**IBM Business Process Manager V8.5 Problem Determination**

Description: 5300_IBMpos

**WB869 (Classroom)**

**ZB869 (Self-paced)**



Course description

In this course, you learn how to troubleshoot problems that might appear in an IBM Business Process Manager V8.5.0.1 environment. It teaches you problem isolation techniques that enable you to be self-sufficient and effective in discovering and resolving runtime problems. IBM consultants and IBM support teams assist their customers by using many of the methodologies that are introduced in this course.

The course begins with an introduction to the tools and techniques that are used for both WebSphere Application Server and IBM Business Process Manager problem determination. It covers problem determination topics such as how to gather and analyze trace data and how to troubleshoot Business Process Manager runtime and user interface (UI) issues. You also learn how to troubleshoot problems with components such as WebSphere Adapters and the Business Process Choreographer.

Hands-on lab exercises throughout the course reinforce the concepts that you learn in the lectures, and enable you to practice your problem determination skills. The exercises cover skills such as collecting data with the IBM Support Assistant, troubleshooting Advanced Integration Services, and troubleshooting problems with long-running business processes and Service Component Architecture (SCA) applications.

The lab environment for this course uses the Microsoft Windows Server 2008 or Microsoft Windows 7 platform.

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

**ibm.com**/training

General information

Delivery method

Classroom or self-paced virtual classroom (SPVC)

Course level

ERC 1.0

Product and version

IBM Business Process Manager V8.5.0.1

Audience

This course is designed for system administrators.

Learning objectives

After completing this course, you should be able to:

* Describe key problem determination steps
* Describe error prevention strategies
* Identify and collect MustGather data for IBM Business Process Manager
* Use the server logs viewer tool to read logging and tracing files
* Query failed events through Failed Event Manager and resubmit the events after the problem is resolved
* Describe the exception types from the SCA programming model: service business exceptions and service runtime exceptions
* Examine the trace log to follow the navigation steps inside the business process engine
* Isolate and troubleshoot WebSphere Adapter-related runtime problems
* Explain how to troubleshoot Advanced Integration services (AIS)
* Use Business Process Choreographer Explorer to examine problems with running business process instances

Prerequisites

Before taking this course, you should successfully complete course WB867 or ZB867, *Administration of IBM Business Process Manager Advanced V8.5*, or have equivalent experience.

Since WebSphere Application Server supports the core JEE services, WebSphere Process Server administrators must know some WebSphere Application Server problem determination techniques. Therefore, this course contains some topics that are also covered in course WA591, VA591, and ZA591, *WebSphere Application Server V8.5.5 Problem Determination*.

Duration

5 days

Skill level

Advanced

|  |  |
| --- | --- |
| Classroom (ILT) setup requirements | |
| Processor | Intel Core i7-3630QM processor |
| GB RAM | 12 GB |
| GB free disk space | 120 GB |
| Network requirements | LAN / Internet / DHCP / Fixed IP / None |
| Other requirements | None |

Notes

The following unit and exercise durations are estimates, and might not reflect every class experience.

This course is an update of the following previous course:

* WB725, VB725, and ZB725*, IBM WebSphere Process Server V7.0 Problem Determination*

Course agenda

|  |
| --- |
| Course introduction  Duration: 30 minutes |

|  |  |
| --- | --- |
| Unit 1. IBM Business Process Manager troubleshooting methodology  Duration: 1 hour | |
| Overview | This unit introduces IBM Business Process Manager problem determination, and outlines some of the topics in the course. The unit shows you how to separate runtime problems, design problems, and environment configuration problems. It also explains the basic troubleshooting checklist for IBM Business Process Manager that can help you clearly identify a problem. |
| Learning objectives | After completing this unit, you should be able to:   * Describe the key steps in problem determination * Characterize a problem from its symptoms * Implement a relief or recovery plan * Describe the basic troubleshooting checklist for IBM Business Process Manager * Describe a problem efficiently to IBM support |

|  |  |
| --- | --- |
| Unit 2. WebSphere Application Server and IBM Business Process Manager systems and components  Duration: 1 hour and 30 minutes | |
| Overview | This unit provides an overview of WebSphere Application Server and IBM Business Process Manager systems and components. |
| Learning objectives | After completing this unit, you should be able to:   * Describe the WebSphere Application Server architecture * Describe the Network Deployment (ND) cell components * Identify the components of IBM Business Process Manager and Process Center * Describe the purpose and business value of IBM Integration Designer |

