Linux Directories Layout
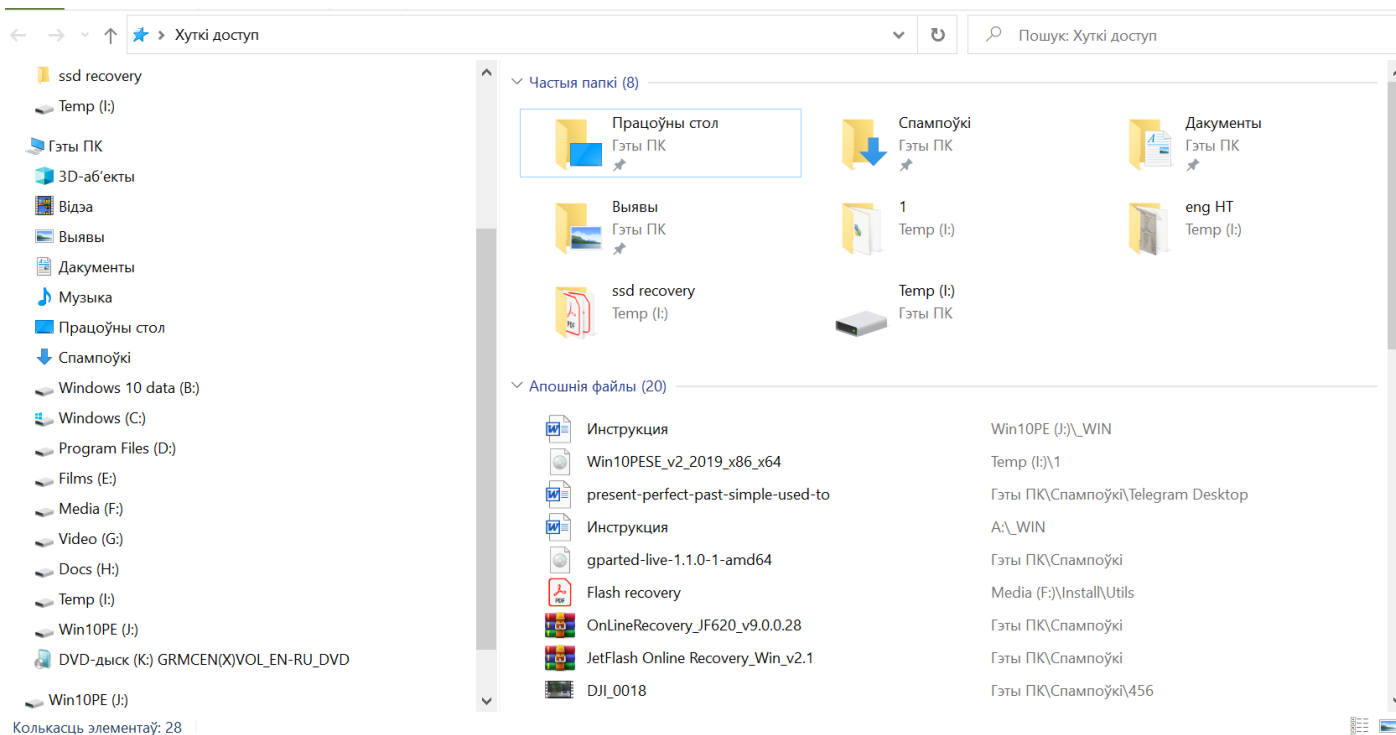
- **Disk abstractions**
- **Navigating folders**
- **Common directory layout**

Windows disk abstraction

- Each drive has its own letter
- Everything is organized like a tree under the "My PC" abstraction

