

ANNEXURE-1

Bharat Heavy Electricals Limited

**High Pressure Boiler Plant
Tiruchirappalli**



Digital Transformation Group

Request for Proposal

for

**Supply of Computer Systems
on Financial lease for a period of 5 years
for replacement of existing Business Server hardware**

Procurement of Business Server Hardware – 2019**Index**

Sl. No	Description	Page No
1	Requirement and Procurement process	3 - 5
2	Eligibility Criteria for Bidders	5 - 7
3	Technical Terms and Conditions	7 - 15
4	Commercial Terms and Conditions	16 - 18
5	Technical Specification (Requirement in the form of Check-list)	19 - 46
6	Annexure TC-01 (Third Party Non-Disclosure Agreement)	47
7	Annexure TC-02 (Diagram)	48
8	Annexure TC-03 (No Deviation Certificate)	49
9	Annexure TC-04 (Documents to be submitted along with the Bid)	50 - 51
10	Annexure TC-05 (Deviation in Technical Specification)	52

Specification for Business Server Hardware

1. Requirement and Procurement process

1.1. Current setup

BHEL, Tiruchirappalli (hereafter referred to as BHEL) is presently running SAP R3 ERP 6.0 EHP5 and other applications on RISC server and enterprise storage in High Availability mode installed in the Primary site in DTG (building 78) and in the Secondary site in building 2&4 (approx. 1.5 km apart) within the same campus running the business critical applications on a 24x7 basis.

1.2. Requirement

It is proposed to procure the hardware and software capable of running the SAP R3, Oracle and HANA Applications since the maintenance contract of the existing hardware is coming to a close. The new hardware should meet the capacity required to cater the business growth during the next five years. The requirement is for industry standard, state-of-the-art computer systems with associated software and accessories to run the business critical applications on a 24x7 basis. All the hardware and software shall be highly resilient, highly performing and capable of running the SAP R3 ECC 6.0, Oracle and HANA applications in Sandbox. During the lease period, BHEL may opt for HANA implementation (Refer additional applications specified in Section 5 of Technical Specification).

The hardware and the software will be installed in the Primary site in DTG (building 78) and in the Secondary site in building 2&4 (approx. 1.5 km apart) within the same campus as shown in the diagram **(Annexure TC-02)**.

The entire system is required on 5-year Financial Lease and in case BHEL opts, the bidder shall undertake to provide maintenance support for two years after the expiry of the Financial Lease period.

In case BHEL opts for additional AMC for 6th and 7th year,

- Only maintenance and onsite manpower support charges shall be paid.
- Rental charges will not be paid as BHEL owns the equipment after 5-year Financial Lease period.

1.3. Clarification on Bidding Documents:

The Bidder is expected to carefully go through this Tender Document and understand the functional requirements thoroughly before submitting their offer. All legitimate queries and clarifications regarding this tender must be submitted through e-mail to **navanee@bhel.in** by this date: 14.06.2019. The reply to the same will also be made available during the pre-bid meeting on **17.06.2019**. BHEL will not entertain or respond to bidders' queries and clarifications received after this date: 14.06.2019.

1.4. Amendment of Bidding Documents:

BHEL may at its sole discretion amend the Bidding Documents at any time prior to the deadline for submission of bids. However, in case of such amendment, the bid submission date may be extended at the discretion of BHEL.

Amendments made prior to submission of bid will be provided in the form of Addenda / Corrigendum to the Bidding Documents and will be posted only on the BHEL website (<http://www.bhel.com>) in Tender Notification section.

1.5. Documents to be submitted along with the Bid:

All documents listed in Annexure TC-04 should be submitted along with the bid. The Bidder shall bear all costs associated with the preparation and submission of its bid and BHEL will in no case be responsible or liable for those costs.

The bid, all correspondence and documents related to the bid shall be in English.

1.6. Late Bids:

Any bid received by BHEL after the deadline for submission of bids will be summarily rejected.

1.7. Evaluation of Bids:

BHEL will evaluate the bids as follows;

Stage-I: Evaluation of Eligibility Criteria of bidder

Only those Bidders who meet all the requirements as per “**Section 2 Eligibility Criteria for Bidders**” will be considered for stage II evaluation.

Stage-II: Evaluation of Technical & Commercial Bids

Technical and Commercial bid of the bidder shall be opened and evaluated for acceptability of Technical and commercial terms.

BHEL's Technical Committee will evaluate the Technical bid submitted by the Bidders. During the Technical Evaluation of the bid, BHEL may ask for additional information / resources to validate the bid. These may include technical documents / white papers from respective OEM or third party, references, demonstration of a proof of concept or solution, visit to respective OEM's lab or their clients reference site, etc.

If there is/are any deviation(s) in the technical solution offered, without affecting the functional requirement, they shall be filled-in the Deviation format (as per **Annexure TC-05**) issued with the tender document and submitted along with the bid. The deviations from the tender specification shall be clearly indicated giving the reference of the specification, if any, as per format for declaring deviations. If deviation other than what is specified in the list is found, the bid will be liable for rejection.

BHEL reserves the right to accept or reject any deviation.

In any case, “**No Deviation Certificate**” must be submitted as per the **Annexure TC-03**.

Failure to furnish all information as required or to submit a bid not substantially responsive to the bidding documents may result in rejection of the bid.

Bids meeting BHEL's commercial requirements (Refer section 4) and technical requirements (Refer section 5) only will be considered for Stage-III price evaluation.

Stage –III: Evaluation of the Price Bids

Bidders clearing the Technical and Commercial evaluation will have their Price Bid opened. The total cost of the bid will be calculated as under:

1. Bidder shall quote the quarterly rental charges (including Principal repayment, tax, interest, Maintenance charges, Onsite Manpower Support Charges, etc.) for 5 years for Hardware, Software and other items listed in the Section 5 (Technical Specification) required for initial offering as per the Price Format (**Annexure-E1**) issued with the tender document.
2. Bidder has to quote outright price for the enhancement BOM for SoH/S4 HANA deployment separately as per Price Format (**Annexure-E3**).
3. Offer will be taken up for evaluation only if vendor quoted for both the above mention components.
4. **Evaluation will be done on cumulative package basis i.e. the least total cash outflow to BHEL (total 5 years lease rental value of Annexure-E1 plus total outright purchase value of Annexure-E3).**
5. Order will be released on the successful cumulative L-1 vendor for 5-year lease rental only. Placement of order for HANA enhancement component is optional and as per BHEL requirement same may be released during the lease period.
6. The quarterly rental charges will be payable at the end of each quarter.
7. The AMC amount for 6th and 7th year towards hardware maintenance (excluding onsite manpower support) shall not be more than 10% of the outright purchase value (excluding onsite manpower support). Onsite manpower support cost during the AMC period (6th and 7th year) should be added to AMC amount to arrive the final value. Bidder shall agree to provide the AMC service for at least two years after the expiry of the five-year lease period. The Technical terms (Including spares items if any) of AMC shall be same as that of maintenance support during the lease period. All subscription based licenses should be made current whenever the license policy of the Software changes during the AMC period. The payment for AMC will be made quarterly at the end of each quarter.
8. BHEL reserves the right to retain the hardware, software and other items supplied in this procurement at the end of the lease period on payment of Re. 1/- (Rupee One only). If BHEL does not retain the equipment, the vendor shall dismantle all the equipment and move it away from BHEL's premises without any cost implications to BHEL.

1.8. BHEL's Right to accept or Reject any or all Bids

BHEL reserves the full right to accept or reject any bid or to annul the bidding process and reject all bids at any time prior to Contract award, without thereby incurring any liability to the Bidders.

2. Eligibility Criteria for Bidders**2.1. Introduction**

- 2.1.1 There can be only 1 bid from each Bidder. More than 1 bid from same bidder will result in rejection of all the bids submitted by the bidder.
- 2.1.2 Bidders are required to quote for all the items of the Tender Enquiry specified in the technical specification (Requirement) document and incomplete offers will be rejected.
- 2.1.3 Relevant portions, in the documents submitted in pursuance of eligibility criterion shall be highlighted. If the offer is not accompanied by all the documents specified in section **2.2 Eligibility Criteria**, the same would be rejected.
- 2.1.4 BHEL reserves the right to verify / confirm all original documentary evidence submitted by bidder in support of the eligibility criteria. Upon verification, evaluation / assessment, if any information furnished by the bidder is found to be false / incorrect, their total bid will be rejected and no correspondence on the same shall be entertained. Submission of false/forged documents will invite penal actions as per extant guidelines of BHEL at any point of time.

2.2. Eligibility Criteria:**2.2.1. For the bidder (Server OEM / Server OEM's Authorized Hardware Partner):**

- 2.2.1.1. The bidder should be a registered company in India under Companies Act 1956 /2013. Documentary proof for the same should be submitted.
 - Certificate of registration
- 2.2.1.2. The average turnover of last 3 financial years of the bidder should be Rs. 3.00 crores or more.
 - Copy of audited Balance Sheet / PL statement to be submitted.
- 2.2.1.3. The bidder should have a positive net worth.
 - Copy of audited Balance Sheet / PL statement to be submitted.
- 2.2.1.4. The bidder should have PAN number, GST registration number.
 - Self-attested copies of PAN number, GST registration number.
- 2.2.1.5. The bidder should not have been currently black listed / banned for business dealings by any Govt. authority / department / agency or by any BHEL Unit / Region / Division / Office on the date of tender opening.
 - Undertaking copy
- 2.2.1.6. This bidding process is open to:
 - o The manufacturers of the SAP HANA supported (published in SAP Portal - CERTIFIED AND SUPPORTED SAP HANA® HARDWARE DIRECTORY - <https://www.sap.com/dmc/exp/2014-09-02-hana-hardware/enEN/index.html>) RISC Servers (hereafter referred to as OEM)
OR
 - o Authorized Partner of the Server OEM.

The bidder should submit following documents, failing which their offer will be rejected:

- Document proof (screenshots) for manufacturers of the SAP HANA supported RISC Servers (published in SAP Portal - CERTIFIED AND SUPPORTED SAP HANA® HARDWARE DIRECTORY - <https://www.sap.com/dmc/exp/2014-09-02-hana-hardware/enEN/index.html>).
 - Manufacturer Authorization Form (MAF) from server OEM specific to this tender in Server OEM's letter head.
- 2.2.1.7. The server OEM must be a manufacturer of UNIX/Linux based SAP HANA supported Server on RISC architecture. The bidder should submit following documents:
 - Certificate from the Server OEM's authorized signatory regarding manufacturer of UNIX/Linux based Server on RISC architecture.
 - 2.2.1.8. Certificate from Server OEM, indicating details of customer (Name, Address, Contact person, Phone and Email), supplied server details like the CPU, OS and the SAPS rating / Cores to Memory Ratio of the hardware delivered to the customer should be submitted. Purchase Order copies in this regard along with SAPS rating should also be submitted.
 - 2.2.1.9. The server OEM must have supplied a similar server, based on class of processors or its predecessor for SAP applications for minimum of 2TB HANA DB TDI model. This supply shall be for an order in a single site of a company during the last 03 (Three) years and the server should be currently running. The bidder should submit following documents:
 - Purchase Order reference copy in this regard
OR
 - Certificate from customer where server OEM has supplied a similar server, based on class of processors or its predecessor for SAP applications for minimum of 2TB HANA DB TDI model.

- 2.2.1.10. In case of the bidder is an authorized partner, then the bidder must be a partner of the Server OEM for minimum period of 12 months preceding the date of opening of the bid. Documentary proof from the Server OEM shall be submitted to this effect.
 - Authorized partner Certificate with date effect from server OEM should be submitted.
- 2.2.1.11. The bidder must undertake the complete responsibility of supply and commissioning of the hardware (may be with the help of Server OEM technical team), software and other equipment, i.e. the entire scope of work of this tender.
 - Undertaking statement should be submitted.
- 2.2.1.12. The offered solution should be approved by Server OEM for the smooth functioning of the applications with High availability, replication, data transfer etc. The approval document should be submitted as a part of technical bid.
 - Letter of Acceptance for the offered solution from Server OEM
- 2.2.1.13. Must have executed either of the following during the last 5 years in India:
 - 1) One order of 1,50,000 SAPS for SAP ERP applications
 - 2) Two orders of 1,20,000 SAPS for SAP ERP applications
 - 3) Three orders of 80,000 SAPS for SAP ERP applications
 - Documentary proof (Purchase order copies and SAPS ratings of the total solution provided) shall be submitted to this effect.

2.3. Purchaser's Right to accept or Reject any or all Bidders:

BHEL reserves the full right to reject any bidder based on other reasons deemed fit but not mentioned above.

3. Technical Terms and Conditions

In this section, the word "vendor" refers to the bidder who has been awarded the tender by BHEL.

