Linux Service Management

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Service in Linux

- In Linux, Service refers to a program or a set of programs
- Run in the background and perform specific tasks that the system or other applications rely on.
- These services are often daemons.
- Daemons are processes that run continuously and manage system or netw ork activities.
- Can include things like :
 - Web servers
 - Database servers
 - File servers
 - Print services
 - Email services
 - System monitoring tools.



Service in Linux (Cont.)

- Services are typically managed through system initialization scripts or more modern service management systems like systemd.
- Allows for starting, stopping, and restarting services as needed.

```
ubuntu@ubuntu-desktop:~$ sudo systemctl start apache2
ubuntu@ubuntu-desktop:~$ sudo systemctl stop apache2
ubuntu@ubuntu-desktop:~$ sudo systemctl restart apache2
ubuntu@ubuntu-desktop:~$ sudo systemctl status apache2
• apache2.service - The Apache HTTP Server
    Loaded: loaded (/lib/systemd/system/apache2.service; enabled; vendor preset: enabled)
     Active: active (running) since Thu 2023-12-28 13:28:13 KST; 7s ago
       Docs: https://httpd.apache.org/docs/2.4/
    Process: 3877 ExecStart=/usr/sbin/apachectl start (code=exited, status=0/SUCCESS)
   Main PID: 3881 (apache2)
      Tasks: 55 (limit: 4599)
     Memory: 4.8M
        CPU: 32ms
     CGroup: /system.slice/apache2.service
              –3881 /usr/sbin/apache2 -k start
              -3882 /usr/sbin/apache2 -k start
              _3883 /usr/sbin/apache2 -k start
12월 28 13:28:13 ubuntu-desktop systemd[1]: Starting The Apache HTTP Server...
12월 28 13:28:13 ubuntu-desktop apachectl[3880]: AH00558: apache2: Could not reliably determine the server's fu
12월 28 13:28:13 ubuntu-desktop systemd[1]: Started The Apache HTTP Server.
lines 1-17/17 (END)
```

ubuntu

systemctl Command

- Is used for controlling the systemd system and service manager.
- Is responsible for initializing, managing, and tracking system services and daemons.
- Common uses of systemctl include ①starting and ②stopping services, ③enabling and ④disabling services to start at boot, checking the status of services, and ⑤reloading configuration files.
- Syntax
 - \$ systemctl <command> <service>
 - Command: start, stop, restart, enable, disable, status, etc.
 - Service : The name of the service want to manage.



Service management with systemctl

- Service start
- Service stop
- Service status

■ Service restart

ubuntu@ubuntu-desktop:~\$ sudo systemctl status apache2
Unit apache2.service could not be found.
ubuntu@ubuntu-desktop:~\$

```
ubuntu@ubuntu-desktop:~$ sudo systemctl status apache2

    apache2.service - The Apache HTTP Server

     Loaded: loaded (/lib/systemd/system/apache2.service; enabled; vendor preset: enabled)
     Active: active (running) since Thu 2023-12-28 13:26:10 KST; 33s ago
       Docs: https://httpd.apache.org/docs/2.4/
   Main PID: 3514 (apache2)
      Tasks: 55 (limit: 4599)
     Memory: 4.9M
        CPU: 77ms
     CGroup: /system.slice/apache2.service
              —3514 /usr/sbin/apache2 -k start
              —3515 /usr/sbin/apache2 -k start
              └─3516 /usr/sbin/apache2 -k start
12월 28 13:26:10 ubuntu-desktop systemd[1]: Starting The Apache HTTP Server...
12월 28 13:26:10 ubuntu-desktop apachectl[3513]: AH00558: apache2: Could not reliably determine the server's fully qualified dom
12월 28 13:26:10 ubuntu-desktop systemd[1]: Started The Apache HTTP Server.
lines 1-16/16 (END)
```

