

kigali tech happy hour

FIRST THURSDAY, 6:30PM
IMPACT HUB KIGALI, KIYOVU



This is My Architecture

Scalable geospatial data on AWS

by Casey Slaught

Background

- **What is Amazon Web Services (AWS)?**
 - **On-demand cloud computing platform**
 - **> 150 services**

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 - > 150 services
- What is Caracal?
 - Geospatial data automation tool for protected areas
 - Moves data from *sources* to *destinations*



Sources

Third-party sources

Collect data from your favorite tools such as Google Sheets, TRBOnet and Orbcomm satellite collars.

REST API

Collect and distribute your own geospatial data by integrating with the real-time REST API.

Centre

Data management

View and manage your tracked devices. Assign attributes to individuals such as call-sign, blood type and phone number.

Alerts

View connection and mobility alerts. Manage alert recipients.

Destinations

Cloud GIS

Send your data to ArcGIS Online and automatically receive feature-rich web layers. Download auto-generated Network KML files.

Reporting

Receive automatic alerts via email or SMS.

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 - > 150 services
- **What is Caracal?**
 - Geospatial data automation tool for protected areas
 - Moves data from *sources* to *destinations*
- **What is geospatial data?**
 - Data that includes a location on the surface of the earth
 - Location described using various coordinate systems

Challenges

- **Scaling to a million positions a minute**
- **Querying and analysis**
- **Maintainability**
- **Security**
- **Cost**

