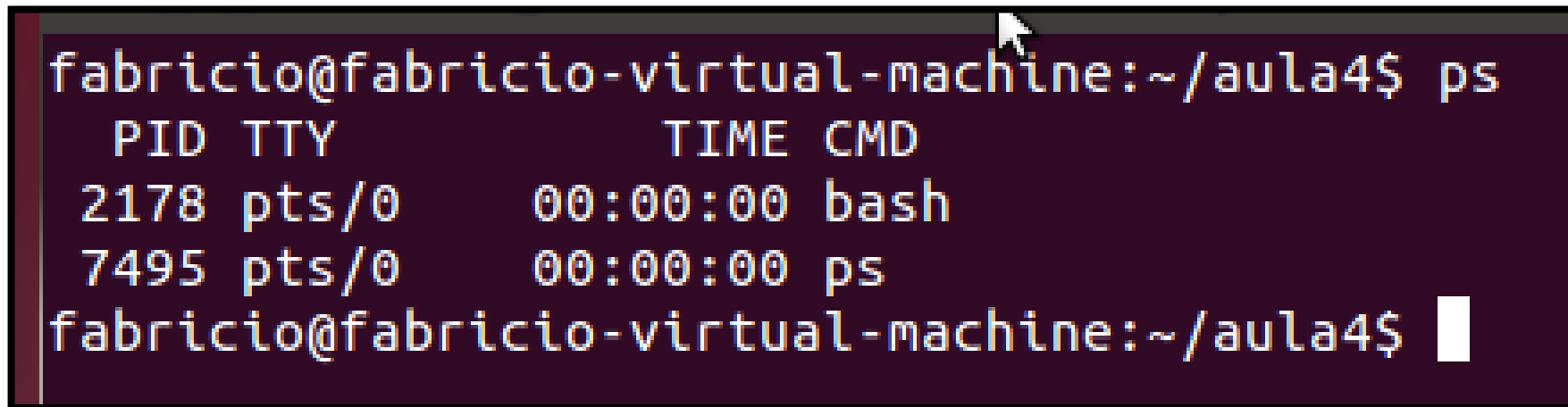


ps: Monitorando Processos

- **ps** é a principal ferramenta para monitorar processos, ela fornece:
 - PID
 - UID
 - Prioridade
 - Terminal de controle
 - Informação de quanta memória foi consumida
 - Estado atual
- **ps** tem muitas implementações diferentes no UNIX
 - O Linux dá suporte a maioria delas
 - Também suporta opções nos estilos:
 - Opções UNIX: podem ser agrupadas e devem ser precedidas por um hífen
 - Opções BSD: podem ser agrupadas e não devem usar hífen
 - Opções longas GNU: são precedidas por dois hífen
- Exemplo:
 - Utilize **ps aux** para obter uma visão geral dos processos em execução
 - Padrão BSD

ps: Monitorando Processos

- Por padrão **ps** mostra apenas processos controlados pelo terminal (ou janela de terminal) em que foi invocado.

A terminal window with a dark purple background and light blue text. The prompt is 'fabricio@fabricio-virtual-machine:~/aula4\$'. The command 'ps' has been entered, and the output is displayed in a table format. The table has four columns: PID, TTY, TIME, and CMD. There are two rows of data: one for PID 2178, TTY pts/0, TIME 00:00:00, CMD bash; and another for PID 7495, TTY pts/0, TIME 00:00:00, CMD ps. The prompt is repeated at the bottom with a white cursor block.

```
fabricio@fabricio-virtual-machine:~/aula4$ ps
  PID TTY          TIME CMD
 2178 pts/0        00:00:00 bash
 7495 pts/0        00:00:00 ps
fabricio@fabricio-virtual-machine:~/aula4$
```

