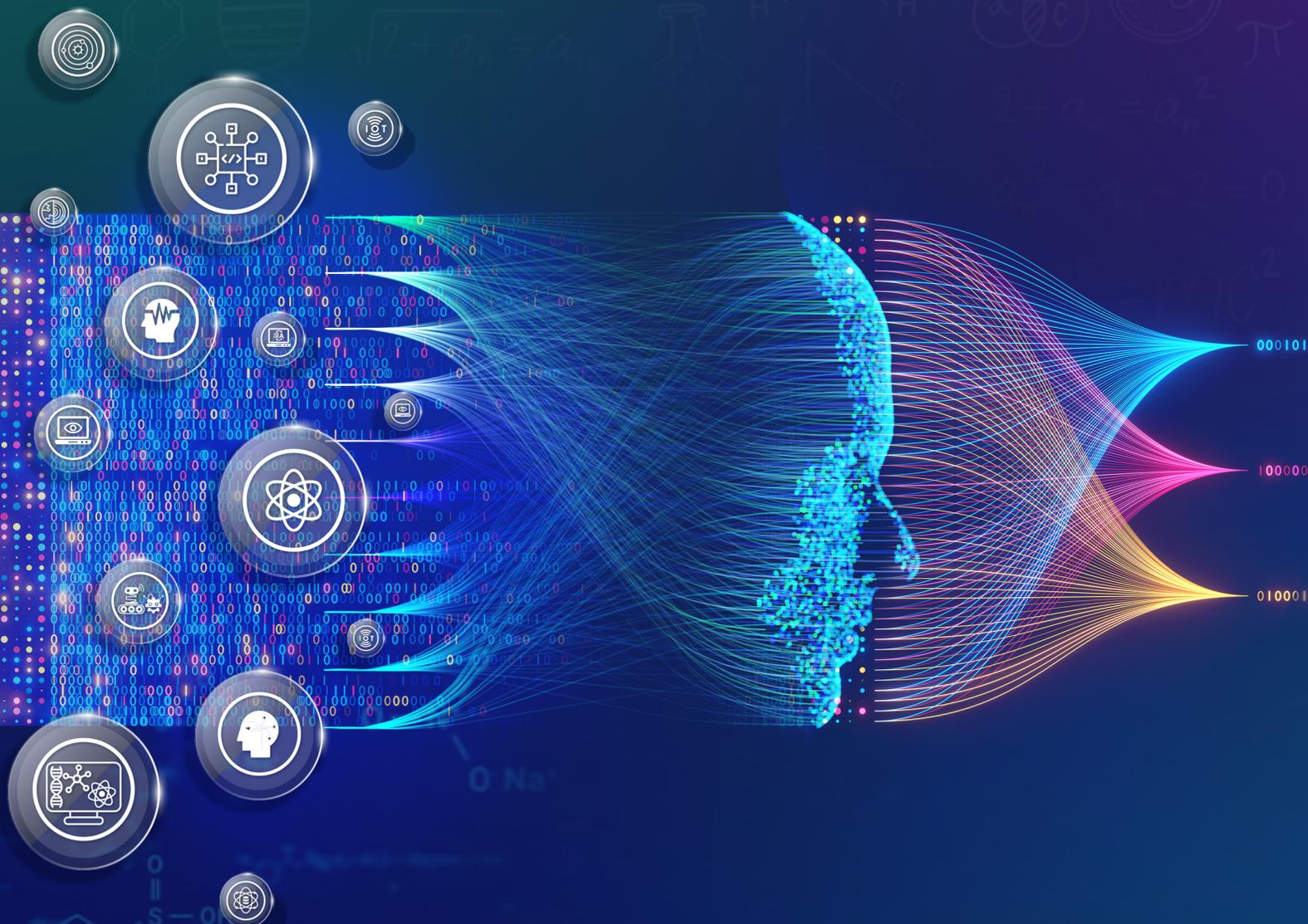




भारत 2023 INDIA



# NATIONAL PARAM SUPERCOMPUTING SYSTEMS



## ANNUAL REPORT 2022

प्रगत संगणन विकास केंद्र  
CENTRE FOR DEVELOPMENT OF ADVANCED COMPUTING



सत्यमेव जयते

विज्ञान एवं प्रौद्योगिकी विभाग  
भारत सरकार

**Department of  
Science & Technology**  
Government of India



सत्यमेव जयते

इलेक्ट्रॉनिक्स और सूचना प्रौद्योगिकी मंत्रालय  
भारत सरकार

**Ministry of Electronics and  
Information Technology**  
Government of India





# Message from Director General



**E. Magesh**  
Director General  
C-DAC

The scale and complexity of modern technologies and scientific areas make High Performance Computing (HPC) increasingly important. Industry stalwarts are working towards ecosystems to create a common HPC Infrastructure, optimized to run diverse HPC, Big-Data, and AI workloads.

I am pleased to place this report on usage statistics and activities carried out on National PARAM Supercomputing Systems for the year 2022. This year, implementation of National Supercomputing Mission (NSM) infrastructure continued the momentum with deployment of additional five HPC facilities namely PARAM Ganga at IIT Roorkee, PARAM Ananta at IIT Gandhinagar, PARAM Porul at NIT Trichy, PARAM Himalaya at IIT Mandi, and PARAM Kamrupa at IIT Guwahati. With these installations, NSM has achieved 24PF cumulative compute capacity available for the researchers.

The NSM HPC facilities are being utilized for a variety of scientific domain areas, including Flood prediction, Seismic-based Oil Exploration, Urban Air Modeling, CFD simulations, Life Sciences and AI/ML/DL technologies. More than 7 million computational jobs were executed on the PARAM Systems across the country till December 2022. These systems have been used by over 5700 users from nearly 100 academic and scientific institutions and a significant number of quality research publications have come out. NSM systems are now becoming the main workhorse for most computationally oriented research community.

Interdisciplinary R&D activities are relying more and more on HPC technologies for path-breaking simulation and outcome. Strengthening collaborations within the Indian HPC ecosystem has always been a priority for C-DAC. NSM program has been immensely beneficial to enable better science and wider use of High Performance Computing resources.

At this junction, where C-DAC is planning roadmap towards indigenous development of Pre-Exascale and Exascale systems, the collaboration with premier academic, scientific and research organizations, industries will help teams to overcome the challenges involved in realization of such large systems.

Special appreciation to HPC teams of C-DAC for their dedication and commitment towards well-coordinated implementation and sustained technical support throughout the year for National PARAM Supercomputing Systems under NSM.

We all should look forward towards making 2023 a year we can remember for more fruitful reasons.

The first part of the document discusses the importance of maintaining accurate records of all transactions. This is essential for ensuring the integrity of the financial statements and for providing a clear audit trail. The second part of the document outlines the various methods used to collect and analyze data, including interviews, surveys, and focus groups. The third part of the document presents the results of the study, which show that there is a significant correlation between the use of accurate records and the reliability of the financial statements. The fourth part of the document discusses the implications of these findings for practice and for future research. The fifth part of the document provides a conclusion and a list of references.



# Message from Executive Director



**Col. A. K. Nath (Retd.)**  
Executive Director  
(Corporate Strategy and C-DAC Pune)

Today's HPC landscape is on a rapid growth, change, and evolution. The overall market has skyrocketed with expected developments fuelling continued expansion. From pandemic after effects and growing cross-disciplinary work to increasing technical advancements, we have entered into a new paradigm for HPC.

Computing pervades all aspects of society in ways once imagined by only a few. From pharmaceutical research, to extreme weather prediction, to space exploration, High Performance Computing systems accelerate discovery, increase accuracy, and stretch the limits of human imagination as we explore new frontiers. The next generation supercomputing systems will be characterized by several approaches to solve a plethora of computational challenges.

