

NATIONAL INSTITUTE OF PLANT GENOME RESEARCH

(An Autonomous Research Institution of the Department of
Biotechnology Ministry of Science and Technology, Govt. of India)
Aruna Asaf Ali Marg, New Delhi – 110 067 Phone: 26735139,
26735141 Fax: 26741658, 26741146

TENDER NOTICE

Tender No. 8/18/2021-22/NIPGR/S&P

Online tenders (in two bid system) are invited on behalf of the Director, NIPGR from manufactures or their authorized dealer for the Supply, Installation, Testing & Commissioning of 01 no. of High Performance Computing (HPC) Cluster at NIPGR Campus, Aruna Asaf Ali Marg, New Delhi 110067.

S.No.	Estimated Cost (in ₹)	EMD in (₹)	Time for Completion	Last Date & Time of Sale / Submission of Tenders	Date & Time of Opening of Tenders
1.	6,00,00,000/-	12,00,000/-	12 Weeks	30/03/2022 15:00 hrs.	31/03/2022 15:00 hrs.

The Earnest Money should be deposited in the form of Demand Draft or Bank Guarantee drawn in favour of the Director, NIPGR, payable at New Delhi so as to reach the undersigned latest by 30/03/2022 (3.00 P.M). The Tender documents and detailed specifications can be obtained in person by the interested firms from the Purchase-Cum-Store Officer, NIPGR, during office hours against non-refundable cash payment of ₹ 500.00 (Rs. Five Hundred only) as mentioned above from 03/03/2022 to 30/03/2022 upto 1500 hrs. The tender document is available on eprocure.gov.in and can also be downloaded from our website: **www.nipgr.ac.in** and CPP Portal <https://eprocure.gov.in/eprocure/app>. The tender document downloaded from the website is exempt from payment of tender document cost (₹ 500/-).

The tenderers registered with MSME & NSIC in the above-mentioned Service / Activity are exempt from deposit of EMD.

The Director, NIPGR, reserves the right to accept or reject all or any of the bids without assigning any reasons thereof.

Purchase cum Stores Officer

TENDER DOCUMENTS

Name of Work: Supply, Installation, Testing & Commissioning of 01 no. of High Performance Computing (HPC) Cluster at NIPGR Campus, New Delhi

Owner: Director, NIPGR, Aruna Asaf Ali Marg, New Delhi – 110 067

Tender Issued to: _____

Place for submission/

Place of opening tender document:

Purchase Section
NIPGR,
Aruna Asaf Ali Marg,
New Delhi-110067

Last date & time for sale of Tender Documents: 30/03/2022 up to 15:00 hrs.

Date & Time of opening of Technical Bid: 31/03/2022 at 15:00 hrs.

Purchase cum Stores Officer
NIPGR, New Delhi

TENDER FORM

To

The Director
NIPGR,
ARUNA ASAF ALI MARG,
New Delhi

Dear Sir,

I/We have read and examined the following Tender Documents relating to the **Supply, installation, testing and commissioning of High Performance Computing (HPC) Cluster at National Institute of Plant Genome Research, Aruna Asaf Ali Marg, New Delhi 110067.**

- General Conditions
- Instructions to bidders
- Annexures I,II,III
- Special Instructions to bidders
- General Information
- Specific condition of contract
- Terms and Conditions of Contract Agreement
- Special Terms and conditions of Contract
- Instructions for online Bid submission
- Technical specifications

Price Bid (Excel Format) Separate

I/We hereby offer to execute the work complete in all respects specified in the underwritten Memorandum within the time specified therein, at the rates specified in the Price Bid and in accordance with the specifications, designs, drawings and instructions in writing referred to in the conditions of tender.

Tenderers Signature and Seal

GENERAL CONDITIONS

1. Online tenders are hereby invited from manufacturers/ authorized dealers for the **Supply, installation, testing and commissioning of High Performance Computing (HPC) Cluster at National Institute of Plant Genome Research, Aruna Asaf Ali Marg, New Delhi 110067.**

The tender document consists of General Conditions, Instructions to bidders, Annexure I, II, III, General Information, Tender form, Terms and Conditions of Contract Agreement, Special Terms and conditions of Contract, Technical specification and Price Bid which can be obtained at a cost of ₹ 500.00 (Rs. Five Hundred only) (Non-refundable) in cash from 03/03/2022 to 30/03/2022 upto 15:00 hrs. from the Purchase-cum-Stores Officer at NIPGR, Aruna Asaf Ali Marg, New Delhi. The tender document can also be downloaded from our website: www.nipgr.ac.in **free of cost**. The tender document is obligatory on the part of the tenderers & bid in no other form will be accepted.

2. The time allowed for the supply, testing and commissioning of above equipment's is 12 weeks from the date of written Supply order.
3. Every tender shall be accompanied by earnest money of ₹ 12,00,000/- in the form of Demand Draft or Bank Guarantee issued from any of the Commercial Banks drawn in favour of the "Director, NIPGR" payable at New Delhi. Any tender not accompanied by such earnest money will be rejected straight away.
4. Annexure –I on Judicial Stamp Paper.
5. The Tenderer will submit his tender in prescribed format after examining the tender documents, scope of work, specific conditions of contract, Instructions to bidders, General Information, Terms and Conditions of contract agreement, technical specification, Price Bid, special terms and conditions of contract, specific conditions of contract.
6. The tender shall be submitted online in two parts, viz., Technical bid and Financial bid. Submission of complete tender document duly stamped and signed by tenderer with technical bid is mandatory.
7. The tenderer shall submit a copy of the audited balance sheets / turnover certificate of the past three financial years ending 31/3/2021.
8. If a tenderer whose tender is accepted fails to undertake the work as per terms of the contract within 10 days to be reckoned from the date of issue of award letter, the earnest Money deposited will be forfeited.
9. NIPGR does not bind itself to accept the lowest or any tender and reserves the right to reject any or all tenders without assigning any reason.
10. NIPGR will not pay any expense, whatsoever incurred by tenderer for the preparation and submission of tenders.
11. The notice inviting tender, will form part of the contract agreement to be executed by the successful tenderer with the NIPGR.
12. All the correspondence on the tender shall be addressed to the Director, NIPGR, Aruna Asaf Ali Marg, New Delhi and any communication addressed to anyone else shall not in any manner to be binding upon the NIPGR, Aruna Asaf Ali Marg, New Delhi.
13. The tenderer shall submit a copy of Authorization Letter from the manufacturer or their authorized agents along with copy of PAN/GST numbers allotted to them.

Tenderers Signature with Seal

Purchase cum Stores Officer

INSTRUCTIONS TO BIDDERS

1. GENERAL INSTRUCTIONS:

The items referred here-in shall cover the entire scope of the proposal which includes supplying and installation of the equipment including the successful completion and the tests which the NIPGR desires testing and commissioning shall be carried out.

2. TENDERERS TO STUDY ENTIRE TENDER DOCUMENT CAREFULLY:

Submission of a tender by a tenderer implies that he has read all the stipulations contained in this tender document and has acquainted himself of the nature, scope and specifications of the items to be followed.

3. TENDERER TO SUBMIT THE ENTIRE TENDER DOCUMENT:

The tenderer shall submit all documents issued to him for the purpose of this tender after duly filling the same in all respects. Tenders which are found to be vague or incomplete shall be rejected summarily.

4. TENDER SHALL BE WRITTEN IN ENGLISH LANGUAGE:

Every tender shall be written in English language. All information such as documents and drawings supplied by the tenderer will also be in the English language only. Drawings and designs shall be dimensioned according to the metric system of measurements. Tenders shall be forwarded under cover or a letter type written on the tenderer's letter-head and duly signed by the tenderer. Signatures must be in long hand, executed in ink by a duly authorized principal of the tendering firm. No oral, telegraphic or telephonic tenders or subsequent modifications there-to shall be entertained; If a tender is submitted on behalf of the firm, then all the partners shall sign or may be signed by one in whose favour all the partners have given General Power Of Attorney. In case of tender submitted by a company, it shall be signed by one who has been authorized by the Board of Directors through a resolution. Copy of resolution and the authority letter in favour of the person signing must accompany the tender.

5. VALIDITY PERIOD OF OFFERS:

- A. The rates quoted in the tender shall hold good for 90 days from the date of opening of the tender. No tenderer can withdraw/or modify his tender or revoke the same within the said period of 90 days. If a tenderer on his own withdraws or revokes the tender or revises or alters or modifies the tender for any item or condition within a period of aforesaid 90 days his earnest money deposit shall stand forfeited.
- B. The validity of accepted rates is extendable for a period of 180 days from the date of issue of Award Letter, with mutual consent of both the parties.

6. TENDERER TO SIGN ALL PAGES:

The tenderer shall stamp and sign at the bottom right hand corner of every page of the tender documents in token of acceptance of tender conditions and for the purpose of identification.

7. ERASURES AND ALTERATIONS:

Tenders containing erasures and alterations of the tender documents are liable to be rejected unless these are authenticated by the person signing the Tender Documents.

8. TENDERER TO SATISFY HIMSELF OF SITE CONDITIONS:

Tenderers are advised to inspect and examine the site and its surroundings and satisfy themselves before submitting their tender regarding nature of the site conditions, the means of access of the site, the accommodation they may require and in general obtain all necessary information as to risks, contingencies and other circumstances which may influence or affect their tender in any manner. A tenderer shall be deemed to have full knowledge of the site, whether he inspects it or not and no compensation or otherwise of any charges incurred or to be incurred consequent on any misunderstanding or otherwise shall be admissible.

9. EARNEST MONEY:

The tender shall be accompanied by earnest money of ₹ 12,00,000/- in the form of Demand Draft only drawn in favour of the Director, NIPGR payable at New Delhi. Earnest money of the unsuccessful bidder(s) shall be refunded after expiry of the validity period of the tenders/placement of Supply Order whichever is earlier. In case of the Successful tenderer the earnest money shall be adjusted against performance security.

10. TENDERER TO QUOTE BOTH IN FIGURES AND WORDS:

The bidder shall quote their rates for all the items both in figures as well as words given as per the attached format of Price bid. The amount of each item shall be worked out and the requisite total given. Special care shall be taken to write percentage in figures and words, and the amount in figures only in such a way that interpolation is not possible. The total amount shall be written both in figures and in words.

11. TENDER LIABLE TO REJECTION:

Tenders which do not fulfill all or any of the conditions laid down in this notice, or contain conditions not covered and / or not contemplated by the Conditions of tender document and/or expressly prohibited therein or stipulate additional/alternative conditions shall be liable to be rejected and his earnest money will be forfeited.

Tenders shall also be liable for rejection on any of the following grounds:-

- i) Tenders containing remarks uncalled for.
- iii) Conditional tenders
- iv) Tenders not submitted on prescribed Performa.
- v) Telegraphic/Fax/Postal tenders.
- vi) Tender submitted without EMD.

13. CORRESPONDENCE:

Tenderers must mention their postal address and telephone number(s) of the Chief Executive/authorized agent or attorney in the tender. The tender submitted by the tenderer will be rejected if he or his agent cannot be contacted on the last known address or on the intimated telephone number(s) after reasonable search in which event earnest money may be forfeited by the NIPGR.

14. NIPGR NOT TO ASSIGN ANY REASON FOR REJECTION OF TENDER:

Director, NIPGR hold absolute discretion to accept or reject the lowest or any other tender without assigning any reason. No claim on this account shall be entertained.

15. AMENDMENT IN TENDER DOCUMENTS:

NIPGR reserves the right to revise or amend the Bid Documents upto the date prior to the date notified for opening of the tenders and also the right to postpone the date of submission and opening of tenders without assigning any reason, whatsoever.

NIPGR also reserves the right to change the quantities of the units while issuing the letter of award of work.

16. REFERENCE IN TENDER DOCUMENTS:

Director, NIPGR, shall be referred as “Owner” in all the documents of Tender documents/contract agreement.

17. SCIENTIST INCHARGE

Where ever the word “Scientist Incharge” occurs it shall mean the authorized Scientist appointed by the NIPGR for the superintendence of the execution of related works.

Tenderers Signature with Seal

Purchase cum Stores Officer

ANNEXURE-I**(Undertaking on a Non-Judicial Stamp Paper worth Rs. 100/- duly notarized)**

I/We (bidder) hereby give an undertaking that:

- (a) I/We have not been backlisted/ not on holding list during last three years by any Govt. Department/Govt. Autonomous Body/Institution, etc.
- (b) I/We do not have any dispute with any of the Govt. Department/Govt. Autonomous Bodies/Institutions, etc.;
- (c) I/We have never been certified as “Unsatisfactory Performer” for the said services provided to the Govt. Department/Govt. Autonomous Bodies/Institutions;
- (d) I/We have not submitted any fake/forged certificates/documents and later, if any such ‘Certificates/Documents’ found to be fake/forged or contains willful wrong/incorrect information, suitable legal action may be initiated against me/us/agency besides ‘Blacklisting’ etc.
- (e) I/We shall not withdraw my/our bid after opening of Technical Bid and if done so, the NIPGR shall be authorized to take action as deemed appropriate against me/us.

(Signature of Authorized Signatory with Company Seal)

Place:

Date:

ANNEXURE-II**Certificate for Tenders involving procurement**

“I/We have read the clause regarding restrictions on procurement from a bidder of a country which shares a land border with India; I/we certify that we/our principles are not from such a country or, if from such a country, have been registered with the Competent Authority. I/we hereby certify that we fulfill all the requirements in this regard and are eligible to be considered. [Where applicable, evidence of valid registration by the Competent Authority shall be attached.]”

(Signature of Authorized Signatory with Company Seal)

Note: The Certificate should be printed on the Company's letter head.

ANNEXURE-III**Certificate for Tenders for Works involving possibility of sub-contracting**

“I/We have read the clause regarding restrictions of procurement from a bidder of a country which shares a land border with India and on sub-contracting to contractors from such countries; I/we certify that we/our principles are not from such a country or, if from such a country, have been registered with the Competent Authority and will not sub-contract any work to a contractor from such countries unless such contractor is registered with the Competent Authority. I/we Hereby certify that we fulfill all requirements in this regard and is/are eligible to be considered. [Where applicable, evidence of valid registration by the Competent Authority shall be attached.]”

(Signature of Authorized Signatory with Company Seal)

Note: The Certificate should be printed on the Company's letter head.

