ASPEED Strikes First: Optimizes Quad-Core Performance

ACCELLERANT Enhances Superior Computing Capabilities

The ASPEED AMBook is an application that calculates the price and risk of a portfolio of American options. This particular implementation of the application demonstrates many of the characteristics of risk and pricing runs. The model uses a trinomial tree algorithm to calculate the present value of an Option and the risk measures (delta, gamma, vega, theta, rho) are calculated by using 2 sided finite difference scheme. In this particular problem, portfolio problem, the algorithm is inside the option class. The Trinomial algorithm is frequently used to value American options because it avoids the need to introduce more complex considerations surfaced by approaches that use PDE, finite difference or mesh. ASPEED has enabled a single thread version of this model using ASPEED's ACCELLERANT software so that it is virtualized and can exploit parallel computing and distributed platforms. ASPEED uses this version of AMBook as a benchmark tool to see the benefits of various platforms because the virtualized application automatically and dynamically optimizes the performance to whatever platform it runs on.

ASPEED ACCELLERANT is an application additive that enables the application to effectively run the heavy application iterations in parallel.

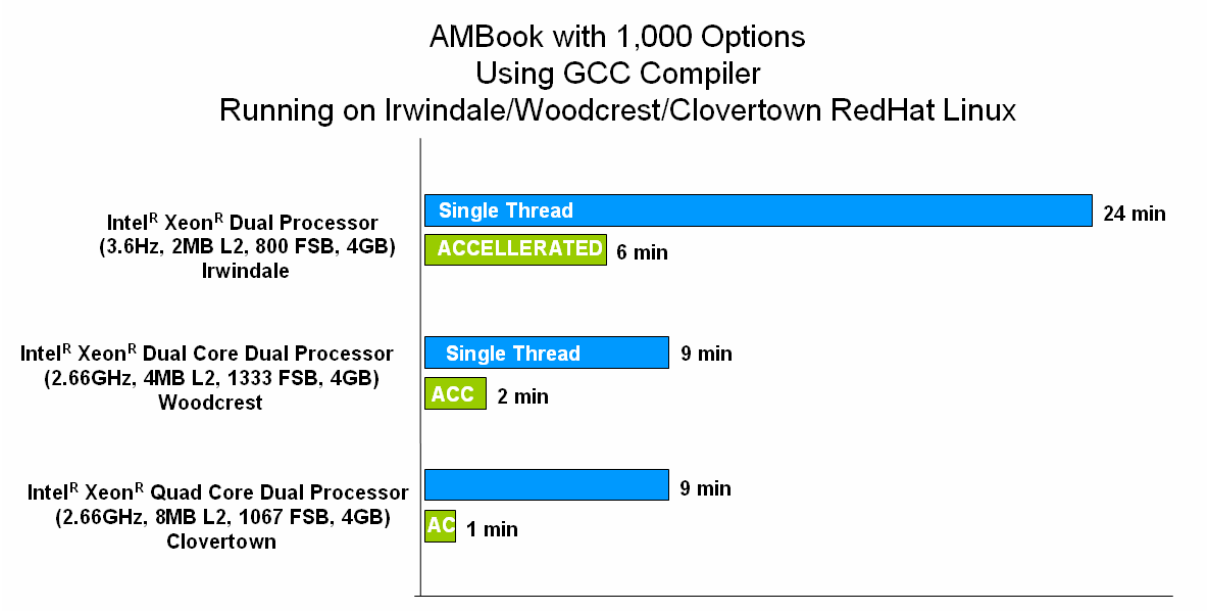
This benchmark compared the performance improvement of Dual-Core Dual Processor (Intel's Dual-Core Intel® Xeon® 5100 series, previously code named Woodcrest) and Quad-Core Dual Processor (Intel® Xeon® 5300 processor series, previously code named Clovertown) over a top of the line Dual Processor (3.6 GHz Irwindale Dual Processor)