Service management with systemctl (Cont.)

```
ubuntu@ubuntu-desktop:~$ sudo systemctl start apache2
ubuntu@ubuntu-desktop:~$ sudo systemctl stop apache2
ubuntu@ubuntu-desktop:~$ sudo systemctl restart apache2
ubuntu@ubuntu-desktop:~$ sudo systemctl status apache2
• apache2.service - The Apache HTTP Server
     Loaded: loaded (/lib/systemd/system/apache2.service; enabled; vendor preset: enabled)
    Active: active (running) since Thu 2023-12-28 13:28:13 KST; 7s ago
       Docs: https://httpd.apache.org/docs/2.4/
   Process: 3877 ExecStart=/usr/sbin/apachectl start (code=exited, status=0/SUCCESS)
  Main PID: 3881 (apache2)
     Tasks: 55 (limit: 4599)
    Memory: 4.8M
       CPU: 32ms
    CGroup: /system.slice/apache2.service
             —3881 /usr/sbin/apache2 -k start
             —3882 /usr/sbin/apache2 -k start
              -3883 /usr/sbin/apache2 -k start
12월 28 13:28:13 ubuntu-desktop systemd[1]: Starting The Apache HTTP Server...
12월 28 13:28:13 ubuntu-desktop apachectl[3880]: AH00558: apache2: Could not reliably determine the server's fu
12월 28 13:28:13 ubuntu-desktop systemd[1]: Started The Apache HTTP Server.
lines 1-17/17 (END)
```

Monitoring in Linux – System Performance Info.

Commands	Descriptions				
lscpu	List CPU Information				
lshw	List Hardware				
du	Check file and directory sizes				
df	Display disk size and free space				
fdisk	List and modify partitions on your hard drive				
vmstat	Show virtual memory usage				
free	Show physical memory usage				
top	Display system processes and resource usage				
uptime	Displays how long the system has been up, number of users, and central processing unit (CPU) latency				



Example

```
ubuntu@ubuntu-desktop: $ df
Filesystem
               1K-blocks
                            Used Av
tmpfs
                  400144
                             1472
/dev/sda3
               98195716 11102224
tmpfs
                 2000716
tmpfs
                    5120
                                4
/dev/sda2
                  451320
                           194068
tmpfs
                  400140
                              120
ubuntu@ubuntu-desktop:~$
```

```
ubuntu@ubuntu-desktop:~
                         lscpu
Architecture:
                         XX6 64
  CPU op-mode(s):
                         32-bit, 64-bit
  Address sizes:
                         39 bits physical, 48 bits virtual
  Byte Order:
                         Little Endian
CPU(s):
 On-line CPU(s) list:
                         0,1
                         GenuineIntel
Vendor ID:
 Model name:
                         11th Gen Intel(R) Core(TM) i7-1165G7 @ 2.80GHz
```

vallaple	Use% Mounted or	1			
top - 13:	11:58 up 5 min,	2 users, load a	verage: 0.26, 6	0.72, 0.42	
		ning , 187 sleepin			
		0.0 ni, 99.3 i			0.0 st
MiB Mem :	3907.6 total,	2028.1 free,	700.8 used,	1178.8 buff/cad	che
MiB Swap:	3905.0 total,	3905.0 free,	0.0 used.	2959.8 avail Me	em

