

Developing Applications in IBM Business Process Manager Advanced V8.5.7 - II

WB861 (Classroom)

ZB861 (Self-paced)

Course description

This course continues to build the skills and concepts that are learned in courses *Developing Applications in IBM Business Process Manager Advanced V8.5.7 - I* (WB860G) and *Developing Applications in IBM Business Process Manager Advanced V8.5.7 - I* (ZB860G). Those courses introduced the service-oriented architecture (SOA) approach to business process management (BPM), and covered how to build a basic process integration solution. In this course, you learn how to extend the functionality of that solution to accommodate more process integration scenarios.

Through presentations and hands-on lab exercises, you learn about the Service Component Architecture (SCA) programming model and runtime environment, XML (business object) support, Business Process Execution Language (BPEL) handlers, business state machines, and SCA transactions. You also learn about business process dynamicity and flexibility, relationships, and mediation primitives. Other topics include creating versions of SCA components, test environment capabilities, and approaches to securing SCA applications.

You use the IBM Process Center repository to add process model artifacts in a complete and integrated development solution. You learn how to apply governance to process applications.

In addition, you use IBM Integration Designer to design, develop, and test comprehensive process integration solutions that use the SCA programming model, the Service Data Object (SDO) data model, and the mediation flow programming model. You learn how to deploy these solutions to the IBM Process Server runtime environment, maintain them in the IBM Process Center repository, and test them in the IBM Integration Designer test environment.

The course also covers how to use the tools of IBM Business Process Manager for iterative (model-driven) application development. For example, you learn how to develop a process diagram in IBM Process Designer, store it in the IBM Process Center repository, and associate it with modules and libraries in IBM Integration Designer.

The lab environment for this course uses the Windows 2012 server R2 64-bit platform.

For information about other related courses, see the IBM Training website:

http://www.ibm.com/training

General information

Delivery method

Classroom or self-paced virtual classroom (SPVC)

Course level

ERC 1.2

Product and version

IBM Business Process Manager Advanced V8.5.7

Audience

This course is designed for integration developers and other application development specialists.

Learning objectives

After completing this course, you should be able to:

* Create and modify an application by using iterative, model-driven development
* Develop a business process diagram in IBM Process Designer
* Work with a process application snapshot in IBM Integration Designer
* Associate IBM Integration Designer artifacts with a process application snapshot
* Use artifacts from an IBM Integration Designer library in a business process diagram
* Implement and deploy SCA modules and libraries that contain version information
* Use the serviceDeploy tool to install versioned modules in an IBM Process Server profile
* Enable cross-component trace to follow the invocation sequences between SCA applications to diagnose and repair an application failure
* Implement the event sequencing quality of service qualifier in an application
* Implement a WebSphere MQ import in an application
* Implement a fault handler and compensation handler in a business process
* Examine and test a business state machine
* Examine the transaction propagation settings and transaction quality of service qualifier settings for an application
* Implement a selector component and dynamically navigate a business process instance at run time
* Implement a static (lookup) relationship
* Create a service aggregation mediation flow by using several pre-built mediation primitives
* Create a reusable mediation subflow that contains error handling primitives
* Configure security quality of service qualifiers and implement role-based security for human tasks and business processes
* Apply governance to process applications
* Configure IBM Business Process Manager Advanced tools for integration with other applications, such as IBM Business Monitor

Prerequisites

Before taking this course, you should successfully complete Developing Applications in IBM Business Process Manager Advanced V8.5.7 - I (WB860G) or Developing Applications in IBM Business Process Manager Advanced V8.5.7 - I (ZB860G). You should also have:

* Basic Java and Java 2 Platform, Enterprise Edition (Java EE) skills
* Experience with, or prior education on, WebSphere Application Server, or experience with Rational Application Developer
* Basic Extensible Markup Language (XML) skills

Duration

5 days

Skill level

Intermediate

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| Classroom (ILT) setup requirements | |
| Processor | Intel Core i7-3630QM processor |
| GB RAM | 12 |
| GB free disk space | 120 |
| Network requirements | None |
| Other requirements | 2 CPUs are required |

Notes

The following unit and exercise durations are estimates, and might not reflect every class experience. If the course is customized or abbreviated, the duration of unchanged units will probably increase.

