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**Information Technology**

***ICTICT522 – Evaluate vendor products and equipment***

**Project Portfolio**

Resource Version: 2.0

First Published: March 2023

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| --- | --- |
| Student name: | Manuel |
| Assessor: | Richard |
| Date: | 10/10/2025 |
| Business this assessment is based on: | King Edward VII College |

Section 1: Business requirements review

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| --- | --- |
| About the business  *Provide an overview of the business and its operations and objectives.* | King Edward VII College, founded in 2010, is a Registered Training Organization (RTO) that provides training through VET courses in business and management. It provides high-quality training, following the VET Quality Framework standards.  Its mission is to provide high-quality industry training that engenders participation and achievement.  **The courses offered are (4):**   * Management * Marketing * Human Resources * International Business   **Their structure is (24 staff members):**   * 1 CEO * 1 Marketing Manager * 1 Marketing Assistant * 1 Human Resources Manager * 1 Finance Manager * 1 Administration Officer * 1 IT Manager * 1 Receptionist * 1 Academic Manager * 1 Student Services Officer * 14 trainers   **Target Market:**  All individuals (residents or foreigners) who wish to enter the industry or are already working in:   * Business * Administration   And wish to formalize or develop their skills.  **Operations:**  The college has a campus in Melbourne CBD and wants to expand to Sydney and Brisbane (6 months)  **Operational plan (3 years):**   * Upgrade current ICT system to be faster * Improve web site information * Conduct annual internal audit * Develop and implement workforce plan * Develop and implement a cultural sensitivity and awareness program for staff * Implement staff performance management review system * Identify suitable location for Sydney and Brisbane campuses * Provide information sessions showcasing the College * Fit out new campuses ready for student admissions in February * Interview staff for commencement in new campuses * Develop an on-line learning platform for all courses * Staff performance reviews * Undertake scoping study for possible offshore campus   **Operational objectives:**   1. Upgrade the current ICT system to be faster. 2. Improve website information and functionality. 3. Conduct an annual internal audit. 4. Develop and implement a workforce plan. 5. Develop and implement a cultural sensitivity and awareness program for staff (PD). 6. Implement a staff performance management review system. 7. Identify suitable locations for the Sydney and Brisbane campuses. 8. Provide face-to-face information sessions showcasing the College. 9. Fit out new campuses, ready for student admissions in February. 10. Interview and recruit staff for commencement in the new campuses. 11. Develop an online learning platform for all courses. 12. Conduct staff performance reviews (annual). 13. Undertake a scoping study for a possible offshore campus. 14. Establish two new campuses (Sydney and Brisbane). 15. Offer online blended learning. 16. Continually improve the quality of service (pre-enrolment, course delivery, and support), while remaining price competitive. 17. Focus on the provision of courses required by industry. 18. Maintain and improve effective communication channels with all stakeholders to ascertain industry requirements. 19. Consistently satisfy individual client needs while developing the knowledge and skills required by industry. 20. Target identified growth markets with planned, market-appropriate campaigns, employing a variety of promotional strategies. 21. Offer attractive fee structures (maintain price competitiveness). 22. Continually improve the skills, knowledge, and effectiveness of management and staff through a commitment to professional development (PD). 23. Regularly review the effectiveness of all our operations and make improvements where and when necessary.   **Projections**:  1. Increase enrolments of at least 10% annually  2. The hiring of human resources is projected in:   * training staff * assessment * medium * administration   according to the table in Workforce Development.  3. Review of the plan every 6 months for management to decide if human resource levels are appropriate |
| Business requirements  *Provide your own evaluation of the business’ requirements, as well as what you consider are priorities for the business.* | 1. **Business Vision & Scope**   **Current Situation**   |  |  | | --- | --- | | **Opportunities** | **Threats** | | 1. Potential for offshore delivery 2. Target market experiencing growth 3. To target other States and Territories 4. Current portfolio of courses popular in target markets 5. Potential to apply for Government funding | 1. Changes in Industry legislation affecting students 2. Possible adverse effects of government policy changes 3. High level of competition from other training providers in relation to target market plus competition for staff 4. Instances of other RTO’s bad practice creating poor perception of training providers to clients 5. Predicted uncertainties in the world economy impacting level of demand for training 6. Low price courses offered by competitors 7. Failing to satisfy clients’ demands 8. Unskilled trainers 9. Ageing workforce |   **Strategic Objectives**   1. To be a leader in vocational education and training 2. To establish and maintain high quality infrastructure supporting clients and staff 3. To be well led, high performing, profitable and accountable 4. To develop our people and resources   **Operational Objectives**   1. Upgrade the current ICT system to be faster. 2. Improve website information and functionality. 3. Conduct an annual internal audit. 4. Develop and implement a workforce plan. 5. Develop and implement a cultural sensitivity and awareness program for staff (PD). 6. Implement a staff performance management review system. 7. Identify suitable locations for the Sydney and Brisbane campuses. 8. Provide face-to-face information sessions showcasing the College. 9. Fit out new campuses, ready for student admissions in February. 10. Interview and recruit staff for commencement in the new campuses. 11. Develop an online learning platform for all courses. 12. Conduct staff performance reviews (annual). 13. Undertake a scoping study for a possible offshore campus. 14. Establish two new campuses (Sydney and Brisbane). 15. Offer online blended learning. 16. Continually improve the quality of service (pre-enrolment, course delivery, and support), while remaining price competitive. 17. Focus on the provision of courses required by industry. 18. Maintain and improve effective communication channels with all stakeholders to ascertain industry requirements. 19. Consistently satisfy individual client needs while developing the knowledge and skills required by industry. 20. Target identified growth markets with planned, market-appropriate campaigns, employing a variety of promotional strategies. 21. Offer attractive fee structures (maintain price competitiveness). 22. Continually improve the skills, knowledge, and effectiveness of management and staff through a commitment to professional development (PD). 23. Regularly review the effectiveness of all our operations and make improvements where and when necessary.   **Priority Operational Objectives**  Considering the available information and expansion plans, I think the college’s priorities are:   1. Upgrade the current ICT system to be faster 2. Improve website information and functionality 3. Develop an online learning platform for all courses   **Priorities for this project at the end of Section 1**  **Project Objectives & Scope (project Scope Fixed at the end of Section 1)**  **Scope**  In general, it involves technologically preparing the college for expansion. Since it is not specified, I will assume that the employee hardware upgrade is only for the current 24 employees. The IT infrastructure upgrade is limited to Melbourne only. Also, based on quick cost calculations, the budget is only sufficient for one of the three locations.  **Requirements**  1. Modernization of IT infrastructure (server or cloud services)  2. Remote Access (VPN or cloud services interface)  3. Improve the campus network (Wi-Fi and network)  4. Software / hardware Quality Assurance (test and trial)  5. Documentation and support  **Out of Scope**  1. Website building  **Constraints**  1. Budget: $15,000  2. Time: 6 months  **Risk Management**   |  |  | | --- | --- | | **Risk** | **Australian government changing policy in relation to industry** | | 1. Accepting policy change will be a constant factor to manage 2. An understanding of this should be instilled in all staff 3. Develop ability to foresee and react quickly to change 4. Maintain effective communication channels with stakeholders 5. Diversification of source markets 6. Develop product range | | | Related to Strategic Objectives: All  Responsibility: CEO & Administration Manager | |  |  |  | | --- | --- | | **Risk** | **Significant drop in cash flow** | | 1. Identify operating costs as per future plans and past performance 2. Identify available finance 3. Efficient invoicing and debt recovery 4. Accurate income projections 5. Close monitoring of expenditure 6. Arrange overdraft facilities 7. Scenario planning | | | Related to Strategic Objectives: All  Responsibility: CEO & Administration Manager | | | **Risk** | **Failure to recruit planned number of clients** | | 1. High quality delivery of all services 2. Swift reaction to feedback 3. Skilled, motivated staff 4. Attractive fee structures 5. Effective market research 6. Allocate finance for each market 7. Monitor performance 8. Take early corrective action if not meeting targets or expectations 9. Maintaining effective relationships with clients 10. Maintaining effective communication channels with all stakeholders | | | Related to Strategic Objectives: 1, 2, 3  Responsibility: CEO | |  |  |  | | --- | --- | | **Risk** | **The world recession and the domino effect** | | 1. Diversification of source markets 2. Target markets with strong growth forecasted 3. Monitor the economic trends 4. Regularly review performance in line with anticipated market conditions 5. Develop culture of accepting continual change 6. React quickly to change 7. Scenario planning 8. Maintaining effective