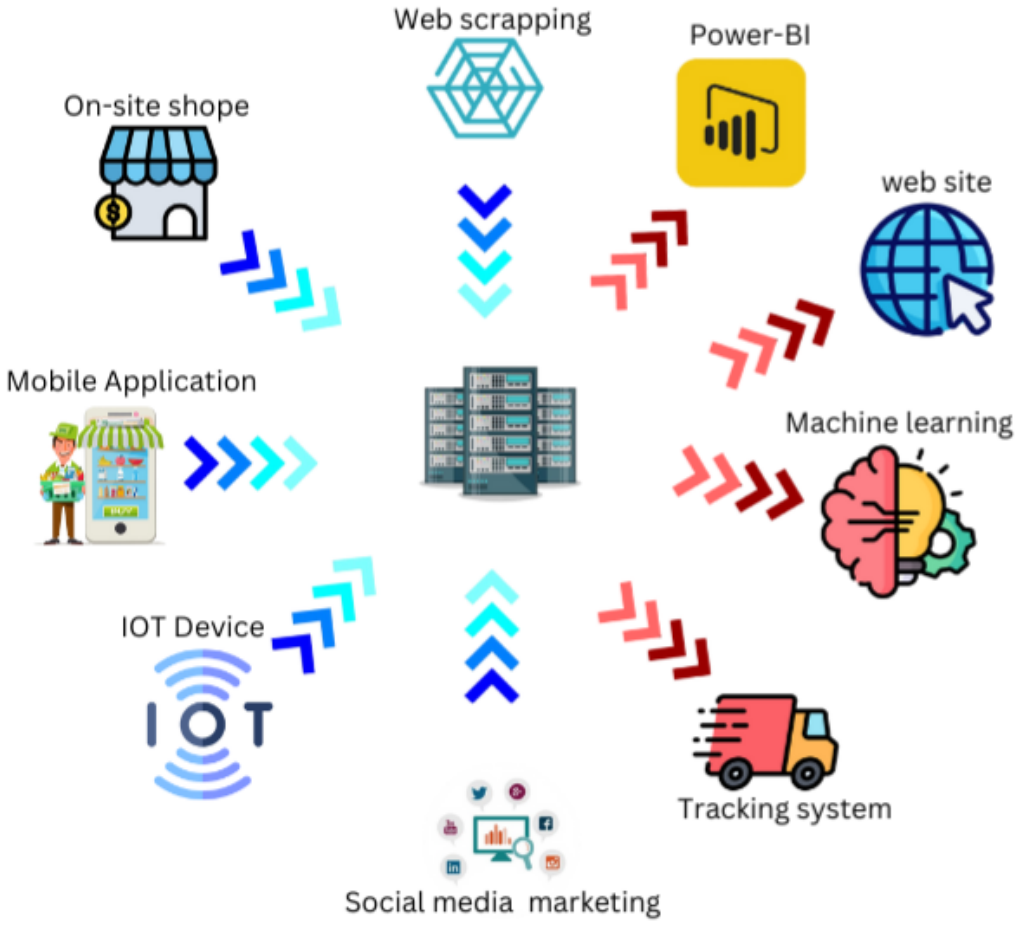
Nature Pick's

Vision:

Nature Pick's is dedicated to producing and delivering fresh, high-quality products to our customers. By integrating advanced IoT devices into our farming processes, we ensure efficiency, sustainability, and exceptional quality from the field to your hands. Our products are available both in-store and through our user-friendly mobile application, providing convenience and accessibility to meet the needs of our valued customers.



Proposed Cloud Architecture

The proposed cloud architecture leverages Microsoft Azure services to ensure scalability, efficiency, and real-time data processing. Below is the detailed architecture:

- Data Sources:
- Mobile Application: Collects structured data such as orders, customer information, and sales.
- On-Site IoT Devices: Monitor environmental conditions (e.g., temperature, humidity) and logistics tracking.
- Social Media APIs: Provide marketing insights.
- Web Scraping: Gathers market trends from e-commerce platforms.

- Data Ingestion:
- Azure IoT Hub: Manages real-time IoT sensor data.
- Azure Event Hubs: Handles high-throughput streaming data from various sources.

