Some basic Unix commands and other helpful hints
Watching memory and CPU usage

- **top**
  - Shows individual program usage
  - Automatic refreshes to show usage over time

- **ps**
  - Shows individual program usage
  - One view only

- **Ganglia**
  - Shows overall usage on machine
  - Differentiates between cached and active use
top

- u
  - Enter an user name at the prompt and see that users processes only. Helpful for finding processes buried in list.

- M
  - List by memory usage, highest first

- P
  - List by processor usage, highest first

- 1
  - Show each processor separately

- q
  - quit
top - 11:31:38 up 5 days, 9:25, 6 users, load average: 0.00, 0.00, 0.00
Tasks: 266 total, 1 running, 251 sleeping, 14 stopped, 0 zombie
Cpu(s): 0.0%us, 0.0%sy, 0.0%ni, 100.0%id, 0.0%wa, 0.0%hi, 0.0%si, 0.0%st
Mem: 66069268k total, 63413152k used, 2656116k free, 130824k buffers
Swap: 4192956k total, 140k used, 4192816k free, 49149212k cached

<table>
<thead>
<tr>
<th>PID</th>
<th>USER</th>
<th>PR</th>
<th>NI</th>
<th>VIRT</th>
<th>RES</th>
<th>SHR</th>
<th>S</th>
<th>%CPU</th>
<th>%MEM</th>
<th>TIME+</th>
<th>COMMAND</th>
</tr>
</thead>
<tbody>
<tr>
<td>28279</td>
<td>giardine</td>
<td>15</td>
<td>0</td>
<td>11008</td>
<td>1188</td>
<td>784</td>
<td>R</td>
<td>0.7</td>
<td>0.0</td>
<td>0:00:04</td>
<td>top</td>
</tr>
<tr>
<td>4604</td>
<td>ganglia</td>
<td>15</td>
<td>0</td>
<td>99.9m</td>
<td>2312</td>
<td>720</td>
<td>S</td>
<td>0.3</td>
<td>0.0</td>
<td>0:25:08</td>
<td>gmond</td>
</tr>
<tr>
<td>1</td>
<td>root</td>
<td>15</td>
<td>0</td>
<td>10364</td>
<td>692</td>
<td>580</td>
<td>S</td>
<td>0.0</td>
<td>0.0</td>
<td>0:02:67</td>
<td>init</td>
</tr>
<tr>
<td>2</td>
<td>root</td>
<td>RT</td>
<td>-5</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>S</td>
<td>0.0</td>
<td>0.0</td>
<td>0:00:32</td>
<td>migration/0</td>
</tr>
<tr>
<td>3</td>
<td>root</td>
<td>34</td>
<td>19</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>S</td>
<td>0.0</td>
<td>0.0</td>
<td>0:00:00</td>
<td>ksoftirqd/0</td>
</tr>
<tr>
<td>4</td>
<td>root</td>
<td>RT</td>
<td>-5</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>S</td>
<td>0.0</td>
<td>0.0</td>
<td>0:00:00</td>
<td>watchdog/0</td>
</tr>
<tr>
<td>5</td>
<td>root</td>
<td>RT</td>
<td>-5</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>S</td>
<td>0.0</td>
<td>0.0</td>
<td>0:00:56</td>
<td>migration/1</td>
</tr>
<tr>
<td>6</td>
<td>root</td>
<td>34</td>
<td>19</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>S</td>
<td>0.0</td>
<td>0.0</td>
<td>0:00:00</td>
<td>ksoftirqd/1</td>
</tr>
<tr>
<td>7</td>
<td>root</td>
<td>RT</td>
<td>-5</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>S</td>
<td>0.0</td>
<td>0.0</td>
<td>0:00:00</td>
<td>watchdog/1</td>
</tr>
</tbody>
</table>
top - 11:31:38 up 5 days, 9:25, 6 users, load average: 0.00, 0.00, 0.00
Tasks: 266 total, 1 running, 251 sleeping, 14 stopped, 0 zombie
CPU(s): 0.0%us, 0.0%sy, 0.0%ni, 100.0%id, 0.0%wa, 0.0%hi, 0.0%si, 0.0%st
Mem: 66069268k total, 63413152k used, 2656116k free, 130824k buffers
Swap: 4192956k total, 140k used, 4192816k free, 49149212k cached

