Enabling Smart Data Filtering by Extending the RIPE Atlas Measurement API

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1. The RIPE ATLAS Platform

What is RIPE Atlas?
- Is a **global**, **open**, **distributed** Internet Measurement platform consisting of thousands of measurement devices that measure Internet connectivity in real time (https://atlas.ripe.net)

How the Atlas platform works?
- Thousands of volunteers around the world host small hardware devices, called probes, in their homes and offices
- Anyone who hosts a probe earns credits
- Credits can be used for creating new measurements
- Results are publicly available through a REST API

Supported Measurement Types: Traceroute, Ping, HTTP, DNS, SSL, NTP

Connected: ~10.5k   Disconnected: ~1.4k

World map showing probes' locations

2. Background and Motivation

- Data plane measurement tools (i.e. traceroute, ping) are widely used by network operators and researchers for **monitoring** and **network diagnostics**

- Internet measurement platforms such as RIPE Atlas and CAIDA's archipelago (Ark) enable packet probing from various Vantage Points (VPs) around the globe, generating daily vast amounts of data

- In this work, we focus on the RIPE Atlas platform as it **allows the creation of user defined measurement campaigns** but also it provides **access** to the results **through a structured REST API**

- Although users can easily collect the results of their own measurements through the API, they can not pinpoint and extract results generated by other users' measurements

- The current RIPE Atlas API supports filtering per target address and a limited number of other parameters. However, it lacks support for more advanced filtering (i.e. fetch results generated by AS-X)

- Network operators and researchers are interested in results between specific source – destination pairs. Thus, the limitations of the current API adds significant overhead, since someone must download and parse all the results, even not relevant ones

- **Goal:** Allowing users of the platform to explore only results matching their filtering criteria

- **Contribution:** An open-source framework that enables advanced result filtering on top of the RIPE Atlas API

3. Prototype Framework Architecture

- The prototype tool is built using Python3, the Django web framework, and a relational PostgreSQL DB as multi-container Docker application. It provides structured and publicly available REST API
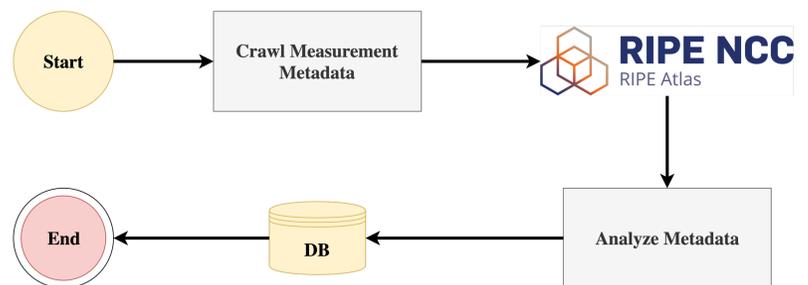
Workflow of indexing the RIPE Atlas measurements

How to use our prototype tool:
A step-by-step search procedure for RIPE Atlas data

1. User sends an advanced filtering query to our framework API (e.g. fetch all traceroutes from AS5400 (British Telecom) towards AS32934 (Facebook))
2. The framework (i) translates the query to a set of URLs pointing to the RIPE Atlas API, (ii) returns a JSON formatted object
3. By iterating to the set of URLs, user retrieves all available results matching his initial query
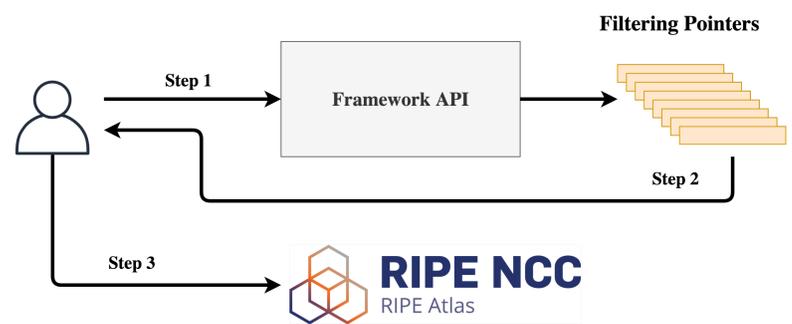
Workflow of a user query for RIPE Atlas data using our framework

4. Conclusions and Future Work

Although RIPE Atlas is a well-established measurement platform used by thousands of users and companies, there is still room for improvement

We plan to:
1. Extend the framework API functionality to support all measurement types (e.g. HTTP, DNS)
2. Improve the response performance and scalability of the framework
3. Automatically fetching meta data from RIPE Atlas stream in real time

Contact Info
- We are the **INSPIRE Group**, and you can find us at:

  https://www.inspire.edu.gr