

Intel® Xeon Phi™ Coprocessor Workshop in Ostrava

Time		5/15/2014	5/16/2014
8:00	8:15		Workshop Introduction
8:15	8:30		Hands-on: Intel® Xeon Phi™ Coprocessor Software Infrastructure
8:30	8:45		
8:45	9:00		Hands-on: Intel® Xeon Phi™ Coprocessor Programming
9:00	9:15		
9:15	9:30		
9:30	9:45		
9:45	10:00	Workshop Introduction	Coffee Break
10:00	10:15	Intel® Software Development Tools	Hands-on: Optimization for Intel® Xeon Phi™ Coprocessor
10:15	10:30	Intel® Xeon Phi™ Coprocessor Architecture	
10:30	10:45		
10:45	11:00	Intel® Xeon Phi™ Coprocessor Software Infrastructure	
11:00	11:15		
11:15	11:30	Coffee Break	
11:30	11:45	Intel® MPI and Intel® Trace Analyzer and Collector for Intel® Xeon Phi™ Coprocessor	Hands-on: Intel® MPI and Intel® Trace Analyzer and Collector for Intel® Xeon Phi™ Coprocessor
11:45	12:00		
12:00	12:15		
12:15	12:30		
12:30	12:45	Lunch Break	Lunch Break
12:45	13:00		
13:00	13:15		
13:15	13:30		
13:30	13:45	Intel® Xeon Phi™ Coprocessor Programming (includes OpenMP 4.0)	"
13:45	14:00		Intel® Vtune™ for Intel® Xeon Phi™ Coprocessor (incl. demo)
14:00	14:15		
14:15	14:30		
14:30	14:45		
14:45	15:00	Debugging with Intel® Xeon Phi™ Coprocessor	Wrap-up Day 2
15:00	15:15	Intel® Math Kernel Library for Intel® Xeon Phi™ Coprocessor	
15:15	15:30		
15:30	15:45		
15:45	16:00	Coffee Break	
16:00	16:15	Optimization for Intel® Xeon Phi™ Coprocessor	
16:15	16:30		
16:30	16:45		
16:45	17:00		
17:00	17:15		
17:15	17:30		
17:30	17:45		Wrap-up Day 1

Day 1 (Training)

Workshop Introduction

[09:45-10:00]

Introduction of presenters and agenda.

Intel® Software Development Tools

[10:00-10:15]

Provides a brief overview about Intel® Software Development tools such as Intel® Parallel Studio XE and Intel® Cluster Studio XE. For developers not familiar with those suites all components are briefly explained.

Intel® Xeon Phi™ Coprocessor Architecture

[10:15-10:45]

This module explains the most important aspects of the Intel® Xeon Phi™ Coprocessor Architecture, as required for SW developers. It also addresses differences between Intel® Xeon® processors and Intel® Xeon Phi™ Coprocessors.

The information provided herein will be used by subsequent modules.

Intel® Xeon Phi™ Coprocessor Software Infrastructure

[10:45-11:15]

Every Intel® Xeon Phi™ Coprocessor comes with an own SW environment (Intel® Manycore Platform Software Stack) whose basic features will be explained. The most important aspects will be highlighted that are required to use the coprocessor in the subsequent hands-on.

Intel® MPI and Intel® Trace Analyzer and Collector for Intel® Xeon Phi™ Coprocessor

[11:30-12:30]

This module provides an introduction to Intel® MPI and presents ways of MPI analysis. Intel® Trace Analyzer and Collector (ITAC) is used for MPI analysis. ITAC and MPI features will be learned, such as MPI correctness checking and performance analysis. It will be demonstrated that Intel® Xeon Phi™ Coprocessor can be used as an additional cluster node for MPI programs. MPI + OpenMP Hybrid computing is essential on Intel® Xeon Phi™ Coprocessor since it makes no sense to allocate 120+ MPI ranks on a single coprocessor. The content focuses on the symmetric use of MPI for both Intel® Xeon® processors and Intel® Xeon Phi™ Coprocessor. ITAC will be used to balance the load between processors and coprocessors.

Intel® Xeon Phi™ Coprocessor Programming

[13:30-14:45]

There are many ways to create SW for the Intel® Xeon Phi™ Coprocessor. This module provides an overview of the wide range of supported programming models. It also includes information regarding coprocessor support in OpenMP* 4.0.

Debugging with Intel® Xeon Phi™ Coprocessor

[14:45-15:15]

This module covers the different ways to debug applications developed for Intel® Xeon Phi™ Coprocessor. It will cover the different debug solutions that come with the development suites.

Intel® Math Kernel Library for Intel® Xeon Phi™ Coprocessor

[15:15-15:45]

Intel® Math Kernel Library (Intel® MKL) contains a wealth of threaded and vectorized complex math functions to accelerate a wide variety of software applications. Major functional categories include Linear Algebra, Fast Fourier Transforms (FFT), Vector Math and Statistics. Cluster-based versions of LAPACK and FFT are also included to support MPI-based distributed memory computing.

For Intel® Xeon Phi™ Coprocessor, in addition to full native optimization support, Intel® MKL provides dedicated features such as automatic offloading, native coprocessor support and even load balancing between the host CPU and the coprocessor. This module will provide an overview about the most important coprocessor related features.

Optimization for Intel® Xeon Phi™ Coprocessor

[16:00-17:30]

The programming model of Intel® Xeon Phi™ Coprocessor is very flexible and not much different to the one of Intel® Xeon® processor based systems. Nevertheless, there are some things worth knowing to optimize and tune for the coprocessor. This module will discuss those and provide best known methods, including vectorization, parallelization and architectural characteristics.

Day 2 (Hands-on)

Workshop Introduction

[08:00-8:15]

Introduction of agenda and clarification of general necessities for the hands-on exercises.

Hands-on: Intel® Xeon Phi™ Coprocessor Software Infrastructure

[8:15-8:45]

This module allows participants to get in touch with a real Intel® Xeon Phi™ Coprocessor. There will be different exercises to learn about the coprocessor environment.

Hands-on: Intel® Xeon Phi™ Coprocessor Programming

[8:45-9:45]

This module allows participants to get in touch with a real Intel® Xeon Phi™ Coprocessor. There will be different exercises to learn about the coprocessor programming models that are specific to the coprocessor. System agnostic programming models (e.g. Intel® TBB, POSIX* threading, ...) won't be covered as there is no difference to programming Intel® Xeon® processor based systems.

Hands-on: Optimization for Intel® Xeon Phi™ Coprocessor

[10:00-11:30]

This module allows participants to apply some of the most important key learnings of optimization techniques for the Intel® Xeon Phi™ Coprocessor. Participants are free to experiment on their own or follow the official lab exercises with simplified real world examples.

Hands-on: Intel® MPI and Intel® Trace Analyzer and Collector for Intel® Xeon Phi™ Coprocessor

[11:30-12:30] & [13:30-14:00]

With this module, participants will exercise MPI programming and analysis for Intel® Xeon Phi™ Coprocessor applications.

Intel® Vtune™ for Intel® Xeon Phi™ Coprocessor (incl. demo)

[14:00-15:00]

Intel® VTune™ Amplifier XE is a sophisticated analysis tool that helps to identify performance bottlenecks in serial and parallel programs. The tool also contains powerful techniques identifying the sources for concurrency inefficiencies in parallel/multi-core applications.

In this module we will introduce common software optimization methodologies using the Intel® VTune™ Amplifier XE profiling tool but with focus on Intel® Xeon Phi™ Coprocessor.