

# Faster and stronger: on India's use of its supercomputers beyond weather forecasts

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**Context-** India shall have a new super computer or an upgarded High performance computing (HPC) later this year that shall arguably be the fastest.

## **Key highlights:**

- The systems are to be made and installed by the French corporation Atos, an information technology service and consulting company.
- In December 2018, the Prime Minister signed a deal with France to procure high performance computers worth ₹4500 crore by 2025.
- The HPC systems shall 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 super machines i.e , the Mihir and Pratyush.

## **The use of the HPCs**

- The Atos machines shall be used to primarily run sophisticated weather models for some years now and are being used now to prepare a range of forecasts from long-term monsoon to fortnightly as well as daily weather changes.
- These extremely powerful machines are needed for this purpose as accurate forecasts are premised on being able to simulate the state of atmosphere and oceans.

## **The changing dynamics over the role of supercomputers**

- “Supercomputers” is a buzzword and the 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 modeling are extremely dependent on computing-protein biology, aerospace-modeling application and now AI-linked applications – the possession of HPCs is also used as a medallion by countries wanting to signify their technological prowess.

## **The Top 500 project**

- The Top 500 project over the two decades has 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.

## **India and its HPCs**

- 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 1000 trillion flops.
- The to be installed French machines are expected to be 18 petaflops and India has already has a handful of machines at multiple research institutions in the petaflop range.
- The possession of powerful supercomputers is necessarily 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.