

Vanier College
Faculty of Careers and Technical Programs
Department of Computer Science Technology

Advanced UNIX

Lab #11

**Title: Compression, System Backup
and Software Installation**

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Submitted to Florin Pilat

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Review Questions (p.514-517):

1. True
2. A) 0
3. A) .tar.gz
4. C) .Z
5. False
6. C) make
7. True
8. A) 0, 1, 2, 3, 4
9. B) `cpio -vicdu -I /dev/fd0`
10. False
11. C) `rpm -ql packagename`
12. D) `apt-get purge test`
13. False
14. /etc/dumpdates
15. D) /dev/nst0
16. B) -L
17. B) -e
18. D) `tar -zcvf /dev/st0 *`
19. B) ./configure
20. A) `yum search oobla`

Project 11.1 (p.517-518):

- 1.

```
Fedora 26 (Workstation Edition)
Kernel 4.16.11-100.fc26.x86_64 on an x86_64 (tty2)

server13 login: root
Password:
Last login: Fri Nov 27 10:49:58 on tty2
[root@server13 ~]#
```

2.

```
[root@server13 ~]# yum install ncompress
Last metadata expiration check: 0:00:03 ago on Thu 03 Dec 2020 02:28:35 PM EST.
Dependencies resolved.
=====
Package                Arch          Version        Repository      Size
=====
Installing:
ncompress              x86_64        4.2.4.4-7.fc26 fedora          30 k
=====
Transaction Summary
=====
Install 1 Package

Total download size: 30 k
Installed size: 35 k
Is this ok [y/N]: y
Downloading Packages:
ncompress-4.2.4.4-7.fc26.x86_64.rpm                148 kB/s | 30 kB    00:00
-----
Total                                              55 kB/s | 30 kB    00:00
Running transaction check
Transaction check succeeded.
Running transaction test
Transaction test succeeded.
Running transaction
  Preparing      :                                1/1
  Installing     : ncompress-4.2.4.4-7.fc26.x86_64 1/1
  Running scriptlet: ncompress-4.2.4.4-7.fc26.x86_64 1/1
Running as unit: run-rfae6ded8461343959125c04e0441379a.service
  Verifying      : ncompress-4.2.4.4-7.fc26.x86_64 1/1

Installed:
  ncompress.x86_64 4.2.4.4-7.fc26

Complete!
[root@server13 ~]# _
```

3. The size of the “services” file is 687295 bytes.

```
[root@server13 ~]# cp /etc/services ~
[root@server13 ~]# ls -l
total 692
-rw-r--r--. 1 root root    0 Oct  8 08:47 aclfile
-rw-----. 1 root root 1443 Sep 17 19:47 anaconda-ks.cfg
-rw-r--r--. 1 root root   39 Nov 12 11:17 bash.md5
drwxr-xr--. 2 root root 4096 Oct  8 09:01 directory
-r-xrwx--x. 1 root root  207 Nov  5 13:27 file
-rw-r--r--. 1 root root   55 Nov  5 13:24 file2
-rw-r--r--. 1 root root    0 Nov  5 11:25 sample1
-rw-r--r--. 1 root root    0 Nov  5 11:25 sample2
-rw-r--r--. 1 root root 687295 Dec  3 14:30 services
[root@server13 ~]# _
```

4. The compression ratio was 68.79%. Basically, the “services” file has the .Z extension and the file size is now 219465 bytes.

```
[root@server13 ~]# compress -v services
services:  -- replaced with services.Z Compression: 68.79%
[root@server13 ~]# ls -l
total 236
-rw-r--r--. 1 root root    0 Oct  8 08:47 aclfile
-rw-----. 1 root root 1443 Sep 17 19:47 anaconda-ks.cfg
-rw-r--r--. 1 root root   39 Nov 12 11:17 bash.md5
drwxr-xr--. 2 root root 4096 Oct  8 09:01 directory
-r-xrwx--x. 1 root root  207 Nov  5 13:27 file
-rw-r--r--. 1 root root   55 Nov  5 13:24 file2
-rw-r--r--. 1 root root    0 Nov  5 11:25 sample1
-rw-r--r--. 1 root root    0 Nov  5 11:25 sample2
-rw-r--r--. 1 root root 219465 Dec  3 14:30 services.Z
[root@server13 ~]# _
```