Linux disks presentation.


```
lexa@gate-bkp:/$ ls
bin    dev   home        initrd.img.old  lib32  libx32       media  opt   root  sbin  sys  usr  vmlinuz
boot   etc   initrd.img  lib             lib64  lost+found   mnt    proc  run   srv   tmp  var  vmlinuz.old
lexa@gate-bkp:/$ df -h
Файловая система        Размер Использовано  Дост Использовано% Смонтировано в
udev                      3,7G            0  3,7G           0% /dev
tmpfs                     755M         744K  754M           1% /run
/dev/mapper/vg00-root     7,3G         3,8G  3,1G          56% /
tmpfs                     5,0M            0  5,0M           0% /run/lock
tmpfs                     1,5G          12K  1,5G           1% /dev/shm
/dev/sdb1                 466M         114M  324M          26% /boot
/dev/mapper/vg00-tmp      3,7G         7,5M  3,4G           1% /tmp
/dev/mapper/vg00-var       28G         5,1G   21G          20% /var
/dev/mapper/vg00-vmbkp     99G          62G   32G          66% /var/vmbackups
tmpfs                     3,7G            0  3,7G           0% /sys/fs/cgroup
tmpfs                     755M            0  755M           0% /run/user/1000
lexa@gate-bkp:/$ mount
sysfs on /sys type sysfs (rw,nosuid,nodev,noexec,relatime)
proc on /proc type proc (rw,nosuid,nodev,noexec,relatime)
udev on /dev type devtmpfs (rw,nosuid,relatime,size=3844436k,nr_inodes=961109,mode=755)
devpts on /dev/pts type devpts (rw,nosuid,relatime,gid=5,mode=620,ptmxmode=000)
tmpfs on /run type tmpfs (rw,nosuid,noexec,relatime,size=772188k,mode=755)
/dev/mapper/vg00-root on / type ext4 (rw,relatime,errors=remount-ro)
tmpfs on /run/lock type tmpfs (rw,nosuid,nodev,noexec,relatime,size=5120k)
pstore on /sys/fs/pstore type pstore (rw,relatime)
tmpfs on /dev/shm type tmpfs (rw,nosuid,nodev,noexec,relatime,size=1544360k)
/dev/sdb1 on /boot type ext4 (rw,relatime)
/dev/mapper/vg00-tmp on /tmp type ext4 (rw,relatime)
/dev/mapper/vg00-var on /var type ext4 (rw,relatime)
/dev/mapper/vg00-vmbkp on /var/vmbackups type ext4 (rw,relatime)
securityfs on /sys/kernel/security type securityfs (rw,relatime)
rpc_pipefs on /run/rpc_pipefs type rpc_pipefs (rw,relatime)
binfmt_misc on /proc/sys/fs/binfmt_misc type binfmt_misc (rw,nosuid,nodev,noexec,relatime)
tmpfs on /sys/fs/cgroup type tmpfs (rw,nosuid,nodev,noexec,mode=755)
cgroup2 on /sys/fs/cgroup/unified type cgroup2 (rw,nosuid,nodev,noexec,relatime,nsdelegate)
cgroup on /sys/fs/cgroup/elogind type cgroup (rw,nosuid,nodev,noexec,relatime,xattr,release_agent=/lib/elogind/elogind-c
gind)
nfsd on /proc/fs/nfsd type nfsd (rw,relatime)
tmpfs on /run/user/1000 type tmpfs (rw,nosuid,nodev,relatime,size=772184k,mode=700,uid=1000,gid=1000)
lexa@gate-bkp:/$
```

Linux disks presentation.

- No abstractions
- Everything are grouped under the / (root directory)
- Each full path is starter from /
- Each linux uses directory structure called **File Hierarchy Standard** or directory structure is similar to this standard

Filesystem Hierarchy Standard

Directory	Description
/	*Primary hierarchy* root and root directory of the entire file system hierarchy.
/boot	Boot loader files
/dev	Device files
/etc	Host-specific system-wide configuration files
/home	Users' home directories, containing saved files, personal settings, etc
/bin	Essential command binaries that need to be available in single user mode; for all users, e.g., cat, ls, cp
/sbin	Essential system binaries, *e.g.*, fsck, init, route.
/sys	Contains information about devices, drivers, and some kernel features.

Filesystem Hierarchy Standard

Directory	Description
/tmp	Temporary files (see also /var/tmp). Often not preserved between system reboots, and may be severely size restricted
/run	Run-time variable data: Information about the running system since last boot, e.g., currently logged-in users and running daemons. Files under this directory must be either removed or truncated at the beginning of the boot process; but this is not necessary on systems that provide this directory as a temporary filesystem (tmpfs).
/root	Home directory for the root user
/var	Variable files—files whose content is expected to continually change during normal operation of the system—such as logs, spool files, and temporary e-mail files.

Filesystem Hierarchy Standard

Directory	Description
/usr	Secondary hierarchy for read-only user data; contains the majority of (multi-)user utilities and applications.
/opt	Optional application software packages
/lib	Libraries essential for the binaries in /bin and /sbin
/mnt	Temporarily mounted filesystems
/media	Mount points for removable media

/usr and /var directory

Working with directories


```
lexa@gate-bkp:/tmp/lesson5$
lexa@gate-bkp:/tmp/lesson5$ mkdir test
lexa@gate-bkp:/tmp/lesson5$ touch testfile
lexa@gate-bkp:/tmp/lesson5$ ls -la
итого 12
drwxr-xr-x 3 lexa lexa 4096 апр  7 07:56 .
drwxrwxrwt 8 root root 4096 апр  7 07:55 ..
drwxr-xr-x 2 lexa lexa 4096 апр  7 07:55 test
-rw-r--r-- 1 lexa lexa    0 апр  7 07:56 testfile
lexa@gate-bkp:/tmp/lesson5$
```

