



POLITECNICO DI TORINO
Repository ISTITUZIONALE

Privacy-preserving network monitoring at high-speed

Original

Privacy-preserving network monitoring at high-speed / Favale, Thomas; Mellia, Marco; Drago, Idilio; Trevisan, Martino. - STAMPA. - (2019). ((Intervento presentato al convegno ACM IMC 2019 tenutosi a Amsterdam (NL) nel 21/10/2019 - 23/10/2019.

Availability:

This version is available at: 11583/2766737 since: 2019-11-13T16:20:04Z

Publisher:

Politecnico di Torino

Published

DOI:

Terms of use:

openAccess

This article is made available under terms and conditions as specified in the corresponding bibliographic description in the repository

Publisher copyright

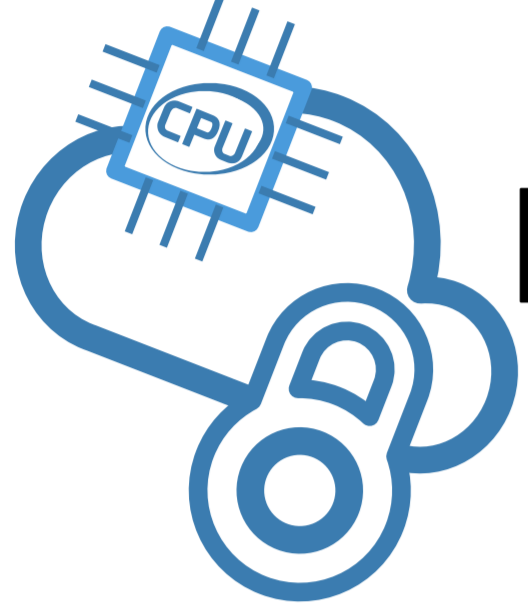
(Article begins on next page)

Supervisors:

Marco Mellia, Idilio Drago, Martino Trevisan

Motivation and background

The analysis of network traffic is essential for many application, such as cyber-security and traffic engineering, but...



Privacy is a critical point

Traffic analyzers must respect Privacy Regulations

e.g., **GDPR**



The goal is to perform analysis **without leaking sensitive information.**

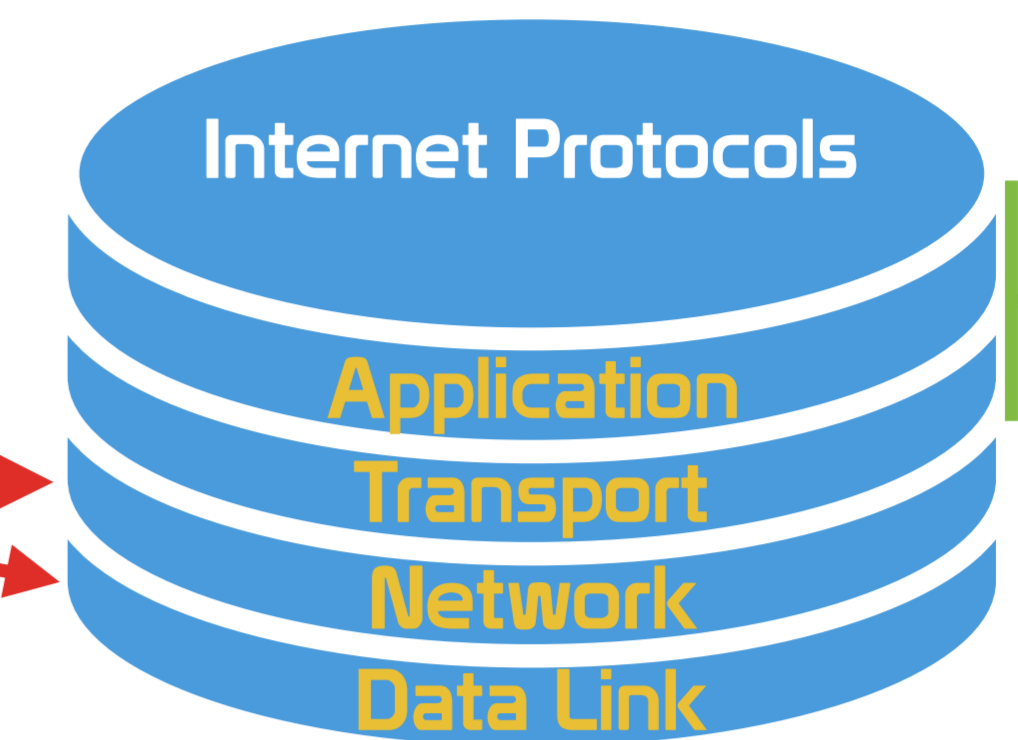
Requirements & Configuration

Our solution satisfies **three requirements**:

- It **automatically** searches for protocol fields that can be linked to **particular users**;

