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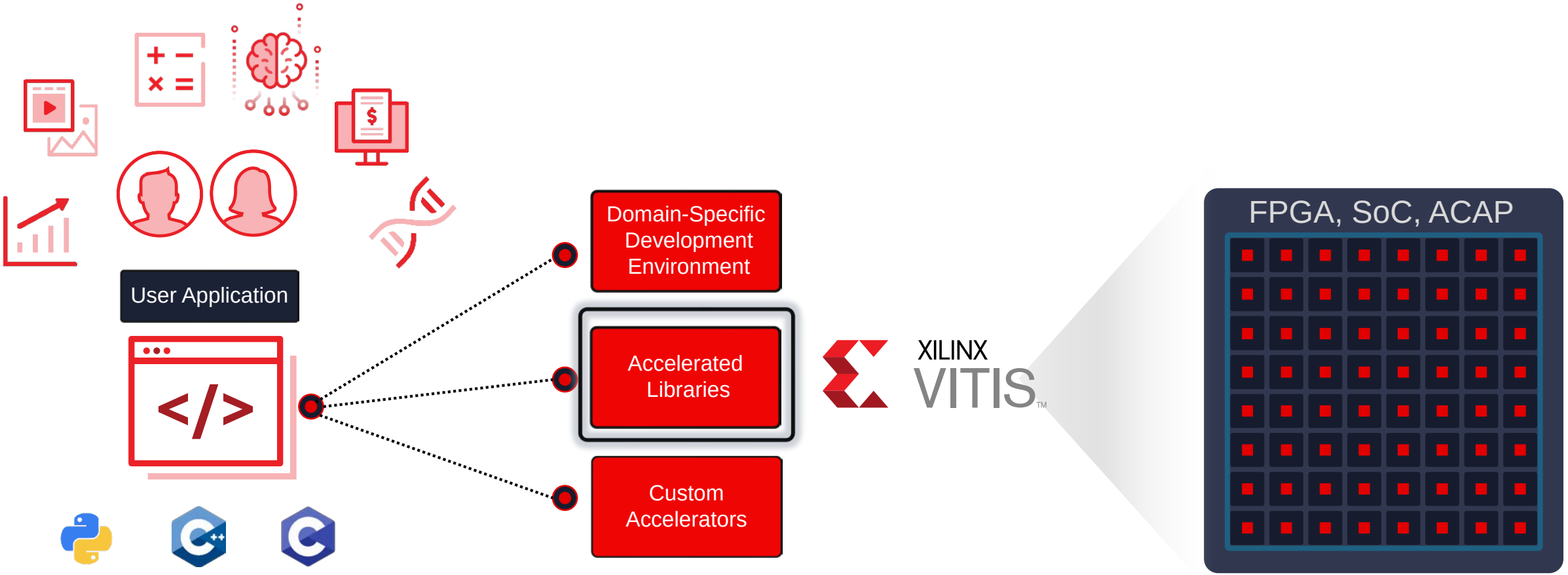
Vitis Accelerated Libraries

Introduction to Vitis

Software-Defined Application Acceleration



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Build: Extensive, Open Source Libraries

