Supply of Server Infrastructure-Part(A) and Creation of Data Centre(Part-B) on finance lease for a period of 5 years / Outright purchase

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Annexure-I

Specification for Server Infrastructure for running BHEL Applications

Specification for Server Infrastructure for running BHEL Applications

Server Infrastructure is required at the Primary site (Informatics Centre) and at the Internal Disaster Recovery site (03 Annex) for running BHEL Applications as per the following specification. All the interface cables required for providing the solution shall be supplied.

1 Unix Servers — Quantity - 2 Nos

(One in Informatics Centre and one in 03 Annex)

Server offered shall be the latest model meeting the stated requirements and shall use the latest generation of processor available in the model.

Processor

- Shall be 64 bit RISC or EPIC Processor
- Adequate number of processors to meet the SAPS requirement and adequate no of adapters shall be provided as mentioned in Table-1.

Processor Performance

- SD Two-tier benchmark results of SAP under Unix Operating System, SAP ECC6.0 and Oracle 10g RDBMS environment will be used for arriving at the number of SAPS each processor core can deliver.
- If the benchmarks are not available with the above required environment, the vendor shall provide a certificate from their SAP competency center for the Server offered.

Memory

- Shall be DDR2, ECC SDRAM
- Memory shall be provided with the same memory to processor ratio as that of the reference model whose SAPS benchmark has been used for Processor performance evaluation. In case of SAP competency certificate, a ratio of 8 GB memory per core should be used.

Table-1

S.No	Server Partitions	Initial Total SAPS Required	Final Total SAPS required after Expansion	I/O slots for Ethernet, Fibre Channel, SCSI and Heart-beat adapters									
				Ethernet Ports				Fibre Channel Ports (Disk)	Fibre Channel Ports (Tape)	Heart-beat Ethernet Ports	SCSI / FC Ports for OS Drives	SCSI for DVD/ DAT	Total
				10G Ethernet Ports		Gigabit Ethernet ports							
				Public LAN	Dedicated LAN	Public LAN	Dedicated LAN						
Server at Primary Site (Informatics Centre)													
1	oracle dB	4500	2000			2	2	4	2	2	2	2	16
2	oracle App 1	3500	2500			2	2				2		6
3	ERP dB	6000	9000		2	4	2	4	2	2	2	2	20
4	ERP App 1	3500	5250		2	4	2				2		10
5	ERP App 2	3500	5250		2	4	2				2		10
6	ERP QA	3500	3500			2	2	2	2	2	2		12
7	BIW dB	3500	5250			2	2	4	2	2	2	1	15
8	BIW App 1	1500	2250			2	2				2		6
9	BIW QA	1500	1500			2	2	2	2	2	2		12
10	Backup 1	4000	6000			2	2	4	4		2		14
Total		**35000**	**42500**	**0**	**6**	**26**	**20**	**20**	**14**	**10**	**20**	**5**	**121**
Server at Disaster Site (03 Annex)													
1	oracle dB Failover	4500	2000			2	2	4	2	2	2	2	16
2	oracle App 2	3500	2500			2	2				2		6
3	ERP dB Failover+CI	6000	9000		2	4	2	4	2	2	2	2	20
4	ERP App 3	3500	5250		2	4	2				2		10
5	ERP App 4	3500	5250		2	4	2				2		10
6	ERP dev	3500	3500			2	2	2	2	2	2		12
7	BIW dB Failover+CI	3500	5250			2	2	4	2	2	2	1	15
8	BIW App 2	1500	2250			2	2				2		6
9	BIW dev	1500	1500			2	2	2	2	2	2		12
10	Backup 2	4000	6000			2	2	4	4		2		14
Total		**35000**	**42500**	**0**	**6**	**26**	**20**	**20**	**14**	**10**	**20**	**5**	**121**

Partitions

- Servers shall be partitioned as given in Table-1 and shall have expansion provision as mentioned in the table.
- Each server shall be capable of supporting a minimum of 12 partitions. Each additional partition beyond specified in Table -1 , shall have two FC IO adapters , 4 Ethernet adapters and 2 SCSI/FC/SAS adapters for boot disks and 2 x 146 GB boot disks.
- Each partition shall have integral number of processors
- It should be logically possible to assign processors and memory to any partition or switch processors and memory between partitions by the system administrator with out reboot of source or target partitions.
- Each partition shall run its own independent Operating System kernel
- Each partition shall be able to run same or different versions of OS kernel independently.

Disc Drives

- Each partition shall have 2 x 146 GB Ultra III SCSI / FC/SAS 15K rpm internal hot swappable Disc drives connected through 2 x Ultra III SCSI/SAS or 2 FC controllers for mirrored OS.

I/O slots

- All I/O slots shall be of PCI -X type or PCI-e or combination of both.
- All adapters shall be hot-swappable.
- All Fibre Channel Adapters shall have at least 4 Gbps bandwidth.
- All SCSI adapters shall be Ultra III SCSI /SAS
- All 10G Ethernet Adapters are to have fibre interface
- All other Ethernet adapters shall be 1000 Mbps with RJ45 interface
- There shall be no single point of failure while using multiple port/function adapters.
- If multiple port/function adapters are used, the cumulative bandwidth of the adapter shall be less than 70% of the I/O slot bandwidth.

Other Server accessories

- Each server at both sites shall have rack mountable system console with foldable TFT monitor, keyboard and mouse.
- The system console shall take care of the server administration, partition configuration and the system administration of each of the partitions. If exclusive hardware is required to support the above functions, then such hardware shall also be included in the scope of supply.
- Each server shall be provided with at least 5 common sets of DVD-RW Drives and 4mm, 36/72 GB (or higher) DAT Drives internal/external for Sharing between partitions. The drives shall be configurable to any partition by the system administrator.
- Shall have redundant hot-swappable Power Supplies and provision for input from atleast two sources.

Campus Wide LAN connectivity

- All partitions shall be connected through two Gigabit Ethernet switches at each site to the campus wide LAN / WAN as shown in the schematic diagram.
- The Gigabit Ethernet adapters from each partition shall connect to either of the switches at each site as shown in the enclosed schematic diagram.

Dedicated LAN connectivity

- DB & CI and Application Servers at the primary site shall be connected through a Gigabit Ethernet switch to a dedicated LAN as shown in the schematic diagram.
- The heart beat communication between the clustered servers if required shall be connected through the dedicated LAN.

Clustering

- High availability cluster shall be configured between the Server partitions in the Primary site and Server Partitions in the Secondary site as shown in the enclosed schematic diagram.
- Shall be configured for both automatic fail-over and automatic fail-back.
- There shall be independent redundant heart-beat communication links for the clusters.

Disaster Recovery

- The databases in Oracle DB server, ERP Rollover DB&CI server and BIW DB server stored on the SAN at the Primary site shall be replicated synchronously on the SAN at Secondary Server using storage to storage replication.

Expandability

- The partitions shall be expandable with respect to the SAPS rating as per Table-1.
- The server at each site shall also be expandable by 10%, with respect to
  - capacity of memory and
  - the number of I/O ports.

Software

- Each partition shall run its own independent operating system kernel.
- Latest version of 64-bit OEM Unix Operating System for each partition.
- Shall be capable of running 64-bit SAP Version ECC 5.0 or higher.
- Shall be capable of running 64-bit Oracle v9.2 RDBMS or higher version.
- At least 12 copies of the OEM Unix operating system shall be supplied with each server.
- The Unix Operating Systems shall support unlimited users.
- Partition management software having dynamic configuration feature with GUI interface.
- Clustering software for the Database and backup sever Clusters.
- Client software to administer the servers from Window desktops.
- Annual Subscription / License fee for software to avail free updates and upgrades, valid for at least 5 years from the date of commissioning of the systems.
- Print Manager (Advanced Spooling) software for printing on at least 50 printers.

2 SAN Storage **Quantity - 2 Nos**

(one in the Primary site and one in the DR Site)

Storage Unit

- Shall be of the latest technology and Monolithic
- The FC connectivity between Servers and the SAN Switch as well as the FC connectivity between SAN Switches and SAN storages shall be of 4 Gbps bandwidth.
- Shall support Raid levels of 1+0 and 5.
- The SAN storage shall have at least sixteen 4 Gbps fibre channel paths distributed across the two SAN switches
- The SAN storage shall be connected as shown in the diagram.
- The remote copy and local copy shall be at storage system level.
- The storage subsystem shall be capable of supporting industry standard operating systems like Windows, Linux, AIX, HP UX and Solaris. Any licenses for this support should be included. The vendor shall supply an interoperability matrix for the model offered.

Disc drives

- Shall be hot swappable fibre channel disc drives.
  The storage subsystem should have 341 spindles of 146GB 15K rpm including adequate hot spare spindles.

Data Cache

- Shall have at least 64 GB cache expandable to 128 GB.
- The write cache shall be de-staged immediately to disk in case of power failure or have a battery backup for atleast 48 hours

Expandability

- The storage at each site shall be expandable by 20%, with respect to the number of disc slots.

SAN Software

SAN management software shall have the following features.

- If the software requires any special hardware for meeting the functionalities mentioned below, such hardware shall be included in the scope of supply. Such items shall also be indicated separately.
- All SAN software modules shall be GUI based.
- Multi-pathing software License for atleast 12 partitions at each site shall be provided
- The fibre channel paths shall work on load sharing and fail-over basis using multi-pathing software
- Storage configuration and Management
- Performance Monitoring and Management
- Local copy software with all available options including provision for taking full copy and incremental copy.
- Remote data replication with all available options including synchronous and asynchronous replication.
- Remote copy license and local copy license for 10000GB of storage shall be included.
- The remote copy and local copy shall be at storage system level.

3 SAN Switches **Quantity - 4 Nos**

(Two in the Primary site and Two in the DR site)

- Shall be connected as shown in the diagram.
- Each site shall have at least 2 numbers of SAN switches offering a total of at least 96 ports.
- Shall be 4 Gbps fibre Channel ports.
- Each site shall have at least 8 Ports distributed across all switches as Long-haul to drive a distance of 5 Km.

4 Tape Library (Back-up Device) **Quantity - 2 Nos**

(one in the Primary site and one in the DR site)

The vendor has to supply either of the following configurations:

Configuration-I: Tape Library with Gen4 LTO drives - 2 Nos.

- The Tape libraries shall have 4 Gen 4 LTO fibre channel drives.
- Shall be capable of supporting at least 100 tapes without pass-through mechanism.
- The tape libraries shall have redundant power supply.
- The LTO tape drives shall be connected as shown in the diagram.
- 100 Gen 4 LTO Tape media and 10 head cleaning tapes also shall be supplied with each of the Tape library

Configuration-II: Tape Library with Gen3 LTO drives - 2 Nos.

- The Tape libraries shall have 8 Gen 3 LTO fibre channel drives.
- Shall be capable of supporting at least 200 tapes without pass through mechanism.
- The tape libraries shall have redundant power supply.
- The LTO tape drives shall be connected with 8 Nos. of 4Gbps Fiber Channel ports to the SAN Switches, and the FC ports on the Servers for tape connectivity have to be doubled.
- 200 Gen 3 LTO Tape media and 20 head cleaning tapes also shall be supplied with each of the Tape library.

Back-up Software

The Back-up Software shall have the following features.

- The offer shall cover licenses required for taking backup of data residing in all the partitions.
- Back-up software shall be a single solution for supporting multiple operating systems and applications using a single product,
- Back-up software shall support tape replication.
- Back-up software shall support scheduled and policy based back-ups.
- Back-up software shall support 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 support features like Point-in-time back up/ restore and Archive /retrieve.

- The Back-up software shall support back-up over LAN and SAN.
- Back-up software shall be scalable and provide enterprise management capability.
- The back-up software shall provide integration with Enterprise Management software such as Tivoli, Unicenter TNG and HP-Open view.

5 Racks

(Adequate number of racks at both the sites)

- The OEM racks and its accessories required for housing the LAN, SAN switches, system console, etc., shall be included in the scope of supply.
- The racks shall have required number of cooling fans.

6 Archival Appliance

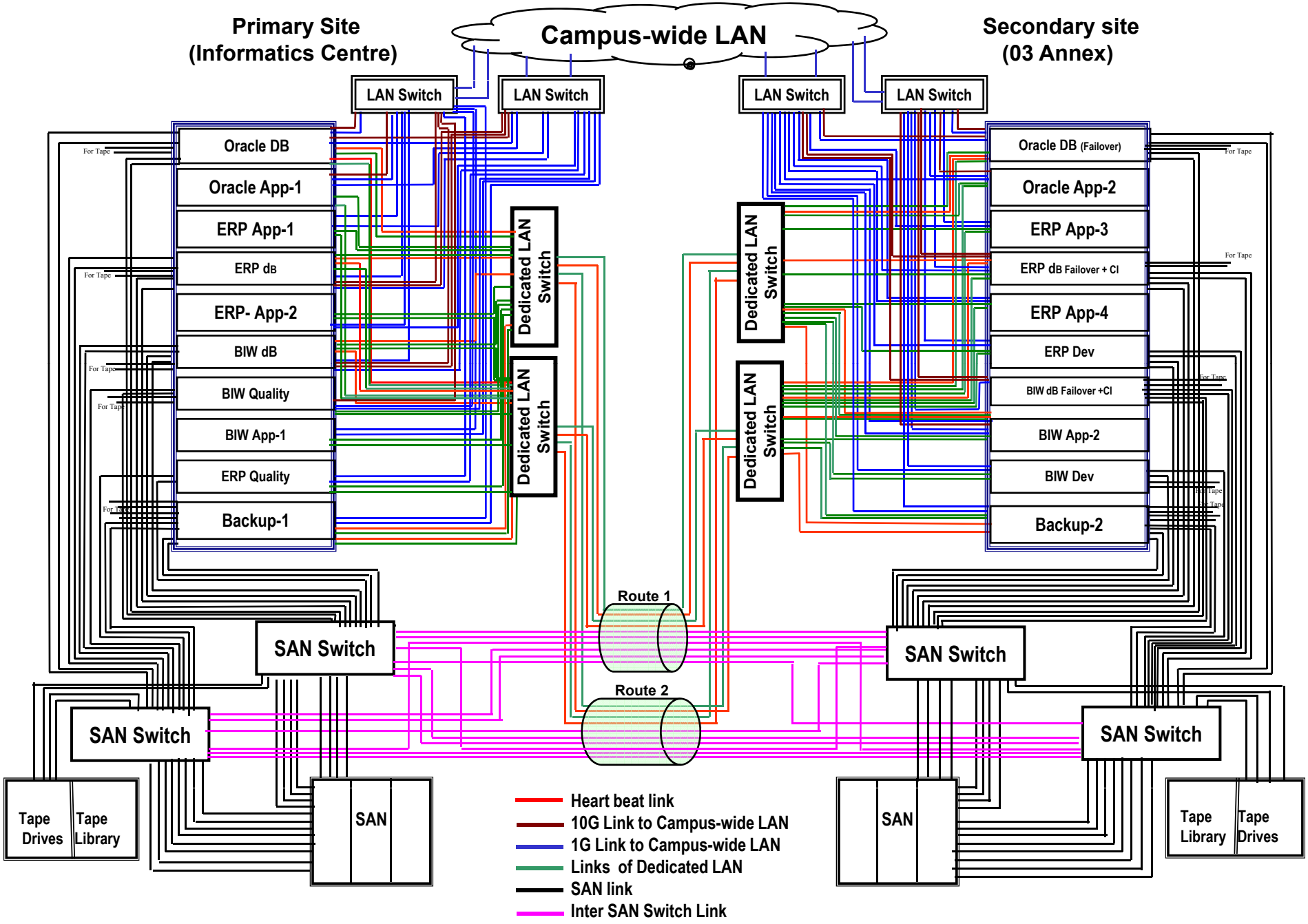
(one in the Primary site and one in the DR site)

The Archival Appliance shall have the following features:

- The Archival System shall have Two UDO2 drives with a library capacity of 80 slots.
- The Media type shall be of UDO2 and shall be supplied with 200 Nos. of UDO2 (60GB each) write once media.
- The RAID cache (Disk Drives) shall be of 2TB capacity.
- The interfaces shall be of Gigabit Ethernet.
- All the Software to be supplied along with licenses to port on Unix platform.

Schematic diagram of Server Infrastructure-BHEL : Hyderabad

Annexure-IA



Annexure-II

Scope, Terms and Conditions for the supply of Server Infrastructure-Part(A) and Creation of Data Centre(Part-B) on finance lease for a period of 5 years / Outright purchase

Terms Used:

OEM – Original Equipment Manufacturer / Principal Equipment Manufacturer
Bidder – Bidder participating in the tender as per the qualification criteria
AMC – Annual Maintenance Contract

A. SCOPE OF LEASE RENTAL		Bidder's Compliance Yes / No	Bidder's Remarks
1.	**Part-A). Provision of Server Infrastructure at Informatics Centre (Primary site) and at 03 Annex (Disaster Recovery Site):** The Server Infrastructure shall have a High available Server & Storage at the Primary Site and a similar Server & Storage at the Secondary Site (Internal Disaster Recovery Site). The proposed solution shall be centralized architecture with Server & Storage at Primary and Server & Storage at Secondary sites. These Servers at both the Sites are kept in the High available cluster in load sharing and Failover modes. The Primary & Secondary Servers shall host the existing Oracle based Applications, Development and Production environment for ERP Rollover to all the BHEL Products, Backup & Recovery requirements and expandability provision for future requirements. The sizing of the Server shall be based on the SAPS. The technical details are given in Technical Specifications at Annexure-I and check list given at Annexure-V. **Part-B). Creating Data Centre Environment at Primary and Disaster Recovery Site:** Creation of new Data Centre Environment at Primary Site (Informatics Centre) and at Disaster recovery site (03 Annex First Floor) with fire resistant materials, proper UPS system with Generator Backup, Precision ACs, Fire detection-cum-suppression System, water leak detection System and Security & Surveillance system. The technical details are given in Technical Specifications at Annexure-VI and check list given in Annexure-VII. **Note:** The two components, Server Infrastructure(Part-A) and Creation of Data Centre(Part-B) is to be offered under Finance lease as well as on outright purchase option. BHEL can choose any one option based on financial feasibility based on RBI Prime lending rate+1% as per formats enclosed in Annexure-VIII.		

B. Bidder Qualification Criteria		Bidder's Compliance Yes / No	Bidder's Remarks
2.	**Bidder** should be either OEM of Servers who is willing to under take total scope of work OR an Authorized System Integrator of the OEM of Server to quote for this tender. The system Integrator shall submit a letter of Authorization from OEM for this specific tender. The Certificate / Authorization Letter specific to this tender must be enclosed with the Technical Bid, without which the offer shall be liable for rejection.		
3.	A bidder shall submit only one bid of a single OEM.		
4.	The Bidder and the OEM has to support the Enterprise Server Infrastructure (Server Infrastructure shall include Servers, Storage and Backup Tape Libraries) for the 5 year lease period or up to 3 years from warranty period (warranty period shall be 24 months from date of commissioning) incase of outright purchase. Bidder & the OEM shall give commitment letter in this regard. Bidder/OEM shall also give AMC support for a period of 5 years beyond contract period of 5 years. All Software Updates shall be provided on regular basis during the contract period at no extra cost. % of AMC after contract period has to be specified in the technical bid.		
5.	I) The Bidder should have experience in Installing, Commissioning and Maintenance of Enterprise Server Infrastructure and projects relating to Data Centre creation. (The executed work under Server Infrastructure should be of total Solution and Enterprise Server Infrastructure Setup, which consists Enterprise Servers, Enterprise SAN Storage, Enterprise Backup Tape Libraries along with Maintenance and Monitoring) II) In addition Bidder should have a minimum of 2 years of experience as on 31st March 2007 of Annual Maintenance/Lease rental contract for Corporate Enterprise Server Infrastructure projects. **Order copies of works Executed and annual AMC/Lease Rental contract should be provided by Bidder along with the Techno-commercial Bid.**		
6.	Bidder should fulfill all statutory and safety requirements for personnel engaged while executing the contract. Due to non compliance of the applicable statutory provisions, if BHEL has to incur any expenditure in this regard the same will be recovered from the Bidder.		
C. Techno-Commercial Terms and Conditions		Bidder's Compliance Yes / No	Bidder's Remarks
7.	The offer should be valid for 180 days from date of opening Price bid.		
8.	Lease rentals quoted shall be all inclusive of the following during the lease period and shall remain FIRM without any variation till completion of the lease contract, except for lease tax if any: a. Freight, handling and packing charges, transit		

	insurance, installation. b. On-site comprehensive maintenance c. On-site comprehensive Insurance covering total scope of supply and man power. d. Spares & Software/Firmware Updates e. All taxes & Duties. f. <u>All other expenses not mentioned above</u>. **Note :** **1) Any changes in lease taxes are to BHEL's account. Payment of applicable taxes and duties mentioned in the tender is on the submission of Documentary proof of actual paid by vendor, subject to the submission of the details of taxes & duties and the rate considered at the time of submission of original bid.**		
9.	Comprehensive maintenance shall include the following : a. Replacement of faulty equipment b. Installation charges c. Site inspection charges d. Cost of Maintenance Engineers e. Supply of spares		
10.	On-site Comprehensive insurance covering total scope of supply and man power during the currency of the contract.		
11.	The bidder should provide 24x7 support for the Server Infrastructure equipment. Any component/equipment failed shall be replaced/replenished within 4 hours on all days of the week.		
12.	**Spares:** The Bidder shall ensure the availability and maintain the required spares to maintain the required uptime, during the contract period and also during 5 years beyond lease period.		
13.	Lease Rentals: Lease Rentals will commence only after successful supply, installation and commissioning of the entire Server Infrastructure equipment as per the scope of the contract. The completion of installation and commissioning shall be as per the ATP (Acceptance Test Plan) and shall be certified by BHEL. The Supply, Installation and Commissioning shall be completed in all respects with in four months from the date of Issue of Letter Of Intent (LOI).		
14.	Lease Rentals will be paid on quarterly basis, on successful completion of each quarter and on certification by BHEL. In case of outright purchase, 80% of the value of the equipment will be made within 90 days from the date of delivery, against the receipt of equipment and balance 20% against successful commissioning along with Bank Guarantee valid for warranty period and period of AMC Contract after warranty period. The AMC charges after warranty period shall be paid on equal quarterly installment basis after end of each quarter.		