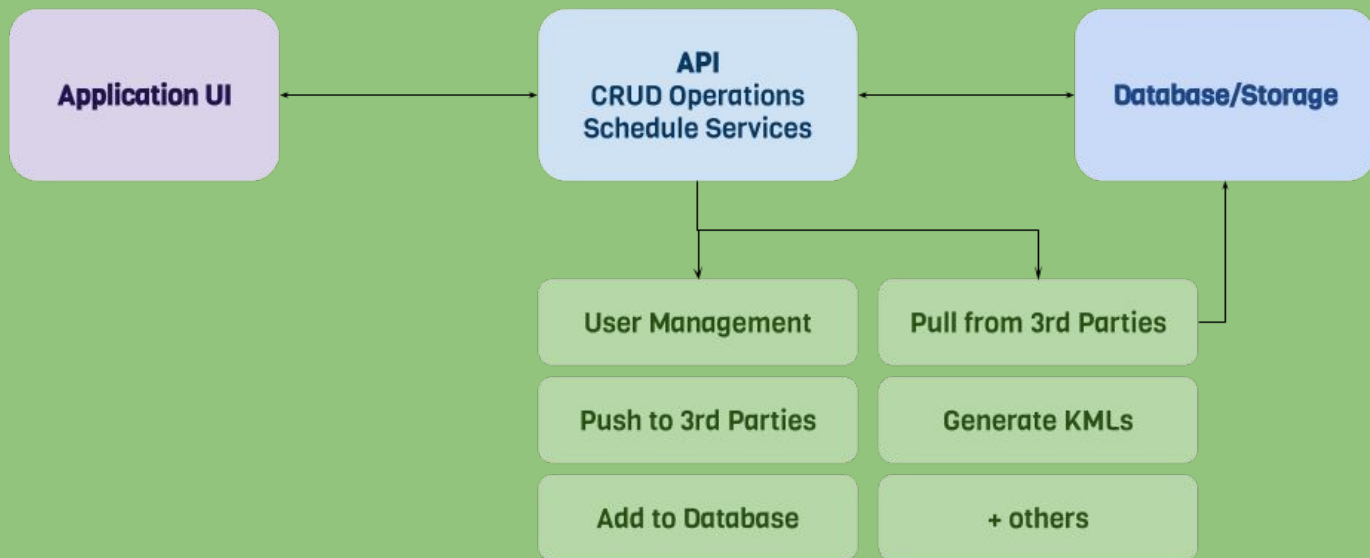
A bad way of doing it :(

- One big monolithic API



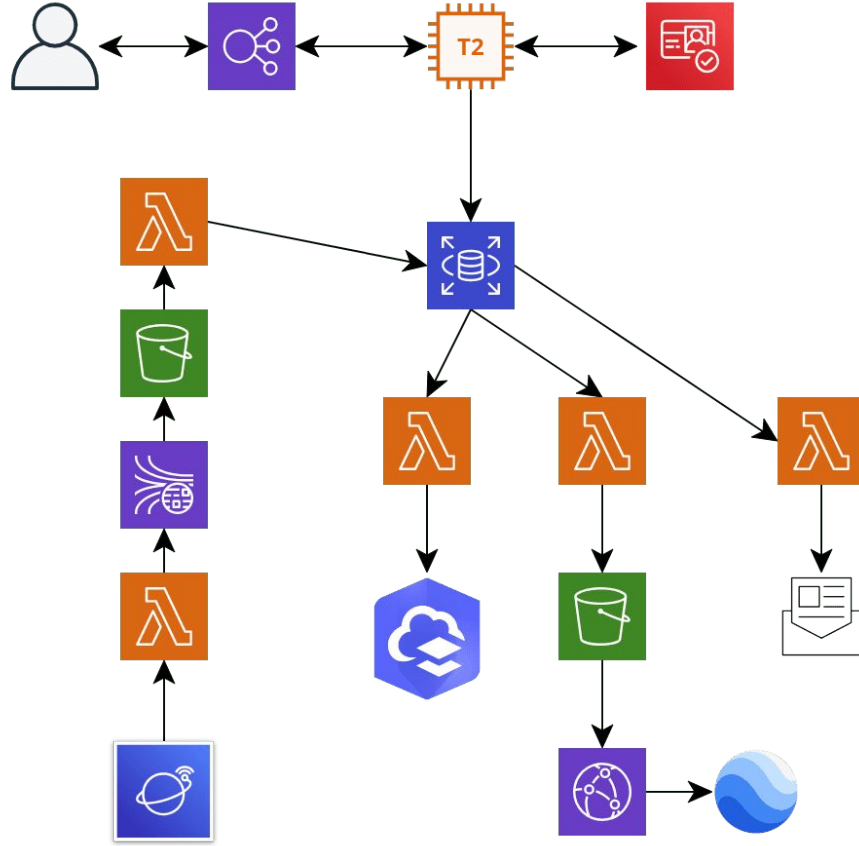
A better way of doing it :)

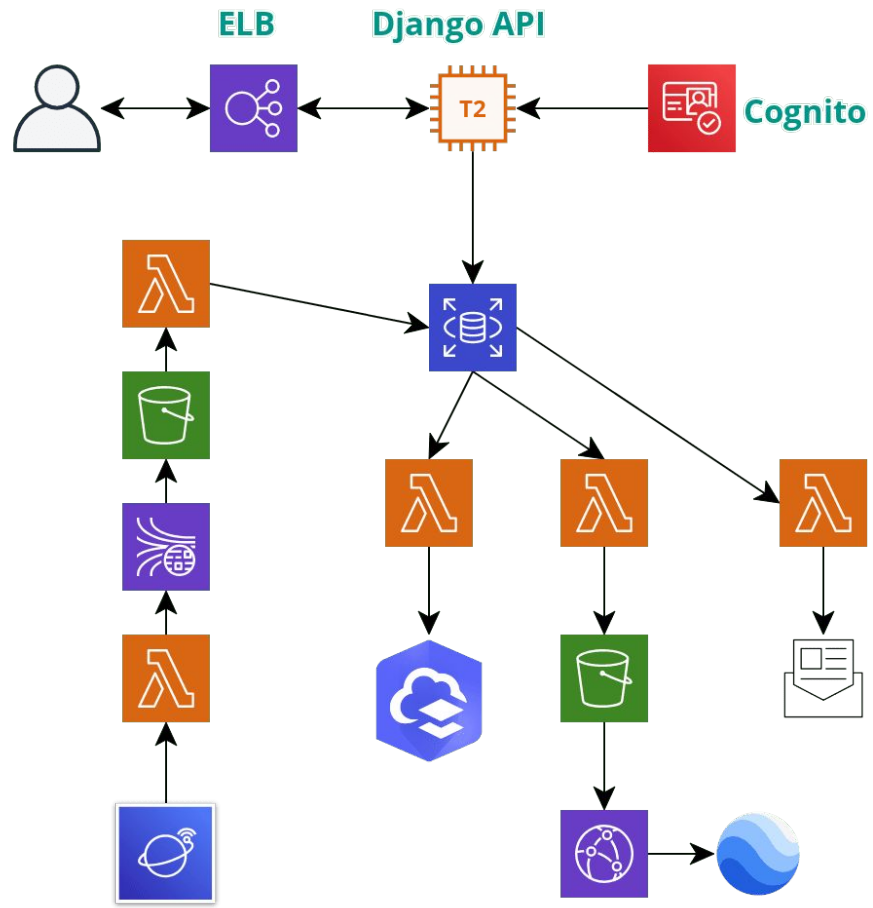
- A single API but also a bunch of services and storage