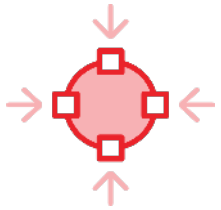
GitHub

Domain-Specific Libraries

Vision & Image

Finance

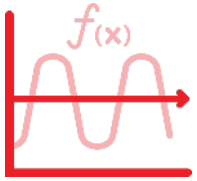
Data Analytics & Database



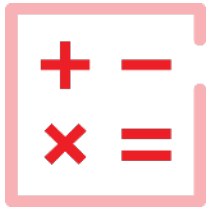
Data Compression

Data Security

Common Libraries

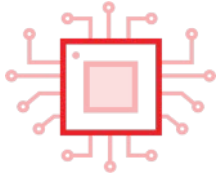


Math



Linear Algebra

Statistics



DSP

Data Management

https://github.com/Xilinx/Vitis_Libraries

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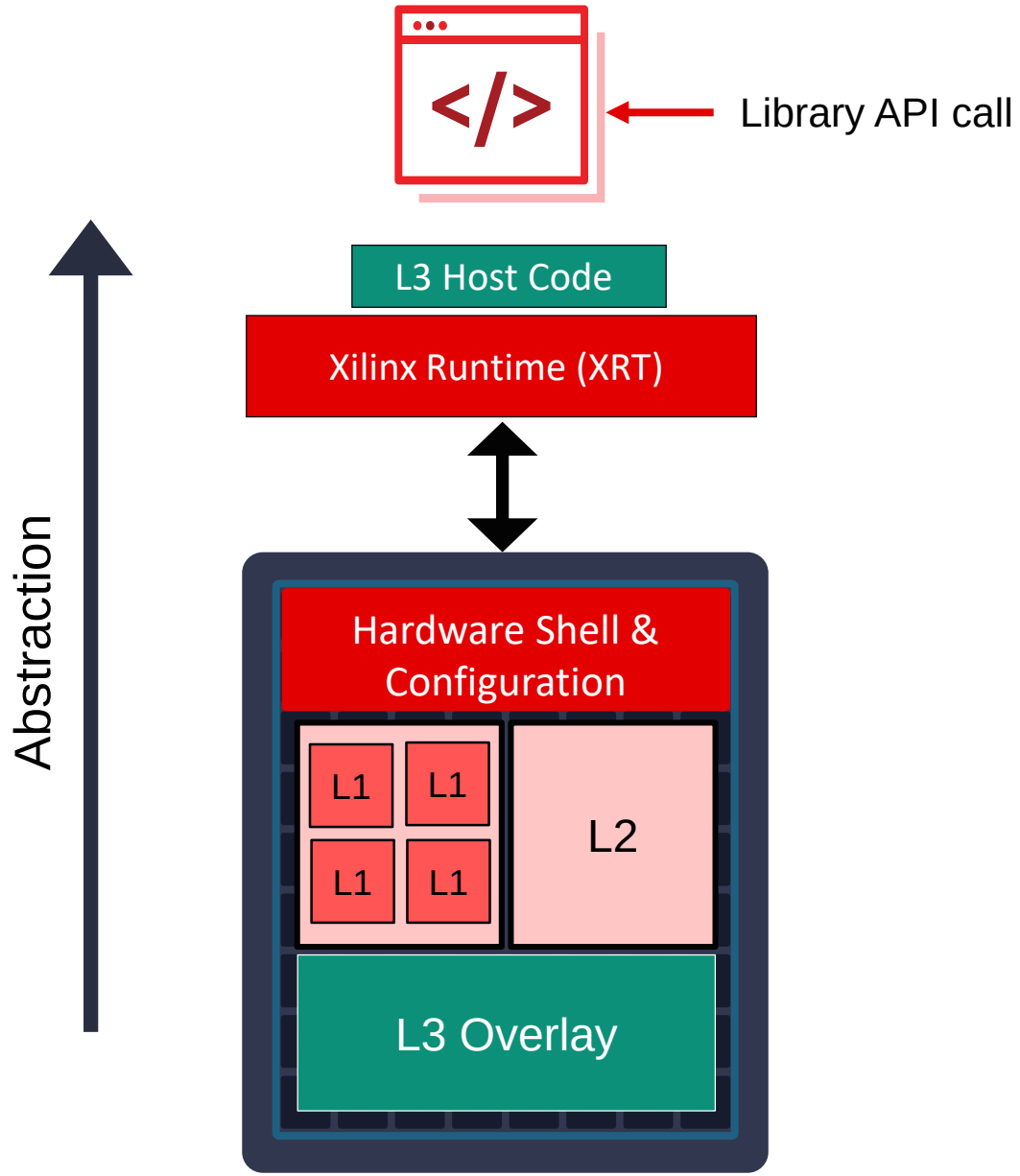
Scalable and Flexible

Choose the Level of Abstraction You Need

- Vitis library API (L3)
  - API directly callable in host application
  - Precompiled accelerators
- Vitis library kernels (L2)
  - Optimized functions with required interfaces
  - Requires host code and build with Vitis tools
- Vitis library primitives (L1)
  - Basic algorithmic building blocks
  - Designed to be called within kernels



