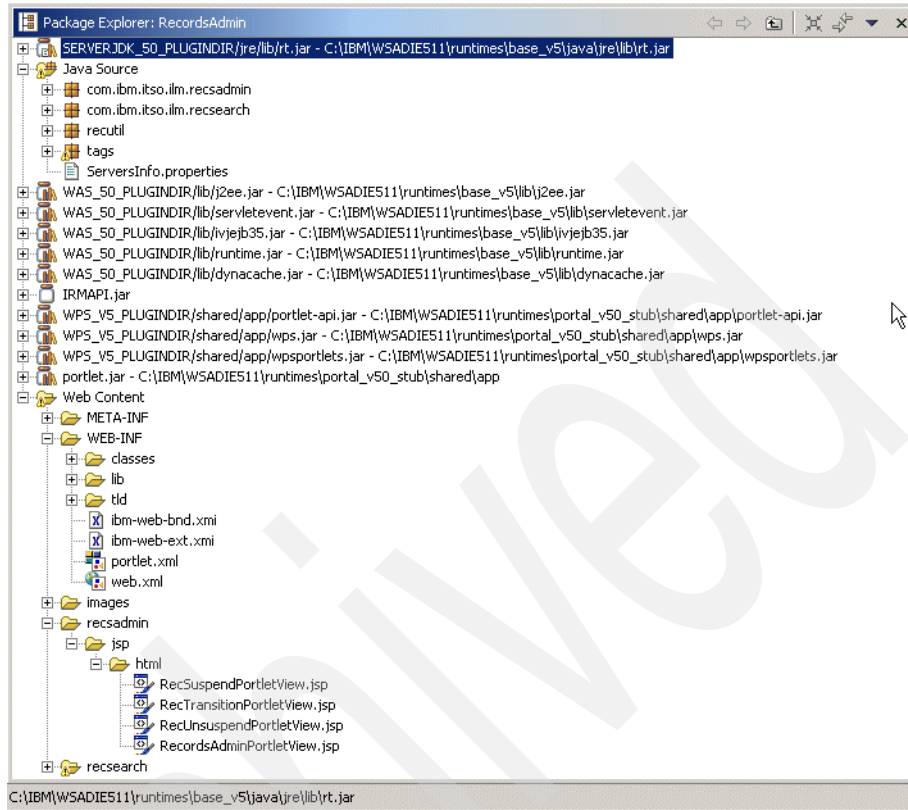
Figure 5-3   Sample portlet project

In WebSphere Studio Application Developer, each file type has a specialized editor that is capable of checking the syntax on the fly and providing highlighting for keywords and comments. In addition, specialized editors are provided for property files, XML files, and other types of files.

5.3 Summary

This chapter described our development environment and the steps to perform to recreate it. You might also want to reference the IBM Redbook, *IBM WebSphere Portal V5: A Guide for Portlet Application Development*, SG24-6076, because it provides an excellent step-by-step guide on application development setup for a WebSphere Portal environment.

Part 3

Installation and configuration

In this part of the book, we provide the necessary details and procedures to successfully install and configure the core records management and process choreography solution products. These detailed procedures provide example configuration values consistent with the solution context.

We organize this part into the following chapters:

Portal node installation

This chapter describes in detail the steps used to install the Portal node in our solution. This node includes the IBM WebSphere Portal server and an LDAP directory and related services.

> **Note:** When installing and configuring the Portal node, we referenced the following information sources:
>
> ► IBM Redbook *Document Management Using WebSphere Portal V5.0.2 and DB2 Content Manager V8.2*, SG24-6349
>
> ► *IBM WebSphere Portal Extend for Multiplatforms V5.0.2 Information Center*, available at:
>
>   http://www.ibm.com/websphere/portal/library
>
> ► IBM Redbook *IBM WebSphere Portal for Multiplatforms V5 Handbook*, SG24-6098

The high-level tasks to install the Portal node are:

1. IBM DB2 Universal Database installation

2. IBM WebSphere Portal V5.0 installation

3. IBM WebSphere Application Server V5.0 Fix Pack 2 installation

4. WebSphere Application Server Enterprise V5.0 Fix Pack 2 installation

5. IBM WebSphere Application Server V5.0.2 Fixes installation

6. IBM WebSphere Portal V5.0 Fix Pack 2 installation

7. WebSphere Application Server V5.0.2 Cumulative Fix 2 installation

8. IBM WebSphere Application Server Enterprise V5.0.2 Cumulative Fix 2 installation

9. WebSphere Application Server V5.0.2 Cumulative Fix 3 installation

10. IBM WebSphere Application Server V5.0.2.3 Fixes installation

11. IBM WebSphere Portal V5.0.2 Cumulative Fix 1 installation

12. IBM Tivoli Directory Server Version 5.2 installation

We implement this node on a Microsoft Windows 2000 Server platform.

6.1 IBM DB2 Universal Database installation

This section describes how to install IBM DB2 Universal Database™ V8.1, Enterprise Server Edition and supporting Fix Pack 4a.

This section is organized into the following tasks:

► Install DB2 UDB V8.1
► Install DB2 UDB V8.1 Fix Pack 4a
► Verify DB2 UDB

6.1.1 Install DB2 UDB V8.1

To install the IBM DB2 UDB Version 8.1 Enterprise Server Edition, complete the following steps.

> **Note:** Depending on the DB2 UDB V8.1 CD distribution you are using, the installation panels might be slightly different from those described here.

1. Insert the *DB2 UDB V8.1 Enterprise Server Edition* CD.

2. Navigate to the <CD_Root> and run `Setup.exe` to start the installation.

3. When the DB2 Installer window opens, click **Install Products**.

4. When the Select the Product to Install window opens, select **DB2 UDB Enterprise Server Edition** (the default and only option) and then click **Next**.

5. When the Welcome window for the DB2 Setup Wizard opens, click **Next**.

6. When the License Agreement window opens, review the terms, and if in agreement, select **I accept the terms in the license agreement**. Click **Next**.

7. When the Select the installation type window opens, select **Typical** and then click **Next**.

8. When you see a warning message regarding the connection to remote DB2 servers using APPC, click **OK**.

9. When the Select the Installation Action window opens, select **Install DB2 UDB Enterprise Server Edition on this computer** and then click **Next**.

> **Note:** Take note of the Save your settings to response file check box. This can be used to capture your selection options to be used for a future installation.

10.When the Select the Installation Folder window opens, we entered `c:\ibm\sqllib`. Click **Next**.

Note: The DB2 UDB installation with the Typical installation type takes approximately 376 MB of disk space.

11. When the Set User Information for DB2 Administration Server window opens, enter and select the following values and then click **Next**:
    – Domain: We left this field blank.
    – User name: DB2admin (default)
    – Password: <password>
    – Confirm password: <password>
    – Select **Use the same username and password for remaining DB2 services** (default).

12. When the Setup the Administration Contact List opens, we accepted the default settings (local). Click **Next**.

13. When the warning message Notification SMTP server has not been specified appears, click **OK**.

14. When the Configure DB2 instances window opens, we accepted the default (**DB2**). Click **Next**.

15. When the Prepare the DB2 tools catalog window opens, select **Do not prepare the DB2 tools catalog on this computer** and then click **Next**.

16. When the Specify a contact for health monitor notification window opens, select **Defer the task after installation is complete** and then click **Next**.

17. When the Start copying files window opens, review the selected options and then click **Install**.

18. When the Setup is Complete window opens, click **Finish**.

19. When the IBM DB2 First Steps window opens, click **Exit First Steps**.

6.1.2 Install DB2 UDB V8.1 Fix Pack 4a

We installed IBM DB2 UDB V8.1 Fix Pack 4a for 32-bit Windows. We chose to use Fix Pack 4a for several reasons. First, IBM Tivoli Directory Server V5.2, WebSphere Portal V5.0.2, DB2 Content Manager V8.2 plus Fix Pack 6, and DB2 Information Integrator for Content plus Fix Pack 6 officially support DB2 UDB V8.1 Fix Pack 4a. Also, we wanted to use the same version of DB2 fix pack on all of the nodes for DB2 compatibility reasons.

> **Note:** For more information about the contents of IBM DB2 UDB V8.1 Fix
> Pack 4a, refer to the text file *FixpackReadme*, available at:
>
> ```
> http://www.ibm.com/cgi-bin/db2www/data/db2/udb/winos2unix/support/v8fphis
> t.d2w/report#WIN-32
> ```

To download and install IBM DB2 UDB V8.1 Fix Pack 4a, complete the following
steps:

1. You can download IBM DB2 UDB V8.1 Fix Pack 4a at:

   ```
   http://www.ibm.com/cgi-bin/db2www/data/db2/udb/winos2unix/support/v8fphist.
   d2w/report#WIN-32
   ```

2. We downloaded the FP4a_WR21338_ESE.exe, which is Fix Pack 4a for IBM
   DB2 Universal Database V8.1, Enterprise Server Edition.

3. Stop all DB2 services in the Windows services.

> **Note:** If you have trouble stopping any of the DB2 services, you can
> proceed with the fix pack installation. When the DB2 Setup Wizard
> launches for the fix pack, it will warn that certain processes are locking
> DB2 and will ask you if you want to shut them down. You can click **Yes**, and
> the Wizard will shut down the processes for you.

4. Install IBM DB2 UDB V8.1 Fix Pack 4a. We accepted the default installation
   options.

5. We recommend that you restart your system after installing the fix pack to
   ensure that all fixes are applied and active in memory.

6. The internal DB2 level is 8.1.4.428 after the installation of Fix Pack 4a. In our
   example, we do not have any existing databases that need special attention
   (rebind DB2 utilities).

   After the system has restarted, open a DB2 command window (or Windows
   command window) and enter the following command:

   ```
   db2level
   ```

   It should return 8.1.4.428 after Fix Pack 4a has been installed.

> **Note: Rebind DB2 utilities to existing databases**
>
> If you have created databases before you installed Fix Pack 4a, you will need to rebind the DB2 utilities to the databases. This step is necessary for the fixes to become effective on existing databases. The binding procedure needs to be performed only once per database. Note that this is not required for databases created after the fix pack is installed. We summarize the rebind procedure found in the *FixpackReadme*.
>
> To rebind existing DB2 UDB databases after installing Fix Pack 4a, enter the following commands from a DB2 command window for each database:
>
> ```
> db2 terminate
> db2 CONNECT TO <dbname>
> db2 BIND <DB2_home>\BND\@db2ubind.lst GRANT PUBLIC
> db2 BIND <DB2_home>\BND\@db2cli.lst GRANT PUBLIC
> db2 terminate
> ```
>
> Where <dbname> represents the name of a database to which the utilities should be bound. And, <DB2_home> represents the directory where you have installed DB2. The db2ubind.lst and db2cli.lst contain lists of required bind files used by IBM DB2 UDB V8.1.

6.1.3 Verify DB2 UDB

After you install DB2 UDB V8.1 and the fix pack and have restarted your system, we recommend that you verify that DB2 UDB is working properly.

6.2 IBM WebSphere Portal V5.0 installation

This section describes how to install and configure IBM WebSphere Portal V5.0 on the Portal node. We install the following components with this installation:

- ► WebSphere Application Server Enterprise Version 5.0.1 (Base and Enterprise), including required fixes
- ► IBM HTTP Server Version 1.3.26
- ► WebSphere Portal Version 5.0
- ► WebSphere Portal Content Publishing Version 5.0

6.2.1 Install WebSphere Portal V5.0

To install IBM WebSphere Portal V5.0, complete the following steps:

1. Insert the *IBM WebSphere Portal V5.0.2 Setup* CD.

   The installer will automatically start the installation process by offering a command prompt. If autostart is disabled, run `install.bat` from the root of the CD to start the installation.

   > **Note:** You might have to minimize the command prompt window if it stays on top and obscures the language prompt.

2. When the Install Shield Language window opens, select the desired language (for example, English) and click **OK**.

3. When the Welcome window opens, you are provided with an option to launch the *Information Center* (optional). Click **Next** to continue installation.

4. When the License Agreement window opens, review the terms, and if in agreement, select **I accept the terms in the license agreement** and then click **Next**.

   The installer checks for the required operating system and prerequisites.

5. The next window provides the installation options: Full (all components) or Custom (useful when components such as WebSphere Application Server are already installed).

   In our example, we select **Full** and click **Next** to continue.

6. The wizard displays a window for the WebSphere Application Server installation directory. We used the following path and then clicked **Next**:

   `C:\IBM\WebSphere\AppServer`

7. The next window displays the IBM HTTP Server installation directory. We used the following path and then clicked **Next**:

   `C:\IBM\IBMHTTPServer`

8. The next window prompts for the system logon user ID and password that will be used to run the WebSphere Application Server and IBM HTTP Server as a Microsoft Windows NT® service. If you do not want these services to be created, you can skip this window by clicking **Next**.

   Otherwise, select **Run WebSphere Application Server As Service** and **Run IBM HTTP Server as a service** and provide a valid user name and password. Note, that this user account is one of your Windows system user accounts, as opposed to most of the user accounts used in this book, which are located in the LDAP directory residing in IBM Tivoli Directory Server. The preferred way is to enter the user account that you are using to install the

product. We had previously defined a Windows user ID for WPSadmin and therefore used the following values:

– User ID: `WPSadmin`
– Password: `<password>`

Click **Next**.

> **Note:** If you do not initially configure WebSphere or start as a service, but want to do so after the installation, use the **ASService** command as follows:
>
> ```
> ASService.exe (with no arguments starts the service)
>     -add <service name>
>         -serverName <Server>
>         [-wasHome <Websphere Install Directory>]
>         [-configRoot <Config Repository Directory>]
>         [-startArgs <additional start arguments>]
>         [-stopArgs <additional stop arguments>]
>         [-userid <execution id> -password <password>]
>         [-logFile <service log file>]
>         [-restart <true | false>]
>     -remove <service name>
>     -start <service name>
>     -stop <service name>
>     -status <service name>
> ```
>
> Assume the following:
>
> ► WebSphere Application Server install path:
>   `C:\IBM\WebSphere\AppServer\`
> ► WebSphere Application Server AppServer instance name: `Server1`
>
> From a command prompt, enter:
>
> ```
> cd:\C:\IBM\WebSphere\AppServer\bin
> ```
>
> Then, execute:
>
> ```
> wasservice –add "IBM WAS Server1" -serverName Server1
> ```

9. The next window prompts you for the node name and host name to be used for the WebSphere Application Server installation. We used the following values and clicked **Next**:

– Node name: `ilm-ui`
– WebSphere Application Server hostname: `ilm-ui.itsc.austin.ibm.com`

> **Note:** There is no WebSphere Portal supported method to change the node and host name after entering them during the installation. Be sure that you enter the desired node and host names correctly.

10.We are now prompted for the WebSphere Portal installation directory. We used the following path and clicked **Next**:

```
C:\IBM\WebSphere\PortalServer
```

11.The next window prompts for the Portal administrative user and password. We used the following values, confirmed the password, and clicked **Next**:

- Administrative user: `WPSadmin`
- Password: `<password>`
  The password for the WPSadmin is user defined during the installation.
- Confirm Password: `<password>`

12.The next window displays the different components that are going to be installed. Click **Next**.

13.The Installer program will then prepare the installation. After a while, you will be prompted to insert *CD #1-1 WebSphere Application Server Enterprise for Windows*. It begins by locating a Java Virtual Machine and then the installation of WebSphere Application Server (Base and Enterprise) starts.

After this installation completes, you will be prompted to insert CD #1-6 *WebSphere Application Server Fixpack and eFixes for Windows and Linux*.

> **Note:** For our example, we avoided the necessity of replacing CDs by putting the CD images on a network drive. By using the following directory names for each CD image (and placing the images in the same directory in the network), you will not be prompted to insert any CDs:
>
> ► setup
> ► cd1-1
> ► cd1-6
> ► cd2

The wizard then performs the following tasks, displaying a progress meter for each task:

- Prepares the WebSphere Application Server Fix Pack files
- Installs WebSphere Application Server Fix Pack 1
- Installs WebSphere Application Server Enterprise Fix Pack 1
- Installs WebSphere Application Server Fixes

14.When these tasks complete, the installer starts WebSphere Application Server (server1 application server). After the server starts, you will be prompted to insert *CD #2 WebSphere Portal WPCP*. This starts the installation of WebSphere Portal.

15.When this completes, the *Information Center* is installed, and then WebSphere Portal starts (WebSphere_Portal application server). The installation is then validated, and the portlets are installed. After this finishes, the installer installs the content publishing features. After the whole procedure completes, you should be presented with a window stating that the installation was successful.

Leave the **Launch First Steps** option selected for and click **Finish**.

16.The installation program then completes and closes. Note that as its final task, it loads the WebSphere Portal First Steps application.

6.2.2 Verify WebSphere Portal V5.0

If the installation completed properly, the WebSphere Portal First Steps application should be running.

> **Note:** If you have restarted the system where WebSphere Portal is installed after the installation and WebSphere Portal and the First Steps are not running, do the following:
>
> 1. Start the WebSphere Portal application by clicking **Start** → **Programs** → **IBM WebSphere** → **Portal Server v5.0** → **Start the Server**.
>
>   Alternatively, start the WebSphere Portal application server from the command line as follows:
>
>   `c:\ibm\WebSphere\AppServer\bin\startServer Webphere_Portal`
>
> 2. Start the First Steps application by clicking **Start** → **Programs** → **IBM WebSphere** → **Portal Server v5.0** → **First Steps**.

To verify the installation of WebSphere Portal, do the following:

1. Click **Launch WebSphere Portal** to test that the portal pages open properly. This should launch a Web browser window with the following URL (ilm-ui.itsc.austin.ibm.com is the host name of this node):

    `http://ilm-ui.itsc.austin.ibm.com:9081/wps/portal`

> **Tip:** When launching WebSphere Portal from the First Steps GUI, be sure that the URL contains the fully qualified DNS name in case the URL has only the host name. This could happen if the **System properties** → **Network Identification** → **Full computer name** does not contain the domain name extension. If this is the case, add the computer to the domain or add the domain name.

2. Log in to the portal by clicking the **Log in** link located in the upper-right corner. This takes you to a new window prompting for login information.

   – User ID: `WPSadmin`
     This user ID was created during the WebSphere Portal installation.
   – Password: `<password>`
     This is a user-defined password created during the WebSphere Portal installation.

3. If the installation is successful, and you have Internet access. you should be presented with the personalized portal pages for the logged-in user.

If your computer does not have direct access to the Internet, you will see a window similar to that shown in Figure 6-1 on page 98. The errors that appear on the window occur only because some of the given portlets obtain content to display by connecting to servers available on the Internet.
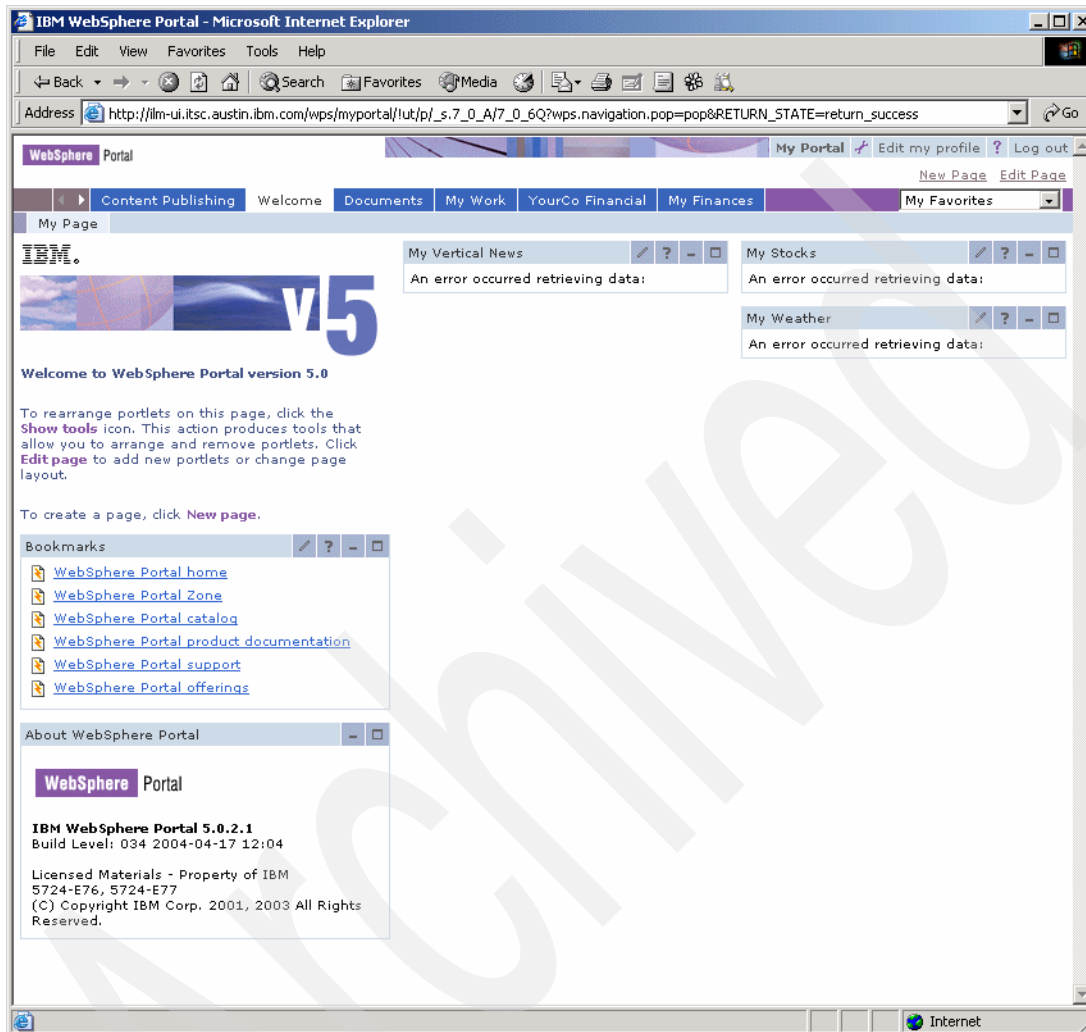
Figure 6-1   Personalized Welcome window of WebSphere Portal V5.0

6.3 IBM WebSphere Application Server V5.0 Fix Pack 2 installation

As a prerequisite to IBM WebSphere Portal V5.0.2, we install IBM WebSphere Application Server Enterprise V5.0 Fix Pack 2, which requires IBM WebSphere Application Server V5.0 Fix Pack 2 to be installed first. Therefore, this section

describes the installation steps required for the IBM WebSphere Application Server V5.0 Fix Pack 2 installation.

The IBM WebSphere Application Server V5.0 Fix Pack 2 installation requires write access to the file system during the installation. For this reason, we need to copy the fix pack to the local file system of the target node. In addition, Fix Pack 2 includes a later version of WebSphere Update Installer (install wizard for fix packs and fixes). We use WebSphere Update Installer included with Fix Pack 2 to install the WebSphere fixes.

6.3.1 Download WebSphere Application Server V5.0 Fix Pack 2

To download IBM WebSphere Application Server V5.0 Fix Pack 2, complete the following steps:

1. Download IBM WebSphere Application Server V5.0 Fix Pack 2 from the following site:

   `http://www.ibm.com/support/docview.wss?rs=180&tc=SSEQTP&uid=swg24005012`

   Or, download it directly from:

   `ftp://ftp.software.ibm.com/software/websphere/appserv/support/fixpacks/was50/fixpack2/Windows/was50_fp2_win.zip`

2. Unpack the downloaded file to a temporary directory on your Portal node. For our environment, we used the c:\install\was50fp2\UpdateInstaller directory.

6.3.2 Stop the servers

Prior to starting the fix pack installation, you need to make sure that the WebSphere Application Servers and IBM HTTP Server are not running. To ensure that the servers are not running, complete the following steps:

1. Stop IBM HTTP Administration by clicking **Start** → **Programs** → **IBM HTTP Server 1.3.26** → **Stop Administration Server**.

1. Stop IBM HTTP Server by clicking **Start** → **Programs** → **IBM HTTP Server 1.3.26** → **Stop HTTP Server**.

2. Stop the WebSphere Portal server by clicking **Start** → **Programs** → **IBM WebSphere** → **Portal Server v5.0** → **Stop the Server**.

3. Stop the WebSphere Application Server server1 by clicking **Start** → **Programs** → **IBM WebSphere** → **Application Server v5.0** → **Stop the Server**.

4. Ensure that everything is stopped by checking that the following Windows NT services are stopped:

   – IBM HTTP Server 1.3.26

– IBM HTTP Administration 1.3.26
– IBM WebSphere Application Server V5 server1

6.3.3 Install WebSphere Application Server V5.0 Fix Pack 2

To install IBM WebSphere Application Server V5.0 Fix Pack 2, complete the following steps on the Portal node:

1. From a command prompt, set the environment variables by running the following command:

   `c:\IBM\WebSphere\AppServer\bin\setupCmdLine`

2. Navigate to the WebSphere Update Installer directory:

   `cd \install\was50fp2\UpdateInstaller`

3. Run the WebSphere Update Installer application:

   `updateWizard`

4. When the WebSphere Update Installer language window opens, select the appropriate language for the wizard (for example, English) and then click **OK**.

5. When the Welcome window opens, click **Next**.

6. WebSphere Update Installer detects your current WebSphere Application Server version (IBM WebSphere Application Server V5.0.1 plus Enterprise V5.0.1) and installation directory (`c:\ibm\WebSphere\AppServer`). Click **Next**.

7. Select **Install fix packs** and then click **Next**.

8. Enter the directory where you have copied the fix pack. For example, we entered the following in the Fix pack directory field and then clicked **Next**:

   `c:\install\was50fp2\UpdateInstaller\fixpacks`

9. Select the **was50_fp2_win** fix pack and then click **Next**.

10. The next window prompts you for the path to IBM HTTP Server and Embedded Messaging.

    We have not installed embedded messaging, so the Embedded Messaging Installation Directory should state `Not Found` and **Embedded Messaging** should not be selected.

    We installed IBM HTTP Server, so we need to install its fix pack. Make sure that the **IBM HTTP Server** option is selected and that the IBM HTTP Server Installation Directory is set to `C:\IBM\IBMHTTPServer`. See Figure 6-2 on page 101.
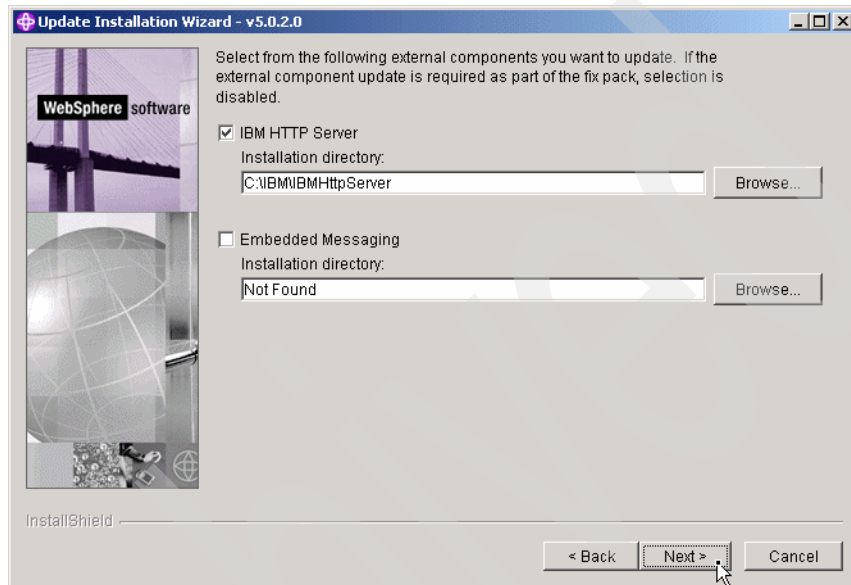
Figure 6-2   WebSphere Application Server 5.0 Fix Pack 2 component selection

11. Review the fix pack settings and then click **Next** to begin the fix pack installation.

12. When the IBM WebSphere Application Server V5.0 Fix Pack 2 installation completes, click **Finish**.

6.4 WebSphere Application Server Enterprise V5.0 Fix Pack 2 installation

As mentioned in the previous section, as a prerequisite to IBM WebSphere Portal V5.0.2, we install IBM WebSphere Application Server Enterprise V5.0 Fix Pack 2. This section describes the installation steps required for the IBM WebSphere Application Server Enterprise V5.0 Fix Pack 2 installation.

IBM WebSphere Application Server Enterprise V5.0 Fix Pack 2 requires write access to the file system during the installation. For this reason, we need to copy the fix pack to the local file system of the target node. In addition, Fix Pack 2

includes a later version of WebSphere Update Installer (install wizard for fix packs and fixes). We use the WebSphere Update Installer included with Fix Pack 2 to install the WebSphere fixes.

6.4.1 Download IBM WebSphere Application Server Enterprise V5.0 Fix Pack 2

To download IBM WebSphere Application Server Enterprise V5.0 Fix Pack 2, complete the following steps:

1. Download the IBM WebSphere Application Server Enterprise V5.0 Fix Pack 2 from the following site:

   `http://www.ibm.com/support/docview.wss?rs=180&tc=SSEQTP&uid=swg24005055`

   Or, download it directly from:

   `ftp://ftp.software.ibm.com/software/websphere/appserv/support/fixpacks/was50/fixpack2_enterprise/Windows/was50_pme_fp2_win.zip`

2. Unpack the downloaded file to the temporary directory on your Portal node. For our environment, we used the c:\install\wase50fp2\UpdateInstaller directory.

6.4.2 Stop the servers

Prior to starting the fix pack installation, you need to make sure that WebSphere Application Servers and IBM HTTP Server are not running. To ensure that the servers are not running, complete the following steps:

1. Stop IBM HTTP Administration by clicking **Start** → **Programs** → **IBM HTTP Server 1.3.26** → **Stop Administration Server**.

1. Stop IBM HTTP Server by clicking **Start** → **Programs** → **IBM HTTP Server 1.3.26** → **Stop HTTP Server**.

2. Stop the WebSphere Portal server by clicking **Start** → **Programs** → **IBM WebSphere** → **Portal Server v5.0** → **Stop the Server**.

3. Stop the WebSphere Application Server server1 by clicking **Start** → **Programs** → **IBM WebSphere** → **Application Server v5.0** → **Stop the Server**.

4. Ensure that everything is stopped by checking that the following Windows NT services are stopped:
   – IBM HTTP Server 1.3.26
   – IBM HTTP Administration 1.3.26
   – IBM WebSphere Application Server V5 server1

6.4.3 Install WebSphere Application Server Enterprise V5.0 Fix Pack 2

To install IBM WebSphere Application Server Enterprise V5.0 Fix Pack 2, complete the following steps on the Portal node:

1. From a command prompt, set the environment variables by running the following command:

   ```
   c:\IBM\WebSphere\AppServer\bin\setupCmdLine
   ```

2. Navigate to the WebSphere Update Installer directory:

   ```
   cd \install\wase50fp2\UpdateInstaller
   ```

3. Run the WebSphere Update Installer application:

   ```
   updateWizard
   ```

4. When the WebSphere Update Installer language window opens, select the appropriate language for the wizard (for example, English) and then click **OK**.

5. When the Welcome window opens, click **Next**.

6. WebSphere Update Installer detects your current WebSphere Application Server version. Click **Next**.

   Notice that the base version is now V5.0.2, because the base fix pack has been installed (IBM WebSphere Application Server V5.0.2 plus Enterprise V5.0.1). The installation directory is c:\IBM\WebSphere\AppServer.

   > **Note:** If the base version is not detected, enter the path to the WebSphere Application Server installation directory.

7. Select **Install fix packs** and then click **Next**.

8. Enter the directory where you have copied the fix pack. For example, we entered the following in the Fix pack directory field and then clicked **Next**:

   ```
   c:\install\wase50fp2\UpdateInstaller\fixpacks
   ```

9. Select the **was50_pme_fp2_win** fix pack and then click **Next**.

10. Review the fix pack settings and then click **Next** to begin the fix pack installation.

11. When the IBM WebSphere Application Server Enterprise V5.0 Fix Pack 2 installation completes, click **Finish**.

6.5 IBM WebSphere Application Server V5.0.2 Fixes installation

This section describes how to install IBM WebSphere Application Server V5.0.2 Fixes on top of IBM WebSphere Application Server Enterprise V5.0 Fix Pack 2.

IBM WebSphere Portal V5.0 Fix Pack 2, which we install in the next section, requires the following fixes to be installed on WebSphere Application Server before proceeding with the WebSphere Portal fix pack installation:

► PQ76567_5.0.2.jar
► PQ78166eFix_fixes_install_db_resource.jar
► PQ81248_fix.jar
► WAS_CM_08-12-2003_5.0.2-5.0.1_cumulative_Fix.jar

The following additional fixes are required for proper operation of IBM WebSphere Portal V5.0.2:

► PQ75469.jar
► PQ77008.jar
► PQ77142.jar
► PQ78370_Fix.jar
► PQ78382_fix.jar
► PQ78882_Fix.jar
► PQ79083_5.0.2_Fix.jar
► PQ79193_fix.jar
► PQ81020_fix.jar
► WAS_Adapter_10-30-2003_5.0.2_cumulative_Fix.jar
► WAS_Sessions_08-12-2003_5.0.2_cumulative_Fix.jar
► WAS_Security_07-07-2003_5.0.2-5.0.1-5.0.0_JSSE_cumulative_Fix.jar
► WAS_Plugin_09-03-2003_5.0.X_cumulative_Fix_Win.jar

These fixes come in a bundle and can be downloaded all in one file.

6.5.1 Download WebSphere Application Server V5.0.2 Fixes

To download the IBM WebSphere Application Server V5.0.2 Fixes, complete the following steps:

1. Download the IBM WebSphere Application Server V5.0.2 Fixes from the following site:

   http://www.ibm.com/support/docview.wss?rs=688&context=SSHRKX&uid=swg2400634
   3&loc=en_US&cs=utf-8&lang=en

2. Unpack the downloaded file to the temporary directory on your Portal node. For our environment, we used the c:\install\was502fx\UpdateInstaller directory.

6.5.2 Stop the servers

Prior to starting the installation of the fixes, you need to make sure that WebSphere Application Servers and IBM HTTP Server are not running. To ensure that the servers are not running, complete the following steps:

1. Stop IBM HTTP Administration by clicking **Start** → **Programs** → **IBM HTTP Server 1.3.26** → **Stop Administration Server**.

1. Stop IBM HTTP Server by clicking **Start** → **Programs** → **IBM HTTP Server 1.3.26** → **Stop HTTP Server**.

2. Stop the Portal server by clicking **Start** → **Programs** → **IBM WebSphere** → **Portal Server v5.0** → **Stop the Server**.

3. Stop the WebSphere Application Server server1 by clicking **Start** → **Programs** → **IBM WebSphere** → **Application Server v5.0** → **Stop the Server**.

4. Ensure that everything is stopped by checking that the following Windows NT services are stopped:

   – IBM HTTP Server 1.3.26
   – IBM HTTP Administration 1.3.26
   – IBM WebSphere Application Server V5 server1

6.5.3 Install WebSphere Application Server V5.0.2 Fixes

To install IBM WebSphere Application Server V5.0.2 Fixes, complete the following steps on the Portal node:

1. From a command prompt, set the environment variables by running the following command:

   `c:\IBM\WebSphere\AppServer\bin\setupCmdLine`

2. Navigate to the WebSphere Update Installer directory:

   `cd \install\was502fx\UpdateInstaller`

3. Run the WebSphere Update Installer application:

   `updateWizard`

4. When the WebSphere Update Installer language window opens, select the appropriate language for the wizard (for example, English) and then click **OK**.

5. When the Welcome window opens, click **Next**.

6. WebSphere Update Installer detects your current WebSphere Application Server version. Click **Next**.

   Notice that the base version is now V5.0.2, because the base fix pack has been installed (IBM WebSphere Application Server V5.0.2 plus Enterprise V5.0.2). The installation directory is c:\IBM\WebSphere\AppServer.

   > **Note:** If the base version is not detected, enter the path to the WebSphere Application Server installation directory.

7. Select **Install fixes** and then click **Next**.

8. Enter the directory where you have copied the fixes. For example, we entered the following in the Fixes directory field and then clicked **Next**:

   `c:\install\was502fx\UpdateInstaller\efixes`

9. When the Fixes list opens, select all the fixes (defined in the previous list) and then click **Next**.

   > **Note:** Information describing each PQ fix is available during the fixes installation by selecting the fix and reviewing the Fix description text box.

10. Review the Fixes selected to install and then click **Next** to begin the fixes installation.

11. When the IBM WebSphere Application Server V5.0.2 Fixes installation completes, click **Finish**.

6.5.4 Verify WebSphere Application Server V5.0.2

Prior to continuing to the IBM WebSphere Portal V5.0 Fix Pack 2 installation, we recommend that you verify that IBM WebSphere Application Server V5.0.2 is working properly.

> **Note:** If any of the following steps fail for any reason, or in the case of installation problems, refer to the documentation provided with the fix packs and to the following publications:
>
> ► *IBM WebSphere Portal Extend for Multiplatforms V5.0.2 Information Center*, available at:
>
>   http://www.ibm.com/websphere/portal/library
>
> ► IBM Redbook *IBM WebSphere Portal for Multiplatforms V5 Handbook*, SG24-6098

To verify the functionality of the IBM WebSphere Application Server V5.0.2, complete the following steps:

1. Start IBM HTTP Server by clicking **Start** → **Programs** → **IBM HTTP Server 1.3.26** → **Start HTTP Server**.

2. Open the WebSphere Application Server First Steps application by clicking **Start** → **Programs** → **IBM WebSphere** → **First Steps**.

3. Start the WebSphere Application Server server1 by clicking **Start the Server** in the WebSphere Application Server - First Steps application.

4. Review the status of the server startup in the startServer.log. You should see the following message:

   ```
   Server server1 open for e-business
   ```

   Note: The server1 directory will not get created until the first time the application server is started.

5. From First Steps application, click **Verify Installation**.

6. The First Steps Output - Verify Installation Test window should open, and then some tests are performed. Check that the verification completes successfully.

7. After completing the Verify Installation, click **Exit** in the First Steps window.

8. Start the WebSphere administrative console by entering the following URL in a Web browser:

   ```
   http://ilm-ui.itsc.austin.ibm.com:9090/admin
   ```

9. Log in to the WebSphere administrative console. You do not need to provide a user name, because the WebSphere security is turned off.

   The WebSphere administrative console should open.

6.6 IBM WebSphere Portal V5.0 Fix Pack 2 installation

This section provides the installation steps required to install IBM WebSphere Portal V5.0 Fix Pack 2. In order to proceed, ensure that you have installed all prerequisites, which include:

► IBM WebSphere Application Server V5.0 Fix Pack 2
► IBM WebSphere Application Server Enterprise V5.0 Fix Pack 2
► IBM WebSphere Application Server V5.0.2 Fixes

6.6.1 Download and unpack WebSphere Portal V5.0 Fix Pack 2

To download and unpack IBM WebSphere Portal V5.0 Fix Pack 2, complete the following steps:

1. Search for and download IBM WebSphere Portal V5.0 Fix Pack 2 from the following site:

   http://www.ibm.com/support

2. Unpack the downloaded file to the temporary directory on your Portal node. For our environment, we used the c:\install\wps50fp2\UpdateInstaller directory.

6.6.2 Stop the servers

Prior to starting the fix pack installation, you need to make sure that WebSphere Application Servers are not running. To ensure that the servers are not running, complete the following steps:

1. From a command prompt, issue the following command to stop the WebSphere Portal server:

   c:\IBM\WebSphere\AppServer\bin\stopServer WebSphere_Portal

2. Issue the following command to stop the WebSphere Application Server server1:

   c:\IBM\WebSphere\AppServer\bin\stopServer server1

6.6.3 Install WebSphere Portal V5.0 Fix Pack 2

To install IBM WebSphere Portal V5.0 Fix Pack 2, complete the following steps on the Portal node:

1. From a command prompt, set the environment variables by running the following command:

   c:\IBM\WebSphere\AppServer\bin\setupCmdLine

2. Navigate to the Portal Update Installer directory:

   cd \install\wps50fp2\UpdateInstaller

3. Run the Portal Update Installer application:

   updatePortal -fixpack -installDir c:\IBM\Websphere\PortalServer -fixpackDir
   c:\install\wps50fp2\UpdateInstaller\fixpacks -install -fixpackID WP_PTF_502

> **Note:** If you configured IBM WebSphere Application Server V5.0.2 security prior to installing IBM WebSphere Portal V5.0 Fix Pack 2, you will need to ensure that the **WasUserid** and **WasPassword** fields are populated correctly in the c:\IBM\Websphere\PortalServer\config\wpconfig.properties file before running Portal Update Installer.

4. When the installation completes, you should see this message:

```
Fix pack installation completed successfully.
```

6.6.4 Update the WebSphere Portal configuration

After the IBM WebSphere Portal V5.0 Fix Pack 2 installation is complete, you need to update the WebSphere Portal configuration.

> **Note: Configuration failure due to WebSphere SOAP timeout**
>
> We found that, on slower systems, the WebSphere Portal configuration for the post-Fix Pack 2 operation received a configuration failure on task 36 of 50, due to a WebSphere Application Server SOAP connector timeout. The failure will show up as follows in
> c:\IBM\WebSphere\PortalServer\log\ConfigTrace.log:
>
> ```
> action-remove-ear-wmm:
>
>   ..
>   [wsadmin] WASX7017E: Exception received while running file
>   "C:\ibm\WebSphere\PortalServer/config/work/was/removeWmmEar.jacl";
>   exception information: com.ibm.bsf.BSFException: error while eval'ing
>   Jacl expression: com.ibm.ws.scripting.ScriptingException:
>   com.ibm.websphere.management.exception.ConfigServiceException
> ```
>
> To work around this issue, we did the following:
>
> 1. Increase the WebSphere Application Server SOAP connector timeout in c:\IBM\WebSphere\AppServer\properties\soap.client.props. We changed the value of the com.ibm.SOAP.requestTimeout=6000 (default 180).
>
> 2. Back out the configuration by running the WebSphere Portal uninstall. See "Note: Configuration failure and recovery" on page 110 for details about how to run uninstall.
>
> Rerun the WebSphere Portal configuration task.

To update the WebSphere Portal configuration, complete the following steps:

1. Restart the IBM HTTP Server by clicking **Start** → **Programs** → **IBM HTTP Server 1.3.26** → **Stop HTTP Server** and then clicking **Start** → **Programs** → **IBM HTTP Server 1.3.26** → **Start HTTP Server**.

2. From a command prompt, enter the following command to update the WebSphere Portal configuration:

   ```
   c:\IBM\WebSphere\PortalServer\config\WPSConfig.bat WP-PTF-502
   -DPortalAdminPwd=<password>
   ```

   Where `<password>` is the WebSphere Portal administrator password that has been set during the installation of IBM WebSphere Portal V5.0.

Note: Configuration failure and recovery

If the Update WebSphere Portal configuration task fails, do the following:

1. Correct the cause of the failure.

2. Uninstall the IBM WebSphere Application Server V5.0 Fix Pack 2 (uninstall might be better called unconfigure; this just unconfigures the failed configuration) as follows:

   ```
   WPSconfig.bat UNINSTALL-WP-PTF-5002
   ```

3. Rerun the WebSphere Portal configuration task:

   ```
   c:\IBM\WebSphere\PortalServer\config\WPSConfig.bat WP-PTF-502
   -DPortalAdminPwd=<password>
   ```

For details, refer to the *IBM WebSphere Portal V5.0 Fix Pack 2 readme* file (install_win_unix.html), available at:

   http://publib.boulder.ibm.com/pvc/wp/502/ent/en/readme/install_win_unix.html

---

6.6.5 WebSphere Portal Content Publisher V5.0

This section is not required for our example.

IBM WebSphere Portal Content Publisher V5.0 was installed as part of the IBM WebSphere Portal V5.0 installation. In our example, we do not use Content Publisher. Therefore, we did not install WebSphere Portal Content Publisher V5.0 Fix Pack 2. If you are using IBM WebSphere Portal Content Publisher V5.0, we recommend that you install Fix Pack 2.

6.6.6 Document Manager search index

This section is not required for our example.

If you installed and are using WebSphere Portal Content Publisher V5.0 and installed WebSphere Portal Content Publisher V5.0 Fix Pack 2, you also need to update the Document Manager search index.

When the fix pack is installed, the existing search index for Document Manager is deleted. Before you can use the search function with Document Manager after installing the fix pack, WebSphere Portal must update the search index through the usual automated process, where the search index is updated according to a specified interval. You can either wait until the next scheduled update occurs, or you can change the interval to the shortest possible time to cause the update to occur sooner.

6.6.7 Verify the WebSphere Portal V5.0.2

Now that you have installed and configured IBM WebSphere Portal V5.0 Fix Pack 2, we recommend that you verify that IBM WebSphere Portal V5.0.2 is working properly. For details, refer to "Verify WebSphere Portal V5.0" on page 96.

6.7 WebSphere Application Server V5.0.2 Cumulative Fix 2 installation

In this section, we describe how to install the prerequisites needed to install IBM WebSphere Portal V5.0.2 Cumulative Fix 1. These prerequisites need to be installed in the following order specified:

- ► IBM WebSphere Application Server V5.0.2 Cumulative Fix 2
- ► IBM WebSphere Application Server Enterprise V5.0.2 Cumulative Fix 2
- ► IBM WebSphere Application Server V5.0.2 Cumulative Fix 3
- ► IBM WebSphere Application Server V5.0.2.3 Fixes

IBM WebSphere Portal V5.0.2 Cumulative Fix 1 is installed after those listed above.

This section provides the installation steps required to install IBM WebSphere Application Server V5.0.2 Cumulative Fix 2.

6.7.1 Download and unpack WebSphere Application Server V5.0.2 Cumulative Fix 2

To download and unpack IBM WebSphere Application Server V5.0.2 Cumulative Fix 2, complete the following steps:

1. Download IBM WebSphere Application Server V5.0.2 Cumulative Fix 2 from the following site:

   http://www.ibm.com/support

   > **Note:** This particular fix might now be been superseded and no longer available, although you should be able to use the latest maintenance available.

2. Unpack the downloaded file to the temporary directory on your Portal node. For our environment, we used the c:\install\was502cf2\UpdateInstaller directory.

6.7.2 Stop the servers

Prior to starting the fix pack installation, you need to make sure that the WebSphere Application Servers are not running. To ensure that the servers are not running, complete the following steps:

1. From a command prompt, issue the following command to stop the WebSphere Portal server:

   c:\IBM\WebSphere\AppServer\bin\stopServer WebSphere_Portal

2. Issue the following command to stop the WebSphere Application Server server1:

   c:\IBM\WebSphere\AppServer\bin\stopServer server1

6.7.3 Install WebSphere Application Server V5.0.2 Cumulative Fix 2

To install IBM WebSphere Application Server V5.0.2 Cumulative Fix 2, complete the following steps:

1. From a command prompt, set the environment variables by running the following command:

   c:\IBM\WebSphere\AppServer\bin\setupCmdLine

2. Navigate to the WebSphere Update Installer directory:

   cd \install\was502cf2\UpdateInstaller

3. Run the WebSphere Update Installer application:

   ```
   updateWizard
   ```

4. When the WebSphere Update Installer language window opens, select the appropriate language for the wizard (for example, English) and then click **OK**.

5. When the Welcome window opens, click **Next**.

6. WebSphere Update Installer detects your current WebSphere Application Server version. Click **Next**.

   Notice that the base version is now V5.0.2 and the installation directory is c:\IBM\WebSphere\AppServer.

   > **Note:** If the base version is not detected, enter the path to the WebSphere Application Server installation directory.

7. Select **Install fix packs** and then click **Next**.

8. Enter the directory where you have copied the fix pack. For example, we entered `c:\install\was502cf2\UpdateInstaller\fixpacks` in the Fix pack directory text field. Click **Next**.

9. Select the **was502_cf2_win** fix pack and then click **Next**.

10. On the Installation Summary window, review the earlier fixes to be uninstalled (later versions in cumulative fix) and then click **Next** to begin the fix pack installation of files.

11. When the IBM WebSphere Application Server V5.0.2 Cumulative Fix 2 installation completes, click **Finish**.

6.8 IBM WebSphere Application Server Enterprise V5.0.2 Cumulative Fix 2 installation

We continue installing the prerequisites needed to install IBM WebSphere Portal V5.0.2 Cumulative Fix 1. We already installed the IBM WebSphere Application Server V5.0.2 Cumulative Fix 2 fix pack

We still need to install these prerequisites:

► IBM WebSphere Application Server Enterprise V5.0.2 Cumulative Fix 2
► IBM WebSphere Application Server V5.0.2 Cumulative Fix 3
► IBM WebSphere Application Server V5.0.2.3 Fixes

This section provides the installation steps required to install IBM WebSphere Application Server Enterprise V5.0.2 Cumulative Fix 2.

6.8.1 Download and unpack WebSphere Application Server Enterprise V5.0.2 Cumulative Fix 2

To download and unpack IBM WebSphere Application Server Enterprise V5.0.2 Cumulative Fix 2, complete the following steps:

1. Download IBM WebSphere Application Server Enterprise V5.0.2 Cumulative Fix 2 from the following site:

   http://www.ibm.com/support/docview.wss?rs=823&context=SS4QY3&uid=swg24005954

2. Unpack the downloaded file to the temporary directory on your Portal node. For our environment, we used the c:\install\wase502cf2\UpdateInstaller directory.

6.8.2 Stop the servers

Prior to starting the fix pack installation, you need to make sure that the WebSphere Application Servers are not running. To ensure that the servers are not running, complete the following steps:

1. From a command prompt, issue the following command to stop the WebSphere Portal server:

   `c:\IBM\WebSphere\AppServer\bin\stopServer WebSphere_Portal`

2. Issue the following command to stop the WebSphere Application Server server1:

   `c:\IBM\WebSphere\AppServer\bin\stopServer server1`

6.8.3 Install WebSphere Application Server Enterprise V5.0.2 Cumulative Fix 2

To install IBM WebSphere Application Server Enterprise V5.0.2 Cumulative Fix 2, complete the following steps:

1. From a command prompt, set the environment variables by running the following command:

   `c:\IBM\WebSphere\AppServer\bin\setupCmdLine`

2. Navigate to the WebSphere Update Installer directory:

   `cd \install\wase502cf2\UpdateInstaller`

3. Run the WebSphere Update Installer application:

   `updateWizard`

4. When the WebSphere Update Installer language window opens, select the appropriate language for the wizard (for example, English) and then click **OK**.

5. When the Welcome window opens, click **Next**.

6. WebSphere Update Installer detects your current WebSphere Application Server version. Click **Next**.

   Notice that the base version is now V5.0.2.2, the enterprise version is 5.0.2, and the installation directory is c:\IBM\WebSphere\AppServer.

   > **Note:** If the base version is not detected, enter the path to the WebSphere Application Server installation directory.

7. Select **Install fix packs** and then click **Next**.

8. Enter the directory where you have copied the fix pack. For example, we entered `c:\install\wase502cf2\UpdateInstaller\fixpacks` in the Fix pack directory text field. Click **Next**.

9. Select the **was502_pme_cf2_win** fix pack and then click **Next**.

10. Review the fix pack installation information and then click **Next** to begin the fix pack installation of files.

11. When the IBM WebSphere Application Server Enterprise V5.0.2 Cumulative Fix 2 installation completes, click **Finish**.

6.9 WebSphere Application Server V5.0.2 Cumulative Fix 3 installation

We continue installing the prerequisites needed to install IBM WebSphere Portal V5.0.2 Cumulative Fix 1. We already installed following fix packs:

► IBM WebSphere Application Server V5.0.2 Cumulative Fix 2
► IBM WebSphere Application Server Enterprise V5.0.2 Cumulative Fix 2

We still need to install these prerequisites:

► IBM WebSphere Application Server V5.0.2 Cumulative Fix 3
► IBM WebSphere Application Server V5.0.2.3 Fixes

This section provides the installation steps required to install IBM WebSphere Application Server V5.0.2 Cumulative Fix 3.

6.9.1 Download and unpack WebSphere Application Server V5.0.2 Cumulative Fix 3

To download and unpack IBM WebSphere Application Server V5.0.2 Cumulative Fix 3, complete the following steps:

1. Download IBM WebSphere Application Server V5.0.2 Cumulative Fix 3 from the following site:

   http://www.ibm.com/support

   > **Note:** This particular fix might now have been superseded and no longer available, although you should be able to use the latest maintenance available.

2. Unpack the downloaded file to the temporary directory on your Portal node. For our sample, we used the c:\install\was502cf3\UpdateInstaller directory.

6.9.2 Stop the servers

Prior to starting the fix pack installation, you need to make sure that the WebSphere Application Servers are not running. To ensure that the servers are not running, complete the following steps:

1. From a command prompt, issue the following command to stop the WebSphere Portal server:

   c:\IBM\WebSphere\AppServer\bin\stopServer WebSphere_Portal

2. Issue the following command to stop the WebSphere Application Server server1:

   c:\IBM\WebSphere\AppServer\bin\stopServer server1

6.9.3 Install WebSphere Application Server V5.0.2 Cumulative Fix 3

'To install the IBM WebSphere Application Server V5.0.2 Cumulative Fix 3, complete the following steps:

1. From a command prompt, set the environment variables by running the following command:

   c:\IBM\WebSphere\AppServer\bin\setupCmdLine

2. Navigate to the WebSphere Update Installer directory:

   cd \install\was502cf3\UpdateInstaller

3. Run the WebSphere Update Installer application:

   updateWizard

4. When the WebSphere Update Installer language window opens, select the appropriate language for the wizard (for example, English) and then click **OK**.

5. When the Welcome window opens, click **Next**.

6. WebSphere Update Installer detects your current WebSphere Application Server version. Click **Next**.

   Notice that the base version is now V5.0.2.2 and the installation directory is c:\IBM\WebSphere\AppServer.

   > **Note:** If the base version is not detected, enter the path to the WebSphere Application Server installation directory.

7. Select **Install fix packs** and then click **Next**.

8. Enter the directory where you have copied the fix pack. For example, we entered `c:\install\was502cf3\UpdateInstaller\fixpacks` in the Fix pack directory text field. Click **Next**.

9. Select the **was502_cf3_win** fix pack and then click **Next**.

10. Review the fix pack installation information and then click **Next** to begin the fix pack installation of files.

11. When the IBM WebSphere Application Server V5.0.2 Cumulative Fix 3 installation completes, click **Finish**.

6.10 IBM WebSphere Application Server V5.0.2.3 Fixes installation

We continue installing the prerequisites needed to install IBM WebSphere Portal V5.0.2 Cumulative Fix 1. We already installed following fix packs:

- ► IBM WebSphere Application Server V5.0.2 Cumulative Fix 2
- ► IBM WebSphere Application Server Enterprise V5.0.2 Cumulative Fix 2
- ► IBM WebSphere Application Server V5.0.2 Cumulative Fix 3

We still need to install the last one: IBM WebSphere Application Server V5.0.2.3 Fixes.

This section provides the installation steps required to install IBM WebSphere Application Server V5.0.2.3 Fixes.