communication channels with all stakeholders | | | Related to Strategic Objectives: 1, 3  Responsibility:CEO | |  |  |  | | --- | --- | | **Risk** | **Over committing resources** | | 1. Balance activities with the amount of finance available for investment 2. Financial planning 3. ICT systems 4. Monitoring of cash flow 5. Review invoicing and debt recovery system 6. Swift response to identified issues 7. Accessing financial advice | | | Related to Strategic Objectives: 1, 3  Responsibility:CEO & Administration Manager | |  |  |  | | --- | --- | | **Risk** | **Adverse changes in market conditions** | | 1. Effective communication channels 2. Continuous market research 3. Monitor new markets and overall recruitments trends for all market segments 4. Scenario planning 5. Develop working knowledge of potential markets 6. Networking 7. Maintaining effective communication channels with all stakeholders | | | Related to Strategic Objectives: 1, 2, 3  Responsibility:CEO | |  |  |  | | --- | --- | | **Risk** | **Changes to relevant legislation** | | 1. Emphasis on professional, ethical practices with all stakeholders 2. Staff training 3. Leading by example 4. Policy implementation and monitoring 5. Effective communication channels with all stakeholders 6. Ability to manage change 7. Managing available finance for re-investment | | | Related to Strategic Objectives: All  Responsibility:CEO | |  |  |  | | --- | --- | | **Risk** | **Shortage of, and difficulty in recruiting, appropriate qualified, skilled trainers and assessors and other key staff** | | 1. Development of workforce plan 2. Offer attractive salary packages, including full-time contracts to trainers and assessors 3. Development of further HR policies and procedures 4. Provide opportunities for career progression 5. Develop stimulating and enjoyable working environments 6. Commitment to training and development 7. Commitment to professional development 8. Succession planning to deal with ageing workforce | | | Related to Strategic Objectives: 1 & 4  Responsibility**:** CEO | |  |  |  | | --- | --- | | **Risk** | **Failure to meet and manage client’s expectations** | | 1. Accurate and timely communication with potential and current clients 2. Management of recruitment activities 3. Up to date ICT system 4. Continuous improvement system 5. Regularly review learning and teaching approaches, resources, structure and systems 6. Client management policies in academic and support services 7. Industry liaison 8. Reviewing effectiveness of communication channels with clients 9. Employing a continuous improvement approach to all operations 10. Continuous market research and action 11. Systematic feedback on management performance and personal reflection | | | Related to Strategic Objectives: All  Responsibility**:** CEO & Administration Manager | |  |  |  | | --- | --- | | **Risk** | **Failure to comply with legislation** | | 1. Consistently implement compliant policies and procedures 2. Continuous improvement system 3. Commitment to training and development 4. Systematic review of policies and procedures 5. Regular reviews of all operations | | | Related to Strategic Objectives: All  Responsibility: CEO & Administration Manager | |  |  |  | | --- | --- | | **Risk** | **Competitors undercutting prices** | | 1. Maintain competitive pricing policy 2. Monitor competitors’ prices and quality 3. Regularly review financial management models and processes 4. Continue focusing on quality 5. Continue strategy of quality brand promotion | | | Related to Strategic Objectives: All  Responsibility: CEO | |  |  |  | | --- | --- | | **Risk** | **Failure to control expenditure** | | 1. Effective financial planning and review 2. Co-ordination of activities 3. Systematic review of practice 4. Financial management and control systems 5. Facilities management 6. Implementation of efficient processes 7. Efficient procurement of products and services 8. Cost comparisons prior to purchasing | | | Related to Strategic Objectives: 1, 2, 3  Responsibility:CEO & Administration Manager | |  |  |  | | --- | --- | | **Risk** | **Only providing business and management courses** | | 1. Weighing the relative advantages of diversification and specialisation 2. Monitor recruitment trends in the market 3. Forecasting 4. Match new and planned courses to market demand 5. Cost benefit analysis 6. Developing reputation for being a specialist in business and management courses 7. Developing market share for delivery of business and management courses | | | Related to Strategic Objectives: 1  Responsibility:CEO | |  |  |  | | --- | --- | | **Risk** | **Ineffective planning** | | 1. Experienced management team 2. Continuous market research 3. Planning system 4. Organisation structure and systems 5. Regular review of structure, systems and procedures 6. External liaison 7. Maintaining effective communication channels with all stakeholders | | | Related to Strategic Objectives: All  Responsibility:CEO & Administration Manager | | | **Risk** | **Non-payment of course fees** | | 1. Effective recruitment policies 2. Review of recruitment policies and market segments 3. Efficient invoicing 4. Attractive payment structures 5. Payment plans 6. Cash flow management 7. Timing of collecting fees | | | Related to Strategic Objectives: 4  Responsibility:CEO & Administration Manager | |  |  |  | | --- | --- | | **Risk** | **Rate of growth in client numbers** | | 1. Systematic review of systems and practice 2. Buying in knowledge and skills 3. Sourcing reliable market information 4. Strategic and operational planning 5. Review and, if indicated, amend management structure 6. Develop policies and procedures 7. Regular reviews of capacity and operation of all functional and curriculum areas 8. Good communication channels with stakeholders 9. Recruitment policy 10. Finance available for expansion | | | Related to Strategic Objectives: 1, 3 & 4  Responsibility: CEO & Administration Manager | |  |  |  | | --- | --- | | **Risk** | **Unethical or unprofessional practices of staff (when employed)** | | 1. Staff selection processes 2. Staff monitoring systems 3. Previous experience of managing staff 4. Swift reaction to feedback 5. Termination of agreements 6. Maintain currency of market recruitment trends 7. Maintain relationships with HR organisations | | | Related to Strategic Objectives: All  Responsibility: CEO & Administration Manager | |  |  |  | | --- | --- | | **Risk** | **Small staff team** | | 1. Identify and source potential casual staff to call on in times of sickness and holidays 2. Planning for holidays and leave 3. Maintain relationships with HR organisations 4. Offer incentivised pay structure for casual staff | | | Related to Strategic Objectives: All  Responsibility: CEO & Administration Manager | |  1. Stakeholders  |  | | --- | | **Stakeholders** | | CEO | | Marketing Manager | | Marketing Assistant | | Human Resources Manager | | Finance Manager | | Administration Officer | | IT Manager | | Receptionist | | Academic Manager | | Student Services Officer | | trainers | | Students | | IT Manager |  1. Functional Requirements & Non-Functional requirements  |  |  |  |  | | --- | --- | --- | --- | | **Scope** | **Requirement** | **Type** | **Description** | | 1. Modernisation of IT Infrastructure | Storage Scalability | Functional | The system must allow the storage space (from 2.5 TB onwards) to be increased or decreased quickly and seamlessly, based on campus requirements. | | Workload Processing | Functional | The server or cloud service must support the critical campus applications (LMS, student management system, and databases) with a response time under 2 seconds during peak periods. | | Backup Mechanisms | Functional | The system must execute automatic, daily backups of all critical data (2.5 TB) with a retention period of at least 30 days. | | Uptime Guarantee | Non-Functional | The infrastructure must guarantee a minimum availability of 99.9% (Tier 3 or cloud equivalent). | | Server Latency | Non-Functional | Latency between the main campus and the server must be under 50 ms to ensure a smooth user experience. | | Data Security | Non-Functional | The infrastructure must implement encryption-at-rest and in-transit (AES-256) to protect all student and staff data. | | 2. Remote Access | Internal Resource Access | Functional | Authorised users (staff and faculty) must be able to access internal network resources (shared drives, LMS) from remote locations using their standard network credentials. | | Multi-Platform Support | Functional | The remote access service must be compatible with common operating systems (Windows, macOS, iOS, and Android). | | Multi-Factor Authentication (MFA) | Non-Functional | The remote access system (VPN or portal) must require and enforce Multi-Factor Authentication (MFA) for all external connections. | | Connection Performance | Non-Functional | The remote connection must offer a minimum transfer speed of 5 Mbps per concurrent user to handle document and video downloads. | | Tunnel Encryption | Non-Functional | The remote communication tunnel must utilise robust encryption protocols (e.g., IKEv2/IPsec or TLS 1.3). | | 3. Campus Network Improvement (Wi-Fi and Network) | Wireless Coverage | Functional | The Wi-Fi network must provide full and continuous coverage in 100% of all teaching, administrative, and common areas on each campus. | | Network Segmentation | Functional | The network must enable the creation of Virtual Local Area Networks (VLANs) to separate student, administrative staff, and IoT device traffic. | | User Density | Non-Functional | Access Points (APs) must be capable of supporting a minimum of 50 simultaneously connected devices per classroom without service degradation. | | Speed Standard | Non-Functional | The Wi-Fi network must operate on the Wi-Fi 6 (802.11ax) standard or newer, and the wired network must be Gigabit Ethernet (1 Gbps). | | Centralised Management | Non-Functional | All network devices (APs, switches, and firewalls) must be manageable from a single, centralised administration console. | | 4. Software / Hardware Quality Assurance | Testing and Trial Plan | Functional | First, trial the products and then make a comprehensive Quality Assurance (QA) plan must be developed and executed, covering functionality, load, and security for all new systems prior to production deployment. | | Hardware Vetting | Functional | All enterprise laptop models (Core i5/Ryzen 5) must undergo a pilot trial with at least 10 end-users for 2 weeks before bulk purchasing. | | Solution Availability | Non-Functional | New systems must be tested to ensure 100% availability during operating hours (8:00 am to 6:00 pm). | | Acceptable Performance | Non-Functional | The new hardware/software must meet the defined Key Performance Indicators (KPIs), such as laptop login time (under 30 seconds). | | Error Handling | Non-Functional | Systems must log and handle errors gracefully, providing clear notifications for technical support and preventing user data loss. | | 5. Documentation and Support | Technical Documentation Creation | Functional | Complete documentation must be generated and delivered, including network diagrams, server/cloud configuration manuals, and Disaster Recovery Procedures (DRP). | | User Manual Generation | Functional | Simple, accessible user manuals must be created for staff on using remote access and connecting to the new Wi-Fi network. | | Service Level Agreement (SLA) | Non-Functional | The support team must respond to critical failures (total network or server loss) within a timeframe not exceeding 15 minutes (SLA). | | Knowledge Base | Non-Functional | An internal knowledge base with common troubleshooting guides must be established for the support team. | | Staff Training | Non-Functional | Campus IT staff must be trained in the administration and support of the new network infrastructure and cloud services. | |
