Android Library Release Notes

Version 6.0.0 of the Comscore library introduces public API changes. Upgrading existing implementations of older library versions will require a small amount of code changes, which are explained in an appendix of the implementation guides.

Library Version 6.10.0+2309070620

Release Date: September 13, 2023
Data Collection Model Version: 6.6
Supported OS Versions: 5.0 - 13.0 (Android API levels 21 - 33)

Feature changes:

1. (TAG-3761) Ensure transmissions which are triggered while the application is being closed are added to offline cache.
   Description: Transmissions which are triggered while the application is being closed can potentially unnecessarily slow down the application shutdown process.
   Resolution: Add these transmissions to the offline cache so they will be transmitted when the application is restarted.
2. (TAG-8308, TAG-8316, TAG-8386, TAG-3647) Update Shared C++ code from C++ 11 to C++ 14.
   Description: The thread sanitizer reported problems with the integrated JUCE code. Updating to C++ 14 change will help resolve those problems.
   Resolution: Update to C++ 14.

Bug fixes:

1. (TAG-8442) Prevent application crashes when the Comscore library is started and then disabled before startup is completed.
   Description: When the Comscore library is started in the implementation and subsequently disabled before startup is completed the application could crash because of background tasks that continue to run.
   Resolution: Ensure all background tasks are terminated when Comscore library is disabled.
2. (TAG-8549) Prevent Application Not Responding (ANR) crash due to native C++ library being loaded twice.
   Description: The C++ library is loaded on the main thread. There are scenarios where this can happen twice, causing the application to become non responsive.
   Resolution: Ensure the C++ library is only loaded once.
3. (TAG-8568) Correct the name of the `disableTfcIntegration` method of the `Configuration` object.
   Description: The `disableTfcIntegration` method contains a typo (the correct term is TCF, rather than TFC).
   Resolution: Deprecate the existing `disableTfcIntegration` method and add the `disableTcfIntegration` method with the same implementation.

Known issues and limitations:

- There were no known issues for this release.

Library Version 6.9.3+2306060540

Release Date: June 8, 2023

Data Collection Model Version: 6.5

Supported OS Versions: 5.0 - 13.0 (Android API levels 21 - 33)

Feature changes:

- There were no feature changes in this release.

Bug fixes:

1. (TAG-8072) Prevent race condition on Streaming Analytics `setMetadata()` calls.

   Description: It has been observed that frequent successive use of `setMetadata()` calls can lead to crashes.

   Resolution: Ensure the involved methods in `Asset` and `PlaybackSession` classes have the appropriate locks to prevent this situation from occurring.

2. (TAG-8086) Prevent Strict Mode `DiskReadViolation` and `LeakedClosableViolationntaggedSocketViolation` warnings.

   Description: Using the library from the main thread in Strict Mode will cause I/O operations performed from `Context` to be flagged.

   Resolution: Move these operations so they occur on a separate thread.

3. (TAG-8377) Prevent potential exceptions from the use of the API to retrieve App Set ID.

   Description: It has been observed that occasionally the response from the API to retrieve the App Set ID is delayed to the point of causing an exception.

   Resolution: Ensure retrieval of the App Set ID uses a timeout to prevent this scenario from occurring.

Known issues and limitations:

- There were no known issues for this release.

Library Version 6.9.2+2211041221

Release Date: November 22, 2022

Data Collection Model Version: 6.5

Supported OS Versions: 5.0 - 12.0 (Android API levels 21 - 32)

Feature changes:

- There were no feature changes in this release.

Bug fixes:

1. (TAG-8005) Prevent long-running requests from `getActivationCategories()` calls from potentially causing problems in the application.

   Description: The `getActivationCategories()` calls address an external server. Depending on how the publisher implements the calls, long-running requests could hinder normal application behaviour.

   Resolution: Implement a time out on `getActivationCategories()` call.

2. (TAG-8084) Remove use of deprecated API methods.

