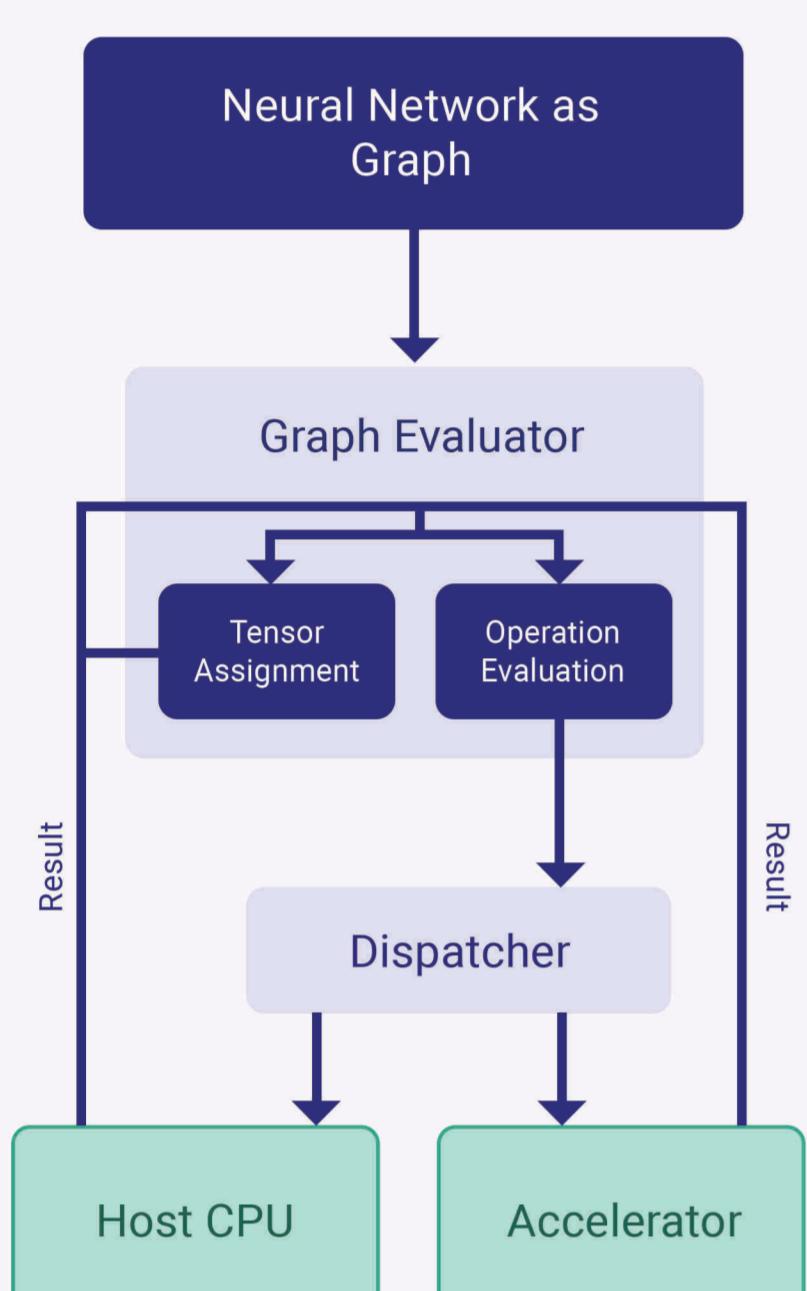


The oneAPI Construction Kit is a framework to provide the implementations of open standards, such as OpenCL™ and Vulkan™, for a wide range of devices, including new and innovative AI accelerators, such as those of RISC-V. You can use the oneAPI Construction Kit to build with the oneAPI Toolkit - which itself then supports further open standards, including SYCL™.



Embecosm delivers open source toolchains for AI applications. In this example, they investigated how to bring parallelism to a basic neural network algorithm by using a pre-silicon RISC-V accelerator with open source code, the oneAPI Construction Kit.

