Indian Institute of Tropical Meteorology
Pashan Pune -411008

PS/125/10/2018   October 5, 2018

Sub :- Minutes of Pre-discussion meeting for Expression of Interest (EOI) published for supply installation and commissioning of Disk based archival storage solutions for HPC facilities installed at Institute's under Ministry Of Earth Sciences Govt. Of India.

It was informed that IITM had published an Expression of Interest (EOI) for supply installation and commissioning of Disk based archival storage solutions for HPC Facilities installed at Institute's premises at IITM Pune and NCMRWF Noida under the Ministry Of Earth Sciences Govt. Of India. Pre-discussion meeting was held at IITM, Pune on 5th October 2018 at 11:00 hrs.

Representative from the following companies participated in the pre-discussion to seek clarifications on the EOI.

Sr. No.	Name of the Company	Sr. No.	Name of the Company
1.	M/s. IBM	7.	M/s. DDN
2.	M/s. Locuz	8.	M/s. NetApp
3.	M/s. Cray	9.	M/s. Bostan India
4.	M/s. Lenovo	10.	M/s. Commvault
5.	M/s. Hitachi	11.	M/s. Atos
6.	M/s. HPE		

The committee discussed the issues requested by various vendors as follows and recommended appropriate guidelines for the participating companies:

1. *"Point 3(b) of the Pre-Qualification Criterion : The bidder must have executed supply/system integration of minimum 10PB Disk Based Archival HPC Storage Solution in the past 3 years. Duly certified documents authenticating this aspect should be enclosed in the bid document such as acceptance certificate etc without which the proposals shall not be considered.*

   The committee recommends revising the criteria as follows:

   The bidder must have executed supply/system integration of Disk Based Archival HPC Storage Solution in the past 7 year for capacities as mentioned below. Duly certified documents authenticating this aspect should be enclosed in the bid document such as acceptance certificate etc without which the proposals shall not be considered.

   a. *Three similar completed solutions of capacity of not less than the 4 PB.*
   or
   b. *Two similar completed solutions of capacity of not less than the 5 PB.*
   or
   c. *One similar completed solutions of capacity of not less than the 8 PB.*

Further Committee discussed all the queries received by the vendors and clarified all of them as per Annexure – 1. The committee also discussed and clarified new queries (which were received after the due date) and few more issues raised by all the participating vendors during this meeting. Details regarding network and software version of existing set up as requested by various vendors is enclosed at Annexure-II which should be given wide publicity.

The meeting ended with thanks to the Chair.

Queries for "PS/125/10/2018/EOI for DISK ARCHIVAL STORAGE SOLUTIONS FOR HPC FACILITIES AT IITM"			
M/s. Locuz Enterprise Solutions Ltd			
Sr No	**Tender Clause**	**Queries**	**Institute's Reply / Remark**
1	**Section 2, b, Page No 6 :** The bidder must have executed supply/system integration of minimum 10PB Disk Based Archival HPC Storage Solution in the past 3 years. Duly certified documents authenticating this aspect should be enclosed in the bid document such as acceptance certificate etc without which the proposals shall not be considered.	We request MANIT to drop this pre-qualification criteria from EOI or keep this criteria for OEMs only so that Indigenous System Integrator like us who are technically strong and capable to propose precise solution for your requirement can participate in this EOI.	**As per report**
M/s. HCL Infosystem Ltd.,			
	With reference to your above EOI notice for supply, implementation of a 27 PB (17 +10) Disk based archival solution for your HPC facilities at your IITM Pune centre and NCMRW – Noida institute, we have to the following queries		
1	In the PQ you have mentioned Bidder should have experience in supply and implantation of "10 PB of Disk based Archival Solution for HPC in the last 3 years." We have supplied and installed many large HP solution including the 1088 node cluster + 2 PB storage hav9ng over 1000 Spindles at CMMACS , IISc Cluster , ONGC etc. We have also supplied and are supporting a huge storage and compute setup at UID. UID has the largest storage space in India. We request you to modify the PQ clause to say " Bidder should have supplied and installed a HPC cluster of over 1000 Nodes or implemented a storage solution of HPC having capacity of over 1 PB"		**As per report**