   Description: The API methods `Display.getRealSize()` and `Display.getSize()` have been deprecated.

   Resolution: Use `WindowMetrics.getBounds()` to replace `Display.getRealSize()` and implement a work-around replacement

for the functionality offered by `Display.getSize()`. Note: in Strict Mode use of these APIs can cause `IncorrectContextUseViolation` warnings.

3. (TAG-8085) Prevent Strict Mode `UntaggedSocketViolation` warnings.

   Description: HTTP requests are currently not tagged for Android OS data metrics.

   Resolution: Add a tag to HTTP requests.

Known issues and limitations:

- There were no known issues for this release.

Library Version 6.9.1+2206141225

Release Date: June 15, 2022

Data Collection Model Version: 6.5

Supported OS Versions: 5.0 - 11.0 (Android API levels 21 - 30)

Feature changes:

- There were no feature changes in this release.

Bug fixes:

1. (TAG-7878) Prevent sporadic ANR crashes due to Android 11 bug.

   Description: The introduction of Android 11 came with a bug that causes the OS to spend so much time on loading libraries with C++ code that the application becomes non-responsive. Google's issue tracker has a *thread with details about the Android 11 bug (https://issuetracker.google.com/issues/168043760#comment14)* which contains a workaround to prevent the crash.

   Resolution: Implement the workaround provided by Google to prevent the crash.

2. (TAG-7889) Prevent deadlock during application termination.

   Description: Recently use cases were observed which were not covered by the resolution of TAG-7514 (see release notes of version 6.8.0+220130).

   Resolution: Address these use cases.

3. (TAG-7916) Prevent potential race condition when statically initializing Android library.

   Description: When non-static code is executing and relies on the static constructor code execution to have been completed this can lead to a race condition that can cause a crash.

   Resolution: Ensure non-static code cannot be executed while static constructor is still executing.

Known issues and limitations:

- There were no known issues for this release.

Library Version 6.9.0+2204261318

Release Date: April 28, 2022

Data Collection Model Version: 6.5

Supported OS Versions: 5.0 - 11.0 (Android API levels 21 - 30)

Feature changes:

1. (TAG-7805, TAG-7828) Introduce the use of App Set ID as the preferred input for the publisher-specific device identifier.

Description: As of Android 10 Android ID and Build Serial values are no longer available and the library uses a fallback randomly generated UUID as the input value for the obfuscated publisher-specific device identifier. Meanwhile App Set ID has been identified as a better input value.

Resolution: Remove any references to Android ID and Build Serial and start using App Set ID.

Bug fixes:

- There were no bug fixes in this release.

Known issues and limitations:

- There were no known issues for this release.

Library Version 6.8.0+220130

Release Date: February 14, 2022

Data Collection Model Version: 6.5

Supported OS Versions: 5.0 - 11.0 (Android API levels 21 - 30)

Feature changes:

1. (TAG-7628, TAG-7654) Improve bandwidth consumption of transmission for offline cache flushes.
   Description: Transmission of offline cache flushes are currently not compressed. Applying compression will cause less bandwidth to be used.
   Resolution: Apply compression to transmission of offline cache flushes.
2. (TAG-7647) Ensure all-zero advertising identifier values are not collected.
   Description: There are cases where value `00000000-0000-0000-0000-000000000000` is returned as the advertising identifier value, which should not be collected by the library.
   Resolution: Ensure the library does not collect this value.

