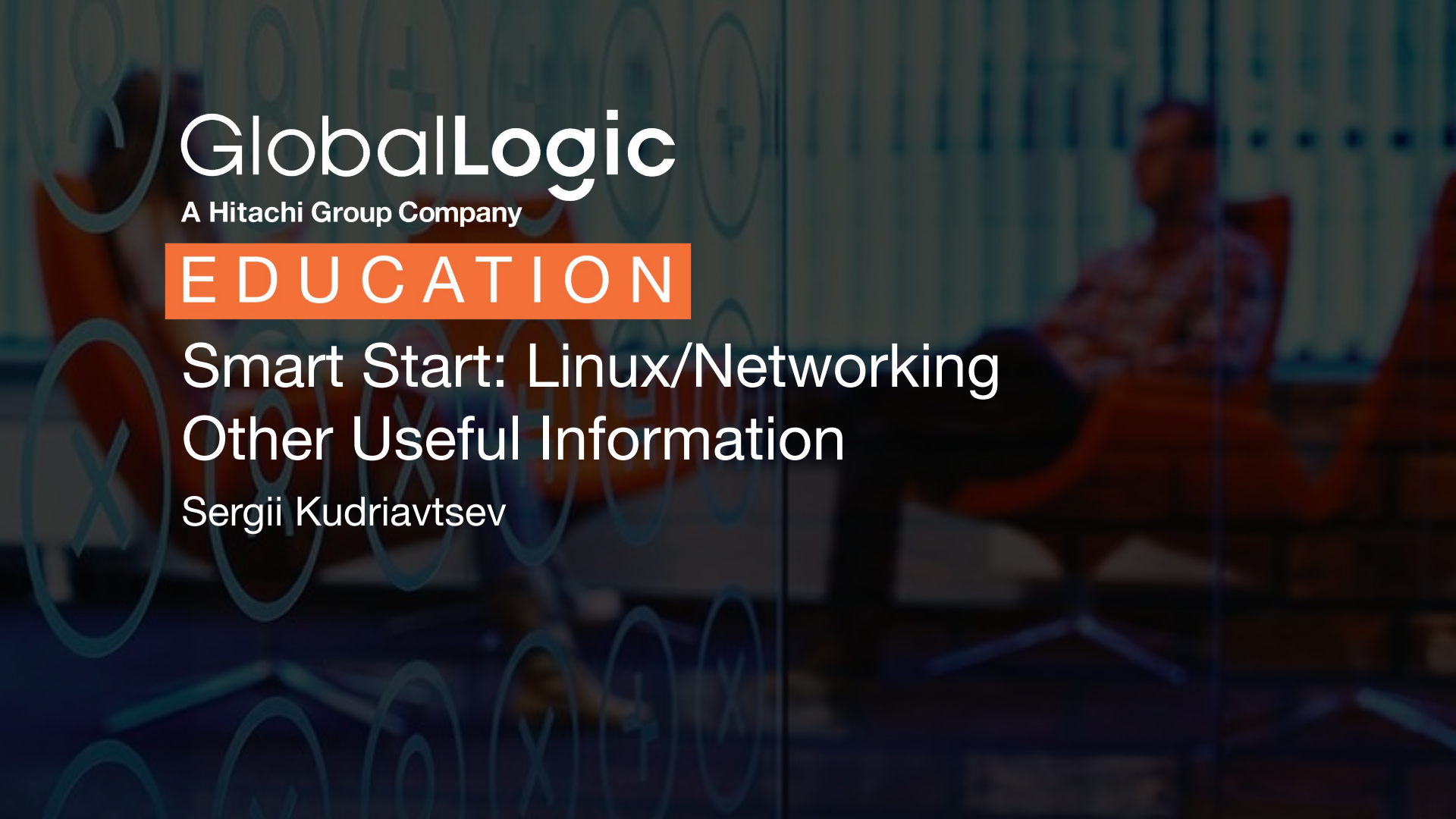

Smart Start: Linux/Networking Other Useful Information

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Agenda

1. hexdump
2. lsof
3. ulimit
4. ps
5. top
6. syslog, dmesg, logs monitoring
7. wget, curl
8. crond
9. archives

