

# OPERATING SYSTEMS & PARALLEL COMPUTING

Windows Examples

# Windows Terminal: cmd

```
Command Prompt
c:\Windows\WinSxS\amd64_microsoft-windows-p...rastructureconsumer_31bf3856ad364e35_10.0.17763.1_none_a4a27884889b78d9\Ru1
es.System.CPU.xml

C:\Users\operard>help dir
Displays a list of files and subdirectories in a directory.

DIR [drive:][path][filename] [/A[:attributes]] [/B] [/C] [/D] [/L] [/N]
  [/O[:sortorder]] [/P] [/Q] [/R] [/S] [/T[:timefield]] [/W] [/X] [/4]

[drive:][path][filename]
    Specifies drive, directory, and/or files to list.

/A      Displays files with specified attributes.
attributes  D Directories          R Read-only files
              H Hidden files        A Files ready for archiving
              S System files        I Not content indexed files
              L Reparse Points      O Offline files
              - Prefix meaning not

/B      Uses bare format (no heading information or summary).
/C      Display the thousand separator in file sizes. This is the
        default. Use /-C to disable display of separator.
/D      Same as wide but files are list sorted by column.
/L      Uses lowercase.
/N      New long list format where filenames are on the far right.
/O      List by files in sorted order.
sortorder  N By name (alphabetic)    S By size (smallest first)
              E By extension (alphabetic) D By date/time (oldest first)
              G Group directories first - Prefix to reverse order

/P      Pauses after each screenful of information.
/Q      Display the owner of the file.
```

# You need help ?

- The Windows Command for Help:
- `help [<Command>]`
- `[<Command>] /?`
- Example: `help dir`

# Common command

Windows Command	Comments
<b>cd</b>	print the working directory
<b>cd &lt;dir&gt;</b>	
<b>dir</b>	List the files in the current working directory
<b>tasklist</b>	List your processes on the system
<b>echo "a string to be echoed"</b>	Echo a string to the terminal

# Execute Next commands

- Execute: **help dir**
- Execute: **dir**
- Redirect the output of **dir /A** command to **dir\_output.txt**
  - **dir /A > dir\_output.txt**
- Execute: **notepad dir\_output.txt**

