

PEMASANGAN SISTEM TEKNOLOGI MAKLUMAT DAN KMONUKASI  
UNTUK UNIVERSITI MALAYSIA TERENGGANU PAKEJ 2B

TECHNICAL SPECIFICATIONS - NETWORK EQUIPMENT

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**1. DISTRIBUTION SWITCH**

- 1.1. The switch shall come with min 7 modular slots, with 2 meant for redundant supervisor engine/processor and remaining 5 slots for line card module
- 1.2. The switch shall be chassis-based, mountable in standard 19" existing equipment rack. All accessories for mounting shall be supplied.
- 1.3. The switch shall support and comes 2 power supply and support for redundant, load sharing AC input power. All slots in the system can operates normally without any interruption if one of its power input lost. Proposed power supply shall able to support Power-over-Ethernet (PoE) applications such as inline power for IP phone and Wireless Access Points. All power cords shall be supplied.
- 1.4. The switch shall support redundant processor, and shall come with come with 130Gbps, 100Mpps switching fabric and switch processor with min 64MB Flash card.
- 1.5. The processor shall support full Layer 3 functionality and routing which is currently supported in UMT Local Area Network – Static, RIP, EIGRP, IS-IS and OSPF. Full Layer 3 functionality shall be performed at hardware/ASIC level, not software emulation.
- 1.6. The switch shall support minimum 100,000 routing entry.
- 1.7. The switch shall comes with min 2 10GE port to be connected to existing core switches in Bangunan Pentadbiran and Bangunan Perpustakaan. 10GE singlemode GBICs and fiber patch cords shall be included.
- 1.8. The switch shall come with 48-port 10/100/1000BaseTx line card modules.
- 1.9. The switch shall comes with 12-port Gigabit Ethernet ports GBIC-based. The port shall support GBIC-T, GBIC-LH, GBIC-SX and GBIC-LX, and the GBIC shall be interchanged without shutting down the module. The GBICs and fiber patch cords shall be included.
- 1.10. The switch line card module shall support hot-swapping without interrupting the switch services and other module switching/forwarding performance.
- 1.11. The switch shall support DHCP Server, DHCP Relay, DHCP Snooping, NAT Services and WCCP Services for transparent caching.
- 1.12. The switch shall support Access Control List per Port Level/VLAN, where it can control traffic flow based on MAC address, IP Address and protocol (TCP/UDP).
- 1.13. The switch shall support inter-switch VLAN Trunking Protocol (VTP), and shall support various modes – server, transparent and client.

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- 1.14. The switch shall support at minimum 4000 active VLANs. It shall support 802.1Q and ISL VLAN Tagging.
- 1.15. The switch shall support Spanning Tree Protocol (STP) instances up to port and VLAN level
- 1.16. The switch shall support 802.3ad link aggregation.
- 1.17. The switch shall support automatic discovery protocol where it can detect and identify neighboring connected devices.
- 1.18. The switch shall support local database, RADIUS and TACACS+ authentication for centralized control, admission, authentication and authorization.
- 1.19. The switch shall support 802.11x user authentication
- 1.20. The switch shall support IP-based network management and shall be managed via single IP address for the entire switch.
- 1.21. The switch shall come with console port for configuration and management
- 1.22. The switch shall support remote management and configuration via Telnet, SSH and WebGUI
- 1.23. The switch shall support Simple Network Management Protocol (SNMPv2) and supports existing Network Monitoring Tools – RRD/SNMP-based Network Traffic Monitoring system and CiscoWorks LAN Management System.
- 1.24. The switch shall support Network Time Protocol (NTP) Services and able to sync with existing master clock in UMT LAN
- 1.25. The switch shall be compatible with existing active equipments in UMT Local Area Network Infrastructure.