Continuing our journey on the implementation of High Performance Computing Systems across the nation, I am glad that the systems which are installed at various premier academic institutions across the nation by C-DAC under National Supercomputing Mission are being well utilized by the Scientific and Engineering community. Special appreciation for the application teams at C-DAC who are working in several domain areas like Climatology, Disaster Management, Computational Biology, Fluid Dynamics,

Computational Chemistry etc., which are grand challenge in nature and having enormous societal benefits. The coming Phase of NSM installations will be equipped with C-DAC's indigenously developed Rudra Sever in line with the goal of self-reliance.

Year 2023 promises to bring further advancements in HPC, with research utilizing higher HPC Capacities, empowering quantum explorations, introducing advanced AI and ML algorithms and emphasizing multi-disciplinary collaborations. This will enable C-DAC's HPC team in getting exposure to upcoming domain areas which in turn ease the way towards achieving our goal for Exascale Computing.

The first part of the document discusses the importance of maintaining accurate records of all transactions. It emphasizes that every entry, no matter how small, should be recorded to ensure the integrity of the financial data. This includes not only sales and purchases but also expenses, income, and any other financial activities that occur within the organization.

Next, the document outlines the various methods used to collect and analyze financial data. It mentions the use of spreadsheets, accounting software, and manual ledgers. Each method has its own advantages and disadvantages, and the choice of which to use depends on the size of the organization and the complexity of its financial operations.

The document also addresses the issue of data security. In an era where digital records are the norm, it is crucial to implement robust security measures to protect sensitive financial information from unauthorized access, theft, or loss. This includes using strong passwords, encryption, and regular backups.

Finally, the document discusses the importance of regular audits and reviews. These processes help to identify any discrepancies or errors in the financial records and ensure that the data is accurate and reliable. It also provides a way to track performance over time and make informed decisions based on the financial data.



## Executive Summary

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## PARAM Systems under NSM

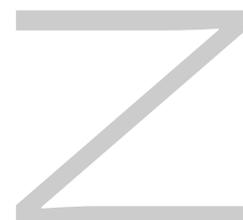
2.1

NSM Systems at a Glance

2.2

Comprehensive System Utilization Report

- Distribution of Jobs by Job Size
  - Month wise System Utilization (CPU)
  - Average Wait Time by Job Size
  - Domain wise Utilization
  - Month wise System Utilization (GPU)
  - User Statistics
  - Publications
  - Support Calls Addressed
- 



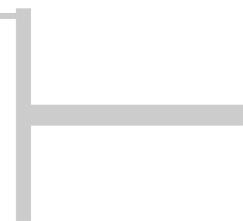
## PARAM Yuva-II System

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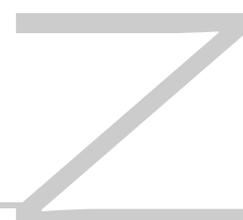
## PARAM Systems (Development Platforms)

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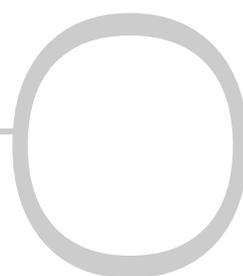
## C-DAC's Indigenous Products and Future Roadmap

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## PARAM Systems in news

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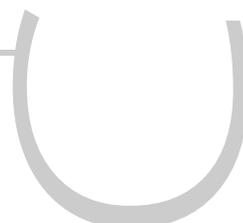
## Acknowledgements

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## Disclaimers

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# HIGH PERFORMANCE COMPUTING FACILITIES





# Executive Summary

Centre for Development of Advanced Computing (C-DAC) is a premier research and development organization under Ministry of Electronics and Information Technology and is recognized as one of the leading organization in High Performance Computing (HPC) in India. C-DAC has been instrumental in development of hardware, software, and information technology. It played an active role as a pioneer in adopting, developing, and promoting HPC technologies across the nation. C-DAC is also known as leading provider of Supercomputing Solutions.

As envisaged and mandated by National Supercomputing Mission (NSM), C-DAC has developed, designed and deployed multiple supercomputing systems at various location across India. Through NSM, India hopes to become fully self-reliant ("Atmanirbhar Bharat") in the field of high performance computing. Very soon, the mission will achieve a significant milestone by deploying indigenous Rudra server-based PARAM Supercomputers.

"National PARAM Supercomputing Systems - Annual Report 2022" provides a brief overview of PARAM systems established at various locations and provides statistical insight into utilization of the systems, user's need attended, scientific domain catered to, awareness initiative taken etc. This document can also be considered as a report card for assessing the progress, effectiveness and direction of ongoing mission, thus can act as a supporting tool for the decision makers to infer and decide the course of future operations. For the common citizen of India and scientific communities, this document is a manuscript of assurance that our country is on right path to attain self-reliance in scientific computing capability.

The early section of chapter-2 of this document, comprises of well-defined report cards for respective sites. Readers can quickly get a glimpse overview of ongoing important activities on each site. The section apprises users on two main types of information: a) total compute capability of the compute facility and b) Current state of user's involvement in terms of number of jobs executed, ongoing important activities in terms of number of work-report and number of publications. All these systems were established before 2022 and end users' involvement has matured in time. Subsequent section discusses the newly inducted NSM PARAM systems which are deployed throughout the year 2022 and currently in production. Although the systems are installed lately, the overall mainstream activities are gaining momentum.

As of December 2022, nearly 5700 users across the nation had successfully run a total number of 7.1 million computational jobs on the NSM systems. Across all NSM systems, there are 500+ publications and 250+ Ph.D. scholars. The systems are supported through the customized ticketing tool and approx. 3663 support tickets have been resolved.

This document presents a concise, toned down but all-inclusive view of existing PARAM System, their deployment status, ongoing activities etc. However, a complete, comprehensive report and related activity wise details can be found in the "National PARAM Supercomputing Systems - Comprehensive Annual Report 2022 and Appendix". Readers are encouraged to refer to the same for more in-depth information and understanding.

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# PARAM Systems under NSM

National Supercomputing Mission (NSM) plans to establish an extensive network of supercomputers with a cumulative capacity of approximately 64PF to strengthen research and development output of educational and research institutions in the country. The facilities are designed and deployed to meet the need of compute capacities necessary to carry forward modern age scientific discoveries and exploration. The National Knowledge Network (NKN), another government initiative linking academic institutions and research labs via a high-speed network, is used as interlinking communication backbone among these systems. The same channel is used by end users of respective institutions to remotely access these systems. Additionally, the mission includes the development of a highly skilled workforce capable of handling large scale HPC applications in order to meet and mitigate the challenges of respective scientific domains. This mission is enhancing countries ability to address complex multi-disciplinary scientific domain challenges through use of NSM Systems.

# PARAM Systems at a Glance

- PARAM Shivay at IIT (BHU) Varanasi
- PARAM Brahma at IISER Pune
- PARAM Shakti at IIT Kharagpur
- PARAM Yukti at JNCASR Bangalore
- PARAM Sanganak at IIT Kanpur
- PARAM Utkarsh at C-DAC Bangalore
- PARAM Seva at IIT Hyderabad
- PARAM Smriti at NABI Mohali
- PARAM Pravega at IISc Bangalore
- PARAM Siddhi at C-DAC Pune
- PARAM Ganga at IIT Roorkee
- PARAM Ananta at IIT Gandhinagar
- PARAM Porul at NIT Trichy
- PARAM Himalaya at IIT Mandi
- PARAM Kamrupa at IIT Guwahati

