WebSphere Application Server V8.5.5 Problem Determination

WA591 (Classroom)
ZA591 (Self-paced)

Highlights

- Intermediate training for administrators, independent software vendors (ISVs), and consultants who work with WebSphere Application Server
- Covers WebSphere Application Server Network Deployment version 8.5.5

Course description

This 5-day course teaches you how to manage WebSphere Application Server problems more skillfully within your organization by using problem determination tools and techniques. The instructor and students explore common scenarios that you might face in your daily activities. You also learn methodologies and techniques for problem determination, including how to use online IBM support tools to resolve problems. In addition, you learn how to communicate more effectively with IBM support teams so they can identify a problem and find its solution.

The course covers problems that are associated with Java virtual machine (JVM) tuning and memory management, database connectivity, connection pool configuration, security configuration, server start and stop failures, application deployment, web requests, and default messaging.

In hands-on lab exercises throughout the course, you gain practical experience with problem determination techniques by using your newly acquired skills within various scenarios. These scenarios include hung threads, OutOfMemory errors, crashes, data source configuration, security-related issues, server start and stop failures, web requests, and Java Message Service (JMS) message flow issues.

The lab environment for this course uses the Linux platform.

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

ibm.com/training

General information

Delivery method

Classroom or self-paced virtual classroom (SPVC)

Course level

ERC 3.0

Product and version

WebSphere Application Server Network Deployment version 8.5.5

Audience

This course is designed for anyone who works on WebSphere related applications and projects, including administrators, IBM Business Partners, independent software vendors (ISVs), and consultants.

Learning objectives

After completing this course, you should be able to:

- Use IBM Support Assistant to organize and analyze problem artifacts
- Use problem determination techniques to identify common problems
- Apply problem investigation approaches such as analysis and isolation
- Gather diagnostic data problem artifacts by using administrative tools
- Troubleshoot JVM-related problems such as hung threads, out of memory issues, and crashes
- Use IBM Support Assistant to run tools that analyze diagnostic data
- Identify and troubleshoot common problems with database connections
- Configure and tune database connection pools
- Troubleshoot WebSphere security problems associated with authentication, authorization, SSL, and Java 2 policies
- Identify and resolve Java EE application deployment problems
- Troubleshoot HTTP request flow problems from web server to web container
- Identify and resolve application server startup failures
- Troubleshoot problems associated with WebSphere default messaging and SI bus
- Troubleshoot WebSphere installation problems
- Use Intelligent Management features to configure health policies and tasks
- Communicate effectively with IBM support teams

Prerequisites

Before taking this course, you should have basic operating skills for the Linux or UNIX operating systems. You should also have WebSphere administration skills, which can be obtained by completing an IBM WebSphere Application Server V8.5.5 Administration course (WA855, VA855, or ZA855) or through practical experience in administering a WebSphere Application Server environment.

Duration

5 days

Skill level

Intermediate

Classroom (ILT) setup requirements

Processor	Intel Pentium 4
GB RAM	3.0 GB
GB free disk space	60 GB
Network requirements	LAN: Preferred, Internet: Required, DHCP: Preferred, Fixed IP: Not required
Other requirements	None

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 a new course.

Course agenda

Course introduction
Duration: 30 minutes

Unit 1. Overview of WebSphere Application Server systems and components
Duration: 1 hour

Overview	This unit provides an overview of the topology of a system and identifies and describes key components and troubleshooting points.
Learning objectives	After completing this unit, you should be able to: • Describe stand-alone server architecture • Describe Network Deployment (ND) cell architecture • List and describe the function of IBM products that are involved in implementing stand-alone and distributed architectures • Identify the components of the application server and describe the services that they provide • Identify the components of an ND cell and describe the function of each • Describe the flexible management model • Describe the various types of clients for the application server • Describe the flow of an application request • Describe the flow of security and administration requests • Identify common troubleshooting points in the end-to-end flow of client requests

Unit 2. Using the IBM Support Assistant Team Server 5.0
Duration: 1 hour

Overview	This unit explains how to use the IBM Support Assistant Team Server.
Learning objectives	After completing this unit, you should be able to: • Describe the components of the IBM Support Assistant Team Server • Install, update, and remove problem determination tools • Manage diagnostic files with cases • Launch problem determination tools • View reports that are generated during problem analysis • Perform automated analysis and review results • Install the IBM Support Assistant Team Server 5.0

Exercise 1. Using the IBM Support Assistant Team Server 5.0
Duration: 1 hour

Overview	This exercise demonstrates how to use the IBM Support Assistant Team Server.
Learning objectives	After completing this exercise, you should be able to: • Start and stop the IBM Support Assistant Team Server • Administer the 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 ISA Data Collector tool