SPECIAL INSTRUCTIONS TO BIDDERS FOR REGISTRATION WITH COMPETENT AUTHORITY

Bidders Registration

- 1) Any bidder from a country which shares a land border with India will be eligible to bid in any procurement whether of goods, services (including consultancy services and non-consultancy services) or works (including turnkey projects) only if the bidder is registered with the Competent Authority constituted by the Department for Promotion of Industry and Internal Trade (DPIIT).
- 2) **“Bidder”** for the purpose of this tender (including the term 'tenderer', 'consultant' 'vendor' or 'service provider' in certain contexts) means any person or firm or company, including any member of a consortium or joint venture (that is an association of several persons, or firms or companies), every artificial juridical person not falling in any of the descriptions of bidders stated hereinbefore, including any agency, branch or office controlled by such person, participating in a procurement process.
- 3) **“Bidder from a country which shares a land border with India”** for the purpose of this tender means:
 - a) An entity incorporated, established or registered in such a country; or
 - b) A subsidiary of an entity incorporated, established or registered in such a country; or
 - c) An entity substantially controlled through entities incorporated, established or registered in such a country; or
 - d) An entity whose beneficial owner is situated in such a country; or
 - e) An Indian (or other) agent of such an entity; or
 - f) A natural person who is a citizen of such a country; or
 - g) A consortium or joint venture where any member of the consortium or joint venture falls under any of the above
- 4) **“The Beneficial owner”** for the purpose of (3) above will be as under:
 - 1) In case of a company or Limited Liability Partnership, the beneficial owner is the natural person(s), who, whether acting alone or together, or through one or more juridical person(s), has a controlling ownership interest or who exercises control through other means.
Explanation: -
 - a)“Controlling ownership interest” means ownership of, or entitlement to, more than twenty-five per cent of shares or capital or profits of the company;
 - b)“Control” shall include the right to appoint the majority of the directors or to control the management or policy decisions, including by virtue of their shareholding or management rights or shareholders agreements or voting agreements;
 - 2) In case of a partnership firm, the beneficial owner is the natural person(s) who, whether acting alone or together, or through one or more juridical person, has ownership or entitlement to more than fifteen percent of capital or profits of the partnership;
 - 3) In case of an unincorporated association or body of individuals, the beneficial owner is

the natural person(s), who, whether acting alone or together, or through one or more juridical person, has ownership of or entitlement to more than fifteen percent of the property or capital or profits of such association or body of individuals;

- 4) Where no natural person is identified under (i) or (ii) or (iii) above, the beneficial owner is the relevant natural person who holds the position of senior managing official;
- 5) In case of a trust, the identification of beneficial owner(s) shall include identification of the author of the trust, the trustee, the beneficiaries with fifteen percent or more interest in the trust and any other natural person exercising ultimate effective control over the trust through a chain of control or ownership.

“An Agent” for the purpose of this Order is a person employed to do any act for another, or to represent another in dealings with third persons.

Sub-contracting in works contracts

In works contracts, including turnkey contracts, contractors shall not be allowed to sub-contract works to any contractor from a country which shares a land border with India unless such contractor is registered with the Competent Authority.

***Please note that the bidders shall provide the mandatory Certificates in the following formats on their registered Company’s letter heads:**

Certificate for Tenders involving procurement

“I/We have read the clause regarding restrictions on procurement from a bidder of a country which shares a land border with India; I/we certify that we are not from such a country or, if from such a country, have been registered with the Competent Authority. I/we hereby certify that we fulfill all requirements in this regard and are eligible to be considered. [Where applicable, evidence of valid registration by the Competent Authority shall be attached.]”

Certificate for Tenders for Works involving possibility of sub-contracting

“I/We have read the clause regarding restrictions of procurement from a bidder of a country which shares a land border with India and on sub-contracting to contractors from such countries; I/we certify that we are not from such a country or, if from such a country, have been registered with the Competent Authority and will not sub-contract any work to a contractor from such countries unless such contractor is registered with the Competent Authority. I/we Hereby certify that we fulfill all requirements in this regard and is/are eligible to be considered. [Where applicable, evidence of valid registration by the Competent Authority shall be attached.]”

Tenderers Signature and Seal

GENERAL INFORMATION

- | | | |
|-----|---|--|
| 1. | Accepting Authority | Director, NIPGR, New Delhi. |
| 2. | Earnest Money | ₹ 12,00,000/- (Rs. Twelve Lakhs only) to be furnished with the tender in the form of the Demand draft or Bank Guarantee issued from any of the Commercial Banks in favour of "Director, NIPGR" payable at New Delhi.
(No interest is payable on this deposit) |
| 3. | Security Deposit | The EMD submitted by successful tenderer shall be treated as part of performance security deposit. |
| 4. | Performance Security | The successful tenderer shall be required to deposit an amount equal to 3% of the tender value of the contract as Performance Security after adjusting the Security Deposit within 10 days from the date of issue of award letter. Performance Security may be deposited in the form of Demand Draft or Bank Guarantee from State Bank of India or any Scheduled bank. |
| 5. | Authority competent to grant extension of time | Director, NIPGR. |
| 6. | Tools & Plants | To be arranged by Tenderer |
| 7. | Authority competent to reduce the Compensation amount | Director, NIPGR |
| 8. | Defect Liability/warranty period | 36 months from the date of installation and acceptance by the NIPGR |
| 9. | Authority Competent to Appoint Arbitrator | Director, NIPGR |
| 10. | Release of Security Deposit | The Performance Security shall be released after completion of the defect liability period. |

Tenderers Signature with Seal

Specific Conditions of Contract

1. **Scope of work:** The scope of work generally consist of providing of High Performance Computing (HPC) Cluster as described in the equipment specifications of the tender documents. The supplier shall carryout and complete the work under the contract in every respect in accordance with this tenders documents and under directions & to the entire satisfaction of the Scientist-In-Charge. If any item of the work to be executed is not covered under specification, the same shall be executed as decided by the Scientist-In-Charge.

It is not the intent to specify completely herein all aspect of design and constructional features of equipment and details of work to be carried out, nevertheless, the equipment and work shall confirm in all respect to high standard of engineering, design and workmanship and shall be capable of performing in continuous commercial operation in a manner acceptable to the Scientist-In-Charge, who will interpret the meaning of the specifications and drawings and shall have the right to reject or accept any work or material, which in his assessment is not complete to meet the requirements of the specifications and or applicable code, and standards mentioned elsewhere in the specifications.

2. **Operation & Maintenance manuals:** Prior to completion of the work and handing over the High Performance Computing (HPC) Cluster, the supplier shall submit 4 sets of following details:
 - i) Comprehensive operation instructions, preventive and routine maintenance schedules
 - ii) Manufacturer's equipment catalogues and operating & maintenance instructions
 - iii) Electrical control diagrams, piping scheme diagrams
 - iv) List of recommended spare parts with spare part codes, specifications & source of procurements.

Supplier to provide all for testing: The supplier shall provide and pay for all necessary tools, instruments gadgets and testing equipment required for conducting various tests. Any defects in material and / or in workmanship detected during initial testing shall be rectified by the supplier at his own cost. Initial testing shall be carried out in the presence of Scientist-In-Charge or his representative to his entire satisfaction. The installation shall be commissioned after approval by Scientist-In-Charge.

3. **Virtual completion:** On satisfactory completion of initial testing and commissioning, the installation shall be put to continuous running test for a period of 2 days for the purpose of taking over. Any defect in material and/ or in workmanship detected in the course of testing shall be rectified by the supplier at his own cost to the entire satisfaction of the Scientist-In-Charge. The test shall be repeated after removal of defects. After successful completion of above tests, the equipment shall be taken over.
4. **Guarantee & Defect liability period:** The equipment covered by this contract shall be guaranteed by the supplier against faulty material and workmanship for a period of 36 months from the date of virtual completion and taking over the installation. Any part found defective shall be replaced free of all costs by the supplier. The supplier shall guarantee that all equipment shall work satisfactorily and that the performance and efficiency of the equipment shall not be less than the specified values. If performance of equipment during guarantee period is not found satisfactory, the guarantee period will be extended till satisfactory performance is established for further period of reasonable time decided by NIPGR. The services of the supplier's personnel if

requisitioned during the defect liability period shall be made available free of any cost to NIPGR. If the defects noticed during the guarantee period are not remedial within a reasonable time and / or some equipment or system as a whole remain out of order for a total period of one month (4 weeks) (Unless or otherwise extended) NIPGR shall have the right to remedy the defects at the supplier's risk & cost without prejudice to any other rights.

5. **Maintenance:** During the guarantee & defect liability, the supplier shall provide at no extra cost necessary material and personal to carry out the repairs & routine maintenance of equipment. The supplier shall attend to all problems experienced in the operation of the system within a reasonable time but not more than 48 Hrs. of receiving the complaint and take corrective action immediately.
6. **Training of Personnel at site:** In order to enable NIPGR's staff to get acquainted with the operation and maintenance of the Equipment, the supplier at no extra cost to NIPGR shall train the departmental personnel during the period of installation, testing, commission and prior to virtual completion and taking over by NIPGR.
7. **Storage of materials & safe custody:** Lockable storage space, if available shall be made available to the supplier by NIPGR. However, the supplier shall be responsible for watch & ward and safe custody of his equipment and installation till they are formally taken over by NIPGR. Non-availability of lockable storage space due to any reasons shall not relieve the supplier of his contractual obligations in any way.
8. **Completion period:** All work of installation, testing, commissioning and handing over of the High Performance Computing (HPC) Cluster in accordance with this contract shall be completed within the stipulated period or within the extended time as has been allowed by the Institute.
9. The supplier/manufacturer should ensure timely service and calibration of machine for successful installation and satisfactory operation.

Tenderers Signature with Seal

TERMS & CONDITIONS OF CONTRACT AGREEMENT

SECURITY DEPOSIT

1. The earnest money amounting of ₹ 12,00,000/- will be treated as part of performance security deposit of the successful tenderer.

COMPENSATION CLAUSE

2. The time allowed for carrying out the work as entered in the tender shall be strictly observed by the Tenderer, and shall be reckoned from the day of the date on which the order to commence the work is given to the Tenderer. The Tenderer shall prepare and submit the details of delivery and installation for the execution of the said work within ten days of award of work for approval of the Scientist Incharge, NIPGR. The work on the contract shall be executed according to the approved schedule as aforesaid and shall throughout the stipulated period of the contract be proceeded with all due diligence (time being deemed to be the essence of the contract on the part of the Tenderer) **and the Tenderer shall pay as compensation an amount equal to one percent or such smaller amount as Scientist Incharge, NIPGR may decide on the value of work as per contract**, for every week that the work remains un-commenced or unfinished after the dates mutually agreed upon by the parties. Further to ensure good progress during the execution of the work, the Tenderer shall be bound in all cases in which the time allowed for any work exceeds one month to complete one fourth of the whole of the work before one fourth of the whole time allowed under the contract has elapsed, one half of work before one half of such time has elapsed and three fourth of the work before three fourth of such time has elapsed. In the event of the Tenderer failing to comply with this condition he shall be liable to pay as compensation an amount equal to one percent or such smaller amount as the Scientist Incharge, NIPGR, may decide of the value of balance work for everyday that the due quantity of work remains incomplete. Provided always that the entire amount of compensation to be paid under the provisions of this clause shall not exceed ten percent of the awarded cost of work as shown in the tender. The Director, NIPGR, on a representation from the Tenderer, is however, empowered to reduce the amount of compensation and his decision in writing shall be final.

TIME EXTENSION

3. If the Tenderer shall desire an extension of the time limit for completion of the work on the grounds of his having been unavoidably hindered in its execution or on any other ground he shall apply in writing to the Scientist Incharge, NIPGR within 10 days of the date of the hindrance on account of which he desires such extensions as aforesaid but before the expiry of time limit and the Scientist Incharge, if in his opinion(which shall be final) reasonable grounds as shown thereof ,authorized such extension of time if any, as may, in his opinion be necessary or proper.

COMPLETION

4. Without prejudice to the rights of Scientist Incharge under any clause hereinafter contained on completion of the work, the Tenderer shall be furnished with a certificate by the Scientist Incharge or his representative of such completion, but no such certificate shall be given nor shall the work be considered to be complete until the Tenderer shall have removed from the premises on which the work has been executed,

all surplus materials and rubbish, and cleaning off the dirt from all doors, walls, floors, or any other parts of buildings said to have been completed, and the measurements in the said certificate shall be binding and conclusive against the Tenderer, if the Tenderer shall fail to comply with the requirements of this clause as to the removal of scaffolding, surplus materials, and rubbish and cleaning off dirt on or before the date fixed for the completion of the work, Scientist Incharge, NIPGR may at the expense of the Tenderer have removed such scaffolding, surplus materials and rubbish and dispose of the same as he thinks fit and clean off such dirt as aforesaid and the Tenderer shall forth with pay the amount of all expenses so incurred, and shall have no claim in respect of any such scaffolding or surplus materials as aforesaid except for any such sale proceeds actually realized by the sale thereof.

ARBITRATION

5. Except where otherwise provided in the contract all questions and disputes relating to the meaning of the specifications, designs, drawings and instructions here in before mentioned and as to the quality of workmanship or materials used on the work or as to any other question, claim, right, matter or thing whatsoever, in any arising out of or relating to the contract, designs, drawings, specifications, estimates, instructions, orders or these conditions or otherwise concerning the works, or the execution or failure to execute the same whether arising during the progress of the work or after the completion or abandonment thereof shall be referred to the sole arbitration of the person selected from out of a panel of names to be supplied upon a request in writing by party invoking the arbitration by the Director, NIPGR, at the time of the dispute. It will be no objection to any such appointment that the arbitrator so appointed was associated with the work and that he had to deal with the matters to which the contract relates and that in the course of his duties in association with the Scientist Incharge, NIPGR, he had expressed views on all or any of the matters in dispute or difference. The arbitrator to whom the matter is originally referred being unable to act for any reason, the Director shall appoint another person to act as arbitrator in accordance with the terms of the contract. Such person shall be entitled to proceed with the reference from the stage at which it was left by his predecessor. It is also a term of this contract that no person other than a person appointed by the Director as aforesaid shall act as arbitrator. In all cases where the amount of the claim in dispute is ₹ 50000/- (Rs. Fifty thousand only) or above, the arbitrator shall give reasons for the award. Subject as aforesaid the provisions of Arbitration and Cancellation Act 1996 or any statutory modifications or reenactment thereof and the rules framed there under and for the time being in force shall apply to the arbitration proceeding under this clause. It is also a term of the contract that while invoking arbitration the party invoking arbitration shall specify the dispute or disputes to be referred to arbitration under this clause together with the amount or amounts claimed in respect of each such dispute. It is also a term of the contract that if a party does not make any demand for arbitration in respect of any claim(s) in writing within 90 days of receiving the intimation from the Scientist Incharge that the bill is ready for payment, the claim if any, shall be deemed to have been waived and absolutely barred and the owner shall be discharged and released of all liabilities under the contract in respect of these claims.

CARRYING OUT OF WORK

6. All the work shall be carried out strictly and in accordance with the specifications given in the tender to the total satisfaction of the Scientist Incharge. In the case of an item for which specification are not available in the said specifications relevant BIS specifications applicable as on the date of tenders shall be followed.

INSPECTION OF WORK

7. All work under or in course of execution or executed in pursuance of the contract shall at all times be open to the inspection and supervision of Scientist Incharge, NIPGR or his subordinate in-charge of the work and the Tenderer shall at all times, during the usual working hours and at all other times at which reasonable notice of the intention of the Scientist Incharge to visit the works shall have been given to the Tenderer, either himself be present to receive order and instructions or have a responsible agent duly accredited in writing present for that purpose. Orders given to the Tenderer's agent shall be considered to have the same force as if they had been given to the Tenderer himself.