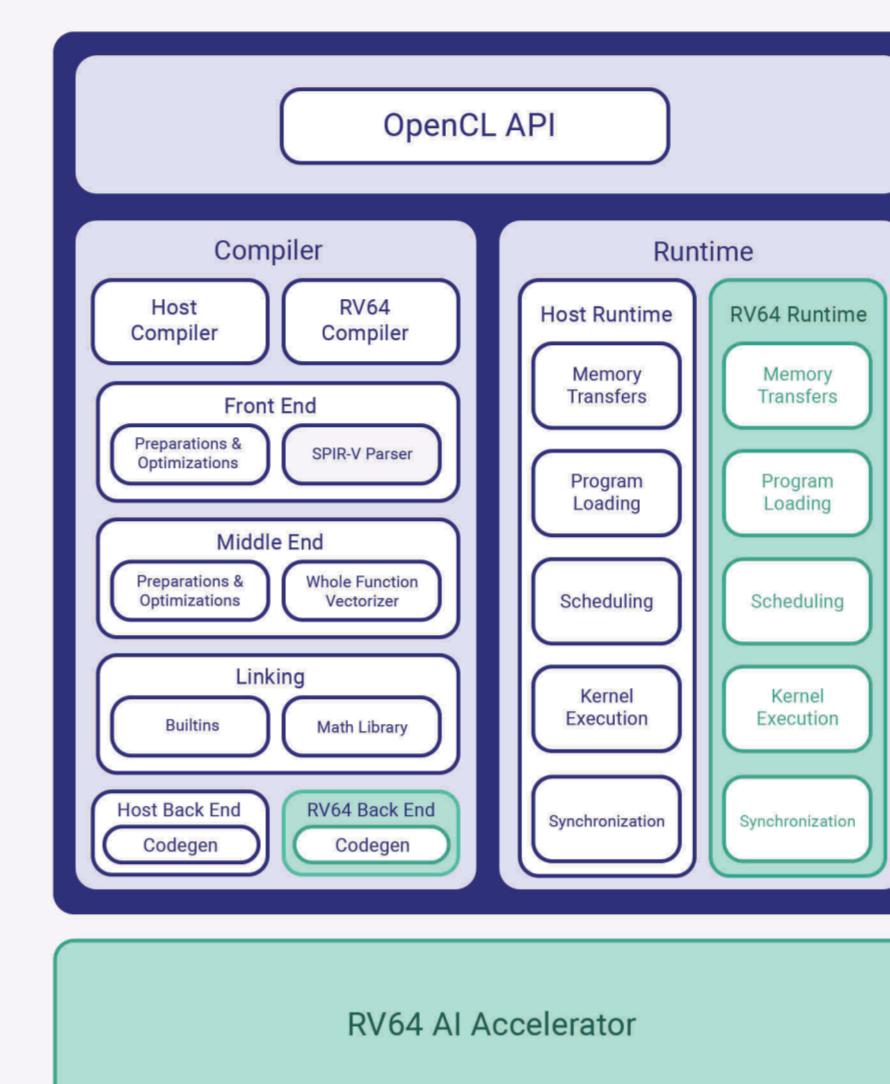
