nCERT

NTISB

CYBER SECURITY FOR DIGITAL PAKISTAN / NCERT

(NATIONAL CYBER EMERGENCY RESPONSE TEAM)

TENDER DOCUMENT
Establishment of Cyber Operations & Defense Emulation Lab

GOVERNMENT OF PAKISTAN
CYBER SECURITY FOR DIGITAL PAKISTAN/nCERT
(NATIONAL CYBER EMERGENCY RESPONSE TEAM)

INVITATION TO BIDS

1. Cyber Security for Digital Pakistan /nCERT invites bids for **Establishment of Cyber Operations & Defense Emulation Lab** under the "Project Cyber Security for Digital Pakistan/nCERT" for which electronic bids are invited from the firms/ companies registered with Income Tax, Sales Tax Departments and who are on FBR's Active Taxpayer's List (ATL) through e-PADS.

2. The prospective service providers are required to submit their electronic bids including technical and financial proposals along with the Bid Security instrument amounting to Rupees 0.8 Million/- (Rupees 08 Hundred Thousand Only) submitted in favor of Project Director, CSDP/NCERT (FTN/NTN: 9012000-7) through e-PADS at http://eprocure.gov.pk uploaded on or before 1100 hours on 2nd March, 2026 in accordance with the provisions of PPRA Rule 36(b) and other terms & conditions as defined in the bidding documents.

3. In case of any technical difficulty in using e-PADS, prospective bidders may contact PPRA team Director MIS Room No. 109, 1st floor, FBC building Sector G-5/2, Islamabad (Contact No. 051-111-137-237).

4. Original Bid security instrument MUST be submitted to the undersigned before closing hours of the bid submission time otherwise respective bid will not be opened.

5. Bidding documents can be accessed from the website of National Computer Emergency Response Team (https://pkcert.gov.pk/) as well as on PPRA website.

6. Bids will be opened on the same day i.e., 2nd March, 2026 at 1130 hours in the presence of representatives of the bidders.

7. As per PPRA Rules 33(1), 2004, National Computer Emergency Response Team (nCERT) has the right to reject any or all bids/ proposals at any time prior to the acceptance of a bid/proposal.

<div align="center">

Project Director
National Computer Emergency Response Team (nCERT)
L- Block, Pakistan Secretariat, Islamabad
Ph No. 051-9203421-22
Email: **bid@pkcert.gov.pk**
Website: (https://pkcert.gov.pk/)

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TERMS OF REFERENCE (TOR) REQUEST FOR PROPOSAL FOR SUPPLY OF HARDWARE AND LICENSED SOFTWARE

1.	Background
2.	General Terms & Conditions
3.	Implementation & Payment Schedule
4.	Evaluation Criteria
5.	Award Of Contract
6.	Mailing address/ Contact information
7.	Annexure-Bill of Quantities
8.	Annex-I

1. BACKGROUND:

"Cyber Security for Digital Pakistan", is a PSDP project sponsored by Ministry of Information and Technology (MoITT) and executed by National Telecommunication & Information Technology Security Board (NTISB). The project "Cyber security for Digital Pakistan" is a prerequisite for the Digital Pakistan initiative addressing current National cyber security gaps and concerns. This project will provide cyber security and digital initiative support to all public/private/defense sector organizations/institutes at national level. "National CERT" is a PSDP Project sponsored by Ministry of Information and Technology (MoIT&T) and executed by National Telecommunication & Information Technology Security Board (NTISB). The Project "Cyber Security for Digital Pakistan" is a prerequisite for the Digital Pakistan initiative addressing current National Cyber Security requirements. This project will provide Cyber Security support to all Public / Private / Defense Sector Organizations/ Institutions on National Scale. In pursuance, Project Director is looking for Establishment of Cyber Operations & Defense Emulation Lab for PKCERT HQ's Office at Block-L Pakistan Secretariat Islamabad.

2. GENERAL TERMS & CONDITIONS:

i. **Proposal Submission:** The electronic bid including technical and financial proposals must be submitted online on or before 02nd March, 2026 at 1100 hours through e-PADS at http://eprocure.gov.pk.

ii. A bid security, in the shape of a Bank Draft / Pay Order in the name of **Project Director, PKCERT,** amounting to Rs. 0.8 million PKR should be submitted along with the Technical and Financial Proposals at the address given below latest by 02nd March, 2026 at 1100 hours. Technical bids will be opened on the same date at 1130 hrs:

<div align="center">

Project Director
Cyber Security for Digital Pakistan (CSDP/nCERT)
L- Block Pak Secretariat, Islamabad
Ph No. 051-9203421-22
Email: bid@pkcert.gov.pk

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iii. **Pre-bid Meeting:** A bidders' conference/ pre-bid meeting will be held in the premises of NCERT L-Block Pak Secretariat Islamabad, on 19th Feb, 2026 at 1100 hrs. All queries relating to RFQ should be faxed or emailed to the undersigned at least 3 days before the bidders' conference/ pre-bid meeting.

iv. **Scope of Work:** The scope of work includes Supply, Installation and successful testing of the Hardware & License Software mentioned at Annexure-I.

v. **Bidders** may participate in the tender under the Single Stage Two Envelope procedure and may quote for one, multiple, or all Lots on a turnkey basis. Evaluation shall be carried out on an item-wise/Lot-wise basis to ensure transparency, fairness, and competitive procurement. Each Lot listed in Annex-I shall be evaluated separately based on a predefined technical scoring criterion, including compliance with specifications, technology offered, OEM credentials, warranty/support, and value-added features. Only

technically responsive bids achieving the minimum qualifying technical score shall proceed to financial evaluation. Financial evaluation shall be conducted item-wise among technically qualified bidders, and award of contract shall be made to the bidder obtaining the highest combined score (technical + financial) as per the approved evaluation methodology.

vi. The bidder(s) winning each respective Lot, in accordance with PPRA Rules under the Single Stage Two Envelope procedure, shall be responsible for the complete supply, installation, configuration, integration, testing, commissioning, and handover of the respective item(s) on a turnkey basis.

vii. The client reserves the right to award contract for one, multiple, or all Lots to one or more bidders. The procuring agency may also increase or decrease the quantity of items in each lot at the time of issuance of supply order as per PPRA Rules. Bidders must quote each module/lot (including hardware and licensed software) separately. Baseline configurations provided in Annex-I represent minimum requirements; equivalent latest or higher configurations may be offered and will be evaluated on scoring criteria considering technical merit versus quoted price.