hexdump
ASCII, decimal, hexadecimal, octal dump

- $ hexdump *binary*
- $ hexdump -n 304 -C *binary*
- $ hexdump -n 304 -C blk00000.datXXX coreutil

```
00000000  f9 be b4 d9 1d 01 00 00  01 00 00 00 00 00 00 00  |................|
00000010  00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00  |................|
00000020  00 00 00 00 00 00 00 00  00 00 00 00 3b a3 ed fd  |............;...|
00000030  7a 7b 12 b2 7a c7 2c 3e  67 76 8f 61 7f c8 1b c3  |z{..z.,>gv.a....|
00000040  88 8a 51 32 3a 9f b8 aa  4b 1e 5e 4a 29 ab 5f 49  |..Q2:...K.^J)._I|
00000050  ff ff 00 1d 1d ac 2b 7c  01 01 00 00 00 01 00 00  |......+|........|
00000060  00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00  |................|
00000070  00 00 00 00 00 00 00 00  00 00 00 00 00 00 ff ff  |................|
00000080  ff ff 4d 04 ff ff 00 1d  01 04 45 54 68 65 20 54  |..M.......EThe T|
00000090  69 6d 65 73 20 30 33 2f  4a 61 6e 2f 32 30 30 39  |imes 03/Jan/2009|
000000a0  20 43 68 61 6e 63 65 6c  6c 6f 72 20 6f 6e 20 62  | Chancellor on b|
000000b0  72 69 6e 6b 20 6f 66 20  73 65 63 6f 6e 64 20 62  |rink of second b|
000000c0  61 69 6c 6f 75 74 20 66  6f 72 20 62 61 6e 6b 73  |ailout for banks|
000000d0  ff ff ff ff 01 00 f2 05  2a 01 00 00 00 43 41 04  |........*....CA.|
000000e0  67 8a fd b0 fe 55 48 27  19 67 f1 a6 71 30 b7 10  |g....UH'.g..q0..|
000000f0  5c d6 a8 28 e0 39 09 a6  79 62 e0 ea 1f 61 de b6  |\..(.9..yb...a..|
00000100  49 f6 bc 3f 4c ef 38 c4  f3 55 04 e5 1e c1 12 de  |I..?L.8..U......|
00000110  5c 38 4d f7 ba 0b 8d 57  8a 4c 70 2b 6b f1 1d 5f  |\8M....W.Lp+k.._|
00000120  ac 00 00 00 00 f9 be b4  d9 d7 00 00 00 01 00 00  |................|
00000130
```

lsof
list open files

- lsof

List open files

- List of open files by processes
  - `$ lsof`
  - `$ lsof -p PID`
- List of Internet and network files
  - Syntax
    - `$ lsof -i[46][protocol][@hostname|hostaddr][:service|port]`
  - Examples
    - `$ lsof -i`
    - `$ lsof -i4`
    - `$ lsof -i TCP:3333`

- List of open IPv4 sockets
  - Run server listening on port #3333, connect client to it and exchange data
    - Server

      ```
      $ nc -l -s 127.0.0.1 -p 3333
      ```

    - Client

      ```
      $ nc 127.0.0.1 3333
      ```

  - Get PIDs of running `nc` processes:
    - `$ ps -ef | grep 'nc ' | grep -v grep`

```
ironman     9827 19391  0 15:44 pts/27   00:00:00 nc -l -s 127.0.0.1 -p 3333
ironman     9830 25619  0 15:45 pts/30   00:00:00 nc localhost 3333
```

  - List open files of type `IPv4` for `nc` processes
    - `$ p1=9827`
    - `$ p2=9830`
    - `$ lsof -i4 -a -p $p1 -p $p2`

```
COMMAND  PID  USER   FD   TYPE DEVICE SIZE/OFF NODE NAME
nc      9827 ironman    4u   IPv4 215468      0t0  TCP localhost: 3333->localhost:51158
(ESTABLISHED)
nc      9830 ironman    3u   IPv4 215469      0t0  TCP localhost:51158->localhost: 3333
(ESTABLISHED)
```