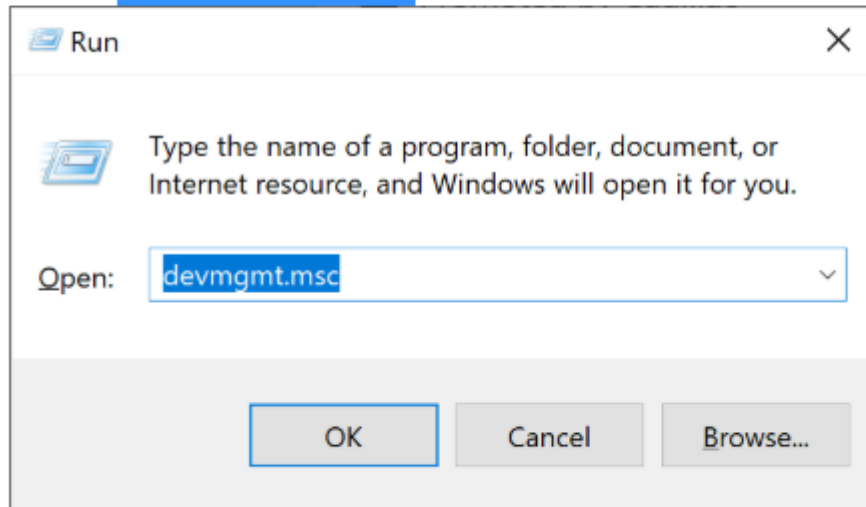
# Execute Process Command

- Execute to show your processes: **tasklist** | **more**

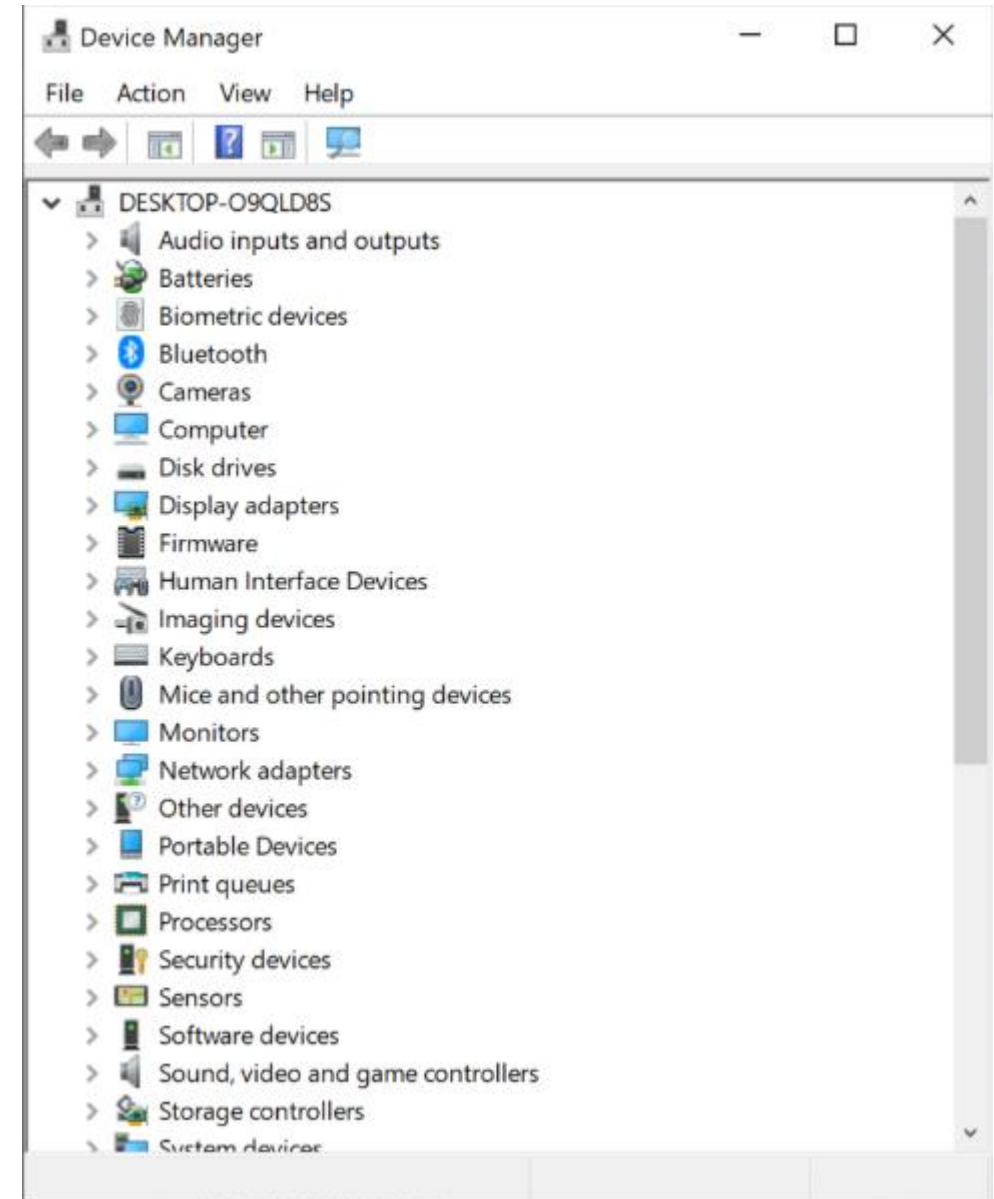
# Windows Device Manager

## To Start Device Manager

- Open the “Run” dialog box by pressing and holding the Windows key, then press the R key (“Run”).
- Type `devmgmt.msc`.

