

# Liberica JDK

## Performance Edition Overview



Liberica JDK  
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# 1. Introduction

Liberica JDK Performance Edition (or liberica-perf) brings some of the performance of JVM 17 to projects that can't afford complete migration out of JDK 8 or JDK 11. Liberica JDK Performance Edition is only available for Linux x86\_64.

## 2. Features and Enhancements of Liberica JDK Performance Edition

Liberica JDK Performance Edition includes the following features:

- Z Garbage Collector (new in JDK 8, improved in JDK 11): a scalable, low latency garbage collector.
- Compact Strings (new in JDK 8): a space-efficient internal representation of strings, which reduces memory footprint and garbage collection activity; it's enabled by default.
- Unified JVM Logging (new in JDK 8): replaces JDK options that print details about the JVM with `-Xlog` options.

In addition, Liberica JDK Performance Edition includes the following enhancements:

- Garbage-First (G1) Garbage Collector: targeted for multiprocessor machines scaling to a large amount of memory. This is the default garbage collector for all versions of Liberica JDK Performance Edition.
- G1 String Deduplication: reduces the memory footprint of String objects on the Java heap by taking advantage of the fact that many String objects are identical. It's disabled by default, but you can enable it with the `-XX:+UseStringDeduplication` option.
- Class Data Sharing (CDS): helps reduce the startup time and memory footprint between multiple JVMs. It's enabled by default in Liberica JDK Performance Edition. To disable it, see [Manually Controlling Class Data Sharing](#).
- Enhanced JDK Flight Recorder: a tool for collecting diagnostic and profiling data for a running Java application.

**Note:**

Concurrent Mark Sweep Garbage Collector is absent in liberica-perf 8 and 11.

# 3. Installing Liberica JDK Performance Edition

Installation procedure for Liberica JDK Performance Edition is similar to Liberica JDK. For detailed Liberica JDK installation and configuration instructions, see *Installation Guide* for the corresponding [Liberica JDK version](#).

# 4. Changes to JVM Runtime Options in Liberica JDK Performance Edition

Several JVM runtime options were added from JDK 17, some were removed. See the tables below for additional information.

## Changes to runtime options for JDK 11

### List of added runtime options

The following is a list of options available in liberica-perf 11, but absent in JDK 11. For more information on these parameters, see [the official documentation](#).

#### New options in liberica-perf 11

AdjustStackSizeForTLS

AllowRedefinitionToAddDeleteMethods

ArchiveClassesAtExit

AsyncLogBufferSize

C1InlineStackLimit

C1MaxInlineLevel

**New options in liberica-perf 11**

C1MaxInlineSize

C1MaxRecursiveInlineLevel

C1MaxTrivialSize

CompilationMode

DynamicDumpSharedSpaces

G1PeriodicGCInterval

G1PeriodicGCInvokesConcurrent

G1PeriodicGCSystemLoadThreshold

G1RSetRegionEntries

G1RSetSparseRegionEntries

HeapDumpGzipLevel

MetaspaceReclaimPolicy

MinHeapSize

RecordDynamicDumpInfo

ShowCodeDetailsInExceptionMessages

SweeperThreshold

UseContainerCpuShares



### New options in liberica-perf 11

UseEmptySlotsInSupers

UseNotificationThread

ZMarkStackSpaceLimit

ZProactive

ZUncommit

ZUncommitDelay

## List of removed and renamed runtime options

The table below lists options unavailable in liberica-perf 11 and the options that were renamed.