15.	Terminal charges to be paid at the end of the contract period is Rs.1/- (rupees one only). On payment of terminal charges, the ownership of entire System including all the equipment, spares & software will get transferred to BHEL without any other payments. BHEL reserves the right to take possession of the equipment by paying the terminal charges. In case BHEL decides to surrender the equipment after the expiry of the contract, Bidder shall remove the equipment from BHEL premises at his own risk and cost after due permission from BHEL within a month after receiving communication in this respect.		
16.	The Annual Maintenance Charges subsequent to the 5 year lease period shall be quoted as a percentage of outright purchase value of each item. The scope of AMC after contract period shall be comprehensive including spares & Services and shall be applicable for a period of 5 years and will be binding on the Bidder. % of AMC after contract period has to be specified in the technical bid. BHEL reserves the right to enter in to AMC after the Lease Rental period.		
17.	The Annual Maintenance Charges subsequent to the outright purchase warranty period (24 months) shall be quoted as a percentage of outright purchase value of each item. The scope of AMC after warranty period shall be comprehensive including spares & Services and shall be applicable for a period of 8 years and will be binding on the Bidder. % of AMC after contract period has to be specified in the technical bid. BHEL reserves the right to enter in to AMC after the warranty period.		
18.	Delivery of all the equipment shall be within 10 weeks from date of LOI (Letter Of Intent) and shall be commissioned with in 16 weeks after LOI. Penalty will be levied in case of delays @ ½ % per week of delay, of total outright value of all items ordered, subject to a maximum of 10%. Incase of non acceptance of the above, loading will be done considering the proportionate of maximum % of penalty, only for the purpose of evaluation.		
19.	Complete technical literature pertaining to the products, any relevant bench mark results/test results are to be submitted along with technical offer.		
20.	The Bidder has to post Five qualified Engineers (OEM Certified) shall be stationed at BHEL site during contract period, for upkeep and maintenance of the Server Infrastructure as well as during AMC period. These engineers shall have expertise in managing the installed Server Infrastructure under the contract. Documentary proof of certification and experience of the engineers shall be provided. These engineers shall be available on-site between 7.30 AM to 4.30 PM during all working days of BHEL, Ramachandrapuram and shall be available on call basis round the clock, to meet any exigency. One person for each shift shall be available in two shifts i.e 6:45 Hrs to 15:15 Hrs and 15:00 Hrs to 22:00 Hrs.		
21.	The Bidder has to post Six qualified computer operators for attending to day to day activities in the data center shall be stationed at BHEL site during contract period as well as during AMC period. These		

	operators shall have basic experience in attending to Server/Storage/Tape library monitoring, taking backups, monitoring power, AC, Access control and Fire extinguishing system. These operators shall be available on-site round the clock in three shifts with two operators per shift.		
22.	Uptime of 99% shall be guaranteed for the Server Infrastructure equipment (Part-A) and 97% shall be guaranteed for Data Centre Equipment(Part-B) on monthly basis. Any down time beyond 1% in case of Server Infrastructure and 3% in case of Data Centre equipment will result in the reduction of lease rentals on Pro rata basis.		
23.	Bidder should arrange a system for registration, monitoring and redress of all Server Infrastructure complaints during the contract period		
24.	Hardware upgrades during rental contract period shall provide upward compatibility.		
25.	The Bidder shall submit the proposed plan of execution and the methodology to execute the plan at the time of bid submission.		
26.	The offers shall be evaluated based on the total lease rentals for 5 year in case of lease rental option or total outright cost with 2 year warranty and 3 year AMC in case of outright option, for the entire scope of the tender total cost of Part-A and Part-B. The total lease rentals are calculated based on the offered lease rental charges per Unit per Quarter. AMC charges quoted after 5 year contract period will not be considered for evaluation, but will be binding on the bidder after lease period, if BHEL decides to place AMC order. Tender will be evaluated on lowest cost to BHEL either in case of lease rental or outright purchase, as per the Price Bid format given in Annexure-III. **Note:** The two components, Server Infrastructure(Part-A) and Creation of Data Centre(Part-B) is to be offered under Finance lease as well as on outright purchase option. BHEL can choose any one option based on financial feasibility based on RBI Prime lending rate+1% as per formats enclosed in Annexure-VIII.		
27.	Successful bidder shall enter into lease rental agreement with BHEL on non-judicial stamp paper of required value as per extant rules, at their own cost as per the draft agreement format (Annexure-F)		
28.	**DOWNTIME CALCULATION FOR THE SERVICE** Bidder shall be responsible for maintaining a minimum uptime of 99% for the entire Server infrastructure on monthly basis. Any down downtime above 1% will be subject deduction of lease rentals on following basis. The downtime will be calculated on hourly basis per month on 24 hours basis. The Management Station record/report shall be basis for Uptime and Down time calculations. Deduction from payments will be made for non-availability of Server Infrastructure during the entire lease period as detailed below: Server Infrastructure have been classified into following three categories Category I - Enterprise Servers & related Software Category II - SAN Storage & related Software Category III - Backup Tape Library & related Software **Downtime calculation for Server Infrastructure Services**		

	Deduction from payments for each equipment will be made on downtime of equipment(s) on daily basis in each category as per the deduction formula given below for that category; The deductions for down time shall be on the Service/maintenance component of quarterly lease rentals. The total down time allowed shall be 72 Hours per month (1% of 30*24Hours) and payment deduction is applicable if the down time is more than 3 hours in a day. Service/Maintenance component of quarterly lease amount = Rs. A **For Category I** If equipment is down for > 3 Hours in a day Deduction for a equipment = Rs. (A*4) / 365 **For Category II** If equipment is down for > 3 Hours in a day Deduction for a equipment = Rs. (A *4) / (365 x 2) **For Category III** If equipment is down for > 3 Hours in a day Deduction for a equipment = Rs. (A *4) / (365 x 3) At the end of the contract period if any Server Infrastructure equipment is found down, final payment for the contract will be made only after system is made up. Downtime calculation will be applicable for non-availability of Server Infrastructure services arising because of malfunctioning of either Processors (CPUs), Input/Output Ports, Power Supply Units, Connecting Cables etc. **Note:** If the uptime for an equipment falls below 99% continuously for 1 month, the equipment shall have to be replaced by the Bidder, without any extra charge.		
29.	**TRAINING** Training of BHEL personnel shall be part of the contract. Advanced level training shall be provided by OEM / authorized training partner. BHEL will nominate 8 **persons** for this training for Six working days. During installation at BHEL, the associated BHEL coordinators shall be guided on the configuration being made and usage.		
30.	Training on Server Infrastructure: A comprehensive training on Servers, Storage, Tape Libraries will be offered by the Bidder. The training shall cover the installation & configuration, Analysis and Trouble shooting, Reports generation and its analysis. Training shall cover all features of the Management software.		
D. Termination of Lease contract and Consequences		Bidder's Compliance Yes / No	Bidder's Remarks
31.	BHEL reserves the right to terminate the order/contract, upon situations arising due to non-compliance of contract Terms & Conditions or non-performance of the equipment/system below 95% continuously for more than one month, at the risk and cost of the		

	Bidder. On termination of the lease agreement, no lease rent shall be payable to the Bidder for the remaining period from the date of Termination.		
32.	In case of the contract termination, Bidder shall remove the equipment from BHEL premises at his own risk and cost after due permission from BHEL within a month of serving notice in this respect.		
33.	Fore-closure: In case of fore-closure of the lease agreement by the BHEL for reasons not attributable to the Bidder, pro-rata compensation will be payable. Compensation will be equivalent to the basic price component for the remaining quarters of the lease period and the ownership of the equipment shall be transferred to BHEL.		
34.	**ACCEPTANCE OF ORDER** Bidder shall submit Letter of acceptance for the LOI/ Order/ Contract within one week.		
35.	**SHIFTING OF EQUIPMENT FROM A LOCATION TO OTHER** BHEL reserves the right to relocate the equipment. Shifting of equipment from one location to another with in BHEL campus shall be the responsibility of the Bidder.		
36.	**PATENTS & TRADEMARKS** Bidder shall at all times indemnify BHEL against all claims which may be made in respect of the Systems/goods/Software supplied, for infringement of any right protected by patent, registration of designs or trade marks and legality of usage of Software. In the event of any such claims being made against BHEL, BHEL will inform the Bidder who shall at his own cost either settle any such dispute or conduct any litigation that may arise there from.		
37.	**Risk Purchase :** BHEL reserves the right to exercise 'Risk Purchase' option for procurement of the undelivered items, or their equivalent, from any other source at the cost of the Bidder in case there is delay of more than 12 weeks beyond the delivery date, in completing the execution of the order. Similarly, the 'Risk Purchase' option shall be exercised by BHEL for spares and services in case of excessive downtime or poor maintenance support. Such expenses will be deducted from any payment due to the Bidder from BHEL. Bidder is responsible for the integration/maintenance of the equipment purchased under 'Risk Purchase' clause.		
38.	**Indemnity :** Bidder shall fully indemnify and keep indemnified BHEL against all claims which may be made in respect of the use of System/Software/Item(s)/services supplied/rendered by the Bidder, for infringement of any rights protected by patent, registration of designs or trademarks and legality of the Software. All such claims in this regard will be settled as per Indian Laws. In the event of any such claims being made against the BHEL, BHEL will inform in writing to the Bidder who shall at his own risk and cost either settle any such dispute or conduct any litigation that may arise		

	there from.		
39.	**Insurance:** Comprehensive insurance cover for all equipment during the currency of the contract. The responsibility for the insurance will rest with the Bidder only. Insurance for the complete Systems/Goods shall be arranged by the Bidder at his own risk and cost throughout the period of lease contract. Evidence of insurance policy shall be submitted to BHEL		
40.	**Confidentiality:** Bidder shall, at all times, undertake to maintain complete confidentiality of all data, information, software, drawings & documents, etc. belonging to the BHEL and also of the Systems, procedures, reports, input documents, manuals, results and any other company documents discussed and/or finalized during the course of execution of the order/contract		
41.	**Arbitration :** In all cases of disputes emanating from and in references to this agreement the matter shall be referred to the arbitration of the sole arbitration of the Executive Director/ GM of BHEL, Hyderabad or any other person (including an employee of BHEL, even though he had to deal with the matter relating to this agreement in any manner) nominated by the said Executive Director /GM to act as sole arbitrator. The arbitration shall be under 'THE ARBITRATION AND CONCILIATION ACT OF 1996' and the rules there under. The arbitrator may from time to times with the consent of the parties enlarge the time for making and publishing the award		
42.	Withdrawal from the Contract: In case the bidder withdraws the offer submitted by him/her after it is accepted by BHEL and fails to supply the goods as per the terms and conditions of the contract, or at any time repudiated the contract wholly or in part, BHEL shall be at liberty to cancel the purchase order and to recover from the bidder the extra cost and the other loss incidentals to the breach of contract on the part of the Bidder.		
43.	In addition to the terms and Conditions mentioned in this document, General Terms and Conditions in Annexure-IV are to be adhered to.		
44.	BHEL reserves the right to finalize the tender through Reverse Auction, as per the Terms and Conditions of reverse auction is given in General Terms and Conditions Annexure-IV.		

Annexure-IV

General Terms and Conditions

1. BIDDER TO INFORM HIMSELF FULLY:

1.1. The bidder shall closely peruse all the clauses, specifications and requirements and drawings etc., specified in the tender documents, and the offer made should be in accordance with these documents. If bidder requires any clarification and additional information on any of the tender documents/conditions, the bidder shall contact the BHEL Official inviting bids at the earliest.

1.2. Bidders are advised to study all the tender documents carefully and submit their offer and the Bidder obliged to honor the offer without any modifications. Any offer not meeting the scope/specifications, terms, conditions, and any other clause specified in the tender documents shall be liable to be rejected.

2. PROCEDURE FOR SUBMISSION OF BIDS

2.1 Tender documents may be obtained from DGM Purchase (CMM), Admin Building, 4th Floor, BHEL, Ramachandrapuram, Hyderabad on payment of non-refundable document fee of Rs 15000/.

2.2 Tender documents may also be downloaded from www.bhel.com. Non-refundable document fee of Rs.15000/- shall be paid along with the offer.

2.3 Mode of payment: Cash deposit made at cash office, BHEL, Ramachandrapuram, Hyderabad or as Demand Draft from any nationalized bank / scheduled bank, drawn in favour of **M/s Bharat Heavy Electricals Limited, Ramachandrapuram**, Payable at Hyderabad.

2.4 The Techno-Commercial bid and Price Bid shall be submitted Hard copies or through Email on or before 14:00 Hrs of the due date indicated in the tender notice.

2.5 Offer shall be made in three parts in separate envelopes, as specified below.

Part-I: Documentation Fee

This part to verify the receipt of Documentation fee. The following document shall be submitted in a separate envelope:

1. Demand Draft or cash receipt / copy of cash receipt for Rs 5,000/ towards Document fee.

Please Note: Part-II of bid will be opened, only if the Part-I is satisfactory.

Part-II: Techno-Commercial Bid

This part shall consist of the following documents in a separate envelope:

a. Technical offer by the bidder including literature/leaflets. The offer shall be only as per the format given in the Technical Specifications as given in Annexure-I, duly signed by Authorised signatory.

b. The Scope, Terms and Conditions as per the format given in Annexure-II, duly signed by Authorised signatory.

c. The General Terms and Conditions as given in Annexure-IV, duly signed by Authorised signatory.

d. Authorisation Letter from the OEM duly signed by Authorised signatory.

e. Price Bid without price/values with details of duties as per Annexure-III duly signed by Authorised signatory..

f. Proof / record of Bidder's experience and / or qualifications as requested in FORM-E duly signed by Authorised signatory.

Part-III: Price Bid

This part shall consist of the following documents in a separate envelope:

a. Price Bid as per the format defined in Annexure-III. The prices shall be quoted in Indian Rupees only.

b. Price Bid shall not contain any technical details and / or Techno-Commercial terms and conditions.

c. BHEL reserves the right to finalize the Price Bids based on Reverse Auction procedure.

3. MARKINGS ON THE ENVELOPE

3.1 The three part of the offer – Part-I, Part-II and Part-III – shall be submitted in separate envelopes with bidder's distinctive SEAL and super-scribed with the details given below:

PART-I: 1. Enquiry Number and Item Description for the Tender
2. Due Date for Opening of the Tender
3. "PART-I: DOCUMENTATION FEE"

PART-II: 1. Enquiry Number and Item Description for the Tender
2. Due Date for Opening of the Tender
3. "PART-II: TECHNO-COMMERCIAL BID"

PART-III: 1. Enquiry Number and Item Description for the Tender
2. Due Date for Opening of the Tender
3. "PART-III: PRICE BID"

Note: Un-sealed envelopes and envelopes not super-scribed as above will be liable to be rejected.

4. BID SUBMISSION

4.1 Bids shall be addressed to the BHEL official inviting Bids by name and designation and sent to the following address on or before the tender due date:

Dy. General Manager, Purchase (CMM),
Admin Building, 4th Floor,
BHEL, RAMACHANDRAPURAM,
HYDERABAD – 502032.

Bids can also be dropped in tender box provided in purchase department on or before the tender due date. Bids can be submitted by post with due allowance for postal delay.

4.2 Whosoever vendor desirous to send the offers (complete in all respects) on their risk through E-mail, have to send the offers to the common email address: **tenderbox@bhelhyd.co.in** . The received email offers will be printed by purchase coordination and put them in covers as per conventional method for tender opening i.e. Techno-commercial Bids and Price Bids shall be put into two separate covers. Superscribing enquiry no. and due date. Offers sent to any other Email ID and incomplete offers shall not be considered for evaluation purpose.

5. BID OPENING

5.1 PART-II (Techno-commercial bid) shall be opened on the due date and time as specified in the Enquiry, for the bids that have satisfied the criteria in Part-I, in the presence of bidders who may like to attend. Part-III (Price Bid) shall be opened only for such offers, which have qualified for PART-II.

5.2 In case of Price Bid opening, date and time of Price Bid (Part-III) opening shall be intimated to the technically and commercially acceptable bidders only.

5.3 Not more than two representatives will be permitted to be present for the tender opening.

5.4 No correspondence shall be entertained from the bidders after the opening of Price Bid(s).

5.5 Standard pre-printed conditions of the bidders attached to the offer will not be considered and only those mentioned in the body of the offer will be considered.

5.6 Unsolicited bids shall not be entertained. Unsolicited revised Price Bids also, shall not be entertained at any stage of the tendering process.

5.7 No Literature, Pamphlets other than what is relevant for the offer shall be enclosed. All such enclosures shall be considered as unread and also will not be considered as part of the quotation.

5.8 Manufacturer's name, trade Mark or Patent No., if any, should be specified.

5.9 BHEL reserves the right to finalize the tender through reverse auction.

6. VALIDFITY OF OFFER

6.1 The offer shall have a minimum validity period of 180 days from the Date of opening the price bids.

7. LANGUAGE AND CORRECTIONS

7.1 The offer shall be in English only international numerals shall be used.

8. ALTERATIONS, REJECTION OF BID AND OTHER CONDITIONS

8.1 BHEL reserves the right to reject the offer at any stage of the tender.

8.2 Any format not properly filled, partially filled or not filled will make the bid liable for rejection. Bidders are requested to note that all columns, rows and spaces provided to fill up the data must be filled with relevant data without fail. In case any bidder fails to do so or fills up irrelevant data, BHEL is not bound to seek clarifications on such items and will be free to reject the tender summarily.

8.3 Equipment offered must be of latest and state of art technology and have current certifications. Future expectations of certification, conditional certifications, variation in certification and certification for equipment different from the make and model offered in the bid is not acceptable.

8.4 No request for change in specifications, clauses of contract, Terms and Conditions etc shall be entertained by BHEL under any circumstances.

8.5 Any clarification pertaining to this tender can be obtained from Dy. General Manager, Purchase(CMM), BHEL, R.C.Puram, Hyderabad on all working days of BHEL between 14:00 Hrs to 16:00 Hrs. Bidders are requested to seek appointment on telephone no. 040-23184562/23182052, prior to visiting BHEL for seeking such clarifications.

8.6 Late bids are liable to be rejected.

8.7 The offer is liable to be rejected, if it is found after the Price Bid Opening, the Price Bid offered is different from that of the Un-Price Bid submitted by the bidder as a part of Technical offer.

8.8 If the bidder deliberately gives wrong information in his bid, Purchaser/Lessee reserves the right to reject such a bid at any stage or to cancel the Order/Contract.

8.9 If the Prices/Rates of one or more of the enquired equipments have not been quoted, the offer is liable to be rejected. In such case highest value(s) offered for such equipment will be considered for all purpose including evaluation and order will be based on quoted price.

8.10 Non-compliance with any of the requirements and instructions of the Tender Enquiry may result in the rejection of the bid.

9. TENDER EVALUATION

9.1 In case of lease rental option, the offers will be evaluated based on the total cash outflow value for the entire scope of the tender.

9.2 In case of Outright option, the offer will be evaluated based on sum of outright price and the AMC Charges after warranty period (24 months from the date of commissioning) for the entire scope of the tender for a total contract period of five years.

9.3 Totals /Gross Total of Prices should be indicated both in words as well as in figures. If there is a difference between price quoted in words and figures or if there is any other price discrepancy, higher value(s) will be considered for evaluation and lower values will be considered for ordering.

9.4 Though offer of higher warranty/configuration/rating, than what is required as per tender specifications, may be accepted, no extra weightage or preference will be given for the same.

9.5 The offers shall be evaluated based on the total lease rentals for 5 year for the entire scope of the tender. The total lease rentals are calculated based on the offered lease rental charges per Unit per Quarter. AMC charges quoted after lease period will not be considered for evaluation, but will be binding on the bidder after lease period, if BHEL decides to place AMC order.

9.6 Prices of optional items, if any, shall not be considered for Price evaluation and comparison, unless stated otherwise

9.7 Order/contract or any part thereof shall not be sub-contracted, assigned or otherwise transferred without prior written consent of the Purchaser/Lessee.

9.8 The Bidders shall offer Bi-lateral Direct lease rental agreement only

10. Terms and Conditions for Reverse Auction: Against this enquiry for the subject items/systems with detailed scope of supply as per enquiry specifications, BHEL may resort to "REVERSE AUCTION PROCEDURE" i.e. ONLINE BIDDING ON INTERNET.

A. For the proposed reverse auction, technically and commercially acceptable bidders only shall be eligible to participate.

B. BHEL will engage the services of service provider who will provide all necessary training and assistance before commencement of online bidding on internet.

C. BHEL will inform the vendors in writing in case of reverse auction, the details of Service provider to enable them to contact & get trained.

