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Intel® Xeon Phi™ Processor: Your Path to Deeper Insight

Intel Inside®. Breakthroughs Outside.

Unlock deeper insights to solve your biggest challenges faster with the Intel® Xeon Phi™ processor, a foundational element of Intel® Scalable System Framework (Intel® SSF)

What if you could gain deeper insight to pursue new discoveries, drive business innovation or shape the future using advanced analytics? Breakthroughs in computational capability, data accessibility and algorithmic innovation are driving amazing new possibilities. One key to unlocking these deeper insights is the new Intel® Xeon Phi™ processor – Intel's first processor to deliver the performance of an accelerator with the benefits of a standard host CPU.

Designed to help solve your biggest challenges faster and with greater efficiency, the Intel® Xeon Phi™ processor enables machines to rapidly learn without being explicitly programmed, in addition to helping drive new breakthroughs using high performance modeling and simulation, visualization and data analytics. And beyond computation, as a foundational element of Intel® Scalable System Framework (Intel® SSF), the Intel® Xeon Phi™ processor is part of a solution that brings together key technologies for easy-to-deploy and high performance clusters.

Solve Your Biggest Challenges Faster[1]

Designed from the ground up to eliminate bottlenecks, the Intel® Xeon Phi™ processor is Intel's first bootable host processor specifically designed for highly parallel workloads, and the first to integrate both memory and fabric technologies. Featuring up to 72 powerful and efficient cores with ultra-wide vector capabilities (Intel® Advanced Vector Extensions or AVX-512), the Intel® Xeon Phi™ processor raises the bar for highly parallel computing. With no dependency on the PCIe bus, the versatile processor is capable of handling a wide variety of workloads and configurations that are not supported by accelerators. Integration of 16GB of high-bandwidth memory delivers up to 490 GB/s of sustained memory bandwidth for memory-bound workloads[2], and the available dual-port Intel® Omni-Path Fabric further reduces solution cost, power and space utilization.

As organizations undertake more complex and time-sensitive computational tasks, scalability becomes critical. The server-class Intel® Xeon Phi™ processor can scale rapidly like an Intel® Xeon® processor across large distributed systems. This capability is important for running high-performance workloads in the data center, especially analytics and machine learning, where scaling efficiency is critical for rapid training of complex neural networks. Moreover, as a foundational element of Intel® SSF, the Intel® Xeon Phi™ processor is part of a complete system architecture that makes it easy to deploy even higher performance clusters in your organization.

Realize Compelling Value

The Intel® Xeon Phi™ processor delivers compelling long-term value, enabling researchers, engineers and data scientists to solve the biggest challenges of our time with an architecture that provides the scalability and efficiency demanded by today's IT managers. The higher degree of parallelism in the Intel® Xeon Phi™ processor results in greater compute per unit of energy consumed for highly-parallel applications .

The processor is binary-compatible with Intel® Xeon® processors, which allows it to run any x86 workload to optimize asset utilization across the data center. By contrast, special-purpose accelerators, like GPUs, often remain underutilized since applications are not always suitable or optimized for them. Standardizing on Intel® architecture means you can use a single programming model for your code, helping increase efficiency through a shared developer base and code reuse.

Maximize Future Potential

Investments in software can last a decade or longer, so as your high performance computing (HPC) needs grow—whether in research or business—you need a system architecture that offers great flexibility, the most reusability and broad ecosystem support. The Intel® Xeon Phi™ processor is a general purpose CPU built on open standards, making your software investment portable to many similar architectures into the future. A broad ecosystem of partners, programming languages and tools supporting the Intel® architecture to provide added confidence in your path forward.

And with the Intel® Xeon Phi™ processor as a foundational element of Intel® SSF, you have the support of a comprehensive technology roadmap for other key technologies, such as storage, connectivity and memory that are critical to your high performance systems.

