Keylogger detector

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Topics

-What is a keylogger

-Our focus: Software Based Keylogger

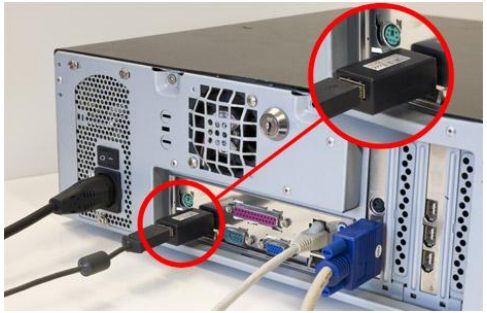
    -Kernel based

    -API based

-Detecting keyloggers

what is a keylogger

a computer program that records every keystroke made by a computer user, especially in order to gain fraudulent access to passwords and other confidential information



Hardware based

```
[root@fedora by-path]# pwd
/dev/input/by-path
[root@fedora by-path]# ll
total 0
lrwxrwxrwx. 1 root root 10 Apr 12 21:18 pci-0000:00:14.0-usb-0:3.4.3:1.0-event-kbd -> ../event23
lrwxrwxrwx. 1 root root 10 Apr 12 21:18 pci-0000:00:14.0-usb-0:3.4.3:1.1-event -> ../event26
lrwxrwxrwx. 1 root root 10 Apr 12 21:18 pci-0000:00:14.0-usb-0:3.4.3:1.1-event-mouse -> ../event24
lrwxrwxrwx. 1 root root  9 Apr 12 21:18 pci-0000:00:14.0-usb-0:3.4.3:1.1-mouse -> ../mouse4
lrwxrwxrwx. 1 root root 10 Apr 12 21:18 pci-0000:00:14.0-usb-0:3.4.4:1.0-event-mouse -> ../event27
lrwxrwxrwx. 1 root root  9 Apr 12 21:18 pci-0000:00:14.0-usb-0:3.4.4:1.0-mouse -> ../mouse5
lrwxrwxrwx. 1 root root 10 Apr 12 21:18 pci-0000:00:14.0-usb-0:3.4.4:1.1-event-kbd -> ../event28
lrwxrwxrwx. 1 root root 10 Apr 10 10:16 pci-0000:00:14.0-usb-0:8:1.0-event -> ../event11
lrwxrwxrwx. 1 root root  9 Apr 10 10:16 pci-0000:00:15.0-platform-i2c_designware.0-event-mouse -> ../event7
lrwxrwxrwx. 1 root root  9 Apr 10 10:16 pci-0000:00:15.0-platform-i2c_designware.0-mouse -> ../mouse2
lrwxrwxrwx. 1 root root  9 Apr 10 10:16 platform-i8042-serio-0-event-kbd -> ../event4
lrwxrwxrwx. 1 root root  9 Apr 10 10:16 platform-i8042-serio-1-event-mouse -> ../event5
lrwxrwxrwx. 1 root root  9 Apr 10 10:16 platform-i8042-serio-1-mouse -> ../mouse0
lrwxrwxrwx. 1 root root  9 Apr 10 10:16 platform-INTC1051:00-event -> ../event9
lrwxrwxrwx. 1 root root 10 Apr 10 10:16 platform-pcspkr-event-spkr -> ../event10
```

Software based

- Keyloggers are not per se malicious.
- Your apps need to access Keyboard I/O too.
- It is malware when you’re not aware of it, and if it is deployed with malintent.

Software Keyloggers

- Hypervisor Based

- Kernel Based

- API Based

- Various Script Injections in Userland

→https://github.com/cyc0rpion/micKeyDetector,https://github.com/kernc/logkeys

countless others, especially Pyhthon API Based Keystroke loggers on Github.

Kernel Based:

- Logger obtains root access and hides in OS
- Intercepts Keystrokes passing through the Kernel