Sr No	Point in Tender	Query	
2	Is the scope of work limited to supply and implementation of Disk Based Archival storage solution with the commercially available HW and SW ? OR are there any Application Development tasks in the scope.		**No**
3	If the scope covers development activities then will it be Develop at one of the centre and implement at the other centre OR will the tasks of IITM and NCMRWF be independent and run parallel ?		**Not Applicable**

M/s. DDN,			
Sr No	Point in Tender	Query	
1	The system is composed of 18 Compute cabinets and uses Cray's Aries NOC with Dragonfly Interconnect network topology	Please confirm if the Archival Storage has to be connected to Aries network or IB Network which can access Aries Network	**IB Network**
2	The system is composed of 18 Compute cabinets and uses Cray's Aries NOC with Dragonfly Interconnect network topology	Kindly confirm no.of Ports available on the existing Network for connectivity of new Archival Storage	**As per enclosed document.**
3	integrated and made available as HPC Disk Archival Storage for Pratyush & Mihir	Is there any plans to use this Archival storage for Aditya & Bhaskara	**Details will be provided in RFP**
		Is there any Data center limitation that bidder shall know about Power per RACK and No.of RACKs limitations?	**Limitations if any will be provided in RFP**
		Is there any performance required from Archival storage for Archival process.	**Details will be provided in RFP**
		Would like to understand, is there any restrictions on access to provide R&W permission from Pratyush & MIHIR storage solution to Archival storage	**Details will be provided in RFP**
		Shall we know the rate of data change per day or Can please provide how much data size could be consider for Archival per Day from both locations	**The storage capacity requirement has been already mentioned. Further details, if any will be provided in RFP.**
		Kindly let us know what all the features MoES is looking from Archival software solution	**Details will be provided in RFP**

M/s. Lenovo			
Sr No	Tender Clause	Queries	Institute's Reply / Remark
1	**Point no 2a**: Supply and installation of two Disk Based Archival HPC Storage solution of minimum usable capacity of 17 Peta Byte and 10 Peta Byte which is to be installed at IITM, Pune (Pratyush datacentre) & NCMRWF Noida (Mihir Data Center) respectively. The Storage Solution should be of latest and best technologies used in building of Top Super Computers across the globe particularly for disk based archival of data both modelling and observations related to weather and climate applications	Lenovo Query: The integration has to be a Cray XC System. Details of the IO nodes and Routers need to be shared. The routers connecting to Inifniband and Aeries network can be supplied by Cray only. Please advise how other bidder will compete.	**The storage connectivity is expected to be on EDR Infiniband. The details of available ports are enclosed For other details please do site survey.**
2	**Point 4 e.:** The Solution should be expandable in future just by adding disks, all drives like SATA, SAS, NL SAS, SSD etc should be supported.	Lenovo Query: This is not supported. Disk need to installed in the Enclosures and Enclosures need to be connected to the IO Storage Servers.	**Final specification will be detailed in RFP.**
3	**Point 3b.:** The bidder must have executed supply/system integration of minimum 10PB Disk Based Archival HPC Storage Solution in the past 3 years. Duly certified documents authenticating this aspect should be enclosed in the bid document such as acceptance certificate etc without which the proposals shall not be considered.	Lenovo query/Request for amendment: The bidder must have executed supply/system integration of minimum 10PB Disk Based~~Archival HPC~~ Storage Solution in the past ~~3~~ 5 years. Duly certified documents authenticating this aspect should be enclosed in the bid document such as acceptance certificate etc without which the proposals shall not be considered.	**As per report**

