SAP NetWeaver®
Process Integration: A Developer’s Guide

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Introduction

These days, there’s a wealth of information out there about SAP NetWeaver® Process Integration (SAP NetWeaver PI). Indeed, at the time this book was written, a random Google search on the term *SAP NetWeaver PI* yielded approximately 275,000 results. Of course, there’s a fundamental difference between information and knowledge.

As we set out to write this book, we wanted to develop a holistic curriculum that provides you with the knowledge you need to become a successful PI developer and consultant. In order to achieve this, we endeavored to strike a balance between theoretical concepts, nitty-gritty details, and hands-on access using real-live examples.

We hope that you’ll find the structure and organization of the material conducive to learning. So, whether you are new to PI, looking to broaden your PI development skills, or simply interested in becoming an SAP-certified PI development consultant¹, we think this book can provide you with the tools you need to be successful. Ultimately, our goal is to adequately prepare you to hit the ground running on an integration project using SAP NetWeaver PI.

Target Group and Prerequisites

In many ways, determining the target audience for this book was a difficult challenge. In over 7 years of experience working with SAP NetWeaver PI technology, we have encountered developers from all walks of life:

- ABAP™ developers who do not have much (if any) experience with Internet-based technologies such as XML, HTTP, etc.
- Experienced middleware developers looking to transition their skills into the world of SAP.

¹ Specifically, it will prepare you to sit for the *SAP Certified Development Associate - Process Integration with SAP NetWeaver (PI 7.1)* exam. See [http://www.sap.com/services/education/certification/certroles/certificationrole.epx?context=[ROLE_C_TBIT44_71]] for more details.
Novice developers just getting started in their careers.

Given the diverse backgrounds of those interested in learning more about SAP NetWeaver PI, we decided to approach the writing of this book under the premise that the reader has little to no experience working with SAP NetWeaver PI and its surrounding technologies. This is especially evident in Part 1 of this book as we explore basic concepts and set the foundation for more advanced topics later on in the book.

The potential downside to this approach is that you run the risk of boring experienced developers who are already familiar with basic concepts. To guard against this, we have organized the content into distinct sections such that you can safely skip over the concepts that you are already familiar with. An added benefit of this approach is that it makes it easier to refer back to sections of the book as needed without having to dig and dig looking for answers to specific questions.

Despite our best efforts, there are certain sections of the book that require some background knowledge in order to firmly grasp the concepts being presented. For example, in our discussion on message mappings, you’ll have an easier time understanding how Java™ or ABAP-based mapping programs work if you have some experience working with these languages. Where appropriate, we will supplement this content with links to relevant reference materials. In many cases, we will also point out alternative techniques which may be easier to understand based upon your skill sets.

While this book is chock full of screenshots and examples that should help guide you through the learning process, we cannot stress enough the importance of getting hands on with the development tools. Therefore, if you have access to an SAP NetWeaver PI development system², we recommend that you use it to follow along with the book’s examples. Alternatively, you might want to look at hosting services such as http://www.sapaccess.com.

² Unfortunately, unlike other SAP NetWeaver products, SAP NetWeaver PI is not available for trial download on the SAP Developer Network (SDN).
Introduction

Tour of the Book

One of our goals in writing this book was not to simply compile a bunch of loosely related information together into a reference manual. While this book can certainly be used as a reference in your day-to-day work, we also hope that you’ll find each chapter to be an interesting read in and of itself. Though each of the chapters are designed to be self-contained, we think you’ll get the most out of your experience by reading the book in order as each chapter builds upon previous concepts. The chapters are organized as follows:

- **Chapter 1: Foundations**
  In this first chapter, we attempt to lay some groundwork by describing what SAP NetWeaver PI is, where it came from, and what value it brings to the table in the world of enterprise software development. As such, this chapter is a microcosm for the entire book.

- **Chapter 2: Working with XML**
  For developers new to the world of interfacing in the Internet age, this chapter will introduce you to the eXtensible Markup Language (XML) and some of its surrounding technologies such as XML Schema.