838 TF Peak Performance

869 Users

774972 Successful Jobs

364 Support tickets resolved

39 Accepted Work reports

88 Publications

# PARAM Shivay IIT(BHU), Varanasi



Inaugurated by  
hon'ble Prime Minister  
Shri. Narendra Modi  
in year 2019

# PARAM Brahma IISER, Pune



Peak Performance 1.75 PF

Users 377

Successful Jobs 4295144

Support tickets resolved 65

Accepted Work reports 52

Publications 68

# PARAM Shakti IIT, Kharagpur



Inaugurated by  
Shri Jagdeep Dhankhar,  
Honourable Governor,  
West Bengal



Peak Performance **1.66PF**

Users **1037**

Successful Jobs **790205**

Support tickets resolved **952**

Accepted Work reports **56**

Publications **195**

**1.836PF** Peak Performance

**163** Users

**84453** Successful Jobs

**107** Support tickets resolved

**9** Accepted Work reports

**21** Publications

# PARAM Yukti JNCASR, Bangalore



# PARAM Sanganak IIT, Kanpur



Peak Performance **1.66PF**

Users **444**

Successful Jobs **209618**

Support tickets resolved **127**

Accepted Work reports **25**

Publications **65**

**838 TF** Peak Performance

**195** Users

**46535** Successful Jobs

**137** Support tickets resolved

**1** Accepted Work reports

supports users of Micro,  
Small and Medium  
Enterprises (MSME) sector

# PARAM Utkarsh C-DAC, Bangalore



838 TF Peak Performance

433 Users

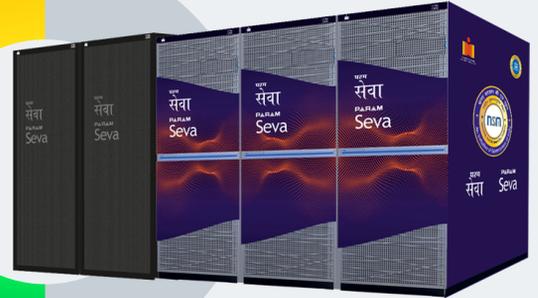
48462 Successful Jobs

244 Support tickets resolved

21 Accepted Work reports

17 Publications

## PARAM Seva IIT, Hyderabad



Inaugurated by  
Shri Dharmendra Pradhan,  
Hon'ble Education Minister

## PARAM Smriti NABI, Mohali



Inaugurated by  
Hon'ble Minister  
Dr. Jitendra Singh

Peak Performance 838 TF

Users 109

Successful Jobs 91083

Support tickets resolved 168

Accepted Work reports 21

Publications 8

# PARAM Pravega IISc, Bangalore



Peak Performance **3.3PF**

Users **451**

Successful Jobs **117398**

Support tickets resolved **1211**

Accepted Work reports **18**

Publications **67**

**210 PF (AI)** Peak Performance

**619** Users

**104038** Successful Jobs

**1822** Support tickets resolved

**33** Accepted Work reports

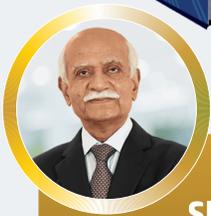
**8** Publications

# PARAM Siddhi AI C-DAC, Pune



ranked 62 among the world's top 500 supercomputers according to a report released in 2020

# PARAM Ganga IIT, Roorkee



Inaugurated by  
**Shri B.V.R. Mohan Reddy**  
Chairman, Board of Governors,  
Indian Institute of Technology,  
Roorkee



Peak Performance **1.66 PF**

Users **331**

Successful Jobs **93827**

Support tickets resolved **301**

Accepted Work reports **16**

Publications **11**

# PARAM Ananta IIT, Gandhinagar



Commissioned by  
**Smt Sunita Verma**  
Group Coordinator (R&D),  
MeitY



838 TF Peak Performance

124 Users

31372 Successful Jobs

77 Support tickets resolved

12 Accepted Work reports

3 Publications

# PARAM Porul NIT, Trichy



Inaugurated by  
Dr. Bhaskar Bhatt,  
Chairperson Board of Governors,  
NIT Trichy



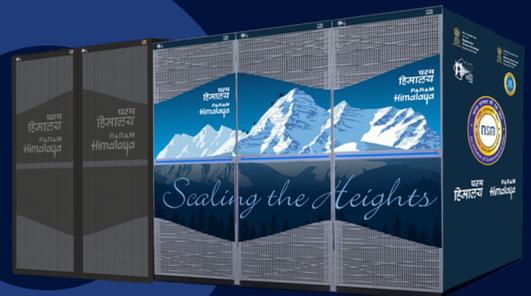
Peak Performance **838 TF**

Users **191**

Successful Jobs **169319**

Support tickets resolved **36**

# PARAM Himalaya IIT, Mandi



**838 TF** Peak Performance

**77** Users

**249141** Successful Jobs

**156** Nodes

# PARAM Kamrupa IIT, Guwahati



Inaugurated by  
Hon'ble President of India  
Smt. Droupadi Murmu



Peak Performance **838 TF**

Users **74**

Successful Jobs **28375**

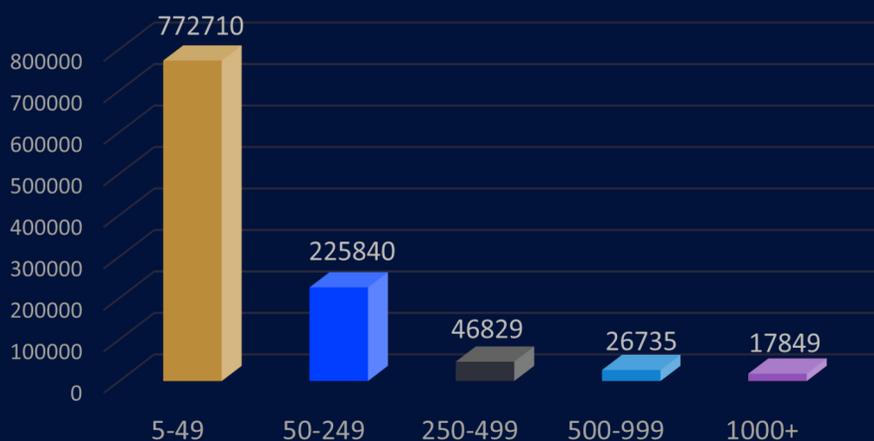
Nodes **155**

# Comprehensive System Utilization Report

## Distribution of Jobs by Job Size

The Job Count according to Job Size across all NSM sites is illustrated in the given bar graph. Job size here indicates number of CPU cores used by the executed jobs. It is evident that the jobs are having requirement of CPU cores in the range of 5-49.

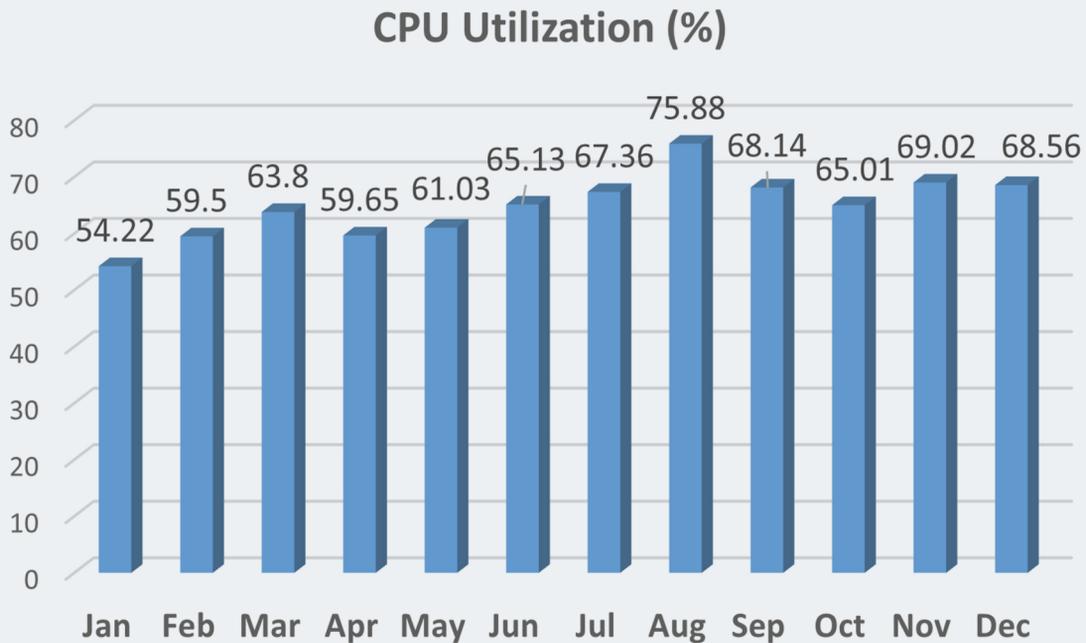
Size Wise Job Distribution



Note: Jobs having less than 5 cores requirement are not considered in the above graph. Total Job Count (1-4 cores) = 23,30,660