JDK 11 options	Resolution in liberica-perf 11
AggressiveOpts	Removed
AllowJNIEnvProxy	Removed
AllowNonVirtualCalls	Removed
AssertOnSuspendWaitFailure	Removed
AssumeMP	Removed
BindGCTaskThreadsToCPUs	Removed
BranchOnRegister	Removed

JDK 11 options	Resolution in liberica-perf 11
BytecodeVerificationLocal	Moved to the diagnostic flags category. Use with <code>-XX:+UnlockDiagnosticVMOptions</code>
BytecodeVerificationRemote	Moved to the diagnostic flags category. Use with <code>-XX:+UnlockDiagnosticVMOptions</code>
CMS*	CMS GC is not supported in liberica-perf 11
CalculateClassFingerprint	AOT is not supported in liberica-perf 11
CompactFields	Removed
CompilationPolicyChoice	Removed
CompilerThreadHintNoPreempt	Removed
Debugging	Removed
DeoptimizeRandom	Moved to the non-product category. Not available in release build.
ErrorReportServer	Removed
FLSAlwaysCoalesceLarge	CMS GC is not supported in liberica-perf 11
FLSCoalescePolicy	CMS GC is not supported in liberica-perf 11
FLSLargestBlockCoalesceProximity	CMS GC is not supported in liberica-perf 11
FailOverToOldVerifier	Removed
FieldsAllocationStyle	Removed
ForceNUMA	Removed

JDK 11 options	Resolution in liberica-perf 11
G1RSetRegionEntries	Removed
G1RSetScanBlockSize	Removed
G1RSetSparseRegionEntries	Removed
GCLockerInvokesConcurrent	Removed
GCTaskTimeStampEntries	Removed
InitialBootClassLoaderMetaspaceSize	Removed
InsertMemBarAfterArraycopy	Removed
LIRFillDelaySlots	Removed
MonitorBound	Removed
MonitorInUseLists	Removed
NeedsDeoptSuspend	Removed
OldPLABWeight	Removed
ParGCDesiredObjsFromOverflowList	Removed
ParGCTrimOverflow	Removed
ParGCUseLocalOverflow	Removed
PrintJNIResolving	Functionality moved to unified logging. Use <code>-Xlog:jni+resolve</code> instead

JDK 11 options	Resolution in liberica-perf 11
PrintSafepointStatistics	Functionality moved to unified logging. Use <code>-Xlog:safepoint+stats</code> instead
PrintSafepointStatisticsCount	Functionality moved to unified logging. Use <code>-Xlog:safepoint+stats</code> instead
PrintSafepointStatisticsTimeout	Functionality moved to unified logging. Use <code>-Xlog:safepoint+stats</code> instead
PrintVMQWaitTime	Removed
ProfileIntervals	Removed
ProfileIntervalsTicks	Removed
ProfileVM	Removed
ProfilerPrintByteCodeStatistics	Removed
ProfilerRecordPC	Removed
ResizeOldPLAB	Removed
ShenandoahSoftMaxHeapSize	Known as <code>SoftMaxHeapSize</code> in liberica-perf 11
StressLdcRewrite	Moved to the diagnostic flags category. Use with <code>-XX:+UnlockDiagnosticVMOptions</code>
SuspendRetryCount	Removed
SuspendRetryDelay	Removed
ThreadLocalHandshakes	Removed

JDK 11 options	Resolution in liberica-perf 11
Tier3AOTBackEdgeThreshold	AOT is not supported in liberica-perf 11
Tier3AOTCompileThreshold	AOT is not supported in liberica-perf 11
Tier3AOTInvocationThreshold	AOT is not supported in liberica-perf 11
Tier3AOTMinInvocationThreshold	AOT is not supported in liberica-perf 11
TraceSuspendWaitFailures	Removed
TransmitErrorReport	Removed
UnlinkSymbolsALot	Removed
UseAdaptiveGCBoundary	Removed
UseCMSBestFit	CMS GC is not supported in liberica-perf 11
UseCMSInitiatingOccupancyOnly	CMS GC is not supported in liberica-perf 11
UseConcMarkSweepGC	CMS GC is not supported in liberica-perf 11
UseGCTaskAffinity	Removed
UseLWPSynchronization	Removed
UseLargePagesInMetaspace	Removed
UseLegacyJNINameEscaping	Removed
UseMembar	Removed
UseOSErrorReporting	Removed

JDK 11 options	Resolution in liberica-perf 11
UseRDPCForConstantTableBase	Removed
VMThreadHintNoPreempt	Removed
VerifyMergedCPBytecodes	Removed
ZMarkStacksMax	Removed
Zpath	Removed
ZStallOnOutOfMemory	Removed
ZStatisticsInterval	Removed

## Changes to Runtime Options for JDK 8

### List of added runtime options

The following is a list of options available in liberica-perf 8, but absent in JDK 8.