**2. ACCESS SWITCHES**

- 2.1. The switch shall be maximum 1-RU size and shall be mounted in standard 19" existing equipment rack. All accessories for mounting shall be supplied.
- 2.2. The switch shall support 110V-240V AC power supply. All power cords shall be supplied.
- 2.3. The Access switch TYPE 1 shall come with dedicated 48-port 10/100BaseTx auto-MDI, auto sensing, and dedicated 2-port 1000BaseT/SFP GBIC combo ports. The GBICs and fiber patch cords shall be included

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- 2.4. The Access switch TYPE 2 shall come with dedicated 24-port 10/100BaseTx auto-MDI, auto sensing, and dedicated 2-port 1000BaseT/SFP GBIC combo ports. The GBICs and fiber patch cords shall be included
- 2.5. The Access switch TYPE 3 shall come with dedicated 48-port 10/100BaseTx auto-MDI, auto sensing, and dedicated 2-port 10/100/1000BaseTx uplink ports.
- 2.6. The Access switch TYPE 4 shall come with dedicated 24-port 10/100BaseTx auto-MDI, auto sensing, and dedicated 2-port 10/100/1000BaseTx uplink ports.
- 2.7. The Access switch TYPE 5 shall come with dedicated 48-port 10/100BaseTx auto-MDI, auto sensing, and dedicated 4-port SFP-based GBIC ports. The GBICs and fiber patch cords shall be included. The switch shall also support Layer 3 and stack features.
- 2.8. The Access switch TYPE 6 shall come with dedicated 24-port 10/100/1000BaseTx auto-MDI, auto sensing, and dedicated 4-port SFP-based GBIC ports. The GBICs and fiber patch cords shall be included. The switch shall also support Layer 3 and stack features.
- 2.9. The switch all UTP port shall support Auto-MDI/MDI-X (Media Dependant Interface), auto sensing (duplex, speed) and able to support up to Cat6 UTP Cabling.
- 2.10. The switch shall support redundant power supply
- 2.11. The switch shall support line-rate, non-blocking packet forwarding, and comes with sufficient capacity of switching fabric to perform such operation
- 2.12. The switch shall support inter-switch VLAN Trunking Protocol (VTP), and shall support various modes – server, transparent and client.
- 2.13. The switch shall support at minimum active 250 VLANs. It shall support 802.1Q VLAN Tagging.
- 2.14. The switch shall support Spanning Tree Protocol (STP) instances up to port and VLAN level.
- 2.15. The switch shall support 802.3ad link aggregation.
- 2.16. The switch shall support automatic discovery protocol where it can detect and identify neighboring connected devices.
- 2.17. The switch shall support local database, RADIUS and TACACS+ authentication for centralized control, admission, authentication and authorization.
- 2.18. The switch shall support 802.11x user authentication

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- 2.19. The switch shall support IP-based network management and shall be managed via single IP address for the entire switch.
- 2.20. The switch shall come with console port for configuration and management
- 2.21. The switch shall support remote management and configuration via Telnet, SSH and WebGUI
- 2.22. The switch shall support Simple Network Management Protocol (SNMPv2) and supports existing Network Monitoring Tools – RRD/SNMP-based Network Traffic Monitoring system and CiscoWorks LAN Management System.
- 2.23. The switch shall support Network Time Protocol (NTP) Services and able to sync with existing master clock in UMT LAN
- 2.24. The switch shall be compatible with existing active equipments in UMT Local Area Network Infrastructure.

**3. GBICS**

- 3.1. The GBICs shall support the following features:-
  - a. 10GE over singlemode fiber, SC Connector – 2 units
  - b. 1GE over multimode fiber 50micron, SC Connector – 18 units
  - c. 1GE over singlemode fiber, SC Connector – 18 units
  - d. 1GE over multimode fiber, LC connector – 32 units
  - e. 1GE over singlemode fiber, LC connector – 7 units
- 3.2. All proposed GBICs shall come with duplex fiber patch cords, compatible with GBICs and fiber panel connector
- 3.3. The GBIC shall be compatible with proposed equipments
- 3.4. The GBIC shall be certified by proposed networking equipment's manufacturer and certified by SIRIM.
- 3.5. The GBIC shall be compatible with IEEE 802.3 standards
- 3.6. The 1GE GBIC shall be interchangeable into any 1GE port of the proposed switch

**4. WIRELESS ACCESS POINTS (AP)**

- 4.1. The AP shall comply with 802.11b, 802.11g and future support of 802.11n. The AP shall