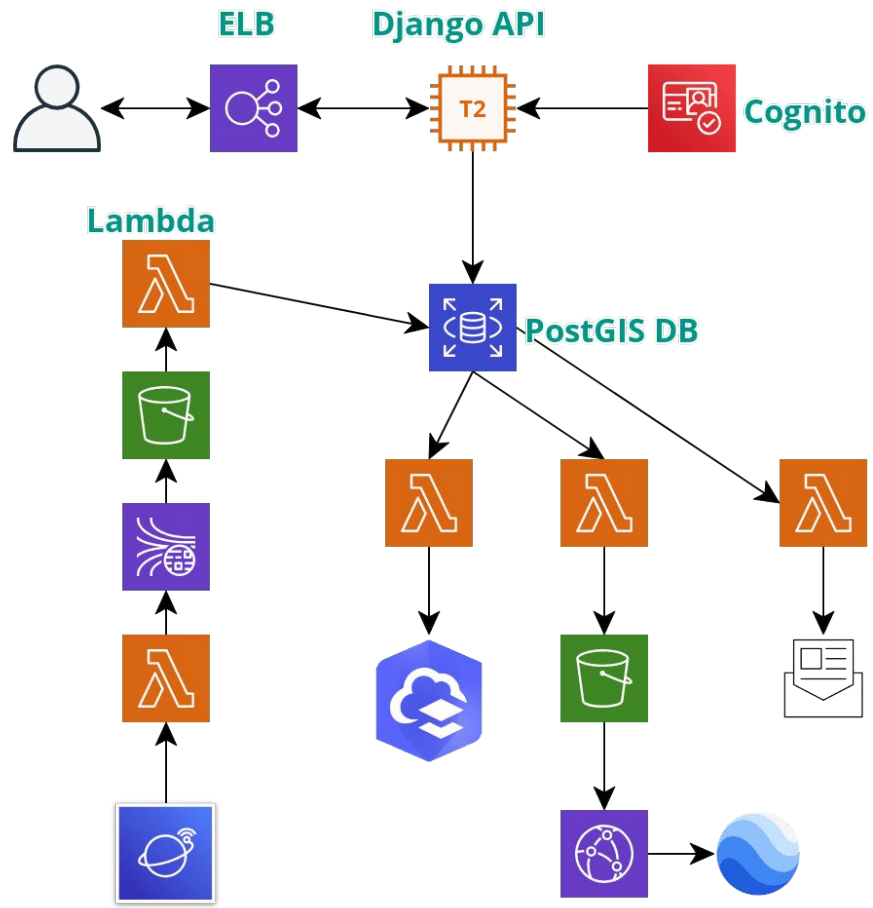


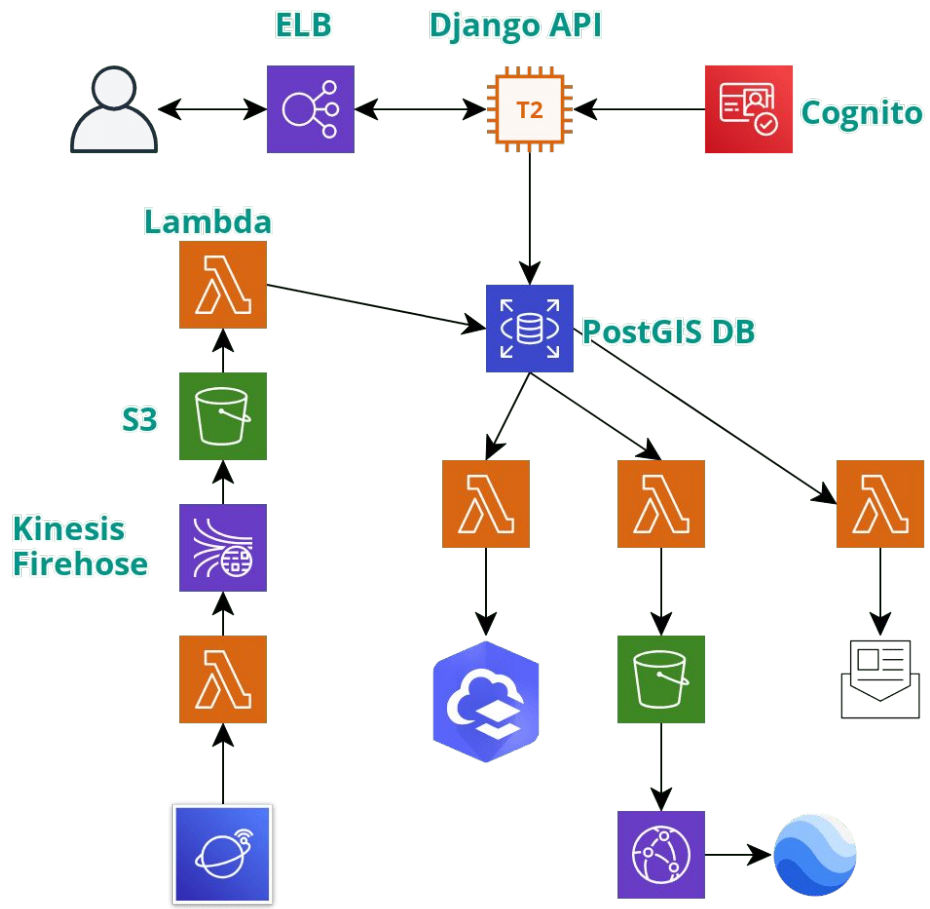
Lifecycle of a satellite collar position

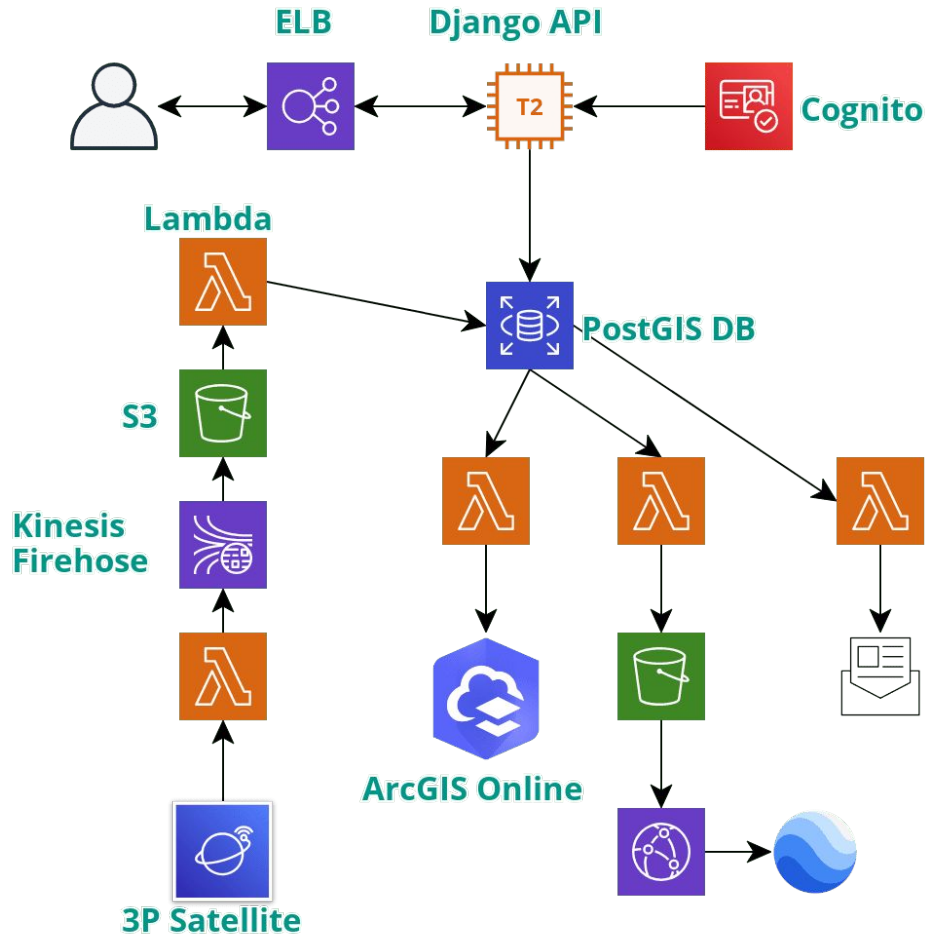
- **User adds an account**
 - **Services scheduled**
 - **Pull collar data**
 - **Push data to ArcGIS Online**
- **Service retrieves collar positions**
 - **Added to data pipeline for buffering**
- **Positions are added to database**
- **Service queries database and adds positions to ArcGIS**