New options in liberica-perf 8
AdjustStackSizeForTLS
AllocateHeapAt
AllowRedefinitionToAddDeleteMethods
AllowVectorizeOnDemand

**New options in liberica-perf 8**

ArchiveClassesAtExit

ArrayCopyLoadStoreMaxElem

AsyncLogBufferSize

C1InlineStackLimit

C1MaxInlineLevel

C1MaxInlineSize

C1MaxRecursiveInlineLevel

C1MaxTrivialSize

CompactStrings

CompilationMode

CompileThresholdScaling

CreateCoredumpOnCrash

DoReserveCopyInSuperWord

DynamicDumpSharedSpaces

EnableDynamicAgentLoading

ErrorLogTimeout

ExecutingUnitTests

**New options in liberica-perf 8**

ExtensiveErrorReports

G1PeriodicGCInterval

G1PeriodicGCInvokesConcurrent

G1PeriodicGCSystemLoadThreshold

G1UseAdaptiveIHOP

HeapDumpGzipLevel

HeapSearchSteps

LoopPercentProfileLimit

LoopStripMiningIter

LoopStripMiningIterShortLoop

MetaspaceReclaimPolicy

MinHeapSize

NonNMethodCodeHeapSize

NonProfiledCodeHeapSize

OptoRegScheduling

PreTouchParallelChunkSize

PrintExtendedThreadInfo



**New options in liberica-perf 8**

PrintFlagsRanges

ProfiledCodeHeapSize

RecordDynamicDumpInfo

RestrictReservedStack

SegmentedCodeCache

SharedArchiveConfigFile

SharedArchiveFile

SharedSymbolTableBucketSize

ShenandoahGCHeuristics

ShenandoahGCMode

ShowCodeDetailsInExceptionMessages

ShrinkHeapInSteps

SoftMaxHeapSize

StackReservedPages

StartAggressiveSweepingAt

SuperWordLoopUnrollAnalysis

SuperWordReductions

**New options in liberica-perf 8**

SweeperThreshold

UseBASE64Intrinsics

UseCMoveUnconditionally

UseCodeAging

UseContainerCpuShares

UseDynamicNumberOfCompilerThreads

UseEmptySlotsInSupers

UseFMA

UseNotificationThread

UseProfiledLoopPredicate

UseShenandoahGC

UseSubwordForMaxVector

UseVectorCmov

UseXMMForObjInit

UseZGC

ZAllocationSpikeTolerance

ZCollectionInterval

### New options in liberica-perf 8

ZFragmentationLimit

ZMarkStackSizeLimit

ZProactive

ZUncommit

ZUncommitDelay

## List of removed and renamed runtime options

The table below lists options unavailable in liberica-perf 8 and the options that were renamed.

JDK 8 options	Resolution in liberica-perf 8
AdaptiveSizePausePolicy	Removed
AdjustConcurrency	Removed
AggressiveOpts	Removed
AllowJNIEnvProxy	Removed
AllowNonVirtualCalls	Removed
AssertOnSuspendWaitFailure	Removed
AssumeMP	Removed
AutoGCSelectPauseMillis	Removed