<table>
<thead>
<tr>
<th>PID</th>
<th>USER</th>
<th>PR</th>
<th>NI</th>
<th>VIRT</th>
<th>RES</th>
<th>SHR</th>
<th>S</th>
<th>%CPU</th>
<th>%MEM</th>
<th>TIME+</th>
<th>COMMAND</th>
</tr>
</thead>
<tbody>
<tr>
<td>28279</td>
<td>giardine</td>
<td>15</td>
<td>0</td>
<td>11008</td>
<td>1188</td>
<td>784</td>
<td>R</td>
<td>0.7</td>
<td>0.0</td>
<td>0:00.04</td>
<td>top</td>
</tr>
<tr>
<td>4604</td>
<td>ganglia</td>
<td>15</td>
<td>0</td>
<td>99.9m</td>
<td>2312</td>
<td>720</td>
<td>S</td>
<td>0.3</td>
<td>0.0</td>
<td>0:25.08</td>
<td>gmond</td>
</tr>
<tr>
<td>1</td>
<td>root</td>
<td>15</td>
<td>0</td>
<td>10364</td>
<td>692</td>
<td>580</td>
<td>S</td>
<td>0.0</td>
<td>0.0</td>
<td>0:02.67</td>
<td>init</td>
</tr>
<tr>
<td>2</td>
<td>root</td>
<td>RT</td>
<td>-5</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>S</td>
<td>0.0</td>
<td>0.0</td>
<td>0:00.32</td>
<td>migration/0</td>
</tr>
<tr>
<td>3</td>
<td>root</td>
<td>34</td>
<td>19</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>S</td>
<td>0.0</td>
<td>0.0</td>
<td>0:00.00</td>
<td>ksoftirqd/0</td>
</tr>
<tr>
<td>4</td>
<td>root</td>
<td>RT</td>
<td>-5</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>S</td>
<td>0.0</td>
<td>0.0</td>
<td>0:00.00</td>
<td>watchdog/0</td>
</tr>
<tr>
<td>5</td>
<td>root</td>
<td>RT</td>
<td>-5</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>S</td>
<td>0.0</td>
<td>0.0</td>
<td>0:00.56</td>
<td>migration/1</td>
</tr>
<tr>
<td>6</td>
<td>root</td>
<td>34</td>
<td>19</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>S</td>
<td>0.0</td>
<td>0.0</td>
<td>0:00.00</td>
<td>ksoftirqd/1</td>
</tr>
<tr>
<td>7</td>
<td>root</td>
<td>RT</td>
<td>-5</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>S</td>
<td>0.0</td>
<td>0.0</td>
<td>0:00.00</td>
<td>watchdog/1</td>
</tr>
</tbody>
</table>
top - 11:32:57 up 5 days, 9:26, 6 users, load average: 0.00, 0.00, 0.00
Tasks: 266 total, 1 running, 251 sleeping, 14 stopped, 0 zombie
Cpu(s): 0.0%us, 0.1%sy, 0.0%ni, 99.9%id, 0.0%wa, 0.0%hi, 0.0%si, 0.0%st
Mem: 66069268k total, 63413232k used, 2656036k free, 130868k buffers
Swap: 4192956k total, 140k used, 4192816k free, 49149212k cached

