



جمهوری اسلامی ایران
وزارت معارف و اوقاف و صنایع مستظرفه

وزارت معارف و اوقاف و صنایع مستظرفه

دانشگاه تهران
معاونت آموزشی و تحصیلات عالی
معاونت تحصیلات عالی

(IUL)196-C/1/2026/97

18 شهریور 1406

معاونت معارف و اوقاف:

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LOT 1: Supply and Installation of AI Hardware and Datacenter Infrastructure Hardware

#	Description	Qty
1.1	AI Server Node Form Factor: 2U Rack Server Processor: 2 Nos x Intel Xeon Silver 4516Y+(2.2GHz/24-Core) Memory - Up to 48 x DDR5 DIMM slots - Supports up to 12 TB memory capacity. - Installed: 4 Nos x DDR5 RDIMM, 64GB, 5600MT/s, 2Rank Storage - Flexible hot-swappable storage supporting HDD/SDD Chassis 4SAS/SATA+8NVME 2.5inch HDD Chassis - Installed NVMe: 4 Nos x 1.92TB NVMe PCIe, RI, 2.5inch - Installed SSD: 2 Nos x 3.84TB, SATA 6Gb/s, RI, 2.5inch - Should have installed RAID controller card with cache capacities of no less than 4 GB and supports RAID 0/1/10/5/50/6/60/10. - A supercapacitor for power-off protection should be included. Networking: - Installed NIC1: 1 x OCP3.0 Ethernet Adapter 25GE Dual Port-SFP28 - Installed NIC2: 1 x 100 Gigabit, QSFP28, 2 ports - Should include 2 x High Speed Cable, 25G SFP28 DAC, 3m - Should include 2 x High Speed Cable, 100G QSFP28 DAC, 3m PCIe Expansion: - Up to 19 expansion slots (17 x PCIe + 2 x OCP 3.0), - Including up to 8 x PCIe 5.0 slots GPU: - Should supports up to 4 x dual-width GPU cards - Installed GPU: 1 x NVIDIA RTX PRO 6000 Blackwell Server Edition Power and Cooling: 2 x Hot-swappable 2000W Platinum PSUs with 1+1 redundancy 2 x Power Cords Cable, AC 250V10A,1.8m,C14-C13 PDU Cable 4 x hot-swappable counter-rotating fans with N+1 redundancy Installation Accessories 1 x Ball Bearing Rail Kit 1 x 2U Bezel/Panel" Server Management: Integrated iBMC with dedicated management port supporting SNMP, IPMI 2.0, HTML5/VNC KVM, Agentless monitoring, remote control Supported OS: Microsoft Windows Server, VMware ESXi, Red Hat Enterprise Linux, SUSE Linux Enterprise Server, Ubuntu, Debian, CentOS, Oracle Linux Warranty 3-Year Warranty Onsite Standard 24x7 Technical Assistance Center (TAC) Support - Online Self-help Support - System Software Updates	1 Bundle

