TENDER DOCUMENTS

Development of Smart Computing Labs Cloud at NUTECH

NUTECH / SCM /Smart Computing Labs 24-25 / TD-331

NATIONAL UNIVERSITY OF TECHNOLOGY, IJP ROAD, I-12, ISLAMABAD

TENDER NOTICE

National University of Technology (NUTECH)

NUTECH / SCM /Smart Computing Labs 24-25 / TD-331

1. Sealed bids are invited from Government / FBR Registered Firms for the procurement of **Smart computing Labs** on **FOR Basis**. Tender documents (& draft contract) can be downloaded from NUTECH Website "https://nutech.edu.pk/downloads/procurement/scm-tenders/ w.e.f **19 Sep 2024** and quotations shall be submitted as per requirement.
2. Bidders will be required to submit **Bank Draft/CDR/BC/PO/SDR** equal to **5%** of quoted value as Bid Bond in favor of National University of Technology (NUTECH).
3. Detail of bids and submission of tender is provided below: -

Sr.	Description	Bank Account Details	Processing Fee	Submission	Tender Opening	Completion Days
a.	Smart Computing Labs	HBL, Tendering and Contracts, **A/C # 5037-7000210755**	**Rs 5,000/-**	1100 hrs on 04 Oct 2024	1130 hrs on 04 Oct 2024	15 days
Tender fee in shape of CDR/PO/BC/SDR etc. will be acceptable. Only deposit receipt shall be considered. Note:- Please attach bank receipt with Technical offer. Offer will not be entertained without payment of processing fee.						

Supply Chain Management

Tel: 0092-51-5476768, Ext: 278

Email Add: scm.office@nutech.edu.pk

NATIONAL UNIVERSITY OF TECHNOLOGY, IJP ROAD, I-12, ISLAMABAD

Compliance – Check List

Offer must be quoted and arranged in accordance with below mentioned sequence.

Non- compliance & non-provision of following documents may lead to disqualification.

Sr.	Required Particulars	Documents Attached	
		Yes / No	Page #
1.	Tender Fee Original Receipt **(Rs 5,000/-)**		
2.	Technical & Financial Offer separately		
3.	NTN/GST Registration		
4.	All Annexures & Special Conditions Compliance Note: All annexures must be as per given format.		
5.	OEM Registration / Authorization Certificate (if applicable)		
6.	OEM Details (if applicable)		
7.	Copy of Earnest Money (prices hidden)		
8.	Proforma Invoice (if applicable) (prices hidden)		
9.	OEM / Equipment brochures & details		
10.	Non-Blacklisting Certificate		
11.	Firm"s Complete details (address, contacts & email)		

INVITATION TO TENDER

Tender submission time: **1100 hrs on 04 Oct 2024**

1. NUTECH desires to procure the list of item(s) / Store(s) on **FOR Basis** as per **Annexure-A**. Interested bidders are requested to send their bids through courier or deliver at NUTECH under "Single Stage – Two Envelopes" (two envelopes placed together in third envelope), marked clearly as **"Technical Offer"** and **"Commercial Offer"** respectively to the undersigned, latest by or before above mentioned due date.
2. **Conditions Governing Contracts.** The contract made as result of this IT will be in accordance with the draft contract published on NUTECH University website and other special conditions (Mentioned in this document) that may be added to given contract for the supply of equipment.
3. **Delivery of Tender.** The offer is to be submitted as under:-
   a. **Technical Offer.** Technical Offer should contain only Annexure-A, Annexure-Annexure B duly filled in (supported with relevant technical literature / details / catalogues etc) and receipt of tender processing fee. Copy of bid bond WITHOUT MENTIONING PRICE should be attached with technical offer.
   Only relevant technical details
   i.e literature/brochures) without mentioning the financial aspect of the offer should be enclosed in an envelope. In technical proposal, all items must have the brand names, model number, manufacturer's name, country of origin, manufacturer's warranty including parts with complete specs and brochures. Re-conditioned and re-furbished equipment shall not be acceptable. Following information will be clearly marked on the envelope:
      (1) Technical Offer
      (2) Original Performa Invoice (without price)
      (3) Tender number
      (4) Date/ time of opening
   b. **Commercial Offer.** Commercial Offer will contain Annexure-C and bid bond
   (Dully mentioned and placed in separate envelope. The offer indicating the quoted price FE/Local Currency (in Local Currency for FOR cases & in FE for FOB cases) in figures as well as in words would be enclosed in an envelope. Following information will be clearly marked on the envelope;
      (1) Commercial Offer
      (2) Original Performa invoice with price
      (3) Tender number
   c. Both the envelopes i.e. commercial offer and technical offer would be enclosed in yet another properly sealed envelope that will be marked with address of this office only. There should be clear indication that this envelope contains tender documents.
   d. The tender duly sealed will be addressed to the following:-
   Deputy Director (Supply Chain Management Office)
   NATIONAL UNIVERSITYOF TECHNOLOGY (NUTECH) IJ P ROAD, I-12, ISLAMABAD
   Tel: 0092-51-5476768, Ext: 278
4. **Date and Time for Receipt of Tender.** Sealed bids with detailed specifications should reach SCM office latest by **1100 hours on 04 Oct 2024.** Delay occurring in post shall not be accepted. Tenders received after the appointed / fixed time will NOT be entertained. The appointed time will, however, fall on next working day in case of closed / forced holiday.
5. **Tender Opening.** The offers shall be opened **30 minutes** after submission time**.**

   Commercial offers will be opened at later stage if Technical Offer is found acceptable on examination by technical authorities. Date and time for opening of commercial offer shall intimate later. Only legitimate / registered representatives of firm will be allowed to attend tender opening.
6. **Validity of Offer.** The validity period of quotations must be indicated and should be 90 days from the date of opening of financial offer.
7. **Withdrawal of offer** If the firm withdraws its offer within validity period the competent authority may place such firm under embargo for a period, which may be extended up to one year. Moreover, the Earnest Money of the firm will be confiscated.
8. **Documents.** Following information / copy of documents must be provided / attached with offer:-
   a. A copy of letter showing firm"s financial capability.

b. NTN/GST number be mentioned on the offer and copy of registration Certificate issued by Sales Tax Department, attached.
c. Foreign supplier to provide its Registration Number issued by respective Department of Commerce authorizing export of subject stores **(in FOB cases).**
d. Annexes A, B and C and special conditions must be signed and stamped. ATTACH ONLY RELEVANT DOCUMENTS.
e. Complete all Annexes as per given format. Do not use your format or letter head. Offer may be rejected if given format is not followed.
f. OEM/principal agency agreement must be provided.

9. **Disqualification.** Offers are liable to be rejected if:-
a. Validity of offer is not quoted as required in IT documents.
b. Any deviation from the General/ Special / Technical Instructions.
c. Offers are found conditional or incomplete in any respect.
d. Copy of EM/Bid Bond & Tender processing fee (with tech offer) and original EM/Bid Bond (with fin offer) are NOT attached.
e. Multiple rates/items are quoted against one item. Deleted
f. Manufacturer's relevant brochures and technical details on major equipment assemblies are not attached in support of specifications.
g. Offer received later than appointed / fixed date and time.
h. Subject to restriction of export license.
i. Offers (Commercial / technical) containing non-initialed / unauthenticated amendments / corrections / overwriting. If the validity of the agency agreement has expired. The commercial offer against FOB / CIF / C&F tender quoted in local currency.
j. If the offer is found to be based on cartel action in connivance with other sources/participants of the tender.

10. **Earnest Money / Bid Bond.** Commercial Offer must be accompanied with a Bid Bond (CDR/Pay Order/Bank Draft) in agreement of faithful compliance of the conditions of Contract. This amount will be equivalent to 5% of the total quoted value. The Bid Bond amount submitted by the successful bidder will however be refunded on effective termination of Contract. (The Bid Bond will be forfeited in case of default by the bidder from his commitments made through his offer). Submission of Bid Bond is mandatory; otherwise your offer will be rejected. Bid Bond will be used as performance guarantee till the delivery of stores, otherwise separate performance guarantee valued at 5% of contract will be submitted by successful firm till stores are delivered and inspected.

