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| SCHOOL OF INFORMATION AND TECHNOLOGY | | |
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# SYSADM1 – Physical Infrastructure

# Instructions:

Answer the following questions based on Week 3 Lecture notes.

### Identify potential issues in physical infrastructure setups and propose solutions to optimize performance or reduce costs 1. **Capacity Bottlenecks**

**Issue:**

* Overwhelmed infrastructure causing slowdowns.

**Solutions:**

* **Capacity Planning:** Assess and predict needs.
* **Scalable Solutions:** Use cloud or modular systems.
* **Load Balancing:** Distribute workloads evenly.

### 2. **Aging Equipment**

**Issue:**

* Old equipment fails or is inefficient.

**Solutions:**

* **Upgrade Cycle:** Regularly replace outdated gear.
* **Modernization:** Invest in new technologies.
* **Maintenance:** Implement upkeep plans.

### 3. **High Energy Consumption**

**Issue:**

* Inefficient equipment driving up costs.

**Solutions:**

* **Energy-Efficient Equipment:** Use low-power devices.
* **Energy Audits:** Identify and fix high consumption areas.
* **Cooling Optimization:** Improve cooling efficiency.

### 4. **Limited Redundancy**

**Issue:**

* Single points of failure causing downtime.

**Solutions:**

* **Redundant Components:** Add backup systems.
* **Failover Systems:** Auto-switch to backups.
* **Disaster Recovery:** Plan and test recovery strategies.

### 5. **Poor Network Design**

**Issue:**

* Network congestion and latency.

**Solutions:**

* **Network Optimization:** Improve topology and flow.
* **High-Speed Connections:** Upgrade network hardware.
* **Traffic Management:** Prioritize critical traffic.

### 6. **Inadequate Security Measures**

**Issue:**

* Increased vulnerability to cyber threats.

**Solutions:**

* **Security Strategy:** Use firewalls and encryption.
* **Regular Updates:** Keep systems patched.
* **Access Controls:** Implement strict authentication.

### 7. **Insufficient Space for Growth**

**Issue:**

* Physical constraints limit expansion.

**Solutions:**

* **Modular Design:** Allow easy expansion.
* **Vertical Expansion:** Use rack-mounted setups.
* **Future-Proofing:** Plan for growth.

### 8. **Inefficient Space Utilization**

**Issue:**

* Wasted space and higher costs.

**Solutions:**

* **Space Planning:** Optimize layouts.
* **Cable Management:** Reduce clutter.
* **Rack Optimization:** Use high-density racks.

### 9. **Cooling Inefficiencies**

**Issue:**

* Overheating due to poor cooling.

**Solutions:**

* **Efficient Cooling:** Use advanced systems.
* **Temperature Monitoring:** Ensure proper cooling.
* **Preventive Maintenance:** Regularly service equipment.

### 10. **Poor Documentation and Management**

**Issue:**

* Operational inefficiencies from lack of documentation.

**Solutions:**

* **Detailed Documentation:** Keep comprehensive records.
* **Configuration Management:** Track changes.
* **Training:** Educate staff on management practices.

You are a project manager responsible for implementing a new infrastructure project, such as a smart city initiative or a digital transformation strategy.

What IT systems and technologies are necessary to support the project's objectives?  
  **Smart City Initiative:**

* **IoT Devices:** For real-time data.
* **Data Analytics:** To process and analyze data.
* **Cloud Computing:** For scalable storage.
* **High-Speed Networks:** (e.g., 5G, fiber optics).
* **AI/ML:** For automation and insights.

 **Digital Transformation:**

* **ERP Systems:** For business process management.
* **CRM Systems:** For customer management.
* **Data Warehousing:** For data consolidation.
* **Collaboration Tools:** (e.g., Microsoft Teams).
* **Cybersecurity Solutions:** To protect data.

How can the IT infrastructure be designed to be scalable and flexible?  
  **Modular Design:** Easy expansion.

 **Cloud Services:** Scalable resources.

 **Microservices:** Independent scaling.

 **Load Balancers:** Distribute traffic.

 **Virtualization:** Efficient resource use.

What are the potential security risks and vulnerabilities, and how can they be addressed?  
  **Risk Assessment:** Regular evaluations.

 **Data Encryption:** Protect data in transit and at rest.

 **Access Controls:** Strong authentication.

 **Updates:** Regular patching.

 **Intrusion Detection:** Monitor threats.

 **Employee Training:** Cybersecurity awareness.

How can the IT infrastructure be integrated with existing systems and processes to minimize disruption?  
  **Compatibility Check:** Ensure integration fits.

 **Phased Rollout:** Gradual implementation.

 **APIs:** Seamless data exchange.

 **Data Migration:** Plan and execute carefully.

 **Change Management:** Communicate and support.

 **Continuous Monitoring:** Track integration performance.