

Liberica Native Image Kit 24.1.0+1 (23+38) Release Notes



Liberica NIK
23
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be//soft

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1. Introduction

This document provides information about Liberica NIK release.

This particular version of Liberica NIK 24.1.0+1 is based on Liberica JDK 23+38.

**Note:**

For more information about Liberica JDK release, see [Liberica JDK Release Notes](#).

[Liberica Native Image Kit](#) is a utility Based on [GraalVM Open Source](#) that is capable of converting your JVM-based application into a fully compiled native executable ahead-of-time under the closed-world assumption with an almost instant startup time.

Liberica NIK supports the following platforms:

- Linux x86_64 (glibc)
- Linux Alpine x86_64 (musl)
- Linux AArch64 (glibc)
- Linux Alpine AArch64 (musl)
- Mac OS x86_64
- Mac OS AArch64
- Windows x86_64

Liberica NIK distribution

Liberica NIK is distributed as .apk, .deb, .dmg, .msi, .pkg, .rpm, .tar.gz, and .zip packages. Please [select the most appropriate](#) for your purposes.

2. What's New

This release contains the following updates and new features.

Notable Issues

This release does not contain any notable issues. For the list of Liberica JDK notable issues, see [Liberica JDK Release Notes](#)

Language and framework versions

Liberica NIK 24.1.0 supports the following languages and frameworks:

Component	Version
LLVM	18.1.3 (GraalVM CE Native 24.1.0)
Python	3.11.7 (GraalVM CE Native 24.1.0)
Node.js	20.15.1
Java	Liberica JDK 23+38
Java Script	GraalVM JavaScript (GraalVM CE Native 24.1.0)
TruffleRuby	24.1.0 (Ruby 3.2.4)
Native Image	GraalVM version 24.1.0 (Liberica JDK 23+38, LTS)

Component	Version
Wasm	WebAssembly (GraalVM CE Native 24.1.0)

3. Known Issues

This release does not contain any known issues. For the list of Liberica JDK known issues, see [Liberica JDK Release Notes](#)

4. CVEs

This release does not contain any fixed CVEs. For the list of Liberica JDK fixed CVEs, see [Liberica JDK Release Notes](#)

5. Resolved Issues

Liberica NIK issues

This is the list of Liberica NIK issues fixed in this release.

Issue ID	Summary
GR-16411	Add gid getter for pwd struct
GR-17457	Use an identity profile to try to make the RegexOptions PE constant in MatchInRegionTRegexNode
GR-18163	Separate <code>rb_set_errinfo/rb_errinfo</code> and <code>\$!</code>
GR-18214	Compacting garbage collection (non-default).
GR-18411	Fix linter warnings
GR-19691	Update the Known CVEs document
GR-20446	Fix recently imported specs
GR-21590	Update Python imports.
GR-21635	TRegex: add <code>MaxDFASize</code> and <code>MaxBackTrackerCompileSize</code> options.
GR-22062	Fixed guard: skip useless pis.
GR-22767	Cleanup native memory at finalization.
GR-23997	Periodic update of the graal import (2023-12-22).

Issue ID	Summary
GR-25734	Remove patches for Nokogiri native extension
GR-25968	Compiler changelog entry for OptimizeLongJumps.
GR-25968	Enable AMD64 long jump replacement just for SVM.
GR-26395	Periodic update of the graal import.
GR-28103	Consolidate JSON printing/parsing across entire codebase
GR-28239	Temporal.Calendar-related improvements.
GR-28866	Allow languages to access scopes of other languages.
GR-28866	Resolved review comments.
GR-31575	Implementation of Resizable and Growable ArrayBuffers proposal.
GR-33074	Relax image heap partitioning and alignment and clean up.
GR-33541	Add support for the v128 value type in WebAssembly bindings.
GR-33678	Build separate static libs for use with musl.
GR-34210	Add assembly read barriers for G1
GR-35112	Verify loop safepoints across loop opts.
GR-36526	Handle relative path issue for tools.
GR-36544	Fix AbstractLanguageLauncher#validateVmArguments() to consider option_vars environment variables

Issue ID	Summary
GR-37533	Update trufferuby import in graal
GR-37712	Backport reachability metadata bugfixes
GR-38293	Fix copyright headers.
GR-38322	Add an option to show the Java stacktrace of a Thread which is missing TruffleSafepoint.poll() calls
GR-38326	Cannot store Auxiliary Engine Cache and use <code>--log.file</code> at the same time.
GR-38700	Update some nodes to use static specializations
GR-38837	Various minor IGV fixes
GR-39807	Make ContextPolicyTest#testOptionDescriptorContextReuse more robust.
GR-40660	Add predicates for Sulong jobs.
GR-40931	Add experimental Truffle support for VirtualThread on HotSpot
GR-41558	Support for lambda class predefinition on Native Image
GR-41869	showOutOfMemoryWarning if builder is OOMKilled.
GR-41996	Avoid recursion in PE, more compatible dict/set pop.
GR-42173	Migrated Chrome Inspector and DAP to system threads.
GR-42261	Prefix <code>native-image</code> output on mx level.
GR-42882	Update testOverloadedFunctionalMethod() for the new expected behavior around bridge methods.

Issue ID	Summary
GR-43052	Add support for tail call, add gcc_c and gcc_cpp test suites on Windows
GR-43440	Minor fixes: remove dead code, all lambdas in PBytecodeRootNode as field, mx graalpytest.
GR-43624	Implement Array.fromAsync proposal.
GR-43837	Enable <code>--report-unsupported-elements-at-runtime</code> by default and deprecate the option.
GR-43839	Use TRegex for java.util.regex in GraalVM Espresso
GR-44298	Remove unused code.
GR-44360	update ray patch
GR-44414	Fix Nashorn test failing in shared-engine mode.
GR-44538	Remove old heap dump implementation.
GR-44560	Allow calling into the host from polyglot isolate's polyglot thread even when the context is not entered.
GR-44733	Public flag for missing registration errors.
GR-45455	Change how stack walking works.
GR-45614	Correctly handle missing services when selecting the DisassemblerProvider
GR-45621	Import CRuby 3.2.4
GR-45628	Add support for detecting icx.

Issue ID	Summary
GR-45697	Fix inheritance of mp_length/sq_length when they overlap between managed and native superclasses.
GR-45720	TRegex: cleanups and more compatibility work on OracleDBFlavor.
GR-45765	Runtime compiled frames are supported by optimized exception handling by now
GR-45840	Force UTF-8 python IO encoding
GR-45954	Propagate recordInlinedMethods property through EncodedGraph
GR-46061	Tool wrapper prints its identification after the wrapped tool.
GR-46114	Update JavaDocs for SandboxPolicy.UNTRUSTED.
GR-46188	Make sure to create host uncompressed strings on string conversion, when string compression is disabled for host.
GR-46399	Use -Xms14g when building libpythonvm
GR-46412	Reduction of the size of the heap dump.
GR-46564	Support more than one image CodeInfo and reduce frame info redundancy with global method ids.
GR-46803	Fix potential race leading to classes with null module.
GR-47010	Add method modifier and signature to a JfrMethod entry.
GR-47015	Fix Proxy.isProxyClass().
GR-47024	Optimize TestIntegrityLevel and SetIntegrityLevel.

Issue ID	Summary
GR-47098	Update overlay import.
GR-47109	Support JFR event ObjectAllocationSample.
GR-47182	Implement basic jumps
GR-47365	Integrate proxy registration to the reflection config
GR-47365	Update JSON schemas for proxy registrations
GR-47371	Add <code>perf</code> documentation.
GR-47515	Use <code>inlinebeforeanalysis</code> method handle intrinsicification for Runtime Compilations.
GR-47561	Disable the shared use of data caches among multiple compilations.
GR-47565	Do not skip self in <code>PyCFunctionWrapper</code> .
GR-47565	Patch for flake8 and category-encoders.
GR-47712	Report error if building static executable without musl libc.
GR-47832	Support JEP 424 ("Panama") foreign upcalls in Native Image.
GR-47965	Migrate to <code>TruffleThreadBuilder</code> API.
GR-48116	Remove <code>IntrinsicifyMethodHandlesInvocationPlugin</code> .
GR-48400	Migrate Truffle doclet usage to JDK 21 javadoc builtin features.
GR-48435	Enable Java code generation for retry compilations

Issue ID	Summary
GR-48439	Port refactored graphio BGV parsing to compiler folder
GR-48481	Deploy python as polyglot isolate.
GR-48516	Fix NPE in isRegisteredDeoptEntry.
GR-48562	Update linux-jdk-latest devkit.
GR-48563	Remove workaround for enterprise compiler
GR-48573	Deopt in Unsafe allocate based on jvmti _should_notify_object_alloc.
GR-48643	Prohibit recursion in compiler phases.
GR-48683	Add JFR event OldObjectSample.
GR-48779	Implement exception groups
GR-48780	Implement exception notes
GR-48809	Update to Python 3.11
GR-48860	Port jobs to JDK-latest.
GR-48910	Add leak test for Native Primitive storages
GR-48915	Disabling Test262 tests that run too long in compile mode.
GR-48926	Call the adapter when reflectively invoking a caller-sensitive method
GR-48956	Update -g to include all information for profiling. Fix the problem with objcopy strip command.

