Project Topic

System Information with Open-Source Software

Submitted on partial fulfilment of the requirements for the award of degree of

Bachelor of Technology

In

Information Technology

Submitted to

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LOVELY PROFESSIONAL UNIVERSITY

PHAGWARA, PUNJAB

SUBMITTED BY

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Project GitHub Link: - https://github.com/suhelkhan2001/Sys_Info_Open_Source.git

Q. Use any Open-Source Software displays details about various system information tools, like the CPU, motherboard, monitor, audio, network, and other components. Also display the current and average speed/rate of the memory, hard drive, and CPU.

Introduction

Description of the project: -

→ ASTRA32 is another free system information tool that shows amazing detail on numerous devices and other parts of the system.

There are several categories to separate the information it gathers on hardware, like that of a motherboard, storage, and monitor information.

A system summary section is perfect for seeing an overview of all the hardware and operating system details. Also, a dedicated section for live monitoring is included to show the temperature and current usage of various hardware components.

ASTRA32 works as a demo program, but it does not really mean much because it still provides lots of useful information.

It can be used on Windows 11, 10, 8, 7, Vista, XP, 2000, and Windows Server 2008 and 2003.

Objective of the project: -

The objective of the topic is to provide information about open-source software that can display system information and performance metrics. The topic suggests using a software called "hwinfo" to display details about various system information tools such as the CPU, motherboard, monitor, audio, network, and other components.

Additionally, the topic suggests using commands such as "mpstat", "free", and "iostat" to display current and average speed/rate of the memory, hard drive, and CPU.

The objective of this topic is to help users monitor their system performance and identify potential performance issues. By using open-source software, users can access detailed system information without having to purchase proprietary software.

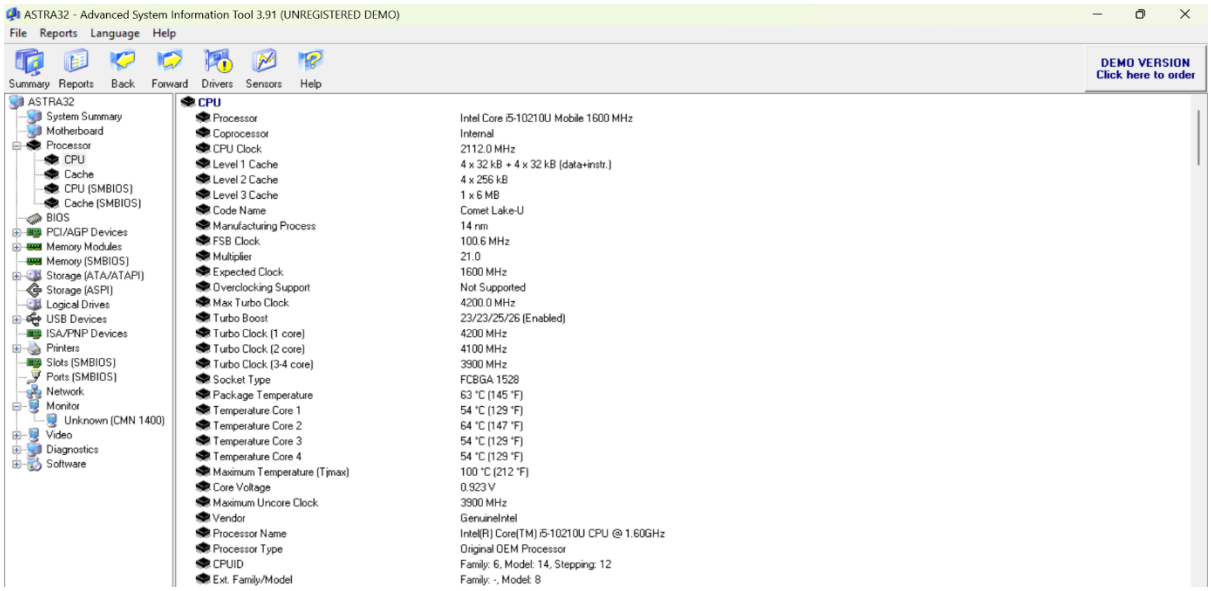
This can be particularly useful for individuals and organizations that need to monitor the performance of multiple systems, as open-source software is often free and can be installed on multiple systems.