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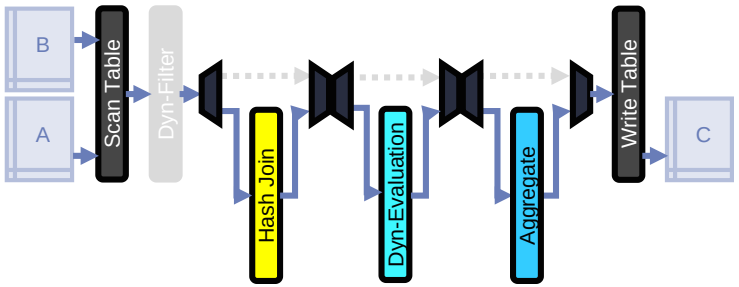
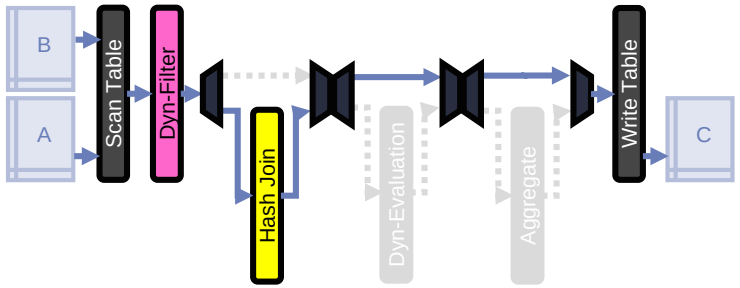
Vitis Vision Library

- Performance-optimized kernel and primitive functions for
  - Color and bit-depth conversion, channel extractions, pixel-wise arithmetic ops.
  - Geometric transforms, image statistics, image filters
  - Feature detection and classifiers
  - 3D reconstructions
  - Motion Analysis and Tracking
- Support for color image processing and multi-channel support
- Multiple pixel/clock processing to meet through requirements
- Familiar OpenCV API interface

Vitis Database Library

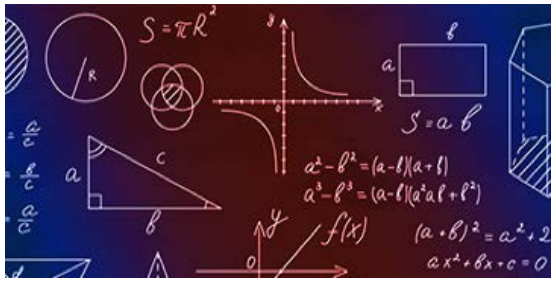
- Accelerate both data-intensive and compute-intensive applications common in Relation Database Management
- Optimized implementation of execution plan steps, like hash-join and aggregation
- The kernels can be used to map a sequence of execution plan steps, without having to compile different binaries for each query.





Vitis BLAS Library

- Performance-optimized implementation of Basic Linear Algebra Subroutines (BLAS)
- General Matrix Multiply (GEMM) and General Matrix-Vector (GEMV) APIs available as pre-compiled accelerators with C, C++, and Python interfaces
- Drop-in and replace CPU and GPU-based BLAS operations for rapid prototyping and evaluation
- Leverage library primitives and kernels to design unique accelerated algorithms



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Vitis Data Compression Library

- Performance optimized library to accelerate the Lempel-Ziv (LZ) data compression and decompression algorithms.
- Scalable compression engine can be instantiated multiple times and run concurrently to meet high-throughput demands.
- Off-the-Shelf LZA and Snappy compression/decompression available.
- Use the low-level primitives as components to design your own.

Vitis Data Security Library

- Brings real-time performance to security applications
- Block ciphers like Advanced Encryption Standard (AES), and Data Encryption Standards (DES)
- Streaming ciphers like ChaCha20 and Rivest Cipher 4(RC4)
- Hashing methods like Message-Digest (MD) algorithms
- Secure Hash Algorithms (SHA-1, SHA-2, SHA-3) BLAKE2, and SHAKE

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Vitis Quantitative Finance Library

- Optimized functions allows user to build accelerated computational solutions for financial workloads.
  - Options-pricing
  - Modeling
  - Trading
  - Evaluation and risk management
- Library APIs can be called directly in your C, C++, and Python host applications.
- Multiple examples available
  - Heston Finite Difference
  - Monte Carlo Black Scholes American and European models

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Vitis Solver Library

- Performance-optimized standard matrix decomposition, linear solvers, and eigen value solvers
- Accelerate applications across multiple domains
  - Computational Finance
  - RADAR, LiDAR
  - Computer Vision
  - DSP, Controls
- Combine the library kernels to accelerate end-to-end processing pipelines

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License

- Licensed under Apache 2.0 license, which is quite permissive.
  - Users don’t need to pay Xilinx for the code.
  - Users can charge their customers for products built with our libraries.
  - Users can modify the code, or give it to anyone without telling Xilinx.
  - Commercial use permitted

Thank You