Mali Developer Resources

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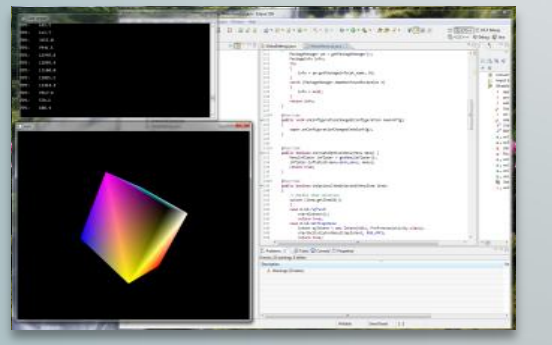
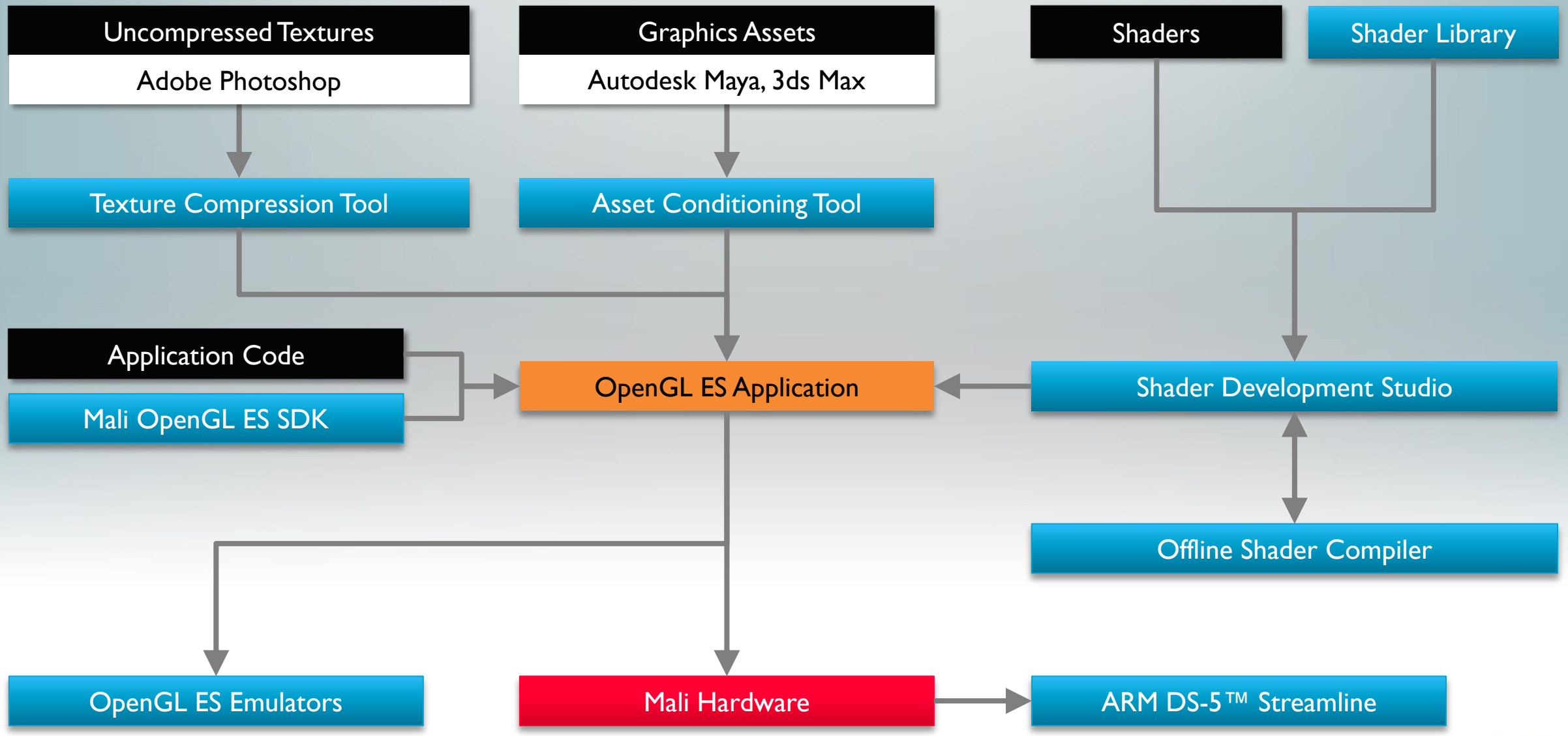
ARM Mali Developer Tools



