



The Association of Surveyors
of Papua New Guinea inc.

56TH ANNUAL ASPNG CONGRESS, LAE MOROBE PROVINCE

THEME:

Fostering Innovation in the Surveying
Profession and Aligned Fields for Economic
Growth and Sustainable Development in
PNG and the South Pacific Region.

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Venue: PNG Unitech – Rose Kekedo Lecture Theatre and the
Lae International Hotel



PAPUA NEW GUINEA
UNIVERSITY OF
TECHNOLOGY



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TECHNOLOGY

A PNG NATIONAL SPATIAL DATA INFRASTRUCTURE (NSDI)

A Comprehensive Overview of NSDI Objectives, Conceptual
Framework, Implementation Strategies, and Governance

SCHOOL OF
SURVEYING AND LAND
STUDIES

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OVERVIEW OF GEOSPATIAL DATA

Introduction to Geospatial Data

- Definition and Scope
- Importance in Various Sectors

Key Characteristics of Geospatial Data

- Location (e.g., XY, Longitude, Latitude)
- Attributes (e.g., Statistics, Descriptions)
- Geometry (e.g., Points, Lines, Polygons)

Applications of Geospatial Data

- Mapping
- Navigation
- Environmental Monitoring
- Urban Planning
- Disaster Management



NATIONAL SPATIAL DATA INFRASTRUCTURE (NSDI) OBJECTIVES

Improve Data Accessibility and Sharing

- Create a framework for easy access across different sectors.

Promote Economic Growth and Innovation

- Make geospatial data easily accessible for businesses and researchers.

Enhance Decision-Making and Policy Development

- Provide accurate and up-to-date spatial data.

Ensure Data Standardization and Quality

- Establish guidelines for consistent and reliable spatial data.
- Establish

NSDI CONCEPTUAL FRAMEWORK

Phase 1: Establishing Policies and Standards

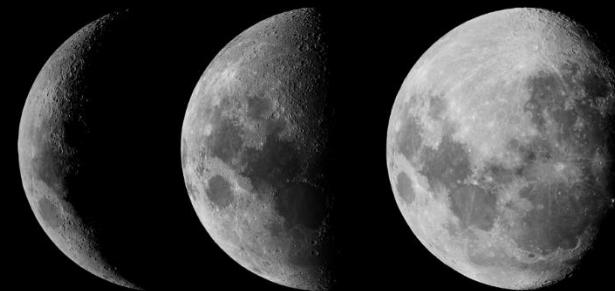
- Define clear policies for data management
- Establish standards for data quality and interoperability

Phase 2: Developing Technological Infrastructure

- Build the necessary technological framework
- Ensure scalability and security of the infrastructure

Phase 3: Implementing Data Sharing Mechanisms

- Create mechanisms for efficient data sharing.
- Promote collaboration among stakeholders





SPATIAL DATA INFRASTRUCTURE (SDI) COMPONENTS

01

Data Warehouse/Data Lake

- Centralized repository for storing, accessing, and maintaining all spatial data.

02

Interoperability

- Seamless integration of multiple data sources for cross-sectoral collaboration.

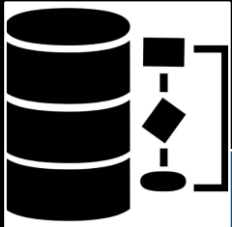
03

Infrastructure Layers

- **Data Layer:** Includes base maps and geographic information.
- **Technology Layer:** Comprises GIS software and hardware components.
- **Service Layer:** Tools for accessing, analyzing, and sharing spatial data.
- **Standards Layer:** Policies ensuring data quality and consistency.



IMPLEMENTATION STRATEGY FOR SDI SETUP



- Gather data from various departments
- Include external entities for comprehensive data



- Choose appropriate GIS platform
- Determine technology stack for data management



- Create policies for data sharing
- Ensure data security and governance



STORAGE SOLUTIONS

- ▶ Data Warehouse-Structured data
- ▶ Data Lake-Unstructured and Semi Structured Data
- ▶ Minio Server-Object Storage
- ▶ POSTGRESQL/POSTGIS/PGVECTOR/PGPOINTCLOUD-Relational Database Management System