PID	USER	PR	NI	VIRT	RES	SHR S	%CPU	%MEM	TIME+ COMMAND
9	root	20	0	0	0	0 I	0.3	0.0	0:01.26 kworker/u4:0-ext4-rsv-conversion
47	root	20	0	0	0	0 I	0.3	0.0	0:00.75 kworker/1:1-mm_percpu_wq
60	root	0	-20	0	0	0 I	0.3	0.0	0:00.43 kworker/0:1H-kblockd
2814	ubuntu	20	0	14512	4352	3584 R	0.3	0.1	0:00.03 top
1	root	20	0	166684	11740	8284 S	0.0	0.3	0:01.20 systemd
2	root	20	0	0	0	0 S	0.0	0.0	0:00.00 kthreadd
3	root	0	-20	0	0	0 I	0.0	0.0	0:00.00 rcu_gp
4	root	0	-20	0	0	0 I	0.0	0.0	0:00.00 rcu_par_gp
5	root	0	-20	0	0	0 I	0.0	0.0	0:00.00 slub_flushwq
6	root	0	-20	0	0	0 I	0.0	0.0	0:00.00 netns
8	root	0	-20	0	0	0 I	0.0	0.0	0:00.00 kworker/0:0H-events_highpri
10	root	0	-20	0	0	0 I	0.0	0.0	0:00.00 mm_percpu_wq
11	root	20	0	0	0	0 I	0.0	0.0	0:00.00 rcu tasks kthread

Monitoring in Linux – System Performance Info. (Cont.)

Commands	Descriptions				
htop	Similar to top but with an improved user interface.				
iotop	Monitors disk I/O usage.				
iftop	Observes data flow through network interfaces.				
nmon	Monitors various system resources like CPU, memory, disk I/O, and network simultaneously.				
glances	Provides an overview of various system metrics.				
netdata	A real-time system and application monitoring tool for performance and health monitoring.				



■ htop

```
0[||
                                                                3.5%]
                                                                       Tasks: 135, 339 thr; 1 running
                                                                       Load average: 0.54 0.57 0.35
 1
                                                               1.4%]
                                                       |||986M/3.82G]
                                                                       Uptime: 00:45:05
Mem |
Swp
                                                           0K/3.81G]
 PID USER
                                    SHR S CPU% ▼MEM%
                                                     TIME+ Command
                   NI VIRT
                              RES
                    0 12664
                                   3584 R 1.4 0.1 0:00.14 htop
 7410 root
                            4992
 631 messagebu
                                   3968 S 0.7 0.2 0:01.98 @dbus-daemon --system --address=systemd: --nofor
               20
                    0 10984 6400
                    0 231M 10592 7112 S 0.7 0.3 0:01.35 /usr/libexec/polkitd --no-debug
 653 root
                    0 74724 14336 11648 S 0.7 0.4 0:00.11 /usr/sbin/cupsd -l
 727 root
 6986 netdata
                    0 252M 36096 8704 S 0.7 0.9 0:01.10 /usr/sbin/netdata -D
                20
 7142 netdata
                    0 252M 36096 8704 S 0.7 0.9 0:00.26 /usr/sbin/netdata -D
                            4096 2048 S 0.7 0.1 0:00.61 /usr/lib/netdata/plugins.d/apps.plugin 1
 7177 netdata
                    0 54348
7184 netdata
                                  6144 S 0.7 0.2 0:00.15 /usr/lib/netdata/plugins.d/cups.plugin 1
                    0 16508 7040
                    0 271M 58852 19840 S 0.7 1.5 0:00.12 /usr/bin/python3 /usr/lib/netdata/plugins.d/pyth
 7380 netdata
                    0 164M 13148 8284 S 0.0 0.3 0:05.21 /sbin/init splash
   1 root
                   -1 56464 24448 23040 S 0.0 0.6 0:00.53 /lib/systemd/systemd-journald
 194 root
                    0 27468 7552 4608 S 0.0 0.2 0:00.34 /lib/systemd/systemd-udevd
 239 root
                    0 14828 6784
                                  6016 S 0.0 0.2 0:02.98 /lib/systemd/systemd-oomd
 527 systemd-o
                                  9600 S 0.0 0.3 0:00.20 /lib/systemd/systemd-resolved
 537 systemd-r
                    0 25664 13780
 538 systemd-t
                                   6528 S 0.0 0.2 0:00.06 /lib/systemd/systemd-timesyncd
                    0 89380
 553 systemd-t
                    0 89380 7424 6528 S 0.0 0.2 0:00.00 /lib/systemd/systemd-timesyncd
                    0 235M 7892 6996 S 0.0 0.2 0:00.26 /usr/libexec/accounts-daemon
 625 root
                    0 2812 1920 1792 S 0.0 0.0 0:00.03 /usr/sbin/acpid
 626 root
 629 avahi
                    0 7624
                             3968 3712 S 0.0 0.1 0:00.21 avahi-daemon: running [ubuntu-desktop.local]
                                  3072 S 0.0 0.1 0:00.01 /usr/sbin/cron -f -P
 630 root
                    0 10804 3200
                    0 256M 19420 16220 S 0.0 0.5 0:00.61 /usr/sbin/NetworkManager --no-daemon
 632 root
```

