



# Intel Software Conference 2015

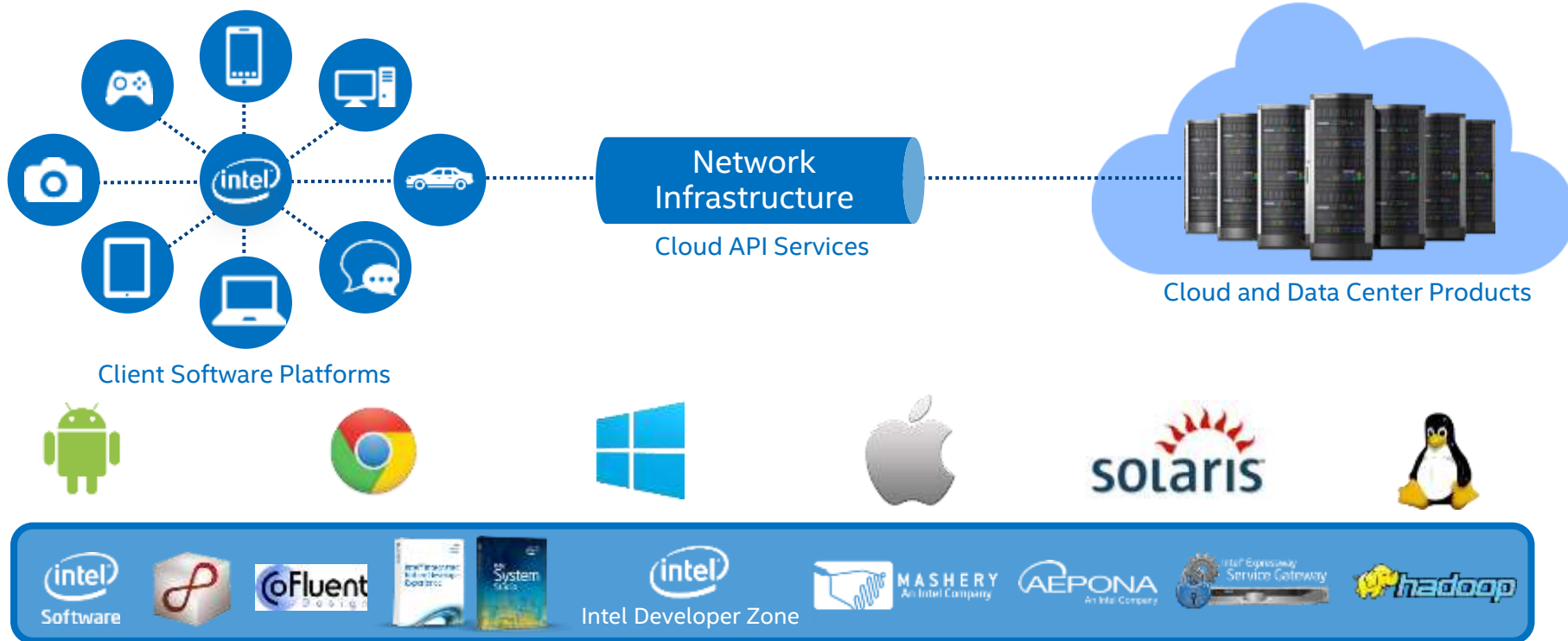
Игорь Лопатин

Руководитель группы по разработке ПО Intel

Intel Software and Services Group, Developer Products Division

11 марта, 2015

# Intel Software & Services Group



\* Other names and brands may be claimed as the property of others.

# Intel Software & Services – глобальное присутствие



~14,000+ сотрудников, более 35  
офисов

# Intel в России – активный рост



# Intel Software в России

## Российские разработчики играют ключевую роль

- Intel Parallel Studio, Cluster Tools, Compilers, Performance Libraries, Threading Tools, GPAs, Media SDK, и т.д.
- Поддержка и разработка ~ 70 продуктов
- Около 20 релизов ПО ежемесячно

## Программы Intel для разработчиков

- Intel® Developer Zone [www.intel.ru/software](http://www.intel.ru/software)
- Intel® Software Partner Program [www.intel.ru/partner](http://www.intel.ru/partner)
- Intel - INTUIT Academy <http://www.intuit.ru/catalog/se/intel/>

