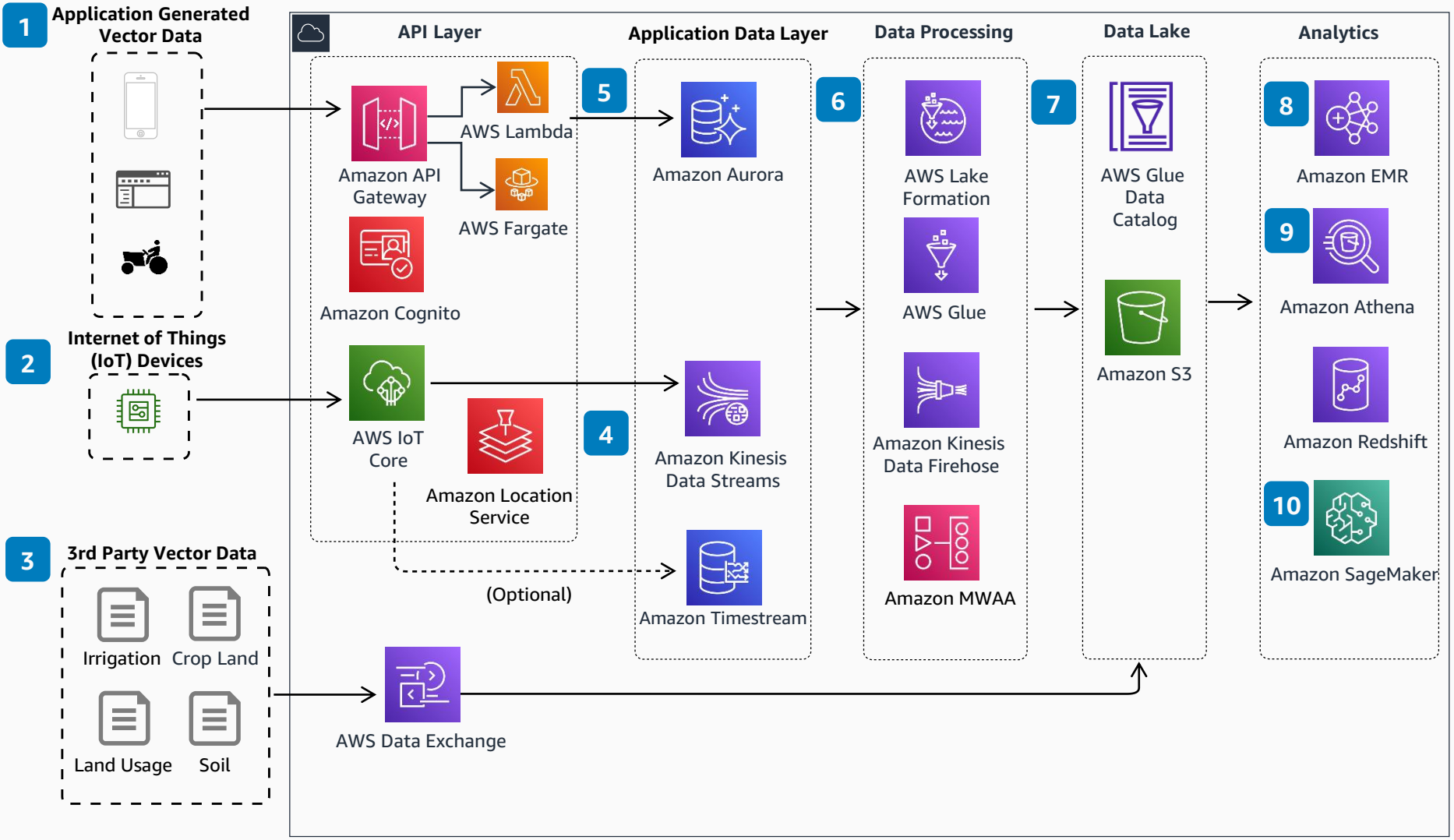
Guidance for Scalable Geospatial Vector Capabilities for Agriculture on AWS

This Guidance shows how to handle vector data for both online transaction processing (OLTP0) and online analytical processing (OLAP) workflows. It highlights built-in features of AWS services and open source add-ons for storing and processing vector data, as well as how the different components connect in the AWS Cloud.



1. Generated geometric data on the farm in mobile, web, and in-cab applications is sent to the AWS Cloud through **Amazon API Gateway** and is backed by **AWS Lambda** or **AWS Fargate**.

2. Sensors on the farm send point data to **AWS IoT Core** for collection and rules-based evaluation to filter, transform, and act.

3. Third-party vectors from government sources and **AWS Data Exchange** can be integrated into the data lake.

4. **Amazon Location Service** is integrated at the API layer to support routes, tracking, and geofences (a virtual boarder around a physical location) for devices in the field. Time series data can be analyzed in a streaming manner with **Amazon Kinesis** or sent to **Amazon Timestream** for both recent and historic data analysis.

5. **Amazon Aurora PostgreSQL-Compatible Edition** with the PostGIS extension installed allows for vector operations supporting online applications.

6. **AWS Lake Formation** is used to create the data lake and to manage moving data from the application data layer into the data lake. **Amazon Managed Workflows for Apache Airflow** (Amazon MWAA) can be used to orchestrate more complex processing jobs.

7. The **AWS Glue Data Catalog** maintains references to your tables containing vector data in your **Amazon Simple Storage Service** (Amazon S3) data lake.

8. **Amazon EMR** with Apache Sedona™ installed provides scalable vector analytics for the most difficult vector problems.

9. **Amazon Athena** and **Amazon Redshift** provide interactive analysis with built-in geospatial vector support.

10. Use **Geospatial ML with Amazon SageMaker** to perform vector enrichment jobs like reverse geocoding or map matching.

Reviewed for technical accuracy March 23, 2023

AWS Reference Architecture