3.1. Scope of Work

- 3.1.1. The vendor shall Supply, Install, Integrate, Test and Commission the Servers, Storage, Networking Components, Backup Solution, Precision ACs, Biometric devices and other related items including Operating Systems & other software at Primary Site and Secondary Site of BHEL Trichy complex as per technical specifications and requirements of this tender. Movement of materials inside the premises, including lifting to requisite floor is the responsibility of the vendor.
 - 3.1.2. The vendor shall supply and install all cables, adapters, power cords and any other interconnects required by the systems to meet the specification. The vendor shall carry out electrical and network cabling pertaining to equipment at Primary site and Secondary Site as per the best international standards & practices and should be compatible with Indian environment.
 - 3.1.3. Arranging requisite tools, measurement equipment and resources required for installation and commissioning of the hardware, software and other equipment is the responsibility of the vendor.
 - 3.1.4. BHEL may shift the equipment to different locations within the premises during the lease period. The vendor shall carryout the shifting activity at free of cost, at least once during the lease period.
-

- 3.1.5. All software to be provided as part of the solution should be licensed to use by "Bharat Heavy Electricals Limited - HPBP". All documents, manuals, administration manuals and software CD/DVDs shall be submitted to BHEL before commissioning the systems. All software shall come with at least two sets of CDs/DVDs or should be given rights to download the same from respective OEM's website.
- 3.1.6. The vendor shall ensure that none of BHEL's equipment/structure/setup gets damaged during commissioning and operations of the supplied equipment. Any damages, if caused to BHEL's property due to Vendor's activity/negligence or due to the operations of the vendor's equipment, shall be rectified, repaired by the vendor at their own cost.
- 3.1.7. Maintenance of the hardware, software and other equipment throughout the lease period and the subsequent AMC period shall be as per the service level agreement.
- 3.1.8. The products, those have reached the end-of-life, shall not be offered.
- 3.1.9. Insurance of the hardware, software and other equipment during the duration of the contract is under the scope of the vendor.

3.2. Installation and Commissioning:

The Vendor shall install, test and commission the hardware, software and other equipment along with the respective OEM as per the requirement. The vendor shall demonstrate the following scenarios as part of the installation and commissioning:

- 3.2.1. Fail-over of Server with all clustered partitions and its automatic restoration.
 - 3.2.2. Fail-over of each clustered partition with associated applications and its automatic restoration.
 - 3.2.3. Backup and Restore.
 - 3.2.4. Clustering and High availability features.
 - 3.2.5. Synchronous and asynchronous SAN based data replication between primary and secondary site.
 - 3.2.6. Backup and Restore options including vault backup and restoration.
 - 3.2.7. Failure of each SAN switch, LAN switch and sustenance of service.
 - 3.2.8. Fail-over of Storage.
 - 3.2.9. Fail-over of Backup server.
 - 3.2.10. Fail-over of entire Primary / secondary site.
 - 3.2.11. Successful running of SAP ERP system (ECC 6.0), sub-systems and applications with acceptable performance.
 - 3.2.12. The partitions which are identified for HANA should pass the HWCCT checker (tool which has been provided by SAP for HANA), in case HANA implementation is opted. Successful running of SAP ERP system (Suite on HANA / S4 HANA), sub-systems and applications with acceptable performance, in case HANA implementation is opted.
-

3.2.13. Integration with BHEL's existing network with isolation of user and application data.

3.2.14. Demonstration of RAS features as defined in the technical specifications.

3.2.14.1. Wherever possible, RAS features has to be demonstrated.

3.2.14.2. Remaining RAS features, the respective OEM has to give undertaking.

3.2.15. Any other scenario not covered above but will ensure business continuity as per BCP plan.

If the Vendor fails to demonstrate these scenarios, supplied equipment will be rejected and vendor shall replace with suitable equipment without any cost implication to BHEL.

3.3. Activities related to Migration:

The vendor shall carry out the following activities required for migrating BHEL's ERP and other applications like Oracle, File Server to new system.

3.3.1. Create necessary partitions as per table 1 and 2 of Section 5.

3.3.2. Installation of required OS, Cluster Package, Patches, updates and file-sets as recommended by SAP, Oracle etc.

3.3.3. Creation of required file-systems.

3.3.4. Installation and configuration of application (BHEL team will complete the activity in co-ordination with the Vendor and Server OEM Engineer).

3.3.5. Data migration with zero data loss and data consistency.

3.3.6. Testing for working after data migration.

3.3.7. Cluster testing.

3.3.8. Move ITSS file server from NAS to SAN (BHEL ITSS team will complete the activity in co-ordination with the Vendor and Server OEM Engineer)

3.3.9. Backup and restoration testing.

3.3.10. OS level tuning for better performance.

The vendor shall complete the SAP ERP data (SAP PRD DB - DB primary, DB Failover, 4 APP Servers) migration activity within 24 hrs (i.e, maximum down-time allowed is 24 Hours).

3.4. Documents to be submitted during Commissioning

On successful installation of the equipment, the Vendor shall submit the following documents as part of the commissioning:

3.4.1. Newness certificate for all hardware items.

3.4.2. Configuration detail for each server – name, IP address, OS version, details of Partitioning, etc.

3.4.3. Migration plan.

3.4.4. Network diagrams / cabling scheme.

3.4.5. Security documents for products supplied (Vulnerability check document).

3.4.6. Clustering and failover details.

3.4.7. Details of SAN Storage configuration, point-in-time copy/snapshot, replication, zoning, etc.

- 3.4.8. Details of Backup solution and Tape Library systems.
- 3.4.9. Details of logging mechanism.
- 3.4.10. Details of PG test.
- 3.4.11. Performance Bank Guarantee
- 3.4.12. Insurance documents for all the items

On completion of the installation, commissioning and submission of the above documents, the Vendor shall carry out Performance Guarantee Tests of the supplied hardware & software as given below:

3.4.13 Performance Guarantee Tests (PG Tests):

- 3.4.13.1. The Performance Guarantee Test shall start after installation and commissioning of all the Hardware & Software at primary and secondary sites. The Performance Guarantee Tests (and repeats of such tests shall be limited to a maximum of two) shall be the primary responsibility of the Vendor, but shall be conducted with the full cooperation of the BHEL to ascertain whether the supplied System meets the standard of performance and complete functionality as specified by BHEL.
- 3.4.13.2. The performance test will be done simultaneously for all the servers with respective SAP and Oracle software installed. After successful completion of installation and commissioning, PG test shall be conducted for ascertaining the availability for a minimum period of 14 days continuously. The Performance Acceptance Test shall be conducted by Powering Up and continuous operation of all the systems on a 24x7 basis to ascertain that all components of the solution are working in the desired fashion individually and together.
- 3.4.13.3. All the systems together shall give an uptime of 99% during the test period. The test duration time shall be exclusive of external power failure time and any scheduled down time by BHEL. The system shall be considered as "available", if all the processors, total installed memory, all hard disks (internal & external), DVD, switches and all other supplied equipment are in service with network and external storage. Any hardware component failure in RISC servers has to be rectified / replaced without bringing down / restarting any partitions or servers.
- 3.4.13.4. If the system is found to be lacking in meeting Performance Guarantee Test, the test time will be extended by 7 days. If the equipment / system does not provide the required uptime even after 2 extensions, the supplied equipment is liable to be rejected. Downtime will not be counted as failure; in case the failure is due to any other reasons not attributed to the vendor.
- 3.4.13.5. All BCP tests shall be carried out as a part of PG test. It shall also be demonstrated that all the traffic between SAP application servers, DB/CI servers and Oracle DB servers goes through the dedicated network. In case of any disturbance in the user network, the server shall continue to run without any failover.
- 3.4.13.6. Beyond the acceptable limits of PG parameters, the supplied equipment is liable to be rejected.

3.5. Commissioning Certificate

BHEL will issue a **Commissioning Certificate** on successful completion of Performance Guarantee Tests of all the Hardware & Software and migration of applications and data.

3.6. Lease Agreement (LA)

A Lease agreement shall be executed as per enclosed format (**Annexure-D**) between BHEL-Trichy and Vendor.

3.7. Training:

3.7.1 Training at BHEL, Trichy premises:

The Vendor shall provide following training at BHEL, Trichy premises on the procured servers. The training course shall be structured and supported by programmed illustrations, video, charts, etc. The training shall be conducted using experienced certified personnel only. The Vendor shall provide extensive lecture notes, handouts and other training documentations. The boarding and lodging of trainer faculty will be responsibility of the vendor.

- ✓ User Level Training (Server operations) and System Administration Training (Servers, Storage, Backup Solution, Replication, DR Plan, Operating System, etc.) for BHEL personnel for minimum period of 10 days.

3.8. Business Continuity plan:

Vendor shall submit a detailed BCP plan at the time of implementation. A detailed restoration plan to startup a failed site shall be submitted. All the necessary resources, software, program, etc. required to carry out the Business Continuity Plan shall be included in the scope of supply. The general guidelines are as follows:

S. No.	Disaster Recovery Management Solution
1	A detailed plan and procedure for business continuity in the event of failure of Primary / Secondary site.
2	A detailed restoration plan to restore to original configuration after the failed site is set right.
3	Two BCP drills to be performed during the entire Lease Period (after commissioning). The time and duration of BCP drills shall be mutually agreed.
4	One full BCP drill is to be performed during Performance Guarantee Test. (Before commissioning)

BCP Drill: Activities described in the BCP plan are to be carried out periodically to ensure preparedness to meet any risks.

3.9. Special Clauses:

- 3.9.1. Make, Model, Product Number and Details of each Item must be mentioned clearly.
- 3.9.2. All hardware supplied shall be **NEW** and newness certificate from OEM shall be furnished.
- 3.9.3. BHEL will not be responsible for any misinterpretation or wrong assumption by the vendor.
- 3.9.4. All the Items must be supplied in full and complete.
- 3.9.5. All components shall be rated for 24x7 operation.
- 3.9.6. The Vendor shall provide all other hardware and software items that are not explicitly mentioned herein, but are required by the Vendor to fulfill the intended specifications and to meet the functionality mentioned in the bid.
- 3.9.7. The indicated specification parameters are the minimum requirement and item with higher rating will be acceptable.

- 3.9.8. No item shall be offered whose end-of-sale has been declared by the respective OEM or has been declared to be under phase out.
- 3.9.9. Proper documentation, labeling and tagging shall be carried out for all the equipment used in the entire landscape for easy management and maintenance.
- 3.9.10. The following documents (either electronic copy or hard copy) shall be provided for all hardware, software and other equipment
 - i) User manual.
 - ii) Administrator Manual.
 - iii) Complete documents for maintenance.
 - iv) Error Handling and troubleshooting manual.
 - v) Source Code for scripts used.
 - vi) Document proof that all software Licenses are procured for the use of BHEL during the entire lease period.
 - vii) Safety and Standard Operating Practices manuals

3.10. Service Level Agreement (SLA)

- 3.10.1. As the equipment will be used for running business critical applications, the vendor shall provide an uptime of 99% on all hardware & software products on monthly basis.
- 3.10.2. If the availability of the systems, or part thereof, is below 95% on monthly basis, continuously over a period of 3 months, BHEL reserves the right to terminate the contract in full, without any cost implication to BHEL.

3.11. Penalty for SLA Non-Conformance:

Downtime will be calculated based on uptime on monthly basis.
The monthly deductions will be made as per the following formula:

Deduction (D) = (downtime in minutes (d) X rental per minute (r) X multiplication factor (f))

Where Multiplication Factor is given below

For Uptime > 99.00 Multiplication Factor is 0.00
For Uptime between 98.00 and 99.00, Multiplication Factor is 2.00
For Uptime between 97.00 and 98.00, Multiplication Factor is 5.00
For Uptime between 96.00 and 97.00, Multiplication Factor is 8.00
For Uptime between 95.00 and 96.00, Multiplication Factor is 12.00
For Uptime below 95.00, Multiplication Factor is 15.00

The downtime will be recorded at BHEL Purchase order item level. Even in case of failure of a component in an item, the deduction will apply to the whole item. If the failure of an item results in major service outage or affects the services provided by other items also, then the deduction will apply to all items affected by the failure.

3.12. Availability of Spares:

Sufficient stock of critical spares shall be maintained by the vendor at the Primary and Secondary sites at all times to ensure the uptime.

3.13. Terms of Payment:

Lease period will start only after successful installation and commissioning of all hardware and software products as per the requirement and the issue of the commissioning certificate. Quarterly lease rental charges (after deduction for any SLA non-conformance) become payable at the end of each quarter.

Vendor shall submit the following documents for processing the bills:

- 3.13.1.** Invoice in triplicate.
- 3.13.2.** SLA reports for the quarter (certified by the System Administrator)
- 3.13.3.** Document proof for Software license renewal as applicable.

