

<epam>

Linux Directories Layout

- Disk abstractions
- Navigating folders
- Common directory layout

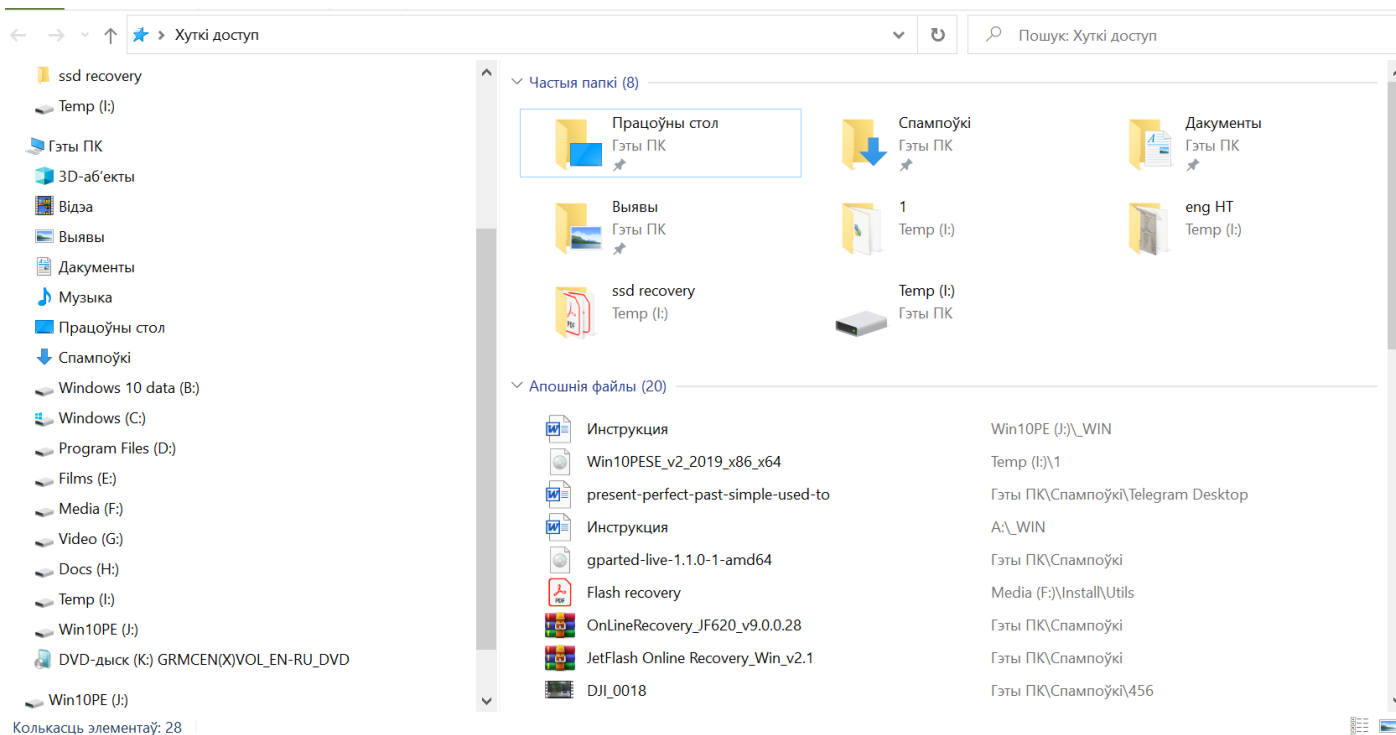


TRAINING
C E N T E R

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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-vmbakp 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,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-vmbakp 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-cgind)
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
/	<i>Primary hierarchy</i> 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, <i>e.g.</i> , 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

```
lexa@gate-bkp:/$ ls /usr
bin  games  include  lib  lib32  libx32  local  sbin  share  src
lexa@gate-bkp:/$ ls /usr/local
bin  etc  games  include  lib  libdata  libexec  sbin  share  src
lexa@gate-bkp:/$
lexa@gate-bkp:/$ ls /var/
agentx  backups  cache  crash  lib  local  lock  log  lost+found  mail  opt  run  spool  tmp  vmbackups  www
lexa@gate-bkp:/$ ls /var/lib/
apt          dbus          exim4          initramfs-tools  letencrypt      mlocate      python          snmp          update-rc.d  xml-core
aptitude     dhcp          fail2ban       initscripts      libxml-sax-perl  nfs          rpm            sudo          urandom
aspell       dictionaries-common  gems          insserv          logrotate       nginx        selinux        systemd      usbutils
bind         dkms          ghostscript    iptraf-ng        man-db          ntp          sgml-base      tex-common    vim
binfmts      dpkg          git            ispell           mibs            os-prober    smartmontools  texmf         vnstat
container    emacs-en-common  grub          kdump            misc            pam          snmp           ucf           xfonts
lexa@gate-bkp:/$ ls /var/log/
127.0.0.1      aptitude.1.gz      daemon.log.4.gz    dpkg.log.2.gz     installer        popularity-contest.0  syslog.4.gz
192.168.1.253 aptitude.2.gz      debug              dpkg.log.3.gz     kern.log         popularity-contest.1.gz  syslog.5.gz
alternatives.log  aptitude.3.gz      debug.1            dpkg.log.4.gz     kern.log.1       popularity-contest.2.gz  syslog.6.gz
alternatives.log.1 aptitude.4.gz      debug.2.gz         dpkg.log.5.gz     kern.log.2.gz    popularity-contest.3.gz  syslog.7.gz
alternatives.log.10.gz aptitude.5.gz      debug.3.gz         dpkg.log.6.gz     kern.log.3.gz    popularity-contest.4.gz  sysstat
alternatives.log.11.gz aptitude.6.gz      debug.4.gz         dpkg.log.7.gz     kern.log.4.gz    popularity-contest.5.gz  user.log
alternatives.log.12.gz auth.log            dmesg              dpkg.log.8.gz     lastlog           popularity-contest.6.gz  user.log.1
alternatives.log.2.gz auth.log.1          dmesg.0            dpkg.log.9.gz     letencrypt        popularity-contest.gpg   user.log.2.gz
alternatives.log.3.gz auth.log.2.gz       dmesg.1.gz         exim4              messages          popularity-contest.new.gpg  user.log.3.gz
alternatives.log.4.gz auth.log.3.gz       dmesg.2.gz         fail2ban.log       messages.1        ppp-connect-errors.1.gz  user.log.4.gz
alternatives.log.5.gz auth.log.4.gz       dmesg.3.gz         fail2ban.log.1     messages.2.gz     squid                    wtmp
alternatives.log.6.gz btmap              dmesg.4.gz         fail2ban.log.2.gz  messages.3.gz     squid3                   wtmp.1
alternatives.log.7.gz btmap.1            dpkg.log            fail2ban.log.3.gz  messages.4.gz     sslh.log
alternatives.log.8.gz daemon.log          dpkg.log.1          fail2ban.log.4.gz  nginx              syslog
alternatives.log.9.gz daemon.log.1        dpkg.log.10.gz     faillog            ntpstats           syslog.1
apt             daemon.log.2.gz     dpkg.log.11.gz     fontconfig.log     openvpn            syslog.2.gz
aptitude        daemon.log.3.gz     dpkg.log.12.gz     fsck                popularity-contest  syslog.3.gz
```


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 anp 7 07:56 .  
drwxrwxrwt 8 root root 4096 anp 7 07:55 ..  
drwxr-xr-x 2 lexa lexa 4096 anp 7 07:55 test  
-rw-r--r-- 1 lexa lexa 0 anp 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#
```