

Windows 21H2 Observations and solutions

Environment:

10 PCs ranging from 10th Gen Intel to 12th Gen. Mainstream and HEDT (X299).
Cat6E cabling with 10G switches.
PCs with 16 or 32GB RAM, all 3200Mhz or higher with tight timings.
All running 970 Evo Plus boot drives
Various sizes of spinner drives, all Seagate NAS
GTX 1660 Ti or RTX 20 series GPUs, 1 RTX 3080 Ti
Server running 2012 R2* with 144TB storage, MySQL, Cold fusion, IIS, several Intranet websites.

Test-PC

Intel 10900X @ 4.3GHz
32GB 3733Mhz CL16 DDR4 RAM
RTX 2070 Super GPU
ASUS XG-C100C 10G NIC
850W Corsair PSU
970 Evo Plus 2TB SSD for boot, 2 additional 970 Evo plus drives
8TB Seagate NAS spinner
Corsair Commander Pro fan hub
ASRock X299 Power Gaming AC motherboard
Define 7 XL case with 10Gbps USB-C front
Pioneer Bluray writer
32" IPS 1440p monitor

Server 2012 R2;

Server 2016 will not install with consumer GPUs.
Sever 2019 has major performance issues with network discovery, file copies, general stability and IIS. So we had to go back to S2012 R2.
Some of the observations for 21H2 may be relevant to S2019 – Haven't tested yet.

Additional consideration: c-states and power plans

Due to excessive energy rate increases running the PCs on performance power plans is not sustainable.

The issues:

After installing 21H2 LTSC 19044.2132 on a test PC several undesirable observations were made;

- Network discovery took 12 seconds. (ping timed out until the Internet “came up”).
- Detection of mapped drives took an extra 4 seconds and drives always showed in a disconnected state
- The Network connection, the all but useless globe icon would not change the connected status icon and persistently stated no Internet access even though Internet access was available.
- Windows reported the wrong available disk space, short by 20GB
- File copies were slow and almost stopped when sending or retrieving files from the server
- Windows was generally less responsive than 1809 in explorer activities and opening, saving and closing programs. The overall experience just felt slower
- The number of services required to perform the same activities and access the same features and functions as 1809 was greater. Microsoft linked several services to multiple features so that disabling a service would instead of affecting 1 function would affect half a dozen hindering hardening and tuning goals.
- Spoolsv.exe sends spanning tree queries to the first 40 IP addresses in the subnet every 60 seconds.
- nVidia telemetry was significantly more troublesome to mitigate
- Websites would load about 90% then stall for a few seconds, at times giving the appearance of the site being compromised.

Solutions

NCSI not detecting internet.

We have a script that installs and configures applications used here.

We disable IPv6. The script disables IPv6 on each NIC via a Powershell command. The script failed. If IPv6 is enabled on the NIC, despite it being blocked by the firewall, policies, and various other strategies Windows 10 21H2 will attempt to use IPv6 to determine if Internet connectivity is enabled. If NCSI cannot perform an IPv6 connect successfully it will report the Internet as being unavailable despite the fact that an IPv4 connection test succeeds.

Removing the Tick from the NIC properties results in the connection being detected successfully relying only on IPv4.

Windows reports wrong available space

This issue is not apparent in 19044.2006. It appeared somewhere between 2006 and 2132.

This issue is related to the hiberfil.sys hibernation file. The PC has 32GB of RAM. The hiberfil.sys is 12GB. Windows attributes 32GB to the file even though looking at the properties it shows 12GB. Turning off hibernation and when the hiberfil.sys is subsequently deleted Windows reports free space correctly.

Slow file copies

Windows SMB is tuned for slower, older systems. There are probably very few valid reasons people can't tweak these values.

Changing the LANMANWorkstation registry values increased file copy performance, but still not as good as W10 1809. A file copy on Windows 1809 over a 10G network from a 970 drive to a 970 drive would average around 1.00GB/s. On 21H2 the best we've been able to achieve thus far is 700MB/s average.

The settings changed are;

HKLM\System\CurrentControlSet\Services\LanmanWorkstation\Parameters.

DirectoryCacheLifetime is the lifetime of the shared folder metadata cache (10 seconds by default). Reduced to 5.

FileNotFoundCacheLifetime – “File not found” response cache (5 seconds);

FileInfoCacheLifetime – the time of keeping the cache with the file info (10 seconds). Reduced to 5 seconds

DirectoryCacheEntriesMax - Maximum directory entries that can be cached (16). Increased to 512

FileInfoCacheEntriesMax - This value is used to determine the amount of file metadata that can be cached by the client (64). Increased to 1024.