ulimit
get and set user limits

- Limits
  - ulimit - resources control for shell session
    - `$ ulimit -a # show all limits`
    - `$ ulimit -u # the maximum number of processes available to a single user`
  - Linux
    - /etc/security/limits.conf
      - `$ man limits.conf`
    - sysctl - current kernel settings
      - `$ sysctl -a`
      - `$ sysctl kernel.threads-max`
      - `$ sysctl kernel.threads-max=12000 #under root`
    - /proc/sys - current kernel settings
      - `$ cat /proc/sys/kernel/threads-max`
    - `$ man 5 proc`
  - quota - disk usage and limits

ps
report a snapshot of the current processes

- ps - report a snapshot of the current processes.
  - `$ ps ax # Print all processes for all users`
  - `$ ps # Print Processes for the current user`
  - `$ ps af# print process tree`
  - `$ ps --help all`
  - `$ ps -C minicom -o pid=`

top
display Linux processes

- $ top # Display Linux processes in realtime
- $ top -u username # Display processes of the specified user
- $ top -p PID # Display process PID in real time

syslog
system logger

- System Logs
  - Log dir
    - /var/log
    - /var/log/messages #view under root
    - /var/log/auth.log
    - /var/log/dmesg
    - /var/log/cron
    - /var/log/kern.log
    - /var/log/Xorg.0.log
    - /var/log/lastlog #$ last
    - /var/log/httpd/ or /var/log/apache2/
    - /var/log/[wub]tmp #user access
  - Facility
    - kern, user, mail, daemon, auth, syslog, lpr, news, cron, authpriv(sec), ftp

- System Logs
  - Severity level
    - 0 - Emergency
    - 1 - Alert
    - 2 - Critical
    - 3 - Error
    - 4 - Warning
    - 5 - Notice
    - 6 - Informational
    - 7 - Debug
  - Network protocols
    - UDP - 514 port
    - TCP - 6514 port

- System Logs
  - syslog daemon
    - syslog-ng or rsyslog
    - Installation (under root)
      - `$ apt-get update`
      - `$ apt-get install syslog-ng`
        OR
      - `$ apt-get install rsyslog`
    - start, stop status
      - `$ service syslog-ng status`
        OR
      - `$ service rsyslog status`
    - rsyslog
      - `/etc/rsyslog.conf`
    - logrotate
      - `/etc/logrotate.conf`
      - `/etc/logrotate.d/*`

- System Logs
  - Manual logging utility
    - `$ logger -t MY_DAEMON Vhahah`
  - dmesg
    - Severity level:
      - `emerg, alert, crit, err, warn, notice, info, debug`
    - `Facility:`
      - `Kern, User, Mail, Daemon, Auth, Syslog, Lpr, news`
    - `$ dmesg | tail`
    - `$ dmesg --color -T`
    - `/var/log/dmesg`

- System Logs
  - Logs coloring
    - ccze
      - `$ tail -f /var/log/messages | ccze -A`
  - Logs monitoring
    - logcheck
      - `$ ls -l /etc/logcheck/ /etc/cron*/*logcheck*`
      - `REPORTLEVEL: server, workstation`
    - logwatch
      - `$ ls -l /etc/logwatch/`

wget, curl
The non-interactive network downloader, URL transfering

- wget, curl
  - `$ wget URL`
  - `$ curl URL`

crond
daemon to execute scheduled commands

- crond daemon
  - https://help.ubuntu.com/community/CronHowto #Ubuntu How to
  - `$ service crond status`
  - `$ service cron status`

- 29.3. crontab file
  - Viewing
    - `$ crontab -l`
    - `$ crontab -l -u username`
  - Editing
    - `EDITOR` env variable
    - `$ crontab -e`
    - `$ crontab -e -u username`
  - Example

```
# mins  hours   day     month   weekday command
*/5     *       17,27   *       *       /bin/ls arg1 arg2
```

    - weekday:
      - 0, 7 - Sunday
      - 1 - Monday, 2 - Tuesday, …, 6 - Saturday

archives

- Archives
  - tar
    - packing
      - new archive
        - `$ tar cvf archive.tar file1.txt file2.txt directory1 directory2`
        - `$ tar cvf archive.tar directory`
      - existing archive
        - `$ tar rvf archive.tar new_file`
    - unpacking
      - `$ tar xvf archive.tar`
      - `$ tar -C directory -xvf archive.tar`
    - View
      - `$ tar tvf archive.tar`
    - Extract group of files
      - `$ tar -xvf archive.tar --wildcards '*.jpg'`
    - Compare
      - `$ tar -dvf file.tar -C /path/to/dir`
    - Check archive size
      - `$ cat archive.tar | wc -c #in bytes`