Scope of the project: -

The scope of the project is to provide information about open-source software that can display system information and performance metrics. Specifically, the topic focuses on a software called "hwinfo" and commands such as "mpstat", "free", and "iostat" to display details about various system components and the current and average speed/rate of the memory, hard drive, and CPU.

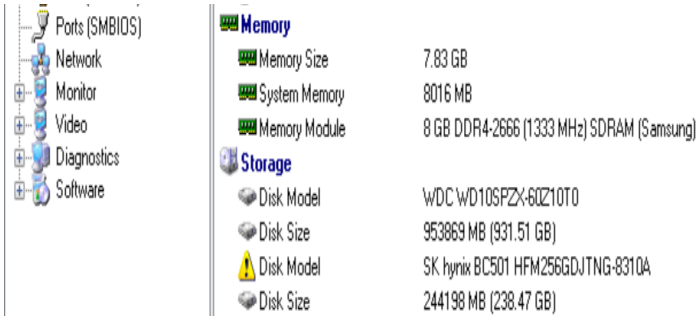
The project does not cover other open-source software or proprietary software that can be used to monitor system performance. Additionally, the topic does not cover in-depth analysis of system performance or specific techniques for optimizing system performance. Instead, the topic provides a high-level overview of tools that can be used to monitor system performance and identify potential performance issues.