| Conflicts and overlaps  *Based on the information you have about the business identify both conflicting and overlapping business requirements. Give at least one example of each.* | |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | **Conflict: Requirement vs Requirement** | 1 | 2 | 3 | 4 | 5 | | 1 | - | **X** | **X** | **X** | - | | 2 | - | - | - | **X** | - | | 3 | **-** | - | - | - | - | | 4 | **-** | **-** | - | - | - | | 5 | - | - | - | - | - |  1. *Modernization IT - 2. Remote Access - 3. Improve Network - 4. Quality Assurance - 5. Documentation & Support*   **Conflicts:**   * 1 vs. 3: Carrying out both projects at the same time is a very ambitious task; in terms of time and budget, it is not possible to complete them in 6 months. * 1 vs. 2: The selection of remote access technology cannot begin until it is determined whether an on-premise server or cloud services will be used, which will affect the activity schedule. * 1 vs. 4: Conducting proof of concepts and trials for all products is very time-consuming. Therefore, the purchase and testing of devices/software/services will be delayed, and this phase cannot begin until the client is satisfied with the trial. * 2 vs 4: Conducting proof of concepts and trials for all remote access services is very time-consuming. Therefore, licensing and testing of devices/software/services will be delayed. |

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| Budget and resources  *Describe the budget and resources available for the project. If you are completing the case study business, identify this information from the simulation pack. If this is your own business, you will need to confirm this information and record it here.* | |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | **Overlapping: Requirement vs Requirement** | 1 | 2 | 3 | 4 | 5 | | 1 | - | **X** | - | - | **X** | | 2 | - | - | - | - | **X** | | 3 | - | - | - | **X** | - | | 4 | - | - | - | - | - | | 5 | - | - | - | - | - |  1. *Modernization IT - 2. Remote Access - 3. Improve Network - 4. Quality Assurance - 5. Documentation & Support*  * 1 vs 2: If cloud services are used, remote access methods such as VPNs are not necessary. * 1 vs 5: Product/service documentation should be provided by each provider's support team as well as our team. * 2 vs 5: Product/service documentation should be provided by each provider's support team as well as our team. * 3 vs 4: Performing network performance tests can negatively impact campus signal statistics and cloud service access tests.   **MoSCoW Matrix**   |  |  |  |  | | --- | --- | --- | --- | | **Must Have** | **Should Have** | **Could Have** | **Won’t have** | | Software / hardware Quality Assurance (test and trial) | Documentation and support | Modernization of IT infrastructure based on promise-server | Improve the campus network, replacing all current infrastructure | | - | Improve the campus network, upgrading current hotspots | Remote Access by VPN | - | | - | Remote Access by cloud services interface | - | - | | - | Modernization of IT infrastructure based on cloud-services | - | - |   **Resources: Available & Needed**  The following resources are available for the project. The following resources will be reused. Basically, all employee devices will be maintained, and only the necessary ones will be purchased.  Resourves Available   |  |  |  | | --- | --- | --- | | **Item** | **Quantity** | **Type** | | Router enterprise | 1 | Hardware | | Computer PC | 24 | Hardware | | Computer monitor | 24 | Hardware | | Router enterprise | 1 | Hardware | | Server | 1 | Hardware | | Switch L2 | 1 | Hardware | | Cables | Bundle | Hardware | | Wi-Fi Modem | 2 | Hardware | | Windows 7 pro | No information | Software | | Office 2010 Pro | 24 | Software |   Resources Needed   |  |  |  | | --- | --- | --- | | **Item** | **Quantity** | **Type** | | ISP Services | 1 | Service | | Cables cat 6a | Bundle | Hardware | | Switch L2 x48 ports | 1 | Hardware | | Switch L2 x 24 ports | 2 | Hardware | | AP | 4 | Hardware | | Linux DHCP server | 1 | Software | | Cloud Data Service | 1 | Service | | Cloud Backup service | 1 | Service | | Cloud Users Account | 25 | Service | | Cloud Office Suite Licences | 25 | Service |   **Fixed Project Objectives & Scope**  **Priorities for this project**  Due to the limitations seen in the conflict, overlap and MoSCoW matrices, the scope of the project will be limited based on priorities.  **Scope**  The project will focus on providing the college with the necessary infrastructure for its expansion plans, as well as meeting its requirement to test and trial all hardware before and after purchase.  By using Cloud technologies, the use of VPNs and all additional security measures is avoided, which drastically reduces testing time, and the budget will be allocated to IT Modernization and testing.  **Requirements**  1. Modernization of IT infrastructure: Using cloud technology to move current infrastructure to cloud-based technologies. Migration of current data to Cloud solutions  2. Remote Access: Provide access to business applications via the Internet while meeting functional requirements.  3. Improve the campus network: Improve campus Wi-Fi coverage, speed, and reliability by upgrading current hardware to higher-performance wireless technology and adding more wireless access points across campus.  4. Software / hardware Quality Assurance: Request trail of products and services then perform unit testing on each hardware unit, run diagnostic tests for faults, perform integration testing, perform connectivity testing, perform performance testing, and perform load testing.  5. Documentation and support: Provide documentation for all purchased hardware, software, and services. Provide quick-help manuals, contact information, and warranty and technical support information from the hardware/software/cloud service manufacturers.  **Out of Scope**  1. Website building  2. Migrating current business applications to the new cloud services  3. Any type of configuration on the Desktops  **Constraints**  1. Budget: $15,000  2. Time: 6 months  3. Test and trial all new software/hardware/service  **Work Breakdown**   1. **Market and Product Research** 1.1 Market research for hardware, software, and cloud services 1.2 Evaluation of vendors and proposed solutions 1.3 Vendor trial schedule and product demonstrations 2. **Modernization of IT Infrastructure** 2.1 Assessment of current on-premises infrastructure 2.2 Migration planning to cloud-based technologies 2.3 Data migration to selected Cloud solutions 2.4 Validation of cloud environment performance and security 2.5 Post-migration review and optimization 3. **Remote Access** 3.1 Role configuration 3.2 User configuration 3.3 Security settings 3.4 Assigning user accounts to employees 4. **Campus Network Improvement (Wi-Fi and Network)** 4.1 Network assessment and coverage analysis 4.2 Upgrade of existing network hardware to high-performance wireless technology 4.3 Installation of additional wireless access points across campus 4.4 Network optimization, speed testing, and reliability validation 4.5 Performance monitoring and fault management 5. **Software / Hardware Quality Assurance** 5.1 Product trial and initial inspection of hardware/software units 5.2 Unit testing and diagnostic fault analysis 5.3 Integration and connectivity testing 5.4 Performance and load testing 5.5 Documentation of test results and corrective actions 6. **Documentation and Support** 6.1 Compilation of documentation for all purchased hardware, software, and cloud services 6.2 Development of quick-help manuals and support guides 6.3 Inclusion of manufacturer contact, warranty, and technical support information 6.4 Establishment of centralized documentation repository |

Section 2: Identifying, testing and evaluating vendor products and equipment