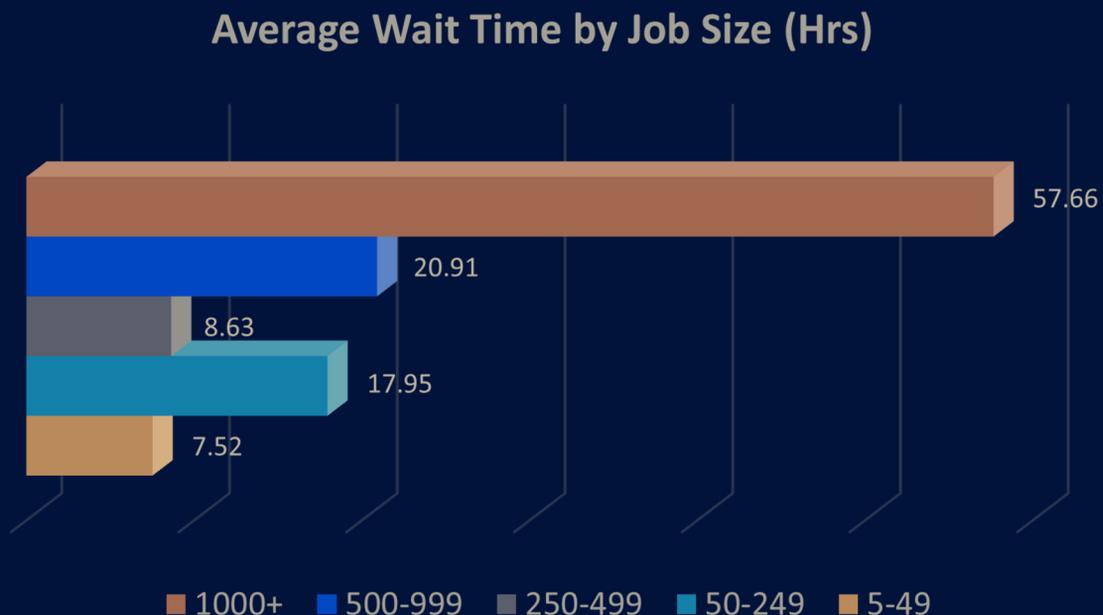
## Month wise System Utilization (CPU)

Examining system utilization on monthly basis is an important activity to analyse any shared resources. It provides a comprehensive understanding of utilizations and can help to justify the need for a high-end compute facility. The statistics below indicates the CPU utilization in percentage, for all NSM Sites.



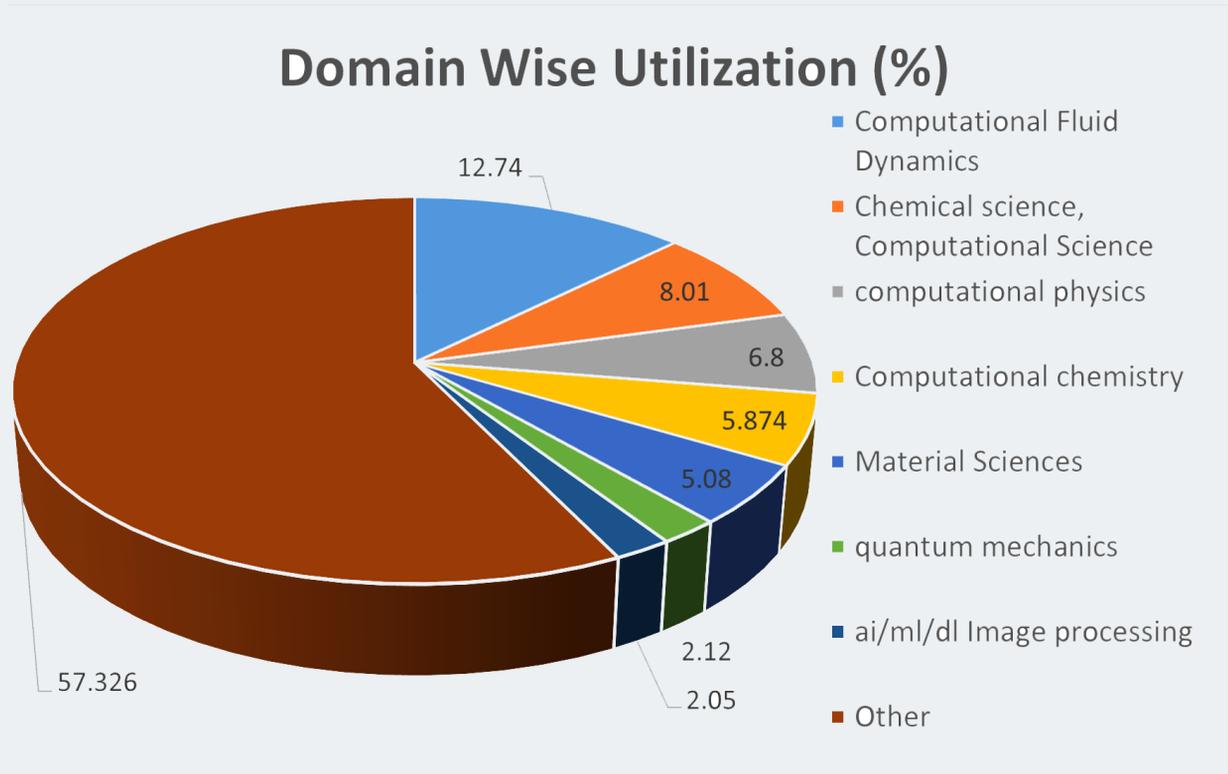
## Average Wait Time by Job Size

The bar chart below, depicts the average wait time for job execution based on their respective job sizes across all NSM sites. The wait time is the duration between job submission and the start of its execution. Notably, jobs that require up to 500 CPU cores have shorter wait times in all NSM sites. However, as the CPU core requirement of jobs surpasses 500, there is a notable surge in wait time.



