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Better iptables Management

Greetings!

I wish to take on the development of a library to help manage iptable rules in an easier and more efficient manner, as a part of Google`s Summer of Code initiative. The project will result in the development of:-

1. A library which provides functions for the parsing of iptable rules using appropriate data structures, which can then be used to figure out if a packet with certain attributes can be transmitted or received.

2. Python bindings for the C library.

3. A CLI-based tool which helps in modifying a rule in the iptables rules set, to allow/deny packets with certain attributes.

Benefits to the Fedora community

1. *Improves user experience*. Applications using the library, can deduce if a packet with certain attributes is allowed to be transmitted\received. In this manner programs can notify the user of the iptable rule which blocks the attempted connection, thus helping the administrator tackle the problem in an easier manner.

2. *Python bindings for the library*. Python provides many modules like scapy, which can be used along this API to create powerful applications.

3. *Easy modification of iptable rules*. Using the tool created, administrators can easily modify the iptable rules in order to allow a packet with certain attributes to be easily allowed/discarded. Currently, there is no such application which can take in the attributes of a packet and then modify the rules, in order to allow/discard them as per user requirements.

Deliverables

1. A C library which provides functions for reading from, writing to, parsing and modifying of iptable rules.
2. A Python binding for the C library.
3. A CLI-based tool which uses the Python API and scapy to determine if a packet with certain attributes can be sent or received.

Project Details

A library providing the following functions will be created :-

1. read() - read the iptable rules.
2. create() - create a tree from the rules read from the file.
3. modify() - modify the tree according to given user input.
4. commit() - convert the tree back into iptable rules.
5. isAllowed() - check if a packet of a given configuration will be accepted, according to the iptable rules set.
6. isDropped() - check if a packet of a given configuration will be dropped, according to the iptable rules set.
7. viewCurrentState() - displays the current state of the iptable rules.
8. viewSavedRules() - calls create() and viewCurrentState()

Once the library is made, work on a python bindings for the same should be done, so that python programmers can use the same API for their applications.

After this, a tool which uses the above python API along with scapy providing the following functionalities should be developed:-

1. It should be a command line tool which allows the easy modifications of iptable rules.
2. It should have the provision to revert the last 5 changes made to the iptables rules set using this tool.
3. It should have provisions for viewing the current state of the iptable rules format in a tubular and arranged manner.
4. The tool could be used along with scapy for creating packets on-the-fly and testing if transmission of a packet with certain attributes is possible or not. (OPTIONAL)

Project Schedule

The project is planned to be split across 6 major Phases:

1. Analysis (April 27 - April 31): This phase involves communicating with the mentor and discussing the data structures which could be used along with API improvement.

2. Development Part I (May 1 - May 31): Work on the C library.

3. Development Part II (June 1 - June 18): Writing python bindings for the same starts.

4. Development Part III (June 19 - June 30): Design and discuss API for the CLI-based tool and implement.

5. Packaging (July 1 – July 20): Package the library and the tool in order to make it suitable for inclusion in the next release of Fedora.

6. Testing and Wrap-Up (July 21 – August 5): The library and the tool are tested extensively for bugs, no more feature additions at this point.

Bio

I am a third-year undergraduate at the Amrita School Of Engineering, Amritapuri where I am pursuing my B. Tech in Information Technology. I have been passionate about computers since my childhood and have been a free software advocate and a python programmer for around 3 years now with an over-all programming experience of around 5 years.

I have been a developer in several open source projects like Transifex, Cobbler, Sahana-Py and Python. Recent contributions to open-source include writing a Geo-locator module for Sahana-Py and integration of the keyring into Disutils2.

I will have no problem merging in and working with the Fedora team, given my experience in the open-source arena. Although most of my open source endeavors have been in python, I am very comfortable using C and C++. I don`t feel that you`ll find me lacking in any of the technical skills required for this project.

I have been using Fedora for over a year now, and have experience working with VPN while participating in various nation-wide CTF`s; also I am an administrator for India`s first nation-wide CTF which will be held this year. Helping with network administration at my college has given me an administrators point of view of what tools could be made to make an administrators life easier. I am also familiar with the basics of using of iptables, however, I also look at this as an opportunity to learn about their usage in depth.

Lastly, I would like to express my deep commitment to this project, Fedora, and the free software ideals in general. You can find more details about me and the current projects I am involved in, at my website. Please contact me if I am unclear at any point.

Thank you for considering this proposal, and for your time.

My Website: http://www.zubin71.wordpress.com