	9x5xNBD Advance Hardware Replacement 9x5xNBD Onsite Support																																					
1.2	AI Workstation NVIDIA GB10 Grace Blackwell Superchip 128GB of LPDDR5x RAM 1TB NVMe M.2 PCIe 4.0 SSD 1 x 10G RJ45 Ethernet Port 2 x NVIDIA ConnectX-7 SmartNIC Wi-Fi 7 (802.11be) Bluetooth 5.4 4 x USB-C 3.2 Gen 2x2 Ports 1 x HDMI 2.1a Port NVIDIA DGX OS	6 Nos																																				
1.3	Existing AI Workstation Upgrades 1 x 4TB PCIe 5.0 M.2 Internal SSD 2 x 32GB DDR5 6400 MHz UDIMM Memory Kit	1 Nos																																				
1.4	High-performance AI Network Switch <table><tr><td>Application</td><td>High-performance interconnection of AI workstations, AI Server and future AI infrastructure</td></tr><tr><td>Architecture</td><td>Non-blocking, wire-speed Ethernet switching architecture suitable for AI/HPC workloads</td></tr><tr><td>Form Factor</td><td>Rack-mountable, suitable for standard 19-inch data-center rack</td></tr><tr><td>Switching</td><td>Minimum 3.2 Tbps</td></tr><tr><td>Forwarding</td><td>Minimum 800 Mpps</td></tr><tr><td>50GbE</td><td>Minimum 8 × 50GbE SFP56 ports</td></tr><tr><td>200GbE</td><td>Minimum 2 × 200GbE QSFP56 ports</td></tr><tr><td>400GbE</td><td>Minimum 2 × 400GbE QSFP56-DD ports</td></tr><tr><td>Port Speed Flexibility</td><td>SFP56 interfaces shall support 25GbE and 50GbE operation. QSFP56/QSFP56-DD interfaces shall support appropriate breakout configurations for 25/50/100/200/400GbE connectivity.</td></tr><tr><td>AI Workstation Connectivity</td><td>The switch shall provide a minimum of 1 independent high-speed Ethernet connections for up to four AI workstations</td></tr><tr><td>AI Workstation Cables</td><td>3 × 3m (7ft) 400G DAC QSFP-DD 8x50G PAM4 to 2x200G QSFP56 4x50G PAM4 Passive Direct Attach Copper Breakout Cable (DAC).</td></tr><tr><td>Jumbo Frames</td><td>Minimum MTU of 9,000 bytes; preferably support approximately 9.6 KB jumbo frames.</td></tr><tr><td>QoS</td><td>802.1p/DSCP QoS, traffic classification, priority queuing and congestion-management capabilities</td></tr><tr><td>PFC</td><td>Support Priority Flow Control (802.1Qbb) or equivalent lossless Ethernet capability where required for AI/RDMA workloads.</td></tr><tr><td>ECN</td><td>Support Explicit Congestion Notification (ECN) or equivalent congestion-management functionality</td></tr><tr><td>RDMA</td><td>Switch shall support Ethernet features required for RDMA/RoCE-based AI workloads, including PFC and appropriate QoS/congestion-management functions.</td></tr><tr><td>VLAN</td><td>IEEE 802.1Q VLAN</td></tr><tr><td>Link Aggregation</td><td>IEEE 802.3ad/802.1AX LACP</td></tr></table>	Application	High-performance interconnection of AI workstations, AI Server and future AI infrastructure	Architecture	Non-blocking, wire-speed Ethernet switching architecture suitable for AI/HPC workloads	Form Factor	Rack-mountable, suitable for standard 19-inch data-center rack	Switching	Minimum 3.2 Tbps	Forwarding	Minimum 800 Mpps	50GbE	Minimum 8 × 50GbE SFP56 ports	200GbE	Minimum 2 × 200GbE QSFP56 ports	400GbE	Minimum 2 × 400GbE QSFP56-DD ports	Port Speed Flexibility	SFP56 interfaces shall support 25GbE and 50GbE operation. QSFP56/QSFP56-DD interfaces shall support appropriate breakout configurations for 25/50/100/200/400GbE connectivity.	AI Workstation Connectivity	The switch shall provide a minimum of 1 independent high-speed Ethernet connections for up to four AI workstations	AI Workstation Cables	3 × 3m (7ft) 400G DAC QSFP-DD 8x50G PAM4 to 2x200G QSFP56 4x50G PAM4 Passive Direct Attach Copper Breakout Cable (DAC).	Jumbo Frames	Minimum MTU of 9,000 bytes; preferably support approximately 9.6 KB jumbo frames.	QoS	802.1p/DSCP QoS, traffic classification, priority queuing and congestion-management capabilities	PFC	Support Priority Flow Control (802.1Qbb) or equivalent lossless Ethernet capability where required for AI/RDMA workloads.	ECN	Support Explicit Congestion Notification (ECN) or equivalent congestion-management functionality	RDMA	Switch shall support Ethernet features required for RDMA/RoCE-based AI workloads, including PFC and appropriate QoS/congestion-management functions.	VLAN	IEEE 802.1Q VLAN	Link Aggregation	IEEE 802.3ad/802.1AX LACP	1 Nos
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	Access Control	- Integrated 3-in-1 access control comprising RFID, fingerprint and PIN authentication - Should be designed with access reader, access controller, and access management software. - Should be integrated into local management system, and can be managed from local display	
	Monitoring	- Integrated DCIM/environmental monitoring system - The display of monitoring system is 10" touch type, and the IP level of display shall be IP55 dust/water protection. - The monitoring is door mounted on the front door - The monitoring sensors include temperature, humidity, smoke, water leaking, door status. - The management of UPS includes display of UPS working mode, UPS alarms, UPS input power parameters, UPS output power parameters. - The management of cooling includes display of cooling working mode, cooling alarms, and setting of target temperature and humidity, control by return or discharge, and ON/OFF unit. - Monitoring function supports calculation of power usage and calculation of system PUE. - Monitoring system supports integration of access control system, with the function of user management, door authorization, and door open/reset. - Monitoring system is designed with remote reporting portal with Modbus-TCP as standard, and optional SNMP protocol	
	Lighting	Integrated internal environment/status lighting	
	Fire Extinguishing System	- The fire system is rack mount, and height is 3U. - The extinguisher gas is Novec1230, and volume is 1.0kg. - The extinguishing trigger method is temperature/smoke sensing and automatic release of firefighting gas.	
	Modular UPS System	- To be installed in the Power Rack - Be a true online double-conversion UPS. - Utilize a modular architecture with independent, hot-swappable power modules. - Be suitable for installation in a standard 19-inch equipment rack/cabinet. - Provide three-phase input and three-phase output. - Operate from a nominal 400 VAC, three-phase electrical supply. - Provide a minimum installed capacity of 40 kVA / 40 kW with the proposed two power modules. - Provide a chassis capacity of not less than 60 kVA. - Permit replacement of an individual power module without requiring complete UPS shutdown - Provide automatic transfer to bypass under defined overload/fault conditions. - Input configuration: 3-phase, 3-wire/4-wire + PE - Nominal input voltage: 380/400/415 VAC - Input Frequency: 50/60 Hz - Input power factor: ≥ 0.99 - Input power factor correction: Active/PFC	

