

CASE STUDY

MVConceptUSA*



Accelerating Engineering Workloads with Faster Storage

Intel® SSD 750 Series



When you need to maximize system performance, what components do you consider? The processor? DRAM capacity? Software optimizations? All of those variables can make a difference, but often, storage performance is overlooked even though it can have a dramatic impact on workload performance.

MVConceptUSA* is a technology consulting company that helps customers optimize performance and productivity for everyday workloads. Recently, one of Germany's largest automotive manufacturers approached MVConceptUSA for help with a particularly time-consuming engineering workload they performed daily. The manufacturer was running ANSYS* simulation software on systems, and the simulation required 15,000 seconds (4 hours, 10 minutes) to complete. The manufacturer instructed MVConceptUSA not to call them back unless they could shorten the workload to under 10,000 seconds.

Challenges

- **Identify performance bottlenecks:** From past experience, MVConceptUSA knew that bottlenecks could come from any component of the system, including the processor, memory, storage, and even software settings. Finding those bottlenecks and how much they each affect performance can be tricky.
- **Identify alternative components and optimizations:** There are a multitude of choices, settings and configurations for each component that could potentially accelerate overall workload performance. Understanding the nature of the workload and the impact of the major components requires experience and diligence.

Solution

- **High-end Intel® processor with software optimizations:** MVConceptUSA discovered they could greatly boost workload performance by overclocking⁵ the systems' high-end processors¹ and tuning the ANSYS software.
- **Intel® SSD 750 Series:** Despite the target workload being compute-intensive, the PCIe-based Intel® SSD 750 Series⁴ delivered significantly more performance. Workload performance increased by **2x** versus the fastest SSD they had previously tested³, and by **3.2x** versus the system's original hard drive¹.

Impact

- **A 20x increase in workload performance:** Processor and software optimizations—combined with upgrading to an Intel SSD 750 Series—slashed workload completion time from four hours and 10 minutes to 12½ minutes—far exceeding the customer's expectations.⁶

"Storage is making a difference."

– Fabrice Girerd,
CEO, MVConceptUSA

“So we have come from 1,500 seconds to 750 seconds just by changing the drive, so we proved the point—the drive was important.”

– Fabrice Girerd,
CEO, MVConceptUSA

ANSYS workloads are computationally intensive, so processor performance was the first variable MVConceptUSA tackled. After several experiments, the greatest processing performance value was provided by overclocking⁵ the Intel® Core™ processor inside the system, which reduced simulation time from 15,000 seconds to 8,000 seconds².

Next, MVConceptUSA wondered how much storage could impact overall performance. Initial results were positive, as replacing the system’s existing hard drive with an SSD reduced the simulation time to 6,000 seconds. They then replaced that SSD with a SATA-based Intel® SSD 730 Series, which further reduced the simulation time to 5,000 seconds. MVConceptUSA had already exceeded their customer’s performance³ target by 2x!

The next variable they tackled was the ANSYS software itself, where MVConceptUSA implemented software optimizations that reduced the simulation time to 1,500 seconds.³

Having already achieved a 10x performance improvement and believing they had exhausted alternatives to meaningfully improve performance, MVConceptUSA was ready to give their customer the good news. That’s when CEO, Fabrice Girerd, received a call from Intel representative, Jeff Fick.

Jeff wondered if their new, PCIe-based Intel SSD 750 Series could further increase performance. When the SSD was installed and tested, simulation time decreased to 750 seconds—increasing simulation performance by 2x over the fastest prior SSD tested⁴!

Increasing productivity by reducing a daily workload from over 4 hours to just 12½ minutes—a **20x performance increase**⁶—made for one happy MVConceptUSA customer.

WORKLOAD PERFORMANCE IMPROVEMENT

Original Configuration ¹	Baseline Performance
Overclocked CPU ²	1.875x Faster
+ Optimized Software ³	6.5x Faster
+ Accelerated Storage ⁶	20x Faster

- Warning: Altering PC clock or memory frequency and/or voltage may (i) reduce system stability and use life of the system, memory and processor; (ii) cause the processor and other system components to fail; (iii) cause reductions in system performance; (iv) cause additional heat or other damage; and (v) affect system data integrity. Intel assumes no responsibility that the memory, included if used with altered clock frequencies and/or voltages, will be fit for any particular purpose. Check with memory manufacturer for warranty and additional details.
- Original system configuration: Tests were done using the following hardware: ASUS* P9X79-WS-IPMI motherboard, with Intel® Core™ i7 4960X @ 3.3GHz CPU, Hard drive 7200 RPM, 16GB DDR3 2133 MHz Corsair Dominator*, software ANSYS Mechanical R14. Test was run by MVConceptUSA.
- Intel® SSD 750 Series system configuration: ASUS* X99-WS-IPMI motherboard, with Intel® Core™ i7 5960X @ 4.5GHz CPU, Intel® 750 SSD, RAM 64GB DDR3 2133 MHz Corsair Dominator, software optimization for ANSYS Mechanical R14. Versus Intel® SSD 730 Series system configuration: ASUS* X99-WS-IPMI motherboard, with Intel® Core™ i7 5960X @ 4.5GHz CPU, Intel® 730 SSD, RAM 64GB DDR3 2133 MHz Corsair Dominator, software optimization for ANSYS Mechanical R14. Test and results were done by MVConceptUSA.
- Intel SSD 730 Series system configuration: ASUS* X99-WS-IPMI motherboard, with Intel® Core™ i7 5960X @ 4.5GHz CPU, Intel® SSD 730 Series, RAM 64GB DDR3 2133 MHz Corsair Dominator, software optimization for ANSYS Mechanical R14. Versus Original system configuration: ASUS P9X79-WS-IPMI motherboard, with Intel® Core™ i7 4960X @ 3.3GHz CPU, Hard drive 7200 RPM, 16GB DDR3 2133 MHz Corsair Dominator, software ANSYS Mechanical R14. Test and results were done by MVConceptUSA.
- Results presented on the “20x increase in workload performance” were completed using the software ANSYS Mechanical R14 with the following hardware: Base system - ASUS* P9X79-WS-IPMI motherboard, with Intel® Core™ i7 4960X @ 3.3GHz CPU, Hard drive 7200 RPM, 16GB DDR3 2133 MHz Corsair Dominator. Final system - Tests were done using the following hardware: ASUS* X99-WS-IPMI motherboard, with Intel® Core™ i7 5960X @ 4.5GHz CPU, Intel® SSD 750 Series, RAM 64GB DDR3 2133 MHz Corsair Dominator. Test and results were done by MVConceptUSA.
- Simulation time improvement test were done using the original system configuration: ASUS* P9X79-WS-IPMI motherboard, with Intel® Core™ i7 4960X @ 3.3GHz CPU, Hard drive 7200 RPM, 16GB DDR3 2133 MHz Corsair Dominator, software ANSYS Mechanical R14. Versus the overclocked CPU system configuration: ASUS X99-WS-IPMI motherboard, with Intel® Core™ i7 5960X @ 4.5GHz CPU, Hard drive 7200 RPM, 64GB DDR4 2133 MHz Corsair Dominator. Test and results were done by MVConceptUSA.

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