3.14. Warranty & Support:

- 3.14.1.** All the supplied equipment / systems (hardware/software) shall be covered under a Comprehensive On-Site Warranty & service support for 5 (Five) years. The period shall start from the date of issue of commissioning certificate. Warranty & Support shall be delivered directly by the respective OEM for Servers, Storage and Backup Systems. A certificate from respective OEM should be attached stating that the OEM will provide support directly during the warranty period. The warranty & support from OEM shall ensure the uptime requirement of 99%.
- 3.14.2.** If any document / manual / CD supplied by the Vendor is found to be inadequate / incomplete within the period of the contract, the vendor shall replace/complete such document/manual/CD at their cost within 15 days' time. The document / manual / CD released with upgrades and updates shall be supplied free of cost as and when they are released.
- 3.14.3.** On-Site Engineers
 - 3.14.3.1.** At least one qualified, trained and certified on-site engineer (henceforth called the OEM engineer) in the respective Server and Storage Management from OEM with at least 3 years of experience on such UNIX servers, storage and backup solutions shall be posted by the vendor at BHEL.
 - 3.14.3.2.** The OEM engineer shall do health monitoring, performance monitoring, capacity monitoring & critical parameter monitoring of the servers on a daily basis. He shall also do diagnostics, fault checking, hardware & software troubleshooting, call logging, spares replacement and also carry out regular backup of the data and critical system files. He shall also be responsible for ensuring uptime of all other items supplied as part of this order like Precision AC, Biometric access control system, SAN, LAN switches etc.
 - 3.14.3.3.** The Vendor shall also post on-site operations engineers to man the data center in round-the-clock 3-shift operations at both the Primary and the Secondary sites. Three Engineers are required at each site to support the three shift operations. These engineers shall be at least Diploma holders in Computer Science/Communications with a minimum of one-year experience in IT field.
- 3.14.4.** Vendor shall arrange for boarding, lodging and logistics of onsite OEM engineer and operations engineers.
- 3.14.5.** If the OEM engineer posted goes on leave for more than a day, then another equivalent engineer shall be posted until the engineer returns back. The engineer shall proceed on leave only with permission of BHEL.

- 3.14.6. If change of OEM Engineer is requested by BHEL, citing reasons, the vendor shall arrange for replacement engineer within 02 (Two) weeks, having the same or higher competence level.
- 3.14.7. If change of on-site operations engineer is requested by BHEL, citing reasons, the vendor shall arrange for replacement engineer within a week (01), having the same or higher competence level.
- 3.14.8. In case of resignation of on-site operations engineer, the vendor shall arrange for replacement engineer within two days, having the same or higher competence level.

3.15. Warranty shall cover the following:

- 3.15.1. Repair / Replacement of faulty / defective Hardware and other supplied items inclusive of supply of all types of spare parts etc. (Including batteries)
- 3.15.2. All Software Patches, Upgrades, updates, Service Packs, etc. of the Operating System and all other Software supplied by the respective OEM must be made available at free of cost during the entire warranty period (5 years) to run the latest version of SAP ERP /Oracle/SAP HANA. Software subscription and any other subscription required should be available for entire lease period.
- 3.15.3. Installation / Re-Installation / Maintenance and update patches, upgrades, updates and fixes of OS, System software and other software supplied in the contract.
- 3.15.4. Licenses shall be perpetual (Except Linux OS) and made current whenever the license policy of the Software changes during the tenure of lease. Linux OS Licenses shall be subscription based and made current whenever the license policy of the Software changes during the tenure of lease.

3.16. Support shall include the following

- 3.16.1. Monitoring, logging and reporting on Hourly/Daily/ Weekly/ Monthly basis as required by BHEL in the specified formats, the Performance and operations of the Servers, storages and the back-up system on 24x7 basis.
- 3.16.2. Periodic health checks of the systems using diagnostic tools and implementing proactive rectification measures.
- 3.16.3. Troubleshooting of supplied Servers, Storage, Backup, SAN and Network components
- 3.16.4. Analyzing and reporting all system related issues.
- 3.16.5. Installation / Re-Installation / Maintenance, update patches, upgrades, updates and fixes of OS, System software and other software supplied in the contract shall be carried out by OEM.
- 3.16.6. Managing users, roles and passwords of all the relevant subsystems of Servers, OS, Storage, Switches, Backup Systems, etc.
- 3.16.7. Liaison with various vendors, OEMs, agencies and service providers for equipment maintenance & related work.
- 3.16.8. All incidents must be documented and logged as per the format specified by BHEL.
- 3.16.9. Any change in the IP Scheme, if required, limited to all the equipment installed at Primary site & Secondary site shall be done in consultation with BHEL.

3.17. Server Administration

Server Administration for the respective functions include the following activities. These activities should be carried out in consultation with BHEL Personnel.

- 3.17.1. Operating System tuning.
 - 3.17.2. OS and software Re-installation in the event of system crash/failures
 - 3.17.3. Configuring file systems, volumes and apportioning disk space.
 - 3.17.4. Ensure proper configuration of server parameters.
 - 3.17.5. Periodic System performance tuning for optimizing the respective application performance.
-

- 3.17.6. Addition, deletion, re-configuration of devices, additional users and printers etc.
- 3.17.7. Implementing security patches on servers at all levels.
- 3.17.8. Orderly start-up and shutdown of servers as per laid down procedures.
- 3.17.9. Security management – Configuring account policy, access rights, password control as per BHEL's security policy.
- 3.17.10. Scheduling and optimizing all critical services run on the hardware.
- 3.17.11. Maintain lists of all system files, root directories and volumes.
- 3.17.12. Resolving all server related problems.
- 3.17.13. Escalating unresolved problems to ensure resolution as per the agreed SLA

3.18. Storage Administration

Storage Administration for the respective functions include the following activities. These activities should be carried out in consultation with BHEL Personnel.

- 3.18.1. Management of storage environment to maintain performance at optimum levels
- 3.18.2. Regular backups of Storage software.
- 3.18.3. Management of the storage solution including, but not limited to, management of space, volume, RAID configuration, configuration and management of disk array, SAN fabric / switches, tape library, etc. as per mutually agreed storage management policy.
- 3.18.4. Installation / Re-Installation / Maintenance, update patches, upgrades, updates and fixes of OS, storage software and other software supplied in the contract shall be carried out by OEM.

3.19. Backup and Restore Administration

Backup and Restoration Administration for the respective functions include the following activities. These activities should be carried out in consultation with BHEL Personnel.

- 3.19.1. 24x7 support for file and volume restoration requests.
- 3.19.2. Backup of operating system as per stipulated policies and time schedule.
- 3.19.3. Periodic restoration of backed up data.
- 3.19.4. Regular maintenance of all the media and the backup / storage devices.
- 3.19.5. Installation / Re-Installation / Maintenance, update patches, upgrades, updates of backup software and other related software supplied in the contract.

3.20. The offline support shall have:

- 3.20.1. 24x7 National telephonic support.
 - 3.20.2. Access to raise technical assistance request at hardware vendor's / supplier's website.
-

4. Commercial Terms and Conditions

4.1. Ethical Standard:

Bidders are expected to observe the highest standard of ethics during the procurement and execution of this Contract. In pursuit of this policy, BHEL will reject a proposal for award if it determines that the Bidder being considered for award has engaged in corrupt or fraudulent practices in competing for the Contract. For the purposes of this provision, the terms set forth below are defined as follows:

a) Corrupt Practice: means the offering, giving, receiving, or soliciting of anything of value to influence the action in the procurement process or in Contract execution; and

b) Fraudulent Practice: means a misrepresentation of facts in order to influence a procurement process including collusive practices designed to establish bid prices at artificial, non-competitive levels to deprive the benefits of competition to BHEL.

The Bidder along with its associate/ collaborators/ sub-contractors/ sub-vendors/ consultants/ service providers shall strictly adhere to BHEL Fraud Prevention Policy displayed on BHEL website <http://www.bhel.com> and shall immediately bring to the notice of BHEL Management about any fraud or suspected fraud as soon as it comes to their notice.

c) Suspension of Business Dealings: Guidelines for Suspension of Business Dealings with Suppliers/ Contractors are available in BHEL website <http://www.bhel.com>. Bidders are requested to go through the same at their own interest for information.

By signing the Bid Forwarding Letter, the Bidder represents that for the software it supplies, it is the owner of the Intellectual Property Rights. Willful misrepresentation of these facts shall be considered a fraudulent practice without prejudice to other remedies that BHEL may take.

4.2. Integrity Pact:

The bidder shall sign an Integrity Pact, to comply with the requirements of the Transparency International Limited (TIL) and the Central Vigilance Commission (CVC) guidelines to ensure an ethical and corruption-free business environment. The proforma for the Integrity Pact is attached as **Annexure-B**.

4.2.1. IP is a tool to ensure that activities and transactions between the Company and its Bidders/ Contractors are handled in a fair, transparent and corruption free manner. A panel of Independent External Monitors (IEMs) have been appointed to oversee implementation of IP in BHEL. The IP as enclosed with the tender is to be submitted (duly signed by authorized signatory who signs in the offer) along with techno-commercial bid. Only those bidders who have entered into such an IP with BHEL would be competent to participate in the bidding. In other words, entering into this Pact would be a preliminary qualification.

Details of IEM for this tender is furnished below:

Name: (1) Shri. D.R.S. Chaudhary, IAS (Retd.)

Address: E-1/164 Arera Colony,
Bhopal- 462016 (MP)

Email: dilip.chaudhary@icloud.com

(2) Mrs. Pravin Tripathi

D-243, Anupam Gardens, Lane 1B,
Neb Sarai, Sainik Farms, New Delhi

parvin.tripathi@gmail.com

4.2.2. Please refer Section-8 of IP for Role and Responsibilities of IEMs. In case of any complaint arising out of the tendering process, the matter may be referred to the IEM mentioned in the tender.

Note: No routine correspondence shall be addressed to the IEM (phone/ post/ email) regarding the clarifications, time extensions or any other administrative queries, etc. on the tender issued. All such clarification/ issues shall be addressed directly to the tender issuing (procurement) department.

For all clarifications/ issues related to the tender, please contact:

Name: (1) Shri Mayank Shrivastava, Sr. Engr. (2) Shri S. Navaneethakumar, DGM
Dept.: CP&SP,WC /Services /MM
Address: HPBP, BHEL, Trichy (TN), Pin-620014
Phone (Landline): (1) 0431-2577926 (2) 0431-2575824
E-mail/Fax: shrivastava@bhel.in navanee@bhel.in

4.3. Non-Disclosure Agreement:

The bidder shall sign a Non-Disclosure Agreement (NDA) with BHEL. By signing the NDA, the bidder agrees not to disclose any confidential information, business or proprietary, as covered by the agreement. The proforma for the Non-Disclosure Agreement is attached as **Annexure TC-01**.

4.4. Delivery Schedule & Project Implementation Schedule:

The Bidder shall be responsible for timely delivery, installation & commissioning of all the hardware & software given in the scope of supply/work at the BHEL's premises. All the hardware & software shall be delivered, installed, commissioned and migration activities shall be completed within 4 months (120 days) from the date of placement of order. Failure will entail Late Delivery Charges as per the LD clause of the contract.

If the delivery is delayed due to reason not attributable to BHEL, BHEL reserves the right to go for alternative procurement.

4.5. Income Tax Depreciation:

Income tax depreciation will be claimed by BHEL.

4.6. Tax & Duties:

4.6.1. Goods and Services Tax (GST) shall be extra and payable as per prevailing rates. Any change in applicable tax or imposition of any new applicable tax by GOI shall be borne by BHEL on submission of documentary proof by the vendor. However, in case of any decrease in applicable taxes benefit shall be passed on to BHEL.

4.6.2. Any statutory changes as and when made applicable by the Government shall become applicable against documentary evidence.

4.6.3. Payment to the vendor will be subjected to TDS as per rules in force from time to time. The Tax Deduction at Source (TDS) shall be done as per the provisions of Income Tax Act and GST as applicable, as amended from time to time and a certificate to this effect shall be provided to the contractor by BHEL.

4.6.4. To enable BHEL to avail GST Input tax credit, the vendor shall submit GST compliant Tax invoice containing all the particulars as stipulated under Invoice Rules of GST Law. Such invoice shall be submitted within 30 days of completion of work (the completion of work shall be vetted by BHEL representative) in the name of BHEL and must contain the address and GSTIN of BHEL.

4.6.5. Payment shall be made to the vendor only after submission of GST compliant Tax invoice as mentioned above and other relevant documents. However, to protect BHEL's interest for GST input tax credit, GST portion amount along with notional interest on GST credit for 2 months' period (presently rate of interest is @ 24%) shall be withheld and the same shall be released only after confirmation from GST website/portal that such invoice has been declared in GSTR-1 return filed by the vendor within the stipulated time for the relevant period and tax amount thereon has been paid by the vendor to Government within the stipulated time period as per GST Law. Alternatively, the same shall be released on submission of BG equal to the amount of GST portion plus notional interest thereon for 2 months' period, valid till the end of the contract plus 3 months or 3 months from the date of submission of final bill, whichever is later.