6.10.1 Download and unpack Application Server V5.0.2.3 Fixes

The following fixes are required to install IBM WebSphere Portal V5.0.2 Cumulative Fix 1:

► WAS_Dynacache_01-30-2004_5.0.2_cumulative
► PQ78370
► PQ81248
► PQ81416
► WAS_Security_12-12-2003_5.0.2.3-5.0.2.2-5.0.2.1-5.0.2-5.0.1-5.0.0_JSSE_cumulative_Fix
► WAS_CM_08-12-2003_5.0.2-5.0.1_cumulative_Fix
► WAS_Adapter_10-30-2003_5.0.2_cumulative_Fix
► WAS_Plugin_02-03-2004_5.0.X_cumulative

Normally, you would need to download the fixes individually from the WebSphere Application Server Support Web site. However, there is a file located on the WebSphere Portal Support Web site that includes all of these fixes and specifically targets IBM WebSphere Application Server 5.0.2.3 for Windows.

Therefore, you can download the fixes individually, or you can download all of the fixes bundled in one file. In order to download the bundle, you need to perform the following steps:

1. Go to the "Required WebSphere Application Server Fixes for Portal 5.0.2.1" site at:

   http://www.ibm.com/support/docview.wss?rs=688&context=SSHRKX&uid=swg24007985&loc=en_US&cs=utf-8&lang=en

2. Under Download package, click the **HTTPS** link.

3. Next, review the term and conditions, and if in agreement, click **I agree**.

4. The next step, which is required, is to log in to the WebSphere Portal Support Web site. If you have not registered before, you have to do so first (registration is free).

5. The next window presents a link to the license agreement to which you have to agree to proceed.

6. On the next window, click the **WAS 5.0.2.3 Fixes for Portal ToolKit 5.0.2.1** link.

7. To download the fixes, click the **Download now** link in the WAS 5.0.2.3 Fixes for Portal ToolKit 5.0.2.1for Microsoft Windows section.

8. Unpack the downloaded file WAS5023CumulativeWindows.zip to the temporary directory on your Portal node. For our example, we used the c:\install\was5023fx\UpdateInstaller directory.

6.10.2 Stop the servers

Prior to starting the fixes installation, you need to make sure that the WebSphere Application Servers are not running. To ensure that the servers are not running, complete the following steps:

1. From a command prompt, issue the following command to stop the WebSphere Portal server:

   ```
   c:\IBM\WebSphere\AppServer\bin\stopServer WebSphere_Portal
   ```

2. Issue the following command to stop the WebSphere Application Server server1:

   ```
   c:\IBM\WebSphere\AppServer\bin\stopServer server1
   ```

6.10.3 Install WebSphere Application Server V5.0.2.3 Fixes

'To install IBM WebSphere Application Server V5.0.2.3 Fixes, complete the following steps:

1. From a command prompt, set the environment variables by running the following command:

   ```
   c:\IBM\WebSphere\AppServer\bin\setupCmdLine
   ```

2. Navigate to the WebSphere Update Installer directory:

   ```
   cd \install\was5023fx\UpdateInstaller
   ```

3. Run the WebSphere Update Installer application:

   ```
   updateWizard
   ```

4. When the WebSphere Update Installer language window opens, select the appropriate language for the wizard (for example, English) and then click **OK**.

5. When the Welcome window opens, click **Next**.

6. WebSphere Update Installer detects your current WebSphere Application Server version. Click **Next**.

   Notice that the base version is now V5.0.2.3 and the enterprise version is V5.0.2.2. The installation directory is c:\IBM\WebSphere\AppServer.

   > **Note:** If the base version is not detected, enter the path to the WebSphere Application Server installation directory.

7. Select **Install fixes** and then click **Next**.

8. Enter the directory where you have copied the fixes. For example, we entered `c:\install\was502cf3\UpdateInstaller\efixes` in the Fix pack directory text field. Click **Next**.

9. When the window opens with a list of fixes, *only* select the following eight fixes and then click **Next**:

– WAS_Dynacache_01-30-2004_5.0.2_cumulative
– PQ78370
– PQ81248
– PQ81416
– WAS_Security_12-12-2003_5.0.2.3-5.0.2.2-5.0.2.1-5.0.2-5.0.1-5.0.0_JSSE_cumulative_Fix
– WAS_CM_08-12-2003_5.0.2-5.0.1_cumulative_Fix
– WAS_Adapter_10-30-2003_5.0.2_cumulative_Fix
– WAS_Plugin_02-03-2004_5.0.X_cumulative

> **Note:** If one of the following three fixes is selected, you will receive an error stating that the fix or fixes are not supported on your installed products:
>
> ► PQ75469
> ► PQ77008
> ► PQ78166
>
> In addition, we did not select PQ76567 or PQ79083, because the *readme* states that they are included in WAS_Dynacache_01-30-2004_5.0.2_cumulative.
>
> Finally, there are seven remaining fixes that we did not select for two reasons:
>
> ► They are not required per the IBM WebSphere Portal V5.0.2 Cumulative Fix 1 *readme* file.
>
> ► We tested the selection of all fixes and eventually had issues running the WPSconfig.bat WP-PTF-5021 configuration task after installing IBM WebSphere Portal V5.0.2 Cumulative Fix 1.

10. On the Installation Summary window, review the fixes to be installed or refreshed and then click **Next** to begin the fix pack installation of files.

11. When the IBM WebSphere Application Server V5.0.2.3 Fixes installation completes, click **Finish**.

6.10.4 Verify WebSphere Application Server V5.0.2.3

Prior to continuing to the IBM WebSphere Portal V5.0.2 Cumulative Fix 1 installation, we recommend that you verify that the IBM WebSphere Application Server V5.0.2.3 is working properly.

For details about how to verify WebSphere Application Server, refer to "Verify WebSphere Application Server V5.0.2" on page 106.

Note: IBM WebSphere Portal V5.0.2 will not work with the level of WebSphere Application Server at this stage. WebSphere Portal will work after applying IBM WebSphere Portal V5.0.2 Cumulative Fix 1 in the next section.

6.11 IBM WebSphere Portal V5.0.2 Cumulative Fix 1 installation

This section describes how to install IBM WebSphere Portal V5.0.2 Cumulative Fix 1. This cumulative fix has several prerequisites that need to be installed. We provide the instructions for installing these prerequisites in the preceding sections.

Note: More information regarding the contents of WebSphere Portal V5.0.2 Cumulative Fix 1 is available at:

```
http://www.ibm.com/support/docview.wss?rs=688&context=SSHRKX&q1=cumulativ
e+fix&uid=swg24006865&loc=en_US&cs=utf-8&lang=en+en
```

6.11.1 Download and unpack Portal V5.0.2 Cumulative Fix 1

IBM WebSphere Portal V5.0.2 Cumulative Fix 1 needs an appropriate Portal Update Installer application to install itself. Because this application is not bundled with the cumulative fix in one file, you need to download it separately. To download and unpack IBM WebSphere Portal V5.0.2 Cumulative Fix 1, complete the following steps:

1. Go to the "WebSphere Portal 5.0.2 Cumulative Fix 1" site located at:

   ```
   http://www.ibm.com/support/docview.wss?rs=688&context=SSHRKX&q1=WebSphere+P
   ortal+5.0.2+Cumulative+Fix+1&uid=swg24006865&loc=en_US&cs=utf-8&lang=en
   ```

2. Under Download package, click the link for **WPS 5.0.2 Cumulative Fix 1**.

3. Next, review the term and conditions, and if in agreement, click **I agree**.

4. The next step, which is required, is to log in to the WebSphere Portal Support Web site. If you have not registered before, you have to do so first (registration is free).

5. The next window presents a link to the license agreement to which you have to agree to proceed.

6. On the next window, click the **Utilities** link.

7. To download the Portal Update Installer, click the **Download now** link in the WebSphere Portal for MultiPlatforms Update Installer section.

8. Click **Back** in your browser, or scroll all the way to the top of the page.

9. Click the **Portal 5.0.2 Cumulative Fix 1** link.

10. To download the fixes, click the **Download now** link in the **Portal 5.0.2 Cumulative Fix 1** section.

11. Unpack the downloaded file PortalUpdateInstaller.zip file to the temporary directory on your Portal node. For our environment, we used the c:\install\wps502cf1\UpdateInstaller directory.

12. Copy the downloaded file WP_PTF_5021.jar file to the Portal Update Installer application directory on your Portal node. In our case, it would be the c:\install\wps502cf1\UpdateInstaller\fixpack directory.

6.11.2 Stop the servers

Prior to starting the fix pack installation, you need to make sure that WebSphere Application Servers and IBM HTTP Server are not running. To ensure that the server are not running, complete the following steps:

1. From a command prompt, issue the following command to stop the WebSphere Portal server:

   ```
   c:\IBM\WebSphere\AppServer\bin\stopServer WebSphere_Portal
   ```

2. Issue the following command to stop the WebSphere Application Server server1:

   ```
   c:\IBM\WebSphere\AppServer\bin\stopServer server1
   ```

3. Stop the IBM HTTP Server by clicking **Start** → **Programs** → **IBM HTTP Server 1.3.26** → **Stop HTTP Server**.

6.11.3 Prepare WebSphere Portal V5.0.2 for installation

To prepare IBM WebSphere Portal V5.0.2, complete the following steps:

1. Edit the httpd.conf file for IBM HTTP Server (c:\IBM\IBMHttpServer\conf\httpd.conf), as shown in Example 6-1.

Example 6-1   Example httpd.conf for IBM HTTP Server

```
##Uncommment the following line
Listen 80

##Comment out the following four lines
#Port 80
#AfpaEnable
#AfpaCache on
#AfpaLogFile "C:\ibm\IBMHttpServer/logs/afpalog" V-EDLF
```

2. Change the timeout for the SOAP client for WebSphere Application Server (if you have not done so previously):

    a. Open the c:\IBM\WebSphere\AppServer\properties\soap.client.props file.

    b. Modify the request timeout as follows (default is 180 seconds):

    ```
    com.ibm.SOAP.requestTimeout=6000
    ```

    c. Save and close the file.

> **Note:** In our example, we have not yet created the WebSphere Portal databases for DB2. Therefore, the following steps are not required.
>
> However, for an environment where the WebSphere Portal databases have already been created in DB2, you can reduce deadlocks with the WebSphere Portal databases by doing the following:
>
> ► DB2 Version 8.1 FP4 or later users only: Use the DB2 command window to enter the following commands on the DB2 server with DB2 instance owner privileges:
>
> ```
> db2set DB2_EVALUNCOMMITTED=YES
> db2set DB2_INLIST_TO_NLJN=YES
> db2 update db cfg for <portal_db using locklist 1024>
> ```
>
> 3. All database users: Connect to the WebSphere Portal database and enter the following commands on the database server:
>
> ```
> CREATE INDEX <portal_db_admin_user>.IX2110D ON
> <portal_db_admin_user>.PROT_RES (PARENT_OID, OID)
> CREATE INDEX <portal_db_admin_user>.IX2140B ON
> <portal_db_admin_user>.LNK_USER_ROLE (ROLE_INST_OID)
> ```

6.11.4 Install WebSphere Portal V5.0.2 Cumulative Fix 1

To install IBM WebSphere Portal V5.0.2 Cumulative Fix 1, complete the following steps:

1. From a command prompt, set the environment variables by running the following command:

    ```
    c:\IBM\WebSphere\AppServer\bin\setupCmdLine
    ```

2. Navigate to the Portal Update Installer directory:

    ```
    cd \install\wps502cf1\UpdateInstaller
    ```

3. Run the Portal Update Installer application:

    ```
    updatePortal -fixpack -installDir c:\IBM\Websphere\PortalServer -fixpackDir
    c:\install\wps502cf1\UpdateInstaller\fixpacks -install -fixpackID
    WP_PTF_5021
    ```

> **Note:** If you configured IBM WebSphere Application Server V5.0.2 security prior to installing IBM WebSphere Portal V5.0.2 Cumulative Fix 1, you need to ensure that the **WasUserid** and **WasPassword** fields are populated correctly in the c:\IBM\WebSphere\PortalServer\config\wpconfig.properties file before running the Portal Update Installer.

4. When the fix pack is complete, you should see this message:

   ```
   Fix pack installation completed successfully
   ```

   If you receive any errors, you can review the log information in the c:\IBM\WebSphere\PortalServer\log directory.

5. Restart IBM HTTP Server. Note that this step is optional if you have not configured WebSphere Portal to use the external IBM HTTP Server. If following the procedure in this chapter, this step is not required.

6. In a command prompt window, run the following command to update the WebSphere Portal configuration:

   ```
   c:\IBM\WebSphere\PortalServer\config\WPSConfig.bat WP-PTF-5021
   -DPortalAdminPwd=<password>
   ```

   Where *<password>* is the WebSphere Portal administrator password. If following the procedure in this chapter, this password equals to the password we entered during the installation of IBM WebSphere Portal V5.0 in "Install WebSphere Portal V5.0" on page 93, step 8 on page 93.

> **Note: Configuration failure/recovery**
>
> If the Update WebSphere Portal configuration task fails, do the following:
>
> 1. Correct the cause of the failure.
>
> 2. Uninstall IBM WebSphere Portal V5.0.2 Cumulative Fix 1 (uninstall might be better called unconfigure; this just unconfigures the failed configuration) as follows:
>
>    ```
>    c:\IBM\WebSphere\PortalServer\config\WPSconfig.bat
>    UNINSTALL-WP-PTF-5021
>    ```
>
> 3. Rerun the WebSphere Portal configuration task:
>
>    ```
>    c:\IBM\WebSphere\PortalServer\config\WPSConfig.bat WP-PTF-5021
>    -DPortalAdminPwd=<password>
>    ```
>
> For details, refer to the *IBM WebSphere Portal V5.0.2 Cumulative Fix 1 readme* file (install_win_unix.html), available at:
>
> http://publib.boulder.ibm.com/pvc/wp/5021/ent/en/readme/install.html

4. Restart WebSphere Application Server server1 by issuing the following commands:

```
cd c:\IBM\WebSphere\AppServer\bin
stopServer server1
startServer server1
```

5. Restart WebSphere Portal by issuing the following commands:

```
stopServer WebSphere_Portal
startServer WebSphere_Portal
```

6.11.5 Verify WebSphere Portal V5.0.2

Now that you have installed and configured IBM WebSphere Portal V5.0.2 Cumulative Fix 1, we recommend that you verify that the IBM WebSphere Portal V5.0.2.1 is working properly. For details, refer to "Verify WebSphere Portal V5.0" on page 96.

6.12 IBM Tivoli Directory Server Version 5.2 installation

Tivoli Directory Server Version 5.2 is used by all application platforms as a user repository to facilitate single sign-on and user management. We chose to install this server on our Portal node as described in the following sections.

6.12.1 Create an administrator user and assign user rights

To assign user rights to the administrator ID used by the DB2 owner during instance creation, complete the following steps:

1. Log on to Windows as an administrator.

2. Create a user ID and add the user to the Administrators group (for example, we created a user called TDSadmin). Alternatively, use an existing administrator user.

3. Click **Start** → **Settings** → **Control Panel** → **Administrative Tools** → **Local Security Policy**.

4. From the Local Security Settings window, select and expand **Local Policies** → **User Rights Assignment**.

5. Ensure that the administrator user ID (for example, TDSadmin) has user right assignments for the following Windows local security policies needed for DB2:

   – Act as part of the operating system
   – Create a token object
   – Increase quotas
   – Log on as a service

> – Replace a process-level token

6. Log on with your user ID (TDSadmin in our case).

7. Verify the network configuration.

Prior to installing WebSphere Commerce and the supporting software components, it is important that you verify that your network is configured properly. We recommend that you use a static TCP/IP address and verify that the host name can be resolved with the name server.

For example, we did the following from a command prompt window:

```
ping <hostname>
ping <ip_address>
or
nslookup <hostname>
nslookup <ip_address>
```

Ensure that the fully qualified host name is returned if resolved by a domain name system. Alternatively, you might be using a hosts file for a stand-alone development environment (use `ping` instead of `nslookup`).

6.12.2 Install IBM GSKit

This section describes how to download and install IBM GSKit V7.0.1.16. GSKit is used to manage key stores and certificates. GSKit includes the IBM Key Management Utility and libraries accessible to applications to create and manage certificates.

GSKit V7.0.1.9 installed with IBM Tivoli Directory Server V5.2 on the Directory Server node includes root certificates that have expired. This results in the administrator not being able to create a new key store using the iKeyman utility. By installing the later version, IBM GSKit V7.0.1.16, this issue is addressed along with other fixes.

Determine GSKit version installed

This section describes how to determine the version of GSKit an application is configured to use in the Windows registry. If you are following the installation order documented in this chapter, this section is not necessary, because we install the new GSKit prior to installing components that use it.

> **Note:** The GSKit version can be obtained by using the `gsk7ver.exe` command or by retrieving the version from the Windows registry. We chose to use the Windows registry method because we also needed the REGAPPS value in addition to the version.

If you have not installed IBM Tivoli Directory Server or other software containing IBM GSKit, you can skip this section. To determine the level of the GSKit installed, complete the following steps:

1. Start the Windows registry editor (regedit.exe) by clicking **Start** → **Run** and entering `regedit` in the Open field. Click **OK**.

2. Select and expand **HKEY_LOCAL_MACHINE** → **SOFTWARE** → **IBM**.

3. In our example, you will see both the GSK5 and GSK7 registry entries.

4. Select **GSK7** → **CurrentVersion**. Record the data value for the version name.

5. Select **REGAPPS** under the CurrentVersion. This will list the name of the application using GSKit. Record the name of the application using this version of GSKit (for example, LDAP).

Uninstall the earlier GSKit version

If you are strictly following the installation of the Portal node as defined so far, this section is not required.

Prior to installing the new IBM GSKit V7.0.1.16, if a GSKit already has been installed, you must manually uninstall the existing IBM GSKit V7.0.1.9 as follows:

1. Ensure that the IBM Tivoli Directory Server V5.2 Windows service has been stopped, as well as other services that might be using GSKit.

2. Open a command prompt window and navigate to the c:\winnt directory.

3. Run the following command to uninstall GSKit:

   `gsk7bui LDAP`

   Where *LDAP* is the name of the application using the GSKit.

4. Verify that the GSK7 Windows registry has been removed.

5. Verify that the GSK7 directory has been removed (for example, C:\Program Files\IBM\GSK7).

> **Note:** If files still exist such as DLLs, manually delete the C:\Program Files\IBM\GSK7 directory after the services that locked the files have been stopped.

> **Note:** If you previously installed applications that use the earlier GSKit V7.0.1.9, the applications might have updated the system path to include the GSKit installation path. If you decide to change the default GSKit installation path, you might need to manually update the system path to include the correct GSKit installation path.

Install GSKit V7.0.1.16

To download and install IBM GSKit Version 7.0.1.16, complete the following steps:

1. IBM GSKit V7.0.1.16 can be obtained by one of the following methods:

   – Request GSKit V7.0.1.16 from IBM Support at:

   `http://techsupport.services.ibm.com/guides/tivoli_contacts.html`

   Or:

   – Download IBM HTTP Server V1.3.28, which includes IBM GSKit V7.0.1.16 at:

   `http://www.ibm.com/support/docview.wss?rs=177&context=SSEQTJ&uid=swg24006718`

   > **Note:** From the URL listed, you will have to log in as a registered user (or register first). After you navigate to the download page by platforms, you will see a list of fixes.
   >
   > We downloaded WINDOWSPQ86671IHS1.3.28.zip (PQ86671) for IBM HTTP Server V1.3.28 to the c:\temp directory and unpacked the ZIP file.

2. Open a command prompt window and navigate to the directory in which you unpacked the WINDOWSPQ86671IHS1.3.28.zip file.

3. Enter the following at the command line to extract the GSKit:

   `gsk7bas c:\temp`

   Where `c:\temp` is the directory into which to extract the GSKit installation files.

4. From the command window, navigate to the directory where you extracted the GSKit installation files (for example, c:\temp).

5. Run the GSKit installer as follows:

   `setup <application_name>`

   Where `<application_name>` is the name of the application using GSKit V7.0.1.16 (for example, LDAP).

   For example:

   `setup LDAP`

6. When the Welcome window opens, click **Next**.

7. When the Choose Destination Location window opens, we entered `c:\ibm\gsk7` for the destination folder using the Browse button. Click **Next** to proceed.

8. When the setup is complete, click **Finish**.

6.12.3 Install IBM Tivoli Directory Server

This section describes how to install IBM Tivoli Directory Server V5.2 on the Directory Server node. WebSphere Portal V5.0.2 includes IBM Tivoli Directory Server V5.1. We chose to use IBM Tivoli Directory Server V5.2 to verify the configuration with the newer version.

IBM Tivoli Directory Server V5.2 includes WebSphere Application Server Express and the Web Administration Tool used to manage Tivoli Directory Server. We chose to install the Web Administration Tool on WebSphere Application Server (not Express).

The high-level steps to install and configure IBM Tivoli Directory Server are as follows:

► Create DB2 database owner
► Install Tivoli Directory Server

Create DB2 database owner

In our example, we granted the TDSadmin user the proper rights assignments for a DB2 user (see 9.1.3, "Create system users and assign user rights" on page 190). No other action is needed.

Install Tivoli Directory Server

To install IBM Tivoli Directory Server V5.2 on the Policy Server node, do the following:

1. Insert the *IBM Tivoli Directory Server V5.2* CD.

2. Navigate to the <CD_Root>\ismp folder, and run `Setup.exe` to start the install.

3. Select the installer language (for example, English); this is separate from the IBM Tivoli Directory Server language. Click **OK**.

4. When the Welcome window opens, click **Next**.

5. When the License Agreement window opens, review the terms, and if in agreement, select **I accept the terms in the license agreement** and then click **Next**.

6. A window displays existing components. In our example, we preinstalled IBM GSKit and IBM DB2 UDB. Click **Next**.

7. We installed IBM Tivoli Directory Server in the c:\ibm\ldap directory.

8. Select the IBM Tivoli Directory Server language (for example, English) and click **Next**.

9. When the Select features to install window opens, we selected the following options, as shown in Figure 6-3, and then click **Next**.

   – Select **Client SDK 5.2**.
   – Select **Web Administration Tool 5.2**.
   – Select **Server 5.2**.
   – Clear IBM WebSphere Application Server - Express 5.0.2.
     We use WebSphere Application Server instead of Express.
   – Clear DB2 V8.1.
     A later level of DB2 UDB has already been installed.
   – Clear GSKit.
     A later level of the GSKit has already been installed.
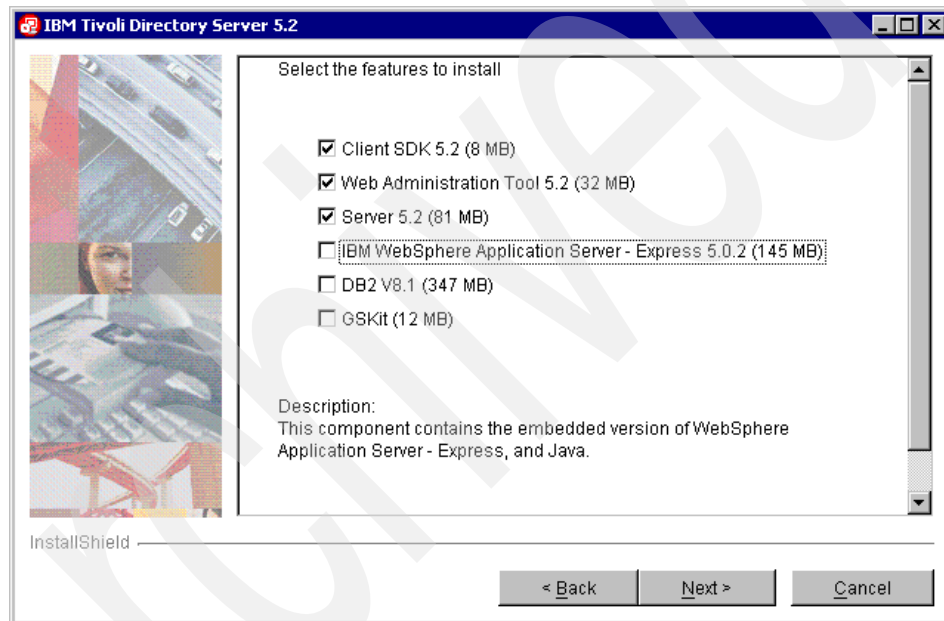
Figure 6-3   IBM Tivoli Directory Server: Select features

10. When the Installation Summary window opens, review the selections and click **Next** to begin installing the files.

11. When the installation completes, review the *readme* files for the client and server and click **Next**.

12. When prompted, select **Yes, restart my computer** and click **Next**. Click **Finish**.

6.13 Summary

We have now completed the installation of the Portal node. Additional configuration is necessary. We describe the additional configuration in Chapter 10, "Configuration" on page 227.

7

Business Integration node installation

This chapter describes the procedure we used to install and configure the Business Integration node for our example runtime environment.

> **Note:** When installing and configuring the Business Integration node, we referenced the following information sources:
>
> ► *IBM WebSphere Business Integration Server Foundation, Version 5.1: Getting started*, IBM Information Center Library, available at:
>
>   `ftp://ftp.software.ibm.com/software/webserver/appserv/library/wasv51ee_gs.pdf`
>
> ► *IBM WebSphere Business Integration Server Foundation, Version 5.1: Process Choreographer*, IBM Information Center Library, available at:
>
>   `ftp://ftp.software.ibm.com/software/webserver/appserv/library/ee_v512ptf_twork.pdf`

The high-level tasks to install the Business Integration node are as follows:

1. WebSphere Business Integration Server Foundation V5.1 installation
2. IBM WebSphere Application Server V5.1 Fix Pack 1 installation

3. IBM WebSphere Business Integration Server Foundation V5.1 Fix Pack 1 installation

In our environment, this node was running Microsoft Windows 2000 Server. The administrator ID for this machine must have the following rights:

► Act as part of the operating system
► Create a token object
► Increase quotas
► Log on as a service
► Replace a process-level token

7.1 WebSphere Business Integration Server Foundation V5.1 installation

This section describes how to install IBM WebSphere Business Integration Server Foundation V5.1 on the Process Choreographer node. We install following components with this installation:

► IBM WebSphere Application Server Version 5.1.0.2
► IBM Integration Server Version 5.1.0
► IBM WebSphere embedded messaging

7.1.1 Install WebSphere Business Integration Server Foundation V5.1

To install IBM WebSphere Business Integration Server Foundation V5.1, complete the following steps:

1. Start the installation by inserting *IBM WebSphere Business Integration Server Foundation V5.1 Installation Disk 1*. If auto start is enabled, the installation wizard will start automatically. If auto start is disabled, run `install.bat` from the win directory on the CD by entering the `D:\win\install.bat` command, where the D: drive is your CD-ROM drive. Start the installation from a read/write location and not from the CD-ROM.

2. When the Welcome window opens, you are provided with an option to launch the *Information Center* (optional). Click **Next** to continue the installation.

3. When the License Agreement window opens, review the terms, and if in agreement, select **I accept the terms in the license agreement** and then click **Next**.

4. The next window provides the installation options: Full (all components) or Custom. In our example, select **Custom** and click **Next** to continue.

5. Because we chose the custom installation, we have to choose the components to install in the next window. See Figure 7-1 on page 136. Make sure that you have selected the following components:

   – Embedded messaging
   – Embedded messaging: Server and Client
   – Additional Integration Server Extensions
   – Scheduler and Asynchronous Beans
   – process choreographer

   Click **Next**.
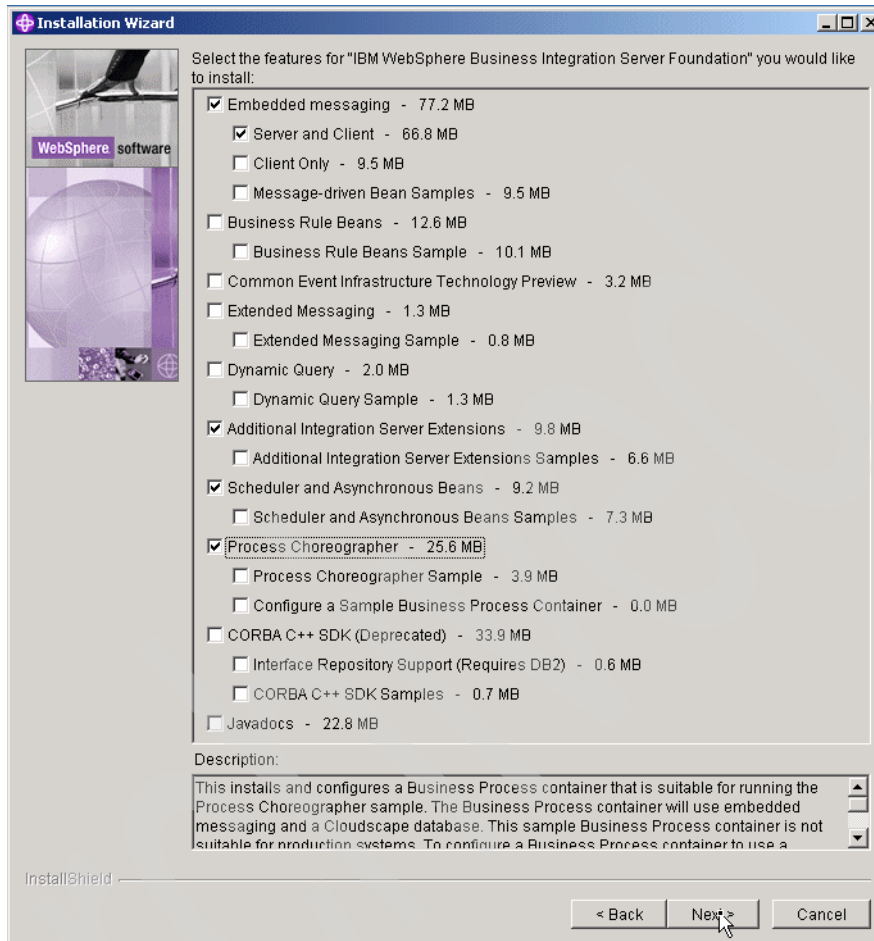
Figure 7-1   WebSphere Business Integration Server Foundation component selection

6. The wizard displays a window for the WebSphere Application Server and Embedded Messaging installation directories. We used the following paths and then clicked **Next**:

   – WebSphere Application Server V5.1 Installation directory:
     `C:\IBM\WebSphere\AppServer`

   – Embedded Messaging Installation directory: `C:\IBM\WebSphere\MQ`

7. The next window prompts for the node name and the host name of the computer on which the server will be running. The defaults should be fine. In our scenario, the defaults were:

   – Node Name: `ilm-bi`

– Host Name or IP Address: `ilm-bi.itsc.austin.ibm.com`

Click **Next**.

8. The next window prompts for the system logon user ID and password that will be used to run WebSphere Application Server as a Windows NT service. If you do not want WebSphere Application Server running as a service, you can skip this window by clicking **Next**. Otherwise, select **Run WebSphere Application Server As Service** and provide the valid user name and password. Note that this user account is one of your Windows system user accounts, as opposed to most of the user accounts used in this book, which are located in the LDAP directory residing on the Tivoli Directory Server. The preferred practice is to enter in the user account you are using to install the product. We used following values:

– User ID: `WASadmin`
– Password: `<password>`

Click **Next**.

> **Note:** If the following message appears in the next window, you have to cancel the installation:
>
> ```
> INST0056E: The user name and password specified cannot be validated
> due to insufficient privileges of current user...
> ```
>
> Make sure that you have the appropriate rights, including:
>
> ► Act as part of the operating system
> ► Create a token object
> ► Increase quotas
> ► Log on as a service
> ► Replace a process-level token

9. The installation starts. You will be prompted to switch the CDs.

> **Note:** For our environment, we avoided the necessity of replacing CDs by putting the CD images on a network drive. By verifying that you use the following directory names for each CD image (and placing the images in the same directory in the network), you will not be prompted to insert any CDs:
>
> ► Disk1
> ► Disk2

7.1.2 Verify WebSphere Business Integration Server Foundation V5.1

If the installation completed properly, the WebSphere Application Server First Steps application should be running.

If it is not running because you restarted the system after the installation (optional), start the First Steps application by clicking **Start → Programs → IBM WebSphere → Application Server v5.1 → InfoCenter**.

In addition, make sure that the WebSphere Application Server is running. (WebSphere Application Server is started by the installation process automatically.) If it is not running, you can start it from the First Steps application by clicking **Start the Server**.

To verify IBM WebSphere Business Integration Server Foundation V5.1, complete the following steps:

1. In the First Steps application, click **Verify Installation**.

2. The First Steps Output - Verify Installation Test window should open, and then some tests are performed. Check that the verification completed successfully.

> **Note:** If the verification fails for any reason, or in the case of installation problems, refer to the following publication:
>
> ► *IBM WebSphere Business Integration Server Foundation, Version 5.1: Getting started*; IBM Information Center Library:
>
> `ftp://ftp.software.ibm.com/software/webserver/appserv/library/wasv51ee_gs.pdf`

7.2 IBM WebSphere Application Server V5.1 Fix Pack 1 installation

In order to update IBM WebSphere Business Integration Server Foundation from Version 5.1.0 to Version 5.1.1, we need to upgrade the base WebSphere Application Server first and then update the Integration Server component.

This section describes the installation steps required for the installation of IBM WebSphere Application Server V5.1 Fix Pack 1.

7.2.1 Download fix pack and WebSphere Update Installer application

Fix packs for the WebSphere family of products need an appropriate WebSphere Update Installer application to install them.

1. Go to the following site:

   http://www.ibm.com/support/docview.wss?rs=180&context=SSEQTP&uid=swg24006036

2. Download the installer for the Windows platform and unpack its contents to the temporary directory, for example, c:\install\was51fp1\UpdateInstaller.

3. Download the IBM WebSphere Application Server V5.1 Fix Pack 1 from the following site:

   http://www.ibm.com/support/docview.wss?rs=180&context=SSEQTP&uid=swg24007195

   Or download it directly from:

   ftp://ftp.software.ibm.com/software/websphere/appserv/support/fixpacks/was51/fixpack1/Windows/was51_fp1_win.zip

4. Unpack the downloaded file to the update subdirectory of your WebSphere Update Installer directory. In our case, it is the c:\install\was51fp1\UpdateInstaller\update directory.

7.2.2 Stop the server

Prior to starting the fix pack installation, you need to make sure that WebSphere Application Server is not running. To ensure that the server is not running, from a command prompt, issue the following command to stop the WebSphere Application Server server1:

    c:\IBM\WebSphere\AppServer\bin\stopServer server1

7.2.3 Install WebSphere Application Server V5.1 Fix Pack 1

'To install the IBM WebSphere Application Server V5.1 Fix Pack 1, complete the following steps:

1. From a command prompt, set the environment variables by running the following command:

    c:\IBM\WebSphere\AppServer\bin\setupCmdLine

2. Navigate to the WebSphere Update Installer directory:

    cd \install\was51fp1\UpdateInstaller

3. Run the WebSphere Update Installer application:

    updateWizard

4. When the WebSphere Update Installer language window opens, select the appropriate language for the wizard (for example, English) and then click **OK**.

5. When the Welcome window opens, click **Next**.

6. WebSphere Update Installer detects your current WebSphere Application Server version. Click **Next**.

   Notice that the base version is now V5.1.0.2 because the base fix pack has been installed, and the installation directory is c:\IBM\WebSphere\AppServer.

   > **Note:** If the base version is not detected, enter the path to the WebSphere Application Server installation directory.

7. Select **Install fix packs** and then click **Next**.

8. Enter the directory where you have copied the fix pack. For example, we entered `c:\install\was51fp1\UpdateInstaller\update` in the Fix pack directory text field. Click **Next**.

9. Select the **was51_fp1_win** fix pack and then click **Next**.

10. The next window prompts you for the path to IBM HTTP Server and Embedded Messaging.

   We have not installed IBM HTTP Server, so the IBM HTTP Server Installation directory should state `Not Found` and the **IBM HTTP Server** should not be selected.

   We installed embedded messaging, so we need to install the fix pack for it. Make sure that **Embedded Messaging** is selected and the Embedded Messaging Installation directory is set to `C:\IBM\WebSphere\MQ`. See Figure 7-2 on page 141.

   > **Note:** If you installed IBM HTTP Server previously, you also need to install its fix pack. In that case, select **IBM HTTP Server** and provide the IBM HTTP Server installation path.
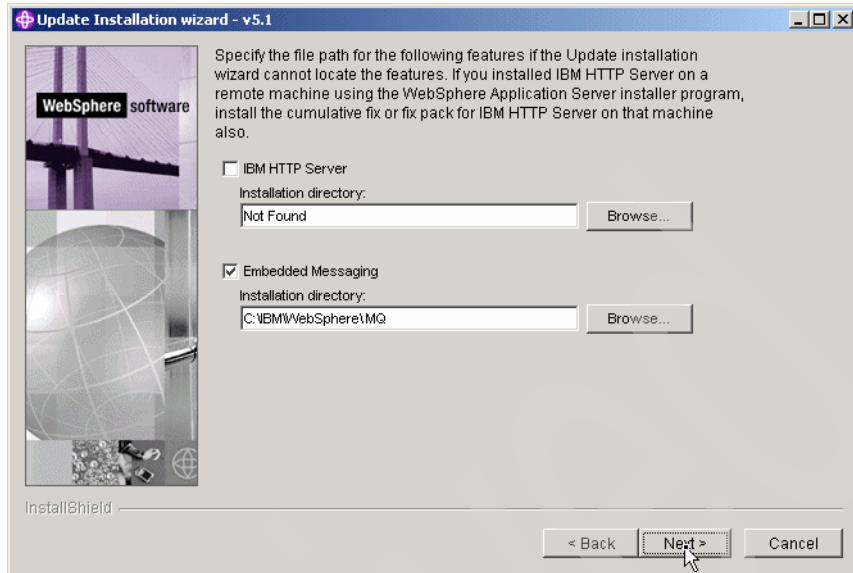
Figure 7-2   WebSphere Application Server V5.1 Fix Pack 1 component selection

11. When the Information window opens, click Next.

12. Review the fix pack settings and then click **Next** to begin the fix pack installation.

13. When the IBM WebSphere Application Server V5.1 Fix Pack 1 installation completes, click **Finish**.

7.3 IBM WebSphere Business Integration Server Foundation V5.1 Fix Pack 1 installation

In order to update IBM WebSphere Business Integration Server Foundation from Version 5.1.0 to Version 5.1.1, we need to upgrade the base WebSphere Application Server first and then update the Integration Server component. We describe updating WebSphere Application Server in 7.2, "IBM WebSphere Application Server V5.1 Fix Pack 1 installation" on page 138.

This section describes the installation steps required for the installation of IBM WebSphere Business Integration Server Foundation V5.1 Fix Pack 1.

7.3.1 Download and unpack the fix pack

Fix packs for the WebSphere family of products need the appropriate WebSphere Update Installer application to install them. To download and unpack the fix pack, complete the following steps:

1. Download IBM WebSphere Business Integration Server Foundation V5.1 Fix Pack 1 from the following site:

   ```
   http://www.ibm.com/support/docview.wss?rs=1079&context=SS2KS6&uid=swg2400074
   86&loc=en_US&cs=utf-8&lang=en
   ```

   Or download it directly from:

   ```
   ftp://ftp.software.ibm.com/software/websphere/appserv/support/fixpacks/was5
   1/fixpack1_wbisf/Windows/wbisf51_fp1_win.zip
   ```

2. Unpack the downloaded file to some temporary directory. We unpacked the fix pack into the c:\install\wbisf51fp1\UpdateInstaller directory.

7.3.2 Stop the server

Prior to starting the fix pack installation, you need to make sure that WebSphere Application Server is not running. To ensure that the server is not running, from a command prompt, issue the following command to stop the WebSphere Application Server server1:

```
c:\IBM\WebSphere\AppServer\bin\stopServer server1
```

7.3.3 Install WebSphere Business Integration Server Foundation V5.1 Fix Pack 1

To install IBM WebSphere Business Integration Server Foundation V5.1 Fix Pack 1, complete the following steps:

1. From a command prompt, set the environment variables by running the following command:

   ```
   c:\IBM\WebSphere\AppServer\bin\setupCmdLine
   ```

2. Navigate to the WebSphere Update Installer directory:

   ```
   cd \install\wbisf51fp1\UpdateInstaller
   ```

3. Run the WebSphere Update Installer application:

   ```
   updateWizard
   ```

4. When the WebSphere Update Installer language window opens, select the appropriate language for the wizard (for example, English) and then click **OK**.

5. When the Welcome window opens, click **Next**.

6. The WebSphere Update Installer detects your current WebSphere Application Server and Integration Server version. Click **Next**.

   Notice that the base version is now V5.1.1 because the base fix pack has been installed and the Integration Server version is still V5.1.0. The installation directory is c:\IBM\WebSphere\AppServer.

   > **Note:** If the base version is not detected, enter the path to the WebSphere Application Server installation directory.

7. Select **Install fix packs** and then click **Next**.

8. Enter the directory where you have copied the fix pack. For example, we entered `c:\install\wbisf51fp1\UpdateInstaller\update` in the Fix pack directory text field. Click **Next**.

9. Select the **wbisf51_fp1_win** fix pack and then click **Next**.

10. When the Information window opens, click **Next**.

11. Review the fix pack settings and then click **Next** to begin the fix pack installation.

12. When the IBM WebSphere Business Integration Server Foundation V5.1 Fix Pack 1 installation completes, click **Finish**.

7.3.4 Verify Business Integration Server Foundation V5.1.1

> **Note:** If any of the following steps fail for any reason, or in the case of installation problems, refer to the documentation provided with the fix pack and to *IBM WebSphere Business Integration Server Foundation, Version 5.1: Getting started*; IBM Information Center Library, available at:
>
> `ftp://ftp.software.ibm.com/software/webserver/appserv/library/wasv51ee_gs.pdf`

To verify the IBM WebSphere Business Integration Server Foundation V5.1.1 installation, complete the following steps:

1. Start the WebSphere Application Server - First Steps application by clicking **Start** → **Programs** → **IBM WebSphere** → **Application Server v5.1** → **InfoCenter**.

2. Start the WebSphere Application Server server1 by clicking **Start the Server** in the WebSphere Application Server - First Steps application.

3. Review the status of the server startup in the startServer.log. You should see the following message:

   ```
   Server server1 open for e-business
   ```

> **Note:** The server1 directory will not get created until the first time the application server is started.

4. Then, click **Verify Installation** in the WebSphere Application Server - First Steps application.

5. The First Steps Output - Verify Installation Test window should open, and some tests are performed. Check that the verification completed successfully.

6. After completing the Verify Installation, click **Exit** in the First Steps window.

7. Start WebSphere administrative console by entering the following URL in a Web browser:

   `http://ilm-bi.itsc.austin.ibm.com:9090/admin`

8. Log in to the WebSphere administrative console. You do not need to provide a user name, because the WebSphere security is turned off.

9. The WebSphere administrative console should open.

7.4 Summary

We have now completed the installation of the Business Integration node. Additional configuration is necessary. We describe the additional configuration in Chapter 10, "Configuration" on page 227.

8

Content Management node installation

This chapter provides detailed instructions for installing an IBM DB2 Content Manager library server and resource manager on one node.

> **Note:** For more detailed information about the installation and configuration of IBM DB2 Content Manager for Multiplatforms V8.2, refer to the following product guides, available at:
>
> http://www.ibm.com/software/data/cm/cmgr/mp/library.html
>
> ► *IBM Content Manager for Multiplatforms: Planning and Installing Your Content Management System Version 8 Release 2*, GC27-1332-02
>
> ► *IBM DB2 Content Manager for Multiplatforms: System Administration Guide Version 8 Release 2*, SC27-1335-04

The DB2 Content Manager implementation includes the following tasks:

1. IBM DB2 Universal Database installation
2. Microsoft Visual C++ installation
3. IBM WebSphere Application Server installation
4. IBM GSKit installation
5. IBM HTTP Server SSL configuration

6. IBM WebSphere Application Server configuration

7. IBM DB2 Content Manager installation

8. Install DB2 Content Manager

9. IBM DB2 Content Manager verification

10. DB2 Content Manager V8.2 Fix Pack 6 installation

11. DB2 Information Integrator for Content installation

12. IBM DB2 Content Manager eClient Version 8.2 installation

13. DB2 Records Manager Enabler Version 8.2.820.600 installation

8.1 Microsoft Windows 2000 Server installation

This section highlights the key issues addressed when installing Microsoft Windows 2000 Server, such as using Windows 2000 Service Pack 4, the latest Windows security patches, and the user rights assigned to an administrator user needed later for DB2.

8.1.1 Windows 2000 Service Pack 4

In our example, we installed Microsoft Windows 2000 Service Pack 4.

8.1.2 Windows 2000 service levels

We installed the latest Windows 2000 service-level critical updates on top of Service Pack 4.

8.1.3 Create system users and assign user rights

To assign user rights to the administrator ID used by the DB2 owner during the instance creation, refer to Table 8-1.

The users shown in Table 8-1 must be created to support DB2, WebSphere, and DB2 Records Manager.

Table 8-1   Required system user IDs

User ID	Description
IBM WebSphere Application Server V5.0.2 system administration (for example, WASadmin)	This user ID is used for installation and administration of all WebSphere components.
DB2 Enterprise Server Edition Version 8.1 database administration (for example, DB2admin)	This user ID will provide the high-level access for configuration and management of the DB2 installation.
DB2 Content Manager database administrative user ID (for example, CMadmin)	This user ID is used if installing and managing the library server on the Content Management node.

This user ID *must* be a member of the DB2 Admin group (right assignments). |

User ID	Description
DB2 database connectivity user ID (for example, CMconnect)	This user ID is used as a database connection ID from the client (Portal or Developer node) to the Content Management node. This user ID is a standard user with normal privileges and should not be part of the DB2 Admin group, with the following exception. DB2 Content Manager makes use of PUBLIC access to DB2 packages. If your security structure allows PUBLIC execution rights on all packages, it needs only to be granted CONNECT rights to the database. If you revoke PUBLIC access, CMconnect needs not only CONNECT rights to the databases, but also EXECUTE permission on Content Manager packages.

8.1.4 Add users to Administrators group

The user IDs DB2admin, CMadmin, and CMconnect need to have DB2 administrative privileges. One simple way to accomplish this is to add DB2admin, CMadmin, and CMconnect to the *Administrators* group.

8.1.5 User rights assignments

The user IDs DB2admin, CMadmin, and CMconnect need to have the following Windows user rights assignments:

► Act as part of the operating system
► Create a token object
► Increase quotas
► Log on as a service
► Replace a process-level token

To assign these user rights, complete the following steps:

1. Click **Start** → **Settings** → **Control Panel** → **Administrative Tools** → **Local Security Policy**.

2. From the Local Security Settings window, select and expand **Local Policies** → **User Rights Assignment**.

3. Ensure that the administrator user ID (for example, admin) has user rights assignments for the following Windows local security policies needed for DB2:

   – Act as part of the operating system
   – Create a token object
   – Increase quotas
   – Log on as a service
   – Replace a process-level token

8.2 IBM DB2 Universal Database installation

This section describes how to install the IBM DB2 Universal Database V8.1, Enterprise Server Edition and supporting Fix Pack 4a.

This section is organized into the following tasks:

- ► Install DB2 UDB V8.1
- ► Install DB2 UDB V8.1 Fix Pack 4a
- ► Verify DB2 UDB

8.2.1 Install DB2 UDB V8.1

To install IBM DB2 V8.1 Enterprise Server Edition, complete the following steps.

> **Note:** Depending on the DB2 UDB V8.1 CD distribution you are using, the installation panels might be slightly different from those described here.

1. Log in as the DB2admin user previously created.

2. Insert the *DB2 UDB V8.1 Enterprise Server Edition* CD.

3. Navigate to the <CD_Root> and run `Setup.exe` to start the installation.

4. When the DB2 Installer window opens, click **Install Products**.

5. When the Select the Product to Install window opens, select **DB2 UDB Enterprise Server Edition** (the default and only option) and then click **Next**.

6. When the Welcome window for the DB2 Setup Wizard opens, click **Next**.

7. When the License Agreement window opens, review the terms, and if in agreement, select **I accept the terms in the license agreement**. Click **Next**.

8. When the Select the installation type window opens, select **Typical** and then click **Next**.

9. When you see a warning message regarding the connection to remote DB2 servers using APPC, click **OK**.

10. When the Select the Installation Action window opens, select **Install DB2 UDB Enterprise Server Edition on this computer** and then click **Next**.

> **Note:** Take note of the Save your settings to response file check box. This can be used to capture your selection options to be used for a future installation.

11. When the Select the Installation Folder window opens, we entered `c:\ibm\sqllib` and then clicked **Next**.

> **Note:** The DB2 UDB installation with the Typical installation type takes approximately 376 MB of disk space.

12. When the Set User Information for DB2 Administration Server window opens, enter and select the following values and then click **Next**:

    – Domain: We left this field blank.
    – User name: `DB2admin` (default)
    – Password: `<password>`
    – Confirm password: `<password>`
    – Select **Use the same username and password for remaining DB2 services** (default).

13. When the Setup the Administration Contact List opens, we accepted the default settings (local) and then clicked **Next**.

14. When the warning message `Notification SMTP server has not been specified` appears, click **OK**.

15. When the Configure DB2 instances window opens, we accepted the default (**DB2**). Click **Next**.

16. When the Prepare the DB2 tools catalog window opens, select **Do not prepare the DB2 tools catalog on this computer** and then click **Next**.

17. When the Specify a contact for health monitor notification window opens, select **Defer the task after installation is complete** and then click **Next**.

18. When the Start copying files window opens, review the selected options and then click **Install**.

19. When the Setup is Complete window opens, click **Finish**.

20. When the IBM DB2 First Steps window opens, click **Exit First Steps**.

8.2.2 Install DB2 UDB V8.1 Fix Pack 4a

We installed IBM DB2 UDB V8.1 Fix Pack 4a for 32-bit Windows. We chose to use Fix Pack 4a for several reasons. First, IBM Tivoli Directory Server V5.2, WebSphere Portal V5.0.2, DB2 Content Manager V8.2 plus Fix Pack 6, and DB2 Information Integrator for Content plus Fix Pack 6 officially support DB2 UDB V8.1 Fix Pack 4a. In addition, we wanted to use the same version of DB2 fix pack on all of the nodes for DB2 compatibility reasons.

> **Note:** For more information about the contents of IBM DB2 UDB V8.1 Fix Pack 4a, refer to the text file *FixpackReadme*, available at:
>
> ```
> http://www.ibm.com/cgi-bin/db2www/data/db2/udb/winos2unix/support/v8fphis
> t.d2w/report#WIN-32
> ```

To download and install IBM DB2 UDB V8.1 Fix Pack 4a, complete the following steps:

1. You can download IBM DB2 UDB V8.1 Fix Pack 4a at:

   ```
   http://www.ibm.com/cgi-bin/db2www/data/db2/udb/winos2unix/support/v8fphist.
   d2w/report#WIN-32
   ```

2. We downloaded the FP4a_WR21338_ESE.exe, which is Fix Pack 4a for IBM DB2 Universal Database V8.1, Enterprise Server Edition.

3. Stop all DB2 services in the Windows services.

> **Note:** If you have trouble stopping any of the DB2 services, you can proceed with the fix pack installation. When the DB2 Setup Wizard launches for the fix pack, it will warn that certain processes are locking DB2 and will ask you if you want to shut them down. You can click **Yes**, and the Wizard will shut down the processes for you.

4. Install IBM DB2 UDB V8.1 Fix Pack 4a. We accepted the default installation options.

5. We recommend that you restart your system after installing the fix pack to ensure that all fixes are applied and active in memory.

6. The internal DB2 level is 8.1.4.428 after the installation of Fix Pack 4a. In our example, we do not have any existing databases that need special attention (rebind DB2 utilities).

   After the system has restarted, open a DB2 command window (or Windows command window) and enter the following command:

   ```
   db2level
   ```

   It should return 8.1.4.428 after Fix Pack 4a has been installed.

> **Note: Rebind DB2 utilities to existing databases**
>
> If you have created databases before you installed Fix Pack 4a, you will need to rebind the DB2 utilities to the databases. This step is necessary for the fixes to become effective on existing databases. The binding procedure needs to be performed only once per database. Note that this is not required for databases created after the fix pack is installed. We summarize the rebind procedure found in the *FixpackReadme.txt*.
>
> To rebind existing DB2 UDB databases after installing Fix Pack 4a, enter the following commands from a DB2 command window for each database:
>
> ```
> db2 terminate
> db2 CONNECT TO <dbname>
> db2 BIND <DB2_home>\BND\@db2ubind.lst GRANT PUBLIC
> db2 BIND <DB2_home>\BND\@db2cli.lst GRANT PUBLIC
> db2 terminate
> ```
>
> Where <dbname> represents the name of a database to which the utilities should be bound. And, where <DB2_home> represents the directory where you have installed DB2. The db2ubind.lst and db2cli.lst contain lists of required bind files used by IBM DB2 UDB V8.1.

8.2.3 Verify DB2 UDB

After you install DB2 UDB V8.1 and the fix pack and have restarted your system, we recommend that you verify that DB2 UDB is working properly.

8.3 Microsoft Visual C++ installation

As a prerequisite to DB2 Content Manager on Microsoft Windows, this section describes how to install and verify Microsoft Visual C++ Version 6.0. The compiler is used to generate DB2 Content Manager Library Server access modules.

We organize this section into the following tasks:

► Install Microsoft Visual C++ V6.0
► Configure Microsoft Visual C++ V6.0
► Verify Microsoft Visual C++ V6.0

8.3.1 Install Microsoft Visual C++ V6.0

To install Microsoft Visual C++ V6.0, complete the following steps:

1. Insert the *Microsoft Visual C++ V6.0* CD in the Content Management node.

2. Run `Setup.exe` to start the installation.

3. We accepted the default settings, with the following exceptions that must be specified:

    – We selected **Typical install**.
    – We selected **Register Environment Variables**.

> **Note:** For our testing, we used Microsoft Visual C++ V6.0 Professional Edition.
>
> If you install Microsoft Visual C++ V6.0 Enterprise Edition, the installation might prompt you as to whether to use a later Version 6.0 database format or to use an earlier format that is compatible with Version 5.0. This format decision has no impact on DB2 Content Manager.
>
> You might be prompted to install Microsoft Developer Network Library (MSDN); it is not needed.

8.3.2 Configure Microsoft Visual C++ V6.0

When Microsoft Visual C++ V6.0 is first installed, the environment variables are set as user variables, not system variables. Therefore, the Microsoft Visual C++ V6.0 environment is not automatically available to every user of the library server.

You can change the user environment variables into system environment variables, so all users have access to the Microsoft Visual C++ V6.0 environment.

If you change user variables to system variables, make sure that you place the Visual C++ values after any DB2 values. After you make changes to the environment variables, you must reboot your system to make the variables available to the Windows services.

After the installation of Microsoft Visual C++ V6.0, complete the following steps:

1. Ensure that the Microsoft Visual C++ V6.0 environment variables are set correctly:

    a. Log on to the system as the user that installed Microsoft Visual C++ V6.0.

    b. Click **Start** → **Settings** → **Control Panel**.

c. Double-click the **System** icon.

d. Click the **Advanced** tab, and then click the **Environment Variables** button.

You can see that the system variables are above the user variables for the user that is logged on to the system.

e. Double-click the **Path** variable in the User variables section of the window.

As you can see, the variable name path is displayed in the Variable field, and the settings of the path variable are displayed in the Value field of the window.

f. Within this Value field, highlight the Microsoft Visual Studio variable. For example:

```
C:\Program Files\Microsoft Visual Studio\Common\Tools\Winnt;C:\Program
Files\Microsoft Visual Studio\Common\vc98\bin;
```

g. Copy this highlighted information to your clipboard (Ctrl+C).

h. Click **Path** in the System variables section of the window.

