

How swappiness kernel affects the compression performance

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1 Abstract

Nowadays is very important for people, who can afford a computer, that their machine has the adequate components, physical and digital, so that it can run fast enough without running out of memory. Zip files are very important in terms of memory because it's essential for sharing big files and that is why we decided to do the Phoronix test suite for the 7-zip program. We are going to compare the results and how they affect performance by modifying the kernel.

2 Introduction

The format compression zip is used to compress files, images, software, etc, this format was created by Phil Katz that launched in January 1989 the first version of software compression PKZIP. Zip files are individual files that could contain one or many compress files. A zip file is easy to be shared, transported, sent by e-mail, or downloaded. 7-Zip is open source software and the most of the source code is under the GNU LGPL license, we can use 7-Zip on any computer and is totally free, for this software we have high compression ratio with LZMA and LZMA2, supported formats like 7z, xz, tar, etc to packing and ar, arj, cab, iso to unpacking (Pavlov) Linux is an operating system that manages all of the hardware resources in a computer, there are different versions like Ubuntu, fedora, back track, etc. Operating systems based in Linux are open source this means that we could do many things with the system, for example we could manage or change the kernel. The kernel is a program that constitutes the central core of a computer operating system. It has complete control over everything that occurs in the system and is the part of the operating system to load into memory during booting (LinuxFoundation)

3 Objective

The main objective of this work is to compare the different results between the different kernel configurations when compressing a file.

4 Justification

The quantity of data in the internet is overwhelming, that is why compressing files has become very important in the last years. For example, nowadays a picture has more resolution than five years ago and this pictures last longer to be downloaded or uploaded than the pictures from 2010.

Zip files make a big difference in terms of speed, zip files reduce the amount of memory of the file and when you send them, it sends faster. On the other hand, zip files may lose information when compressing them.

5 Development

For this report we will use the Phoronix-test-suite application, in order to help us with the comparison between the different rates of speed when compressing a file with different kernel modifications.

These are the steps we followed in order to run the tests:

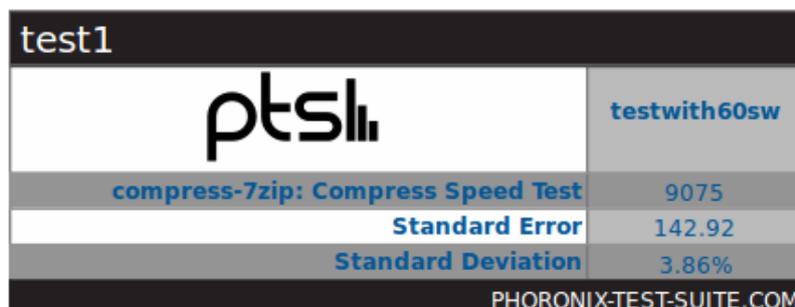
- Install Ubuntu
- Install Phoronix Test Suite
- Prove that it works correctly by listing available tests
- Run a test
- Modify the kernel. The swappiness we used: 60,50,40,20.

To do the process with phoronix we use the benchmark 7zip, this is a test of 7-Zip using p7zip with its integrated benchmark feature. We ran the test and modified the parameter swappiness in Linux kernel, this parameter does the process to use swap in the kernel. A swap is a process to use hard drive space to store temporal data to reduce the use of RAM

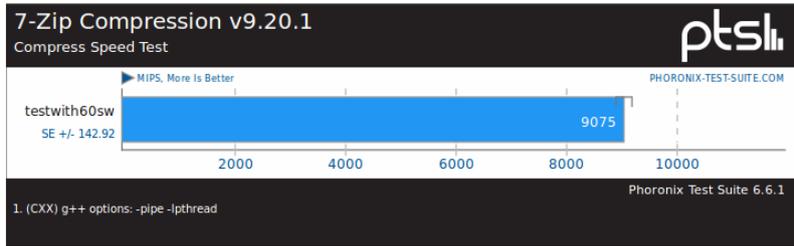
6 Results

To analyze zip compression we use phoronix modifying the swapping and showed this results:

Test 1: Swapping = 60

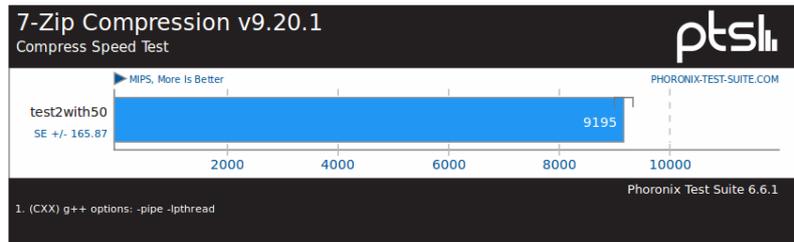


| test1 | |
|------------------------------------|--------------|
| pts | |
| | testwith60sw |
| compress-7zip: Compress Speed Test | 9075 |
| Standard Error | 142.92 |
| Standard Deviation | 3.86% |
| PHORONIX-TEST-SUITE.COM | |



