higher education & training
Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

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To: SUPPLY CHAIN UNIT
From: SPECIFCATION COMMITTEE
SUBJECT: Network Services and ICT Infrastructure Specification for Ehlanzeni TVET College

Objective
To procure and install enterprise-grade servers and network switches, and to implement a comprehensive server room maintenance plan, with the goal of modernizing and securing the ICT infrastructure across all 8 campuses. This initiative will support both academic and administrative operations at the college.

ITEM NUMBER	COMPLETE PRODUCT DESCRIPTION/SPECIFICATION/SCOPE OF WORK	PRODUCT QUANTITY	ESTIMATED TOTAL UNIT PRICE
1.	**Enterprise-Grade Rackmount Servers** **Use Case:** On-Premises Active Directory Domain Controller and Enterprise Application Hosting **Form Factor:** 2U Rackmount **Target Environment:** Medium to Large Enterprise Infrastructure **Quantity:** 11 Units **Technical Specifications:** • **Processor Support:** o Dual-socket configuration o Support for scalable Intel Xeon processors or equivalent o Min. 16 cores per processor, with hyper-threading support o Base clock speeds ranging from 1.8 GHz to 3.9 GHz • **Memory (RAM):** o Min. 24 DIMM slots supporting DDR4 or higher o Max memory capacity up to 3TB o ECC, Memory Mirroring, and Lockstep supported • **Storage Subsystem:** o Support for up to 12 x 3.5" or 24 x 2.5" hot-plug drives o Support for NVMe, SAS, and SATA drives o Optional hybrid storage capabilities o Hardware RAID support (RAID 0, 1, 5, 6, 10, 50, 60) • **Other Requirements:** o Redundant power supplies o Out-of-band remote management capabilities (e.g., iDRAC/iLO/IPMI equivalent) o Enterprise-grade reliability features and support for secure boot	11 Units	Standard Industry Rate
2.	**Managed Layer 3 Network Switches** **Device Type:** Managed, Stackable Layer 3 Network Switch **Form Factor:** 1U Rack-Mountable **Use Case:** Enterprise-grade access layer switch for high-density, high-throughput network environments	31 Units	
	✅ Hardware Overview **Component** | **Specification** **Total Ports** | 48 x 100M/1G/2.5G/5G/10G Multigigabit Ethernet (RJ-45)		

Uplink Ports	4 x 40G QSFP+ (via optional network module)
Stacking	Supports proprietary or standards-based stacking technology with a minimum stack bandwidth of 480 Gbps
Physical Design	1RU, standard rack-mountable with mounting kit included
Fans	Redundant, field-replaceable (FRU) variable-speed fans
Power Supplies	Dual redundant, hot-swappable power supplies supported (one included)
PoE Support	❌ *No PoE (Power over Ethernet) on this model*

✅ Performance

Feature	Specification
Switching Capacity	Up to **1.04 Tbps**
Forwarding Rate	Up to **773.8 Mpps**
MAC Address Table	Up to **32,000 entries**
VLANs Supported	Up to **4094 VLAN IDs**
Jumbo Frame Support	Up to **9198 bytes**
Latency	< 1 µs (depending on load and configuration)
DRAM	16 GB
Flash Memory	16 GB internal + 16 GB external (via USB slot)

3. All Sites

SERVER ROOM MAINTENANCE PLAN (8 CAMPUSES)

1. General Maintenance Overview

Each server room will be inspected and maintained to ensure:

- Maximum uptime and equipment longevity
- Safe and secure access
- Optimal environmental conditions
- Proper documentation and compliance

2. Asset & Documentation Management

- Maintain a full inventory of all equipment (server, switches, firewalls, UPS, etc.)
- Label and Document all equipment with:
  - **Asset Tag**
  - **Location ID** (e.g., CampusCode-RackNumber-Unit)
  - **Last Service Date**
- Keep updated network diagrams per campus

3. Cabling & Rack Management

- **a. Neat Cabling Standards**
- Use **color-coded cables** by function:
  - **Blue:** Data
  - **Red:** Critical servers
  - **Yellow:** Uplink connections
  - **Green:** Management interfaces
- Label both ends of all cables with:
  - Device name
  - Port number
  - Patch panel ID
- **b. Cable Management Tools**

