



## Supercomputer PARAM Ganga: NSM

**For Prelims:** Param Pravega, Supercomputer, National Supercomputing Mission, National Knowledge Network (NKN).

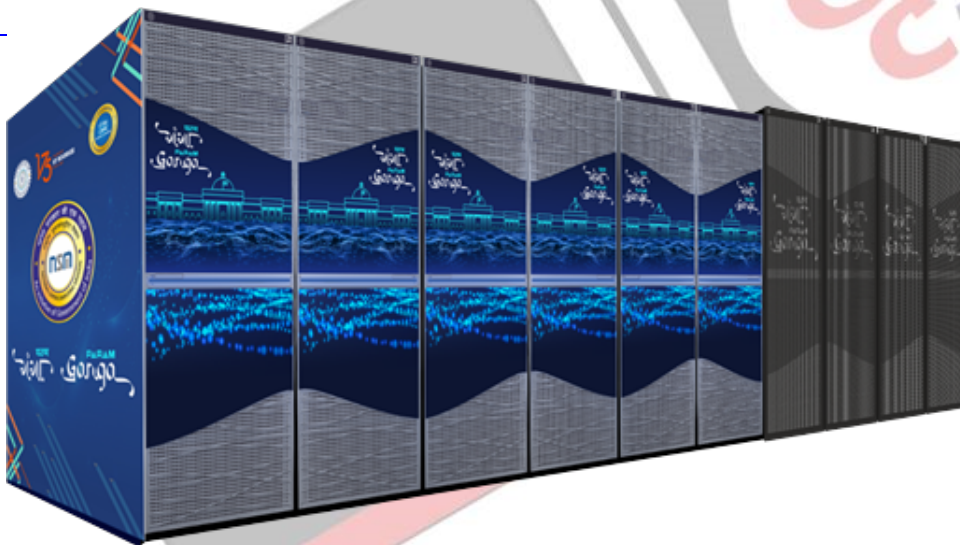
**For Mains:** National Supercomputing Mission, IT and Computers, Achievements of Indians in Science & Technology.

### Why in News?

The [National Supercomputing Mission \(NSM\)](#) has deployed **PARAM Ganga-a High-Performance Computational (HPC) facility at IIT Roorkee**, with a supercomputing capacity of **1.66 Petaflops**.

- Earlier, the Indian Institute of Science (IISc) Bengaluru installed the [supercomputer 'Param Pravega'](#).

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### What are the Key Points?

- It has been established by the [Centre for Development of Advanced Computing \(C-DAC\)](#) under the approach of **NSM**.
- The basic idea behind building a Petascale Supercomputer with manufactured in India components is **to lead the path towards Aatmanirbhar Bharat and accelerate the problem-solving capacity** in multidisciplinary domains simultaneously.
  - It will aid researchers to solve complex problems of national importance and global significance.
- It will serve as an essential computer environment for the modern-day research along with their theoretical and experimental work.

- The focus is **to provide computational power to the user community of IIT Roorkee and neighbouring academic institutions.**

## What is a Supercomputer?

- A supercomputer is a computer **that performs at or near the currently highest operational rate** for computers.
- Generally, PETAFL0P is a measure of a Supercomputer's processing speed and can be expressed as a thousand trillion floating point operations per second.
  - FLOPS (floating point operations per second) are typically used to measure the performance of a computer's processor.
  - Using floating-point encoding, extremely long numbers can be handled relatively easily.
- Supercomputers are **primarily designed to be used in enterprises and organizations** that require massive computing power.
  - For example: weather forecasting, scientific research, intelligence gathering and analysis, data mining etc.
- Globally, **China has the maximum number of supercomputers** and maintains the top position in the world, followed by the US, Japan, France, Germany, Netherlands, Ireland and the United Kingdom.
- India's **first supercomputer was PARAM 8000.**
- **PARAM Shivay, the first supercomputer assembled indigenously,** was installed in IIT (BHU), followed by **PARAM Shakti, PARAM Brahma, PARAM Yukti, PARAM Sanganak** at IIT-Kharagpur, IISER, Pune, JNCASR, Bengaluru and IIT Kanpur respectively.
- In 2020, **PARAM Siddhi**, the High-Performance Computing-Artificial Intelligence (HPC-AI) supercomputer, achieved global ranking of 62nd in Top 500 most powerful supercomputer systems in the world.

## What is the National Supercomputing Mission?

- In 2015, the National Supercomputing Mission was launched **to enhance the research capacities and capabilities in the country** by connecting them to form a Supercomputing grid, with **National Knowledge Network (NKN)** as the backbone.
  - The NKN project is aimed **at establishing a strong and robust Indian network which will be capable of providing secure** and reliable connectivity.
- The Mission **plans to build and deploy 24 facilities with cumulative compute power of more than 64 Petaflops.**
  - Till now C-DAC has deployed 11 systems at IISc, IITs, IISER Pune, JNCASR, NABI-Mohali and C-DAC under NSM Phase-1 and Phase-2 with a cumulative compute power of more than 20 Petaflops.
- It supports the government's vision of '**Digital India**' and '**Make in India**' initiatives.
- The Mission is being jointly steered by the Department of Science and Technology (DST) and the Ministry of Electronics and Information Technology (MeitY).
  - It is implemented by the Center for Development of Advanced Computing (C-DAC), Pune, and the IISc, Bengaluru.
- The mission was planned in three phases:
  - **Phase I** looking at assembling supercomputers,
  - **Phase II** looking at manufacturing certain components within the country.
  - **Phase III** where a supercomputer is designed by India.
- **An indigenously developed server platform called 'Rudra'** is being tried out in a pilot system, **with an interconnect for inter node communication called Trinetra** also having been developed.

**Source: PIB**

