Improving efficiency of IP alias resolution based on offsets between IP addresses

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- Our aproximation
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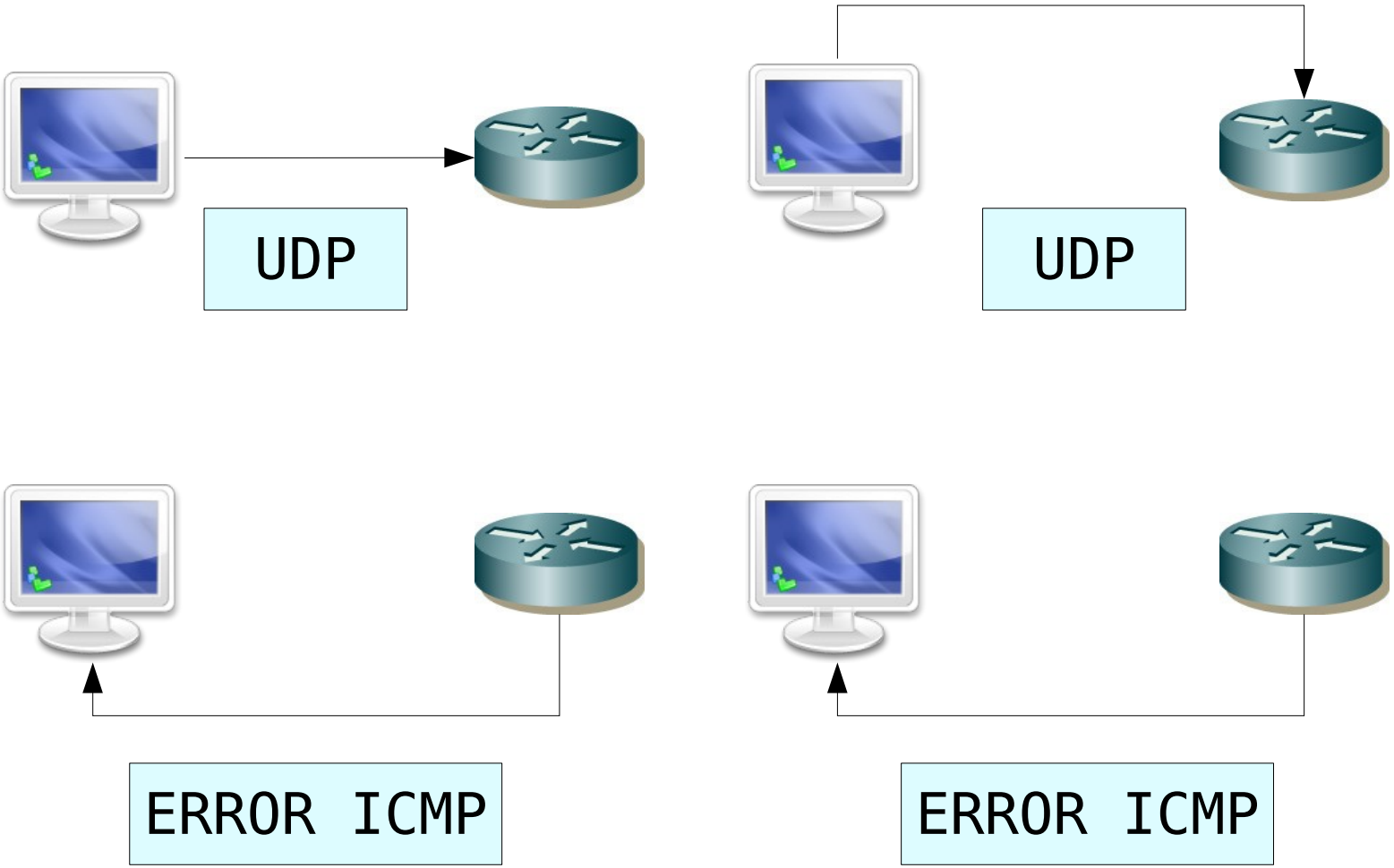
Introduction

- Discovering Internet topology
- Based on Paris traceroute
- Based on Mercator, Ally and variation of it.

