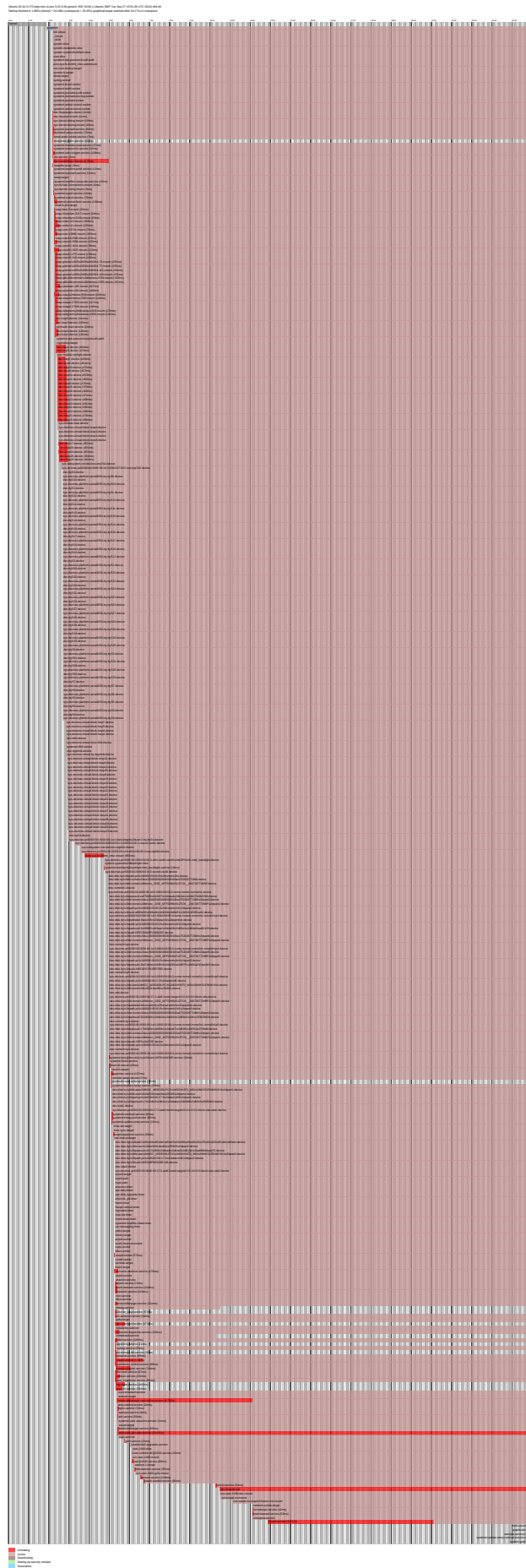# Damir Nabiullin - Lab 9

1. Time spent in the kernel space = 1.865s

```
dale@dale-nitro:~/Documents/SNA/Week 9$ systemd-analyze time
Startup finished in 1.865s (kernel) + 24.186s (userspace) = 26.051s
graphical.target reached after 24.171s in userspace
dale@dale-nitro:~/Documents/SNA/Week 9$ systemd-analyze plot > task1.svg
```

2. `graphical.target` -  starts a system with network, multiuser support, and a display manager.

   `multi-user.target` - starts a multiuser system with networking, and no graphical environment.

   `basic.targe` `t` - is an early-boot synchronization point, ordered even before initrd, so the service for login prompts is simply not started, thus there's no command line to work with