This course is an update of the following previous courses:

* WB858 and ZB858, *Developing Applications in IBM Business Process Manager Advanced V8.5.5 - II*

Course agenda

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| Course introduction  Duration: 15 minutes |

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| Unit 1. Introduction to IBM Business Process Manager V8.5.7  Duration: 1 hour and 15 minutes | |
| Overview | In this unit, you learn about the purpose, function, and business value of IBM Business Process Manager. The unit introduces the tools that are included with IBM Business Process Manager V8.5.7 Advanced edition. |
| Learning objectives | After completing this unit, you should be able to:   * Describe the concepts of business processes and business process management (BPM) * Describe the IBM product editions |

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| Exercise 1. Using iterative development to create applications  Duration: 2 hours | |
| Overview | In this exercise, you explore the iterative, model-driven development process. You create a business model in IBM Process Designer, take a snapshot of the application, and synchronize with IBM Integration Designer. You then add implementation details, wire the model artifacts into a business process, and test the business process in IBM Integration Designer. |
| Learning objectives | After completing this exercise, you should be able to:   * Examine the various paths for the Account Verification process in IBM Integration Designer * Create a business process diagram in IBM Process Designer * Build an implementation for an activity in a business process diagram * Use the IBM Process Center Playback Server to test the business process diagram * Replace a Java component with a business process diagram * Use IBM Integration Designer to test the imported business process diagram |

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| Unit 2. Course business scenario  Duration: 1 hour | |
| Overview | This unit describes the purpose, function, and business value of each lab exercise. It also describes the course lab scenario and the components that you use and build in the course labs. |
| Learning objectives | After completing this unit, you should be able to:   * Describe the key components that you build and assemble in this course * Explain the benefits of each lab exercise in this course |

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| Unit 3. Version control and testing of SCA applications  Duration: 1 hour and 30 minutes | |
| Overview | This unit introduces module and library version control in IBM Process Server, and describes strategies for testing SCA applications. |
| Learning objectives | After completing this unit, you should be able to:   * Describe version control schemes in IBM Process Server * Identify the IBM Process Server components that provide version control * Compare version control in IBM Process Server to snapshots in IBM Process Center * Describe some of the version control considerations for SCA applications * Describe the IBM Integration Designer tools for debugging applications * Describe the advanced testing facilities that are available in IBM Integration Designer * Explain the purpose of the IBM Integration Designer Server Logs view * Explain the business value of the IBM Support Assistant |

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| Exercise 2. Version control for SCA applications  Duration: 1 hour | |
| Overview | Version control of modules and libraries is optional in V8.5.7, and if it is used, it is based on a scheme that IBM provides. This exercise demonstrates how to create versioned modules and libraries in IBM Integration Designer for future deployment to a production environment. |
| Learning objectives | After completing this exercise, you should be able to:   * Create multiple versions of modules and libraries * Deploy modules by using the serviceDeploy tool * Install and start the generated EAR file * Test the versioned application with cross-component tracing * Troubleshoot applications in the administration console and Failed Event Manager * Test the versioned application |

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| Unit 4. SCA bindings, the SCA runtime, and SCA quality of service qualifiers  Duration: 1 hour and 30 minutes | |
| Overview | This unit describes how the SCA runtime environment handles synchronous and asynchronous communication, SCA bindings, and SCA quality of service qualifiers. |
| Learning objectives | After completing this unit, you should be able to:   * Explain how the SCA runtime handles synchronous and asynchronous communication * Describe the function of the Failed Event Manager * Describe the SCA import and export bindings * Identify the components of an SCA import or export * Describe the role of SCA quality of service qualifiers in transmission priority and level of route reliability * Explain the purpose and value of interface qualifiers, implementation qualifiers, and reference qualifiers |