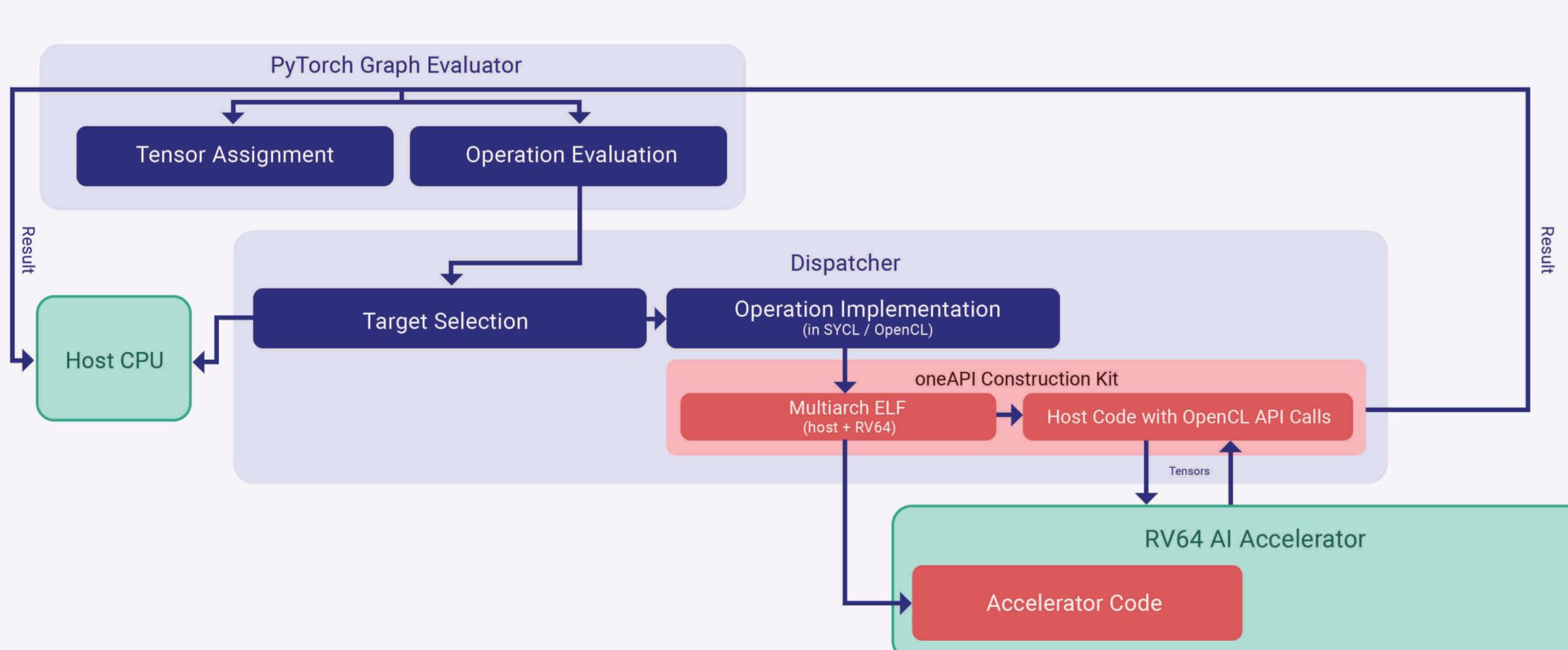
