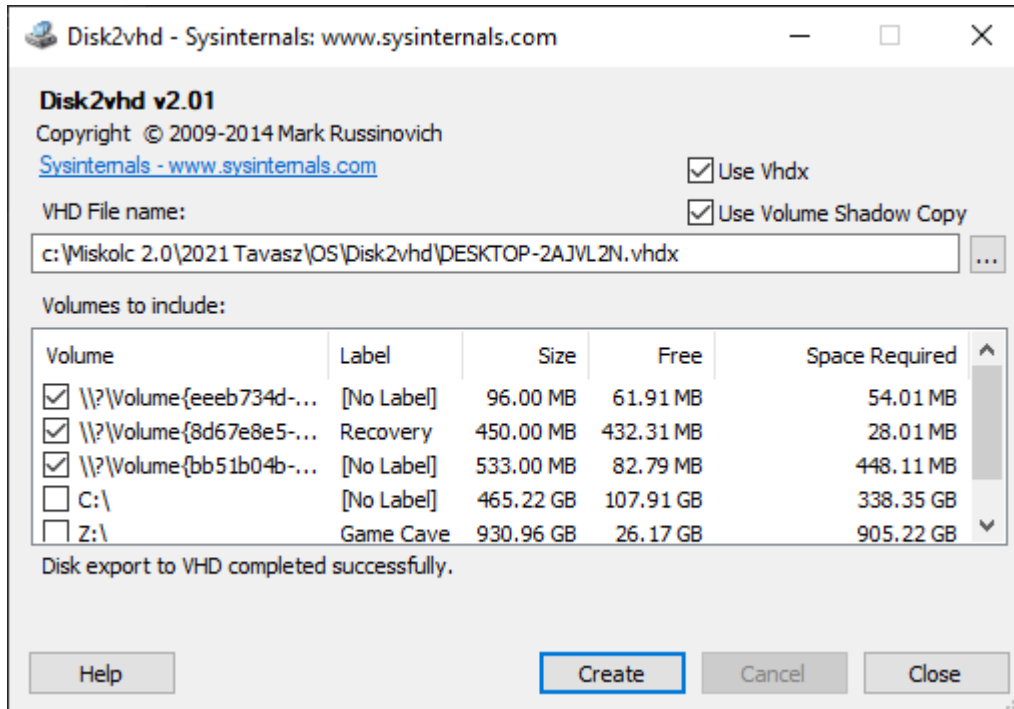


Operációs rendszerek – 3A. Gyakorlat

2.a Disk2vhd

Snapshotot készít a megadott meghajtókról



2.b TCPView

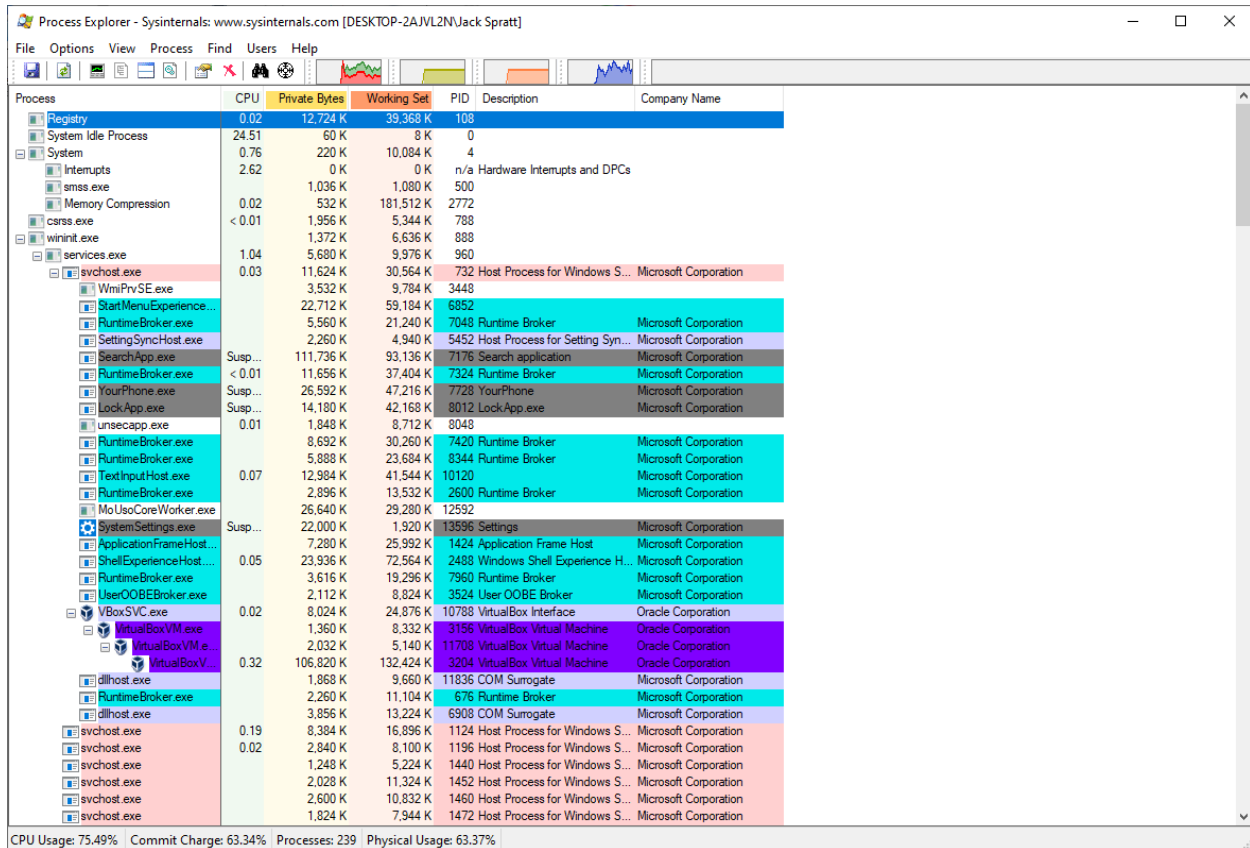
Minden olyan processt megmutat, amelynek internetes kapcsolatra van szüksége, illetve ezeknek az adatait adja meg a szoftver.