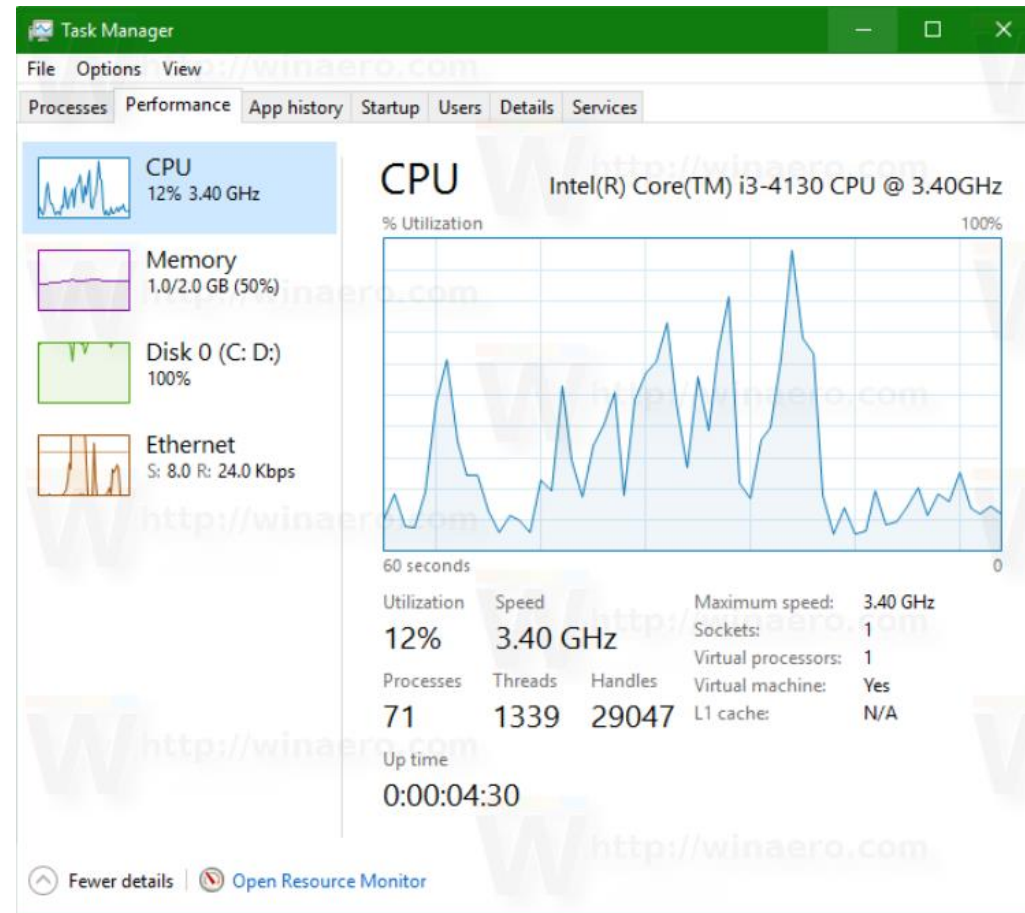


- Click OK.



# Check Windows CPU Info

- Execute next command:
  - `wmic cpu get caption, deviceid, name, numberofcores, maxclockspeed, status`
- Or use the TaskManager tool:





# Windows File System

- **You can view what file systems are mounted using either:**
  - **mountvol c: /L**
- **If you have another drive D:**
  - **mountvol d: /L**

# Environment Variables

- Display variable:
  - Execute: **set**
  - set variable
  - set variable=string
  - set "variable=string"
  - set "variable="
- Using Environment Variables:
  - echo %TEMP%
  - cd %TEMP%
  - echo "the env var TEMP is: %TEMP%"

# Creating file and directories

- Create a new file:
  - Execute: **type nul > your\_file.txt**
  - Execute: **notepad your\_file.txt**
- Create a directory
  - Execute: **mkdir test**
- Remove a directory
  - Execute: **rmdir test**

# File Commands

- Copy a file to other file:
  - **copy <fromfile> <tofile>**
- Move or rename a file:
  - **move <fromfile> <tofile>**
- Remove a file:
  - **del <file>**
- Create/delete a directory:
  - **mkdir <directory>**
  - **rmdir <directory>**

# More Commands

- To compare 2 files (fc):
  - **fc C:\Users\Martin\Desktop\FCsample.txt C:\Users\Martin\Desktop\FCexercise.txt**
- To search a file (for example secret.doc):
  - **dir secret.doc /s /p**
- To search a text in a file:
  - **find "martin hendrikx" C:\Users\Martin\Desktop\exercise.txt**

# Kill Process

- To kill a process:
  - **taskkill**

# Check File Permissions in Windows

- Read the next link:
  - <https://protechguides.com/how-to-check-folder-permissions-on-windows/>

# Compress command

- Here is the *unzip*: <http://gnuwin32.sourceforge.net/packages/unzip.htm>
- There is a ZIP command as well: <http://gnuwin32.sourceforge.net/packages/zip.htm>
- Use winzip, zip, gzip, 7-Zip, winrar, ...etc....