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| Vendor products and equipment  *Describe the products/equipment that you believe could meet the business’ needs. Then document your research about potential vendor products and equipment.*  *You should identify a minimum of two possible vendors for each of the products/equipment you have identified as relevant to the business’ needs.*  *Include the technical details to clearly articulate the alternatives to the business.*  *Also include costs.*  *Also include screenshots of the details on the vendors website.* | **Desired products and services**  My estimates show that in one year, with a 10% increase in enrolment (currently 500), considering the maximum number of staff members needed (12), there would be around 600 people on campus. Therefore, the college's Wi-Fi network could easily support everyone on its premises for at least the first year.  Due to budget constraints, it is more cost-effective to look for a high-speed business ISP plan; this will save on installation costs.  The network configuration will be:     |  |  |  | | --- | --- | --- | | **Item** | **Description** | **Why?** | | ISP business plan | - Plan designed for businesses - 24/7 support - Upgrade or downgrade your contracted internet speed with one click | - Purchase a business internet plan with the most basic recommended configuration, using your own router, and upgrade the ISP plan as needed. - Purchasing a business internet plan is more appropriate for this client, as their expansion plans include using cloud technologies and multiple locations, so no on-premise service would be necessary. - An ISP can easily scale the college's network capacity and speed with the right router. - helps troubleshoot network stability issues | | Switch | - Support for 24 devices - Minimum speed support of 1 Gbps | - Purchasing another switch increases the connection capacity with Wi-Fi modems - To balance the hardware - Increases the number of available connections per network | | Router | - High-volume devices - At least 200 simultaneous sessions - Minimum speed of 1 Gbps - Supports Fiber optic, coaxial, and hybrid technologies - Designed for reliability | - Purchasing a high-capacity business router gives the college network the ability to support a large number of connected devices and simultaneous sessions. - Ability to scale quickly, simply changing the internet plan. - Built-in firewall and packet verification provide additional protection for the college network. | | Wi-Fi Modem | - Supports dual-band 2.5GHz and 5GHz - Supports Wi-Fi 6 - Supports at least 15 devices - Supports a minimum speed of 1Gbps | - They provide Wi-Fi internet coverage - With multiple Wi-Fi modems, you can better balance the network load, with a maximum of 15 devices per device - The network configuration allows for rapid scaling simply by adding more Wi-Fi modems - helps troubleshoot network stability issues | | Cables | - supports at least 1 Gbps  - provides shielded cable  - UTP cat 5e  - UTP cat 6a | - Minimum cabling recommended to avoid interference - Offers good performance - Its cost is relatively low | | Cloud Data Service | X | Not necessary, the college uses office suite software | | Cloud Backup service | - Scheduled backups of all data - Automatic document backups - Backups per user account - File restoration | - Maintains all data - Most cloud providers have automatic backup solutions - Allows for quick recovery of information | | Cloud Users Account | - Individual user accounts - Permissions by roles and groups - Account recovery - Secure connection methods - Data encryption methods - Two-factor login | - Multiple user accounts allow you to apply roles to each one - Data encryption, secure connection, and two-factor login are already included by default | | Cloud Office Suite Licences | - Excel, PowerPoint, and Word online - Automatic backups - Document versioning - Recovery of previous versions - Collaborative work - Offline work | - Allows you to work with cloud office software from anywhere at any time - Documents and information will always be in their latest version by default - Collaborative work is an important feature for the college's expansion plans - Reduces the local load on the device when used over the internet - Technically, it is supported by any device with internet access |   **Vendor And Product Analysis**  Due to the implementation of cloud services includes the entire infrastructure for user management and security, a single table will be displayed with the provider analysis for 1. Modernization of IT Infrastructure and 2. Remote Access.  I've divided the vendors and their products into three categories for the analysis. Each relates to the project's requirements as follows:   |  |  |  |  | | --- | --- | --- | --- | | Requirements / Vendor Analysis | **1. Cloud Services** | **2. ISP-Vendors** | **3. HW-Network-Vendors** | | **1. Modernisation of IT Infrastructure** | Cloud vendors related to infrastructure modernization as well as all user management and security | x | x | | **2. Remote Access** | X | X | | **3. Campus Network Improvement (Wi-Fi and Network)** | x | ISP related to internet service for the improvement of campus internet service | Vendors and products related to hardware for improving the internet network on campus | | **4. Software / Hardware Quality Assurance** | X | X | X | | **5. Documentation and Support** | X | X | X |  * 1. **CLOUD-SERVICES**  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | **VENDOR** | **Product** | **Licencing** | **Max users** |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | **Google** | Google Workspace for Business (Plus) | user / month / year | 300 |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | **Microsoft** | Microsoft 365 for Business (Basic) + Office 365 Extra File Storage | user / month / year | 300 |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | **VENDOR** | **Business Storage** | **User & Rol Scheme** | **Cloud Backup service** | **Cloud Office Suite Licences** | **User Activity and Access Logs** | **Account recovery** | **Secure connection methods** | **Data encryption methods** | **Automatic Backups** | **Document versioning** | **Recovery of previous versions** | **Collaborative work** | **Offline work** | **Format compatibility** | **Admin Panel** | **AI Aplicactions** | **Communication Apps** | | **Google** | 125TB (5TB/user) | advanced Role-Based Access Control (RBAC) | Google Vault  A third-party solution is needed for daily point-in-time backups | Included full suite web-based applications | Security Centre  investigation tools  security health page | Admin Console | TLS Client-side encryption | Advanced Encryption Standard (AES) Client-side encryption | Google Vault  automatic data redundancy  A third-party tool is needed for point-in-time backups | Automatic | version history | Real-time  multi-user collaboration | offline access | Microsoft Office file formats | cloud-based management interface | Gemini AI assistant | own email-domain .com gmail meet chat calendar contacts | | **Microsoft** | 5TB 1TB (base)+ 0.25TB (0.1TB/user)+ 3.75TB (add-on) | Microsoft Entra ID ( Azure Active Directory)  role-based access control (RBAC) | 30-day retention  Backup service pay-as-you-go service | Access to web and mobile versions of Office apps Word, Excel, PowerPoint | Microsoft 365 Compliance Center  Entra ID audit logs. | Microsoft Entra ID | HTTPS web services  TLS Cliente-server encryption | Data centers: AES-256  In transit: TLS and SSL | OneDrive and SharePoint  automatic data redundancy | Automatic | version history | Real-time co-authoring and simultaneous editing via Office web | NO, browser-based only | Microsoft Office file formats | Microsoft 365 Admin Center | Microsoft Editor (grammar, spelling, and style suggestions) | own email-domain .com outlook teams  calendar contacts | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | **VENDOR** | **Price / License per year (25 users)** | **upload speed** | **download speed** | **simultaneous sessions** | **Local Suport** | **International Support** | **Fees for support** | **Quality rewied for other clients** | **Services after sale** | **Trial and demo** | **promotions and discounts** | **Provider recognized in the market** | **Contract Term and Exit Fees** |  |  |  |  | | **Google** | $5,940 | not capped | not capped | 100 | No   24/7 phone, email, and chat | 24/7 phone, email, and chat | $0 | 99.9% SLA | customer onboarding support, domain verification assistance, licence management | 14-day trial | 30% off for 3 months  16% with one-year commitment  25% firs years with Visa | An office suite that's more than sufficient for cloud-focused businesses.  Great price-to-storage ratio.  Integration with third-party apps is excellent.  More than sufficient for small and medium-sized businesses. | Annual cancellation  No fees |  |  |  |  | | **Microsoft** | $4,196.5 yr  $3,249 (base) + $937.5 | not capped | not capped | not specified | local Australian Microsoft support centres  business hours by phone | 24/7 phone, email, and chat | Premium Support Plans are optional and billed | 99.9% SLA | feature enhancements | 1-month | 5% with one-year commitment | Aditional service extremly expensive  Very good experience in medium-sized/large companies.  Integration services with Office, windows and Azure are excellent. | Annual cancellation  No fees |  |  |  |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  | Google Workspace for Business (Plus) | $5,940 | $2,970 | 6 MONTHS |  |  |  |  |  |  |  |  |  |  |  |  |  | | **TOTAL COST** | **$2,970** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  * 1. **ISP-Vendors**  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | **VENDOR** | **Product** | **Contract Terms** | **Price** | **Bandwidth** | **Core Technology Type** | **router compatibility protocols** | **Service Scalability** | **Guaranteed Uptime Percentage** | **Business Support** | **Network Redundancy and Failover Capabilities** | **Trial and demo** | **promotions and discounts** | **Provider recognized in the market** | **Contract Term and Exit Fees** | **Standards** | | **Tesltra** | Business Pro Ultrafast nbn | monthly | $175 | 815 Mbps / 320 Mbps | nbn FTTP HFC | VoIP FTTN FTTB VDSL2 WAN port VLAN Tagging PPPoE/DHCP 1000BaseLX | Upgrade to enterprise plan  Downgrade to smaller business plan | 99.9% | Monday to Friday 8am - 7pm AEST  Call Book an appoiment Multilingual service | Response: 1h  Target: 6h | No | $40 off for 6 months  $240 off over 6 months | Reliable service, fast support  The cost of service is considerably higher | cancel before minimum term ends  No fees | AS/CA S008:2020 Requirements for Customer Cabling Products | | **Optus** | Business nbn Ultimate | monthly | $159 | 800 Mbps / 320 Mbps | nbn FTTP | DHCP/PPPoE FTTN / FTTB VDSL2 WAN port SRA: SOC / ROC | Upgrade to enterprise plan  Downgrade to smaller business plan | 99.9% | in-person  24/7 phone, webchat | 4h | No | No | Low prices, good service  The service is unreliable  Good speeds  Data breach scandals, cyberattacks, and bad practices tarnish the company's name | cancel before minimum term ends  No fees | AS/CA S008:2020 Requirements for Customer Cabling Products | | **Telstra** | Telstra business nbn Enterprise Ethernet | 12 / 24 / 36 months | $420 | 1000 Mbps / 1000 Mbps | nbn FTTP | VoIP FTTN FTTB VDSL2 VLAN Tagging PPPoE/DHCP 1000BaseLX | Contact Business support | 99.95% | Monday to Friday 8am - 7pm AEST  Call Book an appoiment Multilingual service | Response: 1h  Target: 6h | No | No | 90% of large businesses use Telstra Enterprise  Reliable service, fast support  The cost of service is considerably higher | 36 month minimum spend agreement charge up to $5,900 | AS/CA S008:2020 Requirements for Customer Cabling Products | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  | Telstra business nbn Enterprise Ethernet | $420 | $2,520 | 6 MOTHS |  |  |  |  |  |  |  |  |  |  |  | | **TOTAL COST** |  | **$2,520** |  |  |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  * 1. **HW-Network-Venders**   All internet plans offered by ISPs provide the necessary hardware to connect to the internet, so a router is not necessary.   