TCPView - Sysinternals: www.sysinternals.com										
File Options Process View Help										
Process /	PID	Protocol	Local Address	Local Port	Remote Address	Remote Port	State	Sent Packets	Sent Bytes	Rcvd Pack
AvastSvc.exe	4164	TCPv6	[0:0:0:0:0:0:0:0]	12119	desktop-2av2zn	0	LISTENING			
AvastSvc.exe	4164	TCPv6	[0:0:0:0:0:0:0:0]	12143	desktop-2av2zn	0	LISTENING			
AvastSvc.exe	4164	TCPv6	[0:0:0:0:0:0:0:0]	12485	desktop-2av2zn	0	LISTENING			
AvastSvc.exe	4164	TCPv6	[0:0:0:0:0:0:0:0]	12563	desktop-2av2zn	0	LISTENING			
AvastSvc.exe	4164	TCPv6	[0:0:0:0:0:0:0:0]	12993	desktop-2av2zn	0	LISTENING			
AvastSvc.exe	4164	TCPv6	[0:0:0:0:0:0:0:0]	12995	desktop-2av2zn	0	LISTENING			
AvastSvc.exe	4164	UDP	DESKTOP-2AV2ZNL	51212						
AvastSvc.exe	4164	UDP	DESKTOP-2AV2ZNL	51213						
chrome.exe	7900	TCP	desktop-2av2zn	50221	cdn-195-199-108-...	https	ESTABLISHED			
chrome.exe	7900	TCP	desktop-2av2zn	50267	lb-140-82-114-26...	https	ESTABLISHED	3		90
chrome.exe	10444	UDP	DESKTOP-2AV2ZNL	5363	*	*				
chrome.exe	10444	UDP	DESKTOP-2AV2ZNL	5363	*	*				
chrome.exe	10444	UDP	DESKTOP-2AV2ZNL	5363	*	*				
chrome.exe	10444	UDP	DESKTOP-2AV2ZNL	5363	*	*				
chrome.exe	10444	UDP	DESKTOP-2AV2ZNL	5363	*	*				
chrome.exe	10444	UDP	DESKTOP-2AV2ZNL	5363	*	*				
chrome.exe	10444	UDP	DESKTOP-2AV2ZNL	5363	*	*				
chrome.exe	10444	UDP	DESKTOP-2AV2ZNL	5363	*	*				
chrome.exe	7900	TCPv6	[2a01:36d:1400:7...	49837	[2a00:1450:400d:...]	https	ESTABLISHED	4		286
chrome.exe	7900	TCPv6	[2a01:36d:1400:7...	49838	[2a00:1450:400d:...]	https	ESTABLISHED			
chrome.exe	7900	TCPv6	[2a01:36d:1400:7...	50381	[2a00:1450:400d:...]	https	ESTABLISHED	2		736
chrome.exe	7900	TCPv6	[2a01:36d:1400:7...	50380	[2a00:1450:400d:...]	https	ESTABLISHED	6		11,434
chrome.exe	10444	UDPv6	desktop-2av2zn	5363	*	*				
chrome.exe	10444	UDPv6	desktop-2av2zn	5363	*	*				
chrome.exe	10444	UDPv6	desktop-2av2zn	5363	*	*				
chrome.exe	10444	UDPv6	desktop-2av2zn	5363	*	*				
chrome.exe	10444	UDPv6	desktop-2av2zn	5363	*	*				
chrome.exe	10444	UDP	desktop-2av2zn	51214	*	*				
chrome.exe	10444	UDP	desktop-2av2zn	51215	*	*				
chrome.exe	10444	UDP	desktop-2av2zn	51216	*	*				
chrome.exe	10444	UDP	desktop-2av2zn	51217	*	*				
dashHost.exe	8620	UDP	DESKTOP-2AV2ZNL	ws-discovery	*	*				
dashHost.exe	8620	UDP	DESKTOP-2AV2ZNL	ws-discovery	*	*				
dashHost.exe	8620	UDP	DESKTOP-2AV2ZNL	57722	*	*				
dashHost.exe	8620	UDPv6	desktop-2av2zn	3702	*	*				
dashHost.exe	8620	UDPv6	desktop-2av2zn	3702	*	*				
dashHost.exe	8620	UDPv6	desktop-2av2zn	57723	*	*				
DriverUpdSvc.exe	9200	TCP	desktop-2av2zn	58761	5.62.54.29	https	ESTABLISHED			

Endpoints: 195 Established: 25 Listening: 46 Time Wait: 12 Close Wait: 2

2.c.1 Process Explorer

Megmutatja az épp futó, aktív processeket illetve azok tulajdonságait. A grafikonokra kattintva megtekinthető a gép processzor elfoglaltságát, a memória kihasználtságát.



