



[Release Date]

Nov 13, 2020

[Applicable Hardware]

- N16910SAS
- N12910SAS
- N12910
- N8910
- N4910U PRO-S/R
- N4910U-S/R
- N4820U-S/R
- N5810PRO
- N5810
- N4810
- N2810PRO
- N2810PLUS
- N2810(v2)
- N2810(v1)
- N4350
- N2350

[Software Upgrade/Downgrade Note]

1. We recommend backup the RAID data before firmware upgrade. There is potential risk of data loss when upgrade the NAS firmware and Thecus is not responsible for any data loss and recovery.
2. Since new version firmware installed, the new software doesn't allow users to downgrade to any previous version firmware.
3. System Configuration Download/Upload does not support different software version.
4. Reminder: After upgrade to latest firmware, download configuration and save separately.
5. OS7 firmware upgrade guide
http://www.thecus.com/Downloads/OS7_FWUPG_V1.0.pdf
6. Please read the release notes carefully before apply this firmware upgrade.
7. Please reboot your NAS manually after the update finishes.

[New Features/Changes]

- 1 NAS OS 7 Hardware Related
 - 1.1 Fix N8910 Internationalization of System Info SYS_Temperature5.
 - 1.2 Fix N4910U-R / N4820U-R / N4910U Pro-R "FSP Redundant Power" False Alarm Event Issue.
 - 1.3 Fix Thecus Tehuti C10GTR 10 GbE Support Regression.
 - 1.4 Fix Intel IXGBE Regression.



- 1.5 Introduce UPS Support (New Feature)
 - APC SMART SMT750J
 - APC SMART SMT1500J
 - Omron BL50T
 - Omron BL75T
 - Omron BL1000T
- 2 SAMBA Service Related / Advanced Options
 - 2.1 Remove Web UI SAMBA Protocol Min=3 option to avoid confusion.
 - 2.2 Enhance SAMBA Allocation Roundup Size Web UI options and make it default as "Disabled" in order to reduce small-file-size fragmentation confusion.
 - 2.3 Introduce SAMBA Strict Allocate Web UI options and make it default as "Disabled".
 - 2.4 Fix issues of "Rename Share Folder" glitch.
 - 2.5 Introduce an upstream SAMBA patch which fix Windows Volume Label 32-bytes issue; this issue may happen for some "Half-Width Japanese-KANA (they are 3 bytes UTF8)".
 - 2.6 Force BTRFS Snapshot share as READ ONLY. (New Feature).
- 3 Event Log & Access Log
- 4 Enhance SAMBA Access Log in order to reduce duplicated Logs.
 - 4.1 Fix SAMBA Access Log glitch that may lead to stop logging & rotating to export CSV under specific & extensive workload pattern.
 - 4.2 Fix SAMBA Access Log:
 - (1) Fix incomplete folder path displayed.
 - (2) Fix path displayed with unnecessary "./" .
 - 4.3 Fix Access Log / Online User Web UI display for AD users (Local User is normal, Zero-day).
 - 4.4 Fix iSCSI Access Log: Incomplete Message displayed.
 - 4.5 Introduce System Event Log Download Button.
 - 4.6 Enhance System Event Log: CSV first row title.
 - 4.7 Enhance System Event Log: enhance event log database auto-rotate.
 - 4.8 Remove some debug log stored along with System Event Log which may consume not few storage space after thousands loop of NAS reboot.
- 5 SSDP/UPnP
 - 5.1 Enhance SSDP compatibility with Windows 10.
 - 5.2 Introduce SSDP Web UI page with various device type {Storage, Computer, Other} so that user could configure it by their own (New Feature).
- 6 Networking Setup
 - 6.1 Fix a misleading Web UI message when Network DHCP client could not obtain any IP Address.
 - 6.2 Enhance some Static IP setup issue that result from using Setup-Wizard-set-DHCP/Static..

