GigE Vision cameras NIC and PC setup

DEWESoft®

Recommended Network Interface Card and PC Setup for GigE cameras

For the latest Gige camera plugin

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2. GigE Vision Network adapter and Switches

To achieve optimal performance with the GigE Vision device it is important to choose the right Network Interface Card (NIC) that uses the PCI Express bus. To increase video streaming performance it's recommended to choose Ethernet equipment with jumbo frames/packet support. The larger packet size significantly reduces CPU cycles and overhead on the target PC which leads to better performance.

Recommended network adapter configuration:

- Configure the network card to accept *Jumbo Frames*
- Increase the *Receive Buffers*
- Disable all connections on the network card except *IPv4 and OptoStream GEV filter Driver*
- Disable or minimization *Interrupt Moderation rate*
- Disable *Flow control*

2.1. Jumbo frames

The jumbo frames/packet are Ethernet frames that are larger than 1500 bytes. Also your Ethernet adapter must support a jumbo frame/packet larger than 9000 bytes. In most cases jumbo frames are usually turned off by default network card setup and it needs to turn on manually.

On Microsoft Windows operating systems this can be accessed on the following way:

1. Open the Network Connections windows in the Windows Control Panel or execute “ncpa.cpl”, e.g. press Windows key + R, then type “ncpa.cpl” and press enter
2. Right-click the network adapter that is used with your camera and choose Properties
   The *Properties* window opens
3. Click *Configure* button
   The configuration windows of the network driver opens
4. Click *Advanced*
5. Set the *Jumbo Frames** property to its maximum value (Image 1)

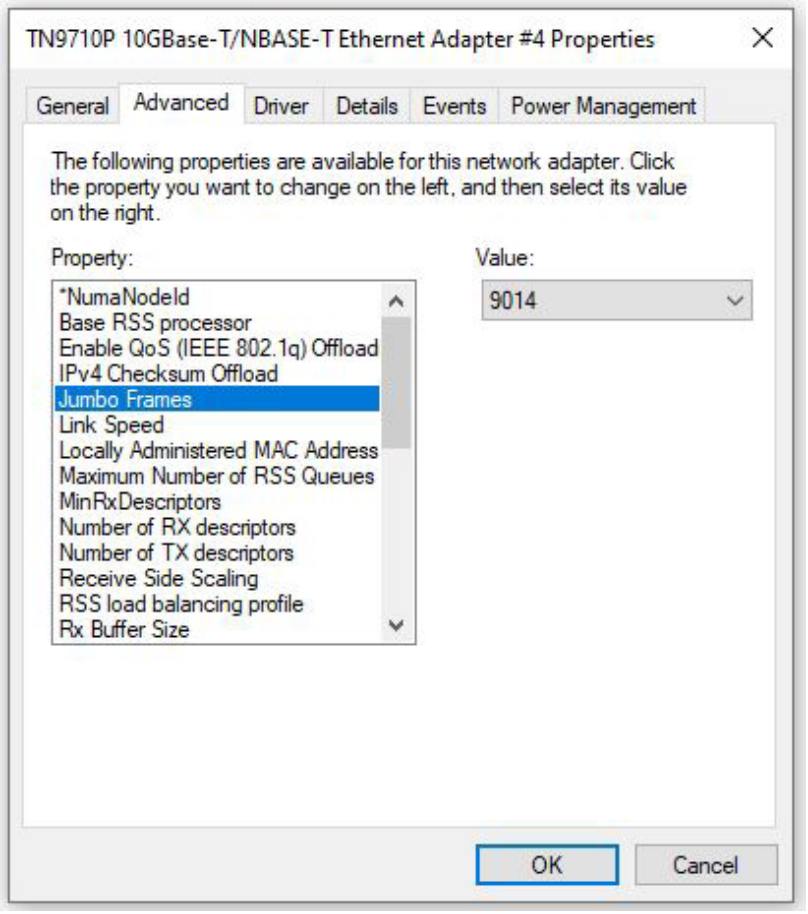


Image 1: Jumbo Frames

2.2. Receive Buffers

A Receive Buffers parameter is the size of system memory that can be used by the network adapter for received packets, which can be increased to help improve the high-bandwidth Ethernet performance.