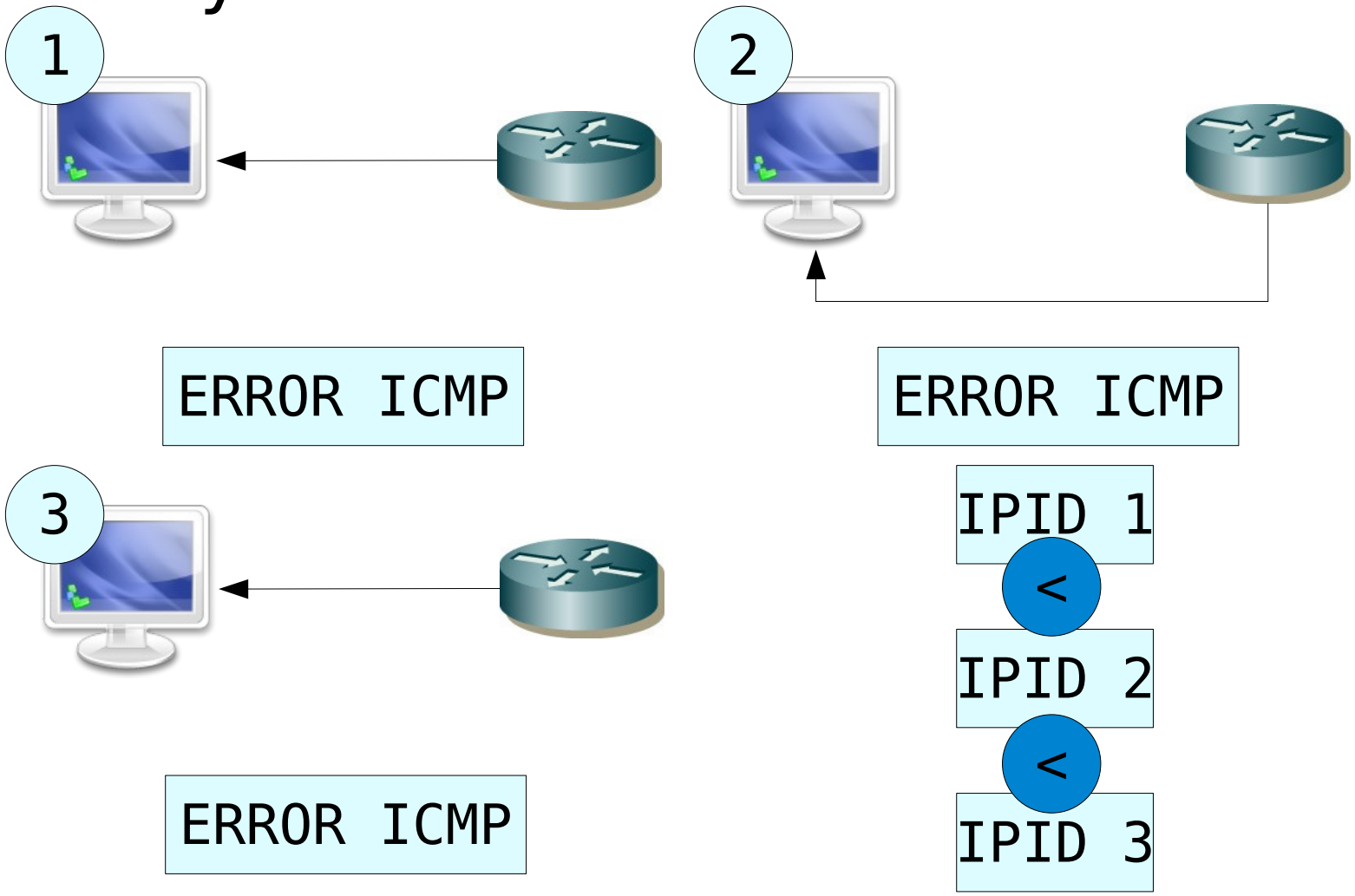
Introduction

- Mercator:



Introduction

- Ally:



Introduction

- Variations:
  - Vary the kind of packets.
    - Sending
      - Icmp echo
      - Icmp timestamp
      - Udp
      - Tcp
  - Vary the time of packets.
    - By sending each 0.2 seconds
  - Vary the number of packets.
    - By sending 20 packets

Introduction

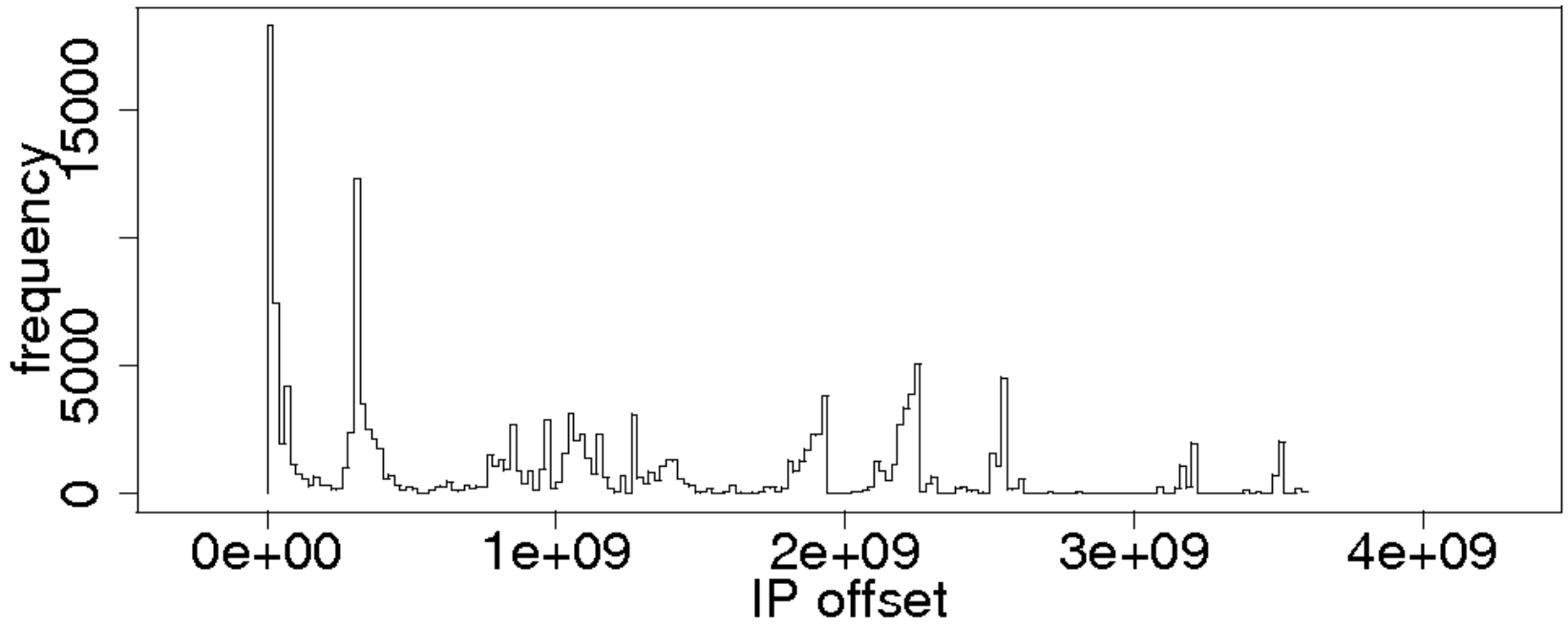
- $O(N^2)$ probes for like ally probes
- Lots of probes to do into Internet
- We need a way to reduce the total of probes
- We do not want to reduce the accuracy and the completness