	- Input protection: Integrated protection against abnormal input conditions - Output configuration: 3-phase - Nominal output voltage: 400 VAC - Output power factor: 1.0 - Output Frequency: 50/60 Hz - Output waveform: Pure sine wave - Online transfer: 0 ms interruption - Bypass transfer: 0 ms interruption under synchronized conditions - AC operating efficiency of $\geq 95.5\%$ at rated/nominal operating conditions. - Automatic bypass transfer for overload and UPS fault conditions. - Manual/maintenance bypass capability. - Bypass overcurrent protection. - Bypass status indication on the local display. - Bypass alarms and event logging. - Battery Management - o Intelligent battery charging. - o Battery state monitoring. - o Battery voltage monitoring. - o Battery current monitoring. - o Battery low-voltage warning. - o Battery discharge protection. - o Battery temperature compensation where supported. - o Battery replacement/maintenance alarm. - o Battery fault detection. - o Runtime estimation. - o Battery test/self-test capability - The UPS shall include a local graphical display or equivalent operator interface providing, at minimum input voltage, input frequency, Output voltage, Output frequency, Output kVA/kW, Battery runtime estimate, UPS operating mode, Bypass status, Power-module status, Alarm/fault status	
Battery	- Valve Regulated Lead Acid (VRLA) batteries. - AGM or equivalent sealed VRLA construction. - Nominal battery voltage: 480 VDC per battery package. - Battery capacity: 40 × 12 V / 9 Ah per package. - Battery package quantity: 2. - Rack-mounted construction. - Integrated battery enclosure/tray and appropriate protection. - Battery isolation/protection device. - Battery interconnection cables and connectors	
Power Management and Distribution System	- Input: 3-phase - Nominal voltage: 380–415 VAC - Rated current: 63 A - Frequency: 50–60 Hz - Enclosure: Rack mounted, 6U - Surge protection: Type/Class suitable for 3-phase + neutral system	

	- The PDM shall provide, at minimum, the following dedicated branches: - 2 × three-phase UPS terminals - 2 × three-phase cooling-system branches - 1 × three-phase manual UPS bypass - 4 × single-phase PDU branches - PDM Metering and Monitoring - Main input power meter. - UPS output power meter. - Voltage measurement. - Current measurement. - kVA measurement. - kWh measurement. Cable Management Vertical and horizontal cable-management provisions suitable for power, network and monitoring cables Warranty: 1-Years Parts and Service	
1.7	Professional Services: Basic Installation and Start-Up Service for AI Hardware and Network Infrastructure <u>Team requirement</u> • The vendor MUST have the following full-time OEM Certified Professional/Engineer under its payroll to provide the required professional services. All relevant engineer(s) certificates and supporting documents shall be included with the proposal. Required certificates of the engineer(s): • IT Project Management or IT Service Management • Fortinet Certified Professional Network Security <u>The Contractor shall provide basic professional installation and start-up services for:</u> • AI Server Node; • AI Workstations; • High-Performance AI Network Switch; and • AI Infrastructure Management Switch. The service shall include physical rack installation, equipment power-up, basic hardware verification, basic network connectivity verification and secure basic remote management configuration for equipment having dedicated management interfaces. The service is intended to deliver the supplied equipment in an installed, powered, operational and basic-management-ready condition. The service shall not include application deployment, operating system installation, AI software-stack configuration, advanced network engineering, production network integration, performance optimization or application-level commissioning unless specifically identified elsewhere in the RFP. Pre-Installation Verification • Verify equipment model, quantity and major accessories against the approved Bill of Quantities. • Inspect equipment for visible physical damage. • Verify that rack-mounting kits, rails, power cables, network cables and other installation accessories required for basic installation are available.	1 Service

