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I would like to dedicate this book to Ruthy, who is thankfully still a wonderful part of our life.

—Ron Ben-Natan

I would like to dedicate this book to the loves of my life, my wife Marcelle and my sons, Joshua and David.

—Richard Gornitsky

I would like to dedicate this book to Yael, for her love and support

—Ori Sasson

I would like to dedicate this to my wife, Susan, for her generosity, love, and understanding; my parents and older sister for contributions too numerous to mention and too vague to articulate; the constant company of Kismet and Skates; and in loving memory of Tux.

—Tim Hanis
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The explosion of access to information and applications, made possible by the Internet and the World Wide Web, has given rise to a new set of challenges for information technology professionals. Portal frameworks such as WebSphere Portal Server provide capabilities and services needed to meet requirements for consistent administration, look and feel, and navigation across all of these sources of content. In addition, portals enable productivity-enhancing services such as single sign-on and role-dependent personalization that bring the right tools and information to the right people in an organization. When combined with tools such as WebSphere Studio Application Developer, used for the development of specialty components (portlets), a portal becomes not only an essential element of any system integration strategy but also a fundamental tool for the development and deployment of new applications.

Software development frameworks evolve out of the observation of programming patterns that frequently recur throughout the industry. Uses of programming techniques such as CGI-bin .exe’s, Pearl scripts, and the like have required programmers to re-create or recode basic services such as memory and thread management, security, authentication, connections to database and back-end data sources, and markup generation libraries. Frustration with these repetitive tasks and initiatives like the Java Community Process gave rise to formalized frameworks of services such as J2EE application servers. J2EE application servers are now commonplace and widely deployed in many enterprises.

As enterprises require more and more integration among their application systems and as Web-based user interfaces have become the hub of application access, the J2EE model has been stretched and adapted. As before,
we can observe patterns of use in many enterprises centered around the aggregation of content, applications, and services, which makes it easy to create navigational models over the aggregation. Techniques such as JSP-includes were used to assemble larger applications out of pieces. However, these pieces lacked formal specifications for life cycle management and a contract between the components and their container. From these reuse patterns, IBM and others developed the specifications for a reusable component model, portlets. Formalization of portlets led directly to the development of management applications for portlets, or portal frameworks, and to a new breed of products to extend the capabilities of J2EE, such as WebSphere Portal (WP).

Portals and their building blocks, portlets, are quickly becoming “norms” for enterprise class application development and deployment environments. As components, portlets encapsulate Web applications in a life cycle and rendering scheme that makes them manageable and aggregatable by portals. The specifications for portlets are becoming codified by industry standards such as the Java Community JSR 168 and the corresponding Web services standard, WSRP. Portlets can be arbitrarily combined with other portlets to create more complex assemblies and navigational structures. This composition makes possible administrative assembly of applications. As the standards mature, they are being enhanced with capabilities that make it possible for portlets to interact with one another and send data and control signals that make portlets work together. Indeed, portlet composition can be thought of as a generalized component assembly programming model in which individually developed components are wired together to form new, more complex components. This powerful model will fundamentally change the way Enterprise Applications are built. Instead of monolithic application structures, applications will be built of modular, reusable components. Standards will ensure that the development and deployment models are portable and reusable across many environments. In addition, catalogs of prebuilt application pieces will enable business professionals with a keen understanding of the business to construct solutions that today projects require in the IT department.

Looking to the future, we see the continued evolution of the portal-based programming model leading to advanced “workplace” style applications. Workplaces bring an unprecedented level of user and administrator control to the design and deployment of component-based solutions. In a workplace, the role of the individual and the intersection of this role with the work processes that go on in all businesses are paramount. Workplaces, which are fundamentally based on the concepts and technology of portals and portlets, combine advanced notions of community, self-service, business process modeling, and management to form powerful and enterprise productivity-enhancing systems. Mastery of the portal concepts and
techniques will help all information technology professionals, not just Java programmers, to solve the future information and application integration challenges of their organizations.

