

Towards a Method of Reduction of Stars by Burkina Traixroute

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Abstract—The Internet is a worldwide computer network that allows its users, called Internet users, to communicate with each other on a global scale. Consisting of a multitude of interconnected networks, distributed throughout the world, each network is attached to its own entity called an Autonomous System (AS) that uses the BGP routing protocol to communicate. Autonomous Systems (AS) meet at an *ixp* point via agreements called peering. Methods have been developed to detect these peering points commonly called *ixp* [13] [29]. Our tool Burkina traIXroute proposes a better detection of *ixp* among many others. The objective of our paper is to propose an algorithmic method to correct the stars at the AS level in the *ixp* detection mechanism by traIXroute. TraIXroute in its current version has three databases (Routeviews, PeeringDB, and Packet Clearing House) that we consider less rich after a long analysis of its results. The results of traIXroute on the traceroute or scamper path reveal enough stars that could induce errors in the mapping of *ixps*. Our article also shows the scientific world that the information contained in some databases is generally in decimal form. and to exploit them in most measurement tools it is necessary to implement a method of converting IP addresses into decimal [4,3]. TraIXroute Burkina has already experimented with this technique to recover the information of the missing AS in some ip2location databases. Our results were satisfactory because we then corrected some stars in our results. Finally, our biggest wish was to display with our tool the information (name, city, continent, country) of each AS in our results

Keywords— *tool, traIXroute, Burkina traIXroute, Traceroute.*

I. INTRODUCTION

Stars (*) at the AS level remain a problem that concerns researchers and network administrators [1]. Their origins are often unknown. To detect them, we propose a series of measurements with traixroute. These measurements consist in sending probes with a lifetime to force routers to reveal their presence. Our traces displayed stars (*) at the AS level (Table 1). These AS* may mislead researchers when mapping IXPs and AS. Our goal in this paper is to propose a method to reduce the stars at the AS level and identify all ASes connected to an IXP. To achieve our goal, we propose our tool Burkina traixroute as a recent tool with additional databases (MaxMind, ip2location) that will be able to answer the questions of concern to researchers (reducing stars at the AS level and identifying members connected to an IXP).

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TABLE I: Results of TraIXroute

destinations	Number of jumps	Number star with traIXroute
www.yahoo.fr	19	6
www.amazone.com	30	17
www.google.fr	21	10
www.google.com	16	12
www.equinix.com	30	25
212.52.142.10	30	20

II. METHODOLOGY

A. Method of star reduction

We have chosen to evaluate our approach on the origin of the stars at the level of traIXroute with one thousand (1000) destinations accessible on the internet and make a traIXroute. The experimental prototype set up is to launch a script every 1h with our two tools:

A first experimental stage of one thousand (1000) destinations were made with traIXroute. To make measurements.

The second experimental stage was to redo the same traces with Burkina traIXroute and store our results.

A third experimental stage consisted in making a comparison of the two values obtained during our traces with traIXroute and Burkina traIXroute in order to propose a new method which will be carried out in four phases to correct the stars at the level of the AS:

- A first phase which had for objective to launch probe by probe with Burkina traIXroute on the traceroute path with the option -A to identify directly the AS on the traceroute path and keep them in memory. This process is done in the background of our tool.

- A second step which aims to search the information of each IP address in the Route Views database. In this part we aim to complete the information of the AS kept in memory during the execution of the probe with traceroute -A.

- Finally a third step which aims at searching the missing information of the AS in the databases (MaxMind, ip2location) integrated in Burkina traIXroute [2,3]. In this part we retrieve the IP addresses of the AS with a star to make a decimal

treatment thanks to a function researchv introduced in the source code. The purpose of this part is to make a vertical search in each of the newly integrated bases to find the ASN, the continent, the country, the name of each network in our results. This method is described in [4,5].

TABLE II: IP to Decinal Conversion

AS*	142.250.234.40	IP in decimal	2398808616
AS*	142.251.226.180	IP in decimal	2398872244
AS*	72.14.238.53	IP in decimal	2398808616
AS*	172.253.76.36	IP in decimal	2902281252
AS*	142.251.48.125	IP in decimal	2398826621

members. Next, we will try to identify the IXPs by their URL or IP address. For the case of URL we can use nslookup to search for DNS address. In cases where the user puts a name that is not listed in the different data sources the system will indicate that the IXP name is not valid. This is a non-trivial task since IXP names, cities and addresses can be spelled differently. We will do a keyword search by retrieving 4 characters from the word entered by the user to display the names of all IXPs that contain the characters chosen at the beginning.