|  |  |
| --- | --- |
| Unit 3. Gathering diagnostic data  Duration: 2 hours | |
| Overview | This unit explains how to identify resources for problem investigation and gather diagnostic data. You learn how to locate and configure server log files. The unit also provides an overview of High Performance Extensible Logging (HPEL) for a server and how to use log viewer tools. Finally, the unit covers the usage of cross-component trace (XCT), and how to use the administrative console to examine Java virtual machine (JVM) diagnostic data. |
| Learning objectives | After completing this unit, you should be able to:   * Identify and access several resources for problem investigation * Identify, locate, and configure server log files * Enable HPEL logging for a server and use log viewer tools * Describe and use cross-component trace (XCT) * Generate JVM diagnostic data by using the administrative console and other tools |

|  |  |
| --- | --- |
| Exercise 1. Gathering diagnostic data  Duration: 2 hours | |
| Overview | This exercise covers various types of problem determination tools that are built into the administrative console. You explore the tools, and look at diagnostic data that is available in log and trace files and in content memory dumps of the JNDI namespace. |
| Learning objectives | After completing this exercise, you should be able to:   * Enable tracing on a WebSphere Application Server component and read a trace output log * Use the administrative console troubleshooting section to view runtime messages and configuration problems * Enable and configure High Performance Extensible Logging (HPEL) * Use the class loader view in the administrative console * Enable and use diagnostic providers in the administrative console * Examine runtime messages and first-failure data capture (FFDC) logs * Use the dumpNameSpace tool to dump the contents of a namespace |

|  |  |
| --- | --- |
| Unit 4. MustGather data and IBM Support Assistant  Duration: 45 minutes | |
| Overview | This unit covers the IBM Support Assistant tool and MustGather data. IBM Support Assistant is a free package, provided by IBM Support, that includes various tools that collect and analyze data for troubleshooting. MustGather data is diagnostic data that IBM Support uses to resolve issues. You can collect MustGather data for Business Process Manager by using the IBM Support Assistant Data Collector. |
| Learning objectives | After completing this unit, you should be able to:   * Describe MustGather data * Describe IBM Support Assistant * Describe various IBM Support Assistant tools for troubleshooting * Describe the Data Collector for IBM Business Process Manager |

|  |  |
| --- | --- |
| Exercise 2. Using IBM Support Assistant  Duration: 1 hour and 30 minutes | |
| Overview | This exercise demonstrates how to use various tools and features in IBM Support Assistant Team Server V5 and IBM Support Assistant Data Collector. |
| Learning objectives | After completing this exercise, you should be able to:   * Start and stop IBM Support Assistant Team Server * Administer IBM Support Assistant Team Server * Run report generator tools and examine the reports * Use the Case Manager to create a case and add diagnostic data * Run interactive desktop tools * Use Automated Analysis to scan a case and examine the results * Run the Data Collector tool * Collect MustGather data for IBM Business Process Manager by using the automated Data Collector tool |

|  |  |
| --- | --- |
| Unit 5. WebSphere Application Server problem determination refresher  Duration: 2 hours | |
| Overview | This unit provides an overview of WebSphere Application Server problem determination techniques. |
| Learning objectives | After completing this unit, you should be able to:   * Describe components of JVM and overall architecture * Describe garbage collection (GC) and GC tuning policies * Identify a sluggish JVM and detect bottleneck problems * Explain how to tune the heap size * Define out-of-memory conditions * Describe tools for analyzing out-of-memory problems * Detect a hang condition * Describe tools for analyzing hangs * Define and detect a crash * Describe the tools that are available for troubleshooting a crash |

|  |  |
| --- | --- |
| Unit 6. Configuration problems  Duration: 1 hour and 30 minutes | |
| Overview | This unit covers how to troubleshoot some of the major configuration problems that can occur when working with IBM Business Process Manager. It also shows how to take advantage of the information that is stored in some of the key database tables. |
| Learning objectives | After completing this unit, you should be able to:   * Describe BPMConfig content * Describe troubleshooting options when working with online Process Server * Describe some key database tables for troubleshooting |

|  |  |
| --- | --- |
| Exercise 3. Troubleshooting an online Process Server  Duration: 2 hours | |
| Overview | This exercise covers how to troubleshoot an online Process Server that is connected to the Process Center. You take a systematic approach and use various tools and mechanisms to investigate the failing online connection status. |
| Learning objectives | After completing this exercise, you should be able to:   * Examine the online Process Server connection status in Process Center * Review the system logs for errors * Run wsadmin script commands for troubleshooting * Verify the authentication alias that is used for Process Server and Process Center communication |

|  |  |
| --- | --- |
| Unit 7. Troubleshooting process application deployment  Duration: 1 hour | |
| Overview | This unit describes troubleshooting and problem prevention techniques for process application deployment. |
| Learning objectives | After completing this unit, you should be able to:   * Explain basic process application concepts * Describe process application management * Describe user permissions issues with process applications * Explain troubleshooting actions for process applications |