CPU Current Details

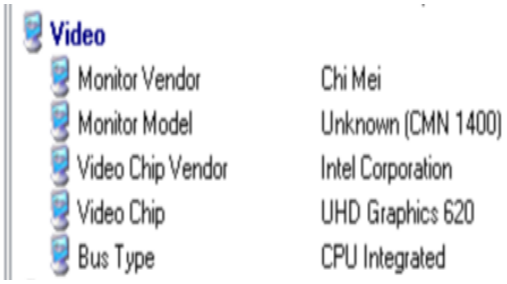


Motherboard Details

Memory and Storage Details

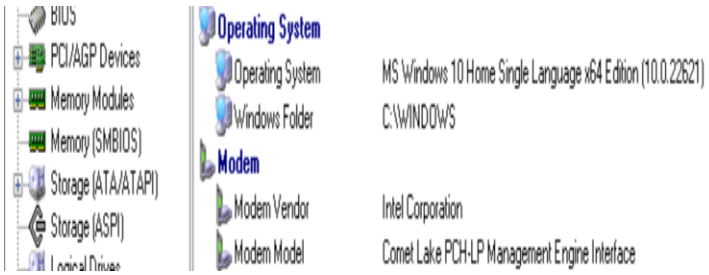


Video

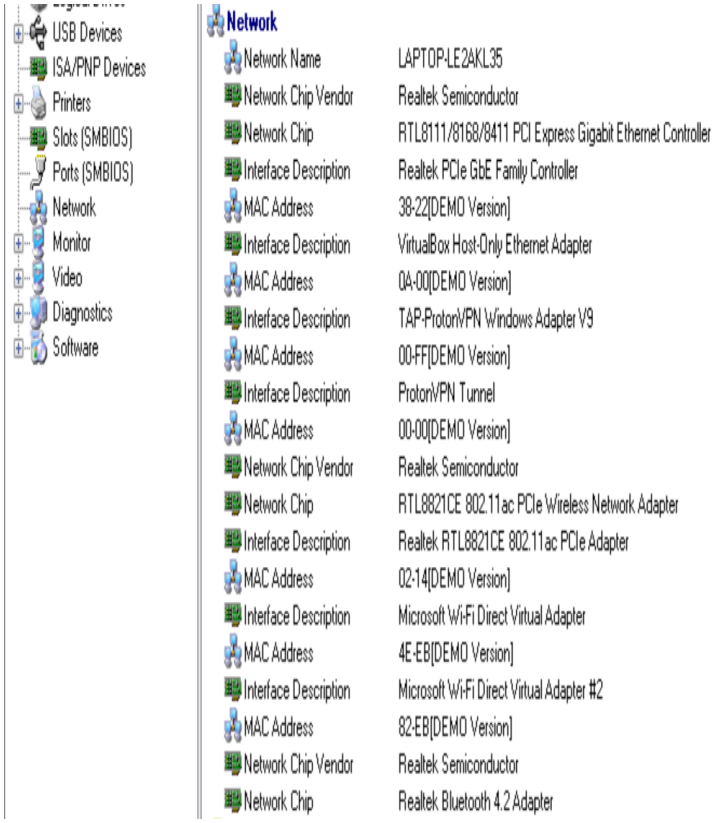


Sound

OS and Modem Details



Network Details

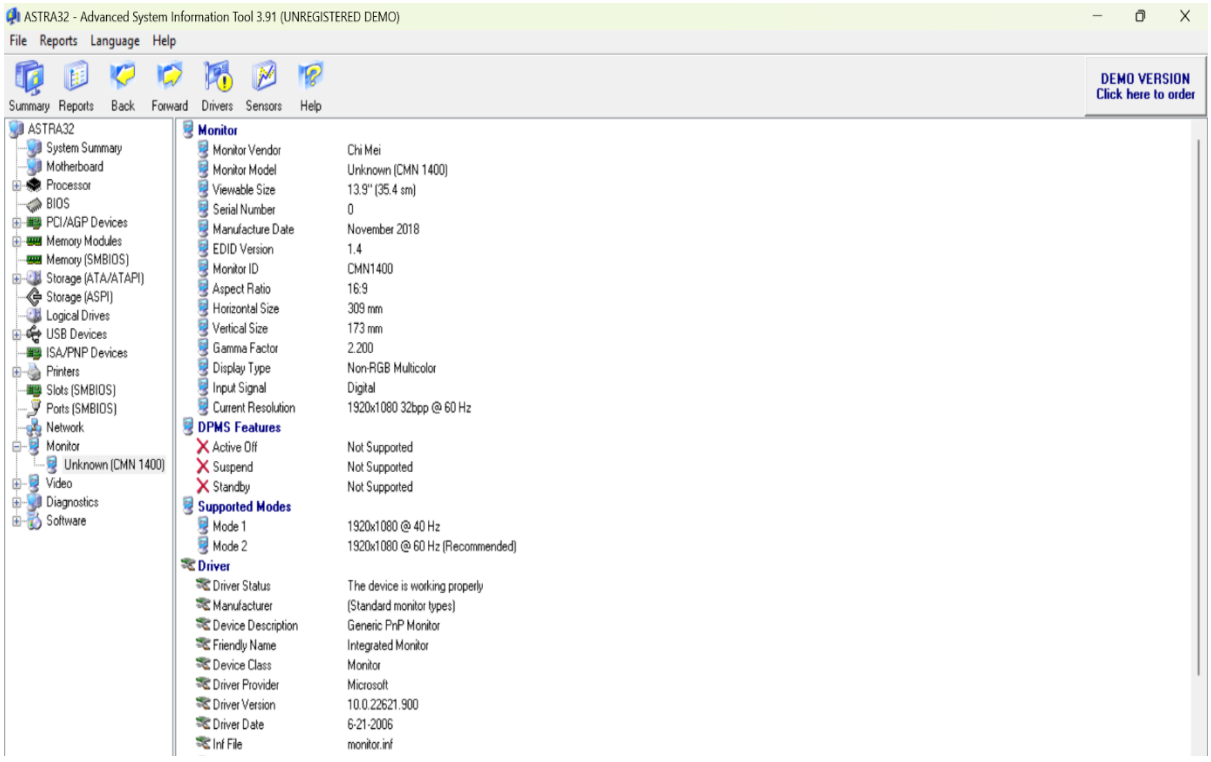


- USB Devices
- ISA/PNP Devices
- Printers
- Slots (SMBIOS)
- Ports (SMBIOS)
- Network
- Monitor
- Video
- Diagnostics
- Software

