Oracle WebLogic Server 14c: Performance Tuning Workshop

JAVA

DURATION	MODULES	COURSE CODE
3 Days	**12 Lectures**	**—**

Course Overview

This course helps you learn how to monitor and tune Oracle WebLogic Server 14c. The lecture content is suitable reinforced with hands-on practices. The lecture content is suitable reinforced with hands-on practices.

What You Will Learn

Course Introduction

- Course Objectives
- Target Audience
- Course Prerequisites
- Course Schedule
- Course Practices
- For More Information
- Related Training

Performance Tuning: Overview

- Learning Objectives
- Agenda
- Performance Terminology
- Scalability
- Performance Testing
- Maintaining Test Integrity
- Benchmarking
- Load and Stress Testing
- Why is testing important?
- Performance Tuning Methodology
- Performance Testing Concerns
- Performance Testing Methodology Tips
- Metrics

- Results Reporting
- Bottlenecks
- CPU Bound
- I/O Bound
- Disk Bound
- Network Bound
- Database Bound
- Section Summary
- Practice 2-1 Overview: Setting Up the Practice Environment
- Practice 2-2 Overview: Exploring the Course Applications
- Agenda
- Load-Testing Tools
- Choosing Testing Tools
- The Grinder
- The Grinder Architecture
- The Grinder Console
- The Grinder Summary Statistics
- Monitoring Performance by Using the Administration Console
- Oracle WebLogic Server Monitoring Dashboard
- Monitoring Dashboard: Views
- Summary
- Practice 2-3 Overview: Executing a Benchmark
- Practice 2-4 Overview: Stress Testing an Application and Identifying
- Bottlenecks

Tuning Operating System Resources

- Learning Objectives
- Agenda
- Processor Metrics
- Memory Metrics
- Network Interface Metrics
- I/O Device Metrics
- Section Summary
- Agenda
- What to Monitor in the Operating System
- CPU Utilization: What to Look For
- CPU Usage in the Linux Environment
- sar Command
- vmstat Command
- iostat Command
- netstat Command
- System Monitor
- Performance Tools and Commands
- Monitoring Disk I/O
- Swapping

- inode Cache
- Section Summary
- Practice 3-1 Overview: Monitoring Linux CPU Utilization
- Practice 3-2 Overview: Monitoring Linux Disk I/O
- Practice 3-3 Overview: Monitoring Linux Virtual Memory and Network
- Agenda
- File Handles
- TCP/IP Parameters to Support a Large Number of Connections
- Summary
- Practice 3-4 Overview: Analyzing and Tuning Linux Kernel Parameters

Tuning HotSpot JVM

- Learning Objectives
- Assumptions and Expectations
- Agenda
- What is performance?
- Performance Focus for This Lesson
- HotSpot JVM Monitoring Tools
- Section Summary
- Agenda
- Garbage Collection Basics
- Generational Garbage Collection
- Garbage Collectors: Java Heap Options
- Setting Heap Memory Size
- Setting Heap Size Options
- G1 Garbage Collector
- GC Algorithms
- GC Performance Goals
- Focusing on Throughput
- Ergonomics
- Focusing on Responsiveness
- Evaluating GC Algorithm
- GC Tuning Tips
- Server-Class Machine Detection
- Ergonomics: What It Does
- Section Summary
- Practice 4-1 Overview: Tuning JVM Garbage Collection
- Agenda
- Using jps
- Using jps: Example
- Using jcmd
- Using jcmd: Examples
- Using jcmd: Histogram
- Using jinfo
- Using jstat

- Using jstack
- jstack
- Section Summary
- Practice 4-2 Overview: Using JVM Command-Line Tools
- Agenda
- Java Monitoring and Management Architecture
- Using jconsole
- VisualVM
- VisualVM Connections
- Remote Monitoring
- VisualVM Interface
- Monitoring JVM
- Monitoring Threads
- JVM Sampler and Profiling
- VisualVM Plugins
- Using VisualGC
- Practice 4-3 Overview: Using Java VisualVM
- Practice 4-4 Overview: Using VisualGC and jconsole
- Java Mission Control
- Java Discovery Protocol
- Mission Control: Architecture
- JVM Browser
- Mission Control: Management Console Overview Tab
- Server Information Tab
- MBeans: Attributes, Operations, Notifications, and Metadata
- MBeans: Triggers
- System and Memory Tabs
- Runtime: Threads
- Practice 4-5 Overview: Using Mission Control
- Flight Recorder
- Flight Recorder: Benefits
- Data Flow in Flight Recorder
- Initiating Recording Using the Management Console
- Flight Recording Automatic Analysis
- Flight Recorder Detailed Data Examples
- Flight Recorder General Tab
- Flight Recorder Memory
- Flight Recorder: Garbage Collections
- Flight Recorder Memory: Object Statistics
- Summary
- Practice 4-6 Overview: Using Flight Recorder