viii. Soon after technical evaluation, the technical qualified firms as per evaluation criteria mentioned at para 4(b), shall be called for opening of financial bid on given date and time which will be communicated to the firms in writing. Un-opened bid security instrument shall be returned to the technically disqualified firms.

ix. Proposal and prices shall remain valid for a period of 90 days from the date of closing for submission of the proposal. However, the responding organizations are encouraged to state a longer period of validity for the proposal.

x. Prices should be quoted in the Pakistani rupees (PKR) and inclusive of all taxes, prices mentioned without any remarks will be treated as inclusive of all applicable taxes.

xi. Any proposal received after the due date and time will not be accepted.

xii. Bidders should be registered with Sales Tax registration Department and should be in possession of valid NTN number. Copies of the certificates must be attached with the technical bid

xiii. The successful bidders shall be responsible for payment of any duties / taxes etc. that are imposed by the Government of Pakistan during the period of delivery and till commissioning.

xiv. The bidders are hereby informed that the Government shall deduct tax at the rate prescribed under the tax laws of Pakistan, from all payments for Hardware/Software by any bidder who signs a contract with the Government.

xv. The successful Firm shall be required to deposit in the form of a Bank Guarantee, a Performance Bond from the date of successful testing and acceptance, a sum equivalent to ten percent (10%) of the contract value. This Bank Guarantee shall be issued by a

scheduled bank operating in Pakistan and shall be kept valid from the date of issue, until one (1) year after all contractual obligations have been fulfilled

xvi.   Bidders should have been in the IT business, Sales and After Sales Support/Maintenance provisioning for at least (03) three years.

xvii. Hardware equipment should have minimum one (01) year warranty (unless stated otherwise in Annex-I), including parts and maintenance after the delivery of hardware with next Business Day Part Replacement and on-site support. Supplier to share list of OEM warehouses for spare-parts and accessories within the country where applicable (nCERT reserves the right to keep faulty Hardware/Equipment under parts replacement warranty claim). Software licenses should be quoted for at least 01 year with perpetual subscription option (if applicable).

xviii. The bidders should be authorized Partner / Reseller / Distributor / Manufacturer, of THE ORG1NAL MANUFACTURER, in Pakistan.

xix.   All equipment should be supplied through verifiable and legitimate distribution/Sales 6 channels.

xx.   The Bidders to provide Company information as per para 4 for Technical Evaluation.

xxi.   Bidders should not submit any kind of refurbished/ Used / End of Life Hardware equipment's / components in their technical proposals.

xxii. Bidders should clearly indicate the timeline for delivery of equipment after receiving the award of contract.

xxiii. The end user licenses, end user warranties and end user contracting support services registrations and subscriptions will be in the name of Client, for all the equipment and Software loaded on the equipment delivered during the course of this procurement. All items/solutions must be pre-configured with all applicable licenses, subscriptions and dependencies with no compatibility conflicts / missing dependencies.

xxiv. Envelope for financial proposals should be clearly marked: "Financial Proposal".

xxv.   Main Envelope should contain "Technical Proposal" & "Financial Proposal" (each being physically separated, bound, sealed and labeled), all the supporting documents as per evaluation criteria mentioned at para 4 & 2 (vi) and a separate clearly marked sealed envelope of bid security instrument.

3. **IMPLEMENTATION & PAYMENT SCHEDULE:**

Sr. No.	Milestones	Time Period	Payment
1.	Supply of equipment / Software. Installation and Configuration	Four-to-Eight weeks from date of signing of contract	40%
2.	Successful testing and acceptance	Four (04) weeks from installation and configuration of Hardware and Software	60% Subject to provision of 10% Performance Guarantee
3.	End of performance Guarantee	Performance Guarantee will have to be provided to cover the warranty period of the hardware which will be One year from the date of successful testing and acceptance.	Release of Performance Guarantee

4. **EVALUATION CRITERIA**

   a. **TECHNICAL BID EVALUATION:**

There will be a two-stage technical evaluation. Preliminary evaluation (Initial Screening) of technical bids will be done on the basis of the following criteria:

Detailed technical evaluation will be done for firms who qualify the preliminary evaluation mentioned above**.**

In detailed technical evaluation the Evaluation & Award Committee will verify the compliance with specifications mentioned in Annexure-I. Any bid containing less specifications will be rejected.

	GENERAL & TECHNICAL EVALUATION			
Sr#	Compliance	Criteria	Max Score	Obtained Score
1	Company Presence in Pakistan	Head Office in Pakistan (5) Branch Office in Pakistan (3) Partner in Pakistan (2)	5	
2	Company presence in Islamabad/ Rawalpindi	Head Office in Isl/Rwp (5) Branch Office in Isl/Rwp (3) Partner in Isl/Rwp (2)	5	
3	Working in IT business (at least 3 x years)	3 or more than 3 years exp (5) Less than 3 years exp (0)	5	
4	Experience of at least 3 x similar size projects	3 or more than 3 projects completed (20) Less than 3 projects completed (0)	20	
5	Solution Presentation, Demonstration and understanding of the required software/ hardware solution.	Deployment plan and functional requirements as per Annex-I	30	
6	Ranking of Technology in Gartner or other relevant body.	Leader (10) Visionary (5) Challenger (4) Niche Player (3) Others (2)	10	
7	Baseline Configuration (Anex-I)	Configuration and Specs higher than Baseline (10), Equivalent (8)	10	
8	Duration of licenses	Perpetual (10) More than 1 year (6) 1 year (4)	10	
9	Warranty duration	More than 1 year (5) 1 year (3)	5	
	Total		**100**	

Technical Evaluation Score (70%) = $\underline{\text{Marks Obtained}}$ x 70

                                                                          100

b. FINANCIAL BID EVALUATION (30%):

Financial bids of the technically qualified firms will be opened before the representatives who wish to attend the tender opening. Financial bids will be opened only for those vendors only who qualify (meet the specifications) in technical and detailed technical evaluation.

Financial Evaluation Score (30%) = $\underline{\text{Amount quoted by the lowest bidder}}$ x 30
        Amount quoted by the bidder whose financial score is to be calculated

c. Final Evaluation
Final Score (100%) = Technical Evaluation Marks (70%) + Financial Evaluation Marks (30%)

The bidders need to score at least 70% marks in technical evaluation to technically qualify for financial bid opening. The bidder scoring maximum marks in final evaluation will be awarded the contract.

5. AWARD OF CONTRACT:

Bidder having scored highest marks in Final evaluation as per para 4(c), will be awarded the contract. After acceptance of Technical and Financial bid, an Award Letter shall be issued, in duplicate, to the successful bidder, and the selected Firm, within 15 days of receipt of Award Letter, sign and return the duplicate copy of the Award Letter in acknowledgement thereof. In the event the duplicate copy of the Award Letter duly signed by the Firm is not received by the stipulated date, the Authority may, unless it consents to extension of time for submission thereof, cancel the Award Letter issued to it.