On Microsoft Windows operating systems this can be accessed on the following way:

1. Open the Network Connections windows in the Windows Control Panel or execute “ncpa.cpl”, e.g. press Windows key + R, then type “ncpa.cpl” and press enter
2. Right-click the network adapter that is used with your camera and choose *Properties*
   The *Properties* window opens
3. Click *Configure button*.
   The configuration windows of the network driver opens
4. Click *Advanced*
5. Set the *Rx Buffer Size* property to its maximum value (Image 2)

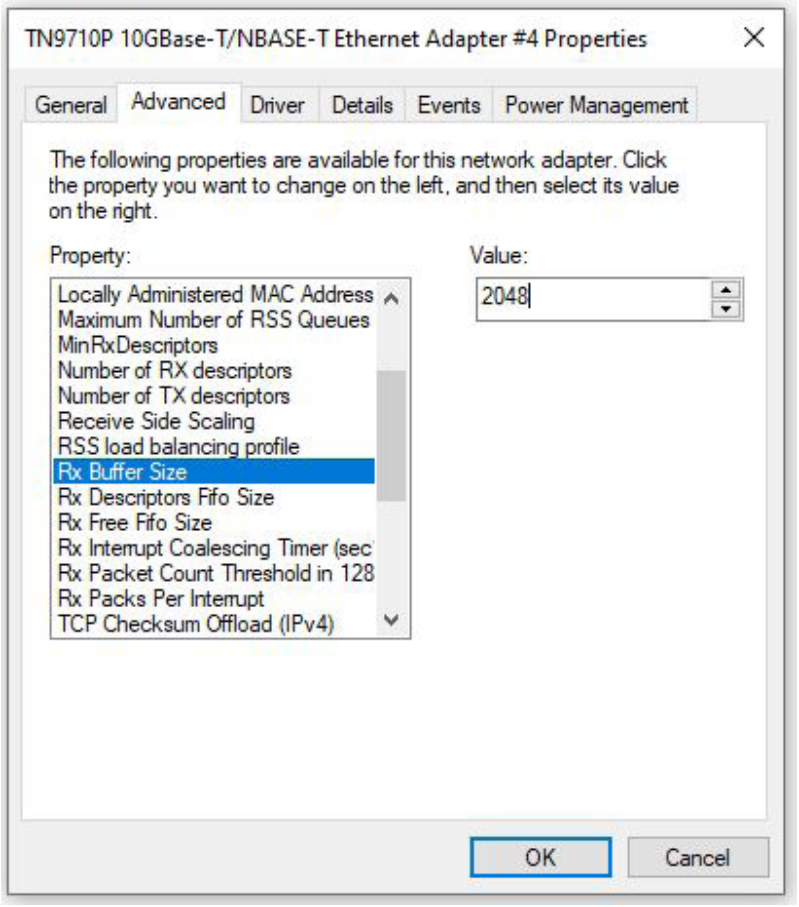


Image 2: Receive Buffers

2.3. Disable Unused Network Clients

It is recommended to disable network clients that are not required for GigE Vision. Disabling these unused network clients can improve GigE performance.

On Microsoft Windows operating systems this can be accessed on the following way:

1. Open the Network Connections windows in the Windows Control Panel or execute “ncpa.cpl”, e.g. press Windows key + R, then type “ncpa.cpl” and press enter
2. Right-click the network adapter that is used with your camera and choose *Properties*
   The *Properties* window opens
3. Disable all network connection on the network card except *IPv4 and OptoStream GEV filter Driver*