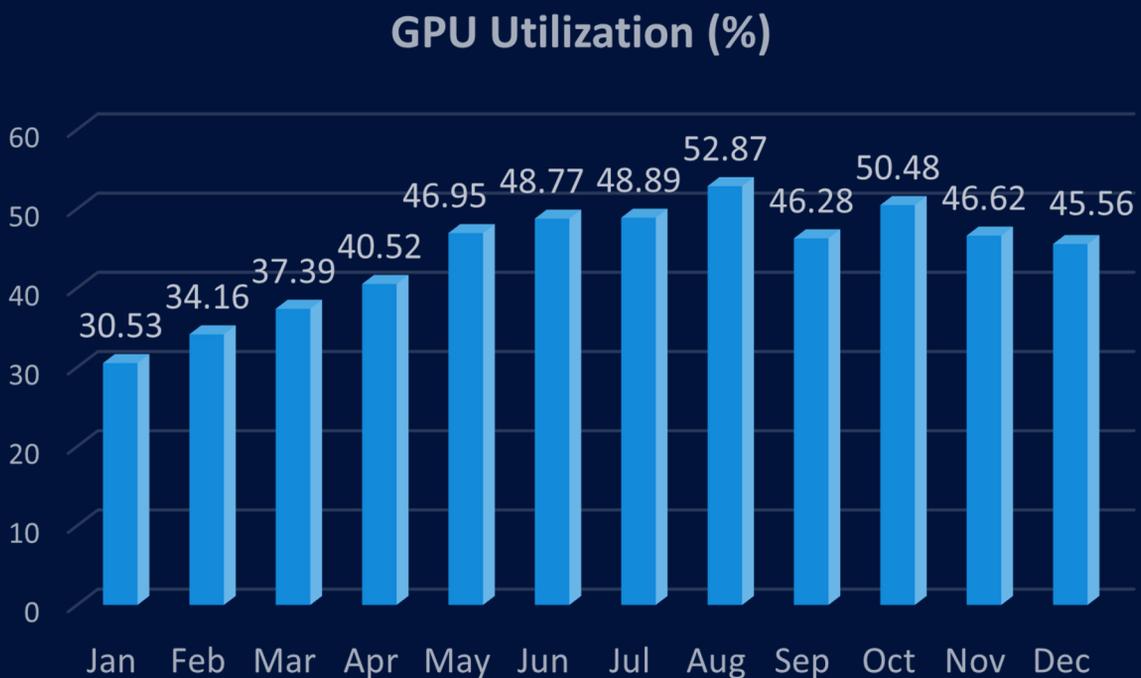
# Domain wise Utilization

The pie chart shows the System Utilization by user's jobs according to their application domains for the year 2022.



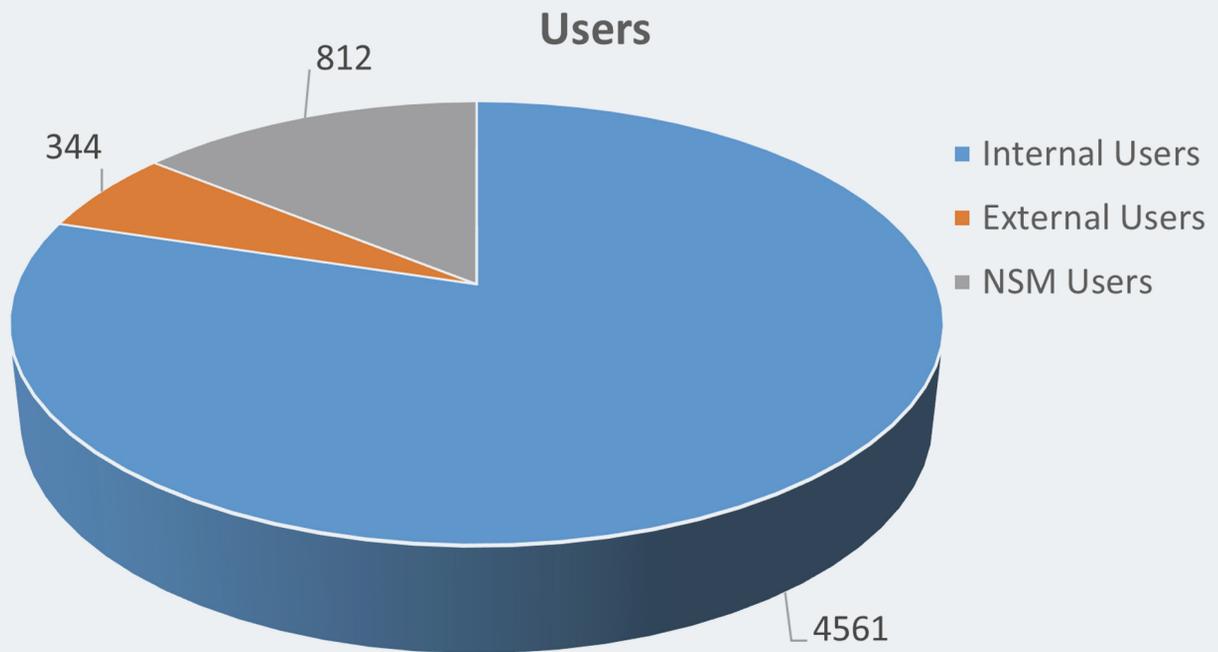
## Month wise System Utilization (GPU)

The statistics below indicates the GPU utilization in percentage for all NSM Sites.



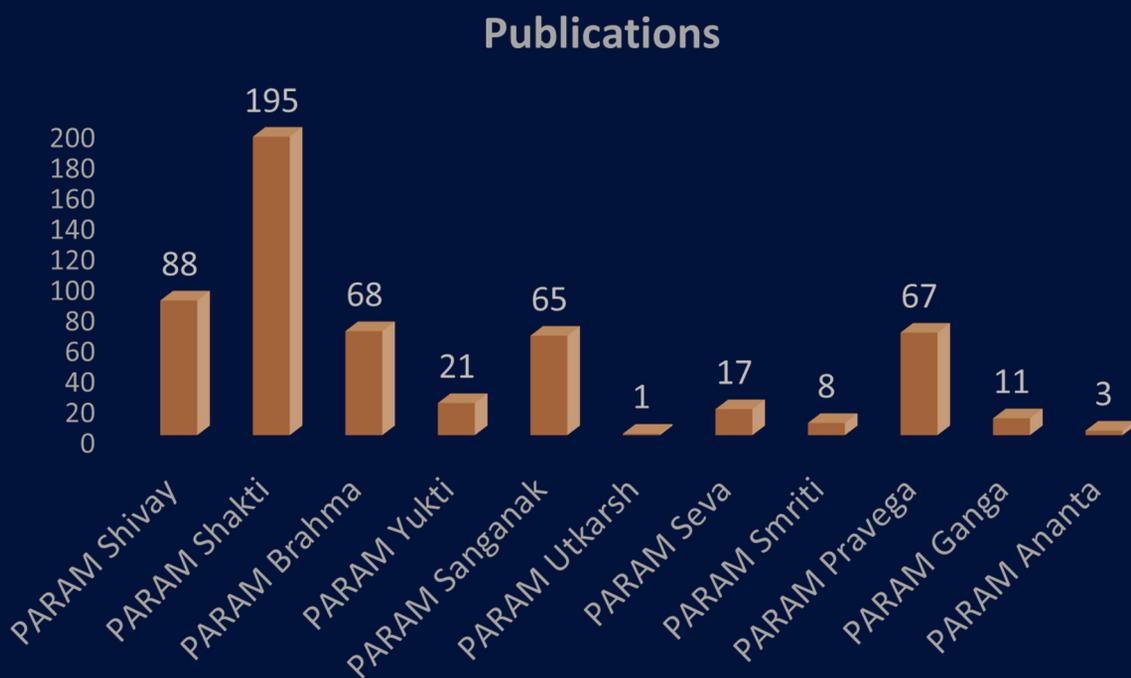
## Users Statistics

The chart below illustrates users of different categories in all NSM sites. There are a total 5717 users including 4561 internal users, 812 NSM users and 344 external users across all NSM sites.