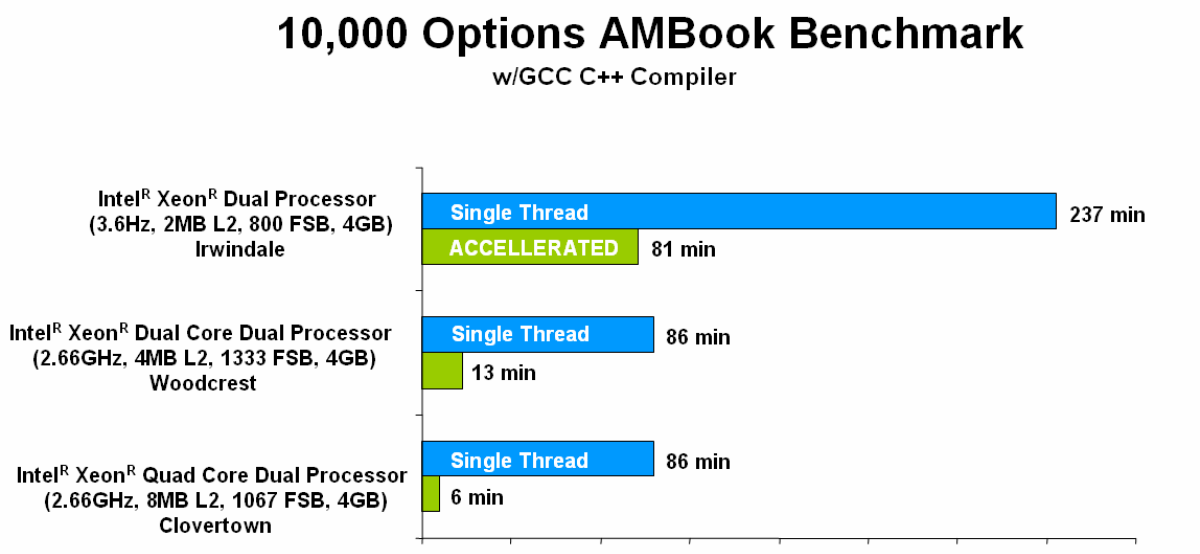
The AMBook benchmark was run with both 1,000 and 10,000 Options to demonstrate application scalability using the GCC C++ Compiler and then with the Intel C++ Compiler to demonstrate the optimization provided.

The Intel Multi-Core benchmark results were rather dramatic; both for performance improvement to a single thread implementation of AMBook and the ACCELLERATED versions can be seen on the graphs. It is important to recognize that the base comparison is based on a single-thread application.

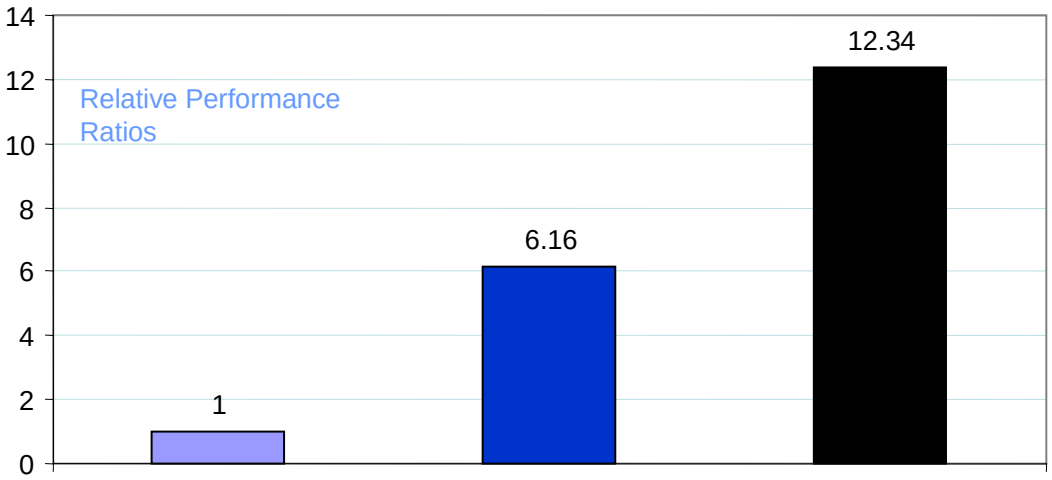
In summary the Dual and Quad Core Intel system positively improved the single-thread application without any application changes. This is the result of many variables but probably most important is that operating system runs multi-thread so those operating system services that can benefit from multiple computing engines were able to use 4 cores. It would appear that this single-thread application and operating system usage could not benefit from over 4 cores. (See the elapsed time of the Dual and Quad Core runs.)

