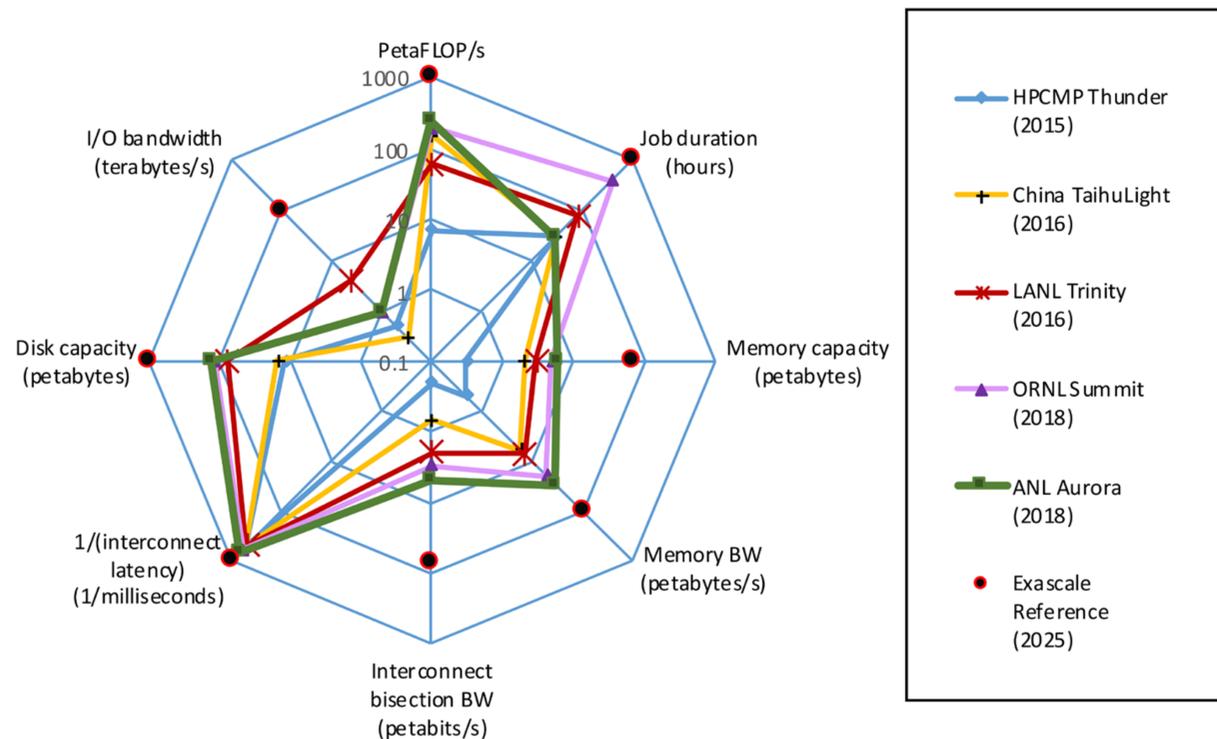




Unbalanced Systems



The figure, reproduced from the U.S. Department of Defense High Performance Computing Modernization Program, illustrates recent high-performance computing systems compared to a desired reference system. Areas of concern include memory capacity, I/O bandwidth, interconnect bisection bandwidth (BW), and memory BW. The NASA-Hyperion Research study reconfirms these concerns and suggests follow-on activities to better characterize the desired weather and climate workloads as compared to the reference system. *Tsengdar Lee, NASA/Headquarters*

The NASA Center for Climate Simulation's 6.7-petaflop Discover supercomputer (a portion shown here) serves NASA weather and climate research groups including the Global Modeling and Assimilation Office and the Goddard Institute for Space Studies. Discover's newest Scalable Compute Units employ Intel Skylake CPUs, 192 gigabytes of memory per 40-CPU node, and 100 gigabit-per-second Omni-Path interconnects to better serve weather and climate model workloads. *Conceptual Image Lab, NASA/Goddard*



Exploring Bespoke Supercomputer Options for Weather and Climate Workloads

In this study, we researched the options available to NASA and others to develop a high-performance computing (HPC) system specifically tailored for weather and climate research. We surveyed weather and climate users and potential HPC suppliers to gather key insights. Their key concerns centered on limitations—of memory, storage latency, and bandwidth—and the current reliance on GPUs not well suited to today's weather/climate workloads. Our recommendations include a NASA initiative to: 1) more accurately assess the range of existing and planned workloads; 2) better provide specific hardware and software requirements; and 3) help determine the various strengths and opportunities of any potential HPC design.



Tsengdar Lee, NASA Headquarters
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NASA EXPLORES SUPERCOMPUTING