Cryptographic IP

Remove/Timestamping MAC



- It anonymizes at **different layers** (e.g. employing **k-anonymization** algorithms)
- Stateful approach is needed

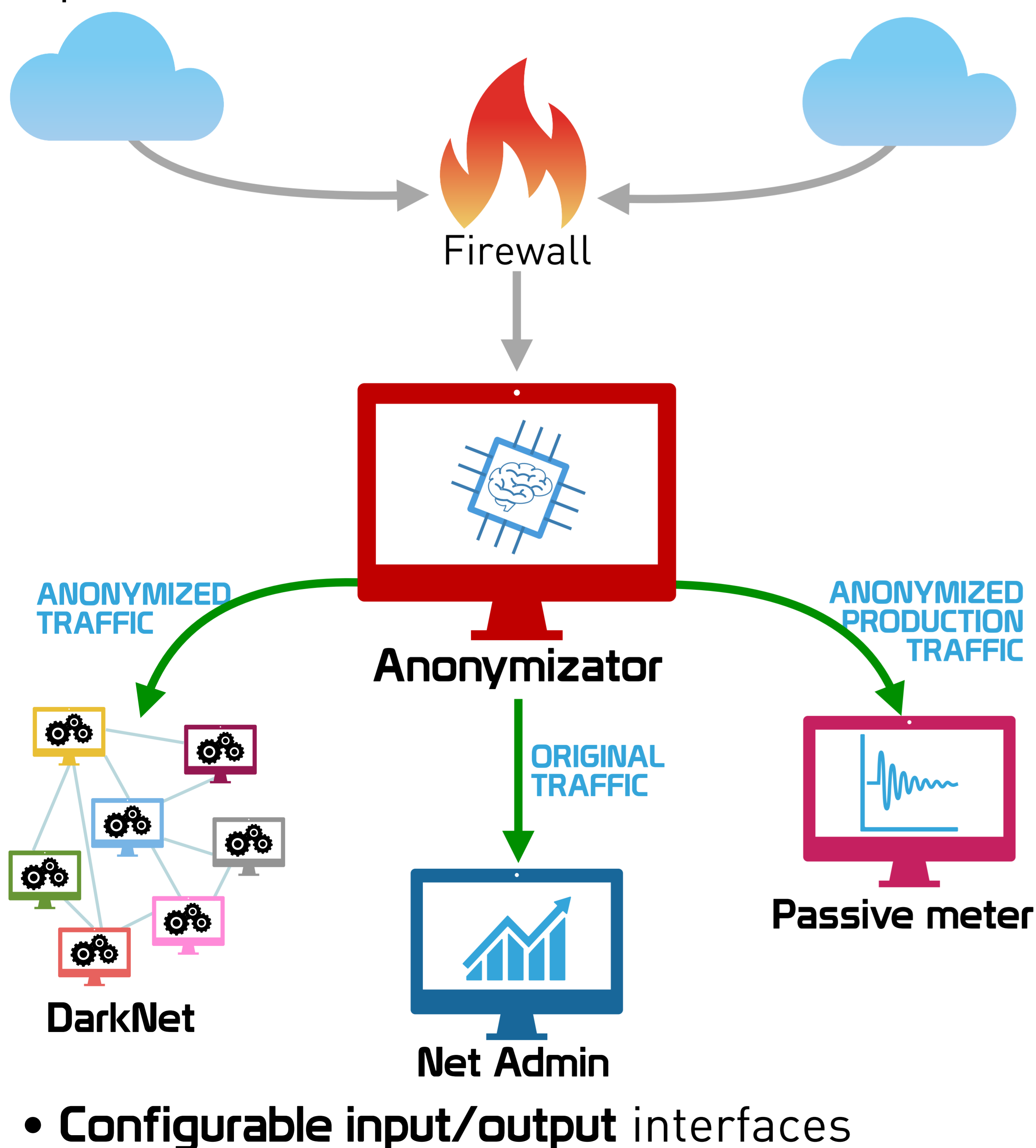
- It is **light-weight** and **scales with the number of cores.**



