Arm® Mobile Studio 2023.0

Product revision: r23p0-00rel0

Release Note

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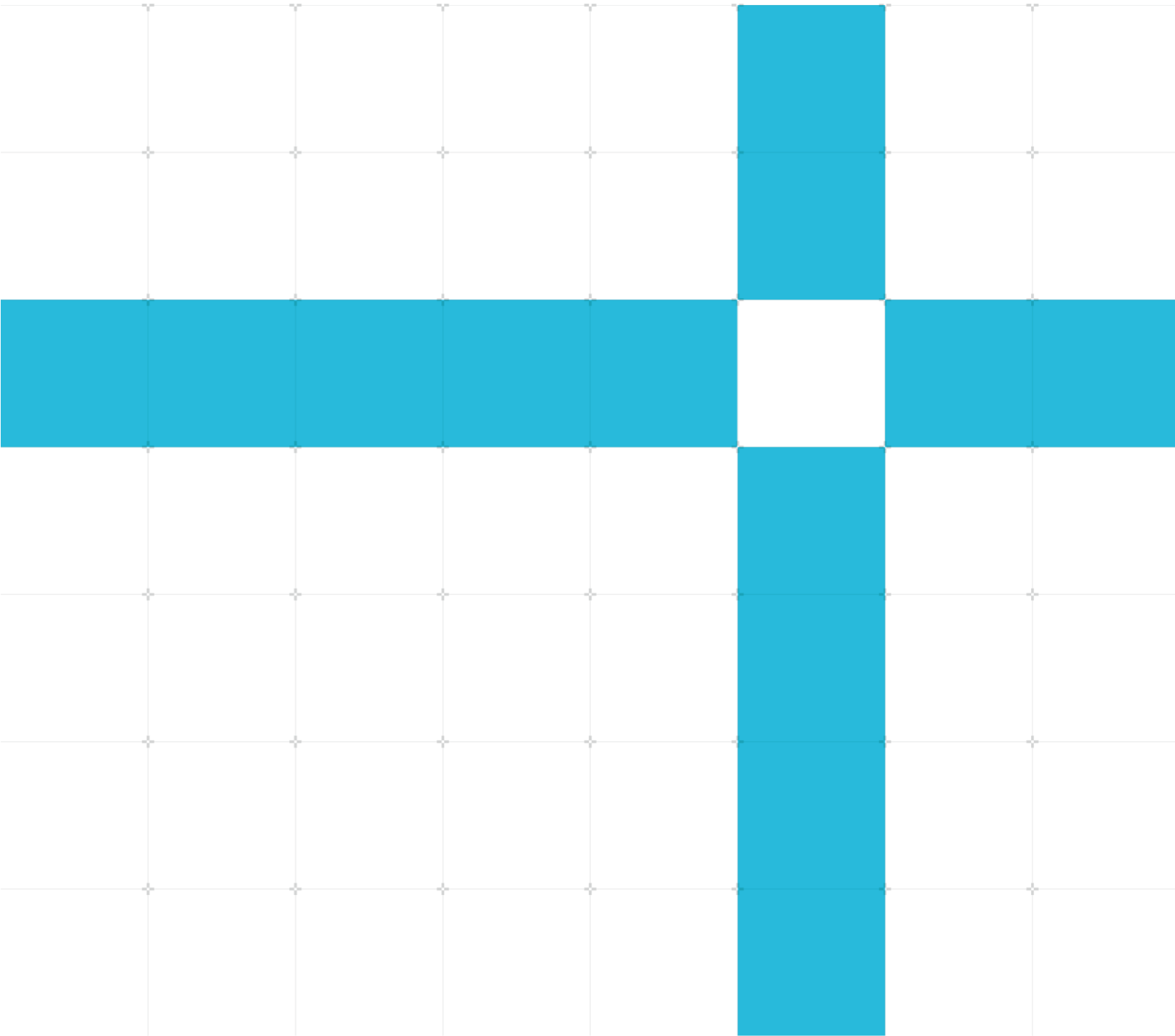

Arm Mobile Studio 2023.0

Release Note

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1 Release overview

The following sections describe the product and its quality status at time of release.

1.1 Product description

Arm® Mobile Studio is a tool suite enabling Android application developers to detect performance bottlenecks in their Arm CPU software and Arm Mali™ GPU rendering. Profiling is provided through analysis of performance counters from the hardware, and the target application's graphics API usage.