4	**Point 3c:** The bidder should have been in existence for at least five years and should have well established service/support centre in India with trained manpower in maintaining the proposed solution. Bidder should provide details on his technical support infrastructure in the country	Lenovo query/Requesting acceptance: Lenovo Global Technology India Pvt Ltd is a part of Lenovo Global Corp which currently having completed 2 years of incorporation. Lenovo has 12 years plus experience of Global existence including India. Lenovo India Pvt Ltd got incorporated in India in year 2005. Confirm acceptance.	**As per EOI**

M/s. IBM India Pvt. Ltd.			
Sr No	**Tender Clause**	**Queries**	**Institute's Reply / Remark**
1	Page No. 6, 2 - Scope of Work	EOI mentions the proposed Disk Archival System to be integrated and made available as local HPC Disk Archival Storage for Pratyush and Mihir. We understand that Lustre is the PFS currently used in these clusters. Please confirm on the Lustre version	**Detailes are enclosed.**
2	Page No. 6, 2 - Scope of Work	Is any integration required with the PFS and storage capacities available at Aditya and Bhaskara	**Details will be provided in RFP**
3	Page No. 6, 2 - Scope of Work	Could you elaborate on what is the scope of integration that is required? What are the envisaged use cases for the proposed disk archival system. Data archival will be done manually by the users? Will it be handled by the existing PFS through policies? Kindly elaborate.	**Details will be provided in RFP**
4	Page No. 6, 2 - Scope of Work	Integration with Lustre may involve installation of agents, and policy engines in the existing PFS at both Pratyush and Mihir. Please confirm that this can be facilitated by IITM and NCMRWF.	**Current version is as per enclosed document. For any future upgrades / updates on the software / firmware versions of existing HPC the vendor in this tender is responsible to ensure optimum performance of the disk archival system provided through this tender.**

5	Page No. 6, 2 - Scope of Work	While an external vendor can make recommendations for these components, support of these components should be coming from Lustre as these are Lustre features. Please confirm on the support available at IITM and NCMRWF on Lustre.	**Details will be provided in RFP**
6	Page No. 7, 4 - Basic Performance & Other Requirements	Is there an option to use existing archival solution that has been deployed in Pratyush and Mihir? If so, please elaborate on the components that have been deployed and the architecture.	**No.**
7	Page No. 7, 4 - Basic Performance & Other Requirements	Please clarify on the fabric that is available for connecting the proposed disk archival system in Pratyush and Mihir? (EDR or FDR or 10Gb) Is there a requirement to add additional ports to the fabric?	**The storage connectivity is expected to be on EDR Infiniband. The details of available ports are enclosed For other details please do site survey.**
8	Page No. 7, 4 - Basic Performance & Other Requirements	What will be the rack space, power and cooling availability for the proposed disk archival system at both the locations? Is there any limitation over here?	**Limitations if any will be provided in RFP**
9	Page No. 7, 4 - Basic Performance & Other Requirements	Will end users want to access files directly from the disk archival system or only through the PFS used in Pratyush and Mihir.	**Both**
10	Page No. 7, 4 - Basic Performance & Other Requirements	Is it possible to get an indication of type of files that will be stored in the disk archival system. This is to enable us plan for metadata capacity.	**Details will be provided in RFP, however general applications are NWP & weather and climate observation data.**
11	Page No. 6, 3b & 3d - Prequalification Criteria	Mentions bidder to have the necessary experience in supply, installation and maintenance. Please clarify whether bidder or OEM to have the necessary supply, installation and maintenance. Please clarify whether bidder can be a SI Partner of the OEM & OEM can have the necessary experience in supply, installation and maintenance.	**As per EOI**