4.6.6. In case GST credit is delayed / denied to BHEL or subsequently recovered from BHEL due to non/delay in filing of GSTR-1 Return or delay in/non-payment of tax to Govt. by the vendor or for any other reasons not attributable to BHEL, in such case any financial implication on BHEL on account of delay/loss/recovery from BHEL of such GST Credit along with interest levied/leviable on BHEL till the time GST credit is available to BHEL, shall be recovered from the vendor's bill and/or adjusted against GST amount not paid.

4.6.7. Irrespective of refund of GST Credit and interest thereon to BHEL by GST portal upon subsequent declaration of such invoice by vendor in his GSTR-1 for any period after due date of such return and/or payment of GST thereon by the vendor on GST portal, the notional interest for delayed period of GST credit (i.e. delay for the period when GST credit is actually allowed and the period when GST credit should have been allowed had the vendor declared such invoice in his GSTR-1 and paid tax thereon in the relevant month as per GST law) shall be recovered from the vendor. The vendor has to submit their GST registration certificate to the ordering BHEL location within 30 days from the acceptance of work order. GSTIN of BHEL will be provided to the vendor by respective office of BHEL within 30 days from the placement of work order.

5. Technical Specification (Requirement)

BHEL Trichy is running its business applications on SAP ERP and is having **Primary Site** in DTG (Building 78) and **Secondary Site** in building 2&4 (approx. 1.5 km apart) within the same campus.

Computer systems are required as per the specifications mentioned in this document. Secondary site will have an identical set up as primary site and during normal operation they will be sharing the load. It will be configured to have storage based synchronous data replication between primary site and secondary site in order to have a near zero data loss in case of failure. Secondary site will be connected to the primary site using dedicated, redundant optical fiber links through which data will be synchronously replicated.

Connectivity from Computer systems in BHEL LAN network to servers will be through user LAN. Connectivity between Application Instance, CI/DB Instance and Oracle Database servers will be through Dedicated LAN connecting both the sites directly.

The RPO has to be zero and the RTO should not be more than 20 minutes.

The SAN storage must be capable of both synchronous and asynchronous replications for the supplied capacity.

The configuration of the servers at Primary site and Secondary site are as follows:

Table - 1: Primary Site Server

Partition No.	Partition Name	Capacity required in SAPS	Memory required in GB	Operating System (64-bit)	High Availability
1	HPBP SAP Production (Database and Central Instance) Server	48000	368	Unix	yes
2	HPBP SAP Application Server 1	10000	64	Unix	
3	HPBP SAP Application Server 2	10000	64	Unix	
4	HPBP SAP Development (Database and Central Instance) Server	10000	48	Unix	
5	HPBP Oracle Development Database Server	6000	32	Unix	
6	HPBP Oracle External Database Server	6000	48	Unix	yes
7	HPVP SAP Production (Database and Central Instance) Server	10000	64	Unix	yes
8	HPVP SAP Development (Database and Central Instance) Server	5000	32	Unix	
9	HPBP Backup Server	6000	32	Unix	yes
10	HPBP Oracle Internal Database Server	10000	64	Unix	yes
11	HPBP SAP Staging Server	6000	32	Unix	yes
12	HPBP ITSS Engineering File Server	6000	32	Unix	yes
13	HPBP Oracle Sandbox Server	3000	32	Unix	
	Total	136000	912		

Legend :

SAPS - SAP Standard Application Benchmarks

For SoH / S4HANA migration:**Additional SAPS Required: 60000****Additional Memory Required: 5584 GB**

Any Hardware/software component required to run SoH/S4 HANA (other than SAP supplied licenses) shall be factored in the offer either in initial deployment or during enhancement along with cores (equivalent SAPS) & memory mentioned above and storage & backup drives mentioned elsewhere. All these components shall have Co-terminus warranty with the base system from the date of installation and maintenance support for the remaining lease period.

Table - 1.1 : Resource Planned for HANA Deployment

Partition No.	Partition Name	Capacity required in SAPS	Memory required in GB	Operating System (64-bit)	High Availability
1	HPBP SAP Production HANA Database Server	65000	2520	RHEL/SUSE Linux	yes
2	HPBP SAP Production Application (Central Instance) Server 1	10000	80	RHEL/SUSE Linux	yes
3	HPBP SAP Production Application Server 2	10000	80	RHEL/SUSE Linux	
4	HPBP SAP Sandbox HANA Database Server	31000	2520	RHEL/SUSE Linux	
5	HPBP SAP Sandbox HANA Application (Central Instance) Server	6000	80	RHEL/SUSE Linux	
6	HPBP SAP Development HANA Database Server	10000	512	RHEL/SUSE Linux	
7	HPBP SAP Development Application (Central Instance) Server	6000	80	RHEL/SUSE Linux	
8	HPBP SAP Production Fiori Server	6000	128	Unix	yes
9	HPVP SAP Production (Database and Central Instance) Server	10000	80	Unix	yes
10	HPVP SAP Development (Database and Central Instance) Server	6000	48	Unix	
11	HPBP ITSS Engineering File Server	6000	48	Unix	yes
12	HPBP Oracle External Database Server	8000	96	Unix	yes
13	HPBP Oracle Internal Database Server	10000	128	Unix	yes
14	HPBP Oracle Development Database Server	6000	48	Unix	
15	HPBP Backup Server	6000	48	Unix	yes
	Total	196000	6496		

Table - 2: Secondary Site Server

Partition No.	Partition Name	Capacity required in SAPS	Memory required in GB	Operating System (64-bit)	High Availability
1	HPBP SAP Production (Database and Central Instance) Server	36000	288	Unix	yes
2	HPBP SAP Application Server 4	10000	64	Unix	
3	HPBP SAP Application Server 5	10000	64	Unix	
4	HPBP SAP Quality (Database and Central Instance) Server	10000	96	Unix	
5	HPBP SAP Solution Manager	6000	64	Unix	
6	HPBP Oracle External Database Server	6000	48	Unix	yes
7	HPVP SAP Production (Database and Central Instance) Server	6000	64	Unix	yes
8	HPVP SAP Quality (Database and Central Instance) Server	6000	64	Unix	
9	HPBP Backup Server	6000	32	Unix	yes
10	HPBP Oracle Internal Database Server	10000	64	Unix	yes
11	HPBP SAP Staging Server	3000	32	Unix	yes
12	HPBP ITSS Engineering File Server	3000	32	Unix	yes
13	HANA Sandbox	24000	1200	RHEL/SUSE Linux	
	Total	136000	2112		

For SoH/S4HANA migration:**Additional SAPS Required: 60000****Additional Memory Required: 4384 GB**

Any Hardware/software component required to run SoH/S4 HANA (other than SAP supplied licenses) shall be factored in the offer either in initial deployment or during enhancement along with cores (equivalent SAPS) & memory mentioned above and storage & backup drives mentioned elsewhere. All these components shall have Co-terminus warranty with the base system from the date of installation and maintenance support for the remaining lease period.

Table – 2.1 : Resource Planned for HANA Deployment

Partition No.	Partition Name	Capacity required in SAPS	Memory required in GB	Operating System (64-bit)	High Availability
1	HPBP SAP Production HANA Database Server	65000	2520	RHEL/SUSE Linux	yes
2	HPBP SAP Production Application (Central Instance) Server 3	10000	80	RHEL/SUSE Linux	yes
3	HPBP SAP Production Application Server 4	10000	80	RHEL/ SUSE Linux	
4	HPBP SAP Quality HANA Database Server	31000	2520	RHEL/SUSE Linux	

Partition No.	Partition Name	Capacity required in SAPS	Memory required in GB	Operating System (64-bit)	High Availability
5	HPBP SAP Quality Application (Central Instance) Server	8000	96	RHEL/SUSE Linux	
6	HPBP SAP Test App Server	5000	512	RHEL/SUSE Linux	
7	HPBP SAP Production Fiori Server	12000	128	Unix	yes
8	HPBP SAP Solution Manager	8000	96	Unix	
9	HPVP SAP Production (Database and Central Instance) Server	10000	80	Unix	yes
10	HPVP SAP Quality (Database and Central Instance) Server	6000	48	Unix	
11	HPBP ITSS Engineering File Server	6000	48	Unix	yes
12	HPBP Oracle External Database Server	6000	64	Unix	yes
13	HPBP Oracle Internal Database Server	10000	128	Unix	yes
14	HPBP Oracle Sandbox Database Server	3000	48	Unix	
15	HPBP Backup Server	6000	48	Unix	yes
	Total	196000	6496		

5.1 Specifications of UNIX Servers:2 Nos.

Table - 3: Specifications of UNIX servers are defined below:

S.No.	Item or Parameter	Specification	Compliance (Yes/No)	Document Reference/ Remarks
1	Servers	All servers quoted must have the same RISC enterprise grade processor. Monolithic server (even after enhancement for HANA) per site shall be offered.		
		The quoted server should support HANA and should be listed in SAP HANA supported hardware directory (published in SAP Portal - CERTIFIED AND SUPPORTED SAP HANA® HARDWARE DIRECTORY - https://www.sap.com/dmc/exp/2014-09-02-hana-hardware/enEN/index.html)		
		Servers shall be capable of being partitioned; each partition shall have its own operating system instance, host name and IP address. (It shall be possible to configure the server in each site as a single partition also).		
		Both servers at Primary and secondary site shall be of the same Make and Model.		
		The support for the Servers and all its components from OEM should be of at least 07 years from the date of submission of bid. Document in support from OEM to be submitted.		
		All the servers shall be capable of running 1) 64-bit SAP R/3 ERP 6.0 EHP 5 (Unicode/Non-unicode) and later versions		

S.No.	Item or Parameter	Specification	Compliance (Yes/No)	Document Reference/ Remarks
		under 64-bit Unix OS with Oracle 12c RDBMS and later versions, 2) SoH (Netweaver suite 7.4 and later version) and 3) S4HANA (1809 and later version)		
		Servers shall be allocated with all resources as per sizing sheet. Higher capacities are acceptable.		
2	Processors	Latest generation CPUs shall be of 64 Bit RISC with SMP architecture.		
		The support of the CPU should be of at least 07 years from the date of submission of bid.		
3	Processor Benchmark	SAPS Benchmark for the offered server/processor should be published in SAP website, public domain (https://www.sap.com/dmc/exp/2018-benchmark-directory/##/sd) and the published SAPS rating will be taken for evaluation.		
4	Main Memory	DDR4 memory shall be offered as specified in Table 1 and Table 2		
5	Partitions	Each SAP instance in the production system should run in an independent partition having its own operating system instance with resources dedicated to it as per specified in Table 1 and Table 2 .		
		It should be possible to assign processors and memory logically to any partition or switch processors and memory between partitions without reboot of source or target partitions or applications.		
		Each partition shall have at least the resources allocated as per the sizing specified in Table 1 and Table 2 . At any point of time, the partition should not run with lesser resources than the minimum condition specified for that partition.		
		Each partition shall be able to run same or different versions of OS kernel, patch levels, etc, independently.		
		Any configuration change in one partition shall not affect any other partition.		
		Any fault in one partition shall not bring the entire system or other partitions down.		
		The OS of each partition shall be upgradeable separately and independently without affecting the other partitions.		
		Each partition shall have the capability to start-up and shutdown independently without affecting any other partition on the same server.		

