

Java Platform, Standard Edition

JRockit to HotSpot Migration Guide



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The Oracle logo, consisting of a solid red square with the word "ORACLE" in white, uppercase, sans-serif font centered within it.

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Preface

This guide helps users of Oracle JRockit to migrate to Java HotSpot VM (Java Platform, Standard Edition). The document describes the command-line options and tools available in Oracle JRockit, and their equivalents in the Java HotSpot VM (HotSpot).

Audience

The target audiences for this document are developers and users who are working on Oracle JRockit and planning to migrate to the Java Development Kit (JDK). The JDK is Oracle's implementation of the Java Platform, Standard Edition (Java SE). The current release is Java SE 13 and JDK 13. However, most of the information in this document can be applied to releases earlier than JDK 13.

This document is intended for readers who have a detailed understanding of the Java HotSpot VM components, and also have some understanding of concepts such as garbage collection, threads, and native libraries. In addition, it is assumed that the reader is reasonably proficient with the operating systems where the Java application is developed and run.

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Related Documents

See [JDK 13 Documentation](#) for other JDK 13 guides.

Conventions

The following text conventions are used in this document:

| Convention | Meaning |
|-------------------|--|
| boldface | Boldface type indicates graphical user interface elements associated with an action, or terms defined in text or the glossary. |
| <i>italic</i> | Italic type indicates book titles, emphasis, or placeholder variables for which you supply particular values. |
| monospace | Monospace type indicates commands within a paragraph, URLs, code in examples, text that appears on the screen, or text that you enter. |

1

Introduction

This document provides simple guidelines to help migrate applications from Oracle JRockit to Java HotSpot VM (HotSpot). It contains sections for each JVM system component that describe the equivalents of those components in both Oracle JRockit and HotSpot. The document also lists the corresponding JVM options of those components. It includes tables that map the complete set of Oracle JRockit `-x` and `-xx` command-line options to the ones available in HotSpot.

Heap Sizing

HotSpot has the same options as Oracle JRockit to set the initial and the maximum Java heap size.

Table 1-1 Heap Size

| Option | Oracle JRockit | HotSpot |
|-------------------|---|---|
| <code>-Xms</code> | Sets the initial and minimum size of the heap | Sets the initial and minimum size of the heap |
| <code>-Xmx</code> | Sets the maximum size of the heap | Sets the maximum size of the heap |

 **Note:**

When migrating from Oracle JRockit to HotSpot, the Java heap size must essentially be the same.

2

Garbage Collectors

This topic describes garbage collection tuning options available in Oracle JRockit and HotSpot, and compares their functionality and performance.

Tuning Garbage Collection

The following table lists important garbage collection (GC) tuning options available in Oracle JRockit and HotSpot:

Table 2-1 Garbage Collectors

| Oracle JRockit Garbage Collectors | HotSpot Garbage Collectors | Notes |
|---|---|--|
| Throughput collector set using any of these options: <ul style="list-style-type: none">-Xgc:throughput-Xgc:genpar-Xgc:singlepar-Xgc:parallel | Throughput collector: -XX:+UseParallelGC - Use parallel compacting collector for both young and old generation -XX:+UseParallelGC -XX:-UseParallelOldGC - Use parallel compacting collector for the young generation and serial mark-sweep for the old generation | The number of parallel GC threads can be controlled using -XX:ParallelGCThreads=n. |
| Low latency collector set using any of the following options: -Xgc:pausetime -Xgc:gencon -Xgc:singlecon | -XX:+UseG1GC Or -XX:+UseConcurrentMarkSweepGC | The HotSpot offers a choice between the two mostly concurrent collectors: <ul style="list-style-type: none">Garbage-First (G1) Garbage Collector is a server-style collector for multiprocessor machines with large memories. It meets garbage collection pause time goals with high probability while achieving high throughputConcurrent Mark Sweep (CMS) Collector is for applications that prefer shorter garbage collection pauses and can afford to share processor resources with the garbage collection The Garbage-First Garbage Collector is the default collector. |



Note:

The CMS collector was deprecated in JDK 9.

To understand the various garbage collectors that are included with the HotSpot, see Introduction to Garbage Collection Tuning in *Java Platform, Standard Edition HotSpot Virtual Machine Garbage Collection Tuning Guide*.

3

Runtime

This topic describes important options that control the runtime behavior of the HotSpot.