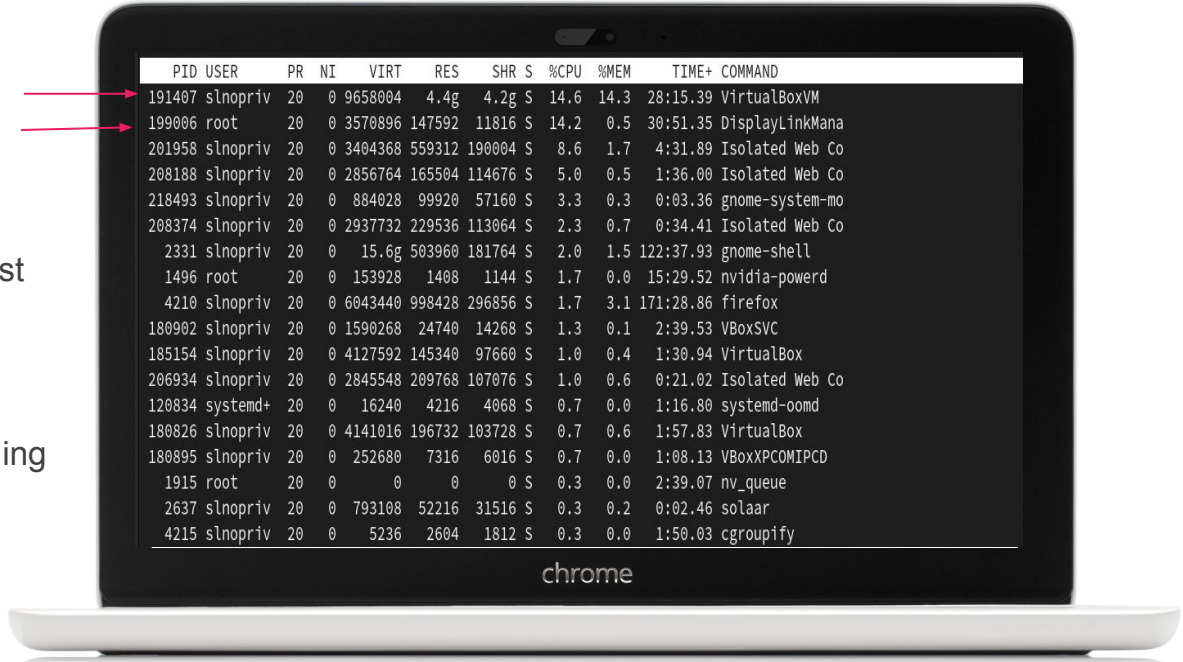
How do you detect a keylogger?

Aren’t I/O Ops ubiquitous and plentiful?

Detection

That's a lot of processes

- Just wade through processes…
- Use list of known loggers → ok I'll just rename mine, thanks
- Signature Based
- Behavioural Analysis
- Main problem: what is good I/O reading behaviour, what not?




```
  PID USER      PR  NI    VIRT    RES    SHR S  %CPU  %MEM     TIME+ COMMAND
191407 slnopriv  20   0 9658004   4.4g   4.2g S  14.6  14.3  28:15.39 VirtualBoxVM
199006 root      20   0 3570896 147592  11816 S  14.2   0.5  30:51.35 DisplayLinkMana
201958 slnopriv  20   0 3404368 559312 190004 S   8.6   1.7   4:31.89 Isolated Web Co
208188 slnopriv  20   0 2856764 165504 114676 S   5.0   0.5   1:36.00 Isolated Web Co
218493 slnopriv  20   0  884028  99920  57160 S   3.3   0.3   0:03.36 gnome-system-mo
208374 slnopriv  20   0 2937732 229536 113064 S   2.3   0.7   0:34.41 Isolated Web Co
  2331 slnopriv  20   0   15.6g 503960 181764 S   2.0   1.5 122:37.93 gnome-shell
  1496 root      20   0  153928   1408   1144 S   1.7   0.0  15:29.52 nvidia-powerd
  4210 slnopriv  20   0 6043440 998428 296856 S   1.7   3.1 171:28.86 firefox
180902 slnopriv  20   0 1590268  24740  14268 S   1.3   0.1   2:39.53 VBoxSVC
185154 slnopriv  20   0 4127592 145340  97660 S   1.0   0.4   1:30.94 VirtualBox
206934 slnopriv  20   0 2845548 209768 107076 S   1.0   0.6   0:21.02 Isolated Web Co
120834 systemd+  20   0   16240   4216   4068 S   0.7   0.0   1:16.80 systemd-oomd
180826 slnopriv  20   0 4141016 196732 103728 S   0.7   0.6   1:57.83 VirtualBox
180895 slnopriv  20   0  252680   7316   6016 S   0.7   0.0   1:08.13 VBoxXPCOMIPCD
  1915 root      20   0       0      0      0 S   0.3   0.0   2:39.07 nv_queue
  2637 slnopriv  20   0  793108  52216  31516 S   0.3   0.2   0:02.46 solaar
  4215 slnopriv  20   0    5236   2604   1812 S   0.3   0.0   1:50.03 cgroupify
```

/*TODOs*/

Analyze existing keyloggers: what APIs/System calls are done?

who is reading /dev/input /*?

Find processes involved in reading from I/O and display them

Env: Fedora 37, Gnome, Wayland

Unclear: Is this a Kernel Module or user App?

Merci

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Questions ?