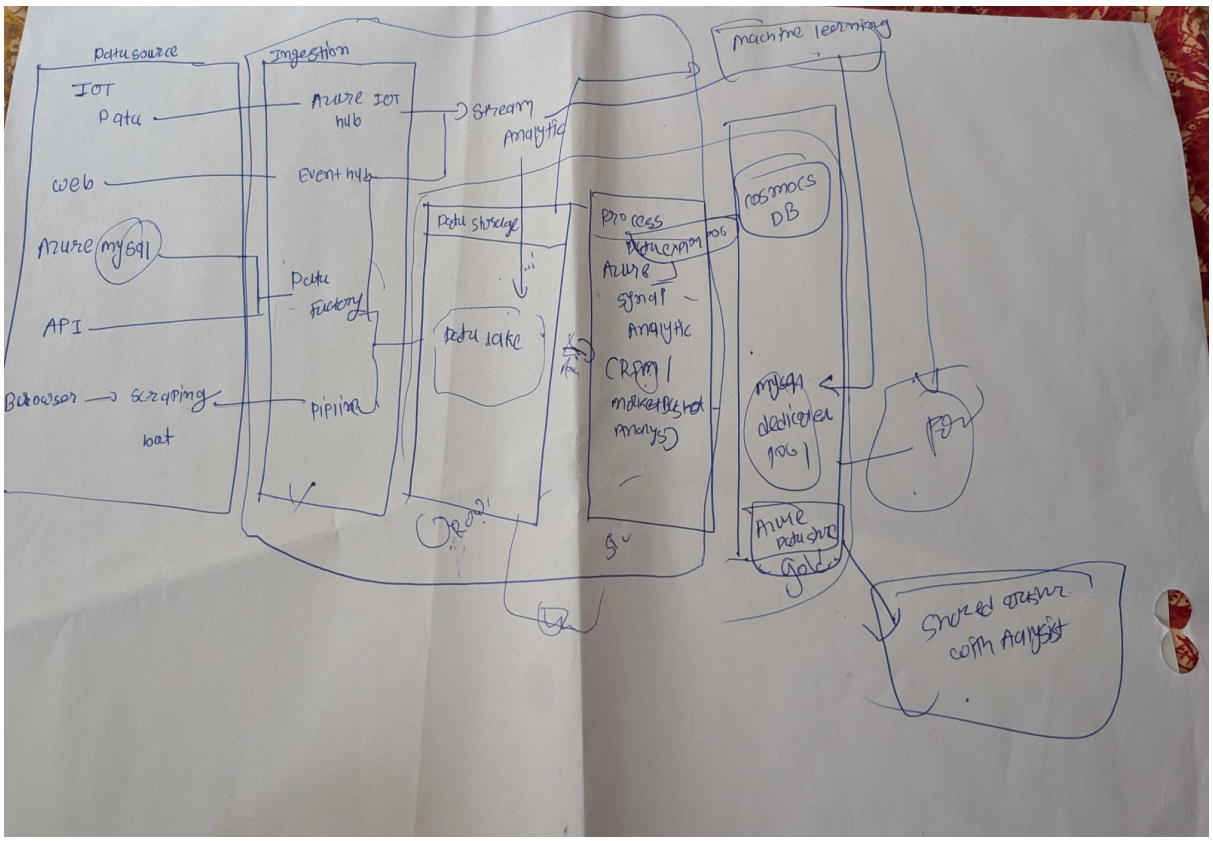
- Data Storage:
- Azure Data Lake Storage: Stores raw and semi-structured data.
- Azure Blob Storage: Manages large-scale unstructured data.
- Azure Database for MySQL and Cosmos DB: Store structured data for quick retrieval.

- Data Processing & Analytics:
- Azure Synapse Analytics: Performs large-scale data analytics.
- Azure Databricks: Supports machine learning models and advanced analytics.

