

NSM

The National Supercomputing Mission (NSM) is a mission that aims to empower national academic and R&D institutions by installing supercomputers of various capacities. The mission envisions connecting these institutions through the National Knowledge Network (NKN), which is another program of the government that connects academic institutions and R&D labs over a high-speed network. The NSM has been dedicated to the nation with a peak computing power of 838 TeraFlops, and it was commissioned on May 30, 2022. The system boasts a mix of CPU nodes, GPU nodes, High Memory nodes, High throughput storage, and high-performance InfiniBand interconnect, making it suitable for various scientific and engineering applications.

HPC

According to the provided context, High Performance Computing (HPC) plays an important role in both scientific advancement and economic competitiveness of a nation - making production of scientific and industrial solutions faster, less expensive, and of higher quality. HPC is a key component in many applications: designing vehicles and airplanes; designing high-rise buildings and bridges; discovery of drugs; discovery. Additionally, the context mentions that India developed its own supercomputer, PARAM, as a response to concerns about using a Cray supercomputer to develop nuclear weapons. This project was given an initial run of three years and an initial funding of ₹30,00,00,000, the cost of a Cray supercomputer. High Performance Computing (HPC) is an important area that enables faster, less expensive, and higher-quality scientific and industrial solutions, and India has developed its own supercomputer, PARAM, as a response to concerns about using a Cray supercomputer.

list of nsm or HPC sites deployed by cdac : -

the list of NSM sites/supercomputers/HPC clusters deployed by CDAC along with their location is:

PARAM Shrestha - located at CDAC Pune.

PARAM Spoorthi - located at Chennai.

PARAM Kamrupa - located at IIT Guwahati.

PARAM Himalaya - located at IIT Mandi.

PARAM Porul - located at NIT Trichy.

PARAM Ananta - located at IIT Gandhinagar.

PARAM Ganga - located at IIT Roorkee.

PARAM Pravega - located at IISc, Bangalore.

PARAM Smriti - located at NABI Mohali.

PARAM Seva - located at IIT Hyderabad.

PARAM SANGANAK - located at IIT Kanpur.

PARAM Shakti - located at IIT Kharagpur.

PARAM Brahma - located at IISER Pune.

PARAM Shavak :-

Variants of PARAM Shavak 2.0

To cater to different user needs, PARAM Shavak 2.0 is available in multiple variants:

- PARAM Shavak HPC
- PARAM Shavak ML/DL
- PARAM Shavak SHRISHTI

PARAM Shavak HPC System

Specifications

Following section provides technical details about the PARAM Shavak HPC variant

Technical Specifications - PSAIOS-A800

Item	Detail
Processor	2 × Intel Xeon Gold 6240R or equivalent (24 core, 2.4 GHz Clock Speed)
RAM	192 GB (Up to 1.28 TB) ECC DDR4 3200 MHz, RAM in balanced configuration
Network	<ul style="list-style-type: none"> ● 2 × 10GbE network port ● 1 × 1GbE for BMC Management ● 1 × Ethernet port for serial communication
Accelerator's slot/ports etc	2 × PCIe Gen3 x16 Slots for GPU/Co-processors, with appropriate power supply, cables, and cooling for two accelerators.
Accelerator	1 × NVIDIA A30 / A800 / MI 210 for Computation
HDD	2 × 15 TB NVMe/SATA SSD with Hardware RAID controller – supports RAID 0, 1, 5

OS Certified C-DAC BOSS OS

Power Supply 2400 W High Efficiency Power Supply

CPU Cooling DCLC Based Cooling

Form Factor All In One (Table top model)

Display Card Nvidia Tesla P1000

Monitor Integrated 32" Full HD 1920×1080 LCD monitor

PARAM Shavak ML/DL System Specifications

Item	Detail
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Processor	2 × Intel Xeon Gold 6240R or equivalent (24 core, 2.4 GHz Clock Speed)
RAM	192 GB (Up to 1.28 TB) ECC DDR4 3200 MHz, RAM in balanced configuration
Network	<ul style="list-style-type: none">• 2 × 10GbE network port• 1 × 1GbE for BMC Management• 1 × Ethernet port for serial communication
Accelerator's slot/ports etc	2 × PCIe Gen3 x16 Slots for GPU/Co-processors, with appropriate power supply, cables, and cooling for two accelerators.
Accelerator	1x NVIDIA / RTX5000ADA/ RTX4500ADA/ RTX4000ADA/ MI210 for Computation
HDD	2 × 15 TB NVMe/SATA SSD with Hardware RAID controller – supports RAID 0, 1, 5
OS Certified	C-DAC BOSS OS