Architecture

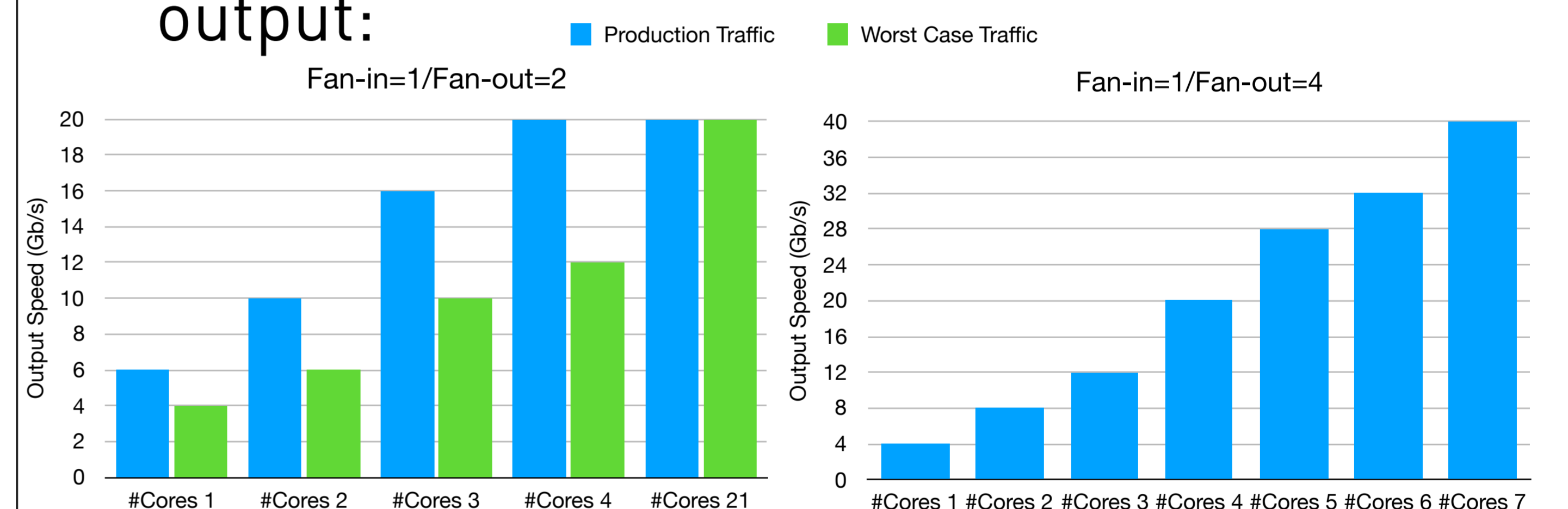
Our prototype is **deployed** in a **campus network**. It is able to:

- handle **multiple 10~Gb/s** links with **zero packet loss**;
- Packet capture based on DPDK
- performing **several anonymization** steps on packets.



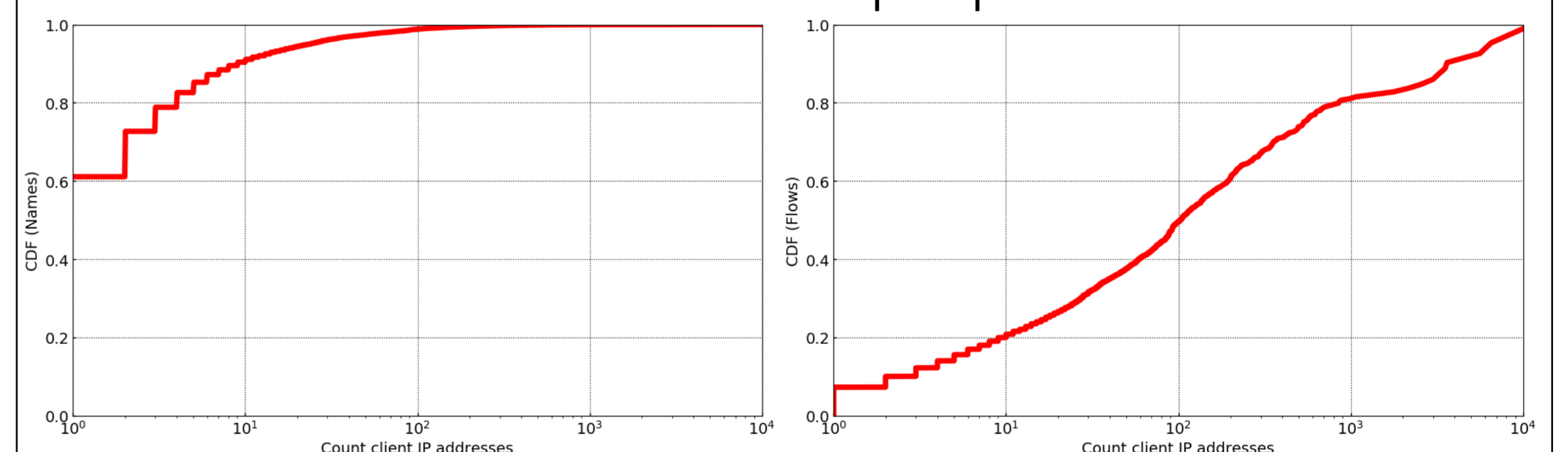
Performance

- Cores required for **20Gb/s** and **40Gb/s** output:



- **K-anonymization** impact on network traffic:

- Simulation on 1 hour of campus production traffic



Conclusions and future work

- We are implementing **k-anonymization approaches** to perform **selective** anonymization of sensitive fields;
- **Obfuscate** only cases where the **information helps to uncover users** behind the traffic;
- Increase **scalability**;
- **Distributed** architecture.