<table>
<thead>
<tr>
<th>PID</th>
<th>USER</th>
<th>PR</th>
<th>NI</th>
<th>VIRT</th>
<th>RES</th>
<th>SHR</th>
<th>S</th>
<th>%CPU</th>
<th>%MEM</th>
<th>TIME+</th>
<th>COMMAND</th>
</tr>
</thead>
<tbody>
<tr>
<td>22700</td>
<td>dpj120</td>
<td>16</td>
<td>0</td>
<td>4617m</td>
<td>4.4g</td>
<td>3340</td>
<td>S</td>
<td>0.0</td>
<td>7.0</td>
<td>7:52.45</td>
<td>R</td>
</tr>
<tr>
<td>14667</td>
<td>dpj120</td>
<td>15</td>
<td>0</td>
<td>3662m</td>
<td>3.5g</td>
<td>3248</td>
<td>S</td>
<td>0.0</td>
<td>5.5</td>
<td>6:26.06</td>
<td>R</td>
</tr>
<tr>
<td>3683</td>
<td>weisheng</td>
<td>15</td>
<td>0</td>
<td>3084m</td>
<td>2.9g</td>
<td>2808</td>
<td>T</td>
<td>0.0</td>
<td>4.6</td>
<td>1:35.66</td>
<td>R</td>
</tr>
<tr>
<td>12996</td>
<td>weisheng</td>
<td>15</td>
<td>0</td>
<td>330m</td>
<td>234m</td>
<td>3088</td>
<td>T</td>
<td>0.0</td>
<td>0.4</td>
<td>16:52.93</td>
<td>R</td>
</tr>
<tr>
<td>14941</td>
<td>weisheng</td>
<td>15</td>
<td>0</td>
<td>173m</td>
<td>78m</td>
<td>2784</td>
<td>T</td>
<td>0.0</td>
<td>0.1</td>
<td>0:05.10</td>
<td>R</td>
</tr>
<tr>
<td>2531</td>
<td>weisheng</td>
<td>15</td>
<td>0</td>
<td>170m</td>
<td>76m</td>
<td>2812</td>
<td>T</td>
<td>0.0</td>
<td>0.1</td>
<td>0:05.61</td>
<td>R</td>
</tr>
<tr>
<td>17654</td>
<td>weisheng</td>
<td>15</td>
<td>0</td>
<td>169m</td>
<td>75m</td>
<td>2784</td>
<td>T</td>
<td>0.0</td>
<td>0.1</td>
<td>0:06.09</td>
<td>R</td>
</tr>
<tr>
<td>3810</td>
<td>root</td>
<td>6</td>
<td>-10</td>
<td>38932</td>
<td>32m</td>
<td>1732</td>
<td>S</td>
<td>0.0</td>
<td>0.0</td>
<td>0:00.02</td>
<td>iscsiuiio</td>
</tr>
<tr>
<td>4523</td>
<td>root</td>
<td>15</td>
<td>0</td>
<td>154m</td>
<td>8132</td>
<td>4120</td>
<td>S</td>
<td>0.0</td>
<td>0.0</td>
<td>0:31.20</td>
<td>snmpd</td>
</tr>
<tr>
<td>14898</td>
<td>weisheng</td>
<td>15</td>
<td>0</td>
<td>100m</td>
<td>5716</td>
<td>1328</td>
<td>S</td>
<td>0.0</td>
<td>0.0</td>
<td>0:04.85</td>
<td>sshd</td>
</tr>
</tbody>
</table>
The `top` command output shows the system status and running processes. The output includes

- System uptime
- User count
- Load average
- System tasks status (total, running, sleeping, stopped, zombie)
- CPU usage statistics (user, system, nice, idle, wait, hilarity, input/output)
- Memory usage statistics (total, used, free, buffers)
- Swap usage statistics (total, used, free, cached)
- IAM user with the highest CPU usage:

<table>
<thead>
<tr>
<th>PID</th>
<th>USER</th>
<th>PR</th>
<th>NI</th>
<th>VIRT</th>
<th>RES</th>
<th>SHR</th>
<th>S</th>
<th>%CPU</th>
<th>%MEM</th>
<th>TIME+</th>
<th>COMMAND</th>
</tr>
</thead>
<tbody>
<tr>
<td>22700</td>
<td>dpj120</td>
<td>16</td>
<td>0</td>
<td>4617m</td>
<td>3340</td>
<td>S</td>
<td>0.0</td>
<td>7.0</td>
<td>7:52.45 R</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14667</td>
<td>dpj120</td>
<td>15</td>
<td>0</td>
<td>3662m</td>
<td>3248</td>
<td>S</td>
<td>0.0</td>
<td>5.5</td>
<td>6:26.06 R</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3683</td>
<td>weisheng</td>
<td>15</td>
<td>0</td>
<td>3084m</td>
<td>2808</td>
<td>T</td>
<td>0.0</td>
<td>4.6</td>
<td>1:35.66 R</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12996</td>
<td>weisheng</td>
<td>15</td>
<td>0</td>
<td>330m</td>
<td>3088</td>
<td>T</td>
<td>0.0</td>
<td>0.4</td>
<td>16:52.93 R</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14941</td>
<td>weisheng</td>
<td>15</td>
<td>0</td>
<td>173m</td>
<td>2784</td>
<td>T</td>
<td>0.0</td>
<td>0.1</td>
<td>0:05.10 R</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2531</td>
<td>weisheng</td>
<td>15</td>
<td>0</td>
<td>170m</td>
<td>2812</td>
<td>T</td>
<td>0.0</td>
<td>0.1</td>
<td>0:05.61 R</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
top - 11:52:34 up 5 days, 9:46, 6 users, load average: 0.00, 0.00, 0.00
Tasks: 266 total, 1 running, 251 sleeping, 14 stopped, 0 zombie
Cpu0 : 0.0%us, 0.0%sy, 0.0%ni, 100.0%id, 0.0%wa, 0.0%hi, 0.0%si, 0.0%st
Cpu1 : 0.0%us, 0.0%sy, 0.0%ni, 100.0%id, 0.0%wa, 0.0%hi, 0.0%si, 0.0%st
Cpu2 : 0.0%us, 0.0%sy, 0.0%ni, 100.0%id, 0.0%wa, 0.0%hi, 0.0%si, 0.0%st
Cpu3 : 0.0%us, 0.0%sy, 0.0%ni, 100.0%id, 0.0%wa, 0.0%hi, 0.0%si, 0.0%st
Cpu4 : 0.0%us, 0.0%sy, 0.0%ni, 100.0%id, 0.0%wa, 0.0%hi, 0.0%si, 0.0%st
Cpu5 : 0.3%us, 0.3%sy, 0.0%ni, 99.3%id, 0.0%wa, 0.0%hi, 0.0%si, 0.0%st
Cpu6 : 0.0%us, 0.0%sy, 0.0%ni, 100.0%id, 0.0%wa, 0.0%hi, 0.0%si, 0.0%st
Cpu7 : 0.3%us, 0.0%sy, 0.0%ni, 99.7%id, 0.0%wa, 0.0%hi, 0.0%si, 0.0%st
Mem: 66069268k total, 63414028k used, 2655240k free, 131228k buffers
Swap: 4192956k total, 140k used, 4192816k free, 49149236k cached
This shows the commands and PID if you want to “kill PID” to remove one.
This host is up and running.