Process Explorer - Sysinternals: www.sysinternals.com [DESKTOP-2AJVL2NUJack Spratt]

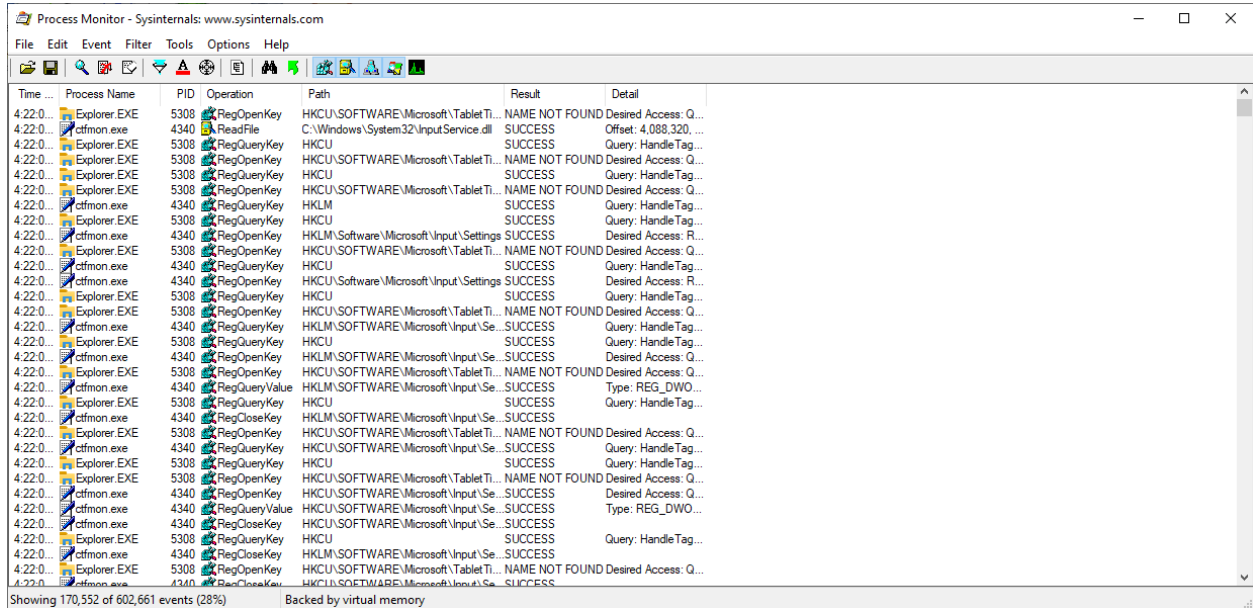
File Options View Process Find Users Help

Process	CPU	Private Bytes	Working Set	PID	Description	Company Name
Registry	0.02	12,724 K	39,368 K	108		
System Idle Process	24.51	60 K	8 K	0		
System	0.76	220 K	10,084 K	4		
Interrupts	2.62	0 K	0 K	n/a	Hardware Interrupts and DPCs	
smss.exe		1,036 K	1,080 K	500		
Memory Compression	0.02	532 K	181,512 K	2772		
csrss.exe	< 0.01	1,956 K	5,344 K	788		
wininit.exe		1,372 K	6,636 K	888		
services.exe	1.04	5,680 K	9,976 K	960		
svchost.exe	0.03	11,624 K	30,564 K	732	Host Process for Windows S...	Microsoft Corporation
WmiPrvSE.exe		3,532 K	9,784 K	3448		
StartMenuExperience...		22,712 K	59,184 K	6852		
RuntimeBroker.exe		5,560 K	21,240 K	7048	Runtime Broker	Microsoft Corporation
SettingSyncHost.exe		2,260 K	4,940 K	5452	Host Process for Setting Syn...	Microsoft Corporation
SearchApp.exe	Susp...	111,736 K	93,136 K	7176	Search application	Microsoft Corporation
RuntimeBroker.exe	< 0.01	11,656 K	37,404 K	7324	Runtime Broker	Microsoft Corporation
YourPhone.exe	Susp...	26,592 K	47,216 K	7728	YourPhone	Microsoft Corporation
LockApp.exe	Susp...	14,180 K	42,168 K	8012	LockApp.exe	Microsoft Corporation
unsecapp.exe	0.01	1,848 K	8,712 K	8048		
RuntimeBroker.exe		8,692 K	30,260 K	7420	Runtime Broker	Microsoft Corporation
RuntimeBroker.exe		5,888 K	23,684 K	8344	Runtime Broker	Microsoft Corporation
TextInputHost.exe	0.07	12,984 K	41,544 K	10120		
RuntimeBroker.exe		2,896 K	13,532 K	2600	Runtime Broker	Microsoft Corporation
MoUsCoreWorker.exe		26,640 K	29,280 K	12592		
SystemSettings.exe	Susp...	22,000 K	1,920 K	13596	Settings	Microsoft Corporation
ApplicationFrameHost...		7,280 K	25,992 K	1424	Application Frame Host	Microsoft Corporation
ShellExperienceHost...	0.05	23,936 K	72,564 K	2488	Windows Shell Experience H...	Microsoft Corporation
RuntimeBroker.exe		3,616 K	19,296 K	7960	Runtime Broker	Microsoft Corporation
UserOOBEBroker.exe		2,112 K	8,824 K	3524	User OOBEBroker	Microsoft Corporation
VBoxSVC.exe	0.02	8,024 K	24,876 K	10788	VirtualBox Interface	Oracle Corporation
VirtualBoxVM.exe		1,360 K	8,332 K	3156	VirtualBox Virtual Machine	Oracle Corporation
VirtualBoxVM.exe		2,032 K	5,140 K	11708	VirtualBox Virtual Machine	Oracle Corporation
VirtualBoxV...	0.32	106,820 K	132,424 K	3204	VirtualBox Virtual Machine	Oracle Corporation
dllhost.exe		1,868 K	9,660 K	11836	COM Surrogate	Microsoft Corporation
RuntimeBroker.exe		2,260 K	11,104 K	676	Runtime Broker	Microsoft Corporation
dllhost.exe		3,856 K	13,224 K	6908	COM Surrogate	Microsoft Corporation
svchost.exe	0.19	8,384 K	16,896 K	1124	Host Process for Windows S...	Microsoft Corporation
svchost.exe	0.02	2,840 K	8,100 K	1196	Host Process for Windows S...	Microsoft Corporation
svchost.exe		1,248 K	5,224 K	1440	Host Process for Windows S...	Microsoft Corporation
svchost.exe		2,028 K	11,324 K	1452	Host Process for Windows S...	Microsoft Corporation
svchost.exe		2,600 K	10,832 K	1460	Host Process for Windows S...	Microsoft Corporation
svchost.exe		1,824 K	7,944 K	1472	Host Process for Windows S...	Microsoft Corporation