JDK 8 options	Resolution in liberica-perf 8
BackEdgeThreshold	Removed. Use <code>-XX:OnStackReplacePercentage</code>
BindGCTaskThreadsToCPUs	Removed
BranchOnRegister	Removed
BytecodeVerificationLocal	Is now a diagnostic option
BytecodeVerificationRemote	Is now a diagnostic option
CheckEndorsedAndExtDirs	Removed
ClearFPUAtPark	Removed
CMS*	CMS GC removed as well as its flags
CodeCacheMinimumFreeSpace	Removed
CollectGen0First	Removed
CompactFields	Removed
CompilationPolicyChoice	Removed
CompilerThreadHintNoPreempt	Removed
ConvertSleepToYield	Removed
ConvertYieldToSleep	Removed
CreateMinidumpOnCrash	Removed. Use <code>CreateCoredumpOnCrash</code> instead

JDK 8 options	Resolution in liberica-perf 8
Debugging	Removed
DefaultMaxRAMFraction	Removed. Use <code>MaxRAMFraction</code> instead
DefaultThreadPriority	Removed
DeferPollingPageLoopCount	Removed
DeferThrSuspendLoopCount	Removed
DeoptimizeRandom	Only available in non-product builds
EmitSync	Removed
EnableTracing	Removed
ErrorReportServer	Removed
ExplicitGCInvokesConcurrentAndUnloadsClasses	Removed
FailOverToOldVerifier	Removed
FastTLABRefill	Removed
FenceInstruction	Removed
FieldsAllocationStyle	Removed
FLSAlwaysCoalesceLarge	Removed
FLSCoalescePolicy	Removed

JDK 8 options	Resolution in liberica-perf 8
FLSLargestBlockCoalesceProximity	Removed
ForceNUMA	Removed
G1RSetScanBlockSize	Removed
GCLockerInvokesConcurrent	Removed
GCLogFileSize	Removed
GCTaskTimeStampEntries	Removed
InitialBootClassLoaderMetaspaceSize	Removed
InsertMemBarAfterArraycopy	Removed
JNIDetachReleasesMonitors	Removed
LazyBootClassLoader	Removed
LIRFillDelaySlots	Removed
LogJFR	Removed
MonitorBound	Removed
MonitorInUseLists	Removed
MustCallLoadClassInternal	Removed
NeedsDeoptSuspend	Removed
NmethodSweepCheckInterval	Removed

JDK 8 options	Resolution in liberica-perf 8
NmethodSweepFraction	Removed
NumberOfGCLogFiles	Removed
OldPLABWeight	Removed
ParallelGCVerbose	Removed
ParGCDesiredObjsFromOverflowList	Removed
ParGCTrimOverflow	Removed
ParGCUseLocalOverflow	Removed
PreInflateSpin	Removed
PrintAdaptiveSizePolicy	Removed
PrintClassHistogramAfterFullGC	Removed
PrintClassHistogramBeforeFullGC	Removed
PrintCMSInitiationStatistics	Removed
PrintCMSStatistics	Removed
PrintFLSCensus	Removed
PrintFLSStatistics	Removed
PrintGCApplicationConcurrentTime	Removed
PrintGCApplicationStoppedTime	Removed

JDK 8 options	Resolution in liberica-perf 8
PrintGCCause	Removed
PrintGCDateStamps	Removed
PrintGCID	Removed
PrintGCTaskTimeStamps	Removed
PrintGCTimeStamps	Removed
PrintHeapAtGC	Removed
PrintHeapAtGCExtended	Removed
PrintJNIGCStalls	Removed
PrintJNIResolving	Removed
PrintOldPLAB	Removed
PrintOopAddress	Removed
PrintParallelOldGCPhaseTimes	Removed
PrintPLAB	Removed
PrintPromotionFailure	Removed
PrintReferenceGC	Removed
PrintSafepointStatistics	Removed
PrintSafepointStatisticsCount	Removed



JDK 8 options	Resolution in liberica-perf 8
PrintSafepointStatisticsTimeout	Removed
PrintSharedSpaces	Removed
PrintStringDeduplicationStatistics	Removed
PrintTenuringDistribution	Removed
PrintTLAB	Removed
PrintVMQWaitTime	Removed
ProfileIntervals	Removed
ProfileIntervalsTicks	Removed
ProfilerPrintByteCodeStatistics	Removed
ProfilerRecordPC	Removed
ProfileVM	Removed
ReadPrefetchInstr	Removed
ReflectionWrapResolutionErrors	Removed
ResizeOldPLAB	Removed
SafepointPollOffset	Removed
SafepointSpinBeforeYield	Removed
SharedMiscCodeSize	Removed