6. MAILING ADDRESS/ CONTACT INFORMATION:

The following address details can be used for any correspondence, queries clarification and communication purposes via email and/or telephone calls:

Address	National Cyber Emergency Response Team (nCERT) HQ's, L- Block, Pakistan Secretariat, Islamabad
Telephone	051-9203421-22
Email	bid@pkcert.gov.pk
Website	www.pkcert.gov.pk

Details of Items Lot-Wise

Lot	Item Description	Qty	Unit Price with GST	Total Price With GST
1 (MicroData Center Solution)	Compute Node	03		
	Firewall	01		
	Core Switch	02		
	Access Switch	02		
	Access Point	06		
	Smart Rack	01		
	Ethernet Cable Cable Roll	01		
	LC to LC Multi-Mode 200M	01		
	Resident Engineer	01		
2 (Red Team Suite)	Adversary Simulation Took Kit	01		
	Penetration Testing Tool Kit	01		
	Offensive Security Toolkit	01		
	ClaudeMax Subscription license	03		
3 (End-User Compute)	Laptop	20		
	Wireless Mouse + Keyboard Combo	20		
	Portable SSD	02		
	Portable USB	10		
	Heavy Duty Color Printer	02		
4 (Video Wall Solution)	2x3 Total 6 Screens	01		
	2x2 Total 4 Screens	01		

Technical Specifications

Lot 1. (MicroData Center Solution)		
ITEM NO. 01	**Compute Node**	**3**
S#	**Technical Description, Specifications and Standards Required**	
1.1	2U Chassis with 12 (3.5") 2x (2.5") Disk Slots or better	
1.2	2x Processor Intel Xeon Gold 6548N 2.8GHz, 32C/64T or better	
1.3	8x 32GB DDR5 5600MHz or better	
1.4	2x 480GB 2.5" SATA SSD (configured with RAID1) or better	
1.5	5x 7.68TB Enterprise Grade SSD, 3D NAND TLC SSD 2.5", read intensive, SATA 3.0 6Gbps or better	
1.6	4x 10GE Optical Ports with SFP Modules (Multimode Optical Transceiver) with 3M Cable or better	
1.7	4x 1G Ethernet Copper Ports with 3M cable or better	
1.8	Raid Card with Pass-through (JBOD) mode supported	
1.9	2x HBA Card DUALPORT-32G	
1.10	Dual Power Supply or better	
1.11	Embedded Server Management Software for Remote Management	
1.12	Complete Rail Kit for Rack Mounting	
1.13	Front Bezel (front cover or faceplate)	
1.14	OEM Backed Warranty (36 Months)	

ITEM NO. 02	**Firewall**	**01**
Technical Description, Specifications and Standards Required		
Must Be Listed in 2022 Gartner Magic Quadrant for Next Generation Firewall		
Must Be Listed in 2021 ICSA Labs Certified Next Generation Firewall		
Must Be Listed in 2023 Cyber Ratings for Enterprise Firewall		
Must Have OEM Presence in Pakistan For Minimum 5 Year		
Must Have Full Features Working Even License Is Expired		
Must Have Minimum 16Gbps NGFW Throughput (FW + SA + IP)		
Must Have Minimum 12Gbps Threat Protection Throughput (FW + SA + IPS + Antivirus)		
Must Have Unrestricted Concurrent User		
Must Have Minimum 900GB Storage Capacity		
Must Have Minimum 4 x 1G Ethernet Interfaces, 4 x 1G SFP Interfaces & 8 x 10G SFP+ Interfaces		
Must Include Intrusion Prevention System (IPS), Anti-Virus & Anti-Malware, Email Security Protection, Cloud-Based Security Sandbox, Web Filtering, Application Control, Bandwidth Management		
Must Quote Minimum 100 Concurrent Users for SSL VPN		
Must Quote 3 Years Complete Security Features License		
Must Quote 3 Years Software Upgrade & 24x7		
Must Quote 3 Years Hardware Warranty Service		
Must Quote Onsite Configuration & Installation		
Must Quote Onsite Training & Product Certification For 2 Participant		

ITEM NO. 03	Core Switch	02
S#	**Technical Description, Specifications and Standards Required**	

S#	Description
3.1	1 **Interface Requirements** 24 × 10G SFP+ ports ≥ 2 × 40G or 100G QSFP uplinks
3.2	1 **Performance Requirements** The switch must meet or exceed:

Parameter	Minimum Requirement
Switching capacity	≥ 640 Gbps (up to 960 Gbps preferred)
RAM	≥ 2 GB
Flash	≥ 8 GB
MAC address table	≥ 384K
ARP entries	≥ 62K
Ipv4 routing entries	≥ 632K
Ipv6 routing entries	≥ 383K
Jumbo frame	≥ 12K
VLANs	≥ 4K
VRF instances	≥ 1,000
VRRP groups	≥ 255

S#	Description
3.3	2 • **Layer-2 Features** The switch must support: • 802.1Q VLANs, QinQ and Flexible QinQ • Private VLANs and Guest VLAN • GVRP and VLAN isolation • LACP with ≥ 64 groups • MSTP, RSTP, STP • Ethernet Ring Protection Switching (G.8032) • Loop detection and fault detection features
3.4	• **Layer-3 Routing Requirements** The switch must support: • **4.1 Ipv4/Ipv6 Dual Stack** • Wire-speed forwarding for Ipv4 and Ipv6 • Static routing (Ipv4 & Ipv6) • RIP/RIPng • OSPFv2 / OSPFv3 • BGP / BGP+ • IS-IS / IS-Isv6 • Policy-Based Routing • VRRP / VRRPv3 • ECMP routing
3.5	• **Network Virtualization & SDN** The proposed solution must support: • **6.1 VxLAN / EVPN**