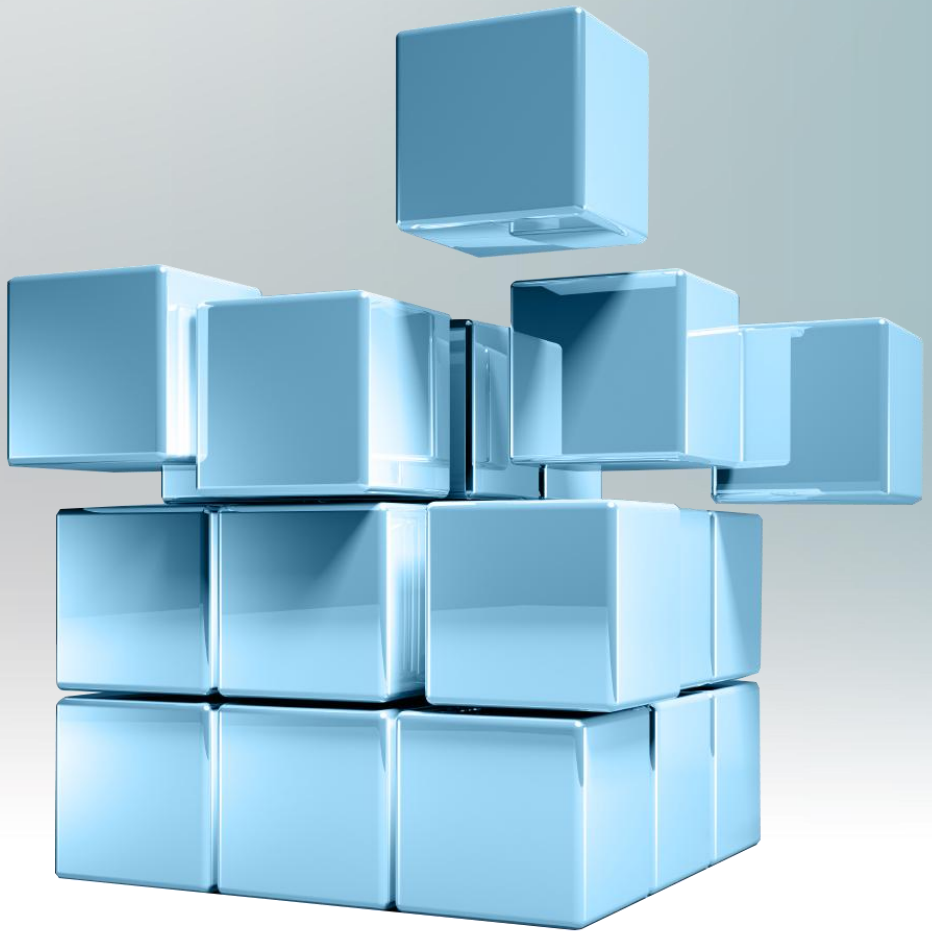
- **Software Development**
  - SDKs for OpenGL® ES & OpenCL™
  - OpenGL ES Emulators
  - Shader Development Studio
  - Shader Library
- **Asset Creation**
  - Texture Compression Tool
  - Asset Conditioning Tool
  - Binary Asset Exporter
- **Performance Analysis**
  - Streamline Performance Analyzer
  - Offline Shader Compiler

Mali Developer Tools Flow



Mali Software Development Kits

- Simplify writing, porting and optimizing OpenGL ES & OpenCL code for Mali GPU based platforms
- Demonstrate key differentiating features to developers and programmers
- **Contents**
  - Environment for quickly developing OpenCL and OpenGL ES applications
  - Tutorials and advice on developing good OpenCL & OpenGL ES code for Mali GPUs
  - Sample code

