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Sistema de configuración del protocolo de enrutamiento BGP para la

Interconexión entre empresas o ISP.

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***Abstract. - The present BGP project: configuration in an emulated environment aims to give a realistic vision of the different practical possibilities that they exist in the market to make use of the BGP protocol, in addition to considering the possible anomalies that occur at the moment of making the configuration. For this, three scenarios have been implemented in which the configuration is explained performed and analyzed the results obtained after monitoring the routing tables and the messages generated.***

# INTRODUCTION

O

VER the last few years, the Internet has become a component critical of our communication infrastructure. Most of the Internet communication is based on data transfers over connections between pairs of machines. For this purpose, the data is divided in small data packages, each of which crosses the Internet independently of the rest. Most of the time, the data is not transferred through a direct physical connection between sender and receiver. Instead, the packets travel through intermediaries called routers, which have to decide for each data packet through what neighboring router send it to reach its final recipient.

The routers have knowledge about the possible recipients.

They have to know where the recipient is located, if it is achievable and with what way. Therefore, when the topology changes, the router has to be informed as soon as possible to make a routing decision. The time it takes the routing tables of the routers to be in a state of uniformity that reflects the real situation after a change in the topology is the time of convergence. Its duration is a critical interest in the stability of the Internet.

Given that the Internet covers a large number of networks, routing

It is a complex task. A part of this task is performed by BGP used by the routers of the different networks to exchange what is called scope information. BGP usually shows a convergence time of the order of minutes and reacts dynamically to topology changes. Unfortunately, convergence can be delayed by factors unknown. In general, BGP-4 is difficult to analyze due to its complexity, size of today's Internet and its distributed character

Abbreviations and Acronyms.

In the tittle, BGP (come from English Border Gateway Protocol) and ISP (Internet service provider).

## How to Create a configuration BGP between two routers?

First, For the present project, the initial requirement is that the routers have an interface address configured, have a password to be able to access said devices remotely through a Telnet session.

Another initial condition to be able to configure the BGP routing protocol, is that the routers must have configured the basic template of the routers so once you enter the devices you are sent the basic template of the router. Finally, access the application to perform the configuration.

# Some Common Mistakes

Repeating the route fails continuously, this is due to the retransmissions of TCP occurs in the MPLS enabled network. If a BGP keep alive message cannot be sent once to the BGP peer because the transport link is down, the neighboring BGP peer does not validate any keep alive packets plus another though the TCP retransmits the failed message through the backup path, and eventually leads to peer BGP down with the hold time expiration. This problem is considered only when the MPLS is configured in Catalyst6500 or Cisco7600

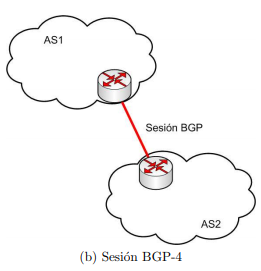


Fig. 1. Topology about the configuration BGP.

# Explanation

Several functions were developed capable of automating the process of configuring a BGP session between two routers. One of these functions is the one that makes the connection to telnet with the router to be configured and receives as parameters the ip address, the user and the password of the device that are the initial parameters necessary to be able to establish a telnet session, in case the If this connection is successful, this function returns a Telnet object, otherwise it returns a -1 and an error message will appear.

Another function allows us to configure the basic template in routers, receiving as a parameter a telnet object and the name of the device to be configured. This function starts typing in the telnet object the commands used in the basic router configuration. Or configure the IP addressing on the routers, that is, assign an IP address with its network mask to a router interface. It receives as parameters a telnet object, the identifier of a company, the user and the password of the device to finally start writing in the telnet object.

The main function that allows us to enable the BGP routing protocol with its respective autonomous system number of each company, this same one that uses another function dedicated only to configure the BGP peer between the local device and the remote device. This function receives as parameter the IP address of the neighbor, the autonomous system number of the local and remote device.