D. Business rules like event date , time, start price, did decrement, extensions etc. also will be communicated through service provider for compliance.

E. Vendors have to fax the Compliance form in the prescribed format (provided by the Service Provider) before start of Reverse Auction. Without this, the Vendor will not be eligible to participate in the event.

F. BHEL will provide the calculation sheet (e.g. EXCEL sheet) which will help to arrive at "Total cost to BHEL" like Packing & forwarding charges, Taxes and Duties, Freight charges, Insurance, Service Tax for Services and loading factors (for non-compliance to BHEL standard Commercial Terns and conditions) for each of the vendor to enable them to fill-in the prices and keep it ready for keying in during the Auction.

G. Reverse Auction will be conducted on scheduled date and time.

H. At the end of Reverse auction event, the lowest bidder value will be known on the network.

I. The lowest bidder has to Fax the duly signed filled-in prescribed format as provided on case-to-case basis to BHEL through service Provider within 24 hours of Auction without fail.

J. Any variation between the on-line bid value and the signed document will be considered as sabotaging the tender process and will invite disqualification of vendor to conduct business with BHEL as per prevailing procedure.

K. In case BHEL decides not to go for Reverse Auction procedure for this tender enquiry, the Price bids and price impacts if any, already submitted and available with BHEL shall be opened as per BHEL standard practice.

11. CHECKLIST OF FORMATS

(TO BE ATTACHED WITH TECHNO-COMMERCIAL BID (PART II) DULY FILLED BY THE BIDDER)

S No.	Annexure to be attached	Format attached as per FORM /Annexure	Whether Attached (Yes / No)
1	Technical Specifications	Annexure-I	Yes/No
2	Server Infrastructure Diagram	Annexure-IA	Yes/No
3	Authorization letter from OEM.	FORM-A	Yes / No
4	No Deviation Certificate	FORM-C	Yes / No
5	Annual Financial Statement of Bidder	FORM-D	Yes / No
6	Corporate Server Infrastructures where the bidder is maintaining SLA Details of major Executed projects with Order copies.	FORM-E	Yes / No
7	Draft Lease agreement	FORM-F	Yes/No
8	Details of Existing UPS	FORM-G	Yes/No
9	Scope, Terms & Conditions	Annexure-II	Yes/No
10	Price format without prices, indicating the % of Statutory Levies / Taxes	Annexure III	Yes / No
11	General Terms and Conditions	Annexure IV	Yes/No
12	Plan & methodology of project execution and ATP		Yes / No
13			

FORM-A

"LETTER OF AUTHORITY"

Date: _____

To,

_____

_____

Subject: **Letter of Authority**

Tender Ref. No.: _____ **dated** _____

Dear Sir,

We hereby authorize _____ who will fulfill the requirements of the tender enquiry ref. no. _____, dated _____ to quote/ negotiate and service the equipment as required in the above tender enquiry.

This authorization is valid for the following equipment for which we are the OEM:

Our Spares Logistic centers in India are at the following locations:

The authorized agency would ensure reliable service during complete lease period. In case of any default alternative arrangement would be done by us on the same terms and conditions as negotiated and finalized in this tender enquiry.

(Authorized Signatory)

For _____ Place:

Date:

Note: This 'Letter of Authority' should be issued on the letterhead of OEM and enclosed in Part-II.

FORM-C

NO DEVIATION CERTIFICATE

This is to certify that our offer is exactly in line with your tender enquiry no._____ _____ **dated _____.** This is to expressly certify that our offer contains **no deviation** either Technical or Commercial in either direct or indirect form.

Signed By:

Name: _____

Designation: _____

Organization: _____

Date & Place: _____

Phone/Fax/Mobile/Email: _____

Stamp & Seal: _____

Place:

Date:

FORM-**D**

FINACIAL STATEMENT OF BIDDER

S.No.	Financial Year	Turnover (In Rs. Crores)	Net Profit
1	2002-2003		
2	2003-2004		
3	2004-2005		
4	2005-2006		
5	2006-2007		

Place: Signature with seal

Date:

FORM- **E**

DETAILS OF ORDERS EXECUTED

(As per Qualification Criteria)

S.No.	Organisation Name & Contact Person details	Type of equipment supplied	Details of Server Infrastructure
1			
2			
3			

Place: Signature with seal

Date:

FORM-F

Contract Ref:

Agreement for LEASE RENTAL AND MAINTENANCE

This agreement made on this day of 2006 between M/s -------- ----------, incorporated under Companies Act, 1956 and having its Registered office at ---------- (hereinafter called the 'Company' which expression shall, unless it be repugnant to the context or meaning thereof, mean and include its successors and assignees) of the one part, and the BHARAT HEAVY ELECTRICALS LTD, Ramachandrapuram, Hyderabad – 500032, incorporated under the Companies Act, 1956 and having its Registered Office at BHEL House, Siri Fort, New Delhi (hereinafter called the 'BHEL' which expression shall, unless repugnant to the context or meaning thereof, mean and include its successors and assignees) of the other part.

Whereas 'Company' is in the business of manufacturing and/or selling and renting out equipment(s) and whereas the 'BHEL' has placed an order (No: ----------) on Company for hiring Computer Server Infrastructure Equipment i.e. Enterprise Servers, Storage and Backup Tape Libraries for a period of Five years as per the Lease Rental Contract (No: ----------) and 'Company' has agreed to renting out the said equipment(s) to the 'BHEL' under the following terms and conditions.

Now, therefore, the agreement witnesseth as follows:

1. CONTRACT REFERENCE:

1.1 This Document shall be read along with the Lease Rental /outright purchase Contract order '_____'. The Terms & Conditions of the Lease Rental/outright purchase Contract order shall be fulfilled along with the clauses of this agreement.

2 SCOPE of CONTRACT (in Brief):

2.1 'Company' will design, supply, install, configure, test, commission and maintain the Server Infrastructure and Data Centre Equipment on Five year lease rental basis or outright purchase basis in consideration of Lease Rental Payment/outright payment as per Terms and Conditions of the Contract.

3. DEFINITIONS:

3.1 The following expressions herein used shall, unless repugnant to the subject or context thereof, carry the meaning hereunder respectively assigned to them namely

'CONTRACT' means the Lease Rental/outright purchase Contract order referred in the Clause 1.0.

'EQUIPMENT' shall mean all the equipment supplied against the 'CONTRACT'.

'DATE OF INSTALLATION' shall mean the date given in the certificate of acceptance by 'BHEL' after the equipment is installed, commissioned & acceptance testing as per Terms & Conditions of the 'CONTRACT'.

'QURTERLY LEASE RENTAL' means Lease Rental Payment for Three months and payable after completion of the quarter.

'TERMINAL PAYMENT' means the one time fixed charges as specified in 'CONTRACT', be paid by 'BHEL' at the end of the Lease Rental Contract.

Upon the payment of 'Terminal Payment', the ownership of the entire equipment is transferred to 'BHEL' and 'Company' has no right on the Equipment.

'On site facilities' shall mean suitable dust free accommodation at 'BHEL' premises to house the equipments with power connection, air-conditioning, as required.

4. Equipment Supply, Installation, Acceptance Test, etc.:

4.1 'Company' will furnish relevant test certificates, certificate of newness of equipment and any other statutory documents for the all the equipment.

4.2 'Company' will furnish relevant test certificates, certificate of newness of equipment and any other statutory documents for the all the equipment.

4.3 'BHEL' shall at its own cost, provide onsite facilities for the equipment.

4.4 'Company' shall arrange for all statutory clearances at its own cost for executing the contract.

5. MAINTENANCE:

5.1 Maintenance service will cover services, repairs and replacements necessary to keep the equipments in good working order on reasonable use of the equipments during the lease period. Periodic maintenance check should be carried out to keep the equipments in good working conditions. Maintenance will include all plastic and/or rubber parts, existing/New UPS, UPS batteries, etc. Batteries of all UPS are to be replaced in the last quarter of the lease contract.

5.2 The 'Copmany' will station Five qualified and experienced Engineers (OEM Certified) at BHEL site during contract period, for upkeep and maintenance of the Server Infrastructure. These engineers shall be available on-site between 7.30 AM to 4.30 PM during all working days of BHEL, Ramachandrapuram and shall be available on call basis round the clock, to meet any exigency. One person for each shift shall be available in two shifts i.e 6:45 Hrs to 15:15 Hrs and 15:00 Hrs to 22:00 Hrs

5.3 'Company' will maintain the required spares to maintain the contractual uptime for the Server Infrastructure.

5.4 'Company' shall arrange a system for registration, monitoring and redress of all Server Infrastructure complaints during the contract period.

5.5 'Company' will provide 24x7 support for the Server Infrastructure Equipment.

5.6 SHIFTING OF EQUIPMENT FROM A LOCATION TO OTHER

'BHEL' reserves the right to relocate the equipment. 'Company' is responsible for shifting of equipment to the required location and to integrate and configure in to the Server Infrastructure system.

5.7 The Company's maintenance service obligations shall be subject to force-meajure, which shall include circumstances beyond the reasonable control of the Company.

6. PERFORMANCE GUARANTEE & DOWNTIME CALULATION:

6.1 'Company' will guarantee Uptime of 99% for all Server Infrastructure equipment on monthly basis. Any down time beyond 1% will result in the reduction of lease rentals on Pro rata basis.

6.2 'Company' shall arrange a system for registration, monitoring and redress of all Server Infrastructure complaints during the contract period.

6.3 DOWNTIME CALCULATION FOR THE SERVER INFRASTRUCTURE SERVICE

'Company' is responsible for maintaining a minimum uptime of 99% for the entire Server Infrastructure on monthly basis. Any down downtime above 1% will be subject deduction of lease rentals on following basis.

Bidder shall be responsible for maintaining a minimum uptime of 99% for the entire Server infrastructure on monthly basis. Any down downtime above 1% will be subject deduction of lease rentals on following basis.

The downtime will be calculated on hourly basis per month on 24 hours basis. The Management Station record/report shall be basis for Uptime and Down time calculations.

Deduction from payments will be made for non-availability of Server Infrastructure during the entire lease period as detailed below:

Server Infrastructure have been classified into following three categories

Category I - Enterprise Servers & related Software

Category II - SAN Storage & related Software

Category III - Backup Tape Library & related Software

Downtime calculation for Server Infrastructure Services

Deduction from payments for each equipment will be made on downtime of equipment(s) on daily basis in each category as per the deduction formula given below for that category; The deductions for down time shall be on the Service/maintenance component of quarterly lease rentals.

The total down time allowed shall be 72 Hours per month (1% of 30*24Hours) and payment deduction is applicable if the down time is more than 3 hours in a day.

Service/Maintenance component of quarterly lease amount = Rs. A

For Category I

If equipment is down for > 3 Hours in a day

Deduction for a equipment = Rs. (A*4) / 365

For Category II

If equipment is down for > 3 Hours in a day

Deduction for a equipment = Rs. (A *4) / (365 x 2)

For Category III

If equipment is down for > 3 Hours in a day

Deduction for a equipment = Rs. (A *4) / (365 x 3)

At the end of the contract period if any Server Infrastructure equipment is found down, final payment for the contract will be made only after system is made up.

Downtime calculation will be applicable for non-availability of Server Infrastructure services arising because of malfunctioning of either Processors (CPUs), Input/Output Ports, Power Supply Units, Connecting Cables etc.

Note:

If the uptime for an equipment falls below 99% continuously for 1 month, the equipment shall have to be replaced by the Bidder, without any extra charge.

7. TRAINING:

7.1 Training of 'BHEL' personnel shall be part of the contract.

During installation at 'BHEL', 'Company' will guide the associated 'BHEL' coordinators on the configuration being made and usage.

'Company' will arrange Advanced level training by OEM / OEM authorized training partner.

'BHEL' will nominate 8 **persons** for this training for Six working days

7.2 Training on Server Infrastructure:

'Company' will provide comprehensive training on Servers, Storage, Tape Libraries will be offered by the Bidder. The training shall cover the installation & configuration, Analysis and Trouble shooting, Reports generation and its analysis. Training shall cover all features of the Management software.

8. LEASE RENTALS & TERMINAL CHARGES:

8.1 The Lease Rental is inclusive of the following during the lease period and shall remain FIRM without any variation till completion of the lease contract:

Freight, handling and packing charges, transit insurance, installation.

On-site comprehensive maintenance including replacement of components free of cost.

On-site comprehensive Insurance covering total scope of supply and man power.

Spares & Software/Firmware Updates

All taxes & Duties

8.2 Comprehensive maintenance shall include the following:

Replacement of faulty equipment/spares free of cost.

Installation charges

Site inspection charges

Cost of Maintenance Engineers

Lease tax/right to use tax / any other statutory levies including service tax.

8.3 On-site Comprehensive insurance covering total scope of supply and man power during the currency of the contract. The beneficiary of the Insurance should be BHEL

8.4 'QURTERLY LEASE RENTAL' payment shall commence from the 'Date of installation'. Quarterly Lease Rental shall be payable to 'Company' after the successful completion of the quarter.

8.5 The Lease Rentals payable under this Agreement during the Lease period shall be paid by 'BHEL' to financing Agency. The Lease Rental shall be paid through an Account Payee cheque favouring '_____' (Financing Agency). The 'Company' shall submit a discharge certificate and indemnity bond to 'BHEL' for the lease rentals paid to the '_____'(Financing Agency) by 'BHEL'.

8.6 That these instructions at clause 4.2 are irrevocable. Any request from the 'Company' to change these instructions would come with the attached "No objection Certificate" from '_____' (Financing Agency).

8.7 On payment of terminal charges, the ownership of entire Server Infrastructure system including all the equipment, spares & software will get transferred to 'BHEL' without any further payments. 'BHEL' reserves the right to take possession of the equipment by paying the terminal charges.

In case 'BHEL' decides to surrender the equipment after the expiry of the contract, 'Company' shall remove the equipment from BHEL premises at his own risk and cost after due permission from 'BHEL'.

9. TERMINATION and FORE-CLOSURE:

9.1 Termination: 'BHEL' reserves the right to terminate the order/contract, upon situations arising due to non-compliance of contract Terms & Conditions or non-performance of the equipment/system with downtime above 2% continuously for more than one month.

On termination of the 'Contract', no lease rent shall be payable to 'Company' or the 'Financing Agency' or any other party, for the remaining period from the date of Termination

In case of Termination of the 'Contract', 'Company' shall remove the equipment from BHEL premises at his own risk and cost after due permission from 'BHEL'.

9.2 Fore-closure: In case of fore-closure of the 'Contract' by 'BHEL' for reasons not attributable to 'Company', pro-rata compensation will be payable. Compensation will be equivalent to the basic price component for the remaining quarters of the lease period and the ownership of the equipment will be transferred to 'BHEL'.

10. ANNUAL MAINTENANCE after Lease Period:

10.1 'Company' will extend Annual Maintenance Contract at the rates given the 'CONTRACT', subsequent to the lease rental period.

11. PATENTS, TRADEMARKS and INDEMNITY:

11.1 'Company' will at all times indemnify and keep indemnified 'BHEL' against all claims which may be made in respect of the Equipment/System/Software/Services supplied/rendered by 'Company', for infringement of any right protected by patent, registration of designs or trade marks and legality of the Software.

All such claims in this regard will be settled as per Indian Laws.

In the event of any such claims being made against 'BHEL', 'BHEL' will inform 'Company' and 'Company' shall either settle any such dispute or conduct any litigation that may arise there from at its own cost.

12. INSURANCE:

12.1 'Company' will provide Comprehensive insurance cover for all Equipment during the currency of the 'Contract'. Insurance for the complete Systems/Goods shall be arranged by 'Company' at his own risk and cost throughout the period 'Contract.' 'Company' will submit Evidence of insurance policy 'BHEL'.

13. CONFIDENTIALITY:

13.1 'Company' and its representatives shall, at all times, maintain complete confidentiality of all data, information, software, drawings & documents, etc. belonging to 'BHEL' and also of the Systems, procedures, reports, input documents, manuals, results and any other documents discussed and/or finalized during the course of execution of the 'Contract'.

14. ARBITRATION:

14.1 In all cases of disputes emanating from and in references to this agreement the matter shall be referred to the sole arbitration of the Executive Director / GM of BHEL, Hyderabad or any

other person (including an employee of BHEL, even though he had to deal with the matter relating to this agreement in any manner) nominated by the said Executive Director / GM to act as sole arbitrator. The arbitration shall be under 'THE ARBITRATION AND CONCILIATION ACT OF 1996' and the rules there under. The arbitrator may from time to times with the consent of the parties enlarge the time for making and publishing the award. The decision of the sole arbitrator is binding on both the parties.

15. JURISDICTION & GOVERNING LAWS:

15.1 In case of any suit or other legal proceedings arising under this contract the courts at Sangareddy (Medak Dist) A.P. only shall have the jurisdiction. This contract will be governed in all respects by India Laws.

15.2 This agreement and any amendments thereto shall be valid and binding upon 'Company' only if signed by the Authorised signatories of both 'BHEL' and 'Company'.

16. ENTIRE CONTRACT:

16.1 The Lease Rental Contract, No._____ forms part of this Agreement along with the references mentioned therein.

16.2 This agreement and any amendments thereto shall be valid and binding upon 'Company' only if signed by the Authorised signatories of both 'BHEL' and 'Company'.

IN WITNESS WHEREOF, 'BHEL' has caused this agreement to be signed at Hyderabad, the day and year first above written, while 'Company' has caused this agreement to be signed at Hyderabad through its Authorised Signatory - under their stamp who are the only constituted attorneys for this purpose, the day and year indicated below against the execution on its behalf.

SIGNED & DELIVERED FOR & on behalf of the above named 'BHEL' by
Shri

its

at Hyderabad this the day of , 200_

SIGNED & DELIVERED FOR & on behalf of the above named 'Company' by

its Authorized Representative

at Hyderabad this the day of , 200_

Annexure-VI

Specification for

Creating Data Centre Environment

at

Primary Site (Informatics Centre)

And

Disaster Recovery Site (03 Annex)

1. technical specifications

The minimum specifications that the bidder has to meet for the major subsystems are listed below. Bidder has to provide compliance to these minimum requirements.

Broad functional requirements and design Parameters

- The Data center to be designed based on standards; and designed in such a way that the zones are clearly demarcated(least secure to high secure zones)

- Floor plan to accommodate the following functional areas:

    - Server room to accommodate 18 racks
    - Communication room to accommodate 12 racks
    - UPS and electrical room
    - Staging area with provision for 6 racks
    - Network monitoring room/ NOC to accommodate 4 seats
    - Data center manager room

A layout for the above requirement to be submitted to BHEL for approval.

2. Civil Interiors

The location identified for the DC is to be ideal and free from sources of EMI, industrial pollution, and vibration. Leveling the flooring to be 0 – 0 level.
The proposed server room should have non-permissible airtight thermally insulated partitions. Both the real ceiling and real flooring to be leak proof, air tight and thermally insulated.
Minimum required height from real floor to real ceiling to be minimum 12 feet (between real ceiling and real flooring) which is available at the proposed site.
All the four sides of the server room/Network room to be covered with appropriate Fire rated partitions. Opening in the partition at required place to be provided for Electrical and LAN/WAN cabling entry to the server room and then sealed.

Access: Appropriate door sizes negotiable corners, ramps and smooth floor surfaces inside the facility are required. The access pathway to the Data center would be minimum 4 feet. In addition, proper access has to be provided in support areas to allow for service or replacement of UPS, HVAC and other large items.

Special Requirements: All materials used in data center have to be of non- combustible, self-extinguishing or fire retardant and have the properties of smooth surface finishing

Walls/Partitions: For data center, rigid floor-to-ceiling perimeter walls/partitions having 2-hour fireproof rating to be considered. (for server/ communication rooms)

Internal Partitions: Partitions inside data center will be built to the false ceiling height in case they are in the same zone. Otherwise rigid floor-to-ceiling perimeter walls/partitions to be considered. For these areas minimum 30 minutes fire rating to be considered

Wall Finishing: Internal walls will be finished smoothly with emulsive paint. Finishing of light colour should enhance the illumination of data center

Thermal insulator: Thermal insulator will be laid on the structural floor to prevent heat gain inside the data center. The junctions between the insulator and fixtures are watertight and airtight.

Dismantling (if any)

The demolition work should be done with utmost care while removing the false ceiling and other supports fixed onto the wall. The partition wall shall be gently removed by without disturbing the existing infrastructure and structure. This material shall be packed in gunny/plastic bags and carted down for clearance by way of service lift or service staircase and to be cleared from the site within 24 hours to designated dumping area.
Cutting and chipping of existing floor: The existing floor shall be cut only by mechanical cutters and then chipped gently by the chisel.

Partitions

The proposed server room to have non-permissible, air tight, thermally insulated surrounding. Both the real ceiling and real flooring to be leak proof, air tight and thermally insulated.

Atleast one side of the server room to be covered with fire rated double skin Gypsum partition with Glass windows (for view/ aesthetics) provided as required. Proper reinforcement to be made where ever the glass windows and provided. Other side, depending on the plan to have either brick walls (of existing building) or fire rated double wall gypsum partitions. Whereverh existing walls are being retained, the same to be finished with one layer of fire rated gypsum. The windows to be closed with brick wall construction

Providing and erecting Gypsum partition from real ceiling to real flooring of 75mm thickness with two layers of 12.5 mm gypsum board (India gypsum or equivalent) with 50 mm of glass wool sandwiched between the gypsum boards. The partition to be erected on channels structure, grouted firmly on ceiling and flooring. (Make: Gyp steel) The surface to be smooth and level finishes with primer to receive the paint.
Note: Gypsum boards/ glass to be minimum of 30 minutes or more fire resistant class.