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| Exercise 3. Working with SCA bindings and qualifiers  Duration: 1 hour | |
| Overview | In this exercise, you implement a WebSphere MQ import binding in an existing SCA module. You work with a SCA QoS qualifier in this exercise; a subsequent exercise introduces more qualifiers. Finally, you add and configure the WebSphere Adapter for Flat Files to allow data to be read from an input file. |
| Learning objectives | After completing this exercise, you should be able to:   * Implement a WebSphere MQ import binding in IBM Integration Designer * Use the WebSphere Adapter for Flat Files to implement an EIS import binding * Test bindings in the IBM Integration Designer integrated test environment |

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| Unit 5. Fault handlers  Duration: 45 minutes | |
| Overview | This unit explains the fault handler element in Web Services Business Process Execution Language (WS-BPEL), and handling of the Advanced Integration services faults. |
| Learning objectives | After completing this unit, you should be able to:   * Explain the purpose and business value of fault handlers * Define activity, local, and process-level fault handlers * Explain the error handling in IBM Process Designer * Apply error handlers to Advanced Integration services (AIS) |

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| Exercise 4. Applying fault handlers  Duration: 1 hour and 30 minutes | |
| Overview | In business processes, some exceptions can be predicted and handled by defining fault handlers within the BPEL. Fault handlers can also be defined to handle unexpected, arbitrary faults. This exercise shows you how to implement fault handlers in a business process and how to handle Advanced Integration services faults. |
| Learning objectives | After completing this exercise, you should be able to:   * Implement a fault handler in a BPEL process * Test fault handlers in the IBM Integration Designer integrated test environment |

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| Unit 6. WS-BPEL compensation and event handlers  Duration: 45 minutes | |
| Overview | This unit explains the compensation handler and event handler elements in WS-BPEL. |
| Learning objectives | After completing this unit, you should be able to:   * Explain the purpose and business value of compensation handlers and event handlers * Define compensation handlers and compensation activities * Explain the purpose of event handlers * Explain the lifecycle of event handlers |

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| Exercise 5. Applying a compensation handler to WS-BPEL  Duration: 1 hour | |
| Overview | This exercise shows you how to implement compensation handlers in a business process. Since you cannot predict exactly when a particular fault might happen, you need to define a sequence of activities to react to such events, and possibly undo the activities that are already committed. The compensation handlers can handle these types of scenarios. |
| Learning objectives | After completing this exercise, you should be able to:   * Implement a compensation handler in a business process * Test compensation handlers in the IBM Integration Designer integrated test environment |

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| Unit 7. Business state machines  Duration: 1 hour | |
| Overview | This unit defines the concept of business state machines and describes their value in process integration applications. The unit also lists and defines the elements of a business state machine and describes its runtime behavior. |
| Learning objectives | After completing this unit, you should be able to:   * Define the purpose and business value of using a business state machine * List the components of a business state machine * Explain the runtime behavior of a state machine * Describe the differences between state machines and business processes |

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| Exercise 6. Working with business state machines  Duration: 1 hour | |
| Overview | This exercise reinforces the business state machine concepts that you learned in the lecture. |
| Learning objectives | After completing this exercise, you should be able to:   * Explore the building blocks of the SodaMachine with the business state machine editor * Test the SodaMachine state machine with Business Process Choreographer Explorer |

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| Unit 8. Transactional behavior of SCA applications  Duration: 1 hour | |
| Overview | This unit explains the transactional behavior of SCA applications, including transaction boundaries, propagation, and transaction quality of service qualifiers. |
| Learning objectives | After completing this unit, you should be able to:   * Describe the general properties of transactions * Explain the purpose of the transaction quality of service qualifiers * Categorize activities according to their effect on transactions * Describe the default transactional behavior of various types of activities * Describe the implied behavior of activities that choose flexible transactional properties * Describe the transactional behavior of a business process during a failure |