11. **Return of Earnest Money/Bid Bond.**
a. Bid Bond to the unsuccessful bidders will be returned on finalization of the lowest evaluated bidder.
b. Bid Bond of the successful bidder/bidders will be returned on submission of Bank Guarantee/Bid bond against warranty period OR Bid bond retained for the warranty period as the case may be.

12. **Terms of Payment/ LC Charges**
a. 25% Advance - At the time of award of project to vendor
b. 25% payment - After delivery of HW stack of Project
c. 50% payment – after completion and commissioning of the project

13. **Taxes/ Duties/ Custom clearance** All taxes /duties /import Licenses Fee as applicable under government laws in Pakistan as well as country of supplier shall be on Seller (in FOR Case). NUTECH will provide applicable exemption certificates and documents (In FOB Cases only).

14. **Insurance: -** Insurance will be Seller's Responsibility **(in FOR Cases)** and NUTECH"s responsibility through NICL **(in FOB Cases)**.

15. **Freight charges /Misc charges:** All charges such as packing, forwarding, local freight, loading and unloading, installation and commissioning, custom clearance, orientations, on job training or any other will be part of quoted price. Delivery till NUTECH will be seller's responsibility and all associated costs will be part of quotation as well.

16. **Delivery Schedule.** Store will be delivered within **60 Days** from contract signing date.

17. **Force Majeure.** If non-compliance with the period of delivery or services can be proved to be due to Force Majeure, such as but not limited to mobilization, war, riot, strike, lockout,

pandemics/epidemics or the occurrence of unforeseen events, the period shall be reasonably extended.

18. **Subletting** Suppliers are not allowed to sublet wholly or part of the contract to any other firm /company without prior permission by NUTECH. Firm found in breach of the clause will be dealt with as per purchaser's right and discretion.

19. **Arbitration.** Will be as under:-

"All Claims ,disputes ,controversies, differences arising out of or in connection with this contract ,including any question regarding its existence, validity, interpretation performance, breach or termination ,shall be referred to and shall finally be solved by binding arbitration. An Arbitration Committee Shall be constituted comprising Rector NUTECH and two Arbitration to be nominated on mutual agreement by each party. The venue of the Arbitration shall be the place of issuance of this contract or as Rector NUTECH may determine. In case of any difference, the clauses of Arbitration Act 1940, Rules and Regulation made thereof for time being enforce shall prevail. The award shall be final and binding on both parties.

a. Provided that written record of any such arbitration and its award shall be arranged properly. An award of such arbitration may be confirmed in a court of competent jurisdiction at Islamabad.
b. Provided further that incase of any other question /dispute not covered under this clause, the decision of Rector NUTECH shall be final."

20. **Redress Of Grievance.** In case of dispute, case shall be reviewed by NUTECH Redress of grievance committee and decision of NUTECH shall be final and binding on both parties.

21. **Export License/Permit /End User Cert.** It shall be the responsibility of the Supplier to obtain from the Government concerned all permits and export licenses, etc required to enable each consignment to be shipped immediately as per the delivery schedule. In case the supplier fails to arrange export license within 30 days of signing the contract the purchaser reserves the right to cancel the contract on the risk and expense of the supplier without prior notice. The purchaser will provide End User Certificate for acquisition of export license to the supplier (format to be provided by the supplier for respective country within 10 day of signing of the contract).

22. **Technical Specification:** The supplier will provide OEM certificate, quality certificate /inspection document to the purchaser confirming the quality of the product being supplied under this contract Store must bear the manufacturer's identification marking /monogram.

23. **Inspection /Testing of Store**: Inspection testing will be carried out at NUTECH by the concerned inspection team as detailed by the respective department in accordance with the laid down Acceptance Criteria. (Acceptance Test Procedure (ATPs)/Drawing /Test standard and specification). The supplier will provide ATPs with technical offer. Mutually agreed/approved ATPs will form part of contract to govern the inspection of store subsequently.

24. **Change In Specification /Mfr /Model.** No alternation marked/brand and quality of store will be entertained after the tender have been opened.

26. **Checking of Store at Consignee/User End.** All stores will be checked at Consignee's end in the presence of the supplier's representative. If for some reason, the supplier decides not to nominate his representative for such checking, an advance written notice to this effect will be given by the supplier to the consignee prior to immediately on shipment of store. In such an event the supplier will clearly undertake that decision of consignee with regard to quantities and description of consignment will be taken as final and discrepancy found will be accordingly made up by supplier. In all other cases the consignee will inform the supplier about arrival of consignment immediately on receipt of store through registered email/letter and telephone. If no response from the supplier is received within 15 days from initiation letter the consignee will have the right to proceed with the checking without supplier's representative. User/Consignee's report on checking of the stores will be binding on the seller in such cases.

27. **Packing /Marking.** The supplier shall be responsible for proper packing of the Store in standard export packing worthy of transportation by sea /air /road rail so as to ensure their content being free from lose or damages due to faulty packing on arrival at the ultimate destination. Packing of stores will be done at the expenses of the supplier. All packing cases, containers and other packing material shall become the property of the NUTECH on receipt. Any loss occurred /demurrage paid due to wrong marking will be made good by the supplier.

28. **Original Performa Invoice**: Original Performa invoice must have following components incorporated: -

a. HS Code
b. Incoterm
c. Payment Terms
d. Origin of good
e. Port of shipment
f. Address of OEM
g. Seller acceptance (on Performa Invoice)
h. Invoice Date
i. Latest date of shipment
j. Seller complete bank detail

Note: Performa Invoice in the name of NUTECH in case of FOB cases & in the name of local partner in case of FOR cases.

29. **General Instructions:** Following must be noted:-

a. The firm should provide point to point acceptance of each clause of IT and special instructions attached with IT.
b. Firm will render a certificate with technical offer that firm is neither defaulter nor blacklisted by any Government / semi Government organization directly or indirectly. (On Judicial Paper)
c. Rates should be quoted on Free Delivery basis at NUTECH Islamabad.
d. The stipulated delivery period should be strictly adhered to. Any anticipated delay that is beyond the control of Seller will be informed (in writing) well in advance of the expiry of the due date of the activity along with reasons thereof, requesting for the grant of extension in delivery period. If the Seller fails to do so, or the Buyer is not convinced with the rationale provided by the Seller, Liquidated Damages up to/at 2% per month or part thereof, will be imposed. However, the maximum limit of the Liquidated Damages will not exceed 10% of the delayed store value.
e. If even after applicability of 10% LD, the Seller fails to deliver the required stores, the Buyer will be at liberty to Cancel the contract, and /or procure the
of stores from an alternate source, on the Seller's "Risk & Cost/Expense". In that case, the Seller will be bound to make payment to the new source through NUTECH. The purchaser's decision under this clause shall currency / execution / after placement, if the firm is found to be involved in any dubious activity, litigation, lacking to meet contractual obligations with the purchaser or is blacklisted with any other Public procurement agency. No claims / loss /damage of whatsoever nature shall be entertained and NUTECH's NOT be subjected to arbitration.
f. NUTECH reserves the right to cancel the Contract without assigning any reason whatsoever during its decision in this regard will be final / binding on the Seller.
g. An appropriate amount may be paid for mobilization against Bank Guarantee/CDR/Demand Draft/Pay Order.
h. Firms with previous pending/outstanding projects/business and unsatisfactory performance with NUTECH may not be considered for award of any further business.
i. Lowest evaluated bidders must send their authorized representatives (with authorization letter) for signing of the contract within three days of sharing of the draft contract.
j. For technical opening firm will send a representative who has knowledge about the quoted items otherwise representative will not be allowed to sit in tender opening.
k. **Stamp duty for Contract will be taken as per Section 22-A of Stamp Act 1899 Pakistan.**
l. **Business will be awarded on Package Deal.**

30. **Warranty** 3 Years Warranty will be required from the successful bidders from the date of commissioning.