INFRASTRUCTURE EXPANSION

- ▶ Native Installation
- ▶ Virtualisation
- ▶ Containerized Installation (Docker and Kubernetes)
- ▶ K8S is a portable, extensible, FOSS platform for managing containerized workloads and services, that facilitates declarative configurations and automation



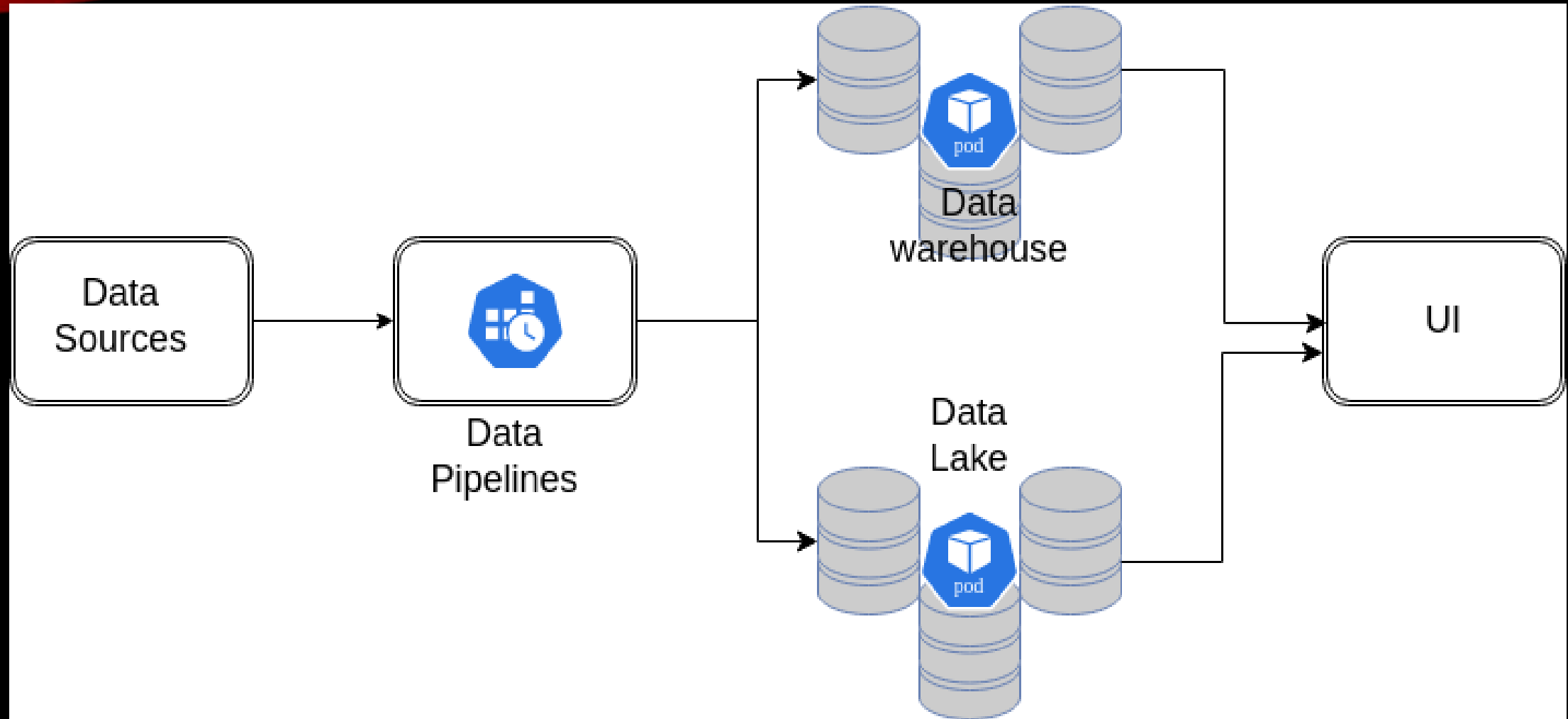


SOFTWARES

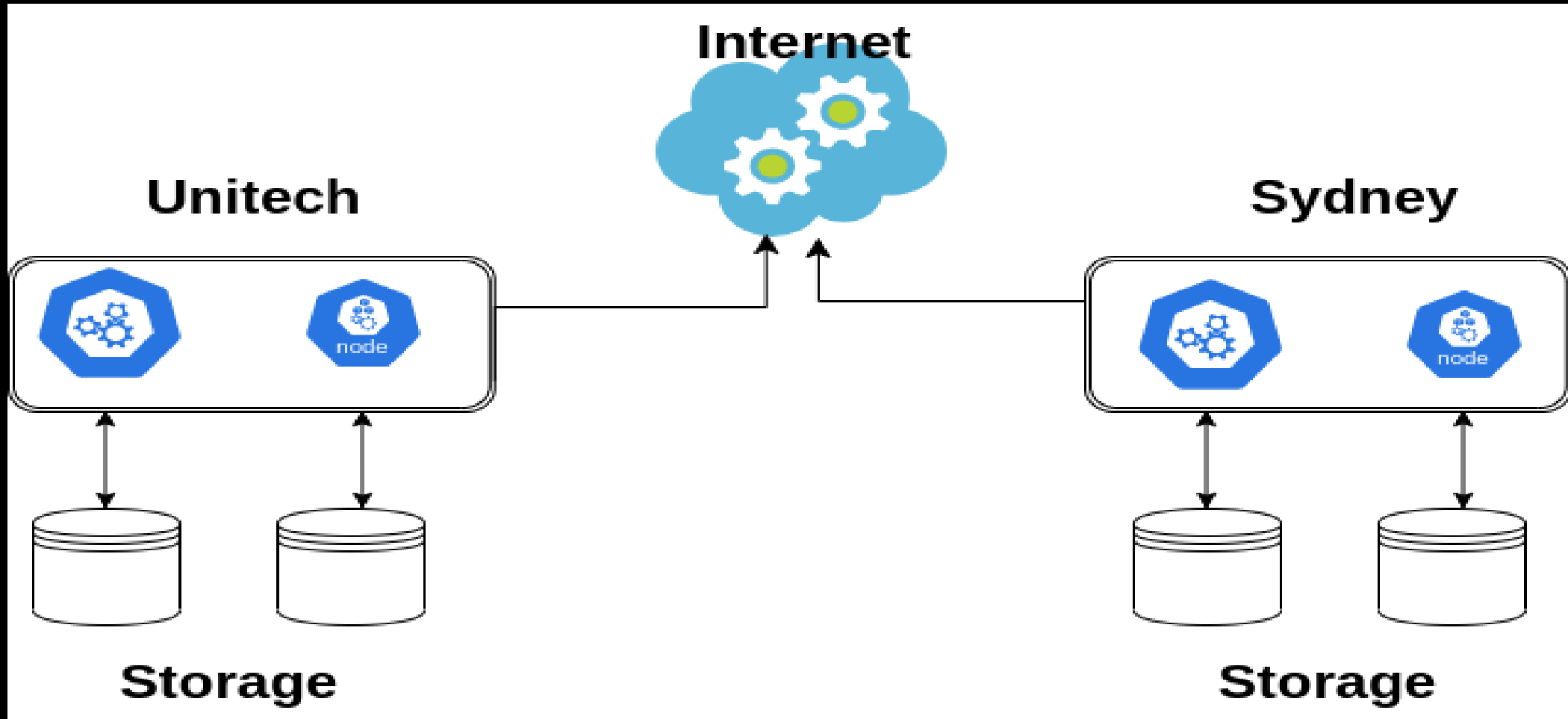
- ▶ Kubernetes and docker/containerd
- ▶ Minio Servers
- ▶ Postgresql Server,pgadmin or dbeaver
- ▶ Apache Airflow(ETL/ELT-data pipelines)
- ▶ TileDB
- ▶ CLI Tools gdal,python,pdal
- ▶ NextJS/ReactJS