Sr No	Tender Clause	Queries	Institute's Reply / Remark
		M/s.Hitachi Micro Clinic	
1	Section 2. Scope of Work , Page No. 6 Onsite Support and Services as required for the proposed Disk Based Archival HPC Storage Solution	Request you to please clarify "Required Onsite support is for incident based breakfix support only or Bidder has to provide resident engineer aswell".	**Details will be provided in RFP**
2	Section 3. Pre-Qualification for Participation, Page No. 6 b. The bidder must have executed supply/system integration of minimum 10PB Disk Based Archival HPC Storage Solution in the past 3 years. Duly certified documents authenticating this aspect should be enclosed in the bid document such as acceptance certificate etc without which the proposals shall not be considered. d. The Bidder should have maintained successfully a similar Disk Based Archival HPC Storage Solution for a period of 3 years. User satisfaction certificate along the contact reference to this effect need to enclosed without which proposal will not be considered.	We request you to kindly allow Global experience of OEM or bidders parent/group companies for the said eligibility criteria's.	**As per EOI**
3	Section 4. Basic Performance and other Requirements: Page No. 7 The proposed Disk Based Archival HPC Storage Solution should be highly dense and should fit in the existing Data Center Space without any additional space requirements; Vendors can conduct a detailed Site survey for this purpose.	Request you to kindly provide details related to the available Rack Space (along with rack Diagram of free space).	**Details will be provided in RFP**
4	Section 4. Basic Performance and other Requirements: Page No. 7 :L The proposed Disk Based Archival HPC Storage Solution should be highly dense and should fit in the existing Data Center Space without any additional space requirements; Vendors can conduct a detailed Site survey for this purpose.	Request you to kindly provide details related to the available Rack Space (along with rack Diagram of free space).	**Details will be provided in RFP**

5	4. Basic Performance and other Requirements: Page no. 7 :The proposed Disk Based Archival HPC Storage Solution should be highly dense and should fit in the existing Data Center Space without any additional space requirements; Vendors can conduct a detailed Site survey for this purpose.	Based on our Datacenter visit, below is our understanding on some of the Datacenter requirement prospective. Please confirm if our understanding is correct.1) Single Phase Power or Three Phase power available in the Datacenter- (Three Phase)2) How much Power (KW) is available per Rack in the Datacenter - (Up to 11KW)3)Space for how many 42U Racks can be provided to install Racks side by side - (Up to 6-7 Racks)4) What is the maximum weight allowed in a Rack - (up to 1500KG)5) Required cooling per rack will be provided by IITM in the DatacenterIn case if the Power source required for the Solution is Single Phase, can it be provided by IITM?	**Details will be provided in RFP**
6	4. Basic Performance and other Requirements:, Page 6 : The Proposed Disk Based Archival HPC Storage Solution should seamlessly integrate (Vendors can conduct a detailed Site survey for this purpose) with our existing Pratyush & Mihir HPC PFS disk storage.	Request to please clarify with what all components/layers, the disk archival storage solution should integrate with.	**As per EOI**
7	General Query	We understand that there are some Free ports in the existing 10Gbps Switches but without SFPs, We request IITM to provide the Ports with SFPs on the existing Switch as we being different OEM will not be able to get SFP's and Upgrade on the existing Switches. Secondly, In case if Solution Need extra 10Gbps port, will IITM Provide the switch or bidder has to factor the extra Switches.	**As per EOI**

8	General Query	There are multiple ways to access HPC Disk Archival Storage like : 1) User accessing directly over NFS/CIFS 2) Lustre file system accessing via New HSM Solution 3) Lustre file system accessing via existing Cray HSM solution/Vercity VSM. Please clarify how would IITM like to access the disk archival storage	**As per EOI**
9	General Query	What all Protocol should be supported by the Disk Archival Storage.	**Details will be provided in RFP**
10	General Query	As per industry trends and technology evolution, long term data retention is moving to Object Storage, due to its inherent Data Integrity, Preservation, Self-Healing and Self-protection features. Request IITM to consider Object Storage technology as part of this disk archival storage solution.	**Details will be provided in RFP**
11	General Query	New Generation data protection technologies such as Erasure, Coding, Self-Healing, Hashing as well as, Metadata and Indexing at the storage system level. Will IITM be considering these technology.	**Details will be provided in RFP**
12	General Query	In case if there is any Licenses or Server augmentation required in the existing HPC setup in order to integrate with HPC Disk archival storage solution, We understand IITM will take care of that.	**Details will be provided in RFP**
13	General Query	Please provide performance requirement in terms of Throughput/IOPS expected from the Disk Archival Storage.	**Details will be provided in RFP**