■ iotop

Total DISK READ:	0.00 B/s	Total DISK	WRITE:	10.74 K/s
Current DISK READ:	0.00 B/s	Current DI	SK WRITE:	17.91 K/s
TID PRIO USER	DISK READ	DISK WRITE	SWAPIN IO	COMMAND
154 be/3 root	0.00 B/s	10.74 K/s	?unavailable?	[jbd2/sda3-8]
1 be/4 root	0.00 B/s	0.00 B/s	?unavailable?	init splash
2 be/4 root	0.00 B/s	0.00 B/s	?unavailable?	[kthreadd]
3 be/0 root	0.00 B/s	0.00 B/s	?unavailable?	[rcu_gp]
4 be/0 root	0.00 B/s	0.00 B/s	?unavailable?	[rcu_par_gp]
5 be/0 root	0.00 B/s	0.00 B/s	?unavailable?	[slub_flushwq]
6 be/0 root	0.00 B/s	0.00 B/s	?unavailable?	[netns]
8 be/0 root	0.00 B/s	0.00 B/s	?unavailable?	[kworker/0:0H-events_highpri]
10 be/0 root	0.00 B/s	0.00 B/s	?unavailable?	[mm_percpu_wq]
11 be/4 root	0.00 B/s	0.00 B/s	?unavailable?	[rcu_tasks_kthread]
12 be/4 root	0.00 B/s	0.00 B/s	?unavailable?	<pre>[rcu_tasks_rude_kthread]</pre>
13 be/4 root	0.00 B/s	0.00 B/s	?unavailable?	<pre>[rcu_tasks_trace_kthread]</pre>
14 be/4 root	0.00 B/s	0.00 B/s	?unavailable?	[ksoftirqd/0]
15 be/4 root	0.00 B/s	0.00 B/s	?unavailable?	[rcu_preempt]
16 rt/4 root	0.00 B/s	0.00 B/s	?unavailable?	[migration/0]
17 rt/4 root	0.00 B/s	0.00 B/s	?unavailable?	<pre>[idle_inject/0]</pre>
19 be/4 root	0.00 B/s	0.00 B/s	?unavailable?	[cpuhp/0]
20 be/4 root	0.00 B/s	0.00 B/s	?unavailable?	[cpuhp/1]
21 rt/4 root	0.00 B/s	0.00 B/s	?unavailable?	[idle_inject/1]
22 rt/4 root	0.00 B/s	0.00 B/s	?unavailable?	[migration/1]

■ iftop



nmon

```
nmon-16n-
             -[H for help]——Hostname=ubuntu-desktoRefresh= 2secs ——13:53.44-
                                      For help type H or ...
                                       nmon -? - hint
                                       nmon -h - full details
                                      To stop nmon type q to Quit
  Use these keys to toggle statistics on/off:
    c = CPU
                    1 = CPU Long-term - = Faster screen updates
    C = " WideView U = Utilisation
                                         + = Slower screen updates
    m = Memory
                    V = Virtual memory
                                         j = File Systems
    d = Disks
                    n = Network
                                         . = only busy disks/procs
    r = Resource
                    N = NFS
                                         h = more options
                                         q = Quit
    k = Kernel
                    t = Top-processes
```