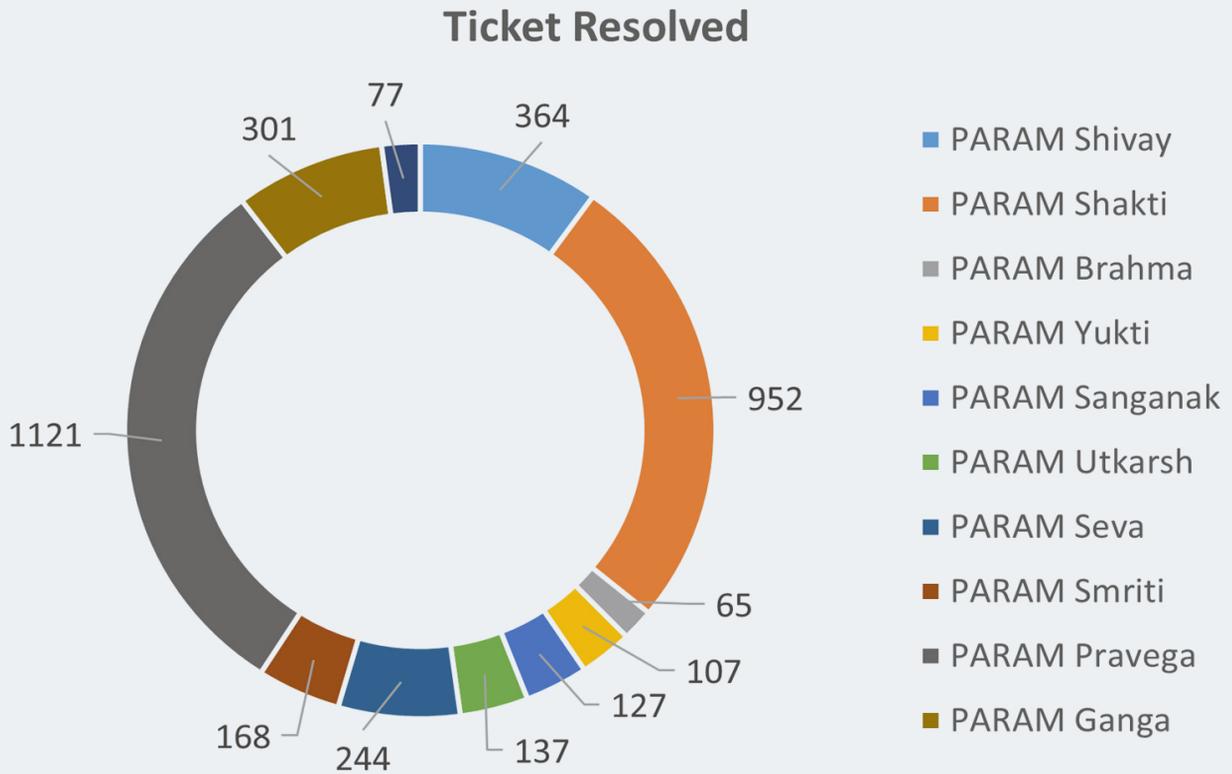
## Publications

The below graph indicates the number of publications across the NSM sites. Highest number of publications is from PARAM Shakti system in the year 2022.



# Support Calls Addressed

The pie chart below shows that 3663 support tickets were resolved for 5700+ users through NSM's ticketing portal for 2022.



NSM ticketing tool provides a centralized location for user's communication, allowing all user interactions with tickets being created and assigned to the appropriate team or individual, with automated notifications and reminders to keep the process moving.

# PARAM

# PARAM Yuva-II System

The National PARAM Supercomputing Facility (NPSF) is a result of more than two and half decade effort of Research and Development (R&D) in High Performance Computing (HPC) since C-DAC's inception. The National PARAM Supercomputing Facility was setup in 1998 at C-DAC Pune with mandate to offer state-of-the-art High Performance Computing systems and resources to the scientific user community of various academic and research institutes, help them with the know-how and usage of such systems and proliferate HPC awareness in the country.

In February 2013, PARAM Yuva-II was launched with a peak capacity of 529.4 TF. This is one of the first HPC systems in the country to use Intel Xeon Phi and Intel Xeon for its computing power. In addition, the launch marks the first time C-DAC has crossed the 500TF threshold in India. PARAM Yuva-II with performance of 1,760.20 MFlops per Watt was ranked 44th on the "Green500" list released in November 2013 at the Supercomputing conference '13 in Denver, Colorado, USA. This HPC System has been phased out in June 2022.

The total number of accepted work reports in PARAM Yuva-II is 10.



# PARAM Systems (Development Platforms)

This section is about the PARAM systems installed at C-DAC, Pune which are PARAM Bio-Embryo, PARAM Bio-Inferno, PARAM Shrestha, PARAM Neel, along with PARAM Spoorthi which is located at SETS Chennai. The research and development on software, middleware, drivers and operating system are important activity behind any successful deployment. Set of small-scale PARAM System plays a crucial role as test-bed for technology experiments, prior to deployment on a production system.