Sr No	Tender Clause	Queries	Institute's Reply / Remark
		M/s.Hewlett Packard Enterprise	
1	Page 6, Scope of Work : Supply and installation of two Disk Based Archival HPC Storage solution of minimum usable capacity of 17 Peta Byte and 10 Peta Byte	Will the Disk Archival Storage be used as a Secondary tier to the existing Cray PFS storage at Pune and Noida OR it will be used to augment the existing PFS storage capacity ?	Neither. As per EOI.
2	General Queries	Is a Resident Engineer required as part of Support Services ? If yes, how many per site ?	**Details will be provided in RFP**
3		Space available for the new requirement ?	**Please do the site survey.**
4		Cray Linux OS versions and existing Storage details (including what is the existing PFS S/w)	**Please do the site survey. As per enclosed document.**
5		Interconnect Fabric details. Who will be responsible for enhancing the fabric – IITM or vendor ?	**As per enclosed document. As per EOI.**
6		Will Cray upgrade the OS versions and firmware versions in the compute nodes and PFS storage, if needed. We presume that IITM will do the necessary coordination.	**Current version is as per enclosed document. For any future upgrades / updates on the software / firmware versions of existing HPC the vendor in this tender is responsible to ensure optimum performance of the disk archival system provided through this tender.**
7		Will the proposed Disk Archival Storage require integration with the older IBM GSS storage ?	**Details will be provided in RFP.**
8		If yes, then how will the connectivity between the two DC's established ? Will IITM provide the necessary connectivity ?	**Details will be provided in RFP.**
9	Page 6, Pre-Qualification : The bidder must have executed supply/system integration of minimum 10PB Disk Based Archival HPC Storage Solution in the past 3 years. Duly certified documents authenticating this aspect should be enclosed in the bid document such as acceptance certificate etc	We request you to kindly consider **"10PB disk based archival/Parallel file system HPC storage solution".**	**As per EOI.**

|		without which the proposals shall not be considered.		
10		Page 6, Pre-Qualification : The bidder must have executed supply/system integration of minimum 10PB Disk Based Archival HPC Storage Solution in the past 3 years. Duly certified documents authenticating this aspect should be enclosed in the bid document su	We request you to kindly consider "The Bidder should have maintained successfully a similar Disk Based Archival/Parallel file System HPC Storage Solution within past 3 years.**" User satisfaction cerfiticate or UAT, need to be enclosed**	**As per EOI.**
11		Page 4, Point#2 : The system is composed of 18 Compute cabinets and uses Cray's Aries NOC with Dragonfly Interconnect network topology	Please confirm if the Archival Storage has to be connected to Aries network or IB Network which can access Aries Network	**IB Network**
12		Page 4, Point#2 : The system is composed of 18 Compute cabinets and uses Cray's Aries NOC with Dragonfly Interconnect network topology	Kindly confirm no.of Ports available on the existing Network for connectivity of new Archival Storage	**As per enclosed document.**
13		Page 4, Point#2 : The system is composed of 18 Compute cabinets and uses Cray's Aries NOC with Dragonfly Interconnect network topology	Is there any plans to use this Archival storage for Aditya & Bhaskara	**Details will be provided in RFP**
			Is there any Data center limitation that bidder shall know about Power per RACK and No.of RACKs limitations?	**Limitations if any will be provided in RFP**
			Is there any performance required from Archival storage for Archival process.	**Details will be provided in RFP**
			Would like to understand, is there any restrictions on access to provide R&W permission from Pratyush & MIHIR storage solution to Archival storage	**Please do the site survey. Details will be provided during that time.**
			Shall we know the rate of data change per day or Can please provide how much data size could be consider for Archival per Day from both locations	**The storage capacity requirement has been already mentioned. Further details, if any will be provided in RFP.**
			Kindly let us know what all the features MoES is looking from Archival software solution	**Details will be provided in RFP**
14		Page 18, Point#7 : Full Clause - Integrity Pact	Fall Clause in Integrity pact needs to be deleted	**No Change As per EOI**