Annex-A

Technical Specification

Sr.	Items	Description	Country of Origin	A/U	Qty	OEM Auth	Bidder Compliance	
							Yes	No
1	Development of VDI based computer labs including HW and Software infrastructure	A complete end to end solution for establishing VDI based computer labs in NUTECH. This will include all HW and Software with requisite licensing for 3 Years. Detailed Specs are appended as **Anx A**.	Europe / USA/ Asia	No.	150			
2	Provisioning of complete Peripheral accessories for VDI Labs	Procurement/ Installation of all peripheral devices and infrastructure for VDI labs including but not limited to Network, Display Screens, Keyboards, Mouse and power backup Equipment.	Europe / USA/ Asia	No.	150			

Annex-B

Necessary to Fill Completely

Fill in following essential Parameters: -

1.	Validity of Offer	Days (Should not be less than **90 days**)	
2.	Delivery period	Days (After placement of order)	
3.	Country of Origin		
4.	Warranty Period		

General:-

1.	GST Number	Enclose Copy
2.	NTN / CNIC	if exempted, provide valid exemption certificate

Payment Terms (In continuation of IT Document clause 12):-

In FOR Cases
20% advance payment against BG/CDR/Pay Order/DD
Remaining **80%** payment after delivery, installation / commissioning /user satisfaction certificate

Details of Foreign Principal Information with account details:-

1. Name / Title: _____
2. Address: _____

OEM Brand Name:	Firm Name:	**Signature:**
OEM Focal Person Name:	Firm Focal Person:	**Official Seal:**
OEM Phone Number for verification:	Firm Phone Number:	**Name & CNIC:**
OEM Email Id for verification:	Firm Email Id:	**Designation:**

Annex C

FINANCIAL OFFER

Sr.	Items	Description	Country of Origin	A/U	Qty	Unit Price (Inc. Tax)	Total Price (Inc. Tax)
1	Development of VDI based computer labs including HW and Software infrastructure	A complete end to end solution for establishing VDI based computer labs in NUTECH. This will include all HW and Software with requisite licensing for 3 Years. Detailed Specs are appended as **Anx A**.	Europe / USA/ Asia	No.	150		
2	Provisioning of complete Peripheral accessories for VDI Labs	Procurement/ Installation of all peripheral devices and infrastructure for VDI labs including but not limited to Network, Display Screens, Keyboards, Mouse and power backup Equipment.	Europe / USA/ Asia	No.	150		

Special Instructions								
1.		Standard & Compliance	Bidder must submit specification compliance in their bids. Non-compliance (if any) against the product specification and general terms & conditions of the tender may lead to the disqualification of the bidder.					
2.		Warranty Period	3 Years Comprehensive warranty of all BOQ items from the date of equipment/ service delivery.					
3.		Liability of Supplier	Supplier is to provide original OEM certificate of subject equipment licenses bought directly from the manufacturer and being an authorized dealer.					
4.		Support Services	Periodic (Quarterly) maintenance for all the relevant parts Replacement / Repair / Servicing of faulty part within 24-hours of escalation of issue.					

Tender No _____
Name of the Firm _____
Firm Address _____
Date _____
Telephone No _____
E-Mail _____

To, DD SCM Office
NUTECH University
I- 2, Main IJP Road,
Islamabad.

Dear Sir

1. I / We hereby offer to supply to the NUTECH University the stores detailed in schedule to the tender inquiry or such portion thereof as you may specify in the acceptance of tender at the price offered against the said schedule and further agree that this offer will remain valid up to 90 days after opening of Financial offer and will not be withdrawn or altered in terms of rates quoted and the conditions already stated therein or on before this date. I / we shall be bound by a communication of acceptance to be dispatched within he prescribed time.
2. I / we have understood the instructions to Tenders and General Conditions Governing Contract available at NUTECH website and have thoroughly examined the specifications / drawing and / or patterns quoted in the schedule here to and am/are fully aware of the nature of the stores required and my/ our offer is to supply stores strictly in accordance with the requirements.

Yours Faithfully.

(Signature of Tenderer)
Designation
Date:

Individual signing tender and / or other documents connected with a contract must be signed by principal authorized rep/ OEM rep/ Authorized partner firm rep.

SPECIMEN FOR "ADVANCE PAYMENT BANK GUARANTEE"

Guarantee No:_____Date _____Amount:_____Valid upto:_____
In Favour of: National University of Technology (NUTECH), IJP Road, I-12, Islamabad
Subject: **Advance Payment Bank Guarantee**
Contract No:_____DATED._____
Dear Sir,

1. We [Name of Guarantor] understand that you have entered into contract with M/S [Name of Firm] (hereinafter called Our Client), for provision of [Name of Stores]. And as per the above mentioned Contract, you are liable to pay to Our Client an amount of [Amount of Guarantee] in advance, which shall be released against a Bank Guarantee. 2. Bank & seller firm shall inform your office regarding termination of the validity of this bank Guarantee one clear month before the actual expiry date of this Bank Guarantee.

3. Now, we hereby irrevocably undertake to immediately make payment on to your orders, merely upon receipt of your first written notice, an amount not exceeding [Amount of Guarantee] that may be claimed by you at your own discretion without it being necessary for you to prove or even assert to the Bank any default whatsoever of Our Client under the Contract.

4. Claims against this Guarantee shall be lodged on us through written request/s on your proper Letter Head. Unless claims are not presented on or before the Validity Date, all rights and benefits under this guarantee shall be forfeited and we shall be released from all claims, demands or liabilities of any kind whatsoever.

5. This Guarantee shall remain in force up to the above mentioned Validity Date which can however, be extended upon request of Our Client.

Yours faithfully,

"SPECIMEN FOR BANK GUARANTEE AGAINST PERFORMANCE/WARRANTY GUARANTEE"

Guarantee No:_____Date _____Amount:_____Valid up to:_____

In Favor of: National University of Technology (NUTECH), IJP Road, I-12, Islamabad

Subject: **In compliance with terms of Performance/Warranty Guarantee Bank Guarantee**

Contract No:_____dated _____

Dear Sir,

1. Whereas your good-self have entered into Contract No __dated with M/s [Firm Name] Located at [Firm Address], Herein after referred to as our customer and that one of the conditions of the Contract is submission of Bank Guarantee by our customer to your good-self for a sum of [Amount].
2. Incompliance with this stipulation of subj contract, we hereby agree and undertake as under:-
    a. To pay to you unconditionally on demand and / or without any reference to our Customer an amount not exceeding the sum of [Amount] as would be mentioned in your written Demand Notice.
    b. To keep this Guarantee in force till [Validity Date].
    c. That the validity of this Bank guarantee shall be kept two clear year ahead of the original / extended delivery period or the warrantee of the stores which so ever is later in duration on receipt of information from your office. Our liability under this Bank Guarantee shall cease on the closing of banking hours on the last date of validity of this Bank Guarantee. Claim received there after shall not been entertained by us whether you suffer a loss or not. On receipt of payment under this Guarantee, this documents i.e., Bank Guarantee must be clearly cancelled, discharged and returned to us.
    d. That we shall inform your office regarding termination of the validity of this bank Guarantee on clear month before the actual expiry date of this Bank Guarantee.
    e. That with the consent of our customer you may amend / alter any term / cause of the contractor add / delete any term / clause to / from this contract without making any reference to us. We do not reserve any right to receive any such amendment / alternation or addition / deletion
    provided such like actions do not increase our monetary liability under this Bank Guarantee which shall be limited only [Amount].
    f. That the bank guarantee herein before given shall not be affected by any change in the constitution of the Bank or Customer / Supplier or Vendor.
    g. That this is an unconditional Bank guarantee, which shall been cashed on sight on presentation without any reference to our Customer / Supplier or Vendor.