Issue ID	Summary
GR-49230	Sampler statistics should aggregate thread local variables.
GR-49240	Update SyncPort info.
GR-49304	Remove use of CompilationLevelAdjustment.
GR-49326	Upgrade Quarkus benchmarks to use NI bundles
GR-49374	[DO NOT MERGE] Remove ZeroExtendNode.inputAlwaysPositive and related optimizations.
GR-49383	Implement base layer open-world analysis
GR-49418	Fix AArch64AtomicMove.
GR-49484	Bytecode index support for stack traces.
GR-49587	Migrate Benchmarking to JDK latest.
GR-49589	False Truffle TCK negative for DebugJSAgent.terminate.
GR-49675	Untag a few transient failures
GR-49708	Implement open type world virtual method dispatch
GR-49739	Context-bound TruffleLoggers ignore log level.
GR-49770	Use Glob Patterns In Resource Config File
GR-49932	Introduce OptionMigrationMessage.
GR-49965	Persist and reload analysis universe and shadow heap

Issue ID	Summary
GR-49987	TRegex: add InputStringGenerator.
GR-49991	Lower AMD64 float conversions to assembly
GR-49996	Make -jar only implicitly set image name if not already defined previously.
GR-50009	Some fixes for CFI.
GR-50018	Simplify/outline UnsupportedSpecializationException branch in execute methods.
GR-50022	Collect datapoints in instrumentation stages
GR-50122	Re-enable jdk-latest jobs on darwin-amd64 and move to macOS BigSur.
GR-50165	Make Sulong standalone tests daily on windows because of transient issue GR-50165.
GR-50176	Implementation of the typeReached conditional for reflection.
GR-50217	Added a LTS compatibility gate for NFI native unittests.
GR-50217	Added generic command to run truffle native unittests.
GR-50234	Cleanup outdated Sulong jobs.
GR-50240	Wrap HotSpotObjectConstant directly in ImageHeapConstant.
GR-50259	Throw exceptions for missing resource bundle registrations
GR-50266	Fix some missing Truffle requirements for Espresso.
GR-50282	Add ray 2.9.1 patch

Issue ID	Summary
GR-50352	Add support for printing all Graal options.
GR-50357	Remove iterated instrumentation
GR-50358	Disable problematic Spark benchmarks for libgraal
GR-50384	Stackifier: Fix unreachable break statements in switch cases
GR-50385	Include all reflection queries for registered classes
GR-50399	Use precise Unresolved deopts in -Xcomp mode
GR-50424	Use both time -v and custom rss percentile tracker for benchmarking.
GR-50428	Fix underflow in MethodHandlePlugin
GR-50432	Allow fields to be registered for reflection without being made reachable
GR-50434	Introduce more flexible type descriptors for JSON configuration
GR-50456	Add ci overlays for galahad
GR-50456	Merge back galahad branch
GR-50672	Fix coverage failures.
GR-50674	Add Truffle owners.
GR-50693	Propagate information through CompressionNodes during conditional elimination.
GR-50709	Next dev cycle 24.1.0

Issue ID	Summary
GR-50709	Use release version for maven artifacts starting with next dev cycle
GR-50772	Fix AArch64 signExtend constant folding ignoring output bits
GR-50779	Bump mx version
GR-50787	Fix the async sampler transient failure.
GR-50801	Implement new readBuffer interop API in Espresso.
GR-50812	Remove method bootstrapping workaround
GR-50815	Enforce that DT_TEXTREL is not used
GR-50832	Do not run post-merge jobs on the galahad branch
GR-50843	Added record and switch bootstrap methods into allows list.
GR-50847	Generated venv laucher for windows in JBangIntegration assumes there is a maven project.
GR-50859	Handle recently started threads without Thread object and NPE during VMOperation.
GR-50864	Unify profiling counters memory
GR-50866	Remove single threaded mode (-H:-MultiThreaded).
GR-50900	Bump the mx version to start compiling with ECJ 3.36.
GR-50901	TRegex: fix compiler graph explosions when running unit tests with CompileImmediately.
GR-50924	Add loop speculation overflow test.

Issue ID	Summary
GR-50927	Change return type of Parser.restoreBlock() to void.
GR-50931	Update JVMCI to 23+3-jvmci-b01
GR-50945	Fixed missing RuntimeCompileMethods option.
GR-50951	Fix graalpy dependencies.
GR-50955	The gate-compiler-test_zgc-labsjdk-latest-linux-aarch64 takes too long.
GR-50957	Add tests for VirtualFileSystem.
GR-50960	Prevent macronodes in deoptimization targets
GR-50981	Avoiding a potential AssertionError.
GR-50987	Unify bench-suite name in data collection
GR-50990	Make options engine.CompilerThreads and engine.CompilationFailureAction available under UNTRUSTED sandbox policy.
GR-50992	Add CompilationIsolateOptions.
GR-51002	Improve intrinsicification of method handles.
GR-51004	Add Truffle Windows gate build on jdkLatest.
GR-51009	Expression string should be provided also by instrumented nodes.
GR-51012	The LibGraal Truffle gate fails on host compilation error.
GR-51015	Workaround for specjvm2008:mpegaudio concurrency issues

Issue ID	Summary
GR-51016	Enable WebAssembly by default in Node.js.
GR-51017	Use JDK 17 for building Quarkus
GR-51019	refactor/remove default array interop messages implementation.
GR-51024	The polyglot app venv launcher does not have to use mvn.
GR-51027	Aarch: Add means for post-processing code after emitting from LIR.
GR-51034	Don't try to replace node with itself
GR-51043	Fix non-converging case in Partial Escape Analysis
GR-51045	Move intrinsicified _pickle module
GR-51053	Fix env var check on Windows.
GR-51054	Array length: fix missing arg for canon search constant length.
GR-51059	Resolve configuration conditions during JSON parsing.
GR-51062	Add info about storing configs in META-INF/native-image/ directory.
GR-51063	Revert "Restore some post-merge snapshots builds."
GR-51067	Add multi-frame serializable continuations to Espresso.
GR-51074	Introduce ReportFatalErrorOnOutOfMemoryError
GR-51077	Clean up single-threaded code
GR-51078	Use 64k page size by default at image build-time.

Issue ID	Summary
GR-51085	Prevent embedding full build path in Native Image generated shared libs.
GR-51086	Introduce <code>--static-nolibc</code> API option.
GR-51099	Generate <code>List.of()</code> instead of <code>Arrays.asList()</code> .
GR-51104	Catch disallowed objects in object reachable callback.
GR-51105	Fix method override reachability handler notification.
GR-51106	Cleanup <code>registerAsUnsafeAccessed</code> .
GR-51107	<code>IntegerTestNode</code> : more canon.
GR-51120	Add support for the <code>UnsupportedMessage</code> polyglot builtin exception.
GR-51121	Only use <code>-H:Path</code> validation in non-bundle mode.
GR-51124	Improvements of consistency of delete, get and set operations on foreign objects.
GR-51131	<code>FrequencyBasedPropertyGetNode</code> should respect the receiver.
GR-51132	<code>NoClassDefFoundError</code> when running polyglot app in java mode.
GR-51137	Inform about invalid <code>--exclude-config</code> regexes.
GR-51139	Add <code>truffle-islisp</code> entry to <code>Languages.md</code> .
GR-51140	Put additional JDK libs into <code>bin/</code> dir on Windows.
GR-51141	Cleanups.

Issue ID	Summary
GR-51143	Publish nightly dev builds based on JDK23.
GR-51148	Fix corner case where cached fields should not be generated for createCachedFields.
GR-51149	Removed obsolete message.
GR-51149	Wrong error message when polyglot implementation is missing.
GR-51153	Added a test for linking classes by compiler.
GR-51153	PEGraphDecoder#handleInvokeWithCallTarget check for a method from an unlinked class is no more valid.
GR-51157	Update mx import.
GR-51158	Implement VirtualThread.notifyJvmtiDisableSuspend intrinsic.
GR-51160	Avoid deadlocks when the VM is out-of-memory and other threading-related fixes.
GR-51160	Update JavaMonitor and JavaMonitorQueuedSynchronizer.
GR-51161	Handle exceptions in CEntryPointSnippets.ensureJavaThread().
GR-51162	Update TCK.md to use maven to run the TCK test.
GR-51172	Add allocation paths with exception to the compiler.
GR-51177	Randomized entry points for untrusted code
GR-51179	Provide a method to set the physical memory size.
GR-51184	Reduce the execution time of graalwasm test coverage runs.