|  |  |
| --- | --- |
| Exercise 4. Troubleshooting process application deployment  Duration: 1 hour and 30 minutes | |
| Overview | This exercise covers how to troubleshoot process application deployment issues. You troubleshoot a failed process application snapshot installation by using several different methods: checking user permissions, reviewing log files, and searching for information in the product documentation. After resolving the issue, you verify the successful process application installation by using Process Admin Console for Process Server. |
| Learning objectives | After completing this exercise, you should be able to:   * Create users in the Process Admin console * Add users to groups in the Process Admin console * Check server log files and identify issues * Search the Business Process Manager product documentation for troubleshooting information |

|  |  |
| --- | --- |
| Unit 8. IBM Business Process Manager Standard runtime problems  Duration: 1 hour | |
| Overview | This unit describes the tools that are available in IBM Business Process Manager to troubleshoot runtime problems. |
| Learning objectives | After completing this unit, you should be able to:   * Describe the REST API tester and use it to make API calls * Describe how to move tokens in process instances * Describe Event Manager and related database tables * Describe how to use Process Monitor and Instrumentation logs * Describe how to migrate inflight instance data |

|  |  |
| --- | --- |
| Exercise 5. Troubleshooting Business Process Manager Standard runtime problems  Duration: 1 hour and 30 minutes | |
| Overview | This exercise covers how to take advantage of the REST APIs to move a token in a failed activity of a BPD to complete the process. You also troubleshoot two different kinds of infinite loops. |
| Learning objectives | After completing this exercise, you should be able to:   * Examine a failed instance in Process Inspector * Restart a failed instance and complete the process * Explore REST APIs by using the REST API Tester * Troubleshoot infinite loops * Examine Process Monitor metrics to identify problem services |

|  |  |
| --- | --- |
| Exercise 6. Troubleshooting the user interface  Duration: 1 hour | |
| Overview | This exercise covers how to take advantage of lazy loading of data in coaches to improve the page performance. |
| Learning objectives | After completing this exercise, you should be able to:   * Use Firefox Firebug for troubleshooting a web page * Create a tabbed coach * Run several instances of a coach and compare their performance |

|  |  |
| --- | --- |
| Unit 9. Troubleshooting SCA runtime problems  Duration: 2 hours | |
| Overview | This unit covers how to approach Service Component Architecture (SCA) problems. A problem can be categorized within three types: a problem with application design, a problem with the runtime configuration, or defects with IBM Business Process Manager. The first step is to narrow down where the problem is located. You can use several tools within IBM Integration Designer to isolate the problem. This unit focuses on troubleshooting techniques that are specific to SCA. |
| Learning objectives | After completing this unit, you should be able to:   * Describe the exception types from the SCA programming model: service business exceptions and service runtime exceptions * Describe how cross-component trace works in IBM Integration Designer * Describe first-failure data capture (FFDC) * Describe how to troubleshoot event sequencing |

|  |  |
| --- | --- |
| Exercise 7. Troubleshooting an SCA application with runtime errors  Duration: 1 hour and 30 minutes | |
| Overview | In this exercise, you import an SOA solution into your workspace, deploy it onto Business Process Manager, and test it. The test fails and produces some exceptions. You use various runtime tools for monitoring failed events and tracing them back to the source of the problem. |
| Learning objectives | After completing this exercise, you should be able to:   * View server console log messages in IBM Integration Designer * Deploy SCA applications onto Business Process Manager * Use the cross-component trace to follow the call sequences between SCA applications * Query failed events through the Failed Event Manager and resubmit the events after the problem is resolved |

|  |  |
| --- | --- |
| Unit 10. Business Process Choreographer problems  Duration: 2 hours | |
| Overview | Business Process Choreographer is the major component of the IBM Process Server, and its container must be installed and configured correctly. Since the BPEL runs on the business process engine, there are tools to help you troubleshoot business process problems. As with SCA troubleshooting, you must be able to differentiate runtime problems from design problems by gathering necessary information (log and trace). Business Process Choreographer Explorer provides monitoring capabilities for running processes, while IBM Integration Designer offers tools for examining the BPEL design. This unit focuses on troubleshooting production environments. |
| Learning objectives | After completing this unit, you should be able to:   * Collect MustGather data for the Business Process Choreographer * Enable logging and tracing to gather relevant data * Examine the trace log to follow the navigation steps inside the business process engine * Describe the Business Process Choreographer application installation architecture * Describe some of the known pitfalls that are associated with Business Process Choreographer application installation * Explain when business process and human task component validation takes place * Determine the status of process instances by using Business Process Choreographer Explorer * Schedule the deletion of completed process instances |