- **Chapter 3: The Web Services Technology Stack**
  If you’re not familiar with Web service technologies such as SOAP, WSDL, and UDDI, then this chapter will provide you with a gentle overview to bring you up to speed. Having an understanding of these concepts is important for being able to comprehend how interfaces are defined and processed within the SAP NetWeaver PI runtime environment.

- **Chapter 4: Getting Started with the ESR**
  In this chapter, we begin getting our hands dirty with the PI design time environment. Here, you will learn how to organize and manipulate SOA assets within the Enterprise Services Repository (ESR).

- **Chapter 5: Service Design Concepts**
  This chapter sets the stage for service interface development by introducing you to some SAP and industry-best practices for designing and modeling business processes in the SOA context. Along the way, you will become familiar with some SOA modeling tools that can be
used to visualize various aspects of a business process at different levels of abstraction.

- **Chapter 6: Service Interface Development**
  In this chapter, you learn about the various approaches to service development supported by SAP NetWeaver PI. Here, you’ll learn how to develop custom services from scratch, or leverage pre-existing services.

- **Chapter 7: Mapping Development**
  This chapter introduces you to some of the basics of mapping development in SAP NetWeaver PI. In particular, we will show you how to implement graphical message mappings and import custom mapping programs written in Java and XSLT.

- **Chapter 8: Advanced Mapping Development**
  This chapter picks up where Chapter 7 left off by showing you some advanced mapping development concepts. Here, you will learn how to define and configure operation mappings, perform value mappings and mapping lookups, and much more.

- **Chapter 9: Integration Processes**
  In this chapter, we will show you how to implement sophisticated message processing requirements using integration processes. As you’ll see, these workflow-like components can be used to implement stateful processing, conditional logic, and much more.

- **Chapter 10: Working with the Integration Builder**
  This chapter introduces the Integration Builder tool which is used to define configuration objects within the Integration Directory.

- **Chapter 11: Collaboration Profiles**
  In this chapter, you will learn how collaboration profiles are used to model the endpoint systems that will participate in collaborative business processes.

- **Chapter 12: Integration Server Configuration**
  This chapter shows you how to configure collaborative business processes for execution within the Integration Server, which is an ABAP-based runtime component of SAP NetWeaver PI. Here, you will learn how to define logical routing rules and some of the other configuration-time objects used to influence the behavior of the messaging components at runtime.
Chapter 13: Advanced Configuration Concepts
In this chapter, we will introduce you to some advanced communication variants that are supported in version 7.1 of SAP NetWeaver PI. Here, you will learn how to configure local processing within the Advanced Adapter Engine (AAE) as well as point-to-point scenarios between SAP-based Web service runtime environments.

Chapter 14: Process Integration Monitoring
This final chapter presents some of the various monitoring tools provided with SAP NetWeaver PI. Here, we’ll show you how these tools can be used to monitor the flow of messages, the health of messaging components, and so on.

Appendix A: Proxy Programming Concepts
In this appendix, you’ll learn about proxy programming concepts. Specifically, we’ll show you how to develop proxy objects in ABAP that can communicate with the PI Integration Server using the native XI protocol.

Appendix B: Enhancing Enterprise Services Provided by SAP
This appendix demonstrates techniques for enhancing enterprise services provided by SAP.

Appendix C: Collecting Mapping Requirements
In this appendix, we’ll provide you with some tips for collecting mapping requirements from the various stakeholders involved in a collaborative business process.

Conventions
This book contains many examples demonstrating programming language syntax, etc. Therefore, to distinguish these sections, we use a monospaced font type similar to the one used in many integrated development environments to improve code readability:

```java
public class MyMappingProgram
    extends AbstractTransformation
{
    ...
}
```

As new syntax concepts are introduced, these statements will be highlighted using a bold face font like the code snippet shown above.
How to Contact Us

If you have questions, comments, (or even complaints!) about this book, we’d love to receive your feedback. You can e-mail the author directly at j James.wood@bowdarkconsulting.com.

We will post errata, updates, and any additional information out on the book’s companion site at http://www.bowdark.com/books/pibook.

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