S.No.	Item or Parameter	Specification	Compliance (Yes/No)	Document Reference/ Remarks
		It shall be possible to create at least 20 active partitions in the offered server. BHEL will provide reconfiguration details with the available resources if required. Necessary licenses required for this are to be provided.		
6	I/O Adapters	All adapters should be PCIe Gen3 or latest		
		All FC ports shall be of 16Gbps speed with multi path I/O trunking and automatic load balancing for each server/partition.		
		All Ethernet Adapters shall be of 1/10 Gbps speed in automatic Fail-over / Redundant / trunking / Link aggregation and auto switching mode.		
		Functional (Ethernet, Fiber Channel & SAS) redundancy at an adapter level shall be provided for all partitions to take care of adapter failure.		
		In case of I/O Virtualization, redundancy shall be provided for the virtualization server/controller.		
		The server will be connected to SAN storage system using fibre channel links. Required compatible Fibre Channel Host Bus Adapters (16Gbps) with multi-path and automatic load balancing on the server side shall be provided to connect the storage system with 100% redundancy. All the hardware and software required for this shall be provided. Multiple fibre cards with multi-pathing capability and automatic load balancing at HBAs on servers shall be supplied.		
		USB/Serial Ports shall be supplied as per the standard availability in the model offered		
7	Disk and Media drives	All partitions shall be booted through the SAN		
		OS to boot from SAN with redundancy.		
		There shall be at least 1(one) DVD ROM drives in the server. These drives can be independently configurable to any partition. There should not be reboot of partition or server when DVDROM is moved across partition.		
		Each server shall have independent SCSI/SAS/FC adapters required to connect each of these DVDROM		
		Suitable disk management software including Volume Manager to dynamically manage these drives shall be supplied.		
8	Operating System	Latest version of 64-bit OEM Unix/Linux Operating System (as listed in Table 1 and Table 2) with latest patch level must be provided. It should include:		
		Logical Volume Management(without any reboot of the partition)		

S.No.	Item or Parameter	Specification	Compliance (Yes/No)	Document Reference/ Remarks
		JFS/XFS/GPFS		
		Mirroring capability		
		Shall be capable of running any version of 64-bit SAP R/3 ERP 6.0 with Unicode/Non Unicode, SoH and S/4 HANA		
		Shall be capable of running 64-bit Oracle 12c RDBMS or higher version and HANA DB		
		The Unix/Linux Operating Systems shall be licensed to support unlimited users. Enterprise edition of the latest 64 bit UNIX/Linux from OEM for each server may be provided with upgrades and support during the entire lease period.		
		Partition management software having dynamic configuration feature with GUI / Web interface. Management Consoles for the same to be provided.		
		Software to be provided for capacity planning & logs maintaining, trend analysis and reporting		
		Software to be provided for intelligent workload & partition replacement across a virtualized environment.		
		Software and licenses to be provided for resource allocation / de-allocation to partitions		
9	Cluster/High availability	The cluster solution must be able to provide automatic fail-over to the other system for any failure arising in one of the system due to: ➤ Hardware ➤ Operating System ➤ Server failure ➤ Partition Failure ➤ Storage Failure ➤ Site Failure ➤ Any other failure which causes the server/partition to fail.		
		All necessary software, SAP agents, oracle agents & hardware components for automatic high availability and seamless fail over and fallback to be provided.		
		Redundant Heart beat paths shall be provided as per the Annexure TC-02 (diagram).		
		Cluster solution shall be OEM solution and shall support both Server and Storage.		
		In case of failure of the clustered partition, there should be an automatic switching (failover and fallback) of SAP, Oracle and backup solutions. No committed transactions in SAP and Oracle should be lost during automatic switching.		
		Once the failed system comes up they should revert back to the original configuration automatically. Option for reverting back manually should also be available.		
		All clustered partitions mentioned in Table 1 & 2 shall be clustered using high availability clustering technology and there should not be any single point of failure in the offered solution. All		

S.No.	Item or Parameter	Specification	Compliance (Yes/No)	Document Reference/ Remarks
		necessary software agents must be provided for clustering. Support for the clustering software and all software agents must be provided. Each of the production components shall have dedicated failover mechanism. The Clustering Solution shall be as per the Annexure TC-02(diagram) enclosed and table mentioned. All software and licenses should be maintained and upgraded in the entire lease period. For the HANA partitions, clustering should be configured during HANA deployment when required as per SAP recommendations.		
10	Printing software	Print spool software shall be provided for 1 partition in each site.		
		Each printing software shall have license for 4 printers.		
		Shall be compatible with the server OS.		
		Centralized Printing management package shall have scheduling, reprinting, cancelling, repositioning pages of spooled jobs, assigning printing priorities etc.		
		Shall have facility to move spooled jobs to other printers.		
11	Other Software	Following shall be provided in each site: 1) Unix/Linux-ODBC with latest drivers for Mysql, MSSQL and MS Access – 2 partitions 2) Fortran compiler – 1 partition		
12	RAS Features	Each of the offered servers shall have an inbuilt service processor.		
		Processors shall be capable of dynamic CPU allocation and de-allocation. Processor RAS: 1) Processor instruction retry 2) Alternate processor recovery 3) Dynamic processor deallocation 4) Dynamic processor sparing		
		Memory shall be protected through: 1) Advanced/extended ECC 2) Survives double memory failures 3) Selective memory mirroring 4) Redundant Memory		
		I/O RAS: 1) Extended error handling 2) I/O adapter isolation		
		System RAS : 1) OS independent First Failure Data capture 2) Memory keys		
		Pre failure Alert capabilities shall be available		
		All adapters shall be hot-swappable.		

S.No.	Item or Parameter	Specification	Compliance (Yes/No)	Document Reference/ Remarks
		All the following components shall be hot swappable – Disks, Power Supplies, Fans, PCI adapter.		
		PCI buses shall have error handling capability or the Server should have end to end retry path for I/O.		
		Shall have indicators to identify failed components.		
		Shall have redundant Power Supplies and provision for input from at least two sources.		
		Shall have redundant cooling fans.		
13	Others	Rack to house the server shall be from the server OEM as per the Rack specification.		
		All cables & accessories to implement connectivity between Server, SAN switches, LAN switches, Storage and Tape library shall be provided.		
		All power cables shall be supplied and should confirm to Indian industry standard.		
14	Software & Licenses	All software and its licenses referred in the Table 3 are to be provided for each server even if not specifically mentioned. Software and licenses provided will be supported along with upgrades during the entire lease period.		
15	Reference	A list of reference sites with contact details must be submitted where same model is being used in SAP landscape. (In case the quoted model in new release, then reference site for an immediate previous model may be submitted). BHEL may contact/Visit the reference sites for verification.		

Other Information Required

1. Servers
 - a. Specify the make and model of the servers.
 - b. The future roadmap of the Server needs to be submitted.
2. Processors
 - a. The CPU's future roadmap needs to be submitted.
3. Main Memory
 - a. Specify the maximum RAM scalability for the server offered.
4. Cluster/High availability
 - a. The proposed solution of implementing the fail-over must be explained in detail in the technical proposal along with logical diagrams.
5. RAS Features
 - a. Specify the technology used for
 - i. Memory protection
 - ii. Processor
 - iii. IO
 - iv. System

6. Scalability
 - a. The server scalability and upgradeability path in terms of CPU and RAM must be submitted.
7. Others
 - a. Specify power consumption on full load.
 - b. Specify heat dissipation on full load in BTU/hour
8. Documentation
 - a. All the documents like data sheets, architecture, line diagrams, etc, shall be submitted.

5.2 Specifications for Server Management System – 2 Nos.

The OEM of Server management system and Servers will be the same.

Table - 4: Specifications for Server Management System:

S.No.	Item / Parameter	Specification	Compliance (Yes/No)	Bidder's Response
1	Hardware / Software	All Hardware and Software modules required to support the following activities shall be included in the scope of supply. Software and its licenses provided will be supported and upgraded in the entire lease period.		
		Server Management System at each site shall be single unified console for following activities:		
		- GUI, Console to create, remove and manage partitions.		
		- Management and performance monitoring of all systems/sub-systems of servers/ partitions such as CPU, Memory, Swap Files, File systems, IO and Network statistics.		
		- Log file monitoring including monitoring for specified error strings to provide real time alerts.		
		- Isolation of performance related issues.		
		- MIS reporting of Historical utilization details for capacity planning for each partitions Physical CPU utilization Virtual CPU utilization Memory utilization Disk utilization Network utilization		
		- Customized Reports should be configurable.		

5.3 Specification for SAN Storage: - 2 Nos**Table - 5: Storage sizing for each site – 72 TB of usable capacity with minimum 1,25,000 IOPS**

Storage Pool	Storage capacity requirement
Solid State Drive (SSD)/Flash Storage Pool	6 TB of usable capacity after RAID 5 with minimum 11 drives and 1,00,000 IOPS
Hybrid Pool (SSD + SAS)	3 TB of usable capacity on SSD with minimum 6 drives and 63 TB of usable capacity after RAID 5 with minimum 66 drives and providing an overall of 25,000 IOPS from the Hybrid Pool
Spare Drives	5% drives in each of the above category as hot spares in addition to the above

Additional capacity required for HANA Deployment:

Disk Type	Storage capacity requirement
Solid State Drive (SSD)/Flash Storage	2 TB of usable capacity after RAID 5 with minimum 4 drives
SAS	7 TB of usable capacity after RAID 5

Any Hardware/software component required to run SoH/S4 HANA (other than SAP supplied licenses) shall be factored in the offer either in initial deployment or during enhancement along with storage mentioned above and cores (equivalent SAPS) , memory & backup drives mentioned elsewhere. All these components shall have Co-terminus warranty with the base system from the date of installation and maintenance support for the remaining lease period.

RAID 5, & RAID 1+0 configurations will be in multiples of 4 or 8 with parity (e.g. 7d+1p or 3d+ 1p or 2d+2p or 4d+4p)

- Capacity calculation should be of Base 2 (Binary) accuracy.
- There should be provision for adding 20% of additional drives for SSD (2½" disks). "Provision" means all the necessary infrastructure should be in place (at the time of delivery) so that when new SSD are added, they should be available for storage configuration. Provide all the necessary storage software licenses for the entire capacity supported by the proposed model.
- Disks for operating system (required for SAN boot) of each partition shall be supplied in addition to the number of disk drives shown in the table above.
- Vendor has to demonstrate the IOPS performance using Intel IOMeter under the following parameters.
 - Read/Write 70%/30%
 - Block size 8 k
 - Random 100%
 - Cache hit 0%
 - File Size Total storage capacity
 - Raid level 5

Table – 6: Specification for SAN Storage for each site:

S.No.	Item / Parameter	Specification	Compliance (Yes/No)	Bidder's Response
1	Architecture	There shall be redundant controllers and no single point of failure. The storages in both sites shall be of the same make and model.		

S.No.	Item / Parameter	Specification	Compliance (Yes/No)	Bidder's Response
		The storage system must support connectivity to multiple host platforms simultaneously.		
		The Storage System shall support Intelligent hardware RAID controllers to implement hardware mirroring at storage controller level. Raid controller should not put any load on the servers.		
		Should provide RAID levels 0, 1, 5 and 1+0		
		The storage system shall be supplied with minimum 16 numbers of 16 Gbps FC ports for connecting to SAN switch.		
2	Cache	Minimum 256 GB of DRAM cache across 2 Controllers. If some part of the Cache is used for OS or Read Cache Mirroring, the total amount of Cache used for the same need to provided extra over and above 256GB.		
		The data in cache shall not be lost in case of power failure. In case of battery backup, a minimum of 48 hours of backup shall be provided. Cache provided in the form of ECC, DIMMs, Flash/SSDs for are not permitted.		
		Any microcode upgrade on the storage should not require any downtime of the controller or storage.		
3	Disks	Disks are to be provided as per Table 5 for each site.		
		In case of disk failure, the system should be able to do dynamic reallocation of spare disk automatically without manual intervention. Any drive replacement process shall not bring down other online drives.		
		SSD disk should be in the 2.5 inch form factor mounted in 2.5 inch canisters.		
		All disks shall be hot swappable. Drives required for vaulting or any other overheads should be configured additionally.		
4	Storage System	The quoted storage should be HANA certified and should listed in SAP HANA hardware directory (published in SAP Portal - CERTIFIED AND SUPPORTED SAP HANA® HARDWARE DIRECTORY - https://www.sap.com/dmc/exp/2014-09-02-hana-hardware/enEN/enterprise-storage.html)		
		During HANA deployment, if the HANA certification status of the quoted storage is expired, then suitable HANA certified storage solution should be provided without any cost implications to BHEL		
5	Copy Services	Storage System shall support the creation of a physical point-in-time copy		
		Storage System shall support Instant Split with read-write access of the primary/ standard volume.		
		The Storage should support SAP Split Mirror backups integrated with the proposed backup software.		

S.No.	Item / Parameter	Specification	Compliance (Yes/No)	Bidder's Response
6	Replication	Storages at each site shall support both synchronous and asynchronous replication.		
		Storage must support bidirectional Data replication between Storage Systems at primary site and secondary without any server intervention.		
7	Software	SAN software modules shall be GUI/Web based.		
		Point in time copy/Flash Copy and Volume Cloning with all available options including provision for taking full and incremental copy shall be provided.		
		Software for creating SAP/Oracle aware snapshot (integration of storage snapshot with SAP BRTOOLS /RMAN) for the provided capacity should be provided.		
		SAN based bidirectional replication software with all available options including synchronous and asynchronous replication shall be provided.		
		Requisite license shall be provided for the entire storage capacity.		
8	I/O	Automatic rerouting of I/O traffic from the host in case of primary path failure.		
		The I/O interfaces from the servers shall be load balanced.		
		Load balancing software shall be provided for every SAN attached partition.		
		There shall be at least 16 numbers of 16 Gbps FC ports in storage, for connecting to the SAN switches. The storage will be connected to two SAN Switches for redundancy.		
9	Volume/ LUN Management	The Storage System shall be capable of:		
		Creation of volumes that stripe across multiple backend disk ports for better load distribution and prevention of hot spots.		
		Allocating and revoking disk space.		
		LUN binding and masking license for at least 50 servers.		
		Dynamic Volume Expansion/Reduction without any impact on other volume.		
10	Software Licenses	Non-disruptive online microcode upgrades without impact on any application connected to storage system.		
		Licenses have to be provided for the storage capacity quoted at Primary and Secondary site as mentioned below: Point-In-Time Copy/snapshot for entire storage capacity.		
		Synchronous & Asynchronous Replication for entire storage capacity.		