**Time and String Metrics**

- Last Boot Time: Thu, 07 Jun 2012 17:15:16 -0400
- Geexec Status: OFF
- Gmond Started: Thu, 07 Jun 2012 17:16:42 -0400
- Last Reported: 0 days, 00:00:01
- Machine Type: x86_64
- Operating System: Linux
- Operating System Release: 2.6.18-274.3.1.el5
- Uptime: 80 days, 19:22:17

**Constant Metrics**

- CPU Count: 48 CPUs
- CPU Speed: 2100 MHz
- Memory Total: 264279232 KB
- Swap Space Total: 2047992 KB
This host is up and running.

**Time and Space Metrics**

- **Last Boot Time:** Tue, 14 Aug 2012 10:58:35 -0400
- **Gexec Status:** OFF
- **Gmon Start:** Tue, 14 Aug 2012 10:59:06 -0400
- **Last Reported:** 0 days, 00:00:08
- **Machine Type:** x86_64
- **Operating System:** Linux
- **Operating System Release:** 2.6.32-131.12.1.el6.x86_64
- **Uptime:** 13 days, 1:42:05

**Constant Metrics**

- **CPU Count:** 8 CPUs
- **CPU Speed:** 2825 MHz
- **Memory Total:** 32878456 KB
- **Swap Space Total:** 33619960 KB
R memory usage

- R keeps all the variables in the memory for as long as the session is open. To keep from slowly growing the memory usage over time, remove variables when you are done with them.
  - `rm(variable)`
samtools

- View the bam files without writing the large sam file to disk
  - `samtools view in.bam | less`
- Get number of reads, mapped reads, or paired reads from a bam file
  - `samtools flagstat in.bam`
wget

• Bring in large files from other websites. Also works for Galaxy main if you right click the disk icon and copy the link location.

  • wget -O filename.ext www.whereever.edu/bigfile.ext
    • Other options under man wget
      • -i infrile.txt --w N
        • Fetch all files listed in infrile.txt, waiting N seconds between them
      • --user=user --password=password
        • Use an username and password
screen

- Useful for working remotely. Keeps connection and allows programs to run without being logged in. Survives breaks in internet connections.
  - pagscr
  - kinit; aklog
  - <control>a d
  - screen -r
Other miscellaneous commands

- **head -N**
  - Show the first N lines in a file

- **tail -N**
  - Show the last N lines in a file

- **du -h .**
  - Show disk usage of current directory and below (-s will give the total)

- **ls -lh**
  - List files, permissions, and sizes in human readable format

- **wc -l file**
  - Line count of file
  - **ls -l | wc -l**
    - Number of files in the directory

- **finger <person>**
  - Lookup another user in the network
  - .plan in home directory adds to what is displayed (phone #s, schedule, etc.)
Questions?