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| Exercise 7. Defining transactional behavior in SCA applications  Duration: 1 hour | |
| Overview | In this exercise, you view the transaction settings in the Account Opening end-to-end lab scenario. You view the transaction propagation settings in the integration solution diagram of the scenario, and you view propagation settings for an individual module with the assembly diagram. After viewing the transaction propagation settings, you examine the transaction boundaries around activities in a BPEL process. |
| Learning objectives | After completing this exercise, you should be able to:   * View transaction propagation settings for a composite application by using an integration solution diagram * View transaction propagation settings for an individual module by using the assembly diagram * Examine the transaction boundaries for activities in long-running business processes * Use a scope in a long-running business process to manage persistence |

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| Unit 9. Business process flexibility  Duration: 1 hour | |
| Overview | This unit describes many of the IBM Process Server features that provide for flexible business processes, including selector components, dynamic routing, and process repair. |
| Learning objectives | After completing this unit, you should be able to:   * Identify the business process components that provide application flexibility and dynamicity * Explain the purpose and business value of selectors * Describe the runtime behavior of selectors * Provide a high-level description of the runtime architecture of content-based routing * Identify the BPEL components that allow dynamic process navigation at run time * Describe the runtime components that support the dynamic repair of process instances |

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| Exercise 8. Creating flexible business processes  Duration: 1 hour and 30 minutes | |
| Overview | This exercise introduces business process flexibility concepts. |
| Learning objectives | After completing this exercise, you should be able to:   * Use the Business Process Choreographer Explorer client to dynamically change the execution path of a running process instance * Implement a selector component to choose between multiple service invocations * Test a selector component in the IBM Integration Designer integrated test client |

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| Unit 10. Relationships  Duration: 1 hour | |
| Overview | This unit describes dynamic and static relationships in IBM Process Server. |
| Learning objectives | After completing this unit, you should be able to:   * Describe the purpose and business value of static and dynamic relationships * Describe the runtime components of relationships * Explain the deployment of SCA applications with relationship components * Explain how to use the Relationship Manager tool to manage runtime relationship instances * Describe the methods of predefining relationship tables with existing data * Explain the use of composite keys in relationships * Explain when foreign key cross-referencing or lookup is required |

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| Exercise 9. Working with static relationships  Duration: 1 hour | |
| Overview | In this exercise, you implement a static relationship in an existing SCA module. |
| Learning objectives | After completing this exercise, you should be able to:   * Implement a static relationship to map corresponding values between business object fields * Import static relationship data from a comma-separated value file * Test a relationship in the IBM Integration Designer integrated test environment |

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| Unit 11. Mediation primitives  Duration: 1 hour and 30 minutes | |
| Overview | This unit describes the mediation primitives in IBM Process Server that are not covered in the prerequisite courses. |
| Learning objectives | After completing this unit, you should be able to:   * Describe the role of mediation services in applications * Describe the prebuilt mediation primitives that are available in IBM Integration Designer |

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| Exercise 10. Implementing a mediation flow  Duration: 1 hour | |
| Overview | In this exercise, you implement a mediation flow with multiple mediation primitives. |
| Learning objectives | After completing this exercise, you should be able to:   * Implement a service aggregation flow in a mediation module with multiple mediation primitives, including fan out, fan in, service invoke, XSL transformation, message element setter, and custom mediation * Test a mediation module in the IBM Integration Designer integrated test environment |

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| Unit 12. Mediation flow control  Duration: 1 hour | |
| Overview | This unit describes the primitives that can be used to control the flow of mediation. The unit also describes the function of event sequencing, and offers suggestions for integrating IBM Process Server with WebSphere Service Registry and Repository. |
| Learning objectives | After completing this unit, you should be able to:   * Selectively route messages in a mediation by using the message filter primitive and type filter primitive * Use the flow order primitive to specify the order in which branches of a flow are run * Explain how subflows work and the advantages of using them * Describe the role of event sequencing in a mediation |

