# CMB WS 2022-23 Assignment 3

## Global Mobile Network Measurements

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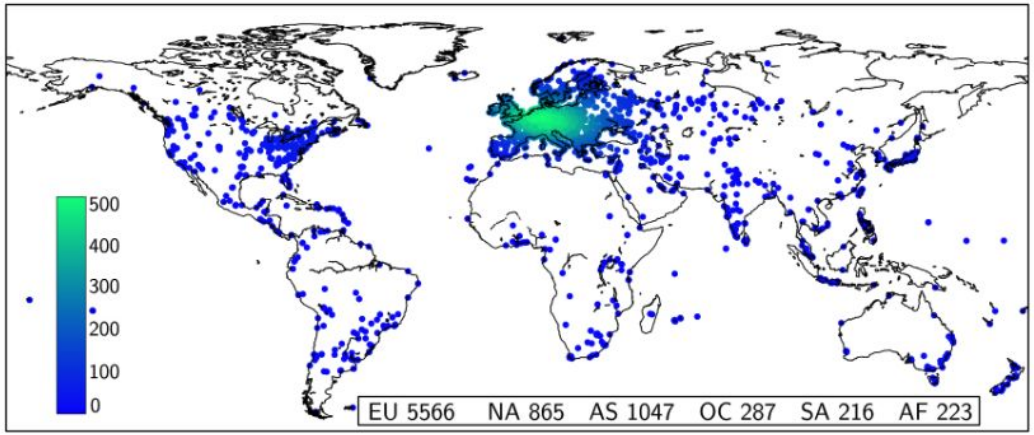
# Assignment Goal - Overview

Measure and analyze the mobile and fixed network performance globally

## RIPE Atlas measurement platform


## Mobile Networks

WiFi

Cellular

Satellite

# Why are we doing this?

I. Understand the operations of mobile networks globally
- What is the impact of wireless last-mile on end-to-end latency?
- Is mobile network performance similar in developed and developing regions of the globe?
- Can satellite networks provide more stable performance than WiFi/cellular worldwide?

II. Understand the connectivity to cloud providers globally
- What is the latency to connect to different cloud provider datacenters in different continents?
- What is the bottleneck link in the mobile client to cloud connection?
- Are there any benefits for (potentially) offloading computations to servers deployed closer to the clients (e.g. in ISP networks)?

III. Learn how to conduct and analyze Internet-wide measurements

# (Generalized) Assignment Tasks

*Prerequisite*: Set up RIPE NCC account and post account details on sheet in Moodle. We will transfer every student 1M RIPE credits for measurements.

1. Filter RIPE Atlas probes connected via WiFi, cellular and Starlink
   - Probe selection is most important task for correctness of wide-scale measurements. Choose wisely!
2. Select your cloud datacenter targets
   - Three different cloud providers: Amazon, Microsoft and Google
3. Conduct periodic pings and traceroutes measurements
   - Wisely choose your test parameters. Too many burns your credit. Too less affects your analysis
4. Analyze collected data
   - Wisely choose your analysis metrics. Which visualizations best answers the questions?

# Recommendations

1. Start early!
   - Measurements take time. Comprehensive measurements take more time and many retries.

2. Understand best practices for conducting Internet-wide measurements
   - Your analysis is as good as your measurements. Screw-ups in measurements will lead to screw-ups in analysis.
   - Read the publications in the references. They provide good hints on how to conduct measurements (and how to perform analysis).

3. Avoid the trap of “surface-level analysis”. Dig deep!
   - Think about the “correctness” of your analysis. Do you have enough datapoints? Did you clean your raw data well? Are your probe and datacenter selection good enough of the question you are answering? …