ps: Monitorando Processos

- `ps -e -o pid,ppid,command`
 - Note que o ID do pai de **ps** é o ID do **bash**
 - E o pai de **bash**, por sua vez, é o terminal do GNOME

```
fabricio@fabricio-virtual-machine: ~/aula4
2088 1 /usr/lib/unity-lens-files/unity-files-daemon
2089 1 /usr/lib/unity-lens-applications/unity-applications-daemon
2090 1 /usr/lib/unity-lens-music/unity-music-daemon
2114 1 /usr/bin/python /usr/bin/zeitgeist-daemon
2138 1 /usr/lib/unity-lens-music/unity-musicstore-daemon
2154 2114 /bin/cat
2156 1 zeitgeist-datahub
2233 1817 /usr/bin/python /usr/share/system-config-printer/applet.py
2247 1817 update-notifier
2264 1 /usr/bin/python /usr/lib/system-service/system-service-d
2323 1817 /usr/lib/deja-dup/deja-dup/deja-dup-monitor
7367 1 kdeinit4: kdeinit4 Running...
7370 7367 kdeinit4: klauncher [kdeinit] --fd=8
7372 1 kdeinit4: kded4 [kdeinit]
7381 1 /usr/bin/knotify4
7438 2 [kworker/0:0]
7465 1 /usr/lib/gvfs/gvfsd-metadata
7493 2 [kworker/0:2]
7514 2 [kworker/0:1]
7525 1 gnome-terminal
7530 7525 gnome-pty-helper
7531 7525 bash
7590 7531 ps -e -o pid,ppid,command
fabricio@fabricio-virtual-machine:~/aula4$
```

root	2668	0.0	1.2	9484	3256	?	Ss	16:53	0:00	sendmail: accepti
smmsp	2676	0.0	1.0	6620	2588	?	Ss	16:53	0:00	sendmail: Queue r
root	2687	0.0	0.2	3012	532	?	Ss	16:53	0:00	gpm -m /dev/input
root	2697	0.0	0.4	5424	1152	?	Ss	16:53	0:00	crond
xf86	2720	0.0	0.6	4528	1612	?	Ss	16:53	0:00	xf86 -droppriv -da
root	2730	0.0	0.2	1724	640	?	SNs	16:53	0:00	anacron -s
root	2739	0.0	0.2	1924	744	?	Ss	16:53	0:00	/usr/sbin/atd
dbus	2758	0.0	0.5	14004	1324	?	Ssl	16:53	0:00	dbus-daemon-1 --s
root	2771	0.0	0.2	5440	540	?	Ss	16:53	0:00	rhnsd --interval
root	2780	0.0	0.4	3588	1040	?	Ss	16:53	0:00	cups-config-daemo
root	2791	0.1	1.6	6880	4140	?	Ss	16:53	0:03	hald
root	2803	0.0	0.1	2408	404	tty3	Ss+	16:53	0:00	/sbin/mingetty tt
root	2807	0.0	0.1	3224	404	tty4	Ss+	16:53	0:00	/sbin/mingetty tt
root	2811	0.0	0.1	2824	404	tty5	Ss+	16:53	0:00	/sbin/mingetty tt
root	2812	0.0	0.1	2424	404	tty6	Ss+	16:53	0:00	/sbin/mingetty tt
root	2813	0.0	0.9	11348	2352	?	Ss	16:53	0:00	/usr/bin/gdm-bina
root	3256	0.0	1.1	11984	2936	?	S	16:53	0:00	/usr/bin/gdm-bina
root	3263	0.2	3.3	10712	8444	?	S	16:53	0:06	/usr/X11R6/bin/X
gdm	3400	0.0	4.2	20892	10740	?	Ss	16:53	0:01	/usr/bin/gdmgreet
root	3517	0.0	0.5	4628	1284	?	Ss	17:09	0:00	login -- root
root	3603	0.0	0.5	6024	1380	tty2	Ss+	17:12	0:00	-bash
root	4121	0.1	0.5	2948	1488	?	Ss	17:26	0:00	login -- fbreve
fbreve	4206	0.3	0.5	5520	1372	tty1	Ss	17:27	0:00	-bash
fbreve	4250	0.0	0.2	3204	744	tty1	R+	17:27	0:00	ps aux