Sr No	Tender Clause	Queries	Institute's Reply / Remark
		M/s.Boston Ltd.	
1		How will the archive be used?	**As per EOI and further details will be provided in RFP**
2		Will users of disk archive be presented with a mount point on the compute cluster Pratyush & Mihir ?	**As per EOI and further details will be provided in RFP**
3		Is the disk archive access restricted to sys admins or is it to be made accessible to users also ?	**Users also**
4		What's the interface ? S3 vs Posix?	**As per EOI and further details will be provided in RFP**
5		Do we need HSM / parallel data movers etc – full turnkey	**As per EOI and further details will be provided in RFP**
6		What's the minimum and desired performance of disk archive ?	**Details will be provided in RFP**
7		How will the archive data be used? Just online files	**The storage capacity requirement has been already mentioned. Further details, if any will be provided in RFP.**
8		Will they look to run any searches / analytics on the archive data (Dump vs smart archive)	**Details will be provided in RFP**
9		Will it be of benefit to have a small(er) pool of storage replicated between the sites for off site backup / DR?	**Details will be provided in RFP**
10		Power and space limitations at each site ?	**Limitations if any will be provided in RFP**
11		Per rack and the whole disk archive system	**Details will be provided in RFP**
12		Whats the scaring requirement over time? Will this grow in terms of capacity and /or performance ?	**Details will be provided in RFP**

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Sub : System details as requested vendors during EOI pre-discussion meeting.

IITM - Schematic Diagram of Storage

LNET Routers (HOME) 28 Nodes	LNET2 and LNET22	LNET Routers (SCRATCH) 7 Nodes

Core Switch1 (36Ports)	Core Switch2 (36Ports)