	- L2/L3 VxLAN Gateway - Ipv4 & Ipv6 VxLAN tunnels - BGP-EVPN - Distributed and centralized VxLAN gateway - End-to-End VxLAN DCI support
3.6	- **QoS Requirements** The switch must support advanced QoS including: - 8 hardware queues per port - Scheduling algorithms: SP, RR, WRR, WDRR, SP+WRR, SP+WDRR - Traffic shaping and rate limiting - DSCP / CoS / 802.1p classification - RED/WRED congestion management
3.7	- **Security Requirements** The switch must provide enterprise security including: - **Access Security** - 802.1X authentication - Port security - MAC + IP + VLAN binding - DHCP Snooping / ND Snooping - IP Source Guard - **Threat Protection** - Dynamic ARP Inspection - DoS/DdoS protection - Storm control - ARP guard & ARP suppression - **AAA** - RADIUS - TACACS+ - Portal authentication
3.8	- **Monitoring & Management** The switch must support: - SNMP v1/v2/v3 - RMON - SYSLOG - Telemetry & sFlow - SPAN / RSPAN / ERSPAN - LLDP and IP-SLA - Web GUI, CLI, Telnet, SSH - TR-069 management - Zero Touch Provisioning via DHCP or USB
3.9	The solution must include: - All features enabled without additional license tiers - Free firmware upgrades and updates - No recurring feature licensing costs
4.0	- **Warranty & Support** - Minimum **1-year OEM warranty**

	• Onsite installation and commissioning required

Access Switches		
ITEM NO. 04	**Access Switch 1G**	**02**
S#	**Technical Description, Specifications and Standards Required**	
4.1	The switch must provide: • Minimum **24 × 10/100/1000 Mbps RJ-45 Ethernet ports** • Minimum **4 × 10Gb SFP+ uplink ports** • Dedicated **RJ-45 Console Port** • **USB 2.0 management port** • Non-blocking switching architecture	
4.2	Switching performance must meet or exceed: • Switching Capacity: **≥128 Gbps** • MAC Address Table: **≥16K entries** • Jumbo Frame Support: **≥12 KB**	
4.3	• **PoE Requirements** Switch must support enterprise PoE features: • PoE Standard: **IEEE 802.3af / 802.3at** • Minimum PoE Budget: **≥380 Watts** • Per-port power management and monitoring • Power scheduling and consumption control	
4.4	**Layer-2 Features** Switch must support enterprise L2 switching including: **VLAN Capabilities** • IEEE 802.1Q VLAN tagging • VLAN capacity: **≥4K VLANs** • Private VLAN • Guest VLAN • Voice VLAN • Protocol VLAN / Subnet VLAN • QinQ & Flexible QinQ • GVRP support • **Spanning Tree & Loop Prevention** • STP / RSTP / MSTP • BPDU Guard, Root Guard, Loop Guard • Loopback detection • Storm control and flood control	

	Link Aggregation • IEEE 802.3ad LACP • ≥64 LACP groups • ≥8 ports per aggregation group
4.5	**Layer-3 Features** The switch must support Layer-3 Lite routing: • Static Ipv4 and Ipv6 routing • ARP / ICMP / DNS / NTP • DHCP Client support (Ipv4 & Ipv6)
4.6	**Multicast Support** Must support: • IGMP v1/v2/v3 Snooping • IGMP Proxy • MLD Snooping • Multicast VLAN Registration (MVR)
4.7	**Security Features** **Access Control & Authentication** Switch must support: • 802.1X authentication • MAC + IP + VLAN binding • AAA, RADIUS, TACACS+ • Portal authentication **Network Protection** • DHCP Snooping • Dynamic ARP Inspection • IP Source Guard • ND Snooping • Host Guard • DoS/DdoS attack protection • ARP attack mitigation • Port Security & ACLs • **7.3 Access Control Lists** • Ipv4 / Ipv6 ACL • MAC ACL • Time-based ACLs
4.8	**High Availability & Resilience** Switch must support: • Ethernet Ring Protection (G.8032) with ≤50ms failover • ULFD / UDLD • BFD with static routing • CPU protection mechanisms
4.9	**Management & Monitoring** Must support multiple management methods: • CLI, Web GUI (HTTP/HTTPS)

	- SNMP v1/v2/v3 - SYSLOG & RMON - sFlow / Telemetry - LLDP - Firmware upgrades without additional license cost	
5.0	**Standards Compliance** Switch must comply with IEEE standards including: 802.3, 802.3ab, 802.3ae (10G) 802.1Q VLAN 802.1X NAC 802.1p QoS 802.1d/w/s STP family 802.3ad LACP	
5.1	**Warranty & Support** - Minimum **1-year OEM warranty** - Onsite installation and commissioning required	

Wireless Access Points		
ITEM NO. 05	**Access Point**	**06**
S#	**Technical Description, Specifications and Standards Required**	
1.1	Access Point must support 802.11 abgn/ac/ax standards	
1.2	Support MU-MIMO and OFDMA	
1.3	The access point should work on 2.4GHz and 5 GHz band simultaneously.	
1.4	Access Point should support 574 Mbps (2.4 GHz) and 1200 Mbps (5 GHz).	
1.5	Access point must work on 2 x 2 MU-MIMO with 2 Spatial Streams on both 2.4 and 5 GHz band.	
1.6	Access Point should support Channelization of 20 MHz, 40 MHz and 80 MHz.	
1.7	Support multiple Integrated dual polarized smart antennas with PD-MRC.	
1.8	BeamFlex+ Antennas: Extended coverage and optimized throughput with patented multidirectional antennas and radio patterns	
1.9	Hardware must have a physical gain of 3dBi on both 2.4GHz and 5GHz antennas, with an additional chip-based gain of 4dB.	
2.0	Device must transmit Power upto 23dBm on both bands	
2.1	Access Point must be able to use all RF channel (not only non-overlapping channels) and maintain channel history with respect to Channel interference and throughput.	
2.2	AP must have one Gigabit PoE Ethernet port with 1 USB port support	
2.3	AP should support 802.3af POE standards.	
2.4	Wireless Security: WPA-PSK, WPA-TKIP, WPA2 AES, WPA3, 802.11i, Dynamic PSK.	
2.5	Implement Wi-Fi alliance standards WMM, Power Save, Tx Beamforming, LDPC, STBC, 802.11r/k/v	
2.6	The access point should support 802.1q VLAN tagging	
2.7	Should support rate limit and MAC base access control.	
2.8	Up to 200 or above Concurrent clients support.	
2.9	1 Year support must be included, support includes Advanced Hardware Replacement (Next Business Day) and Software upgrades.	