JDK 8 options	Resolution in liberica-perf 8
SharedMiscDataSize	Removed
SharedReadOnlySize	Removed
SharedReadWriteSize	Removed
SpecialEncodeISOArray	Moved to diagnostic flags
StarvationMonitorInterval	Removed
StressLdcRewrite	Moved to diagnostic flags
SuspendRetryCount	Removed
SuspendRetryDelay	Removed
SyncFlags	Removed
SyncKnobs	Removed
SyncVerbose	Removed
ThreadSafetyMargin	Removed
TraceBiasedLocking	Removed
TraceClassLoading	Removed
TraceClassLoadingPreorder	Removed
TraceClassPaths	Removed
TraceClassResolution	Removed

JDK 8 options	Resolution in liberica-perf 8
TraceClassUnloading	Removed
TraceDynamicGCThreads	Removed
TraceExceptions	Removed
TraceGen0Time	Removed. Functionality moved to unified logging.
TraceGen1Time	Removed. Functionality moved to unified logging.
TraceLoaderConstraints	Removed
TraceMetadataHumongousAllocation	Removed
TraceMonitorInflation	Removed
TraceParallelOldGCTasks	Removed
TraceRedefineClasses	Removed
TraceSafepointCleanupTime	Removed
TraceSuspendWaitFailures	Removed
TransmitErrorReport	Removed
UnlinkSymbolsALot	Removed
UnlockCommercialFeatures	Removed
Use486InstrsOnly	Removed

JDK 8 options	Resolution in liberica-perf 8
UseAdaptiveGCBoundary	Removed
UseAESIntrinsics	Moved to diagnostic flags
UseAltSigs	Removed
UseAutoGCSelectPolicy	Removed
UseBoundThreads	Removed
UseCMSBestFit	Removed
UseCMSCollectionPassing	Removed
UseCMSCompactAtFullCollection	Removed
UseCMSInitiatingOccupancyOnly	Removed
UseCompilerSafepoints	Removed
UseConcMarkSweepGC	Removed
UseCRC32Intrinsics	Moved to diagnostic flags
UseFastAccessorMethods	Removed
UseFastEmptyMethods	Removed
UseGCLogFileRotation	Removed
UseGCTaskAffinity	Removed
UseGHASHIntrinsics	Moved to diagnostic flags

JDK 8 options	Resolution in liberica-perf 8
UseLargePagesInMetaspace	Removed
UseLegacyJNINameEscaping	Removed
UseLockedTracing	Removed
UseLWPSynchronization	Removed
UseMathExactIntrinsics	Moved to diagnostic flags
UseMembar	Removed
UseMontgomeryMultiplyIntrinsic	Moved to diagnostic flags
UseMontgomerySquareIntrinsic	Moved to diagnostic flags
UseMulAddIntrinsic	Moved to diagnostic flags
UseMultiplyToLenIntrinsic	Moved to diagnostic flags
UseOSErrorReporting	Removed from linux build
UseParallelOldGC	Removed
UseParNewGC	Removed
UseRDPCForConstantTableBase	Removed
UseSHA1Intrinsics	Moved to diagnostic flags
UseSHA256Intrinsics	Moved to diagnostic flags
UseSHA512Intrinsics	Moved to diagnostic flags

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JDK 8 options	Resolution in liberica-perf 8
UseSquareToLenIntrinsic	Moved to diagnostic flags
UseVMInterruptibleIO	Removed
VerifyMergedCPBytecodes	Removed
VMThreadHintNoPreempt	Removed
WorkAroundNPTLTimedWaitHang	Removed



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