   `sysinit.target` - by default is after the filesystems and swap are mounted and the basic system features are up, but before the various background services start.

```
dale@dale-nitro:~/Documents/SNA/Week 9$ systemctl cat graphical.target
# /lib/systemd/system/graphical.target
#  SPDX-License-Identifier: LGPL-2.1+
#
#  This file is part of systemd.
#
#  systemd is free software; you can redistribute it and/or modify it
#  under the terms of the GNU Lesser General Public License as published by
#  the Free Software Foundation; either version 2.1 of the License, or
#  (at your option) any later version.

[Unit]
Description=Graphical Interface
Documentation=man:systemd.special(7)
Requires=multi-user.target
Wants=display-manager.service
Conflicts=rescue.service rescue.target
After=multi-user.target rescue.service rescue.target display-manager.service
AllowIsolate=yes
dale@dale-nitro:~/Documents/SNA/Week 9$ systemctl cat multi-user.target
# /lib/systemd/system/multi-user.target
#  SPDX-License-Identifier: LGPL-2.1+
#
#  This file is part of systemd.
#
#  systemd is free software; you can redistribute it and/or modify it
#  under the terms of the GNU Lesser General Public License as published by
#  the Free Software Foundation; either version 2.1 of the License, or
#  (at your option) any later version.

[Unit]
Description=Multi-User System
Documentation=man:systemd.special(7)
Requires=basic.target
Conflicts=rescue.service rescue.target
After=basic.target rescue.service rescue.target
AllowIsolate=yes
```

```
dale@dale-nitro:~/Documents/SNA/Week 9$ systemctl cat basic.target
# /lib/systemd/system/basic.target
#  SPDX-License-Identifier: LGPL-2.1+
#
#  This file is part of systemd.
#
#  systemd is free software; you can redistribute it and/or modify it
#  under the terms of the GNU Lesser General Public License as published by
#  the Free Software Foundation; either version 2.1 of the License, or
#  (at your option) any later version.

[Unit]
Description=Basic System
Documentation=man:systemd.special(7)
Requires=sysinit.target
Wants=sockets.target timers.target paths.target slices.target
After=sysinit.target sockets.target paths.target slices.target tmp.mount

# We support /var, /tmp, /var/tmp, being on NFS, but we don't pull in
# remote-fs.target by default, hence pull them in explicitly here. Note that we
# require /var and /var/tmp, but only add a Wants= type dependency on /tmp, as
# we support that unit being masked, and this should not be considered an error.
RequiresMountsFor=/var /var/tmp
Wants=tmp.mount
dale@dale-nitro:~/Documents/SNA/Week 9$ systemctl cat sysinit.target
# /lib/systemd/system/sysinit.target
#  SPDX-License-Identifier: LGPL-2.1+
#
#  This file is part of systemd.
#
#  systemd is free software; you can redistribute it and/or modify it
#  under the terms of the GNU Lesser General Public License as published by
#  the Free Software Foundation; either version 2.1 of the License, or
#  (at your option) any later version.

[Unit]
Description=System Initialization
Documentation=man:systemd.special(7)
Conflicts=emergency.service emergency.target
Wants=local-fs.target swap.target
After=local-fs.target swap.target emergency.service emergency.target
dale@dale-nitro:~/Documents/SNA/Week 9$
```

`local-fs.target` - automatically adds dependencies of type `Before=` to all mount units that refer to local mount points for this target unit.

`swap.target` - similar to `local-fs.target`, but for swap partitions and swap files.

3. Script for the server:

```
#!/bin/bash

while true;
    do dd if=/dev/zero of=/dev/null
done &

upt="Uptime:\n\n"
inode="n\nInode usage:\n\n"
mem="\n\nMemory usage:\n\n"
disk="\n\nDisk usage:\n\n"
log="\n\nSystem log:\n\n"

while true;
do echo -e "HTTP/1.1 200 OK$upt$(uptime)$inode$(df -i)$mem$(free -m)$disk$(df -k)$log$(tail -n 15 /var/log/syslog)" \
    | nc -l -k -p 8080 -q 1;
done
```

task3.service:

```
[Unit]
Description=a simple web server for task 3
OnFailure=/lib/systemd/system/task3.service
```

```
[Service]
ExecStart=/home/dale/Documents/SNA/Week\ 9/task3.sh
Slice=task3.slice

[Install]
WantedBy=multi-user.target
```

task3.slice:

```
[Unit]
Description=Custom systemd slice for task3 on systemd.
Before=slices.target

[Slice]
MemoryAccounting=true
CPUAccounting=true
MemoryMax=256MB
CPUQuota=15%
```

