



**[Release Date]**

Nov 05, 2019

**[Applicable Hardware]**

N2350

N4350

N2820 N4820 N2810 N2810PLUS N2810PRO N4810 N5810 N5810PRO N4910

N7910 N8910 N12910 N12910SAS N16910SAS

**[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](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. SAMBA
  - A. Introduce SAMBA Recycle bin "Schedule Clean Up" time setup
2. BTRFS
  - A. Enhance BTRFS "Snapshot & Quota-Rescan" Mutex
  - B. Enhance Kernel "BTRFS Quota" handling
  - C. Introduce BTRFS 3-Options Web UI for N5810pro SKU to enhance performance and robustness
  - D. Introduce Snapshot Event/Syslog
3. External UPS & MiniUPS
  - A. Enhance MiniUPS "Clear Last Event" for N5810pro SKU
  - B. Hide "MiniUPS Clear Last Event" button on Non-N5810pro SKU
4. XFS
  - A. Enhance handling for XFS share folder name containing Space " " or "Braces "(")



may lead Web UI stall.

5. Scale Out
  - A. Enhance UI to prevent prevent mounting same Scale Out Volume for two Share Folder.
  - B. Enhance "Scale Out" Pop out windows UI/Art-Beautification
  - C. Enhance "Scale Out" Add/Edit/Operation UI/Art-Beautification for MacOS
  
6. Share folder ACL & Subfolder ACL
  - A. Enhance exception handling for subfolder contains Space " " or "Braces ()" can't be applied for ACL setup.
  - B. Enhance Various Share Folder & Subfolder ACL handing from "Folder" viewpoint
  - C. Enhance Various Share Folder & Subfolder ACL handing from "Local Account" viewpoint
  
7. User & Group
  - A. Enhance CSV batch creation local account
  - B. Enhance Group Name first character be started with dash "-" e.g. "-group", it won't be listed out in UI.
  
8. RAID / HDD / USB
  - A. Enhance USB storage information in "External Device" and "File Center" so that users could find their devices easier.
  - B. Introduce new version of Seagate IHM tool which is a mandatory to be compatible with new Seagate Cloud Warranty Server.
  - C. Introduce new version of Seagate IHM tool which supports new model IronWolf Disk.
  - D. Enhance Web UI RAID migration status sync with actual RAID migration in kernel.
  
9. Network & TCP/IP & NFS
  - A. Kernel Patched/Upgrade to fix CVE-2019-11477, CVE-2019-11478 and CVE-2019-11479
  - B. Enhance Network VLAN Web UI exception handling
  - C. Move NFS delete button from Edit page to Top tab for UI-Friendly.
  
10. File Center & Photo Center
  - A. Enhance "File Center -> Detail -> Delete"
  - B. Enhance "File Center" Empty Folder Download related features
  - C. Enhance "File Center" button UI/Art-Beautification
  - D. Enhance "Photo Center" on mouse hover display effect



11. Other Web UI Enhancement

- A. Remove IE11 from Login/Reboot/Shutdown Hint
- B. Enhance E-Mail address field exception handling for long length
- C. Enhance "UI Theme" exception handling between themes
- D. Enhance "USB Icon" UI/Art-Beautification on RAID page for MacOS
- E. Make QoS item row adjustable, this is just a UI/Art-Beautification.
- F. Enhance UI button "Blue Rectangle Border" UI/Art-Beautification.
- G. Enhance Web UI display sorting of Event/Syslog when two events have same time stamp.

12. Languages

- A. Enhance "French Language", "RAID & Spin down" setup page
- B. Enhance "English Language" "Monitor" pages I/O WRITE statistics
- C. Enhance "English Language", "Scale Out Mount" Information icon
- D. Enhance "Japanese Language", Make some Un-Adjusted GRID/Tables to be Adjustable.
- E. Enhance "All Languages" that wording of "ro/rw" in NFS page translation
- F. Enhance "Germany Language" overall wording/translations.
- G. Enhance "Japanese Language" bottom description of Let's Encrypt page
- H. Enhance "Japanese Language" wording of RAID page "Scale Out Mount"

13. Hardware Platform Specific

- A. [NAS N7910] Enhance N7910 Skylake NAS HDMI and FAN support
- B. [NAS N2820] Enhance N2820 ApolloLake boot robustness
- C. [NAS N2820] Enhance N2820 AC Auto Resume
- D. [NAS N4350/N2350] Adjust ARM NAS boot log flow to enhance Rescue DOM features
- E. Enhance Sandy Bridge legacy NAS Graphics driver compatibility

**[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. RAID Expansion: When changing the RAID 5 configuration from five smaller disks to five bigger disks, you have to change one disk at a time and then rebuild the RAID. Lastly, utilize the newly added capacity from Space Allocation page. (Optional doesn't all NAS support this function)
7. 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)

<b>Max. No of iSCSI Targets</b>					
<b>Model Name</b>	<b>Targes</b>	<b>Model Name</b>	<b>Targes</b>	<b>Model Name</b>	<b>Targes</b>
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



**OS7 FWRN V3.02.06.13**

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.
8. 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.
9. 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.
10. 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 determine the virtual size, the minimum increase is 100GB.
  - f. 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.
11. 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.
12. Active Directory Support behavior : before AD Sync is pressed, search criteria has to be a fully match string to user account. After AD Sync is pressed, search criteria can be only beginning part of the user account. Only 1000 search results will be displayed. (Optional doesn't all NAS support this function)
13. 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)
14. 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 [User and Group Authentication > Quota > Quota Setting] 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.
15. Some attributes may not be included with files and folders when copying to a USB drive with FAT32 format.
16. 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.
17. 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.
18. 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.
19. 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
20. 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.

21. NAS needs about 5 minutes to broadcast/register itself to other Mac OS through AppleTalk after booting up and service enabled.
22. WebDisk : Only UTF-8 file name is supported.
23. File size has to be less than 1GB to be uploaded to Thecus NAS from web browsers. FTP software has no such limitation.
24. 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.
25. The following characters are not allowed to be included in the name used for files or folders on Thecus NAS.  
    / \ : \* ? " < > | [ ] = + ; ,
26. File and directory attributes can not be modified by an FTP client when the FTP server of Thecus NAS is enabled.
27. Anonymous FTP user could upload files into public folders but could not delete them.
28. FTP client can list up to 2000 files in a single folder. (Optional doesn't all NAS support this function)
29. 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.
30. N8900/N12000/N16000 support specific 10 GbE NIC cards. There will be Additional LAN 1, 2, 3, and 4 to configure the network setting in admin web interface. However, the Link Aggregation functions will just work on original two on-board NIC, WAN/LAN1 and LAN2.
31. File system check page is in English, no multilingual.
32. 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.
33. Disk S.M.A.R.T. Test : N8900/N12000/N16000 do not support Disk S.M.A.R.T. Test on





SAS HDD.

- 34. UPnP function only works on WAN interface.
- 35. The create date is the same with modify date for every file copied into the NAS.
- 36. Single file size upper limitation: 2TB for EXT3 file system.
- 37. 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
mail server	995/25
Nsync	2000
Upnp	2689
iSCSI	3260
Mysql	3306
iTunes	3689
DLM2 (amule)	4662
Media	8080
WebDAV	9800/9802
Apache module	10080
DLM2 (bt)	10000~10200
Twonky (UI)	9000/9001

- 38. 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 ->512
- 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