**IBM Business Process Manager V8.5 Performance and Tuning**

Description: 5300_IBMpos

**WB868 (Classroom)**

**ZB868 (Self-paced)**



Course description

In this three-day course, you learn the advanced skills that are needed to monitor and tune the runtime of IBM Business Process Manager V8.5 for improved performance.

IBM Business Process Manager is a comprehensive BPM product that provides the visibility and insight to effectively manage organizational business processes. This course focuses on both the Standard and Advanced editions of IBM Business Process Manager. You learn how to configure the IBM Business Process Manager V8.5 system beyond the default settings in order to improve runtime performance. You also learn about performance tuning methods and monitoring tools that are available.

The course introduces you to a tuning checklist that lists the major components and their associated configuration properties. You learn about the configuration parameters available to system administrators, and how knowledge of these configuration settings is necessary for improving the runtime performance of IBM Business Process Manager V8.5. The course also provides hints and tips on monitoring and configuring IBM Business Process Manager V8.5 through in-depth lectures of various components.

Hands-on exercises are provided on Linux to reinforce lecture content. The exercises give you practical experience with IBM Business Process Manager V8.5 performance tuning and monitoring. Finally, you are introduced to the Tivoli Performance Viewer and IBM Support Assistant, and learn how to use these tools to monitor the runtime performance of a server.

After completing this course, you have a solid foundation in best practices for tuning IBM Business Process Manager V8.5, as well as the skills to diagnose performance problems.

The lab environment for this course uses the RedHat Linux 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 version 8.5

Audience

This course is designed for anyone who implements, deploys, or manages applications that run in IBM Business Process Manager V8.5. It is particularly useful for system administrators, deployment engineers, process administrators, support engineers, and integration developers.

Learning objectives

After completing this course, you should be able to:

* Explain the architecture and components for a typical IBM Business Process Manager deployment
* Explain basic performance concepts and methodologies
* Apply the Business Process Manager performance checklist and configure the server for better performance
* Identify key development best practices for IBM Process Designer and IBM Integration Designer
* Implement best practices for general WebSphere runtime performance
* Tune the target modules for various bindings
* Purge data that is no longer needed from the Business Process Manager environment
* Create efficient Coaches and Coach Views
* Name the key best practices for the business flow manager (BFM)
* Identify key WebSphere monitoring facilities
* Evaluate various bottleneck patterns and determine a possible solution that is based on your observations
* Collect verbose GC trace logs from the runtime and analyze them to diagnose potential Java memory management issues
* Monitor application server performance by using WebSphere and the IBM Support Assistant
* Monitor and tune the JVM for optimum throughput and response time
* Monitor and tune connection pools for optimum performance
* Use the IBM Health Center tool to profile and tune Java EE applications
* Troubleshoot Business Process Manager performance problems

Prerequisites

Before taking this course, you should have:

* IBM Business Process Manager administration skills, which you can learn by successfully completing course WB867 or ZB867, *Administration of IBM Business Process Manager Advanced V8.5*
* Basic WebSphere performance tuning skills, which you can learn by successfully completing course WA815 or ZA815, *WebSphere Application Server V8.5.5 Performance Tuning*, or through practical experience with tuning a WebSphere Application Server environment
* Basic operating skills for the Linux operating system

Duration

3 days

Skill level

Advanced

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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 | None |

Notes

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

This course is a new course.

Course agenda

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| Course introduction  Duration: 15 minutes |

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| Unit 1. Overview of IBM Business Process Manager  Duration: 1 hour | |
| Overview | This unit introduces the principles of business process management. You learn the capabilities of IBM Business Process Manager V8.5 for deploying BPM solutions. You also learn about the components and deployment topologies for IBM Business Process Manager. |
| Learning objectives | After completing this unit, you should be able to:   * Describe the concepts of business process and business process management * Describe the IBM products that support SOA application development * Describe the capabilities of IBM Business Process Manager * Describe the main components of IBM Business Process Manager * Describe the deployment considerations for the databases * Identify and explain the clustered topologies for IBM Business Process Manager |

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| Unit 2. Performance concepts and methodologies  Duration: 45 minutes | |
| Overview | This unit describes the need for performance monitoring and tuning. It introduces performance methodologies and performance terms, and describes how to do measurements. |
| Learning objectives | After completing this unit, you should be able to:   * Describe performance monitoring and tuning methodologies * Describe performance terminology * Describe performance planning and design tasks that are performed during development * Describe the goals of performance monitoring * Identify key steps for Business Process Manager performance |

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| Unit 3. Implementing for performance  Duration: 1 hour | |
| Overview | This unit introduces best practices for modeling, design, and development choices that are made when designing and implementing a Business Process Manager solution. |
| Learning objectives | After completing this unit, you should be able to:   * Explain general development best practices * Define the differences between BPMN and BPEL * Explain Process Designer best practices * Explain Integration Designer best practices |