III. RESULTS

1.1 Result1 on SA Reduction

Our method allowed us to obtain the table 2 which shows the reduction of the AS.

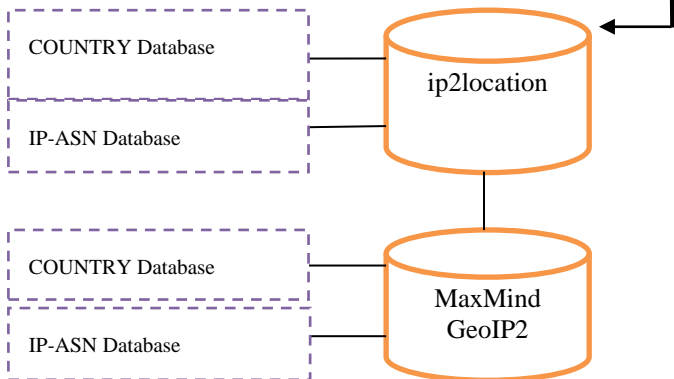


Fig. 1 The different databases

TABLE III: Star Reduction Results

destinations	Number of jumps	Number with star with traIXroute	Number of stars corrected with Burkina TraIXroute
www.yahoo.fr	19	6	2
www.amazon.com	30	17	3
www.google.fr	21	10	4
www.google.com	16	12	6
www.equinix.com	30	25	6
212.52.142.10	30	20	4
	146	90	25

1.1 Description of the Burkina traIXroute algorithm that corrects stars

Start correcting the stars

For each element of the Linked List

Check if ASN contains a star (*);

If yes, check if IP address is in Geo2Lite or Ip2Location

If yes, recover ASN

If no, keep as is

If no, keep as is

End

Our algorithm makes text processing in two paragraphs from the result of traIXroute. it extracts the jumps having stars with IP address. it creates a linked list to send the information of IP address in decimal in the databases (MaxMind and ip2location)

A. Method of detection of member AS

Before any process, we will download the PCH and PDB dataset and create a local database indexed on the name, BURKINA Database this database will be updated automatically throughout the process. A negative value will be automatically assigned to all IXPs whose status is inactive to facilitate the search for IXPs that we want to know the

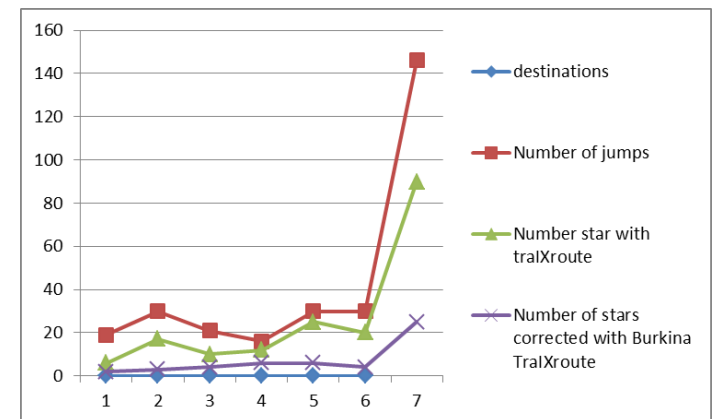


Fig. 2 Star reductions Results

B. Result on the detection of member AS

Our research work then led to a satisfactory result. We have then from method identified the AS members of some IXPs like BFIX, FRANCEIX and EQUINIX.

TABLE IV: PCH AND PDB Membership Statistics

IXP	PCH	PDB	PCH Unique	PDB Unique
Equinix Singapore IBX	586	471	129	9
France-IX	528	426	107	5
BFIX Ouagadougou	0	12	0	12

IV. DISCUSSIONS

traIXroute and Burkina traIXroute. First, we enumerate and classify the causes of the appearance of its stars in the TraIXroute tool by a less rich database. In addition, our research work has been extended to the detection of member AS at the level of some IXPs. We think that the determination of member AS by our tool is an important element for our study because IXPs are born and grow.

V. CONCLUSION

This article brings a contribution to the traIXroute tool. We propose measures to highlight the existence of stars and identify the member SAs. Finally, we show how these results can allow us to better parameterize our tools to reduce stars. The interpretation of these results is not trivial, and often requires a trade-off between the effort put into tracing (in time and number of packets emitted), and the quality of the traces obtained. Work is in progress to better evaluate this trade-off. In particular, we believe that a more precise characterization of the rate limitation would allow us to make major improvements to our tool, Burkina traIXroute.

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