S.No.	Item / Parameter	Specification	Compliance (Yes/No)	Bidder's Response
11	RAS	Non-disruptive component replacement/upgrade of interfaces, disk controllers, disk drives, power supply & battery systems, cooling fans and microcode updates.		
		There shall be redundant power supplies with provision for connecting to power inputs from different sources.		
		Shall have redundant cooling fans.		
		Shall have redundant system clocks.		
		Pro-active maintenance, self-monitoring, self-diagnosing and wherever possible, self-repairing features wherever possible.		
		Automatic isolation of failed components.		
		Recovery from unscheduled power failure/interruption without any data loss irrespective of the number or frequency of outages		
12	Active-Active Storage Cluster	In order to prevent any Application down-time as a result of a complete Storage failure at one site, the proposed Storage solution should be implemented in a Active-Active Storage Cluster between the two Storages at Primary and Secondary Sites.		
		If an Appliance is used for achieving the above functionality, 2 Nos of the same need to be provided at each Site to ensure High availability.		
		All required licenses for implementing the above need to be provided from day 1.		
13	Others	The Storage System shall support multi-path automatic load balancing with no single point-of-failure between Servers, SAN switch and Storage System.		
		There shall not be any single point of failure in the entire SAN.		
		The storage system shall support the latest OS releases (supported by SAP) of the following mentioned Server/OS		
		RISC servers running AIX 7 and above		
		RISC servers running Solaris		
		Intel based servers running Windows Enterprise 64 bit edition		
		Linux (RHEL/SUSE)		
		The storage system shall be guaranteed to be fully compatible for Host Bus Adapters, Clustering Solution and OS offered with the Servers.		
14	Reference	End-of-support for SAN storage and all its components including software provided should be minimum 07 years from the date of submission of bid.		
		A list of reference sites with contact details shall be submitted where same storage is being used in SAP landscape. Two of these reference sites shall be from India. BHEL may contact the reference sites directly for any feedback.		

S.No.	Item / Parameter	Specification	Compliance (Yes/No)	Bidder's Response
15	License	All necessary software and its licenses required to meet the functionalities mentioned from points 1 to 14 is to be provided for each SAN storage as per Table for the provided capacity even if not explicitly mentioned along with support and upgrades during the lease. Any software and its license required for resolving inter-operability issues with Server and Tape shall also be provided. The software and licenses along with upgrades, support will be provided during the entire lease period.		

Other Information Required

1) Specify the details of SAN Storage

- i) Make
- ii) Model
- iii) Number of disk drives offered
- iv) Maximum number of disk drives that can be installed in the offered storage.
- v) Port Types
- vi) Specify disk drives that are supported in the storage system
- vii) The disk drives that have been proposed in the solution FC / SAS
- viii) Power consumption of the storage in full load.
- ix) Heat Dissipation in BTU/Hour
- x) Uptime guarantee of the storage system should be provided.
- xi) Rack space occupied by the proposed storage for the requested configuration

2) Cache

- i) The data in cache shall not be lost in case of power failure. Specify the mechanism used.

3) Software

- i) Specify the available option for taking full and incremental copy.
- ii) Specify the available option for taking SAN based bidirectional replication in both synchronous and asynchronous replications

4) IOPS

- i) IOPS rating of the components of storage offered shall be specified as follows
 - (a) SSD
 - (b) Entire SAN storage

5) Necessary supporting document needs to be submitted.

5.4 Storage Management Software – 1 copy

Table – 7: Specifications for Storage Management Software

S. No.	Item Name / Parameter / Specification	Compliance (Yes/No)	Bidder's Response
1	Single console management for allowing centralized control of physical storages arrays through dedicated server.		
2	Secure web based GUI software to monitor storage hardware performance, Status, configuration, Utilization and provide complete storage system.		
3	Define, configure, add, delete, expand, and reassign Logical Unit (LUNs) to specific host non-disruptively and without having to reboot the system.		

S. No.	Item Name / Parameter / Specification	Compliance (Yes/No)	Bidder's Response
4	The software must provide a graphical view of the complete SAN topology which should include information of LUN's, disks, storage arrays, SAN switches to hosts etc. in the same view.		
5	The Storage Management Software should have the ability to integrate with any industry popular EMS solution like HP-Openview, CA Unicenter, IBM Tivoli, etc.		
6	The Storage Management Software shall be GUI based and shall be able to discover and monitor storage systems. It shall provide pro-active intelligence by monitoring performance & host-wise capacity utilization.		
7	The bidder must submit a complete list of all disk system related software and their functionality. All software which are supplied (at no charges) also needs to be mentioned in the list.		

5.5 Common Specifications for SAN Switches: - Minimum 2 Nos at each site.

Fiber channel switches of same configuration shall be provided and configured, minimum two at each of the sites (Primary and Secondary sites) having ports to connect all the servers, storage, tape library and other equipment. After interconnecting all equipment in failover mode, additional 20% of active spare ports shall be provided in each SAN switch. All active ports shall be licensed and populated with necessary Fiber Adapters. The switches shall be rack mountable. The offered SAN Switches shall be of Brocade / Cisco /IBM/HP make only. All the switches shall be of same make and model.

Table – 8A: Specifications for SAN Switches

S. No.	SAN Switch Specification	Compliance (Yes/No)	Bidder's Response
1	Fiber channel ports shall be 2/4/8/16 Gbps auto sensing full duplex.		
2	The proposed SAN Switch need to be provided with a minimum of 24x16Gbps active ports and should be scalable to at least 48 ports in the same SAN Switch by adding SFP module/Port License. At least 2 Nos of the ports in each switch shall be Long Wave ports to support up to 5 KM direct storage circuit with suitable Fiber Adapters.		
3	All the ports should operate at min 8Gbps in a non-blocking backplane and auto-negotiate to 16Gb/8Gb/4Gb/2Gb FC speeds.		
4	Setting of the port speed to 4Gbps or 8Gbps from the lower speed should not impact or disable the other ports in the same port blade or port group.		
5	All the components should be hot swappable field replaceable allowing non-disruptive maintenance.		
6	Should support non-disruptive Microcode/ firmware Upgrades and hot code activation. There should be no downtime on account of this.		
7	It should be possible to isolate the high bandwidth data flows traffic to specific ISLs/trunks by simply using Zoning.		
8	Switch should provide advanced zoning capabilities and allow health and performance monitoring capabilities.		
9	Should support web based management and also CLI (Command Level Interface) based management.		

S. No.	SAN Switch Specification	Compliance (Yes/No)	Bidder's Response
10	Should have proactive fault detection and alerting capability to avoid any hot-spots in the fabric.		
11	The switch should be rack mountable.		
12	It shall be possible to configure the switches with alerts based on threshold values for temperature, fan status, Power supply status, port status.		
13	Redundant hot-swappable power and cooling subsystems. Power supply and fan assembly should have different FRU (Field Replaceable Units).		
14	The Switch should support Fiber Channel Ping and trace route		
15	The SAN Switch should support LUN Zoning, ACL based Port Security and Port Zoning		
16	The Switch shall be guaranteed to be fully compatible for HBAs, Clustering Solution and OS offered with the servers and the SAN storage.		
17	All software, licenses required shall be supplied All software& licenses required to meet the complete functionality of BHEL shall be supplied along with support and upgrade for the lease period.		
18	Switch management software with all licenses shall be provided for device management		
19	Trunk Licenses for each switch shall be included for interoperability.		
20	End-of-support for SAN switches and all its components including software provided should be minimum 07 years from the date of submission of bid. Necessary supporting document needs to be submitted.		

Other Information Required

- i) SAN Switches
 - (i) Make & Model
 - (ii) No. of ports
 - (iii) Switch management software
- ii) Necessary reference documents.

5.6 Common Specifications for LAN Switches:

Datacenter Switch for LAN – Minimum 2 Nos. at each site

Datacenter Switch with redundant power supply shall be provided and configured at each of the sites (Primary and Secondary sites). The offered LAN Switches shall be of makes figuring in the “Leader” or “Challengers” quadrants of latest “Gartner magic quadrant for wired and wireless access infrastructure”. All the switches shall be of the same make and model. Single point of failure should be addressed.

Table – 8B: Specifications for LAN Switches

S. No.	LAN Switch Specification	Compliance (Yes/No)	Bidder's Response
Solution Requirement			
1	Switch support in-line hot insertion and removal of different parts like power supplies & fan tray etc. should not require switch reboot and disrupt the functionality of the system		
2	The Switch should function in line rate and should not have any port with oversubscription ratio applied		
Hardware and Interface Requirement			
3	Switch should have the following interfaces:		
	a. 48 x 100M/1G/10G/25G Ethernet Fiber Interface with SFP modules – licensed and fully activated. 1. Switch and SFP must be from the same OEM 2. Switch should support native 25G ports 3. Switch should support FC-FEC or RS-FEC"		
	b. minimum 6 x 40/100 GbE uplink ports		
	c. If additional ports are required for any other purpose (management etc.), they may also be provided.		
Performance Requirement			
4	Switch should support 512K IPv4 LPM routes Switch should support 64k IPv6 LPM routes Switch should support 4k multicast routes All Licenses required to support the asked scale must be supplied from Day 1.		
5	Switch should support Graceful Restart for OSPF, BGP, EIGRP etc.		
6	Switch should support minimum 3.6 Tbps of switching capacity including the services:		
7	Each leaf should have connectivity to all spine switches and the over subscription should not be less than 4:1		
Advance Features			
8	Switch should support Network Virtualization using Virtual Over Lay Network using VXLAN (RFC 7348)		
9	Switch should support VXLAN (RFC7348) and EVPN for supporting Spine - Leaf architecture to optimize the east - west traffic flow inside the data centre		
10	Switch should support Data Centre Bridging Exchange Protocol		
11	This functionality is enabled at the fabric / SDN controller level and is communicated back to the switch. This will be covered in the fabric specifications		
Layer2 Features			
12	Switch should support Spanning Tree Protocol (IEEE 802.1D, 802.1W, 802.1S)		
13	Switch should support Jumbo Frames up to 9K Bytes on 1G/10G Ports		
14	Support for broadcast, multicast and unknown unicast storm control to prevent degradation of switch performance from storm due to network attacks and vulnerabilities		
15	Switch should support Link Layer Discovery Protocol as per IEEE 802.1AB for finding media level failures		
Layer3 Features			
16	Switch should support all physical ports to use either in Layer2 or Layer 3 mode and also should support layer 3 VLAN Interface and Loopback port Interface		

S. No.	LAN Switch Specification	Compliance (Yes/No)	Bidder's Response
17	Switch should support basic routing feature i.e. IP Classless, default routing and Inter VLAN routing		
18	Switch should support static and dynamic routing using:		
Security			
19	Switch should support control plane i.e. processor and memory Protection from unnecessary or DoS traffic by control plane protection policy		
20	Switch should support for external database for AAA using: TACACS+ and Radius		
Manageability			
21	Switch should support Telnet, SSHv2, SNMPv1/V2/V3		
22	Switch should support for capturing packets for identifying application		

Other Information Required

- i) LAN Switches
 - (i) Make & Model
 - (ii) No. of ports
 - (iii) Switch management software
- ii) Necessary reference documents.

5.7 Common Specifications for TAPE LIBRARY: - 2 Nos. (1 No for each site).

Table – 9: Requirement for Tape Library

Specification	Requirement
LTO8 drives	4 nos. of latest generation native fiber LTO 8 drives to be offered.

For SoH/S4HANA migration:

Additional LTO8 drives required: 2 numbers

Any Hardware/software component required to run SoH/S4 HANA (other than SAP supplied licenses) shall be factored in the offer either in initial deployment or during enhancement along with cores (equivalent SAPS) , memory, storage mentioned elsewhere & backup drives mentioned above. All these components shall have Co-terminus warranty with the base system from the date of installation and maintenance support for the remaining lease period.

Table – 10: Specification for Tape Library

Sl. No.	Tape Library Specification	Compliance (Yes/No)	Bidder's Response
1	Shall be provided minimum 70 slots and scalable up to a minimum of 200 slots if required		

2	Tape identification shall be using Bar code		
3	The tape library offered shall identify media, load tape media into drives and put them back into corresponding shelves automatically.		
4	Host Platform support: HP-UX, IBM AIX, Solaris, Windows 2008/2012/2016, Linux		
5	Shall supply 75 labeled, blank new latest generation LTO tape media with each tape library; each with 9 TB or higher uncompressed storage capacity.		
6	Shall supply 5 cleaning cartridge with each Tape Library.		
7	The tape library shall be configured with its management software to monitor the entire backup infrastructure—drives, library assets centrally from a single console.		
8	The Tape Library solution should have redundant hot Swappable power supplies and cooling fans.		
9	Specify actual time taken for taking backup of 5 TB data using a single drive with the offered solution.		
10	All the cables -- Fiber, Ethernet, SAS, etc. required for connecting the Tape library with SAN Switch and other servers shall be supplied by the bidder.		
11	There shall be end to end fiber connection between SAN and Tape drive. All the offered drives should be connected to SAN with redundant path across two SAN switches.		
12	Each tape drives should have a fiber port of 8Gbps.		
13	Tape library should have redundant power supply and should provide redundant path failover of control and data path.		
14	A list of reference sites with contact details shall be submitted where Tape Library of the same model is being used. One of these reference sites shall be from India. BHEL may contact these reference sites for any feedback.		
15	End-of-support for Tape library and all its components including software provided should be minimum 07 years from the date of submission of bid. Necessary supporting document needs to be submitted.		