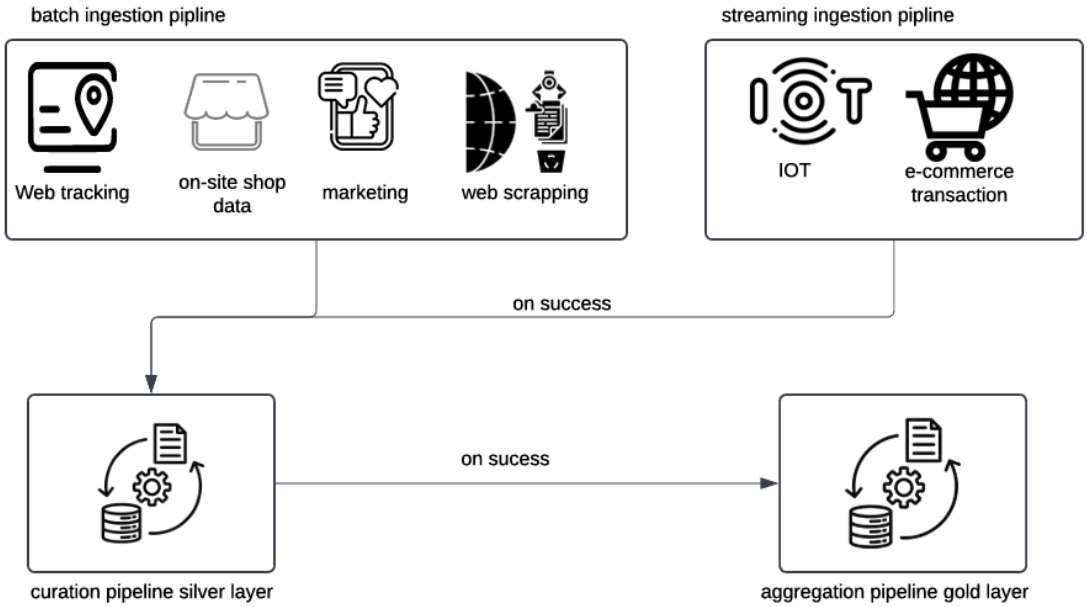
- Visualization & Insights:
- Power BI: Provides dashboards for sales performance, inventory management, and customer insights.
- Machine Learning Models: Optimize pricing strategies and product recommendations based on customer behavior and market trends.

This architecture ensures seamless integration of multiple data sources while maintaining high performance and scalability.

This is our Phase 1 architecture:



The Development:



Batch Ingestion Pipeline

- Purpose: Processes data collected in bulk at scheduled intervals.
- Data Sources:
- Web Tracking: Tracks user interactions on the website to analyze customer behavior.
- On-Site Shop Data: Gathers sales, inventory, and operational data from physical stores.
- Marketing: Collects insights from marketing campaigns, such as customer engagement and ad performance.
- Web Scraping: Extracts market trends and competitor information from e-commerce platforms.

2. Streaming Ingestion Pipeline

- Purpose: Handles real-time data streams for immediate processing.
- Data Sources:
- IoT Devices: Provide real-time environmental monitoring (e.g., temperature, humidity) and logistics tracking.
- E-Commerce Transactions: Captures live sales data from online platforms.

Processing Stages

1. Curation Pipeline (Silver Layer):

- This layer processes raw data from both ingestion pipelines into a structured format.
- The goal is to clean, transform, and organize the data for further analysis.

2. Aggregation Pipeline (Gold Layer):

- The curated data is aggregated into a refined format for actionable insights.
- This layer supports advanced analytics, reporting, and machine learning models.

Key Workflow Connections

- Data flows from batch or streaming ingestion pipelines into the curation pipeline (silver layer) upon successful ingestion.
- Once curated, the data is further processed into the aggregation pipeline (gold layer) for final use in dashboards, analytics, or decision-making systems.

Proposed Development Pipeline

The development pipeline integrates various technologies to support Nature Pick's mission of delivering quality products efficiently while promoting sustainability:

1. Data Collection & Ingestion:
- IoT devices collect real-time environmental data (e.g., soil moisture, temperature).
- APIs ingest social media marketing data.
- Web scraping tools gather competitive market insights.

