

# High Performance Computing (HPC) Needs High Performing Technology



## Earth Systems Modeling

MPAS-A  
UP TO  
**1.7X**  
higher performance vs. prior gen<sup>1</sup>

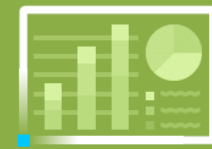
NEMO  
UP TO  
**1.7X**  
higher performance vs. prior gen<sup>2</sup>

ROMS  
UP TO  
**1.8X**  
higher performance vs. prior gen<sup>3</sup>

WRF  
UP TO  
**1.6X**  
higher performance vs. prior gen<sup>4</sup>



## Financial Services



Binomial Options  
UP TO  
**1.6X**  
higher performance vs. prior gen<sup>5</sup>

Black Scholes  
UP TO  
**1.4X**  
higher performance vs. prior gen<sup>5</sup>

Monte Carlo  
UP TO  
**1.4X**  
higher performance vs. prior gen<sup>5</sup>

## Physics

Cosmoflow  
UP TO  
**2.6X**  
higher performance vs. prior gen<sup>1</sup>

## Life and Material Science

DeePMD Training  
UP TO  
**1.5X**  
higher performance vs. prior gen<sup>6</sup>

GROMACS  
UP TO  
**1.5X**  
higher performance vs. prior gen<sup>7</sup>

LAMMPS  
UP TO  
**1.7X**  
higher performance vs. prior gen<sup>8</sup>

Quantum Espresso  
UP TO  
**1.4X**  
higher performance vs. prior gen<sup>9</sup>

VASP  
UP TO  
**1.6X**  
higher performance vs. prior gen<sup>9</sup>



## Introducing 4th Gen Intel® Xeon® Scalable Processors

Advanced Capabilities Based on Built-In Accelerators

UP TO 60 CORES  
per socket  
Up to 50% increase vs. prior gen

UP TO 8 CHANNELS  
DDR5, up to 4800 MT/s  
Up to 50% increase vs. prior gen

UP TO 80 LANES  
PCIe 5.0 per socket  
Increase I/O capacity vs. prior gen

**Intel® HPC Engines**

- Intel® Advanced Vector Extensions 512 (Intel® AVX-512)** optimize data processed per clock cycle
- Intel® QuickAssist Technology (Intel® QAT)** accelerates encryption and compression operations
- Intel® Advanced Matrix Extensions (Intel® AMX)** accelerate deep learning training and inference
- Intel® Data Streaming Accelerator (Intel® DSA)** optimizes streaming data movement and transformation

**intel XEON**  
4th Gen Intel Xeon Scalable Processor

## Energy



Anelastic Wave Propagation  
UP TO  
**1.6X**  
higher performance vs. prior gen<sup>12</sup>

ISO3DFD  
UP TO  
**1.7X**  
higher performance vs. prior gen<sup>12</sup>

Standard Staggered Grid  
UP TO  
**1.6X**  
higher performance vs. prior gen<sup>12</sup>

## Manufacturing

Altair AcuSolve  
UP TO  
**1.4X**  
higher performance vs. prior gen<sup>13</sup>

Ansys LS-DYNA  
UP TO  
**1.4X**  
higher performance vs. prior gen<sup>16</sup>

OpenFOAM  
UP TO  
**1.6X**  
higher performance vs. prior gen<sup>19</sup>

Altair Radioss  
UP TO  
**1.3X**  
higher performance vs. prior gen<sup>14</sup>

Ansys Mechanical  
UP TO  
**1.4X**  
higher performance vs. prior gen<sup>17</sup>

ParSeNet  
UP TO  
**1.4X**  
higher performance vs. prior gen<sup>20</sup>

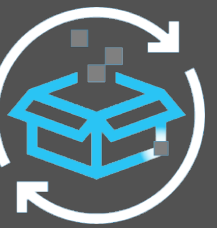
Ansys Fluent  
UP TO  
**1.6X**  
higher performance vs. prior gen<sup>15</sup>

CONVERGE  
UP TO  
**1.6X**  
higher performance vs. prior gen<sup>18</sup>

Simcenter Star-CCM+  
UP TO  
**1.5X**  
higher performance vs. prior gen<sup>21</sup>