- 6.3 Enhance VLAN_ID range check Web UI.
- 6.4 Fix QoS Web UI speed max value could be lower than min/guarantee value.
- 7 Date/Time:
 - 7.1 NTP Enhance NTP Sync to introduce more Sync-Timing: Daily (07:47), Apply button & Network Cable re-attached.
- 8 Web Browser
 - 8.1 Enhance conf.bin / ACL.bin download compatibility about its MIME type in HTTP header (application/octet-stream).
- 9 WebDAV Service
 - 9.1 Fix WebDAV service so that it could display C-J-K UTF8 correctly.
 - 9.2 Enhance WebDAV service reload when Adding/Deleting Share Folder so that.
- 10 Amazon AWS S3
 - 10.1 Introduce AWS S3 SigV4 Support (e.g. Some EU & HK Amazon AWS only support V4, New Feature).
 - 10.2 Enhance USB External Disk (e.g. hotswap / multiple HDD) within Amazon AWS S3 Backup Task.
- 11 BTRFS File System
 - 11.1 Introduce BTRFS filesystem Check, Repair, Balance, Defrag & Scrub for check/maintenance feature(New Feature).
 - 11.2 Fix a Snapshot-Rotate boundary issue which may rotate an extra one snapshot under very extensive and fast Web UI Take-Snapshot-Clicking-Interval (e.g. per 0.01 ~ 0.1 seconds) ..
- 12 XFS File System
 - 12.1 Fix XFS_QUOTA feature in N2350/N4350 ARM NAS.
- 13 SSL/TLS Certificate
 - 13.1 Renew expired Self-Signed SSL/TLS Certificate for HTTPS & FTPS.
 - 13.2 Introduce Self-Signed SSL/TSL Certificate "Generate Button" on Web UI so that user could renew their Self-Signed Certificate (New Feature).
 - 13.3 Enhance Reset Self-Signed SSL/TSL as default flow handling.
 - 13.4 Introduce Let's Encrypt AMCE v2 Protocol (previous was AMCE v1, New Feature).
- 14 Enhance/Fix many USB External Disk zero-day designs/glitches
 - 14.1 Enhance USB External Disk compatibility for:
 - RAIDON (IC vendor: JMicron)
 - Logitech (Not Mouse-Keyboard-Logitech, IC vendor: Logitech)
 - 14.2 Enhance USB HDD Backup Task "Hotswap Exception Handling" when Single or Multiple USB HDD deployed.
 - 14.3 Enhance USB HDD Backup Task "NAS Reboot Exception Handling" when Single or Multiple USB HDD deployed.
 - 14.4 Enhance USB External Disk initialization to avoid some rarely seen race-condition between USB-DOM.



- 14.5 Fix USB-Copy Web UI:
 - Fix Misleading Event Log.
 - Fix USB-Copy Web-UI-Disabled would also disable USB HDD Provision, however it shall not do so.
- 15 System Failover enhancement
 - 15.1 Enhance System Failover Virtual IP dispatching.
 - 15.2 Enhance System Failover Event Log content and sending triggered timing.
 - 15.3 Enhance System Failover DataSync: Better UserData & Metadata sync timing (New Feature).
 - 15.4 Enhance System Failover: Exception handling around RAID faulty or RAID degraded. (New Feature).
 - 15.5 Enhance System Failover: When System Failover mode is running try to disable ACPI Power Button.
- 16 HDD Slot related
 - 16.1 Introduce new version of Seagate IHM which supports more new Seagate Ironwolf HDD/SSD models (New Feature):
 - N2350 N4350 (ARM) IHM v1.3.5.
 - Others (X86) IHM v1.3.9.
 - 16.2 Enhance Seagate IHM Web UI Schedule setup.
 - 16.3 Fix Seagate IHM Weekly-Schedule malfunction (zero-day, Daily-Schedule was OK).
 - 16.4 Enhance an exception handling of conducting restarting Web Service when there is HDD-SMART self-test running.
- 17 NAS OS Firmware Update
 - 17.1 Introduce Firmware "Schedule Update" User-configurable Web UI (New Feature).
 - 17.2 Remove unnecessary Auto-Firmware Check/Update on each boot to increase boot speed.
 - 17.3 Remove unnecessary "LCM type not matched" misleading Web UI debug message when firmware update.
- 18 NAS OS Boot Flow Enhancement
 - 18.1 Fix a zero-day NAS boot issue that may make NAS boot stalled when conducting 300+ NAS reboot iterations...
- 19 AD Service
 - 19.1 Enhance multiple exceptions handling when Local Username is identical to AD Username, so that NAS access will still be functional around this scenario for both users.
 - 19.2 Enhance AD Service compatibility when joining various versions of AD Servers.
 - 19.3 Fix Conf.bin restore might lead to.
- 20 LDAP Service
 - 20.1 Refactor LDAP service to fix various connection glitches.