CPU Usage: 75.49% Commit Charge: 63.34% Processes: 239 Physical Usage: 63.37%

2.c.2 Process Monitor

A Process Monitor képes élőben megmutatni élőben az összes processt azok PID-jeit, illetve, hogy milyen operációt hajtanak végre.



The screenshot shows the Process Monitor application window. The title bar reads "Process Monitor - Sysinternals: www.sysinternals.com". The menu bar includes "File", "Edit", "Event", "Filter", "Tools", "Options", and "Help". The toolbar contains icons for file operations, search, and process management. The main window displays a table of system events. The table has five columns: "Time ...", "Process Name", "PID", "Operation", and "Result". The "Detail" column is also present but its content is truncated. The events listed include Explorer.EXE and ctfmon.exe performing various registry operations (RegOpenKey, RegQueryValue, RegCloseKey) and file operations (ReadFile). The results are either "NAME NOT FOUND", "SUCCESS", or "Desired Access: Q...". The status bar at the bottom indicates "Showing 170,552 of 602,661 events (28%)" and "Backed by virtual memory".

Time ...	Process Name	PID	Operation	Result	Detail
4:22:0...	Explorer.EXE	5308	RegOpenKey	NAME NOT FOUND	Desired Access: Q...
4:22:0...	ctfmon.exe	4340	ReadFile	SUCCESS	Offset: 4,088,320, ...
4:22:0...	Explorer.EXE	5308	RegQueryKey	SUCCESS	Query: HandleTag...
4:22:0...	Explorer.EXE	5308	RegOpenKey	NAME NOT FOUND	Desired Access: Q...
4:22:0...	Explorer.EXE	5308	RegQueryKey	SUCCESS	Query: HandleTag...
4:22:0...	Explorer.EXE	5308	RegOpenKey	NAME NOT FOUND	Desired Access: Q...
4:22:0...	ctfmon.exe	4340	RegQueryKey	SUCCESS	Query: HandleTag...
4:22:0...	Explorer.EXE	5308	RegOpenKey	SUCCESS	Query: HandleTag...
4:22:0...	ctfmon.exe	4340	RegOpenKey	SUCCESS	Desired Access: R...
4:22:0...	Explorer.EXE	5308	RegOpenKey	NAME NOT FOUND	Desired Access: Q...
4:22:0...	ctfmon.exe	4340	RegQueryKey	SUCCESS	Query: HandleTag...
4:22:0...	Explorer.EXE	5308	RegOpenKey	SUCCESS	Desired Access: R...
4:22:0...	Explorer.EXE	5308	RegQueryKey	SUCCESS	Query: HandleTag...
4:22:0...	Explorer.EXE	5308	RegOpenKey	NAME NOT FOUND	Desired Access: Q...
4:22:0...	ctfmon.exe	4340	RegQueryKey	SUCCESS	Query: HandleTag...
4:22:0...	Explorer.EXE	5308	RegQueryKey	SUCCESS	Query: HandleTag...
4:22:0...	ctfmon.exe	4340	RegOpenKey	SUCCESS	Desired Access: Q...
4:22:0...	Explorer.EXE	5308	RegOpenKey	NAME NOT FOUND	Desired Access: Q...
4:22:0...	ctfmon.exe	4340	RegQueryValue	SUCCESS	Type: REG_DWO...
4:22:0...	Explorer.EXE	5308	RegQueryKey	SUCCESS	Query: HandleTag...
4:22:0...	ctfmon.exe	4340	RegCloseKey	SUCCESS	
4:22:0...	Explorer.EXE	5308	RegOpenKey	NAME NOT FOUND	Desired Access: Q...
4:22:0...	ctfmon.exe	4340	RegQueryKey	SUCCESS	Query: HandleTag...
4:22:0...	Explorer.EXE	5308	RegQueryKey	SUCCESS	Query: HandleTag...
4:22:0...	Explorer.EXE	5308	RegOpenKey	NAME NOT FOUND	Desired Access: Q...
4:22:0...	ctfmon.exe	4340	RegOpenKey	SUCCESS	Desired Access: Q...
4:22:0...	ctfmon.exe	4340	RegQueryValue	SUCCESS	Type: REG_DWO...
4:22:0...	ctfmon.exe	4340	RegCloseKey	SUCCESS	
4:22:0...	Explorer.EXE	5308	RegQueryKey	SUCCESS	Query: HandleTag...
4:22:0...	ctfmon.exe	4340	RegCloseKey	SUCCESS	
4:22:0...	Explorer.EXE	5308	RegOpenKey	NAME NOT FOUND	Desired Access: Q...
4:22:0...	ctfmon.exe	4340	RegCloseKey	SUCCESS	

Showing 170,552 of 602,661 events (28%) Backed by virtual memory

Az operációs rendszerrel egyszerre elinduló szoftverek és processek adatai és elérési útvonal mutatja meg, illetve beállítható, hogy mely szoftver induljon el a windowsal.