Existing improving methods

- Static Offset to select pairs
- Existing improving methods
  - Bassed on TTL
  - Bassed on IPID
- TTL can not be use in distributted system
- IPID too cause you need to get the IPID from a snapshoot but you invest time in take it

Our aproximation

- In the identification probes on ETOMIC we saw this:



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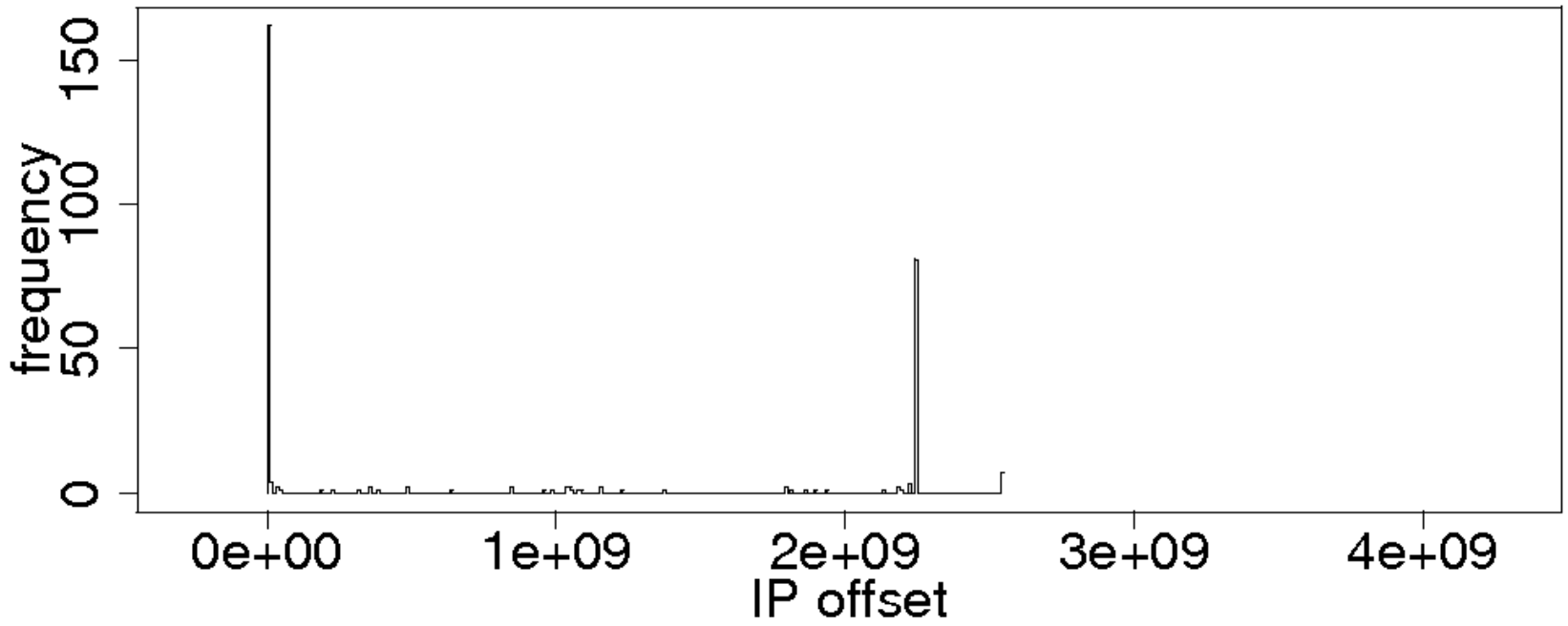