	• Verify the designated rack locations and available rack space. • Verify availability of appropriate electrical power outlets/PDU connections. • Verify availability of the required management network connection. • Confirm the intended rack positions with the client. • Confirm the basic equipment installation sequence. Rack-Mounting and Physical Installation AI Server Node • Install the AI Server Node in the designated IT rack. • Install the supplied rack rails/rail kit. • Install the front bezel/panel where applicable. • Connect the supplied redundant power cables to the designated rack PDU outlets. • Connect the designated management network cable. • Connect the required data/network cables supplied under the equipment or associated network infrastructure. • Ensure appropriate cable routing and strain relief. • Label power and network connections. • Verify that the server is securely mounted and that adequate airflow clearance is maintained. AI Workstations • Position the workstation in the designated rack/shelf location or approved equipment mounting arrangement. • Secure the workstation using the supplied mounting hardware or appropriate rack shelf/support. • Connect AC power. • Connect the 10GbE RJ45 management interface to the designated management switch. • Connect the designated high-speed AI network connection to the high-performance AI network switch. • Label power, management and high-speed network connections. • Verify physical connectivity. High-Performance AI Network Switch • Install the high-performance AI network switch in the designated IT rack. • Install the supplied rack-mounting hardware. • Connect redundant power supplies to designated PDU outlets. • Install and connect the required AI workstation high-speed network cables. • Install and connect the management/uplink connection to the management switch. • Label all connected switch ports. • Verify physical link status on all required interfaces. AI Infrastructure Management Switch • Install the management switch in the designated IT rack. • Install supplied rack-mounting hardware. • Connect AC power. • Connect the AI Workstation 10GbE RJ45 management interfaces. • Connect the designated 10GbE SFP+ uplink(s) to the high-performance AI network switch. • Label all management ports and uplinks.	
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	• Verify physical link status. Equipment Power-Up and Basic Hardware Verification • Power on each installed device. • Verify successful POST/boot or hardware initialization. • Verify that no critical hardware fault indicators are present. • Verify power supply status. • Verify that all required network ports establish physical link. • Rectify installation-related errors where possible. Basic Network Connectivity Verification • Each AI Workstation's 10GbE management interface has an active physical link. • The management switch receives links from the connected AI Workstations. • The management switch uplink to the high-performance AI switch is operational. • The AI Server Node management interface has an active link. • Basic IP connectivity is operational where IP addresses are provided by the Employer. • Physical link establishment between the AI Workstations and high-performance AI network switch. Basic Remote Management Configuration For equipment equipped with a dedicated management interface, the Contractor shall perform basic secure remote management configuration. • AI Server Node integrated management controller; • AI network switch management interface; • Management switch management interface; and • Configure the management interface with a management IP address. • Configure DNS/NTP settings where applicable. • Change default administrator credentials. • Enable secure management protocols such as HTTPS and SSH where supported. • Restrict management access to the designated management network/VLAN. • Configure management VLAN/interface as applicable. • Configure SNMPv3 where required and supported. • Configure appropriate management access permissions. • Verify remote console/KVM functionality where provided by the equipment. Switch Basic Configuration High-Performance AI Network Switch Basic configuration shall include: • Device hostname. • Management IP address. • Management VLAN where applicable. • Default gateway. • Administrator credentials. • Secure management access. • Required AI workstation ports enabled. • Required management/uplink ports enabled. • Basic port-speed configuration where required. • Basic VLAN configuration based on the Employer's approved port/VLAN plan. • Basic port descriptions. • NTP configuration where applicable. • SNMPv3 configuration where required. • Configuration save and backup.	
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	AI Infrastructure Management Switch Basic configuration shall include: • Hostname. • Management IP address. • Management VLAN. • Default gateway. • Administrator credentials. • Secure HTTPS/SSH management. • AI Workstation management ports enabled. • AI network switch uplink port(s) enabled. • AI Server management port enabled where connected. • Basic VLAN configuration. • Port descriptions. • SNMPv3 configuration where required. • NTP configuration. • Configuration save and backup. Installation Completion and Handover • Final equipment installation checklist. • Port-to-device connectivity schedule. • Management IP address schedule. • VLAN/management network information. • Basic switch configuration summary. • Configuration backup files. • Updated asset/equipment inventory where applicable. Knowledge Transfer The Contractor shall provide a basic operational handover session to the client's ICT personnel covering: • Equipment physical layout. • Power-on/shutdown procedure. • Basic hardware status indicators. • Accessing the server management controller. • Accessing switch management interfaces. • Basic management network topology. • Management IP addresses. • Administrative access procedure. • Basic monitoring functions. • Configuration backup/restore location. • Basic troubleshooting and escalation procedure.	
1.8	Professional Services: Installation and Commissioning Service for Micro Data Center Infrastructure • Team requirement - The vendor MUST have full-time OEM Certified Professional/Engineer under its payroll to provide the required professional services. All relevant engineer(s) certificates and supporting documents shall be included with the proposal. Required certificates of the engineer(s): - IT Project Management or IT Service Management - Datacenter Power Specialist	