## PARAM Bio-Embryo C-DAC, Pune

**Performance: 100TF**

**The BioEmbryo HPC configuration is based on AMD server**

**Users: 142**

**Successful Jobs: 18893**

**Publications: 23**



## PARAM Bio-Inferno C-DAC, Pune



**Bioinferno 147.5 TF HPC configuration is based on AMD server**

**Users: 48**

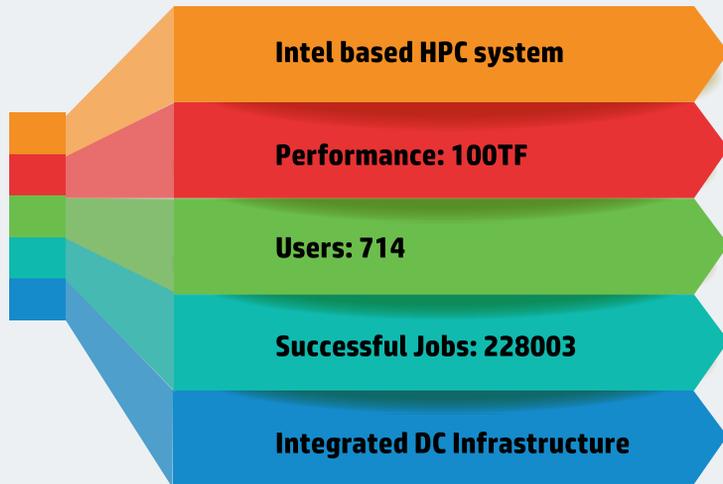
**Successful Jobs: 1520**

**PhD scholars: 35**

**Target Application: Bio and Medical**

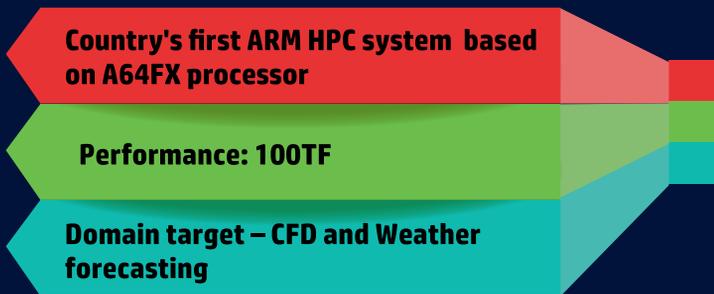
# PARAM Shreshtha

C-DAC, Pune



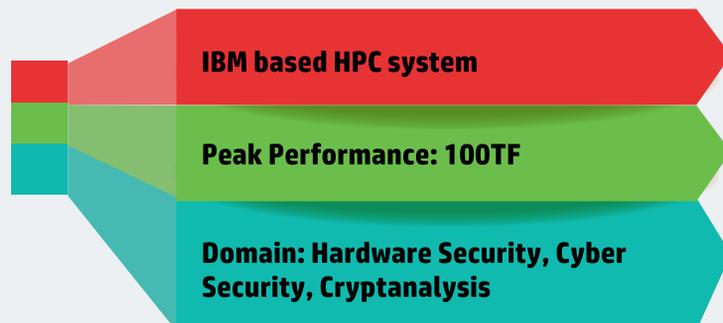
# PARAM Neel

C-DAC, Pune



# PARAM Spoorthi

SETS, Chennai



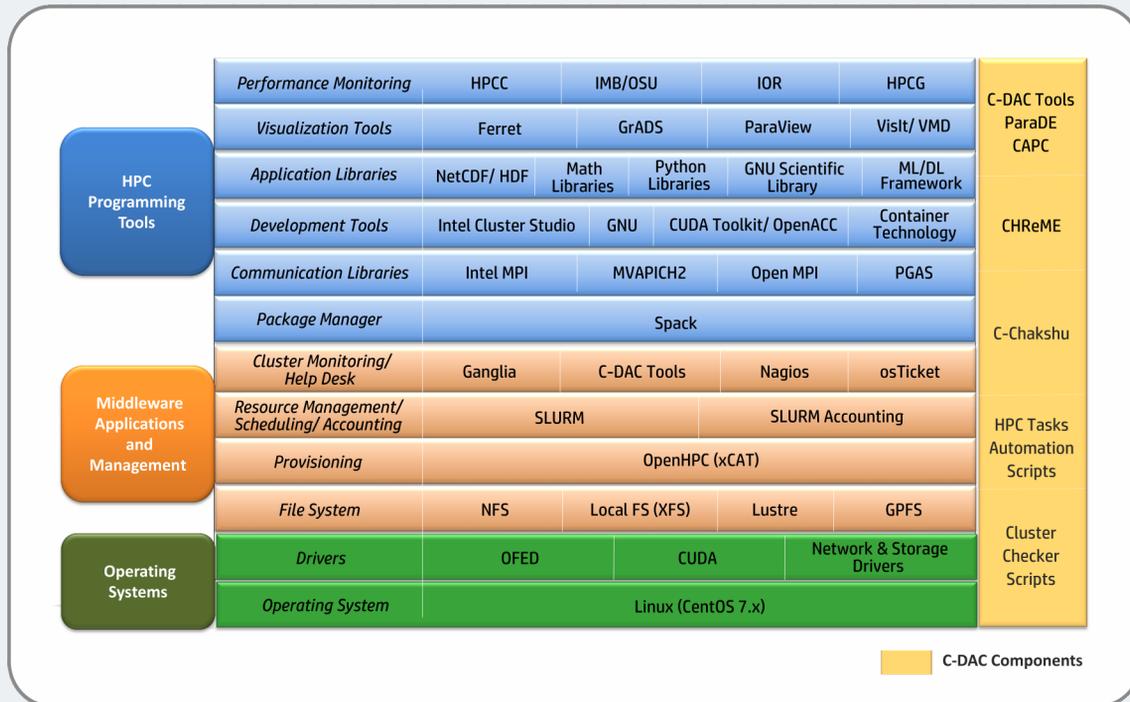
# C-DAC's Indigenous Products and Future Roadmap

C-DAC is developing PARAM Rudra Server, a platform which is helping country to become self-reliant in server hardware design and development. The PARAM Rudra HPC system is based on indigenously designed and developed Rudra Servers, deployed at C-DAC, Pune. It is a reliable, trusted, and powerful platform for the design and development of next generation large scale HPC and Cloud applications. In the coming years, C-DAC plans to deploy 40 PFLOPS HPC systems based on Rudra Servers, showcasing the organization's commitment to leveraging indigenous technology in the field of supercomputing.

Furthermore, CDAC has been developing an indigenous HPC network called "Trinetra", supported by NSM project. Experience gained during Trinetra development is vital towards development of future Exascale capable networks as well. Trinetra-A, currently under production, based on 100Gbps physical link layer technology, uses 3D Torus network topology. Subsequently, Trinetra-B, currently under development, which uses 200Gbps physical link layer network. The pilot project of 100 nodes based on Trinetra platform is expected soon.

To build an HPC Ecosystem, C-DAC is designing and building high-performance data centers based on Direct Contact Liquid Cooling (DCLC), Air-Cooled, In-row, and hybrid cooling technologies.

CHCS (C-DAC's HPC Cluster Suite), a system software stack for HPC deployment, is a novel solution, based on a customized open-source software with value-added indigenous tools, technologies, and scripts. It automates the process of the systematic build, deployment, and management of HPC and AI-based systems. NSM systems are currently built using CHCS. As part of future Exa-scale systems, CHCS is developing its own customized provisioning tool, which will be able to boot-up upto thousands of compute nodes in lesser time.



### Indigenous components of CHCS:

**C-CHAKSHU [v3.0]:** C-Chakshu is a HPC multi cluster monitoring and Management platform which provides a unified dashboard over the web for all NSM sites with different geographic locations across India.

**CHReME [v4.0]:** C-DAC HPC Resource Management Engine portal is an end-user job submission, management and monitoring tool that works with various schedulers or Workload Managers such as Torque, OpenPBS, Sun Grid Engine, Moab, Load leveler. It is designed to increase cluster utilization by bringing more users to the cluster who would ordinarily stay away due to the complexity of submitting jobs to a cluster.

**Parallel Development Environment (ParaDE):** This is an IDE for hybrid parallel application development providing ease-of-use of HPC and mobility to users and data.

**CDAC's Automatic Parallelizing Compiler (CAPC):** CAPC automatically converts sequential programs to equivalent parallel programs for the target parallel architectures.

Scientific discovery in the world can be accelerated by building Exascale capable systems. The availability of High-Performance Computing (HPC) systems correlates strongly with research output. With innovative designs, disruptive technologies, and expert human resources, C-DAC aims to establish a dependable and secure Exascale High Performance Computing Ecosystem in the country.

# PARAM Systems in news

THE TIMES OF INDIA

NEWS / CITY NEWS / VADANASI NEWS / Jayam Shivay Celebrates Completion Of Three Years Of Supercomputing

## Param Shivay celebrates completion of three years of supercomputing

BINAY SINGH / TNN / Updated: Feb 18, 2023, 11:37 IST

ARTICLES

Param Shivay celebrates completion of three years of...



Param Shivay super computer developed by IIT (BHU) completes three years of its operation

The Statesman

Monday, 13 March, 2023

INDIA WORLD BUSINESS SPORTS ENTERTAINMENT OPINION LAW LIFESTYLE DANK STATESMAN

Home » India » India's 'Param Siddhi' AI supercomputer ranked at 63 out of 500 top most powerful supercomputers in the world

## India's 'Param Siddhi' AI supercomputer ranked at 63 out of 500 top most powerful supercomputers in the world

This will accelerate R&D in the war against COVID-19 through faster simulations, medical imaging, genome sequencing and forecasting and is a boon for Indian masses and for start-ups and MSMEs in particular.

SNS | New Delhi | November 18, 2020 6:20 pm



The supercomputer with Rpeak of 5.267 Petaflops and 4.6 Petaflops Rmax (Sustained) was conceived by C-DAC and developed jointly with support of Department of Science and Technology (DST), Ministry of Electronics and Information Technology (MeitY) under NSM. (Representational Image: Stock)

## IISc Installs One Of India's Most Powerful Supercomputers Developed Under NSM

The supercomputer, Param Pravega, developed under National Supercomputing Mission (NSM), is capable of performing over 3.3 quadrillion operations every second.

Written By Harsh Vardhan



Image: IISc

## President Droupadi Murmu inaugurates supercomputer facility at IIT Guwahati

By Utpal Parashar

Oct 13, 2022 08:24 PM IST

Called Param-Kamrupa, the facility at IIT-Guwahati will be able to conduct advanced research in various scientific fields

### President Droupadi Murmu inaugurates supercomputing facility at IIT Guwahati

President Droupadi Murmu on Thursday inaugurated a supercomputer facility at the Indian Institute of Technology, Guwahati and launched several initiatives during her maiden visit to Assam since assuming office.



TH India World Opinion Entertainment Today's Paper

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## NIT-T commissions Param Porul Super Computer Centre, becomes part of NSM

May 25, 2022 09:16 pm | Updated 09:16 pm IST

SPECIAL CORRESPONDENT

COMMENTS SHARE

TIRUCHI:

National Institute of Technology, Tiruchi, on Wednesday became part of the National Super Computing Mission (NSM), Government of India, by commissioning the Param Porul Super Computer Centre.

Home > Computing > Param Ananta Supercomputer Commissioned at IIT Gandhinagar

# Param Ananta Supercomputer Commissioned at IIT Gandhinagar

Article By : PIB India

Category: Computing | 2022-06-01 | (9) Comments



The Param Ananta Supercomputing Facility will greatly benefit IIT Gandhinagar's R&D activities in emerging technologies.