Now, you see that the information displayed in the Value field is the value that is associated with the path of the system variable.

i. Place your cursor in the Value field. Scroll to the end of the information field (or after the DB2 values).

j. Paste (Ctrl+V) the information that you copied to your clipboard from the user variables to this point in the system variables. Click **OK**.

Make sure that there is a semi-colon (;) separating the two variables.

k. Verify that the information is correctly part of the system variable. If it is correct, delete the information from the User variables section.

The C++ variables must be available in the system variables, not in the user variables.

l. Repeat steps for both the **lib** and **include** variables.

m. Restart your system to make that the variables are available to services.

2. You can verify the environment variables by typing the `set include`, `set lib`, and `set path` commands from a command prompt.

You should see the values of each environment variable similar to the following examples. Make sure that the DB2 UDB directories are listed before the Microsoft Visual C++ directories:

a. Log on to the Windows system as a user other than the user you used to install Microsoft Visual C++ V6.0. This way, we will know that the variables have been properly set at the system level.

b. Open a command window and enter:

```
set include
```

The expected results (example) are as follows (your results will be wrapped):

```
C:\ibm\sqllib\INCLUDE;
C:\ibm\sqllib\SQLLIB\LIB;
C:\Program Files\Microsoft Visual Studio\VC98\atl\include;
C:\Program Files\Microsoft VisualStudio\VC98\mfc\include;
C:\Program Files\Microsoft Visual Studio\VC98\include
```

c. From the command window, enter:

```
set lib
```

The expected results (example) are as follows:

```
C:\ibm\sqllib\LIB;
C:\Program Files\Microsoft Visual Studio\VC98\mfc\lib;
C:\Program Files\Microsoft Visual Studio\VC98\lib
```

d. From the command window, enter:

```
set path
```

The expected results (example) are as follows:

```
%SystemRoot%\system32;
%SystemRoot%
%SystemRoot%\System32\Wbem;
c:\ibm\sqllib\BIN;
c:\ibm\sqllib\FUNCTION;
c:\ibm\sqllib\SAMPLES\REPL;
C:\Program Files\Microsoft Visual Studio\Common\Tools\WinNT;
C:\Program Files\Microsoft Visual Studio\Common\MSDev98\Bin;
C:\Program Files\Microsoft Visual Studio\Common\Tools;
C:\Program Files\Microsoft Visual Studio\VC98;
```

8.3.3 Verify Microsoft Visual C++ V6.0

To verify the Microsoft Visual C++ V6.0 installation, start the application by clicking **Start** → **Programs** → **Microsoft Visual C++ V6.0** → **Microsoft Visual C++ V6.0**.

8.4 IBM WebSphere Application Server installation

This section describes how to install IBM WebSphere Application Server Version 5.0 and Fix Pack 2 (V5.0.2).

8.4.1 Install WebSphere Application Server V5.0

To install WebSphere Application Server V5.0, complete the following steps:

1. Insert the *WebSphere Application Server* CD.

2. Navigate to the <CD_Root> directory and run `Install.exe` to start the WebSphere Application Server installer.

3. When the Select the desired language to be used for the installation wizard opens, select the desired language (for example, English) and click **OK**.

4. When the Welcome window opens, click **Next**.

5. When the License Agreement window opens, review the terms, and if in agreement, select **I accept the terms in the license agreement**. Click **Next**.

6. When the Setup Type window opens, select **Custom** and click **Next**.

7. When the features selection window opens, we selected the features shown in Figure 8-1 on page 157 and then clicked **Next**.
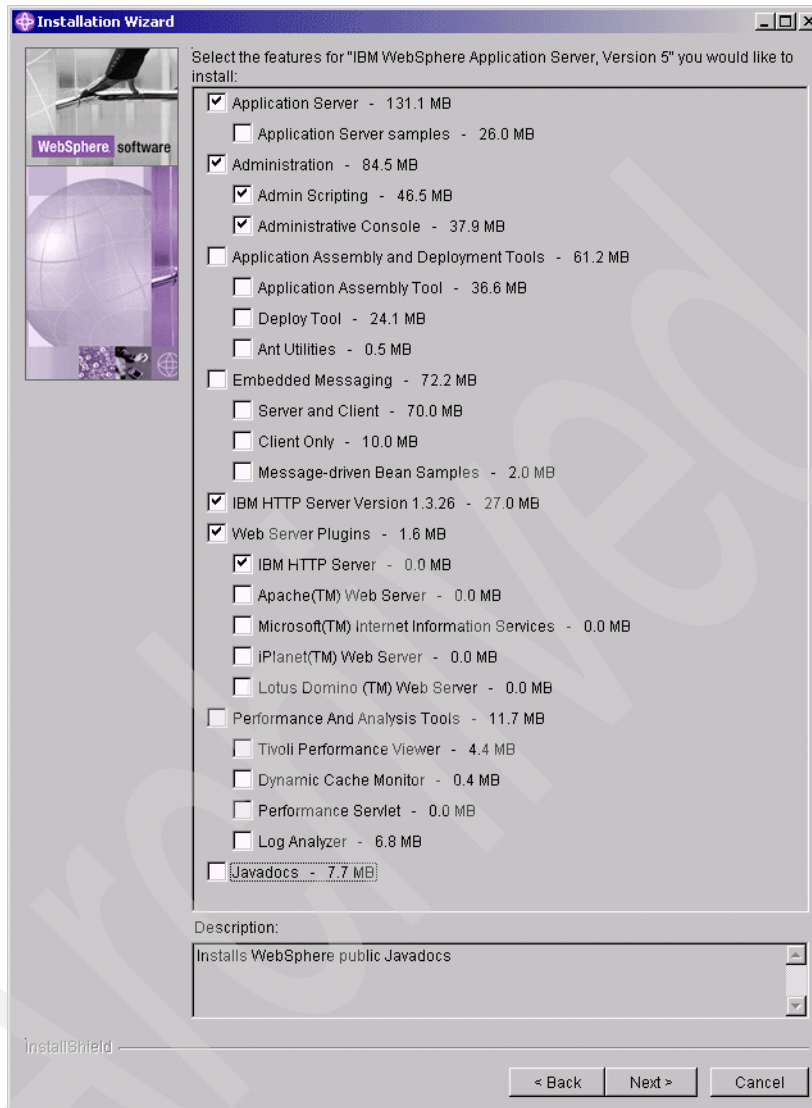
Figure 8-1   WebSphere Application Server: Selected features

8. When the Features Installation directories window opens, we used the
   following values and then clicked **Next**:

   – WebSphere Application Server: `c:\ibm\WebSphere\AppServer`
   – IBM HTTP Server: `c:\ibm\IBMHttpServer`

9. When the Node name and Host name window opens, we used the following values and then clicked **Next**:

   – Node name: `cmwin1`
   – Host name or IP Address: `cmwin1.itso.ral.ibm.com`

10. When the Windows Services window opens, we used the following values and then clicked **Next**:

    – Clear Run WebSphere Application Server as a service.
    – Select **Run IBM HTTP Server as a service**.
    – User ID: `WASadmin`
    – Password: `<password>`

11. When the Installation Summary window opens, review your selections and then click **Next** to begin copying files.

12. When the Register window opens, take the appropriate action.

13. When the First Steps window opens, click **Exit**.

14. Click **Finish** in the Installation Wizard window.

8.4.2 Install WebSphere Application Server V5 Fix Pack 2 (V5.0.2)

To install IBM WebSphere Application Server V5 Fix Pack 2, complete the following steps:

1. Ensure that you have stopped all WebSphere Application Server application servers and nodes.

2. Ensure that you have stopped the IBM HTTP Server and IBM HTTP Administration Windows service (WebSphere plug-in fixes).

> **Note:** The fix pack will attempt to update IBM HTTP Server and will not be able to update the server if it is started.

3. Download WebSphere Application Server V5 Fix Pack 2 at:

   `http://www.ibm.com/support/docview.wss?rs=860&context=SW600&q1=fixpack+2&uid=swg24005012&loc=en_US&cs=utf-8&lang=en+en`

4. Unpack WebSphere Application Server V5 Fix Pack 2 to a temporary directory on the target system (for example, c:\temp\was5.fp2). Note that the WebSphere Update Installer Wizard needs write access.

5. Open a command window, and set the JAVA_HOME by running the following command provided with WebSphere Application Server:

   `c:\ibm\WebSphere\AppServer\bin\setupCmdLine.bat`

6. From the command window, start the WebSphere Installation Update Wizard by entering `updateWizard.bat` found in the temporary directory (for example, c:\temp\was5.fp2).

7. When the WebSphere Update Installer language window opens, select the appropriate language for the wizard (for example, English) and then click **OK**.

8. When the Welcome window opens, click **Next**.

9. The WebSphere Update Installer should detect your current WebSphere Application Server version and installation directory (for example, c:\ibm\WebSphere\AppServer). Click **Next**.

10. Select **Install fix packs** and then click **Next**.

11. Enter the directory where you have copied the fix pack. For example, we entered `c:\temp\was5.fp2\fixpacks` in the Fix pack directory text field. Click **Next**.

12. Select the **was50_fp2_win** fix pack (default) and then click **Next**.

13. You will be prompted for the directories for the IBM HTTP Server and the WebSphere Application Server embedded messaging (not installed), we used the following values and then clicked **Next**:

    – Select **IBM HTTP Server**.
    – IBM HTTP Server installation directory: `c:\ibm\IBMHttpServer`
    – Clear Embedded Messaging (not installed).

14. Review the fix pack settings and then click **Next** to begin the fix pack installation of files.

15. When the WebSphere Application Server V5 Fix Pack 2 installation completes, click **Finish**.

8.4.3 Verify WebSphere Application Server V5.0.2

To verify the functionality of WebSphere Application Server V5.0.2 after the installation, complete the following steps:

1. Click **Start** → **Programs** → **IBM WebSphere** → **First Steps**.

2. From First Steps, click **Verify Installation**.

   If the server is not started, it will start the server and perform some tests. You will see the console output with the status of each test run and passed.

   Note: Alternatively, you can start the Install Verification by opening a command prompt, navigating to the <was_home>\bin directory, and running `ivt.bat`.

3. After completing the Verify Installation, click **Exit** in the First Steps window.

4. Ensure that IBM HTTP Server (WebSphere plug-in) is started.

5. Ensure that the server1 application server is started. If not, start the server as follows:

```
cd \ibm\WebSphere\AppServer\bin
startServer server1
```

> **Note:** Review the status of the server startup in startServer.log.
>
> For example, we used the GNU utility to view the logs:
>
> ```
> tail -f c:\ibm\WebSphere\AppServer\logs\server1\startServer.logs
> ```
>
> You should see the following message:
>
> ```
> Server server1 open for e-business
> ```
>
> The server1 directory will not get created until the first time the application server is started.

6. Start the WebSphere administrative console by entering the following URL in a Web browser:

```
http://<was_hostname>:9090/admin
```

7. Log in to the WebSphere administrative console (for example, WASadmin).

8. When done verifying the WebSphere administrative console, click **Logout** and close the Web browser.

9. Stop the server1 application server as follows:

```
cd \ibm\WebSphere\AppServer\bin
stopServer.bat server1
```

8.5 IBM GSKit installation

This section describes how to download and install IBM GSKit Version 7.0.1.16. GSKit is used to manage key stores and certificates. GSKit includes the IBM Key Management Utility and libraries accessible to applications to create and manage certificates.

GSKit V7.0.1.9 installed with IBM Tivoli Directory Server V5.2 on the Directory Server node includes root certificates that have expired. This results in the administrator not being able to create a new key store using the iKeyman utility. By installing the later version, IBM GSKit V7.0.1.16, this issue is addressed, along with other fixes.

8.5.1 Determine GSKit version installed

This section describes how to determine the version of GSKit an application is configured to use in the Windows registry. If you are following the order of installing components documented in this chapter, this section is not necessary, because we install the new GSKit prior to installing the components that use it.

> **Note:** The GSKit version can be obtained by using the `gsk7ver.exe` command or by retrieving the version from the Windows registry. We chose to use the Windows registry method because we also needed the REGAPPS value in addition to the version.

If you have not installed IBM Tivoli Directory Server or other software containing IBM GSKit, you can skip this section. To determine the level of GSKit installed, complete the following steps:

1. Start the Windows registry editor (regedit.exe) by selecting **Start** → **Run** and entering `regedit` in the Open field. Click **OK**.

2. Select and expand **HKEY_LOCAL_MACHINE** → **SOFTWARE** → **IBM**.

3. In our example, you will see both the GSK5 and GSK7 registry entries.

4. Select **GSK7** → **CurrentVersion**. Record the data value for the version name.

5. Select **REGAPPS** under CurrentVersion. This lists the name of the application using GSKit. Record the name of the application using this version of GSKit (for example, LDAP).

8.5.2 Uninstall the earlier GSKit version

If following our procedure, this section is not required.

Prior to installing the new IBM GSKit V7.0.1.16, if a GSKit already has been installed, you must manually uninstall the existing IBM GSKit V7.0.1.9 as follows:

1. Ensure that the IBM IBM Tivoli Directory Server V5.2 Windows service has been stopped, as well as other services that might be using GSKit.

2. Open a command window and navigate to the c:\winnt directory.

3. Run the following command to uninstall GSKit:

   `gsk7bui LDAP`

   Where `LDAP` is the name of the application using the GSKit.

4. Verify that the GSK7 Windows registry has been removed.

5. Verify that the GSK7 directory has been removed (for example, C:\Program Files\IBM\GSK7).

> **Note:** If files still exist such as DLLs, manually delete the C:\Program Files\IBM\GSK7 directory after the services that locked the files have been stopped.

> **Note:** If you have previously installed applications that use the earlier GSKit V7.0.1.9, the application might have updated the system path to include the GSKit installation path. If you decided to change the default GSKit installation path, you might need to manually update the system path to include the correct GSKit installation path.

8.5.3 Install GSKit V7.0.1.16

To download and install IBM GSKit V7.0.1.16, complete the following steps:

1. IBM GSKit V7.0.1.16 can be obtained by one of the following methods:

   – Request the GSKit V7.0.1.16 from IBM Support at:
     `http://techsupport.services.ibm.com/guides/tivoli_contacts.html`

   Or:

   – Download IBM HTTP Server V1.3.28, which includes IBM GSKit V7.0.1.16 at:
     `http://www.ibm.com/support/docview.wss?rs=177&context=SSEQTJ&uid=swg24006718`

   > **Note:** From the URL listed, you will have to log in as a registered user (or register first). After you navigate to the download window by platforms, you will see a list of fixes.
   >
   > We downloaded the WINDOWSPQ86671IHS1.3.28.zip (PQ86671) for IBM HTTP Server V1.3.28 to the c:\temp directory and unpacked the ZIP file.

2. Open a command window and navigate to the directory in which you have unpacked the WINDOWSPQ86671IHS1.3.28.zip file.

3. Enter the following at the command line to extract the GSKit:

   `gsk7bas c:\temp`

   Where `c:\temp` is the directory into which to extract the GSKit installation files.

4. From the command window, navigate to the directory where you extracted the GSKit installation files (for example, c:\temp).

5. Run the GSKit installer as follows:

```
setup <application_name>
```

Where `<application_name>` is the name of the application using GSKit V7.0.1.16 (for example, LDAP).

For example:

```
setup LDAP
```

6. When the Welcome window opens, click **Next**.

7. When the Choose Destination Location window opens, we entered `c:\ibm\gsk7` for the destination folder using the Browse button. Click **Next** to proceed.

8. When the setup is complete, click **Finish**.

8.6 IBM HTTP Server SSL configuration

As a prerequisite to DB2 Content Manager resource manager, this section describes how to configure SSL for IBM HTTP Server and IBM HTTP administration server.

We organize this section into the following tasks:

- ► Enable the httpd.conf file for SSL
- ► Copy WebSphere plug-in entries
- ► Create the IBM HTTP Server key store
- ► Create a certificate for IBM HTTP Server
- ► Verify IBM HTTP Server

8.6.1 Enable the httpd.conf file for SSL

To modify the httpd.conf file to enable SSL support, complete the following steps:

1. Stop the IBM HTTP Server V1.3.26 Windows service.

2. Back up the original httpd.conf file. For example:

```
cd \<ihs_home>\conf
copy httpd.conf httpd.conf.org
```

3. Copy the httpd.conf.sample containing the commented SSL directives to httpd.conf. For example:

```
copy httpd.conf.sample httpd.conf
```

4. Open the <ihs_home>\conf\httpd.conf file with a text editor.

5. Search for the following lines, uncomment the # symbol, and modify the settings as follows:

   – Verify the ServerName value. This should include your fully qualified host name (for example, ilm-cm.itsc.austin.ibm.com):

   ```
   ServerName <fully_qualified_hostname>
   ```

   – Uncomment the IBM SSL module for the given SSL encryption level (56 or 128 bit). For example:

   ```
   LoadModule ibm_ssl_module modules/IBMModuleSSL128.dll
   ```

   Note: Where 56 or 128 is the appropriate encryption level for your locale, for example, 128 for 128-bit encryption in the U.S. and Canada.

   – Uncomment the following line to listen on port 443 for HTTPS:

   ```
   Listen 443
   ```

   – Uncomment and update the VirtualHost with your host name as follows:

   ```
   <VirtualHost hostname.domain.com:443>
   ```

   Note: Substitute your fully qualified host name in this line (for example, <VirtualHost ilm-cm.itsc.austin.ibm.com:443>).

   – Uncomment:

   ```
   SSLEnable
   ```

   – Uncomment:

   ```
   </VirtualHost>
   ```

   – Uncomment and update the following:

   ```
   Keyfile "<ihs_home>/ssl/keyfile.kdb"
   ```

   Note: The keyfile path has been modified to include *ssl* instead of keys.

   For example:

   ```
   Keyfile "c:\ibm\IBMHttpServer/ssl/keyfile.kdb"
   ```

   – Uncomment:

   ```
   SSLV2Timeout 100
   SSLV3Timeout 1000
   ```

6. Save the changes to the httpd.conf file.

8.6.2 Copy WebSphere plug-in entries

During the installation of the IBM HTTP Server and WebSphere plug-in, the httpd.conf file was updated with the plug-in entries. Now that we have copied the httpd.conf.sample file in the previous section to enable the SSL directives, we now also need to add the WebSphere plug-in entries to the httpd.conf file. To copy the plug-in entries, complete the following steps:

1. Change to the directory the IBM HTTP Server <ihs_home>\conf directory.

2. Modify the httpd.conf file, adding the following for the WebSphere plug-in at the end of the file:

```
LoadModule ibm_app_server_http_module
"c:\ibm\WebSphere\AppServer/bin/mod_ibm_app_server_http.dll"

WebSpherePluginConfig
"c:\ibm\WebSphere\AppServer/config/cells/plugin-cfg.xml"
```

> **Tip:** The above text is two separate lines. Within the httpd.conf file, the lines are not wrapped.
>
> If you backed up the httpd.conf.org file you can cut and paste the plug-in entries to the SSL enabled httpd.conf file.

8.6.3 Create the IBM HTTP Server key store

To create the IBM HTTP Server key store database used to store certificates, complete the following steps:

1. From Windows, click **Start** → **Programs** → **IBM HTTP Server 1.3.26** → **Start Key Management Utility**.

2. From the menu bar, click **Key Database File** → **New**.

3. In the New window, enter and select the following values and then click **OK**:

   – Key Database Type: **CMS key database file**
   – File name: keyfile.kdb
   – Location: <ihs_home>\ssl (for example, c:\ibm\IBMHttpServer\ssl)

   > **Note:** This path must match the keyfile path in the httpd.conf file.

4. In the Password Prompt window, enter and select the following values and then click **OK**:

   – Password: <your_password> (to protect the key store file).
   – Select **Set expiration time** and enter the number of days before the password will expire. If no expiration is required, do not select this option.

> **Note:** Although not required in a development environment, we recommend that you set an expiration period for all key stores used in production environments.

– Select **Stash the password to a file**.

> **Note:** IBM HTTP Server accesses the password-protected key store.

5. When the information window opens with the following message, click OK:

```
The password has been encrypted and saved in the file:
c:\ibm\IBMHttpServer\ssl\keyfile.sth
```

8.6.4 Create a certificate for IBM HTTP Server

For development and testing purposes, we create a new self-signed certificate. The following steps outline the creation of a new self-signed certificate:

1. From the Key Management Utility menu bar, select **Create** → **New Self-Signed Certificate**.

   If you closed the Key Management Utility, you need to open the key store first.

2. Fill in the information about the form and click **OK**. For example, we used the following values:

   – Key Label: `IBM HTTP Server key`
   – Common Name: `<fully_qualified_hostname>`
   – Organization: `<your_organization_name>` (for example, ibm)

> **Note:** For the production IBM HTTP Server, you should create a new certificate request (do not use a self-signed certificate).

3. When done, close the Key Management Utility.

8.6.5 Verify IBM HTTP Server

After the IBM HTTP Server configuration, we recommend that you complete the following verification tests.

Start IBM HTTP Server

Restart the IBM HTTP Server service for the changes to take effect. It can be started by one of the following methods:

► IBM HTTP Server 1.3.26 Windows service

 Or:

► From the command line or batch file containing the following:

```
net start "IBM HTTP Server 1.3.26"
```

Verify the IBM HTTP Server

To verify that the IBM HTTP Server is working properly, enter the following URLs in a Web browser after IBM HTTP Server has been started:

► Verify HTTP:

```
http://<hostname>
```

► Verify HTTPS:

```
https://<hostname>
```

Backup the httpd.conf file

After you have verified that IBM HTTP Server is working properly with SSL enabled, we recommend that you make a backup of the <ihs_home>\conf\httpd.conf file to httpd.conf.was.ssl.

8.6.6 Configure SSL for IBM HTTP administration server

For details about configuring SSL for the IBM HTTP administration server, refer to *IBM Content Manager for Multiplatforms: Planning and Installing Your Content Management System Version 8 Release 2*, GC27-1332-02.

For our example, we did not complete this step because we will not manage the IBM HTTP Server using the administration server.

8.7 IBM WebSphere Application Server configuration

This section describes the need to get proper certificates on the Content Management node for the WebSphere Application Server and WebSphere plug-in. In addition, we provide a procedure for restricting ports to WebSphere Application Server.

8.7.1 Certificates

By default after installation, the WebSphere Application Server Secure Sockets Layer (SSL) is configured with a *dummy* certificate. Before moving to production with DB2 Content Manager, ensure that the WebSphere Application Server and WebSphere plug-in certificate are updated with a proper certificate.

> **Note:** For development testing purposes, this step is not required.

8.7.2 Restrict ports for WebSphere Application Server

For security reasons, restrict the ports of your resource manager application server to *localhost*.

> **Note:** This step is recommended for a production environment, but not required for development purposes.

To restrict ports for WebSphere Application Server V5.0.1, complete the following steps:

1. Start the server1 application server where the WebSphere administrative console enterprise application is installed.

   ```
   cd \ibm\WebSphere\AppServer\bin
   startServer server1
   ```

2. Start the WebSphere administrative console by entering the following URL in a Web browser:

   ```
   http://<was_hostname>:9090/admin
   ```

3. Log in to the WebSphere administrative console (for example, admin).

4. Click **Servers** → **Application Servers**.

5. Click **server1**.

6. Click **Web Container** → **HTTP transports**.

7. Update the host field for each port from * to `localhost`.

8. For each port you changed for your WebSphere Application Server, you must click **Environment** → **Virtual Hosts** → **<default_host>** → **Host Aliases** and update the specific port from * to `localhost`.

9. Update the WebSphere plug-in.

10. Restart IBM HTTP Server for the new plugin-cfg.xml file to be read immediately and the changes to become active.

8.8 IBM DB2 Content Manager installation

This section describes how to install the IBM DB2 Content Manager resource manager on the Resource Manager node.

8.8.1 Prerequisites for DB2 Content Manager

This section outlines the prerequisites that must be completed prior to installing DB2 Content Manager. The prerequisite steps listed in this section should already have been completed if you have followed the procedure in this document. Review the following prerequisites to ensure that you meet all of them:

► Microsoft Visual C++ Version 6.0 is installed and verified.

► IBM DB2 Universal Database V8.1, Enterprise Server Edition with Fix Pack 4a is installed.

► WebSphere Application Server is installed.

► SSL is enabled for IBM HTTP Server.

► WebSphere Application Server is configured in preparation for DB2 Content Manager.

► User IDs with rights and privileges for DB2 Content Manager are created.

► You have enough temporary space (at least 100 MB of temporary free space).

► Your %PATH% is not too long. Remove duplicate path entries if they exist. Windows has a 1024 character limit for environment variables.

Note: The installation program refers to the IDs by the default names, and you should substitute the names you use if you are not using the default names.

Important: The CMconnect user ID is a DB2 Content Manager ID used when a DB2 Content Manager user needs to perform a certain task, for example, when you need to define an item type on the DB2 Content Manager server. DB2 Content Manager uses this ID to connect the DB2 Content Manager user to DB2. The user (for example, CMconnect) should be assigned privilege set UserDB2Connect in DB2 Content Manager. The encrypted CMconnect password is stored in the c:\ibm\cmgmt\cmbicmenv.ini file.

In our example, the CMconnect ID needs only to be granted DB2 CONNECT authority to the icmnlsdb database for the reasons stated in the product guide, *IBM Content Manager for Multiplatforms: Planning and Installing Your Content Management System Version 8 Release 2*, GC27-1332-02.

8.8.2 Install DB2 Content Manager

To install the DB2 Content Manager library server and system administrator client on the Library Server node, complete the following steps.

> **Avoid problems:** During our development and testing, one of our DB2 Content Manager database user IDs did not have a valid password, thus the database creation/population failed. This can be avoided by ensuring that the user IDs are created properly (password set, privileges, and so on). In addition, you can log on with the new ID to verify that it works.

1. Ensure that you are logged into Windows with an administrator user ID, as defined in 8.1.3, "Create system users and assign user rights" on page 147 (for example, CMadmin).

2. Insert the *IBM DB2 Content Manager V8.2* CD.

3. Navigate to the <CD_root>\English directory and run `Setup.exe` to start the installer.

4. When the Welcome window opens, click **Next**.

5. When the License Agreement window opens, review the terms, and if in agreement, click **I accept the terms of the license agreement**. Click **Next**.

6. When the select features window opens, select all the features as shown in Figure 8-2 on page 171. Click **Next**.
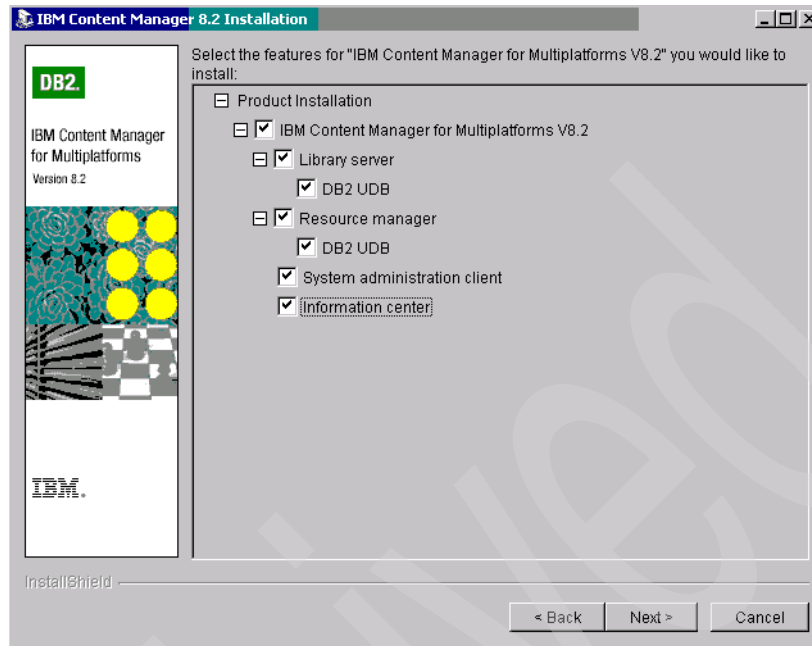
Figure 8-2   DB2 Content Manager: Features selection

7. In the next window, enter the following values:

   Identification:

   – Library server database name: ICMNLSDB
   – Library server schema name: ICMADMIN

   Authentication:

   – Library server database administration ID: CMadmin
   – Password: <password>
   – Confirm password: <password>
   – Database connection ID: CMconnect

   Click **Next** to continue the installation.

8. In the Configure Library Server Options window, enter the following values:

   – Library Server ID: 1
   – Installation Drive: C:
   – Select **Enable Unicode**.

   > **Note:** When sharing common files between DB2 Content Manager and
   > DB2 Information Integrator for Content, you must use Unicode for the
   > database.

– Select **Enable Text Search**.

> **Note:** This option must be selected if using DB2 Net Search Extender (NSE), which is the case in our example.

Click **Next** to continue the installation.

9. In the Configure Resource Manager Options window, enter the following values:

   – Resource Manager database name: `RMDB`
   – Resource Manager database administration ID: `CMadmin`
   – Password: `<password>`
   – Confirm Password: `<password>`

   Click **Next** to continue the installation.

10. In the next Configure Resource Manager Options window, enter the following values:

    – Installation drive: `C:`
    – Mount point: `C:\`
    – Path: `C:\staging`

    Click **Next** to continue the installation.

11. In the Deploy Resource Manager Server With WebSphere Application Server window, enter the following values:

    – Application server name: `icmrm` (default)
    – Web application path: `/icmrm` (default)
    – Web application name: `icmrm` (default)
    – Services port: `7500` (default)

    Click **Next** to continue the installation.

12. In the Configure System Administrative Client window, enter the following values:

    – WebSphere administrator user ID: `WASadmin`
    – WebSphere administrator password: `<password>`
    – Confirm password: `<password>`
    – Node name: `ilm-cm` (or your Windows server host name)

    Click **Next** to continue the installation.

13. In the next Configure System Administrative Client window, enter the following values:

    – Library server database name: `ICMNLSDB` (default)
    – Library server schema name: `ICMADMIN` (default)
    – Authentication type: `Server` (default)
    – Database connection ID: `CMconnect` (default)

- Password: <password>
- Do not select Enable single sign-on.

> **Note:** Single sign-on will be configured post-installation.

Click **Next** to continue the installation.

14. In the Define Location of System Configuration Information window, enter the following values:

   - Select **Local** and enter `c:\ibm\cmgmt`.
   - Do not select Web server.
   - Do not select LDAP.

   Click **Next** to continue the installation.

15. In the Connect Library Server to Resource Manager Server window, enter the following values:

   - Resource manager server host name: `ilm-cm.itso.austin.ibm.com` (or your Windows server host name)

   > **Note:** The installer will supply the host name. If you do not manually enter the fully qualified host name, you will get a warning dialog when you click **Next**.

   - Resource manager database name: `RMDB` (default)
   - Web application port: `80` (default)
   - Secure Web application port (HTTPS): `443` (default)
   - Web application path: `/icmrm` (default)
   - Resource manager server operating system: Windows, in our case
   - Token duration (hours): `48` (default)

   Click **Next** to continue the installation.

16. In the Configure Components for LDAP window, leave all the fields blank and click **Next** to continue the installation.

17. In the DB2 Content Manager Installation Features Summary window, review the selections and then click **Next** to begin the installation process.

18. When the installation completes, click **Finish** to exit the installation wizard.

> **Note:** The installer does not provide an installation progress indicator. We used the Windows task manager to gage the activity of the installation.

19.Review the following installation and configuration log files found in the
   <cm_home>\logs directory:

   – database.log

   > **Note:** This file is created only if errors occurred during the database
   > creation.

   – icm82install.log
   – icmbdlsdb.log
   – icmcrlsdb.log

8.9 IBM DB2 Content Manager verification

Now that DB2 Content Manager has been installed, we recommend that you
verify that the installation and configuration completed properly by completing the
following verification tasks:

► Verify the library server database
► Verify that library server access C++ modules were generated
► Verify that the library server monitor is started
► Verify the system administration client

8.9.1 Verify the library server database

To verify that the library server database was created successfully, complete the
following steps:

1. Open a DB2 command window, and connect to the library server database as
   follows:

   ```
   db2 connect to <icmnlsdb> user <cmadmin> using <password>
   ```

   You should see a message similar to the following:

   ```
   Database Connection Information
   Database server DB2/NT 8.1.4
   SQL authorization ID = CMADMIN
   Local database alias = ICMNLSDB
   ```

2. Check the database tables by entering the following command:

   ```
   db2 list tables
   ```

   You should see 130 tables listed.

8.9.2 Verify that library server access C++ modules were generated

During the DB2 Content Manager installation, Microsoft Visual C++ V6.0 was used to generate C++ access modules for DB2 Content Manager item types. To verify that these modules were generated, complete the following steps:

1. Verify that the <cm_home>\logs\icm82install.log has statements with the following message:

```
Generating access module for view with ID: XXX
....
All access modules rebuilt
```

2. Verify that .dll files are found in the <cm_home>\<icmnlsdb>\dll directory.

8.9.3 Verify that the library server monitor is started

During the installation of the DB2 Content Manager library server, the *ICM LS Monitor ICMNSLDB* Windows service is added. This service is set to automatic start. However, if you have not restarted your system after installing DB2 Content Manager, it will not have been started. Start the service manually or restart the system.

8.9.4 Verify the system administration client

After the installation, we recommend that you start the system administration client. To start the client, complete the following steps:

1. Click **Start → Programs → IBM DB2 Content Manager for Multiplatforms V8.2 → System Administration Client**.

2. When prompted to log on, enter the following values and then click **OK**:
   – Server Type: **DB2 Content Manager** (default)
   – Server: **ICMNLSDB** (default)
   – User ID: CMadmin
   – Password: <password>

8.9.5 Verify resource manager WebSphere deployment

To verify that the DB2 Content Manager resource manager component was deployed properly to WebSphere Application Server, complete the following steps:

1. Ensure that WebSphere Application Server server1 is started. By default, the WebSphere administrative console enterprise application is deployed to server1.

2. Log in to the WebSphere administrative console.

3. Click **Servers** → **Application Servers**.

   You should see the *icmrm* application server listed.

4. Click **Applications** → **Enterprise Applications**.

   You should see the *icmrm* enterprise application listed.

5. Log out and close the WebSphere administrative console.

6. Start the icmrm application server. For example, from a command window, enter the following:

   ```
   cd \ibm\WebSphere\bin
   startServer icmrm
   ```

7. Enter the following URLs in a Web browser to verify that the icmrm application server is started:

   ```
   http://<cm_hostname>/icmrm/snoop
   https://<cm_hostname>/icmrm/snoop
   ```

8.9.6 Verify the resource manager database

To verify that the resource manager database was created successfully, complete the following steps:

1. Open a DB2 command window, and connect to the library server database as follows:

   ```
   db2 connect to <rmdb> user <cmadmin> using <password>
   ```

   You should see a message similar to the following:

   ```
   Database Connection Information
   Database server DB2/NT 8.1.2
   SQL authorization ID = CMADMIN
   Local database alias = RMDB
   ```

2. Check the database tables by entering the following command:

   ```
   db2 list tables
   ```

   You should see 26 tables listed.

8.9.7 Verify DB2 Content Manager installation with First Steps

To verify the DB2 Content Manager installation using the First Steps application, complete the following steps:

1. Ensure that the following servers are started:

   – Library Server node
     • DB2 Windows services
     • ICM LS Monitor ICMNLSDB Windows service

- Resource Manager node
  - DB2 Windows services
  - IBM HTTP Server V1.3.26 Windows service
  - icmrm application server

2. Click **Start** → **Programs** → **IBM DB2 Content Manager for Multiplatforms V8.2** → **First Steps** on the *Library Server node*.

3. Click **Load Sample Data**, enter the following values, and then click **OK**:

   - Library Server database name: `icmnlsdb`
   - Resource Manager database name: `rmdb`
   - User ID: `CMadmin` (library server user ID)
   - Password: `<password>`

   It takes a few minutes to load the sample data.

4. When the data finishes loading, check the following file to verify that the sample data load was successful:

   `<cm_home>\bin\FirstSteps\cm\icmcrsample.log`

5. Click **Work With Sample Data** from the First Steps window to start the DB2 Content Manager system administration client.

   Alternatively, start the system administration client by clicking **Start** → **Programs** → **IBM DB2 Content Manager for Multiplatforms V8.2** → **System Administration Client**.

6. Log in using the library server user ID (for example, `CMadmin`).

   A successful logon verifies that the connection between the system administration client and the library server are working properly.

7. Verify that the data was loaded successfully by at the sample item type definitions beginning with the prefix XYZ by selecting **Data Modeling** → **Item Types**.

8. Exit the DB2 Content Manager system administration client.

9. Click **Remove Sample Data** from the First Steps main menu. Enter the same information provided for the logon information and click **OK** to begin removing the sample data.

   It takes a few minutes to remove the sample data.

10. After removing the sample data, check the following file to verify that the sample data was deleted successfully:

    `<cm_home>\bin\FirstSteps\cm\icmdlsample.log`

11. When done, click **Exit** to close First Steps.

8.10 DB2 Content Manager V8.2 Fix Pack 6 installation

This section describes how to download and install IBM DB2 Content Manager V8.2 Fix Pack 6. To download and install DB2 Content Manager V8.2 Fix Pack 6, complete the following steps:

1. The fix pack can be downloaded from the following location:

   `ftp://ftp.software.ibm.com/ps/products/content_manager/fixes/v8.2/win/820.600/`

   > **Note:** Refer to the fix pack installation *readme* files for details.

2. We chose the English language fix pack (CM_win_ENU_820.600.zip). Make sure that the language of the fix pack matches the language of your installation.

3. Stop all running servers.

   If the following services are installed, stop them:

   – Stop the ICM LS Monitor ICMNLSDB Windows service.
   – Stop all library server processes.
   – Stop and restart the DB2 instance.
   – Stop WebSphere Application Server.
   – Stop all running resource manager processes.
   – Stop and restart the *DB2EXT - DB2* (Net Search Extender) Windows service.

4. Unzip the fix pack into a temporary directory (for example, c:\temp\CM_win_ENU_820.600).

5. Navigate to the temporary directory and run `Update_CM_win_ENU.exe` to start the installer.

6. When the Welcome window opens, click **Next**.

7. When prompted, enter the information for the library server, as shown in Figure 8-3 on page 179.
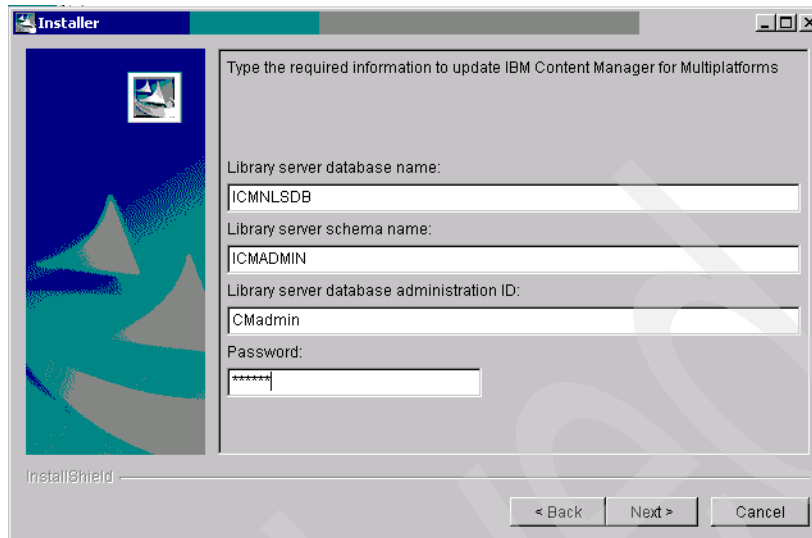
Figure 8-3   DB2 Content Manager Fix Pack 6: Library server information

8. When the CM Update will be installed in the following location window opens, review the path and then click **Next**.

> **Tip:** Be patient. The fix pack installation can take 20-40 minutes, depending on the system hardware. During the fix pack installation, several black text windows might open. Do not close them, because they are artifacts of the running update operation. When the corresponding operation is finished, they will close automatically.

9. Click **Finish** to complete the installation.

10. We recommend that you review <cm_home>\Fixpack6\logs\update.log for errors.

11. Verify the DB2 Content Manager installation.

   For details, refer to 8.9, "IBM DB2 Content Manager verification" on page 174.

8.11 DB2 Information Integrator for Content installation

This section describes how to install, configure, and verify IBM DB2 Information Integrator for Content V8.2. DB2 Information Integrator for Content will be used to support the DB2 Content Manager eClient (Web-based Content Manager user

interface) as a prerequisite to DB2 Content Manager and DB2 Records Manager "Records Manager Enabler" integration.

8.11.1 Install DB2 Information Integrator for Content

To install DB2 Information Integrator for Content (EIP), complete the following steps:

1. Insert the *IBM DB2 Information Integrator for Content (EIP) v8.2* CD.

2. Navigate to the <CD_root>\English directory and run `Setup.exe` to start the installer.

3. When the License Agreement window opens, review the terms, and if in agreement, click **Accept**.

4. When the Welcome window opens, click **Next**.

5. When the Select Machine Type window opens, select **EIP Development Workstation** to get the Enterprise Information Portal (EIP) local connectors.

    This option is for development and testing purposes. The EIP Development Workstation also installs the EIP local connectors. This selection also installs the toolkit and samples that will be used later for verification of the configuration.

6. When the EIP Destination Directory window opens, enter the following values and then click **Next**:

    – EIP directory: `C:\IBM\EIP`
    – EIP and DB2 Content Manager shared files: `C:\IBM\CMgmt`

7. When the Component Selection window opens, enter the following values and then click **Next**:

    – Highlight **Local connectors**:
      • Select **DB2 Content Manager V8 connector**.
      • Select **Federated connector**.
      • Select **Relational database connector**.
    – Highlight **Connector toolkit and samples** and select **Content Manager V8 connector**.

    > **Note:** This is optional. But, if you do not select this option, you will not be able to test the connection using the samples.

    – Select **Information Center** (optional, but might useful when just getting started).

    We did not select any other components.

8. When the Specify RMI Host Name and Port Number window opens, enter the following values and then click **Next**:

    – Specify the RMI server connection to the Administration Database:

        • Host name: `<library_server_node_fully_qualified_hostname>`

            For our example, we entered `ilm-cm.itso.austin.ibm.com`.

        • Port number: `1919`

    – Specify the RMI server connection to the Workflow or Information Mining Server:

        • Host name: `<library_server_node_fully_qualified_hostname>`

            For our example, we entered `ilm-cm.itso.austin.ibm.com`.

        • Port number: `1920`

9. When the Specify Location for System Files window opens, select **Local** for the location of the files to install and then click **Next**.

10. When the Configure Federated Server Connection window opens, enter and select the following values and then click **Next**:

    – Database name: `ICMNLSDB`
    – Schema name: `ICMADMIN`
    – Authentication type: **Server**
    – Database connection ID: `CMconnect`
    – Password: `<password>`
    – Clear Catalog remote database.

11. When the Configure DB2 Content Manager V8 Server Connection window opens, we used the following values and then clicked **Next**:

    – Database name: `ICMNLSDB`
    – Schema name: `ICMADMIN`
    – Authentication type: **Server**
    – Database connection ID: `CMconnect`
    – Password: `<password>`

12. When the Start Copying Files window opens, review your selections and then click **Next** to begin copying files.

13. When the installation completes, select **Yes, I want to restart my computer now** and then click **Finish**.

> **Note:** When you configure DB2 Information Integrator for Content to share the DB2 Content Manager database, there will be a dependency between the two products. Until you have installed Fix Pack 6 of DB2 Information Integrator for Content, your *entire* installation, including DB2 Content Manager V8.2 Fix Pack 6 and DB2 Information Integrator for Content, will not work. In other words, the dependency between DB2 Content Manager and DB2 Information Integrator for Content is such that neither will work unless both are on a matching fix pack level.

14. Open a Windows command prompt and navigate to the <eip_home> directory:

```
cd C:\IBM\EIP
```

15. Ensure that the following environment variable values in the cmbenv81.bat script for your installation paths are correct:

   – CMBROOT
   – DB2HOME
   – JAVAHOME

   For example:

```
if "%CMBROOT%"==""  set CMBROOT=c:\ibm\eip
if "%DB2HOME%"==""  set DB2HOME=c:\ibm\sqllib
if "%JAVAHOME%"=="" set JAVAHOME=%CMBROOT%\jdk
```

> **Note:** Some of these environment variables might already be defined in your Windows system or user environment. We recommend that you make this update regardless to ensure that the environment is set correctly.

8.11.2 Verify DB2 Information Integrator for Content

This procedure tests the DB2 Information Integrator for Content (EIP) DB2 Content Manager V8 connector connection from the Portal node to DB2 Content Manager:

1. Ensure that the DB2 Content Manager servers are started:

   – Library Server node:
     • DB2 Windows services
     • ICM LS Monitor ICMNLSDB Windows service
   – Resource Manager node:
     • DB2 Windows services
     • IBM HTTP Server V1.3.26 Windows service
     • icmrm application server

2. Open a command window and navigate to the c:\ibm\eip directory.

3. Enter the following command to set up the environment:

```
cmbenv81.bat
```

> **Note:** The cmbenv81.bat script is in the <eip_home> directory, which is added to the system path variable.

4. Verify the EIP DB2 Content Manager V8 connector connection to DB2 Content Manager by entering the following commands.

> **Note:** If you did not select the Connector toolkit and samples (Content Manager V8 connector) during the installation, the sample files will not be available to test the connection.

   a. Navigate to the EIP toolkit samples directory:

```
<eip_home>\samples\java\icm
```

   b. Compile as follows:

```
javac SConnectDisconnectICM.java
```

   c. Verify the connection using a DB2 Content Manager user ID as follows:

```
java SConnectDisconnectICM icmnlsdb CMadmin <password>
```

   You should see output similar to the following:

```
Connection to datastore (Database 'icmnlsdb', UserName 'CMadmin')...
Sample program completed.
```

   d. Repeat the previous step to test the connection using the CMconnect DB2 Content Manager user ID.

> **Important:** If this test does not work, you should not continue until the problem is resolved.

8.11.3 Install DB2 Information Integrator for Content Fix Pack 6

To download and install IBM DB2 Information Integrator for Content V8.2 Fix Pack 6, complete the following steps:

1. Ensure that the DB2 Information Integrator for Content is not in use prior to installing the fix pack to avoid a situation where the files are locked and not updated properly.

2. Download the IBM DB2 Information Integrator for Content V8.2 Fix Pack 6 from the following site:

```
ftp://ftp.software.ibm.com/ps/products/enterprise_information_portal/fixes/
v8.2/win/820.600/
```

We downloaded the following files to the c:\temp\eip82.fp6 directory on our Portal node:

- – EIP_win_ENU_820.600.zip (Fix Pack 6 ZIP file for U.S. English)
- – cm82FP6fixes_descriptions.pdf
- – cm82FP6install_knownissues.pdf
- – cm82FP6new_functionality.pdf
- – cm82FP6readme.pdf

3. Unpack the EIP_win_ENU_820.600.zip to a temporary directory (for example, c:\ibm\eip82.fp6).

4. Navigate to the temporary directory and run `Update_EIP_win_ENU.exe` to start the installer.

5. When the Welcome window opens, click **Next**.

6. When the EIP Update Summary window opens, click **Next** to begin copying files.

7. When the installation completes, click **Finish**.

8. After the DB2 Information Integrator for Content V8.2 Fix Pack 6 is installed, verify that the EIP connection is working properly.

8.12 IBM DB2 Content Manager eClient Version 8.2 installation

This section provides instructions about how to install the eClient on the Content Management Windows node.

The IBM DB2 Content Manager eClient is a Web application that enables users to search for and retrieve documents from content servers. The content servers that the eClient can access include:

► IBM DB2 Content Manager for Multiplatforms

► IBM DB2 Content Manager OnDemand

► IBM DB2 Content Manager ImagePlus® for OS/390®

► Other content servers

With the eClient, you can connect to Enterprise Information Portal (EIP) and perform searches across a variety of data sources simultaneously. You can also use the eClient to connect directly to content servers. The eClient supports Enterprise Information Portal Version 8.2 work flow and Content Manager Version 8.2 document routing.

8.12.1 Install Content Manager eClient

To install the eClient, complete the following steps:

1. Start the WebSphere Application Server server1 by clicking **Start →
   Programs → IBM WebSphere → Application Server v5.0 → Start the
   Server**.

2. Insert the *eClient* CD into the CD drive. The launchpad starts automatically. If
   the launchpad does not start automatically, execute `launchpad.bat` from the
   launchpad directory.

3. In the launchpad, click **Install** to start the eClient installation program.

4. Follow the instructions in the installation windows.

5. Change the installation directory for the eClient to be consistent with your
   other installation targets, such as C:\IBM\CMeClient.

6. After you install the eClient files, the installation program checks for
   WebSphere. After the installation program detects WebSphere, you can
   continue with the automatic configuration of the Web application for the
   eClient.

8.12.2 Verify the eClient installation

To verify the installation of the eClient, complete the following steps:

1. Start the eClient.

   To start the eClient from a Windows command prompt, change to the
   C:\IBM\CMeClient\Save subdirectory and execute the `startIDMServer.bat`
   file.

2. Launch the eClient.

   To launch the eClient load your Web browser and enter the following URL:

   > `http://ilm-cm/eClient82/IDMInit`

3. Log in to the eClient:

   – User ID: `CMadmin`

   – Password: `<password>`

   – Server: `ICMNLSDB (CM8)`

4. Log out of the eClient.

8.13 DB2 Records Manager Enabler Version 8.2.820.600 installation

This section describes the steps required to install the IBM DB2 Records Manager Enabler for Content Manager on the Content Manager server node.

8.13.1 Preinstallation tasks

Before installing Records Manager Enabler (RME), complete the following tasks:

1. Set up RME install folder.

   On the systems that you plan to install one or more of the RME components, you need to create a RME installation folder. For our example, we created the C:\IBM\RMenabler RME folder.

2. Create and update your Windows system environment variables:

   a. Create a new system environment variable called RMEROOT and set its value to the RME install folder created in the previous step. In our environment, the variable is set to RMEROOT=C:\IBM\RMenabler.

   b. Create a new system environment variable called RMELANG and set its value to the appropriate language for your installation. In our environment, the English language is used, so the variable is set to RMELANG=en. Table 8-2 shows the supported languages for Records Manager Enabler.

Table 8-2   Records Manager Enabler supported languages

RMELANG value	Language
de	German
en	English (U.S.)
es	Spanish
fr	French
it	Italian
ja	Japanese
ko	Korean
pt	Brazilian Portuguese
zh	Simplified Chinese
zh_TW	Traditional Chinese

8.13.2 Install the Records Manager Enabler Common Client support

The Records Manager Enabler Common Client support includes the RME support for all Windows-based client applications (for example, DB2 Content Manager Client for Windows, Lotus Notes® client, and Microsoft Outlook 2000 client). Therefore, it needs to be installed on *all* RME client application machines. The DB2 Records Manager server uses the Content Manager V8 connector to communicate with the Content Manager server, and therefore, it requires the installation of the Content Manager V8 connector only.

The Content Manager V8 connector can be installed as a component of the DB2 Information Integrator for Content client installation or by installing the DB2 Content Manager Client for Windows Version 8.2 with Fix Pack 6.0. For our purposes, we install the Content Manager Client for Windows, because this client will also provide a convenient user interface to access the Content Manager content.

Microsoft SOAP Toolkit and MSXML Parser installation

All of the Records Manager Enabler Windows-based applications require the Microsoft Simple Object Access Protocol (SOAP) Version 3.0 and Microsoft MSXML Parser Version 4.0 packages.

You can download and install the Microsoft SOAP Toolkit Version 3.0 package from the Microsoft download Web site. Go to the following link and search for SOAP:

```
http://www.microsoft.com/downloads
```

Follow the installation instructions in the package to install the SOAP Toolkit. The installation might install Microsoft MSXML Parser Version 4.0 for some of the Windows system platforms. If the SOAP Toolkit installation does not install the Microsoft MSXML Parser Version 4.0 package, download it from the Microsoft Web site and install it separately.

Install the Records Manager Enabler CommonWin32 component

The RME CommonWin32 component contains the files required to support the Windows-based RME client applications. To install the CommonWin32 component, complete the following steps:

1. Unzip the RME_CommonWin32.zip file to the RME install folder c:\IBM\RMenabler.

2. Register the SOAP DLL.

   After the installation of the RME_CommonWin32.zip file, you need to register the SoapHeaderHandler.dll.

3. Open a command prompt window.

4. Change the directory to the bin folder in the RME install folder:

    `c:\IBM\RMenabler\bin`

5. Enter the following command to register the SoapHeaderHandler.dll:

    `regsvr32 SoapHeaderHandler.dll`

    The **regsvr32** command will return the following message if it is successful:

    `DllRegisterServer in SoapHeaderHandler.dll succeeded`

    Note: You must reregister the SoapHeaderHandler.dll every time you reinstall the RME_CommonWin32.zip file on the system.

8.13.3 Install the Records Manager Enabler for Content Manager eClient server component

To install the Content Manager eClient server component, complete the following steps:

1. Stop the Content Manager eClient application server.

2. Install the RME_CommonJava.zip file. Unzip the RME_CommonJava.zip file to the RME install folder C:\IBM\RMenabler.

3. Install the RME_eClient.zip file. Unzip the RME_eClient.zip file to the eClient server install folder
    C:\IBM\CMeClient\installedApp\IBM_eclient_82.ear\eclient82.war.

8.14 Summary

We have now completed the installation of the Content Management node. Additional configuration is necessary, which we provide in Chapter 10, "Configuration" on page 227.

9

Records Management node installation

This chapter describes the procedure we used to install and configure the Records Management node for our working example runtime environment on the Microsoft Windows 2000 Server platform.

The high-level tasks to install the Records Management node are as follows:

1. Microsoft Windows 2000 Server installation

2. DB2 Universal Database installation

3. WebSphere Application Server installation

4. IBM GSKit installation

5. IBM HTTP Server SSL configuration

6. WebSphere Application Server configuration

7. DB2 Records Manager installation

8. DB2 Records Manager Enabler Version 8.2.820.600 installation

9.1 Microsoft Windows 2000 Server installation

This section highlights the key issues addressed when installing Microsoft Windows 2000 Server, such as using Windows 2000 Service Pack 4, the latest Windows security patches, and the user rights assigned to an administrator user needed later for DB2.

9.1.1 Windows 2000 Service Pack 4

In our example, we installed Windows 2000 Service Pack 4.

9.1.2 Windows 2000 service levels

We installed the latest Windows 2000 service-level critical updates on top of Service Pack 4.

9.1.3 Create system users and assign user rights

To assign user rights to the administrator ID used by the DB2 owner during instance creation, refer to Table 9-1.

The users shown in Table 9-1 must be created to support DB2, WebSphere, and DB2 Records Manager.

Table 9-1   Required system user IDs

User ID	Description
IBM WebSphere Application Server V5.0.2 system administration (for example, WASadmin)	This user ID is used for installation and administration of all WebSphere components.
DB2 Records Manager database and engine user ID (for example, RMADMIN)	This user ID is used for database installation and administration.
DB2 database administration user ID (for example, DB2admin)	This user ID is used for DB2 installation and database administration.