INSURANCE

8. The following insurance cover is to be provided by the Tenderer in the joint names of the employer and the Tenderer for the period from the start date till completion of entire work.
 - a) Cover against damage to other people's property caused by the
 - b) Tenderer's acts or omission;
 - c) Cover against death or injury caused by the Tenderer's acts or omission to:
 - i) Anyone authorized to be on the site;
 - ii) Third parties who are not on the site;
9. No Escalation in rates shall be paid.
10. The Tenderer shall provide all necessary superintendence during execution of the work and as along thereafter as may be necessary for proper fulfilling of the obligations under the contract.
11. The tenderer must visit the site at NIPGR campus, Aruna Asaf Ali Marg, New Delhi - 110067 before quoting the rates.
12. Canvassing whether directly or indirectly, in connection with tenders is strictly prohibited and the tenders submitted by the Tenderers who resort to canvassing will be liable to rejection.
13. The rates quoted for foreign equipments shall be CIF/CIP New Delhi.
14. The rates for Local equipments shall be inclusive of all taxes, octroi, cartage etc., and nothing extra will be paid.
15. No T&P will be issued by the department.
16. The final payment shall be made only after completion of the work subject to certification by Scientist –in- Charge.

17. The site of work is at NIPGR Campus, Aruna Asaf Ali Marg, New Delhi – 110067.
18. The **Technical specifications** of the equipments required are detailed at page **27-38** of this Tender Document.
19. Installation, Testing & Commissioning of the supplied equipments will be done at our site by the bidder in the presence of Scientist-in-Charge of our Institute.

Tenderers Signature with Seal

SPECIAL TERMS AND CONDITIONS OF CONTRACT

1. TENDERER TO BE LIABLE FOR ALL TAXES ETC.

The rates specified in the tender shall be CIF/CIP New Delhi/ FOR NIPGR and inclusive of all taxes, duties and other charges etc., in respect of the contract and the rates shall be firm irrespective of any variation in the prevailing rates of taxes, levies, octroi, etc., and any fresh imposition of any of these by State/Central/Statutory bodies. The supplier shall indemnify the Director against levy of any taxes, etc., in regard to this contract and in the event of the Director being assessed for any of the said imports,

Director shall have the right to recover the total amount so assessed from the supplier's dues and the supplier shall also be responsible for all costs or expenses that may be incurred by Director in connection with any proceedings or limitation in respect of the same. We are eligible for concessional tax (rate) exemption under notification no. 45/2017- Central tax (rate)/Union territory tax (rate) & 47/2017 – Integrated tax (rate) dated 14/11/2017 and fall under the category of Public funded research institution.

2. FORCE MAJEURE:

The right of the Tenderer to proceed with the work shall not be terminated because of any delay in the completion of the work due to unforeseeable causes beyond the control and without the fault or negligence of the Tenderer, including not limited to acts of God, or of the public enemy, restraints of a sovereign state, firms, floods, unusually severe weather.

3. JURISDICTION:

Notwithstanding any other courts having jurisdiction to decide the questions forming subject matter of a suit any and all actions and proceedings arising out of or relative to this contract (including any arbitration in terms thereof) shall lie only in the court of competent Civil jurisdiction in this behalf at New Delhi., where this contract is to be signed on behalf of Director, NIPGR and only the said court shall have jurisdiction to try any such actions and/or proceedings to the exclusion of all other courts.

4. SCOPE OF WORK:

The scope of work is as per enclosed details. The Tenderer should note that during the preparation of detailed working drawings, according to which the Tenderer has to execute the work covered under this contract, may undergo changes. The scope drawings for the entire work are not enclosed, but only a few indicating the probable nature of construction are attached. The scope of work is thus not limited only to the details.

5. Scientist Incharge Role:

The Scientist Incharge shall carry out general supervision and direction of the work. He/she has authority to stop the work. Whenever he/she considering such stoppage necessary to ensure the proper execution of the work. He/she shall also have authority to inspect and reject all work and materials, which do not conform to the specifications and to direct the application of Tenderer's forces to any portion of the work, as in his/her judgment is required, and to order the said force increased or diminished and to decide questions which arise in the execution of the work.

The Scientist Incharge shall have the right to suspend the work or part thereof at any time and no claim whatsoever on this account shall be entertained. In case of any

clarification the Tenderer may appeal to the Director, NIPGR whose decision shall be final and binding on the Tenderer. The above inspection shall, however, not relieve the Tenderer of his responsibilities in regards to defective materials or workmanship and the necessity for rectifying or replacing the same.

6. TENDERER'S RESPONSIBILITY FOR THE MANNER OF EXECUTION OF WORKS

The Tenderer shall be solely responsible for the manner and the method of executing the work. The work shall be subject to the approval of Scientist Incharge from time to time for purposes of determination of the question whether the work is executed by the Tenderer in accordance with the contract.

7. SUBMISSION OF BILLS:

Tenderer is to submit the bills in triplicate along with delivery challans to the Scientist Incharge for works executed by him. Payment will be released on completion of entire work subject to certification by the Scientist Incharge.

8. ACTION AND COMPENSATION PAYABLE IN CASE OF BAD WORK:

If it shall appear to Scientist Incharge, NIPGR or his representatives, that any work has been executed with unsound, imperfect or unskillful workmanship or with materials of any inferior description or that any materials or articles provided by him for the execution of the work are unsound or of a quality inferior to the contracted for, or otherwise not in accordance with the contract specifications the Tenderer shall on demand in writing from the Scientist Incharge specifying the work materials, articles complained or not with-standing that the same have been inadvertently passed, certified and paid for, forthwith rectify or remove and reconstruct the work so specified in whole or in part as the case may require, or as the case, remove the materials or articles so specified and provide other and suitable materials or articles so specified at his own cost and in the event of his failing to do so within a period to be specified by the Scientist Incharge in his demand aforesaid, then the Tenderer shall be liable to pay compensation at the rate of one percent on the amount of the estimate for every day not exceeding ten days while his failure to do so that continue and in the case of any such failure Scientist Incharge, NIPGR may rectify or remove, and re-execute the work or remove and replace with other materials or articles complained of, as the case may be at risk and expenses in all respects of the Tenderer.

9. It shall always prevail, unless otherwise specifically stated, that the entire provisions of Tender document been opened upon and accepted for compliance by the Tenderer without any reservation.

10. Exemption of Customs Duty and Excise Duty

The NIPGR is exempted from payment of Custom Duty and Excise Duty for supply of equipments etc. vide Govt. of India Notification No. 51/96 dt. 23/07/1996. Since the Customs Duty/ Excise Duty and clearance charges will be borne by the Institute, Bidders are requested to quote their rates accordingly. However it will be the responsibility of the Supplier to shift the equipment to site of work including opening of crates, transportation, loading and unloading. Nothing extra will be paid on any account.

11. Terms of payment

100% of the equipments value against irrevocable LC on receipt of order acknowledgement and Performance Guarantee/Security from Principles of supplier or their Indian Agent subject to fulfillment of condition at Sl.No. 4 under General Information. In case of the payment in Indian Rupees, payments shall be released upon successful/satisfactory installation of the equipment. The payment will be released after deduction of taxes at source as per Rules.

- 12. Bidder should provide quotations directly enclosed from the manufacturer.
- 13. Bidder providing misleading or wrong information will be disqualified.
- 14. Bidder will support all the claims by product catalogue, public website of the manufacturer.
- 15. The Tender Compliance Sheet attached with the tender document should be properly filled with complete details.

Tenderers Signature with Seal

Instructions for Online Bid Submission

1. The tender documents are available on our website www.nipgr.ac.in & www.eprocure.gov.in and same can be downloaded.
2. Tender documents may be downloaded from ITPO's website www.nipgr.ac.in and CPPP site <https://eprocure.gov.in/eprocure/app> as per the schedule as given in the tender document.
3. Bids shall be submitted online only at CPPP website: <https://eprocure.gov.in/eprocure/app>. Tenderers/Contractors are advised to follow the instructions provided in the 'Instructions to the Contractors/Tenderer for the resubmission of the bids online through the Central Public Procurement Portal for eProcurement at <https://eprocure.gov.in/eprocure/app>'. Bid documents may be scanned with 100 dpi with black and white option which helps in reducing size of the scanned document.
4. Not more than one tender shall be submitted by one contractor or contractors having business relationship. Under no circumstance will father and his son(s) or other close relations who have business relationship with one another (i.e when one or more partner(s)/director(s) are common) be allowed to tender for the same contract as separate competitors. A breach of this condition will render the tenders of both parties liable to rejection.
5. The bidders are advised to visit CPPP website <https://eprocure.gov.in/eprocure/app> at least 3 days prior to closing date of submission of tender for any corrigendum / addendum/ amendment.
6. Bids will be opened as per date/time as mentioned in the **Tender Document**. After online opening and evaluation of technical bids, the results of their qualification as well Price-Bid opening will be intimated later.

Submission of Tender

The tender shall be submitted online in two parts, viz., Technical bid and Financial bid.

All the pages of bid being submitted must be sequentially numbered by the bidder irrespective of nature of content of the documents before uploading.

The offers submitted by Post/Fax/email shall not be considered. No correspondence will be entertained in this matter.

The bidders are required to submit soft copies of their bids electronically on the CPP Portal, using valid Digital Signature Certificates. The instructions given below are meant to assist the bidders in registering on the CPP Portal, prepare their bids in accordance with the requirements and submitting their bids online on the CPP Portal.

More information useful for submitting online bids on the CPP Portal may be obtained at: <https://eprocure.gov.in/eprocure/app>.

REGISTRATION

- 1) Bidders are required to enroll on the e-Procurement module of the Central Public Procurement Portal (URL: <https://eprocure.gov.in/eprocure/app>) by clicking on the link “**Online Bidder Enrolment**” on the CPP Portal which is free of charge.
- 2) As part of the enrolment process, the bidders will be required to choose a unique username and assign a password for their accounts.
- 3) Bidders are advised to register their valid email address and mobile numbers as part of the registration process. These would be used for any communication from the CPP Portal.
- 4) Upon enrolment, the bidders will be required to register their valid Digital Signature Certificate (Class II or Class III Certificates with signing key usage) issued by any Certifying Authority recognized by CCA India (e.g. Sify / nCode / eMudhra/ Nic etc.), with their profile.
- 5) Only one valid DSC should be registered by a bidder. Please note that the bidders are responsible to ensure that they do not lend their DSC’s to others which may lead to misuse.
- 6) Bidder then logs in to the site through the secured log-in by entering their user ID / password and the password of the DSC / e-Token.

SEARCHING FOR TENDER DOCUMENTS

- 1) There are various search options built in the CPP Portal, to facilitate bidders to search active tenders by several parameters. These parameters could include Tender ID, Organization Name, Location, Date, Value, etc. There is also an option of advanced search for tenders, wherein the bidders may combine a number of search parameters such as Organization Name, Form of Contract, Location, Date, Other keywords etc. to search for a tender published on the CPP Portal.
- 2) Once the bidders have selected the tenders they are interested in, they may download the required documents / tender schedules. These tenders can be moved to the respective ‘My Tenders’ folder. This would enable the CPP Portal to intimate the bidders through SMS / e-mail in case there is any corrigendum issued to the tender document.
- 3) The bidder should make a note of the unique Tender ID assigned to each tender, in case they want to obtain any clarification / help from the Helpdesk.

PREPARATION OF BIDS

Bidder should take into account any corrigendum published on the tender document before submitting their bids.

- 1) Please go through the tender advertisement and the tender document carefully to understand the documents required to be submitted as part of the bid. Please note the number of covers in which the bid documents have to be submitted, the number of documents - including the names and content of each of the document that need to be submitted. Any deviations from these may lead to rejection of the bid.

- 2) Bidder, in advance, should get ready the bid documents to be submitted as indicated in the tender document / schedule and generally, they can be in PDF / XLS / RAR / DWF/JPG formats. Bid documents may be scanned with 100 dpi with black and white option which helps in reducing size of the scanned document.
- 3) To avoid the time and effort required in uploading the same set of standard documents which are required to be submitted as a part of every bid, a provision of uploading such standard documents (e.g. PAN card copy, GST Certificate etc.) has been provided to the bidders. Bidders can use “My Space” or “Other Important Documents” area available to them to upload such documents. These documents may be directly submitted from the “My Space” area while submitting a bid, and need not be uploaded again and again. This will lead to a reduction in the time required for bid submission process.

SUBMISSION OF BIDS

- 1) Bidder should log into the site well in advance for bid submission so that they can upload the bid in time i.e. on or before the bid submission time. Bidder will be responsible for any delay due to other issues.
- 2) The bidder has to digitally sign and upload the required bid documents one by one as indicated in the tender document.
- 3) Bidder has to select the payment option as “offline” to pay the tender fee / EMD as applicable and enter details of the instrument.
- 4) Bidder should prepare the EMD as per the instructions specified in the tender document. The original should be posted/couriered/given in person to the concerned official before bid opening date/time as mentioned in critical date sheet or as specified in the tender documents. The details of the DD/any other accepted instrument, physically sent, should tally with the details available in the scanned copy and the data entered during bid submission time. Otherwise the uploaded bid will be rejected.
- 5) Bidders are requested to note that they should necessarily submit their financial bids in the format provided and no other format is acceptable. If the price bid has been given as a standard BoQ format with the tender document, then the same is to be downloaded and to be filled by all the bidders. Bidders are required to download the BoQ file, open it and complete the white coloured (unprotected) cells with their respective financial quotes and other details (such as name of the bidder). No other cells should be changed. Once the details have been completed, the bidder should save it and submit it online, without changing the filename. If the BoQ file is found to be modified by the bidder, the bid will be rejected.
- 6) The server time (which is displayed on the bidders’ dashboard) will be considered as the standard time for referencing the deadlines for submission of the bids by the bidders, opening of bids etc. The bidders should follow this time during bid submission.
- 7) All the documents being submitted by the bidders would be encrypted using PKI encryption techniques to ensure the secrecy of the data. The data entered cannot be viewed by unauthorized persons until the time of bid opening. The confidentiality of the bids is maintained using the

secured Socket Layer 128 bit encryption technology. Data storage encryption of sensitive fields is done. Any bid document that is uploaded to the server is subjected to symmetric encryption using a system generated symmetric key. Further this key is subjected to asymmetric encryption using buyers/bid opener's public keys. Overall, the uploaded tender documents become readable only after the tender opening by the authorized bid openers.

- 8) The uploaded tender documents become readable only after the tender opening by the authorized bid openers.
- 9) Upon the successful and timely submission of bids (i.e after Clicking "Freeze Bid Submission" in the portal), the portal will give a successful bid submission message & a bid summary will be displayed with the bid no. and the date & time of submission of the bid with all other relevant details.
- 10) The bid summary has to be printed and kept as an acknowledgement of the submission of the bid. This acknowledgement may be used as an entry pass for any bid opening meetings.

ASSISTANCE TO BIDDERS

- 1) Any queries relating to the tender document and the terms and conditions contained therein should be addressed to the Tender Inviting Authority for a tender or the relevant contact person indicated in the tender.

Any queries relating to the process of online bid submission or queries relating to CPP Portal in general may be directed to the 24x7 CPP Portal Helpdesk. The contact number for the helpdesk is 1800 3070 2232, 91-7878007972 and 91-7878007973.