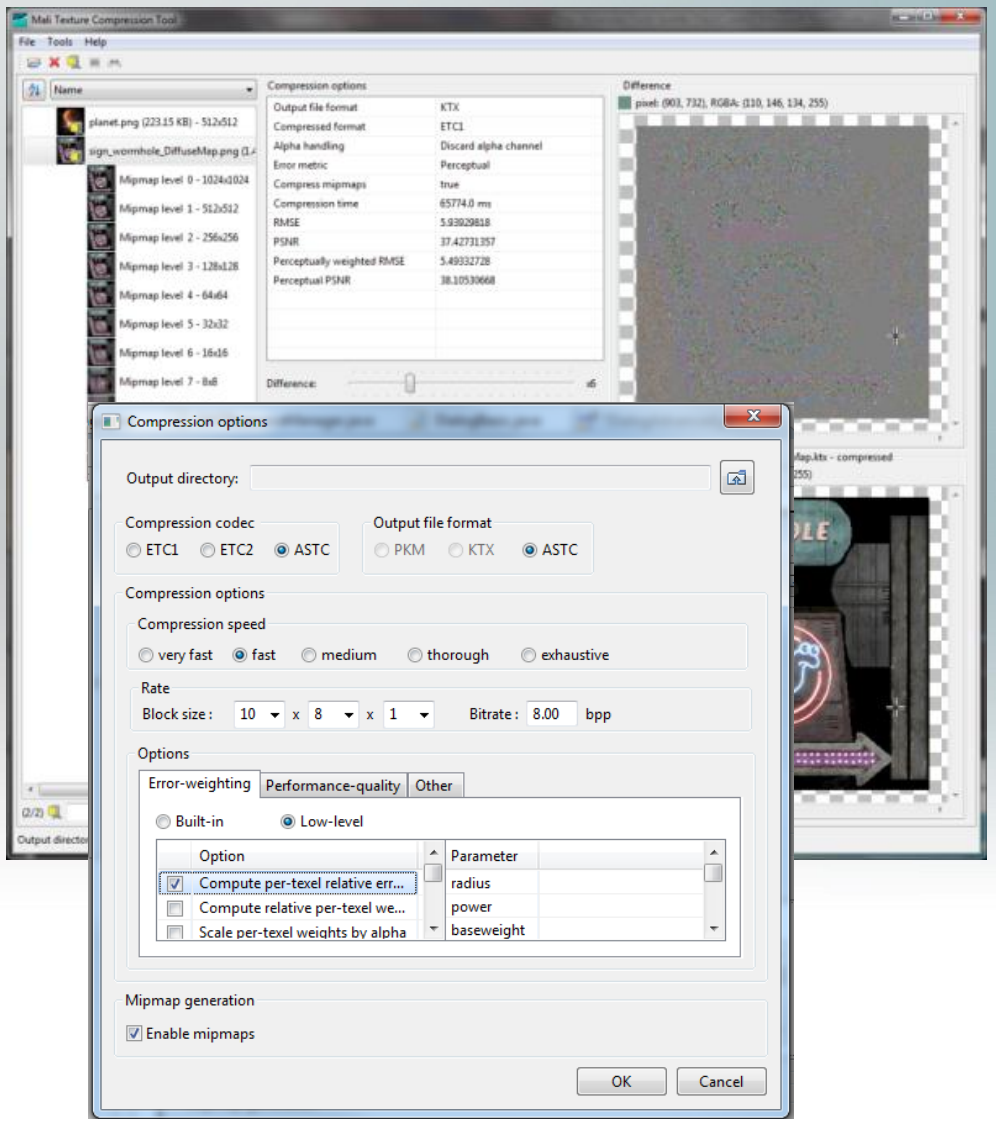


Emulation

- **OpenGL ES 1.1/2.0 Emulator**
  - Khronos Conformant
  - MESA software rendering support
- **OpenGL ES 3.0 Emulator**
  - Khronos Conformance Test Submitted
  - ATSC support
- Includes EGL emulator
- Run OpenGL ES content on desktop systems
  - Easier setup/running/debugging
  - “WYSIWYG”