## Industry Standard



Stream Triad  
UP TO  
**1.5X**  
higher performance vs. prior gen<sup>22</sup>

HPL  
UP TO  
**1.4X**  
higher performance vs. prior gen<sup>23</sup>

HPCG  
UP TO  
**1.6X**  
higher performance vs. prior gen<sup>24</sup>



<sup>1</sup> See [H14] at [intel.com/processorclaims](https://www.intel.com/processorclaims): 4th Gen Intel Xeon Scalable processors. Results may vary.  
<sup>2</sup> See [H13] at [intel.com/processorclaims](https://www.intel.com/processorclaims): 4th Gen Intel Xeon Scalable processors. Results may vary.  
<sup>3</sup> See [H12] at [intel.com/processorclaims](https://www.intel.com/processorclaims): 4th Gen Intel Xeon Scalable processors. Results may vary.  
<sup>4</sup> See [H11] at [intel.com/processorclaims](https://www.intel.com/processorclaims): 4th Gen Intel Xeon Scalable processors. Results may vary.  
<sup>5</sup> See [H16] at [intel.com/processorclaims](https://www.intel.com/processorclaims): 4th Gen Intel Xeon Scalable processors. Results may vary.  
<sup>6</sup> See [H15] at [intel.com/processorclaims](https://www.intel.com/processorclaims): 4th Gen Intel Xeon Scalable processors. Results may vary.  
<sup>7</sup> See [H26] at [intel.com/processorclaims](https://www.intel.com/processorclaims): 4th Gen Intel Xeon Scalable processors. Results may vary.  
<sup>8</sup> See [H17] at [intel.com/processorclaims](https://www.intel.com/processorclaims): 4th Gen Intel Xeon Scalable processors. Results may vary.

<sup>9</sup> See [H20] at [intel.com/processorclaims](https://www.intel.com/processorclaims): 4th Gen Intel Xeon Scalable processors. Results may vary.  
<sup>10</sup> See [H25] at [intel.com/processorclaims](https://www.intel.com/processorclaims): 4th Gen Intel Xeon Scalable processors. Results may vary.  
<sup>11</sup> See [H21] at [intel.com/processorclaims](https://www.intel.com/processorclaims): 4th Gen Intel Xeon Scalable processors. Results may vary.  
<sup>12</sup> See [H9] at [intel.com/processorclaims](https://www.intel.com/processorclaims): 4th Gen Intel Xeon Scalable processors. Results may vary.  
<sup>13</sup> See [H10] at [intel.com/processorclaims](https://www.intel.com/processorclaims): 4th Gen Intel Xeon Scalable processors. Results may vary.  
<sup>14</sup> See [H24] at [intel.com/processorclaims](https://www.intel.com/processorclaims): 4th Gen Intel Xeon Scalable processors. Results may vary.  
<sup>15</sup> See [H7] at [intel.com/processorclaims](https://www.intel.com/processorclaims): 4th Gen Intel Xeon Scalable processors. Results may vary.  
<sup>16</sup> See [H18] at [intel.com/processorclaims](https://www.intel.com/processorclaims): 4th Gen Intel Xeon Scalable processors. Results may vary.

<sup>17</sup> See [H8] at [intel.com/processorclaims](https://www.intel.com/processorclaims): 4th Gen Intel Xeon Scalable processors. Results may vary.  
<sup>18</sup> See [H23] at [intel.com/processorclaims](https://www.intel.com/processorclaims): 4th Gen Intel Xeon Scalable processors. Results may vary.  
<sup>19</sup> See [H6] at [intel.com/processorclaims](https://www.intel.com/processorclaims): 4th Gen Intel Xeon Scalable processors. Results may vary.  
<sup>20</sup> See [H22] at [intel.com/processorclaims](https://www.intel.com/processorclaims): 4th Gen Intel Xeon Scalable processors. Results may vary.  
<sup>21</sup> See [H19] at [intel.com/processorclaims](https://www.intel.com/processorclaims): 4th Gen Intel Xeon Scalable processors. Results may vary.  
<sup>22</sup> See [H3] at [intel.com/processorclaims](https://www.intel.com/processorclaims): 4th Gen Intel Xeon Scalable processors. Results may vary.  
<sup>23</sup> See [H4] at [intel.com/processorclaims](https://www.intel.com/processorclaims): 4th Gen Intel Xeon Scalable processors. Results may vary.  
<sup>24</sup> See [H5] at [intel.com/processorclaims](https://www.intel.com/processorclaims): 4th Gen Intel Xeon Scalable processors. Results may vary.

Availability of accelerators varies depending on SKU. Visit the Intel Product Specifications page for additional product details.  
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