Bug fixes:

1. (TAG-7360) Prevent crashes from problems with linked libraries.
   Description: Version 5.7.0 introduced gracefully shutting down the library when problems with linked libraries occur. Another API was identified which should be covered by graceful shutdowns.
   Resolution: Ensure exceptions in the identified API do not cause crashes and instead cause the library to shutdown gracefully.
2. (TAG-7514) Prevent deadlock during application termination.
   Description: Some of the environment details can only be retrieved from the application's main thread. When the library tries to retrieve a value while the application is being terminated - and therefore the library's processes are being terminated - this can lead to a deadlock.
   Resolution: Cache last-retrieved values and reuse these values when the application is being terminated.
3. (TAG-7545) Ensure all code changes for bug fix TAG-7346 or version 6.7.2 are included in the binaries.
   Description: Part of the code changes for bug fix TAG-7346 of version 6.7.2 were not included in the binaries. This prevented the reported problem from being resolved.
   Resolution: Ensure all code changes are included in the binary.
4. (TAG-7697) Ensure the library uses encrypted transmissions for Activation remote API calls.
   Description: Calls to get Activation categories were observed to be missing from Android 9 and newer if there were no specific network-security-config settings to allow plaintext traffic to the Activation host with the remote API. This is due to the URL's use of the HTTP protocol.
   Resolution: Ensure the URL uses the HTTPS protocol to prevent requests from being blocked by the Android OS in case there are no

specific network-security-config settings to allow plaintext traffic.

Known issues and limitations:

- There were no known issues for this release.

Library Version 6.7.2+210830

Release Date: September 2, 2021

Data Collection Model Version: 6.5

Supported OS Versions: 5.0 - 11.0 (Android API levels 21 - 30)

Feature changes:

- There were no feature changes in this release.

Bug fixes:

1. (TAG-7346) Ensure threads running background tasks do not crash from accessing objects that have already been deallocated.
   Description: Threads that are trying to run tasks crash because their task object was already deallocated (these work as a dynamic array).
   Resolution: Add a lock for this scenario, ensuring this new lock cannot result in a deadlock situation.

Known issues and limitations:

- There were no known issues for this release.

Library Version 6.7.1.210601

Release Date: June 21, 2021

Data Collection Model Version: 6.5

Supported OS Versions: 5.0 - 11.0 (Android API levels 21 - 30)

Feature changes:

1. (TAG-7131) Ensure output from `implementationValidationMode` appears completely.
   Description: Console output is truncated, which can cause `COMSCORE:` log lines to appear to be incomplete.
   Resolution: Ensure `COMSCORE:` log lines appear completely by splitting lengthy output across multiple lines, using `COMSCORE~:` as the label for dangling lines.

Bug fixes:

1. (TAG-7133) Ensure transmission of `ns_ap_lastrun` adheres to its functional specification.
   Description: Transmission of `ns_ap_lastrun` collects a `0` value instead of the identifier of the previous application run.
   Resolution: Correct the business logic for transmitting `ns_ap_lastrun`.
2. (TAG-7172) Prevent crashes from garbage collection of C++ objects which are still used when the application is being terminated.
   Description: Garbage collection starts freeing up application memory and destructs the library core object while threads might still be

executing their tasks. A crash occurs when the execution of these threads subsequently uses the library core object.

Resolution: Ensure all running tasks are cancelled once the library core object is being destructed.

Known issues and limitations:

- There were no known issues for this release.

Library Version 6.7.0.210212

Release Date: February 17, 2021
Data Collection Model Version: 6.5
Supported OS Versions: 5.0 - 11.0 (Android API levels 21 - 30)

Feature changes:

1. (TAG-6681, TAG-6693, TAG-6825, TAG-6831) Update library source code to better support API Level 30 / Android 11 / Android X).

   Description: Android Developer documentation instructs application updates to target Android 10 (API Level 29 or higher) as of November 2, 2020. The Android Developer documentation also recommends to have target and compile SDK versions match.

   Resolution: Apply the necessary code changes to follow the recommendations.

Bug fixes:

1. (TAG-6723, TAG-6769) Improve integrated documentation.

   Description: Doxygen documentation report tool triggers warnings from inclusion of incomplete and outdated elements integrated API documentation.

   Resolution: Improve the integrated documentation.

2. (TAG-6744) Prevent negative application analytics metrics delta values from being collected.