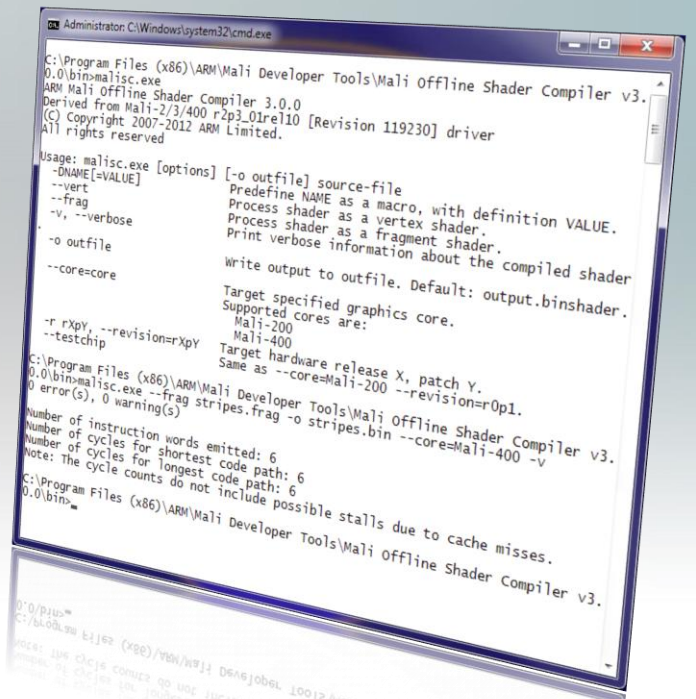
Texture Compression Tool

- ETC1 Texture compression
  - **600x** speed up compared to existing reference encoder
- ETC2 / EAC texture compression
  - Multiple new formats and support for alpha channel
- ASTC Texture Compression
  - LDR and HDR image support
  - Bitrates from 0.89 bits/pixel to 8bits/pixel in fine steps
- Visualization of compressed output
- Reporting of compression statistics
- Automatic Mipmap generation



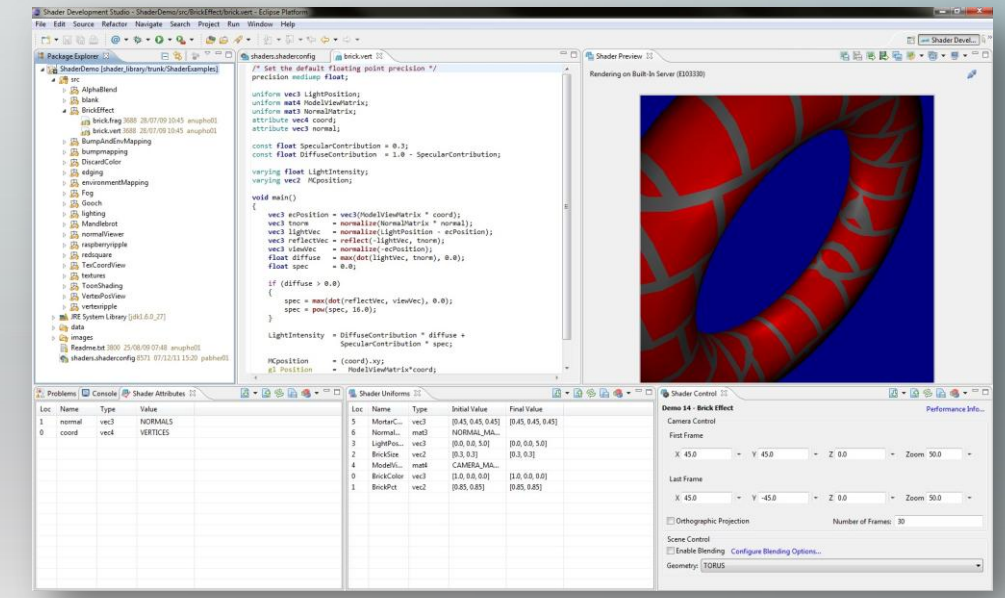
Offline Shader Compiler

- Compiles shader code written in OpenGL ES Shading Language (ESSL) offline
- Provides verbose shader performance & error messages for optimization and debug
- Support for:
  - Mali-400 and Mali-450,
  - Mali-T604, Mali-T658
  - Integration with Shader Development Studio