28/04/2023 [fbreve@localhost ~]\$ _

```

fabricio 1989 0.0 0.2 63660 2956 ? S 22:36 0:00 /usr/lib/gvfs/g
fabricio 1990 1.0 1.8 322856 18820 ? Sl 22:36 0:00 /usr/lib/unity/
fabricio 2002 0.0 0.6 336860 7104 ? Sl 22:36 0:00 /usr/lib/indica
fabricio 2003 0.0 0.5 261092 6072 ? Sl 22:36 0:00 /usr/lib/indica
fabricio 2004 0.0 0.7 233504 7724 ? Sl 22:36 0:00 /usr/lib/indica
fabricio 2006 0.0 0.4 152404 4952 ? Sl 22:36 0:00 /usr/lib/indica
fabricio 2013 0.1 0.6 242504 6716 ? Sl 22:36 0:00 /usr/lib/indica
fabricio 2028 0.0 0.2 49264 2672 ? S 22:36 0:00 /usr/lib/geoclu
fabricio 2033 0.0 0.3 77244 3924 ? Sl 22:37 0:00 telepathy-indic
fabricio 2035 0.0 0.3 60396 3516 ? S 22:37 0:00 /usr/lib/telepa
fabricio 2061 0.1 0.9 188420 9452 ? S 22:37 0:00 /usr/lib/gnome-
fabricio 2065 3.9 5.9 553192 60500 ? Sl 22:37 0:00 /usr/bin/unity-
fabricio 2088 0.2 0.4 124244 4872 ? Sl 22:37 0:00 /usr/lib/unity-
fabricio 2089 1.1 0.9 155908 9660 ? Sl 22:37 0:00 /usr/lib/unity-
fabricio 2090 0.3 0.4 124572 4940 ? Sl 22:37 0:00 /usr/lib/unity-
fabricio 2114 1.4 1.8 141716 19208 ? Sl 22:37 0:00 /usr/bin/python
fabricio 2138 0.1 0.3 102268 3140 ? Sl 22:37 0:00 /usr/lib/unity-
fabricio 2154 0.0 0.0 11252 580 ? S 22:37 0:00 /bin/cat
fabricio 2156 0.1 0.5 160968 5456 ? Sl 22:37 0:00 zeitgeist-datah
fabricio 2170 2.0 1.6 249692 16988 ? Sl 22:37 0:00 gnome-terminal
fabricio 2175 0.0 0.0 14656 824 ? S 22:37 0:00 gnome-pty-helpe
fabricio 2178 1.5 0.4 29460 4328 pts/0 Ss 22:37 0:00 bash
fabricio 2232 0.0 0.1 22232 1268 pts/0 R+ 22:37 0:00 ps aux
fabricio@fabricio-virtual-machine:~$

```

Arquivo Editar Ver Pesquisar Terminal Ajuda

```
fbreve 2218 0.3 0.8 1582892 35748 tty2 SNI+ 10:14 0:00 /usr/libexec/tr
fbreve 2220 0.0 0.1 314020 6740 tty2 Sl 10:14 0:00 /usr/libexec/ib
fbreve 2253 0.3 0.5 788588 20676 tty2 SNI+ 10:14 0:00 /usr/libexec/tr
fbreve 2286 0.8 1.9 1286240 79812 ? Sl 10:14 0:00 /usr/libexec/ev
fbreve 2309 1.0 1.9 1433740 79608 ? Sl 10:14 0:00 /usr/libexec/ev
fbreve 2311 0.5 1.0 1151756 44408 ? Ssl 10:14 0:00 /usr/libexec/ev
fbreve 2361 0.5 1.1 1398676 45120 ? Sl 10:14 0:00 /usr/libexec/ev
root 2416 0.3 0.4 638056 18312 ? Ssl 10:15 0:00 /usr/libexec/fw
fbreve 2417 0.0 0.1 309416 4840 ? Ssl 10:15 0:00 /usr/libexec/gv
root 2433 0.0 0.0 0 0 ? I 10:15 0:00 [kworker/0:0]
root 2437 0.0 0.0 0 0 ? I 10:15 0:00 [kworker/3:0]
fbreve 2450 0.8 0.5 466116 21520 ? Sl 10:15 0:00 /usr/libexec/gn
fbreve 2452 3.0 1.1 1284204 46352 ? Sl 10:15 0:00 /usr/libexec/gn
fbreve 2455 6.6 1.6 2693748 66532 ? Sl 10:15 0:00 /usr/bin/gjs-co
fbreve 2456 1.8 0.9 1034848 37888 ? Sl 10:15 0:00 /usr/bin/nautil
fbreve 2460 0.0 0.1 302756 5844 ? Sl 10:15 0:00 /usr/libexec/gn
fbreve 2463 2.3 0.7 502424 29752 ? Sl 10:15 0:00 /usr/bin/gnome-
fbreve 2464 0.0 0.1 371312 7604 ? Sl 10:15 0:00 /usr/libexec/gn
fbreve 2465 2.3 1.3 1612028 54504 ? Sl 10:15 0:00 /usr/bin/gnome-
fbreve 2488 3.1 0.9 734436 37344 ? Rsl 10:15 0:00 /usr/libexec/gn
fbreve 2504 0.1 0.1 477304 7376 ? Sl 10:15 0:00 /usr/libexec/gv
fbreve 2559 0.6 0.1 132012 5136 pts/0 Ss 10:15 0:00 bash
fbreve 2610 0.0 0.0 155456 3604 pts/0 R+ 10:15 0:00 ps aux
```