For each of these users, ensure that the following local security policy rights assignment have been enabled:

► Act as part of the operating system
► Create a token object
► Increase quotas
► Lock pages in memory
► Log on as a service

► Replace a process-level token

User creation and rights assignment

To create the users and provide the proper user rights assignments, complete the following steps:

1. Log on to Windows as an administrator.

2. Create each user ID and then add the users to the Administrators group.

3. Click **Start → Settings → Control Panel → Administrative Tools → Local Security Policy**.

4. From the Local Security Settings window, select and expand **Local Policies → User Rights Assignment**.

5. Ensure that the administrator user ID (for example, admin) has user rights assignments for the following Windows local security policies needed for DB2:

   – Act as part of the operating system
   – Create a token object
   – Increase quotas
   – Lock pages in memory
   – Log on as a service
   – Replace a process-level token

6. Log on as RMADMIN.

Note: Any administrative user ID can be used for all the remaining installation steps. However, we chose to use the user ID (RMADMIN), which is most closely associated to the functional objectives of this server node.

9.1.4 Verify network configuration

Prior to installing the Records Manager supporting software components, it is important that you verify that your network is configured properly. We recommend that you use a static TCP/IP address and verify that the host name can be resolved with the name server.

For example, we did the following from a command window:

```
ping <hostname>
ping <ip_address>
or
nslookup <hostname>
nslookup <ip_address>
```

Ensure that the fully qualified host name is returned if resolved by a domain name system server. Alternatively, you might be using a hosts file for an environment such as development (use `ping` instead of `nslookup`).

9.2 DB2 Universal Database installation

This section describes how to install the IBM DB2 Universal Database V8.1, Enterprise Server Edition and supporting Fix Pack 4a.

This section is organized into the following tasks:

► Install DB2 UDB V8.1
► Install DB2 UDB V8.1 Fix Pack 4a
► Verify DB2 UDB

9.2.1 Install DB2 UDB V8.1

To install the IBM DB2 V8.1 Enterprise Server Edition, complete the following steps.

Note: Depending on the DB2 UDB V8.1 CD distribution you are using, the installation panels might be slightly different from those described here.

1. Insert the *DB2 UDB V8.1 Enterprise Server Edition* CD.

2. Navigate to the <CD_Root> and run `Setup.exe` to start the installation.

3. When the DB2 Installer window opens, click **Install Products**.

4. When the Select the Product to Install window opens, select **DB2 UDB Enterprise Server Edition** (default and only option) and then click **Next**.

5. When the Welcome window for the DB2 Setup Wizard opens, click **Next**.

6. When the License Agreement window opens, review the terms, and if in agreement, select **I accept the terms in the license agreement** and click **Next**.

7. When the Select the installation type window opens, select **Typical** and then click **Next**.

8. When you see a warning message regarding connection to remote DB2 servers using APPC, click **OK**.

9. When the Select the Installation Action window opens, select **Install DB2 UDB Enterprise Server Edition on this computer** and then click **Next**.

> **Note:** Take note of the Save your settings to response file check box. This can be used to capture your selection options to be used for a future installation.

10. When the Select the Installation Folder window opens, we entered `c:\ibm\sqllib` and then clicked **Next**.

> **Note:** The DB2 UDB installation with the Typical installation type takes approximately 376 MB of disk space.

11. When the Set User Information for DB2 Administration Server window opens, enter and select the following values and then click **Next**:
    – Domain: We left this field blank.
    – User name: `DB2admin` (default)
    – Password: `<password>`
    – Confirm password: `<password>`
    – Select **Use the same username and password for remaining DB2 services** (default).

12. When the Setup the Administration Contact List opens, we accepted the default settings (local) and then clicked **Next**.

13. When the warning message `Notification SMTP server has not been specified`, click **OK**.

14. When the Configure DB2 instances window opens, we accepted the default (**DB2**). Click **Next**.

15. When the Prepare the DB2 tools catalog window opens, select **Do not prepare the DB2 tools catalog on this computer** and then click **Next**.

16. When the Specify a contact for health monitor notification window opens, select **Defer the task after installation is complete** and then click **Next**.

17. When the Start copying files window opens, review the selected options and then click **Install**.

18. When the Setup is Complete window opens, click **Finish**.

19. When the IBM DB2 First Steps window opens, click **Exit First Steps**.

9.2.2 Install DB2 UDB V8.1 Fix Pack 4a

We installed IBM DB2 UDB V8.1 Fix Pack 4a for 32-bit Windows. We chose to use Fix Pack 4a for several reasons. First, IBM Tivoli Directory Server V5.2, WebSphere Portal V5.0.2, DB2 Content Manager V8.2 plus Fix Pack 6, and DB2 Information Integrator for Content plus Fix Pack 6 officially support DB2 UDB

V8.1 Fix Pack 4a. In addition, we wanted to use the same version of DB2 fix pack on all of the nodes for DB2 compatibility reasons.

> **Note:** For more information about the contents of the IBM DB2 UDB V8.1 Fix Pack 4a, refer to the text file *FixpackReadme*, available at:
>
> ```
> http://www.ibm.com/cgi-bin/db2www/data/db2/udb/winos2unix/support/v8fphis
> t.d2w/report#WIN-32
> ```

To download and install the IBM DB2 UDB V8.1 Fix Pack 4a, complete the following steps:

1. You can download IBM DB2 UDB V8.1 Fix Pack 4a at:

   ```
   http://www.ibm.com/cgi-bin/db2www/data/db2/udb/winos2unix/support/v8fphist.
   d2w/report#WIN-32
   ```

2. We downloaded the FP4a_WR21338_ESE.exe, which is the Fix Pack 4a for IBM DB2 Universal Database V8.1, Enterprise Server Edition.

3. Stop all DB2 services in the Windows services.

> **Note:** If you have trouble stopping any of the DB2 services, you can proceed with the fix pack installation. When the DB2 Setup Wizard launches for the fix pack, it will warn that certain processes are locking DB2 and will ask you if you want to shut them down. You can click **Yes**, and the Wizard will shut down the processes for you.

4. Install the IBM DB2 UDB V8.1 Fix Pack 4a. We accepted the default installation options.

5. We recommend that you restart your system after installing the fix pack to ensure that all fixes are applied and active in memory.

6. The internal DB2 level is 8.1.4.428 after the installation of Fix Pack 4a. In our example, we do not have any existing databases that need special attention (rebind DB2 utilities).

   After the system has restarted, open a DB2 command window (or Windows command window) and enter the following command:

   `db2level`

   It should return 8.1.4.428 after Fix Pack 4a has been installed.

> **Note: Rebind DB2 utilities to existing databases**
>
> If you have created databases before you installed Fix Pack 4a, you will need to rebind the DB2 utilities to the databases. This step is necessary for the fixes to become effective on existing database. The binding procedure needs to be performed only once per database. Note that this is not required for databases created after the fix pack is installed. We summarize the rebind procedure found in the *FixpackReadme.txt*.
>
> To rebind existing DB2 UDB databases after installing Fix Pack 4a, enter the following commands from a DB2 command window for each database:
>
> ```
> db2 terminate
> db2 CONNECT TO <dbname>
> db2 BIND <DB2_home>\BND\@db2ubind.lst GRANT PUBLIC
> db2 BIND <DB2_home>\BND\@db2cli.lst GRANT PUBLIC
> db2 terminate
> ```
>
> Where <dbname> represents the name of a database to which the utilities should be bound. And, where <DB2_home> represents the directory where you have installed DB2. The db2ubind.lst and db2cli.lst contain lists of required bind files used by IBM DB2 UDB V8.1.

9.2.3 Verify DB2 UDB

After you install DB2 UDB V8.1 and the fix pack and have restarted your system, we recommend that you verify that DB2 UDB is working properly.

9.3 WebSphere Application Server installation

This section describes how to install WebSphere Application Server Standard Edition V5.0 and Fix Pack 2 (V5.0.2).

9.3.1 Install WebSphere Application Server Standard Edition V5.0

To install WebSphere Application Server V5.0, complete the following steps:

1. Insert the *WebSphere Application Server* CD

2. Navigate to the <CD_Root> directory and run `Install.exe` to start the WebSphere Application Server installer.

3. When the Select the desired language to be used for the installation wizard opens, select the desired language (for example, English) and click **OK**.

4. When the Welcome window opens, click **Next**.

5. When the License Agreement window opens, review the terms, and if in agreement, select **I accept the terms in the license agreement**. Click **Next**.

6. When the Setup Type window opens, select **Full** and click **Next**, as shown in Figure 9-1.
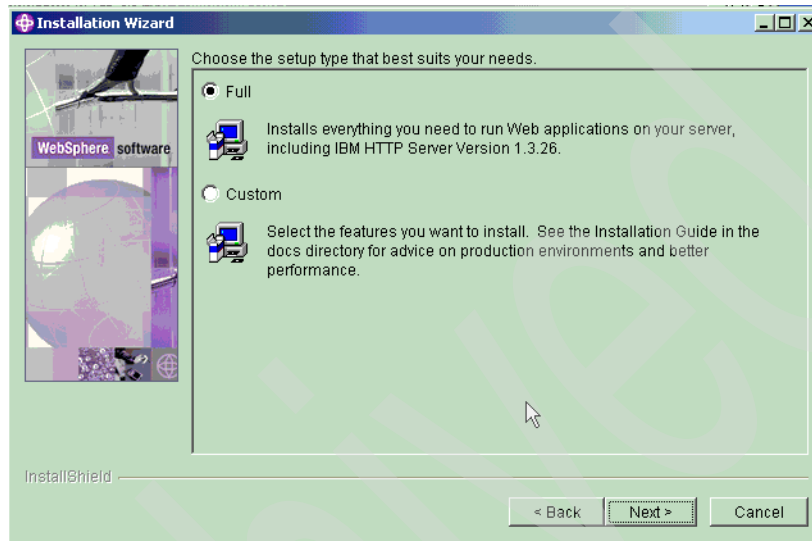
Figure 9-1   WebSphere Application Server: Select Full installation

7. When the Node name and Host name window opens, we used the following values and then clicked **Next**:

    – Node name: `ilm-rm`
    – Host name or IP Address: `ilm-rm.itso.austin.ibm.com`

8. When the Windows Services window opens, we used the following values and then clicked **Next**:

    – Clear Run WebSphere Application Server as a service.
    – Select **Run IBM HTTP Server as a service**.
    – User ID: `WASadmin`
    – Password: `<password>`

9. When the Installation Summary window opens, review your selections and then click **Next** to begin copying files.

10. When the Register window opens, take the appropriate action.

11. When the First Steps window opens, click **Exit**.

12. Click **Finish** in the Installation Wizard window.

9.3.2 Install WebSphere Application Server V5 Fix Pack 2 (V5.0.2)

To install IBM WebSphere Application Server V5 Fix Pack 2, complete the following steps:

1. Ensure that you have stopped all WebSphere Application Server application servers and nodes.

2. Ensure that you have stopped the IBM HTTP Server and IBM HTTP Administration Windows service (WebSphere plug-in fixes).

   Note: The fix pack will attempt to update IBM HTTP Server and will not be able to update the server if it is started.

3. Download WebSphere Application Server V5 Fix Pack 2 at:

   `http://www.ibm.com/support/docview.wss?rs=860&context=SW600&q1=fixpack+2&ui`
   `d=swg24005012&loc=en_US&cs=utf-8&lang=en+en`

4. Unpack WebSphere Application Server V5 Fix Pack 2 to a temporary directory on the target system (for example, c:\temp\was5.fp2). Note that the WebSphere Update Installer Wizard needs write access.

5. Open a command window, and set the JAVA_HOME by running the following command provided with WebSphere Application Server:

   `c:\ibm\WebSphere\AppServer\bin\setupCmdLine.bat`

6. From the command window, start the WebSphere Installation Update Wizard by entering `updateWizard.bat` found in the temporary directory (for example, c:\temp\was5.fp2).

7. When the WebSphere Update Installer language window opens, select the appropriate language for the wizard (for example, English) and then click **OK**.

8. When the Welcome window opens, click **Next**.

9. The WebSphere Update Installer should detect your current WebSphere Application Server version and installation directory (for example, c:\ibm\WebSphere\AppServer). Click **Next**.

10. Select **Install fix packs** and then click **Next**.

11. Enter the directory where you have copied the fix pack. For example, we entered `c:\temp\was5.fp2\fixpacks` in the Fix pack directory text field. Click **Next**.

12. Select the **was50_fp2_win** fix pack (default) and then click **Next**.

13. You will be prompted for the directories for the IBM HTTP Server and the WebSphere Application Server embedded messaging (not installed), we used the following values and then clicked **Next**:

   – Select **IBM HTTP Server**.
   – IBM HTTP Server installation directory: `c:\ibm\IBMHttpServer`
   – Clear Embedded Messaging (not installed).

14. Review the fix pack settings and then click **Next** to begin the fix pack installation of files.

15. When the WebSphere Application Server V5 Fix Pack 2 installation completes, click **Finish**.

9.3.3 Verify WebSphere Application Server V5.0.2

To verify the functionality of WebSphere Application Server V5.0.2 after the installation, complete the following steps:

1. Verify the WebSphere Application Server installation by clicking **Start** → **Programs** → **IBM WebSphere** → **First Steps**.

2. From First Steps, click **Verify Installation**.

   If the server is not started, it will start the server and perform some tests. You will see console output with the status of each test run - passed.

   > **Note:** Alternatively, you can start the Install Verification by opening a command prompt, navigating to the `<was_home>\bin` directory, and running `ivt.bat`.

3. After completing the Verify Installation, click **Exit** in the First Steps window.

4. Ensure that IBM HTTP Server (WebSphere plug-in) is started.

5. Ensure that the server1 application server is started. If not, start the server as follows:

```
cd \ibm\WebSphere\AppServer\bin
startServer server1
```

> **Note:** Review the status of the server startup in startServer.log.
>
> For example, we used the GNU utility to view the logs:
>
> ```
> tail -f c:\ibm\WebSphere\AppServer\logs\server1\startServer.logs
> ```
>
> You should see the following message:
>
> ```
> Server server1 open for e-business
> ```
>
> The server1 directory will not get created until the first time the application server is started.

6. Start the WebSphere administrative console by entering the following URL in a Web browser:

```
http://<was_hostname>:9090/admin
```

7. Log in to the WebSphere administrative console (for example, admin).

8. When done verifying the WebSphere administrative console, click **Logout** close the Web browser.

9. Stop the server1 application server as follows:

```
cd \ibm\WebSphere\AppServer\bin
stopServer.bat server1
```

9.4 IBM GSKit installation

This section describes how to download and install IBM GSKit V7.0.1.16. GSKit is used to manage key stores and certificates. GSKit includes the IBM Key Management Utility and libraries accessible to applications to create and manage certificates.

GSKit V7.0.1.9 installed with IBM Tivoli Directory Server V5.2 on the Directory Server node includes root certificates that have expired. This results in the administrator not being able to create a new key store using the iKeyman utility. By installing the later version, IBM GSKit V7.0.1.16, this issue is addressed, along with other fixes.

9.4.1 Determine GSKit version installed

This section describes how to determine the version of GSKit an application is configured to use in the Windows registry. If you are following the order of installing components documented in this chapter, this section is not necessary, because we install the new GSKit prior to installing components that use it.

> **Note:** The GSKit version can be obtained by using the `gsk7ver.exe` command or by retrieving the version from the Windows registry. We chose to use the Windows registry method because we also needed the REGAPPS value in addition to the version.

If you have not installed IBM Tivoli Directory Server or other software containing IBM GSKit, you can skip this section. To determine the level of GSKit installed, complete the following steps:

1. Start the Windows registry editor (regedit.exe) by clicking **Start** → **Run** and entering `regedit` in the Open field. Click **OK**.

2. Select and expand **HKEY_LOCAL_MACHINE** → **SOFTWARE** → **IBM**.

3. In our example, you will see both the GSK5 and GSK7 registry entries.

4. Select **GSK7** → **CurrentVersion**. Record the data value for the version name.

5. Select **REGAPPS** under the CurrentVersion. This lists the name of the application using the GSKit. Record the name of the application using this version of the GSKit (for example, LDAP).

9.4.2 Uninstall the earlier GSKit version

If following our procedure, this section is not required.

Prior to installing the new IBM GSKit V7.0.1.16, if a GSKit already has been installed, you must manually uninstall the existing IBM GSKit V7.0.1.9 as follows:

1. Ensure that the IBM IBM Tivoli Directory Server V5.2 Windows service has been stopped, as well as other services that might be using the GSKit.

2. Open a command window and navigate to the c:\winnt directory.

3. Run the following command to uninstall the GSKit:

   `gsk7bui LDAP`

   Where `LDAP` is the name of the application using the GSKit.

4. Verify that the GSK7 Windows registry has been removed.

5. Verify that the GSK7 directory has been removed (for example, C:\Program Files\IBM\GSK7).

> **Note:** If files still exist such as DLLs, manually delete the C:\Program Files\IBM\GSK7 directory after the services that locked the files have been stopped.

> **Note:** If you have previously installed applications that use the earlier GSKit V7.0.1.9, they might have updated the system path to include the GSKit installation path. If you decided to change the default GSKit installation path, you might need to manually update the system path to include the correct GSKit installation path.

9.4.3 Install GSKit V7.0.1.16

To download and install IBM GSKit V7.0.1.16, complete the following steps:

1. IBM GSKit V7.0.1.16 can be obtained by one of the following methods:

   – Request the GSKit V7.0.1.16 from IBM support at:
     `http://techsupport.services.ibm.com/guides/tivoli_contacts.html`

   Or:

   – Download the IBM HTTP Server V1.3.28, which include IBM GSKit V7.0.1.16 at:
     `http://www.ibm.com/support/docview.wss?rs=177&context=SSEQTJ&uid=swg24006718`

   > **Note:** From the URL listed, you will have to log in as a registered user (or register first). After you navigate to the download page by platforms you will see a list of fixes.
   >
   > We downloaded the WINDOWSPQ86671IHS1.3.28.zip (PQ86671) for IBM HTTP Server V1.3.28 to the c:\temp directory and unpacked the ZIP file.

2. Open a command window and navigate to the directory in which you have unpacked the WINDOWSPQ86671IHS1.3.28.zip file.

3. Enter the following at the command line to extract the GSKit:

   `gsk7bas c:\temp`

   Where `c:\temp` is the directory into which to extract the GSKit installation files.

4. From the command window, navigate to the directory where you extracted the GSKit installation files (for example, c:\temp).

5. Run the GSKit installer as follows:

```
setup <application_name>
```

Where `<application_name>` is the name of the application using GSKit V7.0.1.16 (for example, LDAP).

For example:

```
setup LDAP
```

6. When the Welcome window opens, click **Next**.

7. When the Choose Destination Location window opens, we entered `c:\ibm\gsk7` for the destination folder using the Browse button. Click **Next** to proceed.

8. When the setup is complete, click **Finish**.

9.5 IBM HTTP Server SSL configuration

As a prerequisite to DB2 Content Manager resource manager, this section describes how to configure SSL for IBM HTTP Server and the IBM HTTP administration server.

We organize the section into the following tasks:

- ► Enable the httpd.conf file for SSL
- ► Copy WebSphere plug-in entries
- ► Create the IBM HTTP Server key store
- ► Create a certificate for IBM HTTP Server
- ► Verify IBM HTTP Server

9.5.1 Enable the httpd.conf file for SSL

To modify the httpd.conf file to enable SSL support, complete the following steps:

1. Stop the IBM HTTP Server V1.3.26 Windows service.

2. Back up the original httpd.conf file. For example:

```
cd \<ihs_home>\conf
copy httpd.conf httpd.conf.org
```

3. Copy the httpd.conf.sample containing the commented SSL directives to httpd.conf. For example:

```
copy httpd.conf.sample httpd.conf
```

4. Open the <ihs_home>\conf\httpd.conf file with a text editor.

5. Search for the following lines, uncomment the # symbol, and modify the settings as follows:

– Verify the ServerName value. This should include your fully qualified host name (for example, `cmrm1.itso.ral.ibm.com`):

```
ServerName <fully_qualified_hostname>
```

– Uncomment the IBM SSL module for the given SSL encryption level (56 or 128 bit). For example:

```
LoadModule ibm_ssl_module modules/IBMModuleSSL128.dll
```

> **Note:** Where 56 or 128 is the appropriate encryption level for your locale. For example, 128 for 128-bit encryption in the U.S. and Canada.

– Uncomment the following line to listen on port 443 for HTTPS:

```
Listen 443
```

– Uncomment and update the VirtualHost with your host name as follows:

```
<VirtualHost hostname.domain.com:443>
```

> **Note:** Substitute your fully qualified host name in this line (for example, `<VirtualHost ilm-rm.itsc.austin.ibm.com:443>`).

– Uncomment:

```
SSLEnable
```

– Uncomment:

```
</VirtualHost>
```

– Uncomment and update the following:

```
Keyfile "<ihs_home>/ssl/keyfile.kdb"
```

> **Note:** The keyfile path has been modified to include *ssl* instead of keys.
>
> For example:
>
> ```
> Keyfile "c:\ibm\IBMHttpServer/ssl/keyfile.kdb"
> ```

– Uncomment:

```
SSLV2Timeout 100
SSLV3Timeout 1000
```

6. Save the changes to the httpd.conf file.

9.5.2 Copy WebSphere plug-in entries

During the installation of the IBM HTTP Server and WebSphere plug-in, the httpd.conf file was updated with the plug-in entries. Now that we have copied the httpd.conf.sample file in the previous section to enable the SSL directives, we now also need to add the WebSphere plug-in entries to the httpd.conf file. To copy the plug-in entries, complete the following steps:

1. Change to the directory the IBM HTTP Server <ihs_home>\conf directory.

2. Modify the httpd.conf file, adding the following for the WebSphere plug-in at the end of the file:

```
LoadModule ibm_app_server_http_module
"c:\ibm\WebSphere\AppServer/bin/mod_ibm_app_server_http.dll"

WebSpherePluginConfig
"c:\ibm\WebSphere\AppServer/config/cells/plugin-cfg.xml"
```

> **Tip:** The above text is two separate lines. Within the httpd.conf file, the lines are not wrapped.
>
> If you backed up the httpd.conf.org file, you can cut and paste the plug-in entries to the SSL enabled httpd.conf file.

9.5.3 Create the IBM HTTP Server key store

To create the IBM HTTP Server key store database used to store certificates, complete the following steps:

1. From Windows, click **Start** → **Programs** → **IBM HTTP Server 1.3.26** → **Start Key Management Utility**.

2. From the menu bar, click **Key Database File** → **New**.

3. In the New window, enter the following values and then click **OK**:

   – Key Database Type: **CMS key database file**
   – File name: keyfile.kdb
   – Location: <ihs_home>\ssl (for example, c:\ibm\IBMHttpServer\ssl)

   > **Note:** This path must match the keyfile path in the httpd.conf.

4. In the Password Prompt window, enter the following values and then click **OK**:

   – Password: <your_password> (to protect the key store file).
   – Select **Set expiration time** and enter the number of days before the password will expire. If no expiration is required, do not select this option.

> **Note:** Although not required in a development environment, we recommend that you set an expiration period for all key stores used in production environments.

– Select **Stash the password to a file**.

> **Note:** IBM HTTP Server accesses the password-protected key store.

5. When the information window opens with the following message, click **OK**:

```
The password has been encrypted and saved in the file:
c:\ibm\IBMHttpServer\ssl\keyfile.sth
```

9.5.4 Create a certificate for IBM HTTP Server

For development and testing purposes, we create a new self-signed certificate. The following steps outline the creation of a new self-signed certificate:

1. From the Key Management Utility menu bar, select **Create** → **New Self-Signed Certificate**.

   If you closed the Key Management Utility, you need to open the key store first.

2. Fill in the information about the form and click **OK**. For example, we used the following values:

   – Key Label: `IBM HTTP Server key`
   – Common Name: `<fully_qualified_hostname>`
   – Organization: `<your_organization_name>` (for example, ibm)

> **Note:** For the production IBM HTTP Server, you should create a new certificate request (do not use a self-signed certificate).

3. When done, close the Key Management Utility.

9.5.5 Verify IBM HTTP Server

After the IBM HTTP Server configuration, we recommend that you complete the following verification tests.

Start IBM HTTP Server

Restart the IBM HTTP Server service for the changes to take effect. It can be started by one of the following methods:

► IBM HTTP Server 1.3.26 Windows service

  Or:

► From the command line or batch file containing the following:

  ```
  net start "IBM HTTP Server 1.3.26"
  ```

Verify the IBM HTTP Server

To verify that IBM HTTP Server is working properly, enter the following URLs in a Web browser after IBM HTTP Server has been started:

► Verify HTTP:

  ```
  http://<hostname>
  ```

► Verify HTTPS:

  ```
  https://<hostname>
  ```

Backup the httpd.conf file

After you have verified that IBM HTTP Server is working properly with SSL enabled, we recommend that you make a backup of the <ihs_home>\conf\httpd.conf file to httpd.conf.was.ssl.

9.5.6 Configure SSL for IBM HTTP administration server

For details about configuring SSL for IBM HTTP administration server, refer to *IBM Content Manager for Multiplatforms: Planning and Installing Your Content Management System Version 8 Release 2*, GC27-1332-02.

For our example, we did not complete this step because we will not manage IBM HTTP Server using the Administration Server.

9.6 WebSphere Application Server configuration

This section describes the need to get proper certificates on the Content Management node for the WebSphere Application Server and WebSphere plug-in. In addition, we provide a procedure for restricting ports to WebSphere Application Server.

9.6.1 Certificates

By default after installation, the WebSphere Application Server Secure Sockets Layer (SSL) is configured with a *dummy* certificate. Before moving to production with DB2 Content Manager, ensure that the WebSphere Application Server and WebSphere plug-in certificate get updated with a proper certificate.

> **Note:** For development testing purposes, this step is not required.

9.6.2 Restrict ports for WebSphere Application Server

For security reasons, restrict the ports of your resource manager application server to *localhost*.

> **Note:** This step is recommended for a production environment, but not required for development purposes.

To restrict ports for WebSphere Application Server V5.0.1, complete the following steps:

1. Start the server1 application server with the WebSphere administrative console enterprise application is installed.

   ```
   cd \ibm\WebSphere\AppServer\bin
   startServer server1
   ```

2. Start the WebSphere administrative console by entering the following URL in a Web browser:

   ```
   http://<was_hostname>:9090/admin
   ```

3. Log in to the WebSphere administrative console (for example, admin).

4. Click **Servers** → **Application Servers**.

5. Click **server1**.

6. Click **Web Container** → **HTTP transports**.

7. Update the host field for each port from `*` to `localhost`.

8. For each port you changed for your WebSphere Application Server, you must click **Environment** → **Virtual Hosts** → **<default_host>** → **Host Aliases** and update the specific port from `*` to `localhost`.

9. Update the WebSphere plug-in.

10. Restart IBM HTTP Server for the new plugin-cfg.xml file to be read immediately and the changes to become active.

9.7 DB2 Records Manager installation

This section describes how to install the DB2 Content Manager resource manager on the Resource Manager node.

9.7.1 Prerequisites for DB2 Records Manager

This section outlines the prerequisites that must be completed prior to installing DB2 Records Manager. All prerequisite steps listed in this section should already have been completed if you have followed the procedure in this document. Review the prerequisites to ensure that you meet all of them:

► IBM DB2 Universal Database V8.1, Enterprise Server Edition with Fix Pack 4a is installed.

► WebSphere Application Server is installed.

► SSL is enabled for the IBM HTTP Server.

► User IDs with rights and privileges for DB2 Records Manager are created.

► You have enough temporary space (at least 100 MB of temporary free space).

► Your %PATH% is not too long. Remove duplicate path entries if they exist. Windows has a 1024 character limit for environment.

9.7.2 Install DB2 Records Manager

To install DB2 Records Manager, complete the following steps

1. Ensure that you are logged in to Windows with the RMADMIN administrator user ID.

2. Ensure that the WebSphere Application Server server1 is started, c:\IBM\WebSphere\AppServer\startServer.bat server1.

Before you begin
You must install an IBM DB2 Records Manager database before you can install and use DB2 Records Manager. Although the IBM DB2 Records Manager installation application guides you through this process, you should be familiar with the database creation procedure and terminology. Refer to your DB2 documentation. See Table 9-2 on page 209 for a description of the required database attributes.

Table 9-2   Required database attributes

Field	Description	Our example values
DB2 Node/Instance Name	The name defined for the server instance within the DB2 Command Center.	`DB2`
Database Name	The name of the database to be created.	`RecManDB`
Default Disk	Physical storage location for the database file to be installed. This is usually designated by a drive letter.	`C`
Folder for Database Containers	The directory for the installation of the database files.	`C:\IBM\RecordsManagerData\`
User Name	The Records Manager administrative ID.	`RMADMIN`
User Password	The Records Manager administrative ID password.	`<password>`
Territory	The locale that is mapped to the country code for internal processing by the database manager default.	`<default>`
Collating Sequence	The sequence in which the characters are ordered for the purpose of sorting, merging, comparing, and processing indexed data sequentially.	`System`
DB language	If the database language is different from the default language on your computer, you can specify a language identifier. The language must be available on the platform where you are running the installation.	`English`
Sys Admin User Name	Name of the database user with system administrator privileges for the DB2 database instance.	`DB2admin`
Sys Admin User Password	Password of the database user with system administrator privileges for the DB2 database instance.	`<password>`

9.7.3 Create the DB2 Records Manager database

To create the DB2 Records Manager database, complete the following steps:

1. Insert the *DB2 Records Manager* CD. Cancel the automatic installation and then navigate to the CD-ROM directory and execute the `irm312_dbinstall_win32.exe` setup program to begin the database installation.

2. Select the language of the text to be displayed while the InstallShield Wizard runs. Click **Next** to continue the installation.

3. The Software License Agreement window opens. Read the DB2 Records Manager license terms. If you accept the license terms, click **I accept the terms of the license agreement**. If you do *not* accept the license terms, the installation program terminates. Click **Next** to continue the installation.

4. The Readme window opens. Review the contents of the DB2 Records Manager *readme*. The *readme* contains last-minute information and tips you should know before the installation. Click **Next**.

5. In the Install directory window, choose the directory where the DB2 Records Manager database files will be installed. The field displays the default location. We installed the database in the C:\IBM\RecordsManagerData\ directory. Click **Next**.

6. When the select database type window opens, select **DB2** and provide the path to the JDBC driver. We entered `C:\IBM\SQLLIB\java`. Click **Next**.

7. Next, the DB2 Database Configuration window opens. Refer to Table 9-2 on page 209 for descriptions of the attributes required in this window. We entered the values shown in Figure 9-2. Click **Next**.

Figure 9-2   Records Manager database configuration value entry

8. In the Database File Plan Information window, select the type of database file plan you want to install. You have two choices. Select **Empty** if you want to install an empty database. Select **Sample** if you want to install a sample database. We installed the sample data. Click **Next**.

9. In the Summary information window, review the summary information and then click **Next** to begin the installation. After the installation completes, the Finished window opens.

> **Note:** Be patient, the installer does not provide a progress indicator.

10. The installation is now complete. Click **Finish** to exit the DB2 Records Manager database installation.

11. After installing the database, launch the DB2 Command Line Processor from a Windows command prompt using the following command:

    ```
    connect to RecManDB user RMADMIN using <password>
    ```

12. issue the following command to list all the tables:

    ```
    list tables
    ```

13. Without samples, you should see 95-96 tables listed; with samples, you should see 111-112 tables listed.

14. issue the following commands to disconnect:

    ```
    connect reset
    exit
    ```

15. Do not reboot the system.

9.7.4 Install DB2 Records Manager Engine

This section describes how to install the DB2 Records Manager Engine.

Before you begin

During the DB2 Records Manager installation, you will be prompted to enter information regarding your WebSphere Application Server configuration. Before you begin the installation, gather the WebSphere information shown in Table 9-3 so that you are ready when prompted.

Table 9-3   WebSphere information required for Records Manager installation

Field	Description	Our example value
Host Name or IP Address	Host name or IP address of the physical computer on which you are installing WebSphere Application Server.	ilm-rm.itsc.austin.ibm.com
Connector Type	Type of communication interface between the server and clients. The application uses SOAP.	SOAP
Connector Port	Port number that the WebSphere Application Server messag.e queue will use for message queues	8880

Field	Description	Our example value
Cell	Cell is an arbitrary, logical grouping of one or more nodes in a WebSphere Application Server distributed network.	`ilm-rm`
Node	Node is a physical computer system with a distinct IP host address.	`ilm-rm`
Server	Server name of the WebSphere Application Server instance to be created to contain the DB2 Records Manager Engine application.	`server1`

9.7.5 Install DB2 Records Manager Version 3.1.2 Engine

Although the target version is DB2 Records Manager Version 3.1.3, we must first install the Version 3.1.2 Engine as a prerequisite for V3.1.3.

To install the DB2 Records Manager Version 3.1.2 Engine, complete the following steps:

1. Ensure that WebSphere Application Server server1 is running.

> **Note:** For our installations, we verified that the server is running by launching the WebSphere Application Server administrative client. You can also verify that the server is running by viewing the server SystemOut log file located within the WebSphere Application Server logs\server1 directory. For our installation, this log file is located at C:\IBM\WebSphere\AppServer\logs\server1\SystemOut.log

2. Insert the *DB2 Records Manager* CD. Cancel the automatic installation and then navigate to the CD-ROM directory and execute the `irm312_engine_win32.exe` setup program to begin the engine installation.

3. Select the language of the text to be displayed while the InstallShield Wizard runs. Click **Next** to continue the installation.

4. The Software License Agreement window opens. Read the DB2 Records Manager license terms. If you accept the license terms, click **I accept the terms of the license agreement**. If you do *not* accept the license terms, the installation program terminates. Click **Next** to continue the installation.

5. The Readme window opens. Review the contents of the DB2 Records Manager *readme*. The *readme* contains last-minute information and tips you should know before the installation. Click **Next**.

6. In the Install directory window, choose the directory where the DB2 Records Manager database files will be installed. The field displays the default location. We installed the database in the C:\IBM\RecordsManager\ directory. Click **Next**.

7. When the select setup type window opens, select **Custom**. Click **Next**.

8. In the Installation features window, select all components, as shown in Figure 9-3. Click **Next**.
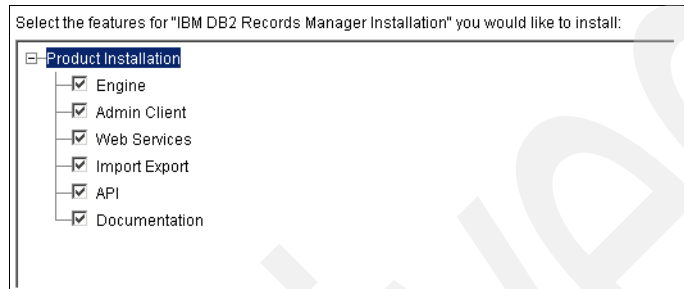
Figure 9-3   Records Manager features

9. When the installation deployment options window opens, choose **I want installer to do deployment and configuration for me**. Click **Next**.

10. The WebSphere Application Server connection window opens. Enter the values as shown in Table 9-3 on page 211. For our installation, we entered the values listed Figure 9-4. Click **Next**.

Figure 9-4   Records Manager: Application Server Connection Information

11. In the Records Manager Administrative Client window, accept the default values for Root and Engine Server ORB Port. Enter the host name of your Records Manager server in the Engine Server Name field. For our installation, we entered the values shown in Figure 9-5 on page 214. Click **Next**.

Figure 9-5   Records Manager: Admin Client Configuration

12. In the Specify JDBC driver class path window, enter the path to your DB2 java installation directory. For our installation, we entered `C:\IBM\SQLLIB\java`. Click **Next**.

13. In the DB2 Data Source Configuration window, enter the values for your DB2 database configuration as defined in 9.7.3, "Create the DB2 Records Manager database" on page 209. For our installation, we entered the values shown in Figure 9-6. Click **Next**.
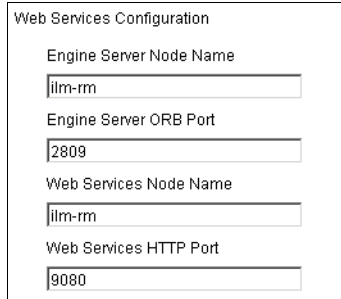
Figure 9-6   Records Manager: DB2 Data Source Configuration

14. In the Web Services Configuration window, accept the default values for Engine Server ORB Port and Web Services Node Name. Enter the values for your Records Manager server in the Engine Server Node Name and Web Services Node Name fields. For our installation, we entered the values shown in Figure 9-7 on page 215. Click **Next**.

Figure 9-7   Records Manager: Web Services Configuration

15. In the Summary information window, review the summary information and then click **Next** to begin the installation. After the installation completes, the Finished window opens.

16. The installation is now complete. Click **Finish** to exit the DB2 Records Manager Engine installation.

9.7.6 Verify DB2 Records Manager

After installing IBM DB2 Records Manager Version 3.1.2, perform the following installation verification steps:

1. Start the WebSphere administrative console.

2. Expand **Applications**.

3. Select **Enterprise Applications**.

4. Verify that the following three Records Manager applications are installed:
   – DB2 Records Manager
   – DB2 Records Manager WebServices
   – IRMClientEAR

5. Stop server1. Click **Start** → **Programs** → **IBM WebSphere** → **WebSphere Application Server 5.0** → **Stop the Server**.

   Alternatively, stop server1 from the command line as follows:

   ```
   c:\ibm\WebSphere\AppServer\bin\stopServer server1
   ```

6. Start server1. Click **Start** → **Programs** → **IBM WebSphere** → **WebSphere Application Server 5.0** → **Start the Server**.

   Alternatively, start server1 from the command line as follows:

   ```
   c:\ibm\WebSphere\AppServer\bin\startServer server1
   ```

7. Launch the WebSphere administrative console.

8. Verify that IBM DB2 Records Manager, IBM DB2 Records Manager WebServices, and IRMClientEAR are now started (green arrows in the Status column).

9. Validate that the Records Manager application is functional. Use the following URL to verify the connection to the applications:

`http://<IRMserver>:9080/IRMClient/doLogin.do?lang=en`

10. The IBM DB2 Records Manager Administrator Login window opens:

   – Log in with the following credentials:

     • Name: `Administrator`

     • Password: `cronos`

   – Log out.

The installation of DB2 Records Manager Version 3.1.2 Engine is now complete.

9.7.7 Install DB2 Records Manager Version 3.1.3 Engine

The purpose of this Fix Pack is to provide compatibility with DoD 5015.2 v7.5 test cases. V7.5 introduced changes that required modifications to DB2 Records Manager.

> **Note:** In IBM DB2 Records Manager Version 3.1.3, there are no new database components; the same database components exist for Version 3.1.1 and 3.1.2. DB2 Records Manager V3.1.3 supports WebSphere Application Server 5.0.2 and currently does not support previous or future versions of WebSphere.

To install DB2 Records Manager Version 3.1.3 Engine, complete the following steps:

1. Stop all running Records Manager applications:

   – DB2 Records Manager
   – IBM DB2 Records Manager WebServices
   – IRMClientEAR

   To stop these Records Manager applications, complete the following steps:

   a. Launch the WebSphere administrative client.

   b. Expand **Applications** → **Enterprise Applications**.

   c. Select the following Records Manager applications:

     • DB2 Records Manager
     • IBM DB2 Records Manager WebServices

- IRMClientEAR

d. Click **Stop**.

e. Ensure that all three applications stop successfully as indicated by the application status column symbol represented a circle with a red cross. Figure 9-8 illustrates this.
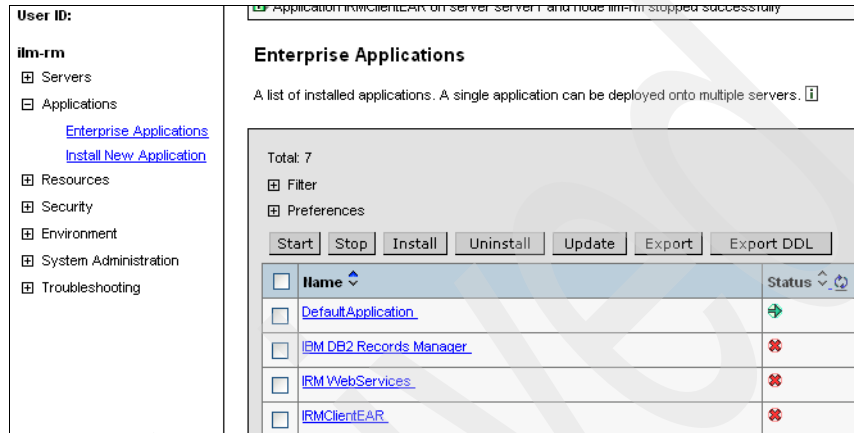
Figure 9-8   Records Manager: WebSphere Application Server configuration (Stop)

2. Insert the *DB2 Records Manager* CD. Cancel the automatic installation and then navigate to the CD-ROM directory and execute the `irm313_engine_win32.exe` setup program to begin the engine installation.

3. Select the language of the text to be displayed while the InstallShield Wizard runs. Click **Next** to continue the installation.

4. The Software License Agreement window opens. Read the DB2 Records Manager license terms. If you accept the license terms, click I **accept the terms of the license agreement**. If you do *not* accept the license terms, the installation program terminates. Click **Next** to continue the installation.

5. The Readme window opens. Review the contents of the DB2 Records Manager *readme*. The *readme* contains last-minute information and tips you should know before the installation. Click **Next**.

6. In the Install directory window, choose the directory where the DB2 Records Manager database files will be installed. The field displays the default location. We installed the database in the C:\IBM\RecordsManager\ directory. Click **Next**.

7. When the select setup type window opens, select **Custom**. Click **Next**.

8. Complete the DB2 Records Manager Version 3.1.3 upgrade by following steps 7-21 in 9.7.5, "Install DB2 Records Manager Version 3.1.2 Engine" on page 212.

9. Start the following Records Manager applications:

   – DB2 Records Manager
   – IBM DB2 Records Manager WebServices
   – IRMClientEAR

   To start these Records Manager applications, complete the following steps:

   a. Launch the WebSphere administrative client.

   b. Expand **Applications** → **Enterprise Applications**.

   c. Select the following Records Manager applications:

      • DB2 Records Manager
      • IBM DB2 Records Manager WebServices
      • IRMClientEAR

   d. Click **Start**.

   e. Ensure that all three applications stop successfully as indicated by the application status column symbol represented as a green arrow. Figure 9-9 illustrates this.
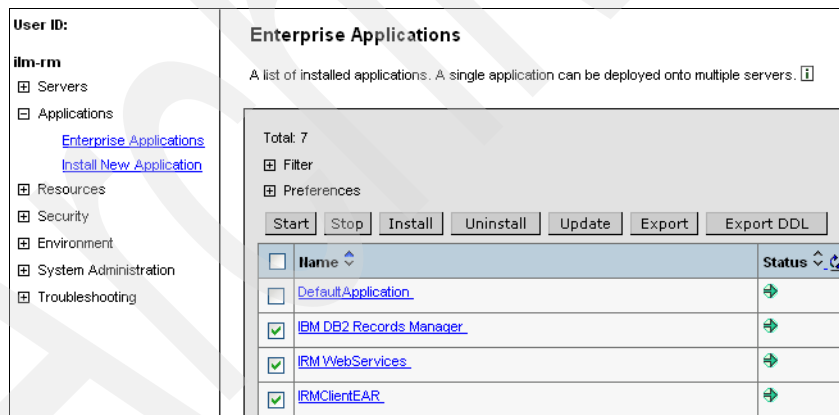
Figure 9-9   Records Manager: WebSphere Application Server configuration (Start)

10. Validate that the Records Manager application is functional. Use the following URL to verify connection to the applications:

`http://<IRMserver>:9080/IRMClient/doLogin.do?lang=en`

11. The IBM DB2 Records Manager Administrator Login window opens:

   – Log in with the following credentials:

      • Name: `Administrator`

      • Password: `cronos`

   – Log out.

The installation of DB2 Records Manager Version 3.1.3 Engine is now complete.

9.8 DB2 Records Manager Enabler Version 8.2.820.600 installation

This section describes the steps required to install the IBM DB2 Records Manager Enabler for Content Manager on the Content Manager server node.

9.8.1 Preinstallation tasks

Before installing Records Manager Enabler (RME), complete the following tasks:

1. Set up the Records Manager Enabler install folder.

   On systems that you plan to install one or more of the RME components, you need to create a RME install folder. For our example, we created the C:\IBM\RMenabler RME folder.

2. Create and update system environment variables:

   – Create a new system environment variable called RMEROOT and set its value to the C:\IBM\RMenabler install folder created in the previous step. In our environment, the variable is set to RMEROOT=C:\IBM\RMenabler.

   – Create a new system environment variable called RMELANG and set its value to the appropriate language for your installation. In our environment, the English language is used, so the variable is set to RMELANG=en. Table 9-4 shows the supported languages for Records Manager Enabler.

Table 9-4   Records Manager Enabler supported languages

RMELANG value	Language
de	German
en	English (U.S.)
es	Spanish
fr	French

RMELANG value	Language
it	Italian
ja	Japanese
ko	Korean
pt	Brazilian Portuguese
zh	Simplified Chinese
zh_TW	Traditional Chinese

9.8.2 Install Records Manager Enabler Common Client support

The RME Common Client support includes the RME support for all
Windows-based client applications (for example, the DB2 Content Manager
Client for Windows, Lotus Notes client, and Microsoft Outlook 2000 client).
Therefore, it needs to be installed on *all* RME client application machines. The
DB2 Records Manager server uses the Content Manager V8 connector to
communicate with the Content Manager server, and therefore, it requires the
installation of the Content Manager V8 connector only.

The Content Manager V8 connector can be installed as a component of the DB2
Information Integrator for Content client installation or by installing the DB2
Content Manager Client for Windows Version 8.2 with Fix Pack 6.0. For our
purposes, we install the Content Manager Client for Windows, because this client
will also provide a convenient user interface for access to Content Manager
content.

IBM DB2 Content Manager Client for Windows installation

This section describes how to install the IBM DB2 Content Manager Client for
Windows Version 8.2 on a remote node to the Content Management node for
administration purposes.

To install the Content Manager Client for Windows, complete the following steps:

1. Ensure that the WebSphere Application Server server1 application server on
   the Content Management node is started.

2. Insert the *Content Manager V8.2 Client for Windows* CD.

3. Navigate to the root of the CD start the installation by running `Setup.exe`.

4. Select the language.

5. When the Welcome window opens, click **Next**.

6. When the Destination Folder window opens, click **Change** and set the install directory (for example, `c:\ibm\CMw32Client`). Click **OK** to return to the Destination Folder and then click **Next** to continue.

7. Select the **Typical Install** and then click **Next**.

8. When the Content Manager Version 8 Properties File Location window opens, review the information in the window carefully. Enter the directory of the Content Manager properties files (for example, `c:\ibm\CMgmt`) and then click **Next**.

9. When the DB2 Content Manager Initialization Files Location - Remote window opens, leave the http:// field blank and click **Next**.

10. When the DB2 Content Manager Initialization Files Location - Local window opens, enter the directory of the DB2 Content Manager initialization files (for example, `c:\ibm\CMgmt`) and then click **Next**.

11. When the DB2 Content Manager Initialization Files - Create window opens, enter the following values:

    – Datastore Alias Name: `icmnlsdb`
    – Database Schema Name: `icmadmin`

    > **Note:** The database schema name is determined by the user ID that was logged in to create the database. If you are not sure, use the DB2 Control Center and select the tables for the database. The schema name will be displayed.

    – User ID: `CMadmin`
    – Password: `<password>`
    – Database Location: `<Remote>`
    – Authentication: **Server**

12. When the Content Manager - Remote Database Catalog Information window opens, enter the following values and then click **Next**:

    – Hostname of database server: `ilm-cm.itsc.austin`.ibm.com
    – Database Node name: `DB2`
    – Port number: `50000`

    > **Note:** The connection port is defined in the DB2 dbm SVCENAME. To see to what the SVCENAME is set, enter the following:
    >
    > ```
    > db2 get dbm cfg | more
    > ```
    >
    > When you know the SVCENAME value, you can look at the /winnt/system32/drivers/etc/services file to determine the corresponding port number.

- Remote Database Name: `icmnlsdb`
- Operating System of server: **WinNT/2000**

13. When the Ready to Install the Program window opens, click **Install**.

14. Click **Finish** to close the wizard.

DB2 Content Manager Client for Windows V8.2 Fix Pack 6 installation

This section describes the installation steps for DB2 Content Manager Client for Windows V8.2 Fix Pack 6.

The fix pack can be downloaded from the following site and will provide you with a list of fix packs:

```
http://www.ibm.com/support/search.wss?rs=86&rankfile=8&tc=SSRS7Z&dc=D420&dtm
```

To install DB2 Content Manager Client for Windows V8.2 Fix Pack 6, complete the following steps:

1. Select Fix Pack 6 and download it to a local disk.

2. Stop all running servers as follows:
   - Stop WebSphere Application Server.
   - Stop and restart the DB2 instance.

   > **Note:** The DB2 instance is running at this point.

3. Click **Update** to begin the fix pack installation.

4. Click **Finish** to complete the installation.

DB2 Content Manager Client for Windows verification

If there are no error messages during the installation, it was successful.

You can verify this by checking the product version in the support information of the Add or Remove Programs panel in Windows.

After restarting all components, you should be able to log in to the Client for Windows and work with your data.

To verify that the IBM DB2 Content Manager V8.2 Client for Windows was installed and configured correctly, complete the following services:

1. To start the DB2 Content Manager Client for Windows, click **Start** → **Programs** → **IBM Content Manager V8** → **Client for Windows**.

2. Log on as a Content Manager user. For example:
   – Server: **ICMNLSDB**
   – User ID: CMadmin
   – Password: <password>

   Click **OK**.

3. When the Welcome window opens, click **Search**.

4. When the Basic Search window opens, specify your search criteria and click **OK**. A result folder should be displayed.

Microsoft SOAP Toolkit and MSXML Parser installation

All of the RME Windows-based applications require the Microsoft Simple Object Access Protocol (SOAP) Version 3.0 and MSXML Parser Version 4.0 packages.

You can download and install the Microsoft SOAP Toolkit Version 3.0 package from the Microsoft download Web site. Go to the following site and search for SOAP:

> http://www.microsoft.com/downloads

Follow the installation instructions in the package to install the SOAP Toolkit. The installation might install Microsoft MSXML Parser Version 4.0 for some of the Windows system platforms. If the SOAP Toolkit installation does not install the Microsoft MSXML Parser Version 4.0 package, download it from the Microsoft Web site and install it separately.

9.8.3 Install Records Manager Enabler CommonWin32 component

The RME CommonWin32 component contains the files required to support the Windows-based RME client applications. To install the CommonWin32 component, complete the following steps:

1. Unzip the RME_CommonWin32.zip file to the RME install folder c:\IBM\RMenabler.

2. Register the SOAP DLL.

   After the installation of the RME_CommonWin32.zip file, you need to register the SoapHeaderHandler.dll.

3. Open a command prompt window.

4. Change directory to the bin folder in the RME install folder:

   > c:\IBM\RMenabler\bin

5. Enter the following command to register the SoapHeaderHandler.dll:

   > regsvr32 SoapHeaderHandler.dll

The `regsvr32` command will return the following message if it is successful:

```
DllRegisterServer in SoapHeaderHandler.dll succeeded
```

Note: You must reregister the SoapHeaderHandler.dll every time you reinstall the RME_CommonWin32.zip file on the system.

9.8.4 Install Records Manager Enabler DB2 Records Manager server component

The Records Manager Enabler DB2 Records Manager server component enables the DB2 Records Manager server to communicate with the Content Manager server to provide support for the RME functions. The RME functions allow the DB2 Records Manager server to support Content Manager users and user groups, retrieve record contents from Content Manager, delete contents from Content Manager, and enforce record life-cycle rules on declared Content Manager items.

To install the RME DB2 Records Manager server component, complete the following steps:

1. Stop the DB2 Records Manager Web applications

   – Start the WebSphere administrative console.
   – Select **Applications** → **Enterprise Applications**.
   – Select **IBM DB2 Records Manager**.
   – Select **IRMClientEAR**.
   – Click **Stop**.

2. Install RME_CommonJava.zip. Unzip RME_CommonJava.zip to the RME install folder C:\IBM\RMenabler.

   Note: The RME_CommonJava.zip file contains the Java common code and the Records Manager Enabler Host Interface component.

3. Install RME_IRMClient.zip. Unzip the RME_IRMClient.exe to the DB2 Records Manager server install folder C:\IBM\WebSphere\AppServer\installedApps\ilm-rm\IRMClientEAR.ear\IRMClient.war (replace "ilm-rm" with the host name for your installation).

4. Update the WEB-INF config RME configurations.

> **Important:** You must run the `RMEUpdate.bat` utility to update the DB2
> Records Manager struts-config.xml and tiles-def.xml files to support
> Records Manager Enabler enhancements on the DB2 Records Manager
> server. You must run this utility whenever a fix pack is installed on DB2
> Records Manager software.
>
> This utility will update struts-config.xml and tiles-defs.xml which are located
> in WEB-INF directory. Backups of the existing struts-config.xml and
> tiles-defs.xml files will be created as: struts-config.xml.orig and
> tiles-defs.xml.orig.

5. Execute the R`MEUpdate.bat` utility:

   a. Stop the WebSphere Application Server server1.

   b. Open a command prompt window and change the directory to
      C:\IBM\WebSphere\AppServer\installedApps\ilm-rm\IRMClientEAR.ear\IR
      MClient.war (replace "ilm-rm" with the host name for your installation).

   c. Enter the following from the command prompt:

      ```
      RMEUpdate.bat C:\IBM\WebSphere WEB-INF
      ```

      Replace "IBM" with the WebSphere parent directory for your installation.

   d. Close the command prompt window.

9.9 Summary

We have now installed the Content Management node. Additional configuration
is necessary, which we provide in Chapter 10, "Configuration" on page 227.

10

Configuration

This chapter describes the configuration tasks needed after the successful installation of all four nodes. These configuration tasks must be done before deployment of the application components.

This chapter is organized into the following configuration sections:

► Configure the Portal node:
  – Configure IBM Tivoli Directory Server
  – Create users in IBM Tivoli Directory Server
  – Configure WebSphere Portal for IBM HTTP Server
  – Configure WebSphere Portal for IBM Tivoli Directory Server

► Configure the Business Integration node:
  – Configure WebSphere Application Server for Directory Server
  – Configure business process container on WebSphere Application Server

► Configure the Content Management node:
  – Configure DB2 Content Manager for LDAP
  – Configure the LDAP User Import Scheduler
  – Configure the DB2 Content Manager RME functions
  – Configure the RME Host Interface component

► Configure the Records Management node:
  – Configure the RME Host Interface component
  – Configure DB2 Records Manager

10.1 Configure the Portal node

Recall that our Portal node includes several software components including IBM WebSphere Portal and IBM Tivoli Directory Server.

This section explains how to configure all software components running on the Portal node in order to run the sample application described in this book.