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | **VENDOR - Switch** | **Product** | **Price** | **L2/L3 Managed Capability** | **Port Density & Speed** | **Standards Compliance** | **Backplane / throughput** | **Uplink Ports (SFP/SFP+ / Fibre)** | **VLAN Support & Port Isolation** | **Quality of Service (QoS)** | **Remote Management & Monitoring** | **Enterprise-Grade Security Features** | **Power over Ethernet (PoE/PoE+) Support** | **Firmware Updates & Long-Term Support** | **Warranty & After-Sales Support** | **Trial or Demo Availability** | **Market Recognition & Reviews** | | **UniFi** | **USW-Pro-48-POE** | $2,349 | Layer 3 Management PoE+ | (40) GbE, 802.3at PoE+ RJ45 ports (8) GbE, 802.3bt PoE++ RJ45 ports (4) 10G SFP+ ports  IEEE 802.1p, RFC 2474, algoritmos WRR/SPQ | CE, FCC, IC  IEEE 802.3ae, IEEE 802.3z, SFP+ MSA  RFC 791, RFC 4293, IEEE 802.1X  ACMA Technical Standards, AS/NZS 3080, AS/NZS ISO/IEC 27001/27002 | Total Non-Blocking Throughput 88 Gbps  Switching Capacity 176 Gbps  Forwarding Rate 130.944 Mpps | (4) 1/10G SFP+ Ethernet Ports | 1000, Access Lists IPv4 MAC | IEEE 802.1p / DSCP / WRR / SPQ | Web UI, SSH, HTTPS API   Real-time, email, syslog export   TLS 1.2+, SSHv2, RBAC, RADIUS/802.1X | 802.1X, MAC Auth Bypass, Guest VLAN DHCP Snooping, DAI, IPSG, BPDU Guard, Port Security VLANs, PVLANs, ACLs HTTPS, SSHv2, RBAC, 2FA Signed updates, rollback Syslog, SNMPv3, Event Alerts | 600w   40 PoE+ 8 PoE++ | No found | 2 years | No | The capabilities of some L3 switch models are not sufficient to qualify as L3.  The network devices are reliable.  Reviews on retail sites are very positive. | | **UniFi** | **USW-Pro-24-POE** | $1,479 | Layer 3 Management PoE+ | (24) 10/100/1000 RJ45 Ports (2) 1/10G SFP+ Ethernet Ports | CE, FCC, IC  IEEE 802.3ae, IEEE 802.3z, SFP+ MSA  RFC 791, RFC 4293, IEEE 802.1X  ACMA Technical Standards, AS/NZS 3080, AS/NZS ISO/IEC 27001/27002 | Total Non-Blocking Throughput 44 Gbps  Switching Capacity 88 Gbps  Forwarding Rate 65.472 Mpps | (2) 1/10G SFP+ Ethernet Ports | 1000, Access Lists IPv4 MAC | IEEE 802.1p, DSCP, WRR, SPQ | Web UI, SSH, HTTPS API   Real-time, email, syslog export   TLS 1.2+, SSHv2, RBAC, RADIUS/802.1X | 802.1X, MAC Auth Bypass, Guest VLAN DHCP Snooping, DAI, IPSG, BPDU Guard, Port Security VLANs, PVLANs, ACLs HTTPS, SSHv2, RBAC, 2FA Signed updates, rollback Syslog, SNMPv3, Event Alerts | 600w   16 PoE+ 8 PoE++ | No found | 2 years | No | The capabilities of some L3 switch models are not sufficient to qualify as L3.  The network devices are reliable.  Reviews on retail sites are very positive. | | **Cisco** | **Cisco Business 350 Series CBS350-24S-4G** | $1,765.61 | L3 | 24 x Gigabit SFP + 2 x Combo Gigabit Ethernet/Gigabit SFP + 2 x Gigabit SFP (Uplink) | ISO 14001, ISO 9001, RoHS, REACH, CE, FCC  IEEE 802.3ab, 802.3z, 802.3ae, SFP/SFP+ MSA  IEEE 802.1X, IEEE 802.1D/802.1Q, RFC 4293   RFC 791, RFC 4293 RFC 2131, RFC 3118  ACMA Technical Standards, AS/NZS 3080, AS/CA S009, AS/NZS ISO/IEC 27001/27002, AS/CA S008 | Switching Capacity  6 Gbps  Forwarding Rate 41.66 Mpps | 2 x Gigabit Ethernet combo + 2 SFP | 256 | 802.1X Control  MAC-Based ACLs & Device Isolation  IP-Based ACLs & Network Isolation  DHCP Snooping & Guarding  MAC Address Blocking  MAC-Based Port Restriction | Cisco Business Dashboard and mobile app; on-device UI, CLI, and SNMP | 802.1X authentication, ACLs, DoS protection, MAC-based access control, SNMPv3 | NO | End of Support Life: October 31, 2029 | 1 year, Enhanced limited lifetime warranty | No | Reputation and market recognition  At the forefront of technology  Specialized technical support  Long-lasting products  More expensive than other options on the market | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | **VENDOR - Access Point** | **Product** | **Price** | **Wi-Fi Standard & Radio Specs** | **Maximum Concurrent Clients / Session Capacity** | **Throughput / Data Rate** | **Multiple SSID & VLAN Mapping** | **Security & Authentication** | **QoS & Traffic Management** | **PoE Support** | **Remote Management & Monitoring** | **Firmware Updates & Patch Support** | **Scalability & Roaming Support** | **Warranty & After-Sales Business Support** | **Trial or Demo Availability** | **Market Recognition & Client Reviews** | **Standards** | | **TP-Link Omada** | **tp link omada ax3000** | $199 | Wi-Fi 6 (802.11ax), Dual-Band: 2.4 GHz (574 Mbps), 5 GHz (2402 Mbps) | 256 | Total 2976 Mbps (574 Mbps on 2.4 GHz + 2402 Mbps on 5 GHz) | Supports up to 16 SSIDs, VLAN tagging, and seamless roaming | WPA3, WPA2, WPA, 802.1X RADIUS, PPSK, MAC filtering, HTTPS management | OFDMA, MU-MIMO, Airtime Fairness, Band Steering, Load Balancing | 802.3bt PoE++ | Omada SDN Cloud Controller, Omada App, Web UI | Automatic updates | scalable deployment | 5 years | No | The software often crashes and requires constant reboots to recognize devices. User rating: Good | IEEE 802.11ax, 802.11ac/n, 802.11v/k/r, IEEE 802.1X, IEEE 802.1Q, WPA3/2/1, HTTPS/TLS  AS/NZS ISO/IEC 27001/27002, AS/CA S008, ACMA Technical Standards  IEEE 802.3bt, 802.3af/at, 802.3ab/z/ae, SFP/SFP+ MSA  IEEE 802.1X, 802.1D/1Q, RFC 2131/3118, RFC 4293, TLS/HTTPS | | **NETGEAR** | **netgear wax630e** | $99 | Wi-Fi 6E (802.11ax), Tri-Band: 2.4 GHz (600 Mbps), 5 GHz (4800 Mbps), 6 GHz (2400 Mbps) | 512 | Total 7800 Mbps (600 Mbps on 2.4 GHz + 4800 Mbps on 5 GHz + 2400 Mbps on 6 GHz) | Supports up to 8 SSIDs, VLAN tagging, and seamless roaming | WPA3, WPA2, WPA, 802.1X RADIUS, MAC filtering, HTTPS management | OFDMA, MU-MIMO, Airtime Fairness, Band Steering, Load Balancing | 802.3bt PoE++ | NETGEAR Insight Cloud Management, Web UI | Automatic updates | scalable deployment | 5 years | No | Resistant to environmental conditions  Good performance  Reliable devices  Some users report software bugs | IEEE 802.11ax, 802.11ac/n, 802.11v/k/r, IEEE 802.1X, IEEE 802.1Q, WPA3/2/1, HTTPS/TLS  AS/NZS ISO/IEC 27001/27002, AS/CA S008, ACMA Technical Standards  IEEE 802.3bt, 802.3af/at, 802.3ab/z/ae, SFP/SFP+ MSA  IEEE 802.1X, 802.1D/1Q, RFC 2131/3118, RFC 4293, TLS/HTTPS | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | **VENDOR - Cables** | **Product** | **Price** | **Cuantity** | **Cable Category** | **Shielding Type** | **PoE Compatibility** | **Gigabit Ethernet & Backward Compatibility** | **Material** | **Connector** | **Installation & Certification Standards** | **Patch Panels & Terminations** | **Environmental & Fire Rating** | **Warranty & Vendor Certification** | **Trial or Demo Segment** | **Market Recognition & Quality Reviews** | **Standards** | | **4cabling** | **CAT6A S/FTP Cable on Reel w/ PVC Jacket | 305m Roll Blue** | $1,496.00 | 1200m | Cat 6A S/FTP | FTP | 100w | 10Gbps | 26AWG x 4Pair, 100% Bare Copper | Strong and robust male-to-male RJ45 connectors  LSZH RJ45-RJ45 | ETL Verified UL Verified Performs at 500MHz ISO/IEC11801:2011(Ed. 2.2) ANSI/TIA/EIA-568-C.2 Category 6A compliant EN 50173-1:2011 EN 50173-2:2007 including amendment A1:2010 IEC61935-2:2010(Ed.3.0) (transmission requirements) | No data | Low Smoke Zero Halogen (LSZH) reduces the amount of corrosive and toxic gases emitted during comb | 3 years | No | Very good user rating  Good value for money  100% Australian company  Many users gave poor ratings due to logistics-related issues. | ISO/IEC 11801:2011, ANSI/TIA/EIA-568-C.2 Cat 6A, EN 50173-1/2, IEC 61935-2  AS/NZS ISO/IEC 11801, AS/NZS 3080, AS/CA S009 | | **4cabling** | **4cabling CAT 5e** | $1,316.00 | 1000m | 5e | UTP | No data PoE | 1000Mbps | 24AWG x 4Pair, 100% Bare Copper | PVC  RJ45-RJ45 | ETL, UL Verification Flame test: comply with IEC 60332-1-2 ISO/IEC11801:2011(Ed. 2.2) ANSI/TIA/EIA-568-C.2 EN 50173-1:2011 EN 50173-2:2007 including amendment A1:2010 IEC61935-2:2010(Ed.3.0) (transmission requirements) | Gold Plated Contacts | Flame Retardant PVC | 3 years | No | Very good user rating  Good value for money  100% Australian company  Many users gave poor ratings due to logistics-related issues. | ISO/IEC 11801:2011, ANSI/TIA/EIA-568-C.2 Cat 6A, EN 50173-1/2, IEC 61935-2  AS/NZS ISO/IEC 11801, AS/NZS 3080, AS/CA S009 | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  |  |  | Counting |  |  |  |  |  |  |  |  |  |  |  |  |  | | switch L2 x2 - 24 | USW-Pro-24-POE | $ 1,479.00 | 2 | $ 2,958.00 |  |  |  |  |  |  |  |  |  |  |  |  | | switch L2 x1 - 48 | USW-Pro-48-POE | $ 2,349.00 | 1 | $ 2,349.00 |  |  |  |  |  |  |  |  |  |  |  |  | | AP x 4 | netgear wax630e | $ 99.00 | 4 | $ 396.00 |  |  |  |  |  |  |  |  |  |  |  |  | | cable CAT 6a pack x300m | CAT6A S/FTP Cable on Reel w/ PVC Jacket | 305m Roll Blue | $ 1,496.00 | 1 | $ 1,496.00 |  |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | **TOTAL COST** |  | **$ 7,199.00** |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | |
| Interdependencies  *In terms of the products and equipment you have identified, identify and describe any interdependencies i.e. does the product/equipment only work with specific software.* | |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | **Component / Dependency** | **Google Workspace** | **Telstra nbn** | **USW-Pro-48-POE** | **USW-Pro-24-POE** | **Netgear WAX630E** | **CAT6A Cable** | **Router Enterprise** | **Server** | **WIFI-Modem** | **Desktops** | | **Google Workspace** | - |  |  |  |  |  |  |  |  |  | | **Telstra nbn** |  | - |  |  |  |  |  |  |  |  | | **USW-Pro-48-POE** |  |  | - |  | - |  |  |  |  |  | | **USW-Pro-24-POE** |  |  |  | - | - |  |  |  |  |  | | **Netgear WAX630E** |  |  | - | - | - | - | - |  |  |  | | **CAT6A Cable** |  |  |  |  | - | - |  |  |  |  | | **Router Enterprise** |  |  |  |  | - |  | - |  |  |  | | **Server** |  |  |  |  | - |  |  | - |  |  | | **WIFI-Modem** |  |  |  |  | - |  |  |  | - |  | | **Desktops** |  |  |  |  |  |  |  |  |  | - | | |