ToR Switches	ToR Switches

Home File System	Scratch File System
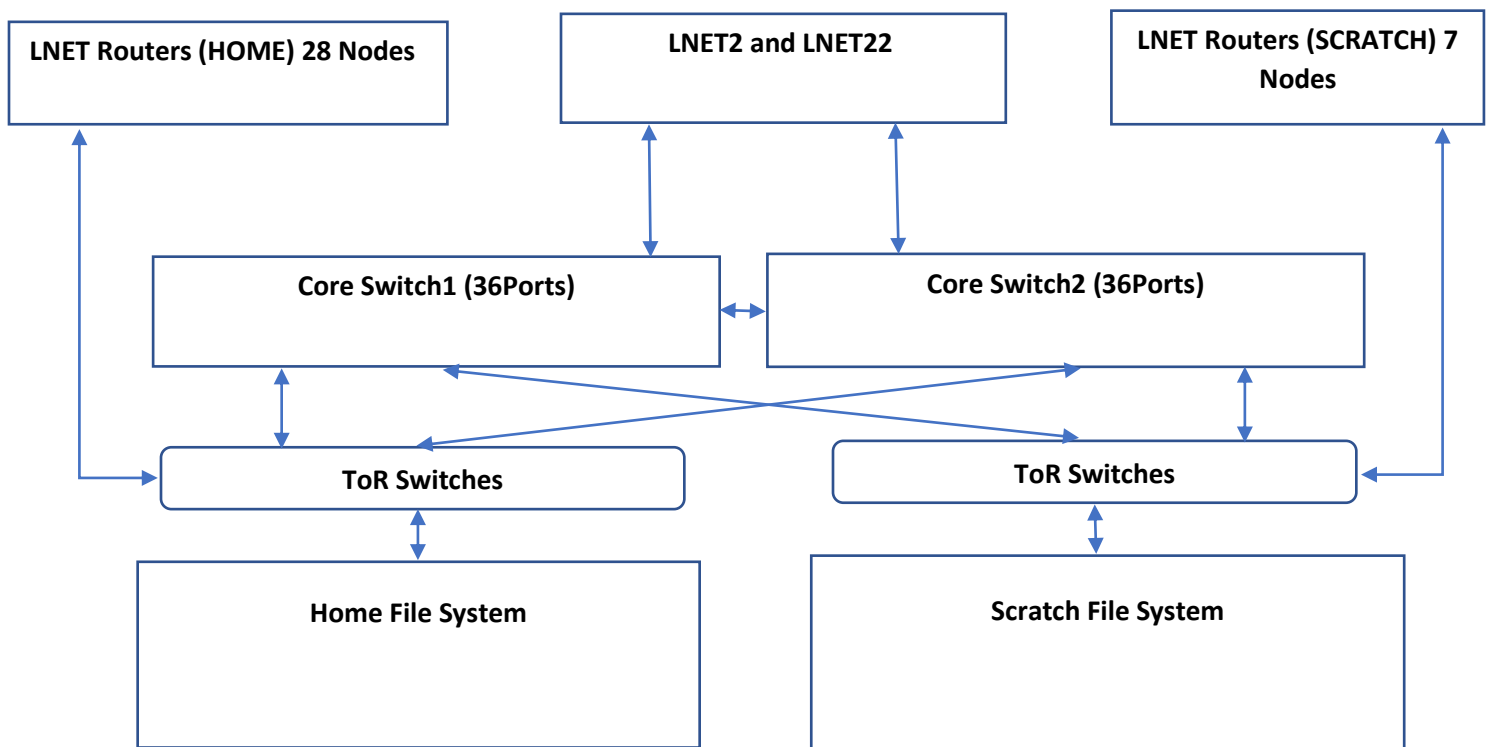
Switches	Available Ports	Free Ports
IB Core Switch 1 (Mellanox EDR SB7700)	36	5
IB Core Switch 2 (Mellanox EDR SB7800)	36	8
10G Switch (Dell S4048)	48	6 (with SFP) 21 (without SFP)
10G Switch (Dell S4048)	48	12 (with SFP) 33 (without SFP)

NCMRWF - Schematic Diagram of Storage

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┌─────────────────────────┐   ┌─────────────────────────┐   ┌─────────────────────────┐
│  LNET Routers (HOME)     │   │    LNET4 & LNET17        │   │  LNET Routers (SCRATCH)  │
│      22 Nodes            │   │                          │   │        6 Nodes           │
└─────────────────────────┘   └─────────────────────────┘   └─────────────────────────┘

┌─────────────────────────┐   ┌─────────────────────────┐
│  Core Switch1 (36Ports)  │   │  Core Switch2 (36Ports)  │
└─────────────────────────┘   └─────────────────────────┘

┌─────────────────────────┐   ┌─────────────────────────┐
│     ToR Switches         │   │     ToR Switches         │
└─────────────────────────┘   └─────────────────────────┘