Unit 3. Problem determination methods
Duration: 45 minutes

Overview	This unit describes the problem determination methods that are used in this course.
Learning objectives	After completing this unit, you should be able to: • Prepare for problems before they occur • Characterize a problem from its symptoms • Collect diagnostic data • Implement a relief or recovery plan • Troubleshoot a problem

Unit 4. Gathering diagnostic data
Duration: 1 hour and 15 minutes

Overview	This unit explains how to use various resources for gathering diagnostic data that includes logs, tracing, and dumps. It also describes tools that can be used to analyze the 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-related diagnostic data by using the administrative console and other tools

Exercise 2. Gathering diagnostic data
Duration: 1 hour and 30 minutes

Overview	This exercise covers tools for problem determination that are built into the administrative console. You explore some of the tools and look at diagnostic data that is available in log and trace files. Finally, you use various tools to examine views of the JNDI namespace.
Learning objectives	After completing this exercise, you should be able to: • Configure basic (legacy) logging and examine server log files • Enable HPEL logging for an application server • Enable tracing on an application server component and read a trace output log • Examine logs and trace data by using the HPEL Log Viewer • Enable and configure Cross Component Trace (XCT) • Use the administrative console troubleshooting section to view runtime messages and configuration problems • Enable and use diagnostic providers in the administrative console • Examine FFDC logs • Use the Classloader viewer in the administrative console • Compare namespaces from different contexts by using the dumpNameSpace tool and the name server MBean

Unit 5. Introduction to JVM-related problems
Duration: 1 hour and 30 minutes

Overview	This unit describes the functions of a JVM and provides an overview of the common types of JVM-related problems.
Learning objectives	After completing this unit, you should be able to: • Describe components of JVM and overall architecture (Java Development Kit V6.0) • Describe garbage collection (GC) and GC tuning policies • Describe JVM command line arguments • Describe javacore files and how to obtain them • Identify a sluggish JVM and detect bottleneck problems • Explain how to tune the heap size • Use JVM-related tools: Garbage Collection and Memory Visualizer (GCMV), Memory Analyzer tool (MAT), and Java Health Center

Exercise 3. Introduction to configuring garbage collection policies
Duration: 1 hour

Overview	This exercise demonstrates how to configure GC policies for an application server. You configure and examine two different GC policies, optthruput and gencon.
Learning objectives	After completing this exercise, you should be able to: • Enable verbose GC for an application server • Manually view verbose GC logs • Configure the optthruput GC policy • Configure the gencon GC policy • Use IBM Monitoring and Diagnostic Tools for Java - Garbage Collection and Memory Visualizer (GCMV) to analyze verbose GC data • Configure and use the Java Health Center

Unit 6. How to troubleshoot hangs
Duration: 1 hour

Overview	This unit explains how to detect and troubleshoot a hang condition.
Learning objectives	After completing this unit, you should be able to: • Describe what a hang is • Detect a hang condition • Trigger and analyze javacore files for hung threads • Use the WebSphere Application Server hang detection facility • Use the IBM Thread and Monitor Dump Analyzer for Java

Exercise 4. Troubleshooting hung threads
Duration: 1 hour and 30 minutes

Overview	In this exercise, you detect and troubleshoot hung thread conditions in an application server.
Learning objectives	After completing this exercise, you should be able to: • Use the thread monitor hang detection facility • Generate and analyze various hung thread scenarios • Use wsadmin to trigger a javacore file • Analyze the javacore file for hung threads by using the IBM Thread and Monitor Dump Analyzer for Java tool

Unit 7. How to troubleshoot crashes
Duration: 1 hour

Overview	This unit explains how to detect and troubleshoot a crash.
Learning objectives	After completing this unit, you should be able to: • Define what a crash is • Detect a crash • Analyze a javacore file for a crash • Analyze system core files • Describe the tools available for troubleshooting a crash • Describe and use the IBM Monitoring and Diagnostic Tools for Java - Interactive Diagnostic Data Explorer

Exercise 5. Troubleshooting crashes
Duration: 1 hour

Overview	In this exercise, you learn how to troubleshoot an application server crash.
Learning objectives	After completing this exercise, you should be able to: • Analyze a javacore file for a crash • Use various methods to trigger a system core dump • Use the IBM Monitoring and Diagnostic Tools for Java - Interactive Diagnostic Data Explorer to analyze system core files

Unit 8. Introduction to WebSphere out-of-memory problems
Duration: 1 hour and 30 minutes