Runtime Options

The following table lists important equivalent options of the runtime subsystem in Oracle JRockit and HotSpot:

Table 3-1 Runtime Options

| Oracle JRockit | HotSpot | Notes |
|-----------------------|-----------------------|--|
| -XX:+UseLazyUnlocking | -XX:+UseBiasedLocking | UseBiasedLocking improves the performance of uncontended synchronization. This option is enabled by default. However, if the application has high contended synchronization, then disable the UseBiasedLocking option to enhance the performance. |
| -XlargePages | -XX:+UseLargePages | On the Linux platform, this option was disabled from version 7u60 onwards. Use -XX: +UseLargePages to enable the use of large pages on the platforms where it is disabled by default. However, -XX: +UseLargePages doesn't enable the use of large pages in the MetaSpace. To enable this option, add -XX: +UseLargePagesInMe taspacespace. |

Table 3-1 (Cont.) Runtime Options

| Oracle JRockit | HotSpot | Notes |
|----------------------|-------------------------------|---|
| -XX:MaxLargePageSize | -XX:LargePageSizeInBytes=size | Sets the maximum size (in bytes) for large pages used for the Java heap. By default, the size is set to 0, which implies that the JVM chooses the size for large pages automatically. |
| -XXcompressedRefs | -XX:+UseCompressedOops | Use of Compressed Oops is the default for 64-bit HotSpot processes when -Xmx isn't specified and the values of -Xmx are less than 32 gigabytes. |

4

Compilation Optimization

This topic describes the various compiler options available in Oracle JRockit and HotSpot to optimize compilation.

- [Compiler Considerations](#)
- [Important HotSpot JIT Compiler Options](#)

Compiler Considerations

Unlike Oracle JRockit, HotSpot features a Java byte code interpreter in addition to two different Just In Time (JIT) compilers, client (also known as C1) and server (also known as C2).

This section provides details about the compiler that you can use.

HotSpot VM defaults to interpreting Java byte code. It compiles (JIT compilation) methods that are executed for a predetermined number of times. JIT compilers are either client or server compilers.

- **Client compiler:** It compiles methods quickly but emits machine code that is less optimized than the server compiler. This compiler is used for quick startup. Also, in this compiler, the smaller memory footprint is more important than steady-state performance.
- **Server compiler:** The compiler often takes more time (and memory) to compile the same methods. However, it generates better optimized machine code than the code generated by the client compiler. It provides better runtime performance after the application reaches the steady state.

The tiered compilation enhances the server VM startup speed by using client compiler as the first tier. A server VM uses the interpreter to collect the profiling information about the methods that is fed into the compiler. In the tiered scheme, in addition to the interpreter, the client compiler generates compiled versions of methods that collect profiling information about themselves. As the compiled code is substantially faster than the interpreter, the program executes with greater performance during this profiling phase. Often, even a startup is faster because the final code produced by the server compiler is available during the early stages of application initialization. The tiered scheme can also achieve better peak performance than a regular server VM. This is because the faster profiling phase allows a longer period of profiling, which yields better optimization.

Tiered compilation is the default mode for the server VM. The 64-bit mode is supported. To enable tiered compilation manually, use the `-XX:+TieredCompilation` flag. You can disable tiered compilation by using the `-XX:-TieredCompilation` flag.

Oracle JRockit JVM compiles a Java method and generates the machine code for the first time it is invoked. This compiled code of frequently invoked methods is optimized in the background by an Optimizer thread. This code is different from the HotSpot where methods are interpreted first and compiled later, either by the client (fewer optimizations) or the server (more optimizations) compiler.

Compiler Control

Compiler Control provides an improved way to control the JVM compilers. The JVM compilation is done through compiler directive options. These options are method-specific and can be changed at run time. See [Compiler Control](#).

Important HotSpot JIT Compiler Options

The following table lists some important Oracle JRockit and HotSpot compiler options:

Table 4-1 JIT Compiler Options

| Oracle JRockit | HotSpot | Notes |
|----------------------------------|---|---|
| -XnoOpt - XXoptFile:<file> | <p>As JIT compilation in HotSpot is considered analogous to optimization in Oracle JRockit (that is, both techniques are only used on methods that are determined by profiling to be hot), the HotSpot equivalent to Oracle JRockit's -XnoOpt is -Xint. In this technique, no JIT compilation is done and only the byte code interpreter is used to execute all methods. This compilation might impact the performance. However, it can be useful when -XnoOpt is used for troubleshooting or working around possible compiler issues of Oracle JRockit.</p> <p>Like Oracle JRockit, HotSpot also offers ways to exclude methods from compilation or to disable specific optimizations on them.</p> <p>If there are any problems while optimizing the methods, then use XnoOpt or XXoptFile options with Oracle JRockit VM to disable the optimization on those methods. However, to exclude the compilation or disable specific optimizations on these methods, ensure that you don't directly translate to HotSpot options.</p> <p>The same compilation or optimization problems observed with the Oracle JRockit JVM for any specific methods are unlikely to happen with the HotSpot JVM. So, to begin with, it is best to remove these options while migrating to the HotSpot JVM.</p> <p>Equivalent HotSpot JVM options are:</p> <ul style="list-style-type: none"> • - XX:CompileCommand=command,method[,option] Specifies a command to perform on a method. For example, to exclude the indexOf() method of the String class from being compiled, use the following: -XX:CompileCommand=exclude,java/lang/String.indexOf • -XX:CompileCommandFile=<filename> Sets the file from which JIT compiler commands are read. By default, the .hotspot_compiler file is used to store commands performed by the JIT compiler. • -XX:CompileOnly=<methods> Sets the list of methods (separated by commas) to which compilation must be restricted. • -XX:CompileThreshold=<invocations> Sets the number of interpreted method invocations before compilation. By default, in the server JVM, the JIT compiler performs 10,000 interpreted method invocations to gather information for efficient compilation. | Options CompileCommand, CompileCommandFile, CompileOnly, and CompileThreshold can be used to disable or delay the compilation of specified methods. |

Table 4-1 (Cont.) JIT Compiler Options

| Oracle JRockit | HotSpot | Notes |
|--|--|--|
| -XX:OptThreads | There are no optimization threads in HotSpot JVM. The count of compiler threads that perform both the compilation and the optimizations can be set using: -XX:CICompilerCount=<threads> | Sets the number of compiler threads to use for compilation. By default, the number of threads is set to 2 for the server JVM and it scales to number of cores if tiered compilation is used. |
| -XX: +ReserveCodeMemory - XX:MaxCodeMemory =<size> | -XX:ReservedCodeCacheSize=<size> | Sets the maximum code cache size (in bytes) for JIT-compiled code. This option is equivalent to -Xmaxjitcodesize. |
| None | -XX:+TieredCompilation | Enables the use of tiered compilation. This option is enabled by default from JDK 8 and later versions. Only the Java HotSpot Server VM supports this option. |

5

Logging

This topic describes the various logging options available in Oracle JRockit and HotSpot:

- [Verbose Logging](#)
- [HotSpot Logging Options](#)

Verbose Logging

Verbose logging in HotSpot can be enabled using the `-verbose` option. There are some specific flags that can be used with this option to get area-specific verbose output.

The following table lists various logging options available in Oracle JRockit and compares them with the options available in HotSpot:

Table 5-1 Verbose Logging

| Oracle JRockit Verbose Module | HotSpot Option | Notes |
|-------------------------------|------------------------------|--|
| alloc | NA | NA |
| class | <code>-verbose: class</code> | Displays information about the classes that are being loaded. |
| codegen | NA | NA |
| compaction | NA | NA |
| cpuinfo | NA | NA |
| exceptions | NA | NA |
| gc | <code>-verbose: gc</code> | Displays information about each garbage collection (GC) event. |
| gcheuristic | NA | NA |
| gcpause | NA | NA |
| gcpausetree | NA | NA |
| gcreport | NA | NA |
| load | NA | NA |
| memory | NA | NA |
| memdbg | NA | NA |
| opt | NA | NA |
| refobj | NA | NA |
| starttime | NA | NA |

Table 5-1 (Cont.) Verbose Logging

| Oracle JRockit Verbose Module | HotSpot Option | Notes |
|-------------------------------|----------------|--|
| shutdown | NA | NA |
| systemgc | NA | NA |
| timing | NA | NA |
| NA | -verbose:jni | Displays information about the use of native methods and other Java Native Interface (JNI) activity. |

HotSpot Logging Options

These are some of the common logging options available in HotSpot that can be used to enable the diagnostic output for a specific subsystem within the HotSpot JVM.