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| Exercise 1. Performance testing  Duration: 1 hour | |
| Overview | This exercise shows you how to measure the response times and throughput that can be achieved by the instrumented solution when synchronous bindings are used for all inter-component bindings. These baseline results are available for comparison against results obtained in tests with different settings. |
| Learning objectives | After completing this exercise, you should be able to:   * Identify various aspects of valid performance benchmarks * Describe the effect of threading in SCA applications that are running in the environment * Explain the effect of target application response time * Describe the differences in performance between synchronous and asynchronous SCA inter-component interactions |

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| Unit 4. WebSphere monitoring and tuning concepts  Duration: 45 minutes | |
| Overview | This unit introduces the areas in WebSphere that can be monitored and tuned for Business Process Manager. |
| Learning objectives | After completing this unit, you should be able to:   * Identify the areas of the runtime environment that need to be tuned * Evaluate a list of the top ten monitoring considerations * Detect performance bottlenecks * Determine optimum queue sizes |

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| Unit 5. IBM Business Process Manager performance concepts  Duration: 1 hour | |
| Overview | This unit introduces the main areas of Business Process Manager that can be monitored and tuned for optimal performance. |
| Learning objectives | After completing this unit, you should be able to:   * Define architecture best practices * Identify top Business Process Manager tuning guidelines * Explain the Business Process Manager performance tuning methodology * Define common tuning parameters * Describe Process Center tuning * Describe how to tune BPEL business processes * Explain how to tune Process Portal * Explain how to tune the Process Center environment * Explain how to use the Event Manager for monitoring * Describe how to tune the Event Manager * Describe how to tune participant groups |

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| Unit 6. Purging data in IBM Business Process Manager  Duration: 45 minutes | |
| Overview | This unit examines the areas of IBM Business Process Manager where data is collected and the methods available to purge that data to help with performance. |
| Learning objectives | After completing this unit, you should be able to:   * Explain the need for purging data in the environment * Archive, restore, and delete process applications and toolkits * Archive and delete snapshots in the Process Center environment * Delete unnamed snapshots * Automate snapshot deletion * Delete business level applications * Delete snapshots and instances in the Process Server environment * Configure the cleanup service * Define various business process choreography cleanup operations * Explain more methods for purging data in the environment |

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| Exercise 2. Monitoring and purging data in the environment  Duration: 1 hour and 30 minutes | |
| Overview | This exercise examines the methods that are available to purge data that is no longer needed in the Business Process Manager environment. You also examine how to monitor data in the development environment by using Process Portal and the Process Admin Console. |
| Learning objectives | After completing this exercise, you should be able to:   * Archive and delete process applications * Manage and delete snapshots, both named and unnamed * Configure an automated method for deleting unnamed snapshots * Use the Process Admin Console to monitor the environment * Use Process Portal to monitor process applications * Purge data in the Process Center and Process Server environment * Delete BPMN and BPEL instances in the Process Server environment * Delete snapshots in the Process Server environment |

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| Unit 7. Performance considerations for Coaches  Duration: 45 minutes | |
| Overview | This unit introduces guidelines for developing and deploying efficient Coaches. |
| Learning objectives | After completing this unit, you should be able to:   * Explain how Coaches can benefit your organization * Define good practices for developing Coach Views * Identify the requirements for good response times when users interact with Coaches * Explain modeling capabilities that impact performance * Describe deployment considerations for Coach Views |

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| Unit 8. Threading  Duration: 30 minutes | |
| Overview | This unit introduces the threading architecture of Business Process Manager and methods on tuning thread pools. |
| Learning objectives | After completing this unit, you should be able to:   * Describe the service component architecture (SCA) threading architecture * Configure thread pools * Tune thread pools that are based on binding types * Explain some common thread issues |

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| Unit 9. Business Process Choreography best practices  Duration: 1 hour | |
| Overview | This unit identifies some of the best practices for business process choreography. It describes the runtime environment of a Business Process Choreographer engine, and addresses the difference between microflows and long-running business processes in terms of transactions. It is important to understand how messages are persisted for a long-running business process. |
| Learning objectives | After completing this unit, you should be able to:   * Describe the difference between long-running and microflow (short-running) business processes * Explain the runtime architecture of long-running business processes * Explain how events are persisted in long-running business processes * Calculate a realistic database table growth rate for each solution, and consult with database administrators to establish a database strategy for sizing * Identify the key best practices for the Business Process Choreographer * Describe the runtime architecture of the Human Task Manager * List and describe methods to optimize work item creation |

