Achieve Extreme Performance across the Full Range of HPC Workloads

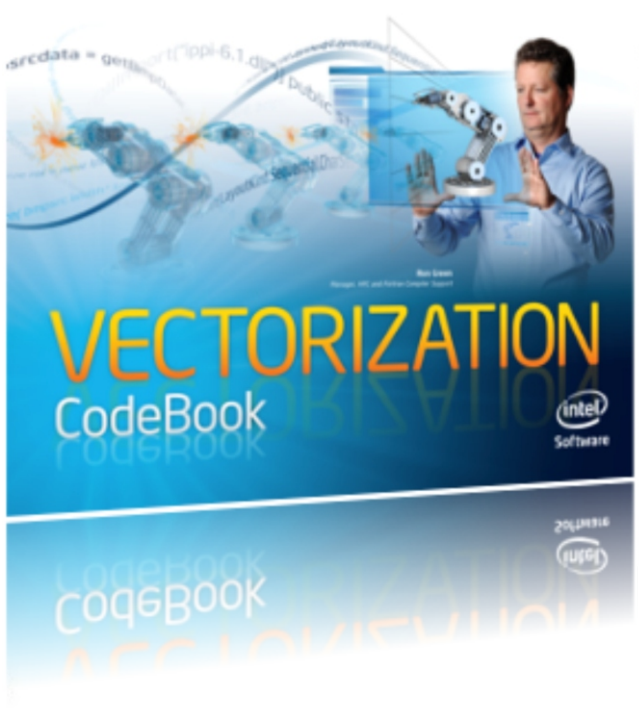
In the world of HPC, every increase in processor performance creates an opportunity to accelerate the pace of research and development – and researchers, scientists, and engineers around the world are using high performance computing (HPC) clusters to push the boundaries of knowledge and innovation and they need ever higher performance to solve today's increasingly complex challenges. From desk-side clusters to the world's largest supercomputers, Intel® products and technologies for HPC provide powerful and flexible options for optimizing performance across the full range of HPC workloads.

Get deep insights into cutting-edge programming techniques and tools required to achieve the highest performance on Intel® Architecture using C/C++ or Fortran. Learn from technical experts on how to modernize your code legacy or develop brand-new code in order to maximize software performance on current and future Intel® Xeon and Xeon Phi™ processors.

Translating Multicore Power into Application Performance

Intel leads the way to technology innovation. With our processors and software tools and our partners, we strive to bring the know how that you required to parallelize your environment to reap the benefits of today's competitive world and domain.

The workshops that we are conducting are a first step to this and we hope that you as a developer, team leader, strategist, analyst in this environment are able to take full advantage of this offering and find the attached agenda for 2 days .



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"G T House" #48, 1st "B" Cross, 7th Block, Bhavani Layout, Banashankari 3rd Stage, Bangalore - 560 085.
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INTEL SOFTWARE TOOLS TRAINING – HPC SEGMENT (1 DAY)