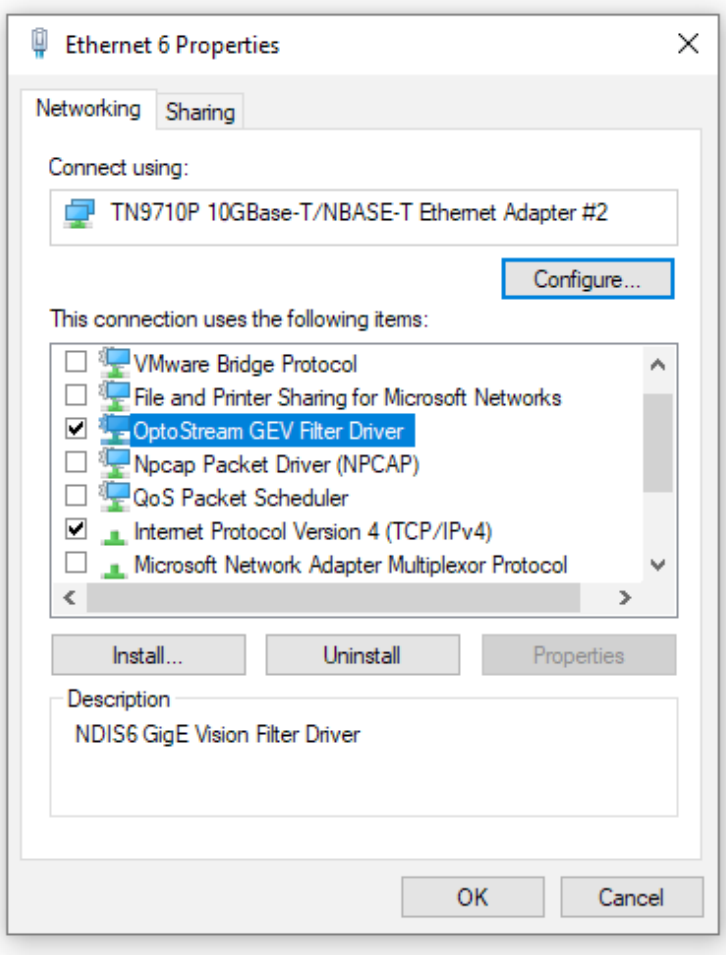


Image 3: Disable Unused Network Clients

2.4. Interrupt Moderation Rate

To get the lowest possible latency of the data transmission, it is recommended to disable *Interrupt Moderation Rate*. Disabling *Interrupt Moderation Rate* can cause increased CPU utilization and a lower PC performance.

On Microsoft Windows operating systems this can be accessed on the following way:

1. Open the Network Connections windows in the Windows Control Panel or execute “ncpa.cpl”, e.g. press Windows key + R, then type “ncpa.cpl” and press enter
2. Right-click the network adapter that is used with your camera and choose *Properties*
   The *Properties* window opens
3. Click *Configure* button
   The configuration windows of the network driver opens
4. Click *Advanced*
5. Set the *Interrupt Moderation Rate** property to its maximum value (Image 4)

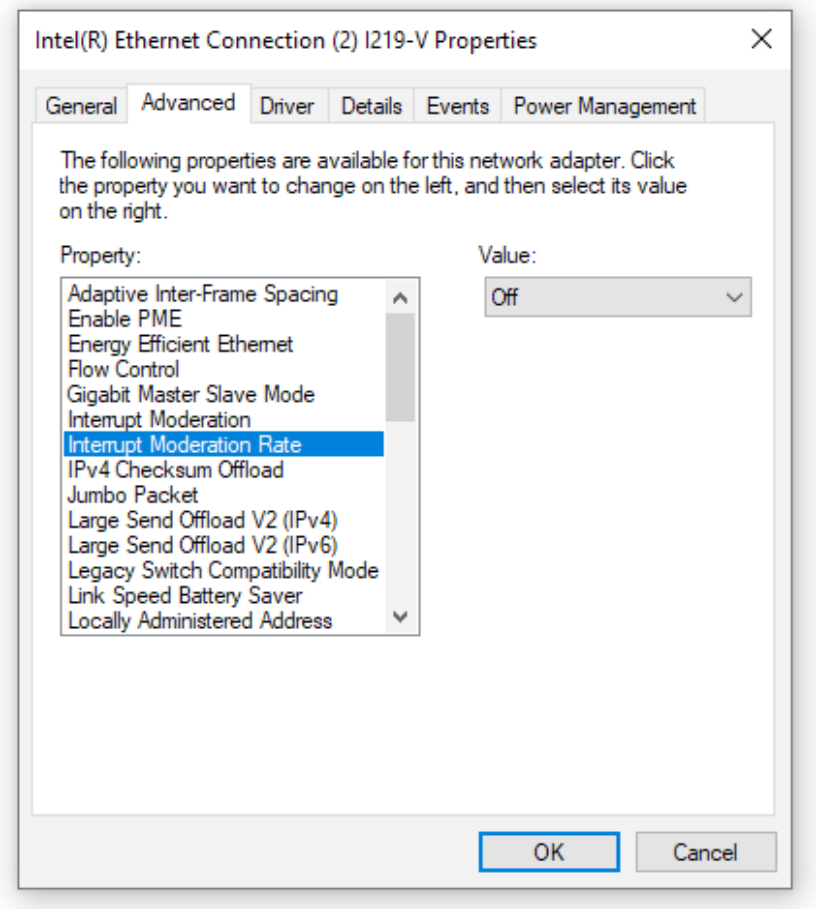


Image 4: Interrupt Moderation Rate

2.5. Flow control

Disabling *Flow control* should reduce timeouts and improve data throughput.