- 21 User/Group Create & Edit
 - 21.1 Fix an user creation Web UI issue that using "0~9" as first character shall be allowed.
 - 21.2 Fix an user creation WEB UI issue that "e-Mail/Quota" fields shall be allowed to be empty/optional fields.
 - 21.3 Fix an user creation WEB UI issue that TAB char (0x09) could be used as username and might lead to abnormal symptoms when doing user-deletion; Web UI shall block and disallow TAB char (0x09) to be input.
 - 21.4 Fix some Web UI redundancy "Select All Users" checkbox.
 - 21.5 Introduce NFS service keyword as user-creation reserved word.
- 22 ACL Setup
 - 22.1 Introduce Background ACL setup mechanism to increase Web UI usability. (New Feature).
 - 22.2 Introduce Queued ACL setup mechanism so that reboot ACL setup could be resumed after next boot (New Feature).
- 23 NAS APP Center
 - 23.1 Fix typos on APP Center module information WEB UI page (Release Date vs. Module Size).
- 24 OrbWeb 5.1.6
 - 24.1 Fix OrbWeb SSL/TLS SSL-Pinning design to avoid unexpected certificate renew/expiry issue. (Cloud & NAS OrbWeb Service).
 - 24.2 Fix Orbweb-iOS APP compatibility issues of previewing/opening Office File / PDF file. (Apple Store APP + NAS OrbWeb Service) in NAS.
 - 24.3 Fix Orbweb-Android compatibility issues of previewing/opening Office File / PDF file. (Google Play APP + NAS OrbWeb Service).
- 25 ClamAV 1.00.30
 - 25.1 Fix ClamAV: Keep current version Task-Schedule setup after upgrading ClamAV.
 - 25.2 Fix ClamAV: Fix Quarantined-Pool exception handling for two or more identical-filename virus file.
 - 25.3 Enhance ClamAV: Enhance Quarantined Web UI tab to make Restore mechanism by limiting 100 files at max each time. This will prevent Web UI from haning when quarantined files exceed 2000 ~ 3000+.
 - 25.4 Fix ClamAV: Fix the scenario that it is unable to conduct virus-scan for Subfolder of Share Folder event the subfolder is correctly assigned when setup.
 - 25.5 Fix ClamAV: Fix Editing Task Web UI pop Window which will not load current task's assigned scanning folder; Web UI shall try to load current assigned folder.
 - 25.6 Enhance ClamAV: Support Multiple RAID.
 - 25.7 Enhance ClamAV: Enhance Web UI foolproof for Weekly(weekday) schedule scanning task.
 - 25.8 Introduce ClamAV Allow BTRFS Snapshot folder provisioned around Folder



Selection. (New Feature).

[Limitations]

1. There is a capacity limit for different file systems, you may have select suitable file system when creating a RAID volume.

File System	Capacity Limit
EXT3	16 TB
EXT4	OS5 & OS7 > 16 TB OS6 16TB (OS6 model N2310 / N4310 / N2520 / N2560 / N4520 / N4560)
XFS	> 16 TB
BTRFS	64TB