Used commands:

```
dale@dale-nitro:~/Documents/SNA/Week 9$ sudo nano /lib/systemd/system/task3.service
dale@dale-nitro:~/Documents/SNA/Week 9$ sudo nano /etc/systemd/system/task3.slice
dale@dale-nitro:~/Documents/SNA/Week 9$ sudo nan0 /usr/bin/task3.sh
sudo: nan0: command not found
dale@dale-nitro:~/Documents/SNA/Week 9$ sudo nano /usr/bin/task3.sh
dale@dale-nitro:~/Documents/SNA/Week 9$ sudo chmod +x /usr/bin/task3.sh
dale@dale-nitro:~/Documents/SNA/Week 9$ sudo systemctl daemon-reload
dale@dale-nitro:~/Documents/SNA/Week 9$ sudo systemctl enable task3.service
dale@dale-nitro:~/Documents/SNA/Week 9$ sudo systemctl start task3.service
dale@dale-nitro:~/Documents/SNA/Week 9$ sudo systemctl status task3.service
● task3.service - a simple web server for task 3
     Loaded: loaded (/lib/systemd/system/task3.service; enabled; vendor preset: enabled)
     Active: active (running) since Sat 2022-10-29 21:43:42 MSK; 19s ago
   Main PID: 8980 (task3.sh)
      Tasks: 4 (limit: 18919)
     Memory: 1.1M
     CGroup: /task3.slice/task3.service
             ├─8980 /bin/bash /usr/bin/task3.sh
             ├─8981 /bin/bash /usr/bin/task3.sh
             ├─8983 dd if=/dev/zero of=/dev/null
             └─8984 nc -l -k -p 8080 -q 1

Oct 29 21:43:42 dale-nitro systemd[1]: Started a simple web server for task 3.
```