Provide metal frame for erecting the doors of the server room for reinforcement

False ceiling

It should be modular and grid system where the ceiling can be accessed for a frequently for cabling, maintenance work and emergency needs. The false ceiling structure and grid is erected at height of 9 feet from the real floor, which is 600x600 tiles type.
Horizontal level False Ceiling grid (Make Armstrong) using hot dipped galvanized steel section, exposed surface chemically cleaned capping pre-finished in baked polyster paint, rotary stitched Main Tee of 24 x 38 x 0.33mm at every 1200 mm C/C max and supported by 2.5 mm GI wire which is fixed to the RCC slab with GI hook and Raw Plug and rotary stitched Cross Tee of size 24 x 30 x 0.254 mm at every 600 mm C/C max and rotary stitched Sub Cross Tee of size 24 mm x 25 x 0.254 mm at every 1200 mm C/C max and 15 x 15 x 0.457 mm Wall Angle all round the wall to form a grid of size 600 x 600 mm and laying of Tiles Prima Fine Fissured Tegular Edge Tiles with life time warranty 600 x 600 x 15mm thick tiles having RH 99 %, NRC of 0.55 and CAC of 34 dB in the above grid.

Approximate size of the voids

False Ceiling Void	: 3 feet
Room Void	: 8 feet
False floor void	: 24 inches

Flooring

The Server room and network rooms to have access flooring with antistatic properties. The UPS room to have flooring with antistatic nature. The rest of the Data centre areas to have vitrified tiles flooring of colour shades as per BHEL’s approval.

False flooring

Supply and installation of 600mm x 600mm grid access floor (false Floor) system in the server /network room along with raceways for power distribution and data & voice cabling underneath.

For server room the understructure system shall be rigid-grid with 12" Clearance between bottom of tile and top of treated real floor. Assembly shall provide a means of leveling and locking at a selected height. Assembly shall provide 30mm adjustment.

The purpose of false flooring is to provide air plenum, to house the raceways for electrical, networking etc., Also to act as a separate void for smoke detection & suppression.
For non-full tiles (cut out tiles): treat / insulate edge with PVC
AC Grills/Tiles (600mm X 600mm): With Manual dampers.
Suction Equipment for lifting tiles (Access Floor Systems Panel Lifting Tools: 1 Number).
UNITILE SF 1000/ EDGE SUPPORT RIGID GRID SYSTEM

(The model to be selected as per the load requirements)

PANEL: UNITILE SF 1000 Access Floor panel is all steel welded construction with an enclosed bottom pan with uniform pattern of modular pockets of 49 hemispherical cones and 12 nos. reversible cones. The top and bottom plates are fused together by resistant welding at 81 spots. The maximum depth of a BARE tile will be 29 MM. The panel is epoxy coated (50/60 microns thick coating) for protection from corrosion and cavity formed by the top and bottom plate is filled with non-combustible cementitious compound to support no less than 85% of the top plate of the panel.

The UNITILE construction will be in a position to withstand a Concentrated Load of 450 kgs applied on area 25mm x 25mm in the center of the panel which is placed on four steel blocks without deflecting more than 2mm and without setting permanently more than 0.25mm.

The UNITILE construction will be in a position to withstand an Uniformly Distributed Load minimum 1350 kg than 1 mm and without deflecting more than 1 mm and without setting permanently more than 0.25mm

FINISH OF THE PANEL
The access floor panel if not required to be supplied BARE shall be laminated with finishes as required and same shall be factory laminated on semiautomatic lamination lines leaving no chance for human error.

The finish shall be either High Pressure Laminate/ Antistatic Vinyl flooring of required shade and color and the Laminate shall be either:
Protected on its edges with PVC beading with mitered corners which shall factory fit.
Or integral trim design.

JACK ASSEMBLY
PEDESTAL: The Pedestal consists of 110 x 110 x 2mm thick embossed steel base plate having 8 nos. of holes. Steel pipe 25-mm (OD) 2 mm thick. is orbitally riveted to the base plate on one side and is thread rolled (3/4" BSP) on the other side to receive the head.

HEAD: The jack head consists 90 x 90 x 4mm thick. Die cut steel plate having tapped holes either to receive screws for locking stringer or bare tiles. To the bottom of the head a flared pipe of 40mm ϕ is MIG welded. The reduced end (25mm ϕ) has internal threads enabling it to be engaged to the pedestal. The adjusted height of the jack assembly is locked by specially designed check nut, which allows locking without use of spanners. The pedestal is either powder coated or

electrogalvanised for prevention of corrosion and the head is electrogalvanised for prevention of corrosion.

STRINGERS: The stringer is hot dipped galvanized steel construction, rectangular C channel with inverted flanges 0f 6mm width each. The size of the C channel is 20 x 25 mm, 1.2 mm thick having special notching arrangement for panel alignment.

Earthing to be done in consultation with the electrical consultant. A pedestal can be connected to the main earthing pit by providing necessary copper earthing and end termination.

Thermal Insulation: The real ceiling and the real flooring to be thermally insulated using suitable material of rubberized nature with fire proof properties for the reason that the cold air is blown from below false floor to rise in to the server room through A/C grills. The thermal insulation will also avoid heat/cool loss in to the below floor and avoid inter floor sweating. The recommended material for the insulation is of Armaflex/Trocelene.

Fire door

The server room shall be provided with a main access door and an emergency exit manufactured from high quality galvanized steel and having fire rating up to 2 hours (conforming to BS 476 part 22 and IS 3614 part 2 standards). The doors shall be suitable for openings of sizes 4" x 7" (or as required) The main access door shall of two pane type, one pane to be bolted and the other with automatic door closer and locking to suit the access control specs. The emergency door shall have a single pane and should have facility for opening outside only during emergency. Both doors shall have vision panel of suitable sizes and painted with etch primer and finish painting of approved color to match the color scheme of the area.

The doors are of appropriate size and as per the standards set by CBRI [Central Building Research Institute – Roorkee [UP], IS 3614 Part 2 and BS 476 Part 20 and 22.
Required Features of Doors:
Galvanized Painted
Fire rating 60 to 120 minutes (Stability and integrity)
Clear Fire Glass- (size300x 200) 120 minutes fire rating tested at Central Building
Research Institute
Shutter Thickness- 46 mm
Fully Flush Construction
Robust structure can be prepared to receive all types of hardware
May be provided with Circular [380 Dia] and rectangular vision 300 x200mm channel.
Should be suitable for Panic Hardware.

Approved makes: Godrej/ Shaktimet

Thermal Insulation

The real ceiling to be thermally insulated using suitable material of rubberised nature with fire retardant properties for the reason that the cold air is blown from below the false floor to the room void through AC grills. The thermal insulation will also avoid heat/ cool loss into the below floor and avoid inter floor sweating. The recommended material is Armaflex/ Torcelene

Work stations

As per the layout and the seating requirement modular workstations and ergonomic chairs need to be supplied. The samples required for deciding upon colour/ texture etc need to be made available to BHEL before installation.

Adequate storage space to be made available in the workstation area, printer room etc.

The modular workstation to have the following features:

Work surface
Keyboard pull out trays
cleaningCPU trolleys
Pedestal units/ floor mounted metal pedestal storage system
Overhead storage with task lighting (as per the layout and space availability)
Accessory rail
Sliding door units
White board
Pinup board with fabric of approved colour and texture
Switch boxes
Etc

Painting
All material required for the works shall be of specified and approved manufacturer, delivered to the site in the manufacture's containers with the seals, etc., unbroken and clearly marked with the manufacture's name or trade mark with a description of the contents and colour.

Debris Cleaning
Removal of Debris: The material shall be packed in gunny sacks/plastic bags and dumped in the area instructed by customer after taking prior permission from the project in charge on a daily/weekly basis

The Bidder is required to provide detailed architectural diagrams and other illustrations like conceptual architectural plan, electrical layouts, false ceiling layouts; communication networks layouts etc., for the envisaged DC requirements.

3. Electrical power distribution

Availability of Distribution System
The distribution system should have N+1 configuration. It should also have a Dual Bus configuration in order to have dual power supply to each rack, thus minimizing downtime during maintenance operations. Dual feeders should also be provided for incoming feed from main feeder. All electrical distribution cables / conduit / casing / caping, etc. should be FRLS type only

Redundancy
Power Supply for each rack should be dual power supply. The concept is based on n + 1 redundancy, where n is the number of systems or main items of equipment required to maintain the specified operational requirements. That means, failure of a single such system or equipment item can be tolerated

Primary/Secondary power
BHEL will make provisions for availability of power to the main panel of data center. From the main panel bidder needs to provide for the power distribution.

For the secondary source, a Generator of required capacity complete with acoustics and AMF panel to be provided.

Main LT Panel
All switchboards should be designed to support non-linear load with neutral conductors at 2x phase/line conductors, this is as per IEEE1100-1999 specifications The Main LT Panel will be housed in the switchgear room (space to be provided by BHEL). The panel boards for UPS and raw power distribution should be installed in the UPS room.

Lighting

Adequate illumination (300 Lux) should be designed for the Server and Network Room. 10% of the power for lighting will be from emergency panel and the rest will be direct electricity board. Lighting on rack area need to be adjusted in order to eliminate lighting in un-proper areas such as over the top of the rack for the purpose of energy saving and cost saving. Bidder to provide sufficient lighting for the Data center as per the standards of data center

General Requirement

The scope of the electrical services will include design, supply and installation of
LV Cables
Installation of Wiring & Cable
Electrical Panel comprising of
Molded Case Circuit Breakers (MCCB's)
Current Transformers (CT"s)
Measuring Instruments
Indicator Lamps
Distribution MCB Boards
Lighting Switches
Switch Socket Outlets
Luminaries
Earthing

Cable Entry Ducts

Cable entry ducts (glands) would be used wherever cables in pipe sleeves, in trenching or conduits have been drawn through floor/wall openings and riser ducts, Contractor shall arrange to seal off the remaining gaps in the sleeves, or floors/walls with cable glands.

Cables

All LV cables required and as indicated shall be supplied, installed in position and terminated at their various items of equipment.
Cables supplied and installed shall be in accordance with the following requirements:
For Low Voltage (LV) wiring which is surface-run on cable tray or PVC conduit, PVC-Insulated & Sheathed (PVC/PVC) cables of 450/750V grade.
Where LV cables are installed in PVC conduit, such cables shall be of PVC-insulated (PVC) type, of 450/750V grade in case of single phase, and the wiring of all 3-phase, 4-wire sub-mains in PVC conduit, cables shall be of 450/750V grade.
All types of cable described above shall be provided with Multi-strand high-conductivity, annealed copper conductors.

Installation of Wiring & Cable

Conduits

All conduits and accessories installed on walls, concrete shall be of PVC types.

Raceways

Raceways duct type would be provided for server room below the false floor, which shall have removable cover plates through its entire length so that cables can be placed in it rather than pulled. The raceway appropriate length and size will be used made of GI

Electrical Panel

The data center electrical panel of appropriate capacity to be proposed by bidder. The electrical panel shall have provision for distribution for raw power to the AHU units, UPS and lighting distribution board. Busbar's of appropriate current carrying capacity shall be used for branching out. Busbar's supports of insulating material and appropriate mechanical strength shall be used to mount the busbar. The busbar shall be sleeved with PVC material. PVC cable with lugs will be used

to terminate the switching equipment with busbar terminations. Earth busbar shall be provided internally throughout the full length of each switchboard.

The electrical panel to comprise of
Molded Case Circuit Breakers (MCCB's)
Current Transformers (CT"s)
Measuring Instruments
Indicator Lamps
All the above components to be appropriately rated as per the requirement

Distribution MCB Boards

The distribution board shall be of metal clad, cubicle construction and suitable for installation on wall will be located inside the UPS room.

All switchboard panels, main earth bonding lead and outgoing earthling leads for wiring circuits shall be securely bonded to the main earthling bar for each switchboard.

Lighting requirement can be calculated by assuming 350lux/sq.ft for effective illumination.
Appropriate number of 3x18W CFL based tiles type 600x600mm recessed light fitting with electronic choke type/ 1FL and other lighting as required. Some lights should be powered by the data center UPS.

Lighting Switches

All control switches for lighting points shall be supplied and installed as mentioned in the BOQ. Lighting switches shall be flush mounted, and fitted with all-insulated on open-type, recessed, metal-clad or PVC boxes.

Switch Socket Outlets

All switch-socket outlets as indicated in the BOQ, shall be supplied and installed. General-purpose switch-socket outlets connected to 230V 50Hz. AC supplies shall be 16A x 3-pin, flush mounted type, installed in recessed, metal clad boxes and provided with flush-fitting, all insulated type cover plates of ivory-color finish. Each rack will have dual power source from UPS. Two separate cables will be run from two separate UPS and terminated at racks. Servers having dual power input will be connected to both the power supply units. The servers which has only single input source, will be powered by using STS. This will ensure the redundancy up to the rack level and avoid single point failures.

Each rack will have two UPS power source located below the false flooring. These power sources will have 16/32A plug and socket type connectors (IEC 320/309).
Depending on the requirement either 3 phase/single phase power to be provided for each rack.
(Detailed study of the IT equipments to be made before the wiring is started)

Earthing

UPS Neutral Earthing (copper)	: 2 Nos.
Body Earthing (GI)	: 1 Nos.
Server room earthing (Copper)	: 1 No

Copper earth strip would be provided for Server room and UPS room. The copper earth strip would be of 25mm x 3mm. The location of earth pits shall be studied and precise information obtained from the client.

Copper plate earthing:

600mm x 600mm x 3mm copper plate with necessary material of 8' GI pipe, funnel set, salt, charcoal & 25mm x 3mm copper strip from copper strip to funnel set and 12 " x 12" chamber cover

GI earth strip would be provided for Main electrical panel and distribution boards. The location of earth pits shall be studied and precise information obtained from the client.

The total power requirement of the data centre to be specified by the vendor in the technical submission.

4. Uninterruptible power supply-Ups

Equipment Specifications to be housed in the DC will determine the total UPS Power Load calculations. The details of equipment to be housed in the data center have been specified elsewhere in the document.

The UPS system for the sever room shall be designed considering the following
The server room equipments should get continuous power
The redundancy should be available for the total load
The Each UPS will have separate battery back up for 30 minutes.
Two separate UPS in dual bus configuration to be considered. Each UPS unit will have a battery backup of 30 minutes at rated load and a combined backup of 60 minutes at rated load. Critical load of server farm to be powered by dual bus UPS system working in load bus synchronization mode.

The DC office space having desktop PC, printers etc to be powered by separate UPS of required capacity with redundant unit working in load bus synchronization mode. Its mandatory to have SNMP management capability within the UPS to manage both the units, and to be monitor by UPS management software.

The minimum required specification for the UPS is listed below. Applicable for both critical load UPS and office space UPS

MATERIAL SPECIFICATIONS FOR 15 KVA 3 PH INPUT 3 PH OUTPUT WITH STATIC BYPASS		
INPUT		
Nominal Voltage	415 V AC, (+15% to - 20%) Three Phase & N	
Nominal Frequency	50 Hz. (+/- 6%)	
Input Power Factor	> 0.93 (at full load & nominal input voltage)	
RECTIFIER		
Type	Full Wave	
CHARGER		
Type	SMPS Based.	
Nominal Voltage Regulation	+/- 1%	
Ripple (Without Battery)	< 1%	
Charging Method	Constant Voltage Constant Current (CVCC)	
Max.Charging Current	**15 Amp. (Adjustable in steps of 5, 10, 15Amp)**	
BATTERY		
Battery Voltage	240 V DC	
Type	Sealed Maintenance Free(SMF) OR Lead Acid, Wet Cell	
OUTPUT		
Power Capacity	15 KVA/ 12KW,	
Load Power Factor	0.7 lag to Unity within KVA & KW rating	
Nominal Voltage	400 V AC, Three Phase & N (Stepless Adjustable) (380V / 415 V Selectable)	
Regulation	+/- 1 % for balance load	+/- 2% for 100% unbalanced load
Phase Displacement	< 1 Degree for balanced load	< 2 Degree for 100% unbalanced load

Frequency	50/60Hz.(+0.25Hz.) in Free Running Mode, (+ 3Hz.) in Synchronous Mode
Waveform	True Sinewave
Total Harmonic Distortion	< 2% Max. for 100% Linear Load
Total Harmonic Distortion	< 5% for 60% Non-Linear Load, < 7% for 100% Non-Linear Load (Ref : IEC 62040 – Part III)
Overload Capacity	125% for 10 min. 150% for 60 sec.
Inverter	IGBT based PWM with INSTANTANEOUS SINEWAVE CONTROL
Dynamic Response	For 0 to 100% step load change the output shall remain within + 5% & recover to 98% within one cycle. (< 3 Cycles for Parallel Redundant System) (as per – IEC 62040 – Part III, Class – 1)
Crest Factor	3 : 1
Duty	Continuous
BYPASS STATIC SWITCH	
Frequency Sync. Band	+/- 3 Hz.
Slew Rate	0.1Hz./Sec.
Transfer (Inverter to Bypass)	In Sync.Mode – No break in transfer In Async.Mode - < 10mSec
Retransfer (Bypass to Inverter)	In Sync.Mode – No break in Retransfer In Async.Mode – Not Applicable
MANUAL BYPASS FACILITY	
Changeover from static bypass to manual bypass	Without break.
CONFIGURATION	Standalone / Hot standby / Parallel Redundant
EFFICIENCY	(At full load & nominal input voltage) For & 15 KVA
Inverter Efficiency (DC toAC)	**> 90%**
Conv. Efficiency (AC to DC)	**> 94%**
Overall Efficiency (AC to AC)	**> 85%**

MATERIAL SPECIFICATIONS FOR 40 KVA 3 PH INPUT 3 PH OUTPUT WITH STATIC BYPASS

INPUT	
Nominal Voltage	415 V AC, (+15% to – 20%) Three Phase & N
Nominal Frequency	50 Hz. (+/- 6%)
Input Power Factor	> 0.93 (at full load & nominal input voltage)
RECTIFIER	
Type	Full Wave , A-PFC rectifier (Advanced PFC rectifier)
CHARGER	
Type	SMPS Based.
Nominal Voltage Regulation	+/- 1%
Ripple (Without Battery)	< 1%
Charging Method	Constant Voltage Constant Current (CVCC)
Max.Charging Current	**15 Amp.**
BATTERY	
Battery Voltage	360 V DC (For 40 KVA)
Type	Sealed Maintenance Free(SMF) OR Lead Acid, Wet Cell
OUTPUT	
Power Capacity	40 KVA/ 32KW,
Load Power Factor	0.7 lag to Unity within KVA & KW rating
Nominal Voltage	400 V AC, Three Phase & N (Stepless Adjustable) (380V / 415 V Selectable)
Regulation	+/- 1 %
Frequency	50/60Hz.(+0.25Hz.) in Free Running Mode, (+ 3Hz.) in Synchronous Mode
Waveform	True Sinewave
Total Harmonic Distortion	< 2% Max. for 100% Linear Load
Total Harmonic Distortion	< 5% for 60% Non-Linear Load, < 7% for 100% Non-Linear Load (Ref : IEC 62040 – Part III)

Overload Capacity	125% for 10 min. 150% for 60 sec.
Inverter	IGBT based PWM with INSTANTANEOUS SINEWAVE CONTROL
Dynamic Response	For 0 to 100% step load change the output shall remain within ± 5% & recover to 98% within one cycle. (< 3 Cycles for Parallel Redundant System) (as per – IEC 62040 – Part III, Class – 1)
Crest Factor	3 : 1
Duty	Continuous
BYPASS STATIC SWITCH	
Frequency Sync. Band	+/- 3 Hz.
Slew Rate	0.1Hz./Sec.
Transfer (Inverter to Bypass)	In Sync.Mode – No break in transfer In Async.Mode - < 10mSec
Retransfer (Bypass to Inverter)	In Sync.Mode – No break in Retransfer In Async.Mode – Not Applicable
MANUAL BYPASS FACILITY	
Changeover from static bypass to manual bypass	Without break.
CONFIGURATION	Standalone / Hot standby / Parallel Redundant
EFFICIENCY	(At full load & nominal input voltage) For 40 KVA
Inverter Efficiency (DC toAC)	**> 92%**
Conv. Efficiency (AC to DC)	**> 98%**
Overall Efficiency (AC to AC)	**> 90%**

MATERIAL SPECIFICATIONS FOR 60 KVA 3 PH INPUT 3 PH OUTPUT WITH STATIC BYPASS

INPUT	
Nominal Voltage	415 V AC, (+15% to – 20%) Three Phase & N
Nominal Frequency	50 Hz. (+/- 6%)
Input Power Factor	> 0.93 (at full load & nominal input voltage)
RECTIFIER	
Type	Full Wave , A-PFC rectifier (Advanced PFC rectifier)
CHARGER	
Type	SMPS Based.
Nominal Voltage Regulation	+/- 1%
Ripple (Without Battery)	< 1%
Charging Method	Constant Voltage Constant Current (CVCC)
Max.Charging Current	**10 Amp.**
BATTERY	
Battery Voltage	360 V DC (For 60 KVA)
Type	Sealed Maintenance Free(SMF) OR Lead Acid, Wet Cell
OUTPUT	
Power Capacity	60 KVA/ 48KW,
Load Power Factor	0.7 lag to Unity within KVA & KW rating
Nominal Voltage	400 V AC, Three Phase & N (Stepless Adjustable) (380V / 415 V Selectable)
Regulation	+/- 1 % for balanced load +/- 2% for 100% unbalanced load
Phase Displacement	< 1 Degree for balance load < 2 Degree fir 100% unbalanced load
Frequency	50/60Hz.(±0.25Hz.) in Free Running Mode, (± 3Hz.) in Synchronous Mode
Waveform	True Sinewave
Total Harmonic Distortion	< 2% Max. for 100% Linear Load
Total Harmonic Distortion	< 5% for 60% Non-Linear Load, < 7% for 100% Non-Linear Load (Ref : IEC 62040 – Part III)

Overload Capacity	125% for 10 min. 150% for 60 sec.
Inverter	IGBT based PWM with INSTANTANEOUS SINEWAVE CONTROL
Dynamic Response	For 0 to 100% step load change the output shall remain within ± 5% & recover to 98% within one cycle. (< 3 Cycles for Parallel Redundant System) (as per – IEC 62040 – Part III, Class – 1)
Crest Factor	3 : 1
Duty	Continuous
BYPASS STATIC SWITCH	
Frequency Sync. Band	+/- 3 Hz.
Slew Rate	0.1Hz./Sec.
Transfer (Inverter to Bypass)	In Sync.Mode – No break in transfer In Async.Mode - < 10mSec
Retransfer (Bypass to Inverter)	In Sync.Mode – No break in Retransfer In Async.Mode – Not Applicable
MANUAL BYPASS FACILITY	
Changeover from static bypass to manual bypass	Without break.
CONFIGURATION	Standalone / Hot standby / Parallel Redundant
EFFICIENCY	(At full load & nominal input voltage) For 60 KVA
Inverter Efficiency (DC toAC)	**> 94%**
Conv. Efficiency (AC to DC)	**> 98%**
Overall Efficiency (AC to AC)	**> 92%**

6. Precision air-conditioning

DC requires round the clock 365 days precision cooling to maintain temperature of 21Deg. C and relative humidity of 50 % RH. The tonnage calculation must cater to the server heat dissipation and maintain the constant temperature.
For effective and uniform distribution of cooling, bottom discharge with high CFM units are considered which will give uniform cooling and eliminate hot spots created surrounding high-end servers. Only Server room will have Precision Air conditioning system in the date center.