- 5.

```
[root@server13 ~]# uncompress -v services.Z
services.Z:  -- replaced with services
```

- 6.

```
[root@server13 marissal# cp /etc/hosts /etc/inittab Desktop
[root@server13 marissal#
```

7. The “hosts.Z” and “inittab.Z” files were compressed. If there were symbolic links in this directory, then we would use the -f option with the compress command to force the compress utility to compress these files.

```
[root@server13 marissal# cp /etc/hosts /etc/inittab Desktop
[root@server13 marissal# compress -vr Desktop
Desktop/hosts:  -- replaced with Desktop/hosts.Z Compression: 38.60%
Desktop/inittab:  -- replaced with Desktop/inittab.Z Compression: 23.26%
[root@server13 marissal# ls -lR Desktop
Desktop:
total 8
-rw-r--r--. 1 root root  97 Dec  3 14:45 hosts.Z
-rw-r--r--. 1 root root 376 Dec  3 14:45 inittab.Z
```

8.

```
[root@server13 marissal# unzip Desktop/Desktop/inittab.Z: -- replaced with Desktop/inittab
Desktop/hosts.Z: -- replaced with Desktop/hosts
[root@server13 marissal# ls -lR Desktop
Desktop:
total 8
-rw-r--r--. 1 root root 158 Dec  3 14:45 hosts
-rw-r--r--. 1 root root 490 Dec  3 14:45 inittab
```

9. The compression ratio was 63.8%.

```
[root@server13 marissal# ps -ef | compress -v >psfile.Z
Compression: 63.80%
```

10.

```
[root@server13 marissal# zmore psfile.Z
UID      PID  PPID  C  STIME TTY          TIME CMD
root      1    0  0  14:24 ?        00:00:03 /usr/lib/systemd/systemd --switched-root --system --
deserialize 23
root      2    0  0  14:24 ?        00:00:00 [kthreadd]
root      4    2  0  14:24 ?        00:00:00 [kworker/0:0H]
root      6    2  0  14:24 ?        00:00:00 [mm_percpu_wq]
root      7    2  0  14:24 ?        00:00:00 [ksoftirqd/0]
root      8    2  0  14:24 ?        00:00:00 [rcu_sched]
root      9    2  0  14:24 ?        00:00:00 [rcu_bh]
root     10    2  0  14:24 ?        00:00:00 [migration/0]
root     11    2  0  14:24 ?        00:00:00 [watchdog/0]
root     12    2  0  14:24 ?        00:00:00 [cpuhp/0]
root     13    2  0  14:24 ?        00:00:00 [kdevtmpfs]
root     14    2  0  14:24 ?        00:00:00 [netns]
root     15    2  0  14:24 ?        00:00:00 [rcu_tasks_kthrel]
root     16    2  0  14:24 ?        00:00:00 [kauditd]
root     17    2  0  14:24 ?        00:00:00 [oom_reaper]
root     18    2  0  14:24 ?        00:00:00 [writeback]
root     19    2  0  14:24 ?        00:00:00 [kcompactd0]
root     20    2  0  14:24 ?        00:00:00 [ksmd]
root     21    2  0  14:24 ?        00:00:00 [khugepaged]
root     22    2  0  14:24 ?        00:00:00 [crypto]
root     23    2  0  14:24 ?        00:00:00 [kintegrityd]
root     24    2  0  14:24 ?        00:00:00 [kblockd]
root     25    2  0  14:24 ?        00:00:00 [ata_sff]
root     26    2  0  14:24 ?        00:00:00 [md]
root     27    2  0  14:24 ?        00:00:00 [edac-poller]
root     28    2  0  14:24 ?        00:00:00 [devfreq_wq]
root     29    2  0  14:24 ?        00:00:00 [watchdogd]
root     34    2  0  14:24 ?        00:00:00 [kswapd0]
root     83    2  0  14:24 ?        00:00:00 [kthrotld]
root     84    2  0  14:24 ?        00:00:00 [acpi_thermal_pm]
root     85    2  0  14:24 ?        00:00:00 [scsi_eh_0]
root     86    2  0  14:24 ?        00:00:00 [scsi_tmf_0]
root     87    2  0  14:24 ?        00:00:00 [scsi_eh_1]
root     88    2  0  14:24 ?        00:00:00 [scsi_tmf_1]
```

```

root      86      2  0 14:24 ?          00:00:00 [scsi_tmf_0]
root      87      2  0 14:24 ?          00:00:00 [scsi_eh_1]
root      88      2  0 14:24 ?          00:00:00 [scsi_tmf_1]
[root@server13 marissa]# _