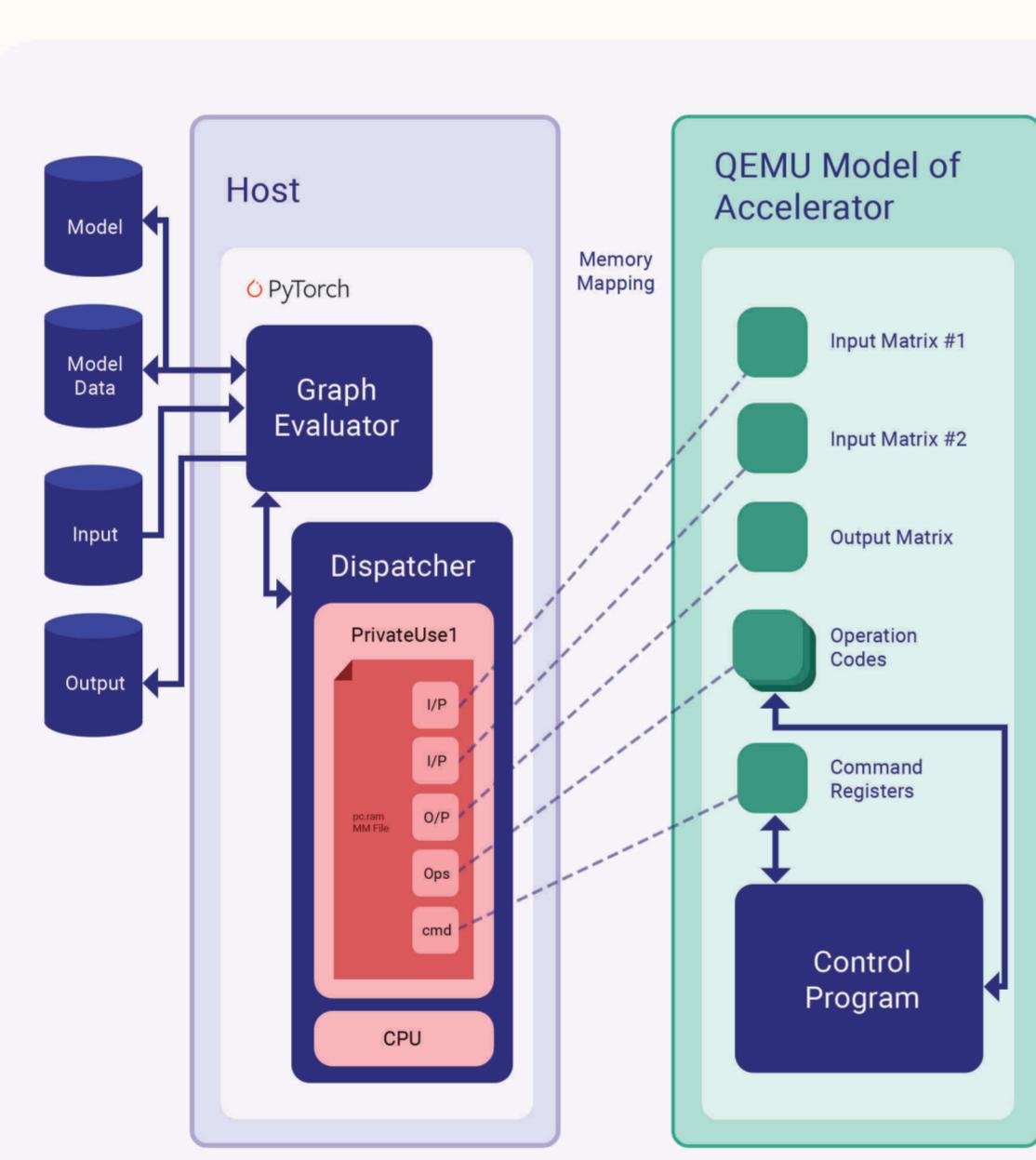


