Jack of All Trades

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**Business Processes IT/ Network and Mapping**

Work Integrated LEARNING (XIMT6329)

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**Business Processes IT/ Network and Mapping**

Proposal for Developing an Interconnected Computer Network for Central Karoo District

**1. IT Situation/Description**

Central Karoo located 417 km southeast of Cape Town, South Africa, has transitioned from a thriving railway junction to an agricultural community due to the collapse of the South African railway system. This shift has left the region poorly connected in terms of telephony and Internet services. Despite ongoing 5G rollout efforts, connectivity remains unstable with intermittent service and heavy noise. The district comprises 3000 homes, three district hospitals, and a government administrative building housing 28 offices for 200 employees.

**IT Situation and Description**

**1.** Geographic and Economic Background

* **Location:** Central Karoo, a rural district with 3000 homes, three district hospitals, and a district administrative building.
* **Connectivity Issues:** The area has limited fixed telephony and internet connectivity, with an unreliable 5G network currently being rolled out.

2. Existing IT Infrastructure

**Network Operating Center (NOC)**

* **Power Backup:** The NOC is equipped with 70 deep cycle batteries, five inverters, solar regulators, and DC/AC disconnects.
* **Server Room:** Houses a rack unit for servers, with cooling and dust prevention measures.
* **Solar Panels:** 24 solar panels installed on a south-facing, 20-degree inclined roof to power the NOC.

**Wireless Backbone Infrastructure**

* **Smart Bridges Multi-band Access Points:** These provide point-to-multipoint wireless links.
* **Network Topology:** A star topology with a 90-degree sectoral antenna and an omnidirectional antenna to cover the area.

3. Applications and Security Concerns**:**

* **ERP and Microsoft Office:** Installed on 200 government desktops.
* **Security Concerns**: Issues with trust and security among external suppliers accessing government data.

**Business Processes and IT/Networking Mapping**

1. Communication and Collaboration

**Processes**

* **Internal Communication:** Coordination among government offices, hospitals, and suppliers.
* **External Communication:** Engaging with 3000 homes and the broader community.

**IT/Networking Requirements**

* **Intranet:** Establish a secure intranet for internal communications.
* **Internet:** Reliable, high-speed internet for external communications and remote work.
* **VPNs:** Secure access for external suppliers to government systems.

2. Healthcare Services:

**Processes:**

* **Patient Data Management:** Efficient access to and updating of patient records.
* **Telemedicine:** Facilitate remote medical consultations and diagnostics.

**IT/Networking Requirements:**

* **High-Bandwidth Connectivity:** Support telemedicine and data-intensive healthcare applications.
* **Redundancy:** Ensure uninterrupted access to critical healthcare data.
* **Data Security:** Implement encryption and firewalls to protect sensitive medical records.

3. Government Operations:

**Processes**

* **Administrative Functions:** Managing day-to-day operations, personnel, and public services.
* **ERP Management:** Handling financial, human resources, and administrative tasks.

**IT/Networking Requirements**

* **Centralized Database Access:** Real-time updates and monitoring of ERP systems.
* **Secure LAN:** Support secure connectivity within the administrative building.
* **Data Backup:** Regular backups to prevent data loss and ensure business continuity.

4. Community Engagement:

**Processes:**

* **Service Delivery:** Efficiently providing services and information to 3000 homes.
* **Public Information Access:** Ensuring the community has access to necessary updates and resources.

**IT/Networking Requirements**

* **Public Wi-Fi Hotspots:** Strategically placed for community access.
* **Interactive Website/Portal:** For accessing government services and information.
* **Scalable Network:** To accommodate future growth and increased demand.

5. Security and Trust Management:

**Processes**

* **Access Control:** Restricting unauthorized access to sensitive data and systems.
* **Monitoring:** Continuously monitoring network traffic for potential threats.

**IT/Networking Requirements**

* **Firewalls and IDS/IPS:** Advanced security measures to protect against cyber threats.
* **User Authentication:** Implementing multi-factor authentication for all users.
* **Audit Trails:** Tracking and reviewing all access to sensitive systems.

**Recommendations and Implementation Strategy**

**1.** Phased Implementation:

* **Phase 1:** Upgrade the NOC and establish the core network infrastructure.
* **Phase 2:** Connect government offices and hospitals with secure and reliable networks.
* **Phase 3:** Extend connectivity to the 3000 homes and deploy public Wi-Fi hotspots.

2. Project Management:

* **Timeline:** The project must be completed within one year.
* **Budget:** Careful monitoring of expenditures to ensure project sustainability, funded by the mayor’s office.

**3. Sustainability Considerations:**

* **Local Resources:** Continue utilizing locally available materials and renewable energy sources, such as solar power.
* **Maintenance:** Develop a long-term maintenance plan for infrastructure, involving training for local personnel.

**Conclusion**

This proposal provides a comprehensive plan to establish a robust and sustainable network infrastructure in the Central Karoo district. By addressing connectivity issues, improving service delivery, and enhancing communication, the proposed network will significantly benefit the community, government, and healthcare services in the district. The project will ensure long-term viability and contribute to the overall development of the Central Karoo.