2. N12000/N16000 support up to five RAID volumes. For HA RAID volume, just one is allowed.
3. RAID volume encryption (Optional doesn't all NAS support this function): AES 256 bits
 - a. NAS admin has to insert an USB flash disk to save encryption key file on it.
 - b. To encrypt an existing RAID is not possible. Please do it while creating a new RAID.
 - c. NAS performance will drop significantly while using encrypted RAID.
 - d. The USB flash disk (key file) should exist whenever the NAS reboots/boots up and doing RAID configuring.
 - e. Encrypted RAID doesn't support on-line Expansion, just off-line Expansion is doable.
 - f. Encrypted RAID support file system check since V2.03.05.
 - g. If the USB flash disk (key file) lost or key file modified, the RAID data will be INACCESSIBLE FOREVER and no way to recover it.**
4. Once the RAID created, there will be about 5% data used by EXT3/EXT4 file system. The capacity stores the journal and inodes; which are necessary to keep RAID data safer.
5. RAID rebuild: in case one HDD failed in RAID 1, 5, 6, 10, 50, and 60 configurations, please hot unplug failed one and hot plug in new one; then RAID rebuilding will automatically start. If the replacement is done after NAS shutdown, administrator has to manually add spare in Admin Web GUI to start the RAID rebuilding. (Optional doesn't all NAS support this function)
6. iSCSI Target: the maximum numbers of iSCSI target volumes depend on the physical memory size (25Target for 2GB) and also the CPU power of each Thecus NAS. No matter one RAID or multiple RAID volumes exist in a NAS, the maximum limit will be the same. (Optional doesn't all NAS support this function)



Max. No of iSCSI Targets					
Model Name	Targes	Model Name	Targes	Model Name	Targes
N2350	25	N4910UPRO	100	N8900	50
N2800	25	N5550	25	N8900PRO	100
N2810	25	N5810	50	N8910	50
N2810PLUS	50	N5810PRO	50	N10850	50
N2810PRO	50	N6850	50	N12000V	25
N4310	25	N7510	25	N12000	25
N4350	25	N7700PROv2	50	N12000PRO	100
N4510UPRO-R	25	N7710	50	N128510L/RU	50
N4510UPRO-S	25	N7710-G	50	N12850	200
N4510U-R	25	N7770	50	N12910	50
N4510U-S	25	N7770-10G	50	N12910SAS	200
N4520	25	N8800PROv2	50	N16000V	25
N4560	25	N8810U	50	N16000	50
N4800	25	N8810U-G	50	N16000PRO	100
N4800Eco	25	N8850	50	N16850	200
N4810	50	N8880U	50	N16910SAS	200
N4820	50	N8880U-10G	50		
N4910	50	N8900V	25		

- a. For NAS admin without cluster based OS/applications to manage multiple initiators connected to the same iSCSI volume, we highly recommend every iSCSI volume is connected by single iSCSI initiator. However, in case NAS admin has cluster based OS/applications, up to 8 initiators is possible.
- b. **Uncontrolled concurrent access to the same iSCSI target volume may result data corruption or un-predicable results.**
- c. **iSCSI target may be disconnected from initiator if other RAID settings on the same target NAS being altered.**
- d. Verified iSCSI initiators:
 - Windows: Microsoft initiator v2.0.4
 - StarPort initiator 3.5.2
 - MAC OS: globalSAN iSCSI initiator version 4.1 (279)
 - Linux: open-iscsi 2.0-865
- e. There is a system advanced option to choose 4K or 512 bytes block size for iSCSI volume, and the default is 4K bytes. 512 bytes block size may encounter **2TB volume capacity limitation** on some initiators running 32bit OS. Nevertheless, 4K block size could slice the iSCSI volume over 2TB, but, there might be compatibility issue. For VMware, we recommend using 512 bytes block size.



7. iSCSI Expansion: there are some limitations applied. (Optional doesn't all NAS support this function)

- a. The maximum iSCSI volume would be 16TB (EXT3/EXT4), and the minimum expansion size is 1GB.
- b. There is no iSCSI volume size limitation with XFS RAID volume.
- c. iSCSI service will be stopped till the expansion completes.
- d. iSCSI expansion just handles the volume size. The partition(s) inside the volume won't be adjusted.
- e. iSCSI expansion just support local RAID, does not support add-on RAID by iSCSI stackable.

8. Stackable function: Support of stackable function across Thecus N8900/N12000/N16000 NASes. (Optional doesn't all NAS support this function)

- a. **The concurrent connection on target iSCSI volume of Thecus NAS will be limited to 1 if the initiator comes from other Thecus NASes.**
- b. The internal file system format of stackable target is EXT4, and the maximum capacity is 16 TB.