This release of Arm Mobile Studio includes:

- Streamline, for profiling application software and rendering performance.
- Performance Advisor, for automating initial data analysis and reporting in continuous integration deployments.
- Graphics Analyzer, for debugging and inspecting usage of graphics APIs.
- Mali Offline Compiler, for static analysis of shader programs and compute kernels.

1.1.1 Component versions

This release of Arm Mobile Studio includes the following tool versions:

- Streamline 8.4
- Performance Advisor 8.4
- Graphics Analyzer 5.12.1
- Mali Offline Compiler 7.8

1.2 Release status

This is the REL quality release of the Arm Mobile Studio 2023.0 (r23p0-00rel0) software.

1.3 Changes in this release

This release of Arm Mobile Studio contains the following changes.

1.3.1 Mobile Studio

Mobile Studio has the following product-wide changes:

- Android 13 is now an officially supported target.

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- Google Pixel 7 added as a supported device.
- vivo X90 Pro added as a supported device.

See the full list of **supported devices** on the Arm Developer website.

1.3.2 Streamline

Streamline has the following changes:

- Host tool analysis performance has been improved, reducing analysis time for typical Android CPU and GPU captures by up to 40%.
- The presented metrics for Arm CSF GPU compute queue utilization and vertex queue utilization have been improved to discount cycles caused by cross-queue contention.

1.3.3 Performance Advisor

Performance Advisor report generation has the following changes:

- Reports now support **Arm Immortalis™-G715** ray tracing counters.
- Reports now support per region FPS summaries.
- Report generation command lines can now specify a process by PID.

Performance Advisor's light-weight interceptor and support script have the following changes:

- The `lwi_me.py` script no longer accepts the `--lwi` option. The behavior has been merged into the `--lwi-mode` option, which now allows three choices:
    - `off`: Do not use the light-weight interceptor. Use application-generated annotations instead.
    - `counters`: Use the light-weight interceptor to generate frame boundaries and software counters.
    - `screenshots`: Use the light-weight interceptor to generate frame boundaries, software counters, and slow frame screenshots.

1.3.4 Graphics Analyzer

Graphics Analyzer has the following changes:

- No changes in this release.

1.3.5 Mali Offline Compiler

Mali Offline Compiler has the following changes:

- No changes in this release.

1.4 Known issues in this release

This release of Arm Mobile Studio contains the following known issues.

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1.4.1 Streamline

Streamline has the following known issues:

- SDDAP-11607: macOS host installs do not show Arm disassembly views.
- SDDAP-11426: Linux host installs using NVIDIA drivers can experience areas of the UI rendering as black rectangles when using monitor scaling. This can be worked around by setting the environment variable GDK_SCALE to 1 before launching Streamline. For ease of use, this can be set in the Streamline launch script.
- SDDAP-11768: CAM annotations ignore user-specified colors and always use the default color sequence.

1.4.2 Performance Advisor

Performance Advisor has the following known issues:

- SDDAP-11717: Vulkan screenshots are not currently supported.

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2 Support

To help you get started we provide a number of quick start guides available online:

- Getting Started Guides on developer.arm.com

Technical support for Arm Mobile Studio is provided via our developer forums:

- Developer forums on community.arm.com

2.1 How-to videos

Refer to the following videos to learn how to use Arm Mobile Studio tools.

- How to capture a performance profile of your application with Streamline
- How to capture a trace of your application with Graphics Analyzer
- How to generate a report with Performance Advisor
- How to analyze a shader program with Mali Offline Compiler

To learn more about Mali GPUs and how to develop optimized graphics content for mobile devices, refer to our Mali GPU Training Series.

2.2 Host OS support

This release has been developed for the following host operating systems:

Table 2-1: Host operating system used in developing this release

Operating system	Version
Windows	10 or newer
macOS	10.15 (Catalina) or newer
Ubuntu Linux	18.04 (Bionic Beaver) or newer

2.3 Target OS support

This release has been developed for the following target operating systems:

Table 2-2: Target operating system used in developing this release

Feature	Version
Streamline	Android 8 or newer
Performance Advisor OpenGL ES	Android 8 or newer with manual annotation Android 10 or newer to use the Light-weight Interceptor
Performance Advisor Vulkan	Android 9 or newer

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Graphics Analyzer OpenGL ES	Android 8 or newer
Graphics Analyzer Vulkan	Android 9 or newer

2.4 The Mobile Studio for Unity package

The Mobile Studio for Unity package provides a supporting Unity game engine integration for Streamline and Performance Advisor. The package provides:

- C# bindings for Streamline's annotation API, allowing users to export custom software counters, and event annotations.
- Integration with the Unity profiler data source, exporting Unity object counts and memory allocations as custom software counters.