Autaruns - Sysinternals: www.sysinternals.com
File Entry Options Help
Filter:

KnownDLLs
Winlogon
Winsock Providers
Print Monitors
LSA Providers
Network Providers
WMI
Office

Everything
Logon
Explorer
Internet Explorer
Scheduled Tasks
Services
Drivers
Codecs
Boot Execute
Image Hijacks
AppInit

Autarun Entry	Description	Publisher	Image Path	Timestamp	VirusTotal
HKLM\SYSTEM\CurrentControlSet\Control\SafeBoot\AlternateShell				12/7/2019 10:15 AM	
cmd.exe	Windows Command Processor	(Verified) Microsoft Windows	c:\windows\system32\cmd.exe	12/11/1953 3:58 AM	
HKLM\SOFTWARE\Microsoft\Windows\CurrentVersion\Run				1/24/2021 11:33 AM	
AvastUI.exe	Avast AvLaunch component	(Verified) Avast Software s.r.o.	c:\program files\avast software\avas...	12/4/2020 11:02 AM	
DriverUpdUI.exe	Avast Driver Updater UI	(Verified) Avast Software s.r.o.	c:\program files\avast software\driv...	2/15/2021 12:46 PM	
RHDVBg_Dolby	HD Audio Background Process	(Verified) Realtek Semiconductor Corp.	c:\program files\realtek\audio\hda\...	5/18/2020 9:46 AM	
RHDVpI	Realtek HD Audio Manager	(Verified) Realtek Semiconductor Corp.	c:\program files\realtek\audio\hda\...	9/28/2020 7:27 AM	
TuneupUI.exe	Avast Cleanup UI	(Verified) Avast Software s.r.o.	c:\program files\avast software\clea...	2/12/2021 3:44 PM	
HKLM\SOFTWARE\Wow6432Node\Microsoft\Windows\CurrentVersion\Run				1/24/2021 12:59 PM	
DXMPatch_981116	Win32 Cabinet Self-Extractor	(Not verified) Microsoft Corporation	c:\windows\p_981116.exe	7/15/1997 12:48 PM	
HP Software Update	hpwSchd Application	(Verified) Hewlett-Packard Company	c:\program files (x86)\hp\hp software...	5/30/2013 8:49 PM	
LogMeIn Hamachi UI	Hamachi Client Application	(Verified) LogMeIn, Inc.	c:\program files (x86)\logmein\hamac...	4/2/2019 3:58 PM	
SunJavaUpdateSchd	Java Update Scheduler	(Verified) Oracle America, Inc.	c:\program files (x86)\common\jre\...	6/18/2020 9:27 AM	
HKCU\SOFTWARE\Microsoft\Windows\CurrentVersion\Run				2/14/2021 3:17 PM	
Bloody2	Bloody7	(Verified) A FOUR TECH CO., LTD.	c:\program files (x86)\bloody7\bloody...	12/29/2020 3:37 AM	
CCleaner Smart Cleaning	CCleaner	(Verified) Piriform Software Ltd	c:\program files\ccleaner\ccleaner64...	11/10/2020 8:08 PM	
com.squirrel.Teams.Teams	Microsoft Teams	(Verified) Microsoft 3rd Party Applicati...	c:\users\k\ovac\appdata\local\micro...	10/2/2020 1:48 PM	
DAEMON Tools Lite Aut...	DAEMON Tools Lite Agent	(Verified) AVB Disc Soft, SIA	c:\program files\daemon tools lite\da...	1/3/2020 8:13 PM	
Discord	Update	(Verified) Discord Inc.	c:\users\k\ovac\appdata\local\disco...	6/1/2020 9:58 PM	
EpicGamesLauncher	EpicGamesLauncher	(Verified) Epic Games Inc.	z:\games\epic games\launcher\port...	1/26/2021 6:48 PM	
OneDrive	Microsoft OneDrive	(Verified) Microsoft Corporation	c:\users\k\ovac\appdata\local\micro...	2/5/1958 12:59 PM	
Screenshot	Screenpresso	(Verified) Leappulse	c:\users\k\ovac\appdata\local\leap...	1/19/2021 2:30 PM	
Skype for Desktop	Skype	(Verified) Skype Software Sarl	c:\program files (x86)\microsoft\skyp...	4/1/2020 11:51 PM	
Steam	Steam Client Bootstrapper	(Verified) Valve	z:\games\steam\steam.exe	12/21/2020 12:10 AM	
uTorrent	uTorrent	(Verified) BitTorrent Inc	c:\users\k\ovac\appdata\roaming\ut...	12/9/2020 1:05 AM	
C:\Users\k\ovac\AppData\Roaming\Microsoft\Windows\Start Menu\Programs\Startup				1/7/2021 10:01 AM	
GameRangerLink	GameRanger	(Verified) GameRanger Technologies	c:\users\k\ovac\appdata\roaming\ga...	9/25/2018 12:43 PM	
Monitor Ink Alerts - HP D...			File not found: File		
HKLM\SOFTWARE\Microsoft\Active Setup\Installed Components				8/12/2020 4:21 PM	
Google Chrome	Google Chrome Installer	(Verified) Google LLC	c:\program files (x86)\google\chrome...	2/13/2021 12:08 AM	
Microsoft Edge	Microsoft Edge Installer	(Verified) Microsoft Corporation	c:\program files (x86)\microsoft\edge...	2/17/2021 4:41 AM	
n/a	Microsoft .NET IE SECURITY REGIS...	(Verified) Microsoft Corporation	c:\windows\system32\mscories.dll	10/25/2019 4:45 AM	

(Escape to cancel) Scanning...
Signed Windows Entries Hidden.