| Availability of products/equipment  *In terms of the products and equipment you have identified, indicate their availability.* | |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | **Product/Service** | **Counting** | **delivery time** | **Price** | **fees** | **Website** | | **Google Workspace for Business (Plus)** | x1 | pay and use | $2,970 | $0.0 | <https://workspace.google.com/pricing.html?source=gafb-lp_meet-faq-en-AU&hl=en-AU&ga_region=japac&ga_country=au&ga_lang=en> | | **Telstra business nbn Enterprise Ethernet** | x1 | pay and use | $2,520 | $0.0 | <https://www.telstra.com.au/small-business/internet/nbn-enterprise-ethernet> | | **USW-Pro-48-POE** | x1 | 2–3 business days | $2,349 | $17.0 | <https://www.scorptec.com.au/product/networking/switches/80121-usw-pro-24-poe> | | **USW-Pro-24-POE** | x2 | 2–3 business days | $1,479 | $17.0 | <https://www.scorptec.com.au/product/networking/switches/80121-usw-pro-24-poe> | | **netgear wax630e** | x4 | 1–2 business days | $99 | $0.0 | <https://www.lmc.com.au/netgear-wax630e-ax7800-tri-band-access-point-wifi-6e-wax630e-100aus?srsltid=AfmBOopd9eCrZZd-9rv0qvRjzSjDf1SswzhmKCbhl0kWX2Z5hLCojeZP> | | **CAT6A S/FTP Cable on Reel w/ PVC Jacket | 305m Roll Blue** | x4 | Store Pickup | $1,496.00 | $0.0 | [https://www.4cabling.com.au/cat-6a-s-ftp-cable-roll-305m-w-pvc-jacket-on-reel-blue.html#](https://www.4cabling.com.au/cat-6a-s-ftp-cable-roll-305m-w-pvc-jacket-on-reel-blue.html) | |  |  |  |  |  |  | |  |  |  |  |  |  | | **TOTAL COST** |  |  | $10,913.0 | $34.0 |  | |  |  |  |  |  | |  |  | **$10,947.0** | |  | |  |  |  | | |
| Standards  *For each of the products/equipment you have identified, identify the Standard that applies to the product/equipment.* | **USW-Pro-48-POE and USW-Pro-24-POE**  CE, FCC, IC  IEEE 802.3ae, IEEE 802.3z, SFP+ MSA  RFC 791, RFC 4293, IEEE 802.1X  ACMA Technical Standards, AS/NZS 3080, AS/NZS ISO/IEC 27001/27002  **Cisco Business 350 Series CBS350-24S-4G**  ISO 14001, ISO 9001, RoHS, REACH, CE, FCC  IEEE 802.3ab, 802.3z, 802.3ae, SFP/SFP+ MSA  IEEE 802.1X, IEEE 802.1D/802.1Q, RFC 4293   RFC 791, RFC 4293 RFC 2131, RFC 3118  ACMA Technical Standards, AS/NZS 3080, AS/CA S009, AS/NZS ISO/IEC 27001/27002, AS/CA S008  **TP-Link Omada**  IEEE 802.11ax, 802.11ac/n, 802.11v/k/r, IEEE 802.1X, IEEE 802.1Q, WPA3/2/1, HTTPS/TLS  AS/NZS ISO/IEC 27001/27002, AS/CA S008, ACMA Technical Standards  IEEE 802.3bt, 802.3af/at, 802.3ab/z/ae, SFP/SFP+ MSA  IEEE 802.1X, 802.1D/1Q, RFC 2131/3118, RFC 4293, TLS/HTTPS  **netgear wax630e**  IEEE 802.11ax, 802.11ac/n, 802.11v/k/r, IEEE 802.1X, IEEE 802.1Q, WPA3/2/1, HTTPS/TLS  AS/NZS ISO/IEC 27001/27002, AS/CA S008, ACMA Technical Standards  IEEE 802.3bt, 802.3af/at, 802.3ab/z/ae, SFP/SFP+ MSA  IEEE 802.1X, 802.1D/1Q, RFC 2131/3118, RFC 4293, TLS/HTTPS  **CAT6A S/FTP Cable on Reel w/ PVC Jacket | 305m Roll Blue and 4cabling CAT 5e**  ISO/IEC 11801:2011, ANSI/TIA/EIA-568-C.2 Cat 6A, EN 50173-1/2, IEC 61935-2  AS/NZS ISO/IEC 11801, AS/NZS 3080, AS/CA S009 | |
| Testing  *Describe the testing procedure for testing the products/equipment.*  *Describe how the test procedure is both valid and reliable.*  *Include results of the tests you have undertook. This can be screenshots, for example, and will be specific to the product/equipment you have chosen.* | **(WBS )5. Software / Hardware Quality Assurance**  5.1 Product trial and initial inspection of hardware/software units  5.2 Unit testing and diagnostic fault analysis  5.3 Integration and connectivity testing  5.4 Performance and load testing  5.5 Documentation of test results and corrective actions  --------------------------------  **5.1 Product trial and initial inspection of hardware/software units**  **Acquire the hardware**  - USW-Pro-48-POE  - USW-Pro-24-POE  - netgear wax630e  - CAT6A S/FTP Cable on Reel w/ PVC Jacket | 305m Roll Blue  **Dismantle current network and restore factory equipment**  - Router Enterprise  - WIFI-Modem  - Switch L3  - Backup all information and convert the Server into a DHCP Server  **Acquire the services**  - Telstra business nbn Enterprise Ethernet  **Request trial and demos**  - 14-day free Google Workspace for Business (Plus)   * + 1. **Role Assignment**   Allocate roles to the team members.   * + 1. **Review Activity Schedule**   Publish the roles and tentative dates and ensure the schedule doesn't clash with other activities.   * + 1. **Start Information Gathering in the Reporting Tool**   Use the Google Workspace reporting tool for information collection.  **Review Features for Google Workspace Testing**  Select a small group of different document types to test during the migration.  **Features:**   * Scheduled backups of all data * Automatic document backups * Backups per user account * File restoration * Individual user accounts * Permissions by roles and groups * Account recovery * Secure connection methods * Data encryption methods * Two-factor login * Excel, PowerPoint, and Word online * Automatic backups * Document versioning * Recovery of previous versions * Collaborative work * Offline work * 24/7 Support Channels   **Review Features for Telstra nbn**  - Bandwidth  - router compatibility protocols  - Business Support  **Review Features for USW-Pro-48-POE**  - L2/L3 Managed Capability  - Port Density & Speed  - Backplane / throughput  - Uplink Ports (SFP/SFP+ / Fibre)  - VLANs x 1000, Access Lists IPv4 MAC  - Quality of Service (QoS)  - Remote Management & Monitoring  - Enterprise-Grade Security Features  - Power over Ethernet (PoE/PoE+) Support  **Review Features for USW-Pro-24-POE**  - L2/L3 Managed Capability  - Port Density & Speed  - Backplane / throughput  - Uplink Ports (SFP/SFP+ / Fibre)  - VLANs x 1000, Access Lists IPv4 MAC  - Quality of Service (QoS)  - Remote Management & Monitoring  - Enterprise-Grade Security Features  - Power over Ethernet (PoE/PoE+) Support  **Review Features for Netgear WAX630E**  - Wi-Fi Standard & Radio Specs  - Maximum Concurrent Clients / Session Capacity  - Throughput / Data Rate  - Multiple SSID & VLAN Mapping  - Security & Authentication  - QoS & Traffic Management  - PoE Support  - Remote Management & Monitoring  - Firmware Updates & Patch Support  **Review Features for CAT6A Cable**  - Cable Category  - Shielding Type  - PoE Compatibility  - Gigabit Ethernet & Backward Compatibility  - Patch Panels & Terminations  **Review Features for Router Enterprise**  - VLAN tagging  - Inter-VLAN routing  - Latency  - Quality of Service (QoS) protocols  - Redundancy and Failover Mechanisms  - Network Monitoring and Logging  **Review Features for WIFI-Modem**  - Effective range Wi-Fi  - Wi-Fi Standard & Radio Specs  - Maximum Concurrent Clients / Session Capacity  - Throughput / Data Rate  - Multiple SSID & VLAN Mapping  - Security & Authentication  - QoS & Traffic Management  - PoE Support  - Remote Management & Monitoring  - Firmware Updates & Patch Support  **Review Features for Switch L3**  - L2/L3 Managed Capability  - Port Density & Speed  - Backplane / throughput  - Uplink Ports (SFP/SFP+ / Fibre)  - VLANs x 1000, Access Lists IPv4 MAC  - Quality of Service (QoS)  - Remote Management & Monitoring  - Enterprise-Grade Security Features  - Power over Ethernet (PoE/PoE+) Support  **5.2 Unit testing and diagnostic fault analysis**  **Google Workspace Unit Test Plan**  **1. 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Open a support ticket via business portal and verify SLA response within defined timeframe.  **USW-Pro-48-POE**  1. Enable OSPFv3 or static routing between VLANs and confirm proper inter-VLAN connectivity.  2. Test all 48 ports using loopback cables and confirm negotiation at 1G/10G as specified.  3. Apply DSCP-based queueing for VoIP traffic and verify priority using traffic simulation.  4. Connect 48 PoE+ devices simultaneously and monitor total power draw and stability under full load.  5. Configure SNMPv3 traps and Syslog export, confirming event reporting and remote monitoring accuracy.  **USW-Pro-24-POE**  1. Create multiple VLANs and verify segmentation between ports with no unauthorised traffic leakage.  2. Measure packet forwarding rate between VLANs and compare against backplane throughput specs.  3. Connect mixed 802.3af/at devices and confirm correct power negotiation per port.  4. Deploy IPv4/MAC ACLs and attempt unauthorised access to verify enforcement.  5. 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Generate high-speed bidirectional traffic to verify throughput matches specifications.  3. Implement DSCP and CoS classification and confirm packet prioritisation.  4. Connect multiple access points and IP phones, confirming consistent voltage delivery and thermal control.  5. Apply MAC-based ACLs and attempt port spoofing to confirm switch blocks unauthorised traffic.  **5.3 Integration and connectivity testing**  **Integration Test Cases — Enterprise Network**  **1. ISP (Telstra) -> Router Enterprise**   1. WAN Connectivity Test — Confirm router establishes a stable connection with Telstra ISP using assigned IP (DHCP/static). 2. Internet Throughput Verification — Measure upstream/downstream bandwidth and verify SLA compliance. 3. DNS Resolution Test — Confirm router correctly resolves public domain names via Telstra DNS. 4. Failover & Recovery Test — Simulate ISP link failure and ensure router triggers backup or reports correctly. 5. Latency & Packet Loss Monitoring — Measure ICMP latency and packet loss over 24 hours to check connection stability.   **2. Server-DHCP -> Router Enterprise**   1. DHCP Lease Assignment — Verify desktops and devices connected to VLANs receive correct IP addresses from DHCP. 2. DHCP Relay Functionality — Ensure DHCP requests from devices in remote VLANs routed via the router are properly relayed. 3. Lease Renewal and Expiry — Check that IPs are renewed automatically and expired addresses are reclaimed. 4. DHCP Conflict Detection — Validate the server detects duplicate IP attempts and logs conflicts. 5. Logging and Monitoring — Confirm all DHCP events (assignment, renewal, release) appear in network monitoring system.   **3. Router Enterprise -> L3 Switch / USW-Pro-48-POE**   1. Inter-VLAN Routing — Verify traffic between VLANs (via L3 switch and USW-Pro-48-POE) is correctly routed. 2. QoS Policy Propagation — Confirm DSCP/CoS prioritisation is maintained across router and switches. 3. ACL Enforcement — Test access restrictions between VLANs and subnets. 4. Redundancy & Failover — Simulate link failure between router and switches and verify failover behaviour. 5. Monitoring Integration — Validate SNMP, NetFlow, or Syslog reporting from both router and switches.   **4. USW-Pro-48-POE -> Wi-Fi Modems & Desktops**   1. PoE Power Delivery Test — Verify each connected Wi-Fi modem and desktop PoE device receives sufficient power. 