



Process Hierarchy

- What is a Linux process
- Lifecycle of the Linux process
- List of processes
- Listing process in hierarchy



TRAINING
C E N T E R

— <epam> —



- What is a Linux process

A process is a running instance of a program.

Attribute of the Linux process:

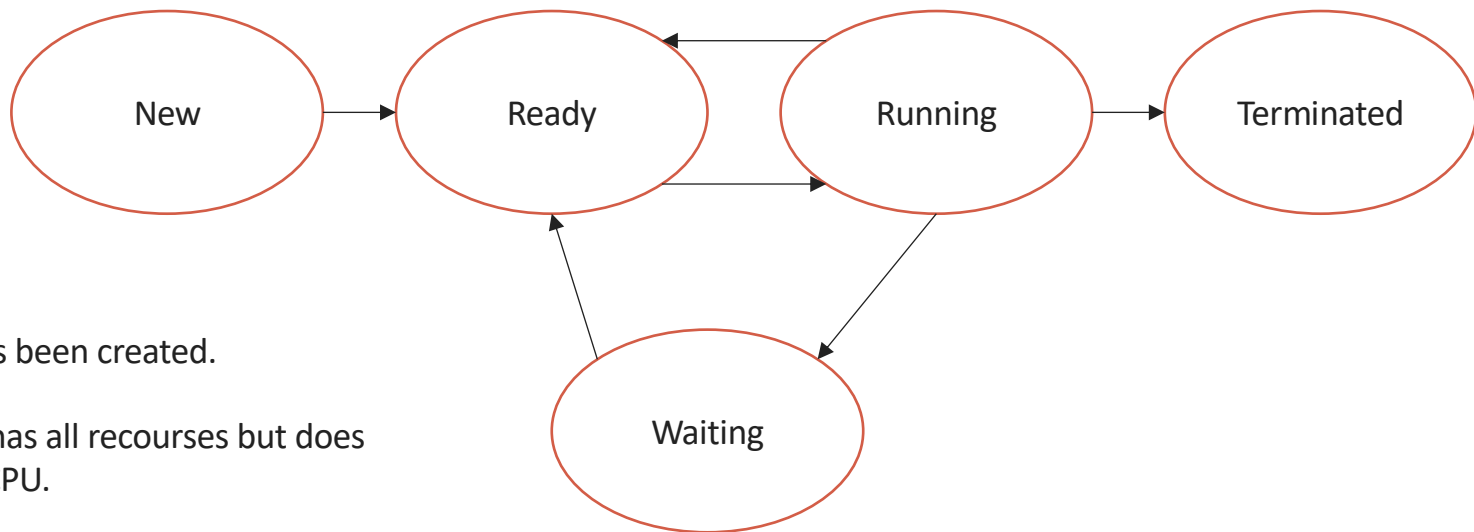
PID: The process ID

PPID: The Parent process ID

CMD: Which command was started the process.

UID	PID	PPID	C	STIME	TTY	TIME	CMD
root	1	0	0	12:24	?	00:00:00	/init
root	165	1	0	13:38	tty1	00:00:00	/init
artem	166	165	0	13:38	tty1	00:00:00	-bash
artem	258	166	0	13:56	tty1	00:00:00	ps -ef

- Lifecycle of the Linux process



New - The process has been created.

Ready – The process has all resources but does not execute on the CPU.

Running – The process is executing on the CPU.

Waiting - The process is waiting for some resource to become available or for some event to occur.

Terminated - The process has completed.



List of processes

ps (ps -ef)

```
[shuliaktim@centos7 ~]$ ps -ef
```

UID	PID	PPID	C	STIME	TTY	TIME	CMD
root	1	0	0	12:02	?	00:00:01	/usr/lib/systemd/systemd --switched-root --sys
root	2	0	0	12:02	?	00:00:00	[kthreadd]
root	4	2	0	12:02	?	00:00:00	[kworker/0:0H]
root	6	2	0	12:02	?	00:00:00	[ksoftirqd/0]
root	7	2	0	12:02	?	00:00:00	[migration/0]
root	8	2	0	12:02	?	00:00:00	[rcu_bh]
root	9	2	0	12:02	?	00:00:00	[rcu_sched]
root	10	2	0	12:02	?	00:00:00	[lru-add-drain]
root	11	2	0	12:02	?	00:00:00	[watchdog/0]
root	13	2	0	12:02	?	00:00:00	[kdevtmpfs]
root	14	2	0	12:02	?	00:00:00	[netns]
root	15	2	0	12:02	?	00:00:00	[khungtaskd]
root	16	2	0	12:02	?	00:00:00	[writeback]
root	17	2	0	12:02	?	00:00:00	[kintegrityd]
root	18	2	0	12:02	?	00:00:00	[bioset]
root	19	2	0	12:02	?	00:00:00	[bioset]
root	20	2	0	12:02	?	00:00:00	[bioset]
root	21	2	0	12:02	?	00:00:00	[kblockd]
root	22	2	0	12:02	?	00:00:00	[md]
root	23	2	0	12:02	?	00:00:00	[edac-poller]
root	24	2	0	12:02	?	00:00:00	[watchdogd]
root	25	2	0	12:02	?	00:00:00	[kworker/0:1]
root	30	2	0	12:02	?	00:00:00	[kswapd0]
root	31	2	0	12:02	?	00:00:00	[ksmd]
root	32	2	0	12:02	?	00:00:00	[khugepaged]
root	33	2	0	12:02	?	00:00:00	[crypto]
root	41	2	0	12:02	?	00:00:00	[kthrotld]
root	42	2	0	12:02	?	00:00:00	[kworker/u2:1]
root	43	2	0	12:02	?	00:00:00	[kmpath_rdacd]
root	44	2	0	12:02	?	00:00:00	[kaluad]
root	45	2	0	12:02	?	00:00:00	[kpsmouse]
root	47	2	0	12:02	?	00:00:00	[ipv6_addrconf]
root	60	2	0	12:02	?	00:00:00	[deferwq]