Technical Specification for supply, installation of High Performance Computing (HPC) Cluster (Quantity of Unit – 01 No.)

HPC Components	Description	Qty	CPU
CPU (Compute) Nodes	12 nodes to be configured across 4 chassis	12	2 x Intel Icelake 6348, 28C, 2.6 Ghz, 512 GB RAM, 1 Port of 100 Gbps HDR, 4 x 1 G Ports, RHEL OS, 3 Years warranty
Master Nodes		2	2 x Intel Icelake 6348, 28C, 2.6 Ghz, 256 GB RAM, 4 x 2.4TB 10KRPM SAS HDD & 2 x 960GB SATA/SAS SSD, 1 Port of 100 Gbps HDR, 4 x 1 G Ports, RHEL OS, 3 Years warranty
Login Node		1	2 x Intel Icelake 6348, 28C, 2.6 Ghz, 512 GB RAM, 4 x 2.4TB 10KRPM SAS HDD & 2 x 960GB SATA/SAS SSD, 1 Port of 100 Gbps HDR, 4 x 1 G Ports, RHEL OS, 3 Years warranty
IO Nodes		4	2 x Intel Icelake 6326, 16C, 2.9 Ghz, 256 GB RAM, 2 x 1.2TB 10KRPM SAS HDD, 1 Port of 100 Gbps HDR, 4 x 1 G Ports, RHEL OS, 3 Years warranty
Backup Server		1	2 x Intel IceLake 4310 2.1GHz 12-core Processor, 64 GB RAM, 2 x 1.2TB 10KRPM SAS HDD, 1 Port of 100 Gbps HDR, 4 x 1 G Ports, 4 x 32Gb FC ports, RHEL OS, 3 Years warranty
Shared Storage	50 TB Usable	1	
PFS Storage	300 TB Usable	1	
D2D Backup Appliance	48 TB Raw	1	
InfiniBand switch (IB Switch)	Mellanox- 40P HDR 200	1	
Ethernet Switch	1G, 48P	2	
OS	RHEL		
Job Scheduler	SLURM		
HPCM			
KVM Switch - Console		1	
Smart Rack	Integrated cooling and UPS	2	
Installation			All the nodes, storage, backup and networking components, and Installation should be from same OEM.

Compute Nodes Compute Nodes – 12

Performance	The proposed solution must deliver a minimum of 55 TF or more Peak HPL from CPU only Compute Server Nodes.
CPU	Intel Xeon at 2 x 28 Cores 2.6 GHz or higher. Processor quoted should be one of the latest generations of the respective processor OEM.
RAM	Minimum 512GB RAM and fully balanced DDR4 at 3200 MHz or higher memory configuration in each node
System Disks	1 x 960GB SATA/SAS SSD per node
Cluster interconnect	Minimum 1 Port of 100 Gbps HDR or equivalent in each node, upgradable up to 200Gbps
Connectivity	Ethernet connectivity in compute node for server management and admin
PCI-e slots	Each Compute Node should have a minimum of two PCI-Express 3.0 slots
Form Factor	Maximum 2U 4 Node Dense Server Chassis
Power Supply	Redundant 80 Plus Platinum Power Supplies
OS Support	The offered Nodes must be fully certified/compatible with latest Version of RHEL, SUSE Linux Enterprise Server and Ubuntu
System Security	UEFI Secure Boot and Secure Start support Immutable Silicon Root of Trust Support for Commercial National Security Algorithms (CNSA) Common Access Card (CAC) 2-factor Authentication Tamper-free updates - components digitally signed and verified Secure Recovery - recover critical firmware to known good state on detection of compromised firmware TPM (Trusted Platform Module) Runtime Firmware Validation - Periodically scan essential firmware for compromised code during runtime

Firmware security	1. For firmware security, system should support remote management chip creating a fingerprint in the silicon, preventing servers from booting up unless the firmware matches the fingerprint. This feature should be immutable 2. Should maintain repository for firmware and drivers recipes to aid rollback or patching of compromised firmware. Should also store Factory Recovery recipe preloaded to rollback to factory tested secured firmware
Server Management	Software should support dashboard view to quickly scan the managed resources to assess the overall health of the data center. It should provide an at-a-glance visual health summary of the resources user is authorized to view. The Dashboard minimum should display a health summary of the following: • Server Profiles • Server Hardware The Systems Management software should provide Role-based access control Zero Touch Provisioning (ZTP) using SSDP with remote access Should help provide proactive notification of actual or impending component failure alerts on critical components like CPU, Memory and HDD. Should provide an online portal that can be accessible from anywhere. The portal should provide one stop, online access to the product, support information and provide information to track warranties, support contracts and status. The Portal should also provide a personalised dashboard to monitor device health, hardware events, contracts and warranty status. Should provide a visual status of individual devices and device groups. The Portal should be available on premise (at our location - console based) or off premise (in the cloud). Should help to proactively identify out-of-date BIOS, drivers, and Server Management agents and enable the remote update of system software/firmware components. Should have dashboard for firmware baselines while performing minimum required firmware checks and highlighting out-of-compliance devices for updates with the selected firmware baseline The Server Management Software should be of the same brand as of the server supplier.
Cloud Enabled Monitoring and Analytics	1. Offered servers shall have cloud enabled monitoring and analytics engine for proactive management. All required licenses for same shall be included in the offer. 2. Cloud Enabled Monitoring and analytics engine shall have capability to provide following: a. Providing Firmware upgrade and patch upgrade recommendations proactively. b. Providing power and support entitlement status. c. Recommendations to eliminate performance bottlenecks and critical events, based on Analytics engine having capability of proactive recommendation for arresting the issues/problems.

Master Node Master Node – 2

CPU	2 No. of 28 Cores Intel Xeon or better at 2.6 GHz or higher Processor quoted should be only of the latest generation of the respective processor OEM.
RAM	Minimum 256 GB RAM per Node with fully balanced DDR4 at 3200 MHz or higher memory configuration in each node
System Disks	4 x 2.4TB 10KRPM SAS HDD & 2 x 960GB SATA/SAS SSD
Raid	PCIe based minimum 12Gb/s SAS RAID Controller. RAID support 0/1/1+0/5/50/6/60
Cluster interconnect	Minimum 1 Port of 100 Gbps HDR or equivalent in each node, upgradable up to 200Gbps
Ethernet connect & FC HBA	Dual port 1Gb base-T ports & Dual 12Gb SAS ports
Management port	1 x 1Gbps dedicated management port
PCI-e slots	Master Node should have a minimum of three PCI-Express 3.0 slots
Optical Drive	DVD R/W
Form Factor	Maximum 2U Rack Mountable
Power Supply	Redundant 80 Plus Platinum Power Supplies
OS Support	The offered Nodes must be fully certified/compatible with latest Version of RHEL, SUSE Linux Enterprise Server and Ubuntu
System Security	UEFI Secure Boot and Secure Start support Security feature to ensure servers do not execute compromised firmware code FIPS 140-2 validation Support for Commercial National Security Algorithms (CNSA) Common Criteria certification Configurable for PCI DSS compliance Advanced Encryption Standard (AES) and Triple Data Encryption Standard (3DES) on browser Tamper-free updates - components digitally signed and verified Secure Recovery - recover critical firmware to known good state on detection of compromised firmware Ability to rollback firmware Secure erase of NAND/User data TPM (Trusted Platform Module) 2.0 Chassis Intrusion detection

Firmware security	1. For firmware security, system should support remote management chip creating a fingerprint in the silicon, preventing servers from booting up unless the firmware matches the fingerprint. This feature should be immutable 2. Should maintain repository for firmware and drivers recipes to aid rollback or patching of compromised firmware. Should also store Factory Recovery recipe preloaded to rollback to factory tested secured firmware Software should support dashboard view to quickly scan the managed resources to assess the overall health of the data center. It should provide an at-a-glance visual health summary of the resources user is authorized to view.
Server Management	The Dashboard minimum should display a health summary of the following: • Server Profiles • Server Hardware The Systems Management software should provide Role-based access control Zero Touch Provisioning (ZTP) using SSDP with remote access Cloud Enabled Monitoring and Analytics Should help provide proactive notification of actual or impending component failure alerts on critical components like CPU, Memory and HDD. Should provide an online portal that can be accessible from anywhere. The portal should provide one stop, online access to the product, support information and provide information to track warranties, support contracts and status. The Portal should also provide a personalised dashboard to monitor device health, hardware events, contract, and warranty status. Should provide a visual status of individual devices and device groups. The Portal should be available on premise (at our location - console based) or off premise (in the cloud). Should help to proactively identify out-of-date BIOS, drivers, and Server Management agents and enable the remote update of system software/firmware components. Should have dashboard for firmware baselines while performing minimum required firmware checks and highlighting out-of-compliance devices for updates with the selected firmware baseline
Cloud Enabled Monitoring and Analytics	1. Offered servers shall have cloud enabled monitoring and analytics engine for proactive management. All required licenses for same shall be included in the offer. 2. Cloud Enabled Monitoring and analytics engine shall have capability to provide following: - Providing Firmware upgrade and patch upgrade recommendations proactively. - Providing power and support entitlement status. - Recommendations to eliminate performance bottlenecks and critical events, based on Analytics engine having capability of proactive recommendation for arresting the issues / problems.

Login Node Login Node- 1

CPU	2 No. of 28 Cores Intel Xeon or better at 2.6 GHz or higher. Processor quoted should be only of the latest generation of the respective processor OEM.
RAM	Minimum 512 RAM and fully balanced DDR4 at 3200 MHz or higher memory configuration in each node
System Disks	4 x 2.4TB 10KRPM SAS HDD & 2 x 960GB SATA/SAS SSD
Raid	PCIe based minimum 12Gb/s SAS RAID Controller. RAID support 0/1/1+0/5/50/6/60
Cluster interconnect	Minimum 1 Port of 100 Gbps HDR or equivalent in each node, upgradable up to 200Gbps
Ethernet connect	Dual port 1Gb base-T ports
Management port	1 x 1Gbps dedicated management port
PCI-e slots	Login Node should have a minimum of three PCI-Express 3.0 slots
Optical Drive	DVD R/W
Form Factor	Maximum 2U Rack Mountable
Power Supply	Redundant 80 Plus Platinum Power Supplies
OS Support	The offered Nodes must be fully certified/compatible with latest Version of RHEL, SUSE Linux Enterprise Server and CentOS
System Security	UEFI Secure Boot and Secure Start support Security feature to ensure servers do not execute compromised firmware code FIPS 140-2 validation Support for Commercial National Security Algorithms (CNSA) Common Criteria certification Configurable for PCI DSS compliance Advanced Encryption Standard (AES) and Triple Data Encryption Standard (3DES) on browser Tamper-free updates - components digitally signed and verified Secure Recovery - recover critical firmware to known good state on detection of compromised firmware Ability to rollback firmware Secure erase of NAND/User data

TPM (Trusted Platform Module) 2.0
Chassis Intrusion detection

Firmware security	1. For firmware security, system should support remote management chip creating a fingerprint in the silicon, preventing servers from booting up unless the firmware matches the fingerprint. This feature should be immutable 2. Should maintain repository for firmware and drivers recipes to aid rollback or patching of compromised firmware. Should also store Factory Recovery recipe preloaded to rollback to factory tested secured firmware
Server Management	Software should support dashboard view to quickly scan the managed resources to assess the overall health of the data center. It should provide an at-a-glance visual health summary of the resource's user is authorized to view. The Dashboard minimum should display a health summary of the following: • Server Profiles • Server Hardware The Systems Management software should provide Role-based access control Zero Touch Provisioning (ZTP) using SSDP with remote access Should help provide proactive notification of actual or impending component failure alerts on critical components like CPU, Memory and HDD. Should provide an online portal that can be accessible from anywhere. The portal should provide one stop, online access to the product, support information and provide information to track warranties, support contracts and status. The Portal should also provide a personalised dashboard to monitor device health, hardware events, contracts and warranty status. Should provide a visual status of individual devices and device groups. The Portal should be available on premise (at our location - console based) or off premise (in the cloud). Should help to proactively identify out-of-date BIOS, drivers, and Server Management agents and enable the remote update of system software/firmware components. Should have dashboard for firmware baselines while performing minimum required firmware checks and highlighting out-of-compliance devices for updates with the selected firmware baseline The Server Management Software should be of the same brand as of the server supplier.
Cloud Enabled Monitoring and Analytics	1. Offered servers shall have cloud enabled monitoring and analytics engine for proactive management. All required licenses for same shall be included in the offer. 2. Cloud Enabled Monitoring and analytics engine shall have capability to provide following: - Providing Firmware upgrade and patch upgrade recommendations proactively. - Providing power and support entitlement status. - Recommendations to eliminate performance bottlenecks and critical events, based on Analytics engine having capability of proactive recommendation for arresting the issues / problems.

IO Node
I/O Node – 4

CPU	2 No. of 16 Cores Intel Xeon or better at 3 GHz or higher. Processor quoted should be only of the latest generation of the respective processor OEM.
RAM	Minimum 256GB RAM with fully balanced DDR4 at 3200 MHz or higher memory configuration in each node
System Disks	2 x 1.2TB 10KRPM SAS HDD
Raid	PCIe based minimum 12Gb/s SAS RAID Controllers as per the solution & performance requirement
Cluster interconnect	Minimum 1 Port of 100 Gbps HDR or equivalent in each node, upgradable up to 200Gbps
Ethernet connect	4 x 1Gb base-T ports & 2 x 12Gb SAS ports
Management port	1 x 1Gbps dedicated management port
Form Factor	Maximum 2U Rack Mountable
Power Supply	Redundant 80 Plus Platinum Power Supplies
OS Support	The offered Nodes must be fully certified/compatible with latest Version of RHEL, SUSE Linux Enterprise Server and Ubuntu

System Security	UEFI Secure Boot and Secure Start support Security feature to ensure servers do not execute compromised firmware code FIPS 140-2 validation Support for Commercial National Security Algorithms (CNSA) Common Criteria certification Configurable for PCI DSS compliance Advanced Encryption Standard (AES) and Triple Data Encryption Standard (3DES) on browser Tamper-free updates - components digitally signed and verified Secure Recovery - recover critical firmware to known good state on detection of compromised firmware Ability to rollback firmware Secure erase of NAND/User data TPM (Trusted Platform Module) 2.0 Chassis Intrusion detection
Firmware security	1. For firmware security, system should support remote management chip creating a fingerprint in the silicon, preventing servers from booting up unless the firmware matches the fingerprint. This feature should be immutable 2. Should maintain repository for firmware and drivers recipes to aid rollback or patching of compromised firmware. Should also store Factory Recovery recipe preloaded to rollback to factory tested secured firmware
Server Management	Software should support dashboard view to quickly scan the managed resources to assess the overall health of the data center. It should provide an at-a-glance visual health summary of the resources user is authorized to view. The Dashboard minimum should display a health summary of the following: • Server Profiles • Server Hardware The Systems Management software should provide Role-based access control Zero Touch Provisioning (ZTP) using SSDP with remote access Should help provide proactive notification of actual or impending component failure alerts on critical components like CPU, Memory and HDD. Should provide an online portal that can be accessible from anywhere. The portal should provide one stop, online access to the product, support information and provide information to track warranties, support contracts and status. The Portal should also provide a personalised dashboard to monitor device health, hardware events, contract and warranty status. Should provide a visual status of individual devices and device groups. The Portal should be available on premise (at our location - console based) or off premise (in the cloud). Should help to proactively identify out-of-date BIOS, drivers, and Server Management agents and enable the remote update of system software/firmware components. Should have dashboard for firmware baselines while performing minimum required firmware checks and highlighting out-of-compliance devices for updates with the selected firmware baseline The Server Management Software should be of the same brand as of the server supplier.
Cloud Enabled Monitoring and Analytics	1. Offered servers shall have cloud enabled monitoring and analytics engine for proactive management. All required licenses for same shall be included in the offer. 2. Cloud Enabled Monitoring and analytics engine shall have capability to provide following: - Providing Firmware upgrade and patch upgrade recommendations proactively. - Providing power and support entitlement status. - Recommendations to eliminate performance bottlenecks and critical events, based on Analytics engine having capability of proactive recommendation for arresting the issues / problems.