Monitoring and Tuning Server Performance

- Learning Objectives
- Agenda

- On-Demand Deployment
- Enabling Exalogic Optimizations
- Monitoring Channel Connections
- Section Summary
- Agenda
- Stuck Threads
- Configuring Stuck Threads Behavior
- Parameters for Stuck Threads at the Server Level
- Actions Upon Stuck Threads Condition
- Automatic Restart of a Failed Server
- WebLogic Overload
- Section Summary
- Practice 5-1 Overview: Configuring Server Stuck Thread Behavior
- Practice 5-2 Overview: Configuring Automatic Restarting of a Failed Server
- Practice 5-3 Overview: Configuring WebLogic Overload Protection
- Agenda
- Secure Sockets Layer
- Section Summary
- Agenda
- Logging Considerations
- Summary

Monitoring and Tuning Cluster Performance

- Learning Objectives
- Agenda
- Cluster: Review
- Benefits of Clustering
- Basic (Single-Tier) Cluster Architecture
- Multitier Cluster Architecture
- Remote Calls and Deployment Packaging
- Architecture Advantages and Disadvantages
- Cluster Communication
- Section Summary
- Practice 6-1 Overview: Configuring Unicast and Multicast Clustering
- Agenda
- A Cluster Proxy for a Web Application Cluster
- Proxy Plug-Ins
- Oracle HTTP Server
- Hardware Load Balancers
- Section Summary
- Agenda
- HTTP Session Persistence
- In-Memory Session Replication
- File Session Persistence
- JDBC Session Persistence

- Oracle Coherence: Overview
- Coherence*Web and WebLogic Clusters
- Session Persistence Comparison
- Summary
- Practice 6-2 Overview: Tuning Session Persistence

Tuning JDBC Performance

- Learning Objectives
- Agenda
- Connection Pools
- Connection Pool Sizing
- Database Listener Timeouts
- JDBC and Application Design
- Section Summary
- Agenda
- Connection Testing
- Shrink Frequency
- Section Summary
- Practice 7-1 Overview: Tuning JDBC Connection Pools
- Agenda
- Row Prefetch
- Statement Caching
- Statement Cache Tuning
- Connection Pinned-To-Thread
- Section Summary
- Practice 7-2 Overview: Testing the Performance of JDBC Statement Caching
- Practice 7-3 Overview: Testing the Performance of Pinned-To-Thread
- Agenda
- Combining Transactions
- Batch Updates
- Section Summary
- Practice 7-4 Overview: Configuring Batch Updates
- Agenda
- Exalogic Optimizations
- Section Summary
- Agenda
- Oracle Database Tuning
- Tips for Tuning Other Databases
- Summary
- Practice 7-5 Overview: Tuning an Oracle Database for WebLogic

Configuring Work Managers

- Learning Objectives
- Agenda
- WebLogic Server Threads

- Monitoring a Server Thread Pool
- Monitoring Server Threads
- Section Summary
- Agenda
- Work Managers
- Work Manager Scope
- Work Manager Architecture
- Default Work Manager
- Section Summary
- Agenda
- Request Classes
- Creating a Work Manager
- Creating a Request Class
- Constraints
- Creating a Constraint
- Work Manager WLST Example
- Work Managers and Stuck Threads
- Assigning Work Managers to Applications
- Practice 8-1 Overview: Creating and Using Work Managers
- Practice 8-2 Overview: Configuring Work Manager Constraints

Tuning Java EE Applications

- Learning Objectives
- Agenda
- What is a JavaServer Page?
- JSP Request Processing
- Precompiled JSP
- The appc Application Compiler
- Using the precompile Parameter
- Tuning JSP: Compilation Tuning
- HttpSession Replication Tuning
- The keepgenerated Parameter
- Page Check Interval
- Servlet Reload Check Interval
- Using Web Servers for Static Content
- Session Timeout
- Session Invalidation
- Page Directive and HTTP Session
- Using Custom JSP Tags
- Using the WebLogic cache Tag
- Web Application Tuning JSP and Servlet Output Buffer Tuning
- Section Summary
- Practice 9-1 Overview: Tuning JSP
- Agenda
- Enterprise JavaBeans