   Description: Session calculation business logic historically had to cover a lot of different entry points for usage time calculation. A reasonable amount of these cases are related to workaround to cover for platform inconsistencies and problematic application life cycle scenarios. Platforms have improved over the years and now some of these workarounds cause negative value calculations in edge case scenarios.

   Resolution: Prevent the negative values as much as possible by collecting `0` delta values instead. When this occurs internal error codes in label `ns_ap_ie` will include value `8` to indicate the library has treated this occurrence as an internal error.

3. (TAG-6752) Align automatically collected screen names on Android with other solutions.

   Description: Different solutions capture different application state values in the `name` label.

   Resolution: Align the solutions to capture either `foreground`, `background` or `Application` while continuing implementations to override the collected value.

Known issues and limitations:

- There were no known issues for this release.

Library Version 6.6.0.201123

Release Date: December 8, 2020
Data Collection Model Version: 6.5
Supported OS Versions: 5.0 - 11.0 (Android API levels 21 - 30)

Feature changes:

1. (TAG-6580) Collect Playback session identifier (label `ns_st_id`) as GUID.

   Description: Playback session identifiers have historically been collected as timestamp values. Reporting will benefit from a Playback session identifier with a higher degree of uniqueness by using GUID values. GUID values are also timestamp-based but have added randomness.

   Resolution: Change the collected Playback session identifier values from timestamp values to GUID values.

Bug fixes:

- There were no known bugs prior to this release.

Known issues and limitations:

- There were no known issues for this release.

Library Version 6.5.3.201009

Release Date: October 13, 2020

Data Collection Model Version: 6.4

Supported OS Versions: 5.0 - 9.0 (Android API levels 21 - 28)

Feature changes:

- There were no feature changes in this release.

Bug fixes:

1. (TAG-6429) Ensure Android example projects can be used as-is in current development environment versions.

   Description: With the release of Android library version 6.5.0 it was observed the DummyPlayer example project no longer builds in current Android Studio versions.

   Resolution: Update all example projects.

2. (TAG-6550) Throw an error when `context.getApplicationContext()` returns `null`.

   Description: If an invalid, non-null, context object — e.g., an incomplete object from a mocking framework — is provided as argument to `Analytics.start(context)` then responses from calls to methods — e.g., `context.getApplicationContext()` — on this context object are not guaranteed. The library checks if the context object itself is `null` and throws a `NullPointerException` in that case, but the library does not perform a similar check for objects returned by method calls on the context object.

   Resolution: Throw a `NullPointerException` when calls to methods on the context object return `null`.

Known issues and limitations:

- There were no known issues for this release.

Library Version 6.5.2.200811

Release Date: August 12, 2020

Data Collection Model Version: 6.4

Supported OS Versions: 5.0 - 9.0 (Android API levels 21 - 28)

Feature changes:

- There were no feature changes in this release.

Bug fixes:

1. (TAG-6462) Prevent JNI local reference table overflow.
   Description: Long running streaming sessions could run into JNI local reference table overflows on devices with Android version 7 and lower due to class references being retained on repeated automated transmissions.
   Resolution: Ensure class references are released when no longer needed.

Known issues and limitations:

- There were no known issues for this release.

Library Version 6.5.1.200805

Release Date: August 5, 2020

Data Collection Model Version: 6.4

Supported OS Versions: 5.0 - 9.0 (Android API levels 21 - 28)

Feature changes:

- There were no feature changes in this release.

Bug fixes:

1. (TAG-6451) Ensure Consent Management Platform's purpose 9 consent values are correctly collected.
   Description: Purpose 9 consent value is read from purpose 8.
   Resolution: Read purpose 9 consent value from purpose 9.

Known issues and limitations:

- There were no known issues for this release.