The server /network rooms will have precision A/C units with redundancy installed to maintain round the clock 21 degree +1 and relative humidity of 50 % + or - 5 variation. The cold air discharge will be from false floor void. The raised floor will be provided with volume controlled diffuser.

The unit supplied should have redundancy. A sequential 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.

Sl no	Technical Requirements	Vendor compliance
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 :	
5	Cabinet conforming to Class 1 BS 476 Part 6&7 standards	
6	Air filtration conforming to EU3 standards	
7	Electric Re-heater should be operating at black heat temperature	
8	Humidifier should have an adjustable capacity control ranging from 40%-100%	
9	Visual and audible alarm indication	
10	Graphical display of temperature and humidity curves over the last 24-hour	
	Humidity , Ventilation, Air Conditioning (HVAC)	
11	air conditioning for direct expansion air conditioning is used then condensers should be located outside the building	

12	Criteria in determination of the air conditioner placement should be its effectiveness in addressing the current planned load, and their adaptability to change in configuration.	
13	Consider the air flow patterns of the hardware being installed. Take care units are not laid out in a fashion that exhausts air from one unit into the intake of the next.	
14	Optimal temperature range for system reliability and operator comfort levels should be between 21 deg C + or- 1	
15	For safe data processing operations ambient relative humidity should be between 45% and 50% RH.	
16	Server room requires precision air conditioning with a sensitivity of +/- 1.60 C and +/- 3% RH or closer.	
17	Ideally a Server Hall cooling system should have sensible ratio of 1: 1, most precision systems have between 85% to 100% sensible cooling.	
18	To deliver the air to the areas in need of air conditioning, the sub floor pressure differential should be maintained at an optimal level of 1.25 mm we.	
19	Server Hall should be isolated from contaminants. Inside server Hall airborne dusts, gases and vapors should be maintained in the defined limits to minimize their potential impact on the hardware	
20	Server Hall should be free from water ingress	
21	**Microprocessor controller Panel**	
22	The display panel should be located on the front of the unit with LCD display for monitoring and alarm indication. The panel should be used for:	
23	Status detection (whether on or off)	
24	Temperature controller	
25	Humidity controller	
26	The panel should make an audio visual alarm in case of:	
27	Power failure	
28	Fan overload	
29	Humidifier power fault	
30	Humidifier control fault	
31	Heater fault	
32	Airflow failure	
33	Change filter	
34	Control circuit trip	
35	Return air temperature / RH out of range	
36	Supply air temperature out of range	
37	Return air humidity sensor alarm	
38	Return air temp. Sensor alarm	
39	Data Error	
40	Service alarm	
41	Electric heater alarm	
42	Microprocessor fault	
43	Humidifier flood	
44	Water leakage alarm	
45	Smoke alarm	
46	Other functions of the control panel	

47	Graphical display of temperature and humidity curves over the last 24-hour.	
48	Self-diagnostic functionality	
49	Supply air fan surge to let fan continue on operation for a period of 180 second before total shutdown.	
50	An automatic changeover for duty / standby unit based on time interval setting and any failure of duty unit.	
51	An automatic restart function with sequence start program to prevent power surge during start-up on multi-system installation.	
52	A graphic display to review the return air temperature and humidity condition.	
53	Comprehensive event storage system by date and time of occurrence.	
54	Simply user-friendly operating guidance.	
55	Remote monitoring of the Precision AC unit using desktop PC with RS232 interface.	

The PAC to be 4 X 10 T.R

7. Comfort air-conditioning

Functional areas of the data center other than the server and network rooms to have comfort cooling facility
Areas where 24 x 7 operations are expected like the UPS room, NOC room etc to have redundancy built in for the cooling. UPS room area housing the UPS units and the electrical power distribution panels requires 24/7 air-conditioning which have to be provided with separate cooling with redundant units. Comfort cooling units of appropriate capacity to be proposed as part of the solution.

8. Fire detection system

The fire detection and alarm system shall be of high quality fast-acting electronic type adopting Soft Addressing Technique. The FDA System comprising of main fire alarm control panels; heat sensors; optical sensors; manual call points; electronic sounders; transponders; sounder controllers, conforming to the relevant and applicable requirements and recommendations of BS5839/EN54 and Local Civil Defence Authority.
The fire detection and alarm system shall be designed to facilitate accurate identification of the source of heat / smoke / fire in their early stages to minimise occurrences of false alarms due to faulty equipment, electrical transients, system faults etc.

The process analog detectors shall make the final decision on whether a fire or fault exists by comparing the sensed fire/fault patterns against all known fire and fault patterns held in it's memory. System shall be true Analogue with the ability to print the output from a fire sensor over a period of time.

All system components and devices shall be connected to two-wire loop circuits with isolators provided before and after a group of 15 devices (max). Removal or disconnection of any component from the loop shall not affect the functioning and performance of those devices between two isolators.

The System shall be of soft addressable type i.e. Addressing of all devices shall be done automatically from FACP wherein the use of hard switches to set addresses is eliminated.

Facilities are provided to constantly monitor and check the following circuits and fault conditions:
- The power supply to the loop /s;
- For open-circuit, short-circuit, earth fault and any other fault condition in the loop wiring;
- For communication failure and errors in all cards and loops
- For faults in keyboard and printer circuits
- monitoring of all devices status every 1.3 minutes to create a table of each 1 analogue channel for event analysis

All devices i.e., Detectors, MCP's, Sounder Controller Units etc. shall be installed on the same loop.

All devices shall be assigned a maximum of 25 character alphanumeric label. In case of fire, fault or warning, the label of device sensing threshold shall appear on visual display unit of the panel.

Any event i.e. Fire, fault or warning shall be recorded with time, date and place of occurrence in the memory of FACP. These events shall either be displayed on VDU or printed, as required.

Provision shall be done at the fire alarm control panel to silence the alarm sounders but the visual indication shall remain until the system is reset.

Facility to introduce / change delay periods in operating individual sounder / group of sounders, shall be possible to program from FACP.

Main Fire Alarm Panel

The main fire alarm control panel shall be located at the Ground Floor and as shown on the schematics. The main FACP shall be capable of accommodating a maximum of 127 analogue addressable devices per loop.
The panel shall be computer controlled using analogue technique to detect smoke / heat / fire conditions. The panel shall be complete with inbuilt printer and not limited to the following elements. It shall have the

1. Flexibility for future extensions and / or extendibility.
2. Reliability for early warning detection using intelligent detectors.
3. Modular construction with individual extendability.
4. Sealed lead acid battery and charger, with 24 hour back up in the event of supply mains failure.
5. Essential controls- sound alarms, silence alarms and reset fire. These shall be enabled by a keyswitch.

6. Cancel fault buzzer
7. Fire, fault, warning and power on lamps.
8. Simple menu driven function keys with password protection will allow users to an extensive range of software based features such as:
    - last 200 system events
    - Current fault and warning logs.
    - Analysis of analogue sensor information
    - Interrogation of sensor cleanliness
    - loop map connections
    - enable/ disable sensors, zones, sounders, interface unit channels.
    - address allocation
    - Status of all cards
    - Printer on, off, line feed and test facilities.

9. All control buttons and keyboard shall be enclosed behind a lockable cover.
10. Up to 127 analogue addressable device capacity per 2km loop.

11. TTY Serial Interface for computer communication option.
12. Will have a secure networking facility to indicate a remote zone and remote zone text across the network.
13. Detector related test functions, such as Activate detector LED, Activate remote detector output, Open/close zone isolator may be selected for individual fire detectors.
14. Graphic indications shall be displayed for the sensor status of the intelligent fire detector selected. The graphics shall show operating data, such as the detector type, the serial number, the number of alarms and operating hours from the date of operation as well as degree of detector soiling, date of manufacture, the date of last maintenance. Also the Graphic display of the multi sensor shall represent status of optical / ionization / heat separately in addition to the summary status.

    The graphic status of the sensor shall also show the birth value, the adjusted quiescent value, the actual value, the alarm level, the warning range - dirt / electric.

    The status shall also represent the sensitivity. ie. The distance between the quiescent value and alarm level shall remain the same even in the situation of detector becoming dirty.

15. It shall be possible to test a /all single intelligent fire detector and a single detector zone on the analog ring loop. The data of all the intelligent fire multi sensors shall be tested, evaluated and verified for soiling, dust or small insects and messages as listed below shall be displayed on the screen.

    i) Detector is functional
    ii) Clean O - chamber, clean O - chamber and I - chamber or clean I - chamber.
    iii) Return detector to factory.

In addition to the above, all other necessary controls, elements and accessories are included to provide a complete and efficient panel conforming to the requirements of EN54.

Detectors
These shall be of multi sensor type (optical/ionization/heat detector – all in a single head) (OTI).

* The multi sensors shall be of the soft addressing type.
* The alarm and operating data memory shall be in the detector.
* The detectors shall be such that it is possible for:

a) Quick maintenance via detector interface ie. Status of each individual sensor shall be shown on the PC monitor.
b) Easy commissioning via software support.
c) Automatic sensitivity check through signal analysis using dynamic filters.
d) Analog compensation of changing environmental conditions with constant alarm sensitivity.
e) Identification of a polluted or defective detector and automatic maintenance request.

All process Analog detectors in the ring loop shall be addressed automatically by the fire alarm control panel.

Manual call points
These shall comply with the requirements of BS 5839: Part 2: 1983 / EN54 and shall be complete with all electronic components and circuitry for a soft addressable device. The manual call point shall have an inbult microprocessor to ensure a response time of less than 2 seconds. The unit shall incorporate a key operation facility for testing purposes.

Alarm sounders
The Alarm Sounders shall be configured via software to operate in sectored groups as shown in the schematics. The Alarm sounders shall be wired to the loops via the Sounder Controllers.

The Sounders shall have a minimum output of 90dBA at 1 metre.

Wiring

All cables associated with Fire Alarm installation shall be fire resistant 2 core 1.5 sq mm screened type. Cables shall comply with BS 7629 : 1993 and BS 6387.

9. High sensitivty smoke detection system

GENERAL

The HSSD system shall be VESDA type, or equal in quality features and performance. It shall provide a early warning of fire in it's incipient stage, analyze the risk, and provide alarm and actions appropriate to the risk. The system shall include, but not be limited to, a Display Control Panel, Detector Assembly, and the properly designed sampling pipe network in complete compliance with the "SNIFF" type computer aided design program. The system equipment shall be manufactured by International OEM and supplied by authorized distributor.

Regulatory Requirements

A. National Electrical Code (NEC)
B. Factory Mutual
C. Local Authority having Jurisdiction

System Description

The VESDA system provides early warning of a fire in its incipient stage. VESDA Detector shall be installed to sample the air from a protected area.
In, operation the air from the protected area is drawn through a piping network in the detector unit by an aspirating fan unit to the detector assembly. The air is the illuminated by a laser light source. Smoke particles scatter this light to a sensitive solid state photo sensor. An Analogue signal is transmitted to the display control panel which displays the smoke obscuration levels in a bar graph display. Each increment in the bar graph represents 120% of the full-scale sensitivity of the detector.
Three independently programmable alarm points provide additional visual indications on the display control cards and activate associated relays for additional annunciation and alarm.
Similar systems which incorporate a nepholometric type detector and require periodic replacement of the light source unless all the conditions are met shall not be considered in any manner as a equal or replacement for the VESDA laser light source system.

Equipment

Display Control Panel
The display control panel shall consist of an enclosure assembly, installation kit, and required number of DISPLAY control cards. Each Display control panel shall be powered from a 24 V DC source and monitored for alarm and trouble condition by the DC fire alarm system. The control unit shall incorporate all of the following features:
1. Compatibility with the Windows based software.
2. Programmability via a PC or terminal.
3. Built-in data and event logger.

4. Separate day/night alarm levels
5. Signal averaging .Signal offset (Fixed)
6. Signal offset function which automatically adjusts for normal fluctuations in background obscurations.
7. Remote test capability
8. Remote real time display
9. Cumulative and non cumulative alarms
10. Latched and timed latch alarm and trouble functions

The Detector assembly

1. The detector assembly shall be approved makes.
2. The VESDA Detector is mounted in an enclosure, which contains a fan that draws air through a piping network and into an air chamber in the detector.

The detector shall examine particulate drawn in by the fan by illuminating them in a small chamber using a laser and a photo detector to capture the light scattered by the particulate.

The particle size discriminator shall inhibit the output whenever a particle pulse exceeds predetermined amplitude, thus permitting the detector to ignore large pulses commonly produced by dust pr airborne contaminant.

A logic pulse associated with each particle detected shall be used to produce an analogue signal that shall be proportional in value to the amount of particulate detected.

Systems which use mechanical filters requiring periodic maintenance or replacement will not be considered an equal or replacement to the VESDA Particle Size Discriminator.

Engineering Sampling Pipe Network

1. Piping networks shall be laid out to provide detection points with spacing as indicated on drawing. Piping shall be as specified on manufacturer's shop drawings and shall be 1" to1/2" I.D. smooth bore pipe with airtight connections.
2. For piping installed above a dropped ceiling, the open end[s] of the sampling pipe[s] shall penetrate the ceiling tile to act as a additional sampling point.
3. Pipes shall be suspended from ceiling slab using hangers or clamp at intervals of no more than 4 feet to ensure the stability of the piping and reduce the possibility of cracks and breaks at the joints.
4. All connections and joints shall be made with standard connections designed to be compatible with the pipe materials. All joints shall be secured according to standard practices.
5. All joints shall be airtight to prevent air leakage or infiltration, which may adversely affect the desired venturi affect in the piping.
6. Provide all sampling point pipe caps with predrilled holes per manufacturer's shop drawings.
7. Sample pipe network shall of the closed end engineered design. Systems using "Open End" design will not be allowed.
8. The design program for the air sampling pipe network shall be listed or approved by Underwriters Laboratories or Factory Mutual [FM].
9. The design program for the air sampling pipe network shall provide a balanced engineered system and ensure equal sensitivity at each sampling point.

Engineered Design Drawings

A. The authorized distributor shall provide all required installation drawings at the time of execution.
B. Provide to the owner drawings showing all sampling pipe layouts and the locations of the sampling points. Non symmetrical type piping systems shall include a copy of the "Sniff" software calculation printout.
C. Drawings are to include point-to-point wiring diagrams and all necessary scaled floor plans showing conduit layouts and detector locations.

System Guarantee

A. The entire VESDA HSSD system, components, parts and labor shall be guaranteed for 12 months from the date of installation.

VESDA DETECTOR SPECIFICATIONS

Dimensions : 14 x 8-5/8 x 5-1/2 “
Weight : 16 Lbs
Finish : Off white semigloss
Mounting : 4-1/4” bolts
Input Voltage : 24 VDC ± 10%
Electrical Connection : 5/8” Flexible Conduit
VESDA Assy.Current : 420mA
VESDA Detector Current : 300 mA
Ambient Environment : 32° to 125° F
Relative Humidity : 0-95%,Non-Condensing
Sensitivity :
89-100000-010 : 0.0015 to 0.015 % obscuration per foot
89-100000-011 : 0.003 to 0.03 % obscuration per foot
89-100000-012 : 0.006 to 0.06 % obscuration per foot
89-100000-010 : 0.012 to 0.12 % obscuration per foot

Inlet Port : ¾ inch pipe (mates with a ¾ to 1 inch adapter)

VESDA Control Panel Specification
Operating Temp.Controller : 32° to 125° F
Charter Recorder Output : 0-5 V,220 ohm
Control Assembly Weight : 14 Lbs
Relative Humidity : 0-95%,Non-Condensing

Intelligent Interface module (IIM) Specification
Input Power : 24 VDC 50mA(max)
Operating Temp. : 32° to 125°F 95% RH
Contact Inputs :(2) 1 Alarm ,1-trouble input for monitoring contact type circuits
RS-232 : 2 RJ-11 style serial connections for PC and FENWAL NET
RS-485 : 1 Serial connection Max.No. of connected AnaLASER zones is 30

11. Fire Suppression System

Fire Detection is not the complete Fire Protection Solution.

In case of a fire present immediate action has to be initiated so as to avoid the impetus of a potential Fire Hazard and most important to maintain Business Continuity.

Fire Protection follows the empirical formula:

DETECTION + SUPPRESSION = PROTECTION

In the event of a Fire alarm, signal is given to the Control panel, which sounds an audiovisual alarm, and a preset timer circuit is initialized. (Time delay set – 0 to 256 secs, as per site requirement). Trained Fire fighting Personnel can extinguish the fire in this time delay made available, else, after the time delay, signal is given to the gas release module. The gas release module actuates the

Electrical Solenoid on the release valve fitted on the FM-200® Gas cylinder, and gas is released in to the manifold through the high-pressure hose. The gas is further let into the protected area through a properly designed Piping distribution network and nozzles.

The entire sequence of operation from the signal to Gas release module to the actual completion of Gas discharge takes less than 10 seconds, and the fire is not allowed to propagate, thus saving the critical assets housed in the protected area.

PURPOSE

This specification is for procurement of FM-200 Clean Agent Based Fire suppression system. It shall be used as a standard for the System Equipment, System Installation and acceptance testing.

Mandatory Bidding Requirements:

Original Equipment Manufactures (OEMs) for FM-200 equipment authorized and certified to manufacture and market FM-200 Fire protection only can be quoted. **Any other product without system approvals shall not be qualified for this Tender.**

The OEM shall arrange for the storage container CCOE approval required for their respective systems and certify that they possess a computer aided software design program suitable for the particular Seamless Cylinder being offered for this project.

The Bidder/partner should have received training on design, installations and commissioning of FM-200 systems from the principal and training certificates to this account from the Principals should be submitted.

Specific Technical Requirements:

- The Storage Container offered shall be of seamless type. Welded cylinders are not permitted.
- The Seamless storage cylinder & valve shall be approved by Chief Controller of Explosive.
- The FM-200 valve, operating actuators shall be an Electric (Solenoid) type, and should be capable of resetting manually. Provision should be provided on the Electric Control Head for a Manual Lever for over-ride in case of failure of the Electrical components. The Electric Control Head (Actuator) shall operate at 24 VDC. Bidders are required to submit confirmation for the same and provide the technical data sheet for the same. The Electric Control Head should be capable of being functionally tested for periodic servicing requirements, and without any need to replace consumable parts.
- The system flow calculations shall be carried out on **certified software, suitable for the particular container being offered for this project**. Such System flow calculations carried out for this project, shall be further vetted by the OEM for it's accuracy, and the only such vetted calculations shall be admissible for approval by the Consultant.

GENERAL TECHNICAL REQUIREMENTS

The designer shall consider and address possible Fire hazards within the protected volume at the design stage. The delivery of the FM-200 system shall provide for the highest degree of protection and minimum extinguishing time. The design shall be as per NFPA standard NFPA 2001.

Sub floor and the ceiling void to be included in the protected volume.

The FM-200 Fire Suppression System shall include a detection and control switch provision for both pre-alarm and automatic agent release.

The FM-200 System to be supplied by the bidder must satisfy the requirement of the Authority having Jurisdiction over the location of the protected area and must be in accordance with OEM's product design criteria.