On Microsoft Windows operating systems this can be accessed on the following way:

1. Open the Network Connections windows in the Windows Control Panel or execute “ncpa.cpl”, e.g. press Windows key + R, then type “ncpa.cpl” and press enter
2. Right-click the network adapter that is used with your camera and choose *Properties*
   The *Properties* window opens
3. Click *Configure* button
   The configuration windows of the network driver opens
4. Click *Advanced*
5. Set the *Flow control** property to off (Image 5)

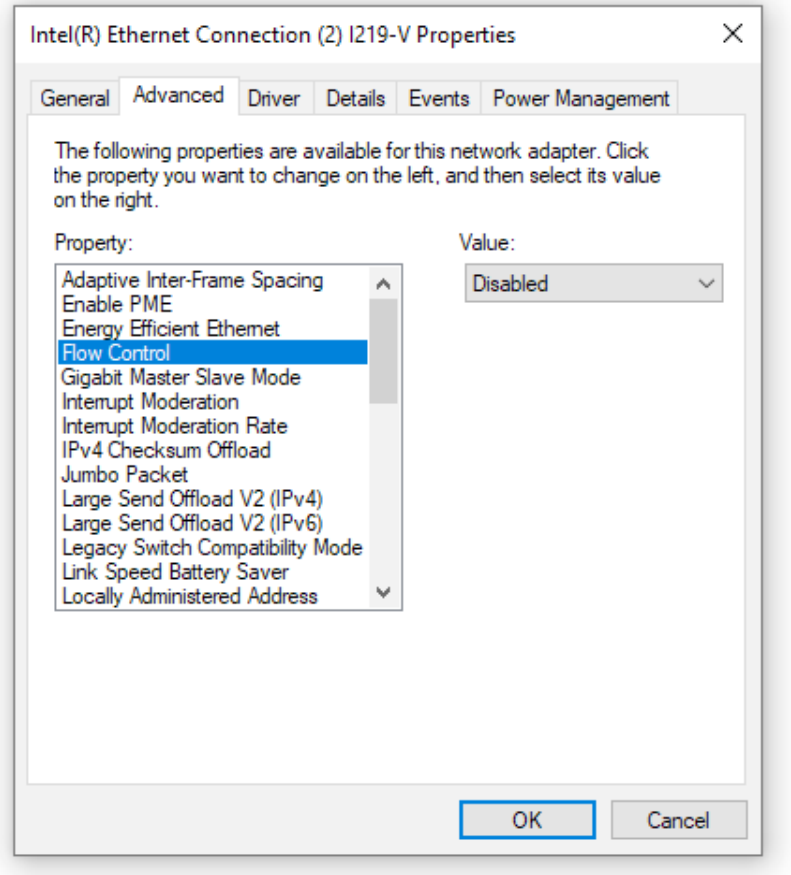


Image 5: Disabling Flow Control

Important

Depending on the network adapter model, the parameter names of your network adapter may differ. The way to set the parameters may differ and some parameters may not be available.

3. Recommended PC settings

3.1. Power optimization

To get best performance of your PC it's recommended to change a Power plan from *Balanced* to *High Performance*.