To then make use of another function capable of announcing the networks that are entered as input parameters in this function, that is, it receives a list containing a list of strings that correspond to the group of networks to be configured in the router devices. local or remote, and with the BGP session configuration commands will begin to write to the telnet object.

It also has functions capable of making the connection to the MySQL database, for it has to receive as parameters the name of the server, the user who wants to enter the database, with its respective password and finally the name of the database of data. In addition, this function returns a database connection object if the connection has been successful. Or simple functions that allow us to query all users according to the role with either administrator privileges or monitoring privileges, as long as the connection to the database already exists. Finally, this function returns a list of tuples with the user's id, the user's name and their password.

It has functions that perform the query in the database by users who have administrator or monitoring privileges and returns a tuple of parallel lists with the user's id, the user's name and their respective password.

This function performs a query in the database and returns a tuple of parallel lists with the id of the company, the name of the company and its respective autonomous system number. You can also query all the interfaces of a device whether it is local or remote, as long as the connection to the database has been successful.

For monitoring, functions are used to verify if the user exists and in addition to that if the password you are entering at the time of login is correct, if so will return True, otherwise return a False

# Conclusion

It was possible to establish a BGP session between different autonomous systems, verify their status with the show commands and identify the neighbors that a router knows when executing BGP as an external routing protocol.

It was possible to configure the protocol in a router in such a way that it does not propagate local networks, this is used by service providers.

It was understood that for communication between the same autonomous system we use iBGP and for communication between different autonomous systems we use eBGP. It was analyzed that for the exchange of routes between an ISP and a company they will have to use External Border Gateway Protocol since an ISP has an ASN and a company will have another ASN different from that of the Internet Service Provider.

Acknowledgment

E. Sánchez thanks his family for the support and the Msig. Jordan for the help provided.

References and Footnotes

References

*Basic format for books:*

1. Cisco. (27 de 01 de 2018). *Cisco-Internet de las cosas*. Obtenido de https://www.cisco.com/c/es\_ec/solutions/internet-of-things/overview.html
2. Cisco. (s.f.). CCNA Routing and Switching ICND2 200-105 Official Cert Guide (200-105). Obtenido de Cisco*.*
3. Cisco. (21 de 05 de 2018). *Cisco-Soporte relacionado con bgp*  .https://www.cisco.com/c/es\_mx/support/docs/ip/border-gateway-protocol-bgp/19167-bgp-rec-routing.html
4. Inc Cisco Systems. Cisco IOS IP Routing: BGP Command Reference.

Cisco Press, 2010.

1. R. Coltun, D. Ferguson, and J. Moy. OSPF for IPv6. RFC 2740 (Proposed Standard), December 1999. Obsoleted by RFC 5340.
2. P. Deutsch. DEFLATE Compressed Data Format Specification version 1.3. RFC 1951 (Informational), May 1996.
3. Iljitsch van Beijnum. BGP, Chapter 6,Traffic Engineering. http: //oreilly.com/catalog/bgp/chapter/ch06.html. Last visit: 13-Jan2010
4. P. Marques and F. Dupont. Use of BGP-4 Multiprotocol Extensions for IPv6 Inter-Domain Routing. RFC 2545 (Proposed Standard), March 1999.
5. E.C. Rosen. Exterior Gateway Protocol (EGP). RFC 827, October 1982. Updated by RFC 904.
6. J. Salim, H. Khosravi, A. Kleen, and A. Kuznetsov. Linux Netlink as an IP Services Protocol. RFC 3549 (Informational), July 2003.
7. S. Sangli, E. Chen, R. Fernando, J. Scudder, and Y. Rekhter. Graceful Restart Mechanism for BGP. RFC 4724 (Proposed Standard), January 2007.

1. This paragraph of the first footnote will contain the date on which you submitted your paper for review. It will also contain support information, including sponsor and financial support acknowledgment. For example, “This work was supported in part by the U.S. Depart­ment of Com­merce under Grant BS123456”.

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