|  |  |
| --- | --- |
| Exercise 8. Troubleshooting a long-running business process  Duration: 1 hour | |
| Overview | In this exercise, you troubleshoot a long-running business process. The error is traced with the cross-component trace and Business Process Choreographer Explorer. |
| Learning objectives | After completing this exercise, you should be able to:   * Start the Business Process Choreographer Explorer to examine problems with running business process instances * Check configuration properties * Find business process instances that are related to a failed event * Check the activity log and find business process-related messages to get additional information |

|  |  |
| --- | --- |
| Unit 11. Troubleshooting the advanced deployment environment  Duration: 1 hour | |
| Overview | This unit covers troubleshooting the advanced deployment environment and Advanced Integration services (AIS). |
| Learning objectives | After completing this unit, you should be able to:   * Describe the procedure to troubleshoot a deployment environment * Explain the problem and resolution of troubleshooting Advanced Integration services (AIS) * Learn some fundamental good practices when using IBM Integration Designer, IBM Process Designer, and IBM Process Center together to create applications   + Describe a façade pattern   + Explain the feature of library mirroring   + Explain how to check for breakages |

|  |  |
| --- | --- |
| Exercise 9. Troubleshooting Advanced Integration services  Duration: 2 hours | |
| Overview | This exercise covers troubleshooting techniques for Advanced Integration services (AIS) in the IBM Process Designer and IBM Integration Designer that interact with the Process Center. |
| Learning objectives | After completing this exercise, you should be able to:   * Change the version of dependency after migration from the previous version * Collaborate before defining an Advanced Integration service for missing data objects * Create a facade service * Troubleshoot a broken map * Protect mirrored artifacts in toolkits |

|  |  |
| --- | --- |
| Unit 12. Business Process Manager performance problems  Duration: 30 minutes | |
| Overview | This unit provides an overview of IBM BPM performance-related troubleshooting. |
| Learning objectives | After completing this unit, you should be able to:   * Describe the nature of the performance problem * Describe the types of data that is needed to troubleshoot performance problems |

|  |  |
| --- | --- |
| Unit 13. WebSphere Adapter problems  Duration: 45 minutes | |
| Overview | This unit covers general adapter troubleshooting techniques. When troubleshooting IBM Process Server, you must be able to isolate adapter problems from enterprise information system (EIS) issues or connection issues. First, you must be sure that the source of the problem is not the third-party application with which the adapter was communicating. The second step is to gather enough information to differentiate runtime problems from design problems. Technology adapters and application adapters have different sets of configuration properties. |
| Learning objectives | After completing this unit, you should be able to:   * Collect WebSphere Adapter MustGather data * Enable confidential tracing for added security * Specify the log and trace file name for a specific adapter * Explain what to do when the XAResourceNotAvailableException appears in the SystemOut.log file * Describe possible causes of the OutOfMemoryError and how to resolve the problem * Explain some of the encoding configuration problems that you might encounter when using the WebSphere Adapter for Flat Files |

|  |  |
| --- | --- |
| Exercise 10. Troubleshooting WebSphere Adapters  Duration: 1 hour | |
| Overview | This exercise covers how to troubleshoot WebSphere Adapters. WebSphere Adapters configuration can be complex, depending on the adapter type and on your environment. If your integration solution uses WebSphere Adapters, you should be able to isolate the adapter components from the rest of the SCA components to narrow down the source of an issue. This exercise demonstrates troubleshooting steps that you can use to solve a runtime problem where the adapter appears to be the source of the failure. |
| Learning objectives | After completing this exercise, you should be able to:   * Use the IBM Integration Designer test environment to conduct component tests * Restrict the source of a problem with cross-component trace * Isolate an adapter problem and test the adapter components * Examine log messages to pinpoint a problem |

|  |  |
| --- | --- |
| Unit 14. Problem prevention and best practices  Duration: 45 minutes | |
| Overview | Problem determination often occurs after a problem is discovered. However, the prudent system administrator or troubleshooter starts planning long before a problem occurs, by preparing the environment so that troubleshooting can be performed more quickly and effectively if and when problems occur. This unit covers recommendations that can help expedite problem resolution in even the most complex production environments. |
| Learning objectives | After completing this unit, you should be able to:   * Describe best practices for preventing production problems * Explain how to prepare for problems before they occur * List some of the diagnostic tools that can help troubleshoot problems |

|  |  |
| --- | --- |
| Unit 15. Course summary  Duration: 20 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 * Access the IBM Training website * Identify other IBM Training courses that are related to this topic * Locate appropriate resources for further study |

For more information

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

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

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

IBM Training News: http://bit.ly/IBMTrainEN

YouTube: youtube.com/IBMTraining

Facebook: facebook.com/ibmtraining

Twitter: twitter.com/websphere\_edu