Backup Server Backup Node – 1

CPU	2 No. of 12 Cores Intel Xeon at 2.1 GHz or higher. Processor quoted should be only of the latest generation of the respective processor OEM.
RAM	Minimum 256GB RAM with fully balanced DDR4 at 3200 MHz or higher memory configuration in each node
System Disks	2 x 1.2TB 10KRPM SAS HDD
Raid	PCIe based minimum 12Gb/s SAS RAID Controllers as per the solution & performance requirement
Cluster interconnect	Minimum 1 Port of 100 Gbps HDR or equivalent in each node, upgradable up to 200Gbps

Ethernet connect	4 x 1Gb base-T ports & 4 x 32Gb FC ports
Management port	1 x 1Gbps dedicated management port. Bidder to factor 10-20TB front end capacity license for backup SW as well.
Form Factor	Maximum 2U Rack Mountable
Power Supply	Redundant 80 Plus Platinum Power Supplies
OS Support	The offered Nodes must be fully certified/compatible with latest Version of RHEL, SUSE Linux Enterprise Server and Ubuntu
System Security	UEFI Secure Boot and Secure Start support Security feature to ensure servers do not execute compromised firmware code FIPS 140-2 validation Support for Commercial National Security Algorithms (CNSA) Common Criteria certification Configurable for PCI DSS compliance Advanced Encryption Standard (AES) and Triple Data Encryption Standard (3DES) on browser Tamper-free updates - components digitally signed and verified Secure Recovery - recover critical firmware to known good state on detection of compromised firmware Ability to rollback firmware Secure erase of NAND/User data TPM (Trusted Platform Module) 2.0 Chassis Intrusion detection
Firmware security	1. For firmware security, system should support remote management chip creating a fingerprint in the silicon, preventing servers from booting up unless the firmware matches the fingerprint. This feature should be immutable 2. Should maintain repository for firmware and drivers recipes to aid rollback or patching of compromised firmware. Should also store Factory Recovery recipe preloaded to rollback to factory tested secured firmware
Server Management	Software should support dashboard view to quickly scan the managed resources to assess the overall health of the data center. It should provide an at-a-glance visual health summary of the resources user is authorized to view. The Dashboard minimum should display a health summary of the following: • Server Profiles • Server Hardware The Systems Management software should provide Role-based access control Zero Touch Provisioning (ZTP) using SSDP with remote access Should help provide proactive notification of actual or impending component failure alerts on critical components like CPU, Memory and HDD. Should provide an online portal that can be accessible from anywhere. The portal should provide one stop, online access to the product, support information and provide information to track warranties, support contracts and status. The Portal should also provide a personalised dashboard to monitor device health, hardware events, contract and warranty status. Should provide a visual status of individual devices and device groups. The Portal should be available on premise (at our location - console based) or off premise (in the cloud). Should help to proactively identify out-of-date BIOS, drivers, and Server Management agents and enable the remote update of system software/firmware components. Should have dashboard for firmware baselines while performing minimum required firmware checks and highlighting out-of-compliance devices for updates with the selected firmware baseline
Cloud Enabled Monitoring and Analytics	The Server Management Software should be of the same brand as of the server supplier. 1. Offered servers shall have cloud enabled monitoring and analytics engine for proactive management. All required licenses for same shall be included in the offer. 2. Cloud Enabled Monitoring and analytics engine shall have capability to provide following: - Providing Firmware upgrade and patch upgrade recommendations proactively. - Providing power and support entitlement status. - Recommendations to eliminate performance bottlenecks and critical events, based on Analytics engine having capability of proactive recommendation for arresting the issues / problems.

IB Switch

InfiniBand Switch – 2

Form factor	1U Managed Switch
Port	Minimum 40 X HDR 200Gb/s ports - InfiniBand HDR
Bandwidth	100% non- blocking bandwidth
Connectors and Cabling	Passive copper or active fibre cables, Optical Modules/QSFP connectors as per the solution requirements

Power Supply

Redundant power supply

Management Switch**Admin & Management Network Switch**

Qty- Minimum Quantity 2 or more as per the connectivity.

Gigabit Ethernet based cluster administration network.

Gigabit Ethernet based remote management network.

Managed 48 port gigabit Switches and suitable cables as required for the proposed HPC systems must be provided.

Redundant power supply

All necessary cables to be provided

Parallel File System Storage**Parallel File System - Qty1 - Shared Storage**

Parameter	Functionality
File System	Lustre based PFS
Metadata Storage	More than or equal to 2% of the Usable Storage space offered
Usable Storage (OST)	300TB usable with RAID 6 (8D +2P) using NL-SAS hot plug drives
Throughput	Sustained 5GB/s independent read & write throughput performance
Operating System & Clustering Support	1. The storage array should support industry-leading Operating System platforms including Windows 2016 / 2019, VMware and Linux. 2. Offered Storage Shall support all above operating systems in Clustering.
Capacity & Scalability	1. PFS Storage Solution shall be offered with 300 TB Usable Capacity with 5 GBps Independent read & write throughput performance.
Front-end Ports & Back-end Ports	1. Offered Storage system shall be supplied with 4 * 12 Gbps SAS ports per controller 2. Offered storage system shall support 12G SAS Back-end connectivity.
Architecture	The storage array should support dual, redundant, hot-pluggable, active-active array controllers for high performance and reliability.
No Single point of Failure	Offered Storage Array shall be configurable in a No Single Point of configuration including Array Controller card, Cache memory, FAN, Power supply etc.
Disk Drive Support	Storage system shall support Enterprise SAS spinning drives, SSD and and near line SAS/ 7.2K RPM drives.
Cache	1. Offered Storage Array shall be given with Minimum of 12GB cache per controller in a single unit. 2. Cache shall be backed up in case of power failure for indefinite time either using batteries or capacitors or any other equivalent technology. 3. Offered storage shall support Flash Cache and shall be configured with 8TB Flash Cache from day 1. 4. Offered Flash cache shall be tuned for random read operations and shall remain activated even at less than 70% of random average read workload.
Raid Support	1. Offered Storage Subsystem must support Raid 1, 10, 5 and Raid 6. 2. All Raid Sets shall support thin provisioning. Vendor shall offer the license of thin provisioning for complete supported capacity of the array. 3. Thin provisioning shall be supported with offered Flash Cache. 4. Raid processing shall be offloaded to a dedicated ASIC instead of CPU. In case vendor is not supporting it then vendor shall ensure that additional 128GB cache per controller is configured to offset the raid processing workload.
Point in time and clone copy	1. Offered Storage array shall be configured with array-based Snapshot and clone functionality and shall be configured for minimum of 512 snapshot licenses. 2. Offered Storage array shall support at-least 512 points in time copies (Snapshots) and 128 volume / Clone copies

Replication	1. Offered storage subsystem shall support storage-based replication to DR location. License for maximum supported capacity of the array shall be offered. 2. Offered storage subsystem shall support replication to multiple storage array of the same family in fan-out mode. At least 1:4 mode shall be supported.
Virtualization and Thin provisioning	1. Offered storage shall be offered and configured with virtualization capability so that a given volume can be striped across all spindles of given drive type within a given disk pool. Disk pool shall support all listed raid sets of Raid 1, Raid 10, Raid 5 and Raid 6. 2. Offered Storage shall be offered and configured with Thin Provisioning capability.
Data Tiering	Offered Storage shall also be configured for Sub-Lun Data tiering in real time fashion across different type of drives within a given pool like SSD, SAS, NL-SAS etc. License shall be configured for maximum supported capacity of the array.
Global and dedicated Hot Spare	1. Offered Storage Array shall support Global hot Spare for offered Disk drives. 2. At least 2 Global hot spare drive shall be configured for every 30 drives. 3. Offered storage array shall have the support for distributed hot spare
Logical Volume & Performance	1. Storage Subsystem shall support minimum of 512 Logical Units. Storage Array shall also support creation of more than 120TB volume at controller level. 2. Offered Storage shall have inbuilt performance management software. Configuration Dashboard shall show overall IOPS and MB/sec performance.
Load Balancing & Muti-path	1. Multi-path and load balancing software shall be provided, if vendor does not support MPIO functionality of Operating system.
Performance	Offered storage shall have listed benchmark for performance of more than 200,000 in Raid 5 using appropriate drives at 8k block size. Vendor shall provide documentary proof for it.
Array Integration	Offered storage array shall have plug-in for VMware VCenter, Microsoft System center as well as vStorage APIs (VAAI) for array integration. The Proposed PFS Storage, Server Node should be from same OEM.

Shared Storage – Qty 1

Parallel File System - Qty1 - Shared Storage

Parameter	Functionality
Usable Storage	50TB usable with RAID 6 (8D +2P) using 10K RPM SAS hot plug drives
Operating System & Clustering Support	1. The storage array should support industry-leading Operating System platforms including Windows 2016 / 2019, VMware and Linux. 2. Offered Storage Shall support all above operating systems in Clustering.
Front-end Ports & Back-end Ports	1. Offered Storage system shall be supplied with 4* 12 Gbps SAS ports per controller 2. Offered storage system shall support 12G SAS Back-end connectivity.
Architecture	The storage array should support dual, redundant, hot-pluggable, active-active array controllers for high performance and reliability.
No Single point of Failure	Offered Storage Array shall be configurable in a No Single Point of configuration including Array Controller card, Cache memory, FAN, Power supply etc.
Disk Drive Support	Storage system shall support Enterprise SAS spinning drives, SSD and and near line SAS/ 7.2K RPM drives.
Cache	1. Offered Storage Array shall be given with Minimum of 12GB cache per controller in a single unit. 2. Cache shall be backed up in case of power failure for indefinite time either using batteries or capacitors or any other equivalent technology. 3. Offered storage shall support Flash Cache and shall be configured with 8TB Flash Cache from day 1. 4. Offered Flash cache shall be tuned for random read operations and shall remain activated even at less than 70% of random average read workload.
Raid Support	1. Offered Storage Subsystem shall support Raid 1, 10, 5 and Raid 6. 2. All Raid Sets shall support thin provisioning. Vendor shall offer the license of thin provisioning for complete supported capacity of the array.

	3. Thin provisioning shall be supported with offered Flash Cache.
	4. Raid processing shall be offloaded to a dedicated ASIC instead of CPU. In case vendor is not supporting it then vendor shall ensure that additional 128GB cache per controller is configured to offset the raid processing workload.
Point in time and clone copy	1. Offered Storage array shall be configured with array-based Snapshot and clone functionality and shall be configured for minimum of 512 snapshot licenses. 2. Offered Storage array shall support at-least 512 points in time copies (Snapshots) and 128 volume / Clone copies
Replication	1. Offered storage subsystem shall support storage-based replication to DR location. License for maximum supported capacity of the array shall be offered. 2. Offered storage subsystem shall support replication to multiple storage array of the same family in fan-out mode. At least 1:4 mode shall be supported.
Virtualization and Thin provisioning	1. Offered storage shall be offered and configured with virtualization capability so that a given volume can be striped across all spindles of given drive type within a given disk pool. Disk pool shall support all listed raid sets of Raid 1, Raid 10, Raid 5 and Raid 6. 2. Offered Storage shall be offered and configured with Thin Provisioning capability.
Data Tiering	Offered Storage shall also be configured for Sub-Lun Data tiering in real time fashion across different type of drives within a given pool like SSD, SAS, NL-SAS etc. License shall be configured for maximum supported capacity of the array.
Global and dedicated Hot Spare	1. Offered Storage Array shall support Global hot Spare for offered Disk drives. 2. At least 2 Global hot spare drive shall be configured for every 30 drives. 3. Offered storage array shall have the support for distributed hot spare
Logical Volume & Performance	1. Storage Subsystem shall support minimum of 512 Logical Units. Storage Array shall also support creation of more than 120TB volume at controller level. 2. Offered Storage shall have inbuilt performance management software. Configuration Dashboard shall show overall IOPS and MB/sec performance.
Load Balancing & Muti-path	1. Multi-path and load balancing software shall be provided, if vendor does not support MPIO functionality of Operating system.
Performance	Offered storage shall have listed benchmark for performance of more than 200,000 in Raid 5 using appropriate drives at 8k block size. Vendor shall provide documentary proof for it.
Array Integration	Offered storage array shall have plug-in for VMware VCenter, Microsoft System center as well as vStorage APIs (VAAI) for array integration. The Proposed PFS Storage, Server Node should be from same OEM.

Disk-2-Disk Backup Appliance Backup appliance

Offered Disk to disk backup device shall be space efficient and controller unit shall not consume more than 2U of rack space. Offered appliance shall be certified to work with at-least 3 Backup application vendor ISV like HPE, Veritas, Dell-EMC, Veeam, Commvault etc.

Offered device shall be offered with Minimum of 48TB of raw space scalable to 140TB.

Offered device shall have separate dedicated drives for Operating System of appliance and shall not participate in data backup.

Offered device shall also be scalable to at-least 100TB usable in native mode (Without de-duplication and compression) and additional 200TB of native usable capacity using storage on the cloud like AWS, Azure or on object storage.

Vendor shall not use any additional staging device in-between while moving the data from Disk based backup device to public cloud or object storage.

Offered device shall be protected with hardware raid 6 from the factory so that no raid configuration is required in field.

Offered device shall support emulation of both VTL and NAS target like CIFS.

Offered device shall have capability to do complete copy of data sets from on premise disk backup storage to Cloud storage instead of data tiering.

Offered device shall have the ability to configure at-least combination of 20 tape Libraries & NAS targets along with 20,000 or more Cartridge slots in the single appliance.

Offered device shall have capability to deliver selective restore from disk Library itself.

Offered Device shall integrate and utilize customer's current tape backup infrastructure in the following aspects

- Compatibility with the existing backup server / media servers at customer.
- Compatibility with existing tape library and tape drives
- Compatibility with existing backup software

Offered device shall have integrated de-duplication license, low bandwidth replication license so that only unique non duplicated block transfers to remote / DR location.

Offered device shall have intelligence to understand both source based, and target based de-duplication and shall be integrated with all well-known backup ISVs like Veritas, Commvault and Veeam etc. At-least 3 ISVs shall be supported.