Other Information Required

1) TAPE LIBRARY:

Specify actual time taken for taking backup of 5 TB data using a single drive with the offered solution.

5.8 Backup Software for TAPE LIBRARY – 2 Copies

Backup Management Software must be provided as per the specifications listed below to use both Tape and Disk at primary site and secondary site.

Table – 11: Specifications for Backup Software

Sl. No.	Backup Software Specification	Compliance (Yes/No)	Bidder's Response
1	Backup software shall be a single solution for supporting multiple operating systems and application using a single product which would take care of data growth in future.		
	Backup Management Software must support both Tape and Disk as backup media.		
2	The proposed Backup Software Solution shall be available on 64 bit UNIX OS platforms. The solution shall provide backup/ restore from various client platforms such as HPUX, IBM AIX, Solaris, Linux, Windows 2008/2012/2016, etc.		
3	Backup management software shall be GUI/ web based.		
4	The offer shall cover licenses required for taking backup of 21 TB. All required license for Disk to Tape copy shall be provided.		
5	Back-up software shall be a single solution for Supporting multiple operating systems and applications using a single product.		
	Back-up software shall provide tape mirroring.		
	Back-up software shall provide deduplication.		
	Back-up software shall provide scheduled and policy based backups.		
	Back-up software shall provide multiple simultaneous client sessions for back-up and restore.		
	The Backup software shall maintain catalog of all the backups for efficient management of data and for better performance.		
	The back-up software shall provide features like Point-in-Time backup / Restore and Archive / Retrieve		
	The Back-up software shall provide back-up over LAN, SAN and Snapshot based Backup for Tape		
	The back-up software shall support integration with Enterprise Management software such as Tivoli, Unicenter TNG, HP- Open view, etc.		
	Should provide Full, incremental and Point in Time Copy / Snapshot based backup.		
	Should have provision for generating backup-sets from existing backup tapes, for moving to off-site location for tapes.		

Sl. No.	Backup Software Specification	Compliance (Yes/No)	Bidder's Response
6	Full back-up of database systems shall be possible to be taken without bringing the production system down, with full data base consistency and without affecting the performance to the users in anyway.		
7	The backup software must be capable of running in a clustered environment. Cluster licenses of the backup software should be provided for both the Client and the Server components.		
8	The backup software must use an RDBMS as the backup catalog for efficient management and scalability of the solution.		
9	The solution should be licensed for Snapshot based Backup (Zero Downtime), SAN based and LAN based backups of the SAN attached servers.		
10	Backup client software shall be licensed for the provided storage capacity / number of partitions.		
11	5 agents for SAP and 4 agents for oracle to be provided. Alternately SAP and oracle aware backup shall be provided. Support and upgrades for the same shall be provided during the entire period of the contract.		
12	It shall be possible to use all the four drives simultaneously for tape library.		
13	The backup software shall be licensed to provide disk staging. The disk staging units used for the Production and QA/ Development systems will be different and thus any additional licenses, if required, shall be included in the scope of supply.		
14	The backup software should provide (Role Based Access) different levels of User access, Administrator, User, Operator, so that only the authorized personnel can make changes or view the status based on the rights they have.		
15	Online backup agents and its license for SAP and Database application shall be provided. The same shall support all the versions of SAP ERP 6.0 and Oracle 12c & above. Any upgrade required for supporting the latest and future version of SAP/Oracle shall also be provided till the expiry of the contract.		
16	The software must have the capability for monitoring and controlling the tapes sent to off-site.		

Sl. No.	Backup Software Specification	Compliance (Yes/No)	Bidder's Response
17	The Software must also provide for creating a Business Continuity Plan in case of the Backup server and all other servers in the backup network being destroyed in a possible disaster. This should be a scheduled and Automated activity on the backup server. The software shall also provide for restoring data at each site during complete non-availability of the other site due to disaster.		
18	Restore feature: System shall be configured for full restoration of the backed up data to the respective server/storage.		
19	Backup software shall be configured to perform periodic restore drills.		
20	BHEL may increase/ decrease the number of CPU/RAM in backup server or any of the partitions at any point during the contract period. Additional licenses, if required shall be provided.		
21	Extensive reporting capabilities with following features: Health of Backups Report in HTML, TEXT and CSV formats Scheduled automated generation of reports.		
22	Software should provide event notification to notify backup administrator about events like Job Failed or Job aborted, etc. via Mail, SMS		
23	Catalog Data base should be configured in High availability		
24	Software should provide centralized management console to remotely monitor backups.		
25	Software should provide Raw device backup of Windows/Linux/ UNIX based system		
26	Software should provide online backup of oracle & shall provide both Online and RMAN to perform online backup.		
27	Software shall be compatible to SAPBACKINT. Details to be provided by the bidder.		
28	It shall be possible to take backup using both backup servers to Tape/Disk independently and simultaneously (Active-Active mode) from both sites.		
29	Automatic media management shall be taken care by the backup software.		
30	The proposed Backup software quoted should have been implemented in at least 2 sites in India along with the same Server and Storage platform proposed in this requirement.		

Sl. No.	Backup Software Specification	Compliance (Yes/No)	Bidder's Response
31	All necessary licenses are to be provided to meet the requirement mentioned from point 1 to 30 even if not explicitly mentioned. The backup software and its licenses will be supported and upgraded in the entire lease period.		

5.9 Racks

Rack shall be server OEM make. Required number of racks should be provided to house all the supplied equipment.

Table – 12: Specifications for the required racks:

Sl. No.	Item / Parameter	Specifications	Compliance (Yes/No)	Bidder's Response
1	Rack	Heavy Duty Racks (not exceeding 42U) for installation of all the hardware shall be supplied, with cable manager, cooling fans, front & rear perforated doors and rack kits. Power distribution unit should have atleast 20% spare PDU sockets after the full installation in each rack. Each rack should have PDU in two separate groups so as to have provision of power supply from different sources. Earthing kit also should be supplied with all the racks. PDU Sockets should be compatible with the power cable connectors of all the supplied equipment.		

5.10 Bio-metric Access control system – 2 Nos.

The Access Control System shall be used to serve the objective of allowing entry and exit to and from the premises / restricted areas within the facility to authorized personnel only. The system shall be designed and implemented to provide following functionality:

1. Controlled Entries to defined access points
2. Controlled exits from defined access points
3. Controlled entries and exits for visitors
4. Configurable system for user defined access policy for each access point
5. Record, report and archive each and every activity (permission granted and / or rejected) for each access point.
6. User defined reporting and log formats
7. Fail safe operation in case of no-power condition and abnormal condition such as fire, theft, intrusion, loss of access control, etc.
8. Day, Date, Time and duration based access rights shall be user configurable for each access point and for each user.
9. One user can have different policy / access rights for different access points.
10. It should be possible to use the access devices like biometrics, proximity card readers, push buttons, manual switches, etc. in user defined combination for any and all of the access points on a single platform using a single software for interface.

11. Access control system shall be designed and integrated with the access levels as desired by the user.
12. Manual mechanical override wherever required shall be provided for access controlled gates / doors.
13. The access control system should support the user defined access logic such as four eye concept, access timeout, anti- pass back, etc.
14. It should be possible to configure the access rights for user defined shift hours of the day, configurable holidays, etc. It should be possible to configure the yearly schedule of access for each user and each access point in advance.

The system employed shall be based on combination of Biometric and Proximity Card Readers (with PIN and without PIN) for the critical areas, and Proximity Reader for less critical areas. System offered shall have minimum false denial of access. It shall not grant the access to the unauthorized entity under any circumstances.

System offered shall use the reliable devices to provide trouble free operation.

System shall be compatible to the Proximity cards to be provided by the Bidder. System should have anti-pass back feature with time scheduling and zonal access defined.

5.10.1 Application Software:

The application software means the access & time management software and database that shall be supplied together with the system in order to provide a Graphical User Interface (GUI) for human – machine interface.

The Application software must: -
Remotely Open Doors when Desired
Provide Patrol Management Interface
Provide at least 65 Control Zones
be the Same for both Biometric and Proximity

Open Platform for future integration must be provided in the form of a SDK Kit.
The software shall be capable of providing the required functionality as mentioned above as a minimum.

5.10.2 Door Controller:

The Door Controller system must be intelligent and capable of controlling 2 Doors having IN and OUT Interface.

The door controller system shall store in its memory all the system parameters & card databases and shall be virtually independent of the network server for its regular operations. It shall also update the network server of the card entry / exit transaction data with time & date stamp when the network is online. If the network is offline, the door controller system shall store such data in its internal memory & transfer the same to the server as and when it comes back online. The Database must have a minimum transaction record of 10,000. The user capacity must be not less than 50. The Controller shall provide Alarm Inputs for CCTV and Fire Alarm System Integration. The Controller shall have an Onscreen LCD Display to display online activities. The Controller shall be independent of the network allowing Users to Add / Delete / Modify Card Databases directly from the Controller.

5.10.3 Proximity Card Reader:

The unit shall be capable of reading the card without physical contact. The card reader shall only read the card data & pass it on to the door controller system for validation. The card reader, on its own may not take any decisions for granting / denying the access. The Card Reader shall have a RED/GREEN Led Indication to highlight the User Access. The card Reader must be slim and capable of directly mounting on the provided surface.

The card reader must be able to communicate with the controller.

5.10.4 Biometric Controller and Reader (Finger Print Reader – FPR)

The Fingerprint Reader should be networkable. The PC will be used for accessing the stored data of the software.

The Finger Print Reader (FPR) shall be a device, which is capable of reading a fingerprint & comparing the same with a stored template, based on optic sensors.

The FPR shall store the fingerprint templates of each cardholder indexed against the card number issued to the person.

The FPR shall provide an interface of Proximity + Biometrics, Biometrics + Pincode + Proximity, Biometrics + Pincode or Only Biometric.

When a card is presented at the proximity card reader, the card number shall be passed on to the FPR, which would then read the finger print, compare it against the templates stored against the same card number. If the fingerprint is matched, FPR shall give signal to the door controller system. In case the fingerprint is not matched, access is denied.

It should be possible to configure the reader to store template of multiple fingers per person. It should be possible to configure access logic to accept alternate template for granting the access.

Biometric reader is for the entry to the server room

5.10.5 Proximity Card:

The proximity card means the access card that is capable of being read without a direct contact by the proximity card reader.

The Proximity Card should be of ISO Thickness and employ 125 kHz for Transmission

The proximity card profile shall be designed and agreed with the Bidder during the engineering stage.

All the cards issued for the various facilities shall have a common facility code to allow interoperability of the cards from one access point to another.

The card numbers shall be unique to each card & the systems at each facility shall permit access only to select card numbers, based on the programming.

Minimum of 50 cards to be made available

5.10.6 Electro Magnetic Locks:

The Electro Magnetic Lock (EML) means a locking mechanism that works on the principle of electromagnetic attraction. The EML shall be installed on double swing flush doors. The door controller system shall control the EML. The Lock holding capacity must be at least 650 Lbs. The type and specification of the locks shall be in accordance with the door design and specification and also door controller system. The locks should be of sufficient strength to withstand forced attack to open the door.

5.10.7 Other devices such as Manual Switches, Push Buttons, Mechanical over – ride etc.:

As required and compatible with the overall system offered by the bidder.

5.10.8 Cables:

As required and in accordance with the general specifications guidelines provided in 'Electrical Distribution System' section and Product Parameters defined hereunder.

Panic latch bar has to be provided for the emergency door of the server room

The design of access control should be based on the various zones of the DC from least secure to high secure zones. A matrix depicting the entry and exit for each of the doors to be submitted along with the technical bid.

5.11 Precision Air-conditioners - 4 Nos.

BHEL will provide a Computer room having 50 Sq. metre area for the deployment of the Computer Systems at each site. The computer room will have false flooring and false ceiling. The Bidder shall offer 2 precision Air-conditioner units per site.

Each of the Precision Air-conditioners shall be sized to support 150% of the heat load in each site. Minimum 10 tons AC (per unit) shall be provided

Temperature of 21 Deg. C +/- 1 and relative humidity of 50% +/- 5 shall be maintained in each site. The computer system will be operated round the clock shift on all 365 days.

All the Precision Air-conditioners shall be bottom discharge with high CFM units.

