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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.

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

* Inefficient Space
  + - * + Implement Smart Storage Solutions
        + Conduct a Space Audit
* Outdated Equipment
  + - * + Invest
        + Monitor for maintenance
* Poor Physical Security
  + - * + Enhance Security Systems like installing cameras for surveillance
        + Implement Strong Access Policies
* High Maintenance Costs
  + - * + Implement a Maintenance Management System
        + Optimize Maintenance Procedures to reduce labor and material costs

1. You are a project manager responsible for implementing a new infrastructure project, such as a smart city initiative or a digital transformation strategy.
2. What IT systems and technologies are necessary to support the project's objectives?

**Smart City Initiative:**

* IoT Devices and Sensors: To collect data from various sources.
* Data Analytics Platforms: For processing and analyzing large volumes of data to generate actionable insights.
* Cloud Computing Services: To provide scalable storage and computing power for data processing.
* Communications Infrastructure: High-speed, reliable network connectivity (e.g., 5G, fiber optics) to support IoT devices and data transfer.
* Smart Infrastructure Systems: Includes smart grids, smart lighting, and intelligent transportation systems.
* City Management Platforms: Software to integrate and manage various smart city components and services.

**Digital Transformation Strategy:**

* Enterprise Resource Planning Systems: For integrating core business processes and data.
* Customer Relationship Management Systems: To manage interactions with customers and improve service delivery.
* Data Warehousing and Analytics: For consolidating data from different sources and deriving insights.
* Cloud Platforms: To enable flexible and scalable deployment of applications and services.
* Collaboration Tools: For improved communication and teamwork.
* Cybersecurity Solutions: To protect digital assets and ensure data integrity.

1. How can the IT infrastructure be designed to be scalable and flexible?

-Using the concepts of a modular architecture, scalability, and flexibility with applications broken down to micro services and containerization to ensure consistency in the deployment model, seamlessly integrate hybrid and multi-cloud environments. Leverage auto-scaling cloud services for variable workloads. Apply flexible networking made possible through SDN and NFV for dynamic resource management and adaptability. Leverage scalable storage to object storage and distributed databases to effectively meet the volume challenge of high data volumes. Apply a standard industry solution to future-proof the solution, refreshing infrastructure periodically to maintain currency with technology evolution.

1. What are the potential security risks and vulnerabilities, and how can they be addressed?

* Data Breaches:
  + - * + Encryption: Use strong encryption protocols for data at rest and in transit.
        + Access Controls: Implement role-based access control.
* IoT Vulnerabilities:
  + - * + Secure Device Management: Ensure IoT devices have robust security features and are regularly updated with the latest firmware.
        + Network Segmentation: Isolate IoT devices from critical systems to minimize potential risks.
* Denial of Service Attacks:
  + - * + Load Balancers: Use load balancers to distribute traffic and prevent overload on any single server.
        + DDoS Protection Services: Employ services that provide protection against distributed denial-of-service attacks.

1. How can the IT infrastructure be integrated with existing systems and processes to minimize disruption?

Integrate IT Infrastructure with the current systems by first conducting a system audit to determine points of integration and conflict. Use middleware to fill in gaps between new and legacy systems. Effect change through piloting and a phased rollout. Enable data integration across APIs and data connectors and standardize all formats of data to be the same across systems. Communicate the change to stakeholders and train them for seamless adoption. Schedule regular monitoring of performance issues in integrated systems. Establish mechanisms for continuous improvement through feedback.