Overview	This unit describes how to troubleshoot out-of-memory conditions.
Learning objectives	After completing this unit, you should be able to: • Define out-of-memory conditions • Use monitoring tools to detect out-of-memory conditions • Obtain and interpret a verbose GC log by using GCMV • Obtain and analyze heap dumps and system core dumps • Describe tools for analyzing out-of-memory problems

Exercise 6. Troubleshooting an out-of-memory condition
Duration: 1 hour and 30 minutes

Overview	This exercise explores some of the tools that can be used to detect and troubleshoot out-of-memory exceptions and memory leaks.
Learning objectives	After completing this exercise, you should be able to: • Use Tivoli Performance Viewer to detect out-of-memory conditions • Configure the lightweight memory leak detection mechanism • Obtain verbose GC data and interpret it by using the Garbage Collection and Memory Visualizer tool (GCMV) • Trigger a heap dump and analyze it by using the Memory Analyzer tool • Examine the diagnostic data artifacts of an application that has a memory leak

Unit 9. Introduction to database connection problems
Duration: 1 hour

Overview	This unit investigates the common problems that can arise when creating a connection to a database, and the techniques that are used to solve them.
Learning objectives	After completing this unit, you should be able to: • Test data source connections to databases • Describe Java EE Connector (J2C) authentication issues • Describe Java database connectivity (JDBC) driver issues • Use the built-in tester console to test connections • Configure the JDBC driver trace facility

Exercise 7. Troubleshooting database connection problems
Duration: 45 minutes

Overview	This exercise shows how to collect diagnostic data for database connection issues. You use various methods to gather diagnostic data, and then simulate a remote database server outage and troubleshoot the problem. Finally, you troubleshoot a data source configuration problem.
Learning objectives	After completing this exercise, you should be able to: • Access and interpret runtime messages in the administrative console • Test a data source connection to a database by using the Test connection facility in the administrative console • Examine server logs by using the HPEL Log Viewer • Locate and examine FFDC logs • Configure tracing for a data source and interpret the trace data • Troubleshoot database connection problems

Unit 10. Tuning and connection pool management problems
Duration: 1 hour

Overview	This unit describes how to troubleshoot connection pool and management problems.
Learning objectives	After completing this unit, you should be able to: • Identify connection pool problems • Describe what to look for in the application server logs • Enable tracing for connection manager components • Interpret and analyze the trace data • Explain how to use PMI to monitor connections

Exercise 8. Troubleshooting a connection leak
Duration: 1 hour

Overview	This exercise demonstrates the Connection Leak Logic trace facility of WebSphere Application Server, which is used to identify application code that is leaking database connections.
Learning objectives	After completing this exercise, you should be able to: • Examine tuning parameters for data source connection pools • Use a diagnostic provider to examine state data for a data source • Recognize a tuning parameter problem situation • Configure tracing and examine the logs

Unit 11. WebSphere security configuration problems
Duration: 1 hour and 30 minutes

Overview	This unit describes how to detect and troubleshoot security-related problems.
Learning objectives	After completing this unit, you should be able to: • Describe common problems with WebSphere security • Recognize symptoms of common security-related problems • Analyze relevant log files for security messages • Enable tracing on relevant security components • Analyze and interpret trace information • Recognize symptoms of common Secure Sockets Layer (SSL) configuration problems • Recognize symptoms of common Java 2 security problems • Locate the security configuration files • Use tools to validate the security configuration files • Use wsadmin securityoff to disable security

Exercise 9. Troubleshooting security problems
Duration: 2 hours and 30 minutes

Overview	This exercise demonstrates how to configure administrative and application security by using an LDAP server as the user registry. You then learn how to troubleshoot some common security problems.
Learning objectives	After completing this exercise, you should be able to: • Detect security problems • Examine and analyze log files for security messages • Configure tracing on relevant WebSphere security components • Examine and analyze trace logs • Identify the security problems and fix them • Analyze an SSL handshake failure • Use wsadmin securityoff to disable security

Unit 12. Application deployment problems
Duration: 45 minutes

Overview	This unit covers common problems that can occur when you deploy an application.
Learning objectives	After completing this unit, you should be able to: • Identify common problems with application installation • Interpret runtime console messages and log messages • Use application deployment troubleshooting tools • Enable tracing of the appropriate components and interpret the data • Use wsadmin to test and reproduce a problem • Use the IBM Assembly and Deploy Tools for WebSphere Administration to validate application configuration files • Use the Classloader Viewer tool to troubleshoot class loading issues • Identify and troubleshoot class loader problems