```

11. Basically, the compression ratio was 79.5% and it is higher than the ratio obtained from Step 4, which is 68.79% since the `gzip` command is more efficient than the `compress` command. Additionally, the “services” file has the `.gz` extension and the file size is 140990 bytes.

```

[root@server13 ~]# gzip -v services
services:      79.5% -- replaced with services.gz
[root@server13 ~]# ls -l
total 160
-rw-r--r--. 1 root root      0 Oct  8 08:47 aclfile
-rw-----. 1 root root 1443 Sep 17 19:47 anaconda-ks.cfg
-rw-r--r--. 1 root root   39 Nov 12 11:17 bash.md5
drwxr-xr--. 2 root root 4096 Oct  8 09:01 directory
-r-xrwx--x. 1 root root  207 Nov  5 13:27 file
-rw-r--r--. 1 root root   55 Nov  5 13:24 file2
-rw-r--r--. 1 root root    0 Nov  5 11:25 sample1
-rw-r--r--. 1 root root    0 Nov  5 11:25 sample2
-rw-r--r--. 1 root root 140990 Dec  3 14:30 services.gz
[root@server13 ~]#

```

- 12.

```

[root@server13 ~]# gunzip -v services.gz
services.gz:   79.5% -- replaced with services

```

13. The compression ratio was 79.6% because the `-9` option is known as the best compression and results in the highest compression ratio at the expense of time.

```

[root@server13 ~]# gzip -v -9 services
services:      79.6% -- replaced with services.gz
[root@server13 ~]# _

```

- 14.

```

[root@server13 ~]# gunzip -v services.gz
services.gz:   79.6% -- replaced with services

```

15. The compression ratio was 76.4% because the -1 option is known as fast compression and results in a lower compression ratio.

```
[root@server13 ~]# gzip -v -1 services
services:      76.4% -- replaced with services.gz
```

- 16.

```
[root@server13 ~]# gunzip -v services.gz
services.gz:    76.4% -- replaced with services
```

17. The compression ratio was 81.29% and is much higher than both ratios from Step 4 (68.79%) and Step 11 (79.5%) since the bzip2 command is more efficient than the gzip and compress commands combined. Additionally, the “services” file has the .bz2 extension and the file size is 128597 bytes.

```
[root@server13 ~]# bzip2 -v services
services: 5.345:1, 1.497 bits/byte, 81.29% saved, 687295 in, 128597 out.
[root@server13 ~]# ls -l
total 148
-rw-r--r--. 1 root root    0 Oct  8 08:47 aclfile
-rw----- 1 root root 1443 Sep 17 19:47 anaconda-ks.cfg
-rw-r--r--. 1 root root   39 Nov 12 11:17 bash.md5
drwxr-xr-- 2 root root 4096 Oct  8 09:01 directory
-r-xrwx--x. 1 root root  207 Nov  5 13:27 file
-rw-r--r--. 1 root root   55 Nov  5 13:24 file2
-rw-r--r--. 1 root root    0 Nov  5 11:25 sample1
-rw-r--r--. 1 root root    0 Nov  5 11:25 sample2
-rw-r--r--. 1 root root 128597 Dec  3 14:30 services.bz2
```