MyIndia

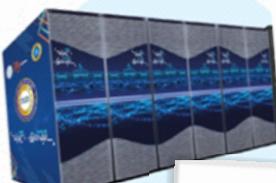
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Applications > Know About PARAM Ganga: The Supercomputer And National Supercomputing Mission

## Know About PARAM Ganga: The Supercomputer And National Supercomputing Mission

Recently, National Supercomputing Mission (NSM) installed PARAM Ganga, a High-Performance Computing (HPC) device with a processing capability of 1.66 petaflops at IIT Roorkee.

By Udit Lakhoria | October 21, 2022



**KNOW ABOUT PARAM GANGA: THE SUPERCOMPUTER AND NATIONAL SUPERCOMPUTING MISSION**

India has been striving for superiority in the realm of supercomputing. It is a breakthrough in this arena by installing a supercomputer with strong processing capability at IIT Roorkee. Recently, National Supercomputing Mission (NSM) installed PARAM Ganga, a High-Performance Computing (HPC) device with a processing capability of 1.66 petaflops at IIT Roorkee.

MAKE IN INDIA

## VVDN signs deal with C-DAC to manufacture India's first indigenously designed HPC server

By Press Trust of India | July 28, 2022, Updated on : Thu Jul 28 2022 12:11:30 GMT+0530



The RUDRA HPC server designed by C-DAC will be manufactured by VVDN under the National Supercomputing Mission.

HPCwire

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## India Seeks HPC Leadership with Nine New Systems, 'Rudra' Server Platform

By Oliver Peckham

Hindustan Times

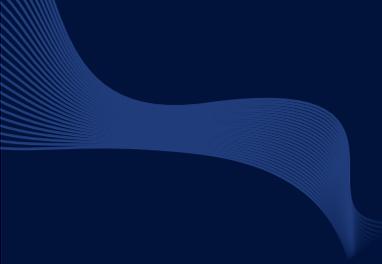
Home / Cities / Pune News / 1PF supercomputing system based on C-DAC's Rudra servers to be installed at GMRT

## 1PF supercomputing system based on C-DAC's Rudra servers to be installed at GMRT

By Jui Dharwadkar

Feb 03, 2023 11:49 PM IST

The Centre for Development of Advanced Computing (C-DAC) and National Centre for Radio Astrophysics (NCRA) have come together to build a high-performance computing facility



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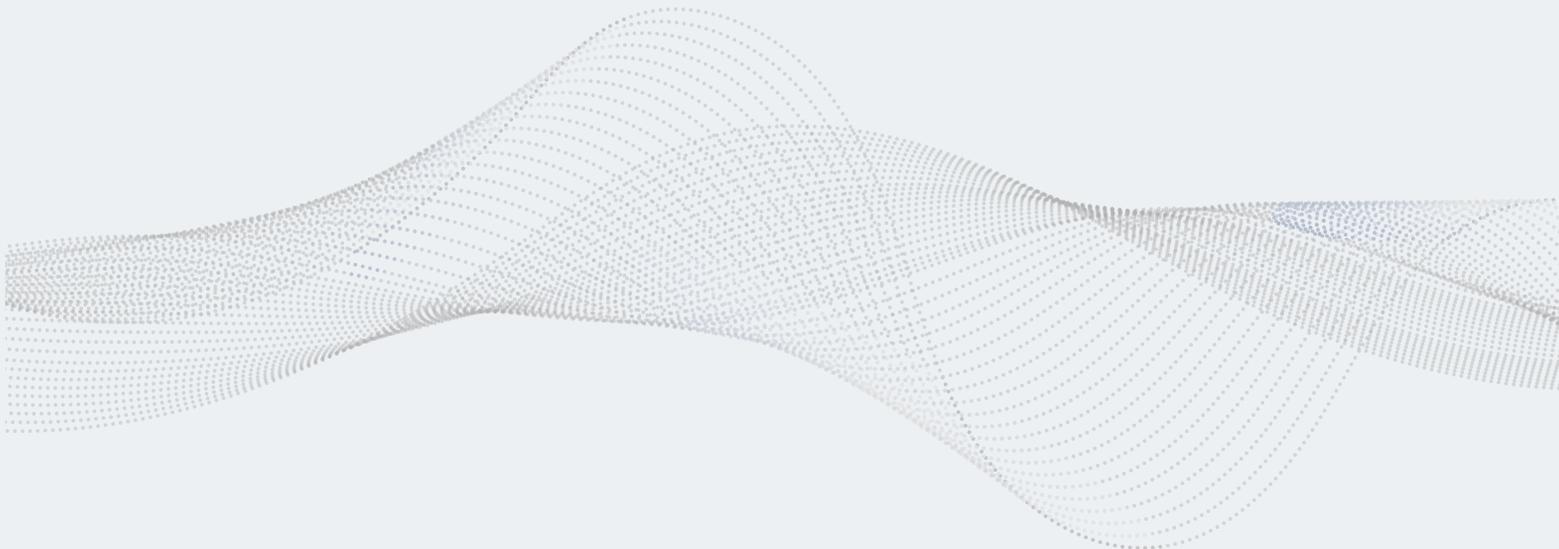
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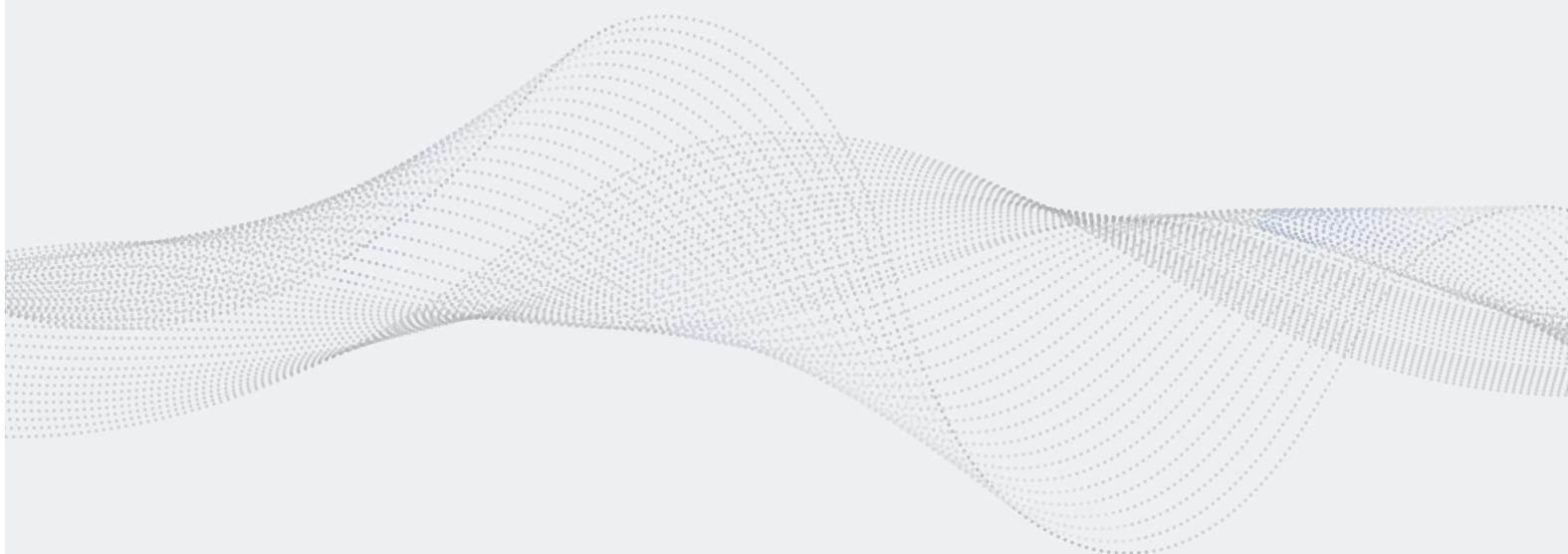
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## HIGH PERFORMANCE COMPUTING FACILITIES