Intel® Cluster Ready—Making HPC Simpler

Boost productivity. Solve tough challenges. The Intel® Cluster Ready program makes it simpler to capture the power of high-performance computing.

Program Brief

Intel Cluster Ready

High-Performance Computing

High-performance computing (HPC) is a key differentiator and productivity engine for business. With the Intel® Cluster Ready program, businesses can exploit the power of high-performance computing more rapidly, easily, and cost-effectively.

Developed collaboratively with hardware and software vendors, the Intel Cluster Ready program makes it simpler to buy, deploy, and manage an HPC cluster. Intel Cluster Ready helps ensure application and component interoperability—from the minute you first power up the cluster through the lifetime of the system.

And, with an Intel Cluster Ready system powered by the new Intel® Xeon® processor 5500 series, you can unleash even more parallel processing performance. Simulate, analyze, and visualize more complex models faster, and accelerate your data-intensive applications—all in a smaller, denser, and more energy-efficient footprint. The net impact: Faster time to value, lower total cost of ownership (TCO), and greater business impact.

Cluster Ready

Why Intel Cluster Ready?

- **Find the right configuration, right away.** Intel Cluster Ready takes the complexity out of purchasing an HPC cluster. Choose a certified Intel Cluster Ready system and reduce the time and risk of selecting a collection of independent hardware components for your applications. Certified Intel Cluster Ready systems have been thoroughly tested to ensure component interoperability.
- **Know that it works.** With a certified Intel Cluster Ready system and registered Intel Cluster Ready applications, you can be confident that all the components will work together, right out of the box. Software tools such as Intel® Cluster Checker help ensure those components continue to work together, delivering a high level of quality and low TCO over the course of the cluster's lifetime.
- **Solve new problems.** Capitalize on the power of an Intel processor–based HPC cluster to enhance productivity and solve new problems. Intel Cluster Ready helps you realize HPC benefits faster by ensuring application and system interoperability.

Industry Cooperation to Accelerate HPC Use

Built and Tested for Interoperability

To lay a foundation for interoperable HPC clusters, Intel teamed up with leading HPC vendors and defined the Intel Cluster Ready Specification. This specification—which includes requirements for hardware, software, manageability, and functionality—provides a common basis for building clusters and registering applications for HPC.

Intelligent Performance to Accelerate Innovation and Discovery

Intel® Cluster Ready systems powered by the Intel® Xeon® processor 5500 series deliver intelligent performance for today's most complex HPC challenges. By providing dynamic performance capabilities, energy efficiency advances, and more than triple the memory bandwidth of Intel's previous-generation dual-socket architecture, the new Intel® Core™ microarchitecture can increase your total HPC application performance up to threefold without requiring added investment in software development or greater power and cooling support for your data center. Key enhancements include:

- Dynamic management of cores, threads, cache, interfaces, and power for performance when you need it
- Intel® Turbo Boost Technology for automatic increases in processor frequency of up to 400 MHz
- Integrated memory controller, delivering up to 18.11GB/sec of memory bandwidth per socket
- Intel® QuickPath Architecture to unleash memory-bound applications