3.0	Proposed product must in the Wired and Wireless LAN infrastructure of Gartner Magic Quadrant for last 3 years.	
3.1	Proposed brand must be Wi-Fi Alliince Certified	
3.2	Proposed Access Point must be from renowned brands i.e Cisco, Ruckus, HPE Aruba	

Smart Rack		
ITEM NO. 06	**Smart Mini Data Center Solution**	**01**
Technical Description, Specifications and Standards Required		

The proposed solution must:
- Be a **fully integrated all-in-one micro data center cabinet**
- Include power, cooling, monitoring, enclosure and security subsystems in one rack
- Support **rapid deployment and day-one operation**
- Support **remote monitoring and centralized management**
- Be suitable for enterprise branch offices, telecom sites, retail, and government locations

Rack Enclosure
The rack enclosure must meet or exceed:
- Rack size: **42U**, 17pprox. **2000mm (H) × 600mm (W) × 1280mm (D)**
- Minimum usable rack space: **29U**
- Maximum equipment depth: **≥1023 mm**
- IP protection rating: **IP5X**
- Fully enclosed cabinet with **dust protection and noise insulation**
- Integrated cable management system
- Vertical cable management panels included
- Rack color: Black (RAL equivalent)

- **Lighting & Display**
- Minimum **10-inch touch LCD control panel**
- LED lighting inside cabinet (minimum 2 units)
- System luminance ≥ 88 lux at 1 meter

- **Integrated Power System**
- **4.1 UPS Requirements**

The system shall include an integrated online UPS with:
- Capacity options: **3kVA / 6kVA / 10kVA / 20kVA**
- Backup time: Variable based on load
- Maintenance bypass: **Included**
- Surge protection: **Level 3, ≥20kA**
- Single-phase input: **230 VAC, 50 Hz**
- Input current range: **63–80A**

- **4.2 Power Distribution**

- Integrated PDU with:
  - Minimum **32A capacity**
  - At least **15 outlets**
  - Combination of **IEC C13 and IEC C19 sockets**
- Dedicated **power distribution module with breakers** for UPS, cooling and surge protection

- **Precision Cooling System**

The micro data center must include an integrated precision cooling solution:

- Cooling capacity: **3.5 kW – 7.5 kW**
- Variable speed **EC fans**
- Refrigerant: **R410A**
- Internal air circulation (cold/hot aisle containment within rack)
- Emergency ventilation system
- Indoor condenser option supported

The cooling system must provide:

- Energy-efficient inverter control
- Low noise operation suitable for office environments
- Continuous cooling during power backup

- **Environmental Monitoring & Sensors**

The solution must include integrated sensors with real-time monitoring:

Mandatory sensors:

- Temperature & humidity sensor
- Smoke detection sensor
- Water leak detection (minimum 5m sensing cable)
- Door access sensors (minimum 2)
- Alarm beacon
- Cabinet lighting sensor

Optional supported sensors:

- Infrared motion detector
- Webcam/video monitoring

The system must provide **multi-stage automatic alarms**.

- **Fire Protection**

The solution should support:

- Automatic **gas-based fire suppression system (optional)**
- Smoke detection integrated with alarm system

- **Security & Access Control**

The micro data center must include:

- Mechanical door lock
- Door contact sensors
- Electronic access control supporting:
    - Fingerprint
    - RFID card
    - PIN authentication (optional)

- **Monitoring & Management System**
- **9.1 Local & Remote Monitoring**

The solution must provide a **central monitoring host** with:

- Web portal access
- Local and remote web management
- SMS alarm capability
- Modbus-TCP interface
- Integration capability with third-party monitoring tools

- **Compliance & Standards**

The solution must comply with:
Safety standards:
- EN 60950-1
- EN 61000-3-11
- EN 55022 / EN 55024

Noise level:
- ≤ 50 dB (excluding outdoor condenser)

- **Warranty & Support**
- Minimum **1-year OEM warranty**
- Onsite installation and commissioning required

ITEM NO. 7	Ethernet Cable Roll	1
S#	**Technical Description, Specifications and Standards Required**	
1.1	Must be Cat6 or higher UTP cable supplied in 305m roll with solid copper conductors, supporting Gigabit/10G, PoE/PoE+ and compliant with TIA/EIA-568 standards.	

ITEM NO. 8	LC to LC Multi-Mode 200M	1
S#	**Technical Description, Specifications and Standards Required**	
1.1	LC to LC Multi-Mode Fiber Optic Patch Cord (200 meters), OM3/OM4 50/125µm, factory-terminated and fully tested, compliant with ISO/IEC and TIA standards. The cable shall support 850/1300 nm operation with low insertion loss (≤0.5 dB) and LSZH/PVC jacket suitable for enterprise/data center use. Manufacturer warranty and test reports must be provided.	

ITEM NO. 9	Resident Engineer (1-Years)	1
S#	**Technical Expertise**	
	• Provide on-site technical support for all lab hardware, software, and security platforms. • Perform installation, configuration, and commissioning of cyber operations and defense emulation tools. • Monitor daily health, performance, and availability of lab systems and infrastructure. • Troubleshoot and resolve technical issues, coordinating with OEMs when required. • Support lab users during exercises, simulations, and cyber defense drills. • Manage updates, patches, and version upgrades for all deployed solutions. • Maintain system documentation, configurations, and operational runbooks. • Ensure compliance with security policies, access controls, and best practices. • Conduct basic knowledge transfer and operational guidance sessions for NCERT staff. • Act as the primary technical point of contact between NCERT and the bidder's support teams.	

Lot 2. Red Team Suite		
ITEM NO. 01	**Adversary Simulation Toolkit**	**01**
S#	**Technical Description, Specifications and Standards Required**	
1.1	The solution must include a customizable payload (e.g., equivalent to Beacon) that models advanced adversary behavior for post-exploitation tasks. It must support: • Asynchronous communication for stealthy, low-and-slow transmission. • Interactive communication for rapid task execution. • Malleable C2 profiles to modify and save network indicators, allowing blending with normal traffic or emulation of malware types.	

1.2	The tool must offer a highly flexible framework for tailored red team engagements, including:
	• Arsenal Kit or equivalent:
	   ○ Sleep Mask Kit: Obfuscate the payload in memory during inactivity using a customizable encryption algorithm for data and strings.
	   ○ Mutator Kit: Generate alternate versions of obfuscation mechanisms (e.g., using Low Level Virtual Machine – LLVM) to evade in-memory detection like YARA scanning.
	   ○ User-Defined Reflective Loaders (UDRLs): Allow modification of default behaviors for personalized tradecraft to enhance evasiveness.
	• Community Kit or equivalent: A curated repository of user-submitted tools, with at least 100 extensions available	