AC ducts, diffuser and floor grills are in the scope of the bidder.

The unit supplied shall work in redundancy mode. A timer facility should be available for the alternate use of the units.

The minimum requirements for the AC are mentioned below. Bidder has to comply to these specifications.

Table – 13: Specifications For Precision Air-conditioners:

Sl. No.	Technical Requirements Vendor compliance	Compliance (Yes/No)	Bidder's Response
1	Precision air conditioners complete with all controls, indoor and outside units, monitoring units and complete installation and commissioning for server room.		
2	The vendor is expected to include all auxiliary works like ducting, inlet and drain piping, piping between indoor and outdoor, cabling, acoustic and thermal insulation (Duct and floor for server room), volume control dampers, supply and returns air grills, stands for indoor and outdoor units with related civil works etc. as per the site requirements.		
3	Automatic monitoring and control of cooling, heating, humidification, dehumidification, air-filtration, etc. should be installed		
4	These equipment should be compliant to the following :		
	Cabinet conforming to Class 1 BS 476 Part 6&7 standards		
	Air filtration conforming to EU3 standards		
	Electric Re-heater should be operating at black heat temperature		
	Humidifier should have an adjustable capacity control ranging from 40%-100%		
	Visual and audible alarm indication		
	Graphical display of temperature and humidity curves over the last 24-hour		
	Humidity , Ventilation, Air Conditioning (HVAC)		
5	Condensers should be located outside the building.		
6	Optimal temperature of 21 deg C + or- 1 shall be maintained.		

Sl. No.	Technical Requirements Vendor compliance	Compliance (Yes/No)	Bidder's Response
7	45 - 50% Relative Humidity shall be maintained.		
8	Relative humidity variation shall not exceed +/- 3%.		
9	Microprocessor controller Panel The display panel should be located in the front of the unit with LCD display for monitoring and alarm indication. The panel should be used for:		
10	Status detection (whether on or off) Temperature controller Humidity controller		
11	The panel should make an audio visual alarm in case of: Power failure Fan overload Humidifier power fault Humidifier control fault Heater fault Airflow failure Change filter Control circuit trip Return air temperature / RH out of range Supply air temperature out of range Return air humidity sensor alarm Return air temp. Sensor alarm Data Error Service alarm Electric heater alarm Microprocessor fault Humidifier flood Water leakage sensor alarm Smoke sensor alarm		
12	Other functions of the control panel Graphical display of temperature and humidity curves over the last 24-hour. Self-diagnostic functionality Supply air fan surge to let fan continue on operation for a period of 180 second before total shutdown. An automatic changeover for duty / standby unit based on time interval setting and any failure of duty unit. An automatic restart function with sequence start program to prevent power surge during start-up on multi-system installation. A graphic display to review the return air temperature and humidity condition. Comprehensive event storage system by date and time of occurrence. Simple user-friendly operating guidance. Web enabled Remote monitoring of the Precision AC unit using desktop PC.		

Annexure TC-01 (Third Party Non-Disclosure Agreement)

 BHEL - TRICHY	THIRD PARTY NON-DISCLOSURE AGREEMENT	Doc. No. : ISMS-04/TP/011	
		Ver. No: 3.0	Rev. No: 00
		Date : 27 - 10 - 14	

THIRD PARTY NON-DISCLOSURE AGREEMENT

I, _____, on behalf of the _____ (Name of Company), acknowledge that the information received or generated, directly or indirectly, while working with BHEL, Trichy on contract is confidential and that the nature of the business of the BHEL, Trichy is such that the following conditions are reasonable, and therefore:

I warrant and agree as follows:

I, or any other personnel employed or engaged by our company, agree not to disclose, directly or indirectly, any information related to the BHEL, Trichy Without restricting the generality of the foregoing, it is agreed that we will not disclose such information consisting but not necessarily limited to:

- Technical information: Methods, drawings, processes, formulae, compositions, systems, techniques, inventions, computer programs/data/configuration and research projects.
- Business information: Customer lists, project schedules, pricing data, estimates, financial or marketing data,

On conclusion of contract, I, or any other personnel employed or engaged by our company shall return to BHEL, Trichy all documents and property of BHEL, Trichy, including: drawings, blueprints, reports, manuals, computer programs/data/configuration, and all other materials and all copies thereof relating in any way to BHEL, Trichy 's business, or in any way obtained by me during the course of contract. I further agree that I, or any others employed or engaged by our company shall not retain copies, notes or abstracts of the foregoing.

This obligation of confidence shall continue after the conclusion of the contract also.

I acknowledge that the aforesaid restrictions are necessary and fundamental to the business of the BHEL, Trichy and are reasonable given the nature of the business carried on by the BHEL, Trichy I agree that this agreement shall be governed by and construed in accordance with the laws of country.

I enter into this agreement totally voluntarily, with full knowledge of its meaning, and without duress.

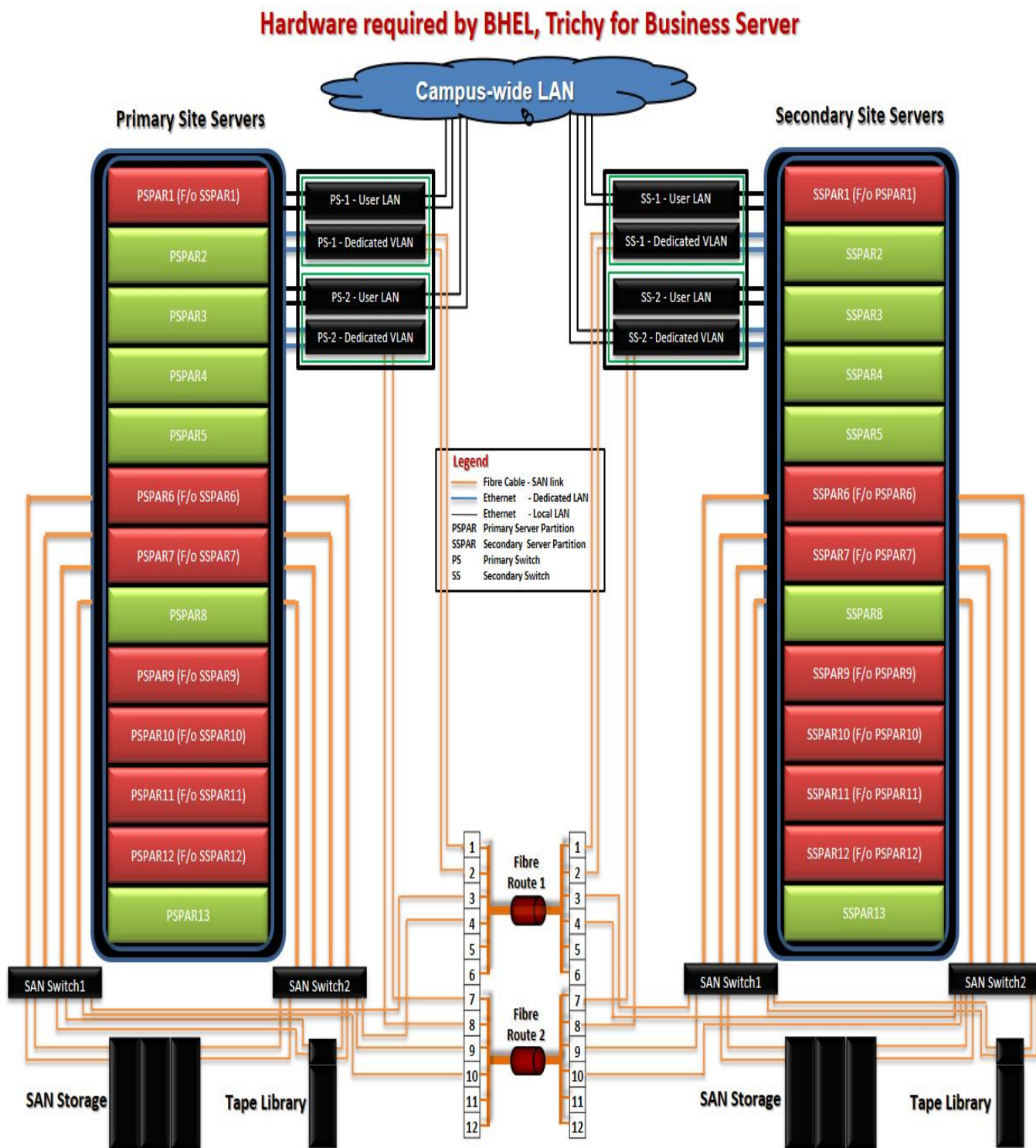
Dated at _____, this ____ day of _____, 20__.

Name
Company
Signature

[Restricted Use]

Page 1 of 1

Annexure TC-02 (Diagram)



Annexure TC-03 (No Deviation Certificate)

No Deviation Certificate

(To be given in bidder's letter head)

Ref: BHEL's Enquiry No. _____ Dated _____

It is Certified that the offered solution vide Enquiry No. _____ dated _____ in response to BHEL's enquiry mentioned under reference has no Technical deviation with the requirement of BHEL, Trichy given vide the Technical Specification (Requirement).

Date:

Vendors Signature with seal

Annexure TC-04 (Documents to be submitted along with the Bid)

Sl. No	Eligibility Criteria	Documents to be provided	Bidder's Compliance (Yes / No)
1	The bidder should be a registered company in India under Companies Act 1956 /2013	Certificate of registration	
2	The average turnover of last 3 financial years of the bidder should be Rs. 3.00 crores or more	Copy of audited Balance Sheet / PL statement	
3	The bidder should have a positive net worth	Copy of audited Balance Sheet / PL statement	
4	The bidder should have PAN number, GST registration number	Self-attested copies of PAN number, GST registration number	
5	The bidder should not have been currently black listed / banned for business dealings by any Govt. authority / department / agency or by any BHEL Unit / Region / Division / Office on the date of tender opening	Undertaking copy	
6	Document proof for manufacturers of the SAP HANA supported RISC Servers	Screenshots of the published list in SAP Portal - CERTIFIED AND SUPPORTED SAP HANA® HARDWARE DIRECTORY - https://www.sap.com/dmc/exp/2014-09-02-hana-hardware/enEN/index.html	
7	Manufacturer Authorization Form (MAF)	Manufacturer Authorization Form (MAF) from server OEM specific to this tender in Server OEM's letter head	
8	Certificate from the Server OEM's authorized signatory regarding manufacturer of UNIX/Linux based Server on RISC architecture	Certificate from Server OEM	
9	Certificate from Server OEM, indicating details of customer (Name, Address, Contact person, Phone and Email), supplied server details like the CPU, OS and the SAPS rating / Cores to Memory Ratio of the hardware delivered to the customer should be submitted	Relevant Purchase Order copies and SAPS rating details	
10	The server OEM must have supplied a similar server, based on class of processors or its predecessor for SAP applications for minimum of 2TB HANA DB TDI model. This supply shall be for an order in a single site of a company during the last 03 (Three) years and the server should be currently running.	Relevant Purchase Order reference copy (OR) Certificate from customer	
11	In case of the bidder is an authorized partner, then the bidder must be a partner of the Server OEM for minimum period of 12 months preceding the date of opening of the bid	Authorized partner Certificate with date effect from server OEM	
12	The bidder must undertake the complete responsibility of supply and commissioning of	Undertaking statement	

	the hardware (may be with the help of Server OEM technical team), software and other equipment, i.e. the entire scope of work of this tender		
13	The offered solution should be approved by Server OEM for the smooth functioning of the applications with High availability, replication, data transfer etc. The approval document should be submitted as a part of technical bid	Letter of Acceptance for the offered solution from Server OEM	
14	The bidder must have executed either of the following during the last 5 years in India: 1) One order of 1,50,000 SAPS for SAP ERP applications 2) Two orders of 1,20,000 SAPS for SAP ERP applications 3) Three orders of 80,000 SAPS for SAP ERP applications	Documentary proof (Purchase order copies and SAPS ratings of the total solution provided)	
15	Documents related to Technical and Commercial offer (All pages should contain Bidder's Signature and Seal)	Acceptance of Technical Terms and Conditions	
		Acceptance of Commercial Terms and Conditions	
		Technical specification of the offered solution-to be filled in the Check-list format issued as Requirements in the tender document	
		Technical Brochures	
		Other Documents to support the compliance	
		Deviations, if any, as per BHEL's Format	
		"No-Deviations" Certificate	
		Un-priced Commercial offer as per Price Format	
		Certificates from respective OEMs of all items quoted, declaring support for a minimum period of seven years from the date of commissioning	
		Integrity Pact as per BHEL's Format	
		Non-Disclosure Agreement (As per Annexure TC-01)	
16	Document to be submitted for the Price Bid	Price in the Price Format	

Annexure TC-05 (Deviation in Technical Specification)

Deviation in Technical Specification

Table No.	Sl. No	Item or Parameter	Specification	Deviation	Alternate solution

Date:

Vendors Signature with seal