Issue ID	Summary
GR-51194	Do not mark objects as reachable that are only used in FrameState.
GR-51195	Improve execution of libgraal with asserts
GR-51196	Ensure all pip dependencies are installed.
GR-51198	Call PlatformThreads.beforeThreadRun() consistently.
GR-51198	Fix execution order of ThreadListenerSupport.afterThreadRun().
GR-51198	ThreadListener.afterThreadRun() and afterThreadExit() must not throw any exceptions.
GR-51204	Fix Thread.isAlive() so that its return value is consistent.
GR-51205	Avoid needlessly rescanning objects.
GR-51210	Espresso: clean up README and add some internal docs.
GR-51211	Preparations for multiple image heaps at runtime.
GR-51213	Ensure that PlatformThreads.unattachedStartedThreads and PlatformThreads.nonDaemonThreads have consistent values.
GR-51213	Verify that PlatformThreads.nonDaemonThreads does not turn negative.
GR-51214	Optimizing delete operator applied to a global object.
GR-51220	Fix running jupyter
GR-51226	Further improve benchmarks stability.
GR-51227	Fix issue with shared engine, quickening and OSR.

Issue ID	Summary
GR-51228	Create test for jbang integration
GR-51234	Update Source.Builder.buildLiteral() method description.
GR-51235	Fix typo in Shape.newBuilder().layout().
GR-51238	Fixes for espresso 21 guest on 22 host.
GR-51253	Extend allowed DynamicObject shape flags to 16 bits.
GR-51267	Invocation profiles are not needed for JIT compilation.
GR-51271	Fix bounds computation for floating point conversion
GR-51273	Implement stable names for arbitrary method handles
GR-51274	Remove references to the removed gu component.
GR-51274	Remove the GraalVM Component Updater (gu) and the installables.
GR-51276	Use latest labsjdk in Quarkus github workflow
GR-51277	Implement stable names for injected invoker
GR-51279	Espresso: impose a 64mb floor on the heap size.
GR-51285	Fixes and improvements while preparing for Espresso JVMCI.
GR-51285	Fix running protobuf on java -truffle in the default configuration.
GR-51286	Add ole32.lib as AWT linking dependency on Windows.
GR-51305	Implementation of Float16Array proposal.

Issue ID	Summary
GR-51306	Review Foreign Interface Native Image doc.
GR-51310	Update truffleruby import in vm
GR-51316	Avoid inflating monitors when installing hash codes for LM_LIGHTWEIGHT.
GR-51318	The <code>_test_libgraal_truffle</code> contains an unused code.
GR-51320	Fix <code>GradualInstrumentationTest#testRepeatedInstrumentationChangesParentsInMaterializedTreeIfSubtreesAreNotCloned</code> by making sure that retired nodes from the first instrumentation are kept alive.
GR-51322	Fix <code>Cpuid1Ecx</code> feature parsing for AMD CPUs.
GR-51325	Add support to native async methods
GR-51330	Support per-thread suspend/resume.
GR-51333	More precise integer stamp folding
GR-51335	Update download links for 24.0.0.
GR-51348	Add required 24.0.0 release updates to docs.
GR-51349	Let <code>getMaxLaneCount()</code> report zero for now.
GR-51350	Update <code>graalvm17</code> command in OCI Cloud Shell and Cloud Editor guides.
GR-51360	Module <code>jdk.jfr</code> not found, required by <code>org.graalvm.polyglot</code> .
GR-51363	Remove <code>ExtendedAsserts</code> option.
GR-51364	Don't add node with dead input to the graph

Issue ID	Summary
GR-51379	Deprecate ImageHeapConstant.getType(MetaAccessProvider).
GR-51382	Use 99th rss percentile as max-rss.
GR-51384	Break class initialization cycle in XML classes.
GR-51385	Debugger API to ignore unavailable source sections.
GR-51393	Small optimization for Heap.getAllClasses().
GR-51398	AbstractIntArray.containsHoleValue() should consider the array offset.
GR-51399	Fix quickening/generalization in the presence of extended args.
GR-51402	Add tests for various functional interface conversions.
GR-51402	Polyglot function proxies should infer the return type from the generic parameter type of the target method.
GR-51403	Fix incorrect quickening of BINARY_SUBSCR
GR-51407	Class-initializaiton error message should not mention -H:+StrictImageHeap
GR-51408	Implement more native fast paths for HPy.
GR-51411	PGO Docs.
GR-51412	Use reachability hooks instead of object replacers where appropriate.
GR-51414	Enable renaissance dotty
GR-51416	Registering a class as initialize-at-build-time should immediately trigger initialization.

Issue ID	Summary
GR-51418	Reduce iterations of micro native benchmarks.
GR-51422	Remove pending analysis operations message.
GR-51428	Skip SHA2.implCompress0 intrinsic check when UseAVX=0 is specified.
GR-51429	IV: only non overflowing constant properties should be constant.
GR-51431	Remove benchmark datapoint repair
GR-51434	Use safe abs in loop opts.
GR-51436	Add @BasedOnJDKFile annotation
GR-51436	Annotate more code with @BasedOnJDKFile.
GR-51436	Annotate Native Images Sources with @BasedOnJDKFile
GR-51440	Fix a Windows-specific thread handle leak.
GR-51442	Fix NFI build problem on Windows.
GR-51446	Adapt unittests.
GR-51446	Change handling of unstructured locking to avoid parser bailouts where possible.
GR-51446	Correct handling of unstructured locking at return and unwind.
GR-51446	Handle unstructured locking at merges.
GR-51446	Handle unstructured locking to avoid parser bailouts where possible.

Issue ID	Summary
GR-51446	Incorporate reviewer feedback.
GR-51446	JCK compatibility wrt explicitly unlocking method synchronized object.
GR-51446	Lowering for UNSTRUCTURED_LOCKING BytecodeExceptionKind for HotSpot and SVM.
GR-51446	Remove BytecodeException for unstructured locking for HotSpot.
GR-51446	Use ForeignCall for UnsupportedFeatureError.
GR-51447	Do not leak PyMethodDefWrapper to native.
GR-51457	Micronaut extension.
GR-51460	Create HostedValuesProvider.
GR-51460	Move all fields interceptions to FieldValueInterceptionSupport.
GR-51460	Various clean-ups.
GR-51469	Fix a bug in the IsolateArgumentParser.
GR-51470	Fix and improve Truffle option lists.
GR-51476	Throw missing registration errors for array instantiation
GR-51477	Use the proper GraphBuilderPhase when changing the configuration
GR-51480	Exclude option fields when include all fields
GR-51487	LoopFragment: Properly handle shared virtual objects from a loop body.

Issue ID	Summary
GR-51490	Iterator.prototype.constructor/Symbol.toStringTag should be accessors.
GR-51492	Array length test: add test penetrating non inlined case.
GR-51494	Generalize profile recording API
GR-51505	Cleanups and minor fixes.
GR-51512	Simplify thread detach, isolate teardown, and fix a Windows-specific thread handle leak.
GR-51515	Fold HostedvsRuntimeOptions.md into BuildOption.md; Add info about Build Output and Reports.
GR-51520	Remove the old class initialization strategy.
GR-51521	Update micronaut benchmarks to 4.3.1, removing -H:-StrictImageHeap usage
GR-51522	Make calltrace calculation more resilient to null values.
GR-51523	TRegex bug fixes.
GR-51524	Fix and improve invalid option reporting.
GR-51526	Fix failing JFR tests.
GR-51529	FileSystemsTest#testSetAttribute() fails on JDK-23-linux.
GR-51531	Fix accesses to indirect mx imports
GR-51531	Fix more accesses to indirect mx imports
GR-51536	Backport changes from nds/foreign-upcall to include in the next release

Issue ID	Summary
GR-51537	Keep track of LIR instructions that modify stack pointer.
GR-51542	Fix rbp handling when configuring registers on Windows.
GR-52189	Properly propagate NFI exceptions between backends.
GR-52190	Fix double free in eagerly-native argument tuple handling
GR-52191	Fix cpyext test errors on windows
GR-52192	Fix single stepping in Espresso JDWP when stepping within not yet loaded code.
GR-52199	Maven plugin should not need the launcher on the project classpath.
GR-52200	We should make embedding resources optional.
GR-52202	Hardcode the path to the vfs.
GR-52203	Fix UnsupportedOperationException in richcompare nodes.
GR-52204	Avoid invalidating no-prototype-elements assumption with manual Array subclassing.
GR-52207	Consolidate access to hidden attributes
GR-52209	Update dependencies in TRegex casefolding tool.
GR-52211	Re-enable should verify framestates for runtime compiled methods.
GR-52213	Port base GraalVM deploy jobs to run-spec.
GR-52223	Components licensed under UPL: Copyright notice missing.

