The auto industry is entering an unprecedented era of innovation as it moves toward new lightweight materials and autonomous cars. Manufacturers have to integrate more advances into each design cycle, which requires fast performance for LS-DYNA* crash simulations.

The Intel® Scalable System Framework (Intel® SSF) offers an essential resource to meet these needs, a flexible blueprint for cluster designs that can scale affordably to address even the most extreme requirements. Intel SSF brings together Intel’s latest compute, memory and storage, fabric, and software technologies to help organizations scale performance more cost-effectively for complex workloads.

“Fujitsu’s PRIMEFLEX* for HPC appliances, powered by the Intel® Xeon® processor E5-2697 v4, offer an efficient, cost-effective way to deploy proven configurations. Fujitsu’s HPC Gateway* software and Intel® HPC Orchestrator add value, helping users maximize the output from these advanced systems.”

— Ian Godfrey, Director Solution Systems, Fujitsu Systems Europe

Up to 1.32X Higher Performance® Today

Intel SSF begins with Intel® processors, such as the Intel® Xeon® processor E5-2600 v4 product family, which can boost LS-DYNA performance by up to 1.32X versus the previous generation (see Figure 1). These processors provide up to 20 percent more cores and cache and support faster memory. They also include technologies for accelerating the vector operations that are so abundant in LS-DYNA workloads.

Intel works closely with Livermore Software Technology Corporation (LSTC) to optimize LS-DYNA, so you can expect meaningful performance gains out of the box. LSTC is evaluating many-core Intel® Xeon Phi™ processors, which offer new levels of parallelism and may deliver additional benefits in performance and energy efficiency.

A Better Foundation for Growth

LSTC is also evaluating Intel® Omni-Path Architecture (Intel® OPA), another vital component of Intel SSF. Intel OPA offers comparable or better performance than InfiniBand EDR* in a wide range of scenarios, while improving price performance by as much as 50 percent (see Figure 2).

With its high switch port densities, Intel OPA scales cost-effectively to support large clusters. It also offers zero-latency error correction and advanced link resiliency, so simulations can run more reliably to completion. Future Intel processors will include integrated fabric controllers to help drive ongoing improvements in performance and cost models.
Massively Scalable Storage

Data requirements continue to grow in crash simulations. Intel® Solutions for Lustre® can help organizations scale storage affordably, without sacrificing the high performance needed for fast performance. Intel offers value-added Lustre solutions that simplify implementation and management.

And Much More

Intel SSF is evolving rapidly to help boost performance and value for LS-DYNA and other complex HPC applications. Intel® HPC Orchestrator, for example, will provide a pre-validated software stack designed to simplify software implementation and maintenance. Intel is also working with industry leaders to deliver advances in sensors, gateways, security, artificial intelligence, and machine learning to help improve performance and reduce risk for self-driving cars.

Over the next few years, automotive designers will take us places we have never been before. Intel technologies can help make that journey faster and safer.

Get more information

- Livermore Software Technology Corporation (LSTC). www.lstc.com

Figure 2. A cluster fabric based on Intel® Omni-Path Architecture offers comparable performance to InfiniBand EDR, while improving performance per dollar by as much as 50 percent.*

1Intel benchmark test performed in January 2016 using the TopCrunch® 3-car crash simulation. Baseline configuration: 2-socket server with 2 x Intel® Xeon® processor ES-2697 v3, 128 GB @2133 MHz DDR4 memory, Intel® Solid State Drive Data Center S3610 Series, Red Hat Enterprise Linux® 7.2, results: 3206 seconds; new system configuration: 2-socket server with 2 x Intel® Xeon® processor ES-2697 v4, 128 GB @2400 MHz DDR4 memory, Intel Solid State Drive Data Center S3610 Series, Red Hat Enterprise Linux 7.2, results: 2419 seconds (faster is better).


3Intel® Omni-Path Architecture switches are built using a 48-port switch ASIC, versus the 36-port switch ASIC used in current Mellanox switches.

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.

All information provided here is subject to change without notice. Contact your Intel representative to obtain the latest Intel product specifications and roadmaps.

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