2. VLAN Segmentation Test — Confirm desktops and Wi-Fi modems are assigned to correct VLANs. 3. End-to-End Connectivity Test (Desktops) — Test that desktops can reach router, server-DHCP, and Internet. 4. Throughput and Latency Test — Measure network performance under full load from all 25 desktops. 5. Remote Management Verification — Confirm USW-Pro-48-POE is accessible via UniFi Controller or SNMP for monitoring.   **5. L3 Switch -> USW-Pro-24-POE -> AP-Netgear**   1. Trunking & VLAN Tagging — Verify correct VLAN tagging between L3 switch and both USW-Pro-24-POE units. 2. Inter-Switch Routing — Confirm traffic passing between USW-Pro-24-POE switches and router is correctly routed. 3. Link Aggregation / STP — Validate LACP or STP configurations for loop prevention and redundancy. 4. AP Connectivity & VLAN Mapping — Ensure each AP-Netgear correctly maps SSIDs to the assigned VLANs. 5. Wireless Performance Test — Validate throughput, client capacity, and seamless roaming across APs.   **6. Full Wireless Network (Wi-Fi Modems + APs) -> Router & Server**   1. End-to-End IP Assignment Test — Confirm all wireless clients receive IPs from DHCP and can reach LAN/Internet. 2. SSID Isolation & VLAN Enforcement — Ensure guest and corporate SSIDs are correctly segregated. 3. QoS Traffic Prioritisation — Validate VoIP and video traffic priority end-to-end. 4. Authentication & Security Test — Check WPA2/WPA3 authentication and encryption across all APs/modems. 5. Firmware Upgrade Test — Apply remote firmware upgrade on APs or Wi-Fi modems and verify network continuity.   **7. Full End-to-End System**   1. Desktop -> Switch -> Router -> Internet Test — Verify full connectivity and correct routing for all traffic paths. 2. Monitoring & Alerts — Validate that all devices send logs, SNMP traps, or alerts to monitoring system. 3. Redundancy and Failover Scenarios — Test link or device failure at critical points and verify automatic recovery. 4. End-to-End QoS Verification — Confirm traffic prioritisation is preserved across wired and wireless segments. 5. Security Audit Test — Attempt unauthorised access or VLAN hopping and verify ACLs/firewalls prevent breaches.   **5.4 Performance and load testing**  **1. ISP Internet (Telstra) -> Router Enterprise**   1. Sustained Throughput Test — Measure maximum upstream and downstream bandwidth over extended periods using iPerf3 or Speedtest CLI. 2. Peak Hour Load Test — Simulate full office load and confirm ISP link maintains SLA-defined speeds. 3. Latency & Jitter under Load — Send continuous ICMP and TCP traffic while saturating the link; verify latency and jitter remain within tolerances. 4. Packet Loss Test — Generate high-volume traffic to check for packet drops at the ISP connection. 5. Failover & Recovery Load Test — Simulate ISP outage and verify that failover mechanisms handle traffic load during switchover.   **2. Router Enterprise -> L3 Switch / USW-Pro-48-POE**   1. Routing Performance Test — Measure packet forwarding rate between VLANs under high traffic conditions. 2. Maximum Simultaneous Sessions — Test thousands of concurrent TCP/UDP sessions to verify router CPU and memory performance. 3. QoS Prioritisation under Stress — Generate mixed traffic (VoIP, video, file transfers) to verify QoS preserves priority for critical flows. 4. Redundancy Load Test — Simulate link failover while maintaining high traffic to validate router stability. 5. Throughput vs Packet Size Test — Test performance with different packet sizes (64B to 1500B) to identify bottlenecks.   **3. USW-Pro-48-POE -> Wi-Fi Modems & Desktops**   1. Port Saturation Test — Simulate full utilisation of all ports with 1G connections and verify backplane throughput. 2. PoE Load Test — Connect 100% of PoE devices at maximum draw to verify voltage stability and thermal performance. 3. Desktop Load Test — Transfer large files concurrently from all 25 desktops to test aggregate throughput. 4. Latency & Packet Loss under Load — Measure latency between desktops and router under full network utilisation. 5. Remote Management Performance — Ensure the switch remains fully manageable during maximum traffic load.   **4. L3 Switch -> USW-Pro-24-POE -> AP-Netgear**   1. VLAN Trunk Load Test — Saturate trunk ports with multi-VLAN traffic and verify correct tagging and throughput. 2. Link Aggregation Stress Test — Generate high-bandwidth traffic over LACP links to confirm load balancing and stability. 3. AP Backhaul Performance Test — Measure throughput from APs to core switch under maximum wireless client load. 4. Concurrent Device Handling — Test the switch’s ability to handle hundreds of simultaneous clients connected via APs. 5. Latency & QoS Validation — Verify latency-sensitive traffic (VoIP/video) maintains quality across switch and AP under load.   **5. Wi-Fi Modems / AP-Netgear**   1. Maximum Concurrent Clients Test — Connect maximum supported clients and measure throughput per client. 2. Peak Throughput Test — Measure combined 2.4GHz and 5GHz throughput under heavy load. 3. SSID Isolation & VLAN Mapping Under Load — Verify VLANs remain isolated and traffic tagging is preserved when network is saturated. 4. Wireless Roaming Test — Move clients between APs while streaming video to test seamless handoff. 5. PoE Power Stress Test — Confirm APs maintain operation under maximum PoE load without thermal issues.   **6. End-to-End Performance**   1. Desktop -> Switch -> Router -> Internet Throughput Test — Verify total end-to-end throughput for LAN-to-WAN traffic. 2. Latency and Jitter for Critical Applications — Test VoIP and video streaming under simultaneous file transfer load. 3. Packet Loss & Retransmission Test — Measure packet drops across the entire path under high utilisation. 4. Simultaneous Multi-VLAN Traffic Test — Generate concurrent traffic on multiple VLANs and verify no degradation. 5. Stress Recovery Test — Push network to maximum capacity and then return to normal load, verifying all devices recover without errors.   **5.5 Documentation of test results and corrective actions**   * Document failures * Document user experience * Document test outcomes * Document support team response * Document response times * Document solutions * Report and present a summary to the Manager.   **Validity and Reliability of the Test Procedure**  The tests designed are divided to identify:  1. The features of each product/service and its capabilities  2. Validate its individual functionality and validate its actual capabilities  4. Validate the functionality of the college's network  5. Support acquired and general experience with the service  In this way, each product is validated separately to check if it meets the requirements for this project. Technical aspects are taken into account, avoiding ambiguities such as:  - raw performance  - operation at 100% load  - latency between devices  - maximum number of supported users  The tests are reliable because they take into account:  - functionality of each device  - integration of each device  - actual network capacity  Furthermore, a clear and consistent process is followed. To achieve this, aspects such as:  - use specific tools to report errors  - use the appropriate tool to migrate data  - documentation for each product and test results are taken into account  Examples of test results of network devices and services  **5.2 Unit testing and diagnostic fault analysis**  **Google Workspace Unit Test Plan**  **1. 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Capture packets to verify correct 802.1Q tagging and priority bits across trunk ports.  2. Measure packet latency between VLANs under controlled load conditions.  3. Apply shaping and policing for critical applications, then simulate congestion to verify prioritisation.  4. Simulate WAN link failure and record failover time using dual-WAN or HSRP configuration.  5. Configure NetFlow and SNMP to confirm router statistics are exported to NMS server correctly.  **Wi-Fi Modem**  1. Measure dBm levels at 5, 10, and 20 metres across 2.4GHz and 5GHz bands.  2. Connect 50+ simultaneous devices and verify throughput stability.  3. Link SSIDs to VLANs and confirm isolation between guest and internal traffic.  4. Prioritise VoIP packets and validate consistent latency under high load.  5. Trigger OTA firmware upgrade and verify connectivity is restored automatically post-reboot.  **Switch L3**  1. Create static and dynamic routes and confirm traffic passes correctly between networks.  2. Generate high-speed bidirectional traffic to verify throughput matches specifications.  3. Implement DSCP and CoS classification and confirm packet prioritisation.  4. Connect multiple access points and IP phones, confirming consistent voltage delivery and thermal control.  5. Apply MAC-based ACLs and attempt port spoofing to confirm switch blocks unauthorised traffic.  **5.3 Integration and connectivity testing**  **Integration Test Cases — Enterprise Network**  **1. ISP (Telstra) -> Router Enterprise**   1. WAN Connectivity Test — Confirm router establishes a stable connection with Telstra ISP using assigned IP (DHCP/static). 2. Internet Throughput Verification — Measure upstream/downstream bandwidth and verify SLA compliance.   PRTG Network Monitor  Bandwidth Monitoring using PRTG – Mushroom Networks   1. DNS Resolution Test — Confirm router correctly resolves public domain names via Telstra DNS. 2. Failover & Recovery Test — Simulate ISP link failure and ensure router triggers backup or reports correctly.   Obkio's Network Monitoring tool  How to Monitor Network Failover: Fighting Against Downtime - Obkio   1. Latency & Packet Loss Monitoring — Measure ICMP latency and packet loss over 24 hours to check connection stability.   **2. Server-DHCP -> Router Enterprise**   1. DHCP Lease Assignment — Verify desktops and devices connected to VLANs receive correct IP addresses from DHCP. 2. DHCP Relay Functionality — Ensure DHCP requests from devices in remote VLANs routed via the router are properly relayed.   CLI commands  *show ip dhcp relay information*  *show ip dhcp relay statistics*  *show logging | include DHCP*  Configure Dynamic Host Configuration Protocol (DHCP) Relay Settings on a  Switch through the Command Line Interface (CLI) - Cisco   1. Lease Renewal and Expiry — Check that IPs are renewed automatically and expired addresses are reclaimed. 2. DHCP Conflict Detection — Validate the server detects duplicate IP attempts and logs conflicts.   