[fbreve@localhost ~]\$

Campo	Conteúdo
USER	Nome do usuário do proprietário do processo
PID	ID (identificador) do processo
%CPU	Porcentagem dos recursos de CPU que este processo está usando
%MEM	Porcentagem da memória real que este processo está usando
VSZ	Tamanho virtual do processo
RSS	Resident Set Size (número de páginas na memória)
TTY	ID (identificador) de terminal de controle
STAT	Estado de processo atual R = Executável D = Espera no disco (ou a curto prazo) S = Dormente (<20 seg) T = Rastreado ou interrompido Z = Zumbi Flags adicionais: W = Processo paginado em disco < = O processo tem uma prioridade maior do que a normal N = O processo tem uma prioridade menor do que a normal L = Algumas páginas são bloqueadas no núcleo (kernel)
START	Horário em que o processo foi iniciado
TIME	Tempo de CPU que o processo consumiu
COMMAND	Nome do comando e argumentos ^a

a. Os argumentos podem ser truncados; acrescente o argumento **ww** para evitar isto. Os programas são capazes de modificar esta informação, de modo que não é necessariamente uma representação acurada da verdadeira linha de comando.

ps: Monitorando Processos

- **ps** recorta os comandos para caberem em uma linha
 - Para evitar esse truncamento use o argumento **w**
- Use o argumento **lax** para obter mais informações técnicas
 - Mais rápido, não traduz cada UID em nome
 - Inclui PPID (PID do pai), valor nice (NI) e nome ou função do kernel na qual o processo está dormente (WCHAN)

top: Monitoramento ainda melhor de processos

- O comando **ps** dá apenas um instantâneo de seu sistema
- O comando **top** fornece um sumário atualizado regularmente
 - Como padrão a tela é atualizada a cada 1,5 segundo
 - Processos mais ativos aparecem no alto
 - **top** consome recursos, portanto deve ser usado apenas para fins de diagnóstico



Veja ps e top em execução:
<https://youtu.be/Xv1j02SossM>

```

top - 19:57:32 up 3:05, 3 users, load average: 0.20, 0.16, 0.09
Tasks: 87 total, 1 running, 86 sleeping, 0 stopped, 0 zombie
Cpu(s): 33.2% us, 18.6% sy, 0.0% ni, 48.2% id, 0.0% wa, 0.0% hi, 0.0% si
Mem: 254784k total, 239672k used, 15112k free, 10968k buffers
Swap: 524280k total, 160k used, 524120k free, 112792k cached

```

PID	USER	PR	NI	UIRT	RES	SHR	S	%CPU	%MEM	TIME+	COMMAND
11816	fbreve	16	0	70136	22m	14m	S	67.9	9.2	0:00.99	firefox-bin
3263	root	16	0	35540	16m	5724	S	23.0	6.4	0:34.59	X
11603	fbreve	15	0	21240	9928	7580	S	5.0	3.9	0:01.17	wnck-applet
11574	fbreve	15	0	14876	7360	6180	S	3.0	2.9	0:01.66	metacity
2427	root	16	0	1916	484	404	S	2.0	0.2	0:02.91	irqbalance
11578	fbreve	15	0	23888	12m	8560	S	2.0	5.1	0:03.64	gnome-panel
11550	fbreve	15	0	4748	2152	1712	S	1.0	0.8	0:00.58	xscreensaver
11588	fbreve	25	10	35916	23m	11m	S	1.0	9.5	0:18.04	rhn-applet-gui
11605	fbreve	15	0	22560	10m	8020	S	1.0	4.2	0:00.82	mixer_applet2
11701	fbreve	16	0	2124	940	752	R	1.0	0.4	0:01.03	top
1	root	16	0	3124	560	480	S	0.0	0.2	0:01.28	init
2	root	RT	0	0	0	0	S	0.0	0.0	0:00.62	migration/0
3	root	34	19	0	0	0	S	0.0	0.0	0:00.06	ksoftirqd/0
4	root	RT	0	0	0	0	S	0.0	0.0	0:00.26	migration/1
5	root	34	19	0	0	0	S	0.0	0.0	0:00.05	ksoftirqd/1
6	root	5	-10	0	0	0	S	0.0	0.0	0:00.20	events/0
7	root	5	-10	0	0	0	S	0.0	0.0	0:00.21	events/1
8	root	5	-10	0	0	0	S	0.0	0.0	0:00.02	khelper

```
top - 22:45:15 up 9 min,  1 user,  load average: 0.47, 0.47, 0.28
Tasks: 141 total,   1 running, 140 sleeping,   0 stopped,   0 zombie
Cpu(s):  1.3%us,  0.7%sy,  0.0%ni, 84.4%id, 13.6%wa,  0.0%hi,  0.0%si,  0.0%st
Mem:   1019072k total,  790896k used,  228176k free,   80080k buffers
Swap:  1046524k total,  27024k used,  1019500k free,  204672k cached
```