Ron Ben-Natan, Richard Gornitsky, Tim Hanis, and Ori Sasson have authored an authoritative “must-have” guide to the capabilities of WP. Mastering IBM WebSphere Portal contains all that one must know to get started and become proficient with the portal application development and delivery environment. Beginning with the basics of installation and configuration, moving through the user interface concepts of skins, themes and tag libraries, and ultimately system administration, you will come to understand all of the essentials for working with WP. In addition, the authors explore the prebuilt capabilities for collaboration among portal users. Finally, you’ll learn the ins and outs of the portal and portlet programming models and best practices for developing and debugging your own portlets.

Portals extend Enterprise Application development to the next level. All application developers and system administrators can benefit from a thorough understanding of the power and flexibility offered by this new breed of system framework. I hope you enjoy Mastering IBM WebSphere Portal, and find that the next-generation environment of the WP truly enables enhanced productivity and improved business results.

Douglass Wilson
Distinguished Engineer, CTO,
IBM Lotus Software Division
Acknowledgments

The authors would like to thank the following people whose efforts were critical to the success of this book. Specifically we would like to thank Mike Rhodin, Larry Bowden, Douglass Wilson, Hershel Harris, Brandon Smith, and Bill Swatling for their support and encouragement. We would also like to thank Mike Durham, Kathy Sitar, and Uwe Zimmerman for their help in involving us in the WebSphere Portal 5.0 Beta program. Special thanks go to Theresa Smit, Jeffrey Hay, Stefan Hepper, Jim Bonanno, Lisa Tomita, Rob Davis, Ashok Iyengar, George Fridrich, and Venkata Gadepalli for their invaluable help in performing the technical review.

This book would not have come to fruition without the patience and dedication of our editors Jim Minatel and Scott Amerman.
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Introduction

If you are a user of Web applications you are also most likely a user of portals. If you develop, manage, or administer Web applications, then you are probably already building or managing Web portals or have thought that you should get started with portal technologies. If you fall into any one of these categories and your Web technology of choice is IBM’s WebSphere then this book is for you.

Web portals are becoming the de facto standard for packaging Web applications, and Web applications are increasingly being developed as “portal plugins” (often called portlets). Regardless of whether the domain is consumer applications or business applications, portals have become the consensus user interface for Web applications. In the consumer world all major Web sites present a portal look and feel: Yahoo and MyYahoo, MSN, and Amazon are just commonly known examples. If you work for a large corporation you probably have some form of corporate portal—offering you various human resources (HR), finance, and corporate communication applications in a portal-like environment.

Why are Web portals so successful? Because they bring together important functions such as integration, presentation, organization, and customizations—functions that are needed in every complex application environment. Why have they succeeded in Web application environments? Because these application environments tend to be highly complex, provide tens, hundreds, and sometimes thousands of disparate applications and serve huge user populations—sometimes many millions of users.

Given this very real need, companies have been offering portal server technologies since the dawn of Web applications. But like other information technology domains, portals too have gone through a maturation process.
Introduction

Some of the early leaders in this space are no longer leaders and some have completely disappeared. On the other hand, many of the large players including IBM, Microsoft, Oracle, BEA, and SAP offer portal products—products that are mature, complete, and very functional.

It is no secret that IBM has been very aggressive and extremely successful with the WebSphere family of products. The WebSphere Application Server started with no market share and today dominates the J2EE application server landscape world; according to some market reviews it has passed BEA WebLogic to become the market share leader. What is less well known is that the same has been happening in the portal space with WebSphere Portal quickly becoming a leader in the portal server space. In fact, WebSphere Portal has the highest new adoption rate within large corporations and is being used within more and more projects and across all industry verticals.

If you are among the many people involved in these portal projects, this book is for you. While WebSphere Portal is a mature product, it is also a highly complex and more specialized one, which means that there are less available resources for you to rely on. It supports many functions and you can use it to do a great number of things and in many ways. This complexity has the unfortunate side effect that WebSphere Portal is not easy to master. The goal of this book is to ease this pain, that is help you master WebSphere Portal.

Overview of the Book and Its Goals

This book will teach you how to install, use, administer, manage, and implement a WebSphere Portal V.5 environment. It will also teach you how to develop and deploy portlets (implementing your custom functionality) on a WebSphere Portal V.5 infrastructure. The focus is not only on developers, but also on administrators, architects, and managers involved with WebSphere Portal projects. If you are a developer you will make the most of this book if you have a Java development background. However, because the focus is on portlets and the inner functions of the portal server, even people with less-than-perfect Java skills will benefit from the book.