Power Supply 2400 W High Efficiency Power Supply

CPU Cooling DCLC Based Cooling

Form Factor All In One (Table top model)

Display Card Nvidia Tesla P1000

Monitor Integrated 32" Full HD 1920×1080 LCD monitor

PARAM Shavak ML/DL System Specifications

Item	Detail
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Processor	2 × Intel Xeon Gold 6240R or equivalent (24 core, 2.4 GHz Clock Speed)
RAM	192 GB (Up to 1.28 TB) ECC DDR4 3200 MHz, RAM in balanced configuration
Network	<ul style="list-style-type: none">• 2 × 10GbE network port• 1 × 1GbE for BMC Management• 1 × Ethernet port for serial communication
Accelerator's slot/ports etc	2 × PCIe Gen3 x16 Slots for GPU/Co-processors, with appropriate power supply, cables, and cooling for two accelerators.
Accelerator	1 × NVIDIA A30 / A800 / MI 210 for Computation
HDD	2 × 15 TB NVMe/SATA SSD with Hardware RAID controller – supports RAID 0, 1, 5
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ssh Login from Linux

Connections to the supercomputer via ssh can be made from a terminal window. On a Macintosh computer, the Terminal.app program is in the Utilities section. In some Linux distributions, the terminal icon is on the menu bar, while others have a menu pick to open it. For instance in Ubuntu, Applications > Accessories > Terminal. A Windows computer with Cygwin installed have a Cygwin icon on the desktop. Once the terminal window is open, the commands syntax is usually the same on all systems. Typical variations on the ssh command line syntax are:

```
ssh <user_id>@hostname  
ssh -l <user_id> hostname
```

Where hostname is the name of the login node and is replaced by your account name.

Examples:

```
local> ssh test@shavak
local> ssh -l test@shavak
```

The captcha is displayed on the screen as shown below. Enter the correct string and press Enter.

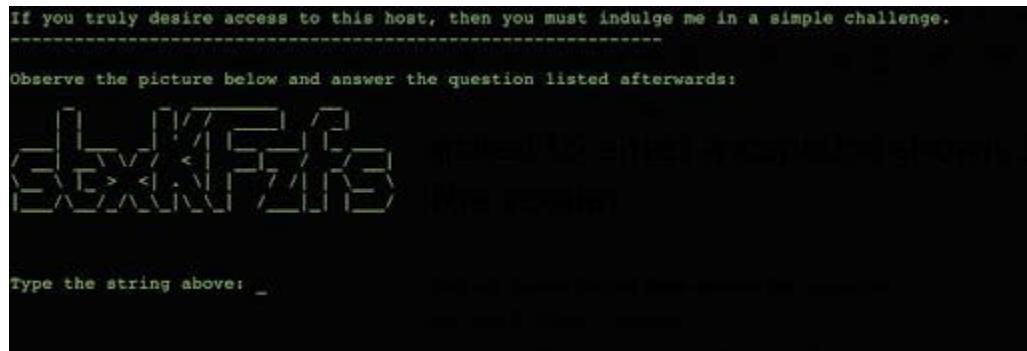


Figure 2 - Captcha Screen

Now enter your password and press Enter.

Note: Nothing is shown on the screen.

When you type the password, asterisk is displayed on the screen (which shows an onlooker how many characters are in your password). If you get a message about password database being too restrictive, it means that you typed an invalid password.

Note: You must type the provided password in the same case (lower or upper).

Once you enter the correct password, a message displays with current announcements. You are now logged on to the supercomputer and can use any of the Linux modules. To logout from the supercomputer, type exit and press Enter.

ssh Login from PuTTY

For Windows operating system, you need to additionally use a ssh utility such as putty. You can download the free version of the Putty utility from the <http://putty.en.softonic.com/download> site.

It can be used in conjunction with some X-window clients, such as X-Win32.

- Download putty.exe from the website putty.exe. Unlike most software packages, putty.exe is not a package with an installation program. It is a single executable file that needs to be run to use PuTTY. Save putty.exe directly to the desktop. Another option is to save putty.exe to a directory of your choice, then create a desktop shortcut to it.
- To connect to the supercomputers with PuTTY, double click the PuTTY icon on the Windows desktop. Windows may pop up a security warning message that requires you to click on Allow, or Run, or Continue in order to allow the PuTTY software to run. This opens the PuTTY Configuration window, shown in Figure.
- Enter the host name in the Host Name (or IP Address) box. The rest of the settings should be correct with the defaults.

Note: These are Port 22, SSH, and keyboard-interactive under Connection -> SSH -

Auth.