The detection and control system that shall be used to trigger the FM-200 suppression shall employ photoelectric and ionization smoke detectors, and heat detectors. A single detector in one zone activated, shall cause an alarm signal to be generated.

Another detector in the second zone activated, shall generate a pre-discharge signal and start the pre-discharge condition.

The suppression sub-system shall provide high- speed release of FM-200 Based on the concept of total flooding fire protection for enclosed areas. A uniform extinguishing concentration shall be seven- (7) percent v/v concentration of FM-200 at 70 degree F.

The system discharge time shall be 10 seconds or less, in accordance with NFPA Standard 2001.

The discharge nozzles shall be located in the protected volume in compliance to the limitation with regard to the spacing, floor and ceiling coverage etc. The nozzle locations shall be such that the design concentration will be established in all parts of the protected volumes. The final number of the discharge nozzles shall be according to the OEM approved software, OEM Product manual and the OEM vetted programmable pressure loss & flow calculation for this particular project, and the same shall be approved by the OEM.

FM-200 shall be stored in seamless storage containers complying with United States D.O.T. Specification 4BA or 4BW. The Seamless Cylinder and the valves shall be approved by FM/UL and Chief Controller of Explosive Nagpur, India. The Bidder shall be required to produce a NOC for the Chief controller of Explosive Nagpur for the storage containers against the cylinder identification nos. punched on them.

Welded cylinders for agent storage will not be acceptable- nor shall such Seamless cylinders that do not have the approval of Chief Controller of Explosives, Nagpur.

The Cylinders shall be equipped with differential pressure valves & No replacement parts shall be necessary to recharge the Fm-200 containers.

FM-200 shall be discharge through the operation of an Electric (Solenoid) operated device which releases the agent through a differential pressure valve. Systems that employ explosive or pyrotechnic device shall not be permitted.

All system components shall be New and of Current manufacture and shall be installed in accordance with local codes. The Buyer, or the End user of this system or the consultant for this project reserves the Exclusive Rights to unconditionally reject any and all such components which may not be, or are suspected not to be of current manufacture; and / or on the grounds of authenticity of the system components and designs.

The suppression agent shall be UL component recognized and the approved agent shall be OEM factory filled and shall have filled certificate from the OEM.

The bidder shall provide IN ORIGINAL all documentation such as Cylinder Manufacturing Certificates, Test and Inspection Certificates & Fill Density Certificates.

The extinguishing system shall include the following components:

Agent storage container with cylinder valve.

FM-200 agent.
Discharge nozzle (s).
Electronic control head for master cylinder (s) and pressure operated control head for slave cylinder(s) as releasing devices.
Mounting brackets.
Discharge hoses.
EL Check valves on manifold.
Actuation hoses for slave cylinder(s)
Master cylinder adapter kit for slave cylinder system Any other required for the completeness of the system
Any other required for the completeness of the system.

The FM-200 discharge shall be activated by an output directly from the FM-200 Gas Release control panel, which will activate the Electric control head based releasing device. FM-200 agent is stored in the container as a liquid, having a natural vapour pressure of 66.4 psia at 77 degree F . To aid release and distribution, the container shall be super pressurized to 360 psi(g) at 70 degree F with dry nitrogen.

Cylinder valve bodies shall be brass. Any other material of construction shall not be acceptable.

The releasing device shall be easily removable from the cylinder without emptying the cylinder. While removed from cylinder, the releasing device shall be capable of being operated, with no replacement of parts required after this operation. The use of explosive devices to actuate agent discharge shall not be permitted. Upon discharge of the system, no parts shall require replacement other than gaskets, lubricants, and the FM-200 agent. Systems requiring replacement of disks, squibs, or any other parts that add to the recharge cost will not be acceptable.

Systems containing component that have a dated life span and must be periodically replaced shall not be acceptable.

The releasing device shall also be capable of direct mechanical actuation, providing a means of discharge in the event of total electrical malfunction.

Provided with a manual lever and a faceplate with clear instruction of how to mechanically activate the system. In all cases, FM-200 cylinders shall be fitted with a manual mechanical operating facility that requires two-action actuation to prevent accidental actuation.

FM-200 storage cylinders shall be provided with a safety rupture disc. An increase in internal pressure due to high temperature shall rupture the safety disc and allow the contents to vent before the rupture pressure of the container is reached. The contents shall not be vented through the discharge piping and nozzles. FM-200 containers shall be equipped with a pressure gauge to display internal pressure. The gauge shall be an integral part of the container and shall be color-coded for fast referencing of pressure reading.

Brass Discharge nozzles shall be used to disperse the FM-200. The nozzles shall be brass with female threads and available in ½” through 2” sizes. Each size shall come in two styles : 180 degree and 360 degree dispersion patterns. The nozzles provided shall be UL listed and FM approved.

Major components of FM-200 system such as the cylinders, valves, and releasing devices, nozzles and all accessories shall be supplied by one single manufacturer under the same brand name.

FM-200 Gas Release Panel: The FM-200 release signal output shall be by a microprocessor based control panel with battery charger and battery stand-by. This panel shall not be of the zone card type, but shall have the entire operational logic on a microchip. The panel shall be

capable of enhanced features such as printer and computer interface, auto dialer interface, by addition of extra cards on the motherboard.

Release of FM-200 agent shall be accomplished by an electrical output from the FM-200 Gas Release Panel to the Electric control head release device and shall be in accordance with the requirements set forth in the current edition of the National Fire Protection Association Standard 2001.

CODES AND STANDARDS

a) UL - Underwriters Laboratories, USA.
b) FM - Factory Mutual, USA.

12. Access control system

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:

(i) Controlled Entries to defined access points
(ii) Controlled exits from defined access points
(iii) Controlled entries and exits for visitors
(iv) Configurable system for user defined access policy for each access point
(v) Record, report and archive each and every activity (permission granted and / or rejected) for each access point.
(vi) User defined reporting and log formats
(vii) Fail safe operation in case of no-power condition and abnormal condition such as fire, theft, intrusion, loss of access control, etc.
(viii) Day, Date, Time and duration based access rights shall be user configurable for each access point and for each user.
(ix) One user can have different policy / access rights for different access points.
(x) 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.
(xi) Access control system shall be designed and integrated with the access levels as desired by the user,
(xii) Manual mechanical override wherever required shall be provided for access controlled gates / doors.
(xiii) The access control system should support the user defined access logic such as four eye concept, access timeout, anti- pass back ,etc.
(xiv) 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.

(i) Application Software:
The application software shall mean the access & time management software 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 be :-
Able to Remotely Open Doors when Desired
Must Provide Patrol Management Interface
Must Provide at least 65 Control Zones
Must 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.

(ii) 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 off line, the door controller system shall store such data in its internal memory & transfer the same to the server as and when it comes back on line. The Database must have a minimum transaction record of 10,000. The user capacity must be not less than 6000. The Controller shall provide Alarm Inputs for CCTV and Fire Alarm System Integration. The Controller shall have a 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.

(iii) 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 employing a RS232 Format.

(iv) 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 a 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
(v) Proximity Card :
The proximity card shall mean 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 inter operability 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 15 cards to be made available

(vi) Electro Magnetic Locks:
The Electro Magnetic Lock (EML) shall mean a locking mechanism that works on the principle of electromagnetic attraction. The EML shall be installed on single swing flush doors. The door controller system shall control the EML.The Lock holding capacity must be atleast 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.

(vii)Other devices such as Manual Switches, Push Buttons, Mechanical over – ride etc.:
As required and compatible with the overall system offered by the bidder.

(viii) 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.

13. Surveillance system -cctv

a. The system is required to monitor the critical areas of the DC Facility on continuous basis for the movement of people within and around the Facility.

b. The primary purpose of the system is to sense the abnormal movement / behavior of the people so that the security and the concerned Facility operation staff can be alerted in case of abnormal behaviour. This also provides the recording of the abnormal events such as fire, intrusion, etc.

c. To provide clear & accurate indication of an intruder or abnormal movement within and around the Facility.

d. CCTV based monitoring and surveillance system shall be provided at the locations as instructed by the client.

e. Activities to be recorded and the archivals to be kept for at least 10 days. System should include automatic back up to suitable device at regular (configurable) interval. Such recording shall be kept for analysis at a later date.

f. The Closed Circuit Television System (CCTV system) shall provide an on-line display of video images on monitor.

g. Cameras with suitable lenses should be strategically located to view specific areas of interest.

h. Adjacent cameras shall have adequate overlap (to cover the blind zone of the camera) in range so that the camera is able to clearly define the intruder until the end of each camera range and these cameras must be able to cover the largest possible area of the

Facility.

Image screen height shall be minimum 10 % at the beginning of camera range (at the far end).

i. Bidder to specifically ensure that the CCTV system shall accurately cover the areas of interest and serve the intended security purpose by providing clear and accurate image display on the video monitor at at the designated location , during all the climatic conditions.

j. Cameras ancillary equipment shall be selected considering the levels of natural and artificial lights.

k. Wherever required, cameras shall be fitted with lights which shall give white illumination to assist in night surveillance and provide clear and accurate image display on monitors even during poor natural light conditions and/or during night hours**.**

l. Automatic video recording for the cameras displaying image of the area for which Access Control System has generated an alarm shall be provided. Also, such cameras shall be automatically selected on to one of the Monitors in Security Control Room and Facility Manager's room.

Technical Specifications

a. Dome Camera :

The Dome camera unit should be 1/3" CCD type Digital Signal Processor Colour Camera. The camera must have Auto Gain Control and Back Light Compensation. The complete unit shall be housed in a dome and base unit, both made from the material suitable for required fire grade. The camera should be tamperproof. It shall be possible to adjust the camera head inside the dome in both the planes so that it can be wall or ceiling mounted. Other important features of the camera should be as follows:-

Product Parameters:

Horizontal Resolution	:	340 TV Lines Resolution
Focal Length	:	f = 3.6 mm
Sensitivity	:	2.0 lux / F=1.2
Gamma Correction	:	>0.45
Back light Compensation	:	Yes
Auto Gain Control	:	On
Auto White Balance	:	Yes
IRIS Level	:	Adjustable
S/N Ratio	:	>48dB

Minimum 4 cameras to be there inside the server farm at critical points monitoring entry and exit and in between rack rows

b. Digital Video Recorder (DVR) :

(i) The Digital Video Recorder (DVR) shall be offering Triplex Operations for Simultaneous Viewing Live, Playback and Recording..

(ii) The DVR must be Non-PC based standalone equipment with its own proprietary Non Windows based Software.

(iii) The DVR must have a LAN / ISDN / Modem network connectivity built in with unlimited simultaneous user access for both Live and Play Back Viewing and System configuration settings.
(iv) No additional software should be required in order to watch the DVR from a remote location.
(v) The DVR must have Dual Hot Swappable Hard Disks for easy up gradation and storage without having to switch off the DVR.
(vi) The DVR must be compatible with the hard disk array such that additional hard disks may be connected for months of uninterrupted recording.
(vii) The DVR must directly connect to Zip drives, CDR-W's, DVDR-W's.
(viii) Compression format must be selectable between MPEF-1 and JPEG for picture quality and Time Selection.
(ix) Full Screen, 4,7,9,10,13,16 multiscreen display for Monitoring and Playback.
(x) The Cameras should have a selectable Recording Frame Rate for Live Recording, Motion Based recording or Time lapse Recording.

(xi) The DVR shall provide a Menu based operation for Alarm Events such as Video Loss, Motion, Alarm Inputs, Power ON-Off etc.
(xii) The DVR should provide an optional mode for Watermark Recording such that the Video cannot be altered or tampered with.
(xiii) The DVR must provide a motion detection of 16 W x 12 H Matrix for selectable area with a sensitivity graph for selection of sensitivity of motion detection.
(xiv) Multiple Password Entry must be supported by the DVR to ensure different levels of user access.
(xv) The DVR must have a watchdog timer for auto re-boot on power off.
(xvi) The DVR must have Time and Day modes for recording time options.
(xvii) The DVR must have 10 Character Title Generator per camera with individual color tags for easy identification.
(xviii) The DVR must have watchdog function for self-diagnosis and auto rebooting on system hung up.
(xix) The DVR must have Radar search for functions such as thumbnail search and direct search for quickly selecting the images of interest.
(xx) DVR must be able to retrieve the recorded data either by date, time, location or alarm status instantaneously and easily.
(xxi) In the event of motion detection and video loss, the DVR must have pre-alarm and post-alarm recording.
(xxii) Each Video input to the DVR will have time, date and title for easy identification.
(xxiii) The video data shall be non-editable and data loss will be detected up to the one second data.
(xxiv) The DVR shall have in-built remote surveillance (over internet or intranet) feature.

c. Monitor:

The monitor shall be suitable with the standards of the selected cameras. It shall be solid state and modular in design. It shall provide a bright, clear and well-defined picture display on the screen.

All controls for brightness, contrast etc. shall be provided on the front panel for readily adjusting the levels of the video signal. The rear panel shall be provided with input and output BNC connectors for coupling the video output to other Monitors. The video monitors installed shall be of 21" size or more and shall comply with the following specification.

1) 14" High Resolution Color Monitor

Video	: PAL / NTSC colour composite

Picture Tube Dimension : 14”
Resolution : > 480 lines

2) 15” Color VGA Monitor

d. Cables :

There are 2 types of cables used for this work :

a.) RG 6 Video Cable
b.) 2 Core Power Cable laid through separate conduits

14. Rodent repellant system

INTRODUCTION:

Ultrasonic Pest Repellers shall be electronic transmitters of high frequency sound waves (well above the 20 KHz frequency which is the upper limit of the hearing range of the human ear.) They should emit intensive sound at high decibel levels (sound pressure) that is audible and painful to pests, but inaudible and harmless to humans.

THE SYSTEM

System shall consist of Master Console with corresponding twelve Satellites/ Transducers. The Master Console shall be installed in the main control room/ server room, and the satellites in the problematic areas i.e. above and below false ceiling and below false flooring.

1. Master Console

The Master console shall be powered through a 230 VAC, 5 A quality supply.

2. Satellites

- Each Satellite shall cover an open area of 300 sq ft given the average height of the ceiling is 10 ft. Installed in the false ceilings or false floorings, it shall be capable of covering an minimum area of 150 sq ft.
- The whole system (12 nos.) will accordingly be capable of covering an open area of approximately 3,600 sq ft.(If installed in false ceilings and false floorings, the area covered will be less).

TECHNICAL INFORMATION

1. <u>Satellites</u>

- **Crystal :** Shall be similar to DM 44T 24V of MAS Germany. Visible Hexagonal, Triangle excitor – Centre damp horizontal line excitors.

- **Frequency :** Peak frequency responses of the satellites are,
  - 21.6 KHz +/- 3 KHz
  - 31.6 KHz +/- 3 KHz
  - 50.4 KHz +/- 3 KHz
  - 60 KHz +/- 3 KHz

- **Nature Of Sound Waves :** The sound waves propagated by the satellites shall be linear sine waves with constantly varying frequencies.

- **Operating Environment :** The satellites shall be capable of operation in a temperature range of - 4^0C to 60^0C, and should propagate sound waves in 100% humid conditions, and even when they are submerged under water.

4. Power Supply

Provision for 230 V AC and 24 V DC shall be provided to bidder.

Specifications

1)	Configuration	:	One master console with 12 satellites/ transducers
2)	Operating frequency	:	Above 20 KHz (variable)
3)	Sound output	:	80 dB to 110 dB (at 1 metre)
4)	Power output	:	800 mW per satellite
5)	Power consumption	:	15 W approximately
6)	Power supply	:	230 V AC 50 Hz
7)	Dimensions	:	16” x 8” x 4”
8)	Weight	:	5.5 kgs approximately
9)	Mounting	:	Wall/ table mounting

15. Water leak detetcion system

Water leak detection system shall be used in the sub floors etc of the area to be protected, and shall have Tape sensors, detection module and control panel as it’s major components.

Panel
The panel shall be microprocessor based one, and should be modular in design.
The system shall have different zones and detectors shall be connected to the panel through the zone module. Each area of the premise shall be divided into specific zones such that the user if required shall isolate any zone.

The entire system shall be backed by maintenance free battery. The system shall be totally tamper proof and activate an alarm if the control panel is opened, the sensors tampered with or if the system cable is cut even in the disarming state.

Water leak detection zone module

Zone Sensor module is surface mounted below the false floor/above false ceiling where localized detection is required. The Zone Module shall provide monitored circuitry for connection to WLD Panel. The Zone Modules shall be housed in suitable IP 55 housings.

Tape Sensors
Tapes are covered with plastic netting to prevent short circuits when used in metal trays or conduits and shall enable the tape to be folded at right angles to allow easy routing. Water leak detection tape shall provide for the earliest detection of water accumulation in the False ceiling / False Floor, or as decided by the AHJ.

Technical Parameters

Supply Voltage	– 15- 30 AC/DC
Output	- 12 A @ 24 v DC relay contacts
Response Indication	- < 1 Sec
Max Length	- 200 mtr

Makes

Panel	- PCD
Tape sensors	- Sontay
Module	- Sontay

16. Building management system

The scope of work includes design, supply installation of building management system including sensors, digital controllers, supervisory software etc.

The building management system should have minimum the following features

- Building management and control
- Data collection and historisation
- Alarm event management
- Trending
- Reports and MIS
- Maintenance and complaint management
- Network integration
- UPS monitoring
- Air-conditioning monitoring and management
- Fire alarm system monitoring
- Power system
- Energy metering

19 LAN cabling andRacks

The objective of the project is to have networking i.e. installation of LAN Passive components at BHEL's DC. This networking is very critical for BHEL's operations. The proposed system is structured cabling solution for Data systems, which is manageable and scaleable complimented with a state-of-the-art network room at BHEL's New Data Centre. In line with the necessary standards mentioned which have to be adhered to by the vendor.
As per BHEL requirement LAN cabling requirement is

- Cat 6 for Data and Voice
- 24 Port Patch Panel in every rack for the Data Connectivity and console connectivity.
- As per the server requirement digital KVM switch with Interface modules for Server racks needs to be proposed.
- LCD monitor and the keyboards also need to be proposed
- Vendor needs to undertake both supply of passive components, the laying of raceways, laying of cables and the termination activities.
- Vendor has to consider the racks with proper cable management facilities.
- 15 no. of closed server racks with required accessories, 6 nos of network racks and open racks for termination of LAN of uniform colour to be supplied by vendor. All should be of 19" , 42 U size (approved make: APW/ Rittal)
- KVM switches: should support access to KVM through IP.
- The switches should support multi platform server environment
- Support serial devices like routers and switches
- Access should be real time

- Provide full non blocked access to servers
- Rack mountable
- Should support LDAP authentication
- Software with centralised administration with 5 concurrent user license

19 DISEL GENERATOR

Supply engine generator sets and associated equipment in accordance with this specification and drawings.

All equipment supplied shall meet all applicable IS, and other applicable standards.

General

Equipment and services to be provided shall include but are not limited to:

a) Diesel engines with set mounted radiators

b) Alternator

c) Integrated microprocessor based engine and Alternator metering and protection panel.

d) Starter motor, batteries and battery charging alternator

e) Brushless exciter and voltage regulators

f) Electronic governor

g) Engine lubrication systems

h) Exhaust silencers

i) Flexible exhaust connectors

l) Anti Vibration mounts.

k Safety shutdown controls

l) Wiring diagrams

m) Fuel tank **BASE MOUNTED ONLY** and not separate Day tank and accessories.

Manufacturer's Qualifications

The DG set manufacturer should have a factory in India and the engine and alternator should be made in India, preferably as this will ensure after sales service. The DG set manufacturer should have been in this business for not less than 20 years and should have supplied atleast 100 generators of same capacity operation in 1 year prior to this tender notice date.

Certifications

The following certificates should be submitted alongwith the tender.

1. Complaince of emission norms as per CPCB guidelines in force on date for engine.

2. Certificate for design approval for acoustic enclosure from CPCB authorised test lab.

Warranty

The DG set (engine and alternator excluding Electrical and electronic items) shall be guaranteed against faulty workmanship/poor material quality and failures due to the same, for minimum of two years or 5000 Hrs of operation , which ever is earlier ,from the date of ocommissioning. No compromise will be entertained on this clause. The warranty should be from manufacturer of the engine and alternator and not by assemblers or OEMs and any other agency. If necessary, certificate / letter for the same from engine and alternator manufacturer need to be produced on demand.

Engine/Generator Sets

DG set should be 380KVA Prime rated.

Engine/generator sets shall be suitable for parallel operation in conjunction with paralleling switchgear provided by others and engine should have electronic governor as manufacturer standard and not as external attachment and should be able to achieve zero droop if necessary.

Engine bhp should be sufficient enough to deliver 380KVA power at alternator terminal.

It is preferred to have engine of not more than six cylinders inline with bhp of not more than 460.

In order to achieve better fuel efficiency, it is preferred to have step timing fuel injector.

Exhaust manifold to be pulse tuned type.

In order to reduce filter change service time, it is preferred to have spin on type filters for fuel , lube oil and coolant.

Genset :

The engine/generator sets shall be assembled on a robust base by the engine/generator manufacturer with in built fuel tank.

Vibration isolators shall be of resilient rubber design and installed as per manufacturer recommendation.

TVD analysis should have been done on the complete DG set and necessary certificate for the same to be produced on demand.

Protection System

The engines shall be equipped with automatic safety controls which will shutdown the engine in the event of low oil pressure, high water temperature, over-speed and low coolant level(alarm only).