On Microsoft Windows operating systems this can be accessed on the following way:

1. Open the *Power Options* windows in the *Windows Control Panel* or execute "powercfg.cpl", e.g. press Windows key + R, then type "powercfg.cpl" and press enter
2. Change *Power Option* property to *High performance* (Image 6)

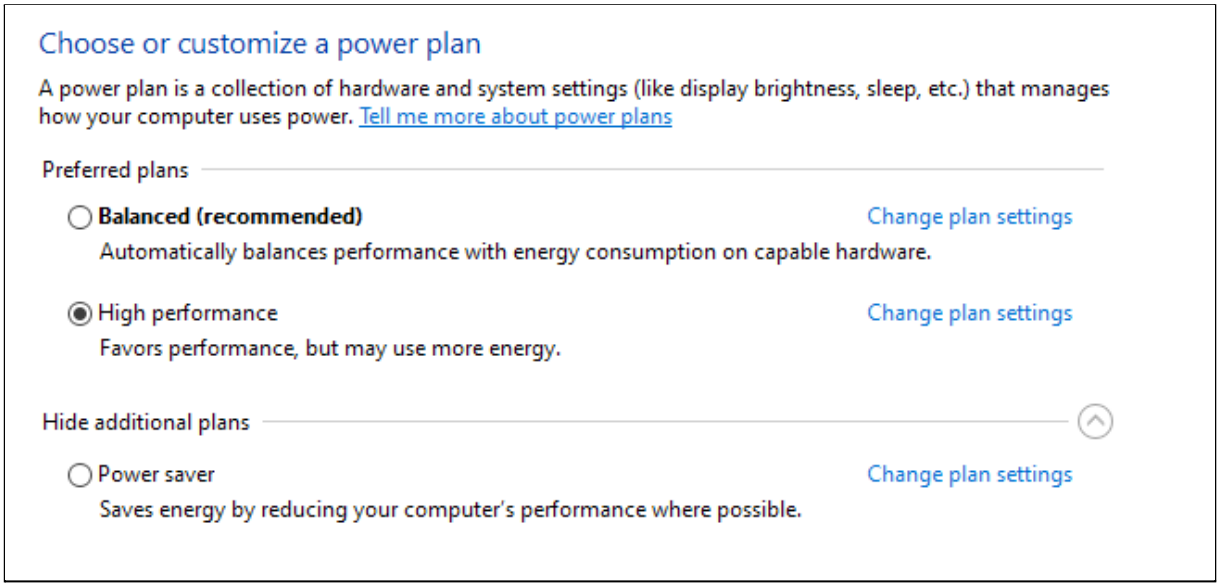


Image 6: Power plan

3.2. Firewall

Is not necessary to turn off the *Windows Firewall*, the Camera can be fully operational except in some cases like: you can get a Pop up *Windows Security Alert* permission request, Image stream can be unstable. Therefore, It's recommended to turn off Windows firewall for connections with the GigE cameras.

On Microsoft Windows operating systems this can be accessed on the following way:

1. Open the *Windows Firewall* windows in the *Windows Control Panel* or execute "firewall.cpl", e.g. press Windows key + R, then type "firewall.cpl" and press enter
2. In the left panel click on *Turn Windows Firewall* on of off
   The *Customize Settings* window opens
3. In the *Customize Settings* window click *Turn off Windows Firewall* (not recommended) (Image 7)