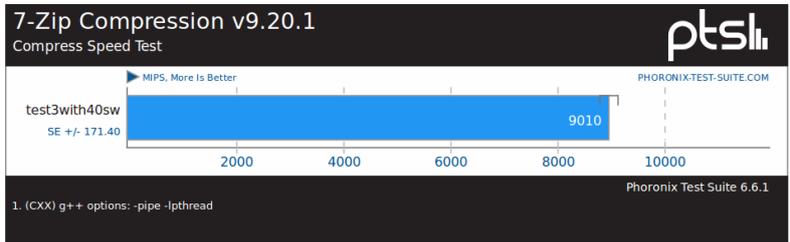
Test 2: Swapping = 50

| test2 | |
|---|--------------------|
| | |
| | test2with50 |
| compress-7zip: Compress Speed Test | 9195 |
| Standard Error | 165.87 |
| Standard Deviation | 3.12% |
| PHORONIX-TEST-SUITE.COM | |



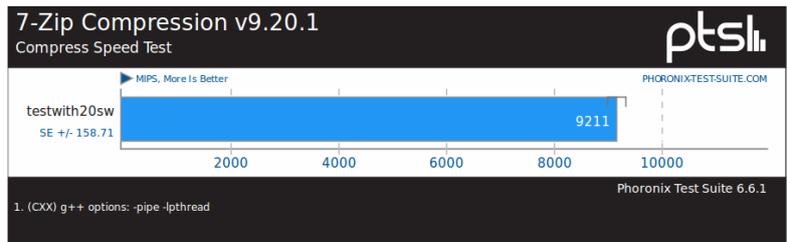
Test 3: Swapping = 40

| test3 | |
|---|----------------------|
| | |
| | test3with40sw |
| compress-7zip: Compress Speed Test | 9010 |
| Standard Error | 171.40 |
| Standard Deviation | 4.66% |
| PHORONIX-TEST-SUITE.COM | |

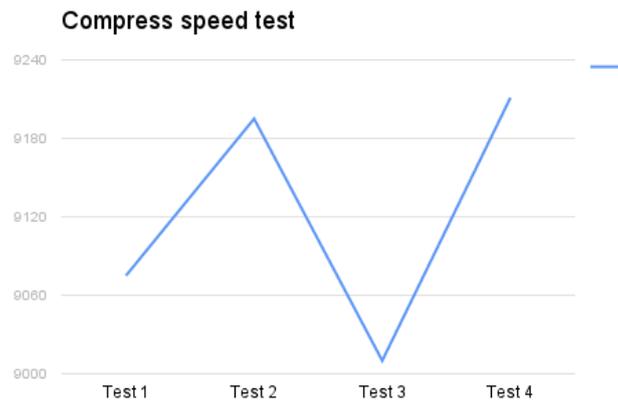


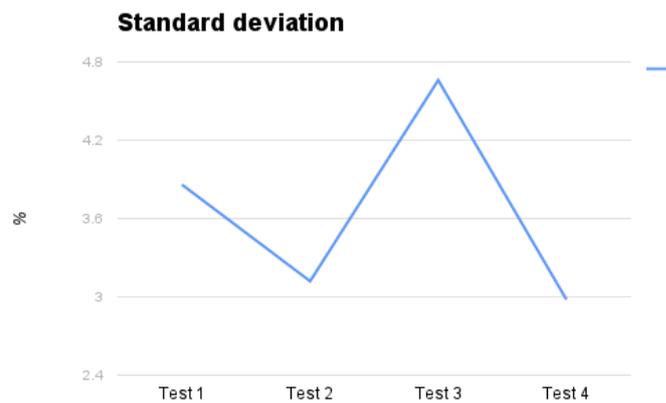
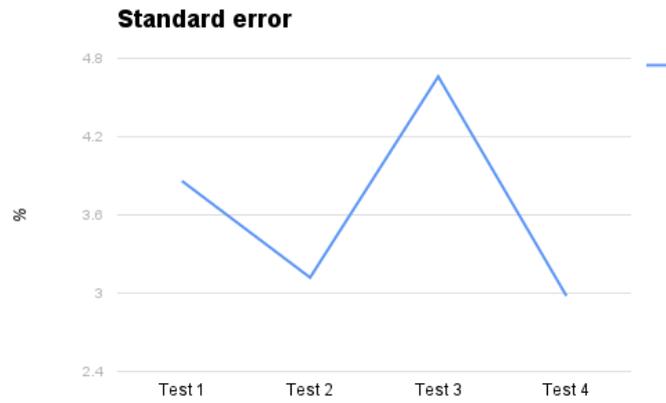
Test 4: Swapping = 20

| test4 | |
|---|--------|
| ptsl | |
| testwith20sw | |
| compress-7zip: Compress Speed Test | 9211 |
| Standard Error | 158.71 |
| Standard Deviation | 2.98% |
| PHORONIX-TEST-SUITE.COM | |



Graphs





7 Conclusion

To conclude, we can see that indeed the swappiness of the kernel affects the performance (speed, standard error and standard deviation). As we saw in the results, compressing files faster, can get you more errors, that is why you need to be clever on how to configure the kernel so that you can get the maximum speed with the minimum errors. Zip files have become more important as people demand better performance to send and receive faster information.

8 References

References

- [1] Pavlov, I. (n.d). 7-Zip. Recovered from <http://www.7-zip.org/>

- [2] LinuxFoundation(n.d). What is linux?. Recovered from <https://www.linux.com/what-is-linux>
- [3] Deepack, P . What is swappiness and how do we change its value?, Recovered from <http://www.golinuxhub.com/2014/01/what-is-swappiness-and-how-do-we-change.html>
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