Library Version 6.5.0.200720

Release Date: July 21, 2020

Data Collection Model Version: 6.4

Supported OS Versions: 5.0 - 9.0 (Android API levels 21 - 28)

Feature changes:

1. (TAG-6280, TAG-6290, TAG-6325, TAG-6327, TAG-6380, TAG-6406) Add integration with Consent Management Platforms which implement iAB's Transparency and Consent Framework (TCF) version 2.0 for automatic collection of user consent.
   Description: When a Consent Management Platform (CMP) is present in the application and the CMP implements TCF 2.0 then the library should integrate with the CMP to automatically collect user consent values.
   Resolution: Implement CMP integration following TCF 2.0 specification.

Bug fixes:

1. (TAG-6403) Ensure calls to `StreamingAnalytics` notification methods prior to start event transmission do not cause crashes.

   Description: Calling `StreamingAnalytics` notification methods prior to transmission of the start event causes a crash.
   Resolution: Prevent the crash from occurring.

2. (TAG-6415) Remove code potential deadlock or crash when using `persistentLabels` or `startLabels`.

   Description: The use of `persistentLabels` or `startLabels` configuration settings could lead to deadlock or crash in some scenarios.
   Resolution: Change the code structure and behavior.

Known issues and limitations:

- There were no known issues for this release.

Library Version 6.4.1.200701

Release Date: July 6, 2020
Data Collection Model Version: 6.3
Supported OS Versions: 5.0 - 9.0 (Android API levels 21 - 28)

Feature changes:

- There were no feature changes in this release.

Bug fixes:

1. (TAG-6395) Correct the measurement label order.

   Description: A typo in code comments in the label order caused a set of labels to be ignored which means they are placed in alphabetical order at the end of the measurement URLs.
   Resolution: Correct the typo.

Known issues and limitations:

- There were no known issues for this release.

Library Version 6.4.0.200626

Release Date: June 29, 2020
Data Collection Model Version: 6.3
Supported OS Versions: 5.0 - 9.0 (Android API levels 21 - 28)

Feature changes:

1. (TAG-6353) Update label order.

   Description: An issue related to the panel meter on PC and Windows desktop collecting specific dictionary values caused the label order to be updated.
   Resolution: This does not affect Android, but as label order is shared amongst all solutions, Android was updated accordingly.

2. (TAG-6360) Add child-directed application configuration setting.

   Description: Child-directed applications have different data collection requirements. Until now, publishers received specific instructions

for this purpose which involved multiple code statements to align library data collection behavior with the different requirements. These instructions can be simplified by making this a feature of the library.

Resolution: Add a configuration setting to simplify appropriate tagging of child-directed applications.

Bug fixes:

1. (TAG-6188) Ensure calls to `StreamingAnalytics` notification methods prior to starting the library do not cause crashes.

   Description: Calling `StreamingAnalytics` notification methods prior to calling `Analytics' Start` method causes a crash.
   Resolution: Prevent the crash from occurring.

2. (TAG-6370) Ensure public API method arguments are not obfuscated or minimized.
   Description: Some API methods have had their arguments unintentionally obfuscated in previously released versions.
   Resolution: Correct the build settings to ensure public API method arguments are not obfuscated or minimized.

Known issues and limitations:

- There were no known issues for this release.

Library Version 6.3.1.200511

Release Date: May 14, 2020
Data Collection Model Version: 6.2
Supported OS Versions: 5.0 - 9.0 (Android API levels 21 - 28)

Feature changes:

1. (TAG-6165) Update to Android NDK 21.0.
   Description: Along with the C++ tool chain update in version 6.3.0.200311, the NDK can be updated to future-proof the solution.
   Resolution: Update the Android NDK.

Bug fixes:

1. (TAG-6181) Ensure application updates are identified in the collected data.
   Description: The changes from (TAG-6017) in version 6.2.0.200128 caused a problem with the application update detection.
   Resolution: Resolve the problem and ensure application updates are detected.