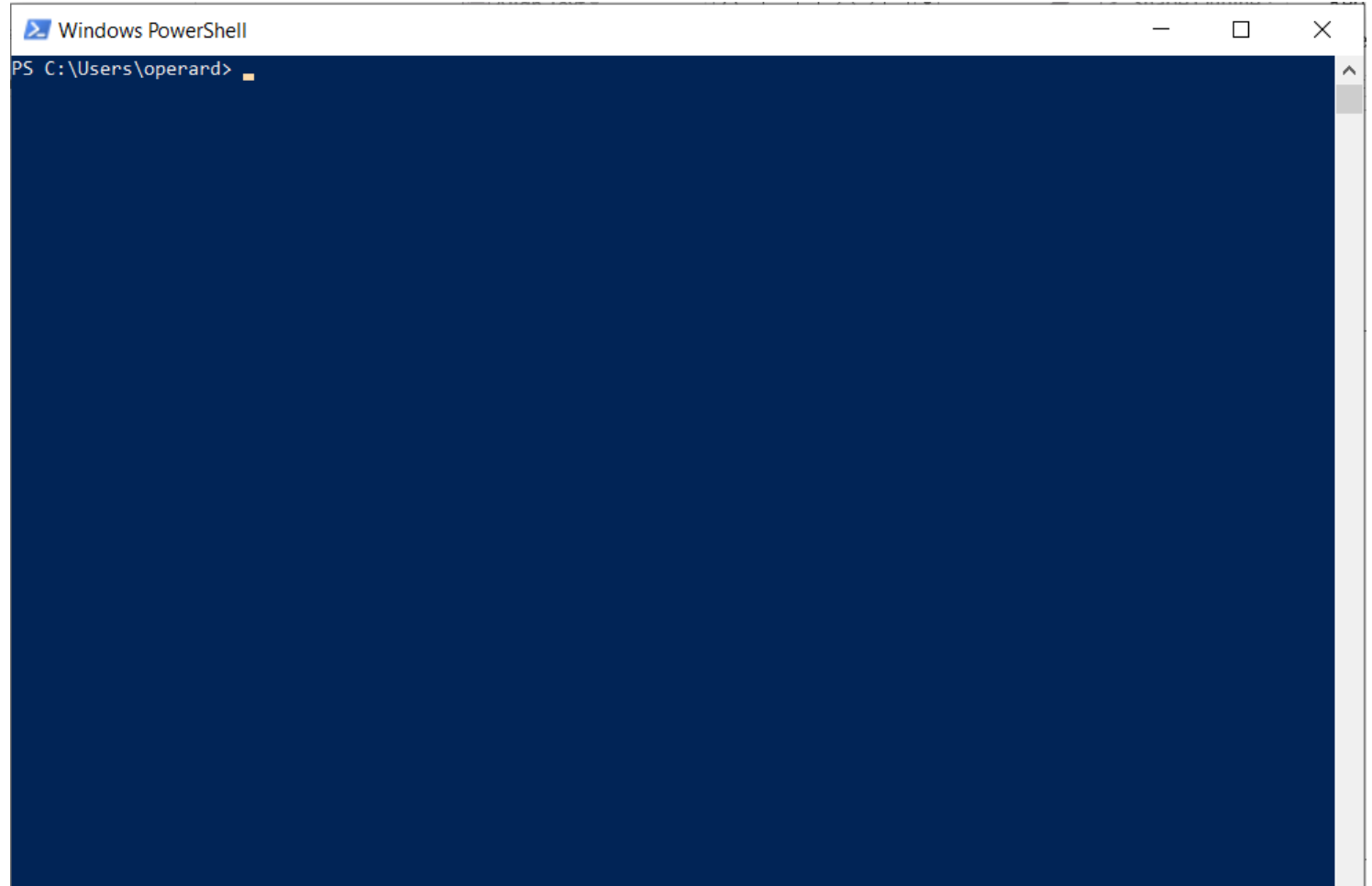


# Viewing Files

- Concatenate:
  - Use **copy** command
  - Use **type** command:
    - `echo hi > a.txt`
    - `echo bye > b.txt`
    - `type a.txt b.txt > c.txt`
    - `type c.txt`
- Display one page at a time:
  - `more`
- Editors:
  - Notepad
  - Notepad++

# New Command Tool in Windows 10

- Windows powershell



# Task Manager

Task Manager

File Options View

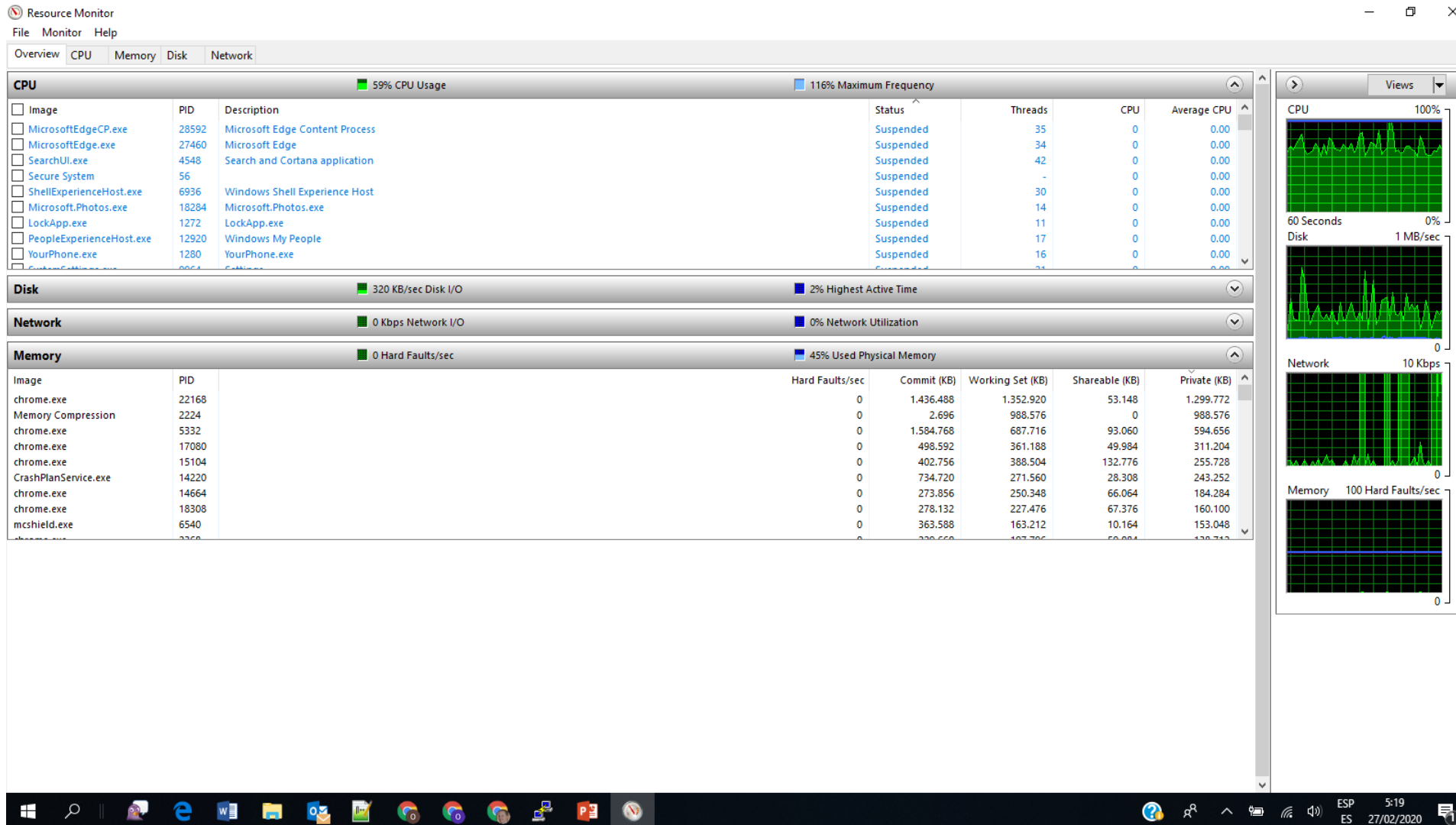
Processes Performance App history Startup Users Details Services