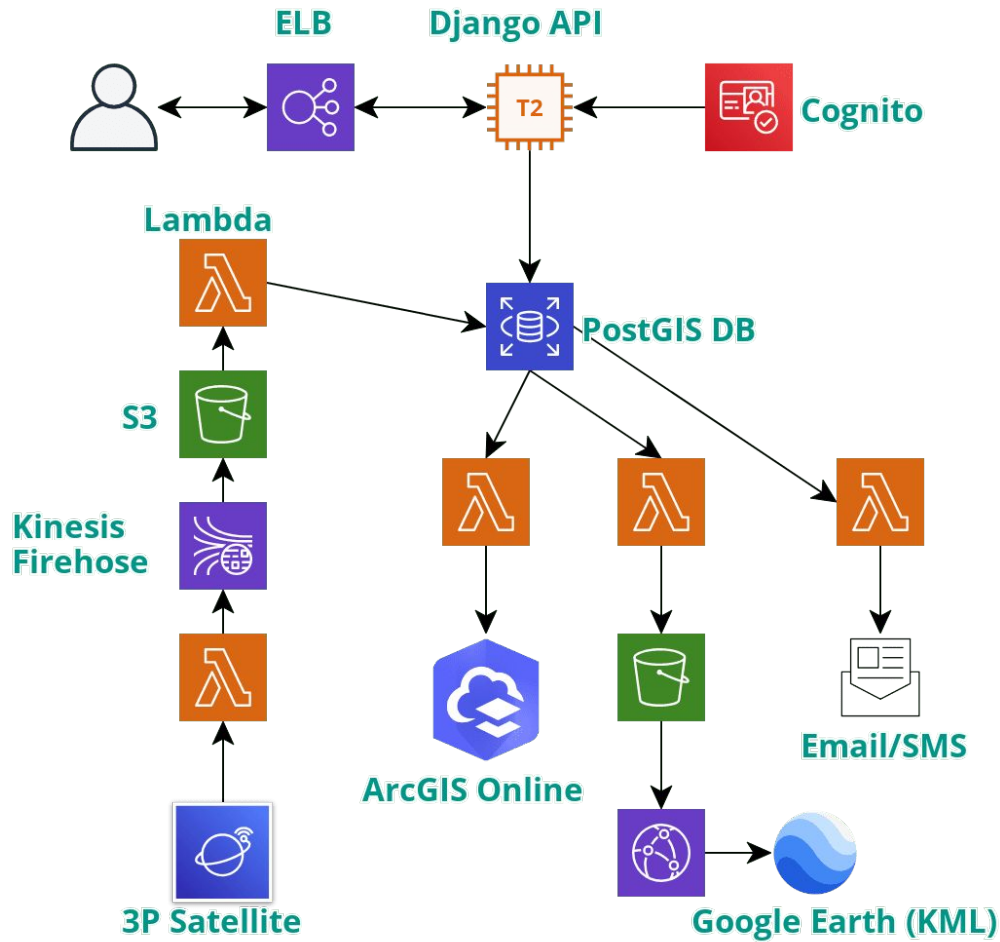












Challenges

- **Scaling to a million positions a minute**
 - Lambda, Kinesis Firehose + S3, ELB
- **Querying and analysis**
 - PostGIS plugin for PostgreSQL, Athena*
- **Maintainability**
 - Many bite-sized Lambda functions
- **Security**
 - Cognito, Cloudfront, Lambda@Edge*
- **Cost**
 - Lambda, S3

Resources

- **CloudCraft.co**
 - Design AWS architectures
 - View projected budgets, export to Terraform
- **caracal.cloud**
 - Automate geospatial data flows
- **ArcGIS Online**
 - Cloud-based GIS mapping platform
 - Perform in-depth analysis

Thank you!

Questions?

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