Offered device shall support receiving non duplicated data from remote locations or branch office directly from the application servers / Client servers in low bandwidth mode without using any backup or replication-based device at remote location / Branch office.

Ability to flexibly emulate tape drive/ tape formats LTO-Gen5, LTO-Gen6, and LTO-Gen7 etc.

Offered device shall have Minimum of 2 x 10Gbps IP, 2 x 25Gbps & 4 x 32Gbps FC and minimum of 4 x 1Gbps IP connection. License and SFP for all ports shall be offered and configured.

Offered Appliance Fiber channel ports shall support connectivity of servers either directly or via SAN switches while supporting both source and Target based de-duplication.

Offered disk-based backup device shall also support encryption functionality.

Offered disk-based backup appliance shall support VLAN tagging. Offered IP ports of same type shall also support Port bonding in Adaptive Load balancing as well as in Active-backup mode.

Offered device shall support rated write performance of at-least 7TB per hour in native mode.

Offered device shall supported rated write performance, when enabled with source level de-duplication, of at-least 16TB/hr.

Software Packages	
Job Scheduler	Slurm
Cluster Management Software	The solution should have OEM supported cluster management software with perpetual license and relevant documents with following features. Provision to push OS images (RHEL, SuSe, etc) onto the compute node and install OS, reboot, power on/off compute node. The management software should support CPU and GPGPU nodes GUI/Web based management. Extensive cluster monitoring capability to check node-level performance parameter using intuitive GUI and with well-designed graphical reports for CPU and GPU activity. Permission for secure shell based access and a robust parallel-execution shell implementation to execute concurrent commands on the cluster Denial of access to compute server for other users whose jobs are not currently being executed on those servers. The software should run on the Master node.
File Systems	Open-Source lustre
Development Environment	Intel One API HPC Toolkit- 2 User license
Installation	One-time installation, integration & download of all required software has to be done by bidder

KVM Switch	
Parameters	Specifications
Form Factor	19" rack mountable
Ports	Minimum 16 ports
Server Connections	USB or KVM over IP
Auto-Scan	It should be capable to auto scan servers
Rack Access	It should support local user port for rack access
SNMP	The KVM switch should be SNMP enabled. It should be operable from remote locations.

OS Support	It should support multiple operating system
Power Supply	It should have dual power with failover
Multi-User support	Multi-User support: It should support multi-user access and collaboration

KVM Console

Form Factor	Rack Foldable TFT in 1U form factor with enough room to mount a KVM switch behind it
Size	18.5 inch WXGA TFT LCD or better

Smart Rack

Two Smart Rack Solution. Each smart rack should have 7 KW cooling system with redundancy (N+N) and UPS system 11 KVA with (N+N) redundancy having 20 minutes common battery bank of 20 minutes. Both smart racks should have total 14 KW cooling capacity (N+N) and UPS System 22 KVA (N+N) with 20 Minutes backup.	
Specification	Description of Items
Modular Design	(i) Smart rack consists of 42HU x 2Nos. suitable for free standing installation. (ii) Provisioning of Smart for further extension.
Dimension (HXWxD) in mm	42U x 2 Nos.- 1000 mm Wide x 2000mm Height x 1200mm Deep. Rack should have base frame of 100mm height for stability. Load bearing capacity of rack frame should be 1400 Kgs. Rack should be made of CRCA sheet steel with minimum sixteen folded frame with 1.5 mm thickness. Top cover and bottom cover should have cable entry provision. Rack front and rear door should have PU gasket. Each rack should have 2 Nos. vertical and 4 Nos. horizontal cable manager. Each rack should have 10 Nos. tool less banking frames of 1U size. Required total 14 KW cooling capacity with redundancy N+N in inclusive of both the racks. Each rack required 7 KW cooling capacity with redundancy (N+N) Racks should have rodent repellent. Rack front door should have electronic keypad system. Rack rear door should be equipped with auto opening system. Rack should have air baffle plate. Racks should have water leak sensor. Rack should have provision to mount the cooling system inside in vertical form without consuming any u space. Rack, cooling system, IP PDU, fire system, Front door access and auto door opening system and monitoring system are required from single OEM for better services. Each rack with minimum 32U usable space. Total required 64 U usable space in both racks.
Access Control	The Front door of smart rack should be fitted with High Security Electro-mechanical code combination lock & Rear with auto door opening system,
Cooling System - Cooling output range 5 – 7kW - Cooling noise level 80 dB (A) - Voltage 230/1/50 V/Ph/Hz - External unit - Refrigerant R 407C - Injection pipe - Suction pipe - Cooling operating range 5/43°C	Cooling System Harmonized modular components should ensure an energy-efficient dissipation of heat. The external unit (condenser) should be designed on the basis of latest technology and for the R 407C refrigerant. Cooling unit mount should be mount vertical to provide the uniform air flow inside the rack, Unit should not take any U space. Each smart rack system should include: 2x Heat exchanger (evaporator) for placing on the inside of the system. 2x Condensor external unit works with R407C refrigerant. - DX control box to activate the evaporator - LCD display, digital temperature display between 18 and 29°C. - Cooling system should not occupy any U space in the rack. - Cooling system mount in vertical form to provide the uniform air flow.
Electrical Power Distribution System	(i)Provisioning of structured power distribution system. The 3-Phase commercial conditioned 440V/50Hz power supply will be made available by the user at the Distribution panel along with MCCB. (ii)This Main Distribution panel will be used to distribute power to all power consuming devices used in Mini Data Center such as: UPS, Air-Conditioning system.
Power Distribution Units for Racks	Vertical metered IP PDU for Racks with 20 Nos C13 & 4 Nos of C19 Sockets with industrial socket 32A. Each rack should have 2 Nos. IPPDU.
Monitoring (HMI display)	Provisioning of IP based monitoring Fault signals - Temp/ Humidity, IPPDU WLD, Fire system and Automatic rear Door Kit, Door access.
(Monitoring) Technical specifications:	CMC should be an intelligent monitoring system with an Ethernet 10BaseT network connection. The priorities of the various functions are monitoring, controlling and documenting physical parameters inside the Mini Data Center. These functions should be managed and controlled via different protocols. The basis of the CMC should be the processing unit (PU unit). Several input/output units (I/O unit) should be connected to one processing unit via a patch cable. This/these function module(s) should connect to the sensors via a standard plug connector. The sensors should be coded so that the function blocks recognize automatically which sensors are connected. Network interface: IEEE 802.3 10/100BaseT Full Duplex

	Basic protocols: TCP/IP, SNMP V1.0, Telnet, FTP, http Additional features: NTP, SSH, SSL, DHCP
Early Fire Detection and Extinguishing Systems	(i) Delivery of an active extinguishing system that detects and extinguishes fires in closed server and network cabinets. (ii) High-performance fan must extract air samples for smoke analysis into the system's measuring chamber. The integrated extinguishing system must trigger if the concentration of smoke exceeds the limits. The extinguishing process must not be electrically conducting and must be fast and residue-free. NOVEC 1230 must be employed as the extinguishing gas. Unit will be 19" mountable. (iii) The installation and removal of the pre-assembled equipment must be carried out without interruption to the protected system's operations. The fire system, Cooling system, IPPDU, Monitoring system. Racks have to be from one OEM for better SLA.
UPS System	Each smart rack required UPS system 11 KVA with (N+N) redundancy having 20 minutes common battery bank of 20 minutes. Required 22 Kva UPS (N+N) redundancy with 20 Minutes back on common battery bank in inclusive of both the racks. UPS Will be mount in smart rack and batteries will be mount in separate utility rack with same aesthetic.
Installation & Training	(i) Installation of smart rack and the relevant components has to be carried out by qualified technicians/OEM engineer. (ii) 01 days onsite training to the user will be given by the vendor.
Certification	Regulatory Standard, ISO 9001, 14001, 45001 and UL2416, ROHS, REACH

Additional Parameters

Additional Parameter -1	All products of IT need to be from single OEM. Both OEM & Bidder must have spares center/warehouse/support office in New-Delhi/NCR for support services. The OEM must have min 3 installations of 100TF HPC set up (CPU only) in last 5 years in India at government organizations/research institutes in a single order.
Additional Parameter -2	The bidder should be an OEM/Authorized partner of the OEM and a Letter of Authorization from the OEM, specific to this tender should be enclosed by the bidder if bidder is not the manufacturer. The OEM/Bidder will be responsible for supply, installation, configuration, commissioning, testing, maintenance, and support for both hardware and software during the warranty period.
Additional Parameter -3	The OEM should have minimum 2-entry in each of the supercomputer list in India maintained by CDAC (which can be downloaded at http://topsc.cdac.in/) from June 2016 and later & should have minimum 5 entries in the latest world top 500 supercomputer list. (Available at www.top500.org) June 2016 and later. The server/ system OEM should be ranked one of the top 3 server OEMs in the country as per the IDC 2017, 2018 & 2019 server market report of India.
Additional Parameter -4	The OEM or partner should be in the HPC business for the min 10 years in India and should have fully operational offices from min 5-years. Please submit documentary evidence for the same.
Additional Parameter -5	The Source of all items shall be either from our country or from the countries who have a good heritage on cyber security and amicable to our country.
Additional Parameter -6	An agreement must be provided for the extended warranty of next two years, after the expiry of 3 years warranty period. Vendor must provide 2 years AMC of the complete system. Rates for the same should be quoted separately. Vendor should have back-to-back agreement with OEM for the same. Vendor should also provide next 2 years software subscription for RHEL during the AMC period.

TECHNICAL BID

NAME OF WORK: Supply, Installation, Testing & Commissioning of 01 no. of High Performance Computing (HPC) Cluster at NIPGR Campus, New Delhi

Tender No. 8/18/2021-22/NIPGR/S&P

S.No.	Description				Qt. Req.	Rate per Unit	Rate in INR, FOR Institute	Rate in Foreign Currency, CIF/CIP New Delhi																																																																																																																				
1.	<table><thead><tr><th>HPC Components</th><th>Description</th><th>Qty</th><th>CPU</th></tr></thead><tbody><tr><td>CPU (Compute) Nodes</td><td>12 nodes to be configured across 4 chassis</td><td>12</td><td>2 x Intel Icelake 6348, 28C, 2.6 Ghz, 512 GB RAM, 1 Port of 100 Gbps HDR, 4 x 1 G Ports, RHEL OS, 3 Years warranty</td></tr><tr><td>Master Nodes</td><td></td><td>2</td><td>2 x Intel Icelake 6348, 28C, 2.6 Ghz, 256 GB RAM, 4 x 2.4TB 10KRPM SAS HDD & 2 x 960GB SATA/SAS SSD, 1 Port of 100 Gbps HDR, 4 x 1 G Ports, RHEL OS, 3 Years warranty</td></tr><tr><td>Login Node</td><td></td><td>1</td><td>2 x Intel Icelake 6348, 28C, 2.6 Ghz, 512 GB RAM, 4 x 2.4TB 10KRPM SAS HDD & 2 x 960GB SATA/SAS SSD, 1 Port of 100 Gbps HDR, 4 x 1 G Ports, RHEL OS, 3 Years warranty</td></tr><tr><td>IO Nodes</td><td></td><td>4</td><td>2 x Intel Icelake 6326, 16C, 2.9 Ghz, 256 GB RAM, 2 x 1.2TB 10KRPM SAS HDD, 1 Port of 100 Gbps HDR, 4 x 1 G Ports, RHEL OS, 3 Years warranty</td></tr><tr><td>Backup Server</td><td></td><td>1</td><td>2 x Intel IceLake 4310 2.1GHz 12-core Processor, 64 GB RAM, 2 x 1.2TB 10KRPM SAS HDD, 1 Port of 100 Gbps HDR, 4 x 1 G Ports, 4 x 32Gb FC ports, RHEL OS, 3 Years warranty</td></tr><tr><td>Shared Storage</td><td>50 TB Usable</td><td>1</td><td></td></tr><tr><td>PFS Storage</td><td>300 TB Usable</td><td>1</td><td></td></tr><tr><td>D2D Backup Appliance</td><td>48 TB Raw</td><td>1</td><td></td></tr><tr><td>InfiniBand switch (IB Switch)</td><td>Mellanox- 40P HDR 200</td><td>1</td><td></td></tr><tr><td>Ethernet Switch</td><td>1G, 48P</td><td>2</td><td></td></tr><tr><td>OS</td><td>RHEL</td><td></td><td></td></tr><tr><td>Job Scheduler</td><td>SLURM</td><td></td><td></td></tr><tr><td>HPCM</td><td></td><td></td><td></td></tr><tr><td>KVM Switch - Console</td><td></td><td>1</td><td></td></tr><tr><td>Smart Rack</td><td>Integrated cooling and UPS</td><td>2</td><td></td></tr><tr><td>Installation</td><td colspan="3">All the nodes, storage, backup and networking components, and Installation should be from same OEM.</td></tr><tr><td colspan="4">Compute Nodes</td></tr><tr><td colspan="4">Compute Nodes – 12</td></tr><tr><td>Performance</td><td colspan="3">The proposed solution must deliver a minimum of 55 TF or more Peak HPL from CPU only Compute Server Nodes.</td></tr><tr><td>CPU</td><td colspan="3">Intel Xeon at 2 x 28 Cores 2.6 GHz or higher. 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	System Security	UEFI Secure Boot and Secure Start support Immutable Silicon Root of Trust Support for Commercial National Security Algorithms (CNSA) Common Access Card (CAC) 2-factor Authentication Tamper-free updates - components digitally signed and verified Secure Recovery - recover critical firmware to known good state on detection of compromised firmware TPM (Trusted Platform Module) Runtime Firmware Validation - Periodically scan essential firmware for compromised code during runtime		
	Firmware security	1. For firmware security, system should support remote management chip creating a fingerprint in the silicon, preventing servers from booting up unless the firmware matches the fingerprint. This feature should be immutable 2. Should maintain repository for firmware and drivers recipes to aid rollback or patching of compromised firmware. Should also store Factory Recovery recipe preloaded to rollback to factory tested secured firmware		
	Server Management	Software should support dashboard view to quickly scan the managed resources to assess the overall health of the data center. It should provide an at-a-glance visual health summary of the resources user is authorized to view. The Dashboard minimum should display a health summary of the following: • Server Profiles • Server Hardware The Systems Management software should provide Role-based access control Zero Touch Provisioning (ZTP) using SSDP with remote access Should help provide proactive notification of actual or impending component failure alerts on critical components like CPU, Memory and HDD. Should provide an online portal that can be accessible from anywhere. The portal should provide one stop, online access to the product, support information and provide information to track warranties, support contracts and status. The Portal should also provide a personalised dashboard to monitor device health, hardware events, contracts and warranty status. Should provide a visual status of individual devices and device groups. The Portal should be available on premise (at our location - console based) or off premise (in the cloud). Should help to proactively identify out-of-date BIOS, drivers, and Server Management agents and enable the remote update of system software/firmware components. Should have dashboard for firmware baselines while performing minimum required firmware checks and highlighting out-of-compliance devices for updates with the selected firmware baseline The Server Management Software should be of the same brand as of the server supplier.		
	Cloud Enabled Monitoring and Analytics	1. Offered servers shall have cloud enabled monitoring and analytics engine for proactive management. All required licenses for same shall be included in the offer. 2. Cloud Enabled Monitoring and analytics engine shall have capability to provide following: - Providing Firmware upgrade and patch upgrade recommendations proactively. - Providing power and support entitlement status. - Recommendations to eliminate performance bottlenecks and critical events, based on Analytics engine having capability of proactive recommendation for arresting the issues/problems.		
		Master Node Master Node – 2		
	CPU	2 No. of 28 Cores Intel Xeon or better at 2.6 GHz or higher Processor quoted should be only of the latest generation of the respective processor OEM.		
	RAM	Minimum 256 GB RAM per Node with fully balanced DDR4 at 3200 MHz or higher memory configuration in each node		
	System Disks	4 x 2.4TB 10KRPM SAS HDD & 2 x 960GB SATA/SAS SSD		
	Raid	PCIe based minimum 12Gb/s SAS RAID Controller. RAID support 0/1/1+0/5/50/6/60		
	Cluster interconnect	Minimum 1 Port of 100 Gbps HDR or equivalent in each node, upgradable up to 200Gbps		
	Ethernet connect & FC HBA	Dual port 1Gb base-T ports & Dual 12Gb SAS ports		
	Management port	1 x 1Gbps dedicated management port		
	PCI-e slots	Master Node should have a minimum of three PCI-Express 3.0 slots		
	Optical Drive	DVD R/W		
	Form Factor	Maximum 2U Rack Mountable		
	Power Supply	Redundant 80 Plus Platinum Power Supplies		
	OS Support	The offered Nodes must be fully certified/compatible with latest Version of RHEL, SUSE Linux Enterprise Server and Ubuntu		
	System Security	UEFI Secure Boot and Secure Start support Security feature to ensure servers do not execute compromised firmware code FIPS 140-2 validation Support for Commercial National Security Algorithms (CNSA) Common Criteria certification Configurable for PCI DSS compliance Advanced Encryption Standard (AES) and Triple Data Encryption Standard (3DES) on browser Tamper-free updates - components digitally signed and verified Secure Recovery - recover critical firmware to known good state on detection of compromised firmware Ability to rollback firmware Secure erase of NAND/User data TPM (Trusted Platform Module) 2.0 Chassis Intrusion detection		
	Firmware security	1. For firmware security, system should support remote management chip creating a fingerprint in the silicon, preventing servers from booting up unless the firmware matches the		