9. iSCSI Thin-Provisioning (Optional doesn't all NAS support this function)

- a. The Thin-Provision capacity has to be determined first.
- b. Up to five iSCSI Thin-Provision target can be created on the Thin-Provision capacity.
- c. The total virtual size of iSCSI Thin-Provision targets in a RAID:

Thin-Provisioning	
File System	Capacity Limit
EXT3	16 TB
EXT4	16 TB
XFS	64 TB

- d. The virtual size should be larger than the real capacity and less than 16 TB.
- e. When the total used capacity reaches 90% of real Thin-Provision capacity, NAS will send E-mail notifications out every 10 minutes until the capacity expanded. Also, system log will show capacity warning in admin web interface. The host server won't receive any notification before the iSCSI Thin-Provision target full.

10. iSCSI LUN ID in admin web interface

- a. The iSCSI LUN ID is between 0 and 254.
- b. Duplicate ID is not allowed excepting ID 0.
- c. Mac computer just recognized the first iSCSI volume.

11. To enable ADS support for Small Business Server 2003, we recommend do not install ISA server. Otherwise, N8900/N12000/N16000 series may fail to join the AD. (Optional doesn't all NAS support this function)

12. User Quota: user quota has been added since firmware version 1.00.01. (Optional

doesn't all NAS support this function)

- a. Value "0" means "User Quota Disabled"
 - b. A quota setting will be applied across multiple RAID volumes. It means, if you set 10GB quota for user John, he will be having 10GB on every RAID. For a NAS with three RAID volumes, John will have 30GB quota in total.
 - c. "User Quota" is implemented in EXT3, EXT4, and XFS RAID.
 - d. When using "User Quota" in a Master and XFS RAID, disabling quota might not take effective until the NAS reboots.
 - e. When "User Quota" full, the user will have 10% tolerance within 7 days; thus he can do some data moving and deleting temporarily.
 - f. System log and Email Notification will remind the users whose "User Quota" reached the limit at 24:00 everyday.
 - g. The status of "User Quota" across multiple RAID will be displayed on [local Account > User Quota] page.
 - h. It may take long time to enable the "User Quota" the 1st time.
 - i. "User Quota" is calculated by UID in the NAS.
 - j. When users put data into a public folder, the used capacity will not be added to quota calculation. Also, data copied through WebDisk will not be calculated either.
13. Some attributes may not be included with files and folders when copying to a USB drive with FAT32 format.
 14. If a USB hard drive is connected to NAS formatted as FAT16/32, the following restrictions apply:
 - Copy file with size greater than or equal to 2 GB to the NAS can not be performed due to FAT file system limitation.
 - Files created by Mac OS X like DS_Store can not be copied to the FAT16/32 USB drive.
 15. NFS share is limited to public folders. In case you enable an NFS share on non-public (ACL) folder, the NFS client could successfully mount it but won't be able to read/write files. Currently we implemented NFS V3 & V4.
 16. Reset button: In case the admin password or HTTP port lost, use Reset button to load factory default please. In that case, user accounts and groups will be erased, but RAID data won't be affected.
 17. HTTP and HTTPS ports should follow the rules given below.
 - Larger than 1024
 - Could not use 3169
 - Port 80 (HTTP) and 443 (HTTPS) are allowed
 18. Mac OS Limitations
 - a. When using Mac OS X (post 10.2 with AppleTalk) without SMB, do not use Japanese characters in folder or file names to prevent errors accessing the data