Note: No changes in the above given BG format shall be accepted.

"SELLER'S WARRANTY CERTIFICATE"

(To be provided on stamp paper)

Validity _____years from the date of final acceptance of the Stores.

We hereby guarantee that we are the genuine and original Source of provisioning the Stores to our Buyer. We also undertake that nothing in the manufacturing of these Stores has been obtained through unauthorized means.

1. We hereby warrant and undertake that the Stores and all the associated spares/ accessories supplied under the terms and conditions of the above Contract, are:
    a. brand new, complete in all respects, possessing good quality and standard workmanship; and
    b. liable for replacement/rectification free of charge, if during the Warranty period the same are found defective before or under normal use or these do not remain within the limits and tolerances stated under the specifications or in any way not in accordance with the terms of this Contract. All expenses incurred in removal, re- provisioning and reinstallation of such defective Stores or their parts shall also be borne by us.
2. The Warranty shall remain valid for a period of___years from the date of final acceptance of the Stores.

**Sellers warranty must be provided by the Seller (firm) on Rs 100 stamp paper along with bank guarantee/CDR/Pay Order without changing a word. BG with additional clauses will be rejected.

CHECK LIST

(This checked list must be attached with your technical offer, duly filled and Signed by authorized signatory)

Tender No_____ Date_____

1	Tender Processing Fee	a. Tender processing fee ref no b. Bank c. Amount		
2	EM/ Bid Bond	a. EM/ Bid Bond ref no b. Bank		
3	Form Annex A, B and C signed by Authorized Signatory		Yes	No
4	Offering specification of items as per IT		Yes	No
5	Quoted Currency as per IT		Yes	No
6	Accounting unit/Qty as per IT		Yes	No
7	Delivery Schedule as per IT		Yes	No
8	Country of origin of store			
9	Name of OEM:- _____			
10	Original Performa invoice (Mandatory)		Yes	No
11	Certified that there is no Deviation from IT conditions/ there is deviation from IT condition as per fol details		Yes	No
12	Blacklisting certificate.		Yes	No
13	Verifiable OEM Certificate		Yes	No
14	Warranty Period as per IT		Yes	No
15	ATPs provided		Yes	No

Note: Fill and/or mark Yes/No where required.

Signature of Firm Auth Signatory

Ins tl/Assy/Commissioning Req	**Yes**	No	Contract with **OEM/Supplier**	**Yes**		No	
Performance Bond Req	**Yes**	No	Offer Req for Package Deal	**Yes**		No	
Note: (If any)			Warranty req and Duration	**Yes**		No	
List of "Additional Req may be" sent to procurement office, immediately							
Maint Spare Req	**Yes**	No	Essentially Running spare req	**Yes**		No	
Pub/Lit Req	**Yes**	No	Req of Cert for test data results	**Yes**		No	
Trg Req	**Local**	Foreign	Req of Calibration	**Yes**		No	
Note:Tick relevant box							

Development of NUTECH Computer Labs

1. **Introduction.** In today's rapidly evolving digital landscape, educational institutions and organizations are increasingly adopting innovative technologies to enhance the learning and working environments. Virtual Desktop Infrastructure (VDI) presents a modern solution that allows users to access desktop environments and applications through powerful compute resources, providing flexibility, scalability, and enhanced security. To meet the growing demand for high performance and scalable computing and to optimize the use of computing resources, NUTECH is embarking on a project to establish VDIbased computer labs. These labs will provide users with consistent and secure access to virtualized desktops and applications from any location, ensuring seamless continuity in learning and work processes. The objective of this RFP is to identify a qualified vendor who can design, deploy, and manage the VDI infrastructure, ensuring it meets our performance, security, and scalability requirements.
2. **Project Objective .** The objective of this project is to establish a robust, secure, and scalable VDI-based computer lab environment that meets the needs of students, faculty and Research activities for 1**50 Concurrent Users**. The solution should provide seamless access to virtual desktops and applications, enhance resource utilization, and offer high availability and performance.

Scope of Work

a. **Design and Architecture**: Development of a VDI solution architecture that meets our needs.

b. **Implementation**: Deployment of VDI infrastructure including servers, storage, network, and software configuration.

c. **Testing and Validation**: Comprehensive testing to ensure the system meets performance, security, and usability requirements.

d. **Training**: Providing requisite training sessions for IT staff and end- users.

e. **Support and Maintenance**: Ongoing support and maintenance services including post-deployment support.

Performance Requirements

a. Per-User Compute Specifications

i. **CPU Allocation**: Each workstation or virtual desktop should be allocated a minimum of **4 vCPUs**.

ii. **RAM Allocation:** Each user session should be allocated at least 32 GB of RAM.

iii. **Storage Allocation:** Each user session should have access to at least 500 GB of storage, with 50-100 GB dedicated to persistent storage (for storing code, project files, and databases) and the remainder for non-persistent storage (temporary files, OS caching).

b. **Network Bandwidth:** Each workstation or virtual desktop should have access to at least **10 Mbps** of dedicated network bandwidth.

c. **Latency Requirements** Maximum acceptable latency should not exceed **30 ms**.

d. **User Density** The infrastructure should support **20-30 concurrent users per host server** with the above CPU, RAM, and storage allocations.

e. **Operating System and Software Requirements.** The system should support **Operating Systems i.e Windows 10/11, Linux (Ubuntu/CentOS)**, or **macOS** as per the curriculum requirements. The system should also support **Development Tools and** IDEs like **Visual Studio, IntelliJ IDEA, Eclipse**, text editors like **VS Code**, compilers for languages like **C++, Java, Python**, database management systems like **MySQL, PostgreSQL**, and virtualization software.

f. **Software Updates**: The system should be capable of handling frequent updates for operating systems, IDEs, and other development tools without impacting performance.

g. **Additional Considerations** Ensure automatic backups are in place for critical project files and data to prevent loss during system crashes or user errors.

Scalability and Future-Proofing

a. **Scalability**: The system should be designed to allow easy expansion to accommodate more users or increased workloads without requiring a complete overhaul of the infrastructure.

b. **Future-Proofing**: The solution should consider future technology trends like AI, machine learning, and cloud computing, ensuring it can be easily upgraded or adapted.

Security Requirements

a. **User Authentication**: Implement multi-factor authentication (MFA) for accessing the VDI environment.

b. **Data Encryption**: Ensure all data at rest and in transit is encrypted using industrystandard protocols.

c. **Access Control**: Enforce role-based access control (RBAC) to restrict access to sensitive data and administrative functions.

d. **Monitoring and Logging**: Enable continuous monitoring and logging of user activities to detect and respond to potential security threats.

User Experience (UX) Considerations

a. **Usability**: The system should be user-friendly, with intuitive interfaces and minimal downtime.

b. **Personalization**: Allow users to customize their desktop environments to suit their preferences.

Support and Maintenance

a. **Vendor Support**: The vendor should provide support with defined response times for different severity levels, 24/7 availability, and on-site support if necessary.

b. **System Maintenance**: The vendor should provide regular maintenance, updates, and patch management to keep the system secure and running smoothly.

c. **Documentation**: Comprehensive documentation, including user manuals, system architecture diagrams, and troubleshooting guides, should be provided.

Training and Knowledge Transfer

a. **Staff Training**: The vendor should provide training sessions for IT staff on managing and maintaining the VDI environment with certified OEM trainings for at-least 5 Different tier IT staff.

b. **End-User Training**: Training for end-users to ensure they are comfortable using the new VDI system.

c. **Knowledge Transfer**: A formal knowledge transfer process should be in place to equip the internal team with the necessary skills and knowledge to manage the VDI environment post-deployment.