> **Note:** When configuring the Portal node, we referenced the following information:
>
> ► IBM Redbook *Document Management Using WebSphere Portal V5.0.2 and DB2 Content Manager V8.2*, SG24-6349
>
> ► *IBM WebSphere Portal Extend for Multiplatforms V5.0.2 Information Center* at:
>
>   http://www.ibm.com/websphere/portal/library
>
> ► IBM Redbook *IBM WebSphere Portal for Multiplatforms V5 Handbook*, SG24-6098
>
> ► IBM Redbook *A Secure Portal Using WebSphere Portal V5 and Tivoli Access Manager V4.1*, SG24-6077

10.1.1 Configure IBM Tivoli Directory Server

The steps described in the following sections must be performed to ensure that IBM Tivoli Directory Server is configured properly for our environment.

Start the IBM Tivoli Directory Server Configuration Tool

During the first restart of your system after the IBM Tivoli Directory Server installation, the IBM Tivoli Directory Server Configuration Tool will be launched automatically.

Alternatively, start the Configuration Tool by clicking **Start** → **Programs** → **IBM IBM Tivoli Directory Server V5.2** → **Directory Configuration**.

Set the administrator DN and password

To set the administrator distinguished name (DN) and password using the IBM Tivoli Directory Server Configuration Tool, complete the following steps:

1. Click **Administrator DN/password** under Choose a task (see Figure 10-1 on page 229).

2. Enter the Administrator DN and password and click **OK**:

   – Administrator DN: `cn=TDSadmin`
   – Password: `<your_password>`

3. When prompted with `Administrator DN and password successfully updated`, click **OK**.

Figure 10-1   Setting the Tivoli Directory Server Administrator DN and password

Create and configure the directory database

To create and configure the IBM Tivoli Directory Server directory database from the IBM Tivoli Directory Server Configuration Tool, complete the following steps:

1. Click **Configure database** under Choose a task.

2. Select **Create a new database** and then click **Next**.

3. When the Configure database - User ID page opens, enter the User ID and password created in "Create DB2 database owner" on page 129 (for example, `DB2admin`) and then click **Next**.

4. When the Configure database name page opens, enter the database name to be created (for example, `ldapdb`) and click **Next**.

5. When the Configure database code page opens, select **Create a universal DB2 database (UTF-8/UCS-2)** and click **Next**.

6. When the Configure database location opens, select the drive (for example `C`) and click **Next**.

7. When the Configuration Summary page opens, review selections and click **Finish**.

8. During the configuration the configuration status will be displayed. Notice that a DB2 instance is created with the name of the user designated as the DB2 owner (for example, `DB2admin`).

You should see the following messages if successful:

```
Configured IBM IBM Tivoli Directory Server Database.
IBM IBM Tivoli Directory Server Configuration complete.
```

When complete, click **Close**.

10.1.2 Configure Tivoli Web Administration Tool

For our example, we installed the Web Administration Tool on IBM WebSphere Application Server Version 5.0.2, which is capable of being configured for WebSphere Application Server security.

Deploy the Web Administration Tool

To deploy the Web Administration Tool on the WebSphere Application Server server1, complete the following steps:

1. Ensure that the WebSphere Application Server server1 is started. If it is not started, start server1 by entering the following:

   ```
   c:\ibm\WebSphere\AppServer\bin\startServer server1
   ```

2. Start the WebSphere administrative console by entering the following URL in a Web browser:

   ```
   http://<hostname>:9090/admin
   ```

3. Log in to the WebSphere administrative console (for example, `admin`).

4. Click **Applications** → **Install New Application** in the console navigation tree.

5. When the Preparing for the application installation page opens, enter the following values (as shown in Figure 10-2 on page 231) and then click **Next**:

   – Path: **Local path**
   – Local path: `c:\ibm\ldap\idstools\IDSWebApp.war`
     This is the full path of the Web Administration Tool application stand-alone IDSWebApp.war file.

   > **Note:** The file can be either on the client machine (the machine that runs the Web browser) or on the server machine (the machine to which the client is connected).

   – Context Root: `/IDSWebApp`
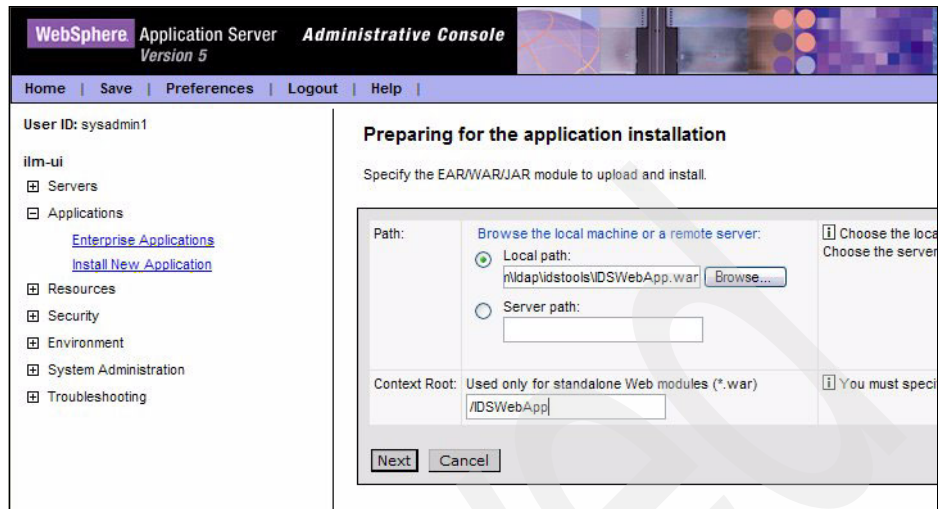
Figure 10-2   Deploying the Web Administration Tool

6. When the Generate bindings page opens, accepted the default settings and click **Next**.

7. When the Step 1: Provide options to perform the installation page opens, accept the default settings and click **Next**:

   – Application Name: IDSWebApp_war (default)

8. When the Step 2: Map virtual hosts for Web modules page opens, enter the following and then click **Next**:

   – Virtual Host: **default_host** (default)
   – Web Module: **IBM Tivoli Directory Server Web Application v2.0**

9. When the Step 3: Map modules to application servers window opens, accept the default and then click **Next**.

10. When the Step 4: Summary Review installation options page opens, click **Finish**.

   You should see a message similar to the following message:

   Application IDSWebApp_war installed successfully.

11. When the configuration update is complete, click the **Save to Master Configuration** link.

12. When the Save to Master Configuration page opens, click **Save**.

13. Start IBM Tivoli Directory Server:

   a. From the Web Administration Tool, click **Applications** → **Enterprise Applications**.

b. From the Enterprise Application page, select **IDSWebApp_war** and then click **Start**.

14.Log out of the WebSphere administrative console by clicking **Logout**.

Web Administration Tool configuration

This section describes how to configure the IBM Tivoli Directory Server Web Administration Tool.

Define the Directory Server node to the Web Administration Tool

To define Tivoli Directory Server to the Web Administration Tool, complete the following steps:

1. Ensure that the WebSphere Application Server server1 is started.

2. Access the Web Administration Tool from a Web browser:

   `http://localhost:9080/IDSWebApp/IDSjsp/Login.jsp`

3. From the Web Administration Tool, enter the following and then click **Login**:

   – LDAP Hostname: **Console Admin**
   – Username: `superadmin` (default)
   – Password: `secret` (default)

4. Modify the default Console Administration user ID and password:

   a. Select **Console Administration** → **Change console administration login**.

   b. When the Change Console administrator logon page opens, enter the following and click **OK**:

   • Console administrator login: `webadmin`
     We created the administrator webadmin, but this could be any name you want.
   • Current password: `<password>`
     The default is `secret`.

   c. Select **Change console administrator password**. Enter the current and new password. Click **OK**.

5. Add the Directory Server node.

   a. Click **Console administration** → **Manage console servers**.

   b. Click **Add**.

   c. Enter the Directory Server host name and change the port numbers if not using the defaults (for example, `ilm-ui.itsc.austin.ibm.com`) and click **OK**:

   • Hostname: `ilm-ui.itsc.austin.ibm.com`
   • Port: 389

- Administration port: 3538
- Clear SSL enabled (default).

  You should see the new server listed after adding it.

  d. Click **Logout** to log out of the Web Administration Tool.

Verify administration to Tivoli Directory Server

Now that the Web Administration Tool is configured for Tivoli Directory Server, we recommend that you verify that it is working properly by connecting to the Directory Server:

1. Ensure that the IBM Tivoli Directory Server V5.2 Windows service is started.

2. Access the IBM Tivoli Directory Server Web Administration Tool from a Web browser:

   `http://localhost:9080/IDSWebApp/IDSjsp/Login.jsp`

3. From the Web Administration Tool, do the following and then click **Login**:

   – Select the newly created server (for example,
     `ilm-ui.itsc.austin.ibm.com`) from the list on the Login page.
   – Username: `cn=TDSadmin`

   > **Note:** For first-time users of LDAP (or distinguished naming conventions), take note that the *user name*: For the LDAP login, it must include the "cn=" designator.
   >
   > For example, the user name listed in this step is not "root", but rather "cn=root".

   – Password: `<password>`

4. To start IBM Tivoli Directory Server, click **Server administration** →
   Start/stop/restart server.

5. Click **Start** (do not select Start/restart in configuration only mode).

   You should see the status message: `Server started`.

Change the password encryption method

We recommend that you change the password encryption method from the default imask to SHA or crypt from the Web Administration Tool. The primary reason is that imask is a 2-way encoding format, and both SHA and crypt are one way.

We configured the password encryption as follows:

1. From the Web Administration Tool, select **Server administration** → **Manage security properties**.

2. From the Manage security properties page, click **Password policy**.

3. Select **SHA** from the Password encryption list and then click **OK** at the bottom of the page.

10.1.3 Create users in IBM Tivoli Directory Server

This section describes how to create users and groups for our example environment.

The section is organized into the following tasks:

- ► Create a suffix
- ► Create LDIF file containing users and groups
- ► Import the LDIF file to create users and groups

Create a suffix

To create a suffix using the IBM Tivoli Directory Server Configuration Tool, complete the following steps on the Portal node where IBM Tivoli Directory Server is installed:

1. Stop the IBM Tivoli Directory Server V5.2 Windows NT service.

2. Start the IBM Tivoli Directory Server Configuration Tool by clicking **Start → Programs → IBM Tivoli Directory Server V5.2 → Directory Configuration**.

3. Select **Manage suffixes** under Choose a task.

4. On the Suffix page, we used `dc=com` for the Suffix DN for our example and then clicked **Add**.

5. Click **OK**.

Create LDIF file containing users and groups

Users and groups can be created for the IBM Tivoli Directory Server from the Web Administration Tool or by importing a Lightweight Directory Interchange Format (LDIF) file containing users and groups. Figure 10-3 on page 236 displays the main structure of the ilm-itso.ldif file.

The ilm-itso.ldif file is included in the sample code available for download. It is located in the SG246481-Samples\config\ldap directory (see Appendix A, "Additional material" on page 367). Example 10-1 on page 236 provides a listing of the file.

As you can see, we created groups of users for various roles used in our example scenario (analysts, supervisors, and records administrators). We also created a group of administrators (sysadmins) to be used as a common administrator account for different servers. We populated each group with at least one user

(more users can be added later). Our primary system administrator account will be sysadmin1. The user account binduser1 is used for authentication while binding WebSphere Application Servers to LDAP.

> **Note:** You can design your own LDAP structure to suit your business needs. In that case, we have some recommendations:
>
> - ► Use attribute *cn* for your DN name (for example, cn=analyst1,cn=users,dc=itso,dc=ibm,dc=com) and *not* the uid attribute (for example, uid=analyst1,cn=users,dc=itso,dc=ibm,dc=com) in order to prevent security problems. (This uid attribute causes the failure of remote JNDI lookup between two secured WebSphere Application Servers. The error message is `UNSUPPORTED KEYWORD UID`.)
>
> - ► Include the uid attribute in your schema. This uid attribute is used by WebSphere Portal to identify users in listings.
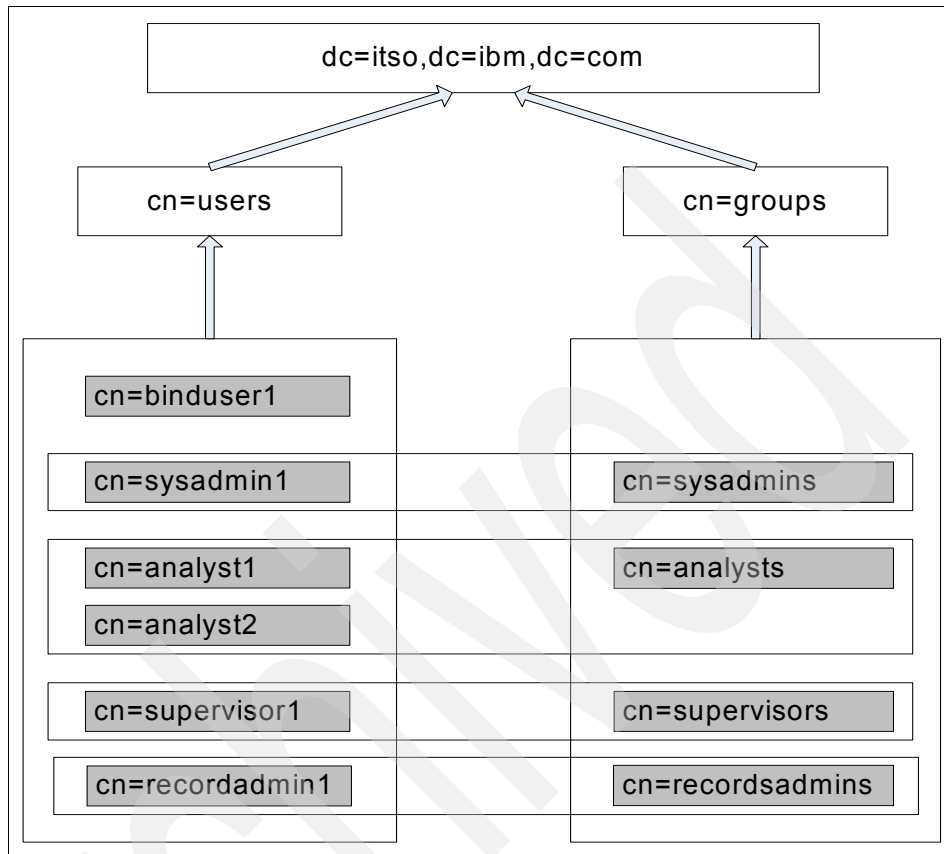
Figure 10-3   LDAP structure used in our example

Example 10-1   Example LDIF file with LDAP structure (ilm-itso.ldif)

```
version: 1

# ITSO example: ilm-itso.ldif file

dn: dc=com
objectclass: domain
objectclass: top
dc: com

dn: dc=ibm,dc=com
objectclass: domain
objectclass: top
dc: ibm

dn: dc=itso,dc=ibm,dc=com
```

```
objectclass: domain
objectclass: top
dc: itso

dn: cn=users,dc=itso,dc=ibm,dc=com
objectclass: container
objectclass: top
cn: users

dn: cn=groups,dc=itso,dc=ibm,dc=com
objectclass: top
objectclass: container
cn: groups

# bind user for ldap

dn: cn=binduser1,cn=users,dc=itso,dc=ibm,dc=com
objectclass: organizationalPerson
objectclass: person
objectclass: top
objectclass: inetOrgPerson
userpassword: password
sn: LDAP Bind In User 1
cn: binduser1
uid: binduser1

# system administrators

dn: cn=sysadmin1,cn=users,dc=itso,dc=ibm,dc=com
objectclass: organizationalPerson
objectclass: person
objectclass: top
objectclass: inetOrgPerson
userpassword: password
sn: System Administrator 1
cn: sysadmin1
uid: sysadmin1

# individual users

dn: cn=analyst1,cn=users,dc=itso,dc=ibm,dc=com
objectclass: organizationalPerson
objectclass: person
objectclass: top
objectclass: inetOrgPerson
userpassword: password
sn: Analyst User 1
cn: analyst1
uid: analyst1
```

```
dn: cn=analyst2,cn=users,dc=itso,dc=ibm,dc=com
uid: analyst2
userpassword: password
objectclass: organizationalPerson
objectclass: person
objectclass: top
objectclass: inetOrgPerson
cn: analyst2
sn: Analyst User 2

dn: cn=supervisor1,cn=users,dc=itso,dc=ibm,dc=com
objectclass: organizationalPerson
objectclass: person
objectclass: top
objectclass: inetOrgPerson
userpassword: password
sn: Supervisory User 1
uid: supervisor1
cn: Supervisor1

dn: cn=recordadmin1,cn=users,dc=itso,dc=ibm,dc=com
uid: sysadmin1
userpassword: password
objectclass: organizationalPerson
objectclass: person
objectclass: top
objectclass: inetOrgPerson
sn: Record Administrator 1
cn: recordadmin1

# user roles

dn: cn=sysadmins,cn=groups,dc=itso,dc=ibm,dc=com
cn: sysadmins
objectclass: groupOfUniqueNames
objectclass: top
uniquemember: cn=sysadmin1,cn=users,dc=itso,dc=ibm,dc=com

dn: cn=analysts,cn=groups,dc=itso,dc=ibm,dc=com
cn: analysts
objectclass: groupOfUniqueNames
objectclass: top
uniquemember: cn=analyst1,cn=users,dc=itso,dc=ibm,dc=com
uniquemember: cn=analyst2,cn=users,dc=itso,dc=ibm,dc=com

dn: cn=supervisors,cn=groups,dc=itso,dc=ibm,dc=com
cn: supervisors
objectclass: groupOfUniqueNames
```

```
objectclass: top
uniquemember: cn=supervisor1,cn=users,dc=itso,dc=ibm,dc=com

dn: cn=recordadmins,cn=groups,dc=itso,dc=ibm,dc=com
objectclass: groupOfUniqueNames
objectclass: top
cn: recordadmins
uniquemember: cn=recordadmin1,cn=users,dc=itso,dc=ibm,dc=com
```

Import the LDIF file to create users and groups

To import the ilm-itso.ldif file to create users and groups to IBM Tivoli Directory Server, complete the following steps on the Portal node:

1. Stop the IBM Tivoli Directory Server V5.2 Windows NT service.

2. Copy the provided \config\ldap\ilm-itso.ldif file to a temporary directory on the Portal node, for example, c:\install\ldap\config.

3. Start the IBM Tivoli Directory Server Configuration Tool by clicking **Start** → **Programs** → **IBM Tivoli Directory Server V5.2** → **Directory Configuration**.

4. Select **Import LDIF data**.

5. When the Import LDIF Data page opens, we used the following values:

   – Path and LDIF file name: `c:\install\ldap\config\ilm-itso.ldif`
   – Select **Standard import**.

   Click **Import** (bottom of page).

   After the import has finished successfully, a message will be displayed reporting how many entries have been imported into the Directory Server.

6. When the import is complete, click **Close** and close the Configuration Tool.

7. Restart the IBM Tivoli Directory Server V5.2 Windows NT service.

8. Verify that the LDAP entries were created properly by performing an LDAP search. For example, we entered the following from a command window on the Directory Server node:

   ```
   ldapsearch -h ilm-ui.itsc.austin.ibm.com -b dc=itso,dc=ibm,dc=com -D
   cn=sysadmin1,cn=users,dc=itso,dc=ibm,dc=com -w <password>
   ```

   Where `ilm-ui.itsc.austin.ibm.com` is the Portal node where IBM Tivoli Directory Server is installed and `<password>` is password that you entered for the sysadmin1 user in the ilm-itso.ldif file.

10.1.4 Configure WebSphere Portal for IBM HTTP Server

We now reconfigure WebSphere Portal to use an external Web server instead of the internal HTTP service of WebSphere Application Server. For our example, we use IBM HTTP Server as our external Web server.

To configure an external IBM HTTP Server for WebSphere Portal in place of the WebSphere Application Server internal HTTP service, complete the following steps:

1. Verify that IBM HTTP Server is started.

2. Stop the WebSphere_Portal application server.

3. Navigate to the c:\IBM\WebSphere\PortalServer\config directory.

4. Back up the WebSphere Portal configuration properties found in the wpconfig.properties file by entering the following command:

   ```
   wpsconfig backup-main-cfg-file
   ```

5. Change the wpconfig.properties values as shown in Table 10-1.

> **Note:** For a detailed description of each of the keywords, refer to the *IBM WebSphere Portal Information Center* and search "Configuring your Web server."

Table 10-1   The wpconfig.properties values for external Web server in Portal server

Section in wpconfig.properties file	Keyword	Our example value
WebSphere Application Server	WpsHostName	`ilm-ui.itsc.austin.ibm.com`
	WpsHostPort	80

6. Save the updated wpconfig.properties file.

7. Enter the following command to configure WebSphere Portal for the external Web server:

   ```
   wpsconfig httpserver-config
   ```

8. The next step is to increase the Post Size Limit. This property limits the amount of data that can be uploaded in a single POST operation. One of the portlets of our sample application has large libraries included and therefore is bigger then the allowed 10 MB limit. In order to deploy this portlet, we can either upload the portlet to the Portal node manually, or increase this Post Size Limit.

   Open the plugin-cfg.xml file for editing. The file is located at c:\IBM\WebSphere\AppServer\config\cells\plugin-cfg.xml.

Look for the node
/Config/ServerCluster[@name=WebSphere_Portal_ilm-ui_Cluster"] and
change the property PostSizeLimit from 10000000 to 20000000. Then, save the
file.

> **Note:** This change will get lost if you regenerate this plugin-cfg.xml file in
> the future. If you need to upload large portlets after the regeneration of the
> file, you will have to manually change this value again.

9. Restart IBM HTTP Server.

10. From a command prompt, issue the following commands to restart the
WebSphere Portal server:

```
c:\IBM\WebSphere\AppServer\bin\stopServer WebSphere_Portal
c:\IBM\WebSphere\AppServer\bin\startServer WebSphere_Portal
```

11. Verify that WebSphere Portal works properly with the external Web server.
You should be able to browse your WebSphere Portal server using the
external Web server host name:

```
http://ilm-ui.itso.austin.ibm.com/wps/portal
```

> **Note:** Prior to adding the external Web server, you need to include the port
> number 9081 for the internal HTTP port the WebSphere Portal server was
> using in the URL, for example:
>
> ```
> http://ilm-ui.itso.austin.ibm.com:9081/wps/portal
> ```
>
> Now that we have configured the external Web server, we do not need to
> specify the port (it will use the default port 80) in the URL:
>
> ```
> http://ilm-ui.itso.austin.ibm.com/wps/portal
> ```

10.1.5 Configure WebSphere Portal for IBM Tivoli Directory Server

This section describes how to enable LDAP security for WebSphere Portal and
how to verify it. The configured IBM Tivoli Directory Server is needed for this
activity. In addition, ensure that you created the LDAP user structure, as
described in 10.1.3, "Create users in IBM Tivoli Directory Server" on page 234.

Configure WebSphere Portal for security with LDAP

On the Portal node, there are preconfigured templates that can be customized to configure WebSphere Portal for LDAP. Complete the following steps:

1. From a command prompt, navigate to the c:\IBM\WebSphere\PortalServer\config directory:

   ```
   cd c:\IBM\WebSphere\PortalServer\config
   ```

2. Back up the WebSphere Portal configuration properties found in the wpconfig.properties file by entering the following command:

   ```
   wpsconfig backup-main-cfg-file
   ```

3. Change the wpconfig.properties values as shown in Table 10-2. A brief description of the individual values in the table follows.

> **Note:** For a detailed description of the wpconfig.properties values for the LDAP security configuration with WebSphere Portal, refer to the *Information Center* and search "Configuring WebSphere Portal for IBM Directory Server."

> **Tip:** The helper configuration files found in the ../config/helpers directory can be used to automate the update of the wpconfig.properties file on multiple systems. We used the security_ibm_dir_server.properties helper file to update the wpconfig.properties file. The helper files include comments that are self-documenting.

Table 10-2   Example wpconfig.properties values for LDAP security

Section in wpconfig.properties file	Keyword	Our example value
WebSphere Application Server Properties	WasUserId	cn=sysadmin1,cn=users,dc=itso,dc=ibm,dc=com
	WasPassword	<password>
Portal Configuration Properties	PortalAdminId	cn=sysadmin1,cn=users,dc=itso,dc=ibm,dc=com
	PortalAdminIdShort	sysadmin1
	PortalAdminPwd	<password>
	PortalAdminGroupId	cn=sysadmins,cn=groups,dc=itso,dc=ibm,dc=com
	PortalAdminGroupIdShort	sysadmins

Section in wpconfig.properties file	Keyword	Our example value
WebSphere Portal Security LTPA and SSO Configuration	LTPAPassword	`<password>`
	LTPATimeout	`120`
	SSODomainName	`itsc.austin.ibm.com`
LDAP Properties Configuration	Lookaside	`false`
	LDAPHostName	`ilm-ui.itsc.austin.ibm.com`
	LDAPPort	`389`
	LDAPAdminUId	`cn=TDSadmin`
	LDAPAdminPwd	`<password>`
	LDAPServerType	`IBM_DIRECTORY_SERVER`
	LDAPBindID	`cn=sysadmin1,cn=users,dc=itso,dc=ibm,dc=com`
	LDAPBindPassword	`<password>`
Advanced LDAP Configuration	LDAPSuffix	`dc=itsc,dc=ibm,dc=com`
	LdapUserPrefix	`cn`
	LDAPUserSuffix	`cn=users`
	LdapGroupPrefix	`cn`
	LDAPGroupSuffix	`cn=groups`
	LDAPUserObjectClass	`inetOrgPerson`
	LDAPGroupObjectClass	`groupOfUniqueNames`
	LDAPGroupMember	`uniqueMember`
	LDAPUserFilter	`(&(cn=%v)(objectclass=inetOrgPerson))`
	LDAPGroupFilter	`(&(cn=%v)(objectclass=groupOfUniqueNames))`
	LDAPsslEnabled	`false`

Here, we describe the wpconfig.properties values listed in Table 10-2 on page 242:

WasUserId
The user ID for WebSphere Application Server security authentication. This should be the fully qualified distinguished name (DN) and not contain any spaces. Because we have not set the WebSphere Application Server security on yet, you can choose any user from your LDAP directory. This user will become the system administrator for WebSphere Application Server after finishing these steps.

WasPassword
Password for the user account, as defined in the WasUserId property.

PortalAdminId
The user ID for WebSphere Portal security authentication. This should be the fully qualified distinguished name (DN) containing no spaces.

PortalAdminIdShort
The short form of the user ID for the WebSphere Portal administrator, as defined in the PortalAdminId property.

PortalAdminPwd
Password for the user account as defined in the PortalAdminId property.

PortalAdminGroupId
The group ID for the group to which the WebSphere Portal administrator belongs. This should be the fully qualified distinguished name (DN) containing no spaces.

PortalAdminGroupIdShort
The short form of the group ID for the WebSphere Portal administrator, as defined in the PortalAdminGroupId property.

LTPAPassword
The password for the LTPA bind. LTPA password is a password used to encrypt and decrypt the LTPA keys. You can choose any password you want; this password is defined here and is not related to any user.

LTPATimeout
This sets the time out for the LTPA bind.

SSODomainName	Single Sign-On domain, for example, `SSODomainName=yourcompany.com`. This property is needed for the WebSphere Application Server ability to perform single sign-on. Entering an incomplete or misspelled domain here might result in strange behavior of WebSphere Application Server.
Lookaside	The purpose of a Lookaside database is to store attributes that cannot be stored in your LDAP server. We are not going to use this kind of database in our sample.
LDAPHostName	The host name of the LDAP server that WebSphere Portal will use. If following our scenario, this is the host name of the Portal node, because our IBM Tivoli Directory Server resides on the Portal node.
LDAPPort	The port number for the LDAP server. Default ports are 389 for non-SSL communication and 636 for SSL communication.
LDAPAdminUId	The LDAP access ID, for example, `LDAPAdminUId=cn=root`. This is the ID that WebSphere Portal (Member Manager) will use to access the LDAP directory. This does not have to be the root admin ID for the directory, simply an ID that has sufficient privileges to the directory to allow the operations that WebSphere Portal will perform. In our sample, we used the admin user ID of our IBM Tivoli Directory Server installation, which is `cn=TDSadmin`.
LDAPAdminPwd	Password for the user account, as defined in the LDAPAdminUId property.
LDAPServerType	Type of LDAP server to be used.
LDAPBindID	User ID for LDAP bind authentication. This is any user in LDAP directory. In our scenario, we created a special user account for this role: `binduser1`.
LDAPBindPassword	Password for the user account, as defined in the LDAPBindID property.

LDAPUserFilter	User filter used for user authentication. Simply said, it specifies which entries in the LDAP directory structure are considered user entries.
LDAPGroupFilter	Group filter used for user authentication. Similar to LDAPUserFilter.
LDAPSuffix	LDAP suffix of your directory structure. This is the part specifying your organization, for example, dc=yourdomain,dc=com. Together with LDAPUserPrefix and LDAPUserSuffix, this specifies the fully qualified user DN name. These make it possible for users to enter only their user name in a login form instead of having to specify the complete DN name.
LDAPUserPrefix	DN name prefix of the user directory entry. This is usually the user attribute, which is unique for each user. In our case it is cn=. See the LDAPSuffix description.
LDAPUserSuffix	Part of the DN name immediately following the user name attribute, for example, cn=users. See the LDAPSuffix description.
LDAPGroupPrefix	See the LDAPUserPrefix description.
LDAPGroupSuffix	See the LDAPUserSufix description.
LDAPUserObjectClass	User object class representing a user directory entry.
LDAPGroupObjectClass	Group object class representing a group directory entry.
LDAPGroupMember	This specifies the attribute name specifying the user entries that are members a given group.
LDAPsslEnabled	True if SSL is used for communication between WebSphere Portal and the LDAP server. We highly recommend that you use the SSL in a production environment, but in our sample, we do not use the SSL communication.

4. Save the updated wpconfig.properties file.

5. Issue the following commands:

```
c:\IBM\WebSphere\AppServer\bin\startServer server1
c:\IBM\WebSphere\AppServer\bin\stopServer WebSphere_Portal
```

6. Change to the c:\IBM\WebSphere\PortalServer\config directory and enter the following command:

```
WPSconfig.bat validate-ldap
```

   If an error occurs, review the values in wpconfig.properties (typographical errors are quite often the cause of an error on this step) and the settings in the LDAP server. Also, ensure that the LDAP server is running.

7. If the validation was successful, enable security by issuing the following command:

```
WPSconfig.bat enable-security-ldap
```

   If the task completes successfully, you will see the message BUILD SUCCESSFUL.

8. Issue the following commands:

```
c:\IBM\WebSphere\AppServer\bin\stopServer server1 -user sysadmin1 -password
<password>
```

   Where sysadmin1 is the WebSphere Administrator user ID and <password> is the password for this user ID.

9. Start the servers by entering the following:

```
c:\IBM\WebSphere\AppServer\bin\startServer server1
c:\IBM\WebSphere\AppServer\bin\startServer WebSphere_Portal -user sysadmin1
-password <password>
```

Verify the LDAP configuration

To verify the WebSphere Portal and LDAP configuration, complete the following steps:

1. Verify that WebSphere security is working properly by starting the WebSphere administrative console and logging in as user ID `sysadmin1`. WebSphere security in this case provides the authentication. If security was not working, you would not be able to log in with the `sysadmin1` user ID.

   `http://ilm-ui.itsc.austin.ibm.com:9090/admin`

   Note that you will be redirected to the secured connection prior to login (`https://ilm-ui.itsc.austin.ibm.com:9043/admin/logon.jsp`).

   > **Important:** Using `localhost` or just the host name for accessing WebSphere Application Server or WebSphere Portal might cause problems after configuring LDAP security. Always use the fully qualified host name for browsing.

2. Verify that WebSphere Portal works properly with the LDAP configuration and WebSphere security by logging in to WebSphere Portal and browsing its pages. Go to the WebSphere Portal site (remember to use the fully qualified host name):

   `http://ilm-ui.itsc.austin.ibm.com/wps/portal`

   > **Note:** Sometimes trying to log in to WebSphere Portal from a window that has been used to log in to the WebSphere administrative console results in erroneous behavior. We recommend that you open new a browser window for the WebSphere Portal login.

   Click **Log in** at the top-right corner (for example, we used the `sysadmin1` user ID and `<password>`).

Enable identity assertion

To enable secure communication with IBM WebSphere Business Integration Server Foundation installed on the Business Integration node, you need to enable identity assertion in WebSphere Application Server on the Portal node.

To enable identity assertion, complete the following steps (Figure 10-4):

1. Log in to the WebSphere administrative console with the `sysadmin1` user ID:

   `https://ilm-ui.itsc.austin.ibm.com:9043/admin`

2. Go to the CSI Authentication → Outbound page by selecting **Security → Authentication Protocol → CSIv2 Outbound Authentication**.

3. Select **Supported** for the Basic Authentication property and select the **Identity Assertion** property.

4. Log out from the WebSphere administrative console.
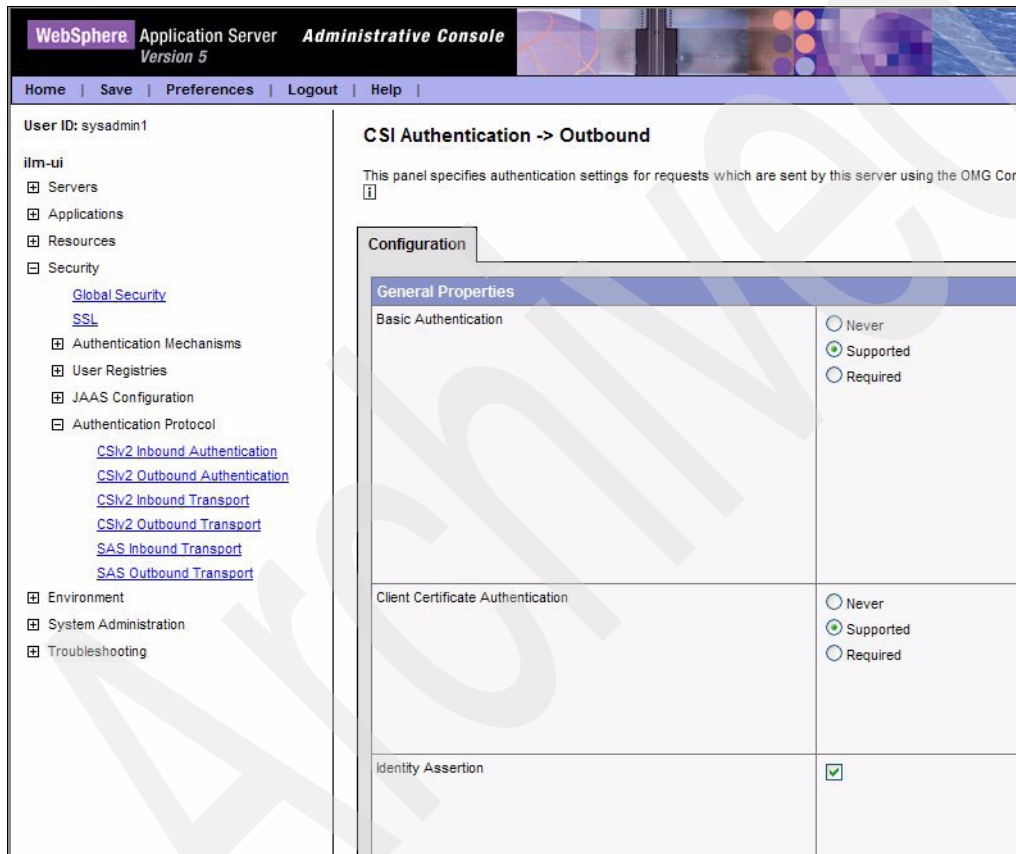
Figure 10-4   Setting identity assertion

Configure access to additional configuration files

In our applications, which we will deploy later, we use specific configuration files. We decided to store these files in the WebSphere Application Server directory. Because we have Java 2 security on, we need to specify the access rights to this directory:

1. Create the directory:

   ```
   C:\IBM\WebSphere\AppServer\config\optionalConfigs
   ```

2. Open the security policy file for editing:

   ```
   C:\IBM\WebSphere\AppServer\config\cells\ilm-ui\nodes\ilm-ui\app.policy
   ```

3. In the `grant codeBase "file:${application}"` section add the following line (the line has been broken into two lines below, you should enter it as one line):

   ```
   permission java.io.FilePermission
   "${was.install.root}${/}config${/}optionalConfigs${/}-", "read";
   ```

4. Save the app.policy file.

Restart the WebSphere Application Servers

Restart the WebSphere Application Servers server1 and WebSphere_Portal in order to pick up the changes.

Restart WebSphere Portal server and WebSphere Application Server server1 by issuing the following in a command window:

```
cd c:\IBM\WebSphere\AppServer\bin
stopServer server1 -user sysadmin1 -password password
stopServer WebSphere_Portal -user sysadmin1 -password <password>
startServer server1
startServer WebSphere_Portal -user sysadmin1 -password <password>
```

10.2 Configure the Business Integration node

This section explains how to configure all software components running on the Business Integration node in order to run the sample application described in this book.

> **Note:** When configuring the Business Integration node, we referenced the following information:
>
> ► *WebSphere Application Server Version 5.1.x Information Center*, available at:
>   http://publib.boulder.ibm.com/infocenter/ws51help/index.jsp
>
> ► *IBM WebSphere Business Integration Server Foundation, Version 5.1: Process Choreographer*, IBM Information Center Library, available at:
>   ftp://ftp.software.ibm.com/software/webserver/appserv/library/ee_v512ptf_twork.pdf
>
> ► The IBM Redbook *IBM WebSphere V5.0 Security, WebSphere Handbook Series*, SG24-6573, available at:
>   http://www.redbooks.ibm.com/pubs/pdfs/redbooks/sg246573.pdf

10.2.1 Configure WebSphere Application Server for Directory Server

This section describes the steps needed to turn on WebSphere security. We use the same IBM Tivoli Directory Server as we used to configure WebSphere Portal. This implies that we use the same users as described in the 10.1.3, "Create users in IBM Tivoli Directory Server" on page 234.

To set WebSphere security with IBM Tivoli Directory Server, complete the following steps:

1. In your Web browser, go to the WebSphere administrative console login page at:

   http://ilm-bi.itsc.austin.ibm.com:9090/admin

2. Do not fill in any user name (security is off) and click **OK**. The WebSphere administrative console opens.

3. Go to the LDAP User Registry window by clicking **Security** → **User Registries** → **LDAP**.

4. In the LDAP User Registry window, fill in the following values.

   For your server user ID, you can use any user account from our LDAP user structure. In our sample, we chose the sysadmin1 user. The user has to be specified with the fully qualified DN name. Unless you did not change the sysadmin1 password, enter the password specified in the LDIF file:

   – Server User ID: `cn=sysadmin1,cn=users,dc=itso,dc=ibm,dc=com`
   – Server User Password: `<password>`

Enter the LDAP server, which is IBM Tivoli Directory Server installed on the Portal node:

– Type: `IBM_Directory_Server`
– Host: `ilm-ui.itsc.austin.ibm.com`
– Port: `389`

– Base Distinguished Name (DN): `dc=itso,dc=ibm,dc=com`
  For the base distinguished name (DN), enter the LDAP suffix, matching your organization structure, for example, `dc=itso,dc=com`.

Next, enter the user ID for the LDAP bind authentication. This can be any user in the LDAP directory. In our scenario, we created a special user account for this role: `binduser1`.

– Bind Distinguished Name (DN):
  `cn=binduser1,cn=users,dc=itso,dc=ibm,dc=com`
– Bind Password: `<password>`
– Select **Ignore Case**.
  The Ignore Case property is required by the LDAP configuration.

For simplicity reasons, we do not use the SSL communication to access the LDAP server in our example. Note that in a production environment, we highly recommend that you use the SSL communication.

– Do not select SSL Enabled.

You can leave the other values with the default values. Click **Apply**.

See Figure 10-5 on page 253.

Figure 10-5   LDAP server configuration

5. Go to the Advanced LDAP Settings page by clicking **Security** → **User Registries** → **LDAP** → **Advanced LDAP Settings**.

6. Values specified on the Advanced LDAP Settings page narrow the number of LDAP objects considered to be a user or group entry. They also enable WebSphere Application Server to allow users to log in without specifying the fully qualified DN name. Based on the LDIF file we used to import the users, enter the following values:

   – User Filter: `(&(cn=%v)(objectclass=inetOrgPerson))`
   – Group Filter: `(&(cn=%v)(objectclass=groupOfUniqueNames))`
   – User ID Map: `*:cn`

- Group ID Map: `*:cn`
- Group Member ID Map:
  `ibm-allGroups:member;ibm-allGroups:uniqueMember`

You can leave the other values with the default values. Click **OK**.

> **Note:** In the WebSphere administrative console if you click Apply and later click OK, your values will be overwritten by the old ones. To be sure that your values were not overwritten, come to this section again after you save changes to the master configuration and check the values.

See Figure 10-6.

Figure 10-6   Advanced LDAP configuration

7. Save the changes to the master configuration by clicking the **Save** link at the top of the page and then by clicking the **Save** button at the bottom of the page.

8. Go to the LTPA page by clicking **Security** → **Authentication Mechanisms** → **LTPA**.

9. Enter the LTPA password. The LTPA password is a password used to encrypt and decrypt the LTPA keys. You can choose any password you want; this password is defined here and is not related to any user. Click **Apply**.

10. Go to the Single Signon (SSO) page by clicking **Security** → **Authentication Mechanisms** → **LTPA** → **Single Signon (SSO)**.

11. On the Single Signon (SSO) page, enable the single signon and specify the domain name:

   – Select **Enabled**
   – Domain Name: `itsc.austin.ibm.com`

   Click **OK**.

   > **Note:** From this point on, you will need to enter a fully qualified DNS name for your URLs. For example, instead of invoking the WebSphere administrative console by typing `http://ilm-bi:9090/admin` or `http://localhost:9090/admin`, you will have to enter `http://ilm-bi.itsc.austin.ibm.com:9090/admin`. Not entering the fully qualified DNS name might result in strange application behavior and various errors.

12. Go to the CSIv2 Inbound Authentication page by clicking **Security** → **Authentication Protocol** → **CSIv2 Inbound Authentication**.

13. We need to set up the identity assertion. This will allow WebSphere Application Servers to pass the user authentication tokens between each other. This is needed to invoke the EJB methods residing on this server from remote servers. We need to set up the following:

   – Basic Authentication: **Supported**
   – Client Certificate Authentication: **Supported**
   – Select **Identity Assertion**.
   – Trusted Servers: *
   – Select **Stateful**.
   – Clear Security Attribute Propagation.

   Then click **OK**.

14. Save the changes to the master configuration by clicking the **Save** link at the top of the page and then by clicking the **Save** button at the bottom of the page.

15. Go to the Global Security page by clicking **Security → Global Security**.

16. So far, we have prepared all the settings. The last step is to turn on WebSphere security. We turn this on in the Global Security page by selecting the following values:

   – Select **Enabled**.
   – Select **Enforce Java 2 Security**.
   – Active Protocol: `CSI and SAS`
   – Active Authentication Mechanism: `LTPA`
   – Active User Registry: `LDAP`

   Click **OK**. You should be presented with a list of informational messages and warnings at the top of the page. If there are any errors, fix these errors before proceeding to next steps. For problem resolution, refer to the IBM Redbook: *IBM WebSphere V5.0 Security: WebSphere Handbook Series*, SG24-6573.

17. Save the changes to the master configuration by clicking the **Save** link at the top of the page and then by clicking the **Save** button at the bottom of the page.

18. Log out from the WebSphere administrative console.

19. From a command prompt, restart the WebSphere Application Server server1 by entering the following commands:

```
c:\IBM\WebSphere\AppServer\bin\stopServer server1
c:\IBM\WebSphere\AppServer\bin\startServer server1
```

> **Note:** After WebSphere security is enabled, you need to specify the user `sysadmin1` and `password` as parameters for the **stopServer** command.
>
> ```
> stopServer server1 -user sysadmin1 -password <password>
> ```
>
> On a development system, you can add the user ID and password values to the soap.client.props file to eliminate keystrokes. Modify the following in the c:\IBM\WebSphere\AppServer\properties\soap.client.props file:
>
> ```
> com.ibm.SOAP.loginUserid=sysadmin1
> com.ibm.SOAP.loginPassword=password
> ```
>
> After making this modification, you will not need to supply the user ID and password.
>
> ```
> stopServer server1
> ```

20. Check the WebSphere Application Server log file for possible errors at c:\IBM\WebSphere\AppServer\logs\server1\SystemOut.log.

   If there are no errors, you should see the following message at the end of file:

```
Server server1 open for e-business
```

21. Verify the installation by logging in to the WebSphere administrative console by using the following URL address:

```
http://ilm-bi.itsc.austin.ibm.com:9090/admin
```

Note that you have to enter the full DNS name. You will be redirected to the secure connection. Or, you can directly enter the secured URL:

```
https://ilm-bi.itsc.austin.ibm.com:9043/admin
```

22. Log in with your server user ID and password (for example, with the sysadmin1 user ID in our example).

> **Note:** If you have problems logging in with your plain user ID, you might try to log in using the fully qualified name (cn=sysadmin1,cn=users,dc=itso,dc=ibm,dc=com, for example) and check the LDAP User Registry and Advanced LDAP Settings pages.
>
> Refer to *IBM WebSphere V5.0 Security: WebSphere Handbook Series*, SG24-6573 for details.

10.2.2 Configure business process container on WebSphere Application Server

We have not yet configured the business process container that is required to run business processes (process choreography). This container is installed as a part of IBM WebSphere Business Integration Server Foundation, but it has to be configured separately.

This section describes the following high-level tasks:

► Create an IBM Cloudscape database for the business process container
► Configure the business process container
► Configure embedded messaging resources with Java 2 security
► Configure access to additional configuration files
► Restart the WebSphere Application Server server1

Create an IBM Cloudscape database for the business process container

The business process container requires a database. This section describes how to create the database for the process choreographer.

In our scenario, we use the IBM Cloudscape™ database that is bundled with the IBM WebSphere Business Integration Server Foundation V5.1.1 product. The Cloudscape version that comes with this product includes the Cloudscape Network Server that enables client/server JDBC access over Distributed

Relational Database Architecture™ (DRDA®) protocol. Because Cloudscape Network Server has no Extended Architecture (XA) support, the process choreographer can only use the embedded Cloudscape version that cannot be accessed remotely.

To create a Cloudscape database named BPEDB, complete the following steps:

1. Because we did not install IBM WebSphere Business Integration Server Foundation to its default location in the Program Files folder, edit the createDatabaseCloudscape.ddl script located at c:\IBM\WebSphere\ AppServer\ProcessChoreographer\createDatabaseCloudscape.ddl.

   Change the line nr.17:

   ```
   connect 'BPEDB;create=true' as BPEDB;
   ```

   To:

   ```
   connect
   'c:\IBM\WebSphere\AppServer\ProcessChoreographer\BPEDB;create=true' as
   BPEDB
   ```

   > **Note:** If you do not use the default location, install_root\ProcessChoreographer\BPEDB, you must also remember to change the custom properties field when selecting the database. You will have to change the value of the property databaseName to your fully qualified database location.

2. From a command prompt, enter the command to run the database creation script using the Cloudscape command line processor:

   ```
   C:\IBM\WebSphere\AppServer\java\jre\bin\java
       -Djava.ext.dirs=C:\IBM\WebSphere\AppServer\cloudscape\lib
       -Dij.protocol=jdbc:db2j:
       com.ibm.db2j.tools.ij
       C:\IBM\WebSphere\AppServer\ProcessChoreographer\createDatabaseCloudscape
       .ddl
   ```

   The Cloudscape database BPEDB for process choreographer should be created.

Configure the business process container

You must configure the necessary resources and install the business process container before you can use it. This section describes how to do so using the installation wizard:

1. In your Web browser, go to the WebSphere administrative console login page at:

   ```
   https://ilm-bi.itsc.austin.ibm.com:9043/admin
   ```

2. Log in with your server user ID and password (the `sysadmin1` user ID in our example).

3. Go to the server1 configuration page by clicking **Servers** → **Application Servers** → **server1**.

4. In the Additional Properties section, click **Business Process Container**.

5. Scroll down past the Business Process Container settings. Near the bottom of the page, click the **Business Process Container Install Wizard** link.

Figure 10-7   Selecting the Business Process Container Install Wizard

> **Note:** The settings provided in the following steps are the recommended settings for our example. For a further explanation of the properties mentioned in these steps, see *IBM WebSphere Business Integration Server Foundation, Version 5.1: Process Choreographer*, IBM Information Center Library, available at:
>
> ftp://ftp.software.ibm.com/software/webserver/appserv/library/ee_v512p
> tf_twork.pdf

> **Important:** You cannot change these fields after they have been applied. If you want to change any of these values after the container is configured, you must uninstall and reinstall the BPEContainer.ear enterprise application file. This action can result in the loss of data, such as pending messages in queues, process templates, and process instances in the process choreographer database.

6. In the "Step 1: Select the Database Configuration for the business process container" page, select or enter the following:

   – JDBC Providers: `Cloudscape 5.1 (Cloudscape JDBC Provider (XA))`
   – Implementation class name: `com.ibm.db2j.jdbc.DB2jXADataSource`
   – Classpath: `${CLOUDSCAPE_JDBC_DRIVER_PATH}/db2j.jar`
   – Datasource User Name: Empty
   – Datasource Password: Empty
   – Custom Properties: Leave to default

   Click **Next**.

7. In "Step 2: Select JMS Provider and Security," select or enter the following:

   – JMS Providers: `Websphere JMS Provider`
   – Queue Manager: Empty
   – Classpath: Empty
   – JMS User ID: `sysadmin1`
   – JMS Password: `<password>`
   – Scheduler Calendar: Empty
   – Security Role Mapping: `cn=sysadmins,cn=groups,dc=itso,dc=ibm,dc=com`
   – JMS API User ID: `cn=sysadmin1,cn=users,dc=itso,dc=ibm,dc=com`
   – JMS API Password: `<password>`

   Click **Next**.

8. In "Step 3: Select JMS Resources and Web Client," select or enter the following:

   – Select **Create new JMS resources using default values**.
   – Select **Install the Process Choreographer Web Client**.

   Click **Next**.

9. In "Step 4: Summary," review the settings and click **Finish**.

> **Note:** The summary includes reminders of which external resources are necessary. If you have not already created them, you can continue configuring the business process container, but you must create the resources before you activate the business process container.

10. The progress will be shown on the Installing page:

   – If the container did not install successfully, check for any error messages that can help you correct the problem, and then repeat this task from step 1.

   – If the container was installed successfully, click **Save Master Configuration**, and then click the **Save** button.

11. Do not restart the server at this moment, because the business process container installation wizard did not set properly the Java 2 security properties for the newly created resources. The restart would, therefore, throw a large number of security-related exceptions. We fix these properties in the following section.

Configure embedded messaging resources with Java 2 security

This section describe how to set additional Java 2 security properties for the resources created by the business process container installation wizard in the previous section.

To set these properties, complete the following steps:

1. We need to create a JAAS entry to authenticate to the various resources. We use our system administrator sysadmin1 user for this purpose. Go to the J2C Authentication Data Entries page by selecting **Security → JAAS Configuration → J2C Authentication Data** and clicking **New**.

2. Fill in the following values:

   – Alias: `SysAdminID`
   – User ID: `sysadmin1`
   – Password: `<password>`

   Click **OK**. Figure 10-8 on page 262 shows the panel after creation.
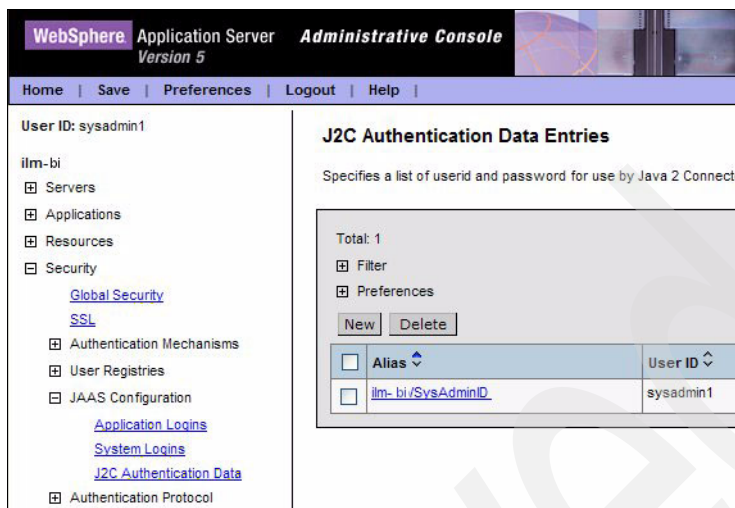
Figure 10-8 J2C Authentication Data Entries page

3. The next step is to use this JAAS entry to authenticate JMS connection factories. Go to the WebSphere JMS Provider page by selecting **Resources → WebSphere JMS Provider**.

4. Select **Server** scope at the top of the page and click **Apply**.

5. Click **WebSphere Queue Connection Factories** at the bottom of the page.

6. Click the **BPECF** link. The property page for the BPECF Queue Connection Factory opens.

7. For the "Component-managed Authentication Alias" property, select the **ilm-bi/SysAdminID** alias from the list.

8. Select the same **ilm-bi/SysAdminID** alias for the "Container-managed Authentication Alias" property.

9. Click **OK**.

10. Click **BPECFC** and repeat steps 7 through 9.

11. Log out of the WebSphere administrative console.

Configure access to additional configuration files

In our application, we use specific configuration files. We decided to store these files in the WebSphere Application Server directory. Because we have Java 2 security on, we need to specify the access rights to this directory:

1. Create the directory:

```
C:\IBM\WebSphere\AppServer\config\optionalConfigs
```

2. Open the security policy file for editing:

```
C:\IBM\WebSphere\AppServer\config\cells\ilm-bi\nodes\ilm-bi\app.policy
```

3. In the `grant codeBase "file:${application}"` section, add the following line (the line is broken into two lines to fit here; however, you should enter it as one line):

```
permission java.io.FilePermission
"${was.install.root}${/}config${/}optionalConfigs${/}-", "read";
```

4. Save the app.policy file.

Restart the WebSphere Application Server server1

Restart the WebSphere Application Server server1 in order to pick up the changes:

1. From a command prompt, restart the WebSphere Application Server server1 by entering the following commands:

```
c:\IBM\WebSphere\AppServer\bin\stopServer server1 -user sysadmin1 -password
<password>
c:\IBM\WebSphere\AppServer\bin\startServer server1
```

2. Check the WebSphere Application Server log file for possible errors at c:\IBM\WebSphere\AppServer\logs\server1\SystemOut.log.

   If there are no errors, you should see following message at the end of file:

```
Server server1 open for e-business
```

10.3 Configure the Content Management node

The following sections describe various configuration tasks for Content Management node that must be performed.

10.3.1 Configure DB2 Content Manager for LDAP

This section describes how to configure IBM DB2 Content Manager with LDAP using IBM Tivoli Directory Server. In addition, we included configuration tasks for enabling trusted logon between WebSphere Portal and DB2 Content Manager for single sign-on.

IBM DB2 Content Manager can be configured to use an LDAP directory for user authentication. DB2 Content Manager can be enabled for LDAP during the installation of DB2 Content Manager or after the installation, as described in this section.

DB2 Content Manager includes support for LDAP user authentication. In addition, DB2 Content Manager includes an LDAP utility used to import and synchronize users between DB2 Content Manager and LDAP.

The following directory servers are supported by DB2 Content Manager:

► IBM Tivoli Directory Server
  We used the IBM Tivoli Directory Server V5.2 for our example.