The annotation API provides a generic means to markup a Streamline capture. It can be used to emit the semantic tags that Performance Advisor reports use to denote interesting gameplay regions.

The package is available on GitHub, and can be imported directly into your Unity project using the Unity package manager. See the GitHub project documentation for more details.

- https://github.com/ARM-software/mobile-studio-integration-for-unity/

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3 Installation

This guide describes how to install and configure Arm Mobile Studio to run on 64-bit Windows, macOS®, and Linux.

Mobile Studio requires **Android Debug Bridge (ADB)** and **Python 3.5** (or newer), to enable connection to your device. Make sure you have **these tools** installed and that you have configured your environment to use them.

3.1 Install on Windows

Arm Mobile Studio is provided with an installer executable. Double-click the **.exe** file and follow the instructions in the setup wizard.

- To launch Streamline, open the Windows Start menu, navigate to the Arm Mobile Studio folder, and select the "Arm MS Streamline 2023.0" shortcut,
- To launch Graphics Analyzer, open the Windows Start menu, navigate to the Arm Mobile Studio folder, and select the "Arm MS Graphics Analyzer 2023.0" shortcut.
- To launch Performance Advisor, open a command terminal, navigate to your work directory, and run the `pa` command on a Streamline capture file. The `pa` command is added to your PATH during installation, so can be used from anywhere.
  ```
  pa.exe <options> my_capture.apc
  ```
- To launch Mali Offline Compiler, open a command terminal, navigate to your work directory, and run the `malioc` command on a shader program. The `malioc` command is added to your PATH during installation, so can be used from anywhere.
  ```
  malioc.exe <options> my_shader.frag
  ```

3.2 Install on macOS

Arm Mobile Studio is provided as a **.dmg** package. To mount it, double-click the **.dmg** package and follow the instructions. The Mobile Studio directory tree is copied to the **Applications** directory on your local file system for easy access.

Launch the tools directly from the Arm Mobile Studio directory tree in your Applications directory.

- To launch Streamline, go to the **<installation>/streamline** directory, and open the **Streamline.app** file.
- To launch Graphics Analyzer, go to the **<installation>/graphics_analyzer/gui** directory and open the **Graphics Analyzer.app** file.
- To launch Performance Advisor, go to the **<installation>/performance_advisor** directory, and double-click the **performance_advisor_launcher** file.

  Your computer will ask you to allow Performance Advisor to control the Terminal application. Confirm this.

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The Performance Advisor launcher opens the Terminal application and updates your PATH environment variable so you can run the `pa` command from any directory.

Run the `pa` command on a Streamline capture file to generate a report:

```
pa <options> my_capture.apc
```

- To launch Mali Offline Compiler, go to the **<installation>/mali_offline_compiler** directory, and double-click the **mali_offline_compiler_launcher** file.

  The Mali Offline Compiler launcher opens the Terminal application and updates your PATH environment variable so you can run the `malioc` command from any directory.

  Run the `malioc` command on a shader program.

  ```
  malioc <options> my_shader.frag
  ```

On some versions of macOS, you might see a message that Mali Offline Compiler is not recognized as an application from an identified developer. To enable Mali Offline Compiler, cancel this message, then open **System Preferences > Security and Privacy**, and select **Allow Anyway** for the `malioc` application.

3.3 Install on Linux

Arm Mobile Studio is provided as a gzipped tar archive. Extract this tar archive to your preferred location, using a recent version (1.13 or later) of GNU tar:

```
tar xvzf Arm_Mobile_Studio_2020.0_linux.tgz
```

Launch the tools directly from the location where you extracted the package.

- To launch Streamline, go to the **<installation_directory>/streamline** directory and run the **`Streamline`** file.

  ```
  cd <install>/streamline
  ./Streamline
  ```

- To launch Graphics Analyzer, go to the **<installation>/graphics_analyzer/gui** directory and run the **aga** file.

  ```
  cd <install>/graphics_analyzer/gui
  ./aga
  ```

- To launch Performance Advisor, go to the **<installation>/performance_advisor** directory and run the `pa` command on a Streamline capture file.

  ```
  cd <install>/performance_advisor
  ./pa <options> my_capture.apc
  ```

- To launch Mali Offline Compiler, go to the **<installation>/mali_offline_compiler** directory and run the `malioc` command on a shader program.

  ```
  cd <install>/mali_offline_compiler
  ./malioc <options> my_shader.frag
  ```

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