Engine Metering and Protection Panel :

Following metering and protection should be offered for the DG set :

Manual Start and Stop
Remote start and stop

Cyclic cranking
Alpna Numeric LCD display for all parameters

AC Metering (Digital display):
- Ammeter 3 phase
- Voltmeter 3 phase
- Frequency meter
- KVA meter
- KW Meter
- PF meter

Engine Instrumentation :
- LubOil pressure
- Water temperature
- Engine Speed
- Hours Run
- Battery Voltage

Engine Protection :

- High Coolant temperature(warning & shutdown)
- Low lub oil pressure (warning & shut down)
- Fail to crank- shut down
- Fail to start- Shutdown
- Over Speed – Shutdown
- Low and high battery voltage – warning
- Loo coolant level-shutdown

Alternator Protection
- Over voltage-shutdown
- Under voltage-warning
- Over frequency-warning
- Under frequency-shutdown
- Over current-shutdown

The panel should have provision for configuring six discrete outputs and two discrete inputs.

Engine Governors

The engine/generator sets shall be provided with electronic governors as manufacturer standard for automatic paralleling and load sharing. External attachment of electronic Governor is not permitted.

3.11 Alternator – Stamford only.

Class H, IP23, double layer lap winding,
Wave form distortion at no load : less than 1.8%.
Single Bearing type.
Telephone interference factor : Better than 50
Total harmonic factor : better than 2 %

Alternator and engine manufacturer should have their authorised service dealers locally. Suppliers without service back up shall not be entertained.

4.1 Start-Up/Testing

Complete DG set with acoustic enclosure should be tested for 100% load and testing will be inspected by our personnel.The test should be carried out DG set manufacturer factory.

Our person, if required., will also visit the respective engine and alternator manufacturing facility and cost of arranging the visit, for outside India visits , to be included in the tender scope.

Tests shall include but are not be limited to, the following:

Loading upto 100% with Acoustic enclosure.

DG set service set up :

The engine/generator set distributor shall have factory trained service representatives in Hyderabad.

Parts Availability

Preference shall be given to generator sets which can be properly maintained and serviced without requiring the Employer either to carry extensive parts stocks, or to be subjected to long periods of interrupted service because of lack of available parts.

ACOUSTIC ENCLOSURE

Acoustic enclosure should be integrated ready to use type and should not be drop down or canopy type.

Acoustic enclosure base frame should have provision for lifting the enclosure with DG set inside

As space is a limitation, dimension of DG set including acoustic enclosure is preferred to be not more than 5500 mm x 2000mm (L x W)

The enclosure shall be coated with UV resistant power coating for long lasting service life and superior finish.

Insulation material should meet IS 8183 specs.

Air inlet louvers shall be liberally designed so as to work at rated load even at 50 deg C enclosure temp.

We prefer to have the Acoustic enclosure manufacturured by the DG set manufacturer and not by sub contract agencies.

Acoustic enclosure sheet metal work should be carried out with CNC machines to ensure quality and same shall be inspected while visiting factory for DG set testing.

General :

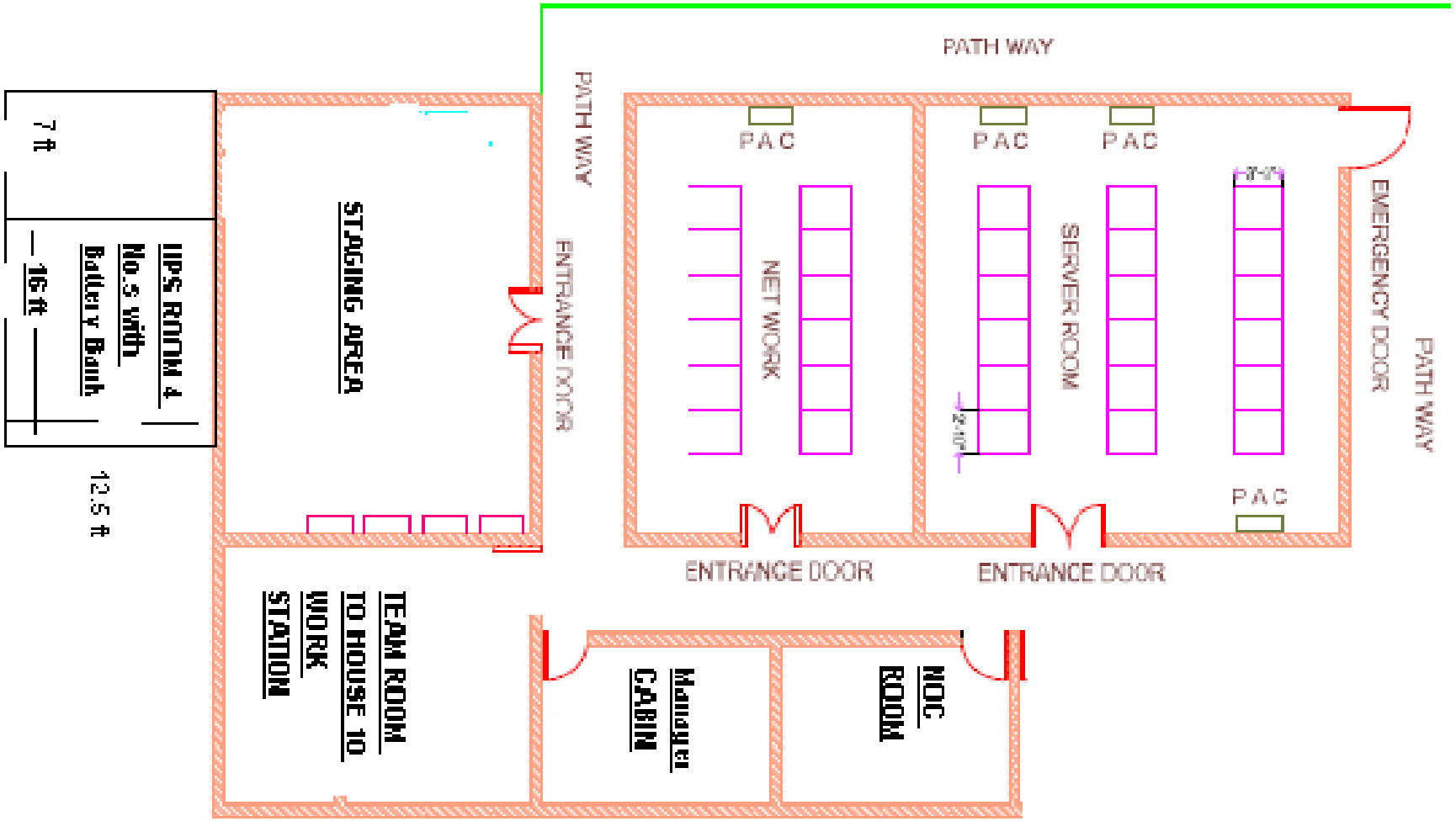
The tenderer should submit the toll free number details in India for the engine manufacturer to ensure speedy service support.

Non-complaince any of the above specs/requirements should be clearly mentioned in the tender, point by point.

QAP from DG set manufacturer to be submitted along with tender.

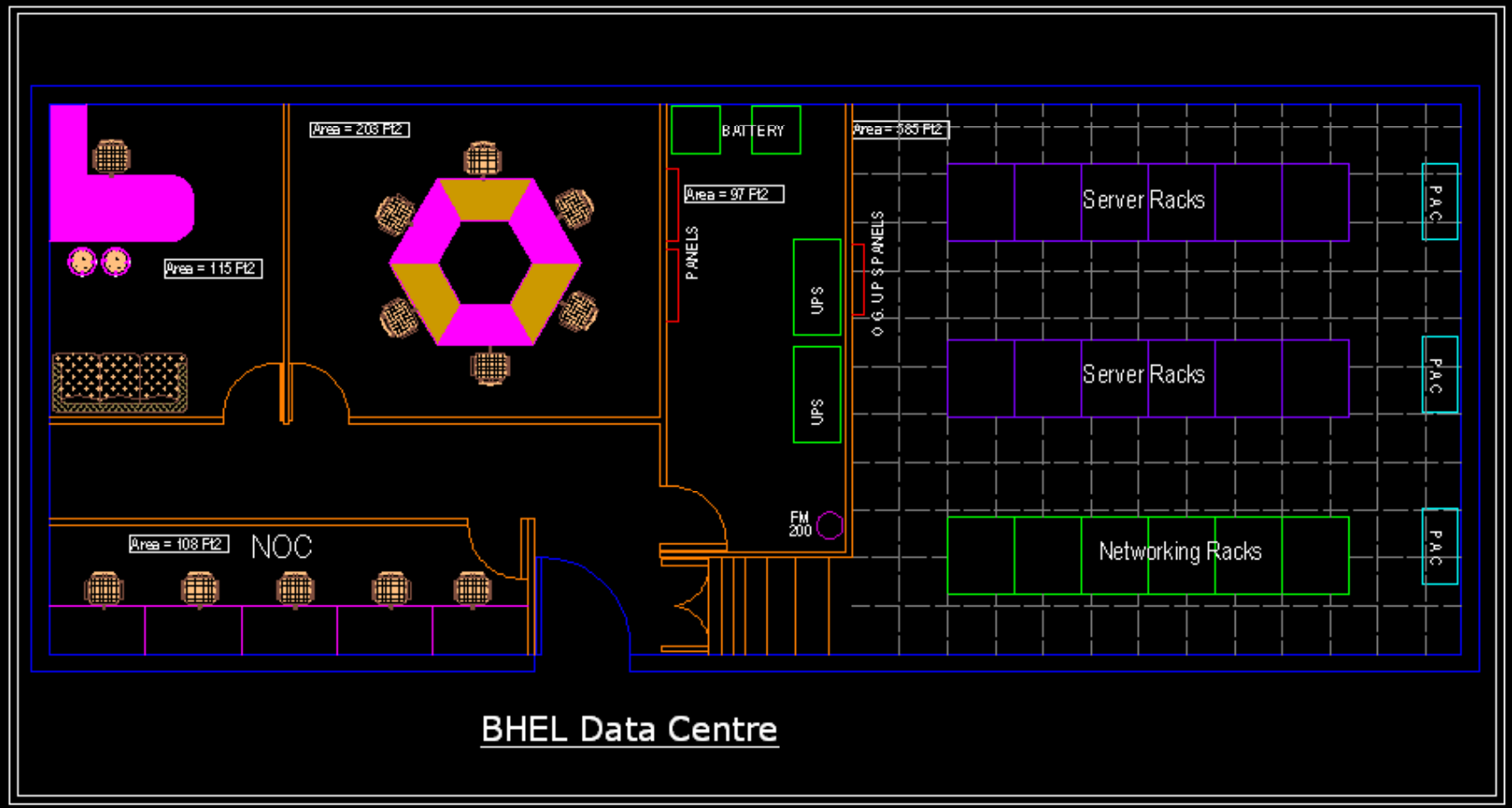
Primary Site Layout (Informatics Centre)

Annexure-IX



Disaster Recovery Site Layout (03 Annex)

Annexure-IX



Annexure-V SI checklist

Check list for the supply of Server Infrastructure to BHEL, Hyderabad

S.No	Server Infrastructure with the following specification is required by BHEL	Vendors Compliance Yes / NO	Remark	Document Reference
1	**Unix Servers (one each at Primary & DR Sites)**			
1	Specify the Make and Model of the Server			
2	Confirm that the two servers are of the same make and model			
3	Specify the Processor			
4	Confirm that the processor is 64 bit RISC / EPIC Processor			
5	Specify the Clock speed of the CPU			
6	Specify the maximum number of Processors accommodated in the server			
7	Is the SAPS bench mark of the offered model published in SAPS web site?			
8	If not, confirm that Certificate from SAP Competence Centre is submitted.			
9	Confirm that the benchmark is for SD - 2tier SAPS			
10	Confirm that the benchmark is for Fully populated (processors) server			
11	Confirm that the benchmark is for Unix Operating System			
12	Confirm that the benchmark is for SAPS ECC 5.0 / 6.0			
13	Confirm that the benchmark is for Oracle RDBMS			
14	Specify the published/certified SAPS benchmark rating of the server			
15	SAPS per processor			
16	All interface cables required for the solution are included in scope of supply			
I/O Slots				
17	All I/O slots are hot pluggable			
18	All adapters are hot swappable			
19	All Fibre Channel Adapters have at least 4 Gbps bandwidth.			
20	All SCSI adapters are Ultra III SCSI/SAS			
21	All Ethernet adapters are 1000 Mbps with RJ45 interface			
22	There shall be no single point of failure while using multiple port/function adapters.			
23	If multiple port/function adapters are used, the cumulative bandwidth of the adapter shall be less than 70% of the I/O slot bandwidth.			
Memory				
24	Type of memory used in the model whose SAP benchmark is published			
25	Confirm that memory is DDR2 SDRAM			
26	Advanced ECC protected?			
27	Specify the memory to processor ratio in the reference model			
28	Specify the memory offered			
29	Ratio of memory to processor in the offered Server			

Check list for the supply of Server Infrastructure to BHEL, Hyderabad

Partitions				
30	Can each server support at least 12 partitions?			
31	Can the processors and memory of any partition be logically assigned to any other partition by the system administrator with out reboot of source or target partitions?			
32	Does each partition run its own independent Operating System kernel?			
Disc Drives				
33	At least 2 internal discs with each partition for OS mirroring			
34	15K rpm 146 GB disc drives			
35	hot-swappable			
36	2 no of FC / SCSI Ultra III/SAS controllers			
Other Server accessories				
37	Rack mountable System console with each Server			
38	17" TFT Monitor with keyboard and mouse			
39	System console capable of Server administration			
40	System console capable of partition configuration			
41	System console capable of administration of any partition			
42	Do the above functions require any special hardware?			
43	Are such special hardware included in the scope of supply?			
44	5 Common sets of removable media drives DVD-RW Drives and 4mm, 40 GB DAT Drives internal/external			
45	Confirm that the drives are sharable across partitions without reboot.			
46	SCSI DVD-RW drive (specify speed)			
47	SCSI DAT (4mm, 40/72 GB) drive			
48	DVD-RW and DAT drives are configurable dynamically to any partition by the system administrator			
49	Provision for input from more than one power source			
50	Redundant hot-swappable Power Supplies			
Campus Wide LAN connectivity				
51	Are all partitions connected through Gigabit Ethernet switches at each site to the campus wide LAN / WAN as shown in the schematic diagram.			
52	Are the Gigabit Ethernet adapters of each partition connected to either of the switches			
Clustering				
53	Clustering as per the schematic diagram provided			
54	Configured for both automatic fail-over and automatic fail-back.			
55	Independent redundant heart-beat communication links between the clusters			
Disaster Recovery				

Check list for the supply of Server Infrastructure to BHEL, Hyderabad

56	The databases in the primary server and DR server are to be replicated synchronously			
57	Confirm that all the software and hardware such as the Multi-protocol Router required for block level replication of the storages are included in the supply			
58	The software required for the data synchronization by periodically transferring the log files from the Primary site to the Disaster Recovery site and updating in the Disaster Recovery site storage and as well as other way round shall also be supplied			
59	The time delay is less than one hour			
Server software				
60	Independent operating system kernel for each partition.			
61	Latest version of 64-bit OEM Unix Operating System for each partition			
62	Capable of running 64-bit SAP ECC Version 5.0 or higher version.			
63	Capable of running 64-bit Oracle v9.2 RDBMS or higher version			
64	At least 12 copies of the OEM Unix operating system with each server.			
65	Support for unlimited users by Unix OS			
66	GUI based system software			
67	Partition Management with Dynamic configuration			
68	System administration			
69	Clustering Software			
70	Client software to administer the servers from Window desktops.			
71	Print Manger with advanced spooling features with each server			
72	Support for SAP enabled Load sharing of Application servers			

Check list for the supply of Server Infrastructure to BHEL, Hyderabad

Please Furnish the Partition-wise Processors, Gigabit Ethernet adapter, Fibre channel adapters, Ethernet adapters for Heart-beat communication, SCSI / FC adapters for OS disc drives, SCSI for DVD-RW/DAT drives offered. If Multiport, multifunctional adapters are used, details on I/O slot-wise adapter deployment shall also be furnished.

S.No	Partition Description	No of Processors (initial supply)	SAPS offered	No of processors expandable to	Ethernet Ports			Fibre Channel adapter	Heart-beat Ethernet adapter	SCSI / FC adapter For OS Drives	SCSI for DVD-RW/ DAT	Total no of I/O slots / adapters
					10Gigabit Ethernet Ports	Gigabit Ethernet adapter						
						Public LAN	Dedicated LAN					
Server at Primary Site (Informatics Centre)												
1	oracle dB											
2	oracle App 1											
3	ERP dB											
4	ERP App 1											
5	ERP App 2											
6	ERP QA											
7	BIW dB											
8	BIW App 1											
9	BIW QA											
10	Backup 1											
	Total											
Server at Disaster Site (03 Annex)												
1	oracle dB Failover											
2	oracle App 2											
3	ERP dB Failover+CI											
4	ERP App 3											
5	ERP App 4											
6	ERP dev											
7	BIW dB Failover+CI											
8	BIW App 2											
9	BIW dev											
10	Backup 2											
	Total											

Check list for the supply of Server Infrastructure to BHEL, Hyderabad

S.No	Description	Vendors Compliance Yes / NO	Remark	Document Reference
2	**SAN Storage (one each at Primary & DR Sites)**			
1	Latest Technology and Monolithic			
2	RAID support 5, 1 + 0			
3	4 Gbps host interfaces			
4	341 disc spindle of 146GB 15K rpm including adequate hot spares at each site			
5	16 or more Fibre Channel host interfaces to connect to both SAN switches.			
Data Cache				
6	64 GB Cache			
7	Cache expandable to 128 GB			
8	The write cache de-staged immediately to disk, in case of power failure			
Other features				
9	Load sharing using multipathing for all partitions with multiple connectivity			
10	License for at least 12 server partitions			
11	SAN storage system level mirroring for 10000 GB Data			
12	SAN storage system level replication for 10000 GB Data			
Expandability				
13	20% with respect to number of Disc Drives			
SAN Software				
14	If the software modules for providing the features mentioned below requires special hardware, the same are included in the scope of supply?			
15	GUI based system software			
16	Multipathing software License for at least 10 server partitions shall be provided			
17	The fibre channel paths shall work on load sharing and fail-over basis using multi-pathing software			
18	Storage configuration and Management			
19	Performance Monitoring and Management			
20	License for Local/Point-in-time/ Flash copy software with all available options including provision for taking full copy and incremental copy of 10000 GB of data			
21	Remote data replication with all available options including synchronous and asynchronous replication of 10000 GB of data			
22	Centralised storage management			
23	The remote copy and local copy shall be at storage system level.			
3	**SAN Switches (Two each at Primary & DR Sites)**			
1	48 port SAN Switches			
2	4 Gbps ports			
3	Out of 48 ports, 8 Ports shall be Long haul to dive a distance of 5 Km.			

Check list for the supply of Server Infrastructure to BHEL, Hyderabad

4	**Tape Library (Back-up Device) (one each at Primary & DR Sites)**												
	Tape Library with Gen4 LTO drives - 2 Nos.												
1	Specify the LTO FC drive Gen 3 or Gen 4												
2	If Gen 3 LTO FC drive is supplied initially, will it be replaced with Gen 4 drive?												
3	If Gen 4 FC drives are supplied, confirm the supply of Tape library with 100 tapes without pass-through mechanism												
4	Redundant Power supply												
5	100 tapes / 200 tapes(in case of Gen 3) included in the scope of supply												
6	50 cleaning tapes included in the scope of supply												
	Tape Library with Gen3 LTO drives - 2 Nos.												
1	The Tape libraries shall have 8 Gen 3 LTO fibre channel drives.												
2	Shall be capable of supporting at least 200 tapes without pass through mechanism.												
3	The tape libraries shall have redundant power supply.												
4	The LTO tape drives shall be connected with 8 Nos. of 4Gbps Fiber Channel ports to the SAN Switches, and the FC ports on the Servers for tape connectivity have to be doubled.												
5	200 Gen 3 LTO Tape media and 20 head cleaning tapes also shall be supplied with each of the Tape library.												
Back-up Software													
1	License for taking backup of data residing in all the partitions												
2	Specify the Back-up software offered												
3	Single solution for supporting multiple operating systems and application												
4	Back-up software shall support tape replication.												
5	Support for scheduled and policy based back-ups.												
6	Support for automated back-up												
7	Support on-line back-up of Oracle/SAP												
8	Support multiple simultaneous client sessions for back-up and restore												
9	Back end RDBMS for efficient management of data on backup												
10	Support features like Point-in-time back up/ restore and Archive /retrieve												
11	Support back-up over LAN and SAN												
12	Support for backup of data from Windows, Novell, Linux Servers												
13	Enterprise management capability												
14	Scalable												
15	Integration with Enterprise Management software such as HP Openview, Tivoli, Unicenter TNG etc.												
5	**Racks (at Primary & DR Sites)**												
1	Confirm the supply of rack to house Servers, storage, LAN, SAN switches, system console, etc												
2	Confirm the supply of mounting hardware, cable managers, power stripes, jack panels and patch chords required for housing the equipment.												
3	Specify the number of cooling fans in each rack												

Check list for the supply of Server Infrastructure to BHEL, Hyderabad

6	**Archival Appliance (at Primary & DR Sites)**			
1	The Archival System shall have Two UDO2 drives with a library capacity of 80 slots.			
2	The Media type shall be of UDO2 and shall be supplied with 200 Nos. of UDO2 (60GB each) write once media			
3	The RAID cache (Disk Drives) shall be of 2TB capacity			
4	The interfaces shall be of Gigabit Ethernet and all the Software to be supplied along with licenses to port on Unix platform.			

