

India's fastest and first multi-petaflops supercomputer inaugurated & dedicated to Nation

Honorable Union Minister for S&T, Earth Sciences, and Environment, Forest and Climate Change Dr. Harsh Vardhan dedicated India's fastest and first multi-petaflops supercomputer to the nation **on 8 January 2018 at IITM Pune**. The Pratyush Support Portal (<http://pratyush.tropmet.res.in/>) was launched by Dr. M. Rajeevan , Hon'ble Secretary, MoES . The supercomputer named as 'Pratyush' meaning the Sun, established at the Indian Institute of Tropical Meteorology (IITM), Pune, will be a national facility for improving weather and climate forecasts and services under the umbrella of the Ministry of Earth Sciences (MoES), Govt. of India.

While inaugurating the facility at IITM, Pune, Dr. Harsh Vardhan said that it will be India's #1 HPC facility in terms of peak capacity and performance. This facility is part of Ministry's continuous endeavor to provide world class forecast services to the citizens of India through upgrading various operational and research activities and the needed infrastructure. India needs better forecasts for Weather and Climate conditions like monsoon, extreme events, Tsunamis, Cyclones, earthquakes, air quality, lightning, fishing, hot/cold waves, flood/drought, etc.

MoES plays a leadership role in South Asian region by providing more accurate weather/climate forecasts to its neighboring countries.

To provide all such forecast and prediction services, it is required to run computer models on high performance computing (HPC) facilities. HPC constitutes one of major basic infrastructural requirements to run these various forecast models. To provide more accurate and reliable forecasts, there is a need of constantly increase in computational (HPC) power. MoES has set up high resolution weather and climate dynamical coupled forecast systems for providing reliable forecasts and is constantly working in this direction to increase its HPC power.

Constantly augmenting its High Performance Computing infrastructure at regular intervals is mandatory to keep MoES abreast with new technologies and to be at par with other leading weather/climate/ocean service centers worldwide.

The HPC infrastructure at MoES institutes has grown from 40 Tera flops in 2008 to 1 Peta flops in 2013-14. With the augmentation of this new 'Pratyush' high performance computing (HPC) facility of 6.8 Peta Flops (PF), India's ranking will move from the 368 th position to around the top 30 in the Top500 list of HPC facilities in the world. India will also be placed at the 4 th position after Japan, UK and USA for dedicated HPC resources for weather/climate community.

The new HPC of 6.8 PF computational power is installed at two MoES Institutes: 4.0 Peta Flops HPC facility at IITM, Pune and 2.8 Peta Flops facility at NCMRWF, Noida.

The HPC facility inaugurated at IITM will be used for carrying out research on improving weather and climate forecasts and its applications. This MoES HPC facility will also be utilized by other MoES institutes (like INCOIS, IMD, NIOT, NCAOR, NCESS) for research activities to improve their respective

weather and climate services.

The second HPC facility at NCMRWF, Noida will be mainly used to cater daily operational forecasts of respective MoES institutes (INCOIS, IMD, IITM, NCMRWF).

This new HPC facility 'Pratyush" will enable MoES scientists to use more detailed components of the Earth System for making better weather and climate forecasts at very high resolution. The facility is expected to improve the following services:

- * Improved weather forecasts at block level over India which can predict extreme weather events.
- * High resolution seasonal/extended range forecasts of active/break spells of Monsoon.
- * Very high resolution coupled models for prediction of cyclones with more accuracy and lead time.
- * Improved Ocean state forecasts including marine water quality forecasts at very high resolution.
- * Tsunami forecasts with greater lead time.
- * Air quality forecasts for different smart cities
- * Climate projections at very high resolution.

This increase in supercomputing power will go a long way in delivering various societal applications committed by MoES. This will also give fillip to research activities not only in MoES but also in other academic institutions working on various problems related to Earth Sciences.