Network

Network Name	LAPTOP-LE2AKL35
Network Chip Vendor	Realtek Semiconductor
Network Chip	RTL8111/8168/8411 PCI Express Gigabit Ethernet Controller
Interface Description	Realtek PCIe GbE Family Controller
MAC Address	38-22[DEMO Version]
Interface Description	VirtualBox Host-Only Ethernet Adapter
MAC Address	0A-00[DEMO Version]
Interface Description	TAP-ProtonVPN Windows Adapter V9
MAC Address	00-FF[DEMO Version]
Interface Description	ProtonVPN Tunnel
MAC Address	00-00[DEMO Version]
Network Chip Vendor	Realtek Semiconductor
Network Chip	RTL8821CE 802.11ac PCIe Wireless Network Adapter
Interface Description	Realtek RTL8821CE 802.11ac PCIe Adapter
MAC Address	02-14[DEMO Version]
Interface Description	Microsoft Wi-Fi Direct Virtual Adapter
MAC Address	4E-EB[DEMO Version]
Interface Description	Microsoft Wi-Fi Direct Virtual Adapter #2
MAC Address	82-EB[DEMO Version]
Network Chip Vendor	Realtek Semiconductor
Network Chip	Realtek Bluetooth 4.2 Adapter

Monitor



Another way to display all the system information of the device is with the help of some syntax in UBUNTU

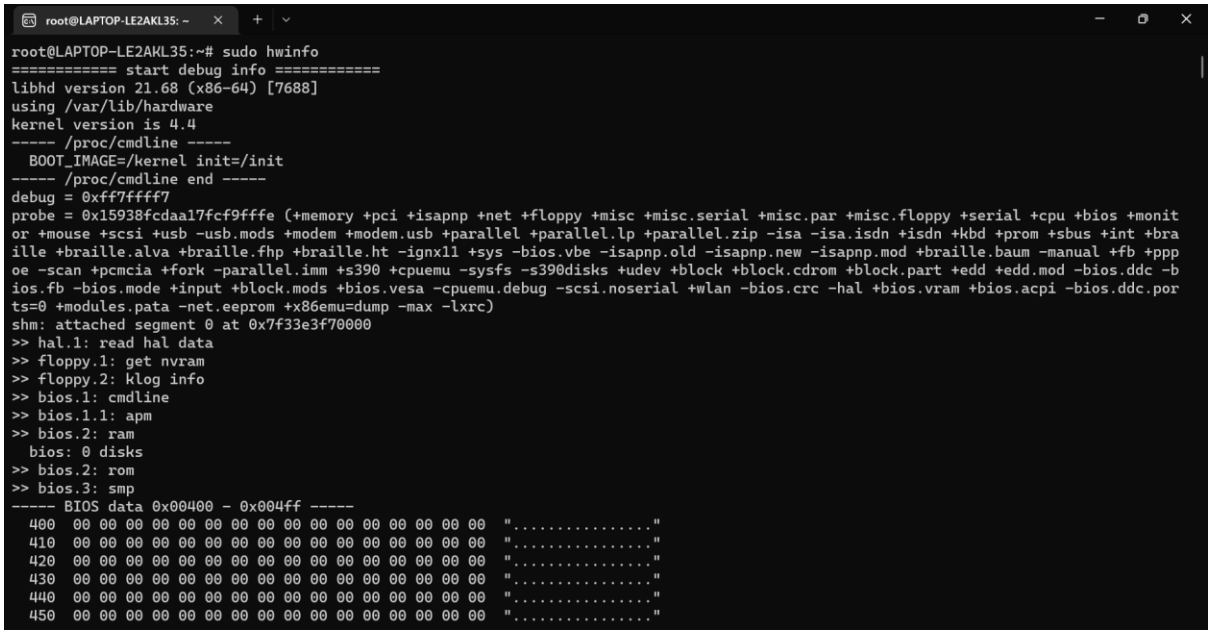
One example of an open-source software that can display system information is "hwinfo".