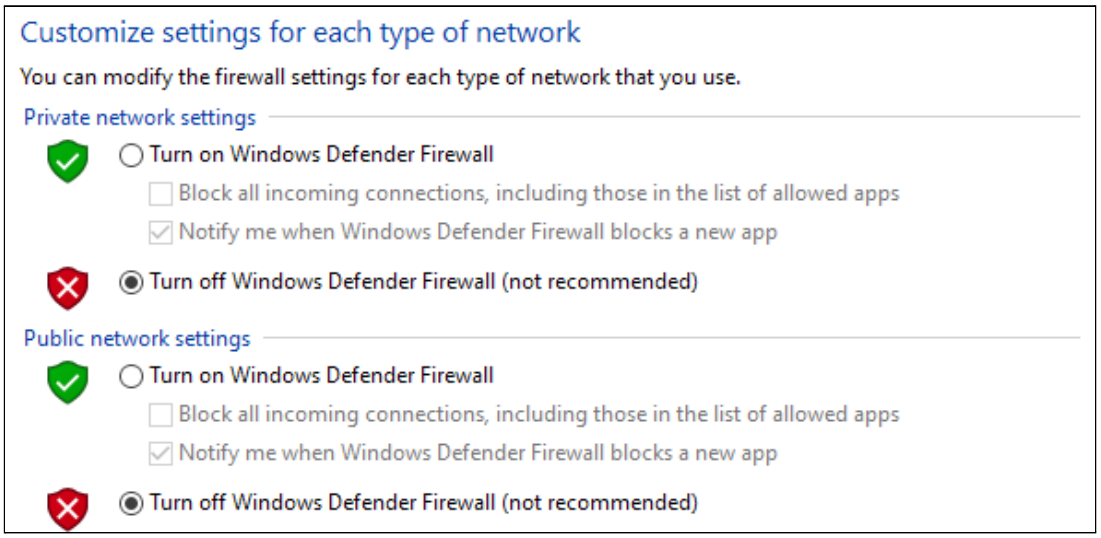


Image 7: Windows Firewall

3.3. DPC latency

Check your DPC latency on PC, recommended software is LatencyMon (Image 8) (www.resplendence.com/latencymon). If there exists a driver that takes longer execution time than normal to process, it may prevent other drivers from being processed in time. The worst case is that it can cause that *OptoStream GEV filter Driver* from responding time and can cause packet lost. The Highest execution time should be less than 10 ms (Image 9)

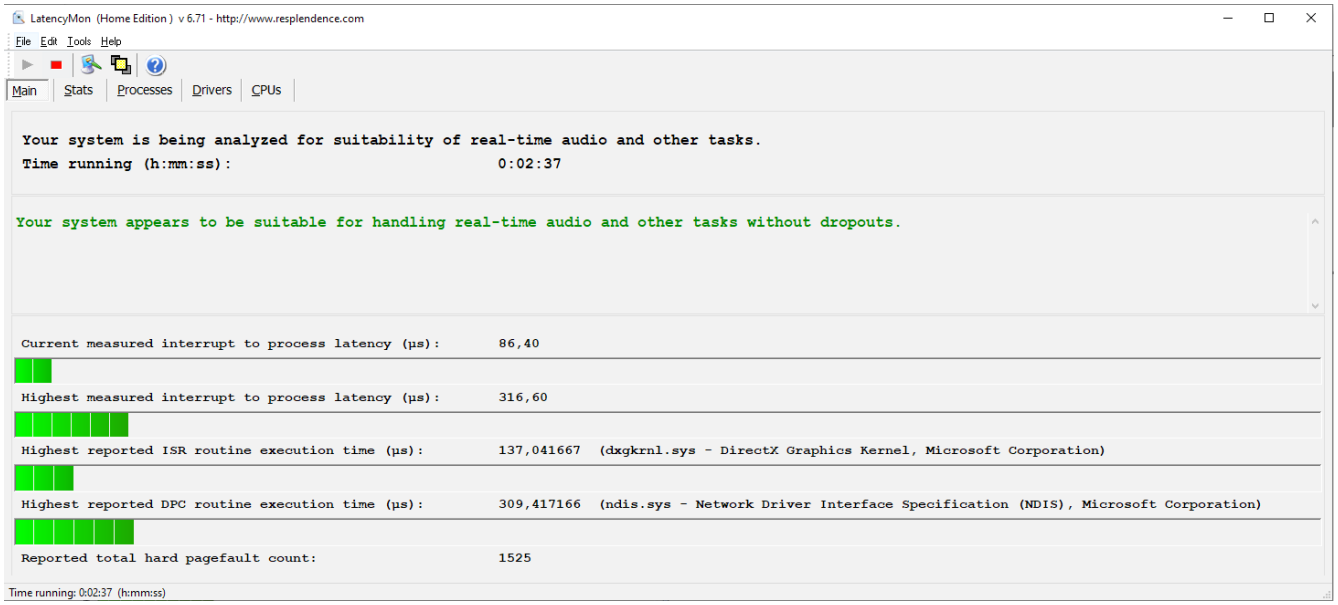
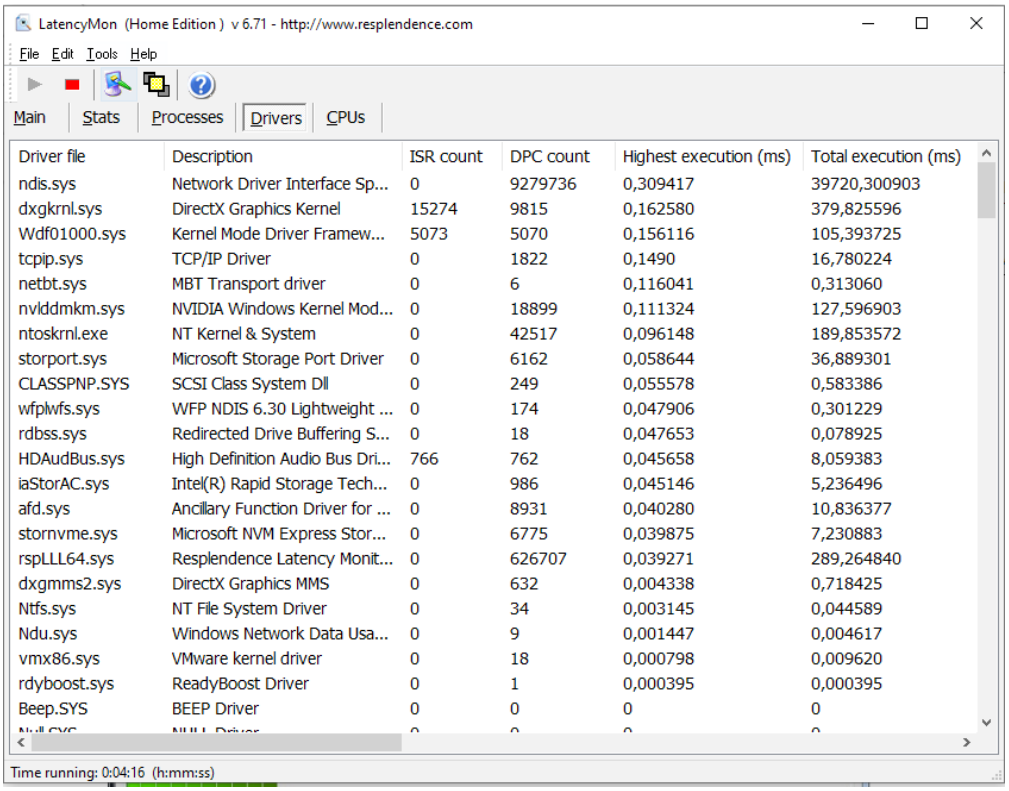