	• Planning Service - The Contractor shall undertake detailed site assessment, engineering planning and implementation planning prior to commencement of physical installation. - Conduct a detailed site survey of the designated Micro Data Center installation area. - Verify available floor space, access routes, rack positioning, ceiling/wall clearances and equipment delivery requirements. - Verify existing electrical supply, distribution boards, circuit capacity, earthing and available power outlets. - Verify cooling requirements, indoor/outdoor unit locations, refrigerant piping routes, condensate drainage and ventilation requirements. - Verify existing network, structured cabling and management connectivity requirements. - Review the existing IT rack configuration and identify all equipment to be migrated. - Develop a detailed installation and migration methodology. - Develop a detailed implementation schedule and work sequence. - Coordinate installation activities with the PGO's ICT, facilities and other relevant teams. • Rack Installation Service - The Contractor shall supply the professional installation services required for the complete installation of the three Micro Data Center racks. - Positioning and installation of 1 × Power Rack and 2 × IT Racks at the approved locations. - Install rack mounting hardware, levelling feet, castors and associated accessories as applicable. - Install vertical and horizontal cable-management accessories. - Install rack blanking panels and airflow-management accessories. - Install rack bonding and protective earth connections. - Verify adequate front/rear equipment access and maintenance clearances. - Install rack PDUs and associated accessories. - Label racks, PDUs, power circuits, network connections and major infrastructure components. • Power Distribution Installation Service - The Contractor shall install and commission the complete electrical power distribution infrastructure associated with the Micro Data Center. - Verify incoming electrical power supply and available capacity. - Verify voltage, phase, frequency and protective-device ratings. - Install and connect the Micro Data Center incoming power supply. - Install the power distribution panel and associated protective devices. - Install UPS input and output power connections. - Install UPS bypass connections where provided. - Install power distribution from the Power Rack to the two IT Racks. - Install and connect rack PDUs. - Provide and install all required power cables, connectors, termination accessories and cable-management components. - Verify protective earthing and rack bonding. - Verify power distribution capacity against the connected IT load.	
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	- Ensure all electrical installation work complies with applicable electrical codes, safety requirements and site standards. - Label all power circuits and distribution points. • Precision Cooling Installation and Configuration Service - The Contractor shall install, configure and commission the integrated precision cooling system associated with the Micro Data Center. - Installation of the rack-mounted precision cooling unit(s). - Installation of associated indoor/outdoor components where applicable. - Installation of refrigerant piping and insulation. - Installation of condensate drainage. - Installation of electrical power and control connections. - Installation and configuration of cooling control systems. - Configuration of temperature setpoints and operating parameters. - Verification of cooling capacity against the installed IT load. - Verification of emergency ventilation operation. - Testing of cooling start/stop and alarm conditions. - Integration of cooling status and alarms with the monitoring/DCIM system. • Modular UPS System Installation and Configuration Service - The Contractor shall install, configure and commission the modular/rack-mounted UPS system and associated battery system. - Inspect and verify the UPS and battery modules prior to installation. - Install the UPS system in the designated Power Rack. - Install UPS power modules and associated components. - Install and connect the battery system. - Install battery modules and verify correct configuration. - Connect UPS input, output and bypass circuits. - Configure UPS operating parameters. - Configure battery parameters and alarm thresholds. - Configure UPS monitoring and communications. - Integrate UPS with the Micro Data Center monitoring/DCIM system. - Test normal online operation. - Test transfer to battery operation. - Test return to utility power. - Test bypass operation. - Test UPS alarms and fault indications. • Monitoring and DCIM Setup Service - The Contractor shall configure the integrated monitoring and management system for centralized monitoring of the Micro Data Center infrastructure. - Configure the local monitoring/display interface. - Configure remote web-based management. - Configure monitoring of the UPS system. - Configure monitoring of power distribution/PDU status where supported. - Configure precision cooling monitoring. - Configure all environmental sensors. - Configure front and rear door status monitoring. - Configure access-control status and events. - Configure alarm thresholds and notification parameters. - Configure event and alarm logging. - Configure appropriate user accounts and access permissions. - Verify remote monitoring from the designated management network.	