Output:

```
dale@dale-nitro:~/Documents/SNA/Week 9$ curl http://127.0.0.1:8080/
 21:51:14 up  3:30,  1 user,  load average: 0.53, 0.81, 0.80n
Inode usage:

Файл.система    Iнодов IИспользовано IСвободно IИспользовано% Смонтировано в
udev           2018061          624   2017437            1% /dev
tmpfs          2027130         1185   2025945            1% /run
/dev/nvme0n1p2 3727360       543071   3184289           15% /
tmpfs          2027130           64   2027066            1% /dev/shm
tmpfs          2027130            5   2027125            1% /run/lock
tmpfs          2027130           19   2027111            1% /sys/fs/cgroup
/dev/loop0          29           29         0          100% /snap/bare/5
/dev/loop3       10858        10858         0          100% /snap/core18/2560
/dev/loop2       11796        11796         0          100% /snap/core20/1611
/dev/loop1        1004         1004         0          100% /snap/chromium/2117
/dev/loop4       12845        12845         0          100% /snap/core/13741
/dev/loop5        1004         1004         0          100% /snap/chromium/2136
/dev/loop7       10858        10858         0          100% /snap/core18/2566
/dev/loop6        3981         3981         0          100% /snap/code/110
/dev/loop20      18500        18500         0          100% /snap/gnome-3-34-1804/72
/dev/loop8       12992        12992         0          100% /snap/core22/275
/dev/loop10      18500        18500         0          100% /snap/gnome-3-34-1804/77
/dev/loop14      76177        76177         0          100% /snap/gtk-common-themes/1534
/dev/loop9       13283        13283         0          100% /snap/core22/310
/dev/loop15        486          486         0          100% /snap/snapd/17336
/dev/loop19      43343        43343         0          100% /snap/postman/184
/dev/loop18      17275        17275         0          100% /snap/snap-store/599
/dev/loop13      27593        27593         0          100% /snap/telegram-desktop/4256
/dev/loop22      12845        12845         0          100% /snap/core/13886
/dev/loop11      18121        18121         0          100% /snap/gnome-3-38-2004/115
/dev/loop12      18272        18272         0          100% /snap/gnome-3-38-2004/119
/dev/loop21        486          486         0          100% /snap/snapd/17029
/dev/loop16      76208        76208         0          100% /snap/gtk-common-themes/1535
/dev/loop17      27599        27599         0          100% /snap/telegram-desktop/4249
/dev/loop26       3981         3981         0          100% /snap/code/111
/dev/loop24      11882        11882         0          100% /snap/core20/1623
/dev/loop25      17311        17311         0          100% /snap/snap-store/558
/dev/loop23      43193        43193         0          100% /snap/postman/183
/dev/nvme0n1p1       0            0         0            - /boot/efi
tmpfs          2027130          119   2027011            1% /run/user/1000

Memory usage:

             всего       занято      свободно     общая  буф./врем.   доступно
Память:      15836        3010        8437       751      4388       11754
Подкачка:     2047           0        2047
```

```
Файл.система     1К-блоков Использовано Доступно Использовано% Смонтировано в
udev              8072244            0  8072244            0% /dev
tmpfs             1621708         2132  1619576            1% /run
/dev/nvme0n1p2   58318836     38194896 17129048           70% /
tmpfs             8108520        20836  8087684            1% /dev/shm
tmpfs                5120            4     5116            1% /run/lock
tmpfs             8108520            0  8108520            0% /sys/fs/cgroup
/dev/loop0             128          128        0          100% /snap/bare/5
/dev/loop3           56960        56960        0          100% /snap/core18/2560
/dev/loop2           63488        63488        0          100% /snap/core20/1611
/dev/loop1          146944       146944        0          100% /snap/chromium/2117
/dev/loop4          117760       117760        0          100% /snap/core/13741
/dev/loop5          146944       146944        0          100% /snap/chromium/2136
/dev/loop7           56960        56960        0          100% /snap/core18/2566
/dev/loop6          233344       233344        0          100% /snap/code/110
/dev/loop20         224256       224256        0          100% /snap/gnome-3-34-1804/72
/dev/loop8           72192        72192        0          100% /snap/core22/275
/dev/loop10         224256       224256        0          100% /snap/gnome-3-34-1804/77
/dev/loop14          83328        83328        0          100% /snap/gtk-common-themes/1534
/dev/loop9           74624        74624        0          100% /snap/core22/310
/dev/loop15          49152        49152        0          100% /snap/snapd/17336
/dev/loop19         192896       192896        0          100% /snap/postman/184
/dev/loop18          47104        47104        0          100% /snap/snap-store/599
/dev/loop13         358400       358400        0          100% /snap/telegram-desktop/4256
/dev/loop22         117760       117760        0          100% /snap/core/13886
/dev/loop11         354688       354688        0          100% /snap/gnome-3-38-2004/115
/dev/loop12         354688       354688        0          100% /snap/gnome-3-38-2004/119
/dev/loop21          49152        49152        0          100% /snap/snapd/17029
/dev/loop16          93952        93952        0          100% /snap/gtk-common-themes/1535
/dev/loop17         362240       362240        0          100% /snap/telegram-desktop/4249
/dev/loop26         233344       233344        0          100% /snap/code/111
/dev/loop24          64768        64768        0          100% /snap/core20/1623
/dev/loop25          55552        55552        0          100% /snap/snap-store/558
/dev/loop23         192128       192128        0          100% /snap/postman/183
/dev/nvme0n1p1     1071040        51228  1019812           5% /boot/efi
tmpfs             1621704           80  1621624            1% /run/user/1000

System log:

Oct 29 21:50:45 dale-nitro task3.sh[9830]: Host: 127.0.0.1:8080
Oct 29 21:50:45 dale-nitro task3.sh[9830]: User-Agent: curl/7.68.0
Oct 29 21:50:45 dale-nitro task3.sh[9830]: Accept: */*
Oct 29 21:50:45 dale-nitro task3.sh[9830]: #015
Oct 29 21:51:02 dale-nitro task3.sh[9843]: GET / HTTP/1.1
Oct 29 21:51:02 dale-nitro task3.sh[9843]: Host: 127.0.0.1:8080
Oct 29 21:51:02 dale-nitro task3.sh[9843]: User-Agent: curl/7.68.0
Oct 29 21:51:02 dale-nitro task3.sh[9843]: Accept: */*
Oct 29 21:51:02 dale-nitro task3.sh[9843]: #015
Oct 29 21:51:02 dale-nitro systemd[1]: Condition check resulted in Daily apt upgrade and clean activi
ties being skipped.
Oct 29 21:51:13 dale-nitro task3.sh[9874]: GET / HTTP/1.1
Oct 29 21:51:13 dale-nitro task3.sh[9874]: Host: 127.0.0.1:8080
Oct 29 21:51:13 dale-nitro task3.sh[9874]: User-Agent: curl/7.68.0
Oct 29 21:51:13 dale-nitro task3.sh[9874]: Accept: */*
Oct 29 21:51:13 dale-nitro task3.sh[9874]: #015
```

4. task4.sh:

```
sudo apt-get update
```

task4.timer:

```
[Unit]
Description=Daily timer

[Timer]
OnBootSec=5min
OnUnitActiveSec=1d
Unit=updater.service

[Install]
WantedBy=timers.target
```

task4.service:

```
[Unit]
Description=Service to update system packages everyday

[Service]
ExecStart=/usr/bin/task4.sh

[Install]
WantedBy=multi-user.target
```

```
dale@dale-nitro:~/Documents/SNA/Week 9$ sudo nano /usr/bin/task4.sh
dale@dale-nitro:~/Documents/SNA/Week 9$ sudo nano /etc/systemd/system/task4.timer
dale@dale-nitro:~/Documents/SNA/Week 9$ sudo nano /lib/systemd/system/task4.service
```