2.d LogonSession

CMD-n keresztül megmutatja azokat a felhasználókat akik valaha beléptek már a számítógépbe.

```
Administrator: Command Prompt

UPN:

[1] Logon session 00000000:00014c1f:
User name:
Auth package: NTLM
Logon type: (none)
Session: 0
Sid: (none)
Logon time: 2/22/2021 3:33:39 PM
Logon server:
DNS Domain:
UPN:

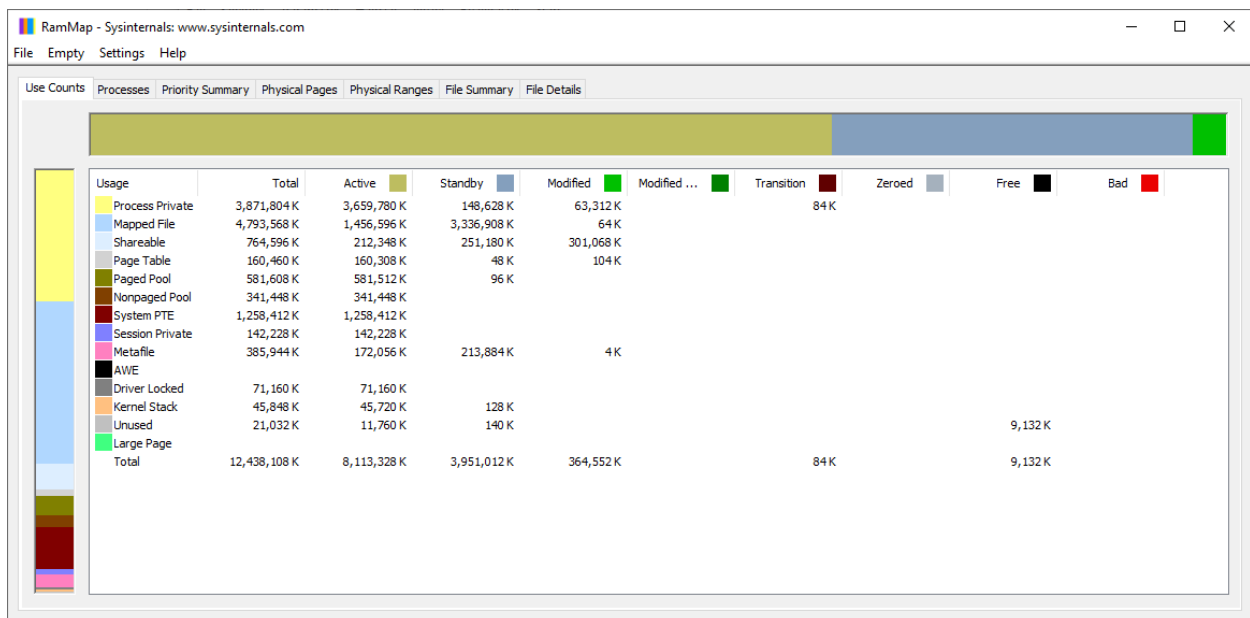
[2] Logon session 00000000:00014fc1:
User name: Font Driver Host\UMFD-0
Auth package: Negotiate
Logon type: Interactive
Session: 0
Sid: S-1-5-96-0-0
Logon time: 2/22/2021 3:33:39 PM
Logon server:
DNS Domain:
UPN:

[3] Logon session 00000000:00003e4:
User name: WORKGROUP\DESKTOP-2A3VL2N$
Auth package: Negotiate
Logon type: Service
Session: 0
Sid: S-1-5-20
Logon time: 2/22/2021 3:33:39 PM
Logon server:
DNS Domain:
UPN:

[4] Logon session 00000000:0001beab:
User name: Font Driver Host\UMFD-1
Auth package: Negotiate
Logon type: Interactive
Session: 1
Sid: S-1-5-96-0-1
Logon time: 2/22/2021 3:33:39 PM
Logon server:
DNS Domain:
UPN:
```