glances

```
ubuntu-desktop (Ubuntu 22.04 64bit / Linux 6.2.0-39-generic)
                                                                                                                                            Uptime: 0:47:59
                                         CPU
                                                         idle:
                                                                  94.5% ctx sw
                                                                                   489
                                                                                         MEM
                                                                                                        active
                                                                                                                    834M
                                                                                                                                     0.0%
                                                                                                                                            LOAD
                                                                                                                                                    2-core
CPU [|||||||||
                                                   2.5%
                                                        irq
                                                                   0.0%
                                                                                   534
                                                                                                 3.82G
                                                                                                                                    3.81G
                                                                                                                                            1 min:
                                52.6%]
                                         user
                                                                        inter
                                                                                         total
                                                                                                        inactive
                                                                                                                   2.30G
                                                                                                                           total
                                                                                                                                                      0.04
    32.5%]
                                         system
                                                   2.2%
                                                        nice
                                                                   0.0% sw int
                                                                                   743
                                                                                         used
                                                                                                 1.24G
                                                                                                        buffers
                                                                                                                   94.5M
                                                                                                                           used
                                                                                                                                            5 min:
                                                                                                                                                      0.33
SWAP [
                                0.0%1
                                         iowait
                                                  0.0%
                                                                   0.0%
                                                                                         free
                                                                                                 2.58G
                                                                                                       cached
                                                                                                                   2.43G
                                                                                                                           free
                                                                                                                                            15 min:
                                                                                                                                                      0.29
                                                         steal
                                                                                                                                    3.81G
NETWORK
                                       TASKS 207 (547 thr), 1 run, 157 slp, 49 oth sorted automatically by CPU consumption
                         Rx/s
                                Tx/s
enp0s3
                         6Kb
                                23Kb
                                                                   PID USER
10
                         11Kb
                                11Kb
                                       CPU%
                                            MEM% VIRT RES
                                                                                      TIME+ THR NI S R/s W/s Command ('k' to kill)
                                       >5.1
                                             1.3
                                                    348M
                                                                   7441 root
                                                                                       0:01 2
                                                                                                  0 R
                                                                                                         00
                                                                                                                python3 /usr/bin/glances
                                                         49.2M
                                                    252M
                                                                                                                netdata -D
DefaultGateway
                                35ms
                                              0.9
                                                         35.4M
                                                                   6986 netdata
                                                                                       0:03 23
                                                                                                 0 S
                                                                                                         00
                                              0.1
                                                   53.1M 4.00M
                                                                   7177 netdata
                                                                                       0:02 1
                                                                                                  0 S
                                                                                                         0 0
                                                                                                                apps.plugin 1
DISK I/O
                         R/s
                                W/s
                                              1.5
                                                   271M 57.6M
                                                                   7172 netdata
                                                                                                 0 S
                                                                                                                python3 /usr/lib/netdata/plugins.d/python.d
                                        0.9
                                                                                       0:01 5
                                                                                                         0 0
                                80K
sda
                                        0.5
                                              0.3
                                                    231M 10.3M
                                                                   653 root
                                                                                       0:01 3
                                                                                                  0 S
                                                                                                         0 0
                                                                                                                polkitd --no-debug
                                                   17.3M 8.19M
                                                                   2764 ubuntu
                                                                                                 0 S
                                                                                                         0 0
sda1
                           0
                                   0
                                        0.5
                                             0.2
                                                                                       0:02 1
sda2
                                        0.5