Annexure-VII DC Check list

Specifications for Creating Data Centre Environment at Primary and Disaster Recovery Site

Check List

Sl no	BHEL Specification	UOM	Vendor Response	Remarks
1	**Civil & interiors works** : Data centre Layout design and implementation which includes false ceiling, false flooring, partitions, fire rated door , painting etc	ls		
2	**Electrical Power distribution:** Supply, installation and commissioning of Main LT panel, UPS DB C DB, UPS output wiring, raw power wiring, lighting , wiring and light fittings, power points, earthing, earthing strip, cable raceways, computer wiring, point wiring, server wiring, desktop wiring, piping and conduting	Lot		
3	**Precision A/C** units: Precision air handling units DX based for Server Room - Supply, installation and commissioning of **4 x 10TR** capacity precision units for server farm area (minimum low side work considered) and **2 X 5.TR** for DR Site	Set		
4	**UPS system: 60 Kva x 2 nos. with 2 hour battery back up** dual bus configuration with load bus synchronisation in Data Center. And **2 X 40** kVA for the DR Site. And **1 X 15kVA with half an hour battery back for 50-60 DESKTOPS in Data Center**			
5	**Access control system** using biometric, proximity combination for DC, Server room and UPS critical levels	Lot		
6	**Fire detection system** : analogue addressable fire alarm system with cross zoning. Intelligent system of VIEW as an addon to this.	Lot		
7	**Fire suppression system**- **FM 200 for server room** including seamless cylnder, valve assembly, FM 200 agent, , electronic control, discharge nozzle, flexible hose, MS contanier strap, piping as per ASTM A-106, sch 40,	Lot		
8	**CCTV - Surveillance system** - with DVR, Camera, monitor power supply etc.,	Lot		

Annexure-VII DC Check list

Specifications for Creating Data Centre Environment at Primary and Disaster Recovery Site

Check List

9	**Water leak detection system** for Server /network room only with Panel, tape sensor and cables	Lot		
10	**Rodent Control system f**or server room and Network room only with Satelite units, panels and cabling for DC & DR	Lot		
11	**VESDA**	lot		
12	**Building Management System**	lot		
13	**Safety Iron Locker 90 ltr**	unit		
14	**Project Management Charges for DC implementation**			
15	**DG Set with AMF Panel: 380 kVA**			

Specifications for Creating Data Centre Environment at Primary and Disaster Recovery Site

Check List for Civil - Primary Site

Sl no	BHEL Specification	UOM	Qty	Vendor Respo	Remarks
A	**Ceiling**				
1	False celing using **Armstrong/ USG/AMF** or equivalent Boards	Sqft	3685		
B	**Flooring**				
2	Raised Acess Flooring for server & Network area using **Unitile/ NITCO** tiles with 600x600 tiles on pedstal 24" and stingers in G.I. The tiles to have antistatic Laminate	Sqft	1215		
3	**MAKE: MODI** Antistatic Vinyl flooring for UPS Room	Sqft	200		
4	Other office area using virtified tiles 600x600m size of **Naveen/Nitico** or equivalent	Sqft	2470		
C	**Partitions**				
	MAKE: IMPACT/ PINLKINTON Fire Rated Partially Glazed Partition for Server Room using Fire Rated Glass with Heavy Duty Aluminium Sections				
5	Fire Rated Partially Glazed Partition	sqft	128		
6	**MAKE: LEGRAND** Double Skin Gypsum Board Partition Reinforced with GI Sheets on both sides full height with GI Heavy Sections sections with 12mm Gypsum Board .	Sqft	1672		
D	**Doors**				
	Fire Rated Doors				
7	**Godrej / Sakthimet** Fire Rated Doors for Server Room without view panelview panel	sqft	98		
	view panel				
8	Glazed door with 12mm **ASHAI/ SAINT GOBAIN**glass with Hard wood twin style frame work on Top & Bottom with Deco Paint Finsih with SS Handles and floor spring	Sqft	98		
9	Other Doors for UPS Room, using Double Skin Plywood with Handles SS Hinges and door Closer	Sqft	35		
E	**Furniture**				
10	**MAKE: WIPRO/ EUROPATCH** Modular Workstations for NOC, Office Area, Manager Room and Staging Room with Pedestals	No	20		
11	**MAKE: WIPRO/ FEATHERLITE** Chairs for ROC, Security etc Room Featherlite/Euro/Eurosat or equivalrnt	No	20		
F	**Miscellaneous**				
12	Tile Puller to remove cementitious Tiles	Nos	1		
13	Vertical Blinds	Sqft	80		
14	RAMPS/STEPS for Server Room Network Room	Sqft	98		

Specifications for Creating Data Centre Environment at Primary and Disaster Recovery Site

Check List for Civil - Primary Site

15	**MAKE: ASIAN / NEROLAC** Painting on Walls with 3 coats of Plastic Emulsion on top of putty work on walls and partitions	Sqft	7960		
16	Storage in NOC,Office Area etc	Sqft	600		
17	P.O.P Punning of average thickness 1/2" over wall	Sqft	1900		
18	Display Boards in NOC	Nos	1		
19	Miscllaneous Civil works like dismantling closing of windows etc	ls	1		
20	Cleaning of site at regular intervels	ls	1		

Annexure-VII Civil-DR

Specifications for Creating Data Centre Environment at Primary and Disaster Recovery Site

Check List for Civil -DR Site

Sl no	BHEL Specification	UOM	Qty	Vendor Response	Remarks
A	**Ceiling**				
1	False celing using Armstrong/ USG/AMF or equivalent Boards	Sqft	1380		
B	**Flooring**				
2	Raised Acess Flooring for server & Network area using Unitile or equivalent Cementitieous tiles with 600x600 tiles on pedstal 24" and stingers in G.I. The tiles to have antistatic Laminate	Sqft	600		
3	Antistatic Vinyl flooring for UPS Room	Sqft	150		
4	Other office area using virtified tiles 600x600m size of Naveen/Nitico or equivalent	Sqft	630		
C	**Partitions**				
	Fire Rated Partially Glazed Partition for Server Room using Fire Rated Glass with Heavy Duty Aluminium Sections				
5	Fire Rated Partially Glazed Partition	sqft	0		
6	Double Skin Gypsum Board Partition Reinforced with GI Sheets on both sides full height with GI Heavy Sections sections with 12mm Gypsum Board .	Sqft	200		
D	**Doors**				
	Fire Rated Doors				
7	Godrej / Sakthimet Fire Rated Doors for Server Room without view panelview panel	sqft	35		
8	Glazed door with 12mm glass with Hard wood twin style frame work on Top & Bottom with Deco Paint Finsih with SS Handles and floor spring	Sqft	91		
9	Other Doors for UPS Room, using Double Skin Plywood with Handles SS Hinges and door Closer	Sqft	35		
E	**Furniture**				
10	Modular Workstations for NOC, Office Area, Manager Room and Staging Room with Pedestals	No	20		

Specifications for Creating Data Centre Environment at Primary and Disaster Recovery Site

Check List for Civil -DR Site

11	Chairs for ROC, Security etc Room Featherlite/Euro/Eurosat or equivalrnt	No	12		
F	**Miscellaneous**				
12	Tile Puller to remove cementitious Tiles	Nos	1		
13	Vertical Blinds	Sqft	40		
14	RAMPS/STEPS for Server Room Network Room	Sqft	40		
15	Painting on Walls with 3 coats of Plastic Emulsion on top of putty work on walls and partitions	Sqft	2100		
16	Storage in NOC,Office Area etc	Sqft	200		
17	P.O.P Punning of average thickness 1/2" over wall	Sqft	700		
18	Display Boards in NOC	Nos	0		
19	Miscllaneous Civil works like dismantling closing of windows etc	ls	1		
20	Cleaning of site at regular intervels	ls	1		

Price Bid for Supply, Installation and commissioning of Server Infrastructure(Part-A) and Creation of Data Centre (Part-B)

Item No	Item Description (For supply & commissioning at BHEL Hyderabad)	Item Qty	Outright Purchase (including AMC upto 5th year)					5 Year Finance Lease Option							AMC after 5 year lease period (specify % of outright price)
			Unit Price inclusive of Taxes & duties	Specify % of Tax & Duties	Warranty Period in no of years	AMC charges after Warranty Period including tax	Total Price including Taxes, Duties and AMC	Principle for total qty.	Interest value	Maintenance Charges	Lease / Service tax (%)	Lease / Service tax (Value)	Total 5 year Rental including Tax	Total Quarterly Rental including Tax	
		a	b	c	d	e	f=(axb)+(5-d)e	g	h	i	j	k	l=g+h+i+k	m= l/20	n
PART-A															
1	**Unix Servers**	2													
2	**SAN Storage**	2													
3	**SAN Switches**	4													
4	**Tape Library (Back-up Device)**	2													
5	**Racks (set)**	1													
6	**Archival Appliance**	2													
	Total for Part-A														
PART-B															
1	**Total for Part-B (Creating Data Centre Environment for both Sites)**	1													
	Grand Total for Part-A and Part-B														

I	Delivery Period: FIRM 10 Weeks	Accepted / Not accepted	
II	BHEL Terms & Conditions	Accepted / Not accepted	
III	Comprehensive Insurance Covered:	Accepted / Not accepted	
IV	Price**: FIRM** inclusive of all Taxes,	Yes/No (indicate the % Taxes, Levies and Duties)	
*	Out right purchase price	=	F.O.R Destination Cost + ED + CST
	F.O.R Destination Cost	=	Price Ex-works + Packing & Forwarding + Freight & Insurance

Warranty period in case of outright purchase is 2 years from the date of commissioning.

(Signature of Authorised Person with seal)

Price Bid for Data Centre Environment at Primary and Disaster Recovery Site

Total Prices

Sl no	BHEL Specificationv (for Both sites)	UOM	Unit Rate	Amount
1	**Civil & interiors works** : Data centre Layout design and implementation which includes false ceiling, false flooring, partitions, fire rated door , painting etc	ls		
2	**Electrical Power distribution:** Supply, installation and commissioning of Main LT panel, UPS DB C DB, UPS output wiring, raw power wiring, lighting , wiring and light fittings, power points, earthing, earthing strip, cable raceways, computer wiring, point wiring, server wiring, desktop wiring, piping and conduting	Lot		
3	**Precision A/C** units: Precision air handling units DX based for Server Room - Supply, installation and commissioning of **4 x 10TR** capacity precision units for server farm area (minimum low side work considered) and **2 X 5.TR** for DR Site	Set		
4	**UPS system: 60 Kva x 2 nos. with 2 hour battery back up** dual bus configuration with load bus synchronisation in Data Center. And **2 X 40** kVA for the DR Site. And **1 X 15kVA with half an hour battery back for 50-60 DESKTOPS in Data Center**			
5	**Access control system** using biometric, proximity combination for DC, Server room and UPS critical levels	Lot		
6	**Fire detection system** : analogue addressable fire alarm system with cross zoning. Intelligent system of VIEW as an addon to this.	Lot		
7	**Fire suppression system**- **FM 200 for server room** including seamless cylnder, valve assembly, FM 200 agent, , electronic control, discharge nozzle, flexible hose, MS contanier strap, piping as per ASTM A-106, sch 40,	Lot		
8	**CCTV - Surveillance system** - with DVR, Camera, monitor power supply etc.,	Lot		
9	**Water leak detection system** for Server /network room only with Panel, tape sensor and cables	Lot		

Price Bid for Data Centre Environment at Primary and Disaster Recovery Site

Total Prices

10	**Rodent Control system f**or server room and Network room only with Satelite units, panels and cabling for DC & DR	Lot		
11	**VESDA**	lot		
12	**Building Management System**	lot		
13	**Safety Iron Locker 90 ltr**	unit		
14	**Project Management Charges for DC implementation**	ls		
15	**DG Set with AMF Panel: 380 kVA**	1		
			Total Amount	

Note: For lease retal price evaluation purpose, the quantities mentioned above for supply and installations are considered. For lease rentals payments, the supply qunatities and the actual installation qunatities shall be taken into consideration.

Civil Works Prices for Creating Data Centre Environment at Primary Site

Civil - Primary Site

Sl no	BHEL Specification	UOM	Qty	Unit Rate	Amount
A	**Ceiling**				
1	False celing using **Armstrong/ USG/AMF** or equivalent Boards	Sqft	3685		
B	**Flooring**				
2	Raised Acess Flooring for server & Network area using **Unitile/ NITCO** tiles with 600x600 tiles on pedstal 24" and stingers in G.I. The tiles to have antistatic Laminate	Sqft	1215		
3	**MAKE: MODI** Antistatic Vinyl flooring for UPS Room	Sqft	200		
4	Other office area using virtified tiles 600x600m size of **Naveen/Nitico** or equivalent	Sqft	2470		
C	**Partitions**				
	MAKE: IMPACT/ PINLKINTON Fire Rated Partially Glazed Partition for Server Room using Fire Rated Glass with Heavy Duty Aluminium Sections				
5	Fire Rated Partially Glazed Partition	sqft	128		
6	**MAKE: LEGRAND** Double Skin Gypsum Board Partition Reinforced with GI Sheets on both sides full height with GI Heavy Sections sections with 12mm Gypsum Board .	Sqft	1672		
D	**Doors**				
	Fire Rated Doors				
7	**Godrej / Sakthimet** Fire Rated Doors for Server Room without view panelview panel	sqft	98		
	view panel				
8	Glazed door with 12mm **ASHAI/ SAINT GOBAIN**glass with Hard wood twin style frame work on Top & Bottom with Deco Paint Finsih with SS Handles and floor spring	Sqft	98		
9	Other Doors for UPS Room, using Double Skin Plywood with Handles SS Hinges and door Closer	Sqft	35		
E	**Furniture**				
10	**MAKE: WIPRO/ EUROPATCH** Modular Workstations for NOC, Office Area, Manager Room and Staging Room with Pedestals	No	20		
11	**MAKE: WIPRO/ FEATHERLITE** Chairs for ROC, Security etc Room Featherlite/Euro/Eurosat or equivalrnt	No	20		
F	**Miscellaneous**				
12	Tile Puller to remove cementitious Tiles	Nos	1		
13	Vertical Blinds	Sqft	80		
14	RAMPS/STEPS for Server Room Network Room	Sqft	98		

Civil Works Prices for Creating Data Centre Environment at Primary Site

Civil - Primary Site

15	**MAKE: ASIAN / NEROLAC** Painting on Walls with 3 coats of Plastic Emulsion on top of putty work on walls and partitions	Sqft	7960		
16	Storage in NOC,Office Area etc	Sqft	600		
17	P.O.P Punning of average thickness 1/2" over wall	Sqft	1900		
18	Display Boards in NOC	Nos	1		
19	Miscllaneous Civil works like dismantling closing of windows etc	ls	1		
20	Cleaning of site at regular intervels	ls	1		
				Total Amount	

Note: For lease retal price evaluation purpose, the quantities mentioned above for supply and installations are considered. For lease rentals payments, the supply qunatities and the actual installation qunatities shall be taken into consideration.

Civil Works Prices for Creating Data Centre Environment at Disaster Recovery Site

Civil -DR Site

Sl no	BHEL Specification	UOM	Qty	Unit Rate	Amount
A	**Ceiling**				
1	False celing using Armstrong/ USG/AMF or equivalent Boards	Sqft	1380		
B	**Flooring**				
2	Raised Acess Flooring for server & Network area using Unitile or equivalent Cementitieous tiles with 600x600 tiles on pedstal 24" and stingers in G.I. The tiles to have antistatic Laminate	Sqft	600		
3	Antistatic Vinyl flooring for UPS Room	Sqft	150		
4	Other office area using virtified tiles 600x600m size of Naveen/Nitico or equivalent	Sqft	630		
C	**Partitions**				
	Fire Rated Partially Glazed Partition for Server Room using Fire Rated Glass with Heavy Duty Aluminium Sections				
5	Fire Rated Partially Glazed Partition	sqft	0		
6	Double Skin Gypsum Board Partition Reinforced with GI Sheets on both sides full height with GI Heavy Sections sections with 12mm Gypsum Board .	Sqft	200		
D	**Doors**				
	Fire Rated Doors				
7	Godrej / Sakthimet Fire Rated Doors for Server Room without view panelview panel	sqft	35		
8	Glazed door with 12mm glass with Hard wood twin style frame work on Top & Bottom with Deco Paint Finsih with SS Handles and floor spring	Sqft	91		
9	Other Doors for UPS Room, using Double Skin Plywood with Handles SS Hinges and door Closer	Sqft	35		
E	**Furniture**				
10	Modular Workstations for NOC, Office Area, Manager Room and Staging Room with Pedestals	No	20		

Civil Works Prices for Creating Data Centre Environment at Disaster Recovery Site

Civil -DR Site

11	Chairs for ROC, Security etc Room Featherlite/Euro/Eurosat or equivalrnt	No	12		
F	**Miscellaneous**				
12	Tile Puller to remove cementitious Tiles	Nos	1		
13	Vertical Blinds	Sqft	40		
14	RAMPS/STEPS for Server Room Network Room	Sqft	40		
15	Painting on Walls with 3 coats of Plastic Emulsion on top of putty work on walls and partitions	Sqft	2100		
16	Storage in NOC,Office Area etc	Sqft	200		
17	P.O.P Punning of average thickness 1/2" over wall	Sqft	700		
18	Display Boards in NOC	Nos	0		
19	Miscllaneous Civil works like dismantling closing of windows etc	ls	1		
20	Cleaning of site at regular intervels	ls	1		
				Total Amount	

Note: For lease retal price evaluation purpose, the quantities mentioned above for supply and installations are considered. For lease rentals payments, the supply qunatities and the actual installation qunatities shall be taken into consideration.

Annexure-VIII Inputs&Summary

	Outright Purchase - 5 yrs Using Borrowed Funds			
	Assumptions:			
a)	***Net Cost of Asset (Rs.)***		***Interest Rate (BHEL Corporate MTLR) p.a.***	12.00%
b)	***Tenor (Qtrs)***	20		
c)	***Depreciation (WDV) % as per I Tax Act***	60.00%		
d)	***Insurance***	1.33%		
	-amount	0.00		
e)	***Tax Rate (%)***	33.990%		
f)	***Maintainence charges (Qtrly in Arrears)***			
	Annual	0		
g)	***Salvage Value after 5 yrs (As a %age of Net Cost of Asset)***	0.00%		
	Summary			
				Amount in Rupees
		PV of Outflows	**PV of Tax Benefits**	**Net Outflows**
	Outright Purchase (Using Borrowed Funds)	0.00	0.00	0.00
	Note:			
	Input figures may pl be cross checked.			

Depreciation

Initial Investment	**0**
Rate of depreciation	**60.00**

Year	Opening Balance	Depreciation (WDV)	Closing Balance
I	0.00	0.00	0.00
II	0.00	0.00	0.00
III	0.00	0.00	0.00
IV	0.00	0.00	0.00
V	0.00	0.00	0.00
VI	0.00	0.00	0.00
VII	0.00	0.00	0.00
		0.00	

Annexure-VIII Borrow Funds

Outright Purchase Using Borrowed Funds

Monthly Principal and Interest Payment

Cost of Assest	**0**
Rate	**12.00%**
Tenor (Qtrs)	**20**

Month	Opng. Balance	EMI	Principal	Interest	Clsg.Balance	Maintenance	Insurance	PV factor	PV of Outflow (EMI+Insu+Maint)	Tax Benefit	PV of Tax Benefit
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.9709	0	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00		0.9426	0	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00		0.9151	0	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00		0.8885	0	0.00	0.00
Year I		**0.00**	**0.00**	**0.00**		**0.00**	**0.00**		**0.00**	**0.00**	**0.00**
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.8626	0	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00		0.8375	0	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00		0.8131	0	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00		0.7894	0	0.00	0.00
Year II		**0.00**	**0.00**	**0.00**		**0.00**	**0.00**		**0.00**	**0.00**	**0.00**
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.7664	0	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00		0.7441	0	0.00	0.00
11	0.00	0.00	0.00	0.00	0.00	0.00		0.7224	0	0.00	0.00
12	0.00	0.00	0.00	0.00	0.00	0.00		0.7014	0	0.00	0.00
Year III		**0.00**	**0.00**	**0.00**		**0.00**	**0.00**		**0.00**	**0.00**	**0.00**
13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.6810	0	0.00	0.00
14	0.00	0.00	0.00	0.00	0.00	0.00		0.6611	0	0.00	0.00
15	0.00	0.00	0.00	0.00	0.00	0.00		0.6419	0	0.00	0.00
16	0.00	0.00	0.00	0.00	0.00	0.00		0.6232	0	0.00	0.00
Year IV		**0.00**	**0.00**	**0.00**		**0.00**	**0.00**		**0.00**	**0.00**	**0.00**
17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.6050	0	0.00	0.00
18	0.00	0.00	0.00	0.00	0.00	0.00		0.5874	0	0.00	0.00
19	0.00	0.00	0.00	0.00	0.00	0.00		0.5703	0	0.00	0.00
20	0.00	0.00	0.00	0.00	0.00	0.00		0.5537	0	0.00	0.00
Year V		**0.00**	**0.00**	**0.00**		**0.00**	**0.00**	0.5537	**0.00**	**0.00**	**0.00**
		0.00	**0.00**	**0.00**					**0.00**	**0.00**	**0.00**