1.3	Extend payload capabilities via compiled C programs that execute within the payload process and use internal APIs. Possible extensions must include: • Target information gathering methods. • Data management. • Post-exploitation techniques. • Process optimizations.	
1.4	The solution must allow tailoring of C2 communication by creating profiles that specify data transformation and storage to suit specific environments and objectives.	
1.5	The tool must support interoperability with other offensive security tools to expand engagement reach, including: • Integration with evasive red teaming toolkits (e.g., equivalent to Outflank Security Tooling) via BOFs and reflective DLL loading for bypassing defensive measures. • Compatibility with automated penetration solutions (e.g., equivalent to Core Impact), including session passing, tunneling, and resource sharing (e.g., .NET assembly tools or execute-assembly commands).	
1.6	Reporting and logging, with support for: • Timeline of activities. • Per-host data summaries. • Indicators of compromise. • Full activity accounts for sessions. • Social engineering details. • Tactics, techniques, and procedures (TTPs).	
1.7	The bidder shall quote relevant certifications, such as Red Team Ops (RTO), Red Team Ops II (RTO II), or equivalent	
1.8	The bidder shall quote accordingly for 02 Users	

ITEM NO. 02	Penetration Testing Toolkit	01
S#	**Technical Description, Specifications and Standards Required**	
2.1	The solution must offer intuitive automation for deploying advanced tests, including Rapid Penetration Tests (RPTs) as guided wizards for efficient execution of common tasks. It should support quick re-testing of exploited systems to verify remediation effectiveness.	
2.2	The solution must provide a robust, up-to-date library of commercial-grade, certified exploits developed and tested by cybersecurity experts. This must include internally developed exploits and partnerships for add-on packs (e.g., for SCADA, medical, and IoT devices). The library should reveal chains of exploitable vulnerabilities leading to mission-critical systems.	
2.3	The solution must allow gathering information, exploiting systems, and generating reports from a single console with an intuitive dashboard. Include an interactive attack map (network graph view) for real-time visualization of attack chains, pivoting, and testing activities.	
2.4	The solution must allow tailoring of C2 communication by creating profiles that specify data transformation and storage to suit specific environments and objectives.	
2.5	The solution must support testing across multiple vectors, including operating systems (Windows, Linux, Mac), cloud environments (public, private, hybrid), databases, web services, network appliances, software applications, and critical data.	
2.6	The solution must allow powerful integrations with other penetration testing tools (e.g., equivalent to Cobalt Strike, OST, Metasploit, PowerShell Empire, Plextrac) and more than 20 vulnerability scanners.	
2.7	The solution must The solution must be able to Identify and target internal systems for network penetration testing, exploiting vulnerabilities in networks, hosts, and devices. Imitate attacker methods for access and data manipulation. Conduct web application tests via detailed web crawling, pivoting to servers, databases, and backend networks to confirm exploitability	
2.8	The solution must offer one-step validation of results from over 20 third-party scanners, including but not limited to: Acunetix Web Vulnerability Scanner, beSECURE, Burp Suite Professional, Cenzic, Frontline VM, GFI LANguard, HP WebInspect, IBM Enterprise Scanner, IBM Internet Scanner, IBM Rational AppScan, McAfee Vulnerability Manager, Microsoft Baseline, nCircle, Nessus, Nexpose, Nmap, NTOSpider, Patchlink VMS, Qualys Guard, Qualys Web Application Scanner, Retine, SAINT, STAI Guardian, Tenable Security Center, Tripwire IP360. Prioritize and validate infrastructure weaknesses post-scan.	
2.9	The bidder shall quote relevant certifications, such as OSCP, OSEP or equivalent	
	The bidder shall quote accordingly for 02 Users	

ITEM NO. 03	Offensive Security Tooling	01
S#	**Technical Description, Specifications and Standards Required**	
4.1	The solution must be a cloud-delivered offensive security platform that is securely accessible through a web browser interface. It must support the secure download of locally generated payloads and provide comprehensive in-portal documentation along with operational guidance to assist users in effectively deploying and managing the platform.	

4.2	The solution must provide a comprehensive suite of red teaming tools that cover the entire cyber kill chain. It must support full-scale adversary simulation, from initial compromise through to data exfiltration, and enable both targeted testing as well as complete end-to-end red team exercises.
4.3	The solution must include anti-forensic payload capabilities designed to evade EDR and antivirus solutions, provide advanced payload obfuscation techniques, and incorporate proprietary evasion methods that are continuously updated through ongoing research and development. It must also support process injection and other advanced weaponization techniques.
4.4	The solution must support macro-based Office exploitation and steganographic payload delivery using image-based payloads. It must also enable the simulation of real-world phishing campaigns and intrusion scenarios.
4.5	The solution must provide low-profile command-and-control implants and support system reconnaissance and network discovery capabilities. It must also enable user activity monitoring while maintaining stealthy persistence within the environment.
4.6	The solution must provide real-time monitoring of defensive actions and alert red teams to blue team detection and response activities during engagements.
	The solution must integrate with Cobalt Strike using Beacon Object Files (BOFs) and reflective DLL loading, and it must also integrate with the Core Impact automated penetration testing solution. Additionally, the solution must support integration with third-party red team tools and enable vendor consolidation to support coordinated, multi-stage engagements.
	The bidder shall quote accordingly for 02 Users

ITEM NO. 4	Claude Max Subscription Licenses ($100 Tier) for Yearly Basis	03
S#	**Technical Description, Specifications and Standards Required**	
4.1	**Core Capabilities:** • Access to advanced models (e.g., Claude Opus 4.6, Sonnet 4.5, Haiku 4.5) for superior reasoning, coding, and multimodal tasks. • Conversational AI for writing, editing, content creation, and complex problem-solving. • Code generation, visualization of data, and execution in supported environments (including Claude Code on web and terminal). Analysis of text, images, and documents with extended context windows.	
4.2	**Productivity Enhancements:** • Unlimited projects for organizing chats, documents, and workflows. • Integration with tools such as Google Workspace (email, calendar, docs) and connectors for remote management. • Extended thinking modes for handling complex, multi-step tasks. • Web search integration and desktop extensions for enhanced functionality. Memory across conversations and priority access during high-traffic periods.	
4.3	**Usage and Performance:** • 5x higher usage limits compared to Pro (e.g., average users can send approximately 900 messages or 200-800 Claude Code prompts every five hours). • Higher output limits across all tasks. • Early access to new features and models. • Support for advanced integrations (e.g., Claude in Excel). Enhanced capacity for intensive workloads, such as extended use of Opus models (e.g., 24-40 hours weekly).	