- Stateless Session Beans
- Stateless Session Beans Tuning
- Pool Miss Ratio
- Pool Management
- Determining the Pool Size
- Configuring a Stateless Session EJB Pool
- Message-Driven Beans
- Configuring an MDB Pool
- Configuring the Use of Batching with an MDB
- MDB Tuning
- Stateful Session Beans
- Cache Management
- What happens when the cache fills up?
- Determining the Cache Size
- Idle Timeout and Eligibility
- Cache Type
- Configuring a Stateful Session EJB Cache
- Using Filtering ClassLoaders
- General Application Performance Problems
- EJBs: Coding for Performance
- Summary
- Practice 9-2 Overview: Tuning Stateless EJBs

Oracle Cloud

- Agenda
- What is cloud?
- What is cloud computing?
- History: Cloud Evolution
- Components of Cloud Computing
- Characteristics of Cloud
- Cloud Deployment Models
- Cloud Service Models
- Industry Shifting from On-Premises to the Cloud
- Oracle IaaS Overview
- Oracle PaaS Overview
- Oracle SaaS Overview
- Summary

Oracle Java Cloud Service Overview

- Learning Objectives
- Introducing Java Cloud Service
- Java Cloud Service: Three Options
- Java Cloud Service Main Use Cases
- Java Cloud Service Feature: Provisioning
- Java Cloud Service Feature: Patching

- Java Cloud Service Feature: Backup/Restore
- Java Cloud Service Feature: Scaling
- Oracle Coherence Option: Data Caching and Scaling
- Oracle Coherence Option: Your Cloud Data Grid
- How You Interact with Java Cloud Service
- Speaking of Dev Environments…Developer Cloud Service
- Java Cloud Service On-Premises!
- Summary

Appendix: Reference Slides

- Quiz
- The Grinder Agent Configuration
- Steps to Use The Grinder
- Setting Up a Test Directory for The Grinder
- The Grinder Scripts
- Recording Scripts with TCPProxy
- Sample grinder.properties File
- httpscript.py File
- Running the Tests
- Test Results
- out_host-n.log
- The Grinder Console
- Creating a View and Adding a Chart to View
- Quiz
- Other Useful Commands
- Garbage Collectors: Comparisons
- Throughput Goal
- Maximum Pause Time Goal
- Footprint Goal
- Monitoring GC: -XX:+PrintGC
- Monitoring GC: –XX:+PrintGC
- GC Manually Using the Administration Console
- Ergonomics Behavior
- Ergonomics: Command-Line Flags
- Why use jinfo?
- Application Snapshot
- Domain Startup Mode
- WebLogic Server Native IO
- Quiz
- Stuck Threads Work Manager
- Work Manager for Stuck Threads
- Work Manager Tuning: I
- Work Manager Tuning: II
- Work Manager Constraint Tuning: I
- Work Manager Constraint Tuning: II
- Chunk Size

- Tuning the Chunk Size
- Tuning the Chunk Pool Size
- Quiz
- Load Balancers
- Quiz
- Oracle Coherence: Overview
- Coherence*Web: Overview
- Replication Configuration
- Quiz
- JDBC Drivers
- JDBC Architecture
- Data Sources
- Transaction Isolation Levels
- Operations Permitted at Each Isolation Level
- Transaction Isolation Levels
- Quiz
- Logging Last Resource Transactions
- Logging Last Resource: Example
- Configuring Logging Last Resource
- Stuck Thread Handling
- Configuring Stuck Thread Handling
- Application Stuck Thread Handling
- Quiz
- Creating a Work Manager
- Request Classes
- Creating a Request Class
- Constraints
- Creating a Constraint
- Referencing Classes or Constraints
- Sharing Constraints Among Work Managers
- Work Managers and Stuck Threads
- Assigning Work Managers to Applications
- Quiz
- Session Persistence Considerations
- Session Persistence Cache Size
- Offload HTTP Sessions to Coherence*Web
- Quiz
- Singleton Session Bean
- When to Use Singleton Session Beans