PID	USER	PR	NI	VIRT	RES	SHR	S	%CPU	%MEM	TIME+	COMMAND
1229	root	20	0	191m	39m	6652	S	1.7	4.0	0:03.41	Xorg
1854	fabricio	20	0	27388	3032	864	S	0.3	0.3	0:01.28	dbus-daemon
1891	fabricio	20	0	224m	12m	8968	S	0.3	1.3	0:00.38	metacity
1929	fabricio	20	0	289m	23m	9952	S	0.3	2.3	0:01.42	vmtoolsd
2170	fabricio	20	0	244m	15m	9740	S	0.3	1.5	0:00.65	gnome-terminal
1	root	20	0	24184	1856	1240	S	0.0	0.2	0:01.34	init
2	root	20	0	0	0	0	S	0.0	0.0	0:00.00	kthreadd
3	root	20	0	0	0	0	S	0.0	0.0	0:00.04	ksoftirqd/0
4	root	20	0	0	0	0	S	0.0	0.0	0:00.27	kworker/0:0
5	root	20	0	0	0	0	S	0.0	0.0	0:00.25	kworker/u:0
6	root	RT	0	0	0	0	S	0.0	0.0	0:00.00	migration/0
7	root	0	-20	0	0	0	S	0.0	0.0	0:00.00	cpuset
8	root	0	-20	0	0	0	S	0.0	0.0	0:00.00	khelper
9	root	0	-20	0	0	0	S	0.0	0.0	0:00.00	netns
10	root	20	0	0	0	0	S	0.0	0.0	0:00.00	sync_supers
11	root	20	0	0	0	0	S	0.0	0.0	0:00.00	bdi-default
12	root	0	-20	0	0	0	S	0.0	0.0	0:00.00	kintegrityd

Arquivo Editar Ver Pesquisar Terminal Ajuda

```
top - 10:38:15 up 28 min,  1 user,  load average: 0,06, 0,07, 0,17
Tasks: 241 total,    1 running, 187 sleeping,    0 stopped,    0 zombie
%Cpu(s):  0,0 us,  0,7 sy,  0,0 ni, 99,1 id,  0,0 wa,  0,3 hi,  0,0 si,  0,0 st
KiB Mem : 4038616 total, 1465100 free, 1145372 used, 1428144 buff/cache
KiB Swap: 3145724 total, 3145724 free,    0 used. 2588068 avail Mem
```

PID	USER	PR	NI	VIRT	RES	SHR	S	%CPU	%MEM	TIME+	COMMAND
1730	fbreve	20	0	3901572	170148	67716	S	2,3	4,2	0:49.83	gnome-shell
1316	gdm	20	0	3457688	127808	62408	S	0,7	3,2	0:12.75	gnome-shell
522	root	20	0	0	0	0	I	0,3	0,0	0:03.99	kworker/3:2
1265	gdm	20	0	644808	41896	30044	S	0,3	1,0	0:06.91	Xorg
1586	fbreve	20	0	680180	51684	33644	S	0,3	1,3	0:09.67	Xorg
1	root	20	0	230048	11636	7468	S	0,0	0,3	0:01.35	systemd
2	root	20	0	0	0	0	S	0,0	0,0	0:00.01	kthreadd
4	root	0	-20	0	0	0	I	0,0	0,0	0:00.00	kworker/0:+
6	root	0	-20	0	0	0	I	0,0	0,0	0:00.00	mm_percpu_+
7	root	20	0	0	0	0	S	0,0	0,0	0:00.03	ksoftirqd/0
8	root	20	0	0	0	0	I	0,0	0,0	0:00.31	rcu_sched
9	root	20	0	0	0	0	I	0,0	0,0	0:00.00	rcu_bh
10	root	rt	0	0	0	0	S	0,0	0,0	0:00.00	migration/0
11	root	rt	0	0	0	0	S	0,0	0,0	0:00.00	watchdog/0
12	root	20	0	0	0	0	S	0,0	0,0	0:00.00	cpuhp/0
13	root	20	0	0	0	0	S	0,0	0,0	0:00.00	cpuhp/1
14	root	rt	0	0	0	0	S	0,0	0,0	0:00.00	watchdog/1

```
top - 01:10:38 up 248 days,  9:10,  2 users,  load average: 0.13, 0.07, 0.02
Tasks:  44 total,   1 running,  43 sleeping,   0 stopped,   0 zombie
Cpu(s):  5.2% user,   8.6% system,   0.0% nice,  86.2% idle
Mem:     61744k total,   60284k used,    1460k free,    5984k buffers
Swap:    160640k total,   1240k used,  159400k free,   34828k cached
```