Lot 3. End User Compute

ITEM NO. 1	Laptops	20
S#	**Technical Description, Specifications and Standards Required**	
1.1	Core™ 7 240H; 16GB DDR5; 512GB; RTX™ 5050 8GB; Win 11 16"; WUXGA or higher	
1.2	Wireless keyboard combo & Mouse The bidder shall supply a wireless keyboard (with integrated touchpad) and mouse combo operating on 2.4 GHz RF and/or Bluetooth with a minimum 10-meter range and USB nano receiver. The keyboard shall be full-size (minimum 104 keys), spill-resistant, and include a responsive multi-touch touchpad, while the mouse shall feature an optical sensor with at least 1000 DPI resolution. The product must be brand new, energy-efficient, and covered by a minimum one-year warranty.	20

ITEM NO. 2	Portable SSD	02
S#	**Technical Description, Specifications and Standards Required**	
6.1	Up to 800 MB/s Transfer Speed, 1TB Storage Capacity, Bus Powered, USB-C 3.2 Gen 2 Interface, 2-years warranty	

ITEM NO. 3	USB	10
S#	**Technical Description, Specifications and Standards Required**	
7.1	64GB, Speed2 USB 3.2 Gen 1 compliant, Min. 2-years warranty	

ITEM NO. 4	Heavy Duty Color Printer	02
S#	**Technical Description, Specifications and Standards Required**	
5.1	Print Speed (A4): 33ppm, Fax	

Lot 4. Video Wall Solution

ITEM NO. 1	Video Wall Solution 01((2x3) Total 6-Screens) – wall mount deployment solution-3 years Warranty and support	01
Technical Description, Specifications and Standards Required		

Specification	Requirement Value / Details
Screen Size	55 inch LCD unit
Bezel Width	≤ 1.8 mm (tolerance ±1.5 mm)
Operation	24-hour continuous, stable
Casing Material	Metal (anti-radiation & EMI protection)
Factory Calibration	Color & brightness uniformity
LCD Technology	IPS

Resolution	1920 × 1080 (Full HD)
Pixel Pitch	0.63 mm
Brightness	≥ 700 cd/m²
Contrast Ratio	1000:01:00
Color Depth	10-bit, 1.07 billion colors
Color Gamut	≥ 72% NTSC
Color Temperature	10,000 ± 2,000K
Viewing Angle	178° (H) / 178° (V)
Response Time	≤ 8 ms
Surface Treatment	Anti-glare, haze 28%, hardness 3H
Type	Direct-lit LED backlight
Brightness Uniformity	Ultra-high, no boundary shadows
Picture Modes	Monitoring / Meeting / Movie
Video Input	VGA ×1, HDMI ×1, DVI ×1, DP ×1, USB ×1
Video Output	HDMI ×1
Audio Output	Line-out (analog audio)
Control Interfaces	RS232 IN ×1, RS232 OUT ×1, IR IN ×1
Signal Support	4K input, auto loop up to 30 screens via HDMI
Supply	100–240 VAC, 50/60 Hz
Consumption	≤ 230 W
Standby Consumption	≤ 0.5 W
Operating Temperature	0 °C to 40 °C
Operating Humidity	20%–80% RH (non-condensing)
Storage Temperature	-20 °C to 60 °C
Storage Humidity	10%–90% RH (non-condensing)
Active Display Area	1209.6 mm × 680.4 mm
Product Dimensions	1212.16 × 683.01 × 69.3 mm
VESA Mounting	600 mm × 400 mm
Net Weight	21.4 ± 0.5 kg
Gross Weight	35.8 ± 0.5 kg
Included	Power cable, network cable, 2m HDMI cable, screws ×4, remote control, IR receiver, RS-232 converter, multilingual & English quick start guides, LCD maintenance notice
Certifications	International safety & EMC standards
Warranty/Certifications	Manufacturer's warranty & after-sales support/Training & MAL from OEM

Video Wall Decoder

Specification	Requirement Value / Details
Device Type	Ultra High Definition Decoder
Operation	24/7 continuous operation
Net Weight	≤ 5.2 kg (11.46 lb)
Dimensions (W×H×D)	440 × 44.5 × 320.8 mm
Working Temperature	-10 °C to 55 °C
Working Humidity	0% RH to 90% RH
Power Interface	Embedded 220 VAC
USB	2 × USB 2.0 ports
Serial	1 × RS-232 (RJ-45), 1 × RS-485

Network	2 × RJ-45 (10/100/1000 Mbps), 2 × optical ports (100 BASE-FX/1000 BASE-X)
Alarm In	8 channels
Alarm Out	8 channels
HDMI Input Ports	2 × HDMI 1.4
Max Input Resolution	4K@30 Hz (odd-numbered port only)
Supported Resolutions	3840×2160@30 Hz, 1920×1200@60 Hz, 1920×1080@60/50 Hz, 1280×720@60/50 Hz, 1600×1200@60 Hz, 1280×960@60 Hz, 1680×1050@60 Hz, 1440×900@60 Hz, 1366×768@60 Hz, 1280×1024@60 Hz, 1024×768@60 Hz
Custom Resolution	Supported (width 800–3840, height 600–2160, multiples of 4/2)
Formats	H.264 (default), H.265
Capability	1 channel 4K@30 Hz or 2 channels 1080p@60 Hz
Formats	G722.1, G711_U, G711_A, AAC
HDMI Output Ports	8 × HDMI 1.4
Max Resolution	4K (3840×2160@30 Hz)
Supported Resolutions	3840×2160@30 Hz, 2560×1440@30 Hz, 1920×1200@60 Hz, 1920×1080@60/50 Hz, 1680×1050@60 Hz, 1600×1200@60 Hz, 1280×1024@60 Hz, 1280×720@60/50 Hz, 1024×768@60 Hz
LED Loading Capacity	≤ 2.6 MP per port (width 144–4096, height 144–2160, multiples of 2)
BNC Output	2 × CVBS (PAL 704×576@25 Hz, NTSC 704×480@30 Hz)
Formats	H.264, H.265, Smart264, Smart265, MJPEG, HIK264
Channels	128
Capability	Up to 32 MP resolution; supports 64 channels of 2 MP or 128 channels of 720p simultaneously
Smart/Encrypted Streams	Supported (per group: 4 channels smart or encrypted decoding)
Interfaces	Embedded HDMI audio or DB15-to-BNC independent audio
Formats	G711A, G711U, G722.1, G726-16/U/A, MPEG, AAC-LC, PCM
Max Scale	≤ 8
Window Division per Output Port	1, 2, 4, 6, 8, 9, 12, 16, 25, 36
Layers per Screen	4 × 1080p or 2 × 4K
Scenes	Up to 64
Plans	Up to 100 view groups
PTZ Control	8-direction, auto-scan, aperture, focal length, focus, presets