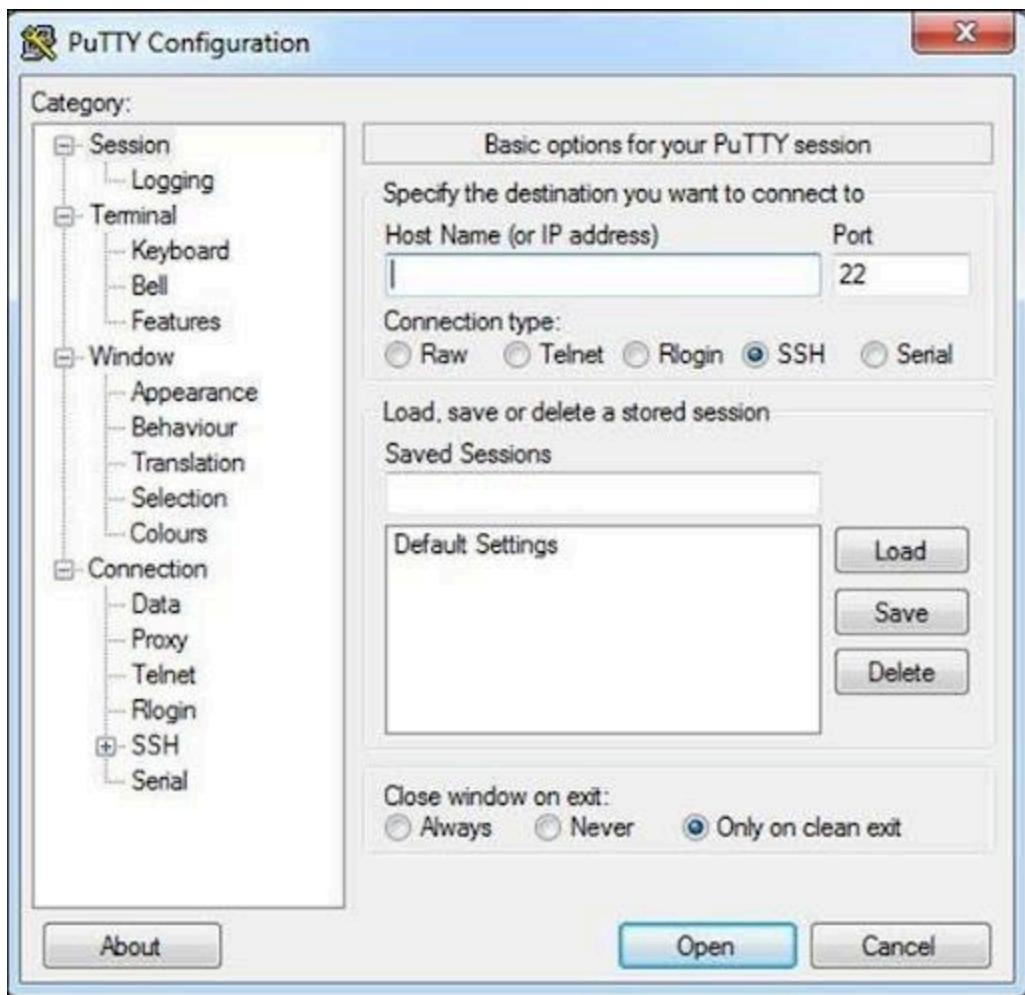


Figure 3 - PuTTY Configuration Dialog Box

- When using the commands involving a host name, such as ssh or scp, you should specify the full name, such as paramshavak. Click Open. The initial window is replaced by the PuTTY terminal window shown in figure.
- The PuTTY terminal window appears with the login as: prompt.
- Enter your supercomputer account name and press Enter.
- Enter the correct string for the Captcha.

```
login as: root
Using keyboard-interactive authentication.
If you truly desire access to this host, then you must indulge me in a sim
allenge.
-----
Observe the picture below and answer the question listed afterwards:

Type the string above: gnacMCvN
Using keyboard-interactive authentication.
Password: [REDACTED]
```

- Enter the password, and press Enter.

```
login as: root
Using keyboard-interactive authentication.
If you truly desire access to this host, then you must indulge me in a sim
allenge.
-----
Observe the picture below and answer the question listed afterwards:

Type the string above: gnacMCvN
```

After you enter the correct password, a message displays with the current announcements. You are now logged on to the supercomputer, and can use any of the Linux, module, or queue system commands described in this manual.



Figure 4 - PuTTY Terminal Window

Note: Nothing is shown on the screen when you type the password, not even asterisks (which show an onlooker of how many characters are in your password). If you get a message about password database being too restrictive, it means that you mistyped the password. The password must be typed exactly as sent to you including the use of upper and lower case characters.