		fingerprint. This feature should be immutable 2. Should maintain repository for firmware and drivers recipes to aid rollback or patching of compromised firmware. Should also store Factory Recovery recipe preloaded to rollback to factory tested secured firmware Software should support dashboard view to quickly scan the managed resources to assess the overall health of the data center. It should provide an at-a-glance visual health summary of the resources user is authorized to view. The Dashboard minimum should display a health summary of the following: • Server Profiles • Server Hardware The Systems Management software should provide Role-based access control Zero Touch Provisioning (ZTP) using SSDP with remote access Cloud Enabled Monitoring and Analytics Should help provide proactive notification of actual or impending component failure alerts on critical components like CPU, Memory and HDD. Should provide an online portal that can be accessible from anywhere. The portal should provide one stop, online access to the product, support information and provide information to track warranties, support contracts and status. The Portal should also provide a personalised dashboard to monitor device health, hardware events, contract, and warranty status. Should provide a visual status of individual devices and device groups. The Portal should be available on premise (at our location - console based) or off premise (in the cloud). Should help to proactively identify out-of-date BIOS, drivers, and Server Management agents and enable the remote update of system software/firmware components. Should have dashboard for firmware baselines while performing minimum required firmware checks and highlighting out-of-compliance devices for updates with the selected firmware baseline		
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		Login Node Login Node- 1		
CPU		2 No. of 28 Cores Intel Xeon or better at 2.6 GHz or higher. Processor quoted should be only of the latest generation of the respective processor OEM.		
RAM		Minimum 512 RAM and fully balanced DDR4 at 3200 MHz or higher memory configuration in each node		
System Disks		4 x 2.4TB 10KRPM SAS HDD & 2 x 960GB SATA/SAS SSD		
Raid		PCIe based minimum 12Gb/s SAS RAID Controller. RAID support 0/1/1+0/5/50/6/60		
Cluster interconnect		Minimum 1 Port of 100 Gbps HDR or equivalent in each node, upgradable up to 200Gbps		
Ethernet connect		Dual port 1Gb base-T ports		
Management port		1 x 1Gbps dedicated management port		
PCI-e slots		Login Node should have a minimum of three PCI-Express 3.0 slots		
Optical Drive		DVD R/W		
Form Factor		Maximum 2U Rack Mountable		
Power Supply		Redundant 80 Plus Platinum Power Supplies		
OS Support		The offered Nodes must be fully certified/compatible with latest Version of RHEL, SUSE Linux Enterprise Server and CentOS		
System Security		UEFI Secure Boot and Secure Start support Security feature to ensure servers do not execute compromised firmware code FIPS 140-2 validation Support for Commercial National Security Algorithms (CNSA) Common Criteria certification Configurable for PCI DSS compliance Advanced Encryption Standard (AES) and Triple Data Encryption Standard (3DES) on browser Tamper-free updates - components digitally signed and verified Secure Recovery - recover critical firmware to known good state on detection of compromised firmware		
Firmware security		Ability to rollback firmware Secure erase of NAND/User data TPM (Trusted Platform Module) 2.0 Chassis Intrusion detection 1. For firmware security, system should support remote management chip creating a fingerprint in the silicon, preventing servers from booting up unless the firmware matches the fingerprint. This feature should be immutable 2. Should maintain repository for firmware and drivers recipes to aid rollback or patching of compromised firmware. Should also store Factory Recovery recipe preloaded to rollback to factory tested secured firmware		
Server Management		Software should support dashboard view to quickly scan the managed resources to assess the overall health of the data center. It should provide an at-a-glance visual health summary of the resource's user is authorized to view.		

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	Cloud Enabled Monitoring and Analytics	IO Node I/O Node – 4		
	CPU	2 No. of 16 Cores Intel Xeon or better at 3 GHz or higher. Processor quoted should be only of the latest generation of the respective processor OEM.		
	RAM	Minimum 256GB RAM with fully balanced DDR4 at 3200 MHz or higher memory configuration in each node		
	System Disks	2 x 1.2TB 10K RPM SAS HDD		
	Raid	PCIe based minimum 12Gb/s SAS RAID Controllers as per the solution & performance requirement		
	Cluster interconnect	Minimum 1 Port of 100 Gbps HDR or equivalent in each node, upgradable up to 200Gbps		
	Ethernet connect	4 x 1Gb base-T ports & 2 x 12Gb SAS ports		
	Management port	1 x 1Gbps dedicated management port		
	Form Factor	Maximum 2U Rack Mountable		
	Power Supply	Redundant 80 Plus Platinum Power Supplies		
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Cloud Enabled Monitoring and Analytics	Backup Server Backup Node – 1 CPU 2 No. of 12 Cores Intel Xeon at 2.1 GHz or higher. Processor quoted should be only of the latest generation of the respective processor OEM. RAM Minimum 256GB RAM with fully balanced DDR4 at 3200 MHz or higher memory configuration in each node System Disks 2 x 1.2TB 10KRPM SAS HDD Raid PCIe based minimum 12Gb/s SAS RAID Controllers as per the solution & performance requirement Cluster interconnect Minimum 1 Port of 100 Gbps HDR or equivalent in each node, upgradable up to 200Gbps Ethernet connect 4 x 1Gb base-T ports & 4 x 32Gb FC ports Management port 1 x 1Gbps dedicated management port. Bidder to factor 10-20TB front end capacity license for backup SW as well. Form Factor Maximum 2U Rack Mountable Power Supply Redundant 80 Plus Platinum Power Supplies OS Support The offered Nodes must be fully certified/compatible with latest Version of RHEL, SUSE Linux Enterprise Server and Ubuntu System Security UEFI Secure Boot and Secure Start support Security feature to ensure servers do not execute compromised firmware code FIPS 140-2 validation Support for Commercial National Security Algorithms (CNSA) Common Criteria certification Configurable for PCI DSS compliance Advanced Encryption Standard (AES) and Triple Data Encryption Standard (3DES) on browser Tamper-free updates - components digitally signed and verified Secure Recovery - recover critical firmware to known good state on detection of compromised firmware Ability to rollback firmware Secure erase of NAND/User data TPM (Trusted Platform Module) 2.0 Chassis Intrusion detection Firmware security 1. For firmware security, system should support remote management chip creating a fingerprint in the silicon, preventing servers from booting up unless the firmware matches the fingerprint. This feature should be immutable 2. Should maintain repository for firmware and drivers recipes to aid rollback or patching of compromised firmware. Should also store Factory Recovery recipe preloaded to rollback to factory tested secured firmware Server Management Software should support dashboard view to quickly scan the managed resources to assess the overall health of the data center. It should provide an at-a-glance visual health summary of the resources user is authorized to view. The Dashboard minimum should display a health summary of the following: - Server Profiles - Server Hardware The Systems Management software should provide Role-based access control Zero Touch Provisioning (ZTP) using SSDP with remote access Should help provide proactive notification of actual or impending component failure alerts on critical components like CPU, Memory and HDD. Should provide an online portal that can be accessible from anywhere. The portal should provide one stop, online access to the product, support information and provide information to track warranties, support contracts and status. The Portal should also provide a personalised dashboard to monitor device health, hardware events, contract and warranty status. Should provide a visual status of individual devices and device groups. The Portal should be available on premise (at our location - console based) or off premise (in the cloud). Should help to proactively identify out-of-date BIOS, drivers, and Server Management agents and enable the remote update of system software/firmware components. Should have dashboard for firmware baselines while performing minimum required firmware checks and highlighting out-of-compliance devices for updates with the selected firmware baseline The Server Management Software should be of the same brand as of the server supplier.		

	Cloud Enabled Monitoring and Analytics InfiniBand Switch – 2 Form factor Port Bandwidth Connectors and Cabling Power Supply Admin & Management Network Switch Qty- Minimum Quantity 2 or more as per the connectivity. Gigabit Ethernet based cluster administration network. Gigabit Ethernet based remote management network. Managed 48 port gigabit Switches and suitable cables as required for the proposed HPC systems must be provided. Redundant power supply All necessary cables to be provided Parallel File System - Qty1 - Shared Storage Parameter File System Metadata Storage Usable Storage (OST) Throughput Operating System & Clustering Support Capacity & Scalability Front-end Ports & Back-end Ports Architecture No Single point of Failure Disk Drive Support Cache Raid Support	1. Offered servers shall have cloud enabled monitoring and analytics engine for proactive management. All required licenses for same shall be included in the offer. 2. Cloud Enabled Monitoring and analytics engine shall have capability to provide following: a. Providing Firmware upgrade and patch upgrade recommendations proactively. b. Providing power and support entitlement status. c. Recommendations to eliminate performance bottlenecks and critical events, based on Analytics engine having capability of proactive recommendation for arresting the issues / problems. IB Switch 1U Managed Switch Minimum 40 X HDR 200Gb/s ports - InfiniBand HDR 100% non- blocking bandwidth Passive copper or active fibre cables, Optical Modules/QSFP connectors as per the solution requirements Redundant power supply Management Switch Functionality Lustre based PFS More than or equal to 2% of the Usable Storage space offered 300TB usable with RAID 6 (8D +2P) using NL-SAS hot plug drives Sustained 5GB/s independent read & write throughput performance 1. The storage array should support industry-leading Operating System platforms including Windows 2016 / 2019, VMware and Linux. 2. Offered Storage Shall support all above operating systems in Clustering. 1. PFS Storage Solution shall be offered with 300 TB Usable Capacity with 5 GBps Independent read & write throughput performance. 1. Offered Storage system shall be supplied with 4 * 12 Gbps SAS ports per controller 2. Offered storage system shall support 12G SAS Back-end connectivity. The storage array should support dual, redundant, hot-pluggable, active-active array controllers for high performance and reliability. Offered Storage Array shall be configurable in a No Single Point of configuration including Array Controller card, Cache memory, FAN, Power supply etc. Storage system shall support Enterprise SAS spinning drives, SSD and and near line SAS/ 7.2K RPM drives. 1. Offered Storage Array shall be given with Minimum of 12GB cache per controller in a single unit. 2. Cache shall be backed up in case of power failure for indefinite time either using batteries or capacitors or any other equivalent technology. 3. Offered storage shall support Flash Cache and shall be configured with 8TB Flash Cache from day 1. 4. Offered Flash cache shall be tuned for random read operations and shall remain activated even at less than 70% of random average read workload. 1. Offered Storage Subsystem must support Raid 1, 10, 5 and Raid 6.		
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		2. All Raid Sets shall support thin provisioning. Vendor shall offer the license of thin provisioning for complete supported capacity of the array. 3. Thin provisioning shall be supported with offered Flash Cache. 4. Raid processing shall be offloaded to a dedicated ASIC instead of CPU. In case vendor is not supporting it then vendor shall ensure that additional 128GB cache per controller is configured to offset the raid processing workload.		
	Point in time and clone copy	1. Offered Storage array shall be configured with array-based Snapshot and clone functionality and shall be configured for minimum of 512 snapshot licenses. 2. Offered Storage array shall support at-least 512 points in time copies (Snapshots) and 128 volume / Clone copies		
	Replication	1. Offered storage subsystem shall support storage-based replication to DR location. License for maximum supported capacity of the array shall be offered. 2. Offered storage subsystem shall support replication to multiple storage array of the same family in fan-out mode. At least 1:4 mode shall be supported.		
	Virtualization and Thin provisioning	1. Offered storage shall be offered and configured with virtualization capability so that a given volume can be striped across all spindles of given drive type within a given disk pool. Disk pool shall support all listed raid sets of Raid 1, Raid 10, Raid 5 and Raid 6. 2. Offered Storage shall be offered and configured with Thin Provisioning capability.		
	Data Tiering	Offered Storage shall also be configured for Sub-Lun Data tiering in real time fashion across different type of drives within a given pool like SSD, SAS, NL-SAS etc. License shall be configured for maximum supported capacity of the array.		
	Global and dedicated Hot Spare	1. Offered Storage Array shall support Global hot Spare for offered Disk drives. 2. At least 2 Global hot spare drive shall be configured for every 30 drives. 3. Offered storage array shall have the support for distributed hot spare		
	Logical Volume & Performance	1. Storage Subsystem shall support minimum of 512 Logical Units . Storage Array shall also support creation of more than 120TB volume at controller level. 2. Offered Storage shall have inbuilt performance management software. Configuration Dashboard shall show overall IOPS and MB/sec performance.		
	Load Balancing & Muti-path	1. Multi-path and load balancing software shall be provided, if vendor does not support MPIO functionality of Operating system.		
	Performance	Offered storage shall have listed benchmark for performance of more than 200,000 in Raid 5 using appropriate drives at 8k block size. Vendor shall provide documentary proof for it.		
	Array Integration	Offered storage array shall have plug-in for VMware VCenter, Microsoft System center as well as vStorage APIs (VAAI) for array integration. The Proposed PFS Storage, Server Node should be from same OEM.		
	Shared Storage – Qty 1			
	Parallel File System - Qty1 - Shared Storage			
	Parameter	Functionality		
	Usable Storage	50TB usable with RAID 6 (8D +2P) using 10K RPM SAS hot plug drives		
	Operating System & Clustering Support	1. The storage array should support industry-leading Operating System platforms including Windows 2016 / 2019, VMware and Linux		
	Front-end Ports & Back-end Ports	2. Offered Storage Shall support all above operating systems in Clustering. 1. Offered Storage system shall be supplied with 4* 12 Gbps SAS ports per controller 2. Offered storage system shall support 12G SAS Back-end connectivity.		
	Architecture	The storage array should support dual, redundant, hot-pluggable, active-active array controllers for high performance and reliability.		
	No Single point of Failure	Offered Storage Array shall be configurable in a No Single Point of configuration including Array Controller card, Cache memory, FAN, Power supply etc.		
	Disk Drive Support	Storage system shall support Enterprise SAS spinning drives, SSD and and near line SAS/ 7.2K RPM drives.		