Table 5-2 Logging Options

| HotSpot Logging Options | Notes |
|--------------------------------|--|
| -Xlog | Enables the common logging system for all JVM components. |
| -Xloggc:<filename> | Sets the file to which verbose GC event information must be redirected for logging. The information written to this file is similar to the output of <code>-verbose:gc</code> with the time elapsed from the first GC event preceding each logged event. The <code>-Xloggc</code> option overrides the <code>-verbose:gc</code> , if both are given with the same <code>java</code> command. |
| -XX:LogFile=<path> | Sets the path and file name where the log data is written. |
| -XX:+LogCompilation | Enables logging of compilation activity to a file named <code>hotspot.log</code> in the current working directory. You can specify a different log file path and name using the <code>-XX:LogFile</code> option. The <code>-XX:+LogCompilation</code> option must be used together with the <code>-XX:UnlockDiagnosticVMOptions</code> option that unlocks diagnostic JVM options. |
| -XX: +PrintCommandLineFlags | Enables printing of the selected JVM flags that appeared on the command-line. |

 **Note:**

This option was deprecated in JDK 9.

Table 5-2 (Cont.) Logging Options



| HotSpot Logging Options | Notes |
|---|---|
| <code>-XX:+PrintGC</code> | Enables printing of messages at every GC. |
| |  Note: This option was deprecated in JDK 9. |
| <code>-XX:+PrintGCDetails</code> | Enables printing of detailed messages at every GC. |
| |  Note: This option was deprecated in JDK 9. |
| <code>-XX:+PrintNMTStatistics</code> | Enables printing of collected native memory tracking data at JVM exit when native memory tracking is enabled. |
| <code>-XX:+PrintNMTStatistics</code> | Enables printing of collected native memory tracking data at JVM exit when native memory tracking is enabled. |
| <code>-XX:+PrintAssembly</code> | Enables printing of assembly code resulting from JIT compilation of Java bytecode by using the external <code>disassembler.so</code> library. This option enables you to view the generated code, which helps you to diagnose the performance issues. This option must be used together with the <code>-XX:UnlockDiagnosticVMOptions</code> option that unlocks diagnostic JVM options. |
| <code>-XX:+PrintCompilation</code> | Enables verbose diagnostic output from the JVM by printing a message to the console every time a method is compiled. |
| <code>-XX:+PrintInlining</code> | Enables printing of inlining decisions. This option enables you to view the methods that are getting inlined. |
| <code>-XX: +PrintClassHistogram</code> | Enables printing of a class instance histogram after a Control +C event (SIGTERM). By default, this option is disabled. |
| <code>-XX: +PrintConcurrentLocks</code> | Enables printing of <code>java.util.concurrent</code> locks after a Control+C event (SIGTERM). By default, this option is disabled. |

Table 5-3 GC Logging Options

| GC Logging Options | Notes |
|-----------------------|--|
| <code>-Xlog:gc</code> | Enables printing of messages at every GC. The <code>gc</code> is the main tag to log all GC related information. The <code>gc</code> tag is combined with other tags to log specific information. A few tags are listed in the following rows. |

Table 5-3 (Cont.) GC Logging Options

| GC Logging Options | Notes |
|----------------------------------|--|
| -Xlog:gc +region=trace | Enables the printing of information about the regions that are allocated and that are reclaimed by the G1 collector. |
| -Xlog:gc +ergo*=trace | Enables printing of information about adaptive generation sizing. |
| -Xlog:safepoint | Enables printing of the time elapsed from the last pause (for example, a GC pause). |
| -Xlog:gc +task=trace | Enables printing of time stamps for every individual GC worker thread task. |
| - Xlog:gc::uptime,t id | Enables printing of time stamps at every GC using the decorators <code>uptime</code> and <code>tid</code> . |
| -Xlog:gc +stringdedup | Prints detailed deduplication statistics. |
| -Xlog:gc +age=trace | Enables printing of tenuring age information. |
| -Xlog:gc* | Enables printing of detailed messages at every GC. |
| - Xlog:gc:file=<fil ename> | Logs messages with the <code>gc</code> tag to the file name specified. For example the option <code>-Xlog:gc:file=gc.txt</code> logs the messages to the <code>gc.txt</code> file. |

See [Enable Logging with the JVM Unified Logging Framework](#) in the *Java Development Kit Tool Specifications* guide.

6

Command-Line Options

This topic describes the various HotSpot command-line options and compares them with those available in Oracle JRockit:

- [Mapping of Oracle JRockit to HotSpot Command-Line Options](#)
- [jcmd Commands](#)

Mapping of Oracle JRockit to HotSpot Command-Line Options

Certain Oracle JRockit command-line options are similar to HotSpot options.

This section provides either a one-to-one mapping of Oracle JRockit options to HotSpot options, or refers you to other sections of this document. There are certain Oracle JRockit options for which there are no corresponding HotSpot JVM options. Also, some of the mapped HotSpot options aren't exactly equivalent to the Oracle JRockit options and may provide slightly different behavior on the HotSpot.

