Application #7 - Config File Comparator

This application connects to a router in the network via Telnet, extracts the output of *"show running-config"* and *"show startup-config"*, filters the irrelevant lines and finally compares the configurations. Now, I know this can be accomplished using the *"show archive config differences"* command in Cisco CLI, but I wanted you to know how can this task be accomplished using Python.

As with the other applications in this course, the full code is available for download.

Based on what you have learned so far in the course, it's your job now to study, understand and test the code against a network device, as you've seen me doing with the previous applications.

Feel free to alter the code in any way you want. New functionality of any kind is welcome, enhancements as well. Just make sure to adapt your code to the command output format.

Also, please read the first 13 lines in the code carefully, as they are a good introduction to the code that follows. As you can see, the first thing you should do is configure Telnet access on the router and the username and password:

username teopy privilege 15 password 0 python

line vty 0 4

   privilege level 15

   login local

   transport input telnet ssh

At line 27, I have defined the **ip_validity()** function, which takes care of checking whether the IP address of the router, which the user enters at the prompt, is valid or not. You have already seen this kind of validity check in action in the previous applications, so there is nothing new here. The same comment is valid for the **file_validity()** function (line 46). Both functions are defined at this point and will be called later in the code.

At line 61, the **telnet()** function is defined, which takes a single parameter: **command**. The value of this parameter will be passed to the **connection.write()** method at line 96.

Starting with line 108, I defined the user menu, which will accept 3 options, except **e - Exit program**:

1 - Compare running-config with startup-config

2 - Compare running-config with local file

3 - Compare startup-config with local file

I had treated only the first option, comparing the running-config with the startup-config - lines 115-196, leaving **you** with the job of coding and testing the other two options, having my code from option 1 as a guideline.

Now, let's look at option 1 for a bit. First, I called the **ip_validity()** function to get this out of the way. Next, a very important step, I called the **telnet()** function for each of the two commands I am interested in, and saved the returned output to a separate variable: **output_run** for the running-config and **output_start** for the startup-config.

Then, I have created (opened for writing) two files, each of them storing the output of the corresponding command. The file names are intuitively chosen. Don't forget to close the files after writing the contents of those variables, to save the information.

Next, I opened the files for reading and used the **readlines()** method on each file object to store the lines in each file as elements of a list. Of course, then I closed the files.

Then, using a **for** loop, I have filtered the lines in each file which were of no interest to our goal. **We are only interested in the lines starting with the one defining the IOS version: "version 12.4" for example.** That is actually the first relevant line in each file.

Now, after "cleaning" the files, we are left with only the pure router configurations. It's time to create a new file (**file_diff.txt**), in which all the config differences are going to be stored. Actually, we are going to compare the two lists obtained with the **readlines()** method.

Finally, using list comprehensions, we are going to find the lines in the running-config which are not present in the startup-config and vice versa. In case there are multiple differences, we use a **for** loop to iterate over the lists and then print those differences directly into the **file_diff.txt** file., one per line As stated in the code, the rule is:

A "+" sign means the line is present in the RUNNING-CONFIG but not in the STARTUP-CONFIG

A "-" sign means the line is present in the STARTUP-CONFIG but not in the RUNNING-CONFIG

Now, let's make a quick test. If you have just started the router and made no config yet, then the startup-config and running-config are the same. No surprise here. But, to make the test more relevant, let's configure a few things before starting the comparison, without saving the changes to the startup-config. So, let's go to router R1:

R1(config)#username udemy1 password udemy

R1(config)#username udemy2 password udemy

R1(config)#username udemy3 password udemy

Now, these three configurations are the differences between the startup-config and the running-config. We should see them after running our program, saved in the **file_diff.txt** file. Let's test this:

root@debian:/home/debian/workingdir# python ConfigFileComp.py

Use this tool to:

1 - Compare running-config with startup-config

2 - Compare running-config with local file

3 - Compare startup-config with local file

e - Exit program

Enter your choice: 1

Enter an IP address: 192.168.2.101

Please wait while the config file is being analyzed...

Use this tool to:

1 - Compare running-config with startup-config

2 - Compare running-config with local file

3 - Compare startup-config with local file

e - Exit program

Enter your choice: e

Exiting... See ya...

Now let's check the results. We should see all three commands with a **"+"** sign, right?

root@debian:/home/debian/workingdir# cat file_diff.txt

+username udemy1 password 0 udemy

+username udemy2 password 0 udemy

+username udemy3 password 0 udemy

root@debian:/home/debian/workingdir#

...and success! As expected, the three commands are marked as differences, in the file.

Please read all the comments in the code very carefully and test/debug the code as you write options 2 and 3 in the menu, before posting any questions. **Have fun, everyone!!!**