DisableBandwidthThrottling - Setting this registry value to 1 disables this throttling, enabling higher file transfer throughput over high-latency network connections. (0). Disabled – set to 1.

Additionally, the send and transmit buffers on server and client NICs were doubled (256-512 and 2048 – 4096).

Additionally, global flow control was enabled on the switches. The switches were also updated to the latest firmware. This doesn't appear to have any impact, but the firmware was quite old.

Additional tuning is being investigated as performance is still not up to par with 1809.

Websites appeared to stall

Added registry tweak IRPStackSize and set to 0x32. Microsoft states that values from 33-38 will cause problems. The maximum is 0x50.

This didn't fix all sites. Some banking sites still appear to lag for 2-3 seconds, but for the most part the surfing experience appears close to on par with 1809.

TCP/IP stacks were reset on the test PC and DNS cache flushed (even though the Windows install was a clean install).

Service configuration

21H2 cannot be hardened and tuned as extensively as 1809. Some services just can't be disabled any longer. For example, on 1809 screen clip works without the clipboard user service. AppxSvc on 1809 results in 100's of MBs of .vtx and .tmp files being created in %windir%\Temp, however disabling the service breaks access to many Powershell cmdlets. That was something we lived with given that Microsoft never fixed the creation of the event and temp files on 1809. It appears to be fixed on 21H2, which is lucky because disabling that service on 21H2 now also breaks settings > System > about.

Several services are now required to be enabled on 21H2 that could be disabled on 1809 without affecting functionality. Overall 6 additional processes are now active.

Spoolsv.exe flooding network every 60 seconds

No solution found as yet.

nVidia Telemetry

To mitigate the nefarious activities of nVidia and their obsessive desire to collect telemetry and scan peoples drives driver files need to be deleted. Updating the driver's results in the files being reinstalled.

Several tasks are disabled, many components blocked in the firewall, and nvcontainer, which is installed even when not selected for installation, is now located in the driverstore folder. The folder name is different for each installation requiring the use of some batch scripts to block the telemetry. The file **nvtelemetry64.dll** needs to be deleted to reduce telemetry. Its location changes for each installation.

Slow network discovery and mapped drive detection.

This appears not to be the fault of Windows.

The NIC required a firmware update from 3.1.84 to 3.1.8.8. Without the firmware update the issues could not be resolved.

V3.x of the Aquantia drivers do not support Windows versions prior to 20H2.

The last version of the drivers supported for 1809 is 2.1.21.

The firmware update utility (atlflash.exe), does not support v3 of the drivers.

To get the firmware updated the v3 drivers needed to be uninstalled/reboot and replaced with 2.2.30, which supports 20H2 and upwards. Marvell's release notes are lacking in clarity about what supports what.

Prior to any updates here Powershell reported that the NIC was up as soon as the OS started. Yet, ping requests timed out for 6 seconds.

After updating to 2.2.30 but before updating the firmware to 3.1.8.8 Windows event log showed the NIC connection being lost at start up and then reconnecting 6 seconds later. Given the time to start various commands this all seems to coincide with the 12 second observation.

After updating the firmware to 3.1.8.8 network discovery was almost instant, NCSI showed a connection after 3 seconds and mapped drives were showing as connected almost instantly.

Then after installing v3 of the drives the 12 second discovery issue resurfaced. We will leave the drivers at 2.2.30 for now. I am not saying the v3 drivers are the cause, but the combination of the system configuration and hardware used in this environment results in the problems persisting on the v3 drivers.

Wireshark offered no insights to this issue, but did lead to the discovery of the spoolsv and nvidia telemetry issues.

Energy efficient (green) Ethernet was enabled on all NICs.

Overall responsiveness

Windows 21H2 is not as responsive as 1809. It just isn't. Perhaps additional tuning will yield higher performance. 21H2 is disappointing compared to 1809, but it's not unusable.

With the tweaks identified so far it is better but I doubt it will ever be as responsive as 1809.

Windows 21H2 has a larger resource requirement than 1809, despite the fact that no inbox applications are installed and several system components have been removed or disabled (eg indexing).

For the most part the systems here are fairly high end. I feel for the people on lower end systems. Microsoft seem to have eroded performance over each feature release. Kind of like the frog in the pot scenario where the loss of performance occurred gradually such that most people didn't notice because of the "must update as soon as a new release is available" mentality. Because we jumped 6 releases the performance degradation was glaringly obvious.

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