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| Unit 10. Performance tools  Duration: 45 minutes | |
| Overview | This unit describes performance data and performance data analysis tools. |
| Learning objectives | After completing this unit, you should be able to:   * Describe important performance data for monitoring Business Process Manager environments * Identify useful performance tools for monitoring performance data * Use the Tivoli Performance Viewer tool to monitor the runtime performance of an application that is running * Describe the performance tools available in the IBM Support Assistant |

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| Exercise 3. Performance monitoring with Tivoli Performance Viewer  Duration: 1 hour | |
| Overview | In this exercise, you enable performance data to be generated by using the administrative console, and then view the performance by using the Tivoli Performance Viewer. |
| Learning objectives | After completing this exercise, you should be able to:   * Enable Performance Monitoring Infrastructure (PMI) on SCA components * View the performance statistics by using the Tivoli Performance Viewer |

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| Exercise 4. Monitoring and tuning the environment  Duration: 1 hour and 30 minutes | |
| Overview | This exercise examines the common tuning parameters that are used for Business Process Manager solutions in both Process Center and Process Server environments. It also provides details on suggested parameters. This exercise also explores methods for monitoring the environment by using the IBM Support Assistant Health Monitor tool. |
| Learning objectives | After completing this exercise, you should be able to:   * Explore an application with various bindings by using IBM Integration Designer * Examine various tuning parameters * Tune the Event Manager * Use operating system commands to monitor the environment * Explore the performanceTuning.properties file * Use the IBM Support Assistant Health Monitor tool to monitor the environment |

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| Unit 11. Performance problem determination  Duration: 1 hour | |
| Overview | This unit describes the IBM Business Process Manager performance-related problem determination methodology. You examine the tools available to help you troubleshoot performance problems, how to detect and troubleshoot a hang condition, and preventive measures for the environment. |
| Learning objectives | After completing this unit, you should be able to:   * Describe the nature of a performance problem * Describe the types of data that is needed to troubleshoot performance problems * Identify integration performance concerns * Apply high-level problem determination methods to a performance problem * Detect a hang condition * Trigger and analyze Java core files for hangs * Use the WebSphere Application Server hang detection facility * Use the IBM Thread and Monitor Dump Analyzer for Java * Identify preventive measures for the Business Process Manager environment |

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| Exercise 5. Hung thread issues  Duration: 1 hour | |
| Overview | In this exercise, you examine a scenario where the threads that the export component spawns are blocking the web container thread. To analyze this performance issue, you generate a thread dump and use the IBM Support Assistant Thread and Monitor Dump Analyzer for Java tool to analyze the javacore. |
| Learning objectives | After completing this exercise, you should be able to:   * Use IBM Integration Designer to explore SCA modules and components * Use wsadmin to trigger a javacore file * Analyze a thread dump by using the IBM Support Assistant Thread and Monitor Dump Analyzer for Java tool |

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| Unit 12. Database tuning  Duration: 30 minutes | |
| Overview | This unit introduces database tuning considerations for the Business Process Manager environment. You examine common tuning tasks for DB2 and Oracle databases. |
| Learning objectives | After completing this unit, you should be able to:   * Explain general database tuning considerations * Identify tuning practices that are specific to DB2 * Identify tuning practices that are specific to Oracle * Describe best practices for BPMN workloads * Describe best practices for BPEL workloads |

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| Unit 13. Java memory issues  Duration: 1 hour | |
| Overview | This unit provides an overview of the JVM, garbage collection policies, and methods of analyzing verbose garbage collection data. |
| Learning objectives | After completing this unit, you should be able to:   * Explain the basic components of garbage collection (GC): mark, sweep, and compact * Explain the concept of Java memory management * Describe some of the myths that surround Java memory management * Collect verbose GC trace logs from a server at run time * Analyze verbose GC trace logs to diagnose potential Java memory management issues |

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| Exercise 6. Analyzing Java memory  Duration: 1 hour and 15 minutes | |
| Overview | In this exercise, you observe Java heap statistics for a Business Process Manager based solution by collecting and graphing verbose garbage collection (verbose:gc) output. You use the IBM Monitoring and Diagnostic Tools for Java - Garbage Collection and Memory Visualizer - (GCMV) tool from the IBM Support Assistant to graph verbose garbage collection trace log output. |
| Learning objectives | After completing this exercise, you should be able to:   * Enable verbose GC and modify JVM heap settings * Analyze Java heap statistics by collecting verbose:gc output for large live sites, large objects, out-of memory-cases, and slow targets * Use the IBM Monitoring and Diagnostic Tools for Java – Garbage Collection and Memory Visualizer – (GCMV) tool from the IBM Support Assistant |

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| Unit 14. 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 * 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

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