- 18.

```
[root@server13 ~]# bunzip2 -v services.bz2
services.bz2: done
```

- 19.

```
[root@server13 ~]# exit
```

```
Fedora 26 (Workstation Edition)
Kernel 4.16.11-100.fc26.x86_64 on an x86_64 (tty2)

server13 login: _
```

Project 11.5 (p.522):

1.

```
Fedora 26 (Workstation Edition)
Kernel 4.16.11-100.fc26.x86_64 on an x86_64 (tty2)

server13 login: root
Password:
Last login: Thu Dec  3 14:27:27 on tty2
[root@server13 ~]# _
```

2. Yes, there are many RPM packages on our computer.

```
[root@server13 ~]# rpm -qa | less
ghostscript-core-9.20-11.fc26.x86_64
perl-Text-ParseWords-3.30-366.fc26.noarch
xorg-x11-server-Xwayland-1.19.3-4.fc26.x86_64
python3-firewall-0.4.4.5-4.fc26.noarch
xorg-x11-drv-fbdev-0.4.3-26.fc26.x86_64
filesystem-3.2-40.fc26.x86_64
libdnf-0.11.1-1.fc26.x86_64
libxkbcommon-x11-0.7.1-3.fc26.x86_64
speech-dispatcher-0.8.8-2.fc26.x86_64
python3-cryptography-2.0.2-2.fc26.x86_64
spice-vdagent-0.17.0-2.fc26.x86_64
bind-license-9.11.2-1.P1.fc26.noarch
libnfsidmap-2.2.1-4.rc2.fc26.x86_64
libmetalink-0.1.3-2.fc26.x86_64
cogl-1.22.2-3.fc26.x86_64
python3-inotify-0.9.6-8.fc26.noarch
samba-client-4.6.15-0.fc26.x86_64
poppler-data-0.4.7-7.fc26.noarch
libssh-0.7.5-1.fc26.x86_64
iso-codes-3.74-2.fc26.noarch
nautilus-extensions-3.24.2.1-1.fc26.x86_64
libsss_certmap-1.16.1-4.fc26.x86_64
openssh-server-7.5p1-4.fc26.x86_64
liberation-serif-fonts-1.07.4-8.fc26.noarch
```



```
passwd-0.80-2.fc26.x86_64
psmisc-22.21-9.fc26.x86_64
gtksourceview3-3.24.3-1.fc26.x86_64
binutils-2.27-28.fc26.x86_64
NetworkManager-adsl-1.8.2-4.fc26.x86_64
libreoffice-opensymbol-fonts-5.3.7.2-9.fc26.noarch
rasqal-0.9.33-3.fc26.x86_64
libnfnetwork-1.0.1-9.fc26.x86_64
gupnp-dlna-0.10.5-3.fc26.x86_64
xmlsec1-openssl-1.2.23-2.fc26.x86_64
kernel-4.16.11-100.fc26.x86_64
libwacom-data-0.26-1.fc26.noarch
python3-rpm-4.13.1-1.fc26.x86_64
libmspack-0.6-0.1.alpha.fc26.x86_64
abrt-gui-libs-2.10.3-4.fc26.x86_64
python3-louis-2.6.2-12.fc26.noarch
rng-tools-5-9.fc26.x86_64
publicsuffix-list-dafsa-20180419-1.fc26.noarch
wget-1.19.5-1.fc26.x86_64
LibRaw-0.18.11-1.fc26.x86_64
gnome-keyring-pam-3.20.1-1.fc26.x86_64
marisa-0.2.4-21.fc26.x86_64
passwdqc-1.3.0-7.fc26.x86_64
f26-backgrounds-base-26.2.7-2.fc26.noarch
NetworkManager-openvpn-1.2.10-1.fc26.x86_64
perl-Term-ANSIColor-4.06-2.fc26.noarch
ibus-wayland-1.5.17-6.fc26.x86_64
libselinux-utils-2.6-7.fc26.x86_64
fpaste-0.3.9.1-1.fc26.noarch
hplip-common-3.18.4-2.fc26.x86_64
systemd-container-233-7.fc26.x86_64
perl-Text-Tabs+Wrap-2013.0523-366.fc26.noarch
gnome-desktop3-3.24.2-1.fc26.x86_64
java-1.8.0-openjdk-headless-1.8.0.171-3.b10.fc26.x86_64
```

```
celt051-0.5.1.3-12.fc26.x86_64
cdparanoia-libs-10.2-22.fc26.x86_64
[root@server13 ~]#
```