## Центры компетенции в ведущих российских



# Создавайте инновационные приложения вместе с Intel



Software



Intel®  
Parallel Studio XE

Technical  
Computing  
Enterprise, and HPC  
Software



Intel®  
System Studio

Embedded  
Systems/Device  
Development  
Software



Intel® Media  
Server Studio

Media Development  
Software



Intel® Integrated  
Native Developer  
Experience

Native App  
Development  
Software



Intel® XDK

Web and hybrid  
HTML5 App  
Development Software

# Technical Computing Enterprise, and HPC Software

Intel® Parallel Studio XE



Улучшение масштабируемости, устойчивости и производительности приложений



## Лидирующая производительность

- Продвинутое компиляторы и библиотеки
- Платформы Linux\*, Windows\*, OS X



## Модели параллельного программирования

- Параллелизм по данным и по задачам
- Распределенные вычисления



## Средства анализа программ

- Выявление параллелизма
- Анализ памяти и потоков
- Анализ производительности




Создание

Построение

Проверка

Улучшение

# Intel® Parallel Studio XE 2015

 <p>Intel® Parallel Studio XE 2015 Composer Edition</p>	 <p>Intel® Parallel Studio XE 2015 Professional Edition</p>	 <p>Intel® Parallel Studio XE 2015 Cluster Edition</p>
<p>Intel® C++ Compiler Intel® Fortran Compiler Intel® Threading Building Blocks Intel® Integrated Performance Primitives Intel® Math Kernel Library Intel® Cilk™ Plus Intel® OpenMP*</p>	<p>Intel® C++ Compiler Intel® Fortran Compiler Intel® Threading Building Blocks Intel® Integrated Performance Primitives Intel® Math Kernel Library Intel® Cilk™ Plus Intel® OpenMP*</p>	<p>Intel® C++ Compiler Intel® Fortran Compiler Intel® Threading Building Blocks Intel® Integrated Performance Primitives Intel® Math Kernel Library Intel® Cilk™ Plus Intel® OpenMP*</p>
<p>Компиляторы и библиотеки</p>	<p>Пакет средств для систем с общей памятью</p>	<p>Intel® Advisor XE Intel® Inspector XE Intel® VTune™ Amplifier XE</p>
		<p>Intel® MPI Library Intel® Trace Analyzer and Collector</p> <p>Пакет средств для систем с распределенной памятью</p>

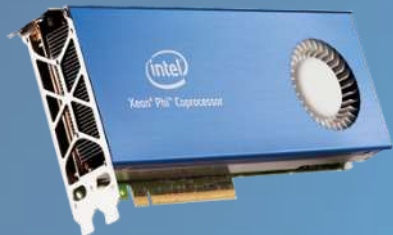


# Intel® Xeon Phi™ Product Family

## Industry and User Momentum

1 TFLOPS<sup>1</sup>

### Knights Corner



[Intel® Xeon Phi™  
Coprocessor – Applications  
and Solutions Catalog](#)

3+ TFLOPS<sup>2</sup>

- Bootable Processor
- On-Pkg, High BW Memory
- Integrated Fabric

### Knights Landing

2H'15  
First  
Commercial  
Systems



**>50** systems  
providers  
expected<sup>3</sup>

*many more  
card-based systems*

**>100 PFLOPS** customer system compute commits to-date<sup>3</sup>

*Announcing*

## Knights Hill

3<sup>rd</sup> Generation  
Intel® Xeon Phi™  
Product Family

2<sup>nd</sup> Generation  
Intel Omni-Path  
Architecture

10nm process  
technology

<sup>1</sup> Claim based on calculated theoretical peak double precision performance capability for a single coprocessor. 16 DP FLOPS/clock/core \* 61 cores \* 1.23GHz = 1.208 TeraFLOPS

<sup>2</sup> Over 3 Teraflops of peak theoretical double-precision performance is preliminary and based on current expectations of cores, clock frequency and floating point operations per cycle.

