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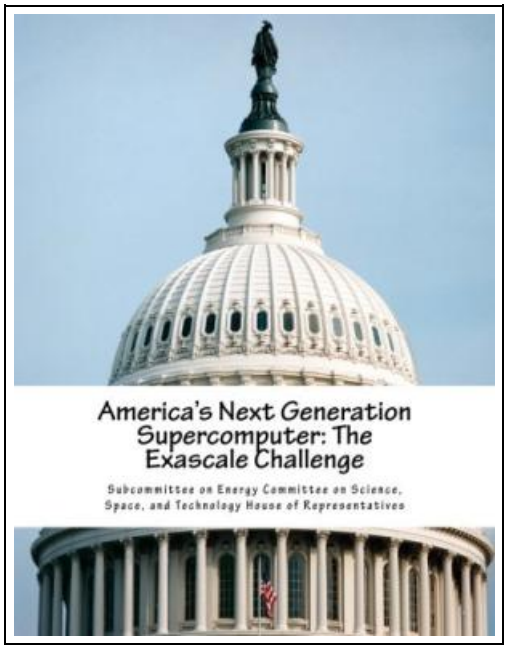

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AMERICA S NEXT GENERATION SUPERCOMPUTER: THE EXASCALE CHALLENGE (PAPERBACK)

Createspace Independent Publishing Platform, 2017. Paperback. Condition: New. Language: English . Brand New Book ***** Print on Demand *****.Scientific research is traditionally conducted through theory or experimentation, both of which generate data that requires the capacity to be processed and analyzed. The invention of computers permitted this data to be examined with increased speed and complexity. As computational technology advanced, this capacity increased in pace and capability, while the data generated from various sensors and experiments also increased in volume. The advent of scientific discovery in which large volumes of data is gathered and mined to exploit information, sometimes referred to as big data, has transformed computing technology needs. The greater availability and utilization of these high-speed supercomputers allows increasingly complex scientific research to be achieved. Medical research, energy and environment system simulations, computational chemistry, and innumerable other scientific problems directly benefit from high-performance computing (HPC). Computing speed is measured in floating-point operations per second, or flops. In the 1970 s, the first supercomputers had a capacity of about 100 megaflops, or 100 million flops. Through forty years of technology advancement, computing capacity climbed through gigaflops (10 DEGREES9 calculations per second) and teraflops (10 DEGREES12), to current HPC capacity of petaflops (10 DEGREES15). Exascale computing refers to computing systems capable of a thousand-fold increase over current petascale computers, or the capability to do a quintillion, 10 DEGREES18, calculations per second. To put this in context, there are currently about 1 sextillion (10 DEGREES21) known stars in the universe - therefore an exascale computer could count every star in the universe.

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