Name	Status	67% CPU	46% Memory	2% Disk	0% Network	2% GPU	GPU engine	Power usage	Power usage t...
<b>Apps (13)</b>									
> Windows Explorer		2,8%	68,8 MB	0 MB/s	0 Mbps	0%		Low	
> Task Manager		4,6%	39,9 MB	0 MB/s	0 Mbps	0%		Low	
> SSH, Telnet and Rlogin client (3...		0%	0,4 MB	0 MB/s	0 Mbps	0%		Very low	
> SSH, Telnet and Rlogin client (3...		0%	0,5 MB	0 MB/s	0 Mbps	0%		Very low	
> SSH, Telnet and Rlogin client (3...		0%	0,5 MB	0 MB/s	0 Mbps	0%		Very low	
> SSH, Telnet and Rlogin client (3...		0%	0,5 MB	0 MB/s	0 Mbps	0%		Very low	
> SSH, Telnet and Rlogin client (3...		0%	0,4 MB	0 MB/s	0 Mbps	0%		Very low	
> Resource and Performance Mo...		3,1%	57,1 MB	0,1 MB/s	0 Mbps	0%		Low	
> Notepad++ : a free (GNU) sourc...		0%	0,8 MB	0 MB/s	0 Mbps	0%		Very low	
> Microsoft Word (32 bit) (3)		0%	14,4 MB	0 MB/s	0 Mbps	0%		Very low	
> Microsoft PowerPoint (32 bit) (2)		0%	101,5 MB	0 MB/s	0 Mbps	0%	GPU 0 - 3D	Very low	
> Microsoft Outlook (32 bit)		0,5%	66,1 MB	0,1 MB/s	0 Mbps	0,1%	GPU 0 - 3D	Very low	
> Google Chrome (114)		12,9%	4.898,2 MB	0 MB/s	0 Mbps	0,8%	GPU 0 - 3D	Moderate	
<b>Background processes (120)</b>									
WMI Provider Host		0%	32,8 MB	0 MB/s	0 Mbps	0%		Very low	
WMI Provider Host		0%	35,9 MB	0 MB/s	0 Mbps	0%		Very low	
Windows Wireless LAN 802.11 E...		0%	0,5 MB	0 MB/s	0 Mbps	0%		Very low	
> Windows Shell Experience Host	⚙	0%	0 MB	0 MB/s	0 Mbps	0%	GPU 0 - 3D	Very low	
Windows Security notification i...		0%	0,2 MB	0 MB/s	0 Mbps	0%		Very low	
> Windows Security Health Service		0%	2,3 MB	0 MB/s	0 Mbps	0%		Very low	
> Windows My People	⚙	0%	0 MB	0 MB/s	0 Mbps	0%		Very low	
Windows Driver Foundation - U...		0%	0,8 MB	0 MB/s	0 Mbps	0%		Very low	
Windows Defender SmartScreen		0%	4,8 MB	0 MB/s	0 Mbps	0%		Very low	