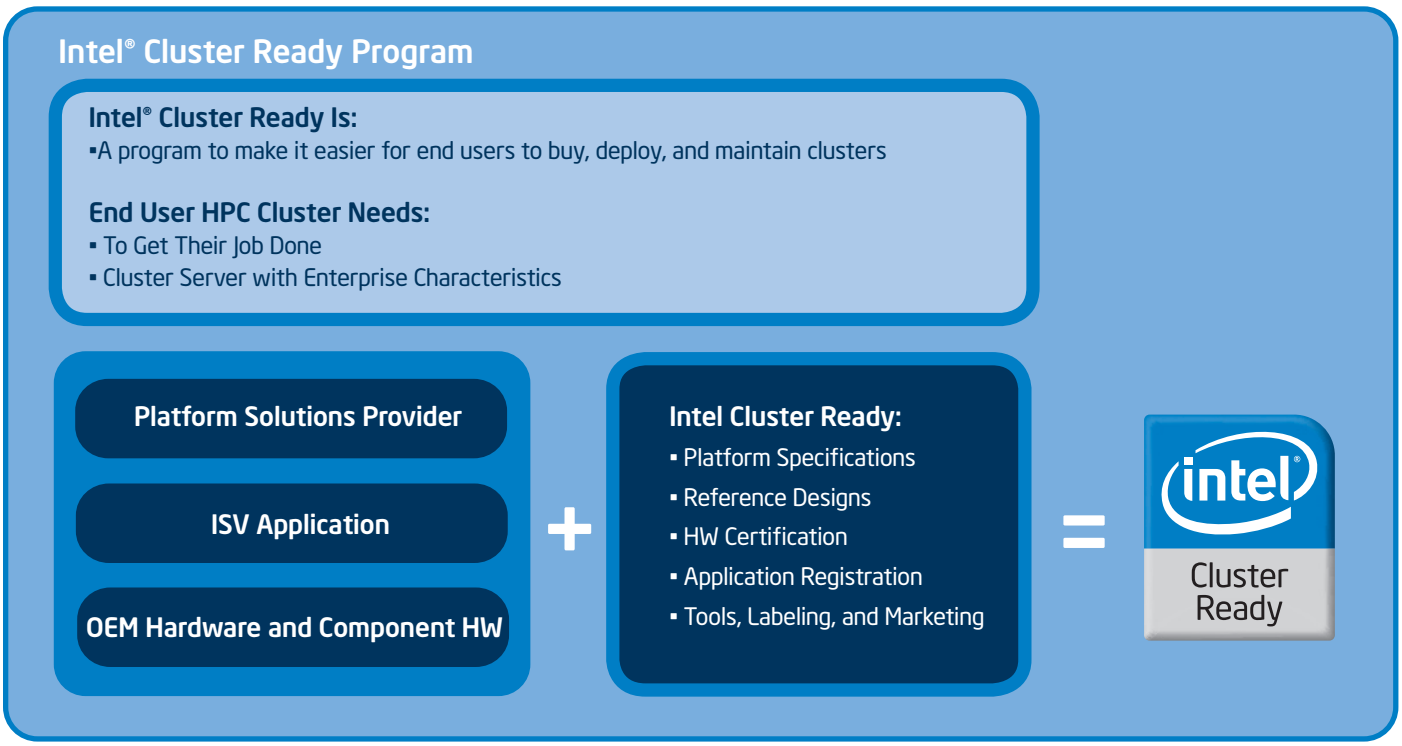

Figure 1. Intel teamed up with leading hardware and software vendors to make it easier to buy, deploy, and maintain HPC clusters—and exploit the high performance of Intel® processor–based high-performance computing.

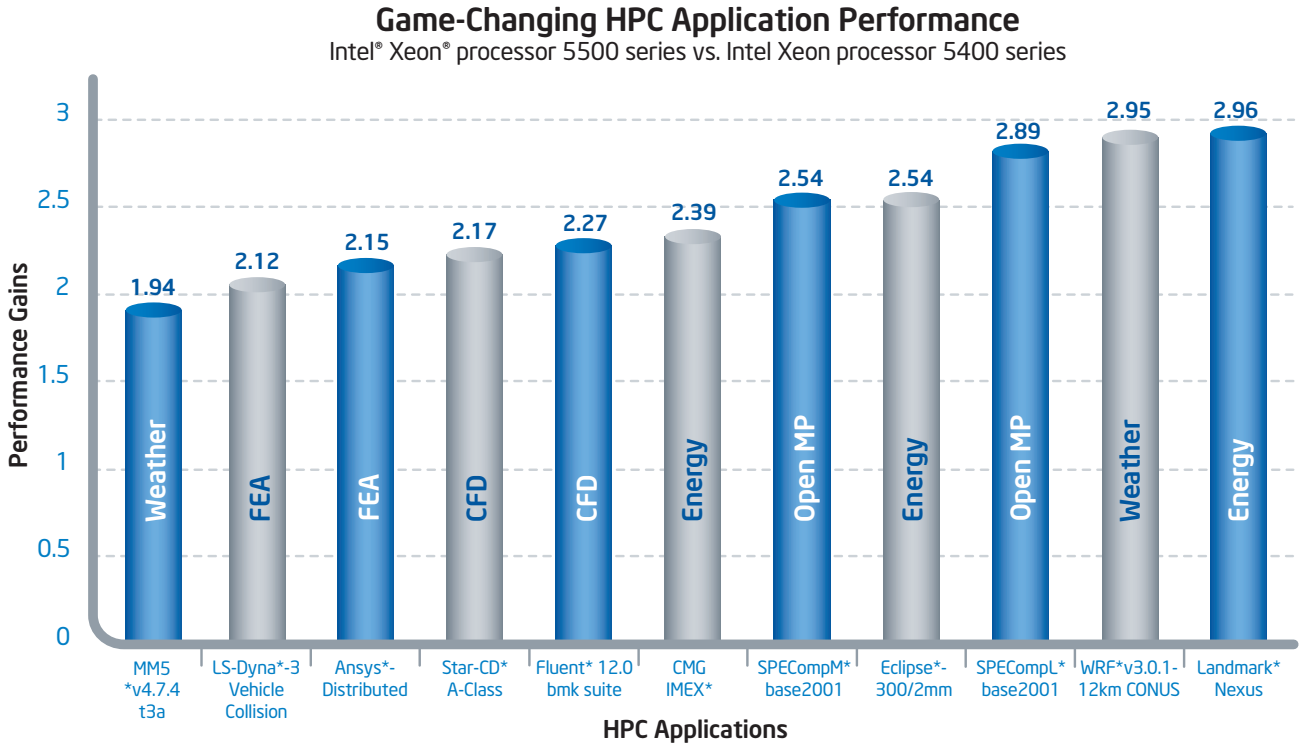

Figure 2. Performance gains using the Intel® Xeon® processor 5570 series compared with the Intel Xeon processor 5482 series on HPC applications. Results published, submitted, or approved on March 30, 2009.