Because portals are normally found in business applications environments with a high degree of complexity, the book also shows you how to address the interaction between the portal and other elements in the enterprise. Portal applications are not islands of functionality—if anything they are the fabric that forms the bridges. Therefore, you will learn not only about the portal as a server but also how it interacts with components such as LDAP servers, Enterprise Applications, mobile devices, and even other (vertical) portals.
How This Book Is Organized

In order to master WebSphere Portal V.5, the book will take you through a series of topics starting with those focused on the portal itself and culminating with topics that discuss how the portal fits in within enterprise environments.

You will first learn how to install and customize the portal, as well as how to migrate existing environments to version 5. Next you will learn how to administer and manage portals, including defining portlets, pages, and user interface properties. You will also learn how to use personalization, collaboration, search, document management, and content management within WebSphere Portal V.5. The third set of chapters of the book discuss portlets and show you how to use the portlet API, how to develop portlets, and how to use various development frameworks that make this an easy task. Finally, the last part of the book focuses on WebSphere Portal V.5 within the enterprise environment and shows you how to address topics such as high availability, security and single-sign-on, identity management, Web services, Enterprise Applications, and mobility.

The book starts with an introduction to the WebSphere product family and a review of what WebSphere Portal is responsible for within the complete product family. You will learn about the three dimensions of WebSphere Portal (WP) experience: the user experience, the developer experience, and the administrator experience. You will then get an overview of the WP architecture and what’s new in WP version 5.0.

Chapters 2 and 3 will take you through the installation procedures for WP 5.0. WP 5.0 greatly improves upon the various WebSphere Portal Server versions 4.x in terms of installations. If you are using a Windows platform turn to Chapter 2, and if you are using Linux, turn to Chapter 3. If you are using other Unix platforms you can start with Chapter 3 and make changes to the installation procedures based on the WP InfoCenter.

Chapter 4 continues with installation by teaching you how to use Oracle, DB2, or Microsoft SQL Server as the back-end database for your WP instances. In addition, Chapter 4 takes you through WP 5.0 customization topics. You will learn how to use WPSconfig and various configuration templates, how to configure the databases used by WP, and how to configure WP when using remote access.

In Chapter 5 you will complete the installation topics by learning how to install and use the WebSphere Portal Toolkit and the WebSphere Portal Test Environment. You will also learn how to install and activate the Lotus Workplace Web Content Management modules and Tivoli’s Web Site Analyzer. Finally, you will learn how to diagnose and troubleshoot problems that you may encounter.
Chapter 6 is the last chapter in the first part of the book and covers topics relating to migration to WP 5.0. If you are already using WebSphere Portal Server 4.x, this chapter will teach you how to upgrade your system to WP 5.0 smoothly and easily. If you are starting fresh on WP 5.0 you can skip this chapter.

In Chapter 7 you will learn about defining elements within your portal. You will learn how to create portals and define pages and how to customize your portal’s structure.

Chapter 8 continues this theme by teaching you how to tailor the portal’s user interface. You will learn what themes and skins are and how to define your own custom style for your portal. You will also learn how to take existing styles and modify them rather than building new styles from scratch.

In Chapter 9 you will learn about one of the most important topics supported by WP: personalization. You will learn about the various personalization features within WP 5.0, how to use rule-based personalization, and how the personalization API can help you with advanced personalization.

Chapter 10 focuses on portal administration and reviews all of the main administration tasks that you will be required to do when maintaining your portal. You will learn about the WP settings, permissions, and access control and in each topic you will see how to perform the main administration tasks.

Chapter 11 reviews document management and content management within WP 5.0. Like personalization, these topics are often synonymous with portals and the chapter will walk you through some of the main tasks you may need to perform, such as setting up workflows, creating content templates, and categorizing content.

Chapter 12 goes on to complete the second part of the book by introducing you to collaboration and to search. You will learn how to use collaboration components—whether they are Lotus components or Microsoft components. You will also learn how to implement search within your portal, manage search taxonomies and categorizations, and set up extended search capabilities.

In Chapter 13 you will learn about portlets and the focus turns to the development of custom functionality to be deployed within your portal. You will learn about the portlet container and the portlet life cycle and will see how to use portlet configuration objects, portlet requests, and portlet responses. Finally, you will learn about the portlet event model.