Duration	Tools	Title	Agenda
30 min	NA	Parallel Programming Concepts	Introduction to Parallelism ☞ Exploiting Parallelism ☞ Distributed Memory ☞ Issues in Parallelism ☞ Improving Performance
60 min	Intel® Advisor XE	Understanding your code and how to parallelize it	Intel Advisor XE Overview * Features * Workflow * Understanding the results ☞ Demo 1 : Survey – Determining if your code has opportunities for Parallelism ☞ Demo 2 : Determining correctness in your code Vectorization Advisor Overview
60 min	Intel®C++ Compiler	Simple way to build your application for Intel Architecture	☞ OS/Architecture Support ☞ Compatibility ☞ Compiler Highlights ☞ Overview of Performance Libraries and Multithreading Support Demo 1 :Simple command line samples accompanying the lecture of optimization/auto-parallelization/auto-vectorization features.
30 min	Intel® C++ Compiler : Vectorization	Vectorization for Intel® C++ & Fortran Compiler	☞ Introduction to SIMD for Intel® Architecture ☞ Vector Code Generation ☞ Compiler & Vectorization ☞ Validating Vectorization Success ☞ Reasons for Vectorization Fails ☞ Vectorization of Special Program Constructs & Loops
30 min	Intel® Cilk Plus	Programming with Intel Cilk Plus.	☞ What is Intel Cilk Plus? ☞ cilk_spawn & cilk_sync ☞ cilk for ☞ Some programming Notes ☞ Reducers ☞ Summary
45 min (Optional)	OpenMP	Industry leading parallelization techniques	☞ What is OpenMP? ☞ Parallel regions ☞ Data-Sharing Attribute Clauses ☞ Worksharing ☞ OpenMP 3.0 Tasks ☞ Synchronization ☞ Runtime functions/environment variables ☞ what's new in OpenMP 4.0 ☞ Optional Advanced topics
60 min	Intel® VTune™ Amplifier XE	Revealing the performance aspects in you code	Performance tuning methodology ☞ Quick overview Introduction to Intel® VTune™ Amplifier XE ☞ Types of performance analysis ☞ Data collecting technologies Hotspot analysis ☞ Demo 1: Finding Performance Hotspots Concurrency Analysis Locks and Waits Analysis Command Line Interface, Installation, Remote Collection Event Based Performance Analysis Overview
30 min	Intel® Inspector XE	Correctness checking - Identifying memory and threading errors in serial and parallel programs	Intro to Intel® Inspector XE Analysis workflowMemory problem analysis ☞ Demo 1. Finding memory errorsThreading problem Analysis ☞ Demo 2. Finding threading errors Preparing setup for analysis Managing analysis resultsIntegration with debugger
30 min	Intel® TBB	Powerful parallel templates library for C++	Introduction Intel® Threading Building Blocks overview Parallel models comparison Summary
30 min	Intel® IPP & MKL	Accelerates math processing routines that increase application performance and reduce development time	☞ Introduction and Overview ☞ Getting Started with Intel® Math Kernel Library ☞ Conditional Numerical Reproducibility ☞ Performance Charts ☞ Intel® IPP Overview ☞ What is Intel® IPP ☞ Intel IPP Benefits ☞ Intel IPP Domains ☞ References
60 min	Cluster Tools	Intel® Parallel Studio XE Cluster Edition	Intel® Parallel Studio XE Cluster Edition Overview – description of each tool Intel® MPI Library – optimized MPI implementation Intel® Trace Analyzer and Collector – MPI visualization

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Intel Software Tools Training – HPC Segment (2 Days)

Intel Software Tools Training – HPC Segment
Day 1

Duration	*Tools*	*Title*	*Agenda*
60 min	NA	Intel® Architecture for Software Developers	Brief introduction to 4th Generation Intel® Core™ architecture Intel® Xeon Phi™ coprocessor architecture overview
30 min	NA	Intel® Xeon Phi™ Coprocessor	☞ Intel® Xeon Phi™ coprocessor architecture ☞ Cache hierarchy, interconnect and communications architecture
30 min	NA	Parallel Programming Concepts	Introduction to Parallelism ☞ Exploiting Parallelism ☞ Shared Memory ☞ Distributed Memory ☞ Issues in Parallelism ☞ Limitations ☞ Improving Performance
30 min	Intel® Advisor XE	Understanding your code and how to parallelize it	Intel Advisor XE Overview * Features * Workflow * Understanding the results ☞ Lab 1 : Survey – Determining if your code has opportunities for Parallelism ☞ Lab 2 : Determining correctness in your code
60 min	Intel® Advisor XE – Vectorization Advisor	Understanding vectorization and how it impacts performance	Vectorization Advisor Overview * Features * Workflow * Understanding the results * Examples & Lab
45 min	Intel® C++ Compiler	Simple way to build your application for Intel Architecture	☞ OS/Architecture Support ☞ Compatibility ☞ Compiler Highlights ☞ Overview of Performance Libraries and Multithreading Support ☞ Lab 1 :Simple command line samples accompanying the lecture of optimization/auto-parallelization/auto-vectorization features.
30 min	Intel® C++ Compiler : Vectorization	Vectorization for Intel® C++ & Fortran Compiler	☞ Introduction to SIMD for Intel® Architecture ☞ Vector Code Generation ☞ Compiler & Vectorization ☞ Validating Vectorization Success ☞ Reasons for Vectorization Fails ☞ Vectorization of Special Program Constructs & Loops
45 min	Intel® Cilk Plus	Programming with Intel Cilk Plus.	☞ What is Intel Cilk Plus? ☞ cilk_spawn & cilk_sync ☞ LAB 1 - cilk_spawn and cilk_sync ☞ cilk for ☞ Some programming Notes ☞ LAB Activity 2 - Parallelizing using cilk_for ☞ Reducers ☞ Summary
30 min	OpenMP	Industry leading parallelization techniques	☞ What is OpenMP? ☞ Parallel regions ☞ Data-Sharing Attribute Clauses ☞ Worksharing ☞ OpenMP 3.0 Tasks ☞ Synchronization ☞ Runtime functions/environment variables ☞ what's new in OpenMP 4.0 ☞ Optional Advanced topics
75 min	Intel® VTune™ Amplifier XE (Generics)	Revealing the performance aspects in you code	Performance tuning methodology ☞ Quick overview Introduction to Intel® VTune™ Amplifier XE ☞ Types of performance analysis ☞ Data collecting technologies Hotspot analysis ☞ Lab 1: Finding Performance Hotspots Concurrency Analysis ☞ Lab 2: Analyzing Parallelism Locks and Waits Analysis Introduction to Performance Monitoring Unit ☞ Event Based Performance Analysis Overview