The Intel Cluster Ready Specification helps ensure that each cluster component conforms to industry standards or, if no standard exists, best-of-class practices. Intel provides the specification to hardware vendors, software vendors, and systems integrators so they can build certified Intel Cluster Ready clusters and develop registered Intel Cluster Ready applications.

By creating a common basis for clusters, the Intel Cluster Ready Specification helps you maintain interoperability while customizing a cluster to meet your specific needs. Choose from a variety of hardware and software components that conform to the specification, both when you first deploy the cluster and as your requirements change. And enjoy the assurance that certified clusters are built according to the Intel Cluster Ready Specification and rigorously tested for component interoperability.

Registered, Validated Applications

Registered Intel Cluster Ready applications have been validated on a certified Intel Cluster Ready cluster. To register an application, Intel or a participating vendor demonstrates that the software can run real-world workloads successfully on a certified cluster. When the software passes the test, Intel issues the Intel Cluster Ready registration to the software vendor and posts the application version and requirements on a public Web page.

Tools to Make Cluster Configuration Even Easier

The Intel® Cluster Ready environment makes it simple to buy, deploy, and manage an HPC cluster. Systems integrator Silicon Mechanics further simplifies the purchase process with a dynamic, online Intel Cluster Ready configuration tool. Starting from a base certified Intel Cluster Ready cluster, the Silicon Mechanics tool lets you interactively choose or configure processors, memory, hard drives, and secondary switching fabrics from several options. No matter what components you choose, the cluster remains within certification.

"Using Rocks+* makes the deployment and management of Intel® Cluster Ready solutions incredibly simple. System builders, ISVs, and end users can get the complete stack from a single source and build out validated, supported solutions with confidence."

– Tim McIntire, CEO, Clustercorp

Because registered applications are developed to run on clusters with the same base specification, you can run multiple registered applications on the same certified Intel Cluster Ready cluster without having to rebuild the software stack or reconfigure the hardware. Run different applications on different days. By taking advantage of this enhanced flexibility, you can optimize your HPC resources and enhance productivity without adding costs or complexity.

Ready to Grow

Systems integrators have created reference designs or recipes with certified Intel Cluster Ready clusters and registered software. When you need to expand your HPC infrastructure or deploy a cluster for another business group, you can use the appropriate recipe to create an exact copy of your cluster. Because the new system is Intel Cluster Ready, you can be confident that hardware and software will work together as they should.

Simpler Management

Intel Cluster Checker is an essential software management tool that helps make sure system components continue to work together over the cluster's lifetime. Provided free with all certified Intel Cluster Ready clusters, Intel Cluster Checker analyzes the cluster's configuration to be certain it remains within certification. If a software update causes software conflicts or a cable comes loose, Intel Cluster Checker identifies the problem quickly and provides detailed diagnostic information.

Use Intel Cluster Checker to reduce the time spent troubleshooting and minimize the need for specialized support skills. Run Intel Cluster Checker regularly to enhance system reliability and ensure optimal performance.

"The Intel® Cluster Ready Program supports the Cray CX1 goal of 'ease-of-everything' by simplifying the setup and configuration complexity of deploying an HPC cluster. Cray applauds Intel's initiative in giving customers confidence that their chosen system will operate successfully through the ICR certification process."

– Ian Miller, SVP, Productivity Solutions Group, Cray

Eight Applications, Six Vendors, One Day—Zero Rebuilds

How robust and flexible is a certified Intel® Cluster Ready cluster? Dell and Intel created a 16-node certified cluster with Dell PowerEdge* blade servers based on the Intel® Xeon® processor. In a single day, the team loaded and ran eight registered Intel Cluster Ready applications from six distinct software vendors—without having to rebuild the cluster.

Dell worked with ESI Group to deploy a new certified Intel Cluster Ready cluster that would support work on PAM-Crash* development. Jean-Louis Gregis, IT Manager for ESI Group's Information Department, says his team would have spent two months researching, assembling, and deploying a cluster. Instead, Dell built and deployed an Intel Cluster Ready system in just four days.

Learn more. Visit www.intel.com/go/cluster to see which applications are Intel Cluster Ready and where to buy a certified Intel Cluster Ready system.

Tap into the power of high performance computing and get more out of your Intel Cluster Ready system. Join ClusterConnection.com, a resource for the Intel Cluster Ready community.

[1]Intel internal measurement (Feb. 2009). STREAM-Triad benchmark. Red Hat Enterprise Linux* Server 5.3. Intel® Xeon® processor E5472, 3.0 GHz, 2x6MB L2 cache, 1600MHz system bus, 16GB memory (8x2GB FB DDR2-800) vs. Intel Xeon processor X5570, 2.93 GHz, 8MB L3 cache, 6.4QPI, 24GB memory (6x4GB DDR3-1333).

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