Chapter 14 continues with portlets and focuses on the portlet API. You will learn about the JSR 168 API and the various portlet APIs at your disposal. You will learn about the portlet processing model, URI addressability, and about services and objects.

In Chapter 15 you will see how easy it is to develop portlets using WebSphere Studio and the embedded Portlet Toolkit. The chapter (along with
Chapter 16) takes you through a complete development cycle using an example poll portlet. Chapter 16 continues with the poll portlet and show you how to implement the controller and action classes, and how to build the view classes and take care of the model classes.

Chapter 17 teaches you how to develop the poll portlet using the JSR 168 API—providing you will a full arsenal of development techniques that you can use in your environment. The chapter also teaches you how to debug your code and how to use trace logging as part of the development life cycle.

Chapter 18 completes the development part of the book by teaching you how to use the struts portlet framework. Struts is the de facto Web application framework in Java server environments and it is very likely that you will develop portlets that make use of struts’ Model-View-Controller paradigm. You will learn how to build both the Web deployment descriptor and the portlet deployment descriptor and how to set up the struts configuration file. You will then revisit the poll portlet and see how it would look within a struts environment.

Chapter 19 moves on from a development focus to address authentication issues and how you can integrate an LDAP environment into your WP 5.0 servers. You will learn how to configure your portal to connect to your LDAP servers and how to implement enterprise identity management.

Chapter 20 continues with this theme and addresses the larger issue of single-sign-on and identity management when using WP 5.0 with either Netegrity SiteMinder or Tivoli Access Manager. You will learn how to configure WP 5.0 to use each of these platforms and the issues you need to think about when doing such a deployment.

Chapter 21 goes on to provide you with planning and implementation skills that will help you set up WP 5.0 in a high-availability environment. You will learn about WP clusters and how to build clusters supporting either vertical or horizontal scaling. You will learn how to configure a clustered environment and how to deploy portlets in such an environment.

Chapter 22 is all about Web services in the context of WP 5.0 After a very quick review on Web services you will learn about remote portlets. You will then learn about two methods for using Web services within a WP environment and for each method you will see what configuration tasks and what development tasks you may need to do within your portal.

Chapter 23 is one of the longest chapters in the book and addresses the issue of integrating external applications into WP. In this chapter you will learn what integration options are available and for each category you will learn what needs to be done. You will learn about using adapters to integrate back-end systems with portlets, using middleware connectors, and about the Portal Application Integrator. You will also learn how to set up back-end single-sign-on and about the Credential Vault service.
learn about front-end integration techniques such as Web Clipping and Web embedding as an alternate integration strategy.

The last chapter in the book, Chapter 24, shows you how to support users who do not only use PCs and desktop Web browsers but rather use mobile and wireless devices to access functionality deployed through WP. You will learn about Transcoding Technologies and about WebSphere Everyplace Access as an enabler for supporting mobile users.

The following table shows the chapters that will be of most interest to portlet developers, portal administrators, portal implementation specialists and enterprise architects:

<table>
<thead>
<tr>
<th>ROLE</th>
<th>FOCUS CHAPTERS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Portlet developer</td>
<td>13, 14, 15, 16, 17, 18, 22</td>
</tr>
<tr>
<td>Portal administrator</td>
<td>4, 5, 6, 10, 19, 20, 21, 22, 23</td>
</tr>
<tr>
<td>Portal implementation specialist</td>
<td>7, 8, 9, 10, 11, 12, 19, 20, 21, 23, 24</td>
</tr>
<tr>
<td>Enterprise architect</td>
<td>19, 20, 21, 22, 23, 24</td>
</tr>
</tbody>
</table>

Summary

This book is about mastering WebSphere Portal V.5. If you are just starting with WebSphere Portal, we recommend you read the chapters in sequence, starting with the installation of the portal, through the various tasks you will need to perform, and ending with advanced topics relevant to enterprise deployment. If you are already familiar with WebSphere Portal, feel free to jump directly to the chapter that fancies your interest—we wrote the book in a way that almost all chapters present a topic from start to finish and is almost self-contained. In any case, we hope that you enjoy the book and that the book will help you gain mastery over WebSphere Portal V.5.