Unit 13. Server start failures
Duration: 45 minutes

Overview	Application server start failures occur because of system state, security, connectivity, or configuration problems. This unit looks at the symptoms, the most common causes, and the resolution of application server start failures.
Learning objectives	After completing this unit, you should be able to: • Verify that an application server is failing to start • Verify that a node agent is failing to start • Verify that a deployment manager is failing to start • Configure tracing on a server that fails to start • Examine and analyze trace logs

Exercise 10. Troubleshooting server start failures
Duration: 45 minutes

Overview	This exercise demonstrates how to troubleshoot server start failures. You explore several scenarios where a WebSphere server fails to start or starts with errors. You troubleshoot problems that occur while starting server1, the node agent, and the deployment manager.
Learning objectives	After completing this exercise, you should be able to: • Verify that an application server is failing to start • Verify that a node agent is failing to start • Verify that a deployment manager is failing to start • Configure tracing on a server that fails to start • Examine and analyze trace logs

Unit 14. Request flow and web container problems
Duration: 45 minutes

Overview	This unit follows a request through the system and covers various problems that can be encountered including the HTTP server, plug-in, and web container.
Learning objectives	After completing this unit, you should be able to: • Enable tracing as appropriate for various components in the end-to-end flow • Describe pinging techniques for components in the request flow • Enable HTTP plug-in tracing • Describe how to bypass external HTTP servers • Describe specific web container issues • Use the WebContainerDP diagnostic provider

Exercise 11. Troubleshooting request flow and web container problems
Duration: 45 minutes

Overview	This exercise demonstrates what web users see when web resource request problems occur, such as when the application server is not responding or the requested resource is not available.
Learning objectives	After completing this exercise, you should be able to: • Configure web server logs for tracing • Configure HTTP plug-in tracing • Examine trace logs manually • Use the WebContainerDP diagnostic provider • Examine plug-in trace logs by using the Web Server Plug-in Analyzer tool

Unit 15. Default messaging provider problem determination
Duration: 1 hour

Overview	This unit describes how to troubleshoot default messaging in WebSphere Application Server V8.5.5.
Learning objectives	After completing this unit, you should be able to: • Describe the components that are involved in default messaging • Identify symptoms of default-messaging-related problems • Collect diagnostic data • Analyze diagnostic data and determine root causes • Validate service integration bus (SIBus) and messaging engine configurations • Use Java Message Service (JMS) clients to validate messaging functions

Exercise 12. Troubleshooting WebSphere default messaging
Duration: 1 hour

Overview	This exercise demonstrates techniques for debugging message flow problems in WebSphere Default Messaging.
Learning objectives	After completing this exercise, you should be able to: • Identify default messaging symptoms • Examine log files for messaging-related errors • Configure the tracing of messaging components • Analyze trace logs to determine root causes • Use JMS clients to verify messaging functions • Use the IBM Service Integration Bus Destination Handler

Unit 16. WebSphere installation problems when using IBM Installation Manager
Duration: 1 hour

Overview	This unit covers problems that can occur during installation and updating when using the Installation Manager.
Learning objectives	After completing this unit, you should be able to: • Identify common installation problems • Locate and examine relevant installation logs • Recover from a failed installation • Search for relevant version information and prerequisite levels • Identify problems that are associated with applying maintenance updates

Unit 17. Intelligent Management problem determination and problem determination tools
Duration: 1 hour

Overview	This unit describes Intelligent Management and how it can be used to troubleshoot common problems.
Learning objectives	After completing this unit, you should be able to: • Describe the basic functions of Intelligent Management • Troubleshoot Intelligent Management routing problems • Troubleshoot application placement problems • Use the health management feature of Intelligent Management • Use other Intelligent Management features to help with problem determination

Exercise 13. Configuring health management policies
Duration: 1 hour

Overview	This exercise demonstrates how to configure the environment to monitor the health of application servers. Requests are sent to an application, and the requests trigger the violation of a health policy. You also see how WebSphere Application Server Intelligent Management implements a defined action plan when the health policy is violated.
Learning objectives	After completing this exercise, you should be able to: • Configure a health policy to monitor application servers for the violation of a health condition • Configure the type of violation to look for • Configure actions to take when a violation occurs • Test the health policy by sending requests to the application that trigger the violation of the health policy • Examine the task that gets generated when a health policy is violated • Examine the results when the task is completed

Unit 18. Course summary
Duration: 10 minutes

Overview	This unit summarizes the course, explains the class evaluation process, 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 • Submit an evaluation of the class • Identify other WebSphere Education courses that are related to this topic • Access the WebSphere Education 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.