⬆ Fewer details

End task

# Execute Process Command: resmon



# PSTools Suite

- <https://docs.microsoft.com/en-us/sysinternals/downloads/pstools>

# Process Monitor

- <https://docs.microsoft.com/en-us/sysinternals/downloads/procmon>

# ProcessExplorer

- <https://docs.microsoft.com/en-us/sysinternals/downloads/process-explorer>

# Check Threads

Process Explorer - Sysinternals: www.sysinternals.com [OPERARD-ES\operard]

File Options View Process Find Users Help

Process	CPU	Private Bytes	Working Set	PID	Description	Company Name
svchost.exe		2.632 K	9.924 K	11308	Host Process for Windows S...	Microsoft Corporation
svchost.exe		6.260 K	8.972 K	17800	Host Process for Windows S...	Microsoft Corporation
svchost.exe		1.776 K	7.260 K	3632	Host Process for Windows S...	Microsoft Corporation
svchost.exe		2.692 K	6.712 K	21516	Host Process for Windows S...	Microsoft Corporation
svchost.exe	0.03	5.656 K	17.164 K	19772	Host Process for Windows S...	Microsoft Corporation
svchost.exe		2.436 K	8.412 K	23452	Host Process for Windows S...	Microsoft Corporation
svchost.exe		1.388 K	4.944 K	24392	Host Process for Windows S...	Microsoft Corporation
svchost.exe		2.332 K	9.124 K	22364	Host Process for Windows S...	Microsoft Corporation
svchost.exe		2.936 K	7.568 K	20452	Host Process for Windows S...	Microsoft Corporation
lsass.exe		1.316 K	2.940 K	1004		Microsoft Corporation
lsass.exe	< 0.01	24.512 K	20.840 K	1020	Local Security Authority Proc...	Microsoft Corporation
fontdrvhost.exe		6.292 K	4.476 K	828		Microsoft Corporation
csrss.exe	0.18	2.452 K	5.736 K	844		Microsoft Corporation
winlogon.exe	< 0.01	3.628 K	14.792 K	944		Microsoft Corporation
fontdrvhost.exe		18.988 K	21.400 K	748		Microsoft Corporation
dwm.exe	1.58	88.252 K	78.688 K	1284		Microsoft Corporation
explorer.exe	2.79	202.600 K	222.756 K	13700	Windows Explorer	Microsoft Corporation
SecurityHealthSystray.exe		1.884 K	9.228 K	14956	Windows Security notificatio...	Microsoft Corporation
CrashPlanDesktop.exe	< 0.01	28.976 K	53.684 K	6260	Code42 CrashPlan	Code42, Inc.
CrashPlanDesktop.exe		19.688 K	20.140 K	7608	Code42 CrashPlan	Code42, Inc.
CrashPlanDesktop.exe	0.04	60.800 K	52.648 K	16472	Code42 CrashPlan	Code42, Inc.
EpePcMonitor.exe	< 0.01	1.440 K	4.532 K	15388	McAfee Drive Encryption Mo...	McAfee, Inc.
Toast32.exe		1.300 K	4.320 K	15444	McAfee Data Protection Noti...	McAfee, Inc.
TecoResident.exe	0.03	2.516 K	11.908 K	15652	Resident module of eco Utility	TOSHIBA
TCrdMain.exe		28.040 K	31.604 K	16192	TOSHIBA Flash Cards Main	TOSHIBA
TCrdKBB.exe		1.268 K	6.176 K	15712	TCrdKBB Application	TOSHIBA
TDUSrv64.exe		1.468 K	6.924 K	16076	TOSHIBA Display Utility Serv...	TOSHIBA
TPwrMain.exe		3.292 K	11.432 K	15844	TOSHIBA Power Saver	TOSHIBA
RAVCpl64.exe		4.784 K	13.068 K	16328	Realtek HD Audio Manager	Realtek Semiconductor Corp.
ScanToPCActivationApp.exe		3.316 K	14.828 K	15600	ScanToPCActivationApp	Hewlett-Packard Development Company, L.P.
ScanToPCActivationApp.exe	< 0.01	5.020 K	17.784 K	15764	ScanToPCActivationApp	Hewlett-Packard Development Company, L.P.
DesktopScreenShare.exe		2.844 K	11.404 K	13088	DesktopScreenShare.exe	Microsoft Corporation
ONENOTEM.EXE		1.632 K	3.592 K	9652	Send to OneNote Tool	Microsoft Corporation
OUTLOOK.EXE	0.63	264.876 K	225.772 K	8488	Microsoft Outlook	Microsoft Corporation
notepad++.exe	0.04	25.504 K	21.220 K	4032	Notepad++ : a free (GNU) so...	Notepad++
WINWORD.EXE	0.07	68.220 K	93.116 K	3252	Microsoft Word	Microsoft Corporation
PUTTY.EXE	< 0.01	4.796 K	16.352 K	2128	SSH, Telnet and Rlogin client	Simon Tatham
PUTTY.EXE	0.01	4.704 K	13.720 K	4768	SSH, Telnet and Rlogin client	Simon Tatham
PUTTY.EXE	< 0.01	3.688 K	17.636 K	22896	SSH, Telnet and Rlogin client	Simon Tatham
PUTTY.EXE	< 0.01	2.572 K	15.544 K	17424	SSH, Telnet and Rlogin client	Simon Tatham
PUTTY.EXE	< 0.01	3.932 K	17.468 K	18216	SSH, Telnet and Rlogin client	Simon Tatham
POWERPNT.EXE	0.31	378.680 K	223.500 K	22992	Microsoft PowerPoint	Microsoft Corporation
splwow64.exe		9.912 K	17.896 K	6192	Print driver host for applica...	Microsoft Corporation
Taskmgr.exe	5.95	45.620 K	77.436 K	20392		Microsoft Corporation
procexp.exe		3.604 K	10.700 K	8180	Sysinternals Process Explorer	Sysinternals - www.sysinter...
procexp64.exe	9.13	31.160 K	50.748 K	4080	Sysinternals Process Explorer	Sysinternals - www.sysinter...
AmptEx.exe		2.080 K	8.564 K	13720	Alps Pointing-device Driver f...	Alps Electric Co., Ltd.