	Cache 1. Offered Storage Array shall be given with Minimum of 12GB cache per controller in a single unit. 2. Cache shall be backed up in case of power failure for indefinite time either using batteries or capacitors or any other equivalent technology. 3. Offered storage shall support Flash Cache and shall be configured with 8TB Flash Cache from day 1. 4. Offered Flash cache shall be tuned for random read operations and shall remain activated even at less than 70% of random average read workload. Raid Support 1. Offered Storage Subsystem shall support Raid 1, 10, 5 and Raid 6. 2. All Raid Sets shall support thin provisioning. Vendor shall offer the license of thin provisioning for complete supported capacity of the array. 3. Thin provisioning shall be supported with offered Flash Cache. 4. Raid processing shall be offloaded to a dedicated ASIC instead of CPU. In case vendor is not supporting it then vendor shall ensure that additional 128GB cache per controller is configured to offset the raid processing workload. Point in time and clone copy 1. Offered Storage array shall be configured with array-based Snapshot and clone functionality and shall be configured for minimum of 512 snapshot licenses. 2. Offered Storage array shall support at-least 512 points in time copies (Snapshots) and 128 volume / Clone copies Replication 1. Offered storage subsystem shall support storage-based replication to DR location. License for maximum supported capacity of the array shall be offered. 2. Offered storage subsystem shall support replication to multiple storage array of the same family in fan-out mode. At least 1:4 mode shall be supported. Virtualization and Thin provisioning 1. Offered storage shall be offered and configured with virtualization capability so that a given volume can be striped across all spindles of given drive type within a given disk pool. Disk pool shall support all listed raid sets of Raid 1, Raid 10, Raid 5 and Raid 6. 2. Offered Storage shall be offered and configured with Thin Provisioning capability. Data Tiering Offered Storage shall also be configured for Sub-Lun Data tiering in real time fashion across different type of drives within a given pool like SSD, SAS, NL-SAS etc. License shall be configured for maximum supported capacity of the array. Global and dedicated Hot Spare 1. Offered Storage Array shall support Global hot Spare for offered Disk drives. 2. At least 2 Global hot spare drive shall be configured for every 30 drives. 3. Offered storage array shall have the support for distributed hot spare Logical Volume & Performance 1. Storage Subsystem shall support minimum of 512 Logical Units. Storage Array shall also support creation of more than 120TB volume at controller level. 2. Offered Storage shall have inbuilt performance management software. Configuration Dashboard shall show overall IOPS and MB/sec performance. Load Balancing & Multi-path 1. Multi-path and load balancing software shall be provided, if vendor does not support MPIO functionality of Operating system. Performance Offered storage shall have listed benchmark for performance of more than 200,000 in Raid 5 using appropriate drives at 8k block size. Vendor shall provide documentary proof for it. Array Integration Offered storage array shall have plug-in for VMware VCenter, Microsoft System center as well as vStorage APIs (VAAI) for array integration. The Proposed PFS Storage, Server Node should be from same OEM. Disk-2-Disk Backup Appliance Backup appliance Offered Disk to disk backup device shall be space efficient and controller unit shall not consume more than 2U of rack space. Offered appliance shall be certified to work with at-least 3 Backup application vendor ISV like HPE, Veritas, Dell-EMC, Veeam, Commvault etc. Offered device shall be offered with Minimum of 48TB of raw space scalable to 140TB. Offered device shall have separate dedicated drives for Operating System of appliance and shall not participate in data backup. Offered device shall also be scalable to at-least 100TB usable in native mode (Without de-duplication and compression) and additional 200TB of native usable capacity using storage on the cloud like AWS, Azure or on object storage.		
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	Vendor shall not use any additional staging device in-between while moving the data from Disk based backup device to public cloud or object storage. Offered device shall be protected with hardware raid 6 from the factory so that no raid configuration is required in field. Offered device shall support emulation of both VTL and NAS target like CIFS. Offered device shall have capability to do complete copy of data sets from on premise disk backup storage to Cloud storage instead of data tiering. Offered device shall have the ability to configure at-least combination of 20 tape Libraries & NAS targets along with 20,000 or more Cartridge slots in the single appliance. Offered device shall have capability to deliver selective restore from disk Library itself. Offered Device shall integrate and utilize customer's current tape backup infrastructure in the following aspects · Compatibility with the existing backup server / media servers at customer. · Compatibility with existing tape library and tape drives · Compatibility with existing backup software Offered device shall have integrated de-duplication license, low bandwidth replication license so that only unique non duplicated block transfers to remote / DR location. Offered device shall have intelligence to understand both source based, and target based de-duplication and shall be integrated with all well-known backup ISVs like Veritas, Commvault and Veeam etc. At-least 3 ISVs shall be supported. Offered device shall support receiving non duplicated data from remote locations or branch office directly from the application servers / Client servers in low bandwidth mode without using any backup or replication-based device at remote location / Branch office. Ability to flexibly emulate tape drive/ tape formats LTO-Gen5, LTO-Gen6, and LTO-Gen7 etc. Offered device shall have Minimum of 2 x 10Gbps IP, 2 x 25Gbps & 4 x 32Gbps FC and minimum of 4 x 1Gbps IP connection. License and SFP for all ports shall be offered and configured. Offered Appliance Fiber channel ports shall support connectivity of servers either directly or via SAN switches while supporting both source and Target based de-duplication. Offered disk-based backup device shall also support encryption functionality. Offered disk-based backup appliance shall support VLAN tagging. Offered IP ports of same type shall also support Port bonding in Adaptive Load balancing as well as in Active-backup mode. Offered device shall support rated write performance of at-least 7TB per hour in native mode. Offered device shall supported rated write performance, when enabled with source level de-duplication, of at-least 16TB/hr. Job Scheduler Cluster Management Software File Systems Development Environment Installation Software Packages The solution should have OEM supported cluster management software with perpetual license and relevant documents with following features. Provision to push OS images (RHEL, SuSe, etc) onto the compute node and install OS, reboot, power on/off compute node. The management software should support CPU and GPGPU nodes GUI/Web based management. Extensive cluster monitoring capability to check node-level performance parameter using intuitive GUI and with well-designed graphical reports for CPU and GPU activity. Permission for secure shell based access and a robust parallel-execution shell implementation to execute concurrent commands on the cluster Denial of access to compute server for other users whose jobs are not currently being executed on those servers. The software should run on the Master node. Open-Source lustre Intel One API HPC Toolkit- 2 User license One-time installation, integration & download of all required software has to be done by bidder KVM Switch Parameters KVM Switch Specifications		
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Form Factor	19" rack mountable
Ports	Minimum 16 ports
Server Connections	USB or KVM over IP
Auto-Scan	It should be capable to auto scan servers
Rack Access	It should support local user port for rack access
SNMP	The KVM switch should be SNMP enabled. It should be operable from remote locations.
OS Support	It should support multiple operating system
Power Supply	It should have dual power with failover
Multi-User support	Multi-User support: It should support multi-user access and collaboration
KVM Console	
Form Factor	Rack Foldable TFT in 1U form factor with enough room to mount a KVM switch behind it
Size	18.5 inch WXGA TFT LCD or better
Smart Rack	
Two Smart Rack Solution. Each smart rack should have 7 KW cooling system with redundancy (N+N) and UPS system 11 KVA with (N+N) redundancy having 20 minutes common battery bank of 20 minutes. Both smart racks should have total 14 KW cooling capacity (N+N) and UPS System 22 KVA (N+N) with 20 Minutes backup.	
Specification	Description of Items
Modular Design	(i) Smart rack consists of 42HU x 2Nos. suitable for free standing installation. (ii) Provisioning of Smart for further extension.
Dimension (HXWxD) in mm	42U x 2 Nos.- 1000 mm Wide x 2000mm Height x 1200mm Deep. Rack should have base frame of 100mm height for stability. Load bearing capacity of rack frame should be 1400 Kgs. Rack should be made of CRCA sheet steel with minimum sixteen folded frame with 1.5 mm thickness. Top cover and bottom cover should have cable entry provision. Rack front and rear door should have PU gasket. Each rack should have 2 Nos. vertical and 4 Nos. horizontal cable manager. Each rack should have 10 Nos. tool less banking frames of 1U size. Required total 14 KW cooling capacity with redundancy N+N in inclusive of both the racks. Each rack required 7 KW cooling capacity with redundancy (N+N) Racks should have rodent repellent. Rack front door should have electronic keypad system. Rack rear door should be equipped with auto opening system. Rack should have air baffle plate. Racks should have water leak sensor. Rack should have provision to mount the cooling system inside in vertical form without consuming any u space. Rack, cooling system, IP PDU, fire system, Front door access and auto door opening system and monitoring system are required from single OEM for better services. Each rack with minimum 32U usable space. Total required 64 U usable space in both racks.
Access Control	The Front door of smart rack should be fitted with High Security Electro-mechanical code combination lock & Rear with auto door opening system,
Cooling System • Cooling output range 5 – 7kW • Cooling noise level 80 dB (A) • Voltage 230/1/50 V/Ph/Hz • External unit • Refrigerant R 407C • Injection pipe • Suction pipe • Cooling operating range 5/43°C	Cooling System Harmonized modular components should ensure an energy-efficient dissipation of heat. The external unit (condenser) should be designed on the basis of latest technology and for the R 407C refrigerant. Cooling unit mount should be mount vertical to provide the uniform air flow inside the rack. Unit should not take any U space. rack system should include: • 2x Heat exchanger (evaporator) for placing on the inside of the system. • 2x Condensor external unit works with R407C refrigerant. • DX control box to activate the evaporator • LCD display, digital temperature display between 18 and 29°C. Cooling system should not occupy any U space in the rack. • Cooling system mount in vertical form to provide the uniform air flow.
Electrical Power Distribution System	(i)Provisioning of structured power distribution system. The 3-Phase commercial conditioned 440V/50Hz power supply will be made available by the user at the Distribution panel along with MCCB. (ii)This Main Distribution panel will be used to distribute power to all power consuming devices used in Mini Data Center such as: UPS, Air-Cond
Power Distribution Units for Racks	Vertical metered IP PDU for Racks with 20 Nos C13 & 4 Nos of C19 Sockets with industrial socket 32A. Each rack should have 2 Nos. IPPDU.
Monitoring (HMI display)	Provisioning of IP based monitoring Fault signals - Temp/ Humidity, IPPDU WLD, Fire system and Automatic rear Door Kit, Door access.

	(Monitoring) Technical specifications:	CMC should be an intelligent monitoring system with an Ethernet 10BaseT network connection. The priorities of the various functions are monitoring, controlling and documenting physical parameters inside the Mini Data Center. These functions should be managed and controlled via different protocols. The basis of the CMC should be the processing unit (PU unit). Several input/output units (I/O unit) should be connected to one processing unit via a patch cable. This/these function module(s) should connect to the sensors via a standard plug connector. The sensors should be coded so that the function blocks recognize automatically which sensors are connected. • Network interface: IEEE 802.3 10/100BaseT Full Duplex • Basic protocols: TCP/IP, SNMP V1.0, Telnet, FTP, http Additional features: NTP, SSH, SSL, DHCP		
	Early Fire Detection and Extinguishing Systems	(i) Delivery of an active extinguishing system that detects and extinguishes fires in closed server and network cabinets. (ii) High-performance fan must extract air samples for smoke analysis into the system's measuring chamber. The integrated extinguishing system must trigger if the concentration of smoke exceeds the limits. The extinguishing process must not be electrically conducting and must be fast and residue-free. NOVEC 1230 must be employed as the extinguishing gas. Unit will be 19" (iii) The installation and removal of the pre-assembled equipment must be carried out without interruption to the protected system's operations. The fire system, Cooling system, IPPDU, Monitoring system. Racks have to be from one OEM for better SLA.		mountable.
	UPS System	Each smart rack required UPS system 11 KVA with (N+N) redundancy having 20 minutes common battery bank of 20 minutes. Required 22 Kva UPS (N+N) redundancy with 20 Minutes back on common battery bank in inclusive of both the racks. UPS Will be mount in smart rack and batteries will be mount in separate utility rack with same aesthetic.		
	Installation & Training	(i) Installation of smart rack and the relevant components has to be carried out by qualified technicians/OEM engineer. (ii) 01 days onsite training to the user will be given by the vendor.		
	Certification	Regulatory Standard, ISO 9001, 14001, 45001 and UL2416, ROHS, REACH		
	Additional Parameter -1	Additional Parameters All products of IT need to be from single OEM. Both OEM & Bidder must have spares center/warehouse/support office in New-Delhi/NCR for support services. The OEM must have min 3 installations of 100TF HPC set up (CPU only) in last 5 years in India at government organizations/research institutes in a single order. The bidder should be an OEM/Authorized partner of the OEM and a Letter of Authorization from the OEM, specific to this tender should be enclosed by the bidder if bidder is not the manufacturer. The OEM/Bidder will be responsible for supply, installation, configuration, commissioning, testing, maintenance, and support for both hardware and software during the warranty period. The OEM should have minimum 2-entry in each of the supercomputer list in India maintained by CDAC (which can be downloaded at http://topsc.cdacb.in/) from June 2016 and later & should have minimum 5 entries in the latest world top 500 supercomputer list. (Available at www.top500.org) June 2016 and later. The server/ system OEM should be ranked one of the top 3 server OEMs in the country as per the IDC 2017, 2018 & 2019 server market report of India. The OEM or partner should be in the HPC business for the min 10 years in India and should have fully operational offices from min 5-years. Please submit documentary evidence for the same. The Source of all items shall be either from our country or from the countries who have a good heritage on cyber security and amicable to our country. An agreement must be provided for the extended warranty of next two years, after the expiry of 3 years warranty period. Vendor must provide 2 years AMC of the complete system. Rates for the same should be quoted separately. Vendor should have back-to-back agreement with OEM for the same. Vendor should also provide next 2 years software subscription for RHEL during the AMC period.		
	Additional Parameter -2			
	Additional Parameter -3			
	Additional Parameter -4			
	Additional Parameter -5			
	Additional Parameter -6			

**Name & Signature of Tenderers/
Company with Seal**

