# WebSphere Troubleshooting and Monitoring

## Course Summary

### Description

In this course students learn how to troubleshoot problems and monitor the performance of WebSphere Application server based systems and applications. The course is based on the idea that understanding the architecture and details of Java and JEE based technologies provides students with the ability to think trough problems to determine the root cause. The course covers key problem areas such as: connection pooling, memory management, multi threading, class loading, JMX, web container.

The course includes several applications that are used to demonstrate the various troubleshooting techniques discussed in the class. The instructor will guide students through the source code of these applications to help students understand why the problems occur.

### Topics

- WebSphere Application Server Architecture
- Request Processing Paths
- WebSphere Pools
- Troubleshooting methodology
- Threading Problems
- Garbage Collection
- Memory Problems
- Database Problems
- HTTP Request Processing Problems
- Message Processing Problems
- Application Deployment Problems
- Reliability Patterns
- Troubleshooting playbook
- Automated troubleshooting framework

### Audience

This course is designed for WebSphere Administrators.

### Prerequisites

Students should have WebSphere Administration experience before attending this course.

### Duration

Three days

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*... to Your Success!"*

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## Course Outline

**I. WebSphere App Server Architecture**
- A. Standalone Server Architecture
- B. Network Deployment Architecture
- C. J9 Virtual Machine
- D. OSGI Runtime
- E. Web Container
- F. EJB Container
- G. Service Integration Bus
- H. HTTP Plug-in
- I. JMX

**II. Request Processing Paths**
- A. WebSphere Request Processing Architecture
- B. HTTP Request Processing
- C. EJB Request Processing
- D. Message Request Processing
- E. Trouble Shooting Requests

**III. WebSphere Pools**
- A. Why resource pools are important
- B. WebSphere Thread Pools
- C. WebSphere Connection Pools

**IV. Troubleshooting Methodology**
- A. Understand the Problem
- B. Developing a Solution
- C. Troubleshooting tools
- D. Automating troubleshooting

**V. Threading Problems**
- A. Understanding Java Threads
- B. Blocked Threads
- C. Deadlocked Threads
- D. Interpreting Stack Traces
- E. Obtaining Tread Dumps
- F. Analyzing Tread Dumps
- G. Thread Pools
- H. Monitoring Threads and Thread Pools

**VI. Garbage Collection**
- A. Garbage Collection Overview
- B. Java Reference Types
- C. Java Memory Leaks
- D. Tracing Garbage Collectors
- E. Copying Garbage Collectors
- F. Generational Garbage Collectors
- G. IBM JVM Garbage Collector

**VII. Memory Problems**
- A. Monitoring Memory Usage patterns
- B. Analyzing Memory Usage Patterns
- C. Heap Dumps
- D. Analyzing Heap Dumps
- E. Tracking down memory leaks

**VIII. Database Problems**
- A. Testing Data Source Connections
- B. Authentication Problems
- C. How applications run out of Connections
- D. Database connection pools
- E. Monitoring Connection pools
- F. Tuning connection pools
- G. Troubleshooting configuration problems
- H. Troubleshooting resource exhaustion problems

**IX. HTTP Request Processing Problems**
- A. Tracing Web Requests
- B. HTTP plug-in tracing
- C. Troubleshooting configuration problems
- D. Troubleshooting response time problems
- E. Monitoring Web Requests
- F. Pinging Techniques
- G. Capturing requests

**X. Message Processing Problems**
- A. Typical Messaging Problems
- B. Collecting Diagnostic Data
- C. Determining Root causes
- D. Monitoring the default provider

**XI. Application Deployment Problems**
- A. Detecting deployment problems
- B. Configuration problems
- C. Class loading problems
- D. Resource definition problems
- E. Validating configuration files

**XII. Troubleshooting playbook**
- A. A summary of all the troubleshooting techniques examined in the class
- B. Reliability Patterns

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