3. Yes, the ncompress RPM package is installed on our computer and we installed it on December 3rd at 2:29 P.M.

```
[root@server13 ~]# rpm -q ncompress
ncompress-4.2.4.4-7.fc26.x86_64
```

4. This package uses the Public Domain license.

```
[root@server13 ~]# rpm -qi ncompress
Name       : ncompress
Version    : 4.2.4.4
Release    : 7.fc26
Architecture: x86_64
Install Date: Thu 03 Dec 2020 02:29:25 PM EST
Group      : Applications/File
Size       : 35997
License    : Public Domain
Signature  : RSA/SHA256, Sun 12 Feb 2017 03:36:37 AM EST, Key ID 812a6b4b64dab85d
Source RPM : ncompress-4.2.4.4-7.fc26.src.rpm
Build Date : Sat 11 Feb 2017 02:39:26 AM EST
Build Host : buildhw-03.phx2.fedoraproject.org
Relocations : (not relocatable)
Packager   : Fedora Project
Vendor     : Fedora Project
URL        : http://ncompress.sourceforge.net/
Summary    : Fast compression and decompression utilities
Description:
The ncompress package contains the compress and uncompress file
compression and decompression utilities, which are compatible with the
original UNIX compress utility (.Z file extensions). These utilities
can't handle gzipped (.gz file extensions) files, but gzip can handle
compressed files.

Install ncompress if you need compression/decompression utilities
which are compatible with the original UNIX compress utility.
```

5. The /usr/share/man/man1 directory holds the compress and uncompress executable files.

```
[root@server13 ~]# rpm -ql ncompress
/usr/bin/compress
/usr/bin/uncompress
/usr/share/doc/ncompress
/usr/share/doc/ncompress/LZW.INFO
/usr/share/doc/ncompress/README
/usr/share/man/man1/compress.1.gz
/usr/share/man/man1/uncompress.1.gz
```

6. The -e option removes the ncompress package from the system.

```
[root@server13 ~]# rpm -e ncompress
Running as unit: run-r3f3eb06ada1c481d8b3b31cdcdbc268e.service
```