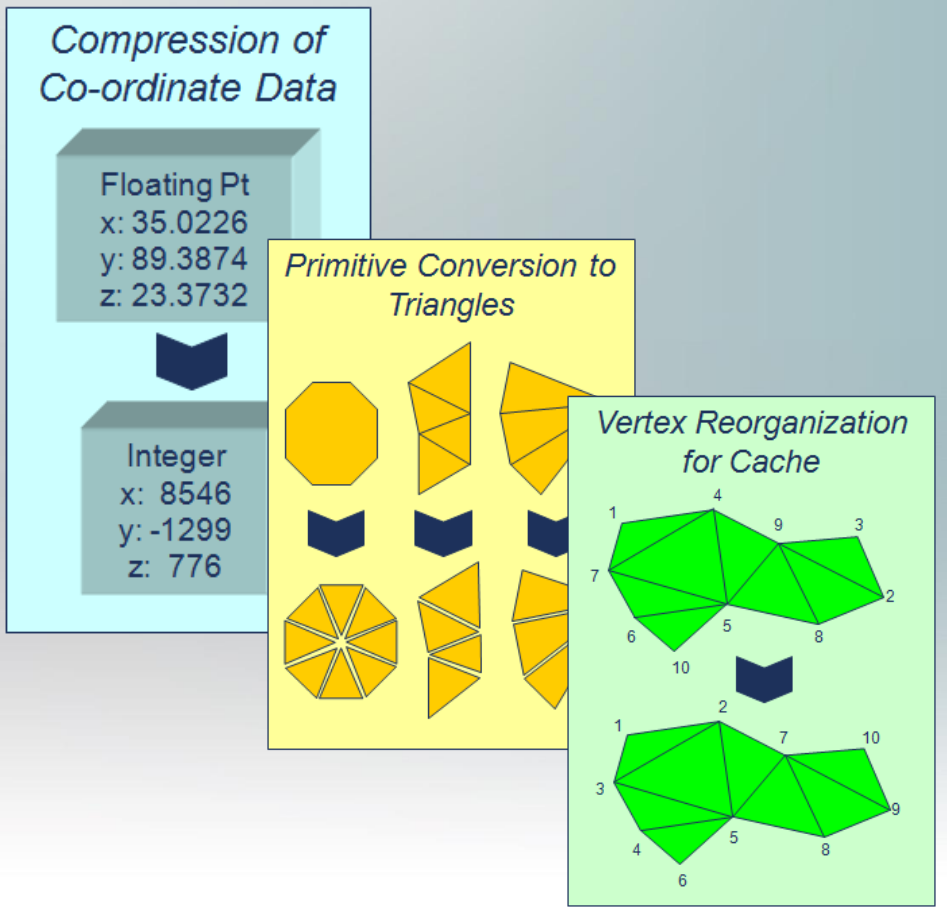
Shader Development

- **Shader Development Studio**
  - Rapid prototyping environment for shader development
  - Extensive Library of shader examples
  - Real-time preview on host and on target



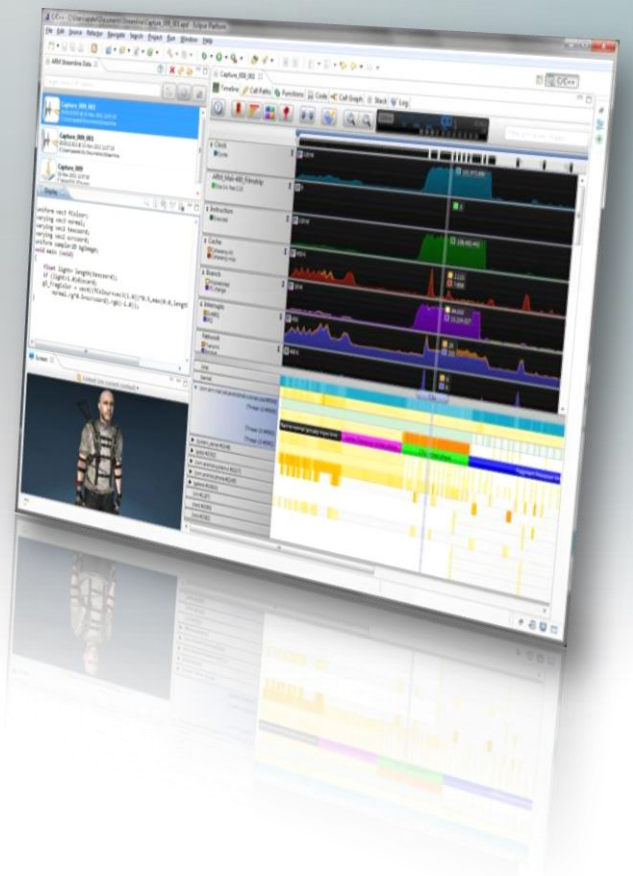
Asset Conditioning Tool

- Optimization of geometry data for Mali GPU-based devices
- Conversion of unsupported primitives to supported types
- Vertex reorganization for efficient cache utilization