FLOPS = cores x clock frequency x floating-point operations per second per cycle. <sup>3</sup> Intel internal estimate



Announcing

# Intel® Omni Scale—The Next-Generation Fabric

- Designed for Maximum Scalability
- Rich Set of Programming Models
- Flexible Configurations
- End-to-End Solution

## INTEGRATION

Intel® Omni  
Scale Fabric



Starting with  
Knights Landing

Intel® Omni  
Scale Fabric



Future 14nm  
generation

★ Coming in '15

✓ PCIe  
Adapters

✓ Edge  
Switches

✓ Director  
Systems

✓ Intel Silicon  
Photonics



✓ Open  
Software  
Tools\*

Intel® True Scale  
Fabric Upgrade  
Program *Helps Your  
Transition*

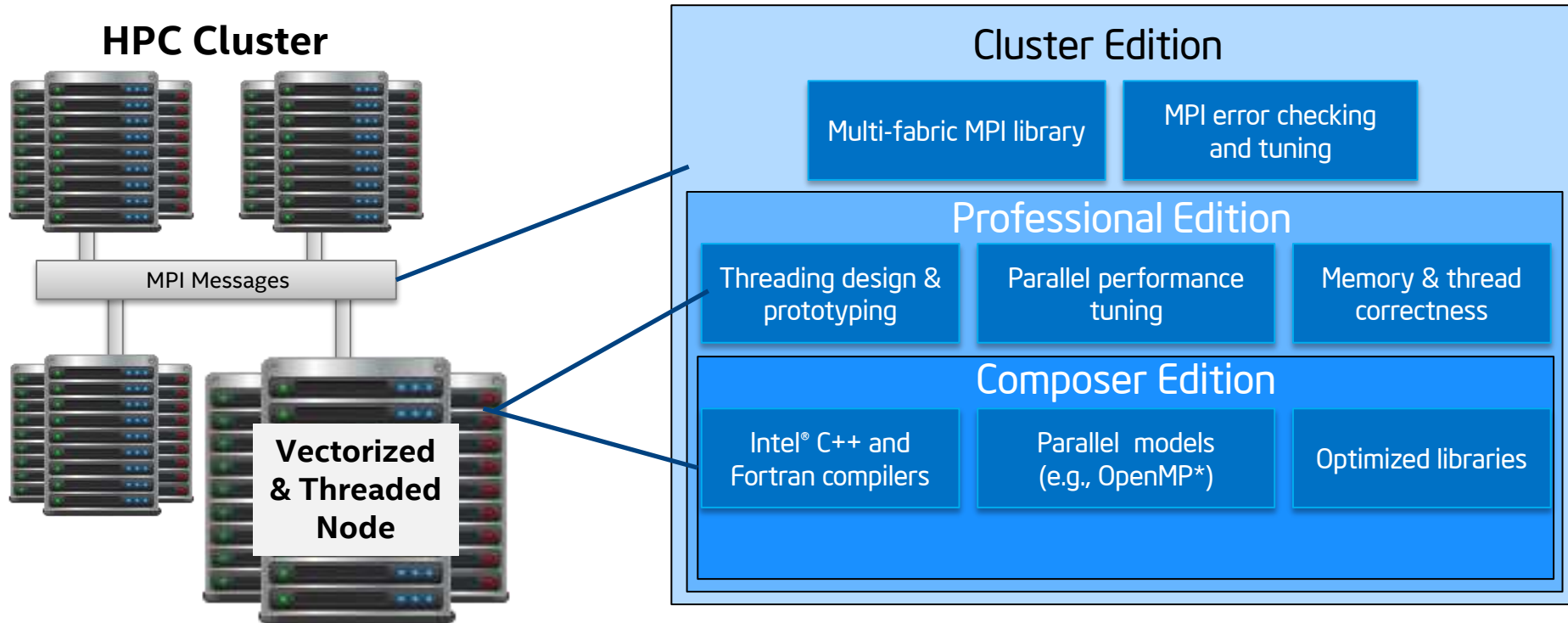


# Спасибо!





# How Intel® Parallel Studio XE 2015 helps make *Faster Code Faster* for HPC



# Available Standalone or in Cluster suite

***Achieve High Performance for MPI  
Cluster Applications  
with  
Intel® MPI Library<sup>+</sup>***

MPI Library - MPICH Based  
MPI 3.0 Standard  
Benchmarks & Tuning



***Elevate Development Tools to a  
Comprehensive Shared,  
Distributed & Hybrid Application  
Development Suite***

MPI Library



Compilers

Performance Libs

Analysis Tools



Also Available in Intel®  
Parallel Studio XE  
2015 Cluster Edition<sup>+</sup>

<sup>+</sup>Available for Windows\*\* and Linux\*

# Intel® C++ and Fortran Compilers 15.0

Productive language-level parallelism models for improved application performance