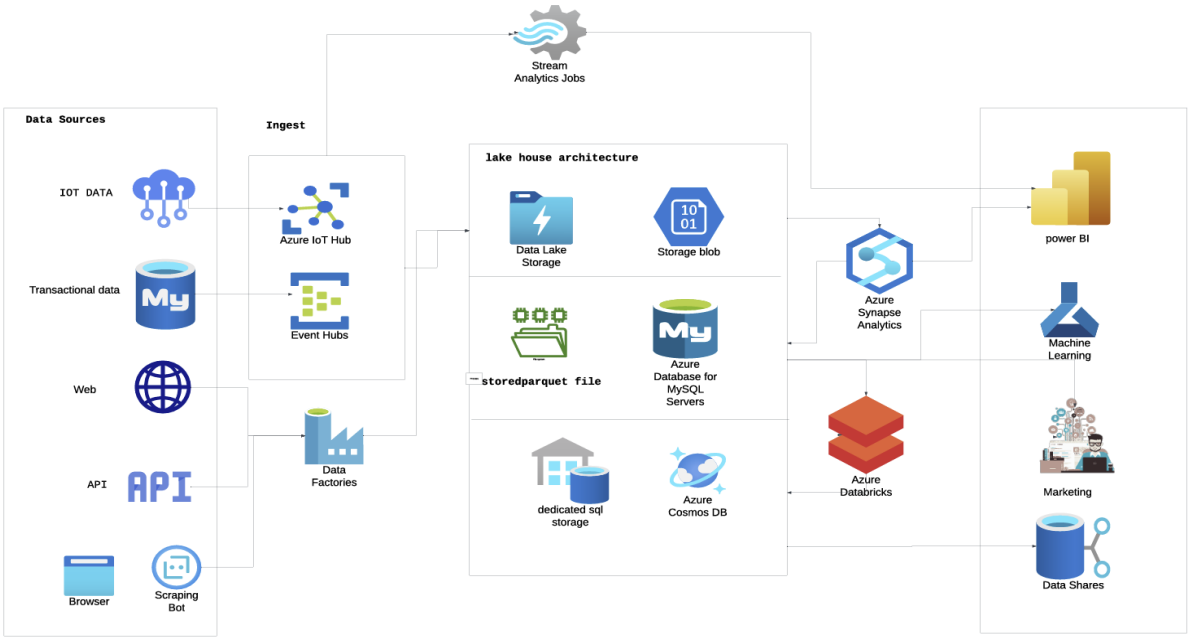
2. Data Processing & Transformation:
- Azure Data Factories automate ETL (Extract, Transform, Load) operations.
- Data is processed in Azure Synapse Analytics for advanced analytics.

3. Storage & Management:
- Structured data (e.g., customer information) is stored in Azure MySQL Database.
- Unstructured raw data is managed in Azure Blob Storage.

4. Insights Generation & Actions:
- Power BI dashboards visualize key metrics like sales trends, inventory levels, and logistics tracking.
- Machine learning algorithms provide actionable insights for product recommendations and dynamic pricing strategies.

5. Continuous Monitoring & Feedback Loop:
- Real-time monitoring systems track inventory levels and delivery statuses.
- Feedback loops from customer interactions improve operational efficiency over time.

This is Final Phase:



Conclusion:

The development pipeline effectively supports Nature Pick's mission by integrating technology to ensure operational efficiency, sustainability, and superior customer engagement. It leverages IoT devices, cloud computing, machine learning, and data analytics to provide real-time insights that optimize farming practices, inventory management, and customer satisfaction. This holistic approach positions Nature Pick's as a leader in eco-friendly agriculture.

Learning Outcomes:

1. Technological Integration: Understanding how IoT devices, cloud platforms (Azure), and machine learning models can work together to optimize agricultural operations.

2. Data-Driven Decision Making: Leveraging analytics tools like Azure Synapse Analytics and Power BI to derive actionable insights for business improvements.

3. Sustainability Practices: Implementing eco-friendly farming techniques supported by real-time monitoring to reduce environmental impact.

4. Customer-Centric Approach: Enhancing customer experiences through seamless mobile applications, tailored recommendations, and efficient logistics tracking.

5. End-to-End Pipeline Design: Gaining expertise in designing a scalable pipeline that integrates diverse data sources while ensuring smooth ingestion, storage, processing, and visualization.

This development strategy demonstrates how advanced technology can transform traditional industries while promoting sustainability—a valuable addition to any portfolio showcase.