Issue ID	Summary
GR-52229	CPython like slots infrastructure and implementation of nb_bool, tp_descrset/get, tp_getattr(o), sq/mp_length.
GR-52234	Specify full URL in @BasedOnJDKFile
GR-52239	Extract common deps and simplify GraalVM CI scripts.
GR-52240	Fix NPE in JDWP when debugger asks for local variable table.
GR-52242	Drop unused fallback code to find reporterhelper.
GR-52250	Fix host inlining of Float comparison operations.
GR-52252	Make it easier to disable async parsing for all inputs
GR-52253	Improve stability of FrequencyBasedPolymorphicAccessNode.
GR-52265	Extend layered images support.
GR-52268	Some fixes in Multibyte*Builtins.
GR-52269	MoveGuardsUpwards: respect dom tree.
GR-52271	Missing symbol PyTruffleWeakref_GET_OBJECT
GR-52274	Switch aarch64registerconfig to check for darwin instead of not darwin.
GR-52278	Fix print name for hosted universe
GR-52284	Improve runtime method call tracing.
GR-52292	Add patch for cryptography-39.0.2

Issue ID	Summary
GR-52295	JFR Throttler Sampling Distribution Test Update.
GR-52297	Update numpy and cython
GR-52302	NPE while diagnosing compilation failure when using compilation in isolate.
GR-52305	Update galahad to jdk-23+12-835.
GR-52314	Make MissingRegistrationReportingMode a runtime option
GR-52320	Allow custom type resolving in profile replay
GR-52324	Add InsertGuardFencesPhase into runtime compilation phases.
GR-52328	Improve an error message when a polyglot does not support the requested sandbox policy.
GR-52333	Refactor and update module system native substitutions
GR-52336	Fix parsing of local variable table in espresso and adapt JDWP implementation.
GR-52338	Fix wasm.jar not being included in nodejs jvm standalone.
GR-52339	Small fixes and improvements.
GR-52340	Sync with galahad branch
GR-52352	Remove the claims about testing for ftp and jar protocols.
GR-52358	Correctly handle invokeSpecial for method handle constructors
GR-52362	JVM standalones without LibGaal should include the Graal compiler.

Issue ID	Summary
GR-52363	Clean up IdentityHashCodeProvider.
GR-52363	Improve TypedConstant.
GR-52366	Cleanup around JSDynamicObject toString methods.
GR-52371	IPython support
GR-52380	Extract from python-embedding what is only build-time relevant.
GR-52397	Fix empty-check issue in OracleDB flavor.
GR-52401	Add logging to GraalPy launcher #386.
GR-52401	Fix #356 and #386: executable path resolution when GraalPy bin is last in \$PATH.
GR-52402	Use correct compare size in AMD64NormalizedUnsignedCompareOp
GR-52403	Update Windows installation guide to be compatible with GraalVM for JDK 22
GR-52409	Fix parent pointers in the inlining log.
GR-52410	Disable jbang test as hot fix for problems with jcoding
GR-52415	Enhance PrintIntrinsics output.
GR-52433	The Target_java_lang_Module file is incorrectly formatted.
GR-52437	Avoid HashMap lookup for resolving tagged pointers.
GR-52438	Cleanup the API of Write/Read attribute nodes

Issue ID	Summary
GR-52439	Existing property (even accessor without a getter) is readable.
GR-52443	DynamicObject API cleanup.
GR-52444	Ensure the return address for deopt handler and exception entry are unique
GR-52453	Implement <code>jdk.ContainerConfiguration.hostTotalMemory()</code>
GR-52454	Add exit handlers if JFR or NMT are enabled.
GR-52456	Add nightly workflow for Spring.
GR-52456	Add weekly workflow for reachability metadata.
GR-52458	Adjust inline cache check size for forced 4-byte displacements
GR-52467	Update galahad-jdk to jdk-23+13-926.
GR-52472	Fix empty-check semantics of OracleDB in the optional part of unrolled quantifiers.
GR-52473	Backport to 24.1: Allow custom constructors for arrays and enums.
GR-52474	Gate-external-mvn-simplelanguage-jdk-latest times out.
GR-52476	Update mx version
GR-52483	New Call tree CSV format
GR-52484	Partial support for physical memory usage and JFR tests for periodic native events.
GR-52487	Merge master into galahad.

Issue ID	Summary
GR-52494	Fix out of bounds regex exec call in <code>String.prototype.split</code> in nashorn compat mode.
GR-52500	Set <code>maven.repo.local</code> for gate jobs.
GR-52500	Set <code>maven.repo.local</code> for gate jobs - remove mvn purge from tests.
GR-52507	Minor touch ups to Graal option help text.
GR-52514	Add <code>FeatureHandler.containsFeature()</code> .
GR-52521	Fix <code>CounterSupport</code> shutdown hook.
GR-52523	Records cannot use <code>Word</code> types.
GR-52525	<code>ModuleExportName</code> can be either <code>IdentifierName</code> or <code>StringLiteral</code> .
GR-52528	Update build output help
GR-52530	Fixed disabled truffle logger combined with contexts with default log levels.
GR-52530	Fixed pre-initialized context bound loggers.
GR-52530	<code>LoggingTest#testDisableLoggersSingleContext</code> fails.
GR-52534	Change digest algorithm and encoding.
GR-52535	Filter <code>ClassSpecializer\$SpeciesData.transformHelpers</code> cache.
GR-52539	Fix native-image detection if no <code>--jvm</code> argument was given
GR-52540	Fix handling of direct root methods that are intrinsified.

Issue ID	Summary
GR-52553	Allow MethodHandles.Lookup to load predefined classes.
GR-52556	Fix issue when stepping and resuming only the current thread.
GR-52557	Add more error context.
GR-52557	Pi node: guard against deletion in recursion.
GR-52559	Merge master as of GR-52162 into galahad.
GR-52561	Implement C API symbol cache using an array.
GR-52565	Fix stepping into intrinsified Java methods in JDWP.
GR-52569	Add regression test.
GR-52569	Fix isResultArrayIndex check for ToArrayIndexNode without ToPropertyKey conversion.
GR-52569	Fix potential ArrayIndexOutOfBoundsException when setting an element at a negative index.
GR-52577	Check that every CI job has defined_in set properly.
GR-52578	Dump All Registered Resources
GR-52583	Update onnxruntime to 1.17.1
GR-52593	Add PLT/GOT implementation for Windows.
GR-52596	Restrict applicability of RemoveOpaqueValuePhase.
GR-52599	Remove HostVM.installInThread.

Issue ID	Summary
GR-52603	Invoke revision registry endpoint.
GR-52606	Replace DynamicObjectLibrary usages with attr Read/Write nodes
GR-52612	check <i>new</i> against requested name of builtin annotations
GR-52619	Add dummy impl for gc.get_referrers.
GR-52620	Fix flags passed to CompilationTask
GR-52621	Graph order: ensure dead node cycles are not wrongly detected.
GR-52624	Minor fixes and cleanup.
GR-52624	TruffleStringBuilderUTF16 capacity should be in chars, not bytes.
GR-52628	Update torch to 2.2.1
GR-52635	Class.getClasses() can be called in AOT already.
GR-52637	Add missing "requires" to module info.
GR-52637	Make jcodings dependency optional.
GR-52641	Avoid unnecessary NodeSourcePosition for runtime compilation.
GR-52642	Avoiding race conditions during the access of invertedMap of well-known Symbols.
GR-52643	Fix libgraal build failure detected in jdk-23-galahadeestaging+1-78.
GR-52647	Add frame anchor verification.

Issue ID	Summary
GR-52649	Abstract binutils wrapper introduced.
GR-52652	Add tools to espresso standalone.
GR-52654	GraalWasm SIMD: less array allocations in interpreter and Buffer interop support.
GR-52656	Respect boxing cache in constant compare canonicalization.
GR-52657	Fix simplification of always-deopt FixedGuard.
GR-52658	Allow the execution of ImageHeapScanner reachability tasks after analysis
GR-52663	Synchronizing help messages with graal/docs/tools/profiling.md.
GR-52663	Update documentation for Galahad (JDK23)
GR-52668	Do not set options that don't have to be set (in JSTestRunner).
GR-52669	Fix libgraal build failure.
GR-52672	Use an instance field instead of a static field.
GR-52676	Use Panama for upcalls
GR-52678	Fix newline handling when logging deopt events.
GR-52680	Take down some redundant user guides.
GR-52930	Added TruffleLanguage.Env::getScope(LanguageInfo).
GR-52931	Provide api for a preconfigured context builder for polyglot apps.