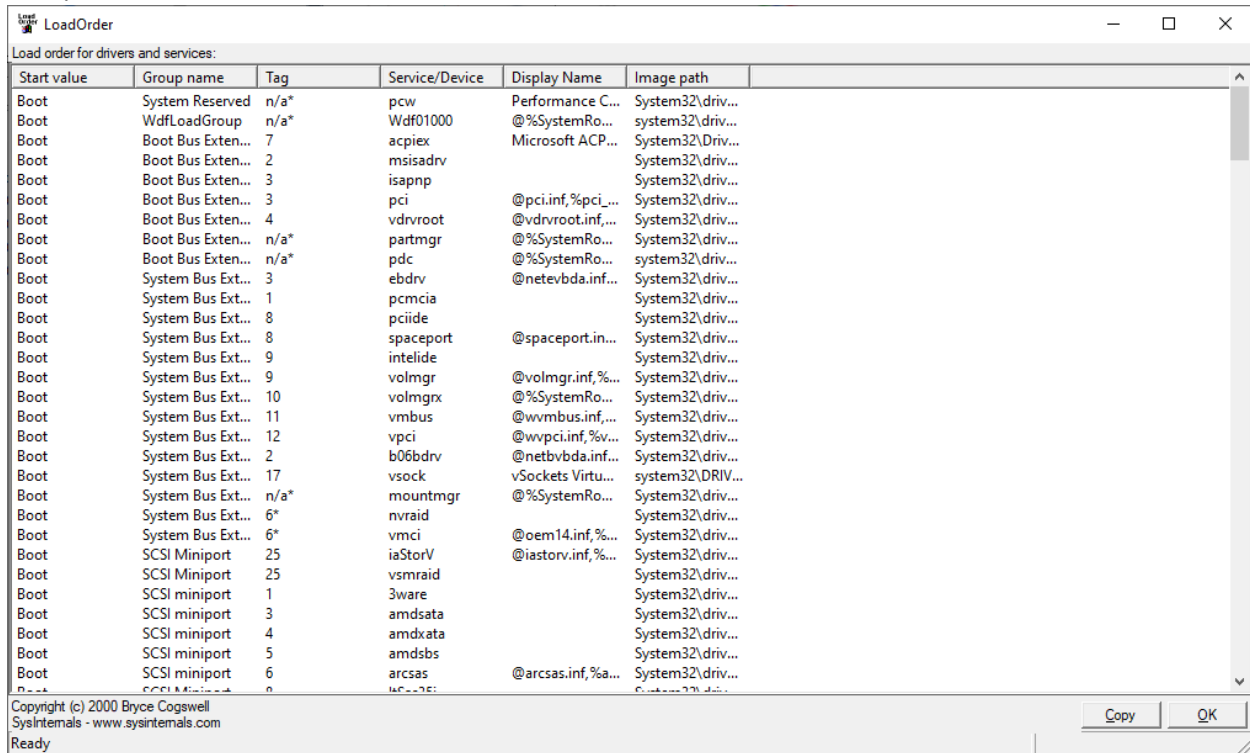
2.e RamMap

A számítógép memóriájáról mutat egy összetett képet a szoftver, láthatjuk, hogy melyik process foglalja le a memóriát, illetve megtekinthetjük, hogy mely processek élveznek prioritást a memóriában.



2.f Load Order

Megmutatja azokat a processeket amelyek az operációs rendszerrel együtt indulnak illetve az éppen futó processeket is.



The screenshot shows a window titled "LoadOrder" with a table listing the boot sequence of various system components. The table has six columns: Start value, Group name, Tag, Service/Device, Display Name, and Image path. The components are listed in descending order of their start value, from 25 down to 0. The components include System Reserved, WdflLoadGroup, Boot Bus Extensions, System Bus Extensions, and various drivers like pci, vdrvroot, partmgr, pdc, ebdrv, pcmcia, pciide, spaceport, intelide, volmgr, vmgrx, vmbus, vpci, b06bdrv, vsock, mountmgr, nvraid, vmci, iaStorV, vsmraid, 3ware, amd_sata, amd_xata, amd_sbs, and arc_sas.

Start value	Group name	Tag	Service/Device	Display Name	Image path
Boot	System Reserved	n/a*	pcw	Performance C...	System32\driv...
Boot	WdflLoadGroup	n/a*	Wdfl01000	@%SystemRo...	system32\driv...
Boot	Boot Bus Exten...	7	acpiex	Microsoft ACP...	System32\Driv...
Boot	Boot Bus Exten...	2	msisadv		System32\driv...
Boot	Boot Bus Exten...	3	isapnp		System32\driv...
Boot	Boot Bus Exten...	3	pci	@pci.inf,%pci...	System32\driv...
Boot	Boot Bus Exten...	4	vdvroot	@vdvroot.inf,...	System32\driv...
Boot	Boot Bus Exten...	n/a*	partmgr	@%SystemRo...	System32\driv...
Boot	Boot Bus Exten...	n/a*	pdv	@%SystemRo...	system32\driv...
Boot	System Bus Ext...	3	ebdrv	@netevbda.inf...	System32\driv...
Boot	System Bus Ext...	1	pcmcia		System32\driv...
Boot	System Bus Ext...	8	pciide		System32\driv...
Boot	System Bus Ext...	8	spaceport	@spaceport.in...	System32\driv...
Boot	System Bus Ext...	9	intelide		System32\driv...
Boot	System Bus Ext...	9	volmgr	@volmgr.inf,%...	System32\driv...
Boot	System Bus Ext...	10	volmgrx	@%SystemRo...	System32\driv...
Boot	System Bus Ext...	11	vmbus	@vmbus.inf,...	System32\driv...
Boot	System Bus Ext...	12	vpci	@vpci.inf,%v...	System32\driv...
Boot	System Bus Ext...	2	b06bdrv	@netbvda.inf...	System32\driv...
Boot	System Bus Ext...	17	vsock	vSockets Virtu...	system32\DRIV...
Boot	System Bus Ext...	n/a*	mountmgr	@%SystemRo...	System32\driv...
Boot	System Bus Ext...	6*	nvraid		System32\driv...
Boot	System Bus Ext...	6*	vmci	@oem14.inf,%...	System32\driv...
Boot	SCSI Miniport	25	iaStorV	@iastorv.inf,...	System32\driv...
Boot	SCSI Miniport	25	vsmraid		System32\driv...
Boot	SCSI miniport	1	3ware		System32\driv...
Boot	SCSI miniport	3	amdsata		System32\driv...
Boot	SCSI miniport	4	amdxata		System32\driv...
Boot	SCSI miniport	5	amdsbs		System32\driv...
Boot	SCSI miniport	6	arc_sas	@arc_sas.inf,%a...	System32\driv...
Boot	SCSI Miniport	0	arc_sas		System32\driv...