	• Velcro straps (avoid zip ties) • Horizontal & vertical cable managers in racks • Label patch panels, switch ports, and racks		

	4. Environmental Control & Aircon
	• Each server room must have a **dedicated air conditioning unit**
	  o Recommended: Precision AC with humidity control
	• Quarterly **aircon servicing**:
	  o Clean filters
	  o Check refrigerant levels
	  o Inspect drainage and airflow
	• Install **temperature & humidity sensors**
	  o Alert if temp exceeds 27°C or humidity > 60%		

	5. Lighting & Power
	• Bright, **LED lighting** with motion sensors
	• Emergency lighting in case of power outage
	• UPS for each rack:
	  o Test batteries quarterly
	  o Log battery health reports		

	6. Safety & Fire Prevention • Install **fire extinguishers** (CO_2 type) in each server room • Fire alarm and smoke detectors must be tested monthly • No storage of flammable items in server rooms		
	7. Implement and Replace Access Control & Security • Limit access to authorized IT staff only • Secure door with electronic key/card access • Maintain **access logbook or digital logs**		

4.	**FIBER OPTIC CABLE IN CAMPUS/SITE BUILDINGS**
	
	Requirements for the replacement of existing damaged fiber optic cables and the installation of new fiber optic cabling within the campus/site buildings. The work includes:
	• Removal of old/damaged fiber cables (if applicable).
	• Installation of new single-mode/multi-mode fiber optic cables as per design.
	• Splicing, termination, and testing of fiber optic connections.
	• Documentation and labeling of all fiber runs.
	
	Materials & Equipment Specifications
	Fiber Optic Cable
	• **Type:** Single-mode (OS2) or Multi-mode (OM3/OM4) as per design requirements.
	• **Outdoor/Indoor Use:**
	  o Outdoor: Armored, water-blocking, UV-resistant.
	  o Indoor: Riser-rated (OFNR) or Plenum-rated (OFNP) as per building code.
	• **Connectors:** LC/UPC or SC/UPC (as per existing infrastructure).
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		Mashishing
		Mthimba
		Kanyamazane
		Mlumati
		Barberton	

5.	**Specification for New Network Points and Cabinets**
	
	1. Network Points Installation (Structured Cabling)
	• **Scope of Work**
	Installation of new network points throughout newly constructed buildings (e.g., admin blocks, labs, classrooms, libraries, offices, etc.) for data and VoIP services.
	• **Specifications**
	• **Cabling Standard**:
	  o CAT6 UTP, solid-core copper, 23 AWG
	  o Compliant with ISO/IEC 11801 and ANSI/TIA-568.2-D
	• **Cable Type**:
	  o Low-smoke zero halogen (LSZH) jacketed
	• **Cable Routing**:
	  o Routed via conduits, trunking, or cable trays as per building layout
	• **Faceplates**:
	  o Dual-port white ABS plastic faceplates with shutters
	  o Label each port with unique ID (e.g., Room#-Point#)
	• **Patch Panels**:
	  o 24/48-port CAT6 patch panels mounted in network cabinets
	• **Testing & Certification**:
	  o All links tested with Fluke DTX or equivalent
	  o Provide certified test results for each point (PASS report)
		Quantity to be confirmed after Site Inspection	

	2. Network Cabinets (Per Floor/Zone)
	• **Specifications**
	• **Cabinet Size**:
	  o 12U / 22U / 42U (depending on floor/site requirements)
	• **Form Factor**:
	  o Wall-mounted (for small areas) or free-standing (main comms rooms)
	• **Material**:
	  o Steel construction, powder-coated finish
	• **Front Door**:
	  o Tempered glass with lock
	• **Ventilation**:
	  o Fan tray with minimum 2 fans (for wall-mounted)
	  o Roof-mounted exhaust fans for 42U cabinets
	• **Cable Management**:
	  o Vertical & horizontal cable organizers
	  o Brush panels for cable entry
	• **Power Distribution**:
	  o 6-way or 8-way PDU (IEC/SA compatible)
	• **Accessories**:
	  o Shelves for equipment		

	○ Earthing kits ○ Casters (for movable 42U units)		
		Standard Industry Rate	