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INTEL SOFTWARE TOOLS TRAINING – HPC SEGMENT (2 DAYS)

Intel Software Tools Training – HPC Segment
Day 2

Duration	*Tools*	*Title*	*Agenda*
45 min	Intel® Inspector XE	Correctness checking - Identifying memory and threading errors in serial and parallel programs	Intro to Intel® Inspector XE Analysis workflow Memory problem analysis ☞ Lab 1. Finding memory errors Threading problem Analysis ☞ Lab 2. Finding threading errors Preparing setup for analysis Managing analysis results Integration with debugger Automated
30 min	Intel® TBB	Powerful parallel templates library for C++	Introduction Intel® Threading Building Blocks overview Tasks concept Generic parallel algorithms Task-based Programming Performance Tuning Parallel pipeline Concurrent Containers Scalable memory allocator Synchronization Primitives Parallel models comparison Summary Labs Lab 1: Parallel For
30 min	Intel® MKL	Accelerates math processing routines that increase application performance and reduce development time	☞ Introduction and Overview ☞ Getting Started with Intel® Math Kernel Library ☞ Conditional Numerical Reproducibility ☞ Performance Charts ☞ Code Samples ☞ References
30 min	Intel® IPP		☞ Intel® IPP Overview ☞ What is Intel® IPP ☞ Intel IPP Benefits ☞ Intel IPP Domains ☞ Intel IPP Naming and Linkage

OPTIONAL

Duration	*Tools*	*Title*	*Agenda*
60 min	ITAC		Advanced ITAC Overview – Effective usage of the ITAC API functions: user timing system available and C++ class – Limiting trace file size by filtering unimportant events – Limiting trace file size by further API functions: switching tracing on and off – Case Study BQCD ☞ Lab1: ITAC default: timing baseline for Poisson with and without ITAC ☞ Lab2: Tcollect: using the –tcollect compiler flag ☞ Lab3: Filter: applying filtering while tracing and while compilation ☞ Lab4: ON-OFF: switching tracing on and off by using API functions ☞ Lab5: Timing: how to use an existing timing system for effective instrumentation
90 min	MPI	Analysis of MPI Programs	Analysis of MPI programs Overview: ☞ Scaling analysis: speedup and efficiency for whole program and compute part ☞ Optimal choice of the process grid and mapping on the data grid ☞ Ideal network simulator ☞ Load balancing ☞ Message passing profile and process mapping ☞ Bandwidth analysis
90 min	MPI	MPI Correctness Checking and Debugging	☞ MPI correctness checking overview ☞ Common MPI problems ☞ Correctness checking goals ☞ Command line or GUI output ☞ Supported checks, configuration, and usage ☞ ITAC failsafe mode for crashing applications ☞ Using Inspector XE for hybrid Intel MPI codes ☞ Intel MPI build-in debug output ☞ Debugging Intel MPI codes Lab ☞ Activity 1 Use Correctness Checking on an erroneous MPI program ☞ Activity 2 Use the ITAC failsafe mode to enforce writing of a trace file ☞ Activity 3 Use the ITAC failsafe mode to trace an erroneous program ☞ Activity 4 Use the Intel MPI debug output ☞ Activity 5 Use the Intel MPI debugger support
90 min	MPI	MPI Tuning	☞ Motivation ☞ Automatic Tuning ➢ mpitune o Allgather ➢ mpitune process ➢ mpitune parameters ☞ Manual Tuning ➢ Basic ➢ Advanced ➢ Black belt ☞ Labs

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