Performance Monitoring and Reporting

a. **Monitoring Tools**: Implement tools for real-time monitoring of system performance, including CPU, memory usage, storage, and network traffic.

b. **Reporting**: The system should generate regular performance reports detailing usage patterns, system health, and any potential issues.

c. **Alerts and Notifications**: Set up alerts and notifications for critical system events, such as resource over-utilization, potential security breaches, or system failures.

11. **Technical Requirements:** Detailed technical requirements are given as per Anx A below.

Category	Item	Requirements
Software		
General Requirements	General Specifications	Must Be Compatible with Any Brand of Intel (x86) Architecture Hardware Servers
		Must Have OEM Local Presence in Pakistan for Minimum 05 Years or more
		Must Have Minimum 05 VDI Deployments in Pakistan with at least one deployment in education sector.
		Must Quote VDI Perpetual Licenses for 150 concurrent users.
		Must Quote 3 Years 24/7 Software Technical Support Services by OEM
		Must Quote Onsite Installation and Configuration by OEM

		Must Include Training and Certification for 05 Participants by OEM
		Non-Compliance to the above general requirements shall lead to the rejection of Bids
Virtualization	**Quantity**	Must Quote all the required components of virtualization covering the mentioned RFP specs (Socket based and perpetual covering all number of sockets mentioned in the server hardware section)
	Virtualization	In the case of a single cluster, a centralized management platform is not needed. Administrator accesses the master server of the cluster in Web mode to manage the servers, VMs, network, and virtual storage in a centralized way.
		To ensure business continuity, Hypervisor should support smooth rolling upgrade. Servers should be upgraded one by one without shutdown of the cluster. During the upgrade, VMs will be automatically migrated to other hosts, and business operation is not affected.
		Support to mixed server, desktop and application virtualization in the same cluster and same hypervisor to simplify the management workload.
		Unified VM backup and restoration should be supported. Users can choose to back up data on multiple or all VMs to external servers as required. In addition, backup policy setting should be supported to implement automatic backup.
User License	**Configuration**	Licenses are required for concurrent VDI user. Five types of desktop resources, including persistent desktop, Non-persistent desktop, pooling desktop, shared desktop, and remote

		application, should be supported to meet the requirements in different scenarios.
	Type	The user license must be perpetual license to reduce the total costs.
VDI management platform and software	**Virtual desktop compatibility**	Multiple types of endpoints should be allowed to log in to VDI, including PCs, laptops (Windows and macOS), Thin clients (ARM and x86), and iOS and Android mobile terminals.
		To ensure the compatibility and stability of peripherals, the product should support USB mapping and be compatible with mainstream peripherals, such as HD document scanner, scanner, camera, password keypad, fingerprint collector, ID card reader, tablet, printer, and USB key.
		To meet the needs of users in different business scenarios (such as localization requirements and no demand for Microsoft AD domain), the platform should support both deployment compatible with the Microsoft AD domain and deployment independent from the Microsoft AD domain.
	Application virtualization	Supports Windows Server 2008, 2008R2, 2012, 2012R2, 2016, 2019, 2022 to publish applications

		The application released via application virtualization can associate multiple application virtualization servers. Load balancing can be implemented among multiple servers without special load balancing devices or software. The indicators of load balancing include CPU usage, memory usage, disk usage, disk I/O latency, and number of current sessions. Load balancing is conducted based on these indicators to ensure the reasonable utilization of server resources.
		Application virtualization servers need to support maintenance mode. A server needs to be maintained when the administrator adds resources to the server or new applications need to be installed. At this time, the server is disabled to prevent access of new users without affecting access of the current user.
		The load of each group of application virtualization servers and each server in a group can be displayed. This helps administrators to quickly obtain the load health status of server groups and single servers, so as to judge the health status of the platform.
		Details about application virtualization servers can be viewed, including health status, CPU usage, memory usage, disk usage, disk I/O latency, template name, number of users, number of sessions, connection status, and Agent version.
		Hypervisor supports automatic monitoring of the health status of server groups and single servers. For disconnected servers, users cannot access these servers, and the administrator should receive related alerts through platform notifications, email. Relevant alert logs should be recorded for troubleshooting.
		Messages can be sent to some or all users using hypervisor. When the server is maintained, new business goes online, or emergency notifications are required, messages can be sent to specified users in a short time.
		When users report faults, hypervisor can display status information by server, session, and application, respectively, and facilitate O&M based on relevant information.

		Hypervisor allows the administrator to manually log out user sessions when: 1) a user session does not respond, and the user cannot close it or log out; 2) a user session does not respond even if the user logs out and then logs in again.
		Hypervisor can disable certain advanced user permissions on the application virtualization server. This will prevent users from performing dangerous operations on the server. The permissions include: disable the registry; disable Task Manager; disable Resource Manager; disable the control panel; disable Command Prompt; hide the local disk of a server; disable the Run command and do not show the list of sub-directories while typing the file name; disable "Manage"; disable "Map network drive"; perform "Disconnect network drive"; hide the recycle bin; disable access to My Network Places; do not allow to run programs on mapped disk at client side.

		Hypervisor can configure business system access permissions for users by allowing users' access to a certain network segment or domain name. This feature is built in Hypervisor and does not require other devices (such as firewalls).
		To ensure the stability of user experience, Hypervisor needs to support session persistence. When an end user's network is abnormal, the user's application state is maintained. The administrator can configure the duration of session persistence.
		To save server resources, Hypervisor needs to support session reuse. This feature ensures that the applications of the same application virtualization server are assigned to the same session.
		To ensure the security of the application virtualization server, Hypervisor needs to control calls of third-party applications on the server by released applications. Hypervisor can specify that only specified or all third-party applications can be called.
		The application virtualization server supports the circuit breaker mechanism. When the load exceeds the specified threshold, access from new users is rejected, while the access of existing users is retained. This mechanism ensures that the server is not overloaded, and therefore user experience is not affected. Indicators of the mechanism include CPU usage, memory usage, disk usage, and number of current sessions. If any of these indicators reaches the threshold, access of new users is rejected.
		The anti-screen capture and recording feature is supported on PC. After a PC client accesses the VM, the screen content is protected, and no local screen capture/recording software or remote meeting software can be used to obtain the screen content. This avoids data breaches.
		Automatic failover is supported. If the hard drive fails, the available data replica on another server will be used for storage. The failover completes in several milliseconds, so it is basically unaware to the user. If the host or network fails, virtualized applications can be quickly switched to another server and started, which will take about 3 to 5 minutes.
		To meet the routine maintenance requirements, VM live migration must be supported. The running location of the application

		virtualization server can be changed to other physical host in the cluster without interruption of the user application operation.
		The template-based linked clone mode should be supported to improve the online maintenance efficiency of the application virtualization server. During cloning, the number of VMs, running location, storage location, CPU, memory, network port, and disk size can be specified. The templated-based deployment of 100 VMs cannot exceed 5 minutes.
		The application virtualization server supports bulk setting of computer names, which prevents domain adding errors of computers as much as possible when administrators add domains.