2. (TAG-6232) Ensure Maven version numbers do not include the build number.
   Description: While Maven repository version numbers use *x.y.z* format, version 6.3.0.200311 was pushed to the Maven repository using its full version number, including the build identifier. This causes a problem with dependency resolution when the full version number is not used in the project.
   Resolution: Ensure Maven version numbers continue to use *x.y.z* format.

3. (TAG-6238) Ensure *ImplementationValidationMode* output is fully visible in console logs.
   Description: Android console logs truncate lines at 1024 bytes. This prevents *ImplementationValidationMode* output from being completely visible.
   Resolution: Cut the *ImplementationValidationMode* output into chunks to span multiple log lines.

Known issues and limitations:

- There were no known issues for this release.

Library Version 6.3.0.200311

Release Date: March 16, 2020

Data Collection Model Version: 6.2

Supported OS Versions: 5.0 - 9.0 (Android API levels 21 - 28)

Feature changes:

1. (TAG-5680) Update minimum Android API level from 16 to 21.

   Description: To be able to use System Clock Jump Detection the C++ tool chain needs to be updated to a newer version. This newer version requires the minimum Android API level to be 21 (Android 5.0.0 / Lollipop).

   Resolution: Update the C++ tool chain.

2. (TAG-6115) Add event-independent re-buffer count for consistency with other metrics.

   Description: Streaming Analytics metrics typically are collected as a three-part values. For re-buffering only two parts are present.

   Resolution: Include the missing re-buffer count.

3. (TAG-6121) Add content media format metadata values for podcasts.

   Description: Streaming Analytics content metadata does not have values for full and partial podcast content.

   Resolution: Add an enum value for full podcast content and an enum value for partial podcast content.

Bug fixes:

1. (TAG-6062, TAG-6065) Ensure customized System Clock Jump Detection Interval and Precision configuration setting values are collected with the appropriate format.

   Description: Values for System Clock Jump Detection Interval and Precision configuration values are not converted to multiples of 100. This causes the provided values to be incorrectly populated in the collected data.

   Resolution: Ensure the System Clock Jump Detection Interval and Precision configuration values are sanitized before they are applied.

Known issues and limitations:

- There were no known issues for this release.

Library Version 6.2.0.200128

Release Date: January 30, 2020

Data Collection Model Version: 6.1

Supported OS Versions: 4.1 - 9.0 (Android API levels 16 - 28)

Feature changes:

1. (TAG-5993) Remove functionality from vCE component.

   Description: Some of the reported issues with Comscore library behavior originate from the requirement for vCE component to support a wide variety of advertisement viewability tagging use cases. Given the adoption of the Open Measurement SDK there no longer is a requirement for viewability measurement in the Comscore library.

   Resolution: Disable the vCE component by default and remove its business logic. This has the following effects on the library API:

   - The `vce` configuration setting is deprecated and no longer has any effect.
   - All vCE-related methods are deprecated and no longer execute any business logic.
   - All vCE-related getters that return a `String` value — such as `Vce.getSdkVersion()` and `Analytics.getVceVersion()` — now return an empty string.

- All vCE-related getters that return a `Boolean` value now return `false`.
- The `Vce.getSharedInstance()` and `Analytics.getSharedVceInstance()` methods return `null`, which aligns with vCE being disabled.

Bug fixes:

1. (TAG-5967) Prevent crashes caused by API calls from threads which are killed shortly after the call
   Description: API calls to change the configuration could cause crashes when executed from different threads.
   Resolution: This has been resolved indirectly by the changes for feature change TAG-5993.
2. (TAG-6017) Ensure explicitly specified application name, version and package are collected
   Description: Any values specified explicitly on the `Analytics` configuration object were not collected as the library would override these values with the automatically retrieved ones as soon as a Context was available (which is after any code statements explicitly specifying values).
   Resolution: The library will only collect any automatically retrieved values for application name, version and package if there is no value explicitly specified by the implementation.

Known issues and limitations:

- There were no known issues for this release.