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| Exercise 11. Writing a generic error handler for IBM Process Server  Duration: 2 hours | |
| Overview | In this exercise, you write generic error handler logic for IBM Process Server in a mediation subflow. The subflow handles runtime failures and logs the messages to the console. |
| Learning objectives | After completing this exercise, you should be able to:   * Write a mediation subflow * Implement mediation logic to manage runtime errors * Use mediation primitives to control the flow of execution in a mediation, including the message filter and flow order primitives * Implement the custom mediation primitive |

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| Unit 13. Security  Duration: 1 hour and 15 minutes | |
| Overview | This unit provides a general overview of security in IBM Process Server, including server security and application security topics. |
| Learning objectives | After completing this unit, you should be able to:   * Explain the role of security quality of service qualifiers in SCA applications * Explain the basic security requirements for IBM Process Server * Describe the methods that are used to secure SCA applications * Identify the role-based security elements of processes and human tasks |

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| Exercise 12. Implementing security  Duration: 1 hour and 30 minutes | |
| Overview | SOA provides flexibility and reusability of enterprise applications. In an earlier exercise, you explored an end-to-end scenario to send data from one EIS to another. The next phase of the development is to secure your application. There are various web service proxy or gateway applications available to tighten the security of your application. However, in this exercise, you learn how to set security properties on your application at development time. |
| Learning objectives | After completing this exercise, you should be able to:   * Configure security qualifiers for an SCA application * Configure role-based security for human tasks * Configure authorization for business process components * Use Business Process Choreographer Explorer to test human task and process permission settings * Configure users and groups with Process Center internal security * Configure participant groups * Test human service security with Process Portal |

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| Unit 14. Governance of process applications  Duration: 45 minutes | |
| Overview | This unit describes the governance of process applications. |
| Learning objectives | After completing this unit, you should be able to:   * Explain the purpose of applying governance to process applications * Identify the integration services in the System Governance toolkit to create a governance process for a snapshot * Describe how to enable governance in process applications |

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| Exercise 13. Applying governance to process applications  Duration: 1 hour | |
| Overview | In this exercise, you explore the sample governance process application, and enable governance to the process application to control its installation on the IBM Process Server. You also test the installation of a snapshot that goes through the governance process. |
| Learning objectives | After completing this exercise, you should be able to:   * Create a governance process application * Enable governance in a process application * Test the governance of a snapshot installation |

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| Unit 15. Integrating with IBM Business Process Manager  Duration: 1 hour | |
| Overview | This unit describes the integration of IBM Business Process Manager with other products, such as IBM Business Monitor, IBM Case Manager, and WebSphere Service Registry and Repository. |
| Learning objectives | After completing this unit, you should be able to:   * Describe integration strategies for IBM Process Designer and IBM Enterprise Content Management * Describe integration strategies for IBM Integration Designer and IBM MobileFirst * Describe integration strategies for IBM Process Server and IBM Operational Decision Manager * Describe integration strategies for IBM Integration Designer and IBM Business Monitor |

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| Exercise 14. Integrating other applications with IBM Integration Designer  Duration: 1 hour | |
| Overview | In this exercise, you explore the procedures for integrating IBM Business Process Manager assets with other applications, such as IBM Business Monitor and IBM Case Management. |
| Learning objectives | After completing this exercise, you should be able to:   * Create a monitor model * Import and explore a monitor model * Associate a monitor model with a process application |

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| Unit 16. Course summary  Duration: 15 minutes | |
| Overview | This unit summarizes the course and provides information for future study. |
| Learning objectives | After completing this unit, you should be able to:   * Explain how the course met its learning objectives * Identify other IBM Training courses that are related to this topic * Access the IBM Training website * Locate appropriate resources for further study |

For more information

To learn more about this course and other related offerings, and to schedule training, see ibm.com/training

To learn more about validating your technical skills with IBM certification, see ibm.com/certify

To stay informed about IBM training, see the following sites:

IBM Training News: ibm.com/blogs/ibm-training

YouTube: youtube.com/IBMTraining

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