

A stream core is arranged as a five-way very long instruction word (VLIW) processor (see bottom of Figure 1.2). Up to five scalar operations can be co-issued in a VLIW instruction, each of which are executed on one of the corresponding five processing elements. Processing elements can execute single-precision floating point or integer operations. One of the five processing elements also can perform transcendental operations (sine, cosine, logarithm, etc.)¹. Double-precision floating point operations are processed by connecting two or four of the processing elements (excluding the transcendental core) to perform a single double-precision operation. The stream core also contains one branch execution unit to handle branch instructions.

Different GPU compute devices have different numbers of stream cores. For example, the ATI Radeon™ HD 5870 GPU has 20 compute units, each with 16 stream cores, and each stream core contains five processing elements; this yields 1600 physical processing elements.

1.3 The ATI Stream Computing Implementation of OpenCL

ATI Stream Computing harnesses the tremendous processing power of GPUs for high-performance, data-parallel computing in a wide range of applications. The ATI Stream Computing system includes a software stack and the ATI Stream GPUs. Figure 1.3 illustrates the relationship of the ATI Stream Computing components.

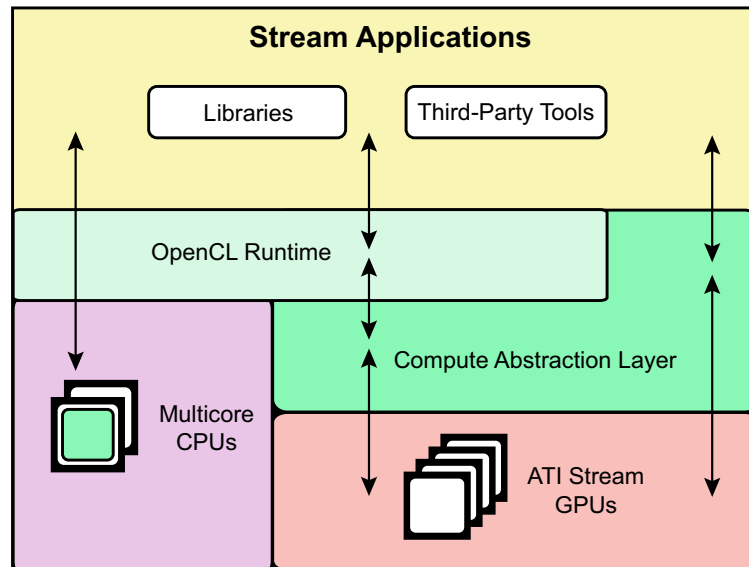


Figure 1.3 ATI Stream Software Ecosystem

The ATI Stream Computing software stack provides end-users and developers with a complete, flexible suite of tools to leverage the processing power in ATI Stream GPUs. ATI software embraces open-systems, open-platform standards.

1. For a more detailed explanation of operations, see the *ATI Compute Abstraction Layer (CAL) Programming Guide*.