                                              0.2
                                                   16.1M 6.88M
                                                                   7184 netdata
                                                                                       0:00 1
                                                                                                 0 S
                                                                                                         0 0
                                                                                                                cups.plugin 1
                           0
                                                                                                                @dbus-daemon --system --address=systemd: --
sda3
                                 80K
                                        0.5
                                              0.2
                                                   10.7M 6.25M
                                                                    631 messagebu
                                                                                       0:02 1
                                                                                                  0 S
sr0
                                        0.5
                                              0.1
                                                   7.45M 4.12M
                                                                    629 avahi
                                                                                       0:00 1
                                                                                                 0 S
                                                                                                         0 0
                                                                                                                avahi-daemon: running [ubuntu-desktop.local
                                              0.0
                                                   0
                                                                     34 root
                                        0.5
                                                          0
                                                                                       0:00 1
                                                                                                 0 S
                                                                                                         0 0
                                                                                                                [kcompactd0]
FILE SYS
                         Used
                              Total
                                        0.5
                                              0.0
                                                   0
                                                                     47 root
                                                                                       0:04 1
                                                                                                 0 I
                                                                                                        0 0
                                                                                                                [kworker/1:1-events]
/ (sda3)
                        11.4G
                              93.6G
                                        0.5
                                              0.0
                                                                    265 root
                                                                                       0:02 1
                                                                                                -20 I
                                                                                                         0 0
                                                                                                                [kworker/1:2H-kblockd]
/common/host-hunspell 11.4G 93.6G
                                        0.0
                                              9.3
                                                   4.36G 362M
                                                                   1502 ubuntu
                                                                                       0:46 14
                                                                                                 0 S
                                                                                                         0 0
                                                                                                                gnome-shell
                                        0.0
                                              2.1
                                                    590M
                                                         81.7M
                                                                   1908 ubuntu
                                                                                       0:00 4
                                                                                                 0 S
                                                                                                         0 0
                                                                                                                gsd-xsettings
SENSORS
                                        0.0
                                             1.7
                                                    801M 66.0M
                                                                   1684 ubuntu
                                                                                       0:00 6
                                                                                                 0 S
                                                                                                         00
                                                                                                                evolution-alarm-notify
Battery
                                 99%
                                        0.0
                                              1.6
                                                   200M
                                                         63.6M
                                                                   1880 ubuntu
                                                                                       0:00 1
                                                                                                 0 S
                                                                                                         00
                                                                                                                Xwayland: 0 -rootless -noreset -accessx -co
                                              1.3
                                                    549M
                                                         50.6M
                                                                   2997 ubuntu
                                                                                       0:00 4
                                                                                                 0 S
                                                                                                        0 0
                                                                                                                gnome-terminal-server
                                                          48.1M
                                                                                                                python3 /usr/bin/glances -s -B 127.0.0.1
                                              1.2
                                                    348M
                                                                   6396 root
                                                                                       0:02 1
                                                                                                  0 S
                                              1.1
                                                    855M
                                                         43.6M
                                                                    657 root
                                                                                       0:03 11
                                                                                                  0 S
                                                                                                                snapd
2023-12-28 13:54:15 KST
```



■ netdata

```
ubuntu@ubuntu-desktop://s sudo wget -0 /etc/netdata/netdata.conf http://localhost:19999/netdata.conf
--2023-12-28 14:02:25-- http://localhost:19999/netdata.conf
Resolving localhost (localhost)... 127.0.0.1
Connecting to localhost (localhost) | 127.0.0.1 | :19999... connected.
HTTP request sent, awaiting response... 200 OK
Length: 329897 (322K) [text/plain]
Saving to: '/etc/netdata/netdata.conf'
/etc/netdata/netdata.conf
                                    100%[========>] 322.17K --.-KB/s
                                                                                                                                      in 0.001s
2023-12-28 14:02:25 (235 MB/s) - '/etc/netdata/netdata.conf' saved [329897/329897]
ubuntu@ubuntu-desktop:/$ cat /etc/netdata/netdata.conf
# netdata configuration
# You can download the latest version of this file, using:
# wget -0 /etc/netdata/netdata.conf http://localhost:19999/netdata.conf
# or
  curl -o /etc/netdata/netdata.conf http://localhost:19999/netdata.conf
# You can uncomment and change any of the options below.
# The value shown in the commented settings, is the default value.
# global netdata configuration
```