► IBM Lotus Domino® Directory

► Microsoft Active Directory

High-level steps

The high-level steps to configure DB2 Content Manager for LDAP are as follows:

1. Prerequisite software for LDAP user authentication
2. Back up the DB2 Content Manager databases
3. Generate the cmbcmenv.properties file
4. Copy the cmbcmenv.properties file
5. Copy the icmxlslg.dll(user exit)
6. Enable trusted logons for the library server
7. Create the ClientUserEditSSO privilege set
8. Set the UserDB2TrustedConnect privilege set for the CMconnect user
9. Configure the LDAP User Import Scheduler
10. Verify the DB2 Content Manager LDAP configuration

> **Note:** For more information about configuring DB2 Content Manager for LDAP, refer to the following product guides:
>
> ► *IBM Content Manager for Multiplatforms: Planning and Installing Your Content Management System Version 8 Release 2*, GC27-1332-02
> ► *IBM DB2 Content Manager for Multiplatforms: System Administration Guide Version 8 Release 2*, SC27-1335-04

Prerequisite software for LDAP user authentication

Prior to configuring DB2 Content Manager for LDAP, ensure that the following prerequisite software components are installed:

► Directory Server node

  – IBM GSKit V7.0.1.16
  – IBM Tivoli Directory Server V5.2

> **Note:** If following procedures in this book, the installation of these components is included in the implementation of the nodes.

► Library Server node
  – IBM GSKit V7.0.1.16
  – IBM Tivoli Directory Server V5.2, client and SDK component

> **Note:** In a development environment, IBM GSKit and IBM Tivoli Directory Server, client and SDK components, should be installed on the Document Management node where DB2 Content Manager is installed. If following procedures in this book, the installation of these components is included in the implementation of the nodes.

Back up the DB2 Content Manager databases

Prior to importing users and groups from LDAP into DB2 Content Manager, we recommend that you back up the library server (icmnlsdb) and resource manager (rmdb) databases at this stage. When you start developing the data model, you might want to restore the pristine databases for further testing from a known state.

Generate the cmbcmenv.properties file

The cmbcmenv.properties file contains configuration settings shared by DB2 Content Manager and DB2 Information Integrator for Content. The CMCOMMON environment variable is used to define the path to the shared directory. In our example, it is `CMCOMMON=c:\ibm\cmgmt` (the path defined during the DB2 Content Manager installation).

This section describes how to generate a cmbcmenv.properties file with LDAP for DB2 Content Manager enabled. Complete the following steps:

1. Ensure that the ICM LS Monitor (ICMNLSDB) Windows service is started.

2. Ensure that the IBM Tivoli Directory Server V5.2 Windows service is started.

3. Start the system administration client by clicking **Start** → **Programs** → **IBM DB2 Content Manager for Multiplatforms V8.2** → **System Administration Client**.

4. When prompted to log in, enter and select the following values and then click **OK**:
   – Server Type: **DB2 Content Manager** (default)
   – Server: **ICMNLSDB** (default)
   – User ID: `CMadmin`
   – Password: `<password>`

5. From the menu bar, click **Tools** → **LDAP Configuration**.

6. Click the **LDAP** tab.

7. From the LDAP tab, select **Enable LDAP User Import and Authentication**.

8. Click the **Server** tab.

9. From the Server tab, enter and select the following values and then click **OK** (see Figure 10-9):

   – Server type: **LDAP**
   – LDAP server hostname: `ldap://ilm-ui.itsc.austin.ibm.com`
     The `ldap://` will be inserted into the LDAP server hostname value automatically.
   – Base DN: **Lookup from Server** and then **DC=ITSO,DC=IBM,DC=COM**
   – User attribute: `cn`
   – User name: `cn=TDSadmin`
   – Password: `<password>`

Figure 10-9   DB2 Content Manager LDAP configuration

You should see a message similar to the following:

```
LDAP - Configuration update successful
Config file : c:\ibm\cmgmt\cmbcmenv.properties
```

10. Click **OK** and close the system administration client.

Copy the cmbcmenv.properties file

The cmbcmenv.properties file is used by the DB2 Content Manager system administration client, library server, and resource manager. When DB2 Content

Manager is enabled for LDAP, the cmbcmenv.properties file is generated to include the LDAP configuration settings. This LDAP-aware cmbcmenv.properties file needs to be available for each of the DB2 Content Manager components. If all components are installed on the same node, the following procedure is not needed.

Copy the cmbcmenv.properties files to the library server

If the library server is on a different node than the system administration client, you will need to copy the generated cmbcmenv.properties file to the node where the library server is installed.

> **Note:** In our example runtime environment and development environment, the system administration client is on the same node as the library server, thus the procedure is not needed.

Enable trusted logons for the library server

As part of the single sign-on configuration between the portal and DB2 Content Manager, this section describes how to enable the DB2 Content Manager library server for a trusted logon (receive token). Complete the following steps:

1. Ensure that the ICM LS Monitor (ICMNLSDB) Windows service is started.

2. Ensure that the IBM Tivoli Directory Server V5.2 Windows service is started.

3. Start the system administration client by clicking **Start** → **Programs** → **IBM DB2 Content Manager for Multiplatforms V8.2** → **System Administration Client**.

4. When prompted to log in, enter and select the following values and then click **OK**:

   – Server Type: **DB2 Content Manager** (default)
   – Server: **ICMNLSDB** (default)
   – User ID: `CMadmin`
   – Password: `<password>`

5. From the menu bar, click **Library Server Parameters** → **Configurations**.

6. Double-click **Library Server Configurations**.

7. When the Library Server Configuration window opens, click the **Definition** tab, select **Allow trusted logon**, and then click **OK**.

Create the ClientUserEditSSO privilege set

The default privilege set for DB2 Content Manager is *ClientUserReadOnly*. We need to assign the users of the DB2 Content Manager application a higher privilege set for the access permissions to work properly for our example application. The ClientUserEdit system-defined privilege set contains the vast

majority of the privileges needed for the example portal document management application. In addition, we need to add two additional privileges (AllowConnectToLogon and AllowTrustedLogon) because we are passing a token from the portlet application to DB2 Content Manager for a trusted logon for the purposes of single sign-on.

To create the ClientUserEditSSO privilege set, complete the following steps:

1. Ensure that the ICM LS Monitor (ICMNLSDB) Windows service is started.

2. Ensure that the IBM Tivoli Directory Server V5.2 Windows service is started.

3. Start the system administration client by clicking **Start** → **Programs** → **IBM DB2 Content Manager for Multiplatforms V8.2** → **System Administration Client**.

4. When prompted to log in, enter and select the following values and then click **OK**:

    – Server Type: **DB2 Content Manager** (default)
    – Server: **ICMNLSDB** (default)
    – User ID: `CMadmin`
    – Password: `<password>`

5. From the menu bar, click **Authorization** → **Privilege Sets**.

6. Select the **ClientUserEdit** privilege set.

7. Right-click **Copy**.

8. When the Copy Privilege Set window opens, enter and select the following values and then click **OK**:

    – Name: `ClientUserEditSSO`
    – Privileges:
        • **AllowConnectToLogon**
        • **AllowTrustedLogon**

Note: In total, 36 privileges should be defined for the ClientUserEditSSO privilege set. The two privileges added above are needed for single sign-on (SSO).

Set the UserDB2TrustedConnect privilege set for the CMconnect user

The CMconnect user is a special user the client application uses for connection to DB2 Content Manager. This section describes how to set the UserDB2TrustedConnect privilege set for the CMconnect user. This privilege set is needed for the trusted logon (single sign-on configuration). Complete the following steps:

1. Ensure that the ICM LS Monitor (ICMNLSDB) Windows service is started.

2. Ensure that the IBM Tivoli Directory Server V5.2 Windows service is started.

3. Start the system administration client by clicking **Start** → **Programs** → **IBM DB2 Content Manager for Multiplatforms V8.2** → **System Administration Client**.

4. When prompted to log in, enter and select the following values and then click **OK**:

   – Server Type: **DB2 Content Manager** (default)
   – Server: **ICMNLSDB** (default)
   – User ID: CMadmin
   – Password: <password>

5. From the menu bar, click **Authentication** → **Users**.

6. Double-click the **CMCONNECT** user to open the user properties.

7. From the Privilege set list, select the **UserDB2TrustedConnect** privilege, and then click **OK**.

10.3.2 Configure the LDAP User Import Scheduler

This section describes how to configure the DB2 Content Manager LDAP User Import Scheduler to import LDAP users into DB2 Content Manager. Complete the following steps:

1. Click **Start** → **Programs** → **IBM DB2 Content Manager for Multiplatforms V8.2** → **LDAP User Import Scheduler**. See Figure 10-10 on page 270.

> **Note:** For more information about the settings of the LDAP User Import Scheduler, refer to the online help available from the tool.

Figure 10-10   DB2 Content Manager: LDAP User Import Scheduler

2. When the LDAP User Import Scheduler window opens, enter and select the following values, as shown in Figure 10-10, and then click **Save**.

    LDAP Directory (Source):

    – LDAP object class for groups: `groupOfNames`
      This value should match the group object class in the LDAP directory.
    – LDAP search scope: `member`
    – LDAP root DN: `cn=TDSadmin`
    – LDAP root DN password: `<password>`

    Import Schedule:

    – Select **Enable** for the ICMNLSDB database.
    – Admin ID: `CMadmin`
    – Admin ID Password: `<password>`
    – User group:
      • Select **Maintain the LDAP group names**.
        In our example, we want the import utility to create that groups found in the LDAP directory in DB2 Content Manager and add users to those groups.

      Or:

      • Select **Put all users in one group**, and enter `<group>`.
    – Schedule time: `<24_hour_time>`
    – Day of week: `<day>`
      To select more than one day use the control key.

– User filter: `(objectclass=inetOrgPerson)`
  The LDAP user filter provides a query string to match users in the LDAP user registry. The default user filter we defined will retrieve all the inetOrgPerson user objects.

  > **Note:** We found the <wp_home>\config\wpconfig.properties file useful for determining the proper values and looking at the LDAP directory schema implemented.

– Privilege set: `ClientUserEditSSO`

> **Note:** The default privilege set is ClientUserReadOnly. Due to the security model of DB2 Content Manager, we needed to assign the users of the DB2 Content Manager application a higher privilege set (ClientUserEdit) for the access permissions to work properly.
>
> In our example, we are passing a token from the portlet to DB2 Content Manager for a trusted logon. We needed to create a privilege set with two additional privileges (AllowConnectToLogon and AllowTrustedLogon) beyond the system-defined ClientUserEdit privilege set. We created the *ClientUserEditSSO* privilege set in Create the ClientUserEditSSO privilege set.
>
> Remember all the users in the LDAP directory will be created in DB2 Content Manager with the privilege set defined in the LDAP User Import Scheduler. If your system resources are properly protected with access control lists (ACLs), this should not be an issue. However, it might be preferred to create users with a restrictive privilege set and only add more powerful privilege sets to users that require the access.

3. When message window with the following message, click **OK**:

   Successfully updated cmbschinfo.ini with schedule information.

> **Tip: Windows scheduled task**
>
> The configuration data for the DB2 Content Manager LDAP User Import
> Scheduler is saved to the c:\ibm\cmgmt\cmbschinfo.ini file. When saving
> the settings, the LDAP User Import Scheduler creates a Windows
> scheduled task, which will run the following batch file:
>
> ```
> c:\ibm\cmgmt\admin\common\cmldapimpusers81.bat ICMNLSDB ICM
> ```
>
> The output from running the task can be found in
> c:\ibm\cmgmt\admin\common\cmldapimpusers81.ICMNLSDB.ICM.log.
>
> The settings for this scheduled task can be modified according to your
> environment. Keep in mind that if you have an LDAP directory with a very
> large number of users and groups, this could have a performance impact
> on the system.

> **Note:** In our environment, we experienced the following two anomalies. We
> did not have time to pursue these to identify their cause or if a fix was
> available.
>
> ► When a user is deleted from LDAP, the DB2 Content Manager LDAP User
>   Import Scheduler is supposed to delete a user or group from DB2 Content
>   Manager and does not.
>
> ► The DB2 Content Manager LDAP User Import Scheduler does not modify
>   an existing group with a new user.

Verify the DB2 Content Manager LDAP configuration

Now that the environment is configured, we recommend that you perform some
basic tests to verify that DB2 Content Manager for LDAP is working properly.
When the WebSphere Portal server was configured to use LDAP, we imported
the WPSadmin and WPSbind users, and WPSadmins group through the
wp-itso.ldif file. The DB2 Content Manager LDAP Import Scheduler Utility should
import the users and groups from the LDAP directory into DB2 Content Manager
when the scheduled event transpires. The users and groups should be visible
using the DB2 Content Manager system administration client.

SSL for LDAP server communication

By default, SSL is not enabled on IBM Tivoli Directory Server. Also, the
communication to the LDAP server from clients such as WebSphere Portal and
DB2 Content Manager needs to be configured to use SSL. When communicating
with the LDAP server on port 389, the communications are in clear text. When
using the SSL-enabled communication on port 636, the data is encrypted.

SSL enabling the LDAP server and communication between nodes using LDAP is very much needed for a secure runtime environment. In a development environment, it is an optional configuration.

SSL enablement and security in general are out of the scope of this book. For information about how to enable SSL for IBM Tivoli Directory Server (LDAP) and SSL communication between WebSphere Portal and IBM Tivoli Directory Server, see Chapter 11, "Security hardening," in *Develop and Deploy a Secure Portal, Using WebSphere Portal V5.0.2 and Tivoli Access Manager 5.1*, SG24-6325. For more information about SSL communication between DB2 Content Manager and IBM Tivoli Directory Server, see *IBM Content Manager for Multiplatforms: Planning and Installing Your Content Management System Version 8 Release 2*, GC27-1332-02

10.3.3 Configure the Content Manager eClient RME support

The following sections describe the configuration steps to support the Records Manager Enabler RME) on the Content Management node.

Configure the eClient server to include RME support

Because the eClient server is supported as a WebSphere application, we need to add the RME JAR files to the WebSphere configurations.

Complete the following steps:

1. Open the WebSphere administrative console by entering:

   `http://servername:9090/admin/`

   (Or, click **Start** → **Programs** → **IBM WebSphere** → **Application Server v5.0** → **Administrative Console**).

2. Log in to the WebSphere administrative console.

3. On the left pane, click **Environment** → **Shared Libraries**.

4. Select **Browse Servers** to the right of the Server input field.

5. Select **eClient_Server**.

6. Click **Apply**.

   The listing at the bottom of the main pane should show an entry called eClientLib, as shown in Figure 10-11 on page 274.
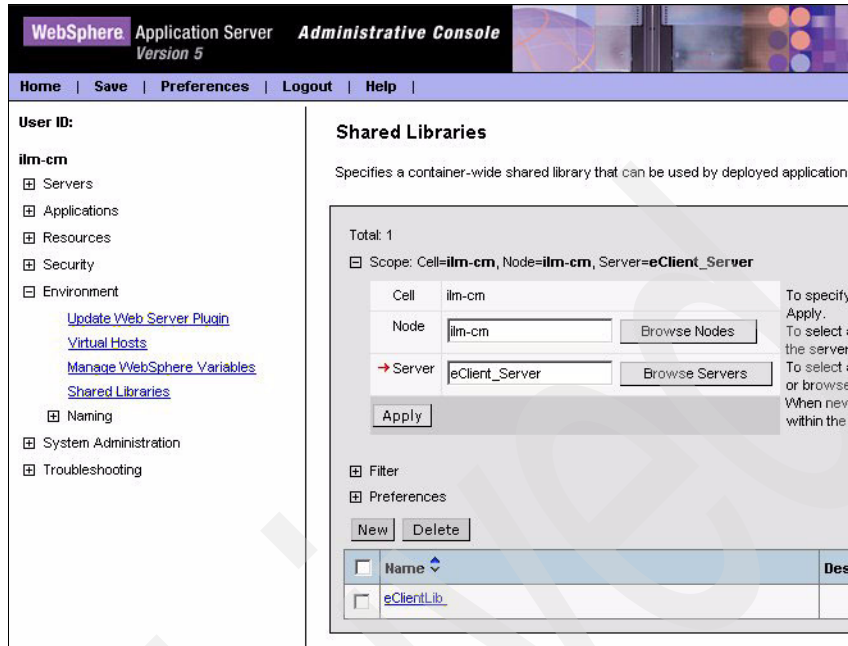
Figure 10-11   Setting Shared Libraries

7. Click the **eClientLib** entry.

    You will see the WebSphere configuration settings. One of them should be the Classpath, with a list of JAR files in the class path (see Figure 10-12 on page 275).

8. Add the following JAR file paths to the beginning of the list:

    – C:\IBM\RMenabler\lib\log4j-1.2.8.jar
    – C:\IBM\RMenabler\lib\rmecm82.jar
    – C:\IBM\RMenabler\lib\IRMAPI.jar
    – C:\IBM\RMenabler\lib\rmeacl82.jar

    Note: Correct the JAR file path definitions to indicate your directory naming convention.

9. Click **OK** to save your changes.
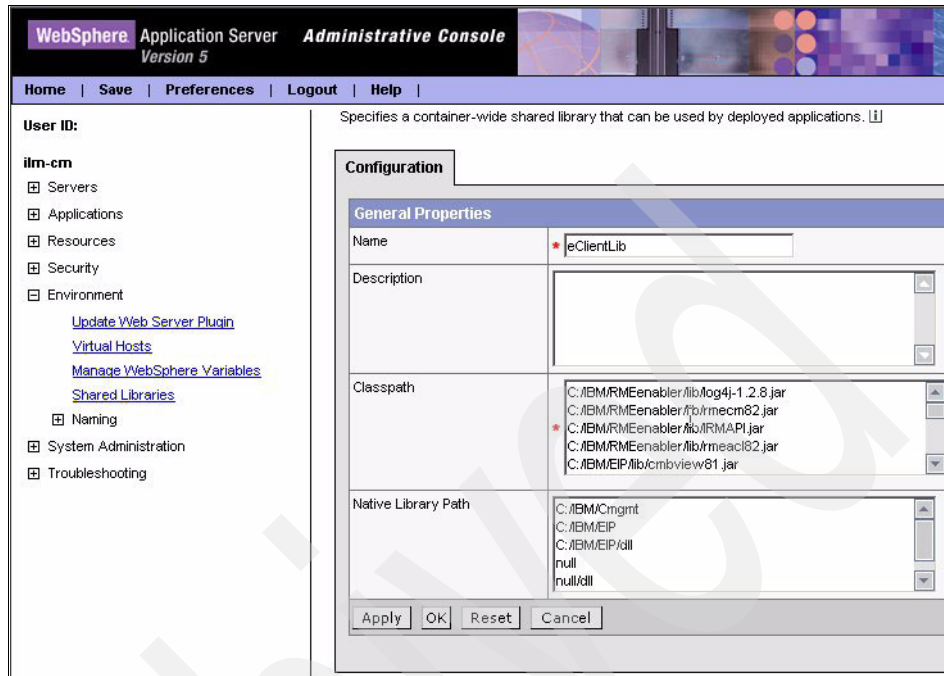
Figure 10-12   Specified JAR files

10. After you have added the JAR file entries, click **Apply**.

> **Important:** If you are configuring a Content Manager eClient server on
> IBM AIX® or Sun Solaris system platform, make sure that you specify the
> path names for the JAR files in the correct case, because these system
> platforms are case-sensitive.

11. On the top left of the page, click **Save**.

12. From the main pane, click the **Save** button to save your changes to the master
    configuration.

13. On the top left of the page, click **Logout**.

14. Restart the Content Manager eClient server.

Customize the eClient server to support new MIME types

The following step is an optional, but recommended, addition to the RME
configuration to ensure new MIME-type compatibility beyond the scope of this
example.

To enable the Content Manager eClient to process DXL MSG formats, you need to add support for two new MIME application types by completing the following steps:

1. Edit the IDMadminDefaults.properties file in the Content Manager eClient install folder C:\IBM\CMeClient.

2. Add the following to the MIME-Type entries section:
   - `application/msg=launch`
   - `application/dxl=launch`

3. Add the following entries to the file extension entries section:
   - `application/dxl.extension=dxl`
   - `application/msg.extension=msg`

4. Stop and restart the Content Manager eClient server.

> **Note:** These MIME-Types should match the MIME-Types that are defined in the Content Manager server using the Content Manager system administration client. See *IBM DB2 Content Manager for Multiplatforms/IBM Information Integrator for Content: Installing, Configuring, and Managing the eClient*, SC27-1350, for more information about customizing the eClient.

10.3.4 Configure the DB2 Content Manager RME functions

Although there is no RME code to be installed on the DB2 Content Manager server, there are configuration steps that need to be performed on the Content Manager server.

Complete the following configuration steps:

1. Log in to the Content Manager server as CMadmin.

2. Set the ACL binding level to support RME access controls. Modify the ACL binding to be "At item level" as follows (see Figure 10-13 on page 277):

   a. Log in to the Content Manager system administrator client as `CMadmin`.
   b. Select **Library Server Parameters** → **Configurations** → **Properties**.
   c. On the Definition tab, click the **Advanced** button.
   d. Select **Public access enabled**.
   e. Under ACL binding level, select **At item level**.
   f. Click **OK**.
   g. Click **OK** to save this setting to the library server configuration.
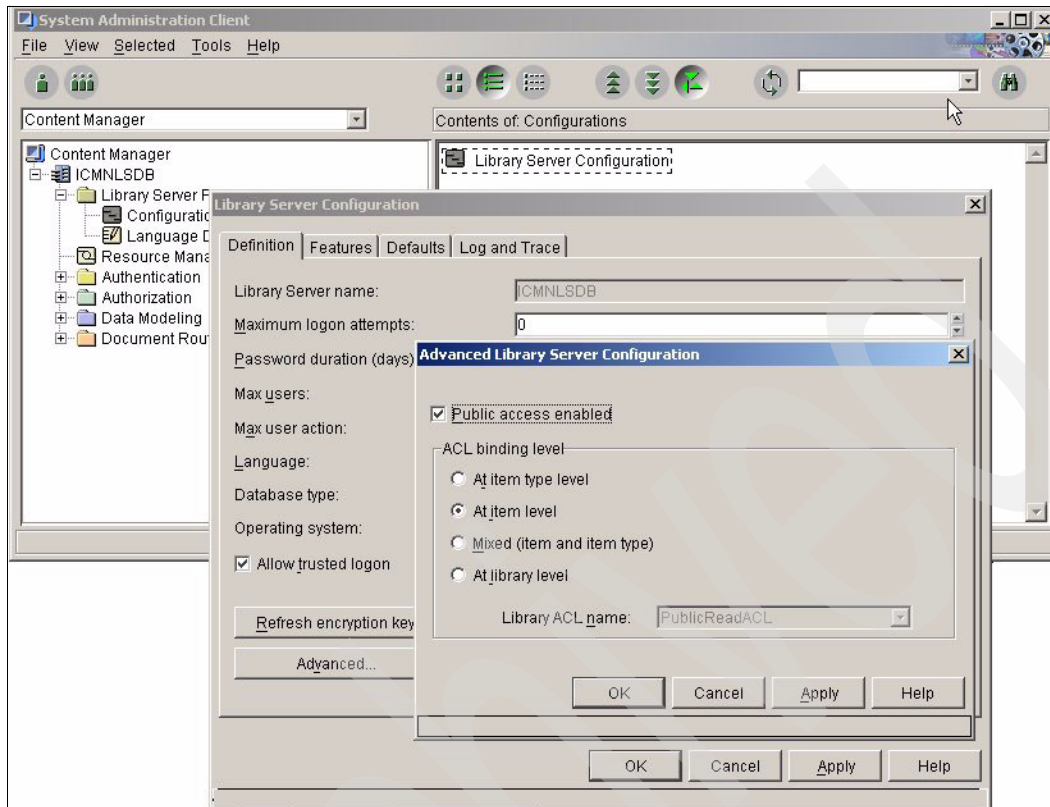
Figure 10-13   Setting the ACL binding

3. Populate the Content Manager server RME objects.

   RME provides an RMECMSetup tool (included in the RME_CommonJava.zip) to automatically set up a Content Manager server to support RME functions. The functions that will be performed by the RMECMSetup tool are:

   – Create the RMEADMIN user ID.
   – Create RME attributes.
   – Create RME item types.
   – Create new MIME types: – DXL – MSG – OLET

4. Execute the setup tool:

   a. Start Windows Explorer and navigator to the RME install folder\setup folder (for example, C:\IBM\RMEenabler\setup).
   b. Double-click **RMECMSetup.bat** to start.
   c. The RMECMSetup tool will prompt you for the following information:
      • CM Server name: `ilm-cm` (your Content Manager Windows platform host name)

- CM Resource Manager name: `RMDB`
- CM Administrator user ID: `CMadmin`
- CM Administrator user password: `<password>`
- Password for the RMEADMIN user ID: `<password>`

> **Note:** The RMECMSetup tool will log its processing and error information in the RMECMSetup.log file that is located in the setup folder of the RME install folder. If the RMECMSetup process completed successfully, it creates all the RME required user ID, attributes, and item types on the Content Manager server.

5. Create RME-enabled item types.

   An RME-enabled item type can be any Content Manager item type that includes the RME required attributes (eRecord, eRecordID) and uses item-level access control list checking. You can only declare Content Manager items as records that belong to a RME-enabled item type. During records declaration, RME automatically copies the values of the Content Manager attributes to the DB2 Records Manager record component attributes if they have the same attribute names.

   To create sample RME-enabled item types, complete the following steps:

   a. Start Windows Explorer and navigator to the RME install folder\setup folder (C:\IBM\RMenabler\setup).

   b. Double-click **RMECMSampleSetup.bat** to start.

   The RMECMSampleSetup tool will log its processing and error information in the RMECMSetup.log file that is located in the setup folder of the RME install.

6. Configure Content Manager to filter out RME authorization objects.

   The RME functions can create some new Content Manager authorization objects such as special privileges, privilege groups, privilege sets, and access control lists. These special authorization objects have names prefixed with $$ICM. Because these authorization objects are for the RME functions internal use only, you might want to filter them out and not to display them to the general users when accessing through the Authorization → Privileges function in the Content Manager system administration client. To filter out these $$ICM authorization objects, you need to set a new option called filterOpt in the Content Manager system administration properties file (cmadmin.properties).

To enable filtering, complete the following steps:

a. Edit the cmadmin.properties file on the Content Manager system.

This file is located in the %CMCOMMON%\Admin\Common directory. The path is C:\IBM\CMgmt\Admin\Common\cmbadmin.properties in our installation.

b. Add a new line with `filterOpt = 1` to the end of the cmadmin.properties file.

This will hide the $$ICM authorization objects when the Content Manager system administration client Authorization → Privileges function is selected.

Table 10-3 shows the possible values of the filterOpt option. The default value is 0.

Table 10-3   Content Manager system administration client filterOpt values

Value	Meaning
0	Displays all authorization objects. This is the default.
1	Hide $$ICM authorization objects. Displays only the regular authorization objects.
2	Displays only the $$ICM authorization objects.

10.3.5 Deploy DB2 Content Manager data model

The DB2 Content Manager data model will be defined against the use cases and scenarios discussed earlier in this document. Within Content Manager, we must create the following data model components:

- ► Attributes
- ► Item types
- ► Users
- ► Groups
- ► Access control lists

Create the DB2 Content Manager attributes

This section describes how to create attributes using the DB2 Content Manager system administration client.

We create the attributes shown in Table 10-4 on page 280.

Table 10-4   DB2 Content Manager attributes

Attribute	Description	Type	Maximum size
A_CommentBody	Body comments	varchar	200
A_RepAuthor	Author of the research report	varchar	60
A_RepLastMod	Last modified date of the report	time stamp	System default
A_RepTitle	Title of the research report	varchar	60
A_RepTopic	Topic of the research report	varchar	60

To create the attributes, complete the following steps:

1. Start the DB2 Content Manager system administration client by clicking
   Start → **Programs** → **IBM Content Manager for Multiplatforms V8.2** →
   System Administration Client.

2. Invoke the New Attribute window by right-clicking the **Attributes** submenu
   under Data Modeling, and then clicking **New**.

3. Fill in the attribute information as shown in Figure 10-14 on page 281.

Figure 10-14   DB2 Content Manager Attribute creation

4. Repeat the process for all the attributes listed in Table 10-4 on page 280.

Create the DB2 Content Manager item types

We create the item types shown in Table 10-5.

Table 10-5   DB2 Content Manager item types

Item type name	Description	Classification
A_Comment	Comment	Item
A_PublishedFl	Folder that has all the published documents	Item
A_Report	Research report	Document

To create the item types, complete the following steps:

1. Start the DB2 Content Manager system administration client by clicking
    Start → **Programs** → **IBM Content Manager for Multiplatforms V8.2** →
    system administration client.

2. Invoke the New Item Type Definition window by right-clicking the **Item Types**
    submenu under Data Modeling, and then clicking **New**.

3. Fill in the item type information as shown in Figure 10-15, Figure 10-16, and Figure 10-17 on page 283.

Figure 10-15   DB2 Content Manager Item Type creation (Definition)

Figure 10-16   DB2 Content Manager Item Type creation (Access Control)
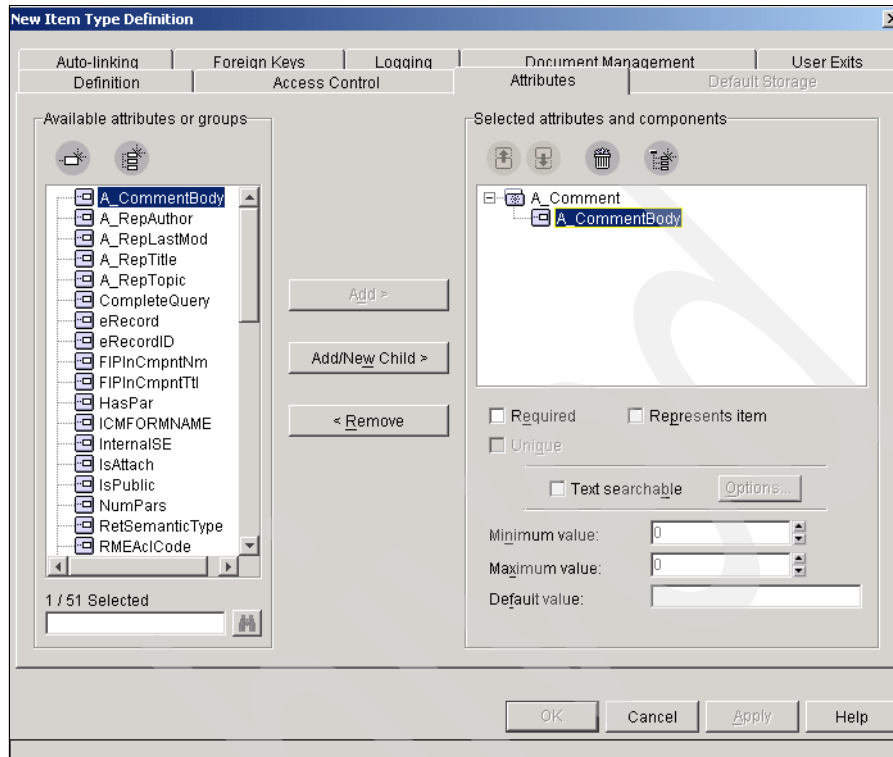
Figure 10-17   DB2 Content Manager Item Type creation (Attributes)

4. Repeat the process for all the item types listed in Table 10-5 on page 281.

Create access control lists

During the Content Management node configuration (described in 10.3.2, "Configure the LDAP User Import Scheduler" on page 269), we established a schedule for the importation of LDAP users into DB2 Content Manager. As implied, that configuration step establishes a schedule for LDAP resource synchronization. Now, we add specific access control list (ACL), user, and group objects into DB2 Content Manager for the deployment of the solution example.

The ACLs shown in Table 10-6 on page 284 must be created prior to importing LDAP users and groups.

Table 10-6   DB2 Content Manager ACL and groups

ACL name	Group name	Privilege set
ACLAnalysts	analysts	ClientUserEdit
	supervisors	NoPrivs
	sysadmins	AllPrivs
	recordsadmins	AllPrivs
ACLSupervisors	supervisors	ClientUserEdit
	analysts	NoPrivs
	sysadmins	AllPrivs
	recordsadmins	AllPrivs
ACLSysAdmins	sysadmins	AllPrivs
	supervisors	NoPrivs
	analysts	NoPrivs
	recordsadmins	NoPrivs
ACLRecAdmin	sysadmins	AllPriv
	supervisors	NoPriv
	analysts	Nopriv
	recordsadmins	AllPriv

To create ACLs using the system administration client, complete the following steps:

1. Start the DB2 Content Manager system administration client by clicking **Start → Programs → IBM Content Manager for Multiplatforms V8.2 → system administration client**.

2. Invoke the New Access Control List Definition window by right-clicking the **Access Control Lists** submenu under Authorization, and then clicking **New**.

3. Fill in the **Name** field according to the values in Table 10-6.

4. You can fill in the optional **Description** field if you want.

5. Select the privilege set according to the information in Table 10-6 and Figure 10-18 on page 285.

6. Click **OK** to save the new ACL.

7. Repeat these steps to create the remaining ACLs.
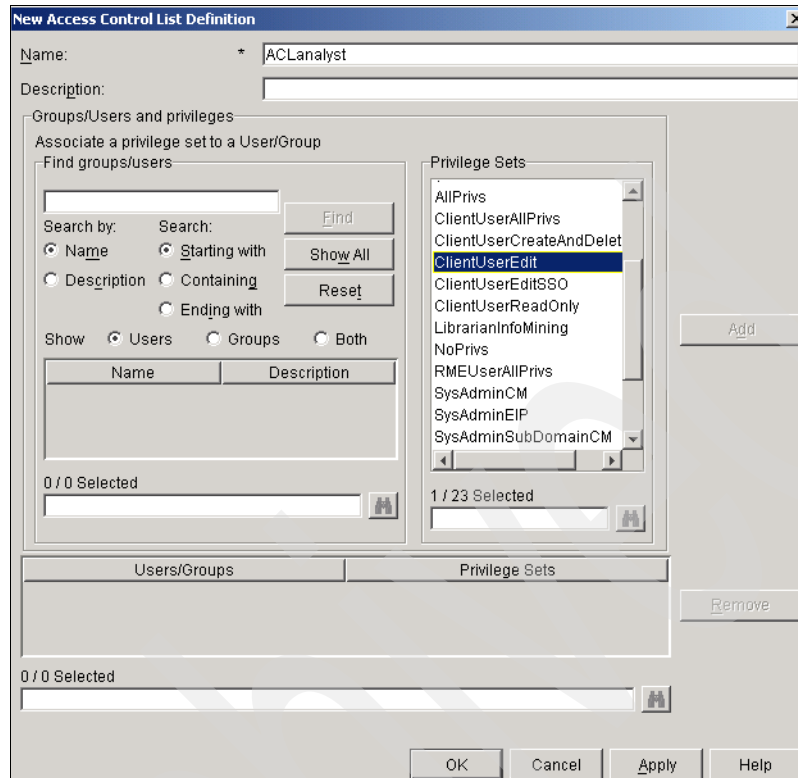
Figure 10-18   DB2 Content Manager ACL creation

Import LDAP users to DB2 Content Manager

The users listed in Table 10-7 must be imported from LDAP.

Table 10-7   DB2 Content Manager users and groups

User name	Group name
analyst1	analysts
supervisor1	supervisors
sysadmin1	sysadmins
recordadmin1	recordsadmins

To import users in DB2 Content Manager using the system administration client, complete the following steps:

1. Start the DB2 Content Manager system administration client by clicking **Start** → **Programs** → **IBM Content Manager for Multiplatforms V8.2** → **system administration client**.

2. Invoke the New User window by right-clicking the **Users** submenu under Authentication, and then clicking **New**.

3. Click the **LDAP** button to launch the LDAP user selection window.

4. Choose the user or users to import by first clicking the **Show All** button.

> **Tip:** In the test environment, we only defined three users, so selecting "Show all" is not an issue. However, for a production implementation, the list of LDAP users can quickly overwhelm the process. In these instances, be sure to limit the number of users returned by providing filtered search criteria within the LDAP user selection window.

5. After the users are loaded into the New User window, complete the import process as illustrated in Figure 10-19, Figure 10-20, and Figure 10-21.

Figure 10-19   DB2 Content Manager user import (Define Users)
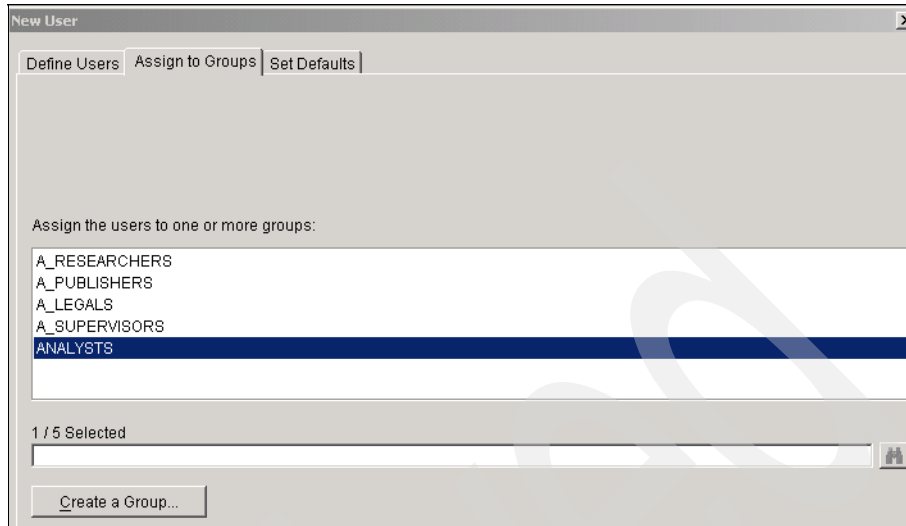
Figure 10-20   DB2 Content Manager user import (Assign to Groups)
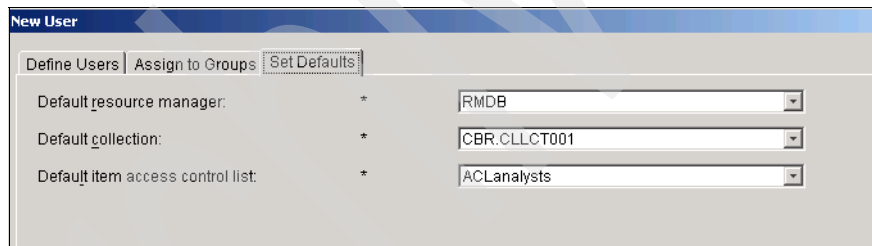
Figure 10-21   DB2 Content Manager user import (Set Defaults)

6. Click **OK** to save the user information.

7. Repeat for all the required users specified in Table 10-7 on page 285.

Create DB2 Content Manager groups

To create users in DB2 Content Manager using the system administration client, complete the following steps:

1. Start the DB2 Content Manager system administration client by clicking **Start** → **Programs** → **IBM Content Manager for Multiplatforms V8.2** → **system administration client**.

2. Invoke the New User Group window by right-clicking the **User Groups** submenu under Authentication, and then clicking **New**.

3. Fill in the user information as shown in Figure 10-22 on page 288.
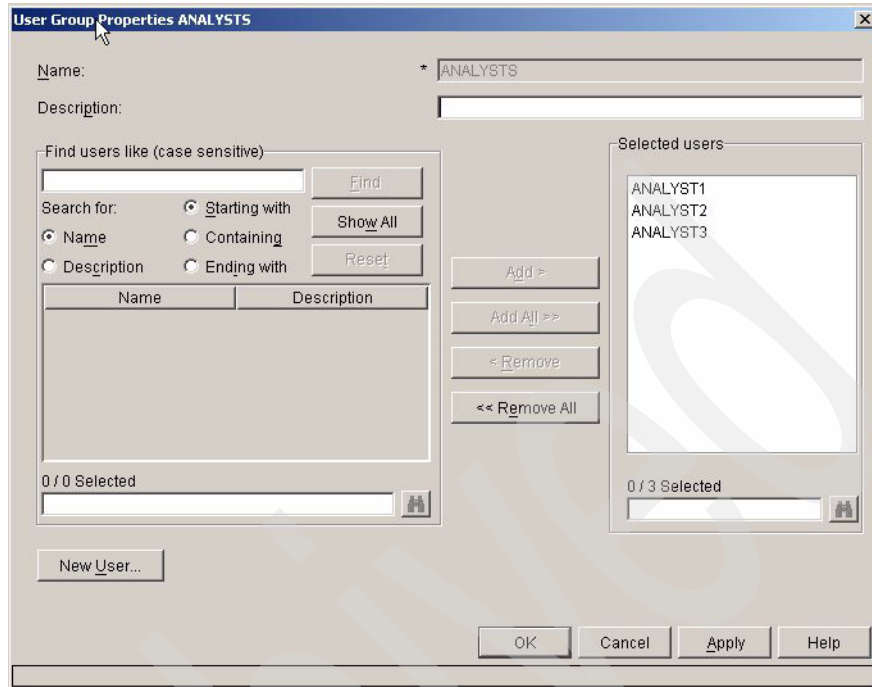
Figure 10-22   DB2 Content Manager User Group definition

4. You can either use search and find to list the desired users, or simply click **Show All** to list all the available users. Scroll up or down to select the users of this group, and then click **Add** to add the users to the group. You can select more than one user at a time by holding down the Shift or Ctrl key when selecting users.

10.4 Configure the Records Management node

The steps below must be performed to properly configure the records management node.

10.4.1 Configure the RME Host Interface component

The RME Host Interface front-end is a WebSphere application that runs alongside the IBM DB2 Records Manager Web applications. The complete Web application is contained in the RMECMRemoteHost82.ear file, which must be deployed before it can be used.

To deploy the RME Host Interface Web application, complete the following steps:

1. Log in to the WebSphere administrative console.

2. Click <**hostname**> → **Applications** → **Install New Application**.

3. In the Path section, select the Local path and select the **RMECMRemoteHost82.ear** file (for example, c:\Program Files\IBM\CM82\RME\lib\RMECMRemoteHost82.ear). Click **Open**.

4. Click **Next**.

5. Continue to click **Next** (about five times) until you get to the page that has the **Finish** button.

6. Click **Finish**. WebSphere will start to process the deployment request. Wait until you see a page displaying the "Application RMECMRemoteHost installed successfully" message and asking you to save the new changes:

7. Click **Save** to save the changes to the master configuration.

Defining RME JAR files to WebSphere as a new shared library

There is a set of JAR files that needs to be defined to the WebSphere environment in order to support the RME functions on the DB2 Records Manager server.

To define these JAR files to the WebSphere environment, complete the following steps:

1. Log in to the WebSphere administrative console.

2. Click **Environment** → **Shared Libraries**.

3. Set the Scope to server1 by completing the following steps:

   a. Click the **Browse Servers** button.

   b. Select **server1**.

   c. Click **OK**.

   d. Click **Apply**.

4. Scroll down and click the **New** button to add a new shared library.

5. Enter RMEJars for the Name.

6. Enter the path for the following JAR files in the CLASSPATH input field:

   – ICM Connector JAR (cmbsdk81.jar)
   – Apache Log4J JAR (log4j-1.2.8.jar)
   – RME Common JAR (rmecm82.jar)
   – RME Host Interface JAR (RMECMHost82.jar)
   – RME security support JAR (rmeacl82.jar)
   – WebSphere SOAP JAR (soap.jar)

7. Add the db2java.zip file to the CLASSPATH. For example, add `c:\Program Files\IBM\SQLLIB\java\db2java.zip` to the CLASSPATH.

8. Add the Content Manager system administration path to the CLASSPATH. For example, add `c:\Program Files\IBM\CMgmt` to the CLASSPATH.

9. After you have entered all the JAR files to the CLASSPATH input field, click the **Apply** button.

10. Click the **Save** link on top of the page and click the **Save** button in the Save to Master Configuration section to save the new RMEJars shared library.

RMEJars shared library references to RMECMRemoteHost

To add the RMEJars library as a RMECMRemoteHost reference, complete the following steps:

1. Log in to the WebSphere administrative console.

2. Click **Application** → **Enterprise Applications**.

3. Click the **RMECMRemoteHost** link.

4. Scroll down until you see the Additional Properties section.

5. Click the **Libraries** link.

6. Click the **Add** button.

7. Select **RMEJars**.

8. Click **OK**.

9. Click **Save** on the top of the page and click the **Save** button to save the changes to the master configuration.

10.4.2 Configure DB2 Records Manager

In order for the RME components to communicate with the Content Manager server, two Content Manager configuration files (cmbicmsrvs.ini and cmbicmenv.ini) must be configured to include the Content Manager server and database connection information. For the DB2 Records Manager server, you need to perform the following procedure to add the Content Manager server to the Content Manager configuration files:

1. Add the Content Manager server to the Content Manager cmbicmsrvs.ini configuration file.

   Edit the c:\program files\ibm\cmgmt\cmbicmsrvs.ini file and add an entry for the Content Manager server. In our installation, we populated the file with the following values:

   – `ICMSERVER=ICMNLSDB`
   – `ICMSERVERREPTYPE=DB2`

- ICMSCHEMA=ICMADMIN
- ICMSSO=FALSE
- ICMDBAUTH=SERVER
- ICMREMOTE=TRUE
- ICMHOSTNAME=ilm-cm.itsc.austin.ibm.com
- ICMPORT=50000
- ICMREMOTEDB=ICMNLSDB
- ICMNODENAME=ilm-cm.itsc.austin.ibm.com
- ICMOSTYPE=NT

2. Add database connect information to the cmbicmenv.ini file.

   This INI file contains Content Manager database connect information.
   Whenever you need to connect to a new, remote Content Manager database,
   you need to add an entry to this INI file. You can use the Content Manager
   system administration client Java utilities to add an entry to this INI file.
   Complete the following steps:

   – From a Windows command prompt, change to the %CMCOMMON% path,
     for example, `cd\C:\IBM\CMgmt`.

   – Execute the cmbicmenv81.bat file to set the Java-enabled environment, for
     example, `C:\IBM\EIP\cmbenv81.bat`.

   – Execute the Java-based Content Manager connection utility.

     The following example adds an entry to the cmbicmenv.ini file for
     ICMNLSDB with the connection user ID `CMconnect` and password
     `<password>`:

     `java com.ibm.mm.sdk.util.cmbenvicm -a add -s ICMNLSDB-u CMCONNECT-p <password>`

   Your system is now configured to communicate with the Content Manager
   server and database.

Configure DB2 Records Manager RME components

RME requires the following DB2 Records Manager components to be defined on
the DB2 Records Manager server:

► Document record component
► Email record component
► Physical record component (optional)
► Cross-Reference
► Supersedes view
► Versions view

RME requires at least one record component for declaring electronic documents
and e-mail messages. If you installed the sample file plan during the IBM DB2
Records Manager installation, the Document record component is already

defined on the system. You can use the same record component for processing both document and e-mail records. You can also create your own record components, and you can name them whatever name you want. The only requirement is to register the record component ID for the Document and Email components with RME using the RME Configuration Tool.

When you install the DB2 Records Manager server, if you have installed the sample file plan database, the Document record component is already defined on the system. Otherwise, you have to create at least one record component for RME to use.

To create the required DB2 Records Manager components, complete the following:

1. Launch the DB2 Records Manager Web administrator client, for example:

   `http://ilm-rm:9080/IRMClient`

2. Log in to DB2 Records Manager client with a user account that has file plan design authority using the following values:

   – Login Name: `administrator`
   – Password: `cronos` (Records Manager default for this account)

3. Create the Primary View component:

   a. From the main menu, click **File Plan Design** → **Views**.
   b. Click **Add** to add a new view.
   c. In the New View window, select the following values:
      • View Name: `File Plan`
      • Type: **Hierarchical**
   d. Click **Save**.

4. Create a new file plan Document record component.

   > **Note:** When you installed the DB2 Records Manager server, if you chose to install the Sample file plan database, the Document record component is already defined on the system.

   a. From the main menu, click **File Plan Design** → **Components** and click **Add**.
   b. Enter the values illustrated in Figure 10-23 on page 293.
   c. Click **Save** to save the new component.
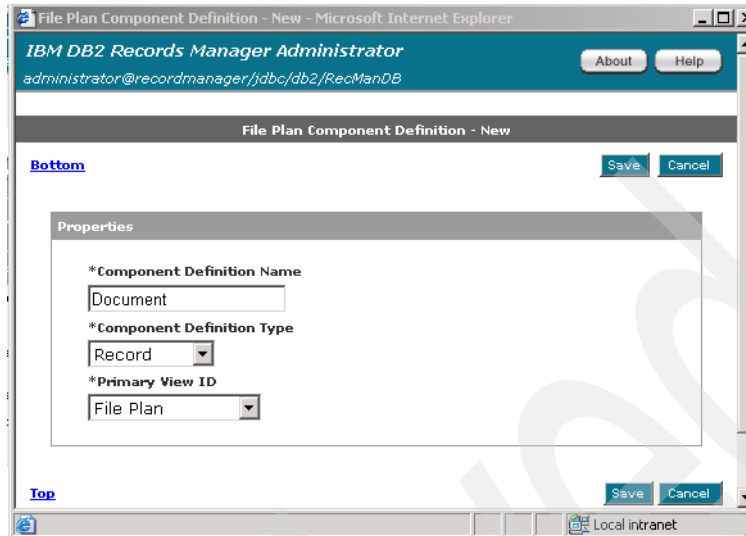
Figure 10-23   Records Manager record-type component creation

5. Add new attributes to the Document record component.

    On the Component window, you can edit the properties of the newly defined component:

    a. Click the **View/Edit Properties** smart icon.
    b. Click the **Add** button.

        Figure 10-24 on page 294 shows an example of adding a new attribute called eRecordID for the Document record component.

    c. Click **Save** to save the new component attribute.
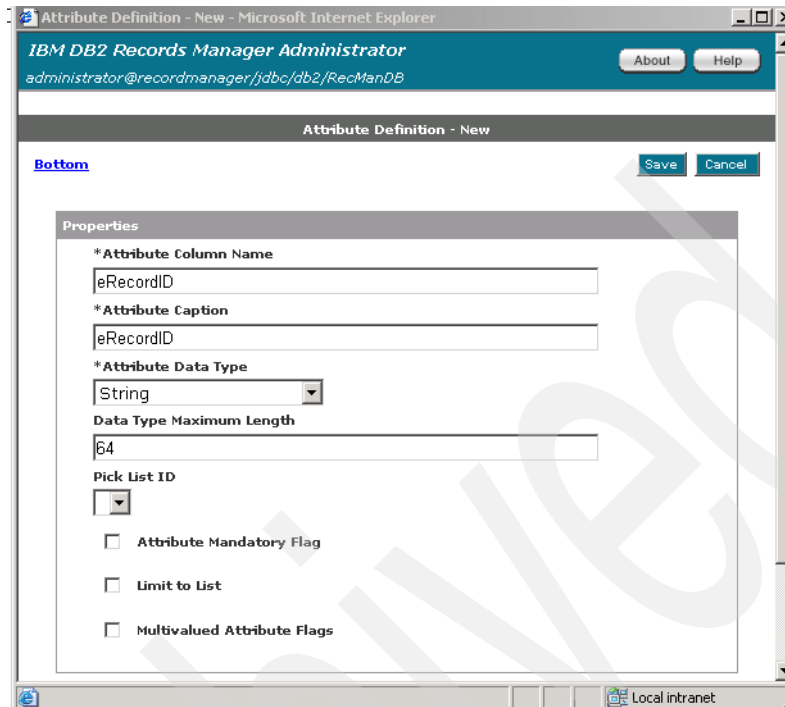
Figure 10-24   Records Manager component attribute creation

> **Note:** For user-defined attributes, the DB2 Records Manager system
> automatically prefixes the attribute names with TS_. For example, for the
> eRecordID attribute we created earlier, its attribute name will be changed
> to be TS_eRecordID.

6. Create a new file plan Email record component:

   a. From the main menu, click **File Plan Design** → **Components** and click
      Add.
   b. Enter and select the following values:
      • Component Definition Name: `Email`
      • Component Definition Type: **Record**
      • Primary View Name ID: **File Plan**
   c. Click **Save** to save the new component.

7. Add new attributes to the Email record component:

   a. Click the **View/Edit Properties** smart icon.
   b. Click the **Add** button.

c. Add the following component attributes:
   - Attribute Name: `From`
   - Attribute Caption: `Author` or `Originator`
   - Data Type: **String**
   - Data Type Maximum Length: `100`
d. Click **Save** to save the new component attribute.

Repeat this procedure to add all of the attributes in Table 10-8 to the Email component

Table 10-8   Email component attributes

Attribute name	Attribute caption	Data type	Data type maximum length
Addressees	Addressee(s)	String	200
OtherRecipients	Other Addressee(s)	String	200
EmailSentDate	Date Sent	String	50
EmailReceivedDate	Date Received	String	50

8. Create the required relationship views.

   RME requires the following relationship views to be defined on the DB2 Records Manager system:

   – Cross-Reference
   – Supersedes
   – Versions

   Note: If you installed the Default database during the DB2 Records Manager installation, the Cross-Reference view is already defined on the system. If not, you can follow this procedure to create the Cross-Reference, Supersedes view, and Versions view.

   Complete the following steps:

   a. Log in to the DB2 Records Manager client with a user ID that has file plan design authority.

   b. From the main menu, click **File Plan Design** → **Views**.

   c. Click the **Add** button to add a new view.

   d. In the New View window, enter and select the following values:

      - View Name: `Supersedes`
      - View Type: **Link**

   e. Click **Save** to create the Supersedes view.

f. Click the **View/Edit Properties** icon for the Supersedes view you just created.

g. Click the **Add Relationship** button to add new relationships.

h. On the Relationship - New window, enter:

```
Relationship Definition Name = Document Supersedes Document
Relationship Capacity = 0
Source Component = Document
Target Component = Document
Click Save to save the relationship.
```

i. Click **Close** to close the edit window after all relationships have been added.

Repeat this procedure to create a new view called Versions:

a. Create a view called Versions:

```
View Name = Versions
View Type = Link
```

b. Define the following relationships for Versions:

```
Relationship Definition Name = Document new versions of Document
Relationship Capacity = 0
Source Component = Document
Target Component = Document

Relationship Definition Name = Email new versions of Email
Relationship Capacity = 0
Source Component = Email
Target Component = Email
```

Next, create a view called Cross-Reference and add relationships to this view:

a. Create a view called Cross-Reference:

```
View Name = Cross-Reference
View Type = Link
```

b. Add relationships to the Cross-Reference view.

The Cross-Reference view is already defined on the DB2 Records Manager system after the DB2 Records Manager installation. You just need to add the following relationships:

- Relationship Definition Name: Document (main) to Document (supporting)

```
Relationship Capacity = 0
Source Component = Document
Target Component = Document—
```

- Relationship Definition Name: Email (main) to Email (supporting)

```
Relationship Capacity = 0
Source Component = Email
Target Component = Email—
```

- Relationship Definition Name: Document (main) to Email (supporting)

```
Relationship Capacity = 0
Source Component = Document
Target Component = Email—
```

- Relationship Definition Name: Email (main) to Document (supporting)

```
Relationship Capacity = 0
Source Component = Email
Target Component = Document
```

10.5 Summary

Although installation and configuration go hand-in-hand for many out-of-the-box products, this solution example involves many products and many integration points to support complex business processes. We provided the details within this configuration chapter for post-installation solution configuration. The order of configuration, if strictly followed, will provide you with a functional solution environment, but more importantly, an in-depth understanding of the solution components and dependencies.