		Application virtualization servers in a group should support smooth capacity expansion. After capacity expansion, the policies set for the group and associated applications can be automatically matched.
		The application virtualization server supports the restored mode, which prevents the impact of users' operations on the application virtualization server (Windows Server). This mode can reduce the failure of the server and the risk of business interruption.
		The application virtualization server should support scheduled automatic startup and shutdown tasks, so as to implement features such as restoration by restart. Regular restart should also be supported to handle system resource occupation. In this case, the administrator does not need to manually restart the server, and automatic O&M can be achieved.
	User experience	In the multi-application office scenario, process acceleration can be performed for frequently used applications. Administrators can also customize the application requiring process acceleration to ensure the application use experience.
		To meet the resource usage requirements , pooling desktop should be supported. VMs are not associated with users all the time. Instead, a random idle VM in the desktop resource pool is assigned to a user. After the user logs out, the system automatically shuts down the VM to release resources.
		To improve the desktop use experience and ensure that the VM startup and shutdown experience is the same as physical PCs, the startup and shutdown processes should be visual in case of access from endpoints. Users can view information about the exceptions (such as SP installation at startup and no response) occurred during startup or shutdown, which helps the user to fix the issues. This feature can improve startup and shutdown experience for users and reduce the maintenance workload of administrators to a certain extent.
		To improve the desktop use stability, the client of the product should be able to connect to the virtual desktop without relying on the VM IP address. If the VM NIC is disabled or the IP address is changed arbitrarily, the desktop session will not be interrupted, and the user can work properly. This will prevent access interruption caused by misoperation.
		To improve the desktop experience, the product should support video redirection. Instead of being decoded on the server, video files are directly redirected to the endpoint for local decoding. This
		feature can improve the playback experience and support multiple local players such as Media Player.

		To ensure the experience of accessing the virtual desktop in WAN or poor network conditions, the transmission protocols of UDP and TCP should be supported. The transmission protocol is automatically selected based on the network conditions before a session is established. The product should support network optimization by techniques, such as setting the compression quality and frame rate, for high-quality and stable connections.
		The product should support the setting of endpoint traffic and uplink and downlink bandwidths of USB mapping, disk mapping, and the clipboard to prevent bandwidth preemption by a user and ensure user experience.
		The product should support network status display on the navigation bar of VM. The navigation bar can display the network status between the current endpoint (thin client or PC client) and VDI console. Users can view the network status and latency in real time. The network status is displayed using signal bars and rated.
		To improve maintenance efficiency, the product should allow administrators to remotely assist with VM maintenance without installing other software. In other words, administrators can directly initiate remote assistance to users on Virtual Desktop Controller. To implement this feature, virtual desktops and virtual applications should be supported.
		Self-service recovery based on snapshots should be supported. When lagging, blue screen, crash, or virus attacks occur on VM, the user can perform system disk recovery based on snapshots by clicking buttons in the navigation bar. This feature is supported in Android thin clients and PC clients.
		Troubleshooting tools for VDI peripherals should be provided. The tools can carry out policy check, peripheral status check, policy status check, routine analysis, and in-depth diagnosis and provide configuration guidance for users. As a result, the efficiency of solving peripheral problems can be improved.
		Built-in desktop O&M tools should be provided for users to view information such as the desktop running status, VDI version information, real-time client bandwidth/traffic/network latency, network protocol, transmission optimization policy, VM resource usage, operating system version, display resolution, and connection status.
	Centralized management	Personal virtual disks (high-speed disks) are supported. On the management interface, the mapping between users' personal accounts and the block storage files stored in the virtualization layer is maintained to allow creation, allocation, deletion, and locking of personal virtual disks for users. When a user logs in to a pooling desktop, the disk will be automatically mounted to the VM, and a fixed drive letter is automatically assigned to the disk. The disk will be automatically dismounted when the user logs out.
		Quick deployment of virtual desktops should be supported. A user can configure startup and shutdown plans, manage idle VMs, and associate policy groups to quickly release desktops based on the VM template, personal disk encryption status, VM name,

		domain/OU, and permission group/zone. After the release, the user can directly access the desktop without intervention by the administrator.
		Permission and zone control of Virtual Desktop Controller should be supported. Different administrator roles can be created, and operation permissions can be customized for the roles.
		Template-based linked clone and full clone VMs should be supported. Linked clone can improve the efficiency of online maintenance, and full clone can keep VMs independent, without being affected by the single point of failure (SPOF) of templates. During cloning, the number of VMs, running location, storage location, network port, and disk size can be specified. In addition, linked clone VMs can be converted into full clone VMs.
		Template update needs to be able to specify the virtual machine for testing, in the new software or software upgrades, this feature can be used to select a small number of virtual machines for a small number of users to test.
		Templates can be updated using the backup files of other specified templates.
		To implement large-scale deployment and simplify management, unified management, distribution, and update of templates across multiple virtualization resource pools should be supported.
		To implement large-scale deployment, the creation of desktop resource groups based on a single template across multiple virtualization resource pools should be supported. The desktop resource groups can be updated and managed across resource pools in a unified manner.
		To improve the flexibility of desktop O&M and management, the controller should support template version management. Template versions can be added, deleted, edited, and switched, and templates of different versions can be applied to different desktop VMs.
		Smooth capacity expansion by expanding the capacity of the original disk or adding disks of the same format should be supported. (Only disks of the same format can be added for capacity expansion. In addition, simultaneous capacity expansion must be performed for all servers when capacity expansion is required.)
		The product should support template-based upgrade. Software and SPs can be installed at once to facilitate the upgrade of corresponding VMs. This feature meets the upgrade requirements in standard scenarios and does not affect the personal data in directories of non-C disks.
		Health check before and after upgrade should be supported to avoid upgrade-related issues.

		To ensure user experience, the product does not need to rely on the Microsoft Active Directory, and Hypervisor provides the optimized feature of user configuration file management, which allows VDI and virtual applications to "inherit custom settings of user account". The custom settings of the user (such as settings of Chrome, input method, ntuer.dat redirection, user profile of edge, system credentials, and desktop layout) can be retained.

		In addition, redirection to specified paths is supported, which solves the problem that special software configuration cannot be saved after restoration. Configuration files can be stored on local disks, and both AD domain control environment and non-AD domain control environment should be supported.
		To quickly meet users' demands for desktop resources, the product should allow users to apply for VM configuration changes. The administrators will review the application and choose to approve the application directly, approve application after modification, or reject the application. After the application is approved, the applied resources will be automatically added to the user's VM. In addition, users can specify department asset managers to approve VM configuration change applications, which not only conforms to the regulations but also improves efficiency.
		To meet the requirements of efficient maintenance, the product should support common bulk operations, such as bulk creation, deletion, disabling, import, and export of users, bulk setting of VM IP addresses, bulk associating and disassociating of VMs, and bulk grouping of users.
		In order to ensure the security of the platform, it is necessary to support the setting of the user account idle over a certain period of time automatically disabled, to avoid the risk of idle accounts being maliciously utilized by a third party when the administrator fails to clean up idle accounts in a timely manner.
		To improve resource usage, settings should be supported to automatically log out a user who has been idle, not involved in sessions, or performed any operations on VMs for a certain time period. Once the use is logged out, resources are released.
		The software store should be supported. The administrator can manage software and release software to specific users (groups) or VMs. After the desktop assistant is installed on VMs, users can install the software that has been released in the software store as required.
		Software distribution should be supported. Software can be distributed to specific VMs. After the administrator completes deployment using basic VM templates, the administrator can flexibly, quickly, and efficiently distribute software to employees according to the software requirements of business departments or employees. In addition, the software does not need to be installed.

		File distribution should be supported. Files (including programs and scripts) can be distributed to specific VMs. The files can be directly delivered to the specified location of a VM or be run directly using scripts without operations by users in the VM.
	Monitoring and O&M	The management platform can monitor and collect statistics on user traffic and the trend of concurrent users so that administrators can adjust the network bandwidth in time.
		Login information of all users can be recorded, managed, and exported. Login information includes login accounts, endpoint IP addresses, MAC addresses, endpoint models, login time, and logout time.

		External data center reports should be supported. Information such as the number of concurrent user sessions within a period, use duration, server load, storage usage, and storage performance can be queried. In addition, reports can be exported.
		External data center reports should be supported. Information such as the number of concurrent user sessions within a period, use duration, server load, storage usage, and storage performance can be queried. In addition, reports can be exported.
		In order to ensure the smooth operation of the platform and avoid business departments from being affected by insufficient or abnormal platform resources, the platform should be able to quantify the comprehensive scores of the experience and risk of each virtual machine/server/cluster based on the current resource occupation and scheduling of virtual machines/servers/clusters (the lower the scores, the worse the experience of this virtual machine/server/cluster is, and the more likely that risky problems will occur) and Support to view the rating trend change graph to help administrators identify related problems in a timely manner. It also gives suggestions to guide administrators to solve the problems, such as expanding the capacity of a virtual machine with insufficient configuration, or migrating part of the virtual machine if the server load is too high.

