Situation

Client

PrestaCop, a company specializing in service delivery for police forces, wants to create a drone service to help police systems make parking tickets.
A camera with a pattern recognition software identifies license plates and characterizes infractions.
PrestaCop has teams to develop the drone and does work. The first prototype is finished it can qualify some infraction. However Prestacop service comes with a software as service offer that PrestaCop struggle to create.

Drone description

Each drone send message regularly, each standard message contains : drone location(latitude, longitude…), timestamp, drone id.
In the event of a violation, the drone sends separately:

- 1 image
- a standard message with additional field : a violation code describing the nature of the offense, image id

A human operator can take control of any drone at any time. Taking control of the drone is done through an already existing software using the drone id.
In doing so the employee is free to observe vehicles from any angle while driving the drone.

Alert

When the drone can not qualify a possible offense with accuracy, its message's violation code indicate it requires human intervention.
If this happen a operator (probably a NYPD officer) using the remote control feature described below understand the situation and may send a new message with the right violation code. (Example a police officer will take control of the drone in order to read a car's plate that the drone can't read).

After a few tests performed prestacop estimates that this represents 1% of observed violations.

Statistics

PrestaCop is convinced that we need to keep every drone's messages in order to make statistics and improve their services. But they still don't know what kind of question/statistic they will want to address.
PrestaCop estimate that everyday drone will produce 100Gb of data.

Initial feed

PrestaCop has forged a partnership with the New York police to retrieve the history of their tickets data. They want to use NYPD historical data to improve those statistics thus they want to transform it to its equivalent drone data to feed

their information system. This historical data is existing data on tickets previously written by NYPD (without Prestacop's system).
NYPD poses 2 constraints: its computers are old and not very powerful, This history is stored in a large CSV.
You can find the csv on
https://www.kaggle.com/new-york-city/nyc-parking-tickets#Parking_Violations_Issued_-_Fiscal_Year_2015.csv

Failed attempt

To create a POC PrestaCop hired a team of data-scientists and
Prestacop manager expect this team of data-scientists to provide a program that uses few memory resources and can send to PrestaCop computers (or cloud) NYPD historical data.
Despite all their efforts, PrestaCop's data teams have not been able to set up a program that is light enough to send them data from New York police computers.

Preliminary questions

1) What technical/business constraints should the architecture meet to fulfill the requirement described by the customer in paragraph «*Statistics*» ? (In other words the customer has express some needs, some existing solutions, it comes with limitations).
   So what kind of component(s) (listed in the lecture) will the architecture need?
2) Same question with the paragraph «Alert»
3) What mistake(s) from Prestacop can explains the failed attempt?
4) Prestacop has likely forgot some technical information in the regular message sent by the drone. In the future this information could help Prestacop make its product much more profitable. Which information?

Project

PrestaCop understand this is beyond their team limits, it can not put in place an information system to deal with the drone's data. PrestaCop asks you for advice to design an architecture allowing them to create a product they could sell to different police forces. Ideally you should also tell PrestaCop how to power this product with NYPD data.

It's up to you to report and recommend what to do.