WINWORD.EXE:3252 Properties

Security Environment .NET Assemblies .NET Performance Strings  
Image Performance Performance Graph GPU Graph Threads TCP/IP

Count: 29

TID	CPU	Cycles Delta	Start Address
17152	0.05	6.024.252	WINWORD.EXE+0x10d4
12732	< 0.01	441.386	EpMPApi.dll!exp_DetachHandlers+0...
25132	< 0.01	126.572	ntdll.dll!RtlAcquirePebLock+0x5f0
10252			mso.dll!Ordinal9267+0x25e
14132			mso.dll!_MsoFinitOffice@20+0x1d
1300			mso.dll!Ordinal1981+0x1001
17984			mso.dll!Ordinal3004+0x2af
21680			mso.dll!Ordinal1981+0x1001
19056			mso.dll!Ordinal7857+0x42d
10032			mso.dll!Ordinal1981+0x1001
17924			mso.dll!Ordinal1981+0x1001
12488			ntdll.dll!RtlAcquirePebLock+0x5f0

Thread ID: 17152 Stack Module

Start Time: 15:27:56 24/02/2020

State: Wait:UserRequest Base Priority: 8

Kernel Time: 0:00:18.812 Dynamic Priority: 10

User Time: 0:00:15.734 I/O Priority: Normal

Context Switches: 4,493,195 Memory Priority: 5

Cycles: 690,796,905,098 Ideal Processor: 2

Permissions Kill Suspend

OK Cancel

CPU Usage: 64.67% Commit Charge: 53.96% Processes: 361 Physical Usage: 47.34%



# Examples Thread & Processes with Python

- Test test\_thread.py
- Test test\_thread2.py
- Test test\_process1.py
- Test test\_process2.py
  
- Which conclusions ?

# Monitoring Example: cluster\_analysis.py

Task Manager

File Options View

Processes Performance App history Startup Users Details Services

Name	Status	99% CPU	49% Memory	1% Disk	0% Network	0% GPU	GPU engine
python.exe (3)		32,4%	590,3 MB	0 MB/s	0 Mbps	0%	
pythonw.exe		32,4%	531,7 MB	0 MB/s	0 Mbps	0%	
Spyder (Python 2.7)		0%	55,9 MB	0 MB/s	0 Mbps	0%	
python.exe		0%	2,7 MB	0 MB/s	0 Mbps	0%	
Host Process for Windows Tasks		27,3%	8,9 MB	0,1 MB/s	0 Mbps	0%	
Google Chrome (121)		18,3%	4.041,4 MB	0,1 MB/s	0 Mbps	0,3%	GPU 0 - 3D
System		5,0%	0,1 MB	0,1 MB/s	0 Mbps	0%	
Task Manager		3,7%	26,7 MB	0 MB/s	0 Mbps	0%	
RAMPMulticastPlusReceiverSer...		2,9%	54,8 MB	0 MB/s	0 Mbps	0%	
McAfee Active Response Client.		2,9%	63,4 MB	0,2 MB/s	0 Mbps	0%	
Windows Explorer (4)		2,6%	266,8 MB	0 MB/s	0 Mbps	0%	
Desktop Window Manager		2,1%	49,4 MB	0 MB/s	0 Mbps	0,1%	GPU 0 - 3D
McAfee Scanner service		0,6%	156,0 MB	0 MB/s	0 Mbps	0%	
Microsoft Outlook (32 bit)		0,3%	57,1 MB	0 MB/s	0 Mbps	0,1%	GPU 0 - 3D
Firefox (32 bit)		0,3%	17,9 MB	0 MB/s	0 Mbps	0%	

Fewer details

End task

# Example: cluster\_analysis.py

Spyder (Python 2.7)