Mount volumes

```
lexa@gate-bkp:/tmp/lesson5$ mount
sysfs on /sys type sysfs (rw,nosuid,nodev,noexec,relatime)
proc on /proc type proc (rw,nosuid,nodev,noexec,relatime)
udev on /dev type devtmpfs (rw,nosuid,relatime,size=3844436k,nr_inodes=961109,mode=755)
devpts on /dev/pts type devpts (rw,nosuid,noexec,relatime,gid=5,mode=620,ptmxmode=000)
tmpfs on /run type tmpfs (rw,nosuid,noexec,relatime,size=772188k,mode=755)
/dev/mapper/vg00-root on / type ext4 (rw,relatime,errors=remount-ro)
tmpfs on /run/lock type tmpfs (rw,nosuid,nodev,noexec,relatime,size=5120k)
pstore on /sys/fs/pstore type pstore (rw,relatime)
tmpfs on /dev/shm type tmpfs (rw,nosuid,nodev,noexec,relatime,size=1544360k)
/dev/sdb1 on /boot type ext4 (rw,relatime)
/dev/mapper/vg00-tmp on /tmp type ext4 (rw,relatime)
/dev/mapper/vg00-var on /var type ext4 (rw,relatime)
/dev/mapper/vg00-vmbkp on /var/vmbackups type ext4 (rw,relatime)
securityfs on /sys/kernel/security type securityfs (rw,relatime)
rpc_pipefs on /run/rpc_pipefs type rpc_pipefs (rw,relatime)
binfmt_misc on /proc/sys/fs/binfmt_misc type binfmt_misc (rw,nosuid,nodev,noexec,relatime)
tmpfs on /sys/fs/cgroup type tmpfs (rw,nosuid,nodev,noexec,mode=755)
cgroup2 on /sys/fs/cgroup/unified type cgroup2 (rw,nosuid,nodev,noexec,relatime,nsdelegate)
cgroup on /sys/fs/cgroup/elogind type cgroup (rw,nosuid,nodev,noexec,relatime,xattr,release_agent=/lib/elogind
gind)
nfsd on /proc/fs/nfsd type nfsd (rw,relatime)
tmpfs on /run/user/1000 type tmpfs (rw,nosuid,nodev,relatime,size=772184k,mode=700,uid=1000,gid=1000)
lexa@gate-bkp:/tmp/lesson5$ df
Файловая система        1К-блоков Использовано Доступно Использовано% Смонтировано в
udev                     3844436          0   3844436            0% /dev
tmpfs                     772188        744    771444            1% /run
/dev/mapper/vg00-root    7557288    3955528   3194824           56% /
tmpfs                       5120          0      5120            0% /run/lock
tmpfs                    1544360         12   1544348            1% /dev/shm
/dev/sdb1                 476706     116277    331297           26% /boot
/dev/mapper/vg00-tmp     3776568       7660   3557352            1% /tmp
/dev/mapper/vg00-var    28703740    5336628  21886000           20% /var
/dev/mapper/vg00-vmbkp 103081248   64835052  33490300           66% /var/vmbackups
tmpfs                    3860928          0   3860928            0% /sys/fs/cgroup
tmpfs                     772184          0    772184            0% /run/user/1000
```

Unmount devices

```
root@gate-bkp:/tmp/lesson5# mount | grep ext4
/dev/mapper/vg00-root on / type ext4 (rw,relatime,errors=remount-ro)
/dev/sdb1 on /boot type ext4 (rw,relatime)
/dev/mapper/vg00-tmp on /tmp type ext4 (rw,relatime)
/dev/mapper/vg00-var on /var type ext4 (rw,relatime)
root@gate-bkp:/tmp/lesson5# mount /dev/mapper/vg00-vmbkp /var/vmbackups
root@gate-bkp:/tmp/lesson5# mount | grep ext4
/dev/mapper/vg00-root on / type ext4 (rw,relatime,errors=remount-ro)
/dev/sdb1 on /boot type ext4 (rw,relatime)
/dev/mapper/vg00-tmp on /tmp type ext4 (rw,relatime)
/dev/mapper/vg00-var on /var type ext4 (rw,relatime)
/dev/mapper/vg00-vmbkp on /var/vmbackups type ext4 (rw,relatime)
root@gate-bkp:/tmp/lesson5# umount /var/vmbackups
root@gate-bkp:/tmp/lesson5# mount | grep ext4
/dev/mapper/vg00-root on / type ext4 (rw,relatime,errors=remount-ro)
/dev/sdb1 on /boot type ext4 (rw,relatime)
/dev/mapper/vg00-tmp on /tmp type ext4 (rw,relatime)
/dev/mapper/vg00-var on /var type ext4 (rw,relatime)
root@gate-bkp:/tmp/lesson5# mount -a
root@gate-bkp:/tmp/lesson5# mount | grep ext4
/dev/mapper/vg00-root on / type ext4 (rw,relatime,errors=remount-ro)
/dev/sdb1 on /boot type ext4 (rw,relatime)
/dev/mapper/vg00-tmp on /tmp type ext4 (rw,relatime)
/dev/mapper/vg00-var on /var type ext4 (rw,relatime)
/dev/mapper/vg00-vmbkp on /var/vmbackups type ext4 (rw,relatime)
root@gate-bkp:/tmp/lesson5#  umount /dev/mapper/vg00-vmbkp
root@gate-bkp:/tmp/lesson5# mount -a
root@gate-bkp:/tmp/lesson5#
```