At this point, you should have a running environment where we can deploy the sample application and test it. We describe deploying and running our application in the next part of this book.

Part 4

Deployment and execution

In this part of the book, we describe how the application modules, as described in Part 2, "Design and development" on page 29, can be deployed to and executed in the runtime environment, as described in Part 3, "Installation and configuration" on page 85.

We organize the part into the following topics:

► Solution deployment
► Solution walkthrough

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Solution deployment

The information life-cycle management (ILM) sample solution consists of several modules. Each of these modules has to be deployed individually to its appropriate node. See Chapter 4, "Component design and development" on page 51 for a description of the modules. The purpose of this chapter is to describe the steps needed to deploy the whole solution.

11.1 Download the ILM sample code

This chapter reference the sample code. Refer to Appendix A, "Additional material" on page 367 for information about how to download the sample code and other files referenced in this chapter.

11.2 Content Management node

The following steps must be carried out on the Content Management node (ILM-CM).

PortalToCM application deployment

The PortalToCM application is a Java 2, Enterprise Edition (J2EE) enterprise application module that needs to be deployed to WebSphere Application Server running on the Content Management node. PortalToCM is a utility application that makes Content Manager functions accessible from remote WebSphere Application Server servers by IIOP protocol.

1. The PortalToCM application needs a Java library called cmbsdk81.jar. This file is provided with the installation of DB2 Information Integrator for Content. It is also available in the sample code included with this book in the SG246481-Samples\requiredLibraries directory.

   You can use the file provided with the sample code, but be aware that it might be specific to the Version 8.2 of the DB2 Information Integrator for Content. If you are using another version for your implementation, the file provided might need to be altered. Upload this file to the Content Management node:

   a. Create the following directory:

      `C:\IBM\WebSphere\AppServer\optionalLibraries\ContentManager`

   b. Upload or copy the cmbsdk81.jar file to the C:\IBM\WebSphere\AppServer\optionalLibraries\ContentManager directory.

2. Log in to the WebSphere administrative console:

   a. Open a Web browser and navigate to the WebSphere administrative console located at:

      `http://ilm-cm.itsc.austin.ibm.com:9090/admin/`

   b. Click **OK**. Security on this server has not been turned on as currently configured, so you do not need to provide a user name.

3. Create a shared library entry for the cmbsdk81.jar file (see Figure 11-1 and Figure 11-2 on page 304):

   a. Go to the Shared Libraries page by clicking **Environment** → **Shared Libraries**.

   b. Click **Browse Servers**.

   c. Select the **server1** entry.

   d. Click **OK**.

   e. Click **Apply**.

   f. Click **New**.

   g. Fill in the description of the new shared library:

      - Name: cmbsdk81.jar

      - Classpath:
        C:/IBM/WebSphere/AppServer/optionalLibraries/ContentManager/cm
        bsdk81.jar

      Click **OK**.

Figure 11-1   Defining the cmbsdk81.jar file
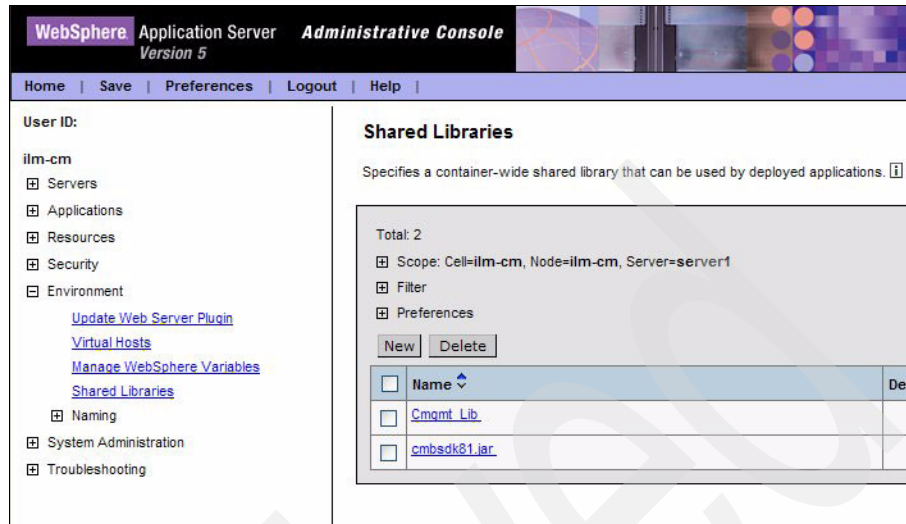
Figure 11-2 Shared Libraries

4. The cmbsdk81.jar library references properties files contained within the Content Manager installation. These files provide the actual specification of connection parameters to Content Manager. If you followed the instructions in this book, these files should be located in C:\IBM\Cmgmt.

If you installed Content Manager on a remote computer, you will need to copy these files to the computer with the PortalToCM application.

The path to these properties files is added to the PortalToCM application as a shared library, so we need to create new shared library entry (see Figure 11-3 on page 305):

a. Go to the Shared Libraries page by clicking **Environment** → **Shared Libraries**.

b. Click **Browse Servers**.

c. Select the **server1** entry.

d. Click **OK**.

e. Click **Apply**.

f. Click **New**.

g. Fill in description of the new shared library:

   • Name: `Cmgmt_Lib`

   • Classpath: `C:/IBM/Cmgmt`

   Click **OK**.
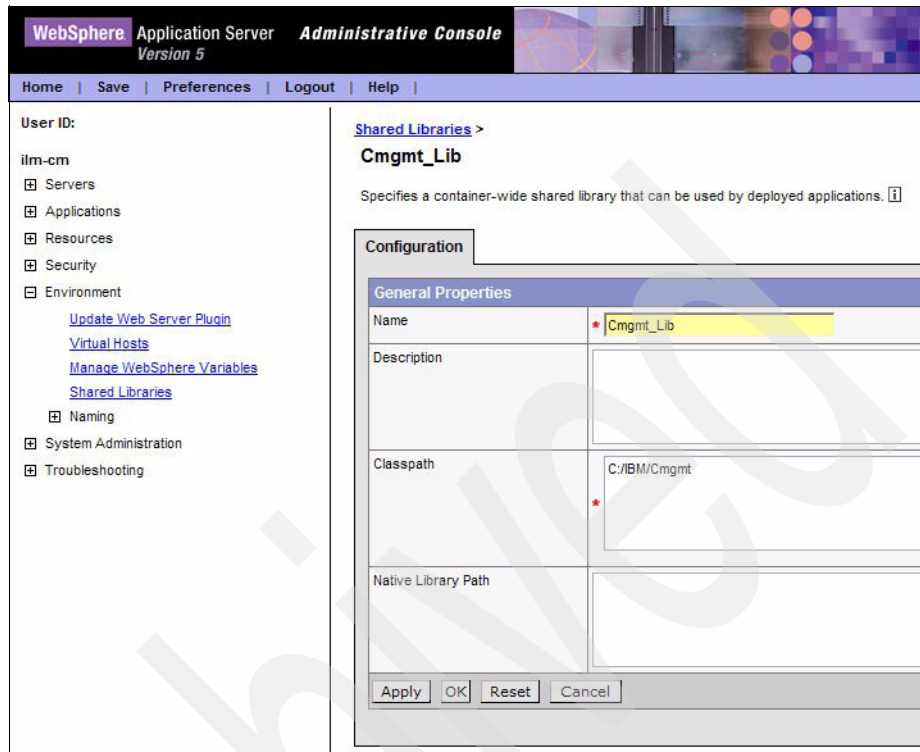
Figure 11-3   Defining Cmgmt_Lib shared libraries

5. Next, install the PortalToCM enterprise application:

   a. Go to the Enterprise Applications page by clicking **Applications** → **Enterprise Applications**.

   b. Click **Install**.

   c. Click **Browse** and select the **PortalToCMEAR.ear** file (available with the sample code in the SG246481-Samples/sampleModules directory).

   d. Click **Next**.

   e. Select **Generate Default Bindings** and click **Next**.

   f. For the next five installation pages or steps, leave all the settings to the defaults. Keep clicking the **Next** button until you reach the Summary page.

   g. At the Summary page, click **Finish**. You will see the progress of the installation on the next page. If the installation succeeds, you will see the `Application PortalToCMEAR installed successfully` message.

   h. Save the changes by following the **Save to Master Configuration** link.

    i. Click **Save** to confirm the changes.

6. After the application is installed, you need to associate the shared libraries to it.

> **Note:** Shared libraries need to be added after each update of the application, because they are lost during the update.

We add the two shared libraries created in the previous steps:

a. Go to PortalToCMEAR application page by clicking **Applications** → **Enterprise Applications** → **PortalToCMEAR**.

b. Select the **Libraries** link from the Additional Properties section.

c. Click **Add**.

d. Select the **cmbsdk81.jar** entry and click **OK**.

e. Select the **Libraries** link from the Additional Properties section.

f. Click **Add**.

g. Select the **Cmgmt_Lib** entry and click **OK**.

h. Click the **Save** link at the top of the page and then click the **Save** button at the bottom of the page.

7. The deployment of the PortalToCM application is now complete. Next, we start the application:

a. Click **Applications** → **Enterprise Applications**.

b. Select the **PortalToCMEAR** option.

c. Click **Start**.

d. You should see the `Application PortalToCMEAR on server server1 and node ilm-cm started successfully` message.

> **Note:** If an error occurs during the application start up, you can find details in the log file C:\IBM\WebSphere\AppServer\logs\server1\SystemOut.log.
>
> For further information, see the *WebSphere Application Server Information Center*, available at:
>
> `http://publib.boulder.ibm.com/infocenter/ws51help/index.jsp`

11.3 Records Management node

To deploy of the Records Management node, we must now extend the previous configuration tasks to include solution-specific component integration into DB2 Records Manager.

In this section, we complete the following tasks:

► Define the DB2 Records Manager logic extensions
► Register the DB2 Content Manager server as a DB2 Records Manager host application
► Capture the DB2 Records Manager component IDs
► Define DB2 Records Manager RME configuration information
► Configure DB2 Records Manager RME users and groups

11.3.1 Define the DB2 Records Manager logic extensions

Records Manager Enabler (RME) added some logic extensions for processing electronic documents and e-mail messages. In order to deploy these logic extensions to the DB2 Records Manager Engine server, you need to define these logic extensions to all the record components defined on the DB2 Records Manager system.

To add the logic extensions, complete the following steps (see Figure 11-4 on page 308):

1. Log in to the IBM DB2 Records Manager client (http://ilm-rm.itsc.austin.ibm.com:9080/IRMClient/) with a user account that has file plan design authority.

2. From the main menu, click the **Tools** → **Extensions**.

3. Click the **Add Logic Extension** button.

4. Select **Document** from the Component Definition list.

5. In the Fully Qualified Logic Extension Class Name field, enter the extension and type the Java package name:

   `com.ibm.rme.ext.RMEListener`

6. Select **Enabled**.
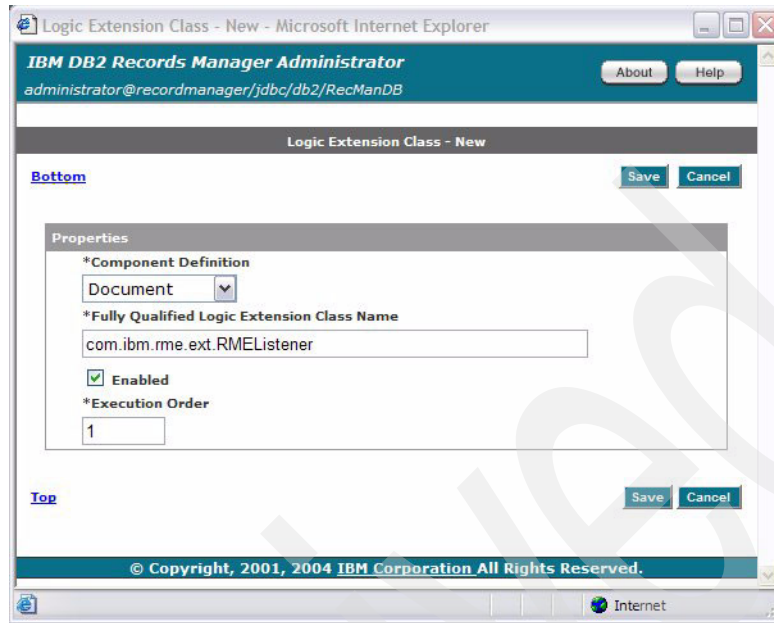
Figure 11-4   Defining Logic Extensions

7. Click **Save** to save the RME logic extension definition.

8. Repeat these steps to define a logic extension for the Email record component and all other defined components that will be used with the Records Manager Enabler.

11.3.2 Register the DB2 Content Manager server as a DB2 Records Manager host application

In order for the IBM DB2 Records Manager server to know which Host Interface module to launch to communicate with a specific Content Manager server, the Content Manager server must be registered with the DB2 Records Manager server as a host application. Complete the following steps:

1. Log in to DB2 Records Manager using the DB2 Records Manager client with a user account that has Record Host Management authority.

2. From the main menu, click **Tools** → **Host Configuration**.

3. Click **Add** to add a new host application.

4. Enter and select the following values:

   – Host Name: `ICMNLSDB`

   – Host Server Name/Address: `ilm-rm.itsc.austin.ibm.com`

> **Note:** The Host Server Name/Address should identify the host name of the machine where the RME Host Interface Web application is deployed. This is usually the same machine as the system from which the DB2 Records Manager Web Admin is running.

– Host JNDI Port field: `2809`

– Host Integration Component JNDI Name: `ejb/com/host/RMECMRemoteHost`

– Select **On Permission Change**.

– Select **Allow Content Retrieval**.

– Fill in the Password and Confirm Password fields.

> **Note:** The host application password is defined by this entry action. That is, the RME can support multiple host applications, but the host application password must be the same for all instances.

Figure 11-5 on page 310 illustrates the details of the host application configuration.

5. Click **Save** to create a new host application entry.

Figure 11-5   DB2 Records Manager Host Configuration

11.3.3 Capture the DB2 Records Manager component IDs

After the host definition, views, and components have been created, we need to capture the component IDs for subsequent configuration steps. The easiest procedure for capturing these IDs is as follows:

1. Go to the Component page to display all the components by clicking **File Plan Design** → **Component**.

2. Hover over the component "Actions" smart icon to reveal the component ID # within the browser status bar, as shown in Figure 11-6 on page 311.
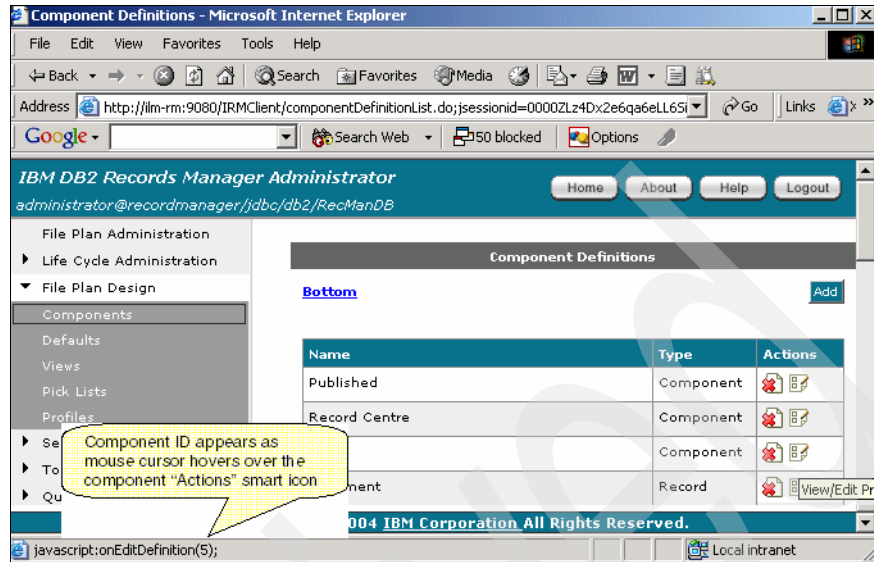
Figure 11-6   Records Manager Component ID: Display ID

3. Record the number in Table 11-1 and repeat this process for each component listed.

Table 11-1   DB2 Records Manager file plan component definition IDs

Component name	Component ID (FIPlnCmpntDefID)
Document Component ID	
Email Component ID	
Cross-Reference View ID	
Supersedes View ID	
Versions View ID	
Host Application ID	

11.3.4 Define DB2 Records Manager RME configuration information

In order for the different RME components to communicate with each other, we need to maintain information about the RME system configurations. The RMEconfig tool is used to input and maintain RME system configurations so that the RME components can access them. The RMEconfig tool is part of the RME_CommonWin32.zip file and it is installed in the RME installation folder during the RME installation. The RMEconfig tool should be executed on the DB2

Records Manager server machine after all the previous post-installation configuration steps have been completed successfully.

Execute the RMEconfig tool

To execute the configuration tool, complete the following steps on the Records Management node:

1. From the Windows Start menu, click **Start** → **Run**.

2. Enter `rmeconfig` and then click **OK**.

3. The RME Configuration Tool interface opens, as shown in Figure 11-7.

Figure 11-7   DB2 Records Manager RME Configuration Tool interface

4. Click **Connect** → **Logon**.

> **Note:** Only the DB2 Records Manager Server button is enabled the first time you log in to the RMEconfig tool. The other buttons are enabled after you enter and save the information specified when using the DB2 Records Manager Server button.

5. Select a Content Manager server from the drop-down list next to Server.

> **Important:** If the Content Manager server you want is not listed, this means that it is not configured to communicate with this DB2 Records Manager server. You have to configure it by completing the steps in 10.4.1, "Configure the RME Host Interface component" on page 288.

6. Enter the password for the RMEadmin user ID to log in to the Content Manager server.

7. Click **OK**.

> **Important:** The first time you execute the RMEconfig tool to log in to the
> Content Manager server, the password for the RMEadmin user ID will be
> saved in the system for subsequent use until the next time the password is
> changed. Whenever the RMEadmin password is changed, you have to run the
> RMEconfig tool on the DB2 Records Manager server machine and log in to
> RMEadmin so that it will save the changed password on the system.

Specify DB2 Records Manager server information

To input the DB2 Records Manager server information into the RMEconfig
database, complete the following steps (see Figure 11-8 on page 314):

1. Click the **DB2 Records Manager Server** button on the RMEconfig main
   page.

2. In the Server Host Name field, enter the host name or the fully qualified host
   name for the DB2 Records Manager server.

3. In the Server URL field, enter the URL for the DB2 Records Manger Web
   services server, for example:

   `http://ilm-rm.itsc.austin.ibm.com:9080/IRMWebServices/`

4. In the Server ORB Port field, enter the ORB port number to which the DB2
   Records Manager Engine server is listening, for example, 2809.

5. From the Server Database list, select the DB2 Records Manager database.

> **Note:** If the Server Database list is empty, either the DB2 Records
> Manager server URL is incorrect or the DB2 Records Manager server is
> not started.

6. In the Client URL field, enter the URL for the Records Manager client logon
   page, for example:

   `http://ilm-rm.itsc.austin.ibm.com:9080/IRMClient/`

7. In the Administrator Password field, enter the password for the administrator
   user ID on the DB2 Records Manager server.

> **Note:** The DB2 Records Manager Web client default administrator logon
> information is:
>
> ► User Name: `administrator`
> ► Password: `cronos`

Figure 11-8   Records Manager DB2 Server definition

8. Click **Save** to save the server information.

Specify DB2 Records Manager definitions information

To input the DB2 Records Manager file plan and component definitions information into the RMEconfig database, complete the following steps:

1. Click the **DB2 Records Manager Definitions** button.

2. Enter the values recorded in Table 11-1 on page 311.

3. Click **Save** to save the server definitions information.

Specify the DB2 Records Manager host application

To input the DB2 Records Manager host application information into the RMEconfig database, complete the following steps:

1. Click the **DB2 Records Manager Host Application** button.

2. Enter the host application ID for the Content Manager server, as recorded in Table 11-1 on page 311.

3. In the Host Application Password field, enter the password for the host application.

4. Click **Save** to save the host application information.

Specify DB2 Content Manager information

To input the DB2 Content Manager information into the RMEconfig database, complete the following steps:

1. Click the **DB2 Content Manager** button.

2. In the Microsoft Outlook Item Type field, click the down-arrow and select a Content Manager item type to be used to store declared Outlook e-mail messages and attachments.

3. Click **Save** to save the information

4. On the RMEconfig main page, click **Connect** → **Exit** to exit the RME Configuration Tool.

11.3.5 Configure DB2 Records Manager RME users and groups

Users can use the same user accounts to log in to both the IBM DB2 Content Manager system and the DB2 Records Manager system. The DB2 Records Manager system supports users and user groups that are defined on the Content Manager system. (This also satisfies any single user account and password requirement for the Records Management application.)

The user and group accounts are first created on the Content Manager system and then imported into the Records Manager system. The user IDs, passwords, and members in a group are defined and maintained on the Content Manager server by the Content Manager system administrator. When users log in to the Records Manager system, users need to specify the Content Manager server name, user ID, and password. Records Manager will authenticate the user account and password with the specified Content Manager server. At logon time, the Content Manager group information for the user is also passed to Records Manager so that Records Manager will grant all the permissions that are defined for the group to the user.

Import DB2 Content Manager users and groups

To import new users, user groups, or both, complete the following steps (see Figure 11-9 on page 316):

1. First, create users or groups in DB2Content Manager using the Content Manager system administration client.

> **Important:** Do not assign any Content Manager privilege set that contains the ItemSuperAccess privilege (for example, ALLPrivs) to any general user. Users who have the ItemSuperAccess privilege will bypass all Content Manager item access controls, including the RME record access controls.

2. Import the users or groups into DB2 Records Manager using the DB2 Records Manager client.

3. Click **Security** → **Users**.

4. Select the Host Name.

5. Click **Import**.

> **Note:** If you successfully import a user from a Content Manager system into the Records Manager system, the Records Manager server and the RME Host Interface components are installed and configured correctly.

Figure 11-9   User definitions in Records Manager

Assign permissions and record access control to the users or groups

When users log in to Records Manager, the system authenticates with Content Manager on the user account and password. The Content Manager group membership information is also extracted during logon for verifying group-related permissions for the user.

Note: All groups are defined and maintained in Content Manager only. This means that the Content Manager administrators are responsible for adding or removing members from groups on the Content Manager server.

You *only* need to import the Content Manager group names into Records Manager. You do not have to import or define group membership in Records Manager.

Tip: When a user logs on to the Records Manager system, the system extracts the group membership information from the Content Manager server for that user. The Records Manager access permissions that are associated with a Content Manager group will apply to all Content Manager users that belong to the Content Manager group.

Tip: Changing user passwords: Passwords changed within the Microsoft Windows environment are inherited into Content Manager. Because Records Manager authentication references the Content Manager user credentials, be aware that subsequent Records Manager logons will be affected by these password changes.

11.4 Business Integration node

You must perform the following steps to deploy the sample application components on the Business Integration node (ilm-bi).

ReportApproval process deployment

The ReportApproval application is a J2EE enterprise application module that needs to be deployed to WebSphere Application Server running on the Business Integration node. The ReportApproval application contains the Business Process module that runs the Report Approval process.

Complete the following steps:

1. The ReportApproval application needs a Java library called IRMapi.jar. This file is provided with the installation of DB2 Records Manager. It is also available within the sample code included with this redbook in the SG246481-Samples\requiredLibraries directory.

   You can use the file provided with the sample code, but be aware that it might be specific to the Version 8.2 of the DB2 Information Integrator for Content. If you are using another version for your implementation, the file provided might

need to be altered. You need to upload this file to the Business Integration Node:

a. Create the following directory:

```
C:\IBM\WebSphere\AppServer\optionalLibraries\RecordManager
```

b. Upload or copy the IRMapi.jar file to the C:\IBM\WebSphere\AppServer\optionalLibraries\RecordManager directory.

2. The ReportApproval application also needs a Java library called PortalToCM.jar. This file contains the classes deployed to the Content Management node for the PortalToCM application. It is needed by the ReportApproval application in order to make the remote calls to the PortalToCM enterprise beans. The file is available with the sample code included with this book in the SG246481-Samples\requiredLibraries directory. If you make changes to the PortalToCM application code, you will need to update this file as well.

Copy the PortalToCM.jar file to the C:\IBM\WebSphere\AppServer\optionalLibraries\RecordManager directory.

3. Log in to the WebSphere administrative console:

a. Open a Web browser and navigate to the WebSphere administrative console at:

```
https://ilm-bi.itsc.austin.ibm.com:9043/admin/logon.jsp
```

b. Log in with your server user ID and password. If following the steps in this book, the user ID should be sysadmin1.

4. Create a shared library entry for the IRMapi.jar file:

a. Go to the Shared Libraries page by clicking **Environment → Shared Libraries**.

b. Select **server1**.

c. Click **Apply**.

d. Click **New**.

e. Fill in the description of new shared library:

- Name: IRMapi.jar
- Classpath: C:/IBM/WebSphere/AppServer/optionalLibraries/RecordManager/IRMapi.jar

Click **OK**.

5. Repeat the same steps for the PortalToCM.jar file:

   a. Go to the Shared Libraries page by clicking **Environment → Shared Libraries**.

   b. Select **server1**.

   c. Click **Apply**.

   d. Click **New**.

   e. Fill in description of new shared library:

      • Name: `PortalToCM.jar`

      • Classpath:
        `C:/IBM/WebSphere/AppServer/optionalLibraries/RecordManager/PortalToCM.jar`

      Click **OK**.

6. The next step is to create a configuration file for the ReportApproval application. A sample configuration file is included as SG246481-Samples\config\process\ReportApprovalConfig.properties within the sample code.

   a. Upload this sample configuration file to the C:\IBM\WebSphere\AppServer\config\optionalConfigs directory on the Business Integration node.

   b. Open the uploaded ReportApprovalConfig.properties for editing.

   c. Modify the values to suit your scenario. The descriptions of the properties are as follows:

RMRecordHostId	DB2 Records Manager host application component ID.
RMRecordHostName	Host application component name.
RMLifeCycleCodeId	Life-cycle code ID.
RMLifeCyclePhaseIdForSubmittedPhase	Life-cycle phase ID representing the "Submitted" life cycle phase.
RMLifeCyclePhaseIdForPublishedPhase	Life-cycle phase ID representing the "Published" life-cycle phase.
RMDisposeAuthorityId	Disposal authority ID.

RMFilePlanComponentDefinitonID

File plan component definition ID, which is unique for each component definition. Records of the same type will share this value.

RMFilePlanComponentParentID

This is the unique ID of the new file plan component's parent. The new file plan component will be added as a child to this parent.

RMServerAddress   This is the physical address of the Records Management node. You need to specify the fully qualified DNS name.

RMHostName   DB2 Records Manager host application name.

RMLoginId   DB2 Records Manager user account that has the component create authority. If following the steps in this book, this would be CMadmin.

RMLoginPassword   Password for the user account previously mentioned.

RMDatabaseJNDI   JNDI name for the DB2 Records Manager database. This JNDI entry resides on the Records Management node.

CMHostName   This is the physical address of the Content Management node. You need to specify the fully qualified DNS name.

    d. Save the file.

7. After we create a configuration file, we need to make a URL resource reference to it so that the ReportApproval sample application can find it:

    a. In the WebSphere administrative console, go to the URL Providers page by clicking **Resources** → **URL Providers**.

    b. Select **server1**.

    c. Click **Apply**.

    d. Click the **Default URL Provider** link.

    e. Click the **URLs** link in the Additional Properties section.

    f. Click **New**.

g. Enter the following values:

- Name: `ReportApprovalConfig`

- JNDI name: `url/com/ibm/itso/ilm/process/config`

> **Restriction:** You need to match this value exactly, because this string is currently hardcoded in our sample application.

- Specification:
  `file:C:/IBM/WebSphere/AppServer/config/optionalConfigs/ReportA pprovalConfig.properties`

h. Click **OK**.

8. Save the changes by clicking the **Save** link at the top of the page and then the **Save** button at the bottom of the page.

9. The next step is to deploy the ReportApproval application itself:

a. Go to the Enterprise Applications page by clicking **Applications** → **Enterprise Applications**.

b. Click **Install**.

c. Click **Browse** and select the **ReportApprovalEAR.ear** file (available with the sample code in the SG246481-Samples/sampleModules directory).

d. Click **Next**.

e. Select **Generate Default Bindings** and click **Next**.

f. In the next pages or steps, leave all the settings to the defaults. Keep clicking the **Next** button until you reach the *Step 12* page.

g. On the Step 12 page, select **Create tables**. This creates the tables needed to support ReportApproval staff activities. Click **Next**.

h. On the Summary page, click **Finish**. You will see the progress of the installation on the next page. If the installation succeeds, you will see the message `Application ReportApprovalEAR installed successfully`.

i. Save the changes by following the **Save to Master Configuration** link.

j. Click the **Save** button to confirm the changes.

10. After the application is installed, you need to associate the shared libraries to it.

> **Note:** Shared libraries need to be added after each update of the application because they are lost during the update.

We add the two shared libraries created in the previous steps:

a. Go to PortalToCMEAR application page by clicking **Applications** → **Enterprise Applications** → **ReportApprovalEAR**.

b. Select the **Libraries** link from the Additional Properties section.

c. Click **Add**.

d. Select the **IRMapi.jar** entry and click **OK**.

e. Select the **Libraries** link from the Additional Properties section.

f. Click **Add**.

g. Select the **PortalToCM.jar** entry and click **OK**.

h. Click the **Save** link at the top of the page and then click the **Save** button at the bottom of the page.

11. The deployment of the ReportApproval application is now complete. Next, we start the application:

a. Click **Applications** → **Enterprise Applications**.

b. Select the **ReportApprovalEAR** option.

c. Click **Start**.

d. You should see the `Application ReportApprovalEAR on server server1 and node ilm-bi started successfully` message.

> **Note:** If an error occurs during the application start up, you can find details in the log file C:\IBM\WebSphere\AppServer\logs\server1\SystemOut.log.
>
> For further information, see the *WebSphere Application Server Information Center*, available at:
>
>   `http://publib.boulder.ibm.com/infocenter/ws51help/index.jsp`

Important: If you want to stop the application, you need to stop the business process first. In order to stop the business process, you need to stop and delete all the instances of that process. To stop and delete all the instances, complete the following steps:

1. Go to the Process Choreographer Web Client at:

   `http://ilm-bi.itsc.austin.ibm.com:9080/bpe/logon.jsp`

2. Log in as `sysadmin1` user (or any user that is part of the sysadmins group in your LDAP schema).

3. Select the **Administered By Me** link and terminate and delete all the ReportApproval process instances.

4. Log out of the Process Choreographer Web Client.

5. Go to the WebSphere administrative console at:

   `https://ilm-bi.itsc.austin.ibm.com:9043/admin/logon.jsp`

6. Log in with your server user ID (for example, `sysadmin1`).

7. Click **Applications** → **Enterprise Applications** → **ReportApprovalEAR** → **EJB Modules** → **ReportApprovalEJB.jar** → **Business Processes**.

8. Select the **ReportApprovalProcess** option and click **Stop**.

9. Save the changes to the master configuration.

Now, you can stop the ReportApproval application. If you update it and then start it again, the process will be started automatically. If you just stop and start the ReportApproval application, the process will not get started, and you will have to navigate to the above destination to start the process manually.

If you want to test the newly deployed process, you can do so in Process Choreographer Web Client:

`http://ilm-bi.itsc.austin.ibm.com:9080/bpe/logon.jsp`

You will need the users of following groups to perform all of the process tasks:

sysadmins   Sysadmins users administer the process and have all the access rights to the process and its activities.

supervisors   Supervisors can start the process and can complete the ApproveReport activities.

analysts   Analysts can only complete the CreateReport and ReworkReport activities.

recordsadmins	Record administrators can perform audit-related actions.

11.5 Portal node

The deployment steps for the Portal node consist of the following tasks:

1. Configure portlets
2. Add required libraries
3. Deploy portlets
4. Create portal pages
5. Set up access rights

11.5.1 Configure portlets

All of the portlets deployed to WebSphere Portal are going to make remote connections to other nodes and modules. We need to provide configuration files for these portlets. This section describes the content of these files and where and how they have to be deployed. You must complete this step before starting the portlet deployment.

ReportTasks and CreateAssignment portlets

The ReportTasks and CreateAssignment portlets use the ILMPortletsConfig.properties file. A sample of this file is provided with the sample code in the SG246481-Samples\config\portlets directory. Complete the following steps:

1. Copy the sample ILMPortletsConfig.properties file to this location:

   `C:\IBM\WebSphere\AppServer\config\optionalConfigs\ILMPortletsConfig.properties`

2. Open the sample file from the above location and edit the following values:

BIHostName	Fully qualified DNS name of the Business Integration node (that is, the server, where IBM WebSphere Business Integration Server Foundation with the Report Approval Process is running).
CMHostName	Fully qualified DNS name of the Content Management node (that is, the server where WebSphere Application Server with the PortalToCM application is running).

   Save the file.

3. The next step is to create a URL resource pointing to this file so that the portlet applications can locate it:

   a. Open a Web browser window and go to the WebSphere administrative console at:

      `https://ilm-ui.itsc.austin.ibm.com:9043/admin/logon.jsp`

   b. Log in using your server user ID. If following steps in this book, this would be `sysadmin1`.

   c. Go to the URL Providers page by clicking **Resources** → **URL Providers**.

   d. Click **Browse Servers**.

   e. Select the **WebSphere_Portal** entry.

   f. Click **OK**.

   g. Click **Apply**.

   h. Click the **Default URL Provider** link.

   i. Click the **URLs** link in the Additional Properties section.

   j. Click **New**.

   k. Enter the following values:

      • Name: `ILMPortletsConfig`

      • JNDI name: `url/com/ibm/itso/ilm/portlets/config`

      > **Restriction:** You need to match this value exactly, because this string is hardcoded in the application.

      • Specification:
        `file:C:/IBM/WebSphere/AppServer/config/optionalConfigs/ILMPortletsConfig.properties`

   l. Click **OK**.

   m. Save the changes by clicking the **Save** link at the top of the page and then the **Save** button at the bottom of the page.

AllDocuments, DocumentDetails, and PublishedReports portlets

The AllDocuments, DocumentDetails, and PublishedReports portlets need a configuration file. This file contains the connection options to the Content Management node, so the portlets can display DB2 Content Manager data. This

file is part of the WAR archive file together with the portlets code. You have several options of how to modify the configuration file:

► You can modify it in WebSphere Studio Application Developer and then export the new WAR file.

► You can use the Application Assembly Tool provided with your IBM WebSphere Portal V5.0 installation.

► You can edit the properties file embedded in the WAR file.

We use the third option. We used a third-party ZIP application that enabled us to view the files contained within the WAR file and edit them in place:

1. Copy the SG246481-Samples/sampleModules/ReportCU.war file into a temporary directory.

2. Rename the file. Change the .war extension to a .zip extension.

3. Use a ZIP utility to unpack the ZIP archive.

4. Locate the file Web-inf/classes/ServersInfo.properties file and open it for editing.

5. Adjust the following value to fit your scenario:

    CMServer   Fully qualified DNS name of your DB2 Content Manager server (that is, the DNS name of the Content Management node in our scenario).

Ignore the other entries, because we do not use them.

6. Save the ServersInfo.properties file.

7. Repack the original ZIP file with the updated files. Make sure that the directory structure is exactly the same as the one in the original file.

8. Rename the file. Change the .zip extension to a .war extension.

RecordsAdmin and RecordsSearch portlets

The RecordsAdmin and RecordsSearch portlets need a configuration file. This file contains the connection options to the Records Management node so that the portlets can display DB2 Records Manager records. This file is part of the WAR archive file together with the portlets code. You have several options of how to modify the configuration file:

► You can modify it in WebSphere Studio Application Developer and then export the new WAR file.

► You can use the Application Assembly Tool provided with your IBM WebSphere Portal V5.0 installation.

► You can edit the file in the WAR file using the ZIP utility.

We use the third option. We used a third-party ZIP application that enabled us to view the files contained within the WAR file and edit them in place:

1. Copy the SG246481-Samples/sampleModules/RecordsAdmin.war file into a temporary directory.

2. Rename the file. Change the .war extension to .zip extension.

3. Use a ZIP utility to unpack the ZIP archive.

4. Locate the file Web-inf/classes/ServersInfo.properties file and open it for editing.

5. Adjust the following values to fit your scenario:

   RMServer   Fully qualified DNS name of your DB2 Records Manager server (that is, the DNS name of the Records Management node in our scenario).

   RMHost   DB2 Records Manager host application component name.

   RMHostAdmin   DB2 Records Manager user account that has component view, update, suspend, and un-suspend authority. If following steps in this book, this would be CMadmin.

   RMHostAdminPassword
                          Password for the RMHostAdmin user account.

   RMDatabase   JNDI name for the DB2 Records Manager database. This JNDI entry resides on the Records Management node.

   RMFilePlanComponentDefinitionID
                          File plan component definition ID that is unique for each component definition. Records of the same type will share this value.

   Ignore the other entries, because we do not use them.

6. Save the ServersInfo.properties file.

7. Repack the original ZIP file with the updated files. Make sure that the directory structure is exactly the same as in the original file.

8. Rename the file. Change the .zip extension to a .war extension.

AuditSearch and AuditResult portlets

The AuditSearch and AuditResult portlets need a configuration file. This file contains the connection options to the Records Management node so that the portlets can display DB2 Records Manager audit logs. This file is part of the WAR

archive file together with the portlets code. You have several options of how to modify the configuration file:

► You can modify it in WebSphere Studio Application Developer and then export the new WAR file.

► You can use the Application Assembly Tool provided with your IBM WebSphere Portal V5.0 installation.

► You can edit the file in the WAR file using the ZIP utility.

We use the third option. We used a third-party ZIP application that enabled us to view the files contained within the WAR file and edit them in place:

1. Copy the SG246481-Samples/sampleModules/AuditAdmin.war file into a temporary directory.

2. Rename the file. Change the .war extension to a .zip extension.

3. Use a ZIP utility to unpack the ZIP archive.

4. Locate the file Web-inf/classes/ServersInfo.properties file and open it for editing.

5. Adjust the following values to fit your scenario:

RMServer	Fully qualified DNS name of your DB2 Records Manager server (that is, DNS name of the Records Management node in our scenario).
RMHost	DB2 Records Manager host application component name.
RMHostAdmin	DB2 Records Manager user account that has component view, update, suspend, and un-suspend authority. If following steps in this book, this would be CMadmin.
RMHostAdminPassword	
	Password for the RMHostAdmin user account.
RMDatabase	JNDI name for the DB2 Records Manager database. This JNDI entry resides on the Records Management node.

Ignore the other entries, because we do not use them.

6. Save the ServersInfo.properties file.

7. Repack the original ZIP file with the updated files. Make sure that the directory structure is exactly the same as in the original file.

8. Rename the file. Change the .zip extension to a .war extension.

11.5.2 Add required libraries

Our sample portlets require a number of additional Java libraries to run properly. These libraries are provided with the sample code and are already embedded in the deployment files of portlets (these files are called Web archives). If you installed other software versions of the IBM products, or if you have made changes to the code of any of the sample modules provided with this book, you need to update these libraries in the war files.

A "quick and dirty" way to accomplish this is to update the libraries in the WAR files as follows:

1. Change the file extension of the WAR files from .war to .zip.

2. Open with a ZIP utility.

3. Update the necessary libraries. These libraries are located in the web-inf/lib directory.

4. Change the file extension from .zip back to .war.

These mentioned steps will not always work. If the names of objects or methods have changed, or if the signatures of the methods have changed, you will need to open the portlets source code in WebSphere Studio Application Developer, change the source code to accommodate these changes, and then compile the source code and export new WAR files.

11.5.3 Deploy portlets

The following subsections describe the steps to deploy the various portlets.

ReportTasks and CreateAssignment portlets

The ReportTasksPortlets application is J2EE Web application module that needs to be deployed to WebSphere Application Server running on the Portal node. The ReportTasksPortlets.war file contains the ReportTasks portlet that manages the user tasks appearing in the ReportApproval process. It also contains the CreateAssignment portlet that is used by a supervisor to create a new report assignment (and thus start the new process instance).

To deploy the portlets, complete the following steps (see Figure 11-10 on page 330):

1. Open a Web browser window and navigate to the WebSphere Portal title page:

   `http://ilm-ui.itsc.austin.ibm.com/wps/portal`

2. Click the **Log in** link in the upper-right corner.

3. Enter your Portal administrator ID and password. If following steps in this book, this would be `sysadmin1`.

4. Go to installation page by clicking **Administration** → **Portlets** → **Install**.
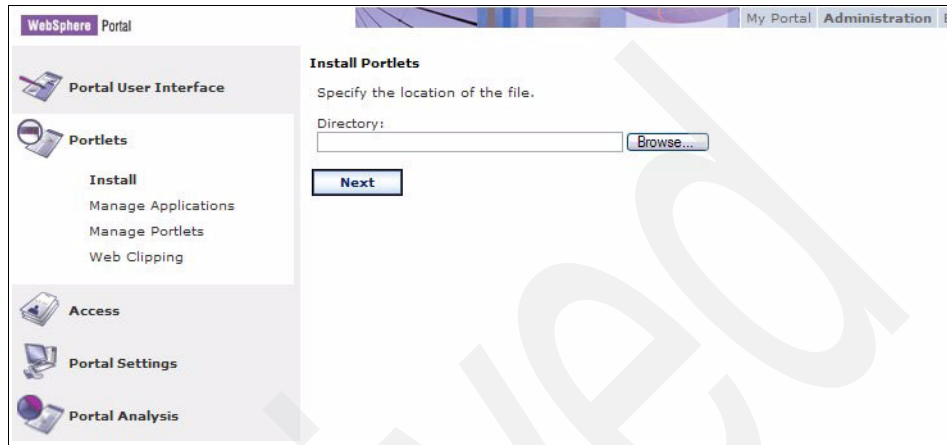
Figure 11-10   Portlet install page

5. Select the **ReportTasksPortlets.war**. This file is available in the sample code of this book under the SG246481-Samples\sampleModules directory.

6. Click **Next**.

7. Click **Install**.

8. You should see a message stating that the portlets have been installed successfully.

AllDocuments, DocumentDetails, and PublishedReports portlets

Repeat the process in "ReportTasks and CreateAssignment portlets" on page 329 for the ReportCU.war file.

RecordsAdmin and RecordsSearch portlets

Repeat this process for the RecordsAdmin.war file.

AuditSearch and AuditResult portlets

Repeat this process for the AuditAdmin.war file.

11.5.4 Create portal pages

After we deploy the portlets, we need to make them available on the portal pages. You can use any existing Web page and add portlets to that page, or you

can create new pages. We decided to create new pages in order to make the content well-organized.

We create a new page on the same level as the default WebSphere Portal Welcome page. We name this page ILM Sample Application. We then create four pages under this main page. These four pages will contain the portlets.

To set up the pages, complete the following steps:

1. Open a Web browser window and navigate to the WebSphere Portal title page:

   `http://ilm-ui.itsc.austin.ibm.com/wps/portal`

2. Click the **Log in** link in the upper-right corner.

3. Enter your Portal administrator ID and password. If following steps in this book, this would be `sysadmin1`.

4. Click **Administration** → **Portal User Interface** → **Manage Pages**.

5. Select **My Portal**.

6. On next page, click the **New Page** button in the Pages in My Portal section.

7. Enter `ILM Sample Application` for the title.

8. Click **OK**.

9. You should see the `ILM sample Application has been created successfully` message. Click **OK**.

10. Click the up arrow icon for the ILM Sample Application entry. The ILM Sample Application page should move one row up in the list. Do this several times until the page appears at the top of the list. The result should look similar to the page shown in Figure 11-11 on page 332.
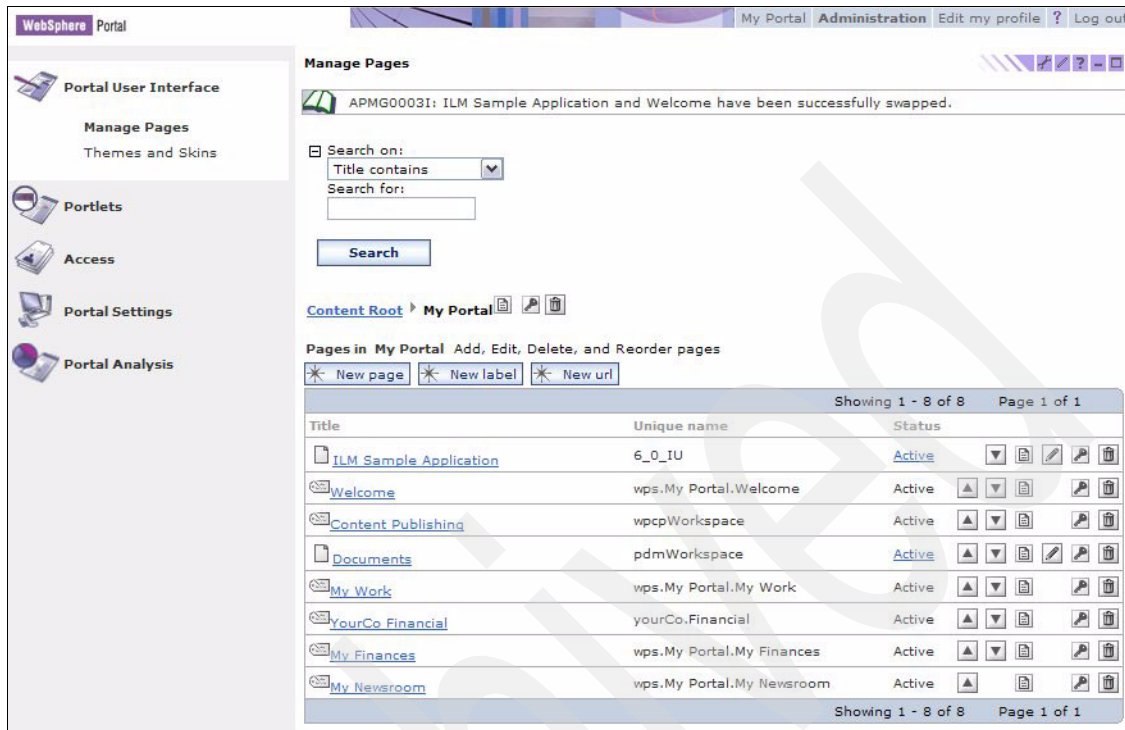
Figure 11-11   Creating Portal pages: Adding the ILM Sample Application page

11. Select the newly created ILM Sample Application page by clicking it.

12. On the next page, click the **New Page** button.

13. Enter `ILM - Tasks` for the title.

14. Click **OK**.

15. You should see the `ILM - Tasks has been created successfully` message. Click **OK**.

16. Click the **Edit Page Layout** icon (pencil) for the ILM - Tasks entry.

17. Select **One column** for the page layout, and click **OK** in the pop-up dialog box.

18. Click the **Add portlets** button.

19. Select the following portlets:

    – **ILM - Create Assignment Portlet**
    – **ILM - Analyst Report Tasks Portlet**

    Use the search functionality to search for the ILM portlets. Then, click **OK**.

20.You should see a page similar to the one shown in Figure 11-12. Click **Done**.
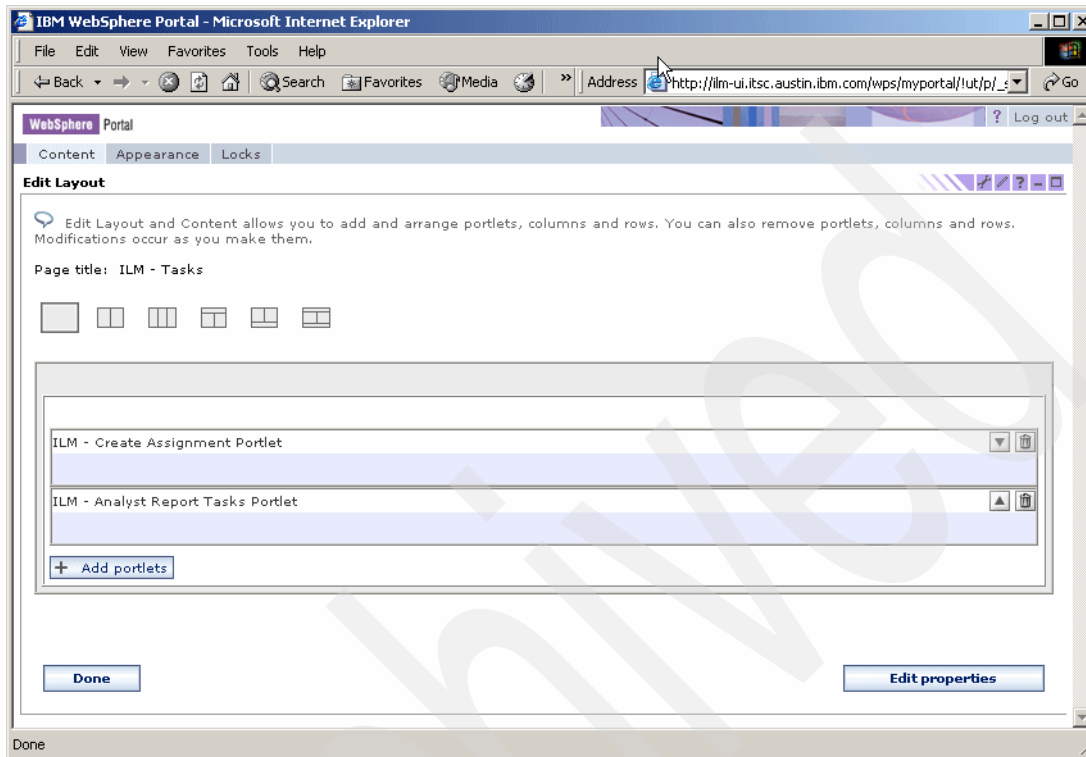
Figure 11-12   Creating Portal pages: Designing the ILM - Tasks page

21.Click **New Page**.

22.Enter ILM - Reports for the title.

23.Click **OK**.

24.You should see the ILM - Reports has been created successfully message. Click **OK**.

25.Click the **Edit Page Layout** icon (pencil) for the ILM - Reports entry.

26.Select **One column** for the page layout, and click **OK** in the pop-up dialog box.

27.Click the **Add portlets** button.

28.Select the following portlets:

   – **ILM - Document Details Portlet**
   – **ILM - All Documents Portlet**
   – **ILM - Published Reports Portlet**

Use the search functionality to search for the ILM portlets. Then, click **OK**.

29. You should see a page similar to the one shown in Figure 11-13. Click **Done**.
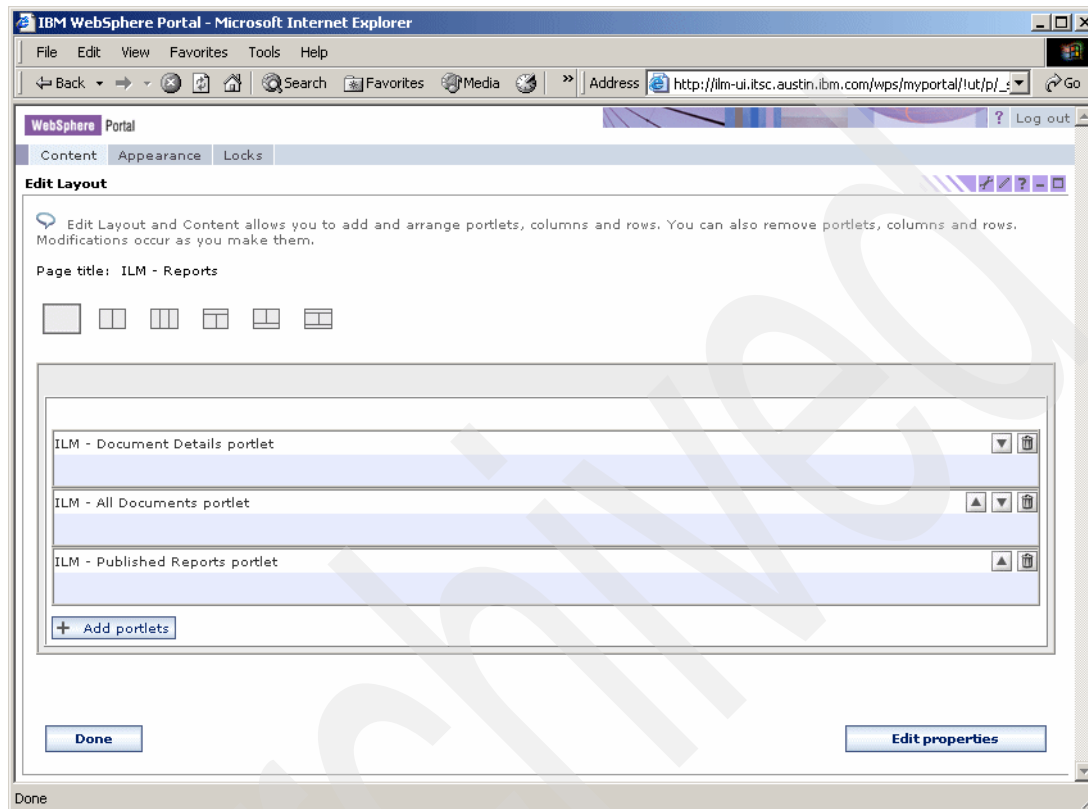
Figure 11-13 Creating Portal pages: Designing the ILM - Reports page

30. Click **New Page**.

31. Enter `ILM - Records` for the title.

32. Click **OK**.

33. You should see the `ILM - Records has been created successfully.` message. Click **OK**.

34. Click the **Edit Page Layout** icon (pencil) for the ILM - Records entry.

35. Select **One column** for the page layout, and click **OK** in the pop-up dialog box.

36. Click **Add portlets**.

37. Select the following portlets:

– **ILM - Records Admin**
– **ILM - Records search portlet**

Use the search functionality to search for the ILM portlets. Then, click **OK**.