Issue ID	Summary
GR-52932	Various cleanups.
GR-52933	Respect quantifier bounds when body of quantifier is dead.
GR-52934	Clean up inner context loggers.
GR-52935	Add a note for <code>-H:+BuildReport</code> not being available in GraalVM CE.
GR-52940	Fix values reported in JFR event <code>GCHeapSummary</code> .
GR-52941	GC-related cleanups.
GR-52942	Add JFR events and track peak usage for native memory tracking.
GR-52944	Avoid repetition when listing available compiler configurations.
GR-52945	Introduce layered image singleton.
GR-52945	Label some Layered Image Singletons.
GR-52953	Add <code>IndirectUsageCanonicalization</code> .
GR-52954	<code>SystemError: HostException: null</code> on eager <code>GraalPyModule</code> init.
GR-52955	Remove <code>diskspace_required</code> from the enumeration
GR-52973	Don't try to build integer constant for different stamp
GR-52973	Various fixes for compiler crashes
GR-52974	Replace <code>DiagnoseDumpLevel</code> and related options with <code>DiagnoseOptions</code> meta-option.

Issue ID	Summary
GR-52975	Retain LC_ variables when sanitizing the environment for the image builder.
GR-52976	Exclude Truffle ASM code from native image.
GR-52976	Exclude unsupported host adapter class generation code from Native Image.
GR-52980	Add regression test.
GR-52980	Map.prototype.forEach needs to import key and value of foreign hash entries.
GR-52983	Avoid lots of upcalls in C API initialization.
GR-52988	Update labsjdk to 23+16-jvmci-b01
GR-52992	Generalize VEXOpAssertion
GR-52993	Use speculation for deopt in Unsafe.allocateInstance InvocationPlugin.
GR-53001	Dead floating node cycle detection: allow the cycle to contain proxies.
GR-53003	Remove -H:-ParseRuntimeOptions for SpecJVM2008
GR-53011	Fix build problems of libsulong++ on Windows.
GR-53012	Add truffle runtime on module-path in the TruffleUnittestConfig.
GR-53012	Resolved review comments.
GR-53024	Enforce no javadoc warnings in the gates
GR-53028	Use the injected VM config instead of the one from the runtime singleton.
GR-53035	Implement async stack trace sampling support.

Issue ID	Summary
GR-53037	Fix leak when deleting from native storage
GR-53043	Rename ModuleResourcePair according to its purpose
GR-53044	JDWP method invocation fix.
GR-53047	Fix infinite loop in flame graph js.
GR-53060	Do not fail gates because of hardcoded versions.
GR-53073	Use concrete VirtualFrame return type to help static analysis.
GR-53074	Process BytecodeOSRNode independently of other types when reporting node replaced
GR-53077	Upgrading the underlying Node.js to version 18.20.2.
GR-53079	Timeout of BytecodeOSRNodeTest#testFrameTransferWithStaticAccessesWithAssertion sDisabled.
GR-53091	Avoid passing boxed object through TruffleBoundary in Sulong NFI call path.
GR-53094	Replace notify_emails by notify_groups for truffle gates.
GR-53094	Updated ci-overlays.
GR-53279	Fix value passed to AMD64ByteSwapOp
GR-53279	Various compiler crash fixes
GR-53299	Rewire all usages in LoopFragmentInside.placeNewSegmentAndCleanup

Issue ID	Summary
GR-53300	Make the esm-eval-returns-exports option be stable and usable in sandbox mode.
GR-53302	Fixes for pybind11, part #1
GR-53303	Update labsjdk to 23+17-jvmci-b01
GR-53313	Fix Java module warning in TRUFFLE_NFI_PANAMA.
GR-53325	Update labsjdk to 23+18-jvmci-b01
GR-53334	Refactor tags into tag groups.
GR-53338	Revert changes to gate predicates.
GR-53338	Run corresponding gates when md files are changed that are checked against code.
GR-53340	Follow-up documentation update requests.
GR-53353	Add sdk.MUSL_CMAKE_TOOLCHAIN
GR-53359	Provide native debugging friendly classloadername based on ClassLoader.nameAndId
GR-53366	Add more patches for cryptography
GR-53367	Add patch for cffi 1.16.0 as requested by fsspec and datasets
GR-53368	Update autopatch_capi to deal with more usages of m_ml and m_module access.
GR-53369	Fixes for optuna

Issue ID	Summary
GR-53369	Fixes for optuna, pyarrow, psycopg2, cryptography
GR-53369	Implement fcntl.ioctl
GR-53370	Stash exception state when calling native destructors
GR-53371	Fixes for prophet
GR-53372	Fix sktime, reacquire GIL after async handler exception
GR-53373	Update Cython patch to reythonize files after unpatched Cython
GR-53373	Update scipy-1.9.3 patch to select a working pythran version
GR-53382	Update the MethodHandleFeature to initialize basic types
GR-53384	Setting targets attribute for artifact builds.
GR-53385	Fix: DeltaBlue benchmark buffer leak.
GR-53386	Avoid lock contention around WeakHashMap.
GR-53389	Access accessors directly when invoking method handles.
GR-53391	Don't try to fold empty stamps in UnaryMathIntrinsicNode
GR-53397	Make graal osr test usable outside of inheritance.
GR-53405	Type mapping perf improvements.
GR-53406	Highly concurrent execution with shared engines contend on TransitionMap.
GR-53407	Optionally ignore OutOfMemoryErrors while in VM-internal code.

Issue ID	Summary
GR-53410	Improve type and method identifiers for base layer snapshot
GR-53411	Make eval-introduced global vars redeclarable.
GR-53419	Provide instructions for run-time class definition in the error message.
GR-53420	Replicate hosted module graph relations for unnamed modules
GR-53427	Fix missing replaces for host to guest compiles by refactoring the replaces into a regular phase.
GR-53428	Backport to 24.1: Libgraal compilation error: java.lang.NullPointerException: Foreign object reference created in scope is no longer valid
GR-53428	Libgraal compilation error: java.lang.NullPointerException: Foreign object reference created in scope is no longer valid
GR-53437	Fix timeout reported in bailout exception thrown by CompilationAlarm.
GR-53439	Change splitting strategy for some core methods
GR-53439	Implement Array#empty? in Java
GR-53439	Report megamorphic on LookupMethodNode node
GR-53442	Review splitting for all nodes that use inline caching
GR-53442	Split nodes that use inline caching
GR-53444	Fixed bug in assertion error.
GR-53447	Support parsing LLVM versions like 18.0.0git in CCompilerInvoker.
GR-53449	Do not register all declared methods of service provider classes for reflection.

Issue ID	Summary
GR-53453	Correction of double to float16 conversion.
GR-53455	Exclude nativeLibraryLockMap and Thread fields when including all
GR-53458	Disable JVMCIVersionCheck for galahad builds
GR-53458	JVMCIVersionCheck should only consider release and early-access OpenJDK version
GR-53462	Adding Array Based Storage abstraction
GR-53462	checking storage size instead of internal array size
GR-53462	EnsureCapacityNode is now void
GR-53462	Fix: Memmove node bug
GR-53462	Use the intrinsified ArrayUtils.indexOf for ByteSequenceStorage#indexOfByte
GR-53463	Update to LLVM 18.
GR-53469	Fix consistency issue in HeapImplMemoryMXBean.getHeapMemoryUsage().
GR-53489	Stop the MaxRssCopyRule from rerunning
GR-53497	Optimize utf8Write, utf8Slice for interop buffers.
GR-53503	Build libespresso with options so we can use the preinit context.
GR-53504	Adapt to JDK-8329949.
GR-53508	Refactor cross layer calls and link base layer .so.

Issue ID	Summary
GR-53520	Use a platform-neutral name for espresso resources on maven.
GR-53526	Normative: Defer ToPropertyKey evaluation in <code>o[p] = f()</code> .
GR-53528	Update labsjdk to 23+21-jvmci-b01
GR-53541	Fixed a deadlock if we run <code>OutOfMemory</code> while entering a synchronized blocks.
GR-53541	<code>OutOfMemoryError</code> -related fixes.
GR-53542	Make sure we convert unexpected Java types before they reach the Python object space.
GR-53552	Remove Future from ImageLayerLoader
GR-53569	Add the profile-inference-pgo-ee JVM config.
GR-53570	Use correct bit width in shift canonicalization
GR-53573	Adding the missing <code>parseFloat</code> specialization for long arguments.
GR-53574	Allow <code>TruffleString</code> only keys in <code>builtinConstants</code>
GR-53574	Store internal module state in a field of <code>PythonModule</code>
GR-53579	Fix <code>BinaryMathIntrinsicNode.canonical</code> usage of node properties
GR-53582	Avoid direct dependency on <code>libcrypt</code>
GR-53583	Updates to Native Image SBOM documentation.
GR-53597	Refactorings.