Whatever choice of representation, whether TensorFlow™ or ONNX or other, these all represent Neural Networks as a Graph. These are also all based on a Host (often x86) and an Accelerator (often a GPGPU).

If we want to introduce a new accelerator, such as RISC-V, then we must first look at the Dispatcher, which decides how the operations are assigned to the host / accelerator. Focusing here allows us to integrate the hardware; it's important to get it working first, and think of optimizations later.

The RISC-V accelerator may still be pre-silicon. Therefore, Embecosm has used QEMU models - which can be applied to systems with 1000s of cores, and micro-controllers with only a few.

With PyTorch® and PrivateUse1 memory mapping, Embecosm was able to emulate large high-performance models with over 1000 cores, as well as micro-processors with only a few.

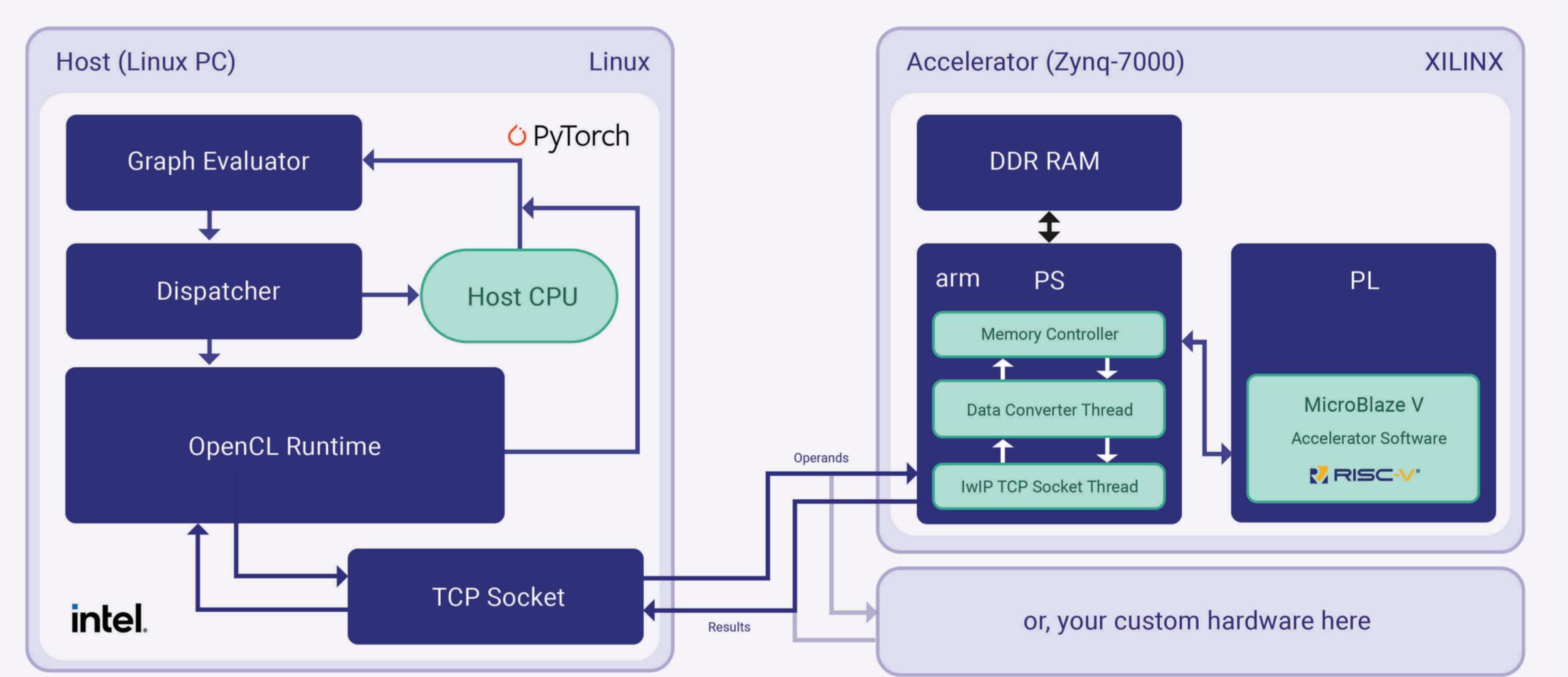


The oneAPI Construction Kit comes with many of the components standard and ready to use; everything in white is provided for the user, with only those in green needing provided.

These components highlighted green include the silicon itself - an RV64-AI accelerator - and the backend, which the oneAPI Hardware Abstraction Layer (HAL) can make easier.

## The Case Study

Bringing up an AI system (PyTorch) on a RISC-V based accelerator



As oneAPI separates out target dependency, Embecosm substituted MicroBlaze Classic for MicroBlaze V with a single recompilation. With open standards, the Embecosm team has shown a path to vendor-neutral software built for the future; able to more easily incorporate new and innovative AI accelerators from RISC-V.

## Try the oneAPI Construction Kit Yourself

This work shows that with the oneAPI Construction kit, you're able to write vendor neutral code for your software - bringing you greater freedom, choice and flexibility. The oneAPI Construction Kit is entirely open source, and we invite you to try it for yourself. Visit the GitHub at the QR Code!



Embecosm and the oneAPI Construction Kit are both a part of the Unified Acceleration (UXL) Foundation. The UXL exists to build a vendor-neutral, open source landscape for accelerated computing software.