To install hwinfo on Ubuntu-based systems, you can run the following command:

➔**sudo apt-get install hwinfo**

Once installed, you can use the following command to display detailed system information:

➔**sudo hwinfo**



```
  460  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00  "................"
  470  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00  "................"
  480  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00  "................"
  490  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00  "................"
  4a0  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00  "................"
  4b0  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00  "................"
  4c0  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00  "................"
  4d0  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00  "................"
  4e0  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00  "................"
  4f0  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00  "................"
----- BIOS data end -----
>> bios.4: vbe
>> bios.4.1: vbe info
=== bios setup ===
failed to read /dev/mem
x86emu: could not init vm
>> bios.5: 32
>> bios.6: acpi
>> sys.1: cpu
  hypervisor check: 0
  vm check: vm_1 = 0, vm_2 = 0
  is_vmware = 0, has_vmware_mouse = 0
>> misc.9: kernel log
>> misc.1: misc data
>> misc.1.1: open serial
>> misc.1.2: open parallel
----- exec: "/sbin/modprobe parport " -----
  modprobe: FATAL: Module parport not found in directory /lib/modules/4.4.0-22621-Microsoft
----- return code: ? -----
----- exec: "/sbin/modprobe parport_pc " -----
  modprobe: FATAL: Module parport_pc not found in directory /lib/modules/4.4.0-22621-Microsoft
----- return code: ? -----
```

```
>> misc.2.1: io
>> misc.2.2: dma
>> misc.2.3: irq
----- /proc/ioports -----
----- /proc/ioports end -----
----- /proc/interrupts -----
----- /proc/interrupts end -----
----- /proc/dma -----
----- /proc/dma end -----
>> misc.3: FPU
>> misc.3.1: DMA
>> misc.3.2: PIC
>> misc.3.3: timer
>> misc.3.4: RTC
>> cpu.1: cpuinfo
----- /proc/cpuinfo -----
  processor       : 0
  vendor_id       : GenuineIntel
  cpu family      : 6
  model           : 142
  model name      : Intel(R) Core(TM) i5-10210U CPU @ 1.60GHz
  stepping        : 12
  microcode       : 0xffffffff
  cpu MHz                 : 2112.000
  cache size      : 256 KB
  physical id     : 0
  siblings        : 8
  core id                 : 0
  cpu cores       : 4
  apicid                  : 0
  initial apicid          : 0
  fpu             : yes
```

```
  cpuid level     : 6
  wp              : yes
  flags           : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov pat pse36 clflush dts acpi mmx fxsr sse sse2 ss ht tm
 pbe syscall nx pdpe1gb rdtscp lm pni pclmulqdq dtes64 monitor ds_cpl vmx est tm2 ssse3 fma cx16 xtpr pdcm pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave osxsave avx f16c rdrand lahf_lm abm 3dnowprefetch fsgsbase tsc_adjust bmi1 avx2 smep bmi2 e
rms invpcid mpx rdseed adx smap clflushopt intel_pt ibrs ibpb stibp ssbd