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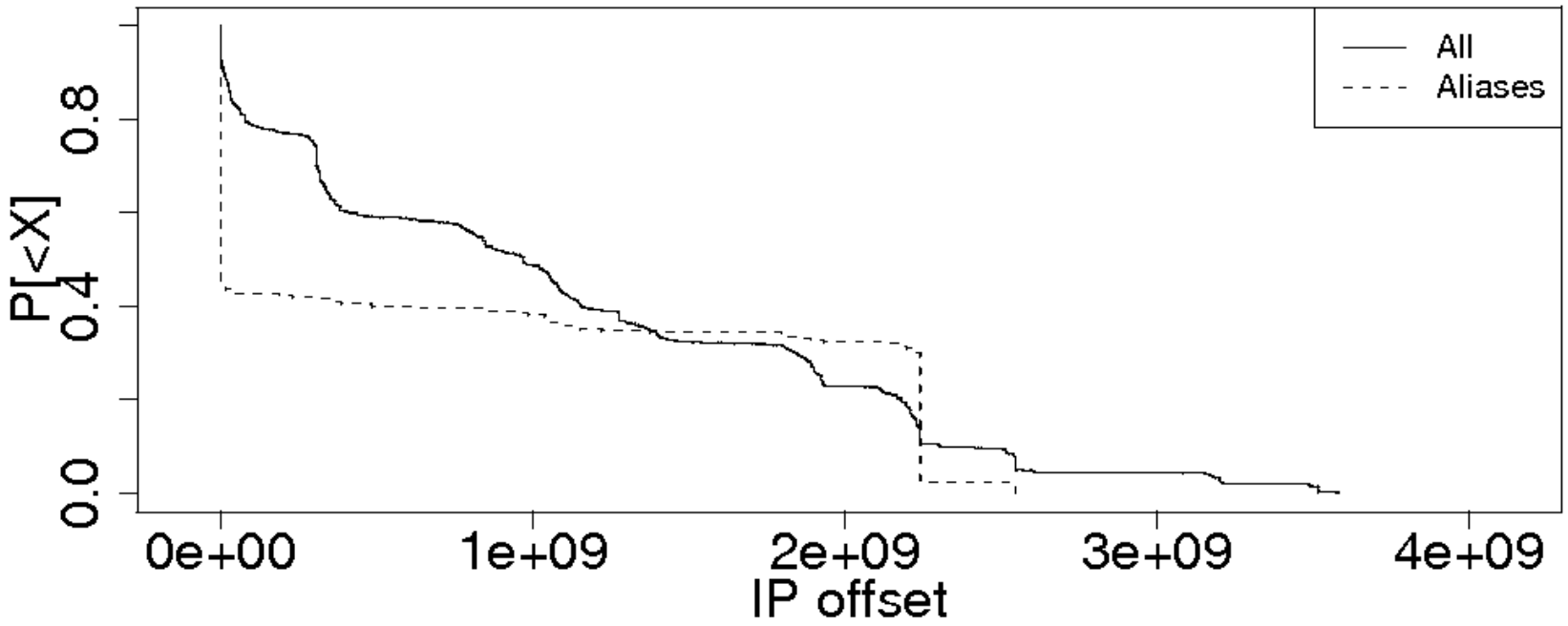

Our aproximation

- It means we have two IP offsets were pairs are kindly to be aliases
- We will no generate more traffic
- We can do it in a distributed way