- Common to both
  - New OpenMP 4.0 vectorization simplifies taking advantage of SIMD instructions for great performance on Intel® Xeon® and Xeon Phi™ processors and coprocessors
  - Improved compiler optimization reports help quickly identify optimization opportunities. For Windows-based developers, Visual Studio\* 2010, 2012 and 2013 integration is included.
  - Linux\*, OS X\*, Windows\*, Android\*
  - Available now in a variety of configurations to suit different development needs. [C++ Info](#)  
[Fortran Info](#)
- Intel® C++ Compiler
  - Intel Cilk™ Plus keywords for parallelism simplify implementation of task and data parallelism
  - Complete C++11 support
- Intel® Fortran Compiler
  - Support for the latest Fortran standards
  - Rogue Wave\* IMSL\* Fortran Numerical Libraries: Performance add-on for Intel® Fortran Windows suites

# Performance without compromise

## Intel® C++ & Fortran Compilers

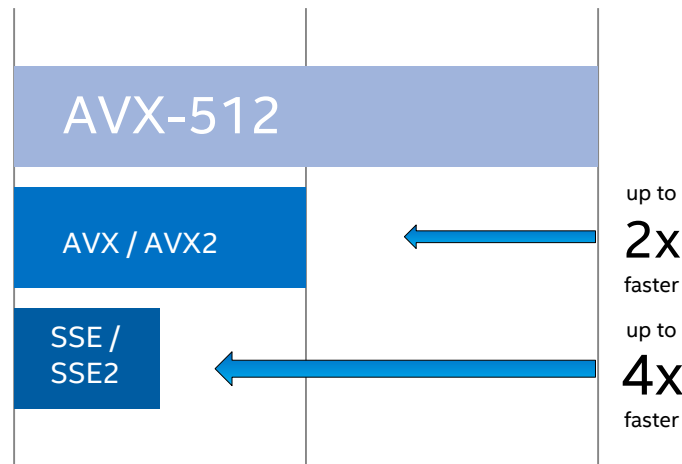
### Vector and parallel programming improvements

- Explicit vectorization achieves predictable vectorization
- Similar to what OpenMP\* does for parallelization
- Maps threaded execution to SIMD hardware
- Memory alias and alignment analysis improvements
- Expanded alignment and restrict attributes

### Hardware Support

- Skylake support
- Knights Landing (KNL) support
- Compute on Intel Graphics

Standards: Full C++ 2011, Full Fortran 2003 support, Fortran 2008 BLOCK support, OpenMP\* 4.0



Peak single precision floating point performance



Pri

## Intel® Parallel Studio XE 2015 Co Edition



from \$699

Intel® C++ Compiler  
Intel® Fortran Compiler  
Intel® Threading Building Blocks  
Intel® Integrated Performance Primitives  
Intel® Math Kernel Library  
Intel® Cilk™ Plus  
Intel® OpenMP\*

## Intel® Parallel Studio XE 2015 Professional Edition



from \$1,699

Intel® C++ Compiler  
Intel® Fortran Compiler  
Intel® Threading Building Blocks  
Intel® Integrated Performance Primitives  
Intel® Math Kernel Library  
Intel® Cilk™ Plus  
Intel® OpenMP\*

Intel® Advisor XE  
Intel® Inspector XE  
Intel® VTune™ Amplifier XE

Add-on:  
Rogue Wave IMSL\* Library

## Intel® Parallel Studio XE 2015 Cluster Edition



from \$2949

Intel® C++ Compiler  
Intel® Fortran Compiler  
Intel® Threading Building Blocks  
Intel® Integrated Performance Primitives  
Intel® Math Kernel Library  
Intel® Cilk™ Plus  
Intel® OpenMP\*

Intel® Advisor XE  
Intel® Inspector XE  
Intel® VTune™ Amplifier XE  
Intel® MPI Library  
Intel® Trace Analyzer and Collector

Add-on:  
Rogue Wave IMSL\* Library

Additional configurations including, floating and academic, are available at: <http://intel.ly/perf-tools>

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Notice revision #20110804

# Faster Code Faster

## Intel® Parallel Studio XE 2015

### Faster Code

- Explicit vector programming speeds more code
- Optimizations for Intel® Xeon Phi™ coprocessor, Skylake and Broadwell microarchitectures
- MPI library now supports latest MPI-3 standard
- Faster processing of small matrixes
- Parallel direct sparse solvers for clusters

### Code Faster

- Comprehensive compiler optimization reports
- Analyze Windows\* or Linux\* profile data on a Mac\*

### Latest standards support

- MPI-3, OpenMP 4, Full C++11 and Fortran 2003