List of processes

TOP

```
top - 12:13:50 up 10 min, 1 user, load average: 0.00, 0.04, 0.05
Tasks: 92 total, 1 running, 91 sleeping, 0 stopped, 0 zombie
%Cpu(s): 0.3 us, 0.0 sy, 0.0 ni, 99.7 id, 0.0 wa, 0.0 hi, 0.0 si, 0.0 st
KiB Mem : 1734812 total, 1035688 free, 232104 used, 467020 buff/cache
KiB Swap: 0 total, 0 free, 0 used. 1348404 avail Mem
```

PID	USER	PR	NI	VIRT	RES	SHR	S	%CPU	%MEM	TIME+	COMMAND
1	root	20	0	128056	6684	4152	S	0.0	0.4	0:01.38	systemd
2	root	20	0	0	0	0	S	0.0	0.0	0:00.00	kthreadd
4	root	0	-20	0	0	0	S	0.0	0.0	0:00.00	kworker/0:0H
6	root	20	0	0	0	0	S	0.0	0.0	0:00.04	ksoftirqd/0
7	root	rt	0	0	0	0	S	0.0	0.0	0:00.00	migration/0
8	root	20	0	0	0	0	S	0.0	0.0	0:00.00	rcu_bh
9	root	20	0	0	0	0	S	0.0	0.0	0:00.25	rcu_sched
10	root	0	-20	0	0	0	S	0.0	0.0	0:00.00	lru-add-drain
11	root	rt	0	0	0	0	S	0.0	0.0	0:00.00	watchdog/0
13	root	20	0	0	0	0	S	0.0	0.0	0:00.00	kdevtmpfs
14	root	0	-20	0	0	0	S	0.0	0.0	0:00.00	netns
15	root	20	0	0	0	0	S	0.0	0.0	0:00.00	khungtaskd
16	root	0	-20	0	0	0	S	0.0	0.0	0:00.00	writeback
17	root	0	-20	0	0	0	S	0.0	0.0	0:00.00	kintegrityd
18	root	0	-20	0	0	0	S	0.0	0.0	0:00.00	bioset
19	root	0	-20	0	0	0	S	0.0	0.0	0:00.00	bioset
20	root	0	-20	0	0	0	S	0.0	0.0	0:00.00	bioset
21	root	0	-20	0	0	0	S	0.0	0.0	0:00.00	kblockd
22	root	0	-20	0	0	0	S	0.0	0.0	0:00.00	md
23	root	0	-20	0	0	0	S	0.0	0.0	0:00.00	edac-poller
24	root	0	-20	0	0	0	S	0.0	0.0	0:00.00	watchdogd
25	root	20	0	0	0	0	S	0.0	0.0	0:00.05	kworker/0:1
30	root	20	0	0	0	0	S	0.0	0.0	0:00.00	kswapd0
31	root	25	5	0	0	0	S	0.0	0.0	0:00.00	ksmd
32	root	39	19	0	0	0	S	0.0	0.0	0:00.01	khugepaged
33	root	0	-20	0	0	0	S	0.0	0.0	0:00.00	crypto
41	root	0	-20	0	0	0	S	0.0	0.0	0:00.00	kthrotld
42	root	20	0	0	0	0	S	0.0	0.0	0:00.04	kworker/u2:1

List of processes

pstree

```
[shuliaktim@centos7 ~]$ pstree
systemd--NetworkManager--dhclient
                        |_2*[{NetworkManager}]
--acpid
--2*[{agetty}]
--auditd--{auditd}
--chronyd
--containerd--8*[{containerd}]
--crond
--dbus-daemon--{dbus-daemon}
--dockerd--9*[{dockerd}]
--firewalld--{firewalld}
--google_guest_ag--9*[{google_guest_ag}]
--google_osconfig--6*[{google_osconfig}]
--lvmetad
--master--pickup
                |_qmgr
--polkitd--6*[{polkitd}]
--rsyslogd--2*[{rsyslogd}]
--sshd--sshd--sshd--bash--pstree
                        |_sftp-server
--systemd-journal
--systemd-logind
--systemd-udev
--tuned--4*[{tuned}]
```

Process Hierarchy

ps -xjf

```
[shuliaktim@centos7 ~]$ ps -xjf
PPID    PID    PGID    SID  TTY      TPGID  STAT   UID    TIME  COMMAND
1376    1379    1376    1376  ?        -1     S      1000   0:00  sshd: shuliaktim@pts/0
1379    1380    1380    1380  pts/0    1573   Ss     1000   0:00  \_ -bash
1380    1573    1573    1380  pts/0    1573   R+     1000   0:00  |  \_ ps -xjf
1379    1381    1381    1381  ?        -1     Ss     1000   0:00  \_ /usr/libexec/openssh/sftp-server
```

Thank you.