When migrating, simply translating every option used with Oracle JRockit into similar HotSpot options isn't recommended. Especially for performance-related options, the best practice is to start by only specifying the Java heap size and the garbage collector, such as CMS or G1. Any additional tuning for HotSpot, if necessary, must be done based on new benchmarking and profiling done with HotSpot. It isn't advised to assume that most, if any, JVM-level tuning decisions made for an Oracle JRockit configuration will also apply to a HotSpot configuration.

Table 6-1 -X Command-Line Options

| Oracle JRockit | HotSpot | Notes |
|-----------------------|--------------------|---|
| -Xbootclasspath | Same | NA |
| -Xbootclasspath/a | Same | NA |
| -Xbootclasspath/p | Same | NA |
| -Xcheck:jni | Same | NA |
| -Xdebug | Same | NA |
| -Xgc | NA | See Tuning Garbage Collection . |
| -XgcPrio (deprecated) | NA | See Garbage Collectors . |
| -XlargePages | -XX:+UseLargePages | NA |
| -Xmanagement | NA | NA |
| -Xms | Same | NA |
| -Xmx | Same | NA |

Table 6-1 (Cont.) -X Command-Line Options

| Oracle JRockit | HotSpot | Notes |
|--------------------------|----------------------------|--|
| -XnoClassGC (deprecated) | Same | Don't use, except for troubleshooting. |
| -XnoOpt | NA | See Compilation Optimization . |
| -Xns | Same | NA |
| -XpauseTarget | - XX:MaxGCPauseMillis=n | See Garbage Collectors . |
| -Xrs | Same | NA |
| -Xss | Same | NA |
| -XstrictFP | NA | NA |
| -Xverbose | -verbose | See Logging . |
| -Xverboosedecorations | NA | See Logging . |
| -XverboseLog | NA | See Logging . |
| -XverboseTimeStamp | NA | See Logging . |

Table 6-2 -XX Command-Line Options

| Oracle JRockit | HotSpot | Notes on HotSpot Options |
|----------------|--|---|
| -XXaggressive | -XX:+AggressiveHeap -XX:+AggressiveOpts | -XX:+AggressiveHeap enables Java heap optimization. This sets various parameters to be optimal for long-running jobs with intensive memory allocation, based on the configuration of the computer (RAM and CPU). By default, the option is disabled and the heap isn't optimized. -XX:+AggressiveOpts enables other non-heap related optimization. |

Table 6-2 (Cont.) -XX Command-Line Options

| Oracle JRockit | HotSpot | Notes on HotSpot Options |
|--|---|--|
| -XX:AllocChunkSize | Related options: <ul style="list-style-type: none"> • - XX:AllocateInstancePrefetchLines=<lines> • -XX:AllocatePrefetchDistance=<size> • - XX:AllocatePrefetchInstr=<instruction> • -XX:AllocatePrefetchLines=<lines> • -XX:AllocatePrefetchStepSize=<size> • -XX:AllocatePrefetchStyle=<style> | NA |
| -XX:+ -CheckJNICalls | -Xcheck:jni | NA |
| -XX:+ -CheckStacks | NA | NA |
| -XXcompaction | NA | NA |
| -XXcompactRatio (deprecated) | NA | NA |
| -XXcompactSetLimit (deprecated) | NA | NA |
| - | NA | NA |
| XXcompactSetLimitPerObject (deprecated) | | |
| -XXcompressedRefs | -XX:-UseCompressedOops | See Runtime Options . |
| -XX:+ - CrashOnOutOfMemoryError | Same | NA |
| -XX:+ - DisableAttachMechanism | Same | NA |
| -XXdumpFullState | NA | On the HotSpot side, there is an option <code>CreateMinidumpOnCrash</code> to enable the dumping of minidumps when fatal errors occur on the Windows platform. |
| -XXdumpSize | NA | NA |
| -XX:ExceptionTraceFilter | NA | NA |
| -XX:+ - ExitOnOutOfMemoryError | Same | NA |
| - | NA | NA |
| XX:ExitOnOutOfMemoryError ExitCode | | |
| -XXexternalCompactRatio (deprecated) | NA | NA |

