In-Core Performance Engineering (online, test run)

Thursday, October 6, 2022 - Friday, October 7, 2022

Zoom

Scientific Program

Introduction
Basic processor and core architecture
Out-of-order execution
Instruction scheduling
Throughput and latency of instructions
Critical path and loop-carried dependencies
Introduction to the x86-64 Instruction Set Architecture (ISA)
Understanding scalar and vectorized assembly code
Performance analysis of simple kernels
Example: STREAM Triad on Intel Ice Lake
Hands-on: Dot product on Intel Ice Lake
Introduction to the Open-Source Architecture Code Analyzer (OSACA)
How to use OSACA
How to use the Compiler Explorer
Analyzing kernels using OSACA to find potential bottlenecks
Hands-on: PI by integration on Intel Ice Lake
In-core analysis with an Arm ISA
Fujitsu A64FX core architecture
AArch64 ISA introduction
Understanding scalar and vectorized Arm assembly
Case studies: In-core performance engineering on A64FX
Sparse Matrix-Vector (SpMV) Multiplication on A64FX
Domain Wall kernel from Lattice Quantum Chromodynamics (QCD) on A64FX
Hands-On: 2D Gauss-Seidel on Intel Ice Lake