

JVM memory configuration parameters

Heap sizing

Parameter	Description
-Xms	Sets the initial heap size
-Xmx	Sets the maximum heap size
-XX:MinHeapFreeRatio	Sets the minimum percentage of free space after garbage collection
-XX:MaxHeapFreeRatio	Sets the maximum percentage of free space after garbage collection
-XX:MaxDirectMemorySize	Sets the limit for the memory allocated to direct byte buffers

RAM consumption

Parameter	Description
-XX:MaxRAM	Sets the max. amount of total memory used by the JVM
-XX:MaxRAMFraction	Sets the RAM limit for JVM in fractions
-XX:MaxRAMPercentage	Sets the RAM limit for JVM per cent

GC selection

Parameter	Description
-XX:+UseSerialGC	Enables Serial Garbage Collector
-XX:+UseParallelGC	Enables Parallel Garbage Collector
-XX:+UseConcMarkSweepGC	Enables Concurrent Mark Sweep Garbage Collector (available up to Java 8 only)
-XX:+UseG1GC	Enables G1 Garbage Collector
-XX:+UseZGC (since Java 15) -XX:+UnlockExperimentalVMOptions -XX:+UseZGC (since Java 11 up to 15)	Enables Z Garbage Collector (available since Java 11)
-XX:+UseShenandoahGC	Enables Shenandoah Garbage Collector (absent in Oracle Java, available in major OpenJDK distributions)

GC logging

Parameter	Description
-Xlog:gc*:<gc.log file path>:time	Stores the GC logging data at the specified location
-XX:PrintGC	Enables basic logging in Java 8
-XX:+PrintGCDetails	Activates detailed logging in Java 8+
-XX:NumberOfGCLogFiles	Sets the limit for the number of GC logs in Java 8
-XX:GCLogFileSize	Sets the max. size of a GC log file in Java 8

GC management

Parameter	Description
-XX:GCTimeRatio	Sets the the limit for GC execution time
-XX:AdaptiveSizePolicyWeight	Specifies how much previous GC times are taken into consideration when calculating current timing goals
-XX:+UseCGroupMemoryLimitForHeap	Sets the heap size based on the available container memory
-XX:ParallelGCThreads	Sets the number of Parallel GC threads
XX:G1HeapRegionSize	Sets the size of a G1 region
XX:InitiatingHeapOccupancyPercent	Sets the heap occupancy threshold triggering a marking cycle.

OutOfMemoryError handling

Parameter	Description
-XX:+HeapDumpOnOutOfMemoryError	Dumps heap into a file in the case of OutOfMemoryError
-XX:HeapDumpPath	Specifies the path for the file with heap data
-XX:OnOutOfMemoryError="< cmd args >;< cmd args >"	Specifies actions to be performed in the case of OutOfMemoryError

String optimization

Parameter	Description
-XX:+UseStringDeduplication	Removes duplicate strings during GC (with G1 GC only)
-XX:+UseStringCache	Caches commonly allocated strings in the String pool
-XX:+UseCompressedStrings	Uses a byte[] for Strings that can be represented as pure ASCII
-XX:+OptimizeStringConcat	Optimizes String concatenation operations when possible

Miscellaneous

Parameter	Description
-XX:LargePageHeapSizeThreshold	Uses large pages if max. heap is at least as big as the specified value
-XX:LargePageSizeInBytes	Sets the large page size for the heap
-XX:+UseCompressedOops	Enables the use of compressed pointers (32-bit instead of 64-bit) for heaps less than 32 GB
-XX:+TieredCompilation	Disables intermediate compilation tiers
-XX:TieredStopAtLevel=1	Uses only the C1 compiler
-XX:ThreadStackSize	Sets the size of thread stack space