Issue ID	Summary
GR-53603	Null pointer exception thrown by HSTruffleCompilable.isSameOrSplit.
GR-53610	Use an array for <i>slots</i> instead of HiddenAttrs
GR-53612	Update mx version.
GR-53615	Not all binary libraries are extracted from VFS.
GR-53616	Improve reference docs for espresso.
GR-53617	Expand docs for Java embeddings
GR-53622	Remove <code>getpwuid</code> in favor of <code>getpwuid_r</code> .
GR-53624	Refactor Native Image Getting Started to focus on Maven/Gradle plugins.
GR-53626	Implement slot <code>tp_setattro</code> .
GR-53628	Infer stamp for phi built in <code>LoopFragment.mergeEarlyExits</code>
GR-53629	Adapt to "JDK-8329593: Drop adjustments to target parallelism when virtual threads do I/O on files opened for buffered I/O".
GR-53644	Patching file from <code>joblib</code> fails
GR-53646	Use memory-efficient List for <code>SnippetSignature.parameters</code> .
GR-53656	Align stack pointer while in <code>deoptStub</code> .
GR-53657	Simplify rerunning subprocess based unit tests.
GR-53658	Update feature availability message.

Issue ID	Summary
GR-53668	In emulated mode, is not possible to use joblib
GR-53670	Layered HelloWorld
GR-53680	Support path related flags for loading NFI libraries on Windows.
GR-53687	Patch watchfiles to use patched pyo3
GR-53690	Review Native Image Guides to be consistent.
GR-53691	Delete VisualVM doc contents and redirect to VS Code marketplace.
GR-53698	Ensure bitcode is present in espresso's LLVM java home.
GR-53699	Ensure we can dump graph from espresso running in a native image.
GR-5369	Add mx.vm/ce-fastr-native for building FastR native standalone.
GR-5369	Periodic update of the Graal import.
GR-53701	Intrinsify <i>signature</i> .
GR-53703	ObjectBuiltins.GetAttributeNode is a @Slot, but AbstractCallMethodNode.getVarargs accepts only @Builtin-s.
GR-53704	Persist Layer Typecheck Info.
GR-53705	Remove the concept of "Unsafe partitions".
GR-53708	Update CI overlay commit.
GR-53712	Create subprocess argfiles in current working directory.

Issue ID	Summary
GR-53714	Correction of the handling of long values.
GR-53715	Add Java-level JFR event tests and annotate JfrAdaptiveSampler methods with BasedOnJDKFile
GR-53716	Add utility for replacing resource data after analysis.
GR-53716	Backport to 24.1: Add utility for replacing resource data after analysis.
GR-53717	PostRunCanonicalization phases must call super.notApplicableTo()
GR-53718	Add missing ImportValue in CanonicalizeLocaleList operation.
GR-53718	Add regression test.
GR-53718	Correction of the handling of long and foreign values.
GR-53718	Handle long values larger than int32 in JSToInt32Node.
GR-53718	Work around DSL evaluation order issue with @CachedLibrary(value="args[0]").
GR-53719	Correct handling of bound and foreign functions in instanceof checks.
GR-53719	Fix instanceof caching on bound function targets.
GR-53721	Timeout in BytecodeOSRNodeTest#testFrameTransferWithStaticAccessesWithAssertionSDisabled in coverage job run.
GR-53722	Do not pass SafeInteger to NumberFormatter.
GR-53723	[darwin-aarch64] Create VaList wrapper for foreign pointers

Issue ID	Summary
GR-53723	darwin-aarch64: Create VaList wrapper for foreign pointers
GR-53724	Add regression test.
GR-53724	Ensure missing number exponent results in early SyntaxError.
GR-53724	Lexer: Check for missing exponent and improve error message for missing start digit.
GR-53726	Allow packages to override distribution spec
GR-53727	Add regression tests.
GR-53727	Correction of the handling of very large RegExp lastIndex values.
GR-53733	Refactor JSON printing
GR-53738	Document deoptimization on foreign call.
GR-53747	Enable debug mode for native-image and native-image-configure.
GR-53758	JavaScript fixes for failing wasm-related testv8 tests.
GR-53758	WebAssembly fixes for testv8 tests.
GR-53764	Migrate to sq_item and mp_item slots.
GR-53767	Fix building standalone executable when the user provides a GraalVM CE JDK
GR-53769	The native-truffle-unittest command should use enterprise Truffle runtime when available.
GR-53780	Introduce mx.DownloadableLibrary

Issue ID	Summary
GR-53781	Internal array should not start with a hole after <code>removeRangeHoles()</code> .
GR-53783	Do not read array type before <code>ToArrayIndex()</code> .
GR-53791	Fix nightly builds URL.
GR-53799	Change <code>CCharPointer</code> from "signed char" to "char".
GR-53801	Added context pre-initialization test for unpatched resource roots.
GR-53801	<code>NullPointerException</code> : Cannot invoke " <code>com.oracle.truffle.polyglot.InternalResourceRoots\$Root.path()</code> " because " <code>this.owningRoot</code> " is null.
GR-53801	Resolved review comments.
GR-53801	Updated unittests.
GR-53803	Only allow <code>Unsafe.allocateInstance</code> for types registered explicitly in the configuration.
GR-53804	Update versions in docs and github actions
GR-53811	Return number of copied bytes in <code>LLVMStringHelper</code> .
GR-53819	Add caching for schedule and CFG across phases.
GR-53819	CFG caching based on edge modification count.
GR-53819	Disable <code>CacheInvalidationListener</code> after invalidation.
GR-53819	Refactoring and documentation.
GR-53819	Remove <code>ChainedNodeEventListener</code> .

Issue ID	Summary
GR-53819	Schedule caching based on edge modification count.
GR-53819	Use NodeEventListener for cache invalidation.
GR-53821	Use a non-cryptographic hash for IsolatedSpeculationReasonEncoding.
GR-53822	Improve error message for incorrect usage of await.
GR-53897	Add regression test.
GR-53897	Fix handling of large bits in BigInt.asUintN and asIntN.
GR-53898	Improve TypedArray.prototype.toSorted,sort.
GR-53900	Loop infra: use correct bit size for overflow checks.
GR-53902	Fix DynamicObjectLibrary.setPropertyFlags.
GR-53919	Remove descriptions of allocation-related runtime routines that throw exceptions on allocation failure.
GR-53920	Use hashed lookup in the secondary supers array.
GR-53928	Use maven wrapper in standalone and micronaut tests.
GR-53938	Reimplement linking wasm module imports from JS.
GR-53973	Document that we are on the version 3.6.4 of simdjson already.
GR-53982	Make icu4j dependency on java.desktop optional.
GR-53986	Increase default typed array size limit to 2GB.

Issue ID	Summary
GR-53988	Delete leftover file from java-benchmarks suite.
GR-53988	Remove legacy benchmarks.
GR-53994	Backport to 24.1: Fold GraalVM CE and Oracle GraalVM install guides into one version; add more installation options.
GR-53999	Update container images docs
GR-54001	Correct Graal JIT options
GR-54006	Update labsjdk to 23+22-jvmci-b01
GR-54008	Make PythonThreadState#shuttingDown volatile.
GR-54012	Fix ComputedIndirectCallTargetTests on AArch64
GR-54027	Updated Maven LTS compatibility gates to graalvm-23.1.3. Using common graalvm LTS definition.
GR-54040	Reduce warm and iteration time of specjvm2008
GR-54057	Fix NullPointerException in PrintMethodHistogram.
GR-54060	Ensure shaded dependencies are downloaded before the shading task.
GR-54062	TruffleHostInliningTest is very slow on JDK-23.
GR-54065	Do not keep Graph/LIR objects alive in CompilationAlarm.
GR-54070	Don't let any exceptions slip through out of NFI closures on SVM.
GR-54080	Make compiler CE jobs daily.