  bogomips        : 4224.00
  clflush size    : 64
  cache_alignment       : 64
  address sizes : 36 bits physical, 48 bits virtual
  power management:

  processor       : 1
  vendor_id       : GenuineIntel
  cpu family      : 6
  model           : 142
  model name      : Intel(R) Core(TM) i5-10210U CPU @ 1.60GHz
  stepping        : 12
  microcode       : 0xffffffff
  cpu MHz                 : 2112.000
  cache size      : 256 KB
  physical id     : 0
  siblings        : 8
  core id                 : 0
  cpu cores       : 4
  apicid                  : 0
  initial apicid          : 0
  fpu             : yes
  fpu_exception   : yes
  cpuid level     : 6
  wp              : yes
  flags           : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov pat pse36 clflush dts acpi mmx fxsr sse sse2 ss ht tm
```

```
 pbe syscall nx pdpe1gb rdtscp lm pni pclmulqdq dtes64 monitor ds_cpl vmx est tm2 ssse3 fma cx16 xtpr pdcm pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave osxsave avx f16c rdrand lahf_lm abm 3dnowprefetch fsgsbase tsc_adjust bmi1 avx2 smep bmi2 e
rms invpcid mpx rdseed adx smap clflushopt intel_pt ibrs ibpb stibp ssbd
  bogomips      : 4224.00
  clflush size  : 64
  cache_alignment       : 64
  address sizes : 36 bits physical, 48 bits virtual
  power management:

  processor     : 2
  vendor_id     : GenuineIntel
  cpu family    : 6
  model         : 142
  model name    : Intel(R) Core(TM) i5-10210U CPU @ 1.60GHz
  stepping      : 12
  microcode     : 0xffffffff
  cpu MHz               : 2112.000
  cache size    : 256 KB
  physical id   : 0
  siblings      : 8
  core id               : 1
  cpu cores     : 4
  apicid                : 0
  initial apicid        : 0
  fpu           : yes
  fpu_exception : yes
  cpuid level   : 6
  wp            : yes
  flags         : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov pat pse36 clflush dts acpi mmx fxsr sse sse2 ss ht tm
 pbe syscall nx pdpe1gb rdtscp lm pni pclmulqdq dtes64 monitor ds_cpl vmx est tm2 ssse3 fma cx16 xtpr pdcm pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave osxsave avx f16c rdrand lahf_lm abm 3dnowprefetch fsgsbase tsc_adjust bmi1 avx2 smep bmi2 e
rms invpcid mpx rdseed adx smap clflushopt intel_pt ibrs ibpb stibp ssbd
```

```
01: None 00.0: 10105 BIOS
  [Created at bios.186]
  Unique ID: rdCR.lZF+r4EgHp4
  Hardware Class: bios
  BIOS Keyboard LED Status:
    Scroll Lock: off
    Num Lock: off
    Caps Lock: off
  Config Status: cfg=new, avail=yes, need=no, active=unknown

02: None 00.0: 10107 System
  [Created at sys.64]
  Unique ID: rdCR.n_7QNeEnh23
  Hardware Class: system
  Model: "System"
  Formfactor: "desktop"
  Config Status: cfg=new, avail=yes, need=no, active=unknown

11: None 00.0: 10102 Main Memory
  [Created at memory.74]
  Unique ID: rdCR.CxwsZFjVASF
  Hardware Class: memory
  Model: "Main Memory"
  Memory Range: 0x00000000-0x1f4e9cfff (rw)
  Memory Size: 8 GB
  Config Status: cfg=new, avail=yes, need=no, active=unknown

12: None 00.0: 10103 CPU
  [Created at cpu.465]
  Unique ID: rdCR.j8NaKXDZtZ6
  Hardware Class: cpu
  Arch: X86-64
```