PID	USER	PR	NI	VIRT	RES	SHR	S	%CPU	%MEM	TIME+	COMMAND
21011	fabricio	14	0	1128	1128	896	R	13.8	1.8	0:17.46	top
1	root	8	0	216	216	196	S	0.0	0.3	2:23.89	init
2	root	9	0	0	0	0	S	0.0	0.0	0:00.11	keventd
3	root	19	19	0	0	0	S	0.0	0.0	0:03.89	ksoftirqd_CPU0
4	root	9	0	0	0	0	S	0.0	0.0	7:14.57	kswapd
5	root	9	0	0	0	0	S	0.0	0.0	0:04.03	bdflush
6	root	9	0	0	0	0	S	0.0	0.0	0:03.31	kupdated
10	root	-1	-20	0	0	0	S	0.0	0.0	0:00.00	mdrecoveryd
11	root	9	0	0	0	0	S	0.0	0.0	3:16.71	kjournald
40	root	9	0	0	0	0	S	0.0	0.0	0:12.62	kjournald
41	root	9	0	0	0	0	S	0.0	0.0	0:01.11	kjournald
63	root	9	0	244	224	220	S	0.0	0.4	19:35.51	syslogd
66	root	9	0	52	4	4	S	0.0	0.0	0:00.05	klogd
409	root	9	0	0	0	0	S	0.0	0.0	0:00.00	khubd
431	bin	9	0	104	4	4	S	0.0	0.0	0:00.89	rpc.portmap
435	root	9	0	96	4	4	S	0.0	0.0	0:00.09	rpc.statd
437	root	9	0	0	0	0	S	0.0	0.0	6:44.83	rpciod

last pid: 4234; load averages: 0.11, 0.07, 0.04 00:38:20
69 processes: 66 sleeping, 1 zombie, 1 stopped, 1 on cpu
CPU states: 97.5% idle, 1.6% user, 0.9% kernel, 0.0% iowait, 0.0% swap
Memory: 2048M real, 1840M free, 33M swap in use, 2015M swap free

PID	USERNAME	THR	PRI	NICE	SIZE	RES	STATE	TIME	CPU	COMMAND
4234	fabricao	1	50	0	2608K	2184K	cpu11	0:12	1.72%	top
549	apfreire	1	58	0	2320K	1120K	sleep	0:15	0.01%	lmgrd
214	0	5	58	0	5248K	3168K	sleep	60:07	0.00%	automountd
513	0	12	58	0	2744K	2032K	sleep	19:47	0.00%	mibiisa
334	0	1	58	0	3600K	824K	sleep	18:23	0.00%	sshd
246	0	11	58	0	9896K	8648K	sleep	5:40	0.00%	nscd
170	0	3	58	0	2528K	1640K	sleep	1:22	0.00%	nis_cachemgr
228	0	16	58	0	3800K	1952K	sleep	0:39	0.00%	syslogd
510	0	1	58	0	2248K	1632K	sleep	0:35	0.00%	snmpdx
1	0	1	58	0	856K	168K	sleep	0:32	0.00%	init
168	0	7	30	0	3648K	1288K	sleep	0:10	0.00%	keyserv
165	0	1	58	0	2464K	1560K	sleep	0:06	0.00%	rpcbind
26908	pvgrf	1	58	0	6672K	2632K	sleep	0:05	0.00%	sshd
194	0	1	58	0	2448K	720K	sleep	0:05	0.00%	inetd
227	0	1	48	0	2512K	1760K	sleep	0:03	0.00%	cron