Table 6-2 (Cont.) -XX Command-Line Options

| Oracle JRockit | HotSpot | Notes on HotSpot Options |
|--|---|---|
| -XX:+ - FailOverToOldVerifier | Same | NA |
| -XX:+ -FlightRecorder | Same | Enables the use of the Java Flight Recorder (JFR) during the runtime of the application. This is a commercial feature that requires you to also specify the -XX: +UnlockCommercialFeatures option. |
| -XX:FlightRecorderOptions | Same | NA |
| -XX:+ - FlightRecordingDumpOnUnhandledException | NA | NA |
| - XX:FlightRecordingDumpPath | NA | NA |
| -XXfullSystemGC | Related options: <ul style="list-style-type: none"> • -XX:+DisableExplicitGC • -XX:+ExplicitGCInvokesConcurrent • -XX: +ExplicitGCInvokesConcurrentAndUnloadsClasses | See Garbage Collectors . |
| -XXgcThreads | Related options: <ul style="list-style-type: none"> • -XX:ParallelGCThreads=<threads> • -XX:ConcGCThreads=<threads> | See Garbage Collectors . |
| -XX:GCTimePercentage | NA | NA |
| -XX:GCTimeRatio | NA | NA |
| -XXgcTrigger | Related options: <ul style="list-style-type: none"> • - XX:CMSInitiatingOccupancyFraction=<percent> • -XX:CMSTriggerRatio=<percent> | See Garbage Collectors . |
| -XX:+ - HeapDiagnosticsOnOutOfMemoryError | Can achieve the same by using - XX:OnOutOfMemoryError=<command> | Example: java - XX:OnOutOfMemoryError ="jmap -heap %p" JavaProgram |
| -XX:HeapDiagnosticsPath | NA | NA |
| -XX:+ - HeapDumpOnCtrlBreak | NA | NA |

Table 6-2 (Cont.) -XX Command-Line Options

| Oracle JRockit | HotSpot | Notes on HotSpot Options |
|--------------------------------------|----------------------------------|--|
| -XX:+ -HeapDumpOnOutOfMemoryError | Same | NA |
| -XX:HeapDumpPath | Same | NA |
| -XX:HeapDumpSegmentSize | NA | NA |
| -XXheapParts (deprecated) | NA | NA |
| -XXinternalCompactRatio (deprecated) | NA | NA |
| -XX:+ -JavaDebug | NA | NA |
| -XXkeepAreaRatio | XX:SurvivorRatio=<ratio> | Sets the ratio between the eden space size and the survivor space size. By default, this option is set to 8. There is another option -XX:InitialSurvivorRatio=<ratio> to set the initial survivor space ratio used by the throughput garbage collector. Adaptive sizing is enabled by default with the throughput garbage collector by using the -XX:+UseParallelGC and -XX:+UseParallelOldGC options, and the survivor space is resized according to the application behavior, starting with this initial value. |
| -XXlargeObjectLimit (deprecated) | NA | NA |
| -XX:MaxCodeMemory | -XX:ReservedCodeCacheSize=<size> | See Compilation Optimization . |
| -XX:MaxDirectMemorySize | Same | NA |
| -XX:MaximumNurseryPercentage | -XX:NewRatio=<ratio> | Sets the ratio between young and old generation sizes. By default, this option is set to 2. |
| -XX:MaxLargePageSize | -XX:LargePageSizeInBytes=<size> | See Runtime options. |
| -XX:MaxRecvBufferSize | NA | NA |
| -XXminBlockSize (deprecated) | NA | NA |

Table 6-2 (Cont.) -XX Command-Line Options

| Oracle JRockit | HotSpot | Notes on HotSpot Options |
|-------------------------------|---|---|
| -XXnoSystemGC | Related options: <ul style="list-style-type: none"> • -XX:+DisableExplicitGC • -XX:+ExplicitGCInvokesConcurrent • -XX: +ExplicitGCInvokesConcurrentAndUnloadsClasses | See Garbage Collectors . |
| -XX:OptThreads | -XX:CICompilerCount=threads | See Compilation Optimization . |
| -XX:+ -RedoAllocPrefetch | Related options: <ul style="list-style-type: none"> • - XX:AllocateInstancePrefetchLines=<lines> • -XX:AllocatePrefetchDistance=<size> • - XX:AllocatePrefetchInstr=<instruction> • -XX:AllocatePrefetchLines=<lines> • -XX:AllocatePrefetchStepSize=<size> • -XX:AllocatePrefetchStyle=<style> | NA |
| -XX:+ -ReserveCodeMemory | -XX:ReservedCodeCacheSize=<size> | See Compilation Optimization . |
| - | NA | NA |
| XX:SegmentedHeapDumpThreshold | | |
| -XXsetGC (deprecated) | NA | NA |
| -XX:+ -StrictFP | NA | NA |
| -XX:StartFlightRecording | Same | NA |
| -XXtlaSize | XX:TLABSize=<size> | Sets the initial size (in bytes) of a thread-local allocation buffer (TLAB). If this option is set to 0, then the JVM chooses the initial size automatically. |
| -XX:TreeMapNodeSize | NA | NA |
| -XX:+ -UseAdaptiveFatSpin | NA | NA |