Issue ID	Summary
GR-54085	Add MathUtils API with inverse hyperbolic functions (asinh, acosh, atanh).
GR-54085	Improve accuracy of Math.hypot.
GR-54096	fix syntax of anchor in Graal Compiler JIT doc
GR-54098	Add regression test.
GR-54098	RegExp.prototype.exec should not perform ToPrimitive if receiver is invalid.
GR-54098	RegExp.prototype.exec tries to coerce invalid receiver to String.
GR-54107	Unify AnalysisType.isAllocated and isInHeap to isInstantiated.
GR-54108	Fix BuiltinMethodDescriptors leak.
GR-54110	CreateDataPropertyOrThrow on typed array should throw TypeError for out-of-bounds index.
GR-54120	Unsigned loops that need an overflow to terminate must not be counted.
GR-54121	Removed obsolete SubprocessTestUtils methods.
GR-54127	Update labsjdk to 23+23-jvmci-b01
GR-54129	Introduce image layer object file section.
GR-54134	Use Truffle safe points for jdwp frames and monitor entry count.
GR-54135	Give better error message when asserts fail in test_subprocess.py
GR-54163	Added stack traces to non-bailout compilation failures.

Issue ID	Summary
GR-54168	Upgrading the underlying Node.js to version 20.13.1.
GR-54171	Flush wrapped stdout/stderr OutputStream after every write
GR-54177	Disable TestSocketEvents and TestSocketChannelEvents. Fix a problem with TestContainerEvent.
GR-54185	Don't try to commute address add on null pointer
GR-54188	Allow intrinsicification of VarHandle for static fields when class is not initialized.
GR-54192	Adjust timelimits in Sulong jobs to new CI machines.
GR-54196	Fixes for elasticsearch
GR-54198	'typeReached' for serialization and resources.
GR-54222	Ensure LinkageError during loadClass.invoke is propagated to caller.
GR-54223	Fix license files.
GR-54225	NPE if package tag in graalpy-maven-plugin config is empty.
GR-54227	Port Unsafe.setMemory intrinsic.
GR-54229	Port _intpoly_montgomeryMult_P256 and _intpoly_assign intrinsics.
GR-54235	Get pip install numpy to work windows again
GR-54236	Avoid direct slice access in cffi
GR-54237	Avoiding a potential internal error in addRange[Grow]().

Issue ID	Summary
GR-54238	Fix <code>this</code> frame slot access via <code>super()</code> in arrow function.
GR-54241	Introduce <code>reachability-metadata.json</code> to replace the various existing <code>-config.json</code> files
GR-54243	Returns sub-int constants from simulation results.
GR-54253	Use argument parsing functions directly from CPython
GR-54254	Cache managed slots native wrappers to preserve identity on the native side.
GR-54255	Update <code>labsjdk</code> to <code>23+24-jvmci-b01</code>
GR-54260	Fix error around local variable name.
GR-54266	Reduce amount of benchmarking CI usage for JS.
GR-54272	Adopt "8330694: Rename 'HeapRegion' to 'G1HeapRegion'".
GR-54277	Fix <code>ProfileReplay</code> using CFG modified by <code>LIRGen</code>
GR-54282	Remove unused bench jobs
GR-54285	Box the result of a nested constant dynamic if the expected type is not a primitive
GR-54286	Fix heap breakdown printing.
GR-54287	Support <code>numpy 2.0</code>
GR-54293	Allow multiple espresso runtime resources to coexist.
GR-54294	Allow importing modules without I/O access.

Issue ID	Summary
GR-54294	I/O permissions are required even though the module is already evaled.
GR-54305	Convert CrashAtIsFatal to an int.
GR-54310	Remove classpath isolation feature.
GR-54313	TruffleString: fix TruffleStringBuilder and RepeatNode breaking string compaction invariants.
GR-54314	Do not include extra method metadata for Truffle.
GR-54319	Support pyarrow 15.0.0
GR-54323	Don't log CPUSampler error if the sampler is already closed.
GR-54334	Support pandas 2
GR-54338	Test fixes.
GR-54340	Have all cross-layer direct calls use the same cglobal.
GR-54342	Reduce python darwin amd64 gates
GR-54361	Update labsjdk to 23+25-jvmci-b01
GR-54364	Minor bugfix in cSunMiscSignal.c in SVM
GR-54366	Migrate the micronaut extension to micronaut repo.
GR-54375	Release GraalVM 24.1.0.
GR-54381	Update the license file of GraalVM CE and CE standalones.

Issue ID	Summary
GR-54383	Prepare the 24.1 release branches.
GR-54383	Start 24.2.0 dev cycle.
GR-54446	LibTruffleAttachResource should not use CompilerDirectives.shouldNotReachHere.
GR-54450	SRE: pass frame to construct call node.
GR-54457	Backport to 24.1: Refactor resources docs.
GR-54473	Move UnsafeSetMemoryTest to JDK23 project.
GR-54490	Storage strategy hierarchy redesign
GR-54496	Remove espresso from standalones builds.
GR-54502	Fix organization.
GR-54505	Validate Wasm function arguments when called through Interop.
GR-54508	Decorators should not be enabled in ES 2023.
GR-54509	Enabling ECMAScript 2024 features by default.
GR-54516	Support an arbitrary amount of threads in ThreadLocalHandshake
GR-54517	Backport to 24.1: Get rid of FrameInstance#getFrame(READ_WRITE) in Sulong.
GR-54521	Reimplement asinh, acosh, atanh using MathUtils.
GR-54548	Backport to 24.1: JFR CPU profiler should respect the sampling period.

Issue ID	Summary
GR-54549	Backport to 24.1: Fix a problem with SEGFAULT in GameOfLife.
GR-54569	Simplify HotSpotFastThreadLocal and HotSpotThreadLocalHandshake
GR-54578	Refactor cannotBeOverridden checks
GR-54581	Backport to 24.1: Various JNI-related bugfixes.
GR-54585	Backport to 24.1: ReduceCodeSize flag should not be true by default.
GR-54600	Backport to 24.1: Fix StrengthenGraphs for LoadFieldNode when analysis is context sensitive.
GR-54601	Backport to 24.1: Add the InterpreterCallStackHeadRoom option to EnterpriseEngineOptions.
GR-54625	Update labsjdk to 23+26-jvmci-b01 (GraalVM 24.1).
GR-54626	Backport to 24.1: Update the embedders guide to include instructions on how to use polyglot isolates for specific platforms.
GR-54626	Update the embedders guide to include instructions on how to use polyglot isolates for specific platforms.
GR-54640	Skip transiently-failing assertGc() with virtual threads in ContextAPITest#testMultithreadedEnterLeave
GR-54643	Ensure # of virtual threads < # of carrier threads in TruffleSafepointTest
GR-54644	Backport to 24.1: Review and update GraalWasm documentation
GR-54685	Backport: typeReached for Unsafe.allocateInstance
GR-54686	Intrinsify Python _struct module.

Issue ID	Summary
GR-54686	Intrinsify <code>_struct</code> module
GR-54688	Implement <code>gc.callbacks</code> mechanism to make <code>dask</code> benchmark run
GR-54688	Implement <code>getrusage</code> with <code>PosixSupportLibrary</code> to support <code>RUSAGE_CHILDREN</code>
GR-54688	Return <code>None</code> from <code>gc.collect</code> , at least <code>pyperformance</code> benchmarks assert that <code>collect</code> returns either <code>None</code> or the correct number of cycles collected
GR-54696	Add a timeout for GitHub Actions jobs
GR-54696	Skip <code>LoomTest#testManyVirtualThreads</code> as it is too slow and can hang
GR-54706	Wasm modules compiled and instantiated via the JS API should be cached.
GR-54720	Backport <code>isCaptureFrameForTrace</code> fix to 24.1.
GR-54724	Backport to 24.1: Make <code>LocalizationSupport.registerBundleLookup</code> thread safe.
GR-54727	Fix leak of <code>StructSequence</code> builtin nodes and call targets.
GR-54729	<code>AbstractPolyglotTest#threadPool(N, vthreads)</code> should create <code>N</code> threads and not more
GR-54743	Upgrade <code>joni</code> version
GR-54764	Backport to 24.1: Support converting foreign object to a non-mapped interface.
GR-54765	Backport to 24.1: Support stepping in combination with <code>suspend/resume</code> in Truffle debuggers.

Issue ID	Summary
GR-54788	Backport to 24.1: Make Stackifier not modify CFG Basic Block IDs
GR-54789	Refactor polyglot.eval to use new form of isPolyglotEvalAllowed
GR-54790	Infer default maven artifact version and output dir.
GR-54828	Backport to 24.1: Use truffleshoot to avoid the need for --add-exports=java.base/jdk.internal.misc=jdk.graal.compiler.
GR-54828	Use truffleshoot to avoid the need for --add-exports=java.base/jdk.internal.misc=jdk.graal.compiler.
GR-54830	Backport to 24.1: Fix InterpreterCallStackHeadRoom changelog.
GR-54840	Use SyncPort to listen JDK23 backports.
GR-54842	Backport to 24.1: Fix handling of unstructured locking in the presence of deopts.
GR-54844	Backport to 24.1: Enable -H:+IgnoreMaxHeapSizeWhileInVMOperation for polyglot isolate builds by default.
GR-54844	Enable -H:+IgnoreMaxHeapSizeWhileInVMOperation for polyglot isolate builds by default.
GR-54845	Backport to 24.1: Remove sun.misc.Unsafe plugins.
GR-54851	Check that function/block type index is in bounds.
GR-54851	Fix handling of trailing code after terminating end marker.
GR-54868	Fix bugs in the Espresso frame analysis.
GR-54871	Backport to 24.1: Execute bootstrap methods for Proxy at image build time.