- Archives
  - gzip, gunzip, zcat, zless, zgrep
    - the most default Linux compress utility
    - compressing
      - `$ gzip file.txt # file.txt.gz will be created`
      - `$ gzip archive.tar # file archive.tar.gz will be created`
      - *`$ gzip -k file.txt #do not dell file.txt`*
      - *`$ gzip -r * #will compress files in the main directory as well as all subdirectories`*
      - *`$ gzip -v file.txt #DEBUG INFO`*
      - `$ gzip -c file1.txt > ar.gz; gzip -c file2.txt >> ar.gz; gunzip -c ar.gz`
      - `$ cat test1.txt test2.txt | gzip > foo; gunzip foo`

- Archives
  - gzip, gunzip, zcat, zless, zgrep
    - de-compressing
      - `$ gunzip file.txt.gz # file.txt will be created`
      - `$ gunzip archive.tar.gz # archive.tar will be created`
      - `$ zcat file.txt.gz #unzip archive on the fly and print to stdout`
      - `$ zless file.txt.gz #unzip archive on the fly and pass to "less" pages`
      - `$ zgrep pattern file.txt.gz #unzip archive on the fly and filter by pattern`

- Archives
  - gzip, gunzip, zcat, zless, zgrep
    - Compressing level
    - **-1, --fast**

-2, -3, -4, -5, -6, -7, -8

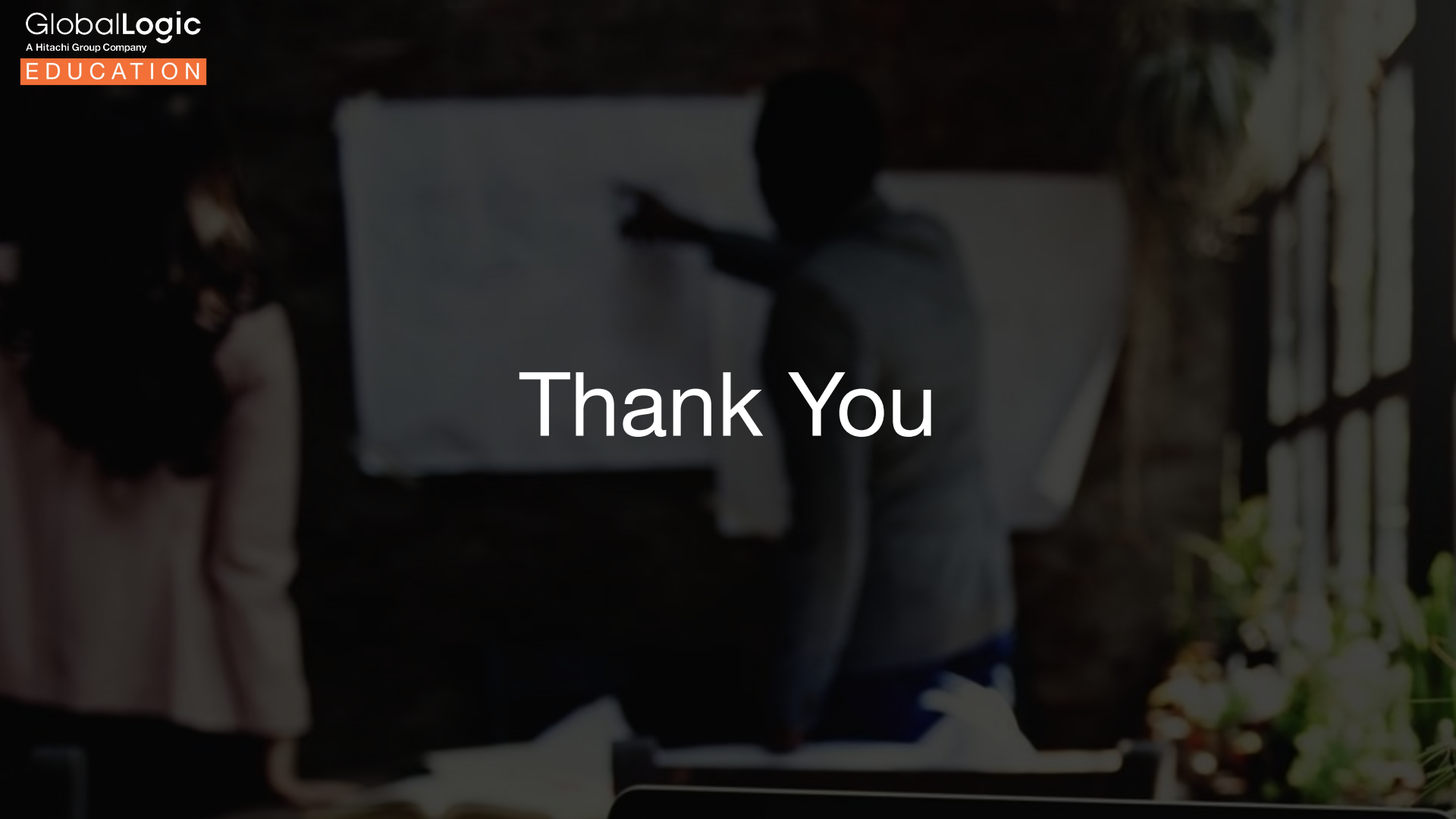
-9, --best These options change the compression level used, with the **-1** option being the fastest, with less compression, and the **-9** option being the slowest, with optimal compression. The default compression level is 6.