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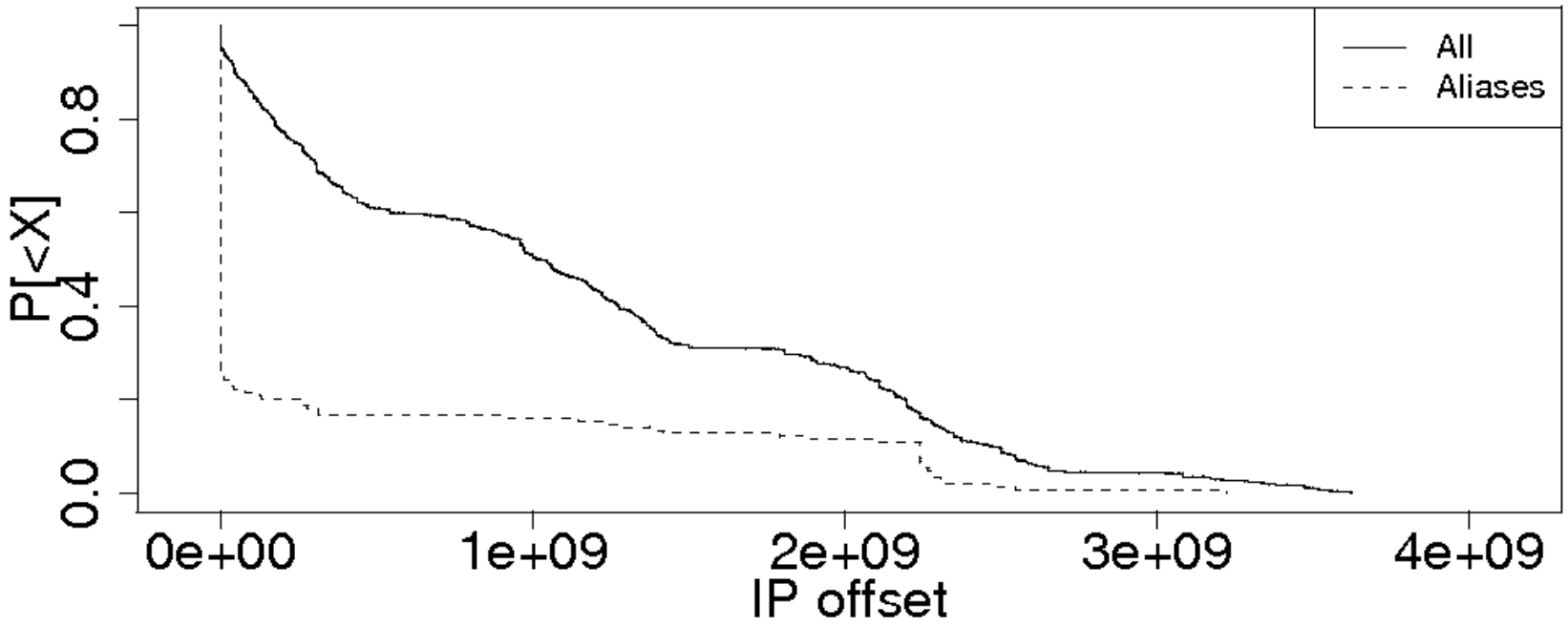
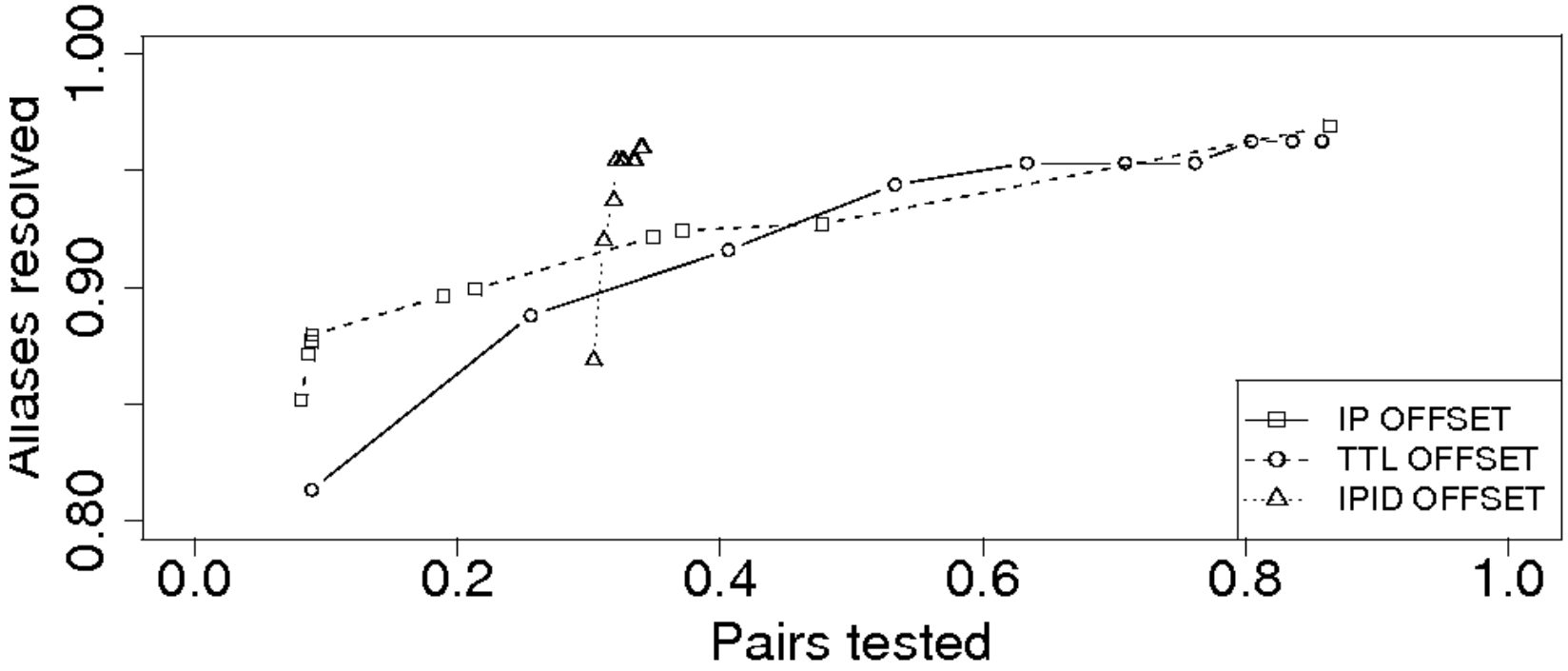
Our aproximation

- We have to probe in another net, we use PLANETLAB:



Our aproximation

- Results:

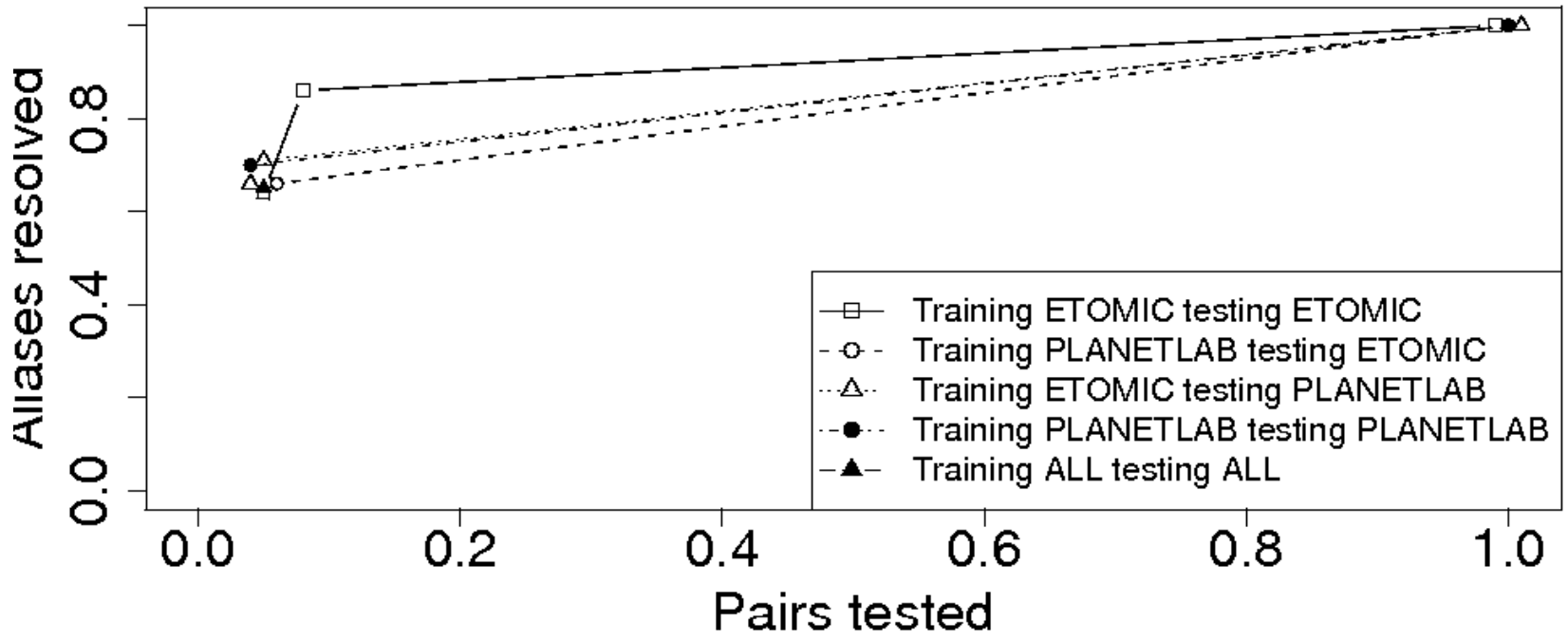


Our aproximation

- We have use clustering methods to automatize the offsets.
  - Expectation Maximization algorithm
  - K means algorithm
- We have trained the algorithm with ETOMIC set and PLANETLAB
- Crosh identification evaluation

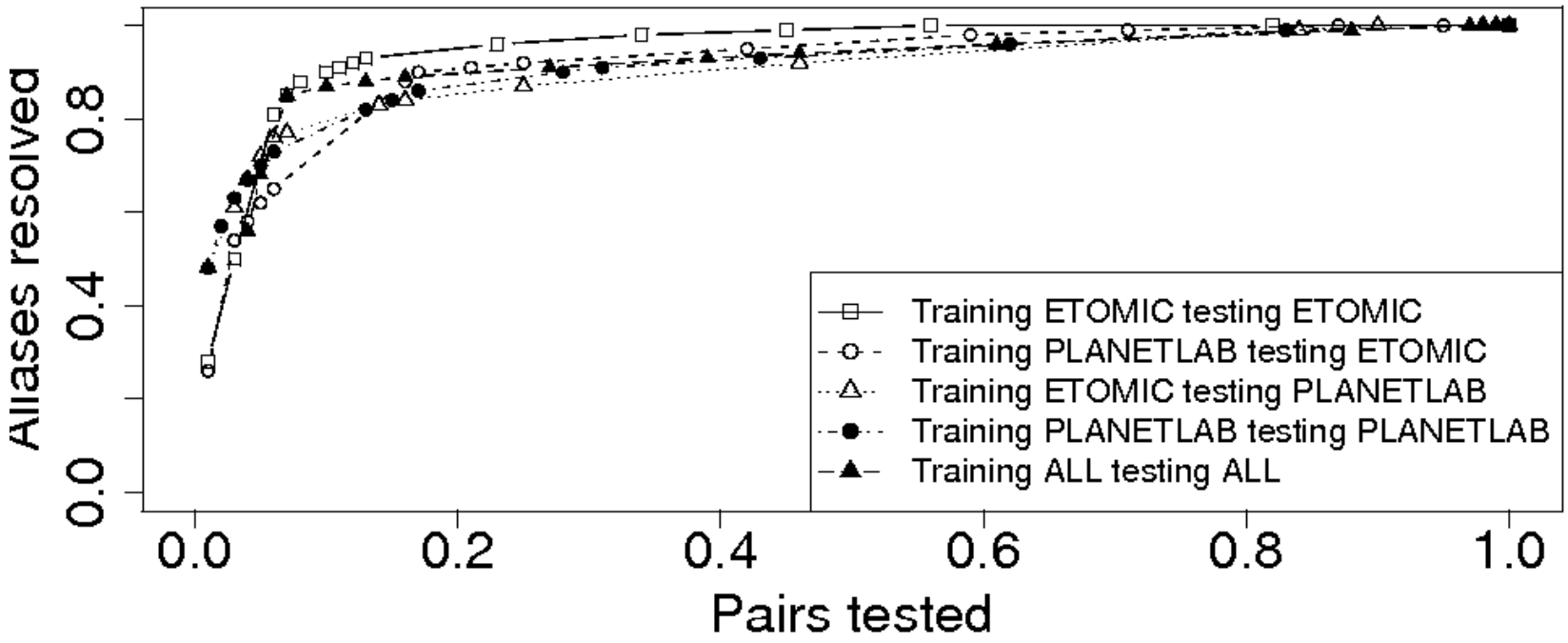
Our aproximation

- Using EM algorithm with optimal trues clusters:



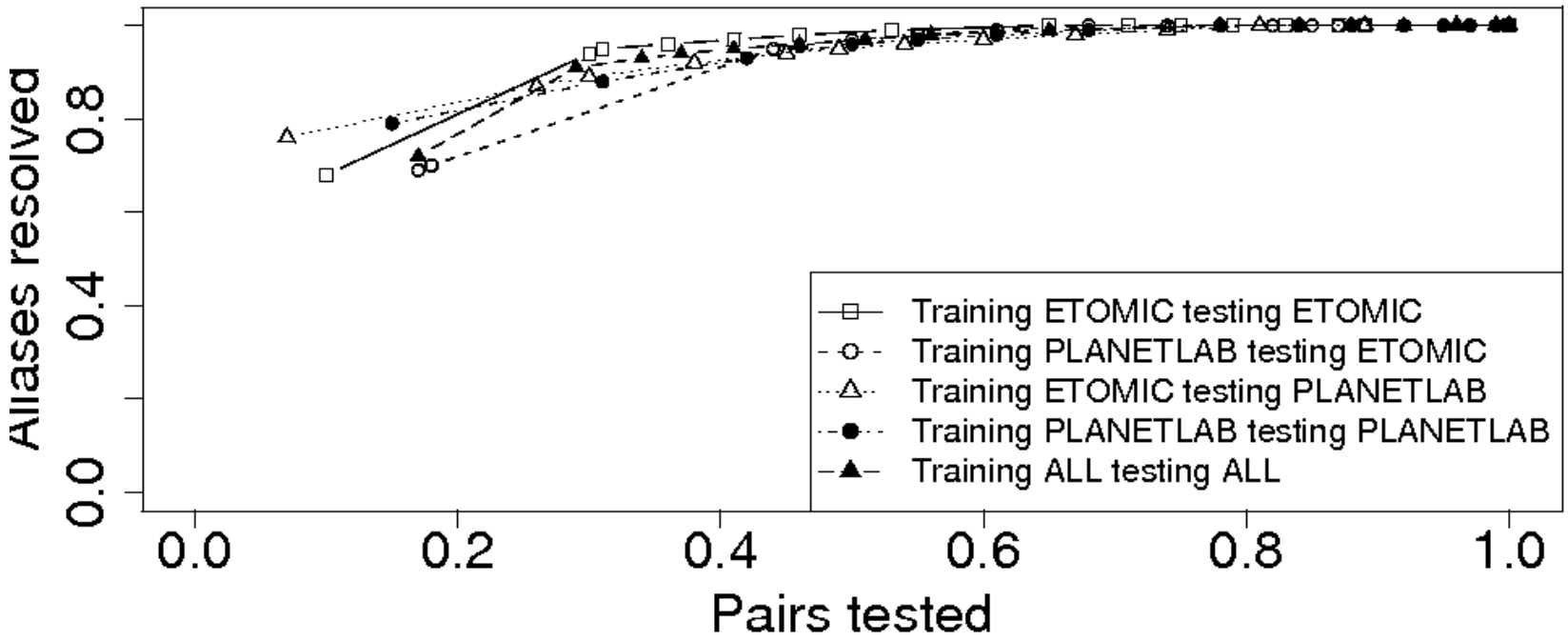
Our aproximation

- Using EM algorithm with 15 trues clusters:



Our aproximation

- Using EM algorithm with 15 false clusters:



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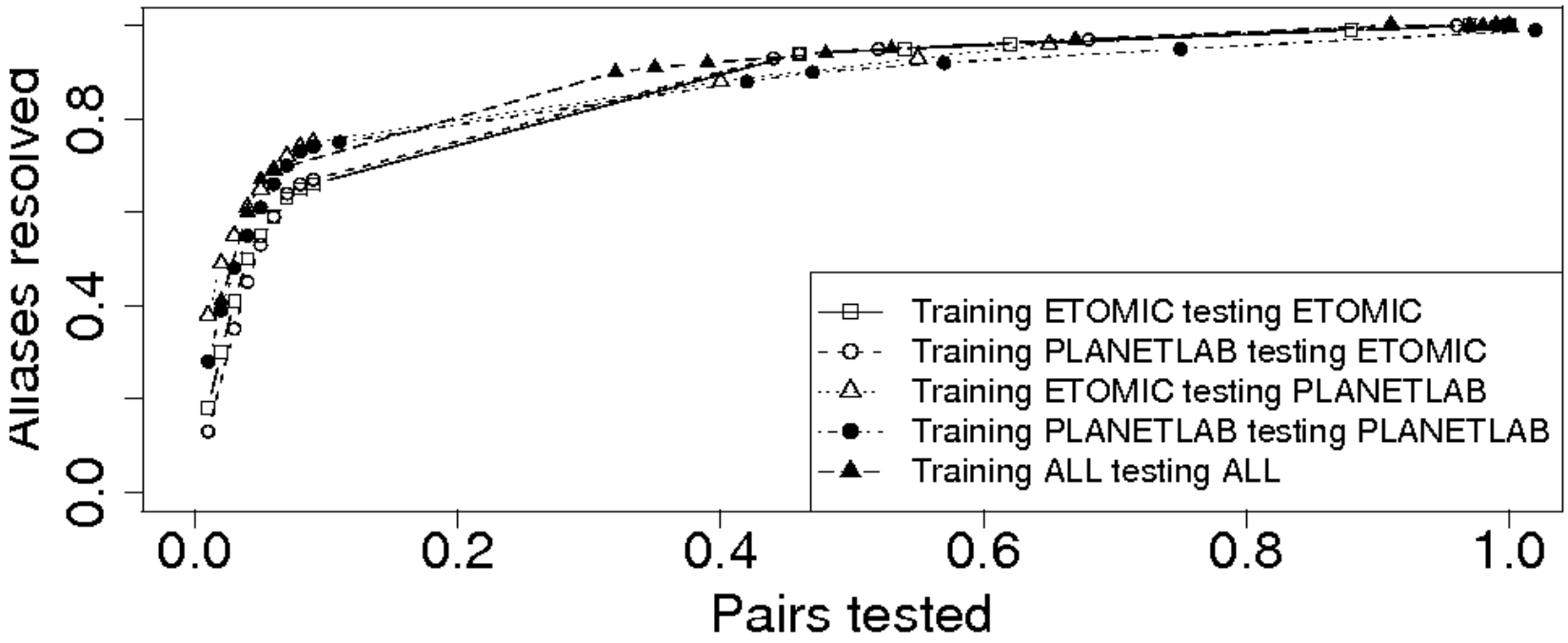

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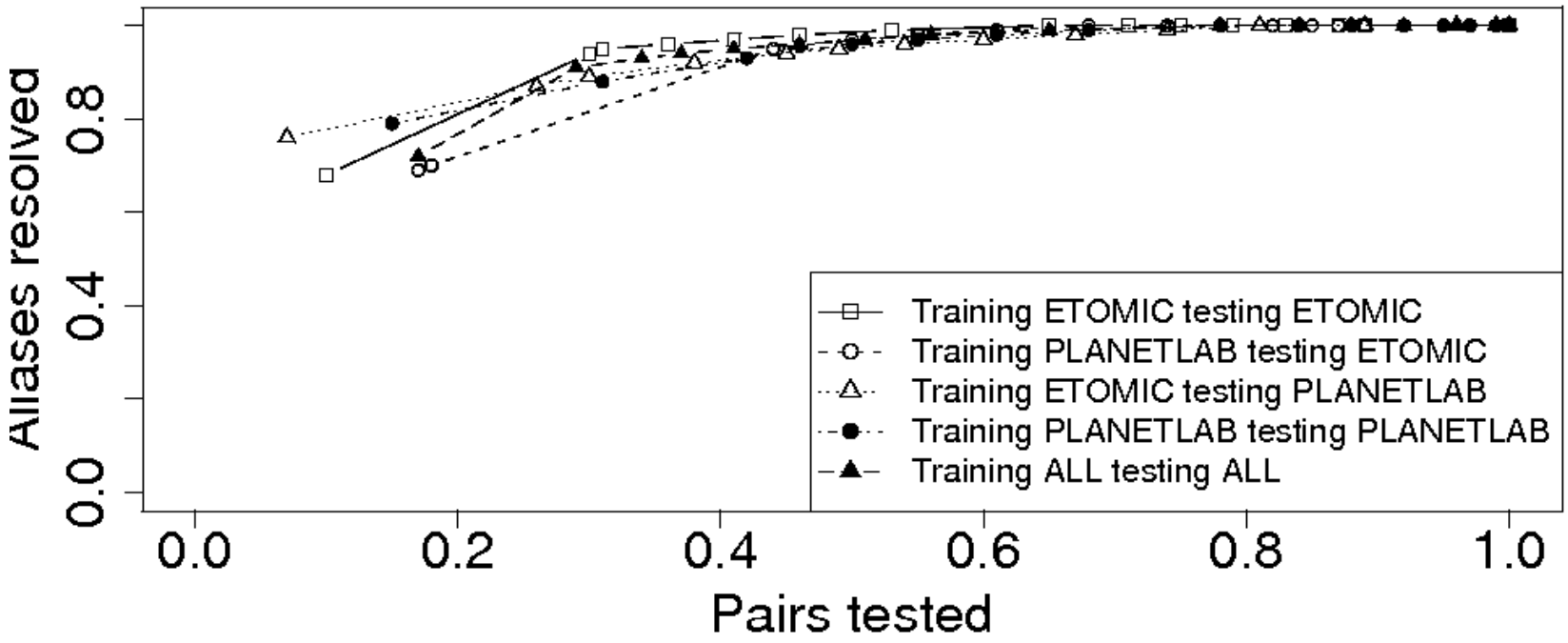

Conclusions

- A largue scale topology identification with all alias probes are inviable
- Improving methods are the way to face the problem
- We propose a viable improving method to do it in a distributed system
- Low probes with high completness and accuracy.

Questions