Once ACCELLERATED, the application and operating system is able to more fully exploit the number of cores and processors. You will note that the improvements are actually greater than the number of cores applied. This is referred to as "super linear" improvement and stems form the fact that original single-thread application could not exploit the full capacity of even a single CPU. ASPEED's ACCELLERANT significantly increases the levels of application parallelism and uses processes rather than threads to manage each parallel instance actually reducing the potential system management overhead.


AMBook with 1,000 Options
Using GCC Compiler
Running on Irwindale/Woodcrest/Clovertown RedHat Linux
Intel^R Xeon^R Dual Processor (3.6Hz, 2MB L2, 800 FSB, 4GB) Irwindale
Single Thread
24 min
ACCELLERATED
6 min
Intel^R Xeon^R Dual Core Dual Processor (2.66GHz, 4MB L2, 1333 FSB, 4GB) Woodcrest
Single Thread
9 min
ACC
2 min
Intel^R Xeon^R Quad Core Dual Processor (2.66GHz, 8MB L2, 1067 FSB, 4GB) Clovertown
9 min
AC
1 min


10,000 Options AMBook Benchmark
w/GCC C++ Compiler
Intel^R Xeon^R Dual Processor (3.6Hz, 2MB L2, 800 FSB, 4GB) Irwindale
Single Thread
237 min
ACCELLERATED
81 min
Intel^R Xeon^R Dual Core Dual Processor (2.66GHz, 4MB L2, 1333 FSB, 4GB) Woodcrest
Single Thread
86 min
13 min
Intel^R Xeon^R Quad Core Dual Processor (2.66GHz, 8MB L2, 1067 FSB, 4GB) Clovertown
Single Thread
86 min
6 min

ASPEED ACCELLERATED AMBook

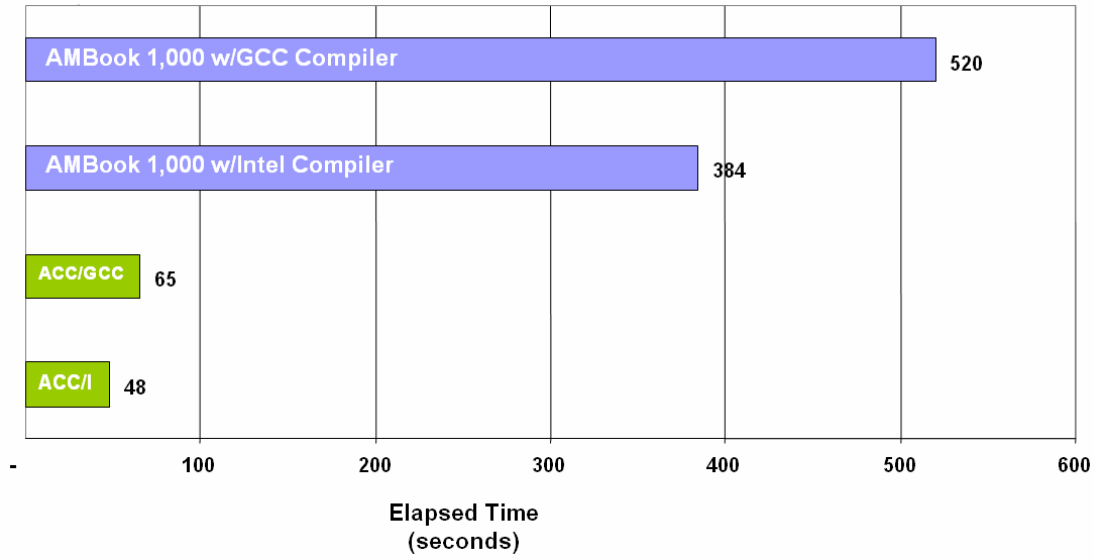


Intel^{R} Xeon^{R} Dual Processor (3.6Hz, 2MB L2, 800 FSB, 4GB)

Intel^{R} Xeon^{R} Dual Core Dual Processor (2.66GHz, 4MB L2, 1333 FSB, 4GB)

Intel^{R} Xeon^{R} Quad Core Dual Processor (2.66GHz, 8MB L2, 1067 FSB, 4GB)

AMBook 1,000 options
ACCELLERANT and Intel Optimizing Compiler on Clovertown



Intel Compiler provides a 26% elapsed reduction to single thread run
ACCELLERANT provides another 65% reduction using with the Intel Compiler