Wireshark  7. Security Analysis | Packet Analysis with Wireshark   1. Logging and Monitoring — Confirm all DHCP events (assignment, renewal, release) appear in network monitoring system.   **3. Router Enterprise -> L3 Switch / USW-Pro-48-POE**   1. Inter-VLAN Routing — Verify traffic between VLANs (via L3 switch and USW-Pro-48-POE) is correctly routed.   CLI command  *show vlan brief*  *show interfaces trunk*  *show ip interface brief*  *tracert IP-address*  How to Run Traceroute on a Switch through the Command Line Interface (CLI)  - Cisco   1. QoS Policy Propagation — Confirm DSCP/CoS prioritisation is maintained across router and switches.   CLI command  Troubleshooting Client Speed using iPerf - Cisco Meraki Documentation  Understanding Wireless QoS – Part 3 | mrn-cciew   1. ACL Enforcement — Test access restrictions between VLANs and subnets. 2. Redundancy & Failover — Simulate link failure between router and switches and verify failover behaviour.   Switch and Router Redundant Network - Cisco Community   1. Monitoring Integration — Validate SNMP, NetFlow, or Syslog reporting from both router and switches.   NetFlow Analyzer  NetFlow Monitoring Software & Tool - ManageEngine NetFlow Analyzer  **4. USW-Pro-48-POE -> Wi-Fi Modems & Desktops**   1. PoE Power Delivery Test — Verify each connected Wi-Fi modem and desktop PoE device receives sufficient power. 2. End-to-End Connectivity Test (Desktops) — Test that desktops can reach router, server-DHCP, and Internet. 3. Throughput and Latency Test — Measure network performance under full load from all 25 desktops.   iPerf3 – performance test  How to use iPerf3 to test network bandwidth | TechTarget  **7. Full End-to-End System**   1. Desktop -> Switch -> Router -> Internet Test — Verify full connectivity and correct routing for all traffic paths.   How to Use Ping to Check Internet Availability | dummies | |
| Additional testing  *If the initial tests you undertook were inconclusive or where it appears another product may be more appropriate, describe revised testing you undertook. If this situation did not occur describe what you would do in this situation.* | **Additional testing**  If the initial tests are inconclusive or the expected results are not achieved, we would take different actions. **For Inconclusive Tests:** We would investigate the reasons and carry out several processes, with necessary changes made at each phase:   1. Configuration verification 2. Re-run Unit testing and diagnostic fault analysis 3. Re-run Integration and connectivity testing 4. Re-run Performance and load testing 5. Compare previous test results and corrective actions 6. Process a warranty claim if device faults are discovered   If, after identification, the result remains the same, and we are certain it is not a device issue, we would opt to:   1. Return the product in compliance with the product dissatisfaction policy/law 2. Process a refund 3. Investigate other alternatives  **For Tests Where Devices Do Not Meet Expectations:** I would follow the following protocol:   1. Return the product in compliance with the product dissatisfaction policy/law 2. Process a refund 3. Adjust the network design and modify the requirements 4. Investigate products that meet the revised requirements   Finally, the test plan will be executed again. | |
| Cost-benefit analysis  *Based on your research and testing to date, summarise how each of the vendor products/equipment you have reviewed rate regarding:*  *their quality*  *their performance*  *support offered by the vendor*  *benefits and limitations*  *integration capabilities*  *Discuss the fit between the vendor products/equipment and the client’s needs.* | |  | | --- | | **Cloud Service: Google vs. Microsoft**  In general, both services are stable, fast, and secure, offering good user control tools and support. Microsoft's strong suit is its ease of use and Office integration.  On the other hand, Google offers Google Suite, which is a lighter web version, but makes up for it with data migration tools, AI tools, and 5TB per user. Microsoft, for its part, offers 0.1TB.  Google's limitations in providing compatibility with Office formats are evident, while Microsoft falls short on storage. As an incentive, Google offers additional discounts. Microsoft also offers discounts, but the most interesting aspect is the Windows, Office, and Azure licenses.  In the college's current state, the information is in the process of being built, so using the Office suite or Windows is not mandatory for the college to operate; simply migrating to Google Suite is sufficient. This is a great opportunity for the college to grow without being tied to rigid technologies, so they could easily migrate to modern cloud CRM options like Monday.com from Google Workspace in the future.  The big difference between Google and Microsoft is storage. While Google offers great capacity, Microsoft requires an add-on that costs more than the service, so Google is the better option. | | **ISP Vendors: Optus vs. Telstra**  In general, the two business services from Telstra and Optus are similar in features. Both have a 99.9% SLA, so there's not much to say. They offer speeds of around 800/300 Mbps and are easily upgradeable. On the other hand, Telstra Enterprise outperforms them in all technical aspects, although its price is higher. It offers three times the performance at a price twice as high, and symmetrical speeds.  The real difference is in the service. Although Optus offers more support and booking services, its response target is 4 hours, while Telstra's is 1 hour.  Telstra Enterprise has the major disadvantage that the service can only be canceled after 36 months, something that Telstra and Optus Business plans don't require, so this aspect is important to consider.  Optus could have been a great alternative, but given its history of scandals and cyberattacks, Telstra is positioned as the better option. At this time, the college requires the most stable internet service. | | **HW Network vendors**  **Unifi vs. Cisco**  Regarding quality, Cisco undoubtedly feels like a quality product, both in terms of build quality and service, while Unifi is of acceptable quality.  In general, the three options, the Pro-48, Pro-24, and 350 series, have similar features; however, Unifi doubles the performance of Cisco, with its 88 Gbps switching capacity.  Cisco's advantages lie mainly in its robustness, quality, and service. The amount of information available on forums is quite varied; it's a product with a long history. In this comparison, it's technically inferior to Unifi.  The college currently needs high performance and sufficient power for the coming years of growth, so the most important features are 10 Gb uplink for communication between nodes, VLANs to segment the network and limit bandwidth, QoS, and PoE for the APs.  Although Cisco is a more reliable option, for the college's current interests, performance is paramount, and in this case, Unifi Pro-24 and Pro-48 are the best option.  **Tp-Link Omada vs. Netgear**  Netgear and Tp-Link are very different products. In general, Netgear receives higher user ratings for build quality and ability to withstand outdoor environmental conditions. Tp-Link users report nothing positive or negative, so this is something to keep in mind.  Netgear's performance is more than double, with a 2.9Gbps ​​data rate versus a 7.8Gbps data rate, which ensures a lower bottleneck with multiple devices connected simultaneously.  Several Tp-Link users comment that the devices are not plug & play and must be rebooted to work. Despite the large number of negative comments, it has a very good rating.  For college purposes, Netgear is sufficient; it is a stable, durable, and plug & play product. Therefore, it is the smarter choice given its performance and price.  **4cabling CAT6a vs CAT5e**  In this section, it's easy to decide. The project requirements suggest 10 Gbps communication channels, so CAT 6a is the preferred option; there's no reason to choose CAT 5e.  This is a 100% Australian company, with a presence throughout Australia, and complies with all the safety regulations required for the installation of electronic equipment.  This product is highly rated by its users. | | |
| Recommendations  *Based on the cost-benefit analysis you have completed, provide your recommendation on which products/equipment you believe is most suitable for the business and why.* | |  | | --- | | ****Recommendations**** It was decided to retain part of the existing infrastructure, such as the enterprise router, L3 switch, Wi-Fi modems, and server, in order to ensure the project remained within budget. As a result, cost was considered a more important factor than quality or service. My general recommendation to the college is to increase the budget by AUD 10,000 to guarantee the acquisition of all high-end equipment, as this is a long-term investment intended to last decades.  Regarding cloud services, Microsoft represents a solid long-term option if the college intends to acquire servers, Windows licences, Office, and Azure services. Although its current cost is high, it could be significantly reduced when purchasing the full Microsoft infrastructure. Primarily, Google is the option that meets the college’s current requirements and future expansion plans, offering excellent cost per terabyte and flexibility across its applications.  As for Telstra, its market advantage is indisputable; no other provider in Australia offers enterprise-grade reliability comparable to Telstra’s services.  Regarding network equipment, I consider the performance and quality of the USW-Pro-24-POE, USW-Pro-48-POE, Netgear WAX630E, and CAT6A S/FTP cable to be the most suitable for the project’s expansion plans. Since business applications will be migrated to cloud services, there is no need for the college to maintain an extremely robust on-premises infrastructure. Consequently, the efforts of the current project have primarily focused on designing the network with three key objectives in mind:   1. Ensure high-speed connectivity to cloud services from staff devices. 2. Improve Wi-Fi signal experience for all students on campus. 3. Enable rapid and easy scalability.   Regarding the last point, the network has a 10Gbps connection capacity, ensuring scalability by allowing additional devices to be connected or by migrating network capabilities to 10Gbps communication channels across all nodes. | | |
| *Paperclip* Attach: | Screenshots |  |