┌─────────────────────────┐   ┌─────────────────────────┐
│    Home File System      │   │   Scratch File System    │
└─────────────────────────┘   └─────────────────────────┘
```
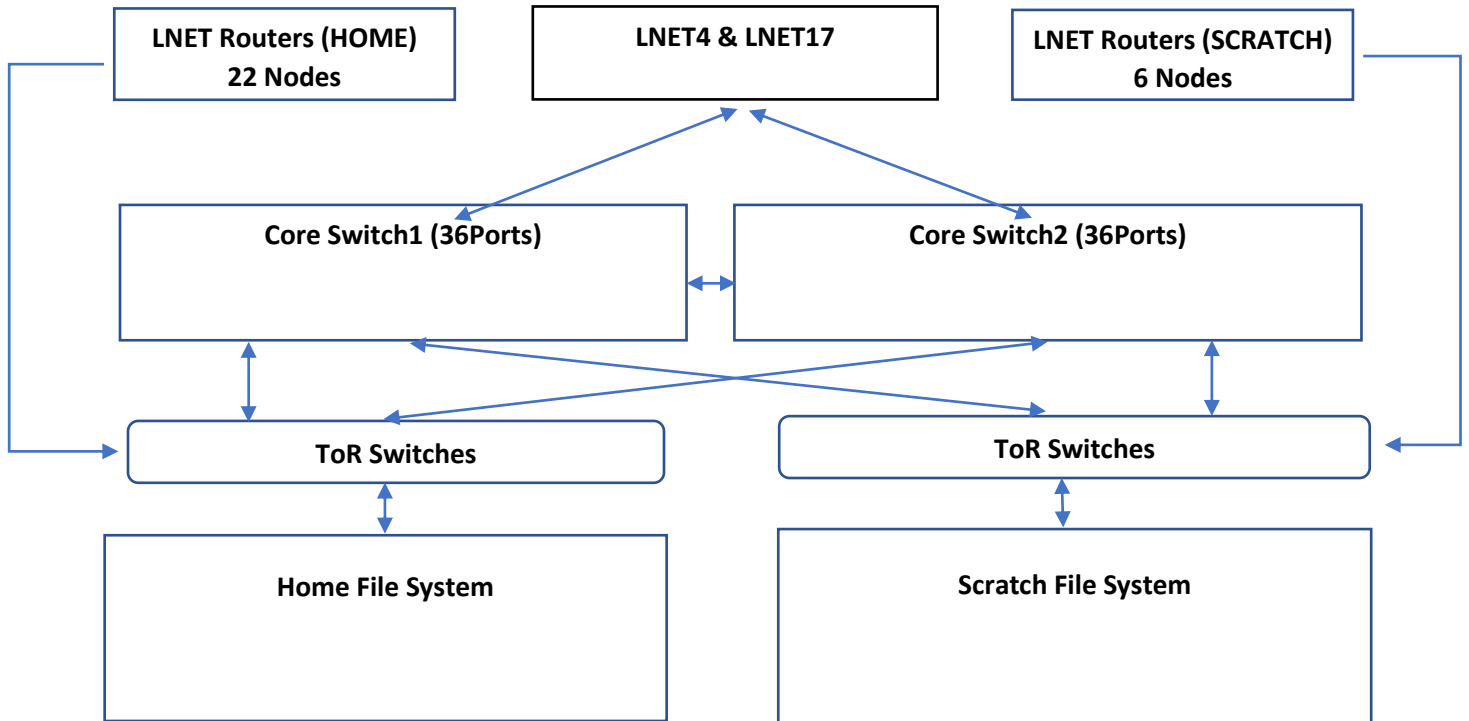
Switches	Available Ports	Free Ports
IB Core Switch 1 (Mellanox EDR SB7700)	36	7 (U37)
IB Core Switch 2 (Mellanox EDR SB7700)	36	7(U38)
10G Switch1 (Dell S4048)	48	8 (with SFP) 26 (without SFP) (U35)
10G Switch 2 (Dell S4048)	48	7 (with SFP) 29 (without SFP)(U36)

Infrastructure Availability

Infrastructure	Available for use - IITM	Available for use - NCMRWF
Electrical Power(UPS)	1,000kW is available with 500kW redundancy	440kW is available with 220kW redundancy
PAC cooling	10TR i.e. 35kW ambient room cooling available.	10TR i.e. 35kW ambient room cooling available.
Chilled water Tapping points inside DC	25NB x 2 50NB x 7	25NB x 1 50NB x 5
Electrical points inside DC. (3 Phase @ 410V)	100A x 12 Nos. MCCB at panel 32A (5 Pin Industrial socket) x 10	100A x 4 Nos. MCCB at panel 32A (5 Pin Industrial socket) x 4

Software Version

- (1)   Lustre Version : 2.7
- (2)   CLE OS : SLES12

For further details please visit http://pratyush.tropmet.res.in