- Archives
  - Zip
    - $ sudo apt-get install zip
      - Compress
        - $ zip files.zip file1.txt file2.txt file3.txt
      - Decompress
        - $ unzip *files.zip*
      - Remove file
        - $ zip -d files.zip file3.txt
      - Add new files
        - $ zip -u files.zip file3.txt file4.txt
      - Encrypt
        - $ zip -e file.zip *file1.txt file2.txt file3.txt*
      - Compressing leve
        - (-0, … -9)

- Archives
  - bzip2, bunzip2, bzcat, bzless, bzgrep
    - one more default Linux compress utility
    - a block-sorting file compressor
    - similar to gzip, usually have better compression ratio
      - Compress
        - `$ bzip2 file1.txt file2.txt file3.txt #file1.txt.bz2, file2.txt.bz2 and file3.txt.bz2`
      - Decompress
        - `$ bzip2 -d file.txt.bz2`
      - List compression information
        - `$ bzip2 -v file.txt`
      - Compression level
        - `$ man bzip2`
  - xz, unxz, xzcat, xzless, xzgrep
    - Compress or decompress .xz and .lzma files
    - similar to gzip and bzip2, have better compression ratio, but consumes a lot of CPU and RAM

- Archives
  - tar with gzip and bzip2 (and xz)
    - packing
      - Single command
        - `$ tar czvf archive.tar.gz file1.txt file2.txt directory1 directory2`
        - `$ tar czvf archive.tar.gz directory`
        - `$ tar cjvf archive.tar.bz2 file1.txt file2.txt directory1 directory2`
        - `$ tar cjvf archive.tar.bz2 directory`
        - `$ tar cJvf archive.tar.xz file1.txt file2.txt directory1 directory2`
        - `$ tar cJvf archive.tar.xz directory`
      - Separate commands
        - `$ tar cvf archive.tar file1.txt file2.txt directory1 directory2 && \`
        - `  gzip archive.tar`
        - `$ tar cvf archive.tar directory && gzip archive.tar`
        - `$ tar cvf archive.tar file1.txt file2.txt directory1 directory2 && \`
        - `  bzip2 archive.tar`
        - `$ tar cvf archive.tar directory && bzip2 archive.tar`

- Archives
  - tar with gzip and bzip2 (and xz)
    - unpacking
      - Single command
        - `$ tar xvf archive.tar.gz`
        - `$ tar xvf archive.tar.bz2`
      - Separate commands
        - `$ gunzip archive.tar.gz && tar xvf archive.tar`
        - `$ bunzip2 archive.tar.bz2 && tar xvf archive.tar`
    - view
      - Single command
        - `$ tar tvf archive.tar.gz`
        - `$ tar tvf archive.tar.bz2`
      - Separate commands
        - `$ gunzip archive.tar.gz && tar tvf archive.tar`
        - `$ bunzip2 archive.tar.bz2 && tar tvf archive.tar`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