9. Yes, the ncompress RPM package is available for installation from a software repository.

```
[root@server13 ~]# yum list available | grep compress
R-Rcompression.x86_64                                0.93.2-15.fc26                                fedora
apache-commons-compress.noarch                      1.13-3.fc26                                    updates
apache-commons-compress-javadoc.noarch              1.13-3.fc26                                    updates
apache-mina-mina-filter-compression.noarch
compress-lzf.noarch                                  1.0.3-6.fc26                                    fedora
compress-lzf-javadoc.noarch                         1.0.3-6.fc26                                    fedora
gambas3-gb-compress.x86_64                          3.9.2-7.fc26                                    fedora
ncompress.x86_64                                     4.2.4.4-7.fc26                                    fedora
node.js-compress-commons.noarch                     0.4.1-3.fc26                                    fedora
node.js-compressible.noarch                         2.0.9-1.fc26                                    fedora
node.js-compression.noarch                          1.6.2-1.fc26                                    fedora
opensips-compression.x86_64                         2.2.6-1.fc26                                    updates
perl-Archive-Extract-Z-uncompress.noarch            1:0.80-2.fc26                                    fedora
perl-Archive-Extract-bz2-IO-Uncompress-Bunzip2.noarch
perl-Archive-Extract-lzma-IO-Uncompress-UnLzma.noarch
perl-Archive-Extract-tbz-Archive-Tar-IO-Uncompress-Bunzip2.noarch
perl-Archive-Extract-txz-Archive-Tar-IO-Uncompress-UnXz.noarch
perl-Archive-Extract-xz-IO-Uncompress-UnXz.noarch
python-django-compressor.noarch                     2.1-3.fc26                                       fedora
python3-django-compressor.noarch                    2.1-3.fc26                                       fedora
qtiocompressor.i686                                  2.3.1-12.fc26                                    fedora
qtiocompressor.x86_64                                2.3.1-12.fc26                                    fedora
qtiocompressor-devel.i686                            2.3.1-12.fc26                                    fedora
qtiocompressor-devel.x86_64                          2.3.1-12.fc26                                    fedora
radium-compressor.x86_64                             0.5.1-11.fc26                                    fedora
smack-compression-jzlib.noarch                      4.1.5-4.fc26                                    fedora
tinycompress.i686                                    1.1.4-1.fc26                                    fedora
tinycompress.x86_64                                  1.1.4-1.fc26                                    fedora
tinycompress-devel.i686                             1.1.4-1.fc26                                    fedora
tinycompress-devel.x86_64                           1.1.4-1.fc26                                    fedora
tinycompress-utils.x86_64                           1.1.4-1.fc26                                    fedora
yuicompressor.noarch                                2.4.8-1.fc26                                    updates
```

10.

```
[root@server13 ~]# yum install ncompress
Last metadata expiration check: 1:38:21 ago on Thu 03 Dec 2020 02:28:35 PM EST.
Dependencies resolved.
=====
Package                Arch             Version          Repository        Size
=====
Installing:
ncompress              x86_64           4.2.4.4-7.fc26   fedora            30 k
=====
Transaction Summary
=====
Install 1 Package

Total download size: 30 k
Installed size: 35 k
Is this ok [y/N]: y
Downloading Packages:
ncompress-4.2.4.4-7.fc26.x86_64.rpm                                152 kB/s | 30 kB      00:00
-----
Total                                                                50 kB/s | 30 kB      00:00
Running transaction check
Transaction check succeeded.
Running transaction test
Transaction test succeeded.
Running transaction
  Preparing      :                                             1/1
  Installing     : ncompress-4.2.4.4-7.fc26.x86_64           1/1
  Running scriptlet: ncompress-4.2.4.4-7.fc26.x86_64         1/1
Running as unit: run-r60614c3e24dd48d1a90f60cb426d35c1.service
  Verifying      : ncompress-4.2.4.4-7.fc26.x86_64           1/1

Installed:
  ncompress.x86_64 4.2.4.4-7.fc26

Complete!
[root@server13 ~]# _
```

11. Yes, the ncompress RPM package is installed.

```
[root@server13 ~]# rpm -q ncompress
ncompress-4.2.4.4-7.fc26.x86_64
```

12.

```
[root@server13 ~]# exit
```

```
Fedora 26 (Workstation Edition)
Kernel 4.16.11-100.fc26.x86_64 on an x86_64 (tty2)

server13 login:
```

Discovery Exercise 2 (p.523):

- a) `[root@server13 ~]# compress -fv /root/sfile`
- b) `[root@server13 ~]# gzip -rv /root/dir1`
- c) `[root@server13 ~]# bunzip2 /root/letter.bz2`
- d) `[root@server13 ~]# gzip --fast /root/letter`
- e) The option is a lowercase L (l), not a one (1) .
`[root@server13 ~]# gzip -l /root/letter.gz`
- f) `[root@server13 ~]# bzip2 -t /root/sample`
- g) `[root@server13 ~]# bzip2 -s /root/sample`