Supported Devices	PanoVu 32 MP, fisheye, conventional IP cameras, DVRs, NVRs, XVRs, third-party devices
Protocols	ONVIF, Ipv4 & Ipv6
Remote Access	PC client & Chrome ≥ v45
Network	Built-in Gigabit switching, NAT support
Remote Management	Parameter config, import/export, logs, restart, upgrade
Failure Detection	Auto alarm for disconnection, IP conflict, illegal access, over-temperature, decoding exception
User Management	Role-based permissions
Time Sync	Manual & NTP synchronization

ITEM NO. 02	Video Wall Solution 02-(2x2) Total 4-Screens-- Wall Mount deployment solution-3 years Warranty and support	01
Specification	**Requirement Value / Details**	
Screen Size	55 inch LCD unit	
Bezel Width	≤ 1.8 mm (tolerance ±1.5 mm)	
Operation	24-hour continuous, stable	
Casing Material	Metal (anti-radiation & EMI protection)	
Factory Calibration	Color & brightness uniformity	
LCD Technology	IPS	
Resolution	1920 × 1080 (Full HD)	
Pixel Pitch	0.63 mm	
Brightness	≥ 700 cd/m²	
Contrast Ratio	1000:01:00	
Color Depth	10-bit, 1.07 billion colors	
Color Gamut	≥ 72% NTSC	
Color Temperature	10,000 ± 2,000K	
Viewing Angle	178° (H) / 178° (V)	
Response Time	≤ 8 ms	
Surface Treatment	Anti-glare, haze 28%, hardness 3H	
Type	Direct-lit LED backlight	
Brightness Uniformity	Ultra-high, no boundary shadows	
Picture Modes	Monitoring / Meeting / Movie	
Video Input	VGA ×1, HDMI ×1, DVI ×1, DP ×1, USB ×1	
Video Output	HDMI ×1	
Audio Output	Line-out (analog audio)	
Control Interfaces	RS232 IN ×1, RS232 OUT ×1, IR IN ×1	
Signal Support	4K input, auto loop up to 30 screens via HDMI	

Supply	100–240 VAC, 50/60 Hz
Consumption	≤ 230 W
Standby Consumption	≤ 0.5 W
Operating Temperature	0 °C to 40 °C
Operating Humidity	20%–80% RH (non-condensing)
Storage Temperature	-20 °C to 60 °C
Storage Humidity	10%–90% RH (non-condensing)
Active Display Area	1209.6 mm × 680.4 mm
Product Dimensions	1212.16 × 683.01 × 69.3 mm
VESA Mounting	600 mm × 400 mm
Net Weight	21.4 ± 0.5 kg
Gross Weight	35.8 ± 0.5 kg
Included	Power cable, network cable, 2m HDMI cable, screws ×4, remote control, IR receiver, RS-232 converter, multilingual & English quick start guides, LCD maintenance notice
Certifications	International safety & EMC standards
Warranty/Certifications	Manufacturer's warranty & after-sales support/Training & MAL from OEM

Video Wall Decoder

Specification	Requirement Value / Details
Device Type	Ultra High Definition Decoder
Operation	24/7 continuous operation
Net Weight	≤ 5.2 kg (11.46 lb)
Gross Weight	≤ 6.3 kg (13.89 lb)
Dimensions (W×H×D)	440 × 44.5 × 320.8 mm
Working Temperature	-10 °C to 55 °C
Working Humidity	0% RH to 90% RH
Power Interface	Embedded 220 VAC
USB	2 × USB 2.0 ports
Serial	1 × RS-232 (RJ-45), 1 × RS-485
Network	1 × RJ-45 (10/100/1000 Mbps), 1 × optical port (100 BASE-FX/1000 BASE-X)
Alarm In	8 channels
Alarm Out	8 channels
HDMI Input Ports	2 × HDMI 1.4
Max Input Resolution	4K@30 Hz (odd-numbered port only)
Supported Input Resolutions	3840×2160@30 Hz, 1920×1200@60 Hz, 1920×1080@60/50 Hz, 1280×720@60/50 Hz, 1600×1200@60 Hz, 1280×960@60 Hz, 1680×1050@60 Hz, 1440×900@60 Hz, 1366×768@60 Hz, 1280×1024@60 Hz, 1024×768@60 Hz
Custom Resolution	Supported (width 800–3840, height 600–2160, multiples of 4/2)
Video Encoding Formats	H.264 (default), H.265
Video Encoding Capability	1 channel 4K@30 Hz or 2 channels 1080p@60 Hz

Audio Encoding Formats	G.722, G.711A/U, G.726, MPEG2-L2, AAC, MP3, PCM
HDMI Output Ports	4 × HDMI 1.4
Max Output Resolution	4K (3840×2160@30 Hz)
Supported Output Resolutions	3840×2160@30 Hz, 2560×1440@30 Hz, 1920×1200@60 Hz, 1920×1080@60/50 Hz, 1680×1050@60 Hz, 1600×1200@60 Hz, 1280×1024@60 Hz, 1280×720@60/50 Hz, 1024×768@60 Hz
LED Loading Capacity	≤ 2.6 MP per port (width 144–4096, height 144–2160, multiples of 2)
BNC Output	1 × CVBS (PAL 704×576@25 Hz, NTSC 704×480@30 Hz)
Video Decoding Formats	H.264, H.265, Smart264, Smart265, MJPEG, HIK264
Video Decoding Channels	64
Video Decoding Capability	Up to 32 MP resolution; supports 32 channels of 2 MP or 64 channels of 720p simultaneously
Smart/Encrypted Stream Decoding	Supported (per group: 4 channels smart or encrypted decoding)
Audio Output Interfaces	Embedded HDMI audio or DB15-to-BNC independent audio
Audio Output Channels	4
Audio Decoding Formats	G711A, G711U, G722.1, G726-16/U/A, MPEG, AAC-LC, PCM
Video Wall Supported	Yes
Video Wall Max Scale	≤ 4
Window Division per Output Port	1, 2, 4, 6, 8, 9, 12, 16, 25, 36
Layers per Screen	4 × 1080p or 2 × 4K
Scenes	Up to 64
Plans	Up to 100 view groups (HCP client)
PTZ Control	8-direction, auto-scan, aperture, focal length, focus, presets
Supported Devices	PanoVu 32 MP, fisheye, conventional IP cameras, DVRs, NVRs, XVRs, third-party devices
Protocols	ONVIF, IPv4 & IPv6
Remote Access	PC client & Chrome ≥ v45
Network	Built-in Gigabit switching, NAT support
Remote Management	Parameter config, import/export, logs, restart, upgrade
Failure Detection	Auto alarm for disconnection, IP conflict, illegal access, over-temperature, decoding exception
User Management	Role-based permissions
Time Synchronization	Manual & NTP synchronization