		In order to improve the disposal efficiency of virtual desktop platform problems, help administrators quickly locate the root cause of the problem, and reduce the administrator's operation and maintenance burden. The operation and maintenance platform should sustainably detect and discover virtual machines, hosts, cluster-related hardware and software problems (such as virtual machine card slowness), and the detected problems are graded according to the severity, and support combined with the built-in AI intelligent diagnostic library for automated problem diagnosis, which can be directly displayed on the platform in the form of a graphic to illustrate the problem analysis, problem evidence analysis, problem disposal recommendations, and administrators can operate according to the disposal recommendations. It can be directly displayed on the platform in the form of graphics to analyze the problem, problem evidence analysis, problem disposal recommendations, and administrators can operate according to disposal recommendations.
		In order to facilitate administrators to remotely analyze virtual desktop operation problems and reduce the impact of intervening in users' desktops to analyze problems on users' normal business, the operation and maintenance platform should comprehensively monitor and count the various operation data of VMs, including, but not limited to, the total number of processes, process lists, and related resource occupancy inside VMs, the total number of threads, the total number of handles, the details of CPUs (the trend of the usage of the whole and the single-core vCPUs, CPU overhead usage trends required for VM operation), memory details (including commit memory, physical memory, cached memory, free memory, free memory, total memory:

		physical memory + virtual memory), disk details (disk activity time, total wait time, read/write latency, queue lengths, number of reads and writes, number of bytes read/written), scheduling details (CPU run time, scheduling wait time, IO wait time, IO wait time, hibernation wait time); it also supports displaying the software installation list, service list, driver installation list, disk list and peripheral list of the virtual machine.

		In order for administrators to systematically assess the health of servers and locate potential problems, the operation and maintenance platform should monitor and count all operational data of virtualized servers, including but not limited to the total number of server processes, memory details (total memory, used memory, available memory, cached memory, total and used SWAP capacity, total and used large-page memory, physical and NUMA memory, trend graphs of the number of VMs powered on and not powered on), CPU details (total CPU usage, CPU kernel usage, CPU user usage, CPU generated by running VMs), and the trend graphs of the number of virtual machines powered on and not powered on. details trend), VM power-on accessed and power-on not accessed quantity trend graph, CPU details (total CPU utilization, CPU kernel state utilization, CPU user state utilization, CPU overhead incurred by running VMs, CPU IO wait rate, CPU interrupt rate, CPU idle rate, vCPU wait rate, and so on), disk details (disk activity time, requests per second, read/write rate, queue length, response time, and so on), and NIC details (incoming and outgoing packet rates, overload packet loss and error packets, and so on).
		Provides software installation statistics of all virtual machines in the cluster through the operation and maintenance platform, sorted by the number of software installed, and list the virtual machines with specific software installed.
		Custom alarm settings can be made through the operation and maintenance platform, and the settings include alarm name, alarm description, alarm type, severity, detection index, alarm threshold, duration, query statement, optimization suggestion, and alarm object.
		Supports stateful problem locating and one-click repair function for Agent of each virtual machine (persistent desktop), administrators can quickly locate the problem and quickly repair it, and it will not cause desktop connection to be disconnected.
		Supports idle VM identification, identifying idle and zombie VMs within a period of time through algorithmic analysis, and can export statistical reports for administrators to do statistical reports and analysis to avoid unnecessary resource overhead.
		Support for virtual machine expansion and decommissioning identification, due to the complexity of the user's actual business, each user has different performance requirements for virtual machines, in order to better balance the experience and resource utilization efficiency, the monitoring platform needs to be able to intelligently identify whether the virtual machine needs to be expanded to meet the user's experience, but also need to identify which virtual machine performance is excessive, and recommend

		that administrators do intelligent decommissioning in order to achieve the maximum utilization of host resources

		Provides software resource consumption statistics and business software identification, for software resources (including CPU, memory, users, installation directory and vendors) to carry out statistical analysis of the occupation, if the consumption of high will provide alerts; at the same time to provide business software identification function, administrators can mark the specific software as business software and non-business software, for administrators of the enterprise organization to do analysis of the installation and use of software
		Provide trend the number of virtual machines that can be added to the host cluster, the monitoring platform can be based on the host performance trend, customized performance thresholds and free resources, to determine how many virtual machines the host can still host, without the need for administrators to manually calculate and subjective judgment.
		Administrators can send messages and notifications to specified or all online users as required.
		The platform provides report center function, supports virtual desktop and application usage report, the report contains desktop usage, usage time, software usage, software usage time, number of installers, number of users, number of times of use and other application hotness analysis function, supports customized statistical strategy, such as statistical users, statistical time, etc., to help enterprise administrators accurately understand the use of desktop and application, and provide data support for enterprise software It provides data support for enterprise software asset management, software licensing, and software usage statistics.
		With intelligent operation and maintenance mapping capabilities, it can analyze the correlation between upstream and downstream clusters, hosts, and processes to show the problem propagation chain, helping administrators to fully understand the operation of the platform, quickly locate the root cause of the fault, and quickly resolve the faulty VMs, which significantly improves the efficiency.
		With application knowledge graph analysis and troubleshooting capabilities, it can output application experience scores based on the built-in deep learning model, quickly locate the root causes of poor application experience and give application experience optimization and disposal suggestions, and it can batch push the disposal method to the virtual desktop for accurate processing.
		Login information of all users can be recorded, managed, and exported to support operation by administrators. Login information includes login accounts, endpoint IP addresses, MAC addresses, endpoint models, login time, and logout time.
		Statistics on user access duration can be collected. The data of the day or a specified time period can be queried by using the feature of intelligent monitoring on historical sessions, which

		helps quickly understand the user access status and access duration and facilitates security audit.

	High reliability	To ensure high reliability, Virtual Desktop Controller should support the cluster mode. Sessions can remain connected in case of Virtual Desktop Controller switchover upon crashes without the need of third-party load balancing devices.
		The authentication should be supported if the AD server is offline due to failures. Users can log on to VDI with an authenticated AD account.
		Password security policies should be provided to ensure the security of authenticated passwords and prevent unauthorized access. Such policies include mandatory password change for the first login, scheduled password change, word verification code, and soft keyboard.
		To meet the secure access requirements of different users, the product should support the virtual portal feature. Users access the virtual desktop using different addresses. This can limit Internet access on the network. Specified accounts can access VDI over WAN, while other accounts can access only over LAN.
		VM snapshot should be supported to carry out rollback when data is deleted by mistake or the system is faulty. Snapshots stores only incremental data to save the storage space.
		Recycle bin should be supported for VMs, which can prevent the loss of VM data caused by misoperations. After a VM is deleted, it automatically enters the recycle bin. You can restore the VM to the original position, set automatic cleaning interval for the recycle bin, and view the actual space occupied by the recycle bin .
		In the case of network disconnection, the virtual desktop window will wait for a period of time before exiting. When the network connection recovers, the user can continue the previous operation in the same window without manual reconnection, which ensures high business continuity.
		The product should support full-screen watermarks and setting of watermark content, color, transparency, font size, and tilt. The watermark color should be different from the background color. Otherwise, the watermark cannot be seen.
		To meet the business requirements of users, the product should support temporary permissions. Administrators can grant certain users with temporary USB and PC clipboard permissions, which are available within a certain period of time and are automatically withdrawn after expiration. This feature can ensure data security.
		To ensure high reliability, Hypervisor should support the cluster mode. Sessions can remain connected in case of Hypervisor switchover upon crashes without the need of third-party load balancing devices.
		Support virtual machine hot migration from one node to another node in the same cluster.
		Supports a highly scalable, manageable and flexible virtual infrastructure. Ensure business continuity by adding or reducing pure compute nodes in a cluster without having to shut down the business.