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SysInternals - www.sysinternals.com
Ready

Copy OK

3.a Aida 64

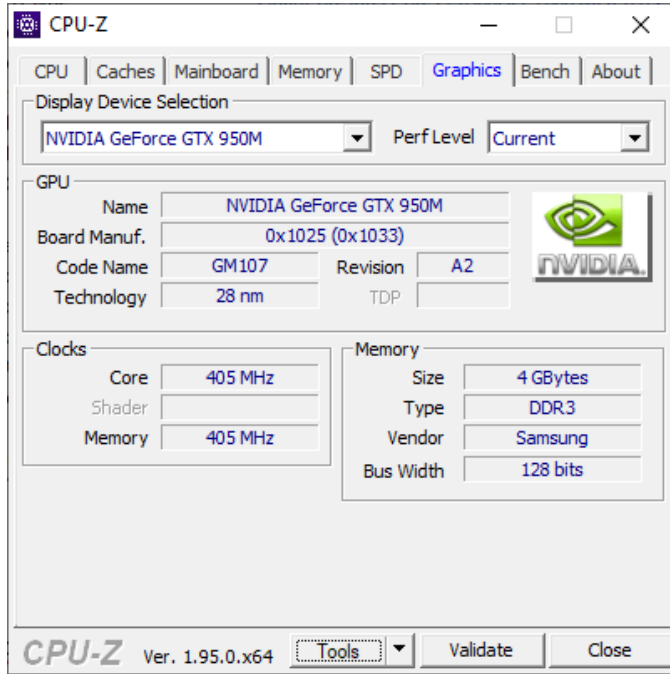
A szoftver általános leírást ad a számítógép minden eszközéről, szenzoráról és magáról a operációs rendszerről. Képes a élőben mutatni a szenzorok állapotát illetve, riportokat készíteni a számítógépről.

The screenshot displays the AIDA64 Extreme application window. The interface includes a menu bar (File, View, Report, Favorites, Tools, Help), a toolbar with navigation icons and buttons for Report, PC Backup, BIOS Updates, and Driver Updates, and a sidebar with a tree view of system categories. The main pane shows a detailed list of system fields and their values.

Field	Value
Computer	
Computer Type	ACPI x64-based PC (Mobile)
Operating System	Microsoft Windows 10 Home
OS Service Pack	-
Internet Explorer	11.789.19041.0
Edge	44.19041.423.0
DirectX	DirectX 12.0
Computer Name	DESKTOP-2AJVL2N
User Name	Jack Spratt
Logon Domain	DESKTOP-2AJVL2N
Date / Time	2021-02-22 / 16:43
Motherboard	
CPU Type	QuadCore Intel Core i5-6300HQ, 2800 MHz (28 x 100)
Motherboard Name	Acer Aspire V5-591G
Motherboard Chipset	Intel Sunrise Point HM170, Intel Skylake-H
System Memory	12146 MB (DDR4 SDRAM)
DIMM1: Kingmax GSJG42F-1...	8 GB DDR4-2133 DDR4 SDRAM (19-16-16-39 @ 1066 MHz) (18-16-16-...
DIMM3: SK hynix HMA451S6...	4 GB DDR4-2133 DDR4 SDRAM (16-15-15-36 @ 1066 MHz) (15-15-15-...
BIOS Type	Unknown (10/19/2017)
Display	
Video Adapter	Intel(R) HD Graphics 530 (1 GB)
Video Adapter	Intel(R) HD Graphics 530 (1 GB)
Video Adapter	Intel(R) HD Graphics 530 (1 GB)
3D Accelerator	Intel HD Graphics 530
Monitor	CMN N156HGE-EAL [15.6" LCD]
Multimedia	

3.b CPU-Z

Rövid leírást ad a számítógép processzor adatairól, cache memóriájáról, alaplapjáról, memóriájáról és videokártyájáról. Ez a software is képes rövid riportok készítésére.



3.c GPU-Z

A szoftver csak a grafikus kártya vagy kártyák adatai adja meg, viszont azt részletesen. Szenzor megfigyelőjével a jelenlegi állapotot is képesek vagyunk figyelni. A lookup-ra kattintva pedig az épp megtekintett grafikus kártyáról kaphatunk internetes leírást.

The screenshot shows the TechPowerUp GPU-Z 2.37.0 application window. The 'Graphics Card' tab is selected, displaying a comprehensive list of GPU specifications. The card identified is an Intel(R) HD Graphics 530, a Skylake GT2 architecture. The interface includes a 'Lookup' button for more details, an Intel logo, and various checkboxes for supported technologies like OpenCL, CUDA, DirectCompute, DirectML, Vulkan, Ray Tracing, PhysX, and OpenGL 4.6. The window also shows the current GPU clock, memory clock, and boost clock, all set to 350 MHz, 1067 MHz, and 950 MHz respectively. The driver version is 27.20.100.9168 DCH / Win10 64, dated Jan 08, 2021, with a WHQL digital signature.

Category	Value
Name	Intel(R) HD Graphics 530
GPU	Skylake GT2
Revision	N/A
Technology	14 nm
Die Size	Unknown
Release Date	Aug 5, 2015
Transistors	Unknown
BIOS Version	Unknown
Subvendor	Acer
Device ID	8086 191B - 1025 1033
ROPs/TMUs	8 / 16
Bus Interface	N/A
Shaders	24 Unified
DirectX Support	12 (12_1)
Pixel Fillrate	7.6 GPixel/s
Texture Fillrate	15.2 GTexel/s
Memory Type	DDR4
Bus Width	128 bit
Memory Size	N/A
Bandwidth	34.1 GB/s
Driver Version	27.20.100.9168 DCH / Win10 64
Driver Date	Jan 08, 2021
Digital Signature	WHQL
GPU Clock	350 MHz
Memory	1067 MHz
Boost	950 MHz
Default Clock	350 MHz
Memory	1067 MHz
Boost	950 MHz
Multi-GPU	Disabled
Computing	<input checked="" type="checkbox"/> OpenCL <input type="checkbox"/> CUDA <input checked="" type="checkbox"/> DirectCompute <input checked="" type="checkbox"/> DirectML
Technologies	<input checked="" type="checkbox"/> Vulkan <input type="checkbox"/> Ray Tracing <input checked="" type="checkbox"/> PhysX <input checked="" type="checkbox"/> OpenGL 4.6