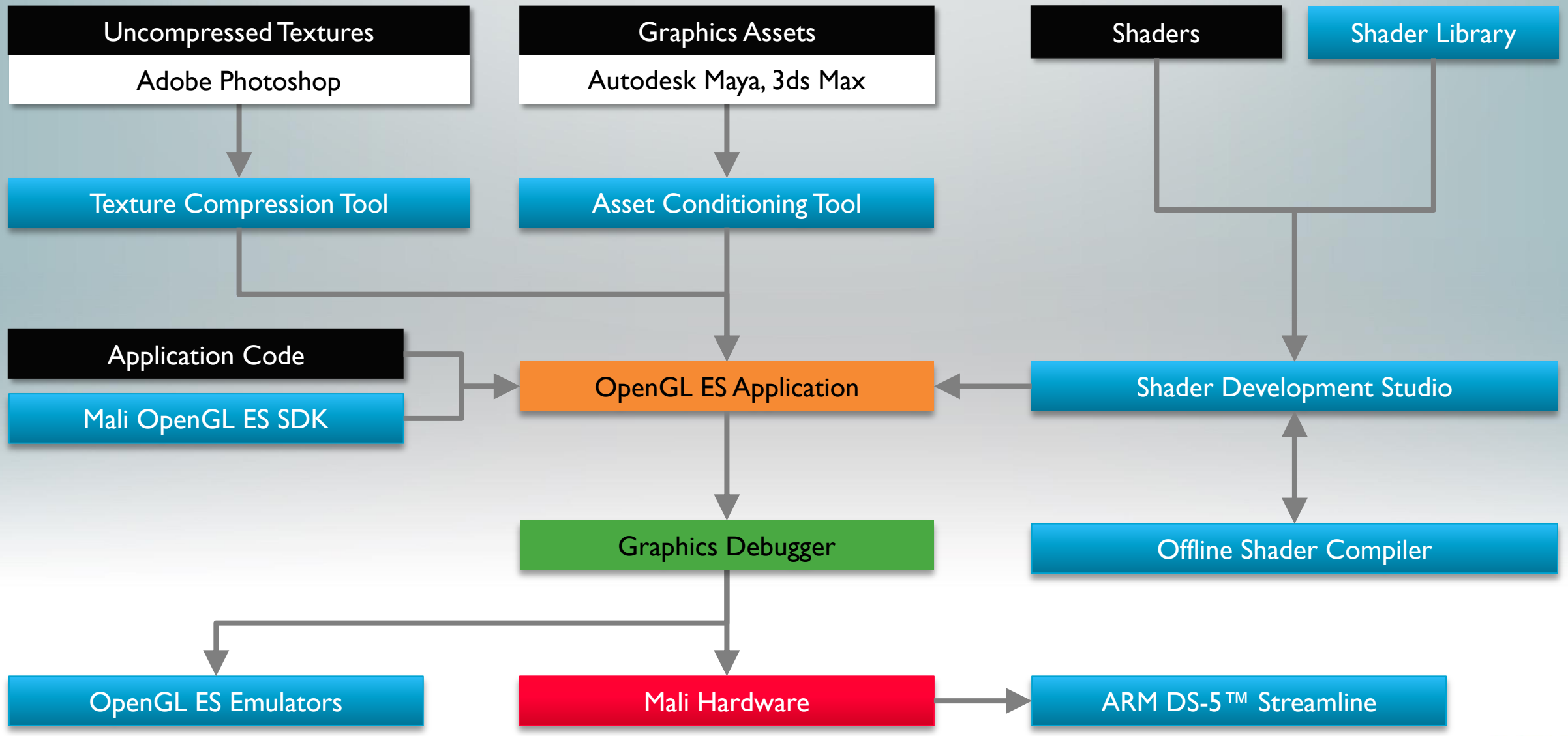


Streamline Performance Analyzer

- **System Wide performance Analysis**
  - Support for graphics and GPU compute performance analysis on Mali-T604/Mali-T658
  - Timeline profiling of hardware counters for detailed analysis
  - Software counter support for OpenGL ES 2.0 and OpenCL 1.1
  - Custom counters
  - Per-core/thread/process granularity
  - Frame buffer capture and display



Mali Developer Tools Flow



Thank you!
Any questions?

malidevelopper.arm.com