Image 8: LatencyMon



Driver file	Description	ISR count	DPC count	Highest execution (ms)	Total execution (ms)
ndis.sys	Network Driver Interface Sp...	0	9279736	0,309417	39720,300903
dxgkrnl.sys	DirectX Graphics Kernel	15274	9815	0,162580	379,825596
Wdf01000.sys	Kernel Mode Driver Framew...	5073	5070	0,156116	105,393725
tcpip.sys	TCP/IP Driver	0	1822	0,1490	16,780224
netbt.sys	MBT Transport driver	0	6	0,116041	0,313060
nvlddmkm.sys	NVIDIA Windows Kernel Mod...	0	18899	0,111324	127,596903
ntoskrnl.exe	NT Kernel & System	0	42517	0,096148	189,853572
storport.sys	Microsoft Storage Port Driver	0	6162	0,058644	36,889301
CLASSPNP.SYS	SCSI Class System Dll	0	249	0,055578	0,583386
wfplwfs.sys	WFP NDIS 6.30 Lightweight ...	0	174	0,047906	0,301229
rdbss.sys	Redirected Drive Buffering S...	0	18	0,047653	0,078925
HDAudBus.sys	High Definition Audio Bus Dri...	766	762	0,045658	8,059383
iaStorAC.sys	Intel(R) Rapid Storage Tech...	0	986	0,045146	5,236496
afd.sys	Ancillary Function Driver for ...	0	8931	0,040280	10,836377
stornvme.sys	Microsoft NVM Express Stor...	0	6775	0,039875	7,230883
rspLLL64.sys	Resplendence Latency Monit...	0	626707	0,039271	289,264840
dxgmms2.sys	DirectX Graphics MMS	0	632	0,004338	0,718425
Ntfs.sys	NT File System Driver	0	34	0,003145	0,044589
Ndu.sys	Windows Network Data Usa...	0	9	0,001447	0,004617
vmx86.sys	VMware kernel driver	0	18	0,000798	0,009620
rdyboost.sys	ReadyBoost Driver	0	1	0,000395	0,000395
Beep.SYS	BEEP Driver	0	0	0	0

Image 9: Highest execution time

4. Documentation version history

Version	Date [Year-Month-Day]	Notes
V21-1	2021-04-18	Initial version of document (MP)