Table 6-2 (Cont.) -XX Command-Line Options

| Oracle JRockit | HotSpot | Notes on HotSpot Options |
|------------------------------------|---|--|
| -XX:+ -UseAllocPrefetch | Related options: <ul style="list-style-type: none"> -XX:AllocateInstancePrefetchLines=<lines> -XX:AllocatePrefetchDistance=<size> -XX:AllocatePrefetchInstr=<instruction> -XX:AllocatePrefetchLines=<lines> -XX:AllocatePrefetchStepSize=<size> -XX:AllocatePrefetchStyle=<style> | NA |
| -XX:+ -UseCallProfiling | -XX:+UseTypeProfile | NA |
| -XX:+ -UseCfsAdaptedYield | NA | NA |
| -XX:+ -UseClassGC | -Xnoclassgc | Disables garbage collection (GC) of classes. This can save the GC time, which shortens interruptions during the application run. When you specify <code>Xnoclassgc</code> at startup, the class objects in the application will be left untouched during GC and will always be considered active. |
| -XX:+ -UseCPoolGC | NA | NA |
| -XX:+ -UseFastTime | NA | NA |
| -XX:+ -UseFatSpin | NA | NA |
| -XX:+ -UseLargePagesFor[Heap Code] | <ul style="list-style-type: none"> -XX:+UseLargePages -XX:+UseLargePagesInMetaspace | See Runtime Options . |
| -XX:+ -UseLazyUnlocking | -XX:+UseBiasedLocking | See Runtime Options . |
| -XX:+ -UseLockProfiling | NA | NA |
| -XX:+ -UseLowAddressForHeap | NA | No direct corresponding option available in HotSpot but the low heap base can be specified explicitly using <code>HeapBaseMinAddress</code> option. |
| -XX:+ -UseNewHashFunction | Same | Only relevant for JDK 5. This option must not be used on JDK 6 or later versions. |

Table 6-2 (Cont.) -XX Command-Line Options

| Oracle JRockit | HotSpot | Notes on HotSpot Options |
|--------------------------------|---------|--|
| -XX:+ - UseThreadPriorities | Same | On HotSpot, this option is enabled by default for the Windows platform. On JRockit, this option is disabled by default for the Windows platform. |

Table 6-3 Diagnostic Commands

| Oracle JRockit | HotSpot |
|-------------------------|--|
| check_flightrecording | JFR.check |
| command_line | VM.command_line |
| dump_flightrecording | JFR.dump |
| exception_trace_filter | NA |
| force_crash | NA |
| heap_diagnostics | GC.heap_info |
| help | help |
| hprofdump | GC.heap_dump |
| kill_management_server | ManagementAgent.stop |
| list_vmflags | VM.flags |
| lockprofile_print | NA |
| lockprofile_reset | NA |
| memleakserver | NA |
| print_class_summary | GC.class_stats |
| print_exceptions | NA |
| print_memusage | VM.native_memory |
| print_object_summary | GC.class_histogram |
| print_threads | Thread.print |
| print_utf8pool | VM.stringtable and VM.symboltable |
| print_vm_state | VM.info |
| runsystemgc | GC.run |
| set_filename | NA |
| start_flightrecording | JFR.start |
| start_management_server | ManagementAgent.start ManagementAgent.start_local |
| stop_flightrecording | JFR.stop |
| stop_management_server | ManagementAgent.stop |

Table 6-3 (Cont.) Diagnostic Commands

| Oracle JRockit | HotSpot |
|----------------|------------|
| timestamp | NA |
| verbosity | NA |
| version | VM.version |

jcmd Commands

The following are the list of jcmd commands:

- JFR.configure
- JFR.stop
- JFR.start
- JFR.dump
- JFR.check
- VM.log
- VM.native_memory
- VM.check_commercial_features
- VM.unlock_commercial_features
- ManagementAgent.status
- ManagementAgent.stop
- ManagementAgent.start_local
- ManagementAgent.start
- Compiler.directives_clear
- Compiler.directives_remove
- Compiler.directives_add
- Compiler.directives_print
- VM.print_touched_methods
- Compiler.codecache
- Compiler.codelist
- Compiler.queue
- VM.classloader_stats
- Thread.print
- JVMTI.data_dump
- JVMTI.agent_load
- VM.stringtable

- VM.symboltable
- VM.class_hierarchy
- GC.class_stats
- GC.class_histogram
- GC.heap_dump
- GC.finalizer_info
- GC.heap_info
- GC.run_finalization
- GC.run
- VM.info
- VM.uptime
- VM.dynlibs
- VM.set_flag
- VM.flags
- VM.system_properties
- VM.command_line
- VM.version help

For the complete list of commands, see [jcmd commands](#) in the *Java Development Kit Tool Specifications* guide.

7

Common Migration Issues and Solutions

This topic describes some common issues that can occur while migrating from Oracle JRockit to HotSpot, along with their solutions.

The following table lists some common issues that can occur during the migration process and solutions for resolving them:

Table 7-1 Migrations Issues and Solutions

| Problem | Oracle JRockit Option | HotSpot Option | Notes |
|---|---|---|---|
| Performance degradation after migrating to JDK 7. The issue was resolved with the use of <code>-XX:ReservedCodeCacheSize=1g</code> | <code>-XX:+ReserveCodeMemory</code> Default values: <ul style="list-style-type: none"> When you use <code>-XX:+UseLargePagesForCode</code>: 64 MB When you use <code>-XX:-UseLargePagesForCode</code>: 1024 MB | <code>-</code> <code>XX:ReservedCodeCacheSize</code> The default value on most of the platforms is 48 MB. | With HotSpot VM, it was observed that in some cases increasing the <code>ReservedCodeCacheSize</code> value, for example, <code>-XX:ReservedCodeCacheSize=1g</code> , improves the performance significantly. |
| Increased locking/unlocking events observed after switching to HotSpot. Disabling <code>UseBiasedLocking</code> helped improve the overall performance. | <code>-XX:-UseLazyUnlocking</code> (to disable) | <code>-XX:-UseBiasedLocking</code> (to disable) | The <code>UseBiasedLocking</code> option improves the performance of uncontended synchronization. This option is enabled by default. However, if the application has high contended synchronization, then disabling <code>UseBiasedLocking</code> benefits the performance. If you face performance issues due to locking or synchronization after migrating to HotSpot, then disabling this option might provide some performance gains. |

8

Troubleshooting Tools

This topic describes various troubleshooting tools available in Java SE and compares their functionality to those available in Oracle JRockit.

Troubleshooting Tools Available in Java SE

The following table lists various tools available for troubleshooting in Java SE. Some of these tools were brought over from Oracle JRockit to HotSpot VM for providing comparable functionality:

Table 8-1 Tools

| Java SE Troubleshooting Tools | Notes and Resources |
|--|---|
| Java Flight Recorder and Mission Control | See the following topics in <i>Java Platform, Standard Edition Troubleshooting Guide</i> : <ul style="list-style-type: none">• Java Mission Control• What are Java Flight Recordings• How to produce a Flight Recording• Inspect a Flight Recording• Debug a Memory Leak Using Java Flight Recorder |
| Serviceability Agent | See the article about the Serviceability Agent published in the Java Magazine dated July 2012: HotSpot's Hidden Treasure |
| JConsole | See Troubleshoot with JConsole in <i>Java Platform, Standard Edition Troubleshooting Guide</i> |
| jcmm command utility | See: <ul style="list-style-type: none">• Troubleshoot with jcmm Utility in <i>Java Platform, Standard Edition Troubleshooting Guide</i>• jcmm commands in <i>Java Development Kit Tool Specifications</i> |
| JDK utilities | There are many useful utilities bundled with JDK. See the following topics in <i>Java Platform, Standard Edition Troubleshooting Guide</i> : <ul style="list-style-type: none">• jdb• jinfo• jmap• jps• jstack• jstat• jrunscript• jstatd |
| visualgc | See visualgc Tool in <i>Java Platform, Standard Edition Troubleshooting Guide</i> . |

Table 8-1 (Cont.) Tools

| Java SE Troubleshooting Notes and Resources | |
|--|---|
| Tools | |
| Native Memory Tracking Tool | See Native Memory Tracking in <i>Java Platform, Standard Edition Java Virtual Machine Guide</i> . |