Issue ID	Summary
GR-54875	Rename PNodeWithContext.isUncached() to isUncachedNode() to avoid conflicts with future Truffle APIs.
GR-54876	Update labsjdk to 23+29-jvmci-b01
GR-54884	Pin numpy 1 in torch 1 patch
GR-54891	Disable micronaut extension tests for now.
GR-54894	Fix digest warnings for downloads.
GR-54895	Fix digest warnings for downloads.
GR-54905	Allow Truffle NFI Panama to use Linker#{downcallHandle,upcallStub} without warnings
GR-54905	Backport Allow Truffle NFI Panama to use Linker#{downcallHandle,upcallStub} without warnings to 24.1
GR-54907	Backport changes in TruffleRuby master branch to the 24.1 release branch
GR-54907	Backport changes in TruffleRuby master branch to the 24.1 release branch. Part 2
GR-54907	Backport to 24.1: Fix Kernel#eval with non-Ruby shebang
GR-54909	Backport to 24.1: Build libffi with -fvisibility=hidden.
GR-54936	Support native string subclasses in more builtins
GR-54951	Fix calculateProgramFullPath on Windows if program has no extension
GR-54964	Backport multiple PRs to 24.1.

Issue ID	Summary
GR-54969	Backport to 24.1: Don't treat yellow-zone code as VM-internal code.
GR-54977	Patch typing_extensions to recognize _py_abc like stdlib typing module.
GR-54988	Fix repr of recursive foreign array, add getMetaParents
GR-54999	Backport espresso fixes.
GR-55005	Backport to 24.1: Native Image is stricter than the JVM when opening non-existing module
GR-55014	Make VFS.resourcePathToPlatformPath public again with deprecation.
GR-55035	Implement PyContext_XXX CExt APIs.
GR-55037	Fixes for tokenizers
GR-55045	Backport multiple PRs to 24.1.
GR-55062	Rework patch license check
GR-55063	Backport to 24.1: Remove the erroneous assertion in acquireMethodAccessor
GR-55079	Fix some usages of transferToInterpreter()
GR-55081	Backport to 24.1: Fix condition printing and agent conditions
GR-55093	Fix deprecations in Java unit tests
GR-55104	Backport to 24.1: Ignore transiently-hanging test
GR-55104	Ignore transiently-hanging test

Issue ID	Summary
GR-55104	Print the main thread stacktrace in case of exception for TruffleSafepointTest
GR-55115	Backport to 24.1: Truffle-side version check for jargraal.
GR-55115	Truffle-side version check for jargraal.
GR-55124	Backport to 24.1: Outline the check for collecting embedded resources information
GR-55141	Backport to 24.1: Triggered Assertion In the LoopBoundOptimizationPhase.
GR-55144	Backport to 24.1: Treat FillerArrays like primitive arrays and don't allocate FillerObjects at run-time.
GR-55144	Mark the options ExitOnOutOfMemoryError and DisableExplicitGC as immutable.
GR-55144	Treat FillerArrays like primitive arrays.
GR-55146	Don't allocate FillerObjects at run-time.
GR-55149	Update mx on the release branch
GR-55159	Backport: Pass reachability-metadata.json files from driver.
GR-55182	Increase timelimit for warmup benchmarks
GR-55197	Fix inheritance of tp_hash in native types
GR-55226	Fix storing promoted values in _PyType_Lookup
GR-55244	Add regression test.
GR-55244	PromiseRejectionTracker should not be shared between contexts.

Issue ID	Summary
GR-55260	Backporting: Escape possible future wildcards in globs
GR-55261	Backporting: Remove Unreachable Globs from Trie
GR-55263	Fix swallowing <i>repr</i> exceptions in REPL
GR-55264	Backport to 24.1: Make <code>sandbox.MaxStackFrames</code> mandatory.
GR-55271	add <code>DataAmount</code> annotation to custom JFR NMT events
GR-55271	Backport to 24.1: JFR-related fixes.
GR-55271	Minor formatting changes.
GR-55272	don't include GC related serializers unless Serial GC is used
GR-55273	Backport to 24.1: Prevent that large array allocations in VM-internal code trigger <code>OutOfMemoryErrors</code> .
GR-55273	Prevent that large array allocations in VM-internal code trigger <code>OutOfMemoryErrors</code> .
GR-55276	Backport to 24.1: Avoid duplicate JFR <code>ThreadSleep</code> events.
GR-55295	Extract resource name from url
GR-55302	Add accessor magic in Jython emulation mode.
GR-55302	Support properties magically calling Java getters/setters in Jython emulation mode
GR-55503	Update <code>labsjdk</code> to <code>23+31-jvmci-b01</code>
GR-55528	Fix parsing <code>pyenv.cfg</code> home property according to PEP 405

Issue ID	Summary
GR-55528	Fix pyvenv.cfg home parsing according to PEP 405.
GR-55529	Mark option EmulateJython as stable
GR-55560	Make the truffle compilation log matching work both for logs with and without engine id.
GR-55562	Update labsjdk to 23+32-jvmci-b01
GR-55563	Update labsjdk to 23+34-jvmci-b01
GR-55700	Update SBOM documentation to include 'classpath' and 'export' options
GR-55710	Backport to 24.1: Memory mapping of image heap no longer works on Windows.
GR-55712	Fixed a crash in InheritedChannel.inetPeerAddress0().
GR-55715	Update SBOM documentation to include 'classpath' and 'export' options
GR-55925	Backport to 24.1: Fix type signatures in WasiModule.
GR-55990	Backport multiple PRs to 24.1.
GR-56001	Fixes for virtualenv
GR-56093	Backport to 24.1: Pool reachability handlers for reflection registrations.
GR-56099	Merge master in 24.1 release branch
GR-56213	Backport to 24.1: Runtime module layer ordering is not deterministic
GR-56296	Backport: Add reflection metadata for jfrTracing field.

Issue ID	Summary
GR-56329	Backport to 24.1: Enhance truffle compilation logs.
GR-56332	Acquire GIL around upcalls
GR-56333	Remove duplicate throw_internal_error symbol.
GR-56340	Make the truffle compilation log matching work both for logs with and without engine id.
GR-56344	Make all annotation processors claim their annotations
GR-56350	Fix option ImplicitExceptionWithoutStacktracelsFatal.
GR-56353	Backport to 24.1: Make polyglot API not swallow thread interrupts.
GR-56356	Backport 24.1: Trace Polyglot Source Cache
GR-56447	Fix #each for a foreign iterator which is also iterable
GR-56523	Backport to 24.1: Fixes of performance regressions caused by resizable ArrayBuffers.
GR-56524	Correctly handle source array transitions in %TypedArray%.prototype.set.
GR-56550	Fix sorting contiguous int and double arrays with holes at the end.
GR-56677	Fix potential AIOOBE in RegExp flags getter.
GR-56681	Backport: Stop escaping '/' in JSON strings.
GR-56684	Backport to 24.1: Upgrading the underlying Node.js to version 20.15.1.
GR-56758	Backport to 24.1: Fix thread initialization in Panama NFI for pre-existing threads.

Issue ID	Summary
GR-56848	Allow module name to be null instead of an empty string
GR-56921	Backport: Add an option to warn when C extensions are loaded
GR-56959	Backport to 24.1: JS interpreter can cause TRegex to fail with IndexOutOfBoundsException
GR-57059	Batch backport from master into 24.1 release branch.
GR-57126	Backport to 24.1.0: Implement WASI functions required by the WASI test suites.
GR-57186	Update labsjdk to 23+36-jvmci-b01
GR-57186	Update labsjdk to 23+37-jvmci-b01
GR-57308	Backport to 24.1: Emit an empty reachability-metadata.json file for helloworld
GR-57318	Backport to 24.1: GraalPy Maven plugin does not work in dev releases of Maven bundles.
GR-57854	Update XZ version.
GR-57856	Update TruffleJWS version.

6. Upgrading to the New Version

To keep your Liberica NIK up-to-date and secure, always upgrade to the newest available version once it is released. To upgrade, install the new version over the previous one. For the installation instructions, see [Liberica NIK Installation Guide](#).



Liberica Native Image Kit
24.1.0+1 (23+38)

[Release Notes](#)

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