- over a network.
 - b. Mac OS 9 and Mac OS X can not see files on the network with names made up of over 32 characters.
 - c. Mac OS 8.x/9.x only supports local character encoding on file names (without Unicode support).
 - d. Occasionally, when a file is accessed by a Mac OS computer within a shared folder, an information file will be created in the same folder. If the file is then deleted by a Windows OS computer, the original file may no longer be accessible by Mac OS computers.
 - e. The following characters are not allowed to be included in the name used for a file or shared folder when using Mac OS (AppleTalk) devices.
? [] / \ = + < > ; : " , | *
 - f. Writing a file larger than 2 GB is not allowed by MAC OS-9.
19. NAS needs about 5 minutes to broadcast/register itself to other Mac OS through AppleTalk after booting up and service enabled.
 20. File size has to be less than 1GB to be uploaded to Thecus NAS from web browsers. FTP software has no such limitation.
 21. File names and folder names should not contain more than 250 characters in their entire directory path to prevent errors occur in the file copy operations.
 22. The following characters are not allowed to be included in the name used for files or folders on Thecus NAS.
/ \ : * ? " < > | [] = + ; ,
 23. File and directory attributes can not be modified by an FTP client when the FTP server of Thecus NAS is enabled.
 24. Anonymous FTP user could upload files into public folders but could not delete them.
 25. FTP client can list up to 2000 files in a single folder. (Optional doesn't all NAS support this function)
 26. Thecus NAS could work as a TFTP server since firmware 1.00.01. (Optional doesn't all NAS support this function)
 - a. TFTP service folder should be public and without any ACL rule.
 - b. Double byte file name (Chinese, Japanese, Korean, etc) may have problems in case the TFTP client doesn't support UTF8. Anyway we recommend using single byte characters as the file name.
 - c. TFTP service runs at port 69 by default. It is changeable from admin web interface. Please notify possible port conflicts, if any.
 - d. The biggest file size is 4GB while transferring thru TFTP.
 27. File system check page is in English, no multilingual.
 28. Disk Power Management: some HDD may not respond to "idle spin down" command, and they won't get into stand by mode even if the specified idle time had been reached. In addition, N8900/N12000/N16000 do not support SAS HDD spin down at current



moment.

- 29. Disk S.M.A.R.T. Test: N8900/N12000/N16000 do not support Disk S.M.A.R.T. Test on SAS HDD.
- 30. UPnP function only works on WAN interface.
- 31. The create date is the same with modify date for every file copied into the NAS.
- 32. Single file size upper limitation: 2TB for EXT3 file system.
- 33. Thecus NAS uses the following service ports by default.

Services	Default TCP port
FTP	20/21
SSH	22
DHCP	67/68
HTTP	80
Nfsd	111/2049
Samba	139/445
SNMP	161/162
HTTPS	443
Printer Server	631
Rsync	873
Upnp	1900
iSCSI	3260
iTunes	3689
WebDAV	9800/9802

- 37. BTRFS snapshot keep difference snapshot copy depend on NAS'default DRAM size.

- 2GB -> 64
- 4GB -> 128
- 8GB-> 256
- 16GB -> 512

Example

- N2810 2GB DRAM -> 64
- N2810 PLUS/PRO 4GB DRAM -> 128
- N4810 4GB DRAM -> 128
- N5550 2GB DRAM -> 64
- N5810(PRO) 4GB DRAM -> 128
- N8900PRO 8GB DRAM ->256
- N16850 16GB DRAM ->5
- N16910SAS 16GB DRAM ->512



[Known Problems]

1. Using samba protocol in MAC OS will not accept file names with blank characters in tail.
2. IE7 / IE8 & above will show certification error alert while user access WEB admin UI via HTTPS.

[Attention]

- 1. During firmware upgrade process, it is imperative that user DO NOT turn off the power to Thecus NAS or closes the browser window. This will lead to catastrophic result. If your browser is set to cache the screen, after firmware upgrade has started for 5 minutes, please press CTRL-F5 to reload browser screen from server instead of from browser cache.**
- 2. Thecus strongly recommends NAS admin to backup the RAID data before doing the RAID Migration and Expansion. There is potential risk of permanent data loss when doing Migration/Expansion with disk drives having physical problems, and Thecus is not responsible for any data loss and recovery expense.**
3. Enforce to enable the system beeper notification after firmware updated.
4. When installing the Windows Wizard program of Thecus NAS on Windows XP Professional SP1 or SP2, Windows Vista, and newer OS, the firewall UDP ports 10000 and 10001 need to be opened.
5. Reset to factory default function automatically resets all the system settings including network settings, administrator password, user groups, language setting, system notification setting, and time zone setting.
6. Users should obey the international RF regulatory rules as they set up the wireless RF channel on the NAS. The RF operating channels for different regions have been specified as following. Thecus has no responsibility for users attempting to violate the international RF regulation.
 - 11 for N. America
 - 14 Japan
 - 13 Europe (ETSI)
 - 2 Spain
 - 4 France

--EOF--