Groveport Platform:
Bootable Intel® Xeon Phi™ Processor system

with integrated
Intel® Omni-Path Fabric
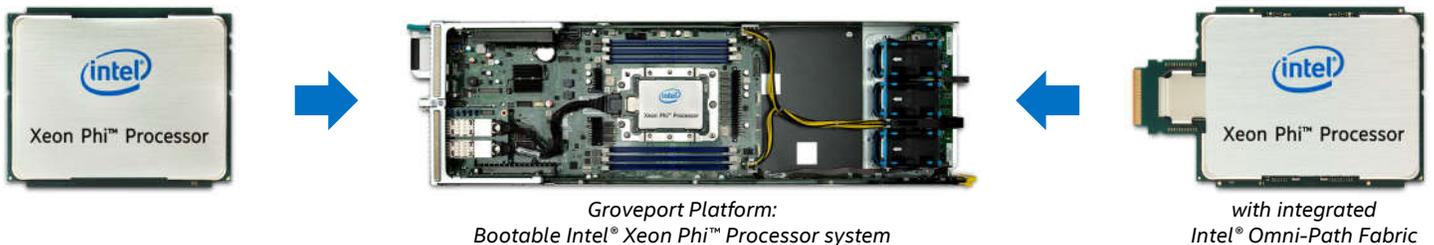
Across a wide range of applications and environments – from machine learning to high-performance computing – you can now realize greater efficiency and scale by implementing a single, unified architecture in your data center that works for all your analytics needs.

The Intel® Xeon Phi™ processor is a true evolution in design and architecture that delivers the performance of an accelerator with the benefits of a standard CPU for your most demanding tasks. Unlock deeper insights to solve your biggest challenges faster with the Intel® Xeon Phi™ Processor, a foundational element of Intel® SSF.

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Product Specifications

For complete information about the Intel® Xeon Phi™ processor, visit http://ark.intel.com.

	Cores	Ghz[3]	INTEGRATED Memory	INTEGRATED Fabric*	DDR4	Power
7290* **Best Performance/Node**	72	1.5	16GB 7.2 GT/s	Yes	384GB 2400 MHz	245W +15W fabric
7250 **Best Performance/Watt**	68	1.4	16GB 7.2 GT/s	Yes	384GB 2400 MHz	215W +15W fabric
7230 **Best Memory** **Bandwidth/Core**	64	1.3	16GB 7.2 GT/s	Yes	384GB 2400 MHz	215W +15W fabric
7210 **Best Value**	64	1.3	16GB 6.4 GT/s	Yes	384GB 2133 MHz	215W +15W fabric

Learn more: www.intel.com/xeonphi

About Intel® Scalable System Framework (Intel® SSF)

Architected for HPC clusters to supercomputer-scale systems, Intel® SSF brings together the key technologies critical to achieve higher performance computing systems and makes them easier to deploy. These include:

- **Connectivity:** Intel® Xeon Phi™ processors now offer the ability to deploy Intel's next-generation fabric architecture, Intel® Omni-Path Architecture, as a standard, integrated option. The combination provides the foundation for powerful and efficient data traffic control by using an advanced "on-load" design that cost-effectively maximizes performance. Intel® Omni-Path Architecture automatically scales to tens of thousands of nodes with extremely low power consumption, making the solution ideal for increasingly demanding HPC and analytics workloads.

- **Storage**: Intel® Solutions for Lustre* software is a parallel file system purpose-built for HPC to provide fast, "massively scalable storage software" for accelerating performance on complex workloads.[4]

- **Memory:** MCDRAM is the integrated memory on Intel® Xeon Phi™ processors, providing up to 5x the bandwidth of DDR4 to deliver breakthrough performance for memory-bound workloads.[5]

- **Software:** Intel® HPC Orchestrator simplifies the complexity of installation, configuration and ongoing maintenance of implementing an HPC software stack.

Learn more: www.intel.com/SSF

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Note: Software and workloads used in performance tests may have been optimized for performance only on Intel microprocessors. Performance tests, such as SYSmark and MobileMark, are measured using specific computer systems, components, software, operations and functions. Any change to any of those factors may cause the results to vary. You should consult other information and performance tests to assist you in fully evaluating your contemplated purchases, including the performance of that product when combined with other products. Intel processors of the same SKU may vary in frequency or power as a result of natural variability in the production process. Performance claims in this document are based on Intel measured results as of April 2016. For more complete information visit: http://www.intel.com/performance

[1] Intel® Xeon Phi™ processor delivers over 3 Teraflops of dual-precision peak theoretical performance, which is faster than the over 1 Teraflop of dual-precision peak theoretical performance for the Intel® Xeon Phi™ Coprocessor x100 Family

[2] Source: Intel measured performance of Intel® Xeon Phi™ processor 7250 on STREAM Triad benchmark in Gigabytes/second as of March 2016.

[3] Frequency listed is nominal (non-AVX) TDP frequency. For all-tile turbo frequency, add 100 MHz. For single-tile turbo frequency, add 200 MHz. For high-AVX instruction frequency, subtract 200 MHz.

[4] For more information, visit www.intel.com/lustre

[5] Measured sustained memory bandwidth (STREAM) for integrated memory is >490GB/s, or 5.4X the measured sustained memory bandwidth of platform memory (DDR4) at ~90GB/s

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