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- obtained type approval from SIRIM – please attach the type approval with the tender submission.
- 4.2. The AP shall support existing UMT hotspot infrastructure where all client is using 802.11b/g and supports existing User Management and Subscription System
  - 4.3. The AP shall support both Lightweight Access Point Protocol (LWAPP) and autonomous Operating System.
  - 4.4. The AP radio shall be operated within 2.412Ghz to 2.472Ghz unlicensed frequencies and compatible with WiFi (Wireless Fidelity) adaptation.
  - 4.5. The AP radio (802.11b/g) shall able to be turned off and on manually and shall able to operate in 802.11b only, 802.11g only and hybrid 802.11b and 802.11g simultaneously.
  - 4.6. The AP shall support up to minimum 15 VLANs per AP, with one VLAN is reserved for management VLAN.
  - 4.7. The AP shall support multiple SSID (minimum 15 SSIDs) to allow users to be connected to different SSIDs
  - 4.8. The AP shall support dynamic VLAN associations
  - 4.9. The AP shall support 40-bit and 128-bit WEP encryption, WPA, WPA2 (personal & enterprise)
  - 4.10. The AP shall support 802.1x user-based authentication and to be connected to proposed authentication, authorization & accounting system:
    - a. EAP
    - b. PEAP
    - c. WPA and WPA-2
    - d. EAP-TLS
    - e. EAP-TTLS
    - f. LEAP
    - g. PEAP-MSCHAPv2
    - h. EAP-FAST
    - i. EAP-SIM
  - 4.11. The AP shall comes with Power Over Ethernet Injector
  - 4.12. The AP shall comes with 5dBi outdoor mast-mount antenna and antenna mounting kit
  - 4.13. The AP shall come with anti-vandalism and anti-theft bracket and shall come with common (master-key) lock.
  - 4.14. The AP shall come with lightning arrestor and low-loss cable, if necessary. The lightning

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- arrestors shall be grounded to the nearest electrical distribution box (DB).
- 4.15. The AP shall support automatic discovery protocol where it can detect and identify neighboring connected devices.
  - 4.16. The AP shall support local database, RADIUS and TACACS+ authentication for centralized control, admission, authentication and authorization.
  - 4.17. The AP shall support IP-based network management and shall be managed via single IP address for the entire switch.
  - 4.18. The AP shall come with console port for configuration and management
  - 4.19. The AP shall support remote management and configuration via Telnet, SSH and WebGUI
  - 4.20. The AP shall support Simple Network Management Protocol (SNMPv2) and supports existing Network Monitoring Tools – RRD/SNMP-based Network Traffic Monitoring system and CiscoWorks LAN Management System.
  - 4.21. The AP shall support Network Time Protocol (NTP) Services and able to sync with existing master clock in UMT LAN
  - 4.22. The AP shall be compatible with existing active equipments in UMT Local Area Network Infrastructure.

**5. INSTALLATION & SUPPORT SERVICES**

- 5.1. Bidder shall perform installation, configuration, commissioning, integration and documentation of the proposed equipments.
- 5.2. Bidder shall provide certified training of the proposed equipments by local certified training center.
- 5.3. Bidder shall provide certified personnel to perform installation of all proposed equipments. Please provide copy of certification and proof of employment with the tender submission.
- 5.4. Bidder shall be responsible in designing cell planning for AP, frequency allocation, antenna power output to ensure widest coverage and highest bandwidth throughput. Bidder shall come out with survey report and AP deployment design prior to the installation works
- 5.5. Bidder shall be responsible for any integration works required of all proposed equipments with the existing UMT Local Area Network Infrastructure to ensure all proposed equipment works seamlessly with existing infrastructure.
- 5.6. All proposed equipments shall come with minimum 1 year onsite manufacturer warranty

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- and onsite support for hardware replacement and troubleshooting.
- 5.7. All proposed equipment shall come with minimum 1 year next-business day advanced replacement warranty. Return-to-factory is not considered as advanced replacement.
- 5.8. Bidder shall provide the following support services for the proposed equipments:-
- a. minimum 1 year labor support on-site at UMT
  - b. 24 x 7 email support
  - c. 8 x 5 telephone and remote troubleshooting support
- 5.9. Bidder shall provide comprehensive documentation on system design, system setup, IP address assignment and other information for ease of management
- 5.10. Bidder shall provide complete documentation on configuration, User Acceptance Test (UAT), commissioning & operation procedure for the installed equipment(s).
- 6. Others**
- 6.1. All the equipment shall be able to co-exist and work in tandem with existing equipment ie Cisco.