

Archiving and compression tools.

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Discussion of homework

- How to print a name of the process which occupies the most physical memory?

```
ps -eo rss,comm | tail -n +2 | sort -k1,1n | \
tail -1 | awk '{print $2}'
```

- How to print a name of the process which has the most threads?

```
ps -eo nlwp,comm | tail -n +2 | sort -k1,1n | \
tail -1 | awk '{print $2}'
```

- Login to the server `fray1.fit.cvut.cz`.

How to print a name of the process which spent the most time on CPU (cumulative time)?

```
ps -eo time,comm | tail +2 | awk -f time.awk | \
sort -k1,1n | tail -1 | awk '{print $2}'
```

Discussion of homework

```
$> cat time.awk
{
  m = split($1,a,"-");
  days = 0;
  if ( m == 2 )
    { days = a[1]; hhmmss = a[2]; }
  else
    { hhmmss = a[1]; }

  n = split(hhmmss,b,":");
  hours = 0; minutes = 0; seconds = 0;
  if ( n == 3 )
    { hours = b[1]; minutes = b[2]; seconds = b[3]; };
  if ( n == 2 )
    { minutes = b[1]; seconds = b[2]; };
  if ( n == 1 ) { seconds = b[1]; };

  time = days*24*60*60 + hours*60*60 + minutes*60 + seconds
  printf("%d %s\n", time, $2);
}
```

Data archivation

- Login to the server `fray1.fit.cvut.cz`.
- How to create a directory `~/ps1-11` and set the working directory to the directory?

```
mkdir ~/ps1-11  
cd ~/ps1-11
```

- How to create a tar archive `~/ps1-11/a.tar` of the directory `/etc/init.d`?

```
cd /etc ; tar cvf ~/ps1-11/a.tar ./init.d ; cd -
```

- How to verify a content of the archive `~/ps1-11/a.tar` ?

```
tar tvf a.tar | less
```

- How to extract a content of the archive `~/ps1-11/a.tar` in the directory `~/ps1-11`?

```
tar xvf a.tar
```

Data compression

- How to create a tar archive ~/ps1-11/etc-01.tar of the directory /etc?

```
cd / ; tar cvf ~/ps1-11/etc-01.tar ./etc ; cd -
```

- How to create three copies of the archive ~/ps1-11/etc-01.tar in the same directory?

```
cp etc-01.tar etc-02.tar  
cp etc-01.tar etc-03.tar  
cp etc-01.tar etc-04.tar
```

- How to compress the previous copy of archive by commands compress, gzip, bzip?

```
compress etc-02.tar  
gzip etc-03.tar  
bzip2 etc-04.tar
```

- What command has the best compression ratio?

Data compression

- How to recover all data from etc-02.tar.Z, etc-03.tar.gz and etc-04.tar.bz2 to directories etc-02, etc-03, and etc-04, respectively?

```
zcat etc-02.tar.C | tar xvf -  
cp etc etc-03
```

```
gzcat etc-03.tar.gz | tar xvf -  
cp etc etc-03
```

```
bzcat etc-04.tar.bz2 | tar xvf -  
cp etc etc-04
```

Data compression

- Login to Linux system.
- How to create compressed archive of /etc in one step?

```
cd / ; tar cZvf ~/ps1-11/etc-05.tar.Z etc ; cd -
```

```
cd / ; tar czvf ~/ps1-11/etc-05.tar.gz etc ; cd -
```

```
cd / ; tar cjvf ~/ps1-11/etc-05.tar.bz2 etc ; cd -
```

- How to recover data from the compressed archive in one step?

```
tar xZvf ~/ps1-11/etc-05.tar.Z
```

```
tar xzvf ~/ps1-11/etc-05.tar.gz
```

```
tar xjvf ~/ps1-11/etc-05.tar.bz2
```


- Copy all data from your home directory, that were modified during the last 24 hours, to the compressed archive.

- Solution 1

```
tar cjvf a.tar.bz2 \  
$(find ~ \! -name "a.tar.bz2" -mtime -1)
```

- Solution 2

```
find ~ \! -name "list.txt" -mtime -1 > list.txt
```

```
tar cjvf a.tar.bz2 -I list.txt  # Solaris
```

```
tar cjvf a.tar.bz2 -T list.txt  # Linux
```

- Copy all files from the directory `/tmp`, that are readable for you, to the compressed archive.
- Verify, that the content of the archive is correct.
- Create the new directory `$HOME/tmp-backup`. Restore all data from the previous archive to this directory.