This will display information about various system components, including the CPU, motherboard, monitor, audio, network, and other components.

To display information about the current and average speed/rate of the memory, hard drive, and CPU, you can use the following commands:

To display CPU speed and usage:

→sudo apt-get install sysstat

```
root@LAPTOP-LE2AKL35:~# sudo apt-get install sysstat
Reading package lists... Done
Building dependency tree
Reading state information... Done
sysstat is already the newest version (12.2.0-2ubuntu0.2).
0 upgraded, 0 newly installed, 0 to remove and 270 not upgraded.
root@LAPTOP-LE2AKL35:~#
```

→sudo mpstat -P ALL

```
root@LAPTOP-LE2AKL35:~# sudo mpstat -P ALL
Linux 4.4.0-22621-Microsoft (LAPTOP-LE2AKL35)   04/08/23        _x86_64_        (8 CPU)

12:23:42     CPU    %usr   %nice    %sys %iowait    %irq   %soft  %steal  %guest  %gnice   %idle
12:23:42     all    0.90    0.00    1.08    0.00    0.05    0.00    0.00    0.00    0.00   97.97
12:23:42       0    1.30    0.00    2.20    0.00    0.32    0.00    0.00    0.00    0.00   96.18
12:23:42       1    0.45    0.00    0.45    0.00    0.00    0.00    0.00    0.00    0.00   99.09
12:23:42       2    2.02    0.00    2.28    0.00    0.05    0.00    0.00    0.00    0.00   95.65
12:23:42       3    0.24    0.00    0.33    0.00    0.01    0.00    0.00    0.00    0.00   99.42
12:23:42       4    0.96    0.00    1.51    0.00    0.02    0.00    0.00    0.00    0.00   97.51
12:23:42       5    0.69    0.00    0.66    0.00    0.00    0.00    0.00    0.00    0.00   98.65
12:23:42       6    0.53    0.00    0.81    0.00    0.01    0.00    0.00    0.00    0.00   98.65
12:23:42       7    1.04    0.00    0.39    0.00    0.00    0.00    0.00    0.00    0.00   98.57
```

To display memory usage and speed:

→sudo free -m

```
root@LAPTOP-LE2AKL35:~# sudo free -m
               total        used        free      shared  buff/cache   available
Mem:            8014        6519        1271          17         223        1364
Swap:          24576         440       24135
root@LAPTOP-LE2AKL35:~#
```

To display hard drive usage and speed:

→sudo iostat -dx /dev/sda

```
root@LAPTOP-LE2AKL35:~# sudo iostat -dx /dev/sda
Linux 4.4.0-22621-Microsoft (LAPTOP-LE2AKL35)   04/08/23        _x86_64_        (8 CPU)

Device            r/s     rkB/s   rrqm/s  %rrqm r_await rareq-sz     w/s     wkB/s   wrqm/s  %wrqm w_await wareq-sz     d/s     dkB/s
   drqm/s  %drqm d_await dareq-sz  aqu-sz  %util


root@LAPTOP-LE2AKL35:~#
```

Reference/ Bibliography

Some general references and resources related to the topic of open-source software for system information and performance monitoring:

"hwinfo" official website: https://www.hwinfo.com/

"mpstat" man page: https://linux.die.net/man/1/mpstat

"free" man page: https://linux.die.net/man/1/free

"iostat" man page: https://linux.die.net/man/1/iostat

"sysstat" official website: https://github.com/sysstat/sysstat

"Top 10 Linux Performance Monitoring Tools" by Ravi Saive, published on Tecmint: https://www.tecmint.com/top-linux-performance-monitoring-tools/

"10 Tools to Monitor Your Linux Server – Network and System Monitoring" by Magesh Maruthamuthu, published on LinuxTechi: https://www.linuxtechi.com/10-tools-monitor-linux-server-performance/

"Linux System Monitoring: Top 12 Tools" by Jeffry R. Davis, published on Datamation: https://www.datamation.com/open-source/linux-system-monitoring-tools.html

"Linux Performance Monitoring and Tuning" by Brendan Gregg, published on the Oracle Technology Network: https://docs.oracle.com/cd/E37670_01/E37355/html/ol_perfmon_tuning.html

"Linux Performance Monitoring with perf" by Brendan Gregg, published on his website: http://www.brendangregg.com/linuxperf.html

These resources can provide you with more information about the software and commands mentioned in the topic, as well as related topics in system monitoring and performance optimization. Please note that there may be other open-source software and tools available for system monitoring, and it is always recommended to research and evaluate multiple options before choosing a specific tool or solution.