

FASTER, STRONGER: ON INDIA AND ITS SUPERCOMPUTER USE

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Later this year, India will have a new 'supercomputer' or, more correctly, an upgraded 'high performance computing (HPC)' system that will arguably be its fastest. This system is to be made and installed by the French corporation, Atos — an information technology service and consulting company. The Narendra Modi government signed a deal in December 2018 with France to procure high-performance computers worth 4,500 crore by 2025. These HPC systems will run at two institutions, the Indian Institute of Tropical Meteorology, Pune, and the National Centre for Medium Range Weather Forecasting, Noida, that currently host two of India's most powerful such machines, Mihir and Pratyush. Like their predecessors, the Atos machines will be used primarily to run sophisticated weather models that, for some years now, are being used to prepare a range of forecasts, from long-term monsoon to fortnightly as well as daily weather changes. Extremely powerful machines are needed for this purpose as accurate forecasts are premised on being able to simulate the state of the atmosphere and oceans. 'Supercomputers' is a buzzword and term that is in constant flux. Supercomputers of two decades ago are today's student laptops and gaming consoles.

While many challenging research questions, apart from weather modelling, are extremely dependent on computing — protein biology, aerospace-modelling applications, and now AI-linked applications — the possession of HPCs is also used as a medallion by countries wanting to signify their technological prowess. The Top500 project has for over two decades maintained a list of the top 500 most powerful HPC machines and this is updated twice a year, with countries prominently advertising the presence of their systems if they make it to the list. Currently, a machine housed at Pune's Centre for Development of Advanced Computing (CDAC) is the only Indian machine in the top 100 with a top speed of 13 petaflops. Floating point operations per second (FLOPS) are an indicator of computer processing abilities and 1 petaflop is a 1,000 trillion flops. The to-be installed French machines are expected to be 18 petaflops and India already has a handful of machines at multiple research institutions in the petaflop range. The possession of powerful supercomputers is certainly a reassurance that Indian scientists, wanting to solve intractable problems, can always tap these behemoths, but whether the use of these machines has translated into significant breakthroughs in fundamental science or engineering commercial products is another matter. Much like India has improved its short-term weather forecasts and made cyclone forecasts more accurate on the back of such machines, there should be greater accounting of their worth in other fields, rather than be content with epithets of speed and power.

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