38. You should see page similar to the one shown in Figure 11-14. Click **Done**.
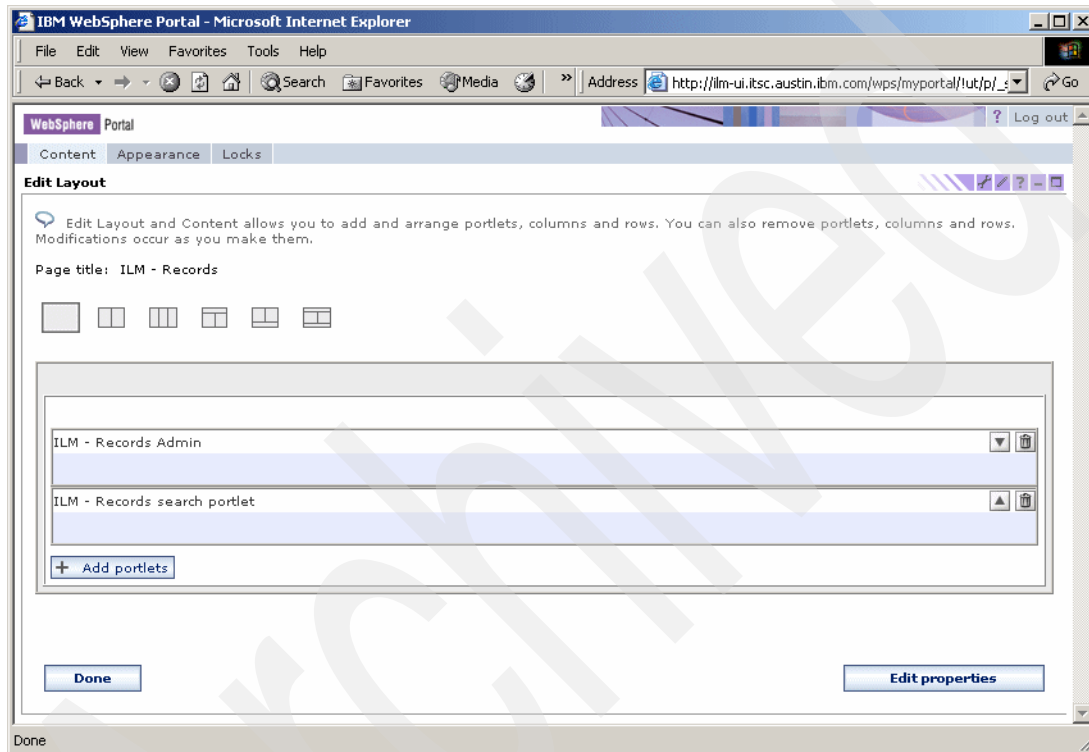
Figure 11-14   Creating Portal pages: Designing the ILM - Records page

39. Click **New Page**.

40. Enter `ILM - Audit` for the title.

41. Click **OK**.

42. You should see the `ILM - Audit has been created successfully` message. Click **OK**.

43. Click the **Edit Page Layout** icon (pencil) for the ILM - Audit entry.

44. Select **One column** for the page layout, and click **OK** in the pop-up dialog box.

45. Click **Add portlets**.

46. Select the following portlets:

– **ILM - Records Admin**
– **ILM - Audit Search**
– **ILM - Audit Result**

Use the search functionality to search for the ILM portlets. Then, click **OK**.

47. You should see page similar to the one shown in Figure 11-15. Click **Done**.
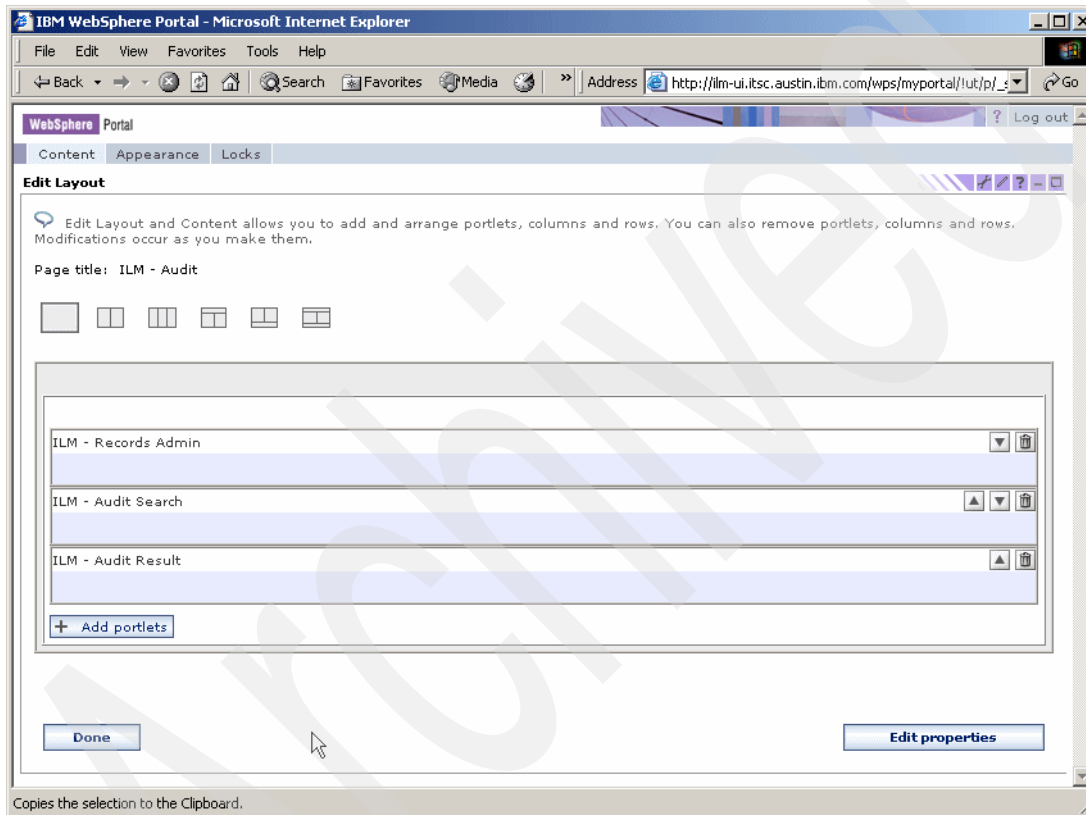
Figure 11-15   Creating Portal pages: Designing the ILM - Records page

11.5.5 Set up access rights

All the portlets and pages created in the previous sections need to have their access rights set. At this point, only an administrator can use these resources. We decided that all authenticated users should be able to use all of the pages and portlets except the audit log page and portlets. The audit log will be accessible only to administrators (that is, sysadmins) and supervisors.

To set up the access rights, complete the following steps (see Figure 11-16):

1. Click **Administration** → **Portal User Interface** → **Manage Pages**.

2. Select **My Portal**.

3. Click the **Set Page Permission** icon (key) for the ILM sample Application entry.
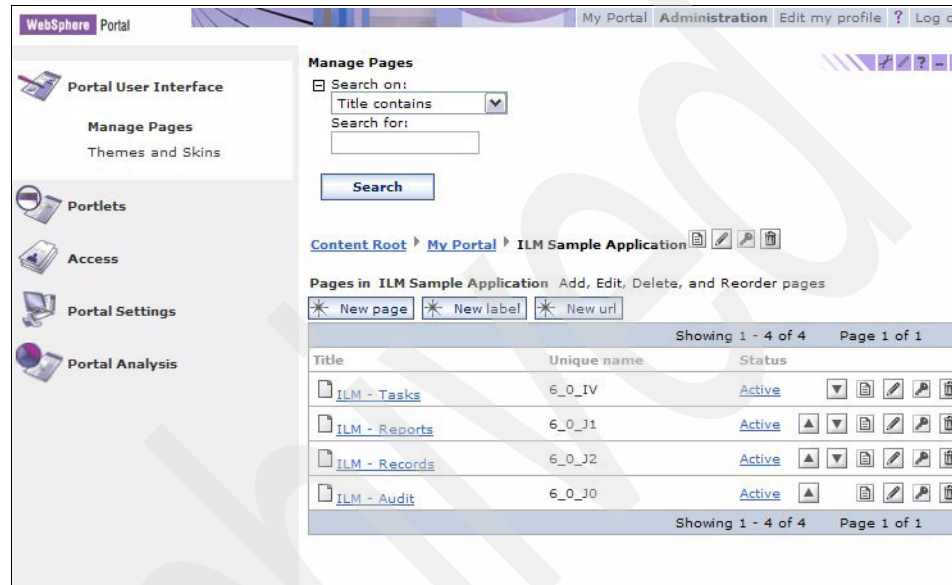
Figure 11-16   Setting access rights for portals

4. Click the **Edit Role** icon (pencil) for the User entry.

5. Click **Add**.

6. Select **all authenticated portal users** and click **OK**.

7. Click **Done**, click **OK**, and then click **Done** again.

8. Select the **ILM Sample Application** page.

9. Repeat steps 3 through 7 to set the access rights for the ILM - Tasks page.

10. Repeat steps 3 through 7 to set the access rights for the ILM - Records page.

11. Repeat steps 3 through 7 to set the access rights for the ILM - Reports page.

12. We set the different access rights for the ILM - Audit page. Click the **Set Page Permission** icon (key) for the ILM - Audit entry.

13. Click the **Edit Role** icon (key) for the User entry.

14. Click **Add**.

15. Enter `recordadmin` in the search field and click **Search**.

16. Select **recordadmins** and click **OK**.

17. Click **Done**, click **OK**, and then click **Done** again.

18. Click **Administration** → **Access** → **Resource Permissions** → **Portlets**.

19. Enter `ILM` in search field and click **Search**.

20. Click the **Assign Access** icon (key) for the ILM - All Documents Portlet entry.

21. Click the **Edit Role** icon (key) for the User entry.

22. Click **Add**.

23. Select **all authenticated portal users** and click **OK**.

24. Click **Done**, and then click **OK**.

25. Repeat steps 20 through 24 to select the same access rights for the following portlets:

    – ILM - Analyst Report Tasks Portlet

    – ILM - Assign Activity Portlet

    – ILM - Create Assignment Portlet

    – ILM - Document Details Portlet

    – ILM - Owned Activities Portlet

    – ILM - Published Reports Portlet

    – ILM - Records Admin

26. Click the **Assign Access** icon (key) for the ILM - Audit Result entry.

27. Click the **Edit Role** icon (key) for the User entry.

28. Click **Add**.

29. Enter `recordadmin` in the search field and click **Search**.

30. Select **recordadmins** and click **OK**.

31. Click **Done**, then click **OK**.

32. Repeat steps 26 through 31 to select the same access rights for the ILM - Audit Search portlet.

Now, you have set up all the pages and portlets and you can explore them with the appropriate users.

11.6 Summary

We have now completed the development, installation, and deployment of our sample ILM solution. In the next and final chapter, we provide a short walkthrough of the application from the users' perspective.

12

Solution walkthrough

In this final chapter, we describe the use of the information life-cycle
management (ILM) application from the users' perspective. Based on the use
case for which this sample was built, there are two primary users, the supervisor
and the analyst.

The complete life cycle was not implemented within our business process and
supporting modules. Instead, we focused on putting the infrastructure in place
and providing enough logic in the modules to show what is possible. In our case,
we have the logic for a supervisor to request a report, an analyst to submit a
report to satisfy the request, and the supervisor to review and approve or reject
the report. In a more complete solution, the entire life cycle would need to be
managed, including the archiving of reports and their eventual destruction when
policy dictates.

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12.1 Supervisor requests a report

Our newly created and installed business process and application for analyst reporting is in place. The first step in the process is for a supervisor to request a report be generated for a specific topic. The supervisor will use a Web browser to access our IBM WebSphere Portal server.

In our environment, the supervisor uses a predefined link to access the following URL:

```
http://ilm-ui.itsc.austin.ibm.com/wps/myportal
```

WebSphere Portal server will handle this request and display the login page. Our supervisor (supervisor1) will log in, as shown in Figure 12-1.
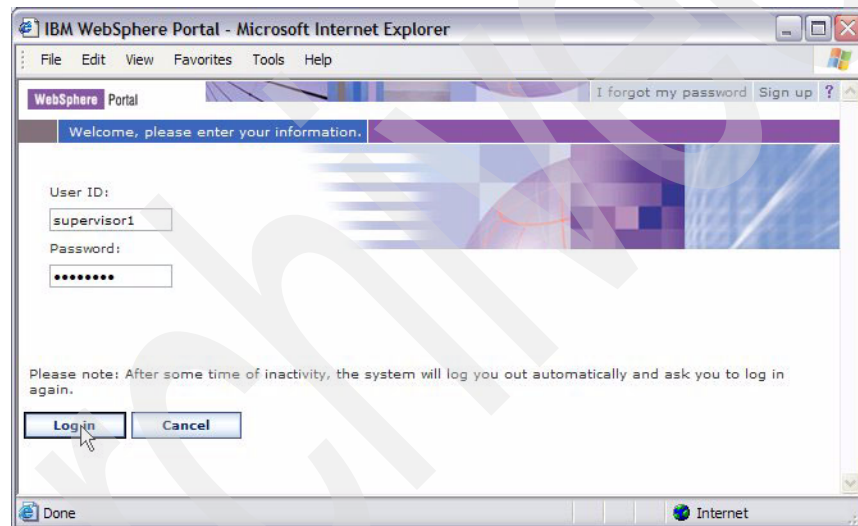
Figure 12-1   Portal login page

After supervisor1 has logged in, the page shown in Figure 12-2 opens. This page is based on the set up of our portal page, as described in 11.5.4, "Create portal pages" on page 330.
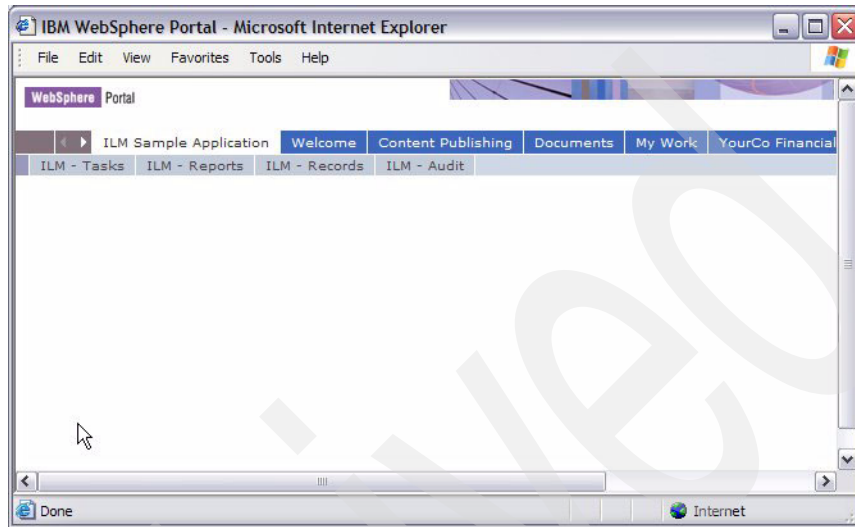
Figure 12-2   Initial view of ILM Sample Application page

In the window shown in Figure 12-2, we can see that the ILM Sample Application portal is selected. There are also other portals available such as Welcome, Content Publishing, and Documents. These are default portlets that were installed with WebSphere Portal server. We have not configured or modified these, and there is no implementation behind them. However, we left them in place so that you can see how different applications would be accessed from the same browser window.

For our ILM application, the supervisor would now like to create a request for a report. By selecting the **ILM - Tasks** submenu, Figure 12-3 opens, showing the CreateTask portlet and a list of outstanding activities. (In this case, there are no outstanding activities, because this is a newly installed application and this is our first use of it.)
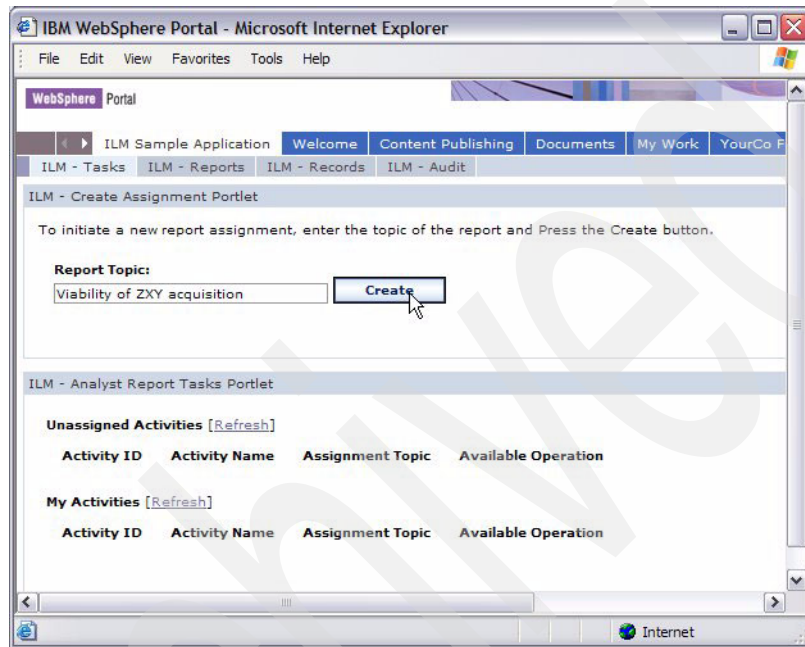
Figure 12-3   Create request report portlet

In this case, the supervisor creates a request for a report on the "Viability of ZXY acquisition."

By selecting the **Create** button, the request is created. Figure 12-4 shows the confirmation page.
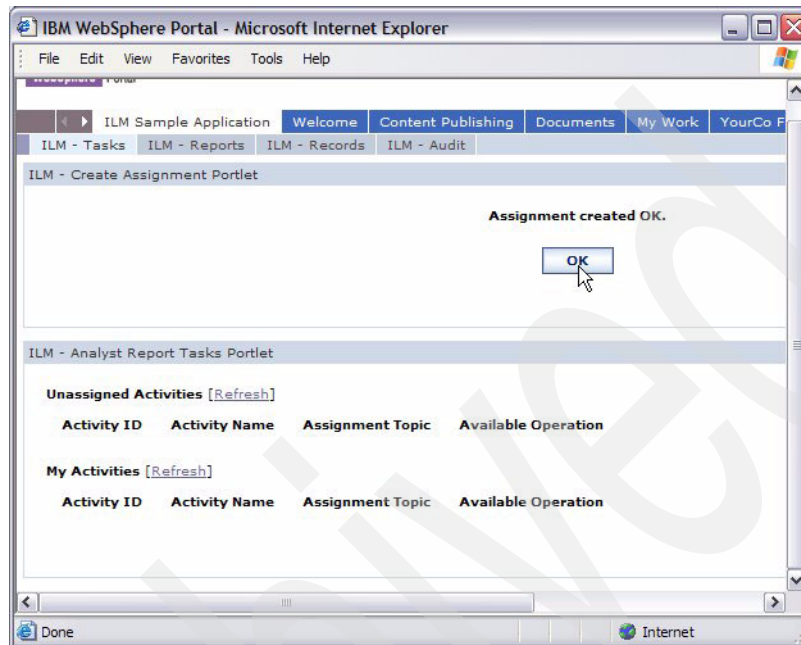
Figure 12-4   Assignment created confirmation

At this point, the supervisor is able to create more requests or to move on to other work. We will return to the supervisor after checking in on the analyst and seeing the application from her perspective.

12.2 Analyst accepts assignment and creates report

In our use case, the analyst is the individual responsible for generating a report to satisfy the supervisor's request. The analyst will log in to the portal in the same way as the supervisor. However, as a member of the analysts group, the information seen and actions that are possible will be different.

Figure 12-5 on page 346 shows what the analyst sees when she logs in to the portal and selects the **ILM - Tasks** option.

As you can see, the analyst is presented with a list of outstanding requests (unassigned and assigned) that have been submitted by supervisors. In this case, the list consists of a single unassigned request. Note also that the analyst

does not have the option to create a new request, because this is a supervisor only function.
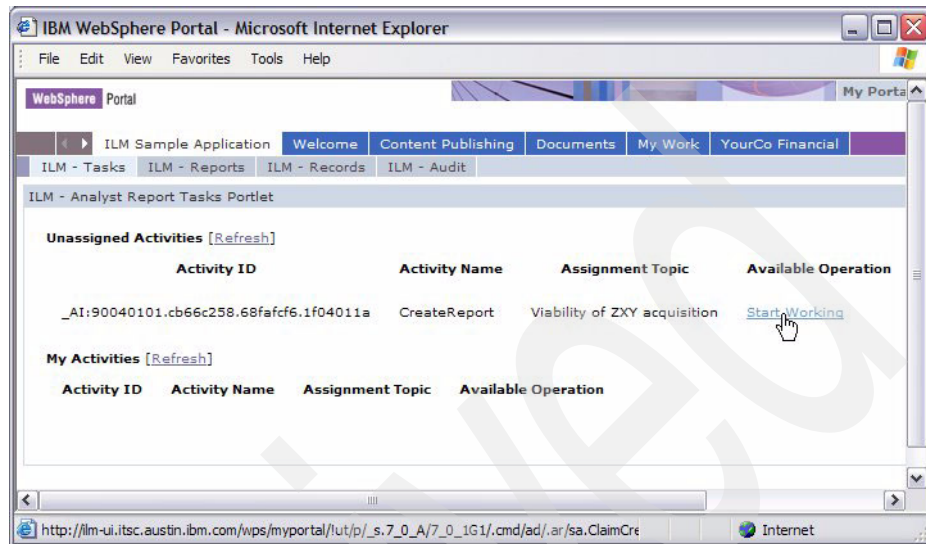
Figure 12-5   Analyst view of ILM - Tasks portlet

The analyst can take ownership of the requested task by clicking the **Start Working** link. At this point, the activity is moved from the unassigned list to the assigned list, as shown in Figure 12-6.
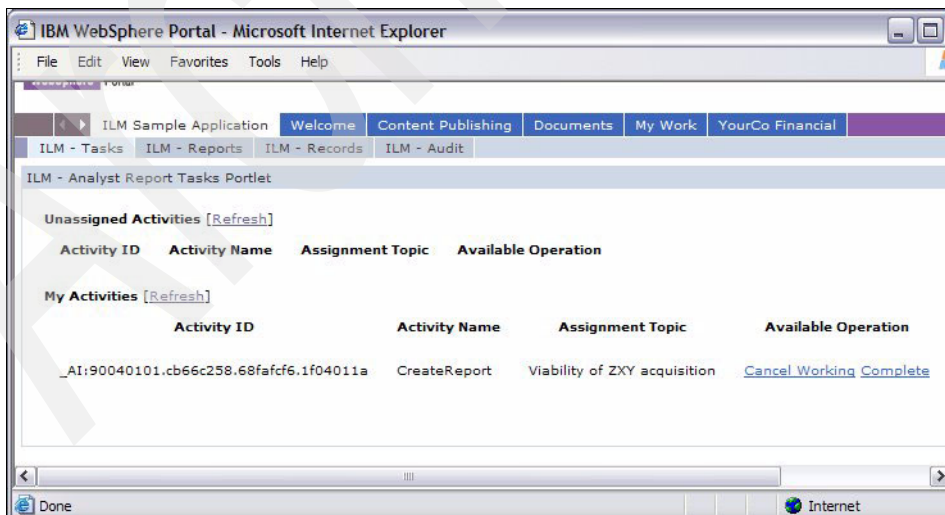
Figure 12-6   Activity assigned to analyst

At this point, the analyst would begin her research and eventually create a report. It is important that this report not just be stored on the analyst's computer. It must be entered into the content management system so that it can be managed, tracked, audited, and so on. When the analyst is ready to create the report, she will navigate to the ILM - Reports section of our application, as shown in Figure 12-7.
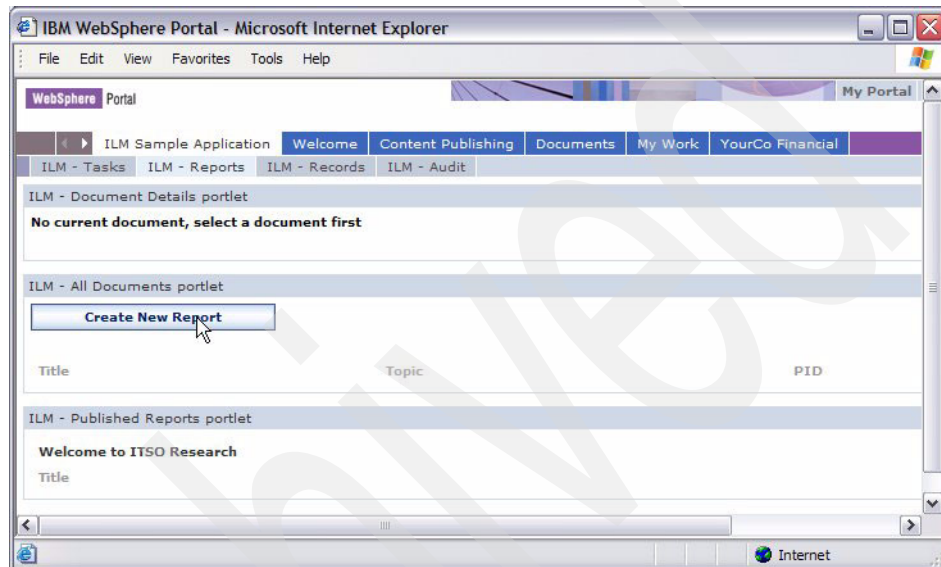
Figure 12-7   ILM - Reports page

This page is made up of multiple portlets that will enable the analyst to create a report and enter it into the content management system and see a list of existing reports. At this time, there are no other reports.

The analyst selects the **Create New Report** button. The page shown in Figure 12-8 opens.
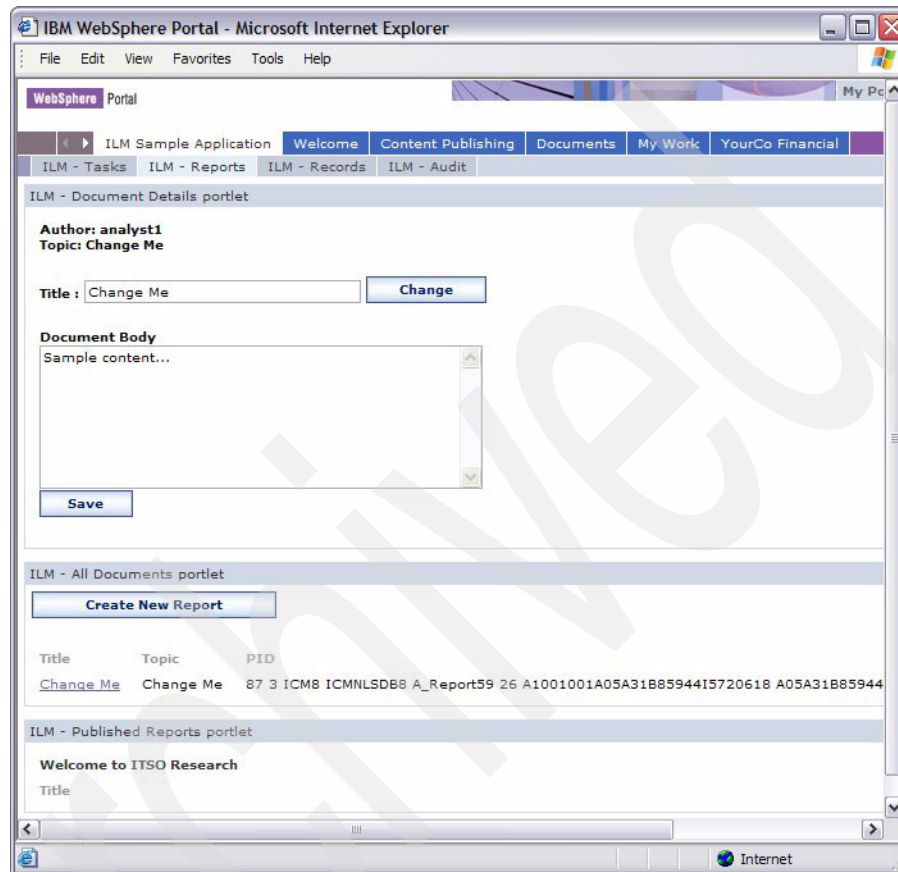
Figure 12-8   Defining the report

Figure 12-8 shows three portlets. The top portlet shows the details of the current document (report), including the title body. The second portlet (including the Create New Report button) contains a list of reports that are currently in progress. The currently selected report in this list is the one whose details are shown in the top portlet. The third portlet, shown at the bottom of the window, displays a list of the currently published reports.

For the current report being created, the fields for the title and body are initially given default values. The analyst makes the appropriate changes and includes the body of the report. In a more robust implementation, the body would likely include a separate document created by a word processing application. However, in our simple scenario, we create minimal content just to prove the concept. We

change the default title of the project and then enter the report body, as shown in Figure 12-9.

Figure 12-9   Filling in the report details

In addition to the portlets on this page, other portlets can be built, for example, to show all reports that are due to expire or are under legal review.

Now that a report has been created and entered into the content management system, the analyst can submit this report as a response to the supervisor's original request.

To do this, the analyst would navigate back to the ILM - Tasks window and select the **Complete** option, as shown in Figure 12-10.
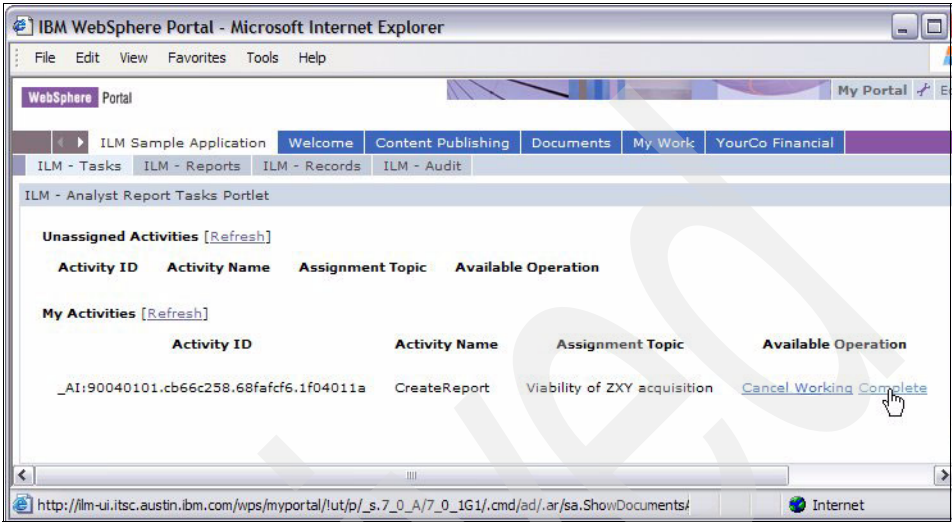
Figure 12-10   Preparing to complete the task

The analyst would select the report that should be submitted to meet the supervisor's request. Again, normally, there could be many reports to choose from, but in our case, we have only created one. When the analyst clicks the **Select** link, a page showing a confirmation that the task is complete, indicating that the report has been submitted to the supervisor for approval, as shown in Figure 12-11.
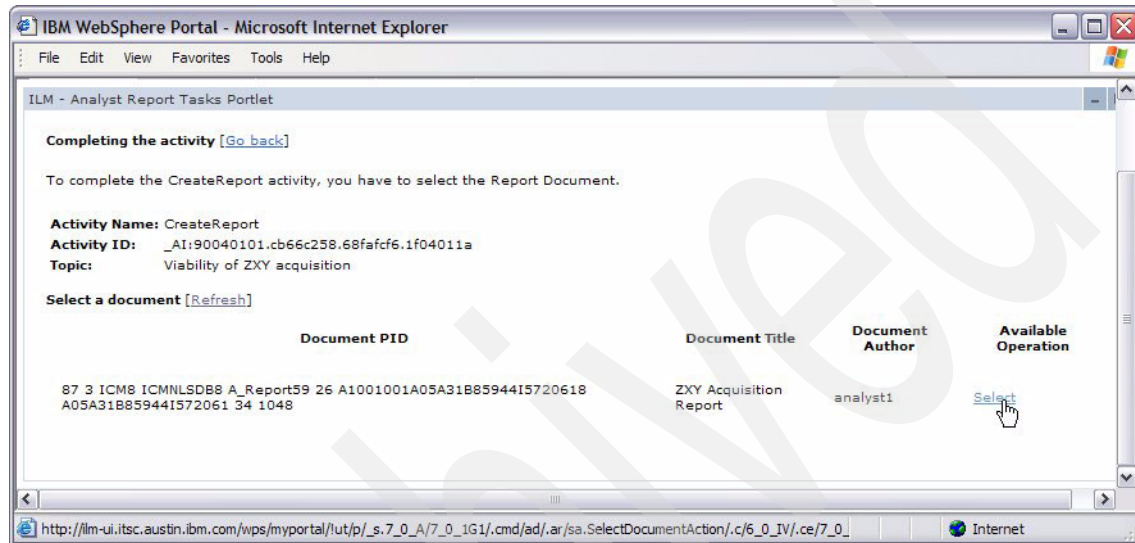
Figure 12-11   Selecting the report to complete the activity

When a report is associated to an assignment, a record is automatically created in IBM DB2 Records Manager. The ILM - Records portlet can be used to search for and view these entries. We see this capability later in this walkthrough from the records administrator view.

After selecting the **OK** button, the analyst is returned to the ILM tasks window where she can select other tasks with which to work.

12.3 Supervisor reviews report

Now that the analyst has completed the report and submitted it for approval, the supervisor needs to complete this (shortened) business process by reviewing the report and approving or rejecting it.

The supervisor opens the ILM - Tasks window. If it was already open before the analyst submitted the report, the supervisor might need to refresh the portal. Figure 12-12 shows the supervisor's view.
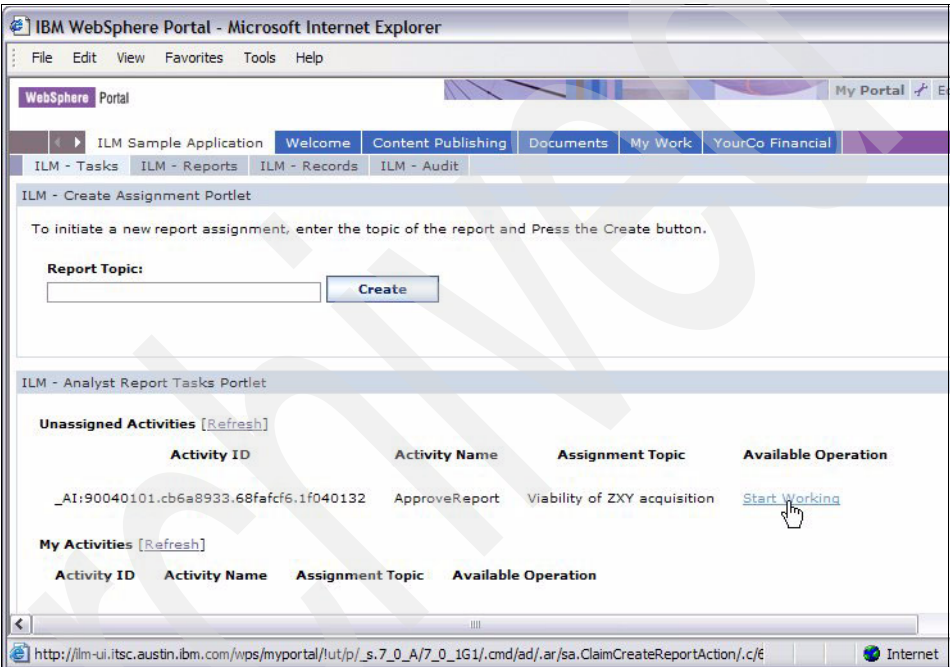
Figure 12-12   Supervisor selecting activity to start approval process

The supervisor sees a list of unassigned activities. In our simple example, this list consists of reports ready to be reviewed and approved or rejected. The supervisor clicks **Start Working** to select the activity with which to work. By selecting this, the activity is now moved to the supervisor's My Activities list.
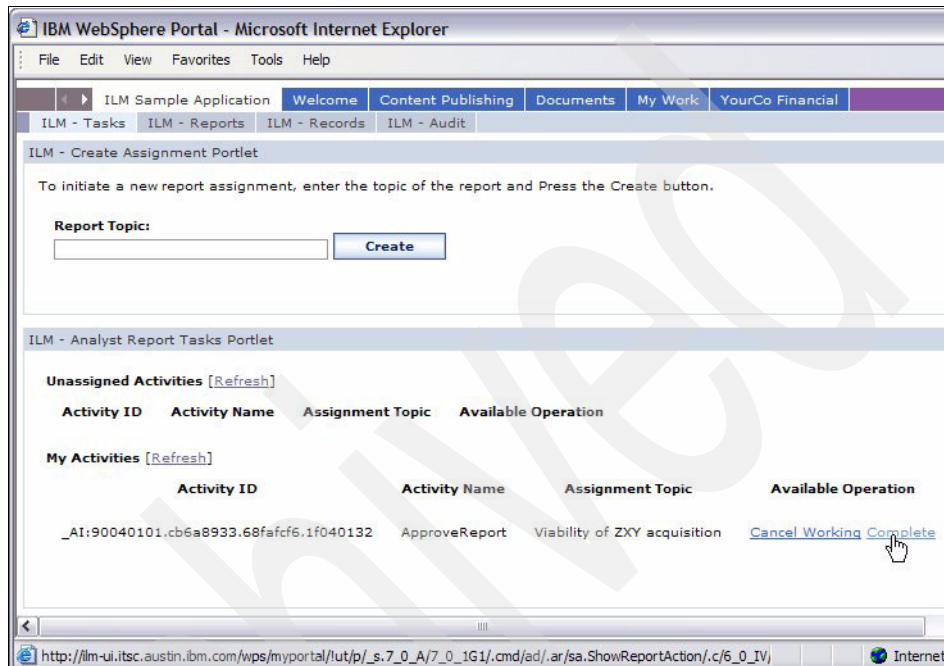
Figure 12-13   Prepare to complete the assigned activity

Now that the supervisor has assigned the activity to himself, he can start the approval process by clicking **Complete**.

The supervisor views the page shown in Figure 12-14 to review the report and selects to Reject or Approve the report.

Figure 12-14   Reviewing the report

Assuming that the report is acceptable, the supervisor selects **Approve**, as shown in Figure 12-14 on page 354, and receives confirmation, as shown in Figure 12-15.
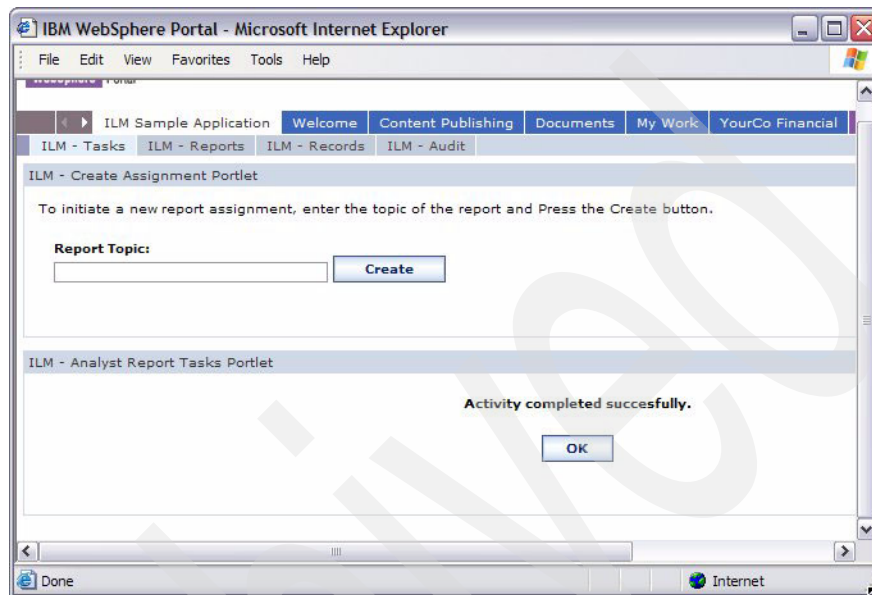
Figure 12-15   Activity completed confirmation page

After this step, the report is then published and appears in the Published Reports list, as shown in Figure 12-16.
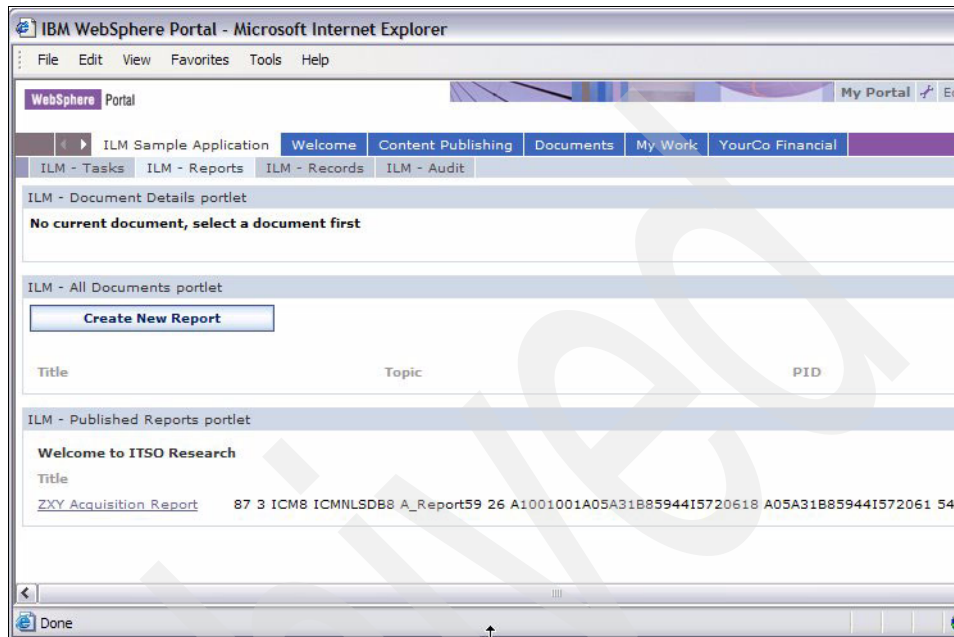
Figure 12-16   Report appears in the Published Reports list

Any users with access to the PublishedReports portlet can select the report to view, as shown in Figure 12-17.
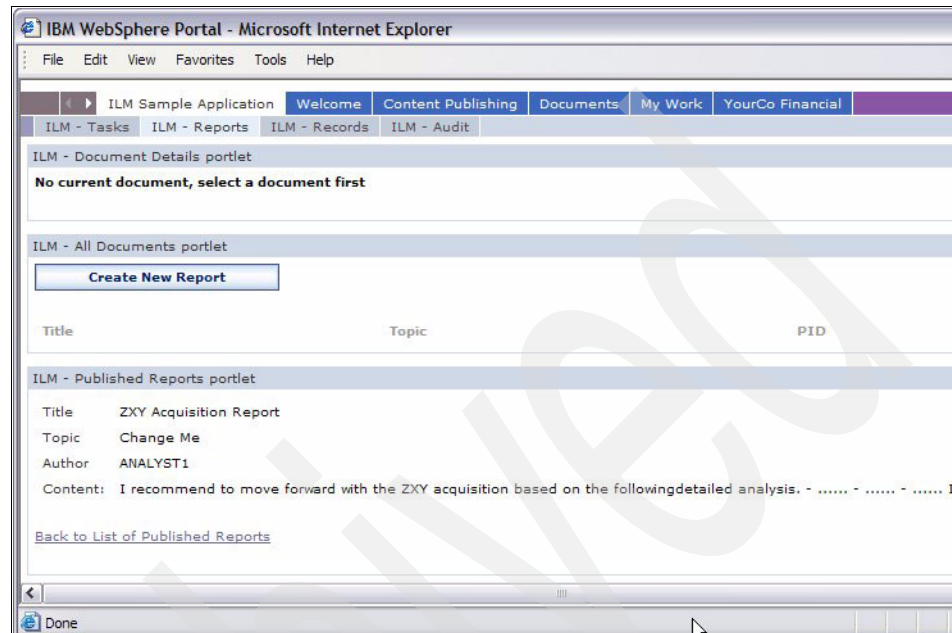
Figure 12-17   Viewing a published report

We have completed a simplified version of the report creation process. Additional portlets can be created, steps added to the process for legal review, and so on.

12.4 Records administrator audits report

An important role in any records management solution is that of the records administrator. Let us take a quick look at the portals we created that can be used by the records administrator.

The records administrator will log in to the same portal interface as our analysts and supervisor. However, the records administrator will have full access to the audit functions.

The first step might be for the administrator to view the ILM - Reports portal, as shown in Figure 12-18.
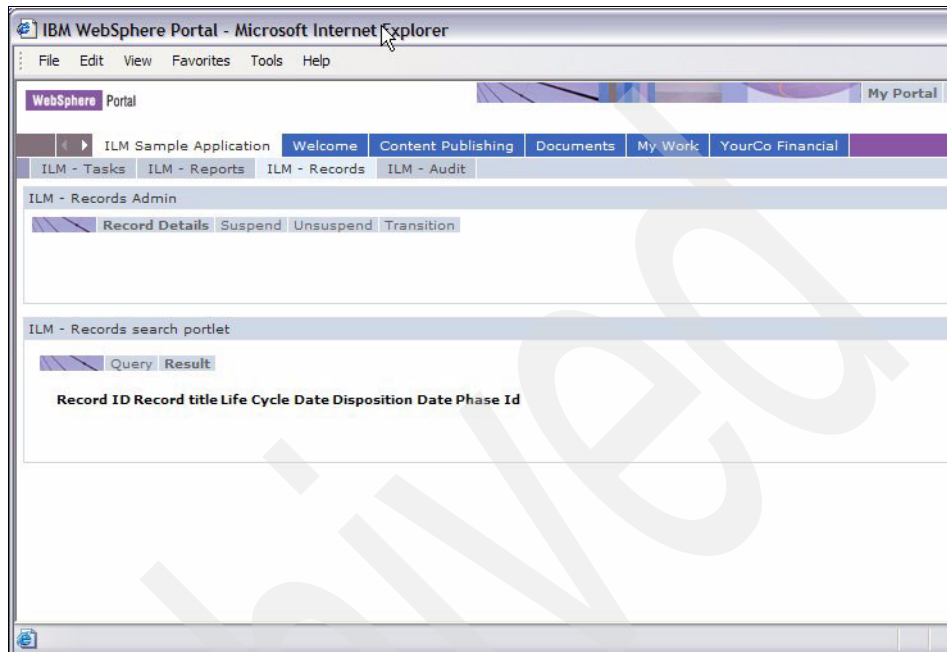
Figure 12-18   ILM - Records portal initial view

By selecting the **Query** option in the RecordsSearch portlet, the user is presented with a page that can be used to search the Records Manager database. In the example shown in Figure 12-19, we simply place an asterisk (*) in the record ID field to search all records.

Figure 12-19   Searching for records

This results in the search results being displayed, as shown in Figure 12-20. (The results show many more records than were entered in this walkthrough. These results are based on many records that we entered during testing.)
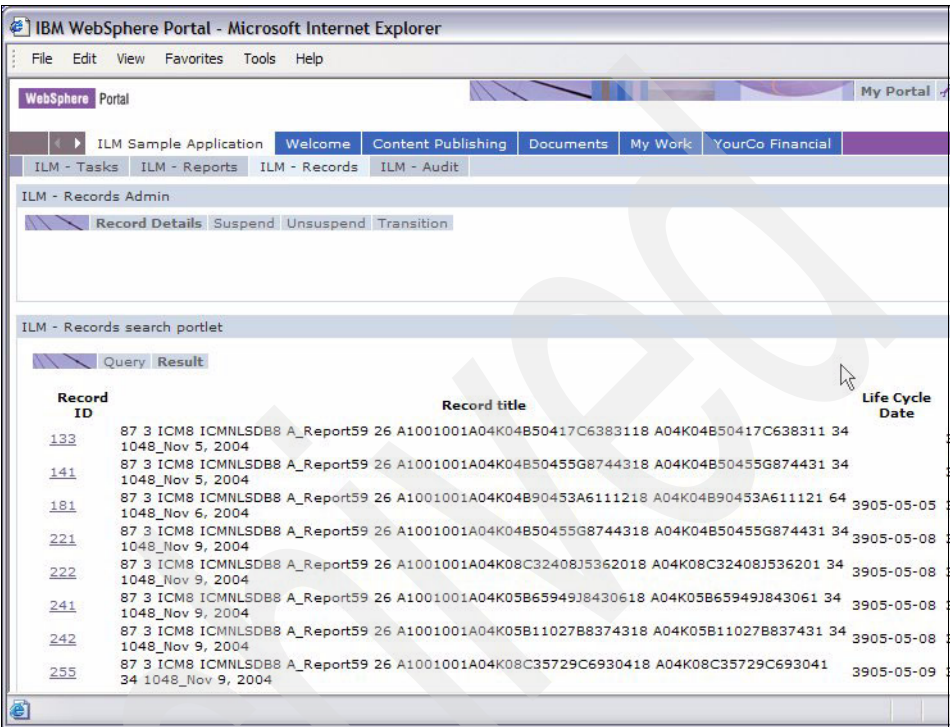
Figure 12-20   Search results view

In our case, the record for our ZXY study is displayed at the bottom of our list (out of sight in the view in Figure 12-20) and has a record ID of 441. We use this information in the next step.

The records administrator would now like to use the ILM - Audit page to access the Audit portlet and review the details of a specific record.

Figure 12-21 shows the ILM - Audit page.

Figure 12-21   Searching for a record to audit

By entering the record ID (441, in this case) in the appropriate field, the record administrator can search for the audit entries associated with this record. Figure 12-22 shows the result.

Figure 12-22   Result of audit query

The records administrator can now see the details of the specified report and the various actions that have been taken during its creation and approval.

The Document ID in the AuditResult portlet is linked to the RecordsAdmin portlet. Therefore, selecting a record in the AuditResult portlet will enable the records administrator to view the record and perform all other RecordsAdmin portlet available actions.

> **Note:** If you look at the details of the report shown in Figure 12-22, you will notice that the originator user ID for each of the phases of this document's life cycle is CMadmin. This is an unfortunate consequence of our simple implementation of our portlets, where the CMadmin ID was passed to the records manager instead of the actual user (supervisor1, analyst1). In an implementation designed for production use, this implementation would be changed to reflect the actual user performing the action in ensure that the audit capability is meaningful.

This completes the simple walkthrough of our sample ILM application. We leave it to you to explore these portlets and processes in more detail in conjunction with the source code provided.

12.5 Summary

This final chapter has provided a brief walkthrough of the sample information life-cycle management application that is the subject of this book. The application logic and implementation is admittedly simple, incomplete, and not designed with ease of use in mind. Instead, it is meant to show the basis of how a variety of IBM products (WebSphere Portal, DB2 Content Manager, DB2 Records Manager, Tivoli Directory Server, process choreographer, and others), along with a minimal amount of user-written logic, can form the basis for a records management solution controlled through a business process.

Part 5

Appendix

This part contains information about the sample code available with this book.

A

Additional material

This IBM Redbook refers to additional material that can be downloaded from the Internet as described in this appendix.

Locating the Web material

The Web material associated with this redbook is available in softcopy on the Internet from the IBM Redbooks Web server. Point your Web browser to:

`ftp://www.redbooks.ibm.com/redbooks/SG246481`

Alternatively, you can go to the IBM Redbooks Web site at:

ibm.com/redbooks

Select **Additional materials** and open the directory that corresponds with the redbook form number, SG246481.

Using the Web material

The additional Web material that accompanies this redbook includes the following file:

File name   *Description*
6481Sample.zip   Contains source code, configuration files and modules as described within this book.

System requirements for downloading the Web material

The 6481Sample.zip file is intended to be used on a development system running IBM WebSphere Studio Application Developer Integration Edition running on a Microsoft Windows environment, as described in Chapter 5, "Development environment" on page 73.

How to use the Web material

Create a subdirectory (folder) on your workstation, and unzip the contents of the Web material .zip file into this folder.

Assuming that the directory you extract these files to is called SG246481-Samples, the directory structure shown in Figure A-1 will be built.
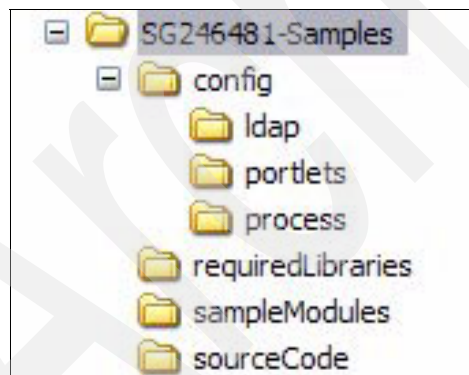
Figure A-1 Directory structure of the .zip file contents

The config directory contains various configuration files used during the set up and deployment of the sample application.

The requiredLibraries directory contains .jar files that are required by our application. As documented in this book, these libraries are available elsewhere, but we included them here as a convenience.

The sampleModules directory contains the prebuilt sample application .war and .ear files. This might prevent you from having to rebuild these modules before deploying the sample (although, based on variations between your environment and the one described in this book, it might be necessary to rebuild your application anyhow).

The sourceCode directory contains a another .zip file, called ILMworkspace.zip. This file, when unzipped to a directory, contains the entire WebSphere Studio Application Developer Integration Edition workspace, providing the source code and other files required to modify and rebuild the modules that make up the sample information life-cycle management (ILM) application described in this book.

Related publications

The publications listed in this section are considered particularly suitable for a more detailed discussion of the topics covered in this redbook.

IBM Redbooks

For information about ordering these publications, see "How to get IBM Redbooks" on page 372. Note that some of the documents referenced here may be available in softcopy only.

► *IBM WebSphere Portal V5: A Guide for Portlet Application Development*, SG24-6076

► *IBM WebSphere Portal for Multiplatforms V5 Handbook*, SG24-6098

► *Document Management Using WebSphere Portal V5.0.2 and DB2 Content Manager V8.2*, SG24-6349

► *A Secure Portal Using WebSphere Portal V5 and Tivoli Access Manager V4.1*, SG24-6077

► *IBM WebSphere V5.0 Security: WebSphere Handbook Series*, SG24-6573

Other publications

► *IBM DB2 Content Manager for Multiplatforms: System Administration Guide Version 8 Release 2*, SC27-1335-04

► *IBM Content Manager for Multiplatforms: Planning and Installing Your Content Management System Version 8 Release 2*, GC27-1332-02

► *IBM DB2 Content Manager for Multiplatforms/IBM Information Integrator for Content: Installing, Configuring, and Managing the eClient*, SC27-1350

Online resources

These Web sites and URLs are also relevant as further information sources:

► IBM DB2 Content Manager for Multiplatforms library

    http://www.ibm.com/software/data/cm/cmgr/mp/library.html

- ► IBM DB2 Records Manager home page

  http://www.ibm.com/software/data/cm/cmgr/rm/

- ► IBM DB2 UDB for UNIX and Microsoft Windows library

  http://www.ibm.com/software/data/db2/udb/support/manualsv8.html

- ► IBM DB2 UDB Support

  http://www.ibm.com/software/data/db2/udb/support/

- ► IBM Support and Downloads

  http://www.ibm.com/support

- ► IBM Technical Support

  http://techsupport.services.ibm.com

- ► IBM WebSphere Application Server Support site

  http://www.ibm.com/software/webservers/appserv/was/support/

- ► *IBM WebSphere Portal Extend for Multiplatforms V5.0.2 Information Center*

  http://www.ibm.com/websphere/portal/library

- ► IBM WebSphere Technical Library

  http://www.ibm.com/software/websphere/technical/

- ► Microsoft SOAP Toolkit (search for SOAP)

  http://www.microsoft.com/downloads

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A Sample Solution for Records Management with Process Choreography

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A Sample Solution for Records Management with Process Choreography

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Explore records management concepts

Design and develop a records management application

Use process choreography to control document life cycles

This IBM Redbook describes a sample implementation of a complex solution that addresses a key challenge being faced by many enterprises today. Document and record management has always been a difficult (and often manual) process. Enterprises need to address this challenge, not only to make their business, employees, partners, and customers more efficient, but also to comply with ever-increasing regulations.

Addressing these requirements demands a flexible solution that can be integrated with current and future IT systems and applications. It is also critical that it is driven through controllable and automated business processes.

This book describes a sample solution that integrates IBM DB2 Records Manager, IBM DB2 Content Manager, IBM WebSphere Application Server Enterprise process choreographer, IBM WebSphere Portal, IBM Tivoli Directory Server, and other software to provide a prototype solution. Though basic in its function, the solution and the steps to implement it can be used to help architects, IT specialists, and developers get started in creating a solution addressing their enterprise-specific requirements.