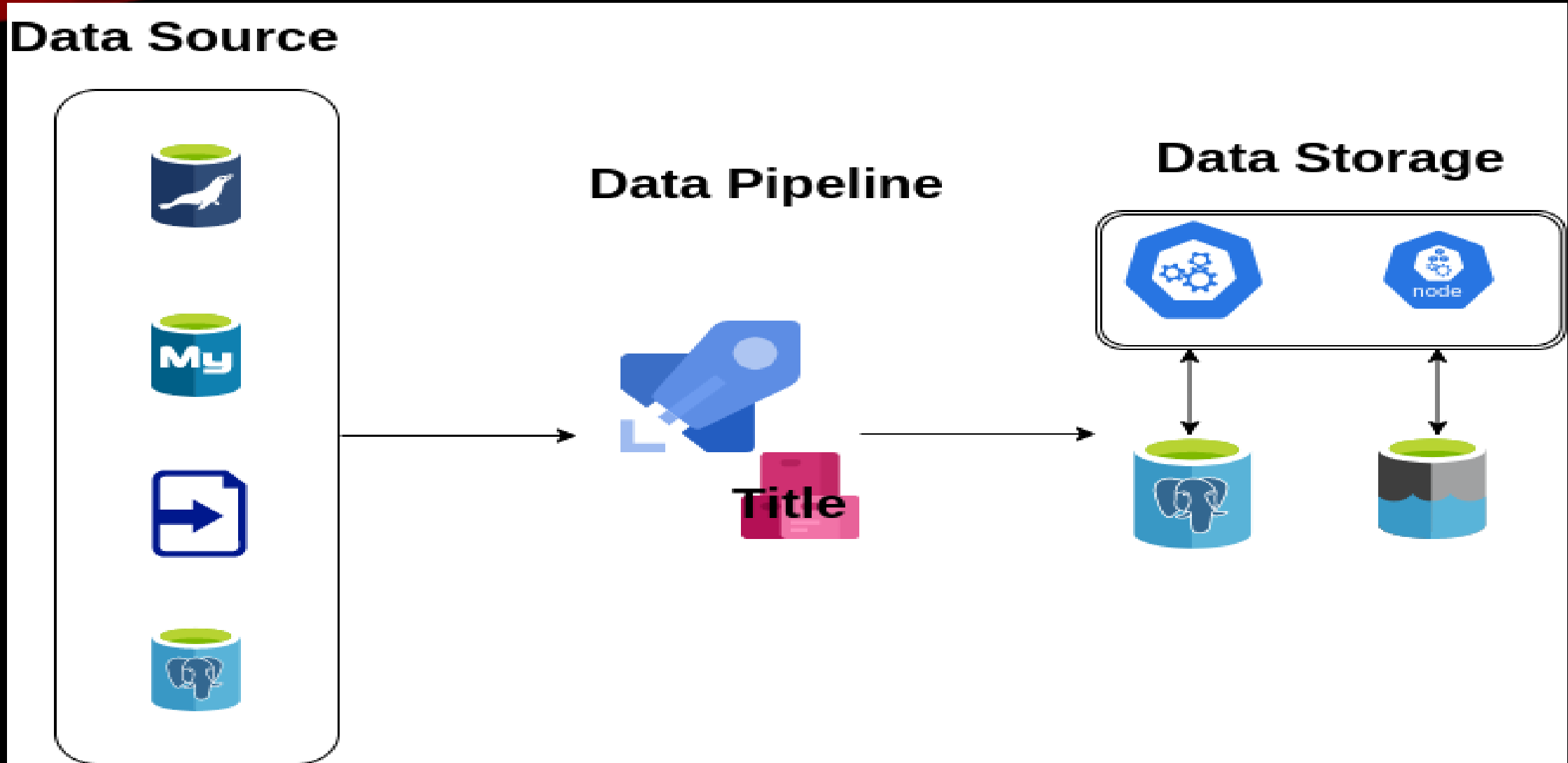
IMPLEMENTATION FLOWCHART



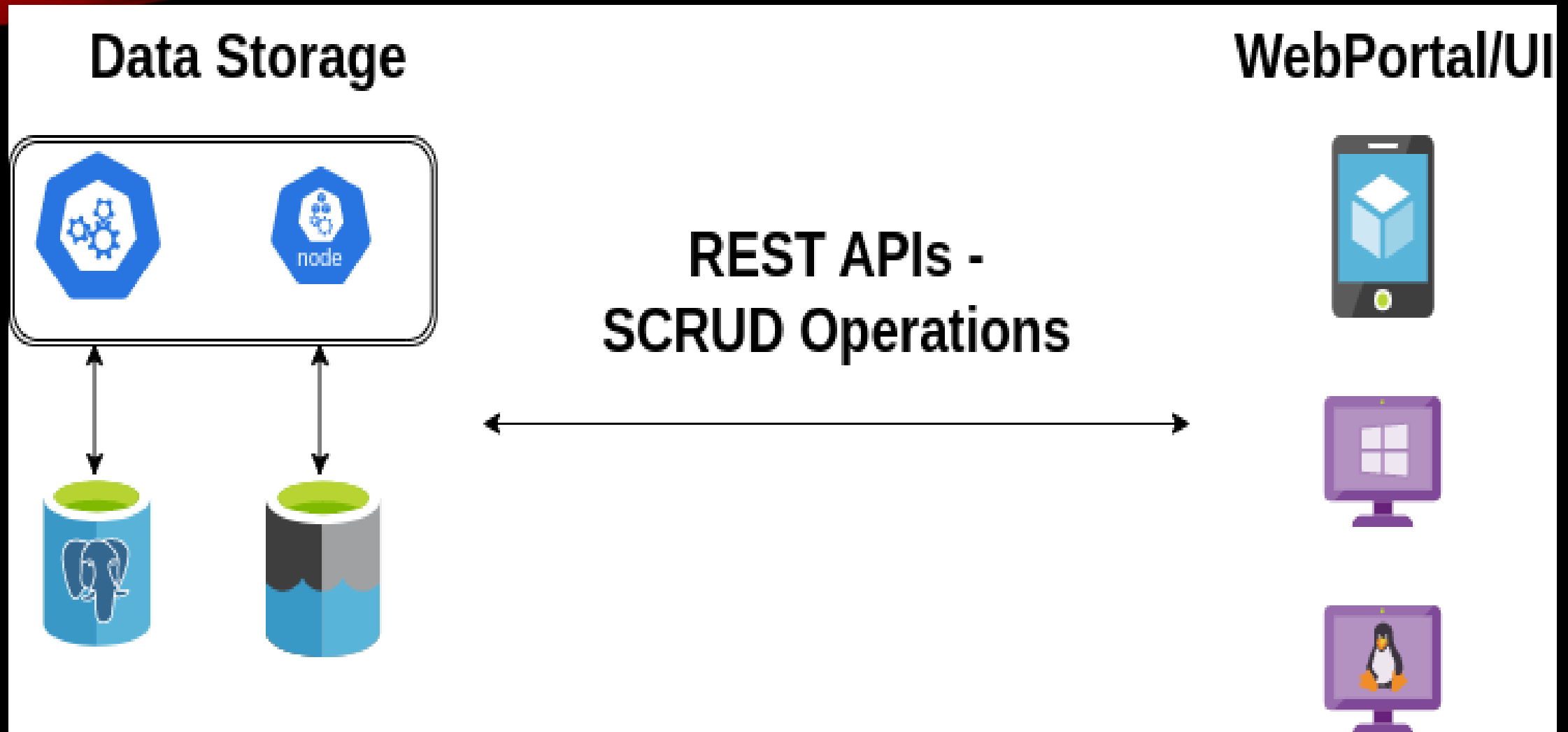
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IMPLEMENTATION FLOWCHART CONT..



IMPLEMENTATION FLOWCHART CONT..





EXPECTED OUTCOMES

- **Enhanced Data Interoperability:** A well-structured SDI will allow various organizations and sectors to integrate and share geospatial data seamlessly, breaking down data silos and improving collaboration across industries.
- **Improved Decision-Making and Planning:** With better access to accurate and timely geospatial data, decision-makers can create more informed policies and strategies for urban development, environmental management, disaster preparedness, and resource allocation.
- **Increased Efficiency and Cost Savings:** By reducing data duplication and improving access to shared datasets, an SDI helps organizations save time and resources, leading to more efficient processes and reduced operational costs.
- **Boosted Innovation and Economic Opportunities:** The open availability of spatial data encourages the development of new applications, services, and technologies, stimulating innovation and creating economic opportunities across various sectors such as smart cities, agriculture, and logistics.
- **Strengthened Collaboration between Stakeholders:** The SDI fosters stronger partnerships and communication between government agencies, private sector entities, academic institutions, and the public, enhancing cross-sectoral cooperation on national and regional projects.



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PNGFA



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DANGE!

ONWARDS TO THE ASPNG 57TH ANNUAL CONGRESS