		Hypervisor can be mapped to the Internet directly. The SSL encryption feature should be built in Hypervisor for both static and dynamic IP addresses. For dynamic IP addresses, third-party plug-ins are not required, thereby reducing the complexity of deployment.
	Security management	Multiple authentication methods can be combined as needed to meet the security requirements of different levels of users. The authentication methods include username/password, USB key, SMS message, bound hardware ID, one-time password, LDAP, RADIUS, AD domain, thin client, and 802.1x.
		In order to enhance the security of user authentication, the bidding product needs to be built-in OTP dynamic password as a multi-factor assisted authentication method, such as Google Authenicator, Microsoft Authenicator.
		AD offline authentication is supported. When an AD server is offline due to failures, users can log on to the virtual application with an authenticated account.
		Clipboard permission management is supported. Policies can be added to the policy group to specify that only text content can be copied so as to prevent data breaches.
		Audit for clipboard content is supported. When the data is copied between the VM and local path, the information of the user and VM related to copying and copied content will be reported to the data center without informing VDI users. Audit administrators can log on to the data center or the report center to view the copy records online or download the copied content. When a user uses the clipboard during the unpermitted period, the data center records the action and gives an alert.
		Distributed firewall is provided to implement east-west access isolation between virtual desktops and north-south control of access from the virtual desktop to the destination system.
		Administrators can configure specific distributed firewall rules in the conditional policy for different users under different conditions. This feature enables the dynamic control of the access policy in users' business system, which can ensure the security and provide convenience for the end users.
		To better control desktop operations, the product should support authentication correlation with Internet access gateway. the gateway will automatically synchronize the authentication information of a VDI user and record its ID. The user can access the Internet without authentication the next time.
		To meet the security requirements of users, the product should support configuration of ACL policies based on the IP address, VM, and user on Hypervisor without using any third-party product. This feature reduces the complexity of access isolation configuration and ensures security of isolated VMs.

		The Virtual Desktop Controller can be mapped to the Internet directly. The SSL encryption feature should be built in Virtual Desktop Controller for both static and dynamic IP addresses. For dynamic IP addresses, third-party plug-ins are not required, thereby reducing the complexity of deployment.
		Endpoint environment check is supported. Access policies can be configured based on information, such as the endpoint type,

		operating system version, IP address and access time, and installed software. Access from clients that fails to pass the check is rejected.
		Polices of different security levels can be configured for different access environments based on information such as IP address or endpoint type. This feature ensures that user access from different locations and endpoints is subject to corresponding authentication policies and desktop policies. For example, if a user logs on over LAN, USB flash disks can be used. If a user logs on over WAN, all peripherals are not allowed. For login over WAN, secondary authentication is required.
		Peripheral blacklist/whitelist is supported. The platform can identify all types of peripherals, including HD document scanner, camera, USB optical drive, and USB key. The blacklist and whitelist can enforce access control and improve security.
		File export audit is supported. If Exported file audit is enabled, the VM cannot export files by using the clipboard, PC device, or USB device. Users can use the internal file export tool of the VM to export files. All exported files are encrypted and backed up in the data center for audit. When a suspicious export operation is detected, an alert is reported.
		Application control rules can be built in the control components to perform comprehensive control on virtual desktop. The rules can be configured in the blacklist or whitelist to prohibit or allow the running of specified applications or processes. The application control rules can be configured based on information such as application name, process name, application signature, product name, and provider name. Both custom and existing rule databases can be used.
		Anti-screen capture and recording for PCs are supported. When a PC client accesses the VM, no local screen capture or recording tools can be used to obtain the window content. This avoids data breaches and protects the desktop data. For example, when a screen capture or recording software is used, the window of virtual desktop becomes invisible. When an online meeting software is used, only the screen sharer instead of attendees can see the virtual desktop window.
		The distributed firewall, screen watermark, anti-screen capture, anti-scree recording, and USB blacklist/whitelist features are supported for all types of user licenses.

		Windows operating system is the hardest hit by ransomware, in order to effectively deal with the threat of ransomware attacks, vendors need to provide a complete automated ransomware disposal mechanism, the entire automated disposal process needs to include the ransomware virus identification and protection beforehand, the detection of ransomware behavior in the virtual machine is automatically isolated and linked to the storage of snapshots to retain the current state, the aftermath of the ransomware virus wizard to deal with the restoration of virtual machines, scanning, restoring the network and so on. virus, network recovery, etc.
		Virtualization platform built-in virtual machine vulnerability patch update, without the need to build additional third-party patch

		update server, support vulnerability and version information patrol, push patch and upgrade information, and support patch management, update and rollback.
		Users may worry about the security of their personal information due to the central management of virtual desktop data. Therefore, VM encryption should be supported to encrypt the data disk.
Thin Clients /Endpoint	**Brand**	The endpoints must be of the same brand as that of VDI software.
	O&M management	The embedded operating system is customized.
		VMs and thin clients are managed together to facilitate management.
		To manage thin clients, operations including group management, bulk moving, bulk deletion, and bulk shutdown should be supported. Features, such as startup and shutdown plans, auto startup upon power-on, custom boot screen, simultaneous shutdown, auto login, and password saving, can be configured.
	Access security	For access security, endpoint configurations can be modified, and passwords are required for login. If a thin client has not accessed to virtual desktop before, reject the access or require the password for access.
Licenses Summary	**Server Virtualization**	10 Sockets
	Storage Virtualization	10 Sockets
	Virtual Desktop Controller	Licence for Virtual Desktop Controller software/s (No limited users license accepted)
	VDI User Licenses	150 Concurrent Users
Hardware		
Servers (Qty.5)	**Servers Qty.**	Total Qty.5 servers required each with below specifications.
	Form Factor	2U Rack mount Server

	Processor	2x Processors with 48 Cores, 96 Threads per processor having 3.6GHz or higher, the processor must be either AMD Series or Intel XEON Platinum Series, can also propose higher specs.
	Memory	1TB or higher Memory
	Hard Drive	2x 240GB SSDs for OS/Hypervisor with RAID-1. 6x 3.84TB Enterprise Grade Hot Plug SSDs.
	RAID Controller	Raid controller with RAID-1(for OS) and pass-through/non-RAID mode supported for virtual storage deployment.
	Network Ports	4x 1G Base-T Network Ports 2x Dual Port 10GbE SFP+ Adapters, all ports with SFP+ 10GE Multimode Optical Transceiver Modules
	Power Supply	2xHot-plug Redundant Power Supply as per Server power consumption with PDU style Power Cords
	Rack Mounting Accessories	Server Rack Mounting Kit with sliding rails
	Support	03 year comprehensive OEM warranty / support
TOR Switches (Qty. 2)	**TOR Switches**	10G SFP+ Low latency TOR switch 24x10G SFP+ ports with MM SR optical transceivers and 5m LC-LC cables 2x40G QSFP+ ports with 1m 40G DAC cables Support of either Stacking(Preferred) or mLAG, VPC, VLT etc In case for stacking, if dedicated card/cables are required, then must include them in BOQ. STP and Jumbo frames supported Major L2 and L3 Features supported.
	Support	03 year comprehensive OEM warranty / support
Thin Clients (Qty. 150)	**Thin Clients**	Thin Client for Virtual Desktops, minimum 4 Cores, 1GB memory and 4GB disk, must have minimum 6x USB ports, HDMI port for LED Monitor, required RJ45 port for network connectivity, the proposed Thin client must have Audio port and mic port.
	Mounting Bracket	Provide LED monitor mounting bracket for all thin clients.
	Support	03 year comprehensive OEM warranty / support