Archivo Editar Buscar Código fuente Ejecutar Depurar Terminales Proyectos Herramientas Ver Ayuda

Editor - C:\tools\ie\_test\cluster\_analysis.py

```

46 # Clean Data
47 df_pred = df_pred.fillna(df_pred.mean())
48 df_pred.drop('screenviews', axis=1, inplace=True)
49 df_pred = df_pred.replace(np.nan,0)
50
51 df_pred.head()
52
53
54 # Function to iterate from k=2 until k=n with kmeans
55 def generate_kmeans(tabla_in,k,initialization,number_init, max_iterations,algoritmo):
56     lista_modelos=[]
57     lista_centroides=[]
58     lista_silhouette=[]
59     lista_inertia=[]
60     for i in range(2,k+1):
61         kmeans_i=KMeans(n_clusters=i, init=initialization, n_init=number_init, max_iter=max_iterations, tol=0.0001, precompute_distances=True)
62         kmedias_i=kmeans_i.fit(tabla_in)
63         lista_modelos.append(kmedias_i)
64         lista_centroides.append(kmedias_i.cluster_centers_)
65         lista_inertia.append(kmedias_i.inertia_)
66         #Lista silhouette.append(silhouette_score(tabla_in,kmedias_i.labels_))
67     return lista_modelos,lista_centroides,lista_silhouette,lista_inertia
68
69 # Code to scale all variables between 0 and 1
70 scaler = MinMaxScaler()
71 scaler.fit(df_pred[['numhits', 'numpageviews', 'totalTransactionRevenue', 'UniqueScreenViews', 'numevts']])
72 df_pred_esc=scaler.transform(df_pred[['numhits', 'numpageviews', 'totalTransactionRevenue', 'UniqueScreenViews', 'numevts']])
73 df_pred_esc = pd.DataFrame({'numhits': df_pred_esc[:, 0], 'numpageviews': df_pred_esc[:, 1], 'totalTransactionRevenue': df_pred_esc[:, 2], 'UniqueScreenViews': df_pred_esc[:, 3], 'numevts': df_pred_esc[:, 4]})
74
75 # Recursive kmeans call to determine the better k
76 init_time2 = datetime.datetime.now()
77 num_clusters=10
78 lista_modelos2,lista_centroides2,lista_silhouette2,lista_inertia2=generate_kmeans(tabla_in=df_pred_esc,k=num_clusters,initialization='k-means++',number_init=10,max_iterations=1000,algoritmo='k-means++')
79 end_time2 = datetime.datetime.now()
80 dif_time2=end_time2-init_time2
81
82 #print(dif_time2.seconds/60)#tiempo que tarda la ejecución en minutos
83
84 temp=dif_time2.seconds
85 hours = temp//3600
86 temp = temp - 3600*hours
87 minutes = temp//60
88 seconds = temp - 60*minutes
89 print('Execution Time: %d hour:%d min:%d sec' %(hours,minutes,seconds))
90
91 # visualize the intracluster variance
92 plt.figure(figsize=(10,8))
93 plt.plot(range(2,num_clusters+1), lista_inertia2)
94 plt.title('Intracluster Variance')
95 plt.xlabel('Number of Clusters')
96 plt.ylabel('Inertia')
97 plt.grid(True)
98 plt.show()

```

Ayuda

Uso

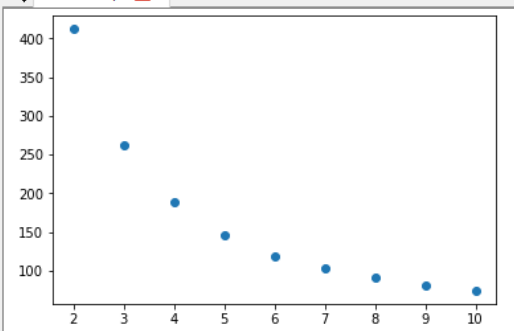
En este panel es posible obtener la ayuda de cualquier objeto al oprimir **Ctrl+I** estando al frente del mismo, bien sea en el Editor o en la Terminal.

Esta ayuda también se puede mostrar automáticamente después de escribir un paréntesis junto a un objeto. Este comportamiento puede activarse en *Preferencias > Ayuda*.

Explorador de variables Explorador de archivos Ayuda

Terminal de IPython

Terminal 1/A



In [8]:

Historial de comandos Terminal de IPython

Permisos: RW Fin de línea: CRLF Codificación: UTF-8 Línea: 17 Columna: 47 Memoria: 48 %

Windows taskbar icons: File Explorer, Edge, Word, PowerPoint, Chrome, Firefox, VS Code, etc.

System tray: ESP, 9:12, 27/02/2020

# Execution in Windows

- `time python3 ./cluster_analysis.py`
- (500000, 33)
- Execution Time: 0 hour:2 min:59 sec
  
- real 3m8.175s
- user 3m53.725s
- sys 2m38.097s