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	- Demonstrate alarm generation and acknowledgement. • Existing IT Rack Decommissioning and IT Equipment Migration Service - The Contractor shall undertake the controlled decommissioning of the existing IT rack(s) and migration of existing Data Center equipment into the new Micro Data Center IT Racks. - This shall be treated as a controlled migration activity and shall be performed in coordination with the client. - Conduct a detailed physical and logical inventory of existing IT rack equipment. - Record equipment manufacturer/model, serial number and asset identification where applicable. - Document existing rack U-position. - Document existing power connections. - Document existing network connections. - Document network port assignments and cable destinations. - Identify equipment dependencies and interconnections. - Identify equipment requiring controlled shutdown. - Establish a migration sequence. - Obtain client approval of the migration plan before shutdown. - Perform controlled shutdown of equipment in accordance with approved procedures. - Disconnect power and network connections in a controlled and labelled manner. - Remove equipment from the existing rack using appropriate handling procedures. - Ensure that no equipment is removed, disposed of or permanently altered without prior approval. - Transport equipment safely from the existing rack to the new IT Racks. - Reconnect power according to the new power distribution design. - Reconnect network and management interfaces. - Reconnect storage, server, security and other infrastructure interconnections. - Install appropriate rack mounting hardware. - Install cable-management accessories. - Maintain appropriate power and data cable separation. - Label all migrated equipment and connections. - Verify equipment airflow orientation. - Verify adequate rack power capacity. - Verify network connectivity prior to system startup. - Power up equipment according to the approved startup sequence. - Verify hardware health and system status. - Verify network connectivity. - Verify management connectivity. - Verify storage connectivity where applicable. - Confirm that migrated equipment operates normally. - Resolve migration-related connectivity or infrastructure issues. • System Verification and Testing - The Contractor shall perform comprehensive verification and commissioning of the complete Micro Data Center environment. - Physical accessibility and maintenance clearances. - Electrical Verification	
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	- Incoming power verification. - Power distribution verification. - UPS input/output verification. - UPS load operation. - Battery operation. - Bypass operation. - PDU operation. - Cooling Verification - Cooling startup/shutdown. - Temperature control. - Airflow verification. - Cooling capacity verification. - Monitoring Verification - UPS monitoring. - Cooling monitoring. - Environmental sensors. - Door sensors. - Access-control events. - Alarm generation. - Local display. - Remote web access. - IT Infrastructure Verification - Power connectivity to migrated equipment. - Network connectivity. - Management connectivity. - Verification of migrated equipment status. - Verification of rack-level power and environmental conditions. • Documentation and Knowledge Transfer - The Contractor shall provide complete technical documentation and conduct knowledge-transfer sessions for the client's technical and facilities personnel. - Micro Data Center as-built layout. - Power distribution single-line diagram. - Rack equipment inventory. - UPS configuration and settings. - Battery configuration. - PDU configuration. - Cooling configuration. - Monitoring/DCIM configuration. - IP addressing and VLAN information where applicable. - Sensor location diagram. - Access-control configuration. - Alarm and event configuration. - Testing and commissioning reports. - Preventive maintenance recommendations. - Troubleshooting procedures. - Emergency operating procedures. - The Contractor shall conduct practical knowledge-transfer sessions covering: - Micro Data Center architecture. - Rack operation and access.	
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	- UPS operation and operating modes. - UPS battery management. - Power distribution and PDU operation. - Precision cooling operation. - Environmental monitoring. - DCIM monitoring and alarm management. - Access-control operation. - Basic troubleshooting. - Safe shutdown and startup procedures. - Preventive maintenance requirements.	
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